Installing Oracle9*i* on IBM @server xSeries 450 with Red Hat Enterprise Linux AS 2.1 for the Itanium Processor

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INTRODUCTION

The IBM ^ xSeries 450 is IBM's new 64-bit Itanium Processor Family (IPF) Architecture server. It is the first full implementation of the 64-bit IBM XA-64 chipset, part of IBM's Enterprise X-Architecture (EXA) that combines industry-standard features with IBM mainframe-inspired capabilities to produce revolutionary advances in the I/O, memory and performance of IBM xSeries servers.

The Itamium-2 based x450 is ideally suited for optimized applications that require large memory footprints and high floating point performance such as large databases, business intelligence applications, scientific and technical computing. The x450's 64-bit addressing capability enables it to handle massive memory resources, increasing performance for database and memory intensive applications.

The purpose of this paper is to help those who are installing Linux and Oracle9*i* database on an IBM ^ xSeries 450. This is done by describing a basic installation of Oracle9*i* database on the x450 running Red Hat Enterprise Linux AS 2.1 for the Itanium Processor (Red Hat Advanced Server 2.1 for the Itanium Processor). The description in this paper is based on tests done at the IBM/Oracle International Competency Center and serves as a proof point for the installation of Oracle9*i* on the x450.

In the following sections, we describe the steps to install Red Hat and Oracle9*i* on the x450, including planning, actual installation of Red Hat Enterprise Linux AS 2.1 and Oracle9*i*, and simple verification of the installation.

Note that this installation is a single-node instance and does not include Real Application Clusters (RAC).

INSTALLATION PLANNING

MATERIALS USED

Hardware

Our test system was a pre-production x450 with the following:

- Four Itanium 2 processors running at 1.0GHz
- 26GB of RAM
- Two 36.4GB hard disks
- EFI Version 1.10

Red Hat Enterprise Linux AS 2.1 operating system

When we started this project, Red Hat Enterprise Linux AS 2.1 (ELAS, formerly named Red Hat Advanced Server 2.1) was not yet available for the Itanium processor. Our test was done using the 3/10 beta release of Red Hat Advanced Server 2.1 for the Itanium Processor. Prior to completing this paper, Red Hat Enterprise Linux AS 2.1 for the Itanium Processor was released as part of Quarterly Update 2 (QU2). However, we were unable to install it in time for this paper.

For information regarding Red Hat certification, refer to:

http://hardware.redhat.com/hcl/?pagename=hcl&view=certified&vendor=4&class=8#list

As this product has just recently been renamed, you will find some of the documentation and reference sources have not yet been updated with the new names. For this reason, there are still references to "Advanced Server" in this paper, such as the name of Red Hat's Installation Guide, Oracle9*i* 's product name, screenshots, etc.

For the latest information on supported operating systems, refer to:

http://www.pc.ibm.com/us/compat/nos/matrix.shtml

Oracle9i Release 2 Release 2 (9.2.0.2) for Linux IA/64

The xSeries 450 is currently certified by Red Hat, SuSE, SCO and Turbolinux for:

- Red Hat Enterprise Linux AS 2.1 for the Itanium Processor
- SuSE Linux Enterprise Server 8.0 for Itanium (SLES8)
- SCO Linux Server 4.0 for the Itanium Processor Family
- Turbolinux Enterprise Server 8.0 for the Itanium Processor

When we started this project, Oracle had just announced certification of their database product for Linux/IA64. Currently, the only 64-bit Linux distribution certified with Oracle9*i* is Red Hat Enterprise Linux AS 2.1. For the latest information on Oracle product certification, refer to:

http://otn.oracle.com/support/metalink/content.html

BEFORE STARTING THE INSTALLATION

To prepare for this installation, review the following sources of information. These sources are either available online or may be downloaded at the URLs listed in the References section

- 1. Oracle9*i* Release Notes, Release 2 (9.2.0.2.0) for Linux Intel on Itanium (64-bit), February 2003, Part No. B10567-02.
- 2. Oracle9*i* Installation Guide, Release 2 (9.2.0.1.0) for UNIX Systems: AIX-Based Systems, Compaq Tru64 UNIX, HP 9000 Series HP-UX, Linux Intel and Sun Solaris, May 2002, Part No. A96167-01.
- 3. Red Hat Linux Advanced Server 2.1, The Official Red Hat Linux Advanced Server Installation Guide for the Itanium® Processor

This document can be accessed online from Red Hat's website. See the References section on page 35, item # 4 for the URL. This document is the reference manual for Red Hat Enterprise Linux AS installation and includes a section on troubleshooting your installation.

4. IBM Redbook, "IBM ^ xSeries 450 Planning and Installation Guide", (References, # 1) This document is a comprehensive source for technical details on the xSeries 450 and provides helpful information for preparing and performing an installation. These include sections describing the x450 hardware, Extensible Firmware Interface (EFI), and installation of SuSE Linux Enterprise Server on the x450.

The aforementioned Redbook (References, #1) describes an issue with the RXE-100 expansion enclosure and an LS-120 drive unit, encountered during the installation of SLES8. The circumvention actions were:

- Disconnect the RXE-100 during installation and reconnect it after the system is installed.
- Remove the LS-120 unit from the spare media bay in front of the x450 (secondary bus of the primary IDE interface)

Our test server did not have these components, thus we were unable to test installation of Red Hat Enterprise Linux AS (ELAS) with these components. We note however, that the Red Hat ELAS Installation Guide also describes the installation from an LS-120, so it may not be an issue with Red Hat ELAS.

