IBM PureFlex System



# Supplemental Installation Information for Business Partners

IBM PureFlex System



# Supplemental Installation Information for Business Partners

Note

Before using this information and the product it supports, read the general information in "Notices" on page 99.

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## Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

Antes de instalar este produto, leia as Informações de Segurança.

在安装本产品之前,请仔细阅读 Safety Information (安全信息)。

安裝本產品之前,請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

Ennen kuin asennat tämän tuotteen, lue turvaohjeet kohdasta Safety Information.

Avant d'installer ce produit, lisez les consignes de sécurité.

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

Πριν εγκαταστήσετε το προϊόν αυτό, διαβάστε τις πληροφορίες ασφάλειας (safety information).

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza.

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

Пред да се инсталира овој продукт, прочитајте информацијата за безбедност.

#### بندع هیدوریدهاروم ر احساستا میدور محسورید محسورید و باریده محسورید هاریدی محسورید و

Les sikkerhetsinformasjonen (Safety Information) før du installerer dette produktet.

Przed zainstalowaniem tego produktu, należy zapoznać się z książką "Informacje dotyczące bezpieczeństwa" (Safety Information).

Antes de instalar este produto, leia as Informações sobre Segurança.

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto, lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

Bu ürünü kurmadan önce güvenlik bilgilerini okuyun.

مەزكۇر مەھسۇلاتنى ئورنىتىشتىن بۇرۇن بىخەتەرلىك ئۇچۇرلىرىنى ئوقۇپ چىقىڭ.

Youq mwngz yungh canjbinj neix gaxgonq, itdingh aeu doeg aen canjbinj soengq cungj vahgangj ancien siusik.

## Chapter 1. Introducing the IBM PureFlex System offerings

IBM PureFlex System offerings are fully integrated systems that include compute, storage, systems management, and networking components. The following IBM PureFlex System offerings are available:

• Express

This offering is designed for small and medium businesses. See the IBM PureFlex System Express overview at http://publib.boulder.ibm.com/ infocenter/flexsys/information/topic/com.ibm.acc.pureflex.doc/ p7een\_expressoverview.html for a more detailed description.

Standard

This offering is optimized for application servers and comes with storage and network devices that are designed to support key independent software vendors (ISV) solutions. See the IBM PureFlex System Standard overview at http://publib.boulder.ibm.com/infocenter/flexsys/information/topic/com.ibm.acc.pureflex.doc/p7een\_standardoverview.html for a more detailed description.

• Enterprise

This offering is optimized for scalable cloud deployments. It has built-in redundancy for high-reliability and is designed to support critical applications and cloud services. See the IBM PureFlex System Enterprise overview at http://publib.boulder.ibm.com/infocenter/flexsys/information/topic/com.ibm.acc.pureflex.doc/p7een\_enterpriseoverview.html for a more detailed description.

More detailed information about the IBM PureFlex System offerings is available at http://publib.boulder.ibm.com/infocenter/flexsys/information/index.jsp.

#### Important information about this document

This topic provides important information about the *Supplemental Installation Information* document.

This *Supplemental Installation Information* document is intended only for use by IBM Business Partners who plan to install IBM<sup>®</sup> PureFlex System offerings without the assistance of IBM Lab Services. This guide assumes that the IBM Business Partner has completed the IBM PureFlex courses listed below (or their equivalent) and is familiar with the IBM PureFlex, IBM Flex System, and other documents listed in "Related documentation" on page 2.

- IBM PureFlex System Fundamentals
  - NGT11 classroom

NGV11 - online

The fundamentals class provides a comprehensive introduction to planning, installing, configuring, and upgrading the IBM PureFlex offerings. It includes hands-on lab exercises to reinforce the learning principles associated with the Chassis Management Module, X-Architecture and Power Systems compute nodes, IBM Flex System Manager, and networking.

• IBM PureFlex Systems Implementation Services

NGTB2 - classroom NGVB2 - online This hands-on course prepares IBM Business Partners to provide installation services for IBM PureFlex Express and IBM PureFlex Standard offerings.

#### • IBM Flex System Overview with Systems Management Focus NGT40 - classroom

NGV40 online

This course will provide an overview of all IBM Flex System components and focus on its systems management building blocks. Discussions include a review of the Integrated Management Module (IMM) and Flexible Service Processor (FSP), describe the Chassis Management Module (CMM), and explore the Flex System Manager (FSM). The Flex System Manager hardware, software setup, selected management tasks and navigation will be reviewed.

See https://www-304.ibm.com/jct03001c/services/learning/ites.wss/zz/ en?pageType=page&c=X120568O90121W20 for additional information about all of the courses that are available.

#### Suggested tools

You might need to use one or more of the following tools during the installation:

- USB key
- USB hard disk drive
- USB CD/DVD drive
- Ethernet cable
- Software (Windows Workstation)
- Strawberry Perl Interpreter v5.12.3
- WinSCP or Cygwin or PuTTY PSCP
- Filezilla FTP Server
- PuTTY
- vSphere client

#### **Related documentation**

In addition to this *Supplemental Information* document, the following documentation is available:

- IBM PureFlex course material
  - IBM PureFlex System Fundamentals student workbooks (from Course NGT11 or NGV11)
  - IBM PureFlex Systems Implementation Services student workbooks (from Course NGTB2 or NGVB2)
- IBM PureFlex Information Center documentation

The IBM PureFlex Information Center provides information to help you plan for, install, manage, and troubleshoot an IBM PureFlex configuration.

Go to http://publib.boulder.ibm.com/infocenter/flexsys/information/topic/ com.ibm.acc.pureflex.doc/p7een\_template\_landing.html to view or download information from the IBM PureFlex Information Center.

IBM Flex System Information Center documentation

The IBM Flex System Information Center provides information about the many IBM Flex System products, including the following:

- Quick Start guides

The Quick start guides are a collection of quick start task-oriented guides that provide step-by-step instructions to help you set up and use your IBM Flex Systems Enterprise Chassis, chassis components, and management devices and interfaces. More than 70 Quick Start guides are provided to help with installing, configuring, and managing the hardware, installing operating systems, deploying virtual appliances, using the IBM Flex System Manager software. Be sure to browse the collections to find information on additional tasks you can perform using your IBM Flex System hardware.

– IBM Flex System Enterprise Chassis Installation and Service Guide

This document contains information about setting up, configuring, and troubleshooting the IBM Flex System Enterprise Chassis and its components.

- IBM Flex System Chassis Management Module Command-Line Interface Reference Guide

This document explains how to use the Chassis Management Module command-line interface (CLI) to directly access management functions. The command-line interface also provides access to the text-console command prompt on each compute node through a Serial over LAN (SOL) connection.

- IBM Flex System Chassis Management Module User's Guide

This document explains how to use the Chassis Management Module user interface to manage chassis components.

- IBM Flex System Manager Systems Management Guide

This document explains how to use the IBM Flex System Manager user interface to manage chassis components.

- IBM Flex System Manager Commands Reference Guide

This document explains how to use commands to configure IBM Flex System Manager and perform many other systems-management operations.

- IBM Flex System Manager Network Control

This document describes an extension of the IBM Flex System Manager product called IBM Flex System Manager Network Control, which can be used to discover, inventory, and monitor network devices, launch vendor applications for configuration of network devices, and view groups of network devices.

- IBM Flex System Manager VMCotrol

This document describes IBM Flex System Manager VMControl, which is can be used to manage virtual servers, virtual appliances, workloads, and system pools across multiple hardware platforms and virtualization environments from one location.

- IBM Flex System Compute Node documentation

Seperate doccumentation is available for each of the IBM POWER7<sup>®</sup> Architecture-based and X-Architecture-based compute node. The documentation includes information for installing, upgrading, configuring, and troubleshooting each of the IBM Flex System compute nodes.

- IBM Flex System V7000 Storage Node documentation

This documentation includes information for planning, installing, upgrading, configuring, administering, monitoring,, and troubleshooting the IBM Flex System V7000 Storage Node node .

- IBM Flex System network device User's Guides

These documents contain detailed information about installing, configuring, updating, and troubleshooting specific IBM Flex System network devices, which include network switches, pass-thru modules, and adapters.

Go to http://publib.boulder.ibm.com/infocenter/flexsys/information/topic/ com.ibm.acc.common.nav.doc/ic-homepage.html to view or download information from the IBM Flex System Information Center.

• IBM Storwize® V7000 Information Center

The IBM Storwize V7000 Information Center contains all of the information that is required to set up the Storwize V7000 hardware and to manage the system using the web-based management GUI or the command-line interface

Go to http://pic.dhe.ibm.com/infocenter/storwize/ic/topic/ com.ibm.storwize.v7000.doc/v7000\_ichome\_640.html to view or download information from the IBM Storwize V7000 Information Center.

• IBM Redbooks

Many IBM Redbooks<sup>®</sup> are available for IBM PureFlex and IBM Flex System products including the following:

- IBM PureFlex System and IBM Flex System Products and Technology, SG24-7982
- IBM Flex System Interoperability Guide, REDP-FSIG
- IBM Flex System Enterprise Chassis, TIPS0863
- IBM Flex System Manager, TIPS0862
- IBM Flex System x240 Compute Node, TIPS0860
- IBM Flex System x220 Compute Node, TIPS0885
- IBM Flex System Interoperability Guide, REDP-FSIG

For a complete list of IBM Redbooks available for IBM PureFlex and IBM Flex Systems products, go to http://www.redbooks.ibm.com/portals/puresystems .

#### Notices and statements

The caution and danger statements in the documentation are also in the multilingual Safety Information document. Each statement is numbered for reference to the corresponding statement in the *Safety Information* document.

The following notices and statements are used in this document:

- Notes: These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information or advice that might help you avoid inconvenient or problem situations.
- Attention: These notices indicate possible damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage might occur.
- **Caution:** These statements indicate situations that can be potentially hazardous to you. A caution statement is placed just before the description of a potentially hazardous procedure step or situation.
- **Danger:** These statements indicate situations that can be potentially lethal or hazardous to you. A danger statement is placed just before the description of a potentially lethal or hazardous procedure step or situation.

## Chapter 2. Installing the IBM PureFlex System offerings

Use the following procedure as a guide during the installation process.

**Attention:** The chassis components come with a preloaded configuration for the IBM PureFlex System offering. Do not reset the chassis components to the factory defaults. This will defeat the preloaded system configuration.

- 1. Use the procedures in the *Installing and configuring IBM PureFlex System* document (available at http://publib.boulder.ibm.com/infocenter/flexsys/ information/topic/com.ibm.acc.pureflex.doc/p7eel\_ex\_pdf.pdf) to complete the following steps; then, return to this *Supplemental Information* document to configure the IBM PureFlex System.
  - Remove the outriggers, position the rack, install the covers, and install the stabilizer bracket.
  - Remove the shipping brackets.
  - Verify that the V7000 storage is cabled between racks, if required.
  - Connect power cords.
  - Connect a device that has browser access to the CMM and perform a verification check.

**Note:** Do not cable the device directly to the CMM. Use the instructions provided in the *Installing and configuring IBM PureFlex System* document to cable the device.

- 2. If a green check mark is next to the **System Status** choice on the CMM menu, continue with the next step. If any components are highlighted in yellow or red, you must resolve the issue before you continue. To determine the potential cause of the issue, click on the yellow or red highlighted component; then, select the **Events** tab to view the log.
- **3**. See Chapter 3, "Configuring the network," on page 9 to complete the following steps:
  - a. If you have x86 compute nodes, review the x86 node configuration information.
  - b. Review the V7000 storage subsystem configuration.
  - c. Configure the IP addresses.
- 4. Define the security settings through the IBM Flex System Manager management software, including the security policies and password policies. For more detailed information about security settings, see http://publib.boulder.ibm.com/infocenter/flexsys/information/topic/com.ibm.acc.8731.doc/security.html.
- 5. Validate the IPv6 addresses. See Chapter 3, "Configuring the network," on page 9 for instructions.
- 6. Configure the storage and storage pools. See Chapter 4, "Configuring storage and storage pools," on page 21 for instructions.
- 7. Configure the system management node. See Chapter 5, "Configuring the IBM Flex System Manager management node," on page 47 for instructions.
- **8**. Configure the virtual servers. See Chapter 7, "Configuring virtual servers," on page 63 for instructions.

**9**. Install the operating systems. Instructions for using the IBM Flex System Manager to deploy the operating systems are provided in the IBM Flex System Information Center.

**Important:** If you are using VIOS or VMware with an Enterprise offering, make sure that you consider your link aggregation configuration.

See http://publib.boulder.ibm.com/infocenter/flexsys/information/topic/ com.ibm.acc.8731.doc/deploying\_operating\_systems.html and http://publib.boulder.ibm.com/infocenter/flexsys/information/topic/ com.ibm.acc.8731.doc/hw\_and\_sw\_requirements.html for instructions.

- 10. Create users and groups:
  - a. From the IBM Flex System Manager Home page, select the Additional Setup tab; then, select Manage Users and Groups.
  - b. After you have created all of the user accounts, log out of the IBM Flex System Manager web interface.
  - **c.** Log in to each new user account and when prompted, change the password. (Record the new passwords.)

For more detailed information about users and groups, see http://publib.boulder.ibm.com/infocenter/flexsys/information/topic/com.ibm.acc.8731.doc/managing\_users\_and\_groups.html.

- 11. Configure the Electronic Service Agent (ESA):
  - a. From the IBM Flex System Manager Home page, select the Plug-ins tab.
  - b. Scroll to the bottom of the Plug-ins page; then, select **Service and Support manager**.
  - c. Scroll to the bottom of the Service and Support Manager page; then, select **Getting Started with Electronic Service Agent**.
  - d. On the Your company contact and System location pages, enter the required information in the fields that are identified with an asterisk.
  - e. On the Connection page, select **Connect to the Internet directly** (the default setting).
  - f. On the Authorize IBM IDs, enter the Primary IBM ID. (Make sure that you register the email address (yours or your customer's) with IBM first.
  - g. On the Summary page, select Finish.

For more detailed information about ESA, see http://publib.boulder.ibm.com/ infocenter/flexsys/information/topic/com.ibm.acc.8731.doc/ configuring\_the\_hw\_and\_sw.html.

- 12. Check the system status and make sure that there are no errors or warnings:
  - a. Locate the system status score card to the right of the Welcome banner on the IBM Flex System Manager Home page.
  - b. If the score card indicates that there are active issues, select **Problems** to determine which components have active issues; then, see http://publib.boulder.ibm.com/infocenter/flexsys/information/topic/com.ibm.acc.common.nav.doc/diagnosing\_a\_problem\_flex\_system\_manager.html for additional instructions.
- 13. If updates are available, run Update Manager. See http:// publib.boulder.ibm.com/infocenter/flexsys/information/topic/ com.ibm.acc.8731.doc/updating\_firmware\_and\_software.html for instructions.
- 14. If required, establish event automation plans. See http:// publib.boulder.ibm.com/infocenter/flexsys/information/topic/

com.ibm.director.automation.helps.doc/ fqm0\_t\_ea\_managing\_automation\_plans.html for instructions.

- 15. Back up the IBM Flex System Manager software image to a local hard disk drive or to an external USB device. See http://publib.boulder.ibm.com/ infocenter/flexsys/information/topic/com.ibm.acc.8731.doc/ backing\_up\_frm\_summary.html for instructions.
- 16. Back up your whole system to a USB device or remote secure FTP server. See http://publib.boulder.ibm.com/infocenter/flexsys/information/topic/com.ibm.director.cli.helps.doc/fqm0\_r\_cli\_backup.html? for instructions.

## Chapter 3. Configuring the network

Use the information and instructions in this chapter to verify and configure the network IP address settings.

In this chapter, you will:

- Use the CMM to verify the correct IPv4 and IPv6 network IP addresses.
- Review and save the I/O module configurations.
- Review the compute node ESXi configuration, verify compute node network communication, and create virtual machine port groups.
- Verify network communication with the storage subsystem.
- Verify network communication with the top-of-rack switches.

This chapter also includes a summary of IP addresses in Table 1 on page 17.

