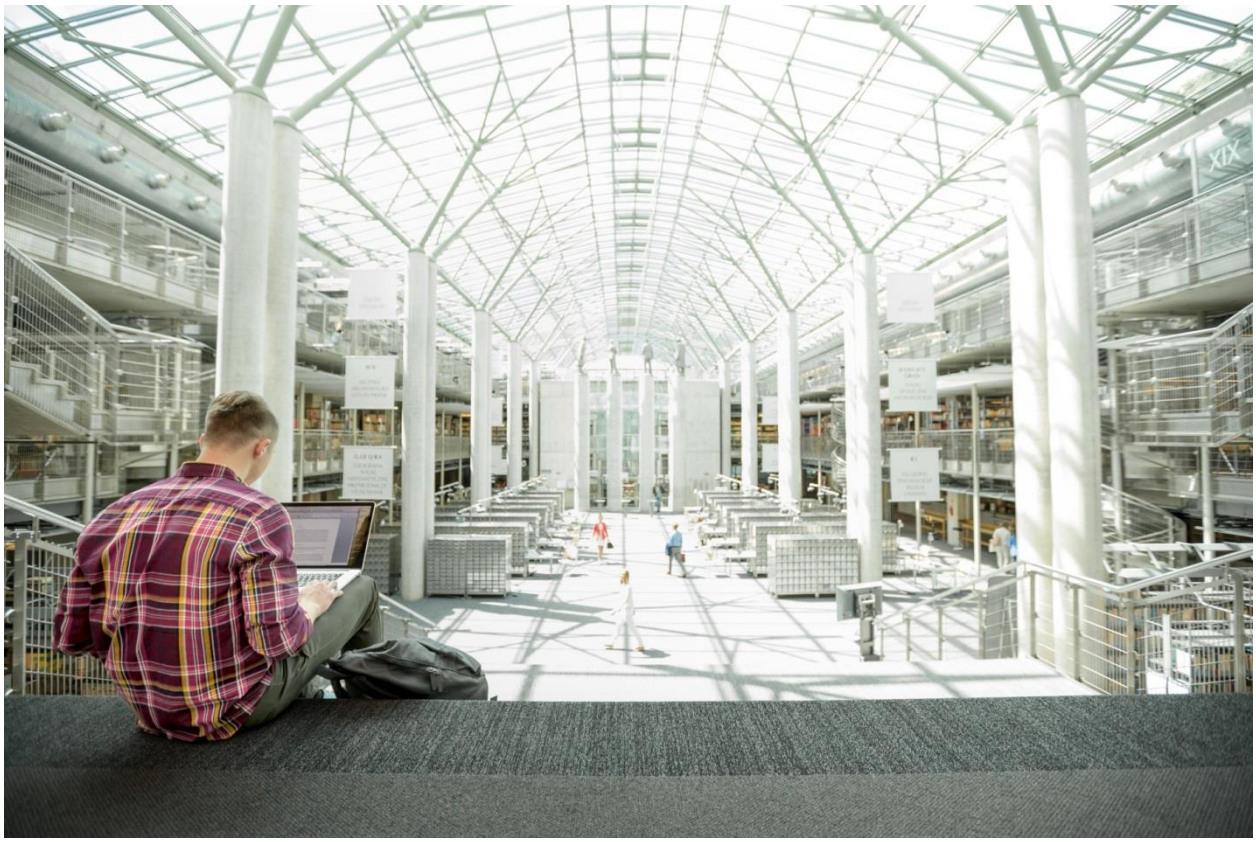

VersaStack for Data Center with All Flash Storage

Deploying Cisco Unified Computing System and IBM FlashSystem V9000 with VMware vSphere 5.5 Update 2

Last Updated: November 25, 2015

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Executive Summary

This document details how to install IBM and Cisco infrastructure for a successful VMware deployment. In today's rapid paced IT environments there are many challenges including:

- Increased OPEX. In a recent poll, 73 percent of all IT spending was used just to keep the current data center running
- Rapid storage growth has become more and more difficult to manage and costly
- Existing compute and storage are under utilized
- IT groups are challenged to meet SLA's, dealing with complex troubleshooting
- IT groups are inundated with time consuming data migrations to manage growth and change

In order to solve these issues and increase efficiency IT departments are moving to converged infrastructure solutions. These solutions offer many benefits, some of which are having the integration testing completed along with thoroughly documented deployment procedures. They also offer increased feature sets and premium support with a single point of contact. Cisco and IBM have team up to bring the best networking, compute and storage in a single solution named VersaStack. VersaStack offers customer's versatility and simplicity, great performance, along with reliability. In this document we will show how to install an All Flash VersaStack setup for a VMware infrastructure that is designed to increase IOPS and provide best performance for IO intensive applications. A brief list of the VersaStack benefits that solve the challenges previously noted include:

- Cisco Unified Computing System Manger providing simplified management for compute and network through a consolidated management tool
- Cisco UCS Service Profiles designed to vastly reduce deployment time and provide consistency in the datacenter
- Cisco Fabric Interconnects to reduce infrastructure costs and simplify networking
- IBM Real-time compression to reduce the storage footprint and storage costs
- IBM Data-at-rest Encryption to provide Enterprise reliability
- Optional IBM Easy Tier to automate optimizing performance while lowering storage costs by automatically placing infrequently accessed data on cheaper disks, and highly accessed data on faster tiers thereby reducing costly migrations
- IBM's FlashSystem V9000 Simplified Storage Management designed to simplify day to day storage tasks

VersaStack offers customers the ability to reduce OPEX while at the same time helping meet their SLA's by simplifying many of the day to day IT tasks, as well as consolidating and automating others.

VersaStack for Data Center Overview

Introduction

The current data center trend, driven by the need to better utilize available resources, is towards virtualization on shared infrastructure. Higher levels of efficiency can be realized on integrated platforms due to the pooling of compute, network and storage resources, brought together by a pre-validated process. Validation eliminates compatibility issues and presents a platform with reliable features that can be deployed in an agile manner. This industry trend and the validation approach used to cater to it, has resulted in enterprise customers moving away from siloed architectures. VersaStack serves as the foundation for a variety of workloads, enabling efficient architectural designs that can be deployed quickly and with confidence.

Audience

This document describes the architecture and deployment procedures of an infrastructure composed of Cisco®, IBM ®, and VMware® virtualization that uses IBM FlashSystem V9000 block protocols. The intended audience for this document includes, but is not limited to, sales engineers, field consultants, professional services, IT managers, partner engineering, and customers who want to deploy the core VersaStack architecture with IBM FlashSystem V9000.

Solution Design and Architecture

Architecture

The VersaStack architecture is highly modular or "Pod"-like. There are sufficient architectural flexibility and design options to scale as required with investment protection. The platform can be scaled up (adding resources to existing VersaStack units) and/or out (adding more VersaStack units).

Specifically, VersaStack is a defined set of hardware and software that serves as an integrated foundation for both virtualized and non-virtualized solutions. VMware vSphere® built on VersaStack includes IBM FlashSystem V9000, Cisco networking, the Cisco Unified Computing System™ (Cisco UCS®), Cisco MDS fiber-channel switches and VMware vSphere software in a single package. The design is flexible enough that the networking, computing, and storage can fit in one data center rack or be deployed according to a customer's data center design. Port density enables the networking components to accommodate multiple configurations.

One benefit of the VersaStack architecture is the ability to meet any customer's capacity or performance needs in a cost effective manner. The Converged Infrastructure system capable of serving multiple protocols across a single interface allows for customer choice and investment protection because it is wire-once architecture.

This architecture references relevant criteria pertaining to resiliency, cost benefit, and ease of deployment of all components including IBM FlashSystem V9000 storage.

The architecture for this solution shown below uses two sets of hardware resources:

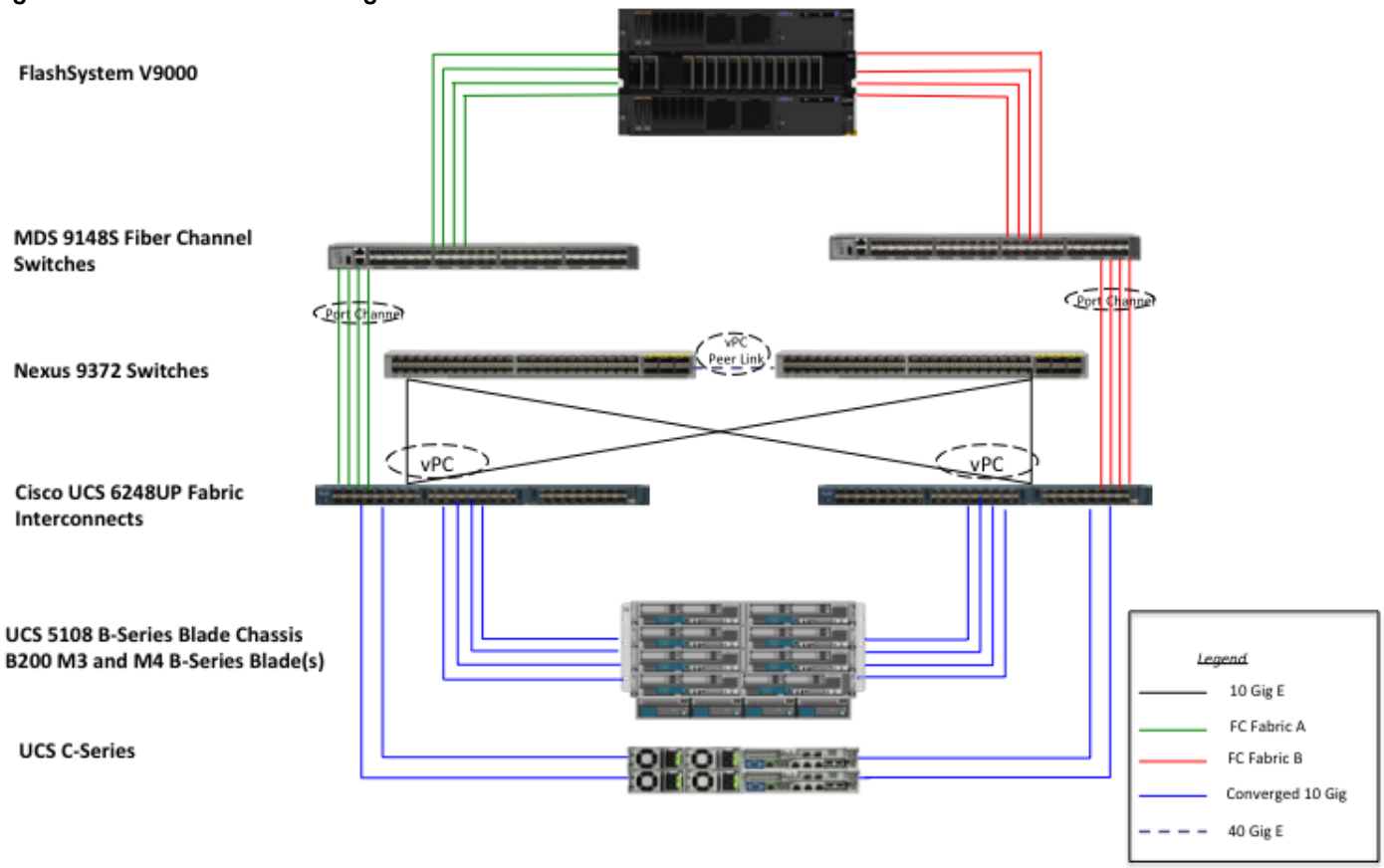
1. Common Infrastructure services on redundant and self-contained hardware.

2. VersaStack Pod.

The common infrastructure services include Active Directory, DNS, DHCP, vCenter, Nexus 1000v virtual supervisor module (VSM), UCS Performance Manager and any other shared service. These components are considered core infrastructure as they provide necessary data-center wide services where the VersaStack Pod resides. Since these services are integral to the deployment and operation of the platform, there is a need to adhere to best practices in their design and implementation. This includes such features as high-availability, appropriate RAID setup and performance and scalability considerations given such services may need to be extended to multiple Pods. At a customer's site, depending on whether this is a new data center, there may not be a need to build this infrastructure piece.

Figure 1 illustrates the VMware vSphere built on VersaStack components and the network connections for a configuration with IBM FlashSystem V9000 Storage. This design uses the Cisco Nexus® 9372, and Cisco UCS B-Series with the Cisco UCS virtual interface card (VIC) and the IBM FlashSystem V9000 storage controllers connected in a highly available design using Cisco Virtual Port Channels (vPCs). This infrastructure is deployed to provide FC-booted hosts with block-level access to shared storage datastores.

Figure 1 VersaStack Cabling Overview



The reference hardware configuration includes:

- Two Cisco Nexus 9396 or 9372 switches
- Two Cisco UCS 6248UP Fabric Interconnects
- Two Cisco MDS 9148S Fibre-Channel switches
- Support for 32 Cisco UCS C-Series servers without any additional networking components
- Support for 8 Cisco UCS B-Series servers without any additional blade server chassis
- Support for up to 160 Cisco UCS C-Series and B-Series servers by way of additional fabric extenders and blade server chassis
- Two IBM FlashSystem V9000 control enclosures, and one V9000 Storage enclosure. Support for up to 12 flash modules of the same capacity within a storage enclosures.

For server virtualization, the deployment includes VMware vSphere. Although this is the base design, each of the components can be scaled easily to support specific business requirements. For example, more (or different) servers or even blade chassis can be deployed to increase compute capacity, additional V9000 Storage Enclosures to increase capacity, and pairs of V9000 Control Enclosures shelves can be deployed to improve I/O capability and throughput, and special hardware or software features can be added to introduce new features.

This document guides you through the low-level steps for deploying the base architecture. These procedures cover everything from physical cabling to network, compute and storage device configurations.

For Information regarding the design of VersaStack, please reference the Design guide at:

http://www.cisco.com/c/en/us/solutions/enterprise/data-center-designs-cloud-computing/versastack-designs.html

Software Revisions

The table below details the software revisions used for validating various components of the Cisco Nexus 9000 based VersaStack architecture. To validate your ENIC version run the "ethtool -i vmnic0" through the command line of the ESX host. For more information regarding supported configurations please reference the following Interoperability links:

IBM:
http://www-03.ibm.com/systems/support/storage/ssic/interoperability.wss
Cisco:
http://www.cisco.com/web/techdoc/ucs/interoperability/matrix/matrix.html

Table 1 Software Revisions

Layer	Device	Version or Release	Details
Compute	Cisco UCS fabric interconnect	2.2(5a)	Embedded management
	Cisco UCS C 220 M3/M4	2.2(3g)	Software bundle release
	Cisco UCS B 200 M3/ M4	2.2(3g)	Software bundle release
	Cisco eNIC	2.1.2.59	Ethernet driver for Cisco VIC
	Cisco fNIC	1.6.0.12	FCoE driver for Cisco VIC
Network	Cisco Nexus 9372	6.1(2)I3(4b)	Operating system version
	Cisco MDS 9148S	6.2(9c)	FC switch firmware version
Storage	IBM FlashSystem V9000	7.4.1.2	Software version
Software	Cisco UCS hosts	VMware vSphere ESXi™ 5.5u2	Operating system version
	Microsoft SQL Server®	Microsoft SQL Server 2012 R2 SP1	VM (1 each): SQL Server DB
	Vmware vCenter™	5.5u2	VM (1 each): Vmware vCenter
	Cisco Nexus 1000v	5.2(1)SV3(1.4)	Software version
	Virtual Switch Update Manager (VSUM)	1.5	Virtual Switch Deployment Software

Configuration Guidelines

This document provides details on configuring a fully redundant, highly available VersaStack unit with IBM FlashSystem V9000 storage. Therefore, reference is made at each step to the component being configured

as either A or B. For example, Controller-A and Controller-B are used to identify the IBM storage controllers that are provisioned within this document, and Cisco Nexus A and Cisco Nexus B identify the pair of Cisco Nexus switches that are configured. The Cisco UCS fabric Interconnects are similarly configured. Additionally, this document details the steps for provisioning multiple Cisco UCS hosts, and these are identified sequentially: VM-Host-Infra-01, VM-Host-Infra-02, and so on. Finally, to indicate that you should include information pertinent to your environment in a given step, <text> appears as part of the command structure. See the following example for the network port vlan create command:

Usage:

```
network port vlan create ?

   [-node] <nodename>                    Node

   { [-vlan-name] {<netport>|<ifgrp>}   VLAN Name

   |  -port {<netport>|<ifgrp>}         Associated Network Port

[-vlan-id] <integer> }               Network Switch VLAN Identifier
```

Example:

```
network port vlan –node <node01> -vlan-name i0a-<vlan id>
```

This document is intended to enable you to fully configure the VersaStack Pod in the environment. Various steps require you to insert customer-specific naming conventions, IP addresses, VSAN and VLAN schemes, as well as to record appropriate MAC addresses.

VLAN Topology

Table 2 and Table 3 describes the VLANs as well as example IP ranges necessary for deployment as outlined in this guide. The virtual machines (VMs) necessary for deployment are outlined in this guide as well. Networking architectures can be unique to each environment. Since the design of this deployment is a POD, the architecture in this document leverages private networks and only the in-band management vlan traffic routes out through the Cisco 9k switches. Other management traffic is routed through a separate Out of Band Management switch. Your architecture could vary based on the deployment objectives. An NFS Vlan is included in this document to allow connectivity to any existing NFS datastores for migration of virtual machines if required, however NFS is not validated in the solution and is not supported on IBM FlashSystem V9000.

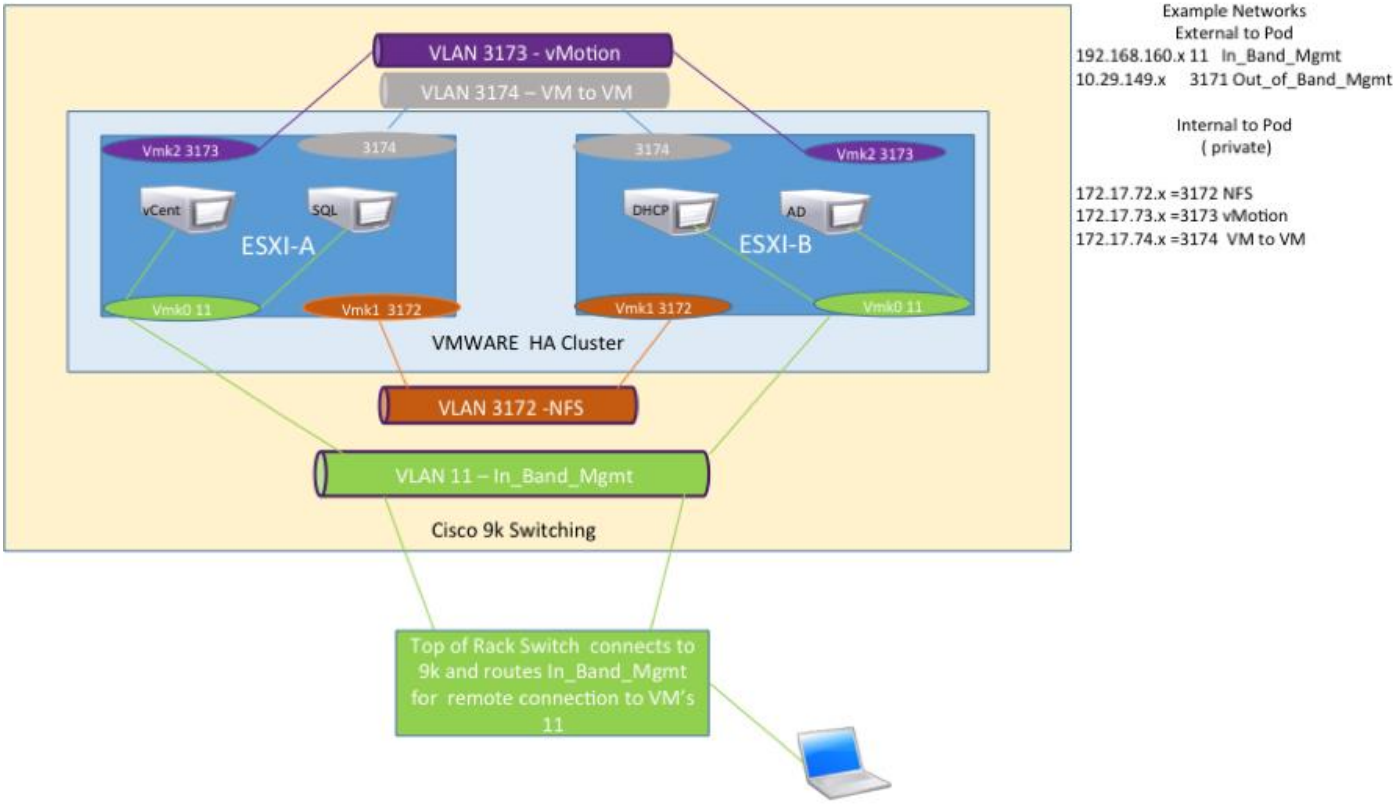
Table 2 VLANs

VLAN Name	VLAN Purpose	ID Used in Validating This Document
Native	VLAN to which untagged frames are assigned	2
Mgmt out of band	VLAN for out-of-band management interfaces	3171
NFS	VLAN for NFS traffic	3172
vMotion	VLAN designated for the movement of VMs from one physical host to another	3173
VM Traffic	VLAN for VM application traffic	3174
Mgmt in band	VLAN for in-band management interfaces	11

Table 3 Example IP's

VLAN Name	IP addresses range examples	ID Used in Validating This Document
Native	0	2
Mgmt out of band	10.29.149.170 -185 (separate switch outside the 9k)	3171
NFS	172.17.72.10-20 (private, does not route out)	3172
IP-Pool ext-Mgmt (FI KVM IP pool)	10.29.149.186 -225 (separate switch outside the 9k)	3171
vMotion	172.17.73.10-20 (private, does not route out)	3173
VM Traffic	172.17.74.10-20 (private, does not route out)	3174
Mgmt in band	192.168.161.10-150 (routes out through the 9k)	11

Figure 2 VLAN Logical View



Fibre Channel Topology

The SAN infrastructure allows addition of storage enclosures or additional building blocks non-disruptively. A pair of MDS switches have been used for the fibre connectivity which provides redundancy and separate fabrics have been created by utilizing VSAN's on the MDS switches which provides dedicated hosts or server-side storage area networks (SANs) and a private fabric to support the cluster interconnects.

The logical fabric isolation provides:

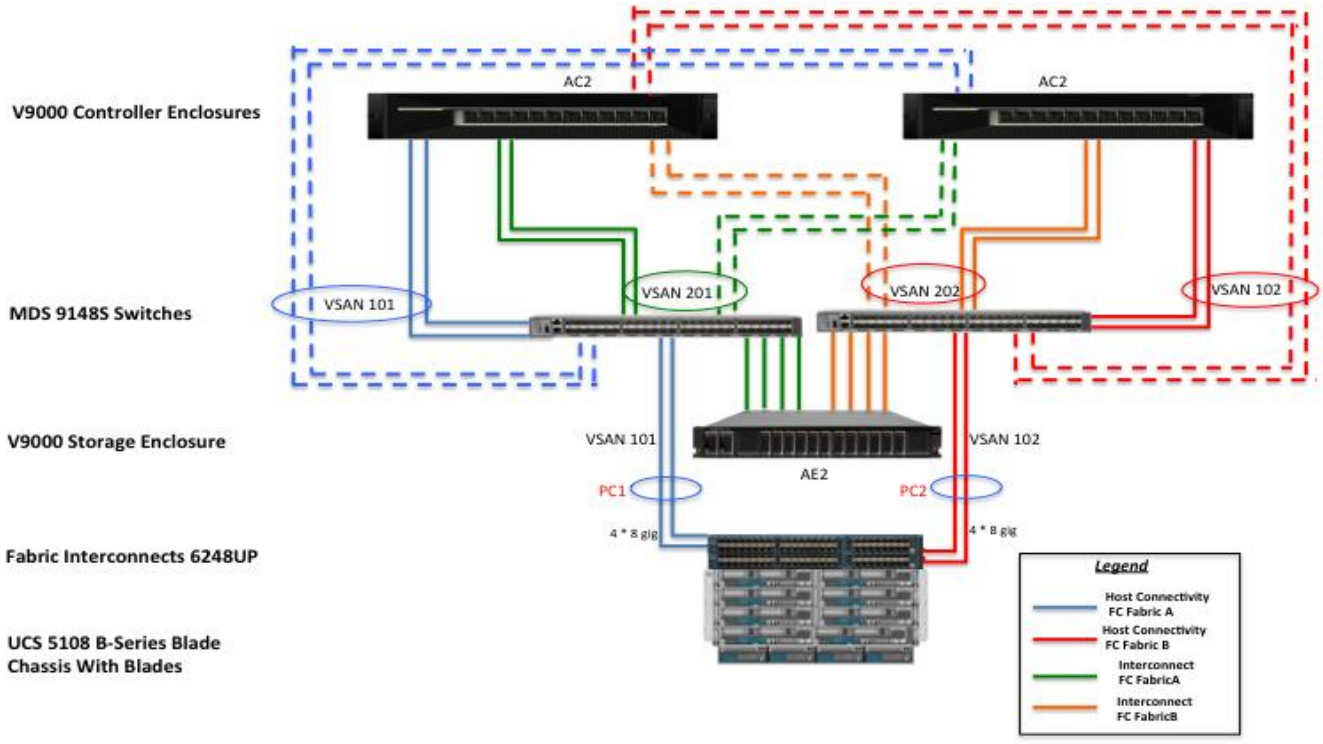
- No access for any host or server to the storage enclosure accidentally.
- No congestion to the host or server-side SAN can cause potential performance implications for both the host or server-side SAN and the FlashSystem V9000.

Table 4 describes the VSANs necessary for deployment as outlined in this guide.

Table 4 VSANs for Deployment

VSAN Name	VSAN Purpose	ID Used in Validating This Document
Host-Fabric-A	VSAN for Host connectivity	101
Host-Fabric-B	VSAN for Host connectivity	102
Cluster-Fabric-A	VSAN for Cluster connectivity	201
Cluster-Fabric-B	VSAN for Cluster connectivity	202

Figure 3 Fibre Channel Topology View



Virtual Machines

This document assumes that the following infrastructure machines exists or are created during the install.

Table 5 Virtual Machine List

Virtual Machine Description	Host Name

Virtual Machine Description	Host Name
Active Directory	
vCenter Server	
SQL Server	
DHCP Server	
CISCO UCS Performance Manager	

Configuration Variables

The following customer implementation values for the variables below should be identified prior to starting the installation procedure.

Table 6 Customer Variables

Variable	Description	Customer Implementation Value
<<var_cont01_mgmt_ip>>	Out-of-band management IP for cluster Controller 01	
<<var_cont01_mgmt_mask>>	Out-of-band management network netmask	
<<var_cont01_mgmt_gateway>>	Out-of-band management network default gateway	
<<var_cont02_mgmt_ip>>	Out-of-band management IP for cluster Controller 02	
<<var_cont02_mgmt_mask>>	Out-of-band management network netmask	
<<var_cont02_mgmt_gateway>>	Out-of-band management network default gateway	
<<var_can01_srvc_ip>>	Out-of-band service IP for canister1, Storage Enclosure	
<<var_can02_srvc_ip>>	Out-of-band service IP for canister2, Storage Enclosure	
<<var_can_srvc_mask>>	Out-of-band services management network netmask	
<<var_can_srvc_gateway>>	Out-of-band services management network default gateway	
<<var_cluster_mgmt_ip>>	Out-of-band management IP for cluster	
<<var_cluster_mgmt_mask>>	Out-of-band management network netmask	
<<var_cluster_mgmt_gateway>>	Out-of-band management network default gateway	
<<var_password>>	Global default administrative password	

Variable	Description	Customer Implementation Value
<<var_dns_domain_name>>	DNS domain name	
<<var_nameserver_ip>>	DNS server IP(s)	
<<var_timezone>>	VersaStack time zone (for example, America/New_York)	
<<var_global_ntp_server_ip>>	NTP server IP address	
<<var_email_contact>>	Administrator e-mail address	
<<var_admin_phone>>	Local contact number for support	
<<var_mailhost_ip>>	Mail server host IP	
<<var_country_code>>	Two-letter country code	
<<var_state>>	State or province name	
<<var_city>>	City name	
<<var_org>>	Organization or company name	
<<var_unit>>	Organizational unit name	
<<var_street_address>>,	Street address for support information	
<<var_contact_name>>	Name of contact for support	
<<var_admin>>	Secondary Admin account for storage login	
<<var_nexus_A_hostname>>	Cisco Nexus A host name	
<<var_nexus_A_mgmt0_ip>>	Out-of-band Cisco Nexus A management IP address	
<<var_nexus_A_mgmt0_netmask>>	Out-of-band management network netmask	
<<var_nexus_A_mgmt0_gw>>	Out-of-band management network default gateway	
<<var_nexus_B_hostname>>	Cisco Nexus B host name	
<<var_nexus_B_mgmt0_ip>>	Out-of-band Cisco Nexus B management IP address	
<<var_nexus_B_mgmt0_netmask>>	Out-of-band management network netmask	
<<var_nexus_B_mgmt0_gw>>	Out-of-band management network default gateway	
<<var_ib-mgmt_vlan_id>>	In-band management network VLAN ID	
<<var_native_vlan_id>>	Native VLAN ID	
<<var_nfs_vlan_id>>	NFS VLAN ID	
<<var_vmotion_vlan_id>>	VMware vMotion® VLAN ID	
<<var_vm-traffic_vlan_id>>	VM traffic VLAN ID	
<<var_nexus_vpc_domain_id>>	Unique Cisco Nexus switch VPC domain ID	

Variable	Description	Customer Implementation Value
<<var_ucs_clustername>>	Cisco UCS Manager cluster host name	
<<var_ucsa_mgmt_ip>>	Cisco UCS fabric interconnect (FI) A out-of-band management IP address	
<<var_ucsa_mgmt_mask>>	Out-of-band management network netmask	
<<var_ucsa_mgmt_gateway>>	Out-of-band management network default gateway	
<<var_ucs_cluster_ip>>	Cisco UCS Manager cluster IP address	
<<var_ucsb_mgmt_ip>>	Cisco UCS FI B out-of-band management IP address	
<<var_cimc_mask>>	Out-of-band management network netmask	
<<var_cimc_gateway>>	Out-of-band management network default gateway	
<<var_vsm_domain_id>>	Unique Cisco Nexus 1000v virtual supervisor module (VSM) domain ID	
<<var_vsm_mgmt_ip>>	Cisco Nexus 1000v VSM management IP address	
<<var_vsm_updatemgr_mgmt_ip>>	Virtual Switch Update Manager IP address	
<<var_vsm_mgmt_mask>>	In-band management network netmask	
<<var_vsm_mgmt_gateway>>	In-band management network default gateway	
<<var_vsm_hostname>>	Cisco Nexus 1000v VSM host name	
<<var_ftp_server>>	IP address for FTP server	
<<var_ucspm_mgmt_ip>>	Cisco UCS Performance Manager management IP address	
<<var_ucspm_mgmt_mask>>	In-band management network netmask	
<<var_ucspm_mgmt_gateway>>	In-band management network default gateway	
<<var_MDS_A_mgmt0_gw>>	MDS switch Out-of-band Cisco Nexus B management IP gateway	
<<var_MDS_B_hostname>>	Name for the FC MDS Switch	
<<var_MDS_B_mgmt0_ip>>	MDS switch Out-of-band Cisco Nexus B management IP address	
<<var_MDS_B_mgmt0_netmask>>	MDS switch Out-of-band Cisco Nexus B management IP netmask	
<<var_MDS_B_mgmt0_gw>>	MDS switch Out-of-band Cisco Nexus B management IP gateway	
<<var_UTC_offset>>	UTC time offset for your area	
<<var_vsan_a_id>>	Vsan id for Host connectivity on MDS	

Variable	Description	Customer Implementation Value
	switch A (101 is used)	
<<var_vsan_B_id>>	Vsan id for Host connectivity on MDS switch B (102 is used)	
<<var_vsan_a_clus_id>>	Vsan id for Cluster connection on MDS switch A (201 is used)	
<<var_vsan_B_clus_id>>	Vsan id for Cluster connectivity on MDS switch B (202 is used)	
<<var_fabric_a_fcoe_vlan_id>>	Fabric id for MDS switch A (101 is used)	
<<var_fabric_b_fcoe_vlan_id>>	Fabric id for MDS switch B (102 is used)	
<<var_In-band_mgmtblock_net>>	Block of IP addresses for KVM access for UCS	
<<var_vmhost_infra_01_ip>>	VMware ESXi host 01 in-band Mgmt IP	
<<var_vmhost_infra_01_2nd_ip>>	VMware ESXi host 01 secondary in-band Mgmt IP	
<<var_nfs_vlan_id_ip_host-01>>	NFS VLAN IP address for ESXi host 01	
<<var_nfs_vlan_id_mask_host-01>>	NFS VLAN netmask for ESXi host 01	
<<var_vmotion_vlan_id_ip_host-01>>	vMotion VLAN IP address for ESXi host 01	
<<var_vmotion_vlan_id_mask_host-01>>	vMotion VLAN netmask for ESXi host 01	
The last 6 variables should be repeated for all ESXi hosts		

The variables below for the Fibre Channel environment are to be collected during the installation phase for subsequent use in this document.

The Storage Controllers are also referred to as AC2 and the Storage Enclosure as AE2 for the V9000, this document refers to the controllers as Controller A (ContA) and Controller B (ContB) and the storage enclosure as (SE).

IBM Storage port naming conventions used on MDS switches:

Cont – Storage Controller

SE- Storage Enclosure

FE – Front-end, Host connectivity

BE – Back-end, Cluster communication

Table 7 WWPN Variables

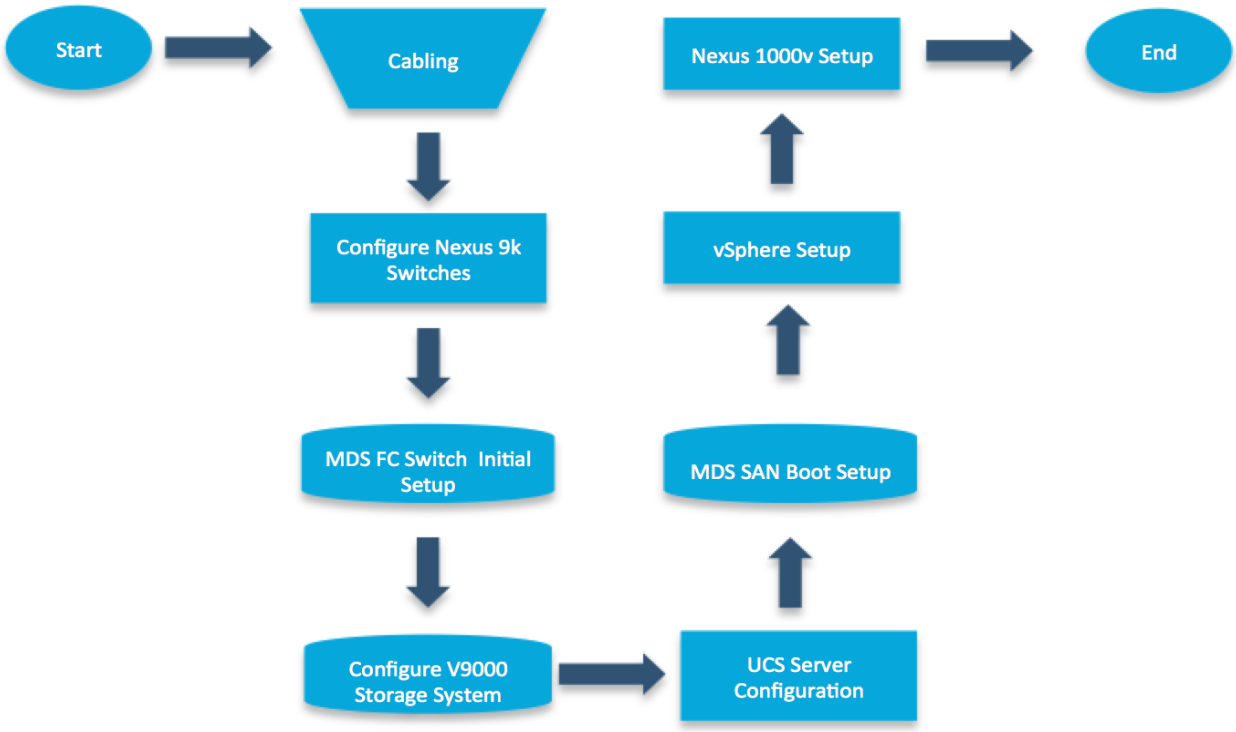
Source	Switch/ Port	Variable	WWPN

Source	Switch/ Port	Variable	WWPN
FC_SE-BE1-fabricA	Switch A FC13	var_wwpn_FC_SE-BE1-fabricA	
FC_SE-BE2-fabricA	Switch A FC14	var_wwpn_FC_SE-BE2-fabricA	
FC_SE-BE3-fabricA	Switch A FC15	var_wwpn_FC_SE-BE3-fabricA	
FC_SE-BE4-fabricA	Switch A FC16	var_wwpn_FC_SE-BE4-fabricA	
FC_SE-BE5-fabricB	Switch B FC13	var_wwpn_FC_SE-BE5-fabricB	
FC_SE-BE6-fabricB	Switch B FC14	var_wwpn_FC_SE-BE6-fabricB	
FC_SE-BE7-fabricB	Switch B FC15	var_wwpn_FC_SE-BE7-fabricB	
FC_SE-BE8-fabricB	Switch B FC16	var_wwpn_FC_SE-BE8-fabricB	
FC_ContA-BE1-fabricA	Switch A FC9	var_wwpn_FC_ContA-BE1-fabricA	
FC_ContA-BE2-fabricA	Switch A FC10	var_wwpn_FC_ContA-BE2-fabricA	
FC_ContB-BE1-fabricA	Switch A FC11	var_wwpn_FC_ContB-BE1-fabricA	
FC_ContB-BE2-fabricA	Switch A FC12	var_wwpn_FC_ContB-BE2-fabricA	
FC_ContA-BE3-fabricB	Switch B FC9	var_wwpn_FC_ContA-BE3-fabricB	
FC_ContA-BE4-fabricB	Switch B FC10	var_wwpn_FC_ContA-BE4-fabricB	
FC_ContB-BE3-fabricB	Switch B FC11	var_wwpn_FC_ContB-BE3-fabricB	
FC_ContB-BE4-fabricB	Switch B FC12	var_wwpn_FC_ContB-BE4-fabricB	
FC_ContA-FE1-fabricA	Switch A FC5	var_wwpn_FC_ContA-FE1-fabricA	
FC_ContA-FE2-fabricB	Switch B FC5	var_wwpn_FC_ContA-FE2-fabricB	
FC_ContA-FE3-fabricA	Switch A FC6	var_wwpn_FC_ContA-FE3-fabricA	
FC_ContA-FE4-fabricB	Switch B FC6	var_wwpn_FC_ContA-FE4-fabricB	

Source	Switch/ Port	Variable	WWPN
FC_ContB-FE1-fabricA	Switch A FC7	var_wwpn_FC_ContB-FE1-fabricA	
FC_ContB-FE2-fabricB	Switch B FC7	var_wwpn_FC_ContB-FE2-fabricB	
FC_ContB-FE3-fabricA	Switch A FC8	var_wwpn_FC_ContB-FE3-fabricA	
FC_ContB-FE4-fabricB	Switch B FC8	var_wwpn_FC_ContB-FE4-fabricB	
VM-Host-infra-01-A	Switch A	var_wwpn_VM-Host-Infra-01-A	
VM-Host-infra-01-B	Switch B	var_wwpn_VM-Host-Infra-01-B	
VM-Host-infra-02-A	Switch A	var_wwpn_VM-Host-Infra-02-A	
VM-Host-infra-02-B	Switch B	var_wwpn_VM-Host-Infra-02-B	
VM-Host-infra-03-B	Switch A	var_wwpn_VM-Host-Infra-03-A	
VM-Host-infra-03-B	Switch B	var_wwpn_VM-Host-Infra-03-B	
VM-Host-infra-04-B	Switch A	var_wwpn_VM-Host-Infra-04-A	
VM-Host-infra-04-B	Switch B	var_wwpn_VM-Host-Infra-04-B	

VersaStack Cabling

VersaStack Build Process



VersaStack Cabling

The information in this section is provided as a reference for cabling the equipment in a VersaStack environment. To simplify cabling requirements, the tables include both local and remote device and port locations.

The tables in this section contain details for the prescribed and supported configuration of the IBM FlashSystem V9000 running 7.4.1.2.

This document assumes that out-of-band management ports are plugged into an existing management infrastructure at the deployment site. These interfaces will be used in various configuration steps

Be sure to follow the cabling directions in this section. Failure to do so will result in changes to the deployment procedures that follow because specific port locations are mentioned.

It is possible to order IBM FlashSystem V9000 systems in a different configuration from what is presented in the tables in this section. Before starting, be sure that the configuration matches the descriptions in the tables and diagrams in this section.

Figure 4 illustrates the cabling diagrams for VersaStack configurations using the Cisco Nexus 9000 and IBM FlashSystem V9000. For more information about FlashSystem V9000 enclosure cabling information, reference the following URL:

https://www-01.ibm.com/support/knowledgecenter/STKMQV_7.5.0/com.ibm.storage.vflashsystem9000.7.5.doc/v9000_cblng_16gb_csco_bb1_copy.html?lang=en

Figure 4 VersaStack Wiring

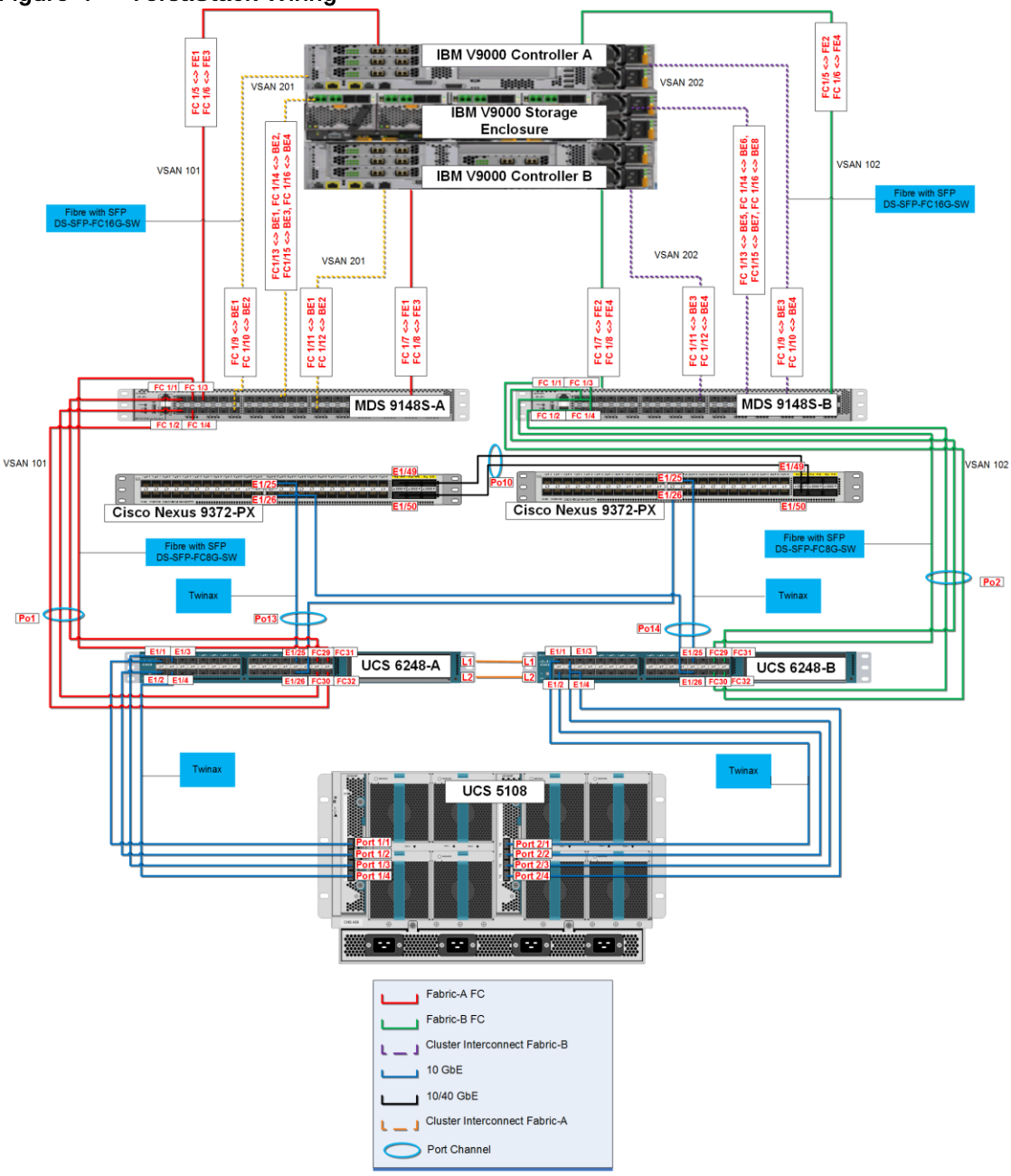
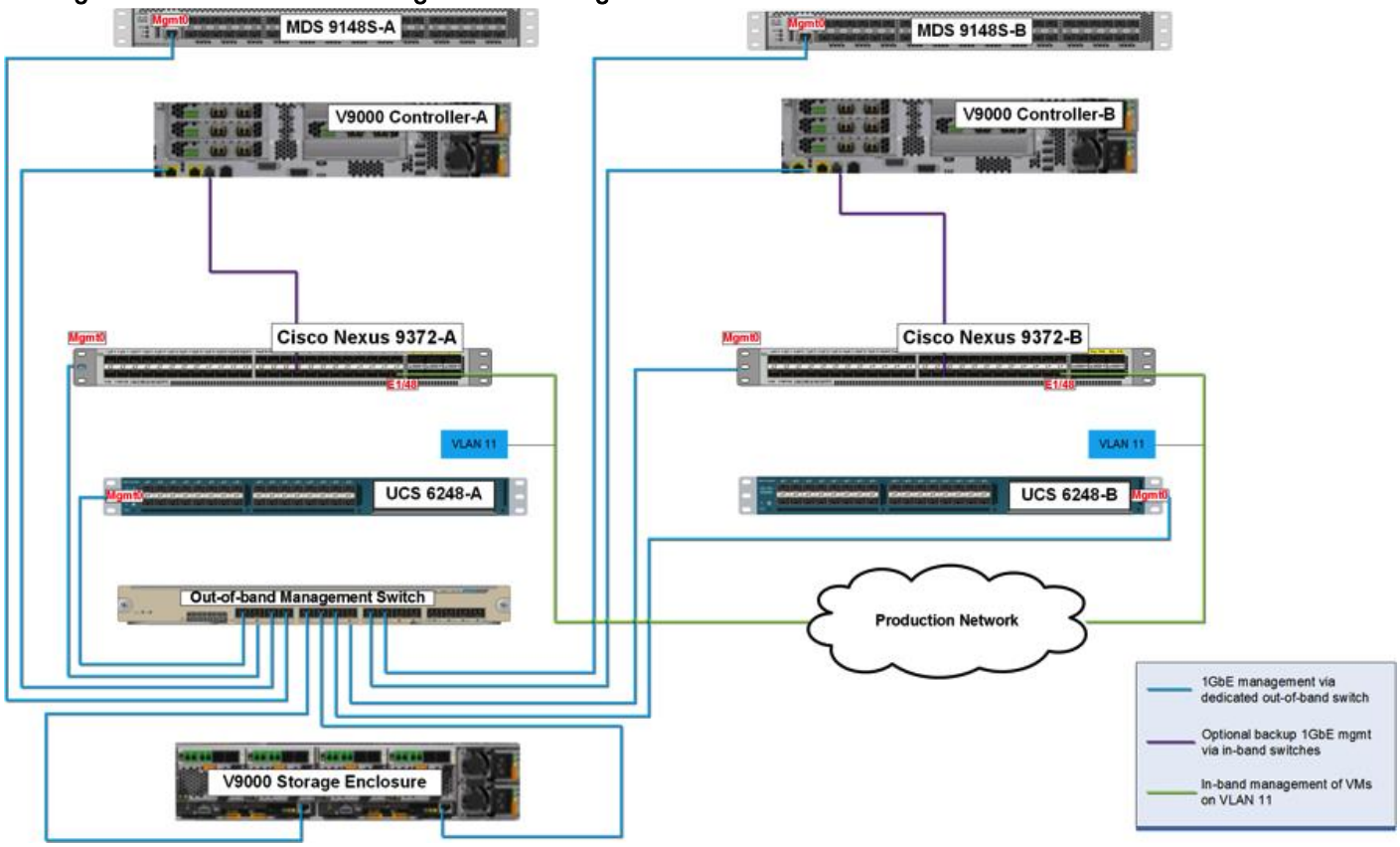


Figure 5 shows the Management cabling. The V9000's have redundant management connections. One path is through the dedicated out-of-band management switch, and the secondary path is through the in-band management path going up through the 9k to the production network.

Figure 5 VersaStack Management Cabling



The tables below provide the details of all the connections in use.

Table 8 Cisco Nexus 9000-A Cabling Information

Local Device	Local Port	Connection	Remote Device	Remote Port
Cisco Nexus 9000-A	Eth1/25	10GbE	Cisco UCS fabric interconnect-A	Eth1/25
	Eth1/26	10GbE	Cisco UCS fabric interconnect-B	Eth1/26
	Eth1/49	40GbE	Cisco Nexus 9000-B	Eth1/49
	Eth1/50	40GbE	Cisco Nexus 9000-B	Eth1/50
	Eth1/48	GbE	GbE management switch	Any

For devices requiring GbE connectivity, use the GbE Copper SFP+s (GLC-T=).

Table 9 Cisco Nexus 9000-B Cabling Information

Local Device	Local Port	Connection	Remote Device	Remote Port
Cisco Nexus 9000-B	Eth1/25	10GbE	Cisco UCS fabric interconnect-B	Eth1/25
	Eth1/26	10GbE	Cisco UCS fabric interconnect-A	Eth1/26
	Eth1/49	40GbE	Cisco Nexus 9000-A	Eth1/49
	Eth1/50	40GbE	Cisco Nexus 9000-A	Eth1/50
	Eth1/48	GbE	GbE management switch	Any

For devices requiring GbE connectivity, use the GbE Copper SFP+s (GLC-T=).

Figure 6 IBM V9000 Storage Day-0 Fibre Cabling Reference

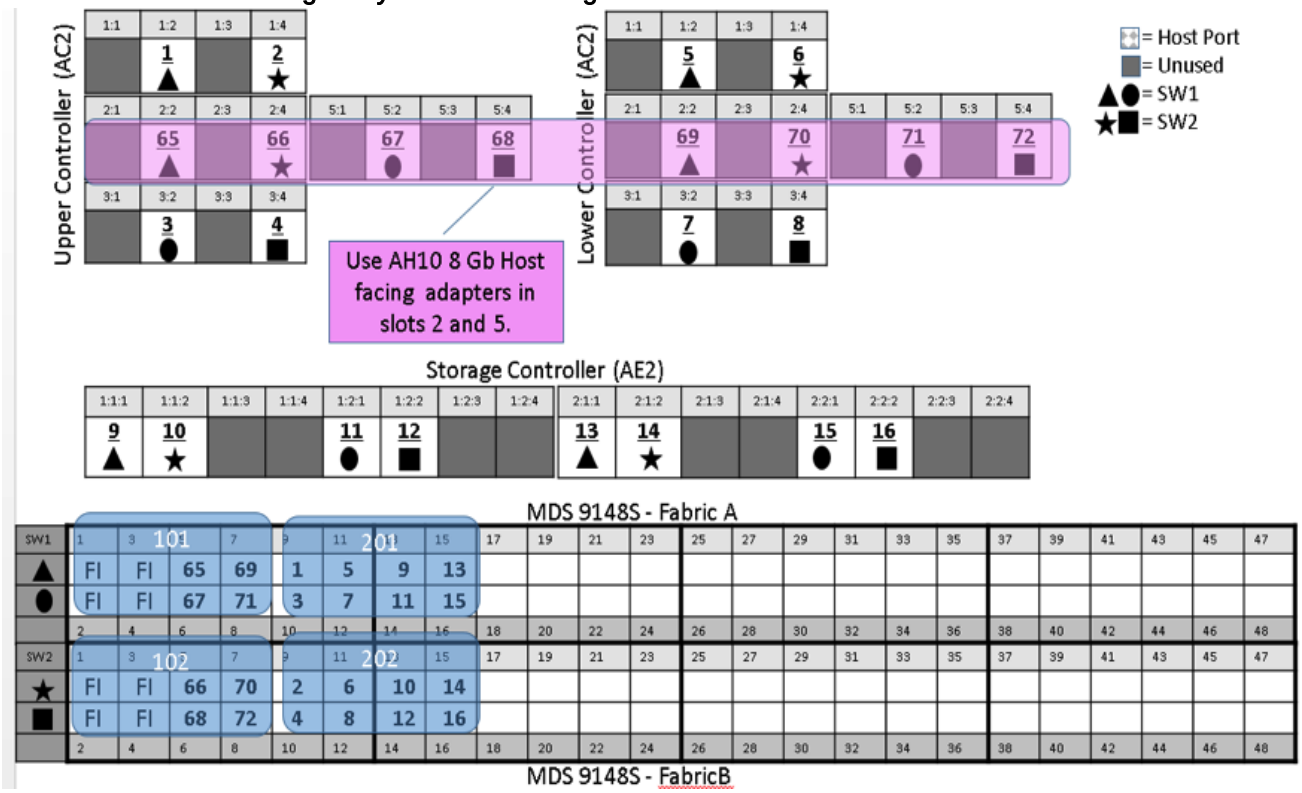


Table 10 Cisco Nexus MDS 9148S-A Cabling Reference to Switch Port Correlation

Naming on Switch	Switch/ Port	Cabling reference
FC_SE-BE1-fabricA	Switch A FC13	9
FC_SE-BE2-fabricA	Switch A FC14	11
FC_SE-BE3-fabricA	Switch A FC15	13
FC_SE-BE4-fabricA	Switch A FC16	15
FC_ContA-BE1-fabricA	Switch A FC9	1
FC_ContA-BE2-fabricA	Switch A FC10	3
FC_ContB-BE1-fabricA	Switch A FC11	5
FC_ContB-BE2-fabricA	Switch A FC12	7
FC_ContA-FE1-fabricA	Switch A FC5	65
FC_ContA-FE3-fabricA	Switch A FC6	67
FC_ContB-FE1-fabricA	Switch A FC7	69
FC_ContB-FE3-fabricA	Switch A FC8	71

Table 11 Cisco Nexus MDS 9148S-B Cabling Reference Correlation

Naming on Switch	Switch/ Port	Cabling reference
FC_SE-BE5-fabricB	Switch B FC13	10
FC_SE-BE6-fabricB	Switch B FC14	12
FC_SE-BE7-fabricB	Switch B FC15	14
FC_SE-BE8-fabricB	Switch B FC16	16
FC_ContA-BE3-fabricB	Switch B FC9	2
FC_ContA-BE4-fabricB	Switch B FC10	4
FC_ContB-BE3-fabricB	Switch B FC11	6
FC_ContB-BE4-fabricB	Switch B FC12	8
FC_ContA-FE2-fabricB	Switch B FC5	66
FC_ContA-FE4-fabricB	Switch B FC6	68
FC_ContB-FE2-fabricB	Switch B FC7	70
FC_ContB-FE4-fabricB	Switch B FC8	72

IBM FlashSystem V9000 Controllers and MDS 9148S switches are 16gbps capable; 16gbps ports have been used for back-end cluster connectivity between the controllers and the storage enclosure and 8gbps ports have been utilized for host connectivity from the V9000 controllers to the Cisco UCS Fabric interconnects.

Table 12 IBM FlashSystem V9000 Controller, Cont-A Cabling Information

Local Device	Local Port	Connection	Remote Device	Remote Port
IBM FlashSystem V9000 Controller, Cont-A	E1	GbE	GbE management switch	Any
	E2 (optional)	GbE	Cisco Nexus 9000-A	Any
	FC1 (Slot2:Port2)	8gbps	MDS 9148S-A	fc1/5
	FC2 (Slot2:Port4)	8gbps	MDS 9148S-B	fc1/5
	FC3 (Slot5:Port2)	8gbps	MDS 9148S-A	fc1/6
	FC4 (Slot5:Port4)	8gbps	MDS 9148S-B	fc1/6

Local Device	Local Port	Connection	Remote Device	Remote Port
	FC5 (Slot1:Port2)	16gbps	MDS 9148S-A	fc1/9
	FC6 (Slot1:Port4)	16gbps	MDS 9148S-A	fc1/10
	FC7 (Slot3:Port2)	16gbps	MDS 9148S-B	fc1/9
	FC8 (Slot3:Port4)	16gbps	MDS 9148S-B	fc1/10

Table 13 IBM FlashSystem V9000 Controller, Cont-B Cabling Information

Local Device	Local Port	Connection	Remote Device	Remote Port
IBM FlashSystem V9000 Controller, Cont-B	E1	GbE	GbE management switch	Any
	E2 (optional)	GbE	Cisco Nexus 9000-B	Any
	FC1 (Slot2:Port2)	8gbps	MDS 9148S-A	fc1/7
	FC2 (Slot2:Port4)	8gbps	MDS 9148S-B	fc1/7
	FC3 (Slot5:Port2)	8gbps	MDS 9148S-A	fc1/8
	FC4 (Slot5:Port4)	8gbps	MDS 9148S-B	fc1/8
	FC5 (Slot1:Port2)	16gbps	MDS 9148S-A	fc1/11
	FC6 (Slot1:Port4)	16gbps	MDS 9148S-A	fc1/12
	FC7 (Slot3:Port2)	16gbps	MDS 9148S-B	fc1/11
	FC8 (Slot3:Port4)	16gbps	MDS 9148S-B	fc1/12

Table 14 IBM FlashSystem V9000 Storage Enclosure, SE Cabling Information

Local Device	Local Port	Connection	Remote Device	Remote Port
IBM FlashSystem V9000 Stor-	E1	GbE	GbE management switch	Any

Local Device	Local Port	Connection	Remote Device	Remote Port
age Enclosure, SE	E2	GbE	GbE management switch	Any
	FC1	16gbps	MDS 9148S-A	fc1/13
	FC2	16gbps	MDS 9148S-A	fc1/14
	FC3	16gbps	MDS 9148S-A	fc1/15
	FC4	16gbps	MDS 9148S-A	fc1/16
	FC5	16gbps	MDS 9148S-B	fc1/13
	FC6	16gbps	MDS 9148S-B	fc1/14
	FC7	16gbps	MDS 9148S-B	fc1/15
	FC8	16gbps	MDS 9148S-B	fc1/16

Table 15 Cisco Nexus MDS 9148S-A Cabling Information

Local Device	Local Port	Connection	Remote Device	Remote Port
Cisco MDS 9148S-A	Mgmt0	GbE	GbE management switch	Any
	fc1/1	8gbps	UCS Fabric Interconnect 6248-A	fc29
	fc1/2	8gbps	UCS Fabric Interconnect 6248-A	fc30
	fc1/3	8gbps	UCS Fabric Interconnect 6248-A	fc31
	fc1/4	8gbps	UCS Fabric Interconnect 6248-A	fc32
	fc1/5	8gbps	IBM controller, ContA-FE1	FC1
	fc1/6	8gbps	IBM controller, ContA-FE3	FC3
	fc1/7	8gbps	IBM controller, ContB-FE1	FC1
	fc1/8	8gbps	IBM controller, ContB-FE3	FC3
	fc1/9	16gbps	IBM controller, ContA-BE1	FC5
	fc1/10	16gbps	IBM controller, ContA-BE2	FC6
	fc1/11	16gbps	IBM controller, ContB-BE1	FC5
	fc1/12	16gbps	IBM controller, ContB-BE2	FC6
	fc1/13	16gbps	IBM Storage Enclosure, SE-BE1	FC1
	fc1/14	16gbps	IBM Storage Enclosure, SE-BE2	FC2
	fc1/15	16gbps	IBM Storage Enclosure, SE-BE3	FC3
	fc1/16	16gbps	IBM Storage Enclosure, SE-BE4	FC4

Table 16 Cisco Nexus MDS 9148S-B Cabling Information

Local Device	Local Port	Connection	Remote Device	Remote Port
Cisco MDS 9148S-B	Mgmt0	GbE	GbE management switch	Any
	fc1/1	8gbps	UCS Fabric Interconnect 6248-B	fc29
	fc1/2	8gbps	UCS Fabric Interconnect 6248-B	fc30
	fc1/3	8gbps	UCS Fabric Interconnect 6248-B	fc31
	fc1/4	8gbps	UCS Fabric Interconnect 6248-B	fc32
	fc1/5	8gbps	IBM controller, ContA-FE2	FC2
	fc1/6	8gbps	IBM controller, ContA-FE4	FC4
	fc1/7	8gbps	IBM controller, ContB-FE2	FC2
	fc1/8	8gbps	IBM controller, ContB-FE4	FC4
	fc1/9	16gbps	IBM controller, ContA-BE3	FC7
	fc1/10	16gbps	IBM controller, ContA-BE4	FC8
	fc1/11	16gbps	IBM controller, ContB-BE3	FC7
	fc1/12	16gbps	IBM controller, ContB-BE4	FC8
	fc1/13	16gbps	IBM Storage Enclosure, SE-BE5	FC5
	fc1/14	16gbps	IBM Storage Enclosure, SE-BE6	FC6
	fc1/15	16gbps	IBM Storage Enclosure, SE-BE7	FC7
	fc1/16	16gbps	IBM Storage Enclosure, SE-BE8	FC8

Table 17 Cisco UCS Fabric Interconnect A Cabling Information

Local Device	Local Port	Connection	Remote Device	Remote Port
Cisco UCS fabric interconnect-A	Mgmt0	GbE	GbE management switch	Any
	Eth1/25	10GbE	Cisco Nexus 9000-A	Eth 1/25
	Eth1/26	10GbE	Cisco Nexus 9000-B	Eth 1/26
	Eth1/1	10GbE	Cisco UCS Chassis FEX-A	IOM 1/1
	Eth1/2	10GbE	Cisco UCS Chassis FEX-A	IOM 1/2
	Eth1/3	10GbE	Cisco UCS Chassis FEX-A	IOM 1/3
	Eth1/4	10GbE	Cisco UCS Chassis FEX-A	IOM 1/4
	fc29	8gbps	Cisco MDS 9148S-A	fc1/1
	fc30	8gbps	Cisco MDS 9148S-A	fc1/2
	fc31	8gbps	Cisco MDS 9148S-A	fc1/3

Local Device	Local Port	Connection	Remote Device	Remote Port
	fc32	8gbps	Cisco MDS 9148S-A	fc1/4
	L1	GbE	Cisco UCS fabric interconnect-B	L1
	L2	GbE	Cisco UCS fabric interconnect-B	L2

Table 18 Cisco UCS Fabric Interconnect B Cabling Information

Local Device	Local Port	Connection	Remote Device	Remote Port
Cisco UCS fabric interconnect-B	Mgmt0	GbE	GbE management switch	Any
	Eth1/25	10GbE	Cisco Nexus 9000-B	Eth 1/25
	Eth1/26	10GbE	Cisco Nexus 9000-A	Eth 1/26
	Eth1/1	10GbE	Cisco UCS Chassis FEX-B	IOM 1/1
	Eth1/2	10GbE	Cisco UCS Chassis FEX-B	IOM 1/2
	Eth1/3	10GbE	Cisco UCS Chassis FEX-B	IOM 1/3
	Eth1/4	10GbE	Cisco UCS Chassis FEX-B	IOM 1/4
	fc29	8gbps	Cisco MDS 9148S-B	fc1/1
	fc30	8gbps	Cisco MDS 9148S-B	fc1/2
	fc31	8gbps	Cisco MDS 9148S-B	fc1/3
	fc32	8gbps	Cisco MDS 9148S-B	fc1/4
	L1	GbE	Cisco UCS fabric interconnect-A	L1
	L2	GbE	Cisco UCS fabric interconnect-A	L2

Cisco UCS C-Series can be connected to the FI directly or using FEX, the system validation had Cisco UCS C-Series directly connected to the Fabric Interconnects.

Table 19 Connectivity with Direct Connect to FI

Local Device	Local Port	Connection	Remote Device	Remote Port
Cisco UCS C-Series Server 1 with Cisco VIC	Port 0	10GbE	UCS Fabric Interconnect 6248-A	Port 5
	Port 1	10GbE	UCS Fabric Interconnect 6248-B	Port 6
Cisco UCS C-Series Server 2 with Cisco VIC	Port 0	10GbE	UCS Fabric Interconnect 6248-A	Port 7
	Port 1	10GbE	UCS Fabric Interconnect 6248-B	Port 8

Table 20 Cisco Nexus Rack FEX A Example Connectivity Option

Local Device	Local Port	Connection	Remote Device	Remote Port
Cisco Nexus 2232PP FEX A	Fabric Port 1/1	10GbE	Cisco UCS fabric interconnect A	Port 5
	Fabric Port 1/2	10GbE	Cisco UCS fabric interconnect A	Port 6

Table 21 Cisco Nexus Rack FEX B

Local Device	Local Port	Connection	Remote Device	Remote Port
Cisco Nexus 2232PP FEX B	Fabric Port 1/1	10GbE	Cisco UCS fabric interconnect B	Port 5
	Fabric Port 1/2	10GbE	Cisco UCS fabric interconnect B	Port 6

VersaStack Deployment

Cisco Nexus 9000 Initial Configuration Setup

This section provides the details for the initial Cisco Nexus 9000 Switch setup.

Cisco Nexus A

To set up the initial configuration for the first Cisco Nexus switch complete the following steps:

On initial boot and connection to the serial or console port of the switch, the NX-OS setup should automatically start and attempt to enter Power on Auto Provisioning.

```
Abort Auto Provisioning and continue with normal setup ?(yes/no)[n]: y

        ---- System Admin Account Setup ----

Do you want to enforce secure password standard (yes/no) [y]:

    Enter the password for "admin":

  Confirm the password for "admin":

        ---- Basic System Configuration Dialog VDC: 1 ----

This setup utility will guide you through the basic configuration of the system.
Setup configures only enough connectivity for management of the system.

Please register Cisco Nexus9000 Family devices promptly with your supplier.
Failure to register may affect response times for initial service calls.
Nexus9000 devices must be registered to receive entitled support services.

Press Enter at anytime to skip a dialog. Use ctrl-c at anytime to skip the
remaining dialogs.

Would you like to enter the basic configuration dialog (yes/no): y

  Create another login account (yes/no) [n]: n

  Configure read-only SNMP community string (yes/no) [n]:

  Configure read-write SNMP community string (yes/no) [n]:

  Enter the switch name : <<var_nexus_A_hostname>>

  Continue with Out-of-band (mgmt0) management configuration? (yes/no) [y]:

 Mgmt0 IPv4 address : <<var_nexus_A_mgmt0_ip>>

 Mgmt0 IPv4 netmask : <<var_nexus_A_mgmt0_netmask>>
 Configure the default gateway? (yes/no) [y]:

 IPv4 address of the default gateway : <<var_nexus_A_mgmt0_gw>>

 Configure advanced IP options? (yes/no) [n]:
```

```
 Enable the telnet service? (yes/no) [n]:
 Enable the ssh service? (yes/no) [y]:
    Type of ssh key you would like to generate (dsa/rsa) [rsa]:
    Number of rsa key bits <1024-2048> [1024]: 2048
  Configure the ntp server? (yes/no) [n]: y
    NTP server IPv4 address : <<var_global_ntp_server_ip>>
 Configure default interface layer (L3/L2) [L2]:
  Configure default switchport interface state (shut/noshut) [noshut]:
  Configure CoPP system profile (strict/moderate/lenient/dense/skip) [strict]:
The following configuration will be applied:
  password strength-check
switchname <<var_nexus_A_hostname>>
vrf context management
 ip route 0.0.0.0/0 <<var_nexus_A_mgmt0_gw>>
exit
 no feature telnet
ssh key rsa 2048 force
 feature ssh
ntp server <<var_global_ntp_server_ip>>
system default switchport
 no system default switchport shutdown
 copp profile strict
interface mgmt0 ip address <<var_nexus_A_mgmt0_ip>><var_nexus_A_mgmt0_netmask>>
no shutdown
Would you like to edit the configuration? (yes/no) [n]:
Use this configuration and save it? (yes/no) [y]:
[########################################] 100% Copy complete.
```

Cisco Nexus B

To set up the initial configuration for the second Cisco Nexus switch complete the following steps:

On initial boot and connection to the serial or console port of the switch, the NX-OS setup should automatically start and attempt to enter Power on Auto Provisioning.

```
Abort Auto Provisioning and continue with normal setup ?(yes/no)[n]: y

         ---- System Admin Account Setup ----

Do you want to enforce secure password standard (yes/no) [y]:

    Enter the password for "admin":

  Confirm the password for "admin":

         ---- Basic System Configuration Dialog VDC: 1 ---This setup utility will
guide you through the basic configuration of the system. Setup configures only
enough connectivity for management of the system.

Please register Cisco Nexus9000 Family devices promptly with your supplier.
Failure to register may affect response times for initial service calls.
Nexus9000 devices must be registered to receive entitled support services.

Press Enter at anytime to skip a dialog. Use ctrl-c at anytime to skip the
remaining dialogs.

Would you like to enter the basic configuration dialog (yes/no): y

  Create another login account (yes/no) [n]: n

  Configure read-only SNMP community string (yes/no) [n]:

  Configure read-write SNMP community string (yes/no) [n]:

  Enter the switch name : <<var_nexus_B_hostname>>

  Continue with Out-of-band (mgmt0) management configuration? (yes/no) [y]:

    Mgmt0 IPv4 address : <<var_nexus_B_mgmt0_ip>>

    Mgmt0 IPv4 netmask : <<var_nexus_B_mgmt0_netmask>>

Configure the default gateway? (yes/no) [y]:

    IPv4 address of the default gateway : <<var_nexus_B_mgmt0_gw>>

  Configure advanced IP options? (yes/no) [n]:

  Enable the telnet service? (yes/no) [n]:

  Enable the ssh service? (yes/no) [y]:

    Type of ssh key you would like to generate (dsa/rsa) [rsa]:

    Number of rsa key bits <1024-2048> [1024]: 2048

  Configure the ntp server? (yes/no) [n]: y

    NTP server IPv4 address : <<var_global_ntp_server_ip>>

  Configure default interface layer (L3/L2) [L2]:

  Configure default switchport interface state (shut/noshut) [noshut]:

  Configure CoPP system profile (strict/moderate/lenient/dense/skip) [strict]:

The following configuration will be applied:
```

```
password strength-check

switchname <<var_nexus_B_hostname>>

vrf context management

ip route 0.0.0.0/0 <<var_nexus_B_mgmt0_gw>>

exit

 no feature telnet

ssh key rsa 2048 force

 feature ssh

ntp server <<var_global_ntp_server_ip>>

system default switchport

 no system default switchport shutdown

 copp profile strict

interface mgmt0 ip address <<var_nexus_B_mgmt0_ip>><<var_nexus_B_mgmt0_netmask>>
no shutdown

Would you like to edit the configuration? (yes/no) [n]:

Use this configuration and save it? (yes/no) [y]:

[########################################] 100% Copy complete.
```

Enable the Appropriate Cisco Nexus 9000 Features and Settings

Cisco Nexus 9000 A and Cisco Nexus 9000 B

To enable IP switching feature and set default spanning tree behaviors, complete the following steps:

1. On each Nexus 9000, enter configuration mode:

```
config terminal
```

2. Use the following commands to enable the necessary features:

```
feature udld

feature lacp

feature vpc
```

3. Configure spanning tree and save the running configuration to start-up:

```
spanning-tree port type network default
spanning-tree port type edge bpduguard default
spanning-tree port type edge bpdufilter default
copy run start
```

Create VLANs for VersaStack Traffic

Cisco Nexus 9000 A and Cisco Nexus 9000 B

To create the necessary virtual local area networks (VLANs), complete the following step on both switches:

1. From the configuration mode, run the following commands:

```
vlan <<var_ib-mgmt_vlan_id>>

name IB-MGMT-VLAN
vlan <<var_native_vlan_id>>

name Native-VLAN

vlan <<var_nfs_vlan_id>>

name NFS-VLAN

vlan <<var_vmotion_vlan_id>>

name vMotion-VLAN

vlan <<var_vm_traffic_vlan_id>>

name VM-Traffic-VLAN

exit
copy run start
```

Configure Virtual Port Channel Domain

Cisco Nexus 9000 A

To configure virtual port channels (vPCs) for switch A, complete the following steps:

1. From the global configuration mode, create a new vPC domain:
   `vpc domain <<var_nexus_vpc_domain_id>>`

2. Make Nexus 9000A the primary vPC peer by defining a low priority value:
   `role priority 10`

3. Use the management interfaces on the supervisors of the Nexus 9000s to establish a keepalive link:

```
peer-keepalive destination <<var_nexus_B_mgmt0_ip>>  source
<<var_nexus_A_mgmt0_ip>>
```

4. Enable following features for this vPC domain:

```
peer-switch
delay restore 150
peer-gateway
ip arp synchronize
auto-recovery
copy run start
```

Cisco Nexus 9000 B

To configure vPCs for switch B, complete the following steps:

1. From the global configuration mode, create a new vPC domain:

```
vpc domain <<var_nexus_vpc_domain_id>>
```

2. Make Nexus 9000A the primary vPC peer by defining a low priority value:

```
role priority 20
```

3. Use the management interfaces on the supervisors of the Nexus 9000s to establish a keepalive link:

```
peer-keepalive destination <<var_nexus_A_mgmt0_ip>> source
<<var_nexus_B_mgmt0_ip>>
```

4. Enable following features for this vPC domain:

```
peer-switch
delay restore 150
peer-gateway
ip arp synchronize
auto-recovery
copy run start
```

Configure Network Interfaces for the VPC Peer Links

Cisco Nexus 9000 A

1. Define a port description for the interfaces connecting to VPC Peer <var_nexus_B_hostname>>.

```
interface Eth1/49
description VPC Peer <<var_nexus_B_hostname>>:1/47
interface Eth1/50

description VPC Peer <<var_nexus_B_hostname>>:1/48
```

2. Apply a port channel to both VPC Peer links and bring up the interfaces.

```
interface Eth1/49,Eth1/50
channel-group 10  mode active
no shutdown
```

3. Define a description for the port-channel connecting to <<var_nexus_B_hostname>>.

```
interface Po10

description vPC peer-link
```

4. Make the port-channel a switchport, and configure a trunk to allow in-band management, NFS, VM traffic, and the native VLAN.

```
switchport
```

```
switchport mode trunk

switchport trunk native vlan <<var_native_vlan_id>>

switchport trunk allowed vlan <<var_ib-mgmt_vlan_id>>,
<<var_nfs_vlan_id>>,<<var_vmotion_vlan_id>>, <<var_vm_traffic_vlan_id>>,
```

5. Make this port-channel the VPC peer link and bring it up.

```
vpc peer-link
no shutdown
copy run start
```

Cisco Nexus 9000 B

1. Define a port description for the interfaces connecting to VPC Peer <var_nexus_A_hostname>>.

```
interface Eth1/49
 description VPC Peer <<var_nexus_A_hostname>>:1/47
 interface  Eth1/50
 description VPC Peer <<var_nexus_A_hostname>>:1/48
```

2. Apply a port channel to both VPC Peer links and bring up the interfaces.

```
interface Eth1/49,Eth1/50
channel-group 10 mode active
no shutdown
```

3. Define a description for the port-channel connecting to <<var_nexus_A_hostname>>.

```
interface Po10
description vPC peer-link
```

4. Make the port-channel a switchport, and configure a trunk to allow in-band management, NFS, VM traffic, and the native VLAN.

```
switchport
switchport mode trunk
switchport trunk native vlan <<var_native_vlan_id>>
switchport trunk allowed vlan <<var_ib-mgmt_vlan_id>>, <<var_nfs_vlan_id>>,
<<var_vmotion_vlan_id>>, <<var_vm_traffic_vlan_id>>,
```

5. Make this port-channel the VPC peer link and bring it up.

```
vpc peer-link
no shutdown

copy run start
```

Configure Network Interfaces to Cisco UCS Fabric Interconnect

Cisco Nexus 9000 A

1. Define a description for the port-channel connecting to <<var_ucs_clustername>>-A.

```
interface Po13
```

```
description <<var_ucs_clustername>>-A
```

2. Make the port-channel a switchport, and configure a trunk to allow in-band management, NFS, VM traffic, and the native VLANs.

```
switchport

switchport mode trunk

switchport trunk native vlan <<var_native_vlan_id>>

switchport trunk allowed vlan <<var_ib-mgmt_vlan_id>>,
<<var_nfs_vlan_id>>,<<var_vmotion_vlan_id>>, <<var_vm_traffic_vlan_id>>,
```

3. Make the port channel and associated interfaces spanning tree edge ports.

```
spanning-tree port type edge trunk

Set the MTU to be 9216 to support jumbo frames.

mtu 9216
```

4. Make this a VPC port-channel and bring it up.

```
vpc 13
no shutdown
```

5. Define a port description for the interface connecting to <<var_ucs_clustername>>-A.

```
interface Eth1/25

description <<var_ucs_clustername>>-A:1/25
```

6. Apply it to a port channel and bring up the interface.

```
channel-group 13 force mode active
no shutdown
```

7. Define a description for the port-channel connecting to <<var_ucs_clustername>>-B

```
interface Po14

description <<var_ucs_clustername>>-B
```

8. Make the port-channel a switchport, and configure a trunk to allow InBand management, NFS, and VM traffic VLANs and the native VLAN.

```
switchport

switchport mode trunk

switchport trunk native vlan <<var_native_vlan_id>>

switchport trunk allowed vlan <<var_ib-mgmt_vlan_id>>, <<var_nfs_vlan_id>>,
<<var_vmotion_vlan_id>>, <<var_vm_traffic_vlan_id>>
```

9. Make the port channel and associated interfaces spanning tree edge ports.

```
spanning-tree port type edge trunk
```

10. Set the MTU to be 9216 to support jumbo frames.

```
mtu 9216
```

11. Make this a VPC port-channel and bring it up.

```
vpc 14
no shutdown
```

12. Define a port description for the interface connecting to <<var_ucs_clustername>>-B.

```
interface Eth1/26

description <<var_ucs_clustername>>-B:1/26
```

13. Apply it to a port channel and bring up the interface.

```
channel-group 14 force  mode active
no shutdown
copy run start
```

Configure Network Interfaces to Cisco UCS Fabric Interconnect

Cisco Nexus 9000 B

1. Define a description for the port-channel connecting to <<var_ucs_clustername>>-B.

```
interface Po14

description <<var_ucs_clustername>>-B
```

2. Make the port-channel a switchport, and configure a trunk to allow in-band management, NFS, VM traffic, and the native VLANs.

```
switchport

switchport mode trunk

switchport trunk native vlan <<var_native_vlan_id>>

switchport trunk allowed vlan <<var_ib-mgmt_vlan_id>>, <<var_nfs_vlan_id>>,
<<var_vmotion_vlan_id>>, <<var_vm_traffic_vlan_id>>
```

3. Make the port channel and associated interfaces spanning tree edge ports.

```
spanning-tree port type edge trunk
```

4. Set the MTU to be 9216 to support jumbo frames.

```
mtu 9216
```

5. Make this a VPC port-channel and bring it up.

```
vpc 14
no shutdown
```

6. Define a port description for the interface connecting to <<var_ucs_clustername>>-B.

```
interface Eth1/25

description <<var_ucs_clustername>>-B:1/25
```

7. Apply it to a port channel and bring up the interface.

```
channel-group 14 force mode active
no shutdown
```

8. Define a description for the port-channel connecting to <<var_ucs_clustername>>-A.

```
interface Po13

description <<var_ucs_clustername>>-A
```

9. Make the port-channel a switchport, and configure a trunk to allow InBand management, NFS, and VM traffic VLANs and the native VLAN.

```
switchport

switchport mode trunk
switchport trunk native vlan <<var_native_vlan_id>>

switchport trunk allowed vlan <<var_ib-mgmt_vlan_id>>, <<var_nfs_vlan_id>>,
<<var_vmotion_vlan_id>>, <<var_vm_traffic_vlan_id>>,
```

10. Make the port channel and associated interfaces spanning tree edge ports.

```
spanning-tree port type edge trunk
```

11. Set the MTU to be 9216 to support jumbo frames.

```
mtu 9216
```

12. Make this a VPC port-channel and bring it up.

```
vpc 13
no shutdown
```

13. Define a port description for the interface connecting to <<var_ucs_clustername>>-A.

```
interface Eth1/26
description <<var_ucs_clustername>>-A:1/26
```

14. Apply it to a port channel and bring up the interface.

```
channel-group 13 force  mode active
no shutdown
copy run start
```

Management Plane Access for Servers and Virtual Machines

There are multiple ways to configure the switch to uplink to your separate management switch. There are two examples shown below. These examples provide to help show you a method on how your configuration

could be setup, however since networking configurations can vary, we recommend you consult your local network personal for the optimal configuration. In the first example provided in this section, a single switch is top of rack and the Cisco Nexus 9000 series switches are both connected to it through its ports #48. The Cisco 9k switches are using a 1 gig SFP to convert the connected to Cat-5 copper connecting to the top of rack switch, however connection types can vary. The 9k's are configured with the interface-vlan option and each 9k switch has a unique IP for its VLAN. The traffic we wish to route from the 9k is the in-band management traffic, so we will use the vlan 11 and set the port to access mode. The top of rack switch also has it ports set to access mode. In the second example, we show how to leverage port channel which maximizes upstream connectivity. In the second example, the top of rack switch would have port channel configured as well.

