Redpaper

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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
 SPOOL 000C 2540 READER *
 SPOOL 000D 2540 PUNCH A
 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
*
```

1

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=lhotse.us.oracle.com
NETTYPE=qeth
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.

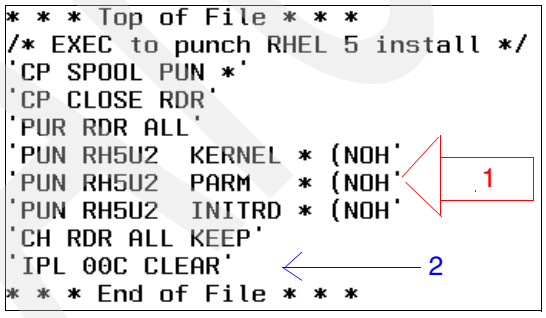

Figure 2 RH5U2 exec

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.

```
 PAZXXQ01 RDRLIST  S0  V 164  Trunc=164 Size=3 Line=1 Col=1 Alt=0
Cmd   Filename Filetype Class User  at Node     Hold  Records  Date      Time
      RH5U2    KERNEL   PUN A PAZXXQ01 HQCMS2   NONE    47182  8/14    10:30:46
      RH5U2    PARM     PUN A PAZXXQ01 HQCMS2   NONE        1  8/14    10:30:47
      RH5U2    INITRD   PUN A PAZXXQ01 HQCMS2   NONE   164400  8/14    10:30:47