INSTALLATION

INSTALLING RED HAT ENTERPRISE LINUX AS

To install Red Hat Enterprise Linux AS, perform the following steps:



1. Power on the x450 and insert the first Red Hat CD into the CD-ROM drive. The EFI Boot Manager menu, as shown in Figure 1, is displayed.

```
x450 BIOS 0.21
EFI version 1.10 [14.60]
EFI Boot Manager ver 1.10 [14.60]
Please select a boot option
EFI Shell [Built-in]
Acpi(PNP0A03,0)/Pci(5|1)/Ata(Primary,Master)
MemMap(0:FF000000-FFFFFFF)
MemMap(0:FF800200-FFFFFFF)
Acpi(PNP0A03,1)/Pci(4|0)/Mac(0002551F0149)
Acpi(PNP0A03,1)/Pci(4|1)/Mac(0002559F0149)
Flash Update
Configuration/Setup
Diagnostic
Boot option maintenance Menu
Use ↑ and ↓ to change option(s). Use Enter to select an option
```

Figure 1. EFI Boot Manager

Verify that the EFI Boot Manager has detected the CD. Do this by selecting the EFI Shell, using the arrow ($\uparrow \downarrow$) keys if needed and pressing the Enter key.



2. The information shown in Figure 2 is displayed. Note the line beginning with fs2. "CDROM/(Entry0)" at the end of this line indicates that the CD has been detected. If not, type map at the shell prompt to redisplay the mapping table. If the mapping does not appear, use "map –r" to force EFI to refresh the device mapping table.

When the mapping has been created for the CDROM, type exit at the shell prompt to return to the EFI Boot Manager menu.

```
Loading.: EFI Shell [Built-in]
EFI Shell version 1.10 [14.60]
Device Mapping Table
fs0 : MemMap(0:FF000000-FFFFFFF)
fs1 : MemMap(0:FF800200-FFBFFFFF)
fs2 : Acpi(PNP0A03,0)/Pci(5|1)/Ata(Primary,Master)/CDROM(Entry0)
fs3 : Acpi(PNP0A03,1)/Pci(30)/Scsi(Pun0,Lun0)/HD(Part1,SigD350A1B8-66E2-
11D7-908C-DBA394519D32)
blk0 : MemMap(0:FF000000-FFFFFFF)
blk1 : MemMap(0:FF800200-FFBFFFFF)
 blk2 : Acpi(PNP0A03,0)/Pci(5|1)/Ata(Primary,Master)
blk3 : Acpi(PNP0A03,0)/Pci(5 1)/Ata(Primary,Master)/CDROM(Entry0)
blk4 : Acpi(PNP0A03,1)/Pci(3 0)/Scsi(Pun0,Lun0)
blk5 : Acpi(PNP0A03,1)/Pci(3|0)/Scsi(Pun0,Lun0)/HD(Part1,SigD350A1B8-66E2-
11D7-908C-DBA394519D32)
 blk6 : Acpi(PNP0A03,1)/Pci(3|0)/Scsi(Pun0,Lun0)/HD(Part2,Sig72675FC2-771D-
11D7-9B4F-E7444EC4AC35)
 blk7 : Acpi(PNP0A03,1)/Pci(3|0)/Scsi(Pun0,Lun0)/HD(Part3,Sig7267CF98,771D-
11D7-9B4F-E7444EC4AC35)
 blk8 : Acpi(PNP0A03,1)/Pci(30)/Scsi(Pun1,Lun0)
 blk9 : Acpi(Pnp0A03,1)/Pci(3 0)/Scsi(Pun1,Lun0)/HD(Part1,Sig1F815096-317D-
44DC-89BC-A54C63E45A66)
 blkA : Acpi(PNP0A03,1)/Pci(3|0)/Scsi(Pun1,Lun0)/HD(Part2,Sig8EA7C282-B618-
4ECD-BFA0-512724111A9B)
Shell>
```

Figure 2. EFI Device Mapping Table

- 3. Select "Acpi(PNP0A03,0)/Pci(5|1)/Ata(Primary, Master)" from the EFI Boot Manager menu (second line on Figure 1) and press Enter.
- 4. The Red Hat GUI welcome screen appears. From this point on, the installation is very similar to that for Red Hat Enterprise Linux AS 2.1 on the 32-bit Intel servers. Proceed with the installation as described in the Red Hat Advanced Server Installation Guide (References, #4).



- 5. We will not describe all the steps to install Red Hat ELAS here, but rather refer you to The Red Hat Enterprise Linux AS Installation Guide (**Error! Reference source not found.**, 4). However, a number of steps were important to our installation, and these were as follows:
 - a. On the Install Options screen, choose Advanced Server, shown in Figure 3. You will have an opportunity to modify the default selections on a later step.



Figure 3. RHAS Install Options



b. On the Disk Partitioning Setup screen (sample shown in Figure 4), we chose to have the installer automatically partition for us. We chose to install the operating system on one of our two disks and use the second disk for Oracle binaries and test database. Note that the installer creates ext3 filesystems by default, we chose to use ext2.

	redhat.
Craw Hey Choosing Your Partitioning Strategy One of the largest obstacles for a new user during a Linux installation is partitioning. Red Hat Linux makes this process much simpler by providing an option for automatic partitioning. By selecting automatic partitioning, you will not have to use partitioning tools to assign mount	2 Addressing Selap: 2 Addressing Furthermong selant up your partitionoring based on your model and they the selant partition in research we developed to be setabling partitions to research your results on the setabling partitions to research your research we developed to be setabling partitions to research your research we developed to be setabling partitions to research your research we developed to be setabling partitions to research your research we developed to be setabling partitions to research your research we developed to be setabling partitions to research your research we developed to be setabling partitions with the setabling partition with the setabling partition with the setabling partition with the partition wit
2 Hate Help 2 Refease Notes	42 Back De Heet

Figure 4. Disk Partitioning Setup

c. On the Firewall Configuration screen, take note of the default selections, shown in Figure 5. Leaving the default settings will interfere with setup activities later on that require network communications. Either configure the firewall at this time, or defer it for later by choosing No firewall. To simplify our installation, we chose No firewall.

