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IBM z/OS Management Facility V2R3

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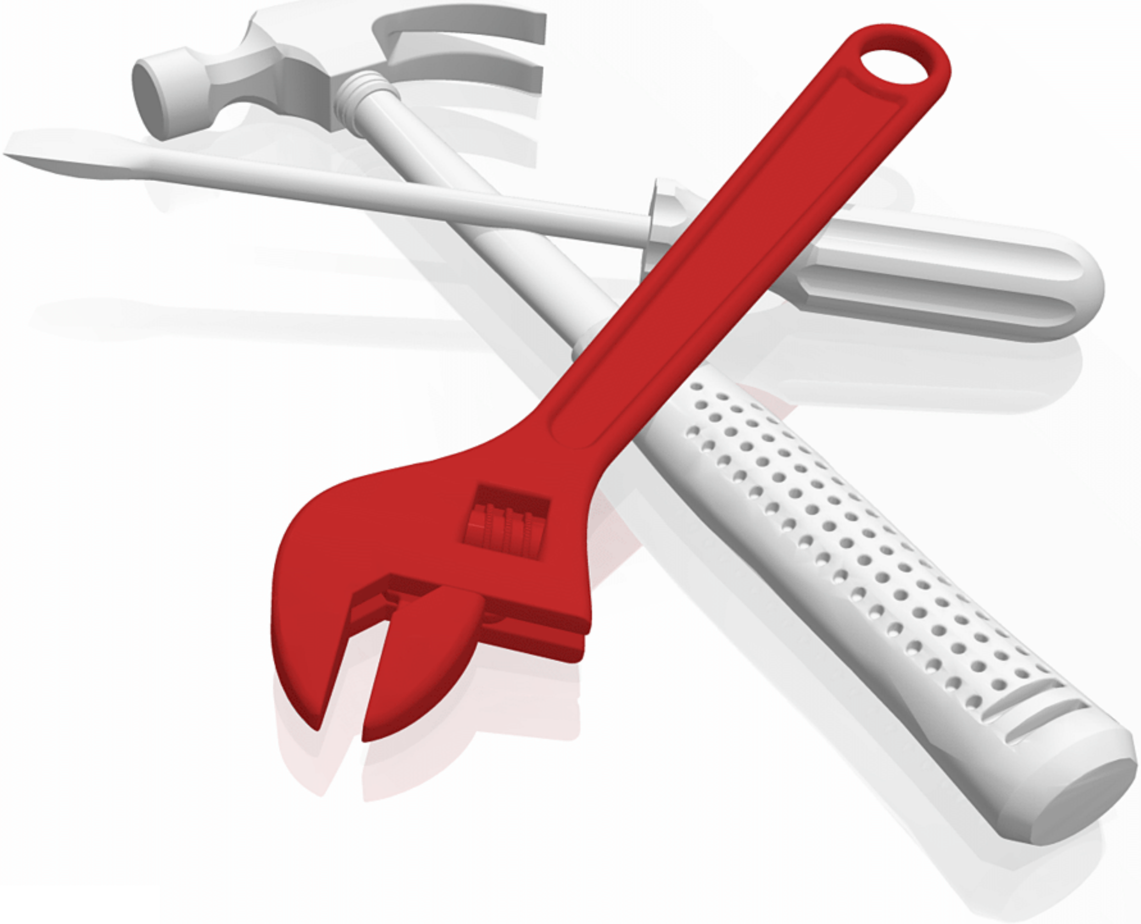

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IBM z/OS Management Facility V2R3

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Note: Before using this information and the product it supports, read the information in “Notices” on page xi.

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Contents

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Preface

This IBM® Redbooks® publication helps you install, configure, and use the IBM z/OS® Management Facility (z/OSMF). z/OSMF is a product for z/OS that simplifies, optimizes, and modernizes the z/OS system programmer experience.

z/OSMF delivers solutions in a task-oriented, web browser-based user interface with integrated user assistance. The goal of z/OSMF is to improve system programmer productivity, and make functions easier to understand and use. This improvement makes system programmers more productive as quickly as possible with the least amount of training. You can automate tasks, reduce the learning curve, and improve productivity through a modern, simplified, and intuitive task-based, browser-based interface.

z/OSMF is aimed at a mixed skills workforce: It is suited to professionals who are new to z/OS and those who are skilled in z/OS. Each professional has their own needs and faces their own challenges. Novice system programmer might need to understand the “big picture” and how procedures are done. Novices also need access to documentation about procedures and tasks, and implement them according to the rules of the enterprise.

Experienced system programmers are familiar with tasks and procedures. Therefore, the goal is to make their work less error-prone and easier. This goal allows them to be more productive and contribute more to their business.

Although z/OS delivered simplification since it was introduced, z/OSMF brings a new dimension and focus to simplification. z/OSMF simplifies and modernizes the user experience and helps make pertinent information readily available and easily accessible.

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Part 1

Introduction

This part introduces the IBM z/OS Management Facility (z/OSMF) V2R3 and provides a brief technical overview.

1

Introduction

The IBM z/OS Management Facility (z/OSMF) is a z/OS component that simplifies, optimizes, and modernizes the z/OS system programmer experience.

z/OSMF delivers solutions in a task-oriented, web browser-based user interface with integrated user assistance. Its focus is to improve system programmer productivity, and make the z/OS functions easier to understand and use. The goal of z/OSMF is *not* to simplify IT in an organization; the goal is to simplify certain tasks for system programmers.

The intention of z/OSMF is to make system programmers productive as quickly as possible with the least amount of training. This task is accomplished by automating tasks and reducing the learning curve through a modern, simplified, and intuitive task-based and browser-based interface.

z/OSMF is aimed at a mixed skills workforce: It is suited to professionals who are new to z/OS and those users who are skilled in z/OS. Each professional has their own needs and faces their own challenges.

Novice system programmer might need to understand the “big picture” and how procedures are done. Novices also need access to documentation about procedures and tasks, and implement them according to the rules of the enterprise.

Experienced system programmers are familiar with tasks and procedures. Therefore, the goal is to make their work less error-prone and easier. This goal allows them to be more productive and contribute more to their business.

Although z/OS delivered simplification since it was introduced, z/OSMF brings a new dimension and focus to simplification. z/OSMF simplifies and modernizes the user experience and helps make pertinent information readily available and easily accessible.

The first release of z/OSMF was z/OSMF V1.11 and was delivered with z/OS V1.11. Since then, a z/OSMF release was made available with every release of z/OS, with some functional enhancements in between releases.

This chapter provides an introduction to z/OSMF and includes the following topics:

- 1.1, “Background and rationale” on page 4
- 1.2, “IBM z/OS Management Facility environment”

1.1 Background and rationale

An IT organization features many domains, including business management, business development, and service management. Each of these domains has its own disciplines and areas in which it works. Simplification is required. Organization and tools are needed, not only in each area, but across all these areas. For z/OS Systems Management simplification, the focus is on the system programmer.

The system programmer is a technical expert who is responsible for ensuring that the infrastructure is available. The system programmers traditionally cover the following areas:

- Installation
- Configuration
- Maintenance
- Disaster recovery
- Enabling new functions
- Problem analysis
- Problem analysis and determination

These areas share the goal of ensuring that the system is available and running correctly.

Currently, no central system management portal for z/OS is available, and the many interfaces that are available are unfamiliar to users who are new to z/OS. In many cases, many manual tasks are available that require the review of extensive documentation and the possession of years of z/OS experience to be productive.

For more information about some of the challenges that are faced by new and experienced systems programmers regarding z/OSMF, see 1.1.1, “Challenges for novice system programmers” and 1.1.2, “Challenges for experienced system programmers”.

1.1.1 Challenges for novice system programmers

Novice system programmers face the following challenges:

- Learning problem analysis and management
- Getting the “big picture”
- Gaining organizational knowledge
- Finding the correct product documentation
- Getting enough of the correct experience
- Dealing with unfamiliar concepts and tools
- Dealing with tasks that require detailed knowledge of command syntax and formats
- Gaining the trust of more experienced colleagues

1.1.2 Challenges for experienced system programmers

An experienced system programmer is faced with the following challenges:

- Too little time and too many tasks with fewer people
- Must be more productive
- Aging workforce (people are retiring)
- Time and knowledge must span across many products and platforms

1.2 IBM z/OS Management Facility environment

z/OSMF runs on the z/OS system and it manages z/OS from within z/OS. z/OSMF is a Web 2.0-based application on z/OS with direct access to z/OS data and information, and a secure browser interface from the workstation. z/OSMF contains the GUIs and the application code. Everything is installed on the z/OS server with no client-side installation requirements.

The applications use the Dojo framework and JavaScript for the GUIs. This application stack communicates with z/OS components as needed for that particular task. It always uses the z/OS System Authorization Facility for authentication and authorization.

This section includes the following topics:

- Updating the IBM z/OSMF package
- Information to assist you in getting started after z/OSMF is installed and configured
- z/OSMF V2R3 functions and z/OSMF in a monoplex or sysplex environment
- zIIP usage

1.2.1 IBM z/OS Management Facility package update

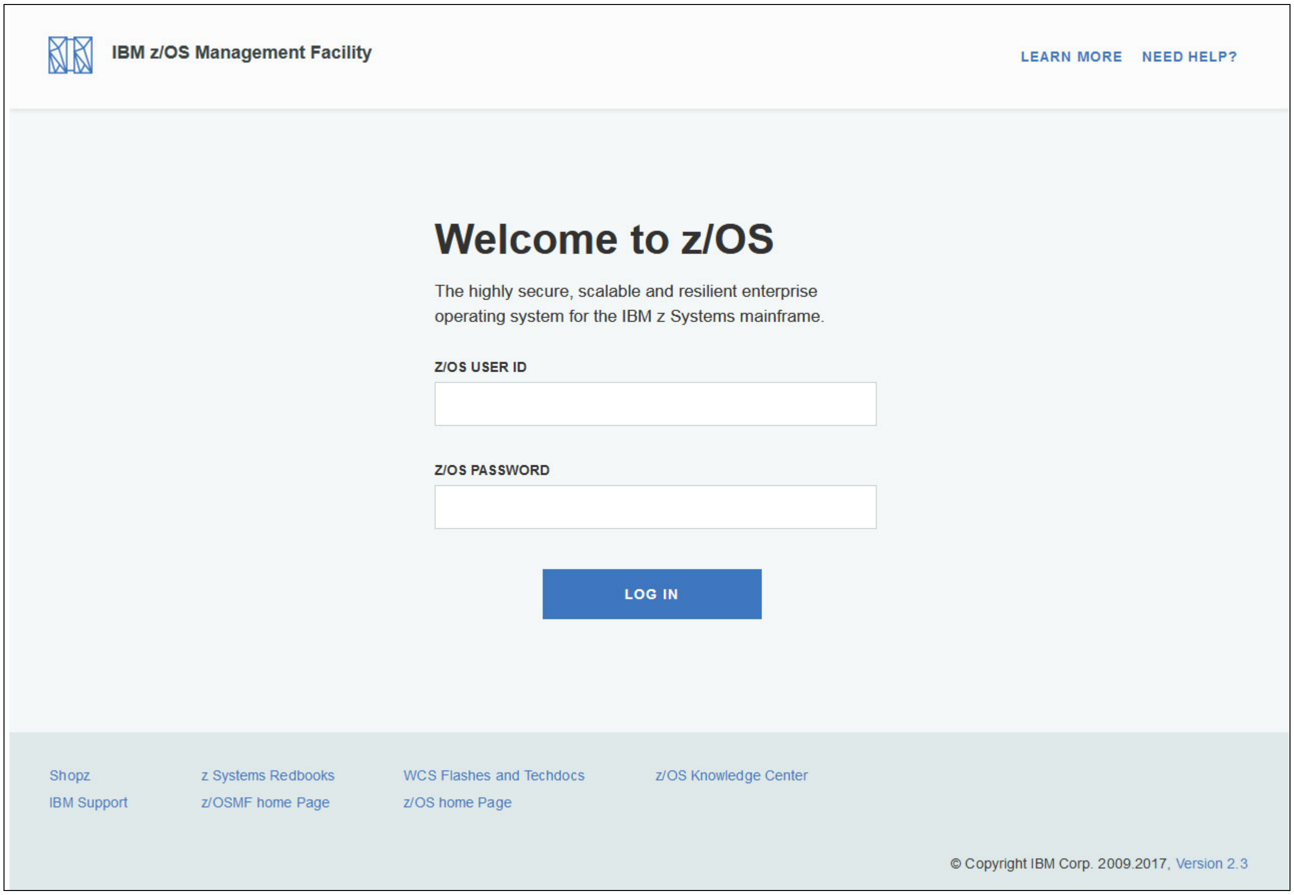
z/OSMF V2R3 includes the IBM WebSphere® Application Server for z/OS V8.5 Liberty profile, which features a composable, smaller run time that can be embedded in the application. WebSphere Application Server for z/OS V7.0 OEM Edition, which was packaged with the former version of z/OSMF, required separate configuration and application deployment.

The new z/OSMF V2R3 package includes the runtime embedded, which means easier configuration, a smaller footprint, reduced resource requirements, and faster starting and stopping of the server. You use the Java Runtime 8 64-bit version that is installed on your z/OS system.

1.2.2 Getting started

After z/OSMF is set up, configured, and started on a system, the user can browse to the URL for the z/OSMF instance, which is basically the host name, secure port, and context root for z/OSMF. The z/OSMF Welcome window and login pane opens. The z/OSMF Welcome page is for non-authenticated users. This window can be modified to provide users with information that they must read before logging in to z/OSMF, such as instructions that are specific to your company. You also can add a small image or graphic, such as your company logo. After the guest user authenticates, the Welcome page is replaced with the standard z/OSMF Welcome page.

The non-authenticated z/OSMF Welcome window, which is modified to add a header, footer, and graphic, is shown in Figure 1-1 on page 6. The navigation pane with the login at the top is shown in the left side of the window. The large center pane is where the tasks open. The only function that you can perform in this window is logging in. To log in, you need a valid z/OS user ID that is defined and enabled for z/OSMF. z/OSMF can use IBM RACF® or equivalent security products.



Welcome to z/OS

The highly secure, scalable and resilient enterprise operating system for the IBM z Systems mainframe.

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Figure 1-1 Login window

After you are logged in, you can see the available categories and tasks under these categories in the Navigation pane. Because z/OSMF supports role-based authorization, a user sees only the tasks that the user is authorized to access.

z/OSMF supports SAF-based authentication and the standard granular z/OS level authorization. During the installation and configuration of z/OSMF, you can enable only the functions in z/OSMF that you want to use.

1.2.3 z/OSMF V2R3 functions

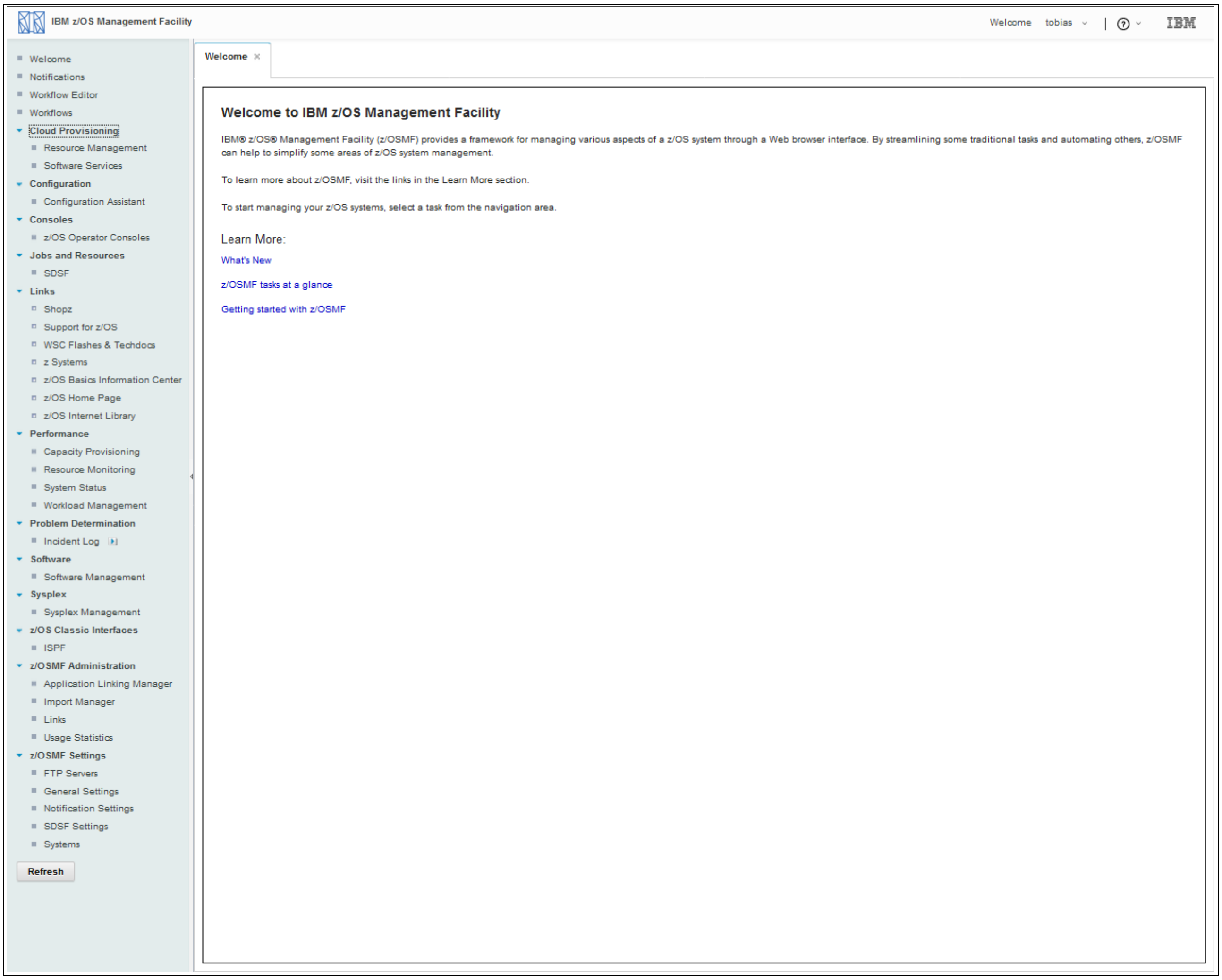
z/OSMF V2R3 provides new and improved packaging, configuration, and functions to further enhance the z/OS management experience.

z/OSMF provides various categories with tasks and some core or basic functions. It features the following categories:

- Cloud Provisioning, which includes Resource Management and Software Services tasks
- Configuration, which includes the Configuration Assistant task for configuring the communication server
- Consoles, which features the z/OS Operator Consoles task
- Jobs and Resources, includes has the SDSF task
- Links, which includes several tasks

- Performance, which includes the following tasks:
  - Capacity Provisioning
  - System Status
  - Resource Monitoring
  - Workload Management
- Problem Determination, which features the Incident Log task
- Software, which includes the Software Management task
- Sysplex, which includes the Sysplex Management task
- z/OS Classic Interfaces, which includes the ISPF task
- z/OSMF Administration, which features the following tasks:
  - Application Linking Manager
  - Import Manager
  - Links
  - Usage Statistics
- z/OSMF Settings, which features the following tasks:
  - FTP Servers
  - General Settings
  - Notification Settings
  - SDSF Settings
  - Systems

Some core functions also are always available, such as the Welcome pane with links to z/OSMF documentation, and the new Workflow and Notifications function. The categories are listed in alphabetical order. The post-login window is shown in Figure 1-2.



Welcome to IBM z/OS Management Facility

IBM® z/OS® Management Facility (z/OSMF) provides a framework for managing various aspects of a z/OS system through a Web browser interface. By streamlining some traditional tasks and automating others, z/OSMF can help to simplify some areas of z/OS system management.

To learn more about z/OSMF, visit the links in the Learn More section.

To start managing your z/OS systems, select a task from the navigation area.

Learn More:

What's New

z/OSMF tasks at a glance

Getting started with z/OSMF

Figure 1-2 z/OSMF post-login welcome window

Tasks and functions summary

In this section, we summarize the tasks and functions of z/OSMF.

Resource Management and Software Services

This section describes the z/OSMF tasks that you can use to perform software provisioning for IBM Cloud™ Provisioning and Management for z/OS when the appropriate plug-ins are installed. These tasks include creating instances of IBM middleware, such as IBM CICS®), IBM DB2®, IBM Information Management System (IMS™), IBM MQ, and IBM WebSphere Application Server, and creating middleware resources, such as IBM MQ queues, CICS regions, and DB2 databases.

Configuration Assistant

This task provides the simplified configuration and setup of TCP/IP policy-based networking functions. Important changes were made to the user experience in z/OSMF V2R3 with workflows to perform some of the tasks.

z/OS Operator Consoles

The SDSF task of z/OSMF allows you to see key summary information about your sysplex, work with objects (such as jobs and data sets), check for IBM z/OS Health Checker, and issue system commands. A graphic summary of message activity also is available. With IBM Knowledge Center for z/OS (KC4Z), the z/OS Operator Consoles task makes documentation available for a message by hovering the mouse pointer over a message that is displayed on the console view.

SDSF

The SDSF task of z/OSMF provides key summary information about your sysplex. It also allows you to work with objects, such as jobs and data sets, check for IBM z/OS Health Checker, and issue system commands.

Links

This task provides a common starting point for accessing resources that are beyond the IBM z/OS Management Facility, such as product links or website URLs. Some links are predefined in the product. Administrators can define more links to share commonly used resources for their installation.

Capacity Provisioning

This task manages Capacity Provisioning Manager (CPM) connections, capacity provisioning domains, active configuration, and policies.

Workload Manager Policy Editor

This task facilitates creating and editing workload manager (WLM) service definitions, installing WLM service definitions, and activating WLM service policies with preferred practices checks that are built in to the policies.

System Status and Resource Monitoring dashboards

The z/OSMF Resource Monitoring application provides integrated performance monitoring of z/OS sysplexes, Linux for IBM z Systems®, Linux for IBM System x, IBM AIX®, and Windows images in your environment. This task can be used if you enabled the IBM Resource Measurement Facility™ (IBM RMF™) feature, which is available for a fee on one of the systems in your enterprise.

Incident Log task

This task helps system programmers with problem data management tasks. It also provides experienced teams with procedural advantages through an incident log summary and detailed views of z/OS memory dump incidents.

The Incident Log provides a consolidated list of IBM SVC memory dump-related problems, along with information and diagnostic data that is captured with each incident. It also facilitates sending the data for further diagnostic tests through use of a wizard.

Software Management task

This task provides IBM recommended preferred practices to make installed software deployment simpler and safer on local or remote systems for IBM or non IBM software. It also enables management reporting of software service levels and product levels.

Sysplex Management

The Sysplex Management task allows you view sysplex resources. You can view sysplexes and systems in a sysplex. You can view physical configurations, such as coupling facilities and LPARs, and logical resources, such as couple data sets and coupling facility structures.

Graphical views help you to visualize the topology of your sysplex. From the graphical view, you can drill down to see more information.

z/OS Classic Interfaces with ISPF task

Introduced in z/OSMF V1.13, this task provides the ISPF application as a 3270 environment through the web interface, which enables you to work with ISPF functions from a browser interface without requiring a 3270 emulator session. In addition, it enables ISPF applications to be URL addressable, which makes it eligible for cross-application linking and starting through the application linking interface. It also supports multiple panes and tabs. Users can have multiple sessions in TSO and web browser simultaneously by enabling profile sharing.

z/OSMF Administration

This task provides the dynamic addition of links to non-z/OSMF resources for the Links category or for any other z/OSMF category. In also includes the application linking manager, which provides the GUI interface for defining application linking events and handlers for cross-application linking across z/OSMF and non-z/OSMF applications or between z/OSMF applications.

z/OSMF also provides RESTful interfaces (APIs) to accomplish the application linking function. The Usage Statistics task provides administrators with options for collecting usage statistics about z/OSMF.

z/OSMF Settings

This task provides the tasks to define FTP servers and systems. FTP servers are used by the Incident Log, Software Management, and Sysplex Management tasks. The z/OSMF Settings task allows the definition of other systems that z/OSMF can communicate with through the Software Management task, with the possibility of being used by other functions in the future.

By using the z/OSMF notification framework, users can send different forms of notifications to multiple recipients. These definitions are set in this section. The task SDSF Settings is used to define logon definitions for the SDSF plug-in. The customization of the Welcome Page and saving diagnostic data in case of a failure can be done with the task General Settings.

Other

At the upper right of the window, a drop-down question mark is available with an About tab that provides more information about the release and service level for z/OSMF. A Help tab also is includes with which a user can access online help to z/OSMF.

z/OSMF provides detailed online help for all the functions and messages. A Help button in the upper right corner of every pane opens the embedded help. This feature can be though of as the z/OSMF user’s guide.

1.2.4 z/OSMF in a monoplex or sysplex

An instance of z/OSMF can manage only one local system or a sysplex. Multiple users can log in to the same instance of z/OSMF from separate workstations or browsers. Based on customer feedback, the expectation is to support up to 50 concurrent users that are simultaneously logged in and actively working and driving functions at the same time, although many more can be authorized to work with z/OSMF.

Although only one z/OSMF instance can be active in a sysplex at any time by using the same configuration and the same z/OSMF data repository, more instances can be created, such as for test or service update, or backup.

However, these other instances should not be actively managing the systems at the same time (such as working on the same incident concurrently from two separate instances of z/OSMF) or using the same data repository. These other instances must be unique, which is enforced by z/OS through global enqueues.

If you multiple sysplexes are available, you can manage more sysplexes in your enterprise from a single client system by opening new browser windows (or tabs) and logging in to the z/OSMF instance that is installed on those sysplexes (one browser per system or sysplex). A z/OSMF instance must be active on every sysplex that you want to manage by using this interface.

In the case of Software Management, you can manage software across all of the z/OS sysplexes from one the primary z/OSMF. This primary z/OSMF communicates with all the other z/OSMF instances as needed to help manage the software on those systems or sysplexes.

1.2.5 zIIP usage

As of z/OS V1.11, z/OS CIM server processing (including the CIM server and CIM provider workloads) can run on the IBM System z® Integrated Information Processor (zIIP). Other CIM-related workloads (such as CIM client and CIM-enabled resource systems processing) are not eligible for zIIP. Because parts of z/OSMF V2R3 use the z/OS CIM Server, this workload is also eligible for the zIIP.

The z/OSMF application is written in Java and is eligible for IBM z Integrated Information Processor (zIIP).

2

Overview and architecture

This chapter provides an overview of z/OS Management Facility (z/OSMF) and its architecture. It also introduces the components that are necessary to run z/OSMF on z/OS.

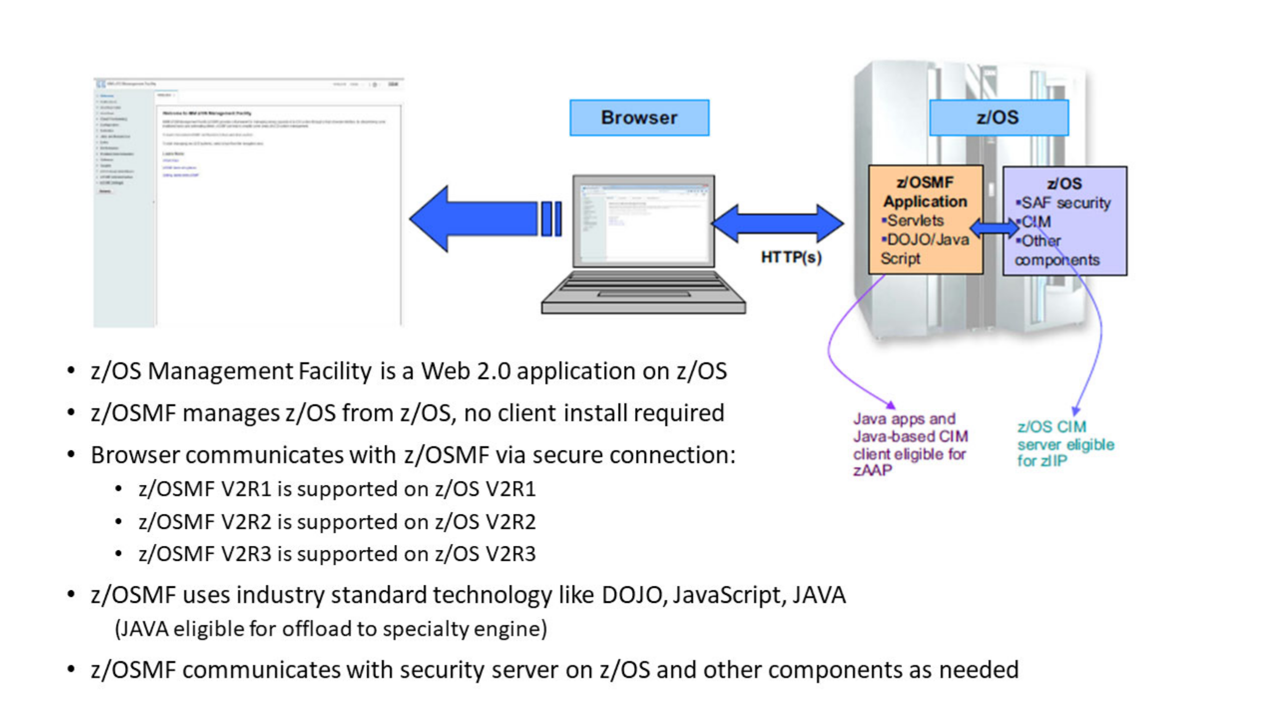
This chapter includes the following topics:

- 2.1, “Overview” on page 14
- 2.2, “IBM WebSphere Liberty profile” on page 14
- 2.3, “Common Information Model server” on page 15
- 2.4, “Common Event Adapter” on page 18
- 2.5, “System REXX” on page 18
- 2.6, “Other z/OS components” on page 19

2.1 Overview

z/OSMF is a web-based solution, with which you can connect to z/OSMF by using a browser through a secure connection. z/OSMF provides the framework to a z/OS system, with which you can perform selected traditional functions from the GUI, along with new functions that are only available with z/OSMF.

The basic architecture of z/OSMF is shown in Figure 2-1. The components are described later.



- z/OS Management Facility is a Web 2.0 application on z/OS
- z/OSMF manages z/OS from z/OS, no client install required
- Browser communicates with z/OSMF via secure connection:
  - z/OSMF V2R1 is supported on z/OS V2R1
  - z/OSMF V2R2 is supported on z/OS V2R2
  - z/OSMF V2R3 is supported on z/OS V2R3
- z/OSMF uses industry standard technology like DOJO, JavaScript, JAVA (JAVA eligible for offload to specialty engine)
- z/OSMF communicates with security server on z/OS and other components as needed

Figure 2-1 z/OSMF architecture

Because the z/OSMF application is written in Java, it can run on a System z Application Assist Processor (zAAP). If your installation includes System z systems, you can use the zAAP on zIIP facility.

2.2 IBM WebSphere Liberty profile

The WebSphere Liberty profile provides the runtime environment that z/OSMF uses as an application server. Before z/OSMF V2R1, the application server was IBM WebSphere Application Server OEM Edition for z/OS.

IBM WebSphere Application Server OEM Edition for z/OS is a separate FMID that is included with z/OSMF that must be configured before you deploy the z/OSMF application. It is a WebSphere Application Server for z/OS package that is built to deploy certain stand-alone applications, such as z/OSMF. Before z/OSMF V2R1, an existing version of WebSphere Application for z/OSMF was not used; instead, IBM WebSphere Application Server OEM Edition for z/OS was used.

Although IBM WebSphere Application Server OEM Edition for z/OS is built for the z/OSMF, it still includes the footprint of a full WebSphere Application Server. The DASD and processor requirements are significant, and the IBM WebSphere Application Server OEM Edition for z/OS must be configured on its own.

IBM WebSphere Application Server OEM Edition for z/OS is larger than required for z/OSMF. Not only does it require a large DASD footprint (1.1 GB - 2 GB), it features a large memory footprint (approximately 2 GB) and high resource consumption (approximately 120 MIPS). This situation made z/OSMF non-viable for small or medium customers, which are the customers for which it is largely intended.

The Liberty profile addresses these issues and reduces the complexity of the installation and resources that are required to run z/OSMF. The Liberty profile is a simplified, lightweight development and application runtime environment that has includes following features:

- It is simple to configure. The configuration is read from a single XML file with text-editor-friendly syntax.
- It is dynamic and flexible. The runtime loads only what your application needs and recomposes the runtime in response to configuration changes.
- It is fast. The server starts in under 5 seconds with a basic web application.

The Liberty profile is built by using Open Services Gateway Initiative (OSGi) technology and concepts. The specific nature of the runtime relies on the dynamic behavior that is inherent in the OSGi Framework and Service Registry.

As bundles are installed to or uninstalled from the framework, the services each bundle provides are added or removed from the service registry. The addition and removal of services cascades to other dependent services. The result is a dynamic, composable runtime that can be provisioned with only what your application requires and responds dynamically to configuration changes as your application evolves.[1]

The Liberty profile features the following estimates:

- Faster startup (less than 5 seconds)
- Reduced memory requirement
- A package footprint of approximately 300 MB
- A memory requirement of approximately 1 GB (previously, IBM WebSphere Application Server OEM Edition for z/OS required 2 GB)

Previously, maintenance was applied to IBM WebSphere Application Server OEM Edition for z/OS, and the z/OSMF components and special actions were required to activate the z/OSMF maintenance. Since z/OSMF V2R1, this step is no longer required and only the normal SMP/E RECEIVE/APPLY and restart of z/OSMF is required.

2.3 Common Information Model server

Common Information Model (CIM) is an open standard that is used for system management. It defines the exchange of management information between managed elements, such as systems, networks, applications, and services.

[1] For more information, see *WebSphere Application Server Liberty Profile Guide for Developers*, SG24-8076

CIM offers you a set of standards that were defined by the Distributed Management Task Force (DMTF). The DMTF is also part of the Web Based Enterprise Initiative (WBEM). These standards define a conceptual model that represents I/T resources.

CIM is platform-independent and works in a technology-neutral way. The CIM specification is the core of the CIM technology. It defines the formal rules for modeling and a data model that describes the resources of the enterprise. (IBM is a member of the DMTF board.)

For more information about DMTF, see the Distributed Management Task Force website.

CIM consists of the following items:

- Meta model

  The meta model describes object-oriented modeling and composition features. It supports schemas, classes, associations, instances, properties, methods, and qualifiers. It also provides features, such as inheritance, method override, and associations.

- Core schema

  The core schema contains the essential base classes for system management. Available classes include ManagedElement, System, LogicalDevice, Product, Configuration, and Setting.

- Various schemas for specific disciplines

  Discipline-oriented schemas include Application, Device, Event, System, and Network.

CIM uses an UML-like, object-oriented data model to describe resources and their relationships.

z/OS used CIM as an element since Version 1.7. For z/OS V1.12, the CIM server is based on the OpenPegasus CIM server implementation V2.10. CIM also provides a new version of its schema (Version 2.22). For more information about OpenPegasus, see the OpenPegasus page of the Open Group website.

The architecture of CIM with the server and its repository with the schemas are shown in Figure 2-2 on page 17. Client applications can connect to the server by using CIMXML through the HTTP or HTTPS protocol. z/OSMF uses the Binary CIM client for communicating with the local system.

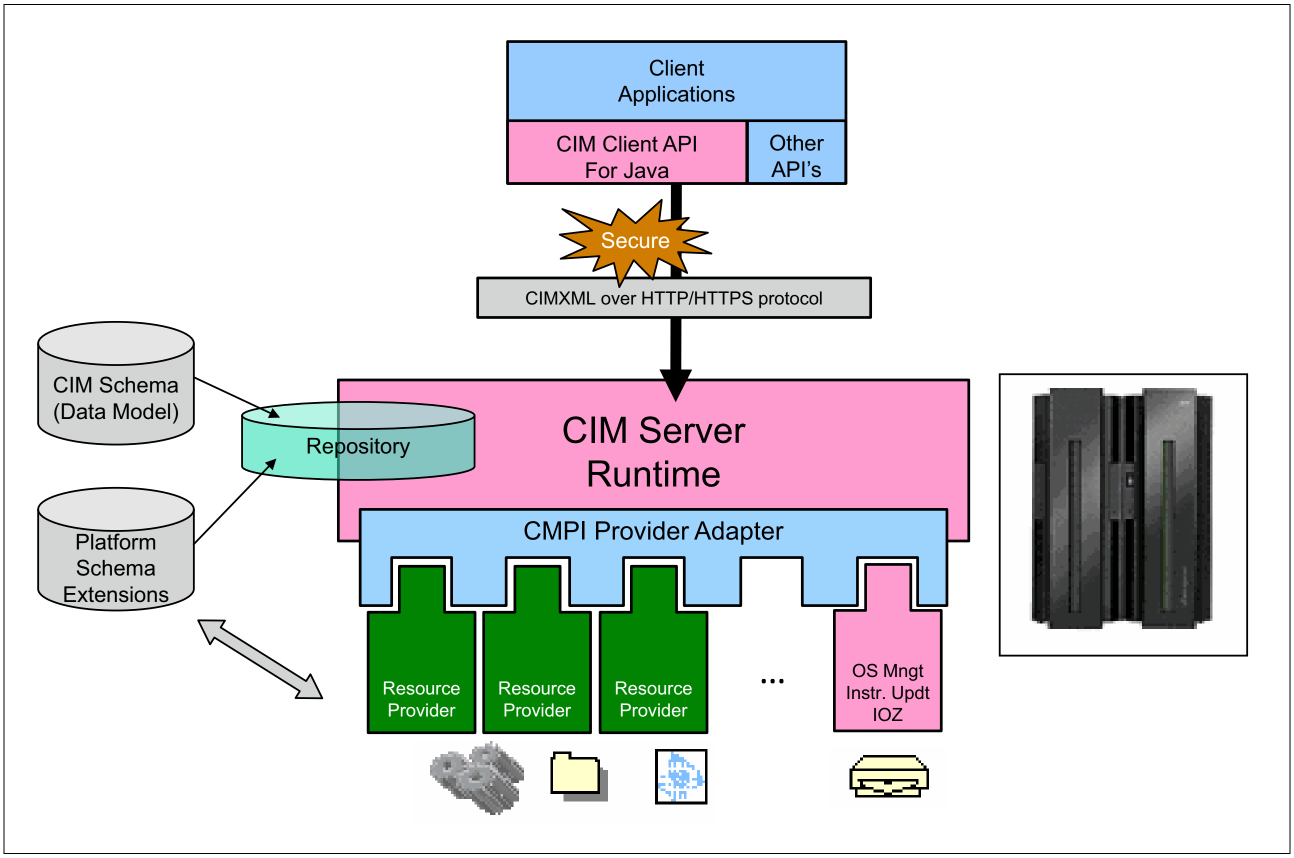


Figure 2-2 CIM overview

z/OSMF uses the application server to connect to the CIM server through the CIM client and its API. The Incident Log application starts a CIM provider to communicate with the z/OS Common Event Adapter (CEA) component. In addition, RMF and WLM use the CIM interface through a CIM provider. For more information about CEA, see 2.4, "Common Event Adapter" on page 18.

Starting with z/OS V1.11, the z/OS CIM server can run on a System z Integrated Information Processor (zIIP), which includes CIM server and CIM provider workloads.

2.4 Common Event Adapter

The CEA enables CIM providers and other internal z/OS C clients to identify, receive, and process the selected z/OS events. The CEA enables a z/OS UNIX System Services program to receive an asynchronous event through a socket.

The CEA also allows a z/OS UNIX program to subscribe to older types of events, such as WTOs (operator messages) and ENFs (asynchronous program events), and provides a facility for component-specific program events. Think of CEA as a bridge from z/OS BCP events to the z/OS UNIX System Services environment.

CEA is part of base z/OS. Its address space is started automatically during an IPL of a z/OS system.

CEA features the following modes of operation:

- Full function: In this mode, both internal z/OS components and clients, such as CIM providers, can use CEA indication functions.
- Minimum: In this mode, only internal z/OS components can use CEA indication functions.

Note: z/OSMF requires that you run CEA in full function mode.

For more information, see *z/OS Planning for Installation,* GA32-0890, which is available at IBM Knowledge Center.

2.5 System REXX

System REXX is a z/OS component that allows REXX execs to be run outside of conventional TSO/E and batch environments. It is part of base z/OS and was first introduced with z/OS V1.9.

The System REXX environment provides a function package that allows a REXX exec to start system commands and return results back to the exec in various ways. System REXX execs can be started through an assembly language macro interface (called AXREXX) or through an operator command.

z/OSMF uses SYSREXX execs to perform System Management tasks. These execs are stored in the SYS1.SAXREXEC data set. SYSREXX is used during incident management.

SYSREXX is also started automatically at IPL with an address space name of AXR. Tasks are created with AXRnn.

For more information, see *z/OS MVS Programming: Authorized Assembler Services Guide*, SA23-1371.

2.6 Other z/OS components

In addition to the basic components that were described in this chapter, you need the following components to enable z/OSMF and its components:

- z/OS Communications Server

  You must have your z/OS Communications Server TCP/IP stack configured to connect to z/OSMF through IBM WebSphere Application Server OEM Edition for z/OS through your browser. In TCP/IP, you must reserve several ports to handle this communication.

- z/OS Security Server

  You need a security product to use z/OSMF, which can be Resource Access Control Facility (RACF) or a comparable product. z/OS resources that you want to manage with z/OSMF are secured by using the appropriate profiles in RACF.

  Since z/OS V1.12, z/OSMF secures the access to its tasks by using a role-based concept. You must ensure that the users that you define in z/OSMF are also defined as RACF users in z/OS.

- System Logger

  System Logger is a z/OS component that provides a logging capability for applications that are running in a single-system sysplex (monoplex with Coupling Facility) or multi-system environment (IBM Parallel Sysplex® with Coupling Facility). The advantage of System Logger compared to application-specific logging is that System Logger is responsible for the handling of logs. It runs in is own address space and is automatically started at IPL.

Depending on your type of sysplex, use the following System Logger configurations:

- Coupling Facility that is based log streams

  These log streams are used for installations in which a Parallel Sysplex is running.

- DASD-only log streams

  Use DASD-only log streams for your applications when your system runs as a monoplex without a Coupling Facility.

Note: For the purposes of this book, it is assumed that System Logger is set up in your environment. However, if you plan to use incident management within z/OSMF, you must define log streams for diagnostic snapshots. These log streams are used for Operlog snapshots and LOGREC snapshots. If you cannot set up System Logger for any reason, you can still get log snapshots of SYSLOG and LOGREC data sets.

Part 2

Installation

This part provides planning, installation, and customization guidance for deploying z/OS Management Facility.

3

Planning and prerequisites

This chapter provides information about planning, prerequisites, and the postinstallation tasks that are required to activate and run the z/OS Management Facility (z/OSMF).

This chapter describes the pre- and post-requisite work that is required to enable plug-in functions. Although you can install the various plug-ins into z/OSMF, certain plug-ins require extra system configuration before you can use their intended functions. Each section in this chapter describes the requirements of a plug-in or a component that is required by multiple plug-ins or by the z/OSMF core.

The configurations of z/OS system components that are required to use z/OSMF plug-ins, such as z/OS Cloud Provisioning, Incident Log, and RMF, also are described in this chapter.

This chapter includes the following topics:

- 3.23, “Common event adapter” on page 71
- 3.24, “System REXX” on page 73
- 3.25, “Plug-in installation options” on page 75
- 3.26, “Planning for z/OSMF communication between sysplexes” on page 76

3.1 Changes in z/OSMF V2R3

z/OSMF becomes more important for the operational aspects of z/OS. Because of this importance, z/OSMF V2R3 is by default, automatically started during IPL of a system. The name of this function is called *z/OSMF autostart*. The intent of this function is to give you access to z/OSMF as soon as possible after an IPL.

z/OSMF V2R3 is managed by the WebSphere Liberty profile, which provides an application server runtime environment for z/OSMF.

z/OSMF is a set of web applications that is hosted on your z/OS system. Depending on the task to be performed, z/OSMF interfaces with other z/OS components to offer a simplified interface for performing tasks. These components make up the environment that is necessary for using the z/OSMF functions.

Note: z/OSMF does not provide a separate client installation. You must provide a compatible browser to access the z/OSMF web application.

An installation of z/OSMF includes the following software:

- z/OSMF server.
- WebSphere Liberty profile, which provides the application server runtime environment for z/OSMF.
- A set of optional, system management functions or plug-ins, which you can enable when you configure z/OSMF.
- Technologies for serving the web browser interface, such as JavaScript and Dojo.

3.2 Target system requirements

This section describes the system requirements for configuring z/OSMF.

3.2.1 Operational requirements

Before you configure z/OSMF, you must ensure that IBM 64-bit SDK for z/OS, Java Technology Edition, Version 8 (program number 5655-DGH) is installed and operational on your system. For more information about the required PTFs, see *z/OS Program Directory V2.3.0*, GI11-9848*.*

3.2.2 System requirements

Ensure that your target system includes the following resources:

- One CPU resource that is equivalent to a processor with a processor capacity index (PCI) of at least 45.
- The z/OSMF server requires a minimum of 4 GB of system memory to be configured.

3.2.3 Preventive Service Planning

Before you install z/OSMF, ensure that you review the current Preventive Service Planning (PSP) information. The PSP Buckets maintain current lists of any recommended or required service for the installation of this package.

This service includes software PSP information that contains HIPER and required PTFs against the base release. Although software, hardware, and functional PSP Buckets might overlap, review all of the services that apply to z/OSMF to ensure that you identify all the known services that are required.

If you obtained z/OSMF as part of an IBM Custom-Build Product Delivery Offering (CBPDO), HOLDDATA is included. If the CBPDO for z/OSMF is older than two weeks by the time you install the product materials, obtain the latest PSP Bucket information from the Preventive Service Planning buckets page of the IBM Support website.

Search for Upgrade ZOSV2R3, and Subset ZOSMF.

You can also use IBM S/390® SoftwareXcel or contact the IBM Support Center to obtain the latest PSP Bucket information. For more information about program support, see the IBM Software Support website.

PSP Buckets are identified by UPGRADEs, which specify product levels, and SUBSETs, which specify the FMIDs for a product level. The UPGRADE and SUBSET values for z/OSMF are listed in Table 3-1.

Table 3-1 Preventive Service Planning

UPGRADE	SUBSET	Description
ZOSV2R3	ZOSMF	Installation Information for z/OSMF Version 2, Release 3, Modification 0.

Fixcat

SMP/E fix categories (FIXCAT) can also be used to identify required maintenance. The available FIXCATs are listed in Table 3-2.

Note: z/OSMF is integrated into z/OS since V2R2. Therefore, a FIXCAT is no longer dedicated to z/OSMF. Instead, use z/OS related FIXCATs. For more information about fix categories and up-to-date listings, see the IBM Fix Category Values and Descriptions page of the IBM IT infrastructure website.

Table 3-2 FIXCAT categories for z/OS V2R3

FIXCAT category	Description
IBM.Coexistence.z/OS.V2R3	Fixes that allow z/OS V2.1 and z/OS V2.2 to coexist with, and fallback from, z/OS V2.3.
IBM.TargetSystem-RequiredService.z/OS.V2R3	Fixes required on other IBM products to allow them to run on z/OS V2.3.

SMP/E examples

You can use the sample JCL code that is shown in Example 3-1 to retrieve HOLDDATA with SMP/E **RECEIVE ORDER** to download it automatically.

Example 3-1 RECEIVE ORDER to download electronically SMP/E Receive Order

```
//jobname  JOB ...
//RECEIVE  EXEC PGM=GIMSMP
//SMPCSI   DD DSN=SMPE.GLOBAL.CSI,DISP=SHR
//SMPNTS   DD PATH='/u/smpe/smpnts/',PATHDISP=KEEP
//SMPOUT   DD SYSOUT=*
//SMPRPT   DD SYSOUT=* //SYSPRINT DD SYSOUT=*
//SMPCNTL  DD *
   SET      BOUNDARY(GLOBAL).
   RECEIVE HOLDDATA
   ORDER( /* Place an order for service */
   ORDERSERVER(ORDRSRVR)
   CLIENT(MYCLIENT)
   CONTENT(
   HOLDDATA))
/*
//ORDRSRVR DD *
   <ORDERSERVER
   url="https://eccgw01.boulder.ibm.com/services/projects/ecc/ws/"
   keyring="MRWKYRNG"
   certificate="SMPE Client Certificate">
   </ORDERSERVER>
/*
//MYCLIENT DD *
   <CLIENT
   javahome="/usr/lpp/java/J8.0"
   classpath="/usr/lpp/smp/classes"
   </CLIENT>
```

After the HOLDDATA is received, you can then use the REPORT MISSINGFIX to generate missing PTFs for selected FIXCATs.

The REPORT MISSINGFIX sample that is shown in Example 3-2 creates a report to list the PTFs that are installed and the PTFs that are missing in the CSI. A **SYSPUNCH DD** statement is generated that contains the **RECEIVE ORDE**R statements to order the missing PTFs electronically.

Example 3-2 REPORT MISSINGFIX

```
//S1       EXEC PGM=GIMSMP
//*
//SMPCSI   DD DISP=SHR,DSN=DSN=SMPE.GLOBAL.CSI
//*
//SMPCNTL  DD *
  SET    BOUNDARY (GLOBAL) .
  REPORT
         MISSINGFIX
         ZONES  (
                TARGTCSI
               )
         FIXCAT(
                IBM.Coexistence.z/OS.*
                IBM.TargetSystem-RequiredService.z/OS.*
               )
               .
```

3.3 z/OSMF core and plug-in requirements

The z/OSMF core or a plug-in might require extra configuration to make a particular task fully functional. These configuration changes can be more security authorizations to allow z/OSMF users to access the required resources on the z/OS images, enable or modify a z/OS component, or make configuration changes to system settings.

The z/OSMF tasks, their associated plug-in (or whether the task is part of the z/OSMF core installation), prerequisites for full functioning, and whether any other setup is required beyond the plug-in installation to fully use the task are listed in Table 3-3.

Table 3-3 Task requirements

Task	**z/OSMF Core or plug-in**	**Prerequisites**	**Setup that is required beyond z/OSMF configuration**
Notifications	Core	None	None
Workflow Editor	Core	None	None
Workflows	Core	None	None
Cloud Provisioning	Cloud Portal and Cloud Provisioning	None	Security, TCP/IP, middleware components like CICS, DB2
Configuration Assistant	Configuration Assistant	z/OS Communication Server Policy Based Networking	None
z/OS Operator Consoles	z/OS Operator Consoles	Common event adapter (CEA)	None
Jobs and Resources	IBM SDSF	IBM SDSF must be licensed	Yes, security protection for SDSF functions
Links	Core	None	None
Capacity Provisioning	Capacity Provisioning	► Provisioning Manager ► CIM server	Yes
Resource Monitoring	Resource Monitoring	► Resource Monitoring Facility (RMF) ► RMF Distributed Data Server	Yes
System Status	Resource Monitoring	► Resource Monitoring Facility (RMF) ► RMF Distributed Data Server	Yes, if more systems are to be monitored
Workload Management	Workload Management	CIM Server	Yes

Task	z/OSMF Core or plug-in	Prerequisites	Setup that is required beyond z/OSMF configuration
Problem Determination	Incident Log	► CIM server ► System Logger ► CEA ► System REXX ► Automatic Dump Data Set allocation ► Dump Analysis and Elimination ► Sysplex Dump Directory ► AMATERSE utility	Yes
Software Management	Software Deployment	SMP/E	None
Sysplex	Sysplex Management	► CEA ► Base Control Program internal interface (BCPii)	Sysplex setup (can be Monoplex or Sysplex)
z/OS Classic Interfaces	ISPF	CEA	Yes
Application Linking Manager	Core	None	Optional
Links (manage)	Core	None	Optional
FTP Servers	Core	None	Optional
Systems	Core	None	Yes, to add z/OSMF instances

The sections that follow provide a brief summary, implementation overview, and considerations for any other setup that is required to use the tasks. For more information about any pre- or postinstallation requirements, see the *IBM z/OS Management Facility Configuration Guide Version 2 Release 1*, SA38-0657.

The prerequisites and postinstallation requirements for each plug-in that you want to activate on your z/OSMF system are described next. Some prerequisites are common to several plug-ins. z/OS system includes the following common prerequisites:

- CIM
- Common event adapter (CEA)
- System REXX

You must have IBM 64-bit SDK for z/OS, Java Technology Edition, V8 (Program number 5655-DGH) installed on your z/OS systems. It is shipped with z/OS Version 2 Release3.

3.4 Browser currency

z/OSMF features a web browser-based user interface. When you use z/OSMF on your workstation, you must ensure that you use supported web browsers.

The supported web browsers and workstation platforms with z/OSMF Version 2 Release 3 are listed in Table 3-4.

Table 3-4 Supported browsers and workstation platforms for z/OSMF Version 2 Release 3

Browser type	Windows 7	Windows 8 Pro, Desktop	Windows 10 Pro, Desktop
Internet Explorer 11	Yes	Yes	No
Edge	No	No	Yes
Firefox ESR 52 or later	Yes	Yes	Yes

3.5 Notifications task

The Notifications task is installed as part of the z/OSMF core installation. No specific prerequisites must be met for this task's usage.

Notifications are used by the Workflows task to inform other z/OSMF users about work that is assigned to them. You can use this technique in the following variations:

- In z/OSMF, by using your user ID
- Specifying an email address
- By using mobile devices

Depending on the technique you want to use, you must specify the appropriate settings in the Notifications task.

3.5.1 System prerequisites

No system prerequisites exist to use Notification task.

3.5.2 Security

When you plan to set up Notification task, ensure that you apply the RACF commands that are shown in Example 3-3 from SYS1.SAMPLIB (IZUSEC) to your RACF database.

Example 3-3 RACF commands for Notifications task

```
RDEFINE ZMFAPLA IZUDFLT.ZOSMF.NOTIFICATION.SETTINGS UACC(NONE)
RDEFINE ZMFAPLA IZUDFLT.ZOSMF.NOTIFICATION.SETTINGS.ADMIN UACC(NONE)
RDEFINE ZMFAPLA IZUDFLT.ZOSMF.NOTIFICATION.MODIFY UACC(NONE)
PERMIT IZUDFLT.ZOSMF.NOTIFICATION.SETTINGS CLASS(ZMFAPLA) +
   ID(IZUUSER) ACCESS(READ)
 PERMIT IZUDFLT.ZOSMF.NOTIFICATION.MODIFY CLASS(ZMFAPLA) +
   ID(IZUUSER) ACCESS(READ)
PERMIT IZUDFLT.ZOSMF.NOTIFICATION.SETTINGS CLASS(ZMFAPLA) +
  ID(IZUADMIN) ACCESS(READ)
 PERMIT IZUDFLT.ZOSMF.NOTIFICATION.SETTINGS.ADMIN CLASS(ZMFAPLA) +
  ID(IZUADMIN) ACCESS(READ)
 PERMIT IZUDFLT.ZOSMF.NOTIFICATION.MODIFY CLASS(ZMFAPLA) +
  ID(IZUADMIN) ACCESS(READ)
SETROPTS RACLIST(ZMFAPLA) REFRESH
```

3.5.3 Postinstallation

No postinstallation tasks are required.

3.6 Workflow Editor

The Workflow Editor is a browser-based tool that is used to create and modify XML-based workflows. It helps you simplify your work by not natively coding XML code. It is installed as part of the z/OSMF core installation. It was introduced in z/OSMF V2R2 during continuous delivery.

3.6.1 System prerequisites

No system prerequisites must be met to use this task.

3.6.2 Security

When you plan to set up Notification task, ensure that you apply the RACF commands that are shown in Example 3-4 from SYS1.SAMPLIB (IZUSEC) to your RACF database.

Example 3-4 RACF command for Workflow Editor task

```
RDEFINE ZMFAPLA (IZUDFLT.ZOSMF.WORKFLOW.EDITOR) UACC(NONE)
PERMIT IZUDFLT.ZOSMF.WORKFLOW.WORKFLOW.EDITOR CLASS(ZMFAPLA) +
  ID(IZUUSER) ACCESS(READ)
SETROPTS RACLIST(ZMFAPLA) REFRESH
```

3.6.3 Postinstallation

No postinstallation tasks are required.

3.7 Workflow task

The Workflow task is installed as part of the z/OSMF core installation. No specific prerequisites must be met to use this task.

To create a workflow, the user requires read access to the workflow definition file, which can be in a cataloged z/OS data set or UNIX System Services file system.

Authors of new workflows (those creating XML files) that are used by others require write access to the cataloged z/OS data set or UNIX System Services directory where the workflow is stored.

If a workflow involves any job submission, the user that is submitting the job from z/OSMF requires the appropriate access authority for any resources that are required by the job.

3.7.1 System prerequisites

No system prerequisites must be met to use the Workflows task.

3.7.2 Security

When you plan to set up Workflows task, ensure that you apply the RACF commands that are shown in Example 3-5 from SYS1.SAMPLIB (IZUSEC) to your RACF database.

Example 3-5 RACF commands for Workflows task

```
RDEFINE ZMFAPLA IZUDFLT.ZOSMF.WORKFLOW.WORKFLOWS UACC(NONE)
RDEFINE ZMFAPLA IZUDFLT.ZOSMF.WORKFLOW.ADMIN UACC(NONE)
PERMIT IZUDFLT.ZOSMF.WORKFLOW.WORKFLOWS CLASS(ZMFAPLA) +
   ID(IZUUSER) ACCESS(READ)
PERMIT IZUDFLT.ZOSMF.WORKFLOW.ADMIN CLASS(ZMFAPLA) +
  ID(IZUADMIN) ACCESS(READ)
PERMIT IZUDFLT.ZOSMF.WORKFLOW.WORKFLOWS CLASS(ZMFAPLA) +
   ID(IZUSECAD) ACCESS(READ)
SETROPTS RACLIST(ZMFAPLA) REFRESH
```

For your regular workflow users, it is important to add their user IDs to RACF group IZUUSER.

3.7.3 Postinstallation

No postinstallation tasks are required.

3.8 Cloud Provisioning

The Cloud Provisioning task is part of the Cloud Provisioning plug-in. Cloud Provisioning is divided into the following categories:

- Marketplace
- Marketplace Administration
- Resource Management
- Software Services

3.8.1 System prerequisites

When you plan for z/OS Cloud Provisioning, check the size of the user file system that you allocate by using the sample job in SYS1.SAMPLIB(IZUMKFS). The default size is 200 cylinders. The following templates and instances that you define for Cloud Provisioning use some extra space:

- 600 kilobytes per template
- 600 kilobytes per instance

If you plan to use this task intensively, calculate the appropriate extra space for your user file system.

3.8.2 Security

z/OS Cloud Provisioning added several new RACF definitions to z/OSMF. The profiles that must be defined when you plan to use Cloud Provisioning are defined to the following RACF classes:

- ZMFAPLA

  For z/OS Cloud Provisioning, this class consists of several profiles that are related to navigation tasks.

- ZMFCLOUD

  This class was created when z/OS Cloud Provisioning was introduced in z/OSMF V2R2. It includes all resource profiles that are related to Cloud Provisioning.

z/OS Cloud Provisioning also added the following new RACF groups to z/OSMF:

- IYU

  For z/OS Cloud Provisioning, this prefix is the default group name prefix. It can be used as is, or another name can be used. However, it must match the parameter `CLOUD_SAF_PREFIX` in SYS1.PARMLIB(IZUPRMxx).

- IYU0

  This name is the default group name for the domain administrator. It includes group IYU as its superior RACF group.

- IYU0RPAW

  This name is the default group name for the WLM resource pool administrator group. It includes group IYU as its superior RACF group.

- IYU0RPAN

  This name is the default group name for the networking resource pool administrator group. It includes group IYU as its superior RACF group.

- IYU000

  This name is the default group name for tenant consumers. It includes group IYU0 as its superior RACF group.

The necessary RACF definitions are shown in Example 3-6.

Example 3-6 RACF commands for z/OS Cloud Provisioning

```
/* Define the z/OSMF Server profile
RDEFINE SERVER BBG.SECCLASS.ZMFCLOUD UACC(NONE)

/* Permit the started task USERID access
PERMIT BBG.SECCLASS.ZMFCLOUD CLASS(SERVER) ID(IZUSVR) ACCESS(READ)

/* Activate the ZMFCLOUD class
SETROPTS CLASSACT(ZMFCLOUD)
SETROPTS RACLIST(ZMFCLOUD) GENERIC(ZMFCLOUD)

/* Setup the cloud provisioning landlord role.
/* Connect users with landlord authority to the IYU group.
/* This is a manual operation to be performed outside of z/OSMF.
ADDGROUP IYU
RDEFINE ZMFCLOUD +
  (IZUDFLT.ZOSMF.PROVISIONING.RESOURCE_MANAGEMENT.IYU) +
  UACC(NONE)
PERMIT IZUDFLT.ZOSMF.PROVISIONING.RESOURCE_MANAGEMENT.IYU +
  CLASS(ZMFCLOUD) ID(IYU) ACCESS(READ)
```

If you plan to use marketplace tasks in your z/OS Cloud Portal within z/OSMF, add the SAF profiles to your RACF database that are shown in Example 3-7. These commands are not documented in SYS1.SAMPLIB(IZUSEC).

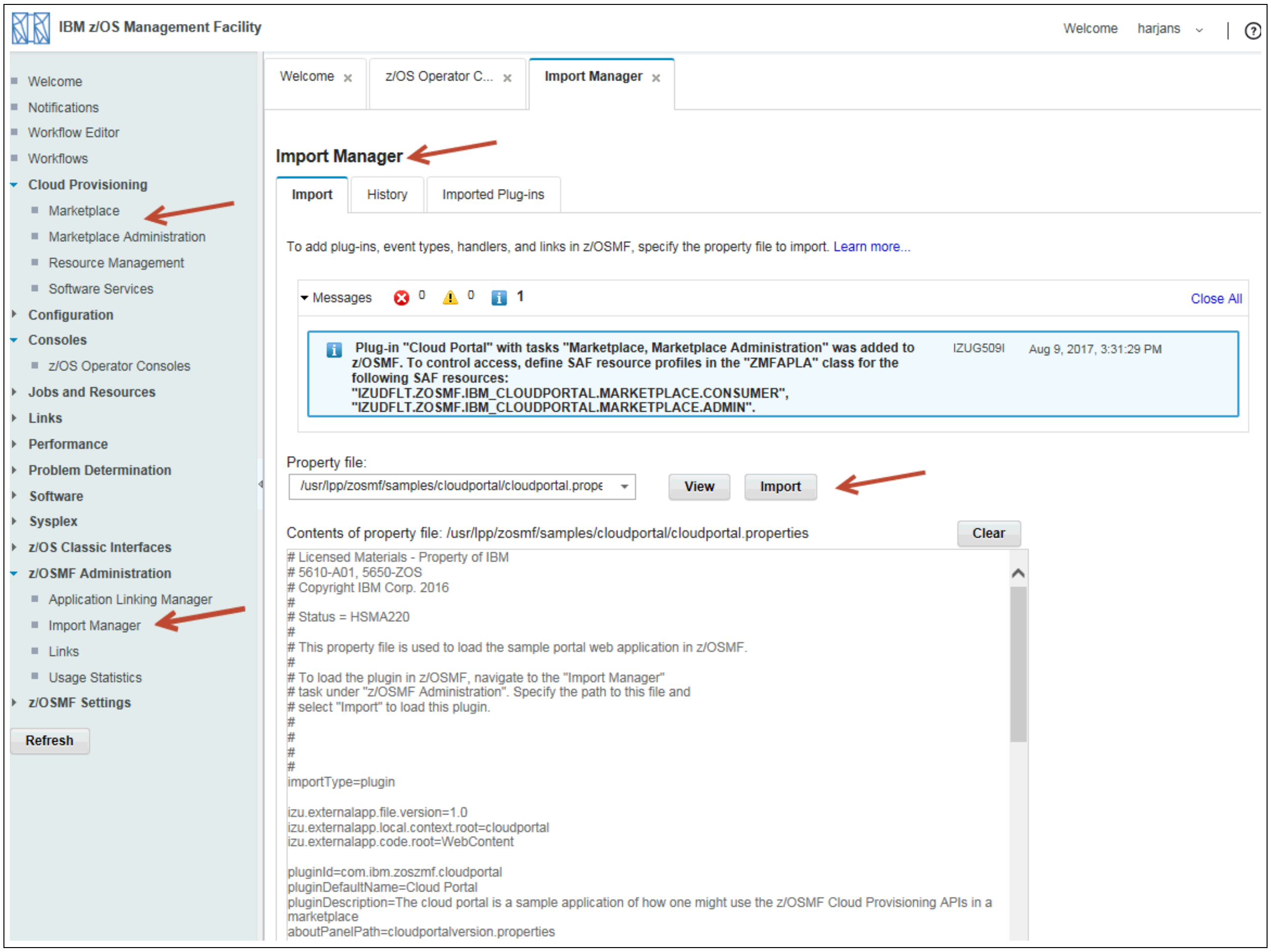
Example 3-7 RACF commands for z/OSMF Cloud portal marketplace tasks

```
RDEFINE ZMFAPLA +
  (IZUDFLT.ZOSMF.IBM_CLOUDPORTAL.MARKETPLACE.CONSUMER) UACC(NONE)
PERMIT IZUDFLT.ZOSMF.IBM_CLOUDPORTAL.MARKETPLACE.CONSUMER +
  CLASS(ZMFAPLA) ID(IZUADMIN IZUUSER) ACCESS(READ)
RDEFINE ZMFAPLA +
  (IZUDFLT.ZOSMF.IBM_CLOUDPORTAL.MARKETPLACE.ADMIN) UACC(NONE)
PERMIT IZUDFLT.ZOSMF.IBM_CLOUDPORTAL.MARKETPLACE.ADMIN +
  CLASS(ZMFAPLA) ID(IZUADMIN) ACCESS(READ)
RDEFINE ZMFAPLA +
  (IZUDFLT.ZOSMF.PROVISIONING.SOFTWARE_SERVICES) UACC(NONE)
PERMIT IZUDFLT.ZOSMF.PROVISIONING.SOFTWARE_SERVICES +
  CLASS(ZMFAPLA) ID(IZUADMIN IZUUSER) ACCESS(READ)
SETROPTS RACLIST(ZMFAPLA) REFRESH
```

3.8.3 Postinstallation

The last step in setting up the Cloud Portal in z/OSMF is to import the `/usr/lpp/zosmf/samples/cloudportalcloudportal.properties` file. For this task, click **z/OSMF Administration** and then, **Import Manager**. \

Enter the file name in the Property file field and click **Import**. The window in which the `cloudportal.properties` file is imported is shown in Figure 3-1.



To add plug-ins, event types, handlers, and links in z/OSMF, specify the property file to import. Learn more...

Messages ✖ 0 ⚠ 0 ℹ 1 Close All

ℹ **Plug-in "Cloud Portal" with tasks "Marketplace, Marketplace Administration" was added to z/OSMF. To control access, define SAF resource profiles in the "ZMFAPLA" class for the following SAF resources: "IZUDFLT.ZOSMF.IBM_CLOUDPORTAL.MARKETPLACE.CONSUMER", "IZUDFLT.ZOSMF.IBM_CLOUDPORTAL.MARKETPLACE.ADMIN".** IZUG509I Aug 9, 2017, 3:31:29 PM

Property file: /usr/lpp/zosmf/samples/cloudportal/cloudportal.prope

Contents of property file: /usr/lpp/zosmf/samples/cloudportal/cloudportal.properties

```
# Licensed Materials - Property of IBM
# 5610-A01, 5650-ZOS
# Copyright IBM Corp. 2016
#
# Status = HSMA220
#
# This property file is used to load the sample portal web application in z/OSMF.
#
# To load the plugin in z/OSMF, navigate to the "Import Manager"
# task under "z/OSMF Administration". Specify the path to this file and
# select "Import" to load this plugin.
#
#
#
#
importType=plugin

izu.externalapp.file.version=1.0
izu.externalapp.local.context.root=cloudportal
izu.externalapp.code.root=WebContent

pluginId=com.ibm.zoszmf.cloudportal
pluginDefaultName=Cloud Portal
pluginDescription=The cloud portal is a sample application of how one might use the z/OSMF Cloud Provisioning APIs in a
marketplace
aboutPanelPath=cloudportalversion.properties
```

Figure 3-1 Using Import Manager to integrate the Cloud Portal plug-in

If you plan to remove the Marketplace tasks later, or if any modifications are necessary, use `/usr/lpp/zosmf/samples/cloudportal/cloudportaldelete.properties` in the same way.

3.9 Configuration Assistant task

The Configuration Assistant task is part of the Configuration Assistant plug-in.

3.9.1 System prerequisites

To use the policies that are created by the configuration assistant, z/OS Communication Server Policy Based Networking must be implemented. Depending on the policy-based networking technology that is required, extra configuration on the host environment might be required. For example, for IP security, users might require the IKE, NSS, and DMD daemons.

Preparing a policy-based networking environment requires many steps that are outside the scope of this book. However, the steps for enabling many of these policy-based networking technologies are included in z/OSMF V2R1 as workflows.

3.9.2 Security

The Policy Agent must be correctly configured to allow policy files to be exported if the import policy data function of the Configuration Assistant is used. The user must have the correct security access permissions to import the policy file. For more information about the required security settings, see the Configuration Assistant Help topic that is titled, “Policy Data Import” (specifically, the section titled “Policy Agent Preparation”).

When policy files are installed, the user must have adequate permissions to save the policy file in the specified location. If FTP is used, a valid user ID and password are required.

3.9.3 Postinstallation

Using the Configuration Assistant in the z/OSMF environment requires that backing store files be migrated into the z/OSMF environment. If you migrate from a previous release of z/OSMF, the Configuration Assistant automatically transfers the backing store files from the previous release. For more information about the steps that are required to migrate files from a non-z/osmf version of the Configuration Assistant, see the Configuration Assistant online help topic that it titled, “Migration of existing backing store files”.

3.10 z/OS Operator Consoles

The Consoles task is part of the z/OS Operator plug-in. With this plug-in, you can view system messages and enter system commands. From a z/OS perspective, the console type is an extended multiple console support (EMCS) console. That is, it is a program that acts as a console.

If you operate in a sysplex environment, an extended console can work with any of your systems in that sysplex. It can receive messages from systems, or send messages to systems. Theoretically, no limit is placed on the number of EMCS consoles. However, EMCS consoles use more system resources, whether they are active or inactive. When an EMCS is activated, its definition is in place for the lifetime of an active sysplex. If you plan to use EMCS consoles, take this issue into account.

3.10.1 System prerequisites

No system prerequisite actions are needed.

3.10.2 Security

z/OS Operator Consoles plug-in added several SAF definitions to z/OSMF, as shown in Example 3-8 (where the general definitions for console usage are made), and in Example 3-9 (where you must define the authorizations for each EMCS console you plan to use). They are documented in SYS1.SAMPLIB(IZUGCSEC).

Example 3-8 RACF commands for z/OS Operator consoles in z/OSMF, Part 1

```
SETROPTS CLASSACT(ACCTNUM)
RDEFINE ACCTNUM <account> UACC(NONE)
PERMIT <account> CLASS(ACCTNUM) ACCESS(READ) ID(<userid>)
SETROPTS RACLIST(ACCTNUM) REFRESH

SETROPTS CLASSACT(TSOPROC)
RDEFINE TSOPROC <proc> UACC(NONE)
PERMIT <proc> CLASS(TSOPROC) ACCESS(READ) ID(<userid>)
SETROPTS RACLIST(TSOPROC) REFRESH

SETROPTS CLASSACT (SERVAUTH)
RDEFINE SERVAUTH CEA.CEATSO.TSOREQUEST UACC(NONE)
PERMIT CEA.CEATSO.TSOREQUEST CLASS(SERVAUTH) ACCESS(READ) ID(<userid>)
SETROPTS RACLIST(SERVAUTH) REFRESH

SETROPTS CLASSACT(TSOAUTH)
RDEFINE TSOAUTH CONSOLE UACC(NONE)
PERMIT CONSOLE CLASS(TSOAUTH) ACCESS(READ) ID(<userid>)
SETROPTS RACLIST(TSOAUTH) REFRESH
```

The following placeholders for different RACF settings are shown in Example 3-8:

- `<account>`

  This definition must match the TSO account that you define in the `COMMON_TSO` parameter in SYS1.PARMLIB(IZUPRMxx). The default is `ACCT(IZUACCT)`.

- `<userid>`

  Enter the target user ID for console users here.

- `<proc>`

  This value must match the logon procedure that you define in the `COMMON_TSO` parameter in SYS1.PARMLIB(IZUPRMxx). The default is `PROC(IZUFPROC)`.

Example 3-9 RACF commands for z/OS Operator consoles in z/OSMF, Part 2

```
SETROPTS CLASSACT(OPERCMDS)

RDEFINE OPERCMDS MVS.MCSOPER.<consolename> UACC(NONE)
PERMIT MVS.MCSOPER.<consolename> CLASS(OPERCMDS) ACCESS(READ) ID(<userid>)

/*ADDUSER <consolename> OPERPARM(AUTH(MASTER) ROUTCODE(ALL) MSCOPE(<sysname>))

RDEFINE OPERCMDS MVS.ROUTE.CMD.<sysname> UACC(NONE)
```

```
PERMIT MVS.ROUTE.CMD.<sysname> CLASS(OPERCMDS) ACCESS(READ) ID(<userid>)

RDEFINE JESSPOOL <sysname>.+MASTER+.SYSLOG.*.* UACC(NONE)
PERMIT <sysname>.+MASTER+.SYSLOG.*.* CLASS(JESSPOOL) ID(<userid>) ACCESS(READ)

PERMIT SYSPLEX.OPERLOG CLASS(LOGSTRM) ID(<userid>) ACCESS(READ)

SETROPTS RACLIST(LOGSTRM) REFRESH
SETROPTS RACLIST(JESSPOOL) REFRESH
SETROPTS RACLIST(OPERCMDS) REFRESH
```

The following placeholders for different RACF settings are shown in Example 3-9 on page 37:

- `<consolename>`

  Replace this name with the console name that you want to define. Remember that each EMCS console needs its dedicated name.

- `<sysname>`

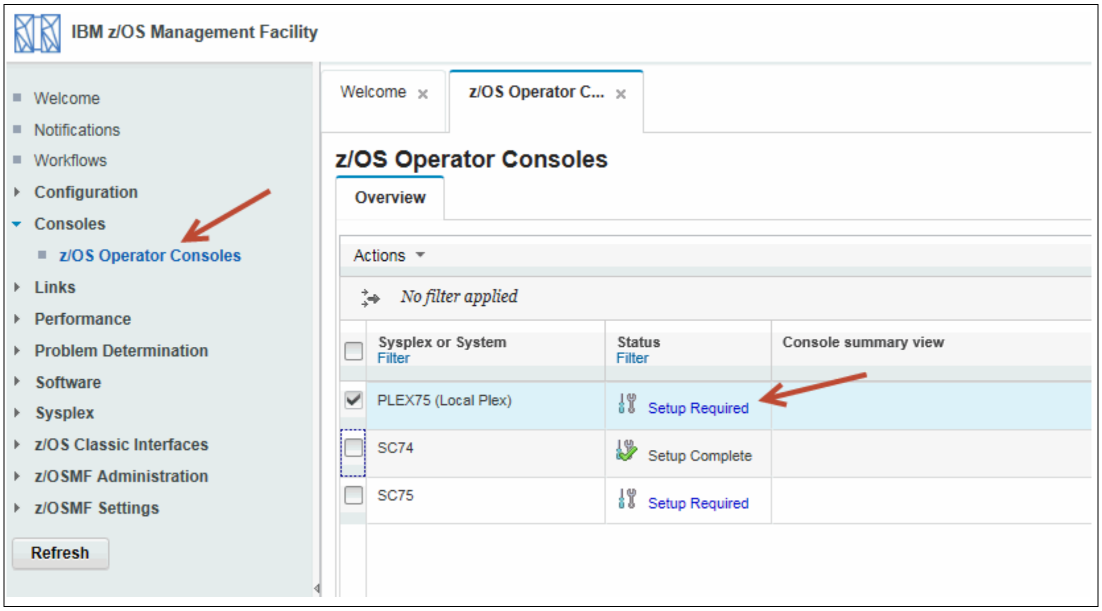
  Replace this name with the z/OS system name that you provide for the console. For sysplex environments, use `*ALL` instead.

- `<userid>`

  Replace this name with the user ID or a group name, such as IZUADMIN or IZUUSER, that you plan to give access to the EMCS console.

3.10.3 Postinstallation

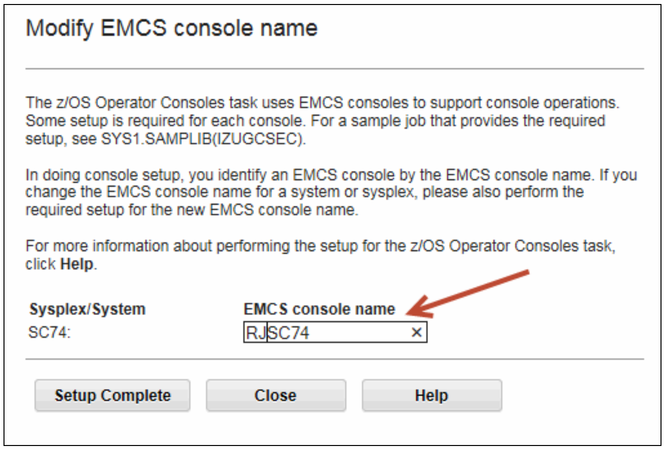
After finishing the SAF definitions, you must define the consoles that you plan to use in z/OSMF. The Consoles task is shown in Figure 3-2.



	Sysplex or System Filter	Status Filter	Console summary view
☑	PLEX75 (Local Plex)	Setup Required	
□	SC74	Setup Complete	
□	SC75	Setup Required	

Figure 3-2 EMCS console setup in z/OSMF

Before you can start a console, you must complete the setup process. Click **Setup Required** and another window opens (see Figure 3-3 on page 39) in which you can modify the default name of the EMCS console.



Modify EMCS console name

The z/OS Operator Consoles task uses EMCS consoles to support console operations. Some setup is required for each console. For a sample job that provides the required setup, see SYS1.SAMPLIB(IZUGCSEC).

In doing console setup, you identify an EMCS console by the EMCS console name. If you change the EMCS console name for a system or sysplex, please also perform the required setup for the new EMCS console name.

For more information about performing the setup for the z/OS Operator Consoles task, click **Help**.

Sysplex/System	EMCS console name
SC74:	RJSC74

Figure 3-3 Modifying EMCS console name in z/OSMF

When you are ready, click **Setup Complete** and your EMCS console is ready to start. Click **Actions** → **Start console**, as shown in Figure 3-4.

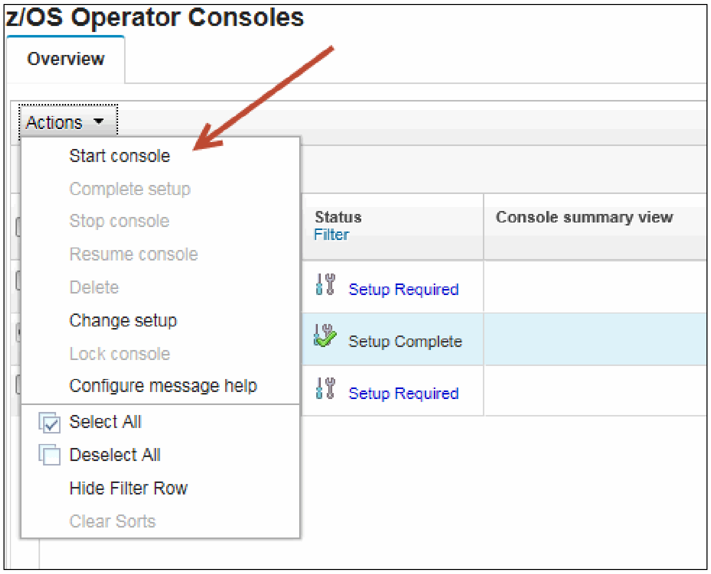
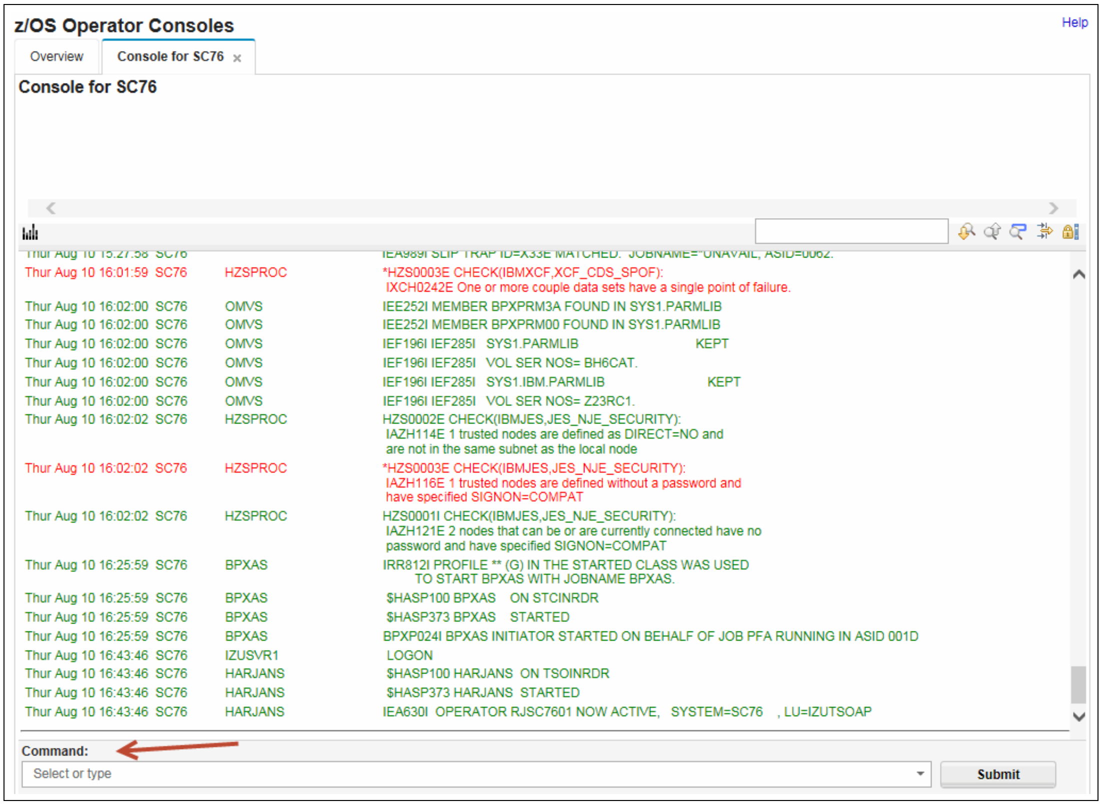


Figure 3-4 Starting an EMCS console in z/OSMF

When the console is started, it turns into the `Connected` state. Click the system name; the console window opens, as shown in Figure 3-5. The red arrow that is shown in Figure 3-5 indicates the command line in which you can enter any IBM MVS™ operator command.



```
Thur Aug 10 15:27:58  SC76                        IEA989I SLIP TRAP ID=X33E MATCHED.  JOBNAME=*UNAVAIL, ASID=0062.
Thur Aug 10 16:01:59  SC76     HZSPROC            *HZS0003E CHECK(IBMXCF,XCF_CDS_SPOF):
                                                   IXCH0242E One or more couple data sets have a single point of failure.
Thur Aug 10 16:02:00  SC76     OMVS               IEE252I MEMBER BPXPRM3A FOUND IN SYS1.PARMLIB
Thur Aug 10 16:02:00  SC76     OMVS               IEE252I MEMBER BPXPRM00 FOUND IN SYS1.PARMLIB
Thur Aug 10 16:02:00  SC76     OMVS               IEF196I IEF285I   SYS1.PARMLIB                     KEPT
Thur Aug 10 16:02:00  SC76     OMVS               IEF196I IEF285I   VOL SER NOS= BH6CAT.
Thur Aug 10 16:02:00  SC76     OMVS               IEF196I IEF285I   SYS1.IBM.PARMLIB                  KEPT
Thur Aug 10 16:02:00  SC76     OMVS               IEF196I IEF285I   VOL SER NOS= Z23RC1.
Thur Aug 10 16:02:02  SC76     HZSPROC            HZS0002E CHECK(IBMJES,JES_NJE_SECURITY):
                                                   IAZH114E 1 trusted nodes are defined as DIRECT=NO and
                                                   are not in the same subnet as the local node
Thur Aug 10 16:02:02  SC76     HZSPROC            *HZS0003E CHECK(IBMJES,JES_NJE_SECURITY):
                                                   IAZH116E 1 trusted nodes are defined without a password and
                                                   have specified SIGNON=COMPAT
Thur Aug 10 16:02:02  SC76     HZSPROC            HZS0001I CHECK(IBMJES,JES_NJE_SECURITY):
                                                   IAZH121E 2 nodes that can be or are currently connected have no
                                                   password and have specified SIGNON=COMPAT
Thur Aug 10 16:25:59  SC76     BPXAS              IRR812I PROFILE ** (G) IN THE STARTED CLASS WAS USED
                                                          TO START BPXAS WITH JOBNAME BPXAS.
Thur Aug 10 16:25:59  SC76     BPXAS               $HASP100 BPXAS    ON STCINRDR
Thur Aug 10 16:25:59  SC76     BPXAS               $HASP373 BPXAS    STARTED
Thur Aug 10 16:25:59  SC76     BPXAS              BPXP024I BPXAS INITIATOR STARTED ON BEHALF OF JOB PFA RUNNING IN ASID 001D
Thur Aug 10 16:43:46  SC76     IZUSVR1             LOGON
Thur Aug 10 16:43:46  SC76     HARJANS             $HASP100 HARJANS  ON TSOINRDR
Thur Aug 10 16:43:46  SC76     HARJANS             $HASP373 HARJANS  STARTED
Thur Aug 10 16:43:46  SC76     HARJANS            IEA630I  OPERATOR RJSC7601 NOW ACTIVE,   SYSTEM=SC76    , LU=IZUTSOAP
```

Figure 3-5   Operational z/OS operator console in z/OSMF

3.11 Jobs and Resources task

The Jobs and Resources task is represented by the z/OSMF version of IBM SDSF. The set up process that is used for this plug-in differs from the set up process that is used for IBM SDSF. This section describes how to set up the Jobs and Resources task.

3.11.1 System prerequisites

You must verify that your z/OS installation is SDSF licensed. You can check this issue by opening IFAPRDxx member of SYS1.PARMLIB and look for the SDSF enablement, as shown in Figure 3-6.

```
PRODUCT OWNER('IBM CORP')
        NAME('z/OS')
        ID(5650-ZOS)
        VERSION(*) RELEASE(*) MOD(*)
        FEATURENAME(SDSF)
        STATE(ENABLED)
```

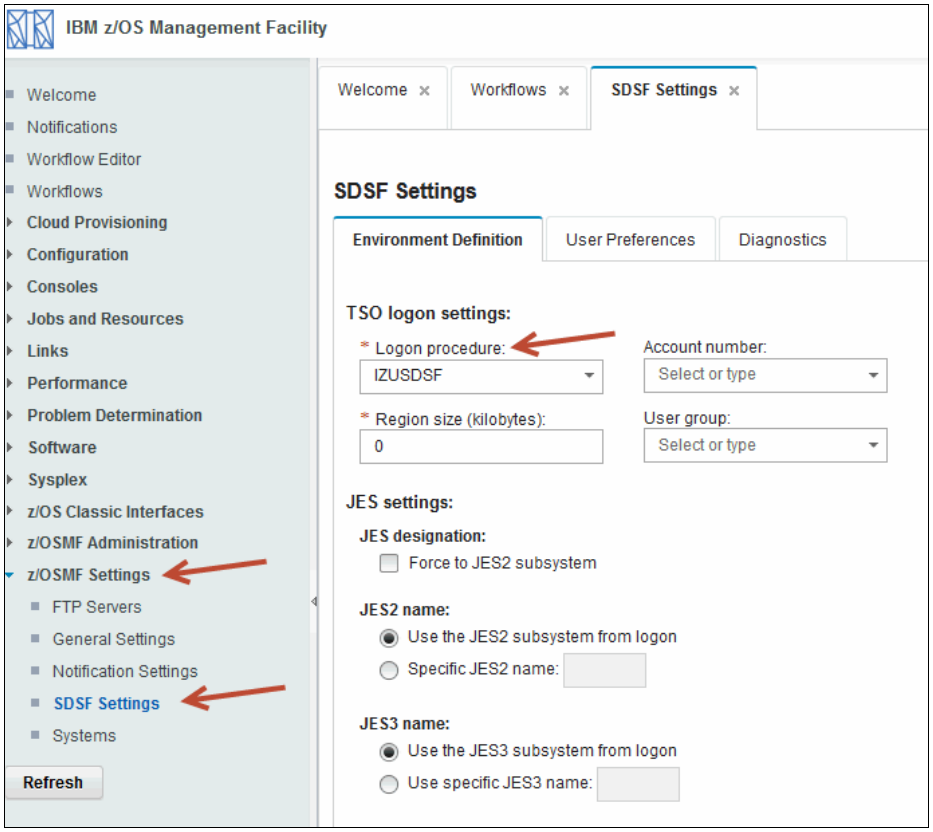
Figure 3-6   SYS.PARMLIB(IFAPRDxx) with SDSF enablement

To access SDSF within z/OMSF, you must provide a TSO logon procedure that includes at least the statements that are shown in Example 3-10.

Example 3-10 Simple logon procedure for z/OSMF SDSF

```
//SDSF EXEC PGM=IKJEFT01,DYNAMNBR=500
//SYSEXEC DD DISP=SHR,DSN=ISF.SISFEXEC
```

In z/OSMF, you must click **z/OSMF settings** and then, **SDSF settings** to define this logon procedure to z/OSMF, as shown in Figure 3-7.



TSO logon settings:

* Logon procedure: IZUSDSF

* Region size (kilobytes): 0

Account number: Select or type

User group: Select or type

JES settings:

JES designation:

□ Force to JES2 subsystem

JES2 name:

● Use the JES2 subsystem from logon

○ Specific JES2 name:

JES3 name:

● Use the JES3 subsystem from logon

○ Use specific JES3 name:

Figure 3-7 SDSF settings in z/OSMF

3.11.2 Security

When you plan to set up SDSF in z/OSMF, you must grant the users access to the profiles from class ZMFAPLA, as shown in Example 3-11.

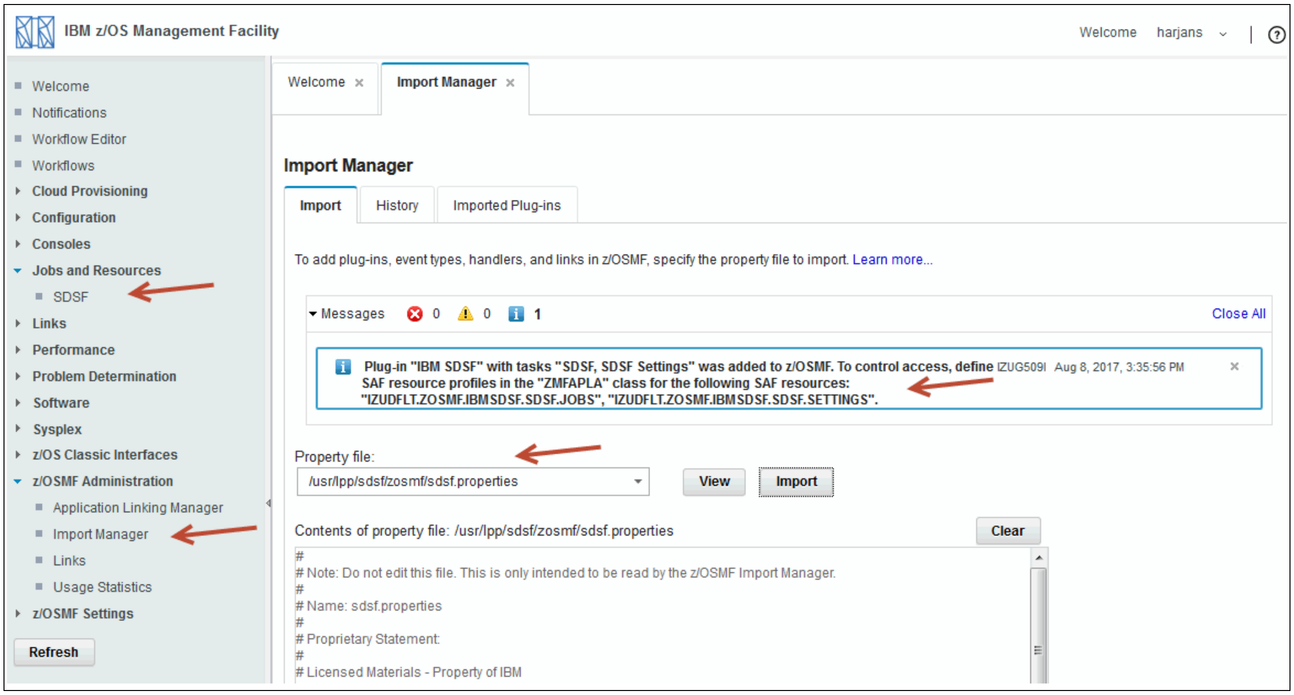
Example 3-11 Definitions for SDSF in RACF class ZMFAPLA

```
RDEFINE ZMFAPLA IZUDFLT.ZOSMF.IBMSDSF.SDSF.JOBS UACC(NONE)
PERMIT IZUDFLT.ZOSMF.IBMSDSF.SDSF.JOBS CLASS(ZMFAPLA) ID(IZUUSER) ACCESS(READ)
RDEFINE ZMFAPLA IZUDFLT.ZOSMF.IBMSDSF.SDSF.SETTINGS UACC(NONE)
PERMIT IZUDFLT.ZOSMF.IBMSDSF.SDSF.JOBS CLASS(ZMFAPLA) ID(IZUUSER) ACCESS(READ)
```

Another option is the use of ISFPARMS to control access to SDSF. However, the use of SAF is recommended.

3.11.3 Postinstallation

The last step in setting up SDSF in z/OSMF is to import the `sdsf.properties` file, which is found in `/usr/lpp/sdsf/zosmf`. For this task, click **z/OSMF Administration** and then, **Import Manager**. The window in which the `sdsf.properties` file is imported is shown in Figure 3-8.



To add plug-ins, event types, handlers, and links in z/OSMF, specify the property file to import. Learn more...

Plug-in "IBM SDSF" with tasks "SDSF, SDSF Settings" was added to z/OSMF. To control access, define SAF resource profiles in the "ZMFAPLA" class for the following SAF resources: "IZUDFLT.ZOSMF.IBMSDSF.SDSF.JOBS", "IZUDFLT.ZOSMF.IBMSDSF.SDSF.SETTINGS". IZUG509I Aug 8, 2017, 3:35:56 PM

Property file: /usr/lpp/sdsf/zosmf/sdsf.properties

Contents of property file: /usr/lpp/sdsf/zosmf/sdsf.properties

```
#
# Note: Do not edit this file. This is only intended to be read by the z/OSMF Import Manager.
#
# Name: sdsf.properties
#
# Proprietary Statement:
#
# Licensed Materials - Property of IBM
```

Figure 3-8 Use of Import Manager for the integration of SDSF

After performing this setup, you can use SDSF by using the Jobs and Resources category.

3.12 Links

Links are available in the Links category of the z/OSMF navigation area. No prerequisites must be met the use the Links category. The available links for a user is determined by the user's role. Links are managed through the Links option under the z/OSMF Administration category.

3.12.1 Security

For more information about the security administration of the Links category, read "Security" on page 193.

3.13 Performance

The Performance section in z/OSMF provides you with all tasks with their appropriate plug-ins to work with z/OS performance-related activities. In this section, we describe these prerequisite activities when you plan to use the following plug-ins:

- Capacity Provisioning
- Resource Monitoring and System Status
- Workload Management

3.13.1 Capacity Provisioning task

The Capacity Provisioning task is part of the Capacity Provisioning plug-in.

System prerequisites

A connection to a Capacity Provisioning Manager (CPM) is required. If the CPM is not on the same system as the z/OSMF instance, more set-up steps are required. The Capacity Provisioning task must communicate with the CPM through a CIM server on the remote system.

For more information about this step, see the “Updating z/OS for Capacity Provisioning plug-in” section of *IBM z/OS Management Facility Configuration Guide Version 2 Release 3,* SC-27-8419.

Security

If you plan to use the Capacity Provisioning plug-in, you must make the SAF definitions that are shown in Example 3-12. The defaults are documented in SYS.SAMPLIB(IZUCPSEC).

Example 3-12 RACF setup for capacity provisioning setup in z/OSMF

```
RDEFINE ZMFAPLA +
  IZUDFLT.ZOSMF.CAPACITY_PROVISIONING.CAPACITY_PROVISIONING.VIEW UACC(NONE)
RDEFINE ZMFAPLA +
  IZUDFLT.ZOSMF.CAPACITY_PROVISIONING.CAPACITY_PROVISIONING.EDIT.DOMAIN +
  UACC(NONE)
RDEFINE ZMFAPLA +
  IZUDFLT.ZOSMF.CAPACITY_PROVISIONING.CAPACITY_PROVISIONING.EDIT.POLICY +
  UACC(NONE)
RDEFINE ZMFAPLA +
  IZUDFLT.ZOSMF.CAPACITY_PROVISIONING.CAPACITY_PROVISIONING.EDIT UACC(NONE)
PERMIT +
  IZUDFLT.ZOSMF.CAPACITY_PROVISIONING.CAPACITY_PROVISIONING.VIEW +
  CLASS(ZMFAPLA) ID(IZUUSER) ACCESS(READ)
PERMIT +
  IZUDFLT.ZOSMF.CAPACITY_PROVISIONING.CAPACITY_PROVISIONING.VIEW +
  CLASS(ZMFAPLA) ID(IZUADMIN) ACCESS(READ)
PERMIT +
  IZUDFLT.ZOSMF.CAPACITY_PROVISIONING.CAPACITY_PROVISIONING.EDIT.DOMAIN +
  CLASS(ZMFAPLA) ID(IZUADMIN) ACCESS(READ)
PERMIT +
  IZUDFLT.ZOSMF.CAPACITY_PROVISIONING.CAPACITY_PROVISIONING.EDIT.POLICY +
  CLASS(ZMFAPLA) ID(IZUADMIN) ACCESS(READ)
PERMIT +
  IZUDFLT.ZOSMF.CAPACITY_PROVISIONING.CAPACITY_PROVISIONING.EDIT +
  CLASS(ZMFAPLA) ID(IZUADMIN) ACCESS(READ)
```

Postinstallation

Depending on your configuration, you might have to grant more access privileges to z/OSMF capacity provisioning users to access the CPM resources.

3.13.2 Resource Monitoring and System Status tasks

The Resource Monitoring and System Status tasks are part of the Resource Monitoring plug-in.

The Resource Monitoring Facility (RMF) is used for the performance monitoring feature of z/OSMF. RMF is an optional component of z/OS that is available for a fee. RMF must be available before RMF can be used with z/OSMF.

For more information, see the "Using dynamic enablement" section of *z/OS Planning for Installation Version 2 Release 3,* GA32-0890.

Your IFAPRDxx member of SYS1.PARMLIB member should contain the following stanzas:

```
PRODUCT OWNER('IBM CORP')
        NAME('z/OS')
        ID(5650-ZOS)
        VERSION(*) RELEASE(*) MOD(*)
        FEATURENAME(RMF)
        STATE(ENABLED)
```

Use of this plug-in requires the RMF feature of z/OS. In addition, an RMF Distributed Data Server (DDS) must be active on the system where z/OSMF is running.

If the RMF DDS server requires authentication, PassTicket support must be configured for communication between z/OSMF and the RMF DDS server. For more information about setting up feature, see the "Updating z/OS for the Resource Monitoring plug-in" section of *IBM z/OS Management Facility Configuration Guide Version 2 Release 3,* SC-27-8419.

If you plan to monitor z/OS systems other than the sysplex where z/OSMF is installed, a DDS server must be set up for each remote system. A connection to that system also must be defined to z/OSMF through the System Status task.

Additionally, if the monitored system is not a z/OS system, other DDS servers must be configured. A DDS server (on a z/OS system) is configured to communicate with a CIM server that is running on the system to be monitored.

PassTicket support might be required if authentication is required between z/OSMF and the DDS servers. The remote CIM servers might have their own authentication requirements, which require appropriate changes to establish communication between the DDS server and the remote CIM server. Finally, a connection to the DDS servers must be defined to z/OSMF through the System Status task.

Metrics for monitored systems also must be defined through the Resource Monitoring task.

System prerequisites

In this section, the system prerequisites for these tasks are described.

Verifying that the CIM server is configured

Ensure that the CIM server is configured and operational. For more information, see 3.22, "Common Information Model" on page 69.

Verifying that the Distributed Data Server is active

For z/OS sysplexes, z/OSMF uses input from a single data server on one system in the sysplex. This data server collects data from the RMF Monitor III data gatherer on each image in the Sysplex by using the Distributed Data Server (DDS) function.

For more information about setting up the DDS server, see the following resources:

- "Setting up the Distributed Data Server" section in the *Resource Measurement Facility User's Guide Version 2 Release 3,* SC34-2664
- "Updating z/OS for the Resource Monitoring plug-in" section in the *IBM z/OS Management Facility Configuration Guide Version 2 Release 3,* SC-27-8419
- "System prerequisites for the Monitoring Desktops and Sysplex Status tasks" section in the *IBM z/OS Management Facility Configuration Guide Version 2 Release 3,* SC-27-8419

The following set-up tasks must be performed:

- Ensure that parameter `PLUGINS(RESOURCE_MON)` in SYS1.PARMLIB(IZUPRMxx) is uncommented.
- Ensure that RMF, RMF Monitor III, and DDS are set as available. The started task name for DDS is GPMSERVE.
- Configure your DDS Security environment.

Security

This section describes preparation of the following security:

- z/OSMF
- RMF

z/OSMF security for Resource Monitoring

If you plan to use the Resource Monitoring plug-in, you must make the SAF definitions for z/OSMF that are shown in Example 3-13. The defaults are documented in SYS.SAMPLIB(IZURMSEC).

Example 3-13 RACF definitions for z/OSMF Resource Monitoring, part 1

```
RDEFINE ZMFAPLA IZUDFLT.ZOSMF.RESOURCE_MONITORING.PERFDESKS +
   UACC(NONE)
 RDEFINE ZMFAPLA IZUDFLT.ZOSMF.RESOURCE_MONITORING.OVERVIEW +
   UACC(NONE)

PERMIT IZUDFLT.ZOSMF.RESOURCE_MONITORING.PERFDESKS CLASS(ZMFAPLA) +
   ID(IZUUSER) ACCESS(READ)
 PERMIT IZUDFLT.ZOSMF.RESOURCE_MONITORING.OVERVIEW CLASS(ZMFAPLA) +
   ID(IZUUSER) ACCESS(READ)

PERMIT IZUDFLT.ZOSMF.RESOURCE_MONITORING.PERFDESKS CLASS(ZMFAPLA) +
   ID(IZUADMIN) ACCESS(READ)
 PERMIT IZUDFLT.ZOSMF.RESOURCE_MONITORING.OVERVIEW CLASS(ZMFAPLA) +
   ID(IZUADMIN) ACCESS(READ)

SETROPTS RACLIST(ZMFAPLA) REFRESH
```

These definitions create only the base rules to allow you to display the Resource Monitoring option in the Performance menu. The `saf_prefix.ZOSMF.RESOURCE_MONITORING` profile of the ZMFAPLA class is shown in Example 3-13 on page 45. If you can access this profile, you can access Resource Monitoring.

However, specific set-up actions must occur at the RMF component level. RMF, the RMF Data Gatherer, and the DDS server must be configured. In addition, if you are monitoring non-z/os hosts, a GPM4CIM server must be configured for each remote host (AIX, Linux, or Windows).

Started task definitions (RMF, RMF Data Gatherer, DDS, and remote DDS)

To set up the started task definitions, complete steps that are shown in Example 3-14.

Example 3-14 RACF definitions for z/OSMF Resource Monitoring, part 2

```
RDEFINE STARTED RMF.*      STDATA(USER(RMF)      TRUSTED(YES))
RDEFINE STARTED RMFGAT.*   STDATA(USER(RMFGAT)   TRUSTED(YES))
RDEFINE STARTED GPMSERVE.* STDATA(USER(GPMSERVE) TRUSTED(YES))
RDEFINE STARTED GPM4CIM.*  STDATA(USER(GPMSERVE) TRUSTED(YES))
SETROPTS RACLIST(STARTED) REFRESH

PERMIT BPX.WLMSERVER CLASS(FACILITY) ID(GPMSERVE) ACCESS(READ)

PERMIT BPX.DAEMON CLASS(FACILITY) ID(GPMSERVE) ACCESS(READ)
PERMIT BPX.SERVER CLASS(FACILITY) ID(GPMSERVE) ACCESS(READ)
PERMIT BPX.STOR.SWAP CLASS(FACILITY) ID(GPMSERVE) ACCESS(READ)
RDEFINE PROGRAM GPM* ADDMEM('SYS1.SERBLINK'//NOPADCHK) UACC(READ)
RDEFINE PROGRAM ERB* ADDMEM('SYS1.SERBLINK'//NOPADCHK) UACC(READ)
RDEFINE PROGRAM CEEBINIT ADDMEM('CEE.SCEERUN'//NOPADCHK) UACC(READ)
RDEFINE PROGRAM IEEMB878 ADDMEM('SYS1.LINKLIB'//NOPADCHK) UACC(READ)
RDEFINE PROGRAM CELHV003 ADDMEM('SYS1.SCEERUN2'//NOPADCHK) UACC(READ)
RDEFINE PROGRAM C128 ADDMEM('SYS1.SCEERUN2'//NOPADCHK) UACC(READ)
RDEFINE PROGRAM CELHDCPP ADDMEM('SYS1.SCEERUN2'//NOPADCHK) UACC(READ)
SETROPTS WHEN(PROGRAM) REFRESH
SETROPTS RACLIST(FACILITY) REFRESH

PERMIT IEAABD.DMPAUTH CLASS(FACILITY) ID(user) ACCESS(READ)

RDEFINE APPL GPMSERVE UACC(READ)
RDEFINE APPL GPM4CIM UACC(READ)

SETROPTS CLASSACT(PTKTDATA)
SETROPTS RACLIST(PTKTDATA)

RDEFINE PTKTDATA GPMSERVE SSIGNON(KEYMASKED(<key>)

PERMIT IRRPTAUTH.GPMSERVE.* CLASS(PTKTDATA) ID(<user>) ACCESS(UPDATE)

SETROPTS RACLIST(PTKTDATA) REFRESH
```

The following placeholders are used for the RACF settings in Example 3-14 on page 46:

- `<key>`

  Replace this placeholder with 16-digit value of your choice. This value is used to generate the PassTicket. Valid characters are 0 - 9 and A - F.

- `<user>`

  Replace this placeholder with the user ID that connects to the DDS server. Because the CIM server is used in our example, take the user ID of the CIM server started task.

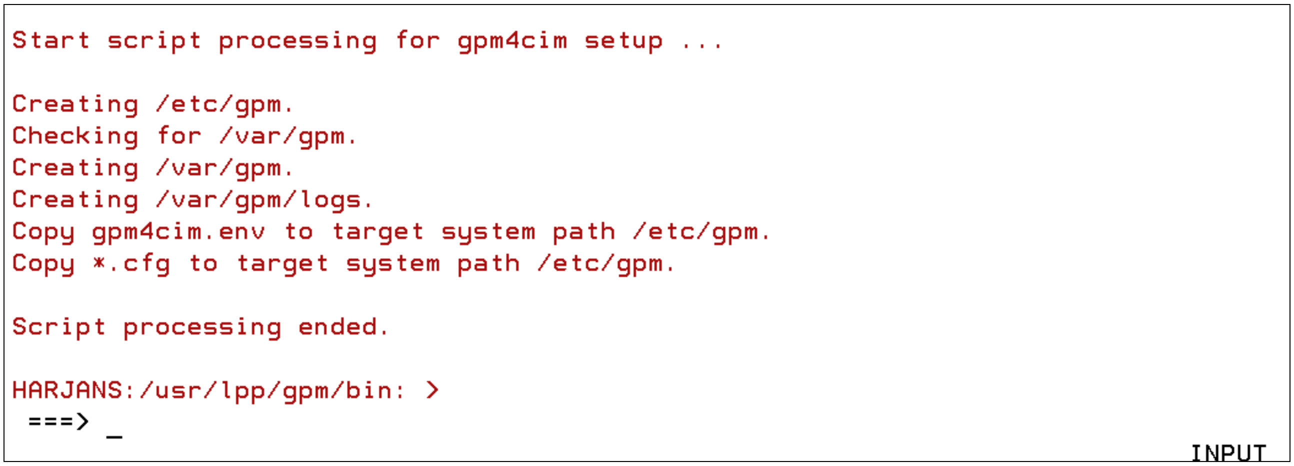
GPM4CIM

The profiles for GPM4CIM are similar to the profiles that are used for GPMSERVE and (where applicable) are included, as described in “Security” on page 45.

Postinstallation

If you monitor non-z/os hosts, you must run the **g**pm4cim_setup.sh script before GPM4CIM is used. This script is in the /usr/lpp/gpm/bin directory. If necessary, the script allocates the /etc/gpm and /var/gpm/logs directories and copies the provided configuration files for all operating system types to the /etc/gpm directory.

You must adapt the configuration files to your environment before starting a GPM4CIM instance. The script output looks similar the output that is shown in Figure 3-9 and the directories are created.



```
Start script processing for gpm4cim setup ...

Creating /etc/gpm.
Checking for /var/gpm.
Creating /var/gpm.
Creating /var/gpm/logs.
Copy gpm4cim.env to target system path /etc/gpm.
Copy *.cfg to target system path /etc/gpm.

Script processing ended.

HARJANS:/usr/lpp/gpm/bin: >
 ===> _
                                                                    INPUT
```

Figure 3-9 gpm4cim setup script

You must update the applicable configuration file (especially the AIX_COMPLEX, AIX_IMAGE, LNX_COMPLEX, LNX_IMAGE, LNZ_COMPLEX, and LNZ_IMAGE sections) with the names of the root resources of the GPM4CIM instance and the IP address information for the images.

Start the procedures by running the following command:

```
START GPM4CIM.identifier,OS=A|X|L
```

The OS parameter is the suffix of the config member. For example, **A** points to gpm4A.cfg.

GPM4CIM parameters

The **cfg** parameter in the **PARM** statement points to the GPM4CIM configuration file. Because one instance of GPM4CIM is needed per platform, no unique configuration file is used. You can supply different configuration files by using the following OS variables to denote the target platform:

- `A`: AIX on IBM System p
- `X`: Linux on System x
- `Z`: Linux on IBM Z

The environment variables are in the `gpm4cim.env` file, which is specified with STDENV ddname. Log and trace output is written to the files that are specified with the STDOUT and STDERR ddnames. If multiple instances of GPM4CIM are running simultaneously, you can specify individual output files by altering the file names in the **PATH** parameter.

The GPM4CIM parameters are supplied with the platform-specific configuration files `/etc/gpm/gpm4[A|Z|W].cfg`. These parameters allow you to run one separate GPM4CIM instance per platform, which is required if you want to monitor AIX, Linux, and systems in a mixed environment.

You can also start multiple instances of GPM4CIM for the same platform. In this case, provide a dedicated copy of the configuration file per instance; for example, `gpm4a1.cfg` and `gpm4a2.cfg`, and use these names in the GPM4CIM procedures

Sample configuration files are in the `/usr/lpp/gpm/etc/` directory.

GPMSERVE PROC

To start the `DDS (GPMSERVE)`, RMF provides the cataloged procedure that is stored in SYS1.PROCLIB(GPMSERVE) and is shown in Figure 3-10. You can modify it according to your requirements.

```
//GPMSERVE PROC MEMBER=00
//STEP1 EXEC PGM=GPMDDSRV,REGION=128M,TIME=1440,
// PARM=’TRAP(ON)/&MEMBER’
...
//GPMPPJCL DD DISP=SHR,DSN=SYS1.SERBPWSV(GPMPPJCL)
```

Figure 3-10 GPMSERVE sample

3.13.3 System Status task

This task is installed as part of the Resource Monitoring plug-in. No other configuration is required to use it. Connections to DDS servers to monitor z/OS or other systems are defined by using this task.

3.13.4 Workload Management task

The Workload Management task is part of the Workload Management plug-in.

A CIM server is required on the system where z/OSMF runs. In addition, security definitions must be in place to allow users to work with the service policies. For more information about these security requirements, see the “Updating z/OS for the Workload Management plug-in” section of *IBM z/OS Management Facility Configuration Guide Version 2 Release 3,* SC-27-8419.

System prerequisites

The following tasks must be completed:

- Ensure that parameter `PLUGINS(WORKLOAD_MGMT)` in SYS1.PARMLIB(IZUPRMxx) is uncommented.
- Ensure that the CIM server is configured and operational. For more information, see 3.22, “Common Information Model” on page 69.

Security

When you plan to use the Workload Management task, you must make the SAF changes that are shown in Example 3-15. The defaults are documented in SYS.SAMPLIB(IZUWMSEC).

Example 3-15 RACF definitions for WLM plug-in

```
RDEFINE FACILITY MVSADMIN.WLM.POLICY UACC(NONE)
PERMIT MVSADMIN.WLM.POLICY CLASS(FACILITY) ID(WLMGRP) ACCESS(UPDATE)
PERMIT MVSADMIN.WLM.POLICY CLASS(FACILITY) ID(IZUSVR) ACCESS(READ)
SETROPTS RACLIST(FACILITY) REFRESH

RDEFINE ZMFAPLA +
  IZUDFLT.ZOSMF.WORKLOAD_MANAGEMENT.WORKLOAD_MANAGEMENT.VIEW +
  UACC(NONE)
RDEFINE ZMFAPLA +
  IZUDFLT.ZOSMF.WORKLOAD_MANAGEMENT.WORKLOAD_MANAGEMENT.MODIFY +
  UACC(NONE)
RDEFINE ZMFAPLA +
  IZUDFLT.ZOSMF.WORKLOAD_MANAGEMENT.WORKLOAD_MANAGEMENT.INSTALL +
  UACC(NONE)
PERMIT IZUDFLT.ZOSMF.WORKLOAD_MANAGEMENT.WORKLOAD_MANAGEMENT.VIEW +
  CLASS(ZMFAPLA) ID(IZUUSER) ACCESS(READ)
PERMIT IZUDFLT.ZOSMF.WORKLOAD_MANAGEMENT.WORKLOAD_MANAGEMENT.VIEW +
  CLASS(ZMFAPLA) ID(IZUADMIN) ACCESS(READ)
PERMIT +
  IZUDFLT.ZOSMF.WORKLOAD_MANAGEMENT.WORKLOAD_MANAGEMENT.MODIFY +
  CLASS(ZMFAPLA) ID(IZUADMIN) ACCESS(READ)
PERMIT +
  IZUDFLT.ZOSMF.WORKLOAD_MANAGEMENT.WORKLOAD_MANAGEMENT.INSTALL +
  CLASS(ZMFAPLA) ID(IZUADMIN) ACCESS(READ)
SETROPTS RACLIST(ZMFAPLA) REFRESH
```

If you plan to use z/OS Cloud Provisioning, you must prepare more SAF definitions for WLM, as shown in Example 3-16.

Example 3-16 RACF definitions for WLM use with z/OS Cloud Provisioning plug-in

```
RDEFINE ZMFAPLA IZUDFLT.ZOSMF.WORKLOAD_MANAGEMENT.WORKLOAD_MANAGEMENT.ENWRP +
 UACC(NONE)
PERMIT IZUDFLT.ZOSMF.WORKLOAD_MANAGEMENT.WORKLOAD_MANAGEMENT.ENWRP +
 CLASS(ZMFAPLA) ID(IZUADMIN) ACCESS(READ)
SETROPTS RACLIST(ZMFAPLA) REFRESH
```

The three profiles that we describe in Example 3-15 on page 49 define the following authorization levels for the Workload Management task:

- Install

  This authorization level allows the user to install service definitions and activate service policies. A user that is authorized for this level also must be authorized for the View level to start the Workload Management task.

- Modify

  This authorization level allows a user to modify service definitions and to import service definitions from host data sets or local workstation files into z/OSMF. A user that is authorized for this level also must be authorized for the View level to start the Workload Management task. To install service definitions and activate service policies, the user must also be authorized for the Install level.

- View

  This authorization level allows the user to start the Workload Management task, and view service definitions, service policies, and WLM status.

By default, the z/OSMF administrators security group is authorized for the Install, Modify, and View functions, which makes the group equivalent to a WLM policy administrator.

More access is required for the FACILITY class of the MVSADMIN.WLM.POLICY profile. You must decide how you want to limit access by using READ or UPDATE. Consider the following points:

- READ

  With READ access, the user can extract a service definition from the WLM couple data set.

- UPDATE

  With UPDATE access, the user can perform the following tasks:

  - Perform all of the functions that are available for READ access.
  - Install a service definition to a WLM couple data set.
  - Activate a service policy.

Postinstallation

No postinstallation tasks are required.

3.14 Problem Determination task

The Problem Determination task is part of the Incident Log plug-in.

This task interacts with several z/OS components. For more information about the requirements for this task, see the “Updating z/OS for the Incident Log plug-in” section of the *IBM z/OS Management Facility Configuration Guide Version 2 Release 3,* SC-27-8419.

The following requirements must be met:

- Ensure that the Common Information Mode (CIM) server is configured on your system, including security authorization and file system customization.
- Define a couple data set for System Logger (System Logger must be configured).
- Enable message log snapshots on the host system, or optionally, on a sysplex-wide basis.

- Enable error log snapshots on the host system, or optionally, on a sysplex-wide basis.
- Set up and configure automatic dump data set allocation.
- Configure dump analysis and elimination (DAE) to suppress duplicate SVC dumps and use a sysplex-wide scope.
- Create a sysplex dump directory.
- Configure CEA in full function mode with the required security authorizations.
- Ensure that System REXX is set up and active.
- If renaming dump data sets, ensure that the data set name in the sysplex dump directory is correct (it matches the renamed dump data set).
- Ensure that the AMATERSE utility is available and in an APF-authorized data set.

Users who are working with Incident Log must have the authority to access the dump, error logs, message logs, and any other relevant data sets when they are browsing or using the FTP feature to send data to a remote site.

System prerequisites

To use Incident Log, you must ensure that several z/OS components and facilities are enabled on your system. These functions support the collection of diagnostic data and the creation of diagnostic logs. Part of this work might already be done on your system (or might not be applicable), but you must check that the Incident Log functions correctly.

Other setup actions might require modifications to a setting. For example, if your installation defined a couple data set for the System Logger component, you might need to increase the space allocation for the log stream records.

Checklist for the Incident Log task

This section describes the requirements for using the Incident Log task.

Ensuring that CIM server is active

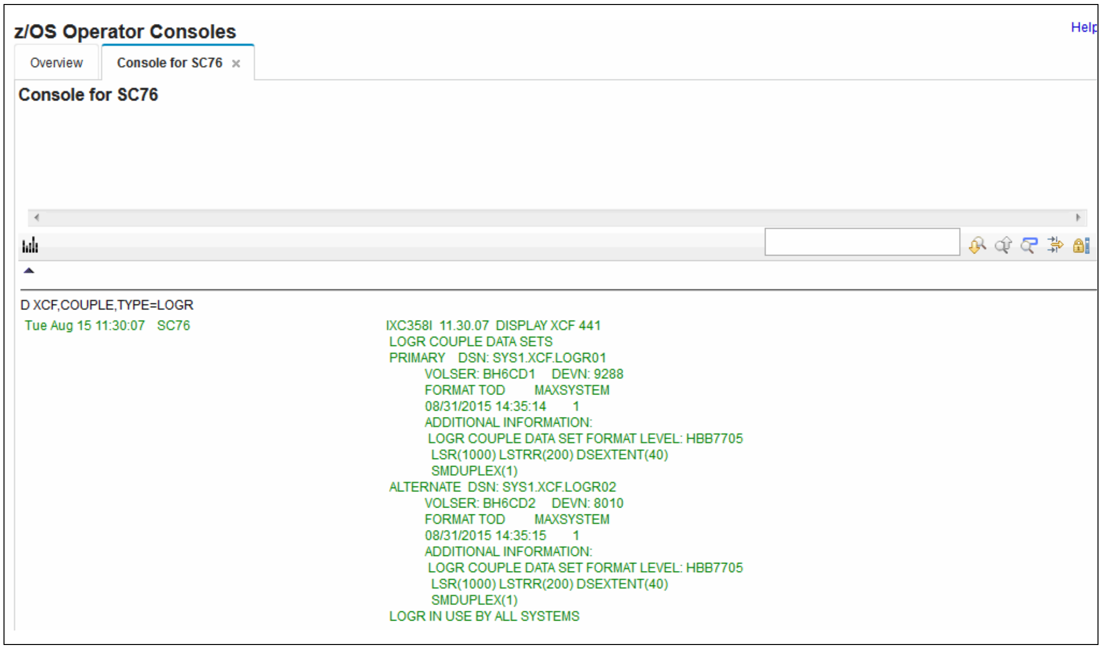
Ensure that the CIM server is configured on your system, including security authorizations and file system customization. For more information, see 3.22, “Common Information Model” on page 69.

Defining the couple data set (CDS) for System Logger

The Incident Log task requires that your system environment includes a couple data set that is defined for the System Logger component of z/OS. To display LOGR couple data sets on a system, run the following command:

```
D XCF,COUPLE,TYPE=LOGR
```

Figure 3-11 shows the results of running the command on our example system.



```
D XCF,COUPLE,TYPE=LOGR
 Tue Aug 15 11:30:07   SC76                    IXC358I  11.30.07  DISPLAY XCF 441
                                                LOGR COUPLE DATA SETS
                                                PRIMARY    DSN: SYS1.XCF.LOGR01
                                                         VOLSER: BH6CD1    DEVN: 9288
                                                         FORMAT TOD        MAXSYSTEM
                                                         08/31/2015 14:35:14       1
                                                         ADDITIONAL INFORMATION:
                                                          LOGR COUPLE DATA SET FORMAT LEVEL: HBB7705
                                                           LSR(1000) LSTRR(200) DSEXTENT(40)
                                                           SMDUPLEX(1)
                                                ALTERNATE  DSN: SYS1.XCF.LOGR02
                                                         VOLSER: BH6CD2    DEVN: 8010
                                                         FORMAT TOD        MAXSYSTEM
                                                         08/31/2015 14:35:15       1
                                                         ADDITIONAL INFORMATION:
                                                          LOGR COUPLE DATA SET FORMAT LEVEL: HBB7705
                                                           LSR(1000) LSTRR(200) DSEXTENT(40)
                                                           SMDUPLEX(1)
                                                LOGR IN USE BY ALL SYSTEMS
```

Figure 3-11 Display command that shows the LOGR couple data sets

You must define or update the System Logger couple data set (LOGR CDS) with a large enough log stream records (LSR) value to allow sufficient space for managing the DASD-only log streams that are created for the diagnostic log snapshots.

The LSR value must be large enough to allow for two snapshot log streams for each dump that is recorded in z/OSMF, plus two model log streams that are used as templates for defining the storage attributes for the snapshots. For more information about modifying and reformatting a couple data set, see *z/OS Setting up a Sysplex*, SA22-7625.

System Logger supports shared sysplex-scope (coupling facility resident) log stream and single-system DASD-only log streams. Consider the following points:

- Coupling facility (CF) log streams are sysplex-wide in scope. Any system in the sysplex can write to these log streams.
- DASD-only log streams can be written to by the local system only. When a DASD-only log stream is closed, it can be read from other systems in the sysplex if it is on the DASD that is shared by the other systems in the sysplex.

The system creates DASD-only log streams for the operations log (OPERLOG) and the sysplex LOGREC diagnostic snapshots. You do not need to predefine the DASD-only log streams. For more information, see the sample job CEASNPLG that is supplied in SYS1.SAMPLIB(CEASNPLG).

Use the shared DASD as the target for OPERLOG and LOGREC snapshots so that the Incident Log task can access the log snapshots from any system in the sysplex.

When you plan the space requirements for your System Logger couple data set, plan for two DASD-only log streams per incident. For example, you must allow enough space for 200 log streams to allow up to 100 incidents.

Allow space for up to 1000 DASD-only log streams (500 incidents) by using the IXCL1DSU format utility. The statements that are used to code with the IXCCL1DSU utility are shown in Figure 3-12.

```
//DAVISRD JOB MSGLEVEL=(1,1)
// EXEC PGM=IXCL1DSU
//* S SUBMIT,JOB=LOGGER.ZOS17.JCL(FORMAT17)
//* SETXCF COUPLE,ACOUPLE=(LOGGER.OSR13.LARGE.INVNTRY,LOGR3),TYPE=LOGR
//* SETXCF COUPLE,PSWITCH,TYPE=LOGR
//SYSPRINT DD SYSOUT=*
//SYSIN DD *
DEFINEDS SYSPLEX(PLEX1) DSN(LOGGER.OSR13.LARGE.INVNTRY) VOLSER(LOGR3)
DATA TYPE(LOGR)
ITEM NAME(LSR) NUMBER(2000)
ITEM NAME(LSTRR) NUMBER(25)
ITEM NAME(DSEXTENT) NUMBER(15)
ITEM NAME(SMDUPLEX) NUMBER(1)
//
```

Figure 3-12 Sample IXCL1DSU format job

For more information about defining the couple data sets for System Logger, see *z/OS MVS Setting Up a Sysplex,* SA23-1399 and *IBM z/OS Management Facility Configuration Guide Version 2 Release 3,* SC-27-8419.

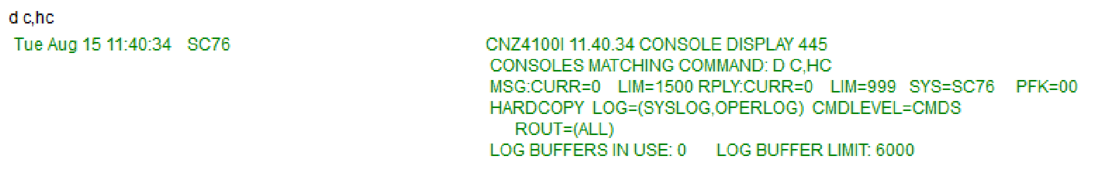
Enabling OPERLOG

The OPERLOG is a system-wide log of system messages that is stored in the System Logger log stream. For a single system, this log is the SYSLOG in the JES spool space.

If your installation collects messages about programs and system functions on a sysplex-wide basis, z/OSMF uses the operations log (OPERLOG) as the source for this message data. Otherwise, z/OSMF uses the system log (SYSLOG) as the source for message data. To display where messages are recorded, run the following command:

```
D C,HC
```

On our system, we use OPERLOG, as shown in Figure 3-13.



```
d c,hc
 Tue Aug 15 11:40:34   SC76                              CNZ4100I 11.40.34 CONSOLE DISPLAY 445
                                                          CONSOLES MATCHING COMMAND: D C,HC
                                                          MSG:CURR=0   LIM=1500 RPLY:CURR=0   LIM=999   SYS=SC76    PFK=00
                                                          HARDCOPY  LOG=(SYSLOG,OPERLOG)  CMDLEVEL=CMDS
                                                             ROUT=(ALL)
                                                          LOG BUFFERS IN USE: 0      LOG BUFFER LIMIT: 6000
```

Figure 3-13 Output from the D C,HC command

For more information about how to set up OPERLOG for the Incident Log task, see the following resources:

- *Systems Programmer's Guide to: z/OS System Logger*, SG24-6898
- *z/OS MVS Setting Up a Sysplex,* SA23-1399
- *IBM z/OS Management Facility Configuration Guide Version 2 Release 3,* SC-27-8419

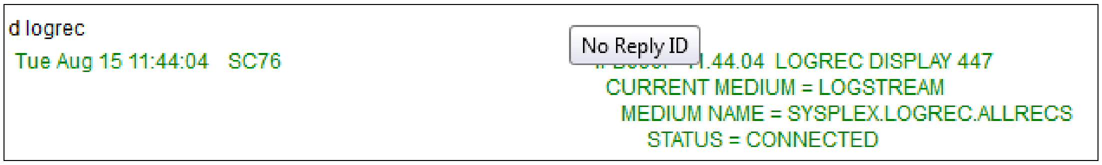
Setting up and activating the LOGREC log stream

If your installation collects its LOGREC data on a sysplex-wide basis, z/OSMF uses the LOGREC log stream as the source for LOGREC data. Otherwise, z/OSMF uses the LOGREC data set as the source for LOGREC data. You can display which is being used by running the following command:

```
D LOGREC
```

If the medium is DATASET, the LOGREC data is recorded by using a data set. If the medium is LOGSTREAM, the LOGREC data is recorded in a LOGR logstream.

We use LOGSTREAM on our system, as shown in Figure 3-14.



```
d logrec
 Tue Aug 15 11:44:04   SC76                        [illegible] 1.44.04  LOGREC DISPLAY 447
                                                    CURRENT MEDIUM = LOGSTREAM
                                                      MEDIUM NAME = SYSPLEX.LOGREC.ALLRECS
                                                         STATUS = CONNECTED
```

Figure 3-14   Output of the D LOGREC command

For more information about how to set up the LOGREC log stream for the Incident Log task, see the following resources:

- *Systems Programmer's Guide to: z/OS System Logger*, SG24-6898
- *z/OS MVS Setting Up a Sysplex,* SA23-1399
- *IBM z/OS Management Facility Configuration Guide Version 2 Release 3,* SC-27-8419

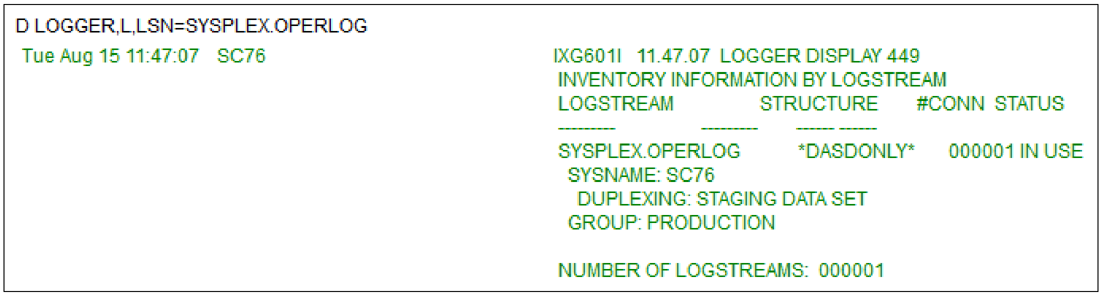
Dynamic snapshot log streams for CEA

If your installation uses OPERLOG and LOGREC log streams, define OPERLOG and LOGREC model log streams for diagnostic log snapshots to be obtained by the CEA component of z/OS. This configuration allows the logger to determine the storage definitions when taking a snapshot

To display the OPERLOG logstream, run the following command:

```
D LOGGER,L,LSN=SYSPLEX.OPERLOG
```

On our system, we see the setup that is shown in Figure 3-15.



```
D LOGGER,L,LSN=SYSPLEX.OPERLOG
 Tue Aug 15 11:47:07   SC76                   IXG601I   11.47.07  LOGGER DISPLAY 449
                                               INVENTORY INFORMATION BY LOGSTREAM
                                               LOGSTREAM              STRUCTURE      #CONN  STATUS
                                               ---------              ---------      ------ ------
                                               SYSPLEX.OPERLOG        *DASDONLY*     000001 IN USE
                                                 SYSNAME: SC76
                                                   DUPLEXING: STAGING DATA SET
                                                 GROUP: PRODUCTION

                                               NUMBER OF LOGSTREAMS:  000001
```

Figure 3-15   Display command that shows OPERLOG LOGSTREAM

To create the log streams, you can use a batch job, such as the sample job CEASNPLG, which is in SYS1.SAMPLIB(CEASNPLG). The CEASNPLG job deletes and redefines CEA diagnostic snapshot model log streams by using the program IXCMIAPU.

Configuring dump analysis and elimination

The Incident Log task requires that dump analysis and elimination (DAE) are active on the z/OS host system to avoid capturing duplicate problems in the Incident Log task. If DAE is not configured on your installation, you must set it up.

Enable DAE to suppress SVC dumps with duplicate symptoms so that the Incident Log task displays only the initial instance of a dump-related incident. If necessary, you can use the **Allow Next Dump** option of the Incident Log task to allow the system to take and report the next dump that occurs for the same symptoms. For example, you might use this option after you apply a fix for the problem. The **Allow Next Dump** option allows you to collect diagnostic data for the next new occurrence of the same problem.

For more information about configuring DAE, see *z/OS MVS Diagnosis: Tools and Service Aids,* GA32-0905 and *IBM z/OS Management Facility Configuration Guide Version 2 Release 3,* SC-27-8419.

Setting up automatic dump data set allocation

For full functionality, the Incident Log task requires that automatic dump data set allocation (auto-dump) is active on the z/OS host system. If auto-dump is not set up on your installation, follow the steps that are described in this section to set up auto-dump.

If you choose to defer this step, the Incident Log task runs with limited functionality. If your installation uses automatic dump data set allocation, the Incident Log task uses the resulting dump data set names in the **Send Data** action, which allows your installation to transmit this data to a remote destination through FTP.

If your installation does not use automatic dump data set allocation, it is likely that pre-allocated dump data sets (SYS1.DUMPxx) are defined for the system to use. Typically, an installation archives an SVC dump to another data set when the dump is complete to avoid having the system overlay the data set with a subsequent dump. The archive data set name is defined by the installation and is not known to the system. If so, the following limitations result:

- The Incident Log records identify the pre-allocated dumps. Thus, the same property information is shown for each incident.
- The **Send Data** action does not find the dump data set because the name is unknown to the Incident Log task. However, the system continues to process the log snapshots.

To continue the use of pre-allocated dump data sets, your installation can use an IBM-supplied JCL step to rename the dump data set in the sysplex dump directory to allow z/OSMF to find the correct data set. For more information, see “Ensuring dump data set names are correct” on page 57.

Some installations use automatic dump data set allocation, but then copy the dump data sets to another volume (to preserve space in the SMS DASD set). If the copied data set features the same name as the original dump data set and the data set is cataloged, the Incident Log **Send Data** action finds the copied dump data sets.

However, if the copied dump data set features a different name, you must use JCL to rename the dump data set in the sysplex dump directory so that the Incident Log task can find it. For more information, see “Ensuring dump data set names are correct” on page 57.

Creating sysplex dump directory

The sysplex dump directory is a shared VSAM data set that contains information about SVC dumps that were taken on each of the systems in the sysplex. When each SVC dump is written to a data set, an entry is added by the DUMPSRV address space to the sysplex dump directory to store information, such as the dump data set name, dump title, and symptom string. The Incident Log task uses the sysplex dump directory as the repository for information about incidents that occurred in the sysplex.

Approximately 50 directory entries are used for each incident, and more are used for multi-system dumps. To allow the Incident Log task (running on one system in the sysplex) to deliver a sysplex view of SVC dumps that are taken, you must select a DASD volume with shared access to all of the systems in the sysplex (or all systems that you want the Incident Log task to represent).

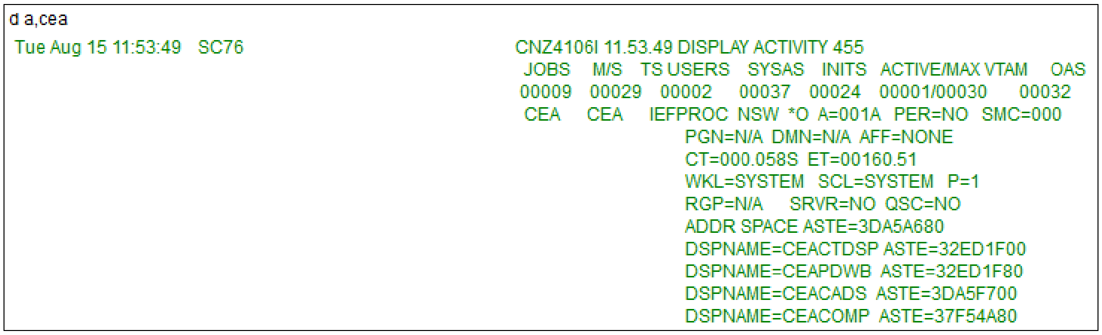
For more information about how to define or expand the sysplex dump directory, see the "Establishing a larger sysplex dump directory" section in the *IBM z/OS Management Facility Configuration Guide Version 2 Release 3,* SC-27-8419.

Ensuring that CEA is active

Because the Incident Log task uses the CEA, ensure that CEA is active on your system. This address space is started automatically during the IPL process. To determine whether the CEA address space is active, run the following command:

```
D A,CEA
```

The result of running that display command is shown in Figure 3-16.



```
d a,cea
 Tue Aug 15 11:53:49   SC76                          CNZ4106I 11.53.49 DISPLAY ACTIVITY 455
                                                      JOBS    M/S    TS USERS    SYSAS    INITS   ACTIVE/MAX VTAM    OAS
                                                     00009   00029   00002      00037   00024   00001/00030      00032
                                                      CEA     CEA     IEFPROC  NSW  *O  A=001A  PER=NO  SMC=000
                                                                               PGN=N/A  DMN=N/A  AFF=NONE
                                                                               CT=000.058S  ET=00160.51
                                                                               WKL=SYSTEM   SCL=SYSTEM   P=1
                                                                               RGP=N/A      SRVR=NO  QSC=NO
                                                                               ADDR SPACE ASTE=3DA5A680
                                                                               DSPNAME=CEACTDSP ASTE=32ED1F00
                                                                               DSPNAME=CEAPDWB  ASTE=32ED1F80
                                                                               DSPNAME=CEACADS  ASTE=3DA5F700
                                                                               DSPNAME=CEACOMP  ASTE=37F54A80
```

Figure 3-16 Output of Display command for CEA address space

Starting the CEA can be done by running the - **`S CEA`** start command. You can dynamically change the active CEA configuration by running the **`MODIFY`** command, as shown in the following example:

```
F CEA,CEA=xx
```

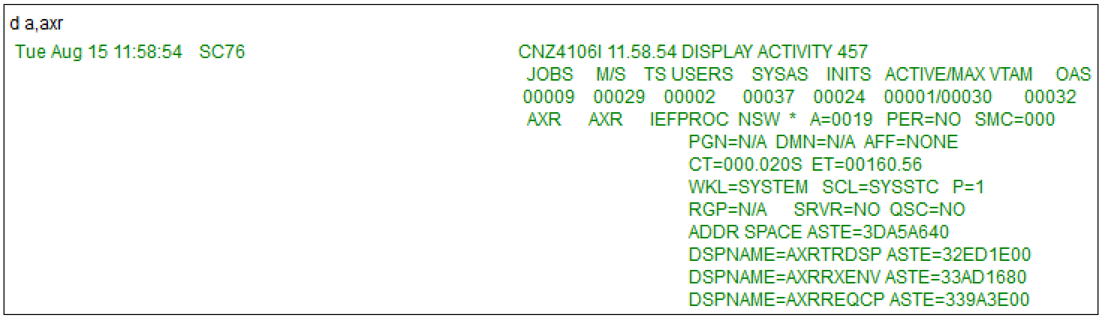
In this example, `xx` is the suffix of the `CEAPRMxx` member to be used. For more information about running the CEA, see the *z/OS Planning for Installation Version 2 Release 3,* GA32-0890 and 3.23, "Common event adapter" on page 71.

Ensuring that System REXX is active

System REXX is started automatically at IPL. For full Incident Log support, ensure that System REXX (SYSREXX) is active. To check that SYSREXX is running, run the following command:

```
D A,AXR
```

The result of running that display command is shown in Figure 3-17.



```
d a,axr
 Tue Aug 15 11:58:54   SC76                                CNZ4106I 11.58.54 DISPLAY ACTIVITY 457
                                                            JOBS    M/S    TS USERS    SYSAS    INITS   ACTIVE/MAX VTAM    OAS
                                                           00009   00029   00002     00037   00024   00001/00030     00032
                                                            AXR     AXR     IEFPROC  NSW  *   A=0019   PER=NO   SMC=000
                                                                                 PGN=N/A  DMN=N/A  AFF=NONE
                                                                                 CT=000.020S  ET=00160.56
                                                                                 WKL=SYSTEM   SCL=SYSSTC   P=1
                                                                                 RGP=N/A      SRVR=NO  QSC=NO
                                                                                 ADDR SPACE ASTE=3DA5A640
                                                                                 DSPNAME=AXRTRDSP ASTE=32ED1E00
                                                                                 DSPNAME=AXRRXENV ASTE=33AD1680
                                                                                 DSPNAME=AXRREQCP ASTE=339A3E00
```

Figure 3-17 Output of Display command for System REXX address space

If you must start the SYSREXX component, run the following start command:

```
S AXRPSTRT
```

For more information about System REXX, see 3.24, “System REXX” on page 73.

Ensuring dump data set names are correct

If you rename a dump data set in your installation, ensure that the data set name in the sysplex dump directory is correct so that the Incident Log task can find the correct dump data set. A sample job to accomplish this task is shown in Figure 3-18.

```
//IPCS EXEC PGM=IKJEFT01,DYNAMNBR=20,REGION=1500K
//IPCSDDIR DD DSN=SYS1.DDIR,DISP=(SHR)
//SYSTSPRT DD SYSOUT=*
//SYSTSIN DD *
IPCS
ALTER DSNAME('OldDump') NEWNAME(DSNAME('NewDump'))
END
/*
```

Figure 3-18 JCL to rename SVC dumps in the sysplex dump directory

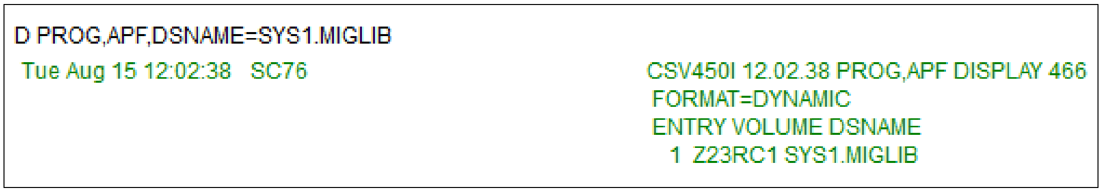
Authorizing SYS1.MIGLIB

For the Incident Log task, you must ensure that SYS1.MIGLIB is APF-authorized. To check that SYS1.MIGLIB is APF-authorized, run the following command:

```
D PROG,APF,DSNAME=SYS1.MIGLIB
```

On our system, SYS1.MIGLIB is authorized as shown in Figure 3-19. If you must authorize SYS1.MIGILB, run the following command:

```
SETPROG APF,ADD,DSNAME=SYS1.MIGLIB,VOLUME=XXXXXX
```



```
D PROG,APF,DSNAME=SYS1.MIGLIB
 Tue Aug 15 12:02:38   SC76                    CSV450I 12.02.38 PROG,APF DISPLAY 466
                                                FORMAT=DYNAMIC
                                                ENTRY VOLUME DSNAME
                                                  1  Z23RC1 SYS1.MIGLIB
```

Figure 3-19 Output from display APF command

SYS1.PARMLIB(IZUPRMxx) changes

Ensure that parameter PLUGINS(INCIDENT_LOG) in is uncommented. Also, ensure that parameter INCIDENT_LOG UNIT(‘device-name’) is set correctly to a device name where data sets and z/OS UNIX files are temporarily stored for the FTP jobs during transfer to IBM or another software vendor. The default value is SYSALLDA.

Security

When you plan to use the Problem Determination task, you must perform the SAF changes that are shown in Example 3-17. The defaults are documented in SYS.SAMPLIB(IZUILSEC).

Example 3-17 RACF definitions for the Incident Log plug-in

```
SETROPTS GENERIC(SERVAUTH)
RDEFINE SERVAUTH CEA.CEAGETPS UACC(NONE)
RDEFINE SERVAUTH CEA.CEADOCMD UACC(NONE)
PERMIT CEA.CEAGETPS CLASS(SERVAUTH) ID(IZUADMIN) ACCESS(UPDATE)
PERMIT CEA.CEAGETPS CLASS(SERVAUTH) ID(IZUUSER) ACCESS(UPDATE)
PERMIT CEA.CEADOCMD CLASS(SERVAUTH) ID(IZUADMIN) ACCESS(UPDATE)
PERMIT CEA.CEADOCMD CLASS(SERVAUTH) ID(IZUUSER) ACCESS(UPDATE)

RDEFINE SERVAUTH CEA.CEAPDWB* UACC(NONE)
PERMIT CEA.CEAPDWB* CLASS(SERVAUTH) ID(IZUADMIN) ACCESS(UPDATE)
PERMIT CEA.CEAPDWB* CLASS(SERVAUTH) ID(IZUUSER) ACCESS(UPDATE)
RDEFINE SERVAUTH CEA.CEADOCONSOLECMD UACC(NONE)
PERMIT CEA.CEADOCONSOLECMD CLASS(SERVAUTH) ID(IZUADMIN) +
  ACCESS(UPDATE)
PERMIT CEA.CEADOCONSOLECMD CLASS(SERVAUTH) ID(IZUUSER) +
  ACCESS(UPDATE)

SETROPTS RACLIST(SERVAUTH) CLASSACT(SERVAUTH)
SETROPTS RACLIST(SERVAUTH) REFRESH

ADDSD 'CEA.*' OWNER(<userid> or <group-name>) UACC(NONE)
ADDSD 'CEA.*' UACC(NONE)
PERMIT 'CEA.*' ID(IZUADMIN) ACCESS(ALTER)
PERMIT 'CEA.*' ID(IZUUSER) ACCESS(ALTER)
SETROPTS GENERIC(DATASET) REFRESH

DEFINE ALIAS(NAME(CEA) RELATE(<user_catalog>))

SETROPTS RACLIST(JESSPOOL) CLASSACT(JESSPOOL)

REDEFINE JESSPOOL <sysname>.+MASTER+.SYSLOG.*.* +
  UACC(NONE)
PERMIT <sysname>.+MASTER+.SYSLOG.*.* CLASS(JESSPOOL)
  ID(<cea_userid>) ACC(READ)
SETR RACLIST(JESSPOOL) REFRESH

PERMIT MVS.DISPLAY.** CLASS(OPERCMDS) ID(<cim_admin_name>)
    ACCESS(READ)
 PERMIT MVS.DUMP CLASS(OPERCMDS) ID(<cim_admin_name>) +
    ACCESS(CONTROL)
 PERMIT MVS.MODIFY.JOB.CEA CLASS(OPERCMDS) +
    ID(<cim_admin_name>) ACCESS(UPDATE)
 SETROPTS RACLIST(OPERCMDS) REFRESH
```

```
RDEFINE ZMFAPLA IZUDFLT.ZOSMF.INCIDENT_LOG.INCIDENT_LOG UACC(NONE)
PERMIT IZUDFLT.ZOSMF.INCIDENT_LOG.INCIDENT_LOG CLASS(ZMFAPLA) +
  ID(IZUUSER) ACCESS(READ)
PERMIT IZUDFLT.ZOSMF.INCIDENT_LOG.INCIDENT_LOG CLASS(ZMFAPLA) +
  ID(IZUADMIN) ACCESS(READ)
SETROPTS RACLIST(ZMFAPLA) REFRESH
```

Example 3-17 on page 58 features a sample EXEC that contains RACF profiles for the Incident Log task. This EXEC is created by the z/OSMF configuration process. You must review these definitions to ensure that they are correct for your environment.

In Example 3-17 on page 58, you can see placeholders for two RACF settings. The settings include the following meanings:

- `<userid>`

  Change this placeholder to a user ID that is planned to be the owner of a generic data set profile ‘CEA.*’

- `<groupid>`

  Change this placeholder to a group ID that is planned to be the owner of a generic data set profile ‘CEA.*’

- `<user_catalog>`

  Change this placeholder to the name of a user catalog that you select to place the data sets into that starts with high-level qualifier CEA.

- `<sysname>`

  Change this placeholder to the system name where the CEA user can access the JESSPOOL class.

- `<cea_userid>`

  Change this name to the user ID that you use to access CEA. In most cases, it is the CEA.

- `<cim_admin_name>`

  Change this name to the user ID that you use with CIM. In most cases, it is CFZADM.

Postinstallation

No postinstallation tasks are required.

3.15 Software Management task

The Software Management task is part of the Software Deployment plug-in.

Users of the Software Management task must have access to the security profiles that grant access to deployment objects and systems within the task. Users also must have access to the z/OS data sets that are represented by the task objects.

For more information about the access controls for the Software Management task, see the “Updating z/OS Software for the Software Deployment plug-in” section in the *IBM z/OS Management Facility Configuration Guide Version 2 Release 3,* SC-27-84197.

3.15.1 System prerequisites

Ensure that parameter `PLUGINS(SOFTWARE_MGMT)` in SYS1.PARMLIB(IZUPRMxx) is uncommented.

The Software Management task uses standard z/OS utilities, such as ICKDSF, IDCAMS, IEBGENER, IEFBR14, and IEHPROGM. SMP/E V3.6 (Program Number `5655-G44`) is also required.

If Remote Deployments are intended, Software Management requires TCP/IP FTP.

3.15.2 Security

If you plan to use the Software Management plug-in, you must make the SAF definitions that are shown in Example 3-18. The defaults are documented in SYS.SAMPLIB(IZUDMSEC).

Example 3-18 RACF definitions for Software Management plug-in

```
RDEFINE ZMFAPLA +
   IZUDFLT.ZOSMF.SOFTWARE_DEPLOYMENT.SOFTWARE_MANAGEMENT +
   UACC(NONE)
 RDEFINE ZMFAPLA +
   IZUDFLT.ZOSMF.SOFTWARE_DEPLOYMENT.DATA.** +
   UACC(NONE)
 RDEFINE ZMFAPLA -
   IZUDFLT.ZOSMF.SOFTWARE_DEPLOYMENT.SOFTWARE_MANAGEMENT.-
   PRODUCT_INFO_FILE.RETRIEVE -
   UACC(NONE)
 RDEFINE ZMFAPLA -
   IZUDFLT.ZOSMF.SOFTWARE_DEPLOYMENT.SOFTWARE_MANAGEMENT.-
   CATEGORIES.MODIFY -
   UACC(NONE)

PERMIT IZUDFLT.ZOSMF.SOFTWARE_DEPLOYMENT.SOFTWARE_MANAGEMENT +
   CLASS(ZMFAPLA) ID(IZUUSER) ACCESS(READ)
 PERMIT IZUDFLT.ZOSMF.SOFTWARE_DEPLOYMENT.DATA.** CLASS(ZMFAPLA) +
   ID(IZUUSER) ACCESS(CONTROL)
 PERMIT -
   IZUDFLT.ZOSMF.SOFTWARE_DEPLOYMENT.SOFTWARE_MANAGEMENT.-
   CATEGORIES.MODIFY CLASS(ZMFAPLA) -
   ID(IZUUSER) ACCESS(READ)

PERMIT IZUDFLT.ZOSMF.SOFTWARE_DEPLOYMENT.SOFTWARE_MANAGEMENT +
   CLASS(ZMFAPLA) ID(IZUADMIN) ACCESS(READ)
 PERMIT IZUDFLT.ZOSMF.SOFTWARE_DEPLOYMENT.DATA.** CLASS(ZMFAPLA) +
   ID(IZUADMIN) ACCESS(CONTROL)
 PERMIT -
   IZUDFLT.ZOSMF.SOFTWARE_DEPLOYMENT.SOFTWARE_MANAGEMENT.-
   PRODUCT_INFO_FILE.RETRIEVE -
   CLASS(ZMFAPLA) ID(IZUADMIN) ACCESS(READ)
 PERMIT -
   IZUDFLT.ZOSMF.SOFTWARE_DEPLOYMENT.SOFTWARE_MANAGEMENT.-
   CATEGORIES.MODIFY -
   CLASS(ZMFAPLA) ID(IZUADMIN) ACCESS(READ)

SETROPTS RACLIST(ZMFAPLA) REFRESH
```

More granular control can be exercised within these profiles to restrict subfunctions of Software Management. For more information, see Chapter 12, “Software Management” on page 273.

3.15.3 Postinstallation

No postinstallation tasks are required.

3.16 Sysplex

For operations, z/OSMF offers you a plug-in for sysplex management. z/OSMF V2R3 is the first stage, which gives you the ability to view the sysplex environment and its properties.

3.16.1 System prerequisites

Ensure that the following z/OS components are configured and running:

- CEA must run in full function mode. For more information, see “Ensuring that CEA is active” on page 56.
- Base Control Program internal interface (BCPii) must be configured if it is not active. For more information, see *z/OS MVS Programming: Callable Services for High-Level Languages Version 2 Release 3,* SA23-1377. If necessary, start BCPii by using the **S HWISTART** command.

Ensure that parameter `PLUGINS(SYSPLEX_MGMT)` in SYS1.PARMLIB(IZUPRMxx) is uncommented.

3.16.2 Security

If you plan to use the Sysplex Management plug-in, you must make the SAF definitions that are shown in Example 3-19. The defaults are documented in SYS.SAMPLIB(IZUPSSEC).

Example 3-19 RACF definitions for Sysplex Management plug-in

```
RDEFINE ZMFAPLA IZUDFLT.ZOSMF.SYSPLEX UACC(NONE)
PERMIT IZUDFLT.ZOSMF.SYSPLEX CLASS(ZMFAPLA) ID(IZUUSER) ACCESS(READ)
PERMIT IZUDFLT.ZOSMF.SYSPLEX CLASS(ZMFAPLA) ID(IZUADMIN) ACCESS(READ)
SETROPTS RACLIST(ZMFAPLA) REFRESH

RDEFINE SERVAUTH CEA.XCF.CF UACC(NONE)
PERMIT CEA.XCF.CF CLASS(SERVAUTH) ID(IZUUSER) ACCESS(READ)
PERMIT CEA.XCF.CF CLASS(SERVAUTH) ID(IZUADMIN) ACCESS(READ)

RDEFINE SERVAUTH CEA.XCF.CDS UACC(NONE)
PERMIT CEA.XCF.CDS CLASS(SERVAUTH) ID(IZUUSER) ACCESS(READ)
PERMIT CEA.XCF.CDS CLASS(SERVAUTH) ID(IZUADMIN) ACCESS(READ)

RDEFINE SERVAUTH CEA.XCF.SYSPLEX UACC(NONE)
PERMIT CEA.XCF.SYSPLEX CLASS(SERVAUTH) ID(IZUUSER) ACCESS(READ)
PERMIT CEA.XCF.SYSPLEX CLASS(SERVAUTH) ID(IZUADMIN) ACCESS(READ)

RDEFINE SERVAUTH CEA.XCF.STRUCTURE UACC(NONE)
```

```
PERMIT CEA.XCF.STRUCTURE CLASS(SERVAUTH) ID(IZUUSER) ACCESS(READ)
PERMIT CEA.XCF.STRUCTURE CLASS(SERVAUTH) ID(IZUADMIN) ACCESS(READ)

RDEFINE SERVAUTH CEA.XCF.FLOW.<system-name> UACC(NONE)
PERMIT CEA.XCF.FLOW.<system-name> CLASS(SERVAUTH) +
  ID(IZUUSER) ACCESS(READ)
PERMIT CEA.XCF.FLOW.<system-name> CLASS(SERVAUTH) +
  ID(IZUADMIN) ACCESS(READ)

SETROPTS RACLIST(SERVAUTH) REFRESH
```

In Example 3-19 on page 61, you see the `<system-name>` placeholders for one RACF definition. Change this placeholder to a system name in your sysplex. For each of the systems in your sysplex, you must perform the `RDEFINE` and `PERMIT` steps for profile `CEA.XCF.FLOW.<system-name>`.

Because Sysplex management uses z/OS BCPii services to query the topology of your LPARs and CPCs that build up a sysplex, you must perform more SAF authorizations, as shown in Example 3-20. The sample definitions are available in SYS1.SAMPLIB(IZUSEC).

Example 3-20 RACF definitions for BCPii use in Sysplex management plug-in

```
RDEFINE FACILITY HWI.APPLNAME.HWISERV UACC(NONE)
PERMIT HWI.APPLNAME.HWISERV CLASS(FACILITY) ID(IZUADMIN) ACCESS(READ)
RDEFINE FACILITY HWI.TARGET.<netid.nau> UACC(NONE) APPLDATA('<uccommname>’)
RDEFINE FACILITY HWI.TARGET.<netid.nau>.<imagename> UACC(NONE)
PERMIT HWI.TARGET.<netid.nau> CLASS(FACILITY) ID(IZUADMIN) ACCESS(READ)
PERMIT HWI.TARGET.<netid.nau>.<imagename> CLASS(FACILITY)
  ID(IZUADMIN) ACCESS(READ)

SETROPTS GENERIC(REALM)
RDEFINE REALM SAFDFLT APPLDATA(‘<plexname>’)
SETROPTS RACLIST(REALM) CLASSACT(REALM)
SETROPTS RACLIST(REALM) REFRESH

SETROPTS RACLIST(SERVAUTH) REFRESH
SETROPTS RACLIST(ZMFAPLA) REFRESH
```

The following placeholders for RACF definitions are shown in Example 3-20:

- `<netid.nau>`

  Change this placeholder to the 3 - 17 character SNA name of a particular Central Processor Complex (CPC).

- `<uccommname>`

  Replace this placeholder with the SNMP community name that is associated with the particular CPC.

- `<imagename>`

  Replace this placeholder to an LPAR name. This LPAR name can be 1 - 8 characters long.

You must set up profiles for each CPC and each LPAR that you plan to manage through z/OSMF Sysplex Management. We recommend that you give only those users access to Sysplex Management that are connected to RACF group IZUADMIN.

3.16.3 Postinstallation

Before you use the Sysplex Management task, we recommend that you configure the CPC information in z/OSMF Systems task as shown in Figure 3-20.

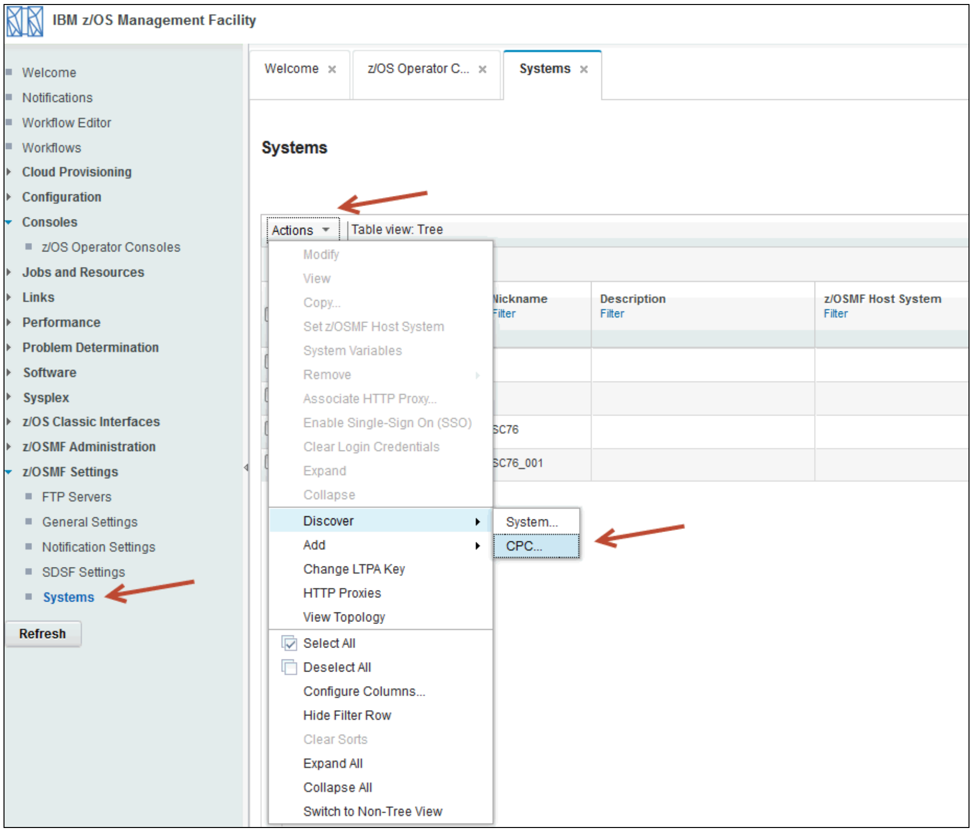


Figure 3-20 CPC Discovery in z/OSMF Systems task

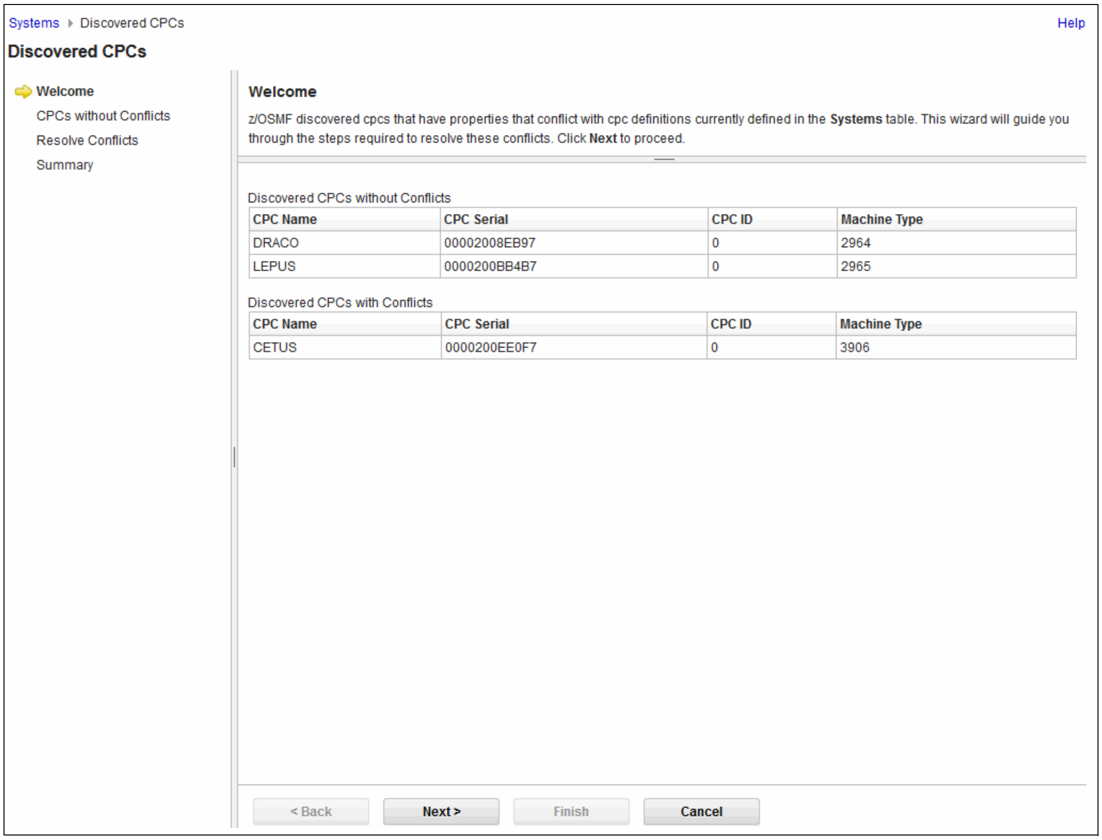
The following options are available to configure the CPC information:

- You can add CPC information manually.
- You can use the Discovery CPC function in Systems task to discover the CPC topology of the interconnected CPCs and LPARs in the sysplex.

We recommend that the Discovery CPC function is used. This function is a long-running action and it might take several minutes to complete. During this operation, BCPii communication to your CPC is established.

> **Tip:** When you plan to use the CPC Discovery, ensure that you have a current TSO logon procedure (IZUFPROC) in your SYS1.PROCLIB data set. With an old logon procedure, you might receive IZUG1084E error messages during discovery.

When you click **Discover** and then **CPC** (as shown in Figure 3-20 on page 63), a wizard starts that shows you the discovered CPCs, as shown in Figure 3-21.



Welcome

z/OSMF discovered cpcs that have properties that conflict with cpc definitions currently defined in the **Systems** table. This wizard will guide you through the steps required to resolve these conflicts. Click **Next** to proceed.

Discovered CPCs without Conflicts

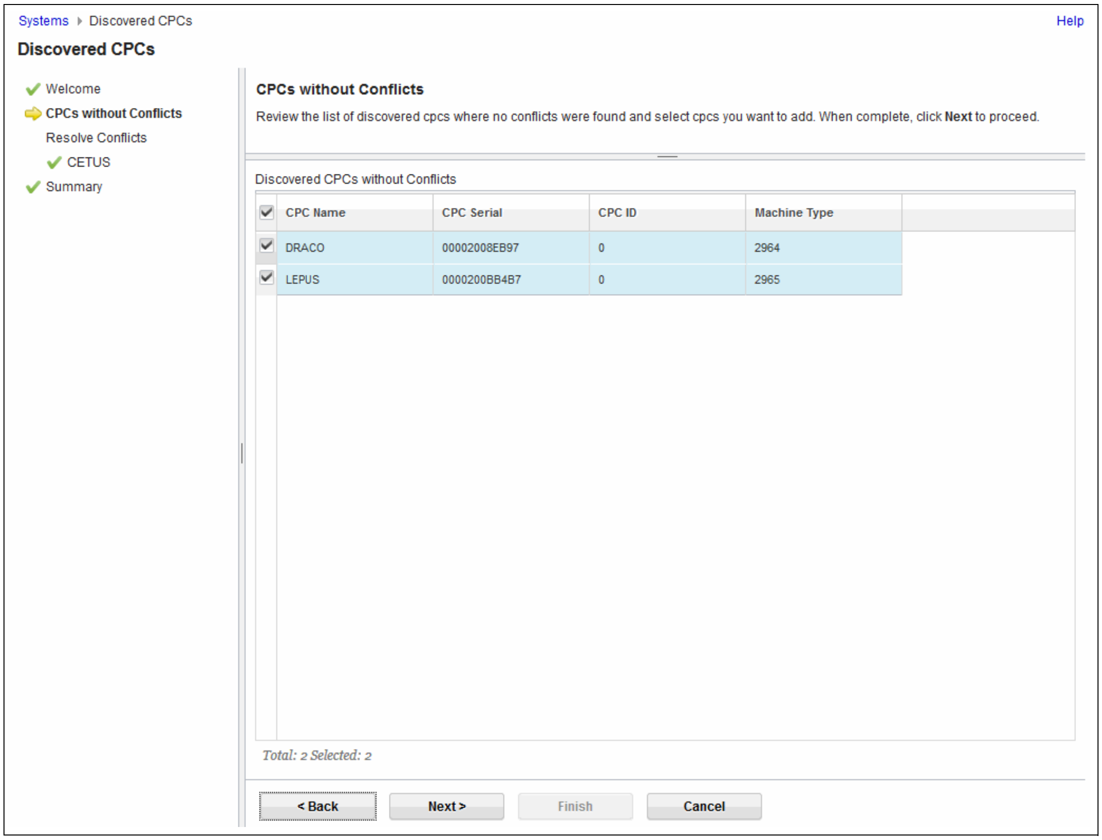
CPC Name	CPC Serial	CPC ID	Machine Type
DRACO	00002008EB97	0	2964
LEPUS	0000200BB4B7	0	2965

Discovered CPCs with Conflicts

CPC Name	CPC Serial	CPC ID	Machine Type
CETUS	0000200EE0F7	0	3906

Figure 3-21 Discovered CPCs wizard, Welcome page

Depending on your situation, you might see CPCs with conflicts and CPCs without conflicts. In our example, two CPCs with conflicts and one without conflicts were discovered. Click **Next** to open the window in which the CPCs without conflicts are shown (see Figure 3-22). Mark the CPCs if you plan to add them to your list of discovered CPCs.



Discovered CPCs

CPCs without Conflicts

Review the list of discovered cpcs where no conflicts were found and select cpcs you want to add. When complete, click **Next** to proceed.

Discovered CPCs without Conflicts

☑	CPC Name	CPC Serial	CPC ID	Machine Type
☑	DRACO	00002008EB97	0	2964
☑	LEPUS	0000200BB4B7	0	2965

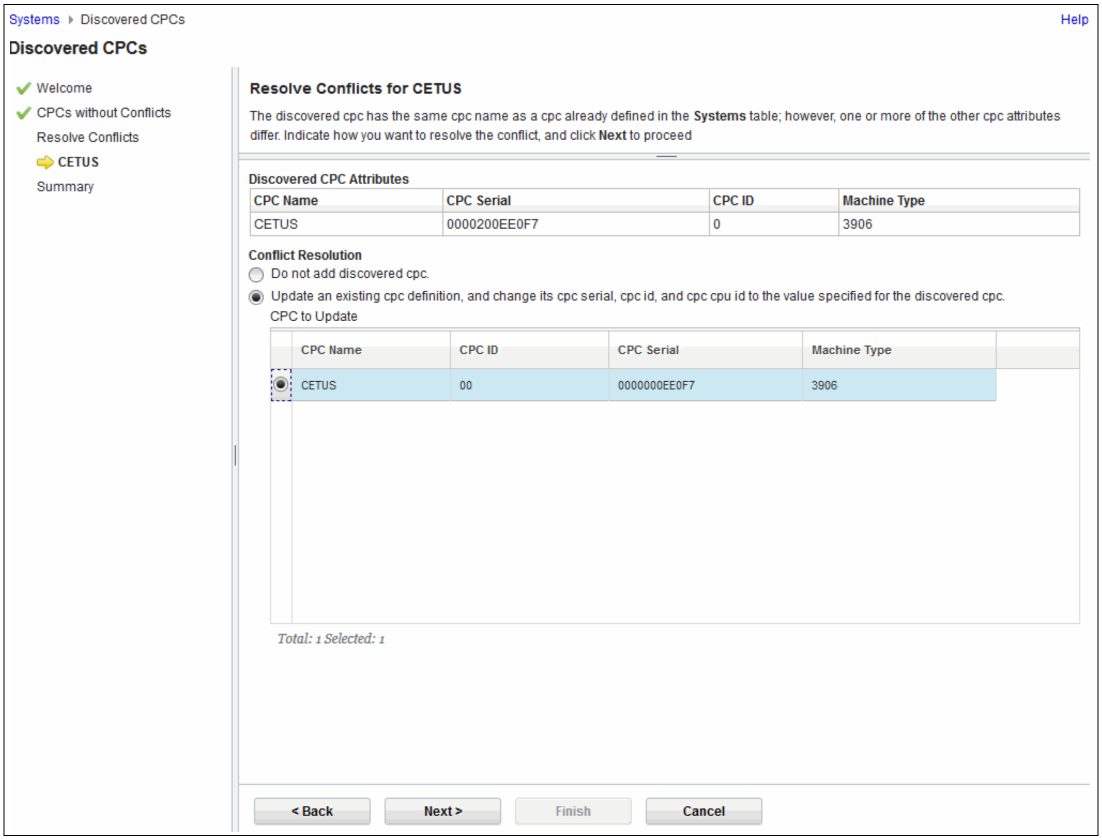
Total: 2 Selected: 2

Figure 3-22   Discovered CPCs without conflicts

Review the list, and check whether it matches your installation. If it does match, click **Next**. A window opens in which you can resolve any conflicts. In our case, we defined CPC CETUS, which results in a conflict. You can move forward in the following ways (see Figure 3-23 on page 66):

- Do not add the CPC that was discovered. In this case, the definitions that you created manually do not change.
- Update a CPC definition and change its CPC serial, CPC ID, and CPU ID to the discovered values.

We chose the second option, as shown in Figure 3-23.



Discovered CPCs

Resolve Conflicts for CETUS

The discovered cpc has the same cpc name as a cpc already defined in the **Systems** table; however, one or more of the other cpc attributes differ. Indicate how you want to resolve the conflict, and click **Next** to proceed

Discovered CPC Attributes

CPC Name	CPC Serial	CPC ID	Machine Type
CETUS	0000200EE0F7	0	3906

Conflict Resolution

○ Do not add discovered cpc.

● Update an existing cpc definition, and change its cpc serial, cpc id, and cpc cpu id to the value specified for the discovered cpc.

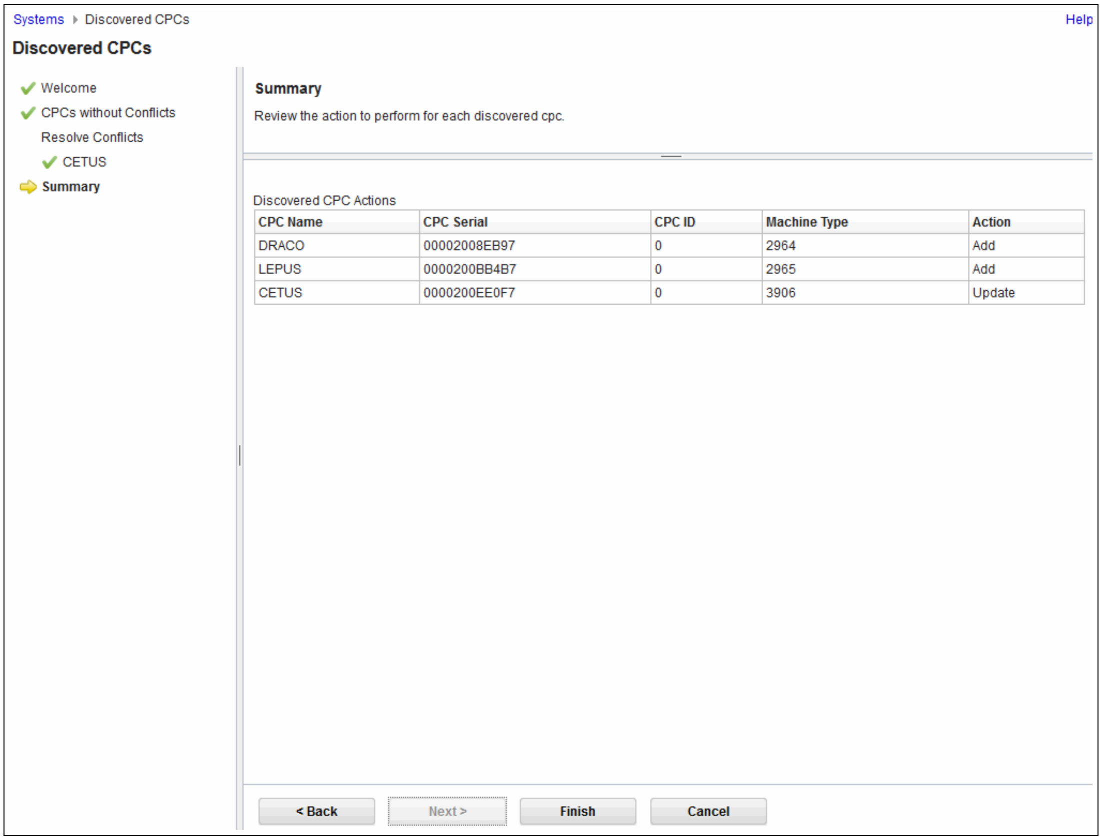
CPC to Update

	CPC Name	CPC ID	CPC Serial	Machine Type
●	CETUS	00	0000000EE0F7	3906

Total: 1 Selected: 1

Figure 3-23   Discovered CPC with conflicts

Click **Next** to move to the Summary window, as shown in Figure 3-24. In our case, we added two CPCs and updated one CPC.



Summary

Review the action to perform for each discovered cpc.

Discovered CPC Actions

CPC Name	CPC Serial	CPC ID	Machine Type	Action
DRACO	00002008EB97	0	2964	Add
LEPUS	0000200BB4B7	0	2965	Add
CETUS	0000200EE0F7	0	3906	Update

Figure 3-24   Summary of discovered CPCs

After reviewing your discovered CPCs, click **Finish**.

3.17 z/OS Classic Interfaces

In z/OSMF, you can use the ISPF plug-in if you prefer to work with the z/OS classic interface.

3.17.1 System prerequisites

The z/OS CEA server must be configured and operational. The CEA task is required to be in full function mode. Also, the TRUSTED(YES) attribute must be set for the CEA started task owner's STARTED profile.

CEA can also be configured to allow for reconnecting user sessions. For more information, see 3.23, "Common event adapter" on page 71.

Users of the ISPF task must meet the following requirements:

- Ensure that parameter `PLUGINS(ISPF)` in SYS1.PARMLIB(IZUPRMxx) is uncommented
- Authorized to use TSO/E (includes a valid TSO/E segment and password)
- Authorized to use a valid logon procedure and TSO/E account number

- Authorized to use the appropriate profiles to protect the usage of commands, such as **SUBMIT**, **STATUS**, **TRANSMIT**, and **RECEIVE**, and access to SYSOUT data sets by using the **OUTPUT** command
- Authorized to JES spool output, as required
- Have an OMVS segment that is defined with a UNIX System Services home directory

If multiple ISPF sessions are started, the logon procedure must be updated to enable ISPF profile sharing.

For more information about these configuration changes, see the “Updating z/OS for the ISPF Plug-in” section of *IBM z/OS Management Facility Configuration Guide Version 2 Release 3,* SC-27-8419.

3.17.2 Security

If you plan to use the ISPF plug-in, you must make the SAF definitions that are shown in Example 3-21. The defaults are documented in SYS.SAMPLIB(IZUISSEC).

Example 3-21 RACF definitions for ISPF plug-in

```
RDEFINE ZMFAPLA IZUDFLT.ZOSMF.ISPF.ISPF UACC(NONE)
PERMIT IZUDFLT.ZOSMF.ISPF.ISPF CLASS(ZMFAPLA) ID(IZUUSER) +
   ACCESS(READ)
PERMIT IZUDFLT.ZOSMF.ISPF.ISPF CLASS(ZMFAPLA) ID(IZUADMIN) +
   ACCESS(READ)
SETROPTS RACLIST(ZMFAPLA) REFRESH
```

3.17.3 Postinstallation

No postinstallation tasks are required.

3.18 Application Linking Manager task

The Application Linking Manager task modifies event types or defines new event types. Application linking is used to link or connect tasks and applications. z/OSMF includes several predefined event types, requesters, and handlers. No other setup is required to use this task.

However, users can define their own event types, requesters, and handlers by using this task, which requires customization. For more information about this task, see Chapter 9, “Linking z/OSMF tasks and external applications” in *IBM z/OS Management Facility Configuration Guide Version 2 Release 3,* SC-27-8419.

3.19 Links task (managing)

The Links task under the z/OSMF Administration category is used to manage and define links that are shown in the Links category on the z/OSMF navigation page. No other setup is required.

3.20 FTP Servers task

You can use the FTP Servers task that is provided in z/OSMF to add, modify, view, copy, and remove FTP server definitions and to associate FTP profiles with FTP server definitions. No other setup is required.

However, when you use these definitions, an FTP server and authorization to submit an FTP job is required. Network connectivity is also required to the remote server.

For more information about defining FTP servers and policies, see the “Enabling data and file transfer between systems” topic in the z/OSMF Help.

3.21 Systems task

By using the Systems task, you can define remote z/OSMF systems and FTP servers. These definitions are required if you use the remote deployment function of the Software Management task. In addition, workflows might require a system definition. No other configuration is required to use it.

The Systems task is also used to discover systems and CPCs as a prerequisite for Sysplex Management. For more information, see 3.16.3, “Postinstallation” on page 63.

To determine whether a system must be defined in the Systems page, see the “Enabling data and file transfer between systems” topic in the z/OSMF Help. For more information about how to define systems, see the “Systems page” topic in the z/OSMF Help.

3.22 Common Information Model

Common Information Model (CIM) is a key requirement for many of the plug-ins, such as Incident Log, Workload Management, Resource Monitoring, and Capacity Provisioning.

The CIM component is included with z/OS.

3.22.1 Set up and configuration

If your installation received z/OSMF through the IBM ServerPac service, your order includes support for customizing the CIM server. For more information, see the “ServerPac: Installing Your Order” document, which was included with your order.

Otherwise, you must customize the CIM server for your installation, as described in Chapter 5, “Quick guide: CIM server setup and verification”, in the *z/OS Common Information Model User’s Guide Version 2 Release 3,* SC34-2671.

Setup tasks

You can find the setup jobs for the CIM server in SYS1.SAMPLIB.

CFZSEC job

Review and update this job if you do not plan to use the default names. The user ID and group ID are used as input to the z/OSMF configuration process.

CFZRCUST job

Run the CFZRCUST job on each system to create and customize the file systems and directories that are used by the CIM server. This job performs the following actions:

- Creates the zFS data set that is mounted under `/var/wbem`.
- Runs the customization/migration utility, which is found in `usr/lpp/wbem/install/CFZRCUST.sh`. The `/etc/wbem` and `/var/wbem` directories are created and populated.

Using the default TCP/IP ports 5988 and 5989

For a successful start, the CIM server must listen to the configured HTTP or HTTPS ports. Ensure that the CIM server can use the default TCP/IP port 5988 for HTTP or 5989 for HTTPS. Check whether another server is listening on one of these ports, your security product is protecting these ports, or the port is blocked by the TCP/IP configuration.

To determine whether the port is reserved, verify that the port that is specified for the httpPort configuration property is not included in the range of reserved ports that is specified in the BPX parmlib member's **`INADDRANYPORT`** and **`INADDRANYCOUNT`** parameters.

For more information about changing the ports for the CIM server, see the "Configuring the ports for the CIM server" section of *z/OS Common Information Model User's Guide*, SC34-2671.

Use the **`cimconfig`** command to change the ports, as shown in Example 3-22.

Example 3-22 Changing the CIM server http port

```
MELVIN:/u/melvin: >
MELVIN:/u/melvin: >cimconfig -p -s httpPort=5992
PGC00218: The planned value for property httpPort is set to 5992 in the CIM
server.
```

The port is changed when the CIM server is restarted.

Starting the CIM server

To start the CIM server, complete the following steps:

1. Copy the CFZCIM started task procedure from your installation PROCLIB to a data set that is part of your PROCLIB concatenation.
2. Start the CIM server from the z/OS system console by running the **`START CFZCIM`** command.

Customizing the UNIX System Services shell

To run CIM server commands, the UNIX System Services shell must be tailored. The `/usr/lpp/wbem/install/profile.add` file contains the required environment variables to run CIM server commands. To prepare the UNIX System Services shell to run CIM server commands, add the content of the `/usr/lpp/wbem/install/profile.add` file to `/etc/profile` or to the user-specific profiles in the user home path, which adds the necessary LIBPATH for CIM commands and facilitates ASCII to EBCDIC translation.

Running the installation verification program

Verify that your CIM customization is complete by running the CIMIVP process. You can use the CFZIVP job for batch or run **`cimivp`** in the OMVS command shell. The output is shown in Example 3-23 on page 71.

Example 3-23 CIMIVP output

```
cimivp Main started ...
Connecting to local CIM Server ...
 ... success
> Found Computer System  : WTSC76.CPOLAB.IBM.COM (CPUID: 21E0F73906, LPARName: CETUS21)
> Found Operating System : SC76 (Version: 02.03.00, Sysplex: PLEX76, FreeMem: 1982296
> Number of active UNIX System Services processes: 53
> Number of active address spaces: 94
> Number of FC ports: 24
> Number of online processors: CP(2) zAAP(0) zIIP(4)
> Number of configured disk volumes: 3996
cimivp - All tests completed successfully.
```

3.23 Common event adapter

The Incident Log task and the ISPF task of z/OSMF require that the CEA component is active on your z/OS system. CEA is a component of the BCP that provides z/OS events to z/OS CIM server and creates or manages TSO user address spaces under the ISPF task. A CEA address space is started automatically during the initialization of every z/OS system.

CEA includes the following operation modes:

- Full function: In this mode, internal z/OS components and clients, such as CIM providers, can use CEA indication functions.
- Minimum: In this mode, only internal z/OS components can use CEA.

Note: If CEA is running in minimum mode, you can change to full function mode by setting up the prerequisites that are described in this section, stopping CEA (run **`P CEA`**), and restarting it (run **`S CEA`**).

z/OSMF requires that CEA runs in full function mode on your system.

CEA provides the data that is then displayed in the Incident Log task user interface. For more information about the role of CEA in the Incident Log task, see the “Ensure that common event adapter (CEA) is configured and active” section under “Updating z/OS for the Incident Log plug-in” in Chapter 7, “Customizing your system for the z/OSMF plug-ins”, in *IBM z/OS Management Facility Configuration Guide Version 2 Release 3,* SC-27-8419.

The CEA TSO/E address space manager is integrated in to the CEA address space infrastructure. The function is started automatically when CEA is started. The CEA TSO/E address space service directs the ISPF task to complete the following tasks:

- Start a TSO/E address space.
- End a TSO/E address space that is started by CEA.
- Send an attention interrupt to a TSO/E address space that is started by CEA.
- Obtain information about a TSO/E address space that is started by CEA.
- Obtain information about all the TSO/E address spaces that CEA started for an application.
- Ping a TSO/E address space that was started by CEA to prevent the address space from ending because it was idle for too long.

Note: If the CEA address space ends, all of the TSO/E sessions that are created by CEA also end.

For more information about CEA TSO address space manager and its services, see Part 5, “CEA TSO/E address space services” in *z/OS MVS Programming: Callable Services for High-Level Languages Version 2 Release 3,* SA23-1377.

3.23.1 Setting up CEA

The CEA setup process includes putting certain security profiles in place in RACF, setting up log streams, and customizing PARMLIB member CEAPRMxx. CEA can be set up as part of z/OSMF customization or outside of z/OSMF customization.

3.23.2 Setting up CEA outside of z/OSMF

If you choose not to enable the CEA component and update related parmlib options during the installation of the Incident Log plug-in, you must manually configure the CEA component, as described in this section.

RACF profiles

A sample job is available in SYS1.SAMPLIB(CEASEC) that contains sample RACF commands to set up security for CEA.

Note: CEA needs the **`TRUSTED(YES)`** attribute set on the **`RDEFINE STARTED CEA.**`** definition, which ensures that CEA has the appropriate authority to start and manage ISPF sessions.

CEA runs in minimum mode if the user ID running CEA has the following properties:

- The user ID cannot access the PARMLIB data set that contains CEAPRMxx.
- The user ID does not include a correct OMVS segment.

CEAPRMxx

Use the CEAPRMxx parmlib member to customize CEA. For more information, see *z/OS MVS Initialization and Tuning Reference Version 2 Release 3,* SA23-1380. A sample CEAPRMxx member is shown in Example 3-24.

Example 3-24 Sample CEAPRMxx member

```
SNAPSHOT(Y)
HLQ(CEA)
DUMPCAPTURETIME
(
SLIP(OPERLOG(00:30:00)  LOGREC(01:00:00)
LOGRECSUMMARY(04:00:00))

DUMP(OPERLOG(00:30:00)  LOGREC(01:00:00)
LOGRECSUMMARY(04:00:00))

ABEND(OPERLOG(00:30:00)  LOGREC(01:00:00)
LOGRECSUMMARY(04:00:00))
)
/*** INCIDENT LOG INSERTED ***/
COUNTRYCODE(866)
```

```
BRANCH(055)
STORAGE(STORCLAS(NORMAL))
```

Note: **SNAPSHOT** must be set to Y for CEA to preserve snapshots of log information about incidents.

The **HLQ** statement specifies the high-level qualifier to use for naming log snapshot data sets that are created during Incident Log task processing for storing diagnostic information. The **HLQ** statement allows up to four characters.

With z/OS V2R1, the allowable length of the high-level qualifier is increased from four to eight characters through the new **HLQLONG** statement in member CEAPRMxx. To maintain compatibility with previous releases, z/OS continues to support the usage of a shorter high-level qualifier, which is specified on the **HLQ** statement in CEAPRMxx.

You are not required to migrate to the longer high-level qualifier. To continue to use your configuration, do not specify the **HLQLONG** statement. If you want to start using the eight character high-level qualifier, specify **HLQLONG**.

If you specify the **HLQLONG** and **HLQ** statements, the **HLQLONG** statement overrides the **HLQ** statement.

CEA can switch to a different CEAPRMxx at any time by using the **F CEA,CEA=xx** command.

Logstreams

The system creates DASD-only log streams for the operations log (OPERLOG) and the sysplex LOGREC diagnostic snapshots. You do not need to predefine the DASD-only log streams. For the model that is used, see sample job CEASNPLG, which is supplied by IBM in SYS1.SAMPLIB(CEASNPLG).

Note: Values that are specified for the **HLQ** and **HLQLONG** statements in CEAPRMxx play a role in the customization of sample job CEASNPLG in SYS1.SAMPLIB.

3.23.3 Recommendations

If your installation does not include a running CEA, complete the following steps:

1. Customize and run SYS1.SAMPLIB(CEASEC).
2. Set up the log streams that are required for CEA by running SYS1.SAMPLIB(CEASNPLG).

3.24 System REXX

System REXX (SYSREXX) is z/OS component that provides an infrastructure through which programs that are written in the REXX language can be run outside the normal TSO/E or batch environments by using a programming interface.

For the Incident Log task, CEA performs some of its processing by using SYSREXX execs, which are started through the AXREXX macro function. For more information about SYSREXX, see Chapter 31, “System REXX”, in *z/OS MVS Programming: Authorized Assembler Services Guide Version 2 Release 3,* SA23-1371.

Setting up SYSREXX consists of customizing the AXRxx PARMLIB member, and setting up a few RACF profiles for a user ID to run SYSREXX, a STARTED class profile, and a SURROGAT class profile.

The AXRxx PARMLIB member in our system is shown in Example 3-25.

Example 3-25 AXRxx PARMLIB member

```
CPF('REXX&SYSCLONE.',SYSPLEX) /* Defines REXXnn as a sysplex-wide cpf value */
AXRUSER(AXR)
REXXLIB ADD DSN(SYS1.SAXREXEC) VOL(&SYSR1.)
MAXWorkerTasks(32)
```

Note: Ensure that the AXR user ID has READ access to the data sets that are specified in REXXLIB in the AXRxx PARMLIB member.

The RACF profiles that we issued in our system are shown in Example 3-26.

Example 3-26 RACF profiles for System REXX

```
ADDUSER AXR DFLTGRP(STCGROUP)

RDEFINE STARTED AXR*.* STDATA(USER(AXR),GROUP(STCGROUP))
SETR RACLIST(STARTED) REFRESH

RDEFINE SURROGAT SYSREXX.AXR UACC(NONE)
PE SYSREXX.AXR CLASS(SURROGAT) ACCESS(READ) ID(AXR)
SETR RACLIST(SURROGAT) REFRESH
```

In our example, we started AXR by running **START AXRPSTRT**, and it started as shown in Example 3-27.

Example 3-27 Syslog output

```
S AXRPSTRT
$HASP100 AXRPSTRT ON STCINRDR
IEF695I START AXRPSTRT WITH JOBNAME AXRPSTRT IS ASSIGNED TO USER AXR
   , GROUP STCGROUP
$HASP373 AXRPSTRT STARTED
$HASP395 AXRPSTRT ENDED
IEA989I SLIP TRAP ID=X33E MATCHED.  JOBNAME=*UNAVAIL, ASID=00B7.
IEF196I         1 //IEESYSAS JOB TIME=NOLIMIT,
IEF196I           // MSGLEVEL=1
IEF196I         2 //AXR      EXEC IEESYSAS,PROG=AXRINIT
IEF196I  STMT NO. MESSAGE
IEF196I         2 IEFC001I PROCEDURE IEESYSAS WAS EXPANDED USING
SYSTEM
IEF196I LIBRARY SYS1.PROCLIB
IEF196I         3 XXIEESYSAS PROC PROG=IEFBR14
IEF196I                   00050000
IEF196I         4 XXIEFPROC  EXEC PGM=&PROG
IEF196I                   00100000
IEF196I           XX* THE IEESYSAS PROCEDURE IS SPECIFIED IN THE
IEF196I                   00150000
IEF196I           XX* PARAMETER LIST TO IEEMB881 BY MVS COMPONENTS
IEF196I                   00200000
```

```
IEF196I          XX* STARTING FULL FUNCTION SYSTEM ADDRESS SPACES.
IEF196I                  00250000
IEF196I          IEFC653I SUBSTITUTION JCL - PGM=AXRINIT
IEE252I MEMBER  AXR00   FOUND IN SYS1.PARMLIB
IEF196I IEF285I   SYS1.PARMLIB                             KEPT
IEF196I IEF285I   VOL SER NOS= BH8CAT.
IEF196I IEF285I   CPAC.ZOSV21.PARMLIB                      KEPT
IEF196I IEF285I   VOL SER NOS= Z21CAT.
IEF196I IEF285I   SYS1.IBM.PARMLIB                         KEPT
IEF196I IEF285I   VOL SER NOS= Z21RB1.
IEF196I IEF285I   SYS1.SAXREXEC                            KEPT
IEF196I IEF285I   VOL SER NOS= Z21RB1.
IEE252I MEMBER CTIAXR00 FOUND IN SYS1.IBM.PARMLIB
IEF196I IEF285I   SYS1.PARMLIB                             KEPT
IEF196I IEF285I   VOL SER NOS= BH8CAT.
IEF196I IEF285I   CPAC.ZOSV21.PARMLIB                      KEPT
IEF196I IEF285I   VOL SER NOS= Z21CAT.
IEF196I IEF285I   SYS1.IBM.PARMLIB                         KEPT
IEF196I IEF285I   VOL SER NOS= Z21RB1.
AXR0102I SYSTEM REXX INITIALIZATION COMPLETE
```

For more information about SYSREXX and how to set up SYSREXX, see Chapter 31, “System REXX”, in *MVS Programming: Authorized Assembler Services Guide Version 2 Release 1*, SA23-1371.

3.25 Plug-in installation options

For each plug-in you select, you must uncomment the appropriate statements in the PLUGINS parameter of SYS1.PARMLIB(IZUPRMxx) and complete the corresponding installation steps for each selected plug-in. The settings for a fully configured z/OSMF instance are shown in Example 3-28. The only plug-that is configured differently is SDSF. For more information, see “Jobs and Resources task” on page 40.

Example 3-28 PLUGINS parameter of SYS1.PARMLIB(IZUPRMxx)

```
PLUGINS( INCIDENT_LOG,
         COMMSERVER_CFG,
         WORKLOAD_MGMT
         RESOURCE_MON,
         CAPACITY_PROV,
         SOFTWARE_MGMT,
         SYSPLEX_MGMT,
         ISPF)
```

3.26 Planning for z/OSMF communication between sysplexes

If you are using the remote deployment facility of the z/OSMF Software Deployment plug-in, you must plan for secure communication between z/OSMF instances that run in different sysplexes.

For more information about these considerations, see Chapter 8, “Configuring a primary z/OSMF for communicating with secondary instances” in *IBM z/OS Management Facility Configuration Guide Version 2 Release 3,* SC-27-8419.

The product documentation suggests the following strategies for configuring the SSL communications:

- Use a common CA certificate to sign all z/OSMF server certificates.
- Use a unique CA certificate for each instance.

The following sections provide an example of deploying each option.

3.26.1 Using a common CA certificate to sign all z/OSMF server certificates

In this case, use your own CA certificate to sign the z/OSMF server certificates or generate the CA certificate on one of the z/OSMF instances (the primary instance) during the configuration process and use it for signing. Complete the following steps:

1. In the primary instance, specify `IZU_DEFAULT_CERTAUTH=Y` to generate the CA zOSMFCA as part of the configuration process.
2. In the primary instance, generate and sign certificates with the CA for all other instances, as shown in Example 3-29.

   Example 3-29 SSL certificate for instance SC74 created in SC80

   ```
   RACDCERT ID(IZUSVR) GENCERT SUBJECTSDN(CN('WTSC74.ITSO.IBM.COM') +
   O('IBM') OU('ARNDFLT')) WITHLABEL('DefaultzOSMFCert.ARNDFLT.SC74') +
   SIGNWITH(CERTAUTH LABEL('zOSMFCA')) NOTAFTER(DATE(2021/06/17))
   ```

3. For each instance, export the CA certificate and SSL certificate (with the private keys) for the instance, as shown in Example 3-30 and Example 3-31.

   Example 3-30 Export the CA certificate

   ```
   RACDCERT EXPORT(LABEL('zOSMFCA')) DSN('ARUN.CERTD.ZOSMFCA1’) +
   FORMAT(CERTDER) CERTAUTH
   ```

   Example 3-31 Export the SSL certificate for instance SC74

   ```
   RACDCERT EXPORT(LABEL('DefaultzOSMFCert.ARNDFLT.SC74')) +
   DSN('ARUN.PCKS12.SSL74') +
   FORMAT(PKCS12DER) PASSWORD('Guess what') ID(IZUSVR)
   ```

4. In binary mode, move the CA certificate and the SSL certificates to the other systems where they are to be imported.

5. Add the CA certificates and SSL certificate to the other systems' RACF database, as shown in Example 3-32 and Example 3-33.

Example 3-32 Add the CA into the SC74 RACF database

```
RACDCERT ADD('ARUN.CERTD.ZOSMFCA1') CERTAUTH TRUST +
 WITHLABEL('zOSMFCA')
```

Example 3-33 Add SSL certificate for instance in SC74 to RACF database

```
RACDCERT ADD('ARUN.PCKS12.SSL74') ID(ARNSVR) TRUST +
WITHLABEL('DefaultzOSMFCert.ARNDFLT') PASSWORD('Guess what')
```

6. In the secondary instances, specify the configuration variable `IZU_DEFAULT_CERTAUTH` as `N` in the configuration process so that the CA for the secondary instance is not created.
7. When you get to the stage of running **`izucofig1.cfg.rexx`** (the name changes depending upon the name of the configuration file name that you decide to use), comment out the statements that create an SSL certificate for the secondary instance (shown in bold in Example 3-34) before running the REXX exec. Then, the key rings are created when the REXX exec is run, and the CA certificate and the SSL certificates are connected to the key ring for the instance.

Example 3-34 izuconfig1.cfg.rexx

```
/* Create the server certificate for the z/OSMF server */
/* Call RacfCmd “RACDCERT ID(ARNSVR) GENCERT
SUBJECTSDN(CN('WTSC74.ITSO.IBM.COM') O('IBM') OU('ARNDFLT'))
WITHLABEL('DefaultzOSMFCert.ARNDFLT')”
“SIGNWITH(CERTAUTH LABEL('zOSMFCA')) NOTAFTER(DATE(2021/06/19))” */

Call RacfCmd “RACDCERT ALTER(LABEL('DefaultzOSMFCert.ARNDFLT')) ID(“ARNSVR”)
TRUST”
Call RacfCmd “RACDCERT ID(ARNSVR) CONNECT (LABEL('DefaultzOSMFCert.ARNDFLT')
RING(IZUKeyring.ARNDFLT) DEFAULT)”
```

3.26.2 Using a unique CA certificate for each instance

Using a unique `IZU_SAF_PROFILE_PREFIX` and specifying `yes` to the installation prompt to generate a CA certificate during the installation process results in uniquely named CA certificates. Make the CA certificates of each instance available to the other instances to enable secure communication.

When `IZU_SAF_PROFILE_PREFIX=ARNDFLT` and `IZU_DEFAULT_CERTAUTH=Y`, the CA certificate that is generated is shown in Example 3-35.

Example 3-35 CA certificate for IZU_SAF_PROFILE_PREFIX=ARNDFLT

```
RACDCERT CERTAUTH GENCERT SUBJECTSDN(CN('z/OSMF CertAuth for Security Domain')
OU('ARNDFLT')) WITHLABEL('zOSMFCA') TRUST NOTAFTER(DATE(2021/06/17))
```

When IZU_SAF_PROFILE_PREFIX=IZUDFLT and IZU_DEFAULT_CERTAUTH=Y, the CA certificate that is generated is shown in Example 3-36.

Example 3-36 CA certificate for IZU_SAF_PROFILE_PREFIX=IZUDFLT

```
RACDCERT CERTAUTH GENCERT SUBJECTSDN(CN('z/OSMF CertAuth for Security Domain')
OU('IZUDFLT')) WITHLABEL('zOSMFCA') TRUST NOTAFTER(DATE(2021/05/31))
```

When you compare Example 3-35 on page 77 with Example 3-36, the value that is specified for IZU_SAF_PROFILE_PREFIX makes the SUBJECTDSN unique, which also makes the CA unique.

When IZU_SAF_PROFILE_PREFIX=ARNDFLT, the SSL certificate and key ring that is created for the instance is shown in Example 3-37.

Example 3-37 SSL certificate and key ring for IZU_SAF_PROFILE_PREFIX=ARNDFLT

```
/* SSL Certificate for the z/OSMF instance */
RACDCERT ID(IZUSVR) GENCERT SUBJECTSDN(CN('WTSC80.ITSO.IBM.COM') O('IBM')
OU('ARNDFLT')) WITHLABEL('DefaultzOSMFCert.ARNDFLT')SIGNWITH(CERTAUTH
LABEL('zOSMFCA')) NOTAFTER(DATE(2021/06/17))

/* key ring for the z/OSMF instance*/
RACDCERT ADDRING(IZUKeyring.ARNDFLT) ID(IZUSVR)
```

When IZU_SAF_PROFILE_PREFIX=IZUDFLT, the SSL certificate and key ring that is created for the instance is shown in Example 3-38.

Example 3-38 SSL certificate and key ring for IZU_SAF_PROFILE_PREFIX=IZUDFLT

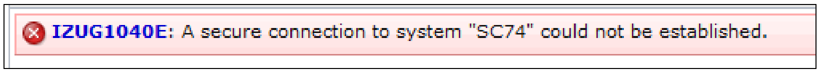
```
/* SSL Certificate for the z/OSMF instance */
RRACDCERT ID(IZUSVR) GENCERT SUBJECTSDN(CN('WTSC74.ITSO.IBM.COM') O('IBM')
OU('IZUDFLT')) WITHLABEL('DefaultzOSMFCert.IZUDFLT')
SIGNWITH(CERTAUTH LABEL('zOSMFCA')) NOTAFTER(DATE(2021/05/31))

/* key ring for the z/OSMF instance*/
RACDCERT ADDRING(IZUKeyring.IZUDFLT) ID(IZUSVR)
```

ARNDFLT and IZUDFLT make the SSL certificate and key ring unique, as shown in Example 3-37 and Example 3-38.

3.26.3 Certificate issues

If you create z/OSMF instances on different sysplexes by using the default security execs, a communication error results when the instances attempt to establish communication to each other because of the following issues:

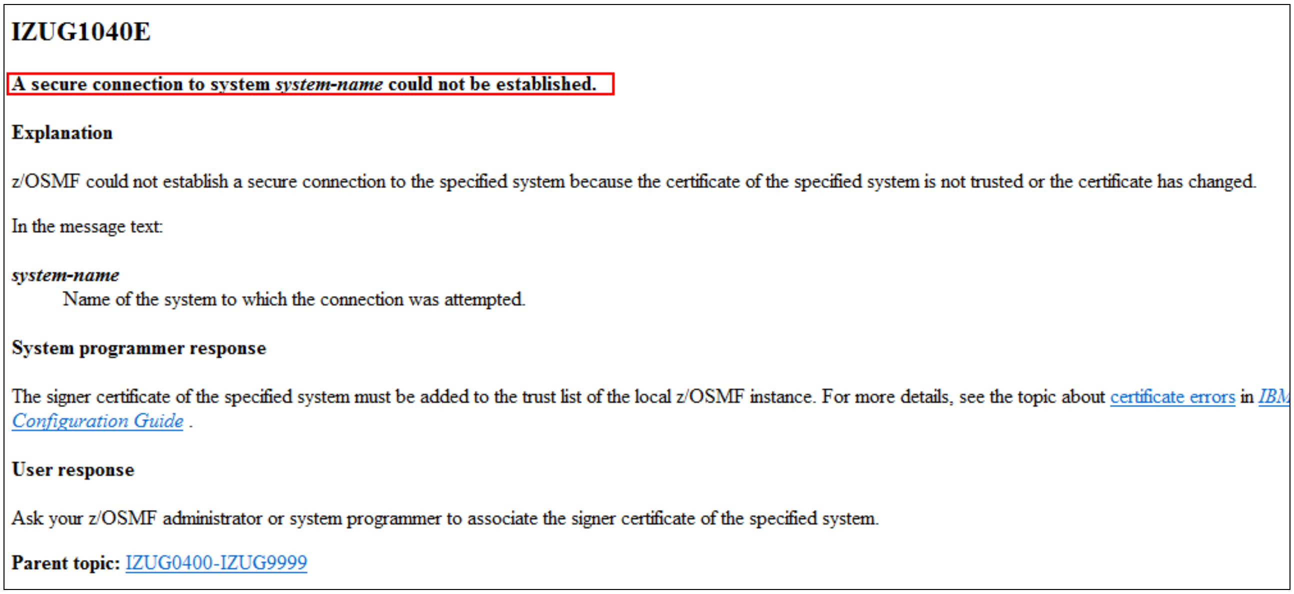
- A problem exists with secure communication between the z/OSMF instances, which produces the message that is shown in Figure 3-25, because the CA certificates are not truly identical on each system and are not unique enough to be imported from one RACF database to another.



IZUG1040E: A secure connection to system "SC74" could not be established.

Figure 3-25 Secure communication failure between the z/OSMF instances

An explanation of the error message IZUG1040E is shown in Figure 3-26.



IZUG1040E

A secure connection to system *system-name* could not be established.

Explanation

z/OSMF could not establish a secure connection to the specified system because the certificate of the specified system is not trusted or the certificate has changed.

In the message text:

system-name
Name of the system to which the connection was attempted.

System programmer response

The signer certificate of the specified system must be added to the trust list of the local z/OSMF instance. For more details, see the topic about certificate errors in *IBM Configuration Guide* .

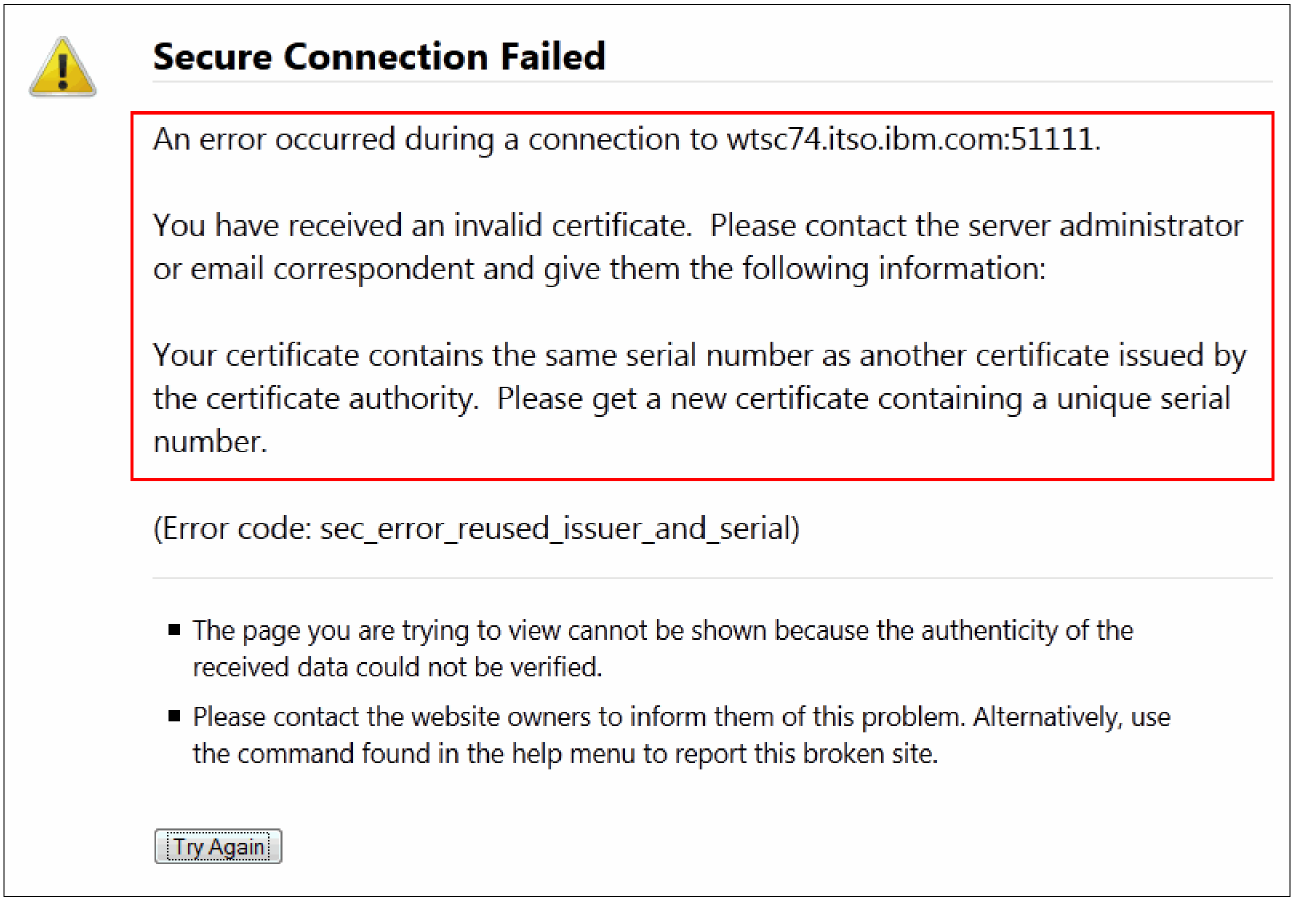
User response

Ask your z/OSMF administrator or system programmer to associate the signer certificate of the specified system.

Parent topic: IZUG0400-IZUG9999

Figure 3-26 Error message explanation

- Another problem exists with the use of multiple z/OSMF instances that were configured by using the default security execs. If you log in to one z/OSMF instance and accept the server certificate and then attempt to log in to another z/OSMF instance (configured with the same default security execs), the browser indicates that you have an identical server certificate (as shown in Figure 3-27) and does not allow you to proceed.



Secure Connection Failed

An error occurred during a connection to wtsc74.itso.ibm.com:51111.

You have received an invalid certificate. Please contact the server administrator or email correspondent and give them the following information:

Your certificate contains the same serial number as another certificate issued by the certificate authority. Please get a new certificate containing a unique serial number.

(Error code: sec_error_reused_issuer_and_serial)

- The page you are trying to view cannot be shown because the authenticity of the received data could not be verified.
- Please contact the website owners to inform them of this problem. Alternatively, use the command found in the help menu to report this broken site.

Figure 3-27 Failure to log on to the second instance

How to address these problems is described next.

Solving problems with multiple instances by using default security execs

A problem occurs when multiple z/OSMF instances use the default security configurations and you want the instances to talk to each other later.

This issue results in identically named CA certificates on the z/OS systems (zOSMFCA), but some system-specific key ring material exists. The differences in key ring material prevent the instances from trusting each other. In addition, you cannot exchange CA certificates between the z/OS systems where the instances are running because the CA certificates are not unique enough to be added to the same database. Attempting to add a certificate into a database that has a certificate with the same name results in an error and the following message:

```
IRRD109I The certificate cannot be added... already defined.
```

This section shows you how to convert such an implementation to a common CA certificate scenario by using two z/OSMF instances, one in SC74 in PLEX75 and the other in SC80 in PLEX81. Both instances are set up with the default z/OSMF configurations (security execs).

Both the instances use the same RACF commands to define their CA as a part of configuration process, as shown in Example 3-39.

Example 3-39 RACDCERT command to generate a z/OSMF certificate authority certificate

```
RACDCERT CERTAUTH GENCERT SUBJECTSDN(CN('z/OSMF CertAuth for Security Domain')
OU('IZUDFLT')) WITHLABEL('zOSMFCA') TRUST NOTAFTER(DATE(2021/05/30)
```

Complete the following steps to convert to a common CA:

1. Export the CA certificate from the primary instance.
2. In the primary instance, create SSL certificates for all the other instance and sign them with a CA.
3. Export a signed SSL certificate to each instance's data set.
4. Move the data set in binary mode to the other system.
5. In the other system:
   a. Delete the duplicate CA and SSL certificate from the RACF database.
   b. Add a CA with same label by using the exported CA certificate in the data set.
   c. Add the SSL certificate from the exported data set.
   d. Add the CA and SSL certificate to the instance's key ring.

In our example, we modified SC74 (which is considered the secondary z/OSMF) and left SC80 (which is considered the primary z/OSMF) as is. Complete the following steps:

1. On SC80, complete the following steps:

   a. Export the CA that is created by the configuration process to a data set, as shown in Example 3-40.

   Example 3-40 Export the CA

   ```
   RACDCERT EXPORT(LABEL('zOSMFCA')) DSN('ARUN.CERTD.ZOSMFCA') FORMAT(CERTDER)
   CERTAUTH
   ```

   b. Generate an SSL certificate for the z/OSMF instance in SC74, as shown in Example 3-41.

   Example 3-41 SSL certificate for the SC74 z/OSMF instance

   ```
   RACDCERT ID(IZUSVR) GENCERT SUBJECTSDN(CN('WTSC74.ITSO.IBM.COM') O('IBM')
   OU('IZUDFLT')) WITHLABEL('DefaultzOSMFCert.IZUDFLT.SC74')
   SIGNWITH(CERTAUTH LABEL('zOSMFCA')) NOTAFTER(DATE(2021/06/17))
   ```

   c. Export the SSL certificate that was created for the z/OSMF instance in SC74, as shown in Example 3-42.

   Example 3-42 Export the SSL certificate

   ```
   RACDCERT EXPORT(LABEL('DefaultzOSMFCert.IZUDFLT.SC74'))
   DSN('ARUN.PCKS12.SSL74')FORMAT(PKCS12DER) PASSWORD('Guess what') ID(IZUSVR)
   ```

   d. Use FTP to transfer the data set to SC74 in binary mode.

2. On SC74, complete the following steps:
   a. Delete the CA certificate, as shown in Example 3-43.

   Example 3-43 Delete the CA certificate

   ```
   RACDCERT DELETE (LABEL('zOSMFCA')) CERTAUTH
   ```

   b. Delete the SSL certificate for the z/OSMF instance from the key ring that was created for the instance, as shown in Example 3-44.

   Example 3-44 Delete the SSL certificate

   ```
   RACDCERT DELETE (LABEL('DefaultzOSMFCert.IZUDFLT')) ID(IZUSVR)
   ```

   c. Add the CA certificate from the data set that was moved from SC80, as shown in Example 3-45.

   Example 3-45 Add the CA certificate

   ```
   RACDCERT ADD('ARUN.CERTD.ZOSMFCA') CERTAUTH TRUST WITHLABEL('zOSMFCA')
   ```

   d. Add the SSL certificate for the SC74 z/OSMF instance, which was moved from SC80, as shown in Example 3-46.

   Example 3-46 Add the SSL certificate

   ```
   RACDCERT EXPORT(LABEL('DefaultzOSMFCert.IZUDFLT.SC74'))
   DSN('ARUN.PCKS12.SSL74') FORMAT(PKCS12DER) PASSWORD('Guess what') ID(IZUSVR)
   ```

   e. Connect the CA and SSL certificate to the z/OSMF instance's key ring, as shown in Example 3-47.

   Example 3-47 Connect certificates to the z/OSMF key ring

   ```
   RACDCERT CONNECT (CERTAUTH LABEL('zOSMFCA') RING(IZUKeyring.IZUDFLT)
   USAGE(CERTAUTH)) ID(IZUSVR)

   RACDCERT CONNECT (ID(IZUSVR) LABEL('DefaultzOSMFCert.IZUDFLT') DEFAULT
   RING(IZUKeyring.IZUDFLT) USAGE(PERSONAL)) ID(IZUSVR)
   ```

3.26.4 Recommendations

To access all the z/OSMF instances that are in your installation from your web browser and to get the z/OSMF instances to talk to each other for any reason, use a unique SSL certificate label for each instance by specifying a unique `IZU_SAF_PROFILE_PREFIX` for each instance.

For certificate management for instances, use of a common CA for all your instances.

4

IBM z/OS Management Facility installation and configuration

This chapter provides the information that is needed to install and configure z/OS Management Facility (z/OSMF) on your system.

Before you begin the configuration process, have the following publications available for reference:

- *IBM z/OS Management Facility Configuration Guide Version 2 Release 3, SC-27-8419*
- z/OS Program Directory V2.3.0, GI11-9848

This chapter includes the following topics;

- 4.1, “Installation considerations” on page 84
- 4.2, “z/OSMF configuration” on page 84
- 4.3, “Adding plug-ins to your z/OSMF system” on page 89
- 4.4, “Authorizing a user to use z/OSMF” on page 90
- 4.5, “Creating SAF security commands with IZUGUTSE utility” on page 90

4.1 Installation considerations

Before you start the z/OSMF configuration process, it is assumed that you completed the SMP/E installation steps that are described in *z/OS Program Directory V2.3.0*, GI11-9848.

4.1.1 Installation prerequisites

This setup must be done before you configure z/OSMF. By default, the SDK is in the `/usr/lpp/java/J8.0_64` directory on your system. If you installed it in another location, be sure to include the JAVA_HOME statement in your IZUPRMxx parmlib member.

4.2 z/OSMF configuration

During the installation and configuration of a z/OSMF system, the following data file systems are built. The default directory names that are used are described in 4.2.1, "z/OSMF file systems" on page 84.

4.2.1 z/OSMF file systems

The following z/OSMF file systems are available:

- Product file system: `/usr/lpp/zosmf`
- Data file system: `/var/zosmf/data`

As a base element of the operating system, z/OSMF is installed when you install z/OS. By default, z/OSMF is installed into the z/OS root file system in the `/usr/lpp/zosmf` directory. As a preferred practice, mount the z/OSMF file systems at IPL by updating your auto-mount process or BPXPRMxx parmlib member.

By default, the file systems use the Data file system name. The default name is `IZU.SIZUUSRD`. The z/OSMF data file system is mounted in read/write mode at the location that is specified on the `IZU_DATA_DIR` configuration variable.

To have the file system mounted automatically at IPL, add the following **`MOUNT`** command for the file system to your BPXPRMxx parmlib member:

```
MOUNT FILESYSTEM('IZU.SIZUUSRD') TYPE(ZFS)
MODE(RDWR)MOUNTPOINT('/var/zosmf/data') PARM('AGGRGROW') UNMOUNT
```

Another z/OSMF directory that are built during configuration script execution is the configuration log files location `/var/zosmf/configuration/logs`.

4.2.2 Configuration stages

The configuration of z/OSMF to create a running instance is composed of the following stages:

1. Configuration

   If z/OSMF requires customization, you can modify settings by using the IZUPRMxx parmlib member, which is new in this release. A sample member is provided in SYS1.SAMPLIB(IZUPRM00) with settings that match the z/OSMF defaults. By using IZUPRM00 as a model, you can create a customized IZUPRMxx parmlib member for your environment.

   The process that is used to configure the core consists of the following steps:

   a. Start the configuration by running the **`izusetup.sh`** script with the **`-config`** option.

   b. Run the RACF security REXX exec that was created during step a.

   c. Run the RACF security REXX exec that was created for your user ID during step a. This REXX exec is not created if the ID that is used to run the **`izusetup.sh`** script with the **`-config`** option includes the required access.

   d. Verify that the RACF setup completes by using the **`-verify`** script option.

   e. Complete the configuration by running **`izusetup`** with the **`-finish`** option.

2. Security

   In this release, security authorizations for z/OSMF are created by using sample jobs IZUxxSEC in SYS1.SAMPLIB. In previous releases, the configuration scripts created one or more REXX execs with sample RACF commands for creating authorizations.

3. z/OSMF autostart

   z/OSMF is started when you IPL your z/OS system. This behavior, which is referred to as *z/OSMF autostart*, means that z/OSMF is available for use when the system is available.

4. Plug-in installation

   With the base setup, you receive a plain z/OSMF instance without plug-ins. To activate the plug-ins that are supported in z/OSMF V2R3, uncomment the `PLUGINS` parameter in IZUPRMxx parmlib member (see Figure 4-1 on page 86). For more information about plug-in prerequisites, see Chapter 3, “Planning and prerequisites” on page 23.

4.2.3 Creating the initial z/OSMF configuration

Our sample parmlib member for z/OSMF is shown in Example 4-1.

Example 4-1 Sample parmlib member for z/OSMF

```
HOSTNAME('*')
HTTP_SSL_PORT(2443)
INCIDENT_LOG UNIT('SYSALLDA')
JAVA_HOME('/usr/lpp/java/J8.0_64')
KEYRING_NAME('IZUKeyring.IZUDFLT')
LOGGING('*=warning:com.ibm.zosmf.*=info:com.ibm.zosmf.environment.ui=fi
ner')
RESTAPI_FILE ACCT(IZUACCT) REGION(32768) PROC(IZUFPROC)
COMMON_TSO ACCT(IZUACCT) REGION(50000) PROC(IZUFPROC)
SAF_PREFIX('IZUDFLT')
CLOUD_SAF_PREFIX(‘IYU’)
SEC_GROUPS USER(IZUUSER),ADMIN(IZUADMIN),SECADMIN(IZUSECAD)
SESSION_EXPIRE(495)
TEMP_DIR('/tmp')
CSRF_SWITCH(ON)
SERVER_PROC(IZUSVR1)
ANGEL_PROC(IZUANG1)
AUTOSTART(LOCAL)
AUTOSTART_GROUP(‘IZUDFLT’)
USER_DIR(‘/var/zosmf’)
UNAUTH_USER(IZUGUEST)
WLM_CLASSES DEFAULT(IZUGHTTP)
            LONG_WORK(IZUGWORK)

 /* Uncomment the following statement and any plugins that
    are desired */
 /* PLUGINS( INCIDENT_LOG,
             COMMSERVER_CFG,
             WORKLOAD_MGMT
             RESOURCE_MON,
             CAPACITY_PROV,
             SOFTWARE_MGMT,
             SYSPLEX_MGMT,
             ISPF)           */
```

4.2.4 Starting and stopping the z/OSMF server

To start the z/OSMF Server manually, run the following z/OS **START** commands by using the optional `jobname`, if required:

```
S IZUANG1,jobname=jobname
S IZUSVR1,jobname=jobname
```

If you omit the **JOBNAME=** specification, the default member names, IZUANG1 and IZUSVR1, are used.

Note: IZUANG1 is started first. When you see the `CWWKB0056I INITIALIZATION COMPLETE FOR ANGEL` message, start the IZUSVR1 STC. The z/OSMF server is available when the following message displays:

```
CWWKF0011I: The server zosmfServer is ready to run a smarter planet is issued.
```

For information about how to stop the z/OSMF server, see 4.3.1, “Shutting down the server and angel STCs” on page 89.

4.2.5 z/OSMF LOGON window

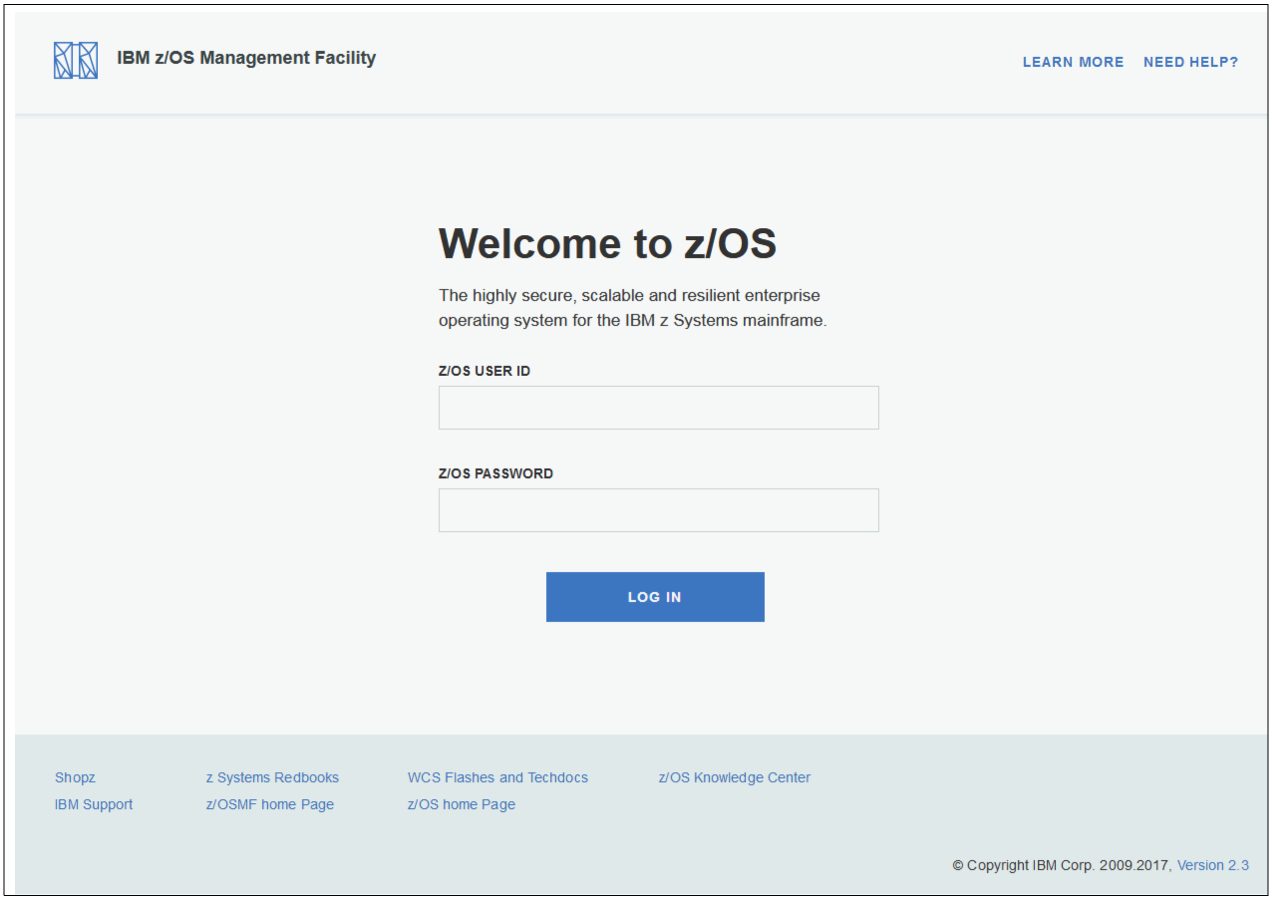
To access the z/OSMF system in our example, enter the URL in a browser that is shown in the message IZUG349I in the job output from the **`IZUSVR1`**, as shown in the following example:

```
https://WTSC81.ITSO.IBM.COM:62222/zosmf
```

The example host name is `WTSC81.ITSO.IBM.COM` and the port that we specified during our configuration was 62222.

After pointing the browser at `https://WTSC81.ITSO.IBM.COM:62222/zosmf`, you see the initial z/OSMF LOGON window, which is shown in Figure 4-1 on page 88. To complete the logon process, enter a valid z/OS user ID and password.

Note: You can start multiple instances of z/OSMF by using different browsers or multiple instances or tabs of the same browser.



Welcome to z/OS

The highly secure, scalable and resilient enterprise operating system for the IBM z Systems mainframe.

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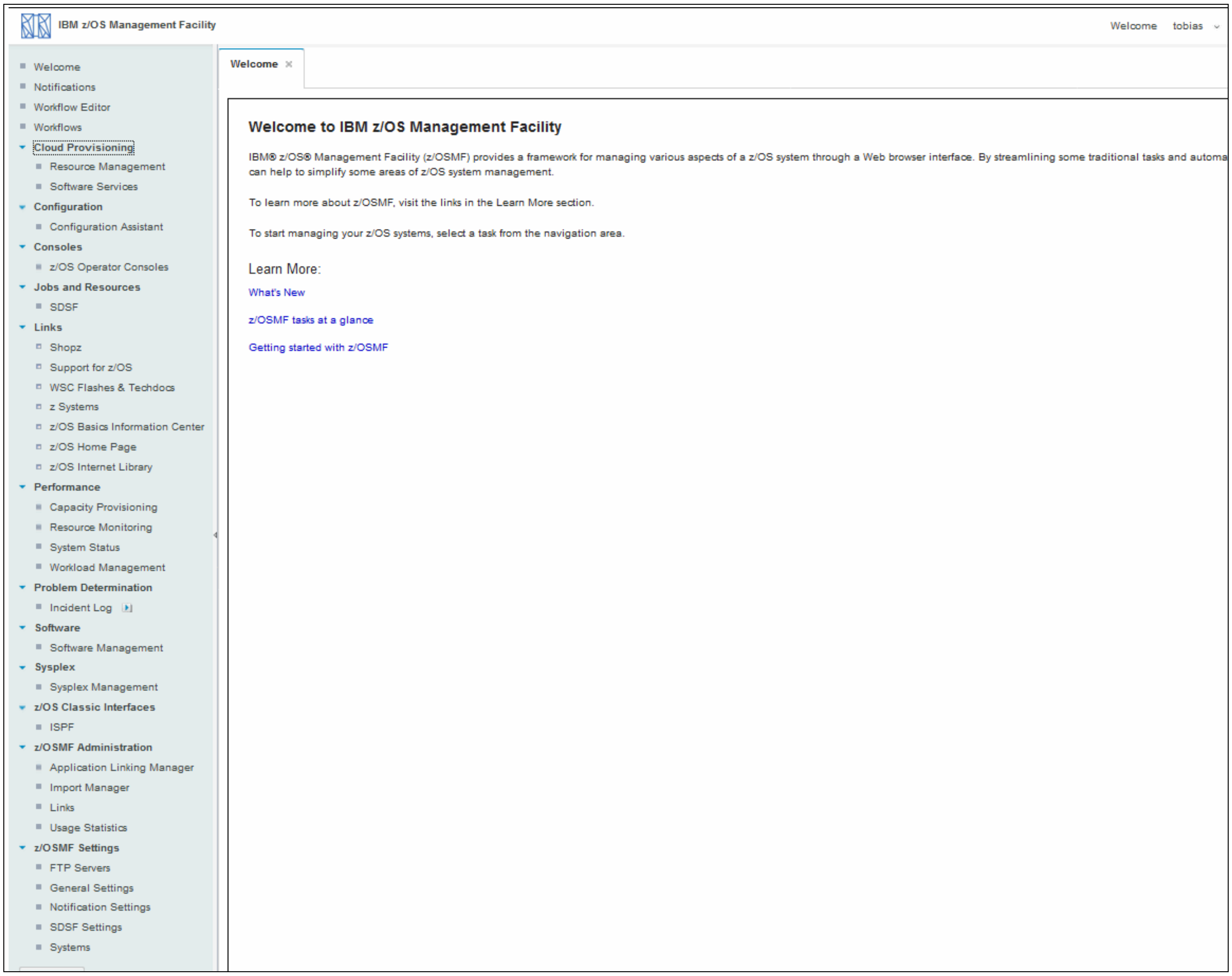
Figure 4-1 Initial z/OSMF LOGON window

After you enter a valid user ID, the z/OSMF Welcome window opens, as shown in Figure 4-2 on page 89. You can see the features that are available with the core product (no plug-ins are selected):

- Welcome
- Notifications
- Workflow Editor
- Workflows
- Cloud Provisioning
- Configuration
- Consoles
- Jobs and Resources
- Links
- Performance
- Problem Determination
- Software
- z/OS Classic Interfaces
- z/OSMF Administration
- z/OSMF Settings



Welcome to IBM z/OS Management Facility

IBM® z/OS® Management Facility (z/OSMF) provides a framework for managing various aspects of a z/OS system through a Web browser interface. By streamlining some traditional tasks and automa can help to simplify some areas of z/OS system management.

To learn more about z/OSMF, visit the links in the Learn More section.

To start managing your z/OS systems, select a task from the navigation area.

Learn More:

What's New

z/OSMF tasks at a glance

Getting started with z/OSMF

Figure 4-2 z/OSMF Welcome window for core functions

4.3 Adding plug-ins to your z/OSMF system

After you configure a working instance of z/OSMF on your system, you might want to update your configuration by adding plug-ins. To do so, use the workflow, `izu.config.setup.xml`. You can find it in `/usr/lpp/zosmf/workflow`. This workflow guides you through the setup of all plug-ins, including their prerequisites.

4.3.1 Shutting down the server and angel STCs

To shut down the z/OSMF server tasks, run the MVS **`STOP`** command. First, shut down the z/OSMF Server task by running the following command:

```
P IZUSVR1
```

You should see the following message, which indicates a successful closure of the task:

```
+CWWKB0001I: Stop command received for server zosmfServer.
£HASP395 IZUSVR1  ENDED
```

After the z/OSMF Server task is shut down, close the angel STC by running the following command:

```
P IZUANG1
```

You should see the following messages, which indicate a successful closure of the task:

```
CWWKB0057I WEBSPHERE FOR Z/OS ANGEL PROCESS ENDED NORMALLY
£HASP395 IZUANG1  ENDED
```

4.4 Authorizing a user to use z/OSMF

The following section describes the procedure that is used to permit a RACF user to use z/OSMF functions.

4.4.1 Using RACF commands to authorize a user ID to use z/OSMF

The SYS1.SAMPLIB member IZUAUTH is used to authorize a RACF defined user ID to use z/OSMF processing.

The necessary commands for z/OSMF users are shown in Example 4-2. The other commands that you must run for z/OS administrators are shown in Example 4-3.

Example 4-2 SYS1.SAMPLIB(IZUAUTH) commands for z/OSMF user

```
CONNECT <userid> GROUP(IZUUSER)
CONNECT <userid> GROUP (CFZUSRGP)

CONNECT <userid> GROUP(CPOCTRL)
CONNECT <userid> GROUP(CPOQUERY)

CONNECT <userid> GROUP WLMGRP)
```

Example 4-3 SYS1.SAMPLIB(IZUAUTH) commands for z/OSMF administrators

```
CONNECT <userid> GROUP(IZUADMIN)
CONNECT <userid> GROUP (CFZADMGP)
```

4.5 Creating SAF security commands with IZUGUTSE utility

Starting with Version 2 Release 3, z/OSMF provides security descriptor files that are based on XML logic. These XML documents contain the z/OSMF security definitions that you must define in a product neutral notation.

With this concept, each type of security management system can use the same XML document as their input. The security management system can then translate the product neutral definitions into their own security database updates.

z/OSMF provides a utility that is called IZUGUTSE, which is used to set up the necessary security configuration in the security database of the system. Unlike the RACF commands, the inputs to the utility are consistent across all external security managers (ESMs) that are running on z/OS.

The utility is used to generate the command text and optionally run the RACF commands. The input to the IZUGUTSE utility is an XML document that contains the security definitions to be defined on the target system. The utility translates the contents of the XML document into RACF commands (or another security subsystem's commands) which can then be optionally run on the target system. The resulting command text and optional command run results are returned to the caller in another XML document.

Restriction: The utility does not create the definition for a digital certificate.

You can find the IZUGUTSE utility in SYS1.SIEALNKE. z/OSMF supplies two XML samples: IZUSEC.xml and IZUAUTH.xml. The samples contain the security definitions that are required by z/OSMF. The samples are in the /usr/lpp/zosmf/samples directory.

The IZUGUTSE utility is designed to work with the RACF-callable service IRRSMO00, which is described in *z/OS Security Server RACF Callable ServicesVersion 2 Release 3,* SA23-2293.

When you plan to use IZUGUTSE, your security administrator should review the sample and make necessary changes before running it with the security utility. You can customize the XML document (as shown in Example 4-5 on page 93 with the results set shown in Example 4-6 on page 94) to change the parameters. You can make these customizations by using a text editor or any other XML editor.

The XML document is translated into a list of ESM-specific updates and these updates are returned for further inspection. For example, the XML is translated into a set of RACF commands which is then returned for review by your security administrator who can then run them later. Optionally, the security definitions in the XML document can be translated and run in a single step.

If you have RACF running, it must be active.

How to run IZUGUTSE from a batch job is shown in Example 4-4.

Example 4-4 Sample job that uses IZUGUTSE utility

```
//IZUXS000 JOB (ACCTINFO),CLASS=A,MSGCLASS=0,
//             MSGLEVEL=(1,1),REGION=0M,NOTIFY=&SYSUID
/*JOBPARM  SYSAFF=SC76
//IZUEXEC1 EXEC PGM=IZUGUTSE,
//  PARM='opt=0010,in=/u/harjans/IZUAUTH.xml,out=/u/harjans/IZUS3.xml'
/*
```

The following parameters for the utility are used in Example 4-4:

- opt

  The name of a 4-byte area that contains the Option values. The individual bits in the Option activate the options.

- in

  The path for XML security definition file (must be a UNIX file). You can find the XML input that we show in the job in Example 4-4 in Example 4-5 on page 93.

- out

  The path for XML execution result (must be a UNIX file). The XML statements are shown in Example 4-5 on page 93. The output that is generated from those XML statements is shown in Example 4-6 on page 94.

The values and their descriptions that the parameter **opt** supports are listed in Table 4-1.

Table 4-1 Values and descriptions for the opt parameter

Value for opt	Description
‘0001’	EXECUTE. If this bit is ON, the security definitions that are specified in the Request XML are run, which results in updates being made to the RACF database. The commands that are run, along with their results, are returned in IZUOUT. If this bit is OFF, the commands are generated and returned without being run. This result allows the user to examine the commands before running them. In this case, no updates are made to the RACF database. If this bit is OFF, the commands are generated with minimal error checking because the command processor (which does most of the syntax checking) is not run.
‘0010’	PRECHECK. Checks for the existence of security definitions in the RACF database during command generation. The processing that is performed on pre-existing security definitions can be customized on a per-security definition basis in the XML by using the override=”yes | no | force”attribute. By default, override=”yes” add commands are suppressed, and alter commands are generated. The override=”no”attribute can be set to prevent any update to a security definition that is found to exist in the RACF database. That is, it suppresses the add and alter (including permit) commands. This feature is useful for certain low-level system resources that are most likely defined, and should not be changed from their current definition. The override=”force”attribute can be set to override the PRECHECK option and always generate the add and alter (including permit) commands. **Note:** READ access to IRR.IRRSMO00.PRECHECK in the FACILITY class is required when you specify this option.
‘0100’	If opt 0100 is ON and option 0001 is ON (execute), command run ends when the first error is encountered. If opt 0100 is off, an attempt is made to run all update commands, even if some fail. If opt 0001 (execute) is OFF, this option is ignored. This option is not supported by RACF, but might be supported by other ESMs.
‘1000’	Suppress sensitive. If this bit is ON, sensitive data that is specified in the input XML is suppressed from the generated command images that are returned from the utility. Sensitive data includes passwords, phrases, and other fields that contain sensitive information. The keywords are still intact in the returned command image, only the values are suppressed. When used with the EXECUTE option bit, the sensitive data is removed from the commands after the command is run. If this option is specified without the EXECUTE option, important data is missing from the generated command images. If sensitive information appears in an error or warning message, it is not suppressed.

You can use multiple **opt** values in your JCL. For example, if you specify opt=0011, it means EXECUTE(0001) and PRECHECK(0010) are performed.

Example 4-5 Sample XML security definition file

```
<?xml version="1.0" encoding="UTF-8"?>
<securityrequest xmlns:saf= "http://www.ibm.com/systems/zos/saf"
xmlns:racf="http://www.ibm.com/systems/zos/racf"
xmlns:esm1="http://www.esm.com/esm1">

   <!--Begin "authorize user" Setup-->


   <!--Begin zOSMF User Role by default-->
   <!--Connect the user to z/OSMF user group by default-->
   <saf:groupconnection name="USERID" group="IZUUSER" operation="set"
requestid="IZU00001000"></saf:groupconnection>

   <!--Connect the user to group of CIM by default-->
   <saf:groupconnection name="USERID" group="CFZUSRGP" operation="set"
requestid="IZU00002000"></saf:groupconnection>
   <!--End zOSMF User Role by default-->


   <!--Begin zOSMF adminstrator Role-->
   <!--Connect the user to z/OSMF administrator group if the role the user is
administrator-->
   <saf:groupconnection name="USERID" group="IZUADMIN" operation="set"
requestid="IZU00003000"></saf:groupconnection>

   <!--Connect the user to CIM administrator group if the role the user is
administrator-->
   <saf:groupconnection name="USERID" group="CFZADMGP" operation="set"
requestid="IZU00004000"></saf:groupconnection>
   <!--End zOSMF adminstrator Role-->


   <!--Connect the user to group of Capacity Provisioning-->
   <saf:groupconnection name="USERID" group="CPOCTRL" operation="set"
requestid="IZU00005000"></saf:groupconnection>
   <saf:groupconnection name="USERID" group="CPOQUERY" operation="set"
requestid="IZU00006000"></saf:groupconnection>

   <!--Connect the user to group of Workload Management-->
   <saf:groupconnection name="USERID" group="WLMGRP" operation="set"
requestid="IZU00007000"></saf:groupconnection>
   <!--End "authorize user" Setup-->


</securityrequest>
```

Example 4-6   Sample XML security definition execution result

```
<?xml version="1.0" encoding="IBM-1047"?>
<securityresult
    xmlns="http://www.ibm.com/systems/zos/saf/IRRSMO00Result1">
    <groupconnection name="USER1" group="IZUUSER" operation="set"
requestid="IZU00001000">
        <command>
            <safreturncode>0</safreturncode>
            <returncode>0</returncode>
            <reasoncode>0</reasoncode>
            <image>CONNECT USER1  GROUP       (IZUUSER)</image>
        </command>
    </groupconnection>
    <groupconnection name="USER1" group="CFZUSRGP" operation="set"
requestid="IZU00002000">
        <command>
            <safreturncode>0</safreturncode>
            <returncode>0</returncode>
            <reasoncode>0</reasoncode>
            <image>CONNECT USER1  GROUP       (CFZUSRGP)</image>
        </command>
    </groupconnection>
    <groupconnection name="USER1" group="IZUADMIN" operation="set"
requestid="IZU00003000">
        <command>
            <safreturncode>0</safreturncode>
            <returncode>0</returncode>
            <reasoncode>0</reasoncode>
            <image>CONNECT USER1  GROUP       (IZUADMIN)</image>
        </command>
    </groupconnection>
    <groupconnection name="USER1" group="CFZADMGP" operation="set"
requestid="IZU00004000">
        <command>
            <safreturncode>0</safreturncode>
            <returncode>0</returncode>
            <reasoncode>0</reasoncode>
            <image>CONNECT USER1  GROUP       (CFZADMGP)</image>
        </command>
    </groupconnection>
    <groupconnection name="USER1" group="CPOCTRL" operation="set"
requestid="IZU00005000">
        <command>
            <safreturncode>0</safreturncode>
            <returncode>0</returncode>
            <reasoncode>0</reasoncode>
            <image>CONNECT USER1  GROUP       (CPOCTRL)</image>
        </command>
    </groupconnection>
    <groupconnection name="USER1" group="CPOQUERY" operation="set"
requestid="IZU00006000">
        <command>
            <safreturncode>0</safreturncode>
            <returncode>0</returncode>
            <reasoncode>0</reasoncode>
            <image>CONNECT USER1  GROUP       (CPOQUERY)</image>
        </command>
    </groupconnection>
    <groupconnection name="USER1" group="WLMGRP" operation="set"
requestid="IZU00007000">
        <command>
            <safreturncode>0</safreturncode>
            <returncode>0</returncode>
            <reasoncode>0</reasoncode>
            <image>CONNECT USER1  GROUP       (WLMGRP)</image>
        </command>
    </groupconnection>
    <returncode>0</returncode>
    <reasoncode>0</reasoncode>
</securityresult>
```

`IZUGUTSE` produces several possible return and reason codes, as listed in Table 4-2.

Table 4-2 IZUGUTSE return and reason codes

Return code	Reason code	Description
0	0	Success. The input XML was processed by IZUGUTSE. All RACF commands were generated properly. If the EXECUTE option was specified, all commands were successfully run. Some commands might issue warning or informational messages, and some commands might complete with a nonzero return code. All output from the commands is contained in the resulting XML.
32	1	PARM invalid. Parameters should be comma-separated.
32	2	PARM opt is missing.
32	3	PARM in is missing.
32	4	PARM out is missing.
32	5	PARM invalid, = is needed for each parameter.
32	6	Value of opt invalid.
36	1	Read input XML file Error. Check the path and if you can access the file.
36	2	Write output XML file Error. Check the path and if you can access the file.
40	1	LOAD IRRSMO00 MODULE ERROR. Check your SAF and security subsystem.
40	2	IRRSMO00 Service Error. Check your job log for more information. The value for SAFRC, RACFRC, and RACFRSN are listed in the job log. For more information, see the description of the IRRSMO00 callable service in the RACF Callable Services book.

Part 3

Usage

This part provides more information about the use of the various IBM z/OS Management Facility (z/OSMF) features.

5

Getting help in IBM z/OS Management Facility

This chapter describes the various help options and tutorials that are available in IBM z/OS Management Facility (z/OSMF) to enable a user to effectively and efficiently use z/OSMF.

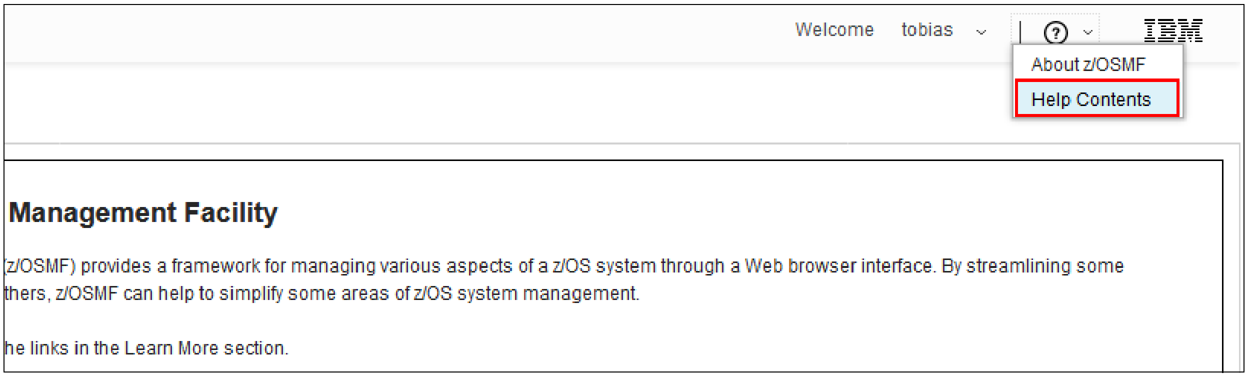
This chapter includes the following topics:

5.1 Overview of help options in z/OSMF

Help information is provided to assist you with understanding and performing a task, troubleshooting problems, entering information, and using all aspects of z/OSMF. Help is available in all z/OSMF windows.

Tip: You can also access the help information in the Welcome window.

The Help Contents button is shown in Figure 5-1.



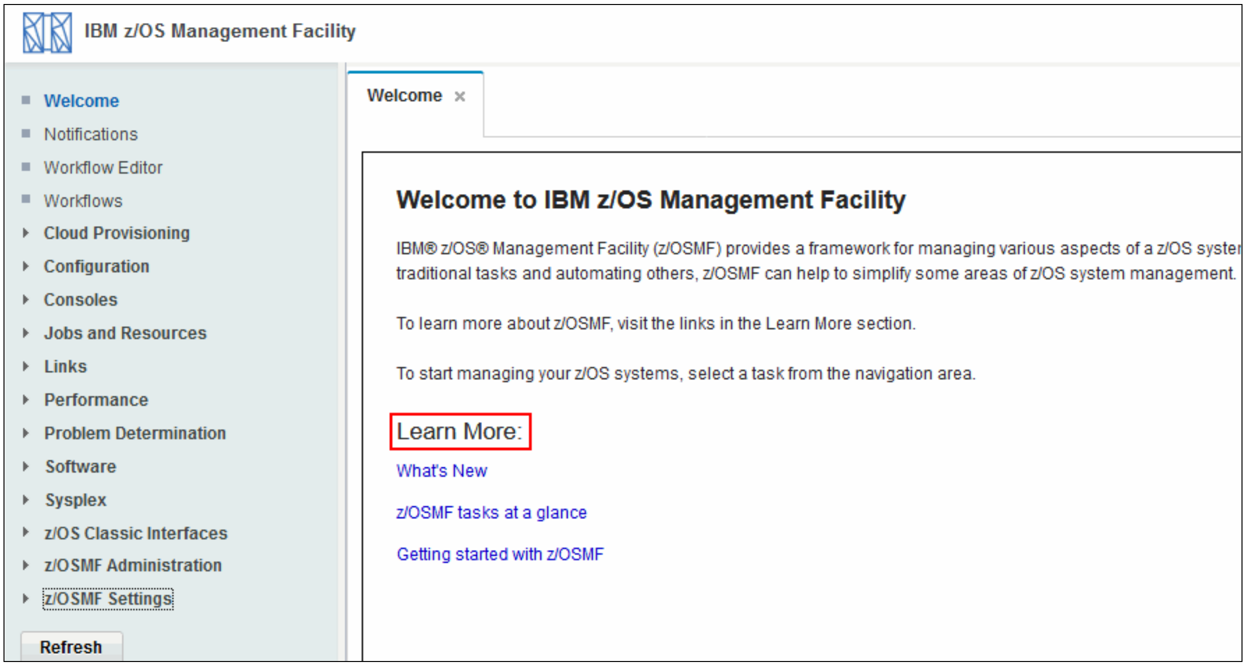
Management Facility

(z/OSMF) provides a framework for managing various aspects of a z/OS system through a Web browser interface. By streamlining some thers, z/OSMF can help to simplify some areas of z/OS system management.

he links in the Learn More section.