```

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**.**

```
eth0      Link encap:Ethernet  HWaddr 02:00:02:00:00:4B
          inet addr:130.35.55.1  Bcast:130.35.52.255  Mask:255.255.252.0
          inet6 addr: fe80::200:200:d00:4b/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1492  Metric:1
          RX packets:190 errors:0 dropped:0 overruns:0 frame:0
          TX packets:7 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:21513 (21.0 KiB)  TX bytes:552 (552.0 B)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

sit0      Link encap:IPv6-in-IPv4
          NOARP  MTU:1480  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
127.0.0.1       0.0.0.0         255.255.255.255 UH    0      0        0 lo
130.35.52.0     0.0.0.0         255.255.252.0   U     0      0        0 eth0
0.0.0.0         130.35.52.1     0.0.0.0         UG    0      0        0 eth0
```

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.

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.

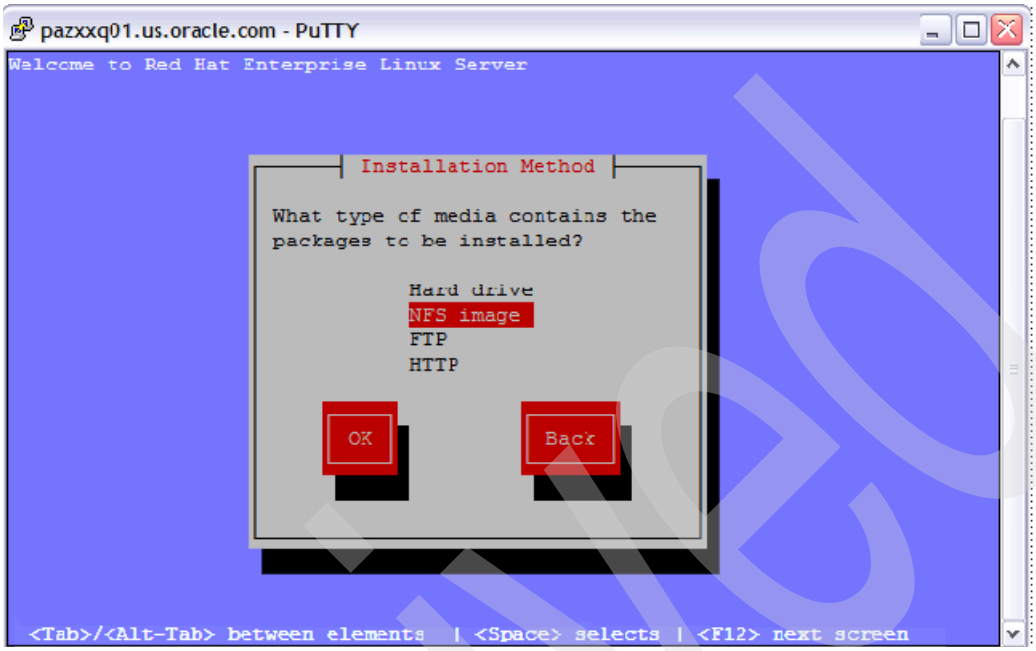

Figure 7 Package media selection

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

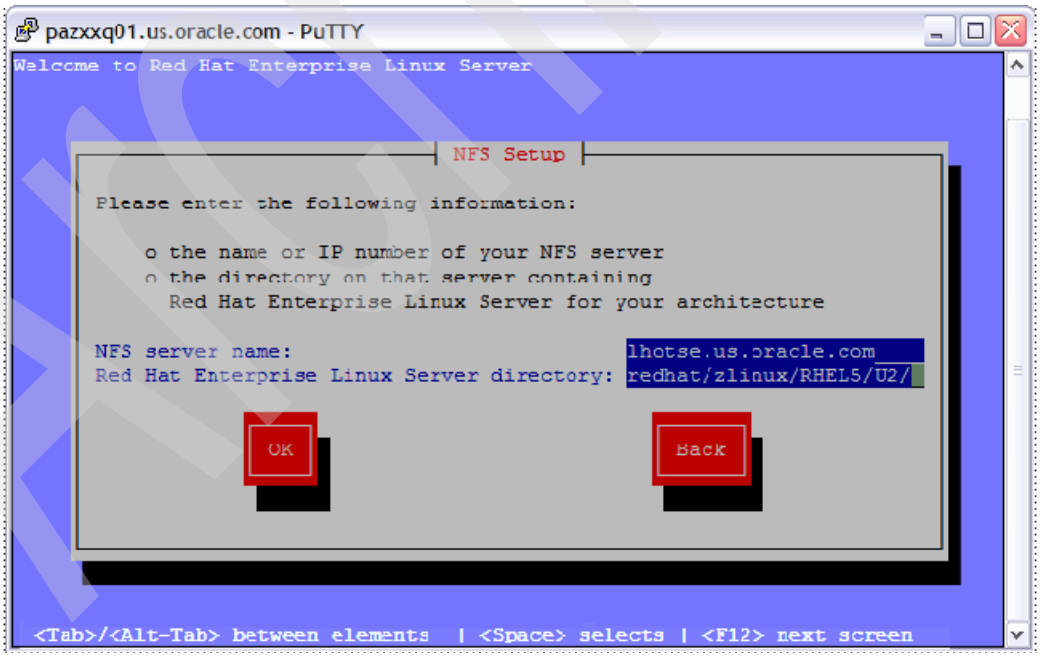

Figure 8 NFS setup

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.

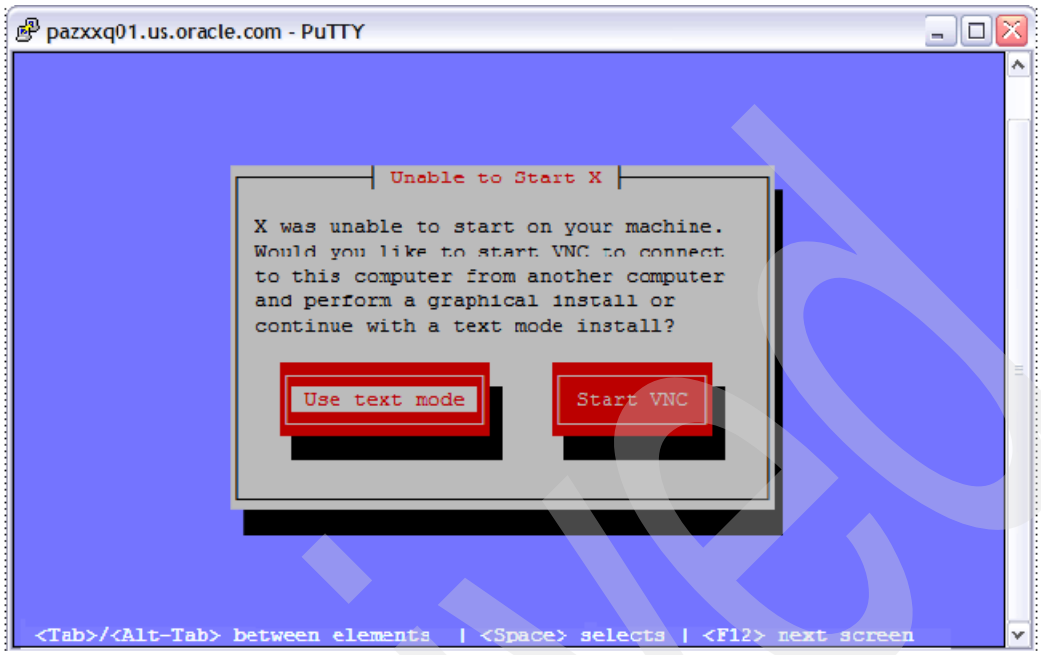

Figure 9 VNC selection

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

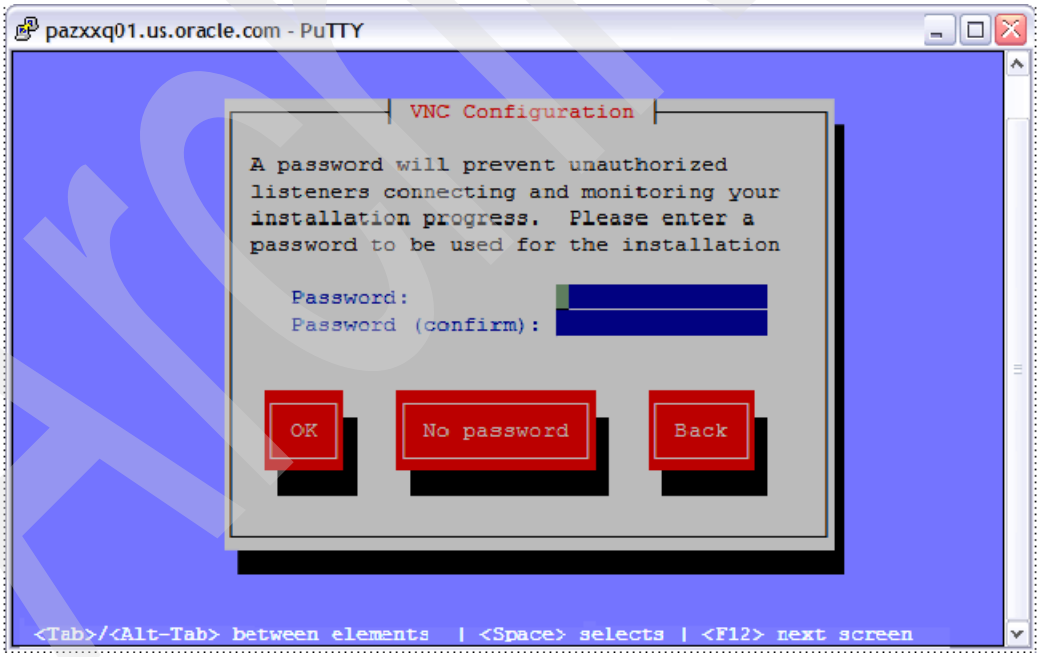

Figure 10 VNC configuration

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

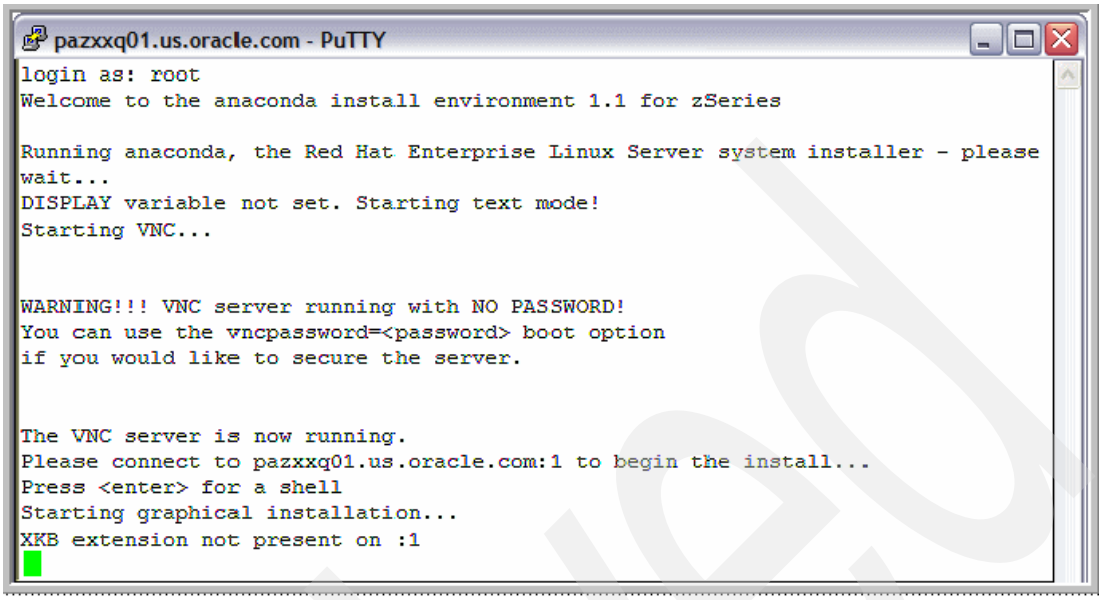

Figure 11 Starting "X" using VNC to initiate the graphical package installation process

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.