	redhat.
Online Help Firewall Configuration Red Hat Linux also offers you firewall protection for enhanced system security. A firewall sits between your computer and the network, and determines which resources on your computer remote users on the network are able to access. A properly configured firewall can greatly increase the out-of-the-box security of your system. Choose the appropriate	Firewall Configuration Please choose your security level: High Medium No firewall C Use default firewall rules Customize Trusted devices: eth0 Allow incoming: DHCP SSH Teinet WWW (HTTP) Mail (SMTP) FTP Other ports:
? Hide Help ? Release Notes	➡ Back ▷ Next

Figure 5. RHAS Firewall Configuration



d. When the Selecting Package Groups screen is displayed (Figure 6), select Software Development, which you will need for the Oracle9*i* installation. Check Select individual packages to review and modify selections as needed.

		red hat.
Online Help Selecting Package Groups Select the package (application) groups that you want to install. To select a package group, click on the check box beside it. To select individual packages, check the Select Individual Packages box at the bottom of the screen.	Package Group Selection Image: Comparison of the selection o	Total install size: 1,905M
? Hide Help ? Release Notes		Sack Next

Figure 6. RHAS Package Groups

e. A sample of the Individual Package Selection screen is shown in Figure 7. On this screen, you may select additional packages or remove selected packages. For example, by default, the installation program does not install the ftp server. On the left hand panel, click **System Environment** → **Daemons**. Scroll down on the right hand panel and select the wu-ftp daemon, wu-ftpd.

						redhat.
Individual Package Selection		Package apel emacs emacs-ell emacs-ell emacs-leim emacs-loim emacs-nox gedit hexedit jed jed-common jed-xjed joe nedit nvi-m17n-canna nvi-m17n-nocanna psgmi semi vim-x11 vim-enhanced	Size (MB) 1 24 14 24 6 2 1 1 2 3 3 1 1 5 5			
Total install size: 1,905M Emacs-X11 includes the Emacs elements). Emacs-X11 will also Install emacs-X11 if you're goin Emacs both with and without X	text edir run Ema g to use (it will wi	tor program for use v ics outside of X, but Emacs with the X V ork fine both ways).	with the X Windo it has a larger m Vindow System. ' You'll also need	Select al w System (it provides emory footprint than th /ou should also install to install the emacs pa	l in group support for the n e 'non-X' Emac emacs-X11 if y ackage in order	Unselect all in group nouse and other GUI is package (emacs-nox). rou're going to run to run Emacs.
? Show Help ? Release	e Notes]			🚽 Ba	ck 🕞 Next

Figure 7. RHAS Individual Package Selection

6. When the x450 is rebooted after Red Hat ELAS installation, the first entry on the EFI Boot Manager menu will be Red Hat Linux Advanced Server. This entry is also the default boot selection, and will be booted automatically if you do not press any key.

Post-installation

Creating Partitions

By default, Red Hat ELAS creates EFI GUID partition tables on disks that are partitioned during installation. To look at these partitions or to create new partitions, you will need to use the parted utility, included with Red Hat ELAS. The fdisk utility does not currently support EFI GUID partition tables. Refer to the man pages for more information on the parted utility.

Issues

After installing ELAS, we encountered severely degraded system performance after logging into the graphical desktop environment. We encountered this issue with both KDE and GNOME environments. Using the top command, we found that in KDE, the autorun program was the largest CPU user and in GNOME, it was a program named magicdev. These programs detect when a CD is inserted or removed in the CD-ROM drive.

We circumvented the issue by switching to a virtual console (using [Ctrl-Alt-Fn], where n=1 through 6), logging in as root and performing the following:

- a. For KDE, rename or remove the file named .kde/Autostart/Autorun.desktop in each user's home directory.
- b. For GNOME remove the magicdev package. As root, type the command: rpm -e magicdev

As we were using a beta version of ELAS, it is possible that this issue has been resolved in the generally available (GA) version.

INSTALLING ORACLE9/

Pre-installation Tasks

To prepare the system for Oracle9*i* installation, perform the following:

1. Create the operating system group for the Oracle Universal Installer Inventory and the user ID that will be used to install, configure and run Oracle. In our test, we named the group oinstall and the user ID oracle. You will need to be root user to do this. From a shell prompt, type the following commands:

```
groupadd oinstall
useradd -g oinstall -m oracle
```

Change oracle's password to enable login. Type the following command:

passwd oracle
< type the desired oracle password when prompted>

If you plan to use KDE with the oracle user, remember to delete or rename /home/oracle/.kde/Autostart/Autorun.desktop, as described above.

- Download JDK 1.4.1 from <u>http://java.sun.com/j2se/1.4.1/download.html</u>. For Itanium processors, JDK 1.4.1 is labeled J2SE Itanium Developer Release v 1.4.1. The download file is named j2sdk-1_4_1-linux-ia64.bin.
 - a. Put the download file in the directory into which you want to install the Java 2 SDK. Launch the downloaded file with the following commands:

```
chmod +x j2sdk-1_4_1-linux-ia64.bin
./j2sdk-1_4_1-linux-ia64.bin
```



- b. The script displays a binary license agreement and asks for your agreement before installation can proceed. Once you agree to the license, the install script installs the Java 2 SDK in a subdirectory named j2sdk1.4.1 in the current directory. You will be asked for this directory during the installation of Oracle9*i*. In our test, we installed into the /usr directory.
- 3. Oracle 9*i* Release 2 for Red Hat Advanced Server 2.1 Itanium 2 is supplied on three CDs, so it is necessary to switch product CDs during installation. Oracle Universal Installer (OUI) will manage the switching between CDs and ask you for the CD location when necessary.

For our installation, we copied the Oracle9*i* product CDs to the hard disk. The three product CDs were copied to three directories on the server named /oracle/stage9i/Disk*n*. These directories were named /oracle/stage9i/Disk1, /oracle/stage9i/Disk2 and /oracle/stage9i/Disk3.