Cisco Nexus 9000 A and B using Interface VLAN Example 1

On the Nexus A switch type the following commands. Notice the VLAN IP is different on each switch.

Cisco Nexus 9000 A

```
int Eth1/48
description IB-management-access
switchport mode access
spanning-tree port type network
switchport access vlan <<var_ib-mgmt_vlan_id>>
no shut
feature interface-vlan
int Vlan <<var_ib-mgmt_vlan_id>>
ip address <<var_switch_A_inband_mgmt_ip_address>>/<<var_inband_mgmt_netmask>>
no shut
ip route 0.0.0.0/0 <<var_inband_mgmt_gateway>>
copy run start
```

Cisco Nexus 9000 B

```
int Eth1/48
description Ib-management-access
switchport mode access
spanning-tree port type network
switchport access vlan <<var_ib-mgmt_vlan_id>>
no shut
feature interface-vlan
int Vlan <<var_ib-mgmt_vlan_id>>
ip address <<var_switch_B_inband_mgmt_ip_address>>/<<var_inband_mgmt_netmask>>
no shut
ip route 0.0.0.0/0 <<var_inband_mgmt_gateway>>
copy run start
```

Cisco Nexus 9000 A and B using Port Channel Example 2

To enable management access across the IP switching environment leveraging port channel in config mode, complete the following steps:

1. Define a description for the port-channel connecting to management switch.

```
interface po11
description IB-MGMT
```

2. Configure the port as an access VLAN carrying the InBand management VLAN traffic.

```
switchport
switchport mode access
switchport access vlan <<var_ib-mgmt_vlan_id>>
```

3. Make the port channel and associated interfaces normal spanning tree ports.

```
 spanning-tree port type normal
```

4. Make this a VPC port-channel and bring it up.

```
vpc 11
no shutdown
```

5. Define a port description for the interface connecting to the management plane.

```
interface Eth1/48
description IB-MGMT-SWITCH_uplink
```

6. Apply it to a port channel and bring up the interface.

```
channel-group 11 force mode active
no shutdown
```

7. Save the running configuration to start-up in both Nexus 9000s and run commands to look at port and port channel.

```
Copy run start
sh int eth1/48 br
sh port-channel summary
```

Cisco MDS 9148S Initial Configuration Setup

These steps provide details for the initial Cisco MDS Fibre Channel Switch setup. We will zone the storage prior to creating the FlashSystem V9000 Cluster so the all the nodes can communicate to each other.

Cisco MDS A

To set up the initial configuration for the first Cisco MDS switch complete the following steps:

On initial boot and connection to the serial or console port of the switch, the NX-OS setup should automatically start and attempt to enter Power on Auto Provisioning.

1. On initial boot and connection to the serial or console port of the switch, the MDS setup should automatically start and attempt to enter Power on Auto Provisioning.

```
Abort Auto Provisioning and continue with normal setup ?(yes/no)[n]: y

        ---- System Admin Account Setup ----

Do you want to enforce secure password standard (yes/no) [y]:

      Enter the password for "admin":

  Confirm the password for "admin":

        ---- Basic System Configuration Dialog ----

This setup utility will guide you through the basic configuration of

the system. Setup configures only enough connectivity for management of the system.

Please register Cisco MDS 9000 Family devices promptly with your supplier. Failure to
register may affect response times for initial service calls. MDS devices must be
registered to receive entitled support services.

Press Enter at anytime to skip a dialog. Use ctrl-c at anytime to skip the remaining
dialogs.

Would you like to enter the basic configuration dialog (yes/no): y

 Create another login account (yes/no) [n]:

  Configure read-only SNMP community string (yes/no) [n]:

  Configure read-write SNMP community string (yes/no) [n]:

  Enter the switch name : <<var_MDS_A_hostname>>

  Continue with Out-of-band (mgmt0) management configuration? (yes/no) [y]:

    Mgmt0 IPv4 address : <<var_MDS_A_mgmt0_ip>>

    Mgmt0 IPv4 netmask : <<var_MDS_A_mgmt0_netmask>>

    Configure the default gateway? (yes/no) [y]:

    IPv4 address of the default gateway : <<var_MDS_A_mgmt0_gw>>

    Configure advanced IP options? (yes/no) [n]:

  Enable the ssh service? (yes/no) [y]:

    Type of ssh key you would like to generate (dsa/rsa) [rsa]:

    Number of rsa key bits <1024-2048> [1024]: 2048
    Enable the telnet service? (yes/no) [n]:

Configure congestion/no_credit drop for fc interfaces? (yes/no)[y]:
Enter the type of drop to configure congestion/no_credit drop? (con/no) [c]:

Enter milliseconds in multiples of 10 for congestion-drop for port mode F in
range (<100-500>/default), where default is 500.  [d]:
Congestion-drop for port mode E must be greater than or equal to Congestion-drop
for port mode F. Hence, Congestion drop for port mode E will be set as default.
```

```
 Enable the http-server? (yes/no) [y]:

 Configure clock? (yes/no) [n]:

 Configure timezone? (yes/no) [n]: y

Enter timezone config [PST/MST/CST/EST] : <<var_timezone>>

Enter Hrs offset from UTC [-23:+23] : <<var_UTC_offset>>

Enter Minutes offset from UTC [0-59] :

Configure summertime? (yes/no) [n]:

Configure the ntp server? (yes/no) [n]: y

NTP server IPv4 address : <<var_global_ntp_server_ip>>
Configure default switchport interface state (shut/noshut) [shut]:

  Configure default switchport trunk mode (on/off/auto) [on]:

  Configure default switchport port mode F (yes/no) [n]:

  Configure default zone policy (permit/deny) [deny]:

  Enable full zoneset distribution? (yes/no) [n]:

  Configure default zone mode (basic/enhanced) [basic]:

The following configuration will be applied:

  password strength-check

 switchname <<var_MDS_A_hostname>>
   interface mgmt0

    ip address <<var_MDS_A_mgmt0_ip>> <<var_MDS_A_mgmt0_netmask>>     no shutdown

ip default-gateway <<var_MDS_A_mgmt0_gw>>

ssh key rsa 2048 force

feature ssh

 no feature telnet   system timeout congestion-drop default mode F   system timeout
congestion-drop default mode E

feature http-server

clock timezone PST 0 0

ntp server <<var_global_ntp_server_ip>>

system default switchport shutdown

system default switchport trunk mode on

no system default zone default-zone permit

no system default zone distribute full

no system default zone mode enhanced

Would you like to edit the configuration? (yes/no) [n]:
```

```
Use this configuration and save it? (yes/no) [y]:

[########################################] 100% Copy complete.
```

Cisco MDS B

To set up the initial configuration for the second Cisco MDS switch complete the following steps:

On initial boot and connection to the serial or console port of the switch, the NX-OS setup should automatically start and attempt to enter Power on Auto Provisioning.

1. On initial boot and connection to the serial or console port of the switch, the MDS setup should automatically start and attempt to enter Power on Auto Provisioning.

```
Abort Auto Provisioning and continue with normal setup ?(yes/no)[n]: y

         ---- System Admin Account Setup ----

Do you want to enforce secure password standard (yes/no) [y]:

      Enter the password for "admin":

  Confirm the password for "admin":

         ---- Basic System Configuration Dialog ----

This setup utility will guide you through the basic configuration of the system. Setup
configures only enough connectivity for management of the system.

Please register Cisco MDS 9000 Family devices promptly with your supplier. Failure to
register may affect response times for initial service calls. MDS devices must be
registered to receive entitled support services.

Press Enter at anytime to skip a dialog. Use ctrl-c at anytime to skip the remaining
dialogs.

Would you like to enter the basic configuration dialog (yes/no): y

Create another login account (yes/no) [n]:

  Configure read-only SNMP community string (yes/no) [n]:

  Configure read-write SNMP community string (yes/no) [n]:

  Enter the switch name : <<var_MDS_B_hostname>>

  Continue with Out-of-band (mgmt0) management configuration? (yes/no) [y]:

    Mgmt0 IPv4 address : <<var_MDS_B_mgmt0_ip>>

    Mgmt0 IPv4 netmask : <<var_MDS_B_mgmt0_netmask>>

 Configure the default gateway? (yes/no) [y]:

    IPv4 address of the default gateway : <<var_MDS_B_mgmt0_gw>>

 Configure advanced IP options? (yes/no) [n]:

  Enable the ssh service? (yes/no) [y]:
```

```
    Type of ssh key you would like to generate (dsa/rsa) [rsa]:

    Number of rsa key bits <1024-2048> [1024]: 2048

 Enable the telnet service? (yes/no) [n]:

  Configure congestion/no_credit drop for fc interfaces? (yes/no)     [y]:

  Enter the type of drop to configure congestion/no_credit drop? (con/no) [c]:

    Enter milliseconds in multiples of 10 for congestion-drop for port mode F     in range
(<100-500>/default), where default is 500.  [d]:

Congestion-drop for port mode E must be greater than or equal to     Congestion-drop for
port mode F. Hence, Congestion drop for port     mode E will be set as default.

  Enable the http-server? (yes/no) [y]:

 Configure clock? (yes/no) [n]:

 Configure timezone? (yes/no) [n]: y

Enter timezone config [PST/MST/CST/EST] : <<var_timezone>>

Enter Hrs offset from UTC [-23:+23] : <<var_UTC_offset>>

Enter Minutes offset from UTC [0-59] :

Configure summertime? (yes/no) [n]:

Configure the ntp server? (yes/no) [n]: y

NTP server IPv4 address : <<var_global_ntp_server_ip>>

Configure default switchport interface state (shut/noshut) [shut]:

Configure default switchport trunk mode (on/off/auto) [on]:

  Configure default switchport port mode F (yes/no) [n]:

  Configure default zone policy (permit/deny) [deny]:

  Enable full zoneset distribution? (yes/no) [n]:

  Configure default zone mode (basic/enhanced) [basic]:

The following configuration will be applied:

  password strength-check

switchname : <<var_MDS_B_hostname>>

interface mgmt0

  ip address <<var_MDS_B_mgmt0_ip>> <<var_MDS_B_mgmt0_netmask>>

   no shutdown

  ip default-gateway <<var_MDS_B_mgmt0_gw>>

  ssh key rsa 2048 force

feature ssh
```

```
 no feature telnet

 system timeout congestion-drop default mode F

system timeout congestion-drop default mode E

feature http-server  clock timezone PST 0 0

       ntp server <<var_global_ntp_server_ip>>

      system default switchport shutdown

      system default switchport trunk mode on

       no system default zone default-zone permit

       no system default zone distribute full

       no system default zone mode enhanced

Would you like to edit the configuration? (yes/no) [n]:

Use this configuration and save it? (yes/no) [y]:
[########################################] 100% Copy complete.
```

Enable Appropriate Cisco MDS Features and Settings

Cisco MDS A and B

1. To enable the feature on both switches, enter the following commands:

```
config

feature npiv

feature fport-channel-trunk
```

Enable VSANs and Create Port Channel and Cluster Zone

Cisco MDS A

1. Create Port Channel that will be uplinked to the fabric interconnect.

```
interface port-channel 1
```

2. Create a VSAN for Host Connectivity and assign interfaces to it. Ports assigned to the port channel will also be in this Vsan. Configure the ports up.

```
vsan database
vsan <<var_vsan_a_id>>
vsan <<var_vsan_a_id>>  interface fc1/5-8

vsan <<var_vsan_a_id>>  interface po1
interface fc1/5-8
no shut
```

3. Create a VSAN for Cluster Interconnect and assign interfaces to it.

```
vsan database
vsan <<var_vsan_a_clus_id>>
vsan <<var_vsan_a_clus_id>> interface fc1/8-16
no shut
```

4. Activate the port channel.

The port channel ports will not be connected until the Fabric Interconnect is configured.

```
interface port-channel 1

channel mode active

switchport rate-mode dedicated
```

5. Assign interfaces to the port channel and save the config.

```
interface fc1/1-4
port-license acquire
channel-group 1 force
no shutdown

exit

copy run start
```

You can run a “show int br” to validate the interfaces 1-4 are in the proper VSAN.

6. Run show flogi database to obtain the WWPN’s for the FlashSystem V9000 nodes. Copy the 8 WWPN’s for the IBM Storewize system to create a zone for the cluster.

```
sh flogi database


VersaStack-MDS-A# sh flogi database  vsan 201
--------------------------------------------------------------------------------
INTERFACE        VSAN    FCID           PORT NAME               NODE NAME
--------------------------------------------------------------------------------
fc1/9            201   0x940000  50:05:07:68:0c:11:22:71 50:05:07:68:0c:00:22:71
fc1/10           201   0x940300  50:05:07:68:0c:31:22:71 50:05:07:68:0c:00:22:71
fc1/11           201   0x940100  50:05:07:68:0c:11:22:67 50:05:07:68:0c:00:22:67
fc1/12           201   0x940200  50:05:07:68:0c:31:22:67 50:05:07:68:0c:00:22:67
fc1/13           201   0x940400  50:05:07:60:5e:83:cc:81 50:05:07:60:5e:83:cc:80
fc1/14           201   0x940600  50:05:07:60:5e:83:cc:91 50:05:07:60:5e:83:cc:80
fc1/15           201   0x940500  50:05:07:60:5e:83:cc:a1 50:05:07:60:5e:83:cc:bf
```

```
fc1/16           201    0x940700   50:05:07:60:5e:83:cc:b1 50:05:07:60:5e:83:cc:bf


Total number of flogi = 8.
```

7. Input the Fabric A WWPN's into the variable table below. Nodes are identified by their assigned switch ports.

Source	Switch/ Port	Variable	WWPN
FC_SE-BE1-fabricA	Switch A FC13	var_wwpn_ FC_SE-BE1-fabricA	50:05:07:60:5e:83:cc:81
FC_SE-BE2-fabricA	Switch A FC14	var_wwpn_FC_SE-BE2-fabricA	50:05:07:60:5e:83:cc:91
FC_SE-BE3-fabricA	Switch A FC15	var_wwpn_ FC_SE-BE3-fabricA	50:05:07:60:5e:83:cc:a1
FC_SE-BE4-fabricA	Switch A FC16	var_wwpn_FC_SE-BE4-fabricA	50:05:07:60:5e:83:cc:b1
FC_ContA-BE1-fabricA	Switch A FC9	var_wwpn_ FC_ContA-BE1-fabricA	50:05:07:68:0c:11:22:71
FC_ContA-BE2-fabricA	Switch A FC10	var_wwpn_ FC_ContA-BE2-fabricA	50:05:07:68:0c:31:22:71
FC_ContB-BE1-fabricA	Switch A FC11	var_wwpn_ FC_ContB-BE1-fabricA	50:05:07:68:0c:11:22:67
FC_ContB-BE2-fabricA	Switch A FC12	var_wwpn_ FC_ContB-BE2-fabricA	50:05:07:68:0c:31:22:67
FC_ContA-FE1-fabricA	Switch A FC5	var_wwpn_ FC_ContA-FE1-fabricA	50:05:07:68:0c:21:22:71
FC_ContA-FE3-fabricA	Switch A FC6	var_wwpn_ FC_ContA-FE3-fabricA	50:05:07:68:0c:51:22:71
FC_ContB-FE1-fabricA	Switch A FC7	var_wwpn_ FC_ContB-FE1-fabricA	50:05:07:68:0c:21:22:67
FC_ContB-FE3-fabricA	Switch A FC8	var_wwpn_ FC_ContB-FE3-fabricA	50:05:07:68:0c:51:22:67

8. Create a dev alias database for each PWWN using the port assignments:

```
device-alias database
device-alias name VersaStack-ContA-BE1  pwwn var_wwpn_FC_ContA-BE1-fabricA
device-alias name VersaStack-ContA-BE2  pwwn var_wwpn_FC_ContA-BE2-fabricA
device-alias name VersaStack-ContB-BE1  pwwn var_wwpn_FC_ContB-BE1-fabricA
device-alias name VersaStack-ContB-BE2  pwwn var_wwpn_FC_ContB-BE2-fabricA
device-alias name VersaStack-SE-BE1  pwwn var_wwpn_FC_SE-BE1-fabricA
device-alias name VersaStack-SE-BE2  pwwn var_wwpn_FC_SE-BE2-fabricA
device-alias name VersaStack-SE-BE3  pwwn var_wwpn_FC_SE-BE3-fabricA
device-alias name VersaStack-SE-BE4  pwwn var_wwpn_FC_SE-BE4-fabricA
device-alias name VersaStack-ContA-FE1  pwwn var_wwpn_FC_ContA-FE1-fabricA
device-alias name VersaStack-ContA-FE3  pwwn var_wwpn_FC_ContA-FE3-fabricA
device-alias name VersaStack-ContB-FE1  pwwn var_wwpn_FC_ContB-FE1-fabricA
device-alias name VersaStack-ContB-FE3  pwwn var_wwpn_FC_ContB-FE3-fabricA


device-alias commit
```

9. Create the zone for the FlashSystem V9000 Cluster. If adding more FlashSystem V9000 control or storage nodes, you will add the WWPN's to the cluster communication zone used below named versastack. Host zones and the cluster zone belong to separate VSAN fabrics.

```
zone name versastack vsan <<var_vsan_a_clus_id>>
```

```
member device-alias VersaStack-ContA-BE1

member device-alias VersaStack-ContA-BE2

member device-alias VersaStack-ContB-BE1

member device-alias VersaStack-ContB-BE2

member device-alias VersaStack-SE-BE1

member device-alias VersaStack-SE-BE2

member device-alias VersaStack-SE-BE3

member device-alias VersaStack-SE-BE4


exit
```

10. Create the zoneset for the VersaStack configuration and add the zone.

```
zoneset name versastackzoneset vsan <<var_vsan_a_clus_id>>

member versastack

zoneset activate name  versastackzoneset vsan <<var_vsan_a_clus_id>>

sh zoneset active
copy run start
```

Cisco MDS B

1. Create Port Channel that will be uplinked to the fabric interconnect.

```
interface port-channel 2
```

2. Create a VSAN for Host Connectivity and assign interfaces to it. Ports assigned to the port channel will also be in this vsan.

```
vsan  database
vsan <<var_vsan_b_id>>
vsan <<var_vsan_b_id>> interface fc1/5-8
vsan <<var_vsan_b_id>> interface po2
interface fc1/5-8
no shut
```

3. Create a VSAN for Cluster Interconnect and assign interfaces to it.

```
vsan database
vsan <<var_vsan_b_clus_id>>
vsan <<var_vsan_b_clus_id>> interface fc1/8-16
no shut
```

4. Activate the port channel.

The port channel ports will not be connected until the Fabric Interconnect is configured.

```
interface port-channel 2
channel mode active
switchport rate-mode dedicated
```

5. Assign interfaces to the port channel and save the config.

```
interface fc1/1-4
port-license acquire

channel-group 2 force

no shutdown

exit

copy run start
```

You can run a “show int br” to validate the interfaces 1-4 are in the proper VSAN.

6. Run show flogi database to obtain the WWPN’s for the FlashSystem V9000 cluster. Copy the 8 WWPN’s for the IBM Storewize system to create a zone for the cluster.

```
sh flogi database
```

```
  VersaStack-MDS-B# sh flogi database vsan 202
--------------------------------------------------------------------------------
INTERFACE        VSAN    FCID           PORT NAME               NODE NAME
--------------------------------------------------------------------------------
fc1/9            202   0x7c0700  50:05:07:68:0c:12:22:71 50:05:07:68:0c:00:22:71
fc1/10           202   0x7c0000  50:05:07:68:0c:32:22:71 50:05:07:68:0c:00:22:71
fc1/11           202   0x7c0600  50:05:07:68:0c:12:22:67 50:05:07:68:0c:00:22:67
fc1/12           202   0x7c0100  50:05:07:68:0c:32:22:67 50:05:07:68:0c:00:22:67
fc1/13           202   0x7c0300  50:05:07:60:5e:83:cc:82 50:05:07:60:5e:83:cc:80
fc1/14           202   0x7c0500  50:05:07:60:5e:83:cc:92 50:05:07:60:5e:83:cc:80
fc1/15           202   0x7c0200  50:05:07:60:5e:83:cc:a2 50:05:07:60:5e:83:cc:bf
fc1/16           202   0x7c0400  50:05:07:60:5e:83:cc:b2 50:05:07:60:5e:83:cc:bf


Total number of flogi = 8.
```

7. Input the fabric B WWPN’s into the variable table identified by their assigned switch port.

Source	Switch/ Port	Variable	WWPN
FC_SE-BE5-fabricB	Switch B FC13	var_wwpn_ FC_SE-BE5-fabricB	50:05:07:60:5e:83:cc:82
FC_SE-BE6-fabricB	Switch B FC14	var_wwpn_ FC_SE-BE6-fabricB	50:05:07:60:5e:83:cc:92
FC_SE-BE7-fabricB	Switch B FC15	var_wwpn_ FC_SE-BE7-fabricB	50:05:07:60:5e:83:cc:a2
FC_SE-BE8-fabricB	Switch B FC16	var_wwpn_ FC_SE-BE8-fabricB	50:05:07:60:5e:83:cc:b2
FC_ContA-BE3-fabricB	Switch B FC9	var_wwpn_ FC_ContA-BE3-fabricB	50:05:07:68:0c:12:22:71
FC_ContA-BE4-fabricB	Switch B FC10	var_wwpn_ FC_ContA-BE4-fabricB	50:05:07:68:0c:32:22:71
FC_ContB-BE3-fabricB	Switch B FC11	var_wwpn_ FC_ContB-BE3-fabricB	50:05:07:68:0c:12:22:67
FC_ContB-BE4-fabricB	Switch B FC12	var_wwpn_ FC_ContB-BE4-fabricB	50:05:07:68:0c:32:22:67
FC_ContA-FE2-fabricB	Switch B FC5	var_wwpn_ FC_ContA-FE2-fabricB	50:05:07:68:0c:22:22:71
FC_ContA-FE4-fabricB	Switch B FC6	var_wwpn_ FC_ContA-FE4-fabricB	50:05:07:68:0c:52:22:71
FC_ContB-FE2-fabricB	Switch B FC7	var_wwpn_ FC_ContB-FE2-fabricB	50:05:07:68:0c:22:22:67
FC_ContB-FE4-fabricB	Switch B FC8	var_wwpn_ FC_ContB-FE4-fabricB	50:05:07:68:0c:52:22:67

8. Create a dev alias database for each PWWN using the port assignments:

```
device-alias database
device-alias name VersaStack-ContA-BE3  pwwn var_wwpn_FC_ContA-BE3-fabricB
device-alias name VersaStack-ContA-BE4  pwwn var_wwpn_FC_ContA-BE4-fabricB
device-alias name VersaStack-ContB-BE3  pwwn var_wwpn_FC_ContB-BE3-fabricB
device-alias name VersaStack-ContB-BE4  pwwn var_wwpn_FC_ContB-BE4-fabricB
device-alias name VersaStack-SE-BE5  pwwn var_wwpn_FC_SE-BE5-fabricB
device-alias name VersaStack-SE-BE6  pwwn var_wwpn_FC_SE-BE6-fabricB
device-alias name VersaStack-SE-BE7  pwwn var_wwpn_FC_SE-BE7-fabricB
device-alias name VersaStack-SE-BE8  pwwn var_wwpn_FC_SE-BE8-fabricB
device-alias name VersaStack-ContA-FE2  pwwn var_wwpn_FC_ContA-FE2-fabricB
device-alias name VersaStack-ContA-FE4  pwwn var_wwpn_FC_ContA-FE4-fabricB
device-alias name VersaStack-ContB-FE2  pwwn var_wwpn_FC_ContB-FE2-fabricB
device-alias name VersaStack-ContB-FE4  pwwn var_wwpn_FC_ContB-FE4-fabricB
device-alias commit
```

9. Create the zone for the FlashSystem V9000 Cluster, if adding more FlashSystem V9000 control or storage nodes, you will add the WWPN's to the cluster communication zone used below named versastack. Host zones and the cluster zone belong to separate VSAN fabrics.

```
zone name versastack vsan <<var_vsan_b_clus_id>>
member device-alias VersaStack-ContB-BE3
member device-alias VersaStack-ContB-BE4
member device-alias VersaStack-ContA-BE3
member device-alias VersaStack-ContA-BE4
member device-alias VersaStack-SE-BE5
```

```
member device-alias VersaStack-SE-BE6

member device-alias VersaStack-SE-BE7

member device-alias VersaStack-SE-BE8

exit
```

10. Create the zoneset for the VersaStack configuration and add the zone.

```
zoneset name versastackzoneset vsan <<var_vsan_b_clus_id>>
member versastack

zoneset activate name  versastackzoneset vsan <<var_vsan_b_clus_id>>

sh zoneset active
copy run start
```

Storage Configuration

In this section we will configure the storage. Encryption will be used to increase security and to save cost when disposing of drives. We will also leverage IBM Real-time compression to reduce OPEX by reducing our storage footprint, and mirroring for fault tolerance. Proper planning can optimize your performance and help reduce operational costs for your VersaStack.

Secure Web Access to the IBM FlashSystem V9000 Service and Management GUI

Browser access to all system and service IPs is automatically configured to connect securely using HTTPS and SSL. Attempts to connect through HTTP will get redirected to HTTPS.

The system generates its own self-signed SSL certificate. Upon first connection to the system, your browser may present a security exception because it does not trust the signer; you should allow the connection to proceed.

Prerequisites

Since we will implement encryption during our setup, we will need the licenses for this feature for both storage controllers. There is no trial license. We will also need three USB keys for our two control enclosures, installed across both control enclosures to allow us to complete the encryption. The USB keys can be removed from the system after setup and kept in a secure location. Whenever and encryption-enabled V9000 system is powered on, it requires a USB key containing the correct encryption key to be plugged into a control enclosure. As such, it is recommended that one USB key is to remain installed in each system if you plan to allow automatic rebooting of the system should it be shut down for any reason. Alternatively, you would need to re-insert one USB key to reboot.

Figure 7 Three USB Drives Installed in the V9000

IBM FlashSystem V9000 Initial Configuration

If you are connecting multiple control enclosures for scale, the additional nodes will communicate through the Fibre Channel connection for initial discovery. To setup on node A only, complete the following steps:

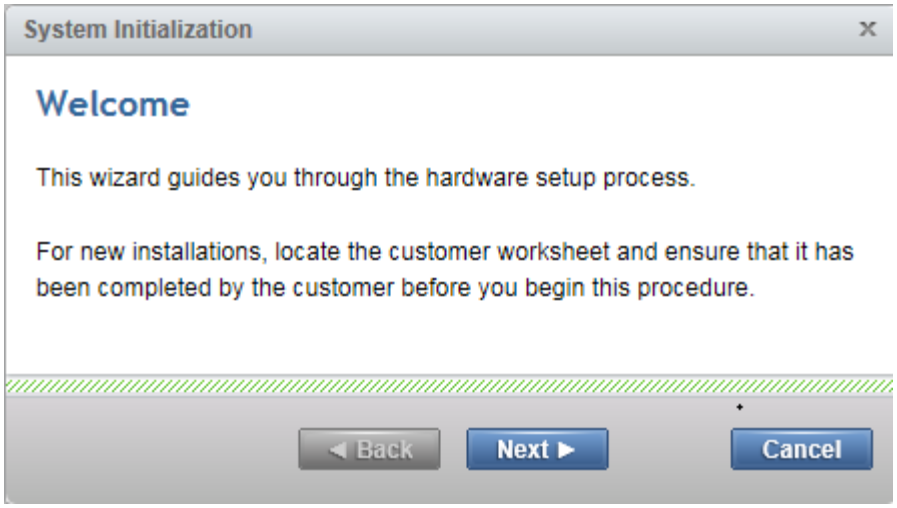
1. Configure an Ethernet port of a PC/laptop to allow DHCP to configure its IP address and DNS.

2. Connect an Ethernet cable from the PC/laptop Ethernet port to the Ethernet port labeled "T" on the rear of either node canister in the V9000 control enclosure.

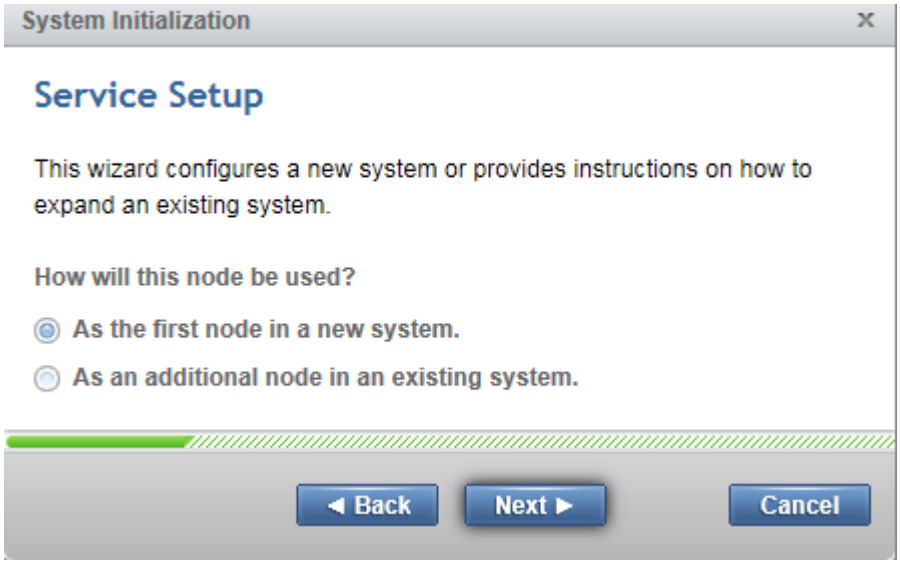
3. A few moments after the connection is made, the node will use DHCP to configure the IP address and DNS settings of the laptop/PC.

This will likely disconnect you from any other network connections you have on the laptop/PC. If you do not have DHCP on your PC/laptop, you can manually configure it with the following network settings: IPv4 address 192.168.0.2, mask to 255.255.255.0, gateway to 192.168.0.1, and DNS to 192.168.0.1

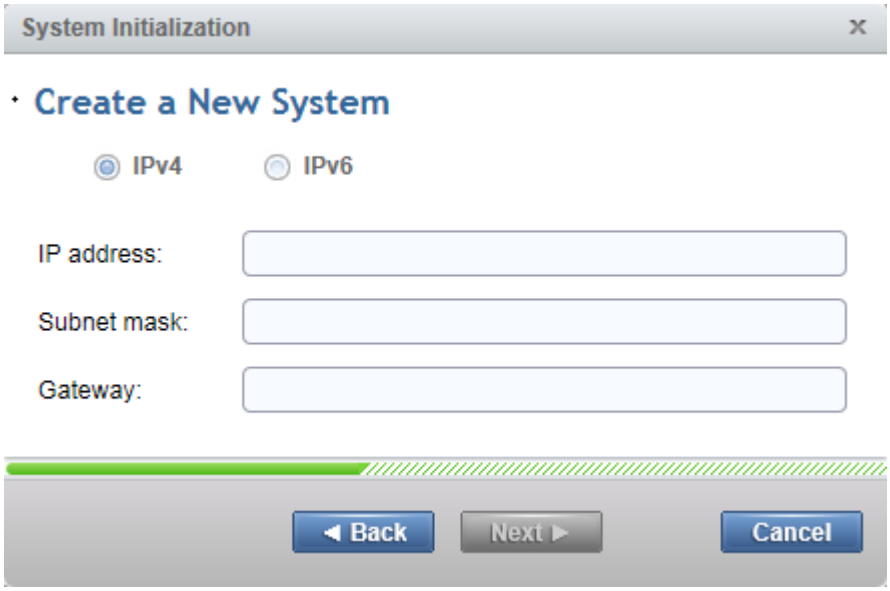
4. Open a browser and go to address https://install which will direct you to the initialization wizard.



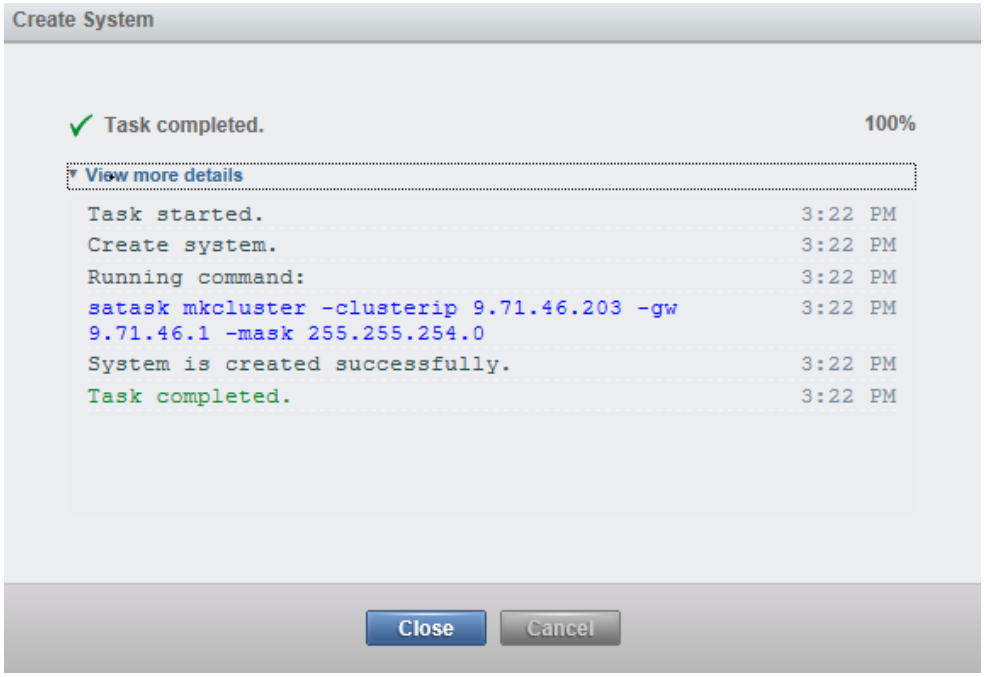
5. When asked how the node will be used, select "As the first node in a new system" and click Next.



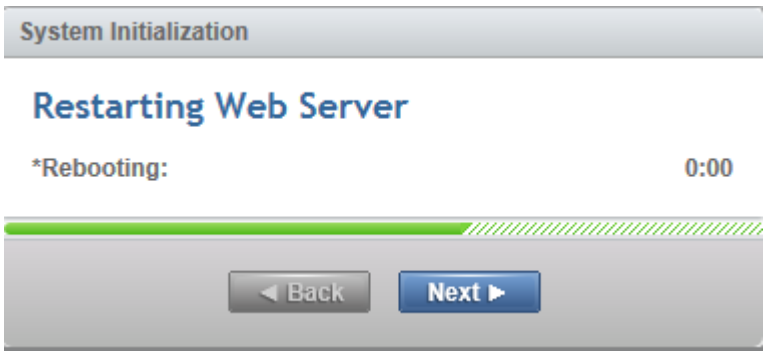
6. Follow the instructions that are presented by the initialization tool to configure the system with a management IP address <<var_cluster_mgmt_ip>>,<<var_cluster_mgmt_mask>> and <<var_cluster_mgmt_gateway>>, then click Next.

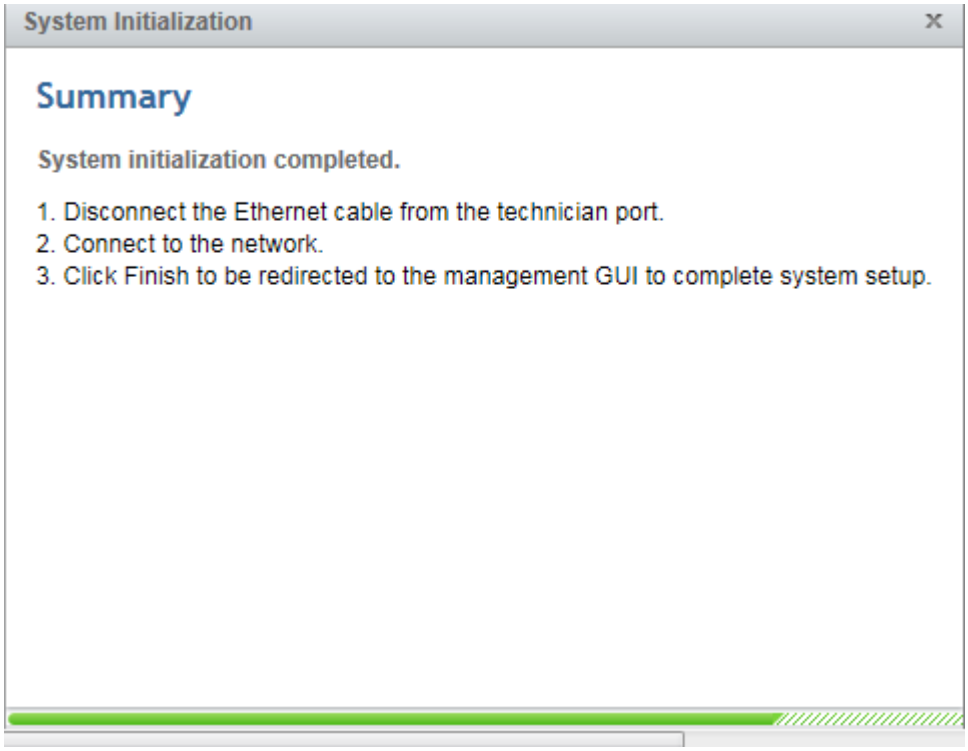


7. Click Close when the task is completed.


Create System
Task completed.
100%
View more details
Task started. 3:22 PM
Create system. 3:22 PM
Running command: 3:22 PM
satask mkcluster -clusterip 9.71.46.203 -gw 9.71.46.1 -mask 255.255.254.0 3:22 PM
System is created successfully. 3:22 PM
Task completed. 3:22 PM
Close
Cancel

8. Click Next.


System Initialization
Restarting Web Server
*Rebooting:
0:00
Back
Next



After you complete the initialization process, disconnect the cable as directed, between the PC/laptop and the technician port, and reconnect to your network with your previous settings. Your browser will be redirected the management GUI, at the IP address you configured.

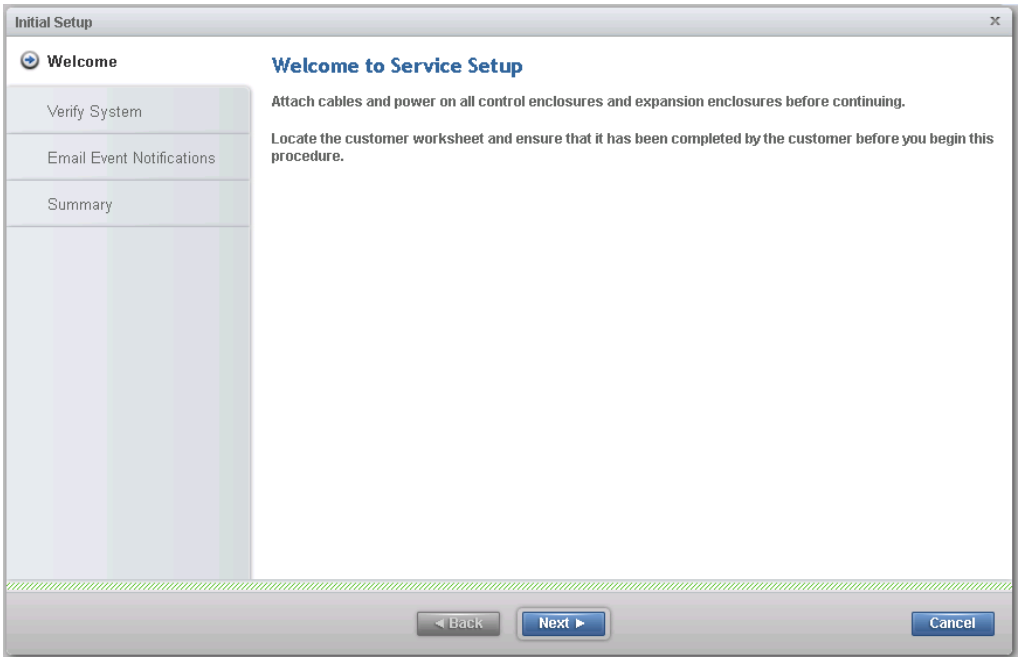
You may have to wait up to five minutes for the management GUI to start up and become accessible.

IBM FlashSystem V9000 SSR Initialization

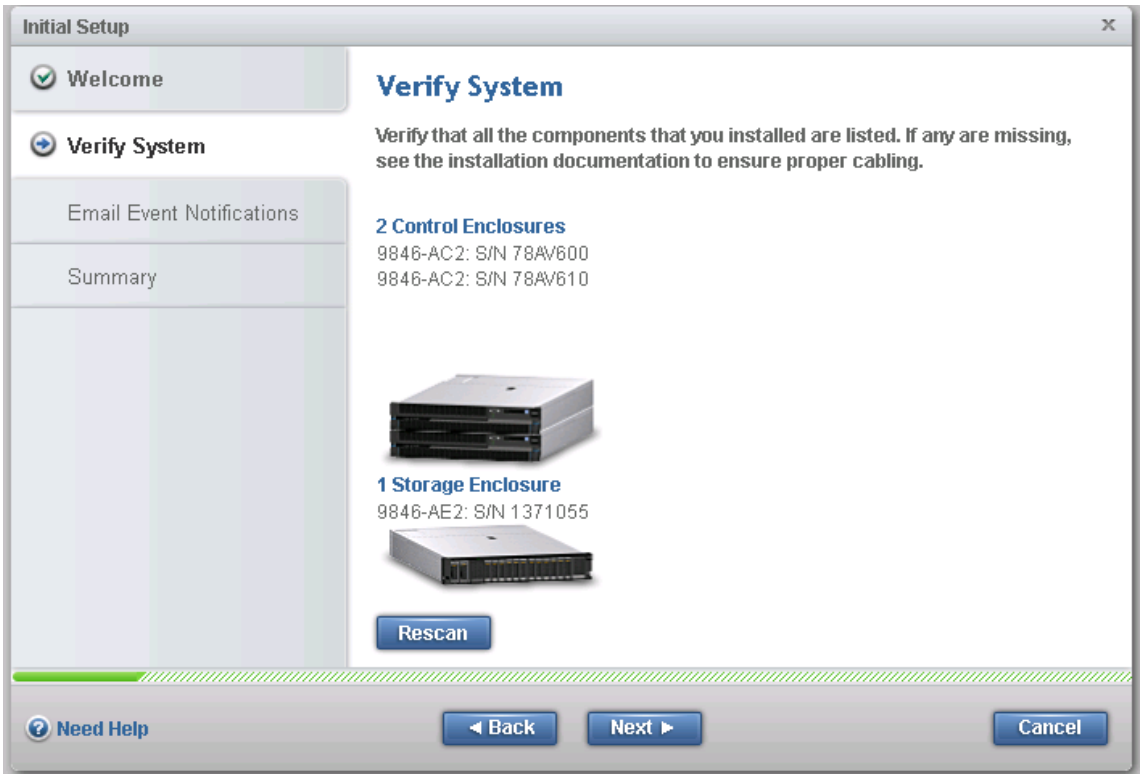
To initialize IBM FlashSystem V9000 SSR, complete the following steps:

1. Use “password” for the Password field and log in.

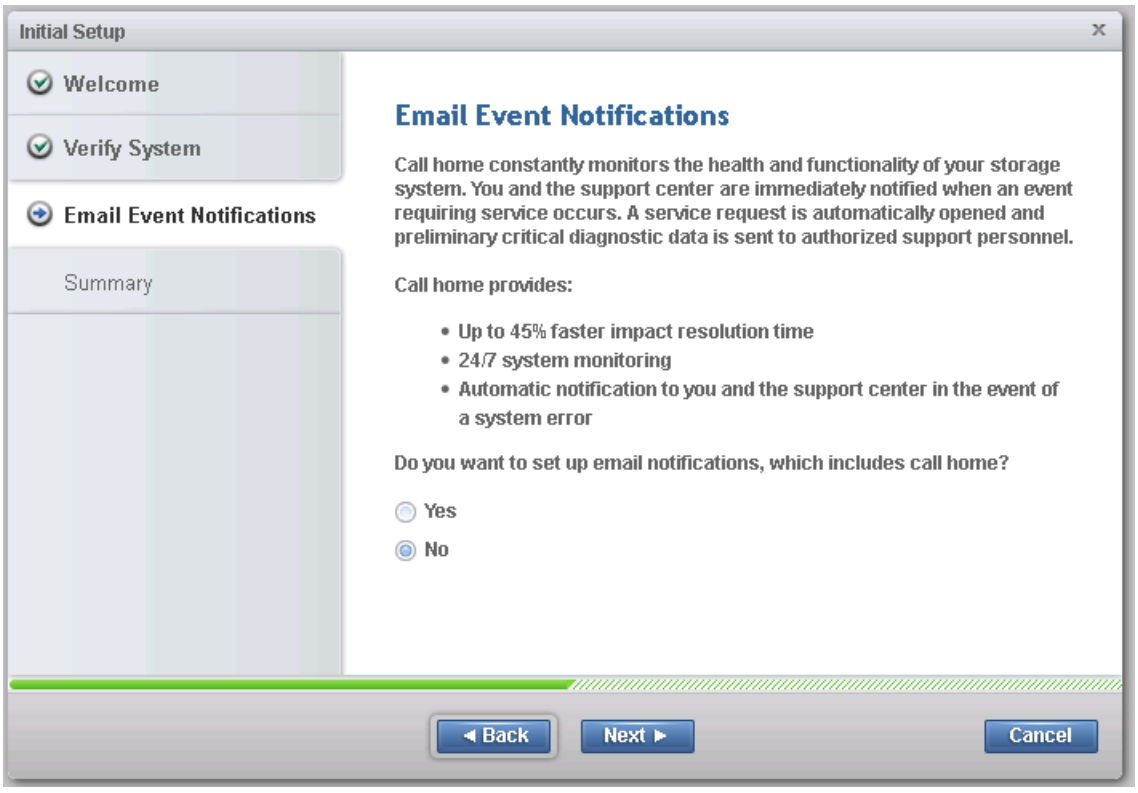
2. Click Next.

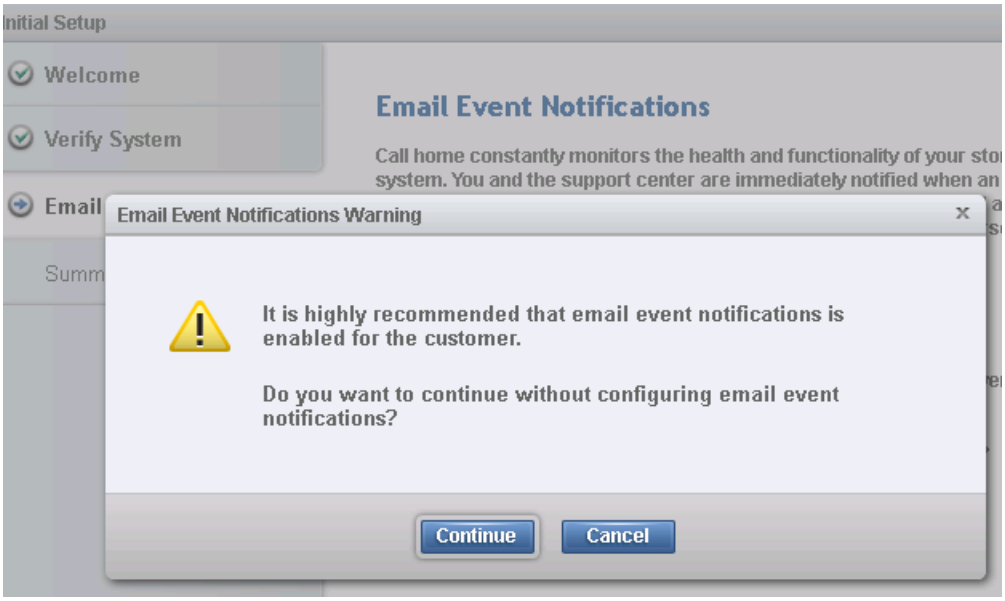


3. Verify the serial numbers of the equipment match what was shipped and racked, then click Next.

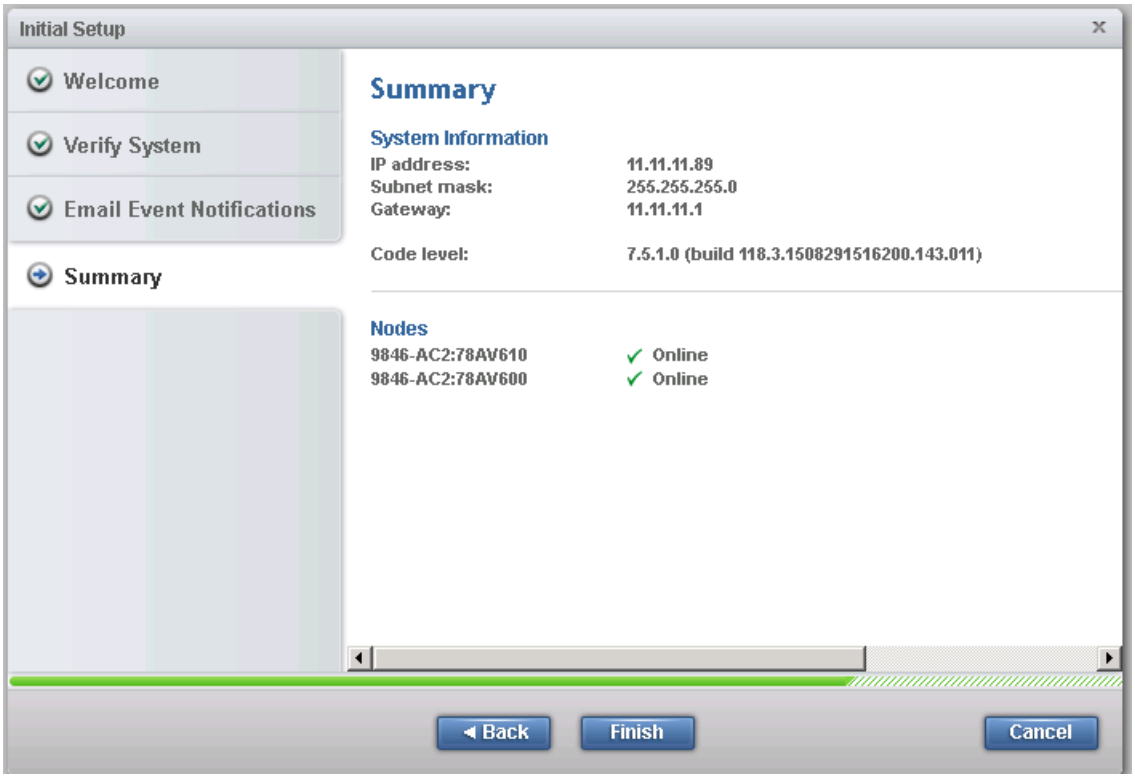


4. During the next wizard the prompt for Call Home information will be presented again; select No and click Next.

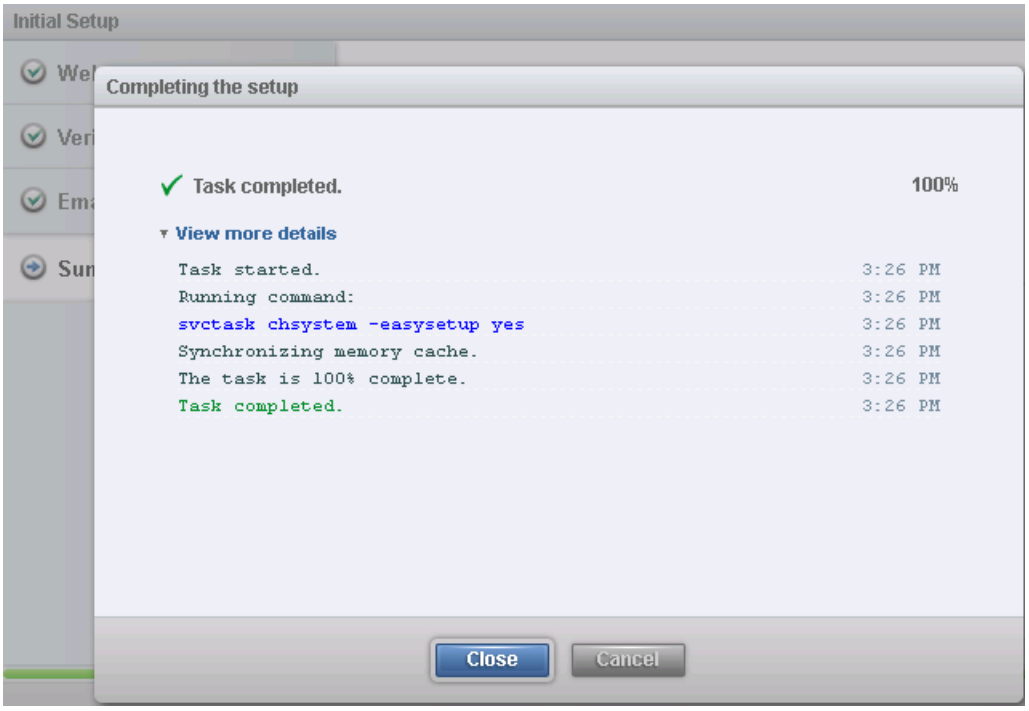




5. Verify the information, click Finish.



6. The task runs briefly (around 20 seconds). Close the dialog to continue.



7. An information panel displays the cluster ipaddress, and default userid and password to proceed to the next wizard with. Click Close to continue.

IBM FlashSystem V9000 Initial Configuration Setup

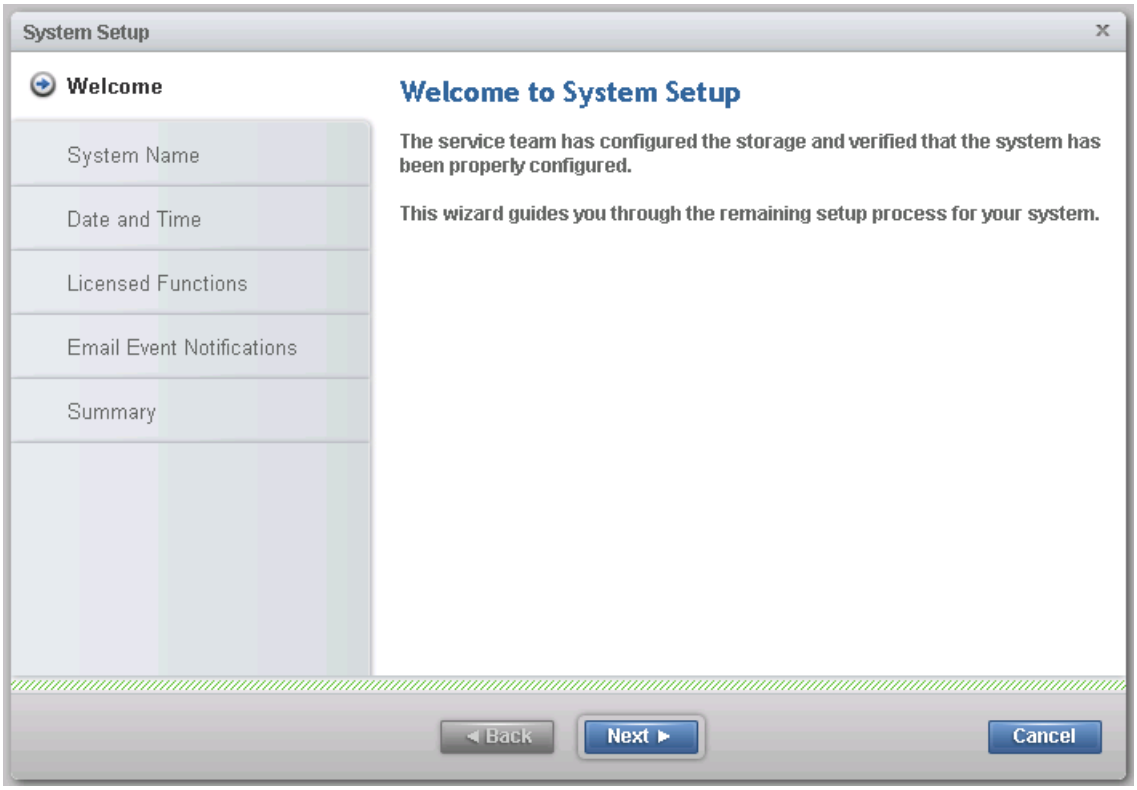
To configure the IBM FlashSystem V9000, complete the following steps:

1. Read and accept the license agreement.

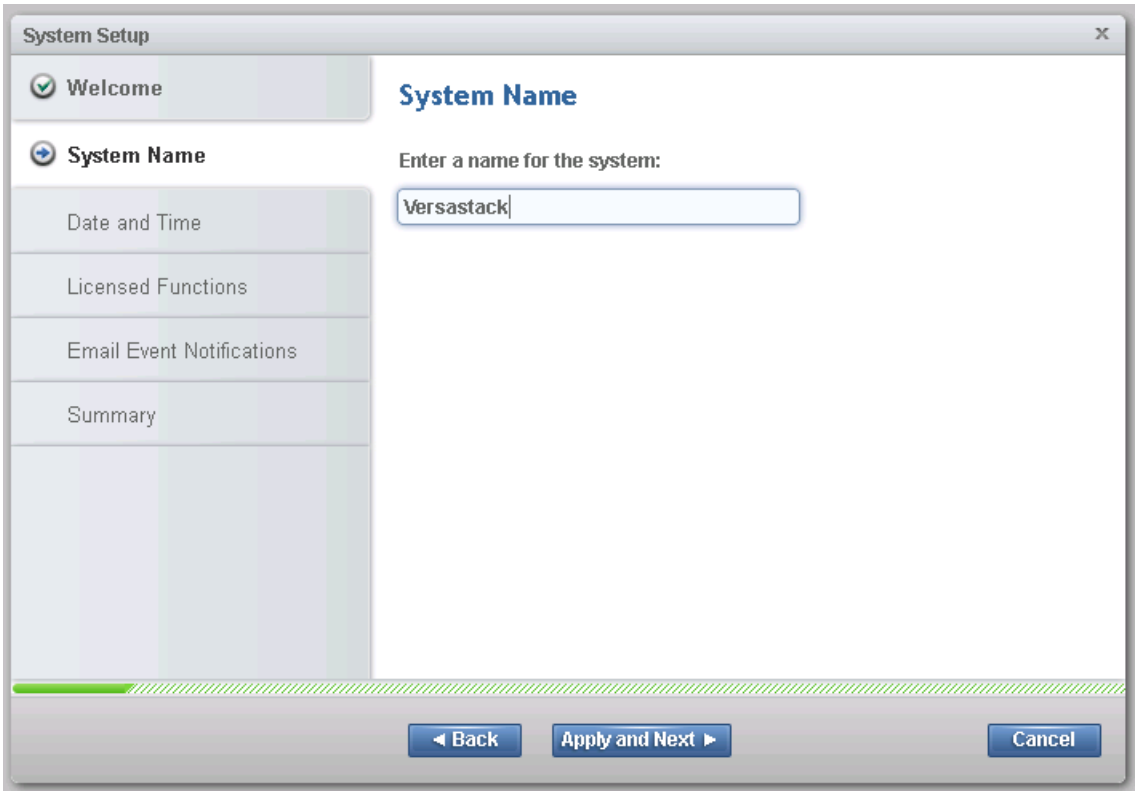
2. Login as superuser with password of passw0rd.

3. Change the password for superuser, then click Log In.

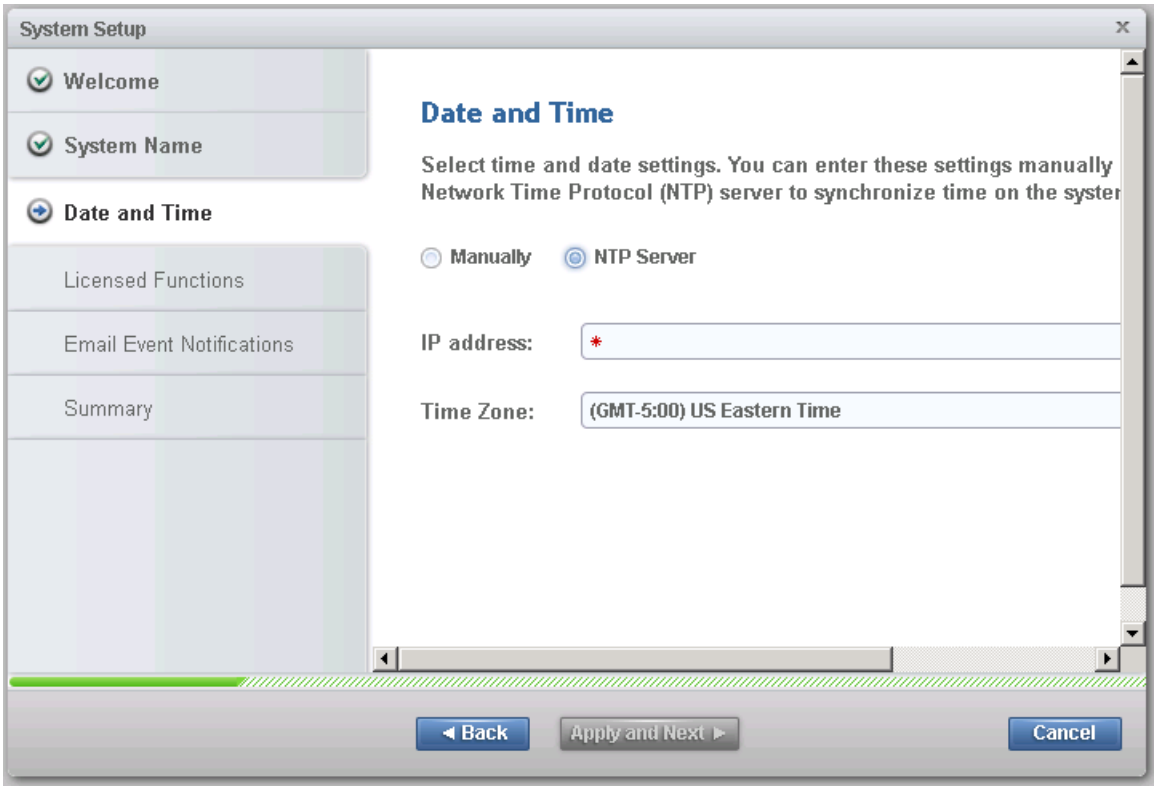
4. On the welcome to system setup screen click Next.



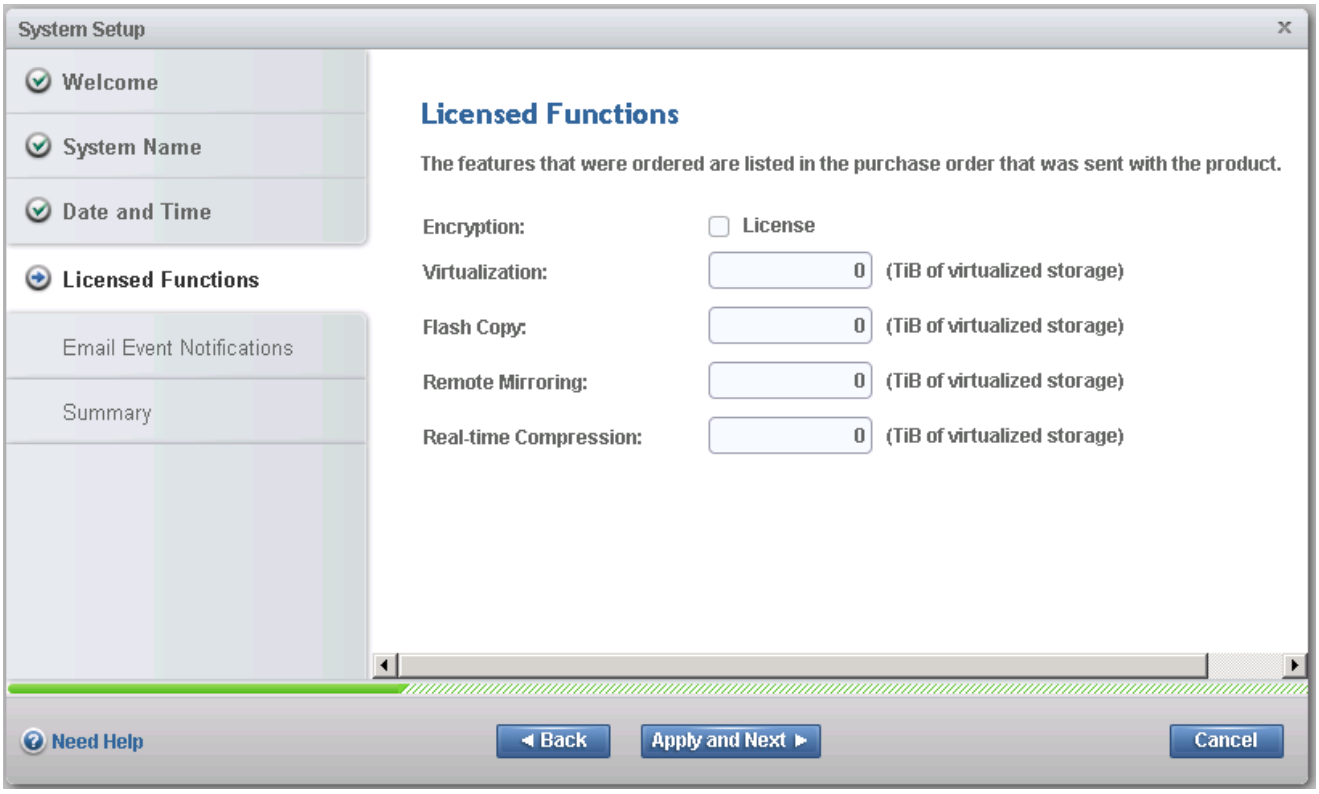
5. Enter the System Name and click Apply and Next to proceed.



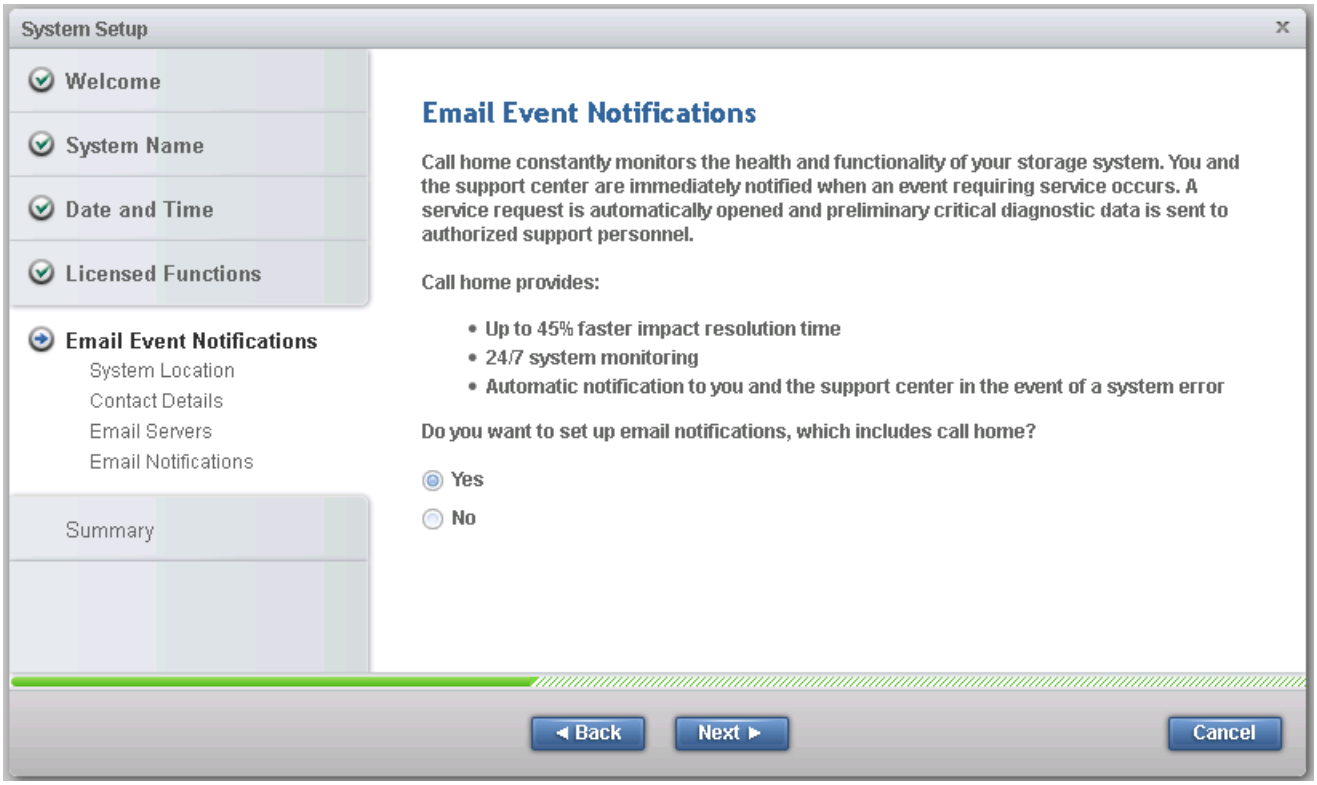
6. Select NTP Server and enter the address of the server then click Apply and Next, then click Close.



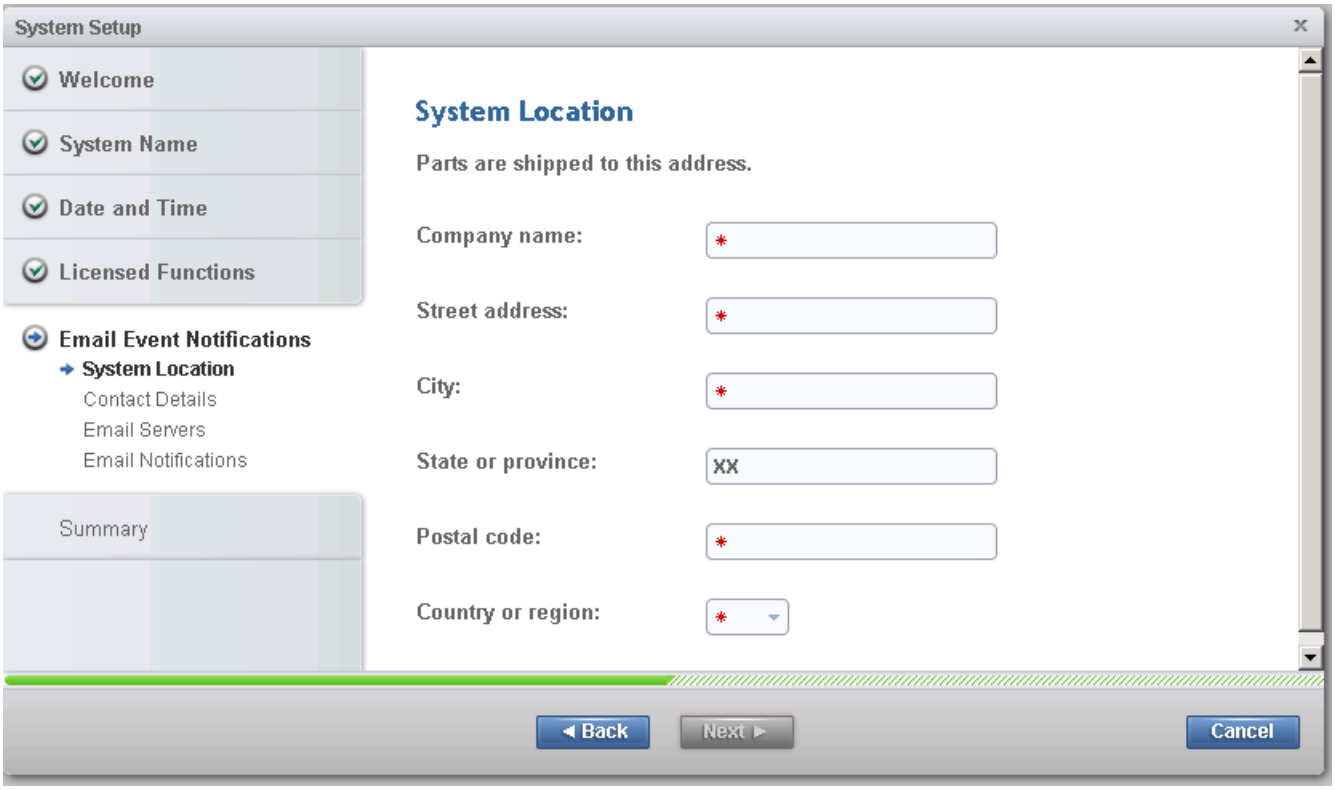
7. If you ordered Encryption then check the Encryption License box. Enter the number of licenses and click Apply and Next, then Close.