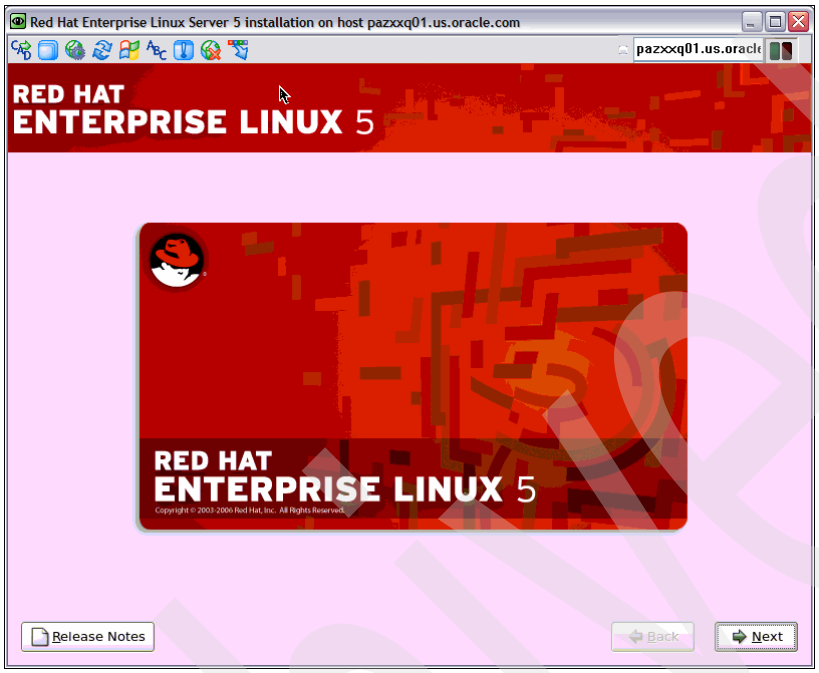

Figure 12 Initial splash window

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.

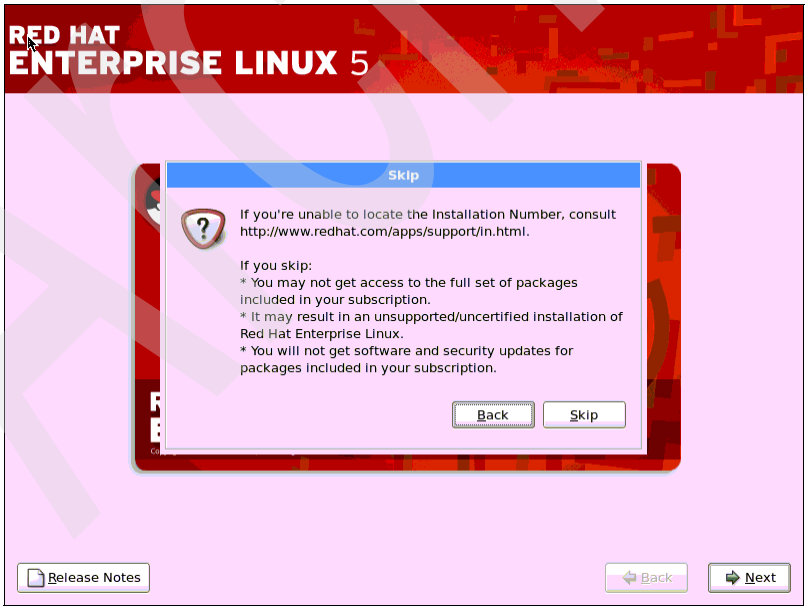

Figure 13 Red Hat Enterprise Linux Networks activation skip confirmation

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.

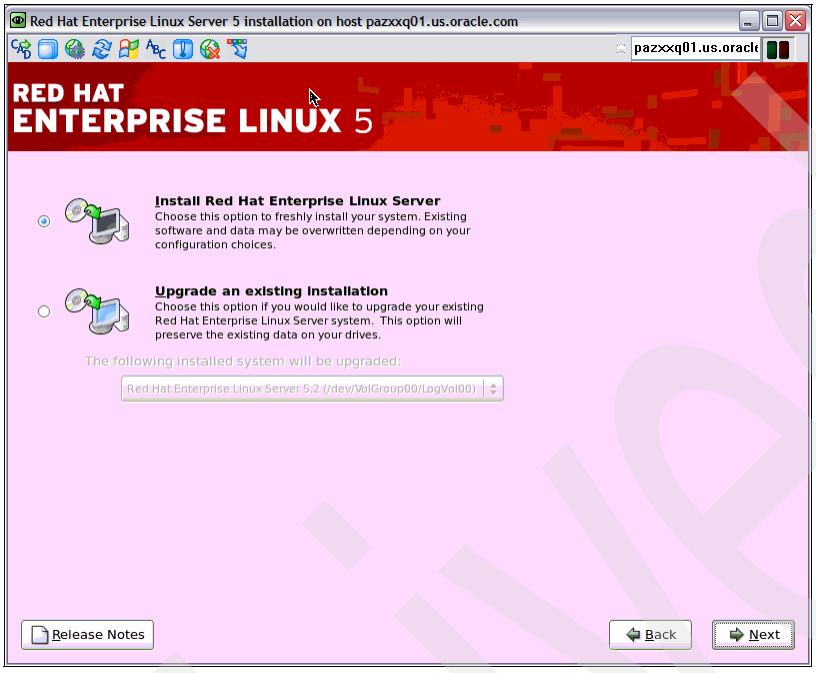

Figure 14 Installation type selection

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.