If you chose to install from the CDs, do not run OUI while the CD is the current directory, or you will not be able to switch CDs when prompted.

- 4. Modify the kernel parameters that affect resources used by Oracle9*i*: This task must be performed as root user.
 - a. Review kernel parameter recommendations in Reference 2 and 3. Use the sysctl command to do look at the current settings. For example, the default values for kernel.sem are shown below in Figure 8.

```
[root@x450db root]# sysctl kernel.sem
kernel.sem = 250 32000 32 128
[root@x450db root]#
```

Figure 8. Displaying kernel parameters

b. In our test, we modified the kernel parameters shown in Figure 9, which may be different for your environment. Add the statements shown to /etc/sysctl.conf, which will cause the parameters to be set upon reboot. Set the parameters now using the sysctl -p command.

```
kernel.sem = 250 32000 100 128
kernel.shmmax = 8192000000
kernel.shmmni = 4096
vm.nr_hugepages = 8
```

Figure 9. Modified kernel parameters

5. Create ORACLE_HOME directory and make oracle user the owner. Issue the commands shown in Figure 10 as root user:

```
[root@x450db root]# mkdir /oracle
[root@x450db root]# mkdir /oracle/9202
[root@x450db root]# chown -R oracle:oinstall /oracle
```

```
Figure 10. Creating ORACLE_HOME
```

- 6. Set up environmental variables for the oracle user. Do this as oracle user.
 - a. Modify .bash_profile in oracle's home directory, adding the statements shown in Figure 11.

```
export ORACLE_BASE=/oracle/9202
export ORACLE_HOME=$ORACLE_BASE
export ORA_NLS33=$ORACLE_HOME/ocommon/nls/admin/data
PATH=.:$ORACLE_HOME/bin:$PATH:$HOME/bin
export PATH
```

Figure 11. oracle user environmental variables



b. Verify that the environmental variables are set correctly by logging in as oracle user and echoing an environmental variable to the console. For example:

```
[oracle@x450db oracle]$ echo $ORACLE_HOME
/oracle/9202
[oracle@x450db oracle]$
```

Oracle9i Installation Tasks

1. Log in as oracle and invoke the Oracle9*i* Universal Installer as follows:

```
cd /oracle/stage9i/Disk1
./runInstaller
```

2. The Welcome screen in Figure 12 is displayed. Click **Next** to continue.

a≓¤ Oracle Universal Installer: Welcome	×
Welcome	
The Oracle Universal Installer guides you through the your Oracle products.	e installation and configuration of
Click "Installed Products" to see all installed produc	its.
	Deinstall Products
	About Oracle Universal Installer
Exit Help Installed Products	Previous Next
ORACLE	

Figure 12. Welcome Screen



3. Since this is the first installation, the Inventory Location screen is displayed, as shown in Figure 13. The default directory for installation files is a subdirectory under ORACLE_HOME. Leave the default setting and click **OK** to continue.

nventory Location	
nventory Location	
You are starting your first installation on this computer. As part install, you will need to specify a base directory for installation f Another directory will be automatically set up for per-product installa	of this first f iles. tion files.
The per-product installation files can vary in size, depending on the products you install. You should plan on an average of about 150KB	complexity of the per product.
The base directory: * Contains the permanent and per-product files in subdirectories. * Must be writable by anyone installing or deinstalling products on thi	s computer.
What would you like as the base directory?	Browse)
Inventory files will be in: /oracle/9202/oralnventory	
rer-product mes will be in: /oracle/9202/oralnventory/Componen	ts

Figure 13. Inventory Location

- Note: There are several files that are used to keep track of choices you make when using OUI. If you have to restart the installation process, information in these files will direct the OUI to default values. The best way to restart is to use OUI to de-install, then restart. However, if you have to manually restart the installation, look at these files and remove or modify the entries.
 - /var/opt/oracle/oralnst.loc contains the following: inventory_loc=/oracle/9202/oraInventory inst_group=oinstall
 - /etc/oratab has entries for ORACLE_HOME and ORACLE_SID



4. The screen entitled UNIX Group Name, Figure 14, is displayed. Enter oinstall (from Post-installation, # 1, page 11) as shown. Click **Next** to continue.

🧏-∺ Oracle Universal Installer: UNIX Group Name	• ×
UNIX Group Name	
You can specify a UNIX group name which will have permission to update Oracle software on th system.	is
If you want only root to have permission, leave the field blank and press "Next" to continue the	install.
UNIX Crown Name:	
onix Group Name. joinstall	
Exit Help Installed Products Previous Ne	ext)
ORACLE	

Figure 14. UNIX Group Name

5. A popup window appears, asking to execute a shell script as root. Go to another window, switch to root and execute the specified shell script. When completed, return to the popup window and click **Continue**.



Figure 15. Popup window - root script execution



6. Verify information on the File Locations screen, shown in Figure 16. Click Next to continue.

a−¤ Oracle Universal Installer: File Locations			• ×
File Locations			
Source			
Enter the full path of the file representing the product(s) you want to install:			
Path: /oracle/stage9i/Disk1/stage/products.jar		Browse)
Destination			
Enter or select an Oracle Home name and its full path:			
Name: OUIHome2	-		
Path: /oracle/9202	•	Browse)
		•	
About Oracle L	Jnive	rsal Installer	
Exit Help Installed Products Previous		Next	
ORACLE			199

Figure 16. File Locations

7. Select Oracle9*i* Database 9.2.0.2.0 on the Available Products screen shown in Figure 17. Click **Next** to continue.



Figure 17. OUI Available Products



8. The Installation Types screen is displayed, shown in Figure 18. If you select Custom, the installer will display additional screens for more detailed product selection. For our example, we selected Enterprise Edition to install all the available products. Click **Next** to continue.