Figure 5-1 Help Contents button

The Welcome window is shown in Figure 5-2, in which you can see links that are available under the Learn more option for learning more about z/OSMF.



Welcome to IBM z/OS Management Facility

IBM® z/OS® Management Facility (z/OSMF) provides a framework for managing various aspects of a z/OS syster traditional tasks and automating others, z/OSMF can help to simplify some areas of z/OS system management.

To learn more about z/OSMF, visit the links in the Learn More section.

To start managing your z/OS systems, select a task from the navigation area.

Learn More:

What's New

z/OSMF tasks at a glance

Getting started with z/OSMF

Figure 5-2 Welcome pane

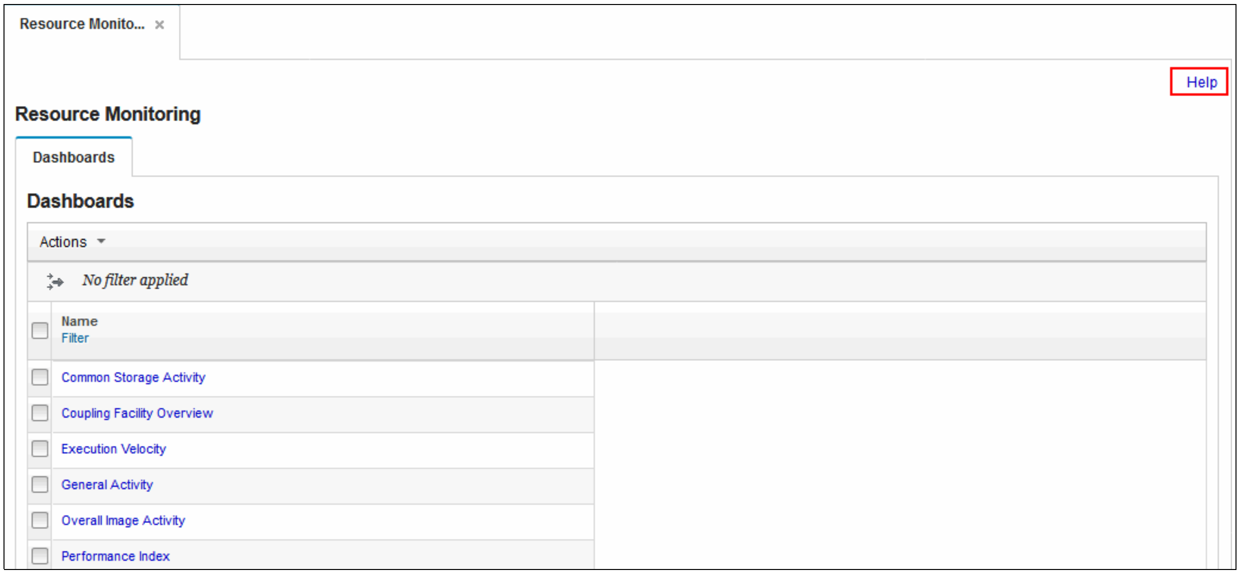
In most of the z/OSMF windows, the following types of help are available:

- Page-level
- Message
- Field-level

Tutorials also are available.

5.2 Page-level help

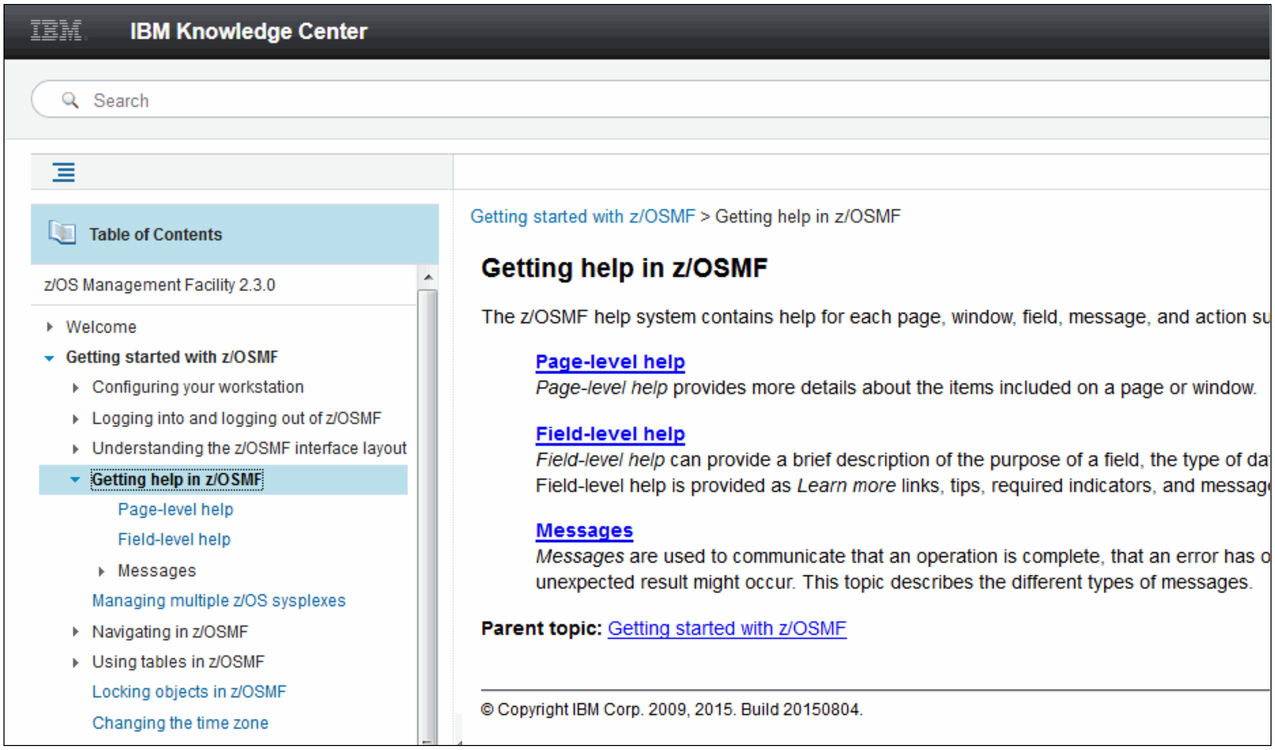
This type of help provides more information about a page. For example, page-level help describes each field or column that is displayed on the page and the actions that you can start from a page. To open page-level help, click the **Help** link in the upper right corner of each page, as shown in Figure 5-3.



□	Name Filter
□	Common Storage Activity
□	Coupling Facility Overview
□	Execution Velocity
□	General Activity
□	Overall Image Activity
□	Performance Index

Figure 5-3 Help that is available in upper right corner of a page or window

More information about the page is displayed in a new browser window. The browser window is divided into two sections: the navigation area and the content area, as shown in Figure 5-4.


IBM
IBM Knowledge Center
Search
Table of Contents
z/OS Management Facility 2.3.0
Welcome
Getting started with z/OSMF
Configuring your workstation
Logging into and logging out of z/OSMF
Understanding the z/OSMF interface layout
Getting help in z/OSMF
Page-level help
Field-level help
Messages
Managing multiple z/OS sysplexes
Navigating in z/OSMF
Using tables in z/OSMF
Locking objects in z/OSMF
Changing the time zone
Getting started with z/OSMF > Getting help in z/OSMF

Getting help in z/OSMF

The z/OSMF help system contains help for each page, window, field, message, and action su

Page-level help
Page-level help provides more details about the items included on a page or window.

Field-level help
Field-level help can provide a brief description of the purpose of a field, the type of da
Field-level help is provided as *Learn more* links, tips, required indicators, and messag

Messages
Messages are used to communicate that an operation is complete, that an error has o
unexpected result might occur. This topic describes the different types of messages.

Parent topic: Getting started with z/OSMF

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Figure 5-4 Help window

The help information is displayed in the content area. A hierarchical list of z/OSMF-specific help topics is displayed in the navigation area. The active help topic is highlighted in the navigation area so that you can see where it is within the hierarchy and easily browse to related information.

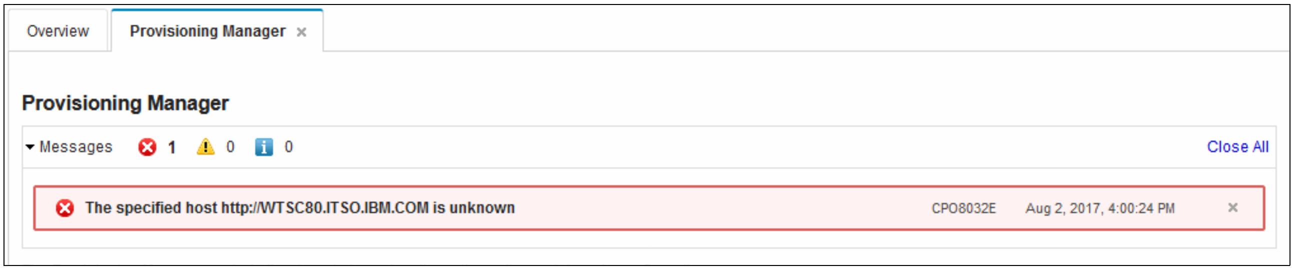
You can also use the links (if any) that are displayed at the bottom of the content area to find information that is related to the active help topic. The following types of links might be displayed:

- Link to child topics: List of topics that are nested within the active help topic in the navigation area. The links immediately follow the help content and typically include a short description.
- Link to parent topic: List of topics in which the active help topic is nested within the navigation area.
- Related concepts: List of topics that provide background information for the active help topic.
- Related tasks: List of topics that explain how to complete tasks (or actions) that are related to the active help topic.
- Related reference: List of topics that provide reference information for the active help topic.
- Related information: List of topics that provide more information that is related to the active help topic.

When clicked, the links open the corresponding information.

5.3 Message help

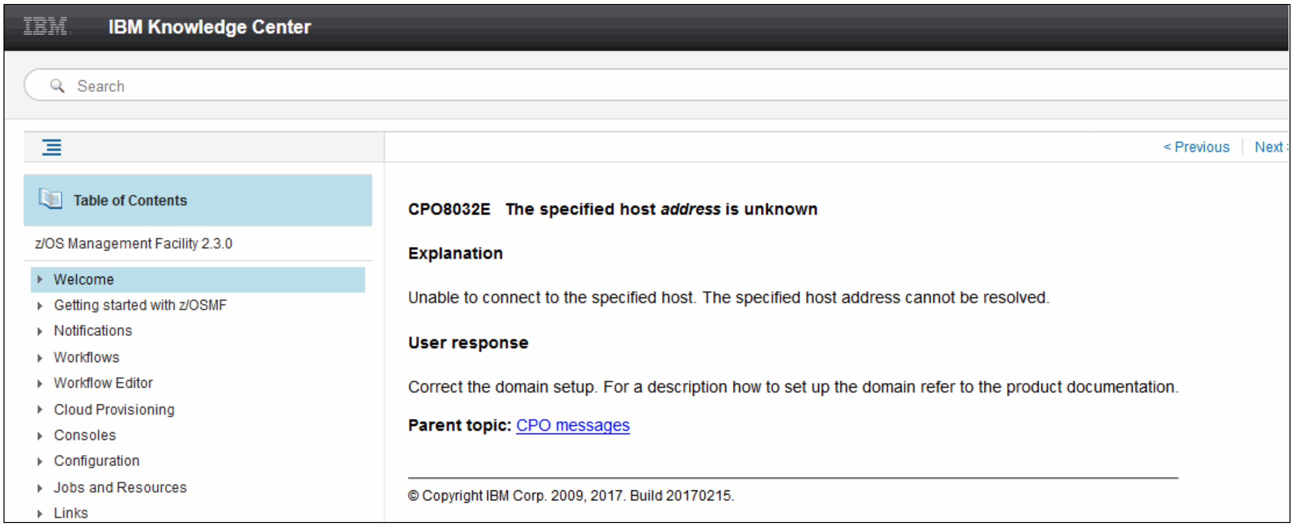
This type of help provides more information about a message. Message help includes a detailed explanation of the message, a description of any reason codes that are listed in the message, and suggestions for actions you can implement to resolve the issue. To display the help for a message, click the message ID link (see Figure 5-5).



The specified host http://WTSC80.ITSO.IBM.COM is unknown CPO8032E Aug 2, 2017, 4:00:24 PM

Figure 5-5 Message ID

When you click the message ID, a new window that includes an explanation of the message opens, as shown in Figure 5-6.



CPO8032E The specified host *address* is unknown

Explanation

Unable to connect to the specified host. The specified host address cannot be resolved.

User response

Correct the domain setup. For a description how to set up the domain refer to the product documentation.

Parent topic: CPO messages

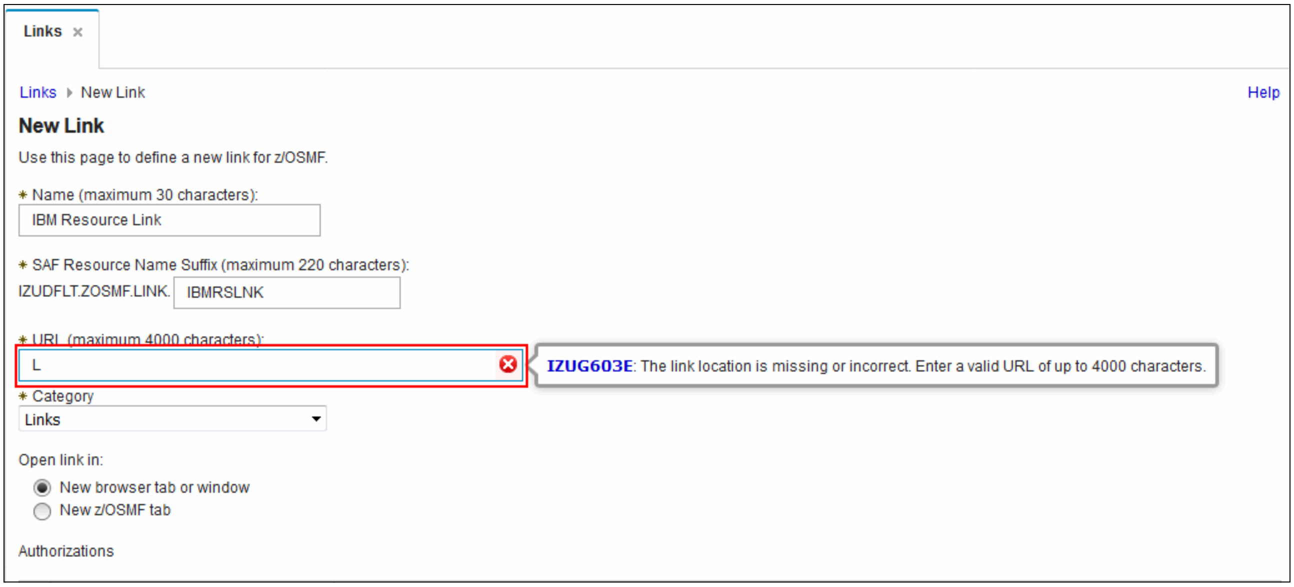
© Copyright IBM Corp. 2009, 2017. Build 20170215.

Figure 5-6 Explanation for a message

5.4 Field-level help

Field-level help describes the type and format of data to enter in a field. It also indicates when required information is omitted.

Field-level help takes the form of messages. When a message is available for a field, a status icon is displayed within or next to the field, and a message also is displayed, as shown in Figure 5-7.



New Link

Use this page to define a new link for z/OSMF.

* Name (maximum 30 characters): IBM Resource Link

* SAF Resource Name Suffix (maximum 220 characters): IZUDFLT.ZOSMF.LINK. IBMRSLNK

* URL (maximum 4000 characters): L

IZUG603E: The link location is missing or incorrect. Enter a valid URL of up to 4000 characters.

* Category: Links

Open link in:

● New browser tab or window
○ New z/OSMF tab

Figure 5-7 Field-level help

6

Configuration Assistant

This chapter describes the IBM z/OS Management Facility (z/OSMF) Configuration Assistant plug-in and includes the following topics:

6.1 Introduction

The IBM Configuration Assistant for z/OS Communications Server is a tool to simply the configuration of z/OS Communications Server policy-based networking technologies. It was previously provided as a downloadable tool, but is integrated as a z/OSMF plug-in since z/OS V1.11. As of z/OS V2R1, the Configuration Assistant tool is not provided as a separate download and is provided only as part of z/OSMF. You can use the Version 2.1 Configuration Assistant to configure Version 2.1, Version 1.13 and Version 1.12 level z/OS systems.

The Configuration Assistant plug-in for z/OSMF V2R1 is redesigned to better integrate with z/OSMF and provides better performance because of the following changes:

- Configuration Assistant now uses common z/OSMF window widget, which results in a common look and feel within z/OSMF windows.
- Configuration Assistant now requires less z/OS processor usage.
- Configuration Assistant initially starts at a home page rather than immediately opening the last used backing store. From the home page, you select which backing store to open.
- Removal of the main perspective. Users now go directly to the last technology they configured.
- Removal of the Configuration Assistant navigation tree. Users now select from a group of tabs to access z/OS image, TCP/IP stacks, and reusable objects.
- Application setup tasks are moved to the z/OSMF workflow plug-in.

The Configuration Assistant task can generate and maintain policy files for the following z/OS Communications Server policy-based networking technologies:

- Application Transparent Transport Layer Security (AT-TLS)
- Defense Manager Daemon (DMD)
- Intrusion Detection Services (IDS)
- IP security (IPSec)
- Network security services (NSS)
- Policy Based Routing (PBR)
- Quality of service (QoS)

The following sections further describe the z/OSMF Configuration Assistant plug-in.

6.2 Installation

The Configuration Assistant plug-in can be installed during the initial deployment of z/OSMF or the plug-in can be enabled later. Detailed instructions about how to enable a plug-in are provided in section 4.3, “Adding plug-ins to your z/OSMF system” on page 89.

There are no z/OSMF requisites (either pre- or post-) that are required to enable the z/OSMF Configuration Assistant plug-in. However, the Policy Agent must be correctly configured to allow export of the policy files if the import policy data function of the Configuration Assistant is being used. The user must have the correct security access permissions to be able to import the policy file. The required security settings are documented in the “Policy Agent Preparation” section of the Configuration Assistant Help topic entitled “Policy Data Import”.

When installing policy files, the user must have adequate permissions to save the policy file in the specified location. If FTP is used, then a valid user ID and password are required.

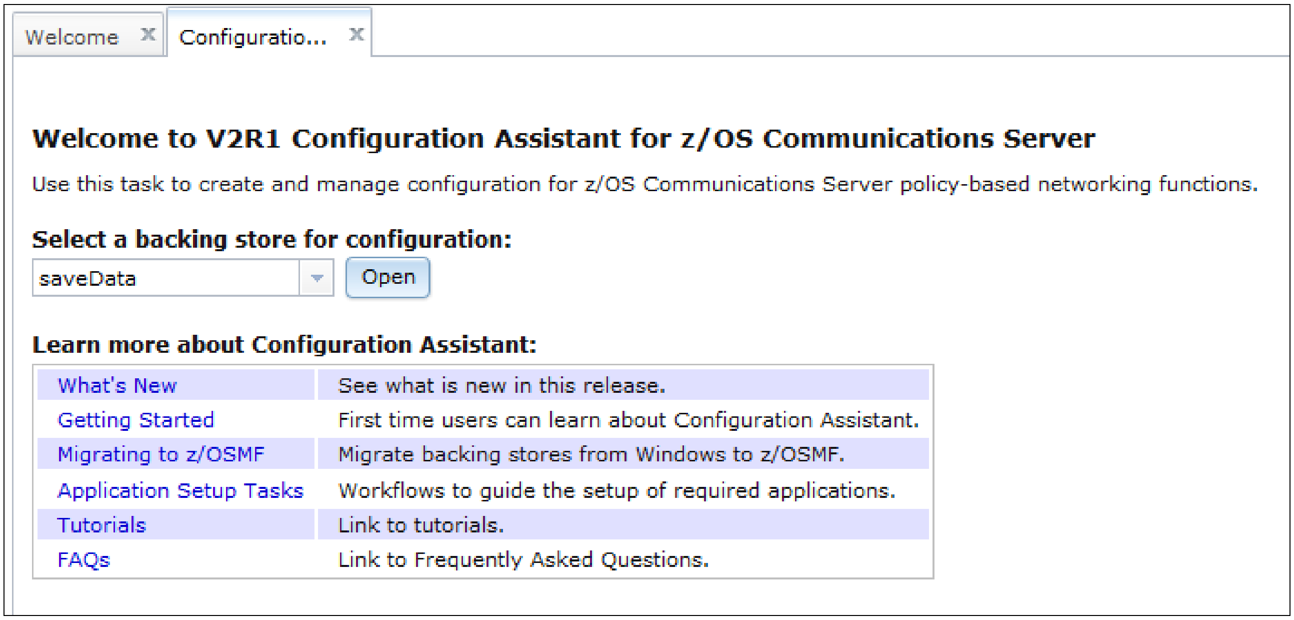
For more information about setting up the Policy Agent, see the following documents:

- *z/OS Communications Server: IP Configuration Guide*, SC27-3650
- *z/OS Communications Server IP Configuration Reference*, SC27-3651

IBM z/OS V2R1 Communications Server TCP/IP Implementation Volume 4: Security and Policy-Based Networking, SG24-8099

6.3 Usage

The Configuration Assistant plug-in is started from the main z/OSMF page by clicking the **Configuration Assistant** link on the left navigation pane. After the plug-in is started, the Welcome page opens, as shown in Figure 6-1.



Welcome to V2R1 Configuration Assistant for z/OS Communications Server

Use this task to create and manage configuration for z/OS Communications Server policy-based networking functions.

Select a backing store for configuration:

saveData

Learn more about Configuration Assistant:

What's New	See what is new in this release.
Getting Started	First time users can learn about Configuration Assistant.
Migrating to z/OSMF	Migrate backing stores from Windows to z/OSMF.
Application Setup Tasks	Workflows to guide the setup of required applications.
Tutorials	Link to tutorials.
FAQs	Link to Frequently Asked Questions.

Figure 6-1 Welcome page

6.3.1 Welcome page

From the Configuration Assistant Welcome page, you can perform the following tasks:

- Start one of several help topics under **Learn more about Configuration Assistant**.
- Open a backing store under **Select a backing store for configuration**.

Learn more about Configuration Assistant

Clicking a link under the **Learn more about configuration Assistant** open a new browser window. The browser window displays one of the following Help topics, depending on which link is clicked:

What’s New Provides a list of changes to the Configuration Assistant from Version 1.8 to Version 2.1.

Getting Started Provides a tutorial on basic usage and navigating the Configuration Assistant windows.

Migrating to z/OSMF Provides a tutorial on the steps that are required to migrate backing store files from a previous release of z/OSMF or from the Windows version of the Configuration Assistant.

Application Setup Tasks Before Version 2.1, setup tasks were provided as part of the Configuration Assistant by using Application Setup Tasks. In Version 2.1, Application Setup Tasks were replaced with workflows, which are accessed through the z/OSMF Workflows task. This link provides a tutorial about how to access the workflows, which guide the user on the setup steps that are required for the supported policy-based networking technologies.

Tutorial In addition to the Getting Started tutorial, the Configuration Assistant help topics provide in-depth explanations about usage and provides numerous tutorials on the supported technologies. It is the best source of information about navigating and using the Configuration Assistant plug-in.

FAQs The frequently asked questions links provide responses to over two dozen often asked questions.

6.3.2 Selecting a backing store for configuration

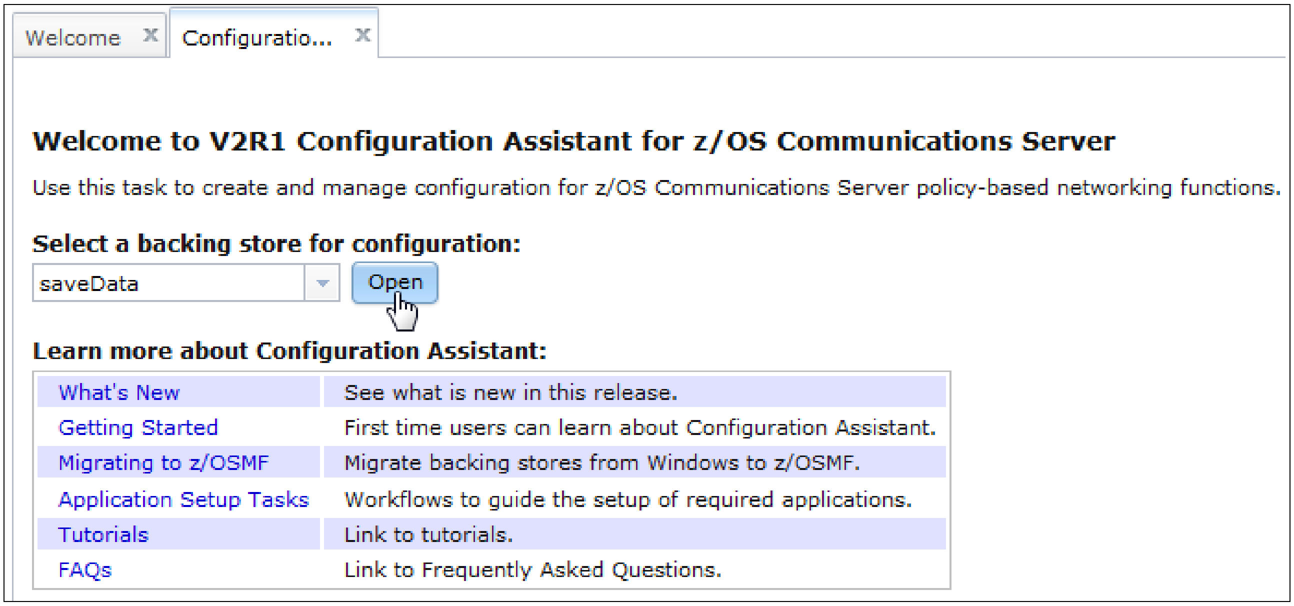
The Configuration Assistant keeps your configuration data in a backing store file. The backing store file is stored in the z/OSMF data file system and is not meant to be modified outside of the z/OSMF Configuration Assistant task. When you use the Configuration Task for the first time, the default backing store is named saveData.

If you have backing stores from pre- z/OSMF V2R1 releases and migrate to z/OSMF V2R1, those backing store files are transferred to z/OSMF V2R1.

You can also migrate backing store files that are created in the Windows version of the Configuration Assistant. The process to do so is documented under the help topic “Migration of existing backing store files”.

Additionally, new backing store files can be created by using the Manage backing store utility, but you must first open the default saveData backing store (or another migrated backing store file) to access the utility.

To open a backing store file, simply choose the file from the drop-down menu and click **Open**. For example, in Figure 6-2 on page 109, we open the default saveData backing store.



Welcome to V2R1 Configuration Assistant for z/OS Communications Server

Use this task to create and manage configuration for z/OS Communications Server policy-based networking functions.

Select a backing store for configuration:

saveData

Learn more about Configuration Assistant:

What's New	See what is new in this release.
Getting Started	First time users can learn about Configuration Assistant.
Migrating to z/OSMF	Migrate backing stores from Windows to z/OSMF.
Application Setup Tasks	Workflows to guide the setup of required applications.
Tutorials	Link to tutorials.
FAQs	Link to Frequently Asked Questions.

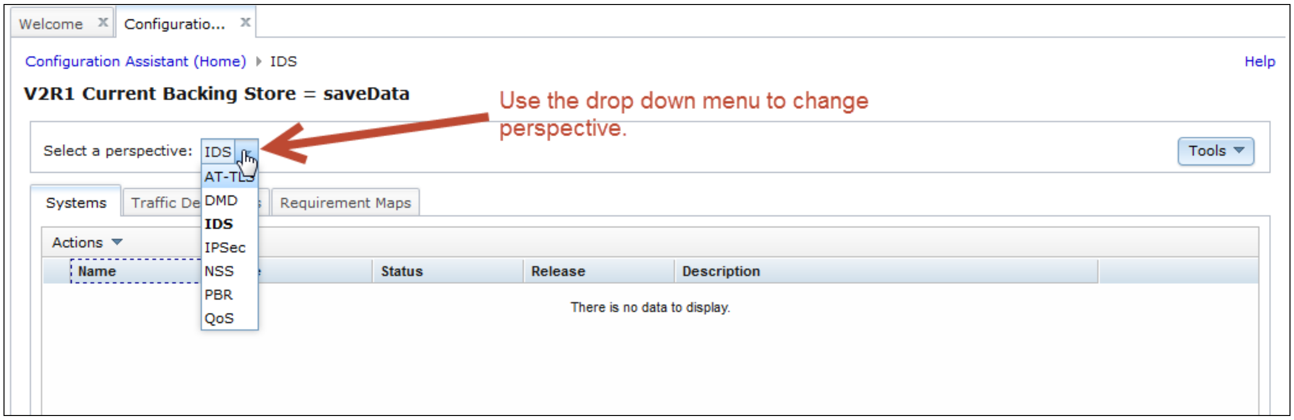
Figure 6-2 Open a backing store file

The Configuration Assistant uses a simple file locking mechanism to ensure that two administrators are not operating on the same backing store file at the same time. When a backing store file is opened in the Configuration Assistant, a lock file is created that contains a lock ID value and the date and time at which the lock file was created. The lock ID value is the z/OSMF logon user ID.

If you open a backing store file and the lock is held, a window opens, where you may choose to unlock this backing store or cancel your action. The window also shows the contents of the lock file, so you can determine who has the backing store file in read/write mode.

6.3.3 Perspectives

After opening a backing store file, a perspective window opens. A perspective is a window (or view) that is related to a particular policy-based networking technology. Each perspective contains tabs that in turn contain modifiable data that is relevant to a particular technology. It is from these perspectives that you create a policy for the relevant technology. You select the particular perspective to work with by using the **Select a perspective** drop-down menu, as shown in Figure 6-3.



V2R1 Current Backing Store = saveData

Use the drop down menu to change perspective.

Select a perspective: IDS

There is no data to display.

Figure 6-3 Select a perspective

Tools menu

From all perspectives, you can access the Tools menu, as shown in Figure 6-4.

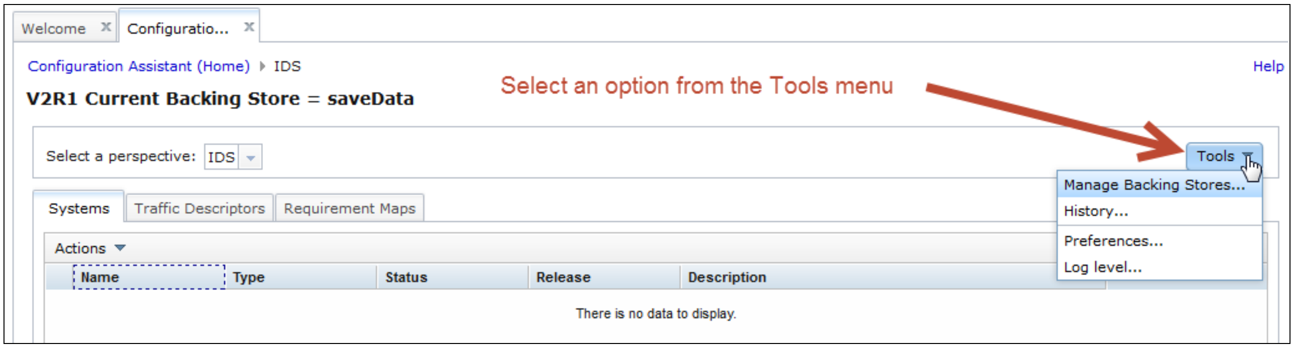


Figure 6-4 Select an option from the Tools menu

The Tools menu includes the following options:

- Manage the Backing Stores

  Selecting **Manage Backing Stores** from the Tools menu displays the Manage Backing Stores window. The backing store files are displayed in a selectable table with the following header columns:

  – Name: The name of the backing store file.

  – Status: Indicates whether the backing store file is open (Current) or available for use (Available).

  – Time Last Updated: The date and time that the backing store file was last updated.

  If many backing store files exist and you need help finding the relevant file, you can filter each row (Name, Status, Time Last Updated) by clicking the **Filter** option in the header row. This action opens the Modify Filters window. From this window, you can set filters for one or more columns.

  Clicking a column header changes the sort order of the displayed data from the default of ascending to descending.

  In addition, each entry in the list can be selected and the following actions can be performed against the selected entry from the Actions drop-down menu:

  – Open
  – Delete
  – Import
  – Extract
  – New
  – Save As
  – Transfer
  – Modify Filters
  – Hide Filter Row
  – Clear Filters
  – Modify Sort
  – Clear Sorts

- View the history of changes that are made to the backing store file

  Selecting **History** from the Tools menu opens a window that displays a list of comments. Each list item contains the following columns:

  - Time Stamp: A time stamp indicating the date and time that the entry was made.
  - User Name: The user ID who entered the comment.
  - Action: The Action that was performed.
  - Comment: The comment that was entered by the user.

  If many comments exist and you need help to find the relevant file, you can filter each row (Time Stamp, User Name, Action, Comment) by clicking the **Filter** option in the header row. This action opens the **Modify Filters** window. From this window, you can set filters for one or more columns.

  A Search box also is available in which you can enter text and press Enter. Any matching text that is found in the History display is highlighted.

  Clicking a column header changes the sort order of the displayed data from the default of ascending to descending.

  In addition, each entry in the list can be selected and the following actions performed against the selected entry from the Actions drop-down menu:

  - View Details
  - View Summary
  - Limit Size of History
  - Modify Filters
  - Hide Filter Row
  - Clear Filters
  - Modify Sorts
  - Clear Sorts
  - Clear Search

- Set the backing store preferences

  You can set the following preferences:

  - Enable a history comment window, where you can enter comments. Click **Save** after you finish entering your comments.
  - Automatically save the backing store after the installation of the configuration files.
  - Enable a history comment window in which you can enter comments before the automatic save of the backing store file occurs.

- Set the logging level for diagnostic purposes

  You can set the log level for the server and for the client. The default level for both is Info. The log level ranges are Info, Fine, Finer, and Finest. You might be directed by an IBM client representative to change the log level to help problem determination.

6.4 Working with a perspective

Before you define a policy for one of the supported technologies, you must add z/OS images and TCP/IP stacks for those policies. Images (a z/OS system) and stacks (a TCP/IP address space) are added through the Systems tab. The Systems tab is common to all perspectives. Any images and stacks that are defined are persistent across all perspectives.

If this the first time you have used the Configuration Assistant, or you have created a backing store file, there are no images or stacks that are displayed in the Systems tab. From the Actions drop-down menu, you can select one of the following actions:

- Properties
- Copy
- Delete
- Add z/OS Image
- Add TCP/IP Stack
- Import Policy Data
- Install all files for *x* (where x is AT-TLS, DMD, IDS, IPSec, NSS, PBR, or QoS, depending on the active perspective)
- Install Configuration Files

6.4.1 Adding a z/OS image

To add a z/OS image, select **Add z/OS Image** from the Actions menu. The fields that are presented in the add z/OS Image window depend on the active perspective. Each perspective has the following common fields:

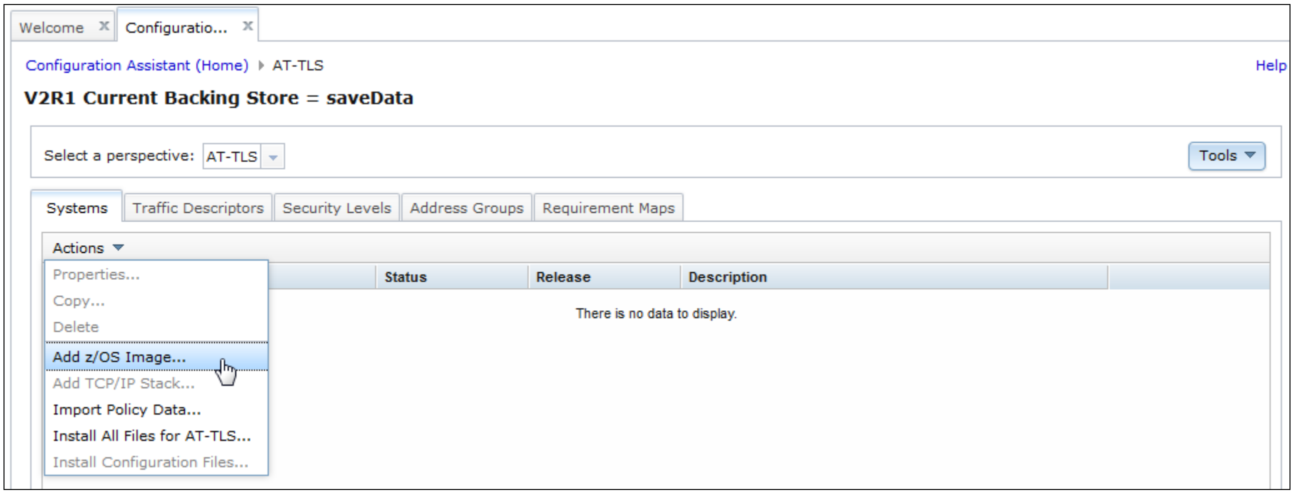
- Name
- Description
- z/OS Release

In addition to the common fields, the perspective-specific data entry fields shown in Table 6-1 are presented, depending on the active perspective.

Table 6-1 Perspective-specific data on the Add z/OS Image window

Perspective	Additional data to be entered
AT-TLS	Default AT-TLS key ring database.
DMD	Directory for DMD to store persistent data.
IPSec	This image has a dynamic tunnels check box.
NSS	NSS Server-specific data. NSS Client-specific data.

For example, in Figure 6-5, from the AT-TLS perspective, we select **Add z/OS Image** from the Actions drop-down menu.



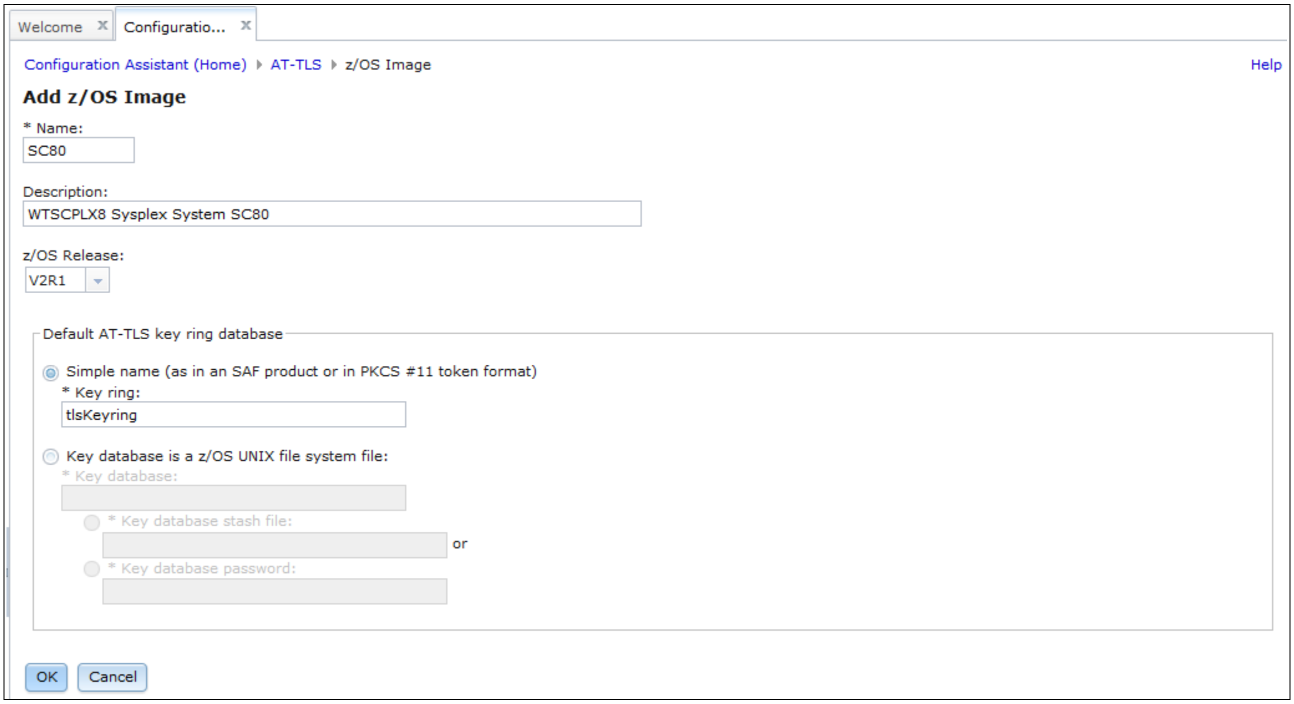
V2R1 Current Backing Store = saveData

Select a perspective: AT-TLS

There is no data to display.

Figure 6-5 Add z/OS Image selection

The Add z/OS Image window opens. The common fields and the AT-TLS specific fields are displayed. Figure 6-6 shows a completed Add z/OS Image window.



Add z/OS Image

* Name: SC80

Description: WTSCPLX8 Sysplex System SC80

z/OS Release: V2R1

Default AT-TLS key ring database

● Simple name (as in an SAF product or in PKCS #11 token format)

* Key ring: tlsKeyring

○ Key database is a z/OS UNIX file system file:

* Key database:

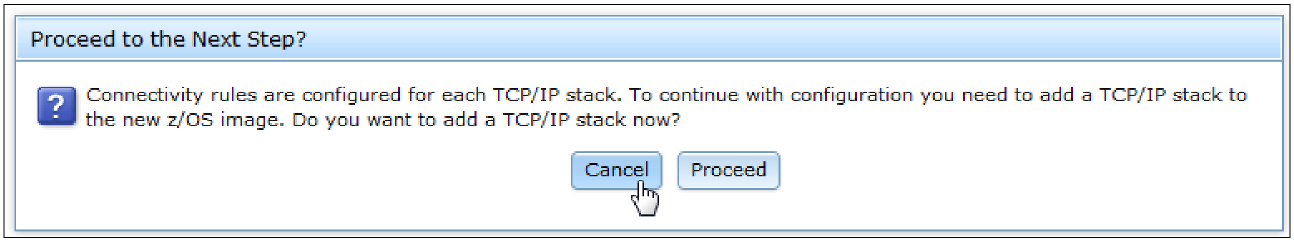
○ * Key database stash file:

or

○ * Key database password:

Figure 6-6 Add z/OS Image window from the AT-TLS perspective - complete

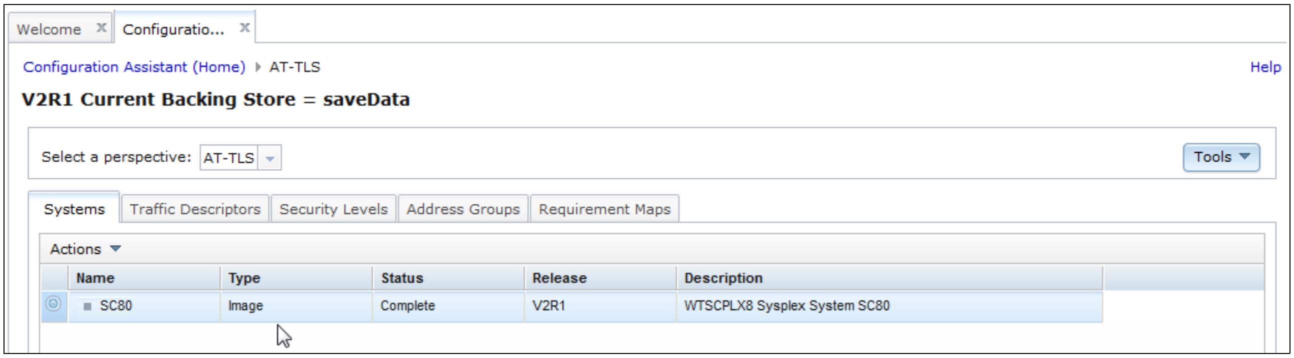
After you enter the data in the Add z/OS Image window, click **OK**. A window opens and prompts you to add a TCP/IP stack for the image. In this example, we click **Cancel** and add the stack later, as shown in Figure 6-7.


Proceed to the Next Step?

Connectivity rules are configured for each TCP/IP stack. To continue with configuration you need to add a TCP/IP stack to the new z/OS image. Do you want to add a TCP/IP stack now?

Figure 6-7 Prompt to add a TCP/IP stack

The AT-TLS main perspective window returns. As shown in Figure 6-8, the z/OS image for SC80 is added.



V2R1 Current Backing Store = saveData

Select a perspective: AT-TLS

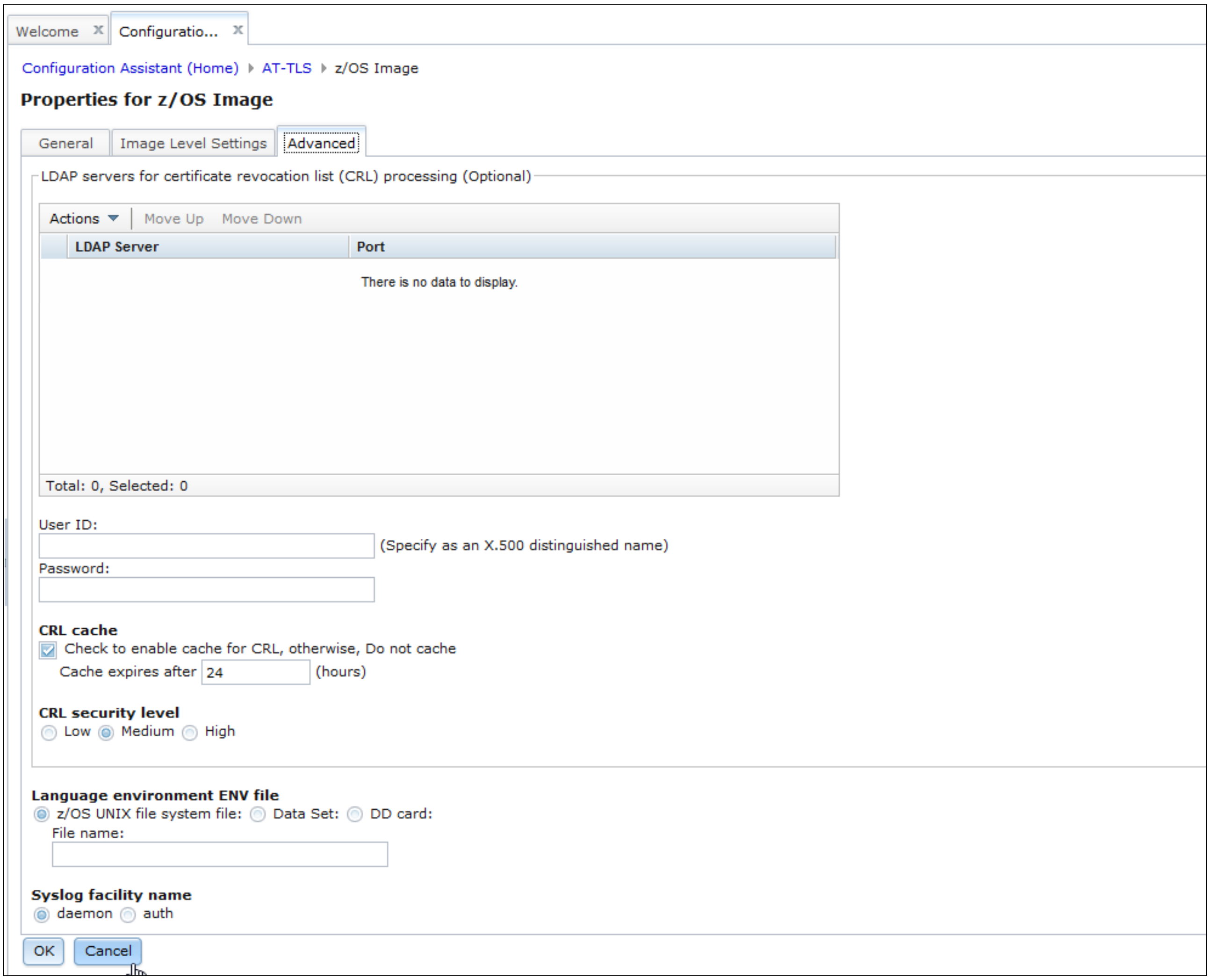
Name	Type	Status	Release	Description
SC80	Image	Complete	V2R1	WTSCPLX8 Sysplex System SC80

Figure 6-8 z/OS image is added

After you define an image, in addition to the data that is specified in Table 6-1 on page 112, there might be additional data that is associated with the perspective for the z/OS image.

You can see all the data for the z/OS image that is relevant for the perspective by selecting the image and then choosing the Properties file from the Actions drop-down menu.

For example, in Figure 6-9, we select the previously defined z/OS Image and choose the **Properties** selection from the Actions menu. As shown in Figure 6-9, there are additional fields and tabs that can be accessed for the selected perspective and z/OS image.



Properties for z/OS Image

LDAP servers for certificate revocation list (CRL) processing (Optional)

LDAP Server	Port

There is no data to display.

Total: 0, Selected: 0

User ID: (Specify as an X.500 distinguished name)

Password:

CRL cache

☑ Check to enable cache for CRL, otherwise, Do not cache

Cache expires after 24 (hours)

CRL security level

○ Low ● Medium ○ High

Language environment ENV file

● z/OS UNIX file system file: ○ Data Set: ○ DD card:

File name:

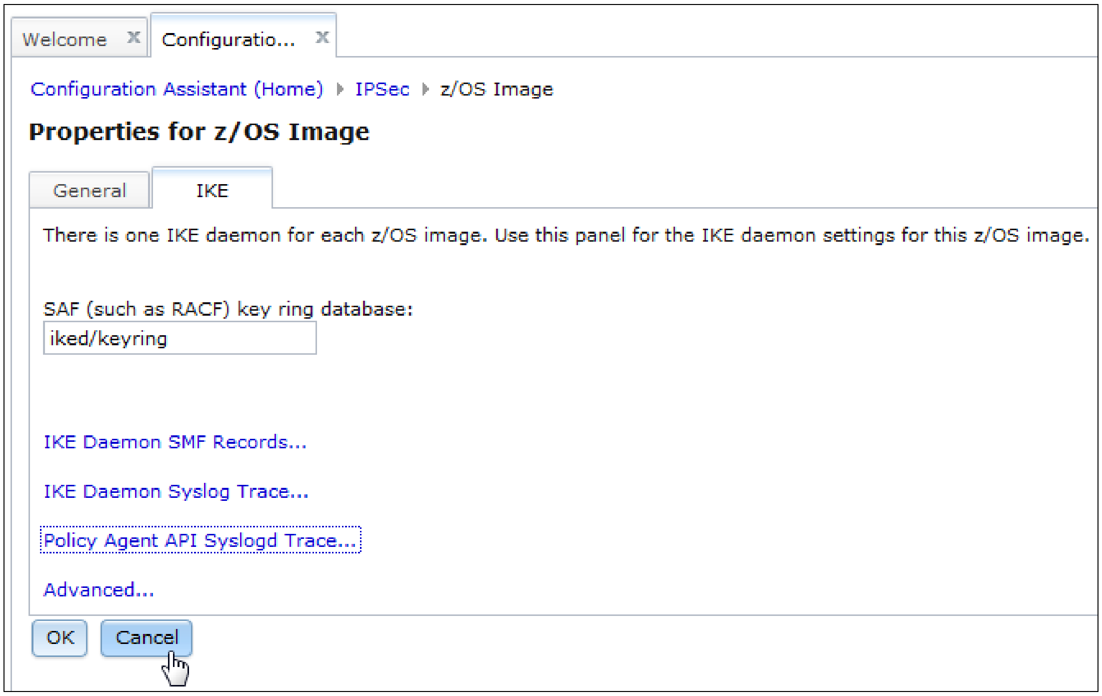
Syslog facility name

● daemon ○ auth

Figure 6-9 z/OS image properties from the AT-TLS perspective

The images that are added are persistent across perspectives. However, because the z/OS image was created from a particular perspective (AT-TLS), if you switch to another perspective that had perspective-specific fields in the add z/OS Image window (see Table 6-1 on page 112), the perspective-specific data is either given default values or the image status is marked as incomplete (meaning that there is additional required data to be entered for the perspective).

For example, if we switch from the AT-TLS perspective to the IPSec perspective, select the previously defined z/OS image, and select **Properties** from the Actions menu, we see that the perspective-specific fields for IPSec are either given defaults or are blank, as shown in Figure 6-10.


Welcome
Configuratio...
Configuration Assistant (Home) ▸ IPSec ▸ z/OS Image
General
IKE
IKE Daemon SMF Records...
IKE Daemon Syslog Trace...
Policy Agent API Syslogd Trace...
Advanced...
OK
Cancel

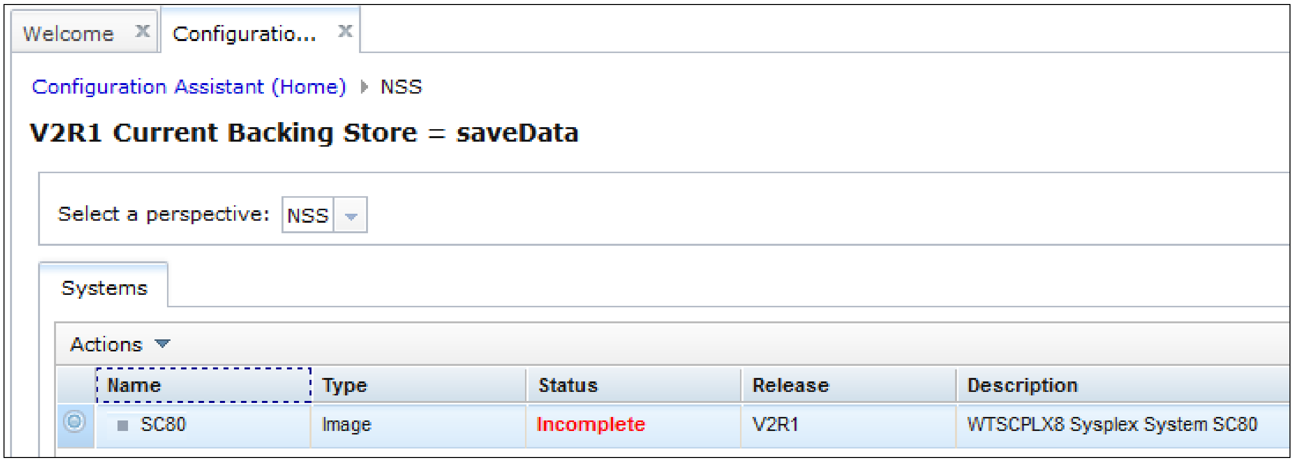
Properties for z/OS Image

There is one IKE daemon for each z/OS image. Use this panel for the IKE daemon settings for this z/OS image.

SAF (such as RACF) key ring database: iked/keyring

Figure 6-10 z/OS Image properties from the IPSec perspective

If there are mandatory input fields that must be completed for a z/OS image for a perspective, then the z/OS image status is marked as incomplete. For example, if we switch to the NSS perspective, we see that image SC80 is now marked Incomplete, as shown in Figure 6-11. This means that some mandatory data must be completed in the z/OS Image definition. The required information can be completed by selecting the z/OS image and selecting **Properties** from the Actions menu.



V2R1 Current Backing Store = saveData

Select a perspective: NSS

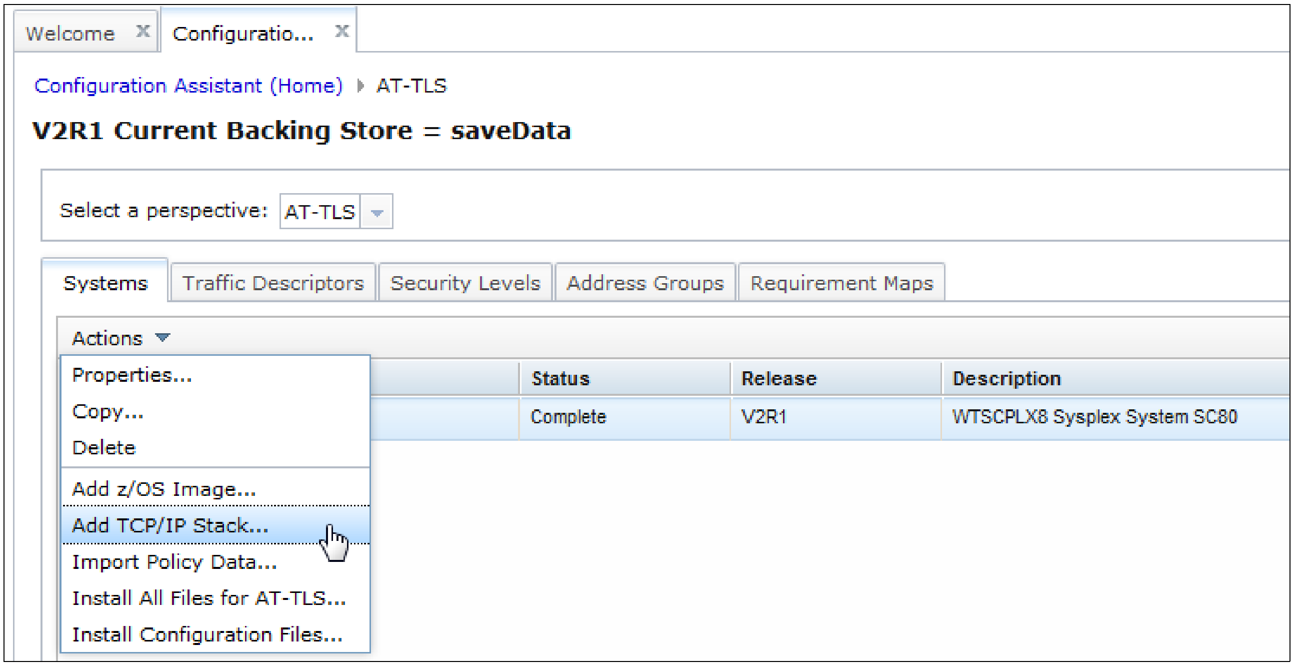
	Name	Type	Status	Release	Description
○	SC80	Image	Incomplete	V2R1	WTSCPLX8 Sysplex System SC80

Figure 6-11 z/OS image incomplete for a perspective

So, it is important that you verify the information in the z/OS image properties from each perspective that you plan to use.

6.4.2 Adding a TCP/IP stack

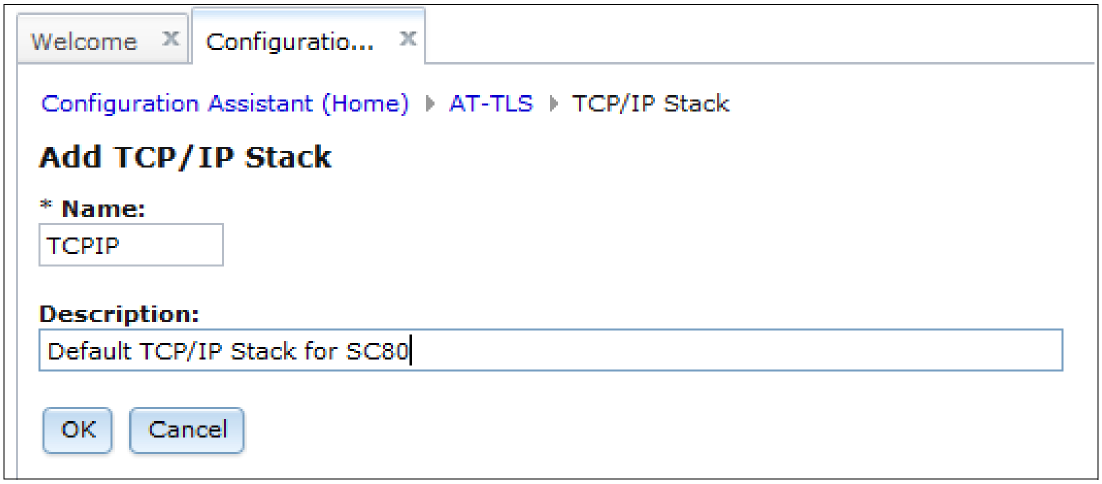
After a z/OS image is added, the next step is to add a TCP/IP stack. Select the z/OS image for which a stack is to be added, and then select the **Add TCP/IP Stack** option from the Actions menu, as shown in Figure 6-12.



Status	Release	Description
Complete	V2R1	WTSCPLX8 Sysplex System SC80

Figure 6-12 Add TCP/IP Stack selection

The Add TCP/IP Stack window opens. Input the name of the TCP/IP stack and optionally a description. A completed window is shown in Figure 6-13.

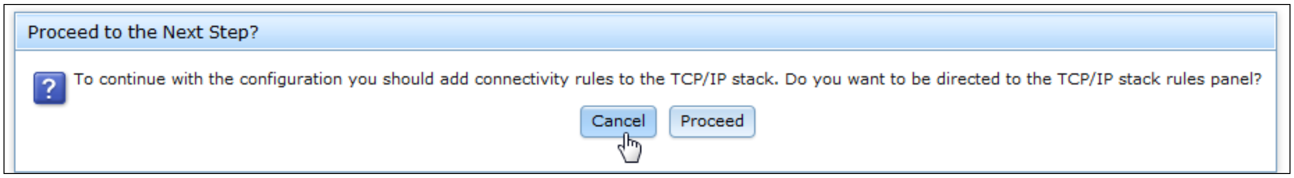


* Name: TCPIP

Description: Default TCP/IP Stack for SC80

Figure 6-13 Add TCP/IP Stack window

After you click **OK** to add the stack, you are prompted to add rules for the specific technology. In this example, we click **Cancel** and add the rules later, as shown in Figure 6-14.

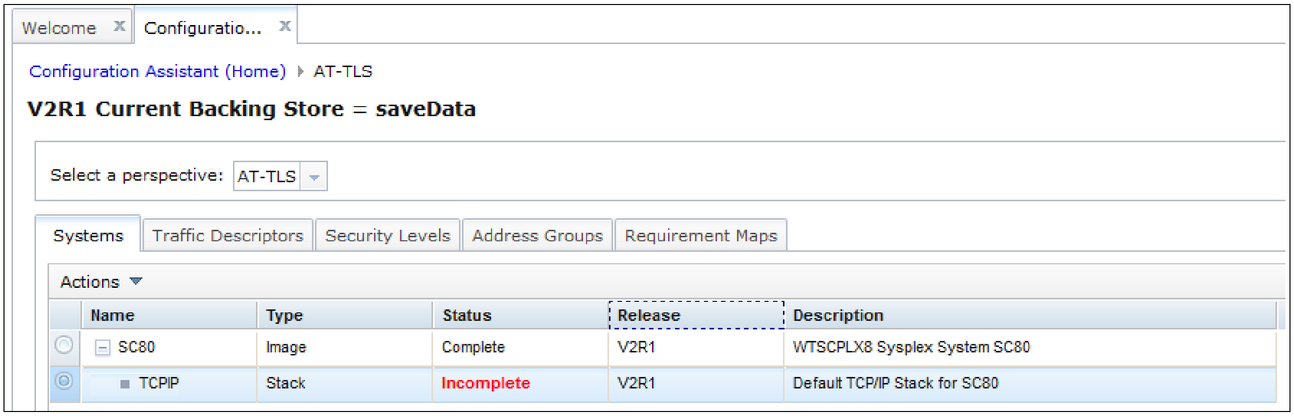

Proceed to the Next Step?

To continue with the configuration you should add connectivity rules to the TCP/IP stack. Do you want to be directed to the TCP/IP stack rules panel?

Figure 6-14 Rules prompt

After the stack is added, you return to the Systems window.

In our example, the stack status is marked incomplete. An incomplete status indicates that perspective-specific rules must be completed, additional stack properties information must be completed, or both. In the case of AT-TLS, there is no additional stack properties information to be completed, so the incomplete status indicates that a rule must be defined. The incomplete status is shown in Figure 6-15.



V2R1 Current Backing Store = saveData

Select a perspective: AT-TLS

	Name	Type	Status	Release	Description
○	⊟ SC80	Image	Complete	V2R1	WTSCPLX8 Sysplex System SC80
●	TCPIP	Stack	Incomplete	V2R1	Default TCP/IP Stack for SC80

Figure 6-15 Incomplete Stack status

Here are the common stack properties:

- TCP/IP Stack Name
- Description

The perspective-specific stack data when adding a stack from a perspective is shown in Table 6-2.

Table 6-2 Add stack specific data

Perspective	**Specific stack properties**
DMD	Select defensive filter mode
IPSec	Dynamic Tunnels indication
QoS	QoS for sysplex distributor indication

As was the case for adding a z/OS image, after a stack is defined, additional data fields and tabs are accessible for the stack (in addition to the common properties and the data that is listed in Table 6-2). This perspective-specific data can be accessed from each perspective by selecting the stack and then selecting **Properties** from the Actions menu.

Verify the information in the stack properties from each perspective that you plan to use.

After a stack is defined, the selections that are available from the Actions menu when a stack is selected vary depending on the perspective. Here are the available common selections:

- Properties
- Copy
- Delete
- Add z/OS Image
- Add TCP/IP Stack
- Import Policy Files
- Install all files for *x* (where x is AT-TLS, DMD, IDS, IPSec, NSS, PBR, or QoS, depending on the active perspective)
- Install Configuration Files

The perspective-specific actions are listed in Table 6-3.

Table 6-3 Perspective-specific actions when a stack is selected

Perspective	Additional actions
AT-TLS	Rules
IDS	Requirement Maps
IPSec	Rules Local Addresses IKE Symbols
PBR	Rules
QoS	Rules

6.4.3 Tabs, objects, and rules

After a TCP/IP stack is defined, you can proceed to define a rule for the specific perspective (if supported) or work with any of the objects in the tabs that are accessible from the perspective.

For example, from the AT-TLS perspective, you can work with the objects in the Systems tab, Traffic Descriptors tab, the Security Levels tab, the Address Groups tab, and the Requirement Maps tab. The tabs are shown in Figure 6-15 on page 118.

The tabs that are available by perspective are listed in Table 6-4 (other than the Systems tab, which is available across all perspectives).

Table 6-4 Tabs available by perspective

Perspective	Tabs (other than the Systems tabs)
AT-TLS	Traffic Descriptors Security Levels Address Groups Requirements Maps Reusable Rules
DMD	None
IDS	Traffic Descriptors
IPSec	Traffic Descriptors Security Levels Address Groups Requirement Maps Reusable Rules
NSS	None
PBR	Traffic Descriptors Address Groups Route Tables
QoS	Traffic Descriptors Priority Levels Traffic Shaping Levels Requirement Maps

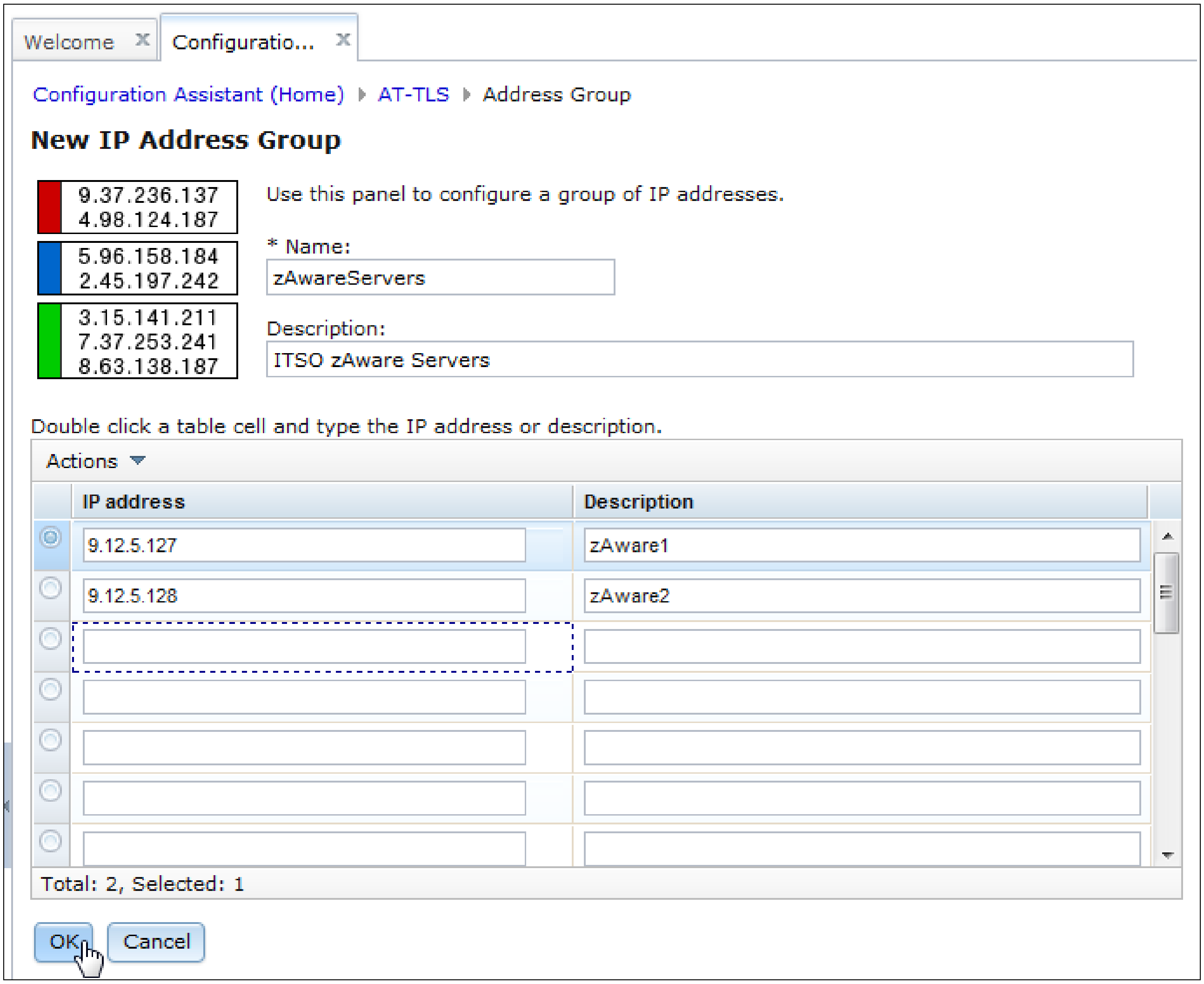
Each tab contains objects that are relevant to the tab. For example, the Security Levels tab for AT-TLS contains objects that specify security levels that characterize different ways to protect data. These objects can be selected and actions performed upon them from the Actions drop-down menu. For example, you can use the `NEW` option to add an object, which usually starts a wizard to assist you in defining the new object. Objects may be used in rules or as part of the definition of other objects.

Objects that are added are only applicable to the current perspective.

To continue with our example, we create objects and add an AT-TLS rule. In this example, we enable AT-TLS for local client applications that communicate with remote IBM zAware servers.

First, we add an address group to that contains the IP addresses for the IBM zAware servers. This task is accomplished in the AT-TLS perspective by using the Address Group tab. A list of address group objects is displayed. To add an address group, select **New** from the Actions menu. The New IP Address Group window opens, where you add the IP addresses for this object, along with a name and description for the object.

Figure 6-16 shows our completed New IP Address Group window.



Configuration Assistant (Home) ▸ AT-TLS ▸ Address Group

New IP Address Group

Use this panel to configure a group of IP addresses.

* Name: zAwareServers

Description: ITSO zAware Servers

Double click a table cell and type the IP address or description.

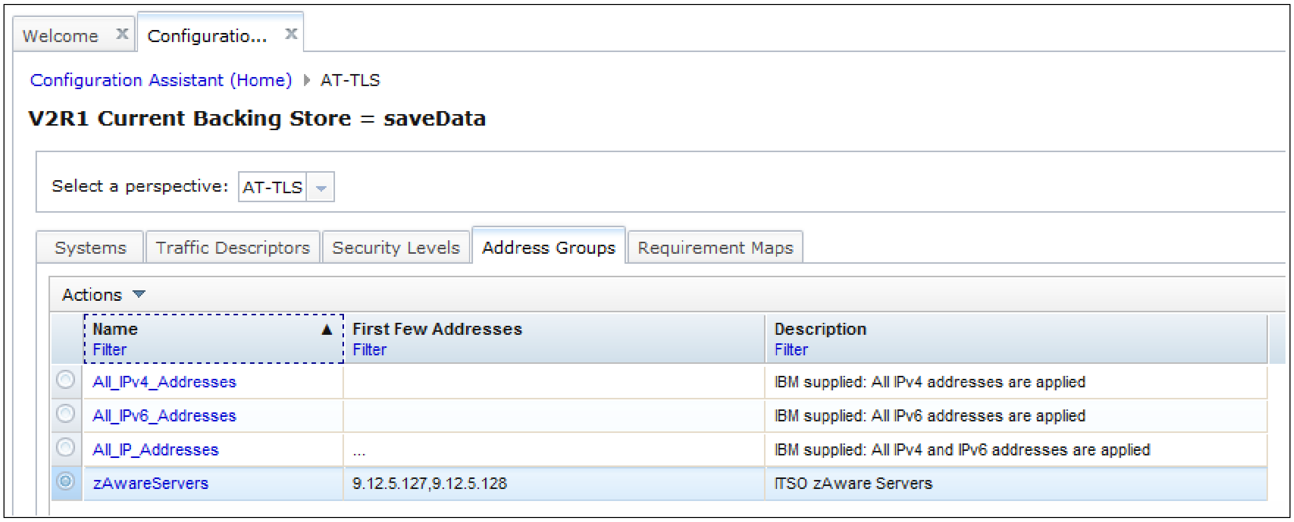
	IP address	Description
●	9.12.5.127	zAware1
○	9.12.5.128	zAware2
○		
○		
○		
○		
○		

Total: 2, Selected: 1

Figure 6-16 New IP Address Group

When the required information is entered, click **OK** to return to the Address Groups window. The new group is now displayed. Save the change to the backing store file by clicking **Save**.

The Address Group window with the new object is shown in Figure 6-17.



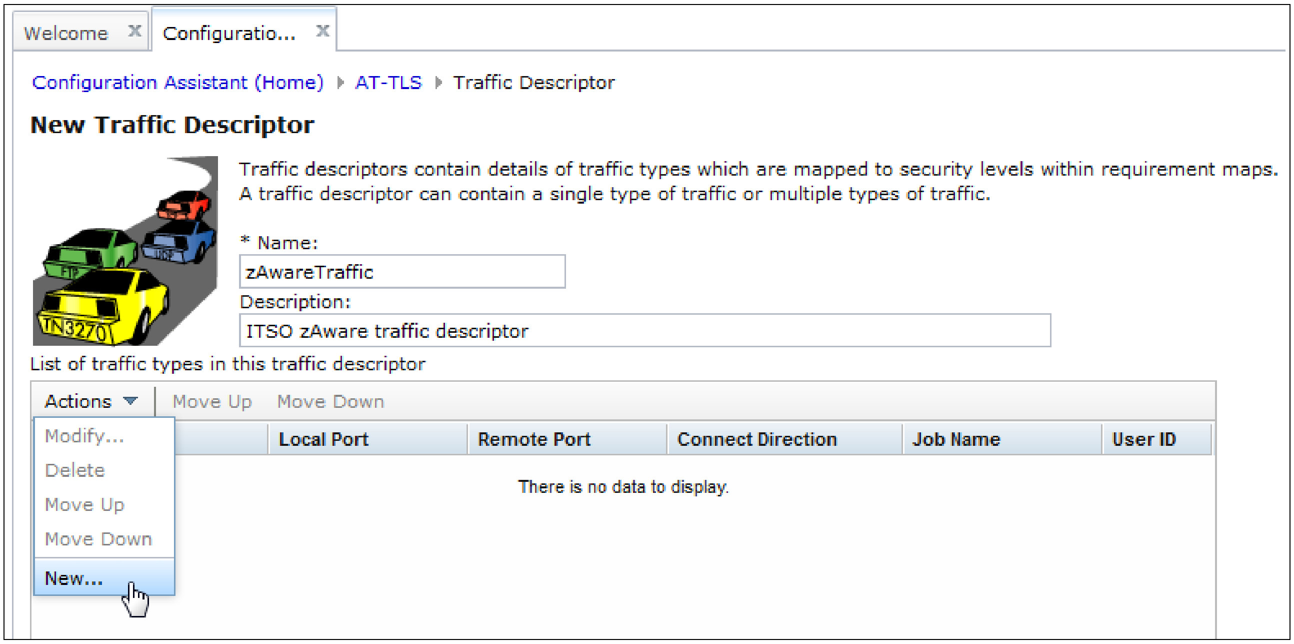
V2R1 Current Backing Store = saveData

Select a perspective: AT-TLS

	Name ▲ Filter	First Few Addresses Filter	Description Filter
○	All_IPv4_Addresses		IBM supplied: All IPv4 addresses are applied
○	All_IPv6_Addresses		IBM supplied: All IPv6 addresses are applied
○	All_IP_Addresses	...	IBM supplied: All IPv4 and IPv6 addresses are applied
●	zAwareServers	9.12.5.127,9.12.5.128	ITSO zAware Servers

Figure 6-17 Address Group window with a new object

Next, we add a traffic descriptor object. Traffic descriptors are reusable objects that describe the properties of network traffic, such as protocols and ports. Traffic descriptors are accessed from the Traffic Descriptors tab. A new object is added by selecting **New** from the Actions menu. Selecting **New** displays the New Traffic Descriptor window, where you can add a name and a description for the object. To add a traffic type, select **New** from the Actions menu, as shown in Figure 6-18.



New Traffic Descriptor

Traffic descriptors contain details of traffic types which are mapped to security levels within requirement maps. A traffic descriptor can contain a single type of traffic or multiple types of traffic.

* Name: zAwareTraffic

Description: ITSO zAware traffic descriptor

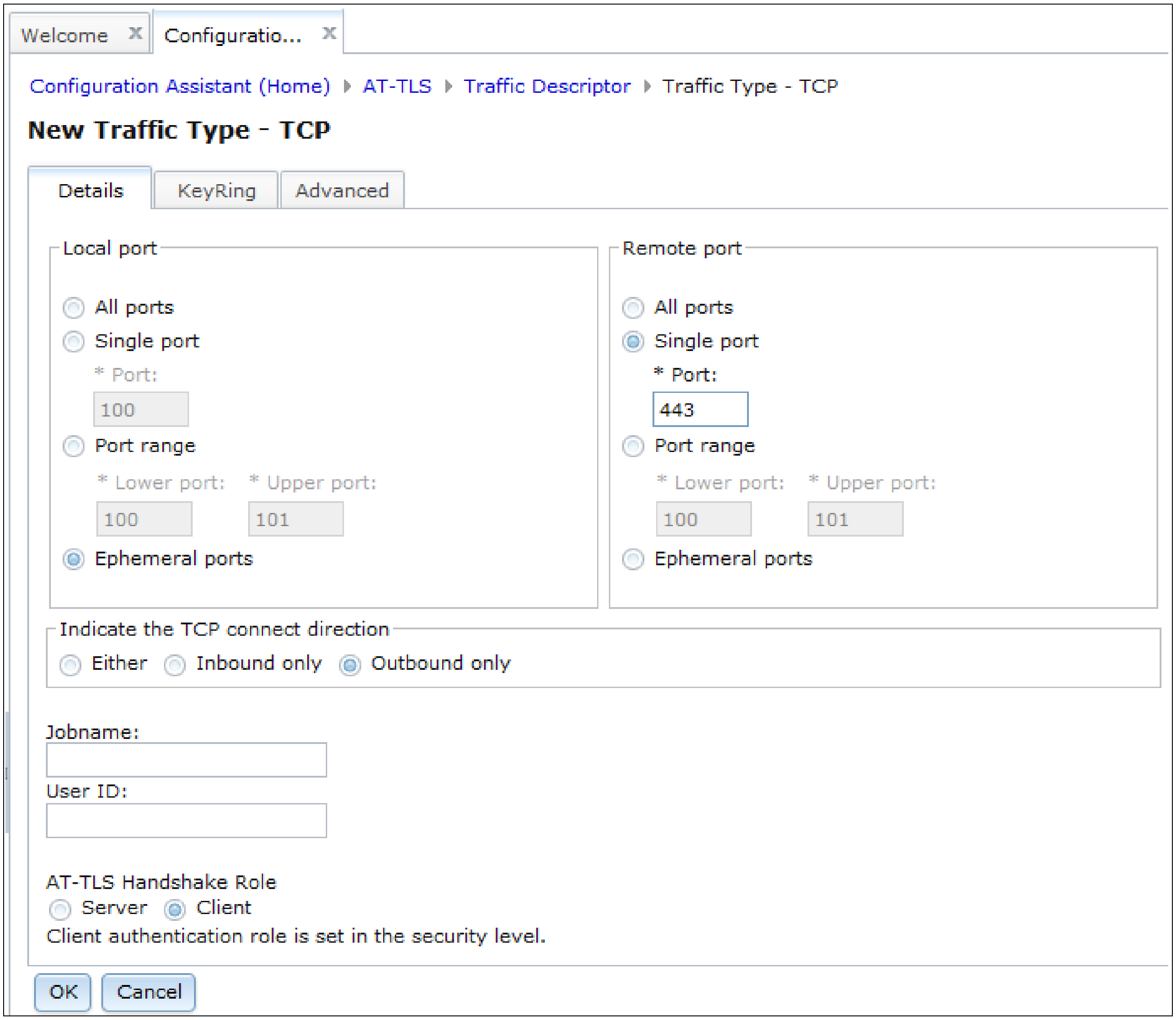
List of traffic types in this traffic descriptor

	Local Port	Remote Port	Connect Direction	Job Name	User ID
		There is no data to display.			

Figure 6-18 New Traffic Descriptor

The New Traffic Type - TCP window opens. This window has three tabs (Details, KeyRing, and Advanced). Enter the required information for each tab.

Figure 6-19 shows the completed information for the Details tab.


Welcome
Configuratio...
Configuration Assistant (Home) ▸ AT-TLS ▸ Traffic Descriptor ▸ Traffic Type - TCP

New Traffic Type - TCP

Local port

○ All ports
○ Single port
* Port: 100
○ Port range
* Lower port: 100 * Upper port: 101
● Ephemeral ports

Remote port

○ All ports
● Single port
* Port: 443
○ Port range
* Lower port: 100 * Upper port: 101
○ Ephemeral ports

Indicate the TCP connect direction

○ Either ○ Inbound only ● Outbound only

Jobname:

User ID:

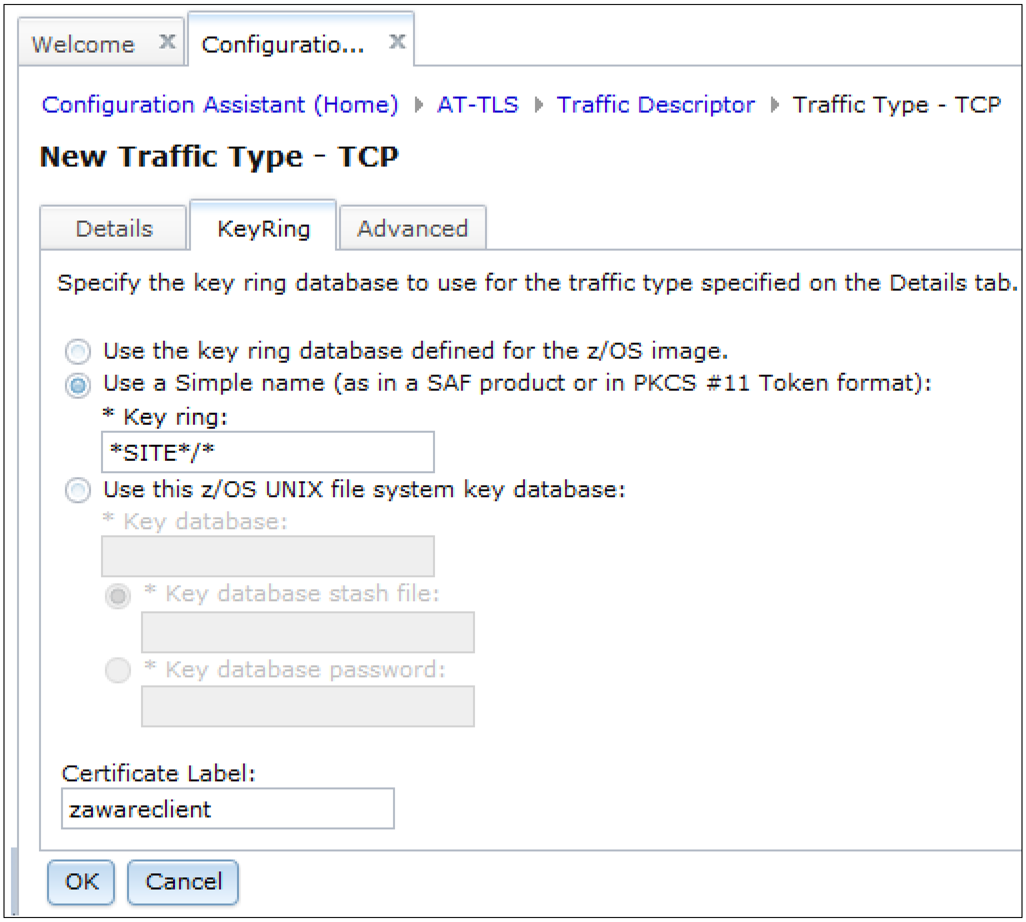
AT-TLS Handshake Role

○ Server ● Client

Client authentication role is set in the security level.

Figure 6-19 New Traffic Type - TCP - Details tab

For this example, the information in the KeyRing tab is also updated. We require client authentication to the zAware servers. The client certificate is stored in the SITE virtual key ring in the RACF database. The completed KeyRing tab is shown in Figure 6-20.



New Traffic Type - TCP

Specify the key ring database to use for the traffic type specified on the Details tab.

○ Use the key ring database defined for the z/OS image.

● Use a Simple name (as in a SAF product or in PKCS #11 Token format):

* Key ring: *SITE*/*

○ Use this z/OS UNIX file system key database:

* Key database:

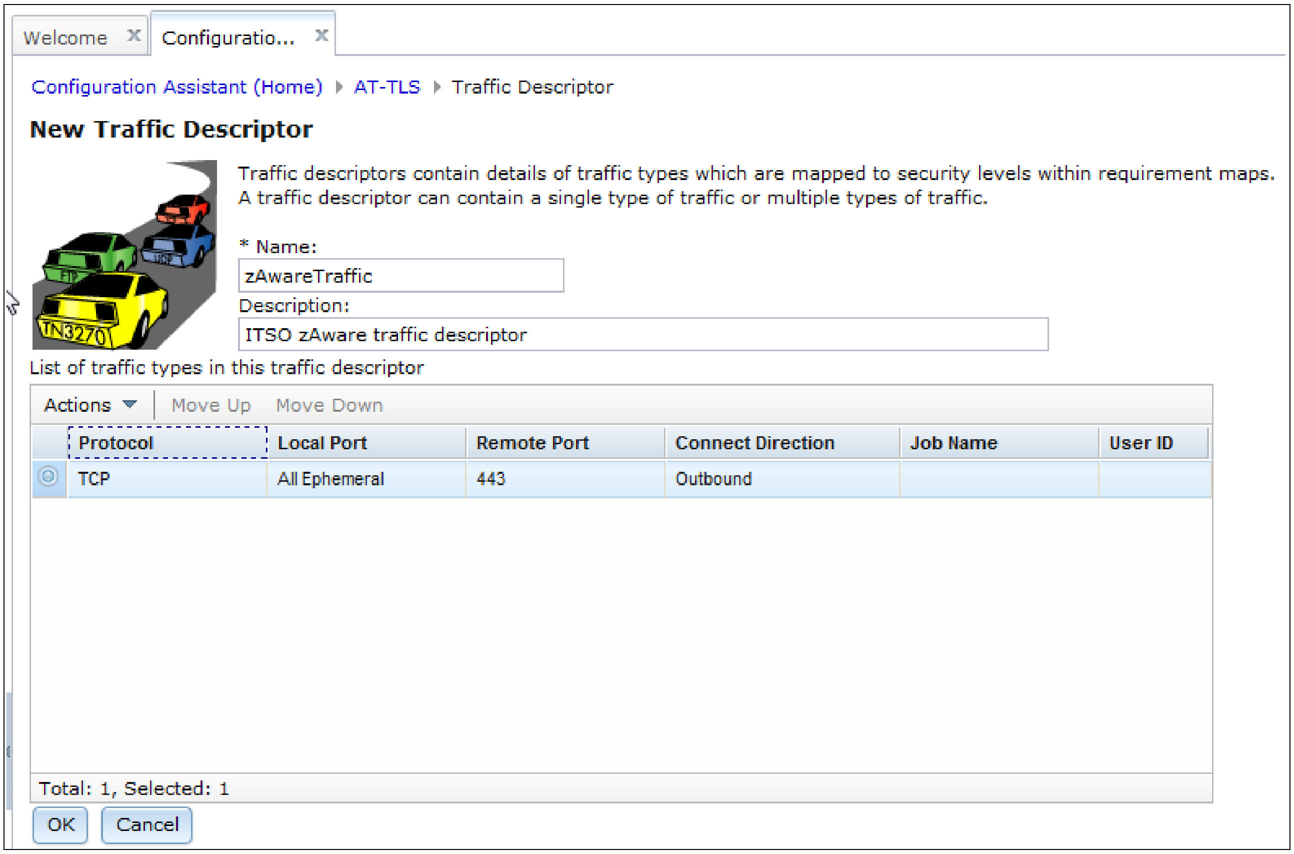
● * Key database stash file:

○ * Key database password:

Certificate Label: zawareclient

Figure 6-20 New Traffic Type - TCP - KeyRing tab

After you select the new traffic type, click **OK** to add the traffic type definition. The traffic type is displayed in the New Traffic Descriptor window, as shown in Figure 6-21. Click **OK** to save the traffic descriptor.



Welcome
Configuratio...
Configuration Assistant (Home) ▸ AT-TLS ▸ Traffic Descriptor

New Traffic Descriptor

Traffic descriptors contain details of traffic types which are mapped to security levels within requirement maps. A traffic descriptor can contain a single type of traffic or multiple types of traffic.

* Name: zAwareTraffic

Description: ITSO zAware traffic descriptor

List of traffic types in this traffic descriptor

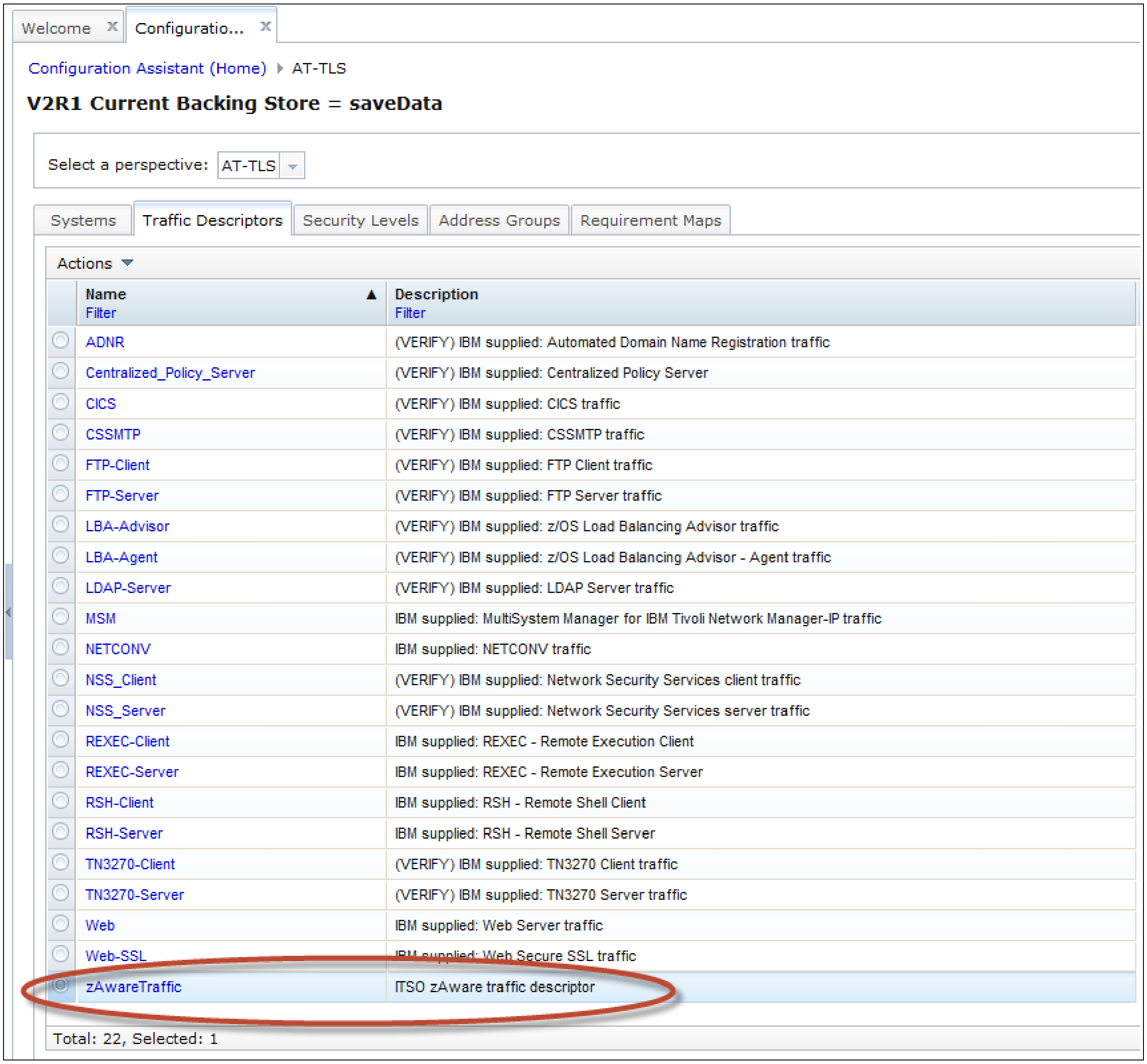
Actions
Move Up
Move Down

	Protocol	Local Port	Remote Port	Connect Direction	Job Name	User ID
○	TCP	All Ephemeral	443	Outbound		

Total: 1, Selected: 1

Figure 6-21 Traffic Descriptor window with new object

Click **OK** to return to the Traffic Descriptor window. Click **Save** to save the definition to the backing store file. The Traffic Descriptor window with the new object definition is shown in Figure 6-22.



Welcome | Configuratio...

Configuration Assistant (Home) ▸ AT-TLS

V2R1 Current Backing Store = saveData

Select a perspective: AT-TLS

Systems | Traffic Descriptors | Security Levels | Address Groups | Requirement Maps

Actions ▼

	Name ▲ Filter	Description Filter
○	ADNR	(VERIFY) IBM supplied: Automated Domain Name Registration traffic
○	Centralized_Policy_Server	(VERIFY) IBM supplied: Centralized Policy Server
○	CICS	(VERIFY) IBM supplied: CICS traffic
○	CSSMTP	(VERIFY) IBM supplied: CSSMTP traffic
○	FTP-Client	(VERIFY) IBM supplied: FTP Client traffic
○	FTP-Server	(VERIFY) IBM supplied: FTP Server traffic
○	LBA-Advisor	(VERIFY) IBM supplied: z/OS Load Balancing Advisor traffic
○	LBA-Agent	(VERIFY) IBM supplied: z/OS Load Balancing Advisor - Agent traffic
○	LDAP-Server	(VERIFY) IBM supplied: LDAP Server traffic
○	MSM	IBM supplied: MultiSystem Manager for IBM Tivoli Network Manager-IP traffic
○	NETCONV	IBM supplied: NETCONV traffic
○	NSS_Client	(VERIFY) IBM supplied: Network Security Services client traffic
○	NSS_Server	(VERIFY) IBM supplied: Network Security Services server traffic
○	REXEC-Client	IBM supplied: REXEC - Remote Execution Client
○	REXEC-Server	IBM supplied: REXEC - Remote Execution Server
○	RSH-Client	IBM supplied: RSH - Remote Shell Client
○	RSH-Server	IBM supplied: RSH - Remote Shell Server
○	TN3270-Client	(VERIFY) IBM supplied: TN3270 Client traffic
○	TN3270-Server	(VERIFY) IBM supplied: TN3270 Server traffic
○	Web	IBM supplied: Web Server traffic
○	Web-SSL	IBM supplied: Web Secure SSL traffic
●	zAwareTraffic	ITSO zAware traffic descriptor

Total: 22, Selected: 1

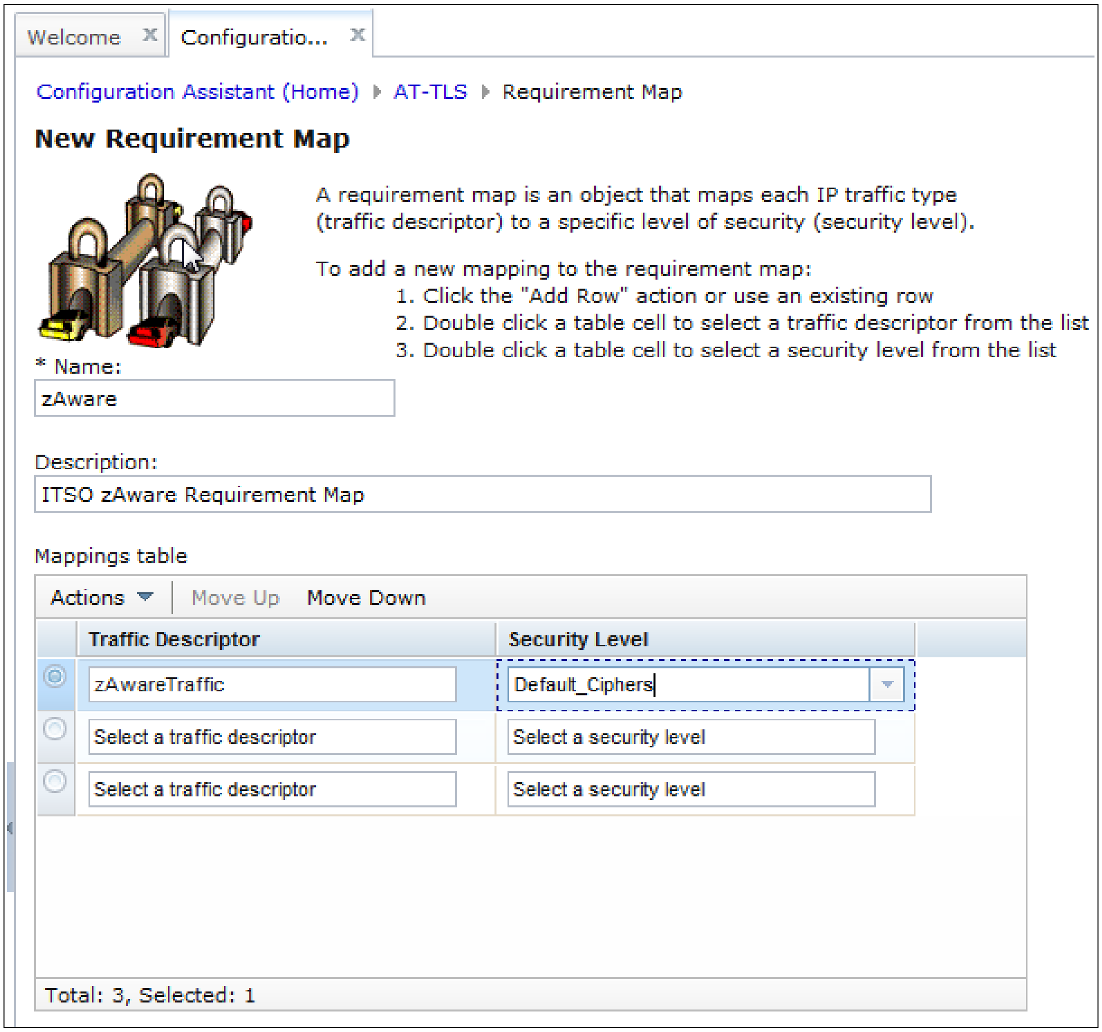
Figure 6-22 Traffic Descriptor window with new object

For this example, we do not add a Security Levels object, as we use the existing Default_Ciphers object, which is predefined.

However, we create a Requirement Maps object. A requirement map is an object that maps each IP traffic type (traffic descriptor) to a specific level of security (security level). The requirement map objects are accessed through the Requirement Maps tab.

To create a requirement map object, select **New** from the Actions menu. The New Requirement Map opens, where you can enter a name and description for the object. In the mapping table, you associate one or more traffic descriptor objects to a security level object.

A completed New Requirement Map window for our example is shown in Figure 6-23.



New Requirement Map

A requirement map is an object that maps each IP traffic type (traffic descriptor) to a specific level of security (security level).

To add a new mapping to the requirement map:

1. Click the "Add Row" action or use an existing row
2. Double click a table cell to select a traffic descriptor from the list
3. Double click a table cell to select a security level from the list

* Name: zAware

Description: ITSO zAware Requirement Map

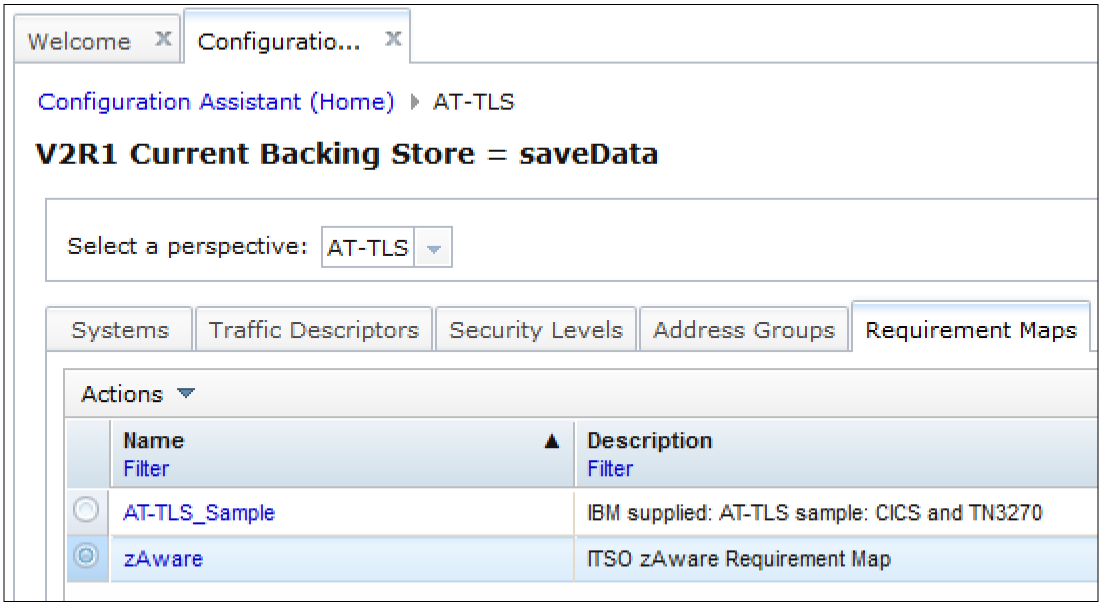
Mappings table

	Traffic Descriptor	Security Level
●	zAwareTraffic	Default_Ciphers
○	Select a traffic descriptor	Select a security level
○	Select a traffic descriptor	Select a security level

Total: 3, Selected: 1

Figure 6-23 New Requirement Map window

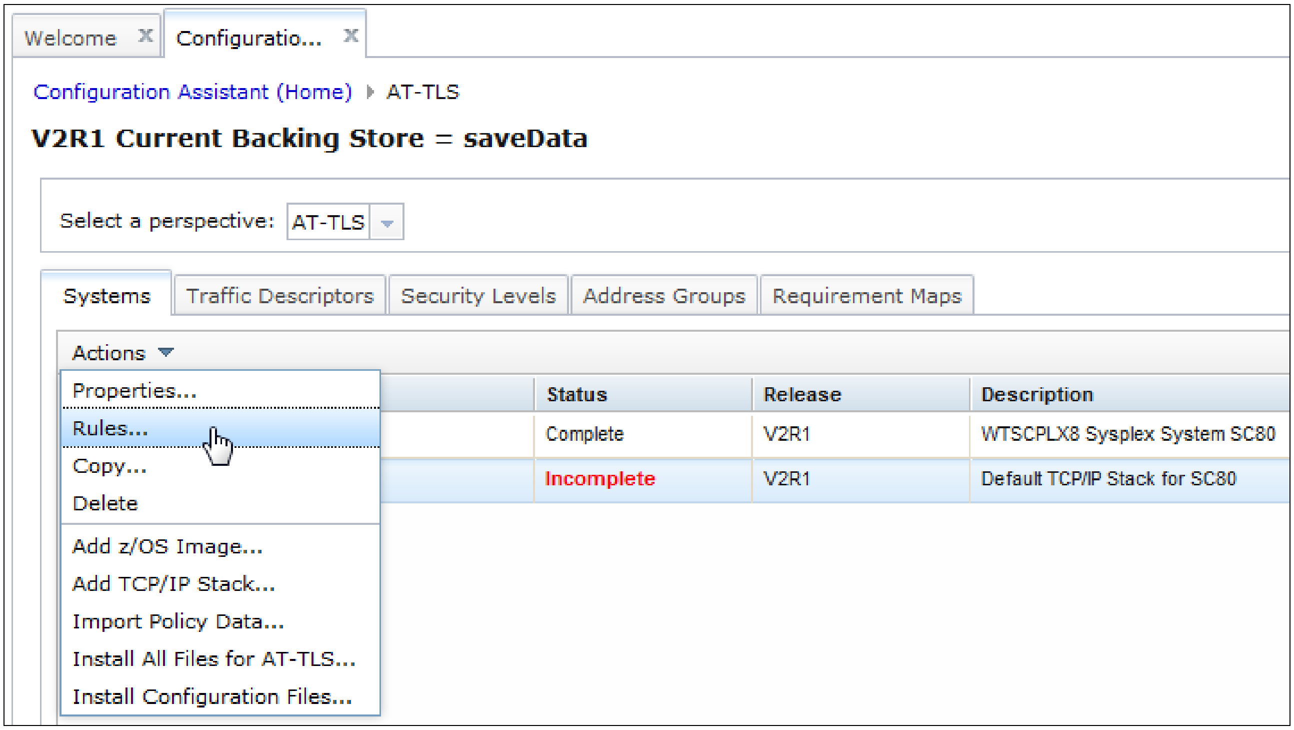
Click **OK** to add the requirement map. The new requirement map is displayed in the Requirement Maps window. Click **Save** to save the new object to the backing store file. The new requirement map object is shown in Figure 6-24.


Welcome
Configuratio...
Configuration Assistant (Home) ▸ AT-TLS
V2R1 Current Backing Store = saveData
Select a perspective: AT-TLS
Systems
Traffic Descriptors
Security Levels
Address Groups
Requirement Maps
Actions

	Name ▲ Filter	Description Filter
○	AT-TLS_Sample	IBM supplied: AT-TLS sample: CICS and TN3270
●	zAware	ITSO zAware Requirement Map

Figure 6-24 New requirement map object

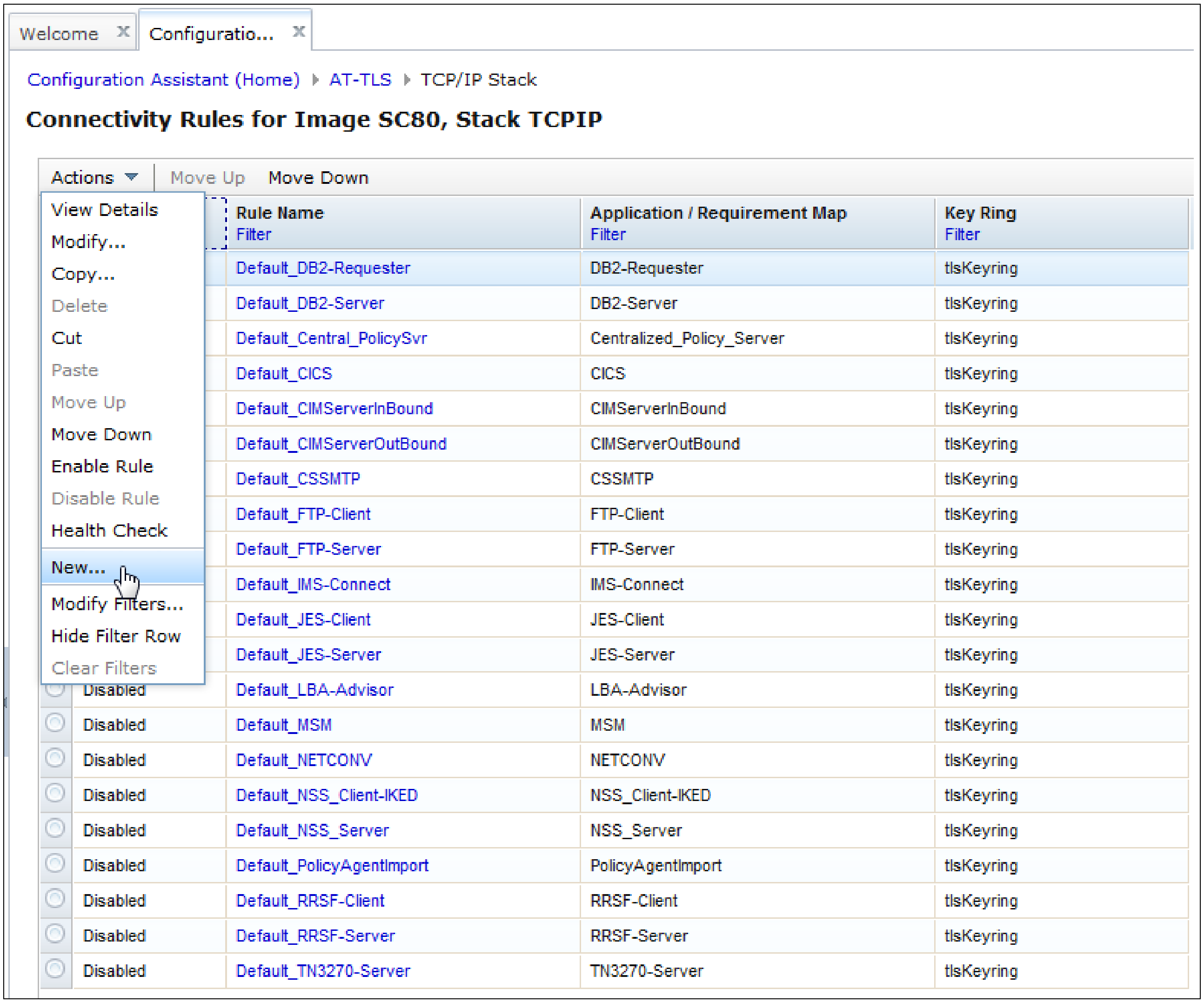
All the objects that are required to define our AT-TLS rule are now defined. The final step is to create a rule. From the Systems tab, select the TCP/IP stack for which the rule will be defined and then select **Rules** from the Actions menu, as shown in Figure 6-25.



Status	Release	Description
Complete	V2R1	WTSCPLX8 Sysplex System SC80
Incomplete	V2R1	Default TCP/IP Stack for SC80

Figure 6-25 Add Rule selection

The Connectivity Rules window for the selected image and stack opens. There are several predefined rules (disabled by default) that you can modify, copy, and enable. For this example, we add a rule by selecting **New** from the actions menu, as shown in Figure 6-26.



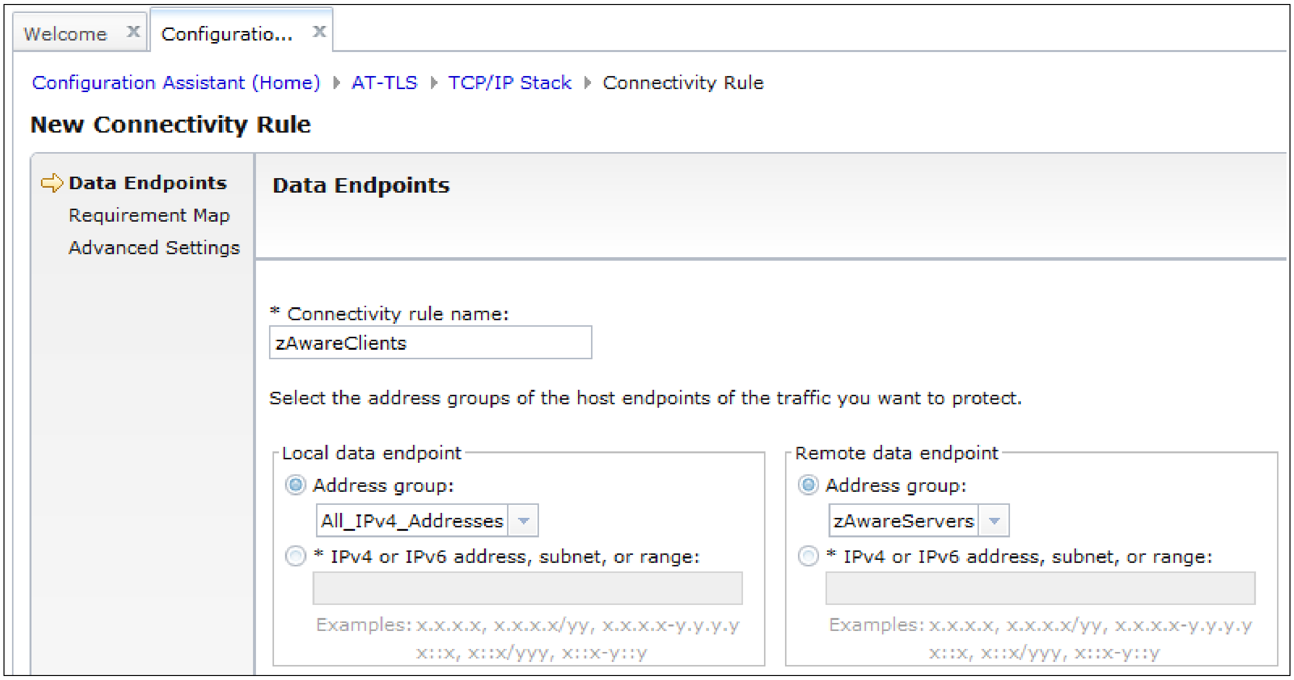
Connectivity Rules for Image SC80, Stack TCPIP

	Rule Name Filter	Application / Requirement Map Filter	Key Ring Filter
	Default_DB2-Requester	DB2-Requester	tlsKeyring
	Default_DB2-Server	DB2-Server	tlsKeyring
	Default_Central_PolicySvr	Centralized_Policy_Server	tlsKeyring
	Default_CICS	CICS	tlsKeyring
	Default_CIMServerInBound	CIMServerInBound	tlsKeyring
	Default_CIMServerOutBound	CIMServerOutBound	tlsKeyring
	Default_CSSMTP	CSSMTP	tlsKeyring
	Default_FTP-Client	FTP-Client	tlsKeyring
	Default_FTP-Server	FTP-Server	tlsKeyring
	Default_IMS-Connect	IMS-Connect	tlsKeyring
	Default_JES-Client	JES-Client	tlsKeyring
	Default_JES-Server	JES-Server	tlsKeyring
Disabled	Default_LBA-Advisor	LBA-Advisor	tlsKeyring
Disabled	Default_MSM	MSM	tlsKeyring
Disabled	Default_NETCONV	NETCONV	tlsKeyring
Disabled	Default_NSS_Client-IKED	NSS_Client-IKED	tlsKeyring
Disabled	Default_NSS_Server	NSS_Server	tlsKeyring
Disabled	Default_PolicyAgentImport	PolicyAgentImport	tlsKeyring
Disabled	Default_RRSF-Client	RRSF-Client	tlsKeyring
Disabled	Default_RRSF-Server	RRSF-Server	tlsKeyring
Disabled	Default_TN3270-Server	TN3270-Server	tlsKeyring

Figure 6-26 Add a connectivity rule for AT-TLS

The New Connectivity Rule window opens. This wizard consists of multiple steps. After the required information is entered into a window, click **Next** to move on to the next step.

Figure 6-27 shows the completed input for Data Endpoints window, which is the first step. For the local endpoints in our example, we select all IPv4 addresses, and for the remote endpoint, we select the zAwareServers address group that we previously defined.


Welcome
Configuratio...
Configuration Assistant (Home) ▸ AT-TLS ▸ TCP/IP Stack ▸ Connectivity Rule
Data Endpoints
Requirement Map
Advanced Settings

New Connectivity Rule

Data Endpoints

* Connectivity rule name: zAwareClients

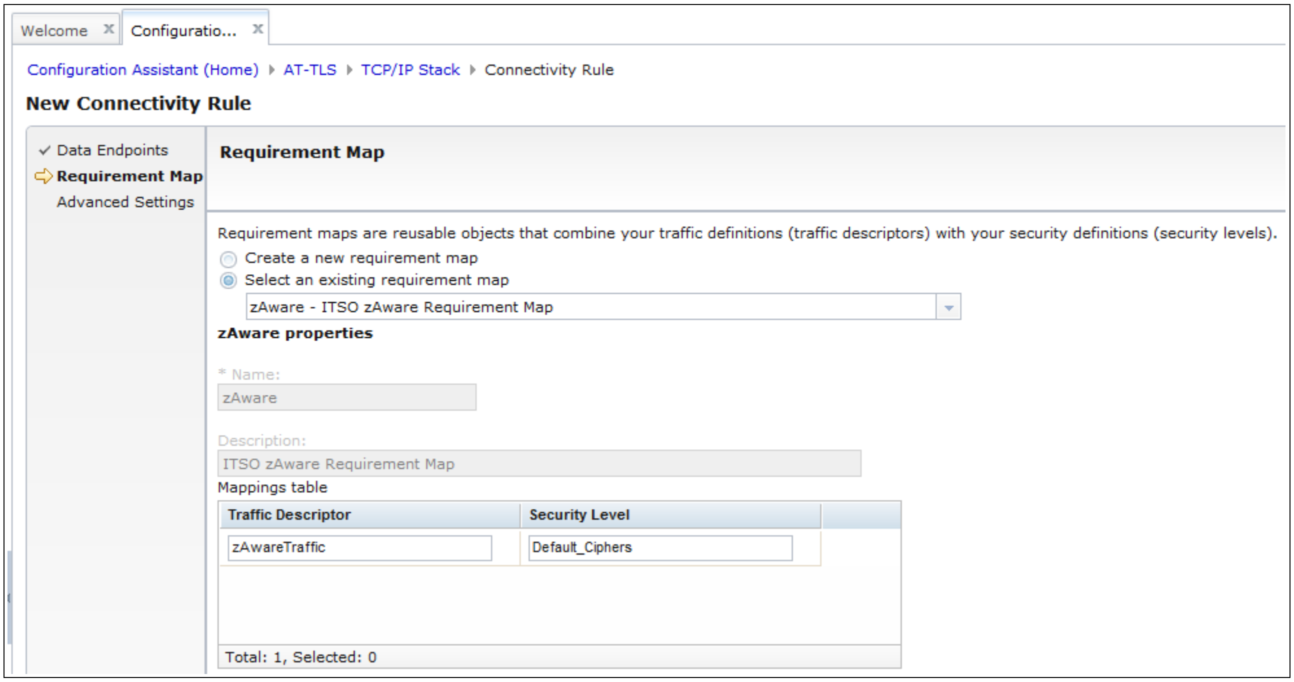
Select the address groups of the host endpoints of the traffic you want to protect.

Local data endpoint
● Address group: All_IPv4_Addresses
○ * IPv4 or IPv6 address, subnet, or range:
Examples: x.x.x.x, x.x.x.x/yy, x.x.x.x-y.y.y.y x::x, x::x/yyy, x::x-y::y

Remote data endpoint
● Address group: zAwareServers
○ * IPv4 or IPv6 address, subnet, or range:
Examples: x.x.x.x, x.x.x.x/yy, x.x.x.x-y.y.y.y x::x, x::x/yyy, x::x-y::y

Figure 6-27 New Connectivity Rule - Data Endpoints

Click **Next** to move to the Requirement Map window. The Requirement Map opens. In this window in our example, we select the **Select an existing requirement map** option and choose the requirement map that was previously created, as shown in Figure 6-28.


Welcome
Configuratio...
Configuration Assistant (Home) ▸ AT-TLS ▸ TCP/IP Stack ▸ Connectivity Rule
✓ Data Endpoints
Requirement Map
Advanced Settings

New Connectivity Rule

Requirement Map

Requirement maps are reusable objects that combine your traffic definitions (traffic descriptors) with your security definitions (security levels).
○ Create a new requirement map
● Select an existing requirement map
zAware - ITSO zAware Requirement Map

zAware properties

* Name: zAware

Description: ITSO zAware Requirement Map

Mappings table

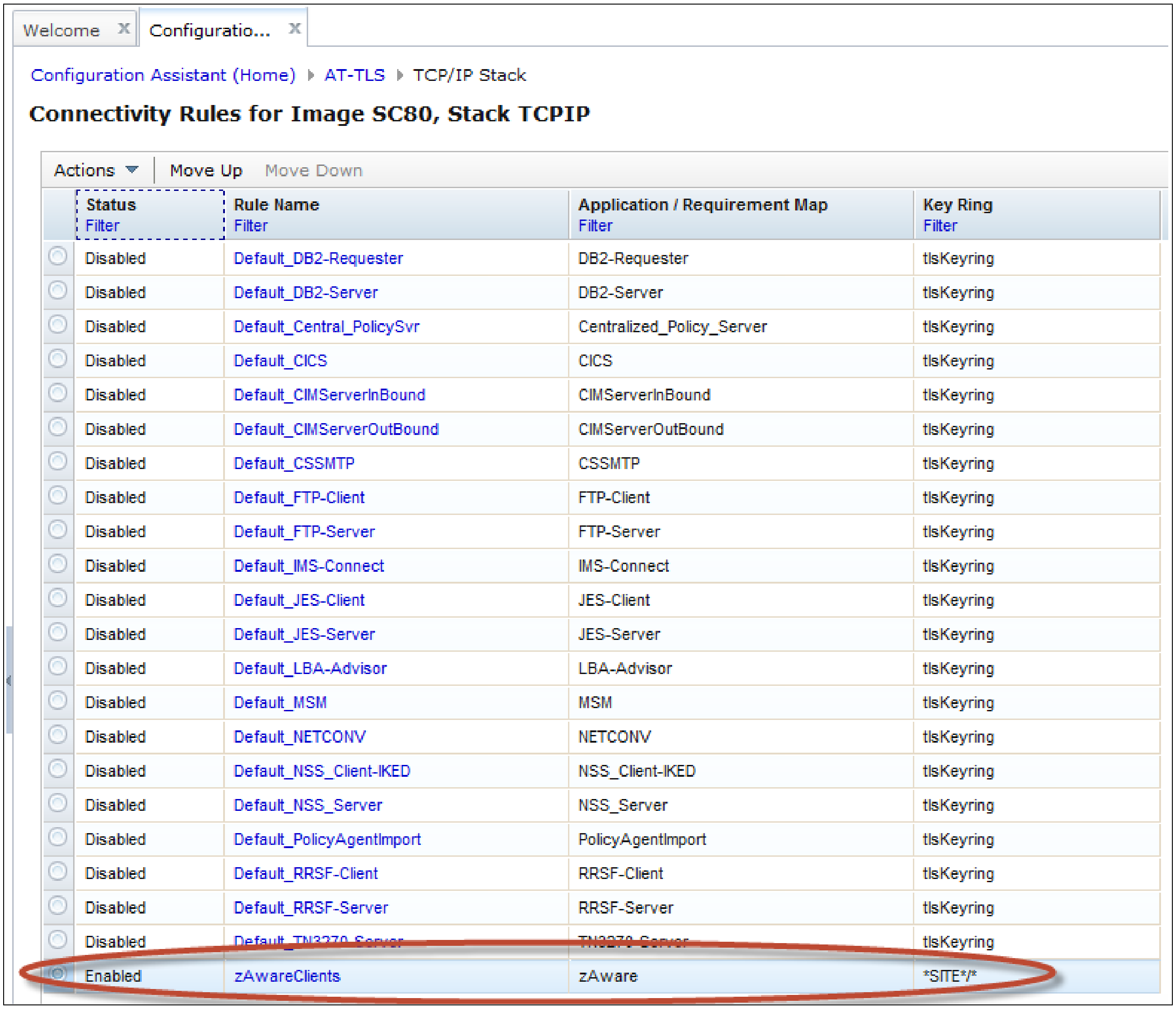
Traffic Descriptor	Security Level
zAwareTraffic	Default_Ciphers

Total: 1, Selected: 0

Figure 6-28 New Connectivity Rule - Requirement Map

Click **Next** to move to the next step. The Advanced Setting window opens. You can click **Advanced Setting** to modify additional settings that are related to the rule being created. In our example, we do not require any additional setting values to be modified, so we click **Finish** to complete our rule addition.

When you click **Finish**, you return to the Connectivity Rules window. The newly added rule is displayed, in an enabled state, as shown in Figure 6-29.



Connectivity Rules for Image SC80, Stack TCPIP

	Status Filter	Rule Name Filter	Application / Requirement Map Filter	Key Ring Filter
○	Disabled	Default_DB2-Requester	DB2-Requester	tlsKeyring
○	Disabled	Default_DB2-Server	DB2-Server	tlsKeyring
○	Disabled	Default_Central_PolicySvr	Centralized_Policy_Server	tlsKeyring
○	Disabled	Default_CICS	CICS	tlsKeyring
○	Disabled	Default_CIMServerInBound	CIMServerInBound	tlsKeyring
○	Disabled	Default_CIMServerOutBound	CIMServerOutBound	tlsKeyring
○	Disabled	Default_CSSMTP	CSSMTP	tlsKeyring
○	Disabled	Default_FTP-Client	FTP-Client	tlsKeyring
○	Disabled	Default_FTP-Server	FTP-Server	tlsKeyring
○	Disabled	Default_IMS-Connect	IMS-Connect	tlsKeyring
○	Disabled	Default_JES-Client	JES-Client	tlsKeyring
○	Disabled	Default_JES-Server	JES-Server	tlsKeyring
○	Disabled	Default_LBA-Advisor	LBA-Advisor	tlsKeyring
○	Disabled	Default_MSM	MSM	tlsKeyring
○	Disabled	Default_NETCONV	NETCONV	tlsKeyring
○	Disabled	Default_NSS_Client-IKED	NSS_Client-IKED	tlsKeyring
○	Disabled	Default_NSS_Server	NSS_Server	tlsKeyring
○	Disabled	Default_PolicyAgentImport	PolicyAgentImport	tlsKeyring
○	Disabled	Default_RRSF-Client	RRSF-Client	tlsKeyring
○	Disabled	Default_RRSF-Server	RRSF-Server	tlsKeyring
○	Disabled	Default_TN3270_Server	TN3270_Server	tlsKeyring
●	Enabled	zAwareClients	zAware	*SITE*/*

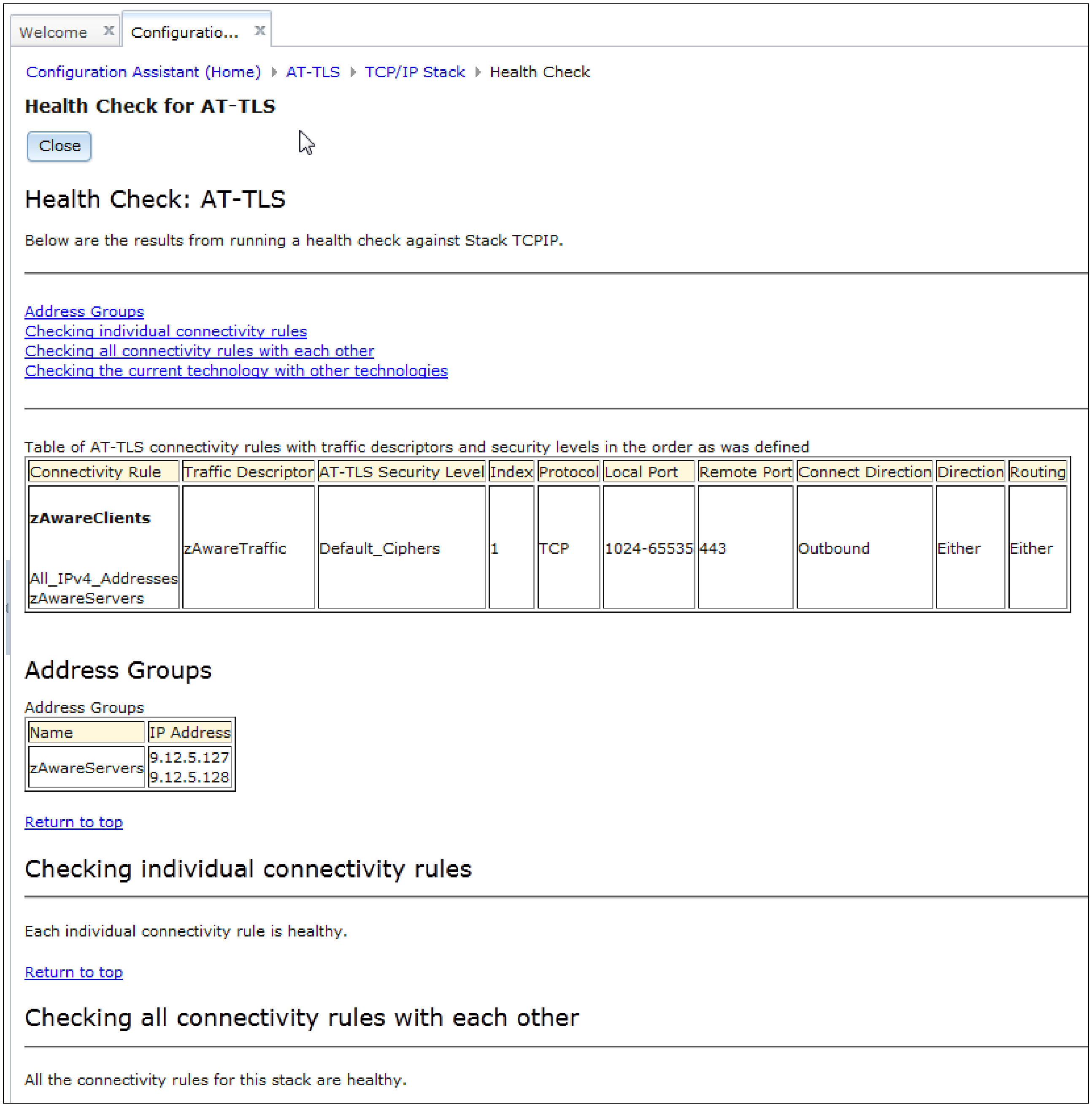
Figure 6-29 Completed connectivity rule

Click **Save** to save the newly defined rule to the backing store file. Click **Close** to return to the AT-TLS perspective Systems window.

Health Check perspective

After the rules are complete, the next step is to install the policy file. However, you can verify whether any errors exist within a connectivity rule or with other connectivity rules by running a *health check* against the rule before installing the policy. From the Connectivity Rules window, select the rule and then select **Health Check** from the Actions menu.

A partial sample Health Check report for our previously defined rule is shown in Figure 6-30.



Welcome
Configuratio...
Configuration Assistant (Home) ▸ AT-TLS ▸ TCP/IP Stack ▸ Health Check
Close

Health Check for AT-TLS

Health Check: AT-TLS

Below are the results from running a health check against Stack TCPIP.

Address Groups
Checking individual connectivity rules
Checking all connectivity rules with each other
Checking the current technology with other technologies

Table of AT-TLS connectivity rules with traffic descriptors and security levels in the order as was defined

Connectivity Rule	Traffic Descriptor	AT-TLS Security Level	Index	Protocol	Local Port	Remote Port	Connect Direction	Direction	Routing
zAwareClients All_IPv4_Addresses zAwareServers	zAwareTraffic	Default_Ciphers	1	TCP	1024-65535	443	Outbound	Either	Either

Address Groups

Address Groups

Name	IP Address
zAwareServers	9.12.5.127 9.12.5.128

Return to top

Checking individual connectivity rules

Each individual connectivity rule is healthy.

Return to top

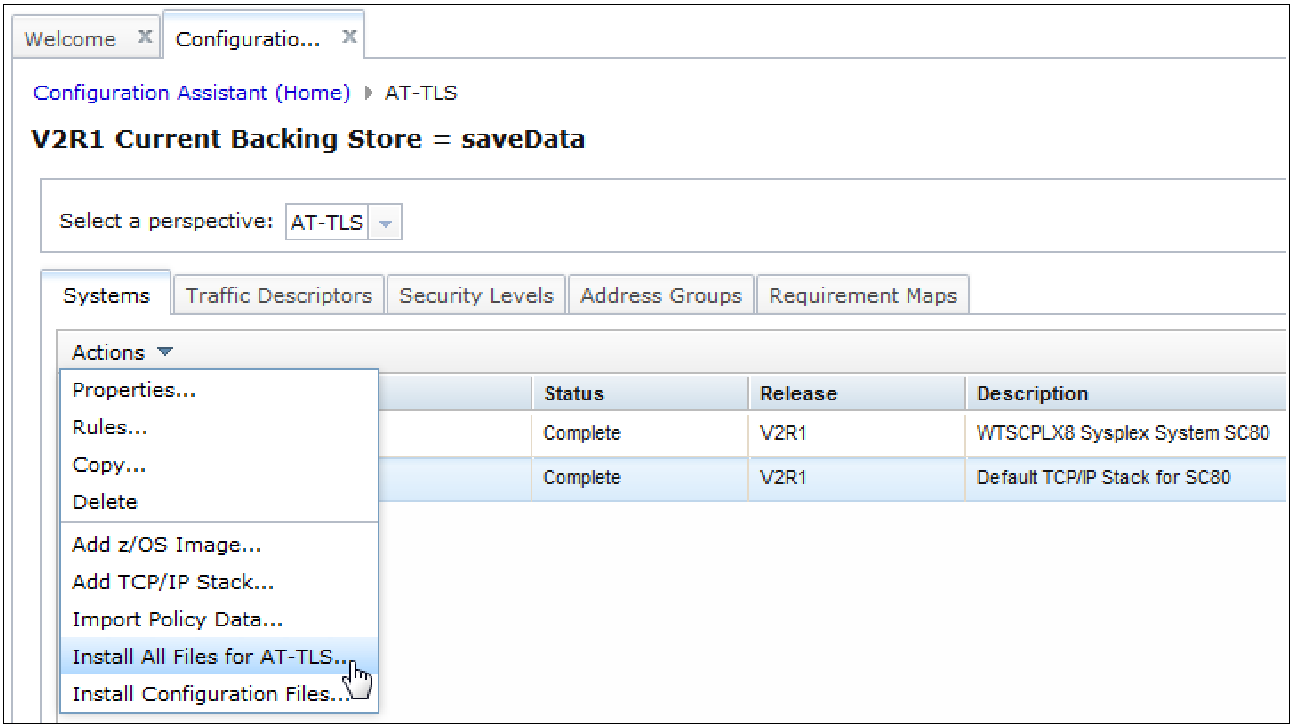
Checking all connectivity rules with each other

All the connectivity rules for this stack are healthy.

Figure 6-30 Health Check report

6.4.4 Installing configuration files

To install a configuration file, from the Systems tab, click either **Install all files for *X*** (where X is the name of the perspective) or **Install Configuration Files**. In this example, we select **Install all files for AT-TLS** from the Systems tab Actions menu, as shown in Figure 6-31.



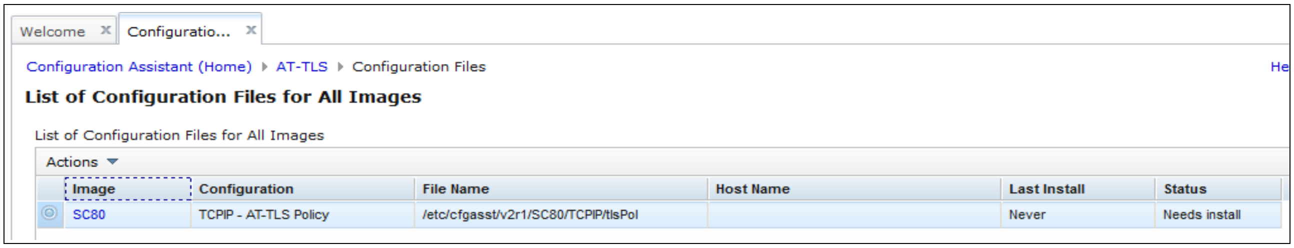
V2R1 Current Backing Store = saveData

Select a perspective: AT-TLS

Status	Release	Description
Complete	V2R1	WTSCPLX8 Sysplex System SC80
Complete	V2R1	Default TCP/IP Stack for SC80

Figure 6-31 Install all files for AT-TLS

The List of Configuration Files for All Images window opens. In our example, we have only one object that is displayed, as shown in Figure 6-32.



Welcome
Configuratio...
Configuration Assistant (Home) ▸ AT-TLS ▸ Configuration Files
He

List of Configuration Files for All Images

List of Configuration Files for All Images

	Image	Configuration	File Name	Host Name	Last Install	Status
○	SC80	TCPIP - AT-TLS Policy	/etc/cfgasst/v2r1/SC80/TCPIP/tlsPol		Never	Needs install

Figure 6-32 List of Configuration Files for All Images

This window lists all the files that are eligible for installation, based on the current selection in the Systems tab. The table of objects is divided into six columns (excluding the Select column):

- The first column shows the image or stack name that is associated with the file.
- The second column shows the configuration type of the file.
- The third column shows the file name. You may edit this column by clicking in this field. The new name is used in all future activity for this file.
- The fourth column shows the destination host name or IP address.

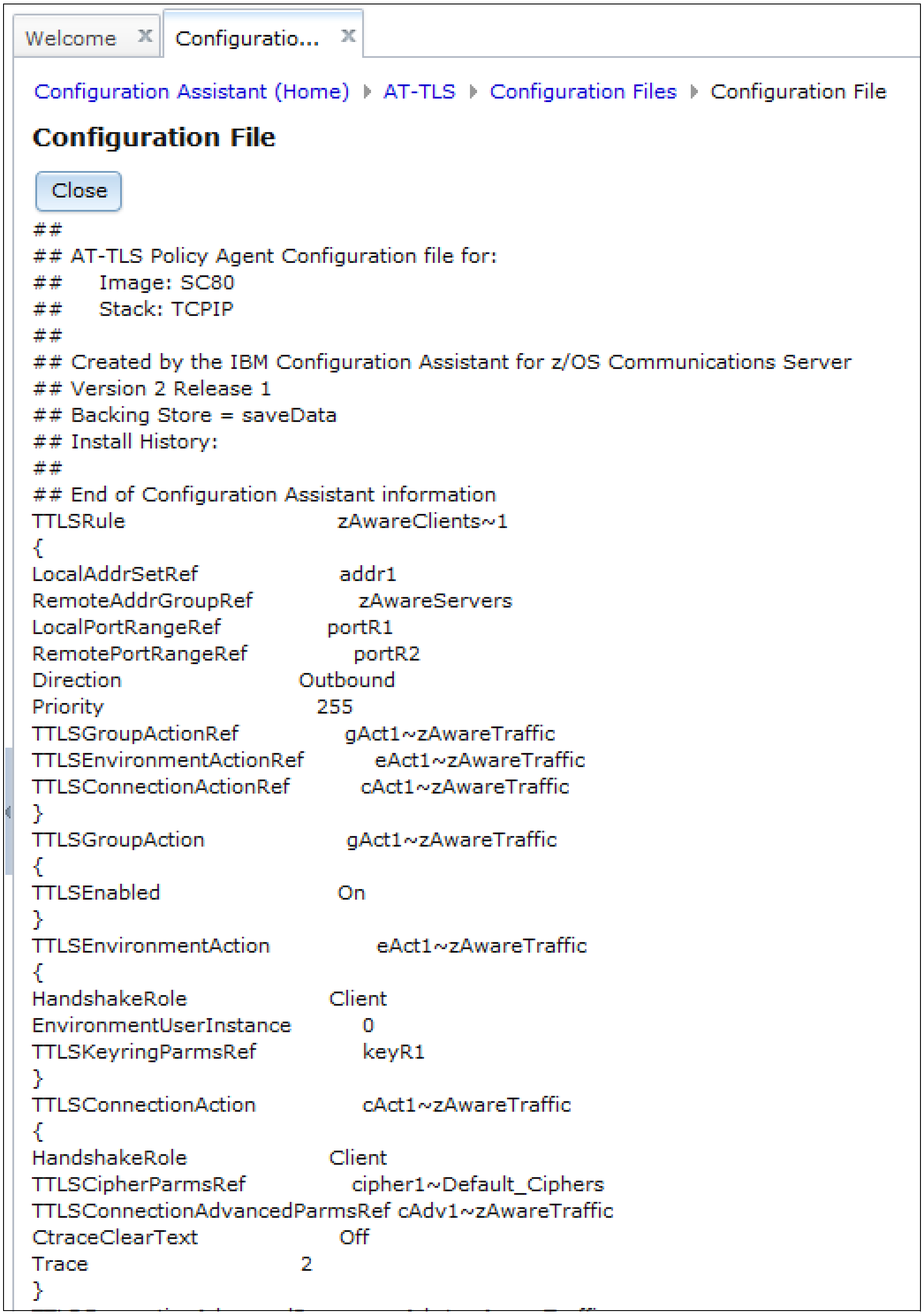
- The fifth column shows the time stamp of the last successful installation for this file.
- The last column shows the status of the file. It is set to one of the following states:
  - Installed, if the file is installed and no policy changes were made.
  - Needs Install, if the file has never been installed or if subsequent policy changes were made to the configuration.

Here are the actions that are available from the Actions menu when one or more objects are selected:

- Show Configuration File (only when a single object is selected)
- Show Configuration Summary
- Install

Show Configuration File

Selecting a single object and then selecting **Show Configuration File** displays the configuration file. An example for the AT-TLS policy we created is shown in Figure 6-33 on page 135.


Welcome
Configuratio...
Configuration Assistant (Home) ▸ AT-TLS ▸ Configuration Files ▸ Configuration File
Configuration File
Close

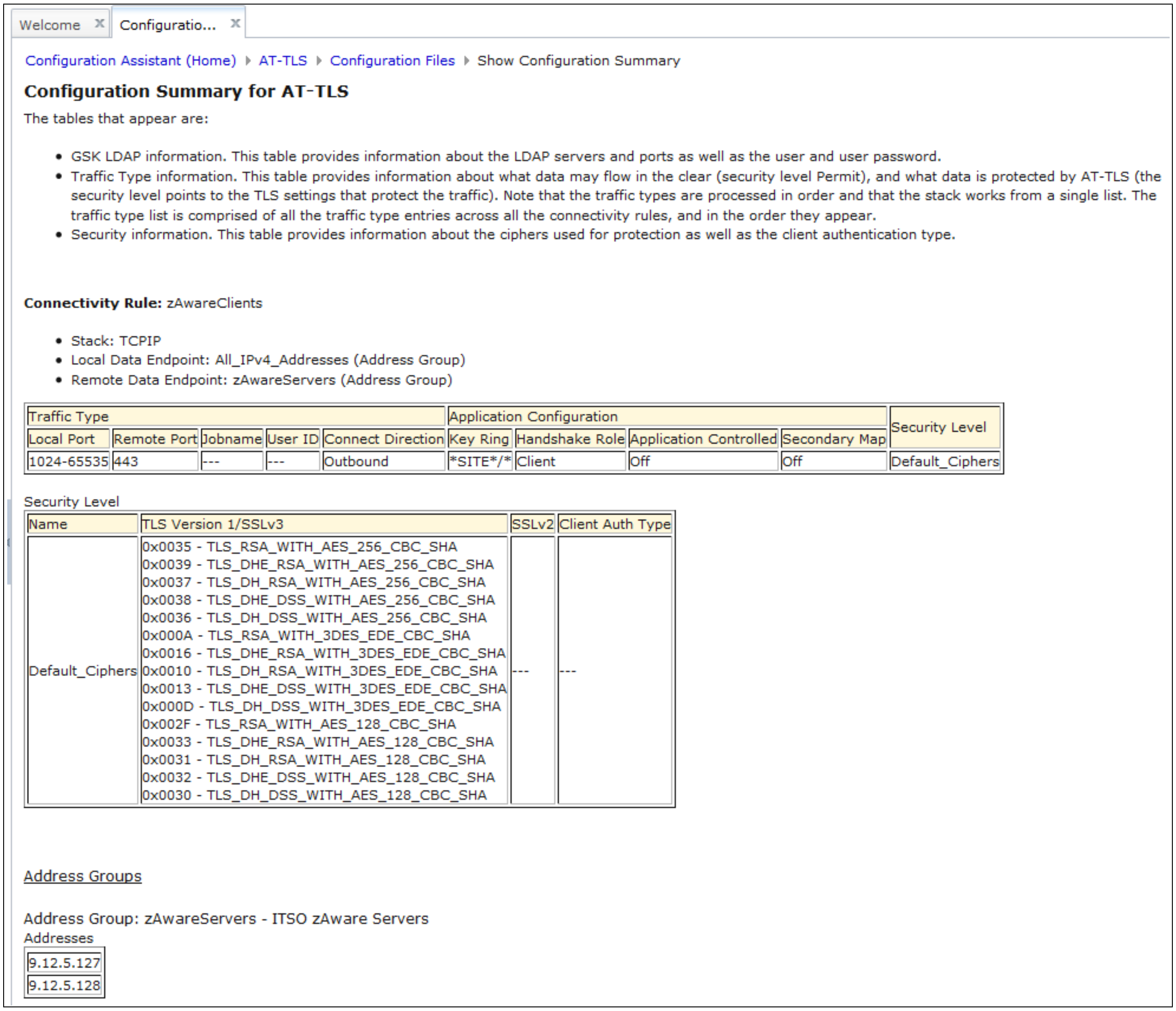
```
##
## AT-TLS Policy Agent Configuration file for:
##     Image: SC80
##     Stack: TCPIP
##
## Created by the IBM Configuration Assistant for z/OS Communications Server
## Version 2 Release 1
## Backing Store = saveData
## Install History:
##
## End of Configuration Assistant information
TTLSRule                          zAwareClients~1
{
LocalAddrSetRef                   addr1
RemoteAddrGroupRef                  zAwareServers
LocalPortRangeRef                portR1
RemotePortRangeRef                  portR2
Direction                      Outbound
Priority                         255
TTLSGroupActionRef                 gAct1~zAwareTraffic
TTLSEnvironmentActionRef             eAct1~zAwareTraffic
TTLSConnectionActionRef            cAct1~zAwareTraffic
}
TTLSGroupAction                    gAct1~zAwareTraffic
{
TTLSEnabled                       On
}
TTLSEnvironmentAction                eAct1~zAwareTraffic
{
HandshakeRole                    Client
EnvironmentUserInstance             0
TTLSKeyringParmsRef                 keyR1
}
TTLSConnectionAction                cAct1~zAwareTraffic
{
HandshakeRole                    Client
TTLSCipherParmsRef                 cipher1~Default_Ciphers
TTLSConnectionAdvancedParmsRef cAdv1~zAwareTraffic
CtraceClearText                   Off
Trace                          2
}
```

Figure 6-33   Show Configuration FIle

Configuration Summary

Selecting one or more objects and then selecting **Show Configuration Summary** from the Actions menu displays the configuration summary for the changes being made. The resulting summary consists of explanatory text and tables that present the relevant technology being installed in a manner that is easier to interpret than the actual configuration file.

An example of the Configuration Summary window for the rule we created is shown in Figure 6-34.


Welcome ✕
Configuratio... ✕
Configuration Assistant (Home) ▸ AT-TLS ▸ Configuration Files ▸ Show Configuration Summary

Configuration Summary for AT-TLS

The tables that appear are:

- GSK LDAP information. This table provides information about the LDAP servers and ports as well as the user and user password.
- Traffic Type information. This table provides information about what data may flow in the clear (security level Permit), and what data is protected by AT-TLS (the security level points to the TLS settings that protect the traffic). Note that the traffic types are processed in order and that the stack works from a single list. The traffic type list is comprised of all the traffic type entries across all the connectivity rules, and in the order they appear.
- Security information. This table provides information about the ciphers used for protection as well as the client authentication type.

Connectivity Rule: zAwareClients

- Stack: TCPIP
- Local Data Endpoint: All_IPv4_Addresses (Address Group)
- Remote Data Endpoint: zAwareServers (Address Group)

Traffic Type					Application Configuration				Security Level
Local Port	Remote Port	Jobname	User ID	Connect Direction	Key Ring	Handshake Role	Application Controlled	Secondary Map	
1024-65535	443	---	---	Outbound	*SITE*/*	Client	Off	Off	Default_Ciphers

Security Level

Name	TLS Version 1/SSLv3	SSLv2	Client Auth Type
Default_Ciphers	0x0035 - TLS_RSA_WITH_AES_256_CBC_SHA 0x0039 - TLS_DHE_RSA_WITH_AES_256_CBC_SHA 0x0037 - TLS_DH_RSA_WITH_AES_256_CBC_SHA 0x0038 - TLS_DHE_DSS_WITH_AES_256_CBC_SHA 0x0036 - TLS_DH_DSS_WITH_AES_256_CBC_SHA 0x000A - TLS_RSA_WITH_3DES_EDE_CBC_SHA 0x0016 - TLS_DHE_RSA_WITH_3DES_EDE_CBC_SHA 0x0010 - TLS_DH_RSA_WITH_3DES_EDE_CBC_SHA 0x0013 - TLS_DHE_DSS_WITH_3DES_EDE_CBC_SHA 0x000D - TLS_DH_DSS_WITH_3DES_EDE_CBC_SHA 0x002F - TLS_RSA_WITH_AES_128_CBC_SHA 0x0033 - TLS_DHE_RSA_WITH_AES_128_CBC_SHA 0x0031 - TLS_DH_RSA_WITH_AES_128_CBC_SHA 0x0032 - TLS_DHE_DSS_WITH_AES_128_CBC_SHA 0x0030 - TLS_DH_DSS_WITH_AES_128_CBC_SHA	---	---

Address Groups

Address Group: zAwareServers - ITSO zAware Servers

Addresses
9.12.5.127
9.12.5.128

Figure 6-34 Show Configuration Summary

Install

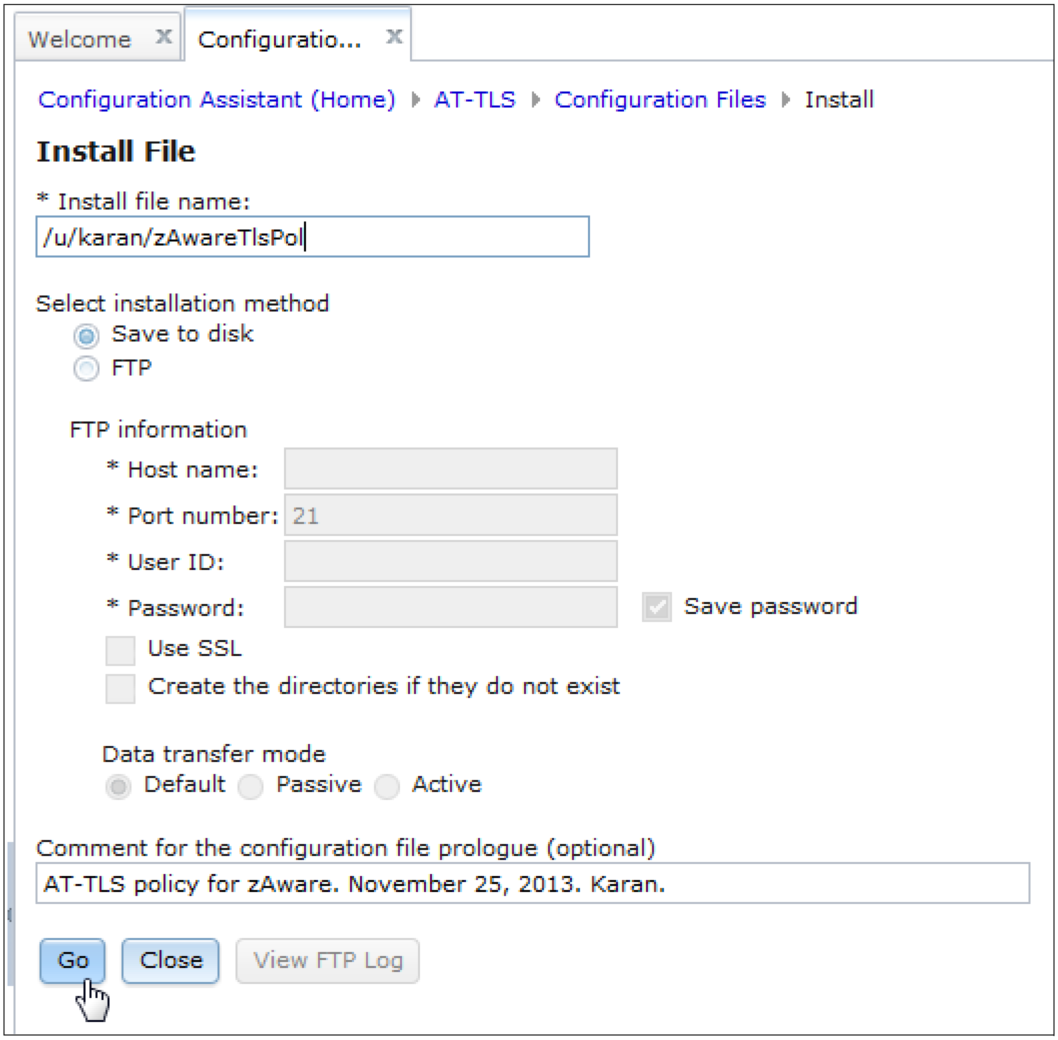
To save the configuration file to the target z/OS system, select **Install** from the Actions menu. The Install File window opens.

There are two methods that are available to install the configuration file:

- Save to disk: The file is saved using the name of the user ID that is logged in to z/OSMF.
- FTP: The file is transferred to z/OS by connecting to the z/OS FTP server.

Detailed information about each option and all the relevant fields are in the topic “Install File” in the z/OSMF Configuration Assistant help.

The Install File window is shown in Figure 6-35 on page 137. In this example, the Install File name path is changed to the installation user’s UNIX System Services home directory and the **Save to disk** method is chosen.


Welcome
Configuratio...
Configuration Assistant (Home) ▸ AT-TLS ▸ Configuration Files ▸ Install
Go
Close
View FTP Log

Install File

* Install file name: /u/karan/zAwareTlsPol

Select installation method
● Save to disk
○ FTP

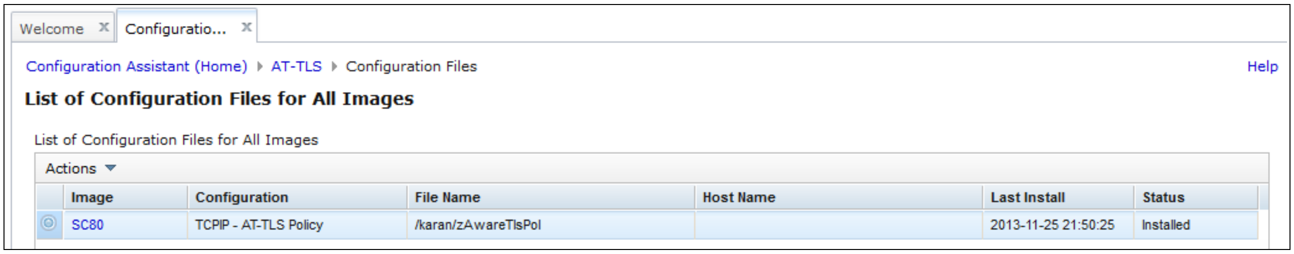
FTP information
* Host name:
* Port number: 21
* User ID:
* Password: ☑ Save password
□ Use SSL
□ Create the directories if they do not exist

Data transfer mode
● Default ○ Passive ○ Active

Comment for the configuration file prologue (optional)
AT-TLS policy for zAware. November 25, 2013. Karan.

Figure 6-35 Install File

Click **Go** to write the file to the target image. A window opens and notifies you of a successful write. Clicking **Close** returns you to the List Configuration Files for All Images window. On a successful installation, the Last Install and Status columns for the selected object (the file you installed) are updated. Figure 6-36 shows that the Last Install and Status files for the file we installed were updated. In addition, the file name is also updated to reflect the actual installation path.


Welcome
Configuratio...
Configuration Assistant (Home) ▸ AT-TLS ▸ Configuration Files
Help
Actions ▾

List of Configuration Files for All Images

List of Configuration Files for All Images

	Image	Configuration	File Name	Host Name	Last Install	Status
○	SC80	TCPIP - AT-TLS Policy	/karan/zAwareTlsPol		2013-11-25 21:50:25	Installed

Figure 6-36 List of Configuration Files after a successful installation

After the configuration file is transferred to the z/OS image, you can take installation appropriate actions to make the file active (for example, move the file to the path or dataset where the PAGENT task expects to find the file or update the PAGENT policy to enable the technology). After the configuration file is transferred to the z/OS image, you can take installation appropriate actions to make the file active (for example, move the file to the path or data set where the PAGENT task expects to find the file or update the PAGENT policy to enable the technology).

7

Workflows

This chapter provides a description of and usage information about IBM z/OS Management Facility (z/OSMF) workflows. It includes the following sections:

7.1 Introduction

The Workflows task is new task that was included with z/OSMF 2.1. It is a tool that provides a guided, step-based activity flow that is used for configuring and maintaining z/OS systems. It is installed with the z/OSMF core installation.

Configuring a product or component on z/OS is a complex process. Customers want a consistent, simplified, and less error-prone way to configure products and components on z/OS.

The intent of the Workflows task is to simplify configuring z/OS for products or more specifically, simplify configuring z/OS-specific constructs for applications and middleware. Workflows are not limited to configuration and installation; they can be used to define any task, such as adding users to the security product (which is our example workflow). Any task that requires a step-by-step process can take advantage of a workflow definition.

The z/OSMF Workflow task also provides some wizards to assist with some common configuration tasks. The wizards assist with creating configuration files, creating and submitting JCL, and creating and running REXX and shell scripts.

The z/OSMF Workflow Editor can be used to create your own workflow. It is a simplified interface for editing a workflow definition. You can add, delete, and modify the steps and variables in a workflow definition without having to know or understand XML.

z/OSMF by does nothing; its usefulness is entirely dependent on workflows that are provided by component owners or third-party vendors.

7.2 Overview

Workflows are created by users or vendors to guide a user through a configuration or setup task. A workflow is written and included as an XML file and can contain external files that include scripts, JCL, or another language text, including XML. These workflows contain meta information (name, vendor, and version), variables, and a collection of steps.

7.3 Lifecycle

A workflow is created by using XML, which is based on the schema that is included with z/OSMF that is in the `/usr/lpp/zosmf/workflow/schemas/workflow_v1.xsd` directory. The schema is the definition of all allowable XML tags and attributes. XML is only `< > </ > x=""`.

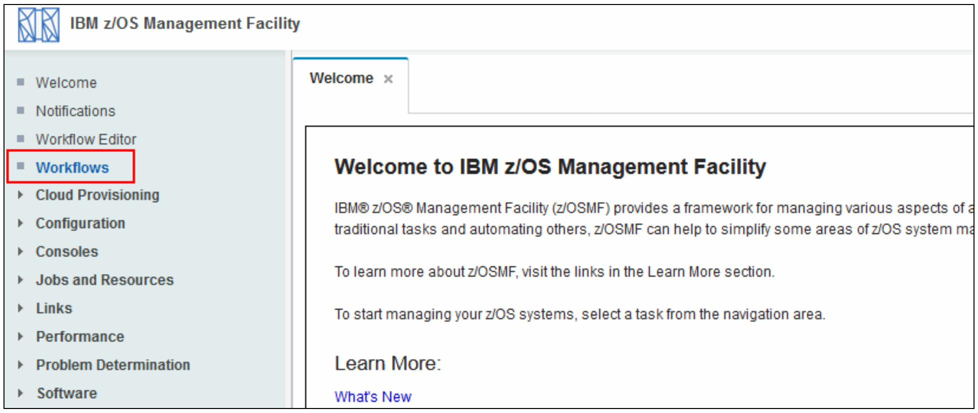
The lifecycle of a typical workflow includes the following milestones:

- A workflow is created by a workflow owner who selects the XML file and sets up the workflow.
- Users are then assigned to perform the steps in the workflow by the workflow owner.
- The assignees accept the steps to become step owners.

- The step owners perform the steps individually. Some steps can be done in parallel and others have prerequisites and must be performed in sequence. Consider the following points:
  - The user might be required to complete the fields in windows that prompt for variable input. Input variables can be used in the subsequent steps.
  - In some cases, steps are performed manually after instructions are read. Instructions are generated from XML text and data from the variables, and are text that describes the purpose of the step and how to perform it.
  - In other cases, JCL is generated by using text in the XML and data from the variables and submitted for running.
- With submitted JCL, you can check the job status tab to see how the jobs ran. The job status is saved locally for future use so that you do not have to retrieve it from the z/OS system frequently.
- The workflow history can be viewed to see what occurred.
- When all the steps are done, the workflow is complete.

7.4 Accessing the Workflows task

You access the Workflows task by clicking **Workflows** in the Welcome window of the z/OSMF interface, as shown in Figure 7-1.



Welcome to IBM z/OS Management Facility

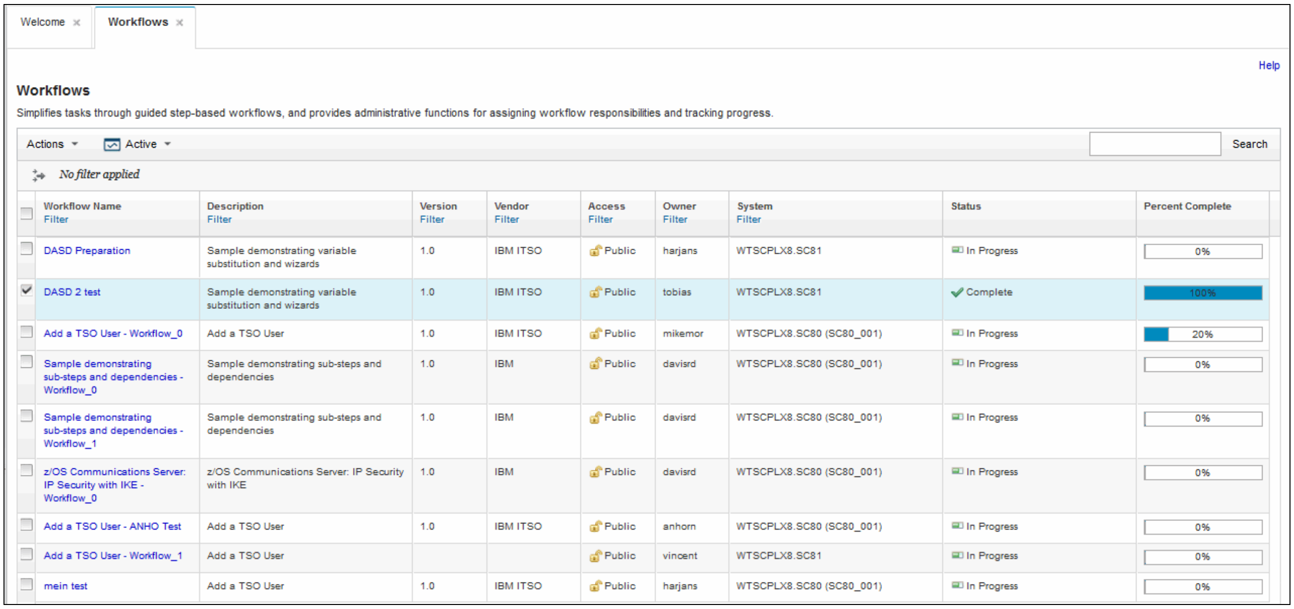
IBM® z/OS® Management Facility (z/OSMF) provides a framework for managing various aspects of a traditional tasks and automating others, z/OSMF can help to simplify some areas of z/OS system ma

To learn more about z/OSMF, visit the links in the Learn More section.

To start managing your z/OS systems, select a task from the navigation area.

Figure 7-1 Workflows task selection

When you click **Workflows**, the main Workflows window opens. This window shows all of the workflows that are created. These workflows can be modified, deleted, viewed, or opened to be worked upon, as shown in Figure 7-2. No workflows are available when you access the Workflows task for the first time.



Workflows

Simplifies tasks through guided step-based workflows, and provides administrative functions for assigning workflow responsibilities and tracking progress.

No filter applied

	Workflow Name Filter	Description Filter	Version Filter	Vendor Filter	Access Filter	Owner Filter	System Filter	Status	Percent Complete
□	DASD Preparation	Sample demonstrating variable substitution and wizards	1.0	IBM ITSO	Public	harjans	WTSCPLX8.SC81	In Progress	0%
☑	DASD 2 test	Sample demonstrating variable substitution and wizards	1.0	IBM ITSO	Public	tobias	WTSCPLX8.SC81	✓ Complete	100%
□	Add a TSO User - Workflow_0	Add a TSO User	1.0	IBM ITSO	Public	mikemor	WTSCPLX8.SC80 (SC80_001)	In Progress	20%
□	Sample demonstrating sub-steps and dependencies - Workflow_0	Sample demonstrating sub-steps and dependencies	1.0	IBM	Public	davisrd	WTSCPLX8.SC80 (SC80_001)	In Progress	0%
□	Sample demonstrating sub-steps and dependencies - Workflow_1	Sample demonstrating sub-steps and dependencies	1.0	IBM	Public	davisrd	WTSCPLX8.SC80 (SC80_001)	In Progress	0%
□	z/OS Communications Server: IP Security with IKE - Workflow_0	z/OS Communications Server: IP Security with IKE	1.0	IBM	Public	davisrd	WTSCPLX8.SC80 (SC80_001)	In Progress	0%
□	Add a TSO User - ANHO Test	Add a TSO User	1.0	IBM ITSO	Public	anhorn	WTSCPLX8.SC80 (SC80_001)	In Progress	0%
□	Add a TSO User - Workflow_1	Add a TSO User			Public	vincent	WTSCPLX8.SC81	In Progress	0%
□	mein test	Add a TSO User	1.0	IBM ITSO	Public	harjans	WTSCPLX8.SC80 (SC80_001)	In Progress	0%

Figure 7-2 Workflow window

7.4.1 Column descriptions

The columns in the main workflow window are listed in Table 7-1.

Table 7-1 Workflow columns

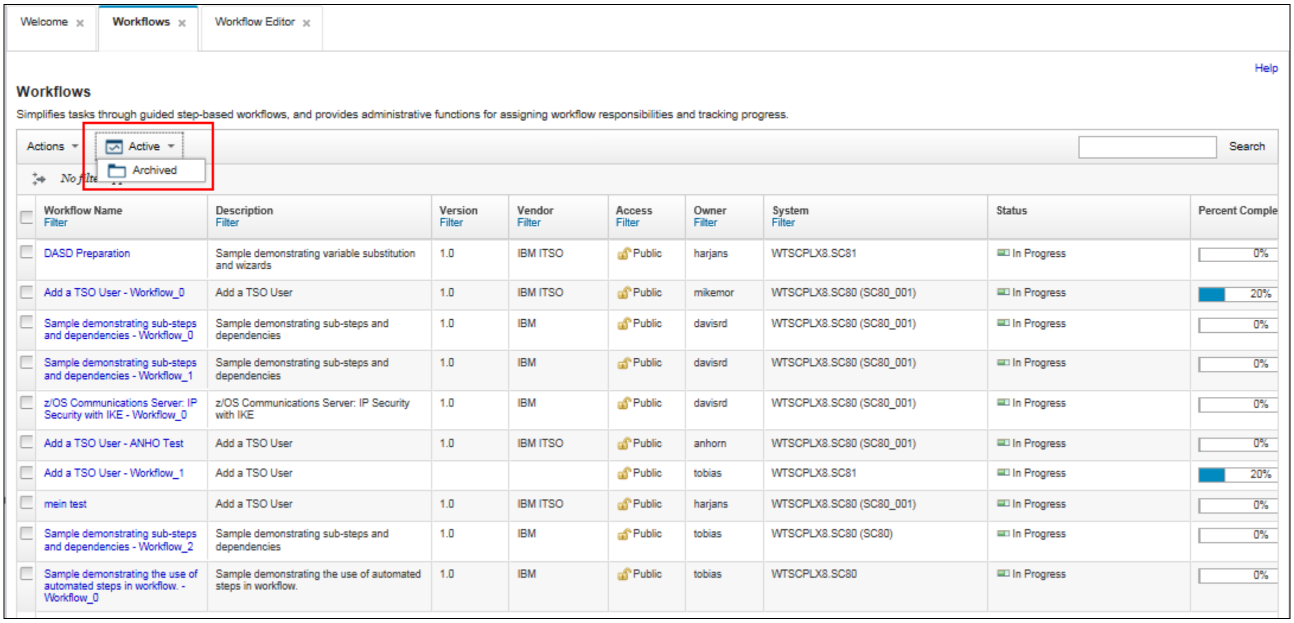
Column	Description
Workflow Name	A descriptive name that identifies the workflow, as specified by the workflow owner. By default, this column is the sort column, and the sort is ascending.
Description	Description of the workflow. z/OSMF obtains this value from the workflow definition file when the workflow is created.
Version	Version of the workflow definition. z/OSMF obtains this value from the workflow definition file when the workflow is created.
Vendor	Name of the vendor that provides the workflow definition. z/OSMF obtains this value from the workflow definition file when the workflow is created.
Owner	User ID of the workflow owner. This value can be modified by the workflow owner only.
System	z/OS system on which the workflow is to be used. This value is specified when the workflow is created.

Column	Description
Access	Access type of the workflow. This value determines which users can view the workflow steps and edit the step notes. One of the following values is displayed: ► Public The workflow notes, steps, and step notes can be viewed by all z/OSMF users. ► Restricted The workflow notes, steps, and step notes can be viewed by the workflow owner, step owners, and step assignees only. ► Private The workflow notes can be viewed by the workflow owner. The steps and step notes can be viewed by the step owner or step assignees for the particular step only.
Status	Indication of the current workflow status. One of the following values is displayed: ► In Progress One or more steps in the workflow are started. ► Automation in Progress Workflow contains an automated step that is running. ► Complete Workflow is complete and all steps are marked complete or skipped. ► Locked Workflow is locked for an update operation. ► Canceled Workflow is canceled and cannot be performed. However, you can view its properties or delete it.
Percent Complete	Percentage of the workflow that is complete.

7.4.2 Archived workflows

You can archive any workflows that are completed or you no longer need. Doing so removes the workflow from the Workflows table and places it in an archive for your reference.

An archived workflow is no longer active, but its information can be viewed by you at any time. When you no longer want to retain an archived workflow, you can delete it permanently from z/OSMF. How to display Archived or Active Workflows is shown in Figure 7-3 on page 144.



Workflows

Simplifies tasks through guided step-based workflows, and provides administrative functions for assigning workflow responsibilities and tracking progress.

□	Workflow Name Filter	Description Filter	Version Filter	Vendor Filter	Access Filter	Owner Filter	System Filter	Status	Percent Comple
□	DASD Preparation	Sample demonstrating variable substitution and wizards	1.0	IBM ITSO	Public	harjans	WTSCPLX8.SC81	In Progress	0%
□	Add a TSO User - Workflow_0	Add a TSO User	1.0	IBM ITSO	Public	mikemor	WTSCPLX8.SC80 (SC80_001)	In Progress	20%
□	Sample demonstrating sub-steps and dependencies - Workflow_0	Sample demonstrating sub-steps and dependencies	1.0	IBM	Public	davisrd	WTSCPLX8.SC80 (SC80_001)	In Progress	0%
□	Sample demonstrating sub-steps and dependencies - Workflow_1	Sample demonstrating sub-steps and dependencies	1.0	IBM	Public	davisrd	WTSCPLX8.SC80 (SC80_001)	In Progress	0%
□	z/OS Communications Server: IP Security with IKE - Workflow_0	z/OS Communications Server: IP Security with IKE	1.0	IBM	Public	davisrd	WTSCPLX8.SC80 (SC80_001)	In Progress	0%
□	Add a TSO User - ANHO Test	Add a TSO User	1.0	IBM ITSO	Public	anhorn	WTSCPLX8.SC80 (SC80_001)	In Progress	0%
□	Add a TSO User - Workflow_1	Add a TSO User			Public	tobias	WTSCPLX8.SC81	In Progress	20%
□	mein test	Add a TSO User	1.0	IBM ITSO	Public	harjans	WTSCPLX8.SC80 (SC80_001)	In Progress	0%
□	Sample demonstrating sub-steps and dependencies - Workflow_2	Sample demonstrating sub-steps and dependencies	1.0	IBM	Public	tobias	WTSCPLX8.SC80 (SC80)	In Progress	0%
□	Sample demonstrating the use of automated steps in workflow. - Workflow_0	Sample demonstrating the use of automated steps in workflow.	1.0	IBM	Public	tobias	WTSCPLX8.SC80	In Progress	0%

Figure 7-3 Display Active or Archived Workflows

Complete the following steps to archive a workflow:

1. In the Workflows table, select the workflow to be archived. You can select more than one workflow at a time.
2. From the Actions menu or pop-up menu, select **Archive**. The Archive Workflow window is opened. Listed in the Selected Workflows field are the workflows that you are about to archive.
3. Click **OK** to archive the selected workflows.

7.5 Creating a workflow instance

Depending on the context that is used, a workflow might be one of the following items:

- An activity that is associated with the z/OS system, such as configuring a component or product.
- The instantiation of a workflow in z/OSMF, based on a workflow definition.

A workflow consists of one or more units of work to be performed on the z/OS system, as described by the workflow definition (which is one or more XML files that describe and define the workflow). A workflow instance is created when the Workflows task is used to create an instance of a workflow from a supplied workflow definition file.

In the following sections, the term *workflow* is used synonymously for a workflow instance when a workflow instance that is instantiated by the Create a Workflow action is described.

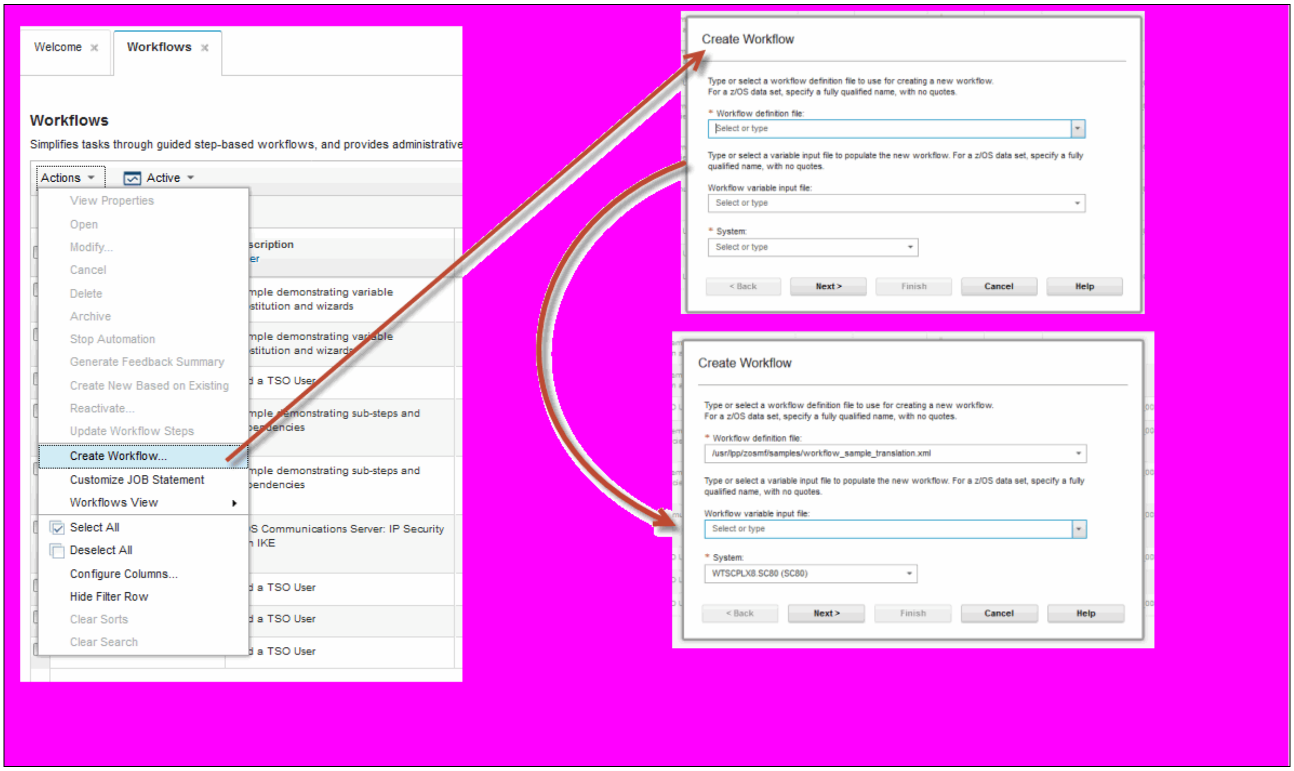
This section does not describe creating your own XML file (workflow definition file). For more information about an example XML file is in 7.6, “Creating your own workflow: An example” on page 152.

For this section, we use the sample that is provided by z/OSMF in the UNIX System Services file `/usr/lpp/zosmf/samples/workflow_sample_substeps.xml`.

7.5.1 Workflow creation procedure

To create the workflow, complete the following steps:

1. From the Actions menu, select **Create Workflow**. The Create Workflow window opens, as shown in Figure 7-4.



Simplifies tasks through guided step-based workflows, and provides administrative

Type or select a workflow definition file to use for creating a new workflow.
For a z/OS data set, specify a fully qualified name, with no quotes.

* Workflow definition file: Select or type

Type or select a variable input file to populate the new workflow. For a z/OS data set, specify a fully qualified name, with no quotes.

Workflow variable input file: Select or type

* System: Select or type

Type or select a workflow definition file to use for creating a new workflow.
For a z/OS data set, specify a fully qualified name, with no quotes.

* Workflow definition file: /usr/lpp/zosmf/samples/workflow_sample_translation.xml

Type or select a variable input file to populate the new workflow. For a z/OS data set, specify a fully qualified name, with no quotes.

Workflow variable input file: Select or type

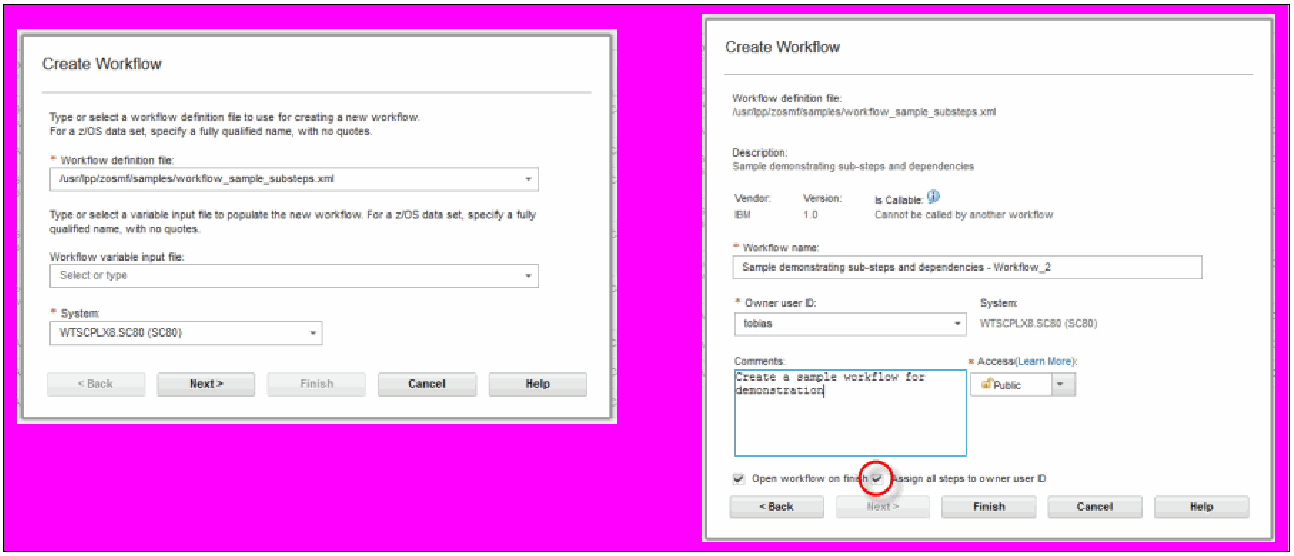
* System: WTSCPLX8.SC80 (SC80)

Figure 7-4 Creating a workflow

a. Select a workflow definition file from the list, or enter the name of a workflow definition file that is on the z/OS system on which z/OSMF is running. Consider the following points:

- Your user ID requires at least READ authority to the workflow definition file.
- If the workflow definition file is in a data set member, enter or select the fully qualified data set name, including the member name. Ensure that this data set is cataloged. It is not necessary to enclose the data set name in single quotation marks; z/OSMF ignores the quotation marks if you include them.
- If the workflow definition file is in a z/OS UNIX file, enter or select the fully qualified path name of the file, beginning with the forward slash (/) and including the file name; for example, `/usr/lpp/zosmf/samples/workflow_sample_basic.xml`.

b. To continue, click **Next** and you should see a window similar the window that is shown in Figure 7-5.



Create Workflow

Type or select a workflow definition file to use for creating a new workflow.
For a z/OS data set, specify a fully qualified name, with no quotes.

* Workflow definition file: /usr/lpp/zosmf/samples/workflow_sample_substeps.xml

Type or select a variable input file to populate the new workflow. For a z/OS data set, specify a fully qualified name, with no quotes.

Workflow variable input file: Select or type

* System: WTSCPLX8.SC80 (SC80)

Create Workflow

Workflow definition file:
/usr/lpp/zosmf/samples/workflow_sample_substeps.xml

Description:
Sample demonstrating sub-steps and dependencies

Vendor: IBM
Version: 1.0
Is Callable: Cannot be called by another workflow

* Workflow name: Sample demonstrating sub-steps and dependencies - Workflow_2

* Owner user ID: tobias

System: WTSCPLX8.SC80 (SC80)

Comments: Create a sample workflow for demonstration

* Access(Learn More): Public

☑ Open workflow on finish ☑ Assign all steps to owner user ID

Figure 7-5 Creating a workflow

c. Complete the following steps:

i. Enter a descriptive name for the workflow in the Workflow name field. This field is initialized with a predetermined name for the workflow, which is based on the following convention:

`<workflow-description>—Workflow_<number>`

where:

- Workflow-description is the description from the workflow definition file.
- Number is the first available number, beginning at 0. If you later delete this workflow, its number can be reused by the Workflows task.

You can accept this name, or enter a name of your own choosing. The workflow name includes the following characteristics:

- Must be unique in the Workflows task.
- Can contain up to 100 characters.
- Is not case-sensitive; for example, MyWorkflow and MYWORKFLOW are the same workflow.

ii. In the Owner user ID field, specify the user ID of the person who holds the overall responsibility for completing the workflow. Select a user ID from the list, which contains up to 10 previously specified user IDs. Otherwise, enter the user ID as it is defined to your z/OS security management product, such as RACF. A valid user ID consists of 1 - 8 alphanumeric characters (A - Z, a - z, 0 - 9, #, $, and @).

    This field defaults to your user ID.

iii. In the System name field, select the name of the system to which this workflow applies. Any jobs or scripts in the workflow can run on this system. Similarly, any work that you perform manually for the workflow should be done on this system.

    This field is a drop-down menu that includes the systems that are defined to z/OSMF. You cannot type over the system names. This field defaults to the z/OS system on which z/OSMF is running.

iv. In the Comments field, you can optionally enter any information that you want to associate with this action (up to 500 characters). Your comment is added to the existing comments in the workflow history.

v. Select **Open workflow on finish** if you want to be brought to the Steps page for the newly created workflow upon completion of the Create workflow action. Otherwise, clear this option. By default, this option is selected.

vi. Select **Assign all steps to owner user ID** if you want all of the steps to be assigned to, and accepted by, the workflow owner upon creation of the workflow. Otherwise, leave this option cleared (which is the default).

vii. Select **Access** if you want to change the workflow access type:

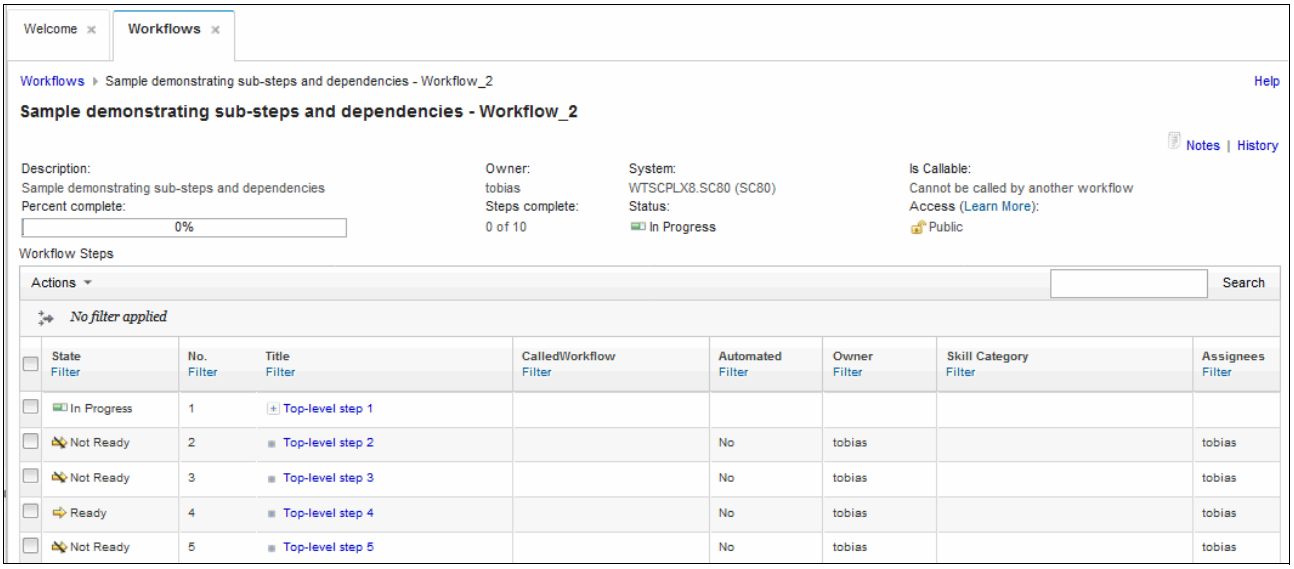
- Public access allows all z/OSMF users to view the workflow information.
- Restricted access allows workflow owner, step owners, and step assignees to view the workflow information. Other users cannot access this information.
- Private access is restricted to a subset of users, and is further limited among these users. Workflow information is accessible to the workflow owner. The steps information is accessible to the step owner and step assignees for the particular step. Other users cannot access this information.

2. Click **Finish** to create the workflow.

If you selected the **Open workflow on finish** option, the Steps window for the new workflow opens. Otherwise, the workflow is displayed in the Workflows table on the Workflows window.

In our example, we selected **Select Open workflow on finish** and our new workflow is shown (see Figure 7-6). If the **Select Open workflow on finish** option is not selected, the main workflow display opens.

As shown in Figure 7-6, the Owner and Assignee fields are assigned to `mikemor`.


Welcome ×
Workflows ×
Workflows ▸ Sample demonstrating sub-steps and dependencies - Workflow_2
Help
Notes | History
Actions ▾
Search
No filter applied

Sample demonstrating sub-steps and dependencies - Workflow_2

Description:
Sample demonstrating sub-steps and dependencies
Percent complete:
0%

Owner:
tobias
Steps complete:
0 of 10

System:
WTSCPLX8.SC80 (SC80)
Status:
In Progress

Is Callable:
Cannot be called by another workflow
Access (Learn More):
Public

Workflow Steps

□	State Filter	No. Filter	Title Filter	CalledWorkflow Filter	Automated Filter	Owner Filter	Skill Category Filter	Assignees Filter
□	In Progress	1	+ Top-level step 1					
□	Not Ready	2	Top-level step 2		No	tobias		tobias
□	Not Ready	3	Top-level step 3		No	tobias		tobias
□	Ready	4	Top-level step 4		No	tobias		tobias
□	Not Ready	5	Top-level step 5		No	tobias		tobias

Figure 7-6 New workflow window with the initial display of steps

7.5.2 Workflow step assignment procedure

As it stands, the user ID `tobias` is responsible for completing the tasks. However, because `mikemor` is the owner of the task, `mikemor` can assign any or all the tasks to another z/OSMF group or individual user. For example, if step 3 should be performed by another user in a different group, the step can be assigned to a different z/OSMF group, or by user. In this case, we want to assign step 3 to HARJANS. The user in question must have access to z/OSMF and the Workflow task.

To assign the workflow steps, complete the following steps:

1. In the Workflow Steps table, select the steps for which assignees are to be added. You can select multiple steps.
2. From the Actions menu, select **Add Assignees**. The Add Assignees window opens.
3. In the Selected Steps table, review the selected steps to ensure that the table includes only the steps that you want to assign.
4. In the Available assignees table, verify that the user IDs and groups to be assigned are included. To add user IDs and groups to the table, complete the following steps:
   a. In the Available assignees table, click **Add**. The Add SAF user ID or SAF group window opens.
   b. Select the SAF user ID or SAF group, as needed. SAF user ID is selected by default.
   c. Specify the user ID or group name.
   d. Click **OK** to add your selection to the Available assignees table.
   e. Repeat steps 4a - 4d to add users and groups to the Available assignees table. When the Available assignees table contains all of the users and groups that you want to assign to the selected steps, proceed to the next step.
5. On the Add Assignees window, complete the following steps:
   a. In the Available assignees table, indicate which users are to be assigned to the step by selecting the appropriate user IDs and groups.
   b. Click **Add** or **Add All** to transfer your selections to the Assignees to be added field.
   c. To undo any selections, select the applicable user IDs and groups in the Assignees to be added field and click **Remove** or **Remove All**.
6. Optionally, enter a comment (up to 500 characters) in the Comments field to document this action.
7. Select whether to send z/OSMF notifications to the assignees. This option is selected by default. If a user was assigned a particular step and sent a notification, selecting this option sends a new notification to the user when the step is assigned.
8. Click **OK** to complete the assignment.

7.5.3 Notifications

A z/OSMF notification is a notice of some occurrence in the system that requires your awareness or response. A notification can be informational in nature, or it can be a request for action from another z/OSMF task.

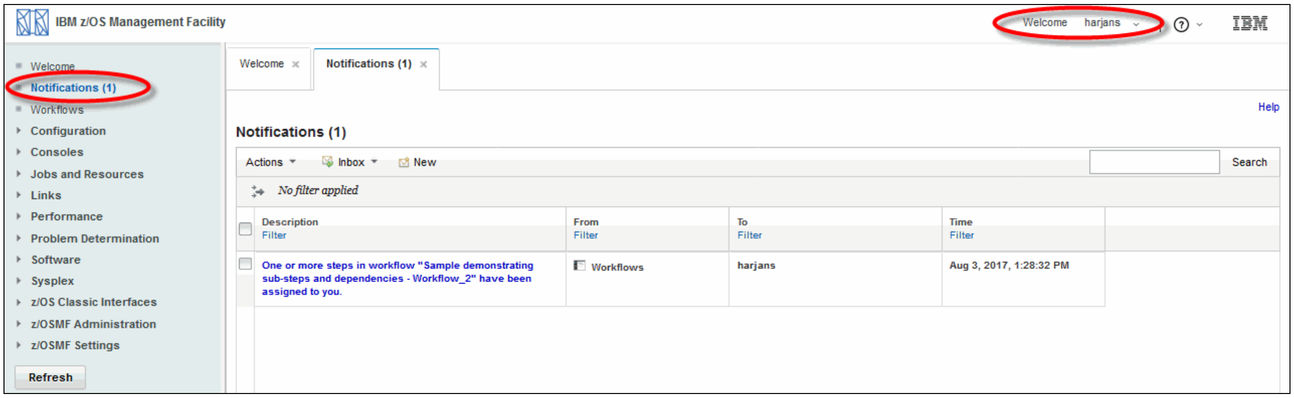
You might receive notifications that were assigned to the following items:

- Your user ID specifically
- A security group to which your user ID is connected, as defined through your security management product, such as RACF
- A z/OSMF role to which your user ID is assigned

If unread notifications are available, the Notifications task is shown in bold in the navigation area with the number of unread notifications; otherwise, the Notifications task is shown without emphasis in the navigation area.

Select the Notifications task in the navigation area to see your notifications. In this task, each notification is displayed as a row in the Notifications table.

After you act on a notification, mark it as read or delete it. A notification is no longer shown in bold when it is marked as read. You can modify multiple notifications at one time, as shown in Figure 7-7.



☐ Description Filter	From Filter	To Filter	Time Filter
☐ One or more steps in workflow "Sample demonstrating sub-steps and dependencies - Workflow_2" have been assigned to you.	Workflows	harjans	Aug 3, 2017, 1:28:32 PM

Figure 7-7 Notifications area

Some notifications provide a hyperlink to a z/OSMF task that requires further action. If a notification is displayed as a hyperlink, you can click the link to start the task in a new tab or window, or you can select the notification in the Notifications table and select **Go to Task** from the Actions menu.

The Notifications task is displayed for all authenticated users. Unauthenticated guest users cannot access this task.

Regardless of whether you access your notifications, z/OSMF deletes them automatically after a period elapses, or if a maximum number of notifications is reached for your installation. These threshold settings are controlled by the following Advanced Configuration settings that are listed in Table 7-2.

Table 7-2 Advanced Configuration settings: thresholds

izuadmin.env variable	Description	Allowable values	Default
`izunotifcationsmax`	Maximum number of z/OSMF user notifications that can be created for your installation.	1 - 1000	500
`izunotifcationexpiration`	Expiration (in days) for z/OSMF user notifications at your installation.	0 - 1825	30

These settings are not part of the configuration file and changes must be done by another file. Create a file that is named `/var/zosmf/configuration/local_override.cfg` and add the following lines:

```
IZU_NOTIFICATION_EXPIRATION=30
IZU_NOTIFICATION_MAXIMUM=500
```

Change these values to your preferences. After saving the `local_override.cfg` file, you must restart the IZUSVR1 task for the notification changes to take effect.

The columns in the Notifications table are listed Table 7-3. For more information about the actions that you can take for notifications, see “Actions for notifications”.

Table 7-3 Columns in the Notifications table

Column	Description
Description	Description text for the notification. This value can be a hyperlink to a task in z/OSMF. To start the task, click the hyperlink.
From	Name of the z/OSMF task that created the notification. If the notification is started from a z/OSMF task, the value of this column is the task name. If the notification is started from a z/OSMF user, the value of this column is the user ID.
To	The users, groups, and roles to which the notification was sent.
Time	Time when the notification was created, based on the locale and time zone setting for your browser.

Actions for notifications

The following notification actions are available:

- Targeted actions. These actions apply to the selected items. To use a targeted action, you must select one or more items. These actions are listed in Table 7-4.
- Table actions. These actions apply to the entire table, such as sorting and filtering. No selection is required.

Table 7-4 Targeted actions

Action	Description
Go to Task	This action is enabled if the description field is a hyperlink to the z/OSMF task that created the notification. Select this action to start the task, or click the hyperlink. Otherwise, this action is not available.
Mark as Read	Mark the selected notification as read.
Mark as Unread	Mark the selected notification as unread.
Delete	Delete the selected notification from your Notifications table. If the notification was sent to other user IDs, groups, or roles, the notification remains available to those other recipients. If no other users are recipients for the notification, it is permanently deleted from z/OSMF.

Action	Description
New	Clicking this action open a window in which the user creates a notification. The window includes user input fields that consisting of subject, to, body, and attachment. After the successful completion of a notification, the user returns to the notifications mail page with the newly created item now added to the table. The value of the Description column of the new item is the subject.
Sent	Clicking this action allows a user to view the notifications that they sent. It shows the description of the notification, who the notification was sent to, and the time that the notification was sent.

7.6 Creating your own workflow: An example

In this example, we chose to use a single XML definition file to create a workflow that gathers the input that is needed to define a user ID on z/OS. The result of the workflow is several jobs that cover all of the typical definitions that are required for a new TSO user. The jobs can be submitted and the output that is viewed within the z/OSMF Workflows task.

Snippets of the definition file are shown to illustrate particular sections of the XML document structure; for example, document declarations, variable definitions, and step definitions.

The full XML file is shown in Example 7-7 on page 162, and the JCL templates that are used are shown in Example 7-8 on page 169, Example 7-9 on page 170, Example 7-10 on page 170, Example 7-11 on page 170, and Example 7-12 on page 170. These files can also be downloaded, as described in Appendix D, “Additional material” on page 579.

For more information about the material in this section and XML, see Chapter 2, “Creating workflow definitions for z/OS” of *z/OSMF Version 2 Release 3 Programming Guide*, SC27-8420.

7.6.1 Editing XML

Although it is possible to edit XML files on z/OS, it is more convenient (and more functions are available) to use a workstation XML-enabled editor. Typically, these features include schema validation, which verifies your XML’s elements and attributes against those elements that are declared in the z/OSMF supplied schema.

In our case, we used Notepad++ with its XML tools plug-in on a Windows workstation.

XML validation

To use Notepad++ XML validation (which is started by clicking **Plugins** → **XML Tools** → **Validate Now**), you must have the schema in the same workstation directory as the XML file that is being edited.

Download the z/OSMF supplied schema file in binary format from the default location of `/usr/lpp/zosmf/workflow/schemas/workflow_v1.xsd` to the directory on your workstation where you create your Workflows XML files.

Note: The `workflow_v1.xsd` file is stored on z/OS in ASCII format and must be downloaded to your workstation as a binary transfer.

7.6.2 Components of the example workflow XML file

This section describes the components of the example workflow XML file.

Declaration statements

The following section describes the statements that are shown in Example 7-1.

Example 7-1 Declarations

```
<?xml version="1.0" encoding="UTF-8"?>

<workflow xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
                        xsi:noNamespaceSchemaLocation="workflow_v1.xsd">

<!-- ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
     This sample demonstrates the use of instructions and wizards that use input
     variables.
     ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
-->
```

<?xml defines the XML version and encoding that is used, which normally is not changed.

The workflow start is defined by the <workflow element and is ended by a </workflow> element (not shown in the example) at the end of the file. On the same line, xmlns:xsi defines the schema namespace (to avoid naming conflicts) and xsi:noNamespaceSchemaLocation defines the schema file location and name. In this case, the location is relative, which is why the XML and schema must be in the same directory for validation to work, which normally is not changed.

<!-- denotes a comment, which is ended by -->.

Workflow information statements

Example 7-2 shows the <workflowInfo> elements, which provide descriptive information that is used in z/OSMF workflows displays. A </workflowInfo> element ends these elements. All of the following elements (except for the <Configuration> element that is shown in Example 7-2) are required:

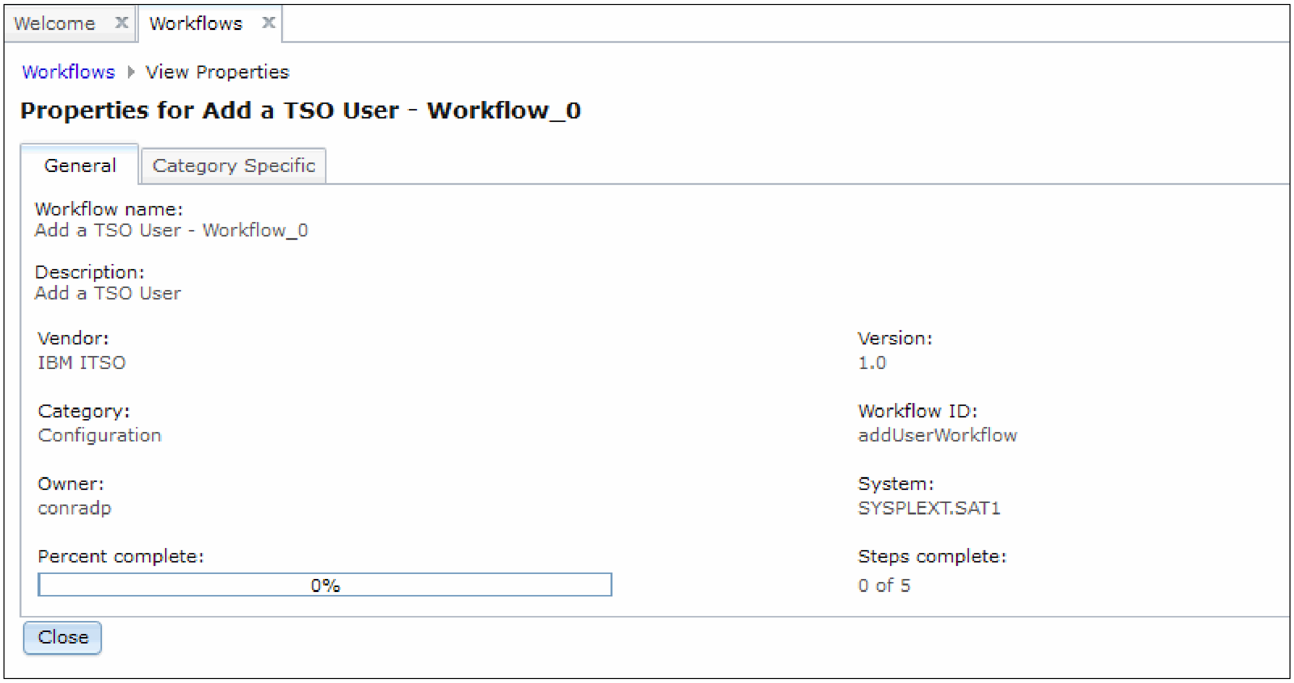
- <workflowID>: An identifier for the workflow.
- <workflowDescription>: A short description.
- <workflowVersion>: A version number of this workflow.
- <vendor>: The workflow provider.

Example 7-2 Workflow information

```
<workflowInfo>
 <workflowID>addUserWorkflow</workflowID>
 <workflowDescription>Add a TSO User</workflowDescription>
 <workflowVersion>1.0</workflowVersion>
 <vendor>IBM ITSO</vendor>
 <Configuration>
  <productID>99999</productID>
  <productName>ITSO General Workflow</productName>
  <productVersion>Version 1</productVersion>
  </Configuration>
</workflowInfo>
```

The `<Configuration>` elements are optional and are for use when the workflow configures a specific piece of software. Configuration metadata specifies information about the product being configured.

A z/OSMF workflows properties display that uses this workflow information is shown in Figure 7-8.



Properties for Add a TSO User - Workflow_0

Workflow name:
Add a TSO User - Workflow_0

Description:
Add a TSO User

Vendor:
IBM ITSO

Version:
1.0

Category:
Configuration

Workflow ID:
addUserWorkflow

Owner:
conradp

System:
SYSPLEXT.SAT1

Percent complete:
0%

Steps complete:
0 of 5

Figure 7-8 Workflow properties display

Variables

Example 7-3 shows the declaration of a variable with the name `tsoUser`. The `<label>` and `<abstract>` elements define the prompts that are displayed on the user's input window. The `<description>` element defines the text that is displayed when the user clicks the information icon for the field. For more information, see Figure 7-12 on page 160.

Note: Variables might include a scope of *instance* (available to this workflow only) or *global* (available to any workflow). We used the default of instance by not specifying a scope.

Example 7-3 tsoUser variable

```
<!-- Declare variables -->

<!-- Category ADDUSER variables -->

<variable name="tsoUser">
 <label>TSO user ID</label>
 <abstract>The user ID for a TSO User</abstract>
 <description>The 7 character TSO user ID being created</description>
 <category>ADDUSER</category>
 <string>
  <validationType>TSOUSERID</validationType>
  <default>XXXXXXX</default>
 </string>
</variable>
```

The `<category>` element defines a logical grouping of variables. All variables of the same category are displayed on the same web page at the input stage of the workflow.

The `<string>` element defines the element type and associated attributes. For more information about the following acceptable element types and their meanings, see “Defining variables for your workflow” in *z/OSMF Version 2 Release 3 Programming Guide*, SC27-8420:

- Boolean
- String
- Integer
- Decimal
- Time
- Date

The `<default>` element provides a default value for the input field.

The `<validationType>` element defines the type of validation that is performed on the input. In our example, we use a validation type that is called `TSOUSERID`, which is defined in the `workflow_v1.xsd` file by using a regular expression.

The available validation types are listed in Table 21, “Variable definition elements and types summary” in *z/OSMF Version 2 Release 3 Programming Guide*, SC27-8420. Alternatively, you can examine the schema `validationType` elements and interpret the regular expressions to determine their purpose.

Several other forms of input validation are used, two examples of which are shown here. The maximum input length, which restricts a user’s name to 20 characters, is shown in Example 7-4.

Example 7-4 Maximum length validation

```
<variable name="userName">
 <label>User Name</label>
 <abstract>Name of user for TSO ID</abstract>
 <description>The real name of the person for whom the TSO ID is being
created.</description>
 <category>ADDUSER</category>
 <string>
 <maxLength>20</maxLength>
 </string>
</variable>
```

A more complex Regular Expression validation to impose password rules (see comments in the code) is shown in Example 7-5.

Example 7-5 Regular Expression validation

```
<variable name="password">
 <label>Password</label>
 <abstract>The initial password for the user</abstract>
 <description>Password must be 8 characters and contain at least 1 number, 1 uppercase, 1
lowercase and 1 of these special characters @#$%</description>
 <category>ADDUSER</category>
 <string>
 <!--    Regular Expression meaning                                             -->
 <!--    ^(                     Begin input group                              -->
 <!--    (?=.*\d)               Must contain at least 1 digit                  -->
 <!--    (?=.*[a-z])            Must contain at least 1 lowercase char         -->
 <!--    (?=.*[A-Z])             Must contain at least 1 uppercase char          -->
 <!--    (?=.*[@#$%])            Must contain at least 1 special char from list  -->
 <!--    )$                      End input group                                 -->
 <!--                                                                            -->
 <regularExpression>
 ^((?=.*\d)(?=.*[a-z])(?=.*[A-Z])(?=.*[@#$%]).{8,8})$
 </regularExpression>
 </string>
</variable>
```

Workflow steps

Example 7-6 shows the definition of a step that the Workflows wizard uses to guide the user through the first part of the process. Our example includes the following steps:

1. Define a user ID to RACF.
2. Add a RACF data set profile.
3. Define a zFS for the user ID's UNIX System Services home directory.
4. Format the zFS.
5. Copy a sample profile into the user ID's UNIX System Services home directory.

Example 7-6 Step definition

```
<step name="define_user">
      <title>Define RACF User using JCL job</title>
      <description>
      Submit a job to define a RACF User.
      </description>
         <variableValue name="tsoUser" required="true"/>
         <variableValue name="userName" required="true"/>
         <variableValue name="password" required="true"/>
         <variableValue name="owningTsoUser" required="true"/>
         <variableValue name="userDefaultGroup" required="true"/>
         <variableValue name="procName" required="true"/>
         <variableValue name="accountNumber" required="true"/>
         <variableValue name="minSize" required="true"/>
         <variableValue name="maxSize" required="true"/>
         <variableValue name="unitName" required="true"/>
         <variableValue name="homeDir" required="true"/>
         <variableValue name="omvsProgram" required="true"/>
      <instructions substitution="false">
This job issues RACF commands to add a user through a batch job.<br/>You will be given the
opportunity to save a copy of the JCL <em>after</em> you have inspected it for your
approval.
      </instructions>
      <weight>10</weight>
      <skills>Basic JCL</skills>
      <template>
         <fileTemplate substitution="true">
            adduser.template
         </fileTemplate>
      <submitAs>JCL</submitAs>
   <!-- Specifying <saveAsDataset> with a value primes the save-as prompt with the value
   specified here.  The value contains a variable reference.  The user can still save
   to a UNIX file if he wants to, but the widget will not be primed with a value.    -->
      <saveAsDataset substitution="true">CONRADP.JCL(ZOSMFJCL)</saveAsDataset>
      </template>
</step>
```

The user is prompted to enter data for variables with variableValue specified, with the wizard displaying one page for each category in the variable definition. For example, the tsoUser, userName, password, owningTsoUser, and userDefaultGroup variables are all defined with category ADDUSER (*<category>ADDUSER</category>*), so they I appear on the same input window.

The fileTemplate element defines that a template file is used for the JCL and that variable substitution is permitted. In this case, the template file is named adduser.template, the contents of which are shown in Example 7-8 on page 169.

The submitAs JCL element indicates that this job is a batch job, so the wizard guides the user through the process of creating a job card, and editing and saving the JCL.

The saveAsDataset element provides a default location for saving the JCL if that option is selected.

The step also includes instructions that are displayed for review after variables are input, but before editing and submission of the JCL. The skills category is a suggested value, which is meant for guidance as to who should perform the step. The weight element is an indication of the difficulty of the step and is used in calculating the percent complete.

7.6.3 Importing and running the example XML file

This section describes how to import and run the example XML file.

Transferring the file from the workstation

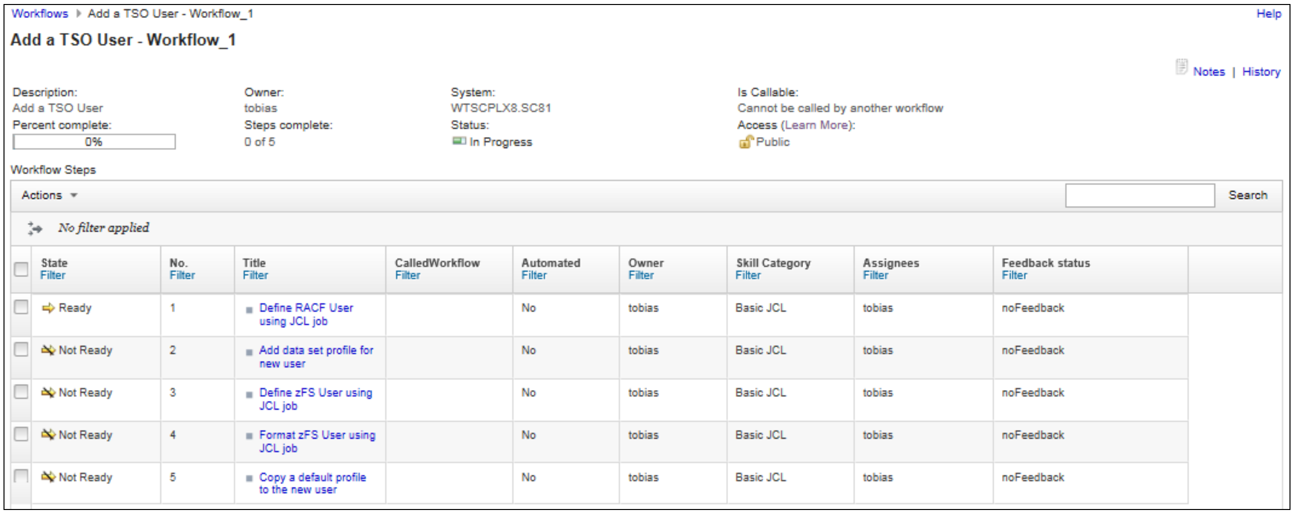
The XML file should be transferred in binary format from your workstation to a z/OS UNIX directory to which the z/OSMF server has READ access. The template files that are used by the example workflow should be transferred in text format if they were edited on your workstation. XML and template files should be in the same z/OS UNIX System Services directory. In our example, we chose to create a /var/zosmf/workflows directory on z/OS. The XML file is called adduser.xml.

Importing the XML file

The sample XML file is imported into the Workflows task by clicking the **Actions** drop-down menu and selecting **Create Workflow**. Enter /var/zosmf/workflows/adduser.xml in to the Workflow definition file field and click **Next**.

Accept all the predefined fields in the next window, select the **Assign all steps to owner user ID** option, and then, click **Finish**.

The steps that are defined in our example workflow are displayed, as shown in Figure 7-9 on page 158.



Workflows ▸ Add a TSO User - Workflow_1

Add a TSO User - Workflow_1

Description: Add a TSO User
Percent complete: 0%
Owner: tobias
Steps complete: 0 of 5
System: WTSCPLX8.SC81
Status: In Progress
Is Callable: Cannot be called by another workflow
Access (Learn More): Public

Workflow Steps

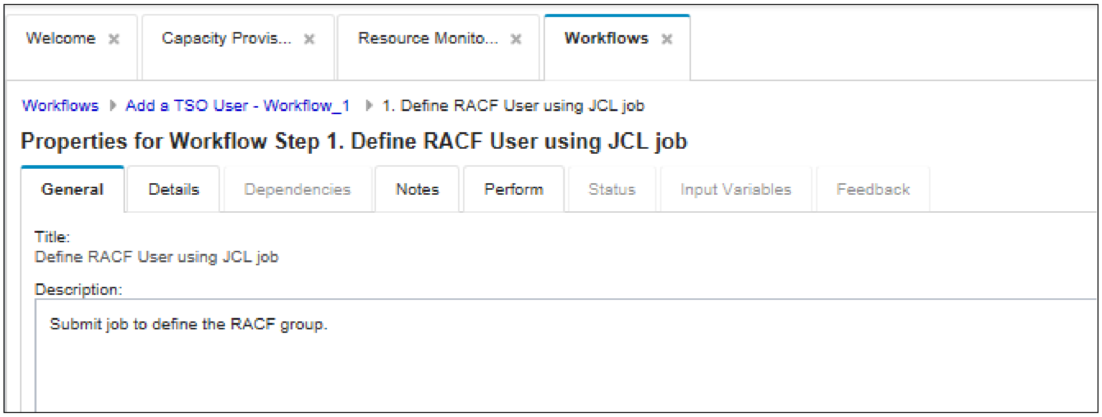
	State	No.	Title	CalledWorkflow	Automated	Owner	Skill Category	Assignees	Feedback status
□	Ready	1	Define RACF User using JCL job		No	tobias	Basic JCL	tobias	noFeedback
□	Not Ready	2	Add data set profile for new user		No	tobias	Basic JCL	tobias	noFeedback
□	Not Ready	3	Define zFS User using JCL job		No	tobias	Basic JCL	tobias	noFeedback
□	Not Ready	4	Format zFS User using JCL job		No	tobias	Basic JCL	tobias	noFeedback
□	Not Ready	5	Copy a default profile to the new user		No	tobias	Basic JCL	tobias	noFeedback

Figure 7-9 Adding a TSO User Workflow

As shown in Figure 7-9, Step 1, Define RACF User using JCL job, is in a Ready state and can be performed.

As shown in Figure 7-9, Steps 2 - 5 are in a Not Ready state, because they are defined as having prerequisite steps that are not complete. For example, the definition of Step 2 contains a `prereqStep name="define_user"` element, which refers to Step 1.

Double-click **Title Define RACF User using JCL job** to open Step 1. A window opens which shows five tabs, as shown in Figure 7-10.



Workflows ▸ Add a TSO User - Workflow_1 ▸ 1. Define RACF User using JCL job

Properties for Workflow Step 1. Define RACF User using JCL job

Title:
Define RACF User using JCL job

Description:
Submit job to define the RACF group.

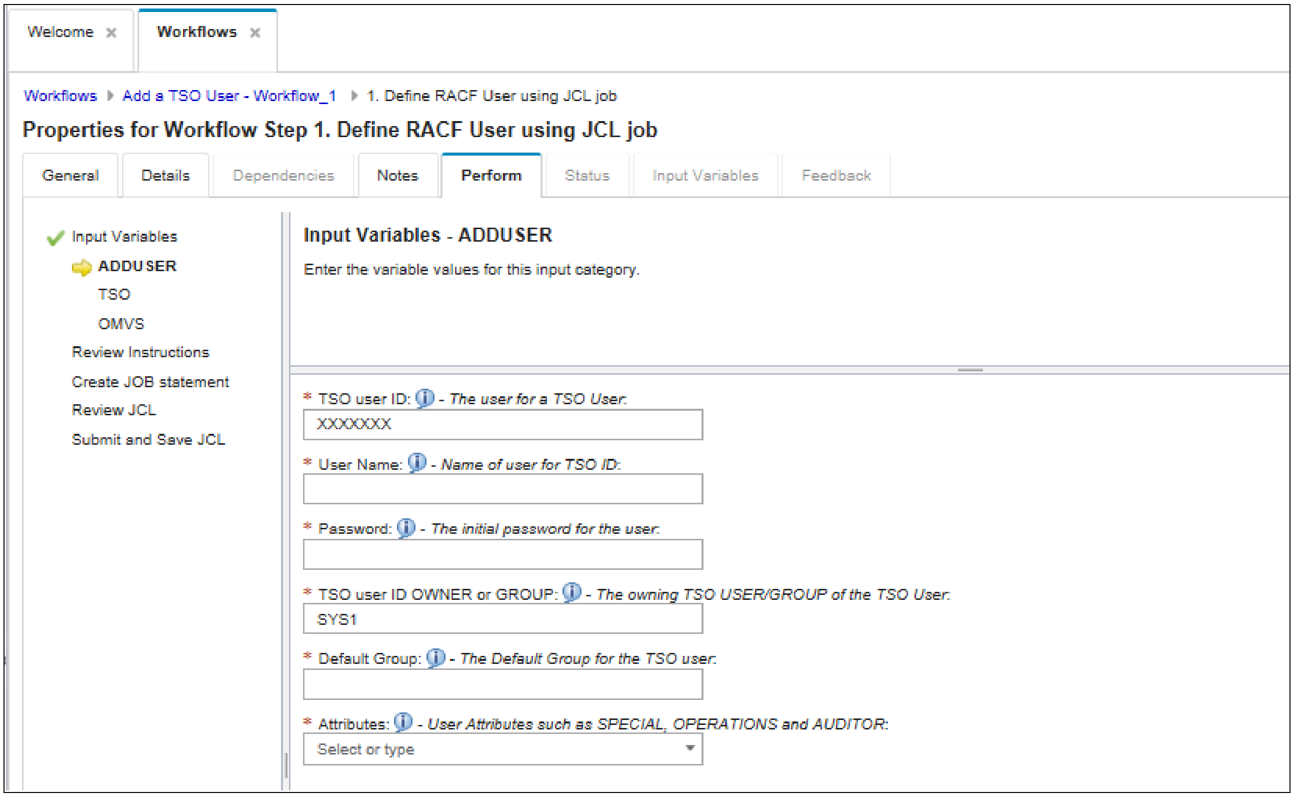
Figure 7-10 Workflow tabs

Consider the following points:

- The General tab shows the Title and Description (as defined in Example 7-6 on page 156 by the `<Title>` and `<Description>` elements).
- The Details tab shows State, Skill category (as defined in Example 7-6 on page 156), the `<skills>` element), Owner, and Assignees information.
- The Notes tab provides a scratchpad area for the user to enter and save notes.
- The Perform tab is where the wizard guides the user through variable input and job submission.
- The Status tab is disabled, no status is available to display at this stage.

Click the **Perform** tab to continue after you review the other tabs.

Figure 7-11 shows the Input Variables window for the category ADDUSER. The left pane shows the flow of this step and the progress that is made through it.



Properties for Workflow Step 1. Define RACF User using JCL job

Input Variables - ADDUSER

Enter the variable values for this input category.

* TSO user ID: - *The user for a TSO User.*
XXXXXXX

* User Name: - *Name of user for TSO ID:*

* Password: - *The initial password for the user.*

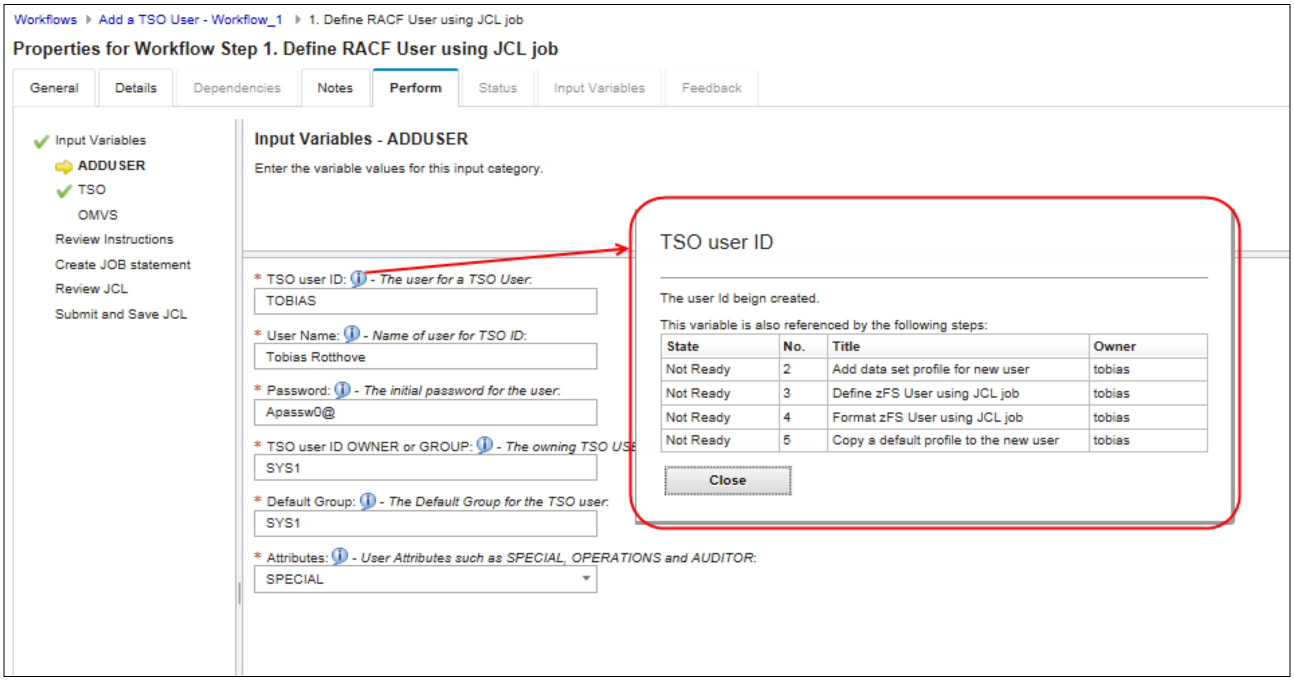
* TSO user ID OWNER or GROUP: - *The owning TSO USER/GROUP of the TSO User.*
SYS1

* Default Group: - *The Default Group for the TSO user.*

* Attributes: - *User Attributes such as SPECIAL, OPERATIONS and AUDITOR:*
Select or type

Figure 7-11 ADDUSER category input variables

The information buttons in each input field (a blue bubble with an "i" inside) provide more information about the variable by using its `<Description>` element, plus information about where it is referenced in other steps, as shown in Figure 7-12. You proceed to the TSO variables category by clicking **Next**.



Properties for Workflow Step 1. Define RACF User using JCL job

Input Variables - ADDUSER

Enter the variable values for this input category.

* TSO user ID: ⓘ - *The user for a TSO User.*
TOBIAS

* User Name: ⓘ - *Name of user for TSO ID:*
Tobias Rotthove

* Password: ⓘ - *The initial password for the user.*
Apassw0@

* TSO user ID OWNER or GROUP: ⓘ - *The owning TSO USE*
SYS1

* Default Group: ⓘ - *The Default Group for the TSO user.*
SYS1

* Attributes: ⓘ - *User Attributes such as SPECIAL, OPERATIONS and AUDITOR:*
SPECIAL

TSO user ID

The user Id beign created.

This variable is also referenced by the following steps:

State	No.	Title	Owner
Not Ready	2	Add data set profile for new user	tobias
Not Ready	3	Define zFS User using JCL job	tobias
Not Ready	4	Format zFS User using JCL job	tobias
Not Ready	5	Copy a default profile to the new user	tobias

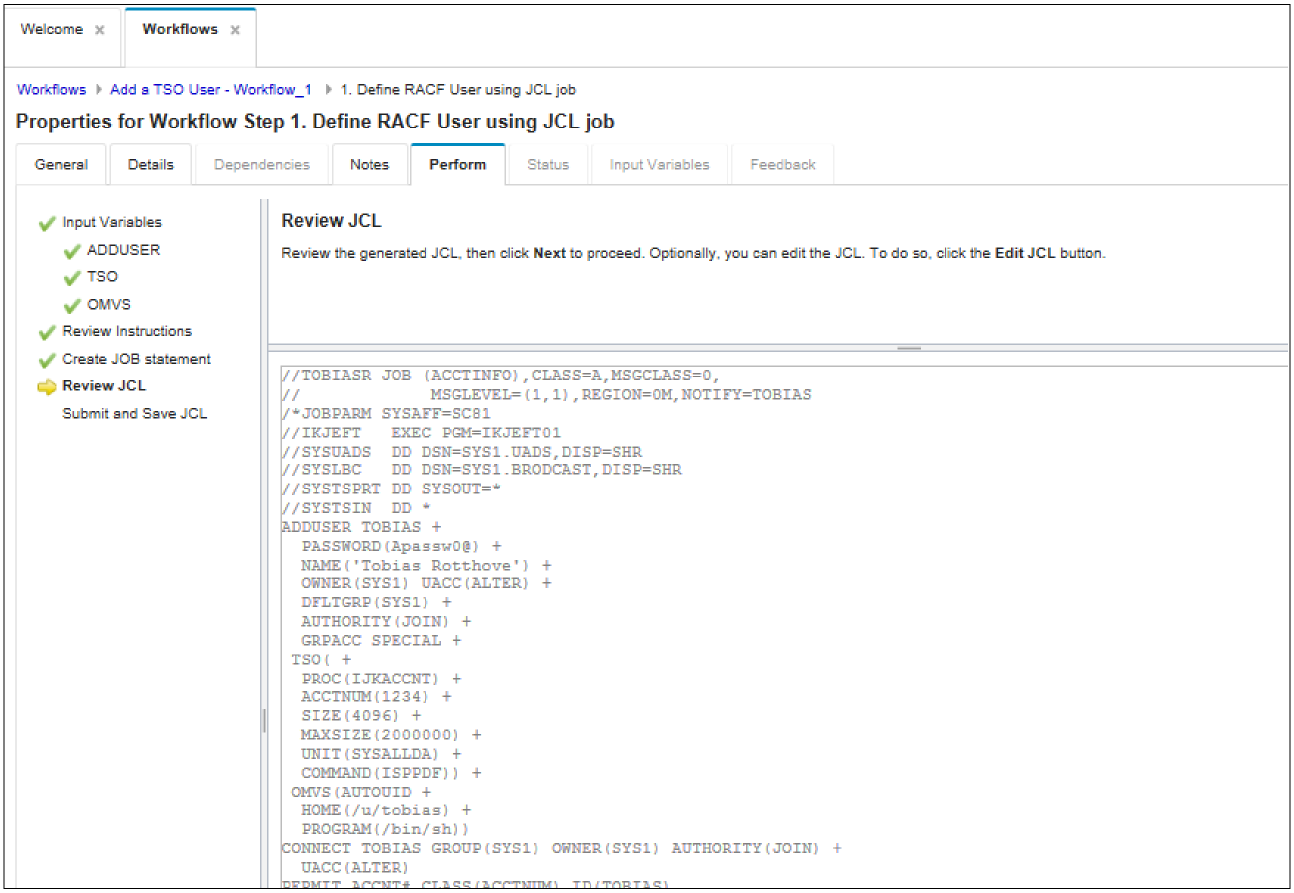
Figure 7-12 ADDUSER input fields and Information button display

After you enter data for the ADDUSER, TSO, and OMVS variables, a Review Instructions window opens. The instructions are defined by the `<instructions>` element of the step definition, as shown in Example 7-6 on page 156.

Click **Next** to continue with the JCL creation process.

> **Note:** Clicking **Finish** bypasses JCL creation and marks the step as complete. Although this action allows you to continue with the steps in our example, it is not the normal action. If you click `Finish` by mistake, you can return to Step 1 by clicking **Define RACF User using JCL job** and redo the step, even though it is marked as complete.

The Create Job Reference window opens, which includes a batch JOB statement that can be modified. Click **Next** to continue to the Review JCL window, as shown in Figure 7-13. The generated job can be changed by clicking **Edit JCL** and overwriting any of the statements.



Properties for Workflow Step 1. Define RACF User using JCL job

Review JCL

Review the generated JCL, then click **Next** to proceed. Optionally, you can edit the JCL. To do so, click the **Edit JCL** button.

```
//TOBIASR JOB (ACCTINFO),CLASS=A,MSGCLASS=0,
//             MSGLEVEL=(1,1),REGION=0M,NOTIFY=TOBIAS
/*JOBPARM SYSAFF=SC81
//IKJEFT   EXEC PGM=IKJEFT01
//SYSUADS  DD DSN=SYS1.UADS,DISP=SHR
//SYSLBC   DD DSN=SYS1.BRODCAST,DISP=SHR
//SYSTSPRT DD SYSOUT=*
//SYSTSIN  DD *
ADDUSER TOBIAS +
  PASSWORD(Apassw0@) +
  NAME('Tobias Rotthove') +
  OWNER(SYS1) UACC(ALTER) +
  DFLTGRP(SYS1) +
  AUTHORITY(JOIN) +
  GRPACC SPECIAL +
 TSO( +
  PROC(IJKACCNT) +
  ACCTNUM(1234) +
  SIZE(4096) +
  MAXSIZE(2000000) +
  UNIT(SYSALLDA) +
  COMMAND(ISPPDF)) +
 OMVS(AUTOUID +
  HOME(/u/tobias) +
  PROGRAM(/bin/sh))
CONNECT TOBIAS GROUP(SYS1) OWNER(SYS1) AUTHORITY(JOIN) +
  UACC(ALTER)
PERMIT ACCNT# CLASS(ACCTNUM) ID(TOBIAS)
```

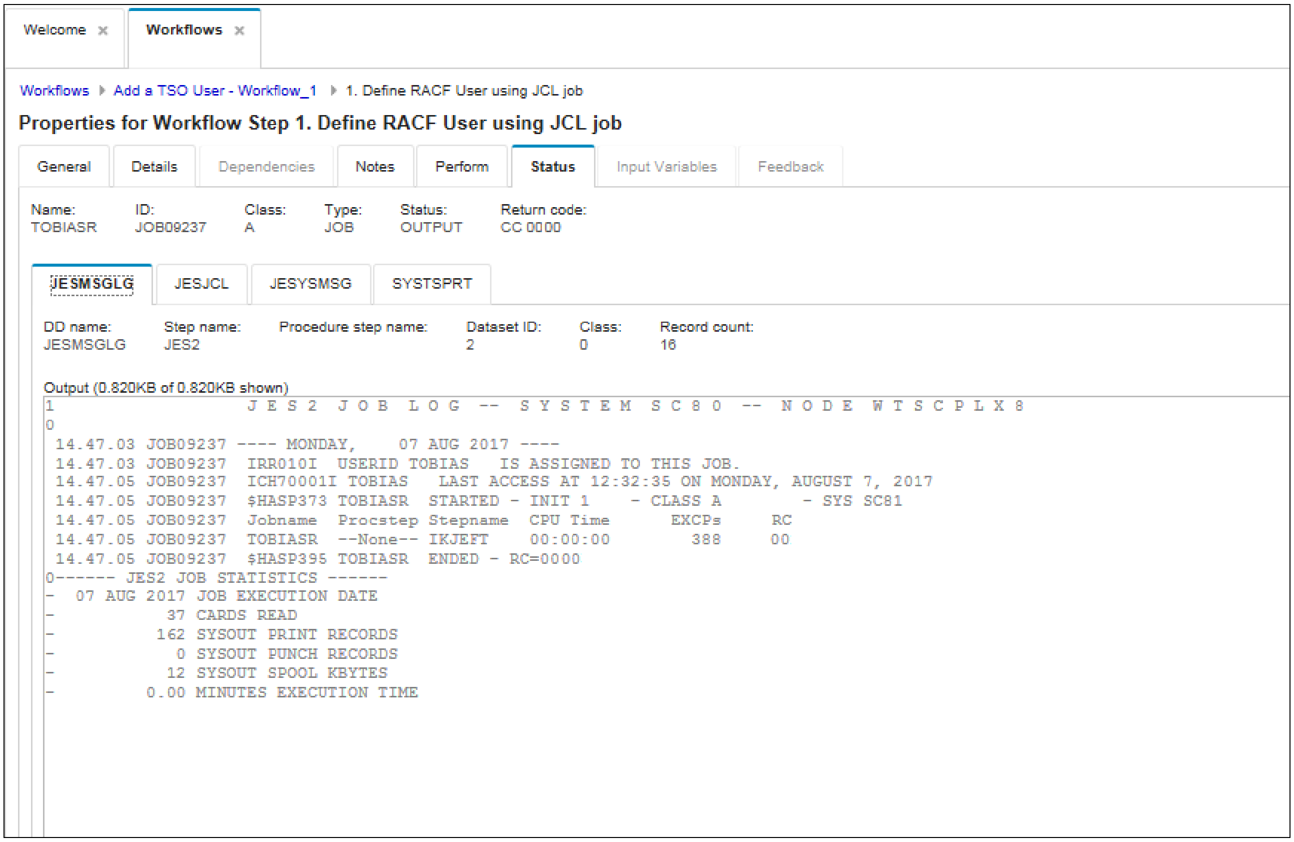
Figure 7-13 Review JCL

Click **Next** to continue to the Submit and Save JCL window. Here, you can submit and save the JCL by selecting options.

In our example, a default location to save the JCL is displayed if that option is selected and defined in the `<saveAsDataset` element, as shown in Example 7-6 on page 156.

Select the **Submit JCL** option and click **Finish** to submit the job. The Status tab opens, where the job output can be viewed. If the job is not complete, click **Refresh**.

Upon completion the job, the Status: field should change to OUTPUT and a Return Code: CC value should be displayed. The job output is displayed in tabs below the job status information (one tab for each DD name), as shown in Figure 7-14 on page 162.



Properties for Workflow Step 1. Define RACF User using JCL job

Name:	ID:	Class:	Type:	Status:	Return code:
TOBIASR	JOB09237	A	JOB	OUTPUT	CC 0000

DD name:	Step name:	Procedure step name:	Dataset ID:	Class:	Record count:
JESMSGLG	JES2		2	0	16

Output (0.820KB of 0.820KB shown)

```
1                    J E S 2  J O B  L O G  --  S Y S T E M  S C 8 0  --  N O D E  W T S C P L X 8
0
 14.47.03 JOB09237 ---- MONDAY,    07 AUG 2017 ----
 14.47.03 JOB09237  IRR010I  USERID TOBIAS   IS ASSIGNED TO THIS JOB.
 14.47.05 JOB09237  ICH70001I TOBIAS   LAST ACCESS AT 12:32:35 ON MONDAY, AUGUST 7, 2017
 14.47.05 JOB09237  $HASP373 TOBIASR  STARTED - INIT 1    - CLASS A         - SYS SC81
 14.47.05 JOB09237  Jobname  Procstep Stepname  CPU Time      EXCPs     RC
 14.47.05 JOB09237  TOBIASR  --None-- IKJEFT    00:00:00        388     00
 14.47.05 JOB09237  $HASP395 TOBIASR  ENDED - RC=0000
0------ JES2 JOB STATISTICS ------
-  07 AUG 2017 JOB EXECUTION DATE
-          37 CARDS READ
-         162 SYSOUT PRINT RECORDS
-           0 SYSOUT PUNCH RECORDS
-          12 SYSOUT SPOOL KBYTES
-        0.00 MINUTES EXECUTION TIME
```

Figure 7-14 Job output in Status tab

If the job did not complete, click the **Perform** tab, then click **Back** on the Submit and Save JCL window to return to the Edit JCL window. You can then make any corrections and resubmit the job by clicking **Next**.

When the output is reviewed, click **Close** in the lower left of the window to return to the Workflow Steps window (see Figure 7-9 on page 158). Step 1 should now be marked Complete with a tick mark next to it. Step 2 should now be in a Ready state.

Complete steps 2 - 5 and then, click **Return To Workflows**. The workflow should now be 100% complete.

7.6.4 Example workflow XML and template files

The complete XML that is used in our example workflow is shown in Example 7-7.

Example 7-7 adduser.xml

```
<?xml version="1.0" encoding="UTF-8"?>

<workflow xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
                              xsi:noNamespaceSchemaLocation="workflow_v1.xsd">

<!-- ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
     This sample demonstrates the use of instructions and wizards that use input
     variables.
     +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
-->
```

```
<workflowInfo>
   <workflowID>addUserWorkflow</workflowID>
   <workflowDescription>Add a TSO User</workflowDescription>
   <workflowVersion>1.0</workflowVersion>
   <vendor>IBM ITSO</vendor>
   <Configuration>
      <productID>99999</productID>
      <productName>ITSO General Workflow</productName>
      <productVersion>Version 1</productVersion>
   </Configuration>
</workflowInfo>

<!-- Declare variables -->

<!-- Category ADDUSER variables -->

<variable name="tsoUser">
   <label>TSO user ID</label>
   <abstract>The user ID for a TSO User</abstract>
   <description>The 7 character TSO user ID being created</description>
   <category>ADDUSER</category>
   <string>
      <validationType>TSOUSERID</validationType>
      <default>XXXXXXX</default>
   </string>
</variable>

<variable name="userName">
   <label>User Name</label>
   <abstract>Name of user for TSO ID</abstract>
   <description>The real name of the person for whom the TSO ID is being
created.</description>
   <category>ADDUSER</category>
   <string>
   <maxLength>20</maxLength>
   </string>
</variable>

<variable name="password">
   <label>Password</label>
   <abstract>The initial password for the user</abstract>
   <description>Password must be 8 characters and contain at least 1 number, 1 uppercase, 1
lowercase and 1 of these special characters @#$%</description>
   <category>ADDUSER</category>
   <string>
   <!--    Regular Expression meaning                                             -->
   <!--    ^(                      Begin input group                              -->
   <!--    (?=.*\d)                Must contain at least 1 digit                  -->
   <!--    (?=.*[a-z])             Must contain at least 1 lowercase char         -->
   <!--    (?=.*[A-Z])             Must contain at least 1 uppercase char         -->
   <!--    (?=.*[@#$%])            Must contain at least 1 special char from list  -->
   <!--    )$                      End input group                                 -->
   <!--                                                                            -->
   <regularExpression>
      ^((?=.*\d)(?=.*[a-z])(?=.*[A-Z])(?=.*[@#$%]).{8,8})$
   </regularExpression>
 </string>
</variable>
```

```
<variable name="owningTsoUser">
   <label>TSO user ID OWNER or GROUP</label>
   <abstract>The owning TSO USER/GROUP of the TSO User</abstract>
   <description>The owning TSO USER/GROUP of the TSO User.</description>
   <category>ADDUSER</category>
   <string>
      <validationType>TSOUSERID</validationType>
      <default>SYS1</default>
   </string>
</variable>

<variable name="userDefaultGroup">
   <label>Default Group</label>
   <abstract>The Default Group for the TSO user</abstract>
   <description>The default group for the TSO user.</description>
   <category>ADDUSER</category>
   <string>
      <validationType>TSOUSERID</validationType>
   </string>
</variable>

<!-- Category TSO variables -->

<variable name="accountNumber">
   <label>Account Number</label>
   <abstract>The account number for the TSO user</abstract>
   <description>The account number for the TSO user.</description>
   <category>TSO</category>
   <string>
   </string>
</variable>

<variable name="maxSize">
   <label>Maximum TSO region size for TSO user</label>
   <abstract>Maximum region size TSO user</abstract>
   <description>The region size the TSO user.</description>
   <category>TSO</category>
   <integer>
   <maxValue>2096128</maxValue>
   </integer>
</variable>

<variable name="minSize">
   <label>Minimum TSO region size for TSO user</label>
   <abstract>Minimum region size TSO user</abstract>
   <description>The minimum or default region size the TSO user.</description>
   <category>TSO</category>
   <integer>
   <maxValue>2096128</maxValue>
   <default>4096</default>
   </integer>
</variable>

<variable name="procName">
   <label>TSO logon procedure</label>
   <abstract>The logon procedure the TSO user</abstract>
   <description>The logon procedure for the TSO user.</description>
   <category>TSO</category>
   <string>
   </string>
```

```
</variable>

<variable name="unitName">
   <label>Default unit or group that is used for allocation during logon procedure</label>
   <abstract>Default unit or group that is used by logon procedure</abstract>
   <description>The default unit or group for the logon procedure.</description>
   <category>TSO</category>
   <string>
   <default>SYSALLDA</default>
   </string>
</variable>

<!-- Category OMVS variables -->

 <variable name="homeDir">
   <label>TSO User OMVS home directory</label>
   <abstract>TSO user OMVS home directory</abstract>
   <description>TSO user OMVS home directory</description>
   <category>OMVS</category>
   <string>
   <default>/u/XXXXXXX</default>
   </string>
</variable>

  <variable name="omvsProgram">
   <label>TSO User OMVS default shell</label>
   <abstract>TSO user OMVS default shell</abstract>
   <description>TSO user OMVS default shell</description>
   <category>OMVS</category>
   <string>
   <default>/bin/sh</default>
   </string>
</variable>

  <variable name="omvsUID">
   <label>TSO User OMVS UID</label>
   <abstract>TSO user OMVS UID</abstract>
   <description>TSO user OMVS UID</description>
   <category>OMVS</category>
   <integer>
   <minValue>0</minValue>
   </integer>
</variable>

<!-- Category ZFS variables -->

 <variable name="storClass">
   <label>DFSMS Storage Class for zFS</label>
   <abstract>DFSMS Storage Class for zFS</abstract>
   <description>DFSMS Storage Class for zFS</description>
   <category>ZFS</category>
   <string>
      <validationType>ALPHANUM</validationType>
      <default>DEFAULT</default>
   </string>
</variable>

<!-- This step uses a file wizard to submit JCL.  The JCL template file contains variable
references.
```

```
     Also demonstrated is the ability to save the generated job (file) with a default data
set name that
    contains a variable substitution. -->
<step name="define_user">
        <title>Define RACF User using JCL job</title>
        <description>
        Submit a job to define a RACF User.
        </description>
        <variableValue name="tsoUser" required="true"/>
        <variableValue name="userName" required="true"/>
        <variableValue name="password" required="true"/>
      <variableValue name="owningTsoUser" required="true"/>
      <variableValue name="userDefaultGroup" required="true"/>
       <variableValue name="procName" required="true"/>
      <variableValue name="accountNumber" required="true"/>
       <variableValue name="minSize" required="true"/>
       <variableValue name="maxSize" required="true"/>
       <variableValue name="unitName" required="true"/>
       <variableValue name="homeDir" required="true"/>
       <variableValue name="omvsProgram" required="true"/>
      <instructions substitution="false">
This job issues RACF commands to add a user through a batch job.<br/>You are given the
opportunity to save a copy of the JCL <em>after</em> you have inspected it for your
approval.
       </instructions>
        <weight>10</weight>
        <skills>Basic JCL</skills>
        <template>
          <fileTemplate substitution="true">
             adduser.template
          </fileTemplate>
       <submitAs>JCL</submitAs>
       <!-- Specifying <saveAsDataset> with a value primes the save-as prompt with the
value
           specified here.  The value contains a variable reference.  The user can still
save
           to a UNIX file if he wants to, but the widget will not be primed with a value.
-->
       <saveAsDataset substitution="true">CONRADP.JCL(ZOSMFJCL)</saveAsDataset>
       </template>
</step>

<!-- This step uses a file wizard to submit JCL.  The JCL template contains variable
references.  Also
    demonstrated is the ability to save the generated job (file) with a default data set
name that
    contains a variable substitution.
-->
<step name="ADDSD_Add">
        <title>Add data set profile for new user</title>
        <description>
        Submit job to define the data set profile for the new user.
        </description>
      <prereqStep name="define_user"/>
        <variableValue name="tsoUser" required="true"/>
      <instructions substitution="false">
Ensure that the Define RACF User using JCL job step is complete.<br/>
This job issues a RACF define for the data set profile.<br/>You are given the opportunity
to save a copy of the JCL <em>after</em> you have inspected it for your approval.
       </instructions>
```

```
        <weight>10</weight>
        <skills>Basic JCL</skills>
        <template>
          <fileTemplate substitution="true">
             addsd.template
          </fileTemplate>
       <submitAs>JCL</submitAs>
       <!-- Specifying <saveAsDataset> with a value primes the save-as prompt with the
value
           specified here.  The value contains a variable reference.  The user can still
save
           to a UNIX file if he wants to, but the widget will not be primed with a value.
-->
       <saveAsDataset substitution="true"></saveAsDataset>
       </template>
</step>

<!-- This step uses a file wizard to submit JCL.  The in-line JCL contains variable
references.  Also
    demonstrated is the ability to save the generated job (file) with a default data set
name that
    contains a variable substitution.
-->
<step name="define_zFS">
        <title>Define zFS User using JCL job</title>
        <description>
        Submit job to define the user zFS.
        </description>
      <prereqStep name="ADDSD_Add"/>
        <variableValue name="storClass" required="true"/>
      <variableValue name="tsoUser" required="false"/>
      <instructions substitution="false">
Ensure that the Define data set profile job step is complete.<br/>
This job issues the IDCAMS define for a user zFS.<br/>You are given the opportunity to save
a copy of the JCL <em>after</em> you have inspected it for your approval.
       </instructions>
        <weight>10</weight>
        <skills>Basic JCL</skills>
        <template>
          <fileTemplate substitution="true">
             zFSalloc.template
          </fileTemplate>
       <submitAs>JCL</submitAs>
       <!-- Specifying <saveAsDataset> with a value primes the save-as prompt with the
value
           specified here.  The value contains a variable reference.  The user can still
save
           to a UNIX file if he wants to, but the widget will not be primed with a value.
-->
       <saveAsDataset substitution="true"></saveAsDataset>
       </template>
</step>

<!-- This step uses a file wizard to submit JCL.  The in-line JCL contains variable
references.  Also
    demonstrated is the ability to save the generated job (file) with a default data set
name that
    contains a variable substitution.
-->
<step name="format_zFS">
```

```
        <title>Format zFS User using JCL job</title>
        <description>
        Submit job to format the user zFS.
        </description>
      <prereqStep name="define_zFS"/>
        <variableValue name="tsoUser" required="true"/>
      <instructions substitution="false">
Ensure that the Define zFS job step is complete.<br/>
This job formats the new zFS using IOEAGFMT.<br/>You are given the opportunity to save
a copy of the JCL <em>after</em> you have inspected it for your approval.
       </instructions>
        <weight>10</weight>
        <skills>Basic JCL</skills>
        <template>
             <inlineTemplate substitution="true">//FMTZFS EXEC PGM=IOEAGFMT,REGION=0M,
//  PARM=('-aggregate ${instance-tsoUser}.ZFS -compat ')
//SYSPRINT DD SYSOUT=*
//STDOUT   DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
             </inlineTemplate>
       <submitAs>JCL</submitAs>
       <!-- Specifying <saveAsDataset> with a value primes the save-as prompt with the
value
          specified here.  The value contains a variable reference.  The user can still
save
          to a UNIX file if he wants to, but the widget will not be primed with a value.
-->
       <saveAsDataset substitution="true"></saveAsDataset>
       </template>
</step>

<!-- This step uses a file wizard to submit JCL.  The in-line JCL contains variable
references.  Also
    demonstrated is the ability to save the generated job (file) with a default data set
name that
    contains a variable substitution.
-->
<step name="copy_prof">
        <title>Copy a default profile to the new user</title>
        <description>
        Submit job to copy a profile.
        </description>
      <prereqStep name="format_zFS"/>
        <variableValue name="homeDir" required="false"/>
      <instructions substitution="false">
This job copies a default profile to the new user directory.<br/>You are given the
opportunity to save a copy of the JCL <em>after</em> you have inspected it for your
approval.
       </instructions>
        <weight>10</weight>
        <skills>Basic JCL</skills>
        <template>
          <fileTemplate substitution="true">
             cpjcl.template
          </fileTemplate>
       <submitAs>JCL</submitAs>
       <!-- Specifying <saveAsDataset> with a value primes the save-as prompt with the
value
```

```
          specified here.  The value contains a variable reference.  The user can still 
save
          to a UNIX file if he wants to, but the widget will not be primed with a value.
-->
      <saveAsDataset substitution="true"></saveAsDataset>
      </template>
</step>

</workflow>
```

The templates that are used by the `adduser.xml` file are shown in Example 7-8, Example 7-9 on page 170, Example 7-10 on page 170, Example 7-11 on page 170, and Example 7-12 on page 170.