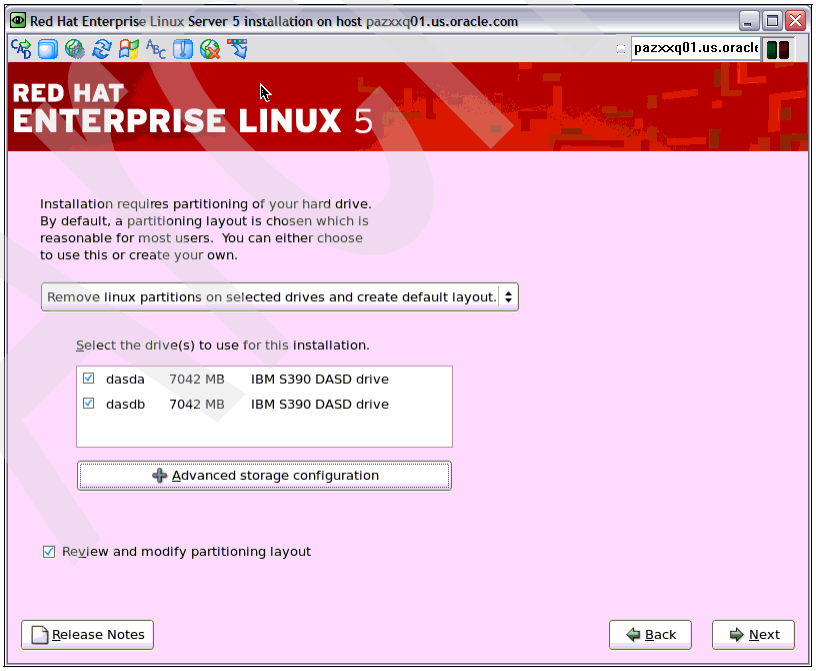

Figure 15 Partition selection

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

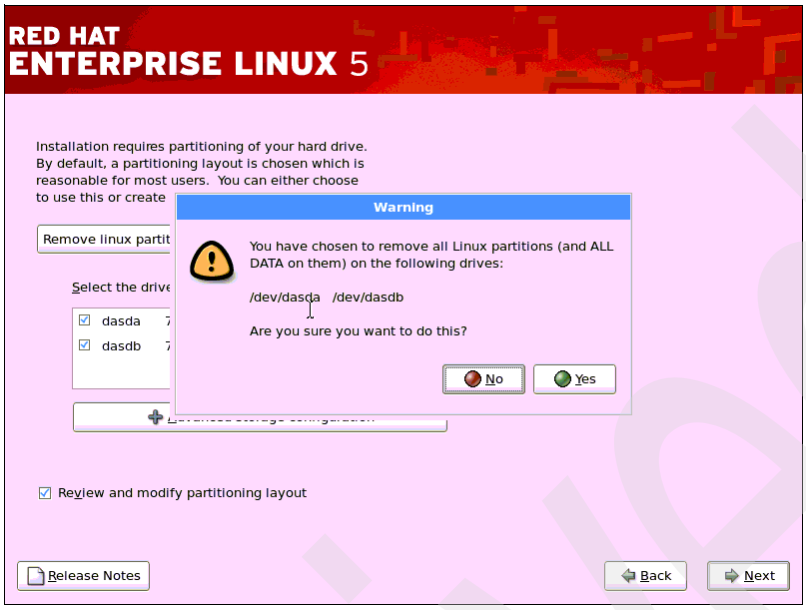

Figure 16 Partition confirmation

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

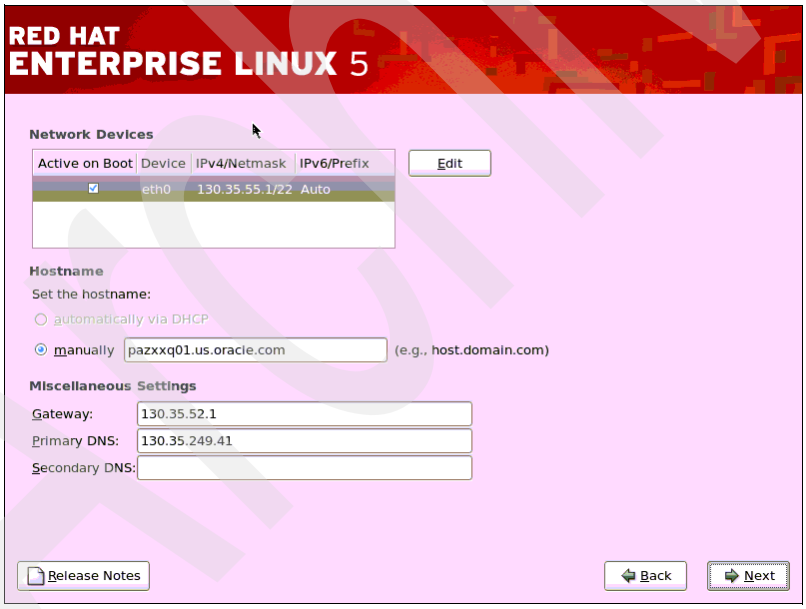

Figure 17 Network configuration

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.