₩-₩ Oracle Universal Installer: Installation Types
Installation Types
Oracle9i Database 9.2.0.2.0
What type of installation do you want?
Enterprise Edition (3.40GB)
Provides data management for high-end applications such as high volume on-line transaction processing (OLTP) environments, query-intensive data warehouse and demanding Internet applications. Delivers tools and functionality to meet the availability and scalability requirements of mission-critical applications.
OStandard Edition (3.32GB)
Targeted for workgroup or department-level applications. Includes an integrated set of management tools, full distribution, replication, web features and facilities for building business-critical applications.
CCustom
Enables you to choose individual components to install.
Exit Help Installed Products Previous Next
ORACLE

Figure 18. Installation Types



9. On the Database Configuration screen (Figure 19), we chose Software Only. Later on, we will manually invoke other Oracle configuration tools, or assistants. If you choose one of the other selections, OUI will automatically invoke the appropriate Oracle assistants. Click **Next** to continue to the next step.

🐨 Oracle Universal Installer: Database Configuration 📃 💌
Database Configuration
Select a database suited to your needs.
C General Purpose
Installs a pre-configured database optimized for general purpose usage
C Transaction Processing
Installs a pre-configured database optimized for transaction processing
C Data Warehouse
Installs a pre-configured database optimized for data warehousing
Clustomized
Allows you to create a customized database. This option takes longer than the pre-configured options
Software Only
Installs software only and does not create a database at this time
Exit Help Installed Products Previous Next
OINACEC

Figure 19. Database Configuration

10. On the next screen, shown in Figure 20, use the Browse button to select the jdk home directory. This is the directory from step 2, Post-installation on page 11. Click **Next** to continue.



Figure 20. JDK Home Directory



11. The Summary screen in Figure 21 is displayed. Review the products being installed. If you want to change the products to be installed, click **Previous** and modify your selections. Otherwise, click **Install** to continue.

rracle Universal Installer: Summary
Summary Oracle9i Database 9.2.0.2.0
P-Global Settings
Source : /oracle/stage9i/Disk1/stage/products.jar
-Oracle Home : /oracle/9202 (OUIHome2)
Installation Type : Enterprise Edition
⊖-Product Languages
⇔Space Requirements
/oracle/ Required 3.18GB : Available 21.46GB
/ Required 78MB (only as temporary space) : Available 24.76GB
-New Installations (161 products)
-Advanced Queueing (AQ) API 9.2.0.2.0
-Advanced Replication 9.2.0.1.0
-Agent Required Support Files 9.2.0.2.0
Apache Configuration for Oracle Iava Server Pages 1.1.2.3.0
Exit Help Installed Products Previous Install
Figure 21 Summary

12. The Install window in Figure 22 shows progress of the installation.

👷 🛏 Oracle Universal Installer: Install	• ×
Install	
r Install successful	
Linking Oracle9i Database 9.2.0.2.0	
61%	No. of Concession
Cancel)	
	X
You can find a log of this install session at: /oracle/oralnventory/logs/installActions2003-06-10_02-35-46PM.log	$\langle \times \rangle$
K/X	\times
\sim	
Exit Help Installed Products Previous N	Vext
ORACLE CONTRACTOR OF A CONTRAC	

Figure 22. Install progress

13. When the installation is complete, a popup window is displayed, shown in Figure 23. Go to another window and execute the requested shell script as root. When done, return to the popup window and click **OK** to continue.



Figure 23. Popup window - Setup Privileges

14. The End of Installation screen, Figure 24, completes Oracle product installation. Click **Exit** to end the Oracle Universal Installer.



Figure 24. End of Installation

Creating a Test Database

To test our installation of Oracle9*i*, we created a database using Oracle's Database Configuration Assistant, dbca. Do this as follows:



1. Log in as oracle and type the dbca command from a shell prompt. The dbca welcome screen is displayed, as shown in Figure 25.

□ Database Configuration	Assistant : Welcome	
	Welcome to Database Configuration Assistant for Oracle database. The Database Configuration Assistant enables you to create a database, configure databas options in an existing database, delete a database, and manage database templates.	56
Cancel Help) (< Back Next >>)	

Figure 25. dbca Welcome

2. Select Create a database as shown in Figure 26. Click **Next** to continue.

∭≓∺ Database Configuration As	sistant, Step 1 of 8 : Operations	• • ×
Database Configuration As	sistant, Step 1 of 8 : Operations Select the operation you want to perform Create a database Configure database options in a database Collete a database Collete a database	
Cancel Help	(∉ Back <u>Next ≫</u>)	

Figure 26. dbca Operations



3. Select a database template, shown in Figure 27. Click **Next** to continue.

∭≓⊣ Database Configuration As	sistant, Step	2 of 7 : Database Templates	• • ×
	Select a temp	plate from the following list to create a database:	
	Select	Template Name	Includes Datafiles?
	0	Data Warehouse	Yes
	9	General Purpose	Yes
	0	Transaction Processing	Yes
	0	New Database	No
Cancel (Help		S Back Next	Show Details)
		Co san Dev	

Figure 27. Database templates

4. Enter the global database name and Oracle System Identifier (SID). In our example, we used the name TEST, as shown in Figure 28.

∏ ≓∺ Database Configuration A	sistant, Step 3 of 7 : Database Identification	×
	Specify the following database information. An Oracle9i database is uniquely identified by a Clobal Database Name, typically of the form "name.domain". Clobal Database Name: TEST A database is referenced by at least one Oracle9i instance which is uniquely identified from any other instance on this computer by an Oracle System Identifier (SID). SID: TEST	
Cancel Help	Sack Next >> Einish)

Figure 28. Database identification



5. The Database Connection Options screen is displayed. Select Dedicated Server Mode as shown in Figure 29 and click **Next** to continue.