- 1. Obtain a list of the IP addresses that your client wants to use for the installation.
- 2. Open a web browser and connect to the CMM. See Table 1 on page 17 for the default IP address information.
- 3. From the CMM menu, select **Mgt Module Management** ► **Network**; then, select the **Ethernet** tab and verify that the iPV4 and iPV6 settings match the information provided in Table 1 on page 17.

anagement 👻	Mgt Module Management 👻	Search				
	User Accounts	Create and modify user accounts that will have access to this web cor View CMM firmware information and update firmware				
	Firmware					
	Security	Configure security protocols such as SSL and SSH				
	Network	Network settings such as SNMP and LDAP used by the CMM				
- 3						

## Network Protocol Properties

Ethernet	SNMP	DNS	SMTP	LDAP Client	TCP Command Mod
Ethern Settings for h	et Conf	figurati	ON ommunicates vi	a Ethernet	
Host name		M	M5CF3FC25E7	77F	
Domain nam Register this	ie interface with	DNS			<u>5</u>
IPv4	IPv6	Advance	ed Ethernet		
	tly assigne	d IPv4 ad	dress infor	mation	
Curren	1	110.90			
Curren IP addre	ss: 10.1.				
Curren IP addre Subnet i	ss: 10.1. nask: 255.2	255.255.0			
Curren IP addre Subnet i Default	ss: 10.1. nask: 255.2 gateway: 10.1.	255.255.0 110.1			
Curren IP addre Subnet i Default DNS prir	ess: 10.1. mask: 255.2 gateway: 10.1. nary: 0.0.0	255.255.0 110.1 .0			
Curren IP addre Subnet r Default DNS prir DNS sec	ess: 10.1. mask: 255.2 gateway: 10.1. mary: 0.0.0 ondary: 0.0.0	255.255.0 110.1 .0 .0			
Curren IP addre Subnet r Default DNS prir DNS sec DNS ter	ess: 10.1. mask: 255.2 gateway: 10.1. nary: 0.0.0 ondary: 0.0.0 iary: 0.0.0	255.255.0 110.1 .0 .0			
Curren IP addre Subnet n Default o DNS prin DNS sec DNS tert	ess: 10.1. mask: 255.2 gateway: 10.1. nary: 0.0.0 ondary: 0.0.0 iary: 0.0.0 ure IP addi	255.255.0 110.1 .0 .0 .0 ress Settin	ıgs:		

4. From the CMM menu, select Chassis Management ► Component IP Configuration; then, hover the mouse over View in the IP Address column and verify that the iPV4 and iPV6 settings match the information provided in Table 1 on page 17.

ipport 🔻	Chassis Management +	Mgt Module Management 🔻	Search				
	Chassis	Properties and settings for	the overall chassis				
	Compute Nodes	Properties and settings for	Properties and settings for compute node in the chassis				
	I/O Modules	Properties and settings for	I/O Modules in the chassis				
	Fans and Cooling	Cooling devices installed in your system					
_	Power Modules and Manager	nent Power devices, consumptio	n, and allocation				
	Component IP Configuration	Single location for you to vi	ew and configure the various IP address setting of chassis components				
	Chassis Internal Network	Provides internal connectivi	ty between compute node nods and the internal CMM management port				

#### **Compute Nodes**

Bay	Device Name	Name     IPv4 Enabled     IF       2     Yes     V		Address
2	node02			ew
3 node03		Yes	Vi	ew
4	node04	Yes	Y	
5	node05	Yes	V	IPv4 Addresses
				10.1.110.63 IPv6 Addresses fe80::5ef3:fcff:fe5f:cd01

**Note:** If this is a new system from the factory and the IP addresses are not set as per Table 1 on page 17, contact IBM support.

- You can set the IP address of any listed device by clicking on the device name. The IP Address Configuration window opens and displays the Current IP Configuration for that device.
- To edit the IPv4 address, select the **IPv4** tab. From this tab, you can edit the address properties, **IP Address**, **Subnet Mask**, and **Gateway Address**; or, you can change the configuration method to assign an address by DHCP. Select **Apply** when you are done.

P Address Configuratio	n node04	х
General Setting	4 IPv6	
Current IP Confi	guration	
Network Interface	eth1	
Configuration Method	Use Static IP Address	
IP Address	10.1.110.64	
Subnet Mask	255.255.255.0	
Gateway Address	10.1.110.1	
Enable IPv4		
Configuration Method	Use Static IP Address	-
New Static IP Co	onfiguration	
Subnet Mask	255.255.255.0	
Gateway Address	10.1.110.1	
Apply		
Close		

5. From the CMM menu, select Chassis Management ► I/O Modules.

**Note:** Depending on the hardware configuration that was ordered, you might have more than one switch to review.

IBM Chassis Management Module			Welcom	
System Status Multi-Chassis Monitor Events - Service and Support -	Chassis Management 🗸	Mgt Module Management 👻 Search		
	Chassis	Properties and settings for the overall chass	lis	
RS NGD Change System Information	Compute Nodes	Properties and settings for compute node in	the chassis	
ervice and Support no open problems.	VO Modules	Properties and settings for I/O Modules in the chassis		
	Fans and Cooling	Cooling devices installed in your system		

6. Select the first I/O module; then, click the Actions tab.

## HO Modules

Power and Restart 👻		Actions 🔻				
Device Name		Restore Factory Defaults	Bay	Power	Serial Number	
	IO Module 1	Send Ping Requests	1	On	Y250VT15B298	
	IO Module 2	Launch IOM Con:	2	On	Y050VT16E0AL	
	IO Module 3	🔀 Normal	3	On	YK5022195007	

7. Select **Launch IOM Console**, choose the protocol (https or SSH), and log in to the switch.

Interface IP:	101.412	
Protocol:	HTTPS	

- 8. If you selected the SSH protocol in step 6, go to step 10 on page 13 for instructions.
- **9**. If you selected the https protocol in step 6, the **Switch Dashboard** is displayed.

IEM	Configu	ure .	Statistics	Das	hboard	Networking OS	
	Apply	Sant	Revent	DE	Outro	Show Log Heta Loggel	
04 Feb 24 71 33 54	NUMPER OF STREET	10TICE	Intrastation	10 A	111		
BMBex Sylue	SH(E) ISS	6 Scill	i.			Sw	vitch Dashboard
						Swittch Naras	NGP:BNT1
						Swotch Location	RTP LBS 200 A124
						Swotch Type	IBM Flex System EN4093 10Gb Virtual Subsic Scalable Syste
						Switch Up Tame	13 days, 23 hours, 35 minutes and 42 seconds.
						Last Boot Time	13 49:11 Mon Feb 30, 2012 (power cycle)
						Time and date	12.40.00.35/2012
						Timesone Location	American USA Pacific Time
						Daylight Savings Time Status	dirabled
						MAC Address	09-17-d4-74-da-00
						IF Address	10.1.4.12
						POBA Part Number	BAC-00072-01
						Bardwars Part Number	4914272
						Secial Number	Y250YT158256

a. Click **Dump** under the dashboard.

IBM	Configure		Statistics	Das	hboard	Networkin		ig OS	
	Apply	Save	Revert	Diff	Dump	Show Log	Help	Logout	
I. Feb 24 21:33:50	NGP1BNT	1 NOTICE	ated						

A window is displayed that shows the current switch configuration.

- b. From the web browser, select File ➤ Save Page as. Name the file showConfigDump.txt and change the file type to text files. The switch configuration file has been saved.
- c. Go to step 11.
- 10. If you selected the SSH protocol, save the configuration to an FTP/TFTP server using IBM NOS-CLI. If prompted, select the preferred mode and use the following procedure to save the switch configuration:
  - a. At the main prompt, enter the following command: cfg/ptcfg
  - b. When prompted, enter the IP address of the FTP/TFTP server, the name of the file, username, password, and the port to be used.
  - c. Once the connection is successful, the transfer will complete and you should see a message similar to Current config successfully ftp'd to 9.44.68.148/tmp/config.txt.
- 11. Verify that you have collected all of the configuration output from all of the switches within your configuration. Make sure that:
  - The dump from each switch has a unique and logical name.
  - Virtual local area networks (VLANs) are set correctly on the ports. See Table 1 on page 17 for more information.
  - The spanning tree is set correctly.
  - Trunks (aggregation groups) are set up correctly.

See also http://publib.boulder.ibm.com/infocenter/flexsys/information/ topic/com.ibm.acc.networkdevices.doc/network.html for more information about the switches.

**12**. If you have x86 compute nodes with ESXi, follow the steps below to review the x86 node configuration information. Make sure that you repeat this procedure for all x86 compute nodes in your configuration.

**Note:** If your configuration includes Power nodes, the configuration of Power nodes is reviewed in Chapter 7, "Configuring virtual servers," on page 63.

- a. Verify the ESXi configuration:
  - 1) Using the information provided in Table 1 on page 17, log in to an ESXi remote console using the x86 nodes IMM.
  - 2) Open a web browser, enter https://<IMM\_address\_of\_ESXi>, and provide the appropriate login credentials.

	User name:
=	Password:
	Inactive session timeout: 20 minutes 🚽
	Log In
lote: To ensure	e security and avoid login conflicts, always

**3)** After logging in, click **Remote Control**. Select your desired sessions (Java Client, Single User Mode). If prompted to trust the certificate, enter yes.



## IBM Flex System x240+10Gb Fabric

Add System Descriptive Name. , ,

The System Status and Health page provides an at-a-glance overview of the op-

atus				
On				
Booting	OS or	in unsupported	OS	
nation 🔻	Pow	er Actions 🔻	Remote Control	Latest
nts @				
Sour	се	Date		Message
	on Booting mation hts Sour	on Booting OS or nation ▼ Pow nts Source	Atus On Booting OS or in unsupported mation Power Actions hts Source Date	On         Booting OS or in unsupported OS         mation       Power Actions         Remote Control         hts         Source       Date

## Remote Control

Allows you to control the server at the operating system level. A new window will apper Disk and Remote Console functionality. The Remote Disk functionality is launched from the Irop-down menu. (Note that the Remote Disk function does not... more...



Use the ActiveX Clier	nt 🔍
Use the Java Client	8
Your current brow	vser Java version (1.6.0.0) is supported for use with remote control
Encrypt disk and KVM	iser Java version (1.6.0.0) is supported for use with remote contro data during transmission in single-user mode
<ul> <li>Your current brow</li> <li>Encrypt disk and KVM</li> <li>Start remote control in Gives you exclusive acce remote control on this sy</li> </ul>	vser Java version (1.6.0.0) is supported for use with remote contro data during transmission in single-user mode iss during the remote session. No other users will be able to use rstem while your remote session is active.
Your current brow Encrypt disk and KVM Start remote control in Gives you exclusive acceremote control on this sy Start remote control on this for the systematic control on the systematic control	data during transmission in single-user mode ess during the remote session. No other users will be able to use restem while your remote session is active. in multi-user mode

- 4) Using a remote or direct console, connect to the ESXi host. Select F2 and log in using root/Passw0rd. Verify all network settings for the ESXi hosts using the information provided in Table 1 on page 17.
- b. Verify network communication:
  - You should be able to connect to EXT5 in the 10 Gb network switch using a 1 Gb SFP module. If your notebook computer is on the same subnet, you should be able to ping the ESXi host. You can also perform a network ping from the ESXi host to your notebook computer and to other components in the chassis.
  - **2)** If the pings are not successful, reverify the 10 GbE switch and ESXi host configurations.
- c. Configure virtual machine port groups:

**Note:** You must have vSphere client on your notebook computer to perform this operation. If you do not have vSphere client, you can download a copy at http://www.vmware.com/.

1) Using vSphere client on your notebook computer, connect directly to your ESXi host using the information provided in Table 1 on page 17. If you receive a security warning, select **Ignore**.

Certificate Wa	rnings			
An untrusted S	SL certificate is installed o	n "10.1.110.33" and sec	ure communic	ation cannot be
guaranteed. D	epending on your security to install a trusted SSL ce	y policy, this issue might	not represent	a security concern.
appearing.		and a server	o prevent un	
The certificate	received from "10.1.110.	33" was issued for "local	host.xlsgate2	xlslab". Secure
communication name on the ce	with "10.1.110.33" canno rtificate matches the add	t be guaranteed. Ensur ress of the server you a	e that the full re trying to co	y-qualified domain nnect to.
Click Ignore to c	ontinue using the current	SSL certificate.		
View Certificat	e	1.1	Ignore	Cancel
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				

2) Select the **Configuration** tab, then **Networking**, and then click vSwitch0 **Properties**.

Getting Started Summary Virtu	al Machines Resource Allocation Performance Conf	1 iguration Local Users & Groups Eve
Hardware Health Status	View: vSphere Standard Switch Networking	
Processors Memory	Standard Switch: vSwitch0	Remove Properties
Networking     Storage Adapters     Network Adapters	Virtual Machine Port Group ♥ VLAN4 ■ 8 virtual machine(s)   VLAN ID: 4 vCenter 5.0	Physical Adapters
Advanced Settings Power Management	FTP-SLES11 Provide The State of	

3) By default, you will see one VMkernel Port Group and one Virtual Machine Port Group. For the purple network (VLAN 4091) it will use the default Virtual Machine Port Group. For the green network (customer data on VLAN 4092), you must create a new Virtual Machine Port Group. Select Add and the Add Network wizard will initialize. Select Virtual Machine.

Connection Type Networking hardware	can be partitioned to accommodate each service that requires connectivity.
Connection Type Connection Settings Summary	Connection Types  Virtual Machine  Add a labeled network to handle virtual machine network traffic.  VHkernel  The VHkernel TCP/IP stack handles traffic for the following ESXI services: vSphere vMotion, iSCSI, NFS, and host management.

4) Under Port Group Properties, enter Customer Data 4092 for the Network Label and enter 4092 for the VLAN ID. Click Next; then, review your changes and click Finish. You will return to the vSwitch0 Properties window. Make sure that you see the new Virtual Machine Port Group and click Close.

-Port Group Properties	
Network Label:	Customer Data 4092
VLAN ID (Optional):	4092

- 13. Review the V7000 storage subsystem configuration:
  - **a**. Using the information provided in Table 1, open a command prompt and verify that you can ping the V7000.
  - b. If you cannot ping or connect to the V7000, connect your notebook computer to the V7000 management port. Provide your notebook computer with the same IP schema and attempt to connect. If this fails, try to connect using the default IP address of the V7000 or use the serial port to connect.

**Note:** If this is a new system and you cannot ping the V7000 at the default IP address in Table 1, contact IBM Support.

- 14. If top-of-rack storage area network (SAN) switches are included in your configuration, review these switches.
  - a. Using the information provided in Table 1, open a command prompt and verify that you can ping the top-of-rack SAN switches.
  - b. If you cannot ping or connect to the top-of-rack SAN switches, connect your notebook computer to the switch management port. Provide your notebook computer with the same IP schema and attempt to connect. If this fails, try to connect using the default IP address of the switch or use the serial port to connect.
- 15. Return to Chapter 2, "Installing the IBM PureFlex System offerings," on page 5 and continue with step 4 on page 5.

#### **IP address summary**

Note: Gateway and DNS must be provided by the customer.

Chassis						
Bay	Component	IPv4	IPv6 prefix	VLAN	Username	Password
Express						
CMM 1	CMM #1	192.168.93.100	fd8c:215d:178e:c0de	4093	USERID	Passw0rd
CMM 2	CMM #2	192.168.93.100	fd8c:215d:178e:c0de	4093	USERID	Passw0rd
I/O bay 1	10 Gb Ethernet Switch	192.168.93.120	fd8c:215d:178e:c0de	4093	USERID	PASSWORD
I/O bay 3	8 Gb Fibre Channel Switch	192.168.93.122	fd8c:215d:178e:c0de	4093	USERID	PASSWORD
FSM (bay	eth0	n/a	fd8c:215d:178e:c0de	4093	USERID	Passw0rd
1)	eth1	10.91.0.2	fd8c:215d:178e:c0de	4091	USERID	Passw0rd
Compute	FSP/IMM	192.168.93.150	fd8c:215d:178e:c0de	4093	Same as CN	ſM
node 1 (bay 2)	VIOS/ESXi	10.91.4.2	n/a	4091	root	Passw0rd

Table 1. IP summary for express, standard, and enterprise configurations as shipped

Chassis Bay	Component	IPv4	IPv6 prefix	VLAN	Username	Password
V7000	Canister #1	192.168.93.210	fd8c:215d:178e:c0de	4093	superuser	Passw0rd
	Canister #2	192.168.93.211	fd8c:215d:178e:c0de	4093	superuser	Passw0rd
	Cluster #1	192.168.93.213	fd8c:215d:178e:c0de	4093	superuser	Passw0rd
	Cluster #2	192.168.93.220	fd8c:215d:178e:c0de	4093	superuser	Passw0rd
Standard	1		1	1	1	I
CMM 1	CMM #1	192.168.93.100	fd8c:215d:178e:c0de	4093	USERID	Passw0rd
CMM 2	CMM #2	192.168.93.100	fd8c:215d:178e:c0de	4093	USERID	Passw0rd
I/O bay 1	10 Gb Ethernet Switch	192.168.93.120	fd8c:215d:178e:c0de	4093	USERID	PASSWORD
I/O bay 3	8 Gb Fibre Channel Switch	192.168.93.122	fd8c:215d:178e:c0de	4093	USERID	PASSWORD
I/O bay 4	8 Gb Fibre Channel Switch	192.168.93.124	fd8c:215d:178e:c0de	4093	USERID	PASSWORD
FSM (bay	eth0	n/a	fd8c:215d:178e:c0de	4093	USERID	Passw0rd
1)	eth1	10.91.0.2	fd8c:215d:178e:c0de	4091	USERID	Passw0rd
Compute	FSP/IMM	192.168.93.150	fd8c:215d:178e:c0de	4093	Same as CN	ſМ
node 1 (bay 2)	VIOS/ESXi	10.91.4.2	n/a	4091	root	Passw0rd
Compute	FSP/IMM	192.168.93.151	fd8c:215d:178e:c0de	4093	Same as CN	ſM
node 2 (bay 3)	VIOS/ESXi	10.91.8.2	n/a	4091	root	Passw0rd
V7000	Canister #1	192.168.93.210	fd8c:215d:178e:c0de	4093	superuser	Passw0rd
	Canister #2	192.168.93.211	fd8c:215d:178e:c0de	4093	superuser	Passw0rd
	Cluster #1	192.168.93.213	fd8c:215d:178e:c0de	4093	superuser	Passw0rd
	Cluster #2	192.168.93.220	fd8c:215d:178e:c0de	4093	superuser	Passw0rd
Enterprise (x	x86 only)			1	1	
CMM 1	CMM #1	192.168.93.100	fd8c:215d:178e:c0de	4093	USERID	Passw0rd
CMM 2	CMM #2	192.168.93.100	fd8c:215d:178e:c0de	4093	USERID	Passw0rd
I/O bay 1	10 Gb Ethernet Switch	192.168.93.120	fd8c:215d:178e:c0de	4093	USERID	PASSWORD
I/O bay 2	10 Gb Ethernet Switch	192.168.93.121	fd8c:215d:178e:c0de	4093	USERID	PASSWORD
I/O bay 3	8 Gb Fibre Channel Switch	192.168.93.122	fd8c:215d:178e:c0de	4093	USERID	PASSWORD
I/O bay 4	8 Gb Fibre Channel Switch	192.168.93.124	fd8c:215d:178e:c0de	4093	USERID	PASSWORD
FSM (bay	eth0	n/a	fd8c:215d:178e:c0de	4093	USERID	Passw0rd
1)	eth1	10.91.0.2	fd8c:215d:178e:c0de	4091	USERID	Passw0rd
Compute	IMM	192.168.93.150	fd8c:215d:178e:c0de	4093	Same as CM	ſМ
node 1 (bay 2)	ESXi	10.91.4.2	n/a	4091	root	Passw0rd
Compute	IMM	192.168.93.151	fd8c:215d:178e:c0de	4093	Same as CM	ſM
node 2 (bay 3)	ESXi	10.91.8.2	n/a	4091	root	Passw0rd