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.

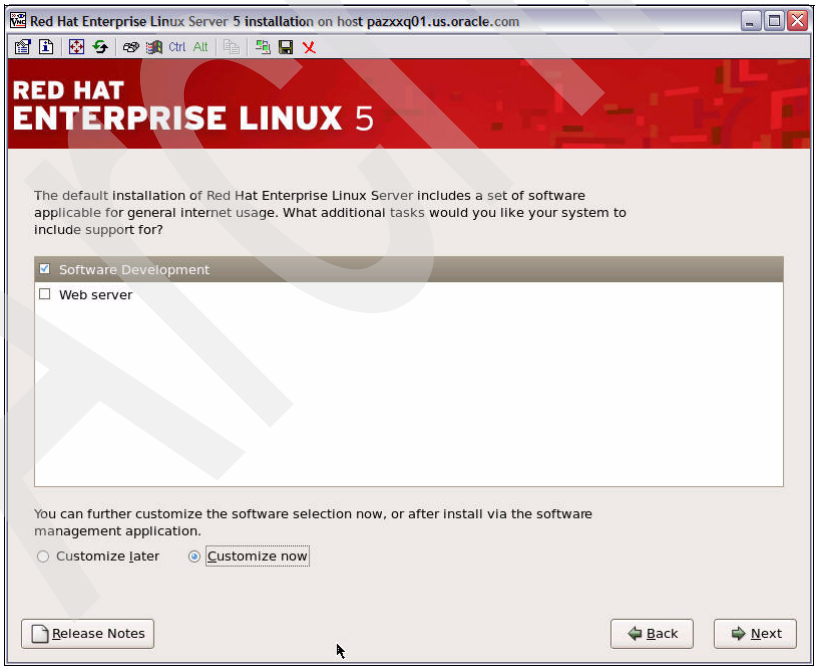

Figure 19 Initial software selection

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.

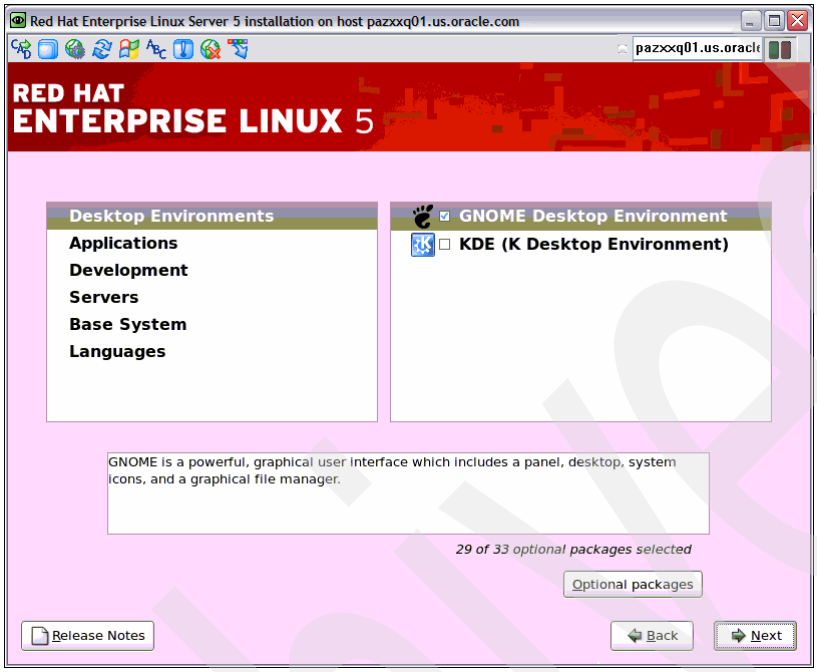

Figure 20 Software selection: Desktop Apps

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

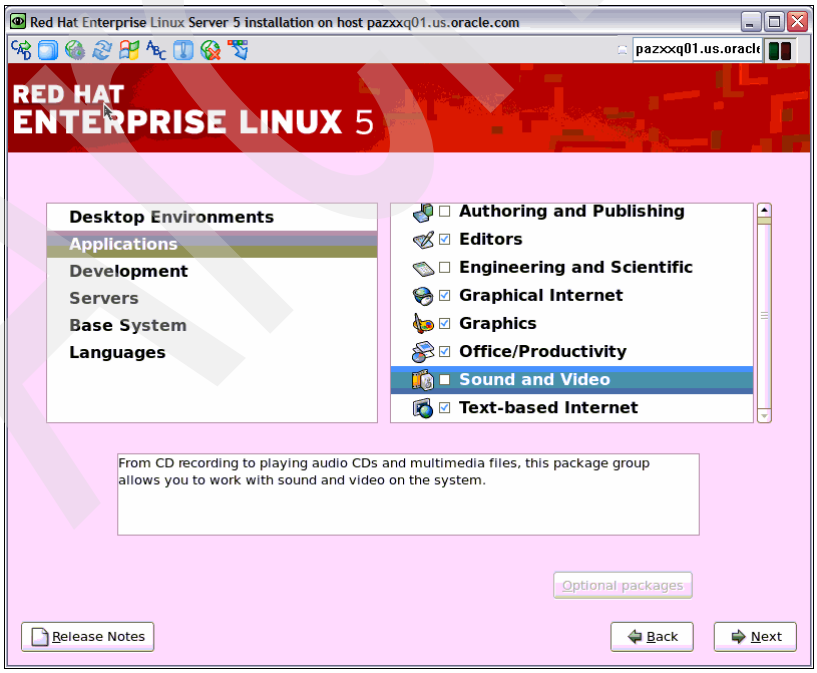

Figure 21 Software selection: Applications

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

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.

