



Deploying IBM BladeCenter S for product-lifecycle management (PLM) applications

An overview

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Abstract

IBM BladeCenter S is the newest chassis within the IBM BladeCenter family. The ability to put a BladeCenter server with different processor architectures in a chassis that offers integrated storage and is capable of running on 110- and 220-volt power make this an attractive and flexible offering for use with product-lifecycle management (PLM) server applications.

The use of the powerful and advanced IBM BladeCenter JS22 Express, with its IBM POWER processor-based blade and the IBM AIX operating system, provides a powerful four-way server that you can virtualize to provide enhanced flexibility when using the IBM PowerVM software.

The target audience for this paper is the IT administrator who needs a quick-start guide for establishing a system environment to install PLM server applications that use the BladeCenter S chassis. Expertise with blades is not a prerequisite; however, an understanding of AIX and the use of the network installation manager (NIM) is helpful.

Introduction

This white paper describes the use of IBM® BladeCenter® S with product-lifecycle management (PLM) applications. It covers the general steps and considerations for using BladeCenter S with BladeCenter servers. The setup described in this white paper is based on the procedure that was used for creating a hands-on multistudent training platform for a recent PLM event. This white paper also explains some of the deployment advantages of the BladeCenter S offering.

Prerequisites

The reader is assumed to have administrator knowledge of the IBM AIX® operating system, familiarity with the IBM Virtual I/O Server (VIOS) with Integrated Virtualization Manager, which is part of IBM PowerVM™. A basic understanding of IBM BladeCenter JS21 Express and JS22 Express blades is helpful, although not required. This white paper describes the setup of the JS22 blades in the BladeCenter S chassis, but does not describe the specific steps for installing and deploying the PLM server applications, because this is outside the scope of this paper.

Understanding the benefits of BladeCenter S for PLM

BladeCenter S, which is the newest addition to the BladeCenter chassis lineup, offers a flexible package for hosting BladeCenter servers. BladeCenter S is capable of running on 110- or 220-volt power, offers integrated storage, and is available with an attractive office-enablement kit for easy installation.

A highly desirable feature of the BladeCenter chassis family is the ability to install a heterogeneous mix of blades by using various processor technologies and operating systems. In addition to the newest features of IBM POWER6™ processor-based blades that can run the AIX, Linux® and IBM i operating systems, a workstation-blade offering can also provide a server-based graphics platform for various mechanical computer-aided design (MCAD) applications. The BladeCenter S integrated storage modules can hold either SAS or SATA disk drives, thus ensuring compatibility with the specific blades that you install — this is important because some blades, such as the JS22, are supported only when using SAS drives.

Because of the wide range of supported processors and operating systems in the BladeCenter server family, in addition to its ability to use integrated storage and to run on both 110- and 220-volt power, BladeCenter S is a nice addition to the IBM server family for PLM server applications.



Overview of steps

Here is a brief overview of the steps that are required to use the BladeCenter S chassis with BladeCenter servers. The rest of this white paper provides a more detailed explanation of each of these steps.

1. Physically install the BladeCenter S chassis, that is, connect both the network and the power cables.
2. Access the Advanced Management Module (AMM) to set the Internet Protocol (IP) addresses for the AMM, the storage controllers and the network controllers. When accessing the AMM for the first time, a wizard is invoked to guide you through much of the setup process

Notes: You should allocate a minimum of four IP addresses and host names on the network for this purpose. You can define the storage configuration when running the setup wizard.

3. Activate each JS22 blade and install the VIOS.

Note: You can do the installation either from a Network Installation Management (NIM) server or from the VIOS DVD.

4. Update the VIOS to the latest level.

Note: It is recommended that you download the update files from the IBM support site at ibm.com/support and place them on a network file server (NFS) that is accessible to the blades in the JS22.

5. Activate the Integrated Virtualization Manager (IVM).
6. Access IVM and define AIX logical partitions (LPARs).
7. Create a virtual terminal on the VIOS, boot the LPAR and install AIX.