Example 7-8 adduser.template

```
//IKJEFT   EXEC PGM=IKJEFT01
//SYSUADS  DD DSN=SYS1.UADS,DISP=SHR
//SYSLBC   DD DSN=SYS1.BRODCAST,DISP=SHR
//SYSTSPRT DD SYSOUT=*
//SYSTSIN  DD *
ADDUSER $instance-tsoUser +
  PASSWORD($instance-password) +
  NAME('$instance-userName') +
  OWNER(SYS1) UACC(ALTER) +
  DFLTGRP($instance-userDefaultGroup) +
  AUTHORITY(JOIN) +
  GRPACC +
 TSO( +
  PROC($instance-procName) +
  ACCTNUM($instance-accountNumber) +
  SIZE($instance-minSize) +
  MAXSIZE($instance-maxSize) +
  UNIT($instance-unitName) +
  COMMAND(ISPPDF)) +
 OMVS(AUTOUID +
  HOME($instance-homeDir) +
  PROGRAM($instance-omvsProgram))
CONNECT $instance-tsoUser GROUP(SYS1) OWNER(SYS1) AUTHORITY(JOIN) +
  UACC(ALTER)
PERMIT ACCNT# CLASS(ACCTNUM) ID($instance-tsoUser)
PERMIT IKJACCNT CLASS(TSOPROC) ID($instance-tsoUser)
PERMIT JCL CLASS(TSOAUTH) ID($instance-tsoUser)
PERMIT RECOVER CLASS(TSOAUTH) ID($instance-tsoUser)
PERMIT OPER CLASS(TSOAUTH) ID($instance-tsoUser)
PERMIT BPX.SUPERUSER CLASS(FACILITY) ID($instance-tsoUser) ACCESS(READ)
LISTUSER  ($instance-tsoUser)
SETROPTS REFRESH RACLIST(TSOPROC ACCTNUM TSOAUTH FACILITY)
DEFINE ALIAS   (NAME('$instance-tsoUser') RELATE('UCAT.BH8CAT')) +
  CATALOG('MCAT.BH8CAT')
```

Example 7-9   addsd.template

```
//IKJEFT   EXEC PGM=IKJEFT01
//SYSUADS  DD DSN=SYS1.UADS,DISP=SHR
//SYSLBC   DD DSN=SYS1.BRODCAST,DISP=SHR
//SYSTSPRT DD SYSOUT=*
//SYSTSIN  DD *
 ADDSD '$instance-tsoUser.**' UACC(READ)
```

Example 7-10   zFSalloc.template

```
//DEFZFS   EXEC PGM=IDCAMS
//SYSPRINT DD SYSOUT=*
//SYSIN    DD *
  DEFINE CLUSTER( -
  NAME(${instance-tsoUser}.ZFS) -
  LINEAR -
  CYL(3 1) -
  SHAREOPTIONS(2) -
  STORCLAS('$instance-storClass') -
  VOL(*))
```

Example 7-11   zFSformat.template

```
//FRMZFS   EXEC   PGM=IOEAGFMT,REGION=0M,
//  PARM=(' -aggregate ${instance-tsoUser}.ZFS -compat ')
//SYSPRINT DD SYSOUT=*
//STDOUT   DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
```

Example 7-12   cpjcl.template

```
//COPY     EXEC PGM=BPXBATCH
//STDPARM  DD *
sh cp /etc/profile.base $instance-homeDir/.profile
/*
//STDOUT   DD PATH='/tmp/cpout',
//         PATHOPTS=(OWRONLY,OCREAT,OTRUNC),PATHMODE=SIRWXU
//STDERR   DD  PATH='/tmp/cperr',
//         PATHOPTS=(OWRONLY,OCREAT,OTRUNC),PATHMODE=SIRWXU
//STDENV   DD DUMMY
```

7.7 Using the Workflow Editor

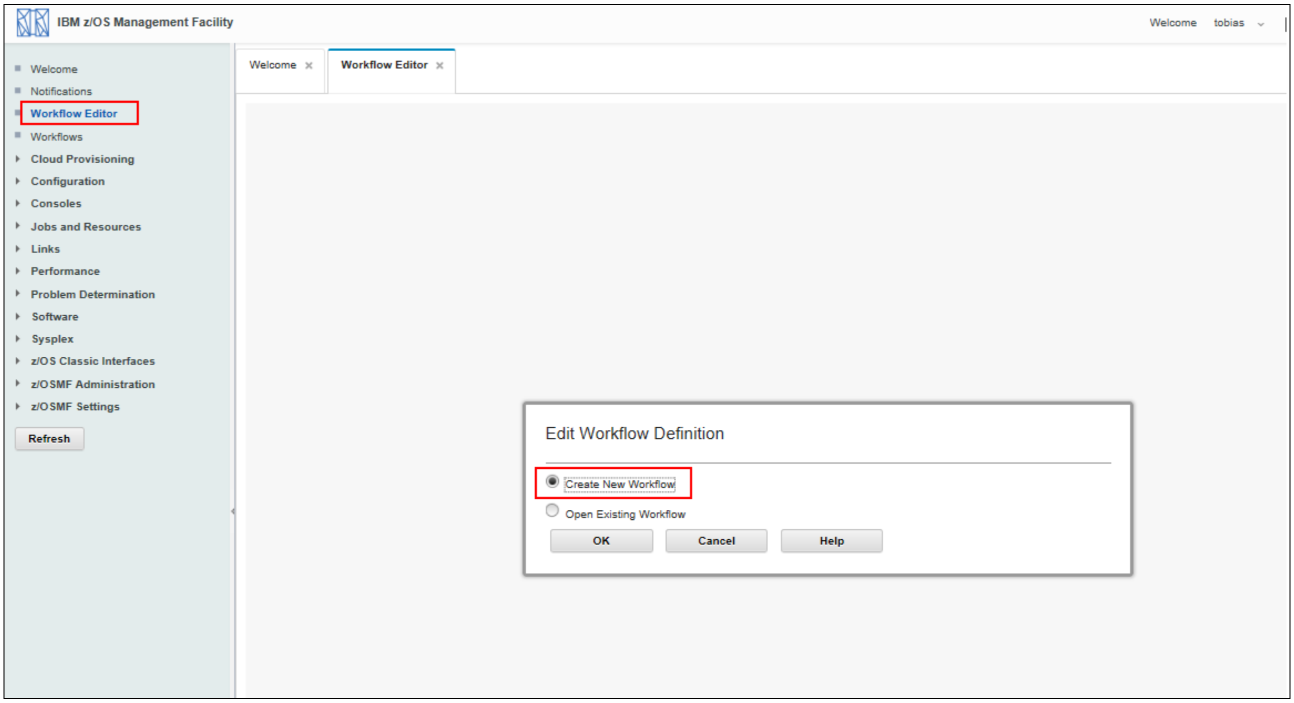
z/OSMF includes the Workflow Editor with which you can create, edit, and view a workflow definition. The Workflow Editor provides a visual framework for working with the elements of a workflow definition: the steps, variables, and workflow metadata. The Workflow Editor includes the following features:

- Review the details of a workflow definition in a graphical user interface (GUI).
- Use options for viewing, creating, and modifying a workflow.
- Select a workflow definition file for editing.

- View information about the different sections of a workflow definition.
- Modify the workflow information, steps, and variables sections of the definition, including adding and deleting steps and variable definitions.
- Overwrite the workflow definition with your changes.

No XML knowledge is required to use the Workflow Editor.

The Workflow Editor start window is shown in Figure 7-15. Creating a workflow is shown in the following example. This example workflow is used to retrieve the contents of a z/OS data set or member.



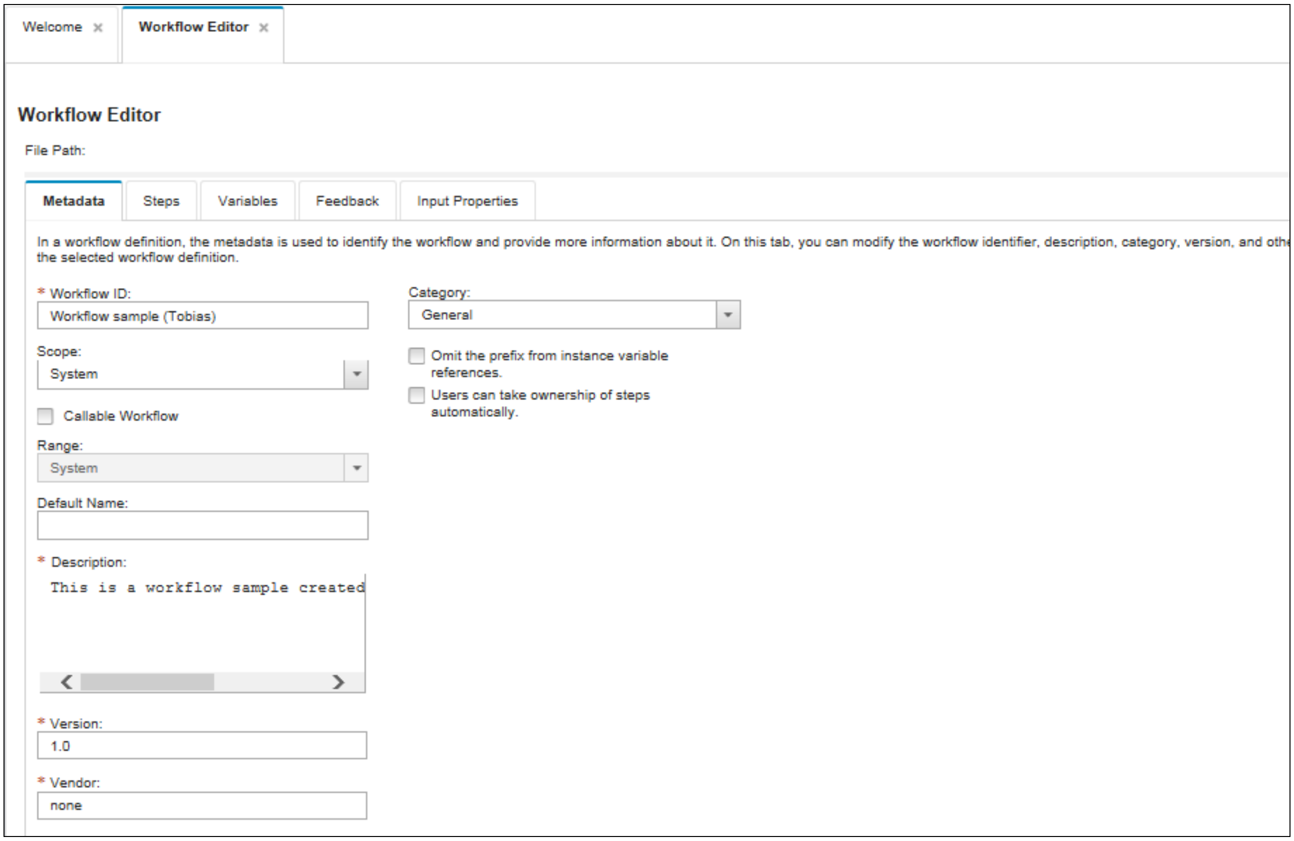
Edit Workflow Definition

● Create New Workflow
○ Open Existing Workflow

Figure 7-15 Workflow Editor start window

First, we must create a workflow by selecting **Create New Workflow** in the first window. From this window, an existing workflow also can be opened.

In our example, we focus on how to define a workflow. As shown in Figure 7-16, the metadata is defined for the new workflow. If you are unsure about the information that must be entered in each field in a window, click the **Help** button that is in the upper right corner of the window. Guided instructions for every step of the process is available.



Workflow Editor

File Path:

In a workflow definition, the metadata is used to identify the workflow and provide more information about it. On this tab, you can modify the workflow identifier, description, category, version, and othe the selected workflow definition.

* Workflow ID: Workflow sample (Tobias)

Category: General

Scope: System

□ Omit the prefix from instance variable references.

□ Users can take ownership of steps automatically.

□ Callable Workflow

Range: System

Default Name:

* Description: This is a workflow sample created

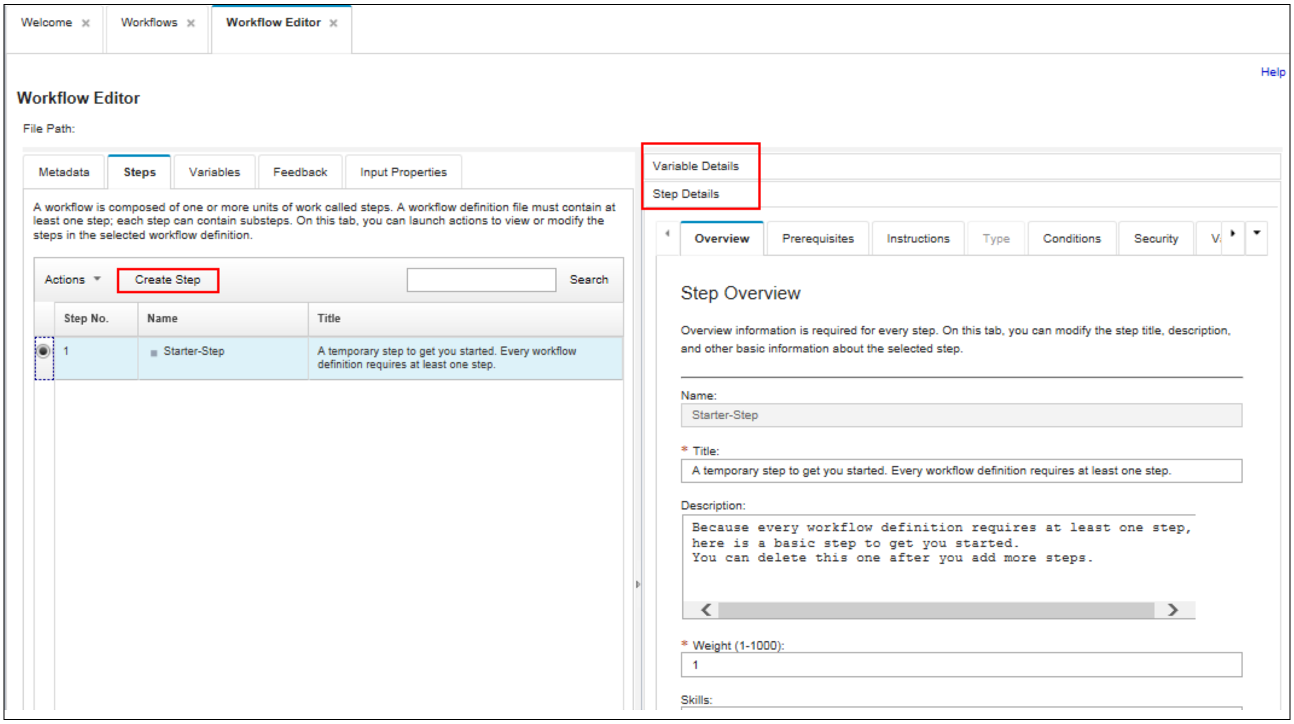
* Version: 1.0

* Vendor: none

Figure 7-16 Metadata for the workflow

Before we save our workflow, we must complete the information that is entered in every tab in the GUI.

Next, we add the required step to our new workflow. Click the **Step** tab (see Figure 7-17). You see a Starter-Step in this workflow. This step is the default setting for all created workflows. Click **Starter-Step** and the Step Details are shown in the right side of the GUI. Click **Create Step** to add the step in this workflow.



Workflow Editor

File Path:

A workflow is composed of one or more units of work called steps. A workflow definition file must contain at least one step; each step can contain substeps. On this tab, you can launch actions to view or modify the steps in the selected workflow definition.

Step No.	Name	Title
1	Starter-Step	A temporary step to get you started. Every workflow definition requires at least one step.

Step Overview

Overview information is required for every step. On this tab, you can modify the step title, description, and other basic information about the selected step.

Name: Starter-Step

* Title: A temporary step to get you started. Every workflow definition requires at least one step.

Description:

```
Because every workflow definition requires at least one step,
here is a basic step to get you started.
You can delete this one after you add more steps.
```

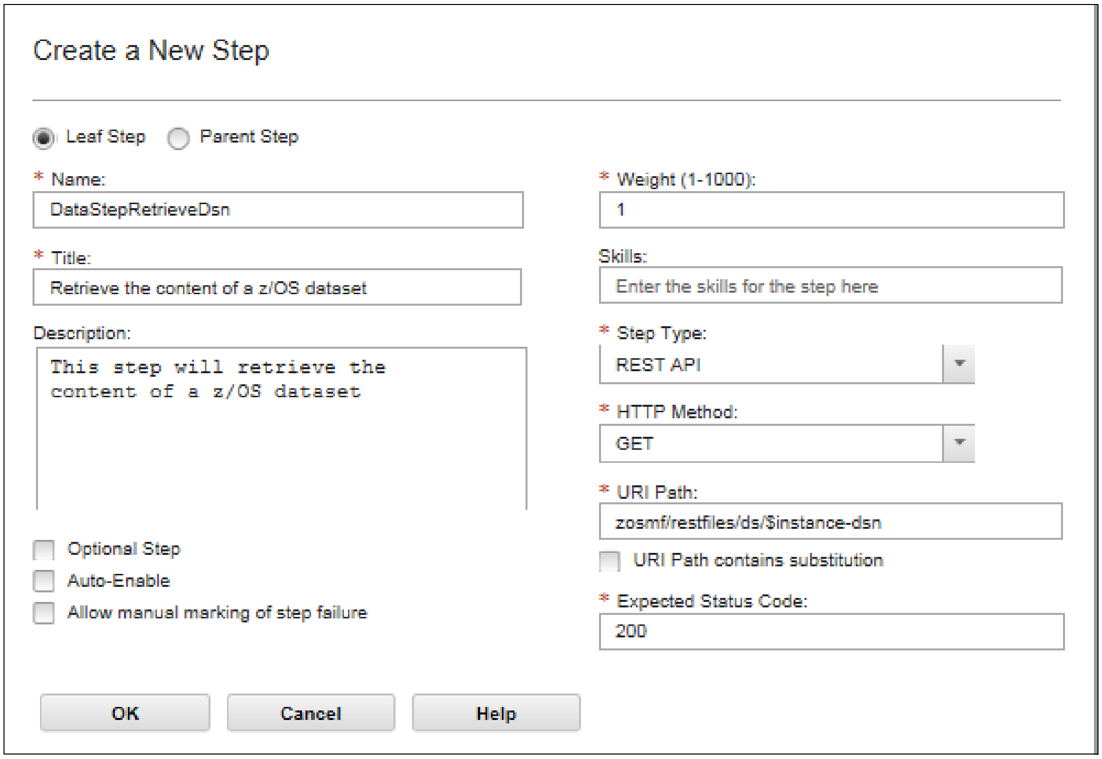
* Weight (1-1000): 1

Skills:

Figure 7-17 Workflow Step tab

Note: Two tabs (Step Detail and Variable) are shown on the right side in Figure 7-17. These tabs provide more information about the steps that are shown on the left side of the GUI.

In our example, we create a Leaf Step. Enter the requested information and click **OK**, as shown in Figure 7-18.



Create a New Step

● Leaf Step ○ Parent Step

* Name: DataStepRetrieveDsn

* Title: Retrieve the content of a z/OS dataset

Description:

```
This step will retrieve the
content of a z/OS dataset
```

□ Optional Step
□ Auto-Enable
□ Allow manual marking of step failure

* Weight (1-1000): 1

Skills: Enter the skills for the step here

* Step Type: REST API

* HTTP Method: GET

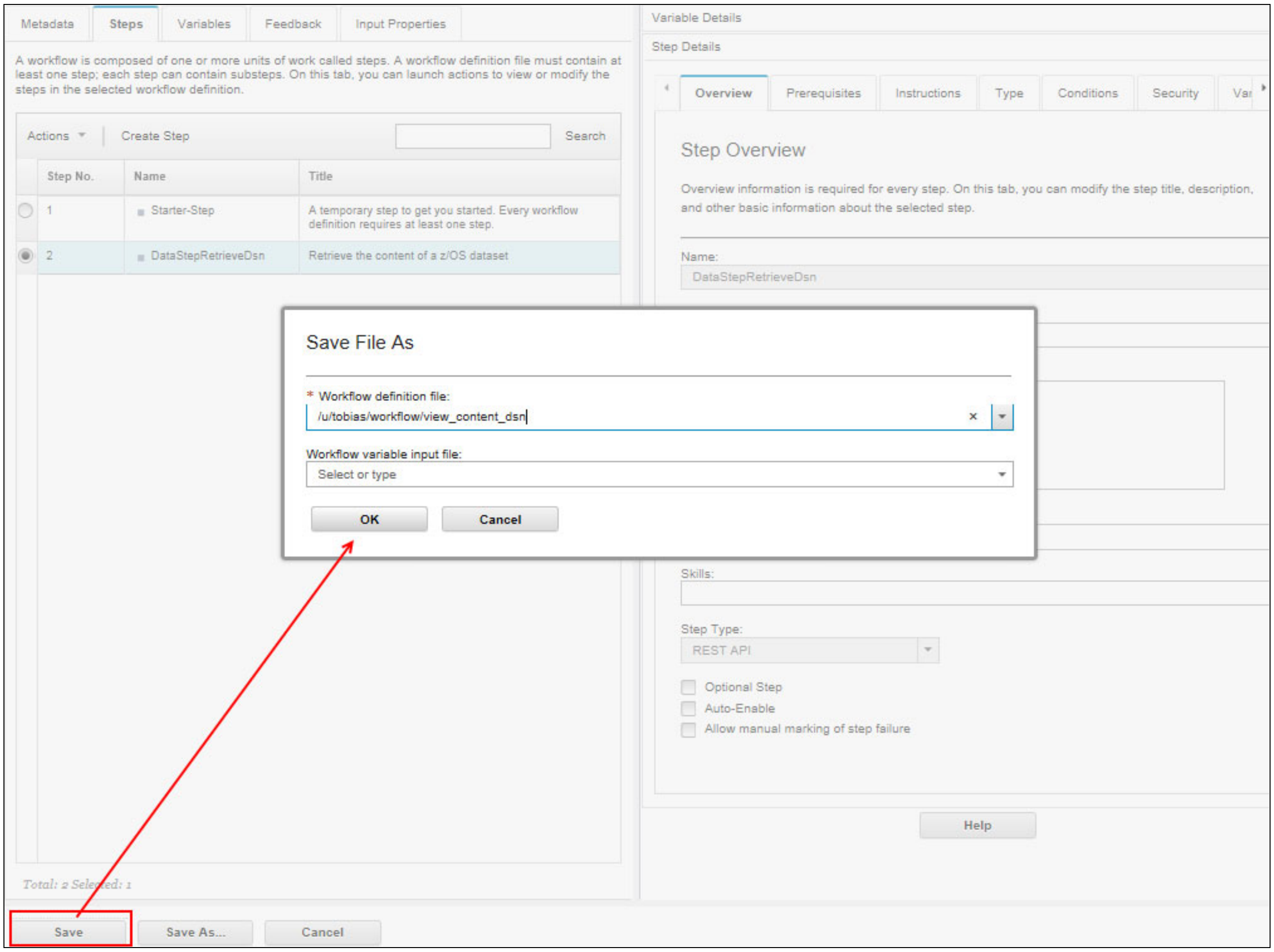
* URI Path: zosmf/restfiles/ds/$instance-dsn

□ URI Path contains substitution

* Expected Status Code: 200

Figure 7-18 Creating a Leaf Step

After adding the new step, save the new workflow, as shown in shown in Figure 7-19.



A workflow is composed of one or more units of work called steps. A workflow definition file must contain at least one step; each step can contain substeps. On this tab, you can launch actions to view or modify the steps in the selected workflow definition.

	Step No.	Name	Title
○	1	Starter-Step	A temporary step to get you started. Every workflow definition requires at least one step.
●	2	DataStepRetrieveDsn	Retrieve the content of a z/OS dataset

Total: 2 Selected: 1

Step Overview

Overview information is required for every step. On this tab, you can modify the step title, description, and other basic information about the selected step.

Name: DataStepRetrieveDsn

Skills:

Step Type: REST API

□ Optional Step
□ Auto-Enable
□ Allow manual marking of step failure

Save File As

* Workflow definition file: /u/tobias/workflow/view_content_dsn

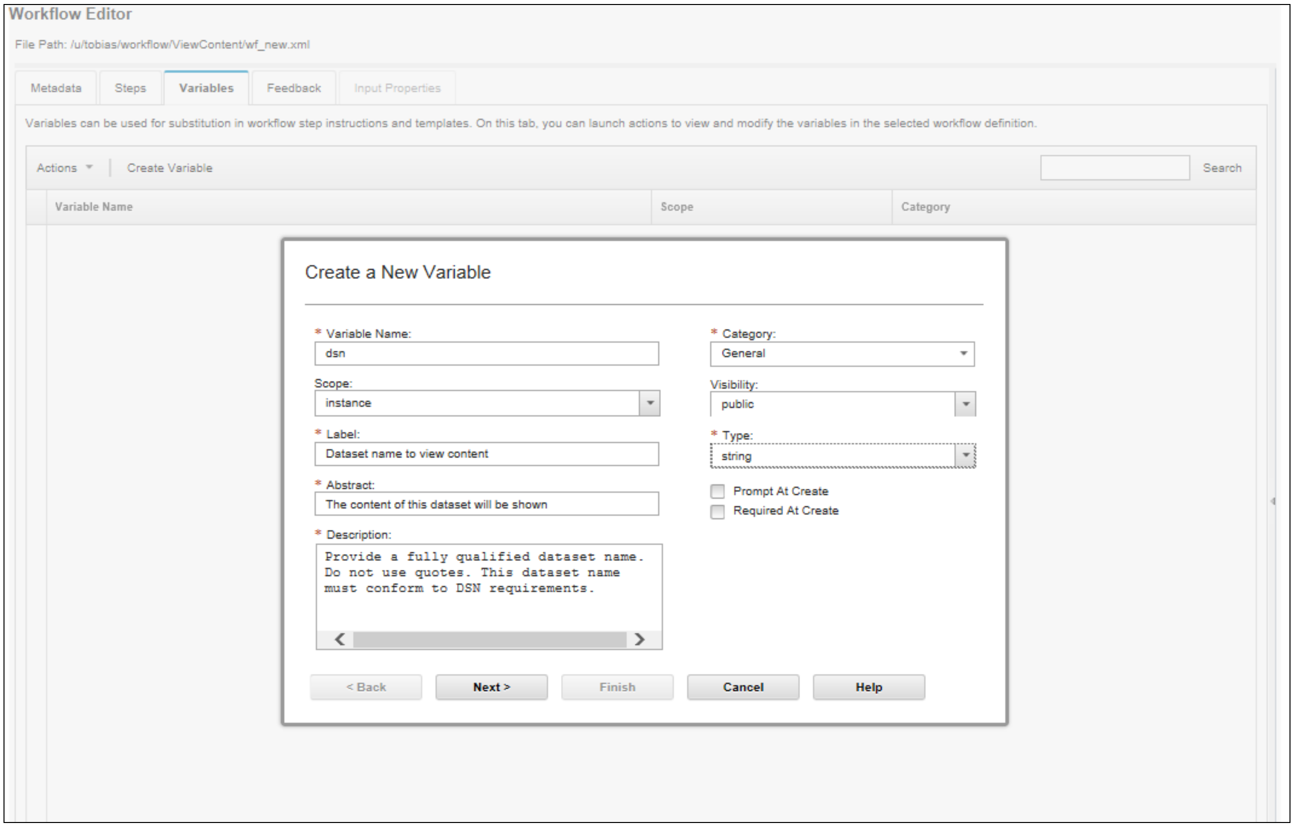
Workflow variable input file: Select or type

OK Cancel

Figure 7-19   Saving the workflow file

At this point in the process, the Starter-Step can be deleted. This step is provided by default because you must always have one step in a workflow.

The variable for this Workflow must be defined, which is done in the Variables tab. Enter the required information to create the variable (see Figure 7-20).



Variables can be used for substitution in workflow step instructions and templates. On this tab, you can launch actions to view and modify the variables in the selected workflow definition.

Create a New Variable

* Variable Name: dsn

Scope: instance

* Label: Dataset name to view content

* Abstract: The content of this dataset will be shown

* Description:

```
Provide a fully qualified dataset name.
Do not use quotes. This dataset name
must conform to DSN requirements.
```

* Category: General

Visibility: public

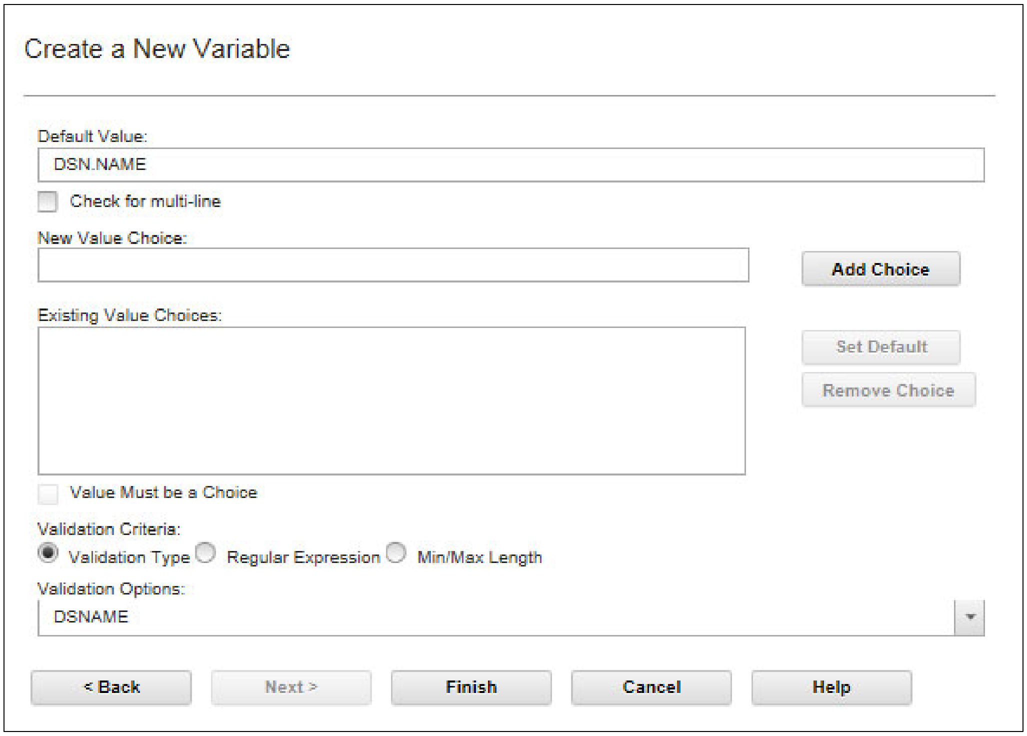
* Type: string

□ Prompt At Create

□ Required At Create

Figure 7-20 Creating a variable

Click **Next** to define the validation criteria for the new variable (see Figure 7-21).



Create a New Variable

Default Value: DSN.NAME

□ Check for multi-line

New Value Choice:

Existing Value Choices:

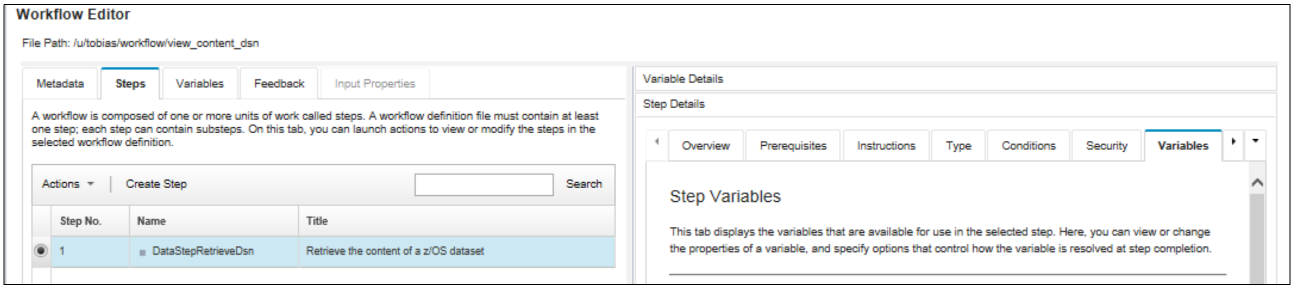
□ Value Must be a Choice

Validation Criteria: ● Validation Type ○ Regular Expression ○ Min/Max Length

Validation Options: DSNAME

Figure 7-21 Entering the validation criteria for the new variable

The variable now can be connected to the step that was created earlier, `DataStepRetrieveDsn`. Click the **Steps** tab and browse to the Variables tab (see Figure 7-22).



Workflow Editor

File Path: /u/tobias/workflow/view_content_dsn

A workflow is composed of one or more units of work called steps. A workflow definition file must contain at least one step; each step can contain substeps. On this tab, you can launch actions to view or modify the steps in the selected workflow definition.

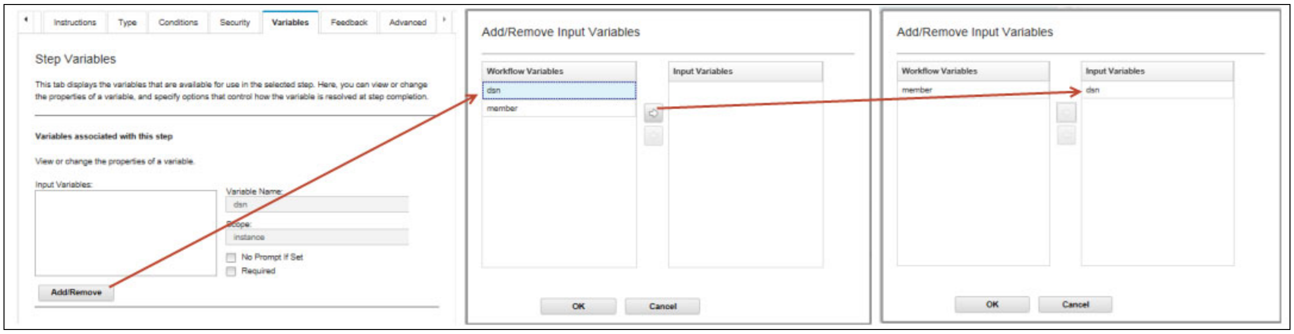
	Step No.	Name	Title
●	1	DataStepRetrieveDsn	Retrieve the content of a z/OS dataset

Step Variables

This tab displays the variables that are available for use in the selected step. Here, you can view or change the properties of a variable, and specify options that control how the variable is resolved at step completion.

Figure 7-22 Variable information for the step

Click the **Add/Remove** button to connect the new variable to the created step (see Figure 7-23).



Instructions | Type | Conditions | Security | Variables | Feedback | Advanced

Step Variables

This tab displays the variables that are available for use in the selected step. Here, you can view or change the properties of a variable, and specify options that control how the variable is resolved at step completion.

Variables associated with this step

View or change the properties of a variable.

Input Variables:

Variable Name: dsn

Scope: instance

□ No Prompt If Set

□ Required

Add/Remove

Add/Remove Input Variables

Workflow Variables	Input Variables
dsn	
member	

OK | Cancel

Add/Remove Input Variables

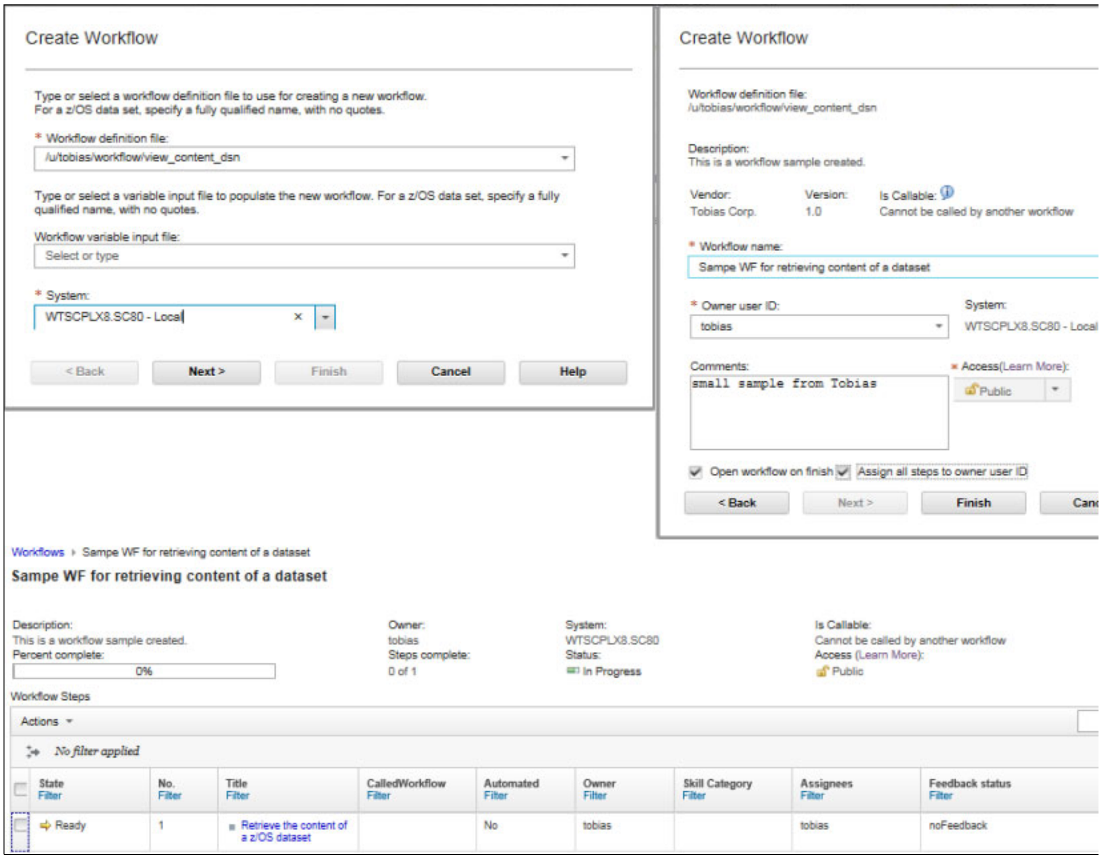
Workflow Variables	Input Variables
member	dsn

OK | Cancel

Figure 7-23 Add new variable

Save the workflow (see Figure 7-19). After successfully saving the workflow, we can test the workflow in the left section of the Workflow GUI.

How you create and test the workflow by using a sample dataset is shown in Figure 7-24 and Figure 7-25 on page 179.



Create Workflow

Type or select a workflow definition file to use for creating a new workflow. For a z/OS data set, specify a fully qualified name, with no quotes.

* Workflow definition file: /u/tobias/workflow/view_content_dsn

Type or select a variable input file to populate the new workflow. For a z/OS data set, specify a fully qualified name, with no quotes.

Workflow variable input file: Select or type

* System: WTSCPLX8.SC80 - Local

< Back | Next > | Finish | Cancel | Help

Create Workflow

Workflow definition file:
/u/tobias/workflow/view_content_dsn

Description:
This is a workflow sample created.

Vendor: Tobias Corp.

Version: 1.0

Is Callable: Cannot be called by another workflow

* Workflow name: Sampe WF for retrieving content of a dataset

* Owner user ID: tobias

System: WTSCPLX8.SC80 - Local

Comments: small sample from Tobias

* Access(Learn More): Public

☑ Open workflow on finish ☑ Assign all steps to owner user ID

< Back | Next > | Finish | Canc

Workflows ▸ Sampe WF for retrieving content of a dataset

Sampe WF for retrieving content of a dataset

Description: This is a workflow sample created.

Percent complete: 0%

Owner: tobias

Steps complete: 0 of 1

System: WTSCPLX8.SC80

Status: In Progress

Is Callable: Cannot be called by another workflow

Access (Learn More): Public

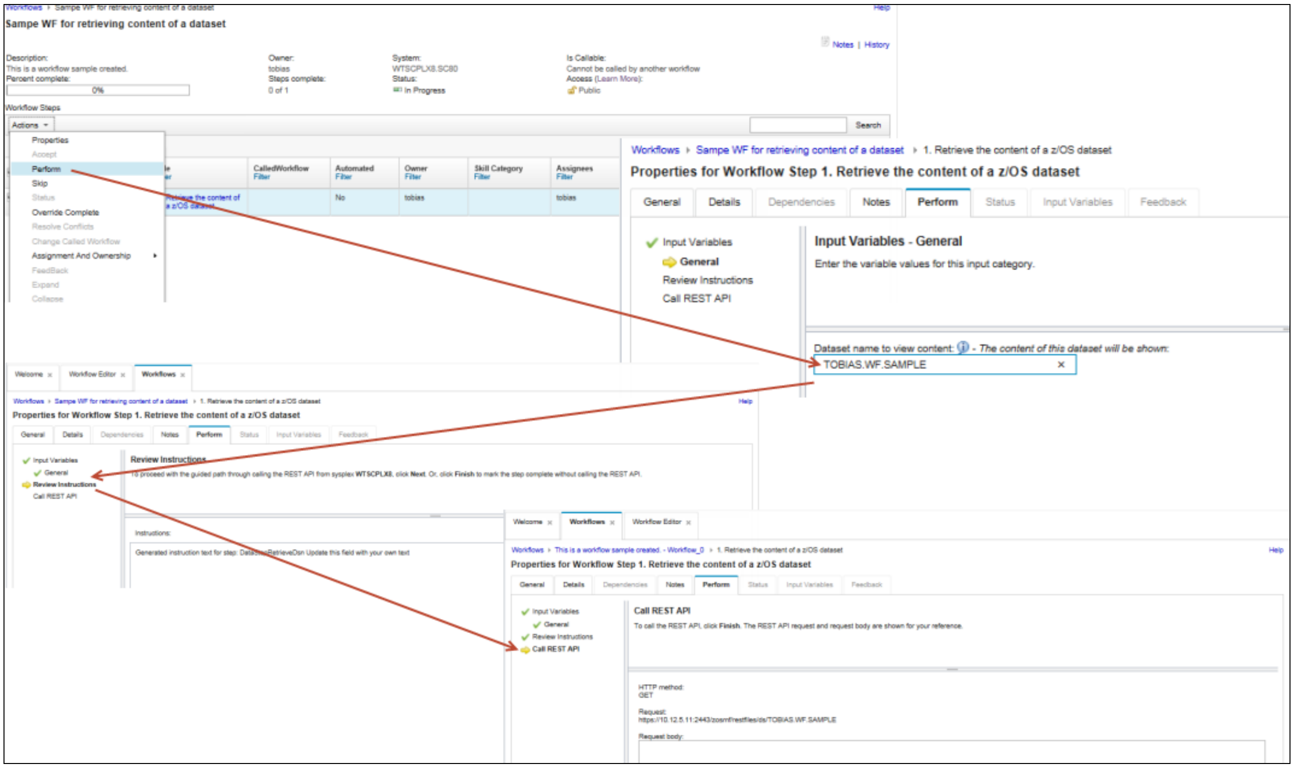
Workflow Steps

Actions ▾

No filter applied

	State	No.	Title	CalledWorkflow	Automated	Owner	Skill Category	Assignees	Feedback status
□	Ready	1	Retrieve the content of a z/OS dataset		No	tobias		tobias	noFeedback

Figure 7-24 Creating and testing the workflow



Sampe WF for retrieving content of a dataset

Description:
This is a workflow sample created.
Percent complete:
0%

Owner:
tobias
Steps complete:
0 of 1

System:
WTSCPLX8.SC80
Status:
In Progress

Is Callable:
Cannot be called by another workflow
Access (Learn More):
Public

CalledWorkflow	Automated	Owner	Skill Category	Assignees
	No	tobias		tobias

Retrieve the content of a z/OS dataset

Workflows ▸ Sampe WF for retrieving content of a dataset ▸ 1. Retrieve the content of a z/OS dataset

Properties for Workflow Step 1. Retrieve the content of a z/OS dataset

Input Variables - General

Enter the variable values for this input category.

Dataset name to view content: ⓘ - *The content of this dataset will be shown:*
TOBIAS.WF.SAMPLE

Workflows ▸ Sampe WF for retrieving content of a dataset ▸ 1. Retrieve the content of a z/OS dataset

Properties for Workflow Step 1. Retrieve the content of a z/OS dataset

Review Instructions

To proceed with the guided path through calling the REST API from sysplex **WTSCPLX8**, click **Next**. Or, click **Finish** to mark the step complete without calling the REST API.

Instructions:
Generated instruction text for step: DatasetRetrieveDsn Update this field with your own text

Workflows ▸ This is a workflow sample created. - Workflow_0 ▸ 1. Retrieve the content of a z/OS dataset

Properties for Workflow Step 1. Retrieve the content of a z/OS dataset

Call REST API

To call the REST API, click **Finish**. The REST API request and request body are shown for your reference.

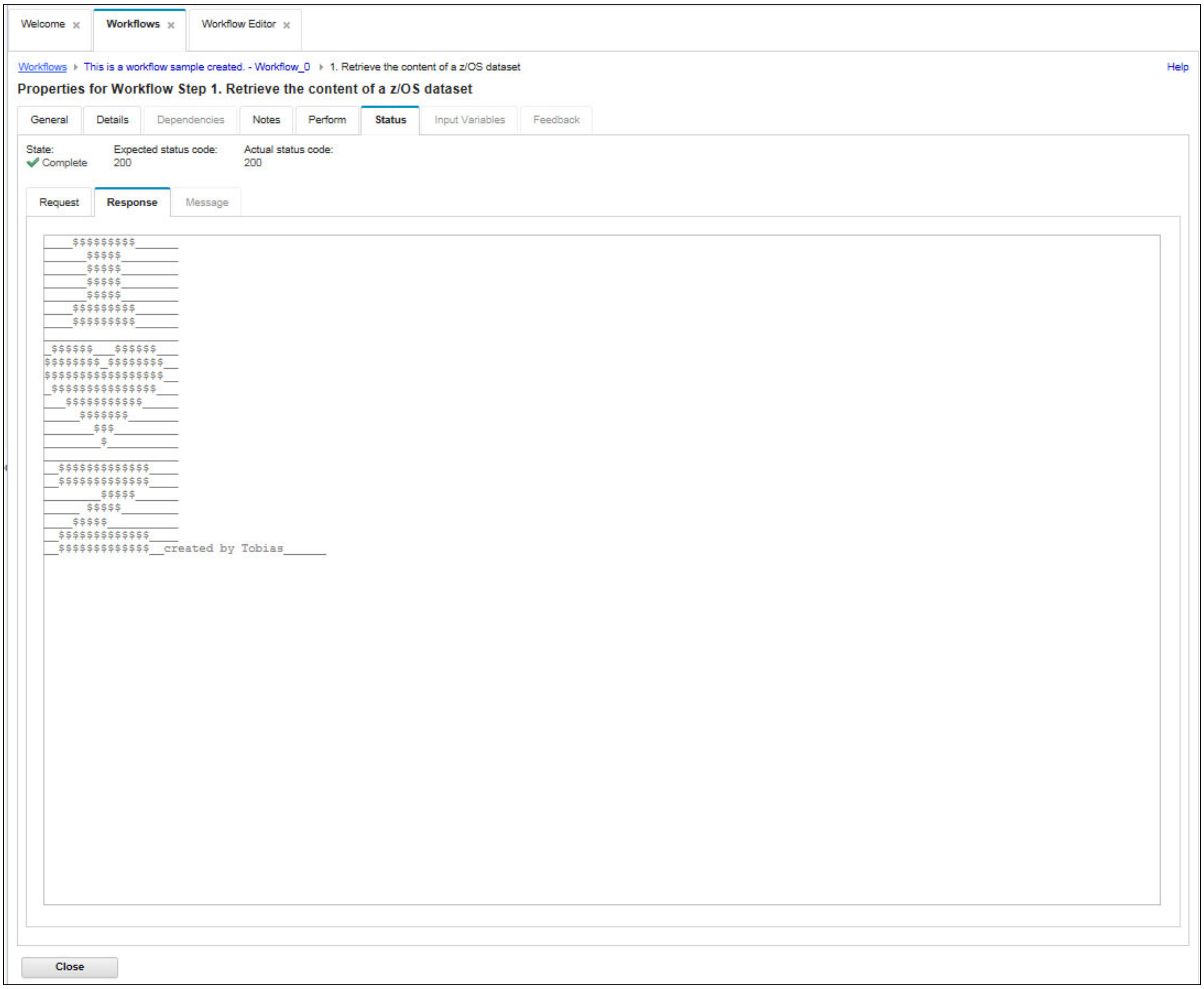
HTTP method:
GET

Request:
https://10.12.5.11:2443/zosmf/restfiles/ds/TOBIAS.WF.SAMPLE

Request body:

Figure 7-25 Using the Workflow

The output of the REST API call of our sample Workflow is shown in Figure 7-26.



Welcome ×
Workflows ×
Workflow Editor ×
Workflows ▸ This is a workflow sample created. - Workflow_0 ▸ 1. Retrieve the content of a z/OS dataset
Help

Properties for Workflow Step 1. Retrieve the content of a z/OS dataset

State: ✓ Complete

Expected status code: 200

Actual status code: 200

```
____$$$$$$$$$______
______$$$$$________
______$$$$$________
______$$$$$________
______$$$$$________
____$$$$$$$$$______
____$$$$$$$$$______
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___________________
__$$$$$$$$$$$$$____
__$$$$$$$$$$$$$____
________$$$$$______
_____ $$$$$________
____$$$$$__________
__$$$$$$$$$$$$$____
__$$$$$$$$$$$$$__created by Tobias______
```

Figure 7-26 Sample output of REST API call

8

Links

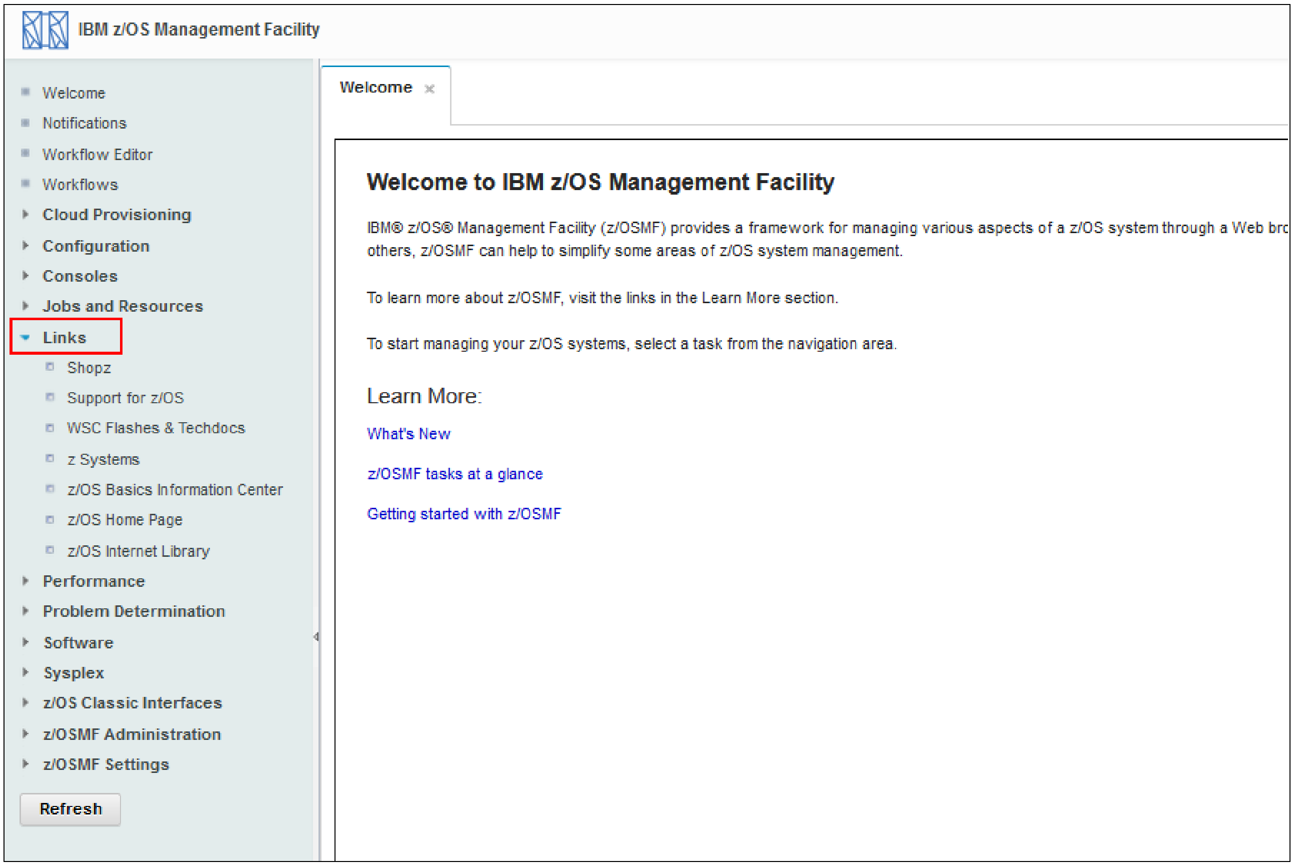
This chapter describes the links in the IBM z/OS Management Facility (z/OSMF) navigation tree and includes the following topics:

- 8.1, “Links and their purpose” on page 182
- 8.2, “Adding links” on page 183
- 8.3, “Modifying links” on page 188
- 8.4, “Deleting links” on page 189
- 8.5, “Adding links to z/OSMF by using the Import Manager” on page 190
- 8.6, “Security” on page 193

8.1 Links and their purpose

Links is a category in the z/OSMF navigation tree that can help effectively store and share information with your team. It is similar to the “Favorites” or “Bookmarks” sections in web browsers. Links can contain start points or links to outside websites, and to any subcategory in the navigation tree.

z/OSMF includes several predefined links, and you can use the z/OSMF web interface to add, modify, and delete links. Figure 8-1 shows the Links category in the left navigation pane with the IBM supplied links under it.



Welcome to IBM z/OS Management Facility

IBM® z/OS® Management Facility (z/OSMF) provides a framework for managing various aspects of a z/OS system through a Web bro others, z/OSMF can help to simplify some areas of z/OS system management.

To learn more about z/OSMF, visit the links in the Learn More section.

To start managing your z/OS systems, select a task from the navigation area.

Learn More:

What's New

z/OSMF tasks at a glance

Getting started with z/OSMF

Figure 8-1 Links in z/OSMF navigation tree

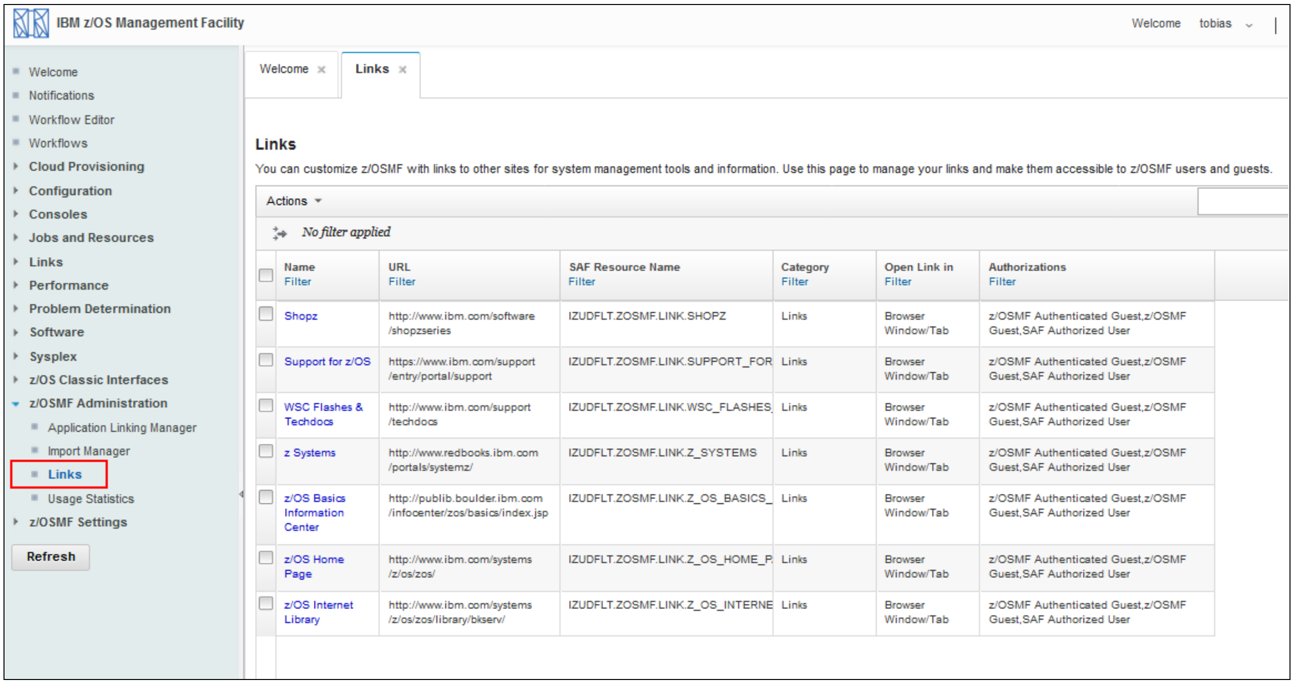
The following links are supplied by IBM:

- Shopz, which opens the ShopzSeries website
- Support for z/OS, which opens the z/OS support website
- WSC Flashes & Techdocs, which opens the Techdocs website
- z Systems, which opens the IBM System z Redbooks website
- z/OS Basics Information Center, which opens the z/OS Basic skills information center
- z/OS Home Page, which opens the z/OS operating system home page
- z/OS Internet Library, which opens the z/OS internet library website

8.2 Adding links

To add new links, complete the following steps:

1. Log on to z/OSMF with a user ID that is connected to the z/OSMF administration role RACF group IZUADMIN.
2. In the left pane, click **z/OS Administration** → **Links**. A listing of links displays in the right pane, as shown in Figure 8-2.



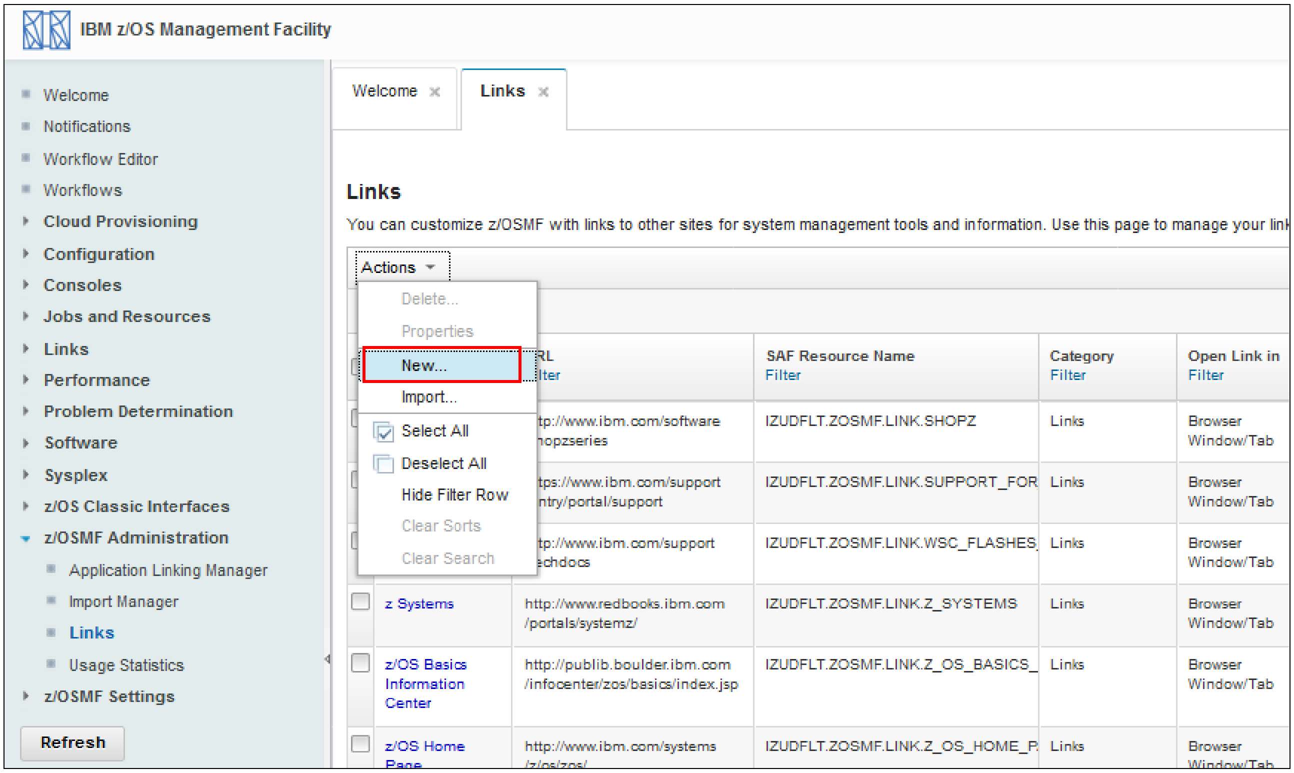
Links

You can customize z/OSMF with links to other sites for system management tools and information. Use this page to manage your links and make them accessible to z/OSMF users and guests.

□	Name Filter	URL Filter	SAF Resource Name Filter	Category Filter	Open Link in Filter	Authorizations Filter
□	Shopz	http://www.ibm.com/software/shopzseries	IZUDFLT.ZOSMF.LINK.SHOPZ	Links	Browser Window/Tab	z/OSMF Authenticated Guest,z/OSMF Guest,SAF Authorized User
□	Support for z/OS	https://www.ibm.com/support/entry/portal/support	IZUDFLT.ZOSMF.LINK.SUPPORT_FOR	Links	Browser Window/Tab	z/OSMF Authenticated Guest,z/OSMF Guest,SAF Authorized User
□	WSC Flashes & Techdocs	http://www.ibm.com/support/techdocs	IZUDFLT.ZOSMF.LINK.WSC_FLASHES	Links	Browser Window/Tab	z/OSMF Authenticated Guest,z/OSMF Guest,SAF Authorized User
□	z Systems	http://www.redbooks.ibm.com/portals/systemz/	IZUDFLT.ZOSMF.LINK.Z_SYSTEMS	Links	Browser Window/Tab	z/OSMF Authenticated Guest,z/OSMF Guest,SAF Authorized User
□	z/OS Basics Information Center	http://publib.boulder.ibm.com/infocenter/zos/basics/index.jsp	IZUDFLT.ZOSMF.LINK.Z_OS_BASICS_	Links	Browser Window/Tab	z/OSMF Authenticated Guest,z/OSMF Guest,SAF Authorized User
□	z/OS Home Page	http://www.ibm.com/systems/z/os/zos/	IZUDFLT.ZOSMF.LINK.Z_OS_HOME_P	Links	Browser Window/Tab	z/OSMF Authenticated Guest,z/OSMF Guest,SAF Authorized User
□	z/OS Internet Library	http://www.ibm.com/systems/z/os/zos/library/bkserv/	IZUDFLT.ZOSMF.LINK.Z_OS_INTERNE	Links	Browser Window/Tab	z/OSMF Authenticated Guest,z/OSMF Guest,SAF Authorized User

Figure 8-2 List of links

3. In the right pane, click **Actions** → **New**, as shown in Figure 8-3.



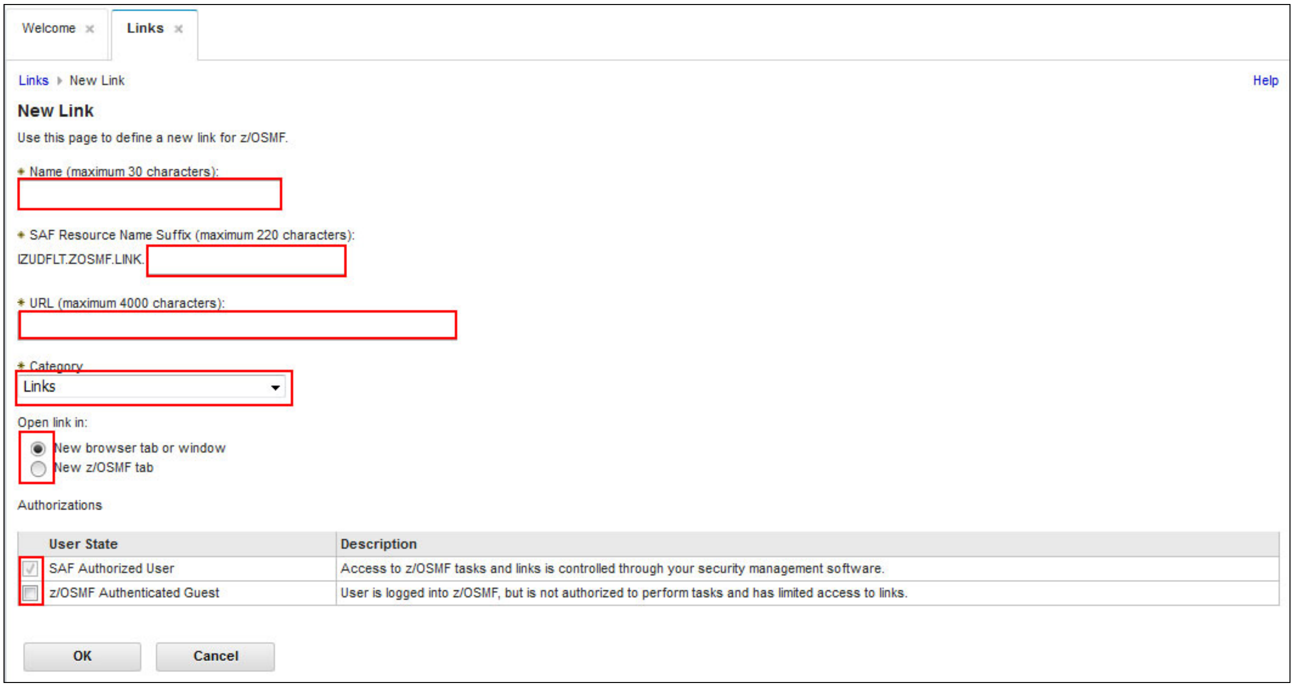
Links

You can customize z/OSMF with links to other sites for system management tools and information. Use this page to manage your lin

		RL lter	SAF Resource Name Filter	Category Filter	Open Link in Filter
		tp://www.ibm.com/software opzseries	IZUDFLT.ZOSMF.LINK.SHOPZ	Links	Browser Window/Tab
		tps://www.ibm.com/support ntry/portal/support	IZUDFLT.ZOSMF.LINK.SUPPORT_FOR	Links	Browser Window/Tab
		tp://www.ibm.com/support echdocs	IZUDFLT.ZOSMF.LINK.WSC_FLASHES	Links	Browser Window/Tab
☐	z Systems	http://www.redbooks.ibm.com /portals/systemz/	IZUDFLT.ZOSMF.LINK.Z_SYSTEMS	Links	Browser Window/Tab
☐	z/OS Basics Information Center	http://publib.boulder.ibm.com /infocenter/zos/basics/index.jsp	IZUDFLT.ZOSMF.LINK.Z_OS_BASICS_	Links	Browser Window/Tab
☐	z/OS Home Page	http://www.ibm.com/systems /z/os/zos/	IZUDFLT.ZOSMF.LINK.Z_OS_HOME_P	Links	Browser Window/Tab

Figure 8-3 Selecting New from the Actions drop-down menu

The New Link window opens, as shown in Figure 8-4.



New Link

Use this page to define a new link for z/OSMF.

* Name (maximum 30 characters):

* SAF Resource Name Suffix (maximum 220 characters):
IZUDFLT.ZOSMF.LINK.

* URL (maximum 4000 characters):

* Category
Links

Open link in:
● New browser tab or window
○ New z/OSMF tab

Authorizations

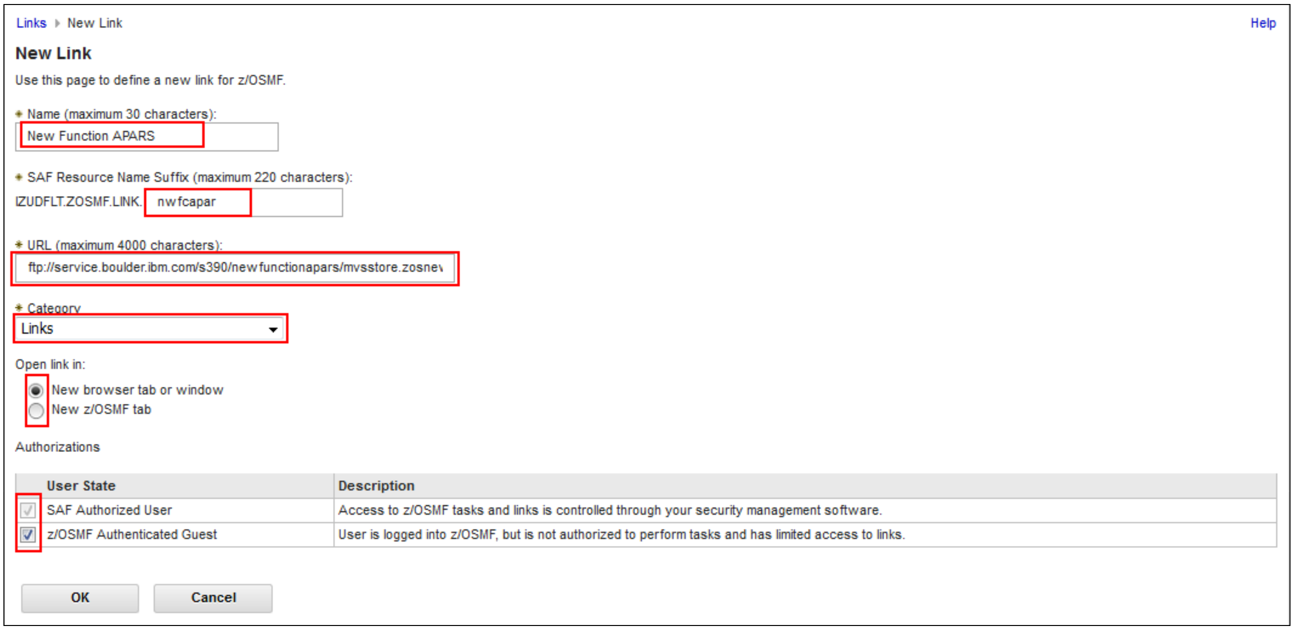
	User State	Description
☑	SAF Authorized User	Access to z/OSMF tasks and links is controlled through your security management software.
□	z/OSMF Authenticated Guest	User is logged into z/OSMF, but is not authorized to perform tasks and has limited access to links.

Figure 8-4 New link window

In our example, we show how to create a “New function APAR link that starts the FTP website with all new function APARs when the link is clicked. This link is available to anyone that uses this z/OSMF instance.

For more information, see the New function APAR FTP website.

4. Enter a name, SAF resource name suffix, and URL. Select a category, and then, select all the options under the Authorizations section, as shown in Figure 8-5. Click **OK**.



New Link

Use this page to define a new link for z/OSMF.

* Name (maximum 30 characters): New Function APARS

* SAF Resource Name Suffix (maximum 220 characters): IZUDFLT.ZOSMF.LINK. nwfcapar

* URL (maximum 4000 characters): ftp://service.boulder.ibm.com/s390/newfunctionapars/mvsstore.zosnev

* Category: Links

Open link in:

● New browser tab or window
○ New z/OSMF tab

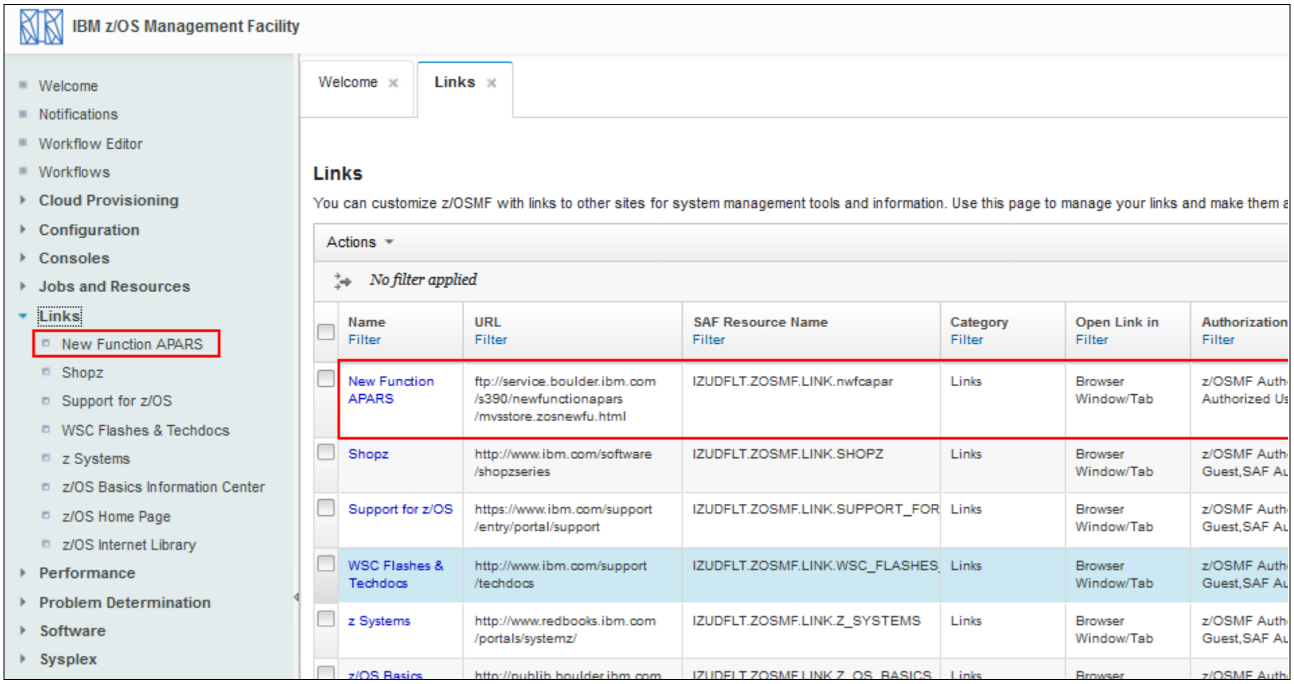
Authorizations

	User State	Description
☑	SAF Authorized User	Access to z/OSMF tasks and links is controlled through your security management software.
☑	z/OSMF Authenticated Guest	User is logged into z/OSMF, but is not authorized to perform tasks and has limited access to links.

Figure 8-5 Completed New Link window

A SAF resource name suffix helps control access user authorization to links by using the ZMFAPLA resource class. A new link can be placed under any category in the navigation tree by selecting the appropriate category.

After a successful update, New function APAR is displayed under the Links category in the navigation view and in the link table, as shown in Figure 8-6.



Links

You can customize z/OSMF with links to other sites for system management tools and information. Use this page to manage your links and make them a

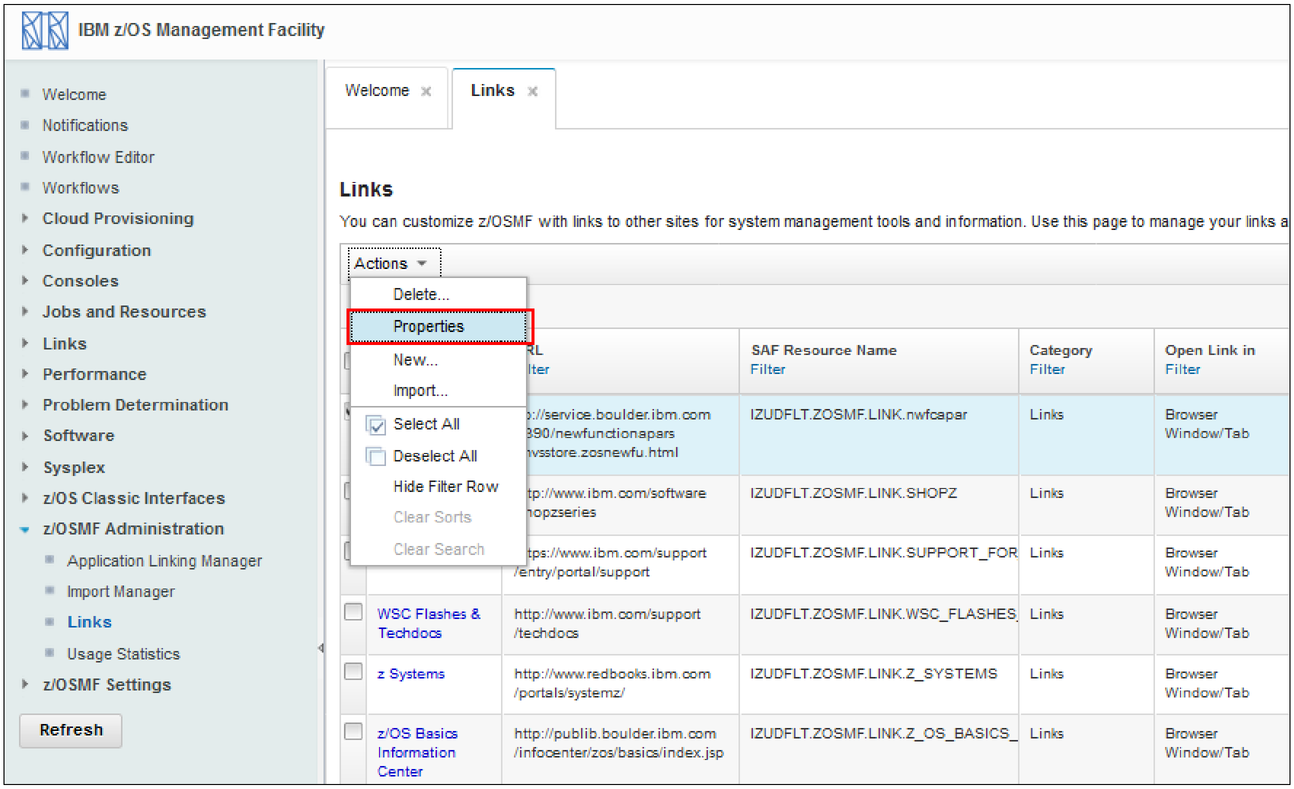
□	Name Filter	URL Filter	SAF Resource Name Filter	Category Filter	Open Link in Filter	Authorization Filter
□	New Function APARS	ftp://service.boulder.ibm.com /s390/newfunctionapars /mvsstore.zosnewfu.html	IZUDFLT.ZOSMF.LINK.nwfcapar	Links	Browser Window/Tab	z/OSMF Auth Authorized Us
□	Shopz	http://www.ibm.com/software /shopzseries	IZUDFLT.ZOSMF.LINK.SHOPZ	Links	Browser Window/Tab	z/OSMF Auth Guest,SAF Au
□	Support for z/OS	https://www.ibm.com/support /entry/portal/support	IZUDFLT.ZOSMF.LINK.SUPPORT_FOR	Links	Browser Window/Tab	z/OSMF Auth Guest,SAF Au
□	WSC Flashes & Techdocs	http://www.ibm.com/support /techdocs	IZUDFLT.ZOSMF.LINK.WSC_FLASHES	Links	Browser Window/Tab	z/OSMF Auth Guest,SAF Au
□	z Systems	http://www.redbooks.ibm.com /portals/systemz/	IZUDFLT.ZOSMF.LINK.Z_SYSTEMS	Links	Browser Window/Tab	z/OSMF Auth Guest,SAF Au
□	z/OS Basics	http://publib.boulder.ibm.com	IZUDFLT.ZOSMF.LINK.Z_OS_BASICS	Links	Browser	z/OSMF Auth

Figure 8-6 IBM New Function APAR is added to z/OSMF

8.3 Modifying links

All links, including the predefined links, can be modified. Except for the name of the link, all of the settings can be modified. In our example, we modify the New function APAR link that we added earlier by completing the following steps:

1. From the left pane, click **z/OS Administration** → **Links**.
2. In the window with the table of links, select **New Function APAR** and click **Actions** → **Properties**, as shown in Figure 8-7.



Links

You can customize z/OSMF with links to other sites for system management tools and information. Use this page to manage your links a

		RL lter	SAF Resource Name Filter	Category Filter	Open Link in Filter
		://service.boulder.ibm.com 390/newfunctionapars vsstore.zosnewfu.html	IZUDFLT.ZOSMF.LINK.nwfcapar	Links	Browser Window/Tab
		tp://www.ibm.com/software opzseries	IZUDFLT.ZOSMF.LINK.SHOPZ	Links	Browser Window/Tab
		tps://www.ibm.com/support /entry/portal/support	IZUDFLT.ZOSMF.LINK.SUPPORT_FOR	Links	Browser Window/Tab
☐	WSC Flashes & Techdocs	http://www.ibm.com/support /techdocs	IZUDFLT.ZOSMF.LINK.WSC_FLASHES_	Links	Browser Window/Tab
☐	z Systems	http://www.redbooks.ibm.com /portals/systemz/	IZUDFLT.ZOSMF.LINK.Z_SYSTEMS	Links	Browser Window/Tab
☐	z/OS Basics Information Center	http://publib.boulder.ibm.com /infocenter/zos/basics/index.jsp	IZUDFLT.ZOSMF.LINK.Z_OS_BASICS_	Links	Browser Window/Tab

Figure 8-7 Modifying links

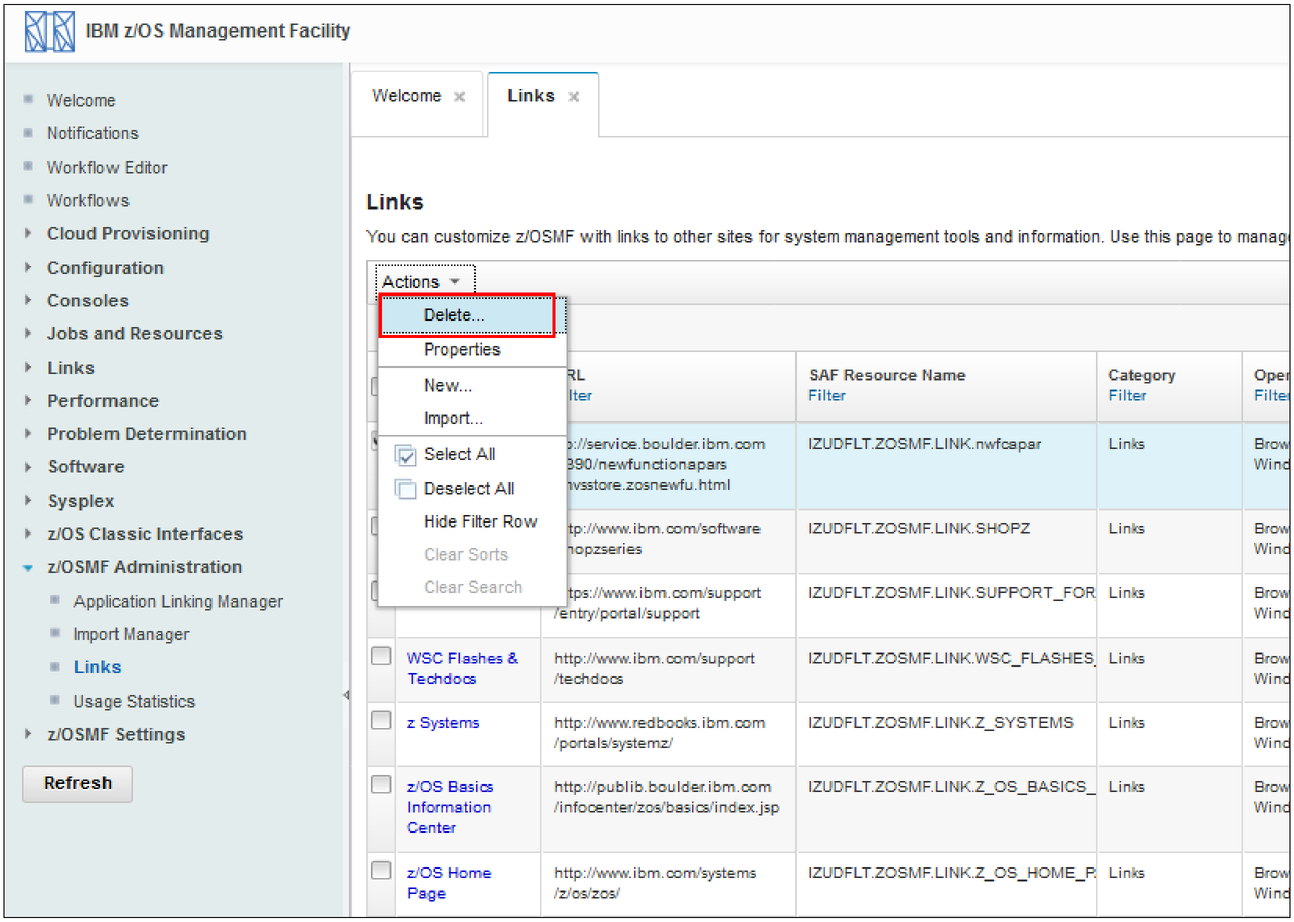
In our example, we want to modify the New Function APAR link that we added. The properties of New Function APAR are similar to the ones shown in Figure 8-6 on page 187.

3. The modification that we want to make is to make New Function APAR available to a SAF authorized user only. To accomplish this task, under the Authorizations section, clear all the **z/OSMF Authenticated Guest** option and click **OK**.

8.4 Deleting links

All links, including the predefined ones, can be deleted. In our example, we delete the IBM Resource Link® link that we added earlier by completing the following steps:

1. From the left pane, click **z/OS Administration** → **Links**.
2. In the window with the table of links, select **New Function APAR** and then, click **Actions** → **Delete**, as shown in Figure 8-8.



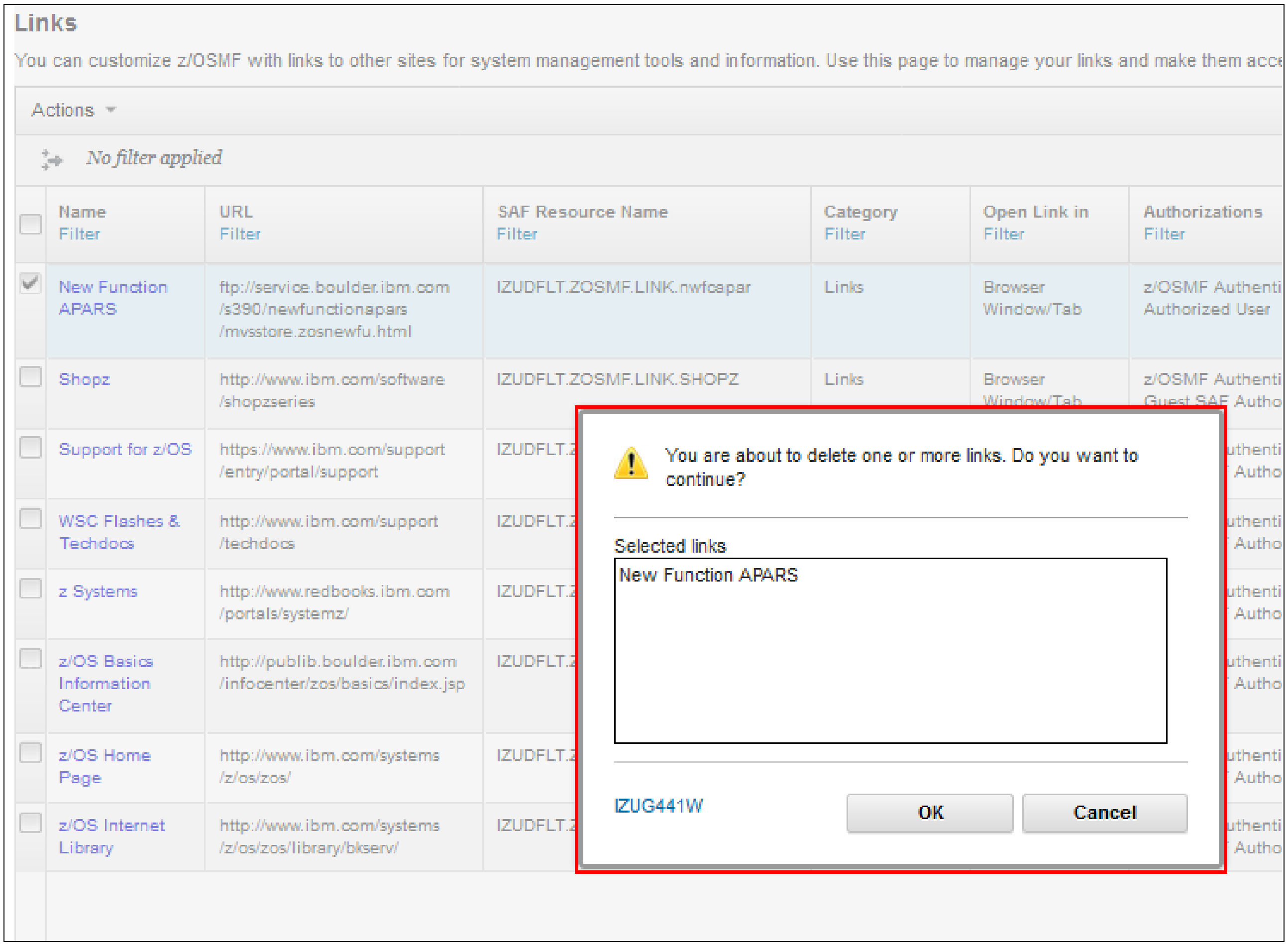
Links

You can customize z/OSMF with links to other sites for system management tools and information. Use this page to manag

		RL lter	SAF Resource Name Filter	Category Filter	Oper Filte
		://service.boulder.ibm.com 390/newfunctionapars vsstore.zosnewfu.html	IZUDFLT.ZOSMF.LINK.nwfcapar	Links	Brow Wind
		tp://www.ibm.com/software hopzseries	IZUDFLT.ZOSMF.LINK.SHOPZ	Links	Brow Wind
		tps://www.ibm.com/support /entry/portal/support	IZUDFLT.ZOSMF.LINK.SUPPORT_FOR	Links	Brow Wind
☐	WSC Flashes & Techdocs	http://www.ibm.com/support /techdocs	IZUDFLT.ZOSMF.LINK.WSC_FLASHES_	Links	Brow Wind
☐	z Systems	http://www.redbooks.ibm.com /portals/systemz/	IZUDFLT.ZOSMF.LINK.Z_SYSTEMS	Links	Brow Wind
☐	z/OS Basics Information Center	http://publib.boulder.ibm.com /infocenter/zos/basics/index.jsp	IZUDFLT.ZOSMF.LINK.Z_OS_BASICS_	Links	Brow Wind
☐	z/OS Home Page	http://www.ibm.com/systems /z/os/zos/	IZUDFLT.ZOSMF.LINK.Z_OS_HOME_P	Links	Brow Wind

Figure 8-8 Deleting links

3. A window opens that prompts you to confirm the deletion, as shown in Figure 8-9. Click **OK** to confirm the deletion of the link.



Links

You can customize z/OSMF with links to other sites for system management tools and information. Use this page to manage your links and make them acce

□	Name Filter	URL Filter	SAF Resource Name Filter	Category Filter	Open Link in Filter	Authorizations Filter
☑	New Function APARS	ftp://service.boulder.ibm.com/s390/newfunctionapars/mvsstore.zosnewfu.html	IZUDFLT.ZOSMF.LINK.nwfcapar	Links	Browser Window/Tab	z/OSMF Authenti Authorized User
□	Shopz	http://www.ibm.com/software/shopzseries	IZUDFLT.ZOSMF.LINK.SHOPZ	Links	Browser Window/Tab	z/OSMF Authenti Guest SAF Autho
□	Support for z/OS	https://www.ibm.com/support/entry/portal/support	IZUDFLT.Z			uthenti Autho
□	WSC Flashes & Techdocs	http://www.ibm.com/support/techdocs	IZUDFLT.Z			uthenti Autho
□	z Systems	http://www.redbooks.ibm.com/portals/systemz/	IZUDFLT.Z			uthenti Autho
□	z/OS Basics Information Center	http://publib.boulder.ibm.com/infocenter/zos/basics/index.jsp	IZUDFLT.Z			uthenti Autho
□	z/OS Home Page	http://www.ibm.com/systems/z/os/zos/	IZUDFLT.Z			uthenti Autho
□	z/OS Internet Library	http://www.ibm.com/systems/z/os/zos/library/bkserv/	IZUDFLT.Z			uthenti Autho

You are about to delete one or more links. Do you want to continue?

Selected links

New Function APARS

IZUG441W

Figure 8-9 Confirmation window

8.5 Adding links to z/OSMF by using the Import Manager

In this section, we describe how to create a link with the Import Manager. First, you must create a property file in your UNIX System Services environment. The file is similar to the file that is shown in Example 8-1.

Example 8-1 Property file sample

```
LinkName=link-name
LinkURL=URL
LinkAuthorizedRoles=authorized-roles
LinkSafSuffix=SAF-suffix
LinkNavigationCategory=category-name
LinkLaunchWorkArea=launch-location
```

To create a link with the Import Manager, complete the following steps:

1. Specify a name for the link that is easily understood by users.
2. Specify the location for the link (a URL).

3. Specify the z/OSMF roles for which users are authorized to use the link.
4. Specify a unique SAF resource name suffix.
5. Specify where the link is to be displayed in the z/OSMF navigation area:
   - 1: z/OSMF Administration
   - 2: Problem Determination
   - 3: Links
   - 4: Configuration
   - 5: Software
   - 7: z/OS Classic Interfaces
   - 9: Performance
   - 10: z/OSMF Settings
   - 11: Uncategorized
   - 12: Commands and Logs
   - 13: Jobs and Resources
6. Set the `LinkLaunchWorkArea` value to `False` so that the link opens in a separate browser tab or window. Set this value to `True` to have the link open as a tab in the z/OSMF work area, such as a z/OSMF task.

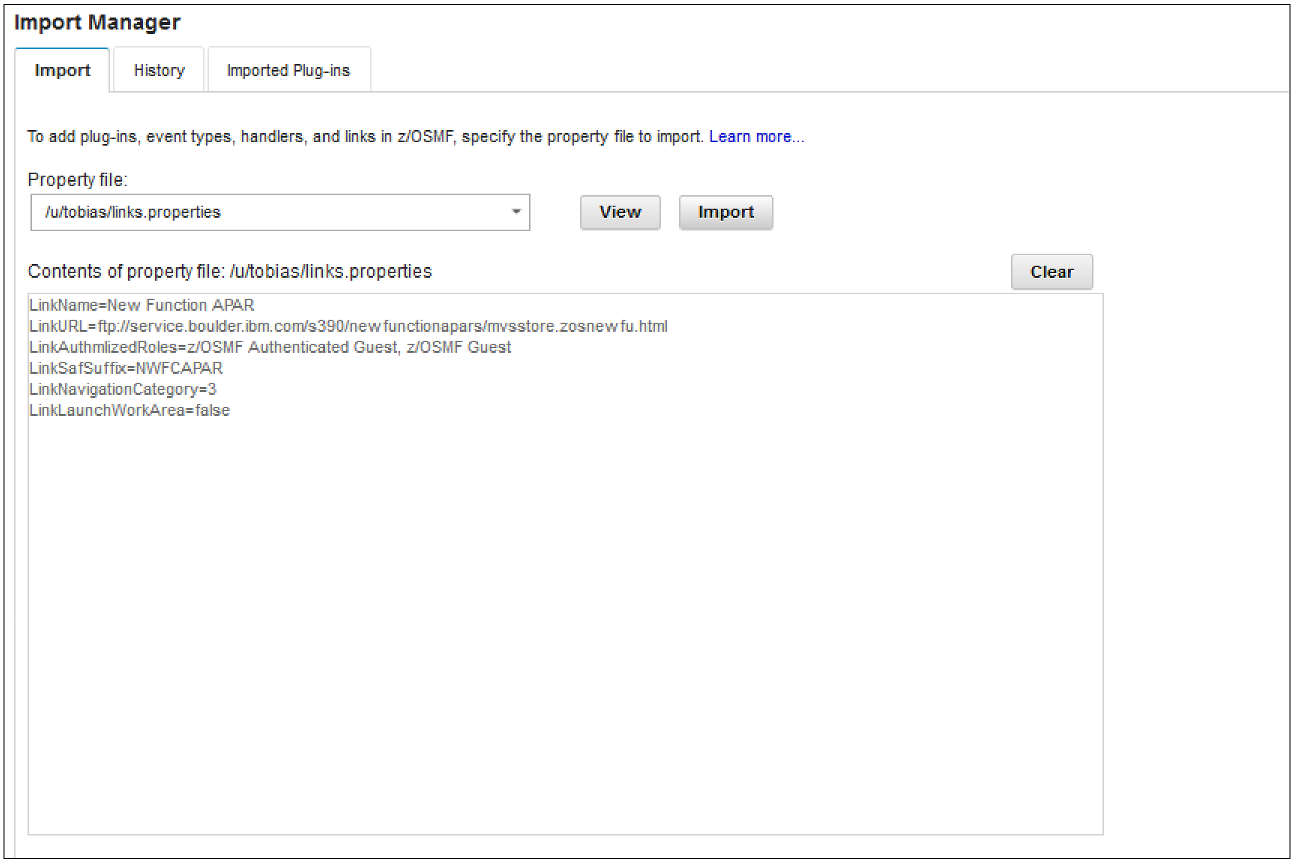
In our example, we created a file in `/u/tobias/links.properties`. Next, we edited this file, as shown in Example 8-2.

Example 8-2 New Function APAR link

```
LinkName=New Function APAR
LinkURL=ftp://service.boulder.ibm.com/s390/newfunctionapars/mvsstore.zosnewfu.html
LinkAuthmlizedRoles=z/OSMF Authenticated Guest, z/OSMF Guest
LinkSafSuffix=NWFCAPAR
LinkNavigationCategory=3
LinkLaunchWorkArea=false
```

Next, save the `links.properties` file return to the Links category in z/OSMF.

Select **Import** from the Actions menu in the Links table. The newly created file can now be imported, as shown in Figure 8-10. Click **View** to see the input of this file. Click **Import** when you want to add this link to z/OSMF.



To add plug-ins, event types, handlers, and links in z/OSMF, specify the property file to import. Learn more...

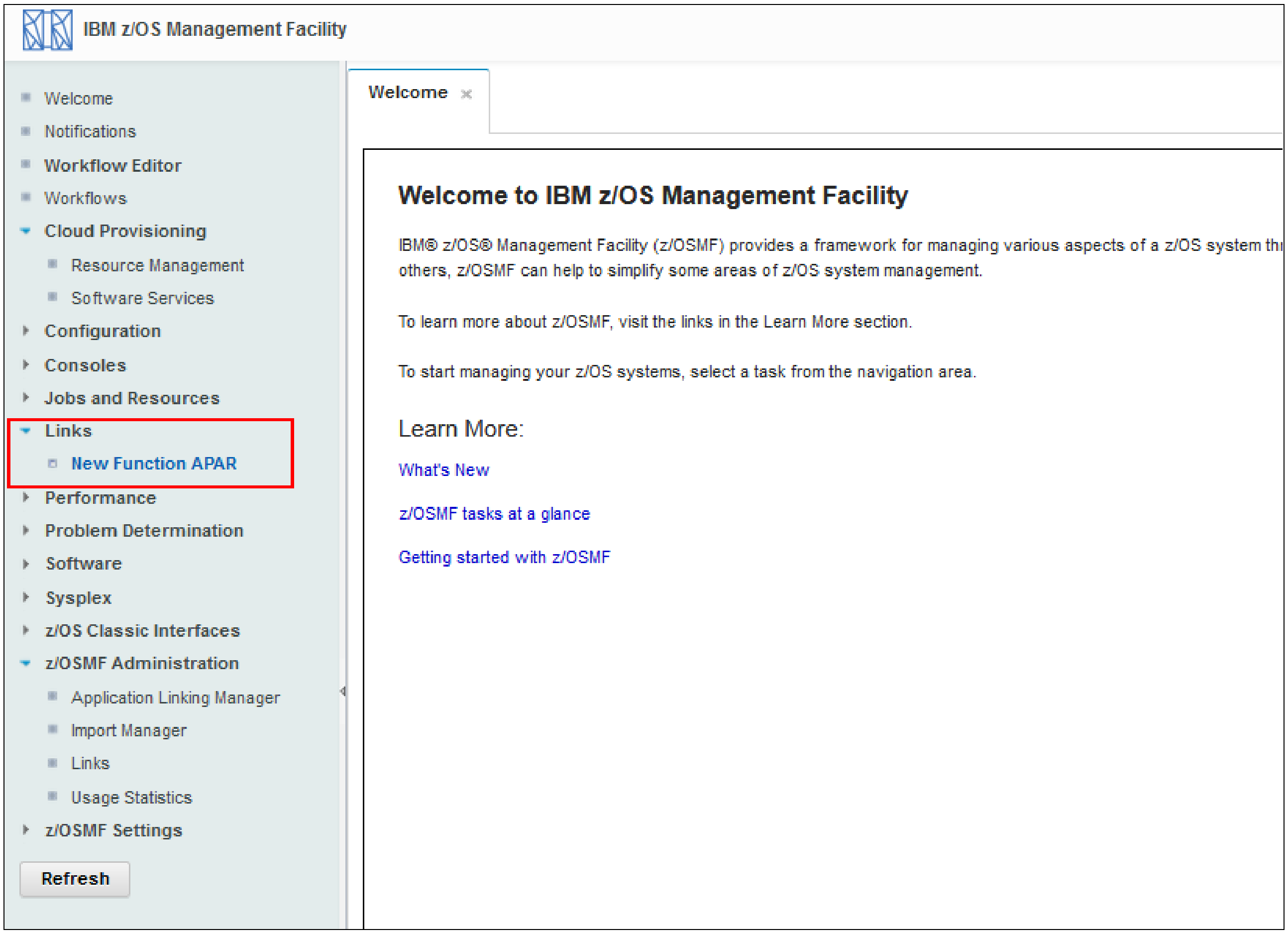
Property file: /u/tobias/links.properties

Contents of property file: /u/tobias/links.properties

```
LinkName=New Function APAR
LinkURL=ftp://service.boulder.ibm.com/s390/newfunctionapars/mvsstore.zosnewfu.html
LinkAuthmlizedRoles=z/OSMF Authenticated Guest, z/OSMF Guest
LinkSafSuffix=NWFCAPAR
LinkNavigationCategory=3
LinkLaunchWorkArea=false
```

Figure 8-10 Import Manager

The newly created link in z/OSMF is shown in Figure 8-11.



Welcome to IBM z/OS Management Facility

IBM® z/OS® Management Facility (z/OSMF) provides a framework for managing various aspects of a z/OS system thı
others, z/OSMF can help to simplify some areas of z/OS system management.

To learn more about z/OSMF, visit the links in the Learn More section.

To start managing your z/OS systems, select a task from the navigation area.

Learn More:

What's New

z/OSMF tasks at a glance

Getting started with z/OSMF

Figure 8-11 New Function APAR

8.6 Security

This section describes how to authorize control and access to links. Links are protected by ZMFAPLA class resources (IZUDFLT.ZOSMF.LINK.**), which control access. The *SAF suffix* that is specified when you add a link can make access to links more granular and specific. For example, we add NWFCAPAR as a SAF suffix for the IBM Resource LInk link to control access to the IBM Resource Link link with the ZMFAPLA class profile IZUDFLT.ZOSMF.LINK.NWFCAPAR.

Consider a user ID named TOBIAS, which has access to all the links, as shown in Figure 8-12 on page 194. To remove all access to the links except for the New Function APAR link, complete the following steps:

1. Remove all access to all links for user ID TOBIAS by running the following command:

   ```
   PE IZUDFLT.ZOSMF.LINK.** CLASS(ZMFAPLA) ID(TOBIAS) ACCESS(NONE)
   ```

2. Add a profile that is named IZUDFLT.ZOSMF.LINK.NWFCAPAR to ZMFAPLA class by running the following command with `UACC(NONE)`:

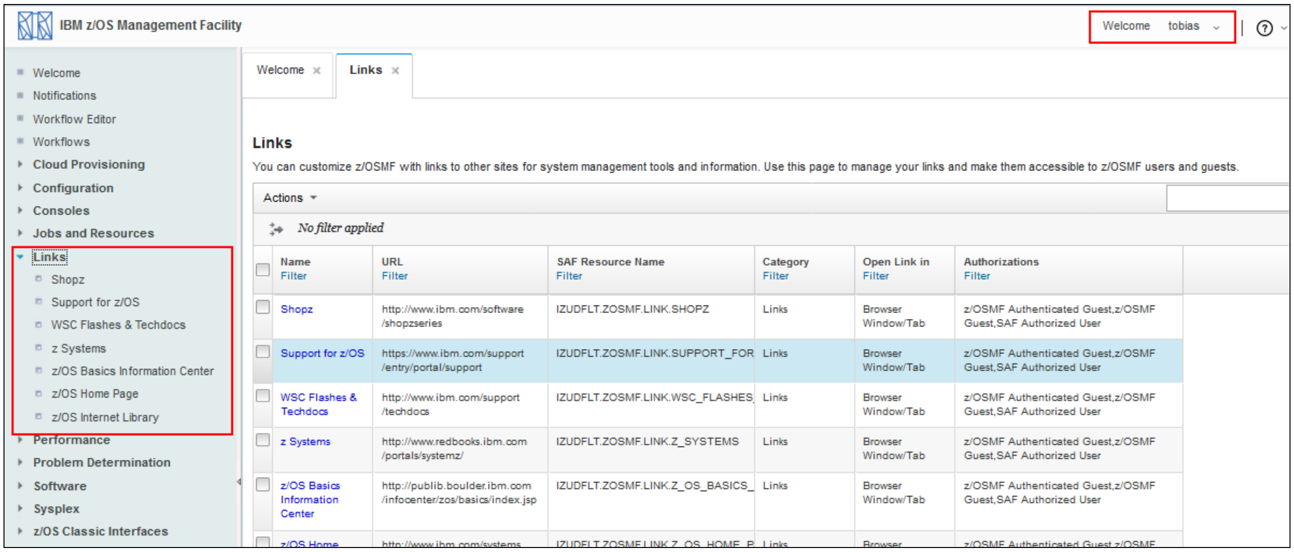
   ```
   RDEFINE ZMFAPLA IZUDFLT.ZOSMF.LINK.NWFCAPAR UACC(NONE)
   ```

3. Permit user ID TOBIAS read access to the ZMFAPLA class profile IZUDFLT.ZOSMF.LINK.NWFCAPAR by running the following command:

```
PE IZUDFLT.ZOSMF.LINK.NWFCAPAR CLASS(ZMFAPLA) ID(TOBIAS) ACCESS(READ)
```

4. Refresh RACF tables by running the following command:

```
SETR RACLIST(ZMFAPLA) REFRESH
```



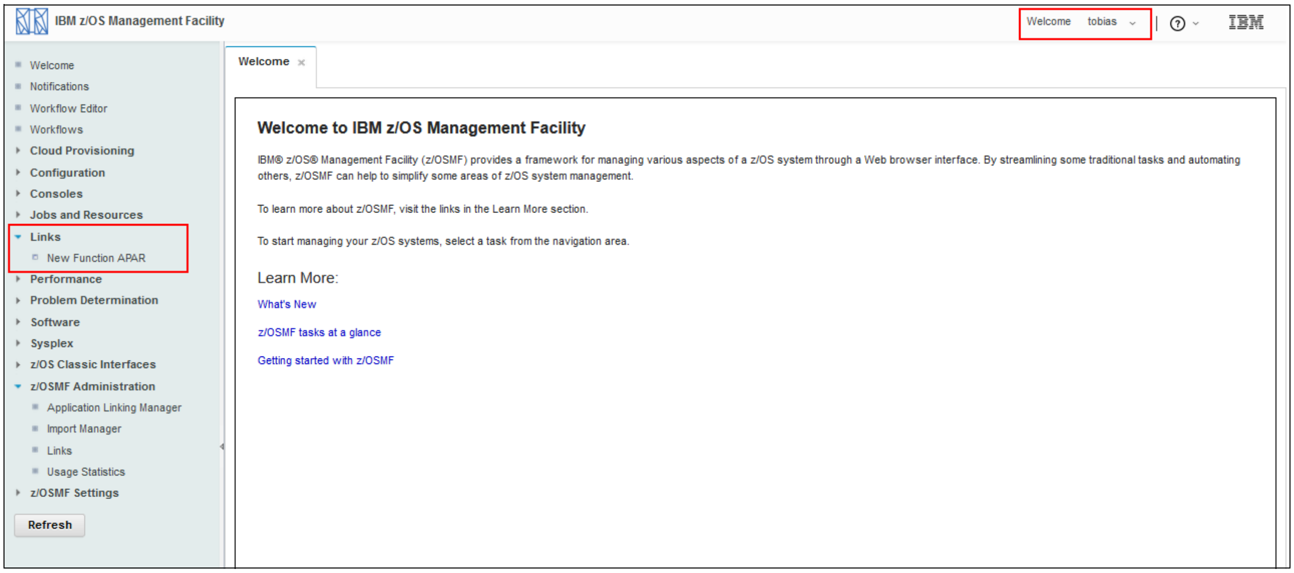
Links

You can customize z/OSMF with links to other sites for system management tools and information. Use this page to manage your links and make them accessible to z/OSMF users and guests.

	Name Filter	URL Filter	SAF Resource Name Filter	Category Filter	Open Link in Filter	Authorizations Filter
□	Shopz	http://www.ibm.com/software /shopzseries	IZUDFLT.ZOSMF.LINK.SHOPZ	Links	Browser Window/Tab	z/OSMF Authenticated Guest,z/OSMF Guest,SAF Authorized User
□	Support for z/OS	https://www.ibm.com/support /entry/portal/support	IZUDFLT.ZOSMF.LINK.SUPPORT_FOR	Links	Browser Window/Tab	z/OSMF Authenticated Guest,z/OSMF Guest,SAF Authorized User
□	WSC Flashes & Techdocs	http://www.ibm.com/support /techdocs	IZUDFLT.ZOSMF.LINK.WSC_FLASHES_	Links	Browser Window/Tab	z/OSMF Authenticated Guest,z/OSMF Guest,SAF Authorized User
□	z Systems	http://www.redbooks.ibm.com /portals/systemz/	IZUDFLT.ZOSMF.LINK.Z_SYSTEMS	Links	Browser Window/Tab	z/OSMF Authenticated Guest,z/OSMF Guest,SAF Authorized User
□	z/OS Basics Information Center	http://publib.boulder.ibm.com /infocenter/zos/basics/index.jsp	IZUDFLT.ZOSMF.LINK.Z_OS_BASICS_	Links	Browser Window/Tab	z/OSMF Authenticated Guest,z/OSMF Guest,SAF Authorized User
□	z/OS Home	http://www.ibm.com/systems	IZUDFLT.ZOSMF.LINK.Z_OS_HOME_P	Links	Browser	z/OSMF Authenticated Guest,z/OSMF

Figure 8-12 Access available to all links

After you finish these steps, the TOBIAS user ID cannot access any other links other than the New Function APAR link, as shown in Figure 8-13.



Welcome to IBM z/OS Management Facility

IBM® z/OS® Management Facility (z/OSMF) provides a framework for managing various aspects of a z/OS system through a Web browser interface. By streamlining some traditional tasks and automating others, z/OSMF can help to simplify some areas of z/OS system management.

To learn more about z/OSMF, visit the links in the Learn More section.

To start managing your z/OS systems, select a task from the navigation area.

Learn More:

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z/OSMF tasks at a glance

Getting started with z/OSMF

Figure 8-13 Access to New Function APAR only

9

Performance monitoring with IBM z/OS Management Facility

This chapter describes z/OS performance monitoring and management by using IBM z/OS Management Facility (z/OSMF) and includes the following topics:

- 9.1, “Introduction” on page 196
- 9.2, “z/OS monitoring with z/OSMF” on page 196
- 9.3, “Customizing views” on page 199
- 9.4, “Creating a view” on page 203
- 9.5, “Other platform performance monitoring” on page 214

9.1 Introduction

Performance monitoring with z/OSMF is accomplished by using the Performance task. This task provides a browser-based interface that can be used monitor the performance of the z/OS sysplexes. With z/OSMF, you can monitor most of the metrics that are supported by the Resource Measurement Facility (RMF) Monitor III and RMF PM.

z/OSMF also uses the z/OS RMF Cross Platform (RMF XP) to monitor the following operating systems:

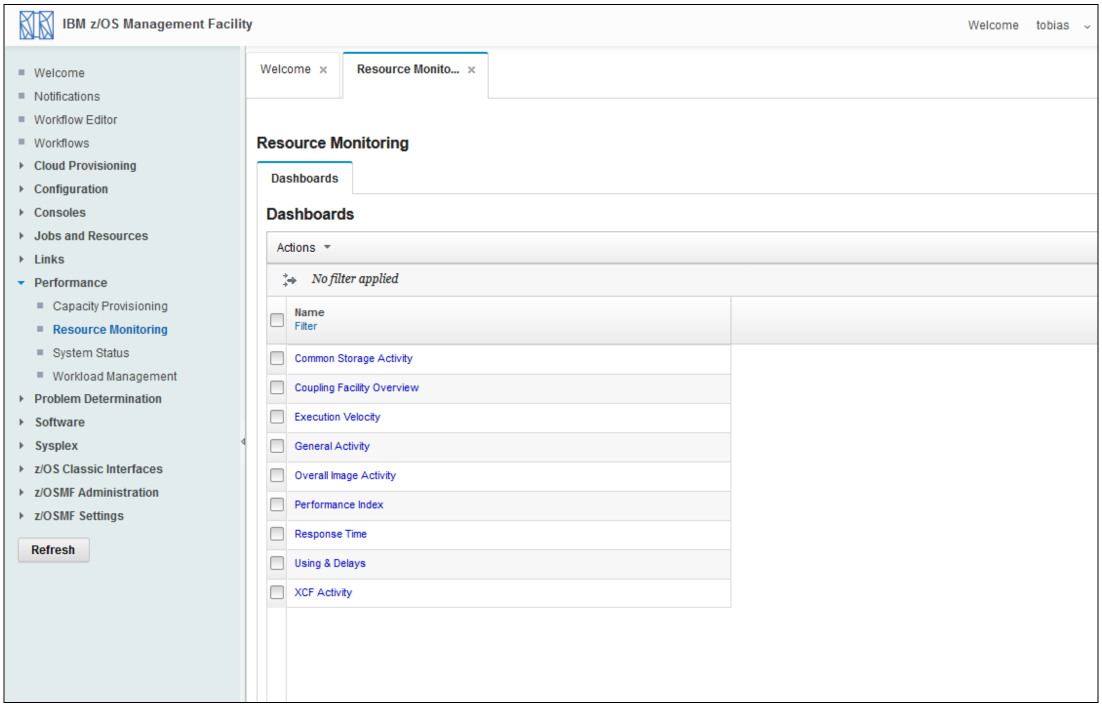
- AIX running on System p
- Linux running on System x
- Linux running on System z
- Windows running on System x

RMF XP does not require any proprietary agent software on the monitored endpoints. It uses the Common Information Model (CIM) instrumentation for the AIX, Linux, and Windows operating systems.

The CIM server and the metric providers are a part of the supported AIX and Linux (but not Windows) distributions, which means that you do not have to install any extra software separately for these distributions. However, you must make sure that the CIM servers with their metric providers are correctly set up and running on the monitored endpoints.

9.2 z/OS monitoring with z/OSMF

z/OSMF provides predefined reports. The performance metrics can be accessed by expanding the Performance category in the navigation area and selecting **Resource Monitoring**. A window opens that is similar to the window that is shown in Figure 9-1.



Name Filter
Common Storage Activity
Coupling Facility Overview
Execution Velocity
General Activity
Overall Image Activity
Performance Index
Response Time
Using & Delays
XCF Activity

Figure 9-1 Default initial view

The first option is Common Storage Activity. To use this option, complete the following steps:

1. Select this option by selecting the check box next to it.
2. Click **Actions** → **Open** or **Actions** → **Open in New Tab or Window**.
3. Select the sysplex name and then, click **OK**.

A window opens that is shown in Figure 9-2.

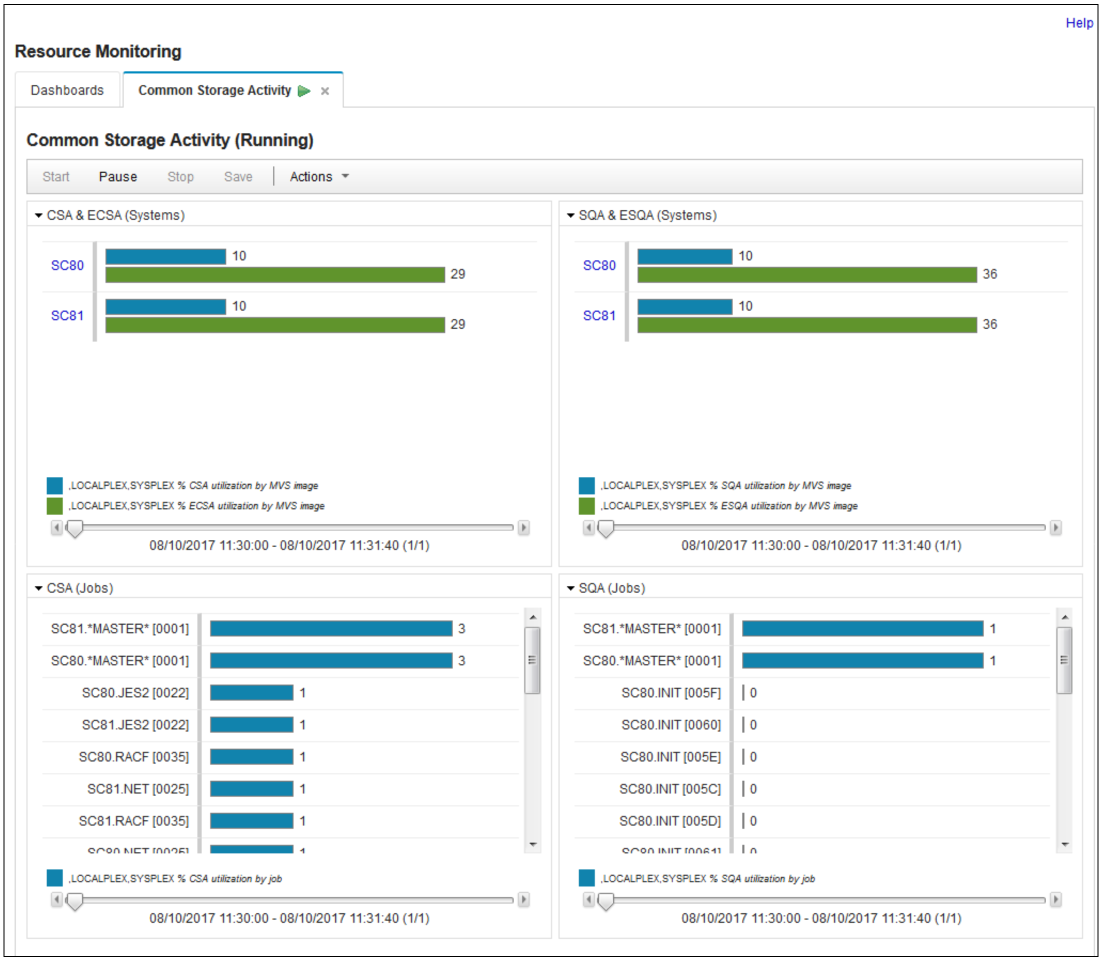
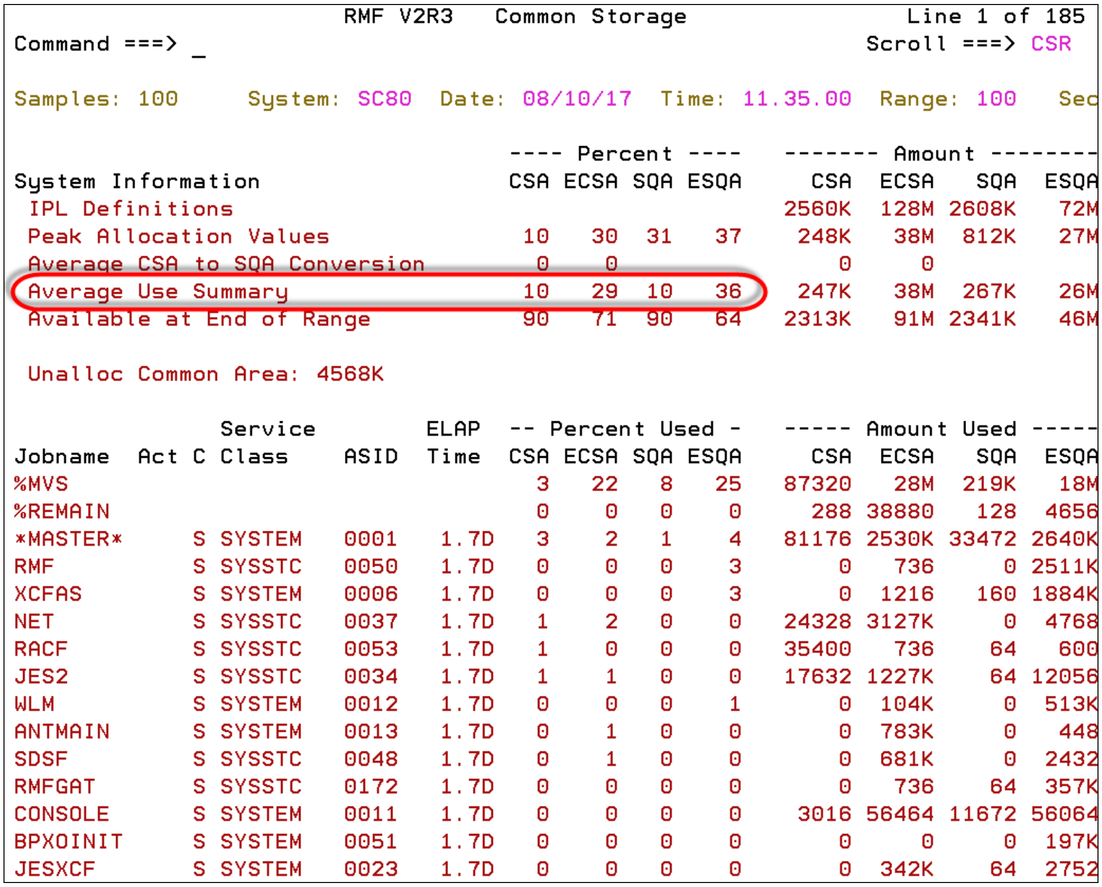


Figure 9-2 Default Common Storage Activity Display window

The top two panes in the window show the CSA, ECSA, SQA, and EQSA usage by system. The bottom two panes in the window show the largest users of CSA and SQA (combined). Under RMF III, the information can be obtained by using the Common Storage display (`STORC`) command.

The values in the Average Use Summary row should match the values from z/OSMF, as shown in Figure 9-3.



```
                         RMF V2R3   Common Storage             Line 1 of 185
Command ===> _                                               Scroll ===> CSR

Samples: 100     System: SC80  Date: 08/10/17  Time: 11.35.00  Range: 100   Sec

                                   ---- Percent ----   ------- Amount --------
System Information                 CSA ECSA SQA ESQA     CSA  ECSA   SQA  ESQA
 IPL Definitions                                        2560K  128M 2608K   72M
 Peak Allocation Values             10   30  31   37    248K   38M  812K   27M
 Average CSA to SQA Conversion       0    0                0     0
 Average Use Summary                10   29  10   36    247K   38M  267K   26M
 Available at End of Range          90   71  90   64   2313K   91M 2341K   46M

 Unalloc Common Area: 4568K

               Service        ELAP  -- Percent Used -   ----- Amount Used -----
Jobname  Act C Class     ASID  Time  CSA ECSA SQA ESQA     CSA  ECSA   SQA  ESQA
%MVS                                   3   22   8   25   87320   28M  219K   18M
%REMAIN                                0    0   0    0     288 38880   128  4656
*MASTER*     S SYSTEM    0001  1.7D    3    2   1    4   81176 2530K 33472 2640K
RMF          S SYSSTC    0050  1.7D    0    0   0    3       0   736     0 2511K
XCFAS        S SYSTEM    0006  1.7D    0    0   0    3       0  1216   160 1884K
NET          S SYSSTC    0037  1.7D    1    2   0    0   24328 3127K     0  4768
RACF         S SYSSTC    0053  1.7D    1    0   0    0   35400   736    64   600
JES2         S SYSSTC    0034  1.7D    1    1   0    0   17632 1227K    64 12056
WLM          S SYSTEM    0012  1.7D    0    0   0    1       0  104K     0  513K
ANTMAIN      S SYSTEM    0013  1.7D    0    1   0    0       0  783K     0   448
SDSF         S SYSSTC    0048  1.7D    0    1   0    0       0  681K     0  2432
RMFGAT       S SYSSTC    0172  1.7D    0    0   0    0       0   736    64  357K
CONSOLE      S SYSTEM    0011  1.7D    0    0   0    0    3016 56464 11672 56064
BPXOINIT     S SYSTEM    0051  1.7D    0    0   0    0       0     0     0  197K
JESXCF       S SYSTEM    0023  1.7D    0    0   0    0       0  342K    64  2752
```

Figure 9-3 RMF III Storage display

The metrics are similar to RMF Performance Monitoring - Java Technology Edition (RMF PM).

As described in the z/OSMF Help documentation, sample collection is available only during the Dashboard session.

The Dashboard collects the samples when you open or start it and temporarily stores them in the sample buffer. When you close the Dashboard or rearrange the metrics in a metric group, z/OSMF clears the sample buffer.

A monitoring Dashboard is a template that you can save so that you can view performance data for your monitored z/OS sysplexes and Linux images (System z and Intel) from the same angle. Saving a Dashboard saves only the changes that were made to the template. For example, you can save the changes that you made to the name of the Dashboard, the order of the metric groups, or the metrics that you want to monitor. A saved Dashboard does not contain the collected samples.

9.3 Customizing views

You can add your own metrics to a dashboard or create your own dashboard for a customized view.

By using the Overall Image Activity (Running) view as a base, you can add a field. In this example, we add the percentage of CSA usage for system SC80. You must open the Overall Image Activity (Running) by using the same process that you used for Common Storage Activity. After the Overall Image Activity (Running) is displayed, you can click the **Actions** tab and then, select **Add Metric**, as shown in Figure 9-4.

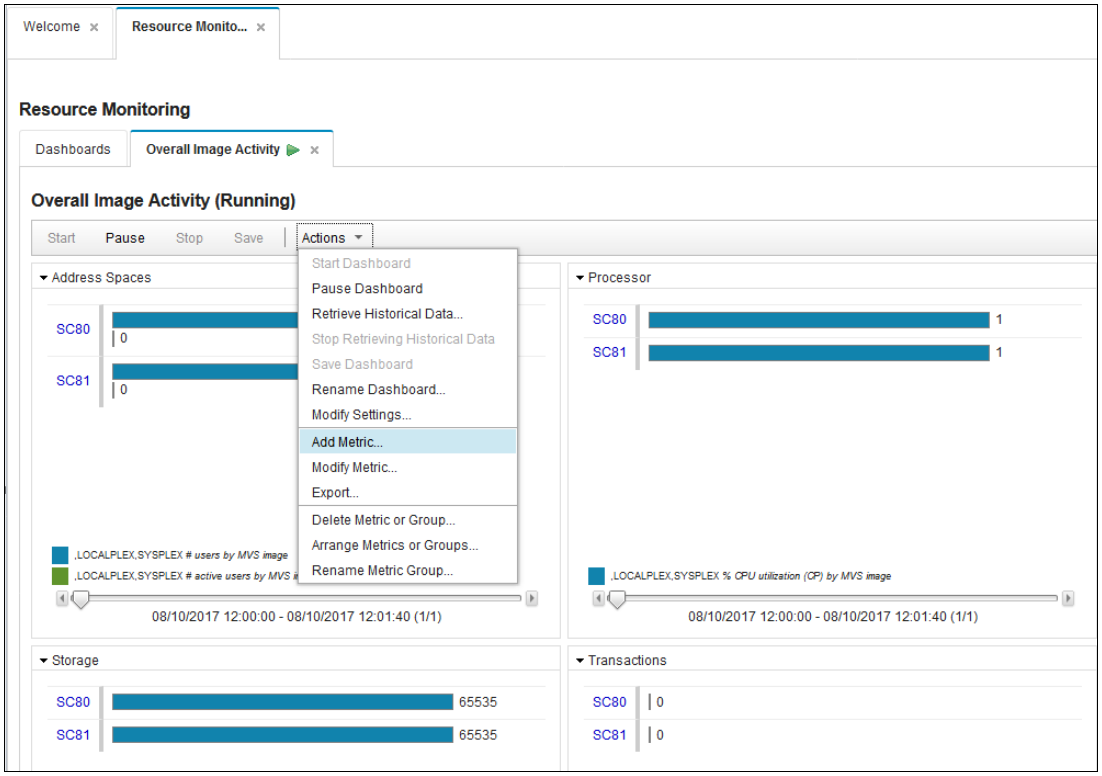
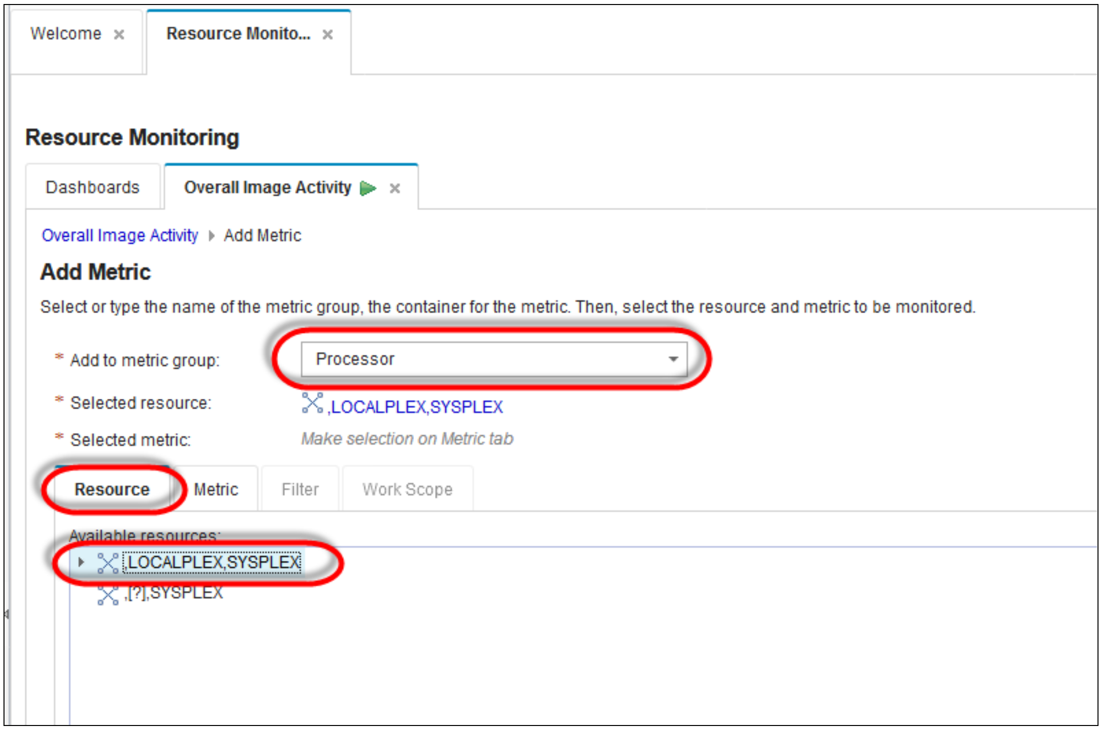


Figure 9-4 Modify a default view

In the window that opens, select the appropriate metric type from the Add to metric group drop-down menu, as shown in Figure 9-5. In this case, the metric type is Processor. Expand the tree structure under the Resource tab until the proc,*, CSA selection is displayed and highlight it by clicking it. Then, click the **Metric** tab.



Resource Monitoring

Overall Image Activity ▸ Add Metric

Add Metric

Select or type the name of the metric group, the container for the metric. Then, select the resource and metric to be monitored.

* Add to metric group: Processor

* Selected resource: ,LOCALPLEX,SYSPLEX

* Selected metric: *Make selection on Metric tab*

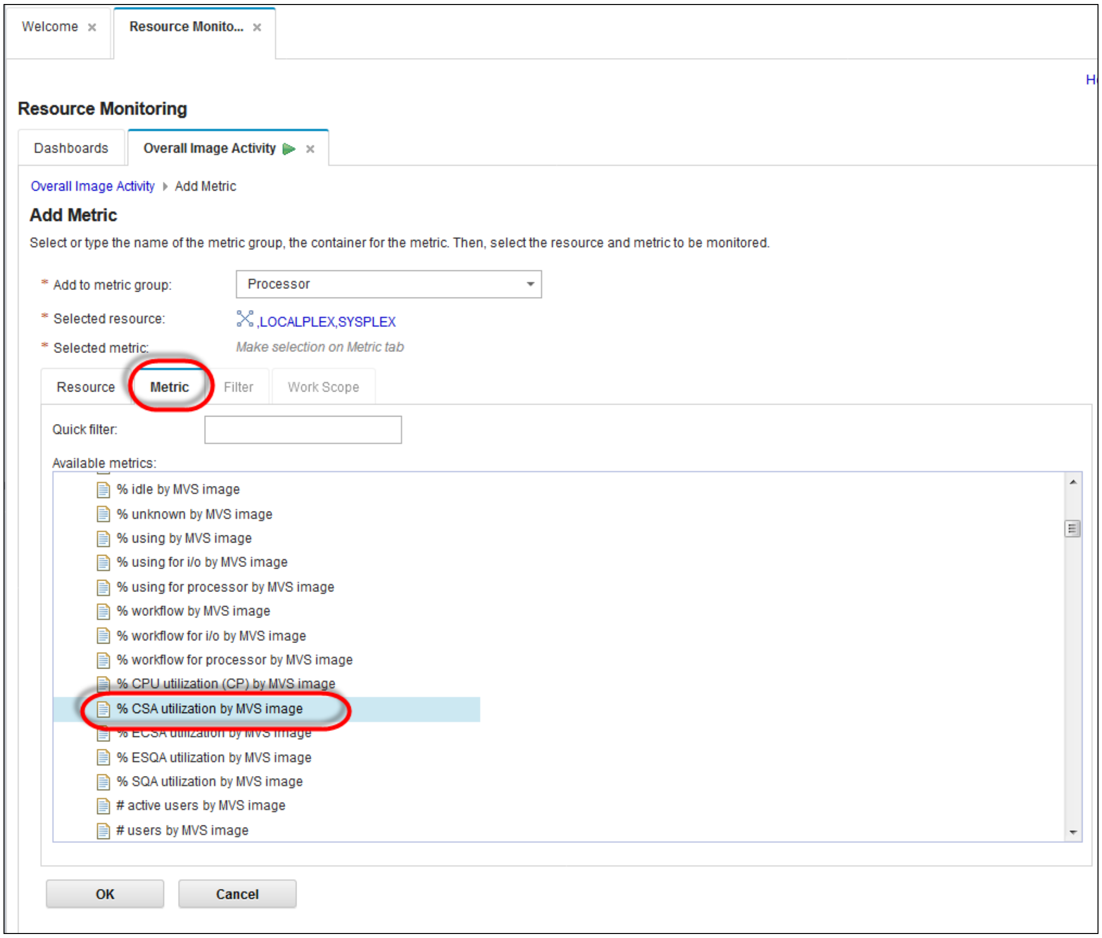
Available resources:

▸ ,LOCALPLEX,SYSPLEX

,[?],SYSPLEX

Figure 9-5 Initial selection of metrics

The metric tab should look as it is pictured in Figure 9-6. Click **% Utilization** under the single valued tree and then, click **OK**.



Resource Monitoring

Add Metric

Select or type the name of the metric group, the container for the metric. Then, select the resource and metric to be monitored.

* Add to metric group: Processor

* Selected resource: ,LOCALPLEX,SYSPLEX

* Selected metric: Make selection on Metric tab

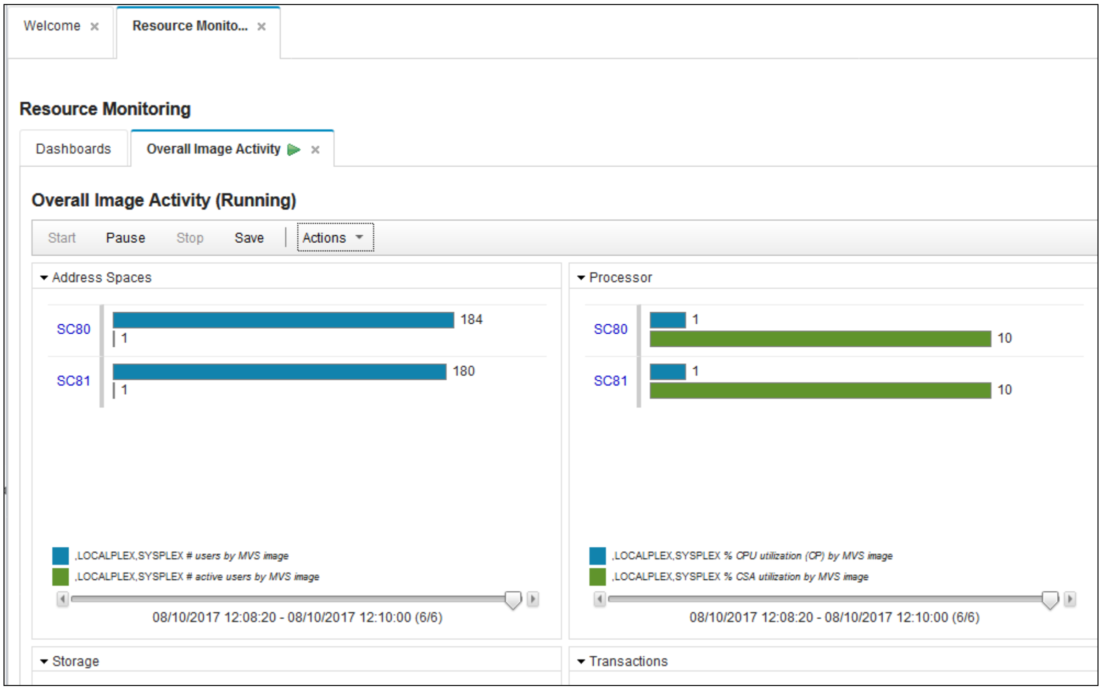
Quick filter:

Available metrics:

- % idle by MVS image
- % unknown by MVS image
- % using by MVS image
- % using for i/o by MVS image
- % using for processor by MVS image
- % workflow by MVS image
- % workflow for i/o by MVS image
- % workflow for processor by MVS image
- % CPU utilization (CP) by MVS image
- % CSA utilization by MVS image
- % ECSA utilization by MVS image
- % ESQA utilization by MVS image
- % SQA utilization by MVS image
- # active users by MVS image
- # users by MVS image

Figure 9-6 Specific selection

Your customized display is now shown in the Processor display, as shown in Figure 9-7. In this case, the CAS percent usage of systems SC74 and SC75 is added to the Processor percent used. If you like the display format, save it permanently by clicking **Save**.



🟦 ,LOCALPLEX,SYSPLEX # users by MVS image
🟩 ,LOCALPLEX,SYSPLEX # active users by MVS image
08/10/2017 12:08:20 - 08/10/2017 12:10:00 (6/6)

🟦 ,LOCALPLEX,SYSPLEX % CPU utilization (CP) by MVS image
🟩 ,LOCALPLEX,SYSPLEX % CSA utilization by MVS image
08/10/2017 12:08:20 - 08/10/2017 12:10:00 (6/6)

Figure 9-7 Overall image activity

9.4 Creating a view

You can also set up your own unique display. In this example, we set up a display to show CPU utilization by job (% appl (TCB + SRB) by job') and storage utilization by job. We set up two windows. To create a view, complete the following steps:

1. Click **Performance** → **Resource Monitoring**.
2. Select **New** from the **Actions** drop-down menu, as shown in Figure 9-8.

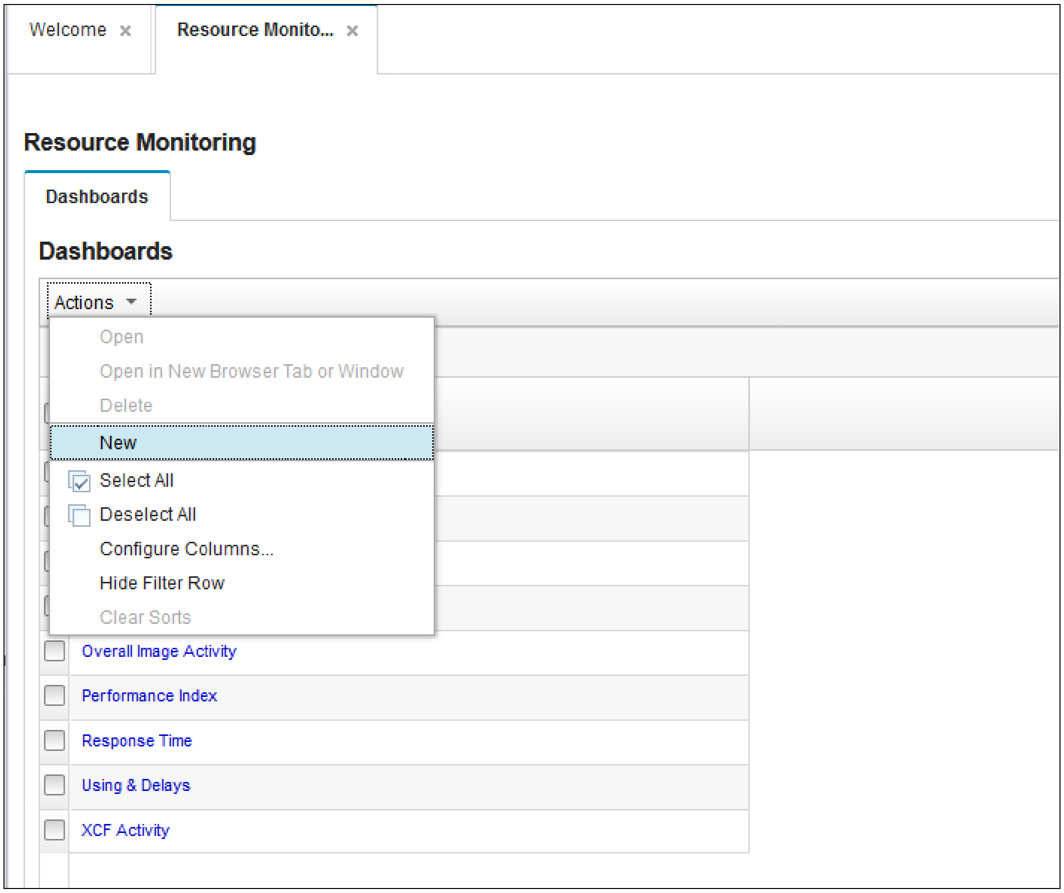
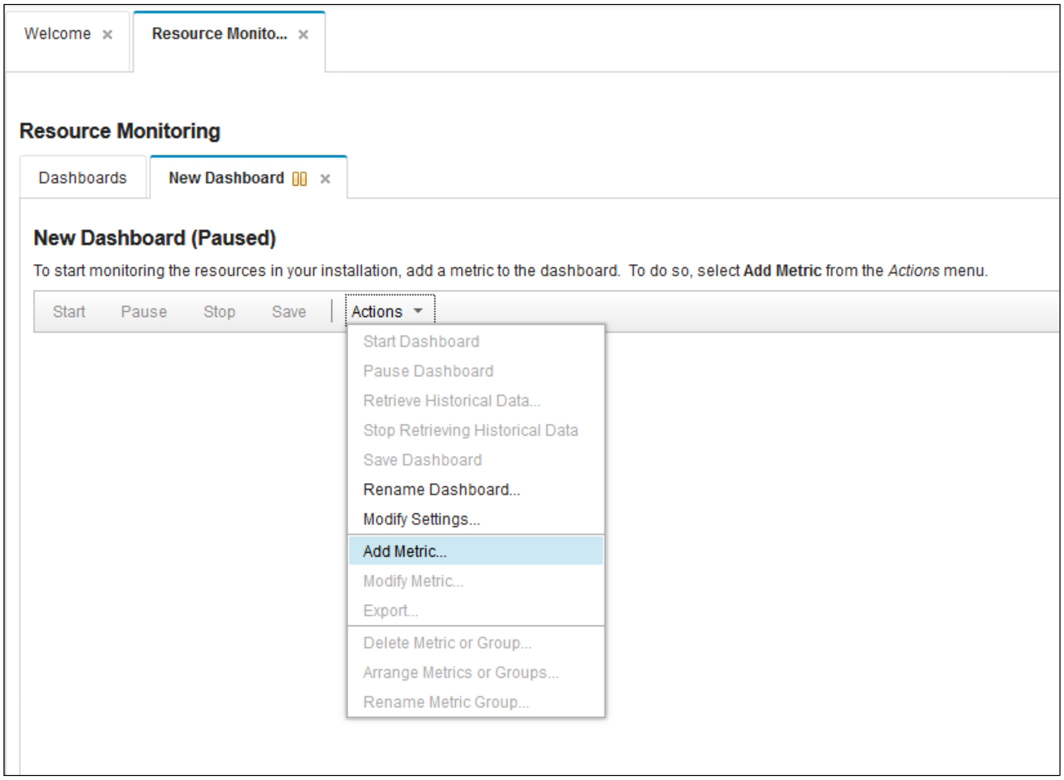


Figure 9-8 Selecting the New option

3. Select **Add Metric** from the Actions drop-down menu, as shown in Figure 9-9.



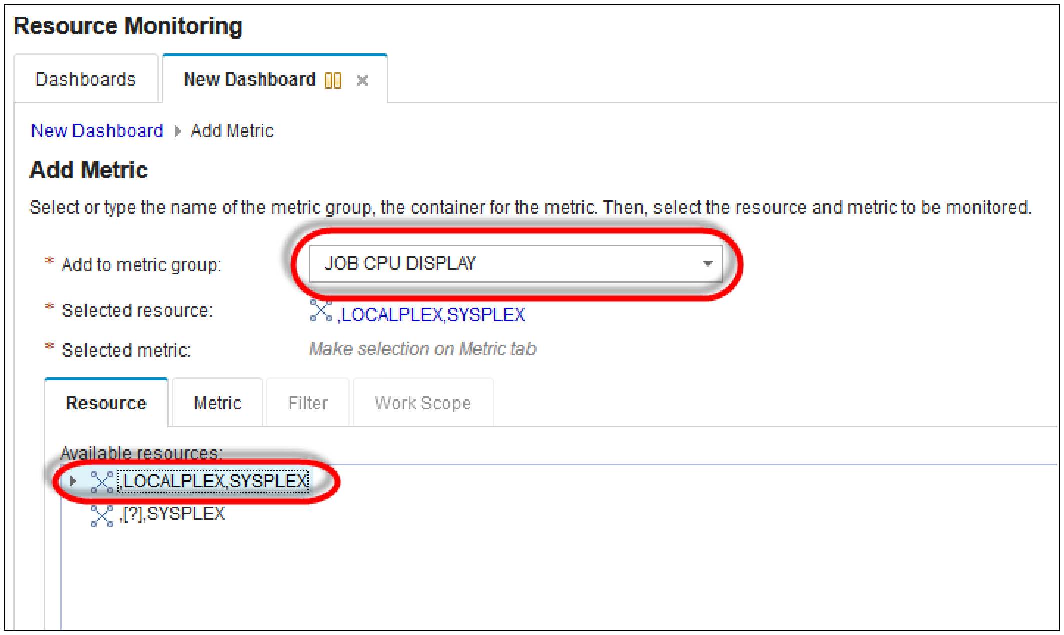
Resource Monitoring

New Dashboard (Paused)

To start monitoring the resources in your installation, add a metric to the dashboard. To do so, select **Add Metric** from the *Actions* menu.

Figure 9-9 Adding a metric option

4. Enter a new name for the display in the Add to metric group field and highlight the applicable sysplex field in the Resource tab, as shown in Figure 9-10.



Resource Monitoring

Add Metric

Select or type the name of the metric group, the container for the metric. Then, select the resource and metric to be monitored.

* Add to metric group: JOB CPU DISPLAY

* Selected resource: ,LOCALPLEX,SYSPLEX

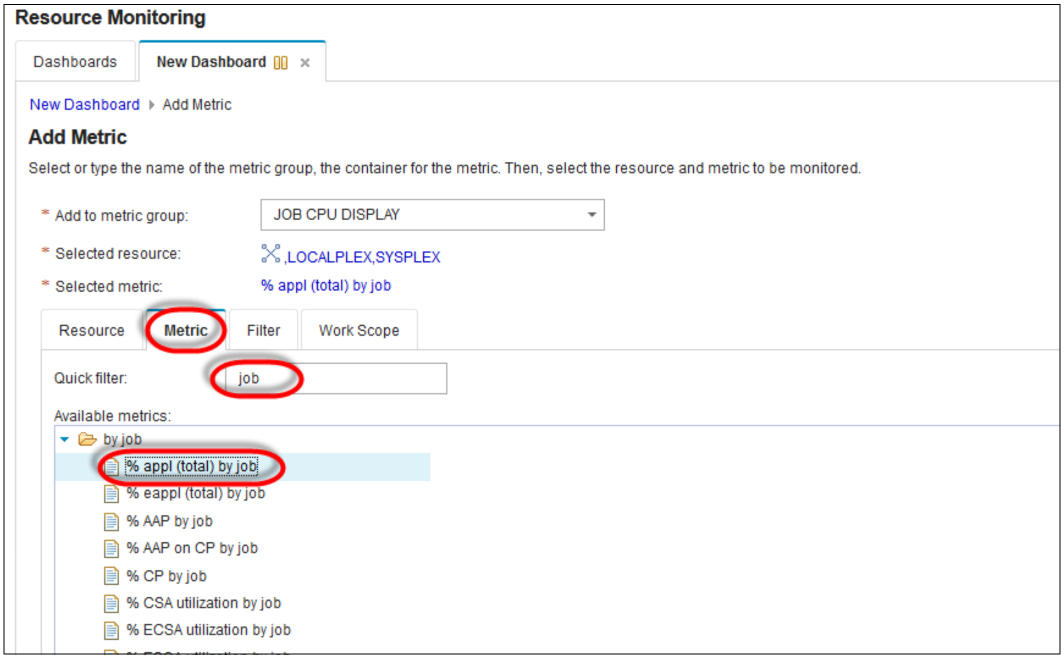
* Selected metric: *Make selection on Metric tab*

Available resources:

- ,LOCALPLEX,SYSPLEX
- ,[?],SYSPLEX

Figure 9-10 Selecting the high-level metric to display

5. Click the **Metric** tab and select **% appl (total) by job** in the “by job” field, as shown in Figure 9-11. You can reduce your search by entering job in the Quick Filter field.



Resource Monitoring

Dashboards | New Dashboard ×

New Dashboard ▸ Add Metric

Add Metric

Select or type the name of the metric group, the container for the metric. Then, select the resource and metric to be monitored.

* Add to metric group: JOB CPU DISPLAY

* Selected resource: ,LOCALPLEX,SYSPLEX

* Selected metric: % appl (total) by job

Resource | Metric | Filter | Work Scope

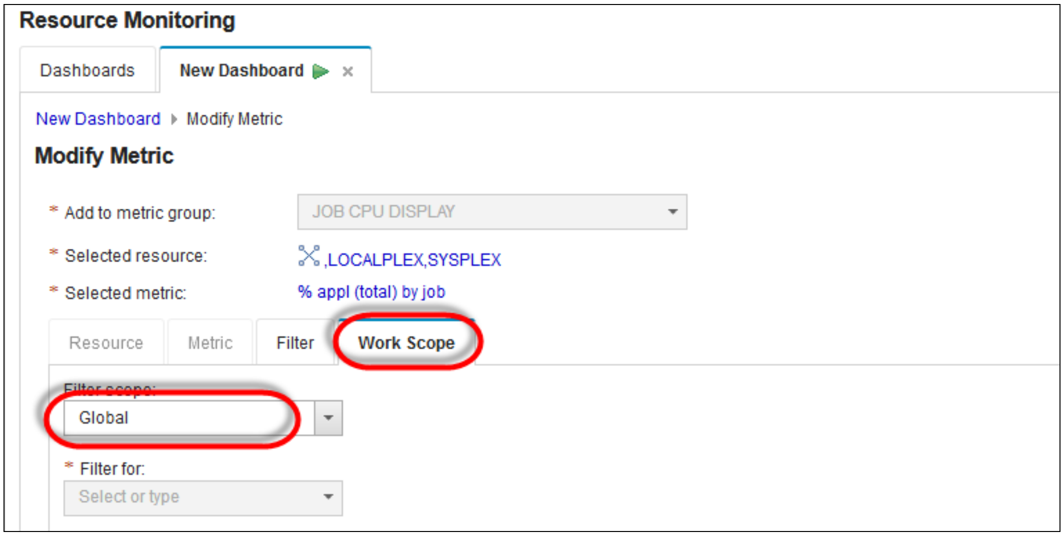
Quick filter: job

Available metrics:

- by job
  - % appl (total) by job
  - % eappl (total) by job
  - % AAP by job
  - % AAP on CP by job
  - % CP by job
  - % CSA utilization by job
  - % ECSA utilization by job

Figure 9-11 Selecting the specific metric

6. In this case, we can skip the Filter tab and move to the Work Scope tab, as shown in Figure 9-12. Select **Global** from the Filter Scope drop-down menu and then, click **OK**.



Resource Monitoring

Dashboards | New Dashboard ×

New Dashboard ▸ Modify Metric

Modify Metric

* Add to metric group: JOB CPU DISPLAY

* Selected resource: ,LOCALPLEX,SYSPLEX

* Selected metric: % appl (total) by job

Resource | Metric | Filter | Work Scope

Filter scope: Global

* Filter for: Select or type

Figure 9-12 Work scope

Your new display looks like the example that is shown in Figure 9-13.

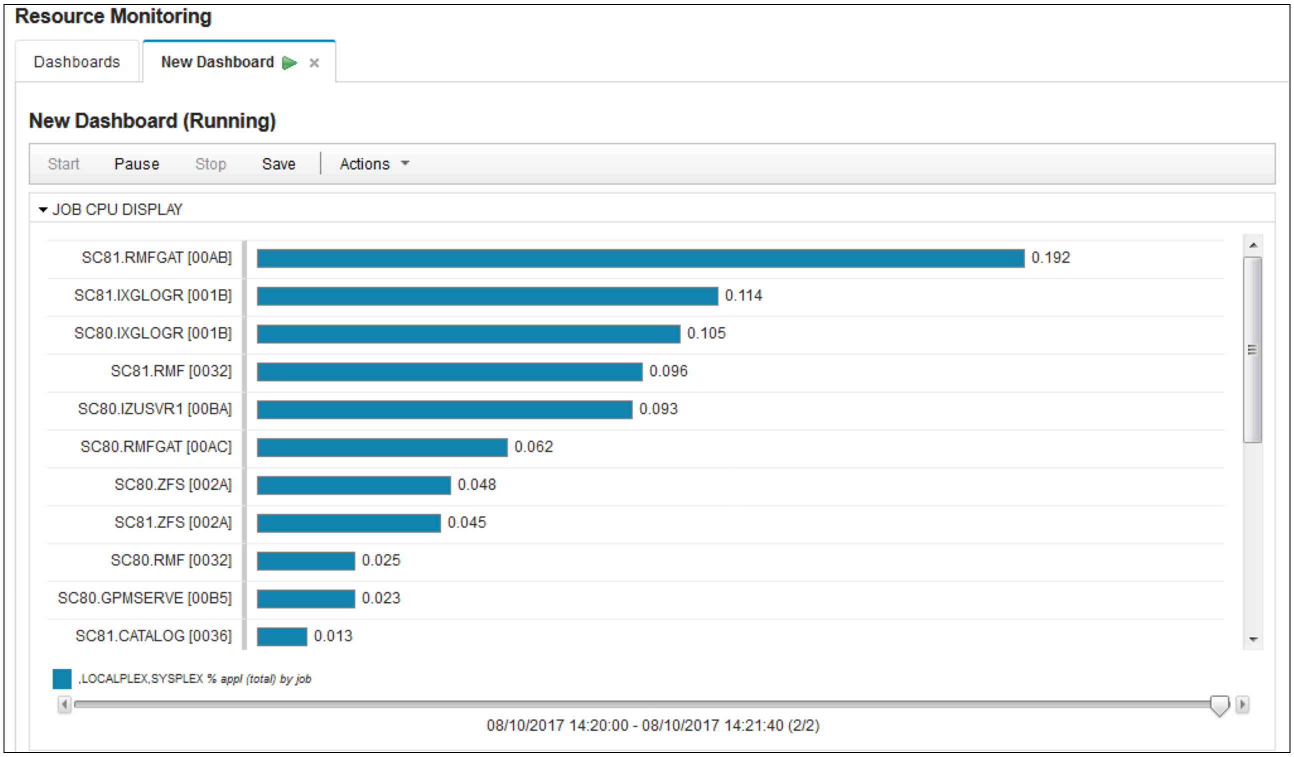
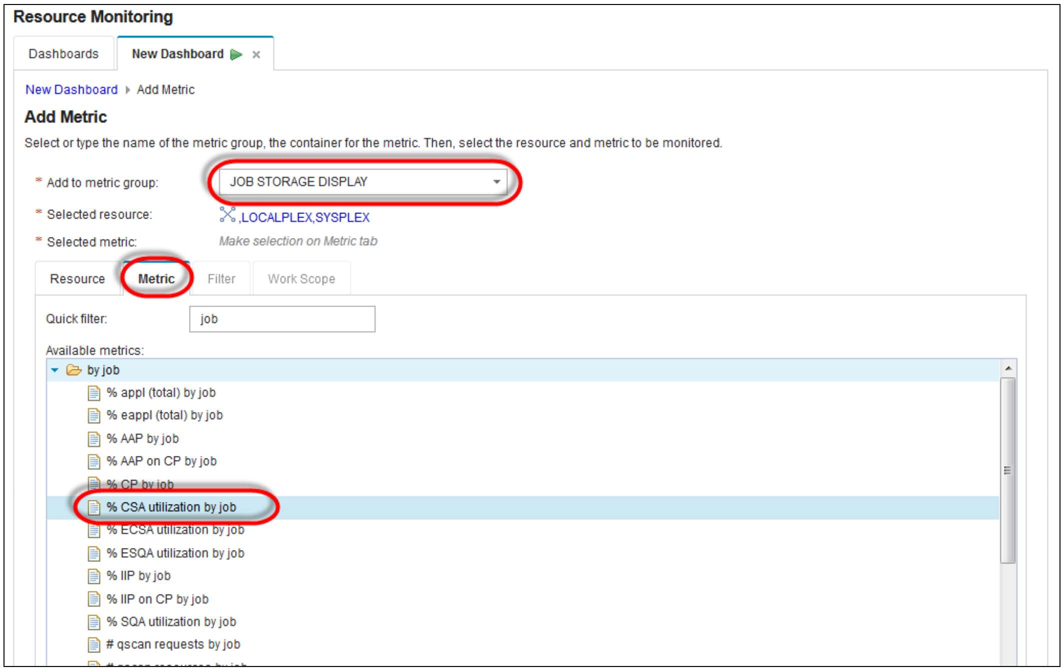


Figure 9-13 Customized display

To add the storage utilization by job display, complete the following steps:

1. Select **Add Metric** from the Actions drop-down menu.
2. Enter a display name in the Add to metric group field. A metric window is created. If you use the previous display name, the new metrics are added to the metrics that you originally specified. Figure 9-14 shows the name of the new window.



Resource Monitoring

Dashboards | New Dashboard ×

New Dashboard ▸ Add Metric

Add Metric

Select or type the name of the metric group, the container for the metric. Then, select the resource and metric to be monitored.

* Add to metric group: JOB STORAGE DISPLAY

* Selected resource: ,LOCALPLEX,SYSPLEX

* Selected metric: *Make selection on Metric tab*

Resource | Metric | Filter | Work Scope

Quick filter: job

Available metrics:

- by job
  - % appl (total) by job
  - % eappl (total) by job
  - % AAP by job
  - % AAP on CP by job
  - % CP by job
  - % CSA utilization by job
  - % ECSA utilization by job
  - % ESQA utilization by job
  - % IIP by job
  - % IIP on CP by job
  - % SQA utilization by job
  - # qscan requests by job

Figure 9-14 Adding a metric

3. Click the **Metric** tab again and select the **% CSA utilization by job** field.

4. Click the **Work Scope** tab, select **Global** from the Filter Scope menu, and then, click **OK**. The new metrics are added, as shown in Figure 9-15.

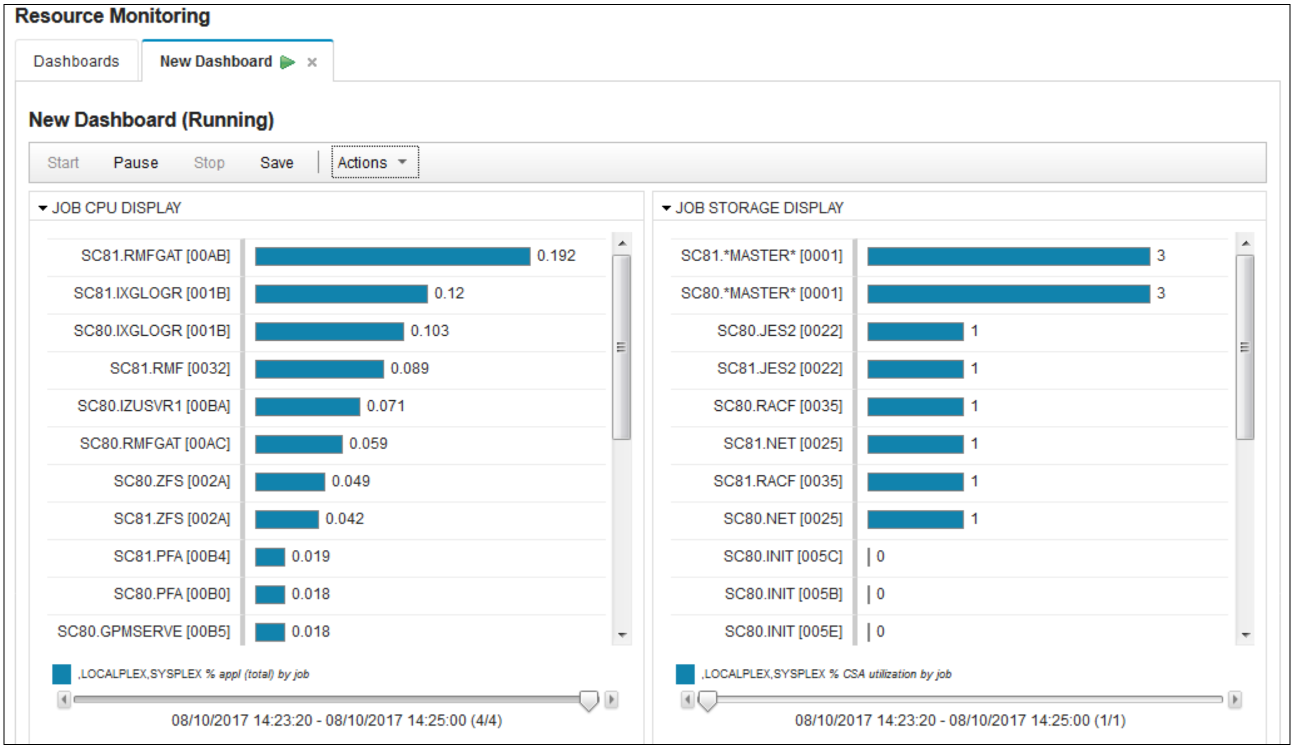


Figure 9-15 New metrics display

You can add other related metrics, such as SQA, ECSA, and ESQA, to your storage view. To do so, repeat this process, except you add to your existing Job Storage Display.

The ECSA, SQA, and ESQA are shown in Figure 9-16.

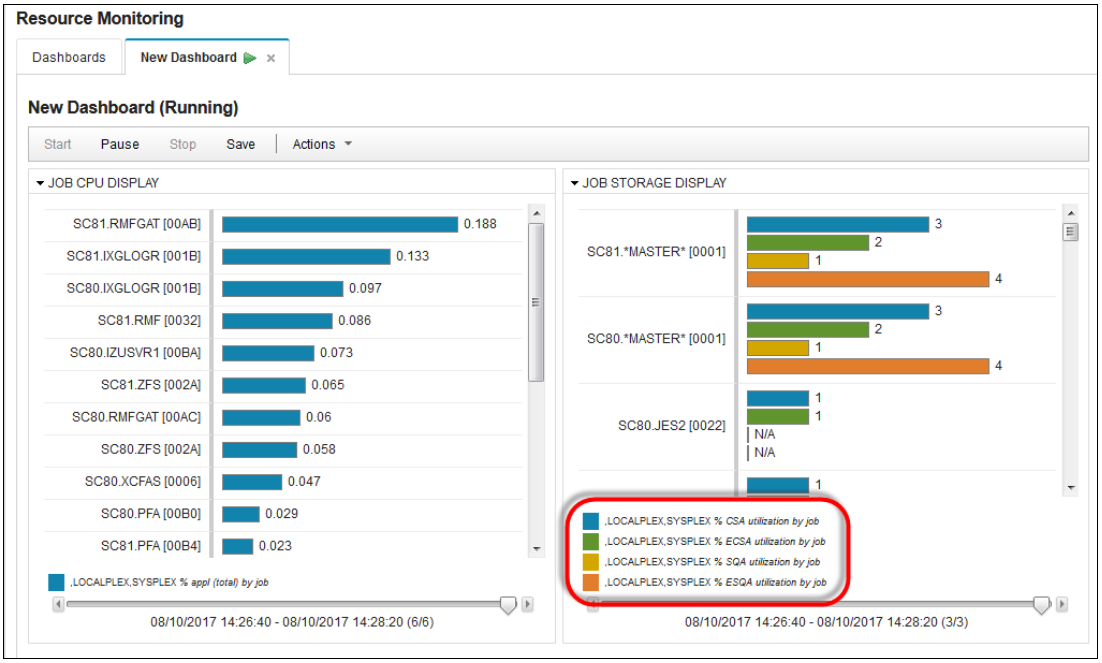


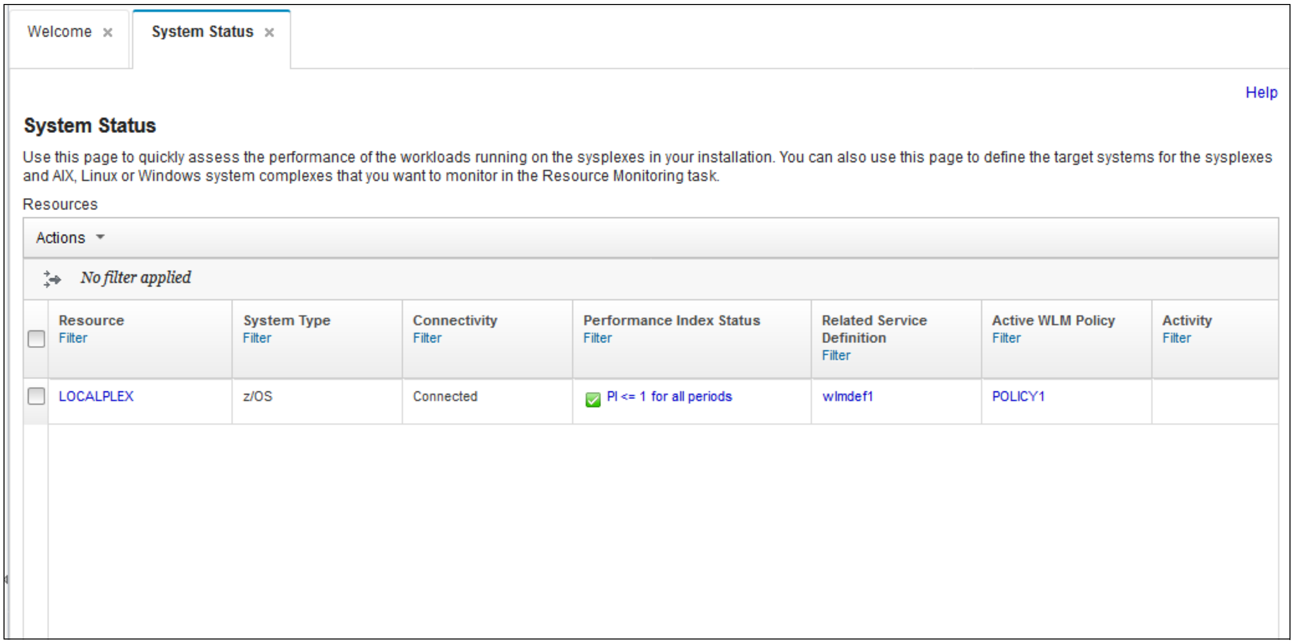
Figure 9-16 Final display

9.4.1 System Status task

The System Status task combines data from an entire system, sysplex, or non-z/OS system into one performance indicator so that you can quickly assess the performance of the workloads that are running on the z/OS sysplexes in your environment. To display the System Status task, expand the **Performance** category in the navigation area and select **System Status**.

This index helps you compare response time goals with execution velocity goals or even goals of the same type against each other. A value of less than or equal to 1 means that transactions that are completed in less time than the goal or that the execution velocity goal was achieved. A value greater than 1 indicates that the goal was not achieved.

This quick summary is comparable to the RMF III SYSSUM report. The Performance Index Status in z/OSMF should match the Performance Status Line in the SYSSUM report. For a comparison, see Figure 9-17 and Figure 9-18 on page 210. In this example, both indicators are green. You can then review any issues by using the Performance Dashboards.



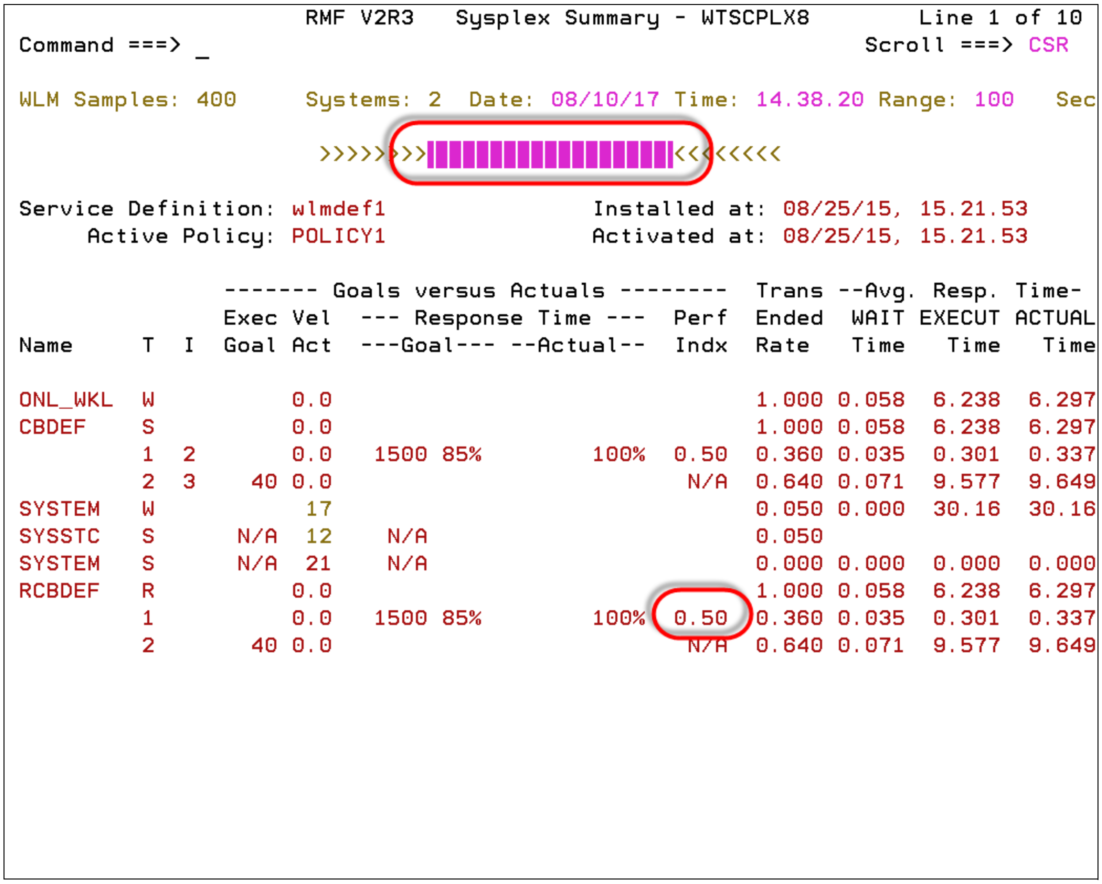
System Status

Use this page to quickly assess the performance of the workloads running on the sysplexes in your installation. You can also use this page to define the target systems for the sysplexes and AIX, Linux or Windows system complexes that you want to monitor in the Resource Monitoring task.

Resources

□	Resource Filter	System Type Filter	Connectivity Filter	Performance Index Status Filter	Related Service Definition Filter	Active WLM Policy Filter	Activity Filter
□	LOCALPLEX	z/OS	Connected	✓ PI <= 1 for all periods	wlmdef1	POLICY1	

Figure 9-17 z/OSMF performance index status



```
                         RMF V2R3   Sysplex Summary - WTSCPLX8        Line 1 of 10
 Command ===> _                                                   Scroll ===> CSR

 WLM Samples: 400       Systems: 2  Date: 08/10/17 Time: 14.38.20 Range: 100   Sec

                          >>>>>>>>||||||||||||||||||||||<<<<<<<<

 Service Definition: wlmdef1                 Installed at: 08/25/15, 15.21.53
      Active Policy: POLICY1                 Activated at: 08/25/15, 15.21.53

                ------- Goals versus Actuals --------  Trans --Avg. Resp. Time-
                Exec Vel  --- Response Time ---  Perf  Ended  WAIT EXECUT ACTUAL
 Name      T  I Goal Act  ---Goal--- --Actual--  Indx  Rate   Time   Time   Time

 ONL_WKL   W          0.0                              1.000 0.058  6.238  6.297
 CBDEF     S          0.0                              1.000 0.058  6.238  6.297
           1  2       0.0   1500 85%        100%  0.50 0.360 0.035  0.301  0.337
           2  3     40 0.0                         N/A 0.640 0.071  9.577  9.649
 SYSTEM    W           17                              0.050 0.000  30.16  30.16
 SYSSTC    S       N/A  12   N/A                       0.050
 SYSTEM    S       N/A  21   N/A                       0.000 0.000  0.000  0.000
 RCBDEF    R          0.0                              1.000 0.058  6.238  6.297
           1          0.0   1500 85%        100%  0.50 0.360 0.035  0.301  0.337
           2        40 0.0                         N/A 0.640 0.071  9.577  9.649
```

Figure 9-18 RMF III performance status

For more information about non-z/OS systems, see 9.5, “Other platform performance monitoring” on page 214.

In this example, no exceptions occurred, which means that the goals were met.

9.4.2 Retrieving historical data

To retrieve data that was collected by the RMF Monitor III data gatherer before the current date and time, use the Retrieve Historical Data action that is provided in the New and Open Dashboard tabs. This action can generate significant CPU consumption on the host, especially for long ranges.

Open a dashboard and click the **Action** tab to select the **Retrieve Historical Data** option for our sample, as shown in Figure 9-19 on page 211.

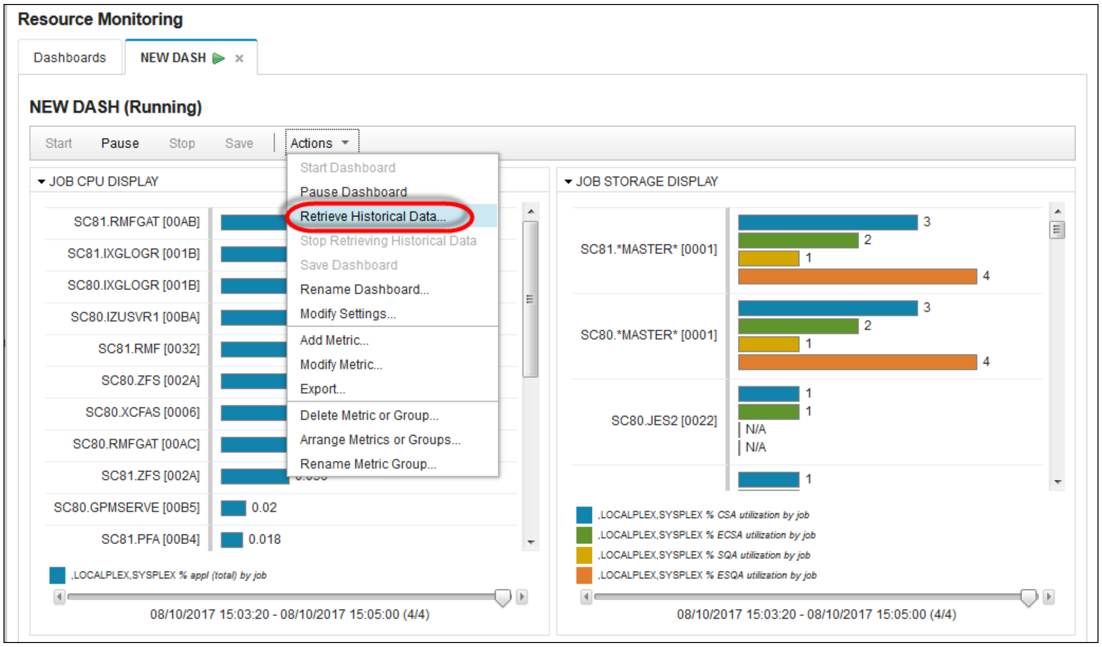
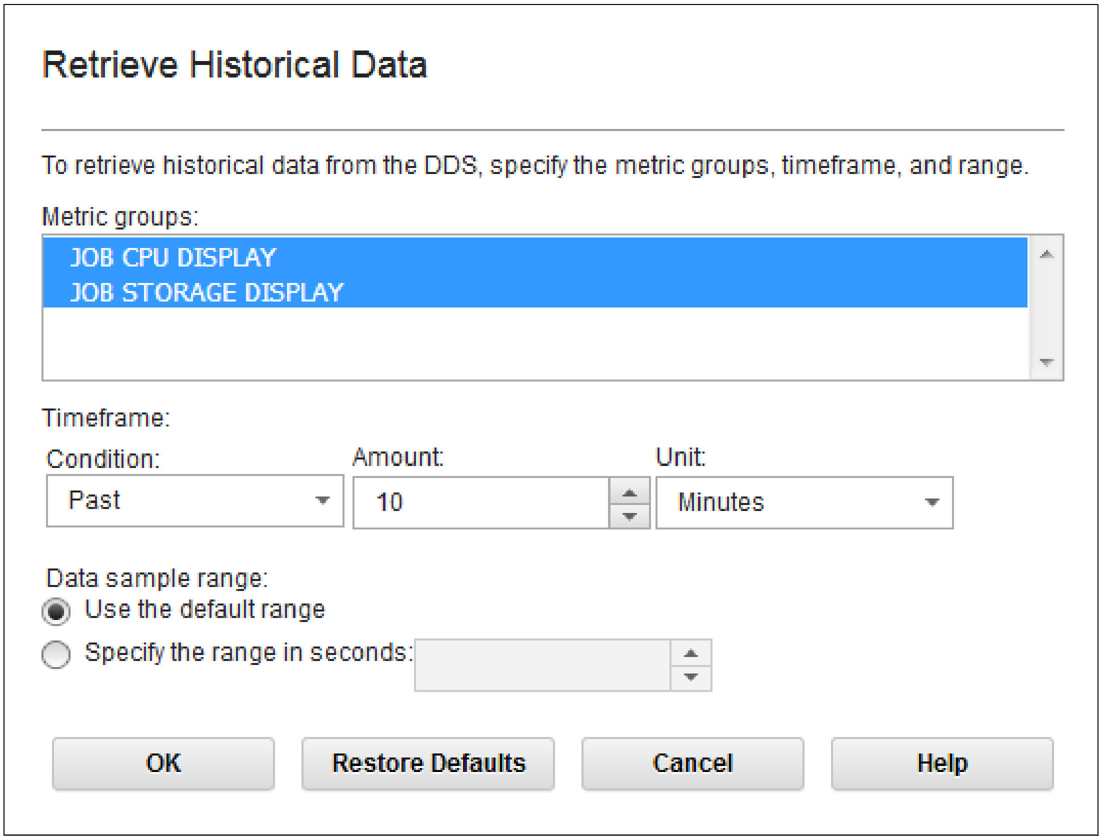


Figure 9-19 Selecting the Retrieve Historical Data option

The Retrieve Historical Data window opens (see Figure 9-20). In this window, you specify what you want to retrieve from the DDS.



Retrieve Historical Data

To retrieve historical data from the DDS, specify the metric groups, timeframe, and range.

Metric groups:

JOB CPU DISPLAY
JOB STORAGE DISPLAY

Timeframe:

Condition: Past

Amount: 10

Unit: Minutes

Data sample range:

● Use the default range

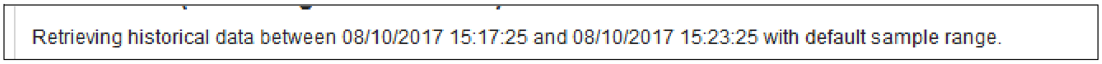
○ Specify the range in seconds:

Figure 9-20 Retrieve Historical Data window

In the Metric groups field, select one or more metric groups for which to retrieve historical data. You must select at least one metric group. By default, all the metric groups in the dashboard are selected.

In the Timeframe section, you can choose from three conditions: Past, Dates from, and Dates between. In our sample, we chose the condition Past to retrieve the last 10 minutes of the historical data.

In the Data sample range field, you can specify whether you want to receive the original Monitor III data gatherer intervals (default range) or specify your own interval. Click **OK** to get the historical data. The text Retrieving historical data is displayed next to the name of the dashboard until the request completes (see Figure 9-21)



Retrieving historical data between 08/10/2017 15:17:25 and 08/10/2017 15:23:25 with default sample range.

Figure 9-21 Message retrieve historical data

9.4.3 Exporting dashboard or metric groups

To export your data to a `*.CSV` file, open a dashboard. From the Action menu, select the **Export** function, as shown in Figure 9-22.

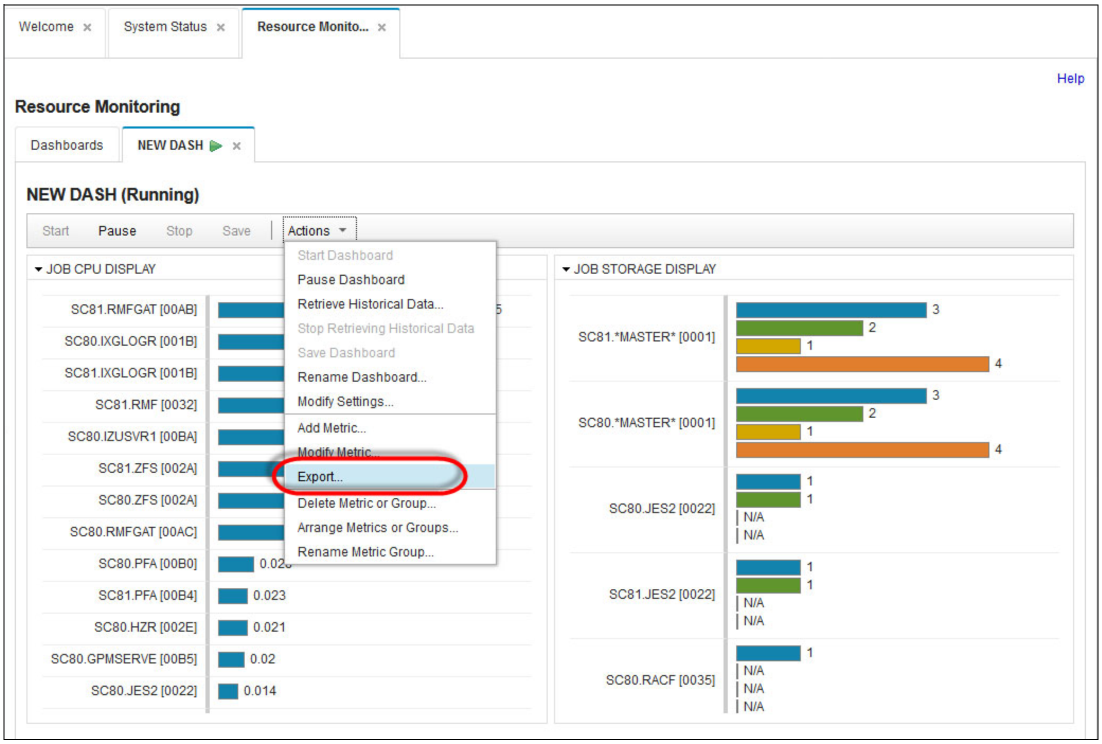


Figure 9-22 Selecting the Export function

In the Export dashboard window (see Figure 9-23 on page 213), complete the following steps:

1. Indicate whether to export a specific metric group or the entire dashboard by selecting the Metric group option (default) or the Entire dashboard with all metrics and resources option.

If you selected the Metric group option, complete the following steps:

a. In the Metric group field, select the metric group to be exported. All of the metric groups that are included in the selected dashboard are listed in this field. The first metric group in the list is selected by default.

b. Indicate whether to export all or a subset of the metrics and resources that are included in the metric group by selecting the Include all metrics and resources option (default) or the Include a selection of metrics and resources option.

2. Specify the range of intervals to export.

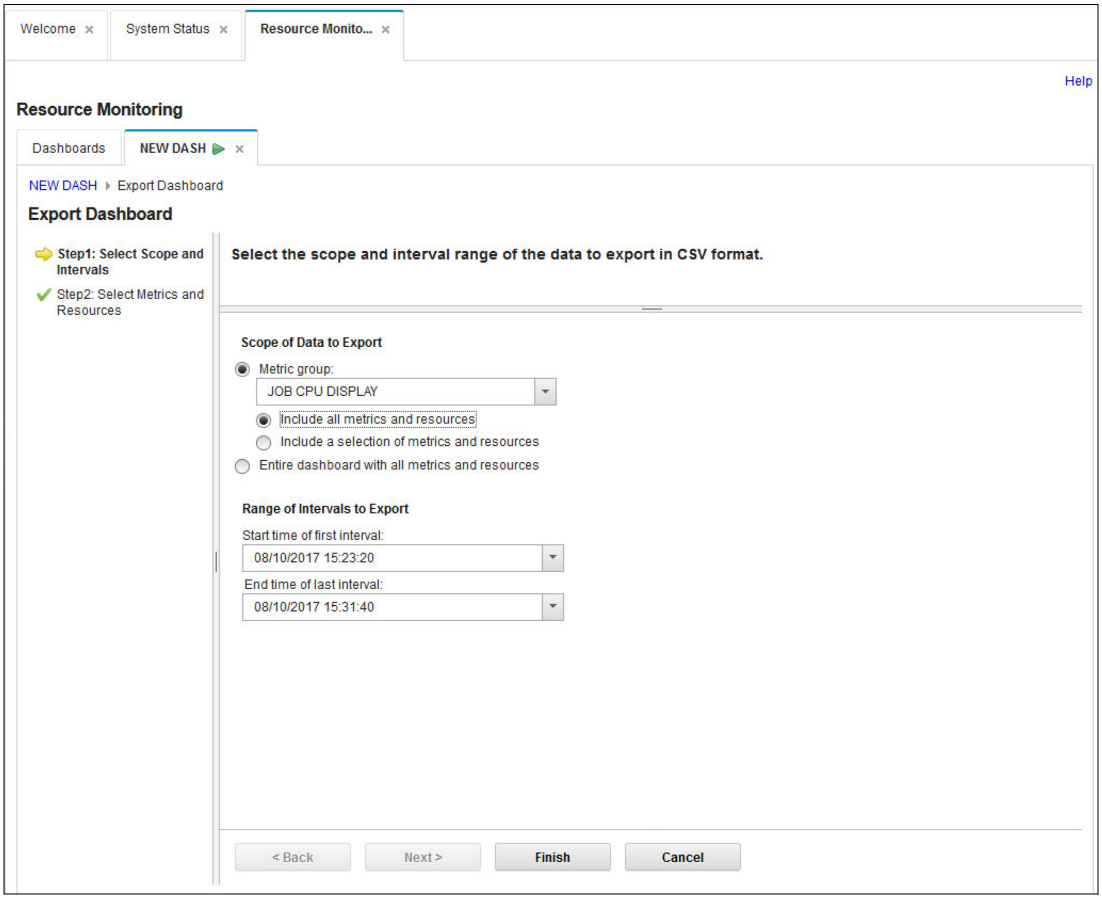
3. If you selected the Include a selection of metrics and resources option, complete the following steps:

   a. Click **Next** to display the Select Metrics and Resources page

   b. In the Metrics field, select the metrics to be exported. This field lists all of the metrics that are included in the selected metric group. By default, all of the metrics are selected.

   c. In the Resources field, select the resources to be exported. This field lists all of the resources that are associated with the selected metrics. By default, all of the resources are selected.

4. Click **Finish** to export the selected items.



Select the scope and interval range of the data to export in CSV format.

Scope of Data to Export

● Metric group:
JOB CPU DISPLAY

● Include all metrics and resources

○ Include a selection of metrics and resources

○ Entire dashboard with all metrics and resources

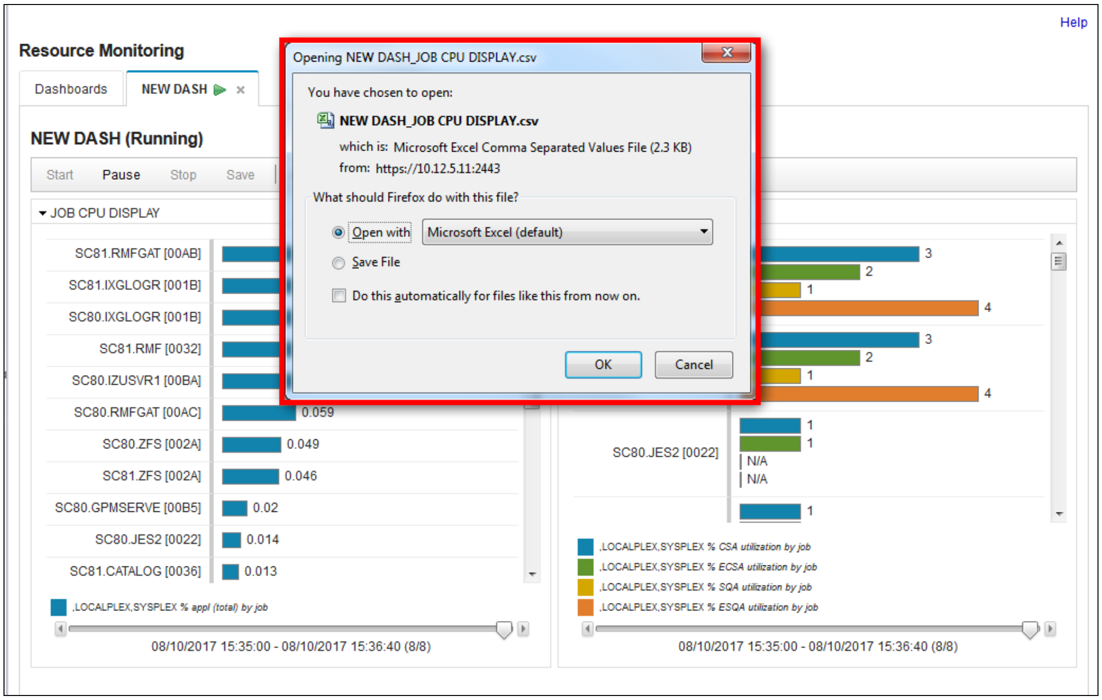
Range of Intervals to Export

Start time of first interval:
08/10/2017 15:23:20

End time of last interval:
08/10/2017 15:31:40

Figure 9-23 Export dashboard window

A pop-up window (see Figure 9-24) with save options of the created `.CSV` file appears. After saving the content of the file, you can generate your own reports or build your own graphs.



Opening NEW DASH_JOB CPU DISPLAY.csv

You have chosen to open:

NEW DASH_JOB CPU DISPLAY.csv

which is: Microsoft Excel Comma Separated Values File (2.3 KB)

from: https://10.12.5.11:2443

What should Firefox do with this file?

● Open with Microsoft Excel (default)

○ Save File

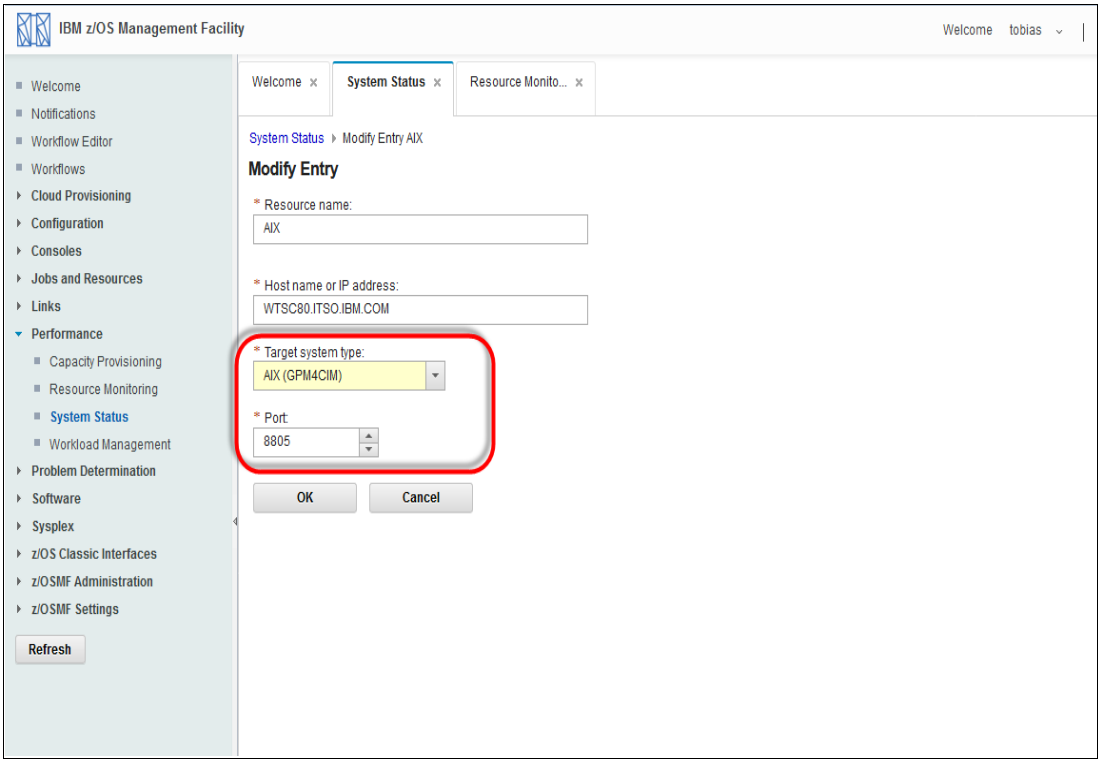
□ Do this automatically for files like this from now on.

Figure 9-24 Saving content of dashboard

9.5 Other platform performance monitoring

To monitor other platforms, as described in 9.1, “Introduction” on page 196, you must ensure that the prerequisite setup for these systems is completed, as described in 3.13.2, “Resource Monitoring and System Status tasks” on page 44.

After GPM4CIM was made available for the system in question, you must add the system to your Performance section by using the System Status option from the Performance category. Select the **Actions** drop-down menu, select **Add Entry**, and complete the required fields, as shown in Figure 9-25 on page 215.



Modify Entry

* Resource name: AIX

* Host name or IP address: WTSC80.ITSO.IBM.COM

* Target system type: AIX (GPM4CIM)

* Port: 8805

Figure 9-25 Add Entry fields

The following fields are included:

- Resource name

  The name of the sysplex, system complex, or image. The name is required and it must be unique in the Resources table. The name can contain up to 24 characters, including alphanumeric characters (A - Z, a - z, and 0 - 9) and special characters (@, #, and $). The resource name is not case-sensitive; for example, SYS1 and Sys1 are the same resource entry.

- Host name or IP address

  The symbolic host name or IP address where the DDS (or Linux data gatherer) is running. The host name or IP address is required. It can contain up to 4000 characters. If the value is an asterisk (*), z/OSMF automatically detects and connects to the DDS that is running in the sysplex in which the z/OSMF host system is a member. The value of this field is likely *not* the IP address of the system that is to be monitored.

- Target system type

  Indicates whether a z/OS, Linux, AIX, or Windows operating system is installed on the systems to be monitored. The target system type is required, and you must select one of the following choices:

  – z/OS (GPMSERVE)
  – AIX (GPM4CIM)
  – Linux on System x (GPM4CIM)
  – Linux on System z (GPM4CIM)
  – Windows (GPM4CIM)
  – Linux (rmfpms)

  The default target system type is z/OS (GPMSERVE).

If an asterisk is specified in the Host name or IP address field, z/OS (GPMSERVE) is selected in the Target system type field and the field is disabled. z/OSMF can automatically detect only the DDS that is running on a z/OS system in the sysplex in which the z/OSMF host system is a member.

- Port

  The port number where the DDS (or Linux data gatherer) is listening for incoming HTTP requests. The port number is required, and it must be an integer 1 - 65535. The default port number depends on the following target system type selection:

  - DDS for z/OS sysplex: 8803
  - DDS for AIX system complex: 8805
  - DDS for Linux system complex on System x: 8806
  - DDS for Linux system complex on System z: 8807
  - DDS for Windows system complex: 8808
  - Rmfpms: 8803

  If you use default port numbers and you change the target system type, the port number changes to the default port of the selected target system type. If a different port number was entered manually, changing the target system type does not change the port number.

  If an asterisk is specified in the Host name or IP address field, the Port field is disabled. In this case, z/OSMF automatically detects the port number.

  In this example, we use AIX; therefore, the default is 8805.

  The Target System type includes a drop-down menu for the five GPM regions. When you select the Target System Type, the applicable port is automatically assigned.

  You now must add the metrics to your dashboard because predefined reports are not available as with z/OS RMF. You go through a process that is similar to the process that is described in section 9.4, “Creating a view” on page 203, but you select the AIX system from your Resource Tab, as shown Figure 9-26 on page 217 and Figure 9-27 on page 217.

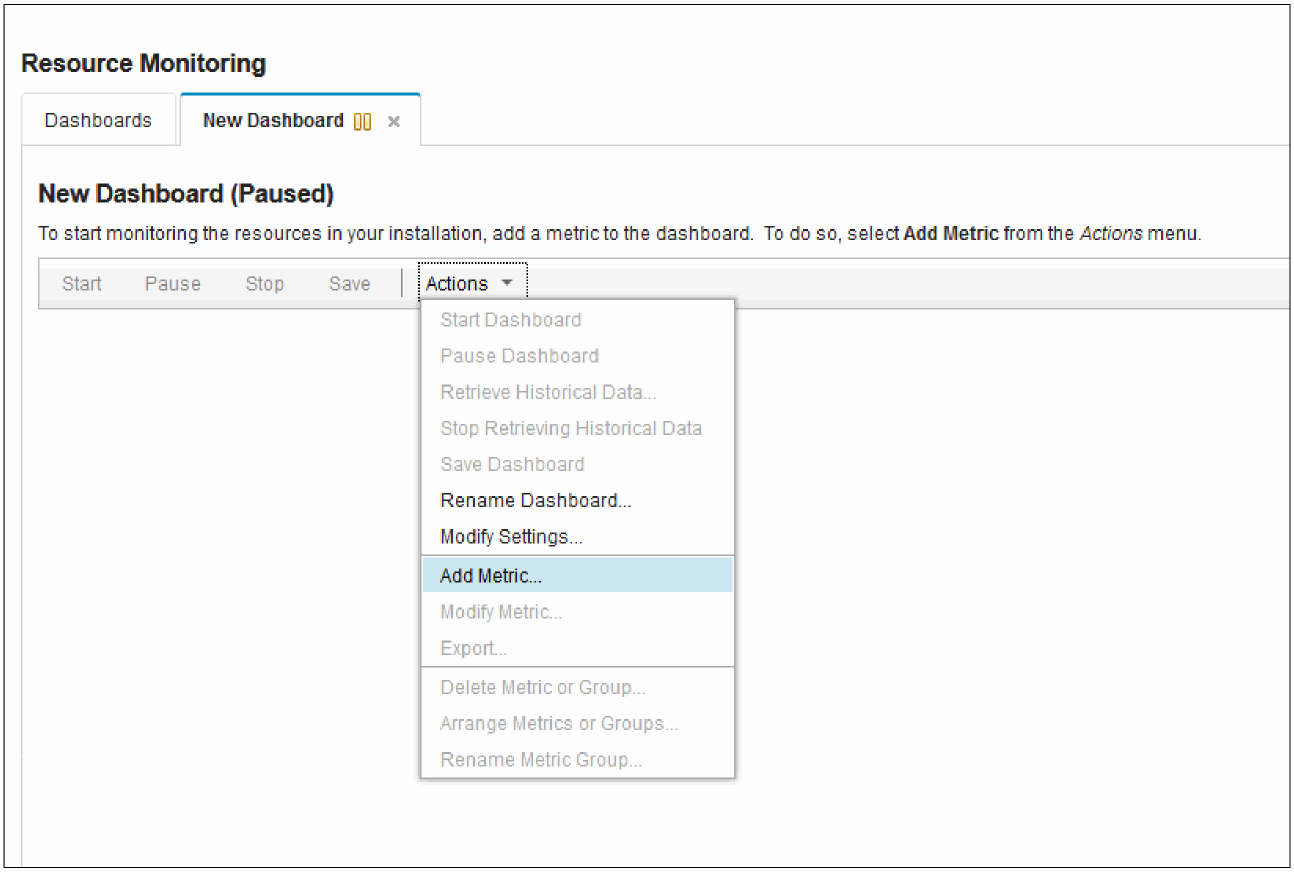

Resource Monitoring
Dashboards
New Dashboard
New Dashboard (Paused)
To start monitoring the resources in your installation, add a metric to the dashboard. To do so, select **Add Metric** from the *Actions* menu.
Start
Pause
Stop
Save
Actions
Start Dashboard
Pause Dashboard
Retrieve Historical Data...
Stop Retrieving Historical Data
Save Dashboard
Rename Dashboard...
Modify Settings...
Add Metric...
Modify Metric...
Export...
Delete Metric or Group...
Arrange Metrics or Groups...
Rename Metric Group...

Figure 9-26 Adding an AIX Metric

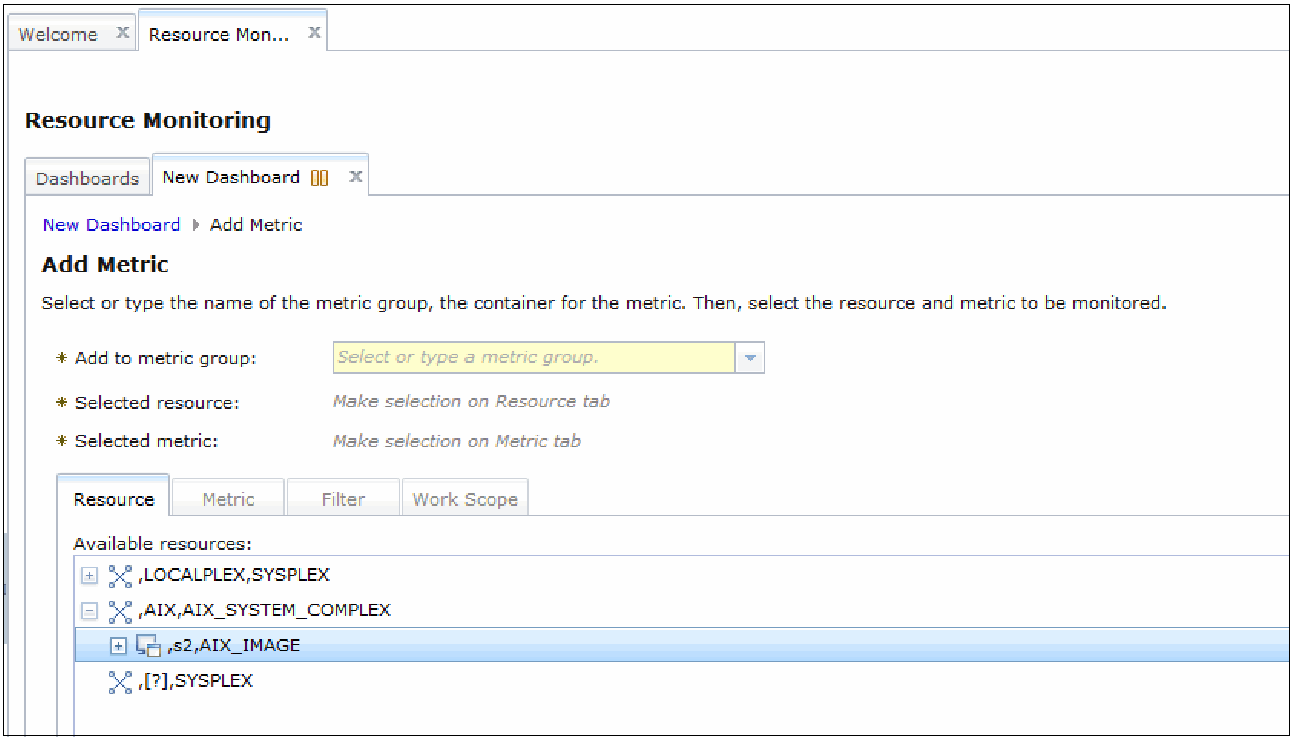
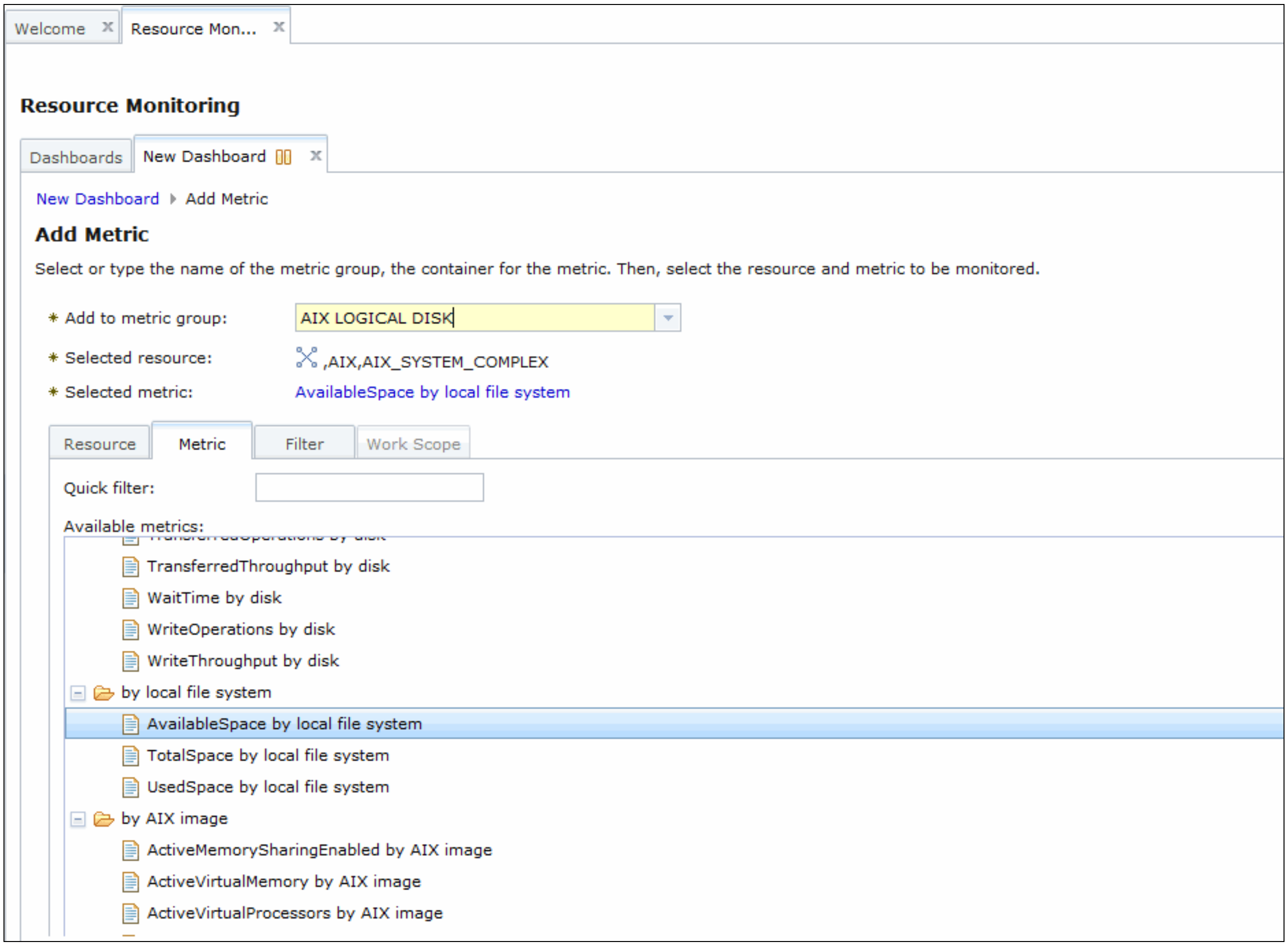


Figure 9-27 Adding an AIX Metric

As with the z/OS RMF metrics, you must specify a metric name and select specific metrics, as shown in Figure 9-28. For our example, we chose **AvailableSpace by local file system** to be defined in our AIX Logical Disk.



Resource Monitoring

New Dashboard ▸ Add Metric

Add Metric

Select or type the name of the metric group, the container for the metric. Then, select the resource and metric to be monitored.

* Add to metric group: AIX LOGICAL DISK

* Selected resource: ,AIX,AIX_SYSTEM_COMPLEX

* Selected metric: AvailableSpace by local file system

Quick filter:

Available metrics:

- TransferredThroughput by disk
- WaitTime by disk
- WriteOperations by disk
- WriteThroughput by disk
- by local file system
  - AvailableSpace by local file system
  - TotalSpace by local file system
  - UsedSpace by local file system
- by AIX image
  - ActiveMemorySharingEnabled by AIX image
  - ActiveVirtualMemory by AIX image
  - ActiveVirtualProcessors by AIX image

Figure 9-28 AIX Logical Disk

The resulting dashboard display resembles the display that is shown in Figure 9-29.

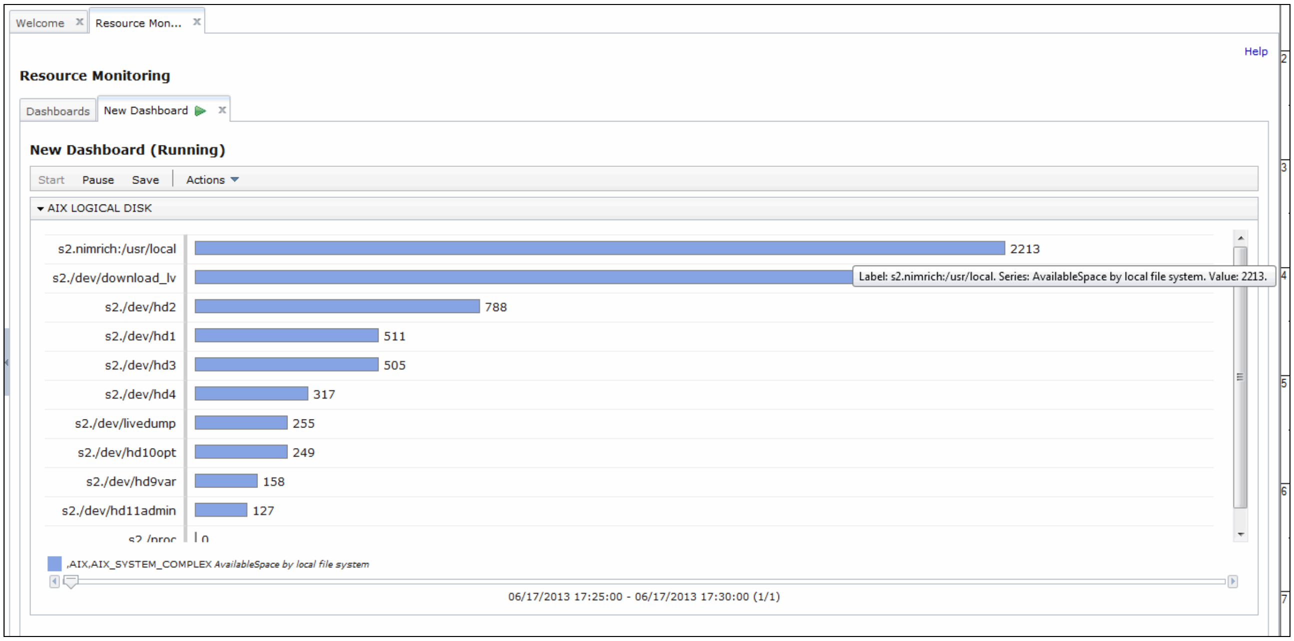


Figure 9-29 New Dashboard

10

Workload Management

This chapter describes the IBM z/OS Management Facility (z/OSMF) Workload Management (WLM) task. How to use z/OSMF WLM for administration and operation of z/OS WLM, and what you can do in comparison to the traditional ISPF-based WLM interface, the Administrative Application (AA), also are described.

The z/OSMF WLM task also integrates the functions of the following WLM tools:

- WLM Service Definition Editor
- WLM Service Definition Formatter

This chapter includes the following topics:

- 10.1, “Introduction” on page 222
- 10.2, “Entering the Workload Manager application in z/OSMF” on page 222

10.1 Introduction

WLM is a key component of the z/OS operating system. WLM provides dynamic workload management within a single z/OS system or across multiple images within a Parallel Sysplex environment. Since the introduction of goal-oriented workload management, you can define, view, install, and activate WLM service policies by using the ISPF-based WLM Administrative Application (AA).

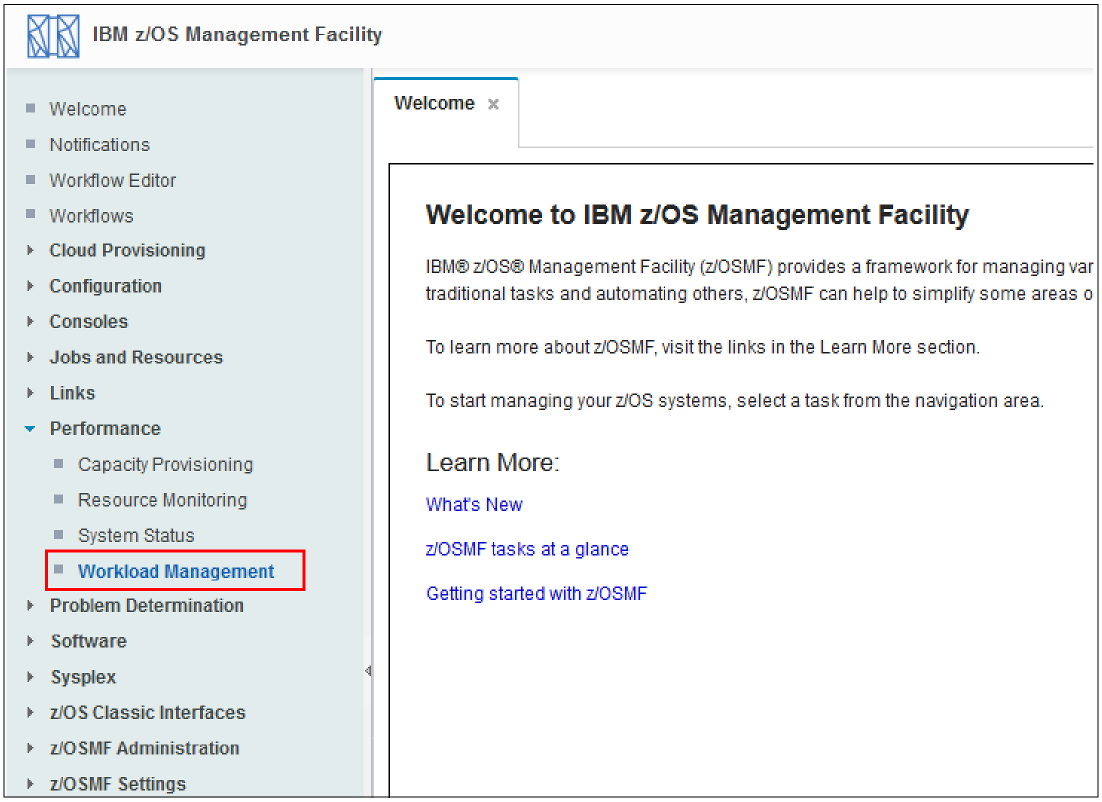
By using the Workload Management task in z/OSMF, you can use another interface to work with your WLM policies. z/OSMF WLM offers you WLM policy creation, editing, merging, and printing. You can review and analyze WLM policies, and activate them.

For more information about WLM in z/OS, see *System Programmer's Guide to: Workload Manager*, SG24-6472.

10.2 Entering the Workload Manager application in z/OSMF

The WLM task can be accessed by expanding the Performance category in the navigation area and clicking **Workload Management**. If your user ID is not authorized to access the WLM task, you do not see it. This authorization is controlled by the &safprefix.ZOSMF.WORKLOAD_MANAGEMENT.WORKLOAD_MANAGEMENT.VIEW profile under the ZMFAPLA class.

Click **Workload Management** to open the WLM overview window that is shown in Figure 10-1. The WLM overview window is the starting point for your WLM-related activities within z/OSMF.



Welcome to IBM z/OS Management Facility

IBM® z/OS® Management Facility (z/OSMF) provides a framework for managing var traditional tasks and automating others, z/OSMF can help to simplify some areas o

To learn more about z/OSMF, visit the links in the Learn More section.

To start managing your z/OS systems, select a task from the navigation area.

Learn More:

What's New

z/OSMF tasks at a glance

Getting started with z/OSMF

Figure 10-1 WLM overview window

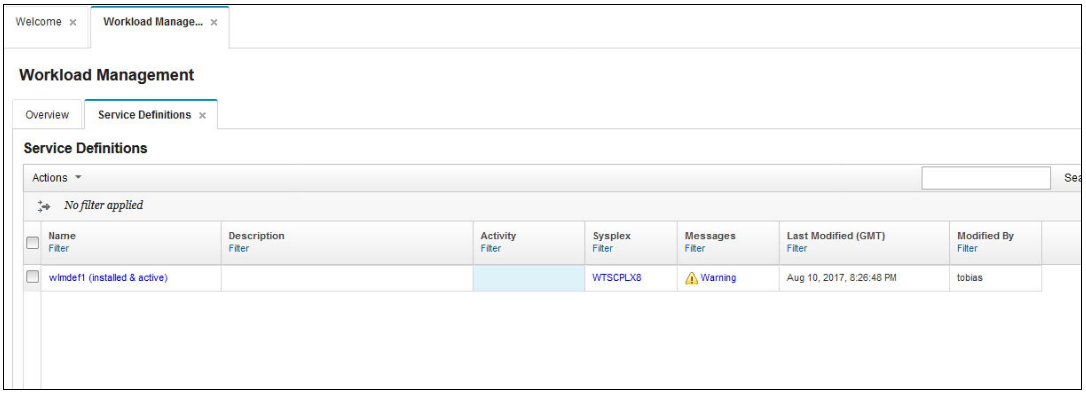
In the Overview window, you can select one of the following actions:

- Under the Manage section, you can select one of the following actions:
  - Service Definitions: Create, modify, import, export, print, and install a service definition.
  - Service Policies for Sysplex: Activate or view the service policies in the service definition that is installed in the WLM couple data set.
  - WLM Resource Pools: View, modify, or delete a WLM resource.
  - Settings: Specify history length, code page, and user preferences.
- Under the View section, you can select the Status for Sysplex, which displays information about the service definition that is installed in the WLM couple data set and the service policy that is active in the sysplex.

10.2.1 Service Definitions table

The Service Definitions window shows WLM service definitions that are created with z/OSMF WLM, which is imported from files or data sets, or that are installed in the WLM couple data set. Therefore, you see at least the service definition, which is installed for the sysplex in which z/OSMF is running.

A Service Definitions table that contains the installed service definition and two other service definitions that are created with z/OSMF WLM is shown in Figure 10-2.



Workload Management

Service Definitions

No filter applied

□	Name Filter	Description Filter	Activity Filter	Sysplex Filter	Messages Filter	Last Modified (GMT) Filter	Modified By Filter
□	wlmdef1 (installed & active)			WTSCPLX8	⚠ Warning	Aug 10, 2017, 8:26:48 PM	tobias

Figure 10-2 Service Definitions table

WLM service definitions that are displayed in the Service Definitions table are stored in a repository that is integrated in the z/OSMF file system. The repository synchronizes automatically with the WLM couple data set.

When the Service Definitions window is opened or refreshed, z/OSMF checks whether the service definition that is installed in the WLM couple data set is contained in the Service Definitions table. If it is not, z/OSMF extracts the service definition automatically, displays it in the Service Definitions table, and marks it with the label Installed.

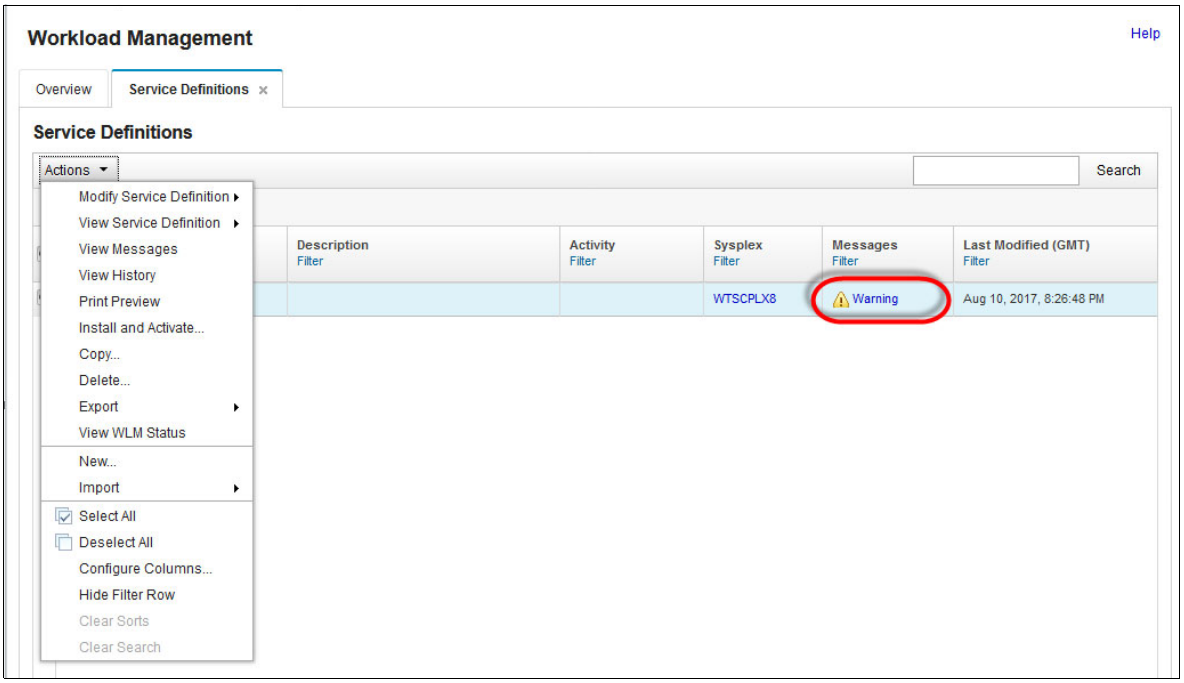
Also, the service definition that contains the service policy that is used by z/OS WLM to manage the system/sysplex is marked with the label Active. If the installed service definition and the service definition that is used to manage the system/sysplex are identical, the corresponding service definition is marked with the label Installed & Active.

The service definitions table also shows if messages exist for a service definition, and if a service definition is being viewed or edited by users.

Service definitions can be imported from host data sets or workstation files in XML format in to the Service Definitions table. Before you can import a service definition that is created with the WLM Administrative Application, you must check whether it is stored in a sequential data set in XML format. If it is not (for example, because the service definition is stored in a partitioned data set as ISPF tables), you must open the service definition with the WLM Administrative Application and save it in a sequential data set in XML format. That sequential data set can then be imported into the Service Definitions table.

Service Definition files that are created with the WLM Service Definition Editor tool that are stored on the workstation can be directly imported in to the Service Definitions table. You can export service definitions to a host data set or a workstation file in XML or CSV format.

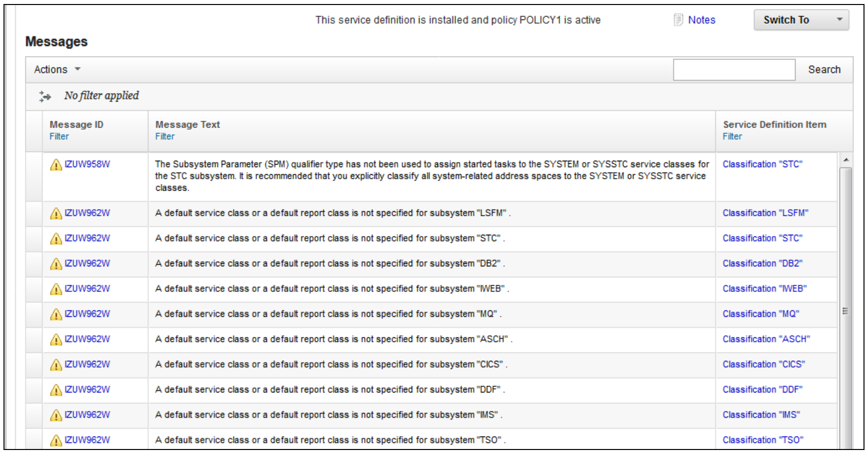
By clicking the **Actions** menu, you can export, import, view, edit, create, and copy a service definition. You can also install, activate, and print service definitions, as shown in Figure 10-3.



Description Filter	Activity Filter	Sysplex Filter	Messages Filter	Last Modified (GMT) Filter
		WTSCPLX8	⚠ Warning	Aug 10, 2017, 8:26:48 PM

Figure 10-3 Actions for the Service Definitions table

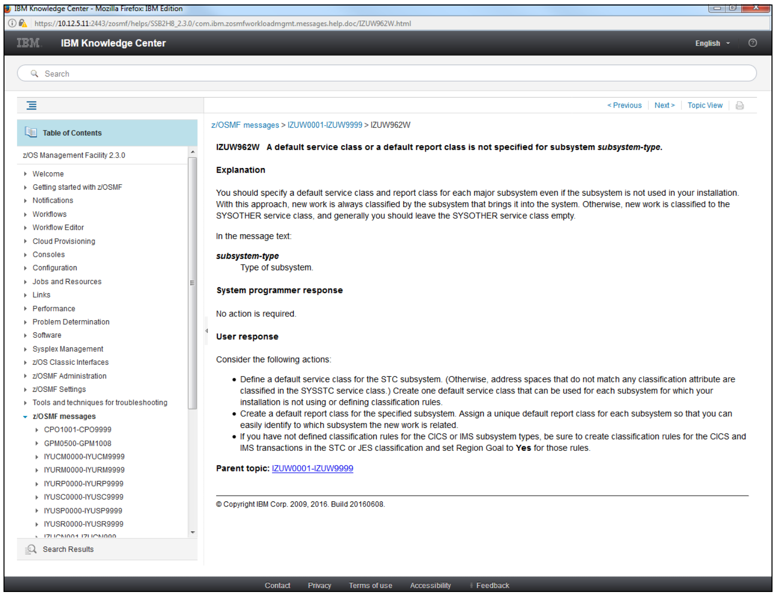
In this example, warning messages are presented regarding the service definition, which indicates warning or information messages. Select this link to view the messages that are associated with this service definition, as shown in Figure 10-4.


This service definition is installed and policy POLICY1 is active
Notes
Switch To
Messages
Actions
Search
No filter applied

Message ID	Message Text	Service Definition Item
IZUW958W	The Subsystem Parameter (SPM) qualifier type has not been used to assign started tasks to the SYSTEM or SYSSTC service classes for the STC subsystem. It is recommended that you explicitly classify all system-related address spaces to the SYSTEM or SYSSTC service classes.	Classification "STC"
IZUW962W	A default service class or a default report class is not specified for subsystem "LSFM" .	Classification "LSFM"
IZUW962W	A default service class or a default report class is not specified for subsystem "STC" .	Classification "STC"
IZUW962W	A default service class or a default report class is not specified for subsystem "DB2" .	Classification "DB2"
IZUW962W	A default service class or a default report class is not specified for subsystem "IWEB" .	Classification "IWEB"
IZUW962W	A default service class or a default report class is not specified for subsystem "MQ" .	Classification "MQ"
IZUW962W	A default service class or a default report class is not specified for subsystem "ASCH" .	Classification "ASCH"
IZUW962W	A default service class or a default report class is not specified for subsystem "CICS" .	Classification "CICS"
IZUW962W	A default service class or a default report class is not specified for subsystem "DDF" .	Classification "DDF"
IZUW962W	A default service class or a default report class is not specified for subsystem "IMS" .	Classification "IMS"
IZUW962W	A default service class or a default report class is not specified for subsystem "TSO" .	Classification "TSO"

Figure 10-4 Warning messages for a service definition

Clicking the message opens a window that displays the description, as shown in Figure 10-5.



z/OSMF messages > IZUW0001-IZUW9999 > IZUW962W

IZUW962W A default service class or a default report class is not specified for subsystem *subsystem-type*.

Explanation

You should specify a default service class and report class for each major subsystem even if the subsystem is not used in your installation. With this approach, new work is always classified by the subsystem that brings it into the system. Otherwise, new work is classified to the SYSOTHER service class, and generally you should leave the SYSOTHER service class empty.

In the message text:

subsystem-type
Type of subsystem.

System programmer response

No action is required.

User response

Consider the following actions:

- Define a default service class for the STC subsystem. (Otherwise, address spaces that do not match any classification attribute are classified in the SYSSTC service class.) Create one default service class that can be used for each subsystem for which your installation is not using or defining classification rules.
- Create a default report class for the specified subsystem. Assign a unique default report class for each subsystem so that you can easily identify to which subsystem the new work is related.
- If you have not defined classification rules for the CICS or IMS subsystem types, be sure to create classification rules for the CICS and IMS transactions in the STC or JES classification and set Region Goal to **Yes** for those rules.

Parent topic: IZUW0001-IZUW9999

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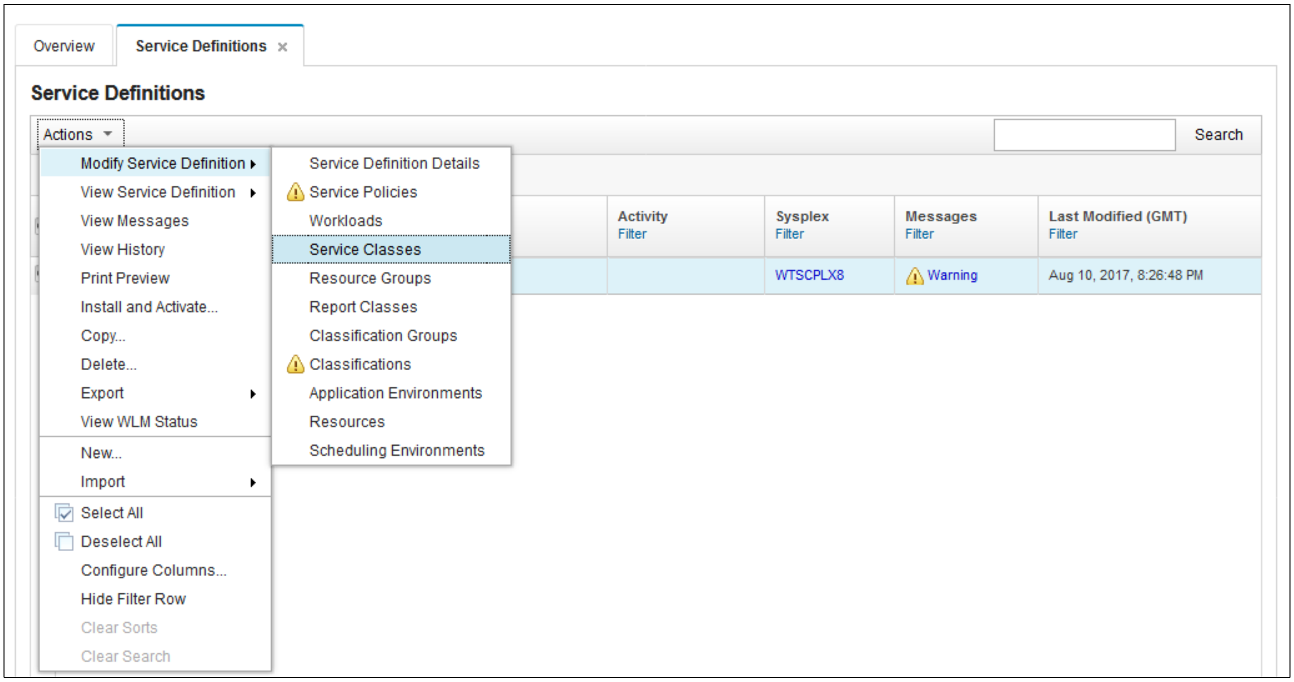
Figure 10-5 Message display

10.2.2 Policy editing

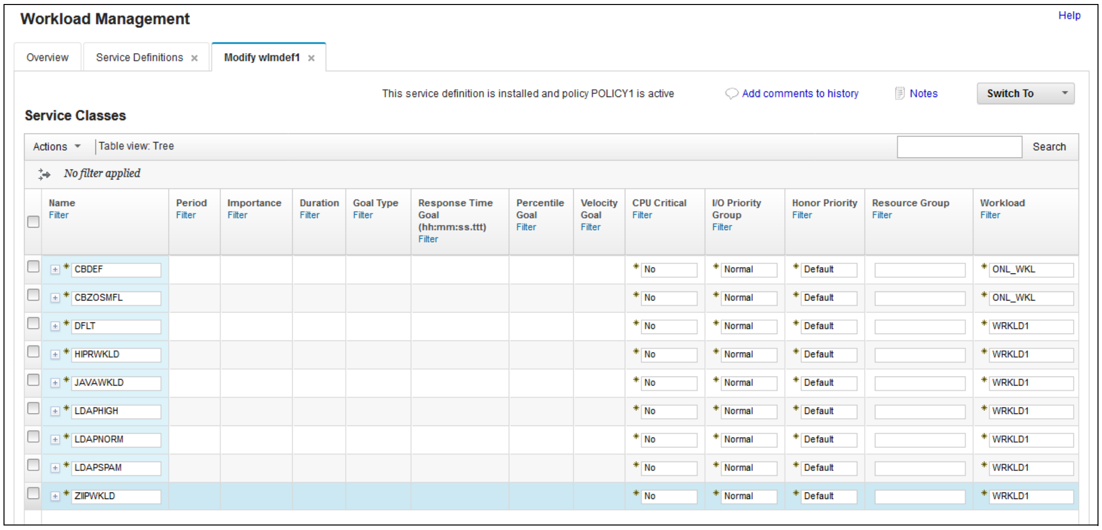
When you select the **Modify Service Definition** or **View Service Definition** action, you are prompted to further select a category in the definition, as shown in Figure 10-6.



Activity Filter	Sysplex Filter	Messages Filter	Last Modified (GMT) Filter
	WTSCPLX8	⚠ Warning	Aug 10, 2017, 8:26:48 PM

Figure 10-6 Service Definitions categories

A tab opens with the selected service definition, as shown in Figure 10-7.



This service definition is installed and policy POLICY1 is active

Service Classes

No filter applied

□	Name Filter	Period Filter	Importance Filter	Duration Filter	Goal Type Filter	Response Time Goal (hh:mm:ss.ttt) Filter	Percentile Goal Filter	Velocity Goal Filter	CPU Critical Filter	I/O Priority Group Filter	Honor Priority Filter	Resource Group Filter	Workload Filter
□	* CBDEF								* No	* Normal	* Default		* ONL_WKL
□	* CBZOSMFL								* No	* Normal	* Default		* ONL_WKL
□	* DFLT								* No	* Normal	* Default		* WRKLD1
□	* HIPRWKLD								* No	* Normal	* Default		* WRKLD1
□	* JAVAWKLD								* No	* Normal	* Default		* WRKLD1
□	* LDAPHIGH								* No	* Normal	* Default		* WRKLD1
□	* LDAPNORM								* No	* Normal	* Default		* WRKLD1
□	* LDAPSPAM								* No	* Normal	* Default		* WRKLD1
□	* ZIIPWKLD								* No	* Normal	* Default		* WRKLD1

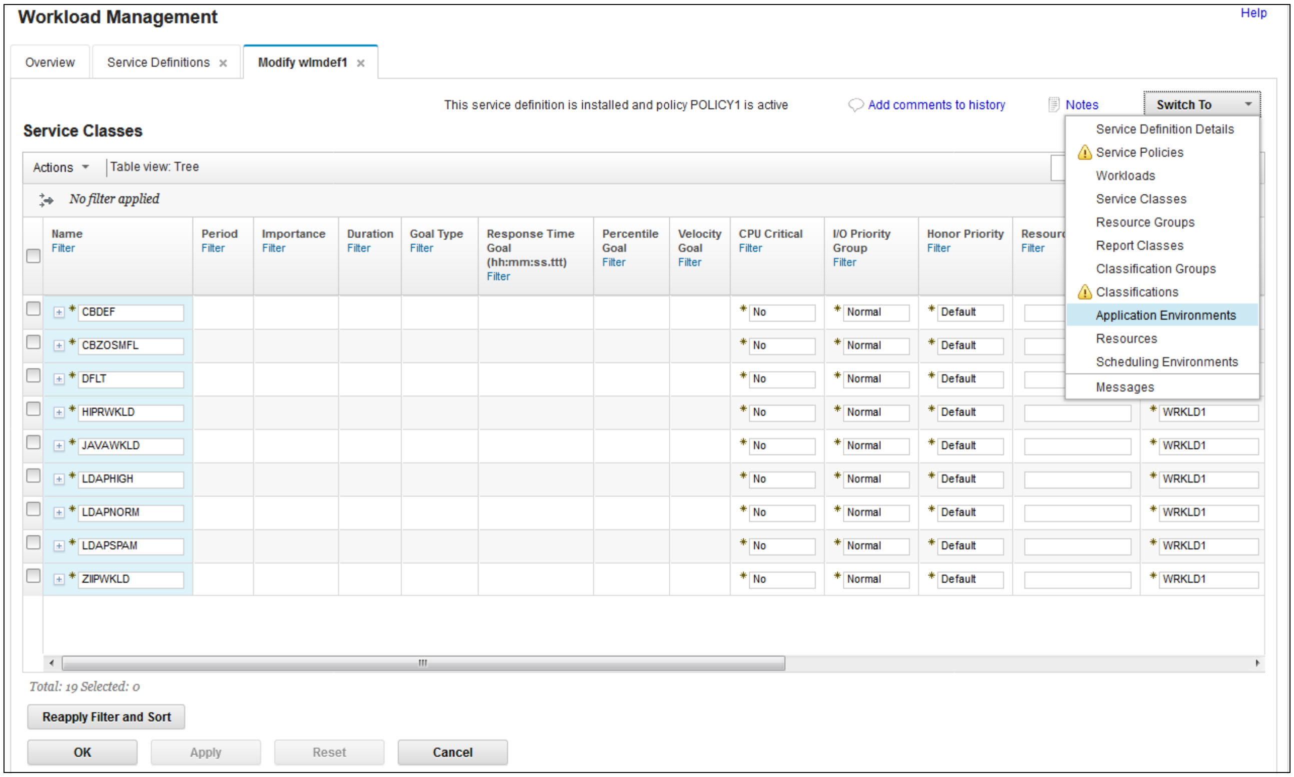
Figure 10-7 Service Definitions table

Service definition items or elements of the same type are displayed in one table. The user can switch to another section of the service definition by using the Switch to menu option.

If service definition items include child items, the tables are tree tables where the parent items can be collapsed or expanded. For example, in the table with service classes, service class items can be expanded to make the periods visible.

Tables and tree tables can be filtered and sorted. For tree tables, the user can switch to a flat table representation, which provides more sort capabilities. Policy elements can be directly edited within tables by double-clicking in the cells.

Recommendations are displayed automatically as you edit policy elements. Selecting **Application Environments** in the Switch to menu (as shown in Figure 10-8) opens the Application Environment table.



This service definition is installed and policy POLICY1 is active

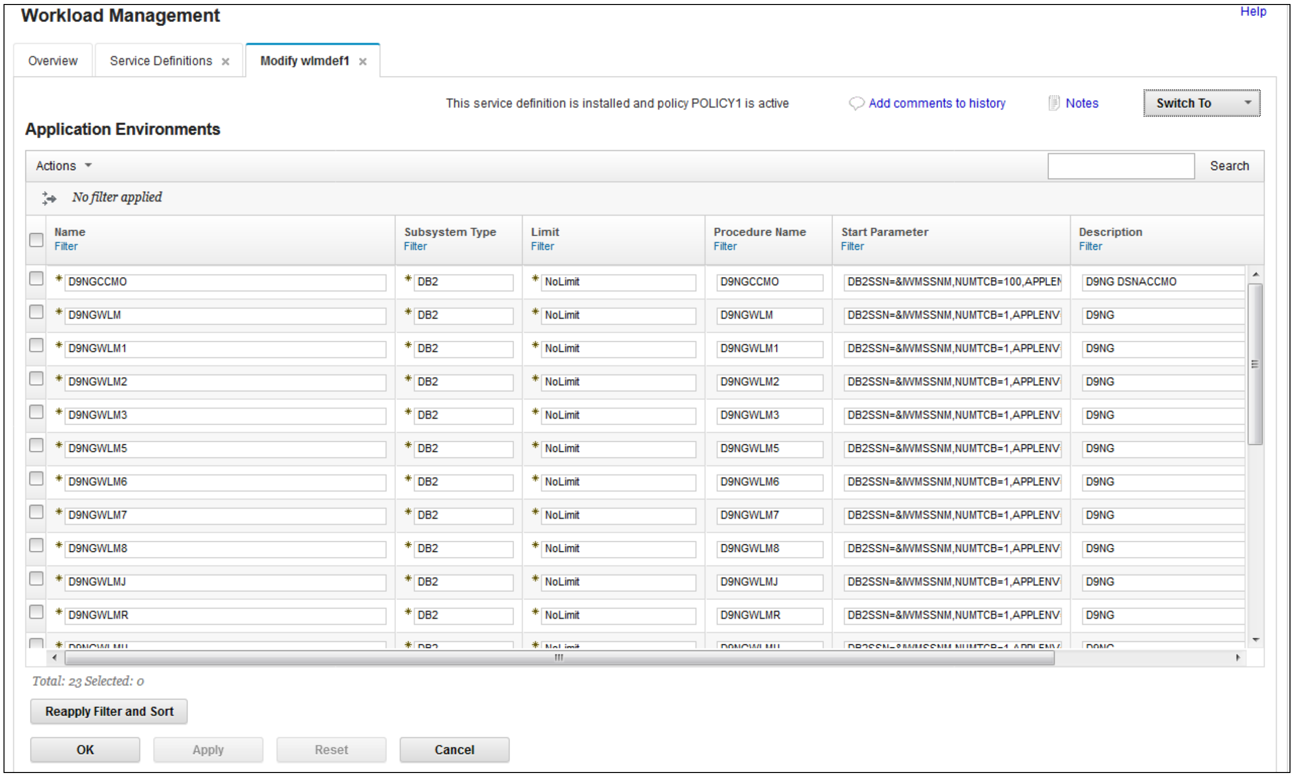
Service Classes

□	Name Filter	Period Filter	Importance Filter	Duration Filter	Goal Type Filter	Response Time Goal (hh:mm:ss.ttt) Filter	Percentile Goal Filter	Velocity Goal Filter	CPU Critical Filter	I/O Priority Group Filter	Honor Priority Filter	Resour Filter	
□	* CBDEF								* No	* Normal	* Default		
□	* CBZOSMFL								* No	* Normal	* Default		
□	* DFLT								* No	* Normal	* Default		
□	* HIPRWKLD								* No	* Normal	* Default		* WRKLD1
□	* JAVAWKLD								* No	* Normal	* Default		* WRKLD1
□	* LDAPHIGH								* No	* Normal	* Default		* WRKLD1
□	* LDAPNORM								* No	* Normal	* Default		* WRKLD1
□	* LDAPSPAM								* No	* Normal	* Default		* WRKLD1
□	* ZIIPWKLD								* No	* Normal	* Default		* WRKLD1

Total: 19 Selected: 0

Figure 10-8   Switch to menu

All Application Environments are listed, as shown in Figure 10-9.



This service definition is installed and policy POLICY1 is active

Application Environments

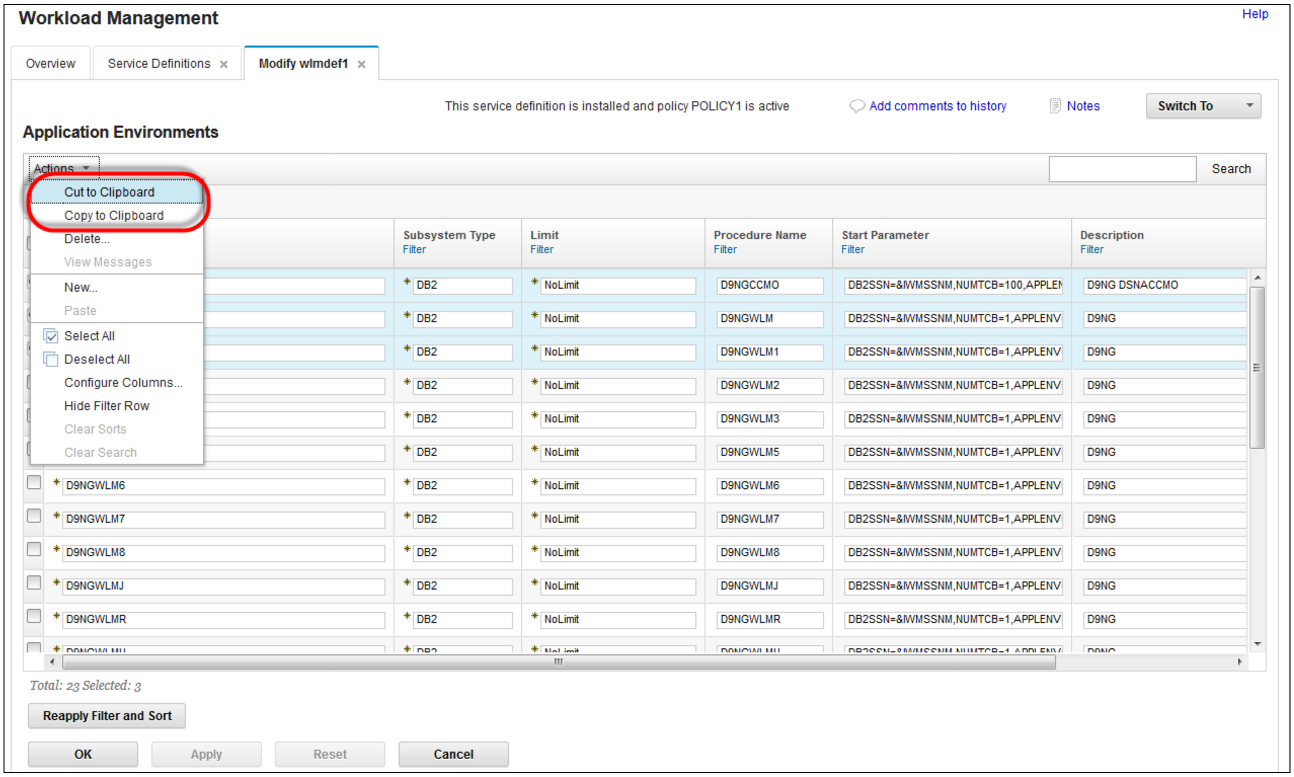
No filter applied

□	Name Filter	Subsystem Type Filter	Limit Filter	Procedure Name Filter	Start Parameter Filter	Description Filter
□	* D9NGCCMO	* DB2	* NoLimit	D9NGCCMO	DB2SSN=&IWMSSNM,NUMTCB=100,APPLEN	D9NG DSNACCMO
□	* D9NGWLM	* DB2	* NoLimit	D9NGWLM	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
□	* D9NGWLM1	* DB2	* NoLimit	D9NGWLM1	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
□	* D9NGWLM2	* DB2	* NoLimit	D9NGWLM2	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
□	* D9NGWLM3	* DB2	* NoLimit	D9NGWLM3	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
□	* D9NGWLM5	* DB2	* NoLimit	D9NGWLM5	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
□	* D9NGWLM6	* DB2	* NoLimit	D9NGWLM6	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
□	* D9NGWLM7	* DB2	* NoLimit	D9NGWLM7	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
□	* D9NGWLM8	* DB2	* NoLimit	D9NGWLM8	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
□	* D9NGWLMJ	* DB2	* NoLimit	D9NGWLMJ	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
□	* D9NGWLMR	* DB2	* NoLimit	D9NGWLMR	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
□	* D9NGWLMU	* DB2	* NoLimit	D9NGWLMU	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG

Total: 23 Selected: 0

Figure 10-9 Application Environments table

Several service definitions can be opened simultaneously, and cut and paste actions can be used to copy or move policy elements from one service definition to another one. For example, you can select certain Application Environments by selecting the environments that you want to copy and then select **Copy to clipboard**, as shown in Figure 10-10.