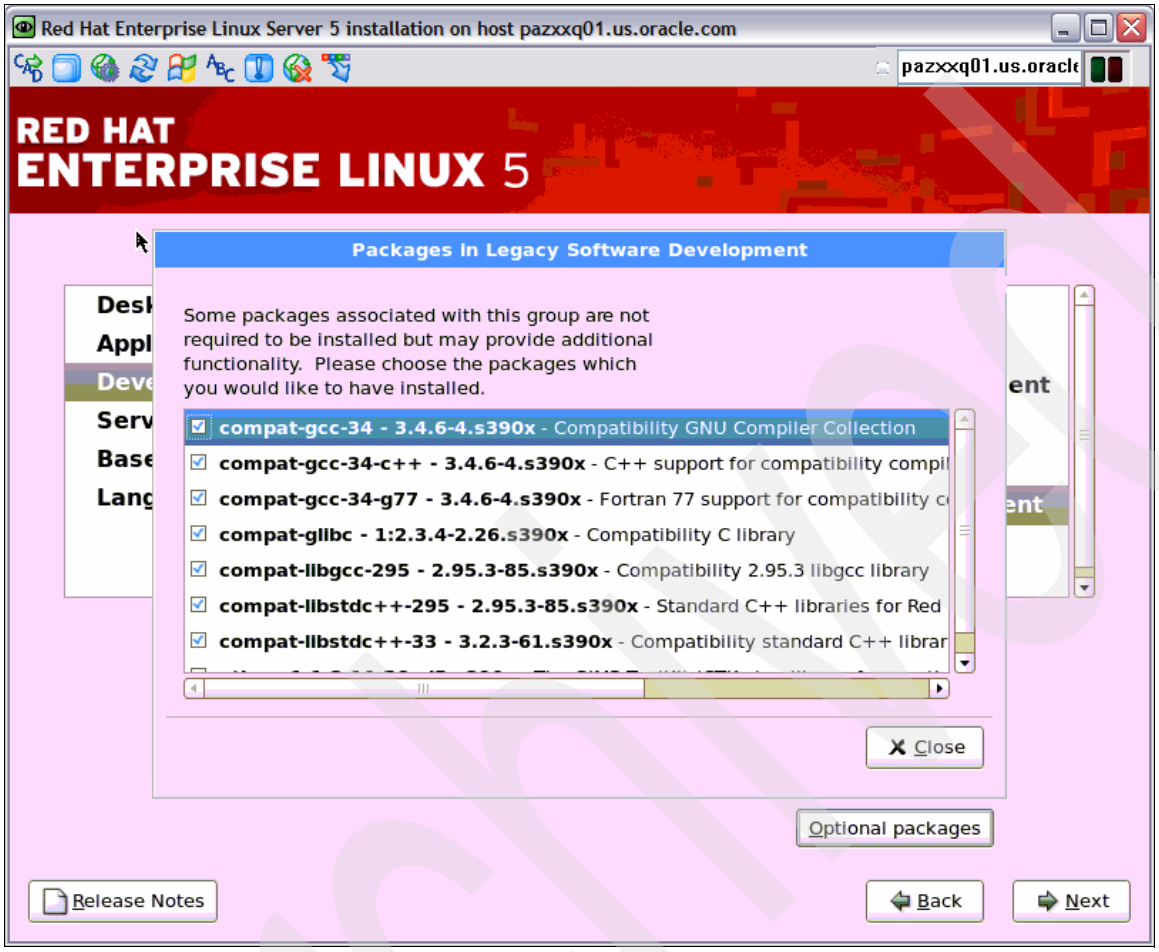

Figure 23 Software selection: Development compatibility libraries

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.