Note: The preferred method for installing AIX is to use a NIM server because it is much faster. However, it is possible to use AIX DVD media, too.

8. After the AIX LPARs are installed, they behave like LPARs that run on other IBM POWER™ processor-based servers. Follow the standard procedures to install and configure the necessary middleware and database software, such as IBM DB2® and IBM WebSphere® Application Server. Then, install the targeted PLM server applications.

Note: Some of the PLM server products and middleware have graphical-user interface (GUI) based installations. Installations that involve the use of several products that require an X GUI are accomplished by using a virtual network computing (VNC) server that is provided on the Linux affinity toolkit.

Physically installing BladeCenter S

For a full description of the BladeCenter chassis and server offerings see the IBM Redbooks® title *IBM BladeCenter Products and Technology (SG24-7523-01)*, which you can access at www.redbooks.ibm.com/abstracts/sg247523.html?Open. This section of the white paper describes the specific configuration of the BladeCenter S chassis for a proof-of-concept project that was used to create a hands-on training environment for PLM server administrators.

The BladeCenter S chassis discussed in this white paper is configured with the following components:

- Advanced management module (AMM)
- Two BladeCenter SAS connectivity modules
- Two of the six disk-storage modules (with a total of 12 SAS hard disks, 300 GB each)
- Two additional autosensing power supplies (for a total of four power supplies)
- Nortel L2 / L3 copper GB Ethernet switch
- Ultralim CD-RW / DVD-ROM (in the media drawer bay)

Figure 1 shows the electronic connections that exist in the BladeCenter S chassis. The Ethernet switch is installed in I/O bay 1. The Ethernet switch provides the connections for both blade network ports. The SAS connectivity modules occupy I/O bays 3 and 4.