This service definition is installed and policy POLICY1 is active

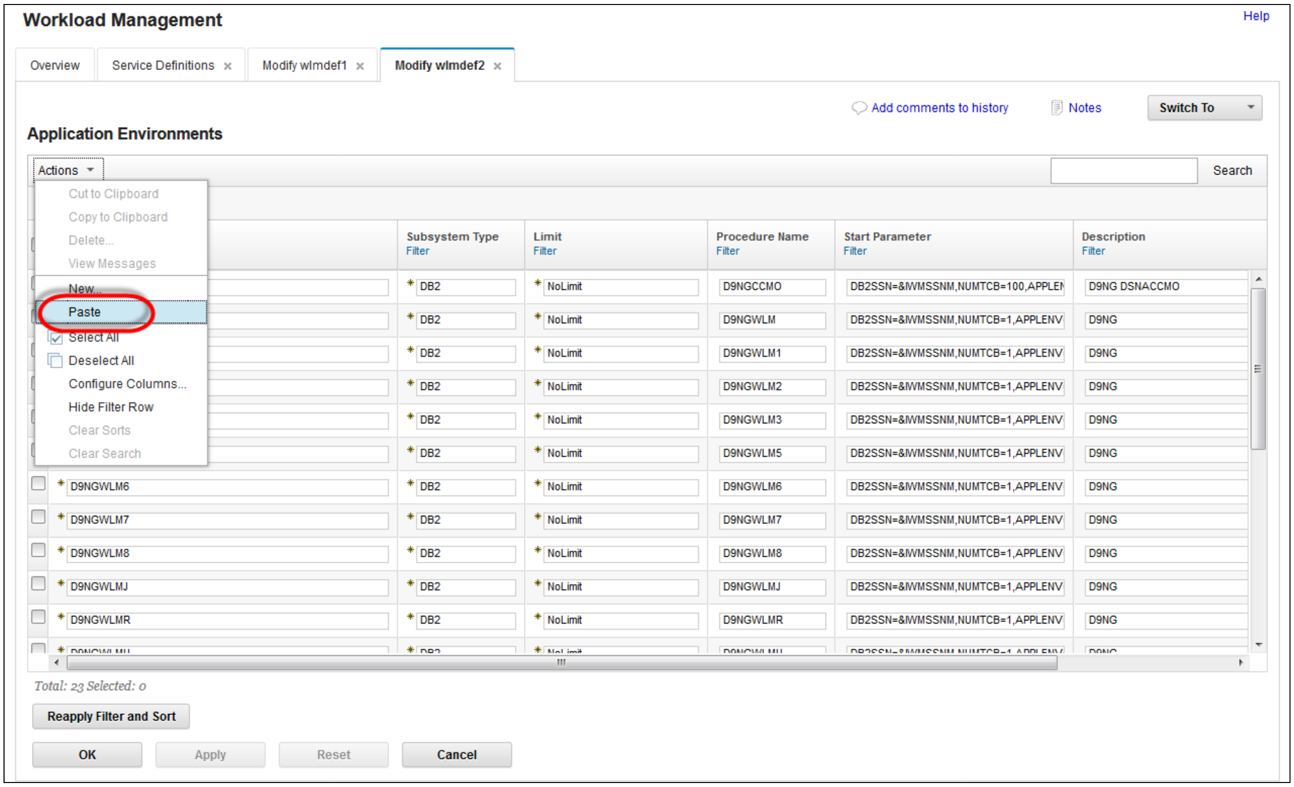
Application Environments

	Subsystem Type	Limit	Procedure Name	Start Parameter	Description
	* DB2	* NoLimit	D9NGCCMO	DB2SSN=&IWMSSNM,NUMTCB=100,APPLEN	D9NG DSNACCMO
	* DB2	* NoLimit	D9NGWLM	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
	* DB2	* NoLimit	D9NGWLM1	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
	* DB2	* NoLimit	D9NGWLM2	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
	* DB2	* NoLimit	D9NGWLM3	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
	* DB2	* NoLimit	D9NGWLM5	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
□ * D9NGWLM6	* DB2	* NoLimit	D9NGWLM6	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
□ * D9NGWLM7	* DB2	* NoLimit	D9NGWLM7	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
□ * D9NGWLM8	* DB2	* NoLimit	D9NGWLM8	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
□ * D9NGWLMJ	* DB2	* NoLimit	D9NGWLMJ	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
□ * D9NGWLMR	* DB2	* NoLimit	D9NGWLMR	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG

Total: 23 Selected: 3

Figure 10-10 Selecting the Copy function

You can then open another Application Environment table for another service definition and paste these definitions, as shown Figure 10-11.



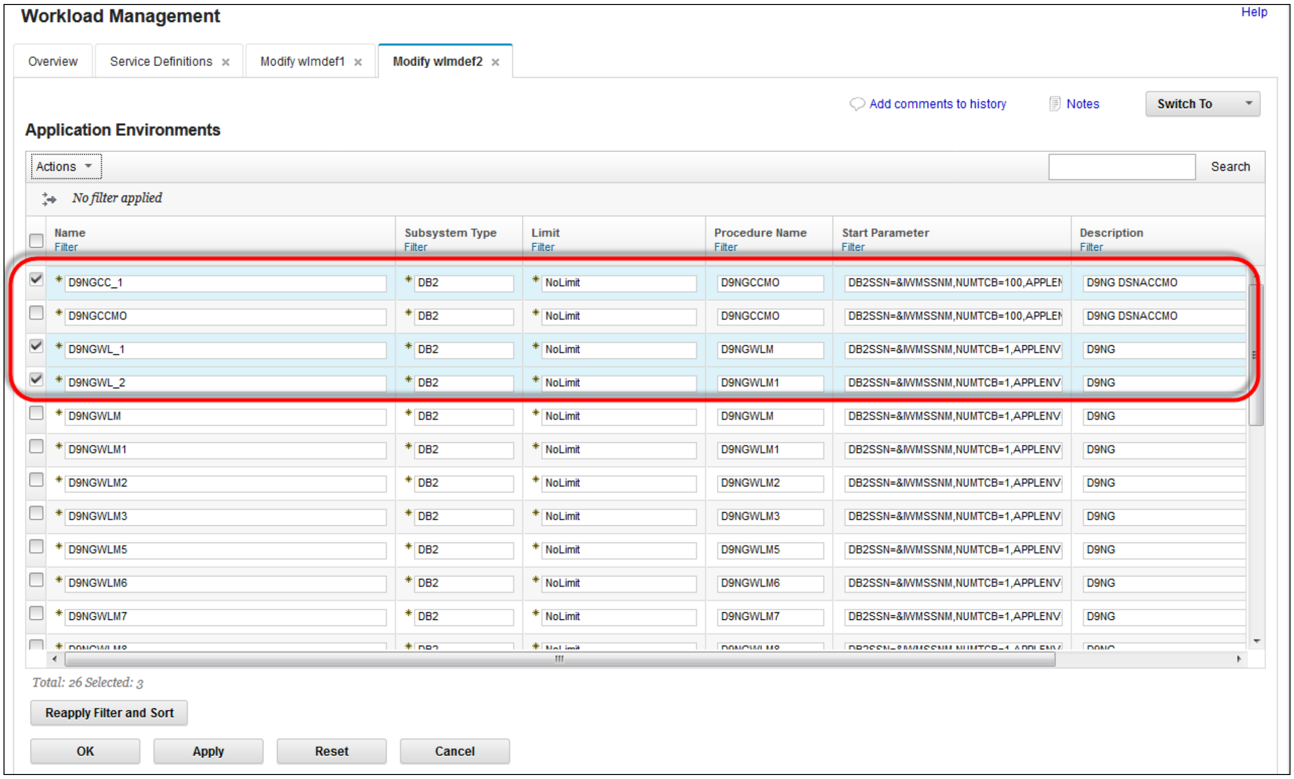
Application Environments

		Subsystem Type Filter	Limit Filter	Procedure Name Filter	Start Parameter Filter	Description Filter
		* DB2	* NoLimit	D9NGCCMO	DB2SSN=&IWMSSNM,NUMTCB=100,APPLEN	D9NG DSNACCMO
		* DB2	* NoLimit	D9NGWLM	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
		* DB2	* NoLimit	D9NGWLM1	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
		* DB2	* NoLimit	D9NGWLM2	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
		* DB2	* NoLimit	D9NGWLM3	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
		* DB2	* NoLimit	D9NGWLM5	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
□	* D9NGWLM6	* DB2	* NoLimit	D9NGWLM6	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
□	* D9NGWLM7	* DB2	* NoLimit	D9NGWLM7	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
□	* D9NGWLM8	* DB2	* NoLimit	D9NGWLM8	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
□	* D9NGWLMJ	* DB2	* NoLimit	D9NGWLMJ	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
□	* D9NGWLMR	* DB2	* NoLimit	D9NGWLMR	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
□	* D9NGWLMU	* DB2	* NoLimit	D9NGWLMU	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG

Total: 23 Selected: 0

Figure 10-11   Selecting the Paste function

The new Application Environment table resembles the table that is shown in Figure 10-12.



Application Environments

No filter applied

□	Name	Subsystem Type	Limit	Procedure Name	Start Parameter	Description
☑	* D9NGCC_1	* DB2	* NoLimit	D9NGCCMO	DB2SSN=&IWMSSNM,NUMTCB=100,APPLEN	D9NG DSNACCMO
□	* D9NGCCMO	* DB2	* NoLimit	D9NGCCMO	DB2SSN=&IWMSSNM,NUMTCB=100,APPLEN	D9NG DSNACCMO
☑	* D9NGWL_1	* DB2	* NoLimit	D9NGWLM	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
☑	* D9NGWL_2	* DB2	* NoLimit	D9NGWLM1	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
□	* D9NGWLM	* DB2	* NoLimit	D9NGWLM	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
□	* D9NGWLM1	* DB2	* NoLimit	D9NGWLM1	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
□	* D9NGWLM2	* DB2	* NoLimit	D9NGWLM2	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
□	* D9NGWLM3	* DB2	* NoLimit	D9NGWLM3	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
□	* D9NGWLM5	* DB2	* NoLimit	D9NGWLM5	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
□	* D9NGWLM6	* DB2	* NoLimit	D9NGWLM6	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG
□	* D9NGWLM7	* DB2	* NoLimit	D9NGWLM7	DB2SSN=&IWMSSNM,NUMTCB=1,APPLENV	D9NG

Total: 26 Selected: 3

Figure 10-12 New Application Environment table

10.2.3 Exporting and importing service definitions

You can export and import a service definition to and from a host data set or a workstation file in XML format. In the following examples, z/OSMF V1.13 running on another SYSPLEX was used.

Exporting

To export a service definition to a workstation, open the Service Definition window and select the correct service definition, click **Export** in the Actions tab, and then, select **To Local Workstation**, as shown in Figure 10-13 on page 232.

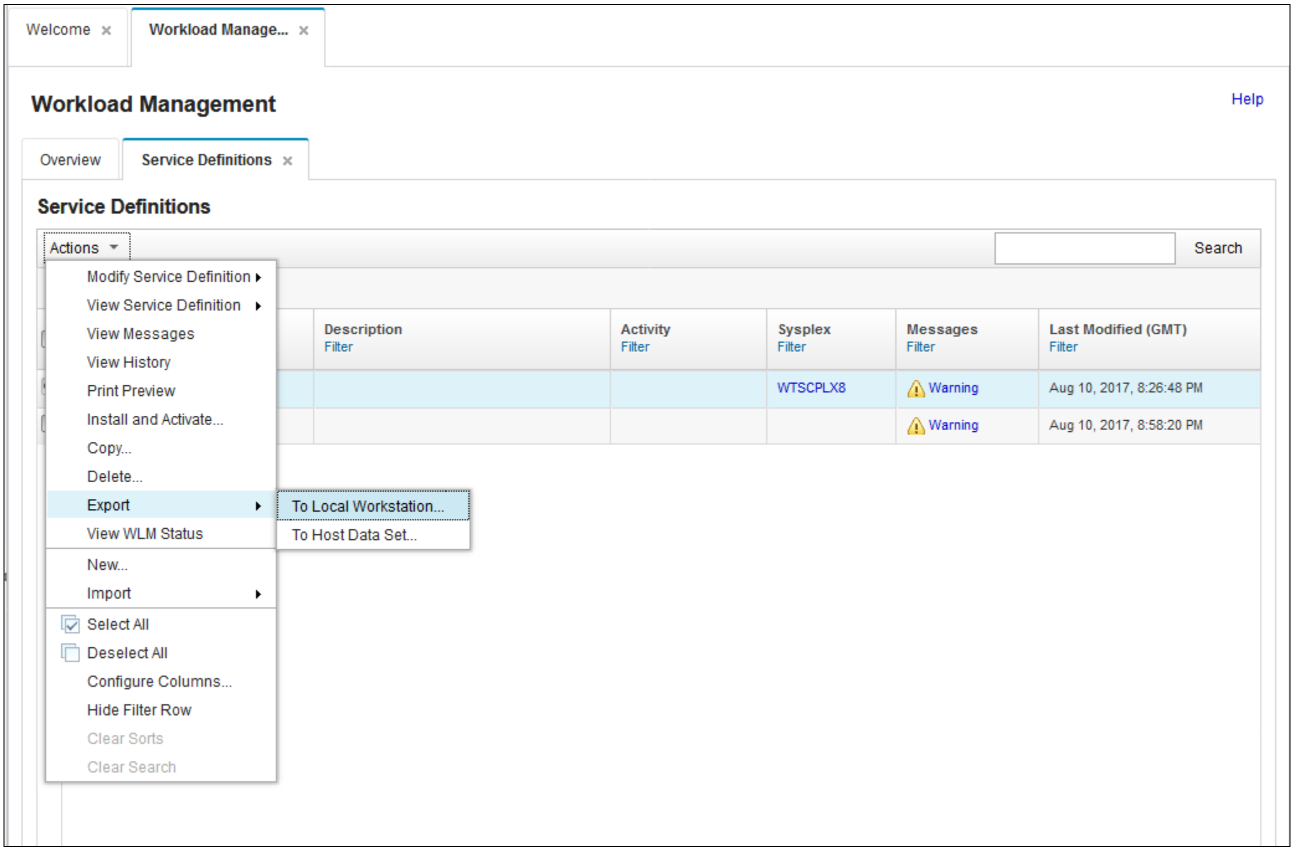


Figure 10-13 Exporting to a local workstation

You can then select your export options in the window that opens, as shown in Figure 10-14.

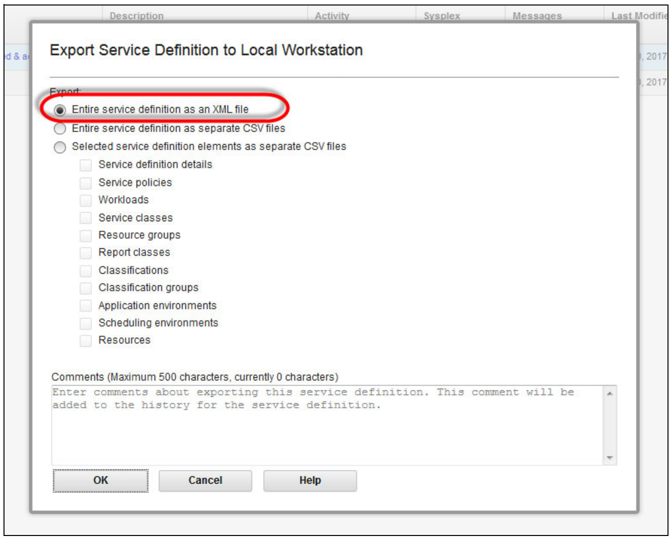

Export Service Definition to Local Workstation
Export:
● Entire service definition as an XML file
○ Entire service definition as separate CSV files
○ Selected service definition elements as separate CSV files
□ Service definition details
□ Service policies
□ Workloads
□ Service classes
□ Resource groups
□ Report classes
□ Classifications
□ Classification groups
□ Application environments
□ Scheduling environments
□ Resources
Comments (Maximum 500 characters, currently 0 characters)
Enter comments about exporting this service definition. This comment will be added to the history for the service definition.
OK
Cancel
Help

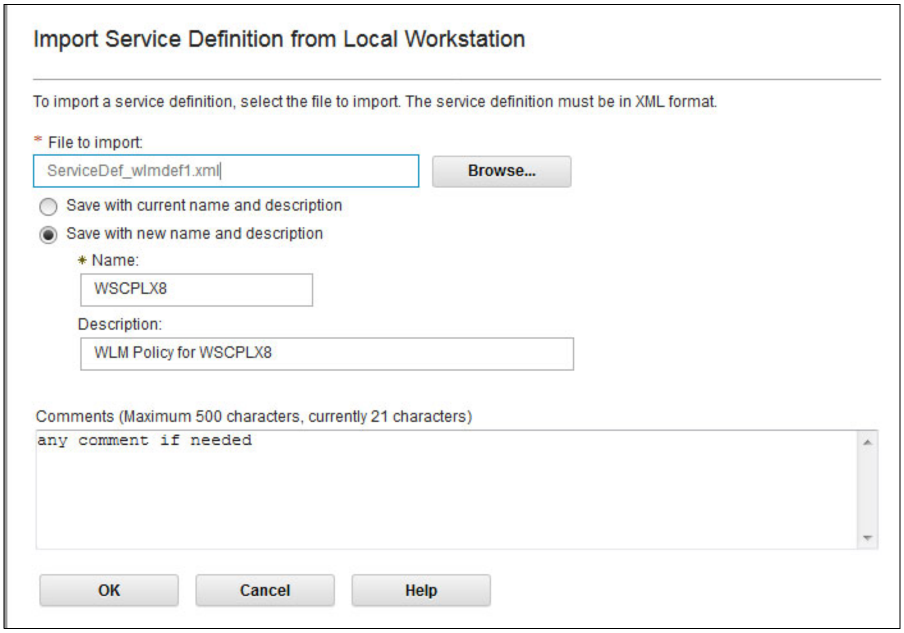
Figure 10-14 Export options

Depending on your browser and settings, an option might be available in which the file can be saved. However, the file format that is used `ServiceDef_XXXX.xml`, where `XXXX` is the name of the service definition that was selected.

Importing

After you have the exported XML file available on your workstation, you can import the service definition to z/OSMF by completing the following steps:

1. Click **Action** → **Import** → **From Local Workstation**.
2. Specify the file to import.
3. Choose the naming options, as shown in Figure 10-15.



Import Service Definition from Local Workstation

To import a service definition, select the file to import. The service definition must be in XML format.

* File to import: ServiceDef_wlmdef1.xml

○ Save with current name and description

● Save with new name and description

* Name: WSCPLX8

Description: WLM Policy for WSCPLX8

Comments (Maximum 500 characters, currently 21 characters)

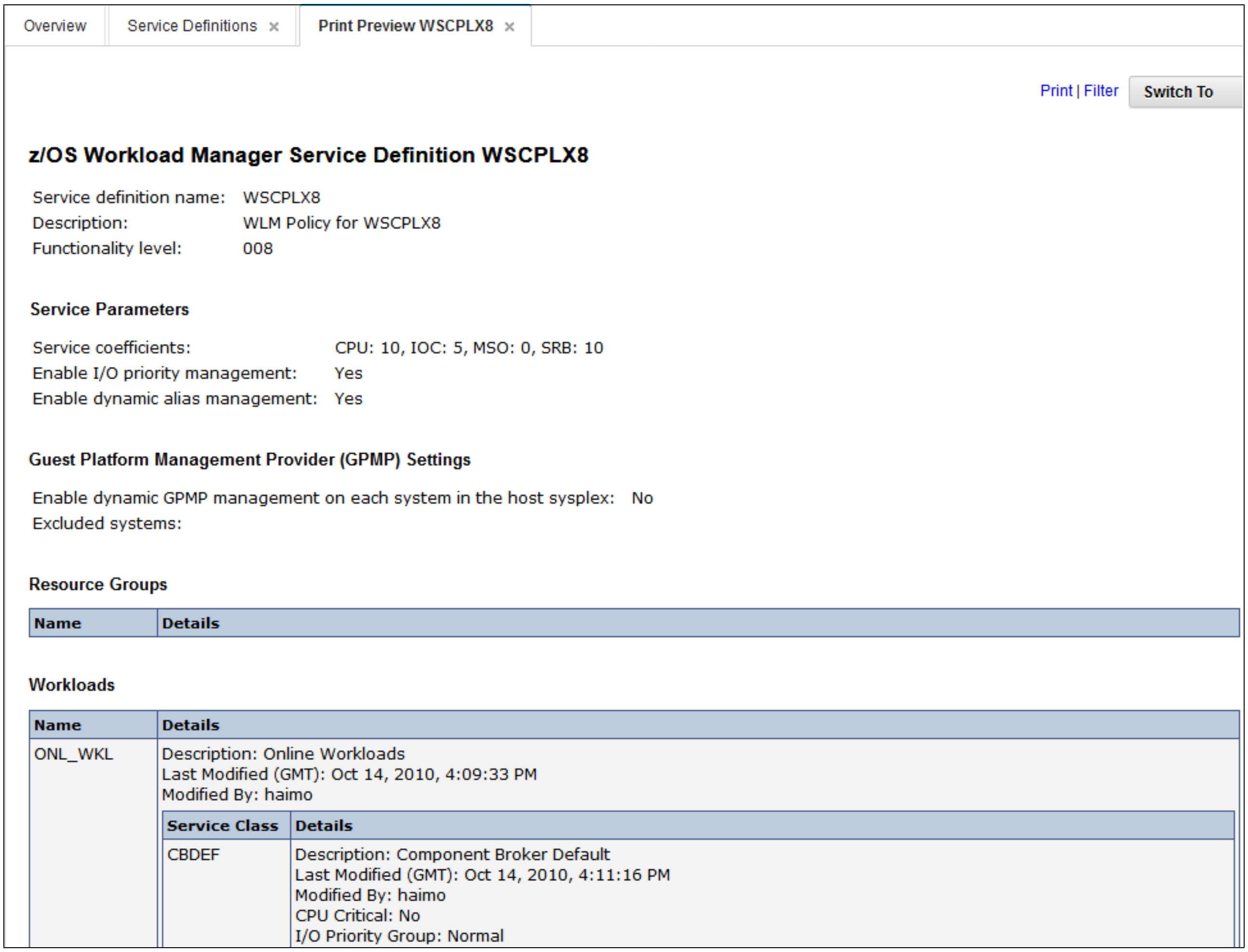
```
any comment if needed
```

Figure 10-15 Importing a service definition

The imported definition is available in the Service Definition window.

10.2.4 Service definition printing

z/OSMF WLM allows you to print a service definition from within the z/OSMF. Select a service definition and click **Actions** → **Print Preview** to open a Print Preview window that shows the service definition as an HTML document, as shown in Figure 10-16.



z/OS Workload Manager Service Definition WSCPLX8

Service definition name:	WSCPLX8
Description:	WLM Policy for WSCPLX8
Functionality level:	008

Service Parameters

Service coefficients:	CPU: 10, IOC: 5, MSO: 0, SRB: 10
Enable I/O priority management:	Yes
Enable dynamic alias management:	Yes

Guest Platform Management Provider (GPMP) Settings

Enable dynamic GPMP management on each system in the host sysplex: No
Excluded systems:

Resource Groups

Name	Details

Workloads

Name	Details
ONL_WKL	Description: Online Workloads Last Modified (GMT): Oct 14, 2010, 4:09:33 PM Modified By: haimo

Service Class	Details
CBDEF	Description: Component Broker Default Last Modified (GMT): Oct 14, 2010, 4:11:16 PM Modified By: haimo CPU Critical: No I/O Priority Group: Normal

Figure 10-16 Print Preview

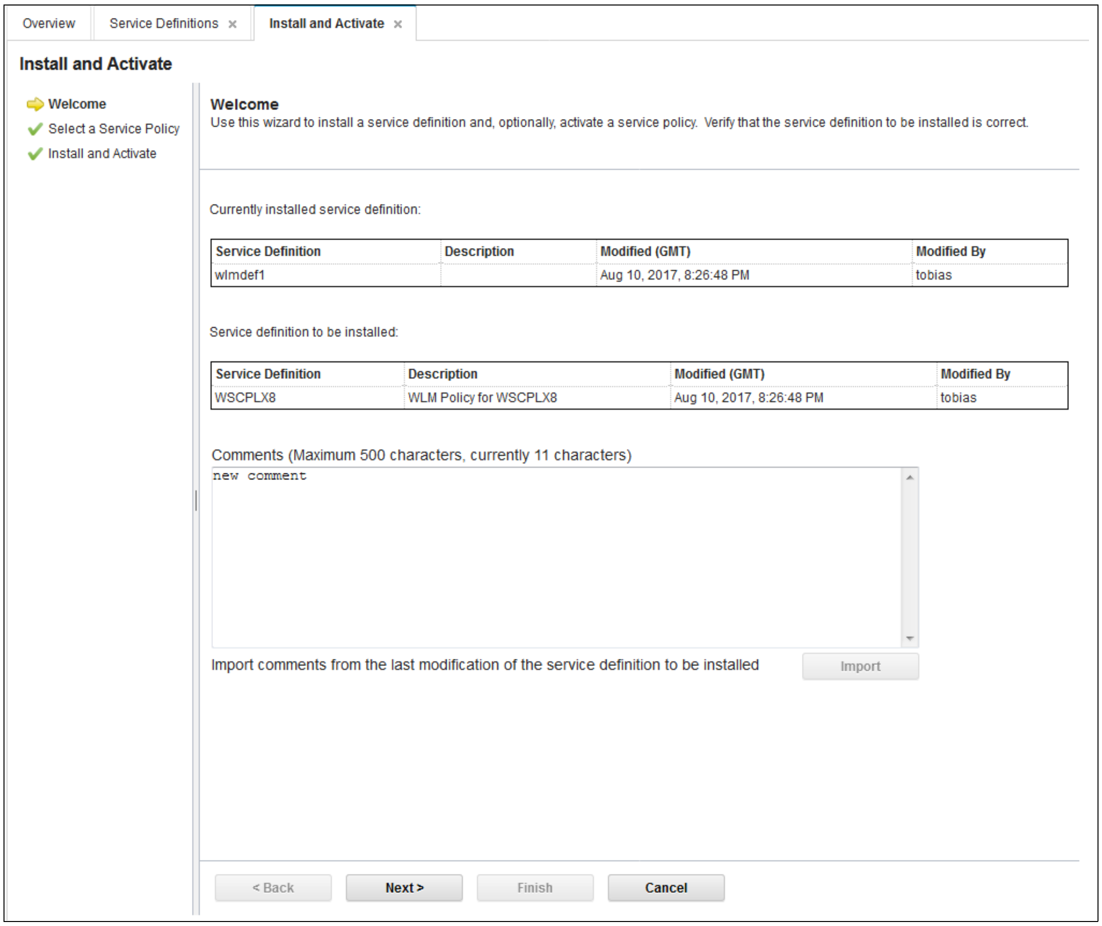
Before you print, you can use the Print Preview function to filter service definition elements or apply service policies.

The messages table with all recommendations for the selected service definition is also contained in the print preview and can be printed for further study.

In addition to being used for printing, the Print Preview window provides a general overview of a service definition.

10.2.5 Installing service definitions

When you select a service definition and click **Actions** → **Install and Activate**, you start a wizard that guides you through the installation and activates the process for the service definition, as shown in Figure 10-17.



Install and Activate

Welcome

Use this wizard to install a service definition and, optionally, activate a service policy. Verify that the service definition to be installed is correct.

Currently installed service definition:

Service Definition	Description	Modified (GMT)	Modified By
wlmdef1		Aug 10, 2017, 8:26:48 PM	tobias

Service definition to be installed:

Service Definition	Description	Modified (GMT)	Modified By
WSCPLX8	WLM Policy for WSCPLX8	Aug 10, 2017, 8:26:48 PM	tobias

Comments (Maximum 500 characters, currently 11 characters)

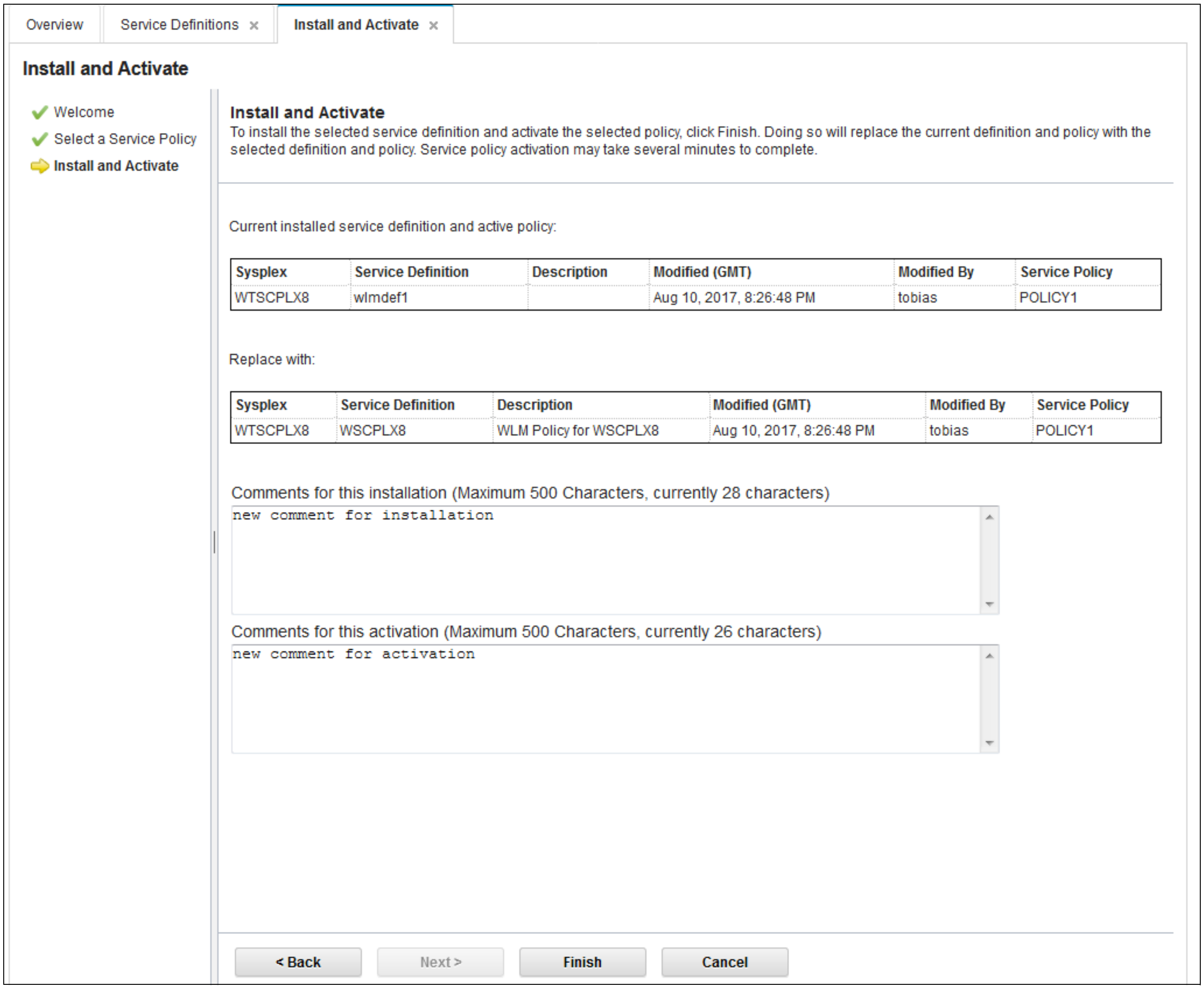
```
new comment
```

Import comments from the last modification of the service definition to be installed

Figure 10-17 Install and Activate wizard

The wizard features the following steps:

1. Review the properties of the installed service definition and the definition to be installed.
2. Select the service policy to be activated.
3. Review the summary of the Install and Activate action, and trigger the installation of the service definition and the activation of the service policy, as shown in Figure 10-18 on page 236. An installation and activation comment can be added to alert other users as to why changes were made.



Install and Activate

Install and Activate

To install the selected service definition and activate the selected policy, click Finish. Doing so will replace the current definition and policy with the selected definition and policy. Service policy activation may take several minutes to complete.

Current installed service definition and active policy:

Sysplex	Service Definition	Description	Modified (GMT)	Modified By	Service Policy
WTSCPLX8	wlmdef1		Aug 10, 2017, 8:26:48 PM	tobias	POLICY1

Replace with:

Sysplex	Service Definition	Description	Modified (GMT)	Modified By	Service Policy
WTSCPLX8	WSCPLX8	WLM Policy for WSCPLX8	Aug 10, 2017, 8:26:48 PM	tobias	POLICY1

Comments for this installation (Maximum 500 Characters, currently 28 characters)

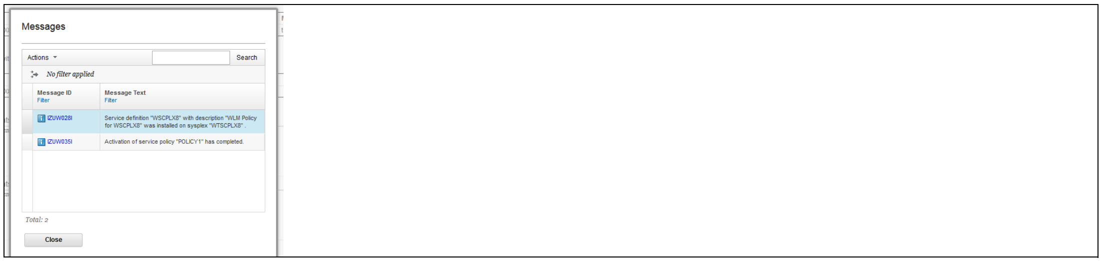
```
new comment for installation
```

Comments for this activation (Maximum 500 Characters, currently 26 characters)

```
new comment for activation
```

Figure 10-18 Activation

Upon successful activation, you see the confirmation window that is shown in Figure 10-19.


Messages

Message ID	Message Text
IZUW028I	Service definition "WSCPLX8" with description "WLM Policy for WSCPLX8" was installed on sysplex "WTSCPLX8" .
IZUW035I	Activation of service policy "POLICY1" has completed.

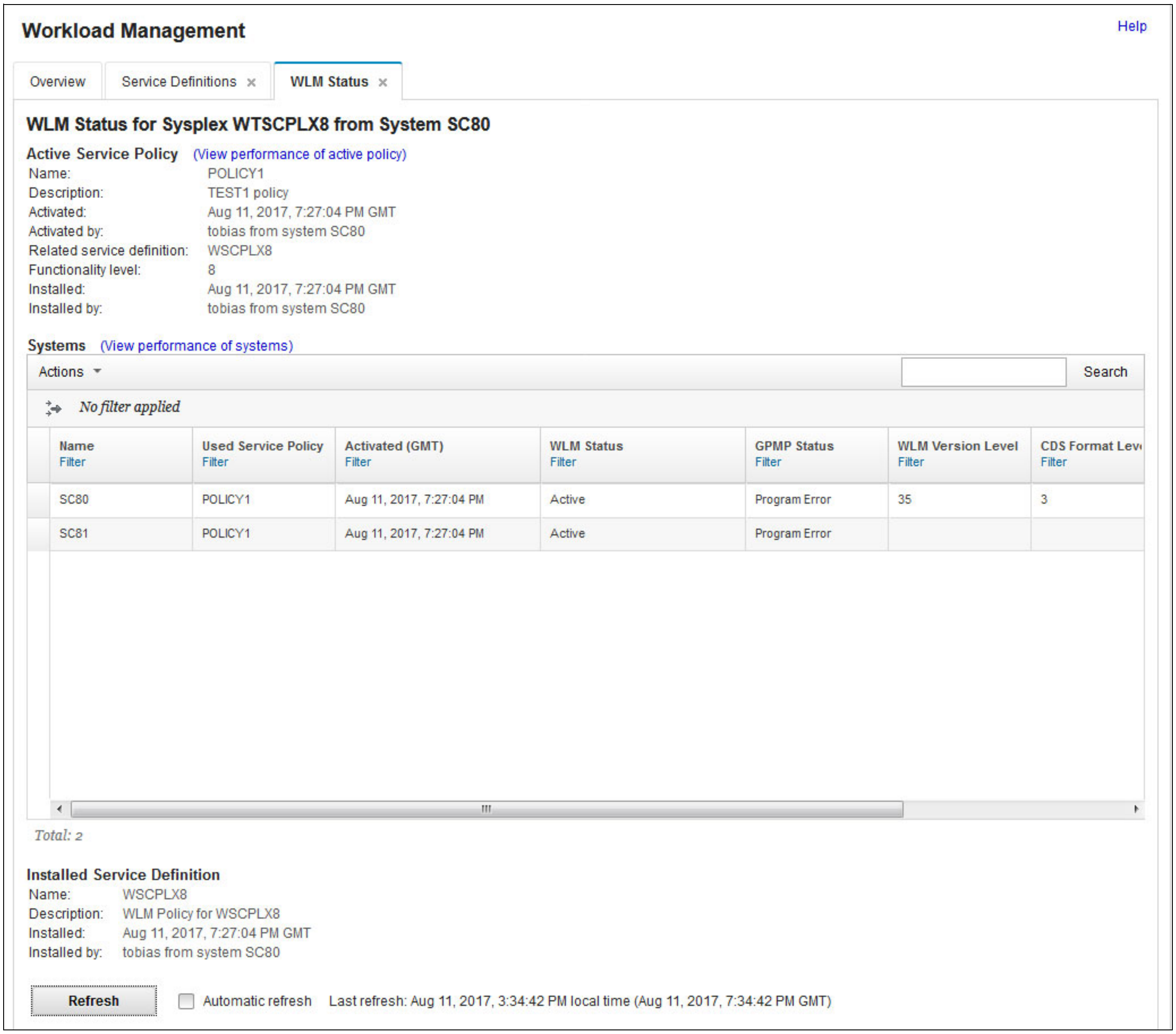
Total: 2

Figure 10-19 Successful activation

If a backup data set is specified in the Settings window, a copy of the installed service definition is stored in that data set.

10.2.6 Monitoring the WLM status in a sysplex

You can open the Sysplex Status pane from the Overview window to view the WLM status in the sysplex. The Sysplex Status pane shows information similar to the output that is produced by the MVS console command **`D WLM,SYSTEMS`**. You can see which service policy is active in the sysplex and on each system in the sysplex, as shown in Figure 10-20.



WLM Status for Sysplex WTSCPLX8 from System SC80

Active Service Policy (View performance of active policy)

Name:	POLICY1
Description:	TEST1 policy
Activated:	Aug 11, 2017, 7:27:04 PM GMT
Activated by:	tobias from system SC80
Related service definition:	WSCPLX8
Functionality level:	8
Installed:	Aug 11, 2017, 7:27:04 PM GMT
Installed by:	tobias from system SC80

Systems (View performance of systems)

Name Filter	Used Service Policy Filter	Activated (GMT) Filter	WLM Status Filter	GPMP Status Filter	WLM Version Level Filter	CDS Format Lev Filter
SC80	POLICY1	Aug 11, 2017, 7:27:04 PM	Active	Program Error	35	3
SC81	POLICY1	Aug 11, 2017, 7:27:04 PM	Active	Program Error		

Total: 2

Installed Service Definition

Name:	WSCPLX8
Description:	WLM Policy for WSCPLX8
Installed:	Aug 11, 2017, 7:27:04 PM GMT
Installed by:	tobias from system SC80

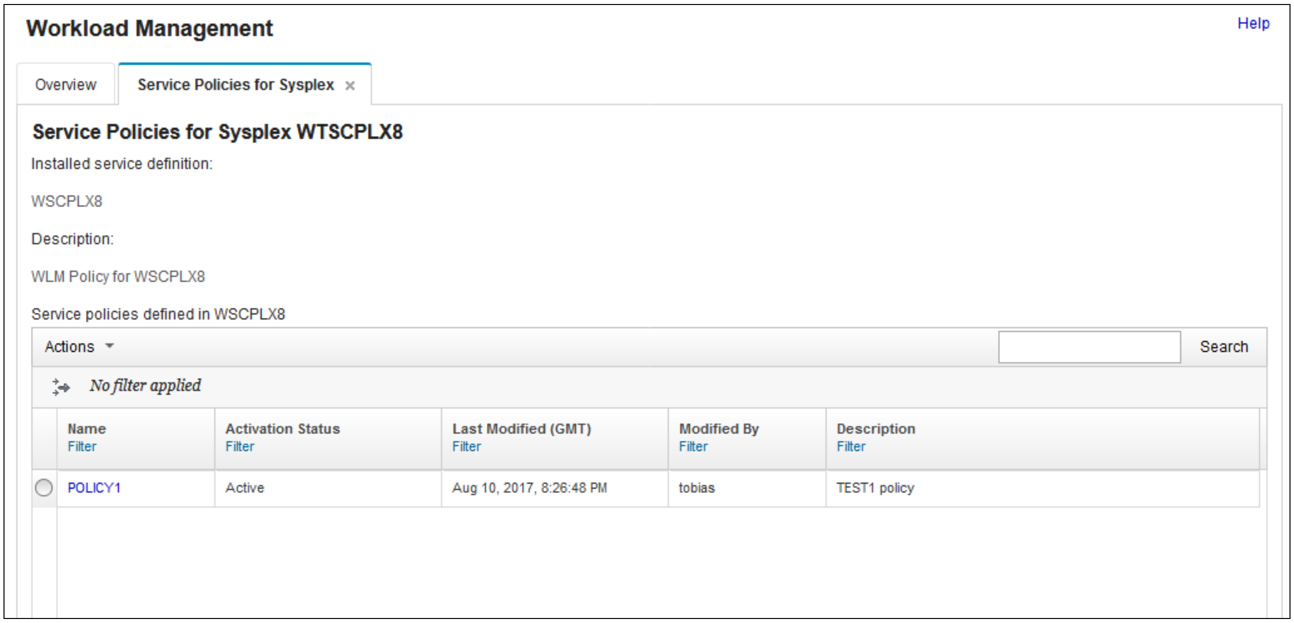
□ Automatic refresh Last refresh: Aug 11, 2017, 3:34:42 PM local time (Aug 11, 2017, 7:34:42 PM GMT)

Figure 10-20 WLM status for a sysplex

In addition, the Sysplex Status pane shows the service definition that is installed in the WLM couple data set. It also provides the option to automatically refresh the window’s content every 30 seconds.

10.2.7 Managing service policies

You can open the Manage Service Policies pane from the Overview window to manage the service policies of the installed service definition. The Manage Service Policies pane shows the state of the service policies that are contained in the service definition that is installed in the WLM couple data set, as shown in Figure 10-21.



Service Policies for Sysplex WTSCPLX8

Installed service definition:

WSCPLX8

Description:

WLM Policy for WSCPLX8

Service policies defined in WSCPLX8

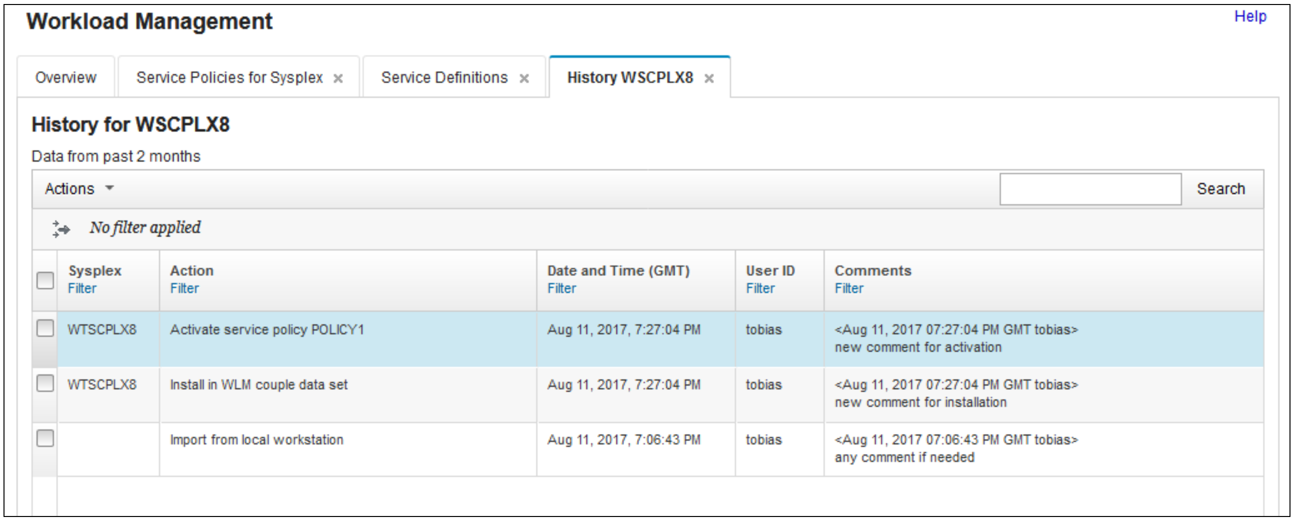
	Name Filter	Activation Status Filter	Last Modified (GMT) Filter	Modified By Filter	Description Filter
○	POLICY1	Active	Aug 10, 2017, 8:26:48 PM	tobias	TEST1 policy

Figure 10-21 Manage Service Policies

The pane indicates which service policy is active. The pane allows you to activate another service policy, and to view and print a service policy of the installed service definition.

10.2.8 Service definition history

If you select a service definition and click **Actions** → **View History**, you open the history pane for this service definition, as shown in Figure 10-22. A history is provided for each service definition by listing the activities that are performed on the service definition. The history contains edit, install, activate, import, and export activities.



History for WSCPLX8

Data from past 2 months

☐	Sysplex Filter	Action Filter	Date and Time (GMT) Filter	User ID Filter	Comments Filter
☐	WTSCPLX8	Activate service policy POLICY1	Aug 11, 2017, 7:27:04 PM	tobias	<Aug 11, 2017 07:27:04 PM GMT tobias> new comment for activation
☐	WTSCPLX8	Install in WLM couple data set	Aug 11, 2017, 7:27:04 PM	tobias	<Aug 11, 2017 07:27:04 PM GMT tobias> new comment for installation
☐		Import from local workstation	Aug 11, 2017, 7:06:43 PM	tobias	<Aug 11, 2017 07:06:43 PM GMT tobias> any comment if needed

Figure 10-22 Service Definition history

For each activity, the history entries display the time stamp and the user who performed the activity. You can customize through the Settings pane how long the history entries are kept.

11

Problem determination monitoring by using the IBM z/OS Management Facility Incident Log task

This chapter describes problem determination monitoring by using IBM z/OS Management Facility (z/OSMF) and the z/OSMF Incident Log task.

This chapter includes the following topics:

11.1 Introduction

The incident Log task of z/OSMF provides a consolidated list of SVC dump-related problems, along with details and diagnostic data that is captured with each incident. It also allows you to easily send the data for further diagnostic tests (for example, to IBM Software Support).

A snapshot is created when a system problem occurs; for example, at an SVC abend dump or a user-initiated SVC abend dump time, and together with any other data, they are linked together to create an *incident*.

By default, 30 minutes of OPERLOG, 1 hour of LOGREC detail, and 4 hours of LOGREC summary are collected. By using the incident log, you can review all incidents on your sysplex and determine what information was collected. You can then send the date by FTP to IBM or elsewhere for debugging and analysis.

With z/OSMF V2R1, the Incident Log task under the Problem Determination category is enhanced to support the z/OS Problem Document Upload Utility (PDUU) apart from standard FTP to send data to IBM or elsewhere.

11.2 Scenario overview

For our scenario, we assume that the Incident Log task is installed and configured during the z/OSMF installation. To use the Incident Log task, you *must* ensure that several z/OS components and facilities are enabled on your system. These functions support the collection of diagnostic data and the creation of diagnostic logs.

For more information about setting up the z/OS system prerequisites for the z/OSMF Incident Log task, see 11.2.4, “Manual Create Incident” on page 261.

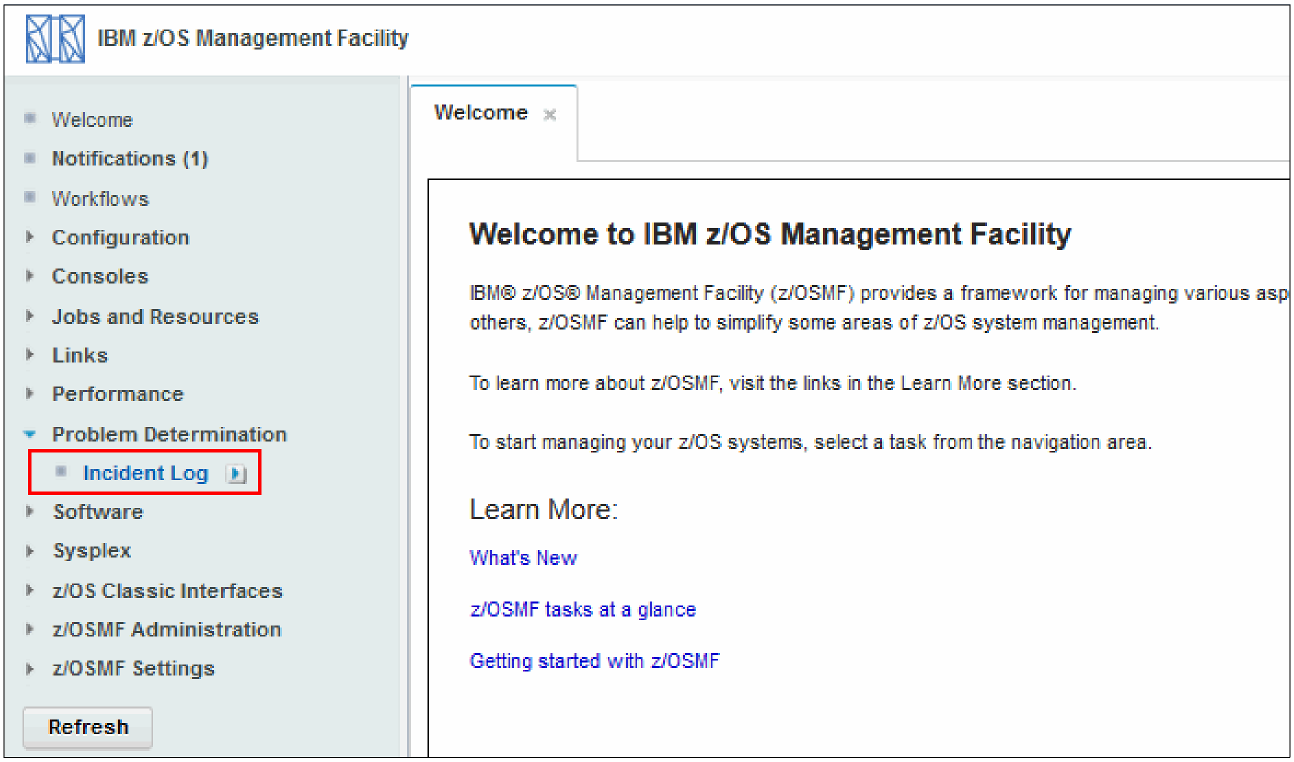
In our scenario, a dump of an address space is requested by IBM Software Support. The address space that is requested is the MASTER address space. These dumps, together with the SYSLOG and LOGREC (if any), should be transmitted to IBM for analysis. A problem record (PMR) is opened with IBM Software Support before data is transmitted.

The command and response that was run to take the initial dump was started by a user by using the following system command:

```
DUMP COMM=(MASTER ADDRESS SPACE DUMP)
*01 IEE094D SPECIFY OPERAND(S) FOR DUMP COMMAND
r 01,JOBNAME=(*MASTER*),CONT
r nn,SDATA=(PSA,CSA,SQA,GRSQ,LPA,LSQA,RGN,SUM,SWA,TRT,XESDATA),END
```

11.2.1 Starting a z/OSMF incident log

To review our incident by using z/OSMF, log on to z/OSMF and click **Incident Log** under Problem Determination, as shown in Figure 11-1.



Welcome to IBM z/OS Management Facility

IBM® z/OS® Management Facility (z/OSMF) provides a framework for managing various asp others, z/OSMF can help to simplify some areas of z/OS system management.

To learn more about z/OSMF, visit the links in the Learn More section.

To start managing your z/OS systems, select a task from the navigation area.

Learn More:

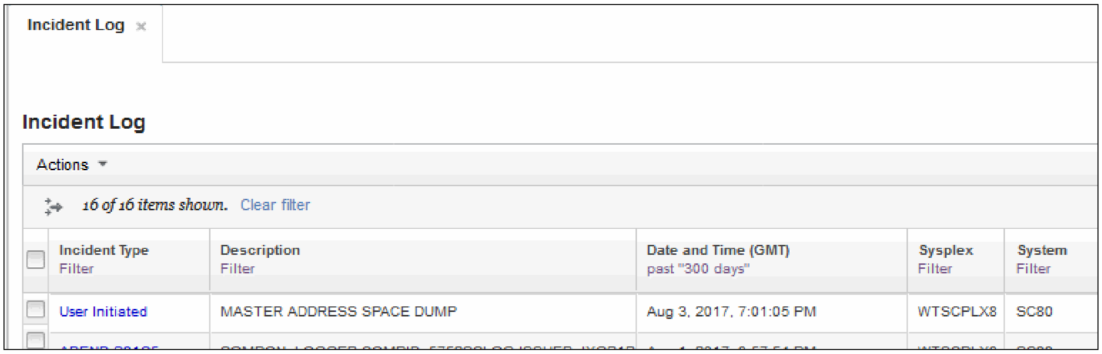
What's New

z/OSMF tasks at a glance

Getting started with z/OSMF

Figure 11-1 Selecting the Incident Log task

After you select the Incident Log task, you see all of the incidents that were collected by z/OSMF. The example incident is logged in z/OSMF, as shown in Figure 11-2.



Incident Log

16 of 16 items shown.

□	Incident Type Filter	Description Filter	Date and Time (GMT) past "300 days"	Sysplex Filter	System Filter
□	User Initiated	MASTER ADDRESS SPACE DUMP	Aug 3, 2017, 7:01:05 PM	WTSCPLX8	SC80

Figure 11-2 Incident Log window

Tip: In z/OSMF, SVC dumps that an operator starts (by using **`DUMP`** or **`SLIP`** commands) are related to user-initiated incidents. SVC dumps that are started by the system on behalf of abend recovery result in ABEND incidents.

When an incident occurs, the system creates diagnostic log snapshots of the operations log, error log, and error log summary, which are based on the settings that are specified in your installation's CEAPRMxx parmlib member.

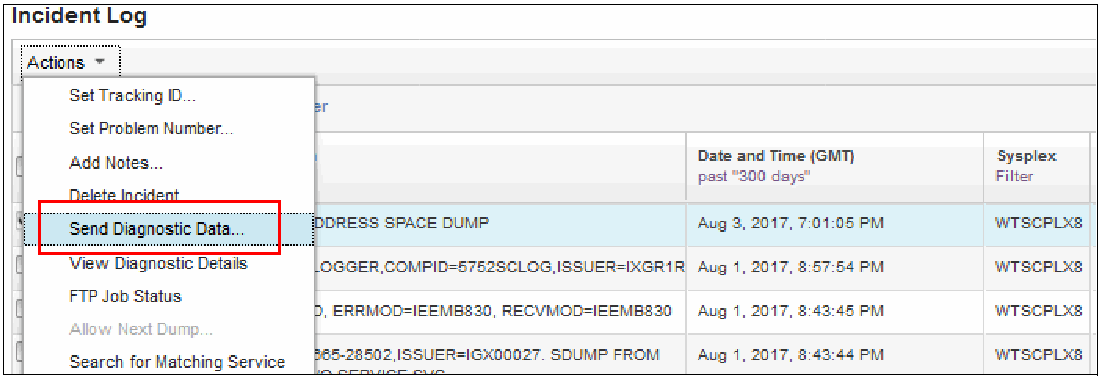
11.2.2 Incident Log window

You can use the Incident Log window to manage the incidents that occurred on a system or in a sysplex. z/OSMF retrieves the incidents from the system and displays them in a table. A maximum of 500 incidents that match filter criteria are retrieved and displayed.

Tip: By default, only the incidents that occurred in the past *three days* are displayed.

11.2.3 Send Diagnostic Data wizard

In our example, we see our incident that is listed and select it. From here, you can click **Actions** and start the Send Diagnostic Data wizard, as shown in Figure 11-3. This function collects the information that is necessary for sending system and any user-supplied (attachments) data to IBM or other defined FTP destinations.



	Date and Time (GMT) past "300 days"	Sysplex Filter
DDRESS SPACE DUMP	Aug 3, 2017, 7:01:05 PM	WTSCPLX8
LOGGER,COMPID=5752SCLOG,ISSUER=IXGR1R	Aug 1, 2017, 8:57:54 PM	WTSCPLX8
D, ERRMOD=IEEMB830, RECVMOD=IEEMB830	Aug 1, 2017, 8:43:45 PM	WTSCPLX8
365-28502,ISSUER=IGX00027. SDUMP FROM	Aug 1, 2017, 8:43:44 PM	WTSCPLX8

Figure 11-3 Starting the Send Diagnostic Data wizard

Send Diagnostic Data Welcome window

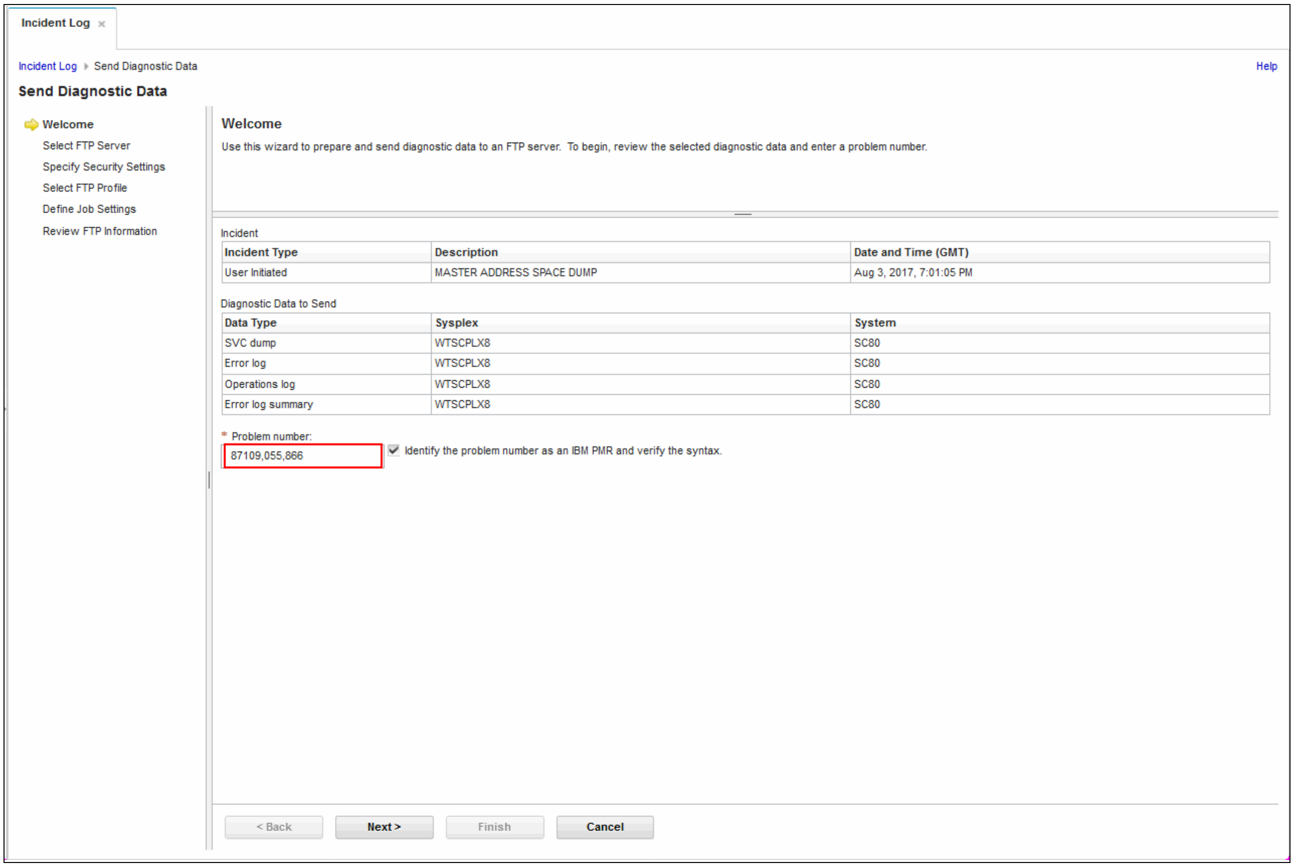
When you start the Send Diagnostic Data wizard from the Incident Log page, all of the system- or user-supplied diagnostic data files that are associated with the incident are sent to the specified destination. For our incident, we see that it was User Initiated and includes a description of MASTER ADDRESS SPACE DUMP, as shown in Figure 11-2 on page 243.

We can see our data types and the associated problem number, if any. This number is used to identify an incident with a problem that was opened with IBM (or perhaps a vendor).

For IBM problems, this number is the PMR number, which features the following format:

- nnnnn is the PMR or ETR number
- bbb is your branch office
- ccc is your country code

In our incident, the PMR is open and assigned a number of 87109,055,866. Click **Next** to open FTP destination selection window, as shown in Figure 11-4.



Welcome

Use this wizard to prepare and send diagnostic data to an FTP server. To begin, review the selected diagnostic data and enter a problem number.

Incident

Incident Type	Description	Date and Time (GMT)
User Initiated	MASTER ADDRESS SPACE DUMP	Aug 3, 2017, 7:01:05 PM

Diagnostic Data to Send

Data Type	Sysplex	System
SVC dump	WTSCPLX8	SC80
Error log	WTSCPLX8	SC80
Operations log	WTSCPLX8	SC80
Error log summary	WTSCPLX8	SC80

* Problem number: 87109,055,866

☑ Identify the problem number as an IBM PMR and verify the syntax.

Figure 11-4 Send Diagnostic Data Welcome window

Select FTP Server pane

In the Select FTP Server pane in the Send Diagnostic Data wizard, you indicate where you want to send the data. These locations can be user-defined or IBM-defined locations (FTP is the default mode of sending data).

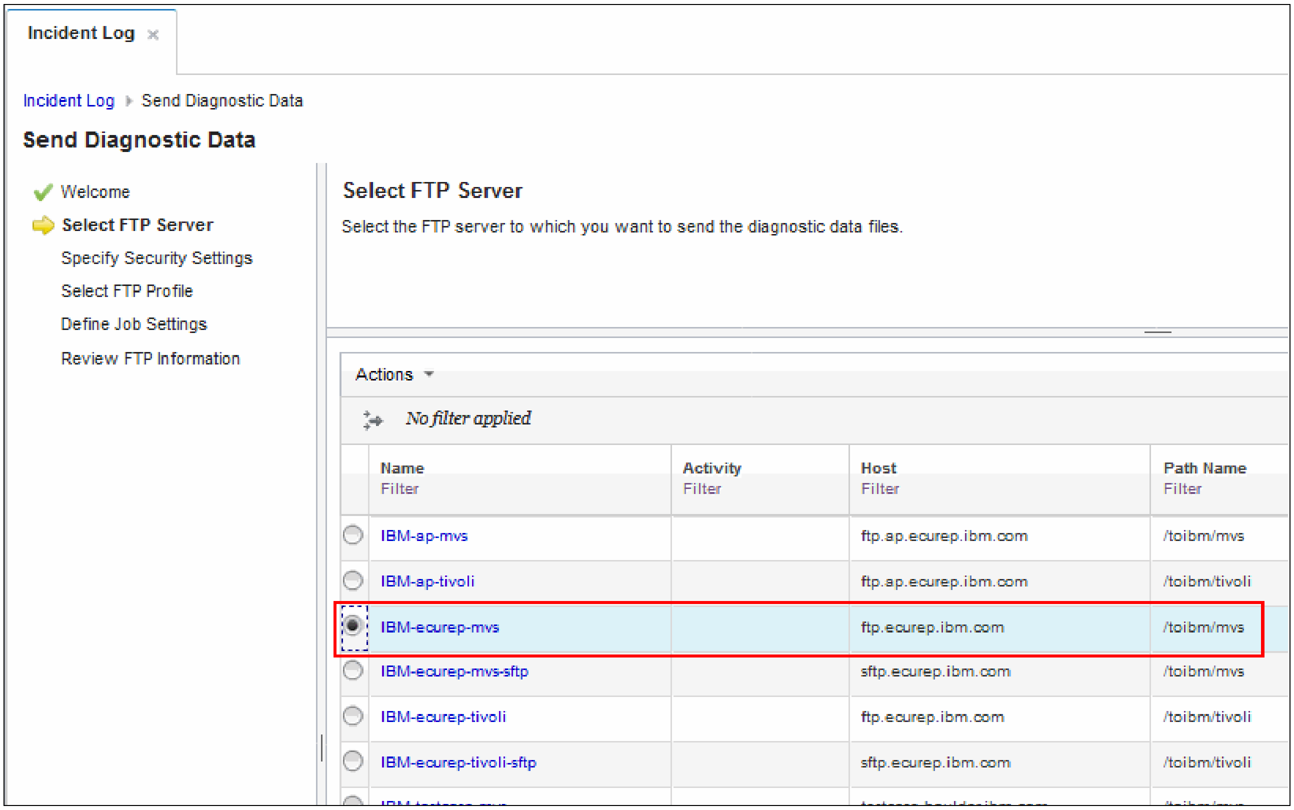
PDUU also can be used for this purpose, but certain modifications are required, as described in 11.2.6, “IBM z/OS Problem Documentation Upload Utility” on page 265. The default IBM locations setup when z/OSMF is installed are listed in Table 11-1.

Table 11-1 Default IBM-defined locations

FTP destination name	IBM path name
`ftp.ap.ecurep.ibm.com`	`/toibm/mvs`
`ftp.ap.ecurep.ibm.com`	`/toibm/tivoli`
`ftp.ecurep.ibm.com`	`/toibm/mvs`
`sftp.ecurep.ibm.com`	`/toibm/mvs`
`ftp.ecurep.ibm.com`	`/toibm/tivoli`
`sftp.ecurep.ibm.com`	`/toibm/tivoli`
`testcase.boulder.ibm.com`	`/toibm/mvs`

FTP destination name	IBM path name
`testcase.boulder.ibm.com`	`/toibm/mvs`
`testcase.boulder.ibm.com`	`/toibm/tivoli`
`testcase.boulder.ibm.com`	`/toibm/tivoli`

In our example, we select destination `ftp.ecurep.ibm.com`, as shown in Figure 11-5. Click **Next** to go to the Specify Security Settings pane.



Send Diagnostic Data

Select FTP Server

Select the FTP server to which you want to send the diagnostic data files.

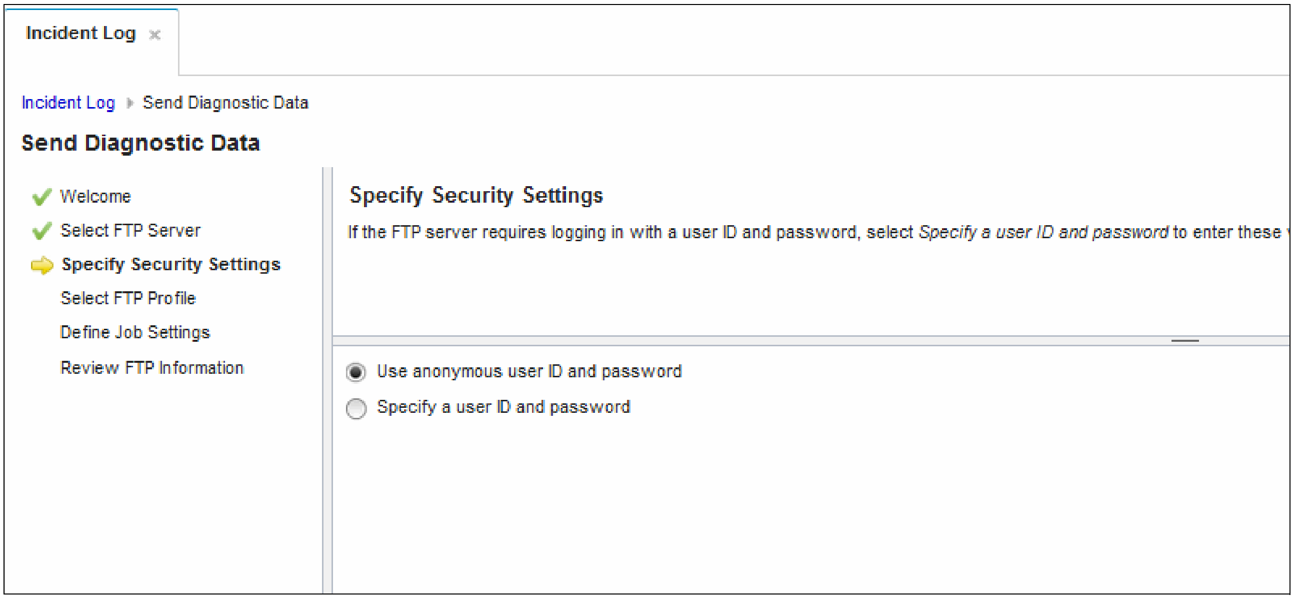
	Name Filter	Activity Filter	Host Filter	Path Name Filter
○	IBM-ap-mvs		ftp.ap.ecurep.ibm.com	/toibm/mvs
○	IBM-ap-tivoli		ftp.ap.ecurep.ibm.com	/toibm/tivoli
●	IBM-ecurep-mvs		ftp.ecurep.ibm.com	/toibm/mvs
○	IBM-ecurep-mvs-sftp		sftp.ecurep.ibm.com	/toibm/mvs
○	IBM-ecurep-tivoli		ftp.ecurep.ibm.com	/toibm/tivoli
○	IBM-ecurep-tivoli-sftp		sftp.ecurep.ibm.com	/toibm/tivoli
○	IBM-testcase-mvs		testcase.boulder.ibm.com	/toibm/mvs

Figure 11-5 Select FTP destination

Specify Security Settings pane

In the Specify Security Setting pane, you specify the user ID and password that is needed to access the FTP destination.

In our scenario, we use an anonymous ID and password, which means that we do not need to specify a user ID and password to access the FTP destination. In this case, the default user ID is `anonymous` and the default password is an email address, as shown in Figure 11-6. Click **Next**.



Incident Log ×

Incident Log ▸ Send Diagnostic Data

Send Diagnostic Data

✓ Welcome
✓ Select FTP Server
⇨ Specify Security Settings
Select FTP Profile
Define Job Settings
Review FTP Information

Specify Security Settings

If the FTP server requires logging in with a user ID and password, select *Specify a user ID and password* to enter these

● Use anonymous user ID and password
○ Specify a user ID and password

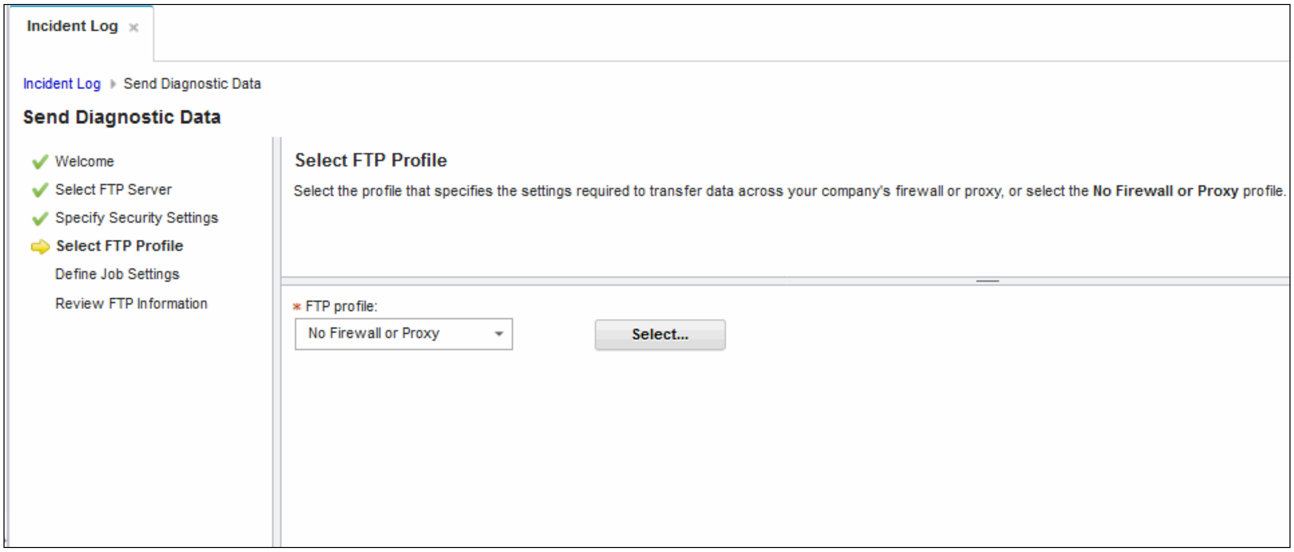
Figure 11-6 Specify Security Settings window

Tip: You must select one of the options, and if necessary, enter a valid user ID and password to enable the **Next** button.

Select FTP Profile pane

In the Select FTP Profile pane in the wizard, select the FTP profile that specifies the appropriate firewall or proxy settings to be used to send the selected files to the previously selected FTP destination (in our example, `ftp.ecurep.ibm.com`). If you want to use a different FTP.DATA (for example, for secure FTP), you must create a profile that specifies the FTPDATA, as shown in the example in 11.2.7, “Secure transmission” on page 271.

In our example, we did not need to define a firewall or proxy; therefore, we selected **No Firewall or Proxy**, as shown in Figure 11-7.



Send Diagnostic Data

- ✓ Welcome
- ✓ Select FTP Server
- ✓ Specify Security Settings
- ➡ **Select FTP Profile**
- Define Job Settings
- Review FTP Information

Select FTP Profile

Select the profile that specifies the settings required to transfer data across your company's firewall or proxy, or select the **No Firewall or Proxy** profile.

* FTP profile: No Firewall or Proxy

Figure 11-7 Select FTP Profile

> **Exception:** If your installation is using a firewall or proxy that cannot process an authentication that uses the File Transfer Protocol (FTP), or if your installation is using a firewall or proxy that allows you to authenticate once and then cross the firewall or proxy without reauthenticating for a period, you must authenticate manually with the firewall or proxy before you use the wizard.
>
> You also must select **No Firewall or Proxy** for the profile that is used. If you do not authenticate manually with the firewall or proxy before you send the files, the action might fail.

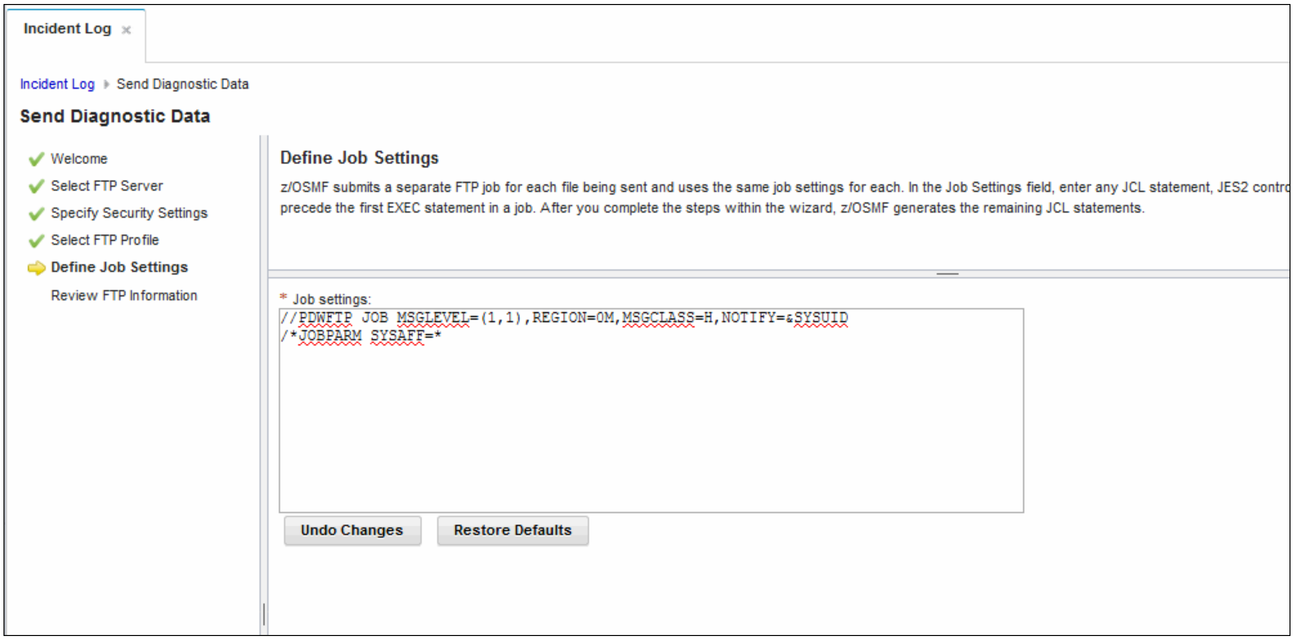
Click **Next** to move to go to the Define Job Settings pane.

For more information about creating and using an FTP profile, see the secure FTP example in 11.2.7, “Secure transmission” on page 271.

Define Job Settings pane

z/OSMF submits one FTP job for each file that is sent. In the Define Job Settings pane, you can accept the default job settings, modify the settings, or enter settings. The settings are used for each FTP job that z/OSMF creates for this send, as shown in Figure 11-8. Click **Next**.

Warning: z/OSMF does not validate the JCL that you enter; therefore, if your JCL contains errors, the job might fail with a JCL error.



Define Job Settings

z/OSMF submits a separate FTP job for each file being sent and uses the same job settings for each. In the Job Settings field, enter any JCL statement, JES2 contro
precede the first EXEC statement in a job. After you complete the steps within the wizard, z/OSMF generates the remaining JCL statements.

* Job settings:

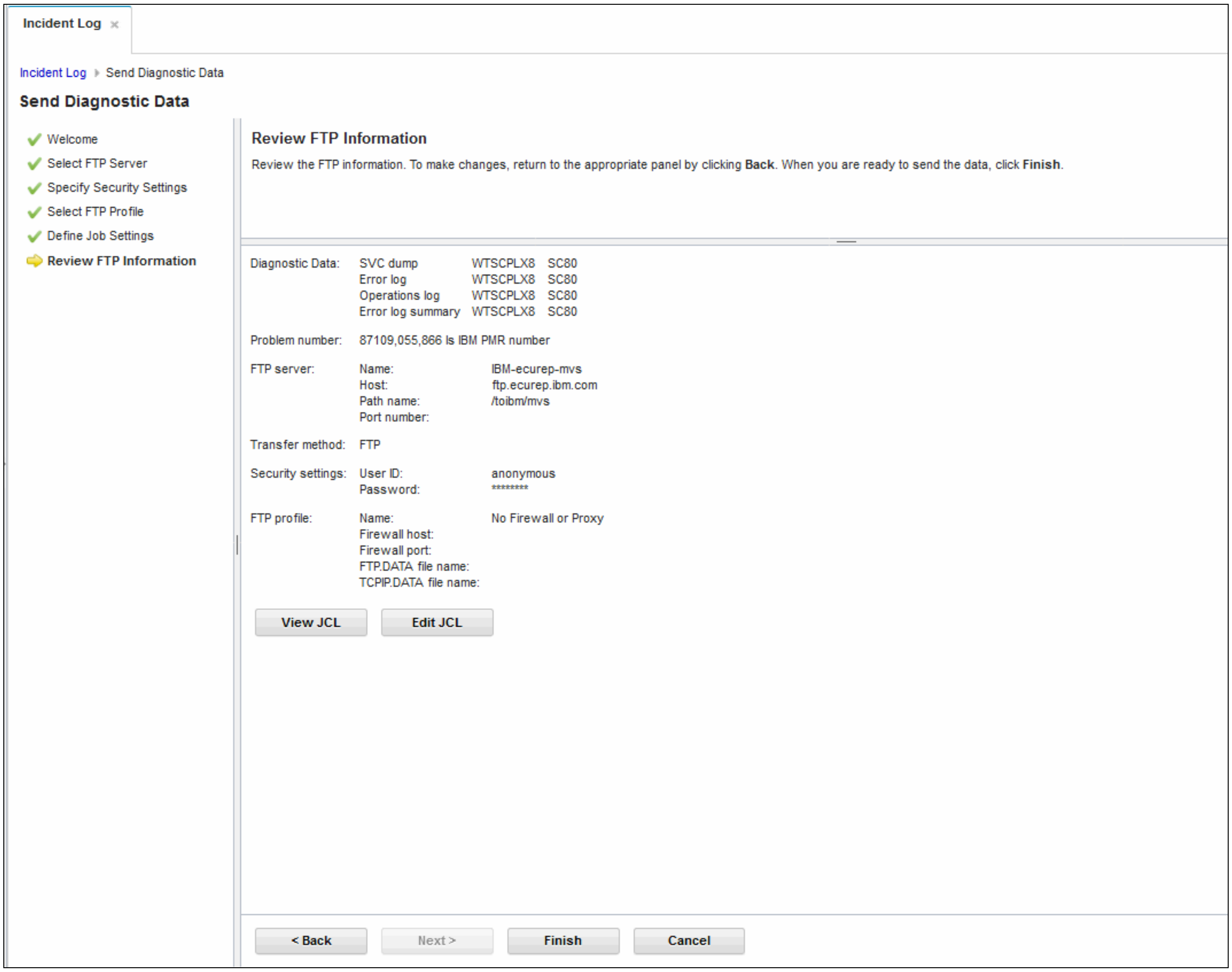
```
//PDWFTP JOB MSGLEVEL=(1,1),REGION=0M,MSGCLASS=H,NOTIFY=&SYSUID
/*JOBPARM SYSAFF=*
```

Figure 11-8 Define Job Settings pane

Review FTP Information pane

In the Review FTP Information pane in the Send Diagnostic Data wizard, you can verify that the FTP information is correct, view or edit the JCL that z/OSMF creates for you, and start the transmission.

Click **View JCL** to review the JCL or click **Edit JCL** to edit the JCL that is submitted, as shown in Figure 11-9. Click **Finish** to submit the JCL.



Review FTP Information

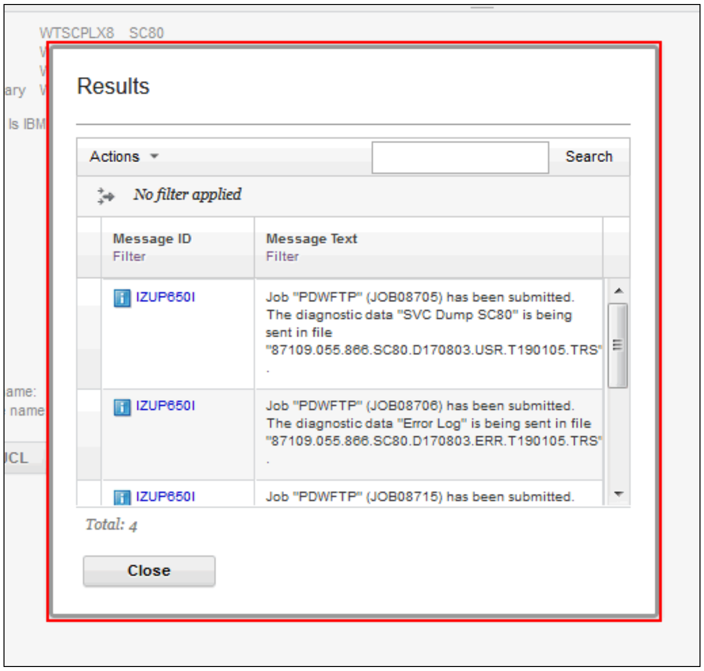
Review the FTP information. To make changes, return to the appropriate panel by clicking **Back**. When you are ready to send the data, click **Finish**.

Diagnostic Data:	SVC dump	WTSCPLX8	SC80
	Error log	WTSCPLX8	SC80
	Operations log	WTSCPLX8	SC80
	Error log summary	WTSCPLX8	SC80
Problem number:	87109,055,866 Is IBM PMR number		
FTP server:	Name:	IBM-ecurep-mvs	
	Host:	ftp.ecurep.ibm.com	
	Path name:	/toibm/mvs	
	Port number:		
Transfer method:	FTP		
Security settings:	User ID:	anonymous	
	Password:	********	
FTP profile:	Name:	No Firewall or Proxy	
	Firewall host:		
	Firewall port:		
	FTP.DATA file name:		
	TCPIP.DATA file name:		

Figure 11-9 Review FTP Information

Review FTP Information pane

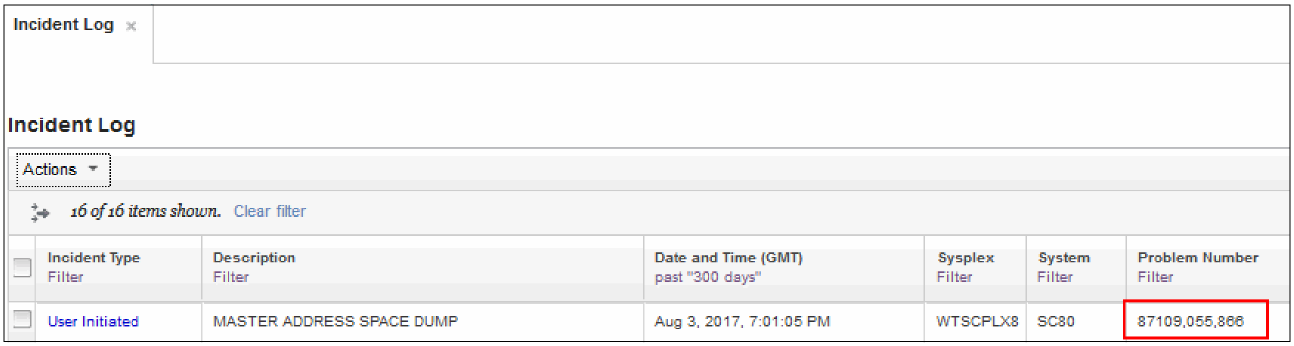
When you click **Finish**, a window opens that includes with the information about the jobs that are submitted, as shown in Figure 11-10. Review the information and click **Close**.



Message ID	Message Text
IZUP650I	Job "PDWFTP" (JOB08705) has been submitted. The diagnostic data "SVC Dump SC80" is being sent in file "87109.055.866.SC80.D170803.USR.T190105.TRS" .
IZUP650I	Job "PDWFTP" (JOB08706) has been submitted. The diagnostic data "Error Log" is being sent in file "87109.055.866.SC80.D170803.ERR.T190105.TRS" .
IZUP650I	Job "PDWFTP" (JOB08715) has been submitted.

Figure 11-10 Job submission information

After the JCL is submitted, you can see the updated incident in the Incident Log with a PMR number, as shown in Figure 11-11.

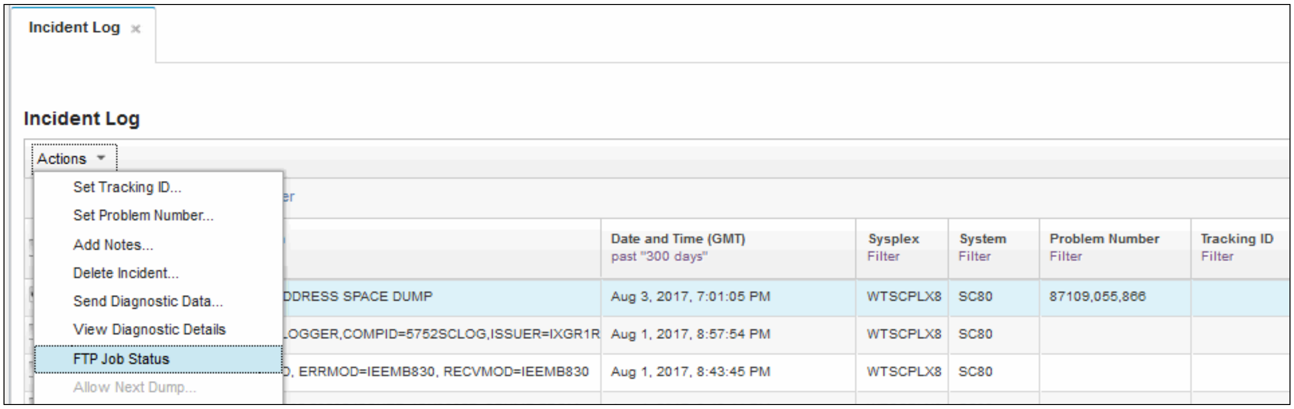


Incident Type	Description	Date and Time (GMT)	Sysplex	System	Problem Number
Filter	Filter	past "300 days"	Filter	Filter	Filter
User Initiated	MASTER ADDRESS SPACE DUMP	Aug 3, 2017, 7:01:05 PM	WTSCPLX8	SC80	87109,055,866

Figure 11-11 Incident Log summary updated with the PMR number

FTP Job Status pane

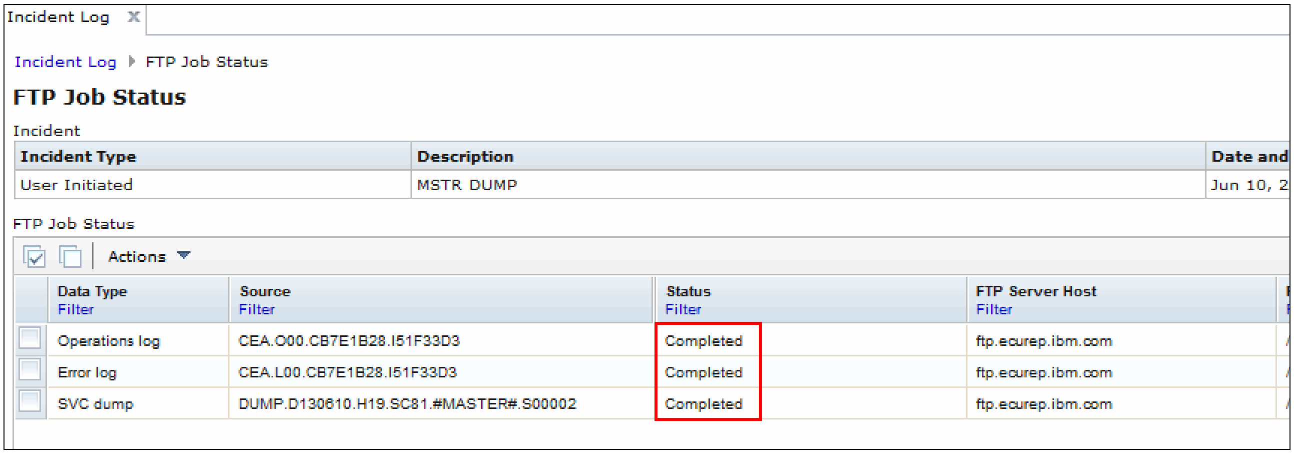
Use the FTP Job Status pane to view the status of the FTP job (or to cancel an FTP job). In our example, we select our incident and click **Actions** → **FTP Job Status**, as shown in Figure 11-12.



	Date and Time (GMT) past "300 days"	Sysplex Filter	System Filter	Problem Number Filter	Tracking ID Filter
DDRESS SPACE DUMP	Aug 3, 2017, 7:01:05 PM	WTSCPLX8	SC80	87109,055,866	
LOGGER,COMPID=5752SCLOG,ISSUER=IXGR1R	Aug 1, 2017, 8:57:54 PM	WTSCPLX8	SC80		
D, ERRMOD=IEEMB830, RECVMOD=IEEMB830	Aug 1, 2017, 8:43:45 PM	WTSCPLX8	SC80		

Figure 11-12 FTP Job Status selection

The status for our transmission is shown in Figure 11-13. We can see that the transmission is successful.



Incident

Incident Type	Description	Date and
User Initiated	MSTR DUMP	Jun 10, 2

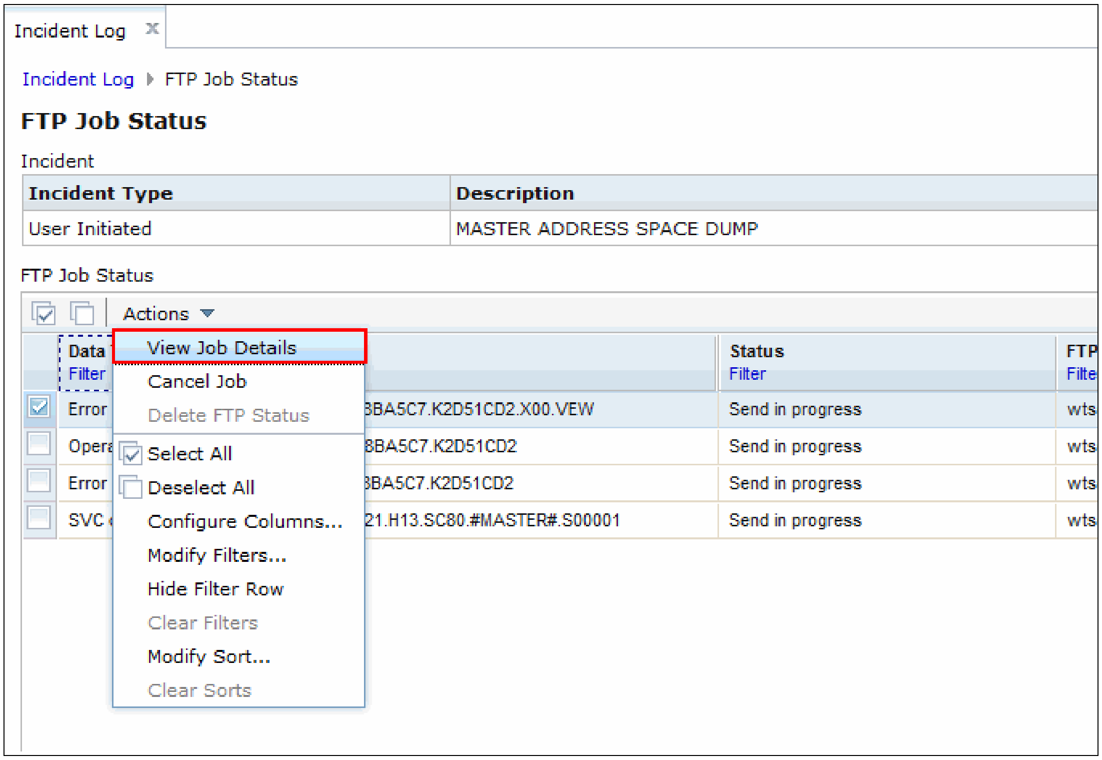
FTP Job Status

	Data Type Filter	Source Filter	Status Filter	FTP Server Host Filter
□	Operations log	CEA.O00.CB7E1B28.I51F33D3	Completed	ftp.ecurep.ibm.com
□	Error log	CEA.L00.CB7E1B28.I51F33D3	Completed	ftp.ecurep.ibm.com
□	SVC dump	DUMP.D130610.H19.SC81.#MASTER#.S00002	Completed	ftp.ecurep.ibm.com

Figure 11-13 FTP Job Status

It is possible to open the job log for each transmission because this SDSF ISPF application must be registered as event handler. If you did not register the SDSF ISPF application as an event handler, see “Example 2: Registering the SDSF ISPF application as an event handler” in the Help menu of your z/OSMF instance.

To open the job log of the transmission, select a transmission by clicking **Actions** → **View Job Details**, as shown in Figure 11-14.



FTP Job Status

Incident

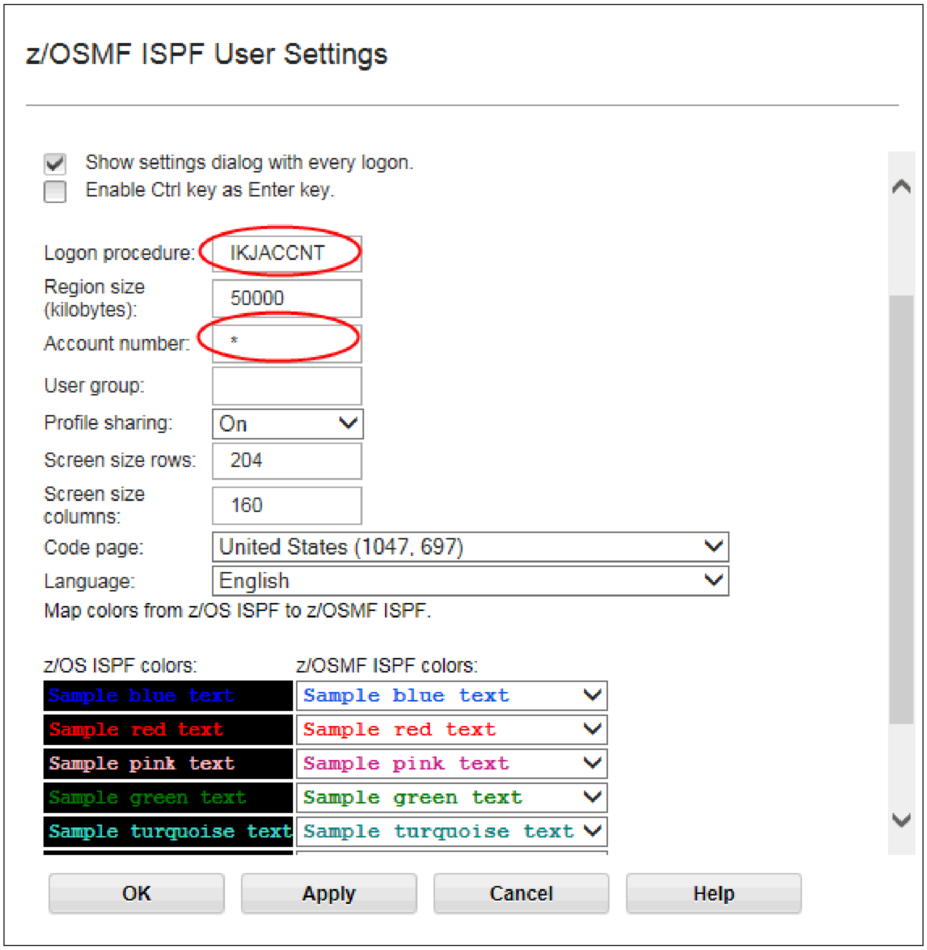
Incident Type	Description
User Initiated	MASTER ADDRESS SPACE DUMP

FTP Job Status

	Data Filter		Status Filter	FTP Filte
☑	Error	3BA5C7.K2D51CD2.X00.VEW	Send in progress	wts
□	Opera	8BA5C7.K2D51CD2	Send in progress	wts
□	Error	3BA5C7.K2D51CD2	Send in progress	wts
□	SVC (	21.H13.SC80.#MASTER#.S00001	Send in progress	wts

Figure 11-14 Selecting View Job Details option

The job log for the selected transmission opens in the ISPF Classic Interface with a prompt, as shown in Figure 11-15. Specify the TSO logon PROC that you want to use and click **OK**.



z/OSMF ISPF User Settings

☑ Show settings dialog with every logon.
□ Enable Ctrl key as Enter key.

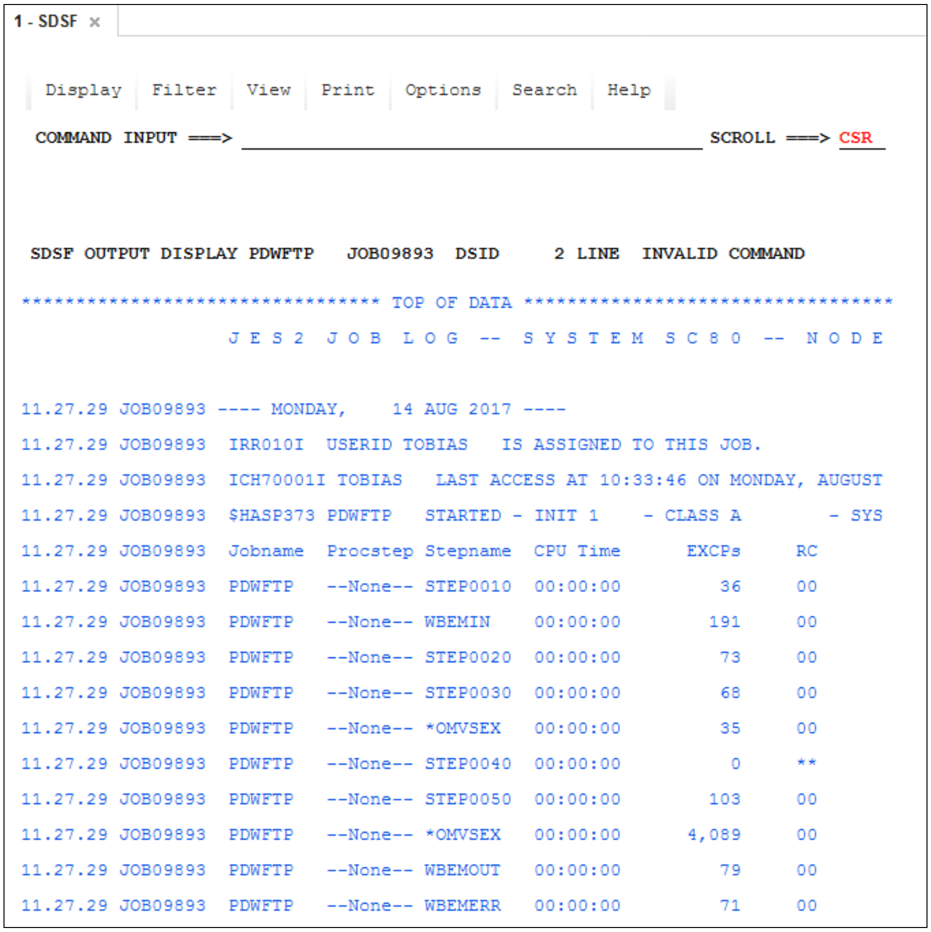
Logon procedure: IKJACCNT
Region size (kilobytes): 50000
Account number: *
User group:
Profile sharing: On
Screen size rows: 204
Screen size columns: 160
Code page: United States (1047, 697)
Language: English

Map colors from z/OS ISPF to z/OSMF ISPF.

z/OS ISPF colors:	z/OSMF ISPF colors:
Sample blue text	Sample blue text
Sample red text	Sample red text
Sample pink text	Sample pink text
Sample green text	Sample green text
Sample turquoise text	Sample turquoise text

Figure 11-15 ISPF Classic Interface prompt

The job log opens, as shown in Figure 11-16.



```
COMMAND INPUT ===> ___________________________________________ SCROLL ===> CSR


SDSF OUTPUT DISPLAY PDWFTP   JOB09893  DSID     2 LINE  INVALID COMMAND
********************************* TOP OF DATA **********************************
                   J E S 2  J O B  L O G  --  S Y S T E M  S C 8 0  --  N O D E

11.27.29 JOB09893 ---- MONDAY,    14 AUG 2017 ----
11.27.29 JOB09893  IRR010I  USERID TOBIAS   IS ASSIGNED TO THIS JOB.
11.27.29 JOB09893  ICH70001I TOBIAS   LAST ACCESS AT 10:33:46 ON MONDAY, AUGUST
11.27.29 JOB09893  $HASP373 PDWFTP   STARTED - INIT 1    - CLASS A        - SYS
11.27.29 JOB09893  Jobname  Procstep Stepname  CPU Time      EXCPs     RC
11.27.29 JOB09893  PDWFTP   --None-- STEP0010  00:00:00         36     00
11.27.29 JOB09893  PDWFTP   --None-- WBEMIN    00:00:00        191     00
11.27.29 JOB09893  PDWFTP   --None-- STEP0020  00:00:00         73     00
11.27.29 JOB09893  PDWFTP   --None-- STEP0030  00:00:00         68     00
11.27.29 JOB09893  PDWFTP   --None-- *OMVSEX   00:00:00         35     00
11.27.29 JOB09893  PDWFTP   --None-- STEP0040  00:00:00          0     **
11.27.29 JOB09893  PDWFTP   --None-- STEP0050  00:00:00        103     00
11.27.29 JOB09893  PDWFTP   --None-- *OMVSEX   00:00:00      4,089     00
11.27.29 JOB09893  PDWFTP   --None-- WBEMOUT   00:00:00         79     00
11.27.29 JOB09893  PDWFTP   --None-- WBEMERR   00:00:00         71     00
```

Figure 11-16 FTP transmission job log

Because this incident includes a PMR that is associated with it and the data was transmitted directly to `ecurep.ibm.com`, the PMR record is automatically updated with the results while generating an alert to inform IBM Support about the details.

The three data files that are arriving at the FTP server in tersed format are shown in Figure 11-17. Then, they are untersed and loaded to z/OS data sets that are ready for IBM Support to review.

The files are stored with the following names:

- `ONTOP.GS055.P87109.C866.ERROR.SC81.N2013`
- `ONTOP.GS055.P87109.C866.OPERATI.ONS.SC81`
- `ONTOP.GS055.P87109.C866.USER.SC81.N2013.N`

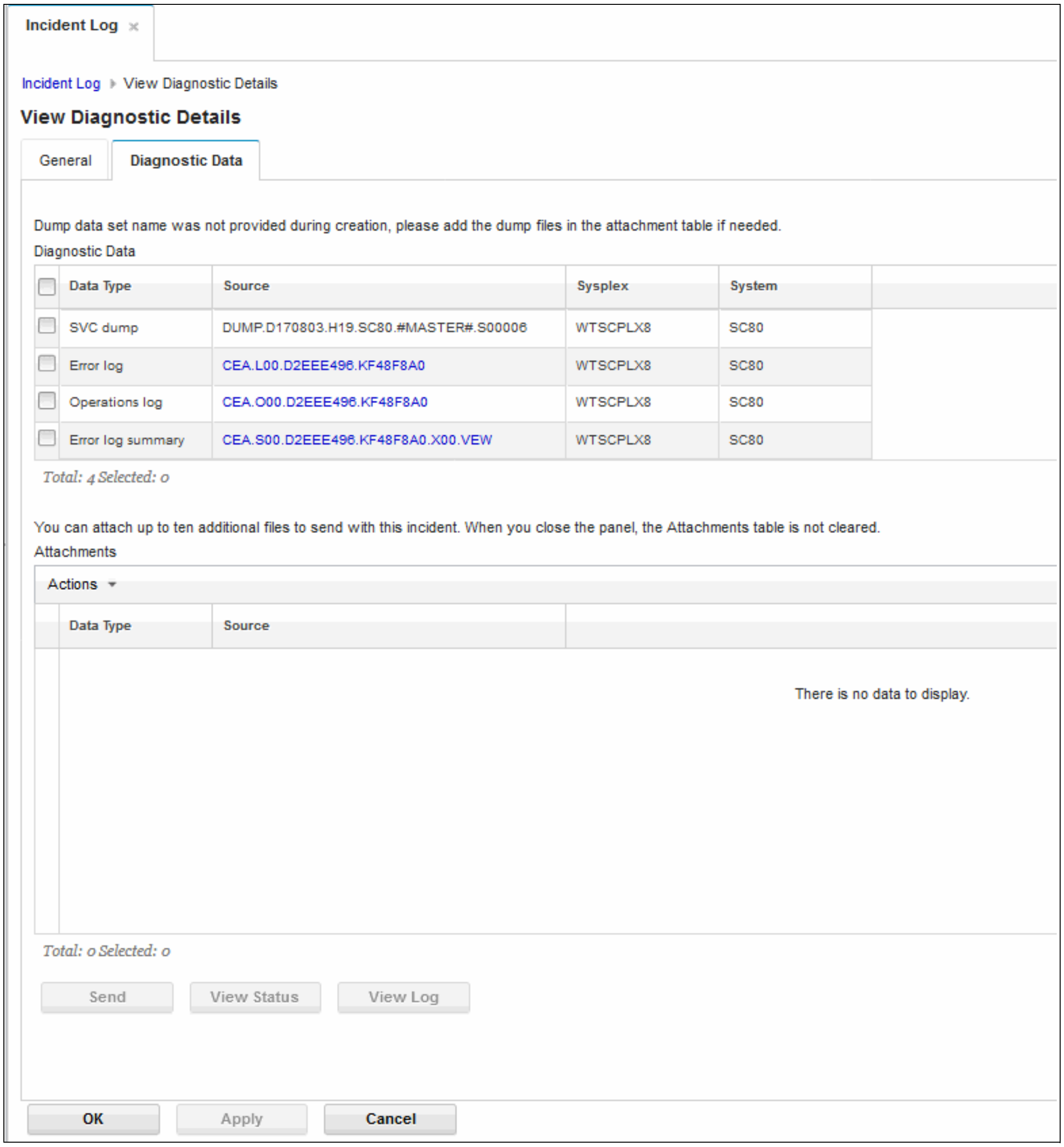
```
Material received from FTP Server and stored in ECuRep:
Directory: /ecurep/pmr/8/7/87109,055,866/2013-06-11
File: 87109.055.866.ERROR.SC81.2013.06.10T19.01.50.937Z.TRS   5120 bytes
File: 87109.055.866.OPERATIONS.SC81.2013.06.10T19.01.50.937Z.TRS 8192 bytes
File: 87109.055.866.USER.SC81.2013.06.10T19.01.50.937Z.TRS
       61317120 bytes
  -CDDR21 PMRUPDATE RS4  -5655S28SM  -L29C/NZE   -P4S4-13/06/11-19:36 SCG
  -CDDR PMRUPDATE RS4    -5655S28SM  -L203/-------P4S4-13/06/11-19:40 -AT
Untersed data now available on MCEVS1-System:
 /ecurep/pmr/8/7/87109,055,866/2013-06-11/87109.055.866.ERROR.SC81.2013.
 06.10T19.01.50.937Z.TRS
 ->ONTOP.GS055.P87109.C866.ERROR.SC81.N2013
  -CDDR23 PMRUPDATE RS4  -5655S28SM  -L203/-------P4S4-13/06/11-19:40 -AT
 Untersed data now available on MCEVS1-System:
 /ecurep/pmr/8/7/87109,055,866/2013-06-11/87109.055.866.OPERATIONS.SC81.
 2013.06.10T19.01.50.937Z.TRS
 ->ONTOP.GS055.P87109.C866.OPERATI.ONS.SC81
-CDDR1 PMRUPDATE RS4   -5655S28SM  -L203/-------P4S4-13/06/11-19:40 -AT
Untersed data now available on MCEVS1-System:
/ecurep/pmr/8/7/87109,055,866/2013-06-11/87109.055.866.USER.SC81.2013.0
6.10T19.01.50.937Z.TRS
 ->ONTOP.GS055.P87109.C866.USER.SC81.N2013.N
```

Figure 11-17 PMR is automatically updated with details of the data that is sent by FTP

View Diagnostic Details window

From the View Diagnostic Details window, you can view the properties of an incident and a list of the system-supplied diagnostic data files, and add files to send with an incident. The following tabs are available:

- General: This tab is used to view the properties of an incident, set the PMR of an incident (if not set), and document more information about an incident.
- Diagnostic Data: This tab is used to view a list of the system-supplied diagnostic data files and to specify other files to send with the incident, as shown in Figure 11-18.



Dump data set name was not provided during creation, please add the dump files in the attachment table if needed.

Diagnostic Data

□	Data Type	Source	Sysplex	System
□	SVC dump	DUMP.D170803.H19.SC80.#MASTER#.S00006	WTSCPLX8	SC80
□	Error log	CEA.L00.D2EEE496.KF48F8A0	WTSCPLX8	SC80
□	Operations log	CEA.O00.D2EEE496.KF48F8A0	WTSCPLX8	SC80
□	Error log summary	CEA.S00.D2EEE496.KF48F8A0.X00.VEW	WTSCPLX8	SC80

Total: 4 Selected: 0

You can attach up to ten additional files to send with this incident. When you close the panel, the Attachments table is not cleared.

Attachments

Data Type	Source

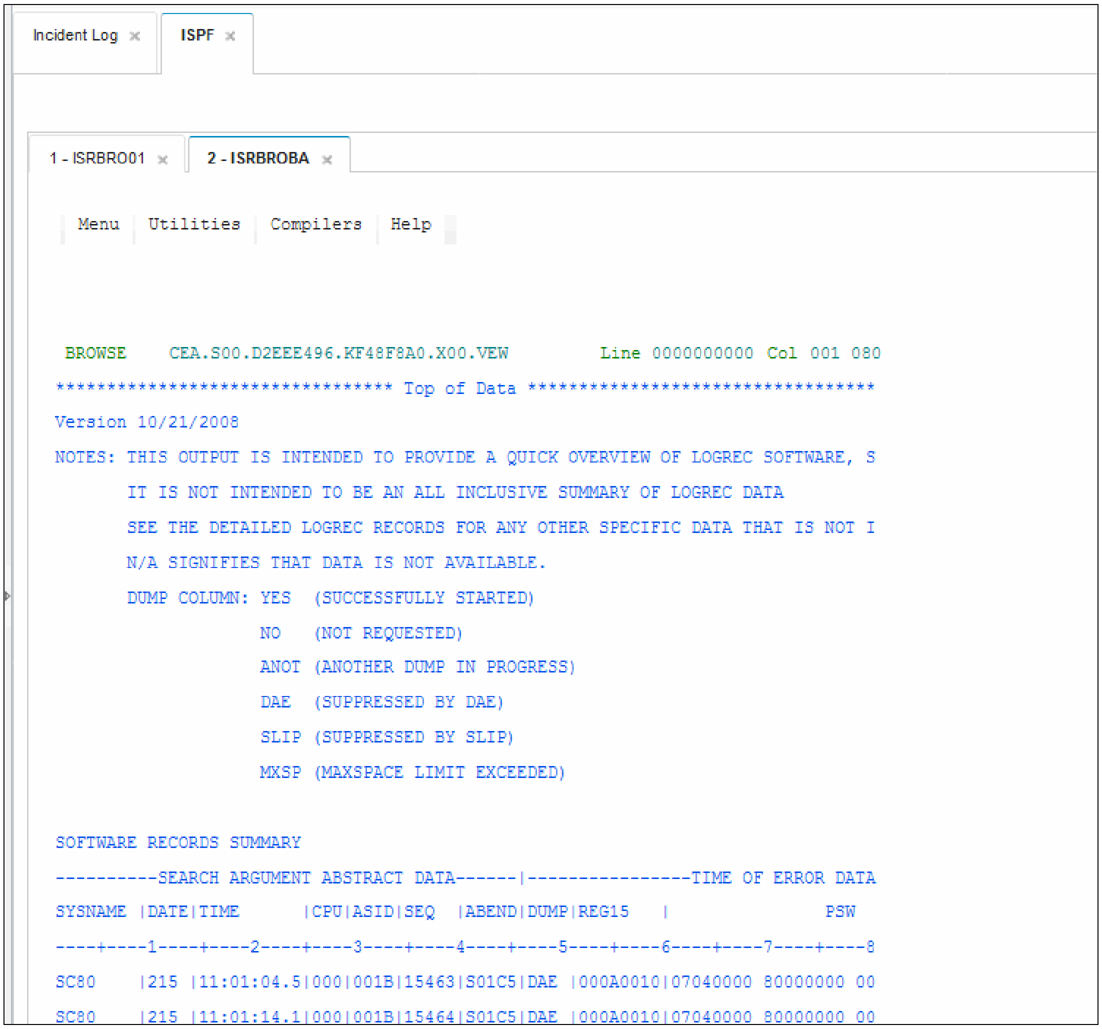
There is no data to display.

Total: 0 Selected: 0

Figure 11-18 View Diagnostic Details window

It is possible to browse the Error log, Error log summary, and Operations log files; z/OSMF opens the files under ISPF Classic Interface. For example, click **CEA.S00.D2EEE496.KF48F8A0**, and the ISPF Classic Interface displays a prompt, as shown in Figure 11-15 on page 254. Specify the TSO logon PROC that you want to use and then, click **OK**.

The `CEA.S00.D2EEE496.KF48F8A0` file in browse mode is shown in Figure 11-19.

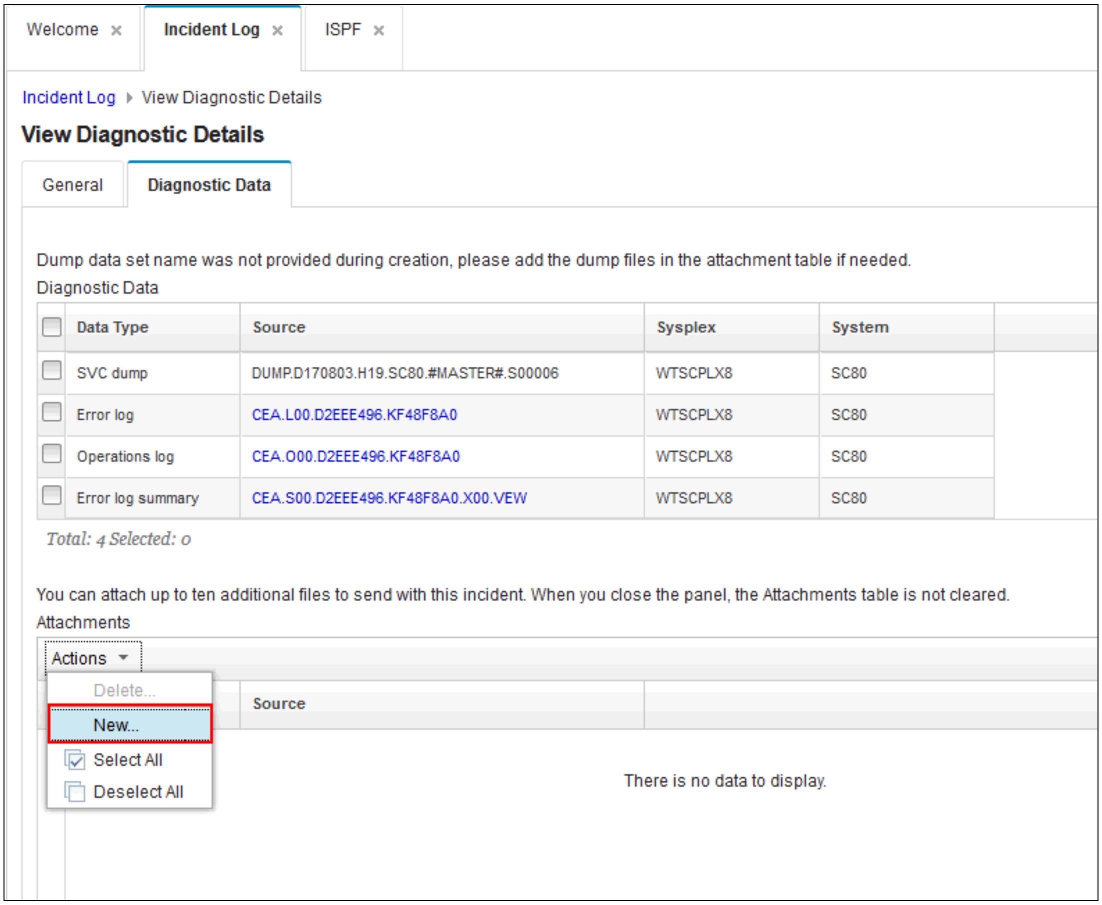


```
 BROWSE    CEA.S00.D2EEE496.KF48F8A0.X00.VEW        Line 0000000000 Col 001 080
********************************* Top of Data **********************************
Version 10/21/2008
NOTES: THIS OUTPUT IS INTENDED TO PROVIDE A QUICK OVERVIEW OF LOGREC SOFTWARE, S
       IT IS NOT INTENDED TO BE AN ALL INCLUSIVE SUMMARY OF LOGREC DATA
       SEE THE DETAILED LOGREC RECORDS FOR ANY OTHER SPECIFIC DATA THAT IS NOT I
       N/A SIGNIFIES THAT DATA IS NOT AVAILABLE.
       DUMP COLUMN: YES  (SUCCESSFULLY STARTED)
                    NO   (NOT REQUESTED)
                    ANOT (ANOTHER DUMP IN PROGRESS)
                    DAE  (SUPPRESSED BY DAE)
                    SLIP (SUPPRESSED BY SLIP)
                    MXSP (MAXSPACE LIMIT EXCEEDED)

SOFTWARE RECORDS SUMMARY
----------SEARCH ARGUMENT ABSTRACT DATA------|----------------TIME OF ERROR DATA
SYSNAME |DATE|TIME       |CPU|ASID|SEQ  |ABEND|DUMP|REG15    |                PSW
----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
SC80    |215 |11:01:04.5|000|001B|15463|S01C5|DAE |000A0010|07040000 80000000 00
SC80    |215 |11:01:14.1|000|001B|15464|S01C5|DAE |000A0010|07040000 80000000 00
```

Figure 11-19 Browse error log summary

In our example, we wanted to send a UNIX file for our incident to IBM; therefore, we clicked **New** to open the New Attachment window, as shown in Figure 11-20 on page 259.



View Diagnostic Details

Dump data set name was not provided during creation, please add the dump files in the attachment table if needed.

Diagnostic Data

□	Data Type	Source	Sysplex	System
□	SVC dump	DUMP.D170803.H19.SC80.#MASTER#.S00006	WTSCPLX8	SC80
□	Error log	CEA.L00.D2EEE496.KF48F8A0	WTSCPLX8	SC80
□	Operations log	CEA.O00.D2EEE496.KF48F8A0	WTSCPLX8	SC80
□	Error log summary	CEA.S00.D2EEE496.KF48F8A0.X00.VEW	WTSCPLX8	SC80

Total: 4 Selected: 0

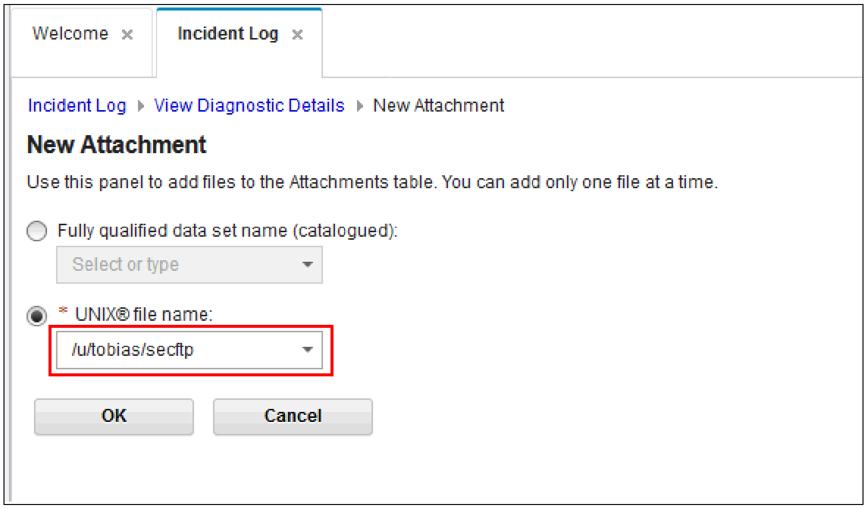
You can attach up to ten additional files to send with this incident. When you close the panel, the Attachments table is not cleared.

Attachments

Source
There is no data to display.

Figure 11-20 Opening the New Attachment window

In the New Attachment window, we entered the name of our file and clicked **OK** to add the file or data set to the Attachments table, as shown in Figure 11-21.



New Attachment

Use this panel to add files to the Attachments table. You can add only one file at a time.

○ Fully qualified data set name (catalogued):
Select or type

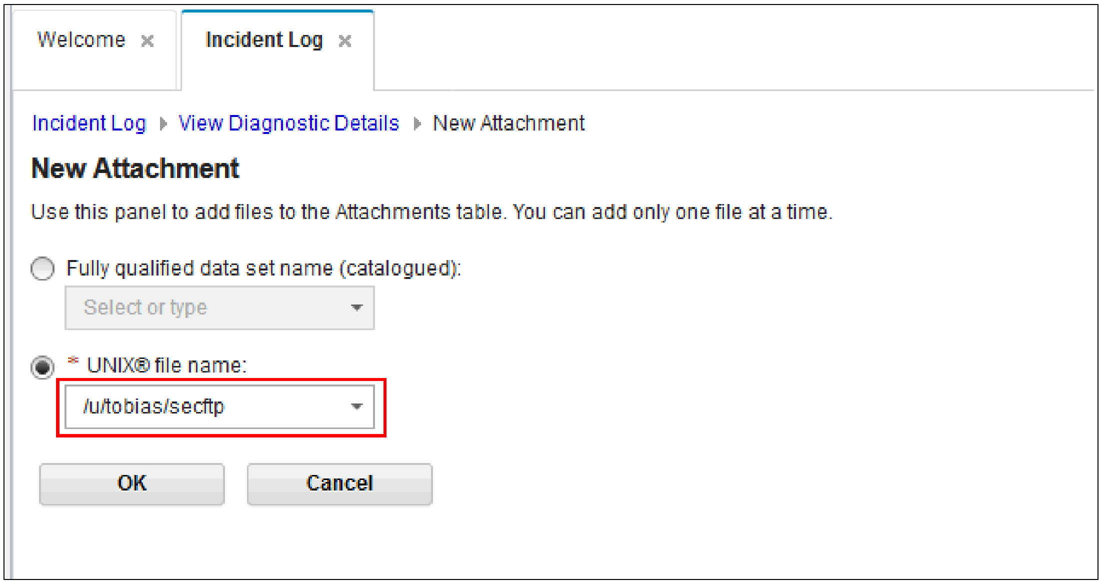
● * UNIX® file name:
/u/tobias/secftp

Figure 11-21 New Attachment window

You can specify one attachment at a time.

Requirement: If you are attaching a data set, it must be a cataloged sequential data set. PDS, PDSE, and VSAM are *not* supported for attachment,

Click **Send** (see Figure 11-22) to send the selected UNIX data file. The Send Diagnostic Data wizard opens again. Follow the directions in the Send Diagnostic Data wizard, as described in “Send Diagnostic Data Welcome window” on page 244. The wizard collects the information that is necessary for sending the data.



New Attachment

Use this panel to add files to the Attachments table. You can add only one file at a time.

○ Fully qualified data set name (catalogued):

Select or type

● * UNIX® file name:

/u/tobias/secftp

Figure 11-22 Sending a file

Finally, our PMR record is updated with the new file (as shown in Figure 11-23) and IBM Support is notified.

```
Material received from FTP Server and stored in ECuRep:
Directory: /ecurep/pmr/8/7/87109,055,866/2017-08-14
File: 87109.055.866.u.TOBIAS.secftp-DUP0001.pax.Z              32256 bytes
-CDDR8 PMRUPDATE RS4   -5655S28SM  -L203/-------P4S4-17/08/14-14:44 -AT
 integrity test on file
  2017-08-14/87109.055.866.u.TOBIAS.secftp-DUP0001.pax.Z : ok
```

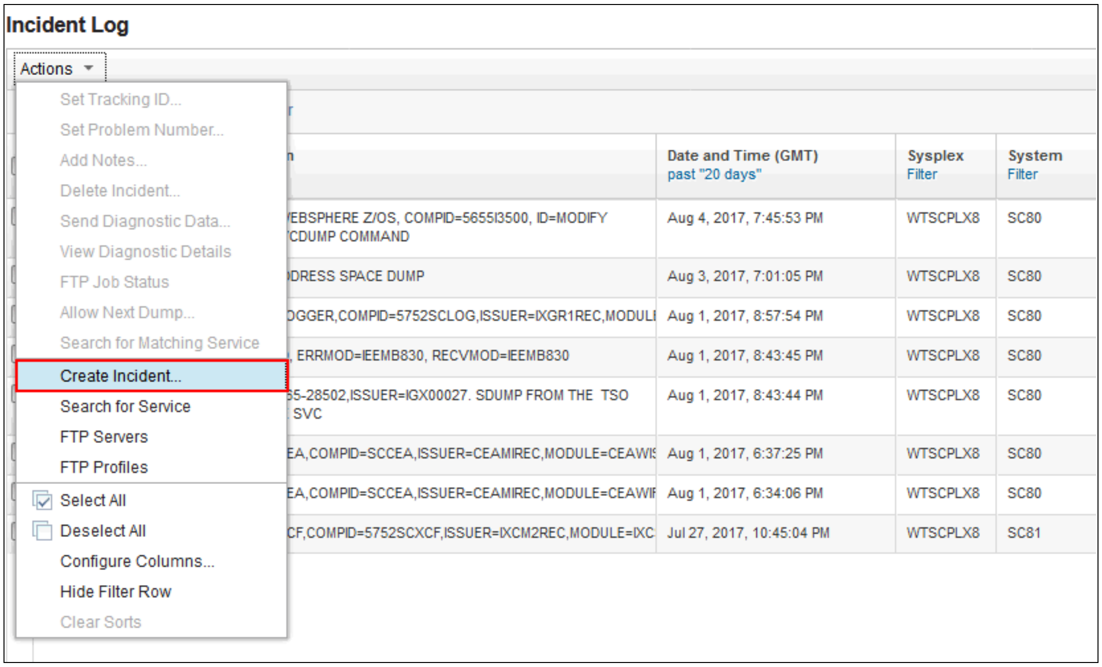
Figure 11-23 UNIX data arrives in our PMR

11.2.4 Manual Create Incident

You can use the Create Incident page in the Incident Log task to manually create an incident with or without an existing dump set. It helps you to send datasets, members, or UNIX files to IBM if you have no incident entry for this specific PMR.

If you provide a dump data set name, it is sent to CEA through the CIM API along with other parameters. Then, CEA attempts to read this dump data set by using the IPCS tool to retrieve the content to complete the incident fields, such as ComponentID, Load Module, CSECT, and Tracking ID.

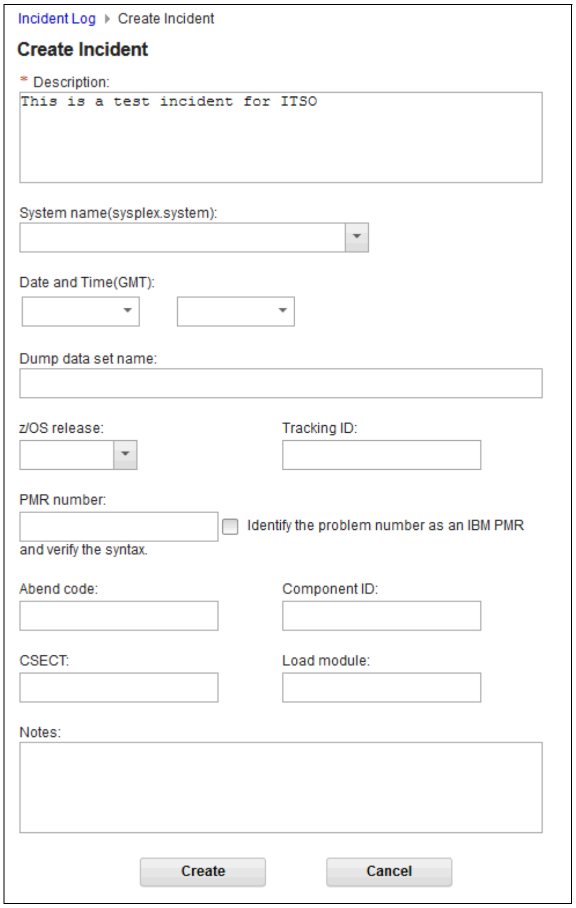
If no value is available for these fields, your input is used. If no dump data set name is specified, the newly created incident is stored in zOSMF's persistence file. All of the modify, delete, and query operations are managed by zOSMF. Click the **Action** tab and select **Create Incident** (as shown in Figure 11-24) to define the new incident entry.



n	Date and Time (GMT) past "20 days"	Sysplex Filter	System Filter
EBSPHERE Z/OS, COMPID=5655I3500, ID=MODIFY CDUMP COMMAND	Aug 4, 2017, 7:45:53 PM	WTSCPLX8	SC80
DRESS SPACE DUMP	Aug 3, 2017, 7:01:05 PM	WTSCPLX8	SC80
DGGER,COMPID=5752SCLOG,ISSUER=IXGR1REC,MODULI	Aug 1, 2017, 8:57:54 PM	WTSCPLX8	SC80
, ERRMOD=IEEMB830, RECVMOD=IEEMB830	Aug 1, 2017, 8:43:45 PM	WTSCPLX8	SC80
35-28502,ISSUER=IGX00027. SDUMP FROM THE TSO SVC	Aug 1, 2017, 8:43:44 PM	WTSCPLX8	SC80
EA,COMPID=SCCEA,ISSUER=CEAMIREC,MODULE=CEAWI	Aug 1, 2017, 6:37:25 PM	WTSCPLX8	SC80
EA,COMPID=SCCEA,ISSUER=CEAMIREC,MODULE=CEAWI	Aug 1, 2017, 6:34:06 PM	WTSCPLX8	SC80
CF,COMPID=5752SCXCF,ISSUER=IXCM2REC,MODULE=IXC	Jul 27, 2017, 10:45:04 PM	WTSCPLX8	SC81

Figure 11-24 Selecting the Create Incident option

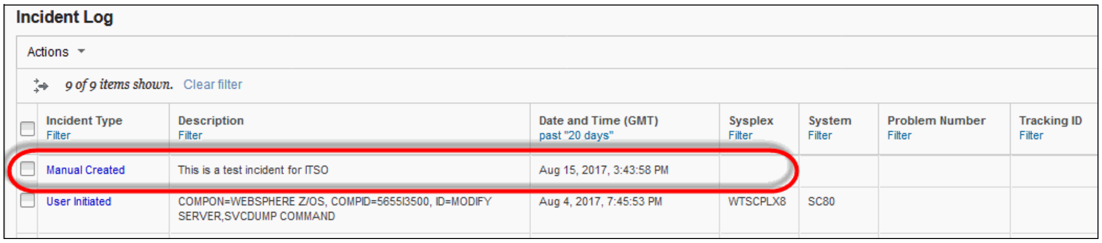
The Create Incident pane is shown in Figure 11-25. You must enter a description, which is required for every manually created incident. All other information is optional.



* Description: This is a test incident for ITSO

Figure 11-25   Create incident pane

When you click the **Create** button, the system validates all fields that are completed. If validation passes, the incident is created and persisted in the SDDIR or z/OSMF persistence file, as shown in Figure 11-26. If the validation is not passed, the system returns an error to let you know why it failed to create an incident.



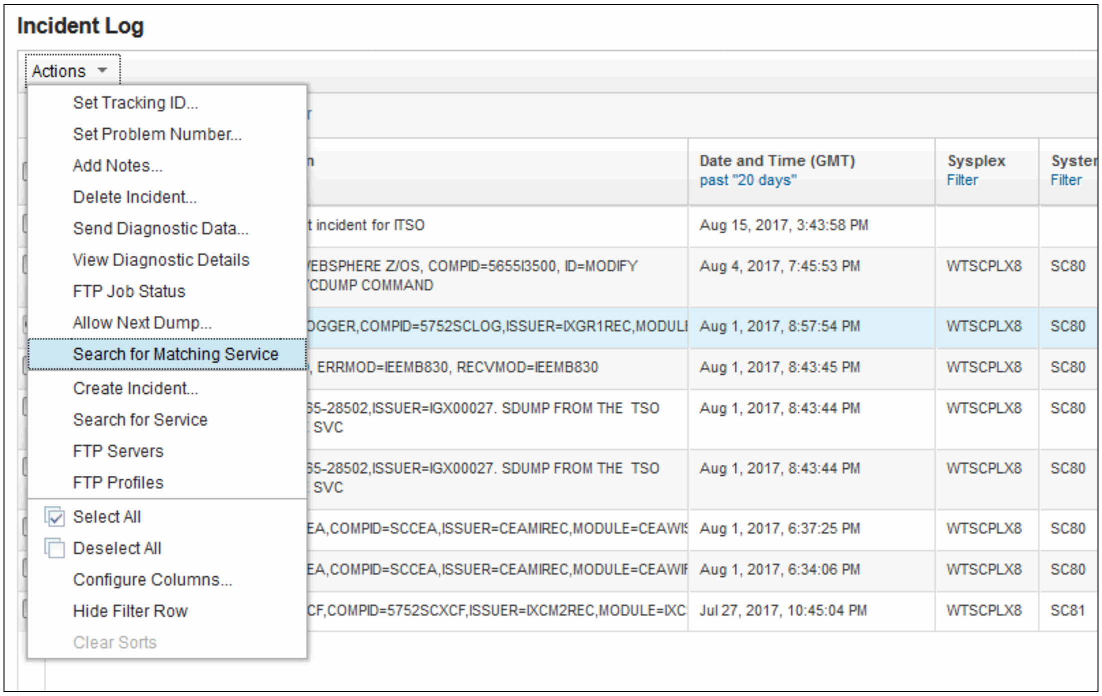
□	Incident Type Filter	Description Filter	Date and Time (GMT) past "20 days"	Sysplex Filter	System Filter	Problem Number Filter	Tracking ID Filter
□	Manual Created	This is a test incident for ITSO	Aug 15, 2017, 3:43:58 PM				
□	User Initiated	COMPON=WEBSPHERE Z/OS, COMPID=5655I3500, ID=MODIFY SERVER,SVCDUMP COMMAND	Aug 4, 2017, 7:45:53 PM	WTSCPLX8	SC80		

Figure 11-26   New incident

11.2.5 Search for matching APAR

You can use the Search for Matching Service page in the Incident Log task to search for specific APARs when a single incident is selected. It is shown if anyone experienced similar problems and if a fix or bypass was developed.

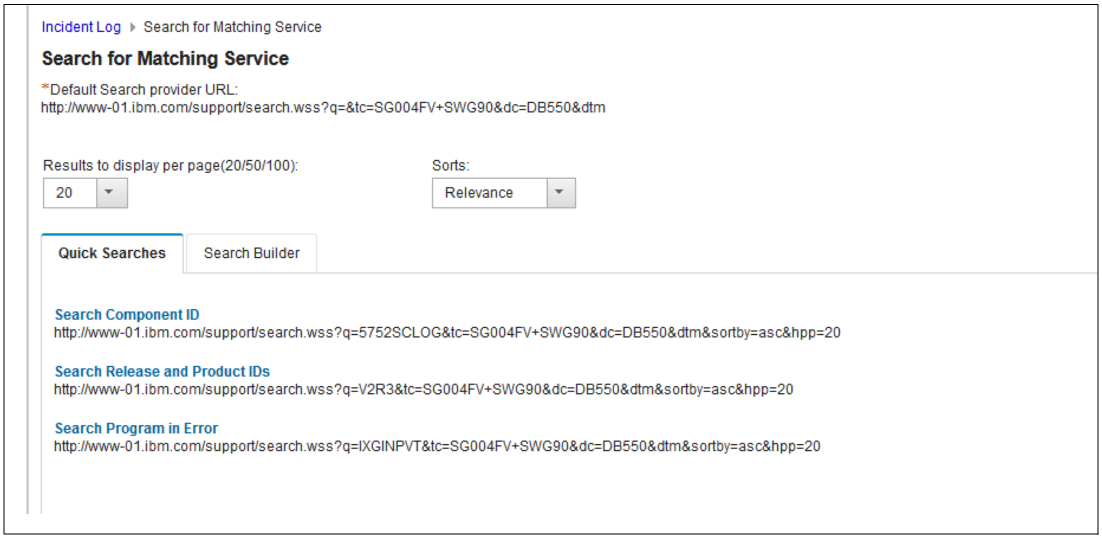
The Search for Matching Service page can be used to input the URL of an IBM dBlue system or any other ISV problem management systems. It also substitutes the necessary information into the URL. Problem management systems can be linked to the Incident Log to perform an APAR search. Select an incident and select **Search for Matching Service** in the Action tab, as shown in Figure 11-27.



n	Date and Time (GMT) past "20 days"	Sysplex Filter	Syster Filter
t incident for ITSO	Aug 15, 2017, 3:43:58 PM		
/EBSPHERE Z/OS, COMPID=5655I3500, ID=MODIFY /CDUMP COMMAND	Aug 4, 2017, 7:45:53 PM	WTSCPLX8	SC80
DGGER,COMPID=5752SCLOG,ISSUER=IXGR1REC,MODULI	Aug 1, 2017, 8:57:54 PM	WTSCPLX8	SC80
, ERRMOD=IEEMB830, RECVMOD=IEEMB830	Aug 1, 2017, 8:43:45 PM	WTSCPLX8	SC80
35-28502,ISSUER=IGX00027. SDUMP FROM THE TSO SVC	Aug 1, 2017, 8:43:44 PM	WTSCPLX8	SC80
35-28502,ISSUER=IGX00027. SDUMP FROM THE TSO SVC	Aug 1, 2017, 8:43:44 PM	WTSCPLX8	SC80
EA,COMPID=SCCEA,ISSUER=CEAMIREC,MODULE=CEAWIS	Aug 1, 2017, 6:37:25 PM	WTSCPLX8	SC80
EA,COMPID=SCCEA,ISSUER=CEAMIREC,MODULE=CEAWIF	Aug 1, 2017, 6:34:06 PM	WTSCPLX8	SC80
CF,COMPID=5752SCXCF,ISSUER=IXCM2REC,MODULE=IXC	Jul 27, 2017, 10:45:04 PM	WTSCPLX8	SC81

Figure 11-27 Search for Matching Service option

You can now select between two methods to search for matching APARs: Quick Searches (see Figure 11-28 on page 264) and Search Builder (see Figure 11-29 on page 264). The Quick Search tab shows three links that are available to search for that problem.



Search for Matching Service

*Default Search provider URL:
http://www-01.ibm.com/support/search.wss?q=&tc=SG004FV+SWG90&dc=DB550&dtm

Results to display per page(20/50/100): 20

Sorts: Relevance

Search Component ID
http://www-01.ibm.com/support/search.wss?q=5752SCLOG&tc=SG004FV+SWG90&dc=DB550&dtm&sortby=asc&hpp=20

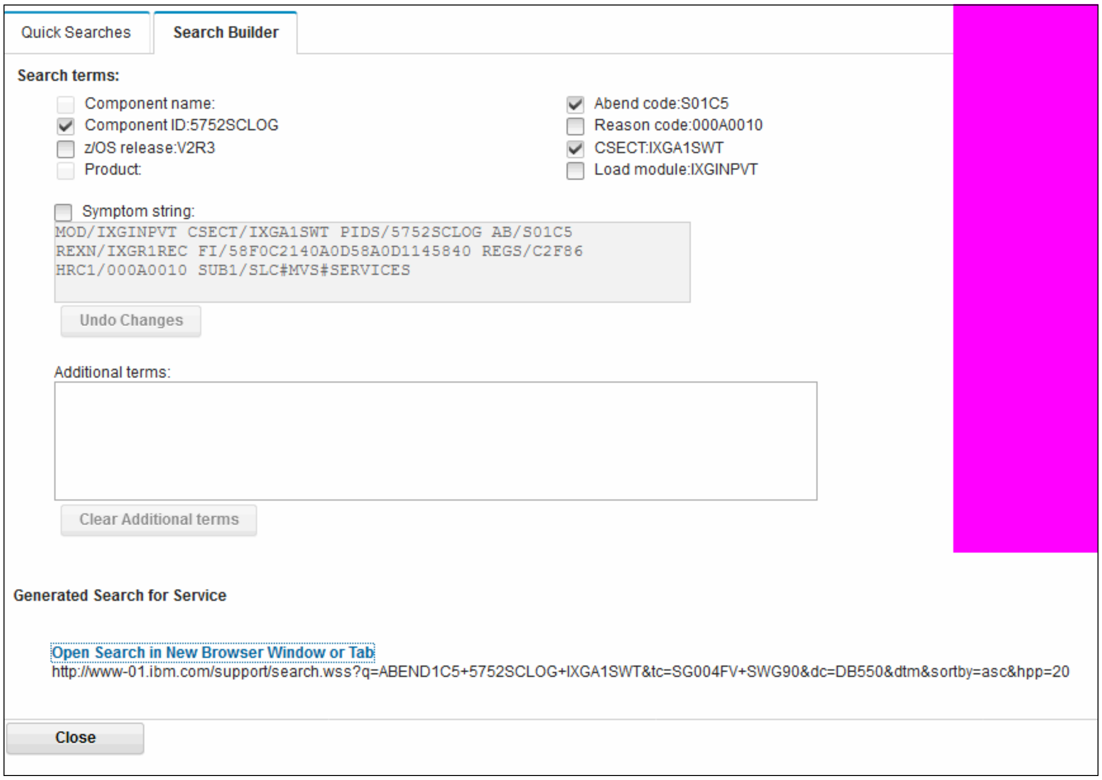
Search Release and Product IDs
http://www-01.ibm.com/support/search.wss?q=V2R3&tc=SG004FV+SWG90&dc=DB550&dtm&sortby=asc&hpp=20

Search Program in Error
http://www-01.ibm.com/support/search.wss?q=IXGINPVT&tc=SG004FV+SWG90&dc=DB550&dtm&sortby=asc&hpp=20

Figure 11-28 Quick Searches

The Search Builder tab is more flexible and generates different links for your requirement. The value of the terms is retrieved from the incident properties. These items can then be selected by clicking their appropriate option.

In our sample, we select the **Component ID**, the **Abend code**, and the **CSECT** information. You can also add terms, which are comma-separated. The selected search terms, including the extra terms, are combined into an encoded URL. It is then used as the query value of the search URL by clicking **Open Search in New Browser Window or Tab**, as shown in Figure 11-29.



Search terms:

□ Component name:
☑ Component ID:5752SCLOG
□ z/OS release:V2R3
□ Product:

☑ Abend code:S01C5
□ Reason code:000A0010
☑ CSECT:IXGA1SWT
□ Load module:IXGINPVT

□ Symptom string:

```
MOD/IXGINPVT CSECT/IXGA1SWT PIDS/5752SCLOG AB/S01C5
REXN/IXGR1REC FI/58F0C2140A0D58A0D1145840 REGS/C2F86
HRC1/000A0010 SUB1/SLC#MVS#SERVICES
```

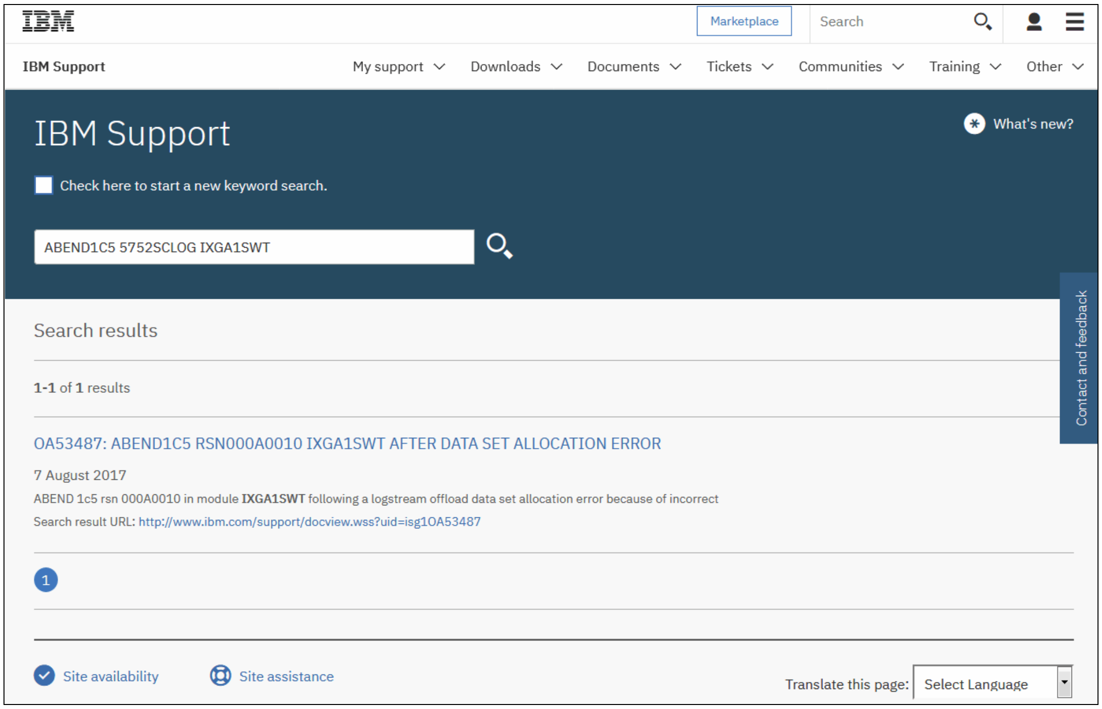
Additional terms:

Generated Search for Service

Open Search in New Browser Window or Tab
http://www-01.ibm.com/support/search.wss?q=ABEND1C5+5752SCLOG+IXGA1SWT&tc=SG004FV+SWG90&dc=DB550&dtm&sortby=asc&hpp=20

Figure 11-29 Search Builder tab

After opening the link that was created in the Search Builder tab, you receive possible matches for this specific search string, as shown in Figure 11-30.



ABEND1C5 5752SCLOG IXGA1SWT

Search results

1-1 of 1 results

OA53487: ABEND1C5 RSN000A0010 IXGA1SWT AFTER DATA SET ALLOCATION ERROR

7 August 2017

ABEND 1c5 rsn 000A0010 in module **IXGA1SWT** following a logstream offload data set allocation error because of incorrect

Search result URL: http://www.ibm.com/support/docview.wss?uid=isg1OA53487

Figure 11-30 IBM Support Search website

11.2.6 IBM z/OS Problem Documentation Upload Utility

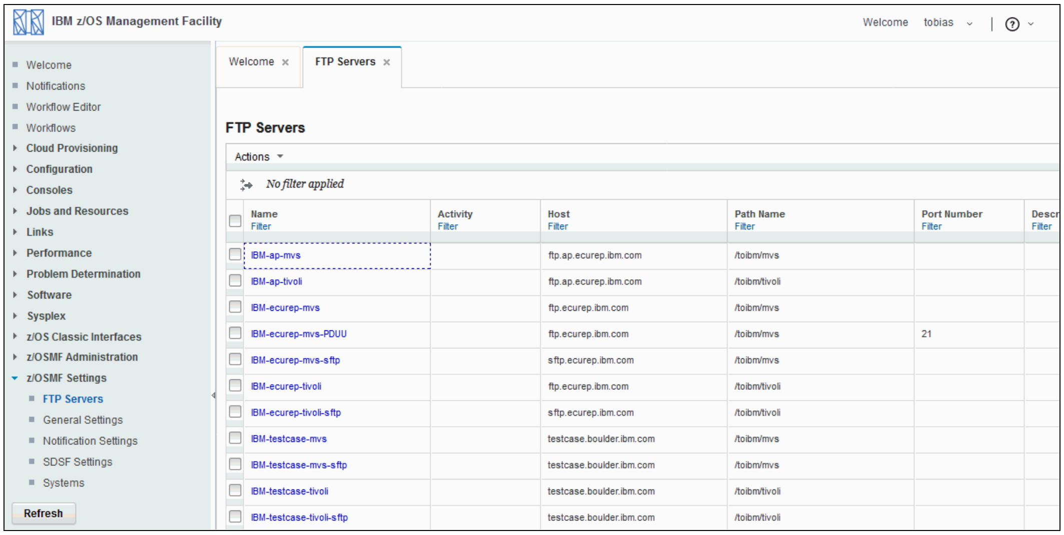
IBM z/OS PDUU is a utility that can send a large amount of data efficiently. This utility breaks the input data set into smaller work data sets that are compressed and sent in parallel by using multiple, simultaneous FTP sessions, which results in a shorter transmission time. You can also symmetrically encrypt the data sets and have up to 20 FTP sessions running simultaneously.

The work data sets are dynamically allocated and can be 1 - 9,999 MB. For more information about PDUU, see *z/OS V2R1.0 MVS Diagnosis: Tools and Service Aids*, GA32-0905.

This section describes how to make z/OSMF use PDUU instead FTP.

To use PDUU instead of FTP, complete the following steps:

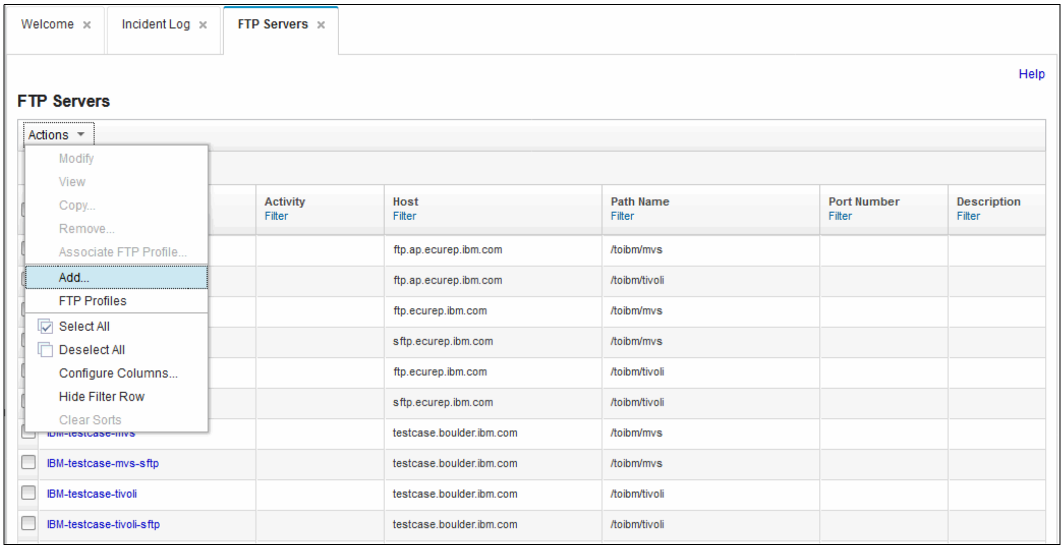
1. Click **z/OSMF Settings** → **FTP Servers**. The FTP Servers pane opens, as shown in Figure 11-31.



Name	Activity	Host	Path Name	Port Number	Descr
Filter	Filter	Filter	Filter	Filter	Filter
IBM-ap-mvs		ftp.ap.ecurep.ibm.com	/toibm/mvs		
IBM-ap-tivoli		ftp.ap.ecurep.ibm.com	/toibm/tivoli		
IBM-ecurep-mvs		ftp.ecurep.ibm.com	/toibm/mvs		
IBM-ecurep-mvs-PDUU		ftp.ecurep.ibm.com	/toibm/mvs	21	
IBM-ecurep-mvs-sftp		sftp.ecurep.ibm.com	/toibm/mvs		
IBM-ecurep-tivoli		ftp.ecurep.ibm.com	/toibm/tivoli		
IBM-ecurep-tivoli-sftp		sftp.ecurep.ibm.com	/toibm/tivoli		
IBM-testcase-mvs		testcase.boulder.ibm.com	/toibm/mvs		
IBM-testcase-mvs-sftp		testcase.boulder.ibm.com	/toibm/mvs		
IBM-testcase-tivoli		testcase.boulder.ibm.com	/toibm/tivoli		
IBM-testcase-tivoli-sftp		testcase.boulder.ibm.com	/toibm/tivoli		

Figure 11-31 FTP Servers

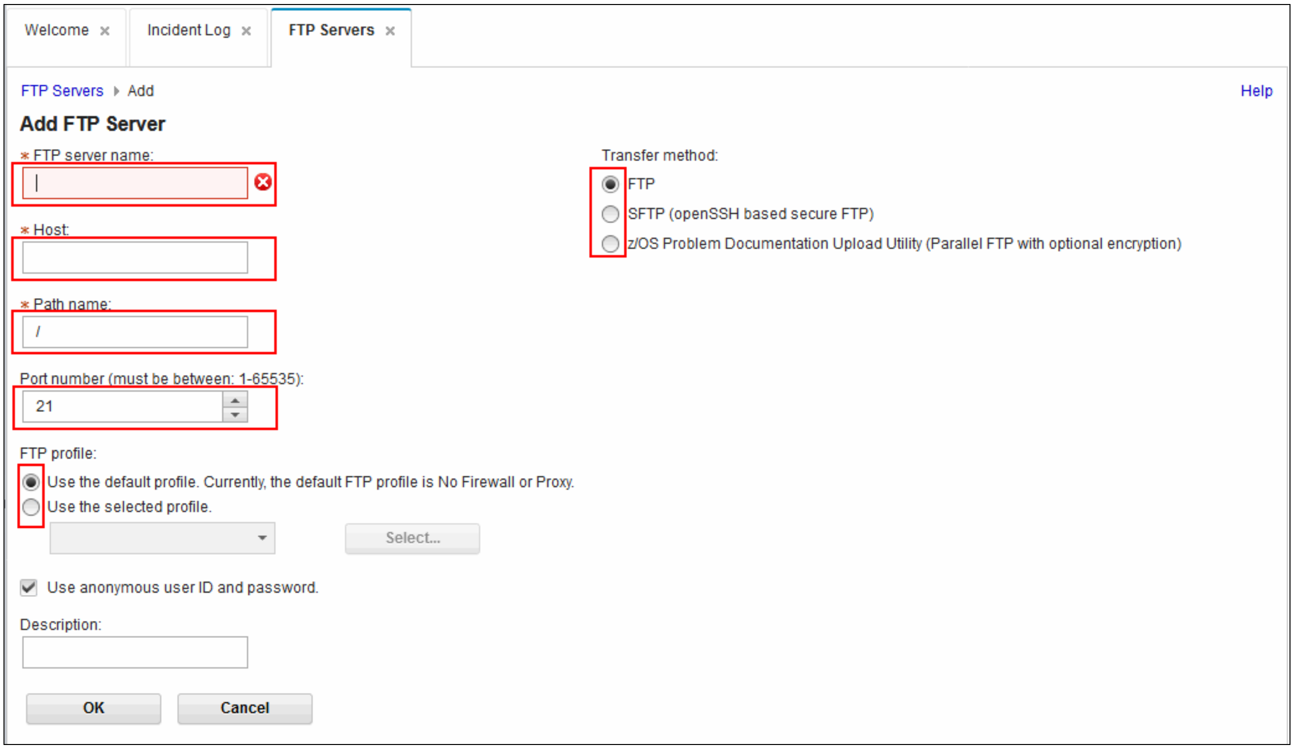
2. To add an FTP server, click **Actions** → **Add**, as shown in Figure 11-32.



	Activity	Host	Path Name	Port Number	Description
	Filter	Filter	Filter	Filter	Filter
		ftp.ap.ecurep.ibm.com	/toibm/mvs		
		ftp.ap.ecurep.ibm.com	/toibm/tivoli		
		ftp.ecurep.ibm.com	/toibm/mvs		
		sftp.ecurep.ibm.com	/toibm/mvs		
		ftp.ecurep.ibm.com	/toibm/tivoli		
		sftp.ecurep.ibm.com	/toibm/tivoli		
IBM-testcase-mvs		testcase.boulder.ibm.com	/toibm/mvs		
IBM-testcase-mvs-sftp		testcase.boulder.ibm.com	/toibm/mvs		
IBM-testcase-tivoli		testcase.boulder.ibm.com	/toibm/tivoli		
IBM-testcase-tivoli-sftp		testcase.boulder.ibm.com	/toibm/tivoli		

Figure 11-32 Adding FTP Servers

The Add FTP server window opens, as shown in Figure 11-33.



Welcome × | Incident Log × | FTP Servers ×

FTP Servers ▸ Add

Help

Add FTP Server

* FTP server name: |

* Host:

* Path name: /

Port number (must be between: 1-65535): 21

FTP profile:

● Use the default profile. Currently, the default FTP profile is No Firewall or Proxy.

○ Use the selected profile.

Select...

☑ Use anonymous user ID and password.

Description:

Transfer method:

● FTP

○ SFTP (openSSH based secure FTP)

○ z/OS Problem Documentation Upload Utility (Parallel FTP with optional encryption)

OK | Cancel

Figure 11-33 Add FTP Server window

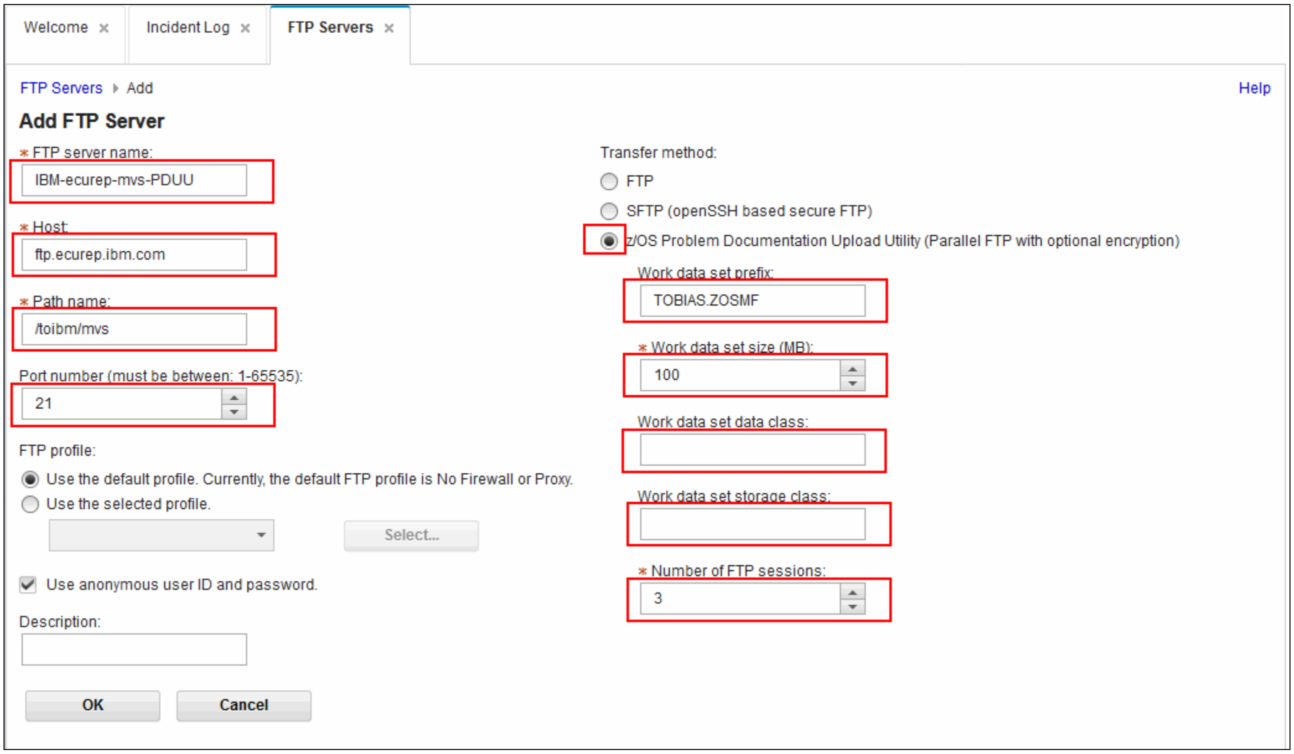
3. We want to send data to IBM-ecurep-mvs (IBM Enhanced Customer Data Repository is a secure and fully supported data repository with problem determination tools and functions) by using PDUU. The data can be sent by using one of the following methods:

   – Modify IBM-ecurep-mvs to use PDUU as the transfer method.

   – Create a server with a host, path, and port similar to IBM-ecurep-MVS with PDDU as the transfer method.

   In our example, because we do not want to change the defaults, we add an entry, as shown in Figure 11-33.

When the z/OS Problem Documentation Update Utility is selected as the transfer method, more information must be entered, such as work data set prefix, work data set size, data class and storage class for the work data set, and the number of parallel FTP sessions that are required. We use the default information that is shown in Figure 11-34 on page 268 and click **OK**.



Add FTP Server

* FTP server name: IBM-ecurep-mvs-PDUU

* Host: ftp.ecurep.ibm.com

* Path name: /toibm/mvs

Port number (must be between: 1-65535): 21

FTP profile:

● Use the default profile. Currently, the default FTP profile is No Firewall or Proxy.

○ Use the selected profile.

☑ Use anonymous user ID and password.

Description:

Transfer method:

○ FTP

○ SFTP (openSSH based secure FTP)

● z/OS Problem Documentation Upload Utility (Parallel FTP with optional encryption)

Work data set prefix: TOBIAS.ZOSMF

* Work data set size (MB): 100

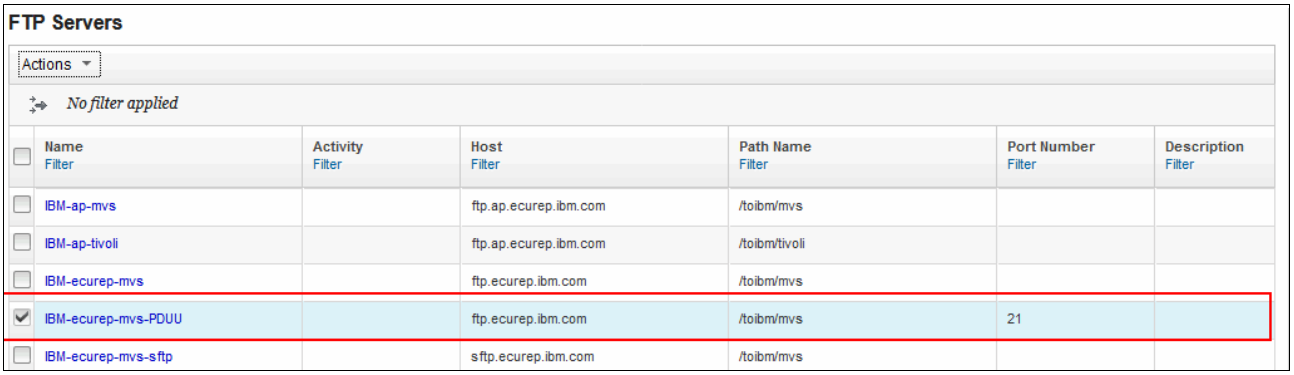
Work data set data class:

Work data set storage class:

* Number of FTP sessions: 3

Figure 11-34 PDUU

Now, the FTP server is added, as shown in Figure 11-35.

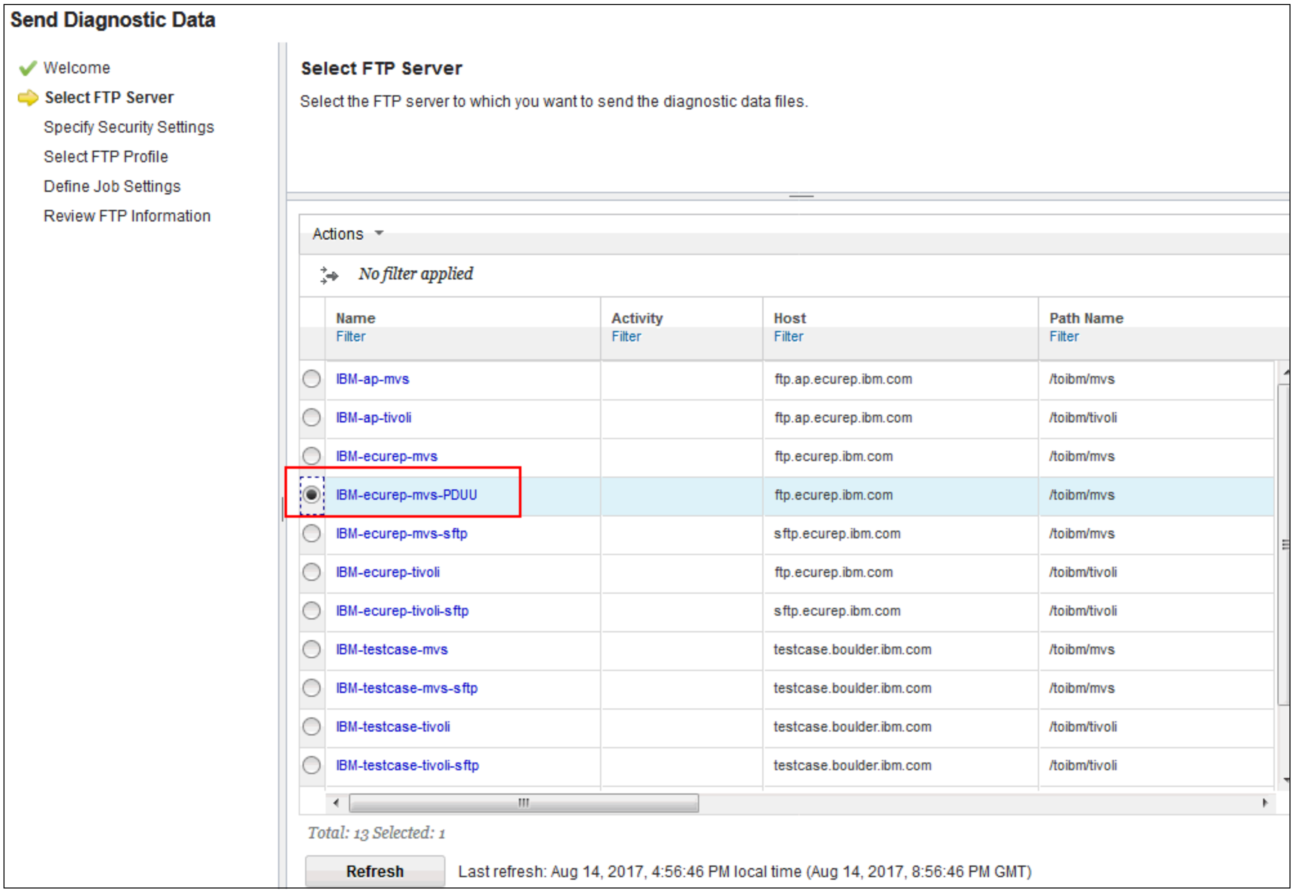

FTP Servers

☐	Name Filter	Activity Filter	Host Filter	Path Name Filter	Port Number Filter	Description Filter
☐	IBM-ap-mvs		ftp.ap.ecurep.ibm.com	/toibm/mvs		
☐	IBM-ap-tivoli		ftp.ap.ecurep.ibm.com	/toibm/tivoli		
☐	IBM-ecurep-mvs		ftp.ecurep.ibm.com	/toibm/mvs		
☑	IBM-ecurep-mvs-PDUU		ftp.ecurep.ibm.com	/toibm/mvs	21	
☐	IBM-ecurep-mvs-sftp		sftp.ecurep.ibm.com	/toibm/mvs		

Figure 11-35 FTP Servers list

4. To send data by using PDUU, start the Send Diagnostic Data wizard and follow the same steps that were described in “Send Diagnostic Data Welcome window” on page 244 with the following differences:

   a. In the Select FTP Server pane, select **IBM-ecurep-mvs-PDUU**, as shown in Figure 11-36. Click **Next**.



Send Diagnostic Data

✓ Welcome
Select FTP Server
Specify Security Settings
Select FTP Profile
Define Job Settings
Review FTP Information

Select FTP Server

Select the FTP server to which you want to send the diagnostic data files.

	Name Filter	Activity Filter	Host Filter	Path Name Filter
○	IBM-ap-mvs		ftp.ap.ecurep.ibm.com	/toibm/mvs
○	IBM-ap-tivoli		ftp.ap.ecurep.ibm.com	/toibm/tivoli
○	IBM-ecurep-mvs		ftp.ecurep.ibm.com	/toibm/mvs
●	IBM-ecurep-mvs-PDUU		ftp.ecurep.ibm.com	/toibm/mvs
○	IBM-ecurep-mvs-sftp		sftp.ecurep.ibm.com	/toibm/mvs
○	IBM-ecurep-tivoli		ftp.ecurep.ibm.com	/toibm/tivoli
○	IBM-ecurep-tivoli-sftp		sftp.ecurep.ibm.com	/toibm/tivoli
○	IBM-testcase-mvs		testcase.boulder.ibm.com	/toibm/mvs
○	IBM-testcase-mvs-sftp		testcase.boulder.ibm.com	/toibm/mvs
○	IBM-testcase-tivoli		testcase.boulder.ibm.com	/toibm/tivoli
○	IBM-testcase-tivoli-sftp		testcase.boulder.ibm.com	/toibm/tivoli

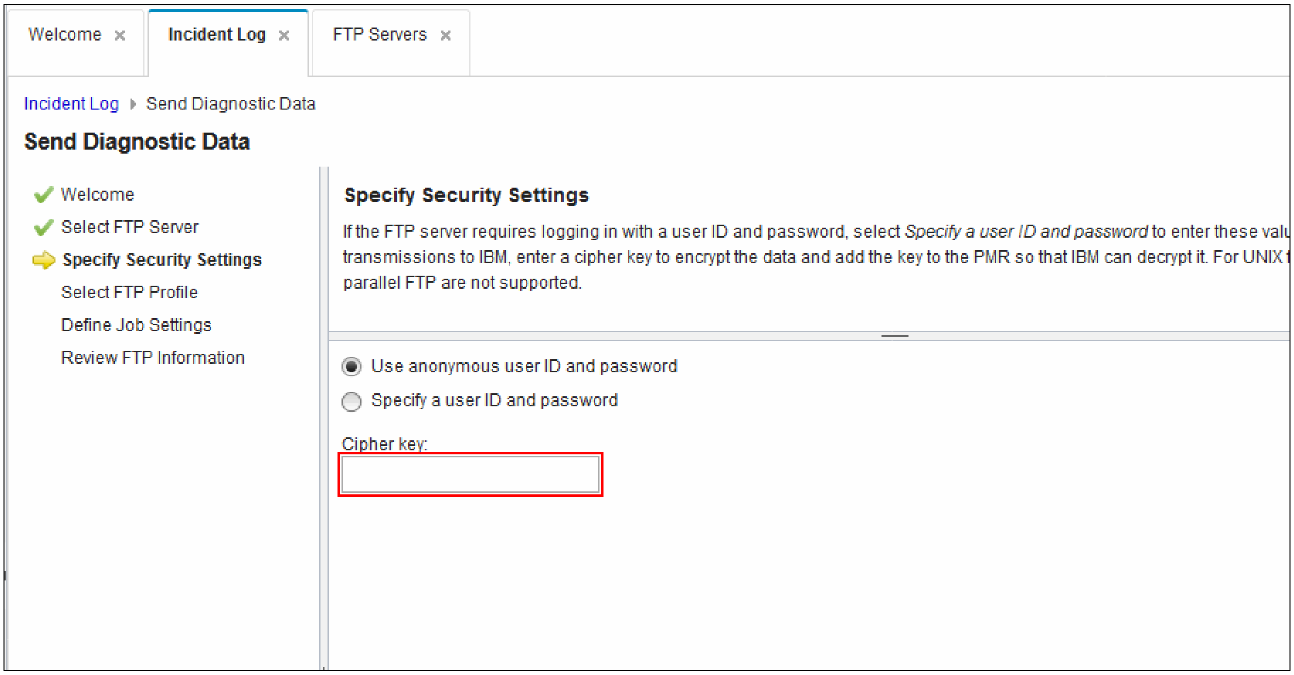
Total: 13 Selected: 1

Last refresh: Aug 14, 2017, 4:56:46 PM local time (Aug 14, 2017, 8:56:46 PM GMT)

Figure 11-36 New FTP server name - IBM-ecurep-mvs-PDUU

b. In the Specify Security Settings pane, enter the cipher key to be used if you want PDUU to perform encryption, as shown Figure 11-37. Click **Next**.

> **Note:** If you are using a cipher key to encrypt the data, add the key to the PMR so that IBM can decrypt it.



Send Diagnostic Data

Specify Security Settings

If the FTP server requires logging in with a user ID and password, select *Specify a user ID and password* to enter these valu transmissions to IBM, enter a cipher key to encrypt the data and add the key to the PMR so that IBM can decrypt it. For UNIX f parallel FTP are not supported.

● Use anonymous user ID and password

○ Specify a user ID and password

Cipher key:

Figure 11-37 Symmetric cipher key or password

c. The files that are arriving and then updating our PMR are shown in Figure 11-38. If you examine the figure closely, four files arrived at IBM Support for every data set we sent; that is, each data set was broken in to four parts and transmitted in parallel. As shown in Figure 11-34 on page 268, we specified the number of parallel transmissions as 3 (as 0 means one transmission; therefore, 3 means four transmissions), so four files arrived at IBM Support.

```
 -CDDR9 PMRUPDATE RS4  -5655S28SM  -L203/-------P4S4-13/06/12-14:41 -AT
 Multiple file transfer
  87109.055.866.ERROR.SC81.2013.06.10T19.01.50.937Z.T56503.MTFTP
  received:
 Directory: /ecurep/pmr/8/7/87109,055,866/mtftp03
  4 files  total size: 32768 bytes
  -CDDR9 PMRUPDATE RS4  -5655S28SM  -L29C/NZE  -P4S4-13/06/12-14:41 SCG
  -CDDR9 PMRUPDATE RS4  -5655S28SM  -L203/-------P4S4-13/06/12-14:41 -AT
 Multiple file transfer
 87109.055.866.USER.SC81.2013.06.10T19.01.50.937Z.T56062.MTFTP received:
 Directory: /ecurep/pmr/8/7/87109,055,866/mtftp02
  4 files  total size: 145678336 bytes
   -CDDR4 PMRUPDATE RS4   -5655S28SM  -L203/-------P4S4-13/06/12-14:44 -AT
Multiple file transfer
 87109.055.866.OPERATIONS.SC81.2013.06.10T19.01.50.937Z.T565AE.MTFTP
  received:
 Directory: /ecurep/pmr/8/7/87109,055,866/mtftp01
  4 files  total size: 32768 bytes
```

Figure 11-38 Files arriving by using PDUU

11.2.7 Secure transmission

Secure FTP can secure a transmission. Secure FTP requires some setup to be done in the z/OS system. For more information about how to set up secure FTP for a client, see Appendix C, “Secure FTP using Application Transparent Transport Layer Security” on page 559.

This section describes how to create FTP profiles in z/OSMF that can be used for secure FTP. In our examples, SC80 is the secure FTP client and SC75 is the secure FTP server, and we send data from SC80 to SC74 securely.

Creating an FTP profile in z/OSMF for secure FTP client

To create an FTP profile in z/OSMF for a secure FTP client, complete the following steps:

1. From Incident Log window, click **Actions** → **FTP Profiles**, as shown in Figure 11-39.

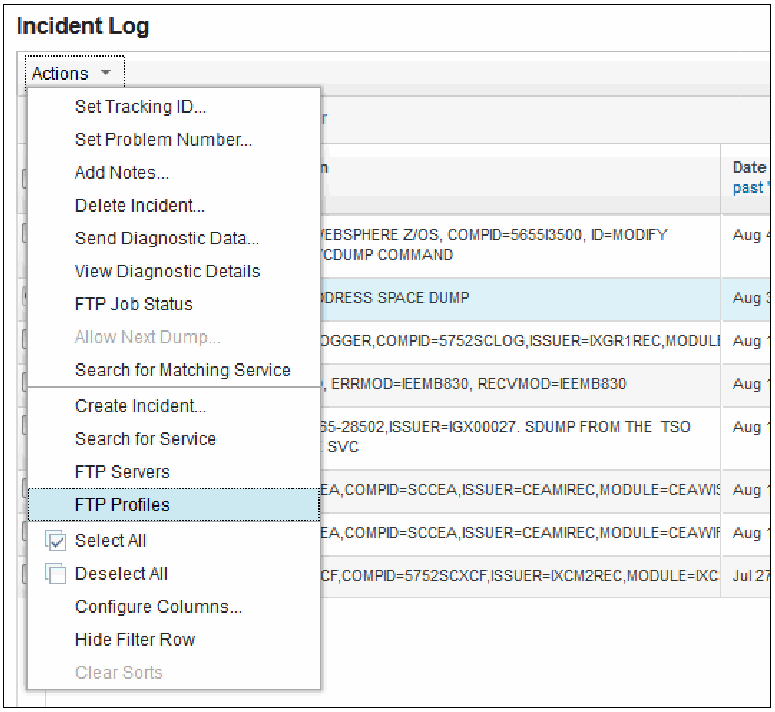
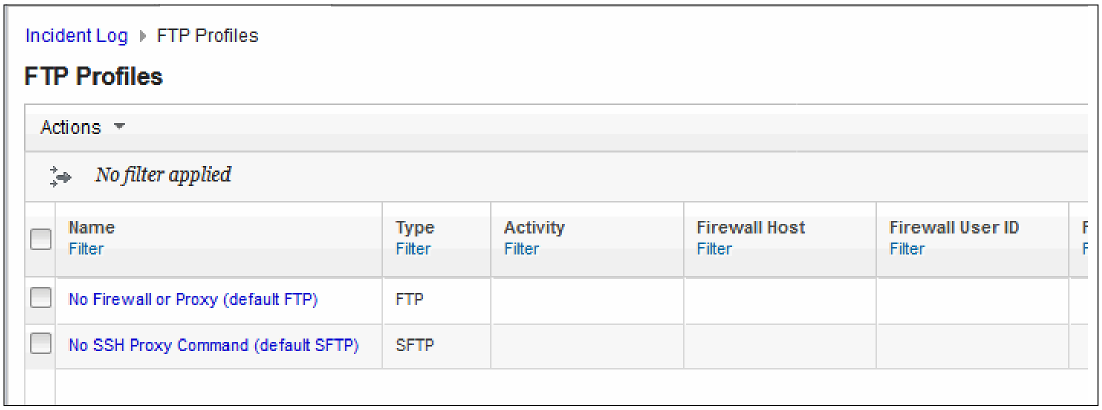


Figure 11-39 FTP Profiles menu

The FTP Profiles window opens, as shown in Figure 11-40.



□	Name Filter	Type Filter	Activity Filter	Firewall Host Filter	Firewall User ID Filter	F F
□	No Firewall or Proxy (default FTP)	FTP				
□	No SSH Proxy Command (default SFTP)	SFTP				

Figure 11-40 FTP Profiles window

2. Click **Actions** → **Add**, as shown in Figure 11-41.

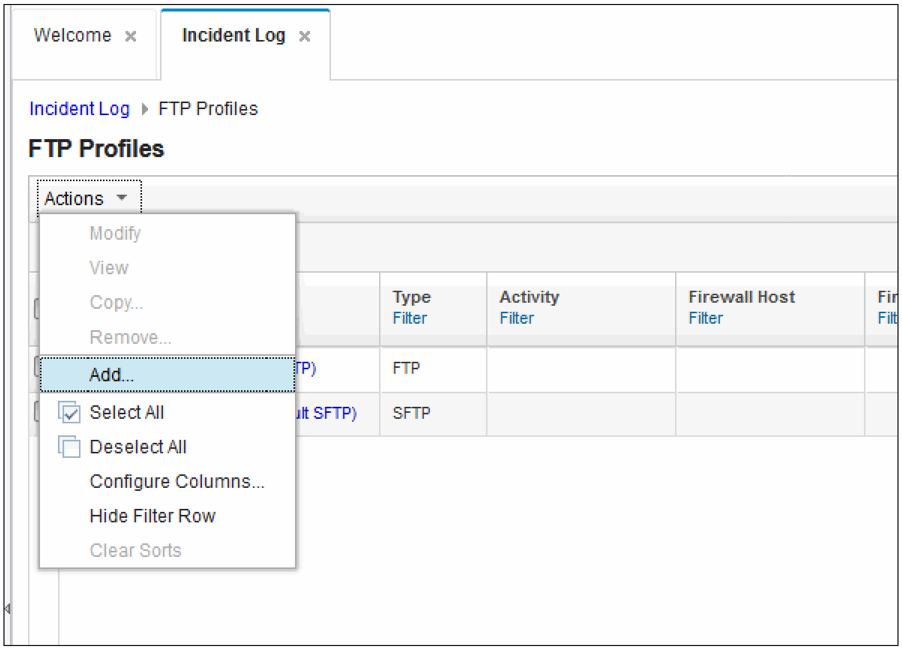
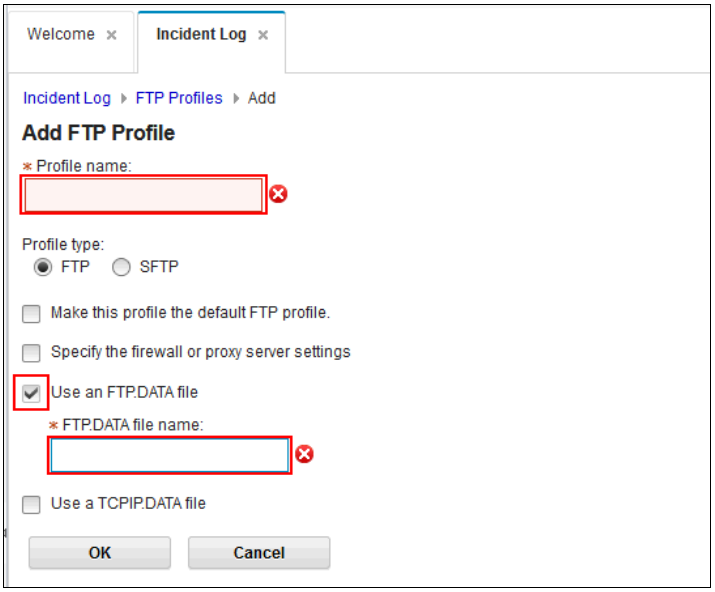


Figure 11-41 Add FTP profiles

The Add FTP Profile window opens, as shown in Figure 11-42.



* Profile name:

Profile type:
● FTP ○ SFTP

□ Make this profile the default FTP profile.

□ Specify the firewall or proxy server settings

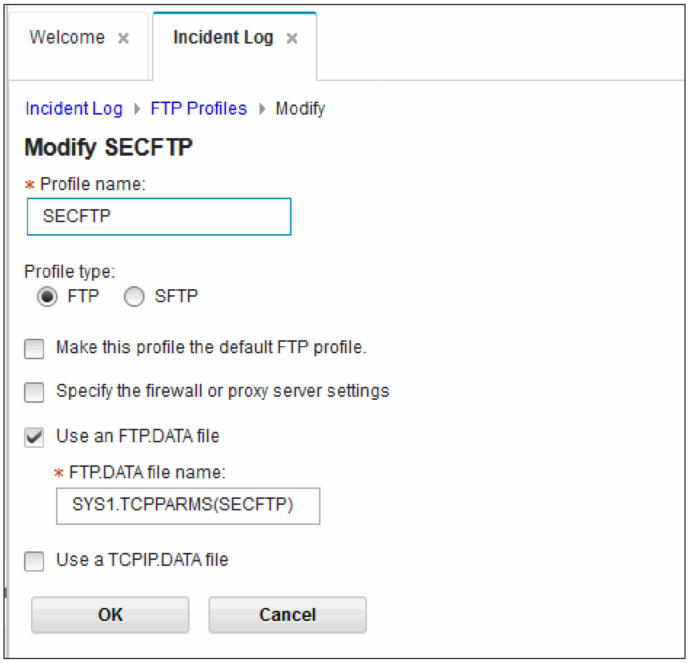
☑ Use an FTP.DATA file

* FTP.DATA file name:

□ Use a TCPIP.DATA file

Figure 11-42 Add FTP Profile window

3. In this example, we enter SECTFTP as the profile name and specify the FTP.DATA file that we created specifically for secure FTP client, as shown in Figure 11-43. Then, we click **OK**.



Incident Log ▸ FTP Profiles ▸ Modify

Modify SECFTP

* Profile name: SECFTP

Profile type:
● FTP ○ SFTP

□ Make this profile the default FTP profile.

□ Specify the firewall or proxy server settings

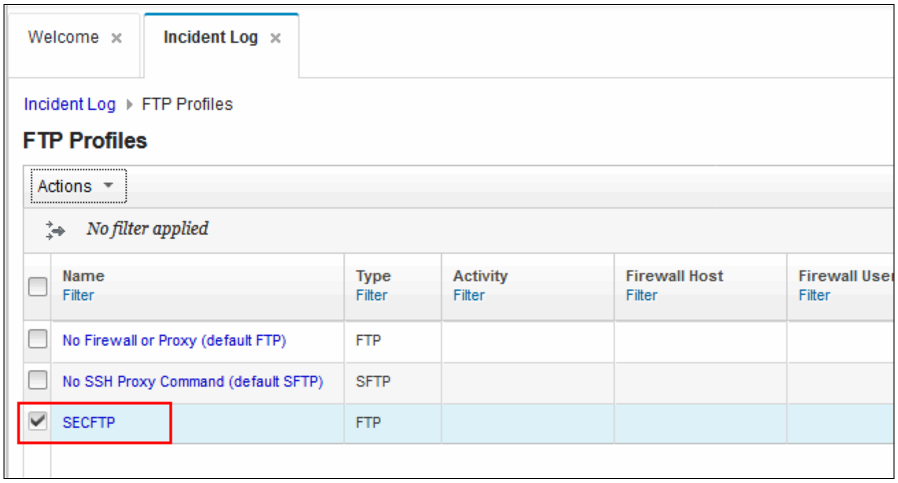
☑ Use an FTP.DATA file

* FTP.DATA file name: SYS1.TCPPARMS(SECFTP)

□ Use a TCPIP.DATA file

Figure 11-43 Completed Add FTP Profile window

After the profile is added, the FTP Profiles window looks as shown in Figure 11-44.



Incident Log ▸ FTP Profiles

FTP Profiles

No filter applied

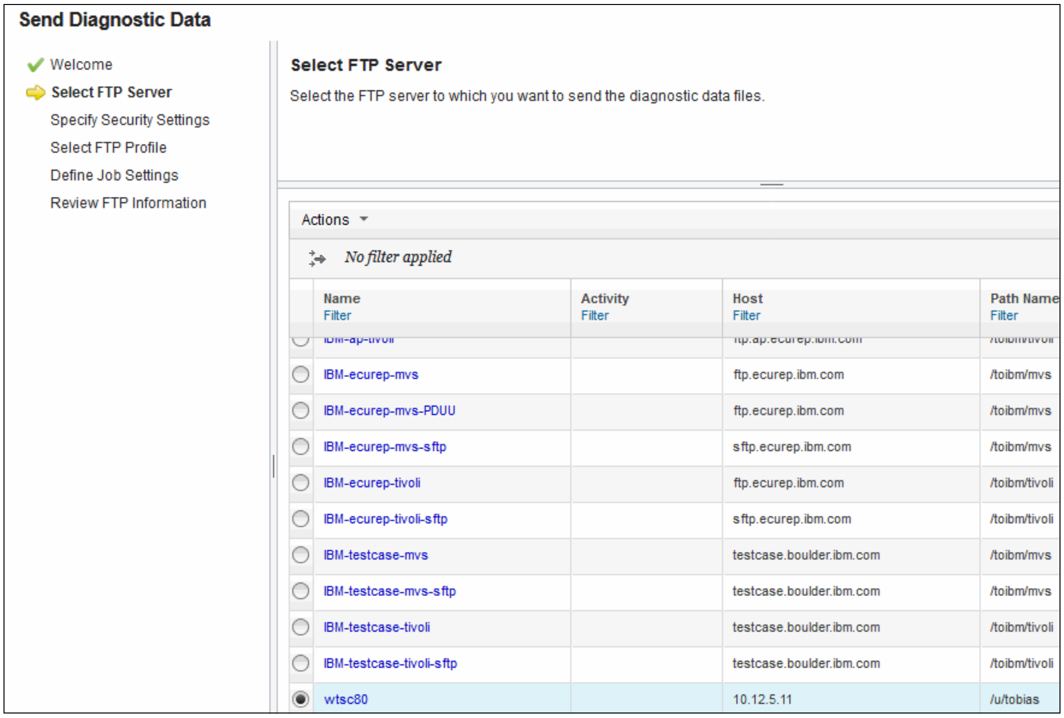
□	Name Filter	Type Filter	Activity Filter	Firewall Host Filter	Firewall Use Filter
□	No Firewall or Proxy (default FTP)	FTP			
□	No SSH Proxy Command (default SFTP)	SFTP			
☑	SECFTP	FTP			

Figure 11-44 Successfully added FTP profile

Starting profiles of a secure FTP client

To send data by using a secure FTP client, start the Send Diagnostic Data wizard and follow the same steps that were described earlier for standard FTP in 11.2.3, “Send Diagnostic Data wizard” on page 244 with the following differences:

1. In our example, we want to send data to WTSC74; therefore, select WTSC74, as shown in Figure 11-45. Click **Next**.



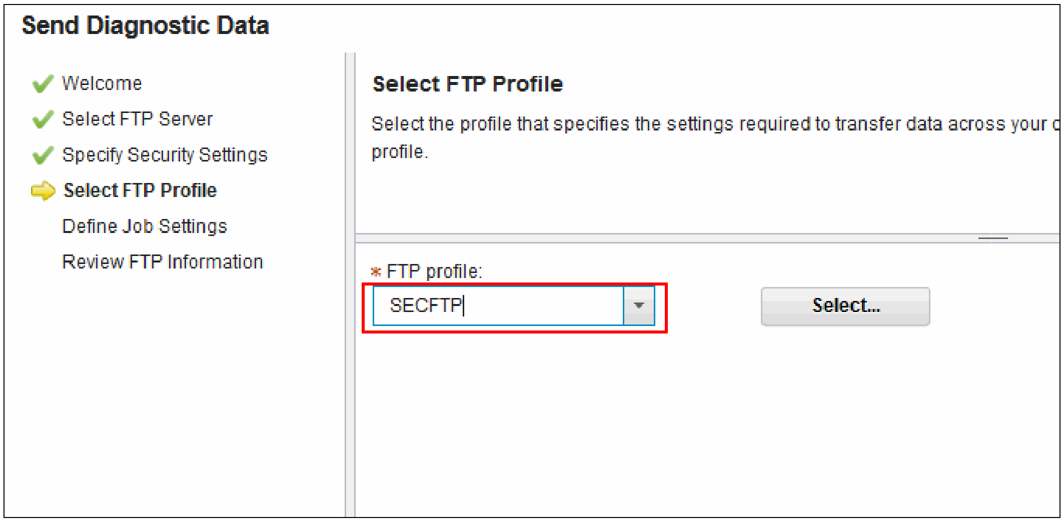
Select FTP Server

Select the FTP server to which you want to send the diagnostic data files.

	Name Filter	Activity Filter	Host Filter	Path Name Filter
○	IBM-ap-tivoli		ftp.ap.ecurep.ibm.com	/toibm/tivoli
○	IBM-ecurep-mvs		ftp.ecurep.ibm.com	/toibm/mvs
○	IBM-ecurep-mvs-PDUU		ftp.ecurep.ibm.com	/toibm/mvs
○	IBM-ecurep-mvs-sftp		sftp.ecurep.ibm.com	/toibm/mvs
○	IBM-ecurep-tivoli		ftp.ecurep.ibm.com	/toibm/tivoli
○	IBM-ecurep-tivoli-sftp		sftp.ecurep.ibm.com	/toibm/tivoli
○	IBM-testcase-mvs		testcase.boulder.ibm.com	/toibm/mvs
○	IBM-testcase-mvs-sftp		testcase.boulder.ibm.com	/toibm/mvs
○	IBM-testcase-tivoli		testcase.boulder.ibm.com	/toibm/tivoli
○	IBM-testcase-tivoli-sftp		testcase.boulder.ibm.com	/toibm/tivoli
●	wtsc80		10.12.5.11	/u/tobias

Figure 11-45 Select FTP Server

2. In the Select FTP Profile pane, select **SECFTP** from the drop-down list, as shown Figure 11-46.



Send Diagnostic Data

✓ Welcome
✓ Select FTP Server
✓ Specify Security Settings
➩ **Select FTP Profile**
Define Job Settings
Review FTP Information

Select FTP Profile

Select the profile that specifies the settings required to transfer data across your c profile.

* FTP profile: SECFTP

Figure 11-46 Select SECFTP FTP profile

The job login SC80 shows that the data is transferred in a secure manner, as shown in Figure 11-47.

```
EZA1736I FTP (EXIT=30
EZY2640I Using dd:SYSFTPD=SYS1.TCPPARMS(SECFTP) for local site configuration
parameters.
EZA1450I IBM FTP CS V2R3
EZA1466I FTP: using TCPIP
EZA1772I FTP: EXIT has been set.
EZA1456I Connect to ?
EZA1554I Connecting to:   10.12.5.11 port: 21.
220-FTPMVS1 IBM FTP CS V2R3 at WTSC80.CPOLAB.IBM.COM, 14:13:13 on
2017-08-15.
220 Connection will close if idle for more than 5 minutes.
EZA1701I >>> AUTH TLS
234 Security environment established - ready for negotiation
EZA2895I Authentication negotiation succeeded
EZA1701I >>> PBSZ 0
200 Protection buffer size accepted
EZA1701I >>> PROT P
200 Data connection protection set to private
EZA2906I Data connection protection is private
```

Figure 11-47 Secure FTP job log

11.2.8 Managing incident and diagnostic data

Incident and diagnostic data can use many system resources (such as DASD space and logstream slots) if incidents are not periodically deleted. To delete incidents, you can use the **ceatool** command-line interface (CLI) or the Incident Log task in z/OSMF.

ceatool program

The **ceatool** program is a CLI utility that you can use to send requests to the z/OS common event adapter (CEA) component. By using this utility, you can manage the incidents that were created for the z/OSMF Incident Log task. Specifically, you can use a z/OS UNIX System Services shell, a JCL job, or a **cron** job to delete incidents and the associated diagnostic data. The following diagnostic data can be deleted:

- Error log
- Error log summary
- Operations log
- Entry for the dump in the sysplex dump directory
- SVC dump (optional)

> **Note:** The utility deletes only incidents that are not associated with a problem number or tracking ID. These incidents are referred to as *inactive incidents*. The utility ignores all active incidents. To delete active incidents, use the Delete Incident action that is provided by the Incident Log task.

You can delete incident and diagnostic data by running **ceatool** with the **-d** options, as shown by the following command:

```
ceatool -d retpd=<no of days>
```

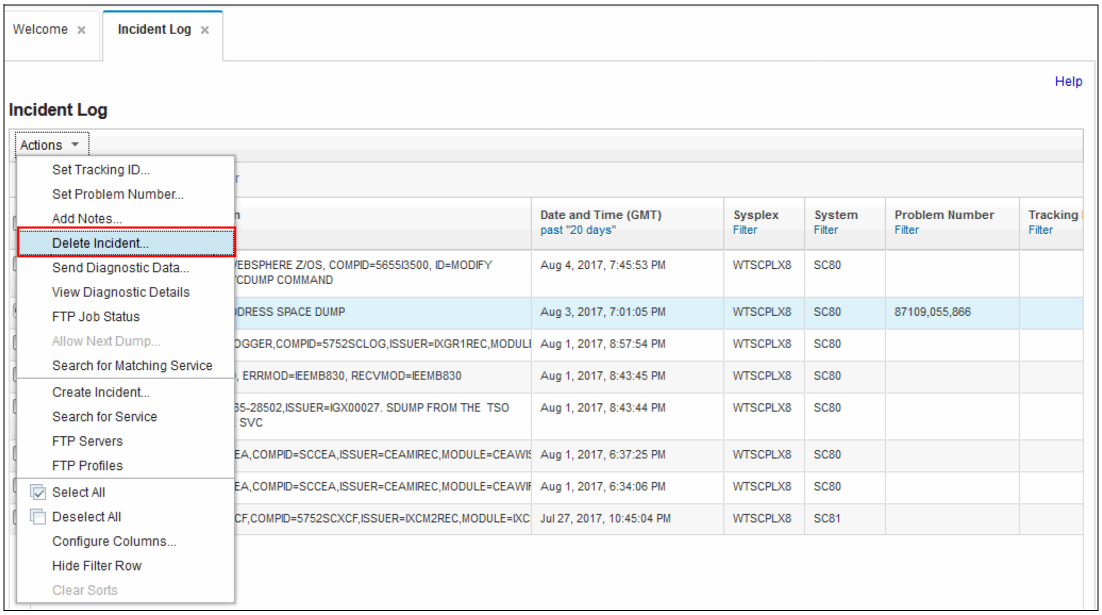
The **retpd** parameter is a mandatory parameter that specifies the number of days an incident must be kept before it can be deleted. The value for number of days can be any whole number 0 - 9999.

To delete all inactive incidents, use a retention period of zero (`retpd=0`), as shown in the following command:

```
ceatool -d retpd=0
```

Deleting incidents by using the Incident Log task

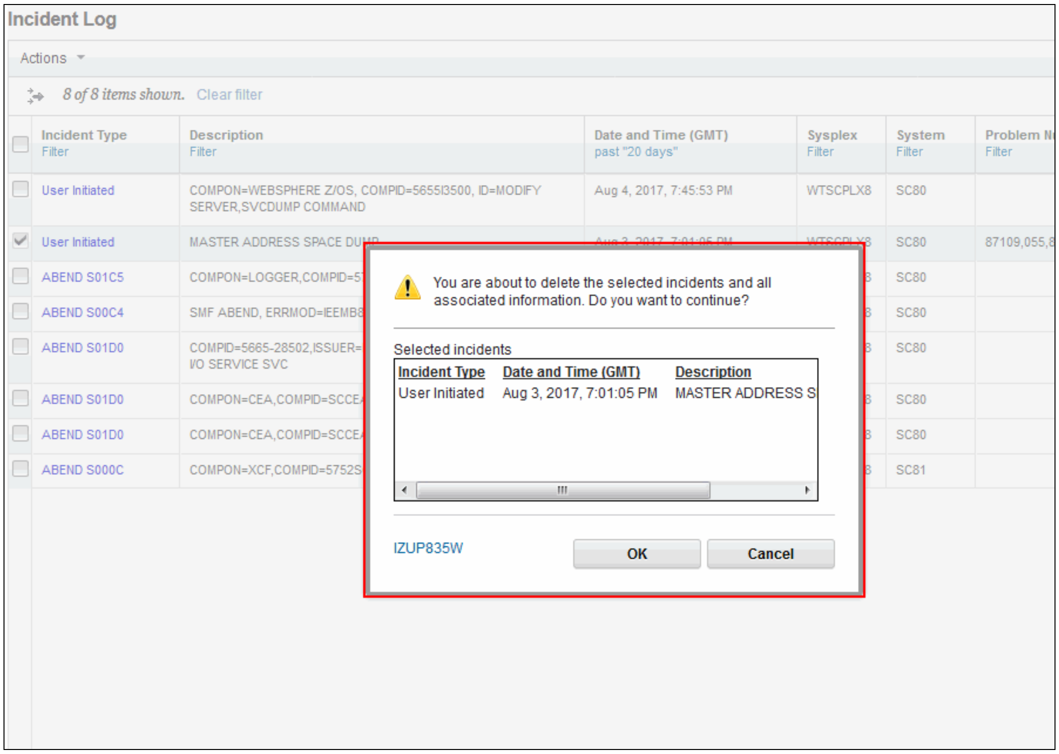
To delete one or more incidents, go to the Incident Log window, select the incidents, and click **Actions** → **Delete Incident**, as shown in Figure 11-48.



n	Date and Time (GMT) past "20 days"	Sysplex Filter	System Filter	Problem Number Filter	Tracking Filter
EBSPHERE Z/OS, COMPID=5655I3500, ID=MODIFY CDUMP COMMAND	Aug 4, 2017, 7:45:53 PM	WTSCPLX8	SC80		
DRESS SPACE DUMP	Aug 3, 2017, 7:01:05 PM	WTSCPLX8	SC80	87109,055,866	
OGGER,COMPID=5752SCLOG,ISSUER=IXGR1REC,MODULI	Aug 1, 2017, 8:57:54 PM	WTSCPLX8	SC80		
, ERRMOD=IEEMB830, RECVMOD=IEEMB830	Aug 1, 2017, 8:43:45 PM	WTSCPLX8	SC80		
35-28502,ISSUER=IGX00027. SDUMP FROM THE TSO SVC	Aug 1, 2017, 8:43:44 PM	WTSCPLX8	SC80		
EA,COMPID=SCCEA,ISSUER=CEAMIREC,MODULE=CEAWI	Aug 1, 2017, 6:37:25 PM	WTSCPLX8	SC80		
EA,COMPID=SCCEA,ISSUER=CEAMIREC,MODULE=CEAWI	Aug 1, 2017, 6:34:06 PM	WTSCPLX8	SC80		
CF,COMPID=5752SCXCF,ISSUER=IXCM2REC,MODULE=IXC	Jul 27, 2017, 10:45:04 PM	WTSCPLX8	SC81		

Figure 11-48 Delete Incident log

A window opens and prompts you to confirm the deletion, as shown in Figure 11-49. Click **OK**.



Incident Log

□	Incident Type Filter	Description Filter	Date and Time (GMT) past "20 days"	Sysplex Filter	System Filter	Problem N Filter
□	User Initiated	COMPON=WEBSPHERE Z/OS, COMPID=5655I3500, ID=MODIFY SERVER,SVCDUMP COMMAND	Aug 4, 2017, 7:45:53 PM	WTSCPLX8	SC80	
☑	User Initiated	MASTER ADDRESS SPACE DUMP	Aug 3, 2017, 7:01:05 PM	WTSCPLX8	SC80	87109,055,8
□	ABEND S01C5	COMPON=LOGGER,COMPID=57		8	SC80	
□	ABEND S00C4	SMF ABEND, ERRMOD=IEEMB8		8	SC80	
□	ABEND S01D0	COMPID=5665-28502,ISSUER= I/O SERVICE SVC		8	SC80	
□	ABEND S01D0	COMPON=CEA,COMPID=SCCE		8	SC80	
□	ABEND S01D0	COMPON=CEA,COMPID=SCCE		8	SC80	
□	ABEND S000C	COMPON=XCF,COMPID=5752S		8	SC81	

You are about to delete the selected incidents and all associated information. Do you want to continue?

Selected incidents

Incident Type	Date and Time (GMT)	Description
User Initiated	Aug 3, 2017, 7:01:05 PM	MASTER ADDRESS S

IZUP835W

Figure 11-49 Incident Log deletion confirmation

11.2.9 Summary

Our data was sent to IBM and loaded in to the FTP server ecurep.ibm.com. The PMR record also was updated.

Before z/OSMF, this process required several manual steps, and the skill to find the correct log files, build and run jobs to rename, and terse and FTP the data sets to the target destinations.

After the incident is resolved, you can delete the incident by using the z/OSMF Incident Log task, which instructs the CEA to delete all the data (dump and all diagnostic snapshots) that were created by CEA for that incident.

With z/OSMF, we achieved these tasks with only a few mouse clicks.

11.3 Incident Log data sets

This section describes how to view the data sets that are associated with an incident. This topic is purely informational, and the knowledge that is presented here is not required to use the Incident Log.

An incident often includes four files that are associated with it. A breakdown of the files is listed in Table 11-2.

Table 11-2 Incident Log files

Data type	Data set type	Notes
SVC Dump	Sequential	This dump is the actual supervisor call dump for the incident.
Error Log	Logstream data set, or sequential if logstream is not used	A snapshot of LOGREC that is based on the capture range that is specified in CEAPRM00.
Operations Log	Logstream data set, or sequential if logstream is not used	A snapshot of OPERLOG that is based on the capture range that is specified in CEAPRM00.
Error Log Summary	Sequential	LOGREC overview.

Example

In this example incident, the data that is in Table 11-3 is collected.

Table 11-3 Incident Log files example

Type	Data name
SVC Dump	DUMP.D101013.H20.SC74.#MASTER#.S00008
Error Log	CEA.L00.C6B95C3B.L0C5D8AC
Operations Log	CEA.O00.C6B95C3B.L0C5D8AC
Error Log Summary	CEA.S00.C6B95C3B.L0C5D8AC.X00.VEW

12

Software Management

This chapter introduces the IBM z/OS Management Facility (z/OSMF) task that is known as Software Management. This chapter describes how to set up this task, and provides guidance about how to use it.

It is assumed that the reader is familiar with z/OS and z/OSMF, and has a functional understanding of SMP/E.

This chapter includes the following topics:

12.1 Terminology

Throughout this chapter, the following terminology is used:

Category A label that is used to organize and group software instances and deployments. You can define as many categories as you need to organize the software instances and deployments for your enterprise.

Deployment A checklist that guides you through the software deployment process, and the object in which z/OSMF stores your input and any output that is generated for each step in the checklist. You can use a deployment to deploy one software instance on to one system at a time.

End of service The last date on which the vendor delivers standard support services for a version or release of the product.

Feature A function that is defined to SMP/E by using a `++FEATURE` statement.

Local deployment The deployment of software to DASD volumes that are shared within the same sysplex where the primary system is stored.

Primary system A z/OS system that hosts the primary z/OSMF instance.

Primary z/OSMF instance A z/OSMF instance to which your web browser is connected.

Product A program or application that is defined to SMP/E by using a `++PRODUCT` statement.

Product information file A file that contains product information, such as the product announce date, general availability date, and end of service date. z/OSMF displays data from product information files in several views and reports in the Software Management task. For more information, see the Help topic “About product information files”.

Product set The operating systems, subsystems, or products that should be installed, maintained, migrated, and deployed as a group.

Remote deployment Deployment of software to DASD volumes that are accessible to a sysplex where the primary system does not reside.

Secondary system Any system that is not the primary system.

Secondary z/OSMF instance Any z/OSMF instance to which your web browser is not connected. These instances can be used for remote deployment and accessing remote software instances.

Software deployment The process of making software available to be used on a system by users and other programs.

Software instance A collection of installed software that is described by one or more SMP/E TARGET and DLIB zone pairs that are defined under a single GLOBAL zone, related libraries, and any other data sets that are associated with the software. It is a deployable unit of SMP/E installed software.

Source software instance A software instance that is cloned during a deployment. The input of the software deployment process.

System A z/OS system that hosts a z/OSMF instance. A z/OSMF host system that can access the volumes and data sets where a software instance is stored.

Target software instance A software instance that is created as a result of a deployment. The output of the software deployment process.

z/OSMF host system A z/OS system where a z/OSMF instance is running.

12.2 Introduction

Software Management is a task that is provided by the z/OS Management Facility Software Deployment plug-in. System programmers can use Software Management to deploy software to the z/OS systems within the enterprise. Software Management tracks each software instance as it is created or modified, and maintains a web browser accessible inventory within z/OSMF. The inventory of software instances can be filtered and sorted, which makes it easy to find the information that you require.

Software Management enables you to view the product, feature, FMID, PTF, and data set information that is associated with your installed software. You can also generate reports about end of service dates, Missing Critical Service, Missing FIXCAT SYSMODs, Software Instance Comparison, and Software Instance Validation.

Before the introduction of z/OSMF, sites that have multiple z/OS systems might install and maintain software on only one system, then copy (or clone) the software to deploy on other systems within the enterprise as a means of reducing workload. In such an environment, it is likely that some process and tools are developed to manage this task.

12.2.1 Software Management topology

Software Management can deploy software from any system to any system in the enterprise. Although it is possible to log in to z/OSMF on multiple systems in the enterprise and start software deployments from each one, this process is not recommended. Doing so results in multiple independent Software Management configurations, each containing unique information for only subsets of the total enterprise.

Instead, choose one system in the enterprise to be the *primary system* from which all deployments are started. The source or target software instances do not need to be on the primary system.

The z/OSMF on the primary system is the *primary z/OSMF instance* for Software Management. All deployments from any system to any system should be started from the primary z/OSMF instance, which results in a centralized inventory of all software instances and software deployments throughout the entire enterprise.

The target software instances that you work with depend on the configuration of your systems. Systems that do not share DASD with the primary system are the target of remote deployments. Systems that do share DASD with the primary system can be local or remote deployments, depending on the configuration. If all the required resources are shared (such as DASD volumes, SMS pools, and catalogs), a local deployment should suffice. Otherwise, a remote deployment might be required.

12.2.2 Naming conventions

To use Software Management, data must be entered in to the task through the web browser interface to describe the software that is eligible for deployment. Some data has pre-existing names (such as an SMP/E GLOBAL CSI data set); therefore, it is a matter of pasting the name into the correct field in the Software Management task. However, other data includes no pre-existing name, and so must be created.

As you enter data, you are prompted to assign names for software instances, deployments, and categories. Some initial consideration should be given to a convention for assigning these names.

Do not be too concerned about being locked into a naming convention that you discover is unwieldy as the volume of data increases. Assigned names can be changed later if you develop better ideas as your experience with Software Management grows.

Guidance for naming conventions is provided in the following sections.

Software instances

A *software instance* is a collection of installed software that is described by one or more SMP/E TARGET and DLIB zone pairs that are defined under a single GLOBAL zone, the related libraries, and any other data sets that are associated with the software. It is a deployable unit of SMP/E installed software.

For example, a software instance might be only the IBM DB2 product (represented by a GLOBAL zone with the DB2 TARGET and DLIB zones linked), or a bundle that consists of DB2 and one or more related DB2 products (represented by a GLOBAL zone with the DB2 TARGET and DLIB zones that are linked, more TARGET and DLIB zones for related products). Whatever is defined in a software instance is deployed as a single unit.

If a software instance contains multiple products, those products must all share a GLOBAL zone. A software instance in Software Management supports only the definition of a single GLOBAL CSI. If products are connected to different GLOBAL CSIs, they cannot be defined in the same software instance.

A valid software instance name consists of up to 30 non-blank characters, including alphanumeric characters (A - Z, a - z, and 0 - 9), mathematical symbols (<, >, -, =, |, and \), punctuation marks (?, !, :, ', ", and /), and special characters ($, _, #, @, and ^).

Use a naming convention for the software instance that suits your environment. Do you want to identify what products are contained within the instance? Do you want to identify whether it is a source or target instance? Do you want to identify the purpose of the instance (test, development, or production)? Do you want to emphasize the date that the instance was deployed? Do you want to emphasize the system where the instance was deployed?

Choose a naming convention that works best for your organization.

For our examples in this publication, we chose names that identified the product content, and differentiated between a source and target instance. For a target instance, we also included the name of the system where the instance was deployed. For example:

ZOS210_Source	z/OS V2.1 source software instance
ZOS210_Target_SC80	z/OS V2.1 target software instance that was deployed to system SC80
TAD810_Source	IBM Tivoli® Asset Discovery for z/OS V8.1 source software instance
TAD810_Target_SC74	Tivoli Asset Discovery for z/OS V8.1 target software instance that was deployed to system SC74

Deployments

A *deployment* is a checklist that guides you through the software deployment process, and the object in which z/OSMF stores your input and any output that is generated for each step in the checklist. You can use a deployment to deploy one software instance on to one system at a time.

A valid deployment name can contain up to 30 non-blank characters, including alphanumeric characters (A - Z, a - z, and 0 - 9), mathematical symbols (<, >, -, =, |, and \), punctuation marks (?, !, :, ', ", and /), and special characters ($, _, #, @, and ^). Deployment names are not case-sensitive; for example, DB2V12R1S_S2 and DB2v12r1s_s2 are the same deployment.

Use a naming convention for deployment that suits your environment. Do you want to identify what products are contained within the deployment? Do you want to emphasize the system where the instance is being deployed? Any naming convention can be used; the choice is yours.

For our examples in this publication, we chose names that identified the product content, the word “Deployment”, the system name of the target instance, and an incremental number. For example:

ZOS210_Deployment_SC80_01	z/OS V2.1 deployed to system SC80 for the first time
TAD810_Deployment_SC74_01	Tivoli Asset Discovery V8.1 that is deployed to system SC74 for the first time

Categories

A *category* is a label that is used to organize and group software instances and deployments. You can define as many categories as you need to organize the software instances and deployments for your enterprise.

Categories are used to group related elements in Software Management, such as related software instances and related deployments. A category can be used as a filter in the Software Management windows to focus on a particular point of interest.

A category can also be associated with RACF profiles to control Software Management user access to those points of interest. For example, you might have a category that is named “DB2” that you associate with all the software instances and deployments of DB2. You might also set up some RACF profiles so that only DB2 system programmers can access those software instances and deployments.

A software instance or deployment can be associated with multiple categories. If RACF profiles are associated with those categories, a user must have authorization to *all* categories to access those software instances or deployments. For example, you might have categories “DB2”, “Production”, and “Test”. With these categories, it is possible to control which system programmers can access Production DB2 software instances versus Test DB2 software instances.

A valid category name can contain up to 30 non-blank characters, including alphanumeric characters (A - Z, a - z, and 0 - 9), mathematical symbols (<, >, -, =, |, and \), punctuation marks (?, !, :, ', ", and /), and special characters ($, _, #, @, and ^). Category names are not case-sensitive; for example, DB2TEST and DB2Test are the same category. You cannot create a category that is called NOCATEGORY because this name is a reserved name.

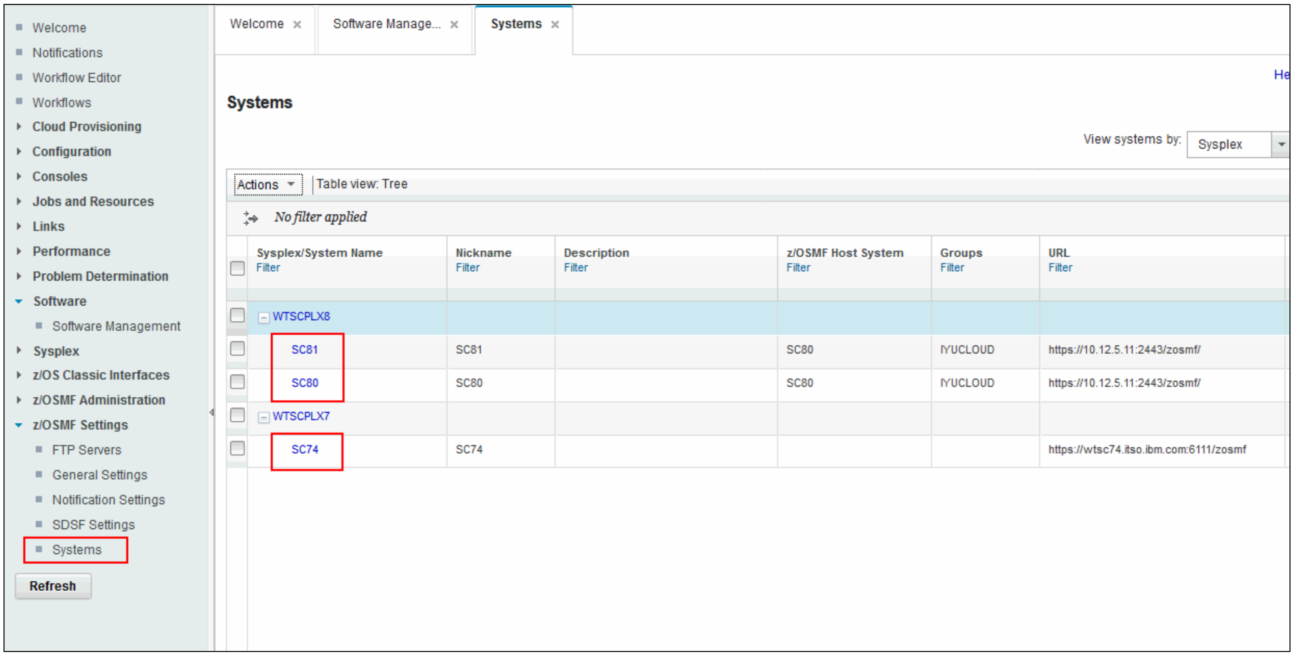
You should use a naming convention for categories that suits your environment. Do you want to identify software instances and deployments by system programming discipline (such as z/OS, IBM CICS, DB2, IBM IMS, and IBM WebSphere MQ)? Do you want to identify software instances or deployments by vendor (such as IBM, CA, and BMC)? Do you want to identify software instances or deployments by lifecycle state (such as Production or Test)? Do you want to identify software instances or deployments by location (such as Northern Data Center or Southern Data Center)?

For our examples in this publication, we chose names that identified SMP/E SREL and vendor. For software instances, we also had categories for source and target, as shown in the following example:

Z038	SMP/E SREL=Z038 (MVS related software)
IBM	IBM vendor
Source	Source software instance
Target	Target software instance

12.2.3 Systems

Software Management requires systems to be predefined when you create a software instance or a deployment (local and remote). Software Management does not have its own system definitions; instead, it uses the system definitions from the Systems pane in the z/OSMF Settings window, as shown in Figure 12-1.



Systems

View systems by: Sysplex

Table view: Tree

No filter applied

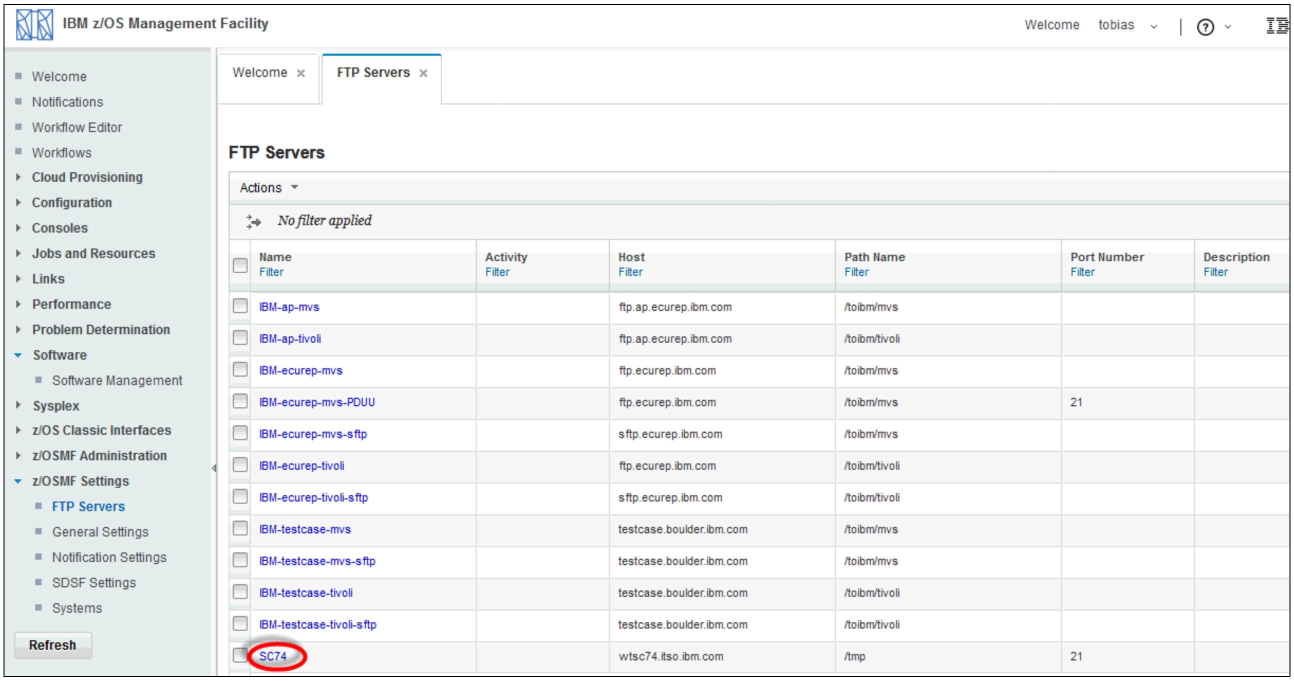
Sysplex/System Name	Nickname	Description	z/OSMF Host System	Groups	URL
WTSCPLX8					
SC81	SC81		SC80	IYUCLOUD	https://10.12.5.11:2443/zosmf/
SC80	SC80		SC80	IYUCLOUD	https://10.12.5.11:2443/zosmf/
WTSCPLX7					
SC74	SC74				https://wtsc74.itso.ibm.com:6111/zosmf

Figure 12-1 z/OSMF Settings - Systems pane

Systems SC74, SC80, and SC81 that are shown in Figure 12-1 represent systems in two different sysplexes.

12.2.4 FTP servers

Software Management requires FTP servers to be predefined if remote deployments are intended. Software Management does not have its own FTP server definitions; instead, it uses the FTP server definitions in the FTP Servers pane in the z/OSMF Settings window, as shown in Figure 12-2.



Name	Activity	Host	Path Name	Port Number	Description
Filter	Filter	Filter	Filter	Filter	Filter
IBM-ap-mvs		ftp.ap.ecurep.ibm.com	/toibm/mvs		
IBM-ap-tivoli		ftp.ap.ecurep.ibm.com	/toibm/tivoli		
IBM-ecurep-mvs		ftp.ecurep.ibm.com	/toibm/mvs		
IBM-ecurep-mvs-PDUU		ftp.ecurep.ibm.com	/toibm/mvs	21	
IBM-ecurep-mvs-sftp		sftp.ecurep.ibm.com	/toibm/mvs		
IBM-ecurep-tivoli		ftp.ecurep.ibm.com	/toibm/tivoli		
IBM-ecurep-tivoli-sftp		sftp.ecurep.ibm.com	/toibm/tivoli		
IBM-testcase-mvs		testcase.boulder.ibm.com	/toibm/mvs		
IBM-testcase-mvs-sftp		testcase.boulder.ibm.com	/toibm/mvs		
IBM-testcase-tivoli		testcase.boulder.ibm.com	/toibm/tivoli		
IBM-testcase-tivoli-sftp		testcase.boulder.ibm.com	/toibm/tivoli		
SC74		wtsc74.itso.ibm.com	/tmp	21	

Figure 12-2 z/OSMF Settings - FTP Servers pane

System SC80 that is shown in Figure 12-2 represents a system in a different sysplex.

To add an FTP server definition, click **Actions** and select **Add**, as shown in Figure 12-3.

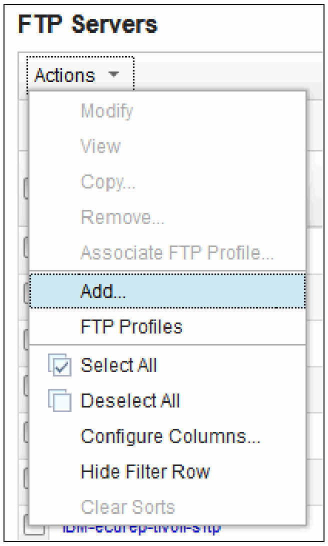
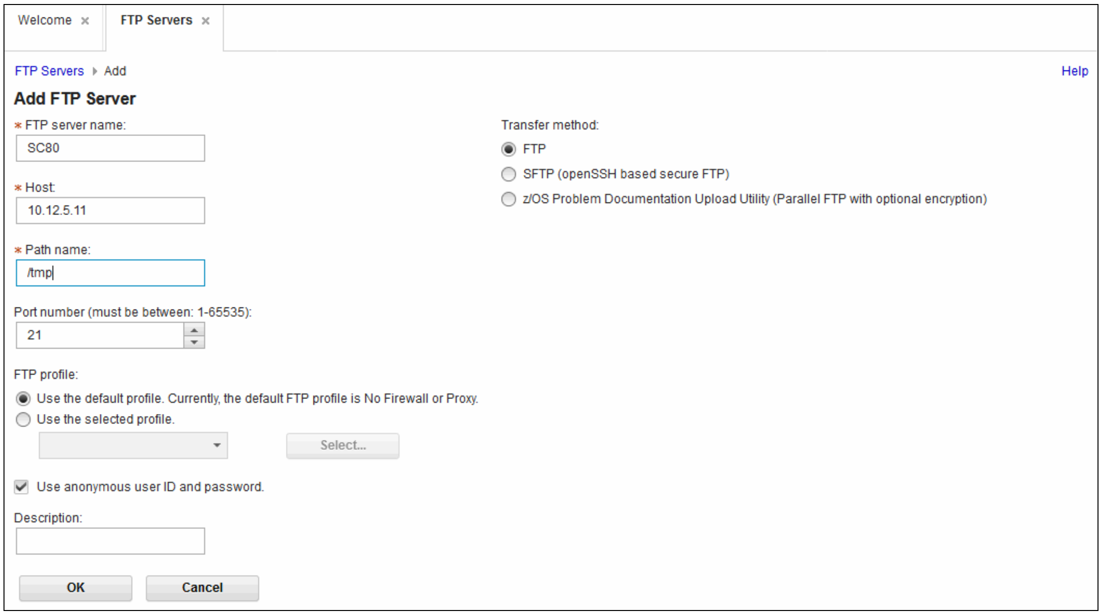


Figure 12-3 Add an FTP server

A window in which you enter the FTP server information opens, as shown in Figure 12-4.



Add FTP Server

* FTP server name: SC80

* Host: 10.12.5.11

* Path name: /tmp

Port number (must be between: 1-65535): 21

FTP profile:

● Use the default profile. Currently, the default FTP profile is No Firewall or Proxy.

○ Use the selected profile.

☑ Use anonymous user ID and password.

Description:

Transfer method:

● FTP

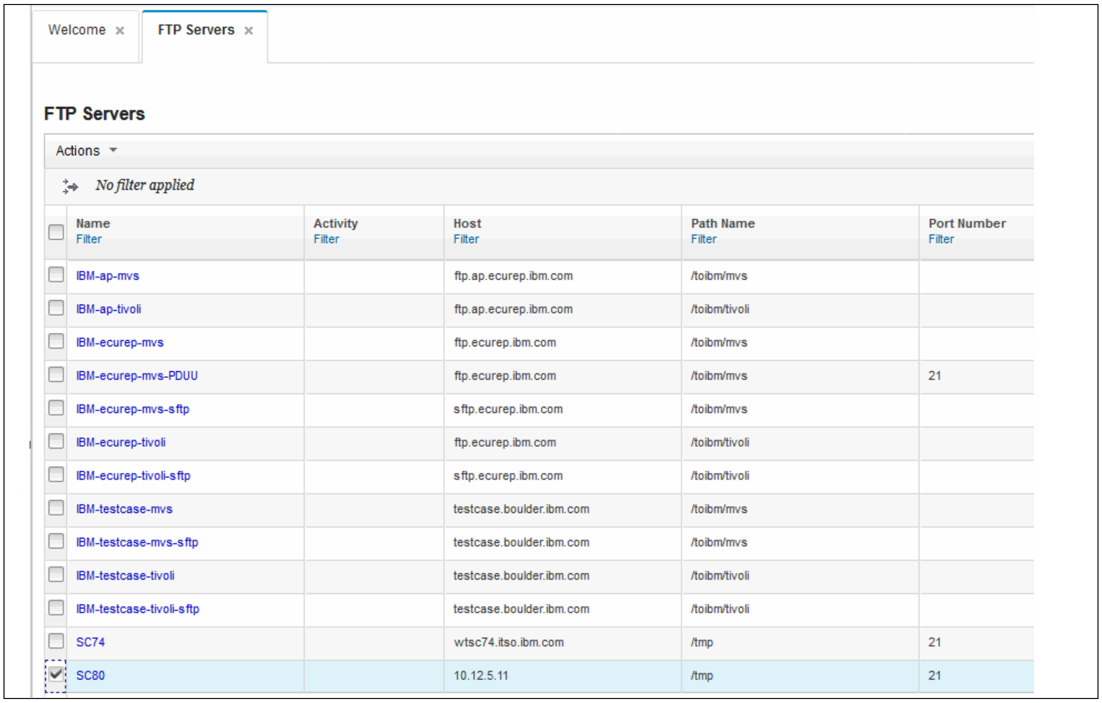
○ SFTP (openSSH based secure FTP)

○ z/OS Problem Documentation Upload Utility (Parallel FTP with optional encryption)

Figure 12-4 Enter FTP server information

FTP servers in z/OSMF can be defined with ports and profiles to suit the policies of your site. For more information, see 11.2.6, “IBM z/OS Problem Documentation Upload Utility” on page 265, 11.2.7, “Secure transmission” on page 271, and Appendix C, “Secure FTP using Application Transparent Transport Layer Security” on page 559.

When you finish entering data, click **OK**. The z/OSMF Settings window displays the FTP Servers pane, which includes with the new FTP server that was added to the list, as shown in Figure 12-5.



FTP Servers

☐	Name Filter	Activity Filter	Host Filter	Path Name Filter	Port Number Filter
☐	IBM-ap-mvs		ftp.ap.ecurep.ibm.com	/toibm/mvs	
☐	IBM-ap-tivoli		ftp.ap.ecurep.ibm.com	/toibm/tivoli	
☐	IBM-ecurep-mvs		ftp.ecurep.ibm.com	/toibm/mvs	
☐	IBM-ecurep-mvs-PDUU		ftp.ecurep.ibm.com	/toibm/mvs	21
☐	IBM-ecurep-mvs-sftp		sftp.ecurep.ibm.com	/toibm/mvs	
☐	IBM-ecurep-tivoli		ftp.ecurep.ibm.com	/toibm/tivoli	
☐	IBM-ecurep-tivoli-sftp		sftp.ecurep.ibm.com	/toibm/tivoli	
☐	IBM-testcase-mvs		testcase.boulder.ibm.com	/toibm/mvs	
☐	IBM-testcase-mvs-sftp		testcase.boulder.ibm.com	/toibm/mvs	
☐	IBM-testcase-tivoli		testcase.boulder.ibm.com	/toibm/tivoli	
☐	IBM-testcase-tivoli-sftp		testcase.boulder.ibm.com	/toibm/tivoli	
☐	SC74		wtsc74.itso.ibm.com	/tmp	21
☑	SC80		10.12.5.11	/tmp	21

Figure 12-5 z/OSMF Settings - FTP Servers

12.3 Using Software Management

After your security access to Software Management is established and the systems you intend to work with is defined to z/OSMF, you can begin using Software Management.

The use of Software Management encompasses the following tasks:

- Optionally defining categories to be used with software instances and deployments.
- Defining preexisting SMP/E data to Software Management as software instances.
- Creating reports about software instances.
- Creating deployments of software instances to local and remote systems.

Software Management is mostly a read only process. It is only when a deployment occurs that Software Management performs read/write actions, and this process happens only when you submit generated batch jobs.

If you are not submitting Software Management generated batch jobs, you can be confident that any SMP/E data that you defined to Software Management is safe from change and not affected in any way.

> **Note:** When you start using Software Management with your own data, start small and simple and gradually work up to large and complex. This approach enables you to develop trust and confidence in how Software Management functions, without data volume and complexity delaying that process.

12.3.1 Interface overview

The web page interface in z/OSMF is consistent across all plug-ins. In this section, some common features that are relevant to Software Management are highlighted.

Navigation

As with all z/OSMF tasks, Software Management operates within a frame of z/OSMF; the URL does not change. To navigate forward and backward in Software Management, click buttons within the Software Management frame only. If you accidentally click the browser forward or backward buttons, you unintentionally exit Software Management.

Select/Deselect All

When you are presented with a table of items, you might want to perform a common action against all or some of the items. In windows that contain a table of items, the table toolbar features two buttons, as shown in Figure 12-6.

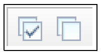


Figure 12-6 Select/Deselect All buttons

The button on the left (the square with a tick inside) is used to select all items in the table. After all of the items are selected, you can then go to individual table items and clear them if you wanted most, but not all, entries selected.

The button on the right (the square with a blank inside) is used to clear all items in the table. After all of the items are cleared, you can then go to individual table items and select them if you wanted only a subset of entries selected.

Actions

In windows that contain a table of items, the table toolbar contains an Actions button. When it is clicked, it opens a menu, as shown in Figure 12-7.

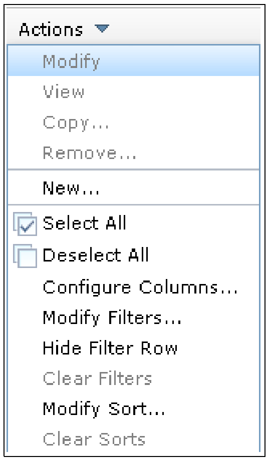


Figure 12-7 Actions

Because the menu is context-sensitive, it includes different information depending on the task. To add items to the table, look for an add or new option within the menu.

Switch To

Many of the pages in Software Management include a Switch To button. When it is clicked, it expands to a fast path menu for switching between the primary tasks of Software Management, as shown in Figure 12-8.

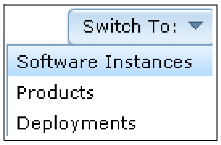


Figure 12-8 Switch To menu

Help

A z/OSMF user manual is not available. Instead, detailed information about the use of z/OSMF can be found in the Help menu. Look for the Help link in the upper right corner of all z/OSMF pages. Alternatively, some windows provide a Help button.

Filtering

The table displays in Software Management include Filter links below most of the column headings, as shown in Figure 12-9.

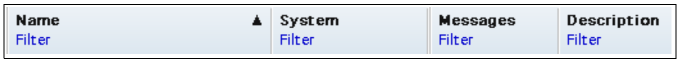


Figure 12-9 Filter links

These filter links are useful when the table display features many rows. You can use the filter link to reduce the number of visible rows so that only the rows you are interested in can be seen.

Clicking the filter link below System (as shown in Figure 12-9 on page 283), opens a selection page, as shown in Figure 12-10.

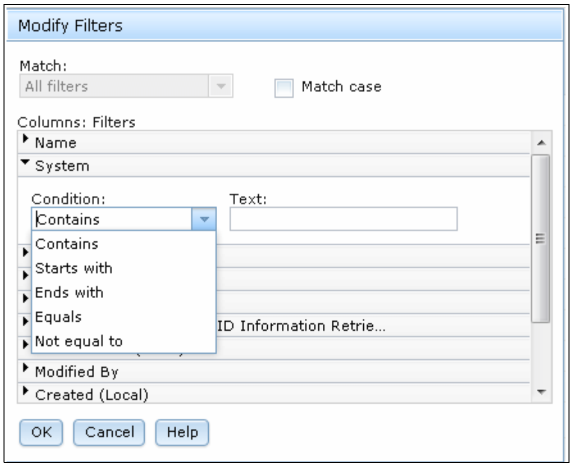
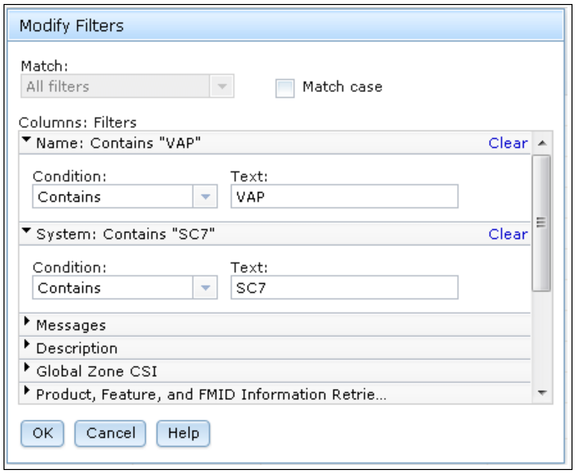


Figure 12-10 Filter selection

Multiple columns can be filtered. As shown in Figure 12-10, after you define filter criteria for the System column, you can click the Name column to add more filter criteria, as shown in Figure 12-11.



Name: Contains "VAP"

Condition: Contains

Text: VAP

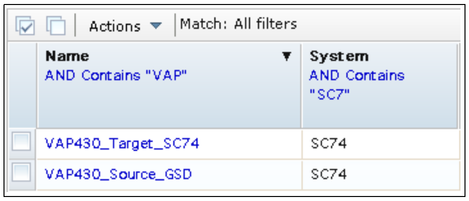
System: Contains "SC7"

Condition: Contains

Text: SC7

Figure 12-11 Multiple filter selection

After you click **OK**, the next window opens, as shown in Figure 12-12. The table contains only rows that match the filter criteria.

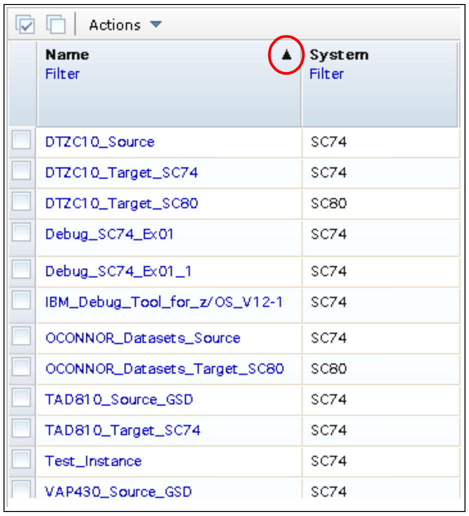


	Name AND Contains "VAP"	System AND Contains "SC7"
□	VAP430_Target_SC74	SC74
□	VAP430_Source_GSD	SC74

Figure 12-12 Filter result

Sorting

The table displays in Software Management can be sorted to suit your preference. The sort sequence is shown in the table header row. For example, Figure 12-13 shows a table that is sorted on the Name column, as signified by the black triangle in the upper right corner.



Name ▲	System
DTZC10_Source	SC74
DTZC10_Target_SC74	SC74
DTZC10_Target_SC80	SC80
Debug_SC74_Ex01	SC74
Debug_SC74_Ex01_1	SC74
IBM_Debug_Tool_for_z/OS_V12-1	SC74
OCONNOR_Datasets_Source	SC74
OCONNOR_Datasets_Target_SC80	SC80
TAD810_Source_GSD	SC74
TAD810_Target_SC74	SC74
Test_Instance	SC74
VAP430_Source_GSD	SC74

Figure 12-13 Sort sequence of tables

If the triangle is pointing up, as shown in Figure 12-13, it means the sort sequence of that column is ascending. If the triangle is pointing down, the sort sequence is descending.

To change the sort sequence, click **Actions** and select **Modify Sort**, as shown in Figure 12-14.

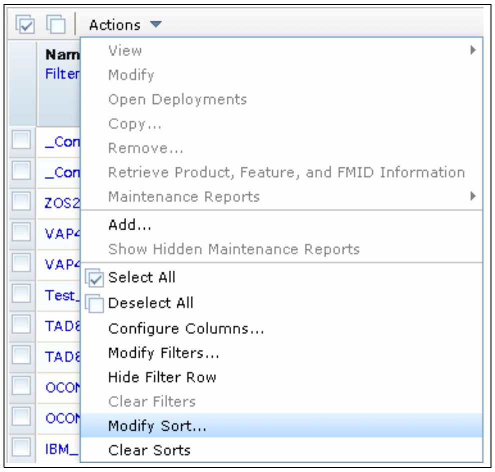
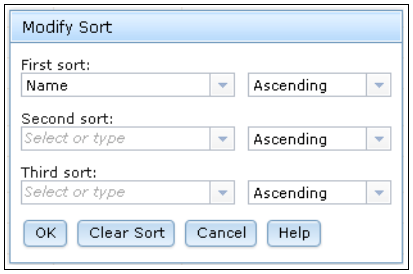


Figure 12-14 Modify Sort

A window opens in which you can define the sort criteria, as shown in Figure 12-15.


Modify Sort

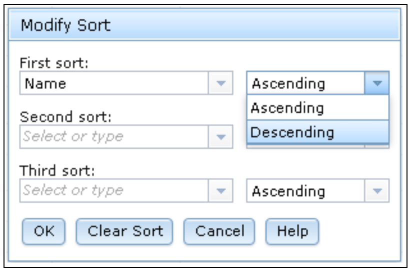
First sort: Name — Ascending

Second sort: Select or type — Ascending

Third sort: Select or type — Ascending

Figure 12-15 Modify Sort

As an example, Figure 12-16 shows changing the Name column to be sorted descending.


Modify Sort

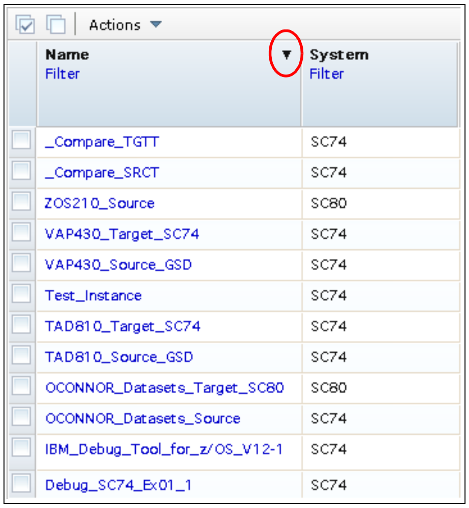
First sort: Name — Ascending

Second sort: Select or type

Third sort: Select or type — Ascending

Figure 12-16 Modify Sort

The result of this change is shown in Figure 12-17.



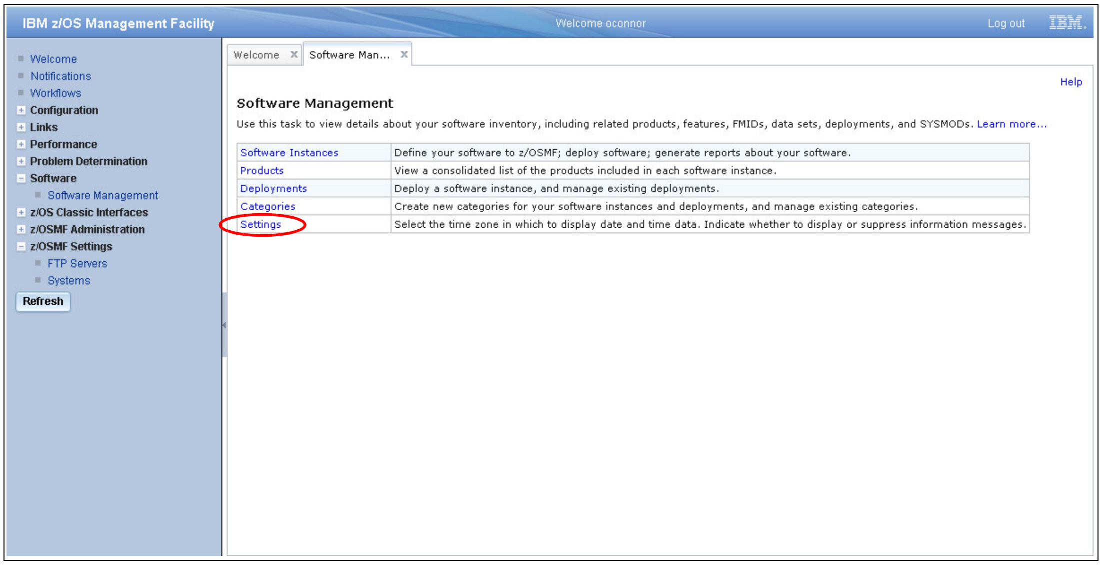
Name ▼ Filter	System Filter
_Compare_TGTT	SC74
_Compare_SRCT	SC74
ZOS210_Source	SC80
VAP430_Target_SC74	SC74
VAP430_Source_GSD	SC74
Test_Instance	SC74
TAD810_Target_SC74	SC74
TAD810_Source_GSD	SC74
OCONNOR_Datasets_Target_SC80	SC80
OCONNOR_Datasets_Source	SC74
IBM_Debug_Tool_for_z/OS_V12-1	SC74
Debug_SC74_Ex01_1	SC74

Figure 12-17 Sort sequence of tables

The inverted triangle that is shown in Figure 12-17 indicates a descending sort sequence.

12.3.2 Settings

Software Management features a Settings window in which some basic configuration options can be modified to suit the preferences of each user. To access the Setting window, go to the Software Management pane and click **Settings**, as shown in Figure 12-18.



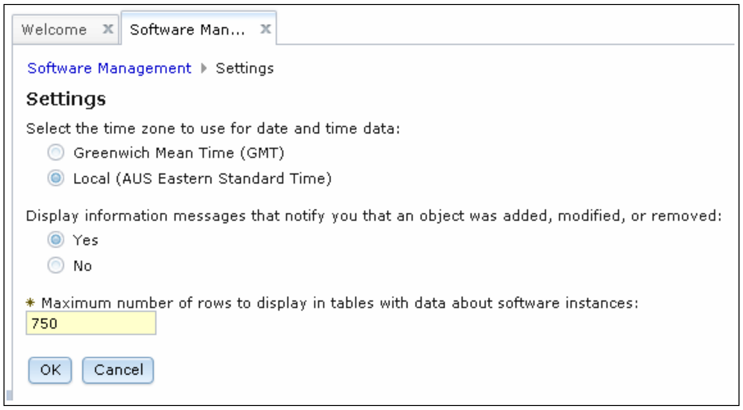
Software Management

Use this task to view details about your software inventory, including related products, features, FMIDs, data sets, deployments, and SYSMODs. Learn more...

Software Instances	Define your software to z/OSMF; deploy software; generate reports about your software.
Products	View a consolidated list of the products included in each software instance.
Deployments	Deploy a software instance, and manage existing deployments.
Categories	Create new categories for your software instances and deployments, and manage existing categories.
Settings	Select the time zone in which to display date and time data. Indicate whether to display or suppress information messages.

Figure 12-18 Software Management main menu

The Settings window opens, as shown in Figure 12-19.



Settings

Select the time zone to use for date and time data:

○ Greenwich Mean Time (GMT)

● Local (AUS Eastern Standard Time)

Display information messages that notify you that an object was added, modified, or removed:

● Yes

○ No

* Maximum number of rows to display in tables with data about software instances:

750

Figure 12-19 Software Management settings

You can use the Settings window in Software Management to select the time zone to use when displaying date and time data to indicate whether to display or suppress information messages. You also can increase or decrease the number of rows that can be displayed in tables that contain information about software instances. Consider the following points:

- The local time is determined by the time in the user's web browser settings.
- The number of rows to display must be 2 - 10,000; increasing this number might adversely affect performance.

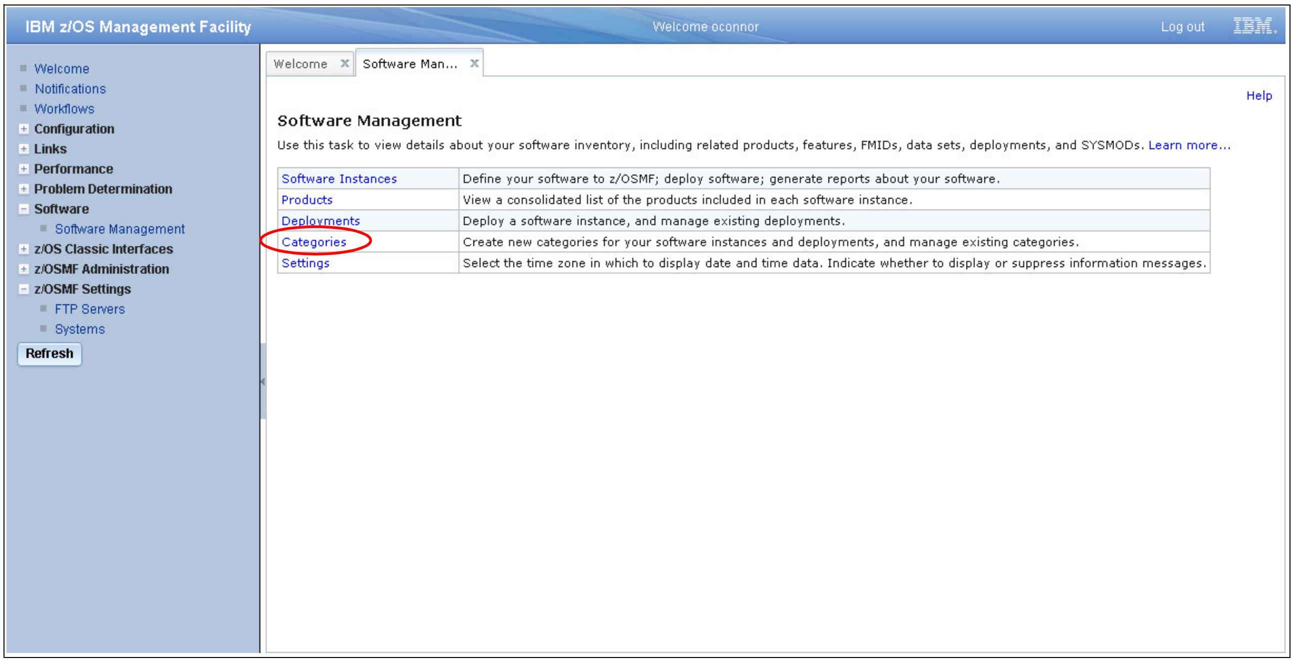
12.3.3 Categories

Categories are optional. Although it is *not* required that software instances and deployments are associated with categories, this association can be implemented. Categories are associated with software instances and deployments because of filtering and access control.