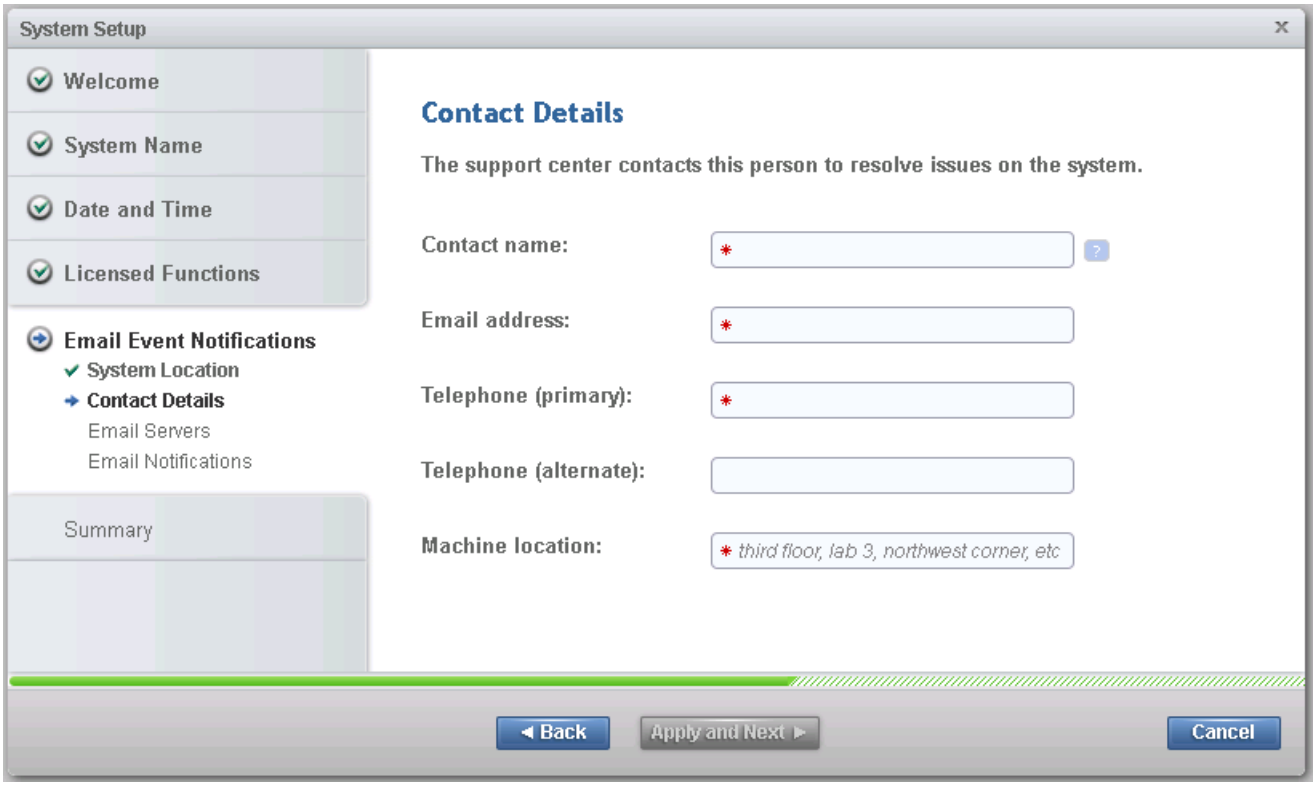
8. Click Yes for Email Event Notification and click Next.



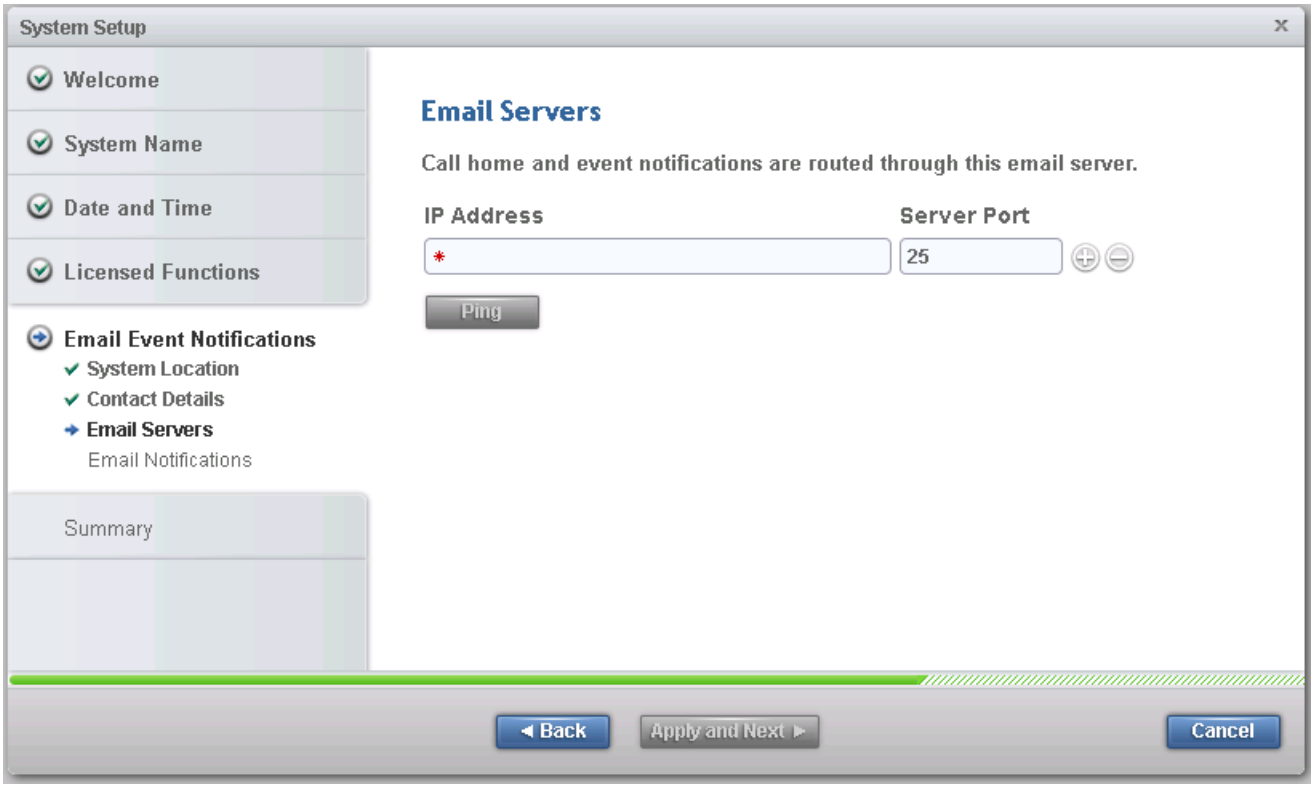
9. Fill out system location and contact details <<var_org>> <<var_street_address>>, <<var_city>> <<var_state>> <<var_zip>> <<var_country_code>>, then click Next.



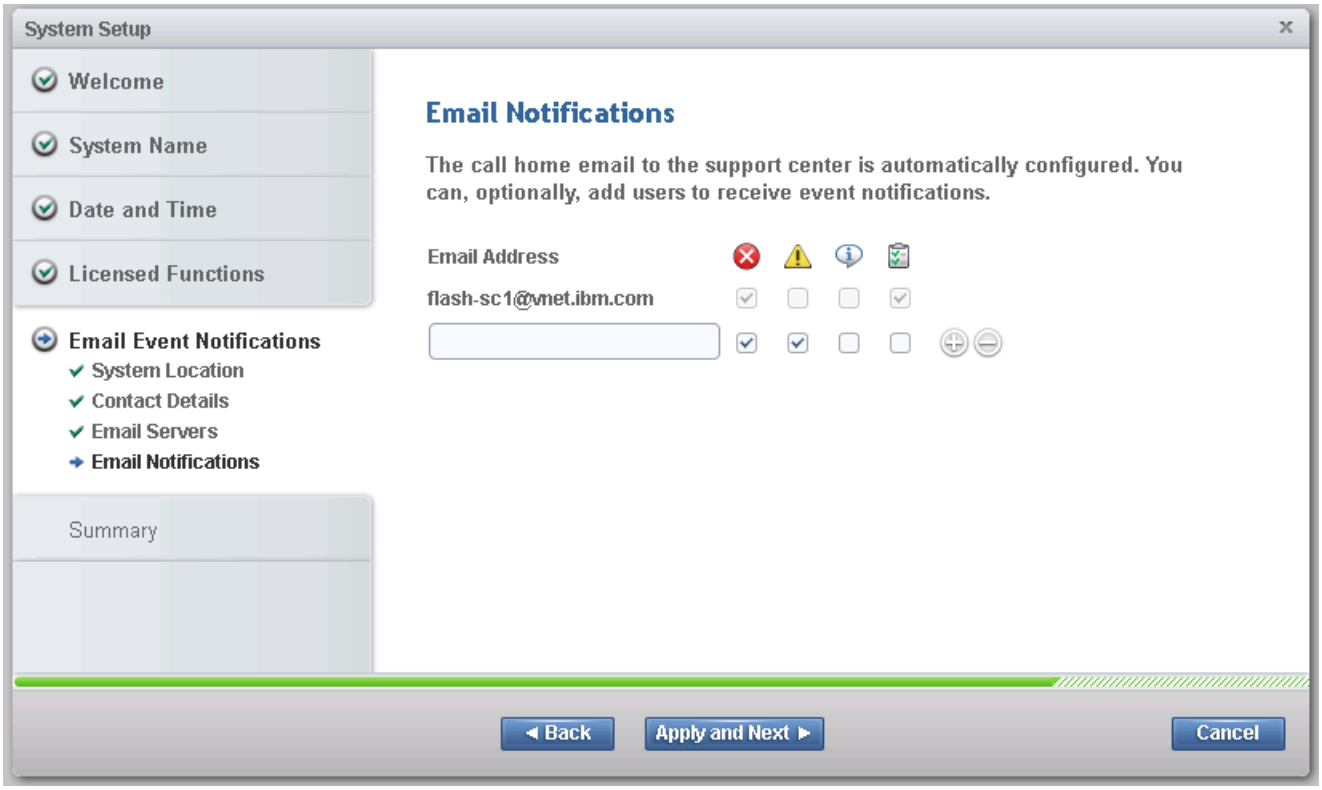
10. Insert Contact Details <<var_contact_name>> <<var_email_contact>><<var_admin_phone>><<var_city>> then click Apply and Next and click Close.



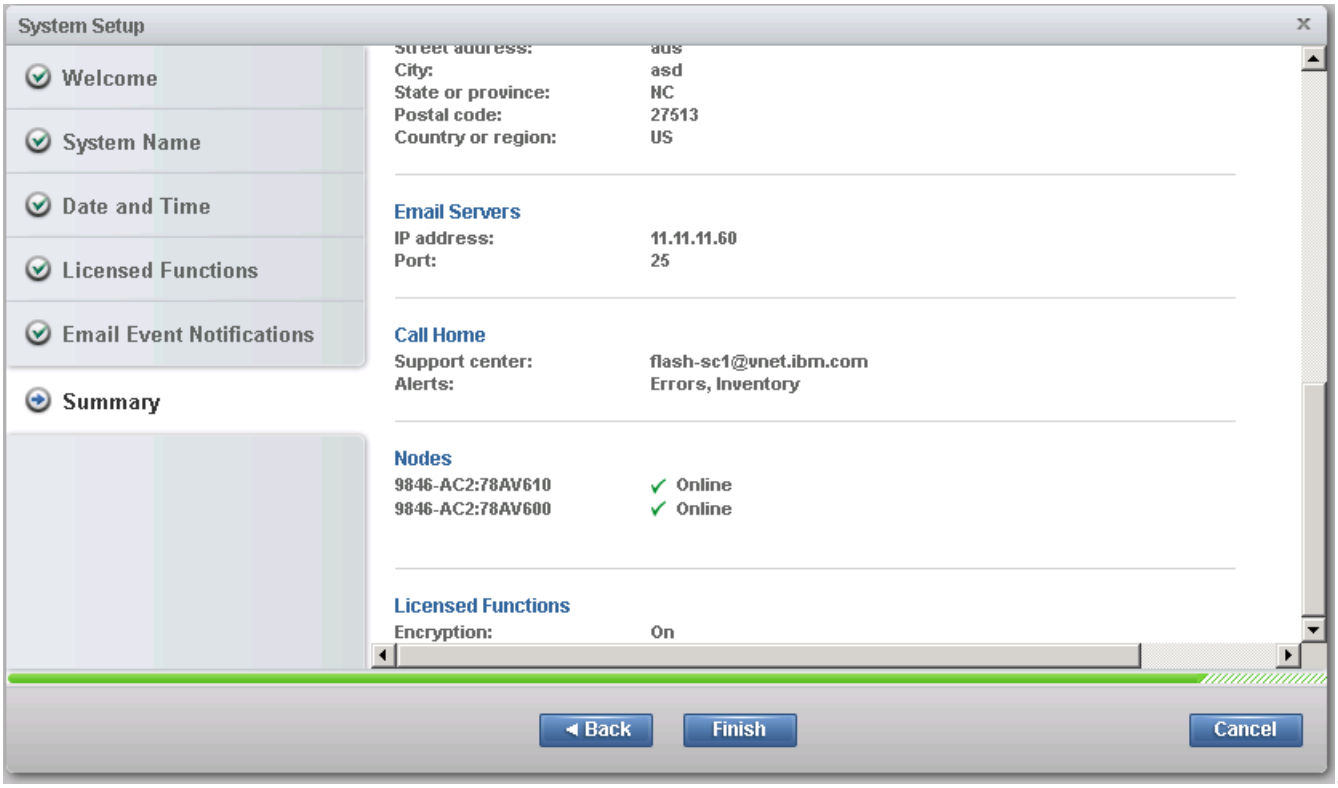
11. Input the email server IP address <<var_mailhost_ip>> and change the port if necessary, then click Apply and Next, then Close.



12. Enter the email addresses for all administrators that should be notified when issues occur as well and any other parties that need info or inventory <<var_email_contact>>. Click Apply and Next then Close.

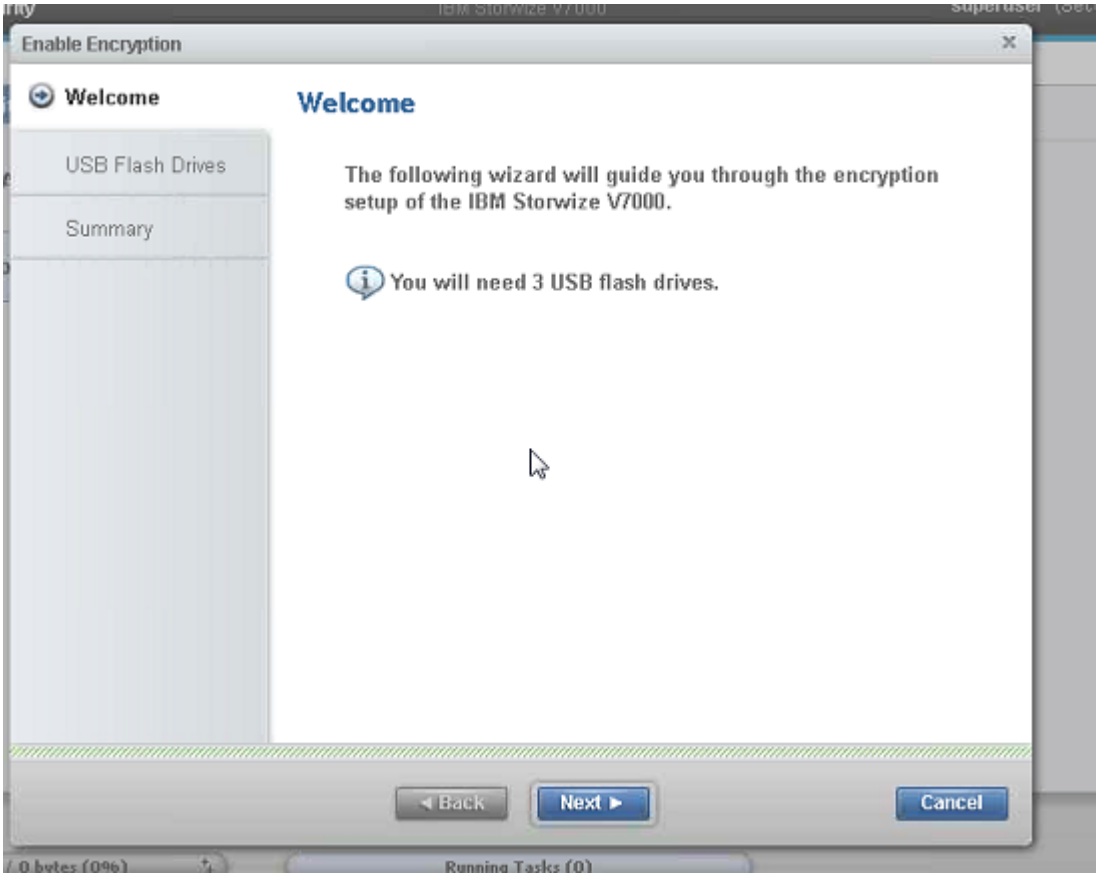


13. Review the Summary and screen and Click Finish, then click Close after tasks have completed.

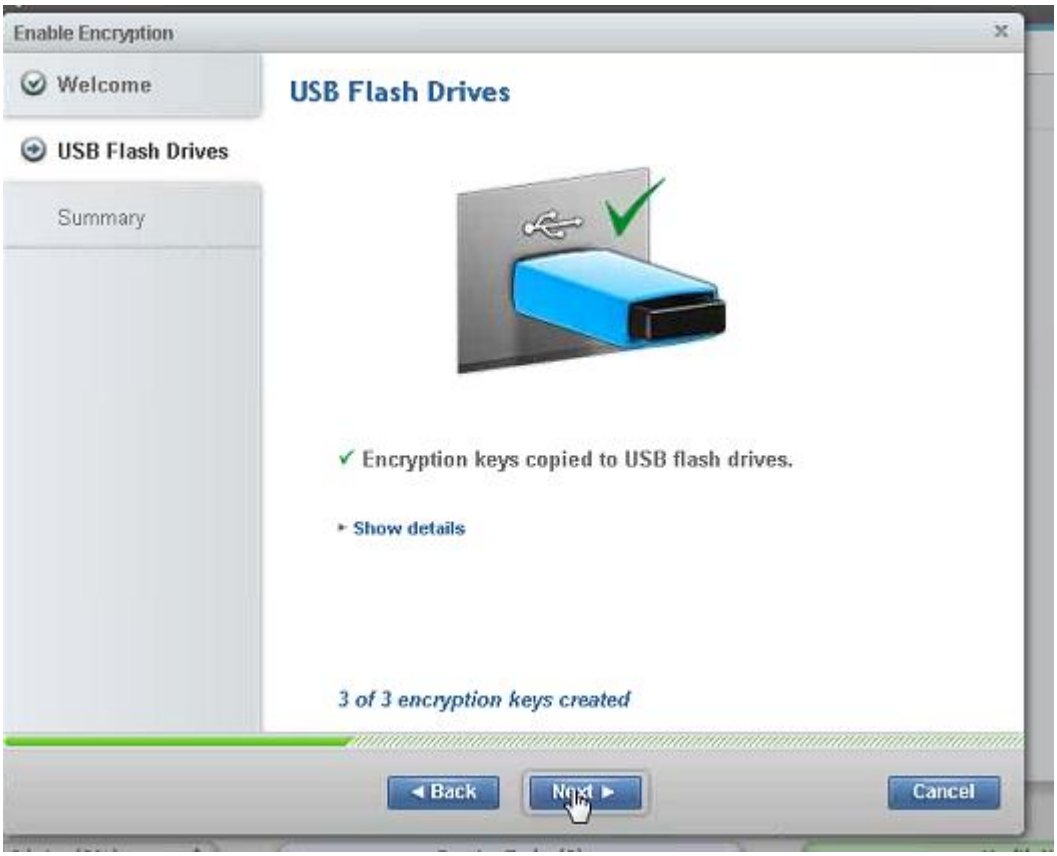


14. Click the Enable Encryption popup dialog.

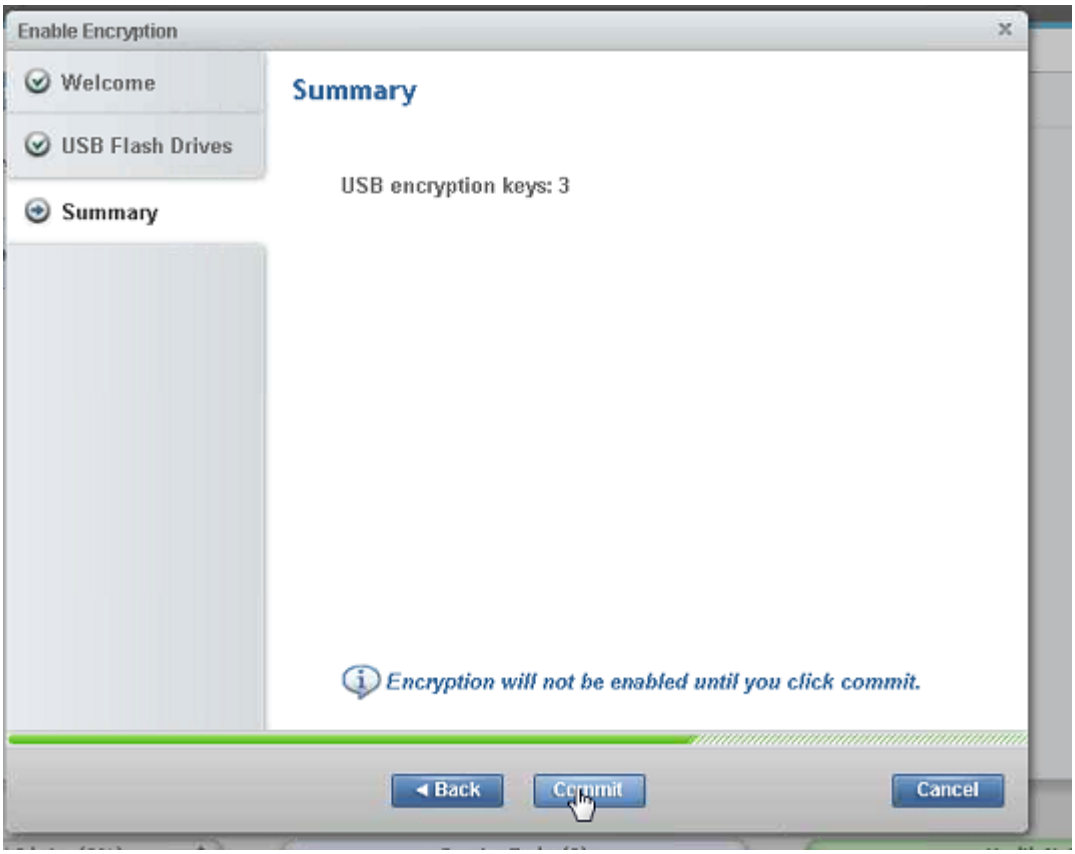
15. The dialog states you will need 3 usb flash drives. This is per storage controller, so make sure you have a total of 6 installed, 3 per enclosure if you are setting up 2 control enclosures. Click Next.



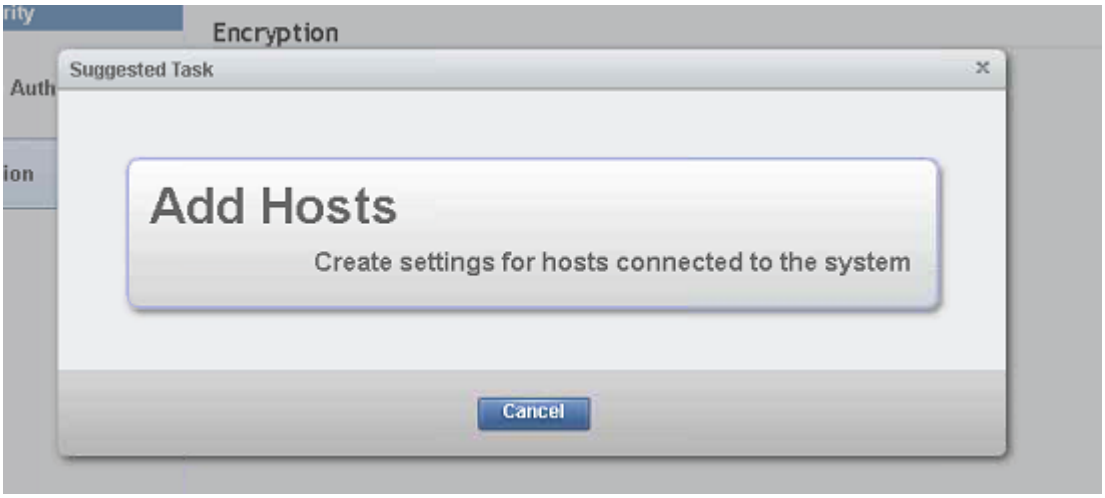
16. Wait for the Encryption Key updates to complete then click Next.



17. Click Commit to enable Encryption then click Close.



18. Click Cancel to the add hosts popup as they will be added later in this document.

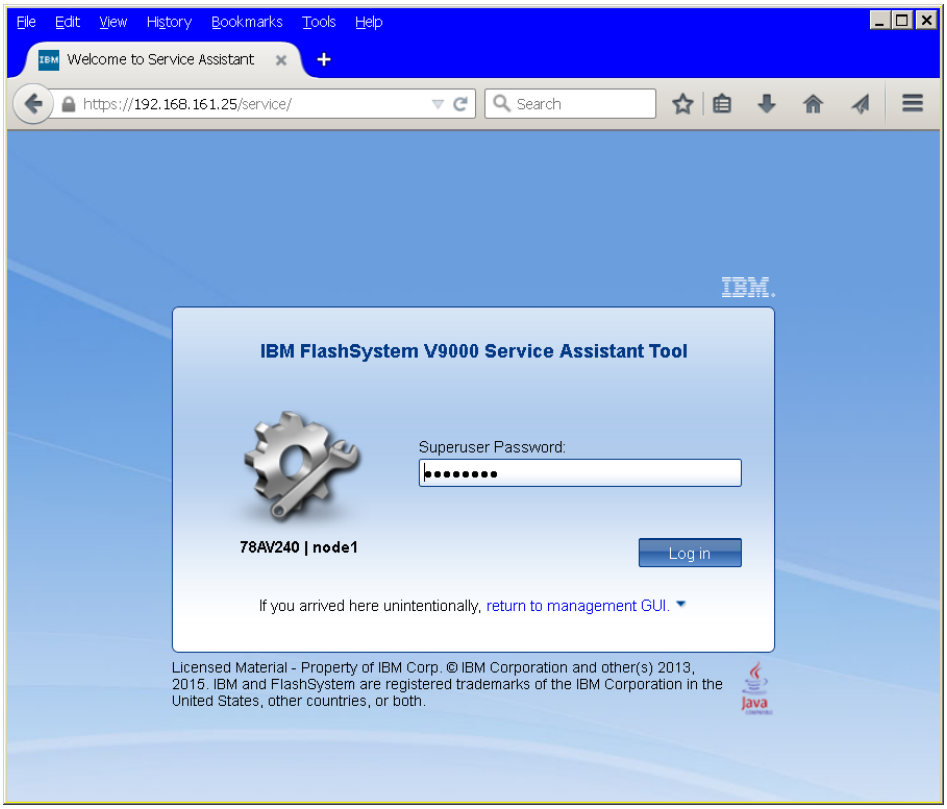


19. Using the lower left Setting navigation, select Network, then highlight the Service IP Addresses section and click interface 1. Change the IP address if necessary and click OK.

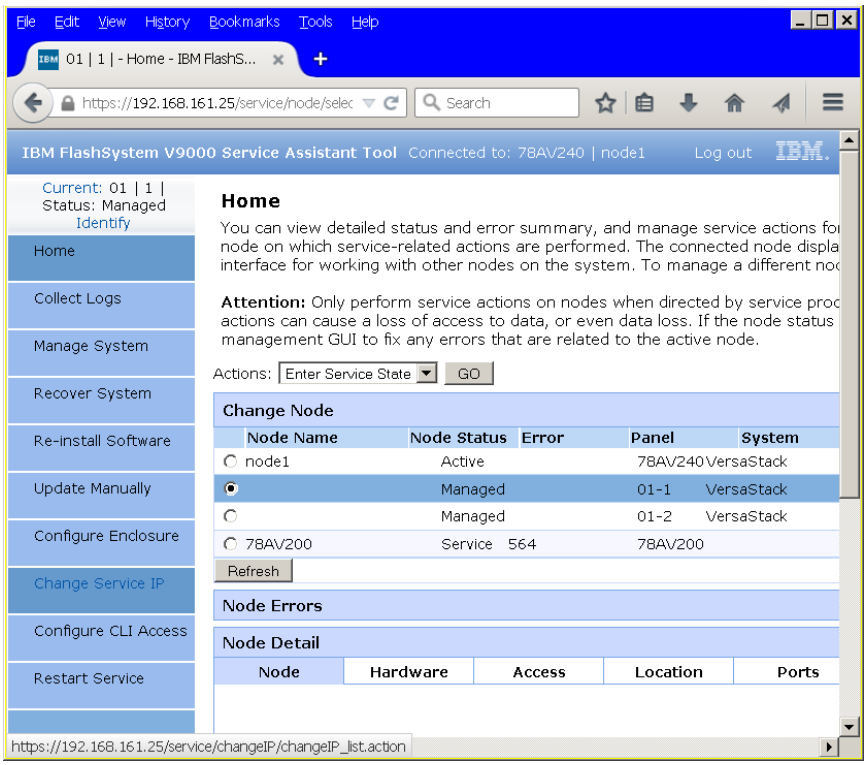
20. Select the Node Name drop-down and select Left.

21. Click node2. Change the IP address if necessary and click OK.

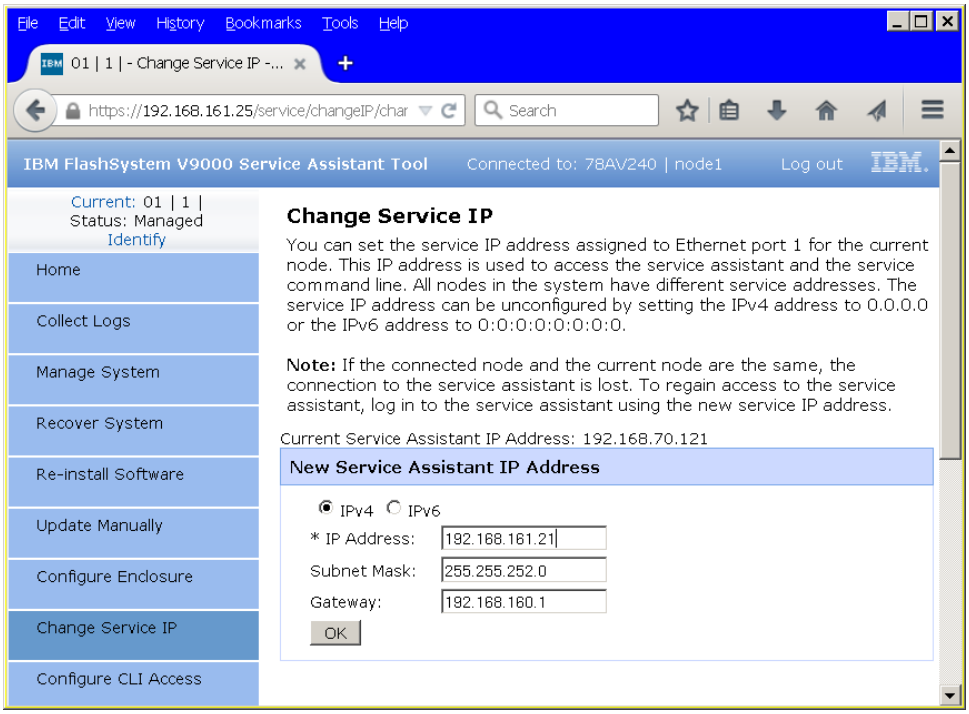
22. Open another browser session to URL, enter the ipaddress of the cluster, followed by /service. (“<<var_cluster_mgmt_ip>>/service”) Enter the superuser password (set on step 4), and click Log in.



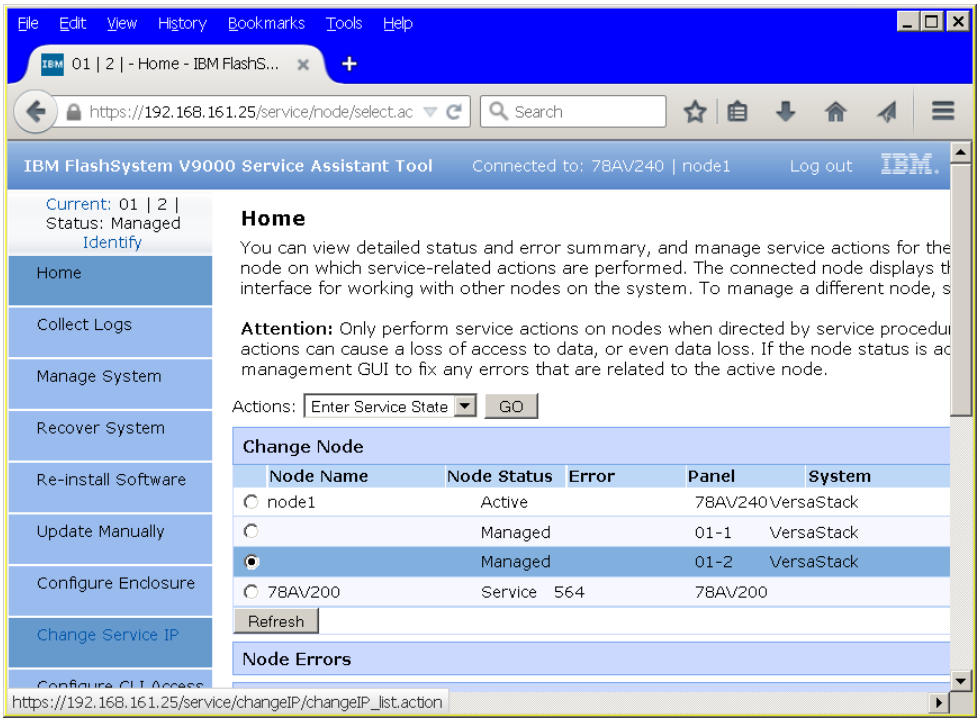
23. Click the radio button of Panel 01-1, then from the left navigation, click Change Service IP.



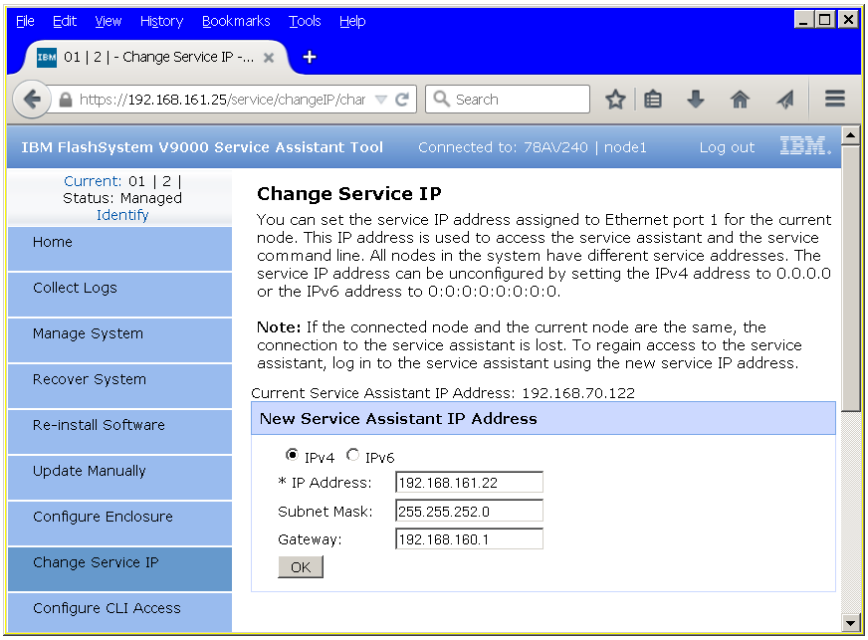
24. Enter `<<var_can01_srvc_ip>>` for IPAddress, `<<var_can_srvc_mask>>` for Subnet Mask, `<<var_can_srvc_gateway>>` for Gateway, then click OK.



25. From left navigation click Home, select the radio button for Panel 01-2, then click Change Service IP.



26. Enter `<<var_can02_srvc_ip>>` for IPAddress, `<<var_can_srvc_mask>>` for Subnet Mask, `<<var_can_srvc_gateway>>` for Gateway, then click OK.

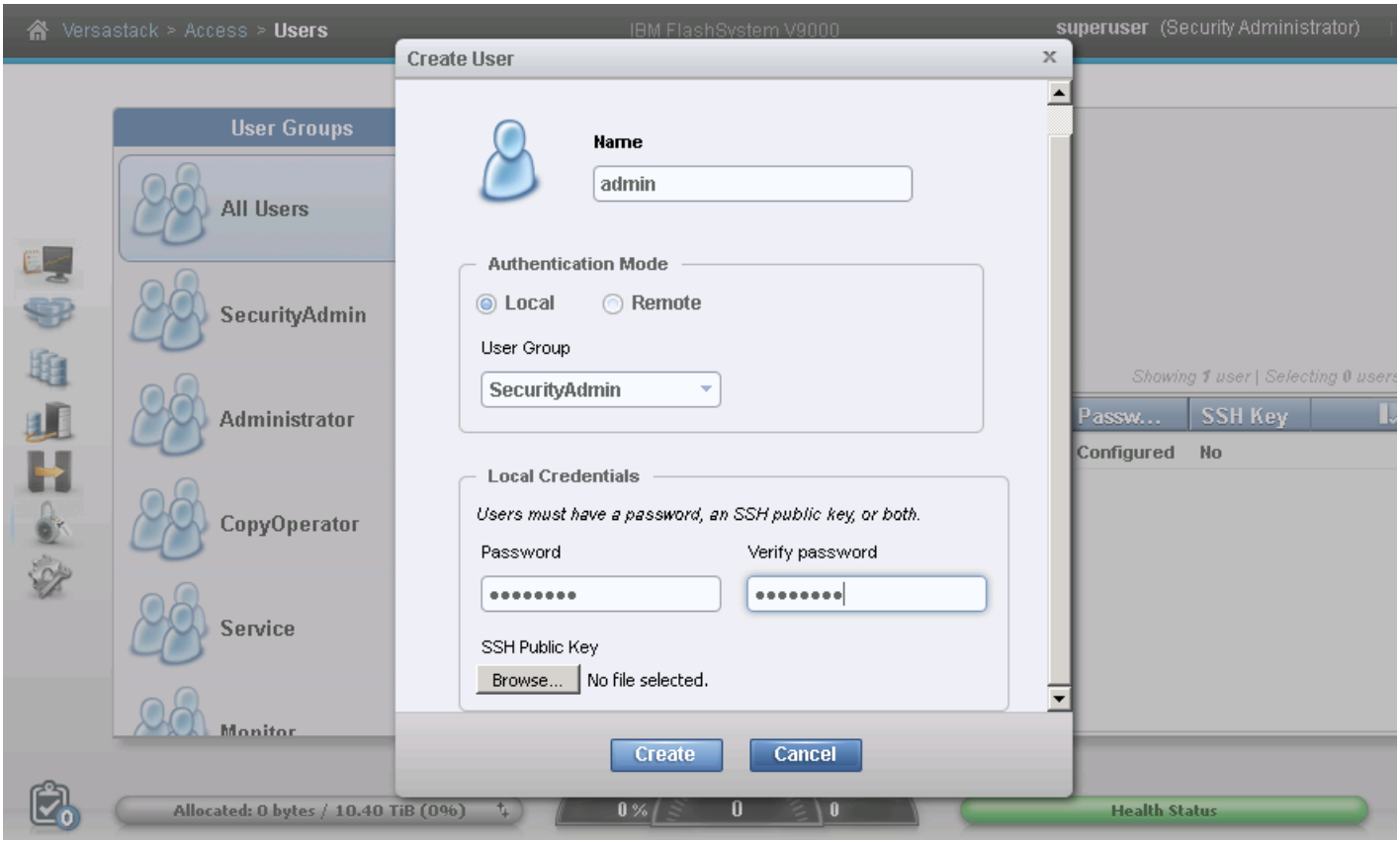


27. Close this browser session and return to the main V9000 GUI browser session.

28. Click the lock Access icon in the left pane and select Users to access the Users screen.

29. Select Create User.

30. Enter and new name for an alternative admin account. Leave Security Admin default, and input the new password then click Create.

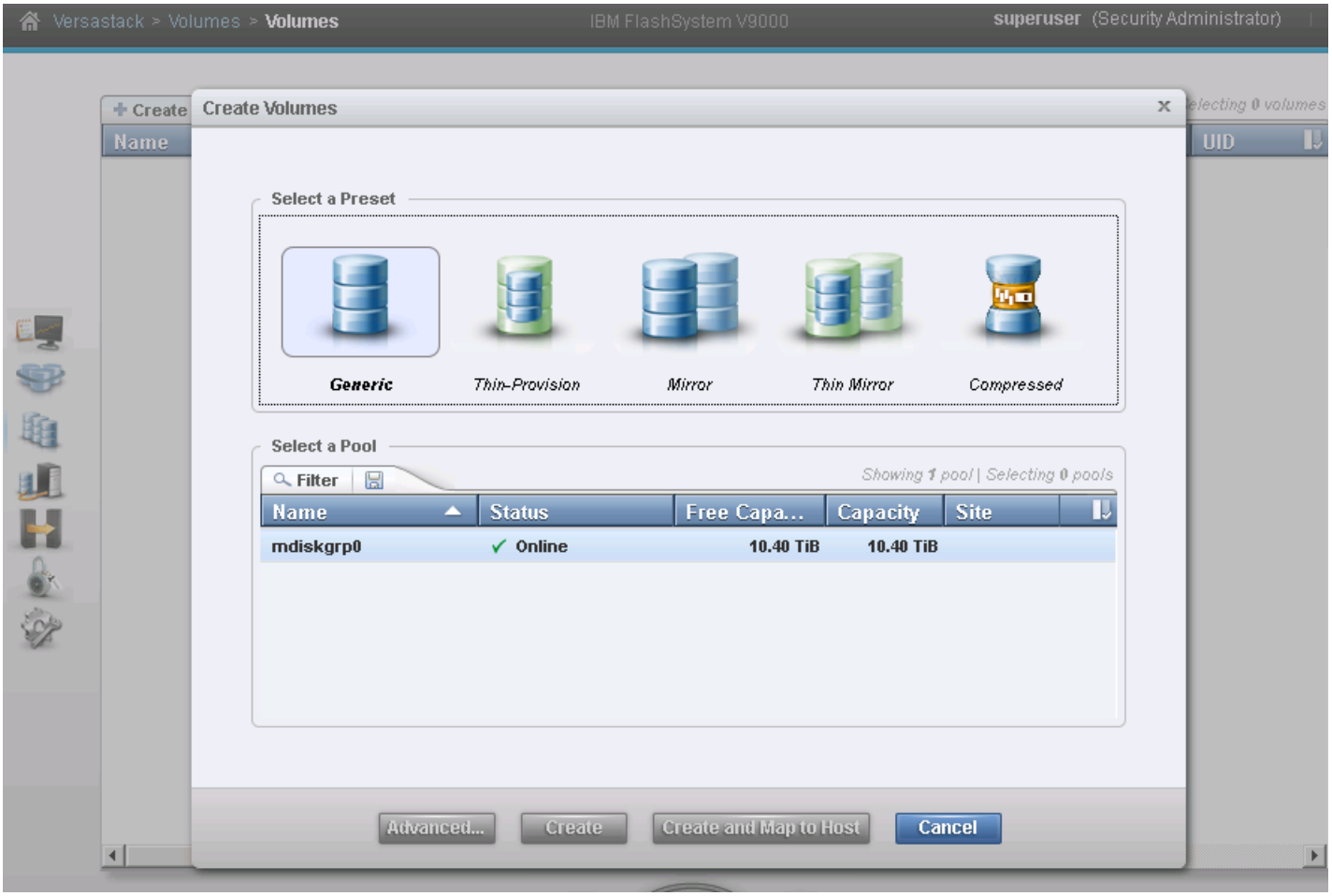


31. Log out the superuser account and log back in as the new account you created.

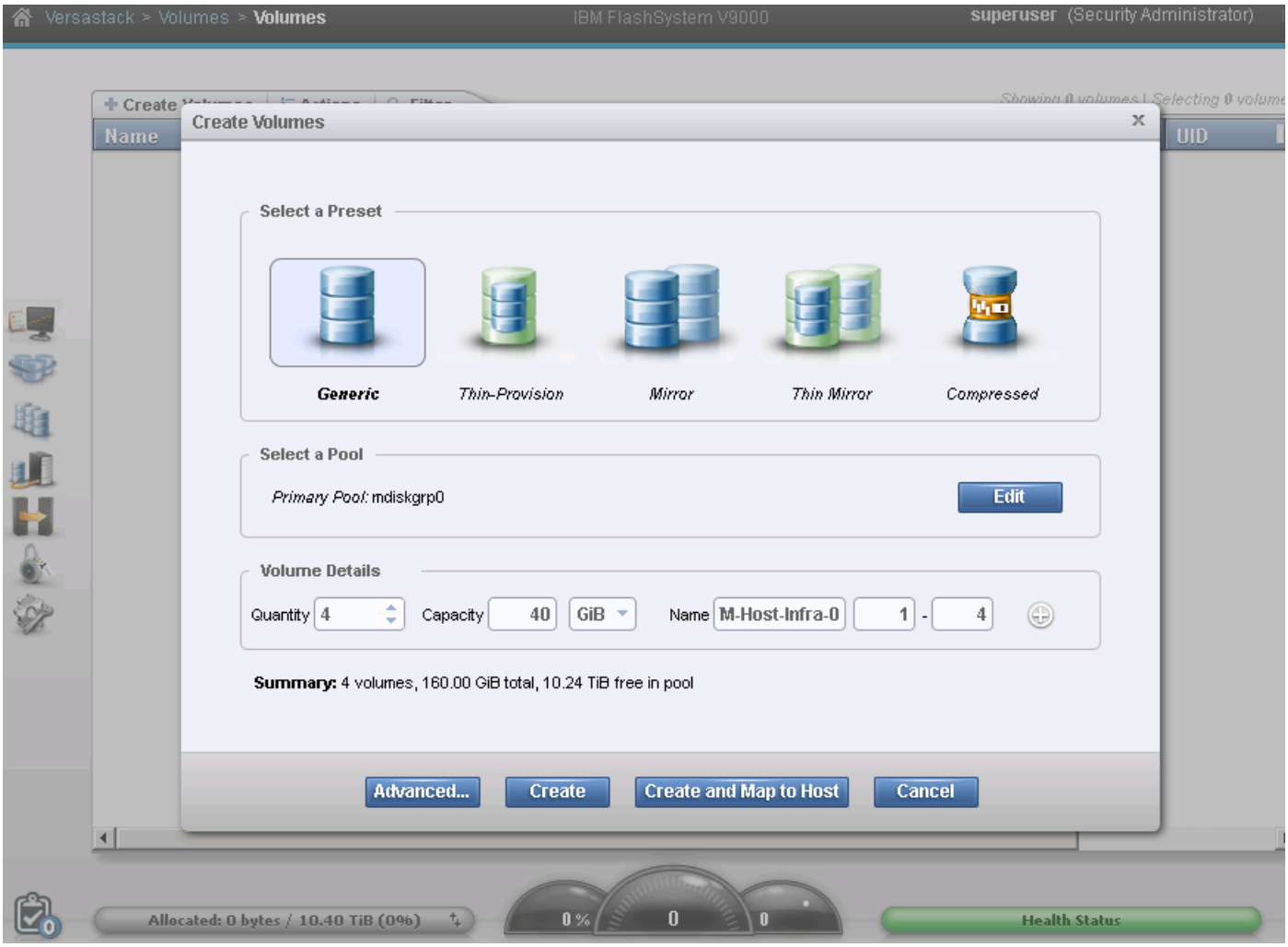
32. Click Cancel if you are prompted to add host or volumes, and select the Pools icon one the left screen and select Volumes by Pool.

33. Click the Create Volumes selection.

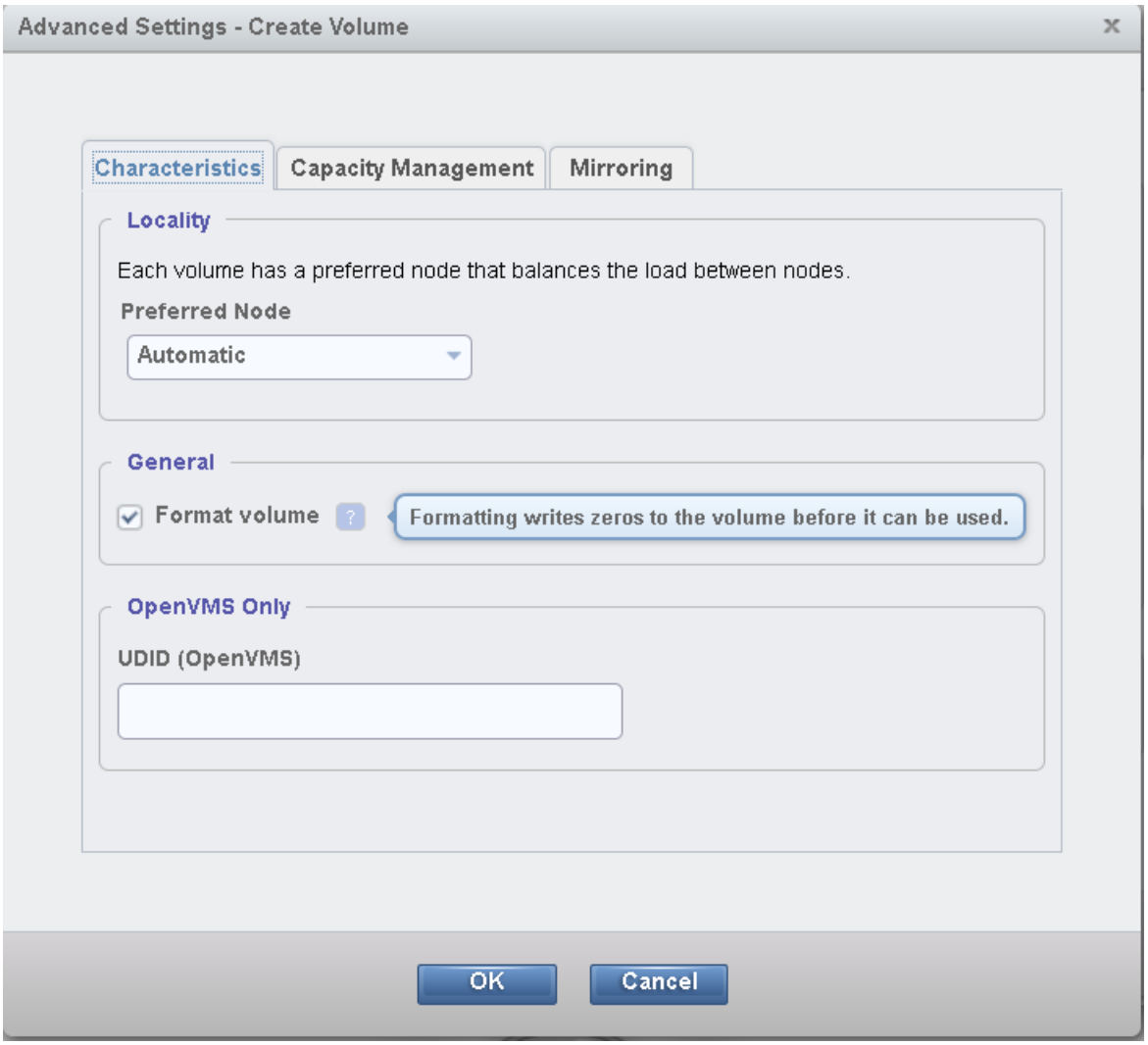
34. Select a preset that you want for the ESXi boot volume and select the Pool.



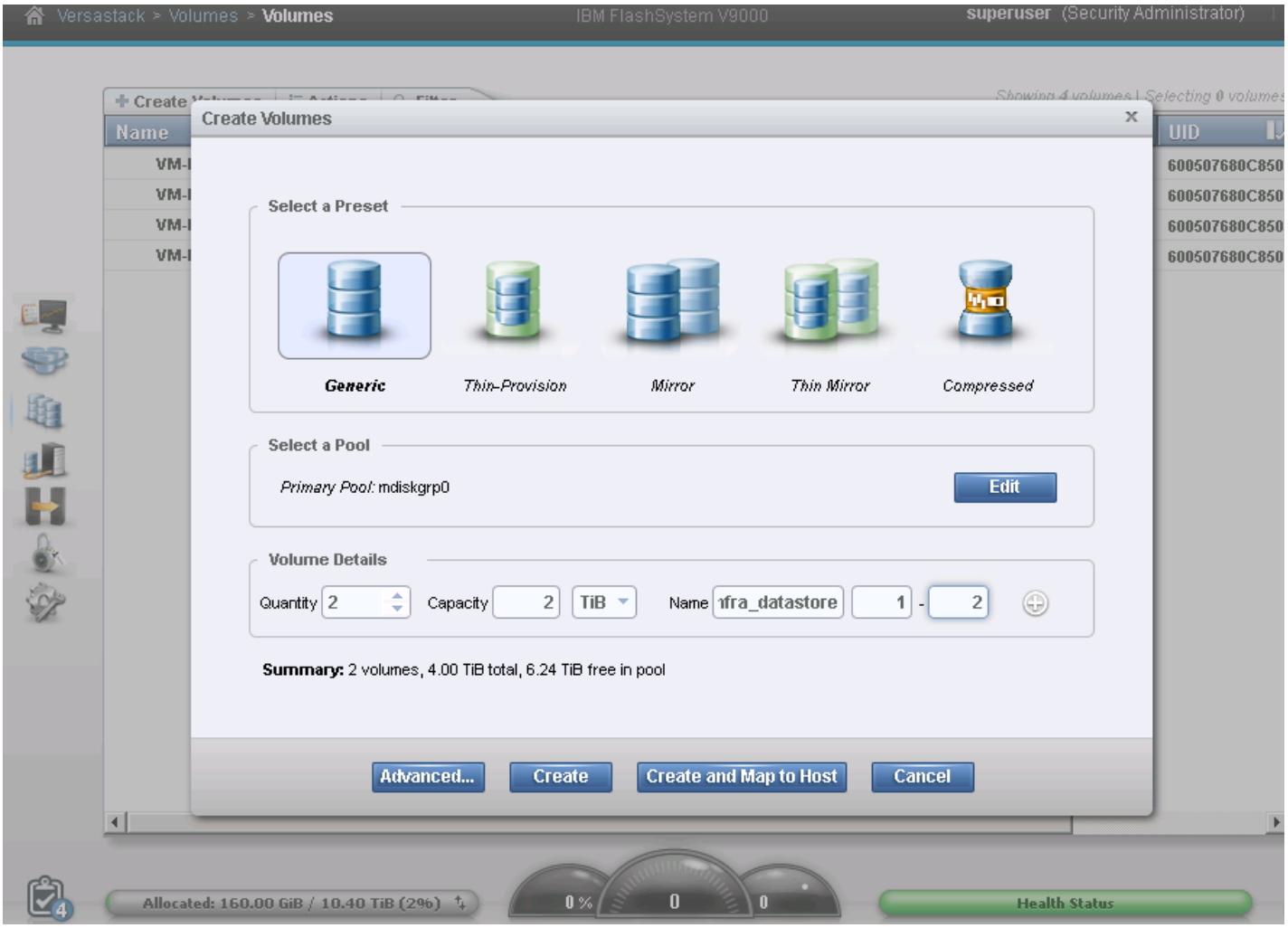
35. Input quantity 4, capacity 40GB, and name VM-Host-Infra-0, and change the starting ID to 1. Click Create, then click Close.



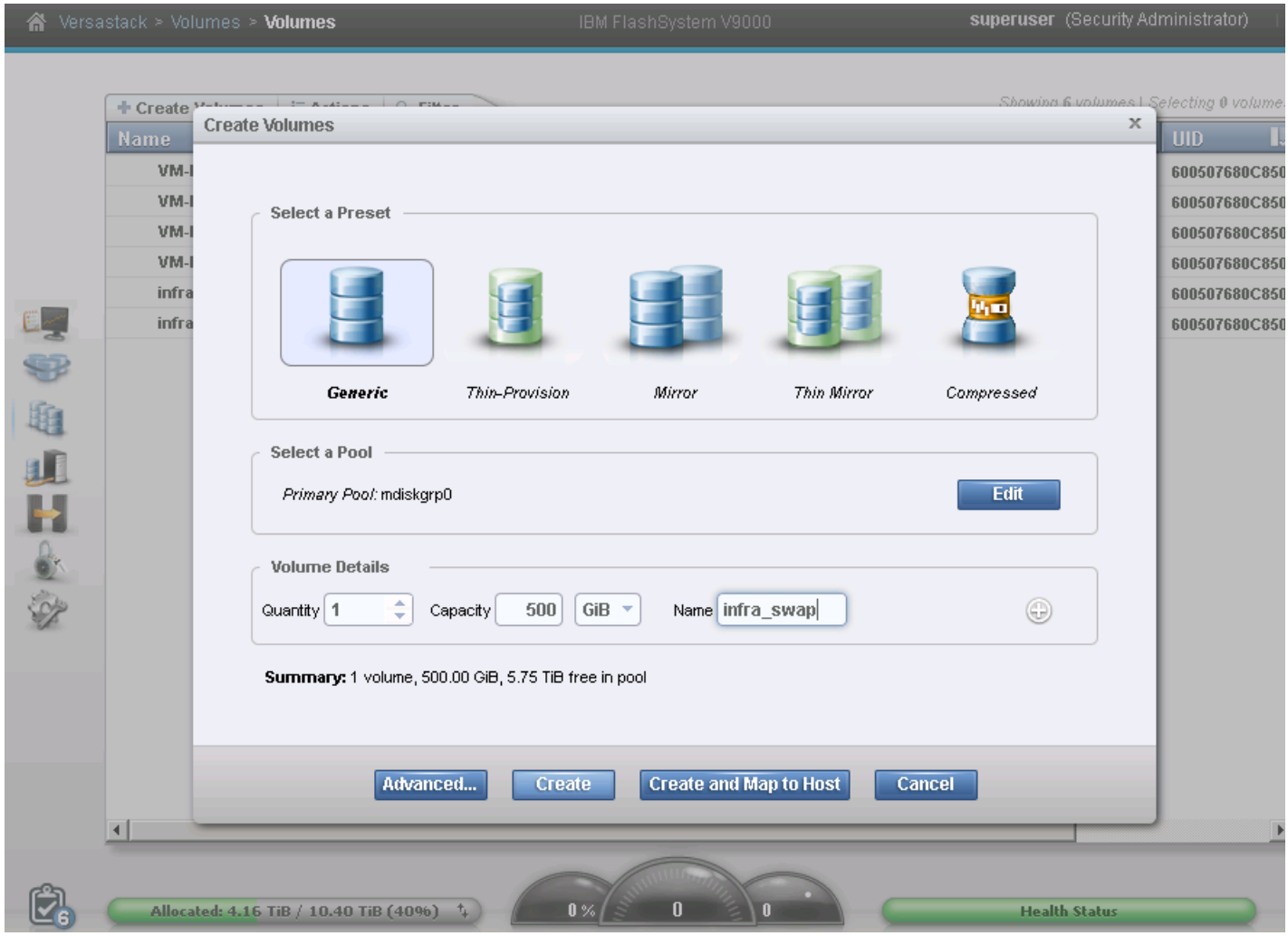
For FlashSystem V9000 software version 7.5 and above, Click Advanced. Deselect the “Format volume”. This will save several hours of volume format time, unless clearing residual data is required. Click OK. Then click Create, then Close.



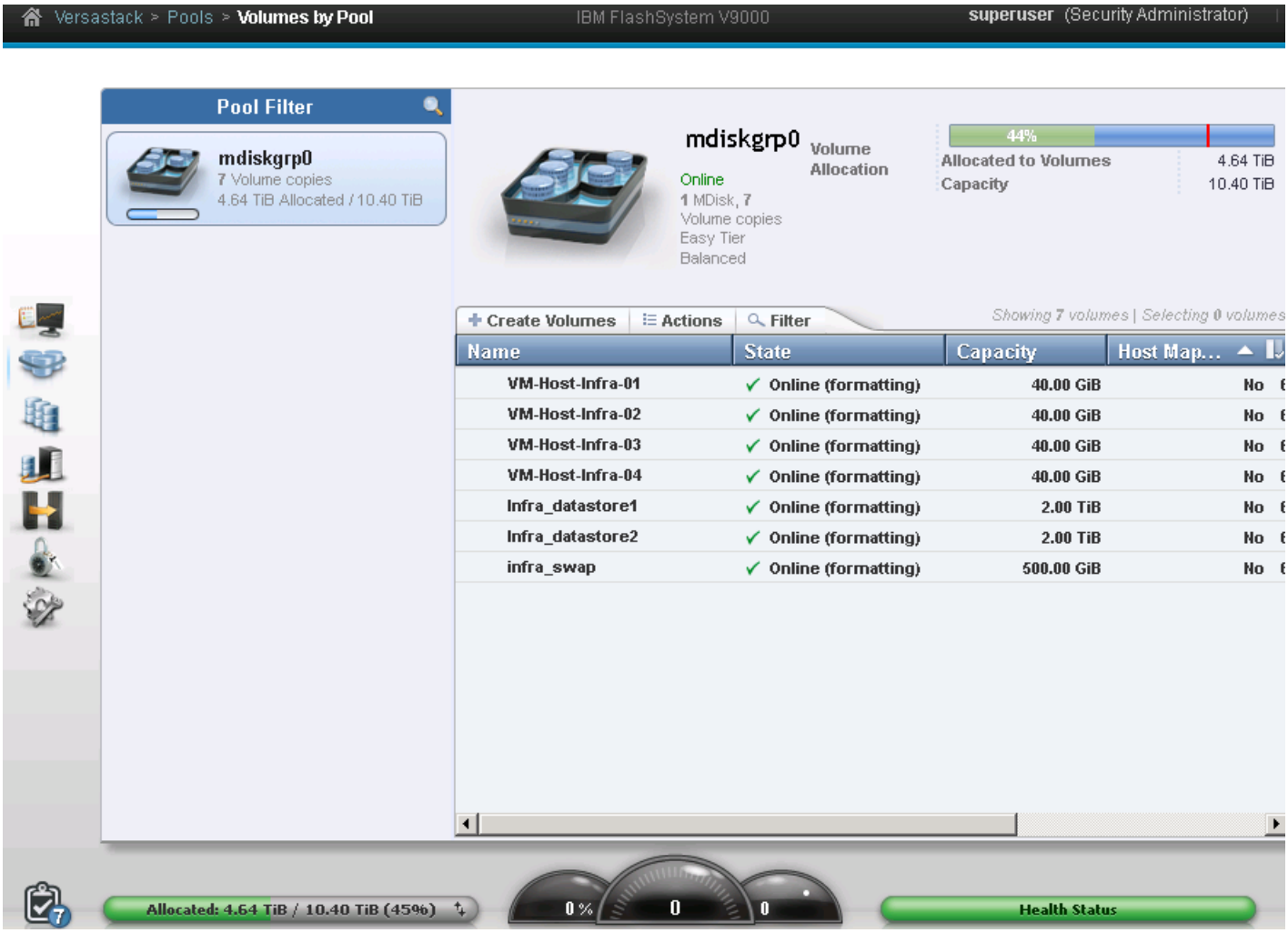
36. Click create volume again and select the disk preset, and the Pool. Enter quantity 2, capacity 2 TB, and name infra_datastore. Enter 1 for the starting ID then click Create, then click Close.



37. Click create volume again and select the disk preset, and the Pool. Enter quantity 1, capacity 500GB, and name infra_swap. Click Create, then click Close.



38. Validate the volumes created volumes.



Server Configuration

VersaStack Cisco UCS Initial Setup

Perform Initial Setup of Cisco UCS 6248 Fabric Interconnect for VersaStack Environments

This section provides detailed procedures for configuring the Cisco Unified Computing System (Cisco UCS) for use in a VersaStack environment. The steps are necessary to provision the Cisco UCS C-Series and B-Series servers and should be followed precisely to avoid improper configuration.

Cisco UCS 6248 A

To configure the Cisco UCS for use in a VersaStack environment, complete the following steps:

1. Connect to the console port on the first Cisco UCS 6248 fabric interconnect.

```
Enter the configuration method: console

Enter the setup mode; setup newly or restore from backup.(setup/restore)? Setup

You have chosen to setup a new fabric interconnect? Continue? (y/n): y
```

```
Enforce strong passwords? (y/n) [y]: y

Enter the password for "admin": <<var_password>>

Enter the same password for "admin": <<var_password>>

Is this fabric interconnect part of a cluster (select 'no' for standalone)?

(yes/no) [n]: y

Which switch fabric (A|B): A

Enter the system name: <<var_ucs_clustername>>

Physical switch Mgmt0 IPv4 address: <<var_ucsa_mgmt_ip>>

Physical switch Mgmt0 IPv4 netmask: <<var_ucsa_mgmt_mask>>

IPv4 address of the default gateway: <<var_ucsa_mgmt_gateway>>

Cluster IPv4 address: <<var_ucs_cluster_ip>>

Configure DNS Server IPv4 address? (yes/no) [no]: y

DNS IPv4 address: <<var_nameserver_ip>>

Configure the default domain name? y

Default domain name: <<var_dns_domain_name>>

Join centralized management environment (UCS Central)? (yes/no) [n]: Enter
```

2. Review the settings printed to the console. If they are correct, answer yes to apply and save the configuration.

3. Wait for the login prompt to make sure that the configuration has been saved prior to proceeding.

Cisco UCS 6248 B

To configure the Cisco UCS for use in a VersaStack environment, complete the following step:

1. Power on the 2nd module and connect to the console port on the second Cisco UCS 6248 fabric interconnect.

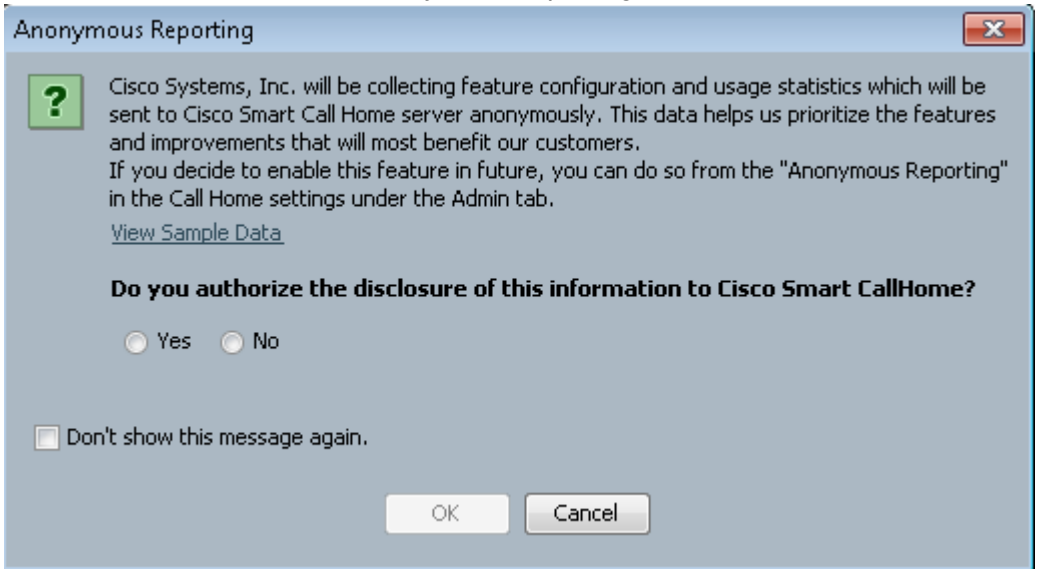
```
Enter the configuration method: console

Installer has detected the presence of a peer Fabric interconnect. This Fabric
interconnect will be added to the cluster.  Do you want to continue {y|n}? y

Enter the admin password for the peer fabric interconnect: <<var_password>>

Physical switch Mgmt0 IPv4 address: <<var_ucsb_mgmt_ip>>
Apply and save the configuration (select ‘no’ if you want to re-enter)? (yes/no):
y
```

VersaStack Cisco UCS Configuration

Log in to Cisco UCS Manager

To log in to the Cisco Unified Computing System (UCS) environment, complete the following steps:

1. Open a web browser and navigate to the Cisco UCS 6248 Fabric Interconnect cluster address.
2. Click the Launch UCS Manager link to download the Cisco UCS Manager software.
3. If prompted to accept security certificates, accept as necessary.
4. When prompted, enter admin as the user name and enter the administrative password. <<var_password>>
5. Click Login to log in to Cisco UCS Manager.
6. Enter the information for the Anonymous Reporting if desired and click OK.



Upgrade Cisco UCS Manager Software to Version 2.2(5a)

This document assumes the use of Cisco UCS Manager Software version 2.2(5a). To upgrade the Cisco UCS Manager software and the UCS 6248 Fabric Interconnect software to version 2.2(5a), refer to Cisco UCS Manager Install and Upgrade Guides.

Cisco UCS Manager and Cisco UCS Fabric Interconnect software version used is 2.2(5a), the blade and rack server software bundle versions used is 2.2(3g). For more information regarding supported configurations please reference the IBM and Cisco Interoperability matrix links.

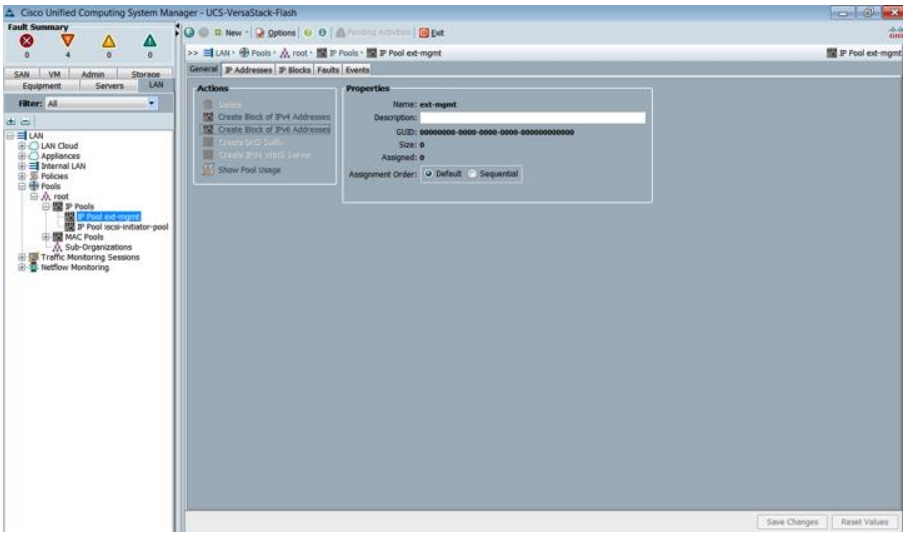
Add Block of IP Addresses for KVM Access

To create a block of IP addresses for server Keyboard, Video, Mouse (KVM) access in the Cisco UCS environment, complete the following steps:

This block of IP addresses should be in the same subnet as the management IP addresses for the Cisco UCS Manager.

1. Log into Cisco UCS Manager, click the LAN tab in the navigation pane.

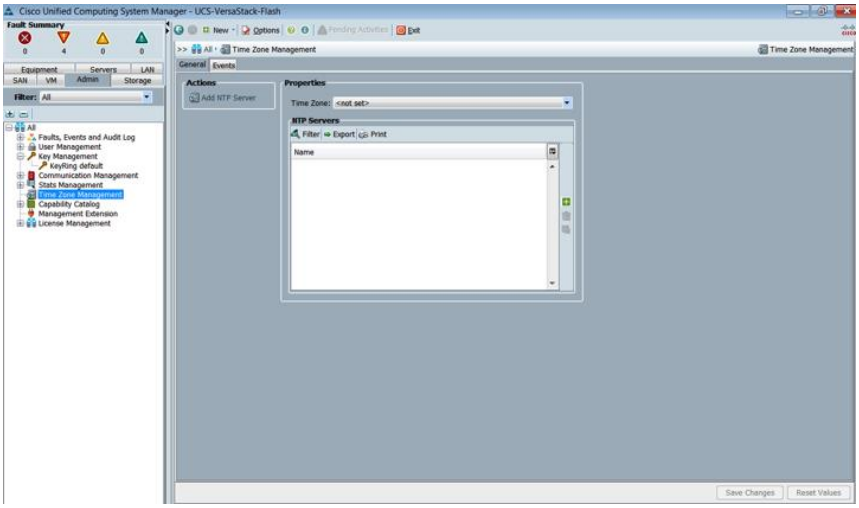
2. Select Pools > root > IP Pools > IP Pool ext-mgmt.
3. In the Actions pane, select Create Block of IP Addresses.
4. Enter the starting IP address of the block and the number of IP addresses required, and the subnet and gateway information. <<var_In-band_mgmtblock_net>>
5. Click OK to create the IP block.
6. Click OK in the confirmation message.



Synchronize Cisco UCS to NTP

To synchronize the Cisco UCS environment to the NTP server, complete the following steps:

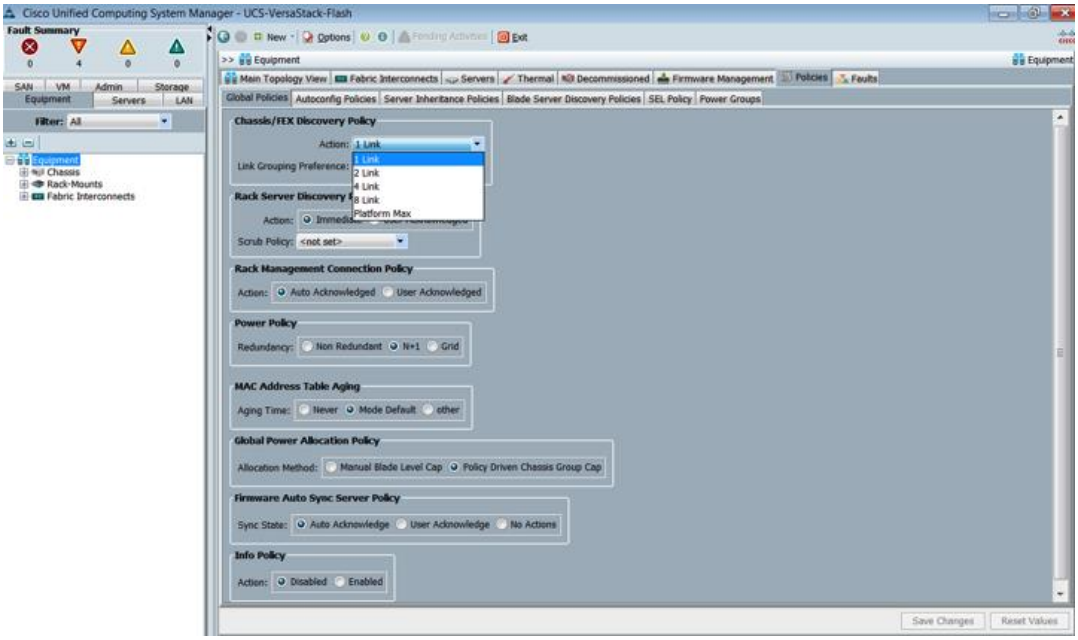
1. In Cisco UCS Manager, click the Admin tab in the navigation pane.
2. Select All > Timezone Management.
3. In the Properties pane, select the appropriate time zone in the Timezone menu.
4. Click Save Changes, and then click OK.
5. Click Add NTP Server.
6. Enter <<var_global_ntp_server_ip>> and click OK.
7. Click OK.