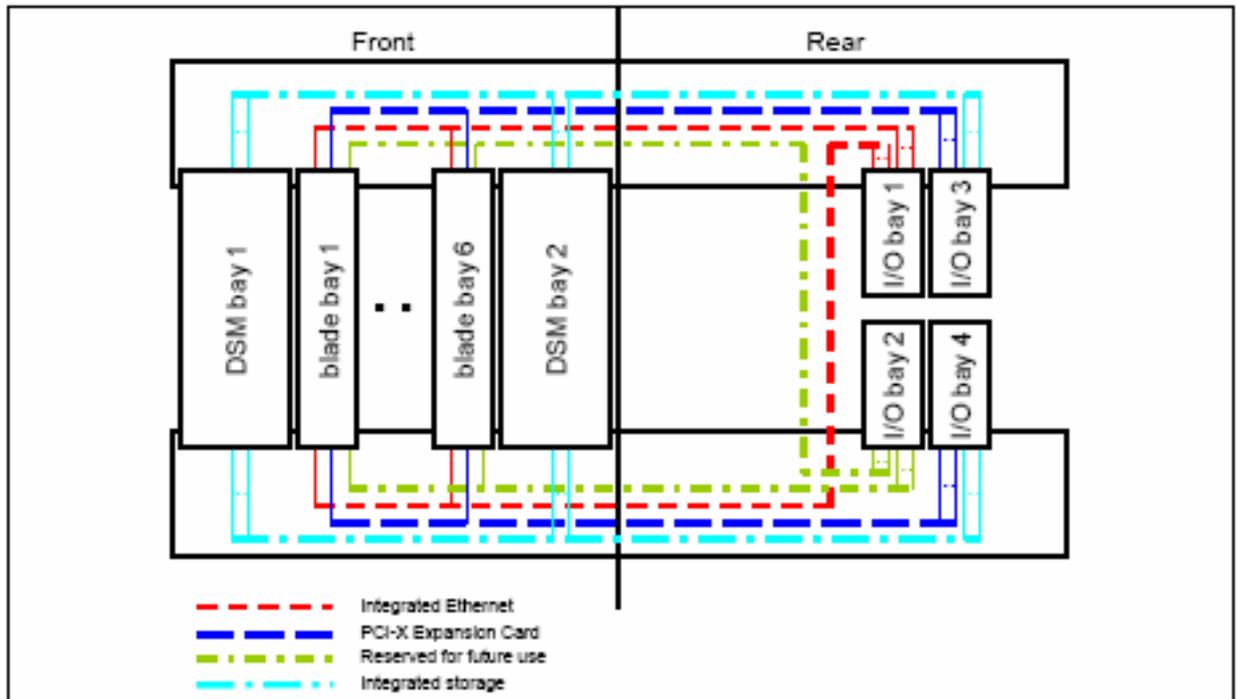


Figure 1. The electronic connections in the BladeCenter S chassis



Six JS22 blades are also installed. Each blade has the following characteristics:

- Four-core (two dual-core) 4.0 GHz POWER6 processor
- 16 GB of memory
- 146 GB, 10 KB Small Form Factor SAS drive
- SAS Expansion card (combination form-factor vertical [CFFv])

There are three network connections: one from the AMM to the main network switch, another from the Nortel Ethernet module to the network switch, and the third connection from the Nortel Ethernet switch to a private 10.x.x.x network.

There are four power connections to the four power modules.

Setting up AMM and storage configuration

You can easily set up the AMM after connecting to the AMM over TCP/IP. If the AMM is on a network that has a Dynamic Host Configuration Protocol (DHCP) server, then, by default, it attempts to obtain an IP address by using DHCP. If an IP address is not obtained from DHCP, the default AMM address is 192.168.70.125.

In the case that is used in this white paper, the IP address that is given from DHCP is associated with hostname `isvlab103.austin.ibm.com`, which is what you enter in the Web browser to log in.

Note: If a DHCP server is not present, you need to configure a system on the 192.168 network that can access the 192.168.70.125 AMM address to perform the first-time setup. You can assign a static address to the AMM, but if DHCP is present, it is easier to do the first-time configuration because it avoids the need to configure a system on the 192.168 network.

Log in to the AMM that provides the default user `USERID` and password `PASSWORD` (the number zero, not the letter O.) When logged in, make suitable changes to the IP information that is associated with each module.

To perform the configuration, the SAS modules need to be accessible to the AMM; therefore, it is strongly suggested that you allocate sufficient IP addresses for the AMM, two SAS hard drives and one network connectivity module for easier administration.



When presented with the Storage Configuration panel, select the appropriate configuration for your use. In this case, two drives were assigned to each of the six JS22 blades, so Predefined Config_02 was selected and the configuration was applied to both modules, as shown in Figure 2.

Apply the same zone configuration to both SAS Connectivity Modules

I/O Module 4 (SAS Module)

The table below lists zone configurations stored on this SAS Module.

Select	Active?	Name	Type	Intended # of Blades	Intended # of SAS Modules	Max Disks per Blade	Configuration Store	Date
<input type="radio"/>	<input checked="" type="checkbox"/>	Predefined Config_02	Pre-defined	6	2	2	6	04/24/2007, 02:00:00
<input type="radio"/>	<input type="checkbox"/>	Predefined Config_03	Pre-defined	6	1	2	7	04/24/2007, 02:00:00
<input type="radio"/>	<input type="checkbox"/>	Predefined Config_04	Pre-defined	1	2	12	8	04/24/2007, 02:00:00
<input type="radio"/>	<input type="checkbox"/>	Predefined Config_05	Pre-defined	1	1	12	9	04/24/2007, 02:00:00
<input type="radio"/>	<input type="checkbox"/>	Predefined Config_06	Pre-defined	3	2	4	10	04/24/2007, 02:00:00
<input type="radio"/>	<input type="checkbox"/>	Predefined Config_07	Pre-defined	3	1	4	11	04/24/2007, 02:00:00
<input type="radio"/>	<input type="checkbox"/>	Predefined Config_08	Pre-defined	2	2	6	12	04/24/2007, 02:00:00
<input type="radio"/>	<input type="checkbox"/>	Predefined Config_09	Pre-defined	2	1	6	13	04/24/2007, 02:00:00

Figure 2. Applying the same zone configuration to both SAS connectivity modules

Activating the blade and installing VIOS

This section explains how to activate the blade and install VIOS.