As an example, suppose that you have a category that is named DB2 and you associated it with all DB2-related software instances and deployments. A DB2 system programmer can select DB2 as a filter within the Categories column in table displays to hide all software instances and deployments that are not associated with the DB2 category.

Continuing with the DB2 example, security controls can also be associated with the DB2 category so that access to DB2 related software instances and deployments can be restricted only to DB2 system programmers.

To create a category, go to the Software Management window and select **Categories**, as shown in Figure 12-20.



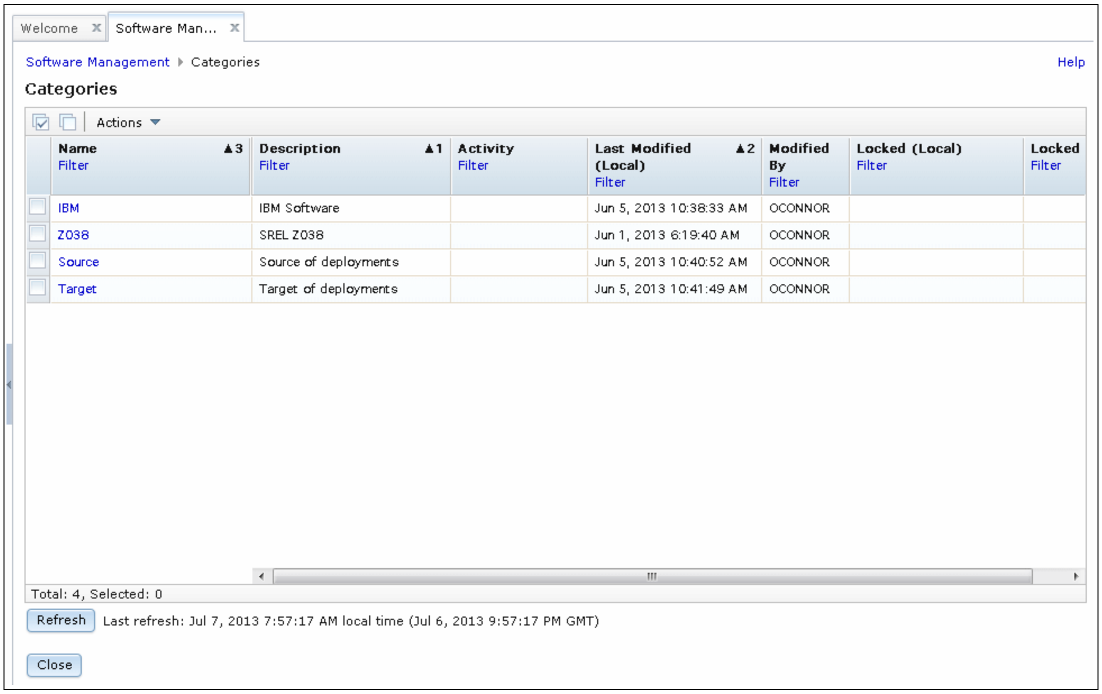
Software Management

Use this task to view details about your software inventory, including related products, features, FMIDs, data sets, deployments, and SYSMODs. Learn more...

Software Instances	Define your software to z/OSMF; deploy software; generate reports about your software.
Products	View a consolidated list of the products included in each software instance.
Deployments	Deploy a software instance, and manage existing deployments.
Categories	Create new categories for your software instances and deployments, and manage existing categories.
Settings	Select the time zone in which to display date and time data. Indicate whether to display or suppress information messages.

Figure 12-20 Software Management main page

A table of available categories displays, as shown in Figure 12-21.



Categories

	Name ▲3 Filter	Description ▲1 Filter	Activity Filter	Last Modified ▲2 (Local) Filter	Modified By Filter	Locked (Local) Filter	Locked Filter
□	IBM	IBM Software		Jun 5, 2013 10:38:33 AM	OCONNOR		
□	Z038	SREL Z038		Jun 1, 2013 6:19:40 AM	OCONNOR		
□	Source	Source of deployments		Jun 5, 2013 10:40:52 AM	OCONNOR		
□	Target	Target of deployments		Jun 5, 2013 10:41:49 AM	OCONNOR		

Total: 4, Selected: 0

Refresh   Last refresh: Jul 7, 2013 7:57:17 AM local time (Jul 6, 2013 9:57:17 PM GMT)

Figure 12-21 Categories

To add the category, click **Actions** and select **New**, as shown in Figure 12-22.

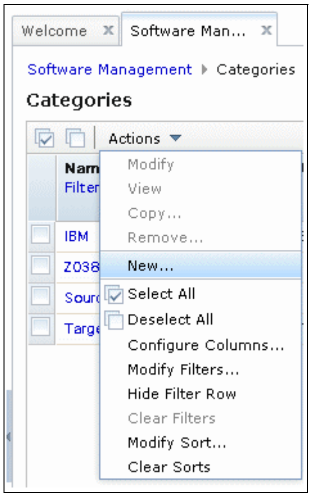
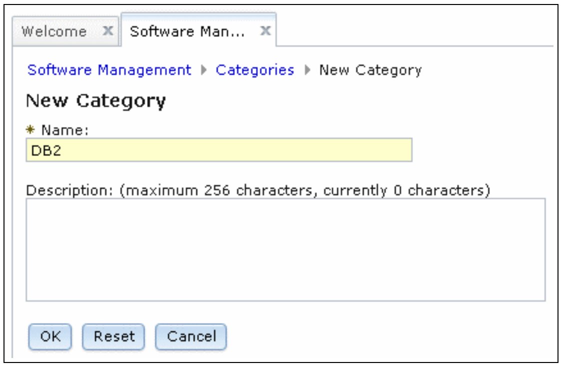


Figure 12-22 Adding a category

A page for defining the new category opens, as shown in Figure 12-23.



New Category

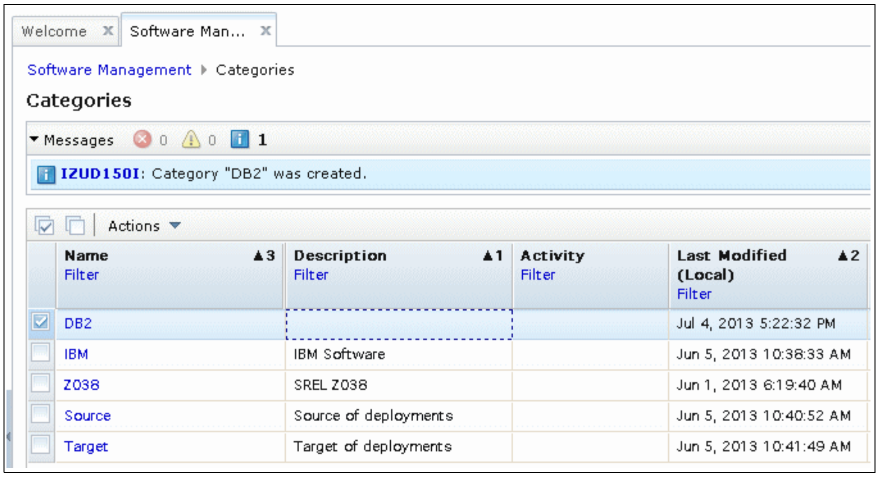
* Name: DB2

Description: (maximum 256 characters, currently 0 characters)

Figure 12-23 Enter category details

Entering a category name is mandatory, but the description field is optional. For more information about choosing category names, see "Categories" on page 277.

After the category information is entered, click **OK** to return to the list of categories, as shown in Figure 12-24.



Categories

IZUD150I: Category "DB2" was created.

	Name ▲3 Filter	Description ▲1 Filter	Activity Filter	Last Modified (Local) ▲2 Filter
☑	DB2			Jul 4, 2013 5:22:32 PM
□	IBM	IBM Software		Jun 5, 2013 10:38:33 AM
□	Z038	SREL Z038		Jun 1, 2013 6:19:40 AM
□	Source	Source of deployments		Jun 5, 2013 10:40:52 AM
□	Target	Target of deployments		Jun 5, 2013 10:41:49 AM

Figure 12-24 Categories

If you want to delete a category later, click **Actions** and then, **Remove**.

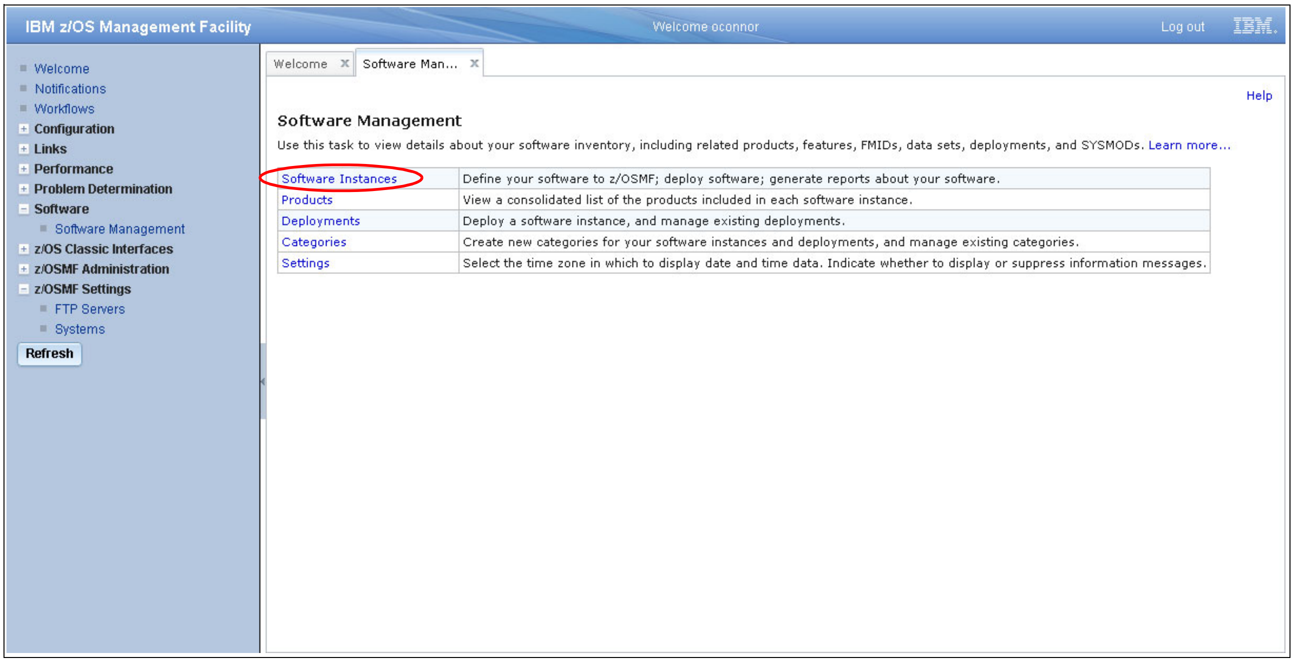
12.3.4 Software instances

A software instance consists of a GLOBAL zone, with one of more pairs of associated TARGET and DLIB zones. A software instance can be added by defining a SMP/E configuration to Software Management, or deploying a software instance, which adds a software instance.

Adding a software instance

Complete the following steps to add a software instance:

1. In the Software Management tab, select **Software Instances**, as shown in Figure 12-25.



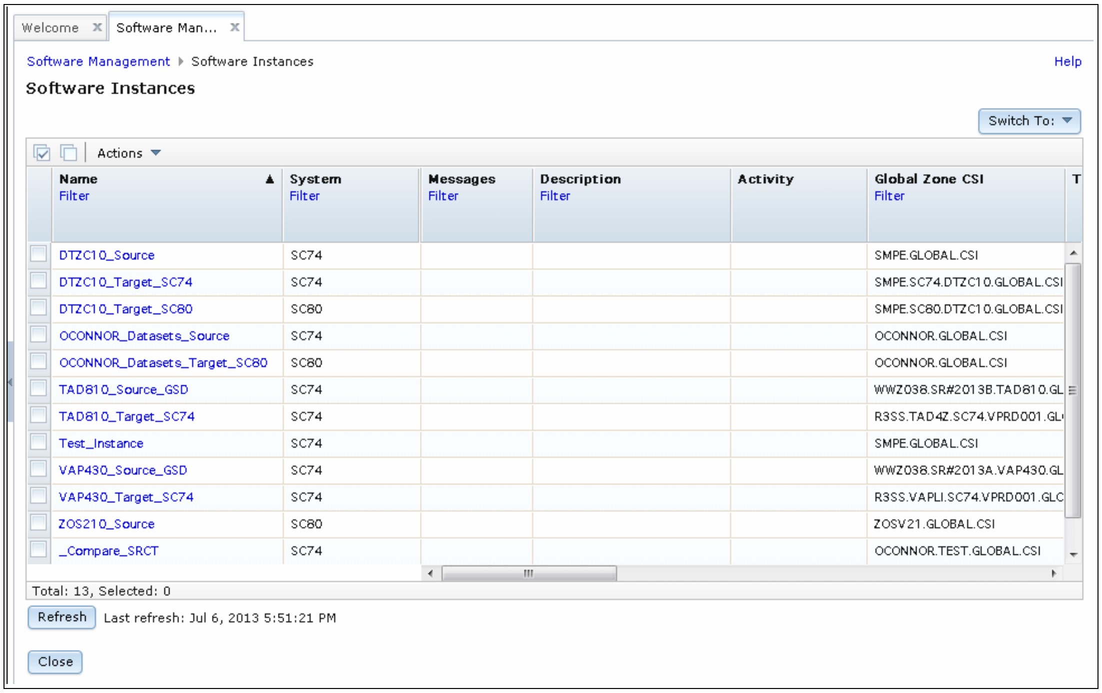
Software Management

Use this task to view details about your software inventory, including related products, features, FMIDs, data sets, deployments, and SYSMODs. Learn more...

Software Instances	Define your software to z/OSMF; deploy software; generate reports about your software.
Products	View a consolidated list of the products included in each software instance.
Deployments	Deploy a software instance, and manage existing deployments.
Categories	Create new categories for your software instances and deployments, and manage existing categories.
Settings	Select the time zone in which to display date and time data. Indicate whether to display or suppress information messages.

Figure 12-25 Software Management main window

A table of software instances displays, as shown in Figure 12-26.



Software Instances

Name ▲ Filter	System Filter	Messages Filter	Description Filter	Activity	Global Zone CSI Filter	T
DTZC10_Source	SC74				SMPE.GLOBAL.CSI	
DTZC10_Target_SC74	SC74				SMPE.SC74.DTZC10.GLOBAL.CSI	
DTZC10_Target_SC80	SC80				SMPE.SC80.DTZC10.GLOBAL.CSI	
OCONNOR_Datasets_Source	SC74				OCONNOR.GLOBAL.CSI	
OCONNOR_Datasets_Target_SC80	SC80				OCONNOR.GLOBAL.CSI	
TAD810_Source_GSD	SC74				WWZ038.SR#2013B.TAD810.GL	
TAD810_Target_SC74	SC74				R3SS.TAD4Z.SC74.VPRD001.GL	
Test_Instance	SC74				SMPE.GLOBAL.CSI	
VAP430_Source_GSD	SC74				WWZ038.SR#2013A.VAP430.GL	
VAP430_Target_SC74	SC74				R3SS.VAPLI.SC74.VPRD001.GLC	
ZOS210_Source	SC80				ZOSV21.GLOBAL.CSI	
_Compare_SRCT	SC74				OCONNOR.TEST.GLOBAL.CSI	

Total: 13, Selected: 0

Last refresh: Jul 6, 2013 5:51:21 PM

Figure 12-26 Software Management software instances

2. To add the software instance, click **Actions** in the table toolbar and select **Add**, as shown in Figure 12-27.

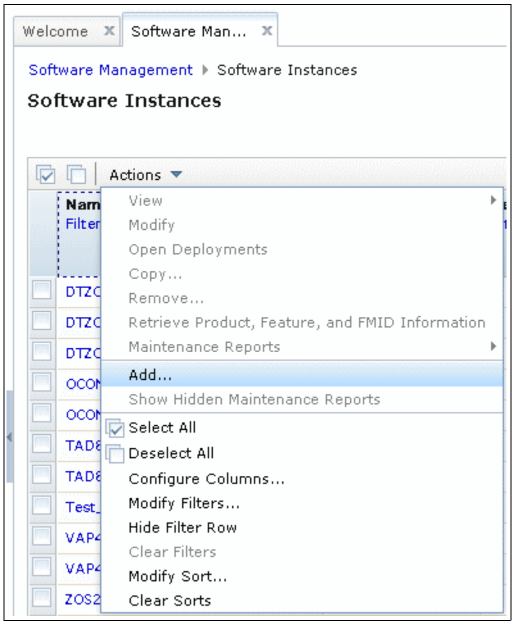
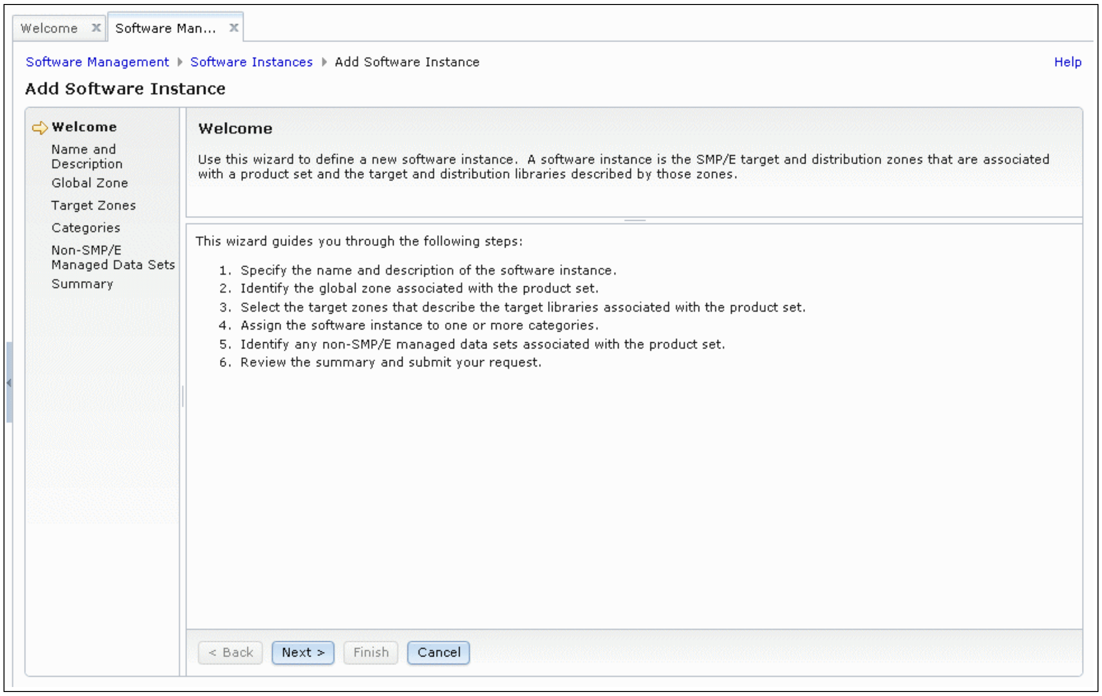


Figure 12-27 Adding a software instance

The initial pane of a wizard opens to guide you through defining the software instance, as shown in Figure 12-28.



Use this wizard to define a new software instance. A software instance is the SMP/E target and distribution zones that are associated with a product set and the target and distribution libraries described by those zones.

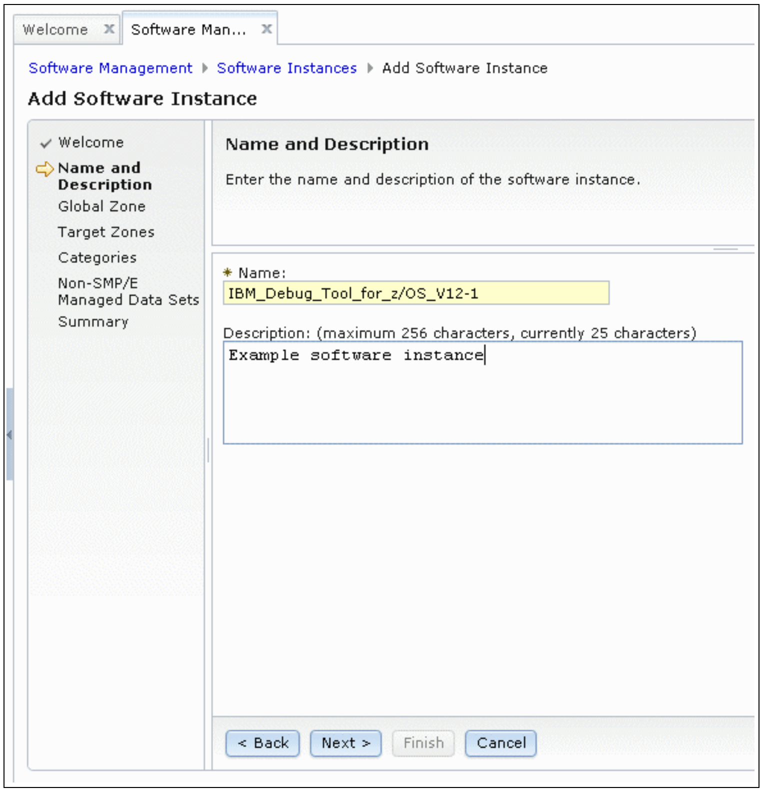
This wizard guides you through the following steps:

1. Specify the name and description of the software instance.
2. Identify the global zone associated with the product set.
3. Select the target zones that describe the target libraries associated with the product set.
4. Assign the software instance to one or more categories.
5. Identify any non-SMP/E managed data sets associated with the product set.
6. Review the summary and submit your request.

Figure 12-28 Add Software Instance wizard

3. To proceed through the wizard, click **Next**.

   The first pane of the wizard is where you define the name of the software instance, as shown in Figure 12-29.



Software Management ▸ Software Instances ▸ Add Software Instance

Add Software Instance

Name and Description

Enter the name and description of the software instance.

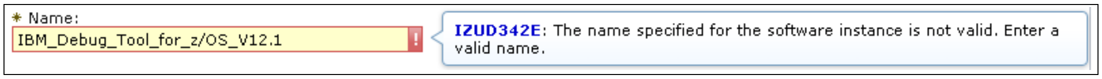
* Name:
IBM_Debug_Tool_for_z/OS_V12-1

Description: (maximum 256 characters, currently 25 characters)
Example software instance

Figure 12-29 Define a software instance name

Although a software instance name must be entered, the description field is optional. For more information about choosing software instance names, see "Software instances" on page 276.

As each character is entered, the name is checked for validity in accordance with the rules for software instance names, as described in "Software instances" on page 276. If an invalid character is entered, an error message is displayed, as shown in Figure 12-30.



* Name:
IBM_Debug_Tool_for_z/OS_V12.1

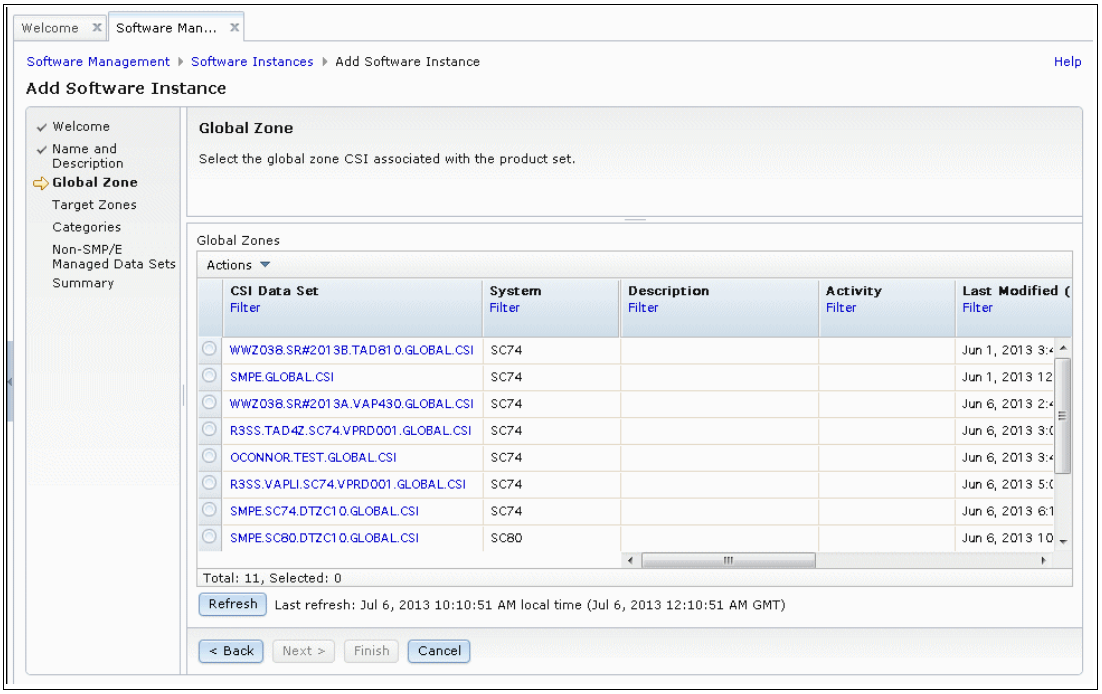
IZUD342E: The name specified for the software instance is not valid. Enter a valid name.

Figure 12-30 IZUD342E message

In this example, the error was caused by the prohibited "." character.

4. After the software instance information is entered, click **Next**.

   The next pane of the wizard is concerned with identifying the GLOBAL zone of the software instance. If software instances are defined to Software Management, you see a list of the GLOBAL CSI data sets that are known to Software Management, as shown in Figure 12-31 on page 294.



Add Software Instance

Global Zone

Select the global zone CSI associated with the product set.

Global Zones

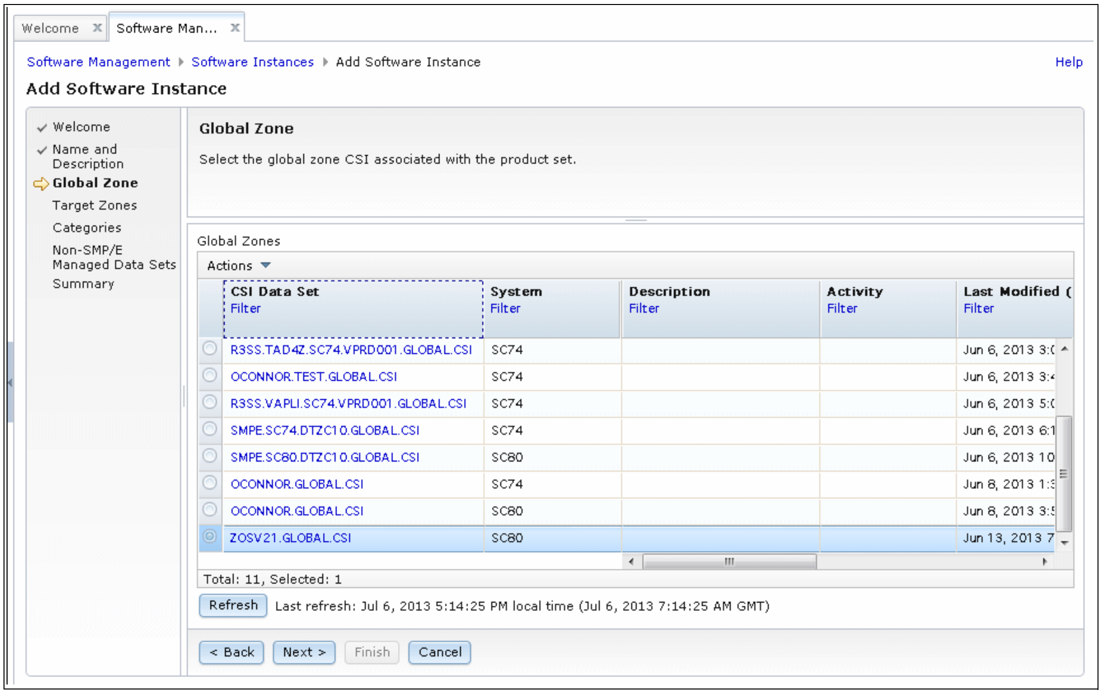
	CSI Data Set Filter	System Filter	Description Filter	Activity Filter	Last Modified (Filter
○	WWZ038.SR#2013B.TAD810.GLOBAL.CSI	SC74			Jun 1, 2013 3:4
○	SMPE.GLOBAL.CSI	SC74			Jun 1, 2013 12
○	WWZ038.SR#2013A.VAP430.GLOBAL.CSI	SC74			Jun 6, 2013 2:4
○	R3SS.TAD4Z.SC74.VPRD001.GLOBAL.CSI	SC74			Jun 6, 2013 3:0
○	OCONNOR.TEST.GLOBAL.CSI	SC74			Jun 6, 2013 3:4
○	R3SS.VAPLI.SC74.VPRD001.GLOBAL.CSI	SC74			Jun 6, 2013 5:0
○	SMPE.SC74.DTZC10.GLOBAL.CSI	SC74			Jun 6, 2013 6:1
○	SMPE.SC80.DTZC10.GLOBAL.CSI	SC80			Jun 6, 2013 10

Total: 11, Selected: 0

Last refresh: Jul 6, 2013 10:10:51 AM local time (Jul 6, 2013 12:10:51 AM GMT)

Figure 12-31 GLOBAL CSI data sets

5. If the GLOBAL CSI data set that includes your software instance (the TARGET and DLIB zones) is identified to Software Management, click the button that is in front of the GLOBAl CSI data set name, as shown in Figure 12-32. Then, click **Next**.



Add Software Instance

Global Zone

Select the global zone CSI associated with the product set.

Global Zones

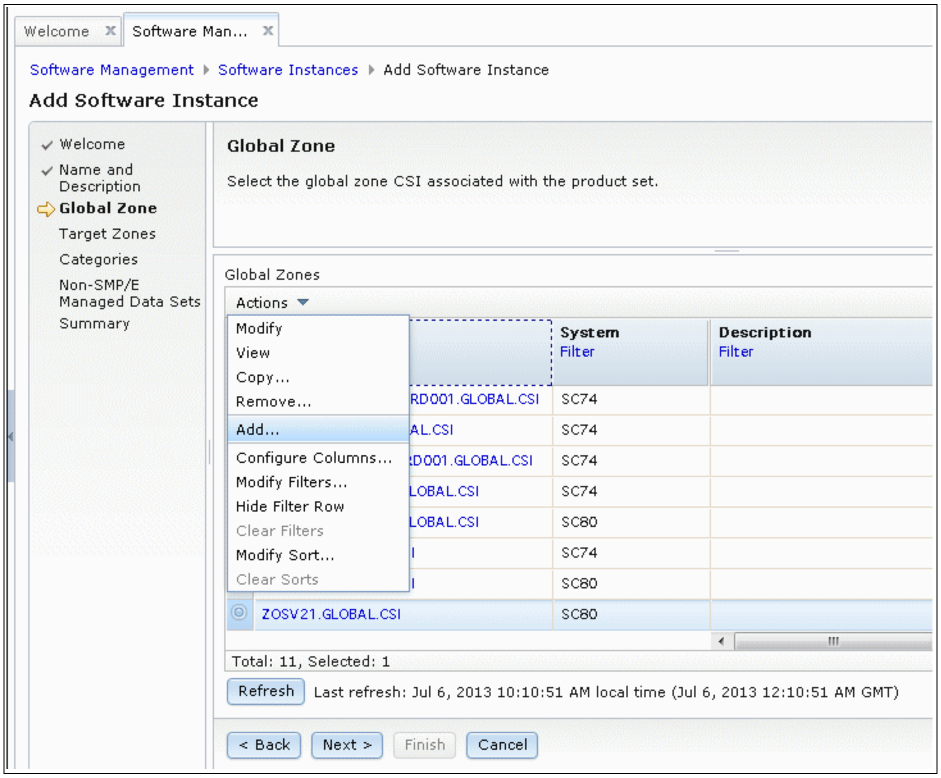
	CSI Data Set Filter	System Filter	Description Filter	Activity Filter	Last Modified (Filter
○	R3SS.TAD4Z.SC74.VPRD001.GLOBAL.CSI	SC74			Jun 6, 2013 3:0
○	OCONNOR.TEST.GLOBAL.CSI	SC74			Jun 6, 2013 3:4
○	R3SS.VAPLI.SC74.VPRD001.GLOBAL.CSI	SC74			Jun 6, 2013 5:0
○	SMPE.SC74.DTZC10.GLOBAL.CSI	SC74			Jun 6, 2013 6:1
○	SMPE.SC80.DTZC10.GLOBAL.CSI	SC80			Jun 6, 2013 10
○	OCONNOR.GLOBAL.CSI	SC74			Jun 8, 2013 1:3
○	OCONNOR.GLOBAL.CSI	SC80			Jun 8, 2013 3:5
●	ZOSV21.GLOBAL.CSI	SC80			Jun 13, 2013 7

Total: 11, Selected: 1

Last refresh: Jul 6, 2013 5:14:25 PM local time (Jul 6, 2013 7:14:25 AM GMT)

Figure 12-32 Selecting a GLOBAL CSI data set

6. If a GLOBAL CSI data set must be defined to Software Management, click **Actions** in the table toolbar and select **Add**, as shown in Figure 12-33.



Add Software Instance

Global Zone

Select the global zone CSI associated with the product set.

Global Zones

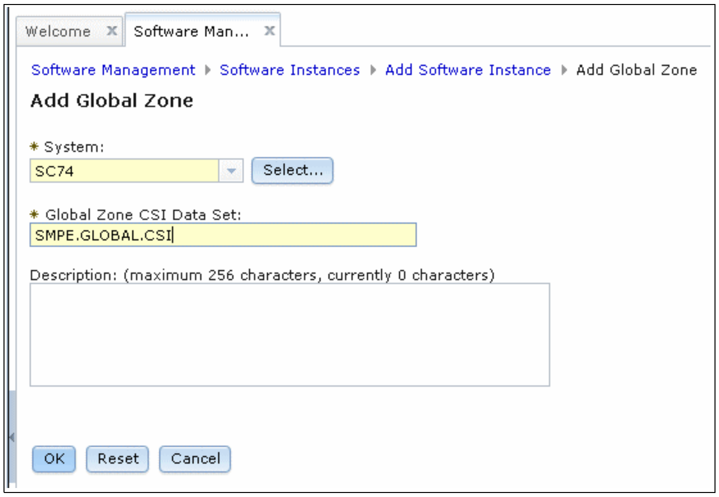
	System Filter	Description Filter
RD001.GLOBAL.CSI	SC74	
AL.CSI	SC74	
D001.GLOBAL.CSI	SC74	
LOBAL.CSI	SC74	
LOBAL.CSI	SC80	
I	SC74	
I	SC80	
ZOSV21.GLOBAL.CSI	SC80	

Total: 11, Selected: 1

Last refresh: Jul 6, 2013 10:10:51 AM local time (Jul 6, 2013 12:10:51 AM GMT)

Figure 12-33 Adding a GLOBAL CSI data set

You are prompted to enter the GLOBAL CSI data set name and the name of the system where the GLOBAL CSI data set is, as shown in Figure 12-34.



Welcome ✕
Software Man... ✕
Software Management ▸ Software Instances ▸ Add Software Instance ▸ Add Global Zone
Select...
OK
Reset
Cancel

Add Global Zone

* System: SC74

* Global Zone CSI Data Set: SMPE.GLOBAL.CSI

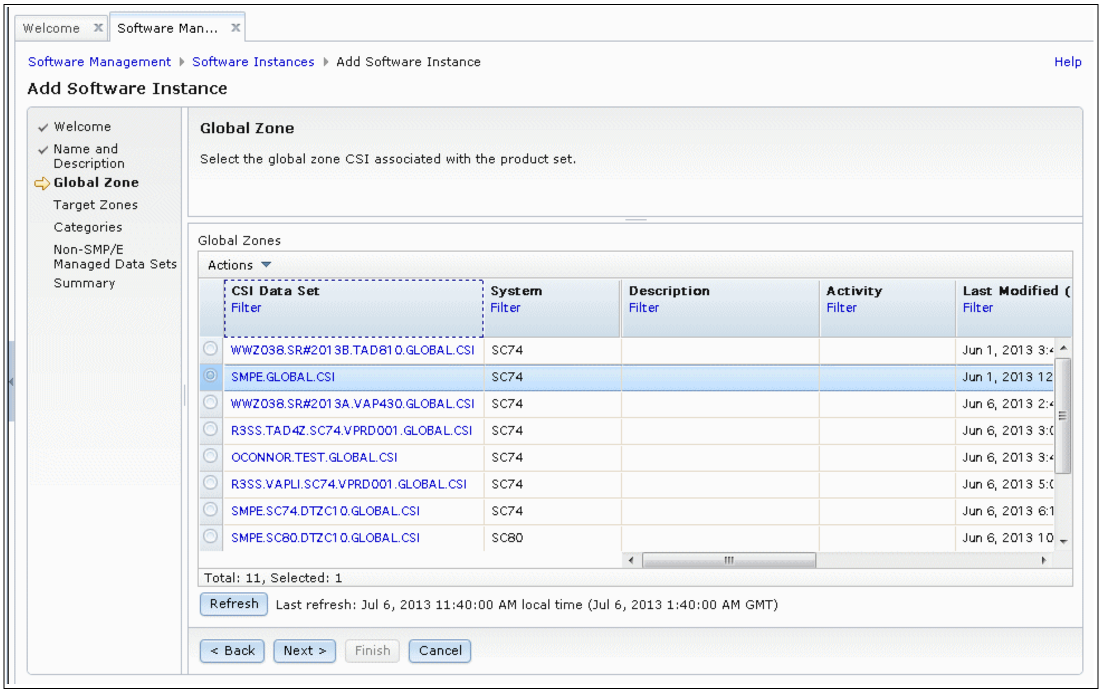
Description: (maximum 256 characters, currently 0 characters)

Figure 12-34 Defining a GLOBAL CSI data set

7. The system should be predefined n the Systems pane in the z/OSMF Settings window, as described in 12.2.3, “Systems” on page 279. You can enter the system name directly in the data entry field, or click **Select** to choose from a list of predefined systems.

   If the system is not predefined, Software Management provides an option to add a system, as described in 12.2.3, “Systems” on page 279.

8. After the GLOBAL CSI data set containing your software instance (the TARGET and DLIB zones) is identified to Software Management, click the button that is in front of the GLOBAl CSI data set name, as shown in Figure 12-35.



Global Zone

Select the global zone CSI associated with the product set.

Global Zones

	CSI Data Set Filter	System Filter	Description Filter	Activity Filter	Last Modified (Filter
○	WWZ038.SR#2013B.TAD810.GLOBAL.CSI	SC74			Jun 1, 2013 3:4
●	SMPE.GLOBAL.CSI	SC74			Jun 1, 2013 12
○	WWZ038.SR#2013A.VAP430.GLOBAL.CSI	SC74			Jun 6, 2013 2:4
○	R3SS.TAD4Z.SC74.VPRD001.GLOBAL.CSI	SC74			Jun 6, 2013 3:0
○	OCONNOR.TEST.GLOBAL.CSI	SC74			Jun 6, 2013 3:4
○	R3SS.VAPLI.SC74.VPRD001.GLOBAL.CSI	SC74			Jun 6, 2013 5:0
○	SMPE.SC74.DTZC10.GLOBAL.CSI	SC74			Jun 6, 2013 6:1
○	SMPE.SC80.DTZC10.GLOBAL.CSI	SC80			Jun 6, 2013 10

Total: 11, Selected: 1

Last refresh: Jul 6, 2013 11:40:00 AM local time (Jul 6, 2013 1:40:00 AM GMT)

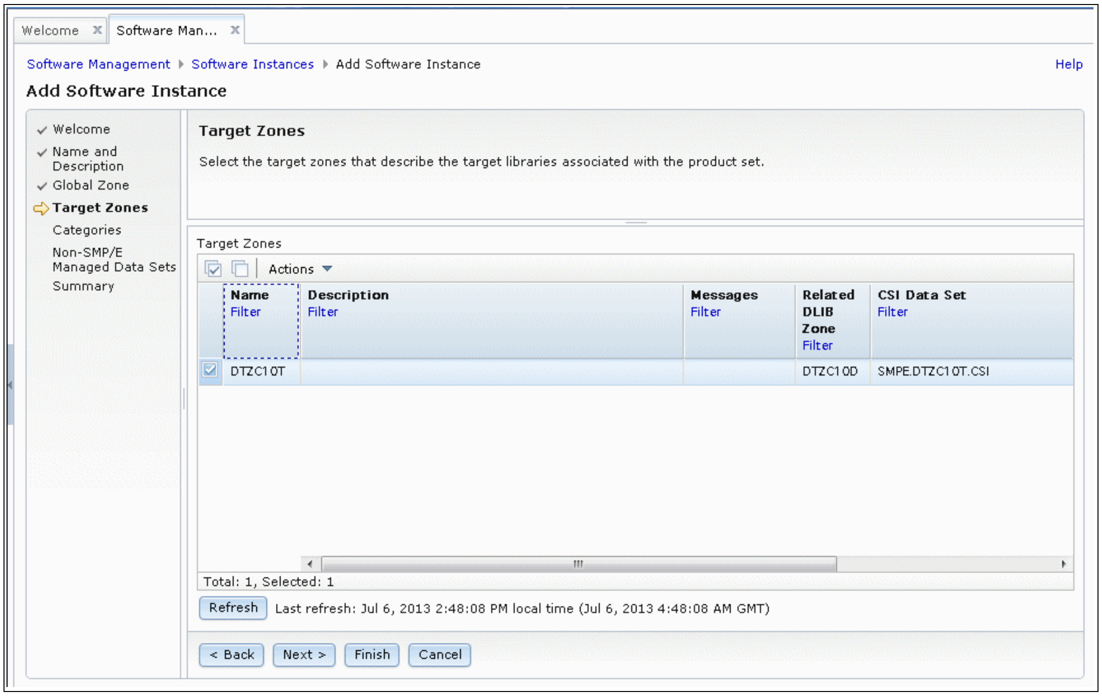
Figure 12-35 GLOBAL CSI data sets

9. Click **Next**.

   Software Management reads the selected GLOBAL CSI data set, and then presents a table of the TARGET and DLIB zone pairs found within it. Select the TARGET and DLIB zone pairs that you want to include in the software instance. A software instance can contain a single TARGET and DLIB zone pair, or multiple TARGET and DLIB zone pairs.

   The content of a software instance is your choice. If you include multiple TARGET and DLIB zone pairs, all of these zone pairs are deployed as a single unit. When a software instance is deployed, the entire content is deployed.

10.A GLOBAL CSI that contains only a single TARGET and DLIB zone pair is shown in Figure 12-36. In this example, the TARGET and DLIB are selected. Click **Next**.



Add Software Instance

Target Zones

Select the target zones that describe the target libraries associated with the product set.

Target Zones

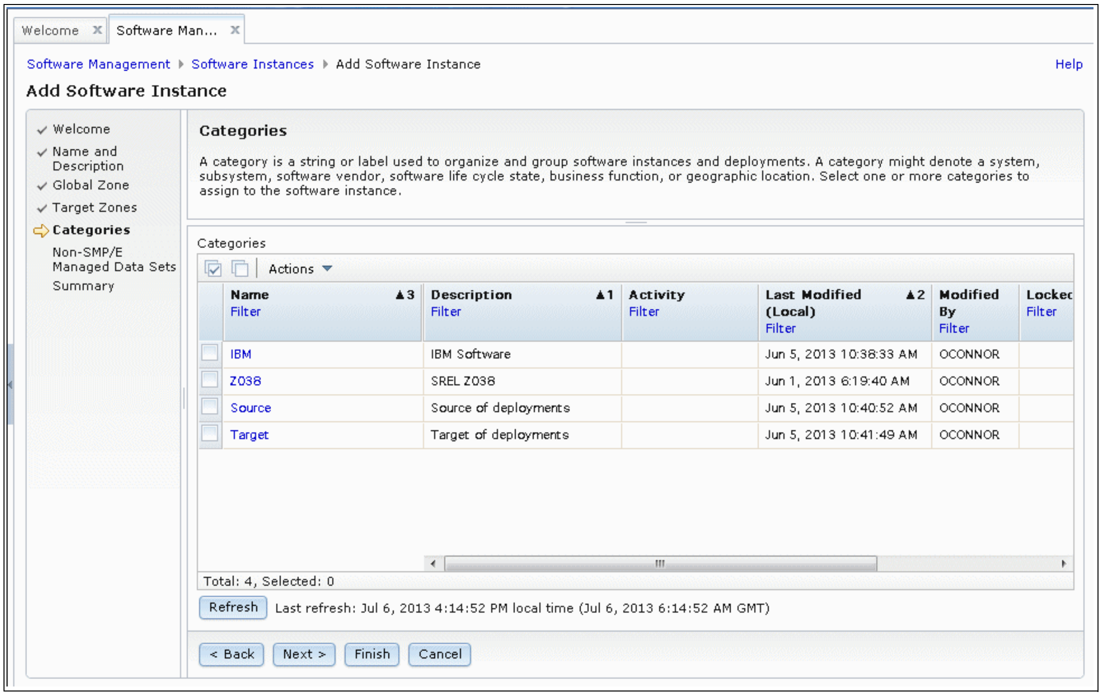
	Name Filter	Description Filter	Messages Filter	Related DLIB Zone Filter	CSI Data Set Filter
☑	DTZC10T			DTZC10D	SMPE.DTZC10T.CSI

Total: 1, Selected: 1

Last refresh: Jul 6, 2013 2:48:08 PM local time (Jul 6, 2013 4:48:08 AM GMT)

Figure 12-36 Selecting a TARGET and DLIB zone pair

In the next pane of the wizard, Software Management shows a table of categories that you might want to associate with your software instance. An example is shown in Figure 12-37.



Add Software Instance

Categories

A category is a string or label used to organize and group software instances and deployments. A category might denote a system, subsystem, software vendor, software life cycle state, business function, or geographic location. Select one or more categories to assign to the software instance.

Categories

	Name ▲3 Filter	Description ▲1 Filter	Activity Filter	Last Modified (Local) ▲2 Filter	Modified By Filter	Lockec Filter
□	IBM	IBM Software		Jun 5, 2013 10:38:33 AM	OCONNOR	
□	Z038	SREL Z038		Jun 1, 2013 6:19:40 AM	OCONNOR	
□	Source	Source of deployments		Jun 5, 2013 10:40:52 AM	OCONNOR	
□	Target	Target of deployments		Jun 5, 2013 10:41:49 AM	OCONNOR	

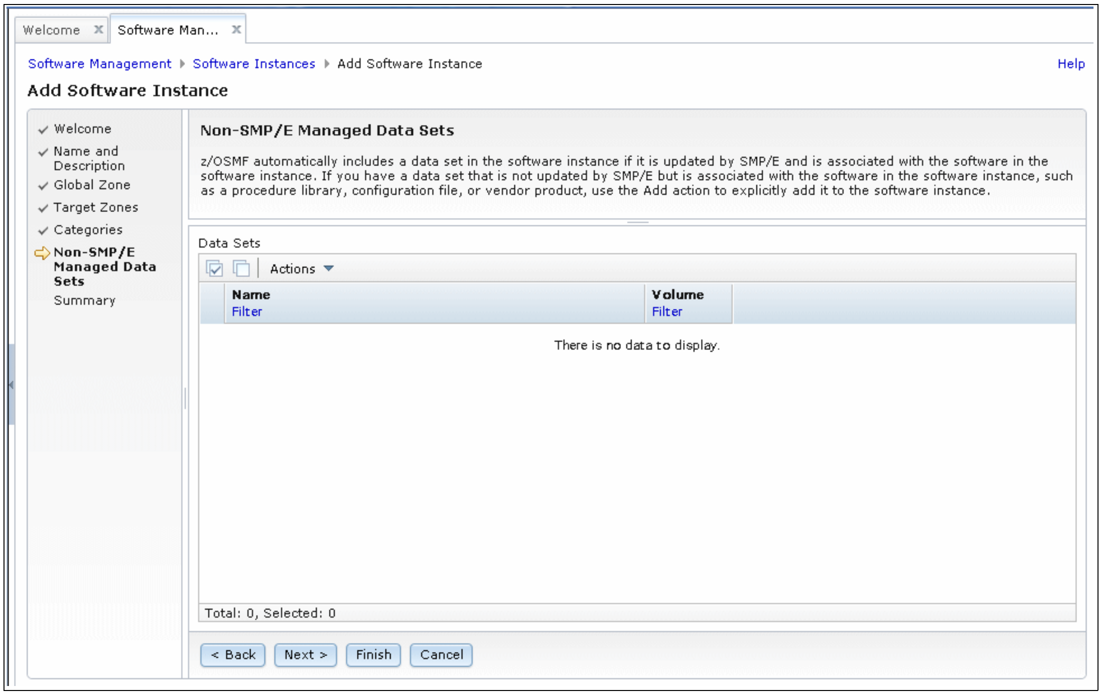
Total: 4, Selected: 0

Last refresh: Jul 6, 2013 4:14:52 PM local time (Jul 6, 2013 6:14:52 AM GMT)

Figure 12-37 Categories

11. Associating categories with a software instance is optional. Establish this association if you want to use the category as a filter field when searching, or you want to assign access control to the software instance in Software Management. If you are not sure whether this association is something you want to establish, skip this task for now; you can always associate categories later.

The next pane of the wizard focuses on non-SMP/E data sets, as shown in Figure 12-38.

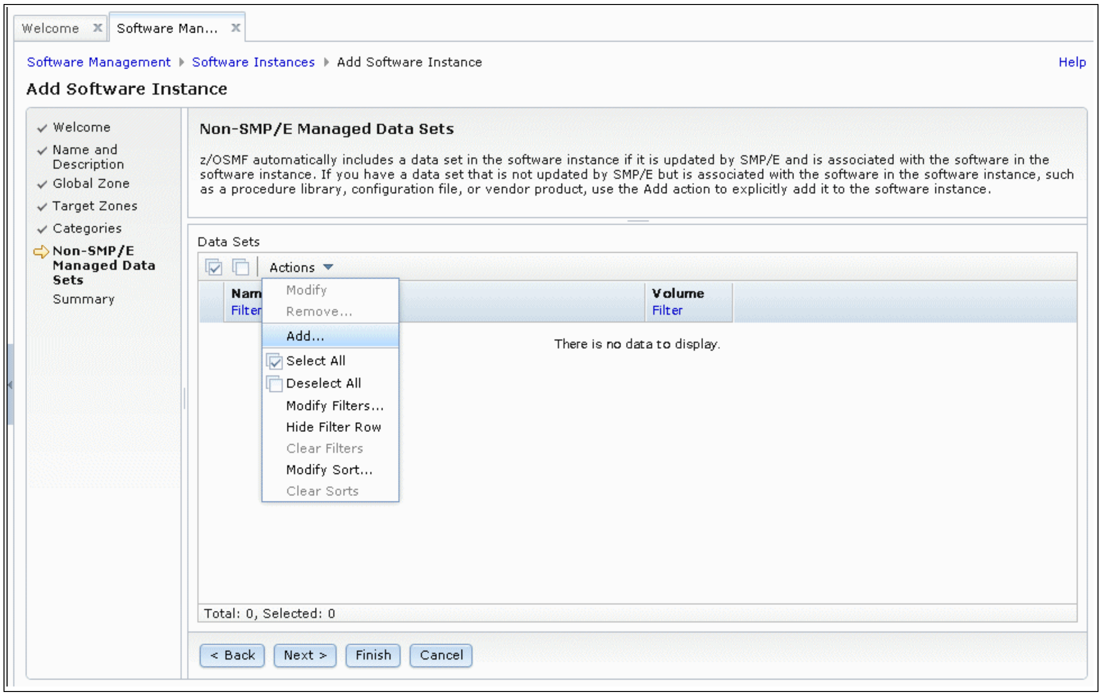


z/OSMF automatically includes a data set in the software instance if it is updated by SMP/E and is associated with the software in the software instance. If you have a data set that is not updated by SMP/E but is associated with the software in the software instance, such as a procedure library, configuration file, or vendor product, use the Add action to explicitly add it to the software instance.

Figure 12-38 Non-SMP/E data sets

Suppose that you had a JCL data set that contains a specialized JCL that you built for use with this product. Although your JCL data set it is not part of the official product, you want it to be deployed along with the product anytime the product is deployed. That JCL data set can be defined as a non-SMP/E managed data set.

12. Defining non-SMP/E data sets in a software instance is optional. If you do not want to include non-SMP/E data sets, click **Next** to continue. If you want to include non-SMP/E data sets in your software instance, click **Actions** and select **Add**, as shown in Figure 12-39.

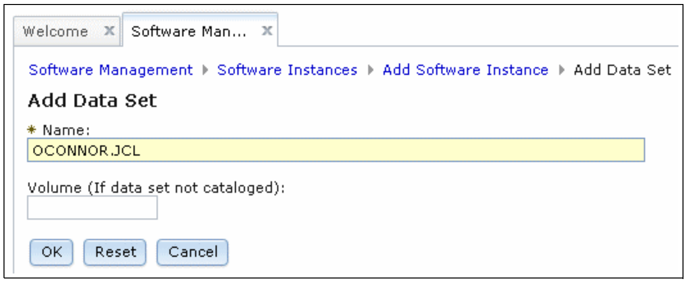


Non-SMP/E Managed Data Sets

z/OSMF automatically includes a data set in the software instance if it is updated by SMP/E and is associated with the software in the software instance. If you have a data set that is not updated by SMP/E but is associated with the software in the software instance, such as a procedure library, configuration file, or vendor product, use the Add action to explicitly add it to the software instance.

Figure 12-39 Adding non-SMP/E data sets

You are prompted to enter the non-SMP/E data set name, as shown in Figure 12-40.



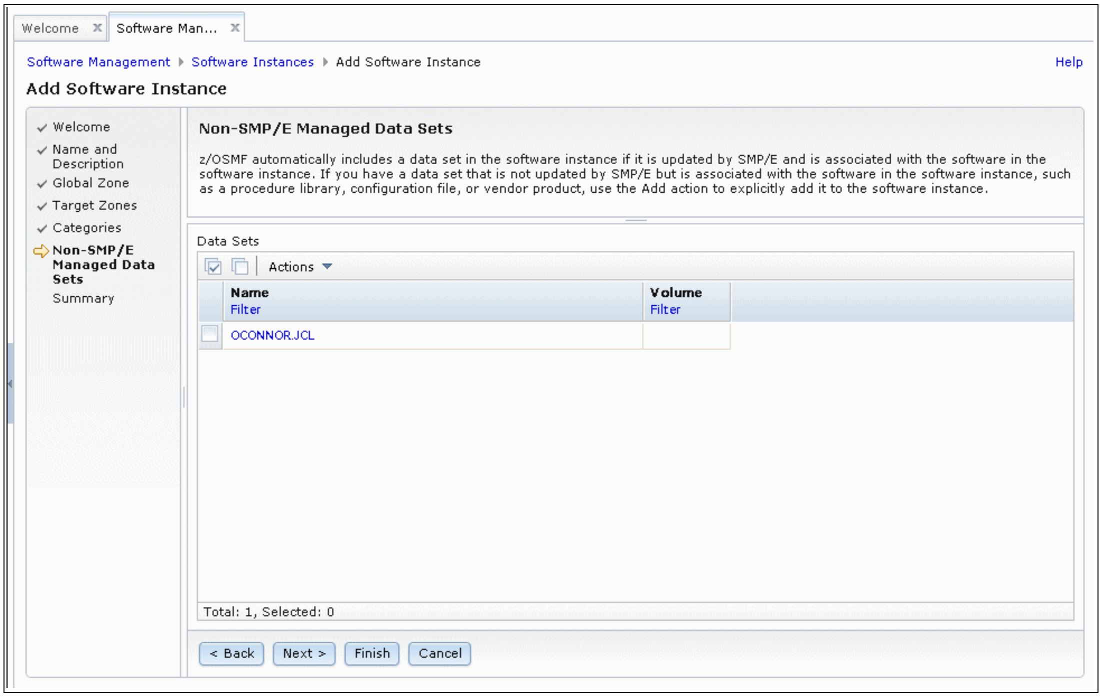
Welcome
Software Man...
Software Management ▸ Software Instances ▸ Add Software Instance ▸ Add Data Set
Add Data Set
OK
Reset
Cancel

* Name: OCONNOR.JCL

Volume (If data set not cataloged):

Figure 12-40 Defining a non-SMP/E data set

13.Click **OK** to return to the list of non-SMP/E data sets, as shown in Figure 12-41.



Add Software Instance

Non-SMP/E Managed Data Sets

z/OSMF automatically includes a data set in the software instance if it is updated by SMP/E and is associated with the software in the software instance. If you have a data set that is not updated by SMP/E but is associated with the software in the software instance, such as a procedure library, configuration file, or vendor product, use the Add action to explicitly add it to the software instance.

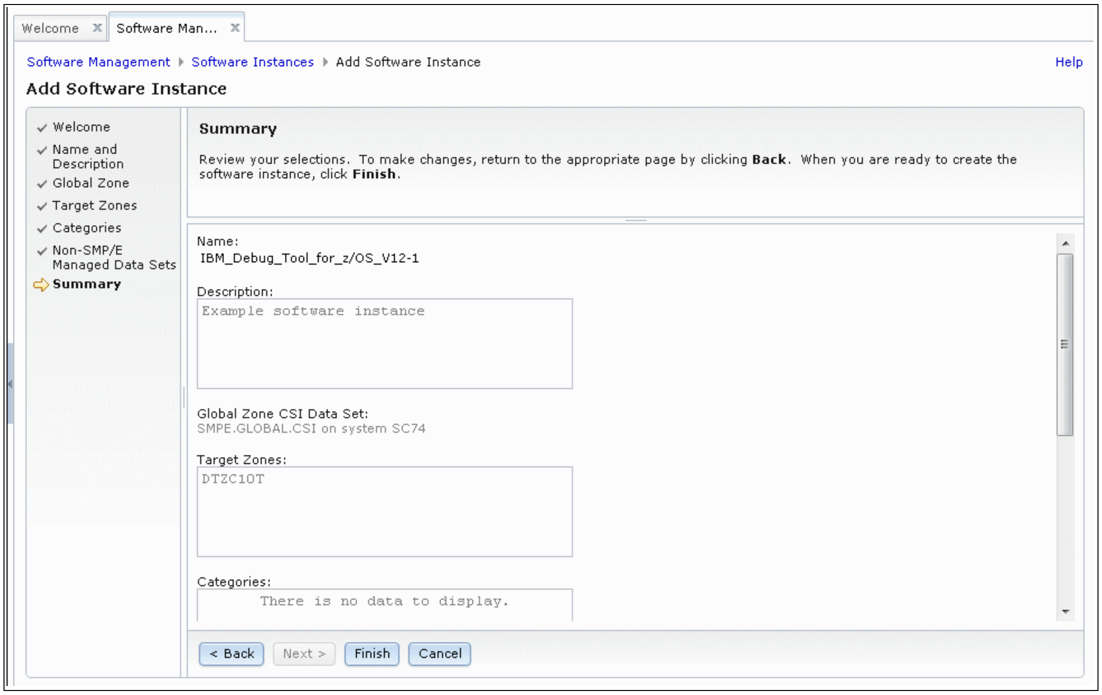
Data Sets

	Name Filter	Volume Filter
□	OCONNOR.JCL	

Total: 1, Selected: 0

Figure 12-41 Non-SMP/E data sets

14.You can add as many non-SMP/E data sets as you want. When all non-SMP/E data sets are added, click **Next** to go to the final summary pane of the wizard, as shown in Figure 12-42.



Add Software Instance

Summary

Review your selections. To make changes, return to the appropriate page by clicking **Back**. When you are ready to create the software instance, click **Finish**.

Name:
IBM_Debug_Tool_for_z/OS_V12-1

Description:
Example software instance

Global Zone CSI Data Set:
SMPE.GLOBAL.CSI on system SC74

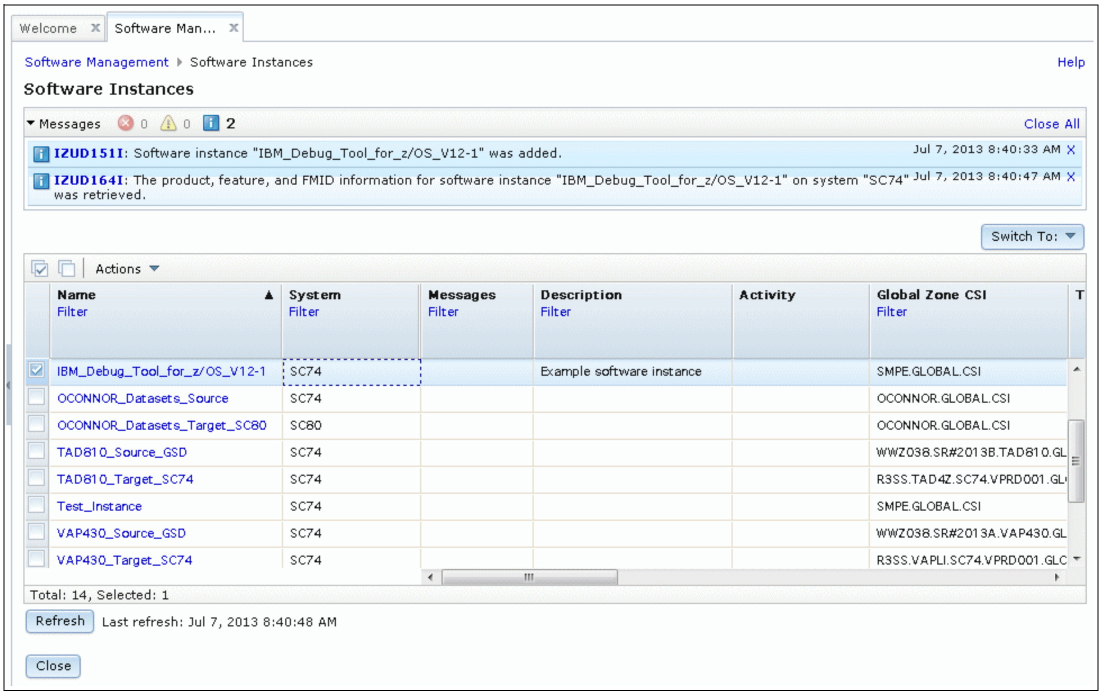
Target Zones:
DTZC10T

Categories:
There is no data to display.

Figure 12-42 Summary pane

The summary pane is a compilation of all the definitions that you provided to the software instance wizard.

15. Click **Finish** to return to the list of software instances, as shown in Figure 12-43.



Software Instances

ℹ **IZUD151I**: Software instance "IBM_Debug_Tool_for_z/OS_V12-1" was added. Jul 7, 2013 8:40:33 AM ✕

ℹ **IZUD164I**: The product, feature, and FMID information for software instance "IBM_Debug_Tool_for_z/OS_V12-1" on system "SC74" was retrieved. Jul 7, 2013 8:40:47 AM ✕

	Name ▲ Filter	System Filter	Messages Filter	Description Filter	Activity	Global Zone CSI Filter	T
☑	IBM_Debug_Tool_for_z/OS_V12-1	SC74		Example software instance		SMPE.GLOBAL.CSI	
□	OCONNOR_Datasets_Source	SC74				OCONNOR.GLOBAL.CSI	
□	OCONNOR_Datasets_Target_SC80	SC80				OCONNOR.GLOBAL.CSI	
□	TAD810_Source_GSD	SC74				WWZ038.SR#2013B.TAD810.GL	
□	TAD810_Target_SC74	SC74				R3SS.TAD4Z.SC74.VPRD001.GL	
□	Test_Instance	SC74				SMPE.GLOBAL.CSI	
□	VAP430_Source_GSD	SC74				WWZ038.SR#2013A.VAP430.GL	
□	VAP430_Target_SC74	SC74				R3SS.VAPLI.SC74.VPRD001.GLC	

Total: 14, Selected: 1

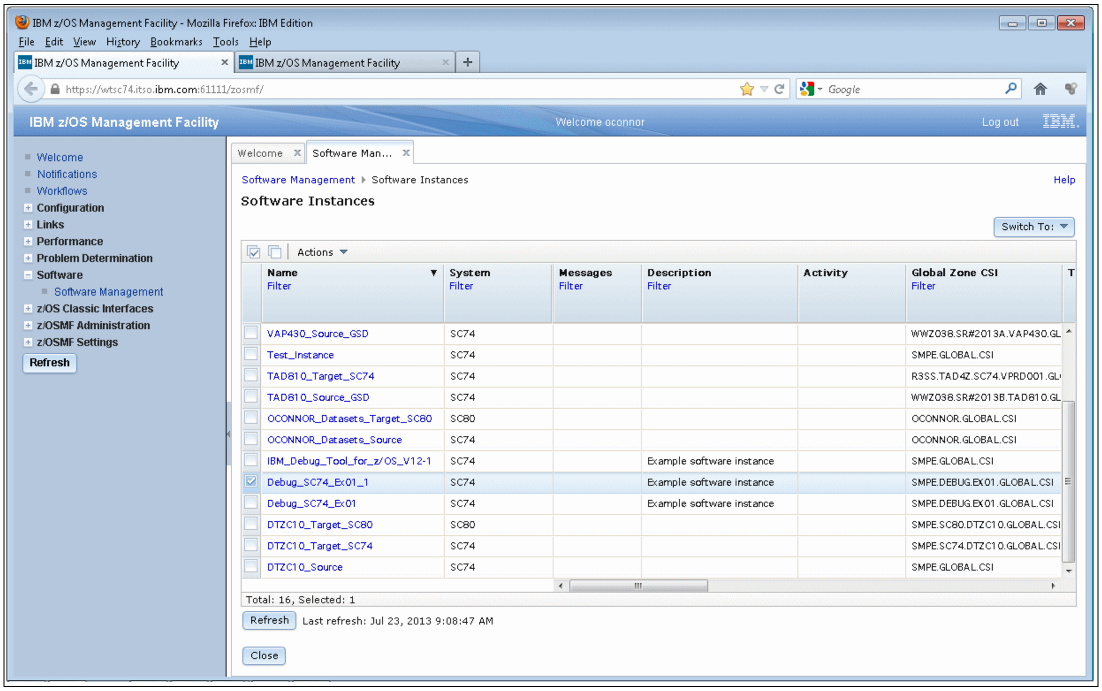
Last refresh: Jul 7, 2013 8:40:48 AM

Figure 12-43 Software Management software instances

Removing a software instance

Complete the following steps to remove a software instance:

1. In the Software Instances pane, select the software instance that you want to remove, as shown in Figure 12-44.



Software Instances

	Name	System	Messages	Description	Activity	Global Zone CSI	T
	Filter	Filter	Filter	Filter		Filter	
□	VAP430_Source_GSD	SC74				WWZ038.SR#2013A.VAP430.GL	
□	Test_Instance	SC74				SMPE.GLOBAL.CSI	
□	TAD810_Target_SC74	SC74				R3SS.TAD4Z.SC74.VPRD001.GL	
□	TAD810_Source_GSD	SC74				WWZ038.SR#2013B.TAD810.GL	
□	OCONNOR_Datasets_Target_SC80	SC80				OCONNOR.GLOBAL.CSI	
□	OCONNOR_Datasets_Source	SC74				OCONNOR.GLOBAL.CSI	
□	IBM_Debug_Tool_for_z/OS_V12-1	SC74		Example software instance		SMPE.GLOBAL.CSI	
☑	Debug_SC74_Ex01_1	SC74		Example software instance		SMPE.DEBUG.EX01.GLOBAL.CSI	
□	Debug_SC74_Ex01	SC74		Example software instance		SMPE.DEBUG.EX01.GLOBAL.CSI	
□	DTZC10_Target_SC80	SC80				SMPE.SC80.DTZC10.GLOBAL.CSI	
□	DTZC10_Target_SC74	SC74				SMPE.SC74.DTZC10.GLOBAL.CSI	
□	DTZC10_Source	SC74				SMPE.GLOBAL.CSI	

Total: 16, Selected: 1

Last refresh: Jul 23, 2013 9:08:47 AM

Figure 12-44 Software Instances pane

2. Click **Actions** → **Remove**, as shown in Figure 12-45.

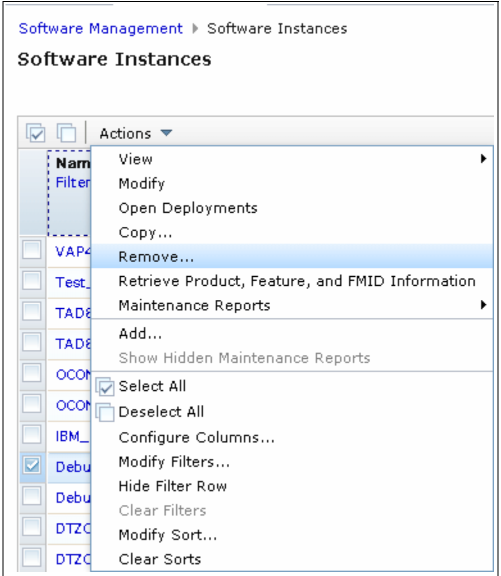
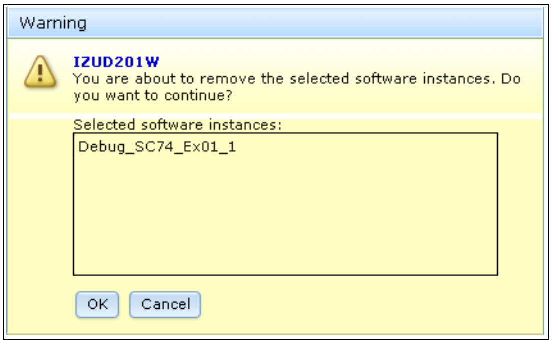


Figure 12-45 Remove the software instance

A window opens that includes the message IZUD201W to confirm the removal, as shown in Figure 12-46.

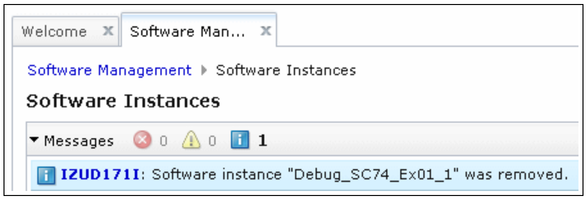

Warning

IZUD201W
You are about to remove the selected software instances. Do you want to continue?

Selected software instances:
Debug_SC74_Ex01_1

Figure 12-46 IZUD201W message

3. Click **OK** to return to the Software Instances pane. A IZUD171I message is displayed to indicate that the software instance was removed, as shown in Figure 12-47.



Software Instances

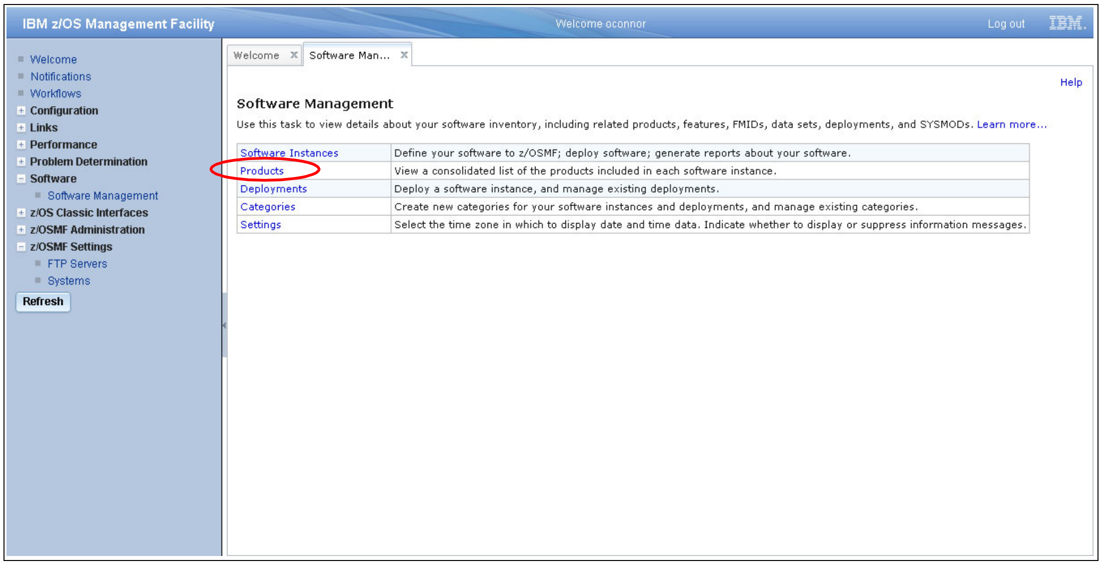
IZUD171I: Software instance "Debug_SC74_Ex01_1" was removed.

Figure 12-47 Software Instances page

Removing a software instance removes only the information from Software Management; it does not remove the data sets. If you want to clean up the data sets, you must log on to TSO on the system where the data sets are stored and delete them manually.

12.3.5 Products

As software instances are identified to Software Management, information about the products within the software instances is accumulated in the Products component of Software Management. To access the Products window, go to Software Management and select **Products**, as shown in Figure 12-48.



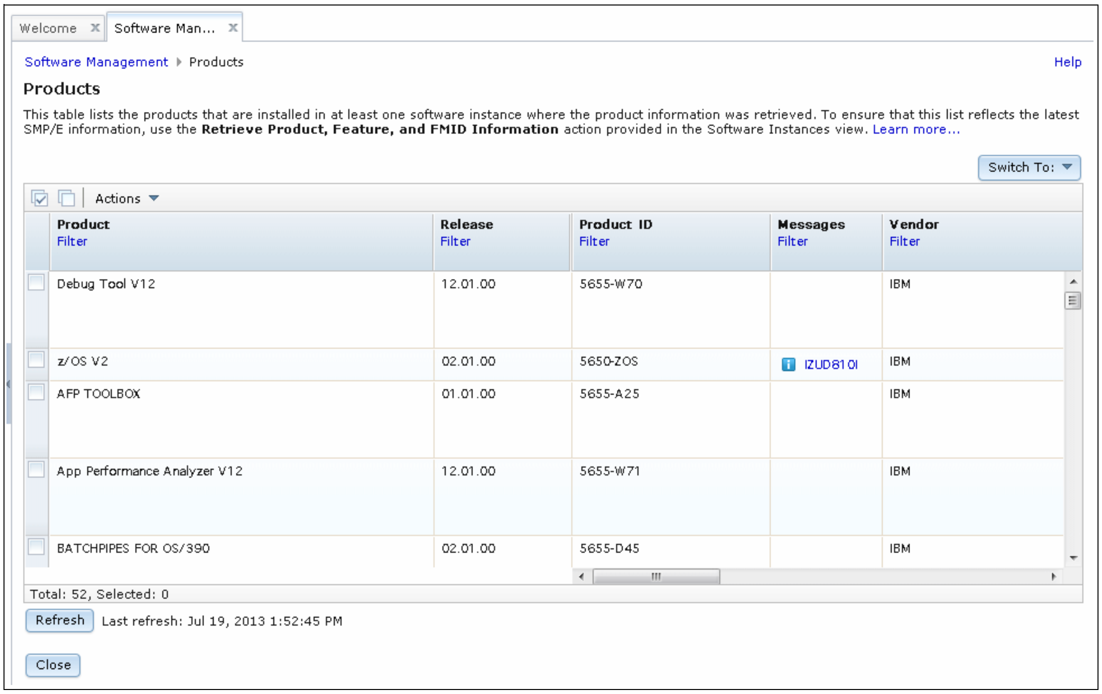
Software Management

Use this task to view details about your software inventory, including related products, features, FMIDs, data sets, deployments, and SYSMODs. Learn more...

Software Instances	Define your software to z/OSMF; deploy software; generate reports about your software.
Products	View a consolidated list of the products included in each software instance.
Deployments	Deploy a software instance, and manage existing deployments.
Categories	Create new categories for your software instances and deployments, and manage existing categories.
Settings	Select the time zone in which to display date and time data. Indicate whether to display or suppress information messages.

Figure 12-48 Software Management main page

The Products window opens, as shown in Figure 12-49.



Products

This table lists the products that are installed in at least one software instance where the product information was retrieved. To ensure that this list reflects the latest SMP/E information, use the **Retrieve Product, Feature, and FMID Information** action provided in the Software Instances view. Learn more...

Product Filter	Release Filter	Product ID Filter	Messages Filter	Vendor Filter
Debug Tool V12	12.01.00	5655-W70		IBM
z/OS V2	02.01.00	5650-ZOS	IZUD810I	IBM
AFP TOOLBOX	01.01.00	5655-A25		IBM
App Performance Analyzer V12	12.01.00	5655-W71		IBM
BATCHPIPES FOR OS/390	02.01.00	5655-D45		IBM

Total: 52, Selected: 0

Last refresh: Jul 19, 2013 1:52:45 PM

Figure 12-49 Products

Although end of service (EoS) information can be displayed for products in software instances, the EoS data must be imported from an external source. The process of importing EoS data should be performed periodically to ensure that Software Management can access the most current and accurate information.

To import EoS data, click **Actions** and then, select **Retrieve End of Service Information**, as shown in Figure 12-50.

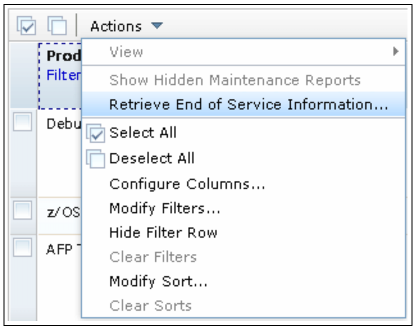
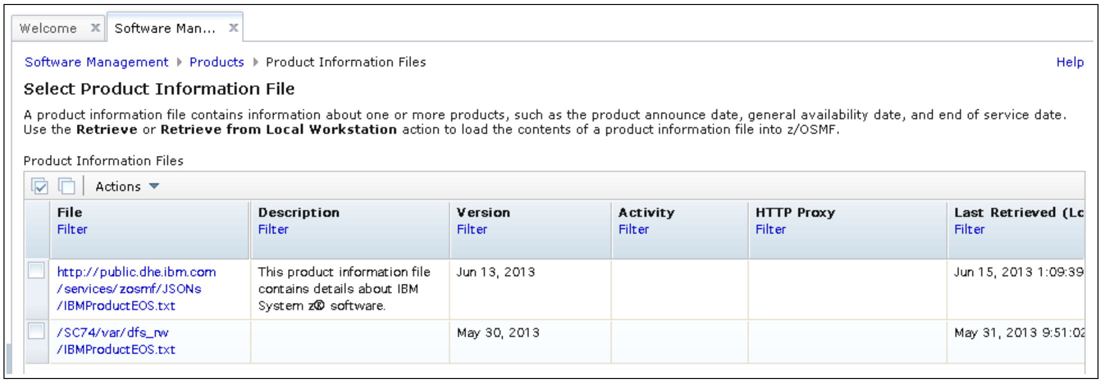


Figure 12-50 Retrieve EoS data

A window opens in which you define the sources for importing product information, as shown in Figure 12-51.



Select Product Information File

A product information file contains information about one or more products, such as the product announce date, general availability date, and end of service date. Use the **Retrieve** or **Retrieve from Local Workstation** action to load the contents of a product information file into z/OSMF.

Product Information Files

	File Filter	Description Filter	Version Filter	Activity Filter	HTTP Proxy Filter	Last Retrieved (Lc Filter
□	http://public.dhe.ibm.com/services/zosmf/JSONs/IBMProductEOS.txt	This product information file contains details about IBM System z® software.	Jun 13, 2013			Jun 15, 2013 1:09:39
□	/SC74/var/dfs_rw/IBMProductEOS.txt		May 30, 2013			May 31, 2013 9:51:0

Figure 12-51 Select Product Information File window

Product information (which includes EoS data) can be imported from a URL or a local file on the primary z/OSMF system. The syntax of the Product Information file is JavaScript Object Notation (JSON). For more information, see the IBMProductEOS.txt file.

In the example that is shown in Figure 12-51, you can see two sources of product information. The first is the IBM URL for product information, and the second is a local file on the primary z/OSMF system. The content of our local file is the same as the IBM URL; we manually downloaded from the URL to the local file so we can test retrieving information from a local file.

To add a source of product information, click **Actions** and then, select **Add**, as shown in Figure 12-52.

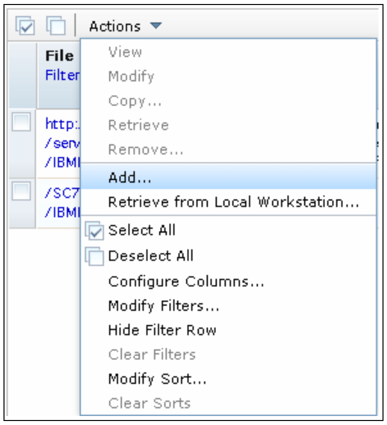
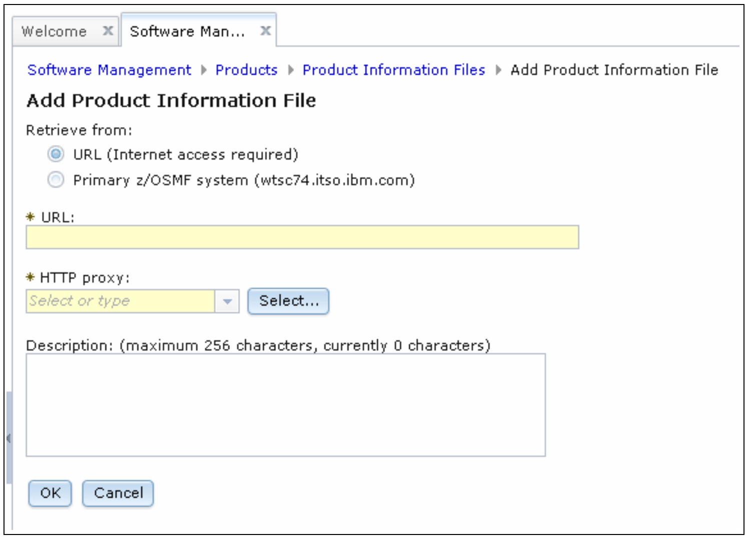


Figure 12-52 Adding a product information file

The Add Product Information File window opens, as shown in Figure 12-53.



Software Management ▸ Products ▸ Product Information Files ▸ Add Product Information File

Add Product Information File

Retrieve from:

● URL (Internet access required)

○ Primary z/OSMF system (wtsc74.itso.ibm.com)

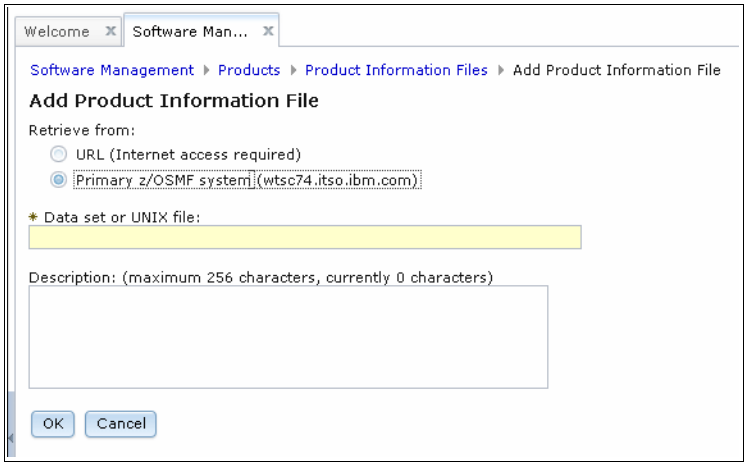
* URL:

* HTTP proxy: Select or type

Description: (maximum 256 characters, currently 0 characters)

Figure 12-53 Add Product Information File - URL

The example that is shown in Figure 12-53 on page 306 is for entering URL information. If the Retrieve from option is changed to Primary z/OSMF system, the input fields are changed, as shown in Figure 12-54.



Software Management ▸ Products ▸ Product Information Files ▸ Add Product Information File

Add Product Information File

Retrieve from:

○ URL (Internet access required)

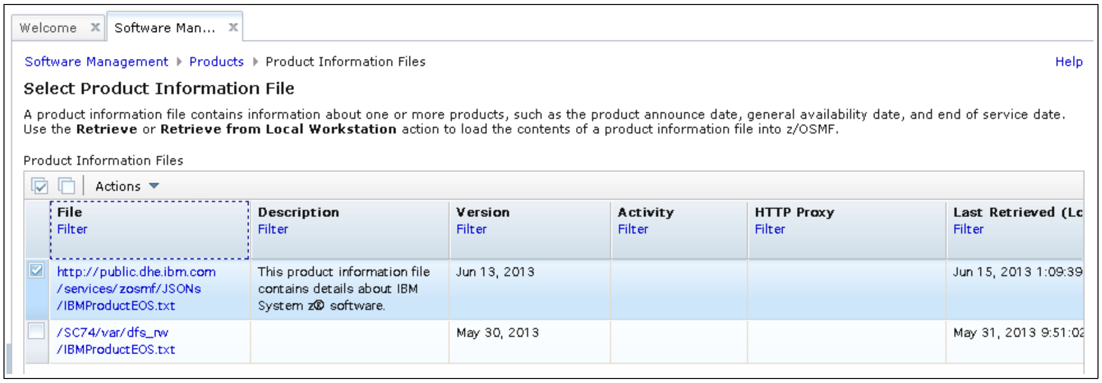
● Primary z/OSMF system (wtsc74.itso.ibm.com)

* Data set or UNIX file:

Description: (maximum 256 characters, currently 0 characters)

Figure 12-54 Add Product Information File window

Returning to the Select Product Information File window (see Figure 12-51 on page 305), select one of the product information sources if you want to retrieve current product information, as shown in Figure 12-55.



Software Management ▸ Products ▸ Product Information Files

Select Product Information File

A product information file contains information about one or more products, such as the product announce date, general availability date, and end of service date. Use the **Retrieve** or **Retrieve from Local Workstation** action to load the contents of a product information file into z/OSMF.

Product Information Files

	File Filter	Description Filter	Version Filter	Activity Filter	HTTP Proxy Filter	Last Retrieved (Lc Filter
☑	http://public.dhe.ibm.com /services/zosmf/JSONs /IBMProductEOS.txt	This product information file contains details about IBM System z® software.	Jun 13, 2013			Jun 15, 2013 1:09:39
□	/SC74/var/dfs_rw /IBMProductEOS.txt		May 30, 2013			May 31, 2013 9:51:02

Figure 12-55 Select Product Information File window

In this example, we select the URL source. Click **Actions** and select **Retrieve** from the menu, as shown in Figure 12-56.

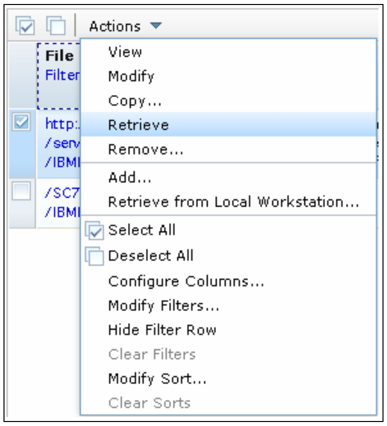
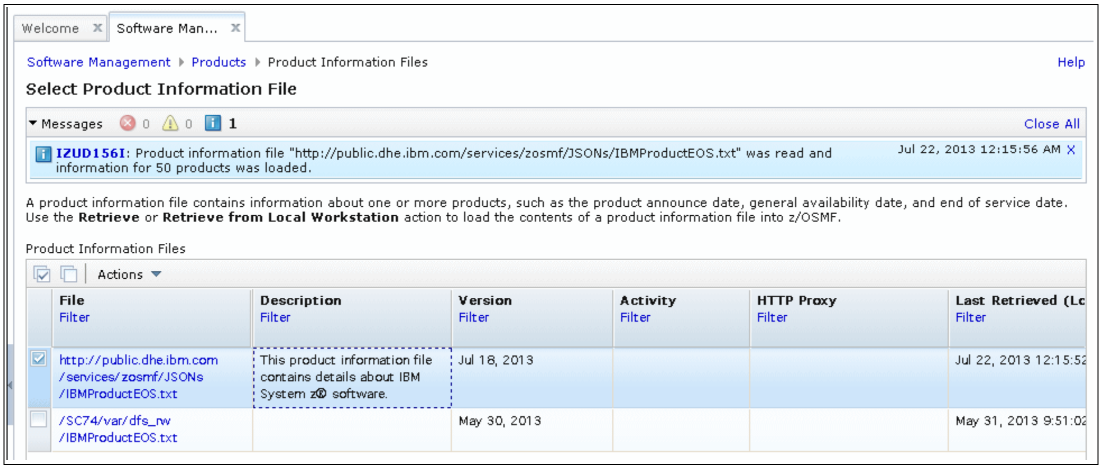


Figure 12-56 Retrieving product information

After some processing time, the product information is retrieved. The Select Product Information File window opens again with an informational message, as shown in Figure 12-57.



Select Product Information File

IZUD156I: Product information file "http://public.dhe.ibm.com/services/zosmf/JSONs/IBMProductEOS.txt" was read and information for 50 products was loaded. Jul 22, 2013 12:15:56 AM

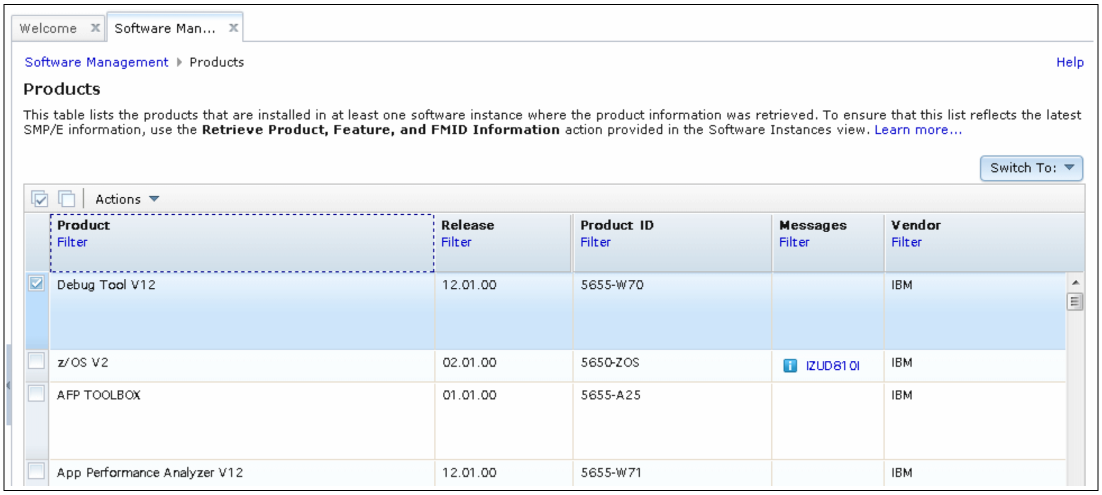
A product information file contains information about one or more products, such as the product announce date, general availability date, and end of service date. Use the **Retrieve** or **Retrieve from Local Workstation** action to load the contents of a product information file into z/OSMF.

Product Information Files

	File	Description	Version	Activity	HTTP Proxy	Last Retrieved (Lc
	Filter	Filter	Filter	Filter	Filter	Filter
☑	http://public.dhe.ibm.com/services/zosmf/JSONs/IBMProductEOS.txt	This product information file contains details about IBM System z® software.	Jul 18, 2013			Jul 22, 2013 12:15:52
□	/SC74/var/dfs_rw/IBMProductEOS.txt		May 30, 2013			May 31, 2013 9:51:02

Figure 12-57 Select Product Information File window

If you want to determine which software instances contain a certain product, go to the Products window and select the product, as shown in Figure 12-58.



Products

This table lists the products that are installed in at least one software instance where the product information was retrieved. To ensure that this list reflects the latest SMP/E information, use the **Retrieve Product, Feature, and FMID Information** action provided in the Software Instances view. Learn more...

	Product Filter	Release Filter	Product ID Filter	Messages Filter	Vendor Filter
☑	Debug Tool V12	12.01.00	5655-W70		IBM
□	z/OS V2	02.01.00	5650-ZOS	IZUD810I	IBM
□	AFP TOOLBOX	01.01.00	5655-A25		IBM
□	App Performance Analyzer V12	12.01.00	5655-W71		IBM

Figure 12-58 Products window

In this example, we select **Debug Tool V12**. Click **Actions** and select **View** → **Software Instances**, as shown in Figure 12-59.

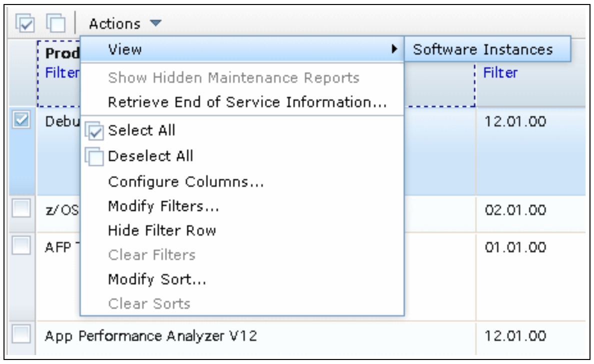
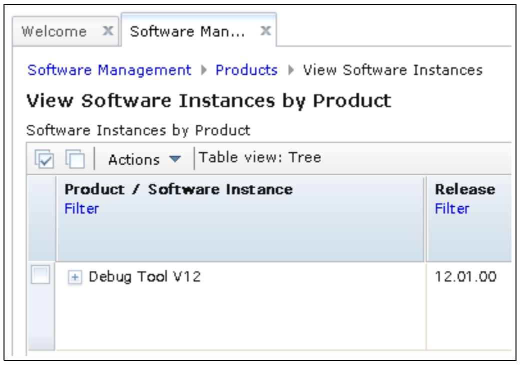


Figure 12-59 View Software Instances

A window opens, as shown in Figure 12-60.



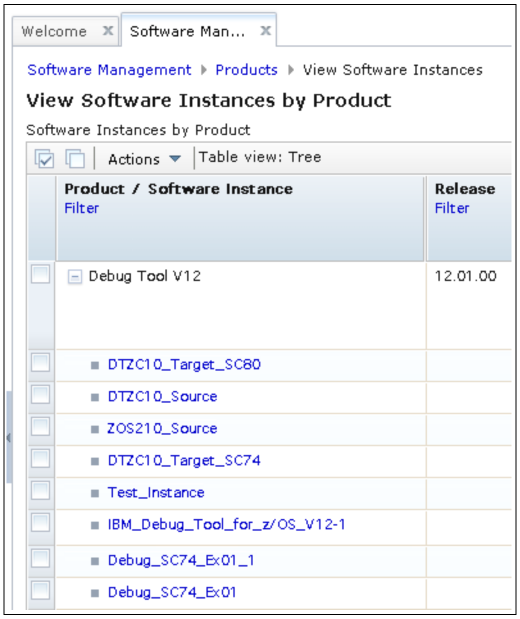
View Software Instances by Product

Software Instances by Product

	Product / Software Instance Filter	Release Filter
□	⊞ Debug Tool V12	12.01.00

Figure 12-60 View Software Instances by Product

Note the “+” symbol preceding the product name. Click the **+** symbol to expand the entry and display the software instances that contain the product. An example is shown in Figure 12-61.



Welcome ✕ | Software Man... ✕

Software Management ▸ Products ▸ View Software Instances

View Software Instances by Product

Software Instances by Product

Actions ▾ | Table view: Tree

	Product / Software Instance Filter	Release Filter
□	⊟ Debug Tool V12	12.01.00
□	■ DTZC10_Target_SC80	
□	■ DTZC10_Source	
□	■ ZOS210_Source	
□	■ DTZC10_Target_SC74	
□	■ Test_Instance	
□	■ IBM_Debug_Tool_for_z/OS_V12-1	
□	■ Debug_SC74_Ex01_1	
□	■ Debug_SC74_Ex01	

Figure 12-61 View Software Instances by Product

The listed software instances are links. You can click them to drill down in to each instance.

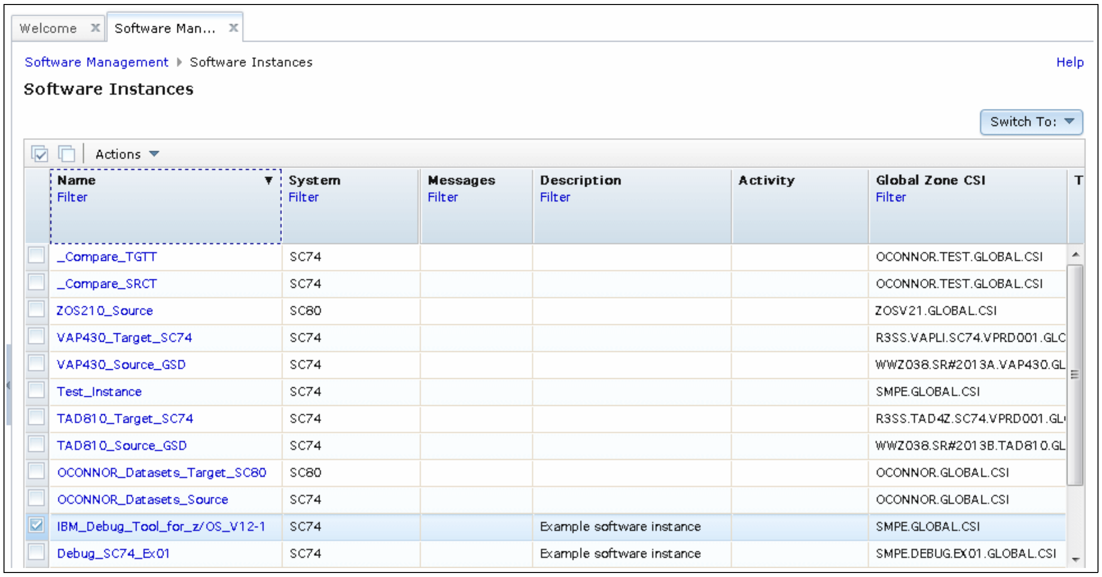
12.3.6 Reporting

Software instance data sets are a traditional SMP/E structure; therefore, traditional SMP/E queries and reports can be done by using ISPF dialogs or batch JCL. However, software instances can also be subjected to more maintenance reporting from Software Management, such as the following reports:

- End of Service
- Software Instance Validation
- Missing Critical Service
- Missing FIXCAT SYSMODs
- SYSMOD Search
- Software Instance Comparison

One of the benefits of Software Management is that maintenance reports for all systems can be started from the primary z/OSMF system; you do not need to log on to individual systems.

To access these maintenance reports, go to the Software Instances window and select the software instance you want to work with, as shown in Figure 12-62.



	Name	System	Messages	Description	Activity	Global Zone CSI	T
	Filter	Filter	Filter	Filter		Filter	
☐	_Compare_TGTT	SC74				OCONNOR.TEST.GLOBAL.CSI	
☐	_Compare_SRCT	SC74				OCONNOR.TEST.GLOBAL.CSI	
☐	ZOS210_Source	SC80				ZOSV21.GLOBAL.CSI	
☐	VAP430_Target_SC74	SC74				R3SS.VAPLI.SC74.VPRD001.GLC	
☐	VAP430_Source_GSD	SC74				WWZ038.SR#2013A.VAP430.GL	
☐	Test_Instance	SC74				SMPE.GLOBAL.CSI	
☐	TAD810_Target_SC74	SC74				R3SS.TAD4Z.SC74.VPRD001.GL	
☐	TAD810_Source_GSD	SC74				WWZ038.SR#2013B.TAD810.GL	
☐	OCONNOR_Datasets_Target_SC80	SC80				OCONNOR.GLOBAL.CSI	
☐	OCONNOR_Datasets_Source	SC74				OCONNOR.GLOBAL.CSI	
☑	IBM_Debug_Tool_for_z/OS_V12-1	SC74		Example software instance		SMPE.GLOBAL.CSI	
☐	Debug_SC74_Ex01	SC74		Example software instance		SMPE.DEBUG.EX01.GLOBAL.CSI	

Figure 12-62 Software Instances window

Click **Actions** and select **Maintenance Reports**, which opens a submenu that includes more choices, as shown in Figure 12-63.

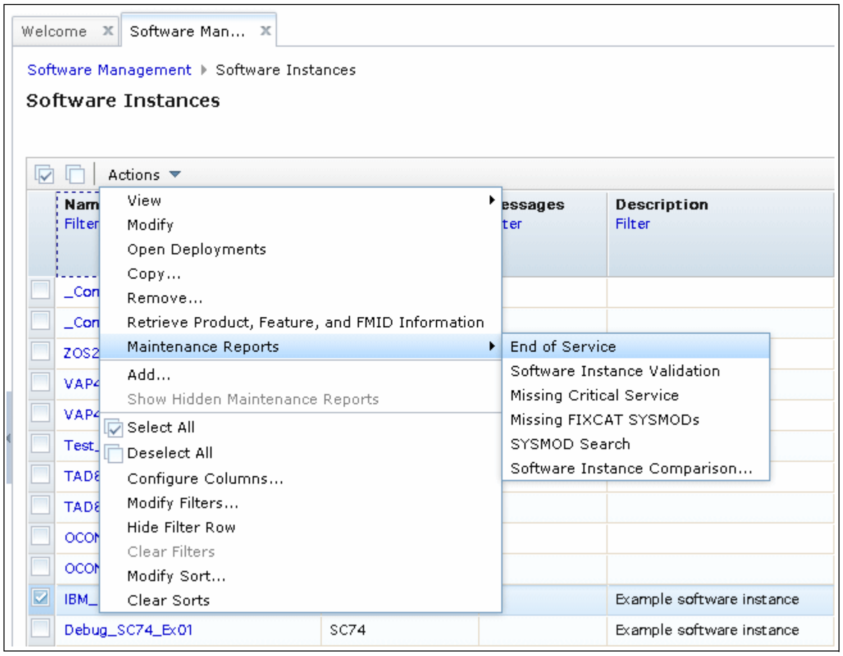


Figure 12-63 Maintenance Reports option

Each of these Maintenance Reports is described in the following sections.

End of service report

The EoS maintenance report uses data from the Product Information File (which is described in 12.3.5, “Products” on page 303) to report about EoS states in one or more software instances. The EoS report is in the form of a timeline graph, as shown in Figure 12-64.

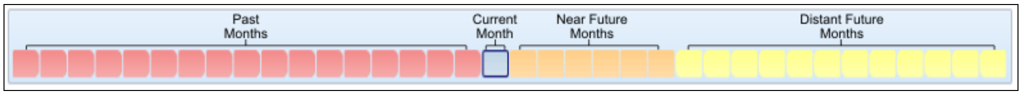
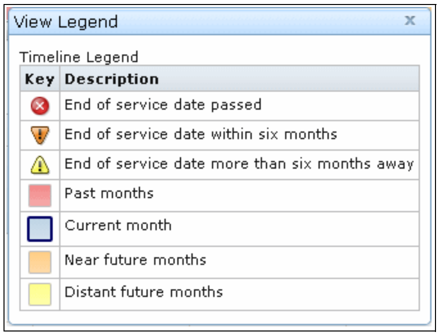


Figure 12-64 Timeline

The legend that is included for this timeline is shown in Figure 12-65.



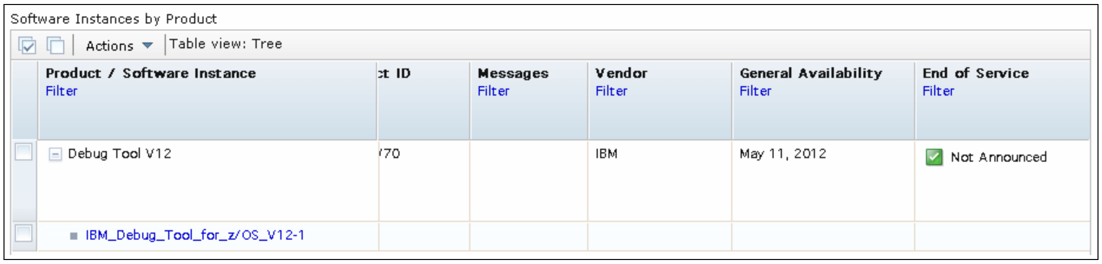
View Legend

Timeline Legend

Key	Description
⊗	End of service date passed
❗	End of service date within six months
⚠	End of service date more than six months away
🟥	Past months
□	Current month
🟧	Near future months
🟨	Distant future months

Figure 12-65 Timeline legend

A Software Instances by Product table is also displayed, in which one of the columns is the EoS date (see Figure 12-66).



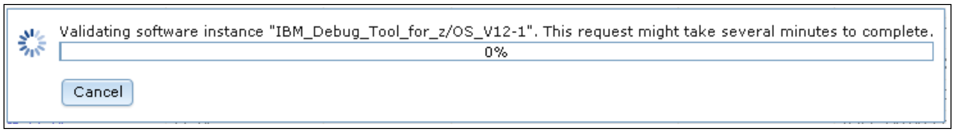
Software Instances by Product

	Product / Software Instance Filter	ct ID	Messages Filter	Vendor Filter	General Availability Filter	End of Service Filter
□	⊟ Debug Tool V12	'70		IBM	May 11, 2012	☑ Not Announced
□	IBM_Debug_Tool_for_z/OS_V12-1					

Figure 12-66 Software Instances by Product

Software Instance Validation

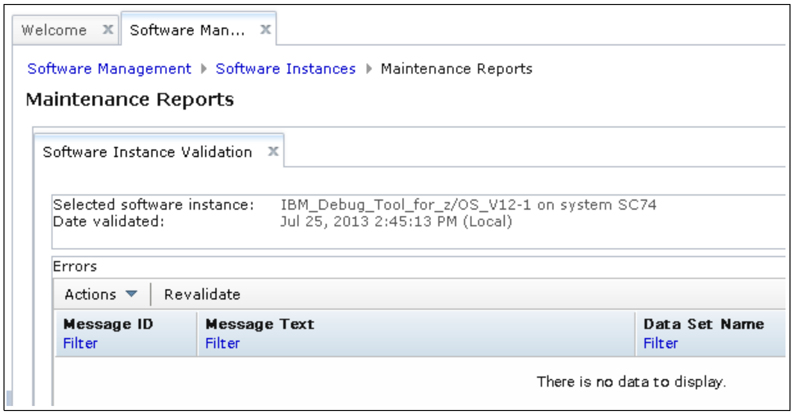
The Software Instance Validation maintenance report verifies that the CSI data sets, software libraries, and SMP/E installed parts that are included in the software instance are on accessible DASD volumes. A window opens when the report is started, as shown in Figure 12-67.



Validating software instance "IBM_Debug_Tool_for_z/OS_V12-1". This request might take several minutes to complete.

Figure 12-67 Validating software instance progress indicator

A summary window opens when the report completes, as shown in Figure 12-68.


Welcome ✕
Software Man... ✕
Software Management ▸ Software Instances ▸ Maintenance Reports
Maintenance Reports
Software Instance Validation ✕
Errors
Actions ▾
Revalidate

Selected software instance: IBM_Debug_Tool_for_z/OS_V12-1 on system SC74
Date validated: Jul 25, 2013 2:45:13 PM (Local)

Message ID Filter	Message Text Filter	Data Set Name Filter

There is no data to display.

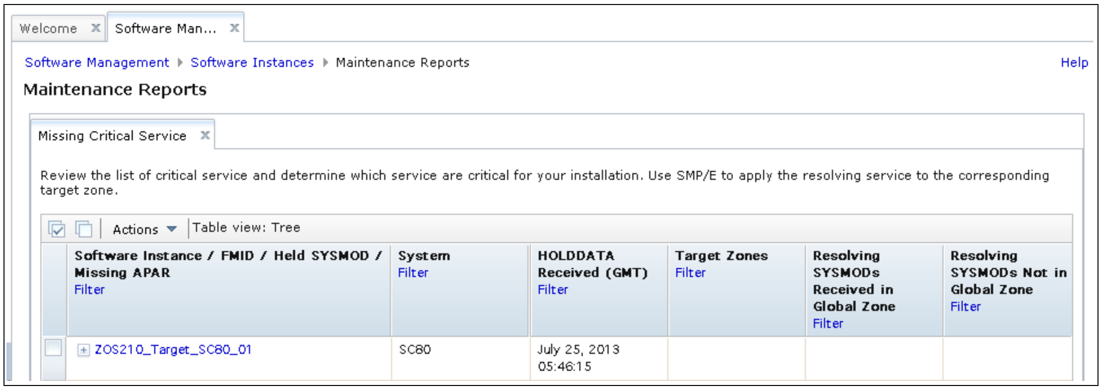
Figure 12-68 Software Instance Validation summary report

Missing Critical Service

The Missing Critical Service maintenance report checks one or more software instances for any unresolved PE PTFs, HIPERs, or other exception SYSMODs that are identified by ERROR HOLDDATA. It also attempts to identify the SYSMODs that resolve those exceptions.

For this maintenance report to work, the HOLDDATA in the GLOBAL CSI should be kept up-to-date. Enhanced HOLDDATA should be received regularly. For more information, see the Enhanced HOLDDATA for z/OS page of the IBM website.

The Missing Critical Service maintenance report is shown in Figure 12-69.


Welcome ✕
Software Man... ✕
Software Management ▸ Software Instances ▸ Maintenance Reports
Help
Maintenance Reports
Missing Critical Service ✕
Actions ▾
Table view: Tree

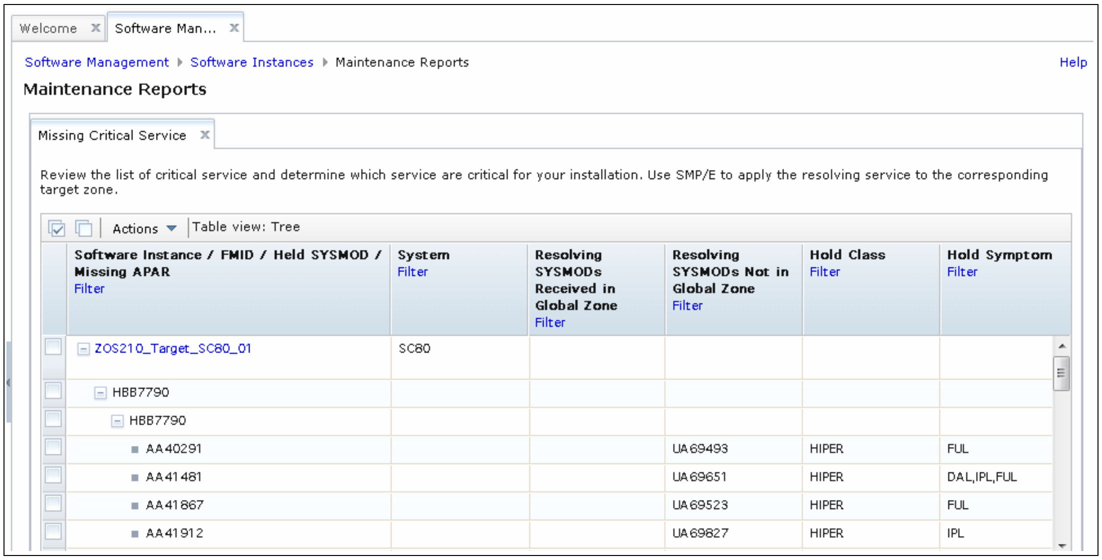
Review the list of critical service and determine which service are critical for your installation. Use SMP/E to apply the resolving service to the corresponding target zone.

	Software Instance / FMID / Held SYSMOD / Missing APAR Filter	System Filter	HOLDDATA Received (GMT) Filter	Target Zones Filter	Resolving SYSMODs Received in Global Zone Filter	Resolving SYSMODs Not in Global Zone Filter
□	⊞ ZOS210_Target_SC80_01	SC80	July 25, 2013 05:46:15			

Figure 12-69 Missing Critical Service

If missing critical maintenance is found, the software instance is listed in the table, as shown in Figure 12-69. Note the “+” symbol to the left of the software instance name. If you click this symbol, the row expands to display the FMIDs with missing services.

A “+” symbol to the left of the FMID can be clicked to expand the row further, as shown in Figure 12-70.


Welcome ✕
Software Man... ✕
Software Management ▸ Software Instances ▸ Maintenance Reports
Help

Maintenance Reports

Missing Critical Service ✕

Review the list of critical service and determine which service are critical for your installation. Use SMP/E to apply the resolving service to the corresponding target zone.

Actions ▾
Table view: Tree

	Software Instance / FMID / Held SYSMOD / Missing APAR Filter	System Filter	Resolving SYSMODs Received in Global Zone Filter	Resolving SYSMODs Not in Global Zone Filter	Hold Class Filter	Hold Symptom Filter
□	⊟ ZOS210_Target_SC80_01	SC80				
□	⊟ HBB7790					
□	⊟ HBB7790					
□	■ AA40291			UA69493	HIPER	FUL
□	■ AA41481			UA69651	HIPER	DAL,IPL,FUL
□	■ AA41867			UA69523	HIPER	FUL
□	■ AA41912			UA69827	HIPER	IPL

Figure 12-70 Missing Critical Service

The expanded row includes the following structure:

```
Software Instance.
   FMID.
      Held SYSMOD.
         Missing APAR.
```

The missing APAR is the unresolved HOLDERROR reason ID that caused the SYSMOD to become an exception SYSMOD.

Columns to the right of the missing APAR list the resolving SYSMOD, HOLD class, and HOLD symptom. The HOLD symptom is a description of the problem that is associated with the held SYSMOD. The description can contain three-character symbols that represent various symptoms of the problem, a text description, or a combination of symptom symbols and text. The following symbols can appear:

- DAL: Data Loss
- FUL: Function Loss
- IPL: Requires IPL
- PRF: Performance Problem
- PRV: Pervasive Problem

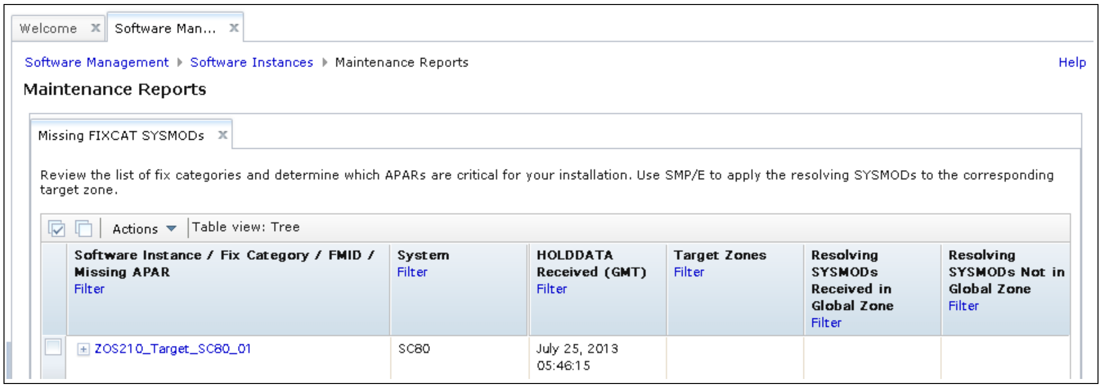
Missing FIXCAT SYSMODs

A fix category is an identifier that is used to group and associate SYSMODs with specific categories of software fixes. For example, a fix category might be used to identify a group of fixes that are required to support a hardware device or release of software, or to support a software function.

The Missing FIXCAT SYSMODs maintenance report identifies missing APARs for fix categories that might be applicable to the selected software instances. It also identifies the SYSMODs that can resolve the missing APARs.

For this maintenance report to work, the HOLDDATA in the GLOBAL CSI should be kept up-to-date. The Enhanced HOLDDATA should be received regularly. For more information, see the Enhanced HOLDDATA for z/OS page of the IBM website.

The Missing FIXCAT SYSMODs maintenance report is shown in Figure 12-71.



Maintenance Reports

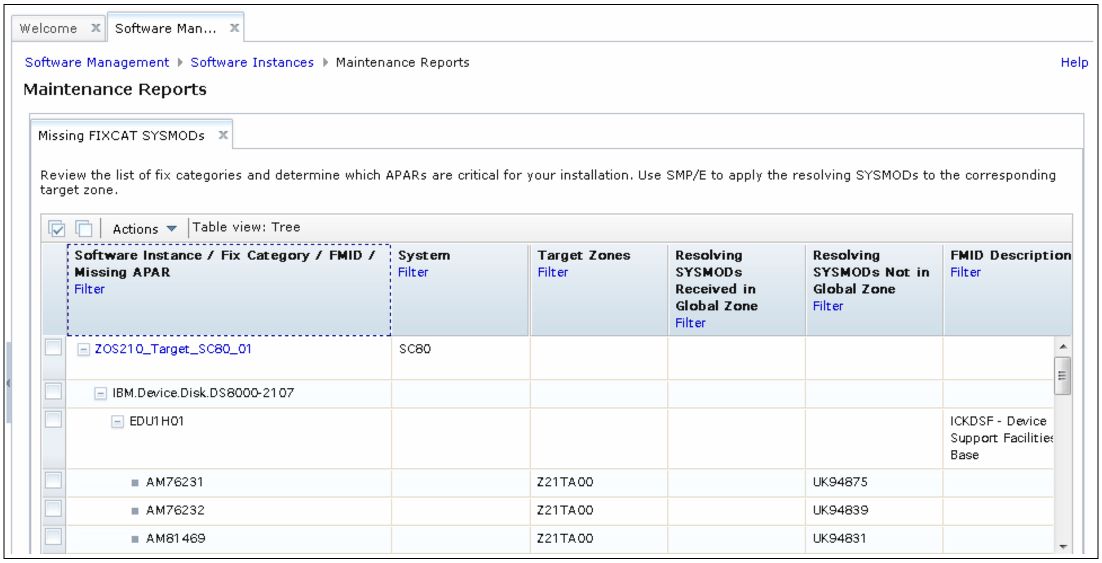
Review the list of fix categories and determine which APARs are critical for your installation. Use SMP/E to apply the resolving SYSMODs to the corresponding target zone.

Software Instance / Fix Category / FMID / Missing APAR Filter	System Filter	HOLDDATA Received (GMT) Filter	Target Zones Filter	Resolving SYSMODs Received in Global Zone Filter	Resolving SYSMODs Not in Global Zone Filter
ZOS210_Target_SC80_01	SC80	July 25, 2013 05:46:15			

Figure 12-71 Missing FIXCAT SYSMODs

If missing FIXCAT maintenance is found, the software instance is listed in the table, as shown in Figure 12-71. Note the “+” symbol to the left of the software instance name. If you click this symbol, the row expands to display the FIXCATs with missing service.

A “+” symbol to the left of the FIXCAT, which can be clicked to expand the row further, as shown in Figure 12-72.



Maintenance Reports

Review the list of fix categories and determine which APARs are critical for your installation. Use SMP/E to apply the resolving SYSMODs to the corresponding target zone.

Software Instance / Fix Category / FMID / Missing APAR Filter	System Filter	Target Zones Filter	Resolving SYSMODs Received in Global Zone Filter	Resolving SYSMODs Not in Global Zone Filter	FMID Description Filter
ZOS210_Target_SC80_01	SC80				
IBM.Device.Disk.DS8000-2107					
EDU1H01					ICKDSF - Device Support Facilitie Base
AM76231		Z21TA00		UK94875	
AM76232		Z21TA00		UK94839	
AM81469		Z21TA00		UK94831	

Figure 12-72 Missing FIXCAT SYSMODs

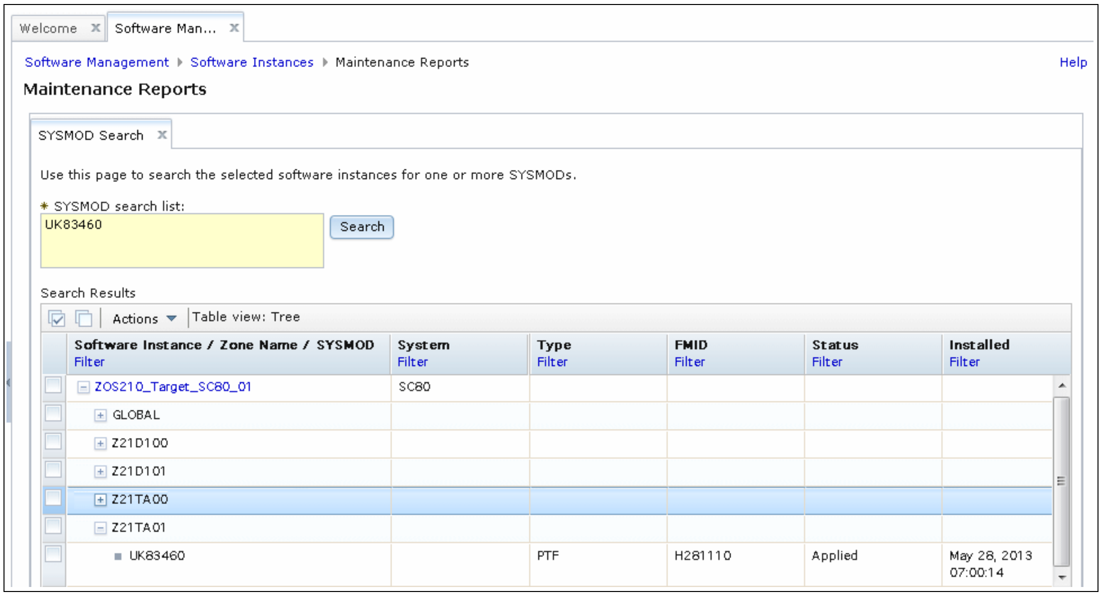
The expanded row includes the following structure:

```
Software Instance.
   FIXCAT.
      FMID.
          Missing APAR.
```

Columns to the right of the missing APAR list the resolving SYSMODs in separate columns, depending whether they are in the GLOBAL zone.

SYSMOD Search

The SYSMOD Search maintenance report allows you to search across one or more software instances for one or more SYSMODs. When the report is selected, the report is displayed as shown in Figure 12-73.



Maintenance Reports

Use this page to search the selected software instances for one or more SYSMODs.

* SYSMOD search list: UK83460

Search Results

	Software Instance / Zone Name / SYSMOD Filter	System Filter	Type Filter	FMID Filter	Status Filter	Installed Filter
□	⊟ ZOS210_Target_SC80_01	SC80				
□	⊞ GLOBAL					
□	⊞ Z21D100					
□	⊞ Z21D101					
□	⊞ Z21TA00					
□	⊟ Z21TA01					
□	■ UK83460		PTF	H281110	Applied	May 28, 2013 07:00:14

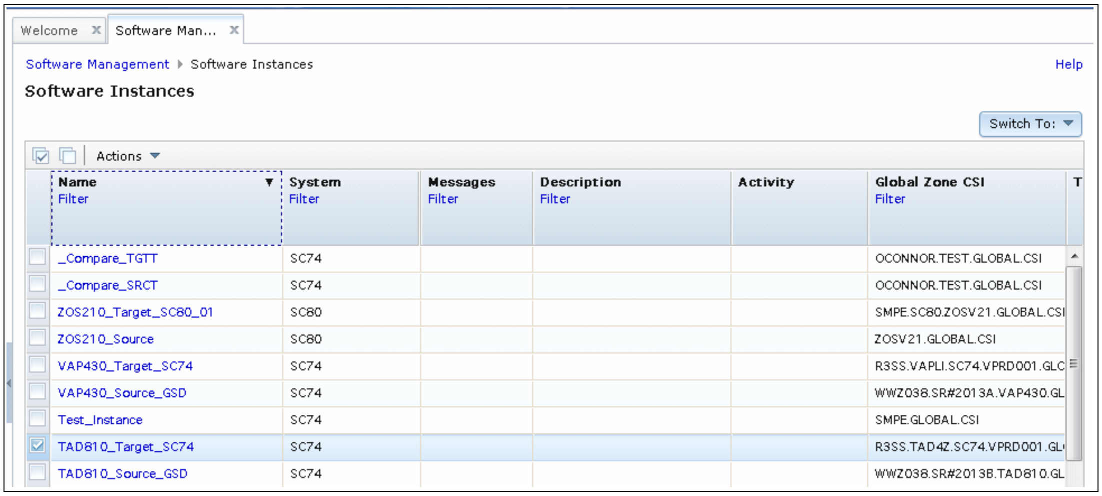
Figure 12-73 SYSMOD Search

This report greatly simplifies searching for SYSMODs when multiple SMP/E configurations are used that are spread across multiple systems.

Software Instance Comparison

The Software Instance Comparison maintenance report compares the SYSMOD content of the first software instance you select to the second software instance you select. It also identifies the SYSMODs in the second software instance that are not in the first software instance. This comparison is unidirectional; to compare in the reverse direction, you must select the second software instance as the first, and the first as the second.

To create the Software Instance Comparison maintenance report, start by selecting the first software instance, as shown in Figure 12-74.



	Name	System	Messages	Description	Activity	Global Zone CSI	T
	Filter	Filter	Filter	Filter		Filter	
□	_Compare_TGTT	SC74				OCONNOR.TEST.GLOBAL.CSI	
□	_Compare_SRCT	SC74				OCONNOR.TEST.GLOBAL.CSI	
□	ZOS210_Target_SC80_01	SC80				SMPE.SC80.ZOSV21.GLOBAL.CSI	
□	ZOS210_Source	SC80				ZOSV21.GLOBAL.CSI	
□	VAP430_Target_SC74	SC74				R3SS.VAPLI.SC74.VPRD001.GLC	
□	VAP430_Source_GSD	SC74				WWZ038.SR#2013A.VAP430.GL	
□	Test_Instance	SC74				SMPE.GLOBAL.CSI	
☑	TAD810_Target_SC74	SC74				R3SS.TAD4Z.SC74.VPRD001.GL	
□	TAD810_Source_GSD	SC74				WWZ038.SR#2013B.TAD810.GL	

Figure 12-74 Selecting the software instance

Then, click **Actions** and select **Maintenance Reports** → **Software Instance Comparison**, as shown in Figure 12-75.

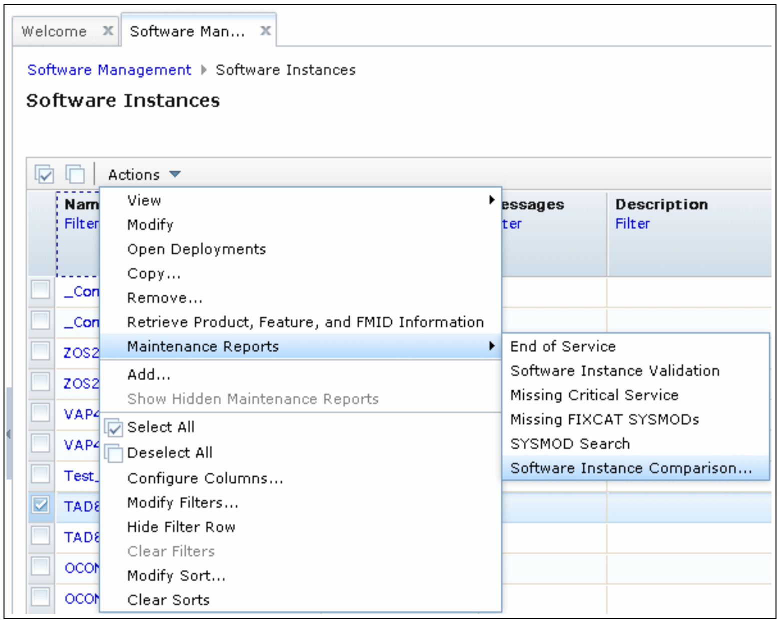
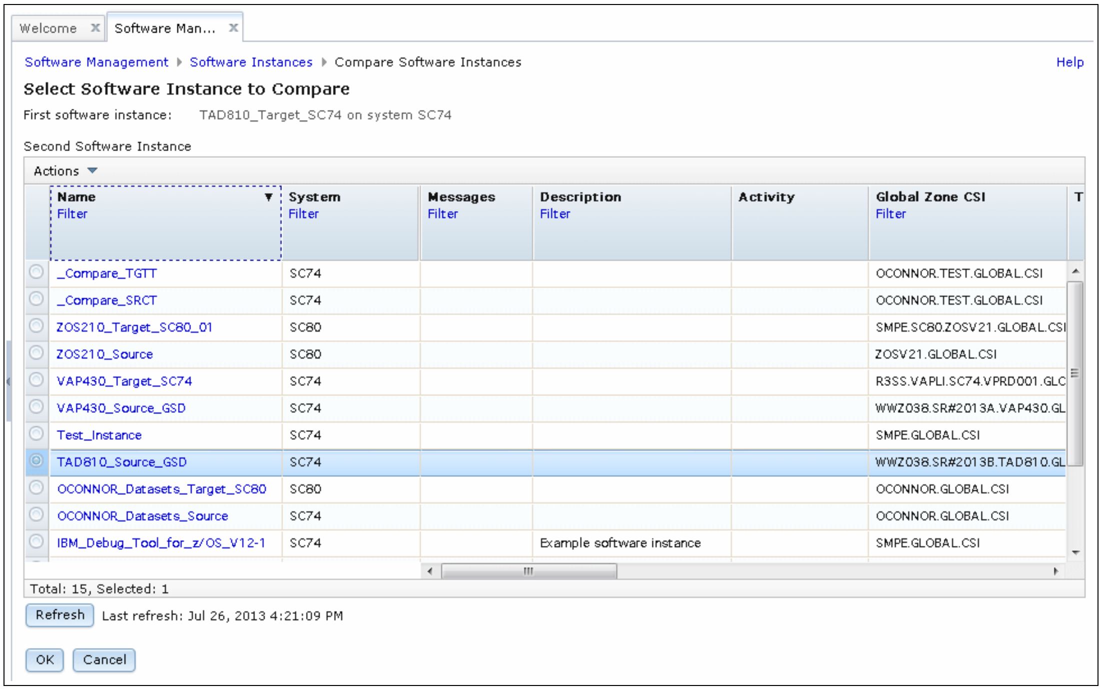


Figure 12-75 Selecting the Software Instance Comparison menu

Select the second software instance to compare against, as shown in Figure 12-76.



Software Management ▸ Software Instances ▸ Compare Software Instances

Select Software Instance to Compare

First software instance: TAD810_Target_SC74 on system SC74

Second Software Instance

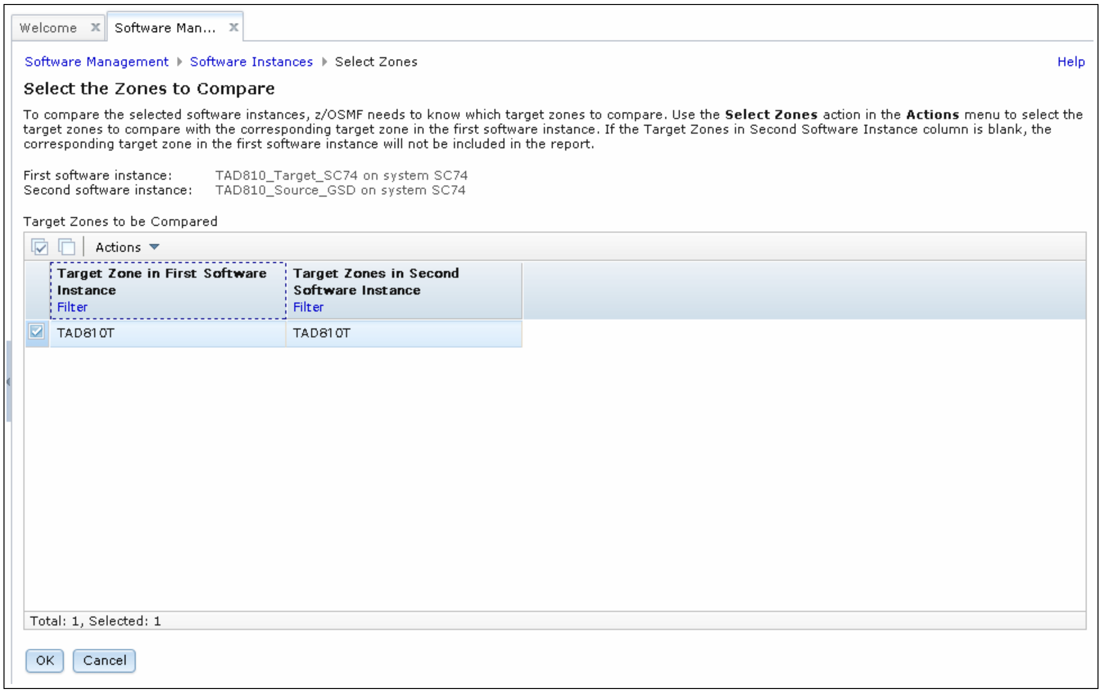
	Name Filter	System Filter	Messages Filter	Description Filter	Activity	Global Zone CSI Filter	T
○	_Compare_TGTT	SC74				OCONNOR.TEST.GLOBAL.CSI	
○	_Compare_SRCT	SC74				OCONNOR.TEST.GLOBAL.CSI	
○	ZOS210_Target_SC80_01	SC80				SMPE.SC80.ZOSV21.GLOBAL.CSI	
○	ZOS210_Source	SC80				ZOSV21.GLOBAL.CSI	
○	VAP430_Target_SC74	SC74				R3SS.VAPLI.SC74.VPRD001.GLC	
○	VAP430_Source_GSD	SC74				WWZ038.SR#2013A.VAP430.GL	
○	Test_Instance	SC74				SMPE.GLOBAL.CSI	
●	TAD810_Source_GSD	SC74				WWZ038.SR#2013B.TAD810.GL	
○	OCONNOR_Datasets_Target_SC80	SC80				OCONNOR.GLOBAL.CSI	
○	OCONNOR_Datasets_Source	SC74				OCONNOR.GLOBAL.CSI	
○	IBM_Debug_Tool_for_z/OS_V12-1	SC74		Example software instance		SMPE.GLOBAL.CSI	

Total: 15, Selected: 1

Last refresh: Jul 26, 2013 4:21:09 PM

Figure 12-76 Select Software Instance to Compare

Click **OK** to open the next window, in which the SMP/E Target Zones are selected, as shown in Figure 12-77.



Software Management ▸ Software Instances ▸ Select Zones

Select the Zones to Compare

To compare the selected software instances, z/OSMF needs to know which target zones to compare. Use the **Select Zones** action in the **Actions** menu to select the target zones to compare with the corresponding target zone in the first software instance. If the Target Zones in Second Software Instance column is blank, the corresponding target zone in the first software instance will not be included in the report.

First software instance: TAD810_Target_SC74 on system SC74
Second software instance: TAD810_Source_GSD on system SC74

Target Zones to be Compared

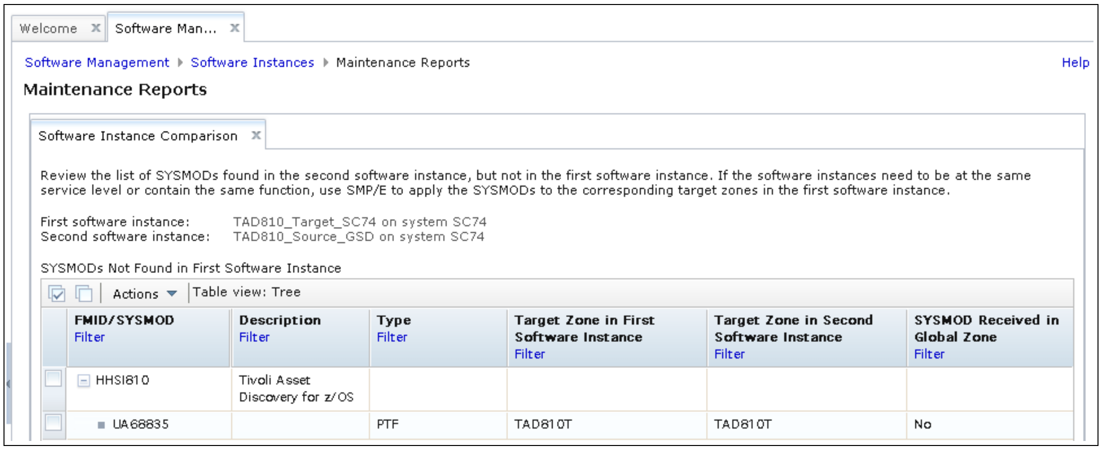
	Target Zone in First Software Instance Filter	Target Zones in Second Software Instance Filter
☑	TAD810T	TAD810T

Total: 1, Selected: 1

Figure 12-77 SMP/E Target Zones

If the Target Zones feature the same name in the first and second software instances, the second software instance field is not blank (as shown in Figure 12-77 on page 318). If you find the second software instance Target Zone field blank, the zone names are not the same between instances. In this case, you must click **Actions** and then select **Select Zones**, which opens another window in which you choose the Target Zone with the different name.

After you have Target Zones to compare between the first and second software instances, click **OK** to create the report, as shown in Figure 12-78.



Review the list of SYSMODs found in the second software instance, but not in the first software instance. If the software instances need to be at the same service level or contain the same function, use SMP/E to apply the SYSMODs to the corresponding target zones in the first software instance.

First software instance: TAD810_Target_SC74 on system SC74
Second software instance: TAD810_Source_GSD on system SC74

SYSMODs Not Found in First Software Instance

	FMID/SYSMOD Filter	Description Filter	Type Filter	Target Zone in First Software Instance Filter	Target Zone in Second Software Instance Filter	SYSMOD Received in Global Zone Filter
□	⊟ HHSI810	Tivoli Asset Discovery for z/OS				
□	■ UA68835		PTF	TAD810T	TAD810T	No

Figure 12-78 Software Instance Comparison

This example shows that PTF UA68835 is applied to the second software instance, but is missing from the first instance.

The Software Instance Comparison report is useful when the first and second software instances are on different systems.

12.3.7 Deployment

Deployment is the process of copying a source software instance to a new or existing target software instance. Typically, a deployment copies a software instance in to productive use. For example, SMP/E maintenance is installed to an isolated software instance, then it is deployed to a production system where it can be used.

During a deployment, Software Management facilitates the modification of software instances to suit the target environment. For example, data set names can be changed, placed on specific DASD volumes, and cataloged a particular way.

To explain how deployment works, some examples of the use of Software Management to deploy software instances are listed in Table 12-1. These examples are explained in the following sections.

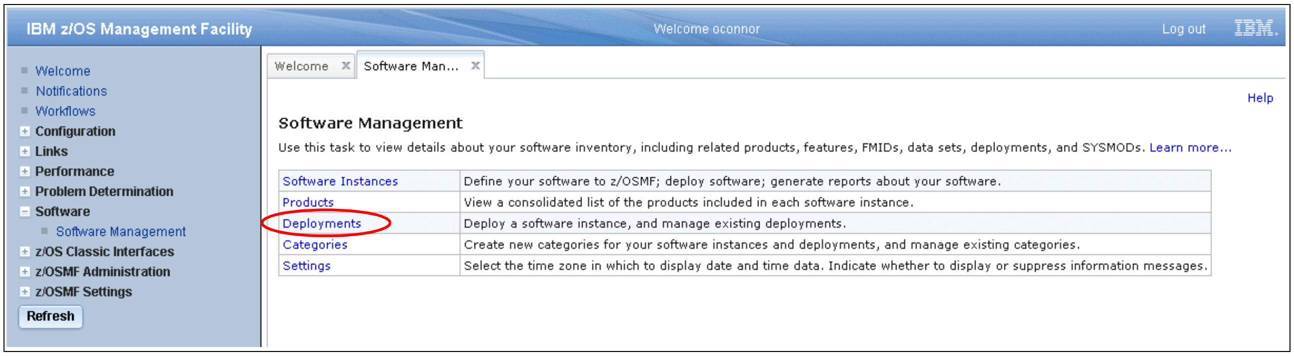
Table 12-1 Example deployments

Example	Attributes
Deployment example 1: Single product without DLIBs.	► Local deployment ► Create a GLOBAL CSI ► Inclusions: – TARGET CSI – TARGET data sets: • Non-SMS • Cataloged – More non-SMP/E data sets ► Exclusions: – DLIB CSI – DLIB data sets
Deployment example 2: Single product with DLIBs.	► Local deployment ► Create a GLOBAL CSI ► Inclusions: – TARGET CSI – TARGET data sets • Non-SMS • Cataloged – More non-SMP/E data sets – DLIB CSI – DLIB data sets • Non-SMS • Cataloged
Deployment example 3: Non-SMP/E product.	► Local deployment ► Create a GLOBAL CSI ► Inclusions: – Dummy SMP/E data sets – More non-SMP/E data sets
Deployment example 4: Operating system.	► Remote deployment ► Create a GLOBAL CSI ► Inclusions: – TARGET CSI – TARGET data sets • SMS and Non-SMS • Cataloged and indirect cataloged – More non-SMP/E data sets – DLIB CSI – DLIB data sets • SMS • Cataloged

Deployment example 1: Single product without DLIBs

This first example of a deployment is a simple single product deployment. The source is maintenance data sets with a high-level qualifier (HLQ) of SMPE, and the target is production data sets with a HLQ of SYS1. Both are on the same z/OS system. The SMP/E DLIB CSI and DLIB data sets are excluded from the deployment.

To start the deployment, go to the Software Management window and select **Deployments**, as shown in Figure 12-79.



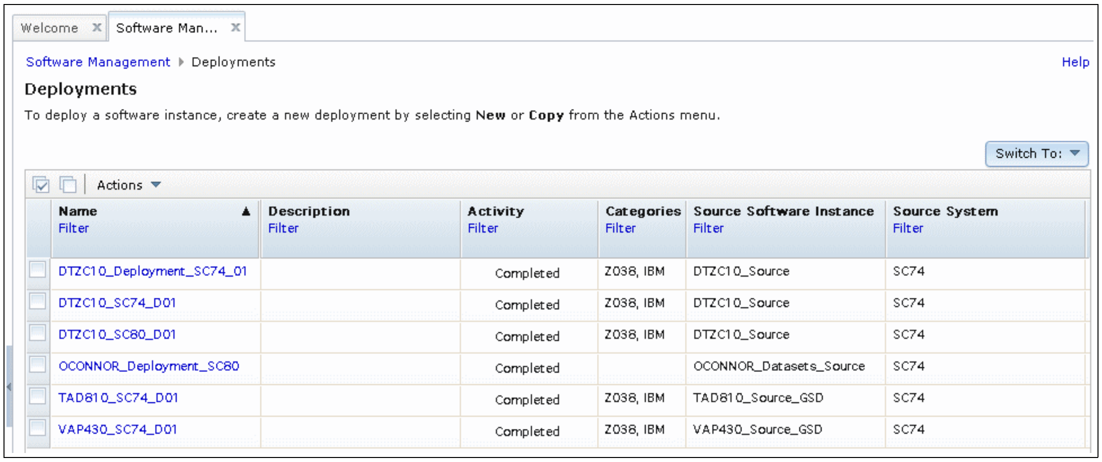
Software Management

Use this task to view details about your software inventory, including related products, features, FMIDs, data sets, deployments, and SYSMODs. Learn more...

Software Instances	Define your software to z/OSMF; deploy software; generate reports about your software.
Products	View a consolidated list of the products included in each software instance.
Deployments	Deploy a software instance, and manage existing deployments.
Categories	Create new categories for your software instances and deployments, and manage existing categories.
Settings	Select the time zone in which to display date and time data. Indicate whether to display or suppress information messages.

Figure 12-79 Software Management main window

The first page that is displayed in Deployments is a table of all deployments and their status, as shown in Figure 12-80.



Deployments

To deploy a software instance, create a new deployment by selecting **New** or **Copy** from the Actions menu.

	Name ▲ Filter	Description Filter	Activity Filter	Categories Filter	Source Software Instance Filter	Source System Filter
□	DTZC10_Deployment_SC74_01		Completed	Z038, IBM	DTZC10_Source	SC74
□	DTZC10_SC74_D01		Completed	Z038, IBM	DTZC10_Source	SC74
□	DTZC10_SC80_D01		Completed	Z038, IBM	DTZC10_Source	SC74
□	OCONNOR_Deployment_SC80		Completed		OCONNOR_Datasets_Source	SC74
□	TAD810_SC74_D01		Completed	Z038, IBM	TAD810_Source_GSD	SC74
□	VAP430_SC74_D01		Completed	Z038, IBM	VAP430_Source_GSD	SC74

Figure 12-80 Deployments

To start a deployment, click **Actions** and then click **New**, as shown in Figure 12-81.

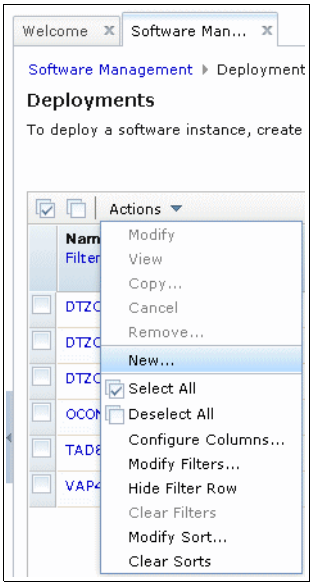
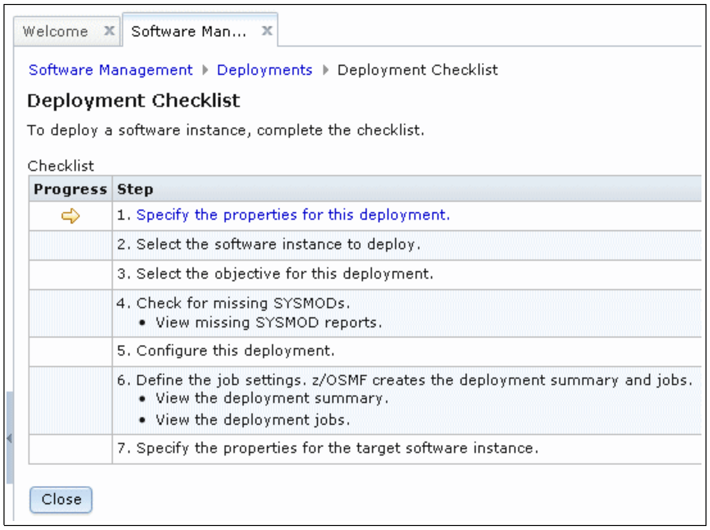


Figure 12-81 Starting a deployment

This action opens the Deployment Checklist, which guides you through the steps of defining all the data that is required to construct a successful deployment. An example is shown in Figure 12-82.



Deployment Checklist

To deploy a software instance, complete the checklist.

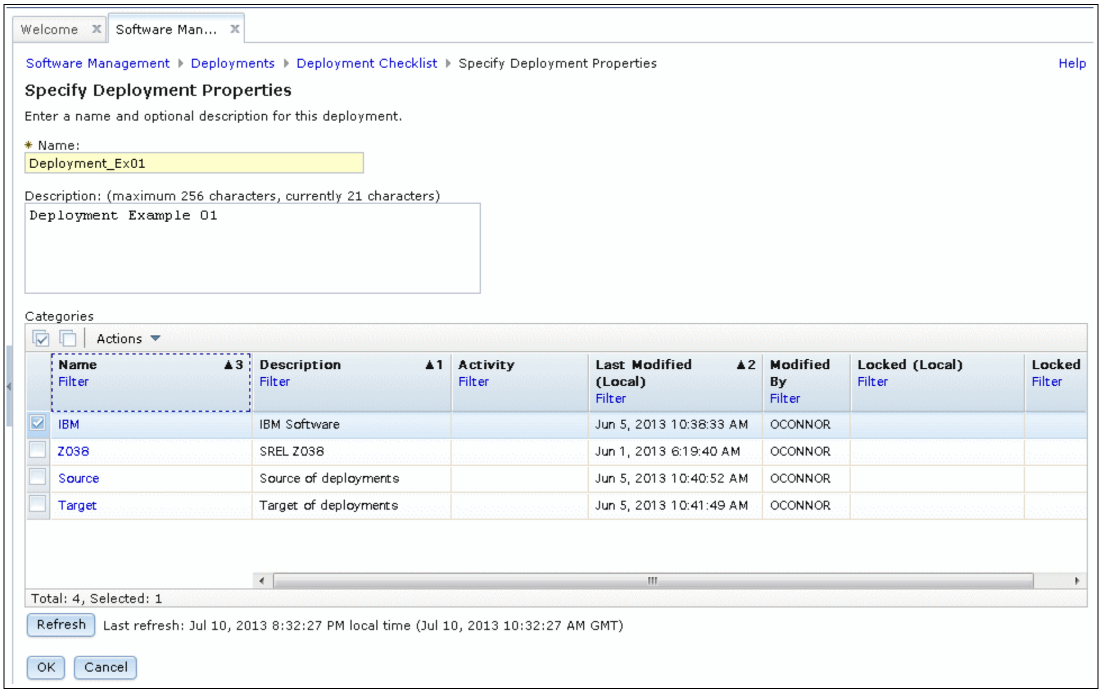
Checklist

Progress	Step
⇨	1. Specify the properties for this deployment.
	2. Select the software instance to deploy.
	3. Select the objective for this deployment.
	4. Check for missing SYSMODs. • View missing SYSMOD reports.
	5. Configure this deployment.
	6. Define the job settings. z/OSMF creates the deployment summary and jobs. • View the deployment summary. • View the deployment jobs.
	7. Specify the properties for the target software instance.

Figure 12-82 Deployment Checklist - Step 1

Each step in the Deployment Checklist runs in sequence. The current step is highlighted by an arrow on the left, and includes a link on the right that when clicked starts a subtask to gather input for a specific aspect of the deployment. As each step is run, the arrow moves down to the next step, and its corresponding subtask link is activated.

The first subtask in the checklist is to define a name for the deployment, and to optionally associate categories to the deployment. An example is shown in Figure 12-83.


Welcome
Software Man...
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Specify Deployment Properties
Help

Specify Deployment Properties

Enter a name and optional description for this deployment.

* Name: Deployment_Ex01

Description: (maximum 256 characters, currently 21 characters) Deployment Example 01

Categories

	Name ▲3	Description ▲1	Activity	Last Modified (Local) ▲2	Modified By	Locked (Local)	Locked
	Filter	Filter	Filter	Filter	Filter	Filter	Filter
☑	IBM	IBM Software		Jun 5, 2013 10:38:33 AM	OCONNOR		
☐	Z038	SREL Z038		Jun 1, 2013 6:19:40 AM	OCONNOR		
☐	Source	Source of deployments		Jun 5, 2013 10:40:52 AM	OCONNOR		
☐	Target	Target of deployments		Jun 5, 2013 10:41:49 AM	OCONNOR		

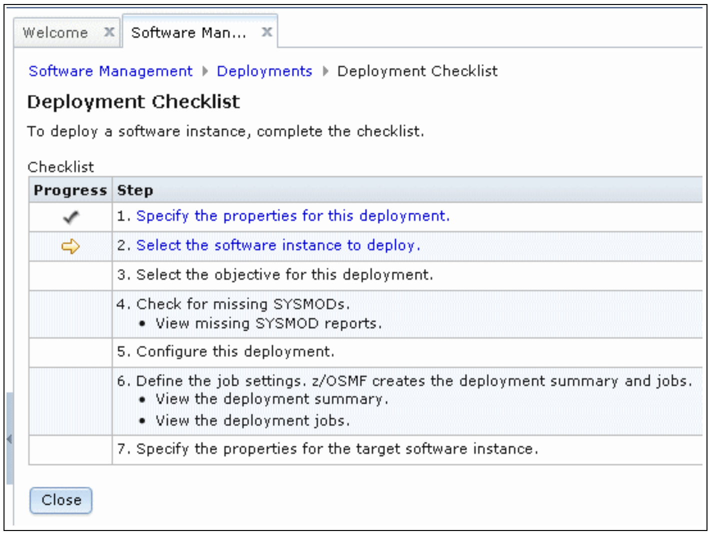
Total: 4, Selected: 1

Last refresh: Jul 10, 2013 8:32:27 PM local time (Jul 10, 2013 10:32:27 AM GMT)

Figure 12-83 Specifying deployment properties

In this example, we name the deployment Deployment_Ex01, and we select a predefined category that is called IBM to be associated with the deployment. For more information about choosing deployment names, see “Deployments” on page 277.

Click **OK** to go to the next step in the Deployment Checklist, as shown in Figure 12-84.



Deployment Checklist

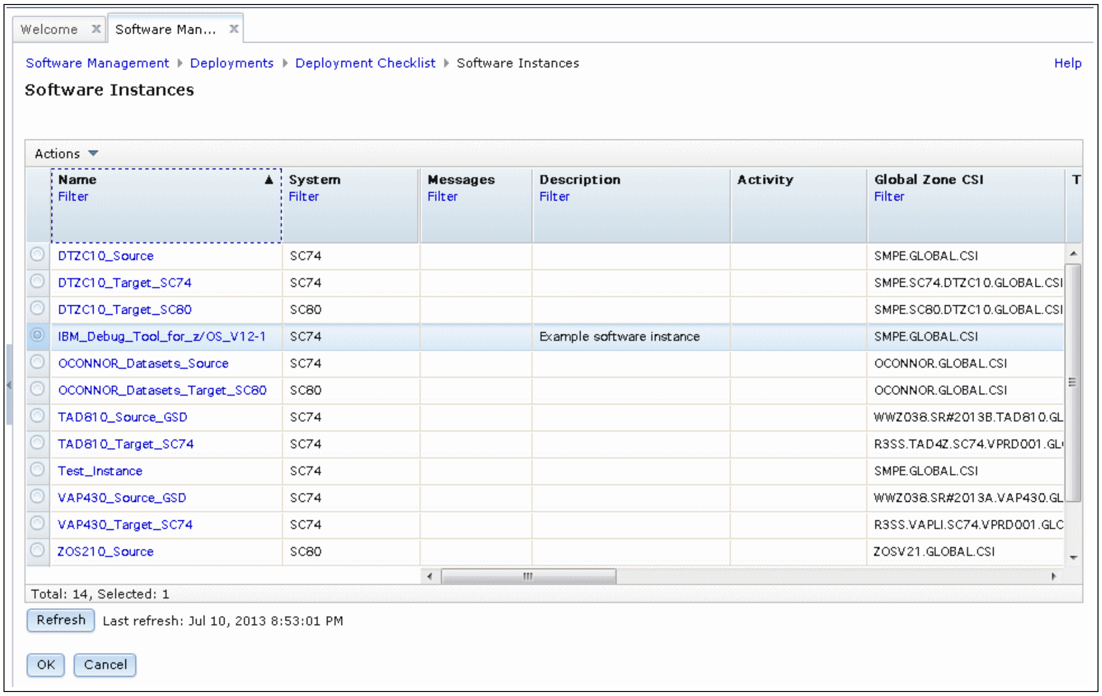
To deploy a software instance, complete the checklist.

Checklist

Progress	Step
✓	1. Specify the properties for this deployment.
⇨	2. Select the software instance to deploy.
	3. Select the objective for this deployment.
	4. Check for missing SYSMODs. • View missing SYSMOD reports.
	5. Configure this deployment.
	6. Define the job settings. z/OSMF creates the deployment summary and jobs. • View the deployment summary. • View the deployment jobs.
	7. Specify the properties for the target software instance.

Figure 12-84 Deployment Checklist - Step 2

The next step in the Deployment Checklist is to select the software instance to be used as input to the deployment. In this example, we select IBM_Debug_Tool_for_z/OS_V12-1 on system SC74, as shown in Figure 12-85.


Welcome ✕
Software Man... ✕
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Software Instances
Help

Software Instances

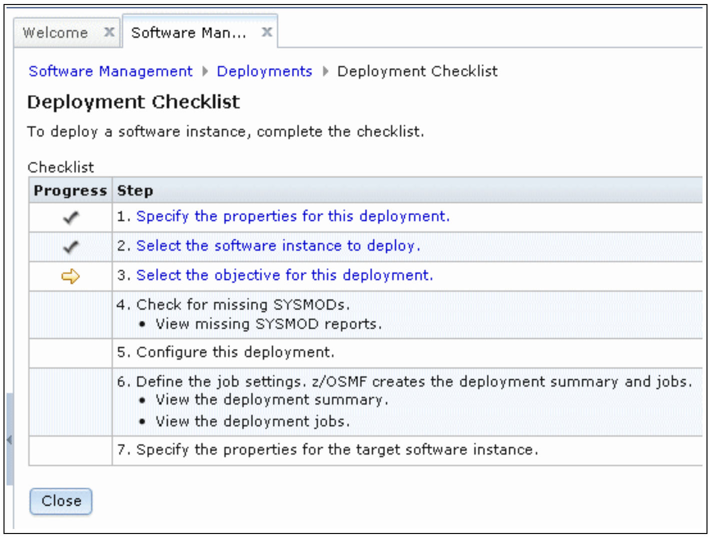
	Name ▲ Filter	System Filter	Messages Filter	Description Filter	Activity	Global Zone CSI Filter	T
○	DTZC10_Source	SC74				SMPE.GLOBAL.CSI	
○	DTZC10_Target_SC74	SC74				SMPE.SC74.DTZC10.GLOBAL.CSI	
○	DTZC10_Target_SC80	SC80				SMPE.SC80.DTZC10.GLOBAL.CSI	
●	IBM_Debug_Tool_for_z/OS_V12-1	SC74		Example software instance		SMPE.GLOBAL.CSI	
○	OCONNOR_Datasets_Source	SC74				OCONNOR.GLOBAL.CSI	
○	OCONNOR_Datasets_Target_SC80	SC80				OCONNOR.GLOBAL.CSI	
○	TAD810_Source_GSD	SC74				WWZ038.SR#2013B.TAD810.GL	
○	TAD810_Target_SC74	SC74				R3SS.TAD4Z.SC74.VPRD001.GL	
○	Test_Instance	SC74				SMPE.GLOBAL.CSI	
○	VAP430_Source_GSD	SC74				WWZ038.SR#2013A.VAP430.GL	
○	VAP430_Target_SC74	SC74				R3SS.VAPLI.SC74.VPRD001.GLC	
○	ZOS210_Source	SC80				ZOSV21.GLOBAL.CSI	

Total: 14, Selected: 1

Last refresh: Jul 10, 2013 8:53:01 PM

Figure 12-85 Selecting the software instance

Click **OK** to go to the next step in the Deployment Checklist, as shown in Figure 12-86.



Deployment Checklist

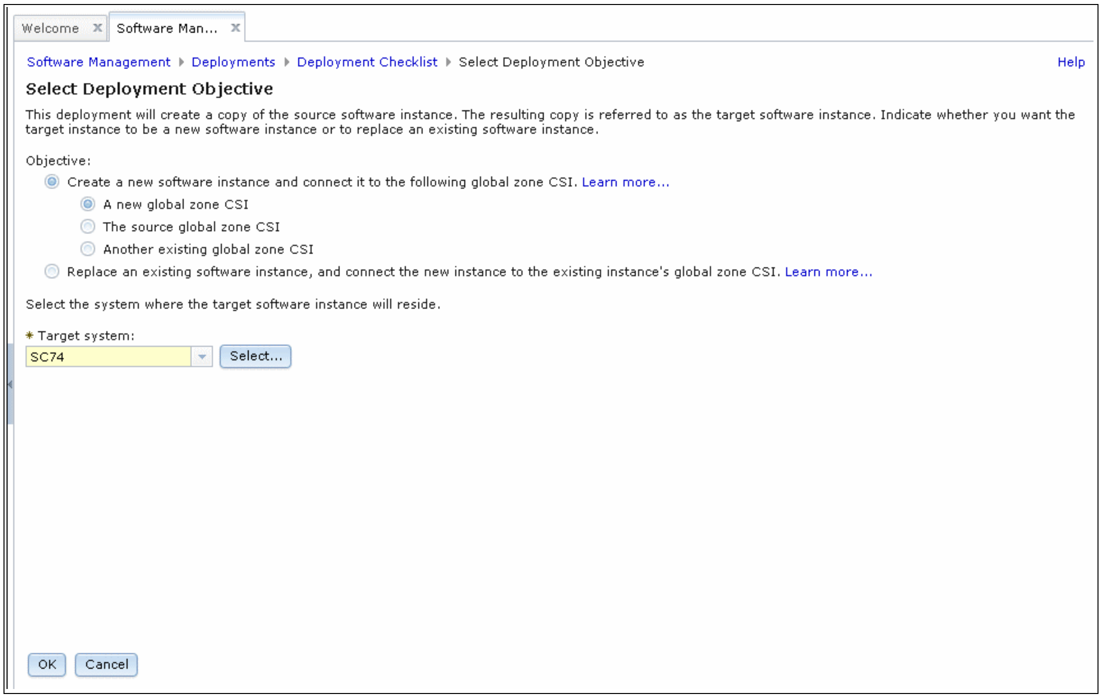
To deploy a software instance, complete the checklist.

Checklist

Progress	Step
✓	1. Specify the properties for this deployment.
✓	2. Select the software instance to deploy.
⇨	3. Select the objective for this deployment.
	4. Check for missing SYSMODs. • View missing SYSMOD reports.
	5. Configure this deployment.
	6. Define the job settings. z/OSMF creates the deployment summary and jobs. • View the deployment summary. • View the deployment jobs.
	7. Specify the properties for the target software instance.

Figure 12-86 Deployment Checklist - Step 3

The next step in the Deployment Checklist is to select the objective of the deployment. In the example that is shown in Figure 12-87, we define that we are creating a software instance, and that the TARGET and DLIB zones should be connected to a newly created GLOBAL CSI. We also specify that the target software instance is on system SC74 (the same system as the source software instance).


Welcome
Software Man...
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Select Deployment Objective
Help

Select Deployment Objective

This deployment will create a copy of the source software instance. The resulting copy is referred to as the target software instance. Indicate whether you want the target instance to be a new software instance or to replace an existing software instance.

Objective:

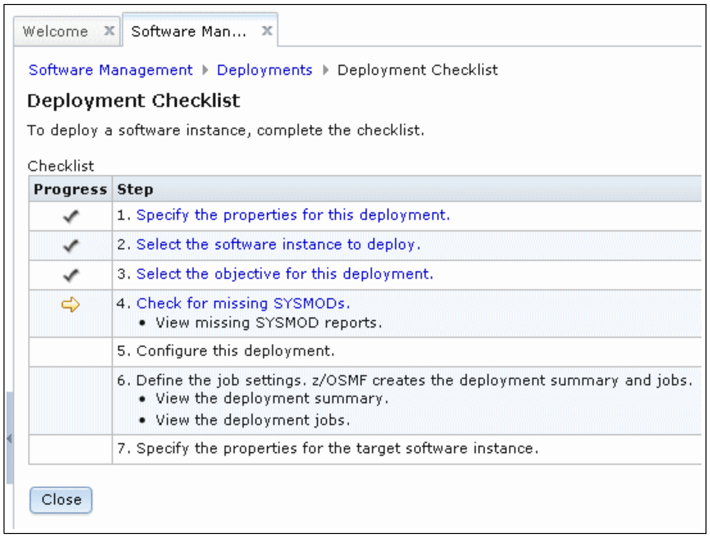
- ● Create a new software instance and connect it to the following global zone CSI. Learn more...
  - ● A new global zone CSI
  - ○ The source global zone CSI
  - ○ Another existing global zone CSI
- ○ Replace an existing software instance, and connect the new instance to the existing instance's global zone CSI. Learn more...

Select the system where the target software instance will reside.

* Target system: SC74

Figure 12-87 Select Deployment Objective

Click **OK** to go to the next step in the Deployment Checklist, as shown in Figure 12-88.



Deployment Checklist

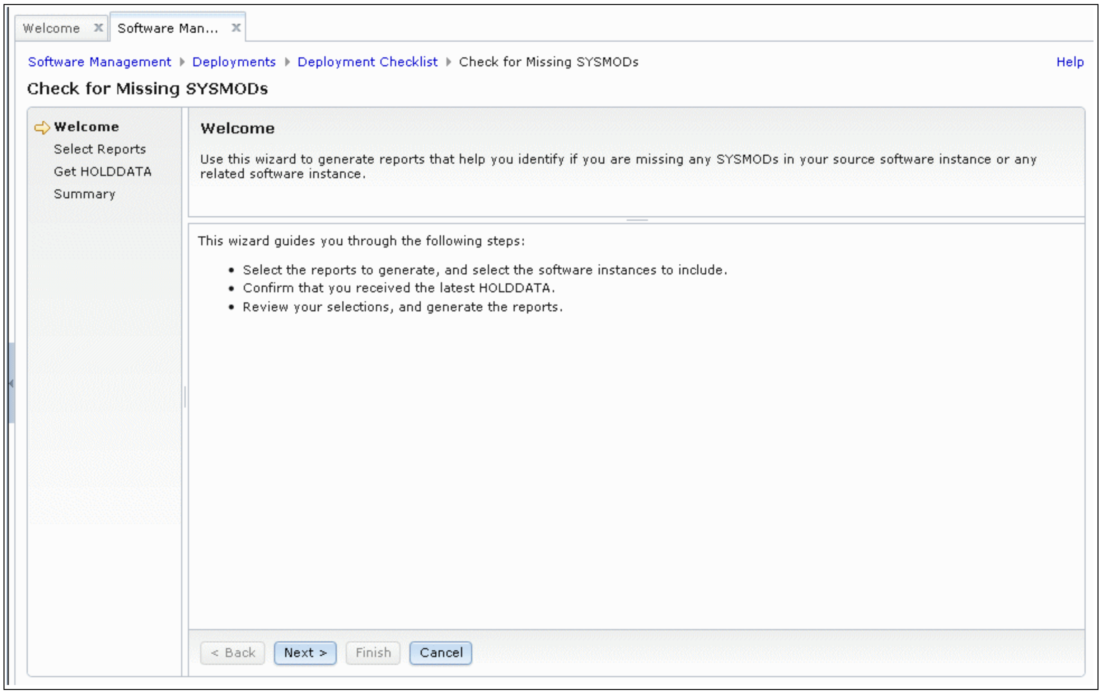
To deploy a software instance, complete the checklist.

Checklist

Progress	Step
✓	1. Specify the properties for this deployment.
✓	2. Select the software instance to deploy.
✓	3. Select the objective for this deployment.
⇨	4. Check for missing SYSMODs. • View missing SYSMOD reports.
	5. Configure this deployment.
	6. Define the job settings. z/OSMF creates the deployment summary and jobs. • View the deployment summary. • View the deployment jobs.
	7. Specify the properties for the target software instance.

Figure 12-88 Deployment Checklist

The next step in the Deployment Checklist is to check for missing SYSMODs, as shown in Figure 12-89.


Welcome
Software Man...
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Check for Missing SYSMODs
Help
Check for Missing SYSMODs
Welcome
Select Reports
Get HOLDDATA
Summary
< Back
Next >
Finish
Cancel

Welcome

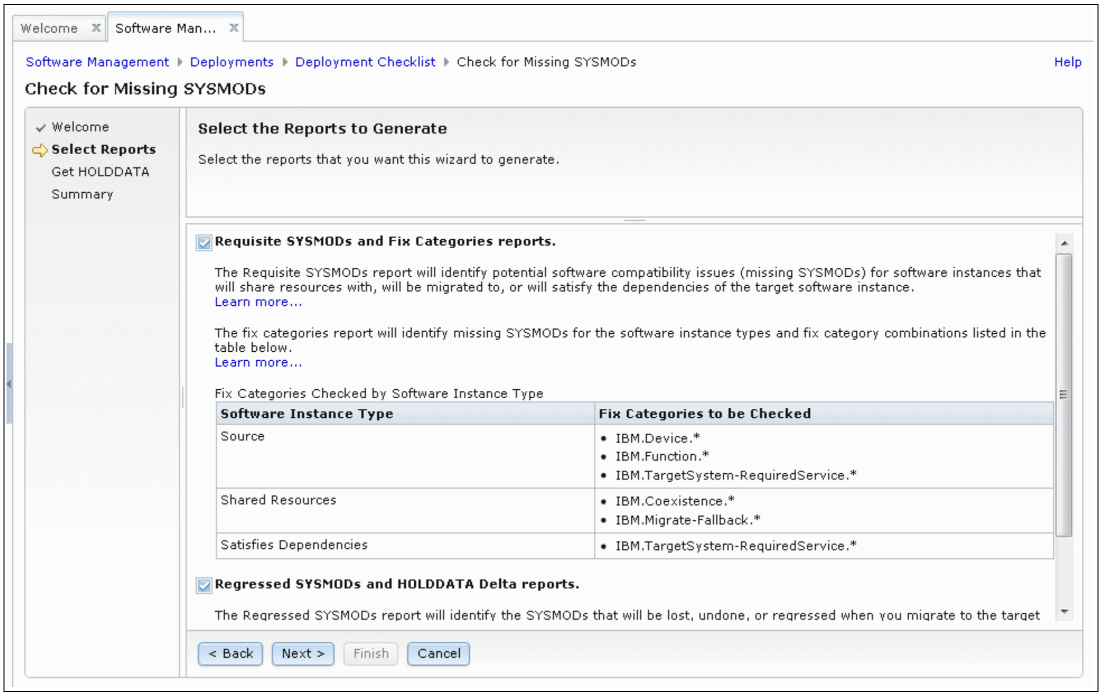
Use this wizard to generate reports that help you identify if you are missing any SYSMODs in your source software instance or any related software instance.

This wizard guides you through the following steps:

- Select the reports to generate, and select the software instances to include.
- Confirm that you received the latest HOLDDATA.
- Review your selections, and generate the reports.

Figure 12-89 Check for missing SYSMOD wizard - Part 1

Click **Next** to go to the next window of the Check for Missing SYSMODs wizard, as shown in Figure 12-90.


Welcome
Software Man...
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Check for Missing SYSMODs
Help
Check for Missing SYSMODs
✓ Welcome
Select Reports
Get HOLDDATA
Summary
< Back
Next >
Finish
Cancel

Select the Reports to Generate

Select the reports that you want this wizard to generate.

☑ **Requisite SYSMODs and Fix Categories reports.**

The Requisite SYSMODs report will identify potential software compatibility issues (missing SYSMODs) for software instances that will share resources with, will be migrated to, or will satisfy the dependencies of the target software instance.
Learn more...

The fix categories report will identify missing SYSMODs for the software instance types and fix category combinations listed in the table below.
Learn more...

Fix Categories Checked by Software Instance Type

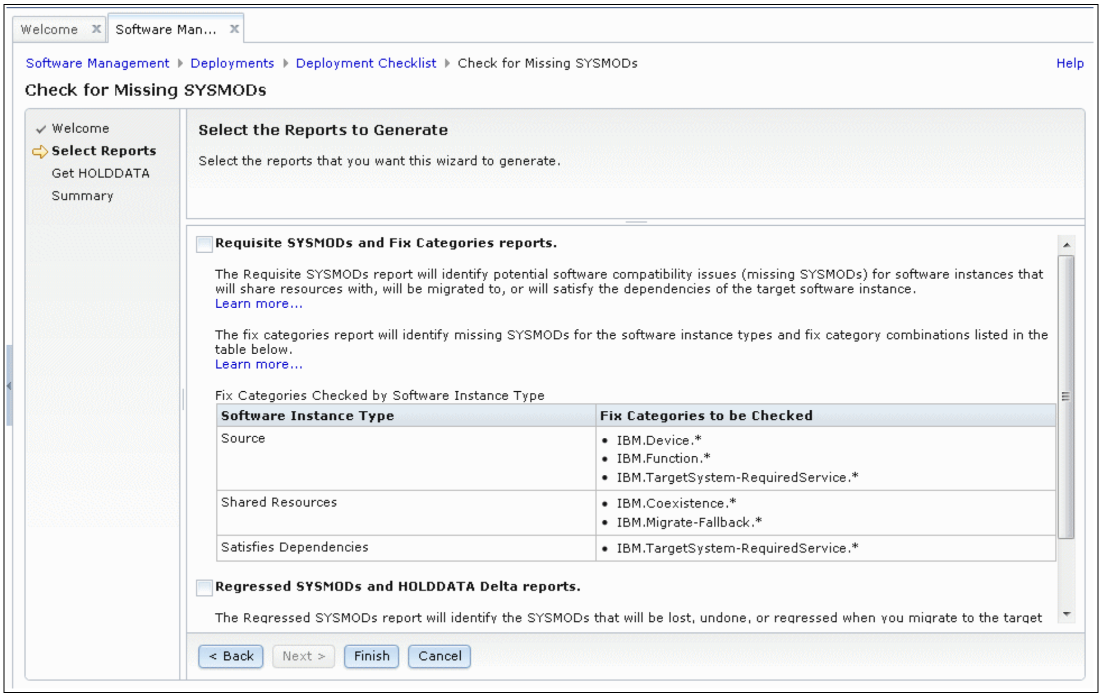
Software Instance Type	Fix Categories to be Checked
Source	• IBM.Device.* • IBM.Function.* • IBM.TargetSystem-RequiredService.*
Shared Resources	• IBM.Coexistence.* • IBM.Migrate-Fallback.*
Satisfies Dependencies	• IBM.TargetSystem-RequiredService.*

☑ **Regressed SYSMODs and HOLDDATA Delta reports.**

The Regressed SYSMODs report will identify the SYSMODs that will be lost, undone, or regressed when you migrate to the target

Figure 12-90 Check for Missing SYSMODs wizard - Part 2

To simplify this example deployment, we do not generate any missing SYSMOD reports now. Therefore, we clear the options for the reports that are offered, as shown in Figure 12-91.



Check for Missing SYSMODs

Select the Reports to Generate

Select the reports that you want this wizard to generate.

□ **Requisite SYSMODs and Fix Categories reports.**

The Requisite SYSMODs report will identify potential software compatibility issues (missing SYSMODs) for software instances that will share resources with, will be migrated to, or will satisfy the dependencies of the target software instance.
Learn more...

The fix categories report will identify missing SYSMODs for the software instance types and fix category combinations listed in the table below.
Learn more...

Fix Categories Checked by Software Instance Type

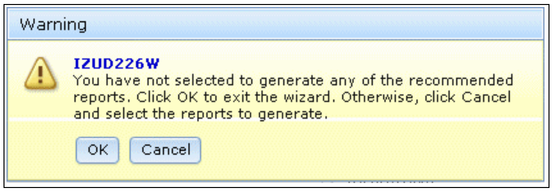
Software Instance Type	Fix Categories to be Checked
Source	• IBM.Device.* • IBM.Function.* • IBM.TargetSystem-RequiredService.*
Shared Resources	• IBM.Coexistence.* • IBM.Migrate-Fallback.*
Satisfies Dependencies	• IBM.TargetSystem-RequiredService.*

□ **Regressed SYSMODs and HOLDDATA Delta reports.**

The Regressed SYSMODs report will identify the SYSMODs that will be lost, undone, or regressed when you migrate to the target

Figure 12-91 Check for Missing SYSMODs wizard - Part 3

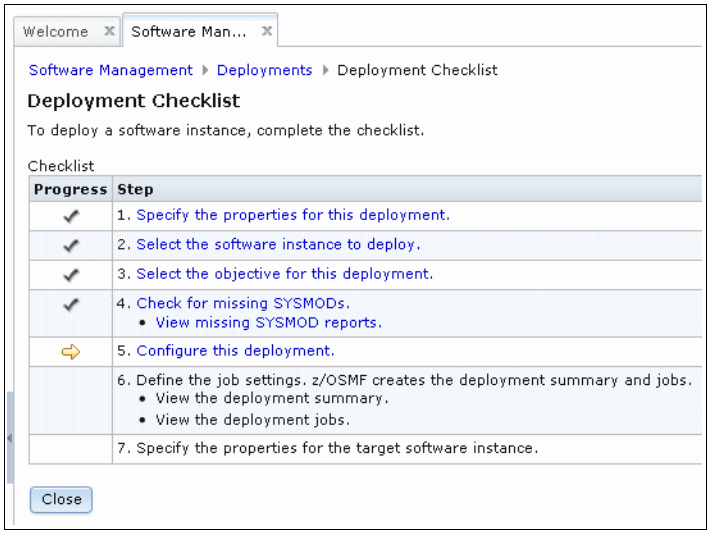
Click **Finish** to finish the wizard. Because we bypassed generating any reports, a warning message is displayed, as shown in Figure 12-92.



IZUD226W
You have not selected to generate any of the recommended reports. Click OK to exit the wizard. Otherwise, click Cancel and select the reports to generate.

Figure 12-92 IZUD226W warning message

Click **OK** to acknowledge the warning message and go to the next step of the Deployment Checklist, as shown in Figure 12-93.



Software Management ▸ Deployments ▸ Deployment Checklist

Deployment Checklist

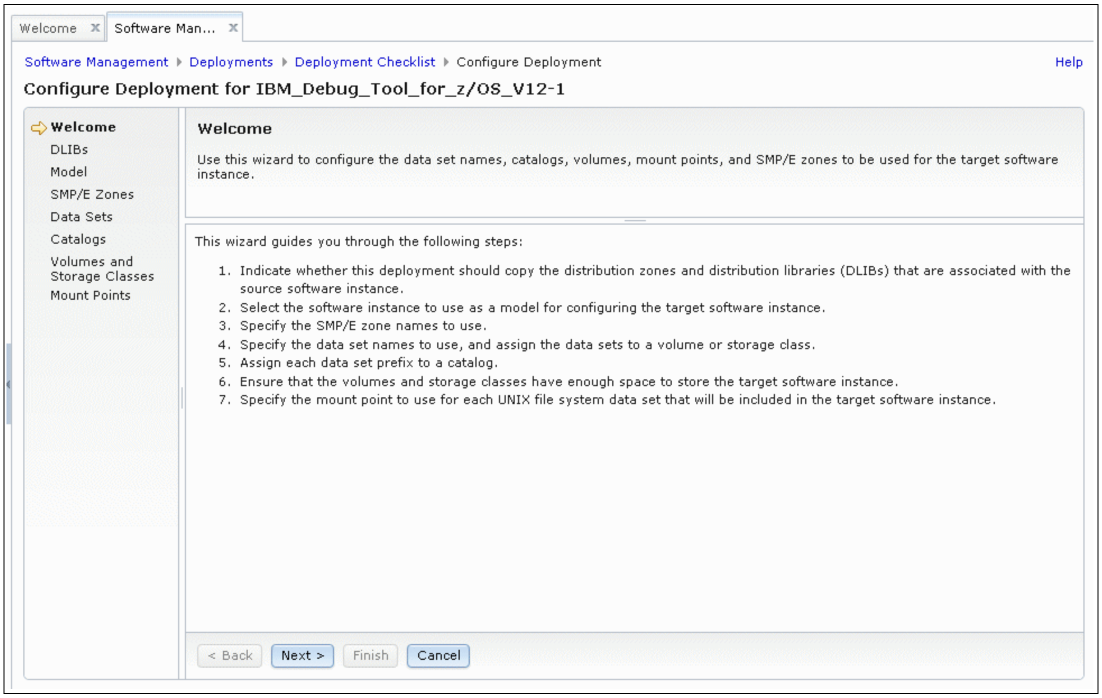
To deploy a software instance, complete the checklist.

Checklist

Progress	Step
✓	1. Specify the properties for this deployment.
✓	2. Select the software instance to deploy.
✓	3. Select the objective for this deployment.
✓	4. Check for missing SYSMODs. • View missing SYSMOD reports.
⇨	5. Configure this deployment.
	6. Define the job settings. z/OSMF creates the deployment summary and jobs. • View the deployment summary. • View the deployment jobs.
	7. Specify the properties for the target software instance.

Figure 12-93 Deployment Checklist

The next step in the Deployment Checklist is to configure the deployment. To accomplish this task, use the wizard that is shown in Figure 12-94.



Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment

Configure Deployment for IBM_Debug_Tool_for_z/OS_V12-1

Welcome

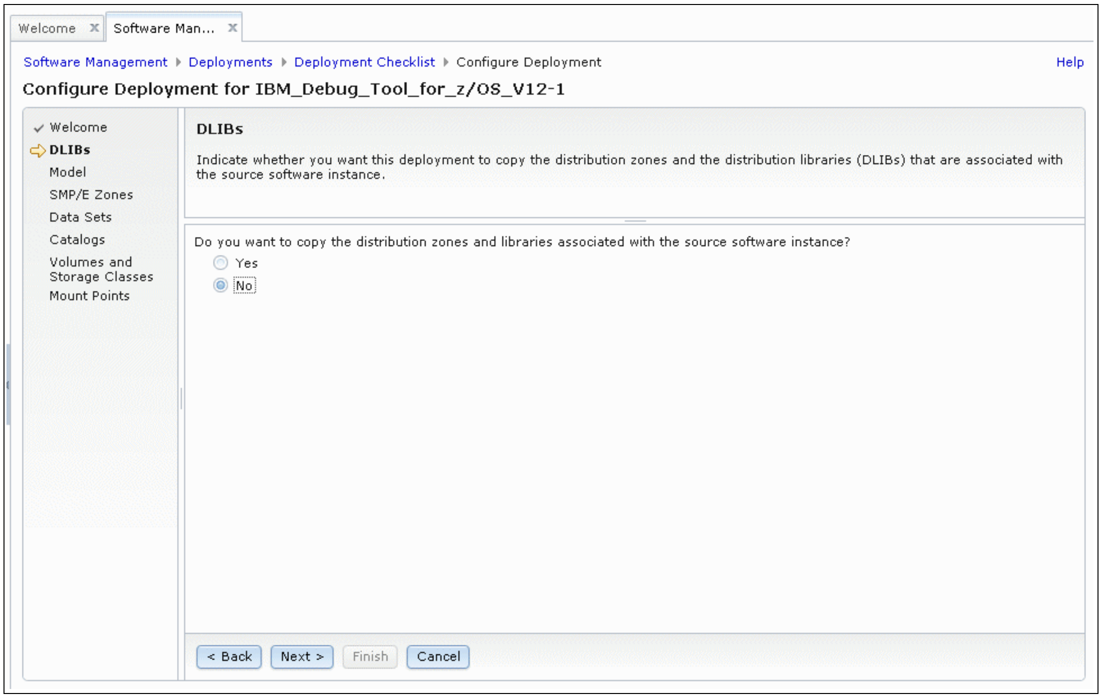
Use this wizard to configure the data set names, catalogs, volumes, mount points, and SMP/E zones to be used for the target software instance.

This wizard guides you through the following steps:

1. Indicate whether this deployment should copy the distribution zones and distribution libraries (DLIBs) that are associated with the source software instance.
2. Select the software instance to use as a model for configuring the target software instance.
3. Specify the SMP/E zone names to use.
4. Specify the data set names to use, and assign the data sets to a volume or storage class.
5. Assign each data set prefix to a catalog.
6. Ensure that the volumes and storage classes have enough space to store the target software instance.
7. Specify the mount point to use for each UNIX file system data set that will be included in the target software instance.

Figure 12-94 Welcome pane

The first part of the Configure Deployment wizard is to identify whether the deployment should include SMP/E DLIB zones and DLIB data sets, as shown in Figure 12-95.



Configure Deployment for IBM_Debug_Tool_for_z/OS_V12-1

DLIBs

Indicate whether you want this deployment to copy the distribution zones and the distribution libraries (DLIBs) that are associated with the source software instance.

Do you want to copy the distribution zones and libraries associated with the source software instance?

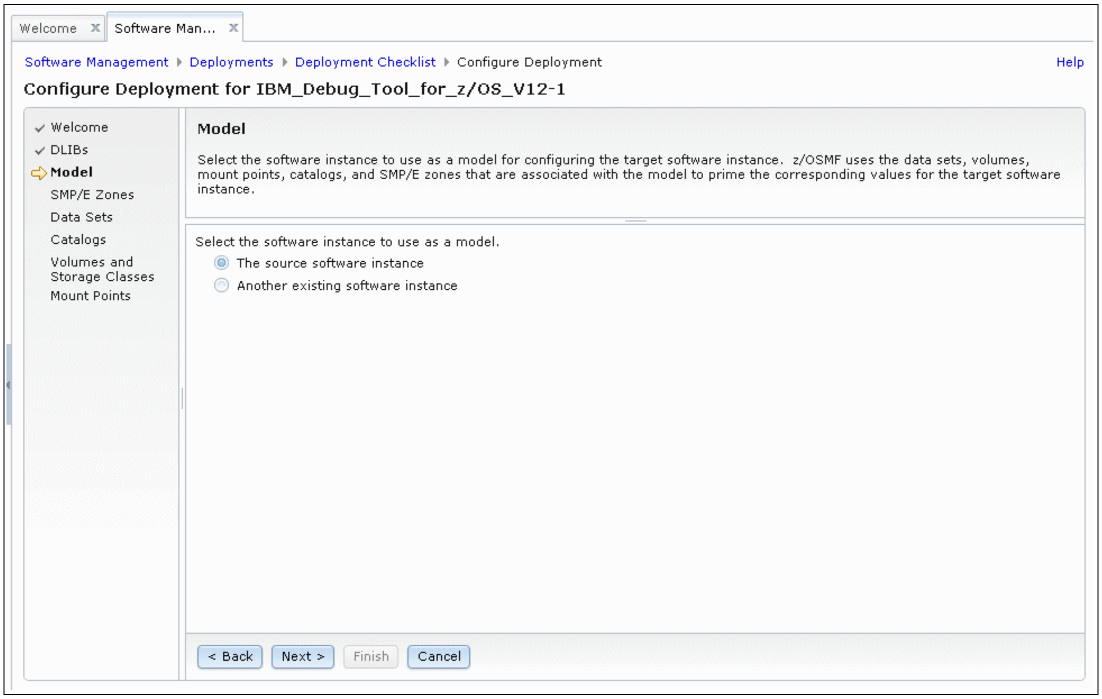
○ Yes

● No

Figure 12-95 Including DLIB zones and data sets

In our example, we do not include SMP/E DLIB zones and DLIB data sets; therefore, we select **No** and click **Next**.

The next part of the Configure Deployment wizard identifies what software instance the target software instance should look like after it is deployed, as shown in Figure 12-96.



Configure Deployment for IBM_Debug_Tool_for_z/OS_V12-1

Model

Select the software instance to use as a model for configuring the target software instance. z/OSMF uses the data sets, volumes, mount points, catalogs, and SMP/E zones that are associated with the model to prime the corresponding values for the target software instance.

Select the software instance to use as a model.

● The source software instance

○ Another existing software instance

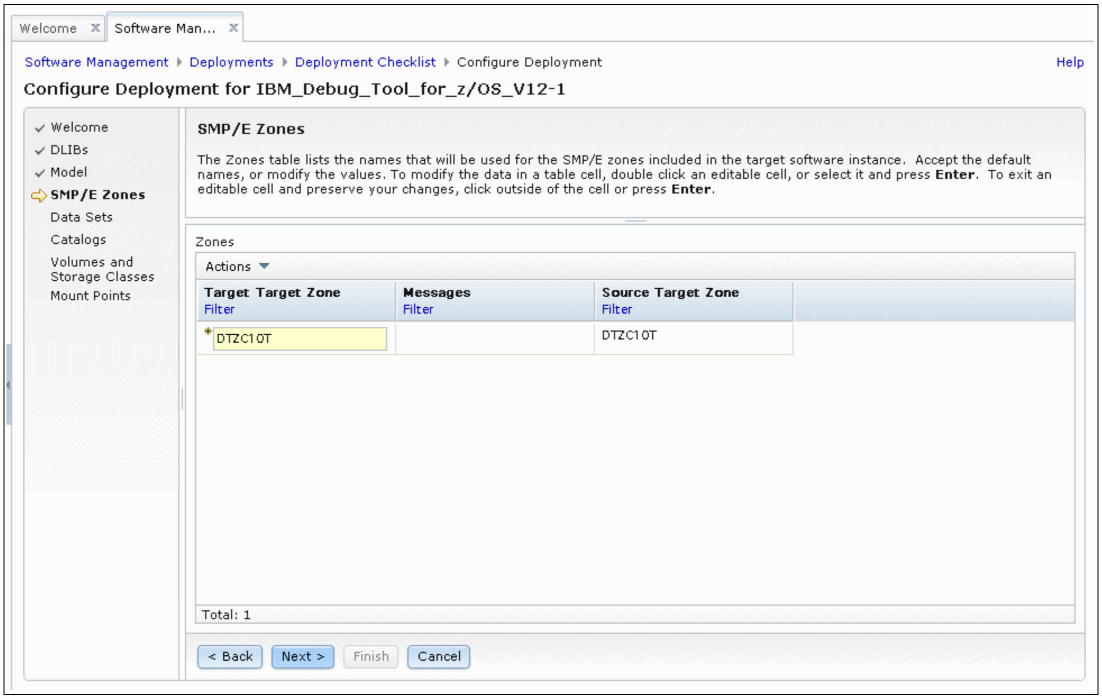
Figure 12-96 Deployed software instance

If this product is deployed, you can select one of those software instances as a model, which reduces the number of definitions that are required for a new deployment. The model definition does not need to be on the same system. Any software instance on any system that is known to the Software Management task can be selected.

Although Software Management allows an unrelated software instance to be selected as a model, it makes no sense to do so. The model is meant to be an instance of the same product so that data set, catalog, UNIX mount points, volume, and SMP/E zone information can be preconfigured in the target software instance. If an unrelated software instance is selected as a model, it serves no useful purpose.

In our example, we select the source software instance as the model and click **Next**.

The next part of the Configure Deployment wizard identifies the name of the SMP/E zones in the target software instance, as shown in Figure 12-97.



Configure Deployment for IBM_Debug_Tool_for_z/OS_V12-1

SMP/E Zones

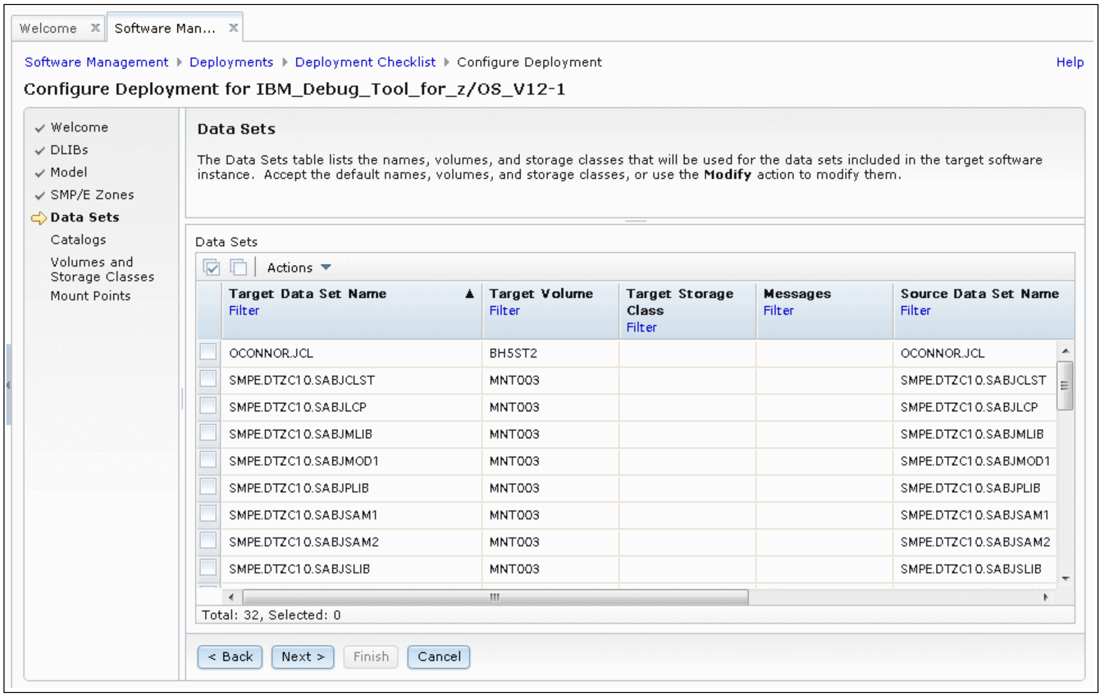
The Zones table lists the names that will be used for the SMP/E zones included in the target software instance. Accept the default names, or modify the values. To modify the data in a table cell, double click an editable cell, or select it and press **Enter**. To exit an editable cell and preserve your changes, click outside of the cell or press **Enter**.

Target Target Zone	Messages	Source Target Zone
* DTZC10T		DTZC10T

Figure 12-97 Configure Deployment wizard - names of the SMP/E zones in target software instance

In our example, we did not include the SMP/E DLIB zone or data sets in the deployment, so the wizard is requesting only a name for the SMP/E TARGET zone. Because we specified the source software instance as the model for the target software instance, the SMP/E TARGET zone name is inherited from the source software instance. The name can be typed over if a different name is wanted. Click **Next**.

The next part of the Configure Deployment wizard identifies the data set names in the target software instance, as shown in Figure 12-98.



Configure Deployment for IBM_Debug_Tool_for_z/OS_V12-1

Data Sets

The Data Sets table lists the names, volumes, and storage classes that will be used for the data sets included in the target software instance. Accept the default names, volumes, and storage classes, or use the **Modify** action to modify them.

Data Sets

	Target Data Set Name ▲ Filter	Target Volume Filter	Target Storage Class Filter	Messages Filter	Source Data Set Name Filter
□	OCONNOR.JCL	BH5ST2			OCONNOR.JCL
□	SMPE.DTZC10.SABJCLST	MNT003			SMPE.DTZC10.SABJCLST
□	SMPE.DTZC10.SABJLCP	MNT003			SMPE.DTZC10.SABJLCP
□	SMPE.DTZC10.SABJMLIB	MNT003			SMPE.DTZC10.SABJMLIB
□	SMPE.DTZC10.SABJMOD1	MNT003			SMPE.DTZC10.SABJMOD1
□	SMPE.DTZC10.SABJPLIB	MNT003			SMPE.DTZC10.SABJPLIB
□	SMPE.DTZC10.SABJSAM1	MNT003			SMPE.DTZC10.SABJSAM1
□	SMPE.DTZC10.SABJSAM2	MNT003			SMPE.DTZC10.SABJSAM2
□	SMPE.DTZC10.SABJSLIB	MNT003			SMPE.DTZC10.SABJSLIB

Total: 32, Selected: 0

Figure 12-98 Data set names in target software instance

All the data sets in the software instance are listed in a table, with the target data set names on the left and the equivalent source data set names on the right. The initial target data set names are determined by the model software instance that is defined earlier in the wizard.

With this design, data set names for each product must be defined only once. Thereafter, a software instance with the preferred data set names can be used as a model for subsequent deployments.

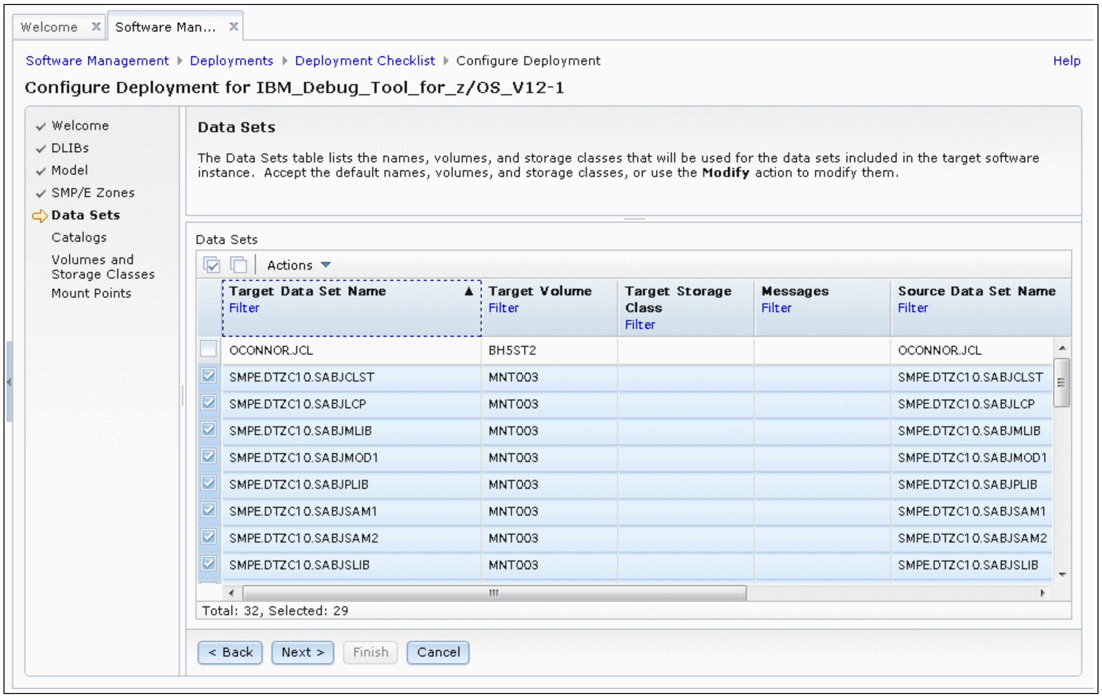
In our example, the target data set names are initially set the same as the source data set names because the source software instance was defined as the model for this deployment. However, these target names are not the names we want to use after deployment. Fortunately, Software Management provides a way to change data set names during deployment.

The data sets in the source software instance feature the following naming conventions:

- ‘SMPE.DTZC10.**’: The SMP/E TARGET data sets. We want it to be deployed as ‘SYS1.DEBUG.EX01.**’.
- ‘OCONNOR.JCL’: A non-SMP/E data set. We want it to be deployed as ‘SYS1.DEBUG.EX01.JCL’.
- ‘SMPE.DTZC10T.CSI’: The SMP/E TARGET CSI data set. We want it to be deployed as ‘SMPE.DEBUG.EX01.DTZC10T.CSI’.
- ‘SMPE.GLOBAL.CSI’: The SMP/E GLOBAL CSI data set. We want it to be deployed as ‘SMPE.DEBUG.EX01.GLOBAL.CSI’.

The fastest way to define the data set name changes is to understand the source naming conventions, and then make definitions for each of those different conventions. It is possible to change every data set name one at a time, but that process takes longer.

Start by selecting all the ‘SMPE.DTZC10.**’ data sets. Because most of the data sets match the ‘SMPE.DTZC10.**’ convention, click **Select All** at the top of the select column, and then, find each row in the table that does not match that convention and clear those rows individually, as shown in Figure 12-99.



Configure Deployment for IBM_Debug_Tool_for_z/OS_V12-1

Data Sets

The Data Sets table lists the names, volumes, and storage classes that will be used for the data sets included in the target software instance. Accept the default names, volumes, and storage classes, or use the **Modify** action to modify them.

Data Sets

	Target Data Set Name Filter	Target Volume Filter	Target Storage Class Filter	Messages Filter	Source Data Set Name Filter
☐	OCONNOR.JCL	BH5ST2			OCONNOR.JCL
☑	SMPE.DTZC10.SABJCLST	MNT003			SMPE.DTZC10.SABJCLST
☑	SMPE.DTZC10.SABJLCP	MNT003			SMPE.DTZC10.SABJLCP
☑	SMPE.DTZC10.SABJMLIB	MNT003			SMPE.DTZC10.SABJMLIB
☑	SMPE.DTZC10.SABJMOD1	MNT003			SMPE.DTZC10.SABJMOD1
☑	SMPE.DTZC10.SABJPLIB	MNT003			SMPE.DTZC10.SABJPLIB
☑	SMPE.DTZC10.SABJSAM1	MNT003			SMPE.DTZC10.SABJSAM1
☑	SMPE.DTZC10.SABJSAM2	MNT003			SMPE.DTZC10.SABJSAM2
☑	SMPE.DTZC10.SABJSLIB	MNT003			SMPE.DTZC10.SABJSLIB

Total: 32, Selected: 29

Figure 12-99 Selecting and clearing data sets

After only the ‘SMPE.DTZC10.**’ convention data sets are selected, click **Actions** and then, select **Modify**, as shown in Figure 12-100.

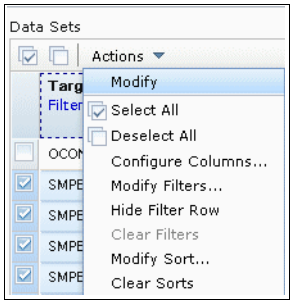
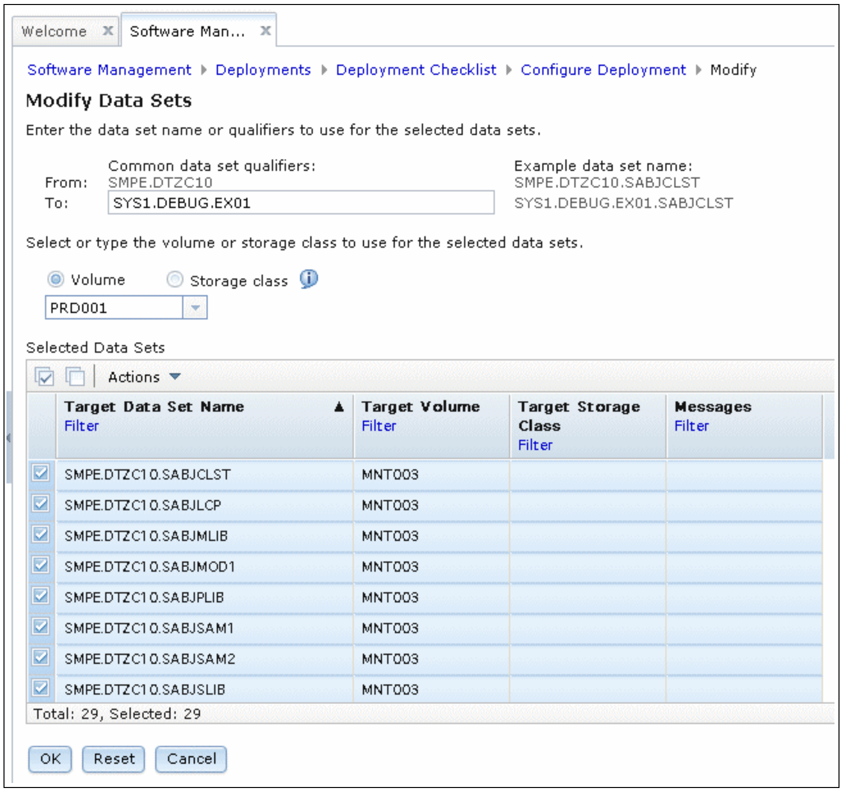


Figure 12-100 Modifying data sets

The Modify Data Sets window opens, as shown in Figure 12-101.


Welcome
Software Man...
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment ▸ Modify

Modify Data Sets

Enter the data set name or qualifiers to use for the selected data sets.

	Common data set qualifiers:	Example data set name:
From:	SMPE.DTZC10	SMPE.DTZC10.SABJCLST
To:	SYS1.DEBUG.EX01	SYS1.DEBUG.EX01.SABJCLST

Select or type the volume or storage class to use for the selected data sets.

● Volume ○ Storage class

PRD001

Selected Data Sets

	Target Data Set Name	Target Volume	Target Storage Class	Messages
☑	SMPE.DTZC10.SABJCLST	MNT003		
☑	SMPE.DTZC10.SABJLCP	MNT003		
☑	SMPE.DTZC10.SABJMLIB	MNT003		
☑	SMPE.DTZC10.SABJMOD1	MNT003		
☑	SMPE.DTZC10.SABJPLIB	MNT003		
☑	SMPE.DTZC10.SABJSAM1	MNT003		
☑	SMPE.DTZC10.SABJSAM2	MNT003		
☑	SMPE.DTZC10.SABJSLIB	MNT003		

Total: 29, Selected: 29

Figure 12-101 Modify Data Sets pane

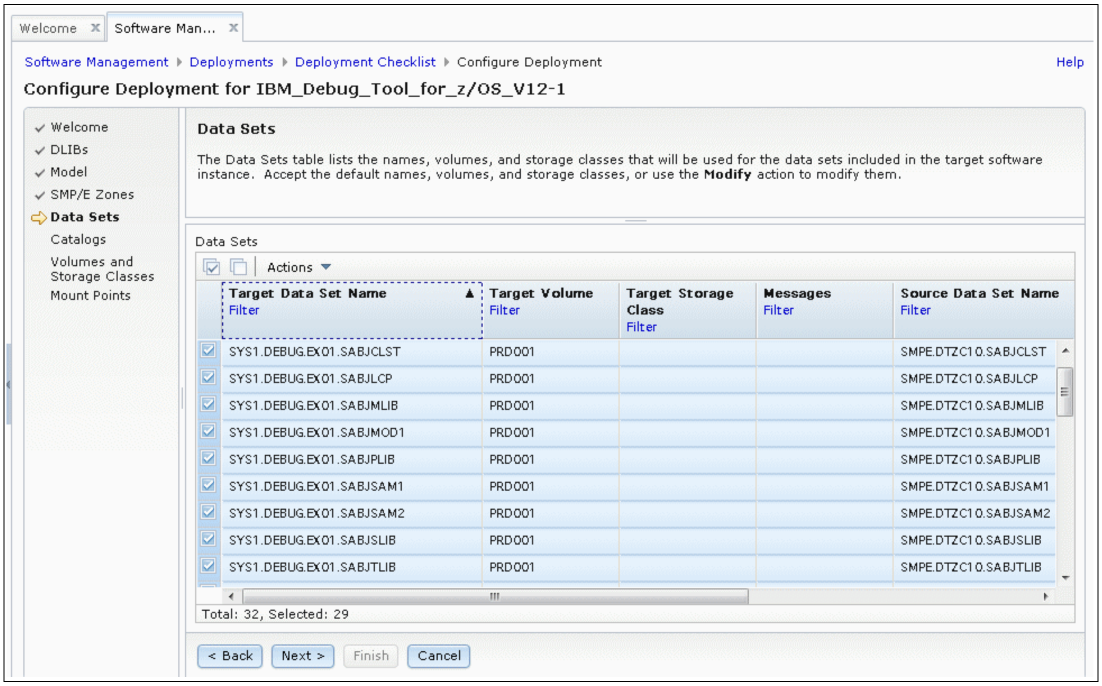
By using the Modify Data Sets window, you can change the names of the data sets and their location.

Regarding data set names, you can change only the qualifiers that were common to the selection that was made coming into the Modify Data Sets window. In our example, we selected all data sets that matched the ‘SMPE.DTZC10.**’ convention; therefore, only the first two qualifiers were common to all selected data sets. Because of this selection, the From field that is shown in Figure 12-101 is offering only the first two qualifiers to be changed.

We enter SYS1.DEBUG.EX01 in the To field. To the right of the From and To fields, you can see an example of how the definition changes the data set names. The number of qualifiers can be different between the From and To fields.

Regarding data set location, you can specify a volume (for non-SMS data sets) or a storage group (for SMS-managed data sets). In our example deployment, our data sets are non-SMS; therefore, we select a volume that is named PRD001.

After you are satisfied with your definitions, click **OK** to return to the table of data sets in the deployment, as shown in Figure 12-102.



Configure Deployment for IBM_Debug_Tool_for_z/OS_V12-1

Data Sets

The Data Sets table lists the names, volumes, and storage classes that will be used for the data sets included in the target software instance. Accept the default names, volumes, and storage classes, or use the **Modify** action to modify them.

Data Sets

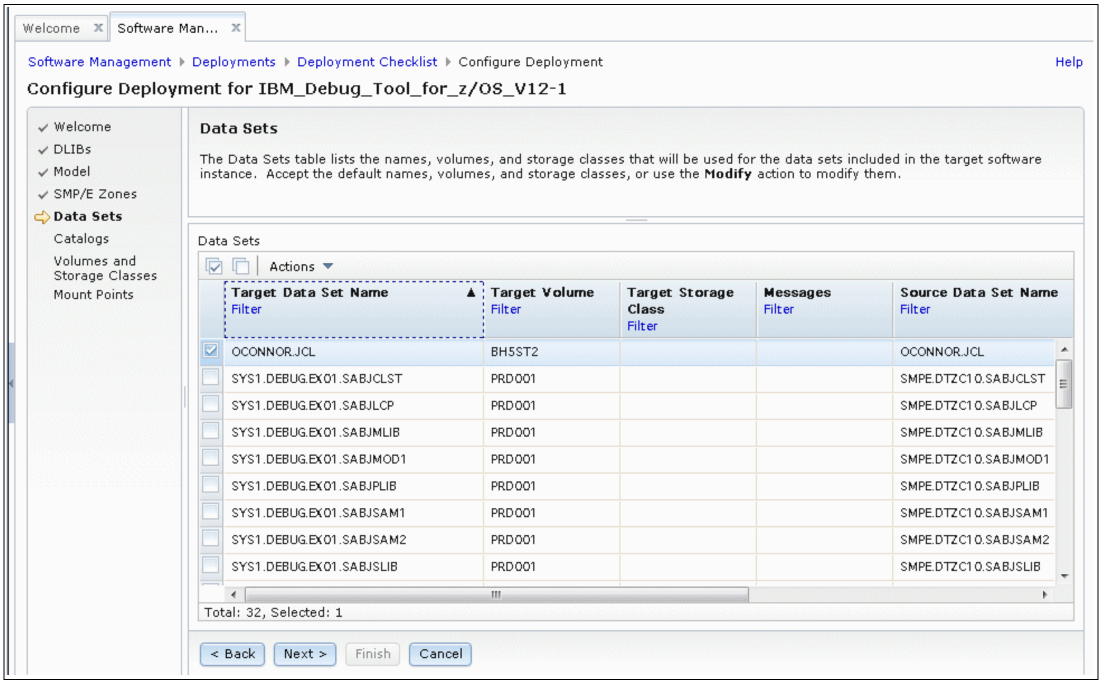
	Target Data Set Name ▲ Filter	Target Volume Filter	Target Storage Class Filter	Messages Filter	Source Data Set Name Filter
☑	SYS1.DEBUG.EX01.SABJCLST	PRD001			SMPE.DTZC10.SABJCLST
☑	SYS1.DEBUG.EX01.SABJLCP	PRD001			SMPE.DTZC10.SABJLCP
☑	SYS1.DEBUG.EX01.SABJMLIB	PRD001			SMPE.DTZC10.SABJMLIB
☑	SYS1.DEBUG.EX01.SABJMOD1	PRD001			SMPE.DTZC10.SABJMOD1
☑	SYS1.DEBUG.EX01.SABJPLIB	PRD001			SMPE.DTZC10.SABJPLIB
☑	SYS1.DEBUG.EX01.SABJSAM1	PRD001			SMPE.DTZC10.SABJSAM1
☑	SYS1.DEBUG.EX01.SABJSAM2	PRD001			SMPE.DTZC10.SABJSAM2
☑	SYS1.DEBUG.EX01.SABJSLIB	PRD001			SMPE.DTZC10.SABJSLIB
☑	SYS1.DEBUG.EX01.SABJTLIB	PRD001			SMPE.DTZC10.SABJTLIB

Total: 32, Selected: 29

Figure 12-102 Finalizing the definitions of the data sets

The Target Data Set Name column now matches the naming convention, and the Target Volume column matches the location.

Next, we select **OCONNOR.JCL** from the list of data sets, as shown in Figure 12-103.



Configure Deployment for IBM_Debug_Tool_for_z/OS_V12-1

Data Sets

The Data Sets table lists the names, volumes, and storage classes that will be used for the data sets included in the target software instance. Accept the default names, volumes, and storage classes, or use the **Modify** action to modify them.

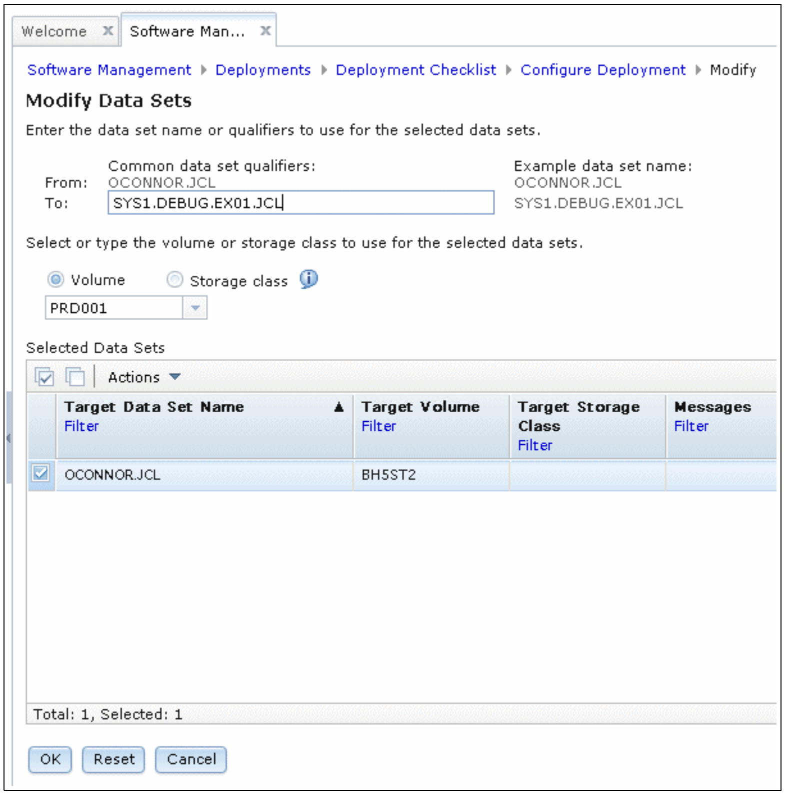
Data Sets

	Target Data Set Name ▲ Filter	Target Volume Filter	Target Storage Class Filter	Messages Filter	Source Data Set Name Filter
☑	OCONNOR.JCL	BH5ST2			OCONNOR.JCL
□	SYS1.DEBUG.EX01.SABJCLST	PRD001			SMPE.DTZC10.SABJCLST
□	SYS1.DEBUG.EX01.SABJLCP	PRD001			SMPE.DTZC10.SABJLCP
□	SYS1.DEBUG.EX01.SABJMLIB	PRD001			SMPE.DTZC10.SABJMLIB
□	SYS1.DEBUG.EX01.SABJMOD1	PRD001			SMPE.DTZC10.SABJMOD1
□	SYS1.DEBUG.EX01.SABJPLIB	PRD001			SMPE.DTZC10.SABJPLIB
□	SYS1.DEBUG.EX01.SABJSAM1	PRD001			SMPE.DTZC10.SABJSAM1
□	SYS1.DEBUG.EX01.SABJSAM2	PRD001			SMPE.DTZC10.SABJSAM2
□	SYS1.DEBUG.EX01.SABJSLIB	PRD001			SMPE.DTZC10.SABJSLIB

Total: 32, Selected: 1

Figure 12-103 Selecting a data set

Then, we change OCONNOR.JCL to the name of SYS1.DEBUG.EX01.JCL, as shown in Figure 12-104.



Welcome
Software Man...
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment ▸ Modify

Modify Data Sets

Enter the data set name or qualifiers to use for the selected data sets.

Common data set qualifiers:
From: OCONNOR.JCL
To: SYS1.DEBUG.EX01.JCL

Example data set name:
OCONNOR.JCL
SYS1.DEBUG.EX01.JCL

Select or type the volume or storage class to use for the selected data sets.

● Volume ○ Storage class

PRD001

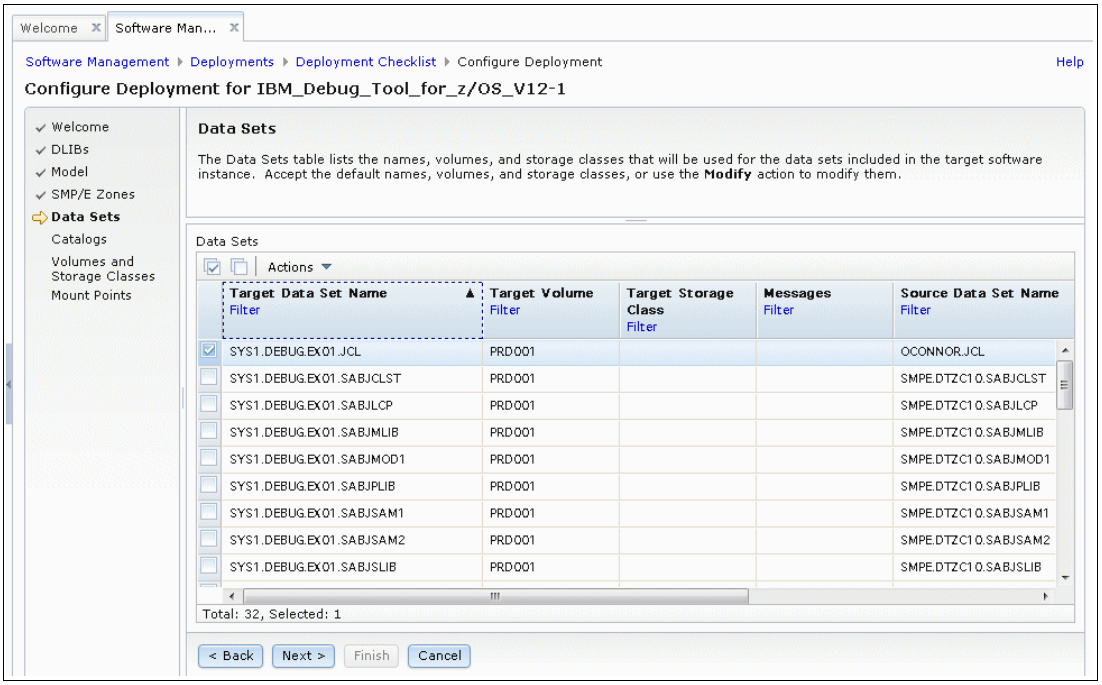
Selected Data Sets

	Target Data Set Name	Target Volume	Target Storage Class	Messages
☑	OCONNOR.JCL	BH5ST2		

Total: 1, Selected: 1

Figure 12-104 Modifying the data set

Returning to the list of data sets in the deployment, you see that the Target Data Set Name and Target Volume columns are changed, as shown in Figure 12-105.



Welcome
Software Man...
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment
Help

Configure Deployment for IBM_Debug_Tool_for_z/OS_V12-1

✓ Welcome
✓ DLIBs
✓ Model
✓ SMP/E Zones
Data Sets
Catalogs
Volumes and Storage Classes
Mount Points

Data Sets

The Data Sets table lists the names, volumes, and storage classes that will be used for the data sets included in the target software instance. Accept the default names, volumes, and storage classes, or use the **Modify** action to modify them.

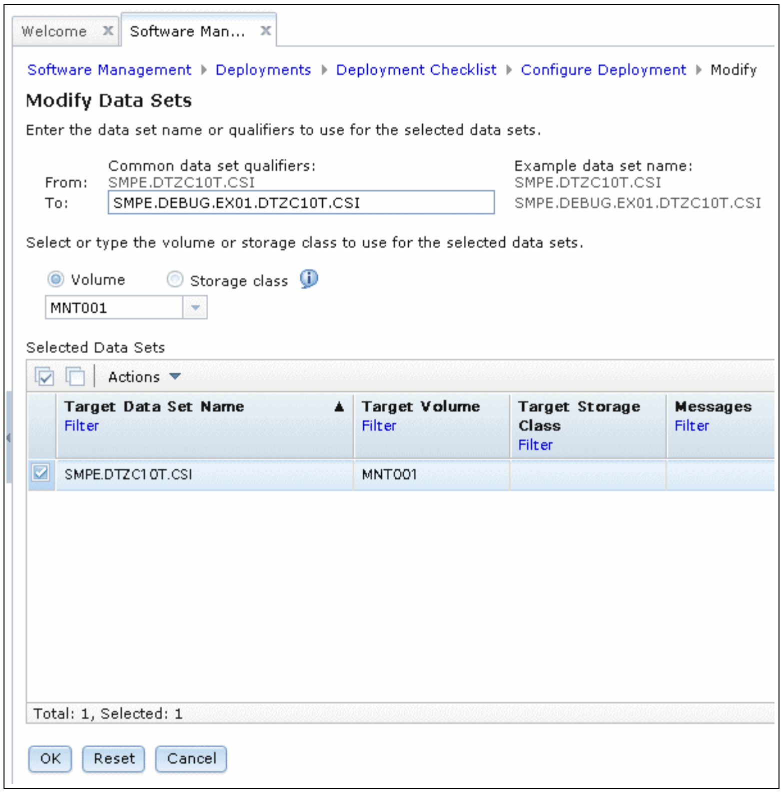
Data Sets

	Target Data Set Name	Target Volume	Target Storage Class	Messages	Source Data Set Name
☑	SYS1.DEBUG.EX01.JCL	PRD001			OCONNOR.JCL
□	SYS1.DEBUG.EX01.SABJCLST	PRD001			SMPE.DTZC10.SABJCLST
□	SYS1.DEBUG.EX01.SABJLCP	PRD001			SMPE.DTZC10.SABJLCP
□	SYS1.DEBUG.EX01.SABJMLIB	PRD001			SMPE.DTZC10.SABJMLIB
□	SYS1.DEBUG.EX01.SABJMOD1	PRD001			SMPE.DTZC10.SABJMOD1
□	SYS1.DEBUG.EX01.SABJPLIB	PRD001			SMPE.DTZC10.SABJPLIB
□	SYS1.DEBUG.EX01.SABJSAM1	PRD001			SMPE.DTZC10.SABJSAM1
□	SYS1.DEBUG.EX01.SABJSAM2	PRD001			SMPE.DTZC10.SABJSAM2
□	SYS1.DEBUG.EX01.SABJSLIB	PRD001			SMPE.DTZC10.SABJSLIB

Total: 32, Selected: 1

Figure 12-105 Modification results

Next, by using the same process, we change `SMPE.DTZC10T.CSI` to `SMPE.DEBUG.EX01.DTZC10T.CSI`, as shown in Figure 12-106.


Welcome
Software Man...
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment ▸ Modify

Modify Data Sets

Enter the data set name or qualifiers to use for the selected data sets.

	Common data set qualifiers:	Example data set name:
From:	SMPE.DTZC10T.CSI	SMPE.DTZC10T.CSI
To:	SMPE.DEBUG.EX01.DTZC10T.CSI	SMPE.DEBUG.EX01.DTZC10T.CSI

Select or type the volume or storage class to use for the selected data sets.

● Volume ○ Storage class

MNT001

Selected Data Sets

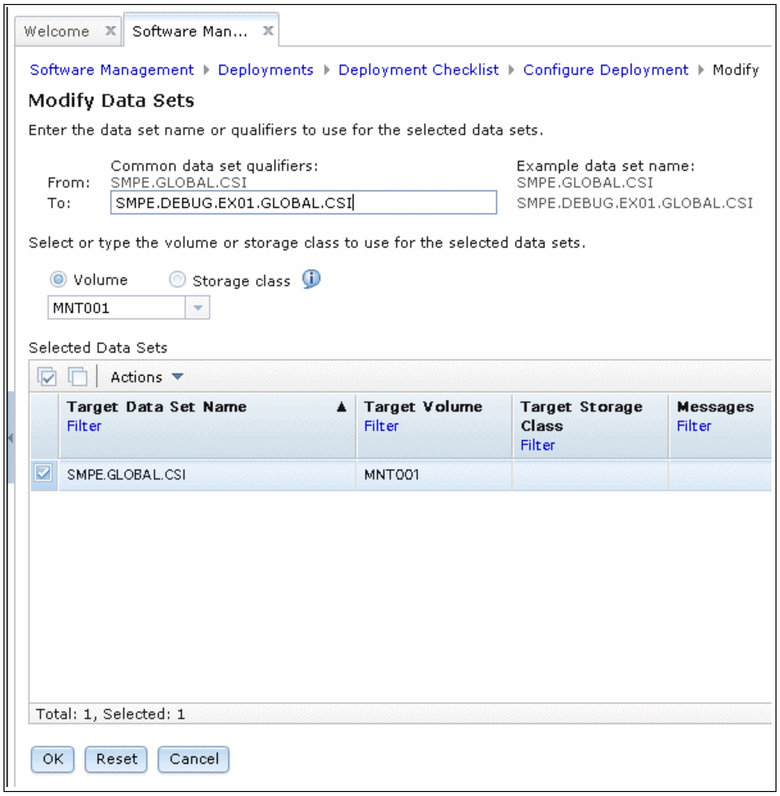
	Target Data Set Name	Target Volume	Target Storage Class	Messages
☑	SMPE.DTZC10T.CSI	MNT001		

Total: 1, Selected: 1

Figure 12-106 Modifying another data set name

In this example, we leave the `SMPE` HLQ data sets on the maintenance volume MNT001, but with a different data set name.

Finally, we change `SMPE.GLOBAL.CSI` to `SMPE.DEBUG.EX01.GLOBAL.CSI`, as shown in Figure 12-107 on page 338.


Welcome
Software Man...
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment ▸ Modify

Modify Data Sets

Enter the data set name or qualifiers to use for the selected data sets.

	Common data set qualifiers:	Example data set name:
From:	SMPE.GLOBAL.CSI	SMPE.GLOBAL.CSI
To:	SMPE.DEBUG.EX01.GLOBAL.CSI	SMPE.DEBUG.EX01.GLOBAL.CSI

Select or type the volume or storage class to use for the selected data sets.

● Volume ○ Storage class

MNT001

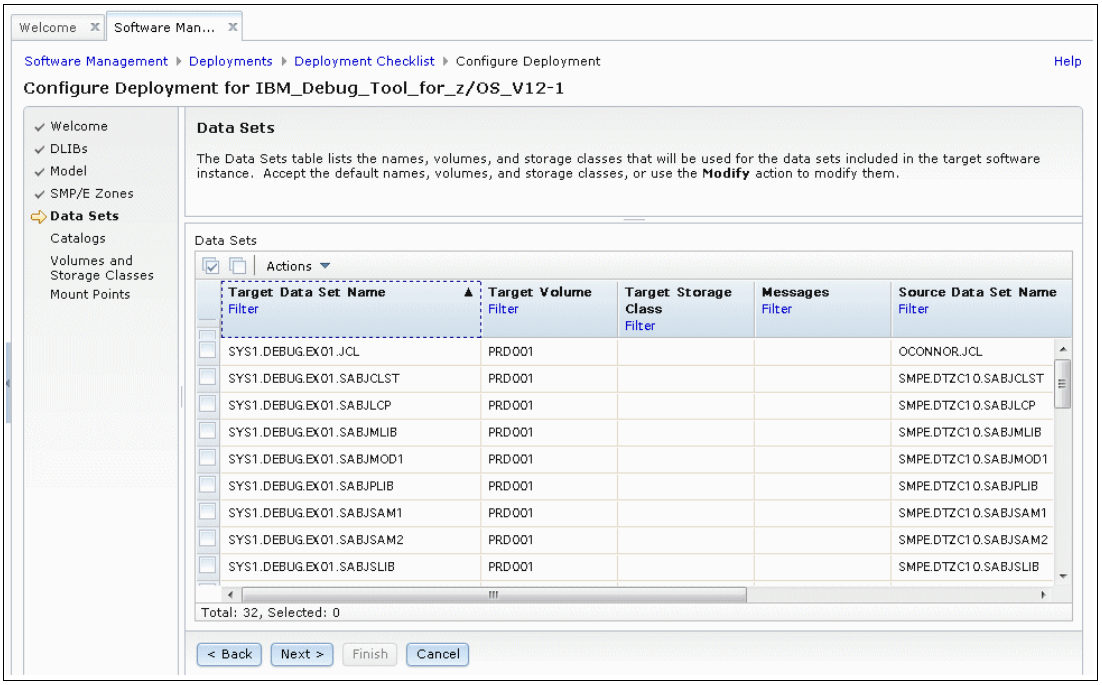
Selected Data Sets

	Target Data Set Name	Target Volume	Target Storage Class	Messages
☑	SMPE.GLOBAL.CSI	MNT001		

Total: 1, Selected: 1

Figure 12-107 Modifying a third data set name

All of the data set definitions are now configured the way that we want, as shown in Figure 12-108.


Welcome
Software Man...
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment
Help

Configure Deployment for IBM_Debug_Tool_for_z/OS_V12-1

✓ Welcome
✓ DLIBs
✓ Model
✓ SMP/E Zones
Data Sets
Catalogs
Volumes and Storage Classes
Mount Points

Data Sets

The Data Sets table lists the names, volumes, and storage classes that will be used for the data sets included in the target software instance. Accept the default names, volumes, and storage classes, or use the **Modify** action to modify them.

Data Sets

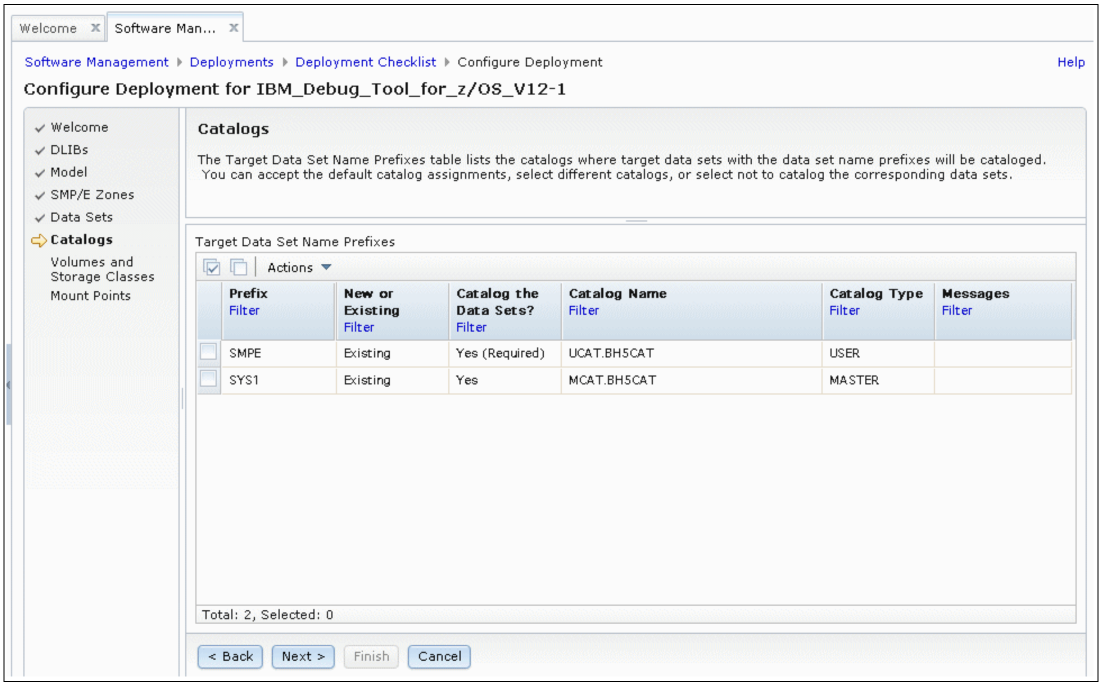
	Target Data Set Name	Target Volume	Target Storage Class	Messages	Source Data Set Name
□	SYS1.DEBUG.EX01.JCL	PRD001			OCONNOR.JCL
□	SYS1.DEBUG.EX01.SABJCLST	PRD001			SMPE.DTZC10.SABJCLST
□	SYS1.DEBUG.EX01.SABJLCP	PRD001			SMPE.DTZC10.SABJLCP
□	SYS1.DEBUG.EX01.SABJMLIB	PRD001			SMPE.DTZC10.SABJMLIB
□	SYS1.DEBUG.EX01.SABJMOD1	PRD001			SMPE.DTZC10.SABJMOD1
□	SYS1.DEBUG.EX01.SABJPLIB	PRD001			SMPE.DTZC10.SABJPLIB
□	SYS1.DEBUG.EX01.SABJSAM1	PRD001			SMPE.DTZC10.SABJSAM1
□	SYS1.DEBUG.EX01.SABJSAM2	PRD001			SMPE.DTZC10.SABJSAM2
□	SYS1.DEBUG.EX01.SABJSLIB	PRD001			SMPE.DTZC10.SABJSLIB

Total: 32, Selected: 0

Figure 12-108 Data set definitions configured

Click **Next**.

In the next part of the Configure Deployment wizard, the cataloging options are defined for the data sets that are included in the deployment, as shown in Figure 12-109.



Welcome
Software Man...
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment
Help
Configure Deployment for IBM_Debug_Tool_for_z/OS_V12-1
✓ Welcome
✓ DLIBs
✓ Model
✓ SMP/E Zones
✓ Data Sets
Catalogs
Volumes and Storage Classes
Mount Points
Catalogs
Target Data Set Name Prefixes
Actions
< Back
Next >
Finish
Cancel

The Target Data Set Name Prefixes table lists the catalogs where target data sets with the data set name prefixes will be cataloged. You can accept the default catalog assignments, select different catalogs, or select not to catalog the corresponding data sets.

	Prefix	New or Existing	Catalog the Data Sets?	Catalog Name	Catalog Type	Messages
☐	SMPE	Existing	Yes (Required)	UCAT.BH5CAT	USER	
☐	SYS1	Existing	Yes	MCAT.BH5CAT	MASTER	

Total: 2, Selected: 0

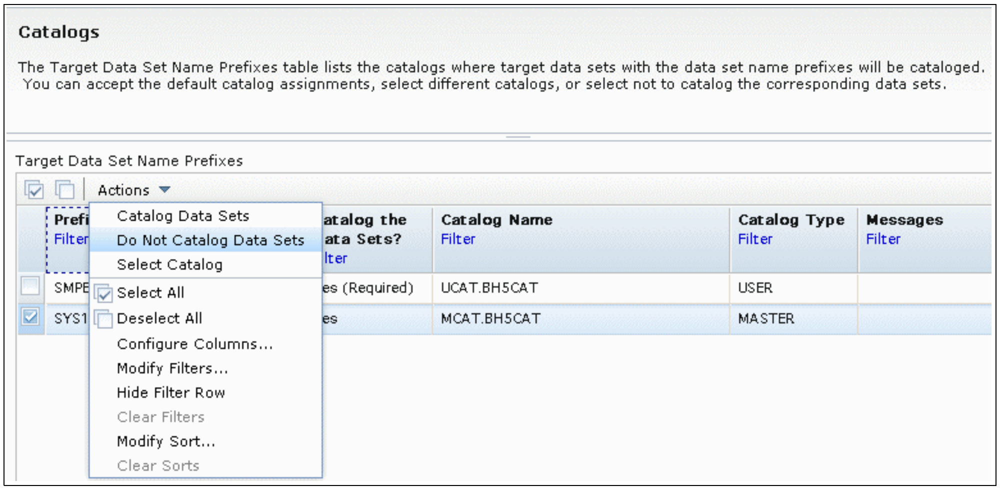
Figure 12-109 Defining catalog options

In our example, we use two HLQs: SMPE and SYS1.

Because the SMPE HLQ in our test environment is for maintenance data sets, we want these data sets to be cataloged.

The SYS1 HLQ in our test environment is for production data sets. We imagine that some other process is available for managing the cataloging of production data sets. Therefore, we want these data sets to be deployed uncataloged in our example.

To specify that the SYS1 HLQ data sets are not cataloged, we select the SYS1 HLQ in the target data set name prefix table. Then, we click **Actions** and select **Do Not Catalog Data Sets**, as shown in Figure 12-110.

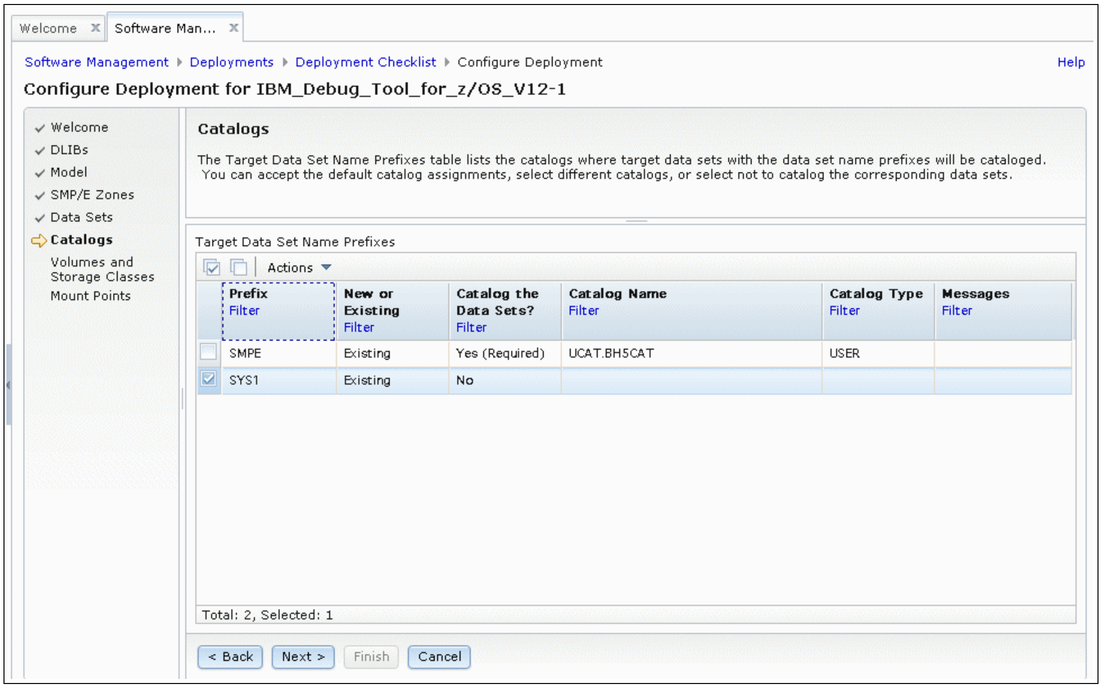


The Target Data Set Name Prefixes table lists the catalogs where target data sets with the data set name prefixes will be cataloged. You can accept the default catalog assignments, select different catalogs, or select not to catalog the corresponding data sets.

	Prefi	atalog the ata Sets?	Catalog Name	Catalog Type	Messages
☐	SMPE	es (Required)	UCAT.BH5CAT	USER	
☑	SYS1	es	MCAT.BH5CAT	MASTER	

Figure 12-110 Selecting the Do Not Catalog Data Sets option

The Catalog the Data Sets column now indicates No for the SYS1 HLQ, as shown in Figure 12-111.



Welcome ✕ | Software Man... ✕

Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment — Help

Configure Deployment for IBM_Debug_Tool_for_z/OS_V12-1

- ✓ Welcome
- ✓ DLIBs
- ✓ Model
- ✓ SMP/E Zones
- ✓ Data Sets
- ⇨ **Catalogs**
- Volumes and Storage Classes
- Mount Points

Catalogs

The Target Data Set Name Prefixes table lists the catalogs where target data sets with the data set name prefixes will be cataloged. You can accept the default catalog assignments, select different catalogs, or select not to catalog the corresponding data sets.

Target Data Set Name Prefixes

Actions ▾

	Prefix Filter	New or Existing Filter	Catalog the Data Sets? Filter	Catalog Name Filter	Catalog Type Filter	Messages Filter
□	SMPE	Existing	Yes (Required)	UCAT.BH5CAT	USER	
☑	SYS1	Existing	No			

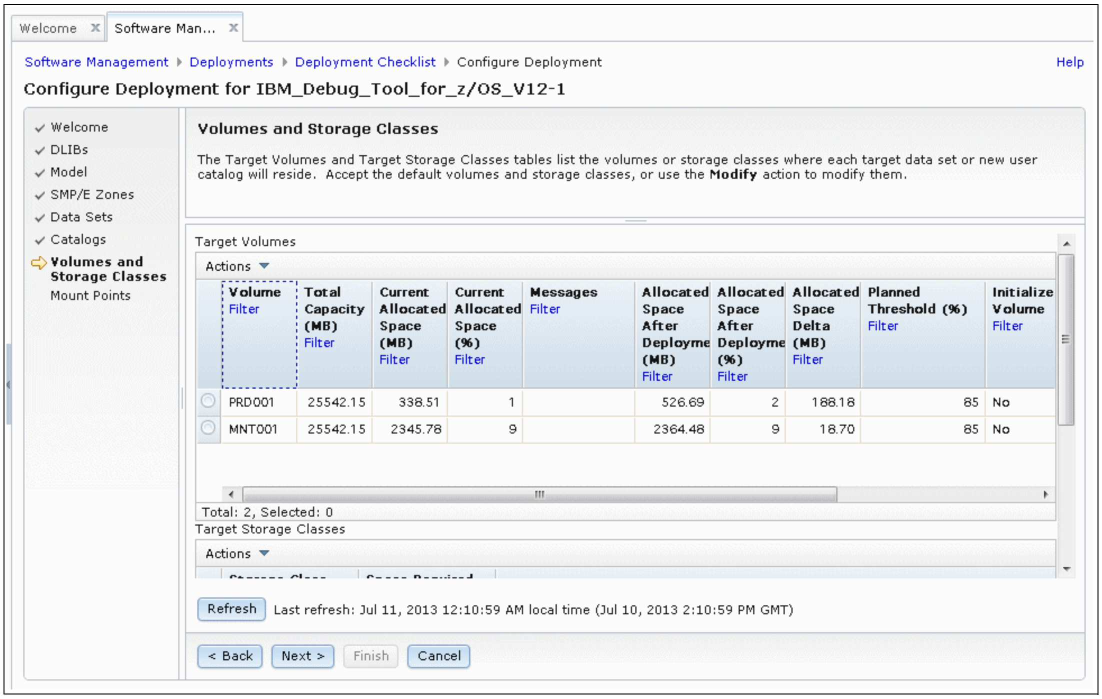
Total: 2, Selected: 1

< Back | Next > | Finish | Cancel

Figure 12-111 SYS1 HLQ set to No

Click **Next**.

In the next part of the configure deployment wizard, settings are defined for DASD volumes and storage classes, as shown in Figure 12-112.



Welcome ✕ | Software Man... ✕

Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment — Help

Configure Deployment for IBM_Debug_Tool_for_z/OS_V12-1

- ✓ Welcome
- ✓ DLIBs
- ✓ Model
- ✓ SMP/E Zones
- ✓ Data Sets
- ✓ Catalogs
- ⇨ **Volumes and Storage Classes**
- Mount Points

Volumes and Storage Classes

The Target Volumes and Target Storage Classes tables list the volumes or storage classes where each target data set or new user catalog will reside. Accept the default volumes and storage classes, or use the **Modify** action to modify them.

Target Volumes

Actions ▾

	Volume Filter	Total Capacity (MB) Filter	Current Allocated Space (MB) Filter	Current Allocated Space (%) Filter	Messages Filter	Allocated Space After Deployme (MB) Filter	Allocated Space After Deployme (%) Filter	Allocated Space Delta (MB) Filter	Planned Threshold (%) Filter	Initialize Volume Filter
○	PRD001	25542.15	338.51	1		526.69	2	188.18	85	No
○	MNT001	25542.15	2345.78	9		2364.48	9	18.70	85	No

Total: 2, Selected: 0

Target Storage Classes

Actions ▾

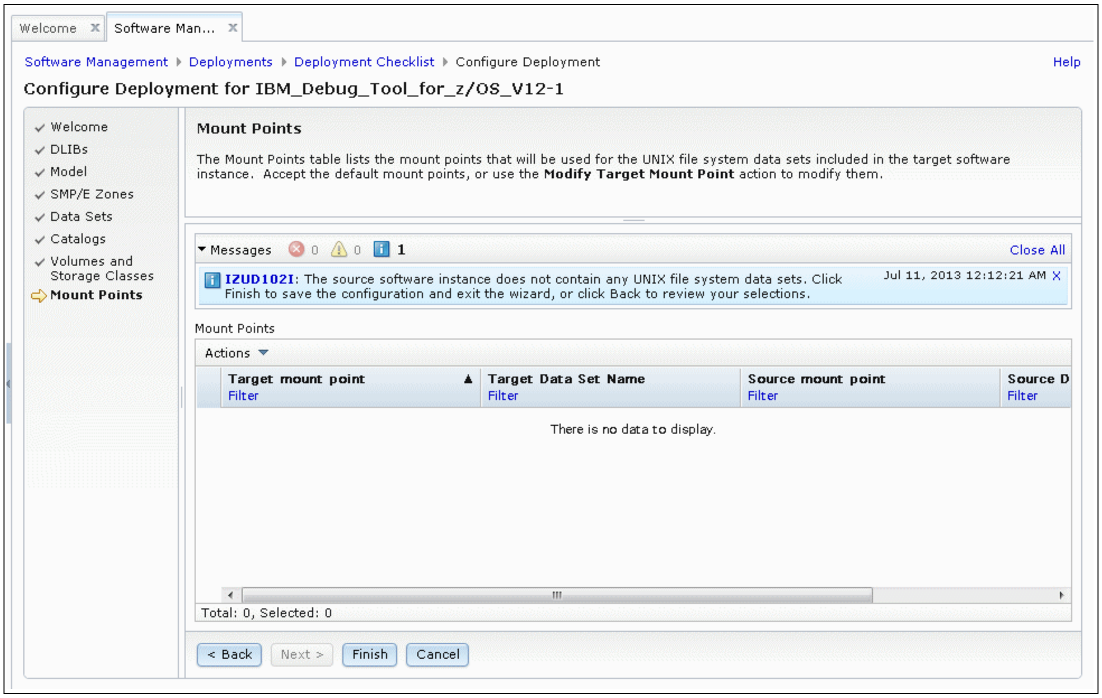
Refresh | Last refresh: Jul 11, 2013 12:10:59 AM local time (Jul 10, 2013 2:10:59 PM GMT)

< Back | Next > | Finish | Cancel

Figure 12-112 Defining settings for DASD volumes and storage classes

Click **Next**.

In the next part of the configure deployment wizard, settings for UNIX System Services mount points are defined, as shown in Figure 12-113.



Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment

Configure Deployment for IBM_Debug_Tool_for_z/OS_V12-1

Mount Points

The Mount Points table lists the mount points that will be used for the UNIX file system data sets included in the target software instance. Accept the default mount points, or use the **Modify Target Mount Point** action to modify them.

IZUD102I: The source software instance does not contain any UNIX file system data sets. Click Finish to save the configuration and exit the wizard, or click Back to review your selections. Jul 11, 2013 12:12:21 AM ✕

Mount Points

Target mount point ▲ Filter	Target Data Set Name Filter	Source mount point Filter	Source D Filter

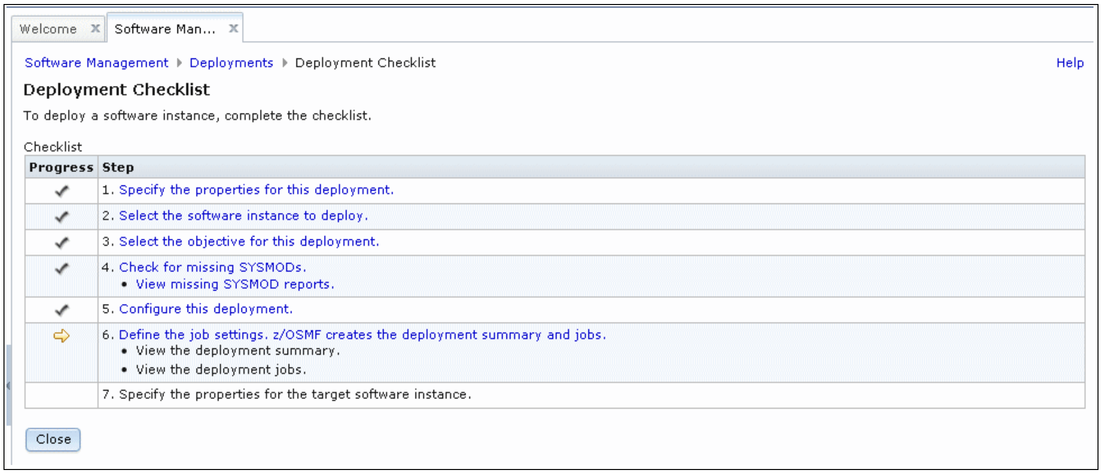
There is no data to display.

Total: 0, Selected: 0

Figure 12-113 Define settings for UNIX System Services

Because the product in our example does not include any UNIX System Services HFS or zFS data sets, no mount points need to be considered.

The Configure Deployment wizard is now complete. Click **Finish** to return to the Deployment Checklist, as shown in Figure 12-114.



Software Management ▸ Deployments ▸ Deployment Checklist

Deployment Checklist

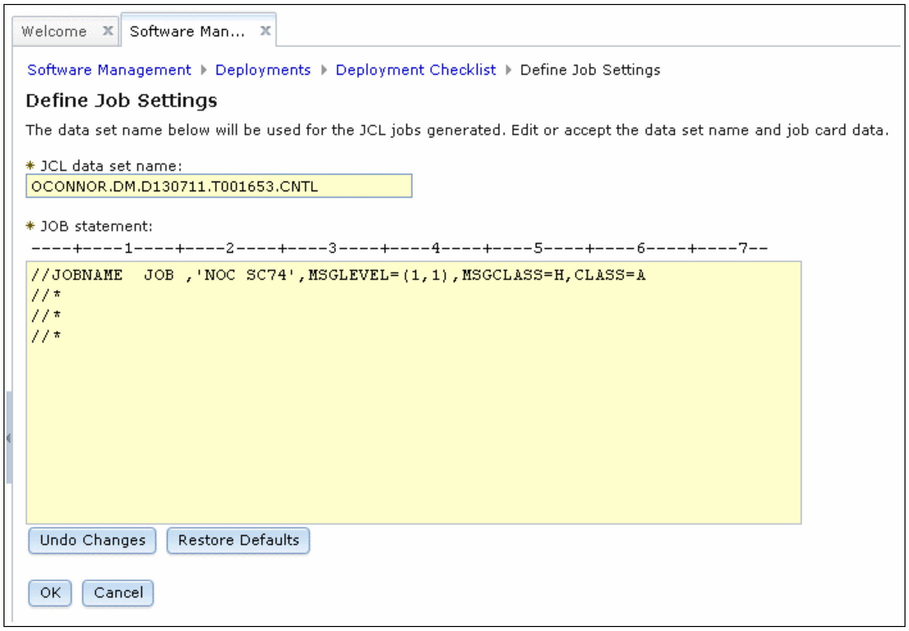
To deploy a software instance, complete the checklist.