Edit Chassis Discovery Policy

Setting the discovery policy simplifies the addition of Cisco UCS B-Series Cisco UCS chassis and of additional fabric extenders for further Cisco UCS C-Series connectivity. To modify the chassis discovery policy, complete the following steps:

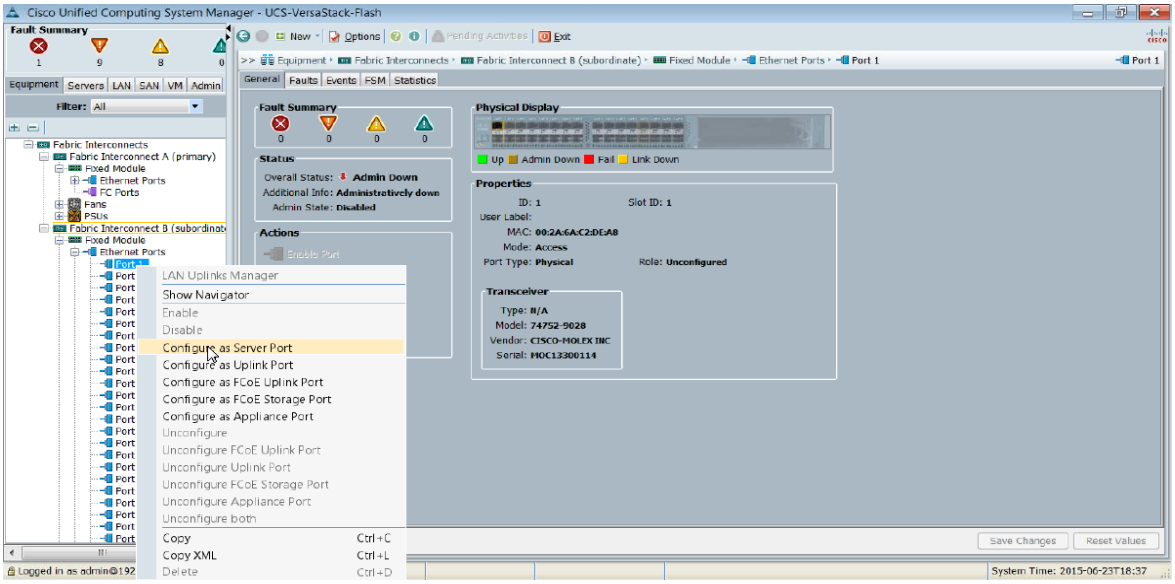
1. In Cisco UCS Manager, click the Equipment tab in the navigation pane and select Equipment in the list on the left.
2. In the right pane, click the Policies tab.
3. Under Global Policies, set the Chassis/FEX Discovery Policy to match the number of uplink ports that are cabled between the chassis or fabric extenders (FEXes) and the fabric interconnects.
4. Set the Link Grouping Preference to Port Channel.
5. Click Save Changes.
6. Click OK.



Enable Server and Uplink Ports

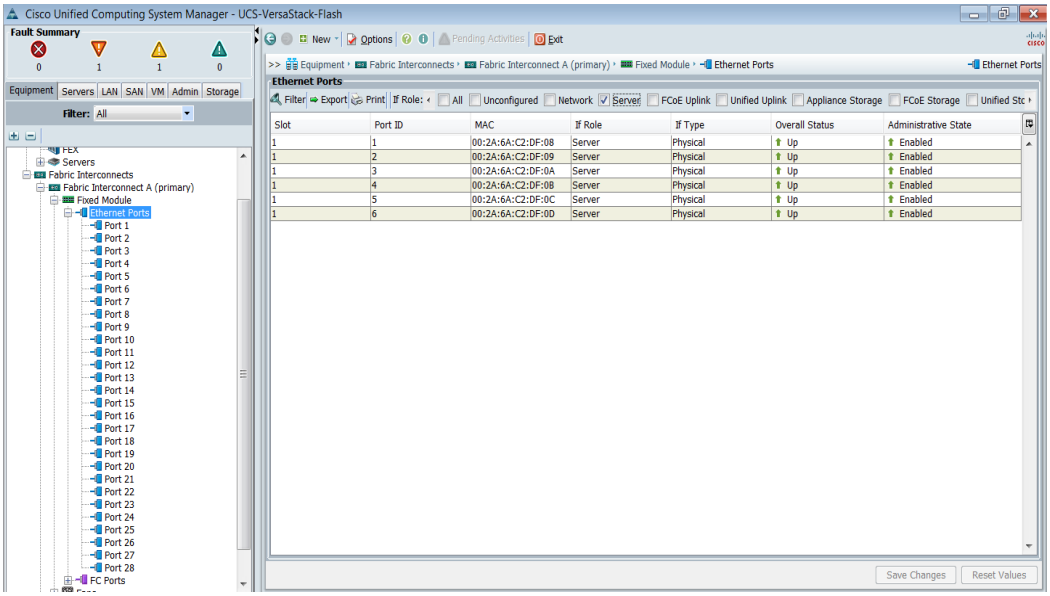
To enable server and uplink ports, complete the following steps:

1. In Cisco UCS Manager, click the Equipment tab in the navigation pane.
2. Select Equipment > Fabric Interconnects > Fabric Interconnect A (primary) > Fixed Module.
3. Expand Ethernet Ports.
4. Select the ports that are connected to the chassis and to the Cisco UCS C-Series or the FEX, right-click them, and select Configure as Server Port.



5. Click Yes to confirm server ports and click OK.

6. Verify that the ports connected to the chassis and to the Cisco UCS C-Series are now configured as server ports.



7. Select ports 25 and 26 that are connected to the Cisco Nexus switches, right-click them, and select Configure as Uplink Port.

8. Click Yes to confirm uplink ports and click OK.

9. Select Equipment > Fabric Interconnects > Fabric Interconnect B (subordinate) > Fixed Module.

10. Expand Ethernet Ports.

11. Select the ports that are connected to the chassis and Cisco UCS C-Series or the FEX (two per FEX), right-click them, and select Configure as Server Port.

12. Click Yes to confirm server ports and click OK.

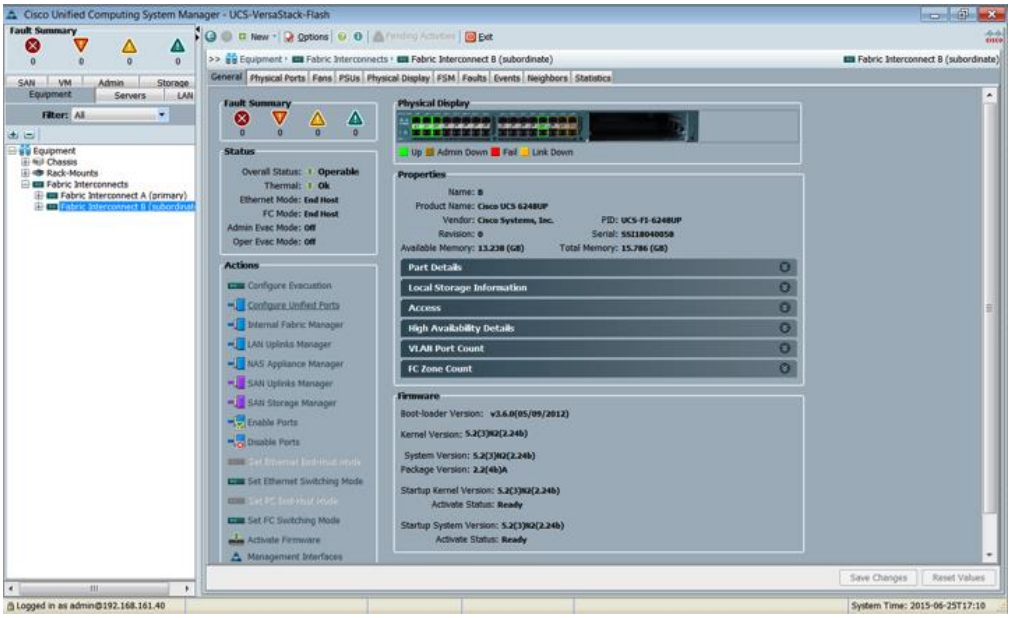
13. Select ports 25 and 26 that are connected to the Cisco Nexus switches, right-click them, and select Configure as Uplink Port.

14. Click Yes to confirm the uplink ports and click OK.

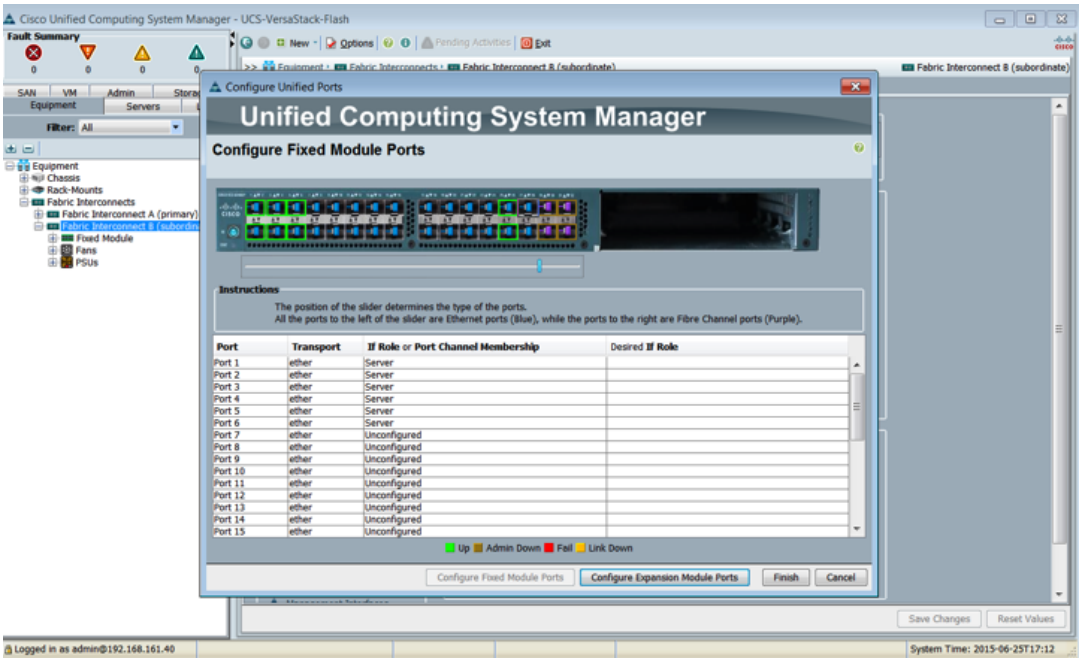
Enable Fibre Channel Ports

To enable server and FC uplink ports, complete the following steps making sure you first reconfigure the subordinate switch to save time:

1. On the equipment tab, select the Fabric Interconnect B which should be the subordinate FI, and in the Actions pane, select Configure Unified Ports, click Yes.



2. Slide the lever to change the ports 29-32 to change the ports to Fiber Channel. Click Finish then Yes to the reboot message. Click OK.



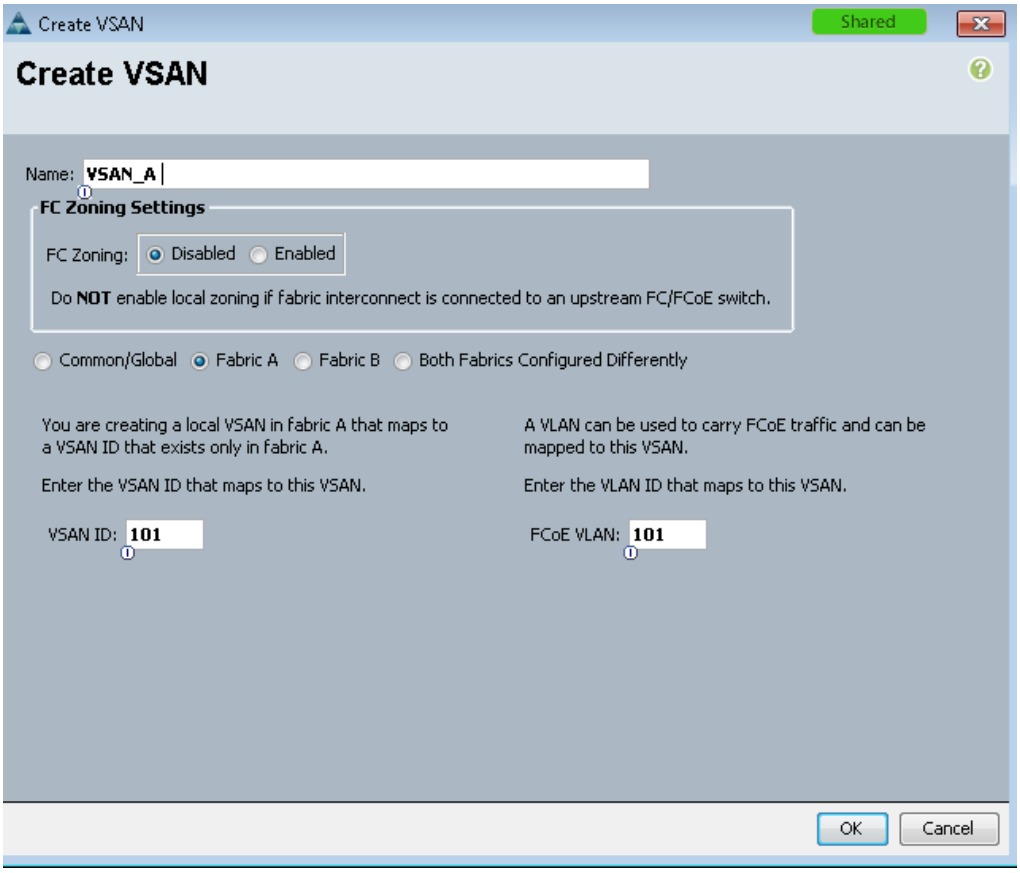
3. When the subordinate has completed reboot, select the Fabric Interconnect A, (primary) , then select Configure Unified Ports, and click Yes.

4. Slide the Bar to the left to select ports 29-32 for FC (purple), click finish, and say Yes to the reboot message. You will need to re-login to the client after the reboot of the FI completes.

Create VSAN for the Fibre Channel Interfaces

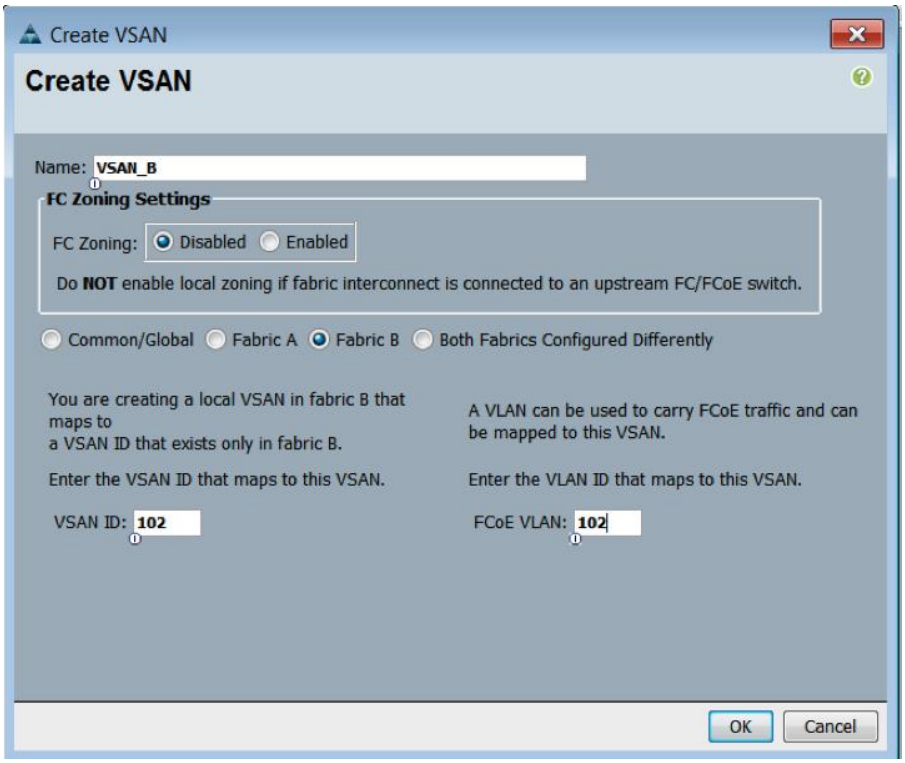
To configure the necessary virtual storage area networks (VSANs) for FC uplinks for the Cisco UCS environment, follow these steps:

1. In Cisco UCS Manager, click the SAN tab in the navigation pane.
2. Expand the SAN > SAN Cloud tree, then fabric A.
3. Right-click VSANs.
4. Choose Create VSAN.
5. Enter VSAN_A as the name of the VSAN for fabric A.
6. Keep the Disabled option selected for FC Zoning.
7. Click the Fabric A radio button.
8. Enter <<var_vsan_a_id>> as the VSAN ID for fabric A.
9. Enter <<var_fabric_a_fcoe_vlan_id>>as the FCoE VLAN ID for fabric A. and click OK, and OK again.



10. On the SAN tab, expand SAN, SAN Cloud, Fabric-B and right-click VSANs.

11. Right-click VSANs and choose Create VSAN.
12. Enter VSAN_B as the name of the VSAN for fabric B.
13. Keep the Disabled option selected for FC Zoning.
14. Click the Fabric B radio button.
15. Enter <<var_vsan_b_id>> as the VSAN ID for fabric B. Enter <<var_fabric_b_fcoe_vlan_id>> as the FCoE VLAN ID for fabric B, then click OK and OK.

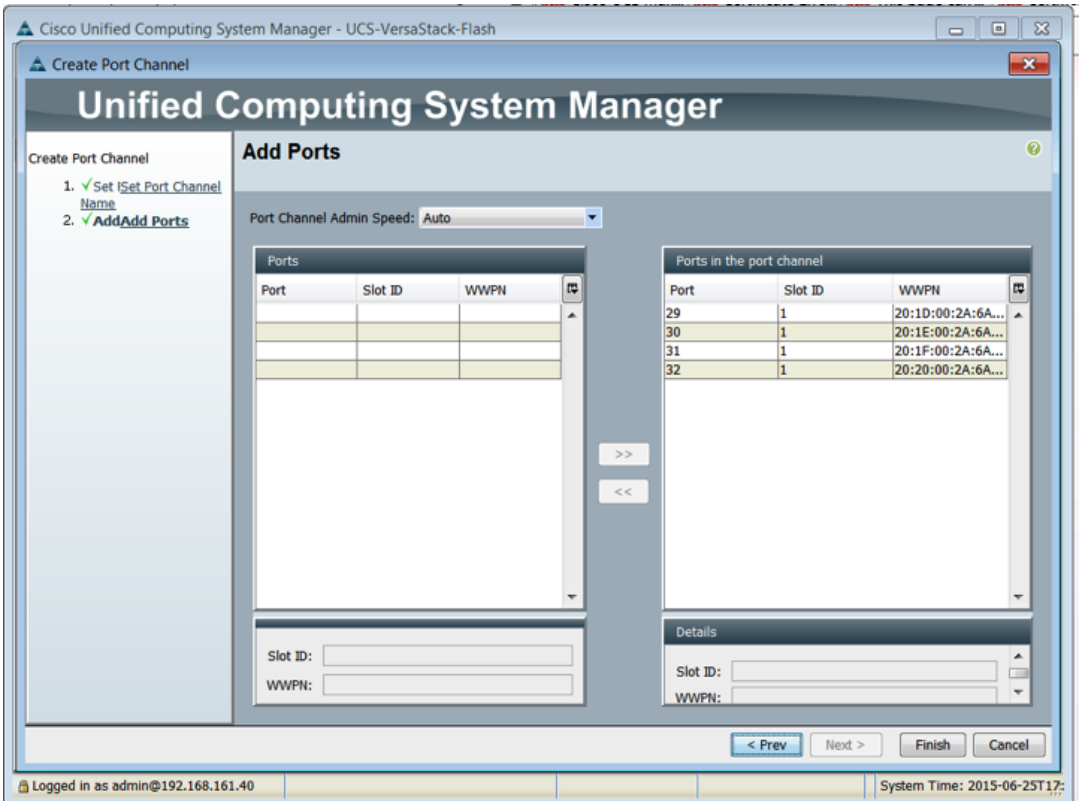


Create Port Channels for the Fibre Channel Interfaces

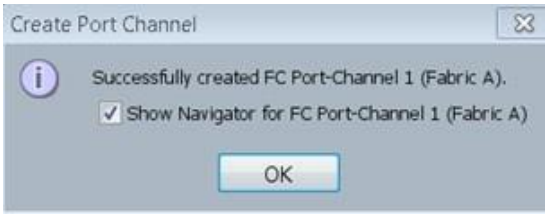
To configure the necessary port channels for the Cisco UCS environment, complete the following steps:

Fabric-A

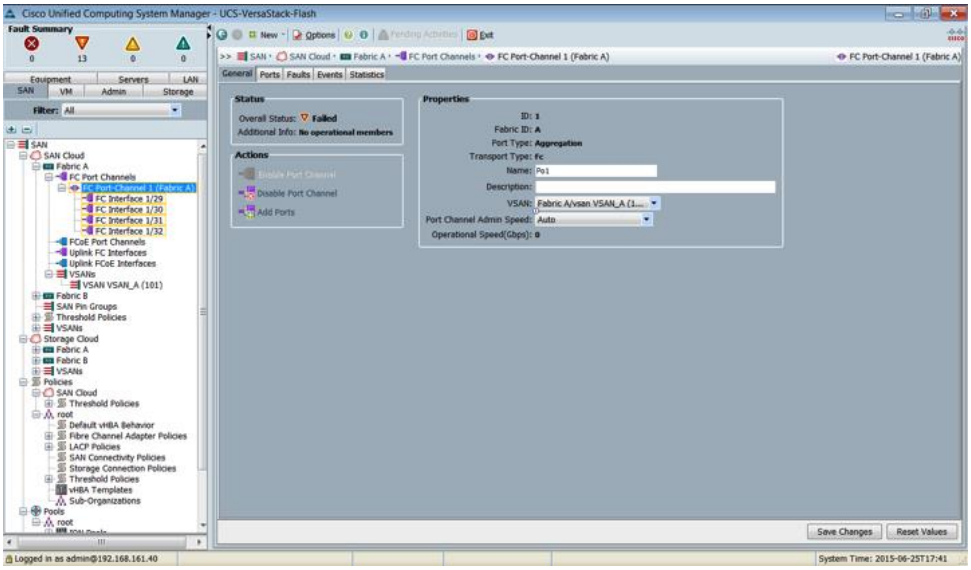
1. In the navigation pane, under SAN > SAN Cloud, expand the Fabric A tree.
2. Right-click FC Port Channels.
3. Choose Create Port Channel.
4. Enter 1 for the port channel ID and Po1 for the port channel name.
5. Click Next then choose ports 29 and 32 and click >> to add the ports to the port channel. Click Finish.



6. Check the check box for Show Navigator for FC Port-Channel 1 (Fabric A) and click OK.



7. Under the VSAN drop-down, select vsan 101.



8. Click Save Changes and then click OK.

9. Click OK to close the navigator.

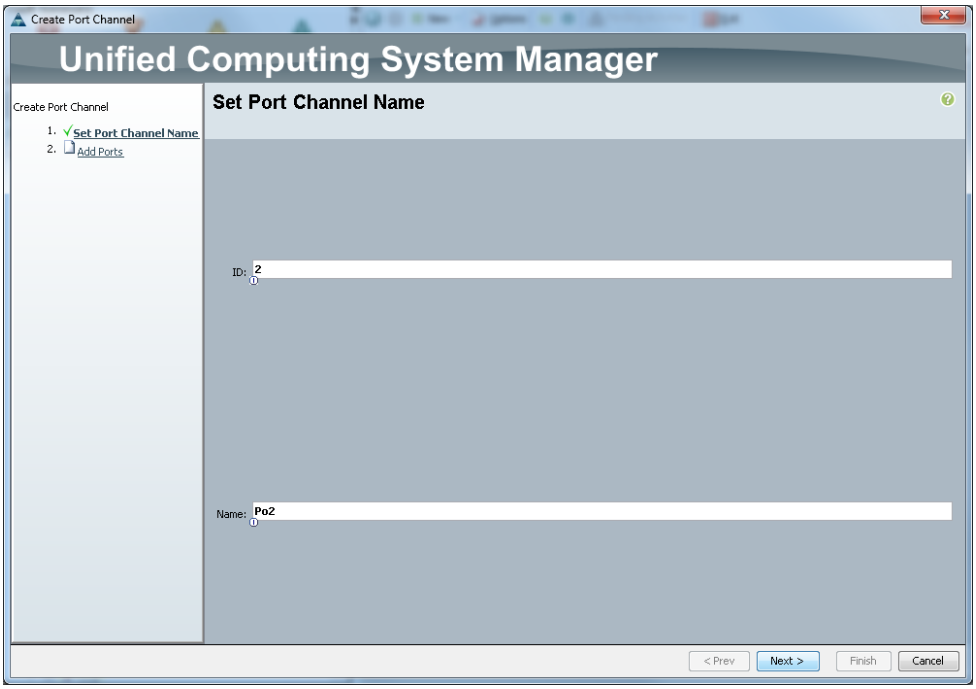
Fabric-B

1. Click the SAN tab. In the navigation pane, under SAN > SAN Cloud, expand the Fabric B tree.

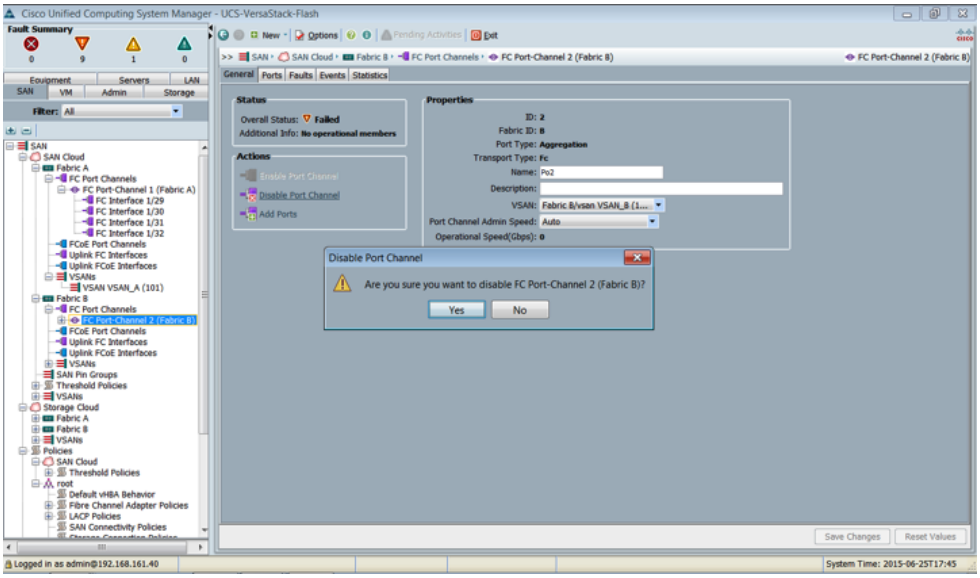
2. Right-click FC Port Channels.

3. Choose Create Port Channel.

4. Enter 2 for the port channel ID and Po2 for the port channel name.



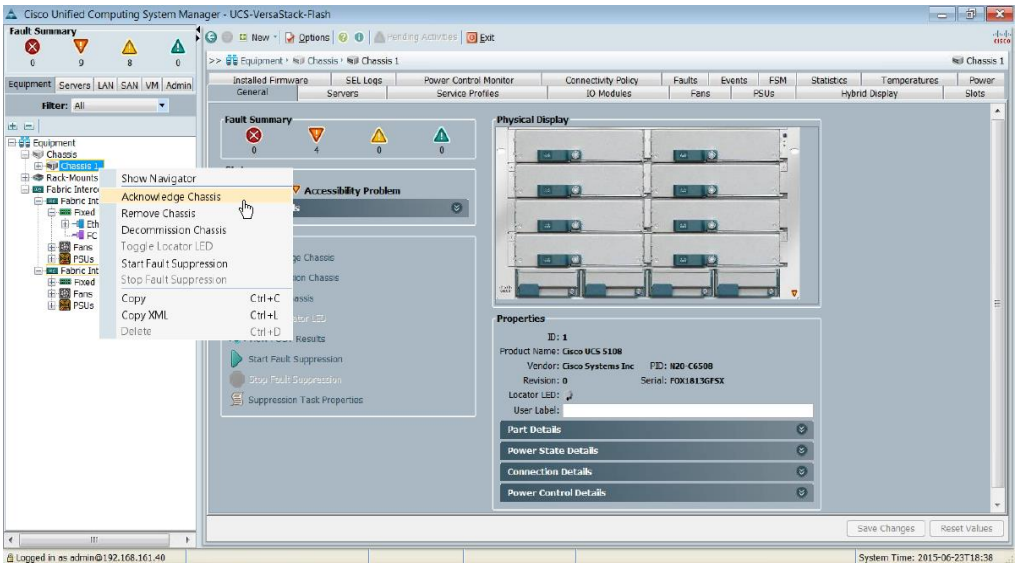
5. Click Next.
6. Choose ports 29-32 and click >> to add the ports to the port channel.
7. Click Finish.
8. Check the check box for Show Navigator for FC Port-Channel 2 (Fabric B).
9. Under the VSAN drop-down, select VSAN 102, click Apply, click OK.
10. To initialize a quick sync of the connections to the MDS switch, right click the port channel created, and select disable port channel, then re-enable the port channel. Repeat this step for the port channel created for Fabric-A.



Acknowledge Cisco UCS Chassis and Cisco UCS C-Series

To acknowledge all Cisco UCS chassis and C-Series Servers, complete the following steps:

1. In Cisco UCS Manager, click the Equipment tab in the navigation pane.
2. Expand Chassis and select each chassis that is listed.
3. Right-click each chassis and select Acknowledge Chassis, click Yes, then click OK.



4. If the C-Series servers are part of the configuration, expand Rack Mounts.

5. Right-click each Server under Rack-Mounts that is listed and select Acknowledge. If FEX is used for the Cisco UCS C-Series servers, acknowledge FEX.

Create Uplink Port Channels to Cisco Nexus Switches

To configure the necessary port channels out of the Cisco UCS environment, complete the following steps:

1. In Cisco UCS Manager, click the LAN tab in the navigation pane.

In this procedure, two port channels are created: one from fabric A to both Cisco Nexus switches and one from fabric B to both Cisco Nexus switches.

---

2. Under LAN > LAN Cloud, expand the Fabric A tree.

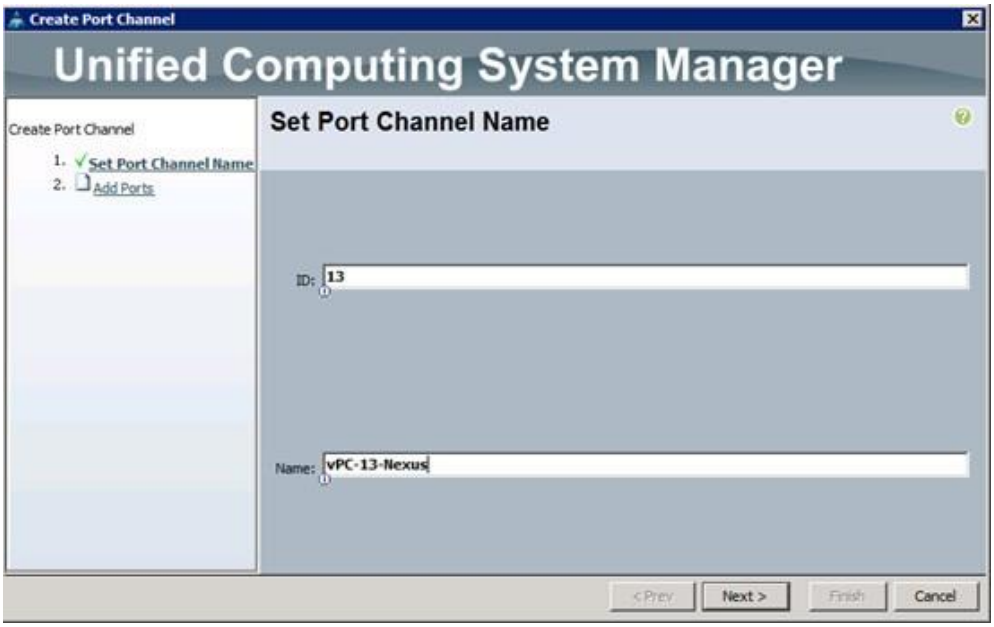
3. Right-click Port Channels.

4. Select Create Port Channel.

5. Enter 13 as the unique ID of the port channel.

6. Enter vPC-13-Nexus as the name of the port channel.

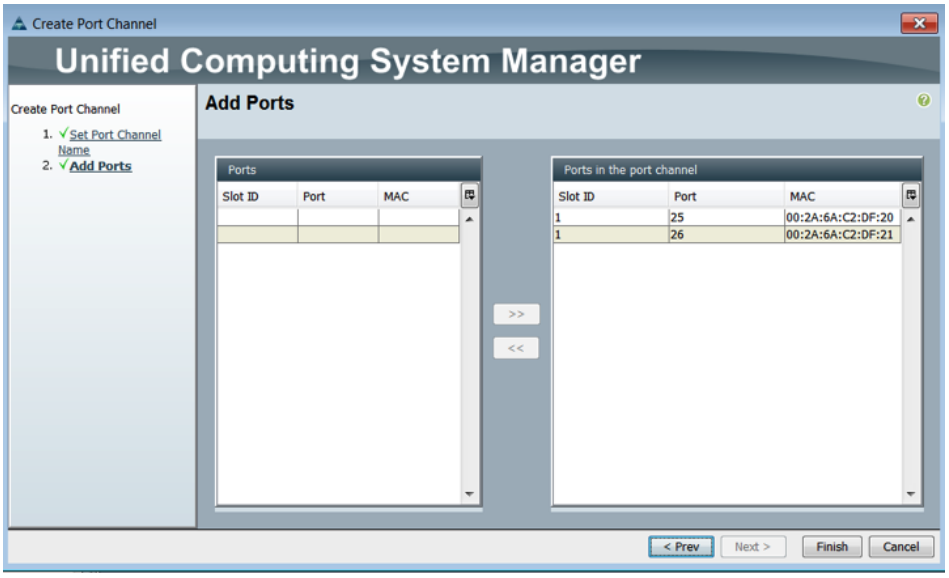
7. Click Next.



8. Select the following ports to be added to the port channel:

- Slot ID 1 and port 25
- Slot ID 1 and port 26

9. Click >> to add the ports to the port channel.



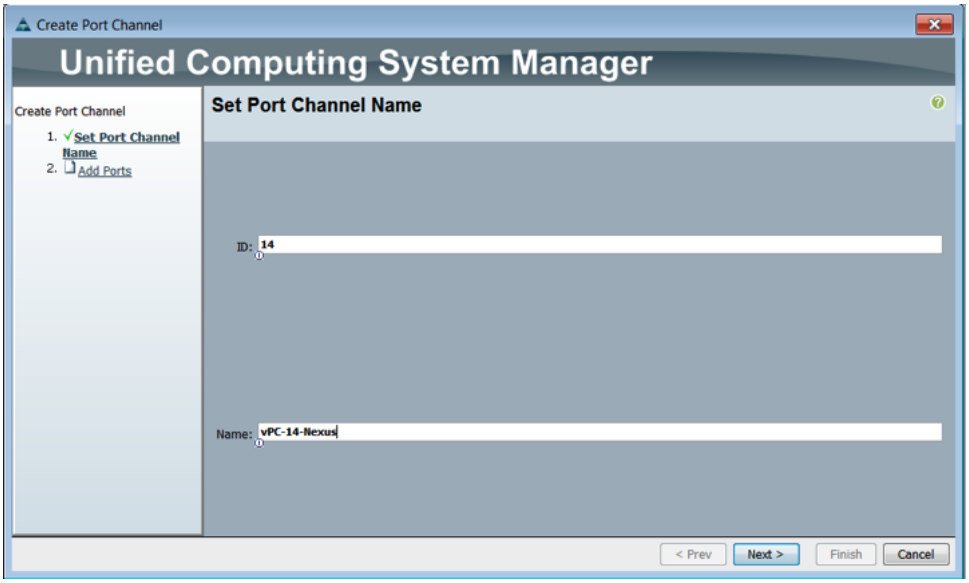
10. Click Finish to create the port channel.

11. Click OK.

12. In the navigation pane, under LAN > LAN Cloud, expand the fabric B tree.

13. Right-click Port Channels.

14. Select Create Port Channel.
15. Enter 14 as the unique ID of the port channel.
16. Enter vPC-14-NEXUS as the name of the port channel.



17. Click Next.
18. Select the following ports to be added to the port channel:
    - Slot ID 1 and port 25
    - Slot ID 1 and port 26
19. Click >> to add the ports to the port channel.
20. Click Finish to create the port channel.
21. Click OK.

Create MAC Address Pools

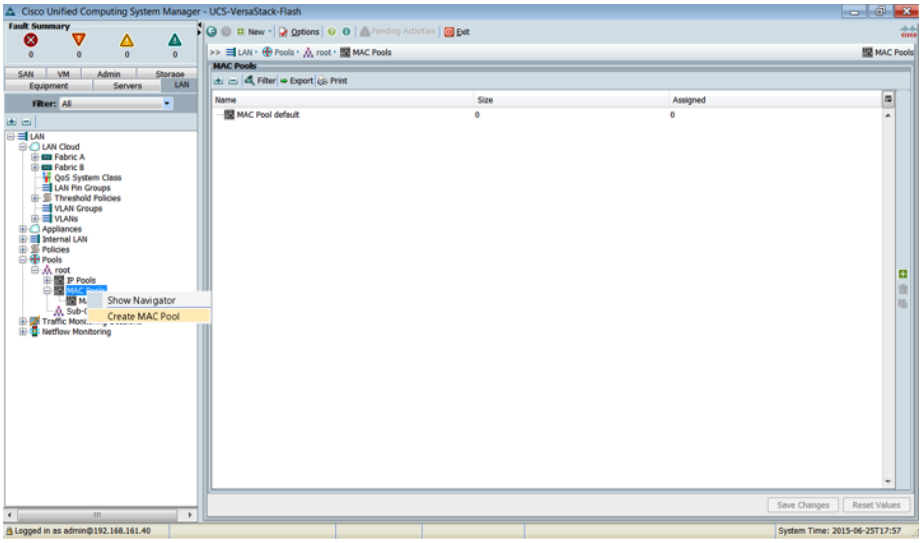
To configure the necessary MAC address pools for the Cisco UCS environment, complete the following steps:

1. In Cisco UCS Manager, click the LAN tab in the navigation pane.
2. Select Pools > root.

In this procedure, two MAC address pools are created, one for each switching fabric.

3. Right-click MAC Pools under the root organization.

4. Select Create MAC Pool to create the MAC address pool.



5. Enter MAC_Pool_A as the name of the MAC pool.

6. Optional: Enter a description for the MAC pool.

7. Click Next.

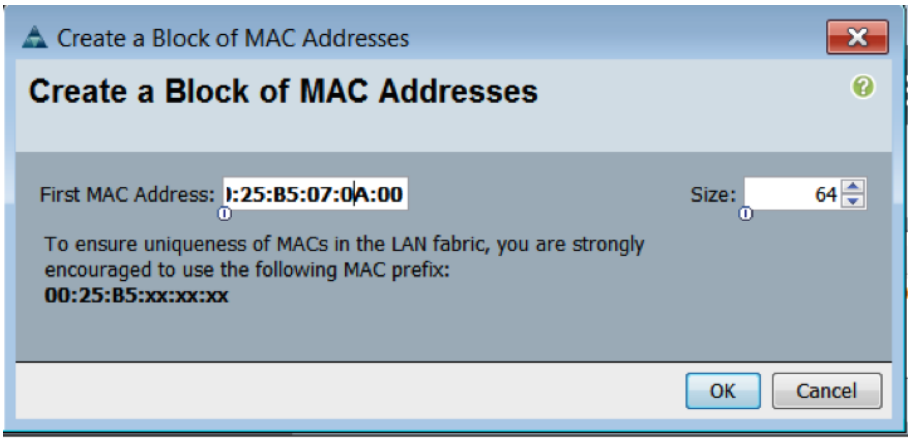
8. Click Add.

9. Specify a starting MAC address.

For the VersaStack solution, the recommendation is to place 0A in the next-to-last octet of the starting MAC address to identify all of the MAC addresses as fabric A addresses.

---

10. Specify a size for the MAC address pool that is sufficient to support the available blade or server resources.

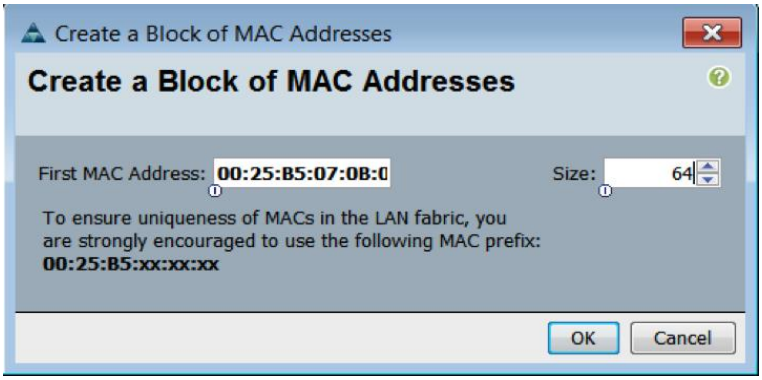


11. Click OK.

12. Click Finish.
13. In the confirmation message, click OK.
14. Right-click MAC Pools under the root organization.
15. Select Create MAC Pool to create the MAC address pool.
16. Enter MAC_Pool_B as the name of the MAC pool.
17. Optional: Enter a description for the MAC pool.
18. Click Next.
19. Click Add.
20. Specify a starting MAC address.

For the VersaStack solution, the recommendation is to place 0B in the next to last octet of the starting MAC address to identify all the MAC addresses in this pool as fabric B addresses.

21. Specify a size for the MAC address pool that is sufficient to support the available blade or server resources.



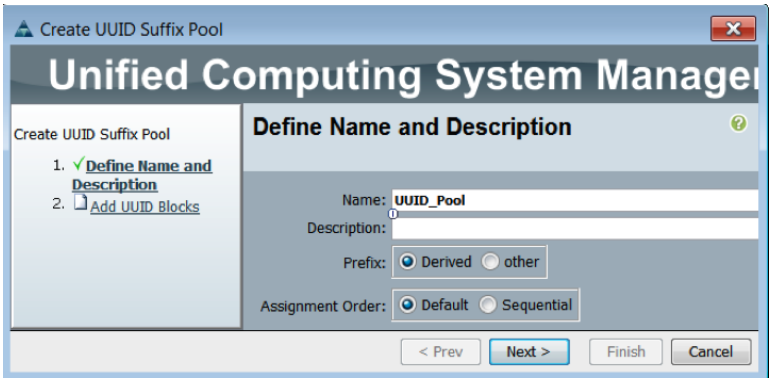
22. Click OK.
23. Click Finish.
24. In the confirmation message, click OK.

Create UUID Suffix Pool

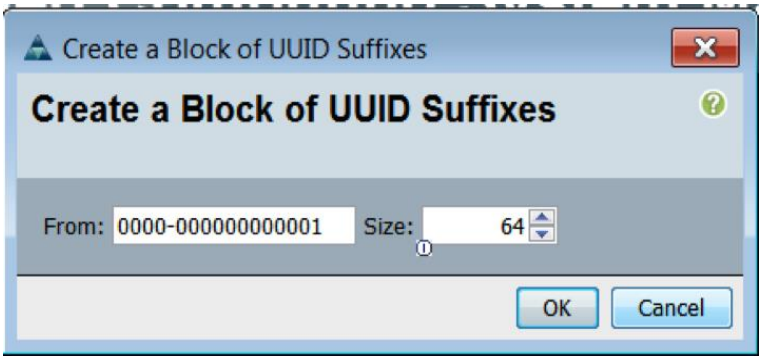
To configure the necessary universally unique identifier (UUID) suffix pool for the Cisco UCS environment, complete the following steps:

1. In Cisco UCS Manager, click the Servers tab in the navigation pane.
2. Select Pools > root.

3. Right-click UUID Suffix Pools.
4. Select Create UUID Suffix Pool
5. Enter UUID_Pool as the name of the UUID suffix pool.



6. Optional: Enter a description for the UUID suffix pool.
7. Keep the prefix at the derived option.
8. Click Next.
9. Click Add to add a block of UUIDs.
10. Keep the From field at the default setting.
11. Specify a size for the UUID block that is sufficient to support the available blade or server resources.



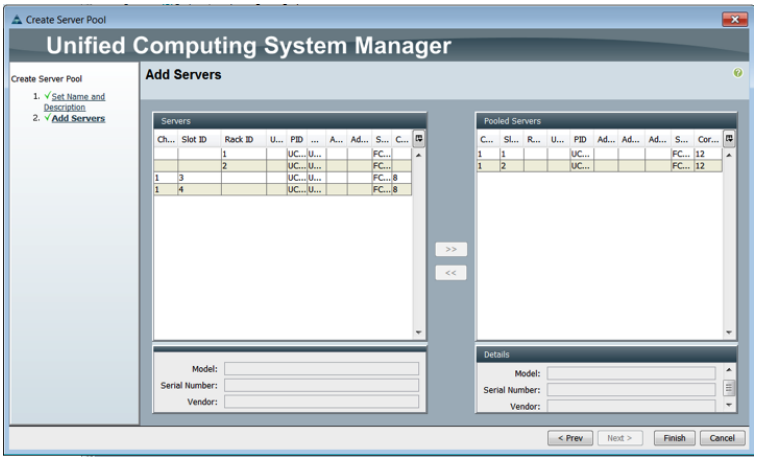
12. Click OK.
13. Click Finish.
14. Click OK.

Create Server Pool

To configure the necessary server pool for the Cisco UCS environment, complete the following steps:

Consider creating unique server pools to achieve the granularity that is required in your environment.

1. In Cisco UCS Manager, click the Servers tab in the navigation pane.
2. Select Pools > root.
3. Right-click Server Pools.
4. Select Create Server Pool.
5. Enter Infra_Pool as the name of the server pool.
6. Optional: Enter a description for the server pool.
7. Click Next.
8. Select two (or more) servers to be used for the VMware management cluster and click >> to add them to the Infra_Pool server pool.



9. Click Finish.
10. Click OK.

Create VLANs

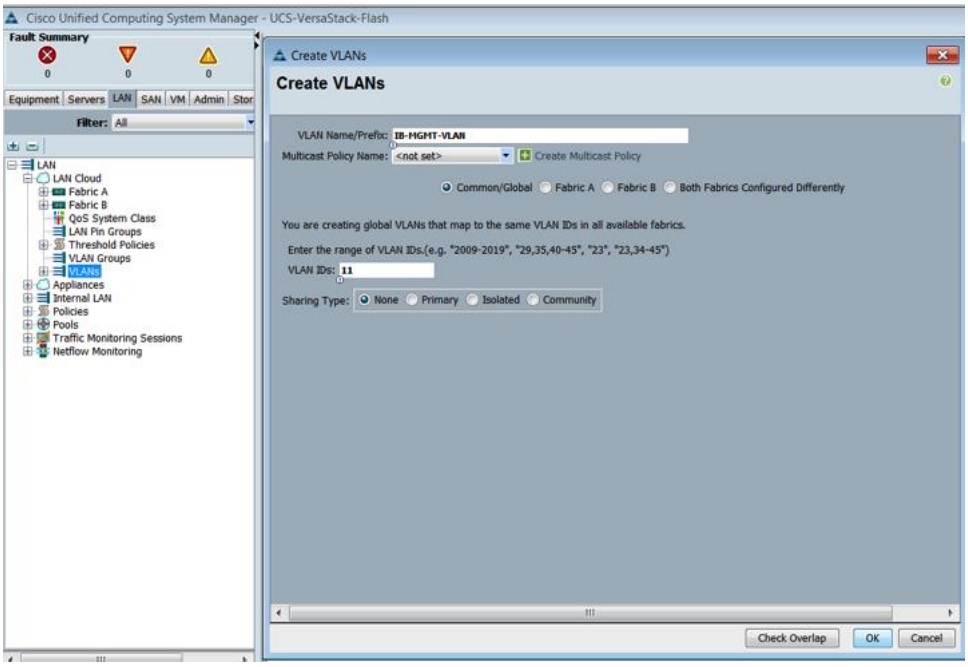
To configure the necessary virtual local area networks (VLANs) for the Cisco UCS environment, complete the following steps:

1. In Cisco UCS Manager, click the LAN tab in the navigation pane.

In this procedure, five VLANs are created.

2. Select LAN > LAN Cloud.
3. Right-click VLANs.

4. Select Create VLANs
5. Enter IB-MGMT-VLAN as the name of the VLAN to be used for management traffic.
6. Keep the Common/Global option selected for the scope of the VLAN.
7. Enter <<var_ib-mgmt_vlan_id>> as the ID of the management VLAN.
8. Keep the Sharing Type as None.
9. Click OK and then click OK again.



10. Right-click VLANs.
11. Select Create VLANs.
12. Enter NFS-VLAN as the name of the VLAN to be used for NFS.
13. Keep the Common/Global option selected for the scope of the VLAN.
14. Enter the <<var_nfs_vlan_id>> for the NFS VLAN.
15. Keep the Sharing Type as None.
16. Click OK, and then click OK again.
17. Right-click VLANs.
18. Select Create VLANs.

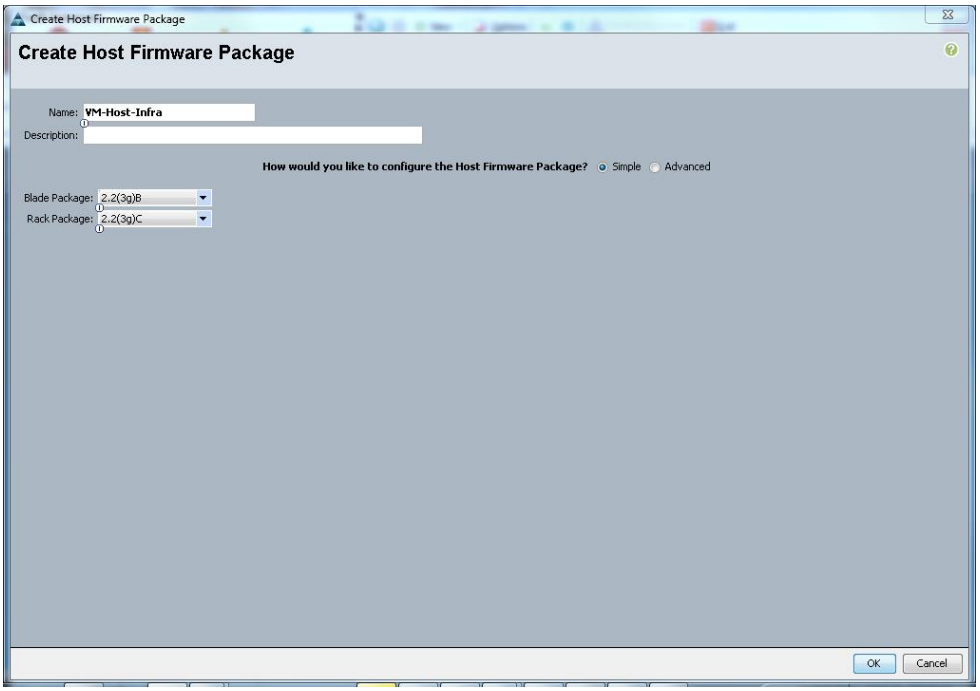
19. Enter vMotion-VLAN as the name of the VLAN to be used for vMotion.
20. Keep the Common/Global option selected for the scope of the VLAN.
21. Enter the <<var_vmotion_vlan_id>> as the ID of the vMotion VLAN.
22. Keep the Sharing Type as None.
23. Click OK, and then click OK again.
24. Right-click VLANs.
25. Select Create VLANs.
26. Enter VM-Traffic-VLAN as the name of the VLAN to be used for the VM traffic.
27. Keep the Common/Global option selected for the scope of the VLAN.
28. Enter the <<var_vm-traffic_vlan_id>> for the VM Traffic VLAN.
29. Keep the Sharing Type as None.
30. Click OK, and then click OK again.
31. Right-click VLANs.
32. Select Create VLANs.
33. Enter Native-VLAN as the name of the VLAN to be used as the native VLAN.
34. Keep the Common/Global option selected for the scope of the VLAN.
35. Enter the <<var_native_vlan_id>> as the ID of the native VLAN.
36. Keep the Sharing Type as None.
37. Click OK and then click OK again.
38. Expand the list of VLANs in the navigation pane, right-click the newly created Native-VLAN and select Set as Native VLAN.
39. Click Yes, and then click OK.

Create Host Firmware Package

Firmware management policies allow the administrator to select the corresponding packages for a given server configuration. These policies often include packages for adapter, BIOS, board controller, FC adapters, host bus adapter (HBA) option ROM, and storage controller properties. To create a firmware management policy for a given server configuration in the Cisco UCS environment, complete the following steps:

1. In Cisco UCS Manager, click the Servers tab in the navigation pane.

2. Select Policies > root.
3. Right-click Host Firmware Packages.
4. Select Create Host Firmware Package.
5. Enter VM-Host-Infra as the name of the host firmware package.
6. Leave Simple selected.
7. Select the version 2.2(3g) for both the Blade and Rack Packages.
8. Click OK to create the host firmware package.
9. Click OK.

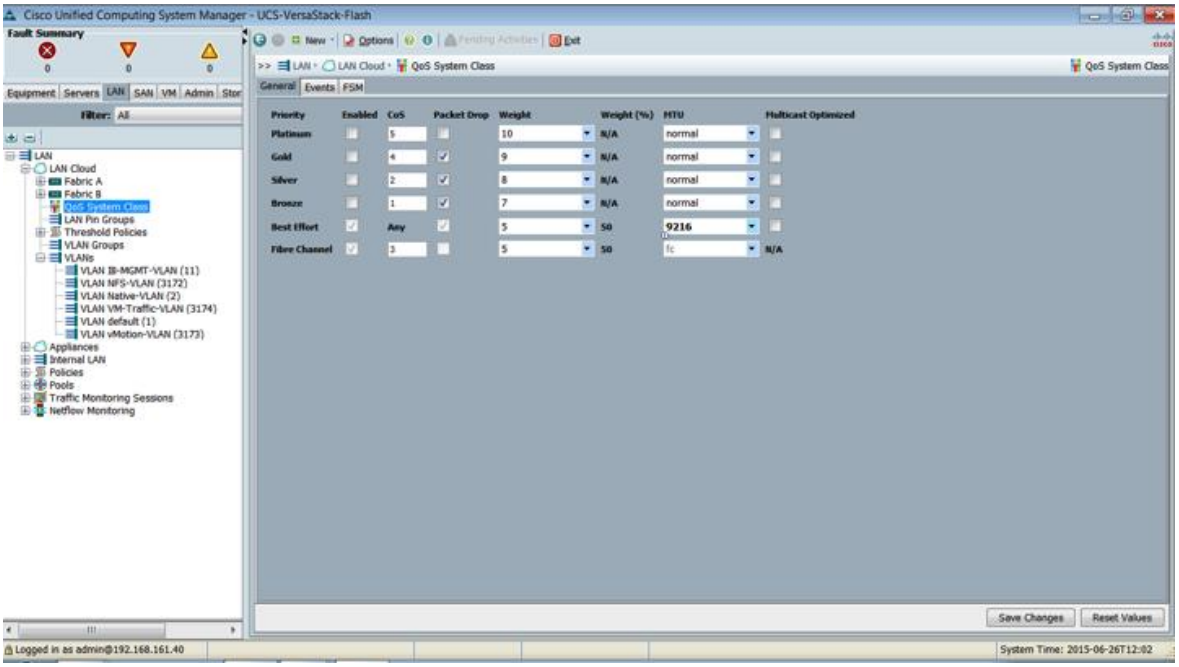


Set Jumbo Frames in Cisco UCS Fabric

To configure jumbo frames and enable quality of service in the Cisco UCS fabric, complete the following steps:

1. In Cisco UCS Manager, click the LAN tab in the navigation pane.
2. Select LAN > LAN Cloud > QoS System Class
3. In the right pane, click the General tab.
4. On the Best Effort row, enter 9216 in the box under the MTU column.
5. Click Save Changes in the bottom of the window.

6. Click OK.



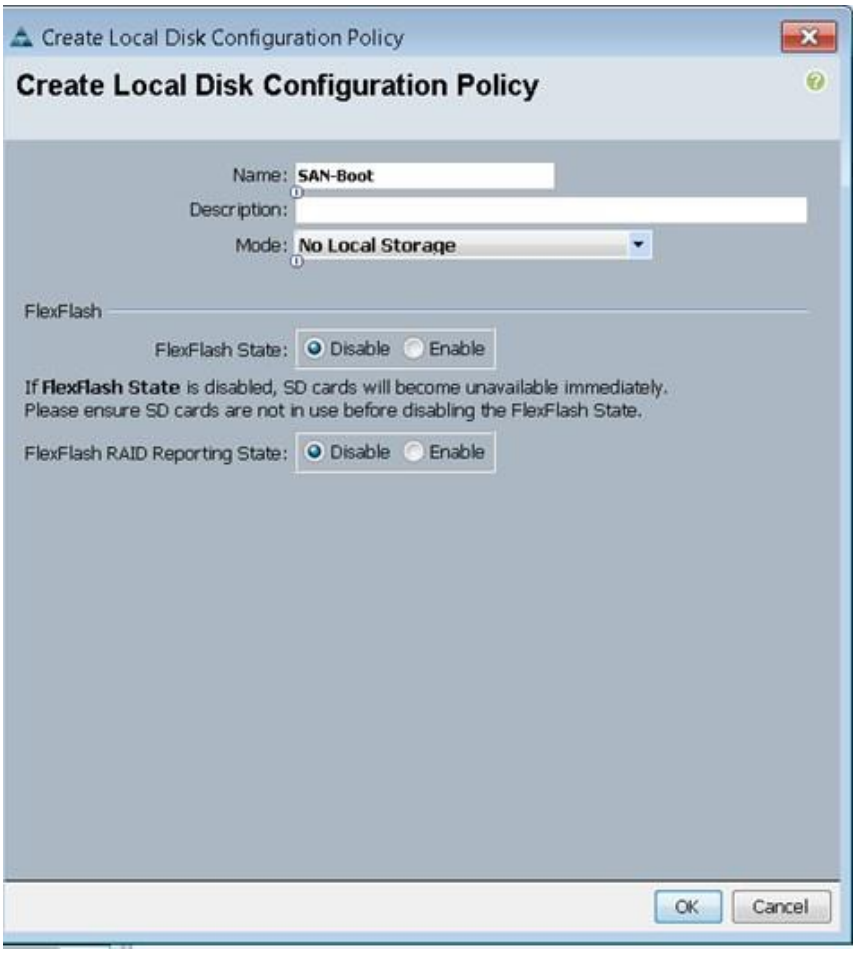
Create Local Disk Configuration Policy (Optional)

A local disk configuration for the Cisco UCS environment is necessary if the servers in the environment do not have a local disk.

This policy should not be used on servers that contain local disks.

To create a local disk configuration policy, complete the following steps:

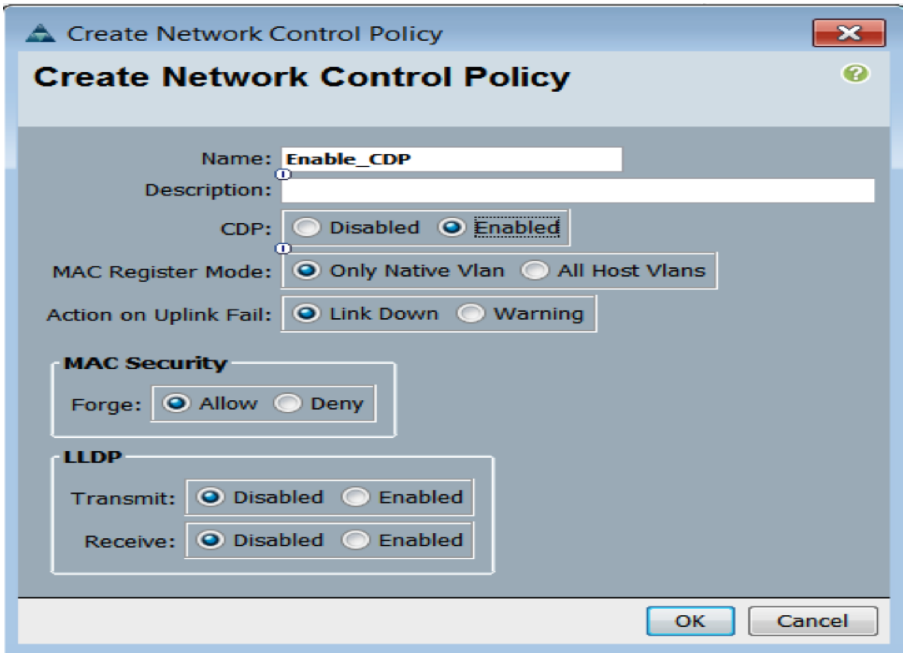
1. In Cisco UCS Manager, click the Servers tab in the navigation pane.
2. Select Policies > root.
3. Right-click Local Disk Config Policies.
4. Select Create Local Disk Configuration Policy.
5. Enter SAN-Boot as the local disk configuration policy name.
6. Change the mode to No Local Storage.
7. Click OK, to create the local disk configuration policy.
8. Click OK.



Create Network Control Policy for Cisco Discovery Protocol

To create a network control policy that enables Cisco Discovery Protocol (CDP) on virtual network ports, complete the following steps:

1. In Cisco UCS Manager, click the LAN tab in the navigation pane.
2. Select Policies > root.
3. Right-click Network Control Policies.
4. Select Create Network Control Policy
5. Enter Enable_CDP as the policy name.
6. For CDP, select the Enabled option.
7. Click OK to create the network control policy.

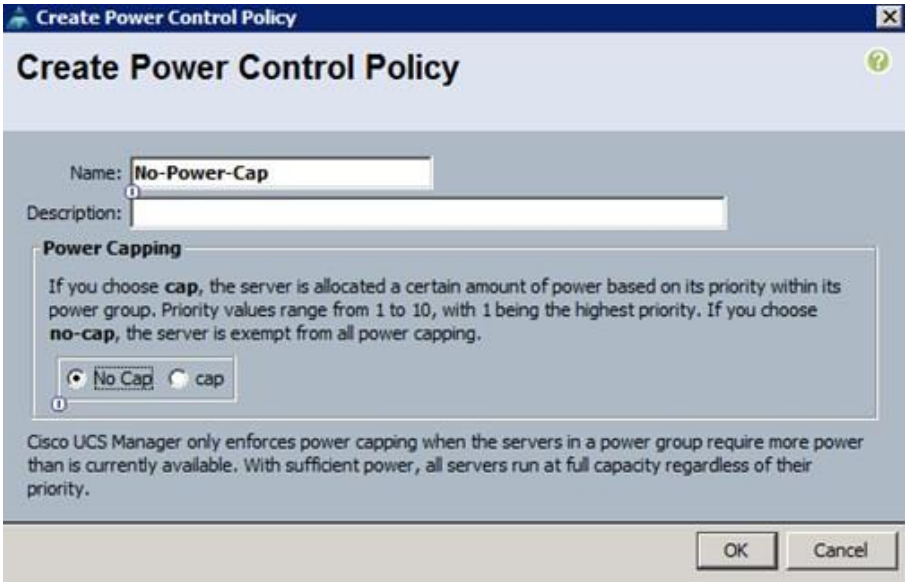


8. Click OK.

Create Power Control Policy

To create a power control policy for the Cisco UCS environment, complete the following steps:

1. In Cisco UCS Manager, click the Servers tab in the navigation pane.
2. Select Policies > root.
3. Right-click Power Control Policies.
4. Select Create Power Control Policy
5. Enter No-Power-Cap as the power control policy name.
6. Change the power capping setting to No Cap.
7. Click OK to create the power control policy.
8. Click OK.



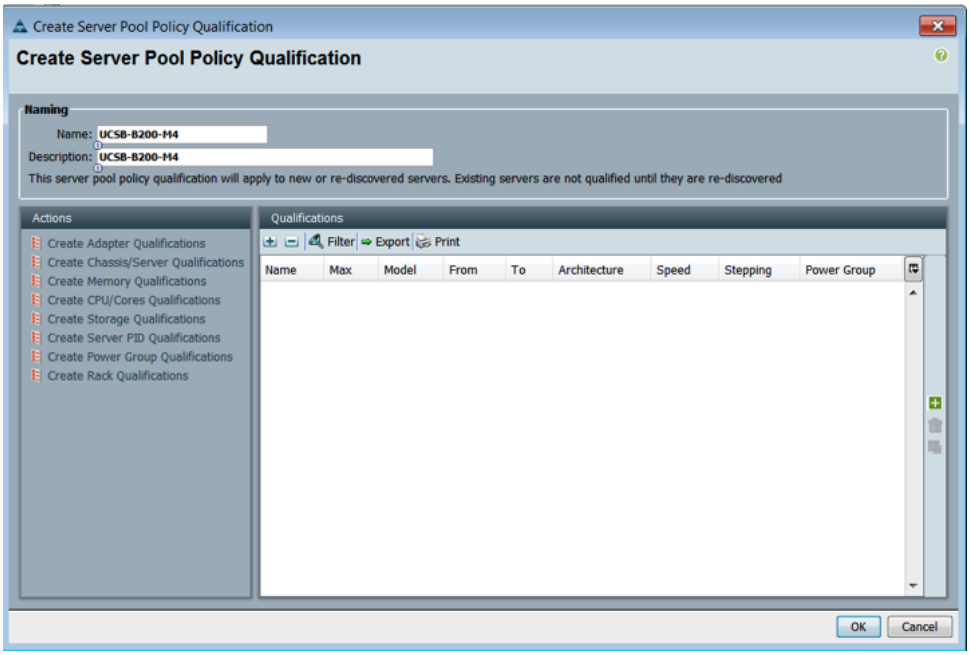
Create Server Pool Qualification Policy (Optional)

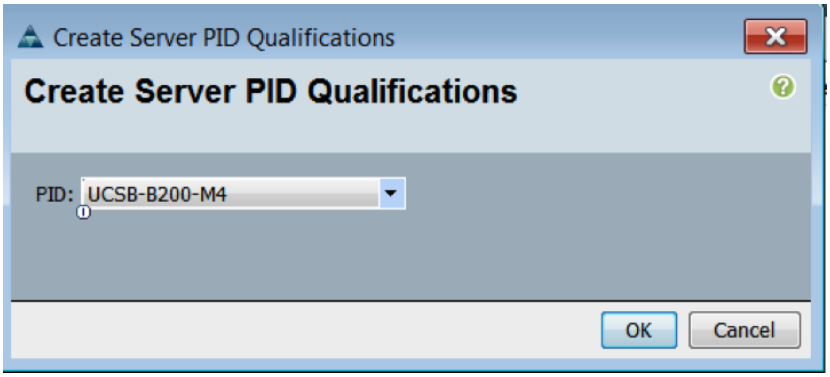
To create an optional server pool qualification policy for the Cisco UCS environment, complete the following steps:

This example creates a policy for a Cisco UCS B200-M4 Server.

---

1. In Cisco UCS Manager, click the Servers tab in the navigation pane.
2. Select Policies > root.
3. Right-click Server Pool Policy Qualifications.
4. Select Create Server Pool Policy Qualification
5. Enter UCSB-B200-M4 as the name for the policy.
6. Select Create Server PID Qualifications.
7. Enter UCSB-B200-M4 as the PID.
8. Click OK to create the server pool qualification policy.
9. Click OK, and then click OK again.

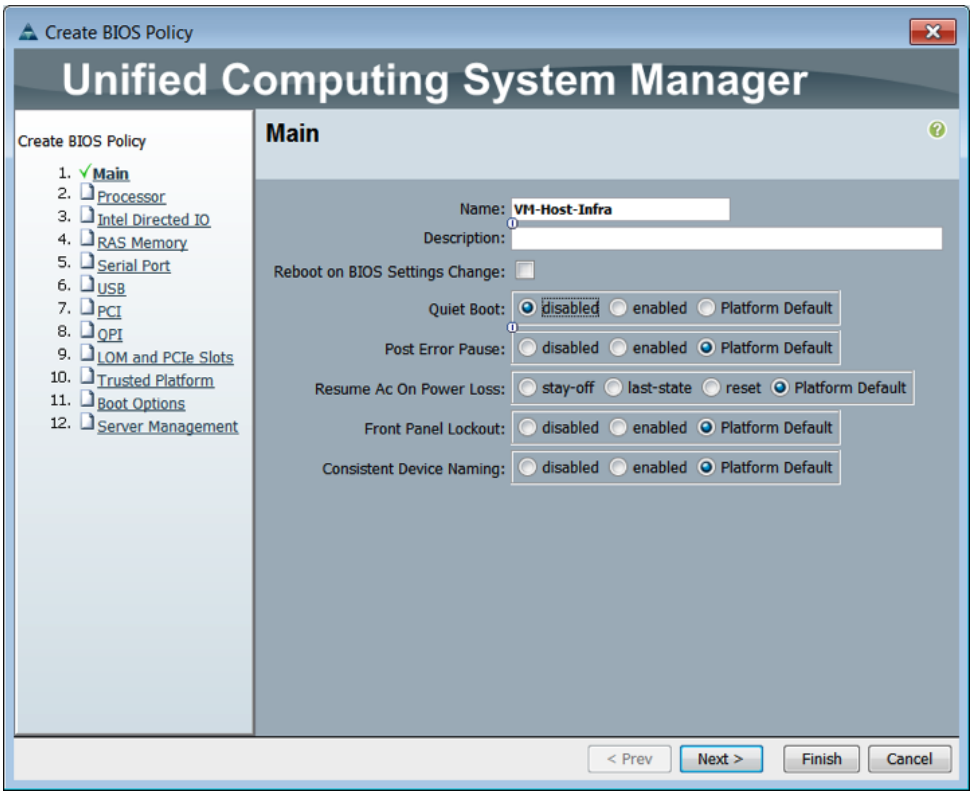




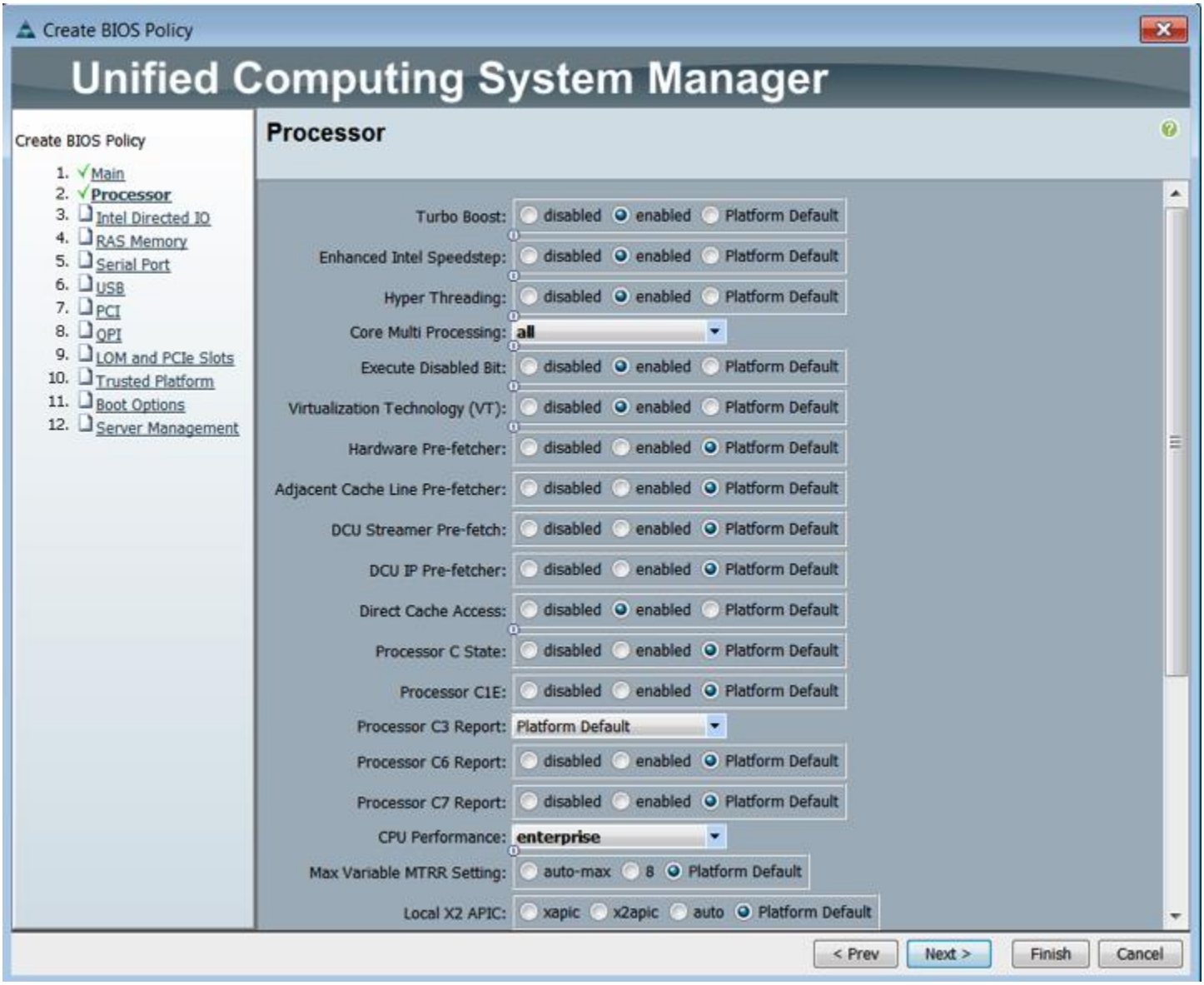
Create Server BIOS Policy

To create a server BIOS policy for the Cisco UCS environment, complete the following steps:

1. In Cisco UCS Manager, click the Servers tab in the navigation pane.
2. Select Policies > root.
3. Right-click BIOS Policies.
4. Select Create BIOS Policy.
5. Enter VM-Host-Infra as the BIOS policy name.
6. Change the Quiet Boot setting to Disabled.
7. Click Next.

