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Installing Oracle 10gR2 on Red Hat® Enterprise Linux on IBM System z

This IBM® Redpaper publication provides the steps to install a Red Hat Enterprise Linux® 5 Linux guest to support an Oracle® 10gR2 Database. We assume that you are performing a new installation, not updating a Red Hat Enterprise Linux 4 and Oracle 10.2.0.2 database to Red Hat Enterprise Linux 5 and Oracle 10.2.0.3.

Note: Oracle plans to certify 10.2.0.4 on Red Hat Enterprise Linux 5 in 4Q 2008.

Introduction

Before beginning this process, ensure that z/VM® guest Directory entries have been prepared and that the user is able to log in to z/VM and use CMS. This installation process has two major steps:

- Initiate the bootstrap loader.
- Install Red Hat Enterprise Linux.

Perform stage 1 of the installation

In this section you will perform stage 1 of the Red Hat Enterprise Linux install. This process starts the Red Hat Enterprise Linux bootstrap loader system. The bootstrap process includes the completion of the following tasks:

- Defining the network interface cards
- Defining the PARM and CONF files
- Defining the EXEC and beginning stage 1 of the installation.
- Punching and IPLing the Red Hat Enterprise Linux reader images
- Connecting to the installation images (This installation uses NFS.)
- Making the VNC connection to perform the next stage of the installation

Define the network interface cards

The installation requires that the guest have a network interface defined. Under z/VM, this is most commonly done by defining a virtual Network Interface Card (NIC) and a VSWITCH. The NIC is then coupled to the VSWITCH. The NIC is defined in the z/VM user definition, displayed in Figure 1, as indicated by the arrow #1.

```
*
USER RH5U2 RH5U2 1G 2G G
IPL CMS
MACHINE ESA
NICDEF 480 TYPE QDIO LAN SYSTEM VSW1
1
SPOOL 000C 2540 READER *
SPOOL 000E 1403 A
CONSOLE 009 3215 T
CPU 00 BASE
CPU 01
MDISK 191 3390 1396 0100 VM350B MR ALL WRITE MULTIPLE
MDISK 200 3390 0001 3338 VM3D24 MR
MDISK 300 3390 0001 3338 VM3D25 MR
*
```

Figure 1 Defining a network interface

Define the PARM and CONF files

You must create a PARM file containing kernel parameters needed for installation. You can also specify a CONF file containing network and disk parameters. Though not required, we strongly recommend this. A sample PARM and CONF file is shown in Example 1.

Example 1 Sample PARM and CONFIG files

```
Sample RH5U2 PARM file:
ramdisk_size=40000 root=/dev/ram0 ro ip=off
CMSDASD=191 CMSCONFFILE=RHU2.CONF
```

vnc

Sample RH5U2 CONF file: DASD=200,300 HOSTNAME=1hotse.us.oracle.com NETTYPE=qeth IPADDR=130.35.55.1

IPADDR=130.35.55.1 SUBCHANNELS=0.0.0480,0.0.0481,0.0.0482 NETWORK=130.35.52.0 NETMASK=255.255.252.0 SEARCHDNS=us.oracle.com BROADCAST=130.35.52.255 GATEWAY=130.35.52.1 DNS=130.35.249.41 MTU=1500 PORTNAME=UNASSIGNED LAYER2=0

The values in **bold** above should be changed to work in your environment. However, the overall format of the CONF file should not change. The SUBCHANNELS parameter defines the subchannel addresses for the NIC. LAYER2=0 is used because the VSWITCH is operating in layer 3 (IP) mode. If the VSWITCH is operating in layer 2 (ETH) mode, you should set LAYER2=1 and VSWITCH=1. If you are unsure, you should check with the network administrator. For more information about this parameter, see the following article:

http://kbase.redhat.com/faq/FAQ_69_12554.shtm

Define EXEC and begin stage 1 of the installation

This section assumes that the Red Hat Enterprise Linux 5 installation tree is available via FTP. From z/VM, log in as the user and transfer the kernel and initial RAMdisk image (initrd) necessary to begin the install. Be sure to set the logical record length to 80 before transferring the kernel and inird (LOCSITE FIX 80 if FTPing *from* z/VM, or SITE FIX 80 if FTPing *to* z/VM).

Next, create the EXEC shown in Figure 2, then execute it to begin the install.