Creating a console for a blade

For the reader who is not already familiar with POWER processor-based BladeCenter servers but who is familiar with IBM System p™ (IBM Power System) servers, some background information can be helpful. You can either use the BladeCenter GUI to turn blades on and off, or you can use a Telnet connection to the AMM and run the power command. For performing the installation of the VIOS, it is preferable that you use the power command because this also provides the system console that is required for the VIOS installation and configuration.



Installing VIOS

If you are installing the VIOS onto each JS22 blade server by using DVD media, place the DVD into the DVD-ROM drive and assign the DVD to the blade you are installing — either by selecting it from the media tray button on the front of the blade, or by using the Remote Control capability that is found under Blade Tasks in the BladeCenter AMM.

If you are installing VIOS by using a NIM server, define and allocate the correct resources through NIM.

Note: See the *IOS installation from a NIM server* section in the Redbooks title *IBM BladeCenter JS21 The POWER Of Blade Innovation* (SG24-7273-00), which is available at www.redbooks.ibm.com/abstracts/sg247273.html?Open.

Hint: The machine objects that are defined in the NIM for VIOS installation need to be defined for the kernel type as MP, rather than 64, because the boot image that is provided from the mkysyb command for the VIOS is a 32-bit MP kernel. If the 64-bit kernel is specified, an error occurs when you attempt to perform the NIM install operation on the machine object after allocating the NIM spot, mkysyb and bosinst.data resources.

In the case used in this white paper, both NIM and DVD media installations of the VIOS were done; because of speed and convenience, NIM is the preferred method.

Several methods are available for powering on the blade and opening a console to perform the VIOS installation. The method that was used in this case is as follows:

1. Use a Telnet connection to access the management module.
2. Start the blade by using the `power -on -c -T blade[1]` command, where the number corresponds to the blade slot location in the BladeCenter S chassis.
3. As the blade turns on and begins to display the SMS prompts, enter **1** and press Enter to get into the SMS panels.
4. If you are using NIM to install, in the SMS interface, set up the remote IPL parameters.
5. Use the SMS panel to select the boot device, either the network interface for NIM installation or the CD / DVD device, if you are installing from media. Follow the VIOS installation prompts to select the 146 GB SAS drive to receive the VIOS and install the VIOS. The hdisk0 should correspond to the 146 GB SAS small form factor drive.
6. After the VIOS installation is complete, log in using the ID padmin. You are prompted to set a password for padmin, and you are asked to accept licensing terms and conditions. After logging in, run the license `-accept` command.
7. It might be necessary to set the network parameters for the VIOS. One advantage of installing by using NIM is that, after you complete the VIOS installation, the network parameters are set. If you use DVD media for the VIOS installation, you need to run the `mktcpip` command to set the network parameters. Here is an example of the `mktcpip` command:

```
mktcpip -hostname zeta.austin.ibm.com -inetaddr 9.3.245.85 -  
interface en0 -netmask 255.255.255.128 \ -gateway 9.3.245.1 -start
```



Updating VIOS to the latest level

To update the VIOS to the latest level, perform the following two steps:

1. Download the VIOS update files and store them on an NFS server.
2. Mount the files onto the VIOS server at /mnt (/mnt is the only location that is authorized for NFS mounting a remote file system with the VIOS) and run the following command:

```
updateios -accept -install -dev /mnt/
```

Activating IVM on the VIOS

To initialize the LPAR data for the Integrated Virtualization Manager (IVM), perform the following step:

1. Run the `mkgencfg -o init` command.

Accessing IVM to define LPARs

At this point, you access the IVM to perform the necessary steps to share the host Ethernet adapters to the AIX LPAR, define storage pools using the disks in the BladeCenter S where virtual disks will be created to assign to the LPARs, and define the partitions that will be installed with AIX in the next step.