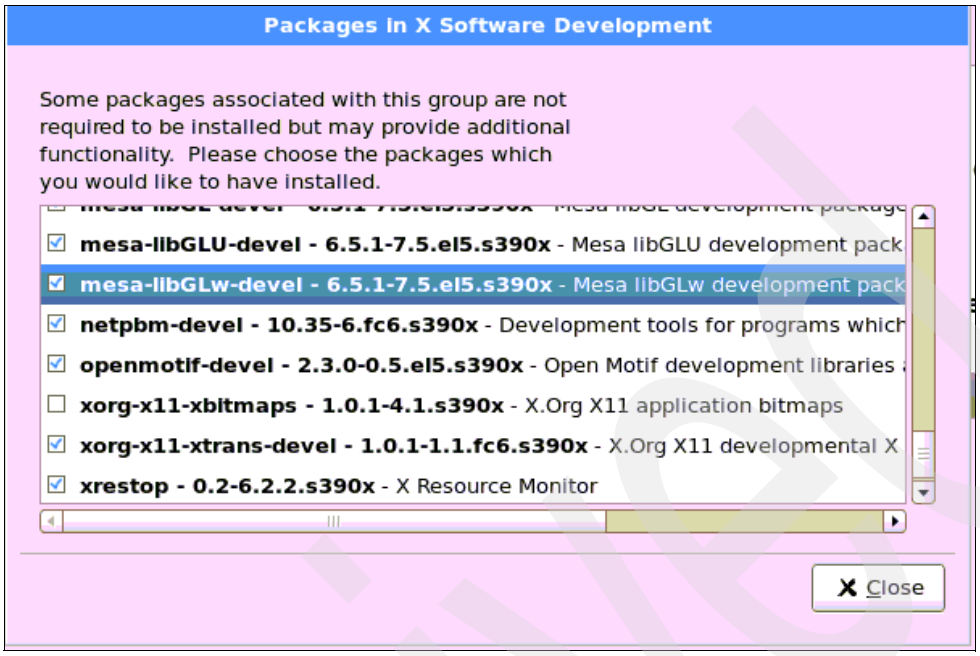

Figure 24 Software selection: Optional x software development selection

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.

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.

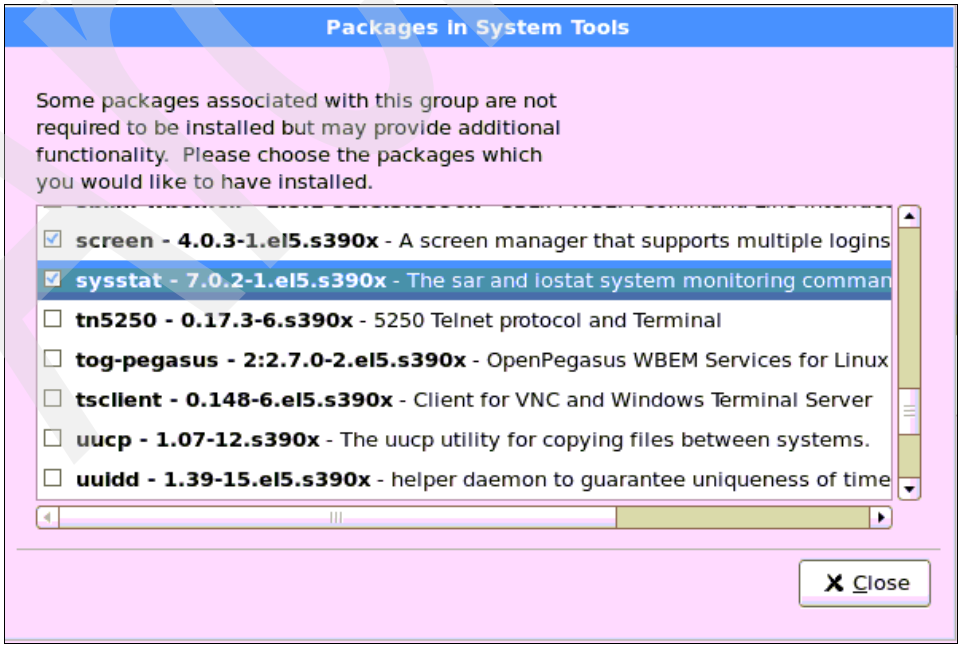

Figure 26 Software selection: System software optional packages

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.

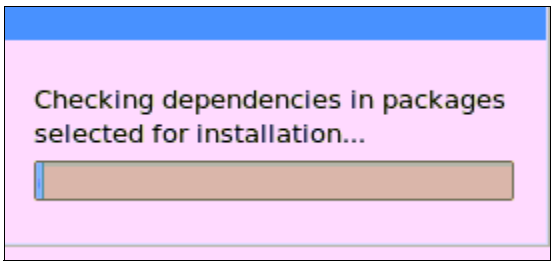

Figure 27 Dependency validation

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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