* * * Top of File * * *		
/* EXEC to punch RHEL 5 install */		
'CP SPOOL PUN *'		
CP CLOSE RDR		
'PUR RDR ALL'		
'PUN RH5U2 KERNEL * (NOH'		
'PUN RH5U2 PARM * (NOH 1		
'PUN RH5U2 INITRD * (NOH'		
CH RDR ALL KEEP		
'TPL 00C CLEAR' ← 2		
* * * End of File * * *		

Figure 2 RH5U2 exec

The commands associated with arrow #1 load the necessary images in the correct order and prepare them to be loaded. The command at arrow #2 IPLs the reader, which loads the that files we just punched.

Figure 3 shows the loading of the install images into the virtual reader.

```
00: 0000003 FILES PURGED
00: RDR FILE 0083 SENT FROM PAZXXQ01 PUN WAS 0083 RECS 047K CPY 001 A NOHOLD NO
KEEP
00: RDR FILE 0084 SENT FROM PAZXXQ01 PUN WAS 0084 RECS 0001 CPY 001 A NOHOLD NO
KEEP
00: RDR FILE 0085 SENT FROM PAZXXQ01 PUN WAS 0085 RECS 164K CPY 001 A NOHOLD NO
KEEP
00: 0000003 FILES CHANGED
```

Figure 3 Loading the reader

The reader will be loaded as shown in Figure 4 and will be ready to IPL.

Figure 4 Properly loaded reader list

Since the CONF file contains the networking and DASD information, the installation proceeds without asking any questions. This brings up Figure 5.



Figure 5 Network configuration

The installer instructs you to connect to the address as defined in Figure 5 on page 4. Connect to the address with PuTTY, using SSH protocol 2, with the username *root*. You will not be prompted for a password. This presents the language selection window shown in Figure 6.

Pazxxq01.us.oracle.co	m - PuTTY				\mathbf{X}
Welcome to Red Hat E	What language would during the installa Catalan Chinese (Simpl Chinese (Tradi Croatian Czech Danish Dutch English	Jer Language	use ?		
<tab>/<alt-tab> be</alt-tab></tab>	ween elements <3	Bpace> select	3 <f12></f12>	next screen	

Figure 6 Installation language selection

The language selected is used during the *installation* of Red Hat Enterprise Linux. It is not the language that is used during the *operation* of the Linux guest once it is installed.

The type of media that will be used for the installation of the Red Hat Enterprise Linux packages is selected in the panel shown in Figure 7. In this example, the installation media is available via NFS.



Figure 7 Package media selection

On the next window enter the NFS server and mount point of the installation media, as shown in Figure 7 on page 6.

	🖗 pa	zxxq01.us.oracle.com - PuTTY		
	Welco	mme to Red Hat Enterprise Linux Server		^
		NFS Setup		
		Please enter the following information:		
		o the name or IP number of your NFS server		
		o the directory on that server containing		
		Red Hat Enterprise Linux Server for your architecture		
		NFS server name: Ihotse.us.pracle.com		_
		Red Hat Enterprise Linux Server directory: redhat/zlinux/RHEL5/U2/		=
		OK Back		
	<ta< th=""><th>b>/<alt-tab> between elements <space> selects <<u>F12> next screen</u></space></alt-tab></th><th></th><th>v</th></ta<>	b>/ <alt-tab> between elements <space> selects <<u>F12> next screen</u></space></alt-tab>		v
ļ	<18	D>/(Alt-lab) between elements <space> selects <pl2> next screen</pl2></space>	 	×

Figure 8 NFS setup

Next, the selection to start VNC as the "X" client appears in the window shown in Figure 9. VNC will be used complete the remainder of the install, which is graphical.

🕑 pazxxq01.us.oracle.com - PuTTY 📃 🗆 🖂
<pre> Unable to Start X X was unable to start on your machine. Would you like to start VNC to connect to this computer from another computer and perform a graphical install or continue with a text mode install? Use text mode Start VNC Start VNC</pre>

Figure 9 VNC selection

Once started, VNC requires a password selection, as shown in Figure 10.