Tabla 1	IP summary for	ovnroce etc	andard and	ontornriso	configurations	bonnia se	(continued)
Table 1.	IF Summary IOI	express, side	anuaru, anu	enterprise	connyurations	as sinppeu	(continueu)

Chassis						
Bay	Component	IPv4	IPv6 prefix	VLAN	Username	Password
V7000	Canister #1	192.168.93.210	fd8c:215d:178e:c0de	4093	superuser	Passw0rd
	Canister #2	192.168.93.211	fd8c:215d:178e:c0de	4093	superuser	Passw0rd
	Cluster #1	192.168.93.213	fd8c:215d:178e:c0de	4093	superuser	Passw0rd
	Cluster #2	192.168.93.220	fd8c:215d:178e:c0de	4093	superuser	Passw0rd
Enterprise ()	Power only)					
CMM 1	CMM #1	192.168.93.100	fd8c:215d:178e:c0de	4093	USERID	Passw0rd
CMM 2	CMM #2	192.168.93.100	fd8c:215d:178e:c0de	4093	USERID	Passw0rd
I/O bay 1	10 Gb Ethernet Switch	192.168.93.120	fd8c:215d:178e:c0de	4093	USERID	PASSWORD
I/O bay 2	10 Gb Ethernet Switch	192.168.93.121	fd8c:215d:178e:c0de	4093	USERID	PASSWORD
I/O bay 3	8 Gb FC Switch	192.168.93.122	fd8c:215d:178e:c0de	4093	USERID	PASSWORD
I/O bay 4	8 Gb FC Switch	192.168.93.124	fd8c:215d:178e:c0de	4093	USERID	PASSWORD
FSM (bay	eth0	n/a	fd8c:215d:178e:c0de	4093	USERID	Passw0rd
1)	eth1	10.91.0.2	fd8c:215d:178e:c0de	4091	USERID	Passw0rd
Compute	FSP	192.168.93.150	fd8c:215d:178e:c0de	4093	Same as CM	ſМ
node 1 (bays 3 - 4)	VIOS	10.91.4.2	n/a	4091	root	Passw0rd
Compute	FSP	192.168.93.151	fd8c:215d:178e:c0de	4093	Same as CM	ſМ
node 2 (bays 5 - 6)	VIOS	10.91.8.2	n/a	4091	root	Passw0rd
V7000	Canister #1	192.168.93.210	fd8c:215d:178e:c0de	4093	superuser	Passw0rd
	Canister #2	192.168.93.211	fd8c:215d:178e:c0de	4093	superuser	Passw0rd
	Cluster #1	192.168.93.213	fd8c:215d:178e:c0de	4093	superuser	Passw0rd
	Cluster #2	192.168.93.220	fd8c:215d:178e:c0de	4093	superuser	Passw0rd
TOR Eth1	Management	192.168.91.221	fd8c:215d:178e:c0d	4093	USERID	Passw0rd
TOR Eth2	Management	192.168.91.221	fd8c:215d:178e:c0d	4093	USERID	Passw0rd
TOR SAN1	Management	192.168.91.222	fd8c:215d:178e:c0d	4093	USERID	Passw0rd
TOR SAN2	Management	192.168.91.223	fd8c:215d:178e:c0d	4093	USERID	Passw0rd

Table 1. IP summary for express, standard, and enterprise configurations as shipped (continued)

## Chapter 4. Configuring storage and storage pools

Use the information and instructions in this chapter to configure storage and storage pools.

In this chapter, you will:

- Review the Fiber Channel SAN switch configuration.
- Configure the storage subsystem.
- Verify storage pools, volumes, and host mappings.

#### **Review the Fiber Channel SAN switch configuration**

Each chassis contains either one or two QLogic fiber channel SAN switches. The Enterprise offerings with Power compute nodes also include a pair of top-of-rack IBM 2498B24 SAN switches. The top-of-rack switches are optional in the Express and Standard offerings.

- If a top-of-rack SAN switch is not present, the QLogic FC SAN switches are configured from the factory for full-fabric mode.
- If a top-of-rack switch is present in the configuration, the QLogic SAN switches are configured for transparent mode and the Brocade top-of-rack switch is configured in the full-fabric mode.

**Note:** The switches come pre-configured from the IBM factory. Do not alter the zoning configuration in the switches.

1. Log in to each SAN switch from a web browser using:

https://<IP\_Address\_of\_SAN\_Switch>

The IP address of the switch will either be the pre-configured default value from Table 1 on page 17, or the customer's desired IP address that you might have set in Chapter 3, "Configuring the network," on page 9.

- 2. For the QLogic switches, verify that the switch mode is appropriate for your configuration. You can determine the switch mode by examining the initial user interface.
  - If the **Zoning** command appears on the menu bar, the switch is in full-fabric mode.
  - If the **Zoning** command does not appear on the menu bar, the switch is in transparent mode.
- **3**. If the QLogic switch is in transparent mode, verify that the internal ports (ports mapped to the compute nodes) are mapped to the correct external ports.

**Note:** The Enterprise with Power node offering requires four ports to be connected between the QLogic chassis switch and the Brocade top-of-rack switch. Best practice is to balance the mapping of the nodes internal ports to the external ports, if possible. For example, if there are four nodes in the chassis, map each node's internal port separately to each external port. If there are 13 nodes in the chassis, then map three or four node's internal ports to each external port.

TF Start		2 14 2 12 2 10 2 8 2 8 2 8 2 8 2 8 2 8 2 8 2 8 2 8 2 8	
-	Field	IBM8Gb	
<del>.</del> Σ	Field Switch Type	IBM80b IBM Flex System FC3171 80b SAN Switch	
Σ.	Field Switch Type First Port Address	IBM80b IBM Flex System FC3171 8Gb SAN Switch N/A - does not apply to this switch	
<u>Σ</u>	Field Switch Type First Port Address World Wilde Name	IBM86b IBM Flex System FC3171 86b SAN Switch N/A - does not apply to this switch 10:00:00::0::dd:1fb4:11	
Σ	Field Switch Type Field First Port Address World Wide Name Senal Number	IBM80b IBM Flex System FC3171 80b SAN Switch NIA - does not apply to this switch 10:00:00:c0:dd t16411 11590/362/VK50221BE003	
Σ <sup>8</sup> <sup>4</sup> <sup>4</sup> <sup>4</sup> <sup>4</sup> <sup>4</sup> <sup>4</sup> <sup>4</sup> <sup>4</sup>	Field Switch Type First Port Address World Wide Name Serial Number Reason for Status	IBM80b IBM Flex System FC3171 8Gb SAN Switch N/A - does not apply to this switch 10:00:00:00:dd:1fb4:11 11590Y3562YK50221BE003 Normal	
Σ	Field Switch Type Field First Fort Address World Wide Name Serial Number Reason for Status Vendor	IBM80b IBM Flex System FC3171 80b SAN Switch NA- does not apply to this switch 10.00.00.c0/airthe4.11 11590925827K50221BE003 Normal IBM	
Σ	Field Switch Type First Port Address World Wide Name Serial Number Reason for Status Vendor MAC Address	IBM80b IBM Flex System FC3171 80b SAN Switch NA#- does not apply to this switch 10:00:00:0:dd:1fb4:11 11:890Y3682YK50221BE003 Normal IBM 00:c0:dd:1fb4:11	
Σ 	Field Switch Type First Port Address World Wide Name Serial Number Reason for Status Vendor MAC Address Switch UUID	IBM80b IBM Flex System FC3171 80b SAN Switch NA- does not apply to this switch 10:00:00:00 dirfb4:11 11:590735827K50221BE003 Normal IBM 00:00:dirfb4:11 4EC1A29ABCABBCFF0F2F00C0DD1FB412	
Σ	Field Switch Type First Port Address Wond Wide Name Serial Number Reason for Status Vendor MAC Address Switch UUID CPLD Revision	IBM80b           IBM Flex System FC3171 80b SAN Switch           NA- does not apply to this switch           10:00:00:00:d0:41fb4:11           11:S90Y3582YK50221BE003           Normal           IBM           00:00:dd:1fb4:11           4EC:1429ABCABCFF0F2F00C0DD1FB412           0x410101,0x20	
	Field Switch Type First Port Address World Wide Name Serial Number Reason for Status Vendor MAC Address Switch UUID CPLD Revision Negotiated Domain ID	IBM80b           IBM Flex System FC3171 8Gb SAN Switch           N/A - does not apply to this switch           10.00.00.c0.dd.1fb4.11           11890Y3682/KS02218E003           Normal           IBM           00:00.dd.1fb4.11           4EC1A2QABCABBCFF0F2F00C0DD1FB412           0x410101,0x20           NAF - does not apply to this switch	
Σ 	Field Switch Type First Fort Address World Wide Name Serial Number Reason for Status Vendor MAC Address Switch UUD CPLD Revision Negotiated Domain ID Configured Domain ID	IBM80b           IBM Flex System FC3171 80b SAN Switch           NA- does not apply to this switch           10:00:00:00:d0:d1:fb4:11           11:909/35827K50221BE003           Normal           IBM           00:00:d0:1fb4:11           4EC1A22ABCABCFF0F2F00C0DD1FB412           0x41010,0x20           N/A- does not apply to this switch           N/A- does not apply to this switch           N/A- does not apply to this switch	
Σ	Field Switch Type First Port Address Vond Wide Name Serial Number Reason for Status Vendor MAC Address Switch UUID COPLD Revision Negotiated Domain ID Configured Domain ID Domain ID Lock	IBM80b           IBM Flex System FC3171 80b SAN Switch           N/A - does not apply to this switch           10:00:00:c0:dd:1fb4:11           11:890/3582/t<0221 8E003	
	Field Switch Type First Port Address Vorid Wide Name Serial Number Reason for Status Vendor MAC Address Switch UUD CPLD Revision Negotiated Domain ID Domain ID Lock Primary CPU	IBM80b           IBM Flex System FC3171 80b SAN Switch           NA- does not apply to this switch           10:00:00:02 did 17b4:11           11:890/3582/rK50221BE003           Normal           IBM           00:00:01:154:11           4EC1A29ABCABBCFF0F2F00C0DD1FB412           0x41010,0x20           NA- does not apply to this switch           NA- does not apply to this switch	

- a. Review the port mapping using the **Port ► Map Ports** menu command. Internal ports are listed along the left side of the screen and the external ports are listed across the top. For each possible mapping, the choices are:
  - No mapping
  - Primary
  - Backup

**Note:** Ports designated as **Backup** only become active when all primary ports fail.

🕌 Map Ports											×
		TF Ports									
		Ext 1:0	Ext 2:15		Ext 3:16		Ext 4:17	Ext 5:18		Ext 6:19	
	Bay 1	-		¥		•			•		*
	Bay 2	Primary 💌	Backup	•		•			•		-
	Bay 3	Primary 🔫	Backup	•		•			•		-
	Bay 4	Primary 💌	Backup	•		*		-	*		•
	Bay 5	Backup 💌		*	Primary	•			•		*
	Bay 6	Backup 💌		•	Primary	*			•		-
TH Ports	Bay 7	Backup 💌		¥	Primary	•			•		-
Inforta	Bay 8	Backup 💌		*		*	Primary		*		-
	Bay 9	Backup 💌		×		•	Primary 🔻		¥		*
	Bay 10	Backup 💌		•		•		Primary	•		-
	Bay 11	Backup 💌		¥		•		Primary	•		-
	Bay 12	Backup 💌		*		*		-	*	Primary	•
	Bay 13	Backup 💌		•		•	-		•	Primary	•
	Bay 14	Backup 🔻		•		-			•	Primary	•
							ОК	Cancel		Help	

- b. Verify that each internal compute node port is correctly mapped to an external port and that at least one backup external port is designated for each internal node port.
- 4. Verify that there is one SAN zone for each compute node host port on each SAN switch. Each zone should include the compute node host port and all of the storage subsystem host ports. Zones should be labeled so that they are easily identifiable, slot\_2 for example.
  - On a QLogic switch, select **Zoning** ► **Edit Zoning** to view the **Edit Zoning** worksheet. Verify that at least one zone exists for each primary compute node host port for each full-fabric SAN switch.



• On a Brocade switch, click Zone Admin on the Web Tools screen.

HTIBM_2498_824_54	N1 - Web Tools
Manage <u>R</u> eports Mo	nitor <u>T</u> ools
Tasks 🔷 🏦	Status O Temp O Power O
Manage	
Zone Admin	Admin Domain AD0
Switch Admin	Switch View
Port Admin	
🔠 Admin Domain	
🙌 Fabric Watch	
Monitor	
Performance I	Switch Events, Information
🛄 Name Server	Switch Events Switch Information

On the **Zone Administration** screen, select the **Zone** tab. Click the drop-down button for the **Name** box. Verify that at least one zone exists for each primary compute node for each full-fabric SAN switch.

Zoning Modes	Basic Zones		
Basic Zones Traffic Isolation Zones	Print Edit ⊻iew Zoning Actions	sh ▼	En
	Name         DS4800VM_X8_X9           DS4800VM_X8_X9           Memb           DS4800_ISV7K6                ■ DS4800_MGMT                 ■ DS4800_X6                 ■ IS1_3690Bot	Tle	w <u>Z</u>
	IFS1_3690Top IFS1_IFS2 IFS1_NGP1BT2	r →> ▼ emb	, per

5. Verify the zone set configuration.

**Note:** A Zone Set (QLogic) or Zone Config (Brocade) contains one or more zones defined on the SAN switch. Only one Zone Set or Zone Config can be active at a time on a SAN switch.

• On a QLogic switch, return to the main screen and click the **Active Zoneset** tab. Verify that all of the required zones are included in the active **Zone Set**.

<u>File Fabric Switch Port Zoning V</u>	/ Wizards Help
9.3.77.164           LESAUSNOP1SW3           I.ESAUSNOP1SW3	13     1     2     1 </th
	ets ZoneSet: C7893-92X-Zone-Set-A Zone: P7895-22X-VIOS-3-Zone-A Zone: P7895-42X-VIOS-1-Zone-A Zone: X8737-AC1-ESXI-1-Zone-A Zone: X8737-AC1-ESXI-2-Zone-A Switch FC Port Stats Port Info Configured Zonesets Active Zoneset

• On a Brocade switch, click **Zone Admin** on the **Web Tools** screen; then, click the **Zone Config** tab. Note the name of the **Effective Zone Config** (lower right corner) and make sure that this Zone Config is selected in the **Name** 

box. Verify that all of the defined zones are present in the **Zone Config Members** box for each full-fabric SAN switch.



- **6**. Back up the configuration of each full-fabric SAN switch after the configuration has been verified.
  - On a QLogic switch, select **Switch ►** Archive from the menu. Enter a name for the .xml file and save it.
  - On a Brocade switch, click **Switch Admin** from the **Web Tools** screen; then, click the **Advanced Mode** button. Select the **Configure** tab; then, select the **Upload/Download** tab in the lower bar. Click the **Config Upload** button.

**Note:** You can transfer the switch configuration file to the IBM Flex System Manager using SCP. Otherwise, you might need to have an FTP server or SCP server on your workstation to facilitate the transfer. If you are using an FTP server or SCP server on your workstation, make sure that your firewall does not block the transfer.

Enter the Host Name or IP, User Name, Password, Protocol Type and a Configuration File Name; then, click Apply.

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7. Continue with "Configure the storage subsystem."

#### Configure the storage subsystem

 Log in to the V7000 storage subsystem from a web browser using https://<IP\_Address\_of\_V7000>. Use the pre-configured IP address found in Table 1 on page 17.

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3. Enter a System Name, select a Time Zone, and set the Date and Time.

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4. Click **Set NTP Server IP Address**, if one is available, enter the IP address, and click **Next**. Task completion details are displayed. Review the data you entered and click **Close**.