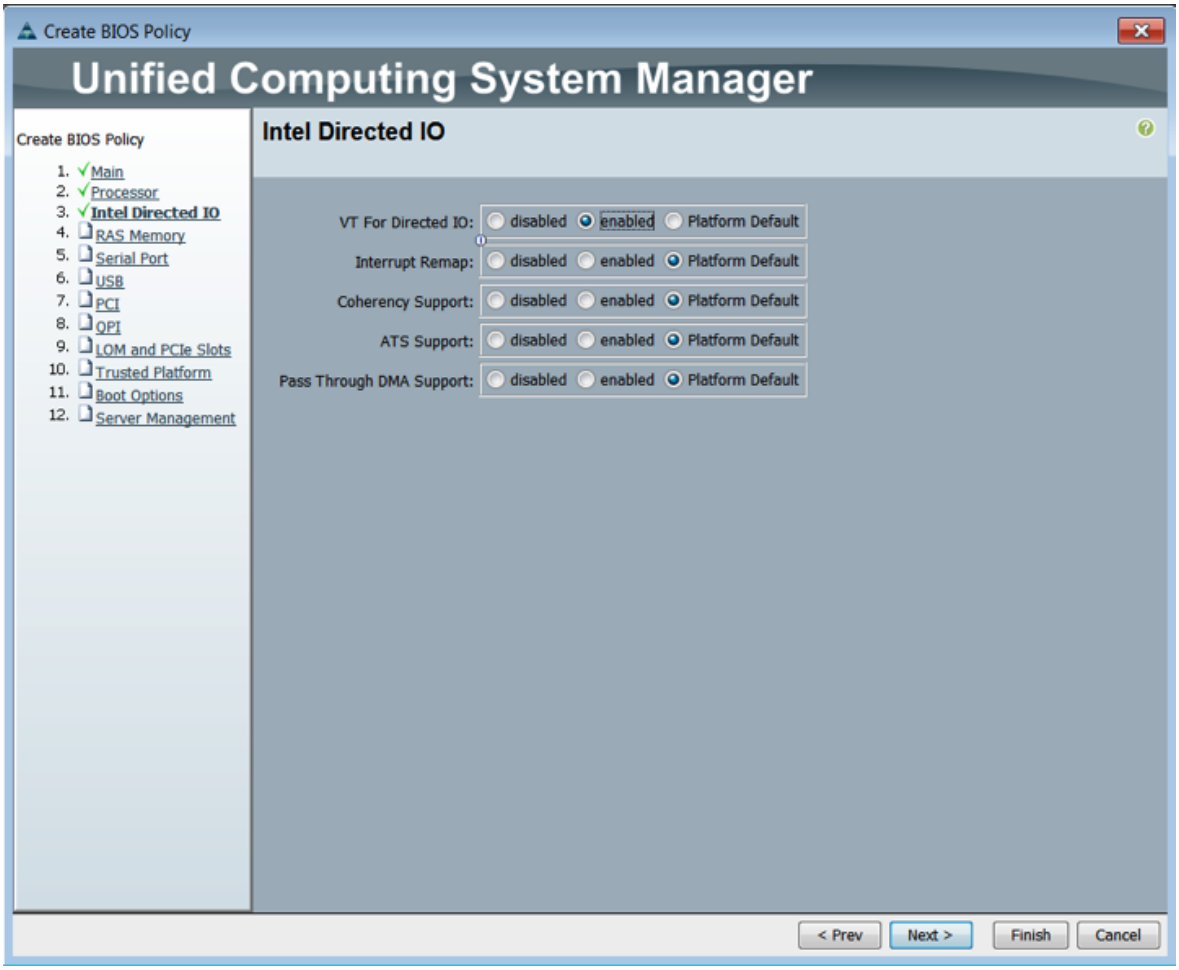


8. Change Turbo Boost to enabled.
9. Change Enhanced Intel Speedstep to enabled.
10. Change Hyper Threading to enabled.
11. Change Core Multi Processing to all.
12. Change Execution Disabled Bit to enabled.
13. Change Virtualization Technology (VT) to enabled.
14. Change Direct Cache Access to enabled.
15. Change CPU Performance to Enterprise.



16. Click Next to go the Intel Directed IO Screen.

17. Change the VT for Direct IO to enabled.

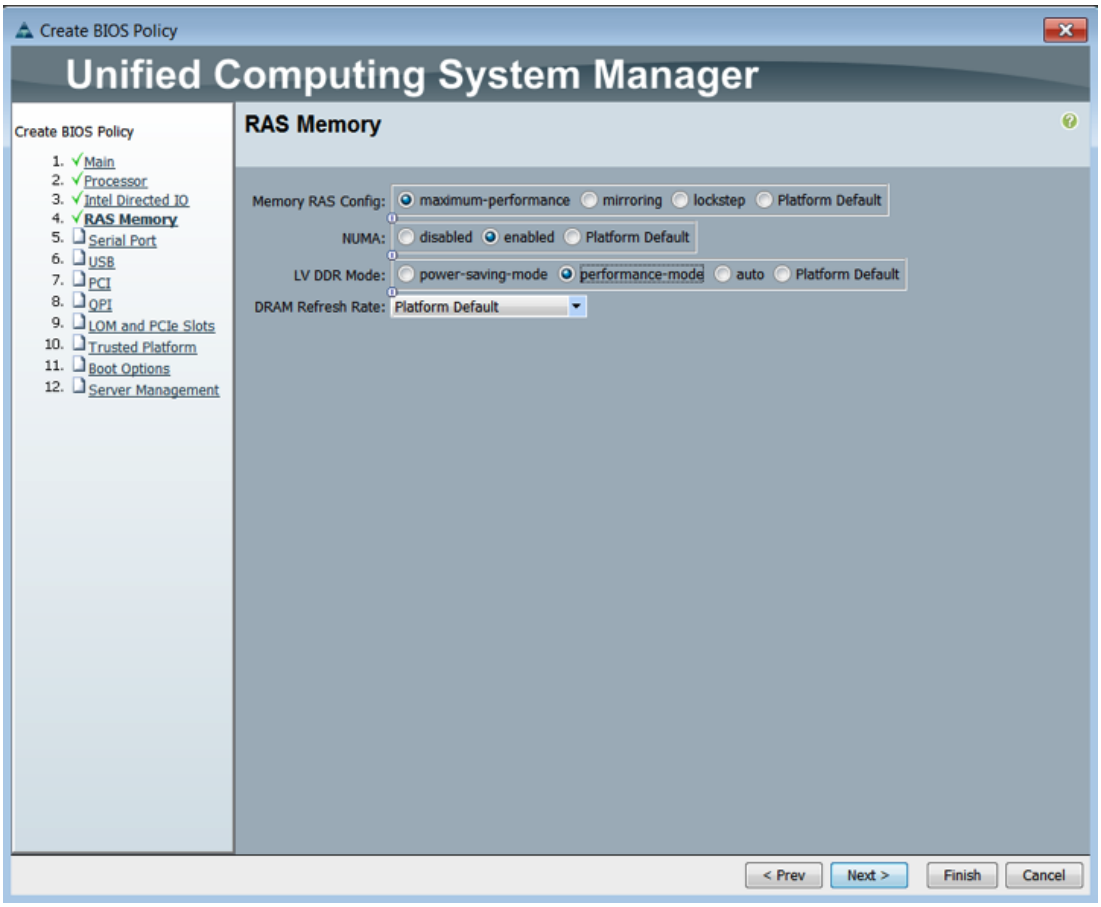


18. Click next to go the RaS Memory screen.

19. Change the Memory RAS Config to maximum performance.

20. Change NUMA to enabled.

21. Change LV DDR Mode to performance-mode.



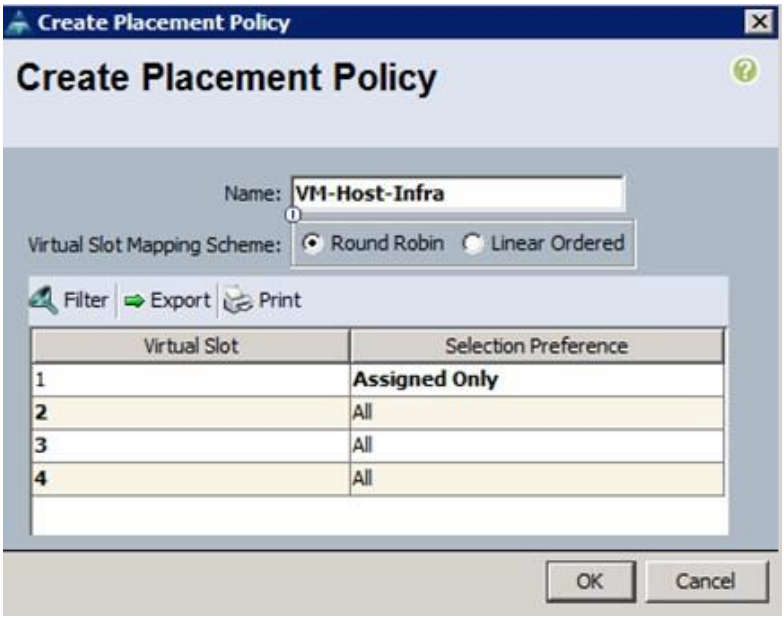
22. Click Finish to create the BIOS policy.

23. Click OK.

Create vNIC/vHBA Placement Policy for Virtual Machine Infrastructure Hosts

To create a vNIC/vHBA placement policy for the infrastructure hosts, complete the following steps:

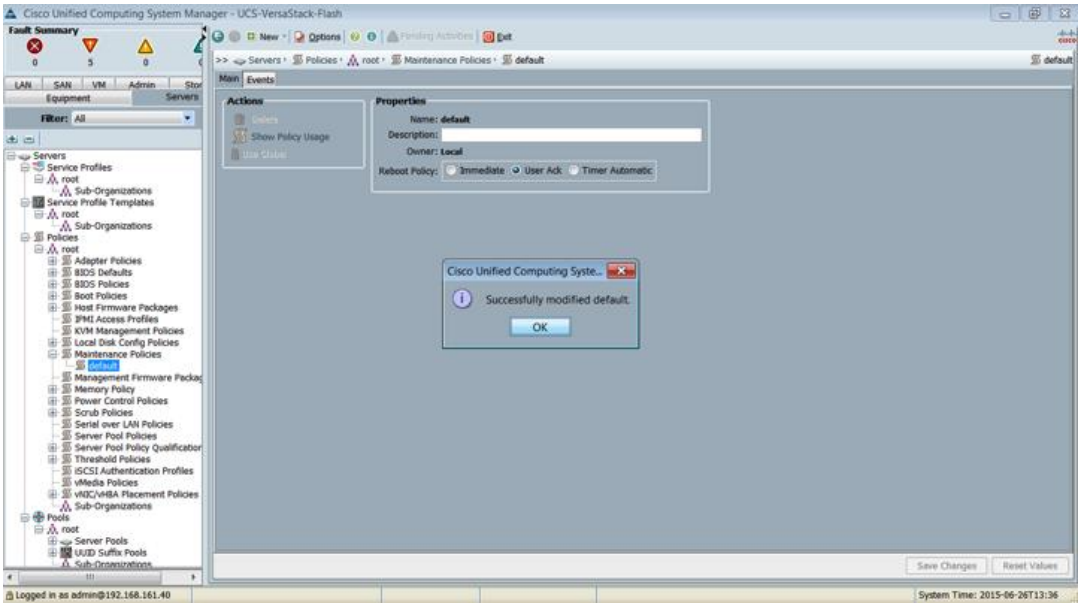
1. In Cisco UCS Manager, click the Servers tab in the navigation pane.
2. Select Policies > root.
3. Right-click vNIC/vHBA Placement Policies.
4. Select Create Placement Policy.
5. Enter VM-Host-Infra as the name of the placement policy.
6. Click 1 and select Assigned Only.
7. Click OK and then click OK again.



Update Default Maintenance Policy

To update the default Maintenance Policy, complete the following steps:

1. In Cisco UCS Manager, click the Servers tab in the navigation pane.
2. Select Policies > root.
3. Select Maintenance Policies > default
4. Change the Reboot Policy to User Ack.
5. Click Save Changes.
6. Click OK to accept the change.



Create vNIC Templates

To create multiple virtual network interface card (vNIC) templates for the Cisco UCS environment, complete the following steps:

The "Enable Failover" option is used for the vNICs in these steps as default, however, if deploying the optional N1kV virtual switch, the “Enable Failover“ options for the vNICs should remain unchecked.“

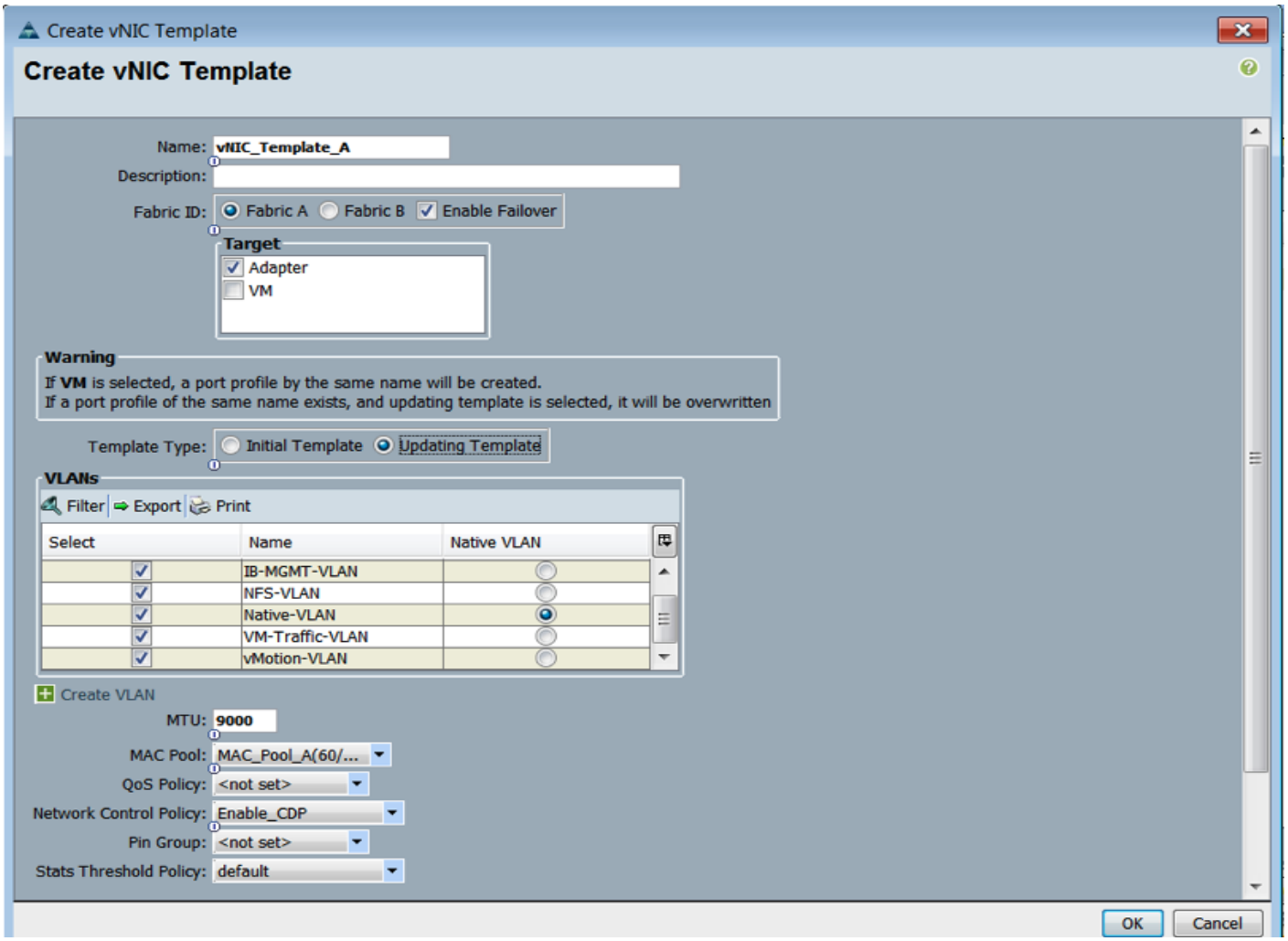
---

1. Select Policies > root.
2. Right-click vNIC Templates.
3. Select Create vNIC Template.
4. Enter vNIC_Template_A as the vNIC template name.
5. Keep Fabric A selected.
6. Select the Enable Failover checkbox.
7. Under Target, make sure that the VM checkbox is not selected.
8. Select Updating Template as the Template Type.
9. Under VLANs, select the checkboxes for IB-MGMT-VLAN, NFS-VLAN, Native-VLAN, VM-Traffic-VLAN, and vMotion-VLAN.
10. Set Native-VLAN as the native VLAN.
11. For MTU, enter 9000.
12. In the MAC Pool list, select MAC_Pool_A.

13. In the Network Control Policy list, select Enable_CDP.

14. Click OK to create the vNIC template.

15. Click OK.



16. In the navigation pane, select the LAN tab.

17. Select Policies > root.

18. Right-click vNIC Templates.

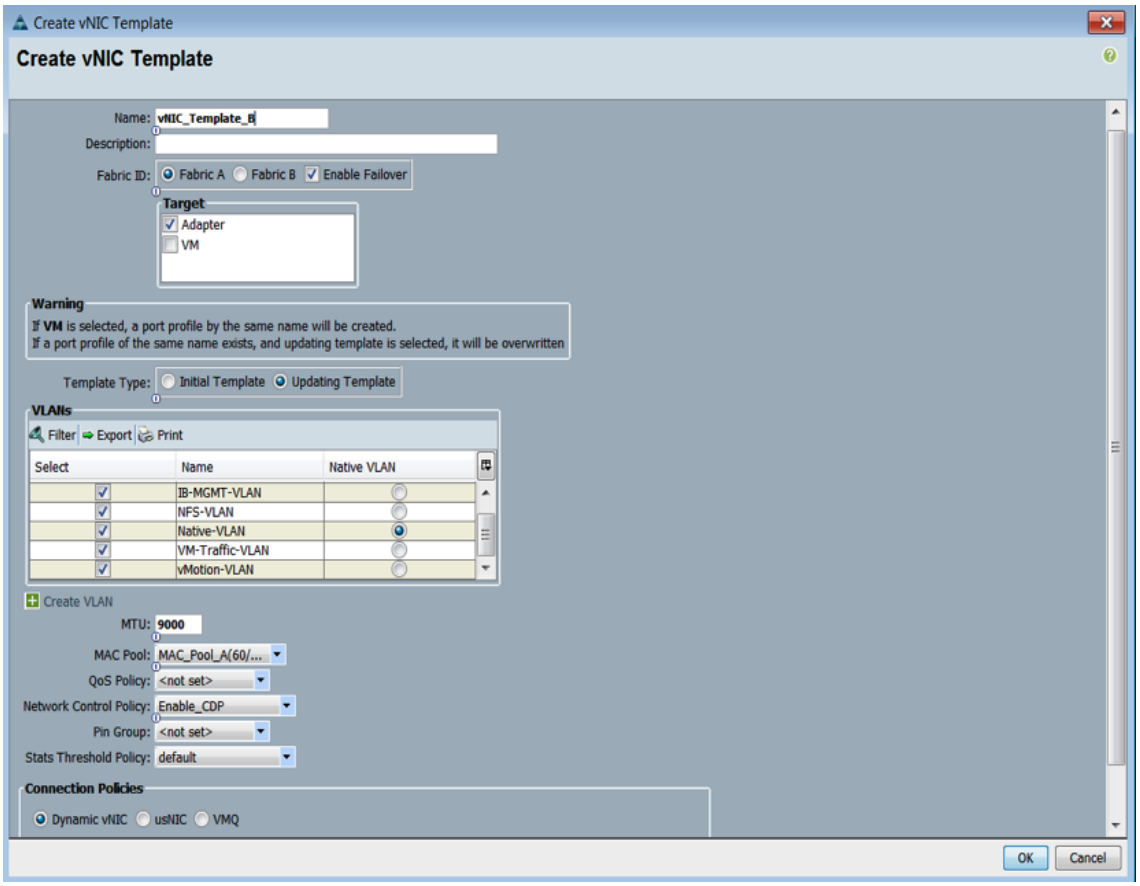
19. Select Create vNIC Template.

20. Enter vNIC_Template_B as the vNIC template name.

21. Select Fabric B.

22. Select the Enable Failover checkbox.

23. Select Updating Template as the template type.
24. Under VLANs, select the checkboxes for IB-MGMT-VLAN, NFS-VLAN, Native-VLAN, VM-Traffic-VLAN, and vMotion-VLAN.
25. Set Native-VLAN as the native VLAN.
26. For MTU, enter 9000.
27. In the MAC Pool list, select MAC_Pool_B.
28. In the Network Control Policy list, select Enable_CDP.
29. Click OK to create the vNIC template.
30. Click OK.

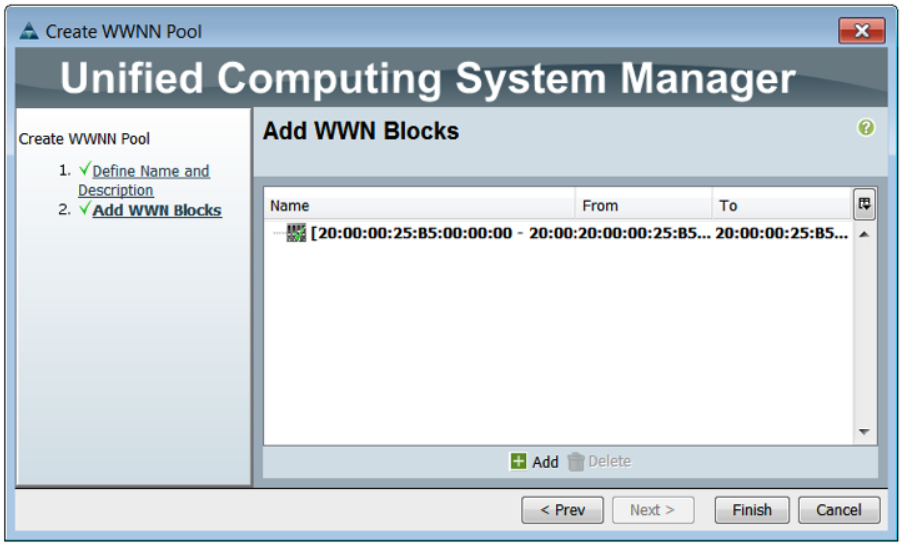


Create WWNN Pools

To configure the necessary World Wide Node Name (WWNN) pools for the Cisco UCS environment, complete the following steps:

1. In Cisco UCS Manager, click the SAN tab in the navigation pane.

2. Choose Pools > root.
3. Right-click WWNN Pools.
4. Choose Create WWNN Pool.
5. Enter WWNN_Pool as the name of the WWNN pool.
6. (Optional) Add a description for the WWNN pool.
7. Click Next.
8. Click Add to add a block of WWNNs.
9. Keep the default block of WWNNs, or specify a base WWNN.
10. Specify a size for the WWNN block that is sufficient to support the available blade or server resources.
11. Click OK.
12. Click Finish.
13. Click OK.



Create WWPN Pools

To configure the necessary World Wide Port Name (WWPN) pools for the Cisco UCS environment, complete the following steps:

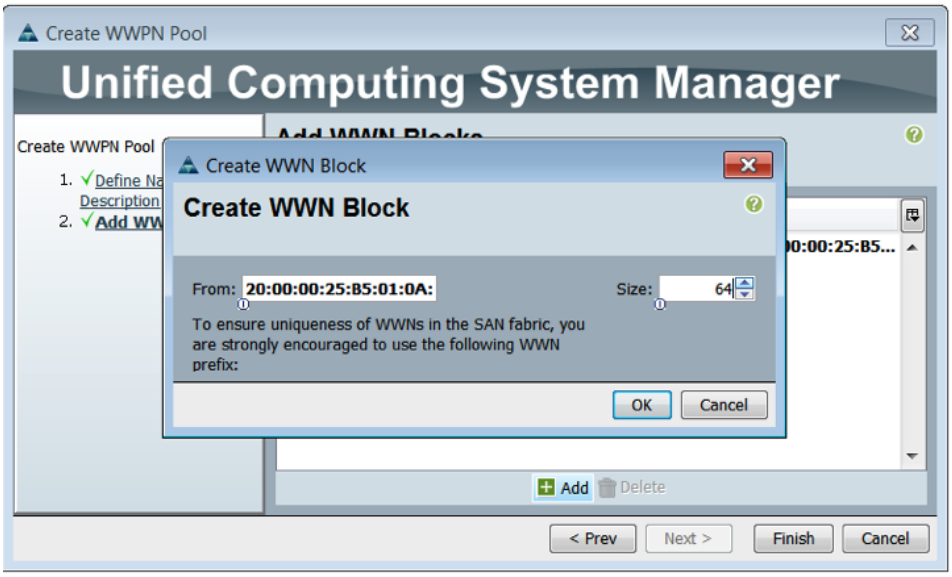
1. In Cisco UCS Manager, click the SAN tab in the navigation pane.
2. Choose Pools > root.

In this procedure, two WWPN pools are create; one for fabric A and one for fabric B.

3. Right-click WWPN Pools.
4. Choose Create WWPN Pool.
5. Enter WWPN_Pool_A as the name of the WWPN pool for fabric A.
6. (Optional) Enter a description for this WWPN pool.
7. Click Next.
8. Click Add to add a block of WWPNs.
9. Specify the starting WWPN in the block for fabric A.

For the Pod solution, the recommendation is to place 0A in the next-to-last octet of the starting WWPN to identify all the WWPNs in this pool as fabric A addresses.

10. Specify a size for the WWPN block that is sufficient to support the available blade or server resources.
11. Click OK.
12. Click Finish to create the WWPN pool.
13. Click OK.



14. Right-click WWPN Pools.
15. Choose Create WWPN Pool.

16. Enter WWPN_Pool_B as the name for the WWPN pool for fabric B.
17. (Optional) Enter a description for this WWPN pool.
18. Click Next.
19. Click Add to add a block of WWPNs.
20. Enter the starting WWPN address in the block for fabric B.

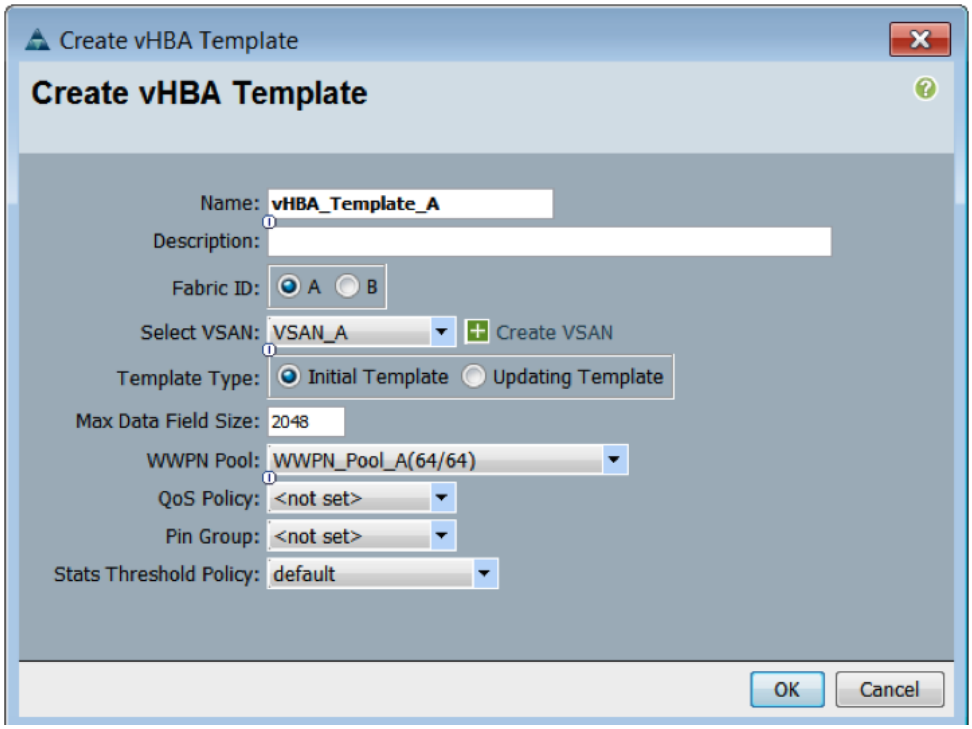
For the Pod solution, the recommendation is to place 0B in the next to last octet of the starting WWPN to identify all the WWPNs in this pool as fabric B addresses.

21. Specify a size for the WWPN block that is sufficient to support the available blade or server resources.
22. Click OK.
23. Click Finish.
24. Click OK.

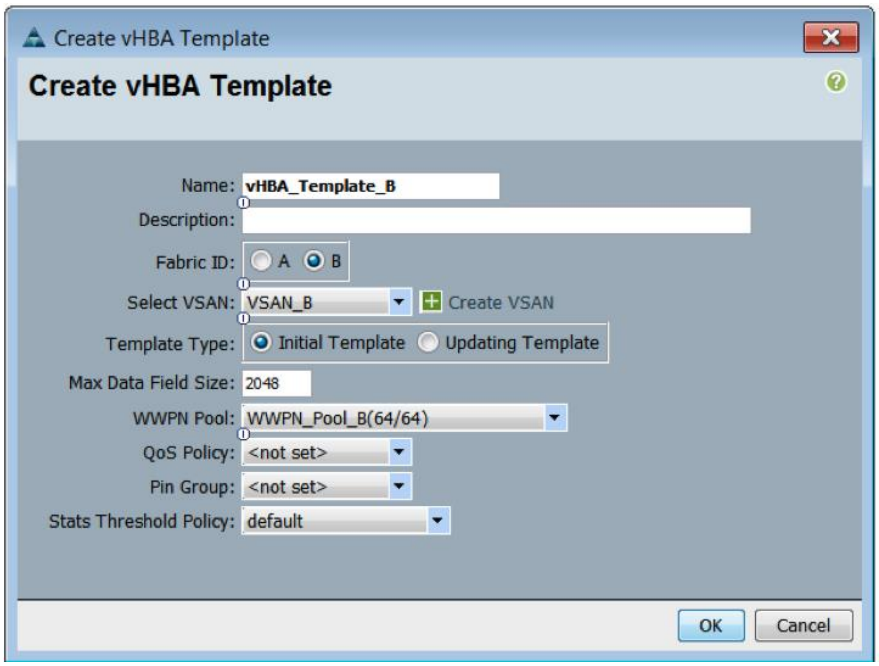
Create vHBA Templates for Fabric A and Fabric B

To create multiple virtual host bus adapter (vHBA) templates for the Cisco UCS environment, follow these steps:

1. In Cisco UCS Manager, click the SAN tab in the navigation pane.
2. Choose Policies > root.
3. Right-click vHBA Templates.
4. Choose Create vHBA Template.
5. Enter vHBA_Template_A as the vHBA template name.
6. Click the radio button Fabric A.
7. In the Select VSAN list, Choose VSAN_A.
8. In the WWPN Pool list, Choose WWPN_Pool_A.
9. Click OK to create the vHBA template.
10. Click OK.



11. In the navigation pane, click the SAN tab.
12. Choose Policies > root.
13. Right-click vHBA Templates.
14. Choose Create vHBA Template.
15. Enter vHBA_Template_B as the vHBA template name.
16. Click the radio button Fabric B.
17. In the Select VSAN list, Choose VSAN_B.
18. In the WWPN Pool, Choose WWPN_Pool_B.
19. Click OK to create the vHBA template.
20. Click OK.



Create Boot Policies

This procedure applies to a Cisco UCS environment in which two FC interfaces are used on the IBM V9000 cluster Controller 1 and two FC interfaces are used on Controller 2.

Two boot policies need to be created. The first boot policy will be created to boot from Fabric A and the second to boot from Fabric B. Though not absolutely necessary to have two boot policies, having two options helps spread the load and helps ensure that a total failure does not happen if a disaster happens that removes an entire fabric.

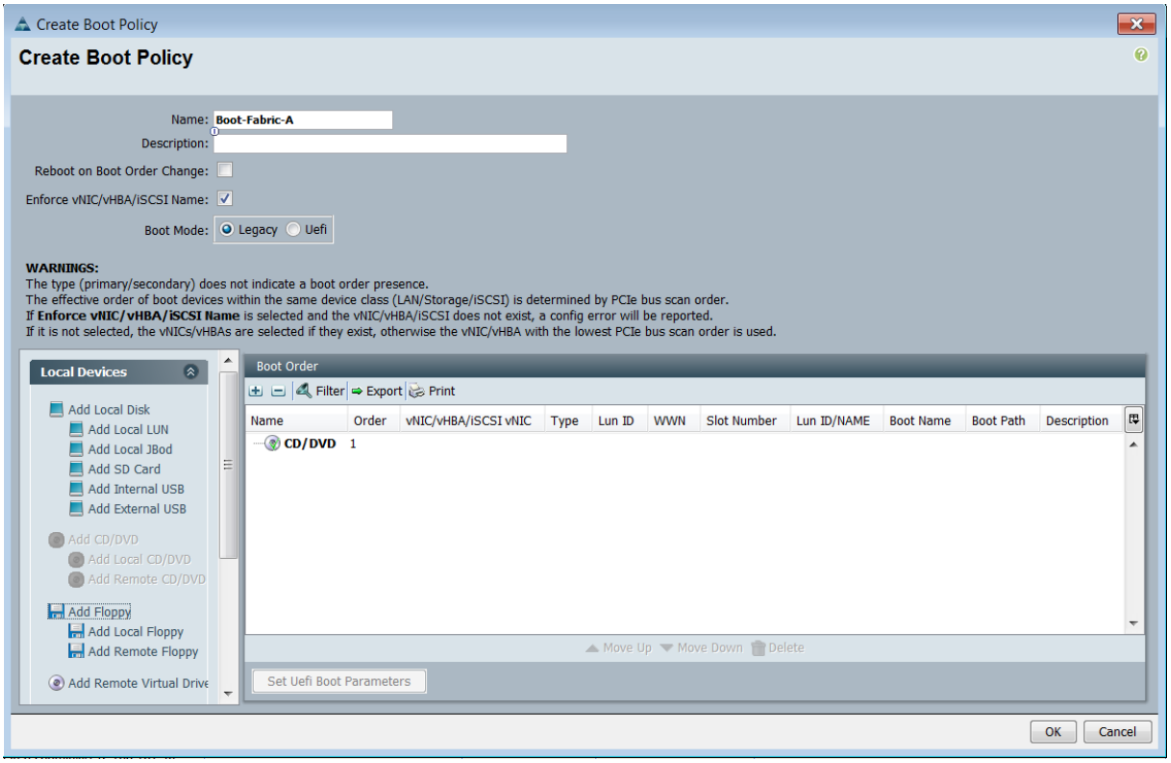
For this example, the following WWPN values are used for the V9000. Your ports may vary depending on the configuration of your V9000.

To create boot policies for the Cisco UCS environment, complete the following steps:

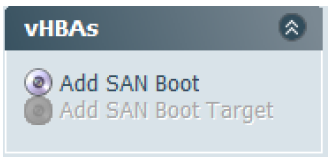
Use the WWPN variables that were logged into the storage section of the WWPN table.

1. In Cisco UCS Manager, click the Servers tab in the navigation pane.
2. Choose Policies > root.
3. Right-click Boot Policies.
4. Choose Create Boot Policy.
5. Enter Boot-Fabric-A as the name of the boot policy.
6. (Optional) Enter a description for the boot policy.
7. Keep the Reboot on Boot Order Change check box unchecked.

8. Expand the Local Devices drop-down menu and Choose Add CD/DVD (you should see local and remote greyed out).



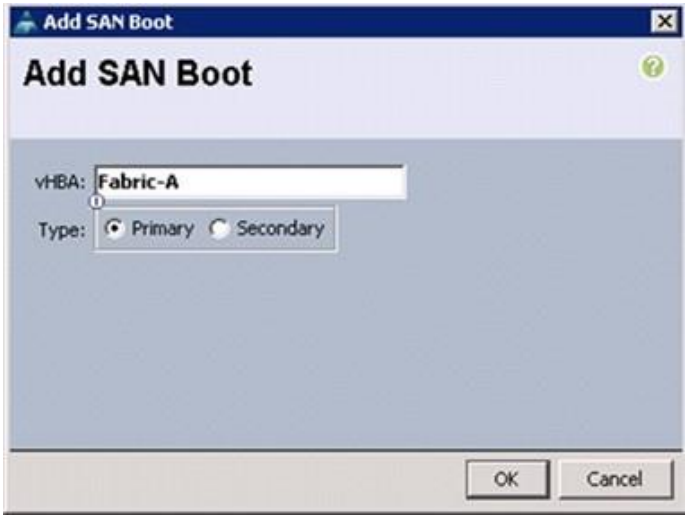
9. Expand the vHBAs drop-down menu and Choose Add SAN Boot.



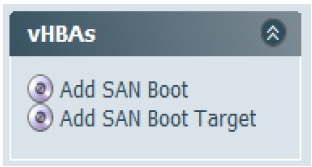
10. In the Add SAN Boot dialog box, enter Fabric-A in the vHBA field.

11. Make sure that the Primary radio button is selected as the SAN boot type.

12. Click OK to add the SAN boot initiator.



13. From the vHBA drop-down menu, choose Add SAN Boot Target.

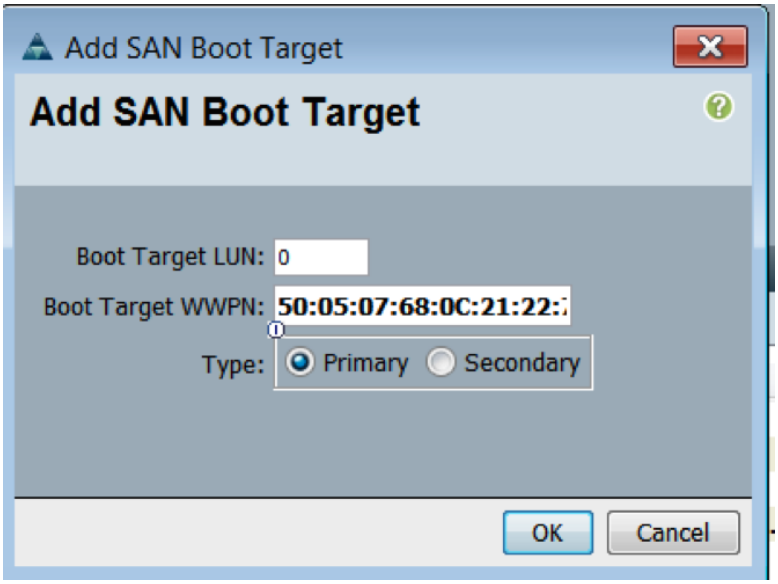


14. Keep 0 as the value for Boot Target LUN.

15. Enter the WWPN for Controller A going to switch A << var_wwpn_FC_ContA-FE1-fabricA>>

16. Keep the Primary radio button selected as the SAN boot target type.

17. Click OK to add the SAN boot target.

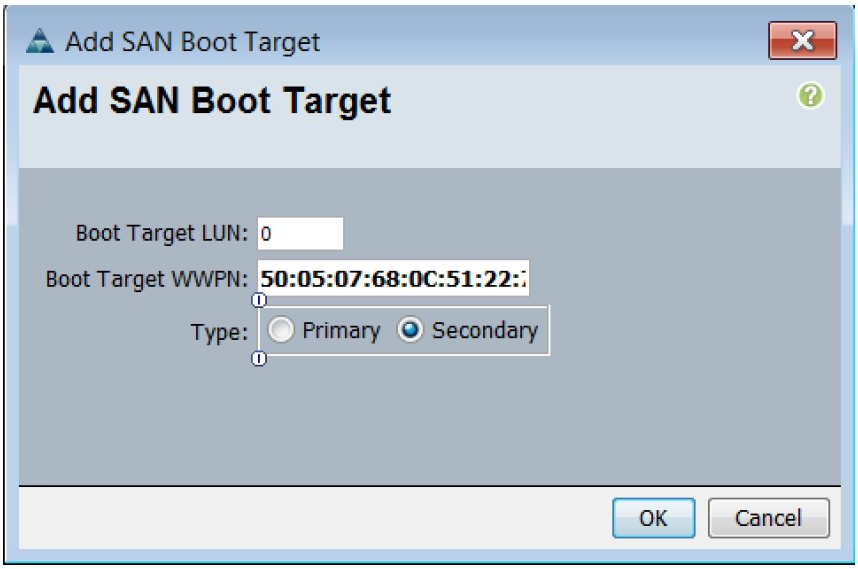


18. From the vHBA drop-down menu, choose Add SAN Boot Target.

19. Keep 0 as the value for Boot Target LUN.

20. Enter the WWPN for Controller A going to switch A << var_wwpn_FC_ContA-FE3-fabricA>>.

21. Click OK to add the SAN boot target.

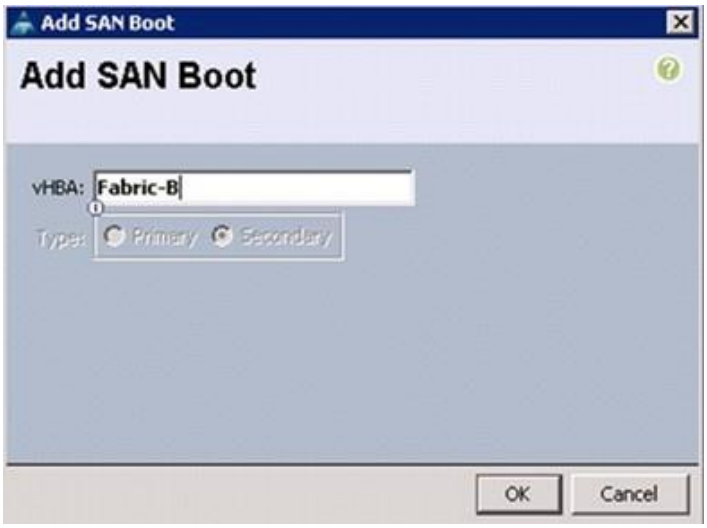


22. From the vHBA drop-down menu, choose Add SAN Boot.

23. In the Add SAN Boot dialog box, enter Fabric-B in the vHBA box.

24. The SAN boot type should automatically be set to Secondary

25. Click OK to add the SAN boot initiator.



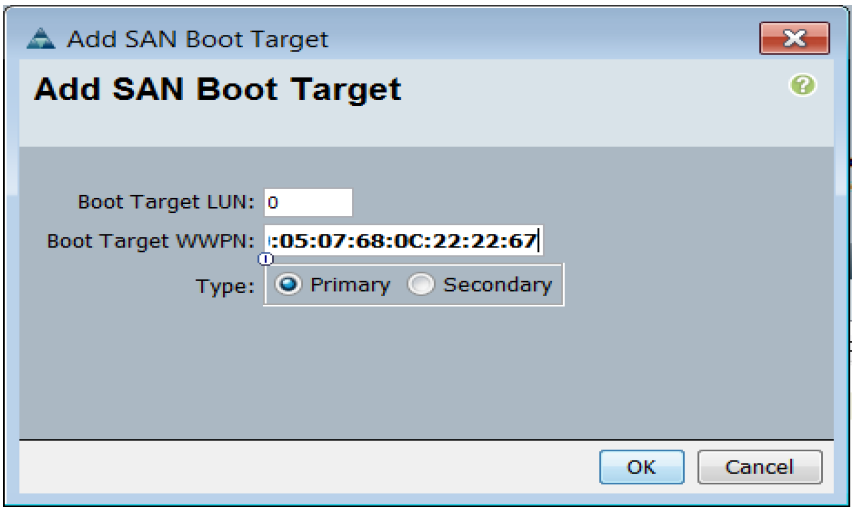
26. From the vHBA drop-down menu, choose Add SAN Boot Target.

27. Keep 0 as the value for Boot Target LUN.

28. Enter the WWPN for Controller B switch B << var_wwpn_FC_ContB-FE2-fabricB>>.

29. Keep Primary as the SAN boot target type.

30. Click OK to add the SAN boot target.

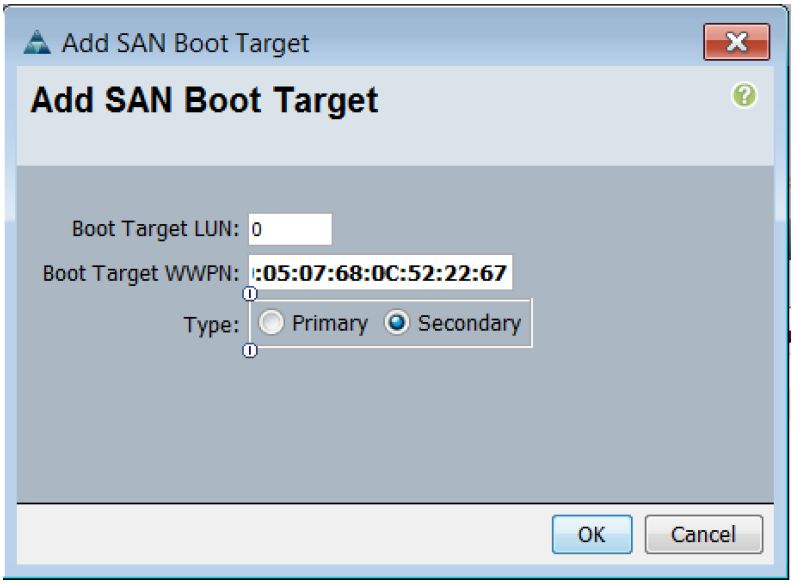


31. From the vHBA drop-down menu, choose Add SAN Boot Target.

32. Keep 0 as the value for Boot Target LUN.

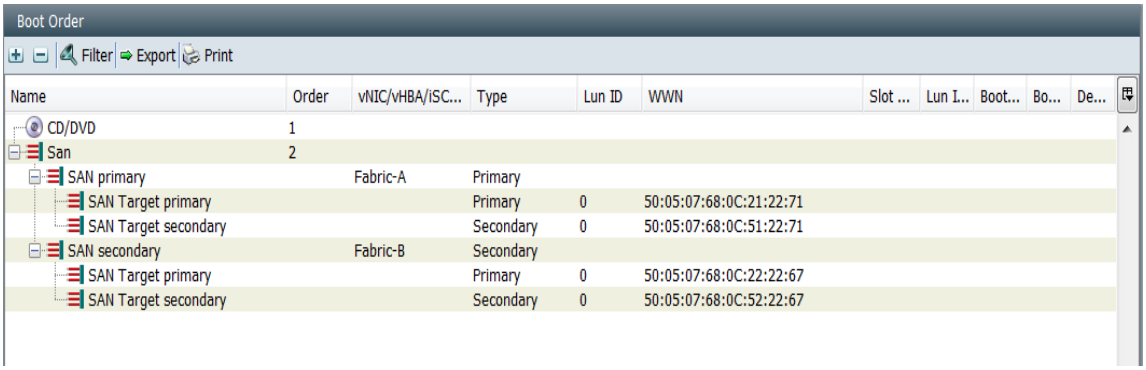
33. Enter the WWPN for Controller B going to switch B << var_wwpn_FC_ContB-FE4-fabricB>>.

34. Click OK to add the SAN boot target.



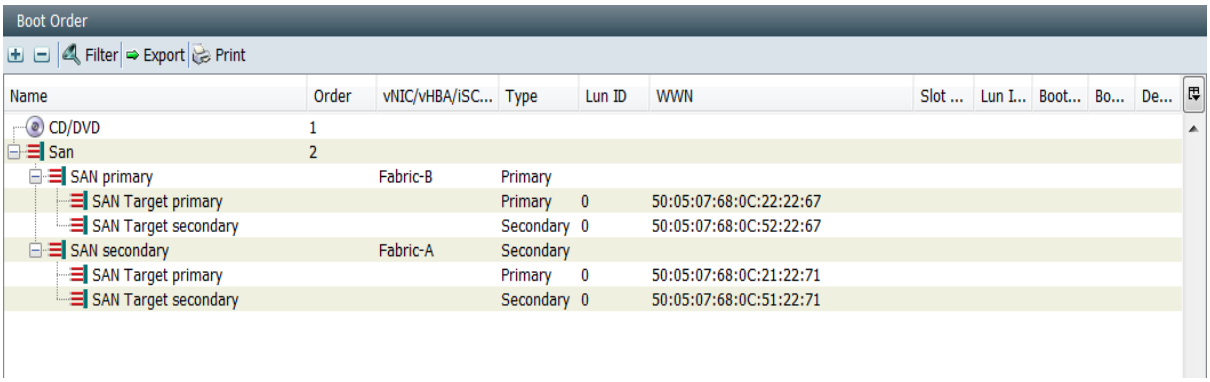
35. Click OK, and then click OK again to create the boot policy.

36. Verify that your configuration looks similar to the screenshot below:



37. Right-click Boot Policies again.
38. Choose Create Boot Policy.
39. Enter Boot-Fabric-B as the name of the boot policy.
40. (Optional) Enter a description of the boot policy.
41. Keep the Reboot on Boot Order Change check box unchecked.
42. From the Local Devices drop-down menu choose Add CD/DVD.
43. From the vHBA drop-down menu choose Add SAN Boot.
44. In the Add SAN Boot dialog box, enter Fabric-B in the vHBA box.
45. Make sure that the Primary radio button is selected as the SAN boot type.
46. Click OK to add the SAN boot initiator.
47. From the vHBA drop-down menu, choose Add SAN Boot Target.
48. Keep 0 as the value for Boot Target LUN.
49. Enter the WWPN for Controller B Switch-B << var_wwpn_FC_ContB-FE2-fabricB>>.
50. Keep Primary as the SAN boot target type.
51. Click OK to add the SAN boot target.
52. From the vHBA drop-down menu, choose Add SAN Boot Target.
53. Keep 0 as the value for Boot Target LUN.
54. Enter the WWPN for Controller B Switch-B << var_wwpn_FC_ContB-FE4-fabricB>>.
55. Click OK to add the SAN boot target.
56. From the vHBA menu, choose Add SAN Boot.

57. In the Add SAN Boot dialog box, enter Fabric-A in the vHBA box.
58. The SAN boot type should automatically be set to Secondary, and the Type option should be unavailable.
59. Click OK to add the SAN boot initiator.
60. From the vHBA menu, choose Add SAN Boot Target.
61. Keep 0 as the value for Boot Target LUN.
62. Enter the WWPN for Controller A Switch-A << var_wwpn_FC_ContA-FE1-fabricA>>.
63. Keep Primary as the SAN boot target type.
64. Click OK to add the SAN boot target.
65. From the vHBA drop-down menu, choose Add SAN Boot Target.
66. Keep 0 as the value for Boot Target LUN.
67. Enter the WWPN for Controller A Switch-A << var_wwpn_FC_ContA-FE3-fabricA>>
68. Click OK to add the SAN boot target.
69. Click OK and then click OK again to create the boot policy.
70. Verify that your configuration looks similar to the screenshot below:



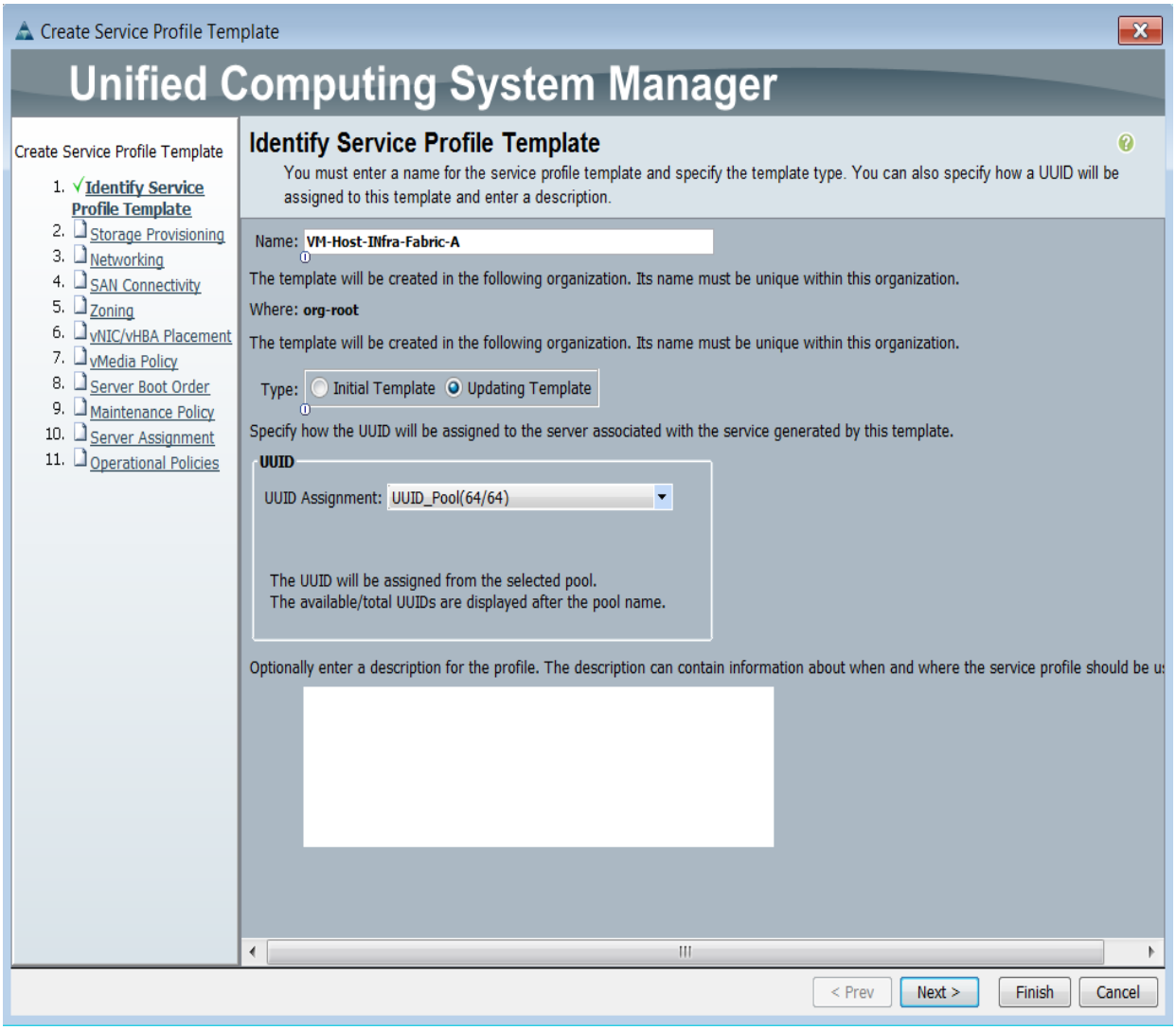
Create Service Profile Templates

In this procedure, two service profile templates are created; one for fabric A boot and one for fabric B boot. The first profile is created and then cloned and modified for the second host.

To create service profile templates, complete the following steps:

1. In Cisco UCS Manager, click the Servers tab in the navigation pane.
2. Choose Service Profile Templates > root.

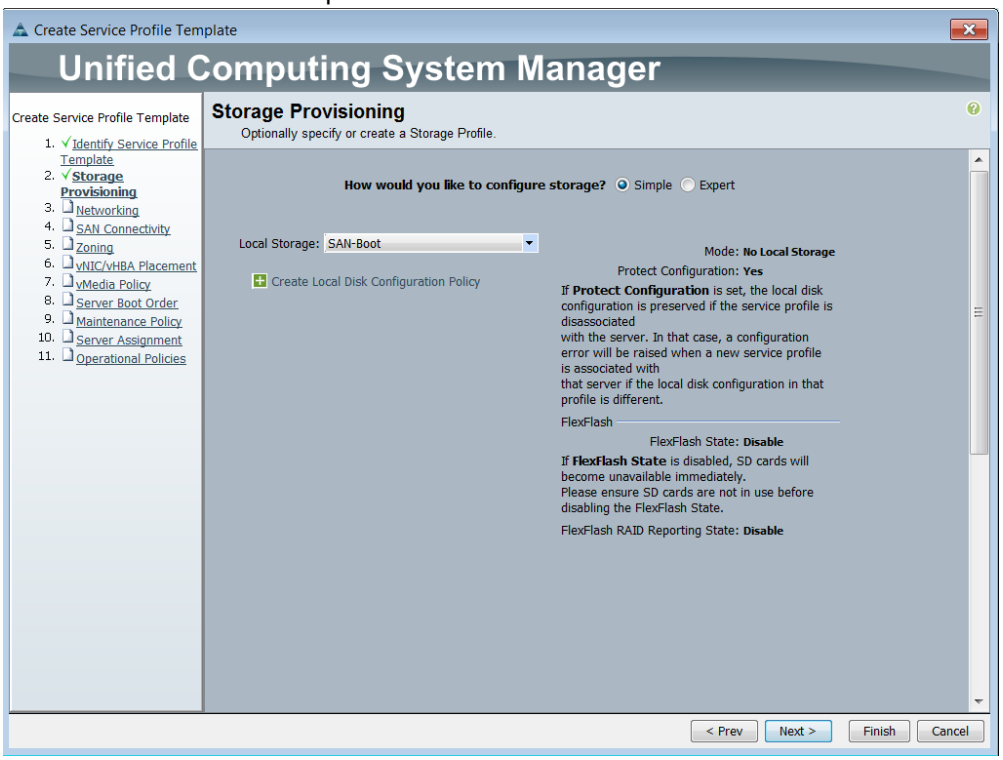
3. Right-click root.
4. Choose Create Service Profile Template to open the Create Service Profile Template wizard.
5. Identify the Service Profile Template:
    a. Enter VM-Host-Infra-Fabric-A as the name of the service profile template. This service profile template is configured to boot from node 1 on fabric A.
    b. Click the Updating Template radio button.
    c. Under UUID, choose UUID_Pool as the UUID pool.
    d. Click Next.



6. Configure the Storage Provisioning Options:
    a. Choose a local disk configuration policy:
        i. If the server in question has local disks, choose default in the Local Storage list.

ii. If the server in question does not have local disks, choose SAN-Boot.

iii. Leave Simple radio button selected as default.

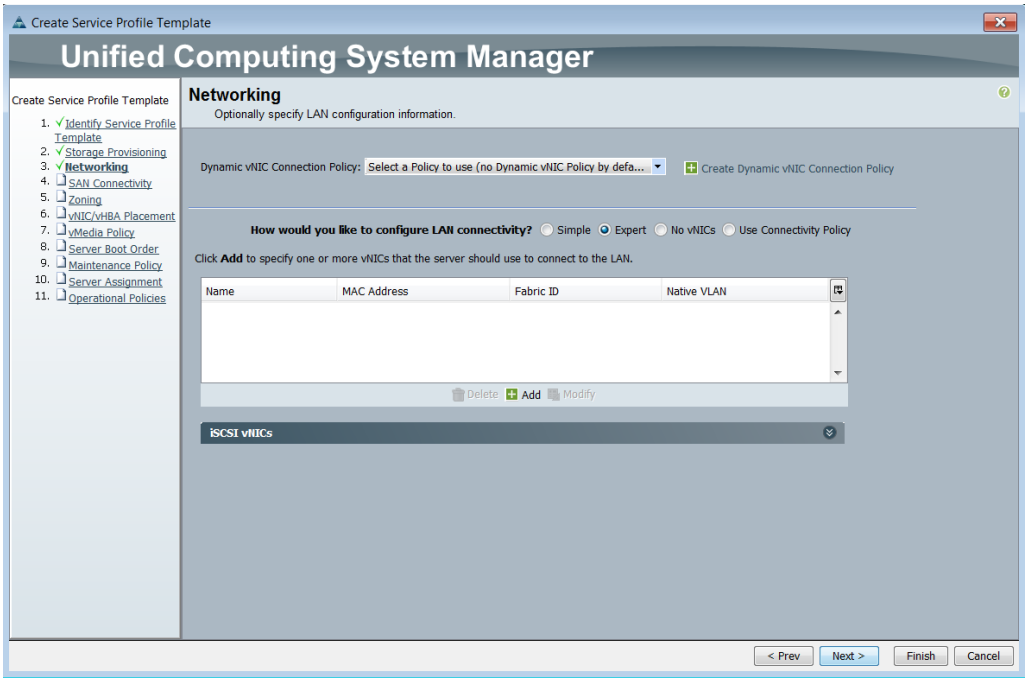


iv. Click Next.

7. Configure the Networking options:

a. Keep the default setting for Dynamic vNIC Connection Policy.

b. Click the Expert radio button to configure the LAN connectivity.



c. Click Add to add a vNIC to the template.

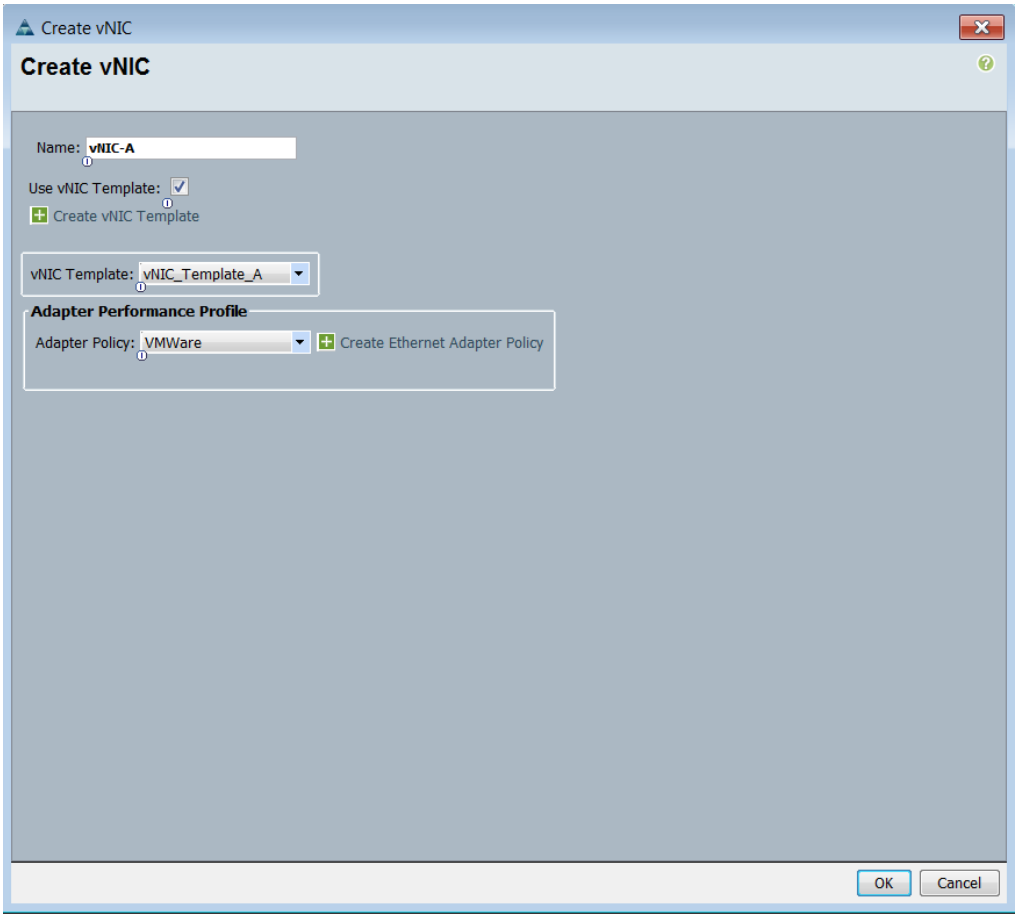
d. In the Create vNIC dialog box, enter vNIC-A as the name of the vNIC.

e. Check the Use vNIC Template check box.

f. In the vNIC Template list, choose vNIC_Template_A.

g. In the Adapter Policy list, choose VMWare.

h. Click OK to add this vNIC to the template.



i. On the Networking page of the wizard, click Add to add another vNIC to the template.

j. In the Create vNIC box, enter vNIC-B as the name of the vNIC.

k. Check the Use vNIC Template check box.

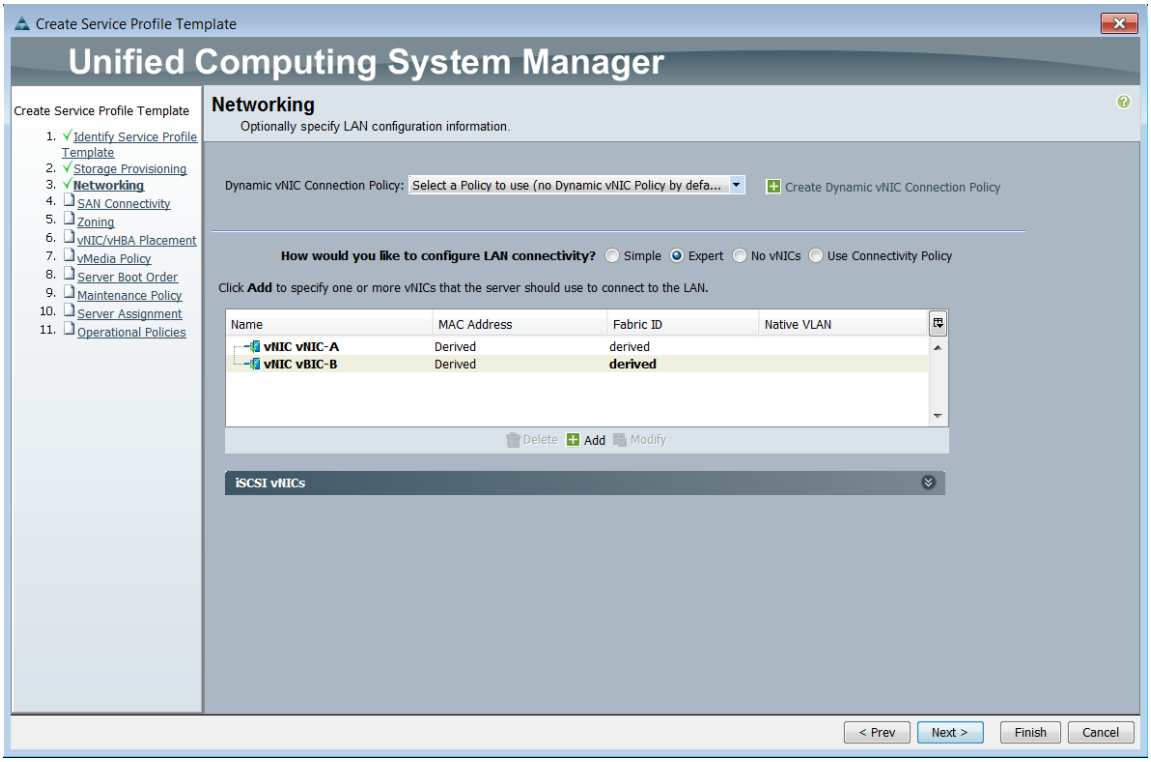
l. In the vNIC Template list, choose vNIC_Template_B.

m. In the Adapter Policy list, choose VMWare.

n. Click OK to add the vNIC to the template.

o. Review the table in the Networking page to make sure that both vNICs were created.

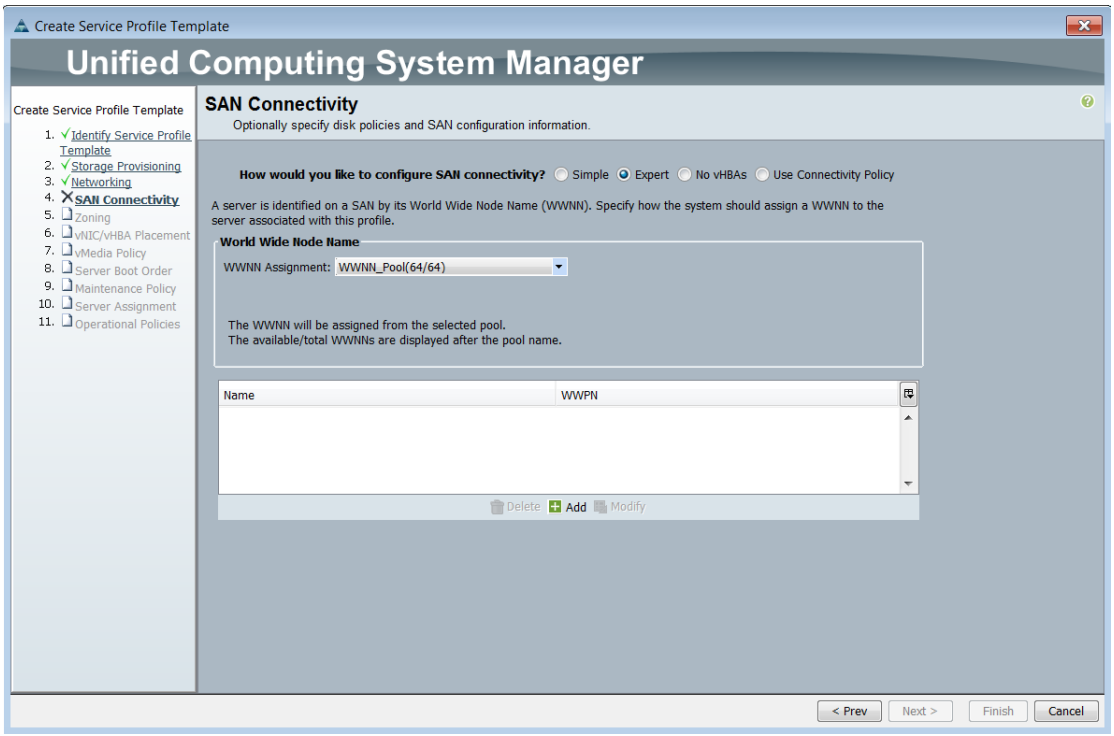
p. Click Next.



8. Configure the SAN Connectivity options:

    a. Click the Expert radio button to configure the SAN connectivity.

    b. In the WWNN Assignment list, choose WWNN_Pool.



c. Click Add at the bottom of the page to add a vHBA to the template.

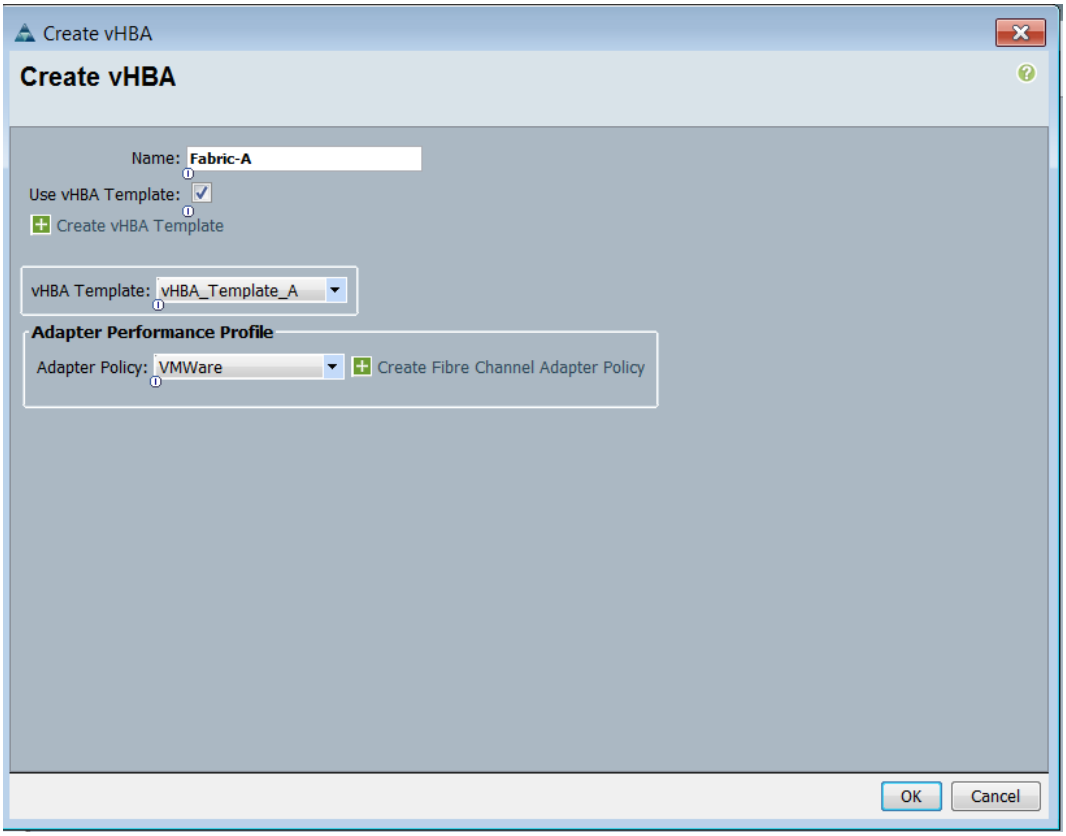
d. In the Create vHBA dialog box, enter Fabric-A as the name of the vHBA.

e. Check the Use vHBA Template check box.

f. In the vHBA Template list, choose vHBA_Template_A.

g. In the Adapter Policy list, choose VMware.

h. Click OK to add this vHBA to the template.



i. On the SAN Connectivity page of the wizard, click Add at the bottom of the page to add another vHBA to the template.

j. In the Create vHBA dialog box, enter Fabric-B as the name of the vHBA.

k. Check the check box for Use HBA Template.

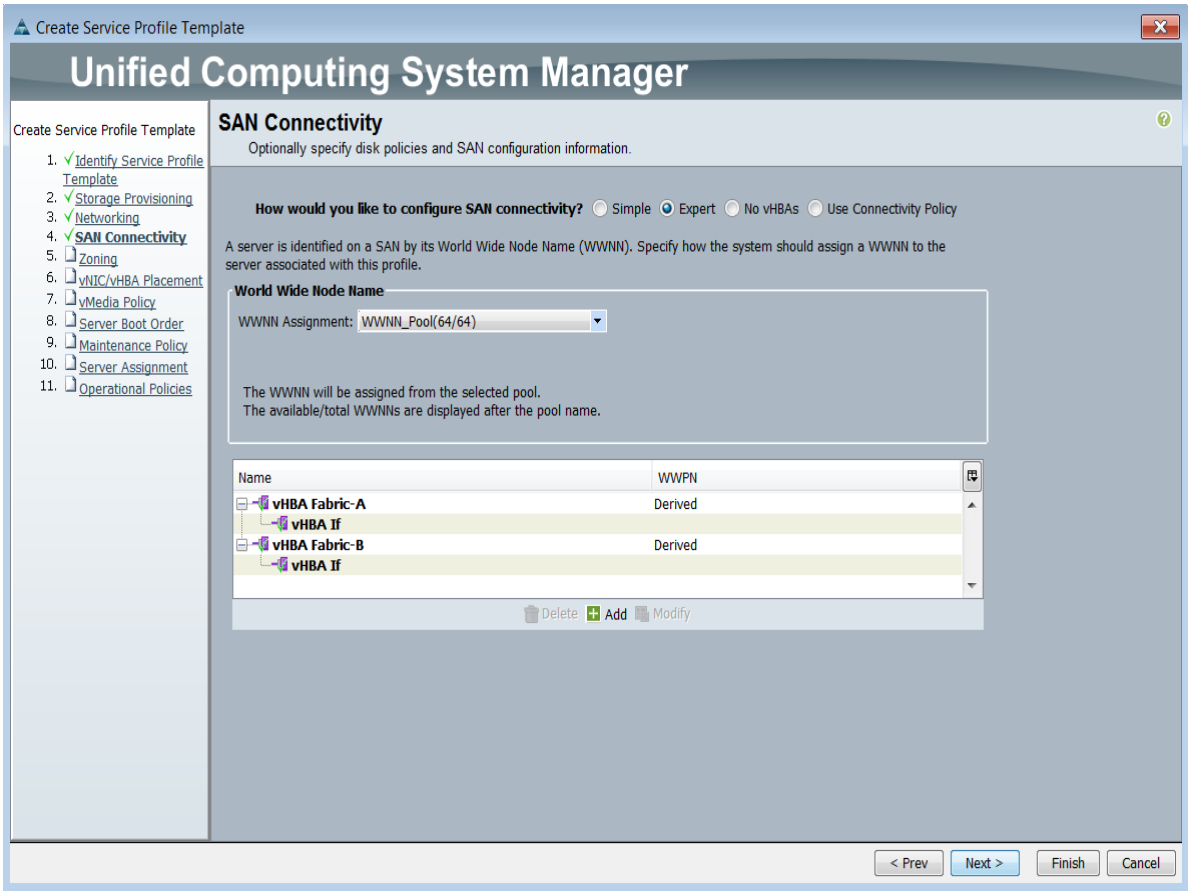
l. In the vHBA Template list, choose vHBA_Template_B.

m. In the Adapter Policy list, choose VMware.