ه pazxxq0	1.us.oracle.com - PuTTY	_ 🗆 🛛
<tab>/<</tab>	VNC Configuration A password will prevent unauthorized listeners connecting and monitoring your installation progress. Please enter a password to be used for the installation Password: Password (confirm): No password Back Back Alt-Tab> between elements <space> selects <f12> next screet</f12></space>	en V

Figure 10 VNC configuration

This selection returns the installer to the console, as seen in Figure 11.

```
Pazxxq01.us.oracle.com - PuTTY
                                                                          login as: root
Welcome to the anaconda install environment 1.1 for zSeries
Running anaconda, the Red Hat Enterprise Linux Server system installer - please
wait...
DISPLAY variable not set. Starting text mode!
Starting VNC...
WARNING !!! VNC server running with NO PASSWORD!
You can use the vncpassword=<password> boot option
if you would like to secure the server.
The VNC server is now running.
Please connect to pazxxq01.us.oracle.com:1 to begin the install...
Press <enter> for a shell
Starting graphical installation...
XKB extension not present on :1
```

Figure 11 Starting "X" using VNC to initiate the graphical package installation process

You are now instructed to connect to the Red Hat Enterprise Linux installation using VNC port 1 to continue with the graphical portion of the install. Now use your VNC client to connect to this IP address or host name, and be sure to append :1 to the end.

Stage 2 of the Red Hat Enterprise Linux 5 installation

The Red Hat Enterprise Linux 5.2 installation system has been initiated from the bootstrap process and will display the image in Figure 12.



Figure 12 Initial splash window

Click **Next** to display the Red Hat Enterprise Linux activation window. The installation number is not required, so you can enter this number or safely select **Skip**, as shown in Figure 13.



Figure 13 Red Hat Enterprise Linux Networks activation skip confirmation

The next window allows you to select the type of install to be performed. Choose the **Install Red Hat Enterprise Linux Server** option, which will install a new copy of Linux, as shown in Figure 14.

📄 pazxxq01.us.oracle
Back Next

Figure 14 Installation type selection

The next window allows you to specify the disk partitioning setup. Under the drop-down box, leave the default options, as shown in Figure 15. Keep in mind that additional disks will be added later to hold the Oracle database.

Red Hat Enterprise Linux Server 5 installation on host pazxxq01.us.oracle.com	
99 🗍 🏟 🏖 🕂 4c 🚺 🎯 📆	🚊 pazxxq01.us.oracle
RED HAT ENTERPRISE LINUX 5	
Installation requires partitioning of your hard drive. By default, a partitioning layout is chosen which is reasonable for most users. You can either choose to use this or create your own.	
Remove linux partitions on selected drives and create default layout.	
Select the drive(s) to use for this installation.	
 ☑ dasda 7042 MB IBM S390 DASD drive ☑ dasdb 7042 MB IBM S390 DASD drive 	
▲dvanced storage configuration	
Review and modify partitioning layout	⇔ Back ► Next

Figure 15 Partition selection

You will be presented with a Warning panel asking you to confirm that all existing data on the DASD will be removed. Click **Yes**.

RED HAT ENTERPRISE LINUX 5		
Installation requires partitioning of your hard drive. By default, a partitioning layout is chosen which is reasonable for most users. You can either choose		
to use this or create Warn	hing	
Remove linux partit Select the drive dasda dasdb dasdb text dasdb	ove all Linux partitions (and ALL llowing drives: o do this?	
Review and modify partitioning layout <u>Release Notes</u>	Back Dext	

Figure 16 Partition confirmation

Selecting Yes in Figure 16 confirms the DASD partitioning and brings up Figure 17.

RED HAT ENTERPRISE LINUX 5
Network Devices
Hostname Set the hostname: O automatically via DHCP
manually pazxxq01.us.oracle.com (e.g., host.domain.com) Miscellaneous Settings
Gateway: 130.35.52.1
Primary DNS: 130.35.249.41
Secondary DNS:
Belease Notes

Figure 17 Network configuration

The network configuration is displayed in Figure 17 on page 11. The values are taken from the entries made in the CONF file. Once confirmed, select **Next**. The next step is to select the geographic location, as shown in Figure 18.

RED HAT ENTERPRISE LINUX 5	
Please click into the map to choose a region:	
America/Los_Angeles	Pacific Time
✓ System clock uses UTC <u>Belease Notes</u>	⇔ <u>B</u> ack ⇔ <u>N</u> ext

Figure 18 Geographic location selection

Once the correct location has been selected, the next panel asks for a root password. Enter and confirm the password, then click **Next**. The next window is the software selection, as displayed Figure 19.