∭ -∺ Database Configuration A	ssistant, Step 4 of 7 : Database Connection Optic	ins	• • ×
	Select the mode in which you want your database	to operate by default :	
	Dedicated Server Mode		
	For each client connection the database will al that client. Use this mode when the number o small or when clients will be making persisten	locate a resource dedicated to servin f total client connections is expected t, long-running requests to the datab	g only to be lase.
	O Shared Server Mode		
	Several client connections share a database-a when more than a small number of users nee while efficiently utilizing system resources. Th enabled.	Illocated pool of resources. Use this i d to connect to the database simultar ie Oracle shared server feature will b	mode neously e
		Edit Shared Connections Paramete	rs)
Cancel Help		(gack Next) Eir	iish

Figure 29. Database connection options

6. The Initialization Parameters screen is displayed (Figure 30). Since we are just testing our installation, accept the default settings. Click on the different tabs to view the default settings. For example, clicking File Locations, Figure 31 shows the names of the initialization and trace files, and that an spfile will be used for the initialization file. Click Next to continue.

∐i− ⊨ Database Configuration Ass	istant, Step 5 of 7 : Initializ	ation Parameters		• • ×
(Memory Character	Sets DB Sizing	File Locations Archive	
	Memory Character Typical Percentage of physical Database Type: Show distribution of M Custom Shared Pool: Buffer Cache: Java Pool: Large Pool:	Sets DB Sizing memory (26384 MB) for lemony 117440512 32 117440512 16777216	File Locations Archive	T
Cancel Help	PGA: Total Memory for Oracl Total memory in empty parameters All Initialization Parameters	25165824 e: 336 M Bytes Includes 40MB of Oracle ers , if any.	Bytes ▼ Process Size and the defaults fo File Location Var Back Next ≫	iables)

Figure 30. Database initialization parameters - memory settings



	Memory Characte	Sets DB	Sizing	File Locations	Archive
	Initialization Parameters F	ilename: {0	RACLE_BA	SE}/admin/{DB_	NAME}/pfile/init{SID
	Create server param	eters file (spf	ile) ——		
	Persistently stored para in the init.ora file or via stored on the database init.ora when starting a Server Parameters Fil	meters behav ALTER SYSTE server side, database.	e much I M or ALT n a binar	ike traditional RI ER SESSION. The y format, elimina	DBMS parameters se se parameters are ating need for local
	Derver i arameterb i m	inama. Itoro			
1	- Trace File Directories -				
	Trace File Directories - For User Processes:	(ORACLE_	3ASE}/ad	min/{DB_NAME}/	udump
	- Trace File Directories - For User Processes: For Background Process	(ORACLE_	3ASE}/ad 3ASE}/ad	min/{DB_NAME}/ min/{DB_NAME}/	'udump 'bdump
.	- Trace File Directories - For User Processes: For Background Process For Core Dumps:	(ORACLE_ (ORACLE_ (ORACLE_	3ASE}/ad 3ASE}/ad 3ASE}/ad	min/{DB_NAME}/ min/{DB_NAME}/ min/{DB_NAME}/	'udump 'bdump 'cdump

Figure 31. Database initialization parameters - file locations

7. The next screen shows the file names and locations of the database storage. Select the entries on the left hand panel to view more detail on the right hand panel. Click **Next** to continue.

∏≓ ⊨ Database Configuration As	sistan	t, Step 6 of 7	: Database Storage	• • ×
		File Name	File Directory	
- 📆 Controlfile	1	cwmlite01	{ORACLE_BASE}/oradata/{DB_NAME}/	
- Datafiles	2	drsys01.dbf	{ORACLE_BASE}/oradata/{DB_NAME}/	
🕂 🗘 Redo Log Groups	3	example0	{ORACLE_BASE}/oradata/{DB_NAME}/	
	4	indx01.dbf	{ORACLE_BASE}/oradata/{DB_NAME}/	.*
	5	odm01.dbf	{ORACLE_BASE}/oradata/{DB_NAME}/	
2 (1	6	system01	{ORACLE_BASE}/oradata/{DB_NAME}/	
	. 7	tools01.dbf	{ORACLE_BASE}/oradata/{DB_NAME}/	
	8	undotbs01	{ORACLE_BASE}/oradata/{DB_NAME}/	
	9	users01.dbf	{ORACLE_BASE}/oradata/{DB_NAME}/	
	;	xdb01.dbf	{ORACLE_BASE}/oradata/{DB_NAME}/	
		temnû1 dhf	(ORACLE BASE)/oradata/(DR NAME)/	
Add Remove				(File Location Variables)
Cancel Help			3 Back	Next >> Einish

Figure 32. Database storage



8. The screen entitled Creation Options is displayed. Check Create Database and click **Next** to continue.

∭ ≓∺ Database Configuration As	sistant, Step 7 of	7 : Creation Options		• • ×
	Select the followin:	g database creation op abase)atabase Template	tions:	
Cancel Help			<u>Back</u> <u>N</u> ext	>) (

Figure 33. dbca database creation options

9. The Summary screen shown in Figure 34 is the last screen before actual creation of the database. Click **OK** to start database creation.

(−¤ Summary Following operation(s) w Creation of database v	ill be perfo vith db nan	rmed: ne "TEST".	×
Use this database t	emplate to	create a pre-configured database optimized for general purpose usage.	A
Option Name	Selected		
Example Schemas	true		
Oracle Data Mining	true		
Oracle Intermedia	true		
Oracle JVM	true		
Oracle Label Security	false		
Oracle OLAP	true		
Oracle Spatial	true		
Oracle Text	true		
Oracle Ultra Search	true		
Oracle XML DB	true		
Initializatio	n Para	meters	ŢÎIe
		OK Cancel Help	

Figure 34. dbca Summary

10. A screen showing progress of database creation is displayed, shown in Figure 35. When dbca has completed database creation, the screen shown in Figure 36 prompts you to change the passwords for the SYS and SYSTEM. After changing the passwords, click **Exit** to end dbca.