**Note:** The IBM Flex System Manager is a good choice for an NTP server. You should enter the IPv6 address of the IBM Flex System Manager eth0 interface for the NTP server. If this IP address is unknown, the NTP server can be set outside of the initial setup wizard (**Settings ► General ► Date and Time**).

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Name, Date, and Time (Step 2 of 6)         System Name         Isv7K6         Time Zone         (GHT-7:00) US Mountain Time         Set Date and Time         Set NTP Server IP Address         7.11.107.11    Set the IP Address of a known Navailable.	NTP server if	Next >

5. If the customer has purchased licenses to manage external storage, enter that information on the **System License** screen and click **Next**. If the customer has not purchased additional licenses, leave the values set to zero and click **Next**.

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System License (Step 3 of 6) The enclosure license already includes virtualization of internal Serial Attached SCSI (SAS) drives on your IBM Storwize V7000 system. You can use this panel to set any additional options. If you are sharing the total authorized capacities across multiple clusters, enter only the capacities you wish to use on this cluster. The sum of the capacities across all clusters must not exceed your authorized capacities. Set License Options External Virtualization Limit		
Remote-Copy Limit Number of enclosures		
	Next >	
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6. Click Next to bypass the Configure Email Event Notification screen.

**Note:** Do not configure email event notification from the V7000 storage subsystem for PureFlex systems. Event notification is handled by the IBM Flex System Manager.

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7. On the **Hardware** screen, determine if the hardware graphic display matches the V7000 physical configuration. If it does not match, reverify the enclosure cabling. You will be able to renumber the enclosures and rearrange the enclosures later by drag-and-drop. If the hardware configuration does match, click **Next**. Each enclosure is added to the system configuration.



8. Click Close on the Add Enclosure screen; then, click Next.

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svctask chenclosure -managed yes 3	
The task is 80% complete.	56 PM
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The task is 100% complete.	56 PM
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	Next >
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9. On the **Configure Storage** screen, the **Yes**, **automatically configure internal storage now** check box is preselected. Deselect (uncheck) this box; then, click **Finish**.

**Important:** You must deselect the **Yes, automatically configure internal storage now** check box. Do not check **Yes, automatically configure internal storage now** under any circumstances. If this box is checked, any storage pre-configuration performed at the factory will be deleted and you will be required to re-configure the storage subsystem and reload it manually.

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Configure Storage (Step 6 of 6)	
Would you like to automatically configure internal storage new?	
Storage Found:	
(19 drives) 278.9 GB, SSD (221 drives) 278.9 GB, SAS, 10000 rpm	
Configuration Summary:	
9 x SSD Easy Tier (278.9 GB, SSD): 2, 2, 2, 2, 2, 2, 2, 2, 2 drives	
1 Hot Spares 0 Unconfigured Drives	
<b>30 x Basic RAID-5</b> (278.9 GB, SAS, 10000 rpm): 8, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7,	
10 Hot Spares	and the second
	-
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	Finish
Done	🧯 //.

10. The storage configuration results are displayed. Review the information and click **Close**.

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Configure	Storage (Step 6 of 6)		
	<b>3 1 7</b>		-
Would you lil	ke to automatically configure internal storage now?		
🗌 Yes, aut	comatically configure internal storage now.		
Storage F			
(19 drives) (221 drives	The task completed.		
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9 x SSD E			-
1 Hot Sp	Details     Induiting Licence cottings		
0 Unconf	The task is 0% complete.		
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10 Hot S	The task is 50% complete. 1:57 PM		-
0 Unconf	Running command: 1:57 PM		
100	svctask chlicense -virtualization 99		
	The task is 100% complete.		
	The task completed. 1:57 PM		100
			1000
	Close		
			-
		Finish	]
2-1			_
Done			<u>_</u>

- 11. If the IP addresses of the V7000 storage subsystem need to be changed, use the steps below to assign new IP addresses. There are three IPv4 addresses (one management and two service) and one management IPv6 address that you can set.
  - a. To set the management addresses, go to the **Settings** ► **Network** screen and click **Management IP Addresses**.

IBM Storwize ¥7000	Welcome, superuser	Legal   Logout   Help IBM.
IBM Storwize V7000 ISV7K3 > Settings > Network * Network Management IP Addresses Service IP Addresses	Welcome, superuser Management IP Addresses Click on a port to configure the system's management IP address. If you cha might be required to log in again. A system uses the same management IP addresses for all control enclosure	Legal   Logout   Help 距離。 inge management IP addresses, you s.
iscsi 3		
Event Notifications Directory Services Network Support General	2	
Allocatad: 36.8 CB (23.1 TB (0%) 1) https://10.10.0203/gu#config-network 1)	Running Tasks (0)	Health Status

b. Click port 1 and enter the correct management IPv4 address settings; then, click OK. If there is no IPv6 address set for the IBM Flex System Manager, select the Show IPv6 check box. Enter the IP Address, Subnet Mask/Prefix, and Gateway.

	151/K3 2	<ul> <li>Settings &gt; Netwo</li> </ul>	rk 🔻
		Network	Management IP Addresses
a a.,		Management IP Addresses	Click on a port to configure the system's mana might be required to log in again.
		Service IP Addres	A system uses the same management IP add
		iscsi	
		Ethernet P <mark>ort 1 (P</mark>	rimary)
	T I	IPv4	IPv6
	IP Address	10.10.0.203	
ubnet M	ask / Prefix	255.255.255.0	
	Gateway	10.10.0.1	

c. Check to see that the IPV6 address is correct for the V7000 by retrieving the MAC address of Node 1 Port 1 from the Service interface: https://<IP\_Address\_of\_Service\_Interface>. Then, enter the MAC address in the IPv6 calculator.

**Note:** The **Subnet Mask/Prefix** value should be 64 and the **Gateway** should be either blank or the IPv6 address of the primary CMM.

IBM Storwize V7000 Serv	vice Assistant Too					Connecter	to: 01   1   node1	Logout	IBM
Current: 01   1   node1 Status: Active Identify	Home You can view d	etailed status a	nd error summ	hary, and manac	e service actions	for the current node. The cur	rent node is the nod	e on which s	ervice-
Home	related actions system. To mai	related actions are performed. The connected node displays the service assistant and provides the interface for working with other nodes on system. To manage a different node, select a node from the following table.							
Collect Logs	Attention: Only perform service actions on nodes when directed by service procedures. If used inappropriately, service actions c access to data, or even data loss. If the node status is active, select Monitoring>Events in the management GUI to fix any error								loss of related t
Manage System	the active node Actions: Enter S	e. Gervice State 💌	GO	<ul> <li>Make sure</li> </ul>	Node 1 is sele	ected.			
Recover System	Change Node		All and a second se				E	Ξ	
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Upgrade Manually	C node2 Refresh	Active		01-2	ISV7K1	Partner			
Configure Enclosure	Node Errors						Đ	Ð	
Change Service IP	Node Detail						E	3	
Configure CLI Access	Node Name: Node Status:	Hardware	node1 Active	Location				<b>A</b>	
Restart Service	Part Identity: Node FRU: Configuration N	oder	11S85Y6044Y 85Y5899	G50CG11BXG9					
	Model: System:	oue.	100 ISV7K1						
	System Softwar Software Versic	re Build: on:	54.6.1111250 6.3.0.0	000					
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	Fibre Channel P	iorts	ID 1 2 3	Status Active Active Inactive	Speed 8Gb 8Gb N/A	WWPN 50050768021000d1 50050768022000d1 50050768023000d1	Type Short-wave Short-wave Short-wave		
	Ethernet Ports		4 ID 1	Inactive Status Link Online	N/A Speed 1Gb/s - Full	50050768024000d1 MAC Address e4:1f:13:74:2c:bb	Short-wave		
			2	LINK Unline	160/S - Full	E9:11:13:79:20:03		-	

12. Determine if there are any problem events with recommended actions.a. On the V7000 management interface, go to Monitoring ► Events.



b. Clear any problems in the **Actions** list by clicking **Run This Fix Procedure** under **Next Recommended Action** and following the directed maintenance procedure.



**13**. Document the Machine Type, Model, and Serial Number (MTMS) of each storage enclosure and the number and type of disk drives contained in each

enclosure. You can obtain this information either by visually inspecting each enclosure or you can use the V7000 management interface. This information should match the customer shipping documentation.

a. To obtain the MTMS information from the V7000 management interface, go to **Monitoring ► System Details**; then, click the link for each storage enclosure.



b. To obtain the number and type of disk drives, go to Pools ► Internal Storage; then, click each Drive Class Filter. These are the types of disk drives present. The number of drives of each type are displayed at the bottom of the screen when you select the drive type.

IBM Storwize V7000	Welco	me, superuser	Legal   Logout   Help IBM.
ISV7K3 > Pools > Internal S Drive Class Filter	torage  Configure Storage		
278.9 GB, SAS 10000 rpm io_grp0	Nearline Nearline SAS	Capacity Allocation	92% MDisk Capacity 10.0 TB Spare Capacity 931.0 GB Total Capacity 10.9 TB
278.9 GB, SSD	I≣ Actions ▼		🔍 🔻 [Filter]
	Drive ID Capacity Use Status MDisk Nam	ie Enclosure ID	Drive Slot
931.0 GB, Nearline	SAS 68 931.0 GB Member 🗹 Online mdisk8	4	4
Nearline 7200 rpm	69 931.0 GB Member 🗹 Online mdisk8	4	3
	70 931.0 GB Member 🗾 Online mdisk8	4	12
	71 931.0 GB Member 📝 Online mdisk8	4	8
	72 931.0 GB Member 📝 Online mdisk8	4	7
	73 931.0 GB Member 📝 Online mdisk8	4	6
0	74 931.0 GB Member 📝 Online mdisk8	4	11
× 1	75 931.0 GB Member 📝 Online mdisk8	4	2
store .	76 931.0 GB Member 📝 Online mdisk8	4	10
SP .	77 931.0 GB Member 🔽 Online mdisk8	4	9
Pools -> Internal	78 931.0 GB Member 📝 Online mdisk8	4	5
Storage	79 931 D GB Spare 📝 Online	4	1
	Showing 12 drives   Selecting 0 drives		
Allocated: 26.0 GB / 23.1 TB (0%)	14) 🧿 Running Tasks (0)	_	Health Status

14. Check the V7000 software level by going to **Monitoring** ► **System**. The installed software version is displayed at the bottom of the system diagram.

**Note:** The V7000 software version will vary over time as later versions are released. You can obtain the current software version from your IBM consultant.



#### Verify storage pools, volumes, and host mappings

The V7000 storage subsystem ships from the factory with one or more storage pools containing a number of volumes pre-configured and mapped to compute node hosts in the chassis (depending on the offering).

**Power offerings** – Express and Standard: eight 600 Gb 10K RPM hard disk drives (HDDs) and two 300 Gb solid state drives (SSDs). The V7000 uses eight drives in a RAID 5 configuration to create one storage pool while providing a single hot spare for resiliency. Storage LUNs for all of the compute nodes can be created from this pool.

When the primary compute node is a Power compute node, the following LUNs are created by IBM Manufacturing:

Туре	Storage requirement	Name
VIOS-1	40 Gb	SN10XXXXX_VIOS1
VIOS-2	40 Gb	SN10XXXXX_VIOS2
OS	100 Gb	SN10XXXXX_TEMPLATE_OS 1
Media repository	400 Gb	SN10XXXXX_MEDIA
SCE	50 Gb	SN10XXXXX_SCE
1. The Template volume will be	OS of the client's choice (AIX, mapped to the single primary	IBM i, or Power Linux) has a LUN. Each Power compute node.

Enterprise: sixteen 600 Gb 10K RPM HDDs and four 300 Gb Solid State Drives.

**x86 offerings** – Express and Standard: eight 600 Gb 10K RPM HDDs and two 300 Gb solid state drives. If your x86 configuration includes SmartCloud Entry, the following LUNs are created by IBM Manufacturing:

Туре	Storage requirement	Name
VMWARE VMFS	500 Gb	x86_Repository
VMWARE VMFS	1300 Gb	x86_VM_Disk1

Enterprise: sixteen 600 Gb 10K RPM HDDs and four 300 Gb solid state drives.

1. Verify the storage pools, volumes, and host mappings by going to **Pools** ► **Volumes by Pool**. Click on each pool to view the volumes.

ISV7K3 > Pools > Volumes Pool Filter mdiskgrp0 5 Volume copies 26.0 GB Used / 15.0	by Pool V	mdiskgrp0 Online 9 MDisks, 5 Volume copies Easy Tier Active	¥olume Allocation	26.0 GB 0%	15.0 TB Capacity
Volume copies 0 Volume copies 0 bytes Used / 8.1 TB	🔽 🐚 🎦 New Volun	ne 🛛 🗄 Actions 🔻	1	Q	▼ Filter
	Infrastructure LPAR1 Media_Repository Production VIOS	Online     Online     Online     Online     Online     Online     Online	200.0 GB         640507680282800           100.0 GB         640507680282800           200.0 GB         640507680282800           200.0 GB         640507680282800           100.0 GB         640507680282800           100.0 GB         640507680282800           100.0 GB         640507680282800           100.0 GB         640507680282800	121 00000000000000000000000000000000000	Yes Hig Yes Hig Yes Hig Yes Hig
Pools -> Volumes t Pool	Showing 5 volumes   Selecting	O volumes			

2. Right-click on each volume and select **View Mapped Hosts** to see which hosts the volume is mapped to.

Name	Status	C
LPAR1 LPAR1 Media_Re Productio VIOS	Map to Host Unmap All Hosts Unmap All Hosts View Mapped Hosts Rename Shrink Expand Migrate to Another Pool Export to Image Mode Delete Volume Copy Actions	1

# Chapter 5. Configuring the IBM Flex System Manager management node

Use the information and instructions in this chapter to configure the IBM Flex System Manager management node.

The first time that you turn on the management node, a setup wizard will load and walk you through the initial setup of the management node. See http://publib.boulder.ibm.com/infocenter/flexsys/information/topic/ com.ibm.acc.8731.doc/using\_the\_setup\_wizard.html for more detailed information and instructions.

Complete the following steps to configure the management node:

- 1. Connect an Ethernet cable from a notebook computer to a Chassis Management Module (CMM) in the chassis.
- 2. From a client computer, point a browser to:

https://default\_IP\_address\_or\_host\_name:8422/ibm/console where default\_IP\_address\_or\_host\_name is the IPv4 address of the management node. The host name can be used if the configuration is assigned through a DHCP server; otherwise, use the IPv4 static IP address. See Table 1 on page 17 for the IPv4 address for the management node. Make sure that the IP address and subnet of the client computer is set to the same value as the management node (the default subnet is 255.255.255.0). The IP address of the management node must also be in the same local domain as the client computer. To connect to the management node for the first time, you might need to change the IP properties on the client computer.

- **3.** On the License page, have your customer review the license information; then, click **I Agree**.
- 4. On the Welcome page, click Next.
- 5. On the Date and Time page, enter the date and time. If a Network Time Protocol (NTP) server is being used in the configuration, enter the information for the server; then, click **Next**.
- 6. On the System Level User ID and Password page, keep the default user ID (USERID), but enter a new password; then, click **Next**.

#### Notes:

- a. The minimum requirement for the password is eight alphanumeric characters, two of which must be capital letters, numbers, or special characters.
- b. The pe and root accounts will share this password.
- 7. On the Network Topology page, leave the Advanced Routing box unchecked and click **Next**.
- 8. On the Configure Local Area Network (LAN) Adapters page, select the radio button for the **eth0** adapter and deselect the **Perform network validation and recovery** box; then, click **Next**.

**Important:** The initial setup wizard will not complete if the **Perform network** validation and recovery box is selected.

- 9. On the Configure IP Address page, configure the IP address for the eth0 adapter. The eth0 adapter provides the internal chassis management network interface for the management node. See the information provided in Table 1 on page 17 for the IP address settings.
  - a. Make sure that you match the CMM and internal chassis settings.
  - b. Select the IPv6 address box.
  - c. Select the Use the following IPv6 radio button.
  - d. In the IPv6 address field, enter the IPv6 address.
  - e. In the **Prefix length** field, enter 64.
  - f. Click Add; then, click Next.
- 10. On the Configure Local Area Network (LAN) Adapters page, select the radio button for the **eth1** adapter; then, click **Next**.
- 11. On the Configure IP Address page, configure the IP address for the eth1 adapter. The eth1 adapter provides the data network interface for the management node. This adapter communicates through the network switch instead of on the internal chassis management network. Typically, IPv4 is used. Make sure that you match the data network settings; then, click **Next**.
- On the Configure Local Area Network (LAN) Adapters page next to the Do you want to configure another LAN adapter? radio button, click No.
- 13. On the Configure Host and Gateway page:
  - a. In the **Host name IP Address** field, enter the IP address of the eth1 adapter (data network).
  - b. In the **Short name** field, enter a host name.
  - c. In the Domain name field, enter a domain name, if available.
  - d. In the **Default Gateway address** field, enter the gateway address. If you did not change the default IPv4 address, see the information provided in Table 1 on page 17 for the IPv4 address.
  - e. In the Default Gateway device field, select the eth1 adapter.
  - f. Click Next to continue.
- 14. On the Configure Domain Name System (DNS) page, enter the DNS information provided by the customer. If you do not plan to use DNS services, deselect the **Enable DNS services** box; then, click **Next**.