The IVM is a Web-based interface to the VIOS that provides the capability to define, manage and activate LPARs. To access the IVM, enter the hostname of the VIOS in a Web browser.

Perform the following steps on each blade:

1. Log in to the IVM GUI as `padmin`.
2. Enable each host Ethernet adapter in the JS22 to be a bridge to the outside network.
3. Assign the virtual Ethernet adapters to the physical Ethernet adapters that were previously enabled for bridging.
4. Create a storage pool by using the external SAS drives in BladeCenter S.
5. Create a virtual disk for each LPAR.
6. Create LPARs that are to be installed with AIX.

Logging into the IVM

Enter the user ID of padmin and the password you assigned to padmin (see Figure 3).

Address <http://zeta.austin.ibm.com/login.faces>

Integrated Virtualization Manager

Welcome, please enter your information.

* User ID:

* Password:

Please note: After some time of inactivity, the system will log you out automatically and ask you to log in again.
This product includes Eclipse technology.
(<http://www.eclipse.org>)

* Required field

Figure 3. Entering the user ID and password

Enabling each host Ethernet adapter

There are two possible configuration methods for the Ethernet ports on the JS22. One possibility is to directly use the host Ethernet adapters and assign connections to LPARs. The other alternative for the setup of the JS22 blades is to allow the two host Ethernet adapters to be bridge devices and then associate the bridged devices with the virtual Ethernet adapters.

Figure 4 shows the selection of **Allow virtual Ethernet bridging**, which you can do by using the View/Modify Host Ethernet Adapters + Properties dialog for both adapters.

The screenshot displays the Integrated Virtualization Manager interface. On the left is a navigation pane with categories like Partition Management, I/O Adapter Management, and System Plan Management. The main area shows the 'View/Modify Host Ethernet Adapters' dialog with a table of adapters. A secondary dialog, 'Host Ethernet Adapter Physical Port Properties: U78A5.001.WIH056E-P1-T6', is open over the table, showing the 'General' tab where 'Allow virtual Ethernet bridging' is checked. The 'Performance' tab shows settings for Speed (Auto), MTU (Standard (1500)), Duplex (Auto), and Flow control enabled (unchecked).

Select	Type	Link State	Physical Location Code ^	Connected Partitions	Available Connections
<input checked="" type="radio"/>	1 G	Up	U78A5.001.WIH056E-P1-T6	1	0
<input type="radio"/>	1 G	Up	U78A5.001.WIH056E-P1-T7	1	0

Figure 4. Using the View/Modify Host Ethernet Adapters + Properties dialog for both adapters

Assigning virtual Ethernet adapters

After enabling bridging for both host Ethernet adapters, the physical device is associated with the virtual Ethernet device. You do this by using the View/Modify Virtual Ethernet + Virtual Ethernet Bridge dialog, as shown in Figure 5.

Integrated Virtualization Manager

Welcome padmin

Partition Management

- [View/Modify Partitions](#)
- [View/Modify System Properties](#)

I/O Adapter Management

- [View/Modify Host Ethernet Adapters](#)
- [View/Modify Virtual Ethernet](#)
- [View/Modify Physical Adapters](#)

Virtual Storage Management

- [View/Modify Virtual Storage](#)

IVM Management

- [View/Modify User Accounts](#)
- [View/Modify TCP/IP Settings](#)
- [Guided Setup](#)
- [Enter APV Key](#)

System Plan Management

- [Manage System Plans](#)

Service Management

View/Modify Virtual Ethernet

Virtual Ethernet **Virtual Ethernet Bridge**

A physical network bridge provides a specific virtual Ethernet access to a physical virtual Ethernet to access the external network via the physical Ethernet device. adapter to which to bridge. If a virtual Ethernet is not bridged, traffic on the virtu