Checklist

Progress	Step
✓	1. Specify the properties for this deployment.
✓	2. Select the software instance to deploy.
✓	3. Select the objective for this deployment.
✓	4. Check for missing SYSMODs. • View missing SYSMOD reports.
✓	5. Configure this deployment.
⇨	6. Define the job settings. z/OSMF creates the deployment summary and jobs. • View the deployment summary. • View the deployment jobs.
	7. Specify the properties for the target software instance.

Figure 12-114 Returning to the development checklist

The next step in the Deployment Checklist is to define the job settings of the deployment, as shown in Figure 12-115.



Software Management ▸ Deployments ▸ Deployment Checklist ▸ Define Job Settings

Define Job Settings

The data set name below will be used for the JCL jobs generated. Edit or accept the data set name and job card data.

* JCL data set name: OCONNOR.DM.D130711.T001653.CNTL

* JOB statement:

```
----+----1----+----2----+----3----+----4----+----5----+----6----+----7--
//JOBNAME  JOB ,'NOC SC74',MSGLEVEL=(1,1),MSGCLASS=H,CLASS=A
//*
//*
//*
```

Figure 12-115   Define Job Settings

The output of the Software Management Deployment Checklist is a JCL data set that includes members to perform the actual deployment. Software Management does not submit the generated jobs automatically; instead, you must log on to TSO and submit each job in sequence. The JCL data set uses the following naming convention:

userid.DM.D*yymmdd*.T*hhmmss*.CNTL

Although the name of the JCL data set can be changed, the preferred practice is to use the default.

The parameters on the job statement can be modified to suit the system where the jobs run. This configuration typically is necessary for accounting information, CLASS, MSGCLASS, and MSGLEVEL.

Although the job name can be modified, Software Management does not use it; instead, Software Management generates its own predefined job names by using a naming convention, as shown in the following example:

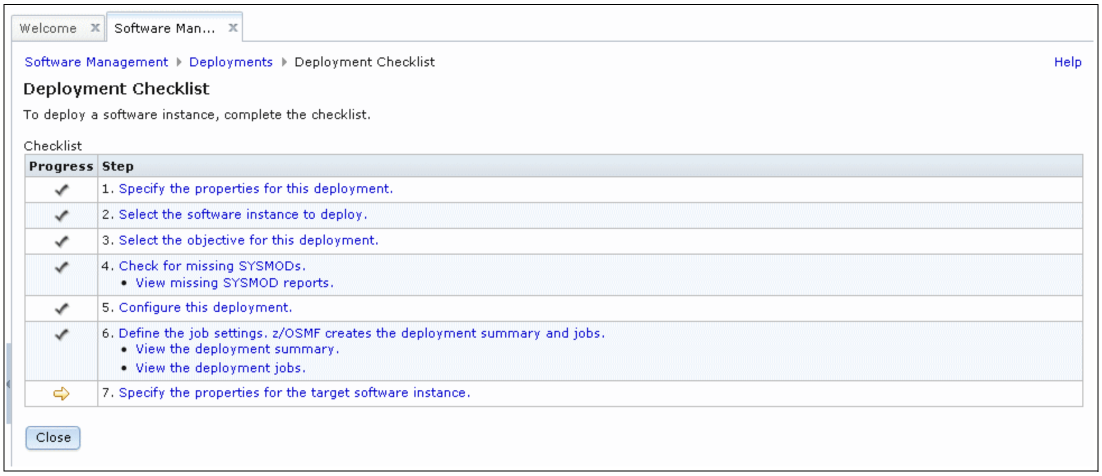
IZUD*nnff*

Where:

- *nn* is a sequential increment starting from 01
- *ff* is the function of the job, such as:
  - CP: Copy data sets
  - DD: Delete data sets
  - DS: Delete source memory dump data sets
  - DT: Delete memory dump data sets
  - DU: Dump data sets
  - FT: FTP memory dump data sets
  - IV: Initialize DASD volumes
  - RM: Read me

- RN: Rename data sets
- RS: Restore data sets
- IBM UC™: Update SMP/E CSI

After the job setting is defined, click **OK** to return to the deployment checklist, as shown in Figure 12-116.



Deployment Checklist

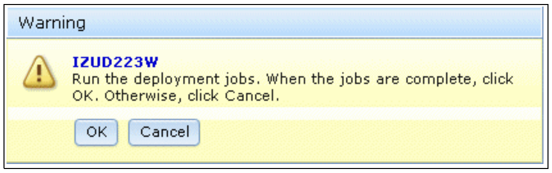
To deploy a software instance, complete the checklist.

Checklist

Progress	Step
✓	1. Specify the properties for this deployment.
✓	2. Select the software instance to deploy.
✓	3. Select the objective for this deployment.
✓	4. Check for missing SYSMODs. • View missing SYSMOD reports.
✓	5. Configure this deployment.
✓	6. Define the job settings. z/OSMF creates the deployment summary and jobs. • View the deployment summary. • View the deployment jobs.
⇨	7. Specify the properties for the target software instance.

Figure 12-116 Deployment Checklist

At this point of the deployment checklist, the jobs in the `userid.DM.Dyymmdd.Thhmmss.CNTL` data set are meant to be run in sequence, which means you log on to TSO on the system that is the target of the deployment, submit each job, and check the output for successful execution. It is only after all the jobs complete that you should proceed to the final step of the deployment checklist. If you select the final step of the deployment checklist, a warning message is displayed, as shown in Figure 12-117.

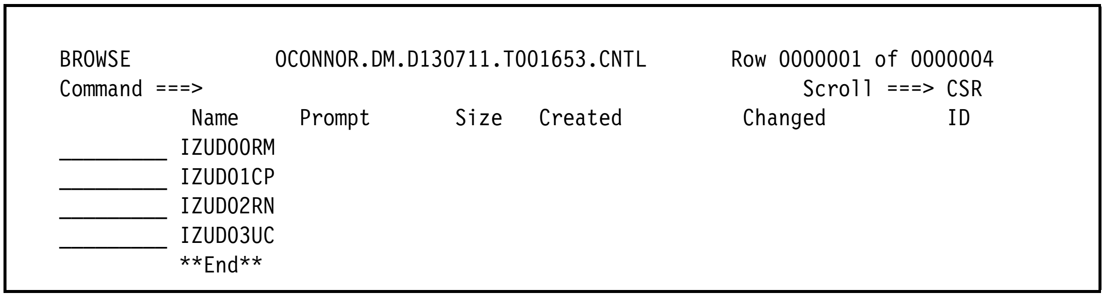


IZUD223W
Run the deployment jobs. When the jobs are complete, click OK. Otherwise, click Cancel.

Figure 12-117 IZUD223W warning message

If the deployment jobs are not run, click **Cancel** to avoid prematurely marking the deployment as being complete. We do this step again later in our example deployment after we run the jobs in `userid.DM.Dyymmdd.Thhmmss.CNTL`.

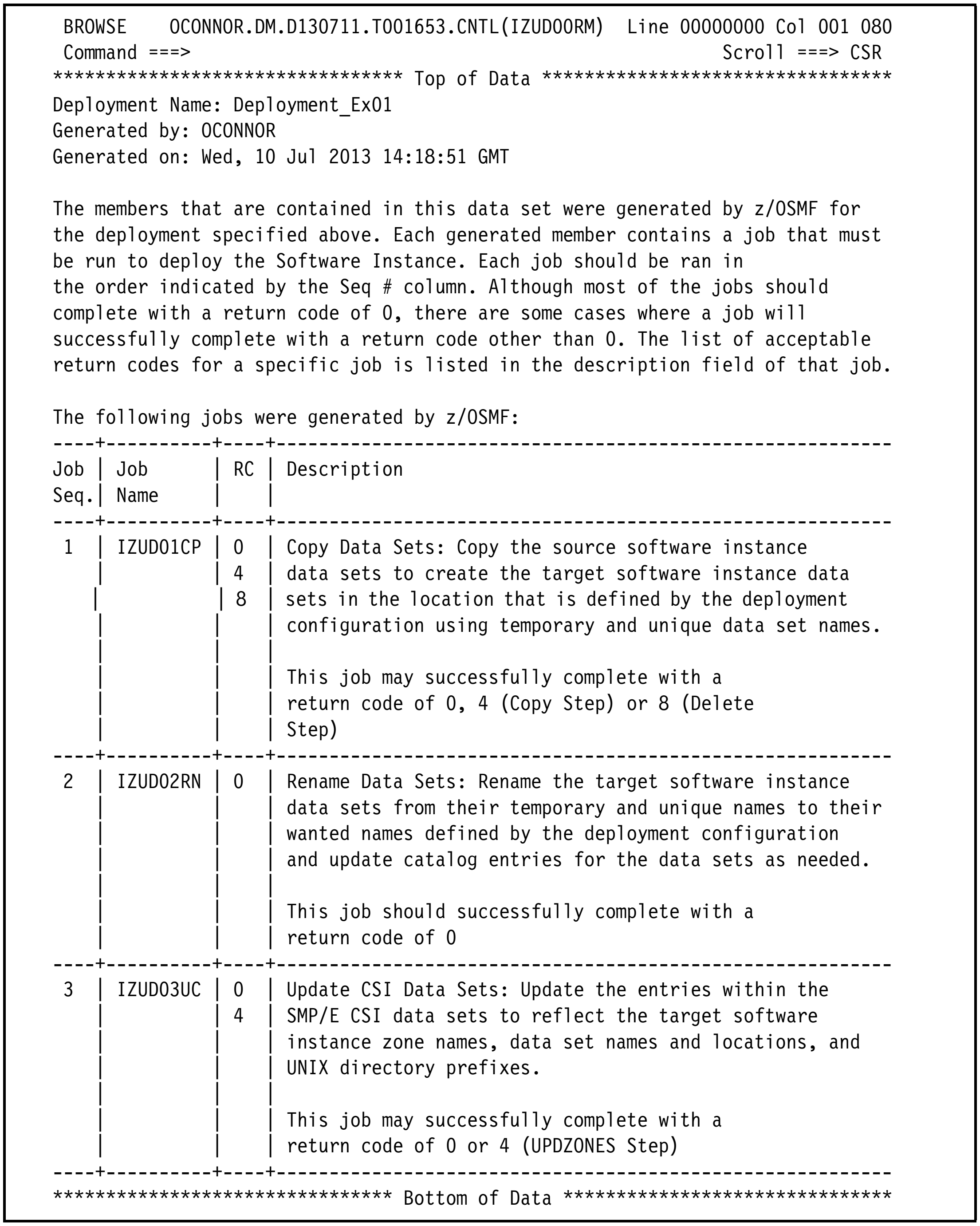
The jobs that are generated by our example deployment are shown in Figure 12-118.



```
BROWSE          OCONNOR.DM.D130711.T001653.CNTL      Row 0000001 of 0000004
Command ===>                                                  Scroll ===> CSR
           Name     Prompt       Size   Created          Changed          ID
_________ IZUD00RM
_________ IZUD01CP
_________ IZUD02RN
_________ IZUD03UC
          **End**
```

Figure 12-118 Generated JCL data set

The IZUD00RM (read me) member (see Figure 12-119), includes documentation about the other members in the *userid*.DM.D*yymmdd*.T*hhmmss*.CNTL data set.



```
 BROWSE    OCONNOR.DM.D130711.T001653.CNTL(IZUD00RM)  Line 00000000 Col 001 080
 Command ===>                                                  Scroll ===> CSR
********************************** Top of Data *********************************
Deployment Name: Deployment_Ex01
Generated by: OCONNOR
Generated on: Wed, 10 Jul 2013 14:18:51 GMT

The members that are contained in this data set were generated by z/OSMF for
the deployment specified above. Each generated member contains a job that must
be run to deploy the Software Instance. Each job should be ran in
the order indicated by the Seq # column. Although most of the jobs should
complete with a return code of 0, there are some cases where a job will
successfully complete with a return code other than 0. The list of acceptable
return codes for a specific job is listed in the description field of that job.

The following jobs were generated by z/OSMF:
----+----------+----+------------------------------------------------------------
Job | Job      | RC | Description
Seq.| Name     |    |
----+----------+----+------------------------------------------------------------
 1  | IZUD01CP | 0  | Copy Data Sets: Copy the source software instance
    |          | 4  | data sets to create the target software instance data
    |          | 8  | sets in the location that is defined by the deployment
    |          |    | configuration using temporary and unique data set names.
    |          |    |
    |          |    | This job may successfully complete with a
    |          |    | return code of 0, 4 (Copy Step) or 8 (Delete
    |          |    | Step)
----+----------+----+------------------------------------------------------------
 2  | IZUD02RN | 0  | Rename Data Sets: Rename the target software instance
    |          |    | data sets from their temporary and unique names to their
    |          |    | wanted names defined by the deployment configuration
    |          |    | and update catalog entries for the data sets as needed.
    |          |    |
    |          |    | This job should successfully complete with a
    |          |    | return code of 0
----+----------+----+------------------------------------------------------------
 3  | IZUD03UC | 0  | Update CSI Data Sets: Update the entries within the
    |          | 4  | SMP/E CSI data sets to reflect the target software
    |          |    | instance zone names, data set names and locations, and
    |          |    | UNIX directory prefixes.
    |          |    |
    |          |    | This job may successfully complete with a
    |          |    | return code of 0 or 4 (UPDZONES Step)
----+----------+----+------------------------------------------------------------
******************************** Bottom of Data ********************************
```

Figure 12-119 Software Management read me member

To deploy software by using Software Management, complete the following steps:

1. Delete any target instance data sets.
2. Copy (if the source and target instances are on the same system) or restore (if the source instance was dumped from a remote system) the new data sets into temporary names. The temporary names are based on the final names with a “`.#`” suffix. For example, ‘`SYS1.ABC.LINKLIB`’ is copied or restored as ‘`SYS1.ABC.LINKLIB.#`’. This technique avoids ENQ conflicts in certain circumstances; for example, when writing to an alternative sysres.
3. Rename the temporary named data sets to their final names.
4. Update the DDDEFs in the SMP/E zones to match the final data set names.

The best way to understand how Software Management deploys software is to examine the JCL it generates. Depending on the environment, the location of the source and target instances, and the type of deployment, Software Management can generate a different number of jobs. For example, if you are deploying the operating system, a job might be generated to start a new set of sysres volumes. If the target instance data sets exist, a job is generated to delete them.

Because our first example deployment is purposely simple, the minimum number of jobs are generated. Next, we take a closer look at what each of these jobs do.

Example 12-1 shows the IZUD01CP job. Each step in the job is highlighted in black so that their purpose can be explained.

Example 12-1 IZUD01CP job

```
//IZUD01CP JOB ,'NOC SC74',MSGLEVEL=(1,1),MSGCLASS=H,CLASS=A
//*
//*
//*
//*****************************************************************
//* This job was generated by z/OSMF on
//* Wed, 10 Jul 2013 14:18:51 GMT
//*****************************************************************
//*
//******************************************************************
//*                                                                *
//* This job copies the source software instance to the target     *
//* data sets.  This job deletes previously allocated target       *
//* data sets (if job was previously run).  It then copies         *
//* the identified source data sets into the target locations.     *
//*                                                                *
//*   NOTE: A temporary low-level qualifier is appended to all     *
//*   non-VSAM or zFS target data set names, and are removed       *
//*   in a subsequent Software Deployment job.                     *
//*                                                                *
//******************************************************************
//*
//******************************************************************
//*                                                                *
//* This step deletes uncataloged target data sets to ensure the   *
//* job may be rerun. Expect RC=8 if the target data sets do not   *
//* exist.                                                         *
//*                                                                *
//******************************************************************
//*
//DEL1 EXEC PGM=IEHPROGM,REGION=0M
//SYSPRINT DD   SYSOUT=*
//DDPRD001 DD   VOL=SER=PRD001,UNIT=3390,DISP=SHR
```

```
//SYSIN    DD   *
  SCRATCH DSNAME=SYS1.DEBUG.EX01.JCL.#,                                +
               VOL=3390=PRD001,                                        +
               PURGE
  SCRATCH DSNAME=SYS1.DEBUG.EX01.SABJCLST.#,                           +
               VOL=3390=PRD001,                                        +
               PURGE
  SCRATCH DSNAME=SYS1.DEBUG.EX01.SABJLCP.#,                            +
               VOL=3390=PRD001,                                        +
               PURGE
  SCRATCH DSNAME=SYS1.DEBUG.EX01.SABJMLIB.#,                           +
               VOL=3390=PRD001,                                        +
               PURGE
  SCRATCH DSNAME=SYS1.DEBUG.EX01.SABJMOD1.#,                           +
               VOL=3390=PRD001,                                        +
               PURGE
  SCRATCH DSNAME=SYS1.DEBUG.EX01.SABJPLIB.#,                           +
               VOL=3390=PRD001,                                        +
               PURGE
  SCRATCH DSNAME=SYS1.DEBUG.EX01.SABJSAM1.#,                           +
               VOL=3390=PRD001,                                        +
               PURGE
  SCRATCH DSNAME=SYS1.DEBUG.EX01.SABJSAM2.#,                           +
               VOL=3390=PRD001,                                        +
               PURGE
  SCRATCH DSNAME=SYS1.DEBUG.EX01.SABJSLIB.#,                           +
               VOL=3390=PRD001,                                        +
               PURGE
  SCRATCH DSNAME=SYS1.DEBUG.EX01.SABJTLIB.#,                           +
               VOL=3390=PRD001,                                        +
               PURGE
  SCRATCH DSNAME=SYS1.DEBUG.EX01.SEQAAUTH.#,                           +
               VOL=3390=PRD001,                                        +
               PURGE
  SCRATCH DSNAME=SYS1.DEBUG.EX01.SEQABIN.#,                            +
               VOL=3390=PRD001,                                        +
               PURGE
  SCRATCH DSNAME=SYS1.DEBUG.EX01.SEQABMOD.#,                           +
               VOL=3390=PRD001,                                        +
               PURGE
  SCRATCH DSNAME=SYS1.DEBUG.EX01.SEQAEXEC.#,                           +
               VOL=3390=PRD001,                                        +
               PURGE
  SCRATCH DSNAME=SYS1.DEBUG.EX01.SEQALPA.#,                            +
               VOL=3390=PRD001,                                        +
               PURGE
  SCRATCH DSNAME=SYS1.DEBUG.EX01.SEQAMENP.#,                           +
               VOL=3390=PRD001,                                        +
               PURGE
  SCRATCH DSNAME=SYS1.DEBUG.EX01.SEQAMENU.#,                           +
               VOL=3390=PRD001,                                        +
               PURGE
  SCRATCH DSNAME=SYS1.DEBUG.EX01.SEQAMOD.#,                            +
               VOL=3390=PRD001,                                        +
               PURGE
  SCRATCH DSNAME=SYS1.DEBUG.EX01.SEQAPENP.#,                           +
               VOL=3390=PRD001,                                        +
               PURGE
  SCRATCH DSNAME=SYS1.DEBUG.EX01.SEQAPENU.#,                           +
               VOL=3390=PRD001,                                        +
               PURGE
  SCRATCH DSNAME=SYS1.DEBUG.EX01.SEQASAMP.#,                           +
               VOL=3390=PRD001,                                        +
               PURGE
  SCRATCH DSNAME=SYS1.DEBUG.EX01.SEQASENP.#,                           +
               VOL=3390=PRD001,                                        +
               PURGE
  SCRATCH DSNAME=SYS1.DEBUG.EX01.SEQASENU.#,                           +
               VOL=3390=PRD001,                                        +
               PURGE
  SCRATCH DSNAME=SYS1.DEBUG.EX01.SEQATLIB.#,                           +
               VOL=3390=PRD001,                                        +
               PURGE
  SCRATCH DSNAME=SYS1.DEBUG.EX01.SMPLOG.#,                             +
               VOL=3390=PRD001,                                        +
               PURGE
  SCRATCH DSNAME=SYS1.DEBUG.EX01.SMPLOGA.#,                            +
               VOL=3390=PRD001,                                        +
               PURGE
  SCRATCH DSNAME=SYS1.DEBUG.EX01.SMPLTS.#,                             +
               VOL=3390=PRD001,                                        +
               PURGE
  SCRATCH DSNAME=SYS1.DEBUG.EX01.SMPMTS.#,                             +
               VOL=3390=PRD001,                                        +
               PURGE
  SCRATCH DSNAME=SYS1.DEBUG.EX01.SMPSCDS.#,                            +
               VOL=3390=PRD001,                                        +
               PURGE
  SCRATCH DSNAME=SYS1.DEBUG.EX01.SMPSTS.#,                             +
               VOL=3390=PRD001,                                        +
               PURGE
//*
//********************************************************************
//*                                                                  *
//* This step copies the source data sets into the target data       *
//* sets. A return code of 4 is acceptable.                          *
//* NOTE: Any changes to the SYSIN statements of this step will      *
//* result in failure.                                               *
//*                                                                  *
//********************************************************************
//*
//COPY1 EXEC PGM=GIMADR,COND=(8,LT,DEL1),REGION=0M,
//         PARM='KEY=CD5750402A97EFAD3F92A64D206F5434'
//SYSPRINT DD   SYSOUT=*
//SYSIN    DD    *
  /* Wed, 10 Jul 2013 14:18:51 GMT */
  COPY DS(INCLUDE( -
    OCONNOR.JCL -
    SMPE.DTZC10.SABJCLST -
    SMPE.DTZC10.SABJLCP -
    SMPE.DTZC10.SABJMLIB -
    SMPE.DTZC10.SABJMOD1 -
    SMPE.DTZC10.SABJPLIB -
    SMPE.DTZC10.SABJSAM1 -
    SMPE.DTZC10.SABJSAM2 -
    SMPE.DTZC10.SABJSLIB -
    SMPE.DTZC10.SABJTLIB -
    SMPE.DTZC10.SEQAAUTH -
    SMPE.DTZC10.SEQABIN -
    SMPE.DTZC10.SEQABMOD -
    SMPE.DTZC10.SEQAEXEC -
    SMPE.DTZC10.SEQALPA -
    SMPE.DTZC10.SEQAMENP -
    SMPE.DTZC10.SEQAMENU -
    SMPE.DTZC10.SEQAMOD -
    SMPE.DTZC10.SEQAPENP -
    SMPE.DTZC10.SEQAPENU -
    SMPE.DTZC10.SEQASAMP -
    SMPE.DTZC10.SEQASENP -
    SMPE.DTZC10.SEQASENU -
    SMPE.DTZC10.SEQATLIB -
    SMPE.DTZC10.SMPLOG -
    SMPE.DTZC10.SMPLOGA -
    SMPE.DTZC10.SMPLTS -
    SMPE.DTZC10.SMPMTS -
    SMPE.DTZC10.SMPSCDS -
    SMPE.DTZC10.SMPSTS -
  )) -
  RENAMEU( -
    (OCONNOR.JCL, -
      SYS1.DEBUG.EX01.JCL.#) -
    (SMPE.DTZC10.SABJCLST, -
      SYS1.DEBUG.EX01.SABJCLST.#) -
    (SMPE.DTZC10.SABJLCP, -
      SYS1.DEBUG.EX01.SABJLCP.#) -
    (SMPE.DTZC10.SABJMLIB, -
      SYS1.DEBUG.EX01.SABJMLIB.#) -
    (SMPE.DTZC10.SABJMOD1, -
      SYS1.DEBUG.EX01.SABJMOD1.#) -
    (SMPE.DTZC10.SABJPLIB, -
      SYS1.DEBUG.EX01.SABJPLIB.#) -
    (SMPE.DTZC10.SABJSAM1, -
      SYS1.DEBUG.EX01.SABJSAM1.#) -
    (SMPE.DTZC10.SABJSAM2, -
      SYS1.DEBUG.EX01.SABJSAM2.#) -
    (SMPE.DTZC10.SABJSLIB, -
      SYS1.DEBUG.EX01.SABJSLIB.#) -
    (SMPE.DTZC10.SABJTLIB, -
      SYS1.DEBUG.EX01.SABJTLIB.#) -
    (SMPE.DTZC10.SEQAAUTH, -
      SYS1.DEBUG.EX01.SEQAAUTH.#) -
    (SMPE.DTZC10.SEQABIN, -
      SYS1.DEBUG.EX01.SEQABIN.#) -
    (SMPE.DTZC10.SEQABMOD, -
      SYS1.DEBUG.EX01.SEQABMOD.#) -
    (SMPE.DTZC10.SEQAEXEC, -
      SYS1.DEBUG.EX01.SEQAEXEC.#) -
    (SMPE.DTZC10.SEQALPA, -
      SYS1.DEBUG.EX01.SEQALPA.#) -
    (SMPE.DTZC10.SEQAMENP, -
      SYS1.DEBUG.EX01.SEQAMENP.#) -
    (SMPE.DTZC10.SEQAMENU, -
      SYS1.DEBUG.EX01.SEQAMENU.#) -
    (SMPE.DTZC10.SEQAMOD, -
      SYS1.DEBUG.EX01.SEQAMOD.#) -
    (SMPE.DTZC10.SEQAPENP, -
      SYS1.DEBUG.EX01.SEQAPENP.#) -
    (SMPE.DTZC10.SEQAPENU, -
      SYS1.DEBUG.EX01.SEQAPENU.#) -
    (SMPE.DTZC10.SEQASAMP, -
      SYS1.DEBUG.EX01.SEQASAMP.#) -
    (SMPE.DTZC10.SEQASENP, -
      SYS1.DEBUG.EX01.SEQASENP.#) -
    (SMPE.DTZC10.SEQASENU, -
      SYS1.DEBUG.EX01.SEQASENU.#) -
    (SMPE.DTZC10.SEQATLIB, -
      SYS1.DEBUG.EX01.SEQATLIB.#) -
    (SMPE.DTZC10.SMPLOG, -
      SYS1.DEBUG.EX01.SMPLOG.#) -
    (SMPE.DTZC10.SMPLOGA, -
      SYS1.DEBUG.EX01.SMPLOGA.#) -
    (SMPE.DTZC10.SMPLTS, -
      SYS1.DEBUG.EX01.SMPLTS.#) -
    (SMPE.DTZC10.SMPMTS, -
      SYS1.DEBUG.EX01.SMPMTS.#) -
    (SMPE.DTZC10.SMPSCDS, -
      SYS1.DEBUG.EX01.SMPSCDS.#) -
    (SMPE.DTZC10.SMPSTS, -
      SYS1.DEBUG.EX01.SMPSTS.#) -
  ) -
  OUTDYNAM(PRD001) NULLMGMTCLAS NULLSTORCLAS -
  ALLDATA(*) ALLEXCP -
  BYPASSACS(**) -
  SHARE TOLERATE(ENQFAILURE) CANCELERROR
/*
//*********************************************************************
//*                                                                   *
//* This step deletes cataloged target data sets to ensure the job    *
//* may be rerun.  Expected return code is 0.                         *
//*                                                                   *
//*********************************************************************
//*
//DEL2   EXEC PGM=IDCAMS,COND=(4,LT,COPY1),REGION=0M
//SYSPRINT DD   SYSOUT=*
//SYSIN    DD   *
  DELETE 'SMPE.DEBUG.EX01.DTZC10T.CSI'
  SET MAXCC = 0
//*
//*********************************************************************
//*                                                                   *
//* This step copies the source data sets into the target data        *
//* sets. A return code of 4 is acceptable.                           *
//* NOTE: Any changes to the SYSIN statements of this step will       *
//* result in failure.                                                *
//*                                                                   *
//*********************************************************************
//*
//COPY2 EXEC PGM=GIMADR,COND=(0,LT,DEL2),REGION=0M,
//         PARM='KEY=4D733EDD8488781E76550218409A3F22'
//SYSPRINT DD   SYSOUT=*
//SYSIN    DD    *
  /* Wed, 10 Jul 2013 14:18:51 GMT */
  COPY DS(INCLUDE( -
    SMPE.DTZC10T.CSI -
  )) -
  RENAMEU( -
    (SMPE.DTZC10T.CSI, -
      SMPE.DEBUG.EX01.DTZC10T.CSI) -
  ) -
  OUTDYNAM(MNT001) NULLMGMTCLAS NULLSTORCLAS -
  CATALOG -
  ALLDATA(*) ALLEXCP -
  BYPASSACS(**) -
  SHARE TOLERATE(ENQFAILURE) CANCELERROR
/*
```

The steps of job IZUD01CP that are shown in Example 12-1 on page 345 perform the following actions:

- Step DEL1 deletes the temporary data sets (those data sets with a ".#" suffix) if they exist. This action facilitates a rerun of this job.
- Step COPY1 creates the temporary data sets (those data sets with a ".#" suffix).
- Step DEL2 deletes the SMP/E TARGET CSI (if it exists).
- Step COPY2 creates the SMP/E TARGET CSI.

We submit the IZUD01CP job and the job log results are shown in Example 12-2.

Example 12-2 IZUD01CP job output

```
                   J E S 2  J O B  L O G  --  S Y S T E M  S C 7 4  --  N O D E  W T S C P L X 7

07.33.55 JOB09582 ---- TUESDAY,   16 JUL 2013 ----
07.33.55 JOB09582  IRR010I  USERID OCONNOR  IS ASSIGNED TO THIS JOB.
07.33.55 JOB09582  ICH70001I OCONNOR  LAST ACCESS AT 07:30:42 ON TUESDAY, JULY 16, 2013
07.33.55 JOB09582  $HASP373 IZUD01CP STARTED - INIT 1    - CLASS A        - SYS SC74
07.33.55 JOB09582  IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME PRD001  746
   746             DATA SET IS SYS1.DEBUG.EX01.SABJMOD1.#
07.33.55 JOB09582  IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME PRD001  747
   747             DATA SET IS SYS1.DEBUG.EX01.SMPLOG.#
07.33.55 JOB09582  IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME PRD001  748
   748             DATA SET IS SYS1.DEBUG.EX01.SEQAMENP.#
07.33.55 JOB09582  IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME PRD001  749
   749             DATA SET IS SYS1.DEBUG.EX01.SABJSAM1.#
07.33.55 JOB09582  IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME PRD001  750
   750             DATA SET IS SYS1.DEBUG.EX01.SABJSAM2.#
07.33.55 JOB09582  IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME PRD001  751
   751             DATA SET IS SYS1.DEBUG.EX01.SMPLOGA.#
07.33.55 JOB09582  IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME PRD001  752
   752             DATA SET IS SYS1.DEBUG.EX01.SABJSLIB.#
07.33.55 JOB09582  IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME PRD001  753
   753             DATA SET IS SYS1.DEBUG.EX01.SEQALPA.#
07.33.55 JOB09582  IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME PRD001  754
   754             DATA SET IS SYS1.DEBUG.EX01.SEQAEXEC.#
07.33.55 JOB09582  IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME PRD001  755
   755             DATA SET IS SYS1.DEBUG.EX01.SEQABMOD.#
07.33.55 JOB09582  IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME PRD001  756
   756             DATA SET IS SYS1.DEBUG.EX01.SEQABIN.#
07.33.55 JOB09582  IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME PRD001  757
   757             DATA SET IS SYS1.DEBUG.EX01.SABJMLIB.#
07.33.55 JOB09582  IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME PRD001  758
   758             DATA SET IS SYS1.DEBUG.EX01.SABJLCP.#
07.33.55 JOB09582  IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME PRD001  759
   759             DATA SET IS SYS1.DEBUG.EX01.SABJCLST.#
07.33.55 JOB09582  IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME PRD001  760
   760             DATA SET IS SYS1.DEBUG.EX01.SEQASAMP.#
07.33.55 JOB09582  IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME PRD001  761
   761             DATA SET IS SYS1.DEBUG.EX01.SEQAPENP.#
07.33.55 JOB09582  IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME PRD001  762
   762             DATA SET IS SYS1.DEBUG.EX01.SEQAMOD.#
07.33.55 JOB09582  IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME PRD001  763
   763             DATA SET IS SYS1.DEBUG.EX01.SEQATLIB.#
07.33.55 JOB09582  IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME PRD001  764
   764             DATA SET IS SYS1.DEBUG.EX01.SEQAPENU.#
07.33.55 JOB09582  IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME PRD001  765
   765             DATA SET IS SYS1.DEBUG.EX01.SMPSCDS.#
07.33.55 JOB09582  IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME PRD001  766
   766             DATA SET IS SYS1.DEBUG.EX01.SEQASENP.#
07.33.55 JOB09582  IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME PRD001  767
   767             DATA SET IS SYS1.DEBUG.EX01.SMPLTS.#
07.33.55 JOB09582  IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME PRD001  768
   768             DATA SET IS SYS1.DEBUG.EX01.SABJPLIB.#
07.33.55 JOB09582  IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME PRD001  769
   769             DATA SET IS SYS1.DEBUG.EX01.SMPMTS.#
07.33.55 JOB09582  IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME PRD001  770
```

```
   770             DATA SET IS SYS1.DEBUG.EX01.SABJTLIB.#
07.33.56 JOB09582  IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME PRD001  771
   771             DATA SET IS SYS1.DEBUG.EX01.SMPSTS.#
07.33.56 JOB09582  IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME PRD001  772
   772             DATA SET IS SYS1.DEBUG.EX01.SEQAMENU.#
07.33.56 JOB09582  IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME PRD001  773
   773             DATA SET IS SYS1.DEBUG.EX01.SEQAAUTH.#
07.33.56 JOB09582  IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME PRD001  774
   774             DATA SET IS SYS1.DEBUG.EX01.SEQASENU.#
07.33.56 JOB09582  IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME PRD001  775
   775             DATA SET IS SYS1.DEBUG.EX01.JCL.#
07.33.56 JOB09582  -                                       ---------TIMINGS (MINS.)---------          ----PAGING COUNTS---
07.33.56 JOB09582  -JOBNAME  STEPNAME PROCSTEP   RC   EXCP   CPU    SRB   VECT  VAFF  CLOCK   SERV  PG  PAGE   SWAP    VIO SWAPS
07.33.56 JOB09582  -IZUD01CP DEL1                08     93   .00    .00    .00   .00     .0  14065   0     0      0      0    0
07.33.58 JOB09582  -IZUD01CP COPY1               04   2067   .00    .00    .00   .00     .0  75130   0     0      0      0    0
07.33.58 JOB09582  -IZUD01CP DEL2                00     55   .00    .00    .00   .00     .0   1827   0     0      0      0    0
07.33.58 JOB09582  -IZUD01CP COPY2               00    102   .00    .00    .00   .00     .0  12417   0     0      0      0    0
07.33.58 JOB09582  -IZUD01CP ENDED.  NAME-NOC SC74           TOTAL CPU TIME=   .00  TOTAL ELAPSED TIME=    .0
07.33.58 JOB09582  $HASP395 IZUD01CP ENDED
```

The IGD17054I messages are expected because the ".#" suffix data sets did not exist before the IZUD01CP job was run.

Example 12-3 shows the IZUD02RN job. Each step in the job is highlighted in black so that their purpose can be explained.

Example 12-3 IZUD02RN job

```
//IZUD02RN JOB ,'NOC SC74',MSGLEVEL=(1,1),MSGCLASS=H,CLASS=A
//*
//*
//*
//*******************************************************************
//* This job was generated by z/OSMF on
//* Wed, 10 Jul 2013 14:18:51 GMT
//*******************************************************************
//*
//********************************************************************
//*                                                                  *
//*  This job renames new target non-VSAM and zFS data sets from     *
//*  their temporary and unique names to their wanted names          *
//*  defined by the deployment configuration. The catalog entries    *
//*  are updated as needed.                                          *
//*                                                                  *
//********************************************************************
//*
//********************************************************************
//*                                                                  *
//* This step renames new uncataloged data sets.  A return code      *
//* of 0 is expected.                                                *
//*                                                                  *
//********************************************************************
//*
//RENAME2  EXEC PGM=IEHPROGM,COND=(0,LT),REGION=0M
//SYSPRINT DD   SYSOUT=*
//DDPRD001 DD   VOL=SER=PRD001,UNIT=3390,DISP=SHR
//SYSIN    DD   *
  RENAME DSNAME=SYS1.DEBUG.EX01.JCL.#,                                 +
               VOL=3390=PRD001,                                        +
               NEWNAME=SYS1.DEBUG.EX01.JCL
  RENAME DSNAME=SYS1.DEBUG.EX01.SABJCLST.#,                            +
               VOL=3390=PRD001,                                        +
               NEWNAME=SYS1.DEBUG.EX01.SABJCLST
  RENAME DSNAME=SYS1.DEBUG.EX01.SABJLCP.#,                             +
               VOL=3390=PRD001,                                        +
               NEWNAME=SYS1.DEBUG.EX01.SABJLCP
  RENAME DSNAME=SYS1.DEBUG.EX01.SABJMLIB.#,                             +
               VOL=3390=PRD001,                                         +
               NEWNAME=SYS1.DEBUG.EX01.SABJMLIB
  RENAME DSNAME=SYS1.DEBUG.EX01.SABJMOD1.#,                             +
               VOL=3390=PRD001,                                         +
               NEWNAME=SYS1.DEBUG.EX01.SABJMOD1
  RENAME DSNAME=SYS1.DEBUG.EX01.SABJPLIB.#,                             +
               VOL=3390=PRD001,                                         +
               NEWNAME=SYS1.DEBUG.EX01.SABJPLIB
  RENAME DSNAME=SYS1.DEBUG.EX01.SABJSAM1.#,                             +
               VOL=3390=PRD001,                                         +
               NEWNAME=SYS1.DEBUG.EX01.SABJSAM1
  RENAME DSNAME=SYS1.DEBUG.EX01.SABJSAM2.#,                             +
               VOL=3390=PRD001,                                         +
               NEWNAME=SYS1.DEBUG.EX01.SABJSAM2
  RENAME DSNAME=SYS1.DEBUG.EX01.SABJSLIB.#,                             +
               VOL=3390=PRD001,                                         +
               NEWNAME=SYS1.DEBUG.EX01.SABJSLIB
  RENAME DSNAME=SYS1.DEBUG.EX01.SABJTLIB.#,                             +
               VOL=3390=PRD001,                                         +
               NEWNAME=SYS1.DEBUG.EX01.SABJTLIB
  RENAME DSNAME=SYS1.DEBUG.EX01.SEQAAUTH.#,                             +
               VOL=3390=PRD001,                                         +
               NEWNAME=SYS1.DEBUG.EX01.SEQAAUTH
  RENAME DSNAME=SYS1.DEBUG.EX01.SEQABIN.#,                              +
               VOL=3390=PRD001,                                         +
               NEWNAME=SYS1.DEBUG.EX01.SEQABIN
  RENAME DSNAME=SYS1.DEBUG.EX01.SEQABMOD.#,                             +
               VOL=3390=PRD001,                                         +
               NEWNAME=SYS1.DEBUG.EX01.SEQABMOD
  RENAME DSNAME=SYS1.DEBUG.EX01.SEQAEXEC.#,                             +
               VOL=3390=PRD001,                                         +
               NEWNAME=SYS1.DEBUG.EX01.SEQAEXEC
  RENAME DSNAME=SYS1.DEBUG.EX01.SEQALPA.#,                              +
               VOL=3390=PRD001,                                         +
               NEWNAME=SYS1.DEBUG.EX01.SEQALPA
  RENAME DSNAME=SYS1.DEBUG.EX01.SEQAMENP.#,                             +
               VOL=3390=PRD001,                                         +
               NEWNAME=SYS1.DEBUG.EX01.SEQAMENP
  RENAME DSNAME=SYS1.DEBUG.EX01.SEQAMENU.#,                             +
               VOL=3390=PRD001,                                         +
               NEWNAME=SYS1.DEBUG.EX01.SEQAMENU
  RENAME DSNAME=SYS1.DEBUG.EX01.SEQAMOD.#,                              +
               VOL=3390=PRD001,                                         +
               NEWNAME=SYS1.DEBUG.EX01.SEQAMOD
  RENAME DSNAME=SYS1.DEBUG.EX01.SEQAPENP.#,                             +
               VOL=3390=PRD001,                                         +
               NEWNAME=SYS1.DEBUG.EX01.SEQAPENP
  RENAME DSNAME=SYS1.DEBUG.EX01.SEQAPENU.#,                             +
               VOL=3390=PRD001,                                         +
               NEWNAME=SYS1.DEBUG.EX01.SEQAPENU
  RENAME DSNAME=SYS1.DEBUG.EX01.SEQASAMP.#,                             +
               VOL=3390=PRD001,                                         +
               NEWNAME=SYS1.DEBUG.EX01.SEQASAMP
  RENAME DSNAME=SYS1.DEBUG.EX01.SEQASENP.#,                             +
               VOL=3390=PRD001,                                         +
               NEWNAME=SYS1.DEBUG.EX01.SEQASENP
  RENAME DSNAME=SYS1.DEBUG.EX01.SEQASENU.#,                             +
               VOL=3390=PRD001,                                         +
               NEWNAME=SYS1.DEBUG.EX01.SEQASENU
  RENAME DSNAME=SYS1.DEBUG.EX01.SEQATLIB.#,                           +
               VOL=3390=PRD001,                                       +
               NEWNAME=SYS1.DEBUG.EX01.SEQATLIB
  RENAME DSNAME=SYS1.DEBUG.EX01.SMPLOG.#,                             +
               VOL=3390=PRD001,                                       +
               NEWNAME=SYS1.DEBUG.EX01.SMPLOG
  RENAME DSNAME=SYS1.DEBUG.EX01.SMPLOGA.#,                            +
               VOL=3390=PRD001,                                       +
               NEWNAME=SYS1.DEBUG.EX01.SMPLOGA
  RENAME DSNAME=SYS1.DEBUG.EX01.SMPLTS.#,                             +
               VOL=3390=PRD001,                                       +
               NEWNAME=SYS1.DEBUG.EX01.SMPLTS
  RENAME DSNAME=SYS1.DEBUG.EX01.SMPMTS.#,                             +
               VOL=3390=PRD001,                                       +
               NEWNAME=SYS1.DEBUG.EX01.SMPMTS
  RENAME DSNAME=SYS1.DEBUG.EX01.SMPSCDS.#,                            +
               VOL=3390=PRD001,                                       +
               NEWNAME=SYS1.DEBUG.EX01.SMPSCDS
  RENAME DSNAME=SYS1.DEBUG.EX01.SMPSTS.#,                             +
               VOL=3390=PRD001,                                       +
               NEWNAME=SYS1.DEBUG.EX01.SMPSTS
//*
```

Step **RENAME2** of job `IZUD02RN`, which is shown in Example 12-3 on page 351, renames the temporary data sets (those data sets with a ".#" suffix) to the final data set names

We submit the IZUD02RN job and the job log results are shown in Example 12-4.

Example 12-4 IZUD02RN job output

```
                   J E S 2  J O B  L O G  --  S Y S T E M  S C 7 4  --  N O D E  W T S C P L X 7

07.39.30 JOB09583 ---- TUESDAY,   16 JUL 2013 ----
07.39.30 JOB09583  IRR010I  USERID OCONNOR  IS ASSIGNED TO THIS JOB.
07.39.30 JOB09583  ICH70001I OCONNOR  LAST ACCESS AT 07:33:58 ON TUESDAY, JULY 16, 2013
07.39.30 JOB09583  $HASP373 IZUD02RN STARTED - INIT 1    - CLASS A        - SYS SC74
07.39.30 JOB09583  -                                      ---------TIMINGS (MINS.)---------            ----PAGING COUNTS---
07.39.30 JOB09583  -JOBNAME  STEPNAME PROCSTEP    RC   EXCP    CPU    SRB   VECT   VAFF  CLOCK   SERV  PG   PAGE   SWAP    VIO SWAPS
07.39.30 JOB09583  -IZUD02RN RENAME2              00    298    .00    .00    .00    .00     .0  16036   0      0      0      0     0
07.39.30 JOB09583  -IZUD02RN ENDED.  NAME-NOC SC74            TOTAL CPU TIME=   .00  TOTAL ELAPSED TIME=    .0
07.39.30 JOB09583  $HASP395 IZUD02RN ENDED
```

Example 12-5 shows the IZUD03UC job. Each step in the job is highlighted with reverse characters so that their purpose can be explained.

Example 12-5 IZUD03UC job

```
//IZUD03UC JOB ,'NOC SC74',MSGLEVEL=(1,1),MSGCLASS=H,CLASS=A
//*
//*
//*
//*****************************************************************
//* This job was generated by z/OSMF on
//* Wed, 10 Jul 2013 14:18:51 GMT
//*****************************************************************
//*
//******************************************************************
//*                                                                *
//*   This job allocates a new GLOBAL zone CSI, and updates it     *
//*   to reflect the target software instance zone names, data set *
//*   names and locations, and UNIX directory prefixes.            *
//*                                                                *
```

```
//*******************************************************************
//*
//*******************************************************************
//*                                                                 *
//* This step defines a new cluster for the global CSI.  The        *
//* expected return code is 0.                                      *
//*                                                                 *
//*******************************************************************
//*
//ALLOCCSI EXEC PGM=IDCAMS,REGION=0M
//SYSPRINT DD SYSOUT=*
//GIMZPOOL DD DSN=SYS1.MACLIB(GIMZPOOL),DISP=SHR
//SYSIN    DD *
  DELETE SMPE.DEBUG.EX01.GLOBAL.CSI
  SET MAXCC = 0
  DEFINE CLUSTER( +
           NAME(SMPE.DEBUG.EX01.GLOBAL.CSI) +
           VOLUMES(MNT001) +
           TRACKS(15 15) +
           FREESPACE(1 1) +
           KEYS(24 0) +
           RECORDSIZE(24 143) +
           SHAREOPTIONS(2 3)) +
     DATA (CONTROLINTERVALSIZE(8192)) +
    INDEX (CONTROLINTERVALSIZE(4096))
  REPRO INFILE(GIMZPOOL) +
           OUTDATASET(SMPE.DEBUG.EX01.GLOBAL.CSI)
/*
//*
//*******************************************************************
//*                                                                 *
//* This step updates zones to reflect the target software instance *
//* zone names, data set names and locations, and UNIX directory    *
//* prefixes. A return code of 4 is acceptable for this step.       *
//*                                                                 *
//*******************************************************************
//*
//UPDZONES EXEC PGM=GIMSMP,COND=(0,LT),REGION=0M
//SMPCSI   DD DSN=SMPE.DEBUG.EX01.GLOBAL.CSI,DISP=SHR
//SMPLOG   DD SYSOUT=*
//SMPLOGA  DD SYSOUT=*
//SMPOUT   DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SMPPTS   DD UNIT=SYSALLDA,SPACE=(TRK,(1,1,5))
//SMPCNTL  DD *
  SET BOUNDARY(GLOBAL).
    UCLIN.
      ADD GLOBALZONE
        ZONEINDEX(
        (DTZC10T,SMPE.DEBUG.EX01.DTZC10T.CSI,TARGET)
                 ).
      ADD DDDEF(SMPLOG) SYSOUT(*).
      ADD DDDEF(SMPOUT) SYSOUT(*).
      /*****************************************************************/
      /*                                                               */
      /* Add Product and Feature entries from the source software      */
      /* instance to the global zone of the target software instance. */
      /*                                                               */
      /*****************************************************************/
      ADD PRODUCT(5655-W70, 12.01.00)
```

```
          DESCRIPTION(
Debug Tool V12)
          VENDOR(
IBM
          )
          PRODSUP(
            (5655-W45, 11.01.00)
            (5655-V50, 10.01.00)
            (5655-U27, 09.01.00)
            (5655-S17, 08.01.00)
            (5655-R44, 07.01.00)
            (5655-P14, 06.01.00)
            (5655-M18, 05.01.00)
            (5655-L24, 04.01.00)
          )
          SREL( Z038).
      ADD FEATURE(IDBTBC10) PRODUCT(5655-W70, 12.01.00)
          DESCRIPTION(
Debug Tool V12)
          FMID( HADRC10 HVWR160 H09F210)
           .
    ENDUCL.
  SET BOUNDARY(DTZC10T).
    UCLIN.
      REP TZONE(DTZC10T) RELATED().
      REP DDDEF(SABJCLST)
          DATASET(SYS1.DEBUG.EX01.SABJCLST)
          VOLUME(PRD001) UNIT(SYSALLDA).
      REP DDDEF(SABJLCP)
          DATASET(SYS1.DEBUG.EX01.SABJLCP)
          VOLUME(PRD001) UNIT(SYSALLDA).
      REP DDDEF(SABJMLIB)
          DATASET(SYS1.DEBUG.EX01.SABJMLIB)
          VOLUME(PRD001) UNIT(SYSALLDA).
      REP DDDEF(SABJMOD1)
          DATASET(SYS1.DEBUG.EX01.SABJMOD1)
          VOLUME(PRD001) UNIT(SYSALLDA).
      REP DDDEF(SABJPLIB)
          DATASET(SYS1.DEBUG.EX01.SABJPLIB)
          VOLUME(PRD001) UNIT(SYSALLDA).
      REP DDDEF(SABJSAM1)
          DATASET(SYS1.DEBUG.EX01.SABJSAM1)
          VOLUME(PRD001) UNIT(SYSALLDA).
      REP DDDEF(SABJSAM2)
          DATASET(SYS1.DEBUG.EX01.SABJSAM2)
          VOLUME(PRD001) UNIT(SYSALLDA).
      REP DDDEF(SABJSLIB)
          DATASET(SYS1.DEBUG.EX01.SABJSLIB)
          VOLUME(PRD001) UNIT(SYSALLDA).
      REP DDDEF(SABJTLIB)
          DATASET(SYS1.DEBUG.EX01.SABJTLIB)
          VOLUME(PRD001) UNIT(SYSALLDA).
      REP DDDEF(SEQAAUTH)
          DATASET(SYS1.DEBUG.EX01.SEQAAUTH)
          VOLUME(PRD001) UNIT(SYSALLDA).
      REP DDDEF(SEQABIN)
          DATASET(SYS1.DEBUG.EX01.SEQABIN)
          VOLUME(PRD001) UNIT(SYSALLDA).
      REP DDDEF(SEQABMOD)
          DATASET(SYS1.DEBUG.EX01.SEQABMOD)
          VOLUME(PRD001) UNIT(SYSALLDA).
      REP DDDEF(SEQAEXEC)
          DATASET(SYS1.DEBUG.EX01.SEQAEXEC)
          VOLUME(PRD001) UNIT(SYSALLDA).
      REP DDDEF(SEQALPA)
          DATASET(SYS1.DEBUG.EX01.SEQALPA)
          VOLUME(PRD001) UNIT(SYSALLDA).
      REP DDDEF(SEQAMENP)
          DATASET(SYS1.DEBUG.EX01.SEQAMENP)
          VOLUME(PRD001) UNIT(SYSALLDA).
      REP DDDEF(SEQAMENU)
          DATASET(SYS1.DEBUG.EX01.SEQAMENU)
          VOLUME(PRD001) UNIT(SYSALLDA).
      REP DDDEF(SEQAMOD)
          DATASET(SYS1.DEBUG.EX01.SEQAMOD)
          VOLUME(PRD001) UNIT(SYSALLDA).
      REP DDDEF(SEQAPENP)
          DATASET(SYS1.DEBUG.EX01.SEQAPENP)
          VOLUME(PRD001) UNIT(SYSALLDA).
      REP DDDEF(SEQAPENU)
          DATASET(SYS1.DEBUG.EX01.SEQAPENU)
          VOLUME(PRD001) UNIT(SYSALLDA).
      REP DDDEF(SEQASAMP)
          DATASET(SYS1.DEBUG.EX01.SEQASAMP)
          VOLUME(PRD001) UNIT(SYSALLDA).
      REP DDDEF(SEQASENP)
          DATASET(SYS1.DEBUG.EX01.SEQASENP)
          VOLUME(PRD001) UNIT(SYSALLDA).
      REP DDDEF(SEQASENU)
          DATASET(SYS1.DEBUG.EX01.SEQASENU)
          VOLUME(PRD001) UNIT(SYSALLDA).
      REP DDDEF(SEQATLIB)
          DATASET(SYS1.DEBUG.EX01.SEQATLIB)
          VOLUME(PRD001) UNIT(SYSALLDA).
      REP DDDEF(SMPLOG)
          DATASET(SYS1.DEBUG.EX01.SMPLOG)
          VOLUME(PRD001) UNIT(SYSALLDA).
      REP DDDEF(SMPLOGA)
          DATASET(SYS1.DEBUG.EX01.SMPLOGA)
          VOLUME(PRD001) UNIT(SYSALLDA).
      REP DDDEF(SMPLTS)
          DATASET(SYS1.DEBUG.EX01.SMPLTS)
          VOLUME(PRD001) UNIT(SYSALLDA).
      REP DDDEF(SMPMTS)
          DATASET(SYS1.DEBUG.EX01.SMPMTS)
          VOLUME(PRD001) UNIT(SYSALLDA).
      REP DDDEF(SMPSCDS)
          DATASET(SYS1.DEBUG.EX01.SMPSCDS)
          VOLUME(PRD001) UNIT(SYSALLDA).
      REP DDDEF(SMPSTS)
          DATASET(SYS1.DEBUG.EX01.SMPSTS)
          VOLUME(PRD001) UNIT(SYSALLDA).
      DEL DDDEF(SMPPTS).
    ENDUCL.
/*
```

The steps of job IZUD03UC, which are shown in Example 12-5 on page 353, perform the following tasks:

- Step ALLOCCSI creates a GLOBAL CSI.
- Step UPDZONES plugs the deployed TARGET CSI into the newly allocated GLOBAL CSI, then, it defines the products and features that are included in the software instance. The DDDEFs in the TARGET CSI are modified from the data set names they had in the source software instance to the new data set names in the target software instance.

We submit the IZUD03UC job. The job log results are shown in Example 12-6.

Example 12-6 IZUD03UC job output

```
                  J E S 2  J O B  L O G  --  S Y S T E M  S C 7 4  --  N O D E  W T S C P L X 7

07.40.51 JOB09584 ---- TUESDAY,   16 JUL 2013 ----
07.40.51 JOB09584  IRR010I  USERID OCONNOR  IS ASSIGNED TO THIS JOB.
07.40.51 JOB09584  ICH70001I OCONNOR  LAST ACCESS AT 07:39:30 ON TUESDAY, JULY 16, 2013
07.40.51 JOB09584  $HASP373 IZUD03UC STARTED - INIT 1    - CLASS A        - SYS SC74
07.40.51 JOB09584  -                                      ---------TIMINGS (MINS.)---------            ----PAGING COUNTS---
07.40.51 JOB09584  -JOBNAME  STEPNAME PROCSTEP    RC   EXCP    CPU    SRB   VECT   VAFF  CLOCK   SERV  PG   PAGE   SWAP    VIO SWAPS
07.40.51 JOB09584  -IZUD03UC ALLOCCSI             00    122    .00    .00    .00    .00     .0   7554   0      0      0      0     0
07.40.52 JOB09584  -IZUD03UC UPDZONES             04    345    .00    .00    .00    .00     .0  24983   0      0      0      0     0
07.40.52 JOB09584  -IZUD03UC ENDED.  NAME-NOC SC74            TOTAL CPU TIME=   .00  TOTAL ELAPSED TIME=    .0
07.40.52 JOB09584  $HASP395 IZUD03UC ENDED
```

The list of data sets that are the result of this deployment are shown in Example 12-7.

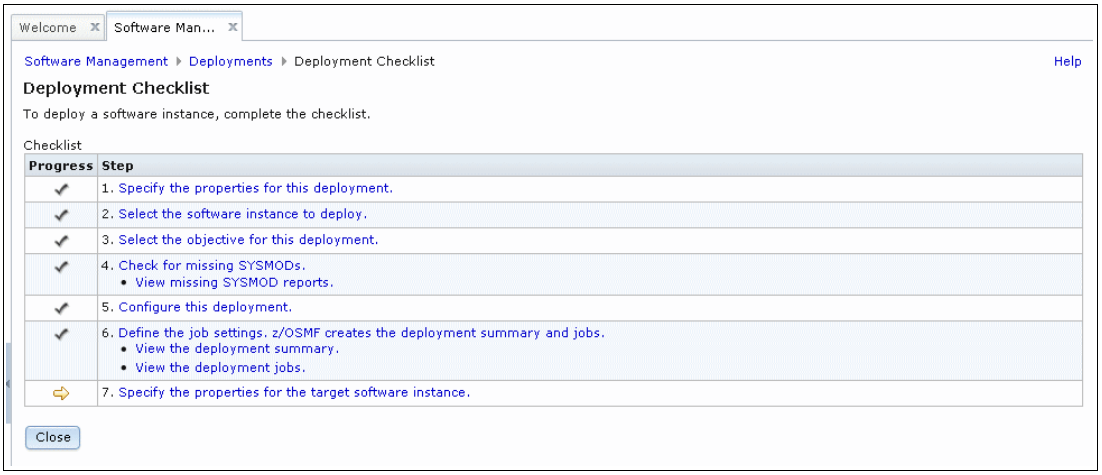
Example 12-7 Deployment example 1 data sets

```
Data Set Name                                                   Volser
SMPE.DEBUG.EX01.DTZC10T.CSI                                     *VSAM*
SMPE.DEBUG.EX01.DTZC10T.CSI.DATA                                MNT001
SMPE.DEBUG.EX01.DTZC10T.CSI.INDEX                               MNT001
SMPE.DEBUG.EX01.GLOBAL.CSI                                      *VSAM*
SMPE.DEBUG.EX01.GLOBAL.CSI.DATA                                 MNT001
SMPE.DEBUG.EX01.GLOBAL.CSI.INDEX                                MNT001

SYS1.DEBUG.EX01.JCL                                             PRD001
SYS1.DEBUG.EX01.SABJCLST                                        PRD001
SYS1.DEBUG.EX01.SABJLCP                                         PRD001
SYS1.DEBUG.EX01.SABJMLIB                                        PRD001
SYS1.DEBUG.EX01.SABJMOD1                                        PRD001
SYS1.DEBUG.EX01.SABJPLIB                                        PRD001
SYS1.DEBUG.EX01.SABJSAM1                                        PRD001
SYS1.DEBUG.EX01.SABJSAM2                                        PRD001
SYS1.DEBUG.EX01.SABJSLIB                                        PRD001
SYS1.DEBUG.EX01.SABJTLIB                                        PRD001
SYS1.DEBUG.EX01.SEQAAUTH                                        PRD001
SYS1.DEBUG.EX01.SEQABIN                                         PRD001
SYS1.DEBUG.EX01.SEQABMOD                                        PRD001
SYS1.DEBUG.EX01.SEQAEXEC                                        PRD001
SYS1.DEBUG.EX01.SEQALPA                                         PRD001
SYS1.DEBUG.EX01.SEQAMENP                                        PRD001
SYS1.DEBUG.EX01.SEQAMENU                                        PRD001
SYS1.DEBUG.EX01.SEQAMOD                                         PRD001
SYS1.DEBUG.EX01.SEQAPENP                                        PRD001
SYS1.DEBUG.EX01.SEQAPENU                                        PRD001
SYS1.DEBUG.EX01.SEQASAMP                                        PRD001
SYS1.DEBUG.EX01.SEQASENP                                        PRD001
SYS1.DEBUG.EX01.SEQASENU                                        PRD001
```

```
SYS1.DEBUG.EX01.SEQATLIB                                       PRD001
SYS1.DEBUG.EX01.SMPLOG                                         PRD001
SYS1.DEBUG.EX01.SMPLOGA                                        PRD001
SYS1.DEBUG.EX01.SMPLTS                                         PRD001
SYS1.DEBUG.EX01.SMPMTS                                         PRD001
SYS1.DEBUG.EX01.SMPSCDS                                        PRD001
SYS1.DEBUG.EX01.SMPSTS                                         PRD001
```

After the Software Management jobs are run, you can return to the deployment checklist and click the link in the final step, as shown in Figure 12-120.



Deployment Checklist

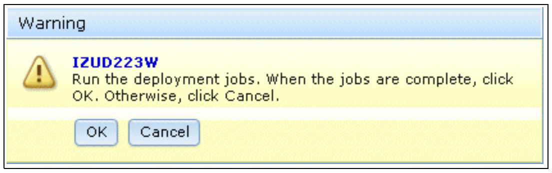
To deploy a software instance, complete the checklist.

Checklist

Progress	Step
✓	1. Specify the properties for this deployment.
✓	2. Select the software instance to deploy.
✓	3. Select the objective for this deployment.
✓	4. Check for missing SYSMODs. • View missing SYSMOD reports.
✓	5. Configure this deployment.
✓	6. Define the job settings. z/OSMF creates the deployment summary and jobs. • View the deployment summary. • View the deployment jobs.
⇨	7. Specify the properties for the target software instance.

Figure 12-120 Final step of Deployment Checklist wizard

When you select the final step of the deployment checklist, a warning message is displayed, as shown in Figure 12-121.

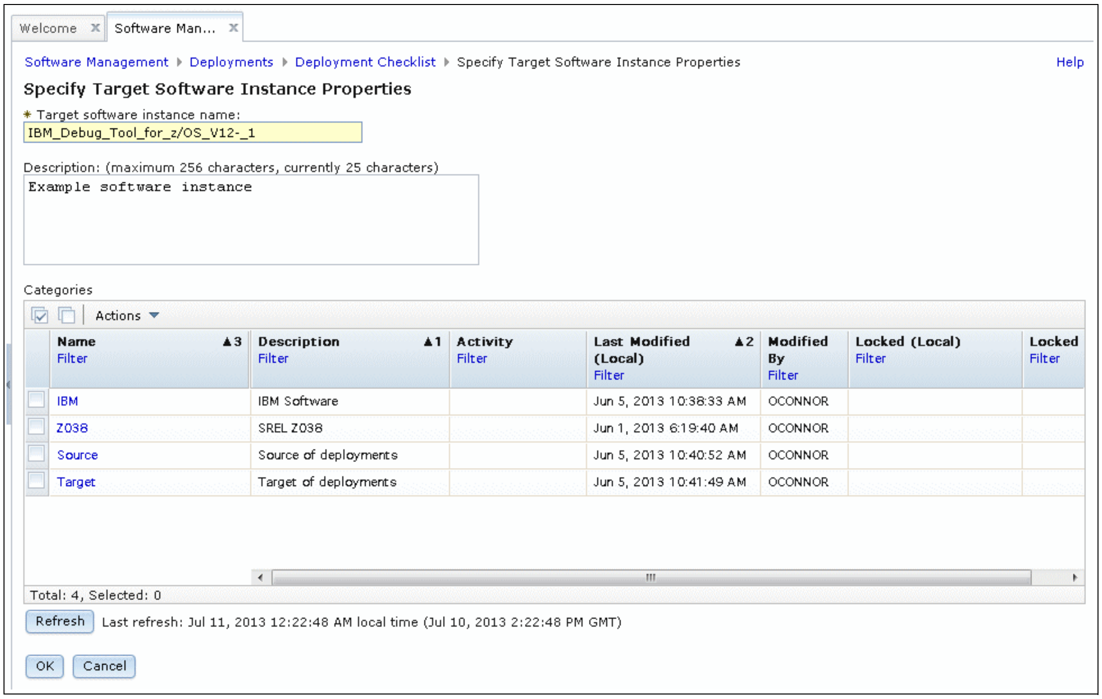


IZUD223W
Run the deployment jobs. When the jobs are complete, click OK. Otherwise, click Cancel.

Figure 12-121 IZUD223W warning message

Now, you can click **OK** because you ran the generated deployment jobs.

A window in which you assign a name to the newly created software instance opens, as shown in Figure 12-122 on page 359.



Software Management ▸ Deployments ▸ Deployment Checklist ▸ Specify Target Software Instance Properties

Help

Specify Target Software Instance Properties

* Target software instance name:

IBM_Debug_Tool_for_z/OS_V12-_1

Description: (maximum 256 characters, currently 25 characters)

Example software instance

Categories

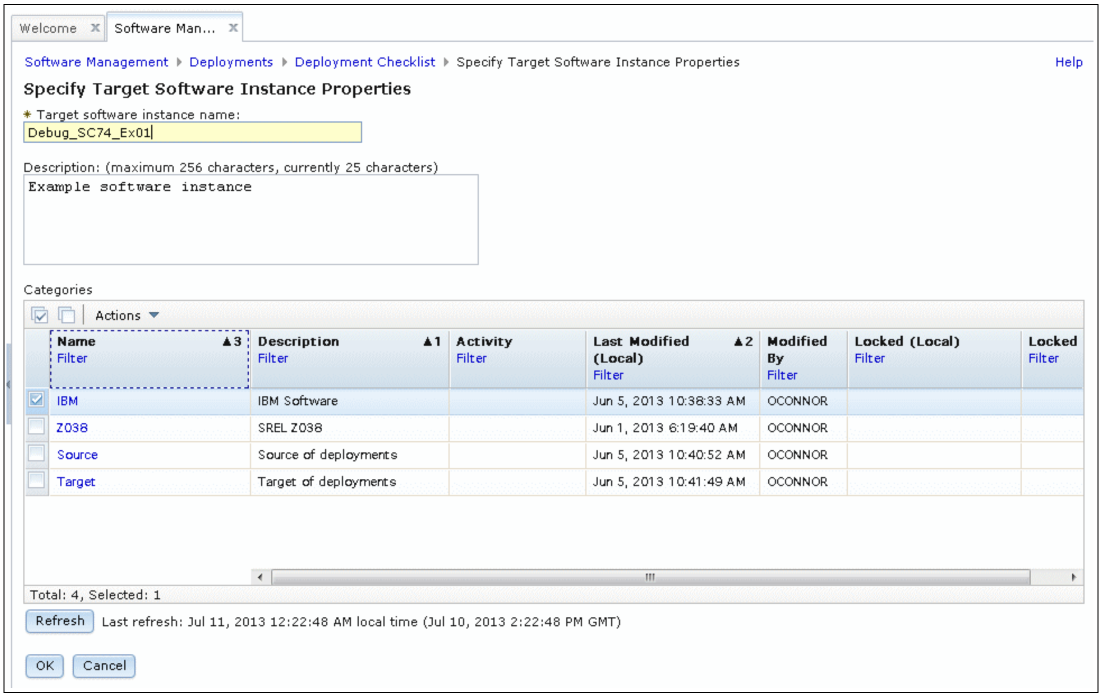
	Name ▲3 Filter	Description ▲1 Filter	Activity Filter	Last Modified ▲2 (Local) Filter	Modified By Filter	Locked (Local) Filter	Locked Filter
□	IBM	IBM Software		Jun 5, 2013 10:38:33 AM	OCONNOR		
□	Z038	SREL Z038		Jun 1, 2013 6:19:40 AM	OCONNOR		
□	Source	Source of deployments		Jun 5, 2013 10:40:52 AM	OCONNOR		
□	Target	Target of deployments		Jun 5, 2013 10:41:49 AM	OCONNOR		

Total: 4, Selected: 0

Last refresh: Jul 11, 2013 12:22:48 AM local time (Jul 10, 2013 2:22:48 PM GMT)

Figure 12-122 Assigning a name to a software instance

The offered name can be typed over. For our example, we assign a name of Debug_SC74_Ex01, as shown in Figure 12-123.



Software Management ▸ Deployments ▸ Deployment Checklist ▸ Specify Target Software Instance Properties

Help

Specify Target Software Instance Properties

* Target software instance name:

Debug_SC74_Ex01

Description: (maximum 256 characters, currently 25 characters)

Example software instance

Categories

	Name ▲3 Filter	Description ▲1 Filter	Activity Filter	Last Modified ▲2 (Local) Filter	Modified By Filter	Locked (Local) Filter	Locked Filter
☑	IBM	IBM Software		Jun 5, 2013 10:38:33 AM	OCONNOR		
□	Z038	SREL Z038		Jun 1, 2013 6:19:40 AM	OCONNOR		
□	Source	Source of deployments		Jun 5, 2013 10:40:52 AM	OCONNOR		
□	Target	Target of deployments		Jun 5, 2013 10:41:49 AM	OCONNOR		

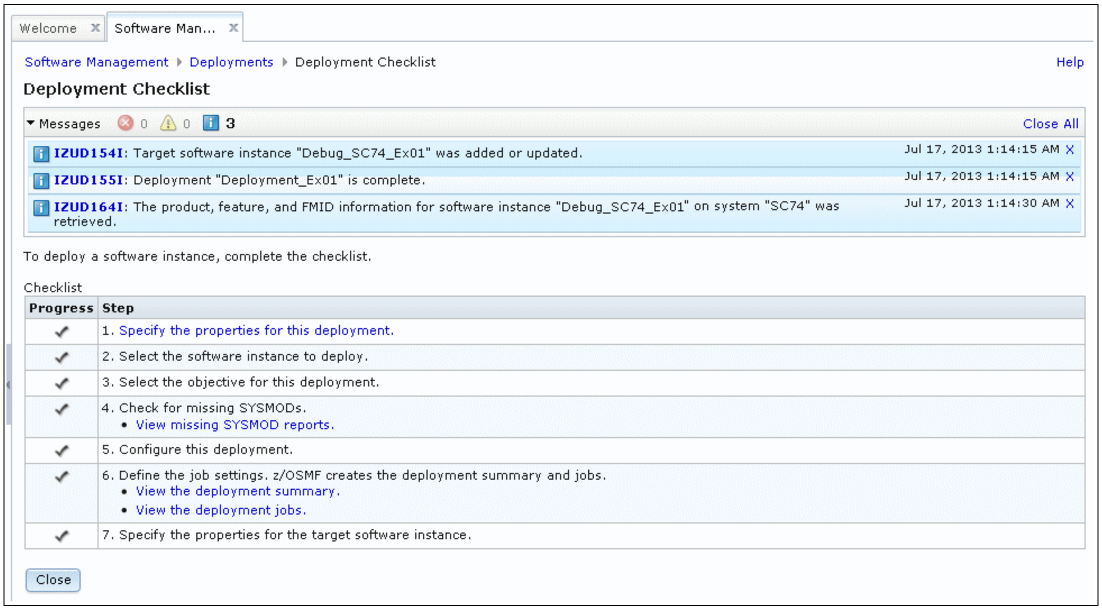
Total: 4, Selected: 1

Last refresh: Jul 11, 2013 12:22:48 AM local time (Jul 10, 2013 2:22:48 PM GMT)

Figure 12-123 Assigning the name

The list of categories is displayed and they can be selected for association with the software instance. In our example, we do not make any change; therefore, we click **OK** to complete the deployment checklist.

The final window of the deployment checklist opens, as shown in Figure 12-124.



Software Management ▸ Deployments ▸ Deployment Checklist

Help

Deployment Checklist

▾ Messages ⊗ 0 ⚠ 0 ℹ 3 Close All

- **IZUD154I**: Target software instance "Debug_SC74_Ex01" was added or updated. Jul 17, 2013 1:14:15 AM ✕
- **IZUD155I**: Deployment "Deployment_Ex01" is complete. Jul 17, 2013 1:14:15 AM ✕
- **IZUD164I**: The product, feature, and FMID information for software instance "Debug_SC74_Ex01" on system "SC74" was retrieved. Jul 17, 2013 1:14:30 AM ✕

To deploy a software instance, complete the checklist.

Checklist

Progress	Step
✓	1. Specify the properties for this deployment.
✓	2. Select the software instance to deploy.
✓	3. Select the objective for this deployment.
✓	4. Check for missing SYSMODs. • View missing SYSMOD reports.
✓	5. Configure this deployment.
✓	6. Define the job settings. z/OSMF creates the deployment summary and jobs. • View the deployment summary. • View the deployment jobs.
✓	7. Specify the properties for the target software instance.

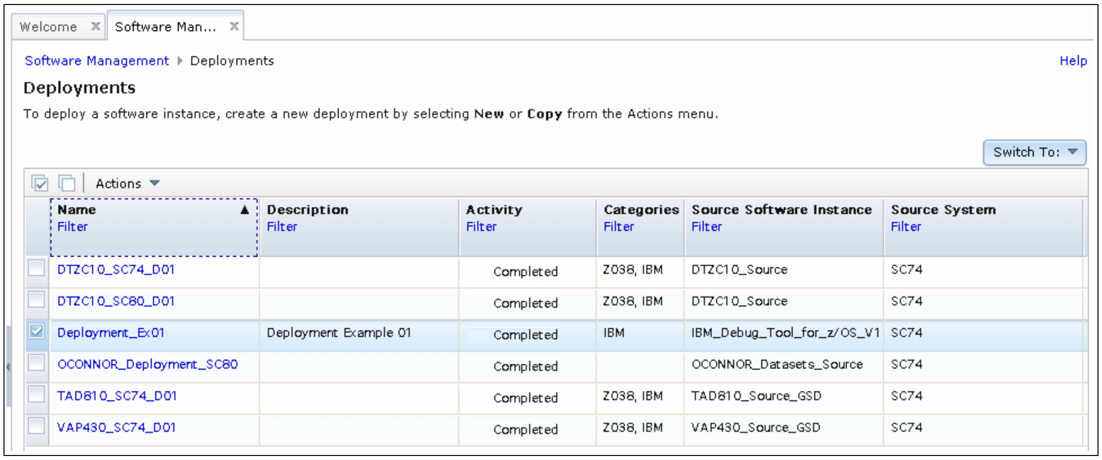
Figure 12-124 Deployment Checklist wizard summary

Summary messages also are shown in Figure 12-124.

Deployment example 2: Single product with DLIBs

This example of a deployment is the same as the first example deployment, except that DLIB data sets are also included. All data sets include the EX02 qualifier instead of EX01.

To start this deployment, copy deployment example 1 so that you do not have to redefine the same information. To make this copy, go to the list of deployments and select Deployment_Ex01, as shown in Figure 12-125.



Software Management ▸ Deployments

Help

Deployments

To deploy a software instance, create a new deployment by selecting **New** or **Copy** from the Actions menu.

	Name ▲ Filter	Description Filter	Activity Filter	Categories Filter	Source Software Instance Filter	Source System Filter
☐	DTZC10_SC74_D01		Completed	Z038, IBM	DTZC10_Source	SC74
☐	DTZC10_SC80_D01		Completed	Z038, IBM	DTZC10_Source	SC74
☑	Deployment_Ex01	Deployment Example 01	Completed	IBM	IBM_Debug_Tool_for_z/OS_V1	SC74
☐	OCONNOR_Deployment_SC80		Completed		OCONNOR_Datasets_Source	SC74
☐	TAD810_SC74_D01		Completed	Z038, IBM	TAD810_Source_GSD	SC74
☐	VAP430_SC74_D01		Completed	Z038, IBM	VAP430_Source_GSD	SC74

Figure 12-125 Deployments

Click **Actions** and then, select **Copy**, as shown in Figure 12-126.

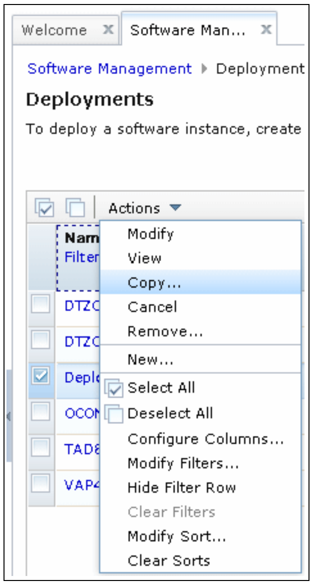
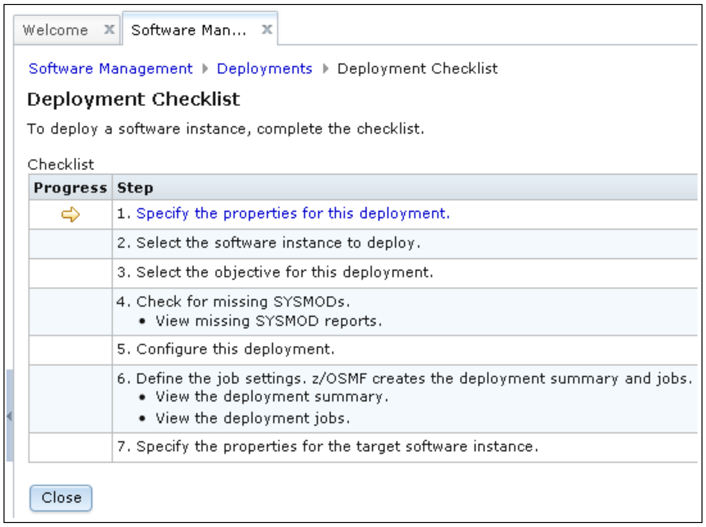


Figure 12-126 Copy deployment

The Deployment Checklist window opens, as shown in Figure 12-127.



Deployment Checklist

To deploy a software instance, complete the checklist.

Checklist

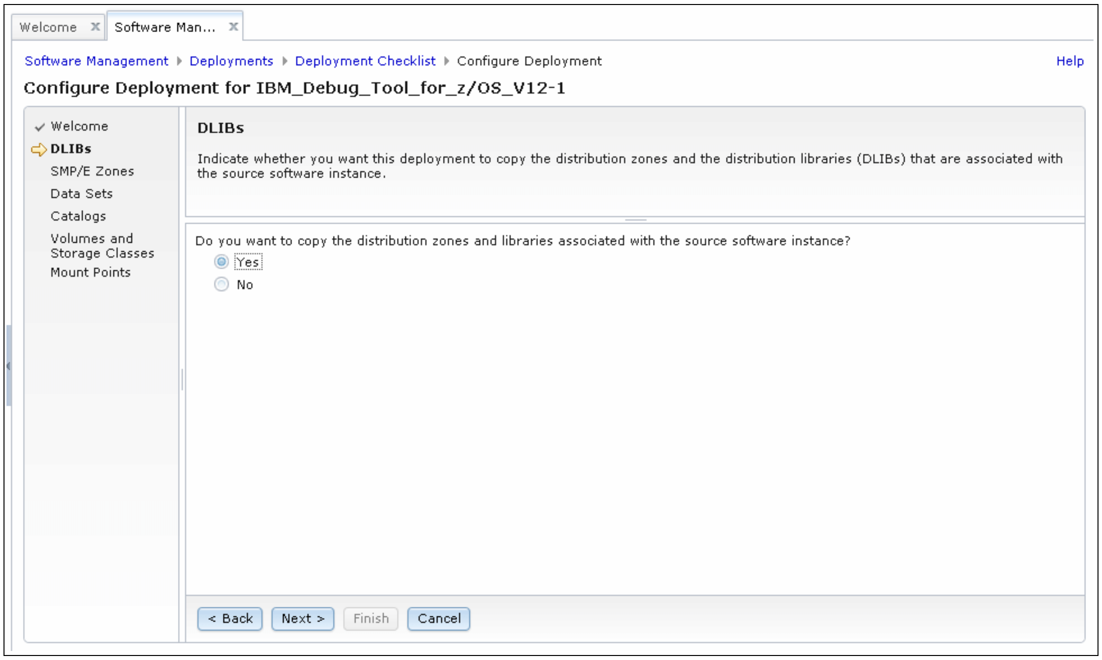
Progress	Step
⇨	1. Specify the properties for this deployment.
	2. Select the software instance to deploy.
	3. Select the objective for this deployment.
	4. Check for missing SYSMODs. • View missing SYSMOD reports.
	5. Configure this deployment.
	6. Define the job settings. z/OSMF creates the deployment summary and jobs. • View the deployment summary. • View the deployment jobs.
	7. Specify the properties for the target software instance.

Figure 12-127 Deployment Checklist wizard

This checklist is the same deployment checklist that is shown in Figure 12-84 on page 323.

Continue through the Deployment Checklist by performing the steps for deployment example 1, as described in “Deployment example 1: Single product without DLIBs” on page 321.

In Step 5: Configure this deployment (see Figure 12-94 on page 328), when you see the window that asks whether DLIBs should be included (see Figure 12-95 on page 329), select **Yes**, as shown in Figure 12-128.



Configure Deployment for IBM_Debug_Tool_for_z/OS_V12-1

DLIBs

Indicate whether you want this deployment to copy the distribution zones and the distribution libraries (DLIBs) that are associated with the source software instance.

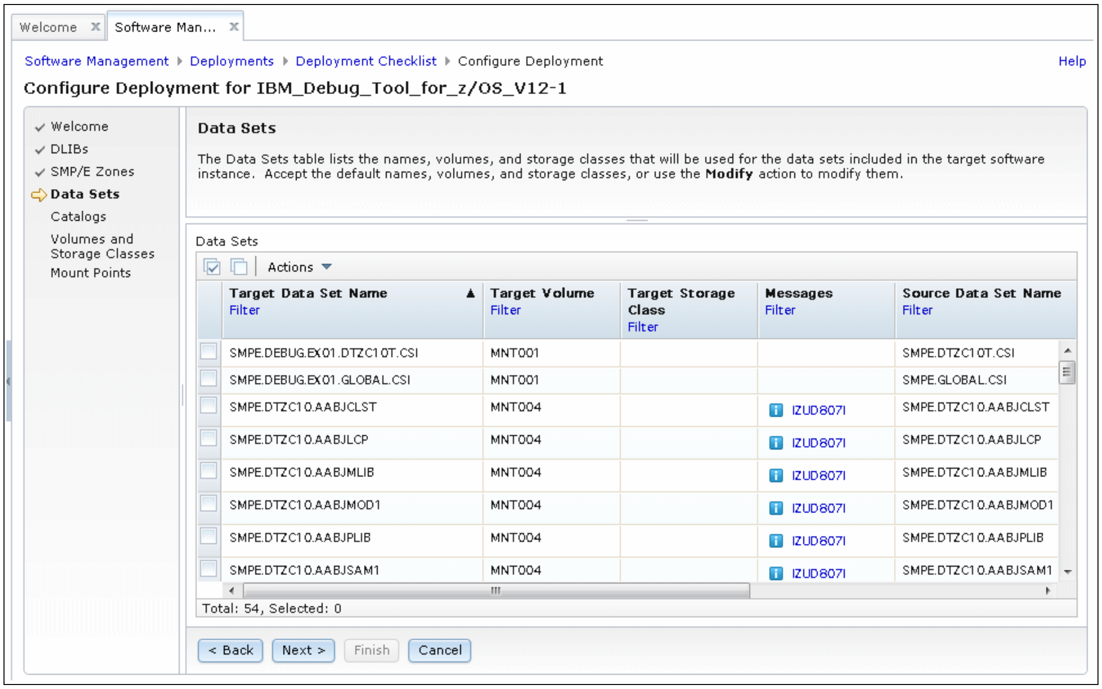
Do you want to copy the distribution zones and libraries associated with the source software instance?

● Yes
○ No

Figure 12-128 Configure deployment wizard - select Yes for DLIBs

Continuing through the Configure Deployment wizard, the SMP/E Zone window lists both a Target Zone and a DLIB Zone. This list is different from deployment example 1 (see Figure 12-97 on page 331) where only a Target Zone was shown.

The next window in the Configure Deployment wizard shows the data sets to be included in the new deployment. Because you started this new deployment by copying an old deployment of the same product that did not include the SMP/E DLIB data sets, no definitions are available for how these DLIB data sets are deployed, as shown by the IZUD807I messages that are shown in Figure 12-129.


Welcome ✕
Software Man... ✕
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment
Help

Configure Deployment for IBM_Debug_Tool_for_z/OS_V12-1

✓ Welcome
✓ DLIBs
✓ SMP/E Zones
Data Sets
Catalogs
Volumes and Storage Classes
Mount Points

Data Sets

The Data Sets table lists the names, volumes, and storage classes that will be used for the data sets included in the target software instance. Accept the default names, volumes, and storage classes, or use the **Modify** action to modify them.

Data Sets

	Target Data Set Name ▲ Filter	Target Volume Filter	Target Storage Class Filter	Messages Filter	Source Data Set Name Filter
□	SMPE.DEBUG.EX01.DTZC10T.CSI	MNT001			SMPE.DTZC10T.CSI
□	SMPE.DEBUG.EX01.GLOBAL.CSI	MNT001			SMPE.GLOBAL.CSI
□	SMPE.DTZC10.AABJCLST	MNT004		IZUD807I	SMPE.DTZC10.AABJCLST
□	SMPE.DTZC10.AABJLCP	MNT004		IZUD807I	SMPE.DTZC10.AABJLCP
□	SMPE.DTZC10.AABJMLIB	MNT004		IZUD807I	SMPE.DTZC10.AABJMLIB
□	SMPE.DTZC10.AABJMOD1	MNT004		IZUD807I	SMPE.DTZC10.AABJMOD1
□	SMPE.DTZC10.AABJPLIB	MNT004		IZUD807I	SMPE.DTZC10.AABJPLIB
□	SMPE.DTZC10.AABJSAM1	MNT004		IZUD807I	SMPE.DTZC10.AABJSAM1

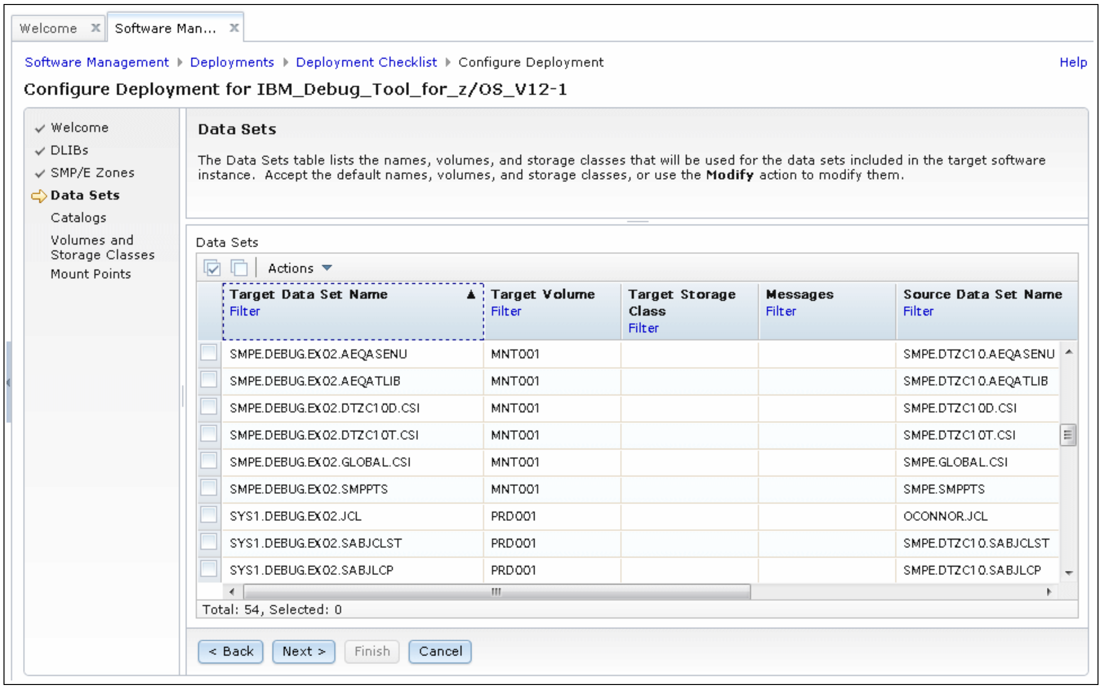
Total: 54, Selected: 0

Figure 12-129 IZUD807I messages

To resolve this message, assign target data set names as shown beginning with Figure 12-99 on page 333 and ending with Figure 12-102 on page 335.

In deployment example 1, we used a qualifier of EX01 in all of the data set names. However, in this deployment example, use the EX02 qualifier. The EX02 qualifier must be added to the new DLIB data sets and EX01 must be changed to EX02 in all the data set definitions that are inherited from the deployment example 1 that we copied to create this deployment.

When all the data set name definitions are configured, the data set list should appear as shown in Figure 12-130.



Configure Deployment for IBM_Debug_Tool_for_z/OS_V12-1

Data Sets

The Data Sets table lists the names, volumes, and storage classes that will be used for the data sets included in the target software instance. Accept the default names, volumes, and storage classes, or use the **Modify** action to modify them.

Data Sets

	Target Data Set Name	Target Volume	Target Storage Class	Messages	Source Data Set Name
	Filter	Filter	Filter	Filter	Filter
□	SMPE.DEBUG.EX02.AEQASENU	MNT001			SMPE.DTZC10.AEQASENU
□	SMPE.DEBUG.EX02.AEQATLIB	MNT001			SMPE.DTZC10.AEQATLIB
□	SMPE.DEBUG.EX02.DTZC10D.CSI	MNT001			SMPE.DTZC10D.CSI
□	SMPE.DEBUG.EX02.DTZC10T.CSI	MNT001			SMPE.DTZC10T.CSI
□	SMPE.DEBUG.EX02.GLOBAL.CSI	MNT001			SMPE.GLOBAL.CSI
□	SMPE.DEBUG.EX02.SMPPTS	MNT001			SMPE.SMPPTS
□	SYS1.DEBUG.EX02.JCL	PRD001			OCONNOR.JCL
□	SYS1.DEBUG.EX02.SABJCLST	PRD001			SMPE.DTZC10.SABJCLST
□	SYS1.DEBUG.EX02.SABJLCP	PRD001			SMPE.DTZC10.SABJLCP

Total: 54, Selected: 0

Figure 12-130 Configure deployment data sets

Continue with the deployment checklist as shown in deployment example 1. The result of the deployment checklist is a data set that contains a series of jobs to perform the deployment. After you log on to TSO and run each of the jobs in sequence, the list of data sets that are the result of this deployment are shown in Example 12-8.

Example 12-8 Deployment example 2 data sets

```
Data Set Name                                                  Volser
SMPE.DEBUG.EX02.AABJCLST                                       MNT001
SMPE.DEBUG.EX02.AABJLCP                                        MNT001
SMPE.DEBUG.EX02.AABJMLIB                                       MNT001
SMPE.DEBUG.EX02.AABJMOD1                                       MNT001
SMPE.DEBUG.EX02.AABJPLIB                                       MNT001
SMPE.DEBUG.EX02.AABJSAM1                                       MNT001
SMPE.DEBUG.EX02.AABJSAM2                                       MNT001
SMPE.DEBUG.EX02.AABJSLIB                                       MNT001
SMPE.DEBUG.EX02.AABJTLIB                                       MNT001
SMPE.DEBUG.EX02.AEQABIN                                        MNT001
SMPE.DEBUG.EX02.AEQAEXEC                                       MNT001
SMPE.DEBUG.EX02.AEQAMENP                                       MNT001
SMPE.DEBUG.EX02.AEQAMENU                                       MNT001
SMPE.DEBUG.EX02.AEQAMOD                                        MNT001
SMPE.DEBUG.EX02.AEQAPENP                                       MNT001
SMPE.DEBUG.EX02.AEQAPENU                                       MNT001
SMPE.DEBUG.EX02.AEQASAMP                                       MNT001
SMPE.DEBUG.EX02.AEQASENP                                       MNT001
SMPE.DEBUG.EX02.AEQASENU                                       MNT001
SMPE.DEBUG.EX02.AEQATLIB                                       MNT001
SMPE.DEBUG.EX02.DTZC10D.CSI                                    *VSAM*
SMPE.DEBUG.EX02.DTZC10D.CSI.DATA                              MNT001
SMPE.DEBUG.EX02.DTZC10D.CSI.INDEX                             MNT001
SMPE.DEBUG.EX02.DTZC10T.CSI                                   *VSAM*
SMPE.DEBUG.EX02.DTZC10T.CSI.DATA                              MNT001
SMPE.DEBUG.EX02.DTZC10T.CSI.INDEX                             MNT001
SMPE.DEBUG.EX02.GLOBAL.CSI                                    *VSAM*
SMPE.DEBUG.EX02.GLOBAL.CSI.DATA                               MNT001
SMPE.DEBUG.EX02.GLOBAL.CSI.INDEX                              MNT001
SMPE.DEBUG.EX02.SMPPTS                                        MNT001

SYS1.DEBUG.EX02.JCL                                           PRD001
SYS1.DEBUG.EX02.SABJCLST                                      PRD001
SYS1.DEBUG.EX02.SABJLCP                                       PRD001
SYS1.DEBUG.EX02.SABJMLIB                                      PRD001
SYS1.DEBUG.EX02.SABJMOD1                                      PRD001
SYS1.DEBUG.EX02.SABJPLIB                                      PRD001
SYS1.DEBUG.EX02.SABJSAM1                                      PRD001
SYS1.DEBUG.EX02.SABJSAM2                                      PRD001
SYS1.DEBUG.EX02.SABJSLIB                                      PRD001
SYS1.DEBUG.EX02.SABJTLIB                                      PRD001
SYS1.DEBUG.EX02.SEQAAUTH                                      PRD001
SYS1.DEBUG.EX02.SEQABIN                                       PRD001
SYS1.DEBUG.EX02.SEQABMOD                                      PRD001
SYS1.DEBUG.EX02.SEQAEXEC                                      PRD001
SYS1.DEBUG.EX02.SEQALPA                                       PRD001
SYS1.DEBUG.EX02.SEQAMENP                                      PRD001
SYS1.DEBUG.EX02.SEQAMENU                                      PRD001
SYS1.DEBUG.EX02.SEQAMOD                                       PRD001
SYS1.DEBUG.EX02.SEQAPENP                                      PRD001
SYS1.DEBUG.EX02.SEQAPENU                                      PRD001
SYS1.DEBUG.EX02.SEQASAMP                                      PRD001
SYS1.DEBUG.EX02.SEQASENP                                      PRD001
SYS1.DEBUG.EX02.SEQASENU                                      PRD001
SYS1.DEBUG.EX02.SEQATLIB                                      PRD001
SYS1.DEBUG.EX02.SMPLOG                                        PRD001
SYS1.DEBUG.EX02.SMPLOGA                                       PRD001
SYS1.DEBUG.EX02.SMPLTS                                        PRD001
SYS1.DEBUG.EX02.SMPMTS                                        PRD001
SYS1.DEBUG.EX02.SMPSCDS                                       PRD001
SYS1.DEBUG.EX02.SMPSTS                                        PRD001
SYS1.DEBUG.EX01.SMPSCDS                                       PRD001
SYS1.DEBUG.EX01.SMPSTS                                        PRD001
```

Return to the Software Management window and complete the last step of the deployment checklist process, as shown beginning with Figure 12-120 on page 358 and ending with Figure 12-124 on page 360.

Deployment example 3: Non-SMP/E product

Suppose that you have a collection of system programming tools that are stored in a group of related data sets. Suppose that you want to have this collection of system programming tools deployed across all systems in your enterprise. One problem in completing this task is the ongoing maintenance of keeping the tools up-to-date and synchronized across all of the systems. Why not use Software Management to solve this problem?

Deployment example 3 demonstrates how Software Management can be used to deploy a group of non-SMP/E data sets. Although Software Management deploys SMP/E installed software only, it is easy to comply with that design requirement, which enables Software Management to be used as a deployment mechanism for groups of related non-SMP/E data sets. The technique that is described here can be used for any non-SMP/E installed software that is provided by non-IBM vendors.

In deployment examples 1 and 2, you saw how non-SMP/E data sets can be added to an SMP/E installed product. This process is one way of deploying non-SMP/E data sets. For example, you can define your system programming tools (or non-IBM product) data sets to be part of your z/OS software instance so that whenever you deploy z/OS, your system programming tools (or non-IBM product) are automatically included in the deployment.

A problem with this approach is that your system programming tools (or non-IBM product) are hard-linked, so they must always be deployed together according to the same schedule. It is much more convenient and flexible if the system programming tools (or non-IBM product) can be defined as their own instance and be deployed independently of any other software. This approach is the focus of this deployment example.

For this example, we create a group of data sets that might contain a collection of system programming tools, as shown in Example 12-9.

Example 12-9 Example system programming tools data sets

```
OCONNOR.SPTOOLS.EXEC
OCONNOR.SPTOOLS.JCL
OCONNOR.SPTOOLS.LOAD
OCONNOR.SPTOOLS.MSGS
OCONNOR.SPTOOLS.PANELS
OCONNOR.SPTOOLS.SKELS
OCONNOR.SPTOOLS.TABLES
```

You cannot define these data sets as a software instance to Software Management because only SMP/E installed software is supported. Therefore, to satisfy this design requirement, the solution is to create a dummy SMP/E configuration. This dummy SMP/E configuration serves no purpose other than to satisfy the design requirements of Software Management so that your system programming tools, which consist of only non-SMP/E data sets, can be deployed by Software Management.

To create a dummy SMP/E configuration for our example, we built and ran the job that is shown in Example 12-10.

Example 12-10 Build dummy SMP/E job

```
//DEFCSI   JOB ,'DEFINE SMP',NOTIFY=&SYSUID,MSGCLASS=H,
//             MSGLEVEL=(1,1),
//             COND=(0,NE)
//*
//*-------------------------------------------------------------------
//*
//S1       EXEC PGM=IDCAMS,COND=(0,LT)
//SYSPRINT DD SYSOUT=*
//SYSIN    DD *
  DEL 'OCONNOR.SPTOOLS.GLOBAL.CSI' CLUSTER PURGE
  IF LASTCC=8 THEN SET MAXCC=0
/*
//*
```

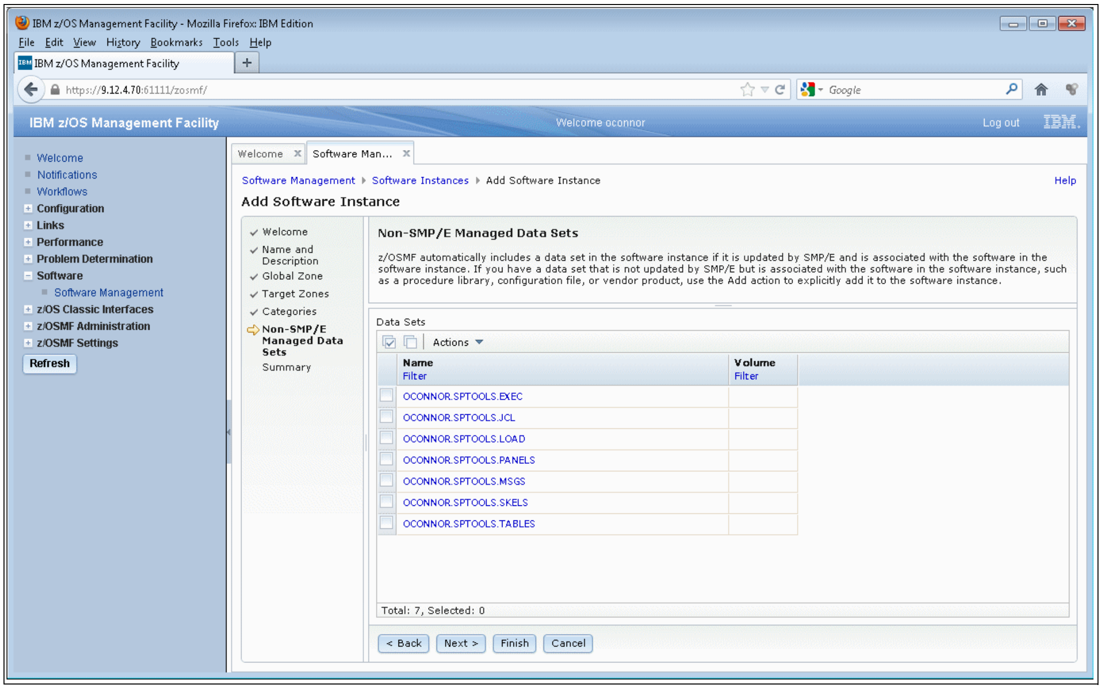
```
//S2       EXEC PGM=IDCAMS,COND=(0,LT)
//SYSPRINT DD SYSOUT=*
//SYSIN    DD *
  DEFINE CLUSTER (NAME(OCONNOR.SPTOOLS.GLOBAL.CSI) -
                  SHAREOPTIONS(2)                -
                  VOLUMES(BH5ST4)                -
                  UNIQUE)                        -
         DATA    (NAME(OCONNOR.SPTOOLS.GLOBAL.CSI.DATA) -
                  RECORDSIZE(24 143)             -
                  BUFFERSPACE(28672)             -
                  FREESPACE(10 5)                -
                  CISZ(4096)                     -
                  KEYS(24 0)                     -
                  SPEED                          -
                  TRACKS(10 10))                 -
         INDEX   (NAME(OCONNOR.SPTOOLS.GLOBAL.CSI.INDEX) -
                  TRACKS(5 5))
/*
//*
//S3       EXEC PGM=IDCAMS,COND=(0,LT)
//SYSPRINT DD SYSOUT=*
//GZONE    DD DSN=OCONNOR.SPTOOLS.GLOBAL.CSI,DISP=OLD
//ZPOOL    DD DSN=SYS1.MACLIB(GIMZPOOL),DISP=SHR
//SYSIN    DD *
  REPRO OUTFILE(GZONE) INFILE(ZPOOL)
/*
//*
//S4       EXEC PGM=GIMSMP,COND=(0,LT),REGION=0M,
//            PARM='DATE=U,CSI=OCONNOR.SPTOOLS.GLOBAL.CSI'
//SMPLOG   DD DSN=NULLFILE,DISP=SHR
//SMPPTS   DD DSN=&&TEMP,DISP=(,PASS),
//            UNIT=SYSALLDA,SPACE=(TRK,(5,5,5)),
//            DCB=(RECFM=FB,LRECL=80)
//SMPCNTL  DD    *
 SET BDY(GLOBAL) .
 UCLIN .
   ADD GLOBALZONE
       ZONEINDEX(
   (DUMMYT,OCONNOR.SPTOOLS.GLOBAL.CSI,TARGET)
   (DUMMYD,OCONNOR.SPTOOLS.GLOBAL.CSI,DLIB)
         ) .
 ENDUCL .
 SET BDY(DUMMYT) .
 UCLIN .
   ADD TARGETZONE(DUMMYT)
       RELATED(DUMMYD) .
 ENDUCL .
 SET BDY(DUMMYD) .
 UCLIN .
   ADD DLIBZONE(DUMMYD)
       RELATED(DUMMYT) .
 ENDUCL .
/*
```

This job creates a single CSI data set that contains the following SMP/E zones:

- GLOBAL zone
- TARGET zone that is named DUMMYT
- DLIB zone that is named DUMMYD

After you create the CSI data set, you can then define the software instance to Software Management. For more information about this process, see 12.3.4, “Software instances” on page 290.

During the setup of the software instance, the most important part for this example is defining the non-SMP/E Managed Data Sets, as shown beginning with Figure 12-38 on page 298 and ending with Figure 12-41 on page 300. The definition of the non-SMP/E data sets for our example system programming tools software instance is shown in Figure 12-131.



Add Software Instance

Non-SMP/E Managed Data Sets

z/OSMF automatically includes a data set in the software instance if it is updated by SMP/E and is associated with the software in the software instance. If you have a data set that is not updated by SMP/E but is associated with the software in the software instance, such as a procedure library, configuration file, or vendor product, use the Add action to explicitly add it to the software instance.

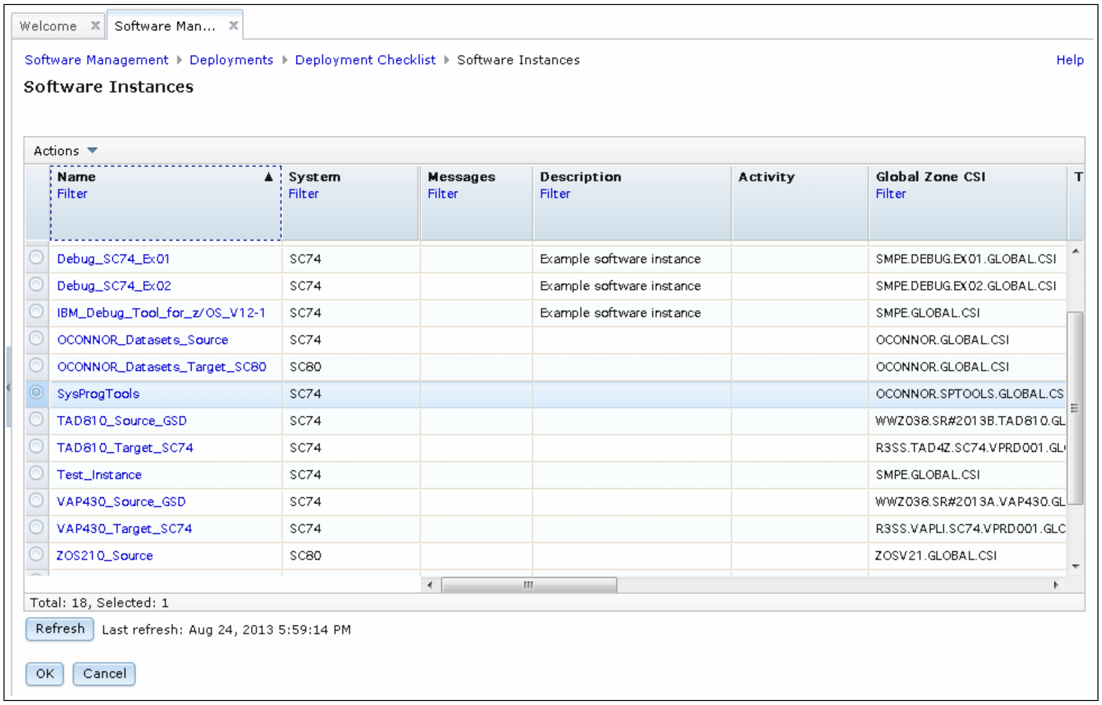
Data Sets

Name	Volume
OCONNOR.SPTOOLS.EXEC	
OCONNOR.SPTOOLS.JCL	
OCONNOR.SPTOOLS.LOAD	
OCONNOR.SPTOOLS.PANELS	
OCONNOR.SPTOOLS.MSGS	
OCONNOR.SPTOOLS.SKELS	
OCONNOR.SPTOOLS.TABLES	

Total: 7, Selected: 0

Figure 12-131 Non-SMP/E data sets

To start the deployment of the system programming tools software instance, follow the same process that is described in deployment example 1 (beginning with Figure 12-79 on page 321 and ending with Figure 12-84 on page 323). When we select a software instance for our example, we choose the instance that is called SysProgTools, as shown in Figure 12-132 on page 369.


Welcome
Software Man...
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Software Instances
Help

Software Instances

	Name	System	Messages	Description	Activity	Global Zone CSI	T
	Filter	Filter	Filter	Filter		Filter	
○	Debug_SC74_Ex01	SC74		Example software instance		SMPE.DEBUG.EX01.GLOBAL.CSI	
○	Debug_SC74_Ex02	SC74		Example software instance		SMPE.DEBUG.EX02.GLOBAL.CSI	
○	IBM_Debug_Tool_for_z/OS_V12-1	SC74		Example software instance		SMPE.GLOBAL.CSI	
○	OCONNOR_Datasets_Source	SC74				OCONNOR.GLOBAL.CSI	
○	OCONNOR_Datasets_Target_SC80	SC80				OCONNOR.GLOBAL.CSI	
●	SysProgTools	SC74				OCONNOR.SPTOOLS.GLOBAL.CS	
○	TAD810_Source_GSD	SC74				WWZ038.SR#2013B.TAD810.GL	
○	TAD810_Target_SC74	SC74				R3SS.TAD4Z.SC74.VPRD001.GL	
○	Test_Instance	SC74				SMPE.GLOBAL.CSI	
○	VAP430_Source_GSD	SC74				WWZ038.SR#2013A.VAP430.GL	
○	VAP430_Target_SC74	SC74				R3SS.VAPLI.SC74.VPRD001.GLC	
○	ZOS210_Source	SC80				ZOSV21.GLOBAL.CSI	

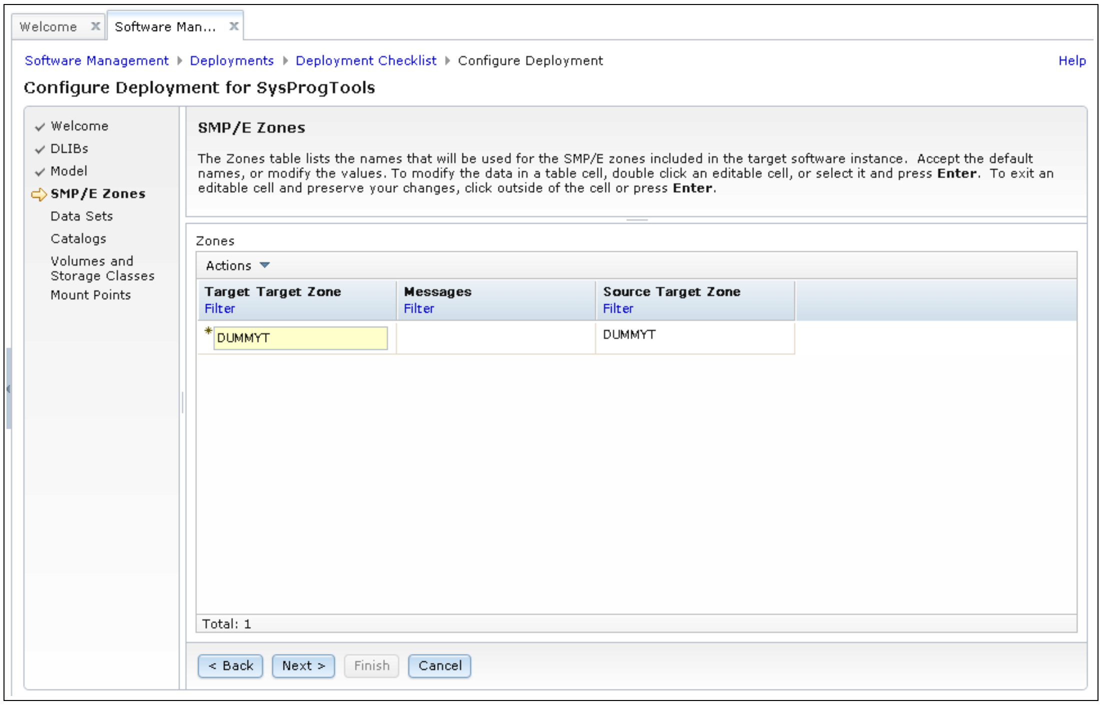
Total: 18, Selected: 1

Last refresh: Aug 24, 2013 5:59:14 PM

Figure 12-132 Selecting the software instance

Continue with the process that is described in deployment example 1 (beginning with Figure 12-86 on page 324 and ending with Figure 12-96 on page 330).

At the SMP/E Zones window, we select the DUMMYT TARGET zone, as shown in Figure 12-133.


Welcome
Software Man...
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment
Help

Configure Deployment for SysProgTools

✓ Welcome
✓ DLIBs
✓ Model
⇨ SMP/E Zones
Data Sets
Catalogs
Volumes and Storage Classes
Mount Points

SMP/E Zones

The Zones table lists the names that will be used for the SMP/E zones included in the target software instance. Accept the default names, or modify the values. To modify the data in a table cell, double click an editable cell, or select it and press **Enter**. To exit an editable cell and preserve your changes, click outside of the cell or press **Enter**.

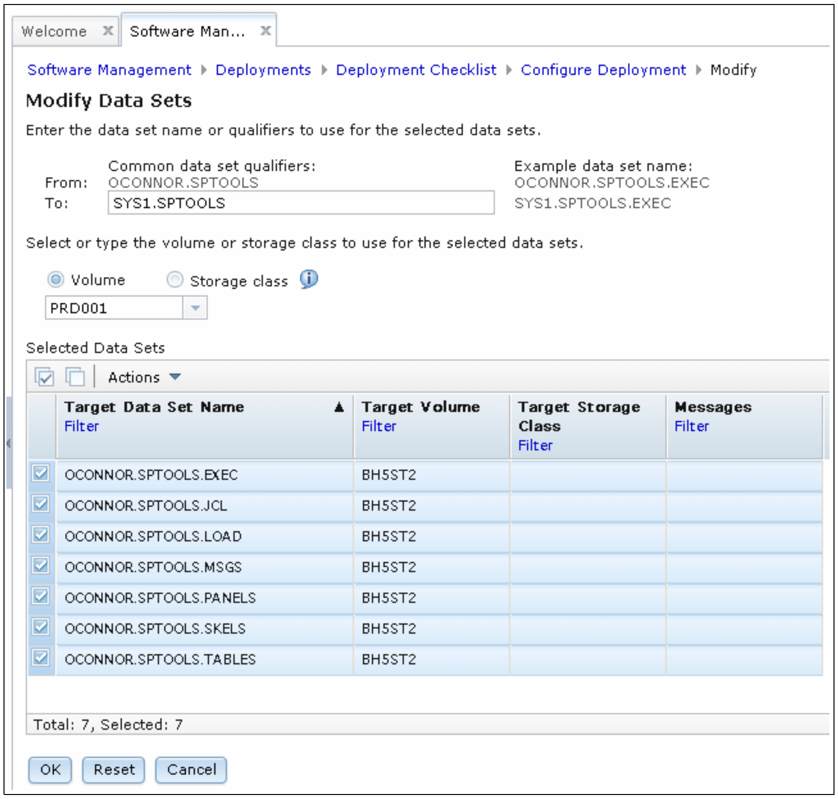
Zones

Target Target Zone	Messages	Source Target Zone
Filter	Filter	Filter
* DUMMYT		DUMMYT

Total: 1

Figure 12-133 SMP/E zones

Continuing to the Data Sets window, select all of the data sets (except GLOBAL.CSI) and change the high-level qualifier (HLQ) to SYS1, as shown in Figure 12-134.


Welcome
Software Man...
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment ▸ Modify

Modify Data Sets

Enter the data set name or qualifiers to use for the selected data sets.

	Common data set qualifiers:	Example data set name:
From:	OCONNOR.SPTOOLS	OCONNOR.SPTOOLS.EXEC
To:	SYS1.SPTOOLS	SYS1.SPTOOLS.EXEC

Select or type the volume or storage class to use for the selected data sets.

● Volume ○ Storage class

PRD001

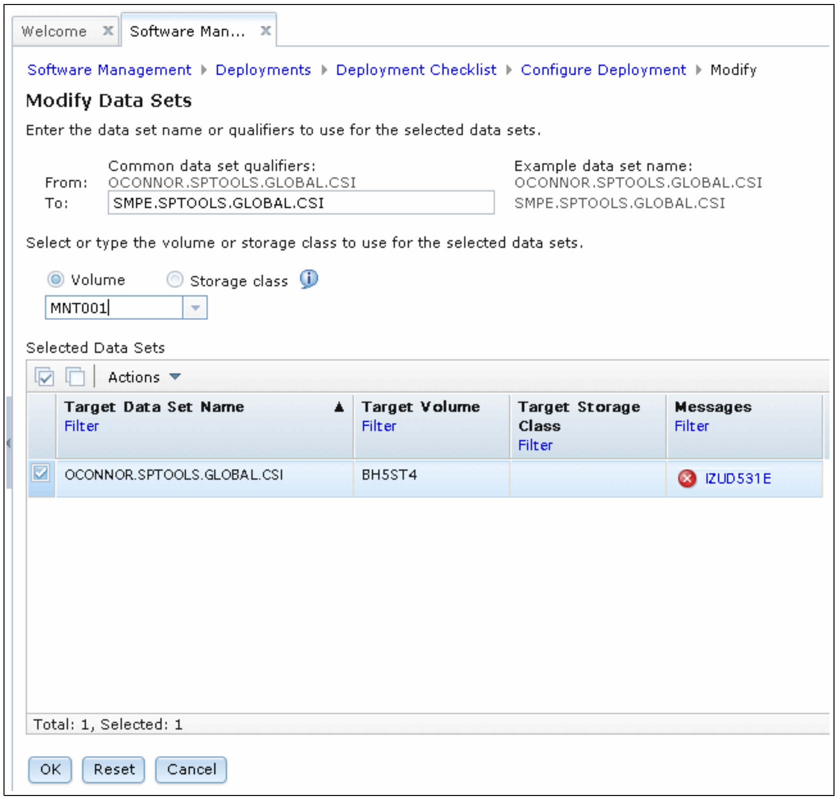
Selected Data Sets

	Target Data Set Name	Target Volume	Target Storage Class	Messages
☑	OCONNOR.SPTOOLS.EXEC	BH5ST2		
☑	OCONNOR.SPTOOLS.JCL	BH5ST2		
☑	OCONNOR.SPTOOLS.LOAD	BH5ST2		
☑	OCONNOR.SPTOOLS.MSGS	BH5ST2		
☑	OCONNOR.SPTOOLS.PANELS	BH5ST2		
☑	OCONNOR.SPTOOLS.SKELS	BH5ST2		
☑	OCONNOR.SPTOOLS.TABLES	BH5ST2		

Total: 7, Selected: 7

Figure 12-134 Changing data set names

Software Management must deploy the GLOBAL.CSI data set, although it is not required in this deployment example. Therefore, we choose a name and location where the GLOBAL.CSI data set can be deployed without any negative effect on the system programming tool data sets (see Figure 12-135 on page 371).



Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment ▸ Modify

Modify Data Sets

Enter the data set name or qualifiers to use for the selected data sets.

	Common data set qualifiers:	Example data set name:
From:	OCONNOR.SPTOOLS.GLOBAL.CSI	OCONNOR.SPTOOLS.GLOBAL.CSI
To:	SMPE.SPTOOLS.GLOBAL.CSI	SMPE.SPTOOLS.GLOBAL.CSI

Select or type the volume or storage class to use for the selected data sets.

● Volume ○ Storage class

MNT001

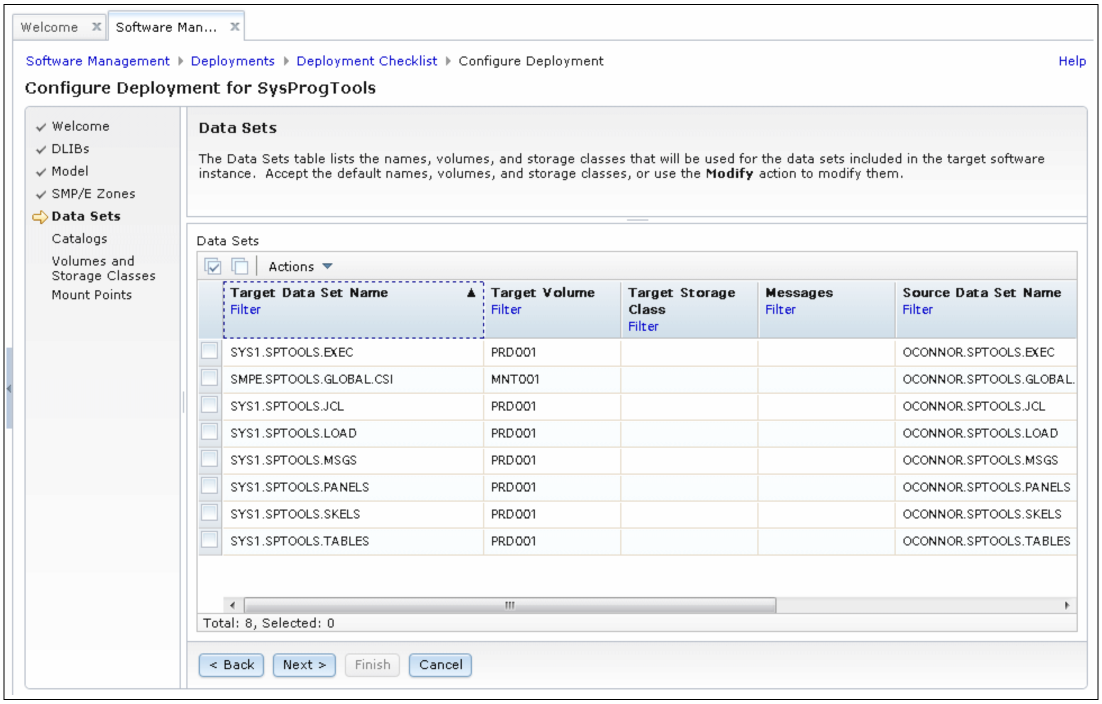
Selected Data Sets

	Target Data Set Name ▲ Filter	Target Volume Filter	Target Storage Class Filter	Messages Filter
☑	OCONNOR.SPTOOLS.GLOBAL.CSI	BH5ST4		☒ IZUD531E

Total: 1, Selected: 1

Figure 12-135 Changing data set names

A summary of the data set name changes is shown in Figure 12-136.



Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment

Configure Deployment for SysProgTools

Data Sets

The Data Sets table lists the names, volumes, and storage classes that will be used for the data sets included in the target software instance. Accept the default names, volumes, and storage classes, or use the **Modify** action to modify them.

Data Sets

	Target Data Set Name ▲ Filter	Target Volume Filter	Target Storage Class Filter	Messages Filter	Source Data Set Name Filter
□	SYS1.SPTOOLS.EXEC	PRD001			OCONNOR.SPTOOLS.EXEC
□	SMPE.SPTOOLS.GLOBAL.CSI	MNT001			OCONNOR.SPTOOLS.GLOBAL.
□	SYS1.SPTOOLS.JCL	PRD001			OCONNOR.SPTOOLS.JCL
□	SYS1.SPTOOLS.LOAD	PRD001			OCONNOR.SPTOOLS.LOAD
□	SYS1.SPTOOLS.MSGS	PRD001			OCONNOR.SPTOOLS.MSGS
□	SYS1.SPTOOLS.PANELS	PRD001			OCONNOR.SPTOOLS.PANELS
□	SYS1.SPTOOLS.SKELS	PRD001			OCONNOR.SPTOOLS.SKELS
□	SYS1.SPTOOLS.TABLES	PRD001			OCONNOR.SPTOOLS.TABLES

Total: 8, Selected: 0

Figure 12-136 Changed data set names

Then, continue with the process that is described in deployment example 1 (beginning with Figure 12-109 on page 339 and ending with Figure 12-124 on page 360).

At the completion of the deployment, our system programming tools data sets are as shown in Example 12-11.

Example 12-11 System programming tools data sets

```
SYS1.SPTOOLS.EXEC                                              PRD001
SYS1.SPTOOLS.JCL                                               PRD001
SYS1.SPTOOLS.LOAD                                              PRD001
SYS1.SPTOOLS.MSGS                                              PRD001
SYS1.SPTOOLS.PANELS                                            PRD001
SYS1.SPTOOLS.SKELS                                             PRD001
SYS1.SPTOOLS.TABLES                                            PRD001
```

The dummy SMP/E GLOBAL.CSI data set is shown in Example 12-12.

Example 12-12 Dummy SMP/E GLOBAL.CSI data set

```
SMPE.SPTOOLS.GLOBAL.CSI                                        *VSAM*
SMPE.SPTOOLS.GLOBAL.CSI.DATA                                   MNT001
SMPE.SPTOOLS.GLOBAL.CSI.INDEX                                  MNT001
```

Deployment example 4: Operating system

In this deployment example, we deploy the z/OS operating system. Operating systems are different from other software in that they cannot be upgraded in-place; the new software must be placed on an inactive set of system residence (sysres) DASD volumes, and then, you must perform an IPL of the system from those volumes to complete the deployment.

For this example, we use one of the SMP/E environments that are used to support ITSO systems. We configured the z/OS V2.1 software instance in Software Management and named it ZOS210_Source_ZOSMFPLX.

The primary system for Software Management in all the example deployments is SC74 (which is in a sysplex with system SC75). Although started and controlled by using Software Management on system SC74, a different sysplex (WTSCPLX8) is deployed to, which consists of systems SC80 and SC81. The source software instance and the TARGET software instance are created on the SC80/SC81 sysplex.

In the ZOS210_Source_ZOSMFPLX software instance, the sysres volumes consist of SMP/E data sets that are sourced from multiple SMP/E zones and a few non-SMP/E data sets.

The name of the SMP/E GLOBAL CSI is ZOSV21.GLOBAL.CSI.

The following SMP/E TARGET and DLIB zones are defined within the GLOBAL CSI:

- TARGET: Z21TA00. DLIB: Z21D100
- TARGET: Z21TA01. DLIB: Z21D101

The following data set HLQs are associated with the software instance @PL:

- ABJ
- AIO
- AOK
- AOP
- APK
- ASM
- ATX
- AUP
- CAZ
- CBC
- CDS
- CEE
- CKL
- CSF
- DGA
- DIT
- ELA
- EMS
- EOX
- EOY
- EPH
- EQAW
- EUVF
- IBM FFST™
- FMN
- GDDM
- GIM
- GLD
- GSK
- HAP
- HVT
- IBMZ
- ICQ
- IDI
- IGY
- IMW
- ING
- IOA
- IOE
- IPV
- IQI
- ISF
- ISP
- ITP
- IXM
- IZU
- JAVA
- NETVIEW
- PPFA
- PSAF
- REXX
- SDF2
- SYS1
- TCPIP
- TIVOLI
- TIVSM
- TPNS
- TWSA
- TWSZ
- VSAPL
- VSF2
- VSPASCAL
- SMPE
- ZFS

Data sets are on the following DASD volumes:

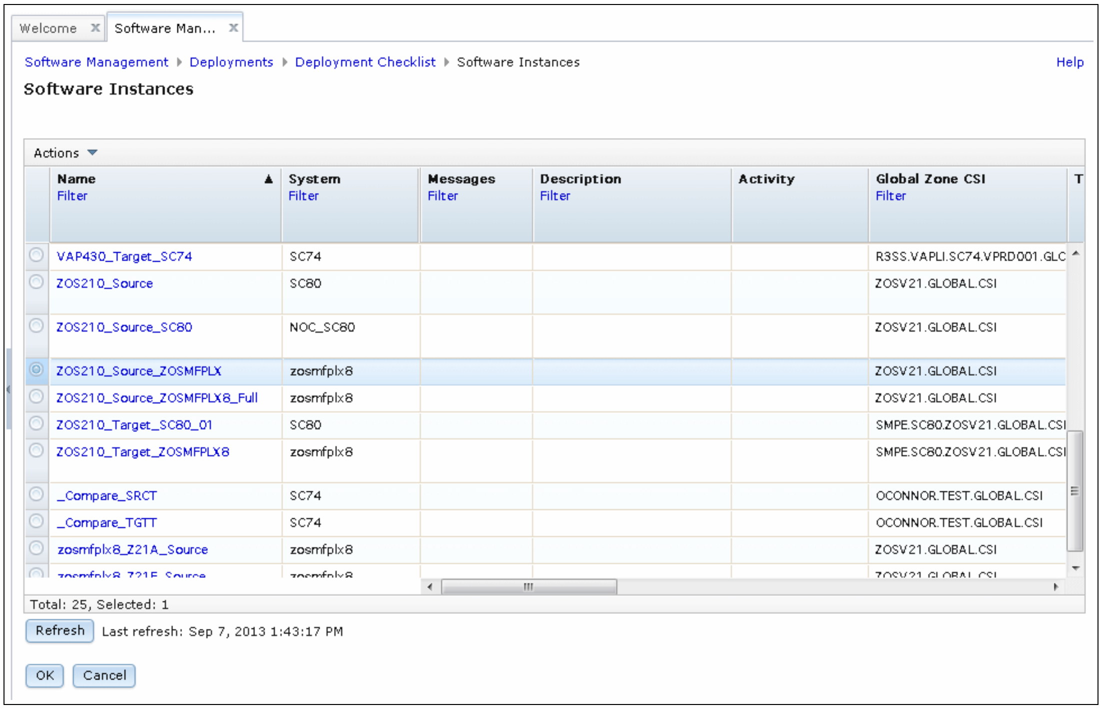
- TARGET: Z21RA1 and Z21RA2
- DLIB: Z21DL1, Z21DL2, and Z21DL3
- SMP/E: Z21SM1 and Z21SM2
- ZFS: SMS

To start this deployment, go to the list of deployments, click **Actions** and select **New**, as shown in Figure 12-79 on page 321, Figure 12-80 on page 321, and Figure 12-81 on page 322.

This action starts the Deployment Checklist and leads you through the steps of defining all the data that is required to construct a successful deployment. An example is shown in Figure 12-82 on page 322.

We select the first step of the Deployment Checklist, as shown in Figure 12-83 on page 323, and name this deployment Deployment_Ex04 and give it the description Deployment Example 04.

In the second step of the Deployment Checklist, we select the ZOS210_Source_ZOSMFPLX software instance, as shown in Figure 12-137.



Welcome
Software Man...
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Software Instances
Help

Software Instances

	Name ▲ Filter	System Filter	Messages Filter	Description Filter	Activity	Global Zone CSI Filter	T
○	VAP430_Target_SC74	SC74				R3SS.VAPLI.SC74.VPRD001.GLC	
○	ZOS210_Source	SC80				ZOSV21.GLOBAL.CSI	
○	ZOS210_Source_SC80	NOC_SC80				ZOSV21.GLOBAL.CSI	
●	ZOS210_Source_ZOSMFPLX	zosmfplx8				ZOSV21.GLOBAL.CSI	
○	ZOS210_Source_ZOSMFPLX8_Full	zosmfplx8				ZOSV21.GLOBAL.CSI	
○	ZOS210_Target_SC80_01	SC80				SMPE.SC80.ZOSV21.GLOBAL.CSI	
○	ZOS210_Target_ZOSMFPLX8	zosmfplx8				SMPE.SC80.ZOSV21.GLOBAL.CSI	
○	_Compare_SRCT	SC74				OCONNOR.TEST.GLOBAL.CSI	
○	_Compare_TGTT	SC74				OCONNOR.TEST.GLOBAL.CSI	
○	zosmfplx8_Z21A_Source	zosmfplx8				ZOSV21.GLOBAL.CSI	
○	zosmfplx8_Z21E_Source	zosmfplx8				ZOSV21.GLOBAL.CSI	

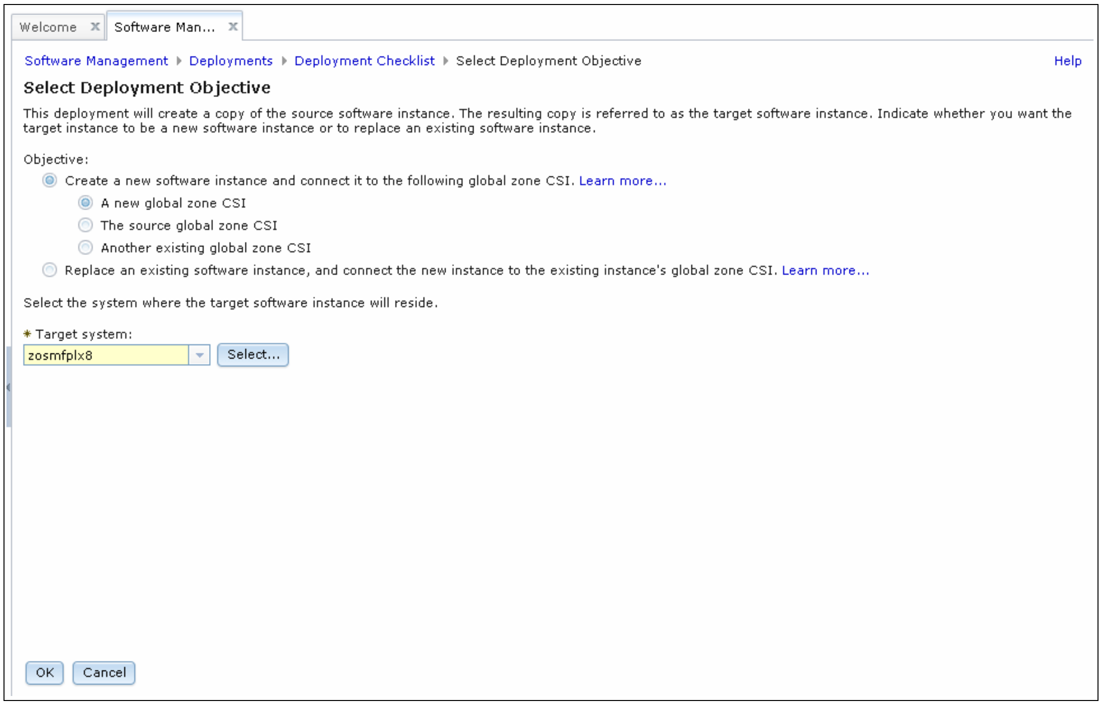
Total: 25, Selected: 1

Last refresh: Sep 7, 2013 1:43:17 PM

Figure 12-137 Selecting the software instance

Click **OK**.

The third step of the Deployment Checklist is to select the deployment objective. To keep the example simple, we choose to create a software instance, and then select the SC80/SC81 sysplex definition zosmfplx8 as the target for the deployment, as shown in Figure 12-138.


Welcome
Software Man...
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Select Deployment Objective
Help

Select Deployment Objective

This deployment will create a copy of the source software instance. The resulting copy is referred to as the target software instance. Indicate whether you want the target instance to be a new software instance or to replace an existing software instance.

Objective:

● Create a new software instance and connect it to the following global zone CSI. Learn more...

● A new global zone CSI

○ The source global zone CSI

○ Another existing global zone CSI

○ Replace an existing software instance, and connect the new instance to the existing instance's global zone CSI. Learn more...

Select the system where the target software instance will reside.

* Target system: zosmfplx8

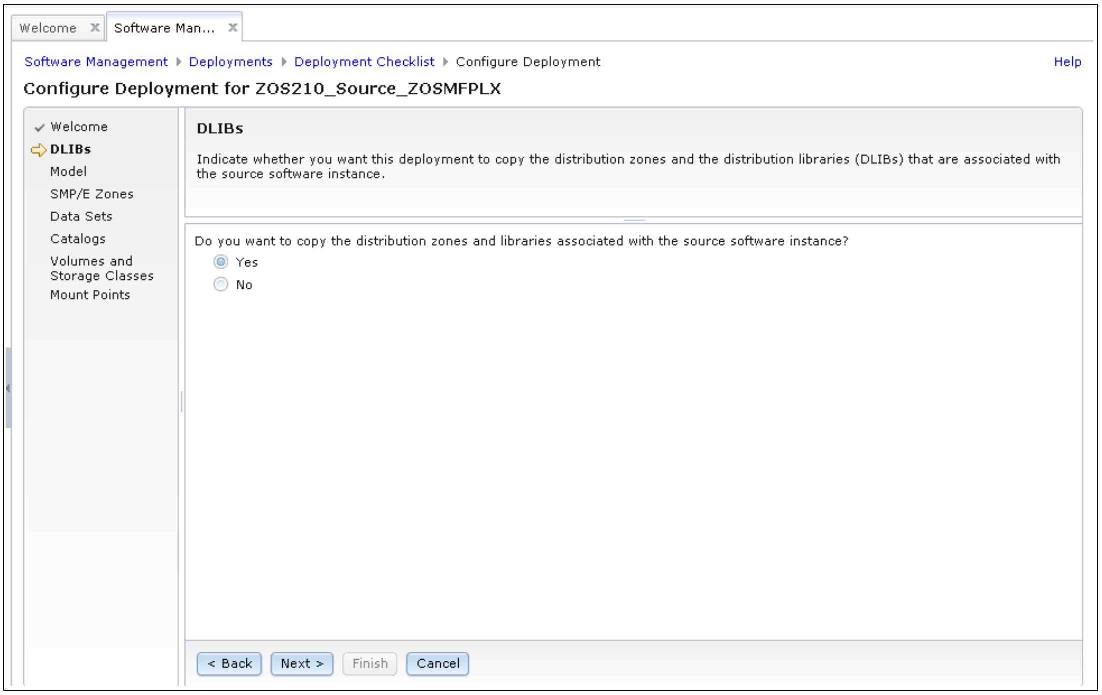
Figure 12-138 Selecting deployment objective

Click **OK**.

The fourth step of the Deployment Checklist is to check for missing SYSMODs. To keep the example simple, we choose not to generate any missing SYSMOD reports, as shown starting with Figure 12-89 on page 326 and ending with Figure 12-92 on page 327.

The fifth step of the Deployment Checklist is to configure the deployment by using the Configure Deployment wizard, as shown in Figure 12-94 on page 328.

For the DLIBs window of the Configure Deployment wizard, we choose to include the DLIB data sets in our example deployment, as shown in Figure 12-139 on page 376.



Configure Deployment for ZOS210_Source_ZOSMFPLX

DLIBs

Indicate whether you want this deployment to copy the distribution zones and the distribution libraries (DLIBs) that are associated with the source software instance.

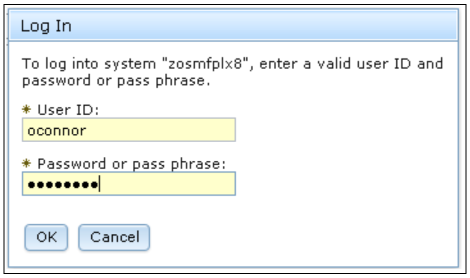
Do you want to copy the distribution zones and libraries associated with the source software instance?

● Yes
○ No

Figure 12-139 Configure Deployment wizard

For the Model window of the Configure Deployment wizard, select the source software instance, as shown in Figure 12-96 on page 330.

For the SMP/E Zones window of the Configure Deployment wizard, Software Management must access the source software instance. In this deployment, the source software instance is on a remote system (SC80/SC81). If the remote system was not accessed during this session of z/OSMF, the user is prompted to supply credentials for accessing the remote system, as shown in Figure 12-140.



Log In

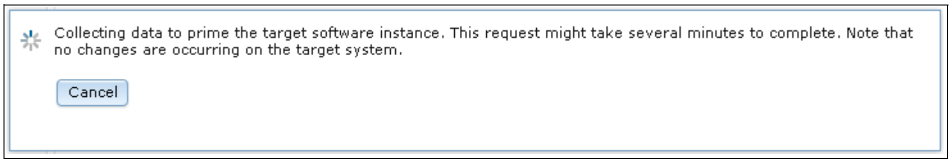
To log into system "zosmfplx8", enter a valid user ID and password or pass phrase.

* User ID: oconnor

* Password or pass phrase: ●●●●●●●●

Figure 12-140 Remote system log on window

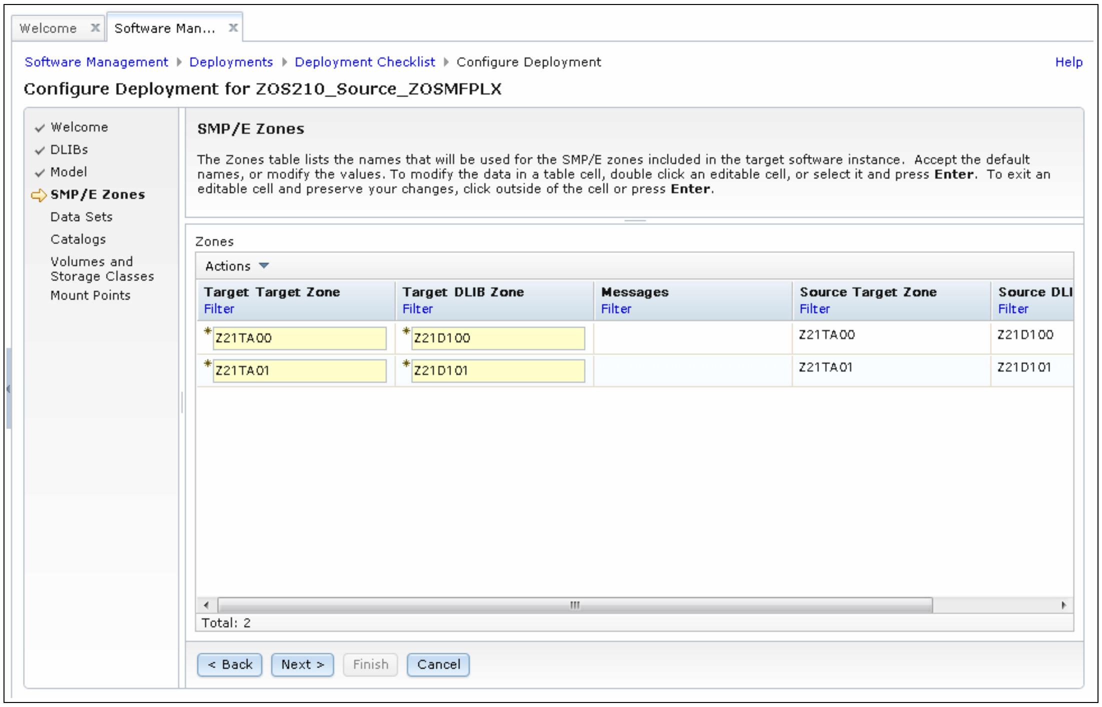
After you provide the TSO userid/password for the remote system, Software Management extracts information about the source software instance, as shown in Figure 12-141.



Collecting data to prime the target software instance. This request might take several minutes to complete. Note that no changes are occurring on the target system.

Figure 12-141 Gathering source software instance data

After the data is gathered, the SMP/E Zones window opens, as shown in Figure 12-142.



Configure Deployment for ZOS210_Source_ZOSMFPLX

SMP/E Zones

The Zones table lists the names that will be used for the SMP/E zones included in the target software instance. Accept the default names, or modify the values. To modify the data in a table cell, double click an editable cell, or select it and press **Enter**. To exit an editable cell and preserve your changes, click outside of the cell or press **Enter**.

Zones

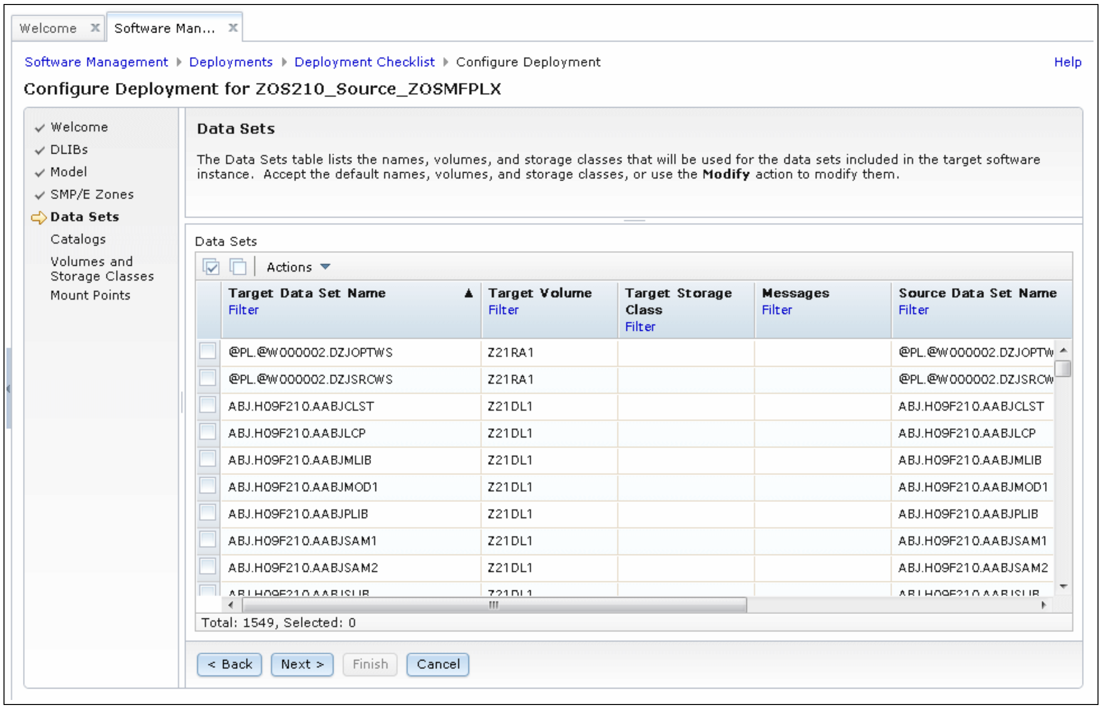
Target Target Zone Filter	Target DLIB Zone Filter	Messages Filter	Source Target Zone Filter	Source DLI Filter
*Z21TA00	*Z21D100		Z21TA00	Z21D100
*Z21TA01	*Z21D101		Z21TA01	Z21D101

Total: 2

Figure 12-142 SMP/E Zones

As shown on the left side of Figure 12-142, you can see the proposed target software instance zone names that are inherited from the source software instance that is listed on the right side. The zone names can be typed over if different names are wanted.

In the Data Sets window of the Configure Deployment wizard, the number of data sets (1549) is far greater than the other example deployments because we are deploying an operating system, as shown in the lower left corner of Figure 12-143 on page 378.



Configure Deployment for ZOS210_Source_ZOSMFPLX

Data Sets

The Data Sets table lists the names, volumes, and storage classes that will be used for the data sets included in the target software instance. Accept the default names, volumes, and storage classes, or use the **Modify** action to modify them.

Data Sets

	Target Data Set Name ▲ Filter	Target Volume Filter	Target Storage Class Filter	Messages Filter	Source Data Set Name Filter
□	@PL.@W000002.DZJOPTWS	Z21RA1			@PL.@W000002.DZJOPTW
□	@PL.@W000002.DZJSRCWS	Z21RA1			@PL.@W000002.DZJSRCW
□	ABJ.H09F210.AABJCLST	Z21DL1			ABJ.H09F210.AABJCLST
□	ABJ.H09F210.AABJLCP	Z21DL1			ABJ.H09F210.AABJLCP
□	ABJ.H09F210.AABJMLIB	Z21DL1			ABJ.H09F210.AABJMLIB
□	ABJ.H09F210.AABJMOD1	Z21DL1			ABJ.H09F210.AABJMOD1
□	ABJ.H09F210.AABJPLIB	Z21DL1			ABJ.H09F210.AABJPLIB
□	ABJ.H09F210.AABJSAM1	Z21DL1			ABJ.H09F210.AABJSAM1
□	ABJ.H09F210.AABJSAM2	Z21DL1			ABJ.H09F210.AABJSAM2
□	ABJ.H09F210.AABJSLIB	Z21DL1			ABJ.H09F210.AABJSLIB

Total: 1549, Selected: 0

Figure 12-143 Data Sets

The SMP/E TARGET data sets must retain the same data set names and logical DASD volume position between the source and target software instances because the data sets are cataloged indirectly (****** or &SYSR1 for the first volume and &SYSR2 for the second volume), which enables the sysres volumes to be put into productive use after you perform an IPL of the system.

The SMP/E DLIB, SMP/E, and ZFS must have different names between the source and target data set names because the data sets are directly cataloged; therefore, new data set names are required for the target software instance to avoid a name crash.

In this example deployment, the name of the source software instance SMP/E GLOBAL CSI ZOSV21.GLOBAL.CSI is changed to ZOSV21.EX04.GLOBAL.CSI in the target software instance.

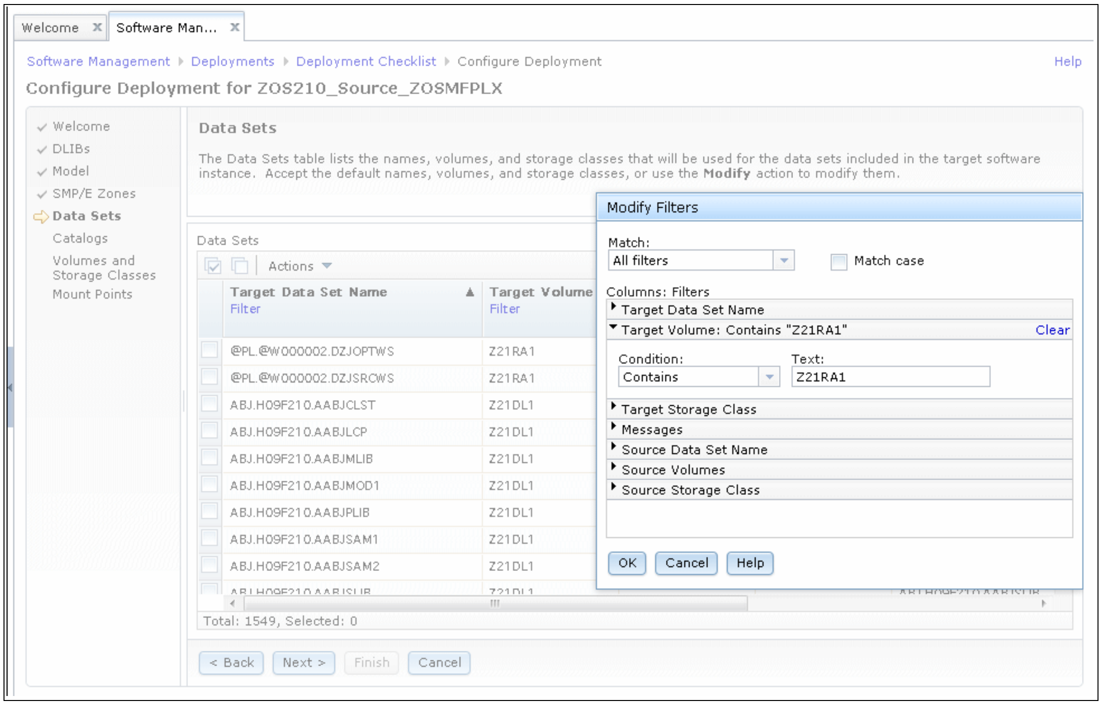
The names of the source software instance SMP/E TARGET and DLIB zones within the GLOBAL CSI TARGET Z21TA00 and DLIB Z21D100, and TARGET Z21TA01 and DLIB Z21D101, do not change in the target software instance.

The source software instance data set HLQs (@PL, ABJ, AIO, AOK, AOP, APK, ASM, ATX, AUP, CAZ, CBC, CDS, CEE, CFZ, CKL, CSD, CSF, DGA, DIT, ELA, EMS, EOX, EOY, EPH, EQAW, EUVF, FFST, FMN, GDDM, GIM, GLD, GSK, HAP, HVT, IBMZ, ICQ, IDI, IGY, IMW, ING, IOA, IOE, IPV, IQI, ISF, ISP, ITP, IXM, IZU, JAVA, NETVIEW, PPFA, PSAF, REXX, SDF2, SYS1, TCPIP, TIVOLI, TIVSM, TPNS, TWSA, TWSZ, VSAPL, VSF2, VSPASCAL, SMPE, and ZFS) do not change in the target software instance if they are SMP/E TARGET data sets (because they are indirectly cataloged). Otherwise, a qualifier of EX04 is inserted into the target software instance data set names to avoid a name crash with the directly cataloged source software instance data set names.

The source software instance DASD volumes (TARGETs Z21RA1 and Z21RA2, DLIBs Z21DL1, Z21DL2, and Z21DL3, and SMP/Es Z21SM1 and Z21SM2) are replaced by TARGETs NOC179 and NOC379, DLIBs NOCB79, NOCD79, and NOCF79, and SMP/Es NOC779 and NOC979, in the target software instance.

These changes can be defined by using different methods. The approach that we chose for our example is just one of those methods.

First, start by isolating data sets on the first sysres DASD volume Z21RA1. Click the **Filter** link that is below the Target Volume column heading. A window opens (see Figure 12-144) in which we enter `Contains` in to the Condition field and `Z21RA1` in to the Text field as the limiting filters.



Welcome ✕
Software Man... ✕
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment
Help

Configure Deployment for ZOS210_Source_ZOSMFPLX

✓ Welcome
✓ DLIBs
✓ Model
✓ SMP/E Zones
Data Sets
Catalogs
Volumes and Storage Classes
Mount Points

Data Sets

The Data Sets table lists the names, volumes, and storage classes that will be used for the data sets included in the target software instance. Accept the default names, volumes, and storage classes, or use the **Modify** action to modify them.

Data Sets

	Target Data Set Name ▲ Filter	Target Volume Filter
□	@PL.@W000002.DZJOPTWS	Z21RA1
□	@PL.@W000002.DZJSRCWS	Z21RA1
□	ABJ.H09F210.AABJCLST	Z21DL1
□	ABJ.H09F210.AABJLCP	Z21DL1
□	ABJ.H09F210.AABJMLIB	Z21DL1
□	ABJ.H09F210.AABJMOD1	Z21DL1
□	ABJ.H09F210.AABJPLIB	Z21DL1
□	ABJ.H09F210.AABJSAM1	Z21DL1
□	ABJ.H09F210.AABJSAM2	Z21DL1
□	ABJ.H09F210.AABJSLIB	Z21DL1

Total: 1549, Selected: 0

Modify Filters

Match: All filters ▾   □ Match case

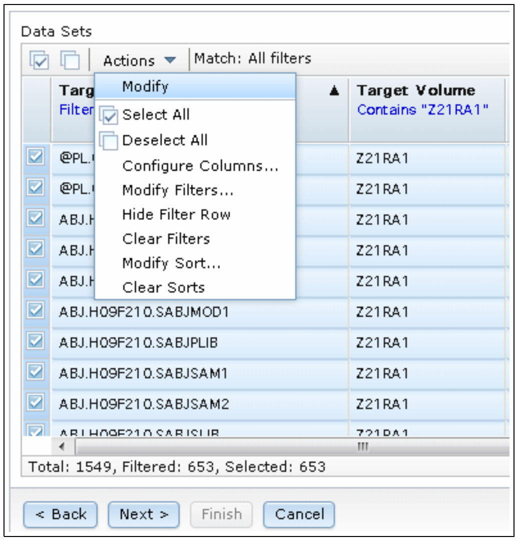
Columns: Filters

- ▸ Target Data Set Name
- ▾ Target Volume: Contains "Z21RA1"   Clear
  - Condition: Contains ▾   Text: Z21RA1
- ▸ Target Storage Class
- ▸ Messages
- ▸ Source Data Set Name
- ▸ Source Volumes
- ▸ Source Storage Class

Figure 12-144 Setting limiting filters

The filtering causes the table to be redisplayed, but contain data sets that are on volume Z21RA1 only.

Now, click **Select All** to include all rows in the table. Next, click **Actions** and select **Modify**, as shown in Figure 12-145.

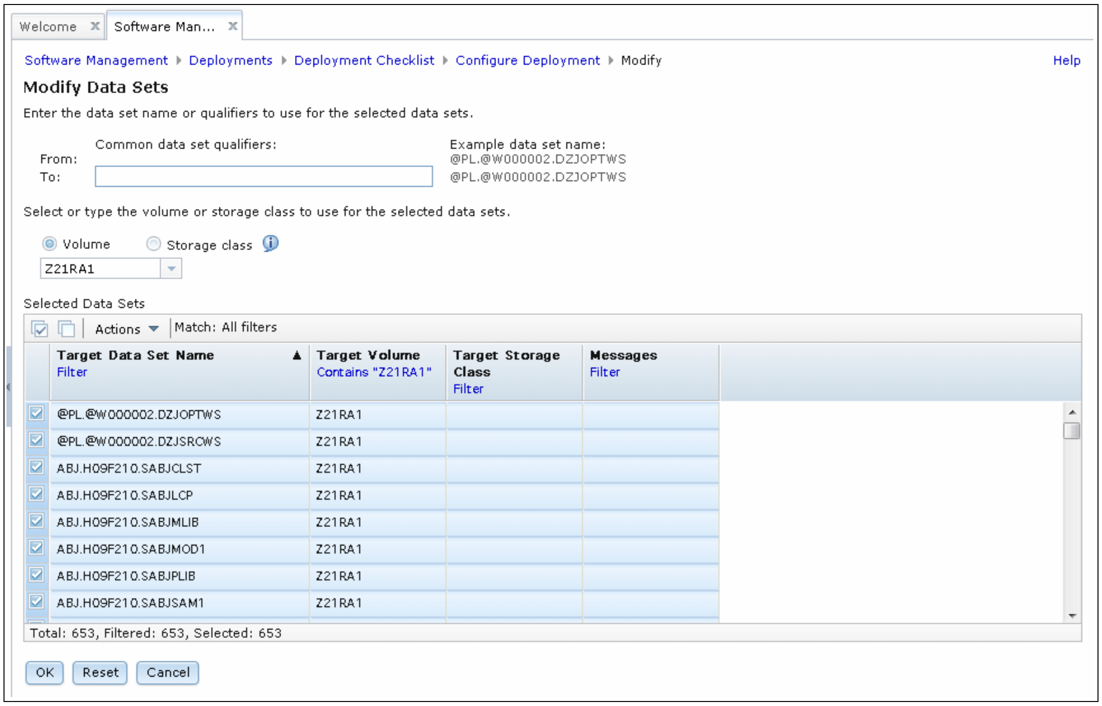


Targ Filter	Target Volume Contains "Z21RA1"
@PL.	Z21RA1
@PL.	Z21RA1
ABJ.H	Z21RA1
ABJ.H	Z21RA1
ABJ.H	Z21RA1
ABJ.H09F210.SABJMOD1	Z21RA1
ABJ.H09F210.SABJPLIB	Z21RA1
ABJ.H09F210.SABJSAM1	Z21RA1
ABJ.H09F210.SABJSAM2	Z21RA1
ABJ.H09F210.SABJSLIB	Z21RA1

Total: 1549, Filtered: 653, Selected: 653

Figure 12-145 Selecting the Modify option

The Modify Data Sets window opens, as shown in Figure 12-146.



Modify Data Sets

Enter the data set name or qualifiers to use for the selected data sets.

Common data set qualifiers:
From:
To:

Example data set name:
@PL.@W000002.DZJOPTWS
@PL.@W000002.DZJOPTWS

Select or type the volume or storage class to use for the selected data sets.

● Volume ○ Storage class

Z21RA1

Selected Data Sets

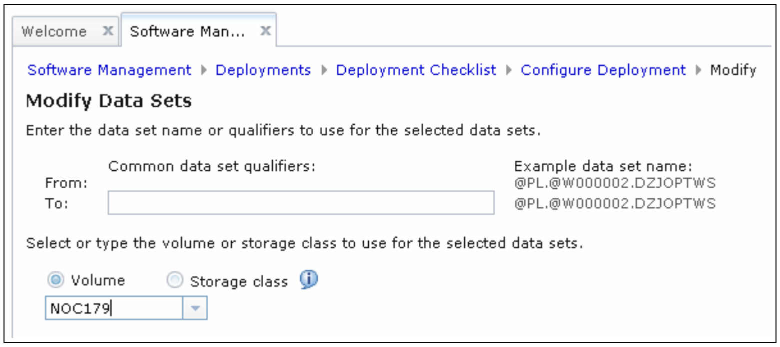
Target Data Set Name Filter	Target Volume Contains "Z21RA1"	Target Storage Class Filter	Messages Filter
@PL.@W000002.DZJOPTWS	Z21RA1		
@PL.@W000002.DZJSRCWS	Z21RA1		
ABJ.H09F210.SABJCLST	Z21RA1		
ABJ.H09F210.SABJLCP	Z21RA1		
ABJ.H09F210.SABJMLIB	Z21RA1		
ABJ.H09F210.SABJMOD1	Z21RA1		
ABJ.H09F210.SABJPLIB	Z21RA1		
ABJ.H09F210.SABJSAM1	Z21RA1		

Total: 653, Filtered: 653, Selected: 653

Figure 12-146 Modify Data Sets window

Because many data sets are available with different HLQs on volume Z21RA1, the lack of commonality means the option for changing data set names is not selected. However, in this case, we are not interested in that option because our intention here is to change only the volume of the target software instance and leave the data sets with the same name as the source software instance.

Change the volume from Z21RA1 to NOC179, as shown in Figure 12-147.



Welcome ✕ | Software Man... ✕

Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment ▸ Modify

Modify Data Sets

Enter the data set name or qualifiers to use for the selected data sets.

	Common data set qualifiers:	Example data set name:
From:		@PL.@W000002.DZJOPTWS
To:		@PL.@W000002.DZJOPTWS

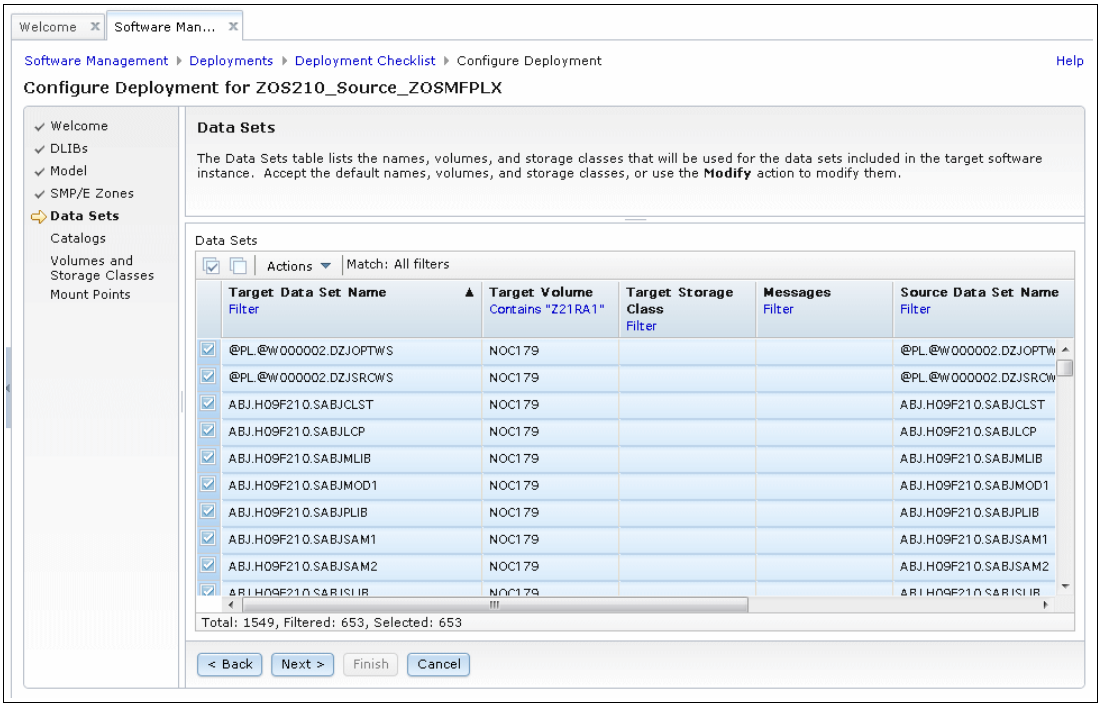
Select or type the volume or storage class to use for the selected data sets.

● Volume ○ Storage class

NOC179

Figure 12-147 Changing the volume

Click **OK**. You now see that volume Z21RA1 is replaced by NOC179, as shown in Figure 12-148.



Welcome ✕ | Software Man... ✕

Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment

Help

Configure Deployment for ZOS210_Source_ZOSMFPLX

Data Sets

The Data Sets table lists the names, volumes, and storage classes that will be used for the data sets included in the target software instance. Accept the default names, volumes, and storage classes, or use the **Modify** action to modify them.

Data Sets

Actions ▾ | Match: All filters

	Target Data Set Name ▲ Filter	Target Volume Contains "Z21RA1"	Target Storage Class Filter	Messages Filter	Source Data Set Name Filter
☑	@PL.@W000002.DZJOPTWS	NOC179			@PL.@W000002.DZJOPTW
☑	@PL.@W000002.DZJSRCWS	NOC179			@PL.@W000002.DZJSRCW
☑	ABJ.H09F210.SABJCLST	NOC179			ABJ.H09F210.SABJCLST
☑	ABJ.H09F210.SABJLCP	NOC179			ABJ.H09F210.SABJLCP
☑	ABJ.H09F210.SABJMLIB	NOC179			ABJ.H09F210.SABJMLIB
☑	ABJ.H09F210.SABJMOD1	NOC179			ABJ.H09F210.SABJMOD1
☑	ABJ.H09F210.SABJPLIB	NOC179			ABJ.H09F210.SABJPLIB
☑	ABJ.H09F210.SABJSAM1	NOC179			ABJ.H09F210.SABJSAM1
☑	ABJ.H09F210.SABJSAM2	NOC179			ABJ.H09F210.SABJSAM2
☑	ABJ.H09F210.SABJSLIB	NOC179			ABJ.H09F210.SABJSLIB

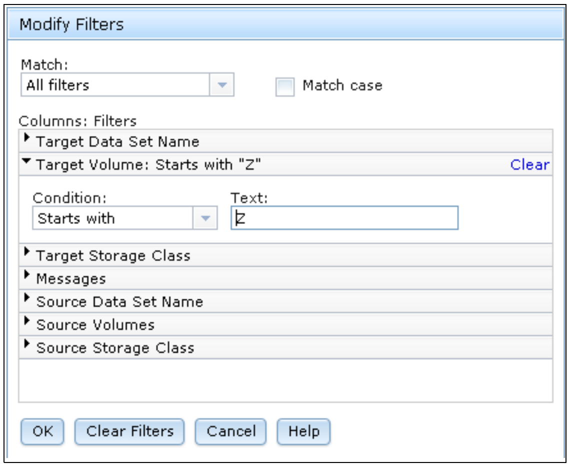
Total: 1549, Filtered: 653, Selected: 653

Figure 12-148 Volume replacement

Next, repeat the same process to change the volume definition of Z21RA2 to NOC379. Set the filter for Target Volume Z21RA2, click **Select All** → **Modify**, type over Z21RA2 with NOC379, and click **OK**.

Now, find all the DLIB and SMP/E data sets and change them to contain EX04 as a data set qualifier. Because the DLIB and SMP/E data sets are all on Z21DL* and Z21SM* volumes, you must isolate the data sets that are on those volumes.

To isolate the data sets, click the **Filter** link that is below the Target Volume column heading. A window opens (see Figure 12-149 on page 382), in which you enter `Starts with` in the Condition field and `Z` in to the Text filed as the limiting filters.



Modify Filters

Match: All filters

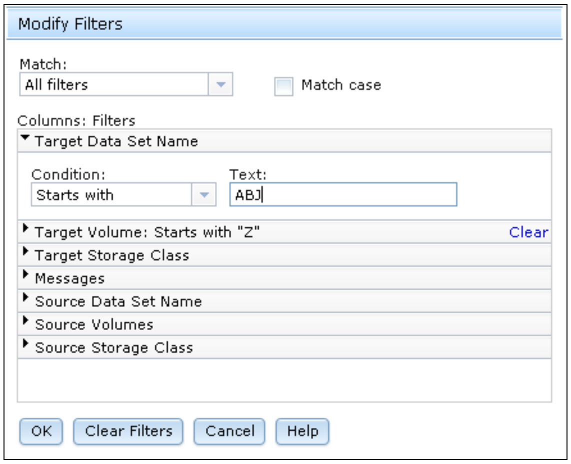
□ Match case

Columns: Filters

- Target Data Set Name
- Target Volume: Starts with "Z" Clear
  - Condition: Starts with
  - Text: Z
- Target Storage Class
- Messages
- Source Data Set Name
- Source Volumes
- Source Storage Class

Figure 12-149 Setting limiting filters

After a list of data sets on Z* volumes is available, you must isolate data sets for each HLQ. As an example, click the **Filter** link that is below the Target Data Set Name column heading. A window opens (see Figure 12-150 on page 382) in which you enter `Starts with` in the Condition field and `ABJ` in the Text field as the limiting filters.



Modify Filters

Match: All filters

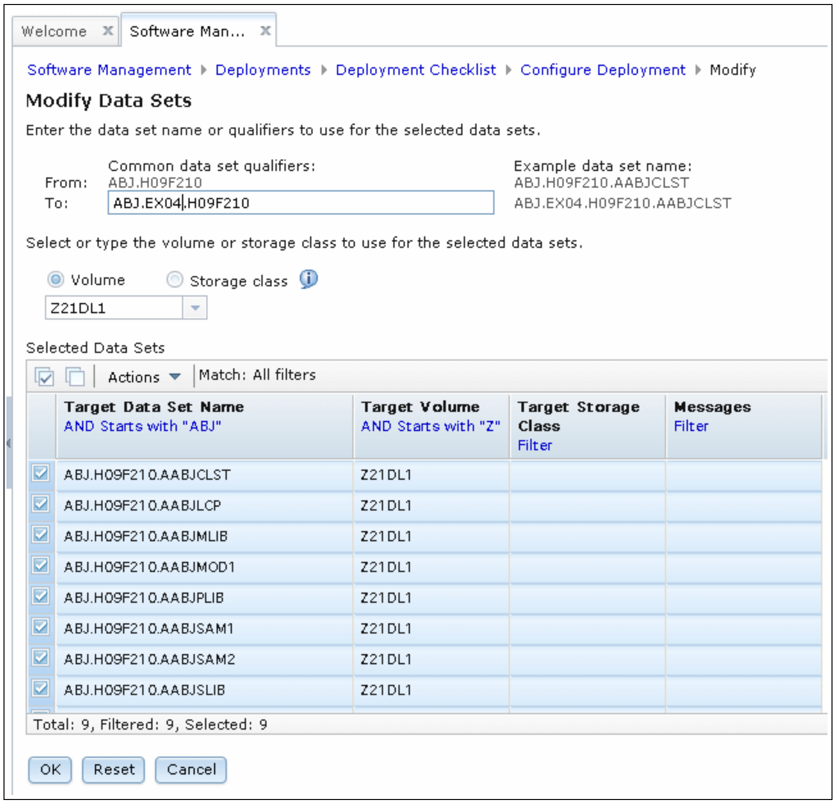
□ Match case

Columns: Filters

- Target Data Set Name
  - Condition: Starts with
  - Text: ABJ
- Target Volume: Starts with "Z" Clear
- Target Storage Class
- Messages
- Source Data Set Name
- Source Volumes
- Source Storage Class

Figure 12-150 Setting limiting filters

After you click **OK**, nine data sets are found. Because all of these data sets have ABJ as the HLQ, you can now insert the EX04 qualifier, as shown in Figure 12-151.


Welcome ✕
Software Man... ✕
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment ▸ Modify

Modify Data Sets

Enter the data set name or qualifiers to use for the selected data sets.

	Common data set qualifiers:	Example data set name:
From:	ABJ.H09F210	ABJ.H09F210.AABJCLST
To:	ABJ.EX04.H09F210	ABJ.EX04.H09F210.AABJCLST

Select or type the volume or storage class to use for the selected data sets.

● Volume ○ Storage class

Z21DL1

Selected Data Sets

Actions ▾
Match: All filters

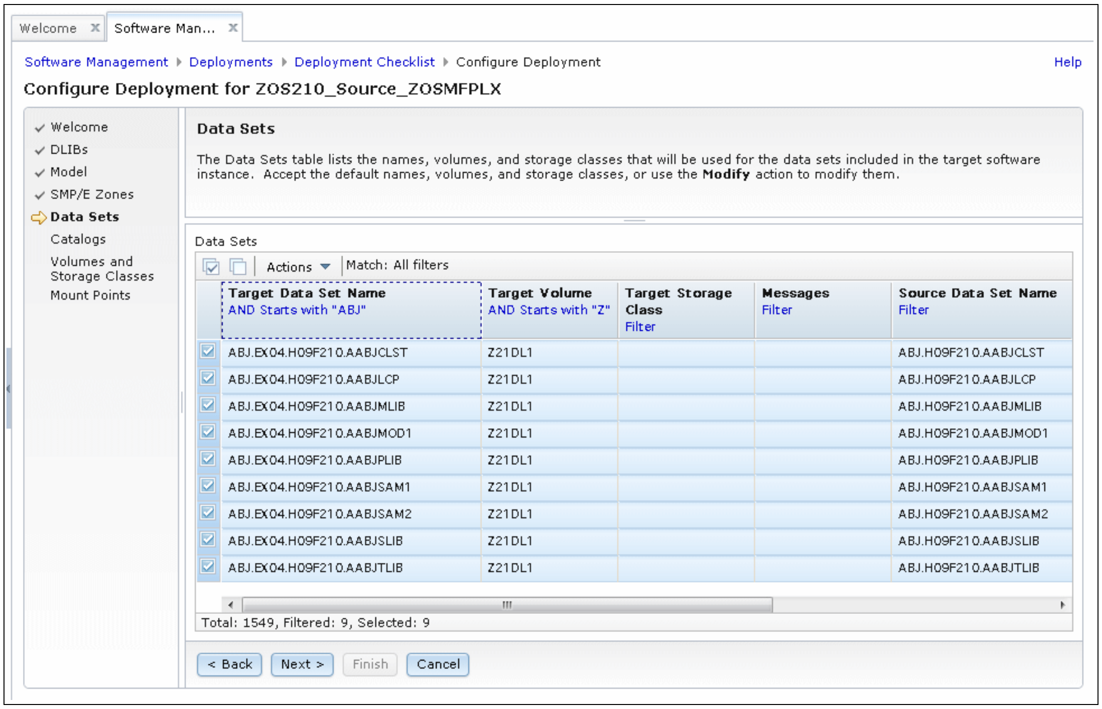
	Target Data Set Name AND Starts with "ABJ"	Target Volume AND Starts with "Z"	Target Storage Class Filter	Messages Filter
☑	ABJ.H09F210.AABJCLST	Z21DL1		
☑	ABJ.H09F210.AABJLCP	Z21DL1		
☑	ABJ.H09F210.AABJMLIB	Z21DL1		
☑	ABJ.H09F210.AABJMOD1	Z21DL1		
☑	ABJ.H09F210.AABJPLIB	Z21DL1		
☑	ABJ.H09F210.AABJSAM1	Z21DL1		
☑	ABJ.H09F210.AABJSAM2	Z21DL1		
☑	ABJ.H09F210.AABJSLIB	Z21DL1		

Total: 9, Filtered: 9, Selected: 9

Figure 12-151 Found data sets

Although you can change the Z21DL1 volume to NOCB79 as planned, do not perform this task yet. At the moment, the volume name separates the sysres TARGET data sets on NOC179 and NOC379 from the non-sysres DLIB and SMP/E data sets that are still marked as being on Z* volumes.

Click **OK** to return to the list of data sets that are shown in Figure 12-152. You can see that EX04 is now the second-level qualifier.


Welcome ✕
Software Man... ✕
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment
Help

Configure Deployment for ZOS210_Source_ZOSMFPLX

Data Sets

The Data Sets table lists the names, volumes, and storage classes that will be used for the data sets included in the target software instance. Accept the default names, volumes, and storage classes, or use the **Modify** action to modify them.

Data Sets

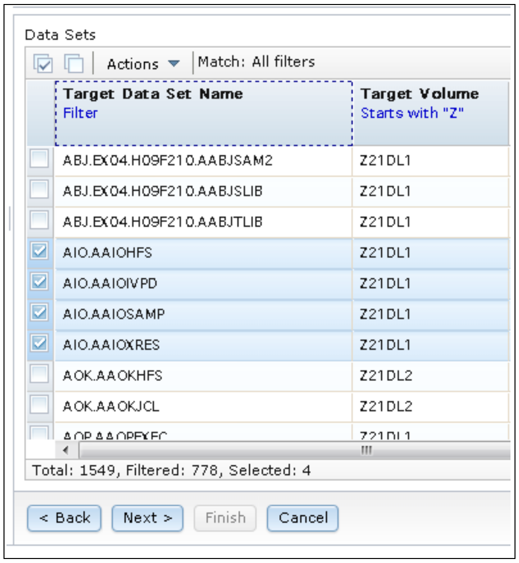
	Target Data Set Name AND Starts with "ABJ"	Target Volume AND Starts with "Z"	Target Storage Class Filter	Messages Filter	Source Data Set Name Filter
☑	ABJ.EX04.H09F210.AABJCLST	Z21DL1			ABJ.H09F210.AABJCLST
☑	ABJ.EX04.H09F210.AABJLCP	Z21DL1			ABJ.H09F210.AABJLCP
☑	ABJ.EX04.H09F210.AABJMLIB	Z21DL1			ABJ.H09F210.AABJMLIB
☑	ABJ.EX04.H09F210.AABJMOD1	Z21DL1			ABJ.H09F210.AABJMOD1
☑	ABJ.EX04.H09F210.AABJPLIB	Z21DL1			ABJ.H09F210.AABJPLIB
☑	ABJ.EX04.H09F210.AABJSAM1	Z21DL1			ABJ.H09F210.AABJSAM1
☑	ABJ.EX04.H09F210.AABJSAM2	Z21DL1			ABJ.H09F210.AABJSAM2
☑	ABJ.EX04.H09F210.AABJSLIB	Z21DL1			ABJ.H09F210.AABJSLIB
☑	ABJ.EX04.H09F210.AABJTLIB	Z21DL1			ABJ.H09F210.AABJTLIB

Total: 1549, Filtered: 9, Selected: 9

Figure 12-152 EX04 as the second-level qualifier

Continue through all of the DLIB and SMP/E data sets and modify the names to include EX04 as the second-level qualifier. The Target Volume filter should remain set to Z, but you might choose data sets directly if choosing directly is less effort than the use of the filter for Target Data Set Name.

Figure 12-153 shows the AIO HLQ data sets as being selected directly because only four data sets are available.


Data Sets

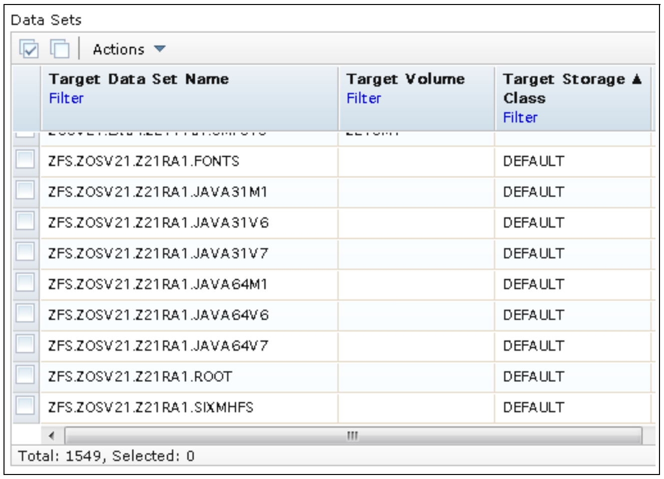
	Target Data Set Name Filter	Target Volume Starts with "Z"
□	ABJ.EX04.H09F210.AABJSAM2	Z21DL1
□	ABJ.EX04.H09F210.AABJSLIB	Z21DL1
□	ABJ.EX04.H09F210.AABJTLIB	Z21DL1
☑	AIO.AAIOHFS	Z21DL1
☑	AIO.AAIOIVPD	Z21DL1
☑	AIO.AAIOSAMP	Z21DL1
☑	AIO.AAIOXRES	Z21DL1
□	AOK.AAOKHFS	Z21DL2
□	AOK.AAOKJCL	Z21DL2
□	AOP.AAOPEXEC	Z21DL1

Total: 1549, Filtered: 778, Selected: 4

Figure 12-153 AIO HLQ data sets

We modify all DLIB and SMP/E data sets so that they contain EX04 as the second-level qualifier. The remaining data sets in our example deployment are the SMS-managed zFS data sets, which are processed differently.

To isolate the SMS-managed zFS data sets, clear all of the filters and click the **Target Storage Class** column heading. This action sorts the column and groups all SMS-managed data sets (with non-null storage classes) at the bottom of the column, as shown in Figure 12-154.



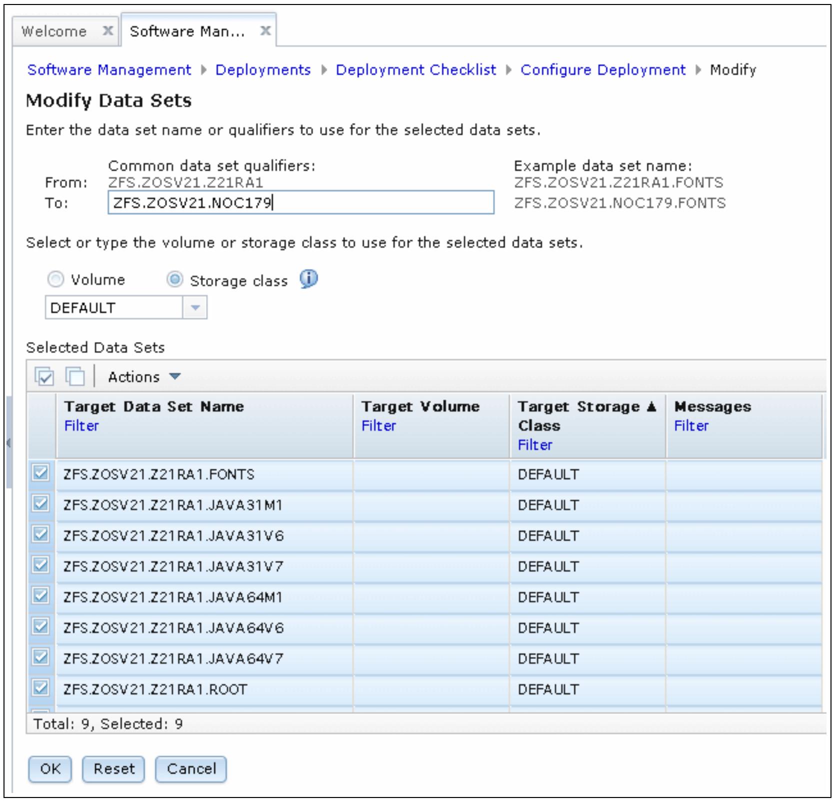
Data Sets

	Target Data Set Name Filter	Target Volume Filter	Target Storage ▲ Class Filter
□	[illegible]	[illegible]	
□	ZFS.ZOSV21.Z21RA1.FONTS		DEFAULT
□	ZFS.ZOSV21.Z21RA1.JAVA31M1		DEFAULT
□	ZFS.ZOSV21.Z21RA1.JAVA31V6		DEFAULT
□	ZFS.ZOSV21.Z21RA1.JAVA31V7		DEFAULT
□	ZFS.ZOSV21.Z21RA1.JAVA64M1		DEFAULT
□	ZFS.ZOSV21.Z21RA1.JAVA64V6		DEFAULT
□	ZFS.ZOSV21.Z21RA1.JAVA64V7		DEFAULT
□	ZFS.ZOSV21.Z21RA1.ROOT		DEFAULT
□	ZFS.ZOSV21.Z21RA1.SIXMHFS		DEFAULT

Total: 1549, Selected: 0

Figure 12-154 Configure Deployment wizard - group SMS-managed data sets

The SMS-managed zFS data sets include the Z21RA1 sysres volume name as a data set qualifier. For these data sets, change the Z21RA1 qualifier to NOC179. To change this qualifier, select all of the zFS data sets; then, open the Modify window in which we can change the Z21RA1 qualifier to NOC179, as shown in Figure 12-155.



Modify Data Sets

Enter the data set name or qualifiers to use for the selected data sets.

	Common data set qualifiers:	Example data set name:
From:	ZFS.ZOSV21.Z21RA1	ZFS.ZOSV21.Z21RA1.FONTS
To:	ZFS.ZOSV21.NOC179	ZFS.ZOSV21.NOC179.FONTS

Select or type the volume or storage class to use for the selected data sets.

○ Volume ● Storage class

DEFAULT

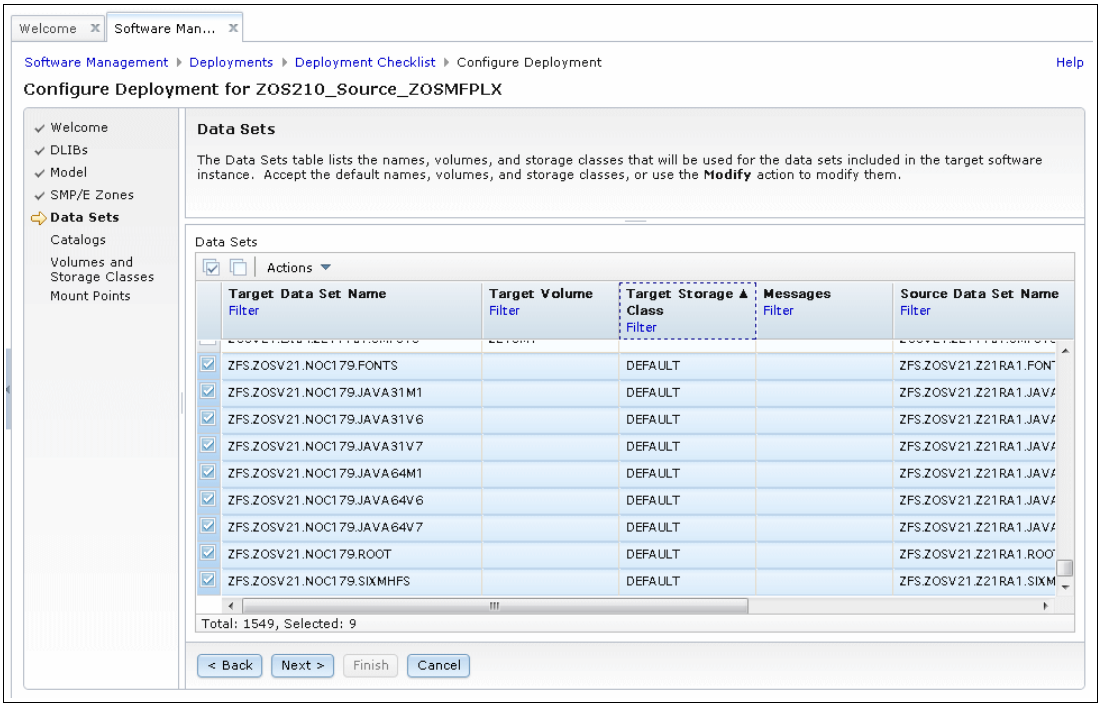
Selected Data Sets

	Target Data Set Name	Target Volume	Target Storage Class ▲	Messages
☑	ZFS.ZOSV21.Z21RA1.FONTS		DEFAULT	
☑	ZFS.ZOSV21.Z21RA1.JAVA31M1		DEFAULT	
☑	ZFS.ZOSV21.Z21RA1.JAVA31V6		DEFAULT	
☑	ZFS.ZOSV21.Z21RA1.JAVA31V7		DEFAULT	
☑	ZFS.ZOSV21.Z21RA1.JAVA64M1		DEFAULT	
☑	ZFS.ZOSV21.Z21RA1.JAVA64V6		DEFAULT	
☑	ZFS.ZOSV21.Z21RA1.JAVA64V7		DEFAULT	
☑	ZFS.ZOSV21.Z21RA1.ROOT		DEFAULT	

Total: 9, Selected: 9

Figure 12-155 Modifying data sets

The result is shown in Figure 12-156.


Welcome
Software Man...
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment
Help

Configure Deployment for ZOS210_Source_ZOSMFPLX

✓ Welcome
✓ DLIBs
✓ Model
✓ SMP/E Zones
Data Sets
Catalogs
Volumes and Storage Classes
Mount Points

Data Sets

The Data Sets table lists the names, volumes, and storage classes that will be used for the data sets included in the target software instance. Accept the default names, volumes, and storage classes, or use the **Modify** action to modify them.

Data Sets

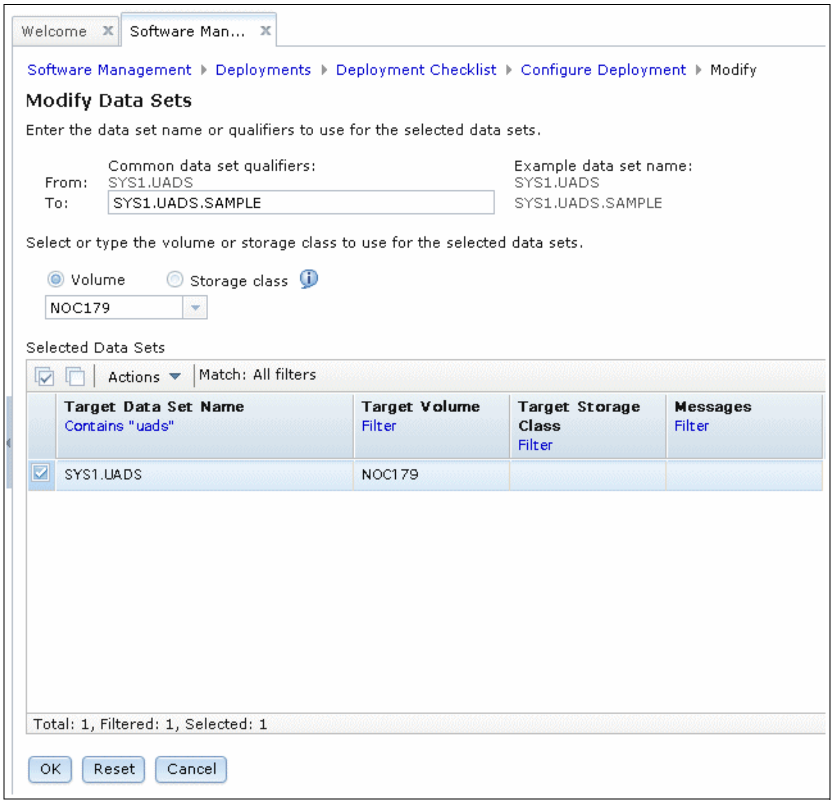
	Target Data Set Name	Target Volume	Target Storage Class ▲	Messages	Source Data Set Name
☑	ZFS.ZOSV21.NOC179.FONTS		DEFAULT		ZFS.ZOSV21.Z21RA1.FONT
☑	ZFS.ZOSV21.NOC179.JAVA31M1		DEFAULT		ZFS.ZOSV21.Z21RA1.JAVA
☑	ZFS.ZOSV21.NOC179.JAVA31V6		DEFAULT		ZFS.ZOSV21.Z21RA1.JAVA
☑	ZFS.ZOSV21.NOC179.JAVA31V7		DEFAULT		ZFS.ZOSV21.Z21RA1.JAVA
☑	ZFS.ZOSV21.NOC179.JAVA64M1		DEFAULT		ZFS.ZOSV21.Z21RA1.JAVA
☑	ZFS.ZOSV21.NOC179.JAVA64V6		DEFAULT		ZFS.ZOSV21.Z21RA1.JAVA
☑	ZFS.ZOSV21.NOC179.JAVA64V7		DEFAULT		ZFS.ZOSV21.Z21RA1.JAVA
☑	ZFS.ZOSV21.NOC179.ROOT		DEFAULT		ZFS.ZOSV21.Z21RA1.ROOT
☑	ZFS.ZOSV21.NOC179.SIXMHFS		DEFAULT		ZFS.ZOSV21.Z21RA1.SIXM

Total: 1549, Selected: 9

Figure 12-156 Results of modifying data sets

One oddity in this deployment is the SYS1.UADS data set. On the ITSO systems, the SMP/E TARGET data set SYS1.UADS is uncataloged, and another non-SMP/E SYS1.UADS data set is on another volume that is cataloged.

This configuration is a common practice that avoids losing locally added UADS members whenever an operating system is upgraded. If we tried to deploy the instance as it is, Software Management produces an error because it knows it cannot deploy SYS1.UAD if it is cataloged somewhere else on the system. To avoid this error, SYS1.UADS is deployed with the alternative name SYS1.UADS.SAMPLE, as shown in Figure 12-157.



Welcome
Software Man...
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment ▸ Modify

Modify Data Sets

Enter the data set name or qualifiers to use for the selected data sets.

	Common data set qualifiers:	Example data set name:
From:	SYS1.UADS	SYS1.UADS
To:	SYS1.UADS.SAMPLE	SYS1.UADS.SAMPLE

Select or type the volume or storage class to use for the selected data sets.

● Volume ○ Storage class

NOC179

Selected Data Sets

Actions
Match: All filters

	Target Data Set Name Contains "uads"	Target Volume Filter	Target Storage Class Filter	Messages Filter
☑	SYS1.UADS	NOC179		

Total: 1, Filtered: 1, Selected: 1

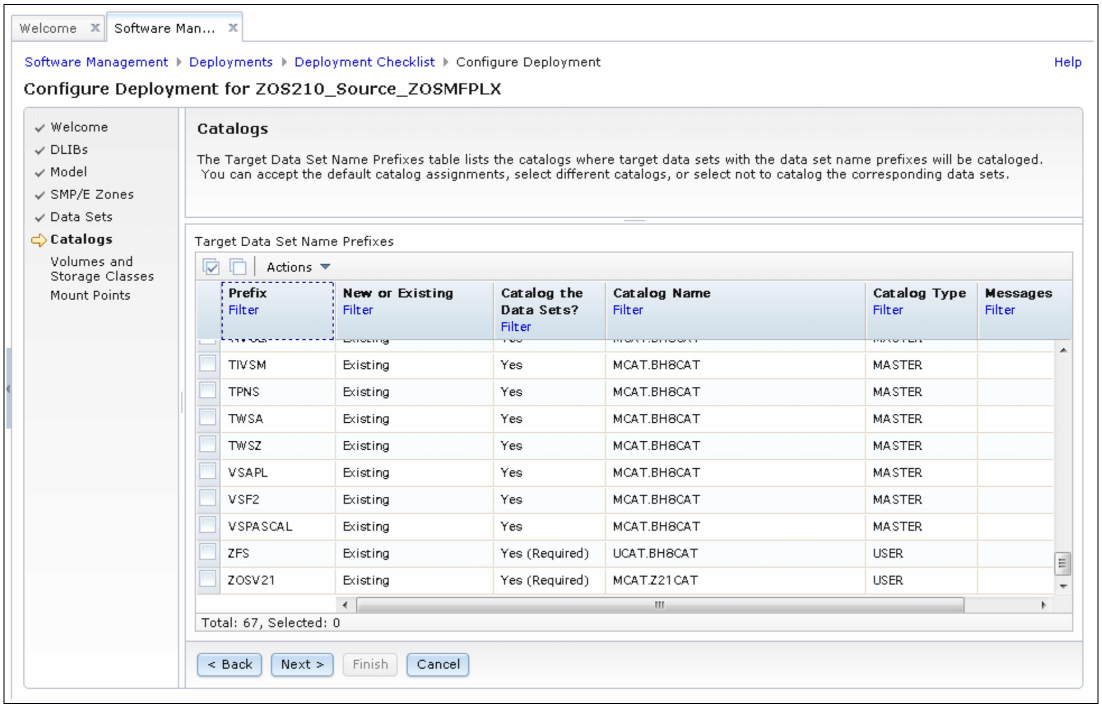
Figure 12-157 SYS1.UADS deployed with alternative name SYS1.UADS.SAMPLE

At this point, all of the non-sysres data sets contain an EX04 or NOC179 qualifier. Now, you can repeat the process that is shown beginning with Figure 12-144 on page 379 and ending with Figure 12-148 on page 381 to change the remaining Z21* volume names to NOC*.

The volume names must be changed individually, so that DLIBs Z21DL1, Z21DL2, and Z21DL3 are replaced by NOCB79, NOCD79, and NOCF79, and SMP/Es Z21SM1 and Z21SM2 are replaced by NOC779 and NOC979.

After the old DASD volume name definitions are changed to the new names, click **Next** to open the Catalogs window.

In this example deployment, the catalog definitions do not need to be changed. Although you can deploy the TARGET and DLIB data sets uncataloged, the SMS-managed zFS data sets and the SMP/E data sets (because some of them are VSAM) must be cataloged, as shown in Figure 12-158 on page 389.



Welcome ✕
Software Man... ✕
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment
Help

Configure Deployment for ZOS210_Source_ZOSMFPLX

Catalogs

The Target Data Set Name Prefixes table lists the catalogs where target data sets with the data set name prefixes will be cataloged. You can accept the default catalog assignments, select different catalogs, or select not to catalog the corresponding data sets.

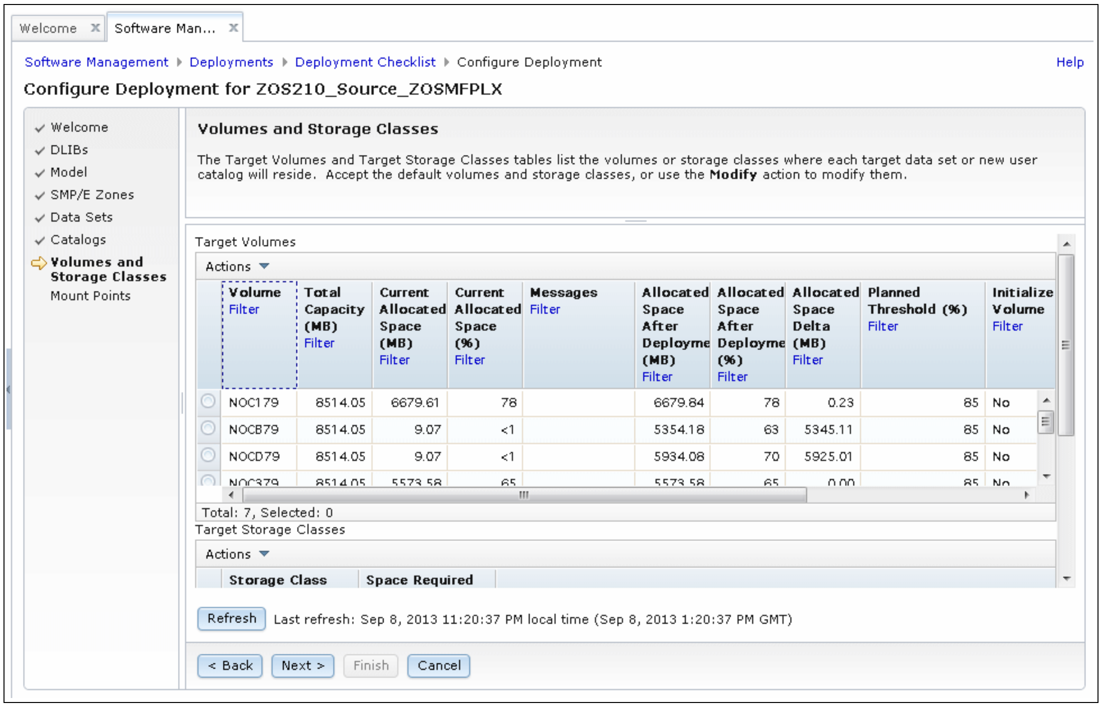
Target Data Set Name Prefixes

	Prefix Filter	New or Existing Filter	Catalog the Data Sets? Filter	Catalog Name Filter	Catalog Type Filter	Messages Filter
□	TIVSM	Existing	Yes	MCAT.BH8CAT	MASTER	
□	TPNS	Existing	Yes	MCAT.BH8CAT	MASTER	
□	TWSA	Existing	Yes	MCAT.BH8CAT	MASTER	
□	TWSZ	Existing	Yes	MCAT.BH8CAT	MASTER	
□	VSAPL	Existing	Yes	MCAT.BH8CAT	MASTER	
□	VSF2	Existing	Yes	MCAT.BH8CAT	MASTER	
□	VSPASCAL	Existing	Yes	MCAT.BH8CAT	MASTER	
□	ZFS	Existing	Yes (Required)	UCAT.BH8CAT	USER	
□	ZOSV21	Existing	Yes (Required)	MCAT.Z21CAT	USER	

Total: 67, Selected: 0

Figure 12-158 Catalogs window

Click **Next** to go to the Volumes and Storage Classes window, as shown in Figure 12-159.



Welcome ✕
Software Man... ✕
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment
Help

Configure Deployment for ZOS210_Source_ZOSMFPLX

✓ Welcome
✓ DLIBs
✓ Model
✓ SMP/E Zones
✓ Data Sets
✓ Catalogs
⇨ Volumes and Storage Classes
Mount Points

Volumes and Storage Classes

The Target Volumes and Target Storage Classes tables list the volumes or storage classes where each target data set or new user catalog will reside. Accept the default volumes and storage classes, or use the **Modify** action to modify them.

Target Volumes

	Volume Filter	Total Capacity (MB) Filter	Current Allocated Space (MB) Filter	Current Allocated Space (%) Filter	Messages Filter	Allocated Space After Deployme (MB) Filter	Allocated Space After Deployme (%) Filter	Allocated Space Delta (MB) Filter	Planned Threshold (%) Filter	Initialize Volume Filter
○	NOC179	8514.05	6679.61	78		6679.84	78	0.23	85	No
○	NOCB79	8514.05	9.07	<1		5354.18	63	5345.11	85	No
○	NOCD79	8514.05	9.07	<1		5934.08	70	5925.01	85	No
○	NOC379	8514.05	5573.58	65		5573.58	65	0.00	85	No

Total: 7, Selected: 0

Target Storage Classes

	Storage Class	Space Required

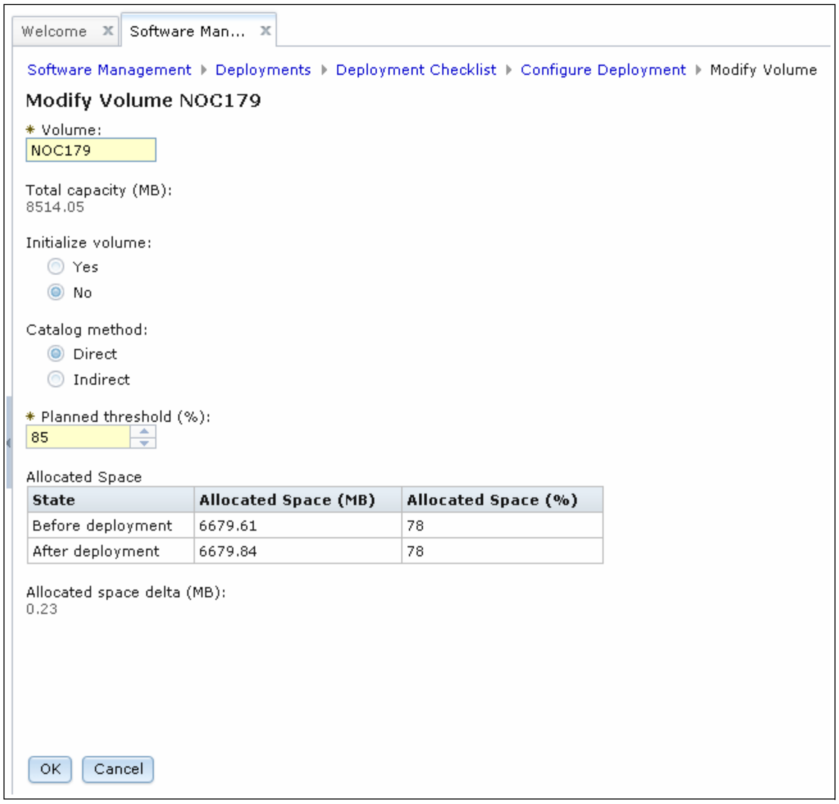
Last refresh: Sep 8, 2013 11:20:37 PM local time (Sep 8, 2013 1:20:37 PM GMT)

Figure 12-159 Volumes and Storage Classes window

In our example deployment, we initialize the sysres volumes (NOC179 and NOC379). We use indirect cataloging for the data sets that are on the sysres volumes. This process facilitates running an IPL from multiple sets of SYSRES volumes.

The DLIB and SMP/E volumes are not initialized. The data sets on these volumes are directly cataloged. The zFS data sets are written to the DEFAULT SMS pool.

To set up volume NOC179 to be initialized and its data sets indirectly cataloged, select **NOC179**. Then, click **Actions** and select **Modify**. The Modify Volume window opens, as shown in Figure 12-160.


Welcome
Software Man...
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment ▸ Modify Volume
OK
Cancel

Modify Volume NOC179

* Volume: NOC179

Total capacity (MB): 8514.05

Initialize volume:
○ Yes
● No

Catalog method:
● Direct
○ Indirect

* Planned threshold (%): 85

Allocated Space

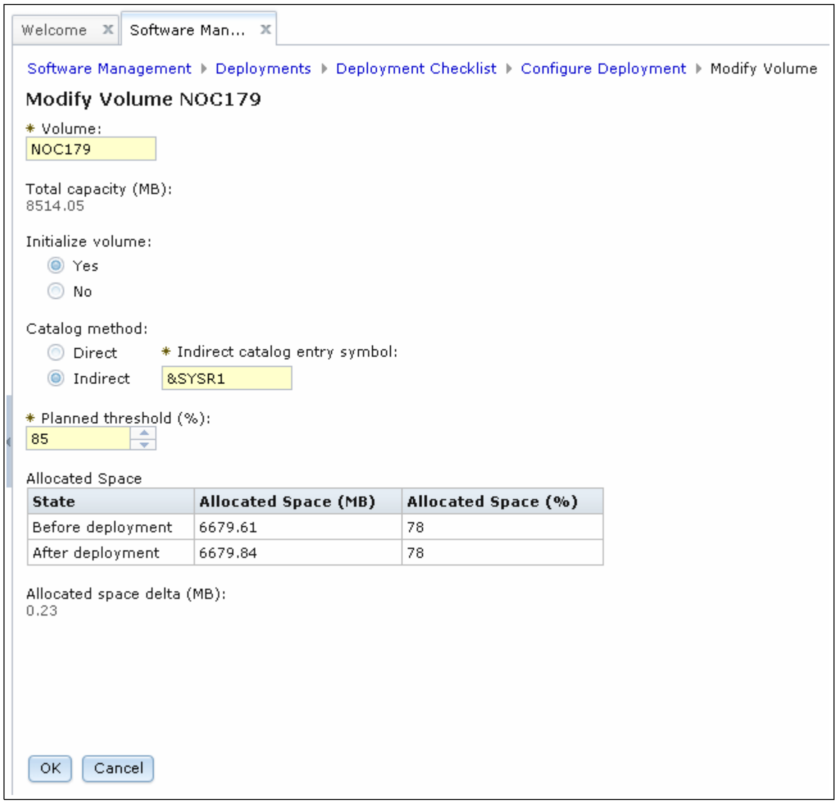
State	Allocated Space (MB)	Allocated Space (%)
Before deployment	6679.61	78
After deployment	6679.84	78

Allocated space delta (MB): 0.23

Figure 12-160 Modify Volume window

To initialize the volume, select **Initialize volume**.

To use indirect cataloging, select **Catalog method**, which opens an Indirect catalog entry symbol window in which a system symbol (such as &SYSR1) or the string ****** (if the first volume of a sysres set) can be entered. In our example, we enter the &SYSR1 symbol, as shown in Figure 12-161.


Welcome
Software Man...
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment ▸ Modify Volume

Modify Volume NOC179

* Volume: NOC179

Total capacity (MB): 8514.05

Initialize volume:
● Yes
○ No

Catalog method:
○ Direct
● Indirect

* Indirect catalog entry symbol: &SYSR1

* Planned threshold (%): 85

Allocated Space

State	Allocated Space (MB)	Allocated Space (%)
Before deployment	6679.61	78
After deployment	6679.84	78

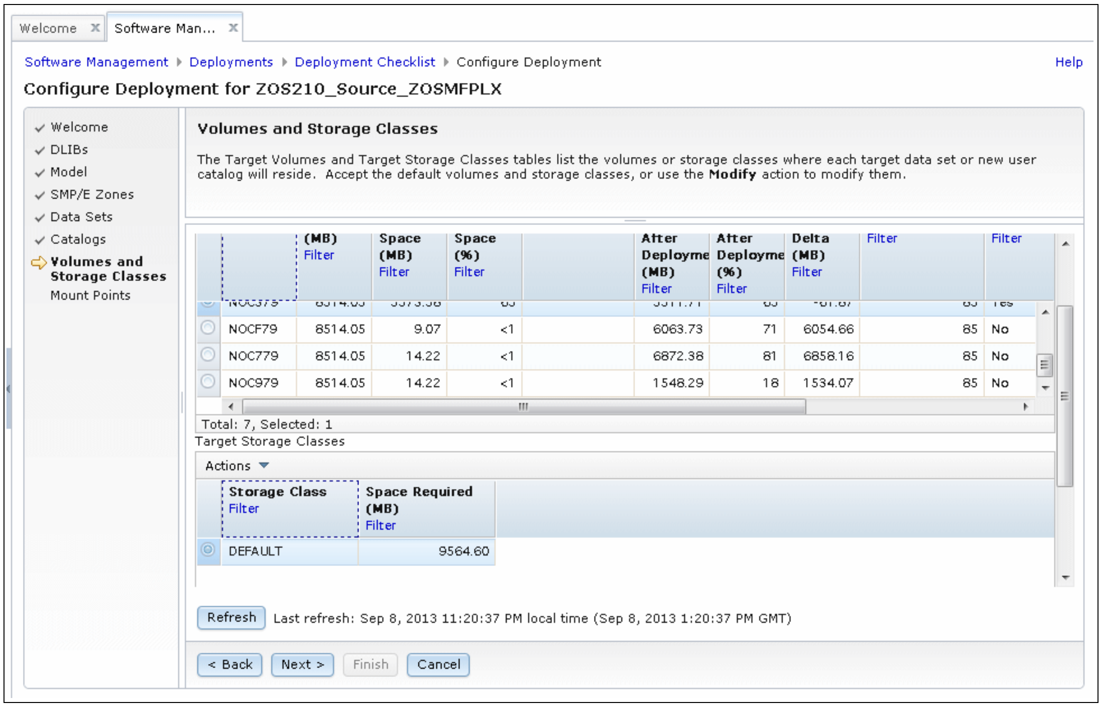
Allocated space delta (MB): 0.23

Figure 12-161 Catalog method

Click **OK** to complete the definition process. Then, select the second sysres volume NOC379, and update it in the same way, except the system symbol we use is &SYSR2.

The DLIB and SMP/E volumes do not need to be changed.

The SMS pool for the zFS data sets also does not need to be changed, as shown at the bottom of the Volumes and Storage Classes window (see Figure 12-162).


Welcome ✕
Software Man... ✕
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment
Help

Configure Deployment for ZOS210_Source_ZOSMFPLX

✓ Welcome
✓ DLIBs
✓ Model
✓ SMP/E Zones
✓ Data Sets
✓ Catalogs
⇨ Volumes and Storage Classes
Mount Points

Volumes and Storage Classes

The Target Volumes and Target Storage Classes tables list the volumes or storage classes where each target data set or new user catalog will reside. Accept the default volumes and storage classes, or use the **Modify** action to modify them.

		(MB) Filter	Space (MB) Filter	Space (%) Filter		After Deployme (MB) Filter	After Deployme (%) Filter	Delta (MB) Filter	Filter	Filter
●	NOC379	8514.05	5573.58	65		5511.71	65	-61.87	85	Yes
○	NOCF79	8514.05	9.07	<1		6063.73	71	6054.66	85	No
○	NOC779	8514.05	14.22	<1		6872.38	81	6858.16	85	No
○	NOC979	8514.05	14.22	<1		1548.29	18	1534.07	85	No

Total: 7, Selected: 1

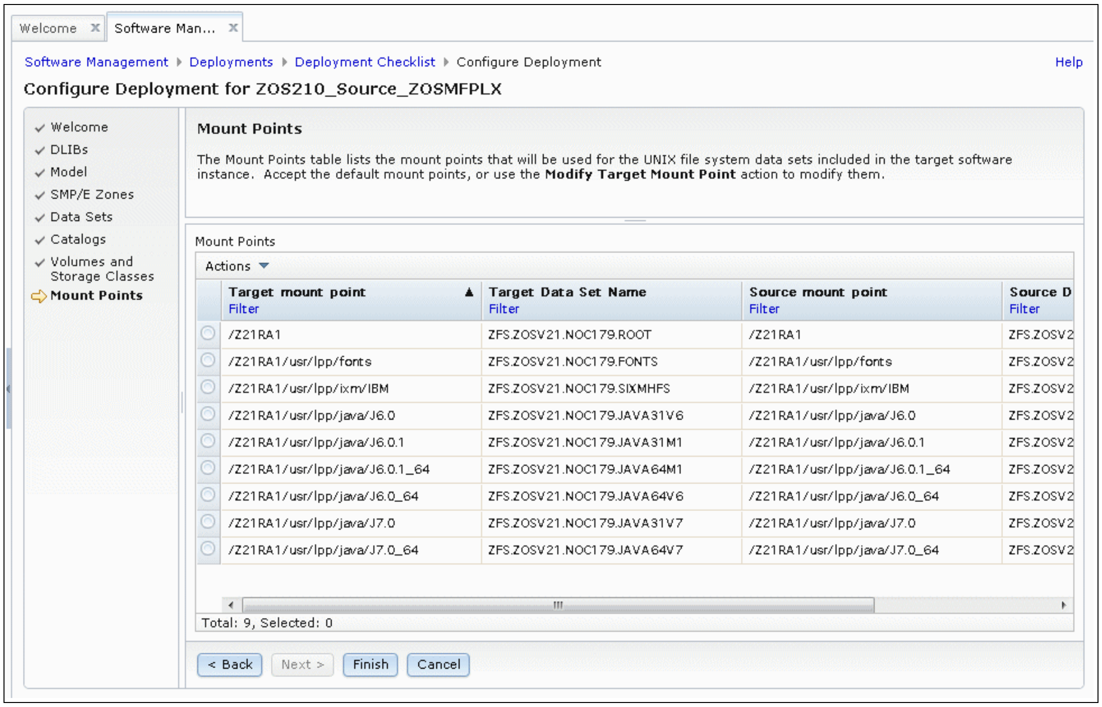
Target Storage Classes

	Storage Class Filter	Space Required (MB) Filter
◉	DEFAULT	9564.60

Last refresh: Sep 8, 2013 11:20:37 PM local time (Sep 8, 2013 1:20:37 PM GMT)

Figure 12-162 Volumes and Storage Classes window

Click **Next** to open the Mount Points step of the Configure Deployment wizard, as shown in Figure 12-163.


Welcome ✕
Software Man... ✕
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment
Help

Configure Deployment for ZOS210_Source_ZOSMFPLX

Mount Points

The Mount Points table lists the mount points that will be used for the UNIX file system data sets included in the target software instance. Accept the default mount points, or use the **Modify Target Mount Point** action to modify them.

Mount Points

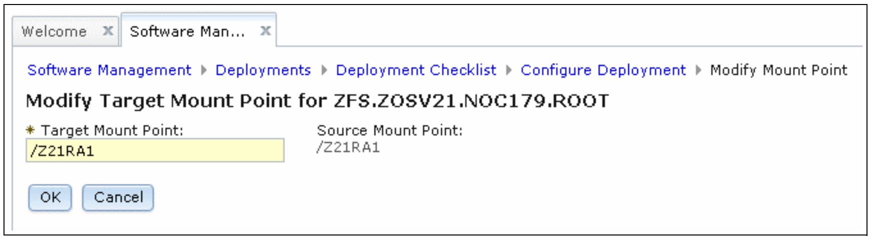
	Target mount point ▲ Filter	Target Data Set Name Filter	Source mount point Filter	Source D Filter
○	/Z21RA1	ZFS.ZOSV21.NOC179.ROOT	/Z21RA1	ZFS.ZOSV2
○	/Z21RA1/usr/lpp/fonts	ZFS.ZOSV21.NOC179.FONTS	/Z21RA1/usr/lpp/fonts	ZFS.ZOSV2
○	/Z21RA1/usr/lpp/ixm/IBM	ZFS.ZOSV21.NOC179.SIXMHFS	/Z21RA1/usr/lpp/ixm/IBM	ZFS.ZOSV2
○	/Z21RA1/usr/lpp/java/J6.0	ZFS.ZOSV21.NOC179.JAVA31V6	/Z21RA1/usr/lpp/java/J6.0	ZFS.ZOSV2
○	/Z21RA1/usr/lpp/java/J6.0.1	ZFS.ZOSV21.NOC179.JAVA31M1	/Z21RA1/usr/lpp/java/J6.0.1	ZFS.ZOSV2
○	/Z21RA1/usr/lpp/java/J6.0.1_64	ZFS.ZOSV21.NOC179.JAVA64M1	/Z21RA1/usr/lpp/java/J6.0.1_64	ZFS.ZOSV2
○	/Z21RA1/usr/lpp/java/J6.0_64	ZFS.ZOSV21.NOC179.JAVA64V6	/Z21RA1/usr/lpp/java/J6.0_64	ZFS.ZOSV2
○	/Z21RA1/usr/lpp/java/J7.0	ZFS.ZOSV21.NOC179.JAVA31V7	/Z21RA1/usr/lpp/java/J7.0	ZFS.ZOSV2
○	/Z21RA1/usr/lpp/java/J7.0_64	ZFS.ZOSV21.NOC179.JAVA64V7	/Z21RA1/usr/lpp/java/J7.0_64	ZFS.ZOSV2

Total: 9, Selected: 0

Figure 12-163 Mount Points window

In this deployment example, we change the /Z21RA1 mount points to /SERVICE/NOC179. To change the mount points, each mount point must be selected individually.

As an example of changing the mount point, we select the first mount point, click **Actions**, and then, click **Modify**. The Modify Target Mount Point window opens, as shown in Figure 12-164.


Welcome ✕
Software Man... ✕
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment ▸ Modify Mount Point

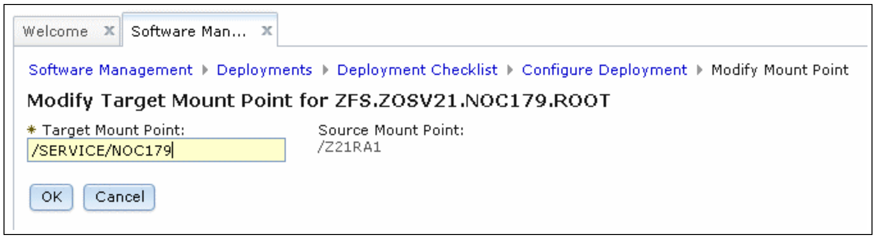
Modify Target Mount Point for ZFS.ZOSV21.NOC179.ROOT

* Target Mount Point: /Z21RA1

Source Mount Point: /Z21RA1

Figure 12-164 Modify Target Mount Point window

We replace the Target Mount Point with `/SERVICE/NOC179`, as shown in Figure 12-165.


Welcome ✕
Software Man... ✕
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment ▸ Modify Mount Point

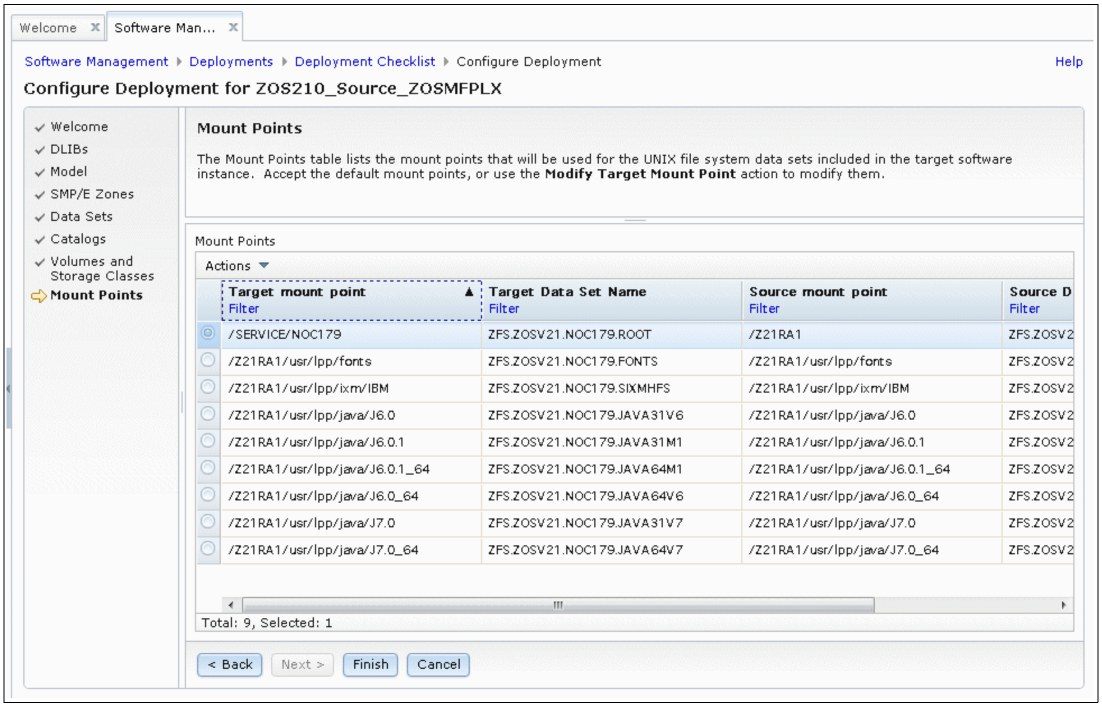
Modify Target Mount Point for ZFS.ZOSV21.NOC179.ROOT

* Target Mount Point: /SERVICE/NOC179

Source Mount Point: /Z21RA1

Figure 12-165 Replacing the Target Mount Point

Click **OK** to return to the list of mount points, as shown in Figure 12-166. In this window, we can see the result of our change to the first mount point.


Welcome ✕
Software Man... ✕
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment
Help
✓ Welcome
✓ DLIBs
✓ Model
✓ SMP/E Zones
✓ Data Sets
✓ Catalogs
✓ Volumes and Storage Classes
⇨ Mount Points

Configure Deployment for ZOS210_Source_ZOSMFPLX

Mount Points

The Mount Points table lists the mount points that will be used for the UNIX file system data sets included in the target software instance. Accept the default mount points, or use the **Modify Target Mount Point** action to modify them.

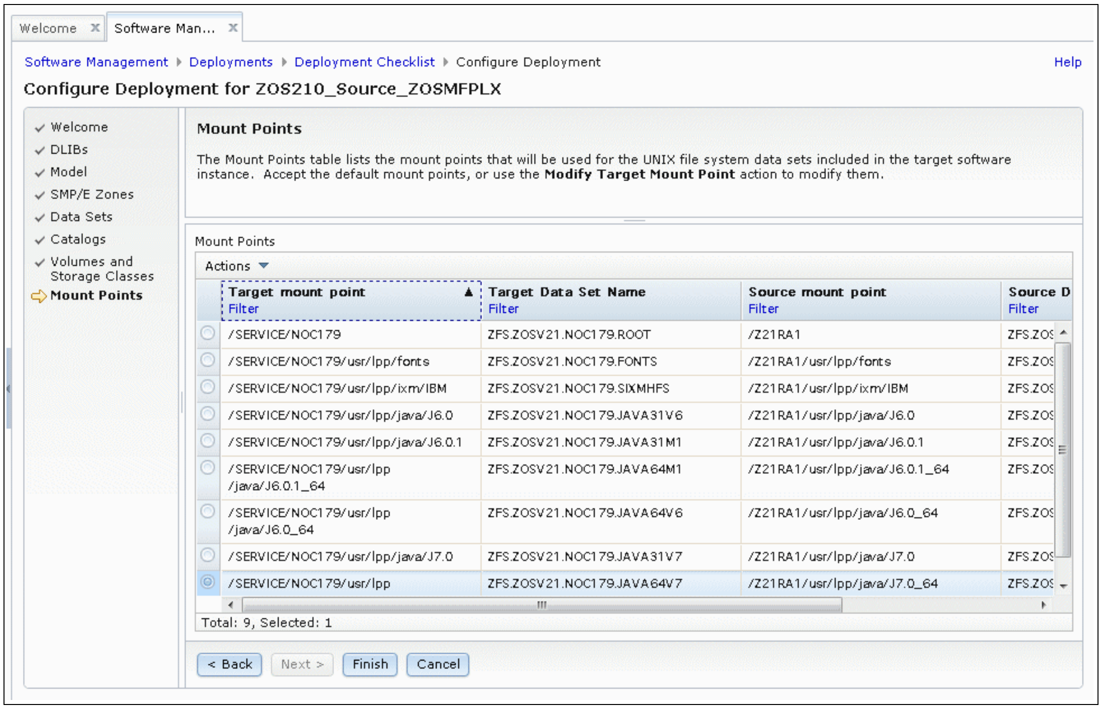
Mount Points

	Target mount point ▲ Filter	Target Data Set Name Filter	Source mount point Filter	Source D Filter
●	/SERVICE/NOC179	ZFS.ZOSV21.NOC179.ROOT	/Z21RA1	ZFS.ZOSV2
○	/Z21RA1/usr/lpp/fonts	ZFS.ZOSV21.NOC179.FONTS	/Z21RA1/usr/lpp/fonts	ZFS.ZOSV2
○	/Z21RA1/usr/lpp/ixm/IBM	ZFS.ZOSV21.NOC179.SIXMHFS	/Z21RA1/usr/lpp/ixm/IBM	ZFS.ZOSV2
○	/Z21RA1/usr/lpp/java/J6.0	ZFS.ZOSV21.NOC179.JAVA31V6	/Z21RA1/usr/lpp/java/J6.0	ZFS.ZOSV2
○	/Z21RA1/usr/lpp/java/J6.0.1	ZFS.ZOSV21.NOC179.JAVA31M1	/Z21RA1/usr/lpp/java/J6.0.1	ZFS.ZOSV2
○	/Z21RA1/usr/lpp/java/J6.0.1_64	ZFS.ZOSV21.NOC179.JAVA64M1	/Z21RA1/usr/lpp/java/J6.0.1_64	ZFS.ZOSV2
○	/Z21RA1/usr/lpp/java/J6.0_64	ZFS.ZOSV21.NOC179.JAVA64V6	/Z21RA1/usr/lpp/java/J6.0_64	ZFS.ZOSV2
○	/Z21RA1/usr/lpp/java/J7.0	ZFS.ZOSV21.NOC179.JAVA31V7	/Z21RA1/usr/lpp/java/J7.0	ZFS.ZOSV2
○	/Z21RA1/usr/lpp/java/J7.0_64	ZFS.ZOSV21.NOC179.JAVA64V7	/Z21RA1/usr/lpp/java/J7.0_64	ZFS.ZOSV2

Total: 9, Selected: 1

Figure 12-166 Change to the first mount point

Now we make the same changes for each mount point in the list. When this process is complete, the list appears as shown in Figure 12-167.



Welcome ✕
Software Man... ✕
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Configure Deployment
Help

Configure Deployment for ZOS210_Source_ZOSMFPLX

Mount Points

The Mount Points table lists the mount points that will be used for the UNIX file system data sets included in the target software instance. Accept the default mount points, or use the **Modify Target Mount Point** action to modify them.

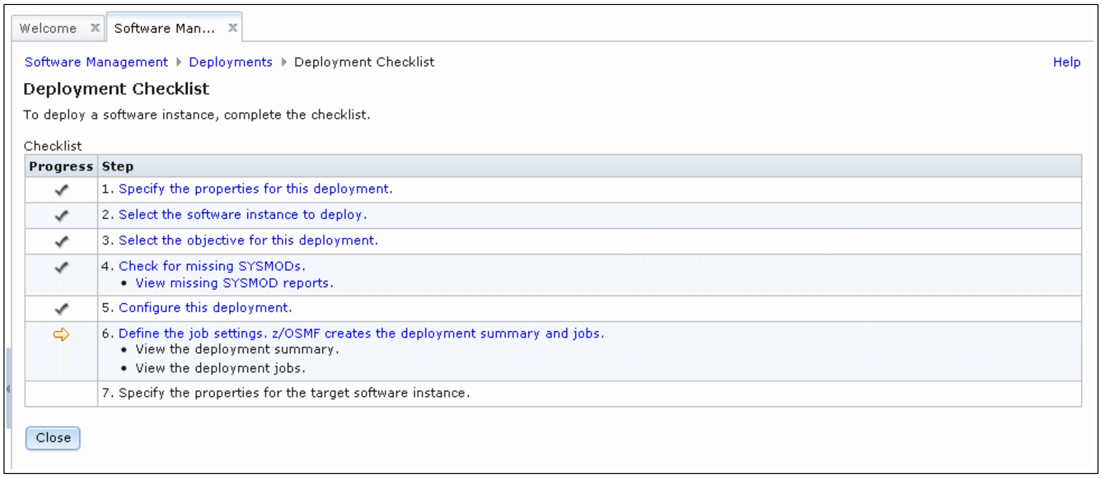
Mount Points

	Target mount point ▲ Filter	Target Data Set Name Filter	Source mount point Filter	Source D Filter
○	/SERVICE/NOC179	ZFS.ZOSV21.NOC179.ROOT	/Z21RA1	ZFS.ZOS
○	/SERVICE/NOC179/usr/lpp/fonts	ZFS.ZOSV21.NOC179.FONTS	/Z21RA1/usr/lpp/fonts	ZFS.ZOS
○	/SERVICE/NOC179/usr/lpp/ixm/IBM	ZFS.ZOSV21.NOC179.SIXMHFS	/Z21RA1/usr/lpp/ixm/IBM	ZFS.ZOS
○	/SERVICE/NOC179/usr/lpp/java/J6.0	ZFS.ZOSV21.NOC179.JAVA31V6	/Z21RA1/usr/lpp/java/J6.0	ZFS.ZOS
○	/SERVICE/NOC179/usr/lpp/java/J6.0.1	ZFS.ZOSV21.NOC179.JAVA31M1	/Z21RA1/usr/lpp/java/J6.0.1	ZFS.ZOS
○	/SERVICE/NOC179/usr/lpp /java/J6.0.1_64	ZFS.ZOSV21.NOC179.JAVA64M1	/Z21RA1/usr/lpp/java/J6.0.1_64	ZFS.ZOS
○	/SERVICE/NOC179/usr/lpp /java/J6.0_64	ZFS.ZOSV21.NOC179.JAVA64V6	/Z21RA1/usr/lpp/java/J6.0_64	ZFS.ZOS
○	/SERVICE/NOC179/usr/lpp/java/J7.0	ZFS.ZOSV21.NOC179.JAVA31V7	/Z21RA1/usr/lpp/java/J7.0	ZFS.ZOS
●	/SERVICE/NOC179/usr/lpp	ZFS.ZOSV21.NOC179.JAVA64V7	/Z21RA1/usr/lpp/java/J7.0_64	ZFS.ZOS

Total: 9, Selected: 1

Figure 12-167 Changing the remaining mount points

The Configure Deployment wizard is complete. Click **Finish** to return to the Deployment Checklist, as shown in Figure 12-168.



Deployment Checklist

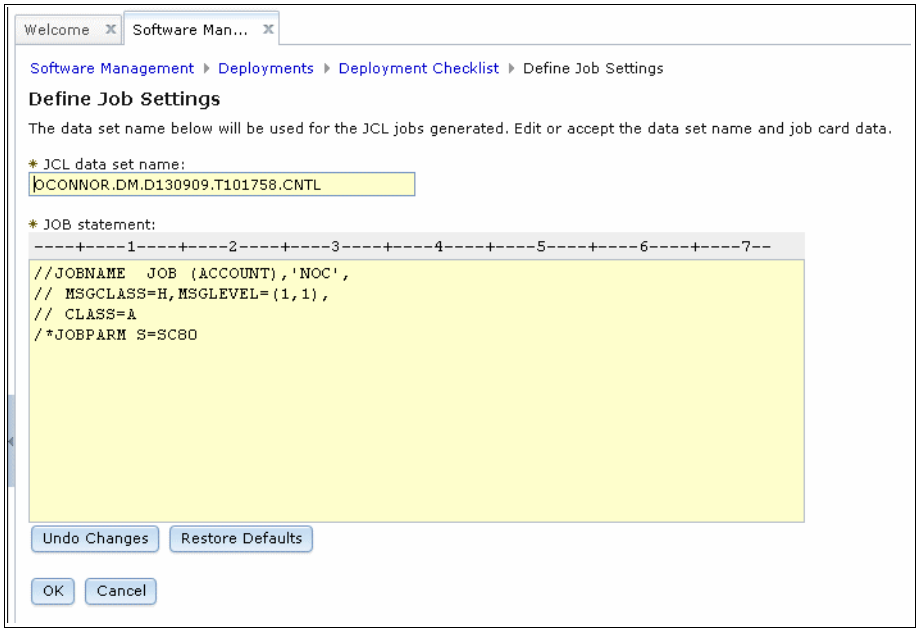
To deploy a software instance, complete the checklist.

Checklist

Progress	Step
✓	1. Specify the properties for this deployment.
✓	2. Select the software instance to deploy.
✓	3. Select the objective for this deployment.
✓	4. Check for missing SYSMODs. • View missing SYSMOD reports.
✓	5. Configure this deployment.
⇨	6. Define the job settings. z/OSMF creates the deployment summary and jobs. • View the deployment summary. • View the deployment jobs.
	7. Specify the properties for the target software instance.

Figure 12-168 Deployment Checklist

Select the sixth step of the Deployment Checklist to define job settings, as shown in Figure 12-169.



Welcome
Software Man...
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Define Job Settings

Define Job Settings

The data set name below will be used for the JCL jobs generated. Edit or accept the data set name and job card data.

* JCL data set name: OCONNOR.DM.D130909.T101758.CNTL

* JOB statement:

```
----+----1----+----2----+----3----+----4----+----5----+----6----+----7--
//JOBNAME  JOB (ACCOUNT),'NOC',
// MSGCLASS=H,MSGLEVEL=(1,1),
// CLASS=A
/*JOBPARM S=SC80
```

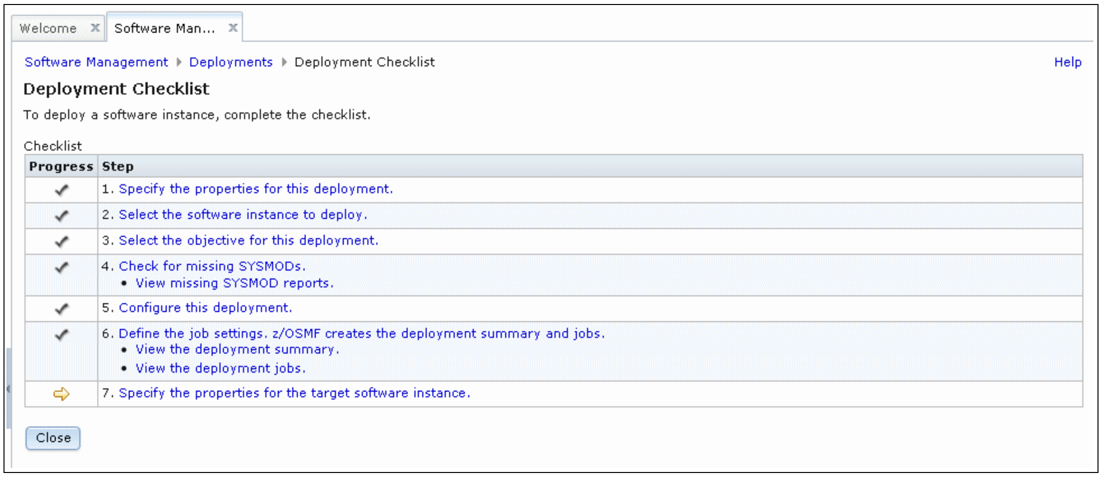
Undo Changes
Restore Defaults
OK
Cancel

Figure 12-169   Define Job Settings window

Define the job statement parameters that are suitable for running on the remote system where the deployment jobs are run. Click **OK** to generate the JCL in the data set name that is listed.

If the connection between the primary z/OSMF instance and the remote system times out or breaks, a window opens in which you enter the remote system user ID and password.

After the JCL data set is created, return to the Deployment Checklist, as shown in Figure 12-170.



Deployment Checklist

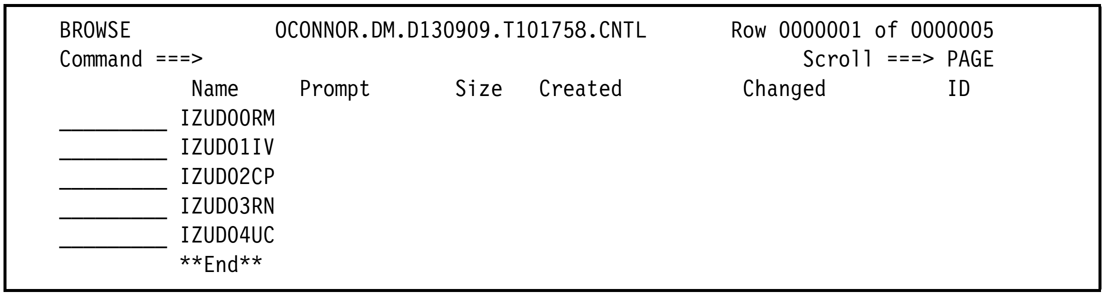
To deploy a software instance, complete the checklist.

Checklist

Progress	Step
✓	1. Specify the properties for this deployment.
✓	2. Select the software instance to deploy.
✓	3. Select the objective for this deployment.
✓	4. Check for missing SYSMODs. • View missing SYSMOD reports.
✓	5. Configure this deployment.
✓	6. Define the job settings. z/OSMF creates the deployment summary and jobs. • View the deployment summary. • View the deployment jobs.
⇨	7. Specify the properties for the target software instance.

Figure 12-170 Deployment Checklist

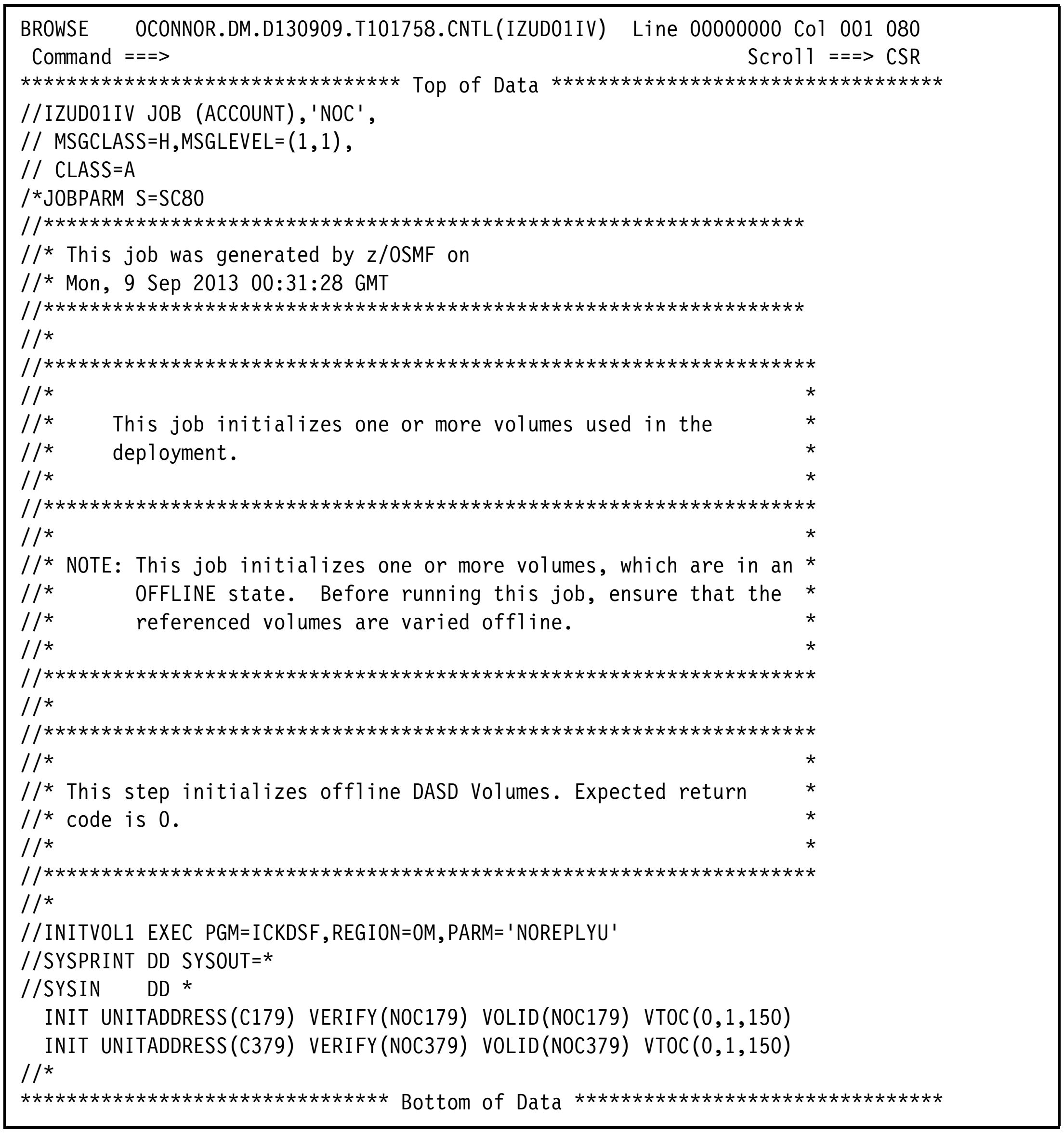
The jobs that are generated by our example deployment are as shown in Figure 12-171.



```
BROWSE          OCONNOR.DM.D130909.T101758.CNTL      Row 0000001 of 0000005
Command ===>                                              Scroll ===> PAGE
          Name     Prompt      Size   Created          Changed          ID
_________ IZUD00RM
_________ IZUD01IV
_________ IZUD02CP
_________ IZUD03RN
_________ IZUD04UC
          **End**
```

Figure 12-171 Generated JCL data set

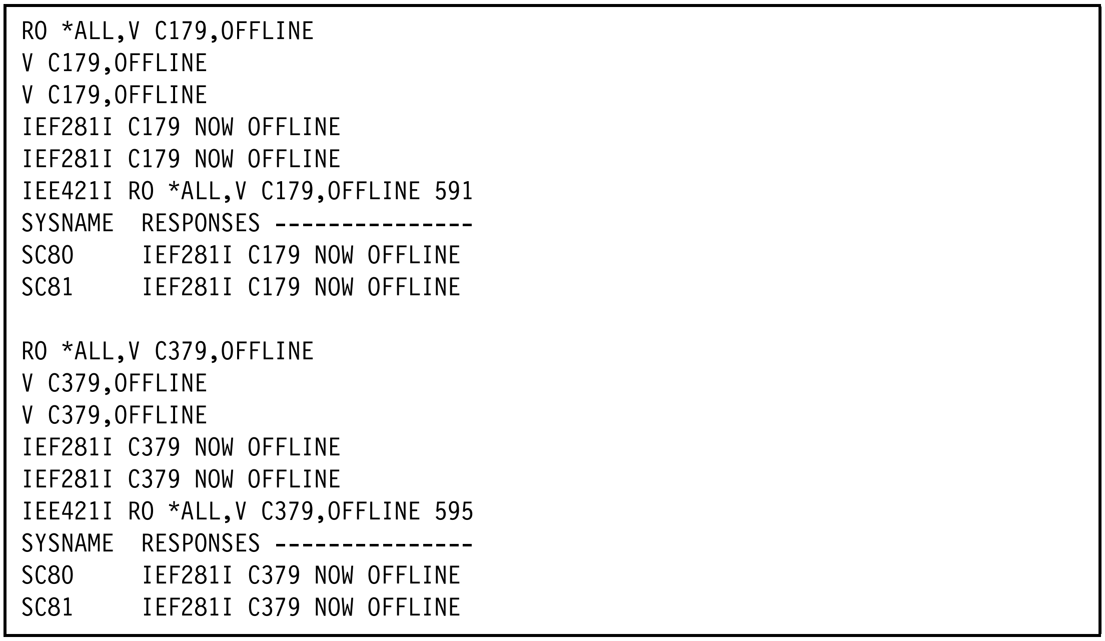
This JCL data set is different from the data set in previous examples, such as Figure 12-118 on page 343. This JCL includes an IZUD01IV member to initialize the two sysres volumes NOC179 and NOC379, as shown in Figure 12-172.



```
BROWSE    OCONNOR.DM.D130909.T101758.CNTL(IZUD01IV)  Line 00000000 Col 001 080
 Command ===>                                                  Scroll ===> CSR
********************************* Top of Data **********************************
//IZUD01IV JOB (ACCOUNT),'NOC',
// MSGCLASS=H,MSGLEVEL=(1,1),
// CLASS=A
/*JOBPARM S=SC80
//******************************************************************
//* This job was generated by z/OSMF on
//* Mon, 9 Sep 2013 00:31:28 GMT
//******************************************************************
//*
//*******************************************************************
//*                                                                 *
//*     This job initializes one or more volumes used in the        *
//*     deployment.                                                 *
//*                                                                 *
//*******************************************************************
//*                                                                 *
//* NOTE: This job initializes one or more volumes, which are in an *
//*       OFFLINE state.  Before running this job, ensure that the  *
//*       referenced volumes are varied offline.                    *
//*                                                                 *
//*******************************************************************
//*
//*******************************************************************
//*                                                                 *
//* This step initializes offline DASD Volumes. Expected return     *
//* code is 0.                                                      *
//*                                                                 *
//*******************************************************************
//*
//INITVOL1 EXEC PGM=ICKDSF,REGION=0M,PARM='NOREPLYU'
//SYSPRINT DD SYSOUT=*
//SYSIN    DD *
  INIT UNITADDRESS(C179) VERIFY(NOC179) VOLID(NOC179) VTOC(0,1,150)
  INIT UNITADDRESS(C379) VERIFY(NOC379) VOLID(NOC379) VTOC(0,1,150)
//*
******************************** Bottom of Data ********************************
```

Figure 12-172 IZUD01IV job

Before the IZUD01IV job is run, ensure that the volumes are varied offline throughout the sysplex, or the ICKDSF step fails. An example of varying the volumes offline is shown in Figure 12-173.



```
RO *ALL,V C179,OFFLINE
V C179,OFFLINE
V C179,OFFLINE
IEF281I C179 NOW OFFLINE
IEF281I C179 NOW OFFLINE
IEE421I RO *ALL,V C179,OFFLINE 591
SYSNAME  RESPONSES ---------------
SC80     IEF281I C179 NOW OFFLINE
SC81     IEF281I C179 NOW OFFLINE

RO *ALL,V C379,OFFLINE
V C379,OFFLINE
V C379,OFFLINE
IEF281I C379 NOW OFFLINE
IEF281I C379 NOW OFFLINE
IEE421I RO *ALL,V C379,OFFLINE 595
SYSNAME  RESPONSES ---------------
SC80     IEF281I C379 NOW OFFLINE
SC81     IEF281I C379 NOW OFFLINE
```

Figure 12-173 Vary sysres volumes offline

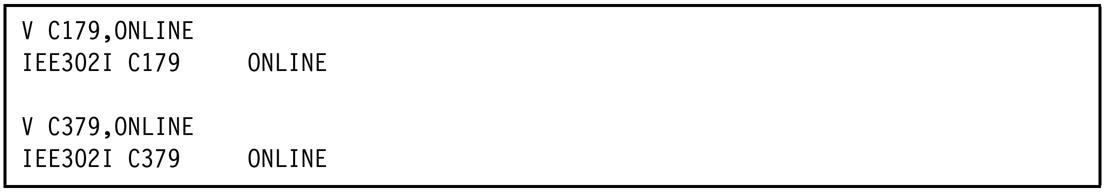
With the sysres volumes offline, submit the IZUD01IV job. It runs successfully, as shown in the job log that is shown in Example 12-13.

Example 12-13 IZUD01IV job log

```
                J E S 2  J O B  L O G  --  S Y S T E M  S C 8 0  --  N O D E  W T S C P L X 8

09.07.22 JOB06630 ---- MONDAY,    09 SEP 2013 ----
09.07.22 JOB06630  IRR010I  USERID OCONNOR  IS ASSIGNED TO THIS JOB.
09.07.22 JOB06630  ICH70001I OCONNOR  LAST ACCESS AT 08:55:51 ON MONDAY, SEPTEMBER 9, 2013
09.07.22 JOB06630  $HASP373 IZUD01IV STARTED - INIT 1    - CLASS A        - SYS SC80
09.07.22 JOB06630  ICK091I   C179 NED=002107.900.IBM.75.0000000W9161
09.07.23 JOB06630  ICK061I   C179 VTOC INDEX CREATION SUCCESSFUL: VOLUME IS IN INDEX FORMAT
09.07.23 JOB06630  ICK091I   C379 NED=002107.900.IBM.75.0000000W9161
09.07.23 JOB06630  ICK061I   C379 VTOC INDEX CREATION SUCCESSFUL: VOLUME IS IN INDEX FORMAT
09.07.23 JOB06630  -                                     ---------TIMINGS (MINS.)---------           ----PAGING COUNTS---
09.07.23 JOB06630  -JOBNAME  STEPNAME PROCSTEP    RC   EXCP    CPU    SRB   VECT   VAFF  CLOCK   SERV  PG   PAGE   SWAP    VIO SWAPS
09.07.23 JOB06630  -IZUD01IV INITVOL1             00    513    .00    .00    .00    .00     .0  14674   0      0      0      0     0
09.07.23 JOB06630  -IZUD01IV ENDED.  NAME-NOC                  TOTAL CPU TIME=   .00  TOTAL ELAPSED TIME=    .0
09.07.23 JOB06630  $HASP395 IZUD01IV ENDED
```

The next job, IZUD02CP, copies data sets from the source software instance to the target software instance by using names that include a ".#" suffix. Because the data sets on the sysres volumes are also created by this job, the sysres volumes must be varied online again in advance. An example of varying the volumes online is shown in Figure 12-174.



```
V C179,ONLINE
IEE302I C179     ONLINE

V C379,ONLINE
IEE302I C379     ONLINE
```

Figure 12-174 Vary sysres volumes online

With the sysres volumes now online, submit the IZUD02CP job. If the job runs successfully, the return codes should be no higher than 4. An example job log of job IZUD02CP being run successfully is shown in Example 12-14.