**Important:** DNS server configuration is required on the data network (eth1) for the following management software functions:

- Using VMControl to manage virtual machines and operating systems that are running on compute nodes
- Updating the device drivers in the operating systems that are running on IBM Power Systems compute nodes
- 15. Review the information on the Summary page; then, click Finish.
- 16. Wait for the setup wizard to process the configuration. When the message Congratulationa. All setup tasks completed is displayed, click **Continue**.
  - The management node will restart. Approximately 5 minutes after the wizard completes the setup, you are prompted to accept the security certificate for the server. If you want to monitor the status of the process, you must accept this certification.

Depending on the browser that you use, you might have to accept the security certificate every time that you log in to the IBM Flex System Manager management software. With Mozilla Firefox, the warning is displayed only during initial setup; if you add the exception during initial setup, the exception is added automatically in the future. However, Microsoft Internet Explorer might require you to accept the security certificate every time you log in.

- When the installation process is completed, the IBM Flex System Manager login page is displayed.
- 17. Using the IBM Flex System Manager web interface and the credentials that you specified in step 6 on page 47, log in to the management node.

**Note:** If a message *There is a problem with the website's security certificate* is displayed, select **Continue to this website (not recommended)**.

 From the Home tab, select Flex System Manager Domain - Select Chassis to be Managed from the Initial Setup tab.

**Note:** If a message *The discovery process is complete. No chassis were found for this management domain* is displayed, click **Discover New Chassis.** 

- **19.** Make sure that the Run Now radio button is selected, then click **OK**. (The status column displays a status of Unmanaged.)
- 20. On the right-hand side, select **General Actions** ► **Resource Explorer**.
- 21. On the Resource Explorer Groups page, select All Systems.
- **22**. Make sure that the Access column for all three objects (Operating System, Server, and Farm) is **OK**. If not, click the **No access** status and provide the appropriate credentials to unlock them.
- 23. When the Access status for all three objects is OK:
  - a. Right-click on the **Operating System** object; then, select **Inventory** ► **Collect Inventory**.
  - b. When the Job name and schedule window is displayed, enter FSM 0S in the **Job Name** field and make sure that the Run Now radio button is selected; then, click **OK**.
  - c. Right-click on the **Server** object; then, select **Inventory** ► **Collect Inventory**.
  - d. When the Job name and schedule window is displayed, enter FSM Server in the **Job Name** field and make sure that the Run Now radio button is selected; then, click **OK**.
- 24. Go to the Home tab, select the **Plugins** tab and scroll to **Automation Manager**; then, select **Active and Scheduled Jobs**.
- **25.** On the Active and Scheduled Jobs page, verify that the inventory is 100% complete with no errors.
- **26.** After the inventory collection is 100% complete, go to the Chassis Manager tab and check the box next to the chassis name; then, click **Manage**.
- 27. On the Manage Chassis page, click **Manage**; then when the process is completed successfully, click **Done**. (The chassis status of **Managed** should be displayed.)
- **28**. Go to the Home tab; then from the Common Links at the bottom of the page, select **Chassis Manager**.
- 29. On the right-hand side of the Managed Chassis page, select General Actions ► Resource Explorer.
- 30. On the Resource Explorer Groups page, select All Systems.
- **31.** The list of components that are installed in the chassis should be displayed. The Type column identifies the object type such as a switch, a server, and so on. If any of the newly discovered systems need access, click the **No access** status and provide the appropriate credentials to unlock them:
  - For x86 compute nodes, enter the IMM login credentials.

• For Power compute nodes, enter the FSP password.

When OK is displayed for the Access status, click Close.

**32**. Verify that all of the components installed in the chassis and the top-of-rack switches have been discovered. If not, do a manual discovery on the missing components.

#### Notes:

- a. All components installed in the chassis should be self discovered. If this is not the case, check the CMM to see if there are any errors being reported. An error might be preventing the component from being discovered.
- b. Before you discover the V7000 component, you must complete the inventory discovery and collection procedures for the chassis components. Instructions for discovering the V7000 component are provided later in this procedure.
- 33. On the Resource Explorer Groups page, right-click the **PureFlex chassis** object; then, select **Inventory** ► **Collect Inventory**.
- 34. Select **Run Now**; then, click **OK** to start the inventory collection job.
- **35**. When the window is displayed to inform you that the job was successfully created, click **Display Properties**.
- **36.** When the job is completed successfully, close the Active Scheduled Jobs tab and return to the Resource Explorer Groups page.
- 37. Right-click the **PureFlex chassis** object; then, select **Inventory** ► **View and Collect Inventory**.
- **38**. Review the inventory and make sure that all components (including the top-of rack switches, if installed) have been successfully discovered.
- **39**. To include an external Storwize V7000 as a managed endpoint for the IBM Flex System Manager, complete the following steps:
  - a. Log in to the IBM Flex System Manager using the command line interface.
  - b. Run the smcli manageV7000 command:
    - smcli manageV7000 -p passw0rd -i <v7000 cluster ip>
  - c. After you successfully run the command, log in to the IBM Flex System Manager graphical user interface and go to the **Resource Explorer** tab.
  - d. Right-click the **Farm** object; then, select **Inventory** ► **Collect Inventory**.
  - e. Select Run Now; then, click OK to start the inventory collection job.
  - f. When the job is completed successfully, close the Active Scheduled Jobs tab and return to the Resource Explorer Groups page.
  - g. Right-click the newly discovered V7000 Storage Array object; then, select Inventory ► View and Collect Inventory.
  - h. Select Run Now; then, click OK .
- 40. If you are setting up IBM Flex System FC5022 switches, see Chapter 6, "Setup and discovery for FC5022 switches," on page 53.
- 41. To verify the overall storage configuration, log in to the IBM Flex System Manager command-line interface (as user USERID) and execute the following command:

smcli dumpstcfg

Note: The output from this command provides a listing of the following:

- All of the SAN Switches
- All of the SAN Zoning

- All of the Storage Controllers
- All of the Host Accessible Containers (Storage Pools)
- **42**. Return to Chapter 2, "Installing the IBM PureFlex System offerings," on page 5 and continue with step 8 on page 5.

# Chapter 6. Setup and discovery for FC5022 switches

This chapter includes tasks for setup and fabric discovery of the IBM Flex System FC5022 24-Port 16Gb SAN Scalable Switch.

### **Initial setup**

Complete this task to set up the FC5022 Switch.

**Note:** This task assumes that the switch default password for snmp is not set. If the password and userid have already been created, skip this task and go to "Fabric discovery" on page 54.

- 1. SSH into the FC5022 switch.
- Enter the following command. This command lists all of the users: snpconfig -show snmpv3

s4:root> snmpconfigshow snmpv3
SNMP Informs = 0 (OFF)
SNMPv3 USM configuration:
User 1 (rw): mmv3 mgr
Auth Protocol: MD5
Priv Protocol: DES
User 2 (rw): snmpadmin2
Auth Protocol: MD5
Priv Protocol: AES128
User 3 (rw): snmpadmin3
Auth Protocol: SHA
Priv Protocol: AES128
User 4 (ro): DirectorServerSNMPv3User
Auth Protocol: MD5
Priv Protocol: DES
User 5 (ro): snmpuser2
Auth Protocol: SHA
Priv Protocol: AES128
User 6 (ro): snmpuser3
Auth Protocol: SHA
Priv Protocol: AES128
SNMPv3 Trap configuration:
Trap Entry 1: FE80::0211:25FF:FEC3:EB39
Trap Port: 162
Trap User: mmv3_mgr
Trap recipient Severity level: 0
Trap Entry 2: No trap recipient configured yet
Trap Entry 3: 192.168.70.60
Trap Port: 162
Trap User: DirectorServerSNMPv3User
Trap recipient Severity level: 5
Trap Entry 4: No trap recipient configured yet
Trap Entry 5: No trap recipient configured yet
Trap Entry 6: No trap recipient configured yet
s4:root>

 Enter the following command to set the user and password: snmpconfig -set snmpv3

```
s4:root> snmpconfig --set snmpv3
SNMP Informs Enabled (true, t, false, f): [false]
SNMPv3 user configuration(snmp user not configured in FOS user database will have physical AD a
nd admin role as the default):
User (rw): [snmpadmin2]
Auth Protocol [MD5(1)/SHA(2)/noAuth(3)]: (3..3) [1]
New Auth Passwd:
Verify Auth Passwd:
Priv Protocol [DES(1)/noPriv(2)/3DES(3)/AES128(4)/AES192(5)/AES256(6)]): (2..2) [4]
New Priv Passwd:
Verify Priv Passwd:
User (rw): [snmpadmin3] []
```

#### **Fabric discovery**

Complete this task to perform fabric discovery and collect inventory for the FC5022 Switch.

Fabric discovery is done in two stages, the first stage using the SMIA tool application and the second using FSM Storage Management. Both are available from the FSM home page.

1. From the home page, go to the **Applications** tab.

nitial Setup	Additional Setup	Plug-ins	Administration	Applications	Learn		
se this tab t	o work with application	ons designed to	extend the capabilitie	s of the IBM Flex S	ystem Manager™.		
- martialities							
Refresh	October 24, 2	012 1:33:20 PM	CDI				
Eabric N	abric Manager	1.1 s virtualization t	ool				
Rui	nning						
Start S Launch	top Restart administration conso	ole					
	Configuration	Tool					
	I Configuration Tool p	provides the abil	ty to connect to and i	manage Brocade to	p-of-rack switches.	Use this application	on to discover these switches, view
The SM	nfiguration, and mon	itor their status.					
The SM their co	nned						

2. Start the **SMIA Configuration Tool**. The tool state should change to Running with in 10 minutes. However, the screen does not automatically refresh. You must refresh the screen to see the tool state change.

				1 5353		
e this tab to wor	rk with applications	designed to ex	tend the canabilitie	s of the IBM Flex S	vstem Manager™	
e this tab to wor	ik widi applications	designed to ex	centi the capabilitie	s of the thir nex s	ystem manager .	

SMIA Configuration Tool 11.14 The SMI Configuration Tool provides the ability to connect to and manage Brocade top-of-rack switches. Use this application to discover these switches, view their configuration, and monitor their status.

initial setup tasks, view or activate pluging, perform administration tasks, and access additional

3. Once the SMIA tool is running, launch the console to get to the network adviser. Use your FSM userid and password. Make sure that you update the laptop where you launch your FSM GUI, it must have the host name of your FSM in the etc/hosts file. In this example, the host name for the FSM is x1123fsm.

Check and Undate Flex System Man

	0 5 54 90	
Network Address	9.5.34.05	
Server Name	x1123fsm	
User ID	USERID	
Password	•••••	
	☑ Save password	
		Login Exit

Line the set to be to

IBM Fabric Manager 1.1 Fabric Manager is an address virtualization tool. Running Start Stop Restart Launch administration console

Start Stop Launch administration console

After login, the **SMIA Configuration Tool** home screen is displayed:

MIA C	onfiguration T	lool			
lome	Authentication	CIMOM	Certificate Management	Summary	
You ca	in launch the follow	ving IBM Ne	twork Advisor dialogs by cli	king on the links.	
abric	Discovery - Con	ficurino fab	ric discovery will let the app	cation discover products connected to the SAN	
Least					
10St D	<u>IISCOVERY</u> - Contig	guring nost	discovery will let the applica	on alscover devices connected to the SAN.	
Jsers	- You can configu	ure the use	r, user roles and area of res	onsibility.	
Option	<u>s</u> - Displays all the	e configura	ble options available in the m	inagement application.	
Berver	- Displays variou	s properties	s of the server.		
bout	- Displays the app	lication buil	d, java version and tradema	information.	
1.40					
					Close

4. Click **Options**. On the **Options** screen under **Software Configuration**, select **Product Communication**. Select **Connect using HTTPS** (the default comes up as HTTP). Click **Apply**, then click **OK**.

**Note:** Before proceeding, go back to the **SMIA Configuration Tool**, stop the application; then, restart the application.

Category       Use this option to configure HTTP or HTTPS connections between the IBM Network Advisor Server and SAN switches.         Connect using HTTP       Office Connect using HTTP         SAN Kine Mode Display       SAN Names         SAN Kine Hore Loss Events       Connect using HTTP         SAN Kine Mode Display       Office Connect using HTTP         SAN Names       Default Port #         Security Misc       Connect using HTTPs (HTTP over SSL) only         Sysing Registration       Connect using HTTPs (HTTP over SSL) only         Trap Forwarding Credentials       Context ways (HTTP over SSL) only         Client/Server IP       Memory Allocation         Product Communication       PfrBS/CP         Support Mode       Support Mode         Changes will take effect at the next application restart	0ptions				
Client/Server IP Memory Allocation Product Communication FTP/SCP Server Port Support Mode  Changes will take effect at the next application restart	Category Event Storage Cook and Feel SAN End Node Display SAN Ethernet Loss Events SAN Names Security Misc Server Backup Syslog Registration Trap Registration Trap Forwarding Credentials Software Configuration Client Export Port	Use this option to con Server and SAN swit Connect using H Port # Current Port # Default Port # Port # Current ving H Port # Current Port # Default Port #	Ifigure HTTP or HTTPS tches. ITTP 80 80 80 80 ITTPS (HTTP over SSI 443 443 443	S connections between the IBM Network / L) only	Advisor
OK Cancel Apply Help	Client/Server IP Memory Allocation Product Communication FTP/SCP Server Port Support Mode	(i) Channes will take	e effect at the next ar	mination restart	
		Changes will take	erfect at the next ap	OK Cancel Apply	Help

5. Once step 4 on page 56 has completed and the **SMIA Configuration Tool** is running, launch the SMIA console and log in as in step 3 on page 55 (note that you lose the SMIA configuration screen when you stop the tool). Once you get to the SMIA Configuration Tool home screen, select **Fabric Discovery**.

acovered i de	rics					
lame	IP A	Address	WWN	Discovery Status	Cor	
						Add
						Edit
						Delete
						Seed Switch
						used erriteit
						Unmonitor
						Unmonitor
	4					Unmonitor
Previously Disc	vered Addresses	().				Unmonitor
Previously Disc P Address	vered Addresses Type	Nam	e WWN	User ID	Community Strin	Unmonitor
Previously Disc IP Address	overed Addresses	Nam	e WWN	User ID	Community Strin	Unmonitor Monitor Discover
Previously Disc IP Address	overed Addresses	Nam	e WWN	User ID	Community Strin	Unmonitor Monitor Discover Delete

6. Click Add on the Discover Fabrics screen. You will see the Add Fabric Discovery screen. The screen default for SNMP Configuration is Automatic, change it to Manual. Enter a fabric name of your choosing, enter the IPV6 address of your FC5022 switch, and enter the userid/password of your FC switch.

	Manual	
Fabric Name		
IP Address		
User ID		
Password		

7. Click the **SNMP** tab. If admin2 was created as userid, then enter that as the **User Name**. Leave **Context Name** blank, set **Auth Protocol** to MD5, and set the **Auth Password** to admin2. In this example, for **Priv Protocol** use AES128 and the password is admin2 (the password is whatever was created in "Initial setup" on page 53).

P Address SNN	IP
Target Port 161	Time-out (sec) 5 Retries 3
SNMP Version	v3 🔻
Presets	Configure for Intrepid 10K
User Name	snmpadmin1
Context Name	
Auth Protocol	- None - 💌
Auth Password	
Priv Protocol	- None -
Priv Password	

8. Once step 7 on page 59 has completed you will see the Discover Fabrics screen. This screen shows two examples that could be the outcome of the previous steps. One has completed successfully (fabric named Van the man #3). There are two fabrics in the Van the man #3 configuration, one is a FC5022 16GB chassis switch and the other is an IBM 2490 B24 (Brocade) top-of-rack switch. The Brocade TOR switch in this example was not set up. The second fabric in this example (Van the man #4 ) failed because the snmp userid/password were not set or were not entered correctly.

se the Add button to d	scover a Fabric.					
iscovered Fabrics						
lame	IP Address	WWN	Discovery Status	Community String	User ID	
🗄 🌏 Van the man #	5					Add
- FC5022	FD8C:215D:1	10:00:00:05:33:92:67:85	Discovered: Seed Switch	*****	admin	Edit
IBM_2498_	824 9.5.52.49	10:00:00:05:33:CD:74:4D	Discovered: Not Reachable : Not registered for SNMP Traps	EXERC.	admin	Delate
EC5022	ED8C:215D:1	10:00:00:05:33:93:15:2A	Discovered: SNMP communication failed SNMP credentials may be invalid	*****	admin	
A IBM 2498	R24 9.5.53.108	10:00:00:05:33:CD:4B:6D	Discovered: Not Reachable : SNMP communication failed. SNMP credential.	*****	admin	
<u> </u>	577 A. (1996) 5 (1976)					Seed Switch
						1
						Unmonitor
						Unmonitor
						Unmonitor Monitor
						Unmonitor Monitor
						Unmonitor Monitor
						Unmonitor Monitor
						Monitor
						Monitor
						Monitor
						Monitor
reviously Discovered	4 sources				22222222 <b> </b>	Unmonkor Montor
reviously Discovered	4 Addresses	e WWN	User ID Community String			Unmonitor Monitor
reviously Discovered Address T	Addresses pe Nam	e WWN	User ID Community String		22223322 <b>•</b>	Unmonitor
eviously Discovered Address	Addresses pe Nam	e WWWN	User ID Community String		222222222 ( ) <b>)</b> )	Unmanter Monter Discover
eviously Discovered Address Ty	Addresses pe Nam	e WWN	User ID Community String			Unmonitor Monitor Discover Delete

**9**. After step 8 has completed and there is a check mark by the FC fabric that you want to discover, go back to the FSM home page and select the Plug-ins tab. From this screen, select **Discover** from **Storage Management**.