Red Hat Enterprise Linux Server 5 installation on host pazxxq01.us.oracle.com	
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RED HAT	
ENTERPRISE LINUX 5	
	1
The default installation of Red Hat Enterprise Linux Server includes a set of software	
applicable for general internet usage. What additional tasks would you like your system to	
Include support for?	
🖬 Software Development	
Web server	8
You can further customize the software selection now, or after install via the software	
management application.	
O Customize later Qustomize now 	
Release Notes	Next

Figure 19 Initial software selection

Select **Software Development** at the top, then select **Customize Now**, as shown in Figure 19 on page 12. This allows the selection of additional packages (described below) that are required for the installation of Oracle products. Click **Next**, which takes you to the software selection window (Figure 20). Under Desktop Environments, leave the check mark by GNOME Desktop Environment.

Red Hat Enterprise Linux Server 5 installation on host page	zxxq01.us.oracle.com	
हे 🗍 🍪 🍣 😤 🍾 🚺 🎡 📆	🔿 pazxxq01.us.oracle	
RED HAT		
Desktop Environments	🖉 🛚 GNOME Desktop Environment	
Applications	🔣 🗆 KDE (K Desktop Environment)	
Development		
Base System		
Languages		
GNOME is a powerful, graphical user interf icons, and a graphical file manager.	ace which includes a panel, desktop, system	
29 of 33 optional packages selected		
	Optional packages	
<u>Release Notes</u>	<u>↓ Back</u> <u>▶ Next</u>	

Figure 20 Software selection: Desktop Apps

Next select **Applications** on the left. On the right side, deselect Sound and Video, as shown in Figure 21, as these packages are unnecessary.

🖻 Red Hat Enterprise Linux Server 5 installation on host pazxxq01.us.oracle.com				
😪 🔲 🍓 🗞 🔁 🍖 🗓 🍇 💐				
RED HAT ENTERPRISE LINUX 5				
Desktop Environments Applications Development Servers Base System Languages	 Authoring and Publishing Editors Engineering and Scientific Graphical Internet Graphics Office/Productivity Sound and Video 			
	🜠 🗹 Text-based Internet 🚽			
From CD recording to playing audio CDs and multimedia files, this package group allows you to work with sound and video on the system.				
Release Notes	Optional packages <u>Back</u>			

Figure 21 Software selection: Applications

Next select **Development** on the left, then click **Optional packages** (Figure 22).

RE EN	D HA'	PRISE LINUX 5	
		Packages in Java Development	
Þ	Desi Appi Deve	Some packages associated with this group are not required to be installed but may provide additional functionality. Please choose the packages which you would like to have installed.	ent
	Serv	bsh - 1.3.0-9jpp.1.s390x - Lightweight Scripting for Java	
	Bas€	bsh-demo - 1.3.0-9jpp.1.s390x - Demo for bsh	
	Lang	 bsh-javadoc - 1.3.0-9jpp.1.s390x - Javadoc for bsh bsh-manual - 1.3.0-9jpp.1.s390x - Manual for bsh java-1.4.2-gcj-compat-src - 1.4.2.0-40jpp.115.s390x - Source files for libgcj xmirpc - 2.0.1-3jpp.1.s390x - Java XML-RPC implementation 	ent •
		xmirpc-javadoc - 2.0.1-3jpp.1.s390x - Javadoc for xmirpc	
		X <u>C</u> lose	
		Optional packages]
	<u>R</u> elease N	lotes 🖉 🔒 ack	▶ <u>N</u> ext

Figure 22 Software selection: Optional development packages

Figure 22 on page 14 displays the optional selections for the Development Java[™] Packages. Ensure that the **Java compatibility library** is selected. Once verified, close this page and select **Legacy Applications**, then again select **Optional Packages**, as in Figure 23.

Red Hat Ente	rprise Linux Server 5 installation on host pazxxq01.us.oracle.com		
8 🗐 🊳 🧞	🔁 🍖 🚺 🎪 🖏 👘 pazxxq01.us.oracle		
RED HA	RPRISE LINUX 5		
R	Packages in Legacy Software Development		
Desi	Some packages associated with this group are not		
Appl Deve	required to be installed but may provide additional functionality. Please choose the packages which you would like to have installed.		
Serv	🖬 compat-gcc-34 - 3.4.6-4.s390x - Compatibility GNU Compiler Collection		
Base Compat-gcc-34-c++ - 3.4.6-4.s390x - C++ support for compatibility compil			
Lanç	Lang Compat-gcc-34-g77 - 3.4.6-4.s390x - Fortran 77 support for compatibility compat-glibc - 1:2.3.4-2.26.s390x - Compatibility C library		
✓ compatibility			
	Compat-libstdc++-33 - 3.2.3-61.s390x - Compatibility standard C++ librar		
X <u>C</u> lose			
L	Optional packages		
<u>R</u> elease f	Notes Act Notes		

Figure 23 Software selection: Development compatibility libraries

Select all of the compat-gcc-* and compat-libstdc* packages for installation. Next, close these optional packages and select **X Software Development**, as in Figure 24.