Virtual Ethernet ID	Physical Adapter
1	ent0 (U78A5.001.WIH056E-P1-T6) ▼
2	ent1 (U78A5.001.WIH056E-P1-T7) ▼
3	None ▼
4	None ▼

Apply Reset

Figure 5. Assigning the virtual Ethernet adapters

Creating a storage pool

With the IVM GUI, you use the View/Modify Virtual Storage + Storage Pools dialog to create a storage pool in order to assign the two SAS drives to a new storage pool. It is also possible to assign the SAS drives to the existing rootvg storage pools. The decision of whether or not to extend rootvg in order to add the additional drives or to create a new storage pool is a matter of administrator preference.

Figure 6 shows the characteristics of the blade_pool storage pool.

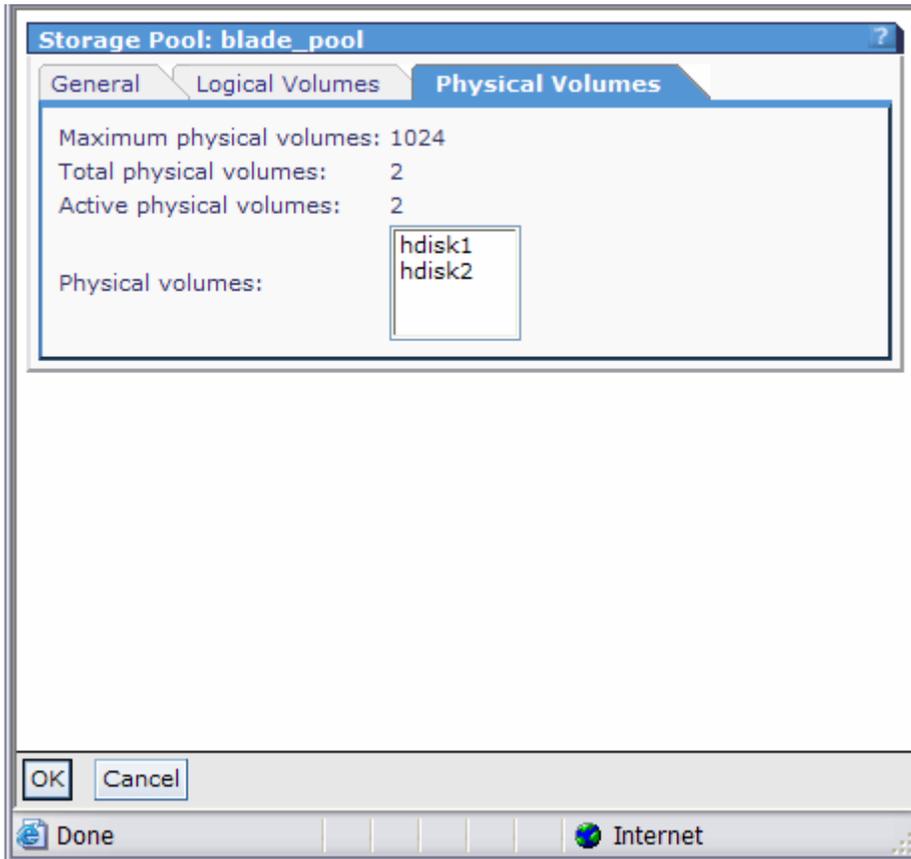


Figure 6. Characteristics of the blade_pool storage pool

Creating a virtual disk for each LPAR

You can also create virtual disks that are to be assigned to LPARs by using the View/Modify Virtual Storage + Virtual Disks dialog. Figure 7 shows the advanced creation of the disks that will be assigned to the LPARs. Each disk is sized at 60 GB.