Example 12-14 IZUD02CP job log

```
                    J E S 2  J O B  L O G  --  S Y S T E M  S C 8 0  --  N O D E  W T S C P L X 8

 09.08.57 JOB06631 ---- MONDAY,    09 SEP 2013 ----
 09.08.57 JOB06631  IRR010I  USERID OCONNOR  IS ASSIGNED TO THIS JOB.
 09.08.57 JOB06631  ICH70001I OCONNOR  LAST ACCESS AT 09:07:22 ON MONDAY, SEPTEMBER 9, 2013
 09.08.57 JOB06631  $HASP373 IZUD02CP STARTED - INIT 1    - CLASS A        - SYS SC80
 09.08.57 JOB06631  -                                      ---------TIMINGS (MINS.)---------            ----PAGING COUNTS---
 09.08.57 JOB06631  -JOBNAME  STEPNAME PROCSTEP    RC   EXCP    CPU    SRB   VECT   VAFF  CLOCK   SERV  PG   PAGE   SWAP    VIO SWAPS
 09.08.57 JOB06631  -IZUD02CP DEL1                 00     22    .00    .00    .00    .00     .0   1922   0      0      0      0     0
 09.08.58 JOB06631  -IZUD02CP COPY1                00    220    .00    .00    .00    .00     .0  51523   0      0      0      0     0
 09.08.58 JOB06631  -IZUD02CP DEL2                 00     25    .00    .00    .00    .00     .0   2487   0      0      0      0     0
 09.09.28 JOB06631  -IZUD02CP COPY2                04   295K    .04    .00    .00    .00     .4  3459K   0      0      0      0     0
 09.09.28 JOB06631  $HASP375 IZUD02CP ESTIMATED  LINES EXCEEDED
 09.09.28 JOB06631  -IZUD02CP DEL3                 00     82    .00    .00    .00    .00     .0  48559   0      0      0      0     0
 09.09.28 JOB06631  $HASP375 IZUD02CP ESTIMATE EXCEEDED BY             4,000  LINES
 09.10.18 JOB06631  -IZUD02CP COPY3                04   475K    .06    .00    .00    .00     .8  5473K   0      0      0      0     0
 09.10.18 JOB06631  $HASP375 IZUD02CP ESTIMATE EXCEEDED BY             8,000  LINES
 09.10.18 JOB06631  -IZUD02CP DEL4                 00     31    .00    .00    .00    .00     .0   7478   0      0      0      0     0
 09.10.51 JOB06631  -IZUD02CP COPY4                04   775K    .06    .01    .00    .00     .5  7102K   0      0      0      0     0
 09.10.51 JOB06631  -IZUD02CP DEL5                 00     31    .00    .00    .00    .00     .0   9218   0      0      0      0     0
 09.11.24 JOB06631  -IZUD02CP COPY5                04   783K    .04    .01    .00    .00     .5  6419K   0      0      0      0     0
 09.11.24 JOB06631  -IZUD02CP DEL6                 00     24    .00    .00    .00    .00     .0   1923   0      0      0      0     0
 09.11.49 JOB06631  -IZUD02CP COPY6                04   543K    .01    .00    .00    .00     .4  3504K   0      0      0      0     0
 09.11.49 JOB06631  $HASP375 IZUD02CP ESTIMATE EXCEEDED BY            12,000  LINES
 09.11.50 JOB06631  -IZUD02CP DEL7                 00     82    .00    .00    .00    .00     .0  50148   0      0      0      0     0
 09.11.50 JOB06631  $HASP375 IZUD02CP ESTIMATE EXCEEDED BY            16,000  LINES
 09.12.06 JOB06631  $HASP375 IZUD02CP ESTIMATE EXCEEDED BY            20,000  LINES
 09.12.41 JOB06631  -IZUD02CP COPY7                04   522K    .06    .00    .00    .00     .8  5924K   0      0      0      0     0
 09.12.41 JOB06631  -IZUD02CP DEL8                 00     27    .00    .00    .00    .00     .0   2108   0      0      0      0     0
 09.14.45 JOB06631  -IZUD02CP COPY8                04  2823K    .05    .03    .00    .00    2.0 18293K   0      0      0      0     0
 09.14.45 JOB06631  -IZUD02CP DEL9                 00     23    .00    .00    .00    .00     .0   1209   0      0      0      0     0
 09.14.45 JOB06631  -IZUD02CP COPY9                04    254    .00    .00    .00    .00     .0   8180   0      0      0      0     0
 09.14.45 JOB06631  -IZUD02CP ENDED.  NAME-NOC                 TOTAL CPU TIME=   .35  TOTAL ELAPSED TIME=   5.8
 09.14.45 JOB06631  $HASP395 IZUD02CP ENDED
```

The next job, IZUD03RN, renames the data sets with the ".#" suffix to their final names. If the job runs successfully, the return codes are all zero. An example job log of job IZUD03RN being run successfully is shown in Example 12-15.

Example 12-15 IZUD03RN job log

```
                   J E S 2  J O B  L O G  --  S Y S T E M  S C 8 0  --  N O D E  W T S C P L X 8

 09.15.11 JOB06632 ---- MONDAY,    09 SEP 2013 ----
 09.15.11 JOB06632  IRR010I  USERID OCONNOR  IS ASSIGNED TO THIS JOB.
 09.15.11 JOB06632  ICH70001I OCONNOR  LAST ACCESS AT 09:14:45 ON MONDAY, SEPTEMBER 9, 2013
 09.15.11 JOB06632  $HASP373 IZUD03RN STARTED - INIT 1    - CLASS A        - SYS SC80
 09.15.13 JOB06632  $HASP375 IZUD03RN ESTIMATED  LINES EXCEEDED
 09.15.14 JOB06632  $HASP375 IZUD03RN ESTIMATE EXCEEDED BY             4,000  LINES
 09.15.16 JOB06632  $HASP375 IZUD03RN ESTIMATE EXCEEDED BY             8,000  LINES
 09.15.17 JOB06632  $HASP375 IZUD03RN ESTIMATE EXCEEDED BY            12,000  LINES
 09.15.19 JOB06632  $HASP375 IZUD03RN ESTIMATE EXCEEDED BY            16,000  LINES
 09.15.21 JOB06632  $HASP375 IZUD03RN ESTIMATE EXCEEDED BY            20,000  LINES
 09.15.23 JOB06632  $HASP375 IZUD03RN ESTIMATE EXCEEDED BY            24,000  LINES
 09.15.24 JOB06632  $HASP375 IZUD03RN ESTIMATE EXCEEDED BY            28,000  LINES
 09.15.24 JOB06632  -                                      ---------TIMINGS (MINS.)---------            ----PAGING COUNTS---
 09.15.24 JOB06632  -JOBNAME  STEPNAME PROCSTEP    RC   EXCP    CPU    SRB   VECT   VAFF  CLOCK   SERV  PG   PAGE   SWAP    VIO SWAPS
 09.15.24 JOB06632  -IZUD03RN RENAME1              00  11805    .01    .00    .00    .00     .2   895K   0      0      0      0     0
 09.15.29 JOB06632  $HASP375 IZUD03RN ESTIMATE EXCEEDED BY            32,000  LINES
 09.15.29 JOB06632  -IZUD03RN RENAME3              00   6950    .00    .00    .00    .00     .0   372K   0      0      0      0     0
 09.15.33 JOB06632  $HASP375 IZUD03RN ESTIMATE EXCEEDED BY            36,000  LINES
 09.15.33 JOB06632  -IZUD03RN RECATIND             00     76    .00    .00    .00    .00     .0   183K   0      0      0      0     0
 09.15.33 JOB06632  -IZUD03RN ENDED.  NAME-NOC                 TOTAL CPU TIME=   .03  TOTAL ELAPSED TIME=    .3
 09.15.33 JOB06632  $HASP395 IZUD03RN ENDED
```

Catalog updates occur in the IZUDnnRN job. Software Management checks existing catalog entries, and if any sysres data sets are not indirectly cataloged, then the IZUDnnRN job generates **DEFINE NVSAM** statements to resolve this issue.

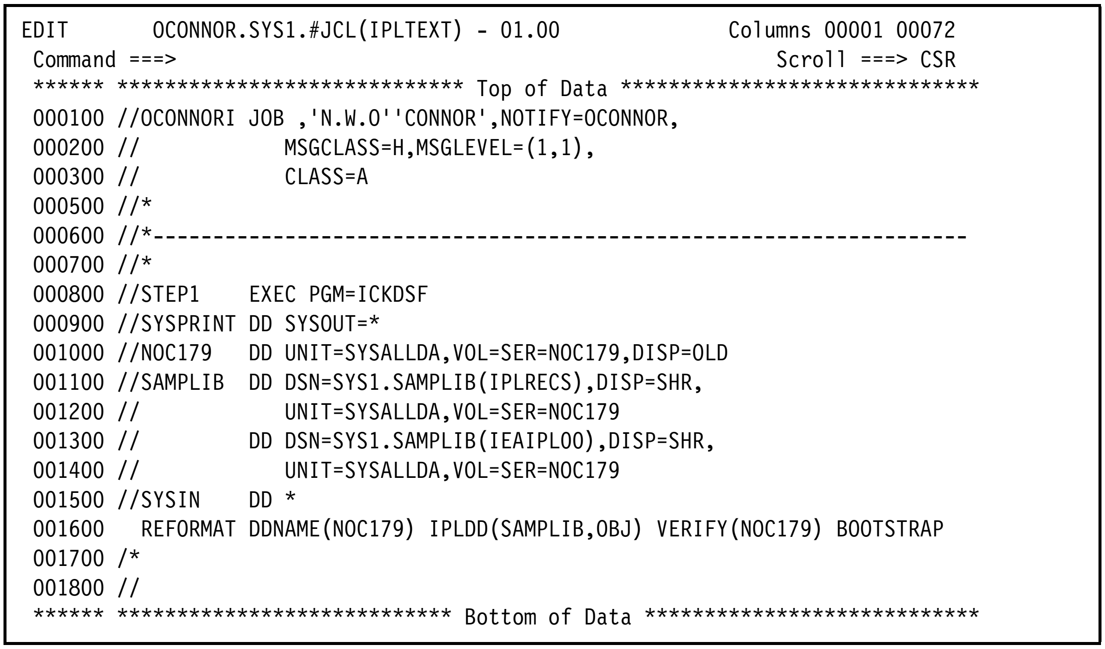
The last job, IZUD04UC, updates the SMP/E configuration to reflect the target software instance, which includes fixing the GLOBAL zone connections to TARGET and DLIB zones and changing the DDDEFs from the source software instance data set names to the target software instance names. If the job runs successfully, the return codes should be no higher than 4. An example job log of job IZUD04UC being run successfully is shown in Example 12-16.

Example 12-16 IZUD04UC job log

```
                     J E S 2  J O B  L O G  --  S Y S T E M  S C 8 0  --  N O D E  W T S C P L X 8

 09.16.20 JOB06633 ---- MONDAY,    09 SEP 2013 ----
 09.16.20 JOB06633  IRR010I  USERID OCONNOR  IS ASSIGNED TO THIS JOB.
 09.16.20 JOB06633  ICH70001I OCONNOR  LAST ACCESS AT 09:15:11 ON MONDAY, SEPTEMBER 9, 2013
 09.16.20 JOB06633  $HASP373 IZUD04UC STARTED - INIT 1    - CLASS A        - SYS SC80
 09.16.20 JOB06633  $HASP375 IZUD04UC ESTIMATED  LINES EXCEEDED
 09.16.20 JOB06633  $HASP375 IZUD04UC ESTIMATE EXCEEDED BY              4,000  LINES
 09.16.20 JOB06633  $HASP375 IZUD04UC ESTIMATE EXCEEDED BY              8,000  LINES
 09.16.21 JOB06633  $HASP375 IZUD04UC ESTIMATE EXCEEDED BY             12,000  LINES
 09.16.21 JOB06633  $HASP375 IZUD04UC ESTIMATE EXCEEDED BY             16,000  LINES
 09.16.21 JOB06633  -                                      ---------TIMINGS (MINS.)---------            ----PAGING COUNTS---
 09.16.21 JOB06633  -JOBNAME  STEPNAME PROCSTEP    RC   EXCP    CPU    SRB   VECT    VAFF  CLOCK   SERV  PG   PAGE   SWAP    VIO SWAPS
 09.16.21 JOB06633  -IZUD04UC UPDZONES             04   1264    .00    .00    .00     .00     .0   225K   0      0      0      0     0
 09.16.21 JOB06633  -IZUD04UC ENDED.  NAME-NOC                 TOTAL CPU TIME=   .00  TOTAL ELAPSED TIME=    .0
 09.16.21 JOB06633  $HASP395 IZUD04UC ENDED
```

A DASD volume that undergoes IPL must contain IPL bootstrap records. Software Management does not create these bootstrap records automatically when it initializes a volume; therefore, a job must be run independently to create the IPL bootstrap records on the sysres volume. In our example deployment, NOC179 is the sysres volume that is intended to undergo IPL. An example of the JCL that is required to create the IPL bootstrap records is shown in Figure 12-175.



```
EDIT       OCONNOR.SYS1.#JCL(IPLTEXT) - 01.00              Columns 00001 00072
 Command ===>                                                  Scroll ===> CSR
 ****** ***************************** Top of Data ******************************
 000100 //OCONNORI JOB ,'N.W.O''CONNOR',NOTIFY=OCONNOR,
 000200 //            MSGCLASS=H,MSGLEVEL=(1,1),
 000300 //            CLASS=A
 000500 //*
 000600 //*-------------------------------------------------------------------
 000700 //*
 000800 //STEP1    EXEC PGM=ICKDSF
 000900 //SYSPRINT DD SYSOUT=*
 001000 //NOC179   DD UNIT=SYSALLDA,VOL=SER=NOC179,DISP=OLD
 001100 //SAMPLIB  DD DSN=SYS1.SAMPLIB(IPLRECS),DISP=SHR,
 001200 //            UNIT=SYSALLDA,VOL=SER=NOC179
 001300 //         DD DSN=SYS1.SAMPLIB(IEAIPL00),DISP=SHR,
 001400 //            UNIT=SYSALLDA,VOL=SER=NOC179
 001500 //SYSIN    DD *
 001600   REFORMAT DDNAME(NOC179) IPLDD(SAMPLIB,OBJ) VERIFY(NOC179) BOOTSTRAP
 001700 /*
 001800 //
 ****** **************************** Bottom of Data ****************************
```

Figure 12-175 Creating IPLTEXT

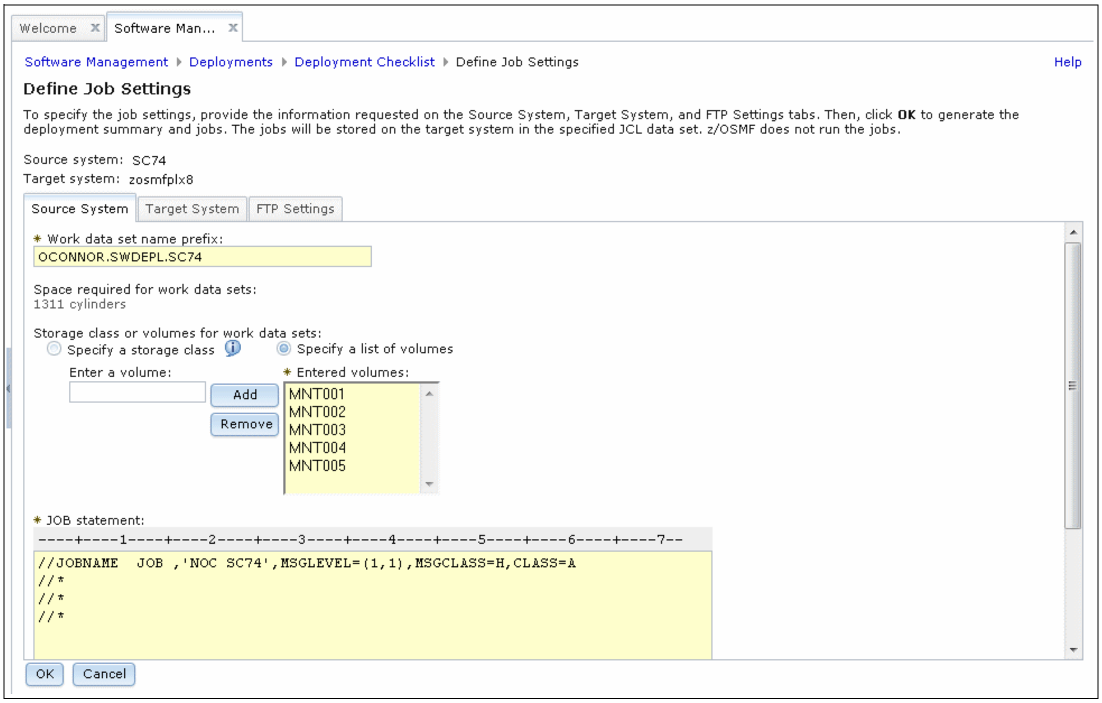
After the IPL bootstrap records are written, the sysres is now ready to undergo IPL. We performed an IPL from a sysres that was created, as described in this deployment example. It was successful and no problems were encountered.

Remote deployment by using FTP

Deployment example 4 (see “Deployment example 4: Operating system” on page 372) is a remote deployment and the source and target software instances are on the same system. Although this deployment demonstrates driving Software Management from a primary system that is remote from the target deployment, it does not show how Software Management behaves if the source and target software instances are on different systems that do not share DASD. In this situation, Software Management builds more jobs to dump the source software instance, and then transfers it to the system where the target software instance is being deployed.

When a remote deployment is performed that involves FTP from source to target, the Define Job Settings window requires more information. In the deployment example (see Figure 12-115 on page 342 and Figure 12-169 on page 395), a simple window without tabs was displayed to solicit job setting information. Compare this window to the window that is shown in Figure 12-176, where the Define Job Settings window contains three tabs: Source System, Target System, and FTP Settings.

The Source System tab, which is shown in Figure 12-176, is for defining temporary data set settings and a job statement for the source system.


Welcome ✕
Software Man... ✕
Software Management ▸ Deployments ▸ Deployment Checklist ▸ Define Job Settings
Help

Define Job Settings

To specify the job settings, provide the information requested on the Source System, Target System, and FTP Settings tabs. Then, click **OK** to generate the deployment summary and jobs. The jobs will be stored on the target system in the specified JCL data set. z/OSMF does not run the jobs.

Source system: SC74

Target system: zosmfplx8

Source System
Target System
FTP Settings

* Work data set name prefix: OCONNOR.SWDEPL.SC74

Space required for work data sets: 1311 cylinders

Storage class or volumes for work data sets:

○ Specify a storage class ● Specify a list of volumes

Enter a volume:

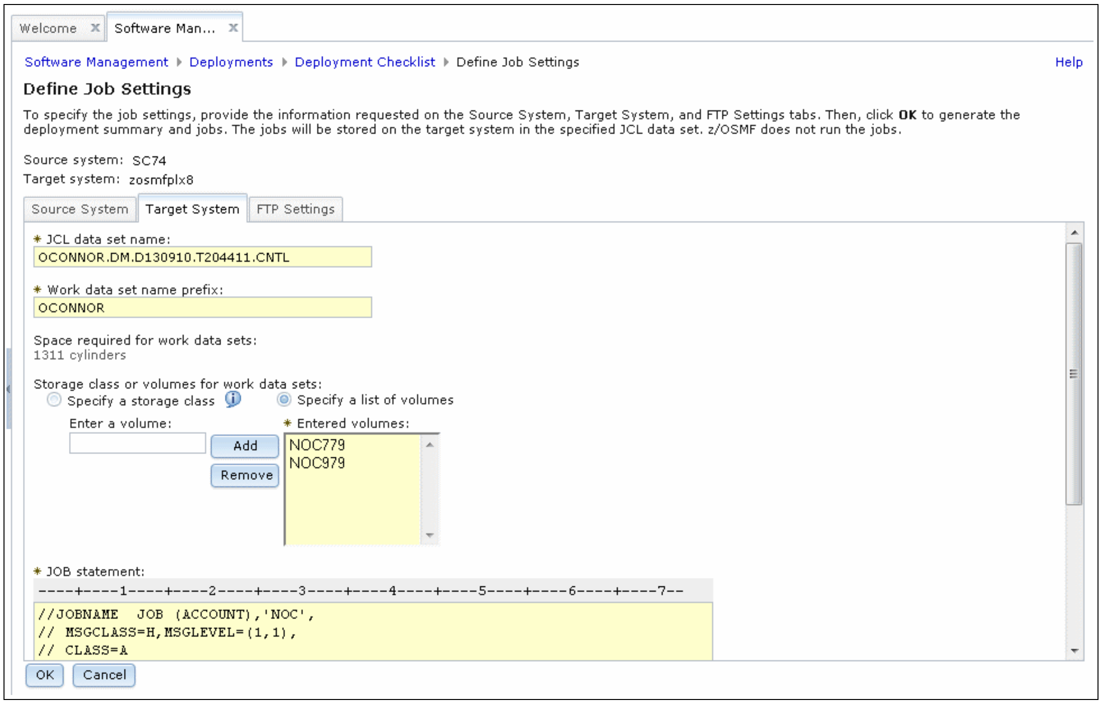
* Entered volumes: MNT001, MNT002, MNT003, MNT004, MNT005

* JOB statement:

```
----+----1----+----2----+----3----+----4----+----5----+----6----+----7--
//JOBNAME   JOB ,'NOC SC74',MSGLEVEL=(1,1),MSGCLASS=H,CLASS=A
//*
//*
//*
```

Figure 12-176 Source System tab settings

The Target System tab, which is shown in Figure 12-177, is for defining temporary data set settings and a job statement for the target system.



Software Management ▸ Deployments ▸ Deployment Checklist ▸ Define Job Settings

Define Job Settings

To specify the job settings, provide the information requested on the Source System, Target System, and FTP Settings tabs. Then, click **OK** to generate the deployment summary and jobs. The jobs will be stored on the target system in the specified JCL data set. z/OSMF does not run the jobs.

Source system: SC74
Target system: zosmfplx8

* JCL data set name: OCONNOR.DM.D130910.T204411.CNTL

* Work data set name prefix: OCONNOR

Space required for work data sets: 1311 cylinders

Storage class or volumes for work data sets:
○ Specify a storage class ● Specify a list of volumes

Enter a volume:

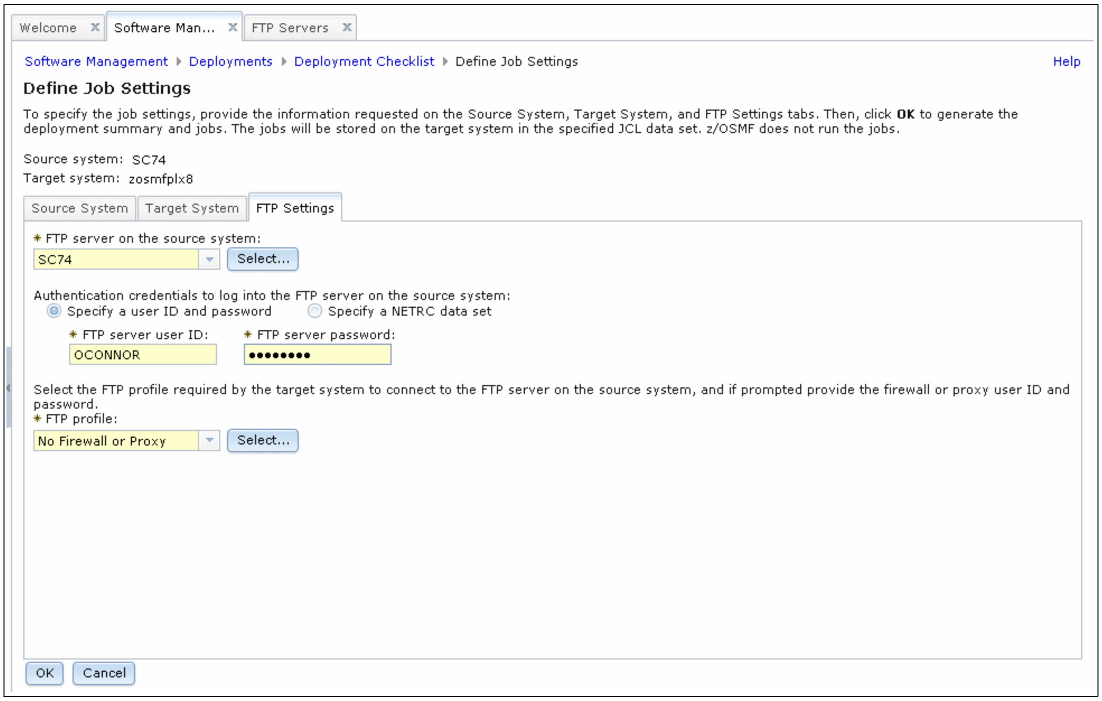
* Entered volumes:
NOC779
NOC979

* JOB statement:

```
----+----1----+----2----+----3----+----4----+----5----+----6----+----7--
//JOBNAME  JOB (ACCOUNT),'NOC',
// MSGCLASS=H,MSGLEVEL=(1,1),
// CLASS=A
```

Figure 12-177 Target System tab settings

The FTP Settings tab, which is shown in Figure 12-178, is for defining FTP settings for the source system. This action is required because the CNTL data set that contains the deployment jobs is built on the target system. The jobs that are submitted from the target system access the source system to dump the source software instance.



Software Management ▸ Deployments ▸ Deployment Checklist ▸ Define Job Settings

Define Job Settings

To specify the job settings, provide the information requested on the Source System, Target System, and FTP Settings tabs. Then, click **OK** to generate the deployment summary and jobs. The jobs will be stored on the target system in the specified JCL data set. z/OSMF does not run the jobs.

Source system: SC74
Target system: zosmfplx8

* FTP server on the source system: SC74

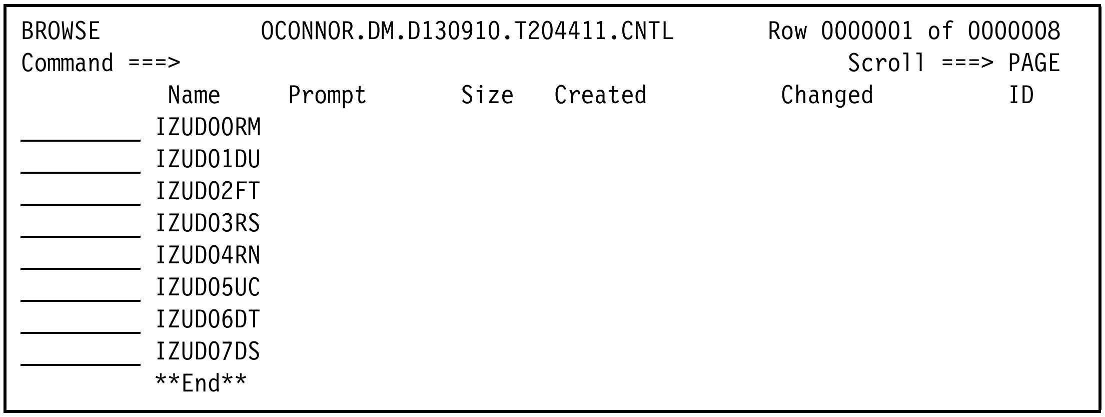
Authentication credentials to log into the FTP server on the source system:
● Specify a user ID and password ○ Specify a NETRC data set

* FTP server user ID: OCONNOR
* FTP server password: ••••••••

Select the FTP profile required by the target system to connect to the FTP server on the source system, and if prompted provide the firewall or proxy user ID and password.
* FTP profile: No Firewall or Proxy

Figure 12-178 FTP Settings tab

An example CNTL data set that Software Management builds on the target system for a remote deployment by using FTP is shown in Figure 12-179.



```
BROWSE           OCONNOR.DM.D130910.T204411.CNTL       Row 0000001 of 0000008
Command ===>                                                 Scroll ===> PAGE
           Name     Prompt       Size   Created          Changed          ID
_________ IZUD00RM
_________ IZUD01DU
_________ IZUD02FT
_________ IZUD03RS
_________ IZUD04RN
_________ IZUD05UC
_________ IZUD06DT
_________ IZUD07DS
          **End**
```

Figure 12-179 Remote deployment JCL

For a remote deployment that uses FTP, DU (dump), FT (FTP), and RS (restore) jobs are available, compared to only a CP (copy) job, as shown in Figure 12-118 on page 343, when the source and target software instances are on the same system.

Also, for a remote deployment that uses FTP, DT (delete target system dump), and DS (delete source system dump) jobs are available. No equivalent jobs are available when the source and target software instances are on the same system because the source software instance is copied to target software instances, rather than dumped and restored.

A readme file member from the CNTL data set of remote deployment that uses FTP is shown in Example 12-17.

Example 12-17 IZUD00RM

```
 BROWSE    OCONNOR.DM.D130910.T204411.CNTL(IZUD00RM)  Line 00000000 Col 001 080
 Command ===>                                                  Scroll ===> CSR
********************************* Top of Data **********************************
Deployment Name: Test_SC74_to_SC80
Generated by: OCONNOR
Generated on: Tue, 10 Sep 2013 11:30:05 GMT

The members that are contained in this data set were generated by z/OSMF for the
deployment that is specified above. Each generated member contains a job that must
be run to deploy the Software Instance. Each job should be executed in the order
that is indicated by the Seq # column. Although most of the jobs should complete
with a return code of 0, there are some cases where a job successfully completes
with a return code other then 0. The list of acceptable return codes for a
specific job is listed in the description field of that job.

The following jobs were generated by z/OSMF:
----+----------+----+-----------------------------------------------------------
Job | Job      | RC | Description
Seq.| Name     |    |
----+----------+----+-----------------------------------------------------------
 1  | IZUD01DU | 0  | Dump Data Sets: Dump the source software instance
    |          |    | data sets into portable dump data sets.
    |          |    |
    |          |    | This job should successfully complete with a
    |          |    | return code of 0
----+----------+----+----------------------------------------------------------
 2  | IZUD02FT | 0  | FTP: Copy the dump data sets from the source system
    |          |    | to the target system using FTP.
    |          |    |
    |          |    | This job should successfully complete with a
    |          |    | return code of 0
----+----------+----+----------------------------------------------------------
 3  | IZUD03RS | 0  | Restore Data Sets: Extract the target software instance
    |          |    | data sets from the dump data sets and place into the
    |          |    | location defined by the deployment configuration
    |          |    | using temporary and unique data set names.
    |          |    |
    |          |    | This job should successfully complete with a
    |          |    | return code of 0 or 4 (RESTORE Step)
----+----------+----+----------------------------------------------------------
 4  | IZUD04RN | 0  | Rename Data Sets: Rename the target software instance
    |          |    | data sets from their temporary and unique names to their
    |          |    | wanted names defined by the deployment configuration
    |          |    | and update catalog entries for the data sets as needed.
    |          |    |
    |          |    | This job should successfully complete with a
    |          |    | return code of 0
----+----------+----+----------------------------------------------------------
 5  | IZUD05UC | 0  | Update CSI Data Sets: Update the entries within the
    |          | 4  | SMP/E CSI data sets to reflect the target software
    |          |    | instance zone names, data set names and locations, and
    |          |    | UNIX directory prefixes.
    |          |    |
    |          |    | This job may successfully complete with a
    |          |    | return code of 0 or 4 (UPDZONES Step)
----+----------+----+----------------------------------------------------------
 6  | IZUD06DT | 0  | Delete Dump Data Sets: Delete the dump data sets on the
    |          |    | target system.
    |          |    |
    |          |    | This job should successfully complete with a
    |          |    | return code of 0
----+----------+----+----------------------------------------------------------
 7  | IZUD07DS | 0  | Delete Source Dump Data Sets: Delete the dump data
    |          |    | sets on the source system using FTP.
    |          |    |
    |          |    | This job should successfully complete with a
    |          |    | return code of 0
----+----------+----+----------------------------------------------------------
******************************** Bottom of Data ********************************
```

To dump the source software instance from a job that is submitted on the target system, Software Management uses the **SITE FILETYPE=JES JESLRECL=80 NOJESGETBYDSN** statement in FTP. This statement, which is combined with a **GET** statement, enables a job to be submitted to JES on a remote system, and the output captured and returned to the submitting system. This process is shown in the IZUD01DU job (see Example 12-18).

Example 12-18 IZUD01DU job

```
//IZUD01DU JOB (ACCOUNT),'NOC',
// MSGCLASS=H,MSGLEVEL=(1,1),
// CLASS=A
/*JOBPARM S=SC80
//******************************************************************
//* This job was generated by z/OSMF on
//* Tue, 10 Sep 2013 11:30:05 GMT
//******************************************************************
//*
//*******************************************************************
//* This job is used to create a job to be run on the source system *
//* which will dump the source software instance data sets into     *
//* portable dump data sets, which will be restored on the target    *
//* system.                                                         *
//*******************************************************************
//*
//*******************************************************************
//* This step deletes the local Dump job data set and the local job *
//* results data set, just in case a prior attempt did not complete.*
///*******************************************************************
//*
//DELETE   EXEC PGM=IDCAMS,REGION=0M
//SYSPRINT DD SYSOUT=*
//SYSIN    DD *
  DELETE 'OCONNOR.T2530828.CNTL'
  DELETE 'OCONNOR.T2530828.SYSOUT'
  SET MAXCC=0
/*
//*******************************************************************
//* This step writes the Dump job to a sequential data set.         *
//*******************************************************************
//*
//CREATE   EXEC PGM=IEBGENER,REGION=0M
//SYSPRINT DD SYSOUT=*
//SYSIN    DD DUMMY
//DMPOUTPT DD DSN=OCONNOR.T2530828.SYSOUT,
//            DISP=(NEW,CATLG),
//            SPACE=(CYL,(1,1)),
//            DCB=(DSORG=PS,RECFM=V,LRECL=256),
//            UNIT=3390,
//            VOL=SER=NOC779
//SYSUT2   DD DSN=OCONNOR.T2530828.CNTL,
//            DISP=(NEW,CATLG),
//            SPACE=(TRK,(5,5),RLSE),
//            DCB=(RECFM=FB,LRECL=80),
//            UNIT=3390,
//            VOL=SER=NOC779
//SYSUT1   DD DATA,DLM=$$
```

```
//OCONNORD JOB ,'NOC SC74',MSGLEVEL=(1,1),MSGCLASS=H,CLASS=A
//*
//*******************************************************************
//*
//* This job was generated by z/OSMF on
//* Tue, 10 Sep 2013 11:30:05 GMT
//*
//*******************************************************************
//*
//*******************************************************************
//* This job runs on the source system and will create portable     *
//* dump data sets that will be used to restore to the target       *
//* system.                                                         *
//*******************************************************************
//*
//*
//*******************************************************************
//* This step deletes the dump data sets to ensure that the job may be   *
//* rerun.                                                          *
//*******************************************************************
//*
//DEL      EXEC PGM=IDCAMS,REGION=0M
//SYSPRINT DD SYSOUT=*
//SYSIN    DD *
  DELETE 'OCONNOR.SWDEPL.SC74.T2530828.D001.DMP'
  SET MAXCC = 0
/*
//*
//*******************************************************************
//* This step dumps the source data sets to create portable images. *
//*******************************************************************
//*
//DUMP     EXEC PGM=GIMADR,REGION=0M,
//         PARM='KEY=BE3EC962806306439FD6009BF2A2CBA1'
//SYSPRINT DD SYSOUT=*
//DMPDS001 DD DSN=OCONNOR.SWDEPL.SC74.T2530828.D001.DMP,
//            DISP=(NEW,CATLG),
//            DCB=(DSORG=PS,BLKSIZE=27998),
//            SPACE=(CYL,(12,21),RLSE),
//            UNIT=3390,
//            VOL=SER=(MNT003)
//SYSIN    DD *
  /* Tue, 10 Sep 2013 11:30:05 GMT */
  DUMP OUTDD(DMPDS001) -
    DATASET(INCLUDE( -
    datasets
    )) -
    ALLDATA(*) ALLEXCP -
    COMPRESS OPTIMIZE(4) -
    SHARE TOLERATE(ENQFAILURE) CANCELERROR
/*
$$
//*
//*******************************************************************
//* This step stores the Dump job onto the source system using FTP  *
//* PUT.                                                            *
//* It will submit the Dump job and retrieve the job results using  *
//* FTP GET.                                                        *
//* The FTP client will wait up to 1 hour for the Dump job to       *
//* complete on the source system (TIMEOUT 3600 parameter).         *
//*******************************************************************
//*
//RUNDUMP  EXEC PGM=FTP,PARM='(EXIT=12 TIMEOUT 3600',REGION=0M
//OUTPUT    DD SYSOUT=*
//INPUT     DD *
wtsc74.itso.ibm.com 21
OCONNOR
password
; Set the allocation for the Dump job data set on the source system.
SITE TRACKS PRIMARY=1 SECONDARY=1 RECFM=FB LRECL=80 RETPD +
VOLUME=MNT001
; Copy the Dump job data set to the source system.
PUT 'OCONNOR.T2530828.CNTL' +
    'OCONNOR.SWDEPL.SC74.T2530828.CNTL'
; Tell the source system to interface with JES.
SITE FILETYPE=JES JESLRECL=80 NOJESGETBYDSN
; Submit the Dump job and get the results.
GET 'OCONNOR.SWDEPL.SC74.T2530828.CNTL' +
    'OCONNOR.T2530828.SYSOUT' (REPLACE
; Tell the source system to operate on data sets.
SITE FILETYPE=SEQ
; Delete the Dump job data set from the source system.
DELETE 'OCONNOR.SWDEPL.SC74.T2530828.CNTL'
QUIT
/*
//*
//*******************************************************************
//* This step copies the Dump job results to SYSOUT.                *
//*******************************************************************
//*
//RESULTS  EXEC PGM=IEBGENER,REGION=0M
//SYSPRINT DD SYSOUT=*
//SYSIN    DD DUMMY
//SYSUT1   DD DISP=SHR,DSN=OCONNOR.T2530828.SYSOUT
//SYSUT2   DD SYSOUT=*,DCB=(RECFM=V,LRECL=256)
//*
//*******************************************************************
//* This step deletes the local Dump job data set and the local job *
//* results data set.                                               *
//*******************************************************************
//CLEANUP  EXEC PGM=IDCAMS,REGION=0M
//SYSPRINT DD SYSOUT=*
//SYSIN    DD *
  DELETE 'OCONNOR.T2530828.CNTL'
  DELETE 'OCONNOR.T2530828.SYSOUT'
  SET MAXCC=0
/*
//*
```

Now that the memory dump is created on the remote system, Software Management uses FTP **GET** to move the memory dump over to the target system, as shown in the IZUD02FT job that is shown in Example 12-19.

Example 12-19 IZUD02FT job

```
//IZUD02FT JOB (ACCOUNT),'NOC',
// MSGCLASS=H,MSGLEVEL=(1,1),
// CLASS=A
/*JOBPARM S=SC80
//******************************************************************
//* This job was generated by z/OSMF on
//* Tue, 10 Sep 2013 11:30:05 GMT
//******************************************************************
//*
//*******************************************************************
//* This job uses FTP to copy the dump data sets from the source    *
//* system to the target system.                                    *
//*******************************************************************
//*
//*******************************************************************
//* Delete dump data sets to ensure that the job may be rerun            *
//*******************************************************************
//*
//DEL      EXEC PGM=IDCAMS,REGION=0M
//SYSPRINT DD SYSOUT=*
//SYSIN    DD *
  DELETE 'OCONNOR.T2530828.D001.DMP'
  SET MAXCC = 0
/*
//*******************************************************************
//* Allocate the dump data sets                                     *
//*******************************************************************
//*
//ALLOC EXEC PGM=IEFBR14,REGION=0M
//DMPDS001 DD DSN=OCONNOR.T2530828.D001.DMP,
//            DISP=(NEW,CATLG),
//            DCB=(DSORG=PS,BLKSIZE=27998),
//            SPACE=(CYL,(12,21),RLSE),
//            UNIT=3390,
//            VOL=SER=(NOC979)
//*
//*******************************************************************
//* Use FTP to copy the dump data sets from the source system to    *
//* the target system.                                              *
//*******************************************************************
//*
//FTP      EXEC PGM=FTP,PARM='(EXIT=12',REGION=0M
//OUTPUT   DD SYSOUT=*
//INPUT    DD *
wtsc74.itso.ibm.com 21
OCONNOR
password
TYPE E
MODE B
GET 'OCONNOR.SWDEPL.SC74.T2530828.D001.DMP' +
'OCONNOR.T2530828.D001.DMP' (REPLACE
QUIT
/*
//*
```

The RN and UC deployment jobs are much the same for an FTP deployment as for a non-FTP deployment. However, the dump files must be cleaned up from the source and target systems when the deployment is complete.

To delete the memory dump on the target system, run a DT job to perform an IDCAMS delete, as shown in Example 12-20.

Example 12-20 IZUD06DT job

```
//IZUD06DT JOB (ACCOUNT),'NOC',
// MSGCLASS=H,MSGLEVEL=(1,1),
// CLASS=A
/*JOBPARM S=SC80
//******************************************************************
//* This job was generated by z/OSMF on
//* Tue, 10 Sep 2013 11:30:05 GMT
//******************************************************************
//*
//*******************************************************************
//* This job deletes the target system dump data sets after restore *
//* processing is complete.                                         *
//* If temporary copies of the source Global zone and SMPPTS data   *
//* sets were created, they will also be deleted.                   *
///*******************************************************************
//*
//*******************************************************************
//* Target software instance data sets have been restored from the  *
//* data sets, so this step will delete the dump data sets.         *
//* It will also delete the temporary copy of the source Global     *
//* SMPPTS data sets, if they were created for the deployment.      *
//*******************************************************************
//*
//DEL      EXEC PGM=IDCAMS,REGION=0M
//SYSPRINT DD SYSOUT=*
//SYSIN    DD *
  DELETE 'OCONNOR.T2530828.D001.DMP'
  SET MAXCC = 0
/*
//*
```

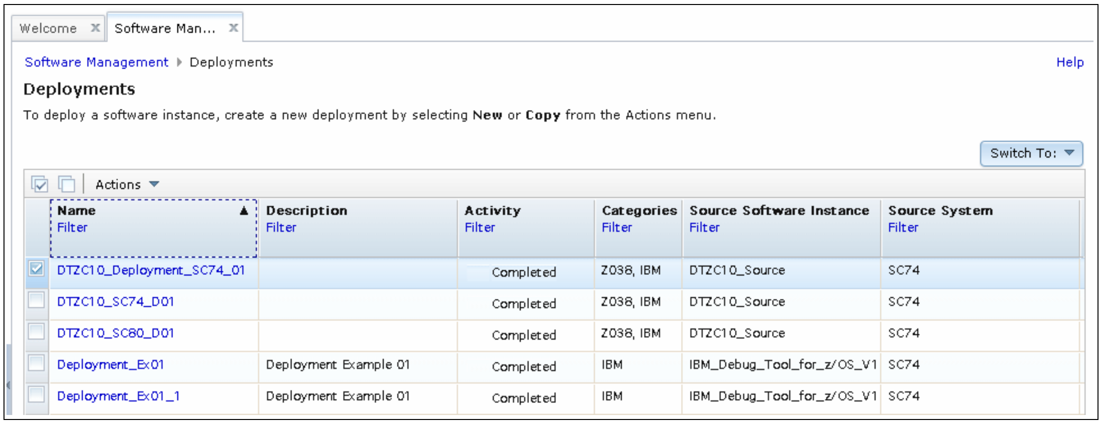
To delete the memory dump on the source system, run a DS job to perform an FTP delete, as shown in Example 12-21.

Example 12-21 IZUD07DS job

```
//IZUD07DS JOB (ACCOUNT),'NOC',
// MSGCLASS=H,MSGLEVEL=(1,1),
// CLASS=A
/*JOBPARM S=SC80
//******************************************************************
//* This job was generated by z/OSMF on
//* Tue, 10 Sep 2013 11:30:05 GMT
//*******************************************************************
//*
//********************************************************************
//* This job uses FTP to delete the dump data sets from the      *
//* source system after the restore process is complete.         *
//********************************************************************
//*
//********************************************************************
//* This step uses FTP to delete the dump data sets from the source *
//* system after the restore process is complete.                   *
//********************************************************************
//*
//FTP      EXEC PGM=FTP,PARM='(EXIT=12',REGION=0M
//OUTPUT   DD SYSOUT=*
//INPUT    DD *
wtsc74.itso.ibm.com 21
OCONNOR
password
DELETE 'OCONNOR.SWDEPL.SC74.T2530828.D001.DMP'
QUIT
/*
//*
```

Removing a deployment

Periodically, you might want to clean up completed deployments that are no longer copied as models for new deployments. To clean up completed deployments, go to the Deployments window and select the deployment to be removed, as shown in Figure 12-180.



Deployments

To deploy a software instance, create a new deployment by selecting **New** or **Copy** from the Actions menu.

	Name ▲ Filter	Description Filter	Activity Filter	Categories Filter	Source Software Instance Filter	Source System Filter
☑	DTZC10_Deployment_SC74_01		Completed	Z038, IBM	DTZC10_Source	SC74
□	DTZC10_SC74_D01		Completed	Z038, IBM	DTZC10_Source	SC74
□	DTZC10_SC80_D01		Completed	Z038, IBM	DTZC10_Source	SC74
□	Deployment_Ex01	Deployment Example 01	Completed	IBM	IBM_Debug_Tool_for_z/OS_V1	SC74
□	Deployment_Ex01_1	Deployment Example 01	Completed	IBM	IBM_Debug_Tool_for_z/OS_V1	SC74

Figure 12-180 Deployments window

You can remove completed deployments only. If you want to remove a deployment that is still in progress, first cancel it by clicking **Actions** and then selecting **Cancel**.

To proceed with removing a completed deployment, click **Actions** and select **Remove**, as shown in Figure 12-181.

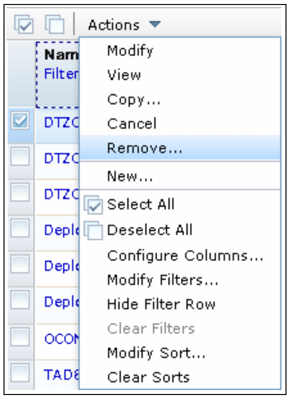
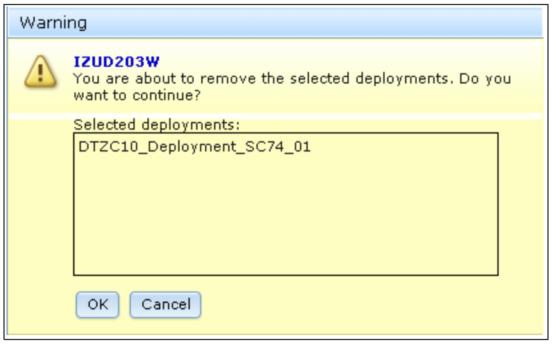


Figure 12-181 Selecting Remove Deployment option

A window opens and shows the message IZUD203W, which confirms the removal, as shown in Figure 12-182.



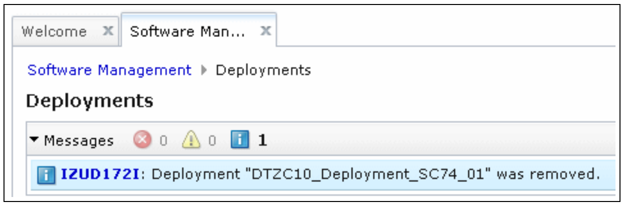
Warning

IZUD203W
You are about to remove the selected deployments. Do you want to continue?

Selected deployments:
DTZC10_Deployment_SC74_01

Figure 12-182 IZUD203W message

Clicking **OK** to return to the Deployments window. A IZUD172I message is displayed that indicates that the deployment was removed, as shown in Figure 12-183.



Deployments

Messages 0 0 1

IZUD172I: Deployment "DTZC10_Deployment_SC74_01" was removed.

Figure 12-183 IZUD172I message

Removing a deployment removes only the information from Software Management; it does not remove the deployment JCL data set or the software instance data sets. If you want to clean up those data sets, you must log on to TSO on the system where the data sets are stored and delete them manually. For more information about the process for removing a software instance from Software Management, see “Removing a software instance” on page 302.

13

ISPF

IBM z/OS Management Facility Interactive System Productivity Facility (z/OSMF ISPF) provides a web-browser based implementation of z/OS ISPF, which is traditionally accessed by PC-based 3270 terminal emulator software (for example, IBM Personal Communications for Windows) or a 3270 terminal.

This chapter describes a usage example of the z/OSMF ISPF feature. It also provides an overview of key differences between the z/OSMF and 3270 implementations and an example of the ISPF new function usage.

This chapter includes the following topics:

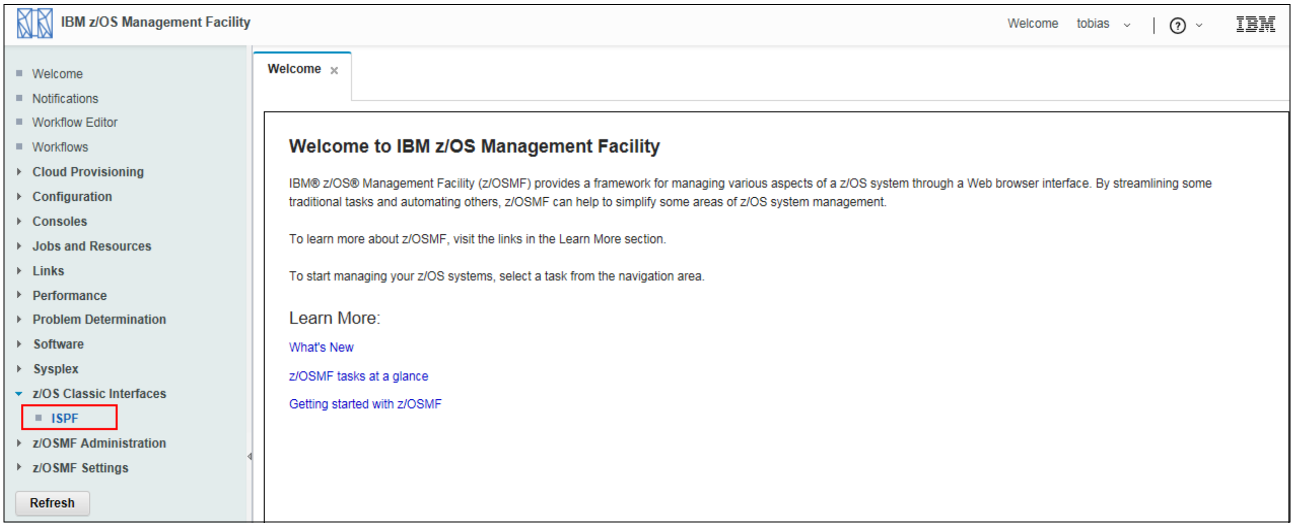
13.1 Introduction

The following sections describe how to log in to z/OSMF ISPF and give an overview of key differences between the z/OSMF and 3270 implementations. An example of how to set up z/OSMF ISPF to use its new ISPF function also is provided.

The z/OSMF ISPF Help windows contain more information about the differences between the two implementations, plus an explanation of features that are unique to z/OSMF ISPF. The Help windows can be displayed by clicking **Help** at the upper right of the z/OSMF ISPF window when you are logged in to z/OSMF, or by clicking **Help** on the z/OSMF ISPF User Settings window.

13.2 Usage

Enter the URL of the z/OSMF server (for example, `https://your-zos-host:port/zosmf/`) in a supported browser to open the welcome page, and log in. Expand **z/OS Classic Interfaces** in the Task Section pane and click **ISPF**, as shown in Figure 13-1.



Welcome to IBM z/OS Management Facility

IBM® z/OS® Management Facility (z/OSMF) provides a framework for managing various aspects of a z/OS system through a Web browser interface. By streamlining some traditional tasks and automating others, z/OSMF can help to simplify some areas of z/OS system management.

To learn more about z/OSMF, visit the links in the Learn More section.

To start managing your z/OS systems, select a task from the navigation area.

Learn More:

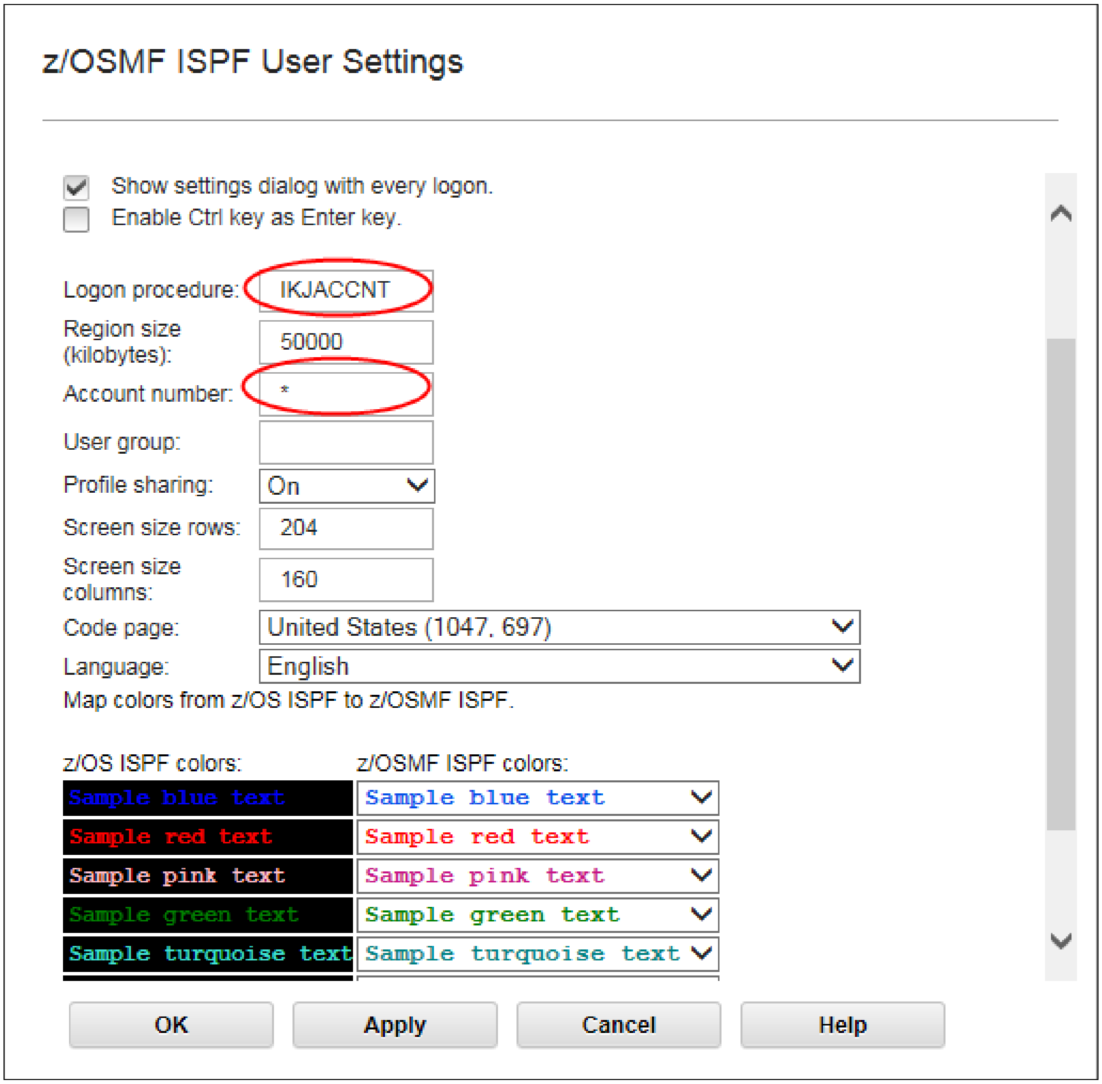
What's New

z/OSMF tasks at a glance

Getting started with z/OSMF

Figure 13-1 Start ISPF

The z/OSMF ISPF User Settings window opens. You must change the information in the Logon procedure and Account number fields (as shown in Figure 13-2) to conform to your installation's standards.



z/OSMF ISPF User Settings

☑ Show settings dialog with every logon.
□ Enable Ctrl key as Enter key.

Logon procedure: IKJACCNT
Region size (kilobytes): 50000
Account number: *
User group:
Profile sharing: On
Screen size rows: 204
Screen size columns: 160
Code page: United States (1047, 697)
Language: English

Map colors from z/OS ISPF to z/OSMF ISPF.

z/OS ISPF colors:	z/OSMF ISPF colors:
Sample blue text	Sample blue text
Sample red text	Sample red text
Sample pink text	Sample pink text
Sample green text	Sample green text
Sample turquoise text	Sample turquoise text

Figure 13-2 User Settings window

If you intend to use the same user ID to log on to z/OSMF ISPF and z/OS ISPF concurrently, or log on through multiple z/OSMF ISPF sessions concurrently, you must perform the following tasks:

- Specify On for Profile Sharing in the z/OSMF ISPF User Settings window.
- Use a logon procedure that starts ISPF with the SHRPROF option for z/OS ISPF.

For more information about profile sharing, see the "Customizing for profile sharing" section of Chapter 5 of *IBM z/OS Management Facility Configuration Guide*, SA38-0657.

Example 13-1 and Example 13-2 show a logon procedure in which an allocation REXX exec is used to log on to z/OSMF ISPF and z/OS ISPF.

Example 13-1 Sample ISPF logon proc

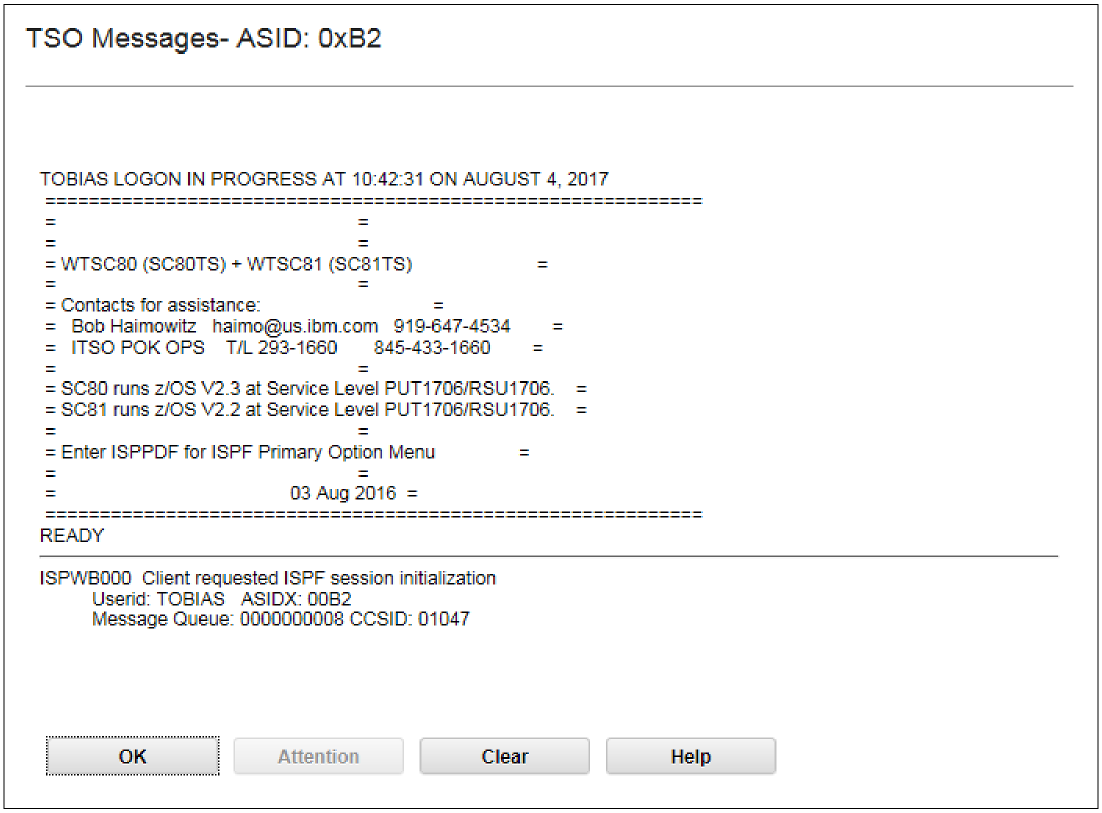
```
//IKJACCCP PROC
//IKJACCT EXEC PGM=IKJEFT01,PARM='EX ''ESA.SYS1.CLIST(ISPZCP)''',
//    DYNAMNBR=150,TIME=1440
//SYSPROC  DD  DSN=ESA.SYS1.CLIST,DISP=SHR
//SYSHELP  DD  DSN=SYS1.HELP,DISP=SHR
//SYSPRINT DD  TERM=TS,SYSOUT=*
//SDFSDUMP DD  TERM=TS,SYSOUT=*
//SYSTERM  DD  TERM=TS,SYSOUT=*
//SYSIN    DD  TERM=TS
//*
```

Example 13-2 Sample ISPF allocation REXX exec

```
/* rexx */
/* zOSMF sample ISPF setup */
uid = strip(sysvar(sysuid))
/* Extract CVT Sysname */
cvt = c2x( storage(10,4) )
cvt_154 = d2x( x2d(cvt) + x2d(154) )
cvt_M20 = d2x( x2d(cvt) - x2d(20) )
sid = strip(storage(cvt_154,8))
dsn = "'"uid"."sid".ISPF42.ISPPROF'"
x = LISTDSI(dsn)
if x <= 4 then do
  "ALLOC FI(ISPPROF) SHR REU DA("dsn")"
  if RC ¬= 0 then do
    say "*** UNABLE TO ALLOCATE ISPF PROFILE" dsn
    exit RC
  end
  else nop
end
else do
  "ALLOC DA("dsn") SP(2,2) TRACKS DIR(12) FI(ISPPROF) NEW REU" ,
  "DSORG(PO) RECFM(F B) LRECL(80) BLKSIZE(6160) "
  if RC = 0 then   say "*** ISPF PROFILE" dsn "HAS BEEN CREATED"
  else do
    say "*** UNABLE TO ALLOCATE ISPF PROFILE" dsn
    exit RC
  end
end
"ALLOC DD(SYSPRINT) DS(*) REU"
"ALLOC DD(SYSIN) DS(*) REU"
If sysdsn("'"uid".LOGON.CLIST'") = "OK" then ,
  uclist =  "'"uid".LOGON.CLIST'"
else uclist =  ""
"ALLOC FI(SYSPROC) SHR REU DA(" uclist                 ,
                             "'ESA.SYS1.CLIST'"       ,
                             "'ISP.SISPCLIB'" ,
                             "'SYS1.SBPXEXEC'" ,
                             "'SYS1.SBLSCLIO'" ,
                             "'SYS1.DGTCLIB'"          ,
                             "'ISF.SISFEXEC'"          ,
                             "'GIM.SGIMCLSO'"          ,
                             "'EOY.SEOYCLIB'"          ,
                             "'SYS1.HRFCLST'"          ,
                             ")"
"ALLOC FI(ISPTABL) SHR REU DA("dsn")"
"ALLOC FI(SMPTABL) SHR REU DA("dsn")"
"ALLOC FI(SYSEXEC) SHR REU DA( "                       ,
                             "'ISF.SISFEXEC'"          ,
                             "'ISP.SISPEXEC'"          ,
                             ")"
"ALLOC FI(ISPLLIB) SHR REU DA("                        ,
                             "'SYS1.DGTLLLIB'"         ,
                             "'SYS1.DFQLLIB'"          ,
                             "'SYS1.SIOALMOD'"         ,
                             ")"
"ALLOC FI(ISPPLIB) SHR REU DA("                        ,
                             "'ESA.SYS2.ISPPLIB'" ,
                             "'ISP.SISPPENU'" ,
                             "'SYS1.SBPXPENU'" ,
                             "'SYS1.DGTPLIB'"          ,
                             "'SYS1.DFQPLIB'"          ,
                             "'ISF.SISFPLIB'"          ,
                             "'GIM.SGIMPENU'"          ,
                             "'SYS1.HRFPANL'"          ,
                             ")"
"ALLOC FI(ISPMLIB) SHR REU DA("                        ,
                             "'ISP.SISPMENU'" ,
                             "'SYS1.SBPXMENU'" ,
                             "'SYS1.DGTMLIB'"          ,
                             "'SYS1.DFQMLIB'"          ,
                             "'SYS1.SBLSMSG0'" ,
                             "'ISF.SISFMLIB'" ,
                             "'EOY.SEOYMENU'" ,
                             "'GIM.SGIMMENU'" ,
                             "'SYS1.HRFMSG'" ,
                             ")"
"ALLOC FI(ISPTLIB) SHR REU DA(" dsn                    ,
                             "'ISP.SISPTENU'" ,
                             "'SYS1.SC80.ISPTLIB'" ,
                             "'SYS1.SBPXTENU'" ,
                             "'SYS1.DGTTLIB'",
                             "'SYS1.SBLSTBL0'" ,
                             "'ISF.SISFTLIB'"          ,
                             "'EOY.SEOYTENU'"          ,
                             "'GIM.SGIMTENU'"          ,
                             ")"
"ALLOC FI(ISPSLIB) SHR REU DA("                        ,
                             "'ISP.SISPSENU'" ,
                             "'ISP.SISPSLIB'" ,
                             "'SYS1.DGTSLIB'"          ,
                             "'EOY.SEOYPENU'"          ,
                             "'GIM.SGIMSENU'"          ,
                             "'SYS1.HRFSKEL'"          ,
                             ")"
```

```
/*** ISP WORK DATA SETS ***********************************************/
x = MSG("OFF")
"FREE FI(ISPWRK1)"
"FREE FI(ISPWRK2)"
"ALLOC FI(ISPWRK1) SP(1,1) CYLINDERS UNIT(VIO) NEW" ,
  "DSORG(PS) RECFM(F B) LRECL(256) BLKSIZE(2560) "
"ALLOC FI(ISPWRK2) SP(1,1) CYLINDERS UNIT(VIO) NEW" ,
  "DSORG(PS) RECFM(F B) LRECL(256) BLKSIZE(2560) "
x = PROMPT("ON")
x = MSG("ON")
queue "ISPF SHRPROF"
```

If the logon procedure that is used starts ISPF, you see the ISPF main menu or the start window that you requested in your procedure. If your logon procedure does not start ISPF, the TSO Messages window opens (as shown in Figure 13-3) before ISPF is started by z/OSMF.



TSO Messages- ASID: 0xB2

```
TOBIAS LOGON IN PROGRESS AT 10:42:31 ON AUGUST 4, 2017
 ==============================================================
 =                                                            =
 =                                                            =
 = WTSC80 (SC80TS) + WTSC81 (SC81TS)                          =
 =                                                            =
 = Contacts for assistance:                                   =
 =   Bob Haimowitz   haimo@us.ibm.com   919-647-4534          =
 =   ITSO POK OPS    T/L 293-1660       845-433-1660          =
 =                                                            =
 = SC80 runs z/OS V2.3 at Service Level PUT1706/RSU1706.      =
 = SC81 runs z/OS V2.2 at Service Level PUT1706/RSU1706.      =
 =                                                            =
 = Enter ISPPDF for ISPF Primary Option Menu                  =
 =                                                            =
 =                                              03 Aug 2016   =
 ==============================================================
READY

ISPWB000  Client requested ISPF session initialization
        Userid: TOBIAS   ASIDX: 00B2
        Message Queue: 0000000008 CCSID: 01047
```

Figure 13-3   TSO Messages

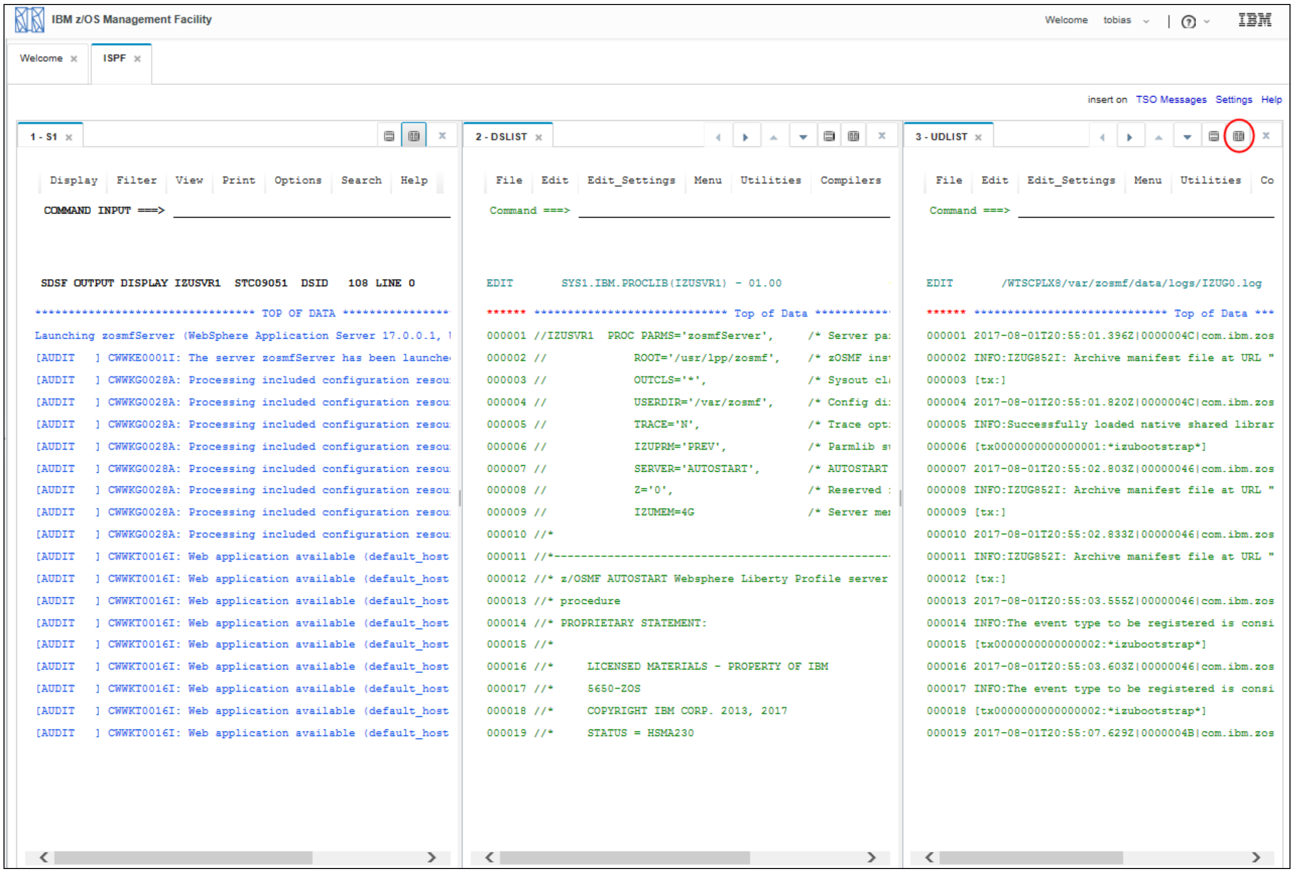
Click **OK** to continue to ISPF.

13.3 z/OSMF and z/OS 3270 ISPF key differences

z/OSMF and z/OS implementations of ISPF feature many key differences. The following sections describe several key differences that might influence your decision about which implementation to use. For more information about these differences, see the z/OSMF ISPF Help.

13.3.1 Panel splitting

z/OSMF ISPF provides vertical panel splitting so that you can view multiple logical panels side by side. This function is especially useful when more than one hardware monitor is available and the browser window can be stretched horizontally across more than one physical window. To use this function, click the **Vertical Split** button (as shown in Figure 13-4) and resize the (non-maximized) browser window by dragging the border.



```
 Display  Filter  View  Print  Options  Search  Help

 COMMAND INPUT ===> ________________________________


 SDSF OUTPUT DISPLAY IZUSVR1  STC09051  DSID   108 LINE 0
******************************** TOP OF DATA ***************
Launching zosmfServer (WebSphere Application Server 17.0.0.1, 
[AUDIT   ] CWWKE0001I: The server zosmfServer has been launche
[AUDIT   ] CWWKG0028A: Processing included configuration resou
[AUDIT   ] CWWKG0028A: Processing included configuration resou
[AUDIT   ] CWWKG0028A: Processing included configuration resou
[AUDIT   ] CWWKG0028A: Processing included configuration resou
[AUDIT   ] CWWKG0028A: Processing included configuration resou
[AUDIT   ] CWWKG0028A: Processing included configuration resou
[AUDIT   ] CWWKG0028A: Processing included configuration resou
[AUDIT   ] CWWKG0028A: Processing included configuration resou
[AUDIT   ] CWWKT0016I: Web application available (default_host
[AUDIT   ] CWWKT0016I: Web application available (default_host
[AUDIT   ] CWWKT0016I: Web application available (default_host
[AUDIT   ] CWWKT0016I: Web application available (default_host
[AUDIT   ] CWWKT0016I: Web application available (default_host
[AUDIT   ] CWWKT0016I: Web application available (default_host
[AUDIT   ] CWWKT0016I: Web application available (default_host
[AUDIT   ] CWWKT0016I: Web application available (default_host
[AUDIT   ] CWWKT0016I: Web application available (default_host
```

```
 File  Edit  Edit_Settings  Menu  Utilities  Compilers

Command ===> ________________________________


EDIT      SYS1.IBM.PROCLIB(IZUSVR1) - 01.00
****** ***************************** Top of Data ***********
000001 //IZUSVR1  PROC PARMS='zosmfServer',     /* Server pa
000002 //            ROOT='/usr/lpp/zosmf',     /* zOSMF ins
000003 //            OUTCLS='*',                /* Sysout cl
000004 //            USERDIR='/var/zosmf',      /* Config di
000005 //            TRACE='N',                 /* Trace opt
000006 //            IZUPRM='PREV',             /* Parmlib s
000007 //            SERVER='AUTOSTART',        /* AUTOSTART
000008 //            Z='0',                     /* Reserved 
000009 //            IZUMEM=4G                  /* Server me
000010 //*
000011 //*-----------------------------------------------------
000012 //* z/OSMF AUTOSTART Websphere Liberty Profile server
000013 //* procedure
000014 //* PROPRIETARY STATEMENT:
000015 //*
000016 //*     LICENSED MATERIALS - PROPERTY OF IBM
000017 //*     5650-ZOS
000018 //*     COPYRIGHT IBM CORP. 2013, 2017
000019 //*     STATUS = HSMA230
```

```
 File  Edit  Edit_Settings  Menu  Utilities  Co

Command ===> ________________________________


EDIT      /WTSCPLX8/var/zosmf/data/logs/IZUG0.log
****** ***************************** Top of Data ***
000001 2017-08-01T20:55:01.396Z|0000004C|com.ibm.zos
000002 INFO:IZUG852I: Archive manifest file at URL "
000003 [tx:]
000004 2017-08-01T20:55:01.820Z|0000004C|com.ibm.zos
000005 INFO:Successfully loaded native shared librar
000006 [tx0000000000000001:*izubootstrap*]
000007 2017-08-01T20:55:02.803Z|00000046|com.ibm.zos
000008 INFO:IZUG852I: Archive manifest file at URL "
000009 [tx:]
000010 2017-08-01T20:55:02.833Z|00000046|com.ibm.zos
000011 INFO:IZUG852I: Archive manifest file at URL "
000012 [tx:]
000013 2017-08-01T20:55:03.555Z|00000046|com.ibm.zos
000014 INFO:The event type to be registered is consi
000015 [tx0000000000000002:*izubootstrap*]
000016 2017-08-01T20:55:03.603Z|00000046|com.ibm.zos
000017 INFO:The event type to be registered is consi
000018 [tx0000000000000002:*izubootstrap*]
000019 2017-08-01T20:55:07.629Z|0000004B|com.ibm.zos
```

Figure 13-4 Vertical split panel

The logical panels can also be stretched to different widths. The example that is shown in Figure 13-4 shows two narrower panels that display SDSF output and JCL, plus one wider panel that displays a UNIX System Services log file, which typically includes longer lines.

13.3.2 Full panel applications

One of the restrictions of z/OSMF ISPF is that use of full panel applications that run outside of ISPF are not supported, including OMVS. This issue might be a major limitation to some users. Entering the TSO **OMVS** command from the ISPF command line produces a TSO Messages window that displays the following message:

```
Command rejected - 'OMVS    ' command not supported when ISPF is invoked from a web
client. ISPD228  Invalid command - The entry for this command in the ISPF TSO
Command Table (ISPTCM) indicates it cannot be run when ISPF has been invoked from a
web client.
```

You can run OMVS commands from a batch shell environment (for example, by using the BPXBATCH utility, as described in *z/OS UNIX System Services User's Guide*, SA23-2279), or manipulate UNIX System Services files by using the ISPF z/OS UNIX directory list (option 3.17 from the main menu) as an alternative.

> **Tip:** UNIX System Services command execution from option 3.17 can be enabled by setting the Enter z/OS UNIX commands in Command field option. You can find this option by opening any directory in 3.17, using the Tab key to select Options on the top line, pressing Enter, and selecting Directory List Options. After the option is set, you can enter UNIX System Services commands at the `Command ===>` prompt, or enter / at the command line to open a command entry panel (which is similar to Option 6 for TSO commands).

13.3.3 Copying and pasting

When you use a PC-based 3270 emulator to access ISPF, multiple text lines or blocks can be selected for copy and paste functions. Typically, this task is done when you use the ISPF editor or view output. With z/OSMF ISPF, you can select only one input field at a time (one line of text while editing).

The ISPF editor provides a partial workaround to this limitation by providing **CUT** and **PASTE** edit commands. For more information, go into the ISPF editor and enter HELP → 14;6;CUT or HELP → 14;6;PASTE.

> **Note:** ISPF **CUT** and **PASTE** edit commands do not use the Windows clipboard and are applicable only when you edit z/OS data sets by using the ISPF editor. You cannot cut from a z/OSMF ISPF window and paste the text into any other window (including a z/OS 3270 ISPF session that is logged on as the same user). You can cut from one logical panel and paste to another logical panel in the same z/OSMF ISPF session.

13.4 ZSTART ISPF function example

In this section, we provide an example of how to set up a session to use the new start command stack feature of ISPF.

The ZSTART profile variable is used to contain a command stack that ISPF runs at start. The stack runs as though it was entered from the primary panel.

The variable must be valid to be run. To run the variable, start with ISPF (assuming that “;” is your command delimiter) followed by delimited ISPF commands. In our example, several **START** commands create logical panels.

The ZSTART variable can be primed with commands by using a simple REXX exec, as shown in Example 13-3.

Example 13-3 REXX exec to create ZSTART variable

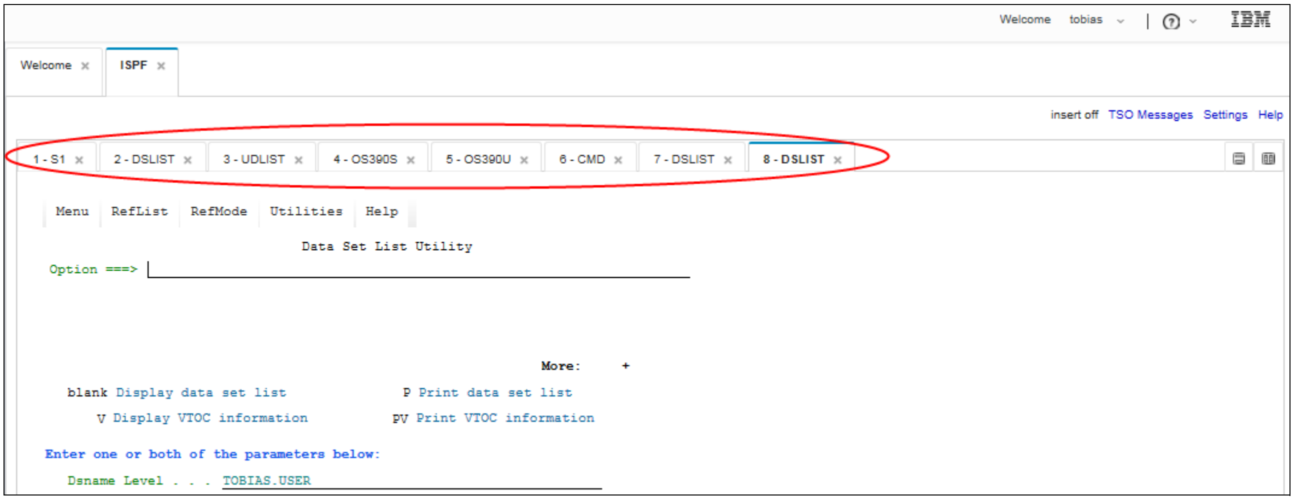
```
/* REXX */
zstart = "ISPF;SD;" ,        /* Screen 1 */
"START 3.4;" ,               /* Screen 2 */
"START 3.17;" ,              /* Screen 3 */
"START 12;" ,                /* Screen 4 */
"START 13;" ,                /* Screen 5 */
"START 6;" ,                 /* Screen 6 */
"START 3.4;" ,               /* Screen 7 */
"START 3.4"                  /* Screen 8 */
ADDRESS ISPEXEC "VPUT ZSTART PROFILE"
```

ZSTART can be displayed by selecting **Dialog Test** → **Variables** from the ISPF Primary menu (Option 7.3) and entering `LOCATE ZSTART`. Alternatively, run the REXX exec that is shown in Example 13-4.

Example 13-4 REXX exec to display ZSTART variable

```
/* REXX */
ADDRESS ISPEXEC "VGET ZSTART PROFILE"
SAY "Profile variable zstart contents =" zstart
```

When ISPF is started in z/OSMF, multiple tabs are created automatically that correspond to the **`START`** commands that are run, as shown in Figure 13-5.



```
                         Data Set List Utility
Option ===>

                                            More:     +
   blank Display data set list           P Print data set list
       V Display VTOC information       PV Print VTOC information

Enter one or both of the parameters below:
   Dsname Level . . . TOBIAS.USER
```

Figure 13-5 SPF logon with multiple tabs

Tip: To exit an ISPF session with multiple logical panels, use the **`=XALL`** option (the extended version of **`=X`**). This option ends all logical sessions and exits ISPF.

For more information, see the “Ending an ISPF function or ISPF” section in *z/OS V2R1.0 ISPF User’s Guide Vol I*, SC19-3627.

14

Capacity provisioning

Capacity provisioning is a series of tasks that simplify the management of temporary capacity for IBM zEnterprise® machines.

This chapter provides an overview of the prerequisites and functions of capacity provisioning within IBM z/OS Management Facility (z/OSMF) and includes the following topics:

14.1 Introduction

IBM Z can activate processor resources dynamically as your business grows. You can activate these resources on a temporary or on a permanent basis, depending on your needs.

With IBM Z On/Off Capacity on Demand (CoD), you can temporarily rent processor resources (CP, IFL, ICF, zIIP, and SAP) to cover your workload peaks. This technique works for the following IBM mainframe processors:

- IBM z14™
- IBM z13®
- IBM z13s®
- IBM zEnterprise EC12
- IBM zEnterprise BC12

Before z/OSMF V1R13, you performed capacity provisioning tasks only by using the Capacity Provisioning Control Center (CPCC). This tool was available as a separate client for a workstation with the Microsoft Windows operating system.

The first stage of capacity provisioning in z/OSMF V1R13 provided a simplified option to monitor your z/OS Capacity Provisioning Manager (CPM) status. The second stage, which became available for z/OSMF V1R13 as a Small Program Enhancement (SPE) at the end of 2012, allows you to perform the following tasks:

- Manage, create, modify, and delete CIM connections from a central shared repository
- View the status of the domain
- View the active configuration of a domain
- View the active policy of a domain

This function was implemented in APAR PM74519.

> **Note:** Starting with z/OS V2R1, you can no longer use the Capacity Provisioning Control Center as a program under Windows. You must use z/OSMF to perform your capacity provisioning activities.

From a z/OS perspective, capacity provisioning is part of the z/OS MVS Base Control Program (BCP). It includes the following features:

- The CPM, which is running as a started task on one z/OS system
- The Capacity Provisioning Management Console, as part of z/OSMF
- Sample data sets and files

The following z/OS components are part of capacity provisioning:

- z/OS Workload Manager (WLM), which manages the workload by goals and business importance on the corresponding z/OS systems.
- IBM Resource Measurement Facility (RMF) Monitor III, which reports the WLM metrics. One RMF data gatherer runs on each corresponding z/OS system.
- RMF Distributed Data Server (DDS), which performs sysplex-wide data aggregation and propagation.
- z/OS Common Information Model (CIM) server, which runs on each corresponding system. Through the CIM server, RMF CIM providers and associated CIM models publish the RMF Monitor III data.

The capacity provisioning infrastructure is shown in Figure 14-1 on page 425.

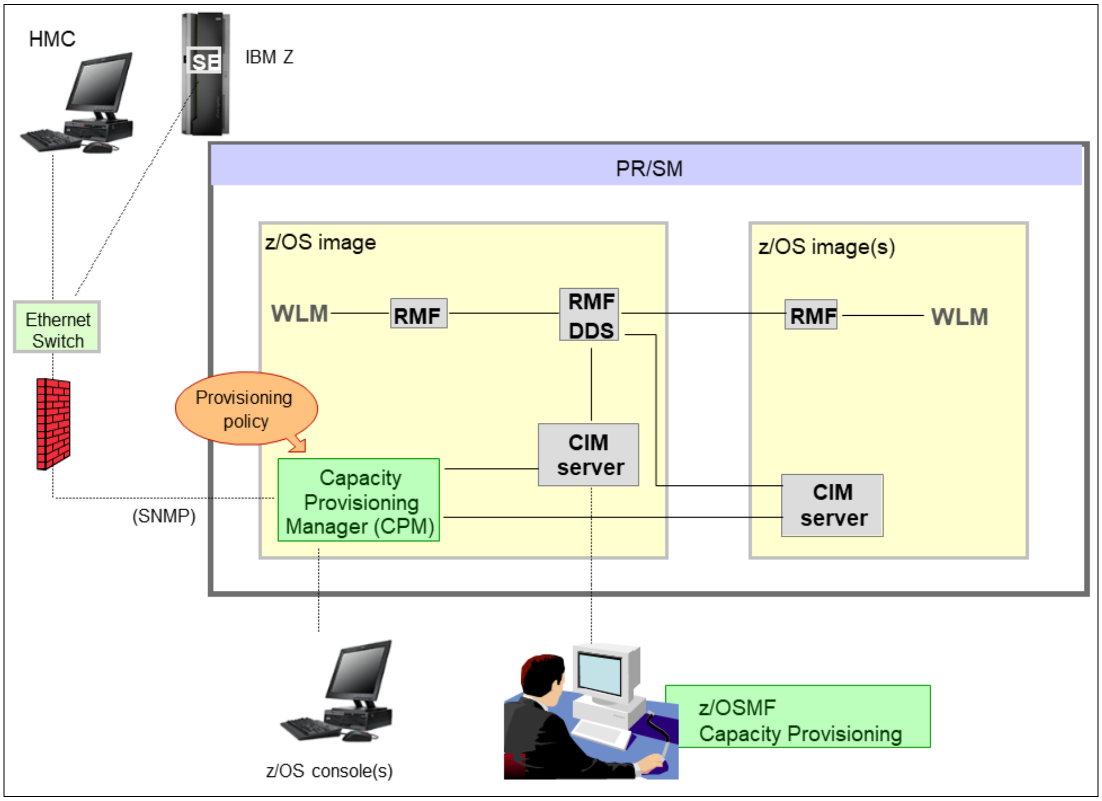


Figure 14-1 Capacity provisioning infrastructure

14.2 Prerequisites

If you want to perform capacity provisioning tasks on your z/OS system by using z/OSMF, some hardware and z/OS site prerequisites must be met. These prerequisites are described in this section.

14.2.1 Hardware

As described in 14.1, “Introduction” on page 424, capacity provisioning needs at least an IBM System z10® server that is running the z/OS operating system as a hardware base. Communication between z/OS and the central processor complex (CPC) is managed through the z/OS Base Control Program internal interface (BCPii).

14.2.2 z/OS

z/OS systems that you want to observe must run z/OS V1R12, at a minimum. This level is also the minimum level that is supported to run with a z/OS V2R1 system. When you plan to run Defined Capacity or Group Capacity, your minimum level of z/OS must be V2R1.

z/OS RMF is necessary for data gathering. A performance monitoring product, such as RMF (an optional, priced feature of z/OS) is required if you need workload-based provisioning of On Off Capacity on Demand, defined capacity, or group capacity resources. The product must be set up on all observed systems.

Because you must create several security definitions, including PassTickets, your security product must create these definitions. In this chapter, we describe sample definitions for IBM Security Server RACF.

When you must decide how to set up your capacity provisioning environment by using z/OSMF, you must differentiate between the following scenarios:

- The Capacity Provisioning Manager runs on the same z/OS system as your managing z/OSMF instance. In this case, you must ensure that only the CIM server is configured and running within this z/OS instance.
- The Capacity Provisioning Manager runs on a different z/OS system than your managing z/OSMF instance. Then, you must perform more configuration steps.

14.3 Capacity provisioning setup

This section describes the setup for capacity provisioning.

14.3.1 Capacity Provisioning Manager setup

The Capacity Provisioning Manager runs as a started task in z/OS. It uses configuration data sets on the z/OS side, but must also have a UID and an OMVS segment because it uses files under OMVS.

A sample started task that is called CPOSERV is in `SYS1.SAMPLIB`. Copy this member to your active `SYS1.PROCLIB` and customize it according to your naming rules. `SYS1.SAMPLIB(CPOMKDSN)` offers you a job with allocation statement for the configuration data sets, which are later used by the provisioning manager and its front end, z/OSMF.

If you must set up the CPM, define the parameters according to the information that is described in *z/OS MVS Capacity Provisioning User’s Guide Version 2 Release 3,* SC34-2661.

You must create several security definitions for the CPM and the interaction between the CPM and z/OSMF.

14.4 z/OSMF setup for capacity provisioning

If you must run capacity provisioning from z/OSMF, you must activate the appropriate plug-in during the initial z/OSMF setup or afterward. For more information, see “Capacity Provisioning task” on page 43. You must also provide some SAF definitions for security, as shown in Example 3-12 on page 43.

For RACF definitions that are related to your own user ID, another REXX script is created and is named `/etc/zosmf/<izuconfig_name>.cfg.<your_userid>.rexx`. The RACF statements that are generated to connect your user ID to the capacity provisioning groups CPOCTRL and CPOQUERY are shown in Example 14-1.

Example 14-1 RACF definitions for z/OSMF user connection to capacity provisioning groups

```
Call RacfCmd "Connect HARJANS group(CPOCTRL)"
Call RacfCmd "Connect HARJANS group(CPOQUERY)"
```

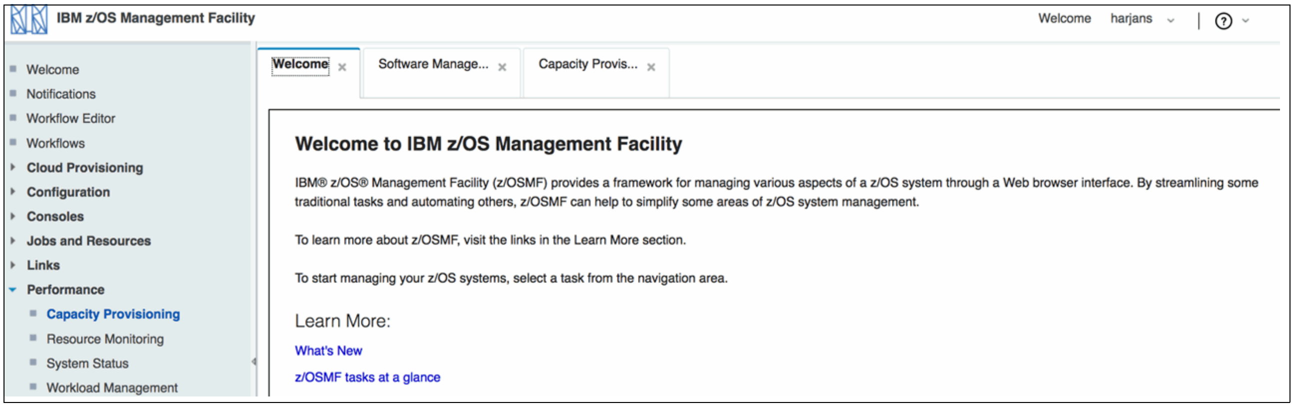
14.5 z/OSMF capacity provisioning usage

This section describes the actions that you can perform for capacity provisioning.

14.5.1 Entering the capacity provisioning plug-in

First, you must log on as an authorized user. Then, you must open the performance section on the left side of your z/OSMF workspace and click **Capacity Provisioning**.

The menu is shown in Figure 14-2.



Welcome to IBM z/OS Management Facility

IBM® z/OS® Management Facility (z/OSMF) provides a framework for managing various aspects of a z/OS system through a Web browser interface. By streamlining some traditional tasks and automating others, z/OSMF can help to simplify some areas of z/OS system management.

To learn more about z/OSMF, visit the links in the Learn More section.

To start managing your z/OS systems, select a task from the navigation area.

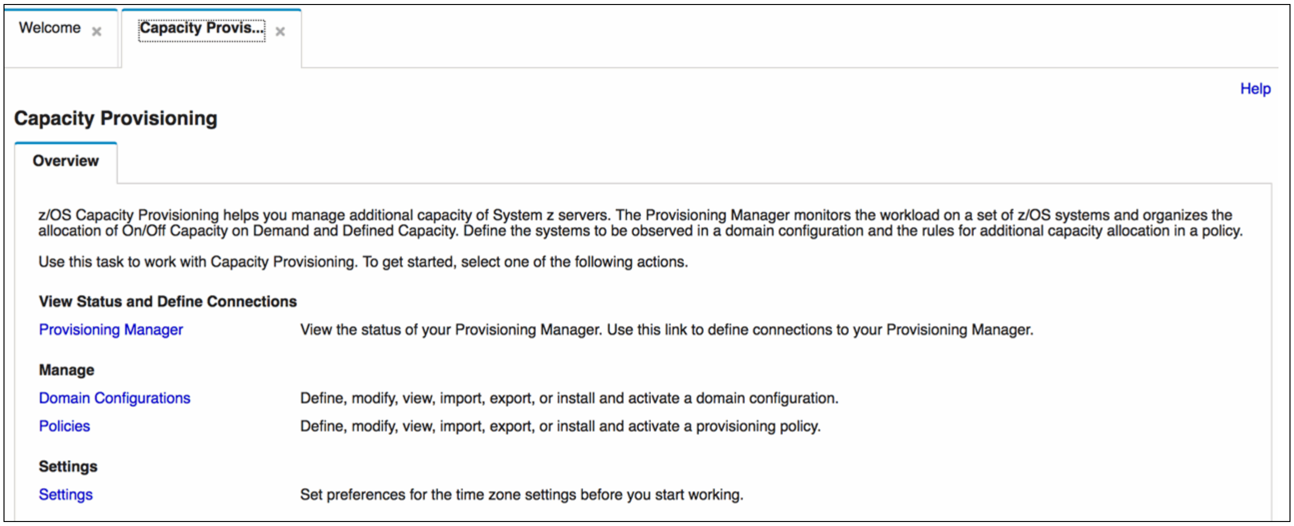
Learn More:

What's New

z/OSMF tasks at a glance

Figure 14-2 z/OSMF welcome window with Performance section open

Now you see the overview menu for capacity provisioning on your z/OSMF workplace. The options are shown in Figure 14-3.



Capacity Provisioning

z/OS Capacity Provisioning helps you manage additional capacity of System z servers. The Provisioning Manager monitors the workload on a set of z/OS systems and organizes the allocation of On/Off Capacity on Demand and Defined Capacity. Define the systems to be observed in a domain configuration and the rules for additional capacity allocation in a policy.

Use this task to work with Capacity Provisioning. To get started, select one of the following actions.

View Status and Define Connections

Provisioning Manager	View the status of your Provisioning Manager. Use this link to define connections to your Provisioning Manager.

Manage

Domain Configurations	Define, modify, view, import, export, or install and activate a domain configuration.
Policies	Define, modify, view, import, export, or install and activate a provisioning policy.

Settings

Settings	Set preferences for the time zone settings before you start working.

Figure 14-3 Capacity Provisioning task overview

You use the following sections for further processing:

- View Status and Define Connections

  Click **Provisioning Manager** to view its status and define connections to your provisioning manager. For more information, see 14.5.2, “Viewing the status and defining connections” on page 428.

- Manage

  Click **Domain Configurations** to work with a domain. For more information, see 14.5.3, “Managing domain configurations” on page 429.

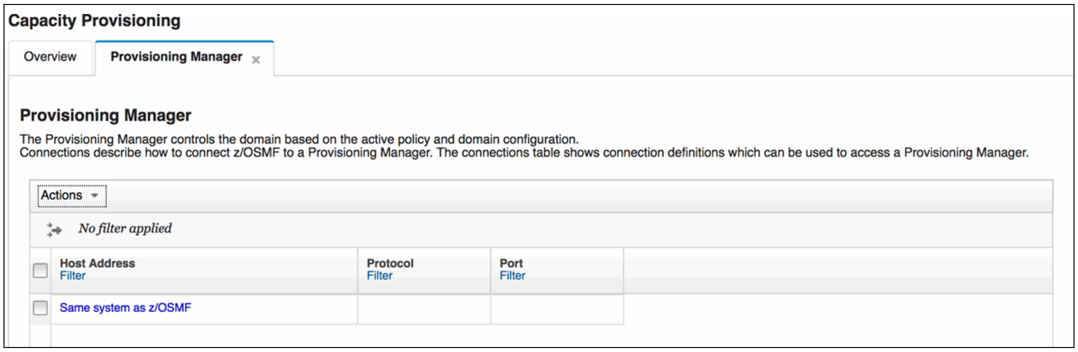
  Click **Policies** to work with your provisioning policies. For more information, see 14.5.4, “Managing policies” on page 432.

- Settings

  Click **Settings** to set your preferred time zone. You can choose between Greenwich Mean Time (GMT) and your local time zone. The local time zone is adopted from your z/OS time settings. Set the correct value before you start with further processing.

14.5.2 Viewing the status and defining connections

Our connection definitions for our example sysplex, WTSCPLX8, are shown in Figure 14-4.



Provisioning Manager

The Provisioning Manager controls the domain based on the active policy and domain configuration.
Connections describe how to connect z/OSMF to a Provisioning Manager. The connections table shows connection definitions which can be used to access a Provisioning Manager.

□	Host Address Filter	Protocol Filter	Port Filter
□	Same system as z/OSMF		

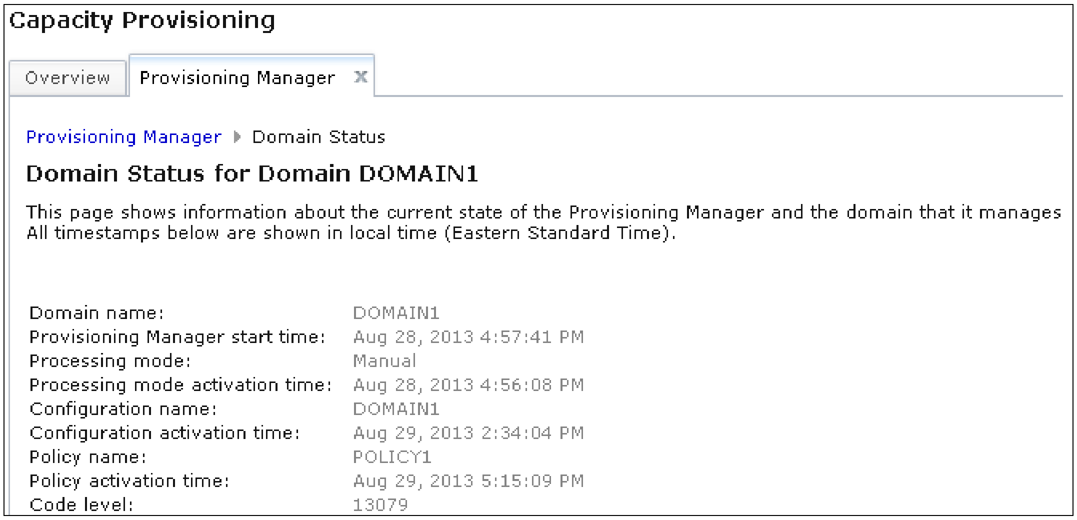
Figure 14-4 Connections to the provisioning manager

You must define the following host addresses:

- A connection to your own system, which is defined as “Same system as z/OSMF”.
- Connections to other participating systems. In our example configuration, we use the systems SC80 and SC81 and define them by their host addresses. Capacity provisioning uses the http protocol on port 5988 to communicate through the CIM server.

Here, you can create, view, or modify the definitions for your connections to the provisioning manager. When you click the host address of a system where the provisioning manager runs, you see more information about its current domain status.

The view for our example system SC80 is shown in Figure 14-5.



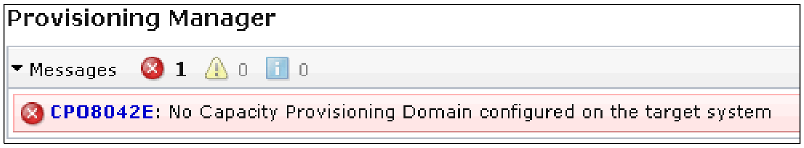
Domain Status for Domain DOMAIN1

This page shows information about the current state of the Provisioning Manager and the domain that it manages
All timestamps below are shown in local time (Eastern Standard Time).

Domain name:	DOMAIN1
Provisioning Manager start time:	Aug 28, 2013 4:57:41 PM
Processing mode:	Manual
Processing mode activation time:	Aug 28, 2013 4:56:08 PM
Configuration name:	DOMAIN1
Configuration activation time:	Aug 29, 2013 2:34:04 PM
Policy name:	POLICY1
Policy activation time:	Aug 29, 2013 5:15:09 PM
Code level:	13079

Figure 14-5 Domain status

This window is shown only for the system where the provisioning manager runs. For flexibility reasons, we also defined system SC81 for our example. However, when you click that host address, you receive an error message that informs you that no capacity provisioning domain is configured there, as shown in Figure 14-6.



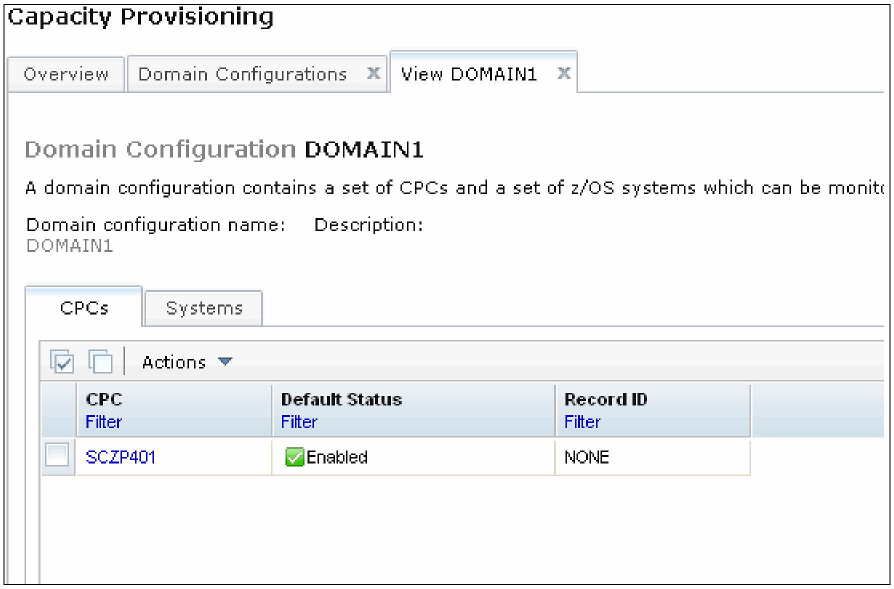
⊗ CPO8042E: No Capacity Provisioning Domain configured on the target system

Figure 14-6 Error message when no capacity provisioning domain is configured

14.5.3 Managing domain configurations

When you click **Domain Configurations**, a window opens in which you create domain definitions or work on existing definitions. In our example, we create a domain that is called DOMAIN1. This domain includes one CPC and two z/OS systems that are on that CPC (SC80 and SC81).

The windows for the CPC and the systems are shown in Figure 14-7 and Figure 14-8.



Domain Configuration DOMAIN1

A domain configuration contains a set of CPCs and a set of z/OS systems which can be monit

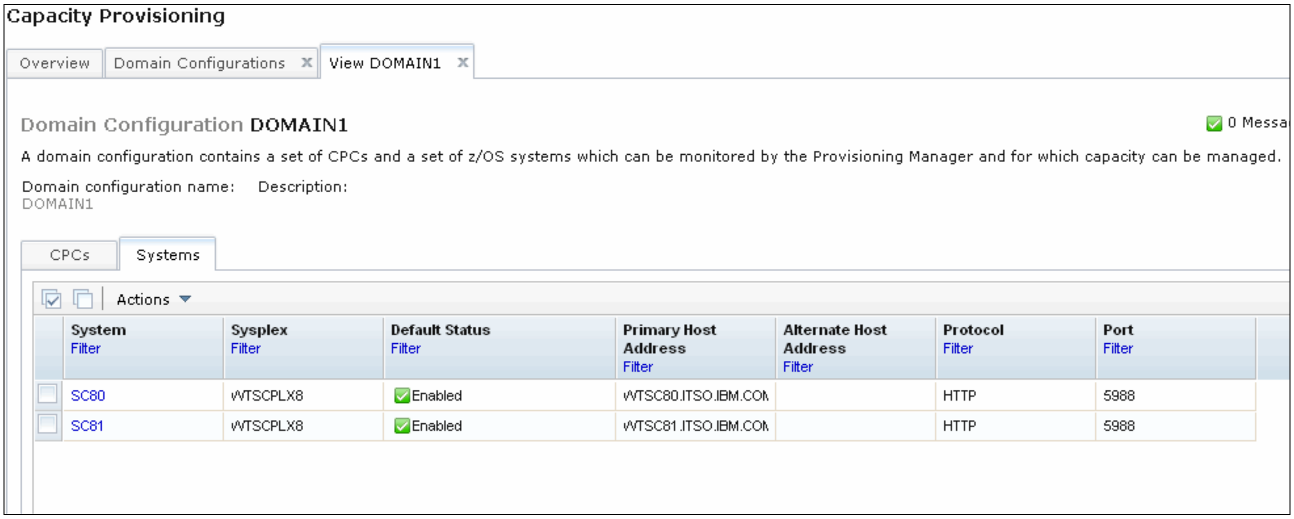
Domain configuration name: DOMAIN1

Description:

	CPC Filter	Default Status Filter	Record ID Filter
□	SCZP401	✓Enabled	NONE

Figure 14-7 Domain configuration with enabled CPC

If necessary, define more CPCs here.



Domain Configuration DOMAIN1

✓ 0 Messa

A domain configuration contains a set of CPCs and a set of z/OS systems which can be monitored by the Provisioning Manager and for which capacity can be managed.

Domain configuration name: DOMAIN1

Description:

	System Filter	Sysplex Filter	Default Status Filter	Primary Host Address Filter	Alternate Host Address Filter	Protocol Filter	Port Filter
□	SC80	WTSCPLX8	✓Enabled	WTSC80.ITSO.IBM.COM		HTTP	5988
□	SC81	WTSCPLX8	✓Enabled	WTSC81.ITSO.IBM.COM		HTTP	5988

Figure 14-8 Domain configuration with enabled z/OS systems

You see in Figure 14-8 that the systems are identified by their system name (SC80 and SC81), sysplex name (WTSCPLX8), and their primary host addresses. An alternative host address is optional. The http protocol and port 5988 are the default for communication with the CIM server on the respective system.

Another action that you can perform in the domain configuration is to import or export a configuration from or to XML files. Click **Actions** and select **Export To File** for a domain and save the XML file to your workstation. The syntax of the exported file for our example DOMAIN1 is shown in Example 14-2.

Example 14-2 XML export of domain definition

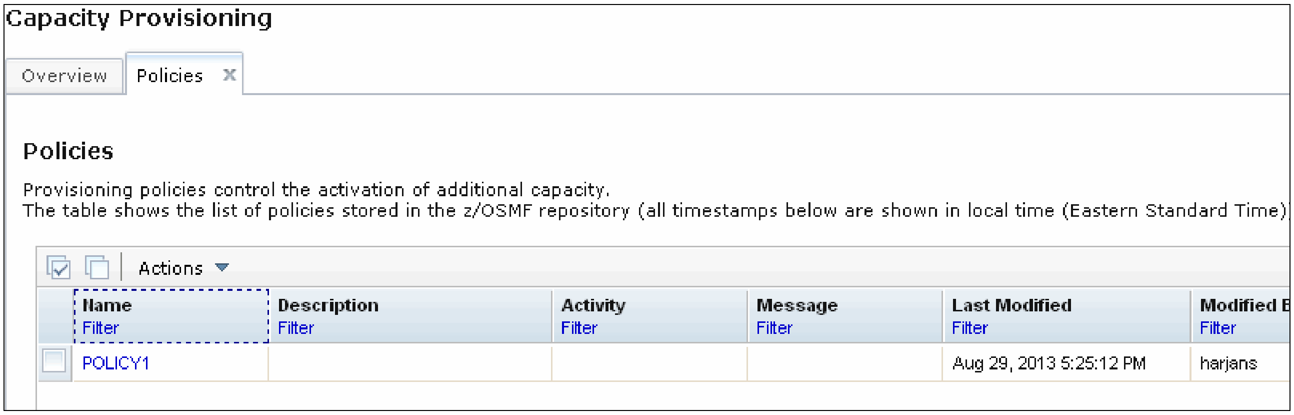
```
<?xml version="1.0" ?>
<DomainSpecification
   xmlns="http://www.ibm.com/xmlns/prod/cpm/2007/09/DomainSpecification.xsd">

   <Name>DOMAIN1</Name>
   <Level>001</Level>
   <ManagedCPCs>
     <ManagedCPC>
       <Name>SCZP401</Name>
       <Enabled>Yes</Enabled>
       <LICRecordId>*</LICRecordId>
     </ManagedCPC>
     <ManagedCPC>
       <Name>SCZP301</Name>
       <Enabled>Yes</Enabled>
       <LICRecordId>*</LICRecordId>
     </ManagedCPC>
   </ManagedCPCs>
   <ObservedSystems>
     <ObservedSystem>
       <Name>SC80</Name>
       <Sysplex>WTSCPLX8</Sysplex>
       <Enabled>Yes</Enabled>
       <PrimaryHostAddress>WTSC80.ITSO.IBM.COM</PrimaryHostAddress>
       <Protocol>HTTP</Protocol>
       <Port>5988</Port>
     </ObservedSystem>
     <ObservedSystem>
       <Name>SC81</Name>
       <Sysplex>WTSCPLX8</Sysplex>
       <Enabled>Yes</Enabled>
       <PrimaryHostAddress>WTSC81.ITSO.IBM.COM</PrimaryHostAddress>
       <Protocol>HTTP</Protocol>
       <Port>5988</Port>
     </ObservedSystem>
     <ObservedSystem>
       <Name>SC75</Name>
       <Sysplex>PLEX75</Sysplex>
       <Enabled>Yes</Enabled>
       <PrimaryHostAddress>WTSC75.ITSO.IBM.COM</PrimaryHostAddress>
       <Protocol>HTTP</Protocol>
       <Port>5988</Port>
     </ObservedSystem>
   </ObservedSystems>
</DomainSpecification>
```

When you import domain configurations, take this import from an XML file that is uploaded from your workstation or from a member of your z/OS domain configuration data set (the default is `<hlq>.DOMAIN1.DOMCFG`).

14.5.4 Managing policies

When you click **Policies** in the Manage section, you see a blank window, in which no policy is defined. In this case, click **Action** and select **New** to define a policy. You also can work with defined policies. The z/OSMF policy window with POLICY1 (which is defined) is shown in Figure 14-9.



Policies

Provisioning policies control the activation of additional capacity.
The table shows the list of policies stored in the z/OSMF repository (all timestamps below are shown in local time (Eastern Standard Time)

	Name Filter	Description Filter	Activity Filter	Message Filter	Last Modified Filter	Modified B Filter
□	POLICY1				Aug 29, 2013 5:25:12 PM	harjans

Figure 14-9 Provisioning policies

Click one of the policy names in your list (in our example, POLICY1) and drill down to the next level of definitions. You then see the following tabs with options, in which you can enter the appropriate values:

- Maximum Processor Scope
- Logical Processor Scope
- Maximum Defined Capacity Scope
- Maximum Group Capacity Scope
- Rules

15

Sysplex Management

This chapter provides a description of and usage information about IBM z/OS Management Facility (z/OSMF) Sysplex Management. It includes the following topics:

15.1 Introduction

The Sysplex Management task allows you to view sysplex resources.You can view sysplexes and systems in a sysplex. You also can view physical configurations, such as coupling facilities and LPARs, and logical resources, such as couple data sets and coupling facility structures.

Graphical views help you to visualize the topology of your sysplex. From the graphical view, you can drill down for more information.

Many of the pages in the Sysplex Management task include a graphic view and a table view. You can drag the divider that separates the views to expand or reduce each section.

The graphic view is in the upper portion of the window. Sysplex objects, such as CPCs and coupling facilities, are shown in graphic form. Right-click a link inside an object (typically the name of the object) to display a menu of actions that are available for the object.

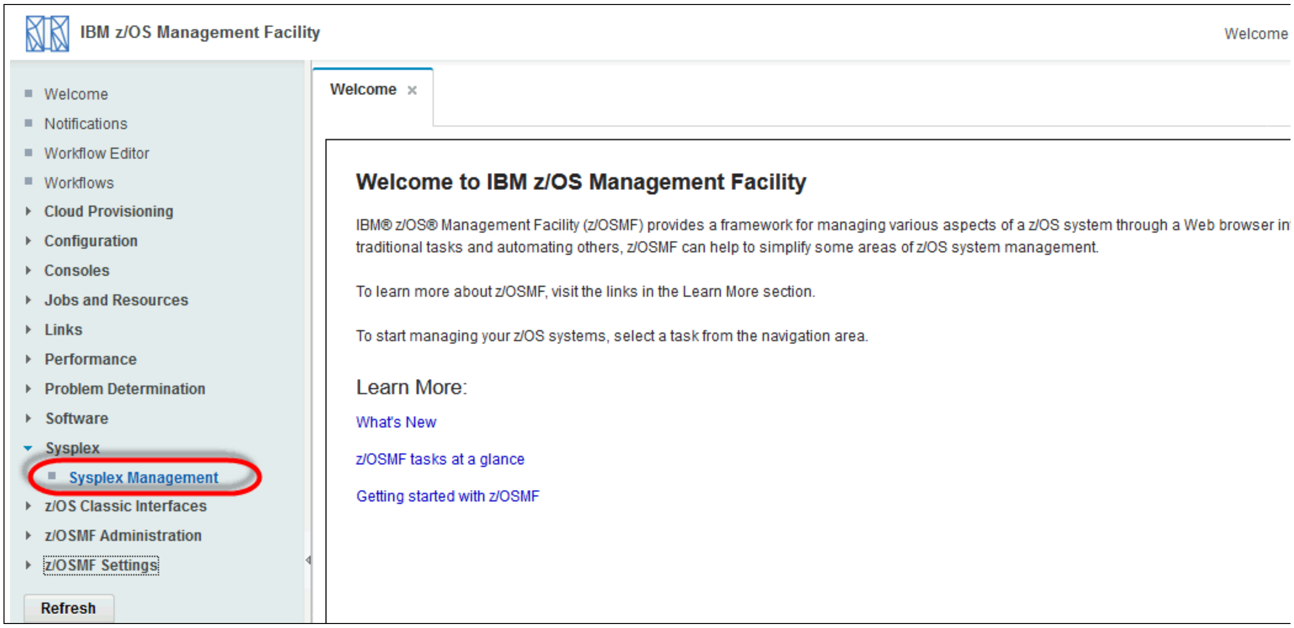
15.2 Prerequisites

To define systems with the Systems task in the z/OSMF Settings, complete the following steps:

1. Add a z/OSMF instance for each sysplex to manage by current z/OSMF instance.
2. Enable single-sign (SSO) for each secondary z/OSMF instance by using the Enable Single Sign-on action in the Systems table.
3. To prepare for the use of the physical view for the local sysplex, use the Discover action in the Systems table to automatically create system definitions for those systems, or use the Add CPC action to manually add all CPC information for the local z/OSMF instance, as described in 3.16, “Sysplex” on page 61.

15.3 Usage

First, we expand the Sysplex category in the navigation area. Then, we select **Sysplex Management**, as shown in Figure 15-1.



IBM z/OS Management Facility

Welcome

Welcome to IBM z/OS Management Facility

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To start managing your z/OS systems, select a task from the navigation area.

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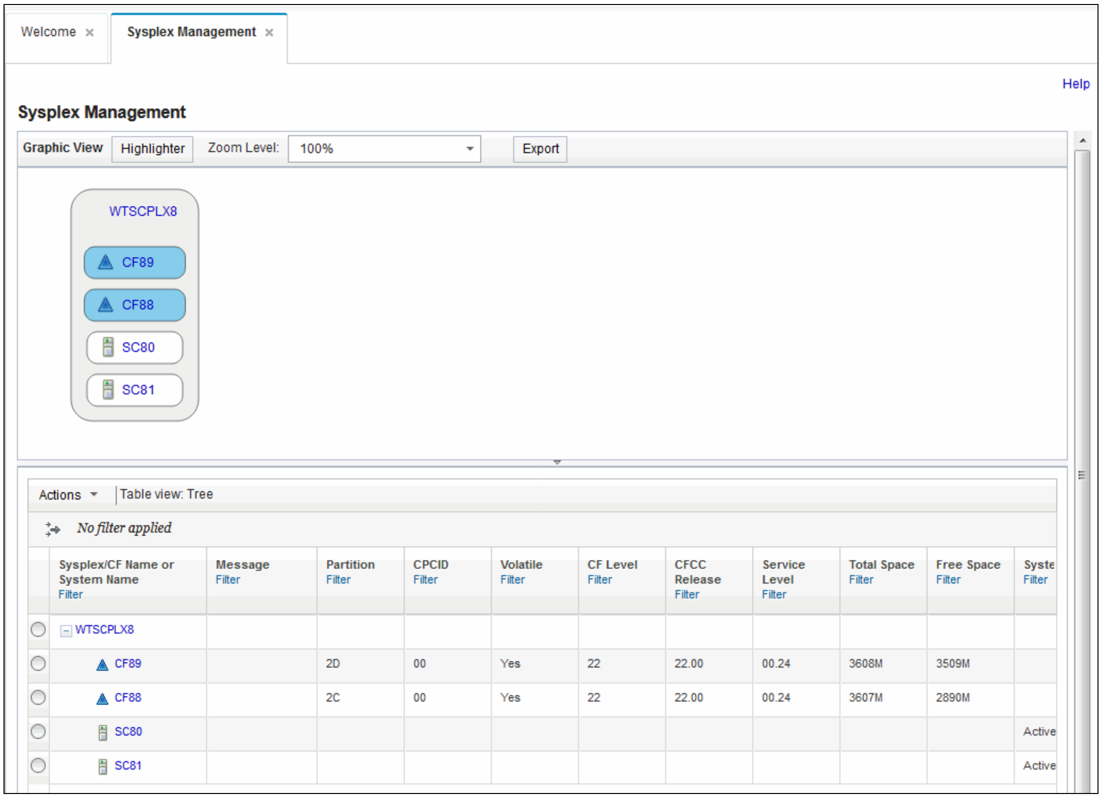
Figure 15-1 Sysplex Management plug-in

The topology of the defined sysplex in a graphic and a table view is shown in the first window (see Figure 15-2). From the main page, you can see a more detailed view of the sysplex definitions.



Zoom Level: 100%

No filter applied

	Sysplex/CF Name or System Name Filter	Message Filter	Partition Filter	CPCID Filter	Volatile Filter	CF Level Filter	CFCC Release Filter	Service Level Filter	Total Space Filter	Free Space Filter	Syste Filter
○	⊟ WTSCPLX8										
○	CF89		2D	00	Yes	22	22.00	00.24	3608M	3509M	
○	CF88		2C	00	Yes	22	22.00	00.24	3607M	2890M	
○	SC80										Active
○	SC81										Active

Figure 15-2 Sysplex Management main page

Use the Zoom Level option to zoom in on or out of the graphic. From a drop-down list, you can select a predefined zoom level. This value can also be overwritten with your own zoom level, as shown in Figure 15-3.

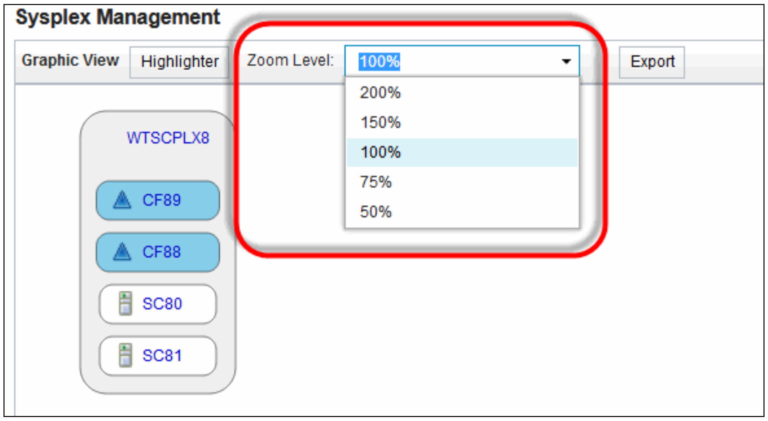


Figure 15-3 Choosing a Zoom Level

Use the Highlighter feature to define colors for the objects that are displayed in that view. An example of changing the color of the sysplex is shown in Figure 15-4. You can reset all of your changes immediately by clicking **Restore Defaults**.

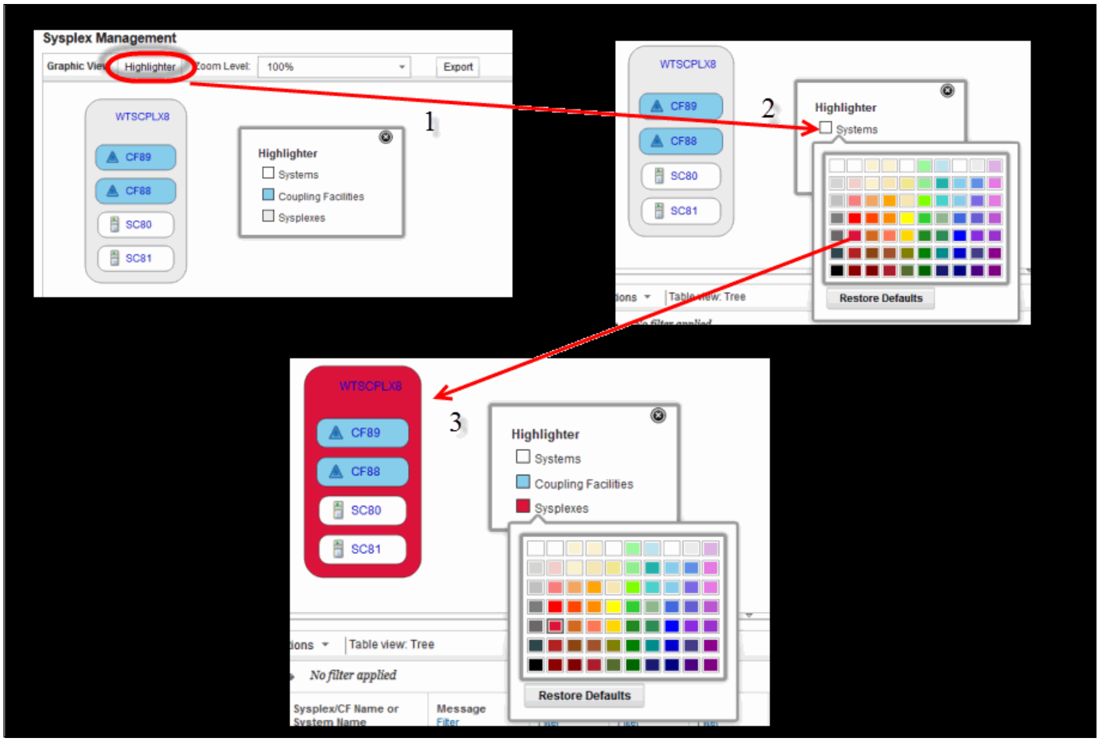
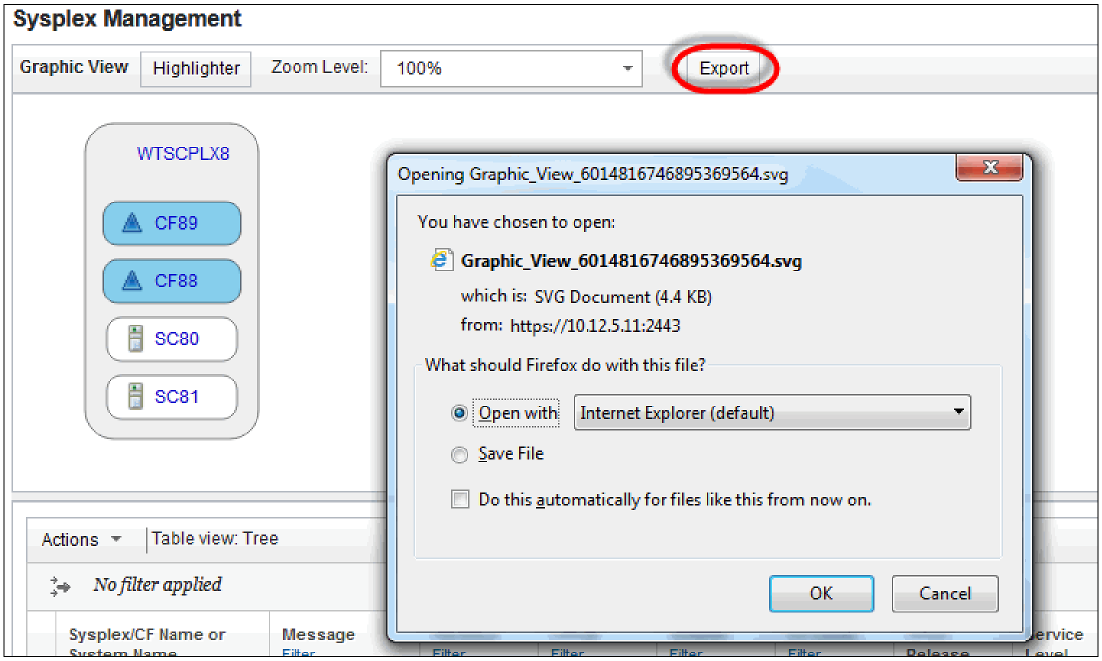


Figure 15-4 Change Highlighter of Graphic View

Use the **Export** feature to save the graphic view as a scalable vector graphics (`.svg`) file. Icons in the graphic view typically appear before an object to indicate its type (such as the CF icon for coupling facility), which are not included in the `.svg` file. The exported `.svg` file might not be well-formatted if the length of the text is too long.

An example of the Export function is shown in Figure 15-5.



Opening Graphic_View_6014816746895369564.svg

You have chosen to open:

Graphic_View_6014816746895369564.svg

which is: SVG Document (4.4 KB)

from: https://10.12.5.11:2443

What should Firefox do with this file?

● Open with Internet Explorer (default)

○ Save File

□ Do this automatically for files like this from now on.

Figure 15-5 Export Graphic View

Note: For more information about any of these tasks, click any hot link in the interface.

Right-click the sysplex name (as shown in Figure 15-6) to open a selection of other views.

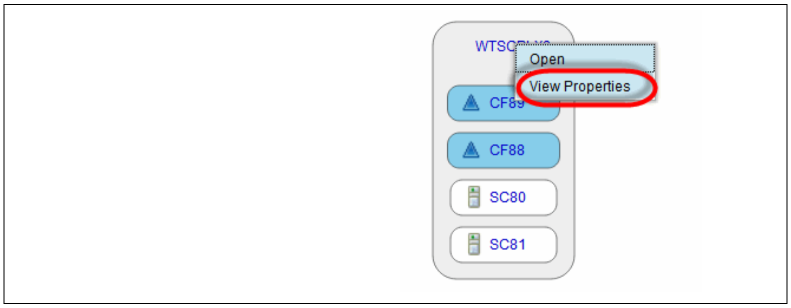
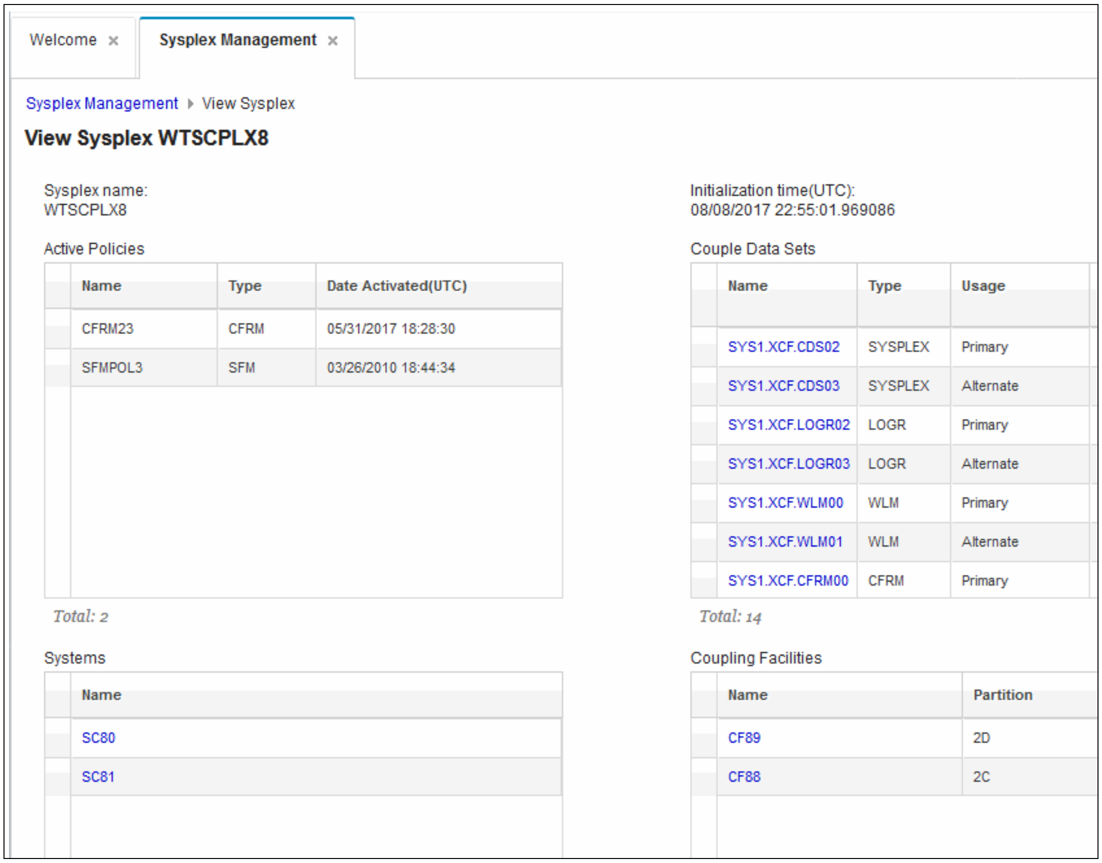


Figure 15-6 Options for View

Click **View Properties** to see a more detailed view, as shown in Figure 15-7.



View Sysplex WTSCPLX8

Sysplex name:
WTSCPLX8

Initialization time(UTC):
08/08/2017 22:55:01.969086

Active Policies

Name	Type	Date Activated(UTC)
CFRM23	CFRM	05/31/2017 18:28:30
SFMPOL3	SFM	03/26/2010 18:44:34

Total: 2

Couple Data Sets

Name	Type	Usage
SYS1.XCF.CDS02	SYSPLEX	Primary
SYS1.XCF.CDS03	SYSPLEX	Alternate
SYS1.XCF.LOGR02	LOGR	Primary
SYS1.XCF.LOGR03	LOGR	Alternate
SYS1.XCF.WLM00	WLM	Primary
SYS1.XCF.WLM01	WLM	Alternate
SYS1.XCF.CFRM00	CFRM	Primary

Total: 14

Systems

Name
SC80
SC81

Coupling Facilities

Name	Partition
CF89	2D
CF88	2C

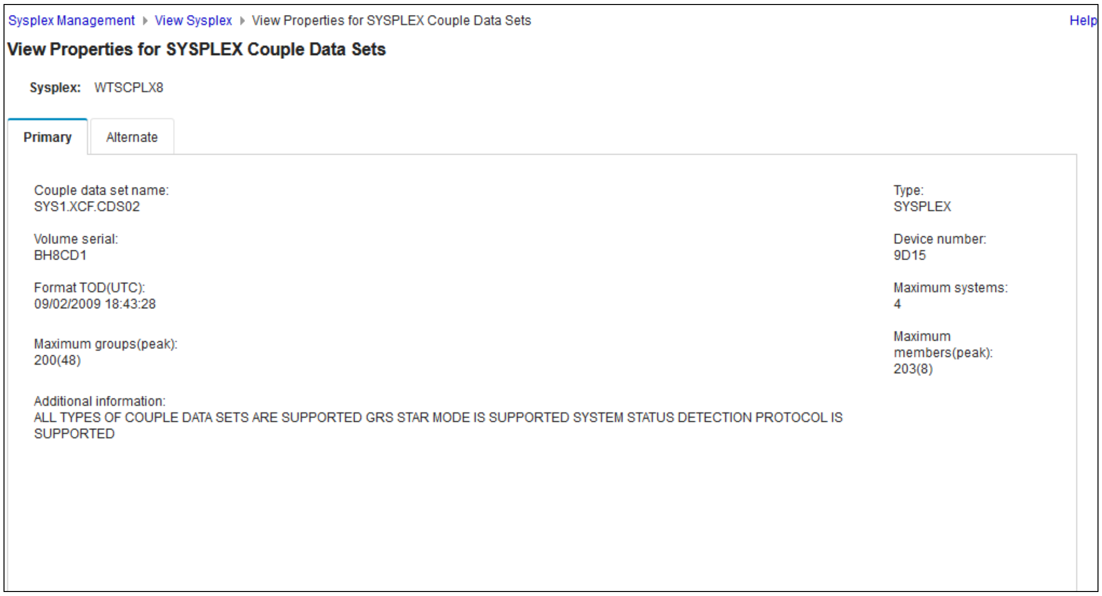
Figure 15-7 Displaying the detail view

The fields that are available in the detailed view are listed in Table 15-1.

Table 15-1 Descriptions on the View Sysplex window

Field	Description
Sysplex Name	Name of the Sysplex.
Initialization time	Date and time that the sysplex was initialized.
Active Policies	Table that lists the active policies, including the name, type, and date and time that they were activated.
Couple Data Sets	Table that lists the couple data sets, including the name, type, usage, and volume serial.
Systems	Table that lists the systems in the sysplex.
Coupling Facilities	Table that lists the coupling facilities in the sysplex, including the name, partition, and CPC.

To see more information about the couple data sets, we click the **SYS1.XCF.CDS02** link in our example. The properties of the Sysplex couple data set (CDS) is shown in Figure 15-8. You can click every CDS to see more information.



Sysplex Management ▸ View Sysplex ▸ View Properties for SYSPLEX Couple Data Sets

Help

View Properties for SYSPLEX Couple Data Sets

Sysplex: WTSCPLX8

Primary | Alternate

Couple data set name:
SYS1.XCF.CDS02

Type:
SYSPLEX

Volume serial:
BH8CD1

Device number:
9D15

Format TOD(UTC):
09/02/2009 18:43:28

Maximum systems:
4

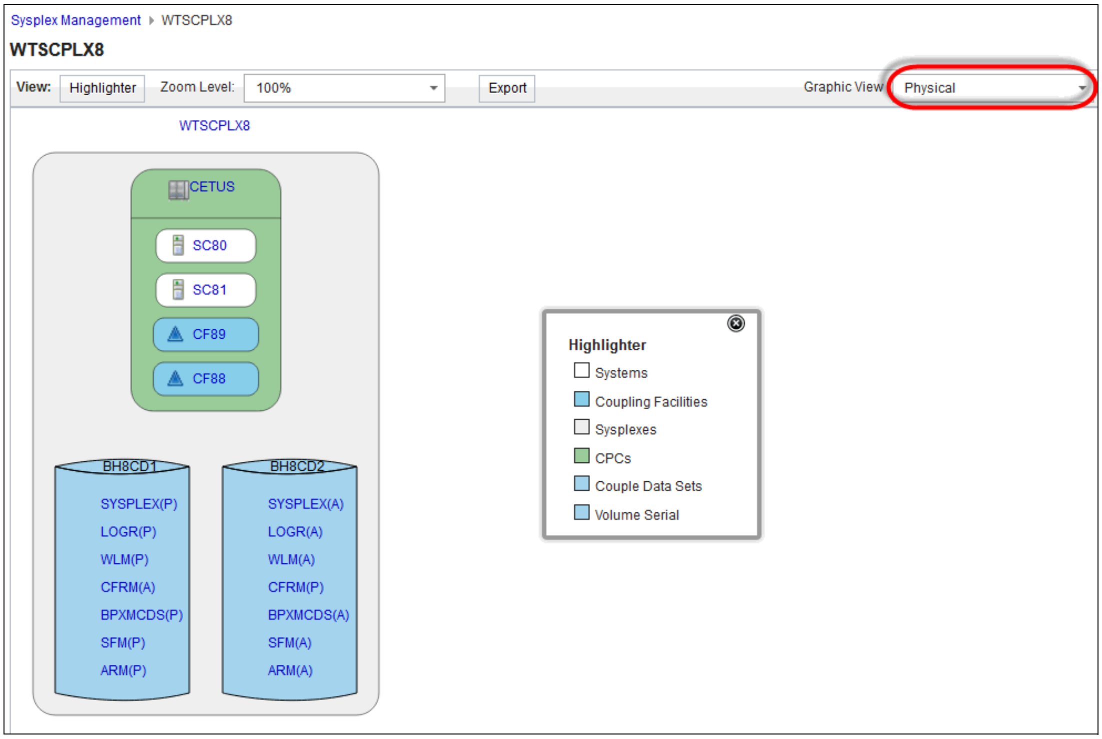
Maximum groups(peak):
200(48)

Maximum members(peak):
203(8)

Additional information:
ALL TYPES OF COUPLE DATA SETS ARE SUPPORTED GRS STAR MODE IS SUPPORTED SYSTEM STATUS DETECTION PROTOCOL IS SUPPORTED

Figure 15-8 Properties Sysplex Couple Data Set

Return to the main page and select **Open** to see a physical view of the sysplex. As shown in Figure 15-9, the physical view of this sysplex is presented in a graphic view. The couple data set information also is shown in this graphical view.



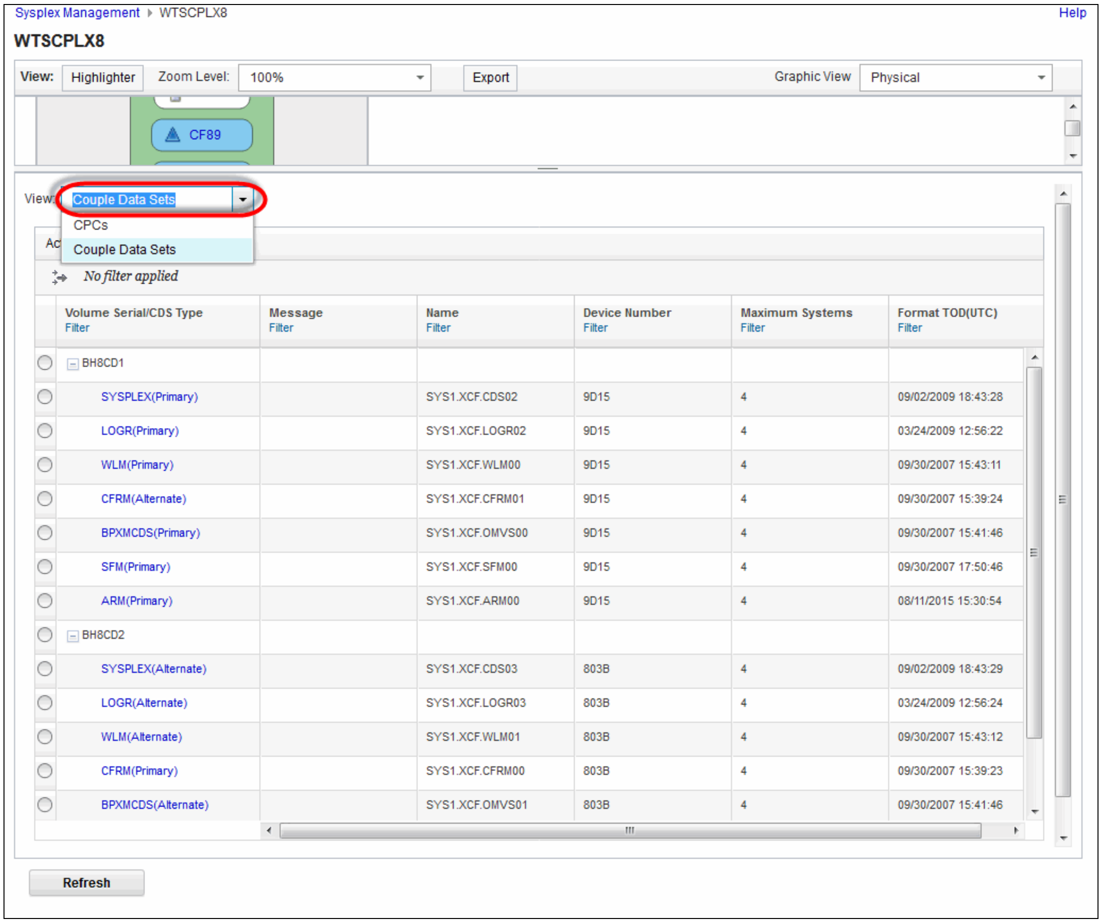
Sysplex Management ▸ WTSCPLX8

WTSCPLX8

View: Highlighter Zoom Level: 100% Export Graphic View: Physical

Figure 15-9 Physical View of Sysplex upper part

Below the graphic view you can see the table view. By default, you see the CDS information. You can select between CDS and CPC information. An example of the CDS view is shown in Figure 15-10. The view easily can be changed by using a drop-down menu.



	Volume Serial/CDS Type Filter	Message Filter	Name Filter	Device Number Filter	Maximum Systems Filter	Format TOD(UTC) Filter
○	⊟ BH8CD1					
○	SYSPLEX(Primary)		SYS1.XCF.CDS02	9D15	4	09/02/2009 18:43:28
○	LOGR(Primary)		SYS1.XCF.LOGR02	9D15	4	03/24/2009 12:56:22
○	WLM(Primary)		SYS1.XCF.WLM00	9D15	4	09/30/2007 15:43:11
○	CFRM(Alternate)		SYS1.XCF.CFRM01	9D15	4	09/30/2007 15:39:24
○	BPXMCDS(Primary)		SYS1.XCF.OMVS00	9D15	4	09/30/2007 15:41:46
○	SFM(Primary)		SYS1.XCF.SFM00	9D15	4	09/30/2007 17:50:46
○	ARM(Primary)		SYS1.XCF.ARM00	9D15	4	08/11/2015 15:30:54
○	⊟ BH8CD2					
○	SYSPLEX(Alternate)		SYS1.XCF.CDS03	803B	4	09/02/2009 18:43:29
○	LOGR(Alternate)		SYS1.XCF.LOGR03	803B	4	03/24/2009 12:56:24
○	WLM(Alternate)		SYS1.XCF.WLM01	803B	4	09/30/2007 15:43:12
○	CFRM(Primary)		SYS1.XCF.CFRM00	803B	4	09/30/2007 15:39:23
○	BPXMCDS(Alternate)		SYS1.XCF.OMVS01	803B	4	09/30/2007 15:41:46

Figure 15-10 Table View Couple Data Sets of Sysplex

The physical view can be changed to see more information about the coupling facility (CF). You can change the View in the upper right corner, as shown in Figure 15-11.

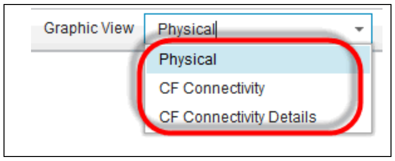
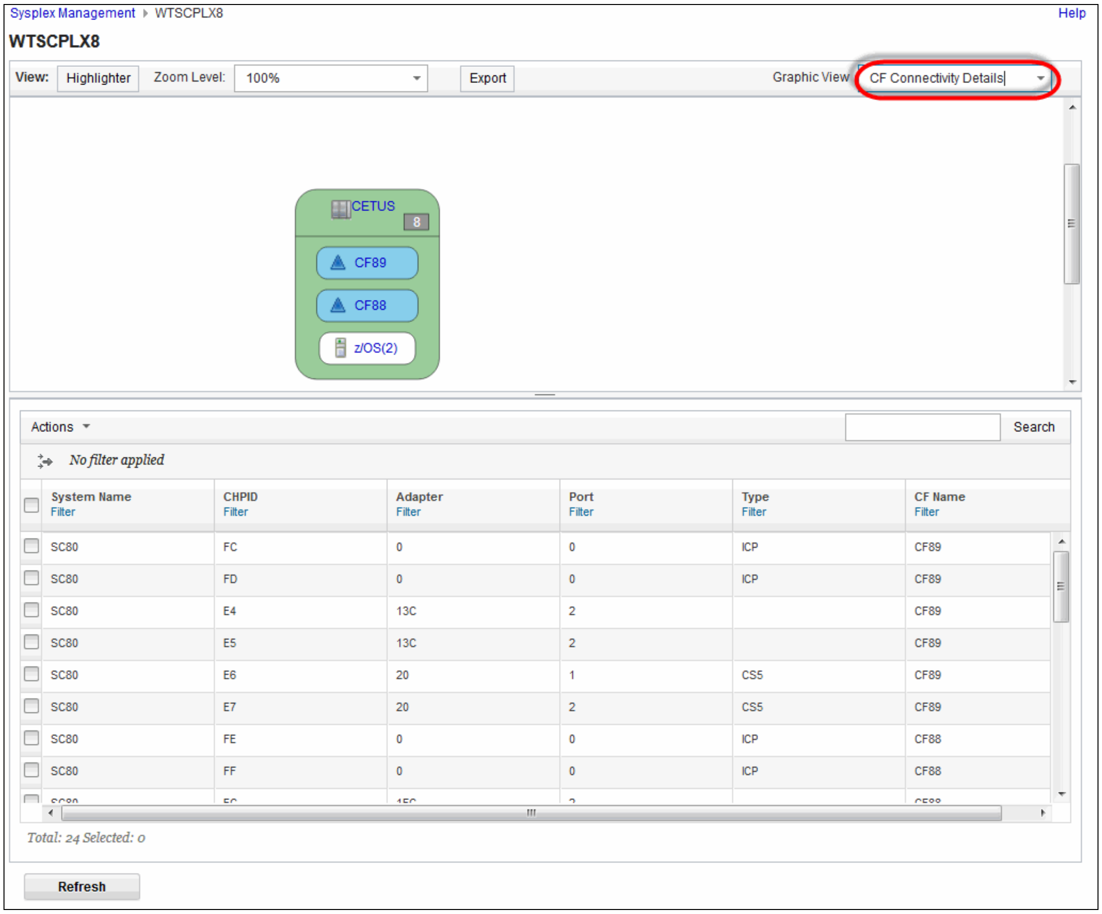


Figure 15-11 Graphic View options

The CF Connectivity Details view of the sysplex are shown in Figure 15-12. In the table at the bottom of the window, you see more information about the CF connections, such as CHPID, Adapter, Port, Type, and CF Name.



WTSCPLX8

No filter applied

☐	System Name	CHPID	Adapter	Port	Type	CF Name
☐	SC80	FC	0	0	ICP	CF89
☐	SC80	FD	0	0	ICP	CF89
☐	SC80	E4	13C	2		CF89
☐	SC80	E5	13C	2		CF89
☐	SC80	E6	20	1	CS5	CF89
☐	SC80	E7	20	2	CS5	CF89
☐	SC80	FE	0	0	ICP	CF88
☐	SC80	FF	0	0	ICP	CF88

Total: 24 Selected: 0

Figure 15-12 CF Connectivity Details View

16

IBM z/OS Management Console plug-in

This chapter provides a description of and usage information about the new IBM z/OS Management (z/OSMF) Console plug-in. It includes the following topics:

- 16.1, “Introduction” on page 444
- 16.2, “Prerequisites” on page 444
- 16.3, “Usage” on page 445

16.1 Introduction

The new z/OS operator console task provides functions with which you can work with z/OS EMCS consoles from your z/OSMF workspace. You can view system or sysplex-related messages and enter system commands.

This plug-in includes the following key features:

- Selecting a console from a list of systems in your sysplex (or monoplex). The Overview tab shows you the sysplex environments and the systems that are available for the z/OS Operator Console function, and its associated consoles.
- Getting a system activity summary. The summary provides you a graphic view of system messages activity. The activity is represented as a graph bar. The colors in the bars reflect the colors of the messages that are displayed in the console.
- Working with system messages. The console shows you system messages. You can search and filter the messages, and lock the console.
- Entering system commands. You can enter system commands at the command line at the bottom of the console plug-in. Enter the command text into the command line, or select a command from the list of previously entered commands.

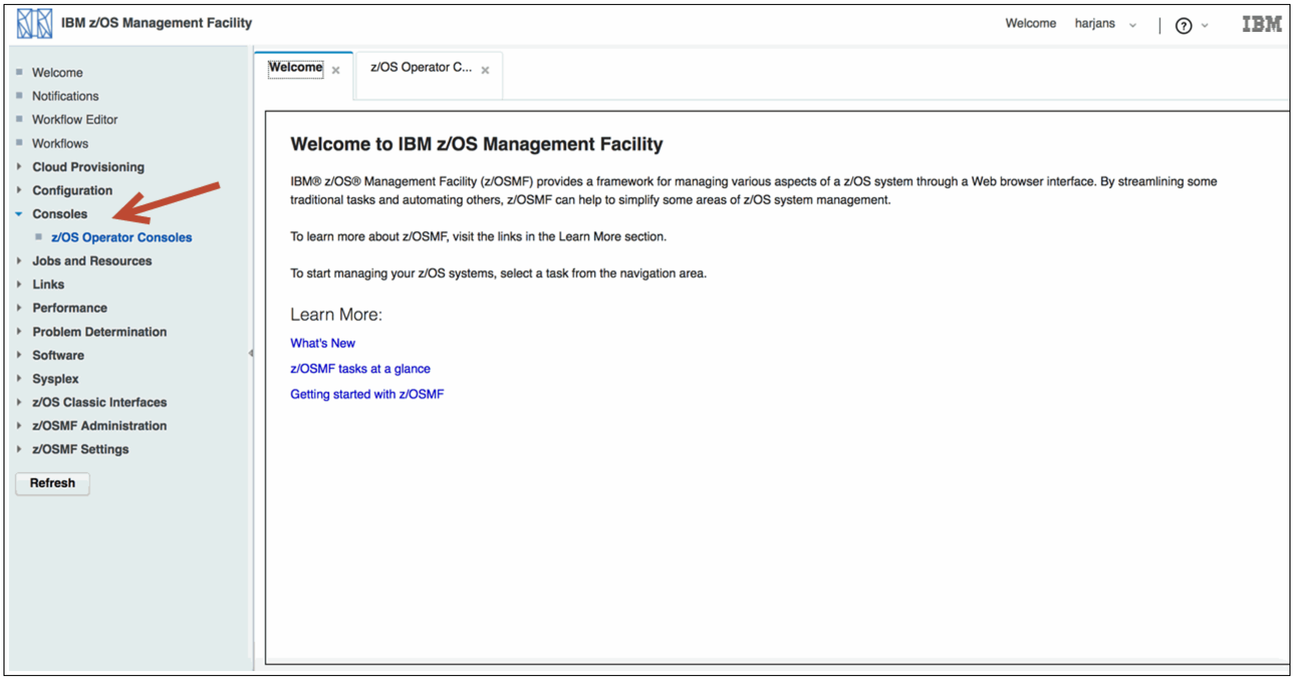
From a z/OS perspective, the console type is extended multiple console support (EMCS). Theoretically, the number of EMCS consoles in a system or sysplex is unlimited. However, EMCS consoles use more system resources, whether they are active or inactive. After you activate an EMCS console, its definition is in place for the life of an active sysplex.

16.2 Prerequisites

No prerequisites must be met from a system perspective. However, you must activate several SAF profiles for your security environment. Some postinstallation tasks are required. For more information, see “z/OS Operator Consoles” on page 36.

16.3 Usage

When you finish setting up the z/OS Operator Consoles plug-in, click **Consoles** and then, **z/OS Operator Consoles** in the selection menu on the left side of your z/OSMF window, as shown in Figure 16-1.



Welcome to IBM z/OS Management Facility

IBM® z/OS® Management Facility (z/OSMF) provides a framework for managing various aspects of a z/OS system through a Web browser interface. By streamlining some traditional tasks and automating others, z/OSMF can help to simplify some areas of z/OS system management.

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To start managing your z/OS systems, select a task from the navigation area.

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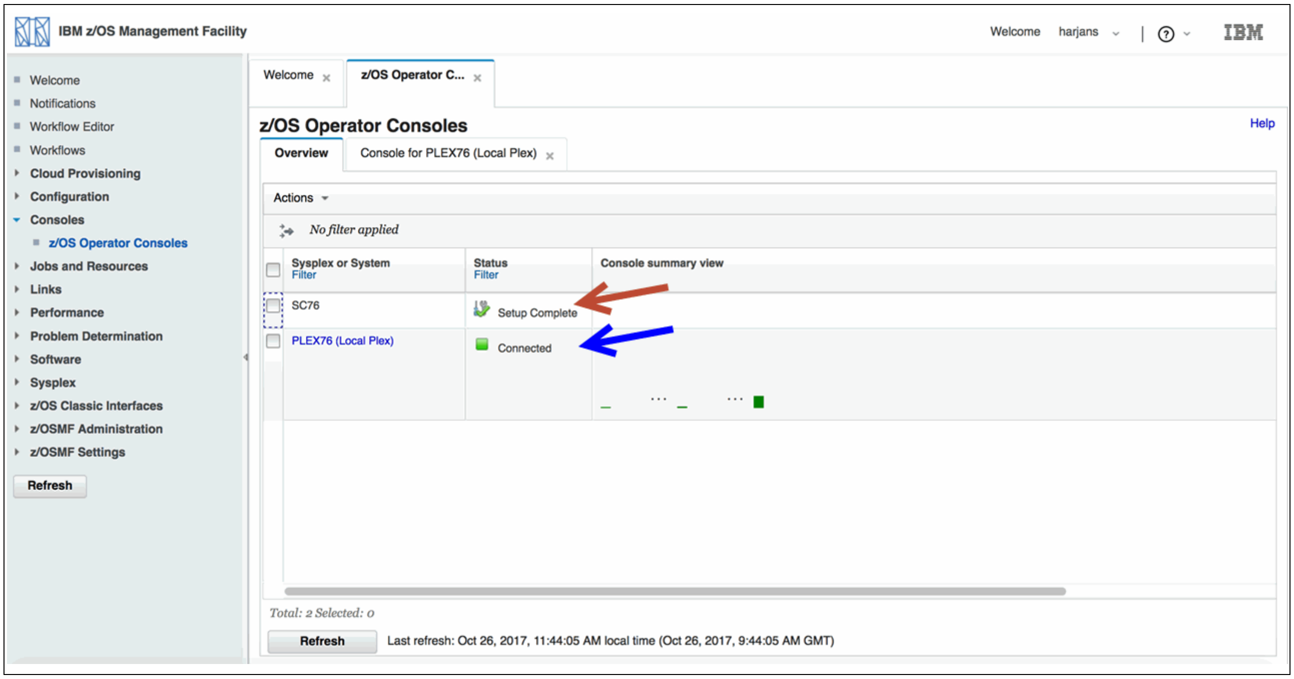
z/OSMF tasks at a glance

Getting started with z/OSMF

Figure 16-1 z/OS Operator Console plug-in

The z/OS Operator Consoles plug-in opens, and you can see the Overview tab with the systems and sysplex environments. An environment with system SC76, in which the console setup is complete (red arrow), is shown in Figure 16-2.



Sysplex or System Filter	Status Filter	Console summary view
SC76	Setup Complete	
PLEX76 (Local Plex)	Connected	

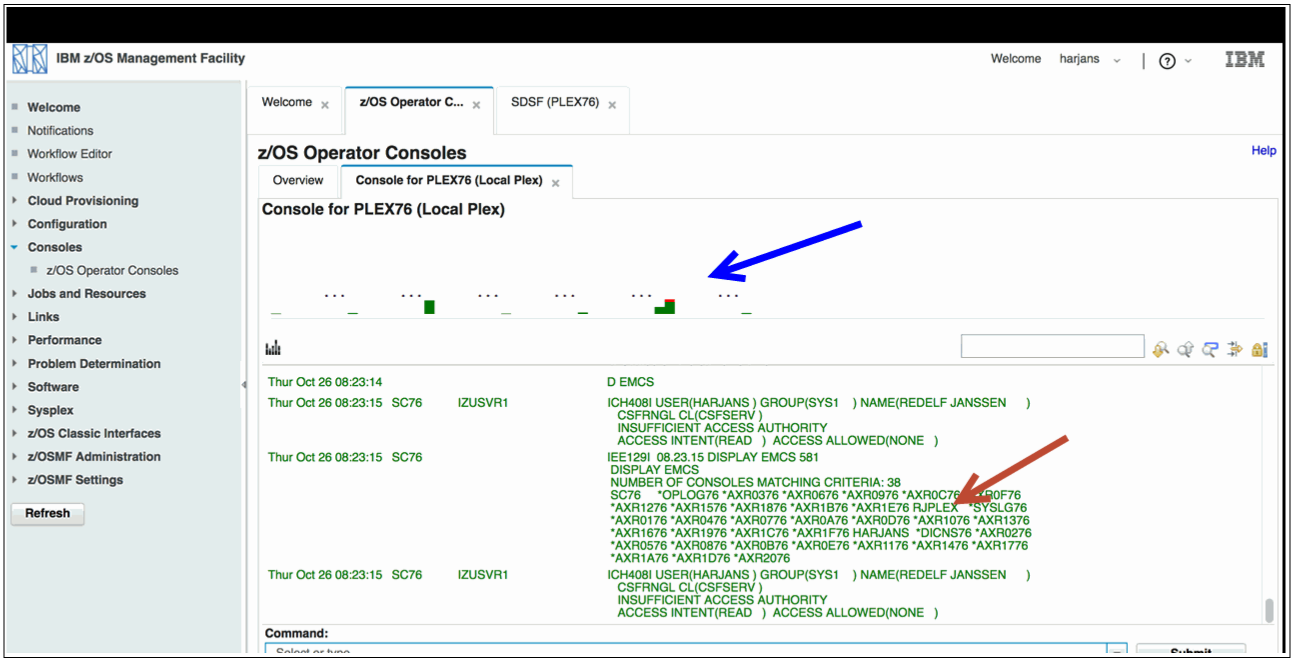
Total: 2 Selected: 0

Refresh Last refresh: Oct 26, 2017, 11:44:05 AM local time (Oct 26, 2017, 9:44:05 AM GMT)

Figure 16-2 Overview window for z/OS Operator Consoles

When you mark this line and click the **Action** menu, you can start the console. The second line shows PLEX76. This console is a console for a sysplex (in this case, a monoplex is running, but the behavior for multi-system sysplex environments is identical). This console is connected (indicated by the blue arrow in Figure 16-2). You can see this in the Status column.

When you start a console (in our case, it is a console that is named RJPLEX in sysplex PLEX76), you see the console window, as shown in Figure 16-3.



```
Thur Oct 26 08:23:14                          D EMCS
Thur Oct 26 08:23:15  SC76    IZUSVR1         ICH408I USER(HARJANS ) GROUP(SYS1    ) NAME(REDELF JANSSEN     )
                                                CSFRNGL CL(CSFSERV )
                                                INSUFFICIENT ACCESS AUTHORITY
                                                ACCESS INTENT(READ   )  ACCESS ALLOWED(NONE   )
Thur Oct 26 08:23:15  SC76                    IEE129I  08.23.15 DISPLAY EMCS 581
                                               DISPLAY EMCS
                                               NUMBER OF CONSOLES MATCHING CRITERIA: 38
                                               SC76     *OPLOG76 *AXR0376 *AXR0676 *AXR0976 *AXR0C76 *AXR0F76
                                               *AXR1276 *AXR1576 *AXR1876 *AXR1B76 *AXR1E76 RJPLEX   *SYSLG76
                                               *AXR0176 *AXR0476 *AXR0776 *AXR0A76 *AXR0D76 *AXR1076 *AXR1376
                                               *AXR1676 *AXR1976 *AXR1C76 *AXR1F76 HARJANS  *DICNS76 *AXR0276
                                               *AXR0576 *AXR0876 *AXR0B76 *AXR0E76 *AXR1176 *AXR1476 *AXR1776
                                               *AXR1A76 *AXR1D76 *AXR2076
Thur Oct 26 08:23:15  SC76    IZUSVR1         ICH408I USER(HARJANS ) GROUP(SYS1    ) NAME(REDELF JANSSEN     )
                                                CSFRNGL CL(CSFSERV )
                                                INSUFFICIENT ACCESS AUTHORITY
                                                ACCESS INTENT(READ   )  ACCESS ALLOWED(NONE   )
```

Figure 16-3 z/OS console work area for PLEX76

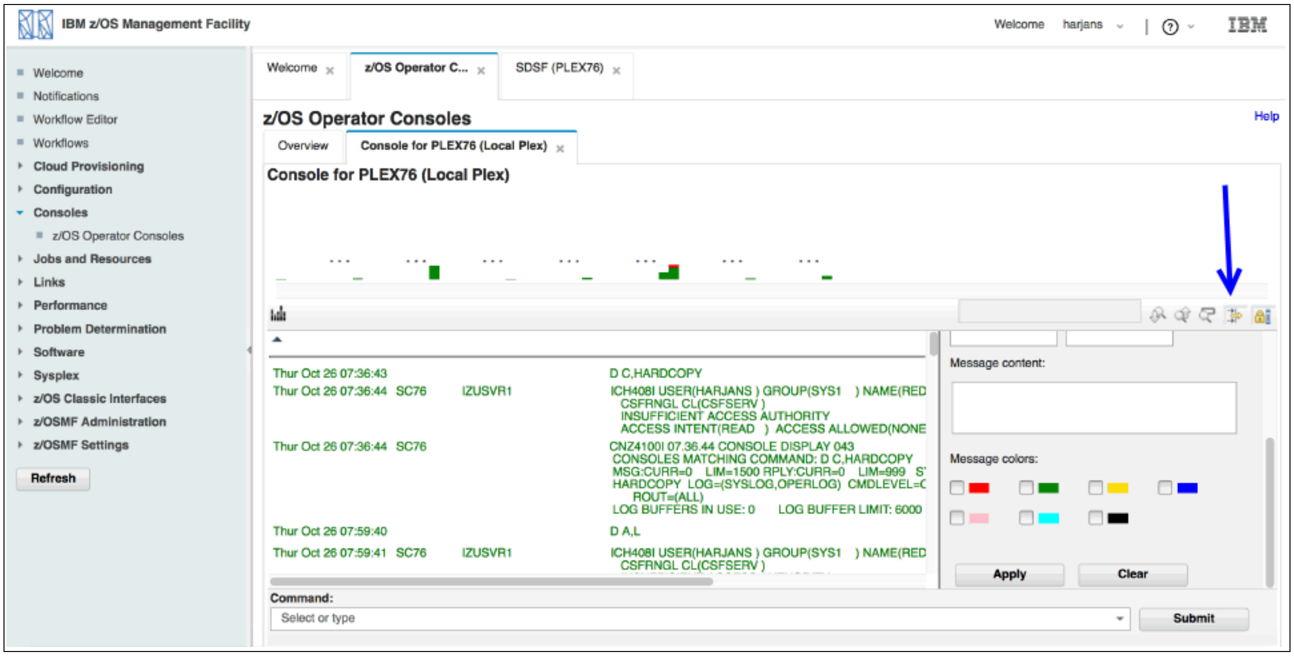
The lower half of the work area shows you the console with the command line at the bottom of the window. At the top of the window, you can see the bar graphs with the message distribution as time passes. The blue arrow that is shown in Figure 16-3 highlights these graphs. If messages are available, different colors are used to indicate severity levels.

When you enter the **`D EMCS`** command, you see the active EMCS consoles in this sysplex. The red arrow that is shown in Figure 16-3 highlights the console that is named RJPLEX. This console is the running z/OSMF console.

When you work with your console, you can also set the following filters for your messages:

- Time
- Date
- Time and date range
- System name
- Job name
- Message content
- Message colors

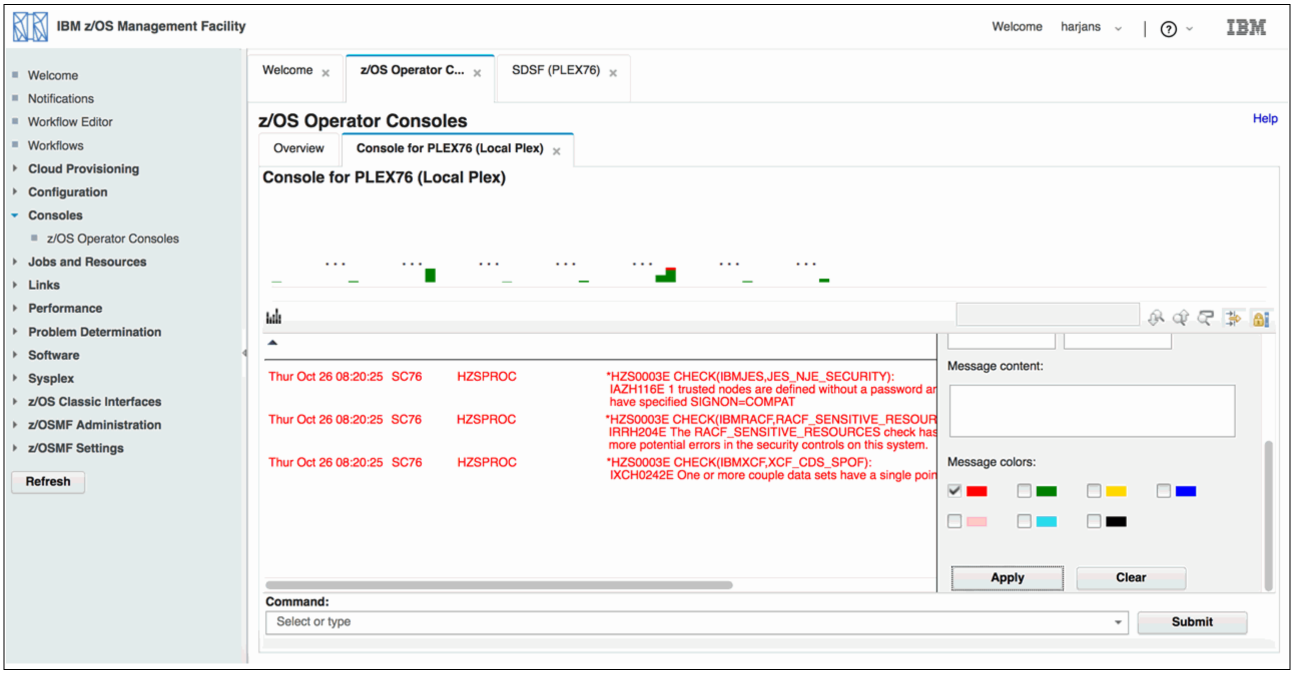
Figure 16-4 shows the pane that opens when you click the filter button (highlighted by the blue arrow) on the right side of your window.



```
Thur Oct 26 07:36:43                        D C,HARDCOPY
Thur Oct 26 07:36:44  SC76    IZUSVR1       ICH408I USER(HARJANS ) GROUP(SYS1    ) NAME(RED
                                              CSFRNGL CL(CSFSERV )
                                              INSUFFICIENT ACCESS AUTHORITY
                                              ACCESS INTENT(READ   )  ACCESS ALLOWED(NONE
Thur Oct 26 07:36:44  SC76                  CNZ4100I 07.36.44 CONSOLE DISPLAY 043
                                             CONSOLES MATCHING COMMAND: D C,HARDCOPY
                                             MSG:CURR=0    LIM=1500 RPLY:CURR=0    LIM=999   S
                                             HARDCOPY  LOG=(SYSLOG,OPERLOG)  CMDLEVEL=C
                                                 ROUT=(ALL)
                                             LOG BUFFERS IN USE: 0       LOG BUFFER LIMIT: 6000
Thur Oct 26 07:59:40                        D A,L
Thur Oct 26 07:59:41  SC76    IZUSVR1       ICH408I USER(HARJANS ) GROUP(SYS1    ) NAME(RED
                                              CSFRNGL CL(CSFSERV )
```

Figure 16-4 z/OS Operator Console message filtering

When you select the red color option and click **Apply**, you see only the messages that are in red. An example of such a filtering is shown in Figure 16-5. Important red messages from z/OS health checker are shown. As a z/OS system programmer, you can then better address these messages.

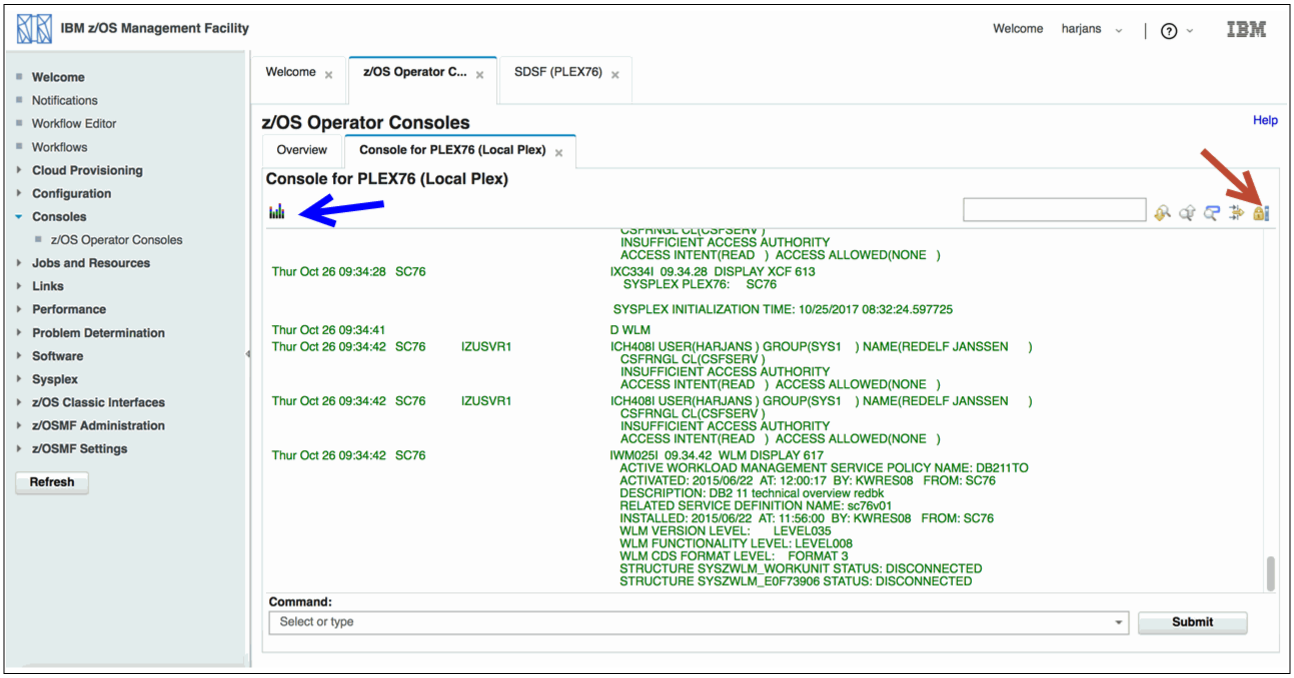


```
Thur Oct 26 08:20:25  SC76    HZSPROC       *HZS0003E CHECK(IBMJES,JES_NJE_SECURITY):
                                             IAZH116E 1 trusted nodes are defined without a password ar
                                             have specified SIGNON=COMPAT
Thur Oct 26 08:20:25  SC76    HZSPROC       *HZS0003E CHECK(IBMRACF,RACF_SENSITIVE_RESOUR
                                             IRRH204E The RACF_SENSITIVE_RESOURCES check has
                                             more potential errors in the security controls on this system.
Thur Oct 26 08:20:25  SC76    HZSPROC       *HZS0003E CHECK(IBMXCF,XCF_CDS_SPOF):
                                             IXCH0242E One or more couple data sets have a single poin
```

Figure 16-5 Important error messages filtered by red color

The following options also are available:

- Hide summary (highlighted by the blue arrow in Figure 16-6) to see more space for the message window
- Lock console (highlighted by red arrow in Figure 16-6), which locks the console from scrolling so that messages can be read.



```
                                                  CSFRNGL CL(CSFSERV )
                                                  INSUFFICIENT ACCESS AUTHORITY
                                                  ACCESS INTENT(READ   )  ACCESS ALLOWED(NONE   )
Thur Oct 26 09:34:28   SC76                      IXC334I  09.34.28  DISPLAY XCF 613
                                                   SYSPLEX PLEX76:     SC76

                                                  SYSPLEX INITIALIZATION TIME: 10/25/2017 08:32:24.597725
Thur Oct 26 09:34:41                             D WLM
Thur Oct 26 09:34:42   SC76        IZUSVR1       ICH408I USER(HARJANS ) GROUP(SYS1    ) NAME(REDELF JANSSEN      )
                                                  CSFRNGL CL(CSFSERV )
                                                  INSUFFICIENT ACCESS AUTHORITY
                                                  ACCESS INTENT(READ   )  ACCESS ALLOWED(NONE   )
Thur Oct 26 09:34:42   SC76        IZUSVR1       ICH408I USER(HARJANS ) GROUP(SYS1    ) NAME(REDELF JANSSEN      )
                                                  CSFRNGL CL(CSFSERV )
                                                  INSUFFICIENT ACCESS AUTHORITY
                                                  ACCESS INTENT(READ   )  ACCESS ALLOWED(NONE   )
Thur Oct 26 09:34:42   SC76                      IWM025I  09.34.42  WLM DISPLAY 617
                                                  ACTIVE WORKLOAD MANAGEMENT SERVICE POLICY NAME: DB211TO
                                                  ACTIVATED: 2015/06/22  AT: 12:00:17  BY: KWRES08   FROM: SC76
                                                  DESCRIPTION: DB2 11 technical overview redbk
                                                  RELATED SERVICE DEFINITION NAME: sc76v01
                                                  INSTALLED: 2015/06/22  AT: 11:56:00  BY: KWRES08   FROM: SC76
                                                  WLM VERSION LEVEL:       LEVEL035
                                                  WLM FUNCTIONALITY LEVEL: LEVEL008
                                                  WLM CDS FORMAT LEVEL:    FORMAT 3
                                                  STRUCTURE SYSZWLM_WORKUNIT STATUS: DISCONNECTED
                                                  STRUCTURE SYSZWLM_E0F73906 STATUS: DISCONNECTED
```

Figure 16-6 z/OS Console, hide and show message, and lock console options

You can see a graphic summary of message activity. When you implement IBM Knowledge Center for z/OS (KC4Z), the z/OS Operator Consoles task allows you to quickly see documentation for a message by hovering the pointer over a message that is displayed on the console view.

Attention: Ensure that the PTF for APAR PI88589 is installed. This installation ensures that the message description displays correctly.

17

z/OS Cloud Provisioning

This chapter provides a short overview of z/OS cloud provisioning and includes the following topics:

- 17.1, “Cloud services on z/OS” on page 452
- 17.2, “More information” on page 453

17.1 Cloud services on z/OS

The provisioning and management areas are within the compute cloud services. The approach for cloud on z/OS is not focusing on the provisioning of operating system instances, but rather the ability to provision multiple workloads in a single z/OS instance.

The targeted area for the cloud enablement is in provisioning middleware and related areas.The focus is within the Platform as a Service (PaaS) and the Software as a Service (SaaS)

Middleware plays a crucial role in the business application’s lifecycle. New business applications (such as applications that are based on mobile devices and IOT), are likely to access middleware components because of the need to access systems of record.

These applications might need their own environments within the development lifecycle; therefore, the appropriate middleware must be provisioned quickly and effectively. Business applications also are changing to use the new technologies and the feeds from them, which raises the demand for more environments.

Middleware is key and must be provisioned in a manner that keeps pace with other provisioning methods and expectations.

The expansion of on-demand services can mean that the users want more from the provisioners. The issue is how the provisioners provide the users with what they want with the following key deliverables:

- Consistent quality
- Rapid provisioning
- Middleware functionality
- Flexibility
- Assured availability levels

The ideal answer is a solution in which a mechanism to provide services (no matter how small or large) is put in place that provides an automated method that is based on standards. The solution must be easy to use and delivers middleware components to an agreed level of specification within a band of flexible options.

The method can encompass various entities from multiple provisioning areas (such as IP addresses and security access) and be classified as a single change.

The process is based on templates that include values that are agreed on by all parties to eliminate the need for repetitive information gathering, reviews, and meetings. The templates are processed and produce the wanted environment with all its components ready for use.

The organization can authorize the personnel to start a process that is deemed appropriate to their needs and roles.

The solution is a series of workflows to create and (where possible) maintain the environments for business development, delivery, and support.

z/OSMF is the keytool within the solution because it can provide the workflow process to deliver the middleware components. z/OSMF plays a pivotal role in delivering the workflows to build instances of middleware in a consistent, effective, and performant manner.

The z/OSMF GUI must be easily browsed to deliver the workflows. This feature is crucial in establishing the opportunity within z/OS for self-service. The simpler the interface that is used to start a workflow, the more attractive it is for users to feel confident in using it.

A user can be anyone who is given the authority to access the particular required service.

IBM Cloud Provisioning and Management for z/OS can provide the following middleware:

- IBM WebSphere Application Server for z/OS Liberty Profile V8.5.8 or higher
- IBM MQ V8 or higher
- IBM CICS TS 5.x or higher
- IBM IMS V13 or higher
- IBM DB2 V11 or higher

17.2 More information

For more information about z/OS cloud provisioning, see *IBM Cloud Provisioning and Management for z/OS An Introduction,* REDP-5416.

For more information about how CICS subsystems can be provided by using z/OSMF Cloud Provisioning plug-in, see *IBM Cloud Provisioning and Management for z/OS: CICS Scenario,* REDP-5423.

For more information about setting up the z/OSMF Cloud Provisioning plug-in, see “Cloud Provisioning” on page 32.

Part 4

IBM z/OS Management Facility APIs

This part provides more information about the use of the IBM z/OS Management Facility (z/OSMF) application programming interfaces (APIs).

18

Using the IBM z/OS Management Facility programmable interfaces

This chapter provides more information about and examples of the use of the IBM z/OS Management Facility (z/OSMF) programmable interfaces (which is also known as RESTful API).

This chapter includes the following topics:

18.1 Introduction and overview

This chapter provides information and examples that demonstrate the use of the supplied z/OSMF programmable interfaces and how they can be used in various languages and environments.

A particular emphasis is placed on the z/OS environment as it might be used by a systems programmer. The APIs have no particular environmental bias because of the industry standards that are used.

Examples are shown for the z/OS REXX, PHP, and JavaScript languages. The z/OS REXX examples run in the foreground TSO environment, and the PHP and JavaScript examples are hosted in a web browser.

18.1.1 z/OSMF functions that use RESTful services

The more functions that were added z/OSMF over the past releases, the more RESTful services were made available. Currently, the following z/OSMF functions support RESTful services:

- Application Linking Manager interface services
- Application server routing services
- Cloud provisioning services
- Data persistence services
- Multisystem routing services
- Notification services
- Software management services
- Topology services
- TSO/E address space services
- WLM resource pooling services
- z/OS console services
- z/OS data set and file REST services
- z/OS jobs REST interface
- z/OSMF information retrieval services
- z/OSMF system variable services
- z/OSMF workflow services

18.1.2 Making a call and receiving a response

The API uses the Representational State Transfer (REST) public interfaces to submit requests to a remote z/OSMF server through the Hypertext Transport Protocol Secure (HTTPS) protocol, which is required. This structure provides a simple and understandable call structure that can be easily adapted to various platforms and programming languages.

The z/OSMF API call must be coded to use the appropriate REST method (as required by the request), including `GET`, `POST`, `PUT`, and `DELETE`. For example, retrieving spooled job information requires `GET`, and purging a job from a spool uses `DELETE`.

Depending on the API call, responses include one or more of the following items:

- HTTP response code (always returned):
  - HTTP/1.1 2nn - Successful
  - HTTP/1.1 4nn - Unsuccessful
  - HTTP/1/1 500 - Internal server error

- Content-Type header (only if response data is returned):
  - MIME type: Application/json for a JavaScript Object Notation (JSON) structure
  - MIME type: Text/plain for plain text
  - Other (for example, application/octet-stream)
- Other headers
- Response data:
  - None
  - JSON
  - Plain text

Most response data takes the form of JSON, which is a standard, text-based structure for representing name-value pairs. JSON is especially oriented toward the JavaScript environment, where its array and object style format are easily adapted to the JavaScript object model. However, most modern platforms and languages offer support for managing and parsing JSON formatted strings. For more information about JSON in the z/OS environment, see 18.2, “Considerations” on page 460.

If an error occurs during request processing, a response that contains a JSON structure is always returned.

A typical **GET** call can be defined as shown in Example 18-1.

Example 18-1 Typical GET request

```
GET /zosmf/restjobs/jobs?owner=wal* HTTP/1.1
```

This GET request results in a JSON response that is similar to the response that is shown in Figure 18-1.

```
HTTP/1.1 200 OK
Date: Fri, 30 Aug 2013 12:39:28 +0000GMT
Content-Type: application/json
Connection: close
[{”jobid”:”JOB00166”,”jobname”:”WJB0005A”,”subsystem”:null,”owner”:”WALLS”,
”status”:”OUTPUT”,”type”:”JOB”,”class”:”A”,”retcode”:”CC0000”,"url":"https:\/\/
host:port\/zosmf\/restjobs\/jobs\/WJB0005A\/JOB00166","files-url":"https:\/\/ho
st:port\/zosmf\/restjobs\/jobs\/WJB0005A\/JOB00166\/files"},{”jobid”:”JOB00171”
,”jobname”:”WJB0005B”,”subsystem”:null,”owner”:”WALLS”,”status”:”OUTPUT”,”type”
:”JOB”,”class”:”A”,”retcode”:”ABEND S000”,
"url":"https:\/\/host:port\/zosmf\/restjobs\/jobs\/WJB0005B\/JOB00171",
"files-url":"https:\/\/host:port\/zosmf\/restjobs\/jobs\/WJB0005B\/JOB00171\/fi
les"}]
```

Figure 18-1 JSON response to GET request

The GET call can be started from a web browser by using a URL, as shown in Example 18-2.

Example 18-2 GET request from a web browser

```
https://<host>:<port>/zosmf/restjobs/jobs?owner=wal*
```

z/OSMF requires the user to be authenticated (standard basic authentication), which causes the browser to prompt for a user ID and password for the remote system. This information can be incorporated in to the URL, as shown in Example 18-3.

Example 18-3 Authentication information as part of URL

```
https://<uid>:<pwd>@<host>:<port>/zosmf/restjobs/jobs?owner=wal*
```

The browser then displays the JSON text string that is returned by the call.

18.1.3 References

For more information about the concepts that are used by the z/OSMF API, see the following resources:

- Hypertext Transfer Protocol (HTTP) 1.1
- Representation State Transfer (REST) Interfaces
- Multipurpose Internet Mail Extensions (MIME) Types
- JavaScript Object Notation (JSON)
- z/OSMF configuration and programming
- Reference information about the z/OSMF programming interfaces:

  IBM z/OS Management Facility Programming Guide, SC27-8420

18.2 Considerations

The following sections describe various considerations that affect the use of the z/OSMF programming interfaces, particularly on the z/OS platform.

For more information about z/OSMF programming usage, configuration, and requirements, see the following publications:

- *IBM z/OS Management Facility Programming Guide,* SC27-8420
- *IBM z/OS Management Facility Configuration Guide Version 2 Release 3*, SC-27-8419

18.2.1 Security configuration

The z/OSMF APIs require a user ID with the appropriate authority (for example, batch job submission) on the server system and READ access to various security profiles, depending on the component.

Batch job interface

The requesting user ID requires at least READ access to the following security profiles on the z/OSMF system:

- IZUDFLT in class APPL.
- IZUDFLT.izuUsers in class EJBROLE.

IZUDFLT is the default z/OSMF SAF profile prefix.

Some batch job operations also require the user ID to be authorized to the Common Information Model (CIM) server. These batch jobs include canceling a job, changing a job class, and purging output.

Application Linking Services

At least READ access is required to the following security profiles to manage the Application Linking Services and list event handlers:

- IZUDFLT.ZOSMF.ADMINTASKS.APPLINKING in class ZMFAPLA.
- IZUDFLT in class APPL
- IZUDFLT.izuUsers in class EJBROLE.

IZUDFLT is the default z/OSMF SAF profile prefix.

For more information about the authorization configuration, see *IBM z/OS Management Facility Programming Guide,* SC27-8420.

18.2.2 HTTP Secure

Access to the z/OSMF server is accomplished through the HTTPS protocol, which uses Secure Sockets Layer (SSL) and requires security certificates and other components.

Although web browsers support HTTPS, it is important to implement SSL manually in an application. Therefore, the use of external libraries is the preferred approach for application development. One such library is OpenSSL, which is available for various platforms, including z/OS.

For more information about OpenSSL, see the OpenSSL website.

The implementation of OpenSSL on the z/OS platform still requires some work. A simpler method can be used for working with the z/OSMF APIs. The z/OS platform provides access to several ported tools, including the **`curl`** command, which fully supports HTTPS and simplifies the send/receive process.

The **`curl`** command is a UNIX System Services based command that can enable easy access to the BPXWUNIX program, which is called from a z/OS REXX EXEC. The application examples for the z/OS platform use the **`curl`** command and BPXWUNIX program for z/OSMF API access.

18.2.3 curl command

The **`curl`** command is a versatile UNIX System Services based command that can be called from most z/OS supported languages and is also available for many other platforms. It is installed as part of the Supplementary Toolkit component of the Ported Tools z/OS feature and must be activated through the IFAPRDxx PARMLIB member before it can be used.

The **`curl`** command can issue an HTTPS request to the z/OSMF REST interface and return the result for use in an application program. It supports basic authentication, SSL, proxies, and redirection, and uses the familiar **`stdin/stdout/stderr`** methodology of UNIX programs.

You can use the **`curl`** command to make a simple call through the BPXWUNIX program from a z/OS REXX EXEC. The **`curl`** command, along with the BPXWUNIX program, is used in the z/OS REXX EXEC examples.

The **`curl`** command provides many options, several of which are used in the example programs. The following options also are available:

- `-connect-timeout <seconds>`

  Specifies the maximum time in seconds for the connection to the server before the command times out.

- `-max-time <seconds>`

  Specifies the maximum time in seconds for the entire network operation to take.

A **`curl`** call to a z/OSMF server is shown in Example 18-4.

Example 18-4 Calling a z/OSMF server through curl

```
/usr/lpp/ported/bin/curl –k ––user <uid>:<pwd>
https://<host>:<port>/zosmf/restjobs/jobs
```

The **–k** option allows the **`curl`** command to accept “insecure” SSL connections and transfers, such as when a self-signed certificate that is not issued by a CA authority is encountered.

The **`<uid>`** and **`<pwd>`** credentials are the user credentials for the remote z/OSMF server and are used by the **`curl`** command to manage the basic authentication protocol.

The location of the remote z/OSMF server is identified by using **`<host>`** and **`<port>`**. The response for this request is returned by **`stdout`**.

For more information about curl, see the curl man page website.

18.2.4 Response character sets

The z/OSMF server request responds with a set of headers that includes information about the request, including the response code and content type of any included data. The use of **`curl`** on the z/OS platform returns the headers in EBCDIC format; however, the included data might be EBCDIC or ASCII, depending on the content type.

If the Content-Type header that is returned by the **`curl`** command indicates `text/plain`, the data is EBCDIC. If `application/json` is returned, the data is ASCII. If the data is not EBCDIC, the data is piped through the **`iconv`** UNIX System Services command to convert it to EBCDIC for use in z/OS application programs.

The **`iconv`** command is a UNIX System Services command that accepts the data through **`stdin`** and streams the converted data to **`stdout`**. In Example 18-5, the **`iconv`** command is used to convert character sets from ISO8859-1 to IBM-1047.

Example 18-5 iconv command format

```
iconv –f ISO8859-1 –t IBM-1047
```

Output from the **`curl`** command can be piped through **`iconv`** for conversion to EBCDIC, as shown in Example 18-6.

Example 18-6 Piping curl output through iconv

```
/usr/lpp/ported/bin/curl –k –user <uid>:<pwd>
https://<host>:<port>/zosmf/restjobs/jobs | iconv –f ISO8859-1 –t IBM-1047
```

The translated data is available in **`stdout`**.

Conversion to EBCDIC is required only for those examples that are running on the z/OS platform. This conversion generally affects only the z/OS REXX code.

18.2.5 Parsing output

Although data that is returned by the z/OSMF REST interface can be in several formats, it generally takes the form of JSON, which is a name-value pair structure that is arranged in an array or object hierarchy.

Some JSON that is arranged as an array of objects (arrays are designated by square brackets and objects by braces) is shown in Example 18-7. Each object consists of name/value pairing, which contains the information that is generated by the request.

Example 18-7 JSON array

```
[{”jobname”:”TESTJOB1”,”jobid”:”JOB00101”},{“jobname”:”TESTJOB2”,”jobid”:”JOB00102
”}]
```

The use of this data in an application program requires that the data is parsed and made available in native language constructs, such as arrays or objects. JSON is suited for the JavaScript language, where it can be easily converted into a JavaScript object. However, most modern languages offer support for JSON (for example, PHP).

The z/OSMF REST API can also return data in other formats, such as plain text (for example, spooled job output). Generally, the other formats are for display purposes so that a specific parsing method is not required.

The following sections provide information about parsing JSON in the z/OS REXX, PHP, and JavaScript languages.

z/OS REXX

Because z/OS REXX provides no built-in support for parsing JSON data, an alternative method is required.

The following options available:

- **JSON.awk** uses the UNIX System Services **awk** command to parse the JSON string and write the output to **stdout**. For more information, see the JSON.awk website.
- **JSON.sh** is a BASH script that parses the JSON string and writes the output to **stdout**. For more information, see the JSON.sh website.

  Both of these options can be called from REXX through the BPXWUNIX program. The results are used to create REXX stem variables.

Another approach is to create a simple parser in REXX, which is the method that is used in our example code.

PHP

PHP V5.2 and later provides the **json_decode()** function, which uses a JSON formatted string and creates PHP arrays and objects that are defined by the JSON structure.

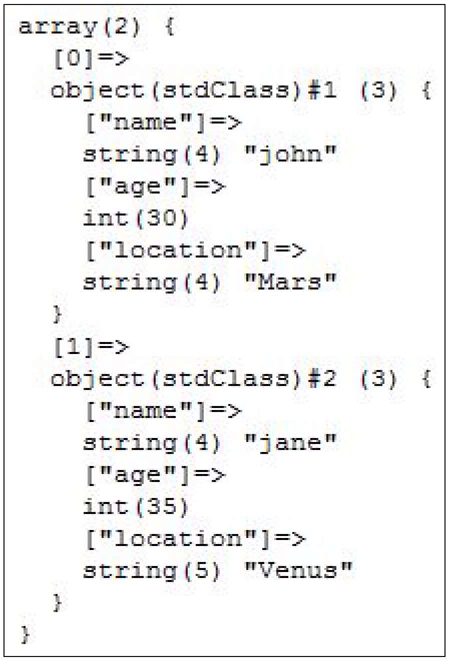
The version of PHP that is provided by the z/OS platform is version 5.1.2; therefore, the **json_decode()** function is not available on that platform.

A PHP script, which parses a JSON formatted string and displays the result, is shown in Example 18-8.

Example 18-8 Parse JSON in PHP

```
<?php
$json='[{"name":"John","age":30,"location":"Mars"},'.
       '{"name":"Jane","age":35,"location":"Venus"}]';
$parsed=json_decode($json);
header('Content-Type: text/plain');
var_dump($parsed);
?>
```

The output appears in the browser, as shown in Figure 18-2.



```
array(2) {
  [0]=>
  object(stdClass)#1 (3) {
    ["name"]=>
    string(4) "john"
    ["age"]=>
    int(30)
    ["location"]=>
    string(4) "Mars"
  }
  [1]=>
  object(stdClass)#2 (3) {
    ["name"]=>
    string(4) "jane"
    ["age"]=>
    int(35)
    ["location"]=>
    string(5) "Venus"
  }
}
```

Figure 18-2 PHP displaying parsed JSON data

After the data is parsed, it is available in native PHP object format.

Arrays in PHP are zero-based. By using the example that is shown in Figure 18-2, the “location” data can be retrieved for the first entry by referencing **`$parsed[0]->location`** in the PHP script. For example, the PHP statement **`echo $parsed[0]->location;`** displays `Mars` in the browser.

JavaScript

JSON can be parsed directly in to JavaScript object format by using the **eval()** function. This method is not recommended because **eval()** evaluates any JavaScript instruction, which can cause problems if the data is compromised. The preferred approach is to use a parsing specific method, such as **JSON.parse()**, which is available in most browsers.

The use of **JSON.parse()** is shown in Example 18-9. In the example, the "location" property of the first element is displayed.

Example 18-9 Use of JSON.parse in JavaScript.

```
var json='[{"name":"John","age":30,"location":"Mars"},'+
         '{"name":"Jane","age":35,"location":"Venus"}]';
var parsed=JSON.parse(json);
alert(parsed[0].location);
```

After the JSON data is parsed, it can be accessed through object properties, as shown by the **alert()** function in Example 18-9. JavaScript also allows the data to be accessed as though it was stored in an associative array. Example 18-10 shows two approaches for accessing the same data from the parsed JSON source.

Example 18-10 Accessing parsed JSON data in JavaScript

```
alert(parsed[0].location);
alert(parsed[0]['location']);
```

18.2.6 JavaScript and Ajax

JavaScript applications can access the Asynchronous JavaScript And XML (Ajax) feature of web browsers to provide a responsive interactive experience for the user. Ajax allows calls to be made to a server directly from JavaScript code. The results are used to update page elements dynamically and asynchronously without reloading the entire page.

Ajax uses the **XMLHttpRequest** browser object to access the remote server and to fire an event when the data returns, which allows JavaScript to continue in a non-blocking fashion and provides a more responsive experience.

The **XMLHttpRequest** object is available with most current browsers. Some older browsers (for example, Internet Explorer V6) use a different object to perform the same function. Methods are available for accommodating all browsers, but the JavaScript examples assume the usage of a modern browser and the **XMLHttpRequest** object.

How an Ajax call can be written in JavaScript is shown in Example 18-11.

Example 18-11 Ajax call that uses JavaScript

```
var xmlhttp=new XMLHttpRequest();
xmlhttp.onreadystatechange=function() {
 if (xmlhttp.readyState==4) {
  alert(xmlhttp.responseText);
 }
}
xmlhttp.open('GET','<url>','true');
xmlhttp.send();
```

The code that is shown in Example 18-11 on page 465 complete the following tasks:

1. Creates an Ajax object.
2. Defines a callback function that is started multiple times throughout the lifetime of the Ajax call.
3. The callback function checks that the call is completed (ready state of 4) and displays the response text.
4. The Ajax request is opened and sent.

Our JavaScript examples use Ajax for calling the z/OSMF APIs.

Ajax cross-domain restrictions

As a security measure, web browsers usually restrict the usage of Ajax to connections to the same domain from which the JavaScript code was loaded. This restriction makes it difficult to access a remote z/OSMF server directly. Although most browsers allow this restriction to be disabled through security options, but this configuration is not recommended.

One solution to this cross-domain issue is to use a proxy that can make the request on behalf of the JavaScript code. A simple proxy can be implemented as a PHP script, which must run on the same host from which the JavaScript was loaded. The PHP script also must be enabled for SSL support and should handle the appropriate z/OSMF API calls.

Our JavaScript Ajax examples use a PHP script as a proxy for making z/OSMF API calls.

18.2.7 BPXWUNIX program

The z/OS REXX example code uses the platform-supplied BPXWUNIX program to run UNIX System Services commands and return the response to the calling REXX.

The use of BPXWUNIX from within a z/OS REXX EXEC is shown in Example 18-12.

Example 18-12 BPXWUNIX from within a REXX EXEC

```
/*rexx*/

stdin.0=0
stdout.0=0
stderr.0=0
stdenv.0=0

cmd=’curl ...’

call bpxwunix cmd,’stdin.’,’stdout.’,’stderr.’,’stdenv.’

if result<>0 then
 say ’BPXWUNIX Result=’result

do i=1 to stdout.0
 say stdout.i
end

do i=1 to stderr.0
 say stderr.i
end

exit 0
```

BPXWUNIX accepts **stdin** through a stem variable and returns **stdout** and **stderr** in stem variables.

BPXWUNIX has a 2048 character length limitation for each compound variable that is returned in the **stdout** stem. This limitation becomes an issue when the response data is JSON because JSON is not record-based; instead, it is one continuous string that is unbroken by line feeds or carriage returns. Lengthy JSON strings cause the BPXWUNIX program to fail with a nonzero return code, and the data is unavailable.

One solution to this situation is to use the platform-supplied **fold** UNIX System Services command.The **fold** command takes a file or **stdin** as input and outputs multiple records of a maximum specified length.

An example in which a UNIX System Services command pipes its output through the **fold** command and returns records no greater than 2000 characters in length is shown in Example 18-13.

Example 18-13 Piping output through the fold command

```
cmd = 'curl ... | fold -b -w 2000'
```

The BPXWUNIX program is used in the z/OS REXX examples to issue requests to a remote z/OSMF server through the **curl** command and returns the results to the calling REXX EXEC. The **fold** command is used to limit the line length of response data.

18.3 Support routines

This section describes support routines that simplify the z/OSMF API access in various programming languages. The routines are procedures or functions that can be copied into an application program.

Routines are provided for z/OS REXX, PHP, and JavaScript.

18.3.1 z/OS REXX

The z/OS REXX support routines are a series of REXX procedures that are in a single member of a partitioned data set. The member can be copied directly into the application REXX EXEC and each procedure can be called as required.

The z/OS REXX support member is called MF$ for the purposes of these examples.

Routines

A listing of the contents of the entire MF$ support member, which includes all of the procedures, is shown in Example 18-14. In-line comments describe the purpose and function of each procedure.

Example 18-14 REXX support routines

```
/*******************************************************************/
/* DESCRIPTION                                                     */
/* -----------                                                     */
/* The following REXX routines simplify the setup, invocation and  */
/* response handling for the z/OSMF API calls. Other supplemental  */
/* support routines are also provided.                             */
/*                                                                 */
/* The 'curl' UNIX command is used to perform http requests to     */
/* the remote z/OSMF server, so it needs to be                     */
/* activated correctly.                                            */
/*                                                                 */
/* USAGE                                                           */
/* -----                                                           */
/* Copy the member containing these REXX procedures to the end of  */
/* the application REXX.                                           */
/*                                                                 */
/* ROUTINES                                                        */
/* --------                                                        */
/* mf_init              - Initialize the environment               */
/* mf_run               - Invoke a UNIX command and parse response */
/* mf_unix              - Invoke a UNIX command                    */
/* mf_parseResponse     - Parse response from z/OSMF request       */
/* mf_jsonParse         - Parse JSON string into REXX stem         */
/* mf_jsonGet           - Retrieve a JSON value from REXX stem     */
/* mf_displayResponse   - Display reponse data                     */
/* mf_queueJsonResponse - Queue JSON response data for display     */
/* mf_stemAdd           - Add lines to a stem                      */
/* mf_copyStem          - Copy stem contents to another stem       */
/* mf_dump              - Display debug data                       */
/* mf_display           - General display routine                  */
/*                                                                 */
/* HISTORY                                                         */
/* -------                                                         */
/* 20130827 01.01 Richard Walton - Initial writing.                */
/*******************************************************************/

mf_init:
/*******************************************************************/
/* Initialize the environment.                                     */
/*                                                                 */
/* curl - Path to UNIX 'curl' command.                             */
/* url  - URL to remote z/OSMF system.                             */
/* uid  - User ID for remote z/OSMF system.                        */
/* pwd  - Password for remote z/OSMF system.                       */
/*                                                                 */
/* stdin.  - Input stem for UNIX commands.                         */
/* stdout. - Output stem for UNIX commands.                        */
/* stderr. - Error output stem for UNIX commands.                  */
/* stdenv. - Environment variable stem for UNIX commands.          */
/*                                                                 */
/* response. - Response stem for z/OSMF request output.            */
/* http.     - http response header stem.                          */
/* json.     - Parse JSON stem.                                    */
/*******************************************************************/
curl='/usr/lpp/ported/bin/curl'
url='https://<host>:<port>/zosmf'
uid='<uid>'
pwd='<pwd>'
stdin.0=0;stdout.0=0;stderr.0=0;stdenv.0=0
response.0=0;http.='';json.0=0
return
```

```
mf_run:
/******************************************************************/
/* Invoke a UNIX command and parse the result.                    */
/*                                                                */
/* Extra options are included on the supplied 'curl' command for  */
/* authentication and header retrieval. The command output is    */
/* piped through the 'fold' command to ensure that stdout lines   */
/* are an acceptable length for the BPXWUNIX facility.           */
/******************************************************************/
call mf_unix arg(1),
     '-k --user' uid':'pwd,
     '-w "\nRC:%{http_code}\nTYPE:%{content_type}"',
     '| fold -b -w 2000'
call mf_parseResponse
return

mf_unix: procedure expose stdin. stdout. stderr. stdenv.
/******************************************************************/
/* Run a UNIX command.                                            */
/*                                                                */
/* The BPXWUNIX facility is used to start the supplied UNIX      */
/* command. Output is returned in the stdout. stem.              */
/*                                                                */
/* A nonzero return code from BPXWUNIX displays debug data and   */
/* terminates the host application.                              */
/******************************************************************/
if \datatype(stdin.0,'w') then stdin.0=0
if \datatype(stdout.0,'w') then stdout.0=0
if \datatype(stderr.0,'w') then stderr.0=0
if \datatype(stdenv.0,'w') then stdenv.0=0
call bpxwunix arg(1),'stdin.','stdout.','stderr.','stdenv.'
rcode=result
if rcode<>0 then
 do
  address mvs 'newstack'
  call mf_dump 'ERROR> BPXWUNIX RC='rcode, ,
               'COMMAND>' arg(1)
  call mf_display
  address mvs 'delstack'
  exit 0
 end
return result

mf_parseResponse: procedure expose http. stdout. response. json.
/******************************************************************/
/* Parse response from http request.                              */
/*                                                                */
/* If the response from the http request has a mime type of      */
/* application/json then the stdout. stem is considered to       */
/* contain a JSON string and is parsed accordingly. If not JSON   */
/* then text/plain is assumed.                                    */
/*                                                                */
/* If the response is JSON then the output is processed by the    */
/* 'iconv' UNIX command prior to parsing in order to convert      */
/* character set from ASCII to EBCDIC.                            */
/*                                                                */
/* response.  - Contains raw output from http request.            */
/* json.      - Contains parsed JSON data.                        */
/* http.?rc   - http response code (e.g. 200, 400, etc.)          */
/* http.?type - http mime type (JSON or TEXT).                    */
/******************************************************************/
response.0=0;json.0=0
http.=''
do i=stdout.0 to stdout.0-1 by -1
 parse var stdout.i name':'val
 t='?'name
 http.t=val
end
t=stdout.0-2
if stdout.t=='' then
 stdout.0=stdout.0-3
else
 stdout.0=stdout.0-2
select
 when http.?type='application/json' then
  do
   http.?type='JSON'
   call mf_copyStem 'stdout.','stdin.'
   stdout.0=0
   call mf_unix 'iconv -f ISO8859-1 -t IBM-1047 | fold -b -w 2000'
   json=''
   do i=1 to stdout.0
    json=json||stdout.i
   end
   p=pos('3D'x,json)  /* Remove converted new line chars due to fold */
   do while p<>0
    json=delstr(json,p,1)
    p=pos('3D'x,json,p)
   end
   call mf_jsonParse json
  end
 otherwise http.?type='TEXT'
end
response.0=stdout.0
do i=1 to stdout.0
 response.i=stdout.i
end
return

mf_jsonParse: procedure expose json.
/******************************************************************/
/* Parse JSON string into REXX stem.                              */
/*                                                                */
/* The JSON string is parsed into the 'json.' stem. The 'json.0'  */
/* variable contains the number of objects returned with each     */
/* element defined as 'json.<count>.<element>'.                   */
/*                                                                */
/* For example, 'json.2.jobname' contains the value for the       */
/* 'jobname' element in the second returned object.               */
/*                                                              */
/* Note that this is an extremely simple JSON parser which only   */
/* processes a single level for each returned object. It is       */
/* sufficient for demonstration purposes but a more robust,       */
/* tokenizing parser should be employed for multi-level parsing   */
/* and to handle escaped characters.                              */
/****************************************************************/
parse arg json
json.='';count=0
lb='AD'x /* Left  square bracket */
rb='BD'X /* Right square bracket */
if abbrev(json,lb) then
 json=substr(json,2,length(json)-2)
array.0=0
do while pos(lb,json)<>0
 parse var json pre(lb)middle(rb)post
 call mf_stemAdd 'array.',middle
 json=pre'<'array.0'>'post
end
do while json<>''
 count=count+1
 parse var json '{'object'}'json
 do while object<>''
  parse var object '"'name'":'val','object
  json.count=json.count name
  select
   when abbrev(val,'<') then
    do
     parse var val '<'i'>'
     val=lb||array.i||rb
    end
   when abbrev(val,'"') then
    parse var val '"'val'"'
   otherwise
  end
  json.count.name=val
 end
end
json.0=count
return

mf_jsonGet: procedure expose json.
/****************************************************************/
/* Retrieve JSON value from REXX stem.                            */
/*                                                              */
/* Simplifies the retrieval of individual values from the parsed  */
/* JSON data.                                                     */
/*                                                              */
/* Args: Node number (optional)                                   */
/*       Element name                                             */
/****************************************************************/
select
 when arg()=0 then
  return ''
 when arg()=1 then
```

```
  do
   name=arg(1)
   node=1
  end
 otherwise
  parse arg node,name
end
return json.node.name

mf_displayResponse: procedure expose http. response. json.
/******************************************************************/
/* Display response data.                                         */
/*                                                                */
/* Display contents of various data stems created from http       */
/* response. Includes specific http headers, raw response output  */
/* and parsed JSON data.                                          */
/******************************************************************/
if \datatype(response.0,'w') then response.0=0
if \datatype(json.0,'w') then json.0=0
address mvs 'newstack'
queue 'HTTP_RC='http.?rc 'HTTP_TYPE='http.?type
queue
select
 when json.0=0 & response.0=0 then
  queue '>>> No Response Data <<<'
 when http.?type='JSON' then
  call mf_queueJsonResponse
 otherwise
  do i=1 to response.0
   queue response.i
  end
end
call mf_display
address mvs 'delstack'
return

mf_queueJsonResponse: procedure expose json.
/******************************************************************/
/* Format parsed JSON data for display.                           */
/******************************************************************/
indent=0
lb='AD'x /* Left  square bracket */
rb='BD'x /* Right square bracket */
if json.0>1 then
 do
  queue lb
  indent=2
 end
do i=1 to json.0
 queue copies(' ',indent)'{'
 maxlen=0
 do j=1 to words(json.i)
  name=word(json.i,j)
  if length(name)>maxlen then maxlen=length(name)
 end
 do j=1 to words(json.i)
  name=word(json.i,j)
  queue copies(' ',indent+2)left(name,maxlen) ':' json.i.name
 end
 queue copies(' ',indent)'}'
end
if json.0>1 then queue rb
return

mf_stemAdd:
/******************************************************************/
/* Add lines to a stem.                                           */
/*                                                                */
/* Adds a line to a named stem. The value in stem.0 is            */
/* incremented by 1.                                              */
/******************************************************************/
if \datatype(value(arg(1)'0'),'w') then
 call value arg(1)'0',0
call value arg(1)'0',value(arg(1)'0')+1
call value arg(1)||value(arg(1)'0'),arg(2)
return

mf_copyStem:
/******************************************************************/
/* Copy a stem.                                                   */
/*                                                                */
/* Copy the conetnts of the stem named in argument 1 to the stem  */
/* named in argument 2.                                           */
/******************************************************************/
call value arg(2)'0',0
if \datatype(value(arg(1)'0'),'w') then
 return
select
 when arg()<3 then __i=1
 when datatype(arg(3),'w') then __i=arg(3)
 otherwise __i=1
end
do __i=__i to value(arg(1)'0')
 call value arg(2)'0',value(arg(2)'0')+1
 call value arg(2)||value(arg(2)'0'),value(arg(1)__i)
end
return

mf_dump: procedure expose http. stdin. stdout. stderr. stdenv.
/******************************************************************/
/* Display debug data.                                            */
/*                                                                */
/* Data from all active stems is displayed at the terminal for   */
/* debug purposes.                                                */
/******************************************************************/
address mvs 'newstack'
do i=1 to arg()
 queue arg(i)
end
if symbol('http.?rc')='VAR' then
```

```
 queue 'HTTP_RC>' http.?rc
if symbol('http.?type')='VAR' then
 queue 'HTTP_TYPE>' http.?type
if datatype(stdenv.0,'w') then
 do i=1 to stdenv.0
  queue 'STDENV>' stdenv.i
 end
if datatype(stdin.0,'w') then
 do i=1 to stdin.0
  queue 'STDIN>' stdin.i
 end
if datatype(stdout.0,'w') then
 do i=1 to stdout.0
  queue 'STDOUT>' stdout.i
 end
if datatype(stderr.0,'w') then
 do i=1 to stderr.0
  queue 'STDERR>' stderr.i
 end
call mf_display
address mvs 'delstack'
return

mf_display: procedure
/******************************************************************/
/* Display data.                                                  */
/*                                                                */
/* Generic routine to display data at the terminal. Data is       */
/* provided on the stack which is then written to a temporary     */
/* sequential data set.                                           */
/******************************************************************/
arg mode
if wordpos(mode,'EDIT VIEW BROWSE')=0 then mode='BROWSE'
ispfok=0
address mvs 'subcom ispexec'
if rc=0 then
 if sysvar('SYSENV')='FORE' then
  ispfok=1
if ispfok then
 do
  call bpxwdyn 'alloc new delete lrecl(8192) recfm(v,b) dsorg(ps)',
               'tracks space(15,15) rtddn(dd)'
  address mvs 'execio' queued() 'diskw' dd '(finis'
  address ispexec
  'control errors return'
  'lminit dataid(id) ddname('dd')'
  mode 'dataid('id')'
  'lmfree dataid('id')'
  address
  call bpxwdyn 'free fi('dd')'
 end
else
 do queued()
  parse pull line
  say line
 end
return
```

The procedures include the following functions:

mf_init Should be called before any z/OSMF API calls are performed. The **curl**, **url**, **uid**, and **pwd** variables in this procedure should be reviewed and set according to the requirements of the remote z/OSMF server.

mf_run Accepts the **curl** command as an argument to run and then parses the response. If multiple piped commands are provided in the argument, the final command should be **curl** because extra options are appended to the **curl** command to manage authentication, response code, and content type retrieval. It also ensures that **stdout** conforms to BPXWUNIX line length restrictions.

mf_parseResponse Parses the response to the **curl** command that is run by the **mf_run** procedure.

The **–w** option is specified on the **curl** command in the **mf_run** procedure to return the HTTP response code and the content type and then add them to the end of **stdout**. The **mf_parseResponse** procedure extracts this information from the end of **stdout** before parsing the remaining **stdout** data based on its content type.

mf_jsonParse A simple, non-generic parser for JSON output that is suited only for the JSON type responses that are returned by the z/OSMF API calls. It is deliberately simple for the purposes of these examples, but should be replaced by a more expansive routine to ensure that all data can be retrieved correctly.

mf_jsonGet Provides a simple method for retrieving individual values from the `json.` stem after JSON response data is parsed. For example, `n=mf_jsonGet(5,”jobname”)` returns the “`jobname`” named value from the fifth object in the JSON array.

Example usage

The basic flow of a call to the z/OSMF remote server that uses the support routines is shown in Example 18-15.

Example 18-15 Example use of the z/OS REXX support routines

```
/************************************rexx**/
/* Return a list of JOBs from the queue. */
/****************************************/
trace o

call mf_init

parms='owner=*&prefix=test*'

call mf_run curl,
     '"'url'/restjobs/jobs?'parms'"'

call mf_displayResponse

exit 0

/* Include Support Routines */
```

The **mf_init** call should be made first to initialize the environment. This call is followed by a call to **mf_run**, which includes the **curl** command that is required. After the **mf_run** procedure completes, the response data is available for use by the application in the following stem variables:

- http.?rc: Contains the HTTP response code (for example, 200).
- http.?type: Contains the response content type ("JSON" or "TEXT").
- response.: Stem that contains each line of response data. Compound variable response.0 contains the number of lines.
- json.: Stem that contains the parsed JSON output. Compound variable json.0 contains the number of objects that are returned.

The REXX support routines should be copied into the application EXEC after the final line.

If the response consists of JSON data, the names and values can be accessed through the json. stem. Each compound variable has the form json.<num>.<name>.

For example, say json.1.jobname displays the job name for the first object at the terminal, assuming that jobname is a literal and not a REXX variable. The **mf_jsonGet()** support routine provides a more robust method for returning values and avoids the situation where <name> might be an in-use REXX variable.

A REXX fragment that loops through all of the values that are returned by an API call and displays various values is shown in Example 18-16 on page 476. The fragment detects the content type of the response data and outputs accordingly. It also uses the **mf_jsonGet()** function to retrieve values if the content is JSON.

Example 18-16 Access response data based on content type

```
if http.?type=”JSON” then
  do i=1 to json.0
    say mf_jsonGet(i,”jobname”) mf_jsonGet(i,”jobid”)
  end
else
  do i=1 to response.0
    say response.i
  end
```

18.3.2 PHP

PHP provides most of the required support, which is built in to the language (for example, retrieving data and JSON decoding). However, some routines are provided to further simplify the process of working with the z/OSMF APIs from PHP.

The code that is shown in Example 18-17 should be copied into a file that is named mf$.php in the HTTP server directory that contains the example PHP code. It can then be dynamically included in to the example PHP code without manual copying.

The contents of the mf$.php file is shown in Example 18-17. Comments within the code explain the function and variables that are created.

Example 18-17 Contents of PHP support routines

```
<?php

//
```

```
// Support routines to manage z/OSMF API
// call/response.
//
// History:
//
// 20130913 01.01 Richard Walton - Initial writing.
//

function mf_init() {
 //
 // Initialize the z/OSMF environment.
 //
 // $uid  - User ID for remote z/OSMF system
 // $pwd  - Password for remote z/OSMF system
 // $host - Address of remote z/OSMF system
 // $port - Port for remote z/OSMF system
 // $url  - URL to remote z/OSMF system
 //
 global $url;
 $uid="<uid>";
 $pwd="<password>";
 $host="<host>";
 $port="<port>";
 $url="https://{$uid}:{$pwd}@{$host}:{$port}/zosmf";
}

function mf_run($call) {
 //
 // Call the z/OSMF API and retrieve response.
 // Parse HTTP headers and JSON data.
 //
 // $http["rc"]   - HTTP response code
 // $http["type"] - HTTP response content type
 // $response[]   - z/OSMF response strings
 // $json[]       - Parsed JSON array
 //
 global $http,$response,$json;
 $http=array("rc"=>"0","type"=>"TEXT");
 $response=array();
 $json=array();
 $r=file_get_contents($call);
 $response=explode("\n",$r);
 $h=explode(" ",$http_response_header[0]);
 $http["rc"]=trim($h[1]);
 foreach($http_response_header as $header) {
  $h=explode(":",$header);
  if(count($h)>1)
   if(trim(strtolower($h[0]))=="content-type") {
    if(trim(strtolower($h[1]))=="application/json")
     $http["type"]="JSON";
    break;
   }
 }
 if($http["type"]=="JSON")
  $json=json_decode($r);
}

function mf_displayResponse() {
 //
 // Output response data based on type.
 //
 global $http,$response,$json;
 if($http["type"]=="JSON")
  print_r($json);
 else
  print_r($response);
}

?>
```

These PHP support routines provide only **GET** type requests. Some API calls require other types of HTTP requests, so the PHP support routines can be enhanced to meet this requirement.

Example usage

How the PHP support routines can be used is shown in Example 18-18.

Example 18-18 Using the PHP support routines

```
<?php

// Include support routines file here

require_once "mf$.php";

// Set up and call the API

mf_init();

$parms="owner=*&prefix=test*";

mf_run("{$url}/restjobs/jobs?{$parms}");

// Display results

header("Content-Type: text/plain");

echo "HTTP_RC={$http['rc']} HTTP_TYPE={$http['type']}\n";
echo "\n";
if(count($json)>1) {
 echo "First Job Name: {$json[0]->jobname}\n";
 echo "First Job ID: {$json[0]->jobid}\n\n";
}
mf_displayResponse();

?>
```

After any JSON data is parsed, the values are available as standard PHP object properties. For example, `$json[0]->jobname` refers to the first returned job name.

18.3.3 JavaScript

The JavaScript examples are run in a web browser and use the Ajax facility to make asynchronous API calls, They also update specific areas on the browser window with the response. JavaScript creates a dynamic and responsive environment for the user.

The API calls are made through a proxy that is written in PHP that is running on the same server from which the JavaScript was loaded. The PHP script contains location and authentication information for the remote z/OSMF server. This approach works around the cross-domain limitations that are enforced by most browsers. If the browser allows cross-domain Ajax calls, the z/OSMF API can be coded directly in the JavaScript code.

The JavaScript support routines are contained in a single file and loaded by a standard HTML file. This file is accessed from the same server and directory as the PHP proxy script.

Proxy PHP script

The PHP proxy script performs only **GET** requests and returns the response headers and body to the calling JavaScript. It accepts arguments, which are included in the API call.

The PHP script can be enhanced to support **POST**, **DELETE**, **PUT**, and other requests.

The PHP script is called `mfproxy.php` for the purposes of these examples and is shown in Example 18-19.

Example 18-19   PHP proxy script that is used by the JavaScript support routines

```
<?php

//
// This script is used as a proxy to retrieve data from
// a remote z/OSMF system and return the response to
// the calling Ajax service running in a browser.
//
// The following variables need to be set:
//
//  $uid  - User ID for remote z/OSMF system
//  $pwd  - Password for remote z/OSMF system
//  $host - Address of remote z/OSMF system
//  $port - Port for remote z/OSMF system
//
// History:
//
// 20130913 01.01 Richard Walton - Initial writing.
//

// Define remote z/OSMF server

$uid="<uid>";
$pwd="<password>";
$host="<host>";
$port="<port>";

// Set up parameters

$parm=$_GET["r"];
```

```
$url="https://{$uid}:{$pwd}@{$host}:{$port}/zosmf/{$parm}";

// Access remote z/OSMF server

$file=fopen($url,"r");

if($file) {

// Return call headers

  foreach($http_response_header as $header)
    header($header);

// Return call results

  while(!feof($file)) {
    $data=fgets($file,4096);
    echo $data;
  }
}

?>
```

This simple proxy script accepts a single parameter that is called **r** that must contain a URL encoded string that is appended to the URL that used to access the z/OSMF server.

The syntax for a call to the `mfproxy.php` proxy script is shown in Example 18-20.

Example 18-20 Syntax for call to PHP proxy

```
https://..../mfproxy.php?r=restjobs%2Fjobs%3Fowner%3D*%26prefix%3Dtest*
```

The use of this syntax results in a call to the z/OSMF server from the proxy script, as shown in Example 18-21.

Example 18-21 Proxy script server call

```
https://<uid>:<pwd>@<host>:<port>/zosmf/restjobs/jobs?owner=*&prefix=test*
```

JavaScript support routines

The JavaScript support routines are stored in a file that is named `mf$.js` in the same HTTP server accessible directory as the `mfproxy.php` file and the HTML that is used to load it.

The support routines consist of a central JavaScript object that is named **`mf_connection()`**, which contains all of the methods and properties to manage calls to the z/OSMF API and to handle the associated responses. The use of an object, such as **`mf_connection()`**, allows multiple asynchronous API calls to be active simultaneously, which can update separate areas of the panel as responses are received.

The basic function of an **`mf_connection()`** instance is to call the API through Ajax, receive a response, parse the response based on the content type (for example, JSON), and then start a callback function to process the API response.

The `mf$.js` support routines are shown in Example 18-22 on page 481. In-line comments document the various aspects of the code.

Example 18-22 JavaScript support routines

```
//
// This file contains support routines for accessing
// the z/OSMF programmable interfaces from JavaScript
// via an AJAX call.
//
// This file should be included in HTML via the
// <script src=""> tag before any other JavaScript.
//
// The support routines consist of an object called
// mf_connection() which contains all of the methods
// and properties required to manage z/OSMF API calls
// and to handle the associated responses.
//
// The following properties are available:
//
//  http["rc"]   - HTTP response code
//  http["type"] - Response content type
//  response[]   - Response array (response lines)
//  json         - Parsed JSON response object
//  loadingMsg   - Waiting message
//
// The following methods are available:
//
//  callAPI(output,request,callback) - Call API and parse response
//
//    output   - Output element on page (DIV)
//    request  - z/OSMF request and parameters
//    callback - Function to call when response parsed
//
//  displayResponse()                - Display response
//
// Example usage:
//
//  <script>
//  var mf=new mf_connection();
//  var request="restjobs/jobs";
//  function myfunc() {
//   mf.displayResponse();
//  }
//  mf.callAPI("mydiv",request,myfunc);
//  </script>
//  <div id="mydiv"></div>
//
// History:
//
// 20130913 01.01 Richard Walton - Initial writing.
//

function mf_connection() {
 //
 // Initialize connection
 //
 this.output=null;
 this.loadingMsg="<h3>Loading, Please Wait ...</h3>";
 this.init=init;
 this.callAPI=callAPI;
 this.displayResponse=displayResponse;

 this.init();

 function init() {
  //
  // Initialize properties
  //
  this.http={"rc":0,"type":"TEXT"};
  this.response=new Array();
  this.json={};
 }

 function callAPI(output,request,callback) {
  //
  // Call z/OSMF API and parse response
  //
  var self=this;
  this.init();
  if(output)
   this.output=document.getElementById(output);
  if(this.output)
   this.output.innerHTML=this.loadingMsg;
  var xmlhttp=new XMLHttpRequest();
  xmlhttp.onreadystatechange=function() {
   if(xmlhttp.readyState==4) {
    self.http["rc"]=xmlhttp.status;
    self.response=xmlhttp.responseText;
    if(xmlhttp.getResponseHeader("Content-Type")=="application/json")
     self.http["type"]="JSON";
    else
     self.http["type"]="TEXT";
    if(self.http["type"]=="JSON")
     self.json=JSON.parse(xmlhttp.responseText);
    else
     self.json={};
    if(callback)
     callback();
   }
  }
  xmlhttp.open("GET","mfproxy.php?r="+encodeURIComponent(request),"true");
  xmlhttp.send();
 }

 function displayResponse() {
  //
  // Display response
  //
  var pre="HTTP_RC="+this.http["rc"]+
          " HTTP_TYPE="+this.http["type"]+"\n\n";
  if(this.output) {
   if(this.http["type"]=="JSON")
```

```
    this.output.innerHTML="<pre>"+pre+
                          JSON.stringify(this.json,undefined,1)+
                          "</pre>";
   else
    this.output.innerHTML="<pre>"+pre+this.response+"</pre>";
  }
 }

}
```

Example usage

An HTML/JavaScript fragment that uses the JavaScript support routines is shown in Example 18-23.

Example 18-23 Use of JavaScript support routines

```
<div id="mydiv"></div>

<script>

var mf=new mf_connection();
var request="restjobs/jobs";

function myfunc() {
 mf.displayResponse();
}

mf.callAPI("mydiv",request,myfunc);

</script>
```

The code that is shown in Example 18-23 uses the following process:

1. A DIV is defined with an ID of “mydiv”. This area is used to display the API response.
2. The script creates a new **`mf_connection()`** object.
3. The API request is defined.
4. A callback function is defined that displays the response data in “mydiv” after the API responds.
5. The API is asynchronously started.

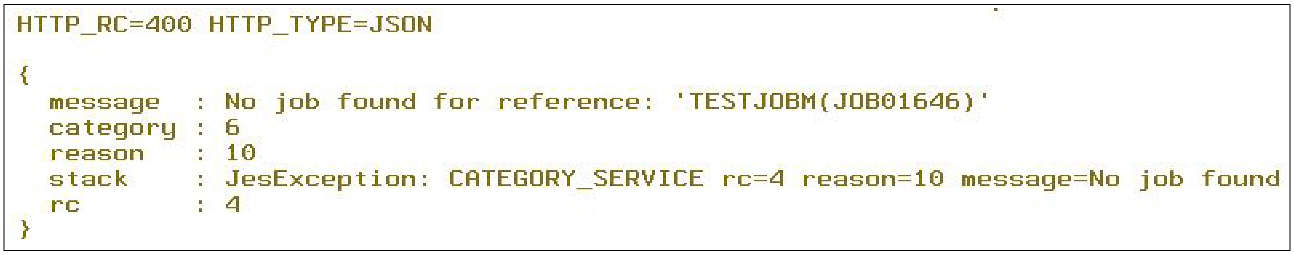
18.4 Example API calls

The example API calls that are described in 18.5, “Jobs interface” on page 484 and 18.6, “Application linking interface” on page 512 use the support routines that are described in 18.3, “Support routines” on page 467. The calls are kept brief to demonstrate an individual API call and show the response that can be expected.

Examples for z/OS REXX and selected PHP and JavaScript calls are shown in this section. These examples include accessing the jobs and the application linking interfaces.

Responses to the API calls might return JSON, plain text, or no data. An HTTP response code is always returned. If the API encounters an error, an invalid response code (such as 400 or 500) and a JSON structure that describes the error is returned.

An example error panel that is displayed by the z/OS REXX support routines for a failing API call is shown in Figure 18-3.

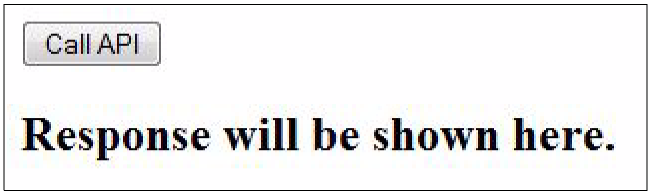


```
HTTP_RC=400 HTTP_TYPE=JSON

{
  message  : No job found for reference: 'TESTJOBM(JOB01646)'
  category : 6
  reason   : 10
  stack    : JesException: CATEGORY_SERVICE rc=4 reason=10 message=No job found
  rc       : 4
}
```

Figure 18-3 API error panel

The actual contents of the JSON structure might vary depending on the call and type of failure.

The JavaScript examples all include button that can be clicked to generate the API call. The area underneath the button is updated to contain the response data. The initial panel that is displayed by the JavaScript examples is shown in Figure 18-4.



Response will be shown here.

Figure 18-4 Initial display for JavaScript examples

18.5 Jobs interface

The following examples demonstrate API calls to the jobs interface.

18.5.1 Retrieving job output

The following example retrieves spooled job output:

- Purpose: Retrieves spooled job output
- Request type: **GET**
- Request parameters: Job name, job ID, and file number
- Request content type: None
- Response code: 200
- Response content type: Plain text

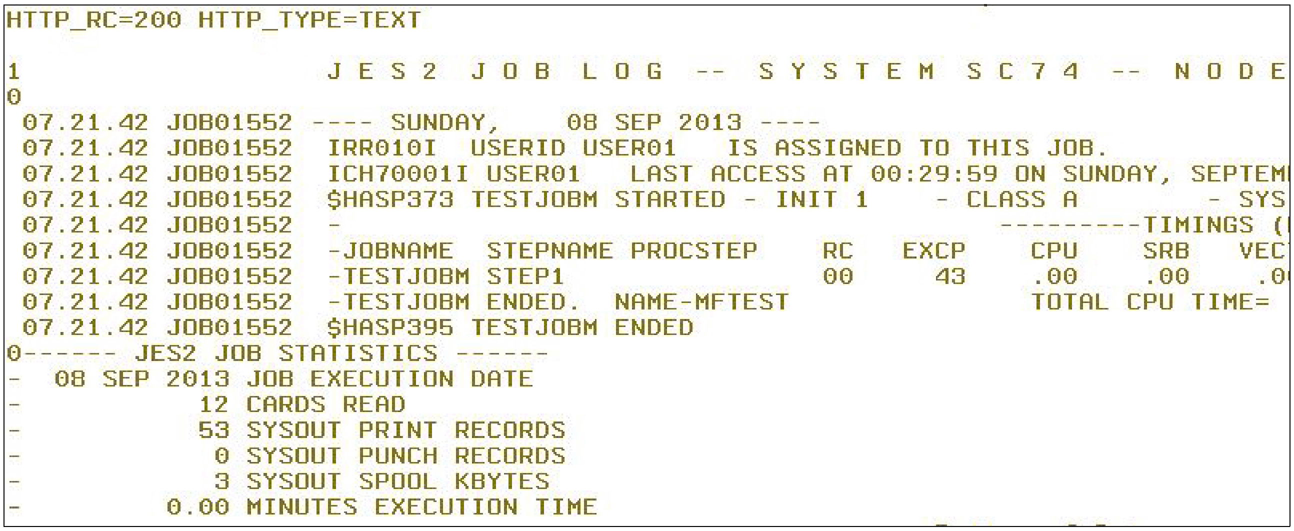
z/OS REXX

The z/OS REXX code that is used to retrieve output from a spooled job file is shown in Example 18-24.

Example 18-24 z/OS REXX code to retrieve output from a spooled job file

```
/************************************rexx**/
/* Retrieve output from spooled JOB file. */
/******************************************/
trace o

jobname='TESTJOBM'
jobid='JOB01552'
jobfile=2

call mf_init

parms='/'jobname'/'jobid'/files/'jobfile'/records'

call mf_run curl,
     '"'url'/restjobs/jobs'parms'"'

call mf_displayResponse

exit 0

/* Include Support Routines */
```

The output from Example 18-24 is shown in Figure 18-5.



```
HTTP_RC=200 HTTP_TYPE=TEXT

1                    J E S 2   J O B   L O G  --  S Y S T E M   S C 7 4  --  N O D E
0
 07.21.42 JOB01552 ---- SUNDAY,    08 SEP 2013 ----
 07.21.42 JOB01552  IRR010I  USERID USER01   IS ASSIGNED TO THIS JOB.
 07.21.42 JOB01552  ICH70001I USER01   LAST ACCESS AT 00:29:59 ON SUNDAY, SEPTEM
 07.21.42 JOB01552  $HASP373 TESTJOBM STARTED - INIT 1    - CLASS A        - SYS
 07.21.42 JOB01552  -                                        ---------TIMINGS (
 07.21.42 JOB01552  -JOBNAME  STEPNAME PROCSTEP    RC   EXCP    CPU    SRB    VEC
 07.21.42 JOB01552  -TESTJOBM STEP1                00     43    .00    .00    .0
 07.21.42 JOB01552  -TESTJOBM ENDED.  NAME-MFTEST              TOTAL CPU TIME=
 07.21.42 JOB01552  $HASP395 TESTJOBM ENDED
0------ JES2 JOB STATISTICS ------
-  08 SEP 2013 JOB EXECUTION DATE
-           12 CARDS READ
-           53 SYSOUT PRINT RECORDS
-            0 SYSOUT PUNCH RECORDS
-            3 SYSOUT SPOOL KBYTES
-         0.00 MINUTES EXECUTION TIME
```

Figure 18-5 Output from retrieve spooled job file - z/OS REXX example

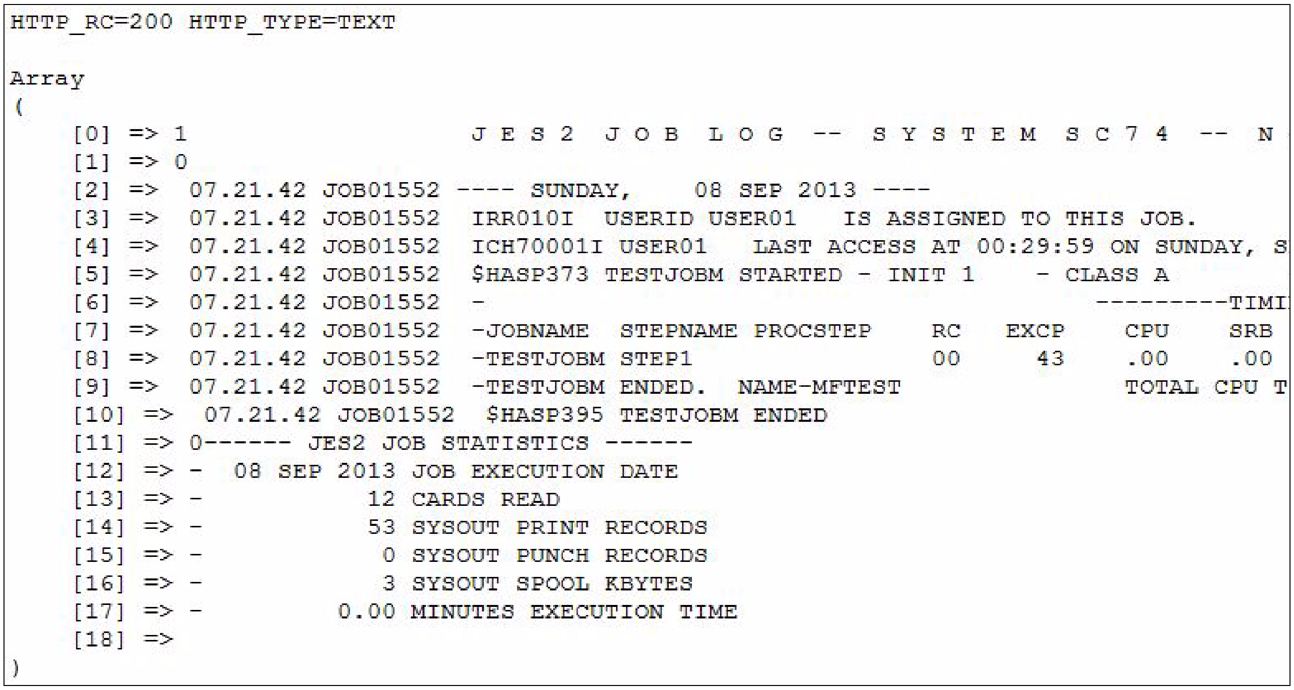
PHP

The code that is used to retrieve output from a spooled job file that uses PHP is shown in Example 18-25.

Example 18-25 PHP code to retrieve output from a spooled job file

```
<?php

//
// Example: Retrieve output from job file.
//

// Include support routines file here

require_once "mf$.php";

// Initialize and call the API

$jobname="TESTJOBM";
$jobid="JOB01552";
$jobfile=2;

mf_init();

$parms="/{$jobname}/{$jobid}/files/{$jobfile}/records";

mf_run("{$url}/restjobs/jobs{$parms}");

// Display results

header("Content-Type: text/plain");
echo "HTTP_RC={$http['rc']} HTTP_TYPE={$http['type']}\n";
echo "\n";
mf_displayResponse();

?>
```

The output from Example 18-25 is shown in Figure 18-6.



```
HTTP_RC=200 HTTP_TYPE=TEXT

Array
(
    [0] => 1                   J E S 2  J O B  L O G  --  S Y S T E M  S C 7 4  --  N
    [1] => 0
    [2] =>  07.21.42 JOB01552 ---- SUNDAY,     08 SEP 2013 ----
    [3] =>  07.21.42 JOB01552  IRR010I  USERID USER01   IS ASSIGNED TO THIS JOB.
    [4] =>  07.21.42 JOB01552  ICH70001I USER01   LAST ACCESS AT 00:29:59 ON SUNDAY, S
    [5] =>  07.21.42 JOB01552  $HASP373 TESTJOBM STARTED - INIT 1    - CLASS A
    [6] =>  07.21.42 JOB01552  -                                         ---------TIMI
    [7] =>  07.21.42 JOB01552  -JOBNAME  STEPNAME PROCSTEP    RC   EXCP    CPU    SRB
    [8] =>  07.21.42 JOB01552  -TESTJOBM STEP1                00     43    .00    .00
    [9] =>  07.21.42 JOB01552  -TESTJOBM ENDED.  NAME-MFTEST               TOTAL CPU T
    [10] =>  07.21.42 JOB01552  $HASP395 TESTJOBM ENDED
    [11] => 0------ JES2 JOB STATISTICS ------
    [12] => -  08 SEP 2013 JOB EXECUTION DATE
    [13] => -           12 CARDS READ
    [14] => -           53 SYSOUT PRINT RECORDS
    [15] => -            0 SYSOUT PUNCH RECORDS
    [16] => -            3 SYSOUT SPOOL KBYTES
    [17] => -         0.00 MINUTES EXECUTION TIME
    [18] =>
)
```

Figure 18-6 Output from retrieved spool job file - PHP example

JavaScript

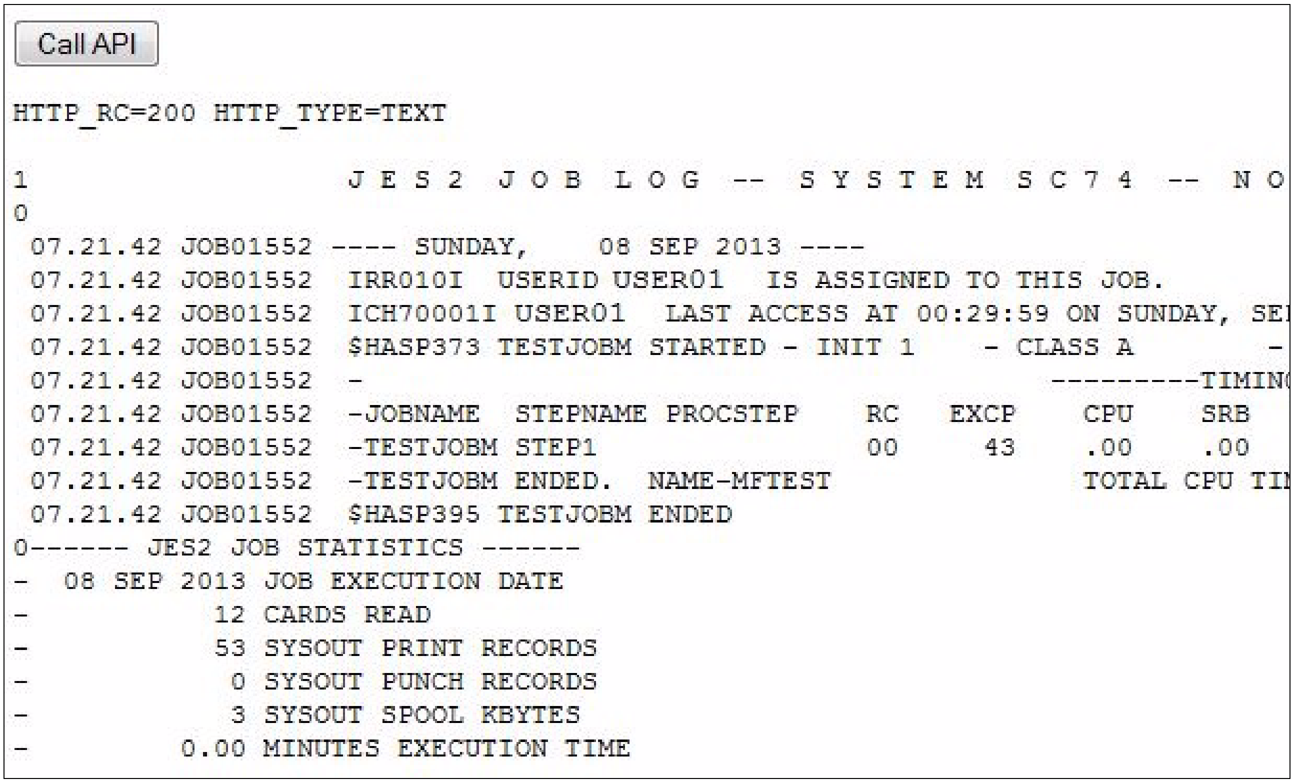
The code that is used for retrieving output from a spooled job file that uses JavaScript is shown in Example 18-26.

Example 18-26 JavaScript code to retrieve output from a spooled job file

```
<!doctype html>
<html>
<head>

<!-- Example: Retrieve output from job file -->

<!-- Include support routines -->

<script type="text/javascript" src="mf$.js"></script>

<!-- Application code -->

<script type="text/javascript">

var jobname="TESTJOBM";
var jobid="JOB01552";
var jobfile=2;

var request="restjobs/jobs/"+jobname+"/"+
                             jobid+"/files/"+
                             jobfile+"/records";

var mf=new mf_connection();
```

```
function complete() {
 mf.displayResponse();
}

</script>

</head>
<body>
<button type="button"
        onclick="mf.callAPI('out',request,complete)">
  Call API
</button>
<div id="out">
<h2>Response will be shown here.</h2>
</div>
</body>
</html>
```

The output from Example 18-26 on page 487 is shown in Figure 18-7.



```
HTTP_RC=200 HTTP_TYPE=TEXT

1                   J E S 2  J O B  L O G  --  S Y S T E M  S C 7 4  --  N O
0
 07.21.42 JOB01552 ---- SUNDAY,    08 SEP 2013 ----
 07.21.42 JOB01552  IRR010I  USERID USER01   IS ASSIGNED TO THIS JOB.
 07.21.42 JOB01552  ICH70001I USER01   LAST ACCESS AT 00:29:59 ON SUNDAY, SE
 07.21.42 JOB01552  $HASP373 TESTJOBM STARTED - INIT 1    - CLASS A        -
 07.21.42 JOB01552  -                                         ---------TIMIN(
 07.21.42 JOB01552  -JOBNAME  STEPNAME PROCSTEP    RC   EXCP    CPU    SRB
 07.21.42 JOB01552  -TESTJOBM STEP1                00     43    .00    .00
 07.21.42 JOB01552  -TESTJOBM ENDED.  NAME-MFTEST                TOTAL CPU TI
 07.21.42 JOB01552  $HASP395 TESTJOBM ENDED
0------ JES2 JOB STATISTICS ------
-  08 SEP 2013 JOB EXECUTION DATE
-          12 CARDS READ
-          53 SYSOUT PRINT RECORDS
-           0 SYSOUT PUNCH RECORDS
-           3 SYSOUT SPOOL KBYTES
-        0.00 MINUTES EXECUTION TIME
```

Figure 18-7 Output from retrieved spooled job file - JavaScript example

18.5.2 Retrieving JCL

The following example retrieves a job’s JCL:

- Purpose: Retrieves job JCL
- Request type: **GET**
- Request parameters: Job name and job ID
- Request content type: None

- Response code: 200
- Response content type: Plain text

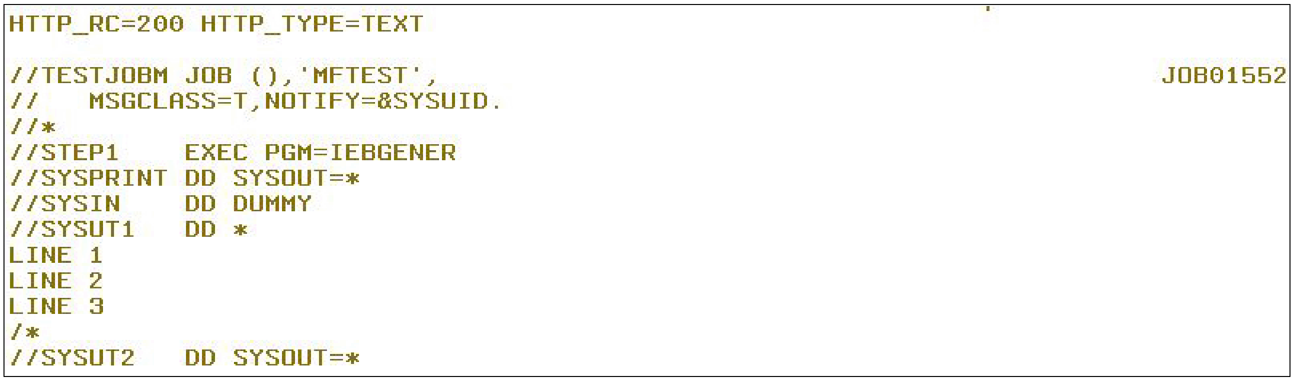
z/OS REXX

The z/OS REXX code that is used to retrieve a job's JCL is shown in Example 18-27.

Example 18-27 z/OS REXX code that is used to retrieve a job's JCL

```
/***********************************rexx**/
/* Retrieve JCL from spooled JOB output. */
/*****************************************/
trace o

jobname='TESTJOBM'
jobid='JOB01552'

call mf_init

parms='/'jobname'/'jobid'/files/JCL/records'

call mf_run curl,
     '"'url'/restjobs/jobs'parms'"'

call mf_displayResponse

exit 0

/* Include Support Routines */
```

The output from Example 18-27 on page 489 is shown in Figure 18-8.



```
HTTP_RC=200 HTTP_TYPE=TEXT

//TESTJOBM JOB (),'MFTEST',                                               JOB01552
//    MSGCLASS=T,NOTIFY=&SYSUID.
//*
//STEP1     EXEC PGM=IEBGENER
//SYSPRINT  DD SYSOUT=*
//SYSIN     DD DUMMY
//SYSUT1    DD *
LINE 1
LINE 2
LINE 3
/*
//SYSUT2    DD SYSOUT=*
```

Figure 18-8 Output from retrieve job - JCL z/OS REXX example

PHP

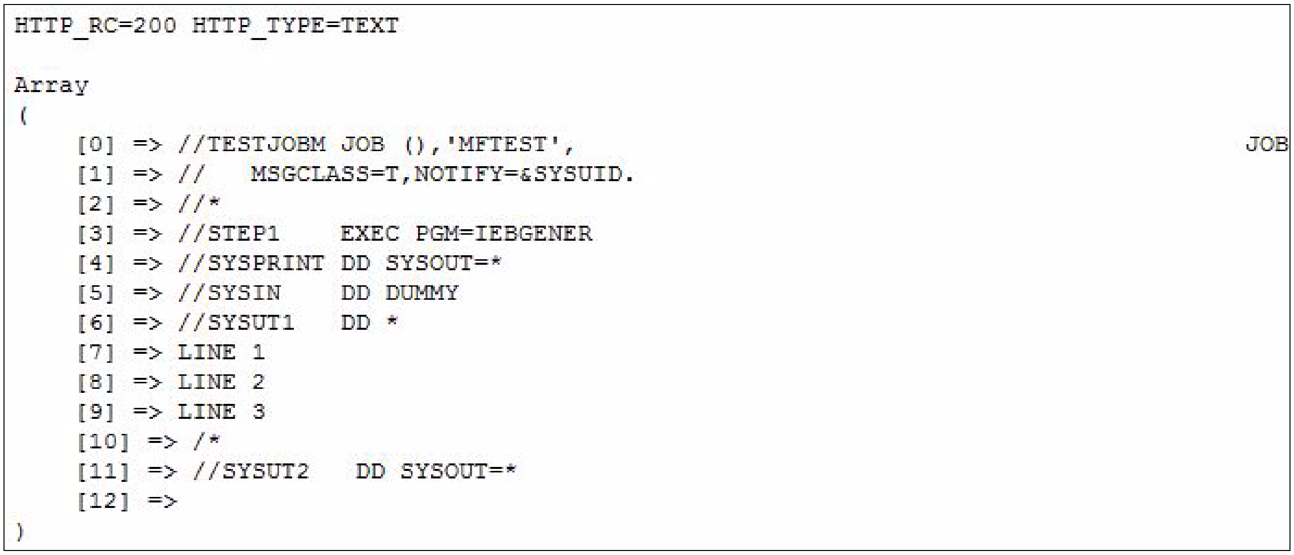
The PHP code that is used to retrieve a job's JCL is shown in Example 18-28.

Example 18-28 PHP code that is used to retrieve a job's JCL

```
<?php

//
// Example: Retrieve job JCL.
//
```

```
// Include support routines file here

require_once "mf$.php";

// Initialize and call the API

$jobname="TESTJOBM";
$jobid="JOB01552";

mf_init();

$parms="/{$jobname}/{$jobid}/files/JCL/records";

mf_run("{$url}/restjobs/jobs{$parms}");

// Display results

header("Content-Type: text/plain");
echo "HTTP_RC={$http['rc']} HTTP_TYPE={$http['type']}\n";
echo "\n";
mf_displayResponse();

?>
```

The output from Example 18-28 on page 489 is shown in Figure 18-9.



```
HTTP_RC=200 HTTP_TYPE=TEXT

Array
(
    [0] => //TESTJOBM JOB (),'MFTEST',                                            JOB
    [1] => //   MSGCLASS=T,NOTIFY=&SYSUID.
    [2] => //*
    [3] => //STEP1    EXEC PGM=IEBGENER
    [4] => //SYSPRINT DD SYSOUT=*
    [5] => //SYSIN    DD DUMMY
    [6] => //SYSUT1   DD *
    [7] => LINE 1
    [8] => LINE 2
    [9] => LINE 3
    [10] => /*
    [11] => //SYSUT2   DD SYSOUT=*
    [12] =>
)
```

Figure 18-9   Output from retrieve job JCL - PHP example

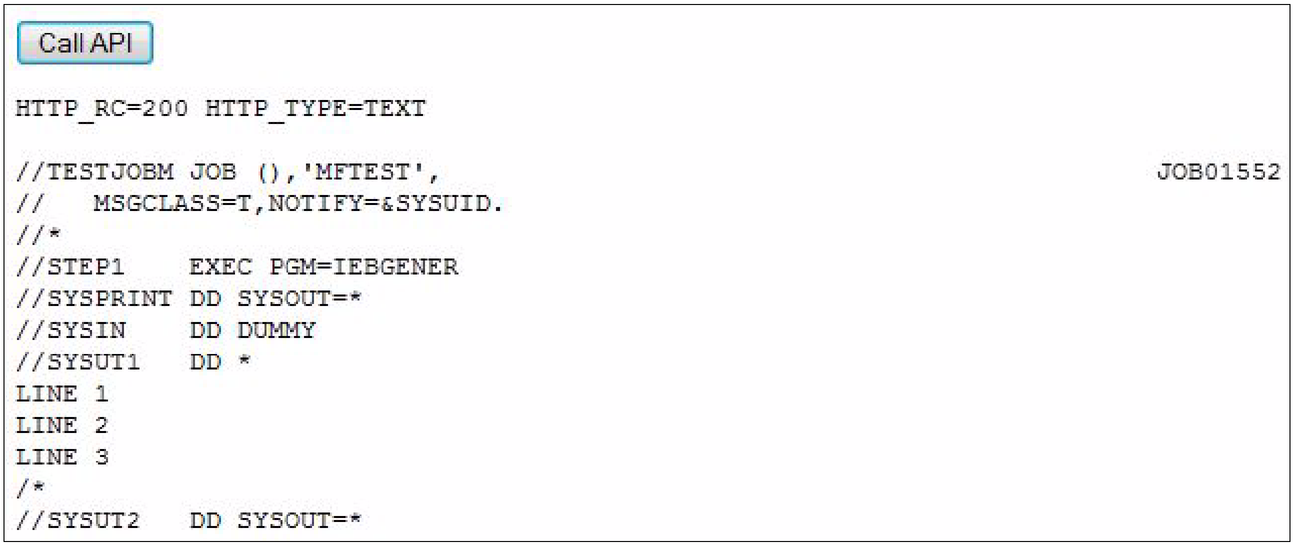
JavaScript

The JavaScript code that retrieves a job's JCL is shown in Example 18-29.