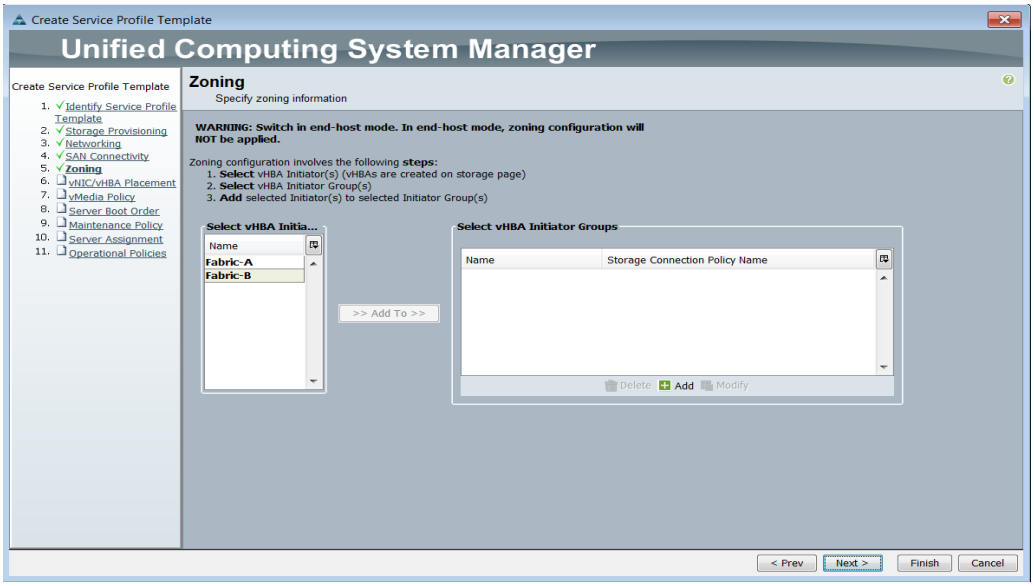
n. Click OK to add the vHBA to the template.

o. Review the table in the SAN Connectivity page to verify that both A and B vHBAs were created.

p. Click Next.



q. Set no Zoning options and click Next.



r. Set the vNIC/vHBA placement options.

s. In the Select Placement list, choose the VM-Host-Infra placement policy.

9. Choose vCon1 and assign the vHBAs/vNICs to the virtual network interfaces policy in the following order:

a. vHBA Fabric-A

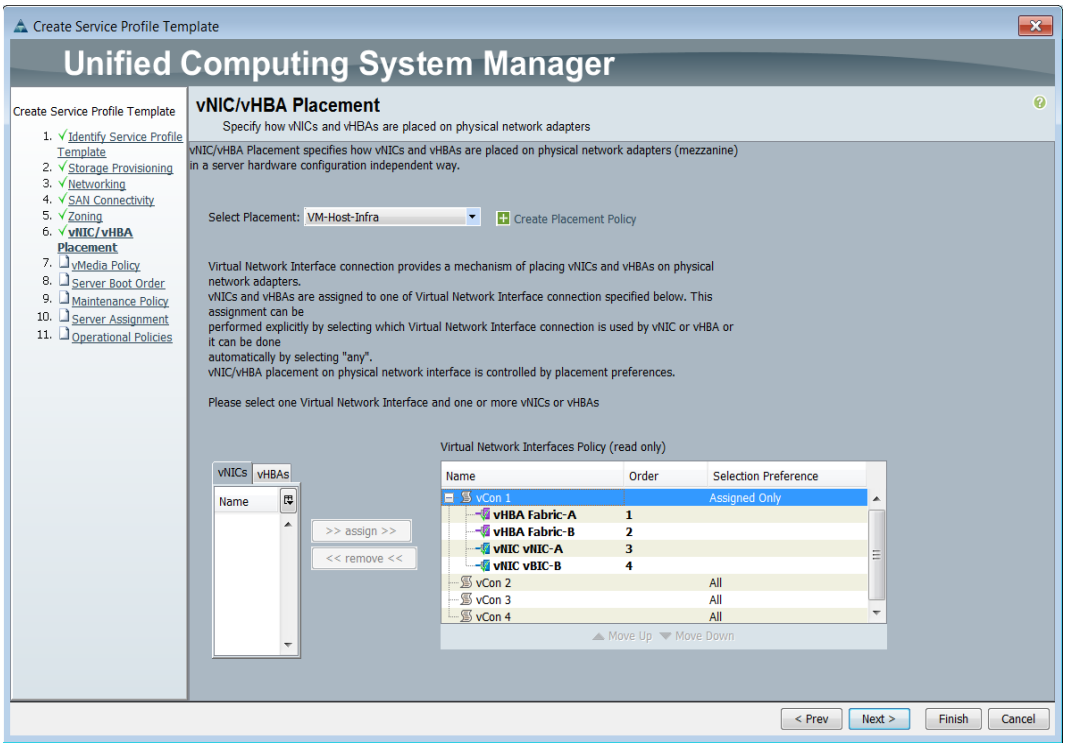
b. vHBA Fabric-B

c. vNIC-A

d. vNIC-B

10. Review the table to verify that all vNICs and vHBAs were assigned to the policy in the appropriate order.

11. Click Next.



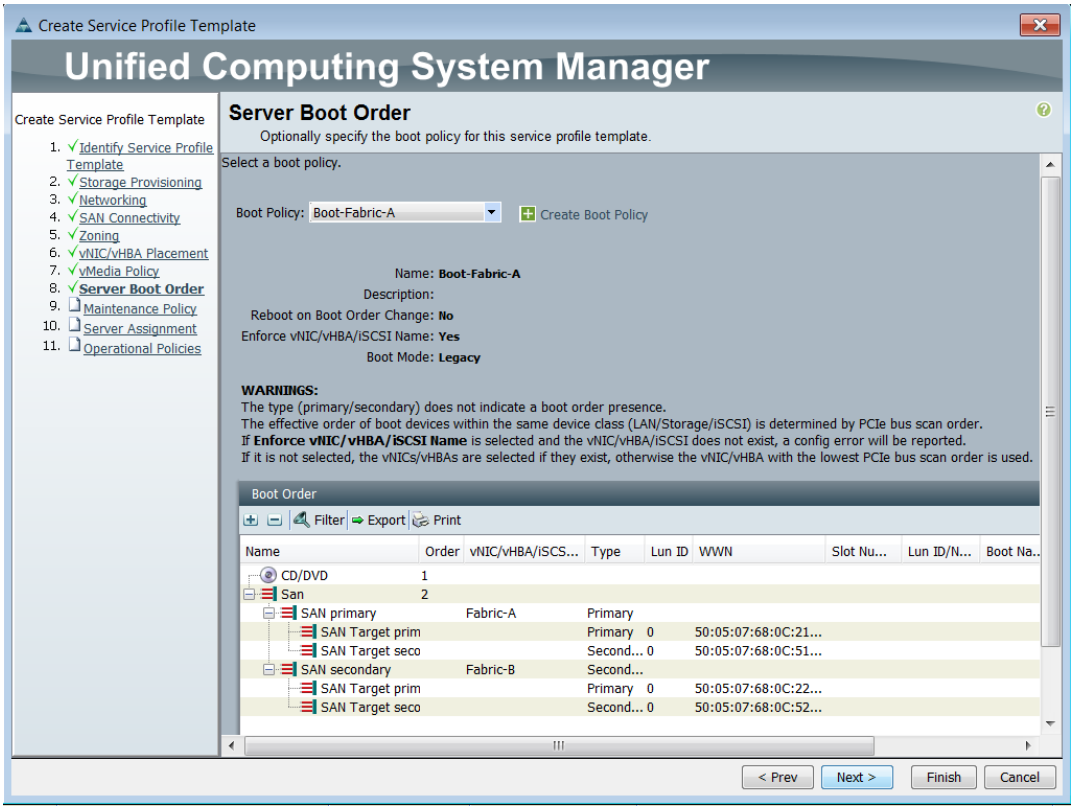
12. Click Next to bypass the vMedia policy screen.

13. Set the Server Boot Order:

a. In the Boot Policy list, choose Boot-Fabric-A.

b. Review the table to verify that all boot devices were created and identified. Verify that the boot devices are in the correct boot sequence.

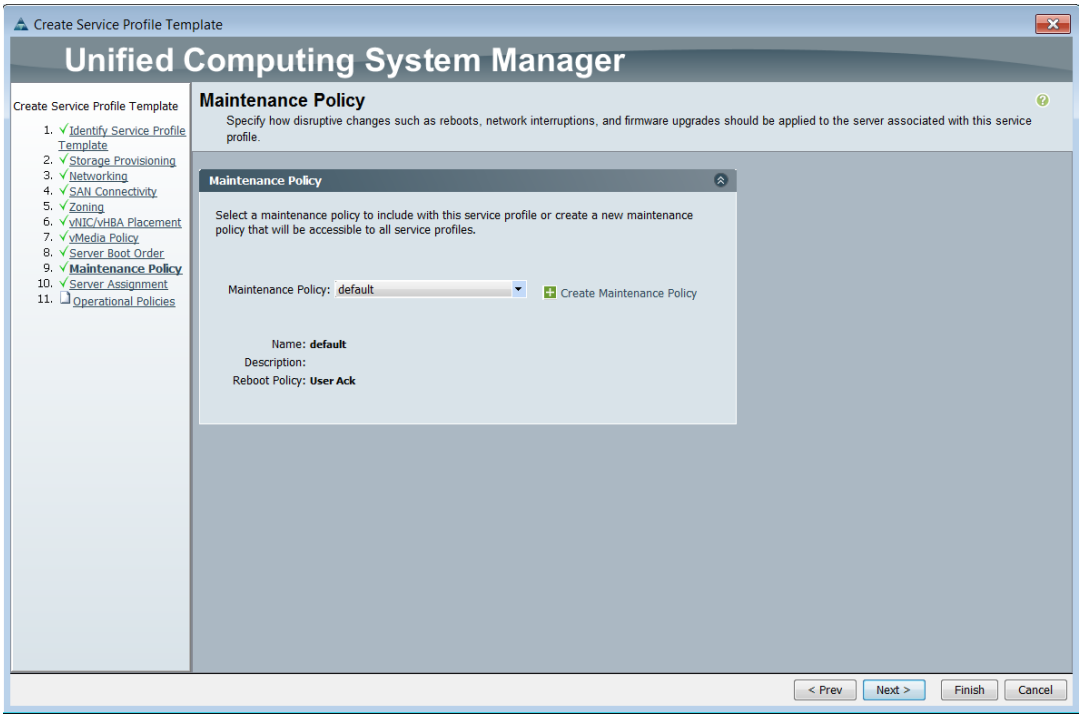
c. Click Next.



14. Add a Maintenance Policy:

    a. Choose the Default Maintenance Policy.

    b. Click Next.



15. Specify the Server Assignment:

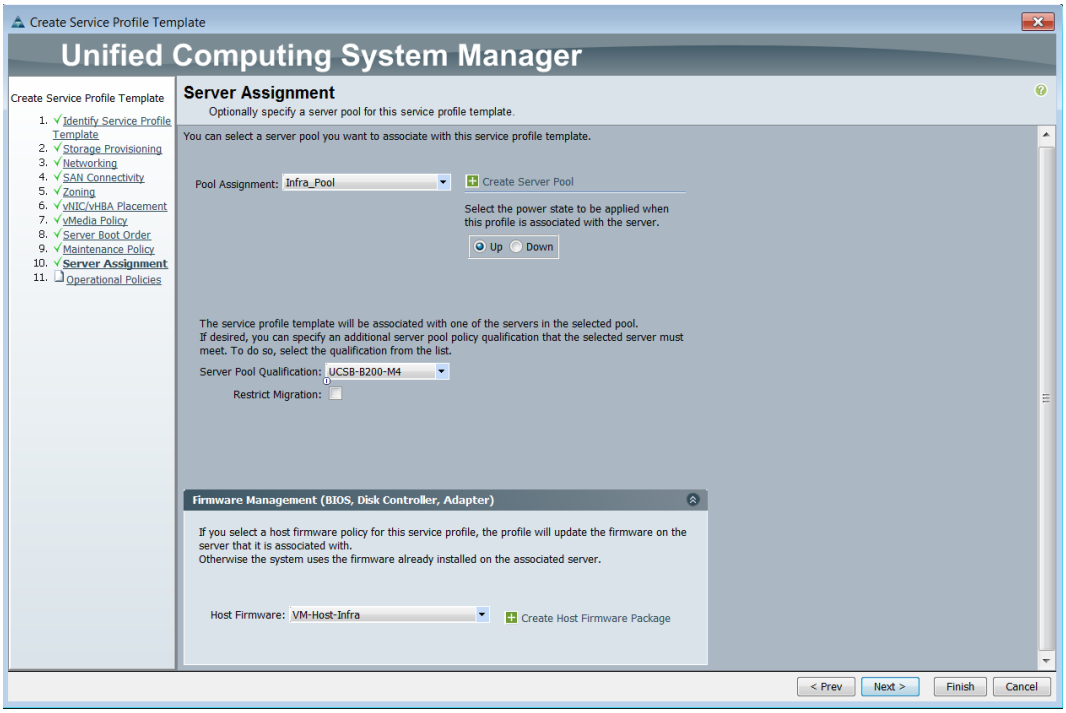
    a. In the Pool Assignment list, choose Infra_Pool.

    b. (Optional) Choose a Server Pool Qualification policy.

    c. Choose Up as the power state to be applied when the profile is associated with the server.

    d. Expand Firmware Management at the bottom of the page and choose VM-Host-Infra from the Host. Firmware list.

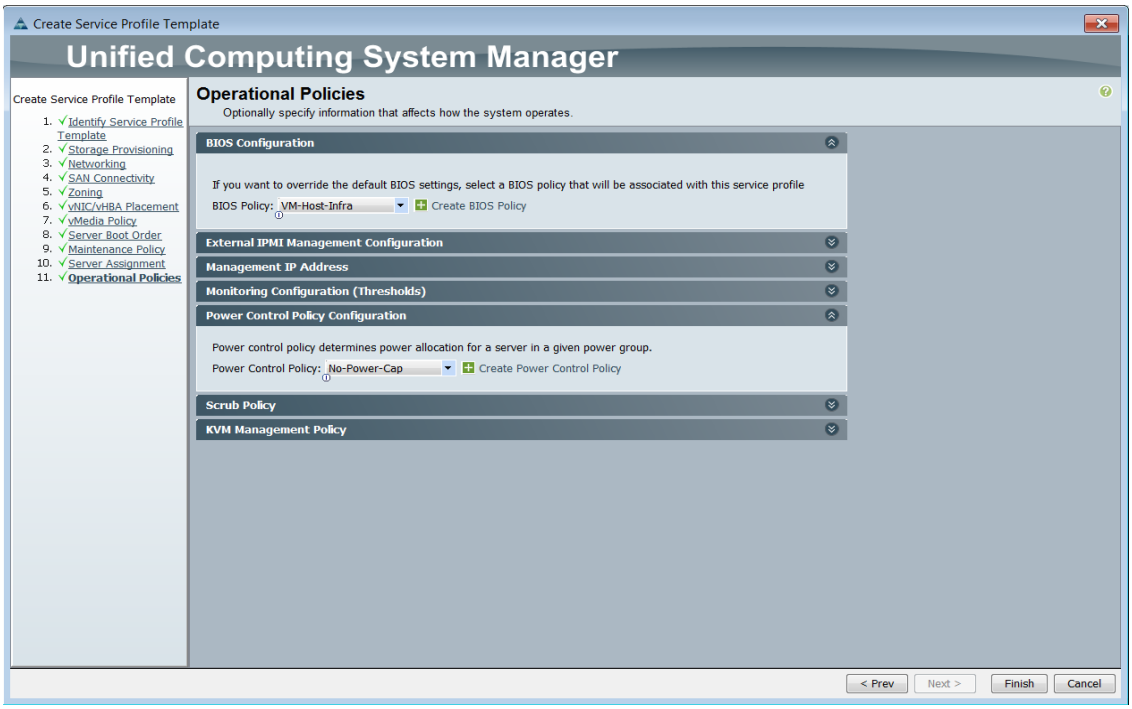
    e. Click Next.



16. Add Operational Policies:

    a. In the BIOS Policy list, choose VM-Host-Infra.

    b. Expand Power Control Policy Configuration and choose No-Power-Cap in the Power Control Policy list.



c. Click Finish to create the service profile template.

d. Click OK in the confirmation message.

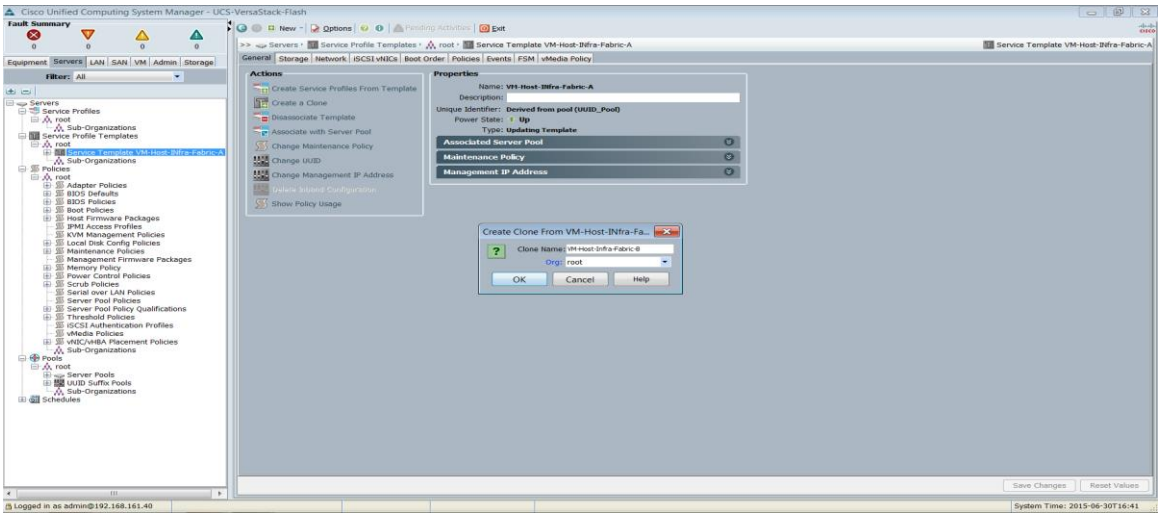
e. Click the Servers tab in the navigation pane.

f. Choose Service Profile Templates > root.

g. Right-click the previously created VM-Host-Infra-Fabric-A template.

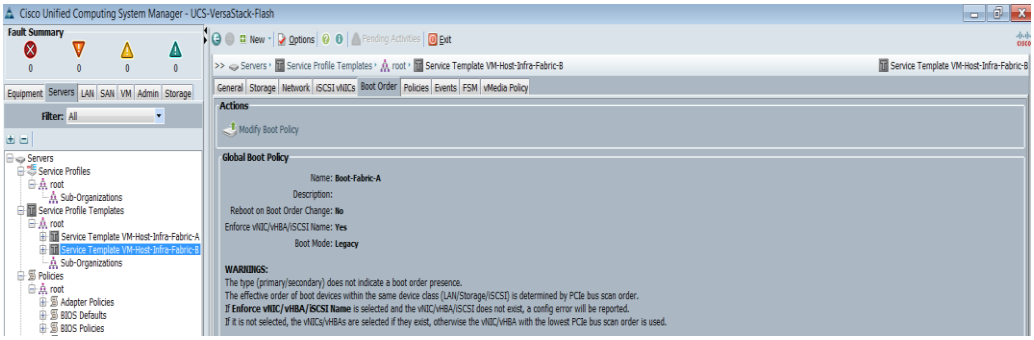
h. Choose Create a Clone.

i. In the dialog box, enter VM-Host-Infra-Fabric-B as the name of the clone, choose the root Org, and click OK.



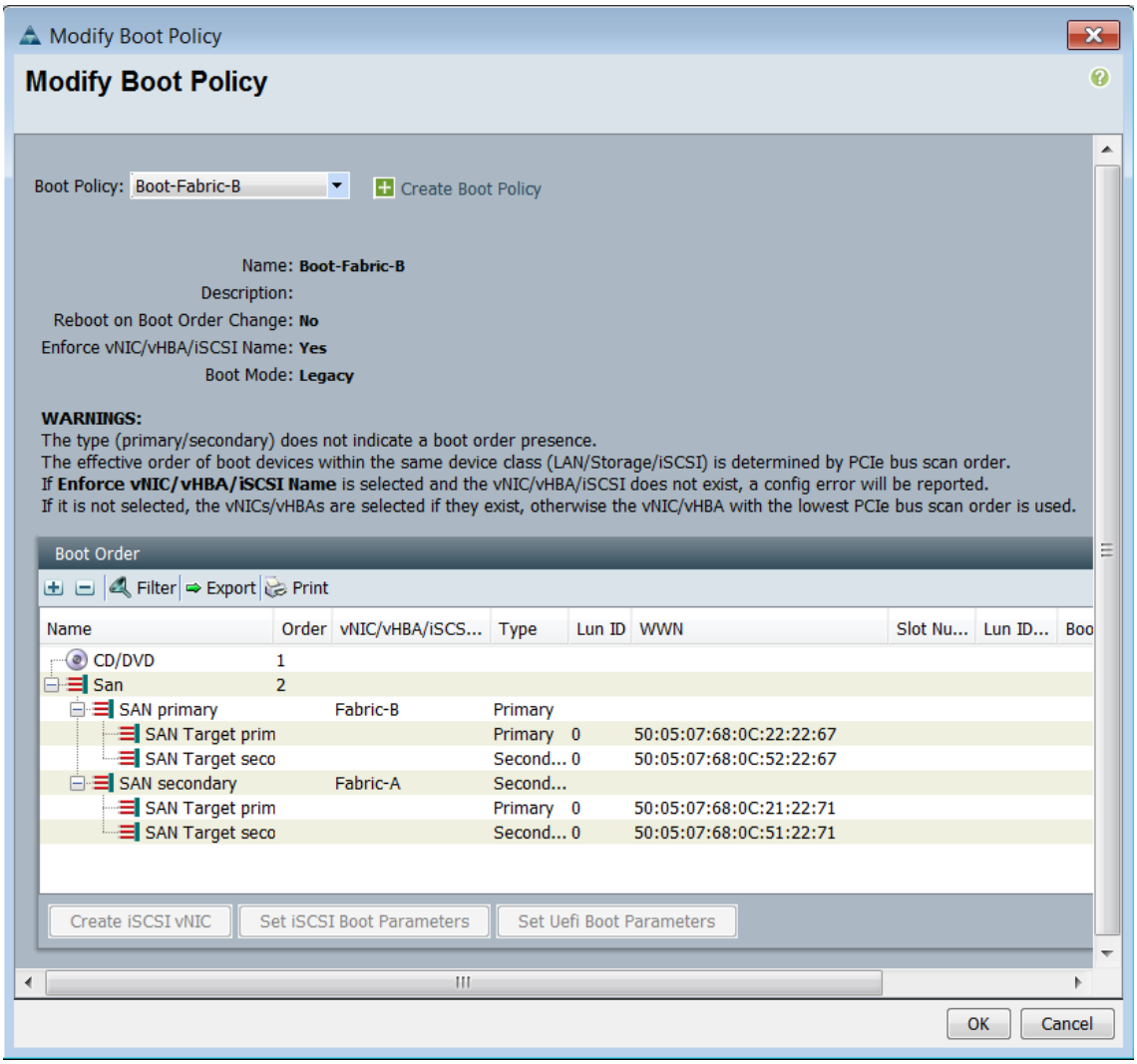
j. Click OK.

k. Choose the newly cloned service profile template and click the Boot Order tab.



l. Click Modify Boot Policy.

m. In the Boot Policy list, choose Boot-Fabric-B.

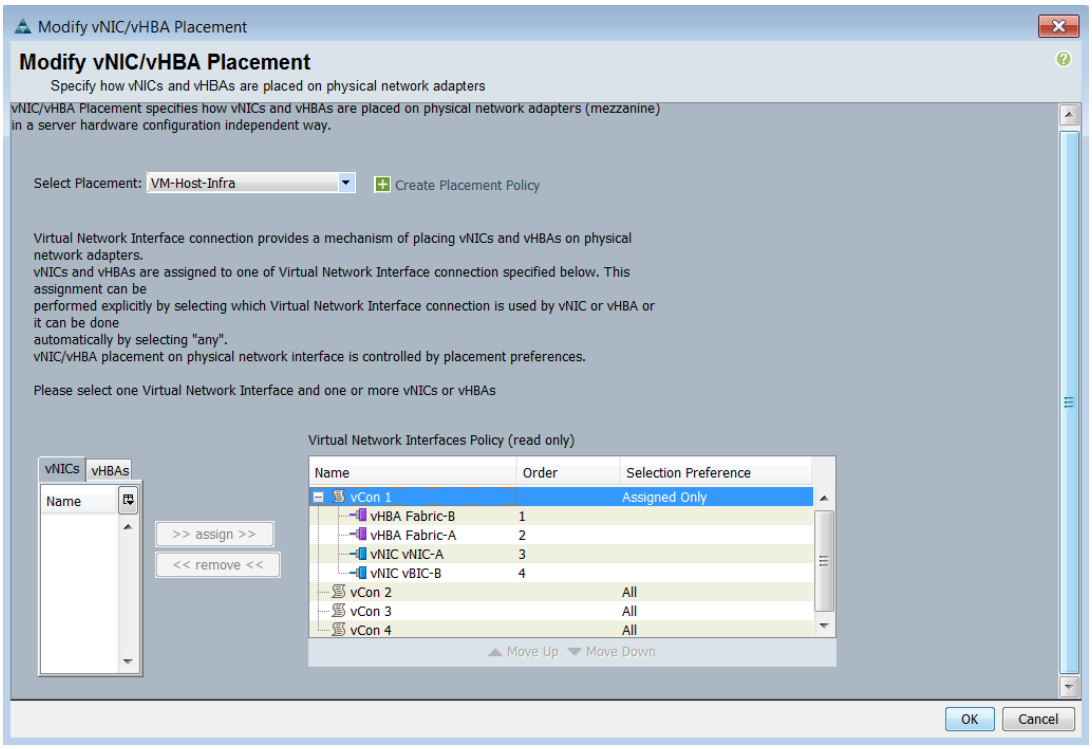


n. Click OK and then click OK again.

o. In the right pane, click the Network tab and then click Modify vNIC/HBA Placement.

p. Select VM-Host-Infra and Expand vCon 1 and move vHBA Fabric-B ahead of vHBA Fabric-A in the placement order.

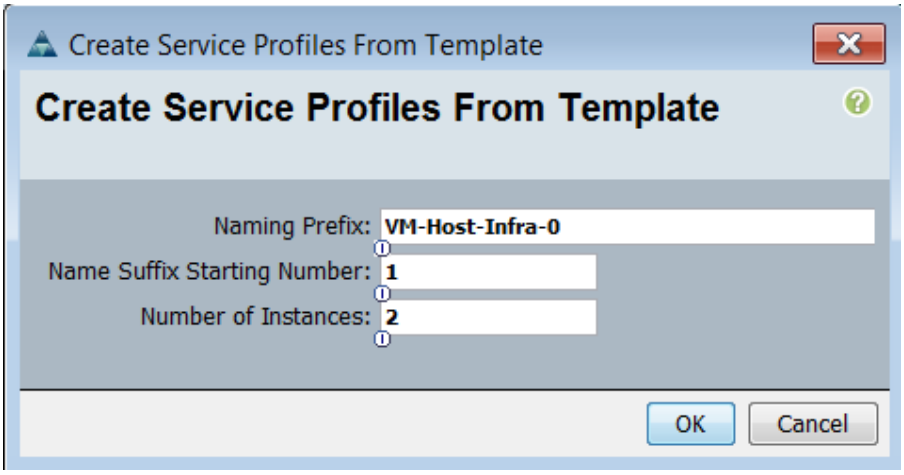
q. Click OK and then click OK again.



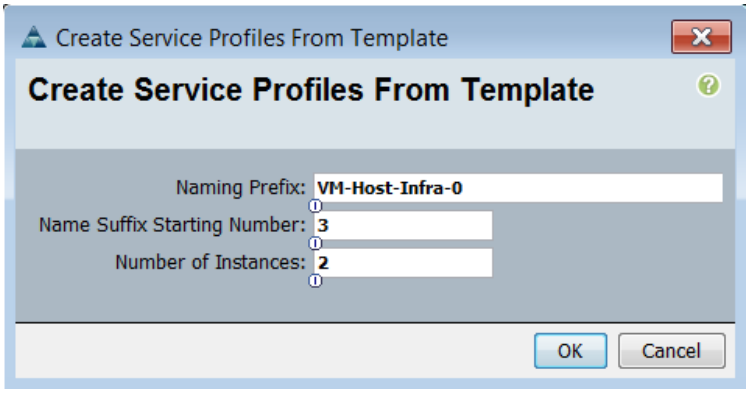
Create Service Profiles

To create service profiles from the service profile template, complete the following steps:

1. In Cisco UCS Manager, click the Servers tab in the navigation pane.
2. Choose Service Profile Templates > root > Service Template VM-Host-Infra-Fabric-A.
3. Right-click VM-Host-Infra-Fabric-A and choose Create Service Profiles from Template.
4. Enter VM-Host-Infra-0 as the service profile prefix.
5. Enter 1 as the Name Suffix Staring Number.
6. Enter 2 as the Number of Instances.
7. Click OK to create the service profile.



8. Click OK in the confirmation message.
9. Choose Service Profile Templates > root > Service Template VM-Host-Infra-Fabric-B.
10. Right-click VM-Host-Infra-Fabric-B and choose Create Service Profiles from Template.
11. Enter VM-Host-Infra-0 as the service profile prefix.
12. Enter 3 as the Name Suffix Staring Number.
13. Enter 2 as the Number of Instances.
14. Click OK to create the service profile.



15. Click OK in the confirmation message.
16. Verify that the service profiles VM-Host-Infra-01, VM-Host-Infra-02, VM-Host-Infra-03 and VM-Host-Infra-04 have been created. The service profiles are automatically associated with the servers in their assigned server pools.
17. (Optional) Choose each newly created service profile and enter the server host name or the FQDN in the User Label field in the General tab. Click Save Changes to map the server host name to the service profile name.

Backup the Cisco UCS Manager Configuration

It is recommended you backup your Cisco UCS Configuration. Please refer to the link below for additional information.

http://www.cisco.com/c/en/us/td/docs/unified_computing/ucs/sw/gui/config/guide/2-2/b_UCSM_GUI_

Configuration_Guide_2_2/b_UCSM_GUI_Configuration_Guide_2_2_chapter_0101010.html

Adding Servers

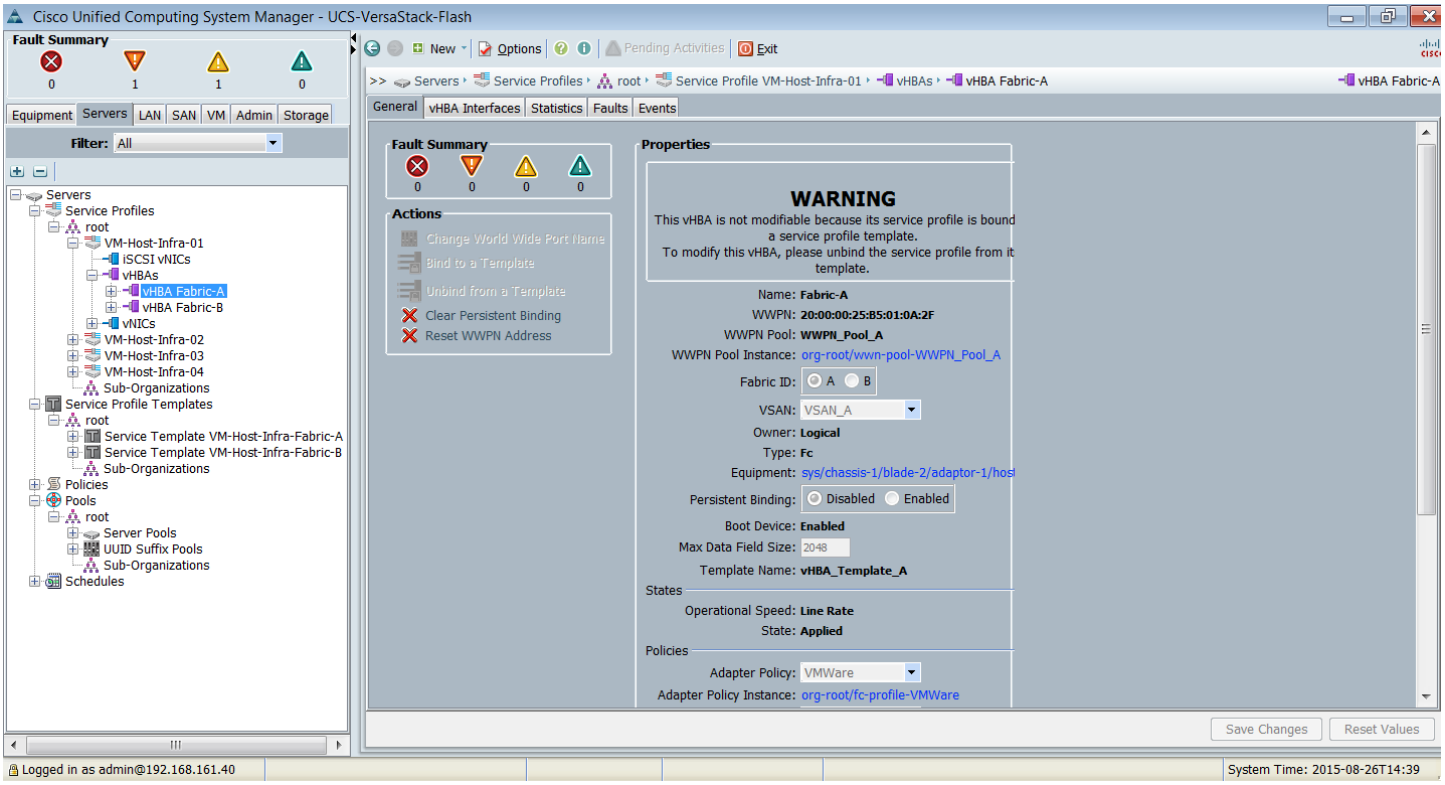
Additional server pools, service profile templates, and service profiles can be created in the respective organizations to add more servers to the Pod unit. All other pools and policies are at the root level and can be shared among the organizations.

Gather Necessary WWPN Information

After the Cisco UCS service profiles have been created, each infrastructure blade in the environment will have a unique configuration. To proceed with the SAN-BOOT deployment, specific information must be gathered from each Cisco UCS blade and from the IBM controllers. Complete the following steps:

1. To gather the vHBA WWPN information, launch the Cisco UCS Manager GUI. In the navigation pane, click the Servers tab. Expand Servers > Service Profiles > root. Click each service profile and expand to see vHBAs.

2. Click vHBA Fabric-A, in the general tab right click the WWPN and click Copy.



3. Record the WWPN information that is displayed for both the Fabric A vHBA and the Fabric B vHBA for each service profile into the WWPN variable in Table 22 .

Table 22 WWPN Variables

VM-Host-Infra-01-A	Switch A	var_wwpn_VM-Host-Infra-01-A	20:00:00:25:b5:01:0a:2f
VM-Host-Infra-01-B	Switch B	var_wwpn_VM-Host-Infra-01-B	20:00:00:25:b5:01:0b:2f
VM-Host-Infra-02-A	Switch A	var_wwpn_VM-Host-Infra-02-A	20:00:00:25:b5:01:0a:3f
VM-Host-Infra-02-B	Switch B	var_wwpn_VM-Host-Infra-02-B	20:00:00:25:b5:01:0b:3f
VM-Host-Infra-03-A	Switch A	var_wwpn_VM-Host-Infra-03-A	20:00:00:25:b5:01:0a:0f
VM-Host-Infra-03-B	Switch B	var_wwpn_VM-Host-Infra-03-B	20:00:00:25:b5:01:0b:0f
VM-Host-Infra-04-A	Switch A	var_wwpn_VM-Host-Infra-04-A	20:00:00:25:b5:01:0a:1f
VM-Host-Infra-04-B	Switch B	var_wwpn_VM-Host-Infra-04-B	20:00:00:25:b5:01:0b:1f

Cisco MDS 9148S Compute SAN Zoning

These steps will configure zoning for the WWPN's from the server and the FlashSystem V9000. We will be using the WWPN information collected in the previous steps for both the storage setup, and for server profile creation. There are 4 zones created for servers in VSAN 101 on Switch A and 4 zones created in VSAN 102 on Switch B. Host zones and the cluster zone belongs to separate VSAN fabrics.

Cisco MDS - A Switch

1. Log in to the MDS switch and complete the following steps to create the WWPN aliases:

```
config

Enter configuration commands, one per line.  End with CNTL/Z.

device-alias database
device-alias name VM-Host-Infra-01-A pwwn var_wwpn_VM-Host-Infra-01-A
device-alias name VM-Host-Infra-02-A pwwn var_wwpn_VM-Host-Infra-02-A

device-alias name VM-Host-Infra-03-A pwwn var_wwpn_VM-Host-Infra-03-A
device-alias name VM-Host-Infra-04-A pwwn var_wwpn_VM-Host-Infra-04-A
device-alias commit
```

2. Create the zones and add device-alias members for the 4 blades.

```
zone name  VM-Host-Infra-01-A vsan 101

member device-alias  VM-Host-Infra-01-A

member device-alias VersaStack-ContA-FE1

member device-alias VersaStack-ContA-FE3

member device-alias VersaStack-ContB-FE1

member device-alias VersaStack-ContB-FE3
```

```
exit
zone name  VM-Host-Infra-02-A vsan 101
member device-alias  VM-Host-Infra-02-A
member device-alias VersaStack-ContA-FE1
member device-alias VersaStack-ContA-FE3
member device-alias VersaStack-ContB-FE1
member device-alias VersaStack-ContB-FE3

zone name  VM-Host-Infra-03-A vsan 101
member device-alias  VM-Host-Infra-032-A
member device-alias VersaStack-ContA-FE1
member device-alias VersaStack-ContA-FE3
member device-alias VersaStack-ContB-FE1
member device-alias VersaStack-ContB-FE3

zone name  VM-Host-Infra-04-A vsan 101
member device-alias  VM-Host-Infra-042-A
member device-alias VersaStack-ContA-FE1
member device-alias VersaStack-ContA-FE3
member device-alias VersaStack-ContB-FE1
member device-alias VersaStack-ContB-FE3
exit
```

3. Add zones to zoneset.

```
zoneset name versastackzoneset vsan 101
member VM-Host-Infra-01-A
member VM-Host-Infra-02-A
member VM-Host-Infra-03-A
member VM-Host-Infra-04-A
exit
```

4. Activate the zoneset.

```
zoneset activate  name versastackzoneset vsan 101
```

Validate all the HBA's are logged into the MDS switch. The V9000 and the Cisco servers should be powered on. To start the Cisco server's from Cisco UCS Manager, select the server tab, then click Server-Service-Profiles-root, and right-click VM-Host-Infra-01 then select boot server .

5. Validate all powered on systems HBA's are logged into the switch through the show zoneset command.

```
sh zoneset active
```

```
VersaStack-MDS-A# sh zoneset active vsan 101
zoneset name versastackzoneset vsan 101
  zone name VM-Host-Infra-01-A vsan 101
  * fcid 0x670003 [pwwn 20:00:00:25:b5:01:0a:2f] [VM-Host-Infra-01-A]
  * fcid 0x670200 [pwwn 50:05:07:68:0c:21:22:71] [VersaStack-ContA-FE1]
  * fcid 0x670400 [pwwn 50:05:07:68:0c:51:22:71] [VersaStack-ContA-FE3]
  * fcid 0x670100 [pwwn 50:05:07:68:0c:21:22:67] [VersaStack-ContB-FE1]
  * fcid 0x670300 [pwwn 50:05:07:68:0c:51:22:67] [VersaStack-ContB-FE3]

  zone name VM-Host-Infra-02-A vsan 101
  * fcid 0x670004 [pwwn 20:00:00:25:b5:01:0a:3f] [VM-Host-Infra-02-A]
  * fcid 0x670200 [pwwn 50:05:07:68:0c:21:22:71] [VersaStack-ContA-FE1]
  * fcid 0x670400 [pwwn 50:05:07:68:0c:51:22:71] [VersaStack-ContA-FE3]
  * fcid 0x670100 [pwwn 50:05:07:68:0c:21:22:67] [VersaStack-ContB-FE1]
  * fcid 0x670300 [pwwn 50:05:07:68:0c:51:22:67] [VersaStack-ContB-FE3]

  zone name VM-Host-Infra-03-A vsan 101
  * fcid 0x670200 [pwwn 50:05:07:68:0c:21:22:71] [VersaStack-ContA-FE1]
  * fcid 0x670400 [pwwn 50:05:07:68:0c:51:22:71] [VersaStack-ContA-FE3]
  * fcid 0x670100 [pwwn 50:05:07:68:0c:21:22:67] [VersaStack-ContB-FE1]
  * fcid 0x670300 [pwwn 50:05:07:68:0c:51:22:67] [VersaStack-ContB-FE3]
  * fcid 0x670001 [pwwn 20:00:00:25:b5:01:0a:0f] [VM-Host-Infra-03-A]

  zone name VM-Host-Infra-04-A vsan 101
  * fcid 0x670200 [pwwn 50:05:07:68:0c:21:22:71] [VersaStack-ContA-FE1]
  * fcid 0x670400 [pwwn 50:05:07:68:0c:51:22:71] [VersaStack-ContA-FE3]
  * fcid 0x670100 [pwwn 50:05:07:68:0c:21:22:67] [VersaStack-ContB-FE1]
  * fcid 0x670300 [pwwn 50:05:07:68:0c:51:22:67] [VersaStack-ContB-FE3]
  * fcid 0x670002 [pwwn 20:00:00:25:b5:01:0a:1f] [VM-Host-Infra-04-A]
```

6. Save the configuration.

```
copy run start
```

Cisco MDS - B Switch

1. Log in to the MDS switch and complete the following steps to create the WWPN aliases:

```
config

Enter configuration commands, one per line.  End with CNTL/Z.

device-alias database
device-alias name VM-Host-Infra-01-B pwwn var_wwpn_VM-Host-Infra-01-B
device-alias name VM-Host-Infra-02-B pwwn var_wwpn_VM-Host-Infra-02-B
```

```
device-alias name VM-Host-Infra-03-B pwwn var_wwpn_VM-Host-Infra-03-B
device-alias name VM-Host-Infra-04-B pwwn var_wwpn_VM-Host-Infra-04-B
device-alias commit
```

2. Create the zones and add device-alias members for the 4 servers.

```
zone name  VM-Host-Infra-01-B vsan 102
member device-alias  VM-Host-Infra-01-B
member device-alias VersaStack-ContA-FE2
member device-alias VersaStack-ContA-FE4
member device-alias VersaStack-ContB-FE2
member device-alias VersaStack-ContB-FE4
exit
zone name  VM-Host-Infra-02-B vsan 102
member device-alias  VM-Host-Infra-02-B
member device-alias VersaStack-ContA-FE2
member device-alias VersaStack-ContA-FE4
member device-alias VersaStack-ContB-FE2
member device-alias VersaStack-ContB-FE4
exit
zone name  VM-Host-Infra-03-B vsan 102
member device-alias  VM-Host-Infra-03-B
member device-alias VersaStack-ContA-FE2
member device-alias VersaStack-ContA-FE4
member device-alias VersaStack-ContB-FE2
member device-alias VersaStack-ContB-FE4
exit
zone name  VM-Host-Infra-04-B vsan 102
member device-alias  VM-Host-Infra-04-B
member device-alias VersaStack-ContA-FE2
member device-alias VersaStack-ContA-FE4
member device-alias VersaStack-ContB-FE2
member device-alias VersaStack-ContB-FE4

exit
```

3. Add zones to zoneset.

```
zoneset name versastackzoneset vsan 102
member VM-Host-Infra-01-B
member VM-Host-Infra-02-B

member VM-Host-Infra-03-B
member VM-Host-Infra-04-B
```

4. Activate the zoneset.

```
zoneset activate  name versastackzoneset vsan 102
```

Validate all the HBA's are logged into the MDS switch. The V9000 and the Cisco servers should be powered on. To start the Cisco server's from Cisco UCS Manager, select the server tab, then click Server-Service-Profiles-root, and right click VM-Host-Infra-01 then select boot server.

5. Validate the all powered on systems HBA's are logged into the switch.

```
sh zoneset active
```

```
VersaStack-MDS-B# sh zoneset active vsan 102
zoneset name versastackzoneset vsan 102
  zone name VM-Host-Infra-01-B vsan 102
  * fcid 0xa50203 [pwwn 20:00:00:25:b5:01:0b:2f] [VM-Host-Infra-01-B]
  * fcid 0xa50000 [pwwn 50:05:07:68:0c:22:22:71] [VersaStack-ContA-FE2]
  * fcid 0xa50400 [pwwn 50:05:07:68:0c:52:22:71] [VersaStack-ContA-FE4]
  * fcid 0xa50100 [pwwn 50:05:07:68:0c:22:22:67] [VersaStack-ContB-FE2]
  * fcid 0xa50300 [pwwn 50:05:07:68:0c:52:22:67] [VersaStack-ContB-FE4]

  zone name VM-Host-Infra-02-B vsan 102
  * fcid 0xa50204 [pwwn 20:00:00:25:b5:01:0b:3f] [VM-Host-Infra-02-B]
  * fcid 0xa50000 [pwwn 50:05:07:68:0c:22:22:71] [VersaStack-ContA-FE2]
  * fcid 0xa50400 [pwwn 50:05:07:68:0c:52:22:71] [VersaStack-ContA-FE4]
  * fcid 0xa50100 [pwwn 50:05:07:68:0c:22:22:67] [VersaStack-ContB-FE2]
  * fcid 0xa50300 [pwwn 50:05:07:68:0c:52:22:67] [VersaStack-ContB-FE4]

  zone name VM-Host-Infra-03-B vsan 102
  * fcid 0xa50201 [pwwn 20:00:00:25:b5:01:0b:0f] [VM-Host-Infra-03-B]
  * fcid 0xa50000 [pwwn 50:05:07:68:0c:22:22:71] [VersaStack-ContA-FE2]
  * fcid 0xa50400 [pwwn 50:05:07:68:0c:52:22:71] [VersaStack-ContA-FE4]
  * fcid 0xa50100 [pwwn 50:05:07:68:0c:22:22:67] [VersaStack-ContB-FE2]
  * fcid 0xa50300 [pwwn 50:05:07:68:0c:52:22:67] [VersaStack-ContB-FE4]

  zone name VM-Host-Infra-04-B vsan 102
  * fcid 0xa50202 [pwwn 20:00:00:25:b5:01:0b:1f] [VM-Host-Infra-04-B]
  * fcid 0xa50000 [pwwn 50:05:07:68:0c:22:22:71] [VersaStack-ContA-FE2]
  * fcid 0xa50400 [pwwn 50:05:07:68:0c:52:22:71] [VersaStack-ContA-FE4]
  * fcid 0xa50100 [pwwn 50:05:07:68:0c:22:22:67] [VersaStack-ContB-FE2]
  * fcid 0xa50300 [pwwn 50:05:07:68:0c:52:22:67] [VersaStack-ContB-FE4]
VersaStack-MDS-B#
```

6. Save the configuration.

```
copy run start
```

Storage LUN Mapping

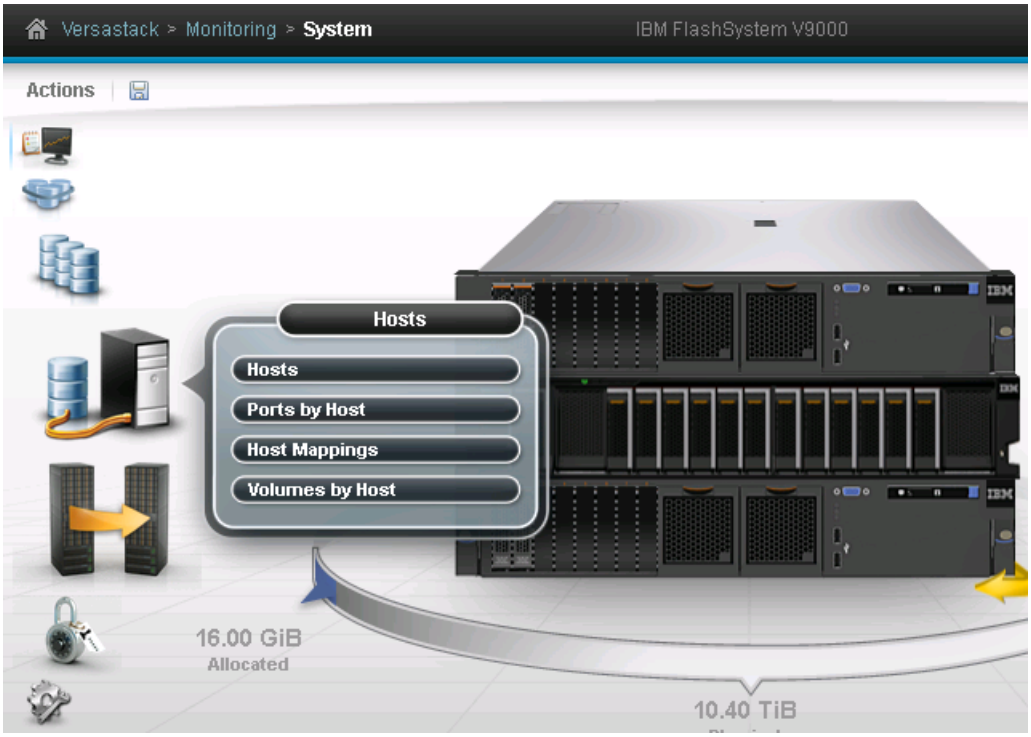
In this section we will be adding the host mappings for the host profiles created through Cisco UCS Manager to the V9000 storage, connecting to the boot LUNs, and doing the initial ESXi install. The WWPN's for the hosts will be required to complete this section.

Adding Hosts and Mapping the Boot Volumes on the IBM FlashSystem V9000

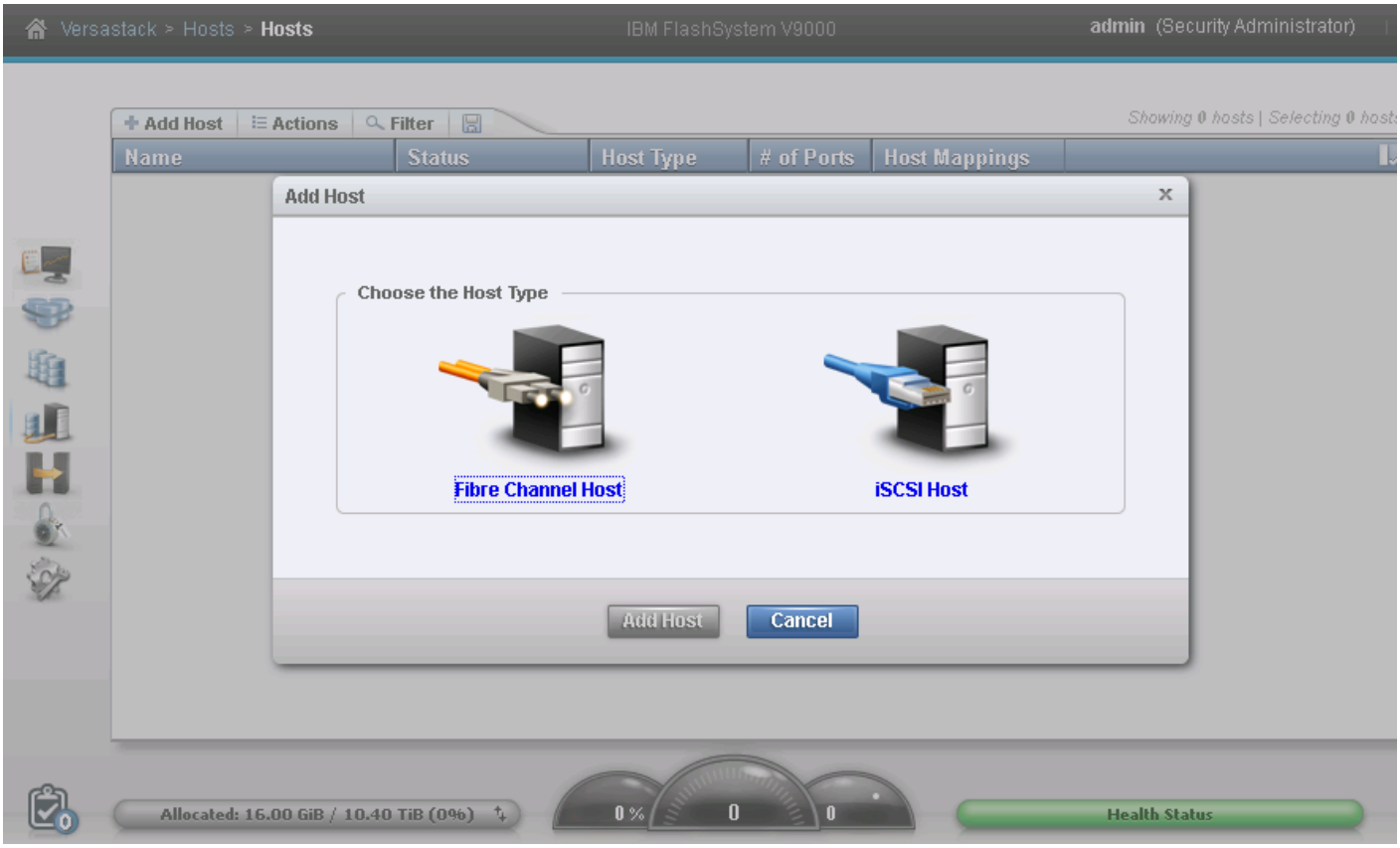
To add hosts and map the boot volumes, complete the following steps:

1. Open the FlashSystem V9000 management GUI by navigating to <<var_cluster_mgmt_ip>>and log in with your superuser or admin account.

2. In the left pane click Host icon, and click the Hosts menu item.



3. Click Add Host in the upper left menu to bring up the Host wizard. Select the Fiber Channel Host option.



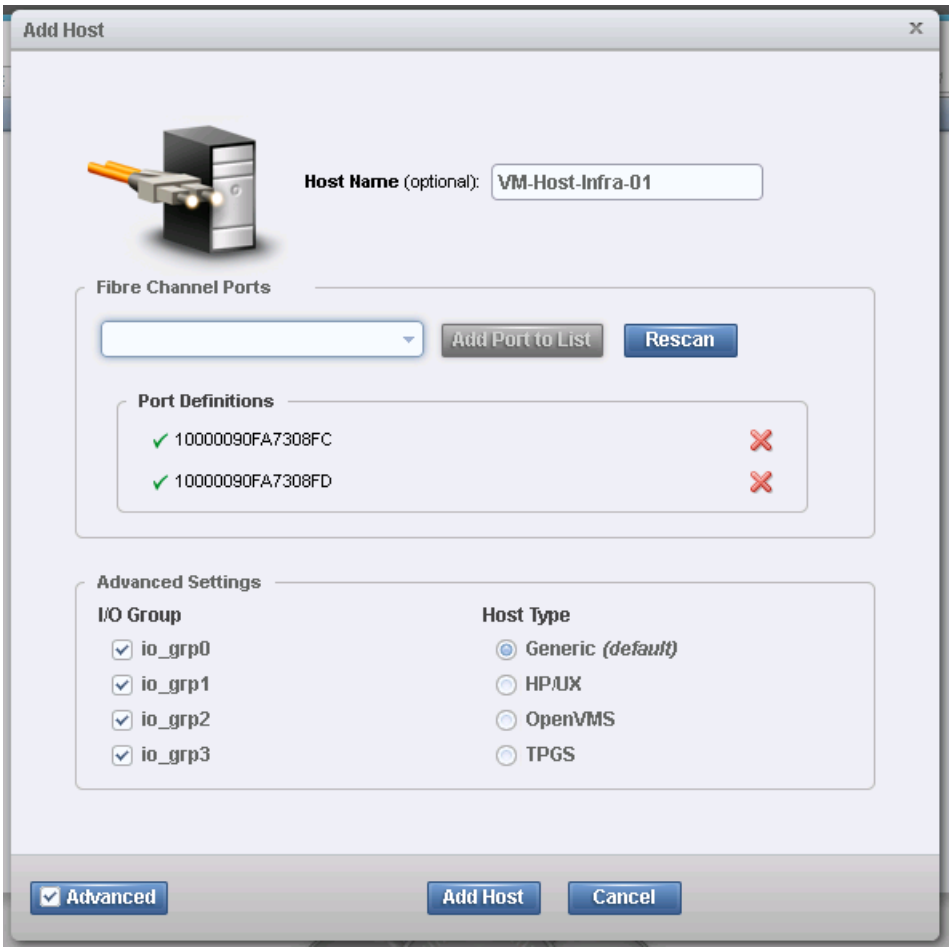
4. Input Host Name VM-Host-Infra-01.

5. For Fibre Channel Ports open the drop-down menu and select or input the WWPN's for the A path vHBA's, <<var_wwpn_VM-Host-infra-01-a>>, and click Add Port to List.

6. Click the drop-down menu again, and select or Input the host B port , <<wwpn_VM-Host-infra-01-b>>, and click add port to list.

7. Leave Advanced Settings as default and click Add Host, then click Close.

If the Hosts are powered on and zoned correctly, they will appear in the selection drop-down or if you type in the WWPN, you should see green check marks for each WWPN's.



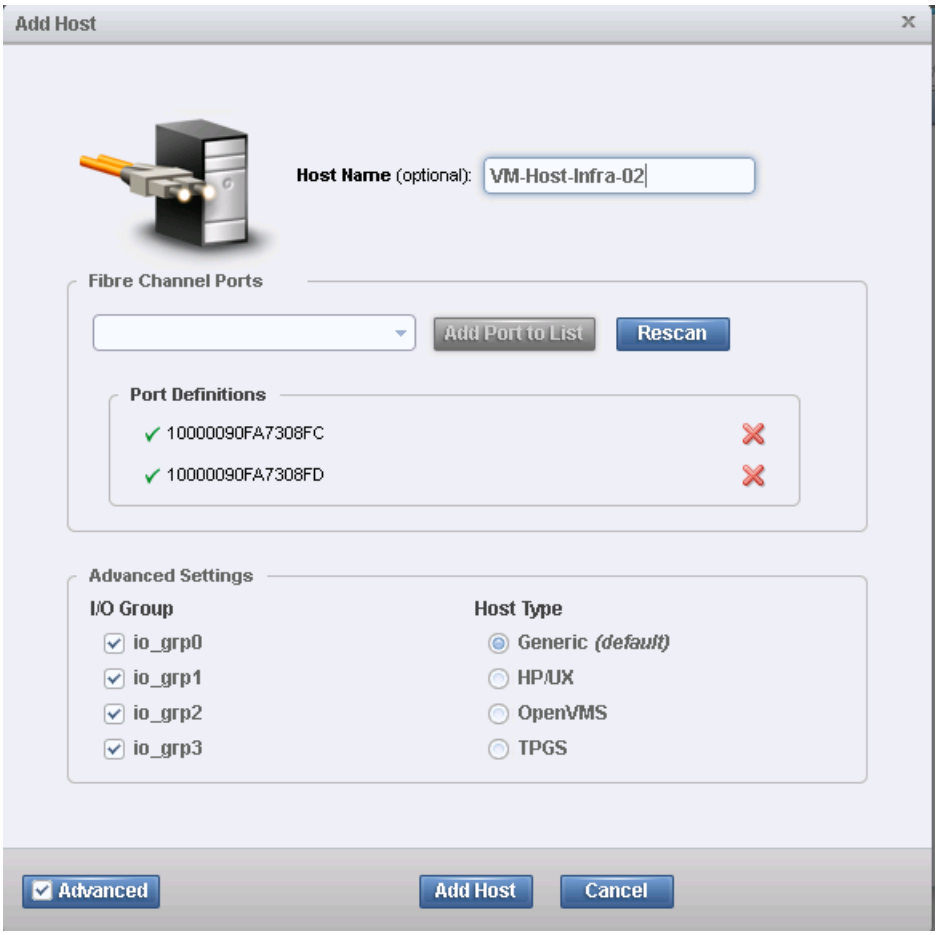
8. Click Add Host to create the 2nd host.

9. Select the Fiber Channel Host option.

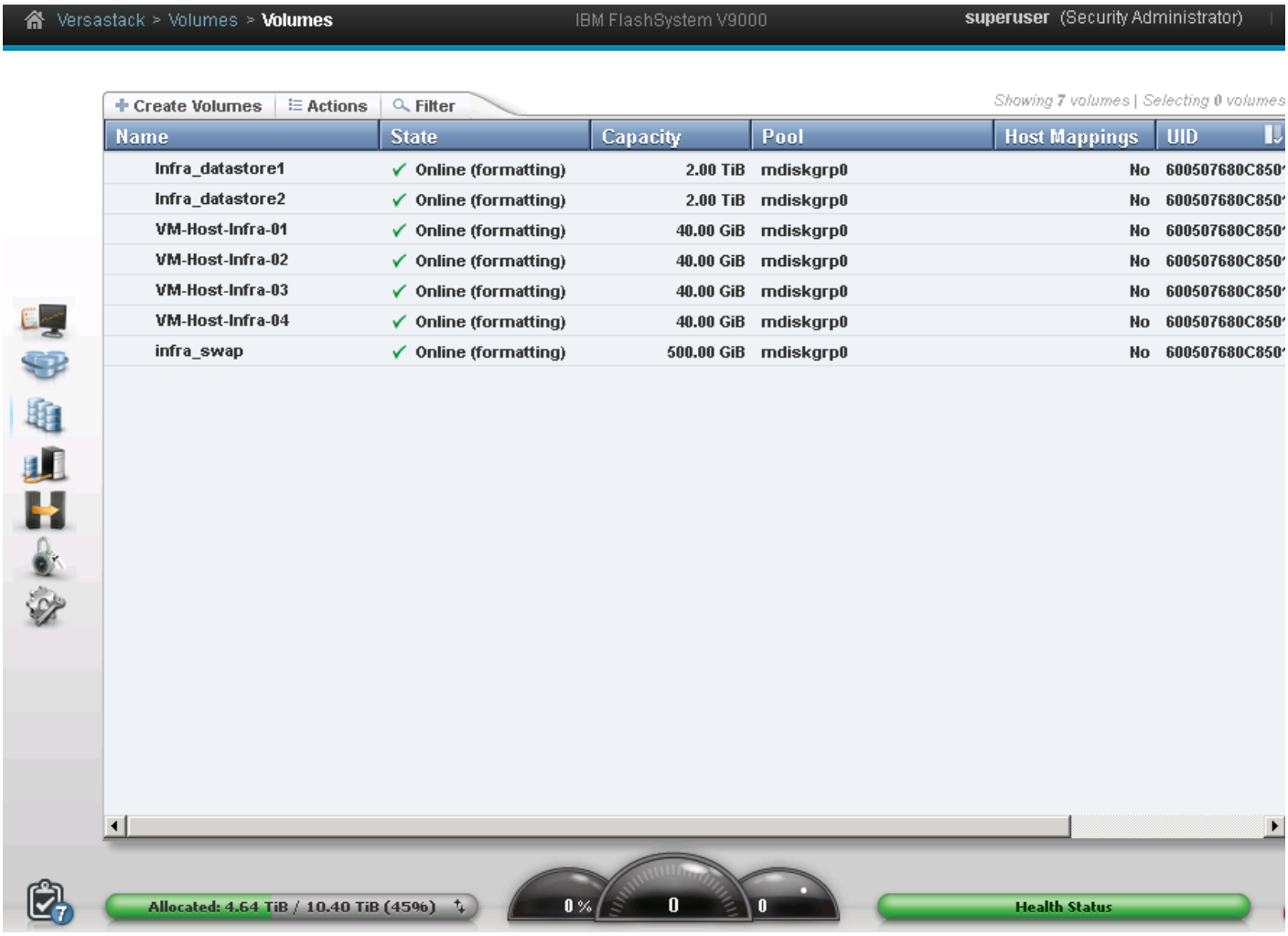
10. For Host Name input VM-Host-Infra-02.

11. For Fibre Channel Ports open the drop-down menu and select the WWPN's for the A path vHBA's, <<var_wwpn_VM-Host-infra-02-a>>, and click Add Port to List.

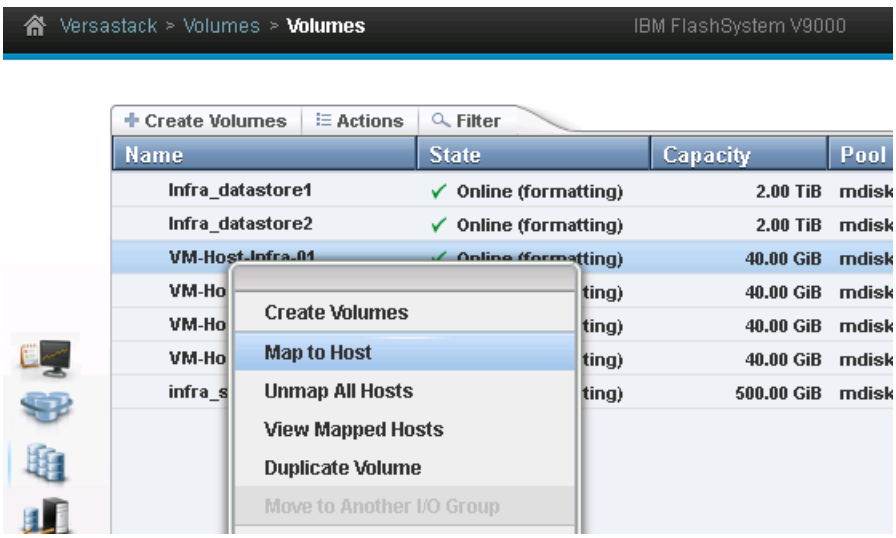
12. Select the B port by selecting the var for the B path, <<wwpn_VM-Host-infra-02-b>>, and click Add Port To List. Leave the Advanced Settings as default and click Add Host, then click Close.



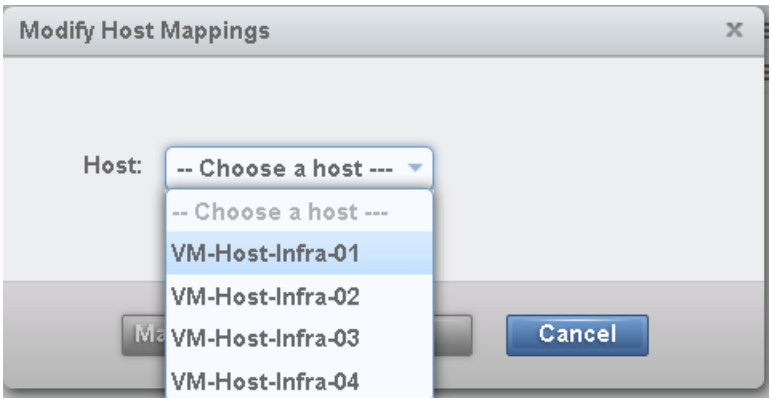
13. Click the Volumes icon in the left pane, then click the volumes menu item to display the created volumes.



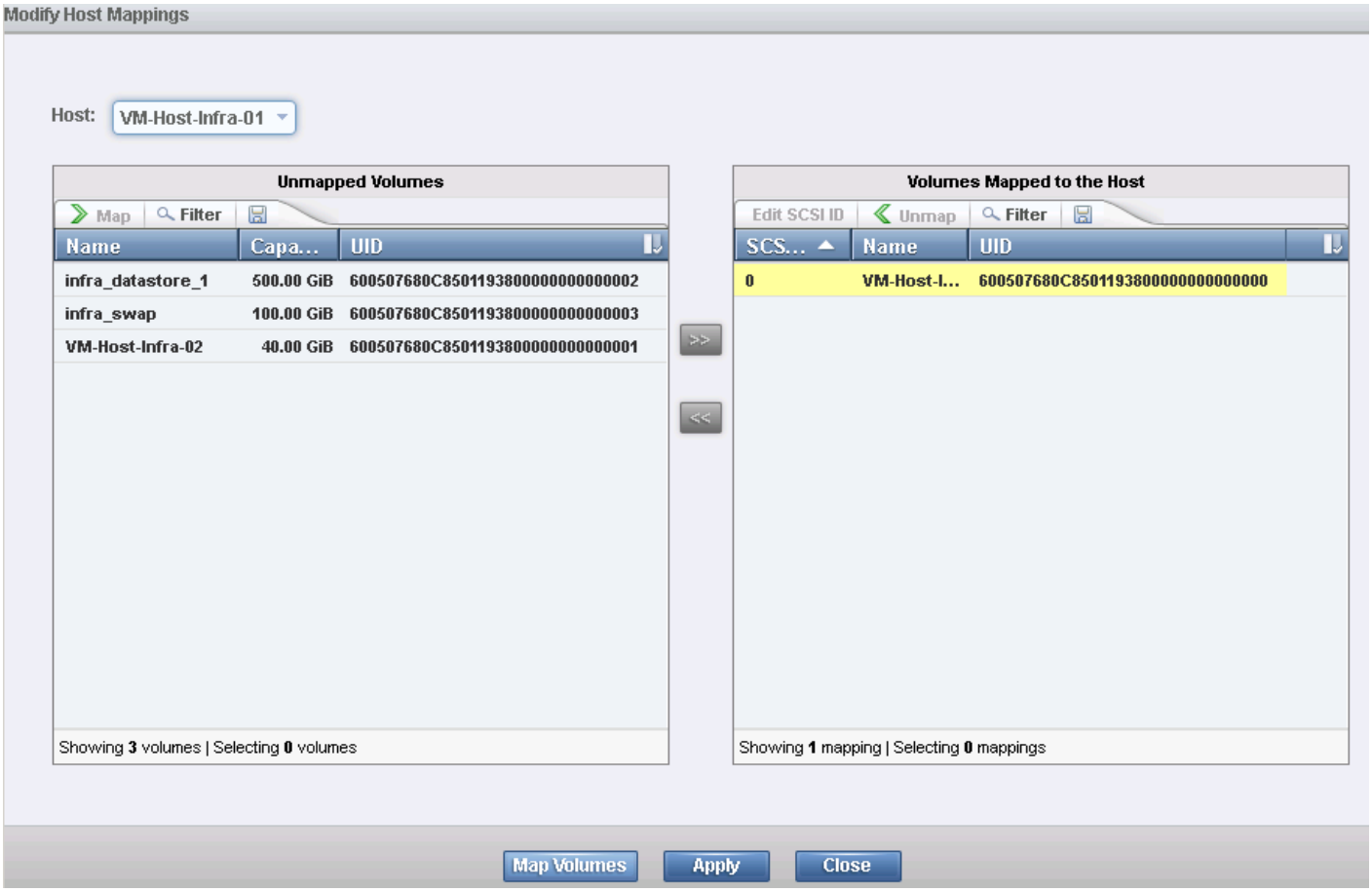
14. Right-click the volume VM-Host-Infra-01 and select Map to Host.



15. In the drop-down, leave ALL I/O Groups enabled, and select VM-Host-Infra-01.

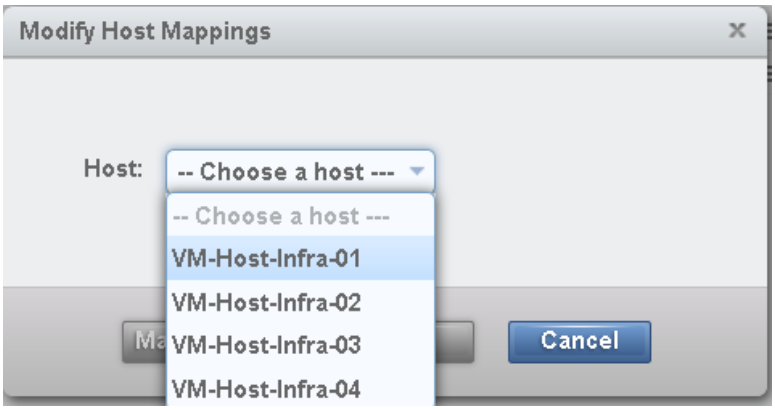


16. Select Map Volumes then click Close.

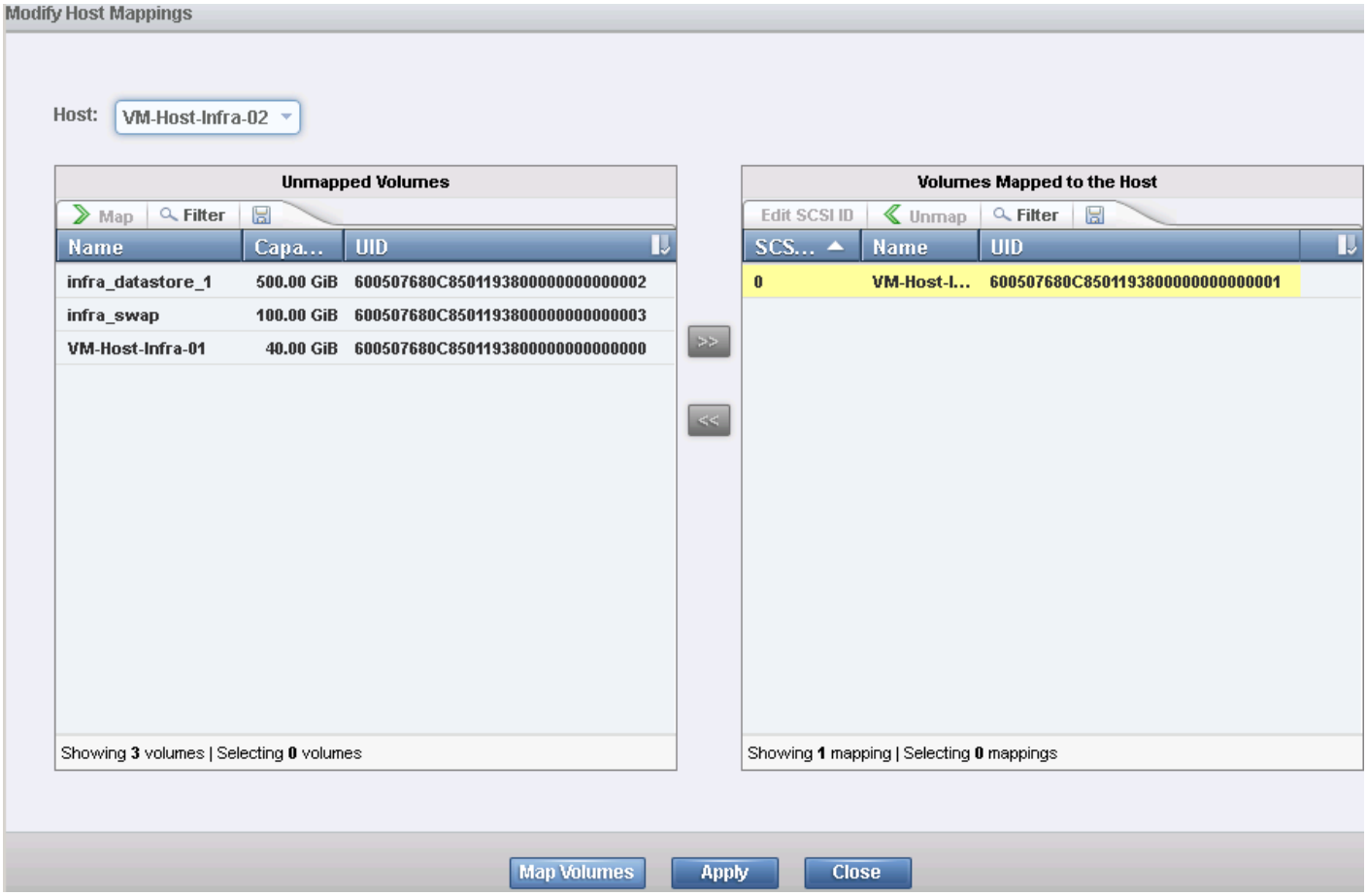


17. Right-click the volume VM-Host-Infra-02 and click Map to host.

18. In the drop-down, leave ALL I/O Groups enabled, and select VM-Host-Infra-02.



19. Select Map Volumes, then click Close.



20. Repeat these steps for the other hosts in the environment.

ESX and vSphere Installation and Setup

VersaStack VMware ESXi 5.5 Update 2 SAN Boot Installation

This section provides detailed instructions for installing VMware ESXi 5.5 Update 2 in a VersaStack environment. After the procedures are completed, two San-booted ESXi hosts will be provisioned. These deployment procedures are customized to include the environment variables.