Figure 35. dbca progress

X→ Database Configuration Assistant <2>
Database creation complete. Check the logfiles at /oracle/9202/admin/TEST/create for details.
Database Information: Global Database Name: TEST System Identifier(SID): TEST Server Parameters Filename: /oracle/9202/dbs/spfileTEST.ora
Change Passwords
For security reasons, you must specify a password for the SYS and SYSTEM accounts in the new database.
SYS Password:
Confirm SYS Password:
SYSTEM Password:
Confirm SYSTEM Password:
Note: All database accounts except SYS, SYSTEM, DBSNMP, and SCOTT are locked. Select the Password Management button to view a complete list of locked accounts or to manage the database accounts. From the Password Management window, unlock only the accounts you will use. Oracle Corporation strongly recommends changing the default passwords immediately after unlocking the account.
Password Management
Exit

Figure 36. dbca completion



Creating Test Listener

At this point, we have completed the steps necessary to install and create a standalone, single-node database instance. However, database server environments typically include applications or users that access the database server from workstations or remote servers using Oracle client software. To enable client access to the database server, we need to configure a listener on the database server.

To test remote connections, we used a second xSeries server, one on which we had Oracle8*i* installed previously for a different purpose.

To create a listener for the test database, we used Oracle's Net Configuration Assistant (netca) as follows:

1. As oracle user, type netca from a shell prompt. The netca welcome screen is displayed, shown in Figure 37. Select Listener configuration and click **Next** to continue.

X-⊨ Oracle Net Configuration	Assistant: Welcome	• ×
	Welcome to the Oracle Net Configuration Assistant. This tool takes you through the following common configuration steps: Choose the configuration you would like to do: © Listener configuration © Naming Methods configuration © Local Net Service Name configuration © Directory Usage Configuration	
Cancel Help) Sack Next >	

Figure 37. netca welcome screen



2. Select Add on the next screen, shown in Figure 38. Click Next to continue.

🗙 🛏 Oracle Net Configuration Assistant: Listener Configuration, Listener	
	For remote connections to be made to your Oracle database, you must configure a Oracle Net listener. The Oracle Net Configuration Assistant allows you to add, reconfigure, rename or delete a listener.
	Select what you want to do:
	Add
	O Reconfigure
	C Delete
1 And I and	O Rename
Cancel Help	(§ Back <u>Next ≫</u>)

Figure 38. netca - add listener

3. Type the listener name on the screen shown in Figure 39. We named our listener TEST. Click **Next** to continue.

X-⊨ Oracle Net Configuratio	n Assistant: Listener Configuration, Listener Name	• ×
	For remote connections to be made to your Oracle database you must have at least one Oracle Net listener. Enter the name of the listener you want to create: Listener name: TEST	
Cancel Help		

Figure 39. Listener name



4. For our test, we left the defaults (TCP) on the Select Protocols screen, shown in Figure 41. Click **Next** to continue.

X-∺ Oracle Net Configuration Ass	sistant: Listener Configuration, Select Protocols
	You can configure the listener to accept connections over one or more protocols. Select which protocols you want to configure for this listener. Keep your configuration as simple as possible by configuring only the protocols you need. Available Protocols TCPS IPC Selected Protocols
Cancel Help	S Back Next >>

Figure 40. Listener protocols

5. Leave the default selection of standard port number on the TCP/IP configuration screen (Figure 41). Click **Next** to continue.

X-⊨ Oracle Net Configuration As	ssistant: Listener Configuration, TCP/IP Protocol	- ×
	Which TCP/IP port number should the listener use? port number selected should not be used by any ot software on this computer. © Use the standard port number of 1521 © Use another port number: 1521	The her
Cancel Help	🛞 Back Next 📎	

Figure 41. Listener protocol configuration



6. At this point, we're done with listener configuration. Select No on the More Listeners screen (Figure 42) and click **Next** to continue to the completion screen, shown in Figure 43.

X-⊨ Oracle Net Configuration Assistant:	Listener Configuration, More Listeners?
	Would you like to configure another listener? No C Yes
Cancel Help	<u> ∉ack Next ≫</u>)

Figure 42. netca more listeners

X→ Oracle Net Configuration Assistant: Listener Configuration Done
Listener configuration complete!
Cancel Help <u>Gack Next</u>

Figure 43. netca completion

INSTALLATION VERIFICATION

Verify the installation as follows:

1. Connect to the database using sqlplus as shown in Figure 44. Do this on the x450 as oracle user.

```
[oracle@x450db oracle]$ sqlplus
SQL*Plus: Release 9.2.0.2.0 - Production on Sun Jun 13 13:18:03 2003
Copyright (c) 1982, 2002, Oracle Corporation. All rights reserved.
Enter user-name: system
Enter password:
Connected to:
Oracle9i Enterprise Edition Release 9.2.0.2.0 - 64bit Production
With the Partitioning, OLAP and Oracle Data Mining options
JServer Release 9.2.0.2.0 - Production
```

SQL>

Figure 44. Connecting using sqlplus

2. Query some of the standard Oracle database views, for example, v\$instance

```
SQL> select * from v$instance;
INSTANCE_NUMBER INSTANCE_NAME
_____
HOST_NAME
_____
       STARTUP_T STATUS PAR THREAD# ARCHIVE LOG_SWITCH_
VERSION
LOGINS SHU DATABASE_STATUS INSTANCE_ROLE ACTIVE_ST
_____ ___ ___ ___ ____ _______ ______
       1 TEST
x450db
9.2.0.2.0 13-JUN-03 OPEN NO
                              1 STOPPED
ALLOWED NO ACTIVE PRIMARY_INSTANCE NORMAL
SQL>
```

Figure 45. Query results of v\$instance



3. Check whether your listener is running. Do this as oracle user using the lsnrctl stat command. Figure 46 shows the output from the lsnrctl stat command when the listener is not started.