10. You will see the **Discover Storage** screen. Select the FC5022 switch from the **Select storage device type** pull-down.

iscover Storage		
Use discover storage to disc	over and automatically collect invento	ry for manageable storage resources, including Fibre Channel switches and storage subsystems.
(?) Learn more about disco	vering storage devices	
Select storage device type:		
- select -	~	
1		
2		
		Cancel
	11. On the <b>Specify</b> S	Settings screen, enter your FSM Farm IPV6 address for the
	SMI-S IP addres	s. Make sure to change the port number from 5989 to 25989
	and enter your F	SM login credentials Click Discover
	and enter your r	Sivi logit cicucitiais. Cick Discover.
pocify Sottings - EC Switch		
pecity Settings -1 C Switch		
	Discover CIMOM- and SMI-S-manager	d Fibre Channel switches, such as a Brocade storage area network (SAN) switch. For SMI-S managed
	the supported storage devices that t	the provider manages are discovered.
	SMI-S IP address or host name:	
In community		
	Port:	
	5989	
	11000000000	
	Username:	
	Deceword	
	Passworu.	
	Interoperability namespace:	
	/interop	
	Junction	
	Protocol:	
	https 👻	
	Local Control Provide	
		Automatically run inventory when discovering device
		Discover Cancel

Note: You can get the FSM Farm IPV6 address from the FSM GUI:

- From The FSM GUI home page, go to Administration► Configuration ► Configure Network. On the resulting screen go to eth1 and check the IPV6 address, but don't set it.
- Go to Resource Explorer>All Systems, select Farm, then Properties. The IP address is listed.
- 12. After step 11 has completed, you will need to inventory the FSM Farm:
  - a. Go to the Resource Explorer tab.
  - b. Right-click the **Farm** object; then, select **Inventory** > **Collect Inventory**.

- c. Select **Run Now**; then, click **OK** to start inventory collection. After the task completes, you should see one or more new switches in the listing.
- d. Select all of the newly discovered switches and click the **Actions** button; then, select **Inventory** ► **Collect Inventory**.
- e. Select Run Now; then, click OK.
- 13. After you have completed this task, return to Chapter 5, "Configuring the IBM Flex System Manager management node," on page 47 and continue with step 41 on page 50.

## **Chapter 7. Configuring virtual servers**

This topic provides information about configuring virtual servers for the IBM PureFlex System Express<sup>®</sup>, Standard, and Enterprise solutions.

#### **Power Systems virtualization**

This topic provides information about Power Systems<sup>™</sup> virtualization. This topic describes capturing, deploying, and importing virtual servers. It also describes importing virtual appliances, and provisioning virtual appliances and workloads into server system pools.

**Note:** The tasks in this section are specific to Power nodes with AIX. Task steps might be different for Power nodes with IBM i, Red Hat, or SUSE Linux.

## Creating virtual servers through IBM Flex System Manager management software or VMControl

Use the information and instructions in this topic to create virtual servers through IBM Flex System<sup>™</sup> Manager management software or VMControl.

- 1. Access IBM Flex System Manager management software and navigate to the Manage Power Systems Management page or VMControl function.
- 2. Verify that a node is discovered and in the proper access state.
- **3**. Verify that the factory preload VIOS has been installed on a virtual server resource.
  - a. From the Manage Power Systems Resources page click the host. A list of virtual servers on the selected server is displayed.
  - b. Start all VIOS servers on the primary Power Systems node.
  - c. The presence of the preloaded VIOS can also be verified from VMControl. Navigate to the VMControl Enterprise Edition page of the IBM Flex System Manager management software. Click the Virtual Server/Hosts tab and review the navigation tree of the server for the VIOS preload virtual server.
  - d. Verify the TCP/IP configuration on the VIOS servers. For Express and Standard offerings, the IP address assigned is on top of the shared Ethernet adapter.
- 4. Verify the presence of the VIOS media library.
  - a. From the Manage Power Systems Resources page or VMControl Virtual Servers/Hosts tab right-click the compute node with the VIOS preload. The VIOS must be started. From the Context Menu click System Configuration
     ▶ Virtual Resources ▶ Virtual Storage Management.
  - b. Select the VIOS, if more than one is defined on a compute node. Choose a VIOS from the drop-down box and click **Query**.
  - c. The query returns a page with all available virtual storage on the selected VIOS. Select the **Virtual Optical Media** tab. The preloaded install ISOs are shown under the Virtual Optical Media section.
- 5. Verify that a factory preload template operating system is installed.
- 6. The next task you complete depends on the offering you are configuring:
  - Power Systems Express offering: Return to Chapter 2, "Installing the IBM PureFlex System offerings," on page 5 and continue with step 9 on page 6.

- Power Systems Standard offering: Go to "Capturing virtual servers."
- Power Systems Enterprise offering: Go to "Creating server system pools" on page 68.

#### Capturing virtual servers

Use the information and instructions in this topic to capture virtual servers.

Capturing virtual servers is one method of populating an image repository with a virtual appliance. The other is importing an open virtualization format (OVF) image (see "Importing virtual appliances" on page 66).

- Prepare the virtual server for capture by discovering, accessing, and inventorying the operating system on the virtual server through IBM Flex System Manager management software. For more information about IBM Flex System Manager management software, see http://publib.boulder.ibm.com/ infocenter/flexsys/information/topic/com.ibm.acc.8731.doc/ product\_page.html. Also, prepare the virtual server by running the activation engine (AE) on the operating system.
  - a. Activate the virtual server to be captured through the Manage Power Systems Resources page available through IBM Flex System Manager management software or the VMControl Virtual Servers/Hosts tab. Right-click the object and select Operations ► Activate Path. For more information about VMControl, see http://publib.boulder.ibm.com/ infocenter/flexsys/information/topic/com.ibm.acc.8731.doc/ product\_page.html.
  - b. Verify the TCP/IP configuration for the virtual server to be captured.
  - c. Verify SSH functionality is installed.
  - d. Once the virtual server is activated and operational the operating system must be discovered. Selecting **System Discovery** under Common Tasks is one of several ways to access the System Discovery page.
  - **e**. Enter the IPv4 address of the operating system associated with the virtual server, then click **Discover Now**.
  - f. When the discovery process has completed, the operating system object is shown in the list at the bottom of the page.
  - g. Verify CAS RSAP is present by right-clicking **OS object/security/configure access**. Access can be requested by clicking **Request Access** or returning to the System Discovery page and clicking the **No access** link. In either case the credentials for the operating system are requested. In the case of AIX<sup>®</sup> it will be root/currentpassword.

When access is provided, the access changes from No access to OK.

- h. Right-click on the operating system object to select the **Inventory/Collect Inventory** option and click **OK** to run the job.
- i. Install and run the Activation Engine (AE) on the operating system. The AE code for various operating systems is available through IBM Flex System Manager management software at:

/opt/ibm/director/proddata/activation-engine

For AIX or Linux operating systems installed on Power Systems, the package needed is:

vmc.vsae.tar
For information on installing the activation engine on IBM i, see http://publib.boulder.ibm.com/infocenter/flexsys/information/topic/com.ibm.acc.8731.doc/getting\_started.html.

Normal access to IBM Flex System Manager management software is through a restricted shell. One way to obtain the package is through the following:

login FSM command line cp /opt/ibm/director/proddata/activation-engine/vmc.vsae.tar scp to workstation or directly to OS

Note: scp will not be available on a base AIX install.

j. For an AIX example, create a /tmp/AE directory for the AE package. Then extract and install the AE package using the following steps:

```
cd /tmp/AE
tar -xvf vmc.vsae.tar
set JAVA_HOME
which JAVA
export JAVA_HOME=/usr/java5/jre
echo $JAVA_HOME
./aix-install.sh
```

k. Run the AE to prepare the OS/virtual server:

/opt/ibm/ae/AE.sh --reset △(system will shutdown automatically)

**Note:** If the AE has been run previously, the following commands must be run to prepare for a new execution of the AE:

```
rm /opt/ibm/ae/AP/*
cp /opt/ibm/ae/AS/vmc-network-restore/resetenv /opt/ibm/ae/AP/ovfenv.
xml
/opt/ibm/ae/AE.sh --reset
```

- 2. Access IBM Flex System Manager management software and navigate to the VMControl function.
- **3**. Navigate to the **Virtual Appliances** tab of VMControl and verify the existence of an image repository.

From the VMControl page click the **Virtual Appliances** tab. Review the count of image repositories. At least one image repository is required to proceed.

- 4. Use the Capture Wizard to capture a virtual server as a virtual appliance and add it to a VMControl image repository.
  - a. From the VMControl page, click the **Virtual Appliances** tab. Next, click the **Capture** link and follow the wizard steps.
  - b. When the Capture Wizard starts, click Next.
  - c. Enter a name for the new virtual appliance and any other optional description or search tag information. Click **Next** to continue.
  - d. Select Virtual Server and click Next to continue.
  - e. The wizard shows all eligible virtual servers that can be captured.

**Note: State** must be in a Stopped condition before a capture can occur. Click **Next** to continue.

f. The next page of the wizard shows the disks that are associated with this virtual server. If the virtual server has multiple disks, they will all be shown on this page. You also have the option to deselect disks if desired. You can add descriptive text in the **Disk Description** field. Make any changes and click **Next** to continue.

- g. The wizard indicates the Network Mapping (virtual adapters) that are seen in the virtual server. The description field can be scrolled to see the details associated with these virtual adapters. Click **Next** to continue.
- h. As images are captured version trees are created to track the changes. Click **Next** to continue.
- i. Review the Summary page and if any changes are required, click **Back**. If no changes are required, click **Finish** to complete the wizard.
- j. The completion of the wizard brings up the Job Scheduler page. The name of the job can be edited later for easier identification. Also, the job can be run immediately or scheduled to be run in the future.

Click **OK** to run the capture job.

- k. When the job starts you have the option to review the progress of the job. Click **Display Properties**.
- I. When the job properties are shown, click the **Logs** tab to review or monitor the progress of the capture job.
- m. When the job completes and you return to the VMControl page, the Virtual appliance section is updated with the newly imported virtual appliance.
- 5. The next task you complete depends on the offering you are configuring:
  - Power Systems Standard offering: Go to "Importing virtual appliances."
  - Power Systems Enterprise offering: Go to "Importing virtual appliances."

## Importing virtual appliances

Use the information and instructions in this topic to import virtual appliances.

Importing a virtual appliance is one method of populating an image repository with a virtual appliance. The appliance is created through the importation of an OVF image. Another method is through a direct capture of a virtual server and is detailed in "Capturing virtual servers" on page 64.

- 1. Access IBM Flex System Manager management software and navigate to the VMControl function.
- 2. Navigate to the Virtual Appliances tab of VMControl and verify the existence of an image repository.

From the VMControl page click the **Virtual Appliances** tab. Review the count of image repositories. At least one image repository is required to proceed.

- **3**. Use the Import Wizard to import an OVF image into a VMControl image repository.
  - a. From the VMControl page click the **Virtual Appliances** tab. Next click the **Import** link and follow the wizard steps.
  - b. When the wizard starts, click **Next** to proceed.
  - c. The OVF image that is being imported must be accessible to IBM Flex System Manager management software. Enter the location of the OVF image and click **Next**.
  - d. The wizard searches for a digital signature for the OVF image and determines the disposition of the image if one does not exist.

A digital signature is a code that uniquely identifies the source of the virtual appliance package. The purpose of the digital signature is to prove

that the virtual appliance package was sent by an entity that has access to the private or shared-secret symmetric key used to authenticate the transmission. Click **Next** to continue.

- e. The wizard shows the name of the OVF and any description that might have been added during the creation of the OVF image. The name cannot be changed at this time but the description and search tags can be modified. Make any changes and click **Next** to continue.
- f. As images are captured version trees are created to track the changes. Click **Next** to continue.
- g. Review the Summary page and if any changes are required, click **Back**. If no changes are required, click **Finish** to complete the wizard.
- h. The completion of the wizard brings up the Job Scheduler page. The name of the job can be edited for easier identification. Also the job can be run immediately or scheduled to be run in the future.

Click **OK** to run the import job.

- i. When the job starts you have the option to review the progress of the job. Click **Display Properties**.
- j. When the job properties are shown, click the **Logs** tab to review or monitor the progress of the import job.
- k. When the job completes and you return to the VMControl page, the Virtual appliance section is updated with the newly imported virtual appliance.
- 4. The next task you complete depends on the offering you are configuring:
  - Power Systems Standard offering: Go to "Deploying virtual servers."
  - Power Systems Enterprise offering: Go to "Deploying virtual servers."

## **Deploying virtual servers**

Use the information and instructions in this topic to deploy virtual servers.

- 1. Access IBM Flex System Manager management software and navigate to the VMControl function.
- 2. From the VMControl page click the **Virtual Appliances** tab. Review the count of image repositories and virtual appliances. At least one image repository and one virtual appliance are required to proceed. If none exist, see "Capturing virtual servers" on page 64 and "Importing virtual appliances" on page 66 for information on creating virtual appliances by capturing and importing methods.
- 3. Click **Deploy virtual appliance** to start the wizard.
- 4. Deploy a virtual appliance using the VMControl wizard.
  - **a**. From the VMControl page click the **Deploy virtual appliance** link shown above to start the Deploy Wizard. When the wizard starts, click **Next** to continue.
  - b. Select the virtual appliance to be deployed. Click Next to continue.
  - c. The Deploy Wizard shows the target selection for the deployment. Eligible servers and virtual servers are listed.

Click **Next** to continue.

- d. The virtual appliance when deployed is known as a *workload*. Provide a name for the workload and click **Next** to continue.
- e. Assign the storage associated with the deployment to a storage pool. The Storage Mapping page assigns which storage pool will be used when a new LUN is created for the workload. Click **Assign to Storage Pool** to see the available storage pools.

- f. Click an option then click OK.
- g. Click Next to continue.
- h. Next, the wizard assigns the virtual adapters to the virtual networks that are available on the target server. Click **Next** to continue.
- i. Use the Product page to assign additional network information such as host names/domains, IP address/mask/gateways and DNS server. There is a section for each virtual adapter. Complete the information and click **Next** to continue.
- j. Review the Summary page and click **Back** if changes are needed.
- k. Click **Finish** to complete the wizard and bring up the Job Scheduler page. The name of the job can be edited for easier identification later. Also the job can be run immediately or scheduled to run later.

Click **OK** to run the deploy job.

- I. When the job starts you have the option to review the progress of the job. Click **Display Properties**.
- m. When the job properties are shown, click the **Logs** tab to review or monitor the progress of the deploy job.
- n. When the deploy job completes you can close the Job Properties tab and review the VMControl under the **Workloads** tab. The deploy workload will be shown.
- 5. The next task you complete depends on the offering you are configuring:
  - Power Systems Standard offering: Return to Chapter 2, "Installing the IBM PureFlex System offerings," on page 5 and continue with step 9 on page 6.
  - Power Systems Enterprise offering: Return to "Provisioning virtual appliances and workloads into server system pools" on page 69.

### Creating server system pools

Use the information and instructions in this topic to create server system pools.

- 1. Access IBM Flex System Manager management software and navigate to the VMControl function.
- 2. Navigate to the System Pools section of VMControl.
  - a. From the VMControl page click the **System Pools** tab and click **Create** to start the Create Systems Pool Wizard.
  - b. The Create Server System Pool Wizard starts. Click Next to continue.
  - **c.** Type the name of the system pool in the **Name** space. Click **Next** to continue.
  - d. Define the pooling criteria. The first check box is for resilience criteria, or in other words systems that are capable of live partition mobility (LPM). LPM requires a PowerVM<sup>®</sup> Enterprise license and a VIOS virtual server that has been enabled as a mover service partition (MSP). The default setting is for it not to be checked. The other selection is for network systems pools.
  - e. Click Next to continue.
  - f. Select the initial host. The type of host selected on this page will be used later to filter what types of additional hosts can be added to the pool. Select the host and click **Add** to add it to the list. Click **Next** to continue.
  - g. Select the V7000 storage pool from the drop-down box, and click **Next** to continue. The storage pool or pools shown in the drop-down box are associated with the initial host. Additional hosts added must also be able to see the same V7000 storage pool.

**Note:** Do not confuse V7000 storage pools with VMC storage pools; they have different meanings.

- h. The wizard displays the eligible additional hosts that passed the filtering of LPM and storage pools. Multiple additional hosts might be available, although for Enterprise configurations there are only two prime nodes: one initial host and one additional host. Click the check box in front of the desired host and then click **Add** to populate the list. Click **Next** to continue.
- i. Select manual or automatic optimization of the system pool. Click **Next** to continue.
- j. Review the Summary page and if any changes are needed, click **Back**.

If no changes are needed, click Finish to complete the wizard.

k. Unlike most jobs within IBM Flex System Manager management software, creating a system pool runs immediately and does not offer the option of being scheduled for a later time. To review the job properties and log information, click **Display Properties**.