Example 18-29 JavaScript code that is used to retrieve a job's JCL

```
<!doctype html>
<html>
<head>

<!-- Example: Retrieve job JCL -->

<!-- Include support routines -->

<script type="text/javascript" src="mf$.js"></script>

<!-- Application code -->

<script type="text/javascript">

var jobname="TESTJOBM";
var jobid="JOB01552";

var request="restjobs/jobs/"+jobname+"/"+
                             jobid+
                             "/files/JCL/records";

var mf=new mf_connection();

function complete() {
 mf.displayResponse();
}

</script>

</head>
<body>
<button type="button"
        onclick="mf.callAPI('out',request,complete)">
  Call API
</button>
<div id="out">
<h2>Response will be shown here.</h2>
</div>
</body>
</html>
```

The output from Example 18-29 on page 491 is shown in Figure 18-10.



```
HTTP_RC=200 HTTP_TYPE=TEXT

//TESTJOBM JOB (),'MFTEST',                                          JOB01552
//   MSGCLASS=T,NOTIFY=&SYSUID.
//*
//STEP1    EXEC PGM=IEBGENER
//SYSPRINT DD SYSOUT=*
//SYSIN    DD DUMMY
//SYSUT1   DD *
LINE 1
LINE 2
LINE 3
/*
//SYSUT2   DD SYSOUT=*
```

Figure 18-10 Output from retrieve job JCL - JavaScript example

18.5.3 Listing job files

The following example retrieves a list of spooled files for a specified job:

- Purpose: Retrieves a list of spooled files for a specified job
- Request type: **GET**
- Request parameters: Job name and job ID
- Request content type: None
- Response code: 200
- Response content type: JSON

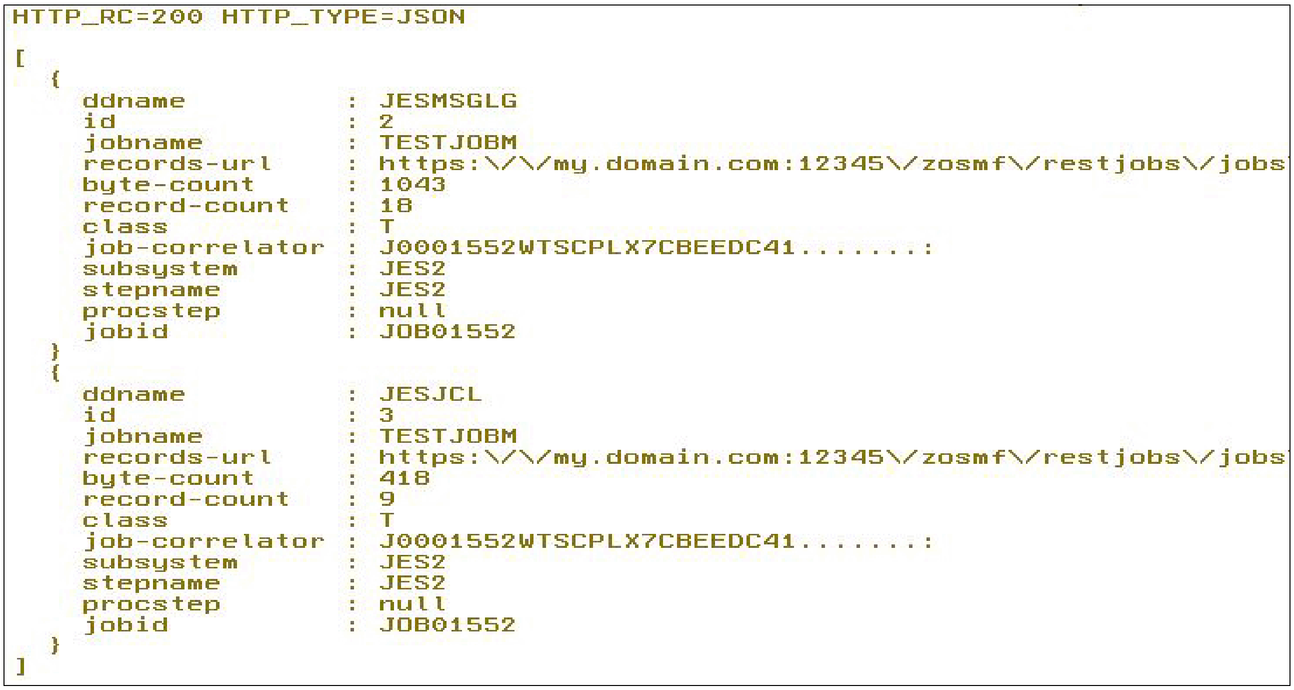
z/OS REXX

The z/OS REXX code that is used to list spooled files for a specified job is shown in Example 18-30.

Example 18-30 z/OS REXX code that is used to list spooled files for a specified job

```
/***************************rexx**/
/* List spooled files for a JOB. */
/*********************************/
trace o
jobname='TESTJOBM'
jobid='JOB01552'

call mf_init

parms='/'jobname'/'jobid'/files'

call mf_run curl,
     '"'url'/restjobs/jobs'parms'"'
call mf_displayResponse
exit 0
/* Include Support Routines */
```

The output from Example 18-30 is shown in Figure 18-11.



```
HTTP_RC=200 HTTP_TYPE=JSON

[
  {
    ddname          : JESMSGLG
    id              : 2
    jobname         : TESTJOBM
    records-url     : https:\/\/my.domain.com:12345\/zosmf\/restjobs\/jobs
    byte-count      : 1043
    record-count    : 18
    class           : T
    job-correlator  : J0001552WTSCPLX7CBEEDC41.......:
    subsystem       : JES2
    stepname        : JES2
    procstep        : null
    jobid           : JOB01552
  }
  {
    ddname          : JESJCL
    id              : 3
    jobname         : TESTJOBM
    records-url     : https:\/\/my.domain.com:12345\/zosmf\/restjobs\/jobs
    byte-count      : 418
    record-count    : 9
    class           : T
    job-correlator  : J0001552WTSCPLX7CBEEDC41.......:
    subsystem       : JES2
    stepname        : JES2
    procstep        : null
    jobid           : JOB01552
  }
]
```

Figure 18-11 Output from list job files - z/OS REXX example

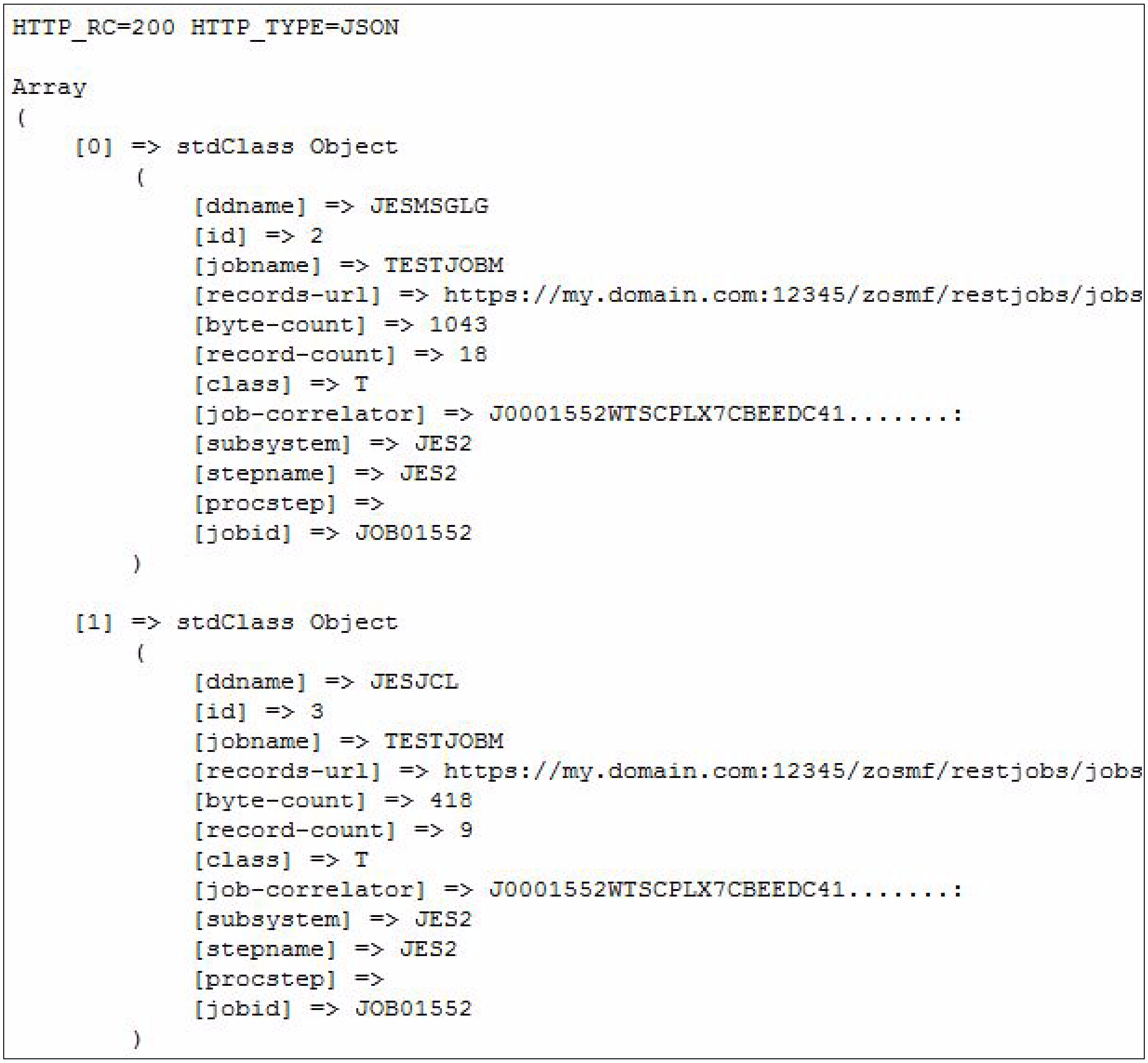
PHP

The PHP code that is used to list spooled files for a specified job is shown in Example 18-31.

Example 18-31 PHP code that is used to list spooled files for a specified job

```
<?php
// Example: List spooled files for a job.
// Include support routines file here

require_once "mf$.php";

// Initialize and call the API

$jobname="TESTJOBM";
$jobid="JOB01552";

mf_init();

$parms="/{$jobname}/{$jobid}/files";

mf_run("{$url}/restjobs/jobs{$parms}");

// Display results

header("Content-Type: text/plain");
echo "HTTP_RC={$http['rc']} HTTP_TYPE={$http['type']}\n";
echo "\n";
mf_displayResponse();
?>
```

The output from Example 18-31 on page 494 is shown in Figure 18-12.



```
HTTP_RC=200 HTTP_TYPE=JSON

Array
(
    [0] => stdClass Object
        (
            [ddname] => JESMSGLG
            [id] => 2
            [jobname] => TESTJOBM
            [records-url] => https://my.domain.com:12345/zosmf/restjobs/jobs
            [byte-count] => 1043
            [record-count] => 18
            [class] => T
            [job-correlator] => J0001552WTSCPLX7CBEEDC41.......:
            [subsystem] => JES2
            [stepname] => JES2
            [procstep] =>
            [jobid] => JOB01552
        )

    [1] => stdClass Object
        (
            [ddname] => JESJCL
            [id] => 3
            [jobname] => TESTJOBM
            [records-url] => https://my.domain.com:12345/zosmf/restjobs/jobs
            [byte-count] => 418
            [record-count] => 9
            [class] => T
            [job-correlator] => J0001552WTSCPLX7CBEEDC41.......:
            [subsystem] => JES2
            [stepname] => JES2
            [procstep] =>
            [jobid] => JOB01552
        )
```

Figure 18-12   Output from list job files - PHP example

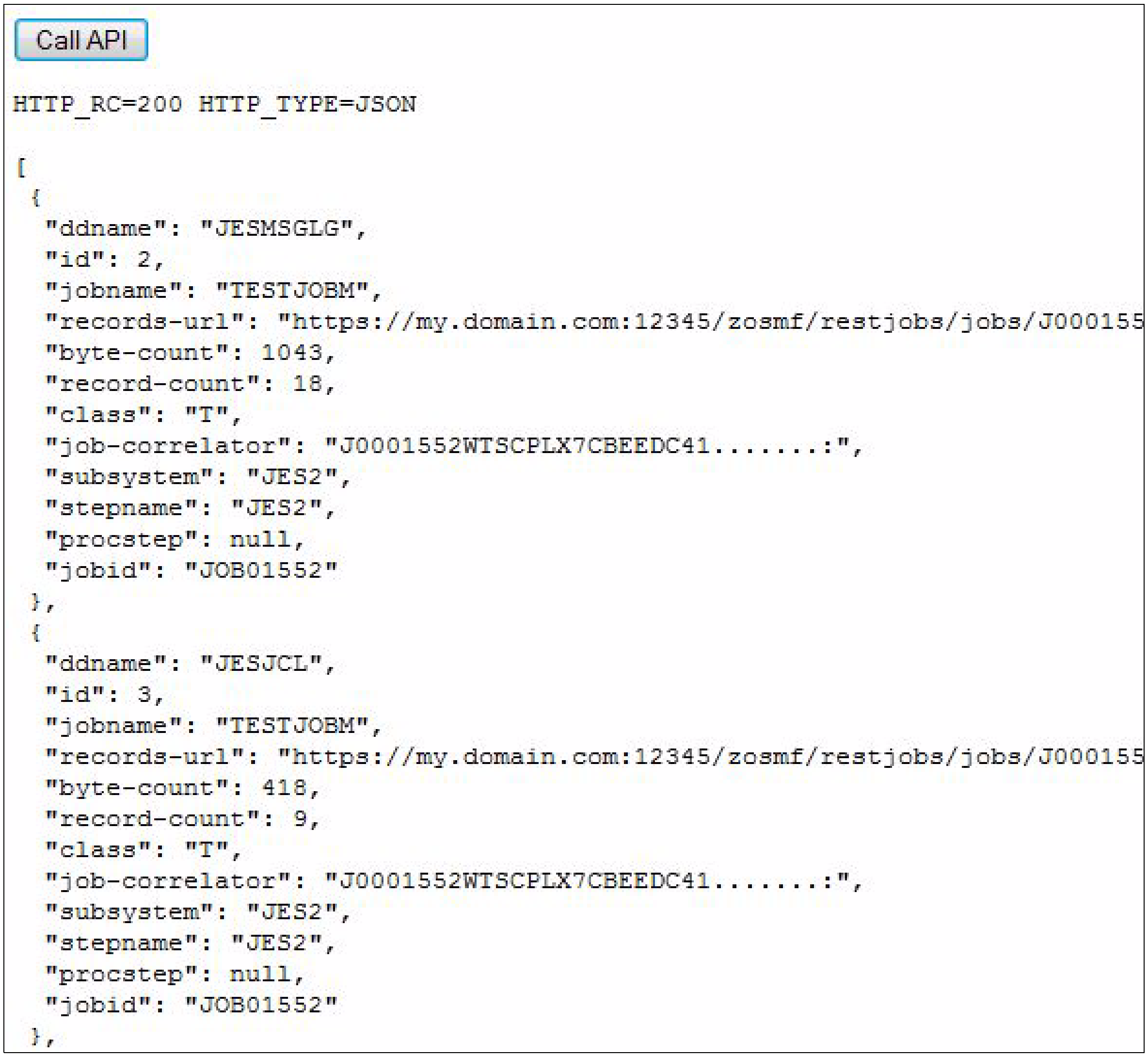
JavaScript

The JavaScript code that is used to list spooled files for a job is shown in Example 18-32.

Example 18-32 JavaScript code that is used to list spooled files for a job

```
<!doctype html>
<html>
<head>

<!-- Example: List spooled files for a job -->

<!-- Include support routines -->

<script type="text/javascript" src="mf$.js"></script>

<!-- Application code -->

<script type="text/javascript">

var jobname="TESTJOBM";
var jobid="JOB01552";

var request="restjobs/jobs/"+jobname+"/"+
                             jobid+"/files";

var mf=new mf_connection();

function complete() {
 mf.displayResponse();
}

</script>

</head>
<body>
<button type="button"
        onclick="mf.callAPI('out',request,complete)">
  Call API
</button>
<div id="out">
<h2>Response will be shown here.</h2>
</div>
</body>
</html>
```

The output from Example 18-32 on page 496 is shown in Figure 18-13.



```
HTTP_RC=200 HTTP_TYPE=JSON

[
 {
  "ddname": "JESMSGLG",
  "id": 2,
  "jobname": "TESTJOBM",
  "records-url": "https://my.domain.com:12345/zosmf/restjobs/jobs/J000155
  "byte-count": 1043,
  "record-count": 18,
  "class": "T",
  "job-correlator": "J0001552WTSCPLX7CBEEDC41.......:",
  "subsystem": "JES2",
  "stepname": "JES2",
  "procstep": null,
  "jobid": "JOB01552"
 },
 {
  "ddname": "JESJCL",
  "id": 3,
  "jobname": "TESTJOBM",
  "records-url": "https://my.domain.com:12345/zosmf/restjobs/jobs/J000155
  "byte-count": 418,
  "record-count": 9,
  "class": "T",
  "job-correlator": "J0001552WTSCPLX7CBEEDC41.......:",
  "subsystem": "JES2",
  "stepname": "JES2",
  "procstep": null,
  "jobid": "JOB01552"
 },
```

Figure 18-13 Output from list job files - JavaScript example

18.5.4 Retrieving job status

The following example retrieves the status of a specified job:

- Purpose: Retrieves the status of the specified job
- Request type: `GET`
- Request parameters: Job name and job ID
- Request content type: None
- Response code: 200
- Response content type: JSON

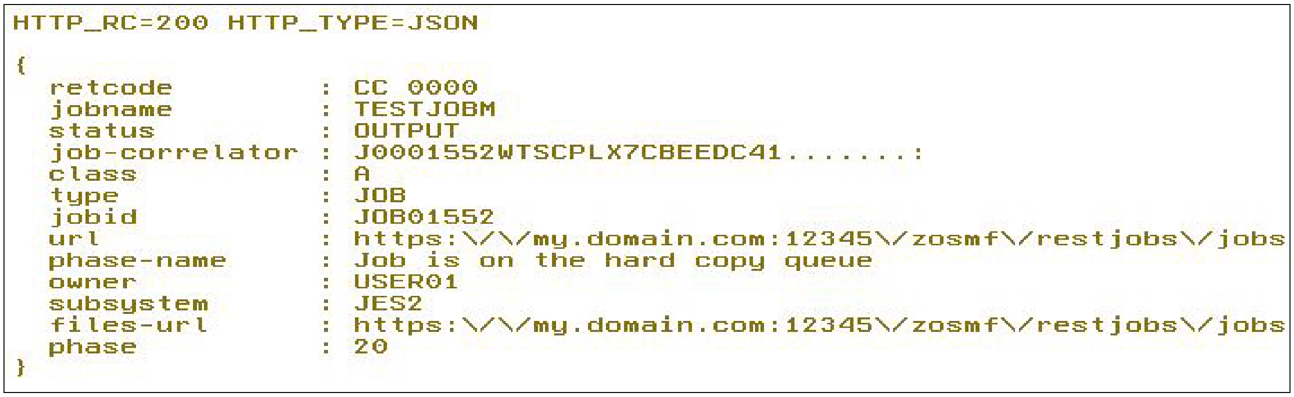
z/OS REXX

The z/OS REXX code that is used to retrieve the status of a specified job is shown in Example 18-33.

Example 18-33 z/OS REXX code that is used to retrieve the status of a specified job

```
/************rexx***/
/* Get JOB status. */
/*******************/
trace o

jobname='TESTJOBM'
jobid='JOB01552'

call mf_init

parms='/'jobname'/'jobid

call mf_run curl,
     '"'url'/restjobs/jobs'parms'"'

call mf_displayResponse

exit 0

/* Include Support Routines */
```

The output from Example 18-33 is shown in Figure 18-14.



```
HTTP_RC=200 HTTP_TYPE=JSON

{
   retcode          : CC 0000
   jobname          : TESTJOBM
   status           : OUTPUT
   job-correlator   : J0001552WTSCPLX7CBEEDC41.......:
   class            : A
   type             : JOB
   jobid            : JOB01552
   url              : https:\/\/my.domain.com:12345\/zosmf\/restjobs\/jobs
   phase-name       : Job is on the hard copy queue
   owner            : USER01
   subsystem        : JES2
   files-url        : https:\/\/my.domain.com:12345\/zosmf\/restjobs\/jobs
   phase            : 20
}
```

Figure 18-14 Output from retrieve job status - z/OS REXX example

PHP

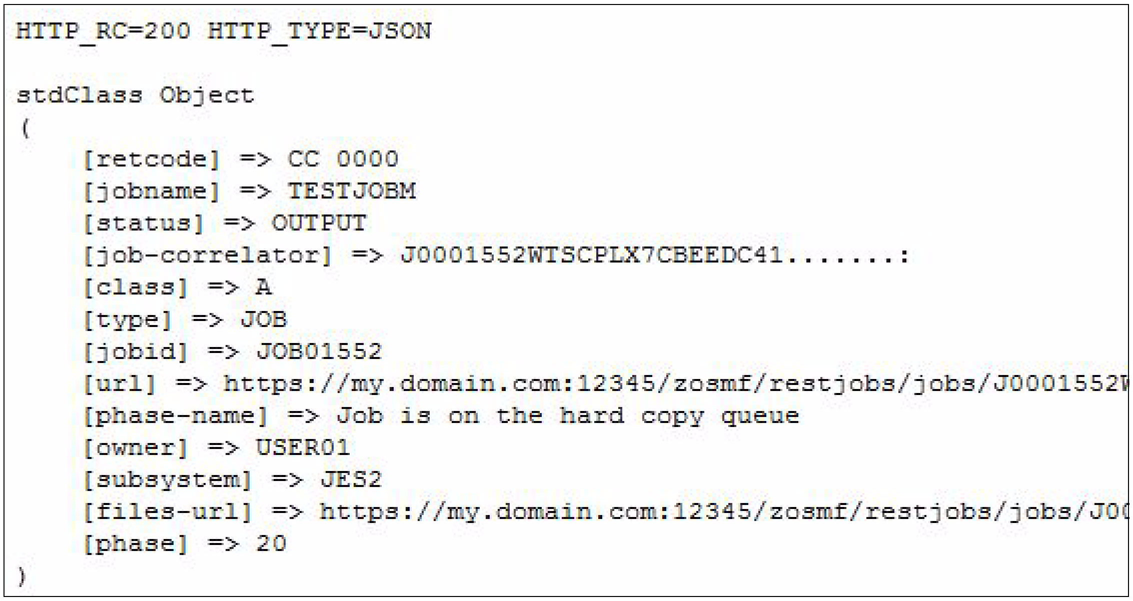
The PHP code that is used to retrieve that status of a specified job is shown in Example 18-34.

Example 18-34 PHP code that is used to retrieve job status

```
<?php

//
// Example: Retrieve job status.
//
```

```
// Include support routines file here

require_once "mf$.php";

// Initialize and call the API

$jobname="TESTJOBM";
$jobid="JOB01552";

mf_init();

$parms="/{$jobname}/{$jobid}";

mf_run("{$url}/restjobs/jobs{$parms}");

// Display results

header("Content-Type: text/plain");
echo "HTTP_RC={$http['rc']} HTTP_TYPE={$http['type']}\n";
echo "\n";
mf_displayResponse();

?>
```

The output from Example 18-34 on page 498 is shown in Figure 18-15.



```
HTTP_RC=200 HTTP_TYPE=JSON

stdClass Object
(
    [retcode] => CC 0000
    [jobname] => TESTJOBM
    [status] => OUTPUT
    [job-correlator] => J0001552WTSCPLX7CBEEDC41.......:
    [class] => A
    [type] => JOB
    [jobid] => JOB01552
    [url] => https://my.domain.com:12345/zosmf/restjobs/jobs/J0001552W
    [phase-name] => Job is on the hard copy queue
    [owner] => USER01
    [subsystem] => JES2
    [files-url] => https://my.domain.com:12345/zosmf/restjobs/jobs/J00
    [phase] => 20
)
```

Figure 18-15 Output from retrieve job status - PHP example

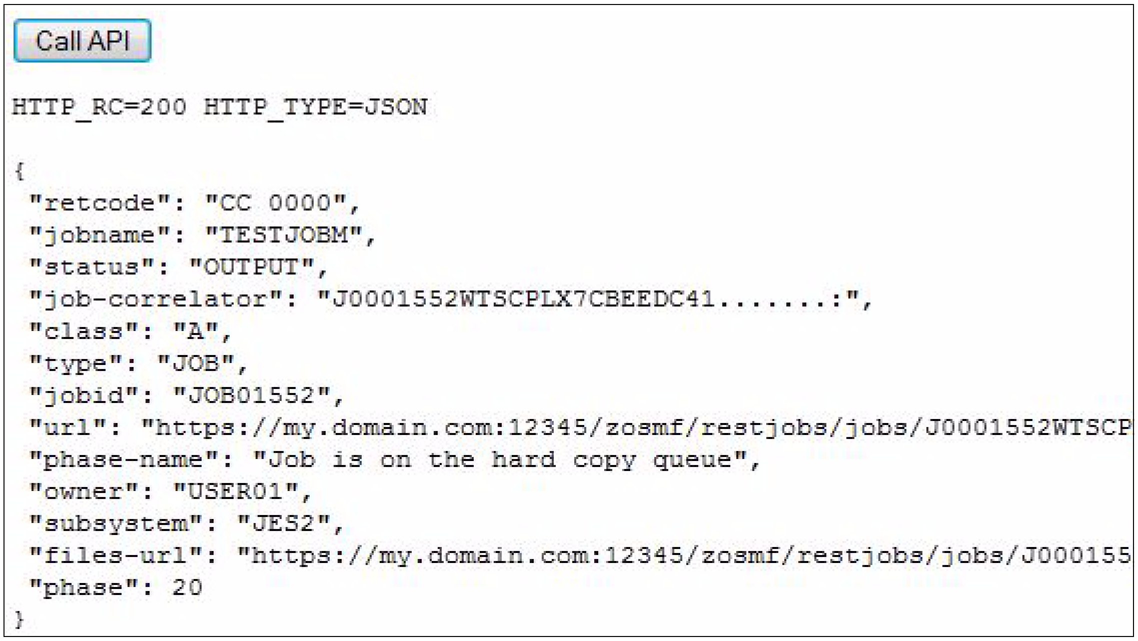
JavaScript

The JavaScript code that is used to retrieve a specified job's status is shown in Example 18-35.

Example 18-35 JavaScript code that is used to retrieve a job's status

```
<!doctype html>
<html>
<head>

<!-- Example: Retrieve job status -->

<!-- Include support routines -->

<script type="text/javascript" src="mf$.js"></script>

<!-- Application code -->

<script type="text/javascript">

var jobname="TESTJOBM";
var jobid="JOB01552";

var request="restjobs/jobs/"+jobname+"/"+jobid;

var mf=new mf_connection();

function complete() {
 mf.displayResponse();
}

</script>

</head>
<body>
<button type="button"
        onclick="mf.callAPI('out',request,complete)">
  Call API
</button>
<div id="out">
<h2>Response will be shown here.</h2>
</div>
</body>
</html>
```

The output from Example 18-35 on page 500 is shown in Figure 18-16.



```
HTTP_RC=200 HTTP_TYPE=JSON

{
 "retcode": "CC 0000",
 "jobname": "TESTJOBM",
 "status": "OUTPUT",
 "job-correlator": "J0001552WTSCPLX7CBEEDC41.......:",
 "class": "A",
 "type": "JOB",
 "jobid": "JOB01552",
 "url": "https://my.domain.com:12345/zosmf/restjobs/jobs/J0001552WTSCP
 "phase-name": "Job is on the hard copy queue",
 "owner": "USER01",
 "subsystem": "JES2",
 "files-url": "https://my.domain.com:12345/zosmf/restjobs/jobs/J000155
 "phase": 20
}
```

Figure 18-16   Output from retrieve job status - JavaScript example

18.5.5 Listing queued jobs

The following example retrieves a list of spooled jobs for a specified user:

- Purpose: Retrieves a list of spooled jobs
- Request type: **GET**
- Request parameters: Filters, such as job name, job ID, and owner
- Request content type: None
- Response code: 200
- Response content type: JSON

z/OS REXX

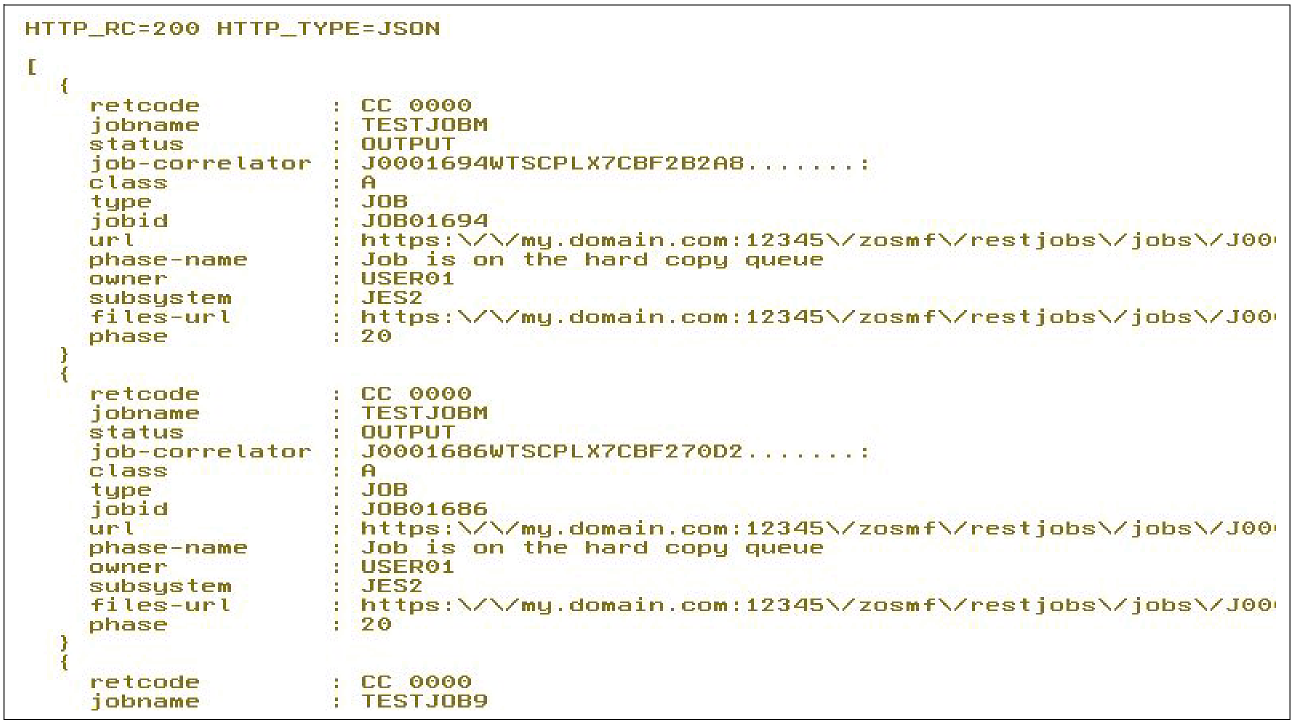
The z/OS REXX code that is used to list queued jobs for a specified user ID is shown in Example 18-36.

Example 18-36   z/OS REXX code that is used to list queued jobs

```
/**********************************rexx**/
/* Return a list of JOBs from the queue. */
/*****************************************/
trace o

call mf_init

parms='owner=*'
parms='owner=ibmuser'
parms='owner=*&prefix=test*'

call mf_run curl,
     '"'url'/restjobs/jobs?'parms'"'
```

```
call mf_displayResponse

exit 0

/* Include Support Routines */
```

The output from Example 18-36 on page 501 is shown in Figure 18-17.



```
HTTP_RC=200 HTTP_TYPE=JSON

[
    {
        retcode          : CC 0000
        jobname          : TESTJOBM
        status           : OUTPUT
        job-correlator   : J0001694WTSCPLX7CBF2B2A8.......:
        class            : A
        type             : JOB
        jobid            : JOB01694
        url              : https:\/\/my.domain.com:12345\/zosmf\/restjobs\/jobs\/J00
        phase-name       : Job is on the hard copy queue
        owner            : USER01
        subsystem        : JES2
        files-url        : https:\/\/my.domain.com:12345\/zosmf\/restjobs\/jobs\/J00
        phase            : 20
    }
    {
        retcode          : CC 0000
        jobname          : TESTJOBM
        status           : OUTPUT
        job-correlator   : J0001686WTSCPLX7CBF270D2.......:
        class            : A
        type             : JOB
        jobid            : JOB01686
        url              : https:\/\/my.domain.com:12345\/zosmf\/restjobs\/jobs\/J00
        phase-name       : Job is on the hard copy queue
        owner            : USER01
        subsystem        : JES2
        files-url        : https:\/\/my.domain.com:12345\/zosmf\/restjobs\/jobs\/J00
        phase            : 20
    }
    {
        retcode          : CC 0000
        jobname          : TESTJOB9
```

Figure 18-17 Output from list jobs - z/OS REXX example

PHP

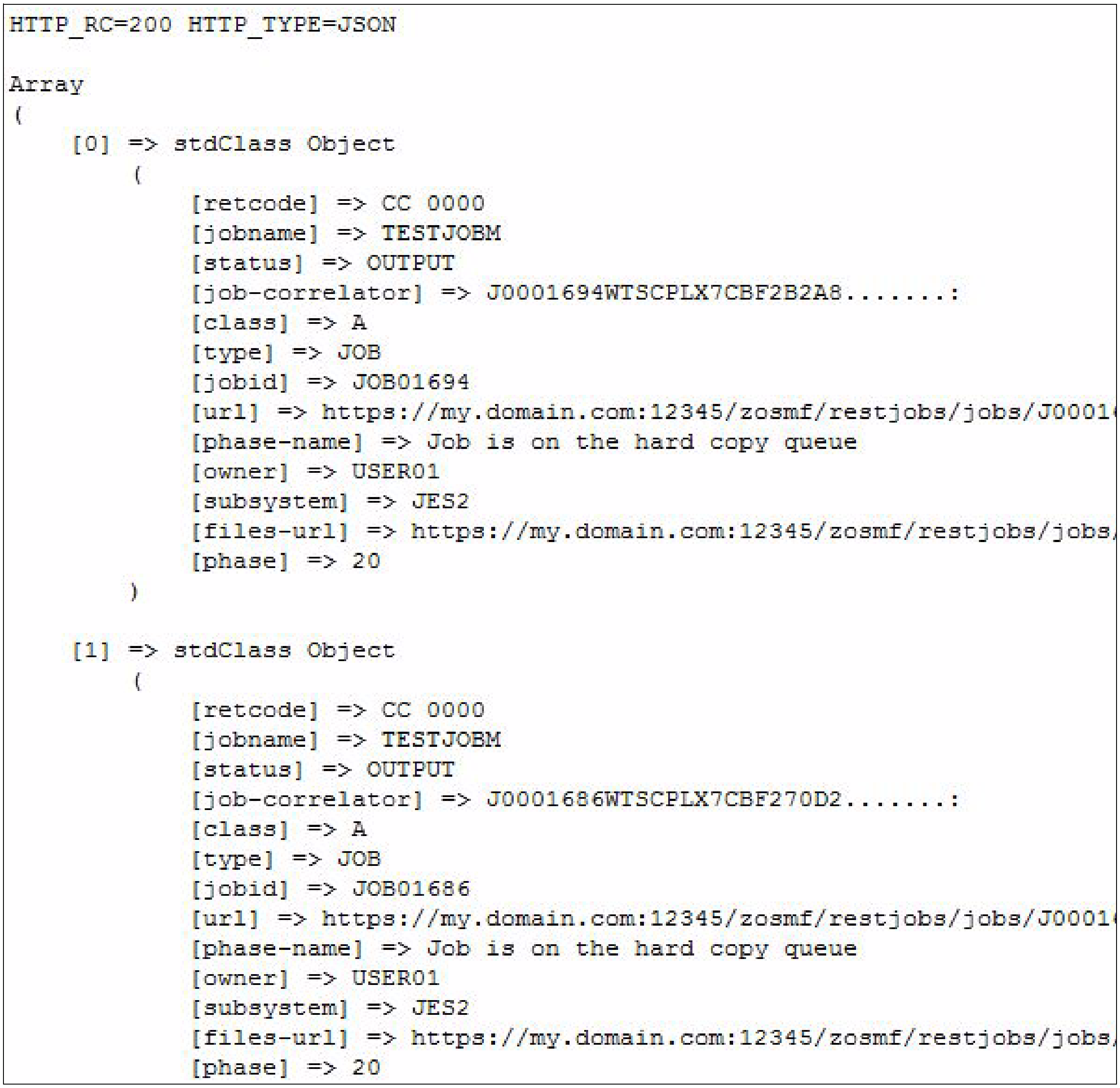
The PHP code that is used to list queued jobs is shown in Example 18-37.

Example 18-37 PHP code that is used to list queued jobs

```
<?php
// Example: Retrieve a list of spooled jobs.
//

// Include support routines file here

require_once "mf$.php";

// Initialize and call the API

mf_init();

$parms="owner=*&prefix=test*";

mf_run("{$url}/restjobs/jobs?{$parms}");

// Display results
```

```
header("Content-Type: text/plain");
echo "HTTP_RC={$http['rc']} HTTP_TYPE={$http['type']}\n";
echo "\n";
mf_displayResponse();
?>
```

The output from Example 18-37 on page 502 is shown in Figure 18-18.



```
HTTP_RC=200 HTTP_TYPE=JSON

Array
(
    [0] => stdClass Object
        (
            [retcode] => CC 0000
            [jobname] => TESTJOBM
            [status] => OUTPUT
            [job-correlator] => J0001694WTSCPLX7CBF2B2A8.......:
            [class] => A
            [type] => JOB
            [jobid] => JOB01694
            [url] => https://my.domain.com:12345/zosmf/restjobs/jobs/J0001
            [phase-name] => Job is on the hard copy queue
            [owner] => USER01
            [subsystem] => JES2
            [files-url] => https://my.domain.com:12345/zosmf/restjobs/jobs/
            [phase] => 20
        )

    [1] => stdClass Object
        (
            [retcode] => CC 0000
            [jobname] => TESTJOBM
            [status] => OUTPUT
            [job-correlator] => J0001686WTSCPLX7CBF270D2.......:
            [class] => A
            [type] => JOB
            [jobid] => JOB01686
            [url] => https://my.domain.com:12345/zosmf/restjobs/jobs/J0001
            [phase-name] => Job is on the hard copy queue
            [owner] => USER01
            [subsystem] => JES2
            [files-url] => https://my.domain.com:12345/zosmf/restjobs/jobs/
            [phase] => 20
```

Figure 18-18 Output from list queued jobs - PHP example

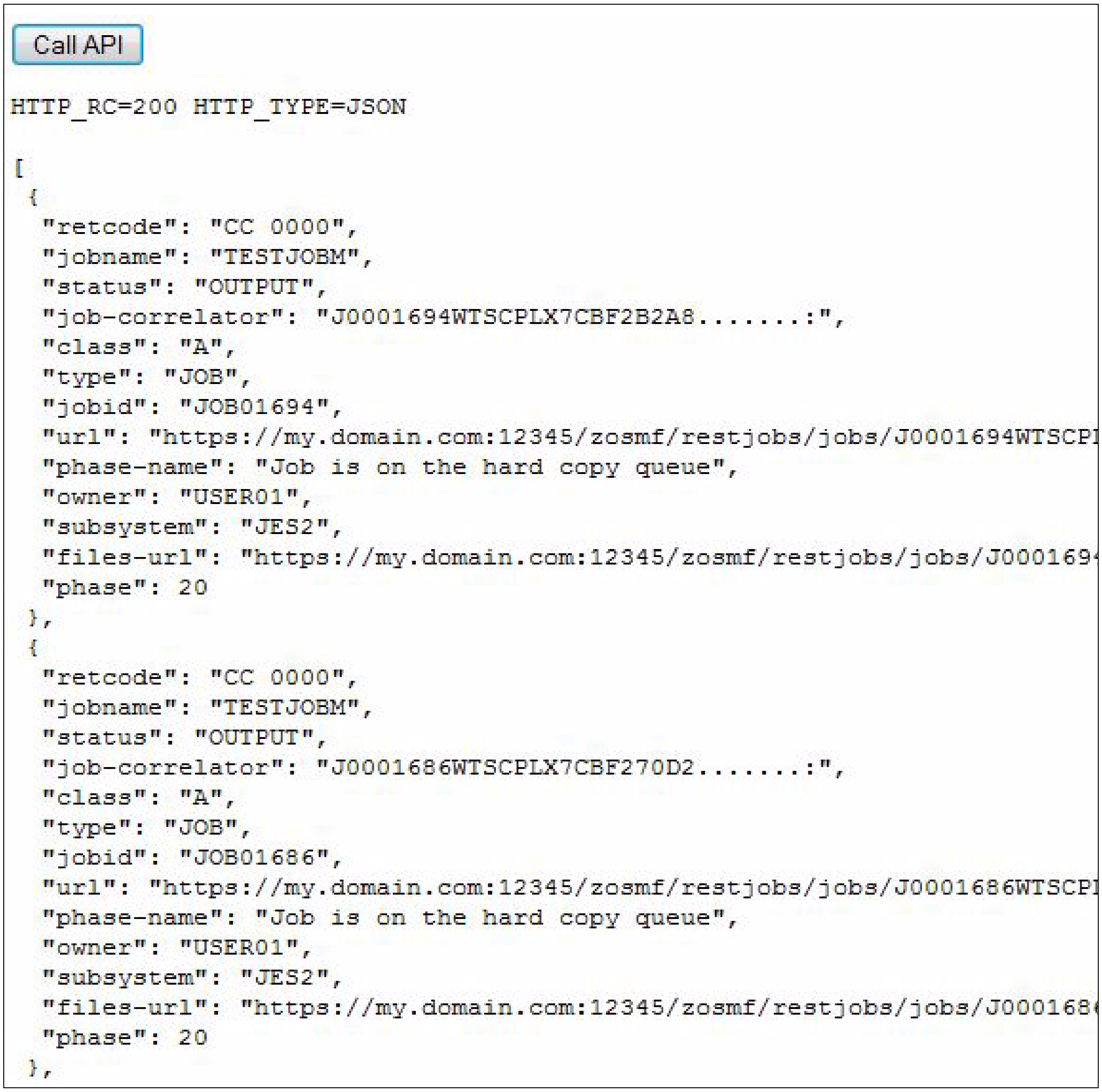
JavaScript

The JavaScript code that is used to list queued jobs is shown in Example 18-38.

Example 18-38 JavaScript code that is used to list queued jobs

```
<!doctype html>
<html>
<head>

<!-- Example: List spooled jobs -->

<!-- Include support routines -->

<script type="text/javascript" src="mf$.js"></script>

<!-- Application code -->

<script type="text/javascript">

var filter="owner=*&prefix=test*";

var request="restjobs/jobs?"+filter;

var mf=new mf_connection();

function complete() {
 mf.displayResponse();
}

</script>

</head>
<body>
<button type="button"
        onclick="mf.callAPI('out',request,complete)">
  Call API
</button>
<div id="out">
<h2>Response will be shown here.</h2>
</div>
</body>
</html>
```

The output from Example 18-38 on page 504 is shown in Figure 18-19.



```
HTTP_RC=200 HTTP_TYPE=JSON

[
 {
  "retcode": "CC 0000",
  "jobname": "TESTJOBM",
  "status": "OUTPUT",
  "job-correlator": "J0001694WTSCPLX7CBF2B2A8.......:",
  "class": "A",
  "type": "JOB",
  "jobid": "JOB01694",
  "url": "https://my.domain.com:12345/zosmf/restjobs/jobs/J0001694WTSCP
  "phase-name": "Job is on the hard copy queue",
  "owner": "USER01",
  "subsystem": "JES2",
  "files-url": "https://my.domain.com:12345/zosmf/restjobs/jobs/J000169
  "phase": 20
 },
 {
  "retcode": "CC 0000",
  "jobname": "TESTJOBM",
  "status": "OUTPUT",
  "job-correlator": "J0001686WTSCPLX7CBF270D2.......:",
  "class": "A",
  "type": "JOB",
  "jobid": "JOB01686",
  "url": "https://my.domain.com:12345/zosmf/restjobs/jobs/J0001686WTSCP
  "phase-name": "Job is on the hard copy queue",
  "owner": "USER01",
  "subsystem": "JES2",
  "files-url": "https://my.domain.com:12345/zosmf/restjobs/jobs/J000168
  "phase": 20
 },
```

Figure 18-19 Output from list queued jobs - JavaScript example

18.5.6 Changing job class

The following example changes a job to another class:

- Purpose: Changes a job to another class
- Request type: **PUT**
- Request parameters: Job name and job ID
- Request content type: JSON
- Response code: 202
- Response content type: None

Input to the request is a JSON structure that specifies the new class for the job. The expected HTTP response code is 202 with no body data returned.

z/OS REXX

The z/OS REXX code that is used to change a job class is shown in Example 18-39.

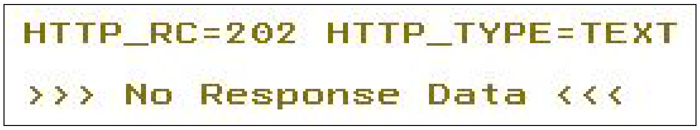
Example 18-39 z/OS REXX code that is used to change a job class

```
/*********************rexx**/
/* Change class for a JOB. */
/***************************/
trace o

jobname='TESTJOBM'
jobid='JOB01552'
class='A'

call mf_init

parms='/'jobname'/'jobid

call mf_stemAdd 'stdin.','{"class":"'class'"}'

call mf_run,
     'iconv -f IBM-1047 -t ISO8859-1 |',
     curl,
     '"'url'/restjobs/jobs'parms'"',
     '-X PUT',
     '-H "Content-Type: application/json"',
     '--data-binary @-'

call mf_displayResponse

exit 0

/* Include Support Routines */
```

As shown in Example 18-39, an initial command is run before the **curl** command runs, and the following extra options are passed to the **curl** command:

- The **iconv** command is called to convert the **stdin** data from EBCDIC to ASCII, which is required by the z/OSMF server.
- The **–X** option for **curl** changes the HTTP request type to **PUT**, which is required for this API call.
- The **–H** option for **curl** allows a specific header to be passed with the API call. In this case, JSON data is provided; therefore, the content type must be identified as application/json.
- The **–data-binary** option for **curl** with the **@-** parameter reads associated data from **stdin**, which, in this case, is the output of the **iconv** command. It ensures that the **curl** command passes the data as is to the API call (that is, no URL encoding is available and no other actions are taken).

The output of the change job class z/OS REXX example is shown in Figure 18-20.



```
HTTP_RC=202 HTTP_TYPE=TEXT
>>> No Response Data <<<
```

Figure 18-20 Output of the change job class - z/OS REXX example

18.5.7 Purging job output

The following example cancels a job and purges its output from the JES spool:

- Purpose: Cancels a job and purges its output from the spool
- Request type: **DELETE**
- Request parameters: Job name and job ID
- Request content type: None
- Response code: 202
- Response content type: None

z/OS REXX

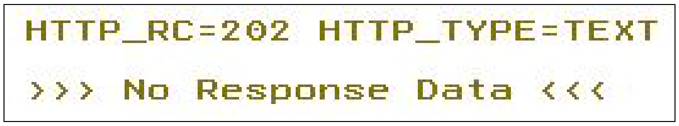
The z/OS REXX code that is used to cancel a job and purge the output is shown in Example 18-40.

Example 18-40 REXX code that is used to cancel a job and purge the output

```
/********************************rexx**/
/* Cancel a JOB and purge the output. */
/**************************************/
trace o

jobname='TESTJOBM'
jobid='JOB01646'

call mf_init

parms='/'jobname'/'jobid

call mf_run curl,
     '"'url'/restjobs/jobs'parms'"',
     '-X DELETE'

call mf_displayResponse

exit 0

/* Include Support Routines */
```

This example uses the **–X** option for **curl** to specify the required **DELETE** request.

If successful, a 202 response code is returned with no data, as shown in Figure 18-21.



```
HTTP_RC=202 HTTP_TYPE=TEXT
>>> No Response Data <<<
```

Figure 18-21 Output from cancel and purge job - z/OS REXX example

18.5.8 Canceling a job

The following example cancels a specified job:

- Purpose: Cancels a specified job
- Request type: **PUT**
- Request parameters: Job name and job ID
- Request content type: JSON
- Response code: 202
- Response content type: None

Input to the request is a JSON structure that specifies the cancel job request. The expected HTTP response code is 202 with no body data returned.

z/OS REXX

The z/OS REXX code that is used to cancel a job is shown in Example 18-41.

Example 18-41 z/OS REXX code that is used to cancel a job

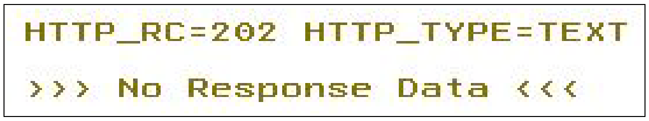
```
/***********rexx**/
/* Cancel a JOB. */
/*****************/
trace o

jobname='TESTJOBM'
jobid='JOB01686'

call mf_init

parms='/'jobname'/'jobid

call mf_stemAdd 'stdin.','{"request":"cancel"}'

call mf_run,
     'iconv -f IBM-1047 -t ISO8859-1 |',
     curl,
     '"'url'/restjobs/jobs'parms'"',
     '-X PUT',
     '-H "Content-Type: application/json"',
     '--data-binary @-'

call mf_displayResponse

exit 0

/* Include Support Routines */
```

As shown in Example 18-41, an initial command that is run before the **curl** command runs, and the following options are passed to the **curl** command:

- The **iconv** command is called to convert the **stdin** data from EBCDIC to ASCII, which is required by the z/OSMF server.
- The **–X** option for **curl** changes the HTTP request type to **PUT**, which is required for this API call.

- The **-H** option for the **curl** command allows a specific header to be passed with the API call. In this case, JSON data is provided; therefore, the content type must be identified as application/json.
- The **-data-binary** option for the **curl** command with the **@-** parameter reads associated data from **stdin**, which, in this case, is the output of the **iconv** command. It ensures that the **curl** command passes the data as is to the API call (that is, no URL encoding is available and other actions are not taken).

The expected HTTP response code is 202 with no body data returned, as shown in Figure 18-22.



```
HTTP_RC=202 HTTP_TYPE=TEXT
>>> No Response Data <<<
```

Figure 18-22 Output from cancel job - z/OS REXX example

18.5.9 Submitting a job from a remote data set

The following example submits a job from a data set on the remote system:

- Purpose: Submits a job from a data set on the remote system
- Request type: **PUT**
- Request parameters: Data set name
- Request content type: JSON
- Response code: 201
- Response content type: JSON

z/OS REXX

The z/OS REXX code that is used to submit a job from a remote data set is shown in Example 18-42.

Example 18-42 z/OS REXX code that is used to submit a job from a remote data set

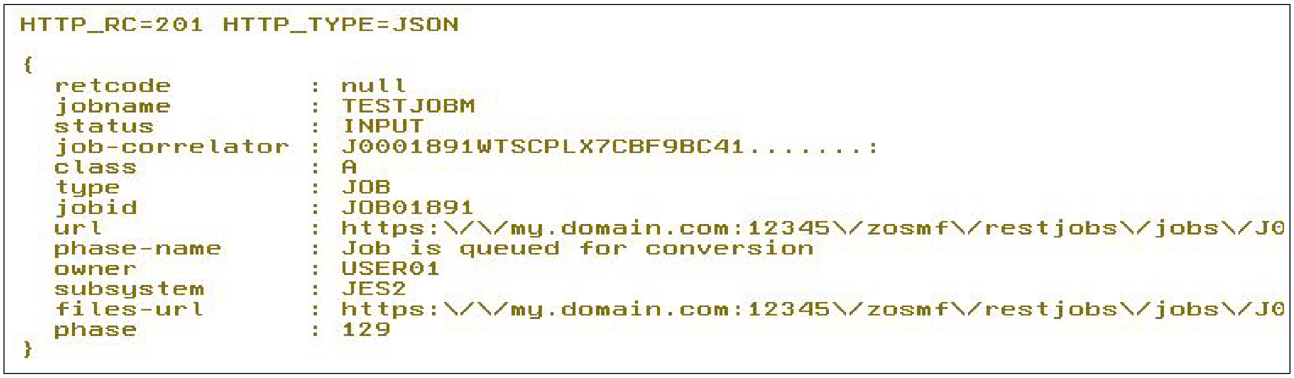
```
/******************************************rexx***/
/* Submit a job from a fully qualified data set. */
/*************************************************/
trace o

call mf_init

jobdsn="'MY.DATA.SET(IEFBR14)'"

call mf_stemAdd 'stdin.','{"file":"//'jobdsn'"}'

call mf_run,
     'iconv -f IBM-1047 -t ISO8859-1 |',
     curl,
     '"'url'/restjobs/jobs"',
     '-X PUT',
     '-H "Content-Type: application/json"',
     '-H "X-IBM-Intrdr-Class: A"',
     '--data-binary @-'

call mf_displayResponse
```

```
exit 0

/* Include Support Routines */
```

As shown in Example 18-42, an initial command is run before the **`curl`** command runs, and the following options are passed to the **`curl`** command:

- The **`iconv`** command is called to convert the **`stdin`** data from EBCDIC to ASCII, which is required by the z/OSMF server.
- The **`-X`** option for the **`curl`** command changes the HTTP request type to **`PUT`**, which is required for this API call.
- The **`-H`** option for the **`curl`** command allows a specific header to be passed with the API call. In this case, JSON data is provided; therefore, the content type must be identified as application/json.
- The **`-data-binary`** option for the **`curl`** command with the **`@-`** parameter reads associated data from **`stdin`**, which, in this case, is the output of the **`iconv`** command. It ensures that the **`curl`** command passes the data as is to the API call (that is, no URL encoding is available and other actions are not taken).

The output from the example is shown in Figure 18-23.



```
HTTP_RC=201 HTTP_TYPE=JSON

{
   retcode         : null
   jobname         : TESTJOBM
   status          : INPUT
   job-correlator  : J0001891WTSCPLX7CBF9BC41.......:
   class           : A
   type            : JOB
   jobid           : JOB01891
   url             : https:\/\/my.domain.com:12345\/zosmf\/restjobs\/jobs\/J0
   phase-name      : Job is queued for conversion
   owner           : USER01
   subsystem       : JES2
   files-url       : https:\/\/my.domain.com:12345\/zosmf\/restjobs\/jobs\/J0
   phase           : 129
}
```

Figure 18-23 Output from remote data set job submission - z/OS REXX example

18.5.10 Submit inline JCL

The following example submits a job from inline JCL to the remote system:

- Purpose: Submits a job from inline JCL to the remote system
- Request type: **`PUT`**
- Request parameters: In-line JCL
- Request content type: Plain text
- Response code: 201
- Response content type: None

z/OS REXX

The z/OS REXX code that is used to send JCL to the remote z/OSMF system and submit it there is shown in Example 18-43.

Example 18-43 z/OS REXX code that is used to submit inline JCL on remote system

```
/***************************rexx**/
/* Submit a job from inline JCL. */
```

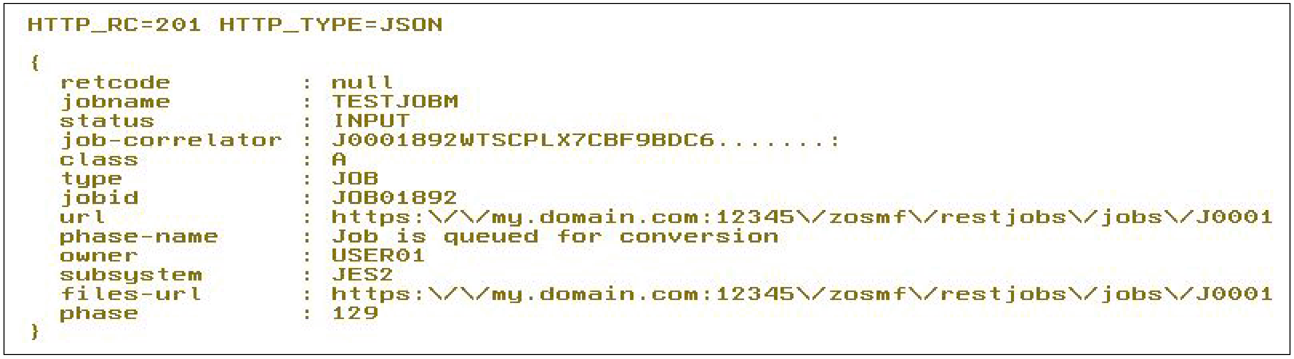
```
/*********************************/
trace o

call mf_init

call mf_stemAdd 'stdin.','//TESTJOBM JOB (),''IEFBR14'','
call mf_stemAdd 'stdin.','//   MSGCLASS=T,NOTIFY=&SYSUID'
call mf_stemAdd 'stdin.','//*'
call mf_stemAdd 'stdin.','/*JOBPARM SYSAFF=SC74'
call mf_stemAdd 'stdin.','//*'
call mf_stemAdd 'stdin.','//STEP1    EXEC PGM=IEFBR14'

call mf_run,
     'iconv -f IBM-1047 -t ISO8859-1 |',
     curl,
     '"'url'/restjobs/jobs"',
     '-X PUT',
     '-H "Content-Type: text/plain"',
     '-H "X-IBM-Intrdr-Class: A"',
     '-H "X-IBM-Intrdr-Recfm: F"',
     '-H "X-IBM-Intrdr-Lrecl: 80"',
     '-H "X-IBM-Intrdr-Mode: TEXT"',
     '--data-binary @-'

call mf_displayResponse

exit 0

/* Include Support Routines */
```

The inline JCL is supplied in **stdin** and is used by an internal reader on the remote system through the API call.

As shown in Example 18-43, an initial command is run before the **curl** command runs, and the following options are passed to the **curl** command:

- The **iconv** command is called to convert the **stdin** data from EBCDIC to ASCII, which is required by the z/OSMF server.
- The **–X** option for the **curl** command changes the HTTP request type to **PUT**, which is required for this API call.
- The first **–H** option for the **curl** command allows a specific header to be passed with the API call. In this case, plain text data is provided; therefore, the content type must be identified as text/plain. The remaining **–H** options specify the internal reader parameters for the job submission.
- The **–data-binary** option for the **curl** command with the **@-** parameter reads associated data from **stdin**, which, in this case, is the output of the **iconv** command. It ensures that the **curl** command passes the data as is to the API call (that is, no URL encoding is available and other actions are not taken).

The output from the example is shown in Figure 18-24.



```
HTTP_RC=201 HTTP_TYPE=JSON

{
  retcode         : null
  jobname         : TESTJOBM
  status          : INPUT
  job-correlator  : J0001892WTSCPLX7CBF9BDC6.......:
  class           : A
  type            : JOB
  jobid           : JOB01892
  url             : https:\/\/my.domain.com:12345\/zosmf\/restjobs\/jobs\/J0001
  phase-name      : Job is queued for conversion
  owner           : USER01
  subsystem       : JES2
  files-url       : https:\/\/my.domain.com:12345\/zosmf\/restjobs\/jobs\/J0001
  phase           : 129
}
```

Figure 18-24 Output from remote inline JCL submission

18.6 Application linking interface

The following examples demonstrate calls to the application linking interface.

18.6.1 List handlers for an event type

The following example lists handlers for an event type:

- Purpose: Lists handlers for an event type
- Request type: **GET**
- Request parameters: Event type ID
- Request content type: None
- Response code: 200
- Response content type: JSON

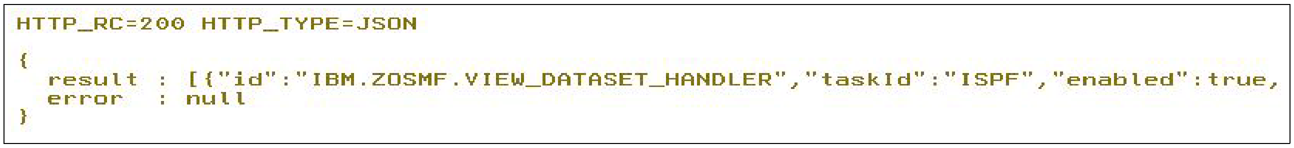
z/OS REXX

The z/OS REXX code that is used to list event handlers for an event type is shown in Example 18-44.

Example 18-44 z/OS REXX code that is used to list event handlers

```
/*******************************rexx**/
/* List handlers for an event type. */
/************************************/
trace o

call mf_init

parms='eventTypeId=IBM.ZOSMF.VIEW_DATASET'

call mf_run curl,
     '"'url'/izual/rest/handler?'parms'"'

call mf_displayResponse

exit 0

/* Include Support Routines */
```

The output is shown in Figure 18-25.



```
HTTP_RC=200 HTTP_TYPE=JSON

{
  result  : [{"id":"IBM.ZOSMF.VIEW_DATASET_HANDLER","taskId":"ISPF","enabled":true,
  error   : null
}
```

Figure 18-25 Output from list event handlers - z/OS REXX example

The “result” name in the JSON output specifies a JSON array, which is not expanded by the simple JSON parser that is included with the z/OS REXX support routines.

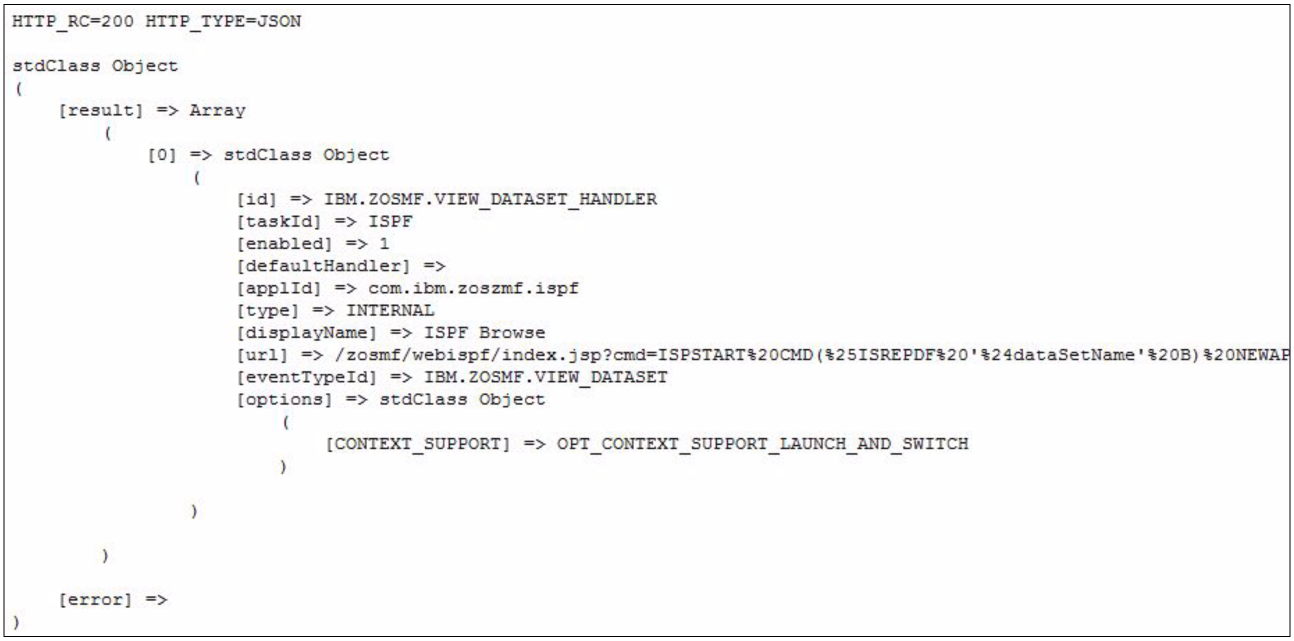
PHP

The PHP code that is used to list event handlers is shown in Example 18-45.

Example 18-45 PHP code that is used to list event handlers

```
<?php

//
// Example: List handlers for an event type.
//

// Include support routines file here

require_once "mf$.php";

// Initialize and call the API

mf_init();

$parms="eventTypeId=IBM.ZOSMF.VIEW_DATASET";

mf_run("{$url}/izual/rest/handler?{$parms}");

// Display results

header("Content-Type: text/plain");
echo "HTTP_RC={$http['rc']} HTTP_TYPE={$http['type']}\n";
echo "\n";
mf_displayResponse();

?>
```

The output of Example 18-45 on page 513 is shown in Figure 18-26.



```
HTTP_RC=200 HTTP_TYPE=JSON

stdClass Object
(
    [result] => Array
        (
            [0] => stdClass Object
                (
                    [id] => IBM.ZOSMF.VIEW_DATASET_HANDLER
                    [taskId] => ISPF
                    [enabled] => 1
                    [defaultHandler] =>
                    [applId] => com.ibm.zoszmf.ispf
                    [type] => INTERNAL
                    [displayName] => ISPF Browse
                    [url] => /zosmf/webispf/index.jsp?cmd=ISPSTART%20CMD(%25ISREPDF%20'%24dataSetName'%20B)%20NEWAP
                    [eventTypeId] => IBM.ZOSMF.VIEW_DATASET
                    [options] => stdClass Object
                        (
                            [CONTEXT_SUPPORT] => OPT_CONTEXT_SUPPORT_LAUNCH_AND_SWITCH
                        )

                )

        )

    [error] =>
)
```

Figure 18-26 Output from list event handlers - PHP example

JavaScript

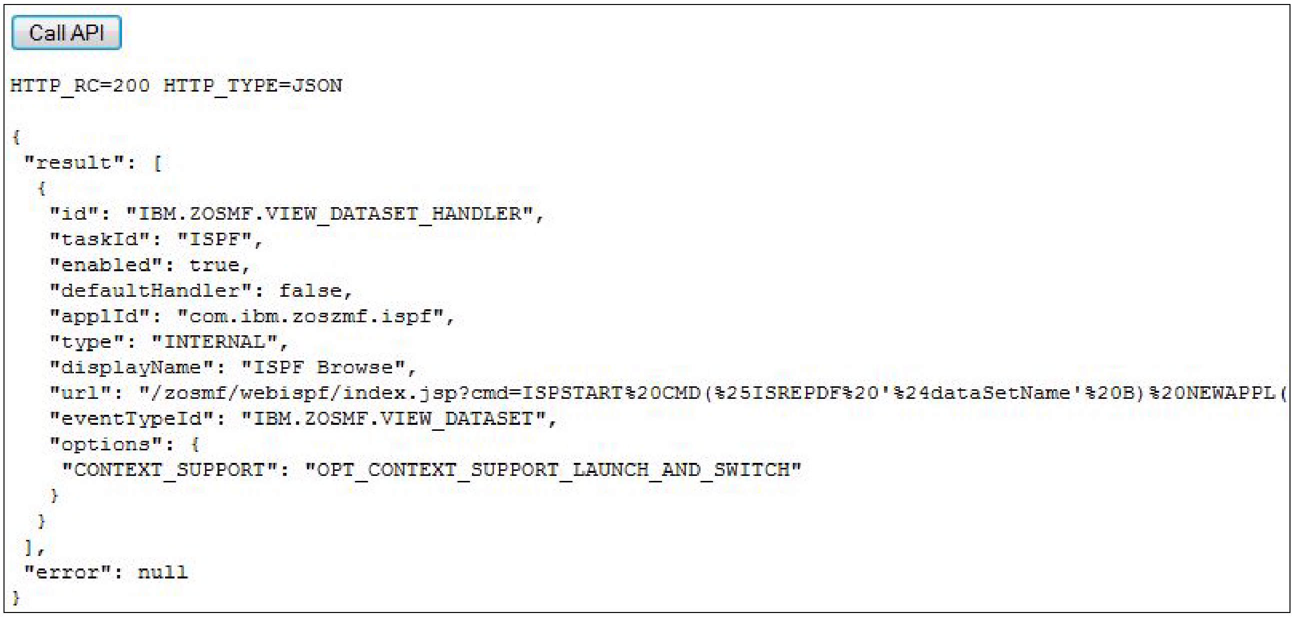
The JavaScript code that is used to list event handlers is shown in Example 18-46.

Example 18-46 JavaScript code that is used to list event handlers

```
<!doctype html>
<html>
<head>

<!-- Example: List handlers for an event type -->

<!-- Include support routines -->

<script type="text/javascript" src="mf$.js"></script>

<!-- Application code -->

<script type="text/javascript">

var type="IBM.ZOSMF.VIEW_DATASET";

var request="izual/rest/handler?eventTypeId="+type;

var mf=new mf_connection();

function complete() {
 mf.displayResponse();
}

</script>
```

```
</head>
<body>
<button type="button"
        onclick="mf.callAPI('out',request,complete)">
  Call API
</button>
<div id="out">
<h2>Response will be shown here.</h2>
</div>
</body>
</html>
```

The output from Example 18-46 on page 514 shown in Figure 18-27.



```
HTTP_RC=200 HTTP_TYPE=JSON

{
 "result": [
  {
   "id": "IBM.ZOSMF.VIEW_DATASET_HANDLER",
   "taskId": "ISPF",
   "enabled": true,
   "defaultHandler": false,
   "applId": "com.ibm.zoszmf.ispf",
   "type": "INTERNAL",
   "displayName": "ISPF Browse",
   "url": "/zosmf/webispf/index.jsp?cmd=ISPSTART%20CMD(%25ISREPDF%20'%24dataSetName'%20B)%20NEWAPPL(
   "eventTypeId": "IBM.ZOSMF.VIEW_DATASET",
   "options": {
    "CONTEXT_SUPPORT": "OPT_CONTEXT_SUPPORT_LAUNCH_AND_SWITCH"
   }
  }
 ],
 "error": null
}
```

Figure 18-27 Output from list event handlers - JavaScript example

18.7 Example application

This section provides a complete example application that demonstrates the use of the z/OSMF API.

The basic function of the application is to return spooled job information from a remote z/OSMF system and present it in an interactive format. The application lists the spooled jobs that provide access to job output and JCL. Job submission to the remote system is also supported (for the z/OS REXX example application only).

The application is complete and functional, but can be enhanced to provide as much flexibility as required by the user (for example, canceling jobs, purging output, and changing job classes).

18.7.1 z/OS REXX: Foreground ISPF dialog

The foreground ISPF dialog is built by using the REXX support routines that are described in 18.3, “Support routines” on page 467. It consists of two ISPF panels that must be in the ISPPLIB concatenation, and one driver REXX EXEC that is in the SYSEXEC or SYSPROC concatenations.

The panels and REXX EXEC can feature any name if the panel names are defined correctly to the appropriate variables in the REXX EXEC. For the purposes of this demonstration, the panels are named MFPID and MFPJOBS. The REXX EXEC is named MFRJOBS.

The dialog is started by running **`TSO %MFRJOBS`** on the ISPF command line.

Dialog flow

A general process flow of the dialog is shown in Figure 18-28 on page 517.

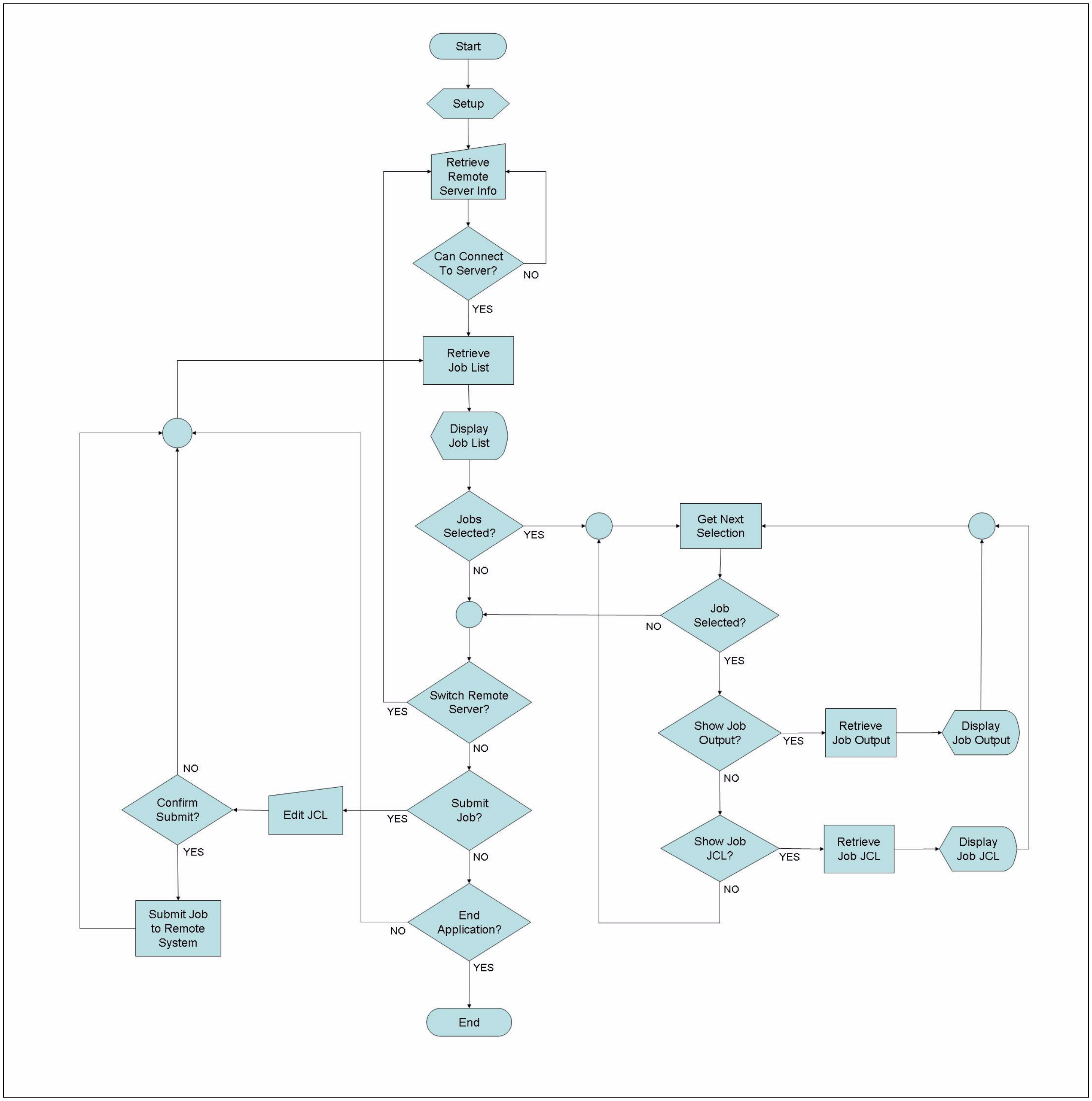


Figure 18-28 z/OS REXX example application process flow

MFPID panel

The MFPID panel (see Example 18-47) is used to prompt the user for the location of the remote z/OSMF server and gathers authentication information for that server.

Example 18-47 z/OS REXX application - MFPID panel

```
)attr
! type(input) color(green) hilite(uscore) caps(off) intens(low)
@ type(input) caps(off) intens(non)
)body expand(\\) window(70,9)
%Command ===>_zcmd
%
```

```
%URL:!url
+
%UID:!uid     %<
%PWD:@pwd     %<
%
+Press%ENTER+to continue or%END+to terminate.
%
)init
&zwinttl='z/OSMF System Access Details'
.cursor='zcmd'
)proc
ver(&url,nb)
ver(&uid,nb)
ver(&pwd,nb)
)end
/********************************************************/
/* DESCRIPTION                                          */
/* -----------                                          */
/* This panel prompts for the remote z/OSMF system URL  */
/* and the associated user ID and password.             */
/*                                                      */
/* HISTORY                                              */
/* -------                                              */
/* 20130827 01.01 Richard Walton - Initial writing.     */
/********************************************************/
```

MFPJOBS panel

The MFPJOBS panel (see Example 18-48) is the main panel and is driven by the TBDISPL ISPF table display service. It lists spooled job output from the remote z/OSMF system and allows the user to select jobs for display. It also provides options to switch to a different z/OSMF server and to submit a job to the remote system.

Example 18-48 z/OS REXX - MFPJOBS panel

```
)attr
~ type(input) caps(on) color(red) intens(low) hilite(uscore)
{ type(input) caps(off) color(red) intens(low) hilite(uscore)
` type(output) caps(off) color(green) intens(high)
$ type(output) caps(off) color(turq) intens(low)
} type(output) caps(off) color(blue) intens(low)
@ type(ab)
! type(pt)
| type(absl) ge(on)
)abc desc('File') mnem(1)
pdc desc('Exit') mnem(1)
    action run(end)
)abcinit
.zvars=pdc
&pdc=&z
)abc desc('Edit') mnem(1)
pdc desc('Change system access details') mnem(1)
    action run(>sysacc)
pdc desc('Create and submit a job') mnem(1)
    action run(>subjob)
)abcinit
```

```
.zvars=pdc
&pdc=&z
)body expand(\\)
+@ File@ Edit+
|\-\
!Jobs - &url
%Command ===>_zcmd\ \%Scroll ===>_z   +
%
%Line commands:+Select Jcl
%       Filter:{filter
+
%s Jobname  Jobid    Class Status   RetCode    Owner    Phase
%- -------- -------- ----- -------- ---------- -------- \-\
)model
~z`jobname `jobid   $jobcl$jobstat $jobrc     $jobown  }jobphn
)init
.zvars='(zscrolld jsel)'
&zcmd=''
)proc
if(&ztdsels>0)
 ver(&psel,list,S,J)
)end
/************************************************************/
/* DESCRIPTION                                              */
/* -----------                                              */
/* This panel is a standard ISPF table display panel shown  */
/* via the TBDISPL service. It lists all of the queued jobs */
/* returned from a request sent to a remote system via the  */
/* z/OSMF REST API.                                         */
/*                                                          */
/* Listed jobs can be selected with the 'S' line command to */
/* display job output or the 'J' line command to display    */
/* the job JCL.                                             */
/*                                                          */
/* The 'Edit' pull-down contains options to connect with a  */
/* different remote z/OSMF server and to submit a job to    */
/* the remote system via the z/OSMF API.                    */
/*                                                          */
/* HISTORY                                                  */
/* -------                                                  */
/* 20130827 01.01 Richard Walton - Initial writing.         */
/************************************************************/
```

REXX MFRJOBS

REXX EXEC MFRJOBS (see Example 18-49) is the main driver and includes all of the code that is necessary to run the dialog. It uses the REXX support routines; therefore, these routines must be included at the end of MFRJOBS.

Example 18-49 z/OS REXX application main driver - MFRJOBS

```
/**************************************************************rexx**/
/* DESCRIPTION                                                      */
/* -----------                                                      */
/* This foreground ISPF dialog utilizes the z/OSMF API to retrieve */
/* spooled job information from a remote z/OSMF system and display */
/* it for user interaction.                                         */
/*                                                                  */
/* Jobs can be listed and selected to display both job output      */
/* and the associated job JCL.                                      */
/*                                                                  */
/* Options are also available to dynamically switch to a           */
/* different remote z/OSMF server and to submit jobs to the        */
/* remote system.                                                   */
/*                                                                  */
/* This REXX should be included in the SYSEXEC concatenation and   */
/* invoked using standard TSO EXEC invocation methods.             */
/*                                                                  */
/* Two panels are required as defined by the 'panel_remote' and    */
/* 'panel_jobs' variables. These panels should be included in the  */
/* ISPPLIB concatenation.                                           */
/*                                                                  */
/* The 'curl' ported tool is utilized for secure https requests    */
/* and is called via the BPXWUNIX program.                          */
/*                                                                  */
/* HISTORY                                                          */
/* -------                                                          */
/* 20130827 01.01 Richard Walton - Initial writing.                 */
/********************************************************************/
trace o

/* Define panel names*/
panel_remote='mfpid'
panel_jobs='mfpjobs'

/* Send commands to ISPF and allow dialog to manage ISPF errors */
address ispexec
'control errors return'

/* Initialize the dialog and z/OSMF environments */
call mf_init

/* Select the remote z/OSMF server */
if \setID() then exit 0

/* Set up inline JCL for user selected submission to remote system */
call setupjob

/* Set up main panel resources */
jtable='job'right(time('s'),5,0)
```

```
filter='owner='userid()
top=0;jsel=''

/* Mainline loop terminated by ENDing main panel */
do until finished
 call getjoblist /* Get spooled jobs from remote system */
 'tbtop' jtable
 'tbskip' jtable 'number('top') noread' /* Retain table scroll pos */
 'tbdispl' jtable 'panel('panel_jobs')'
 finished=rc>7
 top=ztdtop
 do while ztdsels>0
  'control display save'
  select
   when jsel='S' then call showfiles /* Show job output */
   when jsel='J' then call showjcl   /* Show job JCL    */
   otherwise
  end
  'control display restore'
  jsel=''
  if ztdsels>1 then 'tbdispl' jtable;else;ztdsels=0
 end
 select
  when zcmd='SYSACC' then call setID     /* Switch remote system */
  when zcmd='SUBJOB' then call submitjob /* Submit a remote job  */
  otherwise
 end
end

/* Cleanup */
'tbend' jtable
call bpxwdyn 'free fi('ddjob')'

exit 0

setID: procedure expose url uid pwd panel_remote
/*******************************************************************/
/* Prompt user for remote z/OSMF system details.                  */
/*                                                                 */
/*   url - http URL for remote z/OSMF system                       */
/*   uid - User ID  for remote z/OSMF system                       */
/*   pwd - Password for remote z/OSMF system                       */
/*******************************************************************/
'addpop'
'display panel('panel_remote')'
ok=rc=0
'rempop'
return ok

getjoblist:
/*******************************************************************/
/* Retrieve the list of spooled jobs from the remote z/OSMF system */
/* and store in an ISPF table.                                     */
/*******************************************************************/
'tbend' jtable
```

```
'tbcreate' jtable,
           'names(jobname,jobid,jobstat,jobcl,jobrc,jobown,jobphn)'
'tbsort' jtable 'fields(jobname,c,a,jobid,c,a)'
call mf_run curl '"'url'/restjobs/jobs?'filter'"'
if \abbrev(http.?rc,2) then
 do
  call mf_displayResponse
  return
 end
do i=1 to json.0
 jobname=mf_jsonGet(i,'jobname')
 jobid=mf_jsonGet(i,'jobid')
 jobstat=mf_jsonGet(i,'status')
 jobcl=mf_jsonGet(i,'class')
 jobrc=mf_jsonGet(i,'retcode')
 jobown=mf_jsonGet(i,'owner')
 jobphn=subword(mf_jsonGet(i,'phase-name'),3)
 'tbadd' jtable 'order'
end
return

showfiles:
/********************************************************************/
/* Retrieve the spooled output for the selected job from the        */
/* remote z/OSMF system.                                            */
/*                                                                  */
/* The first call returns the list of DD names for the spooled      */
/* job. The output from each DD is then retrieved and added to a    */
/* temporary sequential data set with text dividers between each    */
/* piece of output.                                                 */
/*                                                                  */
/* The temporary data set is then displayed in an ISPF BROWSE       */
/* session.                                                         */
/********************************************************************/
call mf_run curl '"'url'/restjobs/jobs/'jobname'/'jobid'/files"'
if \abbrev(http.?rc,2) then
 do
  call mf_displayResponse
  return
 end
file.0=json.0
do i=1 to json.0
 file.i.?id=mf_jsonGet(i,'id')
 file.i.?ddname=mf_jsonGet(i,'ddname')
 file.i.?stepname=mf_jsonGet(i,'stepname')
 file.i.?procstep=mf_jsonGet(i,'procname')
end
out.0=0
do i=1 to file.0
 call mf_run curl,
   '"'url'/restjobs/jobs/'jobname'/'jobid'/files/'file.i.?id'/records"'
 if \abbrev(http.?rc,2) then
  do
   call mf_displayResponse
   iterate
  end
 call mf_stemAdd 'out.'
 call mf_stemAdd 'out.',copies('-',100)
 call mf_stemAdd 'out.','FILEID='file.i.?id,
                       'DDNAME='file.i.?ddname,
                       'STEPNAME='file.i.?stepname,
                       'PROCSTEP='file.i.?procstep
 call mf_stemAdd 'out.',copies('-',100)
 call mf_stemAdd 'out.'
 do j=1 to response.0
  call mf_stemAdd 'out.',response.j
 end
end
address mvs 'newstack'
queue 'JOB='jobname','jobid
do i=1 to out.0
 queue out.i
end
call mf_display
address mvs 'delstack'
return

showjcl:
/*******************************************************************/
/* Retrieve the selected spooled job JCL from the remote z/OSMF    */
/* system and display in an ISPF VIEW session.                     */
/*******************************************************************/
call mf_run curl,
    '"'url'/restjobs/jobs/'jobname'/'jobid'/files/JCL/records"'
if \abbrev(http.?rc,2) then
 do
  call mf_displayResponse
  return
 end
address mvs 'newstack'
do i=1 to response.0
 queue response.i
end
call mf_display 'view'
address mvs 'delstack'
return

submitjob:
/*******************************************************************/
/* ISPF EDIT the JCL stored in the temporary data set. The user is */
/* prompted to submit the job on the remote z/OSMF system when the */
/* EDIT session ends.                                              */
/*                                                                 */
/* If submitted then the JSON response is displayed in an ISPF     */
/* BROWSE session.                                                 */
/*******************************************************************/
zerrhm='*';zerralrm='YES';zerrsm=''
zerrlm='Update the displayed JCL as required and END the EDIT session.',
       'You will be prompted to submit the job.'
'setmsg msg(isrz002)'
```

```
'lminit dataid(did) ddname('ddjob')'
'edit dataid('did')'
'lmfree dataid('did')'
say 'Do you want to submit the job via z/OSMF? (Y/N)'
pull ans
if ans='Y' then
 do
  stdin.0=0
  address mvs 'execio * diskr' ddjob '(stem stdin. finis'
  call mf_run,
       'iconv -f IBM-1047 -t ISO8859-1 |',
       curl,
       '"'url'/restjobs/jobs"',
       '-X PUT',
       '-H "Content-Type: text/plain"',
       '-H "X-IBM-Intrdr-Class: A"',
       '-H "X-IBM-Intrdr-Recfm: F"',
       '-H "X-IBM-Intrdr-Lrecl: 80"',
       '-H "X-IBM-Intrdr-Mode: TEXT"',
       '--data-binary @-'
  call mf_displayResponse
 end
return

setupjob: procedure expose ddjob
/********************************************************************/
/* A temporary data set is used to contain some JCL that the user   */
/* can EDIT and submit via options on the application panel.        */
/********************************************************************/
call bpxwdyn 'new delete lrecl(80) recfm(f,b) dsorg(ps)',
            'tracks space(5,5) rtddn(ddjob)'
address mvs 'newstack'
queue '//'left(userid()'J',8) 'JOB (),''IEFBR14'','
queue '//   MSGCLASS=T,NOTIFY=&SYSUID.'
queue '//*'
queue '//STEP1    EXEC PGM=IEFBR14'
address mvs 'execio' queued() 'diskw' ddjob '(finis'
address mvs 'delstack'
return

/* Include Support Routines */
```

The panel_remote and panel_jobs variables must be modified to contain the names of the remote server prompt panel and main table display panel. In this example, they are named MFPID and MFPJOBS.

The dialog is defined so that the list of jobs is automatically refreshed whenever the enter key is pressed at the MFPJOBS panel.

The REXX code includes comments that explain the various sections of the application.

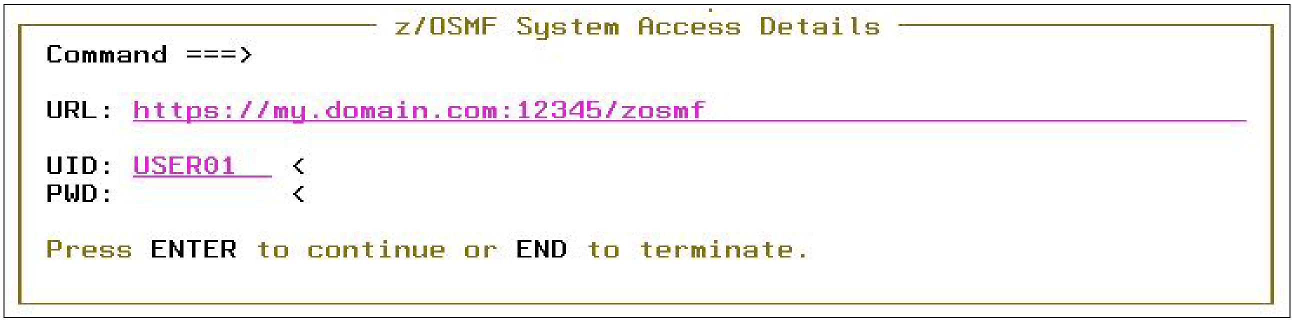
Foreground ISPF application examples

Examples of the use of the z/OS REXX-based foreground ISPF application are shown in the figures in this section.

MFPID panel: Select Remote z/OSMF Server

You can use this panel to choose a remote z/OSMF server and provide authentication information.

The MFPID panel is displayed (see Figure 18-29) when the example application is first started and when the user selects the option to switch to a different remote z/OSMF server (through an option from the Edit drop-down menu that is on the main job list panel).

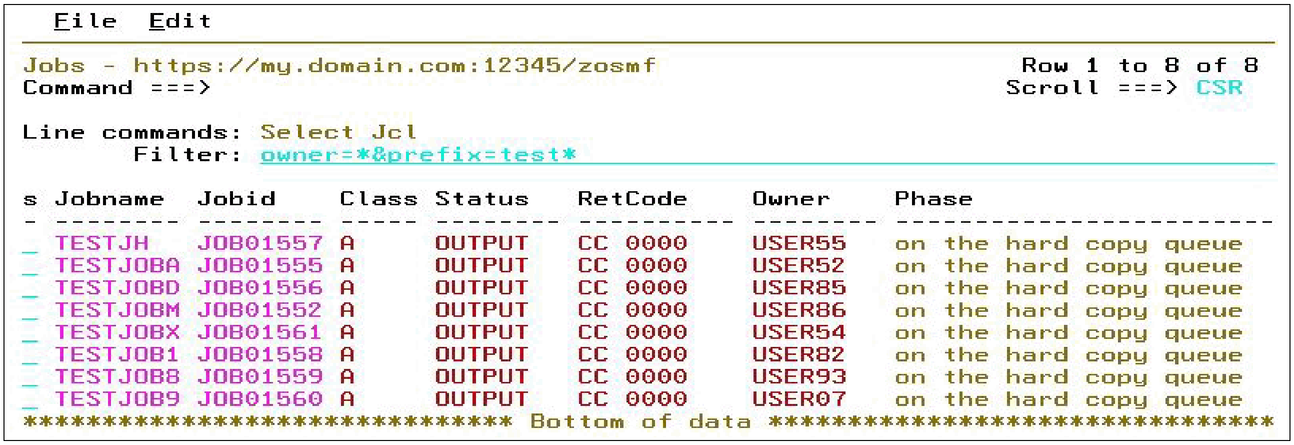


```
 -------------------- z/OSMF System Access Details ---------------------
  Command ===>

  URL: https://my.domain.com:12345/zosmf

  UID: USER01    <
  PWD:           <

  Press ENTER to continue or END to terminate.
```

Figure 18-29 REXX application MFPID panel in use

MFPJOBS panel: Job List

The main panel that displays a list of jobs that are retrieved from the remote z/OSMF system is shown in Figure 18-30.



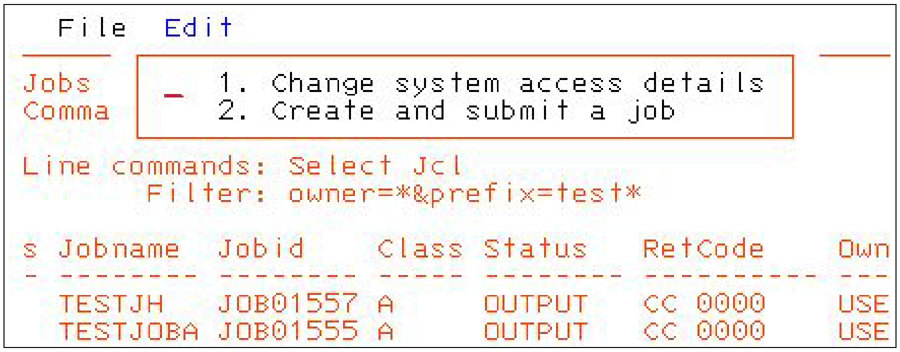
```
   File  Edit
 ------------------------------------------------------------------------------
 Jobs - https://my.domain.com:12345/zosmf                         Row 1 to 8 of 8
 Command ===>                                                    Scroll ===> CSR

 Line commands: Select Jcl
        Filter: owner=*&prefix=test*

 s Jobname  Jobid    Class Status   RetCode   Owner    Phase
 - -------- -------- ----- -------- --------- -------- ------------------------
 _ TESTJH   JOB01557 A     OUTPUT   CC 0000   USER55   on the hard copy queue
 _ TESTJOBA JOB01555 A     OUTPUT   CC 0000   USER52   on the hard copy queue
 _ TESTJOBD JOB01556 A     OUTPUT   CC 0000   USER85   on the hard copy queue
 _ TESTJOBM JOB01552 A     OUTPUT   CC 0000   USER86   on the hard copy queue
 _ TESTJOBX JOB01561 A     OUTPUT   CC 0000   USER54   on the hard copy queue
 _ TESTJOB1 JOB01558 A     OUTPUT   CC 0000   USER82   on the hard copy queue
 _ TESTJOB8 JOB01559 A     OUTPUT   CC 0000   USER93   on the hard copy queue
 _ TESTJOB9 JOB01560 A     OUTPUT   CC 0000   USER07   on the hard copy queue
 ******************************* Bottom of data ********************************
```

Figure 18-30 z/OS REXX application MFPJOBS panel in use

The MFPJOBS panel provides the following features:

- The “S” and “J” line commands can be run to display job output and display job JCL.
- The display can be filtered by job owner, job prefix, job ID, and so on.
- A job can be submitted to the remote z/OSMF system by clicking the **Edit** drop-down menu.
- A different remote z/OSMF server cab be switched to by clicking the **Edit** drop-down menu.
- The jobs list is automatically refreshed whenever the Enter key is pressed.

The Edit drop-down menu that shows the options to change the remote z/OSMF system and to submit a job to the remote z/OSMF system is shown in Figure 18-31.

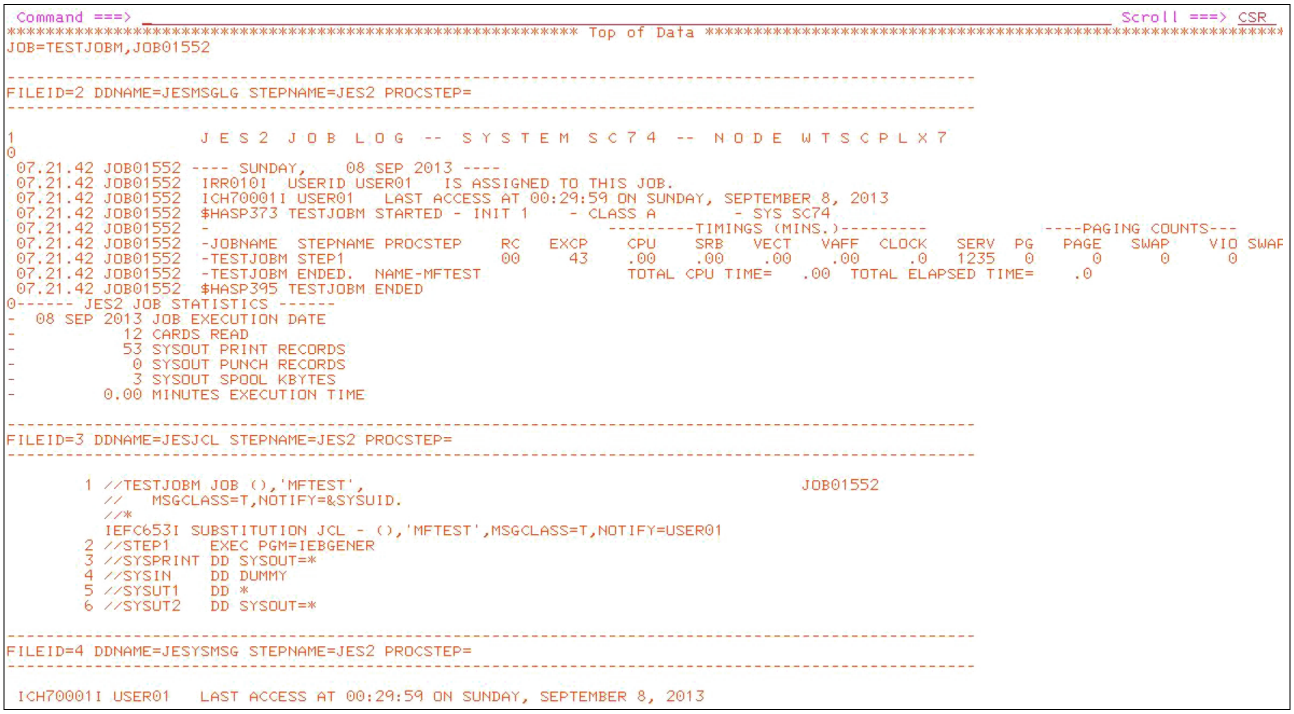


```
  File  Edit
 ______  ______________________________________________  ______
 Jobs   |  _  1. Change system access details         |
 Comma  |     2. Create and submit a job              |
         ----------------------------------------------

 Line commands: Select Jcl
          Filter: owner=*&prefix=test*

 s Jobname  Jobid    Class Status   RetCode    Own
 - -------- -------- ----- -------- ---------- ---
   TESTJH   JOB01557 A     OUTPUT   CC 0000    USE
   TESTJOBA JOB01555 A     OUTPUT   CC 0000    USE
```

Figure 18-31   Edit drop-down menu options

Displaying a job's output

Selecting a job from the jobs list retrieves the associated output from the remote z/OSMF system and displays it in an ISPF BROWSE session, as shown in Figure 18-32.



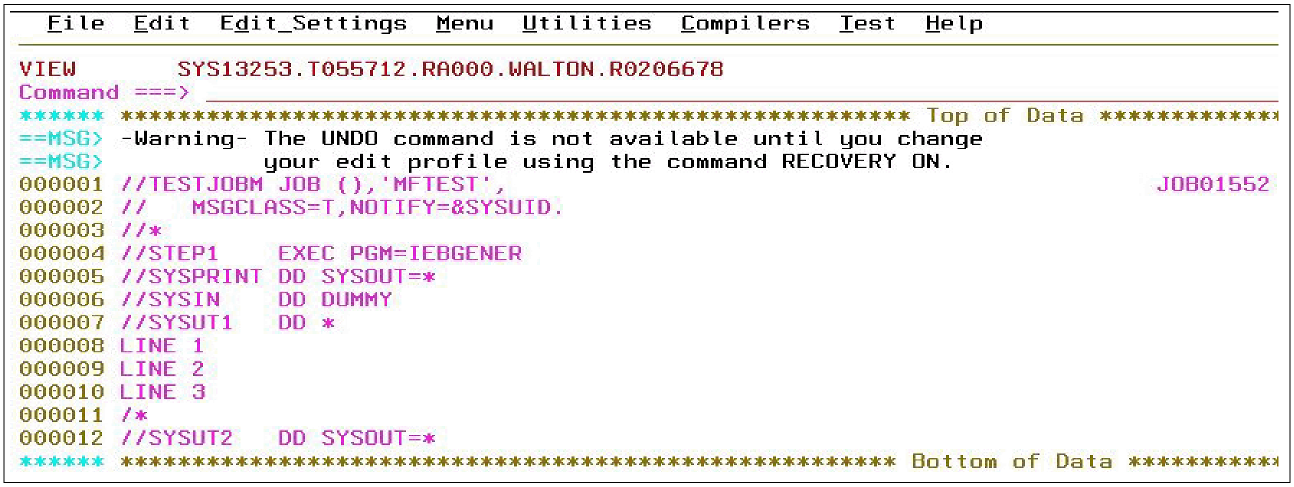
```
 Command ===> ___________________________________________________________________________________________________ Scroll ===> CSR
**************************************************************** Top of Data *****************************************************************
JOB=TESTJOBM,JOB01552

----------------------------------------------------------------------------------------------------
FILEID=2 DDNAME=JESMSGLG STEPNAME=JES2 PROCSTEP=
----------------------------------------------------------------------------------------------------

1                   J E S 2  J O B  L O G  --  S Y S T E M  S C 7 4  --  N O D E  W T S C P L X 7
0
 07.21.42 JOB01552 ---- SUNDAY,    08 SEP 2013 ----
 07.21.42 JOB01552  IRR010I  USERID USER01   IS ASSIGNED TO THIS JOB.
 07.21.42 JOB01552  ICH70001I USER01   LAST ACCESS AT 00:29:59 ON SUNDAY, SEPTEMBER 8, 2013
 07.21.42 JOB01552  $HASP373 TESTJOBM STARTED - INIT 1    - CLASS A        - SYS SC74
 07.21.42 JOB01552  -                                        ---------TIMINGS (MINS.)---------            ----PAGING COUNTS---
 07.21.42 JOB01552  -JOBNAME  STEPNAME PROCSTEP    RC   EXCP    CPU    SRB   VECT    VAFF  CLOCK   SERV  PG   PAGE   SWAP    VIO SWAF
 07.21.42 JOB01552  -TESTJOBM STEP1                00     43    .00    .00    .00    .00     .0   1235   0      0      0      0
 07.21.42 JOB01552  -TESTJOBM ENDED.  NAME-MFTEST               TOTAL CPU TIME=   .00  TOTAL ELAPSED TIME=    .0
 07.21.42 JOB01552  $HASP395 TESTJOBM ENDED
0------ JES2 JOB STATISTICS ------
-  08 SEP 2013 JOB EXECUTION DATE
-           12 CARDS READ
-           53 SYSOUT PRINT RECORDS
-            0 SYSOUT PUNCH RECORDS
-            3 SYSOUT SPOOL KBYTES
-         0.00 MINUTES EXECUTION TIME

----------------------------------------------------------------------------------------------------
FILEID=3 DDNAME=JESJCL STEPNAME=JES2 PROCSTEP=
----------------------------------------------------------------------------------------------------

        1 //TESTJOBM JOB (),'MFTEST',                                         JOB01552
          //   MSGCLASS=T,NOTIFY=&SYSUID.
          //*
          IEFC653I SUBSTITUTION JCL - (),'MFTEST',MSGCLASS=T,NOTIFY=USER01
        2 //STEP1    EXEC PGM=IEBGENER
        3 //SYSPRINT DD SYSOUT=*
        4 //SYSIN    DD DUMMY
        5 //SYSUT1   DD *
        6 //SYSUT2   DD SYSOUT=*

----------------------------------------------------------------------------------------------------
FILEID=4 DDNAME=JESYSMSG STEPNAME=JES2 PROCSTEP=
----------------------------------------------------------------------------------------------------

 ICH70001I USER01   LAST ACCESS AT 00:29:59 ON SUNDAY, SEPTEMBER 8, 2013
```

Figure 18-32   z/OS REXX application job output display

All output is retrieved and is listed by DD name. A useful enhancement to this feature is an intermediate step to retrieve the list of DD names and allow the user to show the output for a specific DD only.

Displaying job JCL

The use of the “J” line command on a listed job retrieves the JCL and displays it in an ISPF VIEW session, as shown in Figure 18-33.

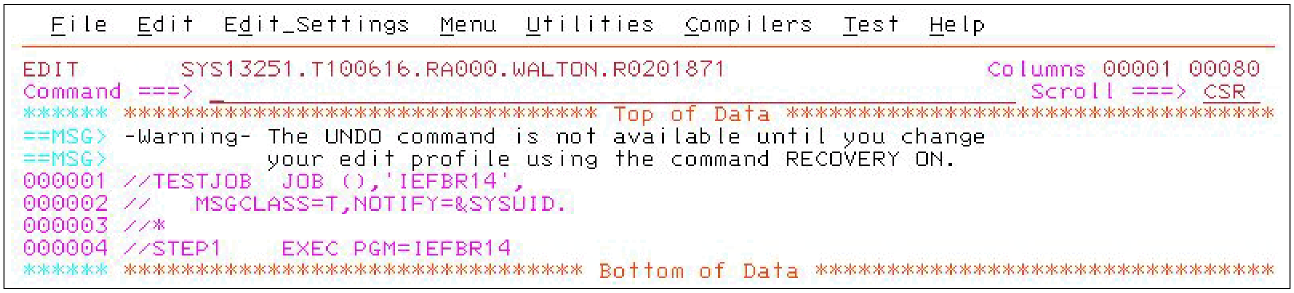

File Edit Edit_Settings Menu Utilities Compilers Test Help

```
VIEW       SYS13253.T055712.RA000.WALTON.R0206678
Command ===>
****** ***************************************************** Top of Data ************
==MSG> -Warning- The UNDO command is not available until you change
==MSG>           your edit profile using the command RECOVERY ON.
000001 //TESTJOBM JOB (),'MFTEST',                                            JOB01552
000002 //    MSGCLASS=T,NOTIFY=&SYSUID.
000003 //*
000004 //STEP1    EXEC PGM=IEBGENER
000005 //SYSPRINT DD SYSOUT=*
000006 //SYSIN    DD DUMMY
000007 //SYSUT1   DD *
000008 LINE 1
000009 LINE 2
000010 LINE 3
000011 /*
000012 //SYSUT2   DD SYSOUT=*
****** **************************************************** Bottom of Data **********
```

Figure 18-33 z/OS REXX application displaying JCL

Submitting a job to a remote z/OSMF system

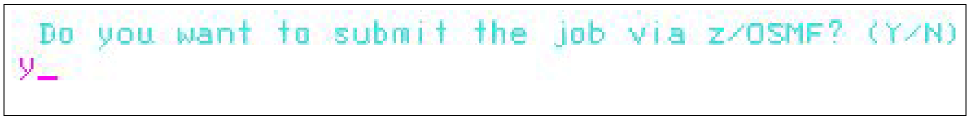
During the initialization of the example application, a basic job JCL is created and stored in a temporary data set. Selecting the remote job submission option from the Edit drop-down menu on the main panel starts an ISPF EDIT session and allows the user to update the JCL, as shown in Figure 18-34.


File Edit Edit_Settings Menu Utilities Compilers Test Help

```
EDIT       SYS13251.T100616.RA000.WALTON.R0201871            Columns 00001 00080
Command ===>                                                    Scroll ===> CSR
****** ********************************* Top of Data **********************************
==MSG> -Warning- The UNDO command is not available until you change
==MSG>           your edit profile using the command RECOVERY ON.
000001 //TESTJOB  JOB (),'IEFBR14',
000002 //    MSGCLASS=T,NOTIFY=&SYSUID.
000003 //*
000004 //STEP1    EXEC PGM=IEFBR14
****** ******************************** Bottom of Data ********************************
```

Figure 18-34 z/OS REXX application edit inline JCL

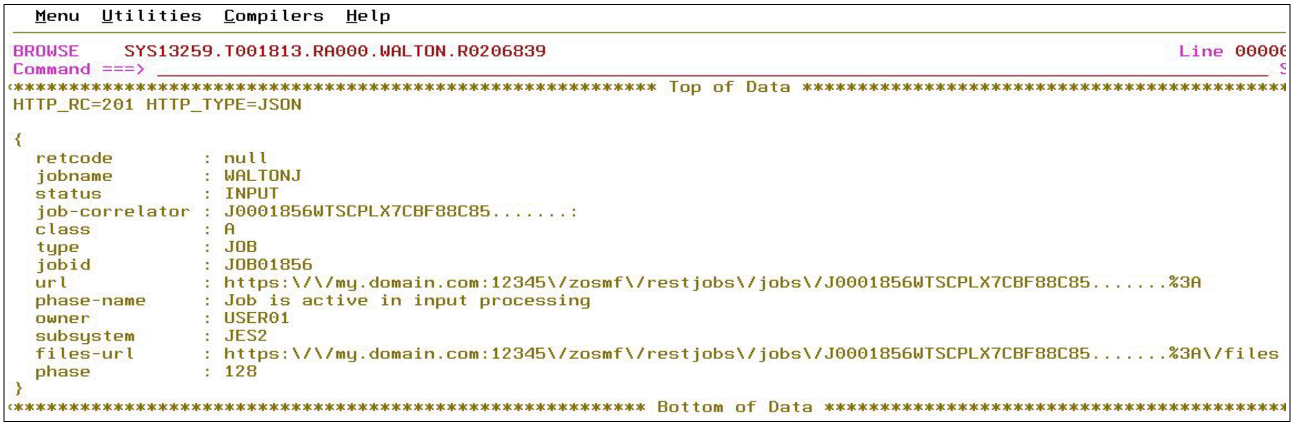
After changes are made to the JCL and the **END** command is run, the user is prompted whether to submit the job to the remote z/OSMF system, as shown in Figure 18-35.



```
 Do you want to submit the job via z/OSMF? (Y/N)
y_
```

Figure 18-35 z/OS REXX application submit job

If the user replies with Y, the job is submitted to the remote z/OSMF system and the API responds with job submission information in JSON format. The example application displays this information in an ISPF BROWSE session, as shown in Figure 18-36. The HTTP response code and content type are also displayed.



```
   Menu  Utilities  Compilers  Help
 BROWSE    SYS13259.T001813.RA000.WALTON.R0206839                                    Line 0000
 Command ===> ____________________________________________________________________________ S
*********************************************************** Top of Data ***********************************************
 HTTP_RC=201 HTTP_TYPE=JSON

 {
   retcode         : null
   jobname         : WALTONJ
   status          : INPUT
   job-correlator  : J0001856WTSCPLX7CBF88C85.......:
   class           : A
   type            : JOB
   jobid           : JOB01856
   url             : https:\/\/my.domain.com:12345\/zosmf\/restjobs\/jobs\/J0001856WTSCPLX7CBF88C85.......%3A
   phase-name      : Job is active in input processing
   owner           : USER01
   subsystem       : JES2
   files-url       : https:\/\/my.domain.com:12345\/zosmf\/restjobs\/jobs\/J0001856WTSCPLX7CBF88C85.......%3A\/files
   phase           : 128
 }
********************************************************** Bottom of Data *********************************************
```

Figure 18-36 z/OS REXX application job submission display

When you exit the job submission display, the job list includes the newly submitted job if the filtering is set appropriately.

18.7.2 JavaScript: Browser-based

The JavaScript version of the job viewer example application is similar to that of the z/OS REXX foreground ISPF dialog with the following differences:

- It is browser-based.
- It does not support remote job submission.
- It shows all data in the window at the same time.
- It does not prompt for user authentication information (it is hardcoded).

The example application requires the following files to be in the same directory that is accessible by the HTTP server that hosts the application.:

- The `mf$.js` support routines
- The `mfproxy.php` support file
- The `mfjobs.html` main driver file

The `mfjobs.html` file is a combination of HTML and inline JavaScript and is the resource that is loaded in to the browser by the user to run the application.

The contents of the `mfjobs.html` file is shown in Example 18-50.

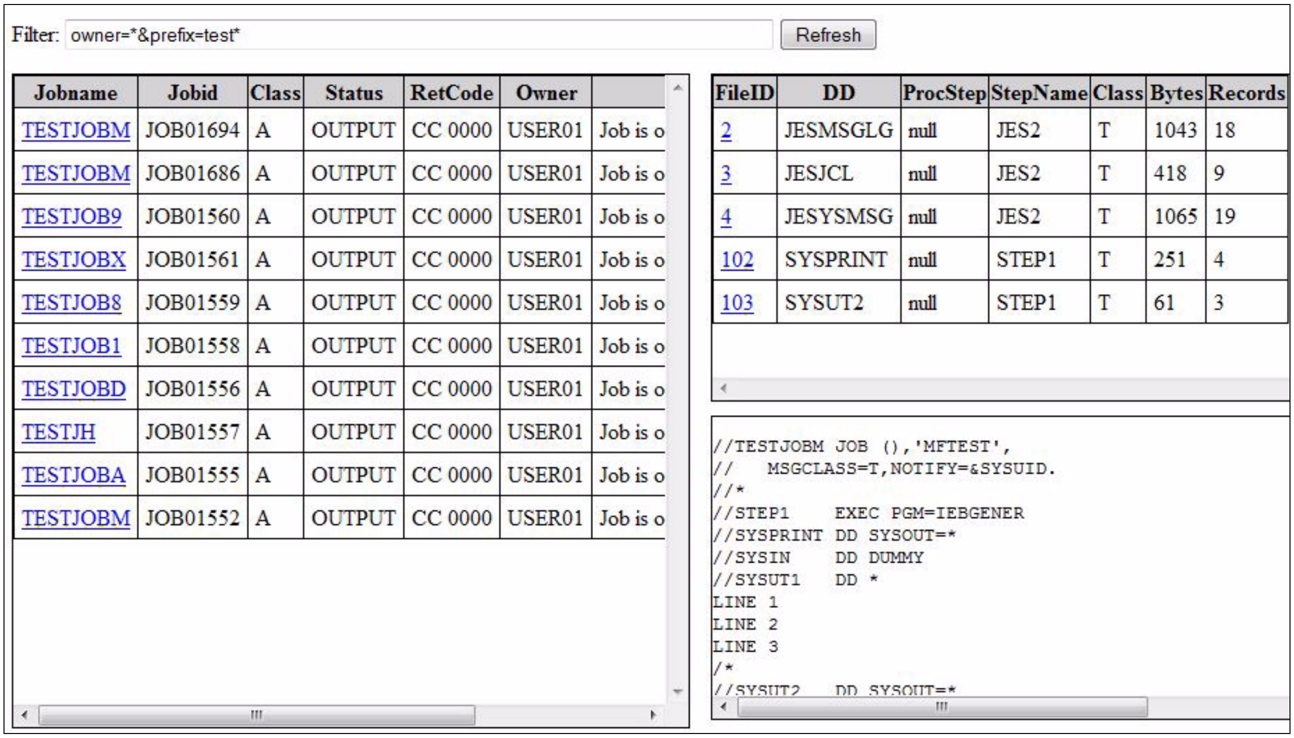
Example 18-50 JavaScript application driver - mfjobs.html

```
<!DOCTYPE html>

<html>
<head>

<!--

  Example application to demonstrate the JavaScript
  support routines.
  A filter field and three output areas are managed
  in the browser session. The filter field controls
  which jobs are displayed and the output areas
  display the jobs list, the selected job files and
  the selected job JCL.

  History:

  20130913 01.01 Richard Walton - Initial writing.

-->

<style>
html,body {height:98%;}
table {border-collapse:collapse;}
table,th,td {border: 1px solid black;}
th {background-color:lightgray;}
td {padding:5px;white-space:nowrap;}
div {border:1px solid black;overflow:scroll;
     width:49%;}
</style>

<!-- Load the support routines -->

<script type="text/javascript" src="mf$.js"></script>

<!-- Application code -->

<script type="text/javascript">

function ready() {
 //
 // Define global pointers
 //
 jobs=new mf_connection();
 files=new mf_connection();
 file=new mf_connection();
 jcl=new mf_connection();
 filter=document.getElementById("ifilter");
 filter.value="owner=*&prefix=test*";
 document.getElementById("irefresh").click();
}

function listJobs() {
 //
 // Display jobs table
 //
 var jobname,jobid;
 var t='<table>';
 t=t+'<tr><th>Jobname</th>'+
         '<th>Jobid</th>'+
         '<th>Class</th>'+
         '<th>Status</th>'+
         '<th>RetCode</th>'+
         '<th>Owner</th>'+
         '<th>Phase</th></tr>';
 for(var j in jobs.json) {
  jobname=jobs.json[j]["jobname"];
  jobid=jobs.json[j]["jobid"];
  t=t+'<tr><td>'+'<a href="javascript:selectJob(\''+
                           jobname+'\',\''+jobid+'\')">'+
                 jobs.json[j]["jobname"]+'</a></td>'+
          '<td>'+jobs.json[j]["jobid"]+'</td>'+
          '<td>'+jobs.json[j]["class"]+'</td>'+
          '<td>'+jobs.json[j]["status"]+'</td>'+
          '<td>'+jobs.json[j]["retcode"]+'</td>'+
          '<td>'+jobs.json[j]["owner"]+'</td>'+
          '<td>'+jobs.json[j]["phase-name"]+'</td></tr>';
 }
 t=t+'</table>';
 jobs.output.innerHTML=t;
}

function selectJob(jobname,jobid) {
 //
 // Get job information
 //
 files.callAPI("ifiles","restjobs/jobs/"+jobname+"/"+
                             jobid+"/files",listFiles);
 jcl.callAPI("ijcl","restjobs/jobs/"+jobname+"/"+jobid+
                         "/files/JCL/records",listJCL);
}

function listJCL() {
 //
 // List JCL for selected job
 //
 jcl.output.innerHTML='<pre>'+jcl.response+'</pre>';
}

function listFiles() {
 //
 // List output files for selected job
 //
 var jobfile,jobname,jobid;
 var t='<table>';
 t=t+'<tr><th>FileID</th>'+
         '<th>DD</th>'+
         '<th>ProcStep</th>'+
         '<th>StepName</th>'+
         '<th>Class</th>'+
         '<th>Bytes</th>'+
         '<th>Records</th></tr>';
 for(var f in files.json) {
  jobfile=files.json[f]["id"];
  jobname=files.json[f]["jobname"];
  jobid=files.json[f]["jobid"];
  t=t+'<tr><td>'+
          '<a href="javascript:selectFile(\''+jobfile+
                       '\',\''+jobname+'\',\''+jobid+'\')">'+
          files.json[f]["id"]+'</a></td>'+
          '<td>'+files.json[f]["ddname"]+'</td>'+
          '<td>'+files.json[f]["procstep"]+'</td>'+
          '<td>'+files.json[f]["stepname"]+'</td>'+
          '<td>'+files.json[f]["class"]+'</td>'+
          '<td>'+files.json[f]["byte-count"]+'</td>'+
          '<td>'+files.json[f]["record-count"]+'</td></tr>';
 }
 t=t+'</table>';
 files.output.innerHTML=t;
}

function selectFile(jobfile,jobname,jobid) {
 //
 // Get job file information
 //
 file.jobname=jobname;
 file.jobid=jobid;
 file.callAPI("ifiles","restjobs/jobs/"+
                       jobname+"/"+jobid+"/files/"+
                       jobfile+"/records",listFile);
}

function listFile() {
 //
 // List selected job file
 //
 file.output.innerHTML='<a href="javascript:selectJob(\''+
                        file.jobname+'\',\''+
                        file.jobid+'\')">[back]</a>'+
                        '<pre>'+file.response+'</pre>';
}

</script>

</head>
<body onload="ready()">
 <p>Filter:
  <input type="edit" id="ifilter" name="ifilter"
         value="" size="80"></input>
  <button type="button" id="irefresh"
          onclick="jobs.callAPI('ijobs','restjobs/jobs?'+
                                 filter.value,listJobs)">
   Refresh
  </button>
 </p>
 <div id="ijobs" style="height:80%;float:left;">
 </div>
 <div id="ifiles" style="height:40%;float:right;">
 </div>
 <div id="ijcl" style="height:37%;float:right;margin-top:1%;">
 </div>
</body>
```

```
</html>
```

Example application components

All of the components of the example JavaScript application, with each one loaded with relevant data, is shown in Figure 18-37.



Jobname	Jobid	Class	Status	RetCode	Owner	
TESTJOBM	JOB01694	A	OUTPUT	CC 0000	USER01	Job is o
TESTJOBM	JOB01686	A	OUTPUT	CC 0000	USER01	Job is o
TESTJOB9	JOB01560	A	OUTPUT	CC 0000	USER01	Job is o
TESTJOBX	JOB01561	A	OUTPUT	CC 0000	USER01	Job is o
TESTJOB8	JOB01559	A	OUTPUT	CC 0000	USER01	Job is o
TESTJOB1	JOB01558	A	OUTPUT	CC 0000	USER01	Job is o
TESTJOBD	JOB01556	A	OUTPUT	CC 0000	USER01	Job is o
TESTJH	JOB01557	A	OUTPUT	CC 0000	USER01	Job is o
TESTJOBA	JOB01555	A	OUTPUT	CC 0000	USER01	Job is o
TESTJOBM	JOB01552	A	OUTPUT	CC 0000	USER01	Job is o

FileID	DD	ProcStep	StepName	Class	Bytes	Records
2	JESMSGLG	null	JES2	T	1043	18
3	JESJCL	null	JES2	T	418	9
4	JESYSMSG	null	JES2	T	1065	19
102	SYSPRINT	null	STEP1	T	251	4
103	SYSUT2	null	STEP1	T	61	3

```
//TESTJOBM JOB (),'MFTEST',
//   MSGCLASS=T,NOTIFY=&SYSUID.
//*
//STEP1    EXEC PGM=IEBGENER
//SYSPRINT DD SYSOUT=*
//SYSIN    DD DUMMY
//SYSUT1   DD *
LINE 1
LINE 2
LINE 3
/*
//SYSUT2   DD SYSOUT=*
```

Figure 18-37 Example components of JavaScript application

The browser window displays a filter edit control and three output areas that include the list of jobs from the remote system, the list of files that are included in the selected job, and the selected job JCL.

18.8 z/OS data set and file REST interface

The z/OS data set and file REST interface is an application programming interface (API), which is implemented through industry standard Representational State Transfer (REST) services, A set of REST services is provided for working with data sets, UNIX files, and directories on a z/OS system.

The z/OS data set and file REST interface services provide a programming interface that you can work with z/OS data sets and UNIX files. This function is similar to the use of GET and PUT requests through file transfer protocol (FTP), but it is secured through traditional z/OS security controls for user authentication and resource authorizations.

The z/OS data set and file REST interface services can be started by any client application that is running on a local z/OS system or remote system. Your program (the client) starts a request through a standard HTTP request method. All four methods (`GET`, `PUT`, `POST`, and `DELETE`) are valid.

From a security point of view, your user ID requires the same authorizations for the use of the z/OS data set and file REST interface because you perform these operations through a TSO/E session on your system. For example, if you want to list the members of a z/OS data set through the REST interface, it requires authorization to start a TSO/E user address space and access to the specified data set.

The operations and the corresponding HTTP methods that you can use with the z/OS data set and file RESTful services are listed in Table 18-1.

Table 18-1 z/OS data set and file RESTful services

Operation	HTTP Method
List data sets on a z/OS system according to specified pattern	GET
List the members of PDS or PDSE according to specified patterns	GET
List the files and directories in a UNIX file paths on a z/OS system	GET
Retrieve the content of a sequential data set, or a member of an OPDS, PDSE, or UNIX file	GET
Write data to a sequential data set, or a member of a PDS, PDSE, or UNIX file	PUT
Allocate a sequential or partitioned data set	POST
Delete a sequential or partitioned data set or a member of a PDS or PDSE	DELETE
Mount or unmount a UNIX file system	PUT
Create or delete a UNIX file or directory	POST or DELETE
Use z/OS UNIX file utilities (chmod, chown, chtag, move, copy, setfacl, getfacl, and extattr)	PUT
Rename or copy zOS data set and PDS member utilities (rename or copy)	PUT
List a z/OS UNIX file system	GET
Create or delete a z/OS UNIX zFS file system	POST or DELETE
Use the IDCAMS Access Method Services	PUT

If you use the z/OS data set and files services, you must follow the syntax as shown in the following examples:

- Retrieve data from a sequential data set:

```
https://host:port/zosmf/restfiles/ds/<data-set-name>
```

- Retrieve data from a member of a PDS or PDSE:

```
https://host:port/zosmf/restfiles/ds/<data-set-name>(<member-name>)
```

- Retrieve data from an uncataloged sequential data set:

```
https://host:port/zosmf/restfiles/ds/-(volser)/<data-set-name>
```

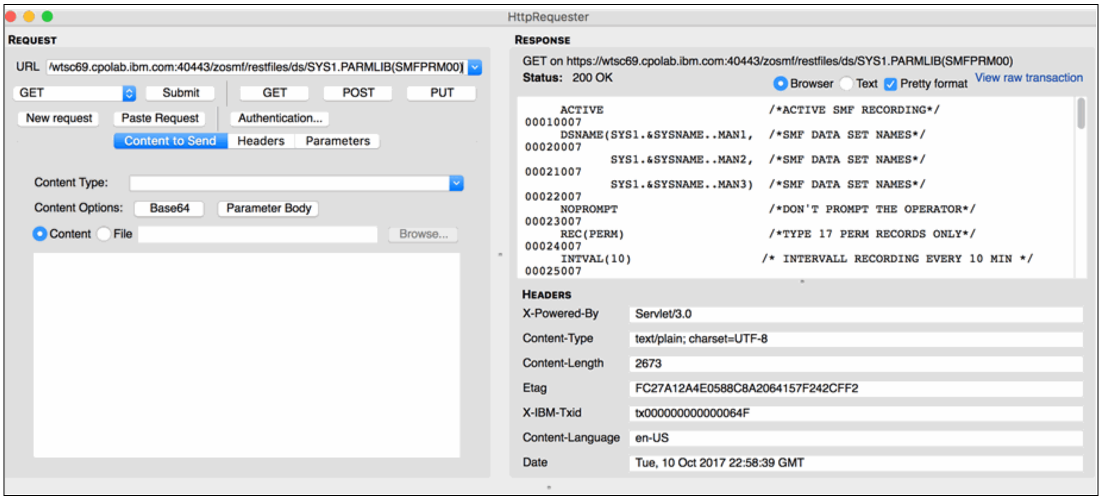
- Retrieve data from a member of an uncataloged PDS or PDSE:

```
https://host:port/zosmf/restfiles/ds/-(volser)/<data-set-name>(<member-name>)
```

- List z/OS data sets on a system:

```
https://host:port/zosmf/restfiles/ds/?dslevel=filter-criteria
```

The command and output for listing the content of SYS1.PARMLIB(SMFPRM00) that uses the z/OS data set and file services by way of the Mozilla Firefox plug-in HttpRequester is shown in Figure 18-38.



URL /wtsc69.cpolab.ibm.com:40443/zosmf/restfiles/ds/SYS1.PARMLIB(SMFPRM00)

Content Type:

Content Options:

● Content ○ File

GET on https://wtsc69.cpolab.ibm.com:40443/zosmf/restfiles/ds/SYS1.PARMLIB(SMFPRM00)
Status: 200 OK

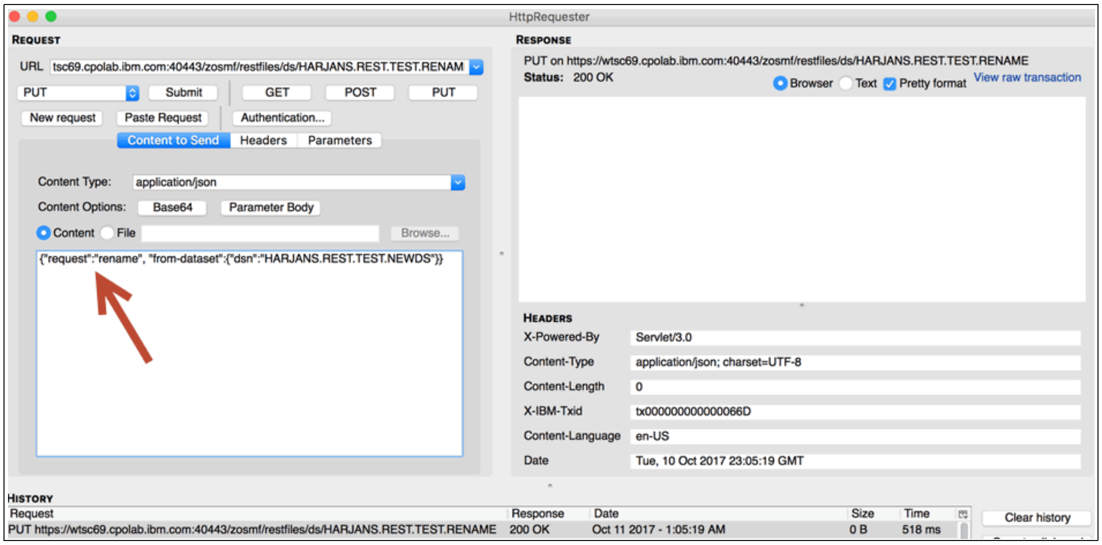
● Browser ○ Text ☑ Pretty format

```
     ACTIVE                       /*ACTIVE SMF RECORDING*/
00010007
     DSNAME(SYS1.&SYSNAME..MAN1,  /*SMF DATA SET NAMES*/
00020007
            SYS1.&SYSNAME..MAN2,  /*SMF DATA SET NAMES*/
00021007
            SYS1.&SYSNAME..MAN3)  /*SMF DATA SET NAMES*/
00022007
     NOPROMPT                     /*DON'T PROMPT THE OPERATOR*/
00023007
     REC(PERM)                    /*TYPE 17 PERM RECORDS ONLY*/
00024007
     INTVAL(10)                  /* INTERVALL RECORDING EVERY 10 MIN */
00025007
```

X-Powered-By	Servlet/3.0
Content-Type	text/plain; charset=UTF-8
Content-Length	2673
Etag	FC27A12A4E0588C8A2064157F242CFF2
X-IBM-Txid	tx000000000000064F
Content-Language	en-US
Date	Tue, 10 Oct 2017 22:58:39 GMT

Figure 18-38 List content of a data set using Firefox plug-in HttpRequester

How to use the data set rename function is shown in Figure 18-39.



URL tsc69.cpolab.ibm.com:40443/zosmf/restfiles/ds/HARJANS.REST.TEST.RENAM

Content Type: application/json

Content Options:

● Content ○ File

```
{"request":"rename", "from-dataset":{"dsn":"HARJANS.REST.TEST.NEWDS"}}
```

PUT on https://wtsc69.cpolab.ibm.com:40443/zosmf/restfiles/ds/HARJANS.REST.TEST.RENAME
Status: 200 OK

● Browser ○ Text ☑ Pretty format

X-Powered-By	Servlet/3.0
Content-Type	application/json; charset=UTF-8
Content-Length	0
X-IBM-Txid	tx000000000000066D
Content-Language	en-US
Date	Tue, 10 Oct 2017 23:05:19 GMT

Request	Response	Date	Size	Time
PUT https://wtsc69.cpolab.ibm.com:40443/zosmf/restfiles/ds/HARJANS.REST.TEST.RENAME	200 OK	Oct 11 2017 - 1:05:19 AM	0 B	518 ms

Figure 18-39 Rename of a data set using Firefox plug-in HttpRequester

In contrast to a list function HTTP GET request, you must use the HTTP PUT verb. For a PUT verb, you must send more parameters that you describe in JSON notation. The arrow that is shown in Figure 18-39 indicates where to place the PUT code and its parameters.

Part 5

Appendixes

The appendixes feature useful information about topics (such as migration and diagnostic tests) that is not covered elsewhere.

A

Migration

This appendix describes pre-migration tasks and the necessary migration steps to move from IBM z/OS Management Facility (z/OSMF) V1.13 to the new level of z/OSMF V2R3. Other post-migration steps are also described.

The appendix includes the following topics:

A.1 Pre-migration issues

This section provides an overview of the steps that you must consider before you can start the migration to z/OSMF V2R3. Because the Repository Authorization Mode in z/OSMF was discontinued, you must ensure that your security setup is in SAF Authorization Mode before migrating to z/OSMF versions 2.1 or 2.3.

In this section, we briefly review the command flow. If your z/OSMF configuration is converted to the SAF Authorization Mode, see A.1.2, “Software and miscellaneous prerequisites” on page 538.

Some software prerequisites are listed in this appendix.

A.1.1 Converting from Repository Authorization Mode to SAF Authorization Mode

If you are running in a z/OSMF before V2R1, convert your z/OSMF to the new SAF Authorization Mode by completing the full z/OSMF V1.13 configuration with the following exceptions:

1. Create an override file that contains the configuration variable, as shown in Example A-1.

   Example A-1 Override configuration variable for SAF Authorization Mode

   ```
   IZU_AUTHORIZATION_MODE=SAF
   ```

   During the **izusetup.sh -config -overridefile ...** process, the following REXX execs are created:

   – **izuconfig.cfg.rexx**
   – **izuconfig.cfg.convertREPtoSAF.rexx**

   The REXX exec **izuconfig.cfg.convertREPtoSAF.rexx** contains all the RACF definitions that are required for z/OSMF to run in SAF Authorization Mode. It is sufficient to run only this REXX exec. However, if you want to run all the RACF definitions again (including the new RACF definitions for the SAF Authorization Mode), you also can run the **izuconfig.cfg.rexx** REXX exec.

2. Run the **izusetup.sh -verify racf | -prime | -finish** script to complete the z/OSMF configuration.

For more information about configuring z/OSMF at the z/OS V1R13 level, see *IBM z/OS Management Facility Configuration Guide*, SA38-0652.

A.1.2 Software and miscellaneous prerequisites

Consider the following points before you perform the migration of z/OSMF V2R1:

- z/OSMF V2R1 requires Java Version 1.7 64-bit.
- z/OSMF V1R13 WebSphere OEM ports are no longer used:
  - With z/OSMF V2R1, the HTTP/S default ports are changed to 80 and 443.
  - If possible, change your TCP/IP PORT definitions to use the same ports for HTPP/S as before. If you use the same port numbers for z/OSMF V2R1, consider changing them back in case a fallback to z/OSMF V1.13 occurs.

Tip: Use your TCP/IP port definitions for 32207 and 32208 and change the following z/OSMF variables:

```
IZU_HTTP_SSL_PORT=39208
IZU_HTTP_PORT=39207
```

- With z/OS V2R1, a new **HLQLONG** parameter in CEAPRMxx supports a longer HLQ for CEA logging data sets. With **HLQLONG** CEA, the length of the HLQ is increased from four to eight characters.
- z/OSMF installation user ZOSMFAD is no longer required to run the configuration scripts. The user that is running the installation (the configuration script) must be defined to RACF group IZUADMIN, as UID(0), or to the BPX.SUPERUSER profile.

  Also, review the UNIXPRIV class privileges for SUPERUSER.**. Later during the z/OSMF configuration, a RACF REXX exec is created for the installation user. Run this REXX exec to complete the RACF definitions for this z/OSMF V2R1 installation user. Typically, you can use your defined TSO here.
- Check your installation if you use PassTickets for secure communication with a remote server. The Capacity Provisioning and Resource Monitoring plug-ins are use PassTickets authentication against the CIM server.

  As with the z/OSMF V1.13 WebSphere OEM servant user ID (the default user ID name is WSSRU1), the z/OSMF server user ID (the default user ID name is IZUSVR) must be authorized to create PassTickets:

  – **UPDATE** access for IRRPTAUTH.CFZAPPL.* in RACF class PTKTDATA for the Capacity Provisioning plug-in.

  – **UPDATE** access for IRRPTAUTH.GPMSERVE.* in RACF class PTKTDATA for the Resource Monitoring plug-in.
- z/OSMF V2R1 delivers two new started task procedures, one for the z/OSMF server and one for the WebSphere Liberty Profile. Ensure that you define these new tasks in your RACF STARTED class and assign the z/SOMF user (IZUSVR) to the STARTED profile. The following procedure names are used:

  – IZUANG1: The WebSphere Liberty Profile.
  – IZUSVR1: The z/OSMF server.

A.2 Migrating the configuration file to the new release level

Run the migration script from an OMVS or a telnet/login session. You can migrate the configuration file or the override file separately or you can migrate both files at the same time.

A.2.1 Running the izumigrate.sh script

To migrate the configuration and override files concurrently, run the command that is shown in Example A-2.

Example A-2 izumigrate.sh script example

```
./izumigrate.sh -file /etc/zosmf/izuconfig1.cfg -overridefile
/etc/zosmf/izuconfig1.ovr
```

The migrate script saves the configuration and override files with new names by using the suffix *.V1R13, as shown in the `/etc/zosmf` directory that is shown in Example A-3.

Example A-3 Saved configuration and override file name

```
izuconfig1.cfg.V1R13
izuconfig1.ovr.V1R13
```

A.2.2 Log and reports

The script creates the following log file and report files in the `IZU_LOGFILE_DIR` directory:

- `izumigrate.mm.dd.yy.hh.mm.ss.log`
- `izumigration.report`
- `izumigration.report.mm.dd.yy.hh.mm.ss`

The report files are divided into sections: one for the configuration file and one for the override file. Also, each section includes the following parts:

- Removed properties
- Added properties
- Updated properties

The properties list includes the names of the configuration file and override file variables that are removed, added, and updated with z/OSMF V2R1. The complete sample output of a migration report file is shown in Example A-4.

Example A-4 Sample output of the izumigrate script report file

```
/* ------------------------------------------------------------------    */
/* Licensed Materials - Property of IBM                                  */
/* 5610-A01                                                              */
/* Copyright IBM Corp. 2010, 2013                                        */
/*                                                                       */
/* Status = HSMA210                                                      */
/* ------------------------------------------------------------------    */
/*                                                                       */
/* ------------------------------------------------------------------    */
/*                                                                       */
/* Exec Name   : izumigration.report                                     */
/*                                                                       */
/* Description : z/OSMF migration report.                                */
/*                                                                       */
/* ------------------------------------------------------------------    */
/* Change History :                                                      */
/* Date       Description                              Prgmr      Ch Flg */
/* ---------- ---------------------------------------- ---------- ------ */
/* 2011-10-07 New                                      puiam             */
/*                                                                       */
/*************************************************************************/

/*-----------------------------------------------------------------------*/

Invocation command: ./izumigrate.sh -file /etc/zosmf/izuconfig1.cfg -overridefile
/etc/zosmf/izuconfig1.ovr
```

```
User ID: OMVS
Date: 07.01.13
Time: 13.42.55

The following environment variables were in effect during the creation
of this report file:

IZU_CODE_ROOT=/usr/lpp/zosmf/V2R1

IZU_CONFIG_DIR=/etc/zosmf

IZU_LOGFILE_DIR=/var/zosmf/configuration/logs

/*-----------------------------------------------------------------------*/

/*-----------------------------------------------------------------------*/

Configuration File Processing
-----------------------------
Previous configuration file was saved as:  "/etc/zosmf/izuconfig1.cfg.V1R13"

Updated configuration file was created as:  "/etc/zosmf/izuconfig1.cfg"

The complete list of properties contained in the default configuration file for
the current release of z/OSMF are:

IZU_CONFIG_FILE_VERSION=2.1.0
IZU_DATA_DIR=/var/zosmf/data
IZU_DATA_FS_NAME=IZU.SIZUDATA
IZU_DATA_FS_TYPE=ZFS
IZU_DATA_FS_VOLUME='*'
IZU_DATA_FS_SIZE=200
IZU_AUTOUID_OVERRIDE=NO.DEFAULT.VALUE
IZU_AUTOGID_OVERRIDE=NO.DEFAULT.VALUE
IZU_ADMIN_GROUP_NAME=IZUADMIN
IZU_ADMIN_GROUP_GID=9003
IZU_USERS_GROUP_NAME=IZUUSER
IZU_USERS_GROUP_GID=9004
IZU_HTTP_SSL_PORT=32208
IZU_APPSERVER_HOSTNAME=NO.DEFAULT.VALUE
IZU_CIM_ADMIN_GROUP_NAME=CFZADMGP
IZU_CIM_USER_GROUP_NAME=CFZUSRGP
IZU_ZOS_SECURITY_ADMIN_GROUP_NAME=IZUSECAD
IZU_ZOS_SECURITY_ADMIN_GROUP_GID=9006
IZU_UNAUTHENTICATED_GROUP_NAME=IZUUNGRP
IZU_UNAUTHENTICATED_GROUP_GID=9012
IZU_CA_CONFIGURE=NO.DEFAULT.VALUE
IZU_CP_CONFIGURE=NO.DEFAULT.VALUE
IZU_CP_QUERY_GROUP_NAME=CPOQUERY
IZU_CP_CONTROL_GROUP_NAME=CPOCTRL
IZU_DM_CONFIGURE=NO.DEFAULT.VALUE
IZU_IL_CONFIGURE=NO.DEFAULT.VALUE
IZU_IL_CEA_CONFIGURE=Y
IZU_CEA_HLQ='CEA'
IZU_COUNTRY_CODE=NO.DEFAULT.VALUE
```

```
IZU_BRANCH_CODE=NO.DEFAULT.VALUE
IZU_STORAGE_VALUE=NO.DEFAULT.VALUE
IZU_CEAPRM_SOURCE_PARMLIB=SYS1.PARMLIB
IZU_CEAPRM_TARGET_PARMLIB=SYS1.PARMLIB
IZU_IEADMC_SOURCE_PARMLIB=SYS1.SAMPLIB
IZU_IEADMC_TARGET_PARMLIB=SYS1.PARMLIB
IZU_CEA_PARM_NAME=01
IZU_IEA_PARM_NAME=ZM
IZU_WISPF_CONFIGURE=NO.DEFAULT.VALUE
IZU_RMF_CONFIGURE=NO.DEFAULT.VALUE
IZU_WLM_CONFIGURE=NO.DEFAULT.VALUE
IZU_WLM_GROUP_NAME=WLMGRP

Plug-in Configuration Property
--------------------------------------------
Configuration Assistant = IZU_CA_CONFIGURE
Incident Log            = IZU_IL_CONFIGURE
Workload Management     = IZU_WLM_CONFIGURE
Resource Monitoring     = IZU_RMF_CONFIGURE
Capacity Provisioning   = IZU_CP_CONFIGURE
ISPF                    = IZU_WISPF_CONFIGURE
Software Deployment     = IZU_DM_CONFIGURE

/*----------------------------------------------------------------------*/


/*----------------------------------------------------------------------*/

Removed Properties
------------------
The following properties are removed from the updated configuration file.
These properties are no longer supported in the current release of z/OSMF.
In the list below, each property is shown with its value as specified in
the previous configuration file. This value is either an installation
supplied value, if one was specified, or the IBM default value.

IZU_SMS_CONFIGURE=Y
IZU_STORAGE_GROUP_NAME=ZOSMFSTG
IZU_STORAGE_GROUP_GID=502009005
IZU_AUTHORIZATION_MODE=SAF
IZU_WAS_CONFIG_FILE_KNOWN=Y
IZU_WAS_CONFIG_FILE_LOCATION=/etc/zWebSphereOEM/V7R0/conf/CONFIG1/CONFIG1.response
File
IZU_APPSERVER_GROUP=BBNCFG1
IZU_APPSERVER_ROOT=/zWebSphereOEM/V7R0/config1
IZU_WAS_PROFILE_PREFIX=BBNBASE
IZU_CLUSTER_TRANSITION_NAME=BBNC001
IZU_CELL_SHORT_NAME=BBNBASE
IZU_CONTROL_USERID=BBNCRU1
IZU_SERVANT_USERID=BBNSRU1
IZU_ORB_PORT=39203
IZU_WBEM_ROOT=/usr/lpp/wbem
IZU_ADMIN_NAME=ZOSMFAD
IZU_ADMIN_UID=502009001
IZU_ADMIN_HOME=/u/zosmfad
```

```
IZU_ADMIN_PROGRAM=/bin/sh
IZU_ADMIN_PROC=TSOLOGON
IZU_ADMIN_ACCOUNT=1111

Added Properties
----------------
The following properties are added to the updated configuration file.
These properties are new for z/OSMF since the time of your last
configuration. In the list below, each property is shown with its
IBM default value, unless a value from your previous configuration applies
to an added property.  In this case, your value is used in its place.

IZU_ZOS_SECURITY_ADMIN_GROUP_NAME=IZUSECAD
IZU_ZOS_SECURITY_ADMIN_GROUP_GID=9006
IZU_UNAUTHENTICATED_GROUP_NAME=IZUUNGRP
IZU_UNAUTHENTICATED_GROUP_GID=9012
IZU_STARTED_TASK_USERID_NAME=IZUSVR
IZU_STARTED_TASK_USERID_UID=9010
IZU_STARTED_TASK_HOME=/u/izusvr
IZU_STARTED_TASK_PROGRAM=/bin/sh
IZU_SAF_PROFILE_PREFIX=IZUDFLT
IZU_DEFAULT_CERTAUTH=Y
IZU_UNAUTHENTICATED_NAME=IZUGUEST
IZU_UNAUTHENTICATED_UID=9011
IZU_HTTP_PORT=80

Updated Properties
------------------
The following properties have been updated in the configuration file for the
current release.

IZU_CONFIG_FILE_VERSION=2.1.0

/*-----------------------------------------------------------------------*/


The migration of the configuration file has completed.



/*-----------------------------------------------------------------------*/

Override File Processing
------------------------
Previous override file was saved as:  "/etc/zosmf/izuconfig1.ovr.V1R13"

Updated override file was created as:  "/etc/zosmf/izuconfig1.ovr"

The complete list of properties contained in the default override file for the
current release of z/OSMF are:

IZU_OVERRIDE_FILE_VERSION=2.1.0
IZU_DATA_DIR=/var/zosmf/data
IZU_DATA_FS_NAME=IZU.SIZUDATA
IZU_DATA_FS_TYPE=ZFS
IZU_DATA_FS_VOLUME='*'
```

```
IZU_DATA_FS_SIZE=200
IZU_AUTOUID_OVERRIDE=NO.DEFAULT.VALUE
IZU_AUTOGID_OVERRIDE=NO.DEFAULT.VALUE
IZU_ADMIN_GROUP_NAME=IZUADMIN
IZU_ADMIN_GROUP_GID=9003
IZU_USERS_GROUP_NAME=IZUUSER
IZU_USERS_GROUP_GID=9004
IZU_HTTP_SSL_PORT=32208
IZU_APPSERVER_HOSTNAME=NO.DEFAULT.VALUE
IZU_CIM_ADMIN_GROUP_NAME=CFZADMGP
IZU_CIM_USER_GROUP_NAME=CFZUSRGP
IZU_ZOS_SECURITY_ADMIN_GROUP_NAME=IZUSECAD
IZU_ZOS_SECURITY_ADMIN_GROUP_GID=9006
IZU_UNAUTHENTICATED_GROUP_NAME=IZUUNGRP
IZU_UNAUTHENTICATED_GROUP_GID=9012
IZU_CA_CONFIGURE=NO.DEFAULT.VALUE
IZU_CP_CONFIGURE=NO.DEFAULT.VALUE
IZU_CP_QUERY_GROUP_NAME=CPOQUERY
IZU_CP_CONTROL_GROUP_NAME=CPOCTRL
IZU_DM_CONFIGURE=NO.DEFAULT.VALUE
IZU_IL_CONFIGURE=NO.DEFAULT.VALUE
IZU_IL_CEA_CONFIGURE=Y
IZU_CEA_HLQ='CEA'
IZU_COUNTRY_CODE=NO.DEFAULT.VALUE
IZU_BRANCH_CODE=NO.DEFAULT.VALUE
IZU_STORAGE_VALUE=NO.DEFAULT.VALUE
IZU_CEAPRM_SOURCE_PARMLIB=SYS1.PARMLIB
IZU_CEAPRM_TARGET_PARMLIB=SYS1.PARMLIB
IZU_IEADMC_SOURCE_PARMLIB=SYS1.SAMPLIB
IZU_IEADMC_TARGET_PARMLIB=SYS1.PARMLIB
IZU_CEA_PARM_NAME=01
IZU_IEA_PARM_NAME=ZM
IZU_WISPF_CONFIGURE=NO.DEFAULT.VALUE
IZU_RMF_CONFIGURE=NO.DEFAULT.VALUE
IZU_WLM_CONFIGURE=NO.DEFAULT.VALUE
IZU_WLM_GROUP_NAME=WLMGRP
IZU_STARTED_TASK_USERID_NAME=IZUSVR
IZU_STARTED_TASK_USERID_UID=9010
IZU_STARTED_TASK_HOME=/u/izusvr
IZU_STARTED_TASK_PROGRAM=/bin/sh
IZU_SAF_PROFILE_PREFIX=IZUDFLT
IZU_DEFAULT_CERTAUTH=Y
IZU_UNAUTHENTICATED_NAME=IZUGUEST
IZU_UNAUTHENTICATED_UID=9011
IZU_HTTP_PORT=80


If a property was removed from the current release of z/OSMF and it was found
in your override file, the migration process will remove that property from your
override file.

If a property has been added to the current release of z/OSMF and it corresponds
to a property in your override file, that property will be added to your
override file with your existing value.
```

```
Plug-in Configuration Property
--------------------------------------------
Configuration Assistant = IZU_CA_CONFIGURE
Incident Log            = IZU_IL_CONFIGURE
Workload Management     = IZU_WLM_CONFIGURE
Resource Monitoring     = IZU_RMF_CONFIGURE
Capacity Provisioning   = IZU_CP_CONFIGURE
ISPF                    = IZU_WISPF_CONFIGURE
Software Deployment     = IZU_DM_CONFIGURE

/*---------------------------------------------------------------------*/


/*---------------------------------------------------------------------*/

Removed Properties
------------------
The following properties have been removed from the override file for the
current release and are no longer supported.  The properties are displayed
with their default values unless a corresponding value was found in your
override file.  In this case, your value is used in its place.

IZU_SMS_CONFIGURE=Y
IZU_STORAGE_GROUP_NAME=ZOSMFSTG
IZU_STORAGE_GROUP_GID=502009005
IZU_ADMIN_NAME=ZOSMFAD
IZU_ADMIN_UID=502009001
IZU_ADMIN_HOME=/u/zosmfad
IZU_ADMIN_PROGRAM=/bin/sh
IZU_ADMIN_PROC=TSOLOGON
IZU_ADMIN_ACCOUNT=1111

Added Properties
----------------
The following properties have been added to the override file for the current
release.  The properties are displayed with their default values unless a
corresponding value was found in your override file.  In this case, your value
is used in its place.

IZU_ZOS_SECURITY_ADMIN_GROUP_NAME=IZUSECAD
IZU_ZOS_SECURITY_ADMIN_GROUP_GID=9006
IZU_UNAUTHENTICATED_GROUP_NAME=IZUUNGRP
IZU_UNAUTHENTICATED_GROUP_GID=9012

Updated Properties
------------------
The following properties have been updated in the override file for the current
release:

IZU_OVERRIDE_FILE_VERSION=2.1.0

/*---------------------------------------------------------------------*/


The migration of the override file has completed.
```

```
/*---------------------------------------------------------------------*/

You can migrate your system to the new release of z/OSMF.  Follow the
steps described in the IBM z/OS Management Facility Configuration Guide Version 2
Release 1, SA38-0657 to configure the new release of z/OSMF.

/*---------------------------------------------------------------------*/
```

A.3 Configuration

After you convert the configuration file, you must run a complete z/OSMF V2R1 configuration setup. To do so, use the configuration scripts that are described in Chapter 4, “IBM z/OS Management Facility installation and configuration” on page 83.

> **Tip:** Configure your new z/OSMF V2R1 environment by using the same TCP/IP ports for HTTP and HTTPS as in z/OSMF V1.13 for WebSphere OEM Server instead of the new default ports 80 for HTTP and 443 for HTTPS. By using the same TCP/IP port numbers and the same z/OSMF URL, your z/OSMF users do not have to change their web browser links.

A.4 Post-migration tasks

Because you no longer must use the ZOSMFAD user ID (the former z/OSMF installation user) since z/OSMF V2R1, that user ID can be removed. Also, you can remove all WebSphere OEM SAF and system-related definitions.

For more information about removing these IDs and definitions, “Clean-up actions to perform when satisfied with the new release” section in Chapter 4 of *IBM z/OS Management Facility Configuration Guide Version 2 Release 1*, SA38-0657.

B

Diagnostic tests

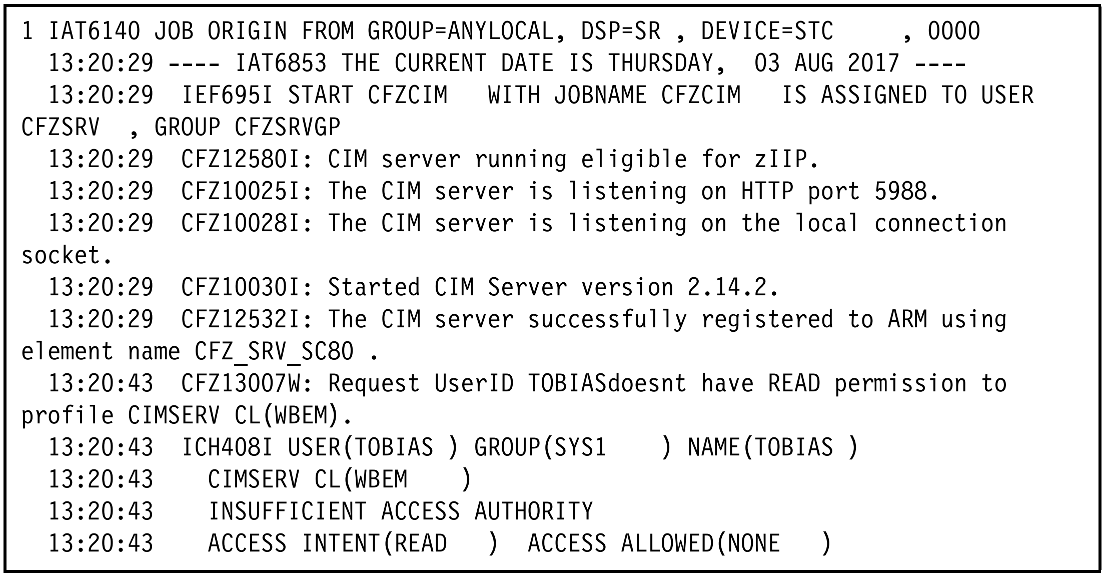
This appendix describes some procedures and methods that are used for performing problem determination, troubleshooting the status of the components, and acquiring diagnostic information. Enabling traces for the components is done only at the request of IBM Support.

This appendix includes the following topics:

B.1 Diagnostic messages overview

Diagnostic messages are written to separate places, depending on the component for which diagnostic information is being collected. Look for messages in the SYSLOG or the running started tasks. CFZCIM, IZUANG1, CPOSERV, and IZUSVR1 started tasks (STC) are often the first places to check.

Part of the CIM server STC that records a RACF profile issue for the MELVIN ID is shown in Figure B-1.



```
1 IAT6140 JOB ORIGIN FROM GROUP=ANYLOCAL, DSP=SR , DEVICE=STC     , 0000
  13:20:29 ---- IAT6853 THE CURRENT DATE IS THURSDAY,  03 AUG 2017 ----
  13:20:29  IEF695I START CFZCIM   WITH JOBNAME CFZCIM   IS ASSIGNED TO USER
CFZSRV  , GROUP CFZSRVGP
  13:20:29  CFZ12580I: CIM server running eligible for zIIP.
  13:20:29  CFZ10025I: The CIM server is listening on HTTP port 5988.
  13:20:29  CFZ10028I: The CIM server is listening on the local connection
socket.
  13:20:29  CFZ10030I: Started CIM Server version 2.14.2.
  13:20:29  CFZ12532I: The CIM server successfully registered to ARM using
element name CFZ_SRV_SC80 .
  13:20:43  CFZ13007W: Request UserID TOBIASdoesnt have READ permission to
profile CIMSERV CL(WBEM).
  13:20:43  ICH408I USER(TOBIAS ) GROUP(SYS1    ) NAME(TOBIAS )
  13:20:43    CIMSERV CL(WBEM    )
  13:20:43    INSUFFICIENT ACCESS AUTHORITY
  13:20:43    ACCESS INTENT(READ   )  ACCESS ALLOWED(NONE   )
```

Figure B-1 RACF violation

B.2 CIM server tracing

Logging and tracing troubleshooting tools are provided by CIM. These tools are defined in the CIM server configuration properties.

Use the UNIX System Services **cimconfig** command or the MVS **Modify** command to enable tracing and logging for the CIM server. For more information, see *z/OS Common Information Model User's Guide*, SC34-2671.

You need CONTROL access to the CIMSERV profile in the WBEM class to run these commands.

By default, tracing is written to memory and included in a memory dump; this default can be changed by using the **traceFacility** setting. IBM Support often asks you to modify the **Loglevel**, **traceComponents**, and **traceLevel** settings.

B.2.1 Log levels

You can choose between the following log levels:

- INFORMATION: The default level, which provides informational messages
- WARNING: Returns log messages for warnings, and severe and unrecoverable errors
- SEVERE: Returns log messages for severe and unrecoverable errors

- FATAL: Returns log messages only for unrecoverable errors
- TRACE: Returns all log messages and all trace messages

B.2.2 Trace components

The **traceComponents** parameter specifies the components that you want to trace. Although you can isolate a trace to a specific CIM component, “All” is suggested.

For more information about the available options, see the “Tracing” section of *z/OS Common Information Model User's Guide*, SC34-2671.

B.2.3 Trace level

The **traceLevel** parameter turns tracing on and off and specifies the trace level. The following trace levels are available:

- 0: Tracing is off
- 1: Severe errors
- 2: Warning level error messages (default)
- 3: Inter-function logic flow, medium data detail
- 4: High data detail
- 5: High data detail, method enter, and exit

B.2.4 Example of tracing

In this section, we describe a tracing example in which we perform the following actions:

1. Specify a trace level of 5 for High data detail (**traceLevel**).
2. Specify a trace for all components (**traceComponents**).
3. Run the trace.
4. Write the trace to the default trace file `/tmp/cimserver.trc`. This file can be changed by using the **traceFilePath** parameter.

To set tracing dynamically, run the commands that are shown in Example B-1 from the UNIX System Services shell. You can also save these commands in a UNIX System Services shell script for faster setup.

Example B-1 Cimconfig commands to enable tracing

```
cimconfig -c -s traceFacility=File
cimconfig -c -s traceFilePath=/tmp/cimserver.trc
cimconfig -c -s traceLevel=5
cimconfig -c -s logLevel=TRACE
cimconfig -c -s traceComponents=All
```

You can also use MVS console commands, as shown in Example B-2.

Example B-2 MVS commands to enable tracing

```
F CFZCIM,APPL=CONFIG,TRACEFACILITY=FILE:
F CFZCIM,APPL=CONFIG,TRACEFILEPATH=/tmp/cimserver.trc
F CFZCIM,APPL=CONFIG,TRACELEVEL=5
F CFZCIM,APPL=CONFIG,LOGLEVEL=TRACE
F CFZCIM,APPL=CONFIG,TRACECOMPONENTS=ALL
```

Trace data is written in ASCII format to the specified file, which can be viewed by using ISPF with the View ASCII (VA) option. This data also can be downloaded to a workstation in `bin` format and viewed with a text editor.

The trace records use the following format:

```
<Seconds after 1970>s-<micro seconds>us:<Component Name> [<ProcessID:ThreadID:File
name: Line Number>]: <detailed information>
```

For more information, see the OpenPegasus Tracing User Guide.

These changes are in effect while the current CIM server is running. To make a persistent change, use the **`-p`** option instead of the **`-c`** option with **`cimconfig`**. For the MVS command, you use the **`PLANNED`** parameter.

To turn off the traces, run the commands that are shown in Example B-3 from the UNIX System Services shell. You can also save these commands in a UNIX System Services shell script for faster setup.

Example B-3 Cimconfig commands to turn off tracing

```
cimconfig -c -s traceLevel=1
cimconfig -c -s logLevel=INFORMATION
```

Leave the default for **`traceComponents`** as ALL. The MVS console commands that are used to update for the next IPL are shown in Example B-4.

Example B-4 MVS commands to turn off tracing

```
F CFZCIM,APPL=CONFIG,TRACELEVEL=1,PLANNED
F CFZCIM,APPL=CONFIG,LOGLEVEL=INFORMATION,PLANNED
```

B.2.5 OSBASE

You also might need to perform an OSBASE trace, which traces CIM instrumentation. This trace is set by the `OSBASE_TRACE` CIM environment variable in the `/etc/wbem/cimserver.env` file.

The default setting is 0 and can go up to 4, which provides the most detail. This trace is written to the location that is specified by the `OSBASE_TRACE_FILE=` variable.

This trace can also be changed dynamically by running the following MVS commands:

```
F CFZCIM,APPL=ENV,OSBASE_TRACE=4
```

B.2.6 Caveats

Running a trace does result in some unwanted effects. Depending on what is being traced, you might see increased processing time for the CIM server.

Along with increased processing time, data is written to files that can grow large (how large is proportionate to the type and length of tracing).

Typical trace requests are run for short periods and then reset to the default settings. Space and processor usage should not be an issue. Ensure that the traces are disabled.

B.3 Application server

The WebSphere Application Server Liberty Profile is the application server that we use in our example. Tracing can be controlled by MVS commands to the Liberty Server address space or by modifying the `bootstrap.template` file.

B.3.1 z/OS modify command

z/OSMF tracing can be enabled by running the following MVS **`MODIFY`** command:

```
f server-name,logging='trace_specification'
```

Where `server-name` is the z/OSMF server, which is IZUSVR1 by default, and `trace_specification` is the level of tracing to be used.

The following examples show the use of this command:

- To enable all tracing, run the following command:

  ```
  f izusvr1,logging='*=warning:com.ibm.zoszmf.util.data.*=all'
  ```

- To trace security, run the following command:

  ```
  F IZUSVR1,LOGGING='com.ibm.ws.security.*=all'
  ```

- To reset the trace specification, run the following command:

  ```
  f izusvr1,logging='reset'
  ```

B.3.2 Bootstrap updates

Trace specifications can be set in the file `/var/zosmf/configuration/local_override.cfg`. The first time that you want to add or change some configuration settings, you must create this file. After the started task IZUSVR1 is restarted, the new configuration is loaded in the `/var/zosmf/configuration/active_configuration.cfg` file.

The following example shows the default setting:

```
LOGGING='*=warning:com.ibm.zoszmf.*=info:com.ibm.zoszmf.environment.ui=finer'
```

To enable security tracing, modify or create the `local_override.cfg` file, as shown in Example B-5.

Example B-5 local_override.cfg file

```
LOGGING='com.ibm.ws.logging.trace.specification=*=audit:com.ibm.zoszmf.*=all:com
.ibm.ws.security.*=all=enabled:com.ibm.ws.security.*=all=enabled'
```

After the trace is captured, remove the additions because this change is persistent.

B.3.3 Tracing and logging output

Message and traces are written to the following file:

```
IZU_DATA_DIR/logs/zosmfServer/logs
```

The `trace.log` data set contains z/OSMF-related trace messages. The `message.log` contains non-z/OSMF trace messages (for WebSphere Application Liberty profile). These messages are created as a result of enabling tracing, as described in B.3, "Application server" on page 551.

B.3.4 First Failure Data Capture

WebSphere Application Server uses the First Failure Data Capture (FFDC) facility to instantly collect information about the events and errors that lead up to the failure. The captured data can then be used to analyze the problem.

After a maximum number of days, these files are automatically deleted from your system. These logs are stored in `IZU_DATA_DIR/logs/zosmfServer/logs/ffdc`.

FFDC files for errors are created in this directory.

B.3.5 Dumps

You can create Java dumps, memory dumps, and display the server's status by using the **`MODIFY`** console command. The Liberty server supports requests for SVC dumps and transaction dumps by using the following commands:

- `MODIFY jobname,svcdump`
- `MODIFY jobname,tdump`

Server commands can also be used to issue dumps and check the server's status.

When the WebSphere Application Server Liberty profile is used to create Java dumps, memory dumps, and the server's status, export the following environment variables:

- `WLP_INSTALL_DIR="IZU_CODE_ROOT/wlp"`
- `WLP_OUTPUT_DIR="IZU_DATA_DIR/logs"`
- `WLP_USER_DIR="IZU_CONFIG_DIR"`

Then, you can run the following UNIX System Services commands:

- `IZU_CODE_ROOT/wlp/bin/server javadump   zosmfServer`

  This command creates a snapshot of the JVM and archived output goes to `IZU_DATA_DIR/logs`.

- `IZU_CODE_ROOT/wlp/bin/server dump   zosmfServer`

  This command creates a snapshot of the server and archived output goes to `IZU_DATA_DIR/logs`.

- `IZU_CODE_ROOT/wlp/bin/server status   zosmfServer`

  This command checks if the server is running.

For more information about the WebSphere Application Server Liberty profile trace and logging functions, see the Liberty:Logging and Trace page of IBM Knowledge Center.

For more information about WebSphere Application Server Liberty profile administration through the command line, see the Administering Liberty from the command line page of IBM Knowledge Center.

B.4 z/OSMF

Do not change the default trace and log settings unless you are instructed by IBM Support to change them. Certain trace and log settings can cause performance degradation on the system.

B.4.1 z/OSMF logs

Two types of logs are available for z/OSMF: runtime logs and configuration logs.

Runtime logs

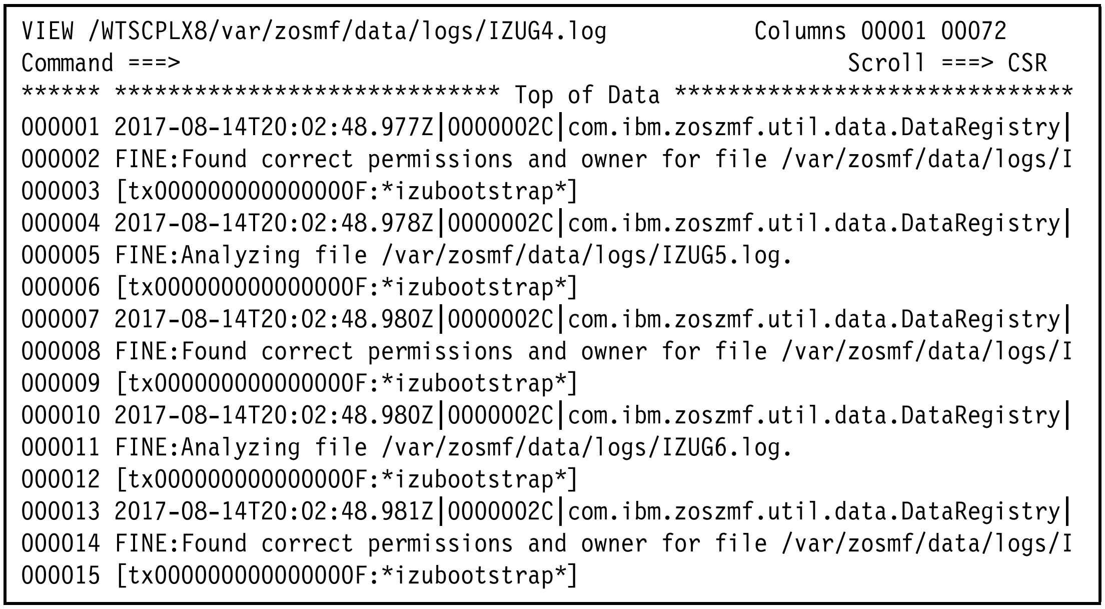
The runtime logs contain the messages for all plug-ins. WLM Software Management, Performance Management, and so on, include the messages that are written here, unless they are written elsewhere.

z/OSMF creates the log files in the `/var/zosmf/data/logs` directory by default. z/OSMF names the log files `IZUG`*`n`*`.log`, where *n* is a number 0 - 9.

z/OSMF creates log files in a “cascading” manner. The most current log file is always named `IZUG0.log`. When this log file reaches the limit of 2 MB, it is saved as `IZUG1.log` and z/OSMF begins writing to a new `IZUG0.log` file.

When the `IZUG0.log` file is again full, z/OSMF saves it as `IZUG1.log` after renaming the existing `IZUG1.log` file to `IZUG2.log`. z/OSMF continues this process, saving each log file under the next available name, up to a maximum of 10 log files. After 10 log files are reached, z/OSMF discards the oldest log file whenever a new log file is created.

The z/OSMF runtime log files are written in ASCII format, and UNIX System Services tools, such as **vi**, emacs, and **grep**, display the text correctly. ISPF Browse and Edit also work (you select the Edit ASCII or View ASCII option), as shown in Figure B-2.



```
VIEW /WTSCPLX8/var/zosmf/data/logs/IZUG4.log          Columns 00001 00072
Command ===>                                                 Scroll ===> CSR
****** ***************************** Top of Data ******************************
000001 2017-08-14T20:02:48.977Z|0000002C|com.ibm.zoszmf.util.data.DataRegistry|
000002 FINE:Found correct permissions and owner for file /var/zosmf/data/logs/I
000003 [tx000000000000000F:*izubootstrap*]
000004 2017-08-14T20:02:48.978Z|0000002C|com.ibm.zoszmf.util.data.DataRegistry|
000005 FINE:Analyzing file /var/zosmf/data/logs/IZUG5.log.
000006 [tx000000000000000F:*izubootstrap*]
000007 2017-08-14T20:02:48.980Z|0000002C|com.ibm.zoszmf.util.data.DataRegistry|
000008 FINE:Found correct permissions and owner for file /var/zosmf/data/logs/I
000009 [tx000000000000000F:*izubootstrap*]
000010 2017-08-14T20:02:48.980Z|0000002C|com.ibm.zoszmf.util.data.DataRegistry|
000011 FINE:Analyzing file /var/zosmf/data/logs/IZUG6.log.
000012 [tx000000000000000F:*izubootstrap*]
000013 2017-08-14T20:02:48.981Z|0000002C|com.ibm.zoszmf.util.data.DataRegistry|
000014 FINE:Found correct permissions and owner for file /var/zosmf/data/logs/I
000015 [tx000000000000000F:*izubootstrap*]
```

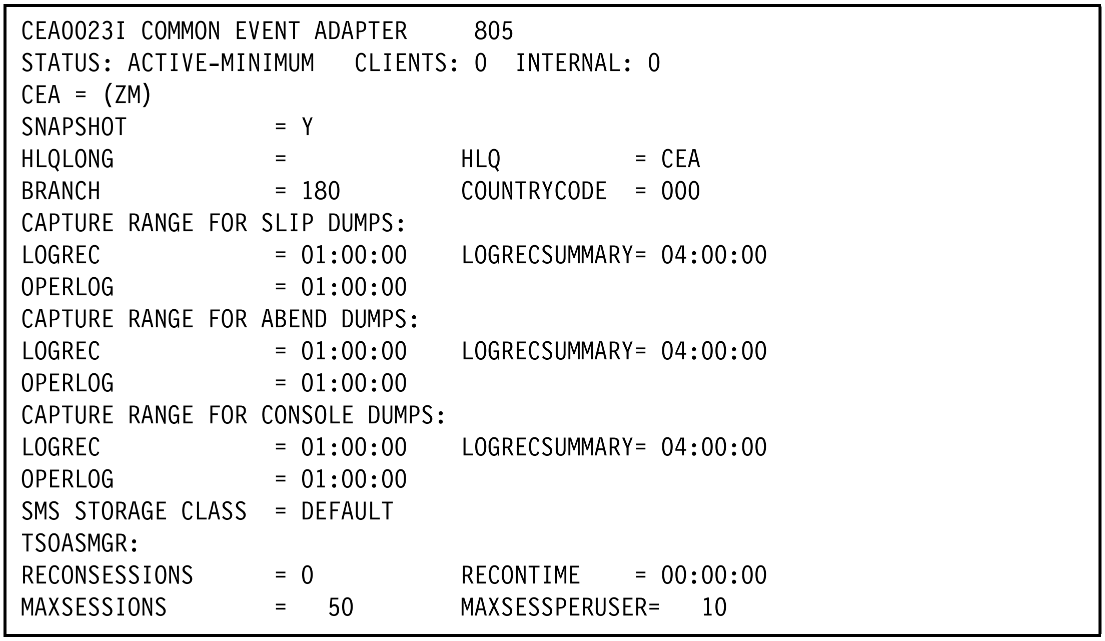
Figure B-2 ISPF View of a log file

If a problem occurs with the product logs directory (for example, the directory is not writable or z/OSMF encounters an error on initialization), z/OSMF writes its log data in the Application Server Servant log instead.

B.5 Common Event Adapter

Common Event Adapter (CEA) issues are diagnosed by using MVS **MODIFY** commands. For more information about displaying the CEA, see *MVS System Command*, SA38-0666.

For example, **F CEA,D,P** displays the active CEA settings that are based on PARMLIB, as shown in Figure B-3.



```
CEA0023I COMMON EVENT ADAPTER     805
STATUS: ACTIVE-MINIMUM   CLIENTS: 0  INTERNAL: 0
CEA = (ZM)
SNAPSHOT           = Y
HLQLONG            =             HLQ          = CEA
BRANCH             = 180         COUNTRYCODE  = 000
CAPTURE RANGE FOR SLIP DUMPS:
LOGREC             = 01:00:00    LOGRECSUMMARY= 04:00:00
OPERLOG            = 01:00:00
CAPTURE RANGE FOR ABEND DUMPS:
LOGREC             = 01:00:00    LOGRECSUMMARY= 04:00:00
OPERLOG            = 01:00:00
CAPTURE RANGE FOR CONSOLE DUMPS:
LOGREC             = 01:00:00    LOGRECSUMMARY= 04:00:00
OPERLOG            = 01:00:00
SMS STORAGE CLASS  = DEFAULT
TSOASMGR:
RECONSESSIONS      = 0           RECONTIME    = 00:00:00
MAXSESSIONS        =   50        MAXSESSPERUSER=   10
```

Figure B-3 F CEA,D,P output

If you want to change CEA settings, you can update a CEAPRMxx member dynamically by running **F CEA,CEA=xx**, as shown in Example B-6.

Example B-6 Modify CEA

```
f cea,cea=00
CEA0502I    CEA PARMLIB PROCESSING COMPLETE.
```

B.5.1 CEA tracing

CEA REXX tracing is available and should be used only under the direction of IBM Support. You can turn on this tracing facility by running **F CEA,DIAG,REXXDEBUG=ON**. The trace is written to a data set with the **HLQ** qualifier according to your PARMLIB setting. It looks similar to **CEA.REXXDBG.CEACDMPC.RC6C95F7.X6F1AE7A.TC3**.

B.5.2 CEA Component Trace

You can create a CEA CTRACE by completing the following steps:

1. Issue the following command on the console to see whether CTRACE is active:

   ```
   D TRACE,COMP=SYSCEA
   ```

   The output should look similar to the output that is shown in Example B-7.

   Example B-7 Display trace output

   ```
   SYSCEA        ON   0016M
      ASIDS      *NONE*
      JOBNAMES   *NONE*
      OPTIONS    ALL
      WRITER     *NONE*
   ```

2. The `OPTIONS` setting should be set to `ALL`. If it is not, or if the CTRACE is not `ON` for `SYSCEA`, enable the CTRACE by running the following command:

   ```
   TRACE CT,ON,COMP=SYSCEA
   ```

   Then, to turn on the **ALL** option, run the following command:

   ```
   nn,OPTIONS=(ALL),END
   ```

3. Collect the trace by taking a dump of OMVS and CEA and the OMVS data spaces by running the following commands:

   ```
   DUMP COMM=('cea and omvs')
    R xx,JOBNAME=(cea procname,OMVS),CONT   (procname is probably CEA)
    R xx,DSPNAME=('OMVS'.*),CONT
    R xx,SDATA=(ALLNUC,PSA,GRSQ,SUM,CSA,LPA,LSQA,RGN,SWA,SQA,TRT),END
   ```

4. You can view the output in IPCS by starting the dump and then running the following command:

   ```
   ‘IP CTRACE COMP(SYSCEA) FULL’
   ```

B.6 System REXX

As with CEA, System REXX information is best obtained through MVS **MODIFY** commands. These commands also are described in *MVS System Command*, SA38-0666. To display the general status of the server, run the **F AXR,SYSREXX,STATUS** command, which should produce the output that is shown in Figure B-4.

```
AXR0200I SYSREXX STATUS DISPLAY 817
 SYSTEM REXX STARTED AT 18.03.19 ON 08/03/2017
 PARMLIB MEMBERS:      AXR00
 CPF:  @ (SYSTEM)      AXRUSER:  AXR
 TIMEINT:       30     TMP: NOT ENABLED
 SUBSYSTEM:   AXR      TSO=YES ENABLED
 REQUESTS QUEUED:      0  ACCEPTING NEW WORK
 REXX WORKER TASKS:    ACTIVE:   0     TOTAL:   4
                       IDLE:     4     MAX:    32
                       ASYNC:    0     SYNC:    0
                       UNTIMED:  0
 TSO SERVER SPACES:    ACTIVE:   0     TOTAL:   1
                       IDLE:     1     MAX:     8
                       ASYNC:    0     SYNC:    0
                       UNTIMED:  0
```

Figure B-4 F AXR output

B.7 RMF

Errors that are encountered when you use the Monitoring Desktops (RMF) should be written to the SYSLOG, GPMSERVE STC, or GPM4CIM STCs. However, if not enough information is available, you can turn on more debugging options.

In the GPMSRVxx parmlib member that you use, set `DEBUG_LEVEL(3)` to get the most messages. You can run **F GPMSERVE,OPTIONS** to display the current options. You must restart GPMSERVE to display the options.

Comments in the GPMSERVE proclib member that tell you how to turn on the **gpmserve** trace (such as **TRACEON**). You must change the SYSPRINT and SYSOUT options in the **GPMSERVE** proc to `SYSOUT=x`.

To turn on the trace, run **F GPMSERVE,TRACEON** and then, re-create the issue. The trace output goes to the SYSOUT, as specified in the GPMSERVE proc. After the trace is complete, run **F GPMSERVE,TRACEOFF** to stop the trace.

For the GPM4CIM procedures, you can modify the applicable `/etc/gpm/gpm4_.cfg` file in the same manner as GPMSERVE. Modify commands produce similar results. For example, to turn on a trace for the AIX version of GPM4CIM, run **F GPM4CIM.GPM4A,TRACEON**.

C

Secure FTP using Application Transparent Transport Layer Security

You can use the FTP Servers page of IBM z/OS Management Facility (z/OSMF) to add, modify, view, copy, and remove FTP server definitions and to associate FTP profiles with FTP server definitions. This appendix describes how to define a secure FTP client connection by using Application Transparent Transport Layer Security (AT-TLS).

This appendix includes the following topics:

C.1 Secure FTP

If you want to send data in a secure manner, secure FTP for clients must be configured in the z/OS system of interest. The following options are available to complete this configuration:

- Use of native Transport Layer Security (TLS)
- Use of Application Transparent Transport Layer Security (AT-TLS)

This chapter describes how to use the second option.

C.2 Using Application Transparent Transport Layer Security

For more information about secure FTP, see *IBM z/OS V2R2 Communications Server TCP/IP Implementation: Volume 4 Security and Policy-Based Networking*, SG24-8363.

FTP that uses AT-TLS offers more security. In our example, we configured it for FTP clients in test system SC80 by performing the following steps:

1. Create a key ring and certificates for AT-TLS.
2. Configure PAGENT and build an AT-TLS policy for secure FTP client.
3. Enable AT-TLS in TCP/IP.
4. Update the `FTP.DATA` file for secure client by using AT-TLS.

These steps are described next.

C.2.1 Creating a key ring and certificates for AT-TLS

You can use a virtual key ring if the FTP server does not require client authentication. The virtual key ring allows the FTP client to validate the FTP server certificate.

Because the FTP client does not need its own certificate and private key, you can use a CERTAUTH virtual key ring. The CERTAUTH virtual key ring includes all of the certificates that are added to RACF as CERTAUTH. To use this CERTAUTH virtual key ring, use `*AUTH*/*` as the name of the key ring.

If `TLSMECHANISM FTP` is coded in the `FTP.DATA` file, the **`KEYRING`** statement in FTP.DATA uses the following format:

```
KEYRING *AUTH*/*
```

If `TLSMECHANISM ATTLS` is coded in the `FTP.DATA` file, the **`Keyring`** parameter of the TTLSKeyringParms statement uses the following format:

```
TTLSKeyringParms
{
Keyring *AUTH*/*
}
```

A key ring that is owned by the user of the FTP client does not need to be created when you use the virtual key ring.

For server authentication, the remote FTP server’s SSL certificate (and any intermediary and top-level CA signing certificates) must be added to the FTP client system’s RACF database. In our example, the remote FTP server's (SC74) SSL certificate and any intermediary and top-level CA certificates were added to the client system’s (SC80) RACF database under the CERTAUTH virtual keyring.

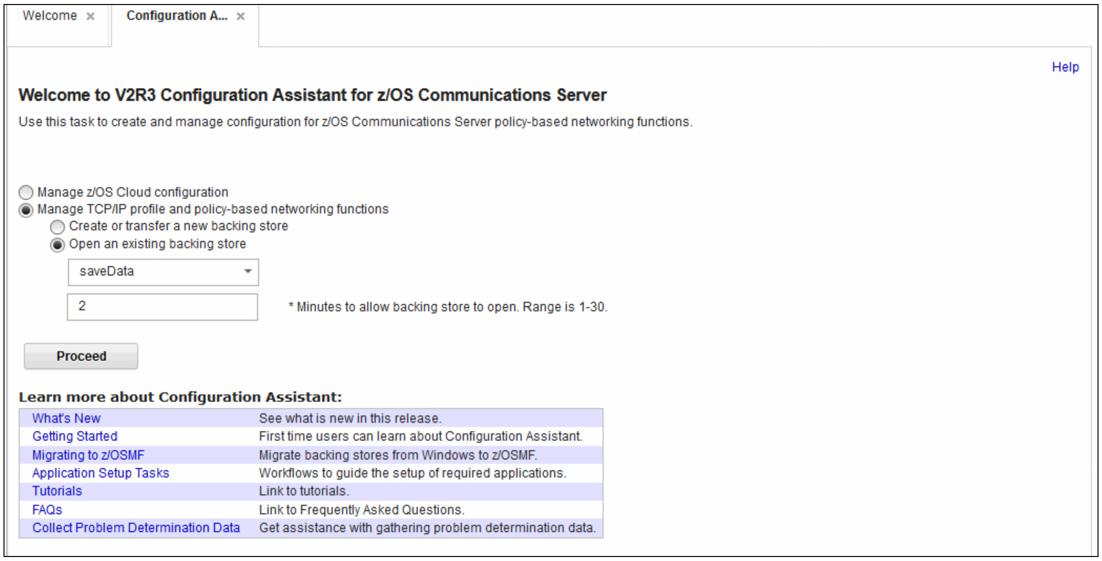
C.2.2 Ensuring that PAGENT is configured and building an AT-TLS policy for a secure FTP client

The Policy Agent must be configured and an AT-TLS policy must be defined.

Building an AT-TLS policy for secure FTP

In our example, we used the Configuration Assistant feature of z/OSMF to build an AT-TLS policy for the FTP client in SC80 by completing the following steps:

1. In the Configuration Assistant plug-in window, select a backing store to which to save the data and click **Open**, as shown in Figure C-1. In most cases, the default backing store "saveData" should be sufficient.



Welcome to V2R3 Configuration Assistant for z/OS Communications Server

Use this task to create and manage configuration for z/OS Communications Server policy-based networking functions.

○ Manage z/OS Cloud configuration
● Manage TCP/IP profile and policy-based networking functions
  ○ Create or transfer a new backing store
  ● Open an existing backing store

saveData

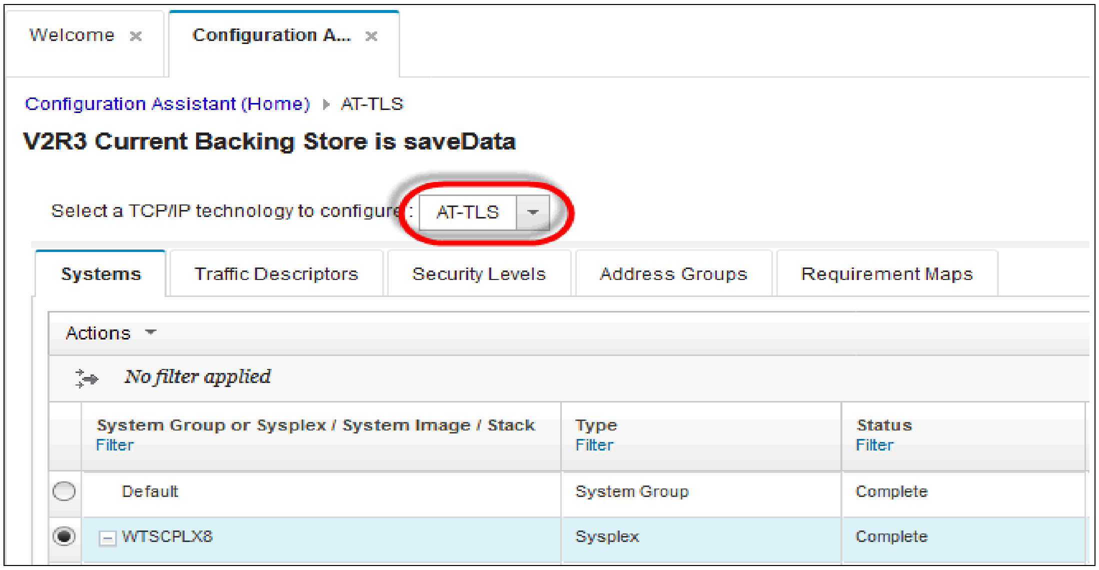
2 * Minutes to allow backing store to open. Range is 1-30.

Learn more about Configuration Assistant:

What's New	See what is new in this release.
Getting Started	First time users can learn about Configuration Assistant.
Migrating to z/OSMF	Migrate backing stores from Windows to z/OSMF.
Application Setup Tasks	Workflows to guide the setup of required applications.
Tutorials	Link to tutorials.
FAQs	Link to Frequently Asked Questions.
Collect Problem Determination Data	Get assistance with gathering problem determination data.

Figure C-1 Configuration Assistant backing store

2. Select **AT-TLS** as the perspective from the drop-down menu, as shown in Figure C-2.



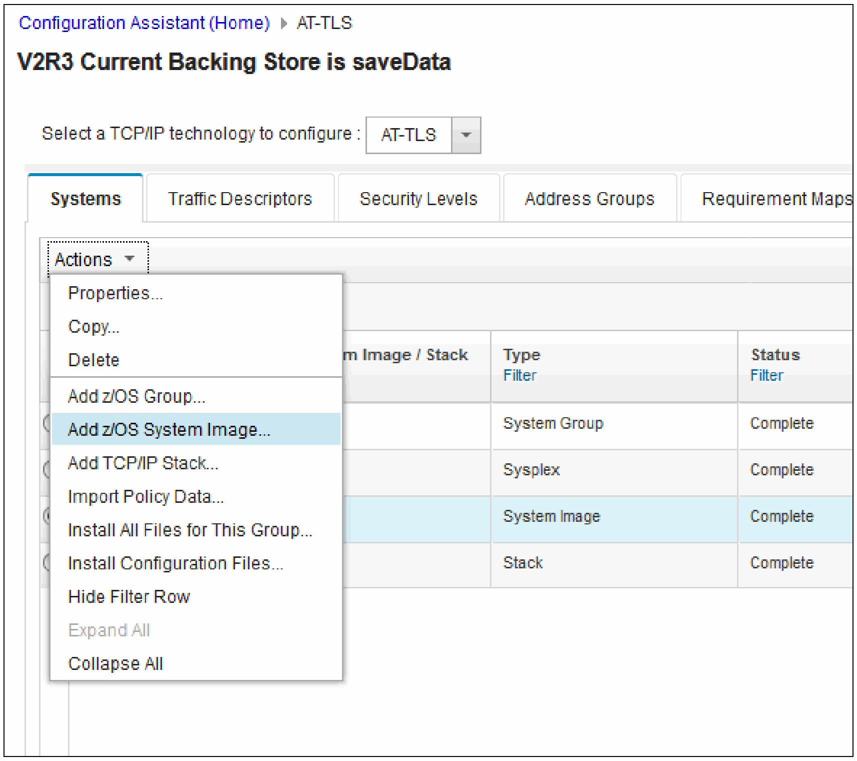
V2R3 Current Backing Store is saveData

Select a TCP/IP technology to configure: AT-TLS

	System Group or Sysplex / System Image / Stack Filter	Type Filter	Status Filter
○	Default	System Group	Complete
●	⊟ WTSCPLX8	Sysplex	Complete

Figure C-2 Selecting a perspective

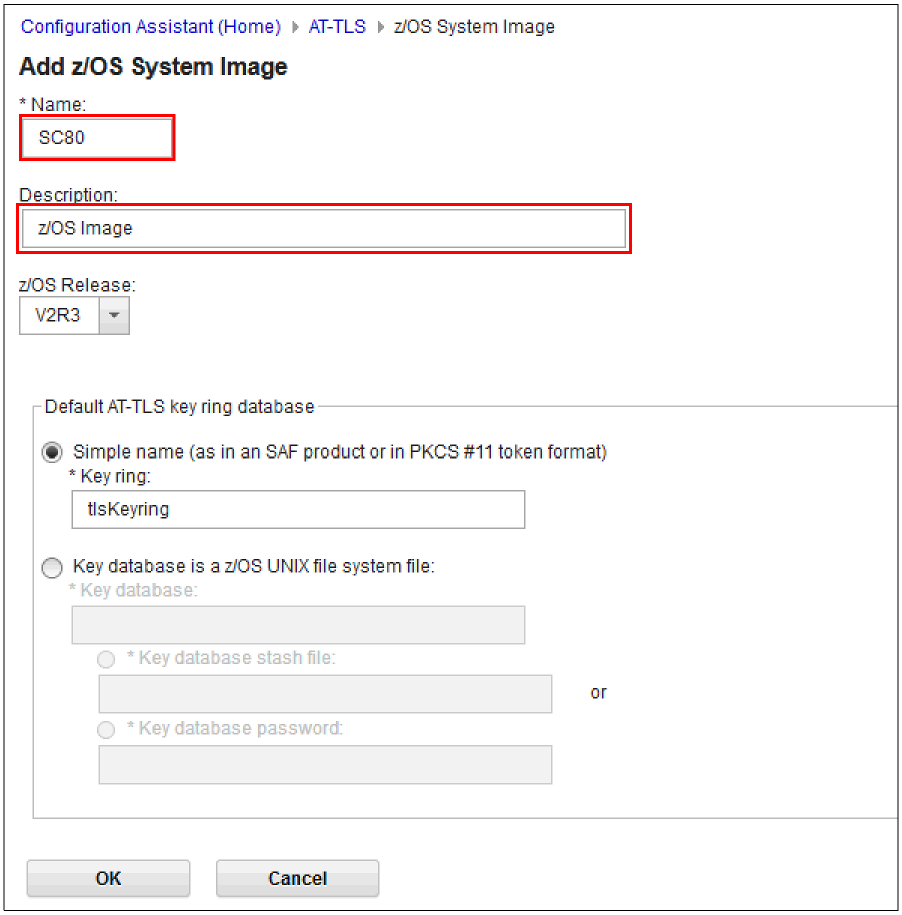
3. To add SC80 as an image, click **Actions** → **Add z/OS System Image**, as shown in Figure C-3.



m Image / Stack	Type Filter	Status Filter
	System Group	Complete
	Sysplex	Complete
	System Image	Complete
	Stack	Complete

Figure C-3 Adding z/OS Image menu item

4. Enter the required information in the fields in the Add z/OS image window and click **OK**, as shown in Figure C-4.



Add z/OS System Image

* Name: SC80

Description: z/OS Image

z/OS Release: V2R3

Default AT-TLS key ring database

● Simple name (as in an SAF product or in PKCS #11 token format)

* Key ring: tlsKeyring

○ Key database is a z/OS UNIX file system file:

* Key database:

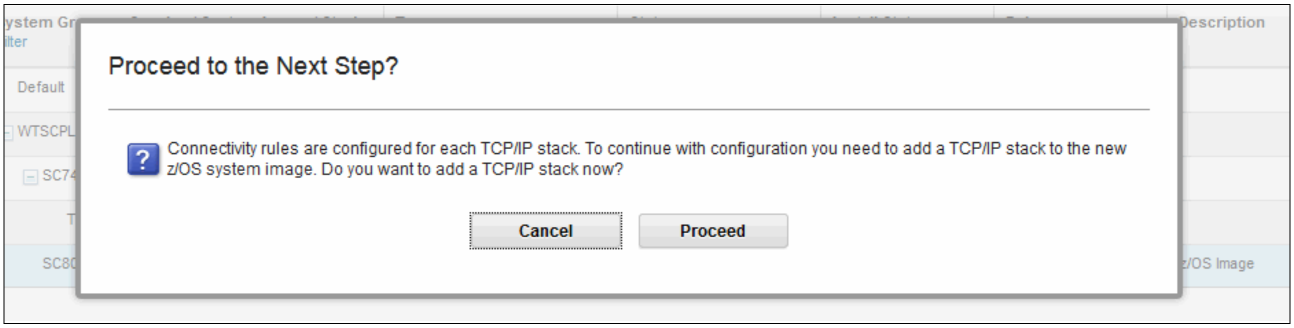
○ * Key database stash file:

or

○ * Key database password:

Figure C-4 Add z/OS System Image window

5. You are prompted to add a TCP/IP stack to the SC80 image, as shown in Figure C-5. Click **Proceed** to proceed to the Add TCP/IP Stack window.

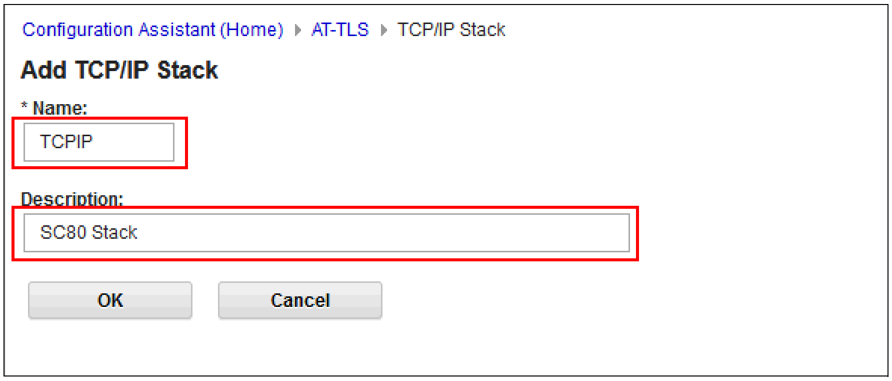


Proceed to the Next Step?

Connectivity rules are configured for each TCP/IP stack. To continue with configuration you need to add a TCP/IP stack to the new z/OS system image. Do you want to add a TCP/IP stack now?

Figure C-5 Prompt to add a TCP/IP stack to the SC80 image

6. Complete the Names and Description fields in the Add TCP/IP Stack window by entering the name of the TCP/IP stack and any appropriate comment, as shown in Figure C-6. Click **OK**.



Configuration Assistant (Home) ▸ AT-TLS ▸ TCP/IP Stack

Add TCP/IP Stack

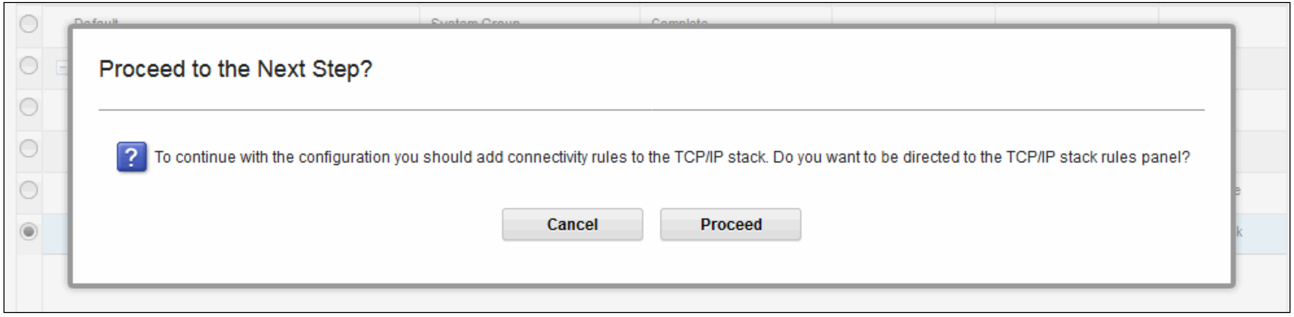
* Name: TCPIP

Description: SC80 Stack

Figure C-6 Adding TCP/IP Stack window

7. You are prompted to add connectivity rules to the TCP/IP stack, as shown in Figure C-7. Click **Cancel**.

{

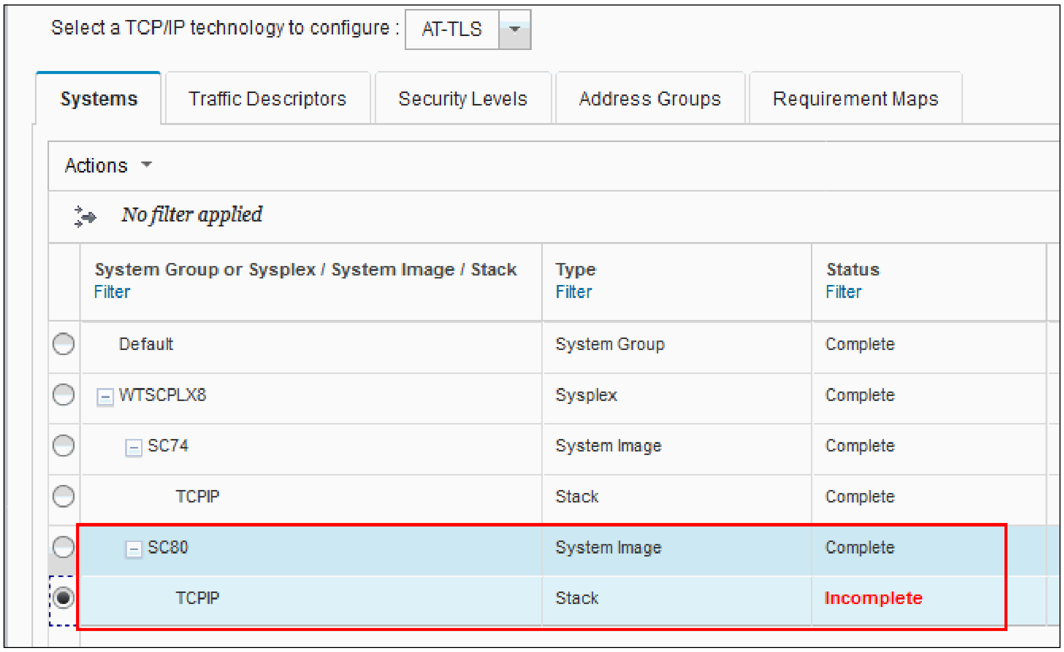


Proceed to the Next Step?

To continue with the configuration you should add connectivity rules to the TCP/IP stack. Do you want to be directed to the TCP/IP stack rules panel?

Figure C-7 Prompt to add connectivity rules to the TCP/IP stack

8. A window opens that shows the z/OS image and the TCP/IP stack that was added, as shown in Figure C-8.

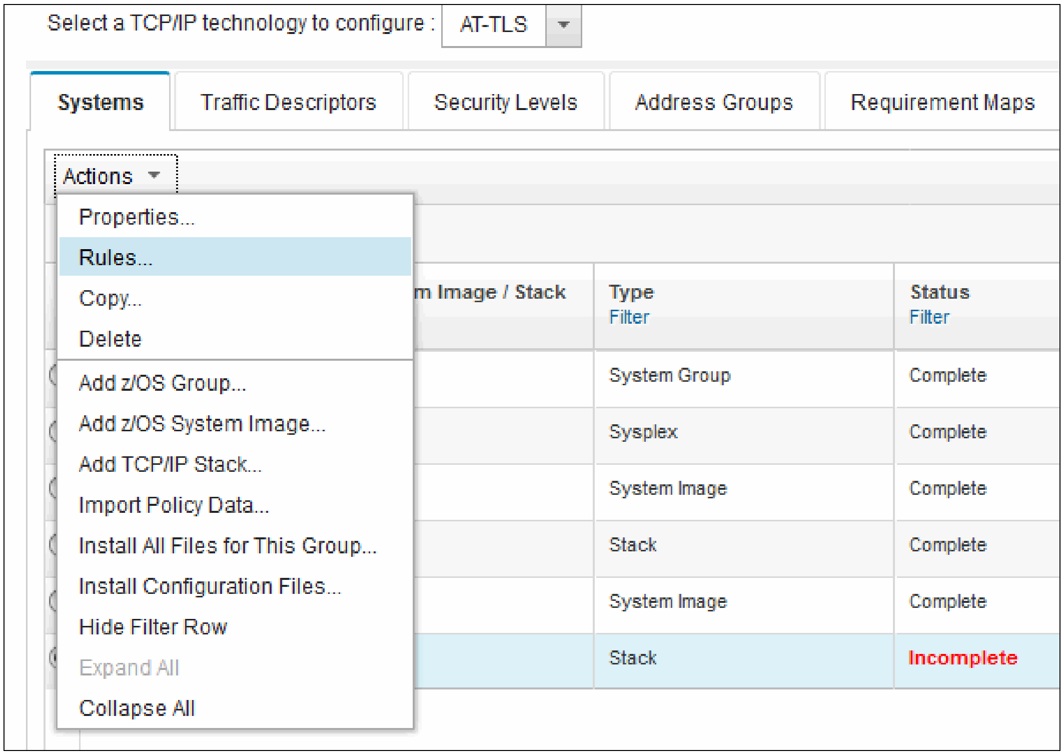


Select a TCP/IP technology to configure : AT-TLS

	System Group or Sysplex / System Image / Stack Filter	Type Filter	Status Filter
○	Default	System Group	Complete
○	⊟ WTSCPLX8	Sysplex	Complete
○	⊟ SC74	System Image	Complete
○	TCPIP	Stack	Complete
○	⊟ SC80	System Image	Complete
●	TCPIP	Stack	Incomplete

Figure C-8 Page showing the z/OS image and TCP/IP stack

9. To select the stack, select **Actions** → **Rules**, as shown in Figure C-9.

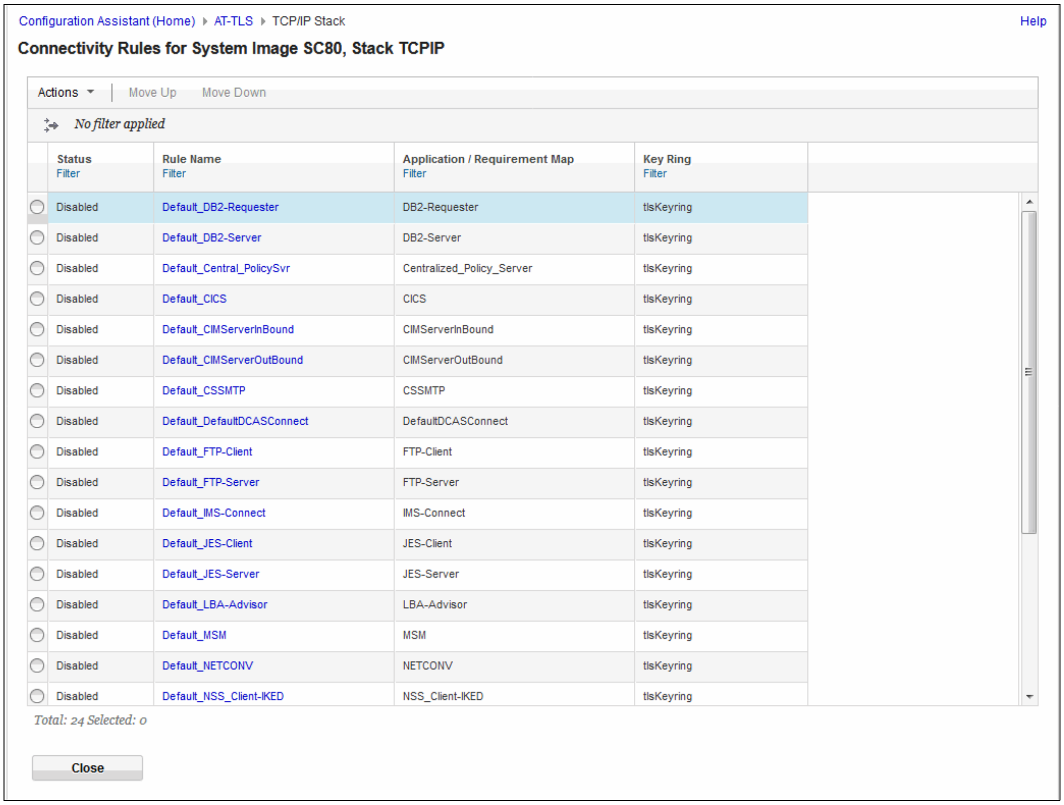


Select a TCP/IP technology to configure : AT-TLS

m Image / Stack	Type Filter	Status Filter
	System Group	Complete
	Sysplex	Complete
	System Image	Complete
	Stack	Complete
	System Image	Complete
	Stack	Incomplete

Figure C-9 Rules under the Actions menu

The Connectivity Rules for Stack TCPIP window opens, as shown in Figure C-10.



Connectivity Rules for System Image SC80, Stack TCPIP

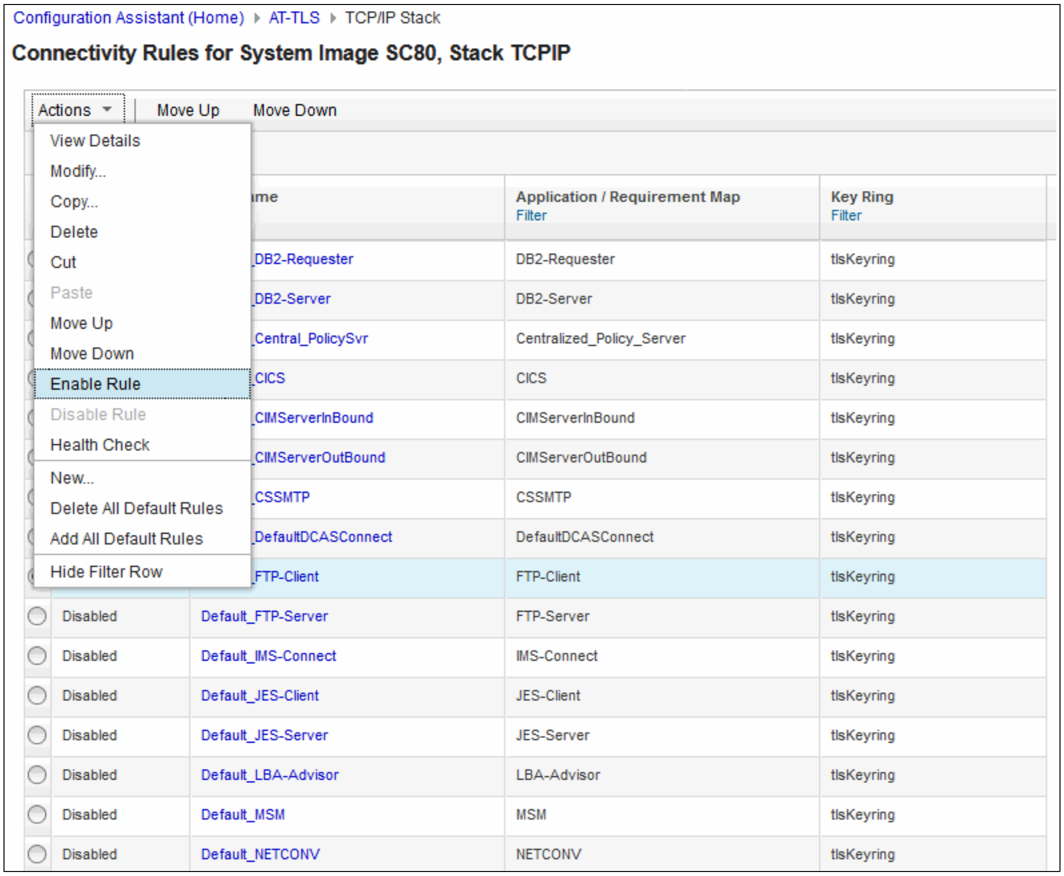
No filter applied

	Status Filter	Rule Name Filter	Application / Requirement Map Filter	Key Ring Filter
○	Disabled	Default_DB2-Requester	DB2-Requester	tlsKeyring
○	Disabled	Default_DB2-Server	DB2-Server	tlsKeyring
○	Disabled	Default_Central_PolicySvr	Centralized_Policy_Server	tlsKeyring
○	Disabled	Default_CICS	CICS	tlsKeyring
○	Disabled	Default_CIMServerInBound	CIMServerInBound	tlsKeyring
○	Disabled	Default_CIMServerOutBound	CIMServerOutBound	tlsKeyring
○	Disabled	Default_CSSMTP	CSSMTP	tlsKeyring
○	Disabled	Default_DefaultDCASConnect	DefaultDCASConnect	tlsKeyring
○	Disabled	Default_FTP-Client	FTP-Client	tlsKeyring
○	Disabled	Default_FTP-Server	FTP-Server	tlsKeyring
○	Disabled	Default_IMS-Connect	IMS-Connect	tlsKeyring
○	Disabled	Default_JES-Client	JES-Client	tlsKeyring
○	Disabled	Default_JES-Server	JES-Server	tlsKeyring
○	Disabled	Default_LBA-Advisor	LBA-Advisor	tlsKeyring
○	Disabled	Default_MSM	MSM	tlsKeyring
○	Disabled	Default_NETCONV	NETCONV	tlsKeyring
○	Disabled	Default_NSS_Client-IKED	NSS_Client-IKED	tlsKeyring

Total: 24 Selected: 0

Figure C-10 Connectivity Rules for Stack TCPIP window

10.Select **Default_FTP-Client** and then, click **Actions** → **Enable Rule**, as shown in Figure C-11.

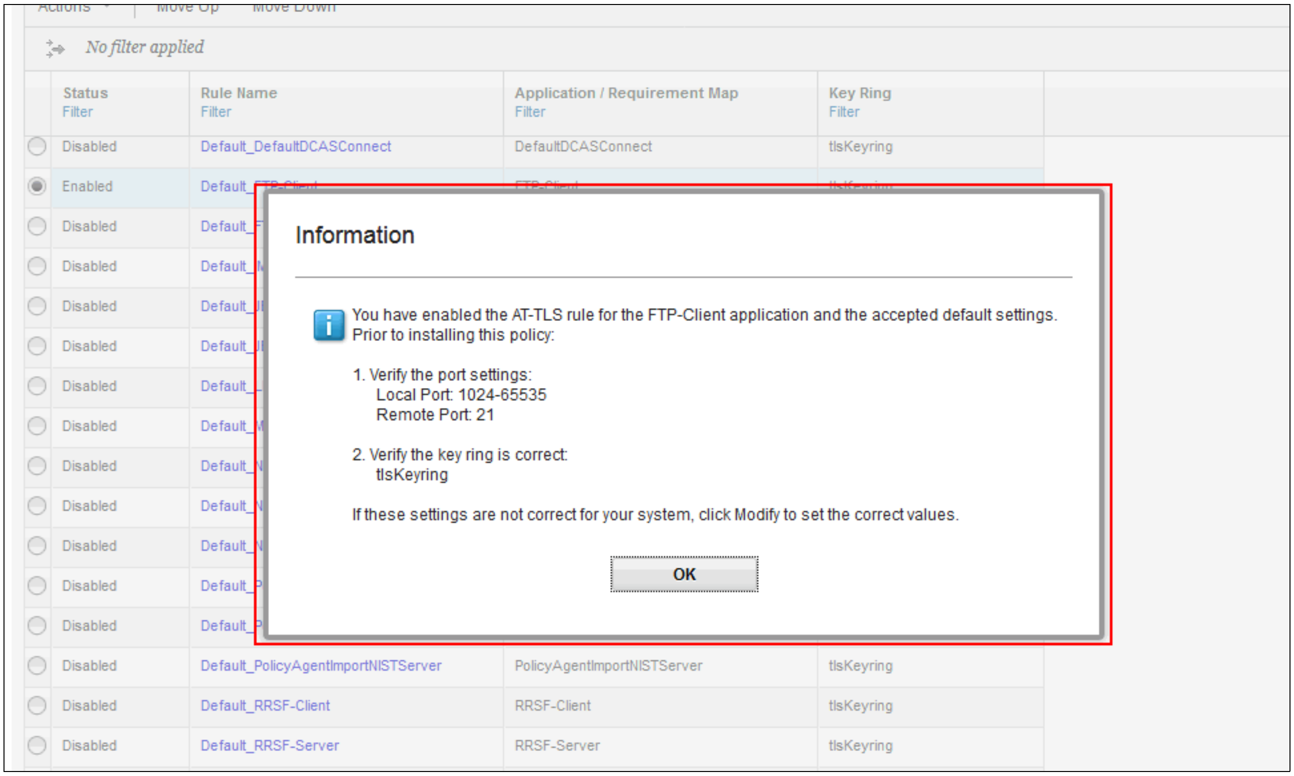


Connectivity Rules for System Image SC80, Stack TCPIP

		me	Application / Requirement Map Filter	Key Ring Filter
○		_DB2-Requester	DB2-Requester	tlsKeyring
○		_DB2-Server	DB2-Server	tlsKeyring
○		_Central_PolicySvr	Centralized_Policy_Server	tlsKeyring
○		_CICS	CICS	tlsKeyring
○		_CIMServerInBound	CIMServerInBound	tlsKeyring
○		_CIMServerOutBound	CIMServerOutBound	tlsKeyring
○		_CSSMTP	CSSMTP	tlsKeyring
○		_DefaultDCASConnect	DefaultDCASConnect	tlsKeyring
○		_FTP-Client	FTP-Client	tlsKeyring
○	Disabled	Default_FTP-Server	FTP-Server	tlsKeyring
○	Disabled	Default_IMS-Connect	IMS-Connect	tlsKeyring
○	Disabled	Default_JES-Client	JES-Client	tlsKeyring
○	Disabled	Default_JES-Server	JES-Server	tlsKeyring
○	Disabled	Default_LBA-Advisor	LBA-Advisor	tlsKeyring
○	Disabled	Default_MSM	MSM	tlsKeyring
○	Disabled	Default_NETCONV	NETCONV	tlsKeyring

Figure C-11 Selecting Enable Rule option

11. A window opens that shows that the defaults are loaded and describes how to modify the defaults (if required), as shown in Figure C-12. Because the defaults are correct for the FTP client setup, click **OK**.



	Status Filter	Rule Name Filter	Application / Requirement Map Filter	Key Ring Filter
○	Disabled	Default_DefaultDCASConnect	DefaultDCASConnect	tlsKeyring
●	Enabled	Default_FTP-Client	FTP-Client	tlsKeyring
○	Disabled	Default_F		
○	Disabled	Default_M		
○	Disabled	Default_II		
○	Disabled	Default_II		
○	Disabled	Default_L		
○	Disabled	Default_M		
○	Disabled	Default_N		
○	Disabled	Default_N		
○	Disabled	Default_N		
○	Disabled	Default_P		
○	Disabled	Default_P		
○	Disabled	Default_PolicyAgentImportNISTServer	PolicyAgentImportNISTServer	tlsKeyring
○	Disabled	Default_RRSF-Client	RRSF-Client	tlsKeyring
○	Disabled	Default_RRSF-Server	RRSF-Server	tlsKeyring

Information

You have enabled the AT-TLS rule for the FTP-Client application and the accepted default settings. Prior to installing this policy:

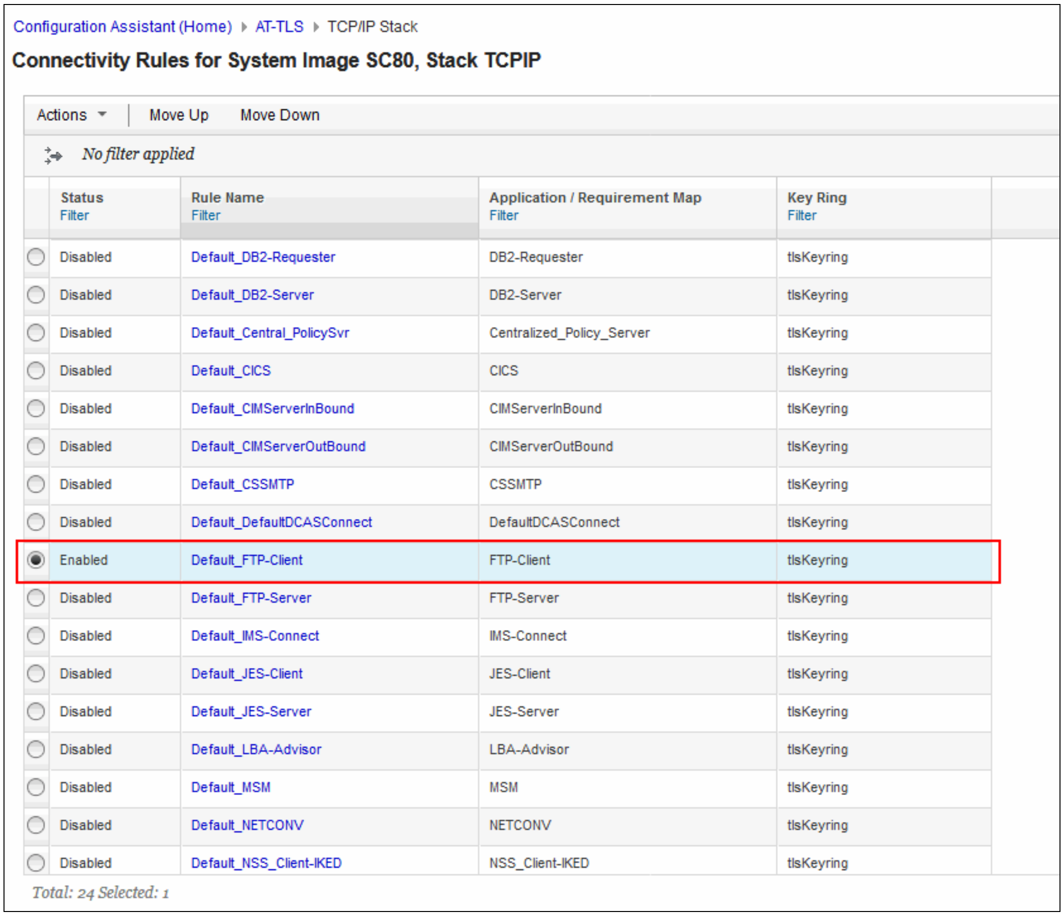
1. Verify the port settings:
   Local Port: 1024-65535
   Remote Port: 21

2. Verify the key ring is correct:
   tlsKeyring

If these settings are not correct for your system, click Modify to set the correct values.

Figure C-12 Notification

The Connectivity Rules for Stack TCPIP window opens, as shown in Figure C-13.



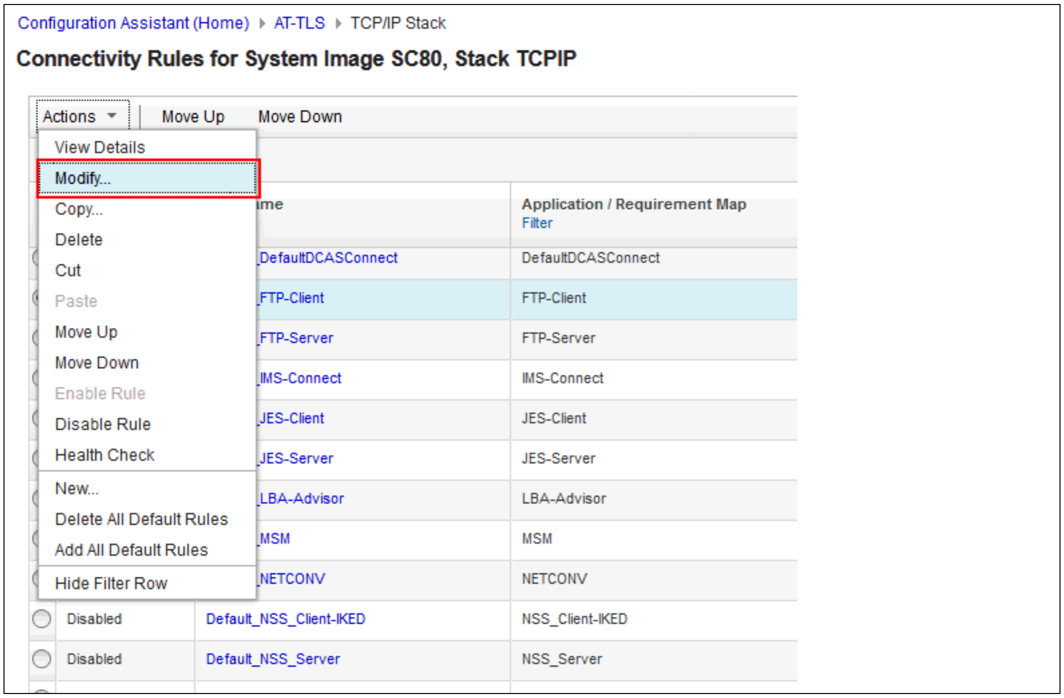
Connectivity Rules for System Image SC80, Stack TCPIP

	Status Filter	Rule Name Filter	Application / Requirement Map Filter	Key Ring Filter
○	Disabled	Default_DB2-Requester	DB2-Requester	tlsKeyring
○	Disabled	Default_DB2-Server	DB2-Server	tlsKeyring
○	Disabled	Default_Central_PolicySvr	Centralized_Policy_Server	tlsKeyring
○	Disabled	Default_CICS	CICS	tlsKeyring
○	Disabled	Default_CIMServerInBound	CIMServerInBound	tlsKeyring
○	Disabled	Default_CIMServerOutBound	CIMServerOutBound	tlsKeyring
○	Disabled	Default_CSSMTP	CSSMTP	tlsKeyring
○	Disabled	Default_DefaultDCASConnect	DefaultDCASConnect	tlsKeyring
●	Enabled	Default_FTP-Client	FTP-Client	tlsKeyring
○	Disabled	Default_FTP-Server	FTP-Server	tlsKeyring
○	Disabled	Default_IMS-Connect	IMS-Connect	tlsKeyring
○	Disabled	Default_JES-Client	JES-Client	tlsKeyring
○	Disabled	Default_JES-Server	JES-Server	tlsKeyring
○	Disabled	Default_LBA-Advisor	LBA-Advisor	tlsKeyring
○	Disabled	Default_MSM	MSM	tlsKeyring
○	Disabled	Default_NETCONV	NETCONV	tlsKeyring
○	Disabled	Default_NSS_Client-IKED	NSS_Client-IKED	tlsKeyring

Total: 24 Selected: 1

Figure C-13 FTP-Client policy enabled

12. For our example, we must make one modification to the Default_FTP-Client rule. Click **Actions** → **Modify**, as shown in Figure C-14.

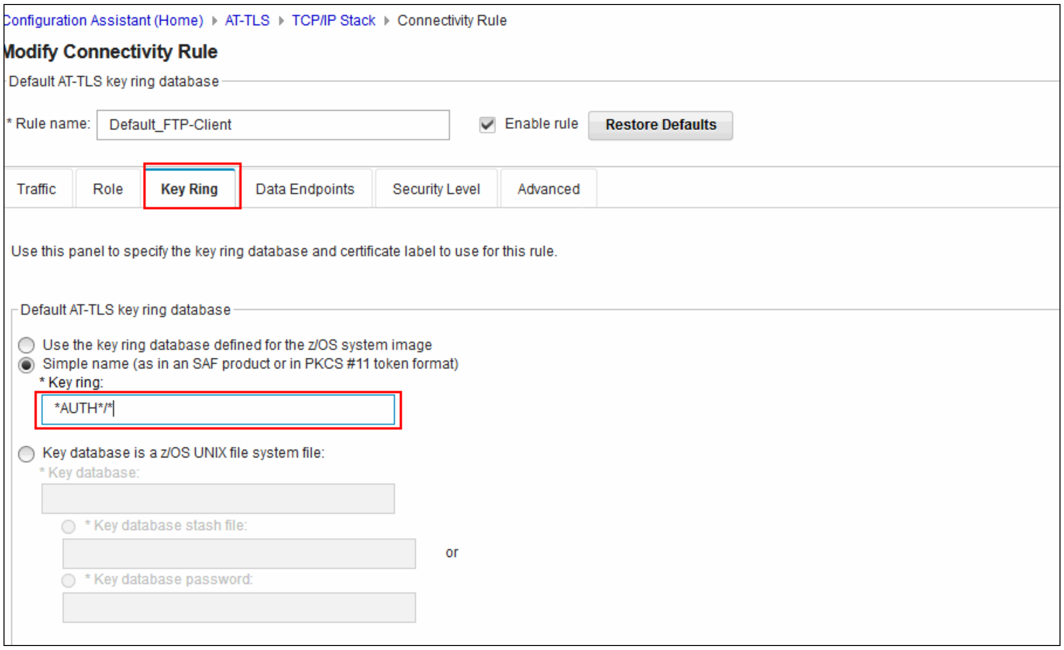


Connectivity Rules for System Image SC80, Stack TCPIP

		ıme	Application / Requirement Map Filter
		_DefaultDCASConnect	DefaultDCASConnect
		_FTP-Client	FTP-Client
		_FTP-Server	FTP-Server
		_IMS-Connect	IMS-Connect
		_JES-Client	JES-Client
		_JES-Server	JES-Server
		_LBA-Advisor	LBA-Advisor
		_MSM	MSM
		_NETCONV	NETCONV
○	Disabled	Default_NSS_Client-IKED	NSS_Client-IKED
○	Disabled	Default_NSS_Server	NSS_Server

Figure C-14 Modify connectivity rules

13. In the Modify Connectivity Rule window, click the **Key Ring** tab and specify the virtual key ring, as shown in Figure C-15. Click **OK** to return to Connectivity Rules for Stack TCPIP window (see Figure C-13 on page 570). Click **Close**.



Configuration Assistant (Home) ▸ AT-TLS ▸ TCP/IP Stack ▸ Connectivity Rule

Modify Connectivity Rule

Default AT-TLS key ring database

* Rule name: Default_FTP-Client ☑ Enable rule [Restore Defaults]

Traffic | Role | Key Ring | Data Endpoints | Security Level | Advanced

Use this panel to specify the key ring database and certificate label to use for this rule.

Default AT-TLS key ring database

○ Use the key ring database defined for the z/OS system image

● Simple name (as in an SAF product or in PKCS #11 token format)

* Key ring: *AUTH*/*

○ Key database is a z/OS UNIX file system file:

* Key database:

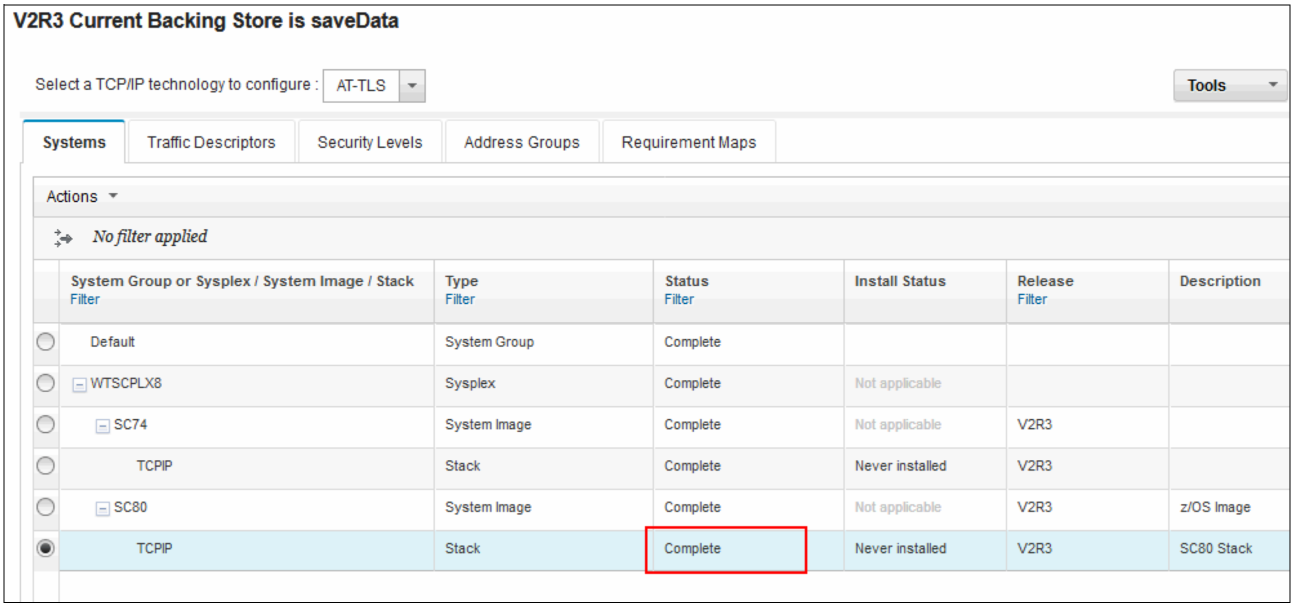
○ * Key database stash file:

or

○ * Key database password:

Figure C-15 Specifying the key ring

A window opens that shows the SC80 image and TCP/IP stack, as shown in Figure C-16. A complete status denotes that the AT-TLS policy was created and completed.



V2R3 Current Backing Store is saveData

Select a TCP/IP technology to configure : AT-TLS [Tools]

Systems | Traffic Descriptors | Security Levels | Address Groups | Requirement Maps

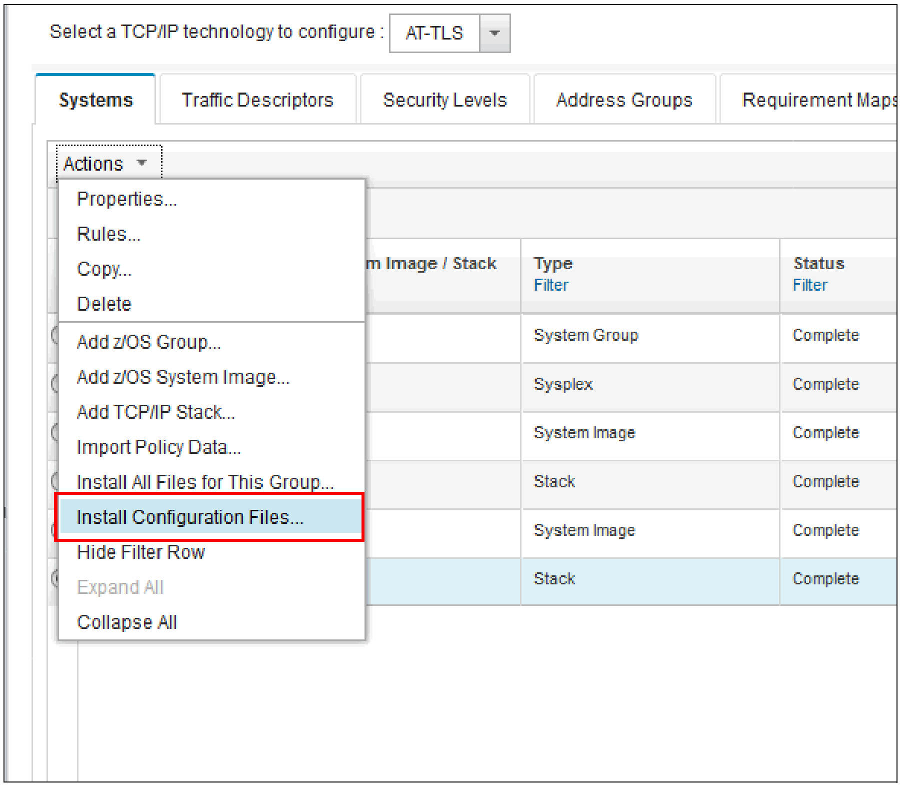
Actions

No filter applied

	System Group or Sysplex / System Image / Stack Filter	Type Filter	Status Filter	Install Status	Release Filter	Description
○	Default	System Group	Complete			
○	⊟ WTSCPLX8	Sysplex	Complete	Not applicable		
○	⊟ SC74	System Image	Complete	Not applicable	V2R3	
○	TCPIP	Stack	Complete	Never installed	V2R3	
○	⊟ SC80	System Image	Complete	Not applicable	V2R3	z/OS Image
●	TCPIP	Stack	Complete	Never installed	V2R3	SC80 Stack

Figure C-16 Image and TCP/IP stack

14. Now, the policy must be saved in the correct place in SC80. Select the stack and click **Actions** → **Install Configuration Files**, as shown in Figure C-17.

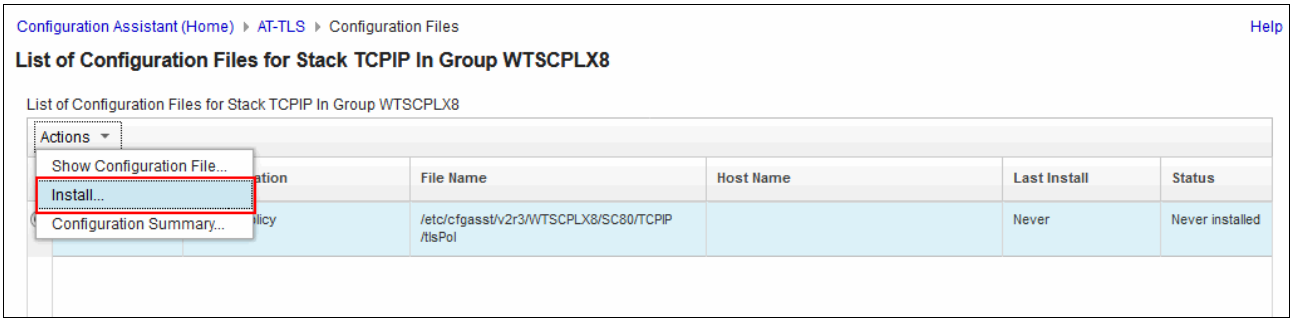


Select a TCP/IP technology to configure : AT-TLS

m Image / Stack	Type Filter	Status Filter
	System Group	Complete
	Sysplex	Complete
	System Image	Complete
	Stack	Complete
	System Image	Complete
	Stack	Complete

Figure C-17 Installing the files for AT-TLS

15. The Configuration Files window opens, as shown in Figure C-18. Select the stack and click **Actions** → **Install**.



Configuration Assistant (Home) ▸ AT-TLS ▸ Configuration Files

Help

List of Configuration Files for Stack TCPIP In Group WTSCPLX8

List of Configuration Files for Stack TCPIP In Group WTSCPLX8

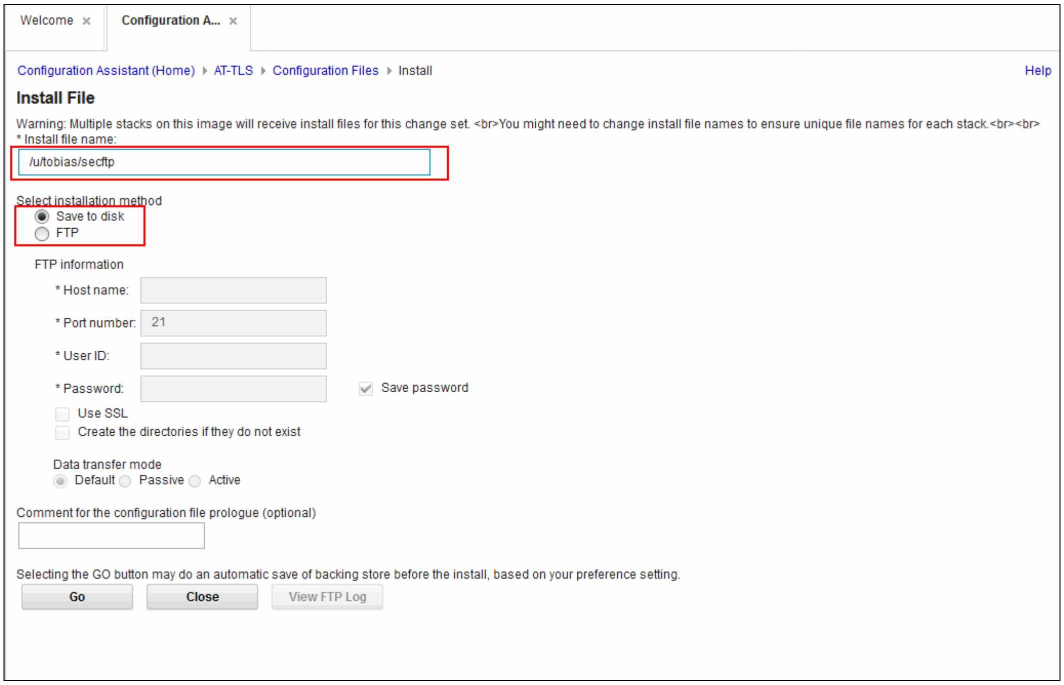
Actions ▾

- Show Configuration File...
- Install...
- Configuration Summary...

...ation	File Name	Host Name	Last Install	Status
...licy	/etc/cfgasst/v2r3/WTSCPLX8/SC80/TCPIP /tlsPol		Never	Never installed

Figure C-18 Configuration files

16. The Install File window opens, as shown in Figure C-19. Enter the file name, select the mode to install the file, and click **Go**.



Configuration Assistant (Home) ▸ AT-TLS ▸ Configuration Files ▸ Install

Help

Install File

Warning: Multiple stacks on this image will receive install files for this change set.
You might need to change install file names to ensure unique file names for each stack.

* Install file name: /u/tobias/secftp

Select installation method
● Save to disk
○ FTP

FTP information
* Host name:
* Port number: 21
* User ID:
* Password:
☑ Save password
□ Use SSL
□ Create the directories if they do not exist

Data transfer mode
● Default ○ Passive ○ Active

Comment for the configuration file prologue (optional)

Selecting the GO button may do an automatic save of backing store before the install, based on your preference setting.

Figure C-19 Install File window

The policy that was created is shown in Example C-1.

Example C-1 AT-TLS policy for FTP-Client

```
##
## AT-TLS Policy Agent Configuration file for:
##    Image: SC80
##    Stack: TCPIP
##
## Created by the IBM Configuration Assistant for z/OS Communications Server
## Version 2 Release 3
## Backing Store = saveData
## Install History:
## 2017-08-18 15:01:46 : Save To Disk
```

```
##
## TLS default rules: Default_FTP-Client
## End TLS default rules
##
## End of Configuration Assistant information
TTLSRule                          Default_FTP-Client~1
{
  LocalAddr                       ALL
  RemoteAddr                      ALL
  LocalPortRangeRef               portR1
  RemotePortRangeRef              portR2
  Direction                       Outbound
  Priority                        255
  TTLSGroupActionRef              gAct1~FTP-Client
  TTLSEnvironmentActionRef        eAct1~FTP-Client
  TTLSConnectionActionRef         cAct1~FTP-Client
}
TTLSGroupAction                   gAct1~FTP-Client
{
  TTLSEnabled                     On
  Trace                           2
}
TTLSEnvironmentAction             eAct1~FTP-Client
{
  HandshakeRole                   Client
  EnvironmentUserInstance         0
  TTLSKeyringParmsRef             keyR1
}
TTLSConnectionAction              cAct1~FTP-Client
{
  HandshakeRole                   Client
  TTLSCipherParmsRef              cipher1~Default_Ciphers
  TTLSConnectionAdvancedParmsRef  cAdv1~FTP-Client
CtraceClearText                 Off
  Trace                           2
}
TTLSConnectionAdvancedParms       cAdv1~FTP-Client
{
  SSLv3                           On
  TLSv1                           On
  TLSv1.1                         On
  ApplicationControlled           On
  SecondaryMap                    On
  TLSv1.2                         Off
}
TTLSKeyringParms                  keyR1
{
  Keyring                         *AUTH*/*
}
TTLSCipherParms                   cipher1~Default_Ciphers
{
  V3CipherSuites                  TLS_RSA_WITH_AES_256_CBC_SHA
  V3CipherSuites                  TLS_DHE_RSA_WITH_AES_256_CBC_SHA
  V3CipherSuites                  TLS_DH_RSA_WITH_AES_256_CBC_SHA
  V3CipherSuites                  TLS_DHE_DSS_WITH_AES_256_CBC_SHA
  V3CipherSuites                TLS_DH_DSS_WITH_AES_256_CBC_SHA
  V3CipherSuites                TLS_RSA_WITH_3DES_EDE_CBC_SHA
  V3CipherSuites                TLS_DHE_RSA_WITH_3DES_EDE_CBC_SHA
  V3CipherSuites                TLS_DH_RSA_WITH_3DES_EDE_CBC_SHA
  V3CipherSuites                TLS_DHE_DSS_WITH_3DES_EDE_CBC_SHA
  V3CipherSuites                TLS_DH_DSS_WITH_3DES_EDE_CBC_SHA
  V3CipherSuites                TLS_RSA_WITH_AES_128_CBC_SHA
  V3CipherSuites                TLS_DHE_RSA_WITH_AES_128_CBC_SHA
  V3CipherSuites                TLS_DH_RSA_WITH_AES_128_CBC_SHA
  V3CipherSuites                TLS_DHE_DSS_WITH_AES_128_CBC_SHA
  V3CipherSuites                TLS_DH_DSS_WITH_AES_128_CBC_SHA
}
PortRange                       portR1
{
  Port                          1024-65535
}
PortRange                       portR2
{
  Port                          21
}
```

PAGENT configuration

The Policy Agent (PAGENT) system component enforces policies to control network, security, traffic prioritization, bandwidth management, network behavior, routing, and resource balancing in the z/OS environment. It reads and parses these policies, and stores the policy definitions that are acted on by the TCP/IP task.

If you do not have PAGENT configured in your installation, see *IBM z/OS V2R2 Communications Server TCP/IP Implementation: Volume 4 Security and Policy-Based Networking*, SG24-8363. Copy the policy that is generated by Configuration Assistant to the appropriate directory for PAGENT to pick up the policy.

If PAGENT is configured in your installation, you must import the current policy in to Configuration Assistant and add the AT-TLS for FTP client-related parts to the policy. Then, the updated policy is installed back in to the correct directory and PAGENT must be refreshed to pick up the new policy. To refresh PAGENT, run **F PAGENT, REFRESH**.

C.2.3 Enabling AT-TLS in TCPIP

Enable AT-TLS in the TCP/IP profile by adding the **TTLS** parameter to the **TCPCONFIG** profile statement in each stack that supports AT-TLS, as shown in Example C-2.

Example C-2 TCP/IP profile update

```
TCPCONFIG TTLS
```

C.2.4 Updating the FTP.DATA file for secure client by using AT-TLS

In our example, SC80, we maintain two sets of `FTP.DATA`: one with security for FTP client and the other without the security option. The `FTP.DATA` file for FTP client security includes several other statements, as shown in Example C-3.

Example C-3 FTP.DATA for FTP client security

```
SECURE_MECHANISM TLS[1]
TLSMECHANISM ATTLS[2]
```

C.2.5 Creating an FTP profile in z/OSMF

For more information about an example of how to create an FTP profile in z/OSMF, see 11.2.7, “Secure transmission” on page 271.

[1] Use TLS as the secure mechanism.

[2] Use ATTLS as the mechanism for TLS.

D

Additional material

This book refers to additional material that can be downloaded from the Internet as described in the following sections.

Locating the web material

The web material that is associated with this book is available in softcopy on the internet from the IBM Redbooks web server. Point your web browser at:

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Alternatively, you can go to the IBM Redbooks website at:

ibm.com/redbooks

Select **Additional materials** and open the directory that corresponds with the IBM Redbooks form number, SG247851.

Using the web material

The additional web material that accompanies this book includes the following files:

File name	*Description*
APIsamples.zip	Compressed code samples for Chapter 18, “Using the IBM z/OS Management Facility programmable interfaces” on page 457.
SampleWorkflow.zip	Compressed code samples for zFS allocation, adding TSO users, and so in, for Chapter 7, “Workflows” on page 139.

Downloading and extracting the web material

Create a subdirectory (folder) on your workstation, and extract the contents of the web material compressed file into this folder.

Related publications

The publications that are listed in this section are considered particularly suitable for a more detailed discussion of the topics that are covered in this book.

IBM Redbooks

The following IBM Redbooks publications provide more information about the topic in this book Some publications that are referenced in this list might be available in softcopy only:

- *ABCs of z/OS System Programming: Volume 5*, SG24-6985
- *IBM z/OS V1R13 Communications Server TCP/IP Implementation: Volume 4 Security and Policy-Based Networking*, SG24-7999
- *IBM z/OS V2R1 Communications Server TCP/IP Implementation Volume 3: High Availability, Scalability, and Performance*, SG24-8098
- *IBM z/OS V2R1 Communications Server TCP/IP Implementation Volume 4: Security and Policy-Based Networking*, SG24-8099
- *System Programmer's Guide to: Workload Manager*, SG24-6472
- *Systems Programmer's Guide to: z/OS System Logger*, SG24-6898
- *WebSphere Application Server Liberty Profile Guide for Developers*, SG24-8076
- *z/OS Management Facility*, SG24-7851
- *z/OS MVS Setting up a Sysplex*, SA23-1399

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Other publications

The following publications are also relevant as further information sources:

- *IBM z/OS Management Facility Configuration Guide Version 2 Release 1,* SA38-0657
- *IBM z/OS Management Facility Programming Version 2 Release 1*, SA32-1066
- *MVS Data Areas Volume 1*, which is available at:

  https://ibm.biz/BdZGF2
- *MVS Programming: Authorized Assembler Services Guide Version 2 Release 1*, SA23-1371
- *MVS Programming: Callable Services for High-Level Languages*, SA23-1377
- *MVS System Commands*, which is available at:

  https://ibm.biz/BdZGFz
- *Program Directory for IBM z/OS Management Facility*, GI11-9847
- *RMF User's Guide*, SC34-2664

- *z/OS Common Information Model User's Guide*, SC34-2671
- *z/OS Communications Server: IP Configuration Guide*, SC27-3650
- *z/OS Communications Server IP Configuration Reference*, SC27-3651
- *z/OS Planning for Installation*, GA22-7504
- *z/OS Setting up a Sysplex*, SA22-7625
- *z/OS UNIX System Services User's Guide*, SA23-2279
- *z/OS V2R1 Planning for Installation*, GA32-0890
- *z/OS V2R1.0 ISPF User's Guide Vol 1*, SC19-3627
- *z/OS V2R1.0 MVS Capacity Provisioning User's Guide*, SC34-2662
- *z/OS V2R1.0 MVS Diagnosis: Tools and Service Aids*, GA32-0905
- *z/OS V2R1.0 MVS Initialization and Tuning Reference*, SA23-1380

Online resources

The following websites are also relevant as further information sources:

- **curl** command:

  http://curl.haxx.se/docs/manpage.html
- DMTF:

  http://www.dmtf.org
- HOLODATA:

  http://service.software.ibm.com/holdata/390holddata.html
- Hypertext Transfer Protocol (HTTP) 1.1:

  http://www.w3.org/Protocols/rfc2616/rfc2616.html
- IBM product information for JSONs:

  http://public.dhe.ibm.com/services/zosmf/JSONs/IBMProductEOS.txt
- IBM Software Support:

  http://www.ibm.com/software/support/
- IBM z/OS Management Facility Online Help:

  https://ibm.biz/BdZGFq
- JavaScript Object Notation (JSON):

  http://www.json.org
- **JSON.awk**:

  https://github.com/step-/JSON.awk
- **JSON.sh**:

  https://github.com/dominictarr/JSON.sh
- Multipurpose Internet Mail Extensions (MIME) Types:

  http://www.iana.org/assignments/media-types/index.html
- OpenPegasus:

  http://www.openpegasus.org

- OpenSSL:

  http://openssl.org
- PSP Bucket:

  http://www14.software.ibm.com/webapp/set2/psearch/search?domain=psp
- Representation State Transfer (REST) Interfaces:

  http://www.ics.uci.edu/~fielding/pubs/dissertation/rest_arch_style.htm
- SMP/E fix categories (FIXCAT):

  http://www.ibm.com/systems/z/os/zos/smpe/fixcategory.html
- Tracing:

  https://ibm.biz/BdZGFy
- WebSphere Application Server Liberty profile trace and logging functions:

  https://ibm.biz/BdZGFS
- WebSphere Application Server Liberty profile administration through the command line:

  https://ibm.biz/BdZGFv
- z/OSMF configuration:

  https://ibm.biz/BdZGFn
- z/OSMF programming:

  https://ibm.biz/BdZGFn

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