[oracle@x450db oracle]\$ lsnrctl stat TEST LSNRCTL for Linux IA64: Version 9.2.0.2.0 - Production on 13-JUN-2003 12:47:13 Copyright (c) 1991, 2002, Oracle Corporation. All rights reserved. Connecting to (ADDRESS=(PROTOCOL=TCP)(Host=x450db)(Port=1521)) TNS-12541: TNS:no listener TNS-12560: TNS:protocol adapter error TNS-00511: No listener Linux IA64 Error: 111: Connection refused [oracle@x450db oracle]\$

Figure 46. Output from lsnrctl command when listener is not started

4. If the listener is not running, start it using the lsnrctl start command (Figure 47)

[oracle@x450db oracle]\$ lsnrctl start TEST LSNRCTL for Linux IA64: Version 9.2.0.2.0 - Production on 13-JUN-2003 12:51:36 Copyright (c) 1991, 2002, Oracle Corporation. All rights reserved. Starting /oracle/9202/bin/tnslsnr: please wait... TNSLSNR for Linux IA64: Version 9.2.0.2.0 - Production System parameter file is /oracle/9202/network/admin/listener.ora Log messages written to /oracle/9202/network/admin/test.log Listening on: (DESCRIPTION=(ADDRESS=(PROTOCOL=tcp)(HOST=x450db)(PORT=1521))) Connecting to (ADDRESS=(PROTOCOL=TCP)(Host=x450db)(Port=1521)) STATUS of the LISTENER _____ Alias TEST TNSLSNR for Linux IA64: Version 9.2.0.2.0 - Production Version Start Date 13-JUN-2003 12:51:36 Uptime 0 days 0 hr. 0 min. 0 sec Trace Level off Security OFF SNMP OFF Listener Parameter File /oracle/9202/network/admin/listener.ora Listener Log File /oracle/9202/network/admin/test.log Listening Endpoints Summary... (DESCRIPTION=(ADDRESS=(PROTOCOL=tcp)(HOST=x450db)(PORT=1521))) Services Summary... Service "PLSExtProc" has 1 instance(s). Instance "PLSExtProc", status UNKNOWN, has 1 handler(s) for this service... Service "x450db.sanmateo.ibm.com" has 1 instance(s). Instance "TEST", status UNKNOWN, has 1 handler(s) for this service... The command completed successfully [oracle@x450db oracle]\$

Figure 47. Starting the listener



5. Check listener status again. Figure 48 shows the results when the listener is started.

[oracle@x450db oracle]\$ lsnrctl stat TEST LSNRCTL for Linux IA64: Version 9.2.0.2.0 - Production on 13-JUN-2003 13:09:54 Copyright (c) 1991, 2002, Oracle Corporation. All rights reserved. Connecting to (ADDRESS=(PROTOCOL=TCP)(Host=x450db)(Port=1521)) STATUS of the LISTENER _____ Alias TEST Version TNSLSNR for Linux IA64: Version 9.2.0.2.0 - Production Start Date 13-JUN-2003 13:08:44 0 days 0 hr. 1 min. 10 sec Uptime Trace Level off Security OFF SNMP OFF /oracle/9202/network/admin/listener.ora Listener Parameter File Listener Log File /oracle/9202/network/admin/test.log Listening Endpoints Summary... (DESCRIPTION=(ADDRESS=(PROTOCOL=tcp)(HOST=x450db)(PORT=1521))) Services Summary... Service "PLSExtProc" has 1 instance(s). Instance "PLSExtProc", status UNKNOWN, has 1 handler(s) for this service... Service "x450db.sanmateo.ibm.com" has 1 instance(s). Instance "TEST", status UNKNOWN, has 1 handler(s) for this service... The command completed successfully [oracle@x450db oracle]\$

Figure 48. Output from Isnrctl when listener is started

As previously mentioned, to test the listener, we used an xSeries with Oracle8*i* as a client system. We added the statements shown in Figure 49 to the file named \$ORACLE_HOME/network/admin/tnsnames.ora in the client system.

```
TEST = (DESCRIPTION=
    (ADDRESS=(PROTOCOL=tcp)(HOST=x450db)(PORT=1521))
    (CONNECT_DATA=(SID=TEST))
)
```

Figure 49. tnsnames.ora entry



 To connect from the xSeries client, set the environmental variable ORACLE_SID to TEST and invoke sqlplus. Figure 50 shows the connection dialogue between the xSeries client (hostname xclient) and the x450 (hostname x450db).

```
applmgr@xclient:~ > export ORACLE_SID=TEST
applmgr@xclient:~ > sqlplus system/manager
SQL*Plus: Release 8.0.6.0.0 - Production on Sun Jun 13 12:55:24 2003
(c) Copyright 1999 Oracle Corporation. All rights reserved.
Connected to:
Oracle9i Enterprise Edition Release 9.2.0.2.0 - 64bit Production
With the Partitioning, OLAP and Oracle Data Mining options
JServer Release 9.2.0.2.0 - Production
SOL>
SQL> select * from v$instance;
INSTANCE_NUMBER INSTANCE_NAME
------
HOST NAME
_____
VERSION STARTUP_T STATUS PAR THREAD# ARCHIVE LOG_SWITCH_
_____ ____
                                        -----
LOGINS SHU DATABASE_STATUS INSTANCE_ROLE ACTIVE_ST
_____ __ ___ ___ ____ _______ ______
1 TEST
x450db
9.2.0.2.0 13-JUN-03 OPEN NO 1 STO
ALLOWED NO ACTIVE PRIMARY_INSTANCE NORMAL
                                           1 STOPPED
SQL>
```

Figure 50. Connecting from the client system

SUMMARY

This concludes our installation test of Oracle9*i* on the IBM xSeries 450. If you have any questions or comments, please send an email note to ibmoracl@us.ibm.com.



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