When the job completes the new system pool is shown together with status information. The system pool is now ready to be used as a deploy target up to the limits of the pool.

3. Power Systems Enterprise offering: Go to "Capturing virtual servers" on page 64.

# Provisioning virtual appliances and workloads into server system pools

Use the information and instructions in this topic to provision virtual appliances and workloads into server system pools.

Deploying to a server system pool works similarly to deploying to a specific target server, but you are only shown the server system pool(s) to choose from.

Power Systems Enterprise offering: Return to Chapter 2, "Installing the IBM PureFlex System offerings," on page 5 and continue with step 9 on page 6.

## X-Architecture virtualization in a VMware vSphere environment

Use the information and instructions in this topic to configure X-Architecture<sup>®</sup> virtualization in a VMware vSphere environment. This topic also describes provisioning virtual appliances and workloads into VMware clusters.

## **Requirements for virtualization**

This topic describes the information, tools, software packages, and software license requirements for virtualization through VMware vSphere management.

Before you begin, make sure you have the following information:

- Host names for each compute node
- Management network IP addresses for each compute node
- vMotion network IP addresses for each compute node
- Host names and IP addresses for the vCenter Server
- IP subnet masks
- Gateway IP addresses
- DNS addresses
- · Passwords for the root account on the vSphere Host
- User accounts and password for the database server
- User accounts and password for the vCenter Server

You might need one or more of the following tools:

- SSH tool (for example, PuTTY)
- SFTP client (for example, WinSCP)

You must have the following software packages available:

• vCenter 5 media

**Note:** The compute node comes with vSphere 5 Update 1 on an embedded USB key.

- Windows 2008R2 Server 64-bit media
- (Optional) An enterprise database media (for example, DB2<sup>®</sup>, MSSQL, Oracle)

You must have the following software licenses:

- vSphere 5
- vCenter 5 Server
- Windows 2008R2 Server
- (Optional) a license to the enterprise database

Go to "Configuring virtualization."

## **Configuring virtualization**

Use the information and instructions in this topic to configure the virtual infrastructure and create a vCenter server.

1. Use vSphere Host to define the host name for the host, and the IP address for the management network to which the vSphere Client and vCenter Server will communicate.

The first time you log into the IMM, if a DHCP server is not available on the same network as the vSphere Host, the default static IP address is 192.168.70.125. The default user ID is USERID and the password is PASSW0RD (with a zero, not the letter O).

If you plan to transfer media images (for example, ISO for Windows 2008 Server) to the datastores on this host, it might be necessary to enable the ESXi Shell and the SSH features on this host. Click **Troubleshooting Options** and once the transfer is complete, close the access to enforce a high security level on the host.

- 2. Create the vCenter Server.
  - a. Using a web browser, point to the IP or host name of the vSphere Host.
  - b. On the Welcome page, initiate the download of the vSphere Client.
  - c. Using the vSphere Client, log into the vSphere Host.
  - d. Start the New Virtual Machine Wizard to create a Windows 2008R2 64-bit server.
  - e. Create the workload as a two microprocessor, 8 GB of memory, and 60 GB hard disk drive server.
  - f. Follow the Windows Installation Wizard to complete the 2008R2 installation.
  - g. Install VMware Tools.
  - h. If you plan to use the Update Manager plug-in, create a second hard disk drive of at least 100 GB for the software repository.
  - i. Attach the vCenter media to the virtual server, power on the vCenter Server and begin the installation process.
  - j. Select to use the embedded SQL 2008 Express database.

- k. Optionally, to use an external database, obtain the database user ID, password, and connection point, and create an ODBC Data Source Administrator entry on the vCenter Server using the SQL Native Client driver.
- I. Select to create a stand-alone VMware vCenter Server instance.
- m. Retain the default network port allocations and complete the installation.

**Note:** All environmental settings, access permissions, scheduled tasks, alarm thresholds and other settings are recorded in the vCenter Server database. For all production-ready environments, the vCenter Server database must be fully backed up regularly or be part of a database cluster environment.

The following are the hardware requirements for a virtual shadow server for use as a backup:

- Microprocessors
  - Two microprocessors minimum, but four microprocessors is typical.
- Memory

Minimum is 4 GB, but 8 GB or higher is best practice.

• Networking

Allocate a single 1 Gb virtual network adapter that resides on a physical teamed network configuration of multiple adapters.

External Database

MS SQL 2005 and 2008, Oracle 10g R2 and 11g, DB2 9.5 and 9.7 are all supported as the external database. The problem with using the DB2 database is that other vCenter modules such as the Update Manager cannot also use the DB2 database, so you must deploy a separate MS SQL or an Oracle database just for these modules.

• Operating System

Windows 2008 or 2008R2, both must be 64-bit versions to support vCenter.

3. Include all available vSphere hosts in the vCenter Server inventory database.

The IP or host name of each host and the password to the root account are required to add each host into the management environment of the vCenter Server. If there are virtual servers already running on the host, the objects will also be added into the inventory for management. This is the case if the vCenter Server is running on a virtual Windows 2008R2 server.

- 4. The next task you complete depends on the offering you are configuring:
  - X-Architecture Express offering: Return to Chapter 2, "Installing the IBM PureFlex System offerings," on page 5 and continue with step 9 on page 6.
  - X-Architecture Standard offering: Return to Chapter 2, "Installing the IBM PureFlex System offerings," on page 5 and continue with step 9 on page 6.
  - X-Architecture Enterprise offering: Go to "Provisioning virtual appliances and workloads into server system pools" on page 69.

# Provisioning virtual appliances and workloads into VMware clusters

Use the information and instructions in this topic to provision virtual appliances and workloads into VMware clusters.

The Open Virtualization Format (OVF) and Open Virtualization Appliance (OVA) transformation standard consists of a folder that contains the virtual machine files and the configuration description. If moving a folder is too cumbersome, by

compressing the folder into a single file, an OVA file, you can transport virtual objects without missing any crucial components in the process. However, the OVA file must be converted into an OVF format to produce a running virtual machine. Also, OVF can encapsulate multiple virtual machines to produce multi-tier application environments.

To deploy from an OVF template, complete the following steps:

- 1. Upload the template to a ESX data store or copy it to the local disk of the vSphere Client system.
- 2. Using the vSphere Client, select File and click Deploy OFV Template.
- **3**. Navigate to the location of the OVF file. The vCenter Server starts the process of converting and importing the bundled virtual objects into the inventory.
- 4. Return to Chapter 2, "Installing the IBM PureFlex System offerings," on page 5 and continue with step 9 on page 6.

## X-Architecture virtualization in a KVM environment

Use the Virtualization Checklist - KVM-based systems topic accessible from the *Goals and corresponding quick start guides* table in http://publib.boulder.ibm.com/ infocenter/flexsys/information/topic/com.ibm.acc.commontasks.doc/ commontasks\_intro.html for information about configuring X-Architecture virtualization in a KVM environment.

# **Chapter 8. Advanced virtualization management**

This topic provides information about advanced virtualization management.

## Simplifying system deployments using VMware templates

This topic provides information about simplifying system deployments using VMware templates.

Use VMware templates to automate workflow, reduce manual labor, and simplify provisioning. You can create a template virtual machine by duplicating an existing virtual machine and changing the copy into a template virtual machine. You can also create a template virtual machine by converting an existing virtual machine into a template virtual machine. The basic difference is that a template virtual machine can be powered on and a normal virtual machine cannot be powered on.

To start provisioning new virtual machines, click **Deploy Virtual Machine from Template**. You can customize each new virtual machine with a predefined configuration during the provisioning process. And, you can create different configuration files for future use.

## VMware HA and DRS clusters

This topic describes VMware high availability (HA) and distributed resource scheduler (DRS) clusters and how to create them.

## **Requirements for VMware HA and DRS clusters**

This topic describes the requirements for VMware high availability (HA) and distributed resource scheduler (DRS) clusters.

To establish a VMware high availability (HA) and distributed resource scheduler (DRS) cluster, all host candidates must have access to the same storage pool and have access to the same virtual machine networks. This shared storage volume can be on Fibre SAN, iSCSI SAN or NAS. To set up the DRS feature in the cluster, all hosts must have an identical vMotion network connection. This network traffic link allows the DRS engine to migrate virtual machines, while they are active, from one host to another with no service disruptions.

The following is a summary of the requirements:

- Shared storage accessible by all cluster candidates.
- All hosts in the cluster must have access to the same virtual machine networks.
- DNS server role is establish in the environment with host records for the ESXi systems.
- Static IP addresses on the cluster candidates.
- Common vMotion network across all cluster candidates.
- All cluster candidates under the management of a single vCenter server.

## **Creating VMware HA and DRS clusters**

To create VMware high availability (HA) and distributed resource scheduler (DRS) clusters, complete the following steps:

- 1. From the vCenter user interface, right-click the datacenter object and click **New Cluster**.
- 2. Right-click the new cluster object and click **Settings**. Select **Turn On** , **HA** , and **DRS**.
- **3**. On the Automation Level page choose the scenario. In most cases, select **Fully automated** and the DRS engine makes all the decisions on the workloads and decides which virtual machine runs on which host in the cluster.
- 4. On the next page, click to enable monitoring of host failure and restart virtual machines. In the Admission Control Policy section of the page, select to have a percentage of resources set aside for host failure recovery or select the number host losses tolerable in the cluster.
- 5. To include a host in the cluster, click a host candidate and drag the host object onto the cluster object. You can build a cluster of up to 32 hosts.

# Appendix A. Detailed network configuration

This appendix contains detailed information about the PureFlex offering networking environments, including component descriptions, switch characteristics, point-to-point wiring, and a comprehensive list of IP addresses.

See Appendix B, "Cabling diagrams," on page 83 for related information.

#### Networking components description

The PureFlex platform is similar to previous generations of BladeCenters in that there is a chassis internal network used for management, network interface controllers (NICs) on the compute nodes, midplane connectors to the I/O modules (switches), and the switches themselves.

#### Ethernet chassis internal network

The CMM provides layer 2 switching for the management network. All of the I/O module bays and the node service processors (IMMs or FSPs) are connected to the management network. The FSM management node has a special adapter that allows it to communicate directly on the management network, enabling common administrative tasks such as power control and discovery. The CMM has an external connection that allows one FSM to control multiple chassis. In a single chassis implementation, the external connection and external switching support is not required but is included in all offerings so that external devices, like the V7000 storage subsystem, can be managed on the management network.

**Note:** Communication on the chassis internal network uses IPv6 local link addresses. An IPv4 address is only required if you are presenting an external interface.

#### NICs on the nodes - LOM and mezzanine cards

All nodes have 10 Gb dual-port Emulex BE3 chips. Some models have the chips on the system board (LAN on motherboard or LOM) and others are on mezzanine cards. When you have a node with an LOM it is connected in place of mezzanine card 1 using the periscope adapter.

#### Midplane connections to I/O module bays

Each node has four connections through the chassis midplane to the I/O bays, one connection to each bay. Mezzanine card 1 connects to I/O bays 1 and 2 and mezzanine card 2 connects to I/O bays 3 and 4. In the case of a double-wide (2-bay) node, for example the 4S Power node, there are eight connections.

The normal convention is to have Ethernet switches in chassis I/O bays 1 and 2. As with the previous generation of blades there is a hard-wired connection between the Ethernet ports (eth0, eth1) on the nodes and the I/O bay (and therefore the switch installed in that bay). If only one Ethernet switch module is installed, then only the eth0 NIC can communicate.

#### Switch modules

There are both 1 Gb and 10 Gb switch modules available for the IBM Flex System chassis, but in the PureFlex offerings, only the IBM Flex System EN4093 10 Gb Virtual Fabric switch module is used.

#### **Network switches**

With the PureFlex offerings there are two versions of the IBM 8264 Virtual Fabric switch. One version is a conventional top-of-rack switch and the other is a switch module form factor that fits in the Flex chassis I/O bays. Internally they are the same switch, so you only need to become familiar with one switch architecture and interface. Externally, the IBM Flex System EN4093 10 Gb Virtual Fabric switch module provides a subset of the ports (SFP+ and QSFP+) provided by the IBM 8264.

#### Switch characteristics

The IBM 8264 switch can provide up to 64 10 Gb connections at near line speed. There are 48 small form-factor pluggable (SFP+) connections and four quad small form-factor pluggable (QSFP+) connections. There is also a 1 Gb connection for external management and a mini-USB serial connection for setup. The switch does not come with SFPs, the customer must purchase them separately and they must be IBM qualified (interfaces are not available otherwise). The QSFP connections can be used for 40 Gb Ethernet or can be subdivided using a dongle into four 10 Gb connections.

In the PureFlex offerings, the QSFP+ connections are used for trunking or virtual link aggregation groups (VLAGs). There are SFP+ transceivers that can be used to connect DAX cables, Fibre, and for 1 Gb connections, RJ45 and Fibre as well. There are QSFP+ double-ended DAX cables (1 M and 3 M) used for trunking as well as QSFPs for use with Fibre.

On the IBM 8264 switch the ports are numbered internally as shown in the following graphic. Note that the first QSFP+ port is number 1 and the first SFP+ port is number 17.



The IBM Flex System EN4093 10 Gb Virtual fabric switch module provides 28 internal 10 Gb connections to the chassis, 10 external 10 Gb SFP+ connections, and 2 external QSFP+ connections. There is also a 1 Gb connection for external management and a mini-USB serial connection for setup, similar to the IBM 8264. The same transceivers are used for the EN4093 switch module as are used for the IBM 8264.

There are four chassis switch module configurations that are used with the PureFlex offerings:

- Express (single chassis): This configuration has a single stand-alone IBM 10 Gb switch module with two 10 Gb uplinks (SR Fibre transceivers)
- Standard (single chassis): This configuration has a single stand-alone IBM 10 Gb switch module with four 10 Gb uplinks (SR Fibre transceivers)
- Enterprise (single chassis): This configuration has two IBM 10 Gb switch modules, each with four 10 Gb uplinks (SR Fibre transceivers)

• Enterprise (single chassis with 4-socket Power node): This configuration has two IBM 10 Gb switch modules with two IBM 8264 top-of-rack switches. Each of the switch modules has two QSFP+ to SFP+ uplinks (one to each 8264 TOR). The QSFP connections on the 8264 switches are used for trunking between the core switches.

In every configuration there are a number of 1 Gb links provided for management of the switches, CMMs, and the V7000. These links are implemented using RJ45 transceivers plugged into the SFP+ slots in either the switch modules or the 8264 core switch. Note that these transceivers do not auto-negotiate so only 1 Gb-capable devices can be connected to them. See RETAIN tip: for more information.

### Point-to-point wiring configurations

The PureFlex offerings have wiring conventions so that you can predict what each port is used for and therefore which VLAN or trunk it should participate in.

#### Express and standard (single chassis)

Express:

- 10 Gb SFP+ external ports 1 and 2 are for the customer data network trunk
- External ports 3 and 4 are unused
- External port 5 is for customer external VM management (1 Gb, using RJ45 transceiver)
- External port 6 is for customer infrastructure management
- External ports 7 and 8 are connected to the CMMs (1 Gb, using RJ45 transceiver)
- External ports 9 and 10 are connected to the V7000 (1 Gb, using RJ45 transceiver)
- External ports 11 through 14 are not activated

Standard:

- 10 Gb SFP+ external ports 1 through 4 are for the customer data network trunk
- External port 5 is for customer external VM management (1 Gb, using RJ45 transceiver)
- External port 6 is for customer infrastructure management
- External ports 7 and 8 are connected to the CMMs (1 Gb, using RJ45 transceiver)
- External ports 9 and 10 are connected to the V7000 (1 Gb, using RJ45 transceiver)
- External ports 11 through 14 are not activated

#### Enterprise single chassis - No 4S Power node

This configuration has two switch modules, each configured as follows:

- 10 Gb SFP+ external ports 1 through 4 are for the customer data network trunk
- External port 5 is for customer external VM management (1 Gb, using RJ45 transceiver)
- External port 6 is for customer infrastructure management
- External port 7 is connected to a CMM (1 Gb, using RJ45 transceiver)
- External port 8 is connected to a V7000 controller (1 Gb, using RJ45 transceiver)
- External ports 9 and 10 are unused

• External ports 11 through 14 are used for a VLAG to the other switch module

#### Enterprise single chassis - With 4S Power node

This configuration has two switch modules and two IBM 8264s configured as shown below.

Switch modules:

- External ports 1 through 6 are unused
- External ports 11 through 14 are used for a VLAG to the other switch module
- External ports 15 through 18 (QSFP+ ports) are used for a link aggregation group (LAG) to 8264 #1
- External ports 19 through 22 (QSFP+ ports) are used for a LAG to 8264 #2

#### Top-of-rack switches:

- Ports 1 through 16 (QSFP ports) are used for a LAG to the other 8264 switch
- Ports 17 through 20 and 29 through 32 are used for a LAG to switch modules #1 and #2
- Ports 21 through 28 are unused
- Ports 33 through 40 are unused
- Ports 41 through 54 are used for customer data network trunks
- Ports 55 and 56 are unused
- Port 57 is connected to a CMM (1 Gb, using RJ45 transceiver)
- Ports 58 and 59 are unused
- Port 60 is connected to a V7000 controller (1 Gb, using RJ45 transceiver)
- Port 61 is connected to a 2948 SAN switch (1 Gb, using RJ45 transceiver)
- Port 62 is connected to the other 8264 switch management port (1 Gb, using RJ45 transceiver)
- Ports 63 and 64 are used for customer external management (1 Gb, using RJ45 transceiver)

### **VLANs**

Four VLANs are used:

- VLAN 4091 Customer VM management
- VLAN 4092 Customer data
- VLAN 4093 Customer infrastructure management
- VLAN 4094 VLAG ISL

#### VLANs - Single chassis Express and Standard

This is for the single switch module in the chassis. There is no tagging required.