Several methods exist for installing ESXi in a VMware environment. These procedures focus on how to use the built-in Keyboard, Video, Mouse (KVM) console and virtual media features in Cisco UCS Manager to map remote installation media to individual servers and connect to their boot logical unit numbers (LUNs). In this Method, we are using the Cisco Custom ESXi 5.5 U2 GA ISO file which is downloaded from the URL below. This is required for this procedure as it contains custom Cisco drivers and thereby reduces installation steps.

https://my.vmware.com/web/vmware/details?downloadGroup=OEM-ESXI55U2-CISCO&productId=353

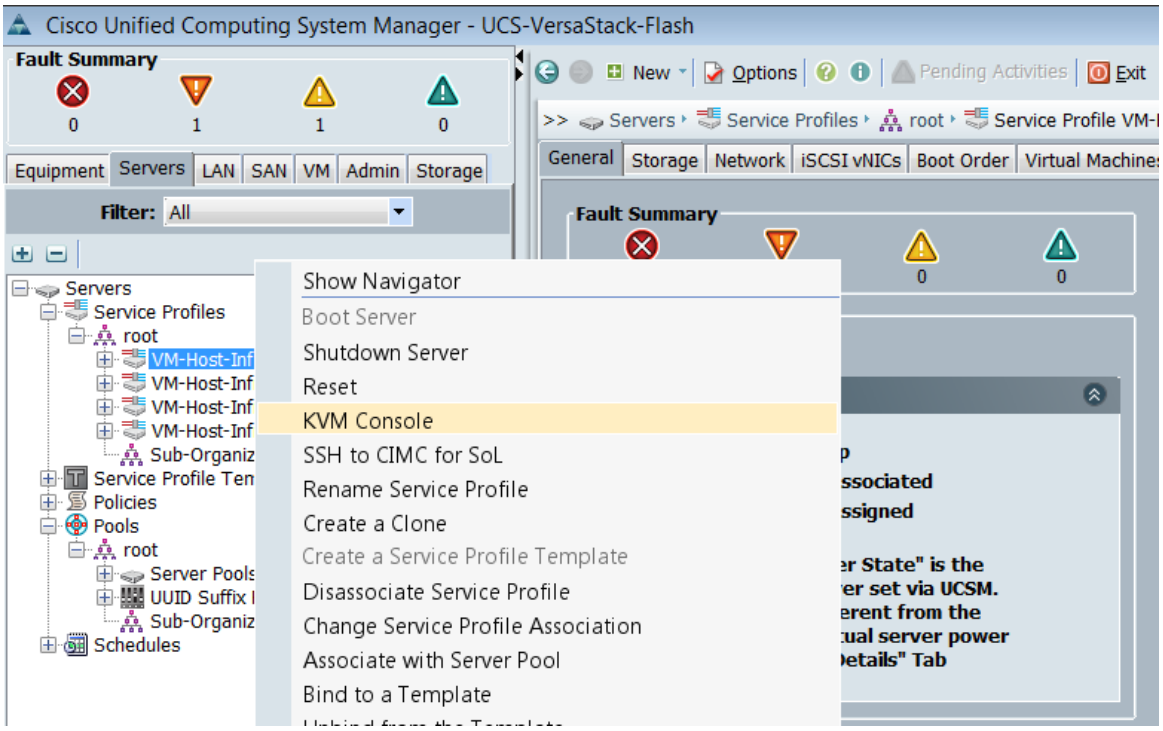
Log in to Cisco UCS 6200 Fabric Interconnect

Cisco UCS Manager

The IP KVM enables the administrator to begin the installation of the operating system (OS) through remote media. It is necessary to log in to the UCS environment to run the IP KVM.

To log in to the Cisco UCS environment, complete the following steps:

1. Download the Cisco Custom ISO for ESXi from the VMware website.
2. Open a web browser and enter the IP address for the Cisco UCS cluster address. This step launches the Cisco UCS Manager application.
3. Log in to Cisco UCS Manager by using the admin user name and password.
4. From the main menu, click the Servers tab.
5. Select Servers > Service Profiles > root > VM-Host-Infra-01.
6. Right-click VM-Host-Infra-01 and select KVM Console.
7. Select Servers > Service Profiles > root > VM-Host-Infra-02.
8. Right-click VM-Host-Infra-02 and select KVM Console Actions > KVM Console.
9. Repeat these steps for other servers.



VMware ESXi Installation

ESXi Hosts VM-Host-Infra-01 and VM-Host-Infra-02

To prepare the server for the OS installation, complete the following steps on each ESXi host:

1. In the KVM window, click Virtual Media.
2. Click Activate Virtual Devices, select Accept this Session, then Apply.
3. Select Virtual Media, Map CD/DVD, then browse to the ESXi installer ISO image file and click Open.
4. Select the Map Device to map the newly added image.

5. Select Reset, then Ok and allow a power cycle and click the KVM tab to monitor the server boot.
6. As an alternate method if the server is powered on, first shutdown the server, then boot the server by selecting Boot Server and clicking OK, then click OK again.

Install ESXi

ESXi Hosts VM-Host-Infra-01,VM-Host-Infra-02,VM-Host-Infra-03 and VM-Host-Infra-04

To install VMware ESXi to the SAN-bootable LUN of the hosts, complete the following steps on each host:

1. On boot, the machine detects the presence of the ESXi installation media. Select the ESXi installer from the menu that is displayed.
2. After the installer is finished loading, press Enter to continue with the installation.
3. Read and accept the end-user license agreement (EULA). Press F11 to accept and continue.
4. Select the IBM LUN that was previously set up as the installation disk for ESXi and press Enter to continue with the installation.
5. Select the appropriate keyboard layout and press Enter.
6. Enter and confirm the root password and press Enter.
7. The installer issues a warning that existing partitions will be removed from the volume. Press F11 to continue with the installation.
8. After the installation is completes, hitting Enter will reboot the server. The ISO is automatically unmapped

Set Up Management Networking for ESXi Hosts

Adding a management network for each VMware host is necessary for managing the host. To add a management network for the VMware hosts, complete the following steps on each ESXi host.

ESXi Host VM-Host-Infra-01

To configure the VM-Host-Infra-01 ESXi host with access to the management network, complete the following steps:

1. After the server has finished rebooting, press F2 to customize the system.
2. Log in as root and enter the corresponding password.
3. Select the Configure the Management Network option and press Enter.
4. Select the VLAN (Optional) option and press Enter.
5. Enter the <<var_ib-mgmt_vlan_id>> and press Enter.
6. From the Configure Management Network menu, select IP Configuration and press Enter.
7. Select the Set Static IP Address and Network Configuration option by using the space bar.
8. Enter the IP address for managing the first ESXi host: <<var_vm_host_infra_01_ip>>.
9. Enter the subnet mask for the first ESXi host.

10. Enter the default gateway for the first ESXi host.
11. Press Enter to accept the changes to the IP configuration.
12. Select the IPv6 Configuration option and press Enter.
13. Using the spacebar, unselect Enable IPv6 (restart required) and press Enter.
14. Select the DNS Configuration option and press Enter.

Because the IP address is assigned manually, the DNS information must also be entered manually.

15. Enter the IP address of the primary DNS server.
16. Optional: Enter the IP address of the secondary DNS server.
17. Enter the fully qualified domain name (FQDN) for the first ESXi host.
18. Press Enter to accept the changes to the DNS configuration.
19. Press Esc to exit the Configure Management Network submenu.
20. Press Y to confirm the changes and restart the host.
21. The ESXi host reboots. After reboot, press F2 and log back in as root.
22. Select Test Management Network to verify that the management network is set up correctly and press Enter.
23. Press Enter to run the test.
24. Press Enter to exit the window.
25. Press Esc to log out of the VMware console.

ESXi Host VM-Host-Infra-02

To configure the VM-Host-Infra-02 ESXi host with access to the management network, complete the following steps:

1. After the server has finished rebooting, press F2 to customize the system.
2. Log in as root and enter the corresponding password.
3. Select the Configure the Management Network option and press Enter.
4. Select the VLAN (Optional) option and press Enter.
5. Enter the <<var_ib-mgmt_vlan_id>> and press Enter.

6. From the Configure Management Network menu, select IP Configuration and press Enter.
7. Select the Set Static IP Address and Network Configuration option by using the space bar.
8. Enter the IP address for managing the second ESXi host: <<var_vm_host_infra_02_ip>>.
9. Enter the subnet mask for the second ESXi host.
10. Enter the default gateway for the second ESXi host.
11. Press Enter to accept the changes to the IP configuration.
12. Select the IPv6 Configuration option and press Enter.
13. Using the spacebar, unselect Enable IPv6 (restart required) and press Enter.
14. Select the DNS Configuration option and press Enter.

Because the IP address is assigned manually, the DNS information must also be entered manually.

15. Enter the IP address of the primary DNS server.
16. Optional: Enter the IP address of the secondary DNS server.
17. Enter the FQDN for the second ESXi host.
18. Press Enter to accept the changes to the DNS configuration.
19. Press Esc to exit the Configure Management Network submenu.
20. Press Y to confirm the changes and restart the host.
21. The ESXi host reboots. After reboot, press F2 and log back in as root.
22. Select Test Management Network to verify that the management network is set up correctly and press Enter.
23. Press Enter to run the test.
24. Press Enter to exit the window.
25. Press Esc to log out of the VMware console.
26. Repeat the above procedure to configure VM-Host-Infra-03 and VM-Host-Infra-04 ESXi hosts.

vSphere Setup and ESXi configuration

In this section we will set up the VSphere environment using Windows 2008 and SQL server. The Virtual machines used in this procedure will be installed on a local Datastore one VersaStack for any Greenfield

deployments, however these could be install on a different ESX clustered system or physical hardware if desired. This procedure will use the volumes previously created for VMFS Datastores.

Download VMware vSphere Client and vSphere Remote CLI

To download the VMware vSphere Client and install Remote CLI, complete the following steps:

1. Open a web browser on the management workstation and navigate to the VM-Host-Infra-01 management IP address.
2. Download and install both the vSphere Client and the Windows version of vSphere Remote Command Line.

These applications are downloaded from the VMware website and Internet.

Log in to VMware ESXi Hosts Using VMware vSphere Client

ESXi Host VM-Host-Infra-01

To log in to the `VM-Host-Infra-01` ESXi host by using the VMware vSphere Client, complete the following steps:

1. Open the recently downloaded VMware vSphere Client and enter the IP address of VM-Host-Infra-01 as the host you are trying to connect to:<<var_vm_host_infra_01_ip>>.
2. Enter root for the user name.
3. Enter the root password.
4. Click Login to connect.

ESXi Host VM-Host-Infra-02

To log in to the `VM-Host-Infra-02` ESXi host by using the VMware vSphere Client, complete the following steps:

1. Open the recently downloaded VMware vSphere Client and enter the IP address of VM-Host-Infra-02 as the host you are trying to connect to: <<var_vm_host_infra_02_ip>>.
2. Enter root for the user name.
3. Enter the root password.
4. Click Login to connect.
5. Login to VM-Host-Infra-03 and VM-Host-Infra-04 as per the above procedure.

Set Up VMkernel Ports and Virtual Switch

ESXi Host VM-Host-Infra-01

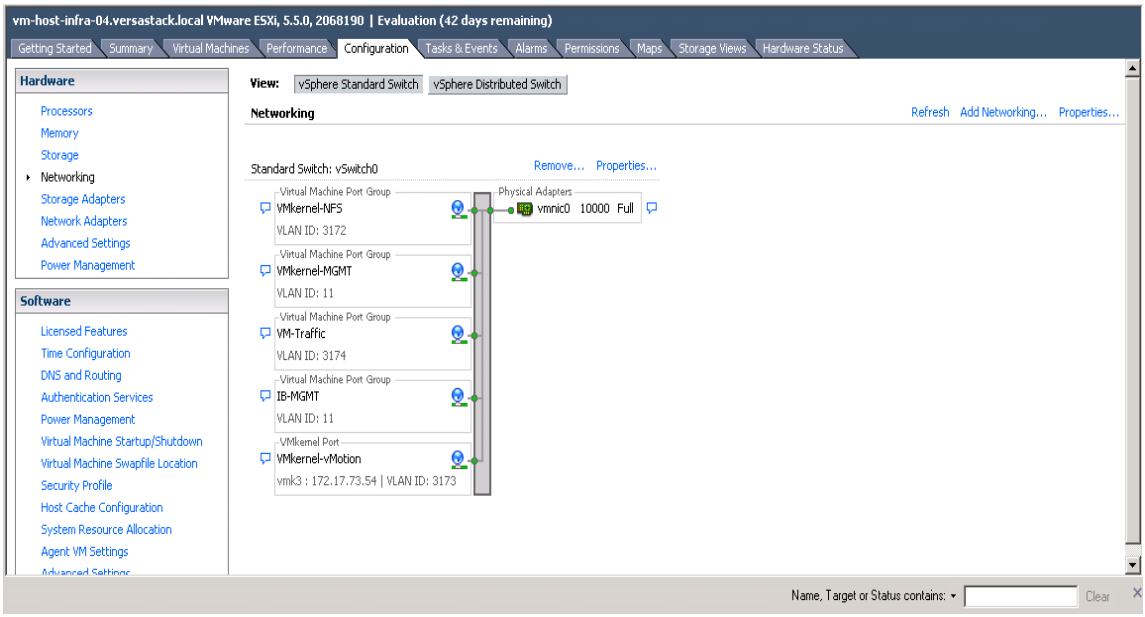
Repeat the steps in this section for all the ESXi Hosts.

To set up the VMkernel ports and the virtual switches on the `VM-Host-Infra-01` ESXi host, complete the following steps:

1. From each vSphere Client, select the host in the inventory.
2. Click the Configuration tab.
3. Click Networking in the Hardware pane.
4. Click Properties on the right side of vSwitch0.
5. Select the vSwitch configuration and click Edit.
6. From the General tab, change the MTU to 9000.
7. Click OK to close the properties for vSwitch0.
8. Select the Management Network configuration and click Edit.
9. Change the network label to VMkernel-MGMT and select the Management Traffic checkbox.
10. Click OK to finalize the edits for Management Network.
11. Select the VM Network configuration and click Edit.
12. Change the network label to IB-MGMT Network and enter <<var_ib-mgmt_vlan_id>> in the VLAN ID (Optional) field.
13. Click OK to finalize the edits for VM Network.
14. Click Add to add a network element.
15. Select VMkernel and click Next.
16. Change the network label to VMkernel-NFS and enter <<var_nfs_vlan_id>> in the VLAN ID (Optional) field.
17. Click Next to continue with the NFS VMkernel creation.
18. Enter the IP address <<var_nfs_vlan_id_ip_host-01>> and the subnet mask <<var_nfs_vlan_id_mask_host01>> for the NFS VLAN interface for VM-Host-Infra-01.
19. Click Next to continue with the NFS VMkernel creation.

20. Click Finish to finalize the creation of the NFS VMkernel interface.
21. Select the VMkernel-NFS configuration and click Edit.
22. Change the MTU to 9000.
23. Click OK to finalize the edits for the VMkernel-NFS network.
24. Click Add to add a network element.
25. Select VMkernel and click Next.
26. Change the network label to VMkernel-vMotion and enter <<var_vmotion_vlan_id>> in the VLAN ID (Optional) field.
27. Select the Use This Port Group for vMotion checkbox.
28. Click Next to continue with the vMotion VMkernel creation.
29. Enter the IP address <<var_vmotion_vlan_id_ip_host-01>> and the subnet mask <<var_vmotion_vlan_id_mask_host-01>> for the vMotion VLAN interface for VM-Host-Infra-01.
30. Click Next to continue with the vMotion VMkernel creation.
31. Click Finish to finalize the creation of the vMotion VMkernel interface.
32. Select the VMkernel-vMotion configuration and click Edit.
33. Change the MTU to 9000.
34. Click OK to finalize the edits for the VMkernel-vMotion network.
35. Click add and select Virtual Machine Network, then click Next.
36. Change the network label to VM-Traffic and enter <<var_vmtraffic_vlan_id>> in the VLAN ID (Optional) field
37. Click next, click finish to complete the creation of the VM-traffic network.
38. Close the dialog box to finalize the ESXi host networking setup.

This procedure uses 1 physical adapter (vmnic0) assigned to the vSphere Standard Switch (vSwitch0). If you plan to implement the 1000V Distributed Switch later in this document, this is sufficient. If your environment will be using the vSphere Standard Switch, you must assign another physical adapter to the switch. Click the properties of Vswitch0 on the configuration networking tab, click the Network Adapters tab, click Add, select vmnic1, click Next, click Next, click Finish, and click Close.



Map Required VMFS Datastores

Map the VMFS Datastores to the First ESXi Host

To map the VMFS datastores to the first ESXi host, complete the following steps:

The second Host will be mapped when the cluster is created.

---

1. Log in to the IBM FlashSystem V9000 management GUI.
2. Select the volumes icon on the left side screen and click the Volumes menu item.
3. Right-click the infra_datastore_1 volume and click map to host
4. Choose host VM-Host-Infra-1, leave All I/O Groups selected then click map volumes , then close
5. Right-click the infra_swap volume and click map to host
6. Choose host VM-Host-Infra-1, leave All I/O Groups selected then click map volumes, then close

ESXi Hosts VM-Host-Infra-01

To mount the required datastores, complete the following steps on the first ESXi host:

1. From the vSphere Client, select the host VM-Host-Infra-01 in the inventory.
2. Click the Configuration tab to enable configurations.
3. Click Storage in the Hardware pane.
4. From the Datastore area, click Add Storage to open the Add Storage wizard.

5. Select Disk/LUN and click Next.
6. Select the 2TB Datastore LUN and click Next.
7. Accept default VMFS setting and click Next.
8. Click Next for the disk layout.
9. Enter infra_datastore_1 as the datastore name.
10. Click Next to retain maximum available space.
11. Click Finish.
12. Click Add Storage to open the Add Storage wizard.
13. Select Disk/LUN and click Next.
14. Select the 500GB swap LUN and click Next.
15. Accept default VMFS setting and click Next.
16. Click Next for the disk layout.
17. Enter infra_swap as the datastore name.
18. Click Next to retain maximum available space.
19. Click Finish.

ESXi Hosts VM-Host-Infra-01, VM-Host-Infra-02, VM-Host-Infra-03 and VM-Host-Infra-04

To configure Network Time Protocol (NTP) on the ESXi hosts, complete the following steps on each host:

1. From each vSphere Client, select the host in the inventory.
2. Click the Configuration tab to enable configurations.
3. Click Time Configuration in the Software pane.
4. Click Properties at the upper right side of the window.
5. At the bottom of the Time Configuration dialog box, click Options.
6. In the NTP Daemon Options dialog box, complete the following steps:
    a. Click General in the left pane and select Start and stop with host.
    b. Click NTP Settings in the left pane and click Add.
    c. In the Add NTP Server dialog box, enter <<var_global_ntp_server_ip>> as the IP address of the NTP server and click OK.

d. In the NTP Daemon Options dialog box, select the Restart NTP Service to Apply Changes check-box and click OK.

7. In the Time Configuration dialog box, complete the following steps:

   a. Select the NTP Client Enabled checkbox and click OK.

   b. Verify that the clock is now set to approximately the correct time.

The NTP server time may vary slightly from the host time.

VersaStack VMware vCenter 5.5 Update 2

The procedures in the following subsections provide detailed instructions to install VMware vCenter 5.5 Update 2 in a VersaStack environment. After the procedures are completed, a VMware vCenter Server will be configured along with a Microsoft SQL Server database to provide database support to vCenter. These deployment procedures are customized to include the environment variables.

This procedure focuses on the installation and configuration of an external Microsoft SQL Server 2012 R2 database, but other types of external databases are also supported by vCenter. To use an alternative database, refer to the VMware vSphere 5.5 documentation.

To install VMware vCenter 5.5 Update 2, an accessible Windows Active Directory® (AD) Domain is necessary. If an existing AD Domain is not available, an AD virtual machine, or AD pair, can be set up in this VersaStack environment. Refer to the Appendix.

Build Microsoft SQL Server VM

ESXi Host VM-Host-Infra-01

To build a SQL Server virtual machine (VM) for the VM-Host-Infra-01 ESXi host, complete the following steps:

1. Log in to the host by using the VMware vSphere Client.
2. In the vSphere Client, select the host in the inventory pane.
3. Right-click the host and select New Virtual Machine.
4. Select Custom and click Next.
5. Enter a name for the VM. Click Next.
6. Select infra_datastore_1. Click Next.
7. Select Virtual Machine Version, Click Next.
8. Verify that the Windows option and the Microsoft Windows Server® 2012 R2 (64-bit) version are select-ed. Click Next.
9. Select two virtual sockets and one core per virtual socket. Click Next.

10. Select 8GB of memory. Click Next.
11. Select one network interface card (NIC).
12. For NIC 1, select the IB-MGMT Network option and the VMXNET 3 adapter. Click Next.
13. Keep the LSI Logic SAS option for the SCSI controller selected. Click Next.
14. Keep the Create a New Virtual Disk option selected. Click Next.
15. Make the disk size at least 80GB. Click Next.
16. Click Next.
17. Select the checkbox for Edit the Virtual Machine Settings Before Completion. Click Continue.
18. Click the Options tab.
19. Select Boot Options.
20. Select the Force BIOS Setup checkbox.
21. Click Finish.
22. From the left pane, expand the host field by clicking the plus sign (+).
23. Right-click the newly created SQL Server VM and click Open Console.
24. Click the third button (green right arrow) to power on the VM.
25. Click the ninth button (CD with a wrench) to map the Windows Server 2012 R2 ISO, and then select Connect to ISO Image on Local Disk.
26. Navigate to the Windows Server 2012 R2 ISO, select it, and click Open.
27. Click in the BIOS Setup Utility window and use the right arrow key to navigate to the Boot menu. Use the down arrow key to select CD-ROM Drive. Press the plus (+) key twice to move CD-ROM Drive to the top of the list. Press F10 and Enter to save the selection and exit the BIOS Setup Utility.
28. The Windows Installer boots. Select the appropriate language, time and currency format, and keyboard. Click Next.
29. Click Install Now.
30. Make sure that the Windows Server 2012 R2 Standard (Full Installation) option is selected. Click Next.
31. Read and accept the license terms and click Next.
32. Select Custom (Advanced). Make sure that Disk 0 Unallocated Space is selected. Click Next to allow the Windows installation to complete.

33. After the Windows installation is complete and the VM has rebooted, click OK to set the Administrator password.
34. Enter and confirm the Administrator password and click the blue arrow to log in. Click OK to confirm the password change.
35. After logging in to the VM desktop, from the VM console window, select the VM menu. Under Guest, select Install/Upgrade VMware Tools. Click OK.
36. Click OK “Installing the VMware tools package will greatly enhance graphics and mouse performance in your virtual machine.”
37. If prompted to eject the Windows installation media before running the setup for the VMware tools, click OK, then click OK.
38. In the dialog box, select Run setup64.exe.
39. In the VMware Tools installer window, click Next.
40. Make sure that Typical is selected and click Next.
41. Click Install.
42. Click Finish.
43. Click Yes to restart the VM.
44. After the reboot is complete, select the VM menu. Under Guest, select Send Ctrl+Alt+Del and then enter the password to log in to the VM.
45. Set the time zone for the VM, IP address, gateway, and host name.
46. If Necessary, activate Windows.
47. Log back in to the VM and download and install all required Windows updates.

This process requires several reboots.

Install Microsoft SQL Server 2012 R2

vCenter SQL Server VM

In our setup, we have enabled Remote Desktop connection on the server to simplify the following procedure. To install SQL Server on the vCenter SQL Server VM, complete the following steps:

1. Connect to an AD Domain Controller in the Windows Domain and add an admin user in Active Directory Users and Computer tool. This user should be member of the Domain Administrator Security Group.
2. Log into the vCenter SQL Server VM as the admin user.

3. Navigate to the c: drive and create a new folder called database.
4. Click Manage and then select Add Roles and Features to start the Add roles and Features Wizard.
5. Click Next.
6. On the Select installation screen, select Role-based or feature-based installation.
7. Select target Server and click Next.
8. Click Next on Server Roles.
9. On the Select Features screen, check the box .Net Framework 3.5 Features and click Next.
10. On the Confirm installation selections screen, a warning will be displayed asking Do you need to specify an alternate source path?. If the target computer does not have access to Windows Update, click the Specify an alternate source path link to specify the path to the \sources\sxs folder on the installation media and then click OK. After you have specified the alternate source, or if the target has access to Windows update, click the X next to the warning, and then click Install.
11. Click Close.
12. Open Server Manager click on Tools and then select Windows Firewall with Advanced Security.
13. Choose Inbound Rules and click New Rule.
14. Choose Port and click Next.
15. Choose TCP and enter specific local port 1433. Click Next.
16. Choose Allow the Connection. Click Next, and the click Next again.
17. Name the rule SQL Server and click Finish.
18. Close the Windows Firewall with Advanced Security.
19. In the vCenter SQL Server VMware console, click the ninth button (CD with a wrench) to map the Microsoft SQL Server 2012 SP1 ISO. Choose Connect to ISO Image on Local Disk.
20. Navigate to the SQL Server 2012 SP1, select it, and click open.
21. In the dialog box, click Run Setup.exe.
22. In the SQL Server Installation Center window, click Installation on the left.
23. Click on New SQL Server stand-alone installation or add features to an existing installation.
24. On Setup Support Rules screen, click OK.
25. Choose Enter the Product Key. Enter a product key and click Next.

26. Read and accept the license terms and choose whether to check the second check box. Click Next.
27. On the Product Updates screen, Click Next.
28. Click Show details>> Address any warning except for the Windows Firewall Warning. Click Next on Set-up Support Rules screen.

The Windows Firewall issue was addressed in Step 16.

29. Choose SQL Server Feature Installation and click Next on the Setup Role screen.
30. Under Instance Features, Choose Only Database Engine Services.
31. Under Shared Features, choose Management Tools > Basic and Management Tools > Complete and click Next.
32. On the Installation Rules screen click Show details>> Address any warning and click Next
33. Keep the Default instance selected. Click Next.
34. Click Next on the Disk Space Requirements screen.
35. For the SQL Server Agent Service and SQL Server Database Engine choose the first cell in the account Name column and then click <<Browse...>>.
36. Enter the local Machine Administrator name (for example, systemname\Administrator), Click Check names, and click OK.
37. In the password field enter your password.
38. Change the startup type for SQL Server Agent to Automatic, and Click Next.
39. Choose Mixed Mode (SQL Server and Windows Authentication. Enter and confirm the password for the SQL Server System Administrator (sa) account, click Add Current User, and click Next.
40. Choose whether to send error reports to Microsoft and click Next.
41. On the Installation Configuration Rules screen, Click Show details>> Address any warning. Click Next.
42. Click Install.
43. After the installation is complete, click Close.
44. Close the SQL Server Installation Center.
45. Install all available Microsoft updates by going to Control Panel and select Windows Updates.
46. Open SQL Server Management Studio.

47. Under Server Name, choose the local machine name. Under Authentication, choose SQL Server Authentication. Enter sa in the Login field and enter the sa password. Click Connect.

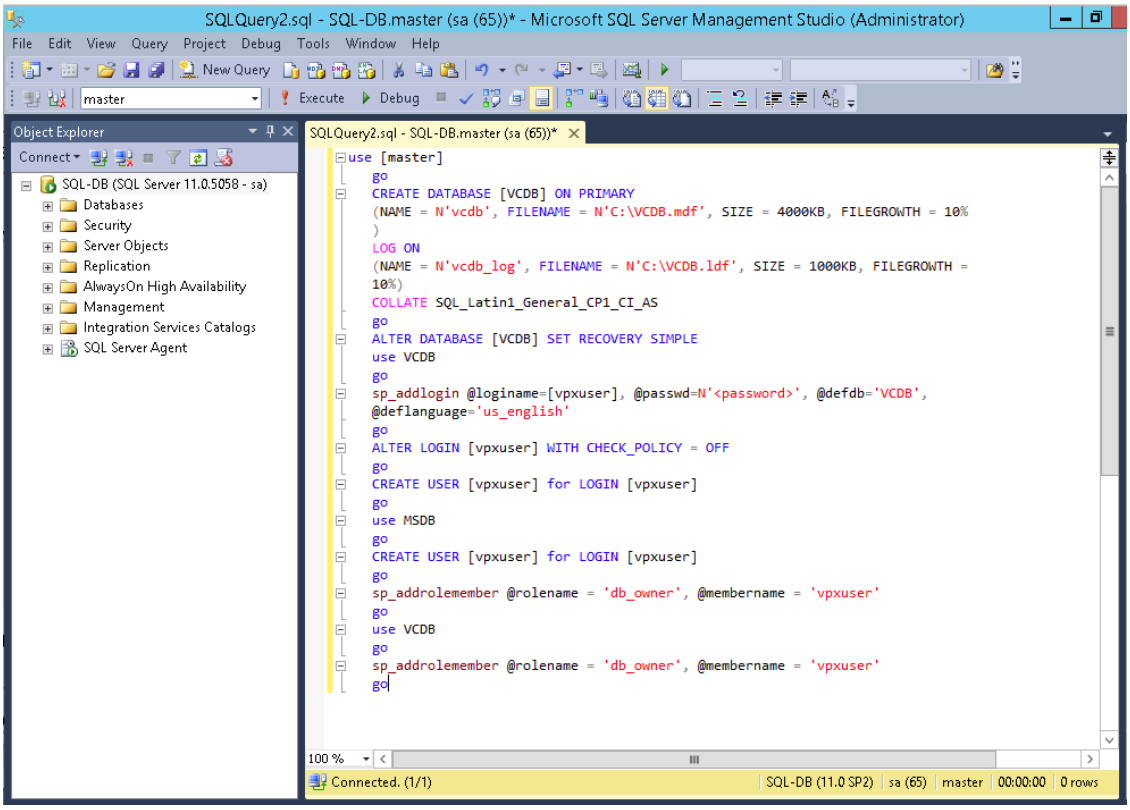
48. Click New Query on the toolbar.

49. Run the following script, substituting the vpxuser password for <Password>:

```
use [master]
go
CREATE DATABASE [VCDB] ON PRIMARY
(NAME = N'vcdb', FILENAME = N'C:\VCDB.mdf', SIZE = 40000KB, FILEGROWTH = 10% )
LOG ON
(NAME = N'vcdb_log', FILENAME = N'C:\VCDB.ldf', SIZE = 1000KB, FILEGROWTH = 10%)
COLLATE SQL_Latin1_General_CP1_CI_AS
go
use VCDB
go
sp_addlogin @loginame=[vpxuser], @passwd=N'<Password>', @defdb='VCDB',
@deflanguage='us_english'
go
ALTER LOGIN [vpxuser] WITH CHECK_POLICY = OFF
go
CREATE USER [vpxuser] for LOGIN [vpxuser]
go
use MSDB
go
CREATE USER [vpxuser] for LOGIN [vpxuser]
go
use VCDB
go
sp_addrolemember @rolename = 'db_owner', @membername = 'vpxuser'
go
use MSDB
go
sp_addrolemember @rolename = 'db_owner', @membername = 'vpxuser'
```

```
go
```

This example illustrates the script.



50. Click Execute and verify that the query executes successfully.

51. Close Microsoft SQL Server Management Studio.

52. Disconnect the Microsoft SQL Server 2012 R2 ISO from the SQL Server VM.

Build and Set Up VMware vCenter VM

Build VMware vCenter VM

To build the VMware vCenter VM, complete the following steps:

1. Build a VMware vCenter VM with the following configuration in the<<var_ib-mgmt_vlan_id>> VLAN:

   - 12GB RAM
   - Two CPUs
   - One virtual network interface

2. Start the VM, install VMware Tools, and assign an IP address and host name to it in the Active Directory domain.

Set Up VMware vCenter VM

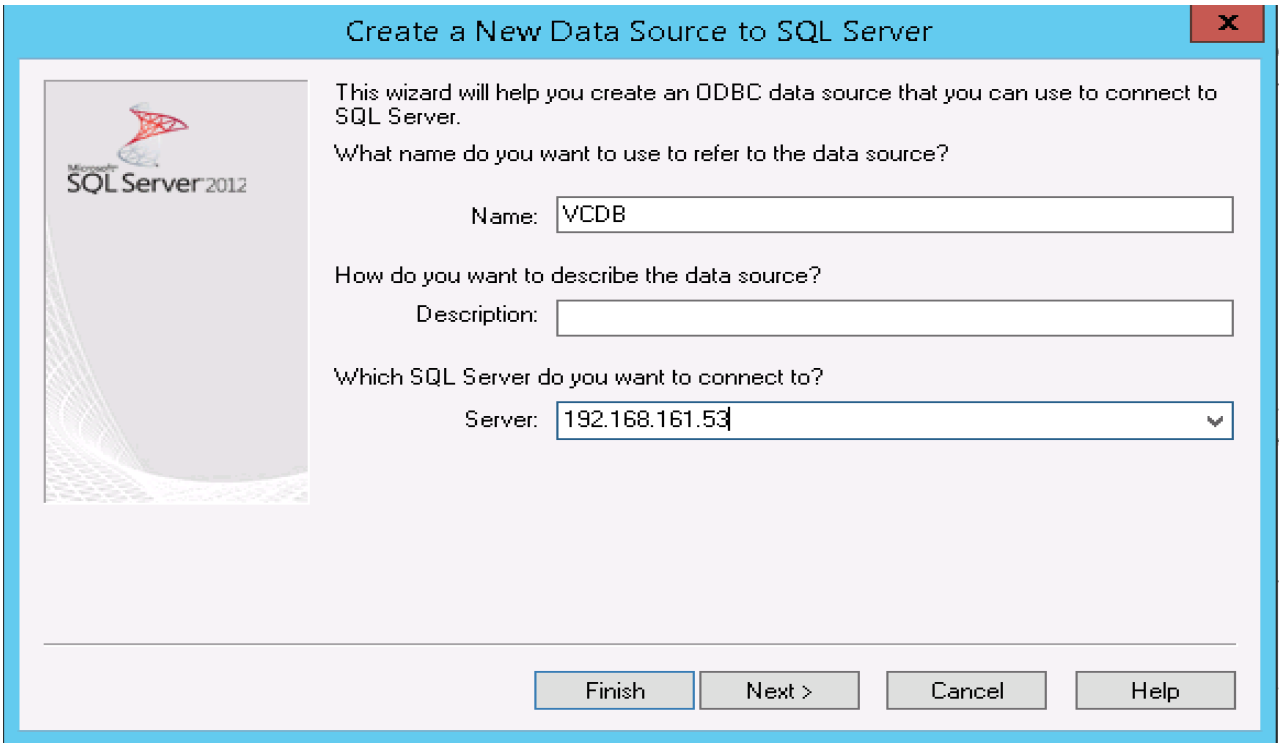
To set up the newly built VMware vCenter VM, complete the following steps:

1. Log into the vCenter VM as the admin user and open Server Manager.
2. Click Manage and then select Add Roles and Features to start the Add roles and Features Wizard.
3. Click Next.
4. On the Select installation screen, select Role-based or feature-based installation.
5. Select target Server and click Next.
6. Click Next on Server Roles.
7. On the Select Features screen, check the box .Net Framework 3.5 Features and click Next.
8. On the Confirm installation selections screen, a warning will be displayed asking Do you need to specify an alternate source path?. If the target computer does not have access to Windows Update, click the Specify an alternate source path link to specify the path to the \sources\sxs folder on the installation media and then click OK. After you have specified the alternate source, or if the target has access to Windows update, Click the X next to the warning, and then click Install.
9. Click Close.
10. Click the link Windows SQL Server 2012 SP1 Feature Pack.
11. Click Download.
12. Select the file name ENU\x64\sqlncli.msi and click Next.
13. Save it to a destination folder and run it.
14. On the Microsoft SQL Server 2012 Native Client Setup click Next.
15. Accept the license terms and click Next.
16. Click Next.
17. Click Install.
18. Click Finish.
19. Create the vCenter database data source name (DSN). Open Data Source (ODBC) by selecting Server Manager > Tools > ODBC Data Sources (64-bit).
20. Click the System DSN tab.
21. Click Add.

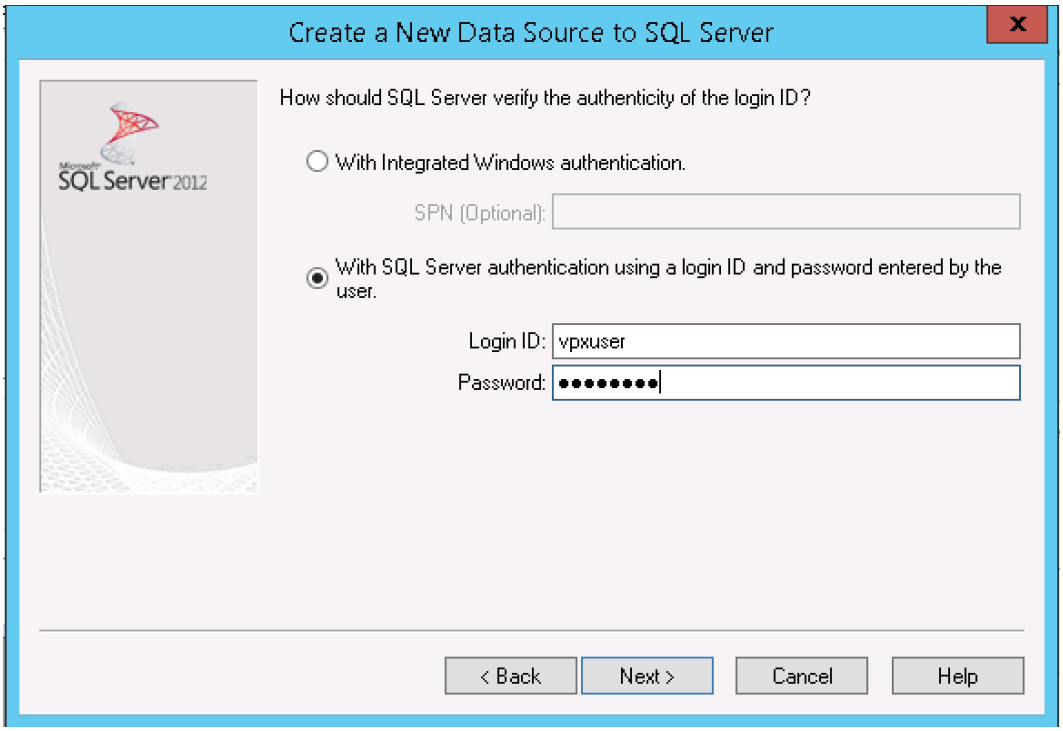
22. Choose SQL Server Native Client 11.0 and Click Finish.

23. Name the data source VCDB. In the server, enter the IP address of the vCenter SQL server and

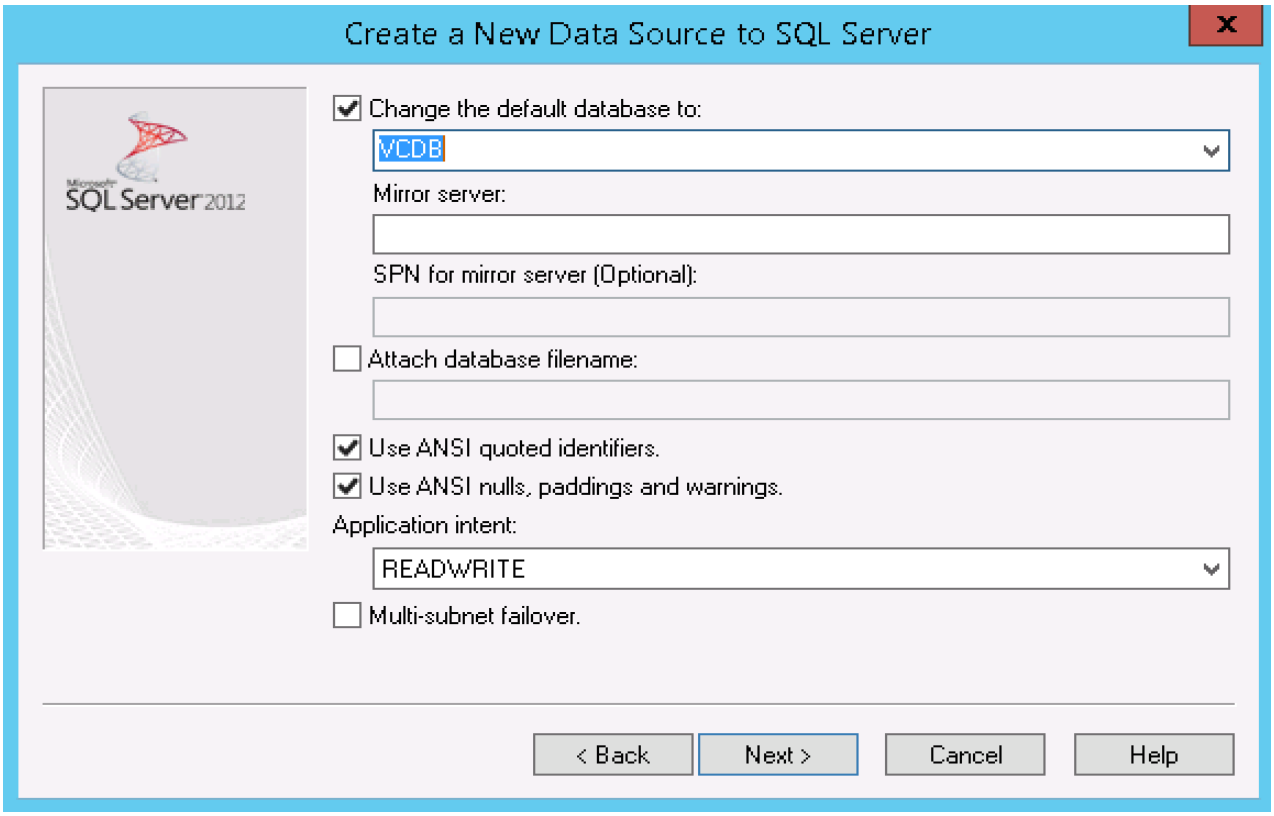
24. Click Next.



25. Choose With SQL Server authentication using a login ID and password entered by user. Enter vpxuser as the login ID and vpxuser password. Click Next.

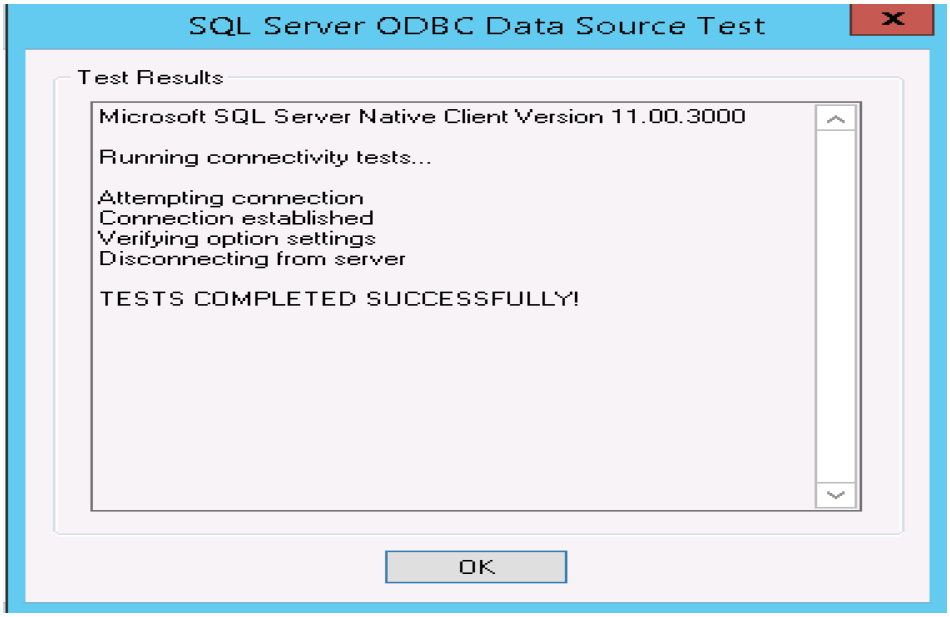


26. Choose Change the Default Database to and choose VCDB from the list. Click Next.



27. Click Finish.

28. Click Test Data Source. Verify that the test completes successfully.



29. Click OK and Click OK again.

30. Click OK to close the ODBC Data Source Administrator (64-bit) window.

31. Install all available Microsoft Windows updates by Right Click on Start> Control Panel> Windows Update.

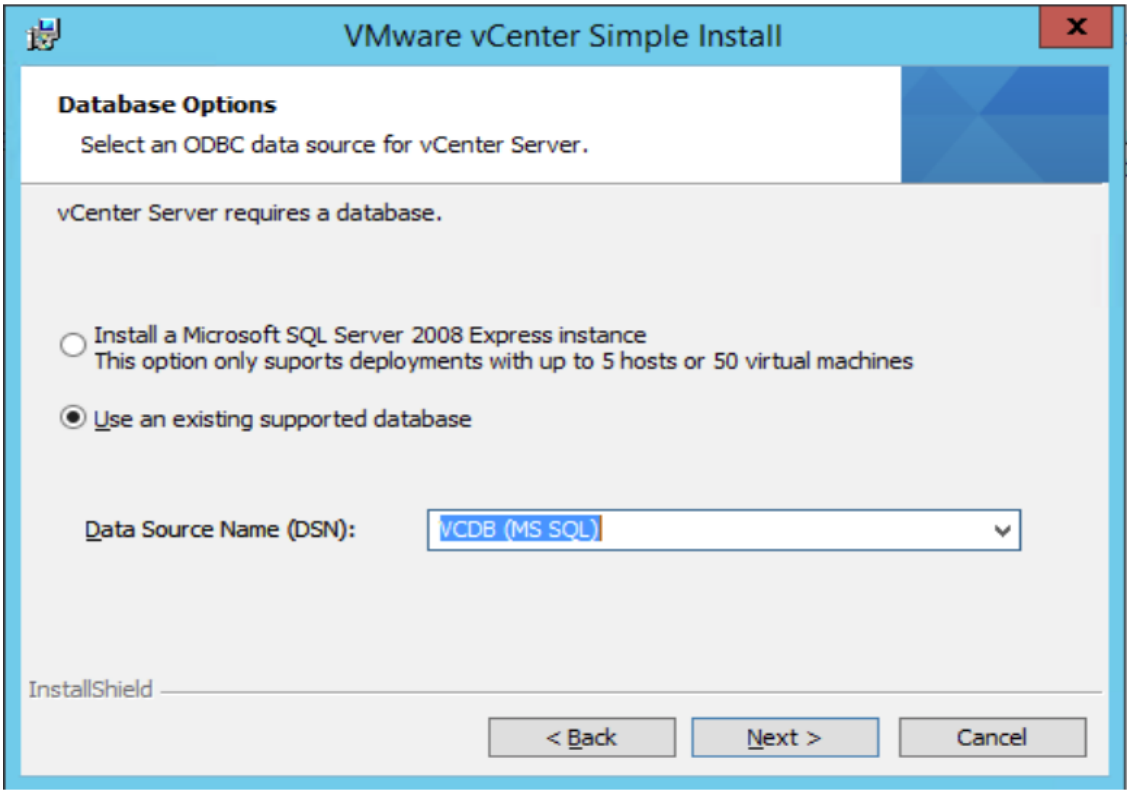
Install VMware vCenter Server

vCenter Server VM

To install vCenter Server on the vCenter Server VM, complete the following steps:

1. In the vCenter Server VMware console, click the ninth button (CD with a wrench) to map the VMware vCenter ISO and select Connect to ISO Image on Local Disk.
2. Navigate to the VMware vCenter 5.5 Update 2 (VIMSetup) ISO, select it, and click Open.
3. In the dialog box, click Run autorun.exe.
4. In the VMware vCenter Installer window, make sure that VMware vCenter Simple Install is selected and click Install.

5. Click Next on the Welcome to the vCenter Single Sign-On Setup screen.
6. Accept the terms of the license agreement and click Next.
7. Click Next on Simple Install Prerequisites check screen.
8. Enter and confirm <<var_password>> for administrator@vsphere.local. Click Next.
9. Click Next on Simple Install Configure Site window.
10. Click Next on Simple Install Port Setting window.
11. Click Next on Change destination folder.
12. Review the installation option and click Install.
13. Enter the vCenter 5.5 license key and click Next.
14. Choose Use an Existing Supported Database. Choose VCDB from the Data Source Name list and click Next.



15. Enter the vpxuser password and click Next.
16. Click Next vCenter Server Service Window.
17. Click Next on Configure Ports screen.
18. Choose the vCenter Server Configuration that best describe your setup. Click Next.
19. Choose the inventory size that that best describes your setup. Click Next.
20. Click Install.
21. Click Yes to accept and continue with SSL SHA1 SSO lookup Service Leaf certificate.
22. Click Install certificates.
23. Click Finish.
24. Click OK.

ESXi Dump Collector Setup

To setup the ESXi Dump Collector, complete the following steps:

1. In the VMware vCenter Installer window, under vCenter Support Tools, select VMware VSphere ESXi Dump Collector.

2. Click Install.
3. Click Yes.
4. Select the appropriate language and click OK.
5. In the vSphere ESXi Dump Collector Installation Wizard, click Next.
6. Click Next.
7. Accept the terms in the License Agreement and click Next.
8. Click Next to accept the default Destination Folders.
9. Click Next to accept a Standalone installation.
10. Click Next to accept the default ESXi Dump Collector Server Port (6500).
11. Select the VMware vCenter Server IP address from the drop-down menu. Click Next.
12. Click Install to complete the installation.
13. Click Finish.
14. Click Exit in the VMware vCenter Installer window.
15. Disconnect the VMware vCenter ISO from the vCenter VM.
16. Install all available Microsoft Windows updates by navigating to Start > All Programs > Windows Updates.
17. A restart might be required.
18. Back on the Management Workstation, open the VMware vSphere CLI command prompt.
19. Set each ESXi Host to core dump to the ESXi Dump Collector by running the following commands:

```
esxcli -s <<var_vm_host_infra_01_ip>> -u root -p <<var_password>> system coredump
network set --interface-name vmk0 --server-ipv4 <<var_vcenter_server_ip> --
server-port 6500

esxcli -s <<var_vm_host_infra_02_ip>> -u root -p <<var_password>> system coredump
network set --interface-name vmk0 --server-ipv4 <<var_vcenter_server_ip> --
server-port 6500

esxcli -s <<var_vm_host_infra_03_ip>> -u root -p <<var_password>> system coredump
network set --interface-name vmk0 --server-ipv4 <<var_vcenter_server_ip> --
server-port 6500

esxcli -s <<var_vm_host_infra_04_ip>> -u root -p <<var_password>> system coredump
network set --interface-name vmk0 --server-ipv4 <<var_vcenter_server_ip> --
server-port 6500
```

```
esxcli -s <<var_vm_host_infra_01_ip>> -u root -p <<var_password>> system coredump
network set --enable true

esxcli -s <<var_vm_host_infra_02_ip>> -u root -p <<var_password>> system coredump
network set --enable true

esxcli -s <<var_vm_host_infra_03_ip>> -u root -p <<var_password>> system coredump
network set --enable true

esxcli -s <<var_vm_host_infra_04_ip>> -u root -p <<var_password>> system coredump
network set --enable true


esxcli -s <<var_vm_host_infra_01_ip>> -u root -p <<var_password>> system coredump
network check

esxcli -s <<var_vm_host_infra_02_ip>> -u root -p <<var_password>> system coredump
network check

esxcli -s <<var_vm_host_infra_03_ip>> -u root -p <<var_password>> system coredump
network check

esxcli -s <<var_vm_host_infra_04_ip>> -u root -p <<var_password>> system coredump
network check
```

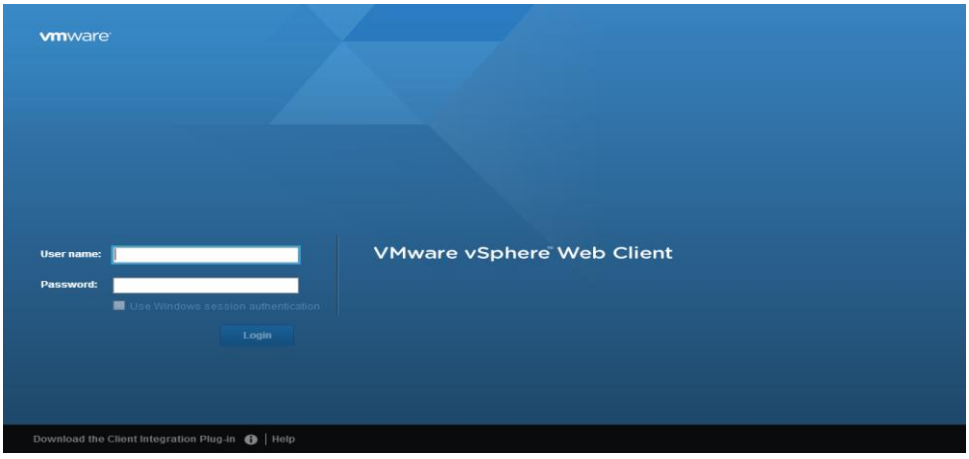
Set Up vCenter Server

vCenter Server Virtual Machine

To set up vCenter Server on the vCenter Server VM, complete the following steps:

1. Using the vSphere Client, log in to the newly created vCenter Server as the VersaStack admin user or administrator@vsphere.local and password.

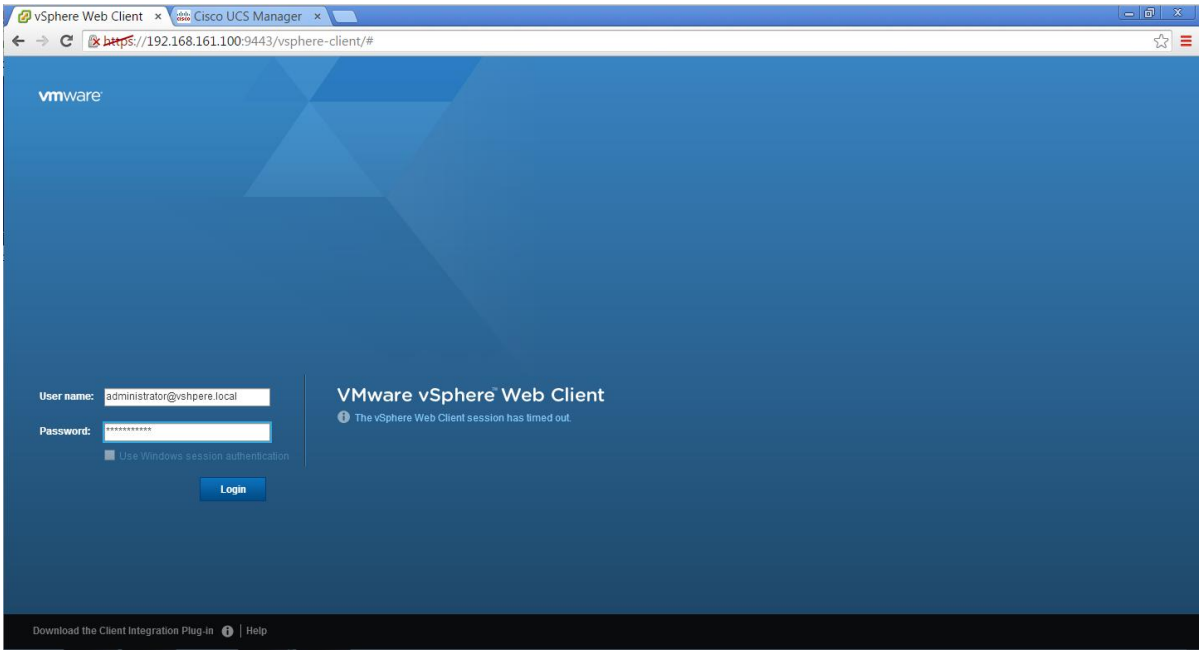
2. Click Download the Client Integration Plug-in.



3. Click Run.

4. Click Next.

5. Accept the license terms and Click Next.
6. Click Next on Destination Folder window.
7. Click Install.
8. Click Finish.
9. Using a web browser, navigate to https:// <<var_vcenter_server_ip>>:9443/vsphere-client/#
10. In the user name type in administrator@vsphere.local and Password your <<password>.

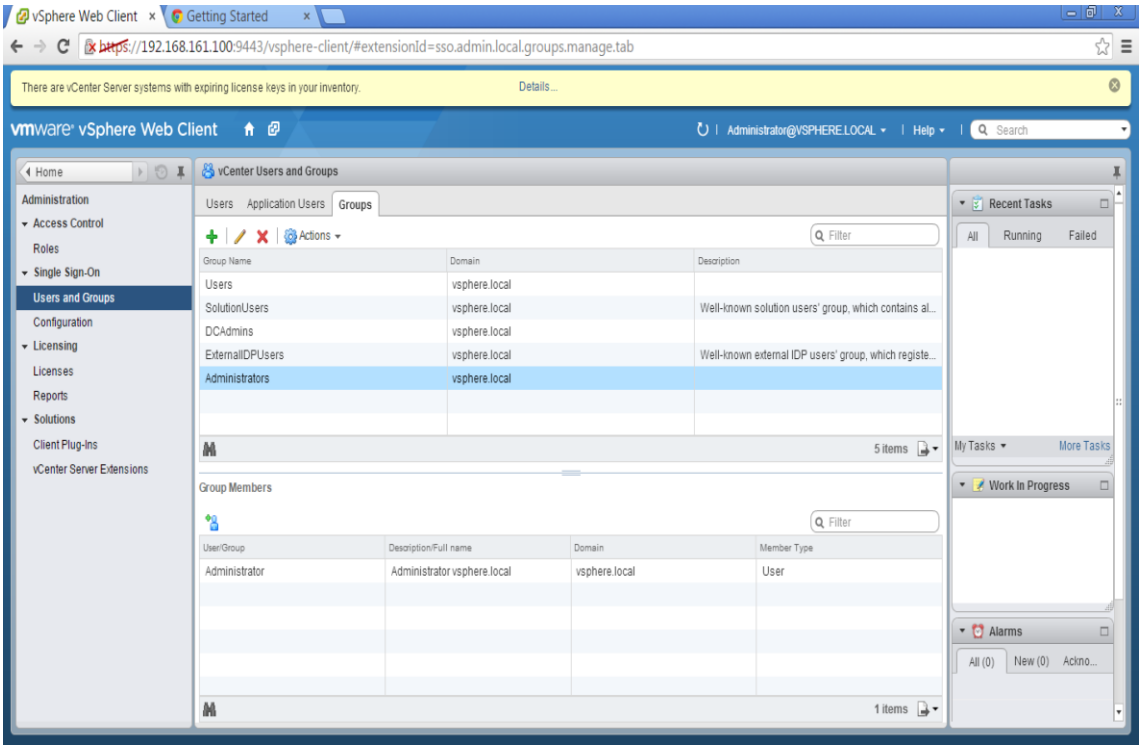


11. Click Login.

Adding the AD Account to Administrator Group and Delegate Permission on the vCenter

To add the AD Account, complete the following steps:

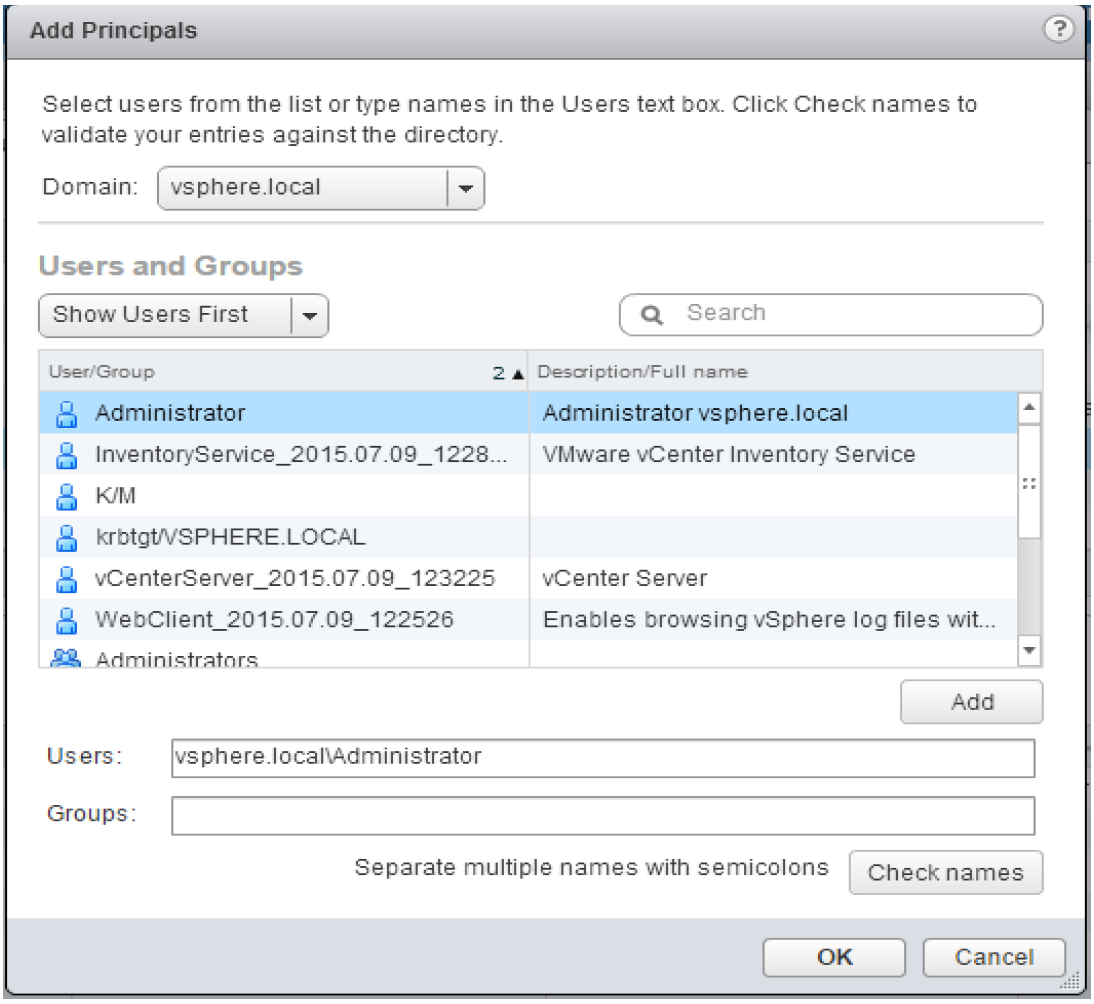
1. Log in to the vSphere Web Client as Administrator@vsphere.local.
2. From the home Location, navigate to >>Administration>>Single Sign-ON>>User and Groups>>.
3. Select the Groups.
4. Click Administrators on Group Name.



5. Click the + on Group Members.

6. Change the Domain to <<domain>>.

7. Highlight the Administrator and click Add.



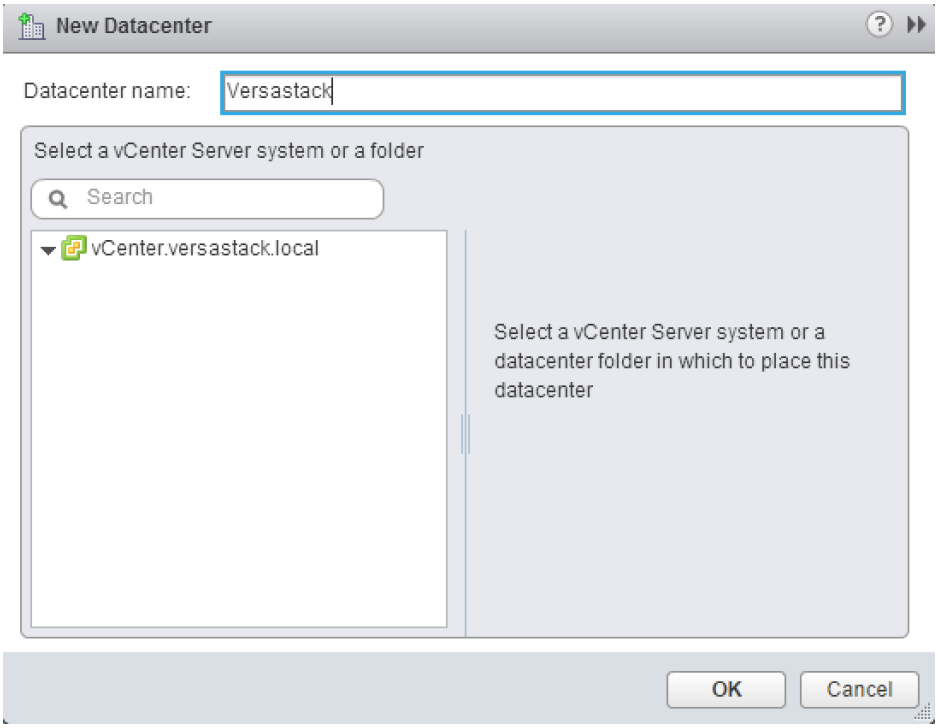
8. Click OK.
9. Navigate to > Home > vCenterServers and Click on your <<vcenter_server>>.
10. Click the Manage tab.
11. Click the Permissions tab.
12. Click + sign.
13. Click Add.
14. Select your domain.
15. Highlight Administrator and double-click it.
16. Click OK.
17. Change the Assigned Role to Administrator and click OK.
18. Log out from vSphere Web Client.

19. Log in to the vSphere Web Client as Administrator@<<domain>>.

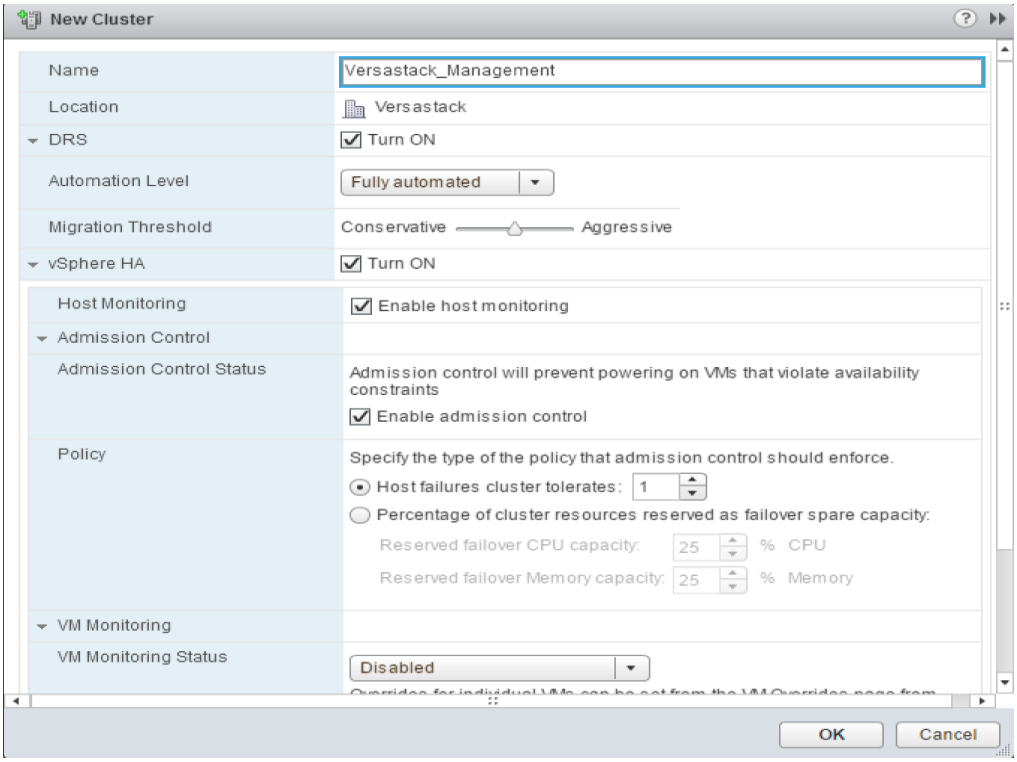
Set Up vCenter Server with a Datacenter, Cluster, DRS and HA

To setup the vCenter Server, complete the following steps:

1. In the vSphere Web Client, navigate to the >>vCenter>>vCenter Servers>>vCenter_name.
2. Select Actions > New Datacenter.



3. Rename the datacenter and click OK.
4. Browse to a datacenter in the vSphere Web Client navigator.
5. Right-click the datacenter and select New Cluster.



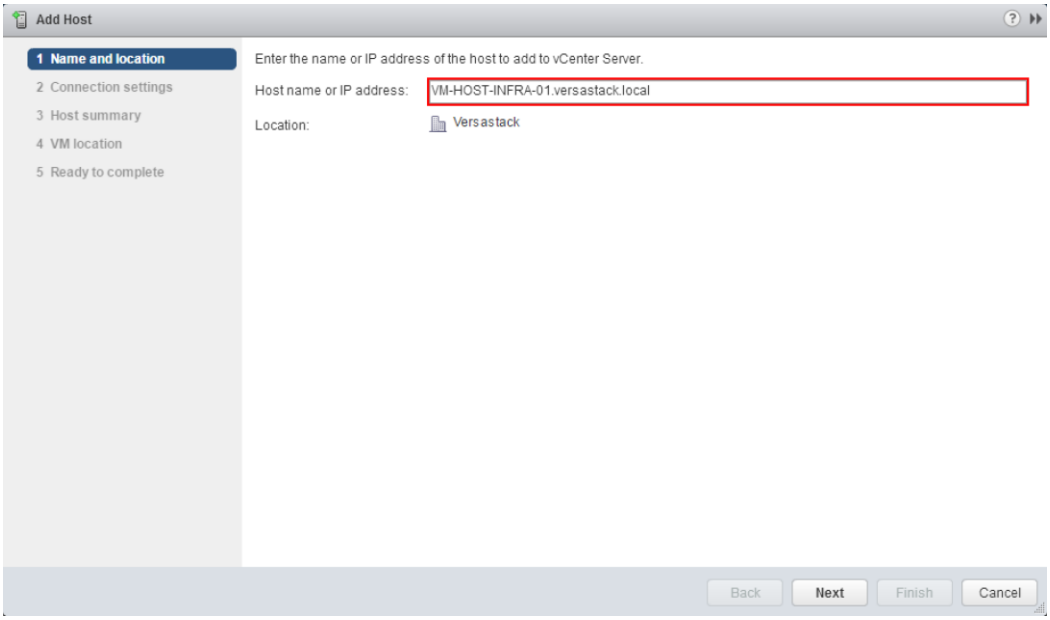
6. Select DRS and vSphere HA cluster features.
7. Select the DRS Turn ON check box.
8. Select the vSphere HA Turn ON check box.
9. Click OK.

Important: If mixing Cisco UCS B or C-Series M2, M3 or M4 servers within a vCenter cluster, it is necessary to enable VMware Enhanced vMotion Compatibility (EVC) mode. For more information about setting up EVC mode, refer to Enhanced vMotion Compatibility (EVC) Processor Support.

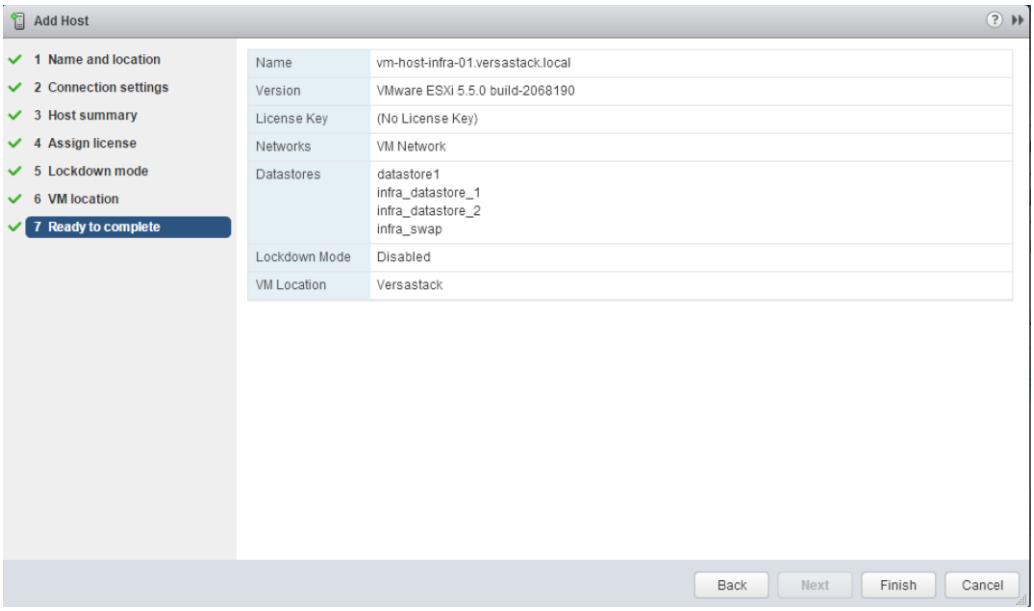
Add Host to vCenter

To add a host to the vCenter, complete the following steps:

1. In the vSphere Web Client, navigate to a datacenter, cluster, or folder within a datacenter.
2. Right-click the datacenter, cluster, or folder and select Add Host.
3. Type the IP address or the name of the host and click Next.



4. Type root credentials and click Next.
5. Click Yes to accept the certificate.
6. Review the host summary and click Next.
7. Assign a license key to the host. Click Next.
8. (Optional) Select Enable Lockdown Mode to disable remote access for the administrator account after vCenter Server takes control of this host and click Next.
9. (Optional) If you add the host to a datacenter or a folder, select a location for the virtual machines that reside on the host and click Next.



10. Review the summary and click Finish.
11. Repeat this procedure to add other Hosts to the cluster.

Important: If mixing Cisco UCS B or C-Series M2, M3 or M4 servers within a vCenter cluster, it is necessary to enable VMware Enhanced vMotion Compatibility (EVC) mode. For more information about setting up EVC mode, refer to Enhanced vMotion Compatibility (EVC) Processor Support.

Map the Datastores on the IBM FlashSystem V9000 Second Host After Enabling the Cluster

To map the datastores on the IBM FlashSystem V9000, complete the following steps:

1. Open the web client to the FlashSystem V9000.
2. Click the volumes button in the left pane and select volume to open the volumes screen.
3. Right-click the volume infra_datastore_1 and select map to host.
4. Choose host VM-Host-Infra-02, and leave All I/O Groups default and select Map Volumes.
5. Click Map All volumes on the warning popup and click Close.
6. Right-click the volume infra_swap and leave All I/O Groups default and select map to host.
7. Choose host VM-Host-Infra-02 and select Map Volumes.
8. Click Map All volumes on the warning popup, then click Close.
9. In vSphere in the left pane right click the cluster VersaStack_Management, and click Rescan for datastores.

At this point of the install, there is a warning for no network management redundancy. The optional Cisco 1000v virtual switch shown later is this document will remedy that issue. If you are not installing 1000v, you should add the second Cisco network adapter to the VMware standard switch to each ESX hosts by clicking on the configuration tab, and in the hardware pane, click Networking, click the properties of vSwitch0. From the Network adapters tab, click Add and select the unclaimed adapter vmnic1, and click Next, then click Next again and then click Finish.

Move VM Swap File Location

ESXi Hosts VM-Host-Infra-01 and VM-Host-Infra-02

To move the VM swap file location, complete the following steps on each ESXi host:

1. From each vSphere Client, select the host in the inventory.
2. Click the Configuration tab to enable configurations.
3. Click Virtual Machine Swapfile Location in the Software pane.

4. Click Edit at the upper right side of the window.
5. Select Store the swapfile in a swapfile datastore selected below.
6. Select infra_swap as the datastore in which to house the swap files.
7. Click OK to finalize moving the swap file location.

Set Up the Optional Cisco Nexus 1000V Switch using Cisco Switch Update Manager

Cisco Nexus 1000V

The Cisco Nexus 1000V is a distributed virtual switch solution that is fully integrated within the VMware virtual infrastructure, including VMware vCenter, for the virtualization administrator. This solution offloads the configuration of the virtual switch and port groups to the network administrator to enforce a consistent data center network policy. The Cisco Nexus 1000V is compatible with any upstream physical access layer switch that is compliant with Ethernet standard, Cisco Nexus switches, and switches from other network vendors. The Cisco Nexus 1000V is compatible with any server hardware that is listed in the VMware Hardware Compatibility List (HCL).

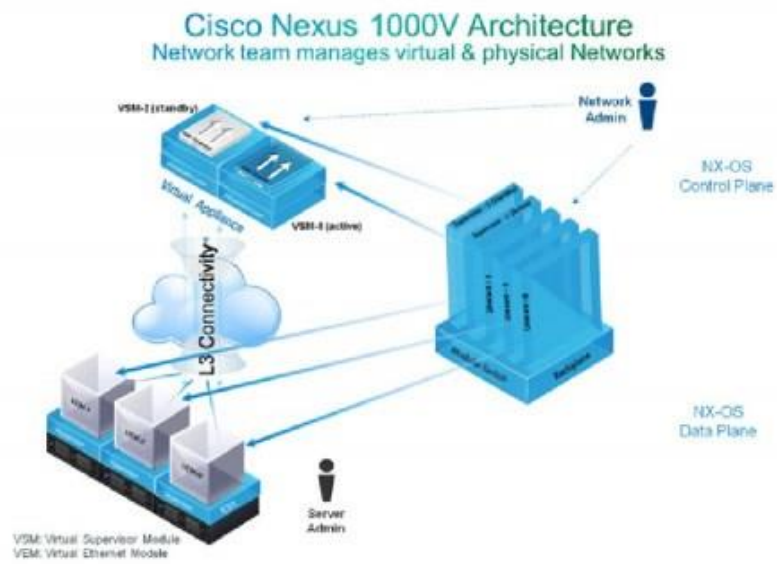
The Cisco Nexus 1000V has the following components:

- Virtual Supervisor Module (VSM)—The control plane of the switch and a VM that runs Cisco NX-OS.
- Virtual Ethernet Module (VEM)—A virtual line card that is embedded in each VMware vSphere (ESXi)host. The VEM is partly inside the kernel of the hypervisor and partly in a user-world process, called the VEM Agent.