Figure 24 Software selection: Optional x software development selection

The optional packages from the X Software Development section are displayed in Figure 24. Check the box next to **mesa-libGLU-devel**, **mesa-libGLw-devel**, and the **openmotif-devel** software packages.

This concludes the updates to the development sections of the install. The server sections are next, as displayed in Figure 25.

🐵 Red Hat Enterprise Linux Server 5 installation on host pazxxq01.us.oracle.com		
କ୍ଟ 🗧) 🚳 & H Az 🗊 🍪 🕱	pazxxq01.us.oracle
REI EN	TERPRISE LINUX 5	
R.	Desktop Environments	☐ MySQL Database ▲ Network Servers
	Development	Server
	Servers	💼 🗆 PostgreSQL Database
[Base System	le Printing Support
	Languages	Server Configuration Tools
		🐻 🗆 Windows File Server
	These tools allow you to run a Web serve	er on the system.
11 of 23 optional packages selected		
Optional packages		
<u>Belease Notes</u> <u>Belease Notes</u> <u>Belease Notes</u>		

Figure 25 Software selection: Server package selection

Make sure that **Web Server** is checked, as this is a necessary option for Oracle. Next, select **Base System** on the left, then **System Tools** on the right, and click **Optional packages**, which will present Figure 26.

reo fur yo	uired to be installed but may provide additional actionality. Please choose the packages which u would like to have installed.
	screen - 4.0.3-1.el5.s390x - A screen manager that supports multiple login
	sysstat - 7.0.2-1.el5.s390x - The sar and iostat system monitoring comm
	tn5250 - 0.17.3-6.s390x - 5250 Telnet protocol and Terminal
	tog-pegasus - 2:2.7.0-2.el5.s390x - OpenPegasus WBEM Services for Linu
	tsclient - 0.148-6.el5.s390x - Client for VNC and Windows Terminal Server
	uucp - 1.07-12.s390x - The uucp utility for copying files between systems.
	uuidd - 1.39-15.el5.s390x - helper daemon to guarantee uniqueness of tim
ल	

Figure 26 Software selection: System software optional packages

Though optional, check the **sysstat** and **dstat** packages, as displayed in Figure 26 on page 17. These tools are useful for monitoring system performance. On the next window, the installer checks dependencies in the packages selected, as shown in Figure 27.

Checking dependencies in packages selected for installation

Figure 27 Dependency validation

Once the validation has completed the installation can now commence using the window displayed in Figure 28.



Figure 28 Installation Splash window

Selecting Next in Figure 28 starts the installation.

The last step in the preparation of the installation of the Oracle Database is to disable SELinux. To accomplish this, update /etc/selinux/config to reflect SELINUX=disabled.

To verify that you have the required 31-bit and 64-bit libraries installed, execute the following **rpm** command, which can be used to distinguish between an s390 (31-bit) or s390x (64-bit) package:

```
#rpm -qa --queryformat "%{NAME}-%{VERSION}-%{RELEASE} (%{ARCH})\n" | grep
packagename
```

Replace *packagename* with the package to query. You should see the following results:

```
# rpm -qa --queryformat "%{NAME}-%{VERSION}-%{RELEASE} (%{ARCH})\n" | grep
glibc-devel
glibc-devel-2.5-24 (s390)
glibc-devel-2.5-24 (s390x)
# rpm -qa --queryformat "%{NAME}-%{VERSION}-%{RELEASE} (%{ARCH})\n" | grep libaio
libaio-0.3.106-3.2 (s390x)
libaio-0.3.106-3.2 (s390)
```

At this point, you now have a Red Hat Enterprise Linux 5 Linux guest ready for the installation of an Oracle Database 10gR2 or Oracle Application Server 10g. The steps for the Oracle installation are detailed in *Experiences with Oracle Solutions on Linux for System z®*, SG24-7634.

Resources

The following Redbooks® publications are available at:

http://www.redbooks.ibm.com

- ► Experiences with Oracle 10g Database for Linux on zSeries, SG24-6482
- ► Experiences with Oracle® 10gR2 Solutions on Linux for IBM System z, SG24-7191
- Using Oracle Solutions on Linux for System z, SG24-7573
- ► z/VM and Linux on IBM System z, SG24-7492

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