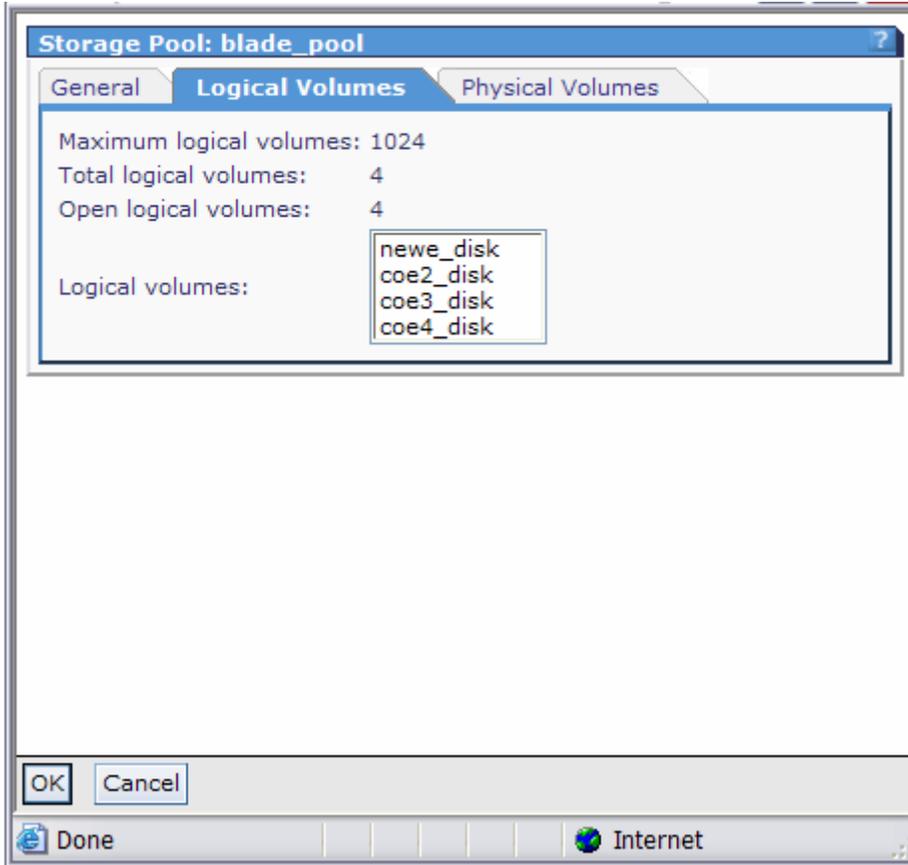


Figure 7. Creating disks to be assigned to LPARs

Creating LPARs to be installed with AIX

Use the IVM View/Modify Partitions + Create Partition dialog to define a new LPAR. The creation of the LPAR uses a wizard to define the characteristics of the LPAR. When running the wizard, you are asked for information, such as:

- LPAR name
- Dedicated or shared processors
- Amount of memory
- Storage devices
- Virtual Ethernet adapters

Figure 8 shows an example of the values that are used to create the LPARs on the JS22 blades.

The screenshot displays the Integrated Virtualization Manager (IVM) interface. On the left is a navigation pane with categories like Partition Management, I/O Adapter Management, Virtual Storage Management, IVM Management, System Plan Management, and Service Management. The main area shows the 'View/Modify Partitions' page with a 'System Overview' table and a 'Partition Details' table. A 'Create Partition Wizard' dialog box is open in the foreground, showing the 'Summary' step. The summary lists the following configuration for the new LPAR:

Property	Value
System name:	Server-7998-61X-SN100C5EA
Partition ID:	3
Partition name:	demo_lpar
Environment:	AIX or Linux
Memory:	4 GB (4096 MB)
Processors:	2 virtual
Virtual Ethernet:	2
Host Ethernet adapter ports:	None
Storage capacity:	72 GB (73728 MB)
Storage devices:	demo_blade_disk
Optical devices:	None
Virtual optical devices:	1
Physical adapters:	None

The background table in the IVM interface shows the following partition details:

Select	ID	Name	State	Uptime	Memory	Processors	Entitled Processing Units	Utilized Processing Units	Reference Code
<input type="checkbox"/>	1	10-0C5EA	Running	8.16 Days	2 GB	4	0.4	0.01	

Figure 8. Creating the LPARs on the JS22 blades

Creating a virtual terminal and booting the LPAR to install AIX

This section describes the process of creating a virtual terminal and booting the LPAR to install the AIX operating system.