- External ports 1 through 4 are data only
- External port 5 is VM management only
- External ports 6 through 10 are infrastructure management only
- · All internal ports are for data and VM management only

#### VLANs - Single chassis Enterprise - No 4S Power node

Since there are two switches there is a trunk between them and a requirement to carry tagged data over the trunk. The configuration is the same on both switches from the VLAN perspective.

- External ports 1 through 4 are data only
- External port 5 is VM management only
- External ports 6 through 10 are infrastructure management only
- External ports 11 through 14 are used for a VLAG to the other switch module. It carries all VLANs. VLAG ISIL, VLAG tagged
- All internal ports are for data, VM management, and VLAG ISIL only

#### VLANs - Single chassis Enterprise - With 4S Power node

Since there are four switches there is a trunk between them and a requirement to carry tagged data over the trunk. The configuration is the same on both chassis and core switches from the VLAN perspective.

Switch modules:

- External ports 1 through 6 are unused
- External ports 11 through 14 are used for a VLAG to the other switch module. It carries data only.
- External ports 15 through 18 (QSFP+ ports) are used for a LAG to 8264 #1. It carries both data and management. Management is tagged.
- External ports 19 through 22 (QSFP+ ports) are used for a LAG to 8264 #2. It carries both data and management. Management is tagged.
- All internal ports are for data only

8264 top-of-rack switches:

- Ports 1 through 16 (QSFP+ ports) are used for a LAG to the other 8264 switch. It carries both data and management. Management is tagged.
- Ports 17 through 20 and 29 through 32 (QSFP+ ports) are used for a LAG to switch modules #1 and #2. It carries both data and management. Management is tagged.
- Ports 21 through 28 are unused
- Ports 33 through 40 are unused
- Ports 41 through 54 are used for the customer data network trunks. They are for data only.
- Ports 55 and 56 are unused
- Port 57 is management only
- Ports 58 and 59 are unused
- Ports 60 through 64 are management only

#### Network integration considerations

Take the following into account:

- 1. Physical integration with the customers infrastructure, for example, SFPs and cabling.
- 2. Trunks and trunking protocol used between the customers infrastructure and the machine being installed, for example, PaGP or LACP.
- 3. Routing for the virtual machine subnet(s).
- 4. Routing for the FSM virtual machine.

5. Routing for the external management interface(s), for example, the CMMs.

At the physical link layer, a number of SR-fibre SFPs appropriate for the model selected are supplied that will attach to customer-supplied fiber from their switching infrastructure.

There is no need to tie the subnets for the virtual machines to hardware configuration. These should be addresses that are directly route-able for the end-user community. This is entirely dependent on the customer and the number of virtual machines that they expect to host and will likely be negotiated on site with the customer.

The FSM console virtual machine will likely be accessed by a system administrator. That virtual machine can be on a subnet that might require special routing for access. The external management interfaces might also require special routing.

### **IP addressing**

This is the current plan on IP addressing for the platform. Everything will be on two private subnets:

- 192.168.93.0/24 For management
- 10.91.0.0/16 For data

The customer will need to make these subnets route-able in their enterprise, or perform some form of network address translation, or use a gateway to provide access.

**Note:** Selection of this address range can cause some problems if a complete V7000 replacement occurs, as they are configured in the factory with a conflicting IP address that is in this range. If you encounter a network issue you might want to check the V7000 configuration first.

Chassis	Component	IPv4	IPv6 prefix	VLAN	Username	Password		
СММ	•							
Chassis 1	CMM #1	192.168.93.100	fd8c:215d:178e:c0de	4093	USERID	Passw0rd		
	CMM #2	192.168.93.100	fd8c:215d:178e:c0de	4093	USERID	Passw0rd		
IOM	IOM							
Chassis 1	IOM #1	192.168.93.120	fd8c:215d:178e:c0de	4093	USERID	Passw0rd		
	IOM #2	192.168.93.121	fd8c:215d:178e:c0de	4093	USERID	Passw0rd		
	IOM #3	192.168.93.122	fd8c:215d:178e:c0de	4093	USERID	Passw0rd		
	IOM #4	192.168.93.123	fd8c:215d:178e:c0de	4093	USERID	Passw0rd		
FSM								
Chassis 1	eth0	n/a	fd8c:215d:178e:c0de	4093	USERID	Passw0rd		
	eth1	10.91.0.2	fd8c:215d:178e:c0de	4091	USERID	Passw0rd		
Compute nodes - Chassis 1								
Chassis 1: Compute node 1	FSP/IMM	192.168.93.150	fd8c:215d:178e:c0de	4093	Same as CMM			
	VIOS/ESXi	10.91.0.2	n/a	4091	root	Passw0rd		

Table 2. Comprehensive list of IBM PureFlex System IP addresses

Chassis 1:	FSP/IMM	192.168.93.151	fd8c:215d:178e:c0de	4093	Same as CMM	
Compute node 2	VIOS/ESXi	10.91.4.2	n/a	4091	root	Passw0rd
Chassis 1: Compute node 3	FSP/IMM	192.168.93.152	fd8c:215d:178e:c0de	4093	Same as CMM	
	VIOS/ESXi	10.91.8.2	n/a	4091	root	Passw0rd
Chassis 1:	FSP/IMM	192.168.93.153	fd8c:215d:178e:c0de	4093	Same as CMM	
Compute node 4	VIOS/ESXi	10.91.12.2	n/a	4091	root	Passw0rd
Chassis 1:	FSP/IMM	192.168.93.154	fd8c:215d:178e:c0de	4093	Same as CMM	
Compute node 5	VIOS/ESXi	10.91.16.2	n/a	4091	root	Passw0rd
Chassis 1:	FSP/IMM	192.168.93.155	fd8c:215d:178e:c0de	4093	Same as CMM	
Compute node 6	VIOS/ESXi	10.91.20.2	n/a	4091	root	Passw0rd
Chassis 1:	FSP/IMM	192.168.93.156	fd8c:215d:178e:c0de	4093	Same as CMM	
Compute node 7	VIOS/ESXi	10.91.24.2	n/a	4091	root	Passw0rd
Chassis 1:	FSP/IMM	192.168.93.157	fd8c:215d:178e:c0de	4093	Same as CMM	
Compute node 8	VIOS/ESXi	10.91.28.2	n/a	4091	root	Passw0rd
Chassis 1:	FSP/IMM	192.168.93.158	fd8c:215d:178e:c0de	4093	Same as CMM	
Compute node 9	VIOS/ESXi	10.91.32.2	n/a	4091	root	Passw0rd
Chassis 1:	FSP/IMM	192.168.93.159	fd8c:215d:178e:c0de	4093	Same as CMM	
Compute node 10	VIOS/ESXi	10.91.36.2	n/a	4091	root	Passw0rd
Chassis 1:	FSP/IMM	192.168.93.160	fd8c:215d:178e:c0de	4093	Same as CMM	
Compute node 11	VIOS/ESXi	10.91.40.2	n/a	4091	root	Passw0rd
Chassis 1:	FSP/IMM	192.168.93.161	fd8c:215d:178e:c0de	4093	Same as CMM	
Compute node 12	VIOS/ESXi	10.91.44.2	n/a	4091	root	Passw0rd
Chassis 1:	FSP/IMM	192.168.93.162	fd8c:215d:178e:c0de	4093	Same as CMM	
Compute node 13	VIOS/ESXi	10.91.48.2	n/a	4091	root	Passw0rd
Chassis 1:	FSP/IMM	192.168.93.163	fd8c:215d:178e:c0de	4093	Same as CMM	
Compute node 14	VIOS/ESXi	10.91.52.2	n/a	4091	root	Passw0rd
Top-of-rack co	omponents	·			·	
TOR V7000	Canister #1	192.168.93.210	fd8c:215d:178e:c0de	4093	USERID	Passw0rd
	Canister #2	192.168.93.211	fd8c:215d:178e:c0de	4093	USERID	Passw0rd
	Cluster	192.168.93.213	fd8c:215d:178e:c0de	4093	USERID	Passw0rd
TOR Eth1	Management	192.168.91.220	fd8c:215d:178e:c0d	4093	USERID	Passw0rd
TOR Eth2	Management	192.168.91.221	fd8c:215d:178e:c0d	4093	USERID	Passw0rd
TOR SAN1	Management	192.168.91.222	fd8c:215d:178e:c0d	4093	USERID	Passw0rd

IPv6 prefix

VLAN

Username

Password

Table 2. Comprehensive list of IBM PureFlex System IP addresses (continued) IPv4

Chassis

TOR SAN2

LPAR/VM

Management

192.168.91.223

Component

Passw0rd

USERID

4093

fd8c:215d:178e:c0d

Chassis	Component	IPv4	IPv6 prefix	VLAN	Username	Password
Chassis 1: Compute node 1	SmartCloud Entry VM/LPAR	10.91.0.230		4091	root	Passw0rd
	vCenter VM	10.91.0.232		4091	Administrator	Passw0rd
	Template OS LPAR (Mgt.)	10.91.0.233		4091		
Varies	Guest OS	Customer defined	Customer defined	4091		

Table 2. Comprehensive list of IBM PureFlex System IP addresses (continued)

# Appendix B. Cabling diagrams

This appendix contains cabling diagrams that might be useful during the installation process.

#### THIS SECTION IS UNDER DEVELOPMENT

# SFP descriptions and usage

The following table provides a high-level overview of the SFPs used in the Express, Standard, and Enterprise configurations.

AAS	HVEC	Description	Express Base		Standard Base		Enterprise Base	
			Flex System V7000	Storwize V7000 >0	Flex System V7000	Storwize V7000 =1	Flex System V7000	Storwize V7000 >0
EB29	3268	1 Gb on the chassis	4 6		4	6	4	6
3282	5053	10 Gb on the chassis	2	2	4	4	4	4
EB28	5063	10 Gb on the G8264 TOR switch			-	-		
AAS	HVEC	Description	Express E	Expansion	Standard Expansion		Enterprise Expansion	
			Flex Syst	em V7000	Flex System V7000	Storwize V7000 >1		-
EB29	3268	1 Gb on the chassis	0		0	2	0	
3282	5053	10 Gb on the chassis	-		-	-	-	
EB28	5063	10 Gb on the G8264 TOR switch	2		2	2	2	
AAS	HVEC	Description	Expansion rules for a one chassis configuration with more than one Storwize V7000 Storage System and no top-of-rack switches					
			Express		Standard		Enterprise	
EB29	3268	1 Gb on the chassis	2		2		2	
3282	5053	10 Gb on the chassis	-		-		-	
EB28	5063	10 Gb on the G8264 TOR switch	-		-		-	

See "Symbols, feature codes, and descriptions" on page 84 for more information.

# Symbols, feature codes, and descriptions

Use the information in the following table as a legend for the configuration and cabling diagrams.

Symbol	MTM or Feature Code AAS	Feature Code HVEC	Description
<u> </u>	3282	5053	10 GbE SFP
	EB29	3268	1 GbE SFP
Q,B	5370	—	(B) 8 Gb GbFC SFP for use with the FC5022 switch and V7000 Storage System
Either Q (QLogic) or B (Brocade)	3286	—	(Q) 8 Gb GbFC SFP for use with the FC3171 switch and V7000 Storage System
$\bigcirc$	EB28	5053	10 GbE SFP
<>	-	_	Cables called out from the components.
$\bigtriangleup$	-	-	Expansion rules
Chassis 1	7893-92X	8721-HC1	IBM Flex System Enterprise Chassis
V7000 node	4939-A49	4939-X49	IBM Flex System V7000 Storage Node
V7000 node	4939-A29	4939-X29	IBM Flex System V7000 Storage Node (expansion)
V7000 system	2076-124	—	IBM Storwize V7000 Storage System
V7000 system	2076-224	—	IBM Storwize V7000 Storage System (expansion)
EN4093 switch	3593	A0TB	IBM Flex System EN4093 10Gb Scalable Switch
FC3171 switch	3595	A0TD	IBM Flex System FC3171 8Gb SAN Switch
FC5022 switch	3771	A2RQ	IBM Flex System FC5022 24-Port 16Gb SAN Scalable Switch
G8264 switch	1455-64C	—	IBM System Networking RackSwitch G8264
G8052 switch	1455-48E	—	IBM System Networking RackSwitch G8052
SAN switch	2498-B24	—	IBM System Storage SAN24B-4 Express
	2808	—	SFP 8 Gbps SW 8-Pack
ECB4	ECB4	—	1 m IBM Passive DAC SFP+ cable (1455 top-of-rack switch)
ECB5	ECB5	—	3 m IBM Passive DAC SFP+ cable (1455 top-of-rack switch)
EB2B	EB2B	_	1 m IBM QSFP+-to-QSFP+ Cable

Symbol	MTM or Feature Code AAS	Feature Code HVEC	Description
EB25	EB25	_	3m IBM Passive QSFP+ DAC Break Out Cable
EB28	EB28	_	IBM SFP+ SR Transceiver
_	7309-HC3	—	10m IBM QSFP+ MTP Optical cable
Cat 5 Ethernet	ECB2 1111		1.5 m Category 5 Ethernet Cable (blue) 3 m Category 5 Ethernet Cable (blue)
Fibre	5305 and 5605	—	5 m Fiber Optic Cable LC-LC

# **Express configurations**

This section provides illustrations of the Express configurations.

# Express configuration with a V7000 storage node





## Express configuration with a V7000 storage system

See "Symbols, feature codes, and descriptions" on page 84 for the key to the symbols used in the illustrations.

# Express configuration with V7000 storage node expansion



# Express configuration with V7000 storage system expansion





## Express multi-chassis with V7000 storage systems

See "Symbols, feature codes, and descriptions" on page 84 for the key to the symbols used in the illustrations.

# Standard configurations

This section provides illustrations of the Standard configurations.

# Standard configuration with V7000 storage nodes



## Standard configuration with V7000 storage systems





# Standard multi-chassis with V7000 storage systems

See "Symbols, feature codes, and descriptions" on page 84 for the key to the symbols used in the illustrations.

# **Enterprise configurations**

This section provides illustrations of the Enterprise configurations.

## Enterprise configuration with V7000 storage nodes



# Enterprise configuration with V7000 storage systems





# Enterprise configuration with V7000 storage nodes and 4S Power compute nodes

See "Symbols, feature codes, and descriptions" on page 84 for the key to the symbols used in the illustrations.

# Enterprise configuration with V7000 storage systems and 4S Power compute nodes



See "Symbols, feature codes, and descriptions" on page 84 for the key to the symbols used in the illustrations.



# Enterprise multi-chassis with V7000 storage systems

See "Symbols, feature codes, and descriptions" on page 84 for the key to the symbols used in the illustrations.

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Processor speed indicates the internal clock speed of the microprocessor; other factors also affect application performance.

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1024 bytes, MB stands for 1,048,576 bytes, and GB stands for 1,073,741,824 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1,000,000 bytes, and GB stands for 1,000,000 bytes. Total user-accessible capacity can vary depending on operating environments.

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Risks that are posed by the presence of excessive particulate levels or concentrations of harmful gases include damage that might cause the device to malfunction or cease functioning altogether. This specification sets forth limits for particulates and gases that are intended to avoid such damage. The limits must not be viewed or used as definitive limits, because numerous other factors, such as temperature or moisture content of the air, can influence the impact of particulates or environmental corrosives and gaseous contaminant transfer. In the absence of specific limits that are set forth in this document, you must implement practices that maintain particulate and gas levels that are consistent with the protection of human health and safety. If IBM determines that the levels of particulates or gases in your environment have caused damage to the device, IBM may condition provision of repair or replacement of devices or parts on implementation of appropriate remedial measures to mitigate such environmental contamination. Implementation of such remedial measures is a customer responsibility.

Contaminant	Limits
Particulate	• The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV 9) according to ASHRAE Standard 52.2 <sup>1</sup> .
	• Air that enters a data center must be filtered to 99.97% efficiency or greater, using high-efficiency particulate air (HEPA) filters that meet MIL-STD-282.
	• The deliquescent relative humidity of the particulate contamination must be more than 60% <sup>2</sup> .
	• The room must be free of conductive contamination such as zinc whiskers.
Gaseous	• Copper: Class G1 as per ANSI/ISA 71.04-1985 <sup>3</sup>
	• Silver: Corrosion rate of less than 300 Å in 30 days
1. ASHRAE 52 Removal Eff	.2-2008 - Method of Testing General Ventilation Air-Cleaning Devices for iciency by Particle Size, Atlanta: American Society of Heating, Refrigerating

Table 3. Limits for particulates and gases

Removal Efficiency by Particle Size. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

2. The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.

 ANSI/ISA-71.04-1985. Environmental conditions for process measurement and control systems: Airborne contaminants. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.

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