Defining a console for AIX LPAR on IVM managed system

Using IVM to define and manage LPARs is similar to using the Hardware Management Console (HMC) to perform similar tasks. However, the method that is required to create the virtual terminal is different. On an HMC-managed system, it is possible to create a console from the HMC GUI. In contrast, with the IVM, there is a different procedure that involves two commands that create and remove virtual terminals. These commands are `mkvt` and `rmvt` — you need to perform them after logging into the VIOS.

- To create a virtual terminal, use the Telnet connection to the VIOS and run the `mkvt -id X` command, where X is the LPAR number that is assigned to the LPAR where you want to create a virtual terminal.
- To remove a virtual terminal, use the Telnet connection to the VIOS and run the `rmvt -id X, V` command, where X is the LPAR number that is assigned to the LPAR where you want to remove a virtual terminal.

Installing AIX

The following steps explain how to install AIX.

1. Use a Telnet connection to the VIOS and log in with `padmin`.
2. Run the `mkvt -d X` command (where X corresponds to the LPAR identifier in the IVM GUI) to create a virtual terminal that you can use to define the boot parameters in SMS and perform the AIX installation tasks.

Note: To delete the virtual terminal, run the `rmvt -id X` command (where X corresponds to the LPAR identifier)
3. Then, using the IVM GUI, select **View/Modify Partitions** and use the **Activate** option to activate the LPAR that is to be installed.

Similar to the installation of the VIOS, you can perform AIX installation tasks either by using the AIX DVD media or by using a NIM server. For the BladeCenter S setup used in this white paper, the first AIX LPAR on BladeCenter S was installed using the AIX DVD media. The first installed AIX LPAR was then configured to be a NIM master in order to network-install the rest of the AIX LPARs that were created on the blades in the BladeCenter S chassis.



Using AIX LPARs that run on the blades

After the AIX LPARs have been installed, the next step is to install middleware products, such as database servers and Java™ 2 Platform, Enterprise Edition (J2EE) Web application servers, that are used by the PLM server applications. After installing the prerequisite middleware products, the next step would be the installation of PLM server software.

The installation procedures for the middleware and applications are identical to the steps that are used to install those software products in LPARs that are defined on POWER servers. After AIX is installed in the LPARs that are defined on the JS22 BladeCenter servers, the installation and administration of the applications is common to the steps that are familiar to an administrator who is already familiar with AIX, the PLM server applications and their middleware software.

Summary

The BladeCenter S chassis provides a flexible platform for installing and using IBM BladeCenter servers. When combined with the POWER processor-based BladeCenter JS22 servers that run PowerVM and AIX, a high-performance and compact server platform for PLM server application servers has been delivered.

This white paper described some of the reasons to consider the BladeCenter S chassis for use with various PLM applications. A description was provided of the steps that are required to set up the BladeCenter S chassis, install JS22 blades with VIOS, and activate the IVM to manage the LPARs. A description was also provided of the steps to use the IVM to create AIX LPARs. Then, the defined AIX LPARs were activated and AIX was installed onto the JS22 blades, making them ready for the installation of the PLM server applications.



Resources

These Web sites provide useful references to supplement the information contained in this document:

- IBM System p and AIX Information Center
<http://publib.boulder.ibm.com/infocenter/pseries/index.jsp>
- IBM Publications Center
www.elink.ibm.com/public/applications/publications/cgibin/pbi.cgi?CTY=US
- IBM Redbooks
www.redbooks.ibm.com
- *IBM BladeCenter Products and Technology* (SG24-7523-01)
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- *IBM BladeCenter JS21: The POWER Of Blade Innovation* (SG24-7273-00)
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