Cisco Nexus 1000V Architecture

Figure 8 illustrates the Cisco Nexus 1000V architecture.

Figure 8 Cisco Nexus 1000V Architecture



Layer 3 control mode is the preferred method of communication between the VSM and the VEMs. In Layer 3 control mode, the VEMs can be in a different subnet than the VSM and from each other. Active and standby VSM control ports should be Layer 2 adjacent. These ports are used to communicate the HA protocol between the active and standby VSMs. Each VEM needs a designated VMkernel NIC interface that is attached to the VEM that communicates with the VSM. This interface, which is called the Layer 3 Control vmknic, must have a system port profile applied to it (see System Port Profiles and System VLANs), so the VEM can enable it before contacting the VSM.

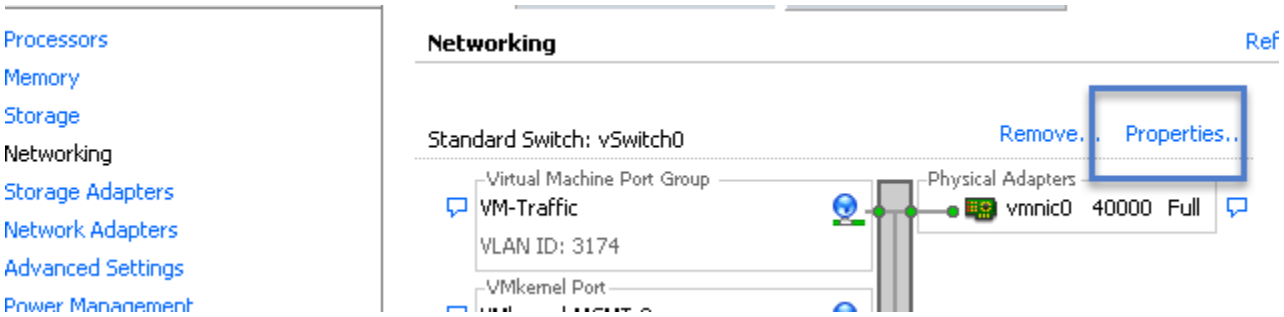
Installation Process

To create network redundancy for the migration, create a temporary VMkernel, and complete the following steps:

ESXi Host VM-Host-Infra-01

Repeat steps 1-11 in this section for all ESXi Hosts.

1. From each vSphere Client, select the host in the inventory.
2. Click the Configuration tab.
3. Click Networking in the Hardware then Properties.

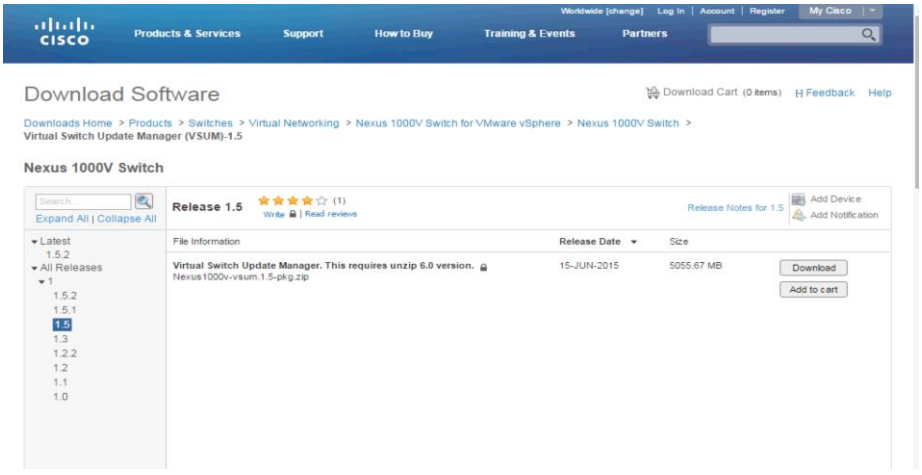


4. Click Add.
5. Select VMkernel and click Next.
6. Change the network label to VMkernel-MGMT-2 and enter <<var_ib-mgmt_vlan_id>> in the VLAN ID (Optional) field.
7. Select Use this port group for management traffic.
8. Click Next to continue with the VMkernel creation.
9. Enter the IP address <<var_vmhost_infra_01_2nd_ip>> and the subnet mask for the VLAN interface for VM-Host-Infra-01.
10. Click Next to continue with the VMkernel creation.
11. Click Finish to finalize the creation of the new VMkernel interface.

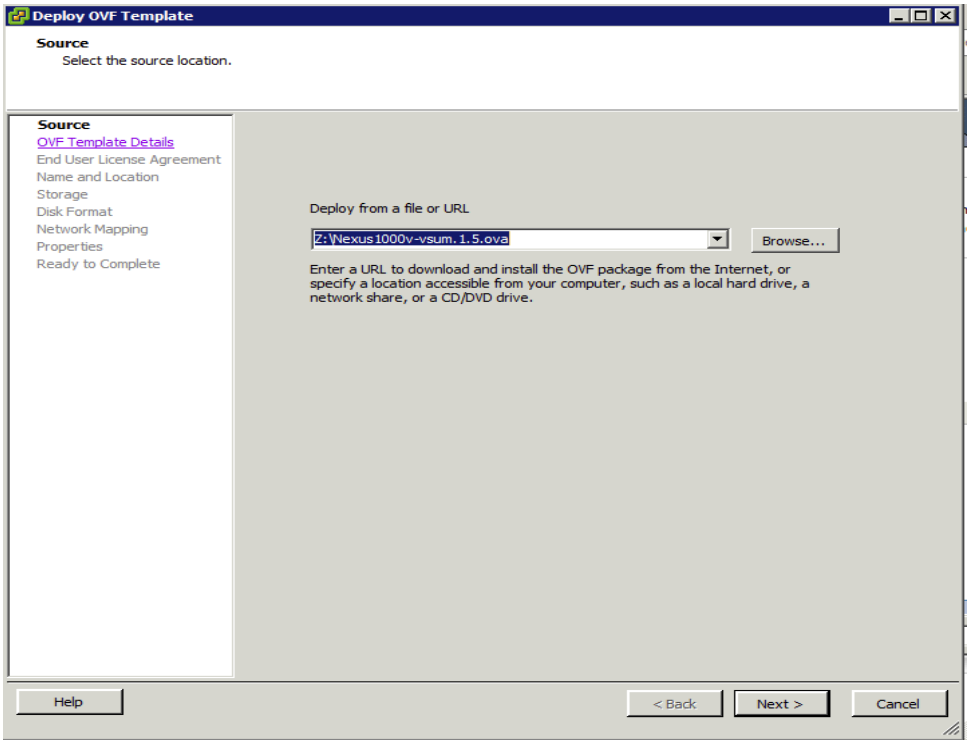
Deploy the OVF Template for the Cisco Nexus 1000 Virtual Switch Update Manager

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

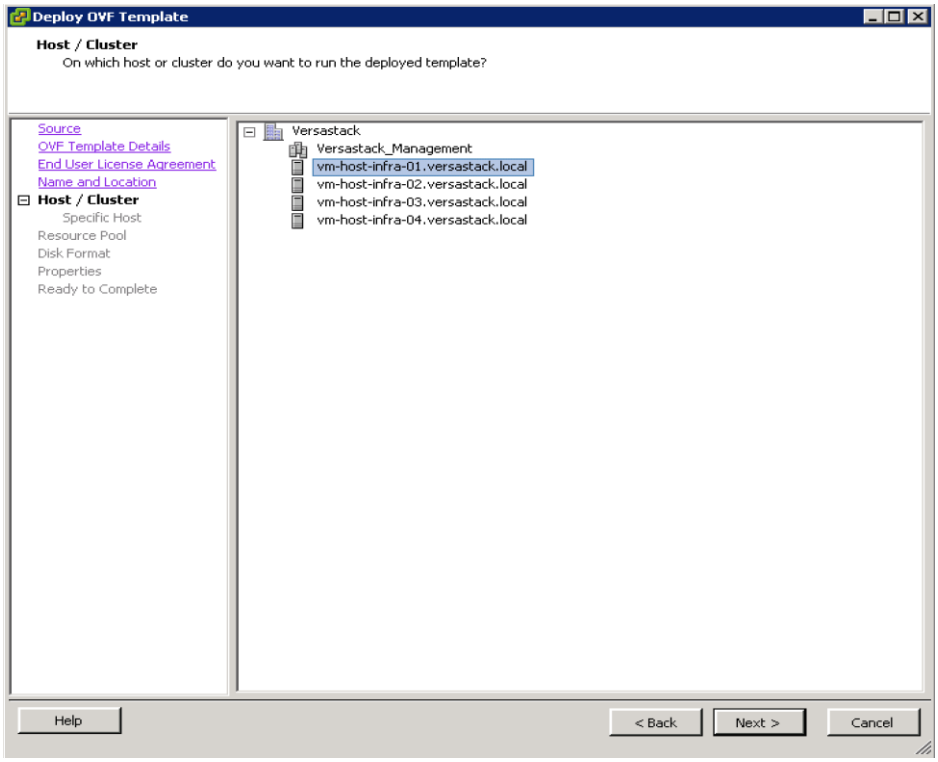
1. Log in and Download the Cisco Nexus 1000V installation software from www.cisco.com.



2. Unzip the package.
3. From the vSphere client, click File, Deploy OVF Template and browse to the unzipped ova file.



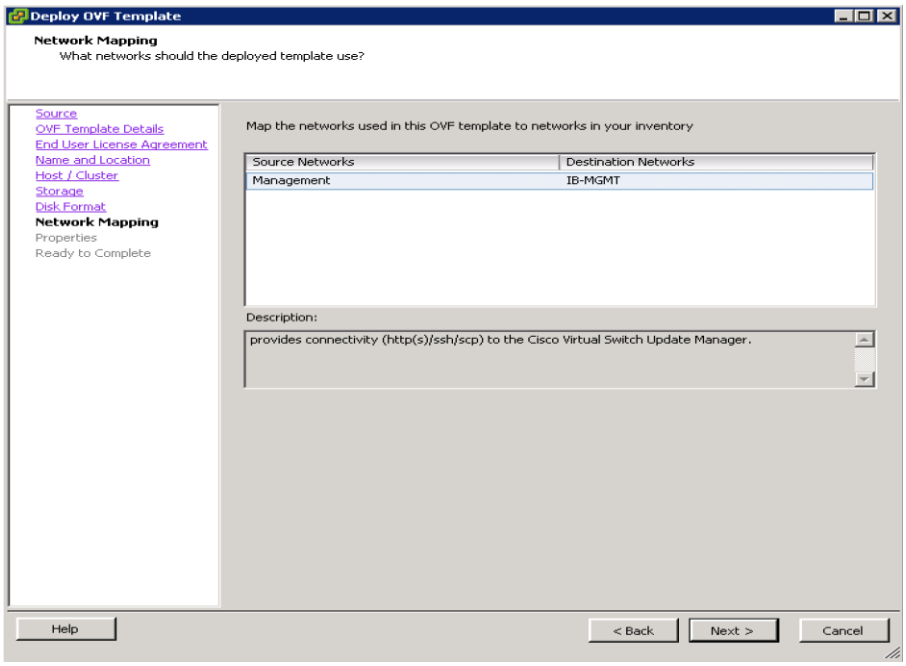
4. Click Next, then click Next again.
5. Review the license agreement. Click Next.
6. Click Next on the Name and Location screen.
7. Select VersaStack_Management as the Host Cluster and click Next.



8. Select infra_datastore_1 as the Datastore and click Next.

9. Choose a disk format and Click Next.

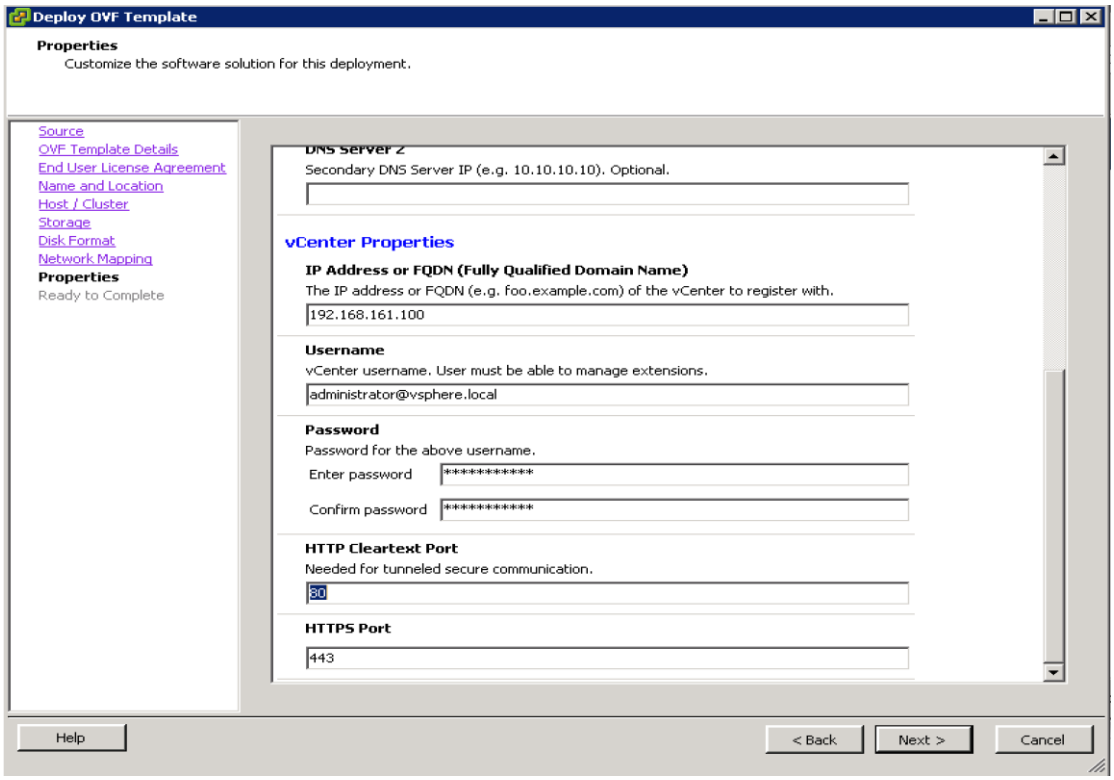
10. For Network Mapping make sure you have Management Mapped to IB-Mgmt and click Next.



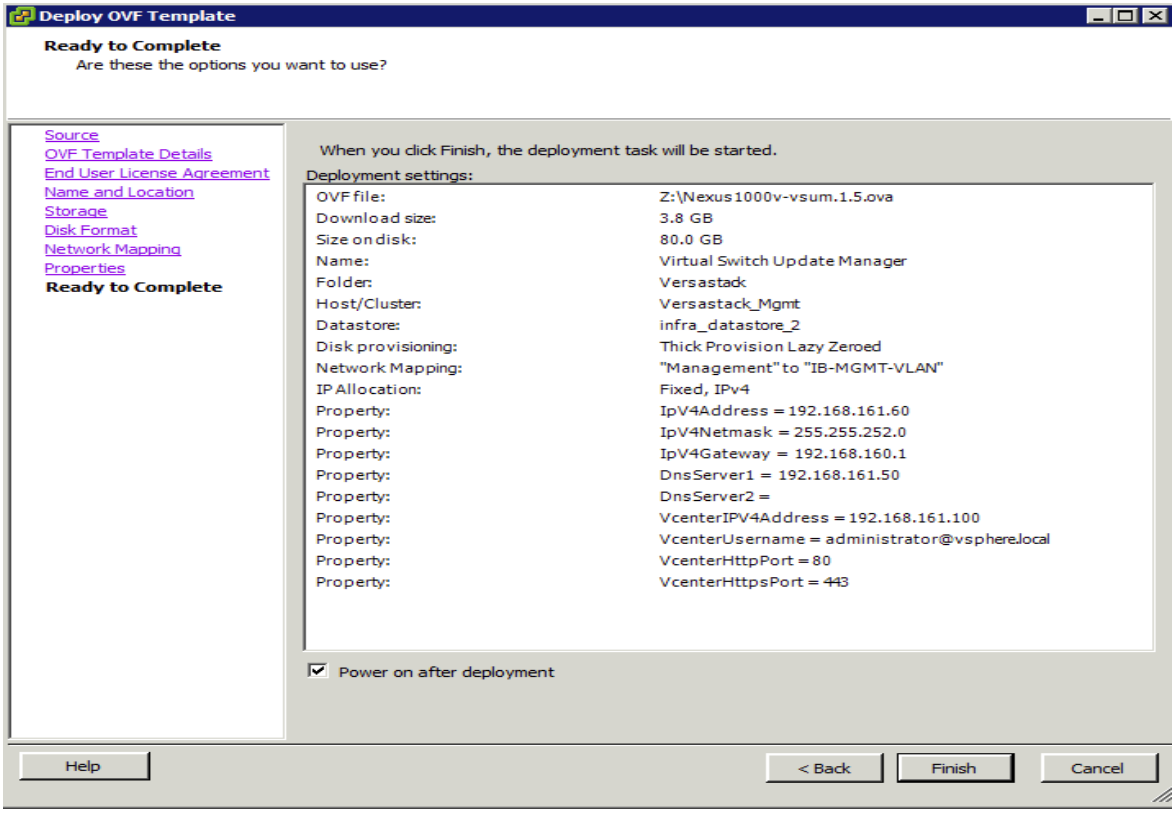
11. On the properties Screen input <<var_vsm_updatemgr_mgmt_ip>> <<var_vsm_mgmt_mask>> <<var_vsm_mgmt_gateway>> <<var_nameserver_ip>>.

12. Enter the vCenter IP and login information. For domain accounts, use the Administrator@Vsphere.local login format and do not use domainname\user account format.

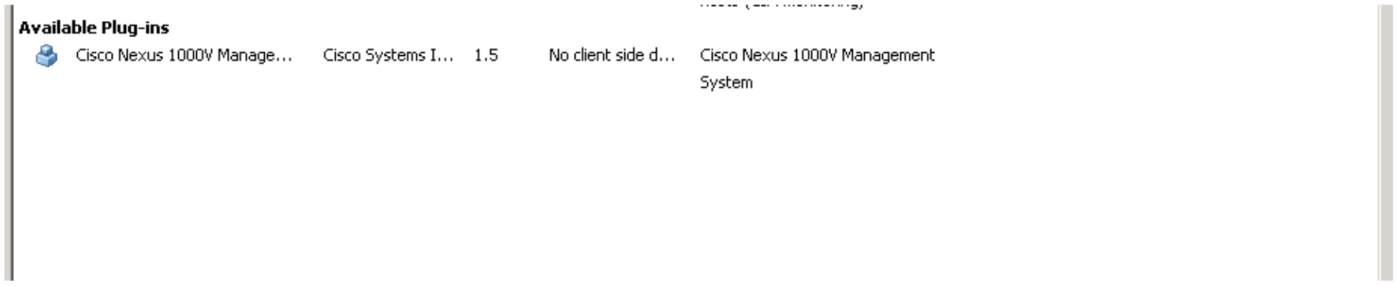
13. Accept default ports, and click Next.



14. Review the summary screen, click Power on after deployment and click Finish.



15. After the VM boots in a few minute the Plugin is registered. Validate the plugin in the vSphere client by clicking Plug-ins, then Manage plug-ins in the top menu bar and look under Available Plug-ins.



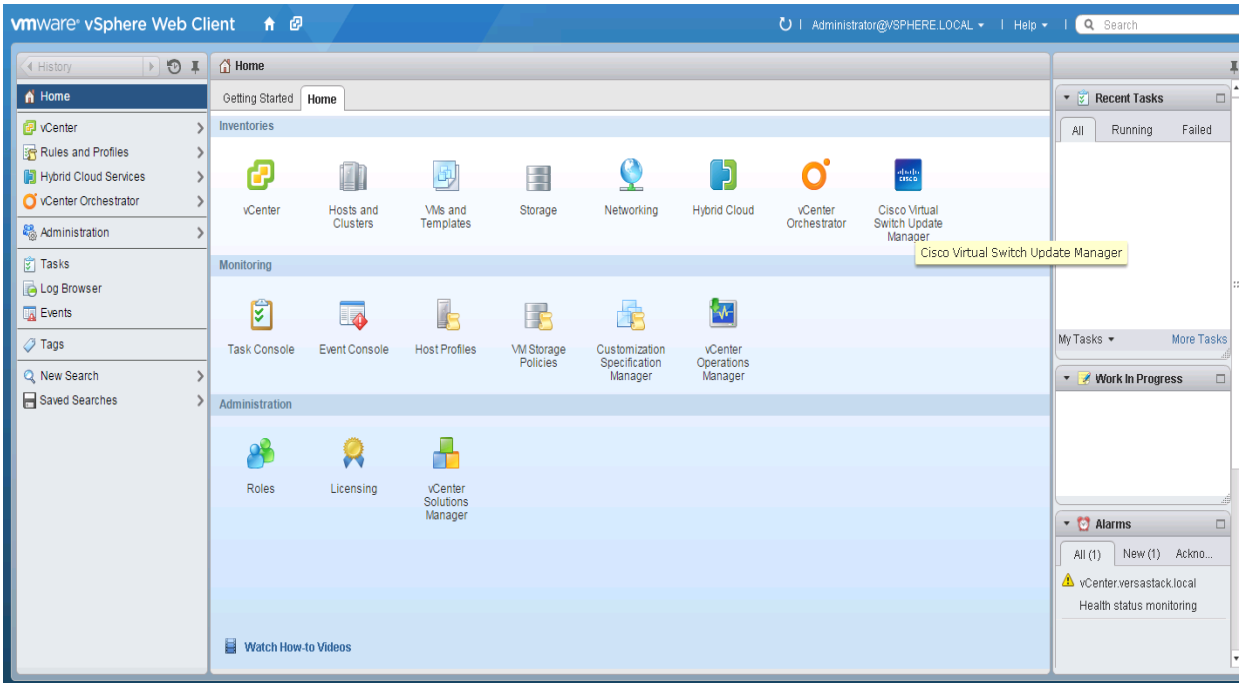
Install the VSM through the Cisco Virtual Switch Update Manager

The VSUM will deploy the VSM primary and secondary to the ESXi hosts through the GUI install. You will have a VSM primary running on 1 ESXi host and a secondary running on the other ESXi host. Both of these are installed at them same time through the host selection. Complete the following steps to deploy the VSM:

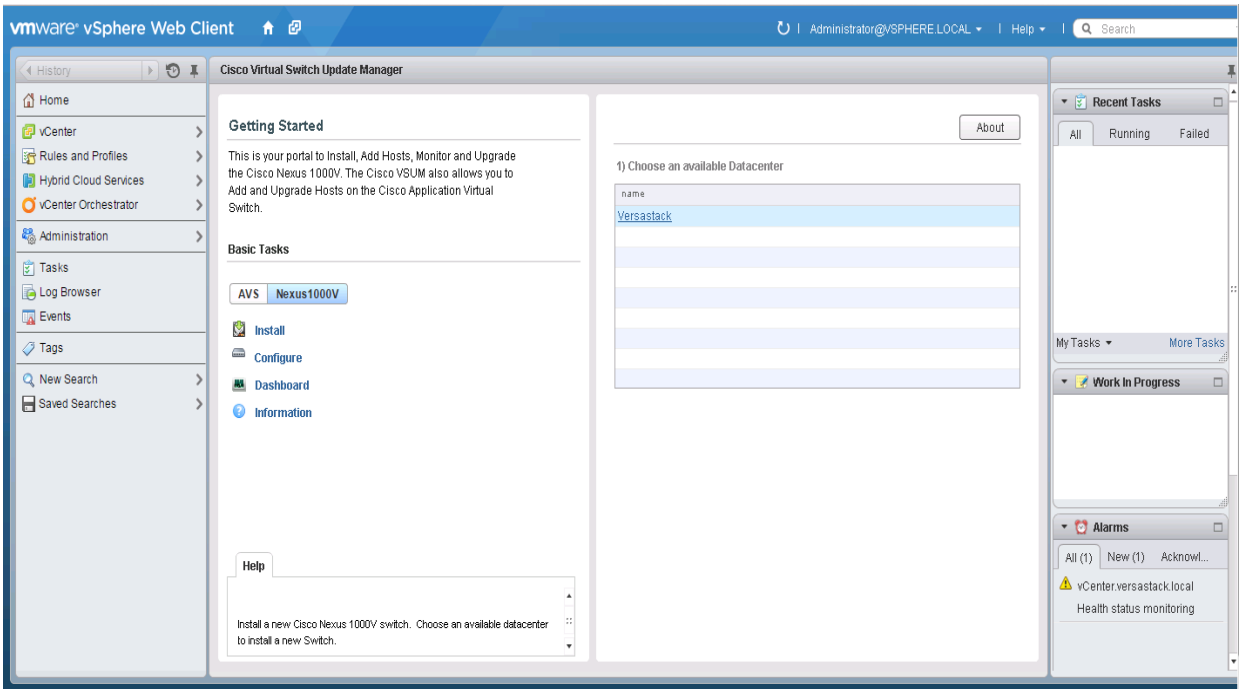
On the machine where you will run the browser for the VMware vSphere Web Client, you should have installed Adobe Flash as well the Client Integration plugin for the web client. The plug-in can be downloaded from the lower left corner of the web client login page.

1. Launch the vSphere Web client interface https://<<Vshpere_host_ip>>:9443/vsphere-client and login.

2. Select the home tab and click Cisco Virtual Switch Update Manager.

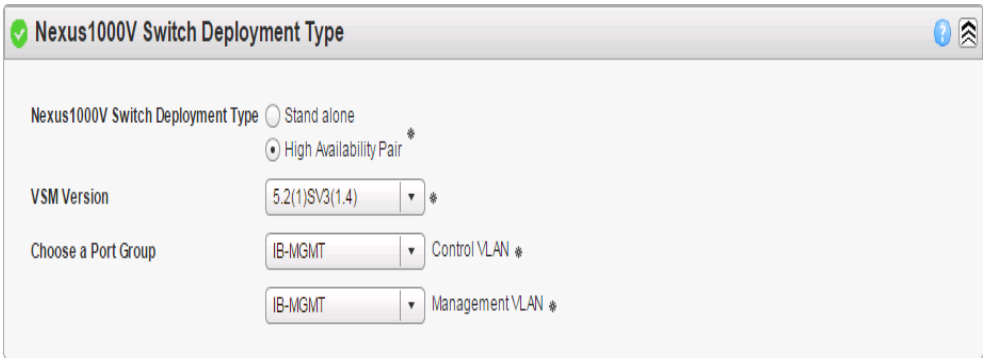


3. Click the Nexus 1000V button then click Install.

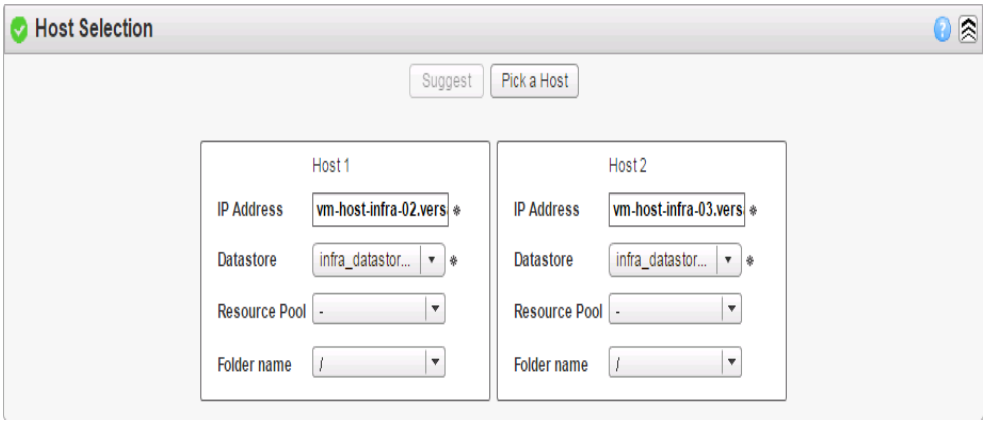


4. Click the VersaStack datacenter in the right screen.

5. Keep the default for deploy new VSM and High Availability Pair. Select IB-Mgmt for the control and Management VLAN.

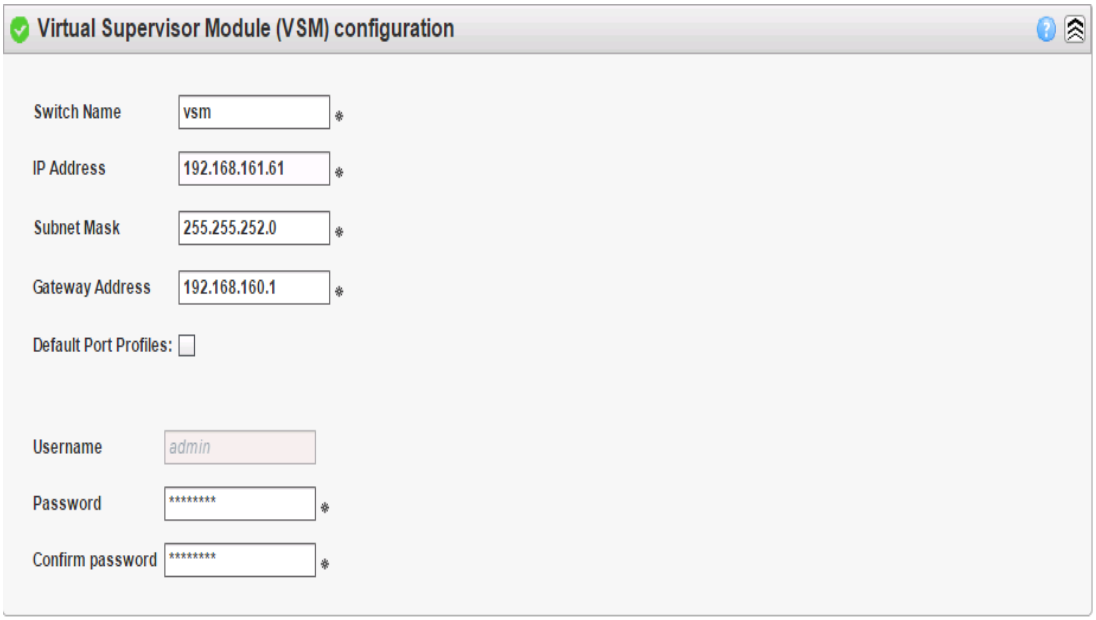


6. For the Host Selection, click the suggest button and choose the Datastores.



7. Enter a domain ID for the switch configuration section.

8. Enter the following information for the VSM configuration <<var_vsm_hostname>> <<var_vsm_mgmt_ip>>, <<var_vsm_mgmt_mask>> <<var_vsm_mgmt_gateway>> <<var_password>>, then click Finish. You can launch a second VSphere Client to monitor the progress. Click Tasks in the left pane. It will take a few minutes to complete.



Perform Base Configuration of the Primary VSM

To perform the base configuration of the primary VSM, complete the following steps:

1. Use an SSH client, log in to the primary Cisco Nexus 1000V VSM as admin.
2. Run the following configuration commands:

```
config t

ntp server <<var_global_ntp_server_ip>> use-vrf management

vlan <<var_ib-mgmt_vlan_id>>
name IB-MGMT-VLAN
vlan <<var_nfs_vlan_id>>
name NFS-VLAN
vlan <<var_vmotion_vlan_id>>
name vMotion-VLAN
vlan <<var_vm-traffic_vlan_id>>
name VM-Traffic-VLAN
vlan <<var_native_vlan_id>>
name Native-VLAN
exit

port-profile type ethernet system-uplink
vmware port-group
switchport mode trunk
switchport trunk native vlan <<var_native_vlan_id>>

switchport trunk allowed vlan <<var_ib-mgmt_vlan_id>>, <<var_nfs_vlan_id>>,
<<var_vmotion_vlan_id>>, <<var_vm-traffic_vlan_id>>
channel-group auto mode on mac-pinning
no shutdown
system vlan <<var_ib-mgmt_vlan_id>>, <<var_nfs_vlan_id>>,
<<var_vmotion_vlan_id>>, <<var_vm-traffic_vlan_id>>
system mtu 9000
```

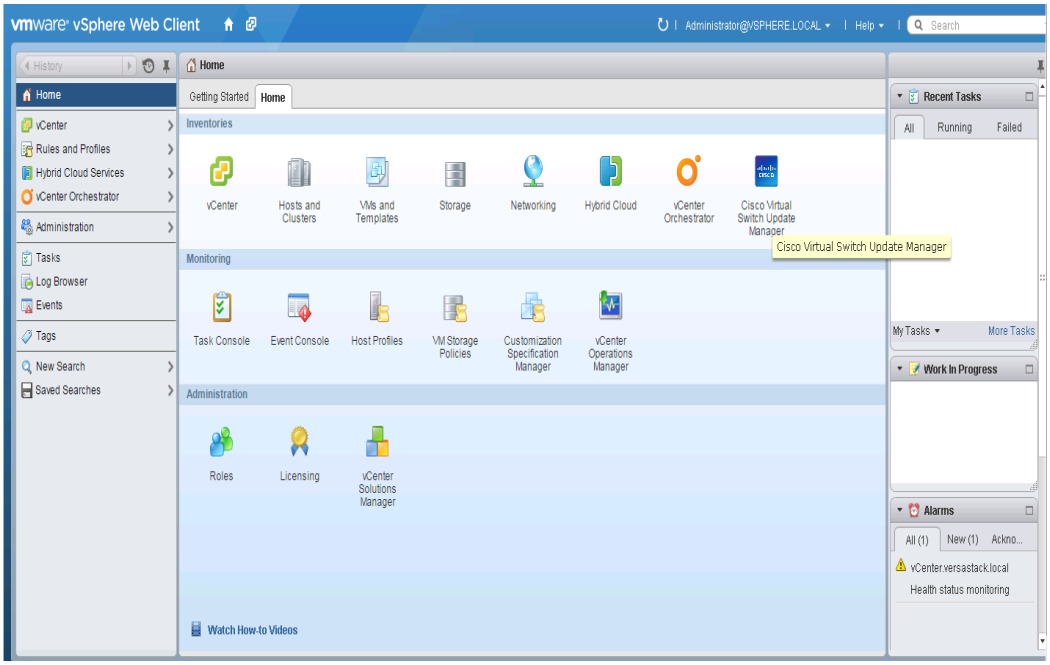
```
state enabled
exit


port-profile type vethernet IB-MGMT-VLAN
vmware port-group
switchport mode access
switchport access vlan <<var_ib-mgmt_vlan_id>>
no shutdown
system vlan <<var_ib-mgmt_vlan_id>>
state enabled
exit

port-profile type vethernet NFS-VLAN
vmware port-group
switchport mode access
switchport access vlan <<var_nfs_vlan_id>>
no shutdown
system vlan <<var_nfs_vlan_id>>
state enabled
exit

port-profile type vethernet vMotion-VLAN
vmware port-group
switchport mode access
switchport access vlan <<var_vmotion_vlan_id>>
no shutdown
system vlan <<var_vmotion_vlan_id>>
state enabled
exit

port-profile type vethernet VM-Traffic-VLAN
vmware port-group
switchport mode access
switchport access vlan <<var_vm-traffic_vlan_id>>
no shutdown
system vlan <<var_vm-traffic_vlan_id>>
state enabled
exit

port-profile type vethernet n1kv-L3
capability l3control
vmware port-group
switchport mode access
switchport access vlan <<var_ib-mgmt_vlan_id>>
no shutdown
system vlan <<var_ib-mgmt_vlan_id>>
state enabled
exit


copy run start
```

Migrate Networking Components for ESXi Hosts to Cisco Nexus 1000V

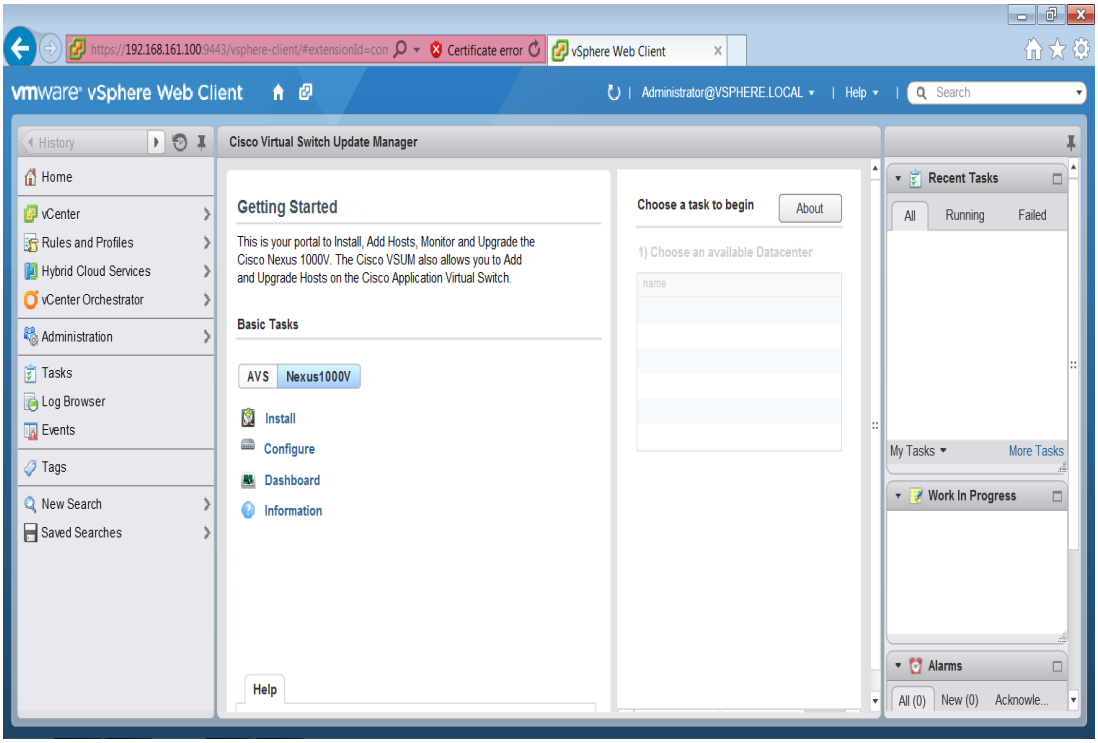
vSphere Client Connect to vCenter

To migrate the networking components for the ESXi hosts to the Cisco Nexus 1000V, complete the following steps:

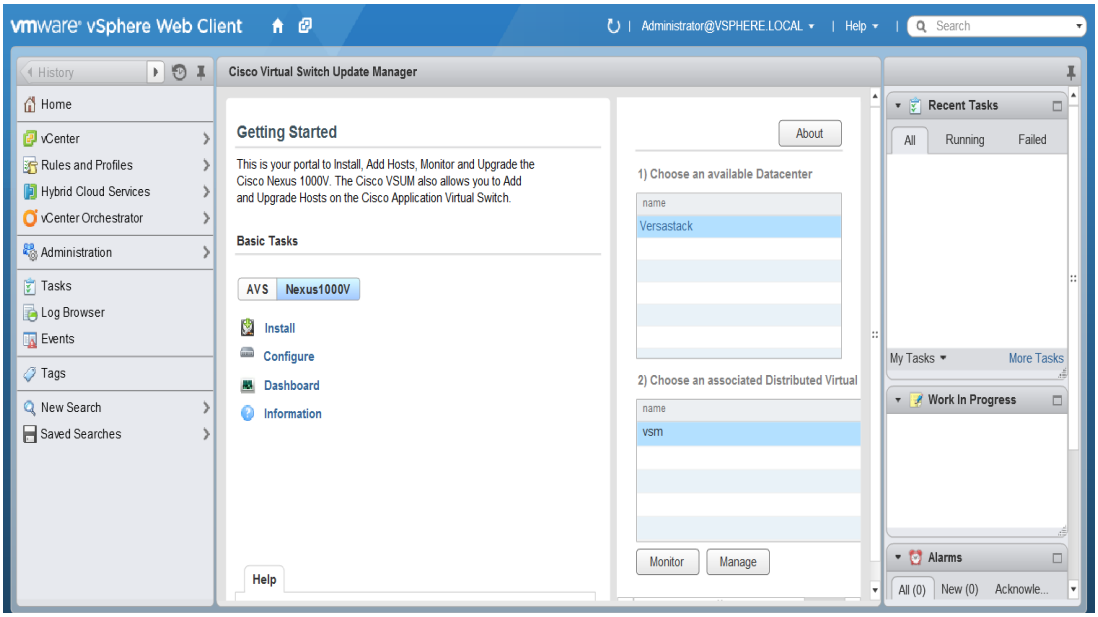
1. In the vSphere web client, click the Home tab and click the Cisco Virtual Switch Update Manager.



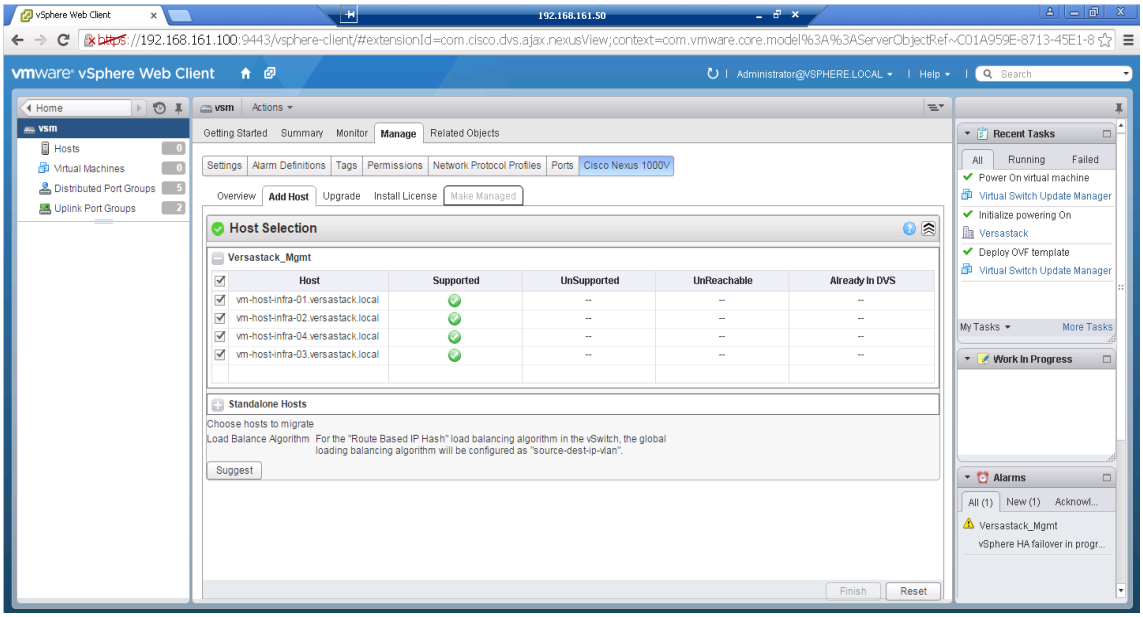
2. Click the Nexus 1000v and click Configure.



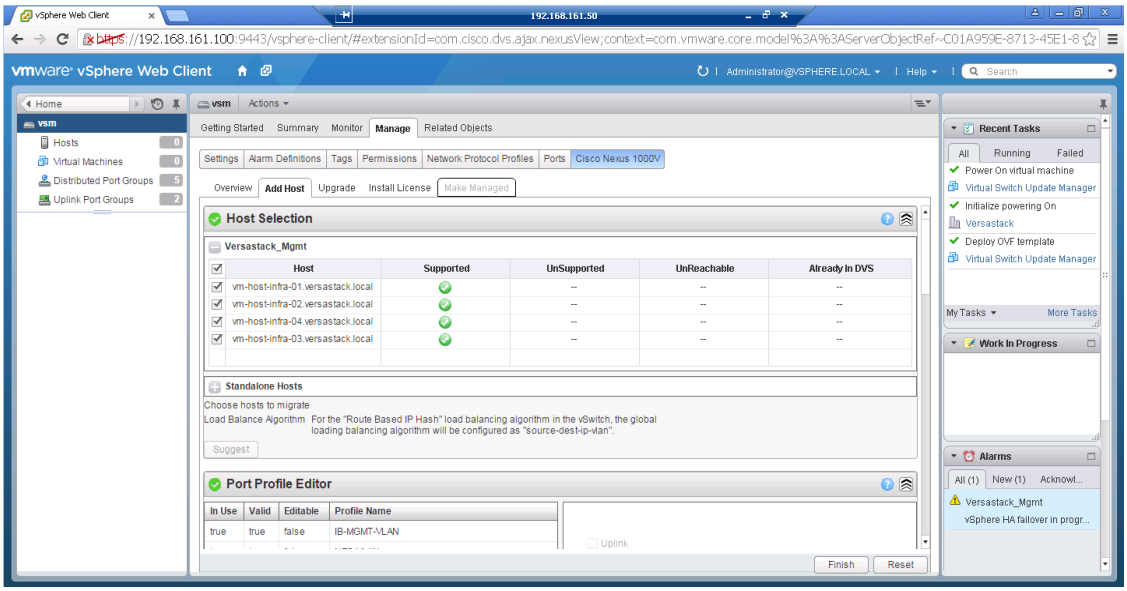
3. Click Datacenter, then click Distributed Virtual Switch and select Manage.



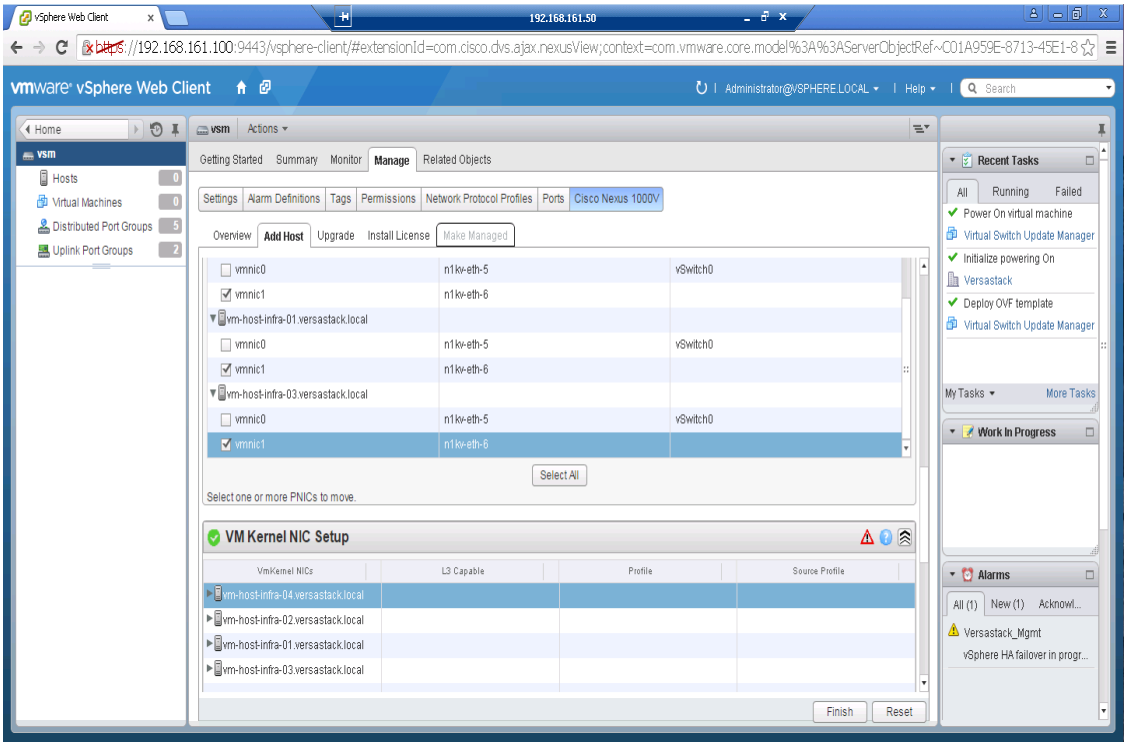
4. Click the Add Host tab then select the plus sign next to Versastack_Management, then click the top check box to both Hosts.



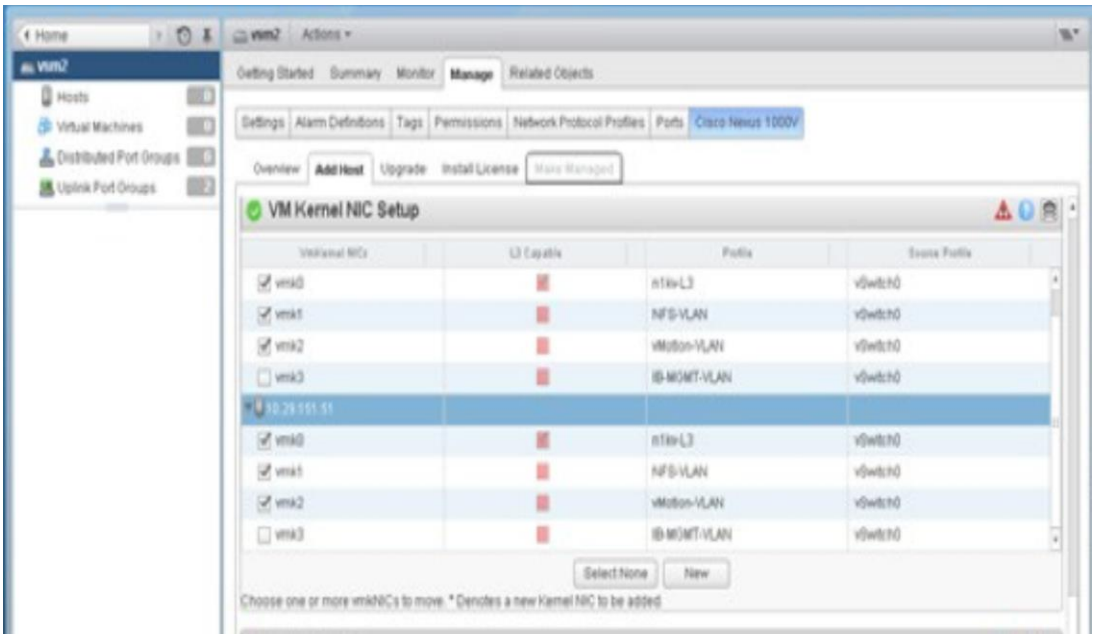
5. Click Suggest.

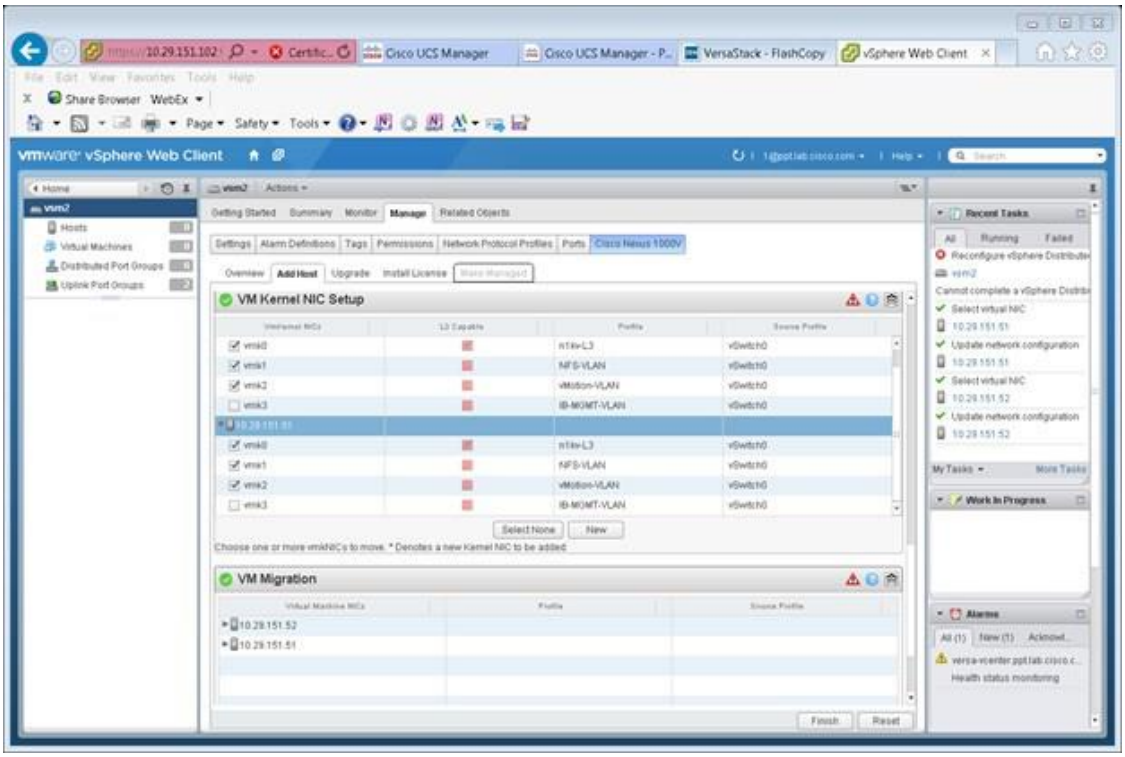


6. Select the Physical NIC Migration, and select the Unused Nic vmnic1 for migration. Select system uplink in the middle pane.

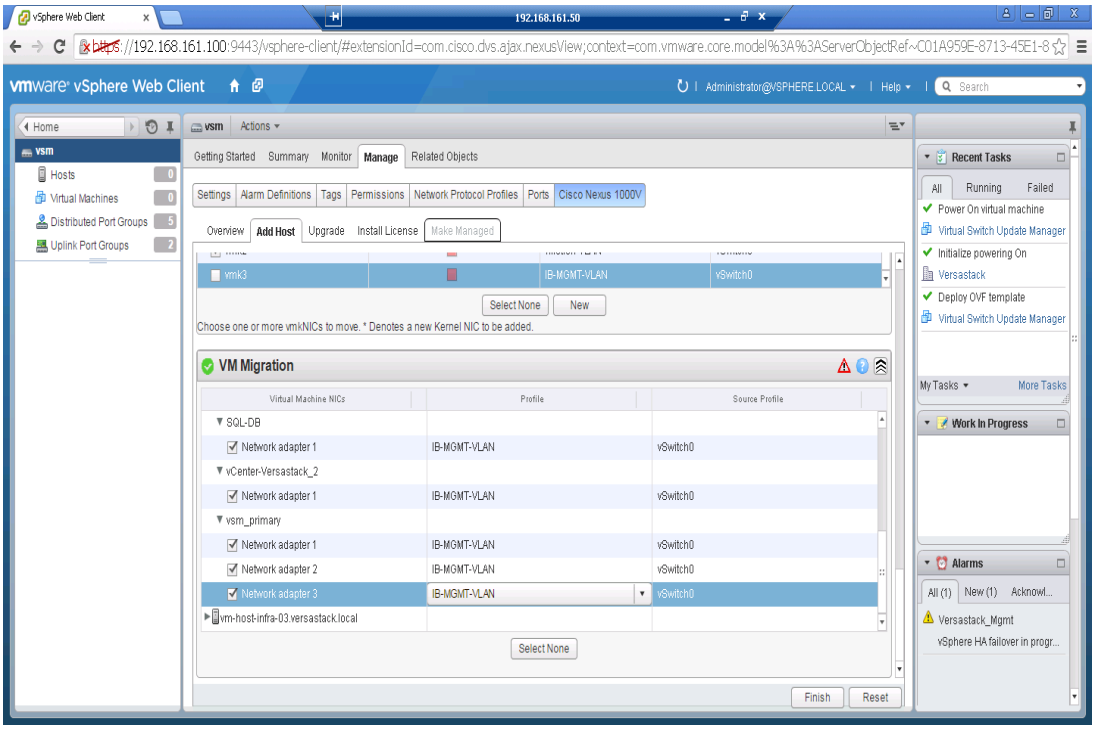


7. For the VM Kernel NIC Setup, deselect vmk3, which is the temporary management kernel we created for this migration.



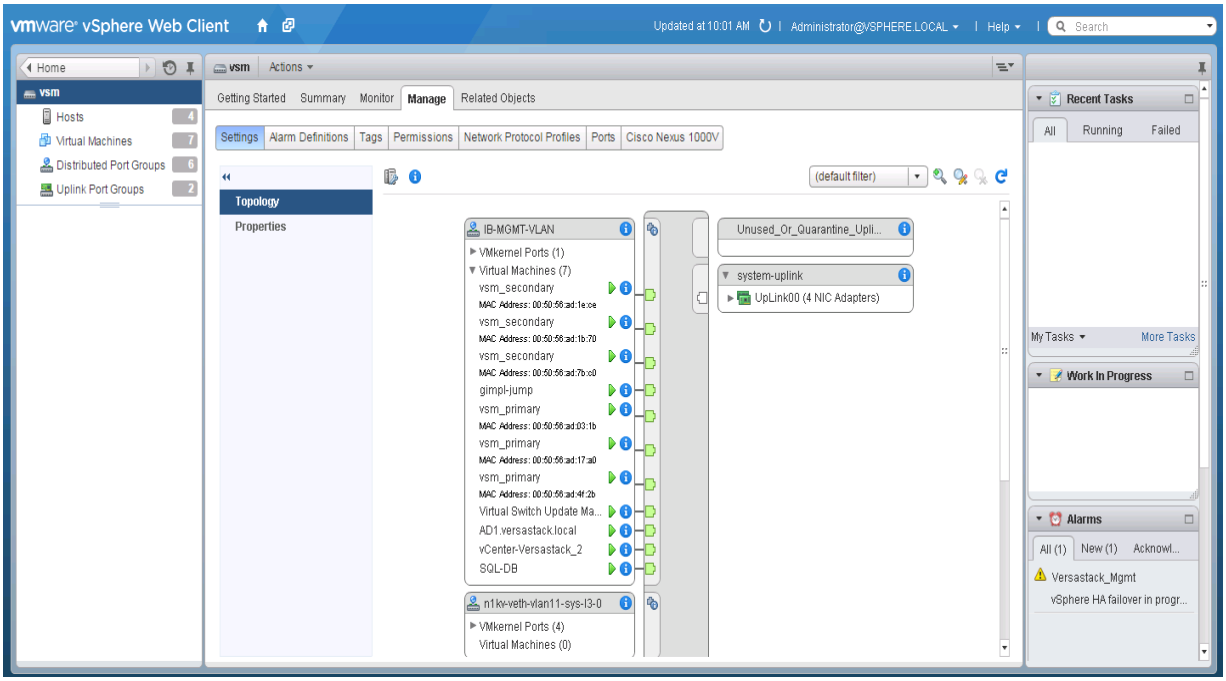


8. For VM migration click the button next to the virtual machine to expand the target profile and chose the correct profile which should be IB-MGMT-VLAN. Repeat this for each Virtual Machine.



9. Click Finish.

10. When the migration completes, click Settings then click Topology and expand the virtual machines to view the network connections.



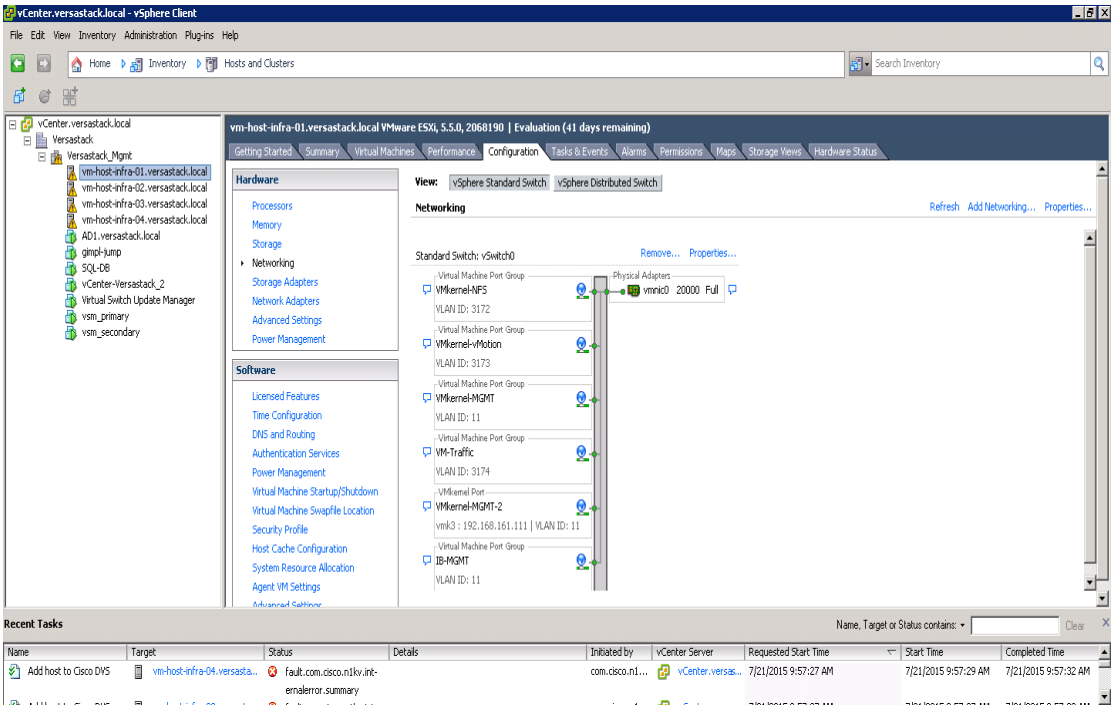
Remove the Networking Standard Switch Components for ESXi Hosts

In this section, the unused standard switch components will be removed and the second VIC will be assigned. To remove the unused switch and assign the second VIC, complete the following steps:

ESXi Host VM-Host-Infra-01

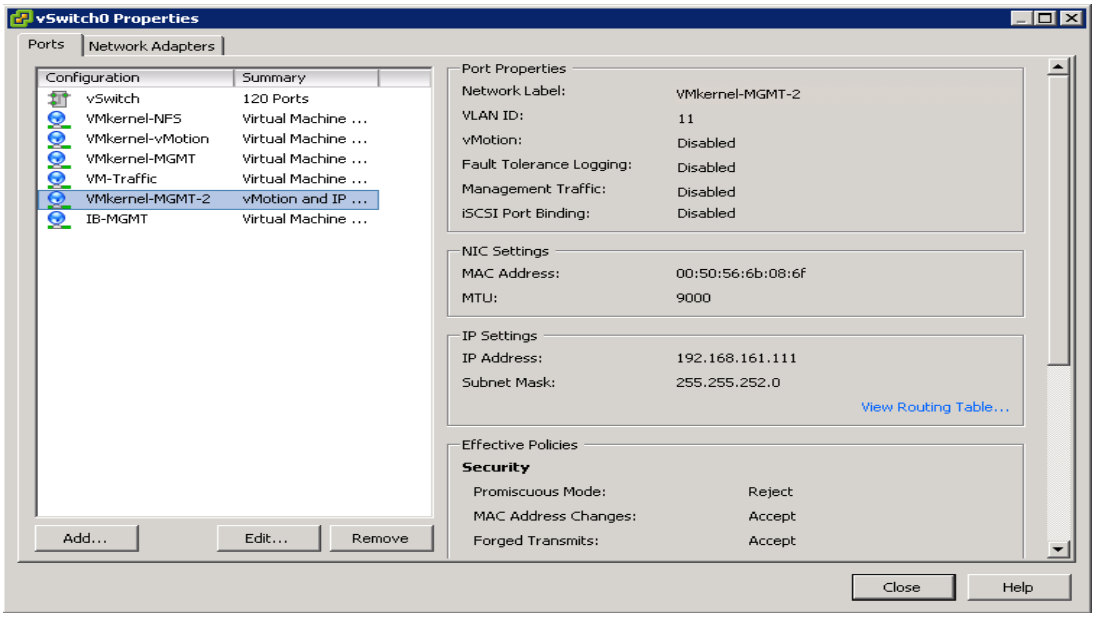
Repeat the steps in this section for all ESXi hosts.

1. From each vSphere Client, select the host in the inventory.
2. Click the Configuration tab.
3. Click Networking.
4. Select the VSphere Standard switch, then click Properties.



5. Click the temporary network VMkernel-MGMT-2 created for the migration and click Remove.

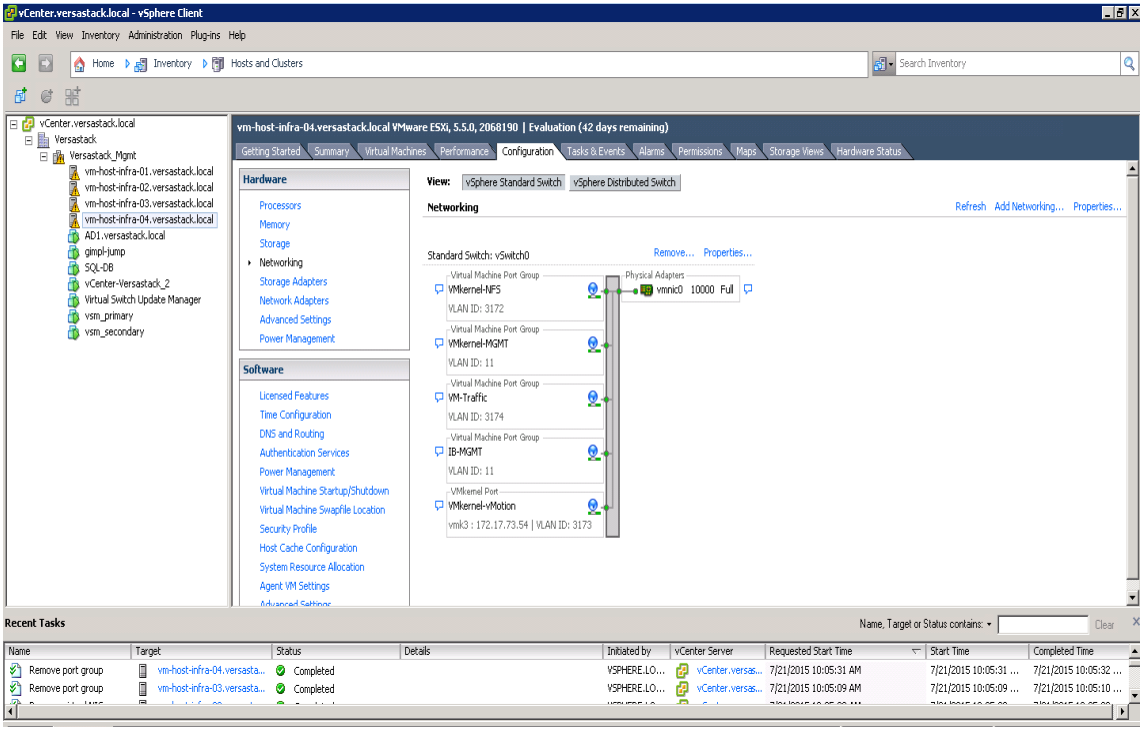
6. Click Yes, then click Yes again.



7. Click Close.

8. Validate you still are focused on the VSphere standard switch and click Remove to remove this switch.

9. Click Yes to the warning popup.

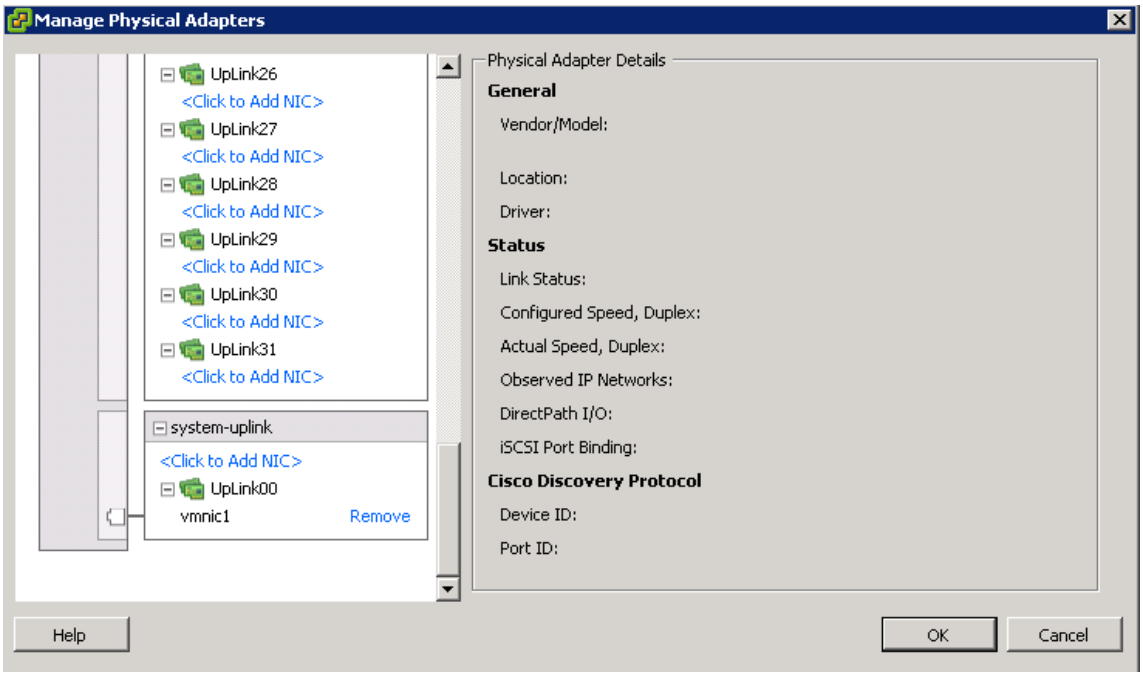


10. After vSwitch0 has disappeared from the screen, click vSphere Distributed Switch at the top next to View.

11. Click Manage Physical Adapters.

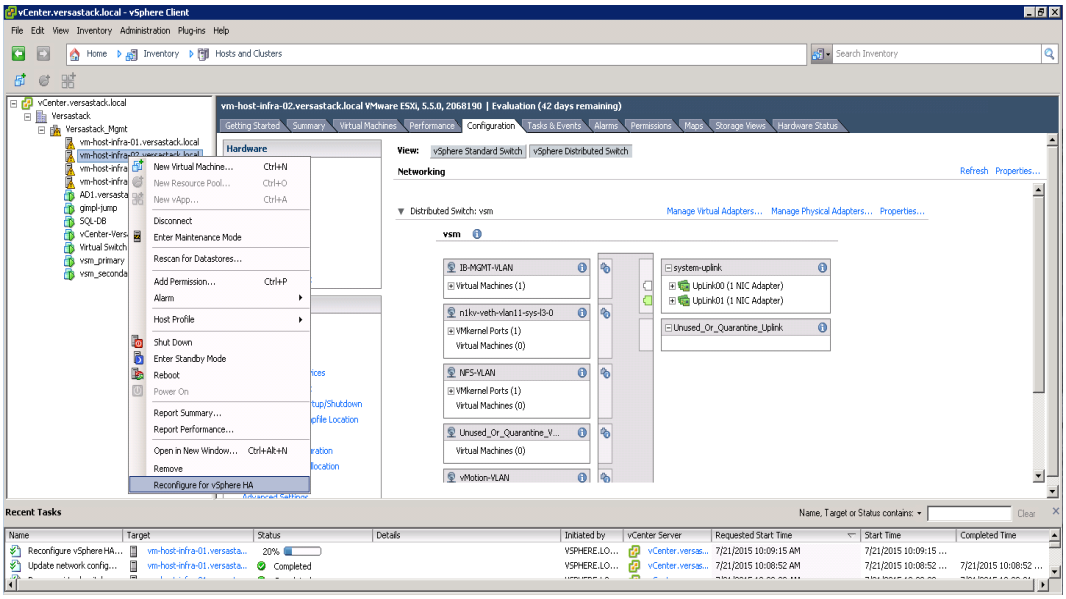
12. Scroll down to the system-uplink box and click Add NIC.

13. Choose vmnic0 and click OK, then click OK again.



14. Validate there are no warnings for the ESX nodes. From each vSphere Client, select the Hosts and Clusters in the inventory section, click the Summary tab.

15. If there are warnings, right-click each node and click Reconfigure for vSphere HA.



Remove the Redundancy for the NIC in Cisco UCS Manager

While creating the ESXi vNIC template settings, the default is to enable hardware failover on the vNIC. When you have deployed the N1kV, that setting is no longer required and should be disabled. To remove the redundancy, complete the following steps:

1. Launch UCS Manager and click the LAN tab.

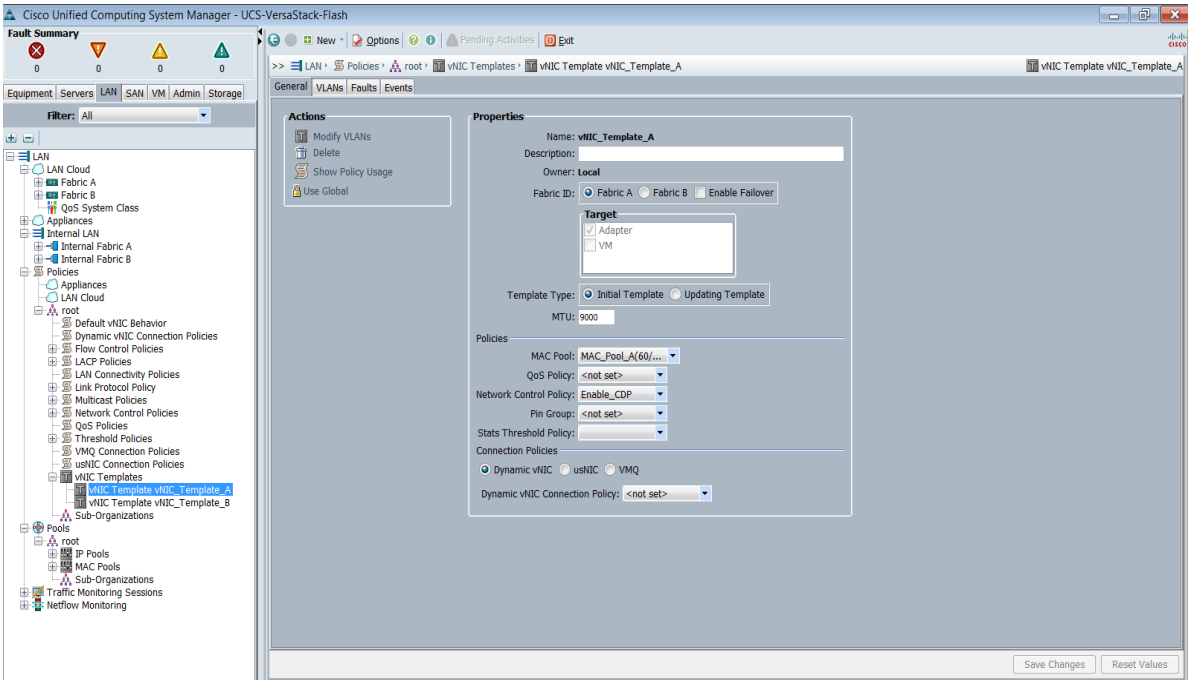
2. Click Policies, root, vNIC templates.

3. Click vNIC_Template_A, and on the General Tab uncheck enable failover.

4. Click Save Changes, then Yes, then ok.

5. Repeat action for vNIC_Template_B.

Reboot the ESXi hosts to implement the change.



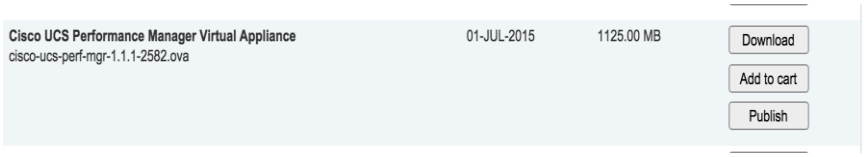
For more information about the 1000v switch, including how to update the software after installation, please visit the web site: http://www.cisco.com/c/en/us/products/switches/nexus-1000v-switch-vmware-vsphere/index.html

Set Up the Optional Cisco UCS Performance Manager

Deploying a VMware Virtual Machine for Cisco UCS Performance Manager

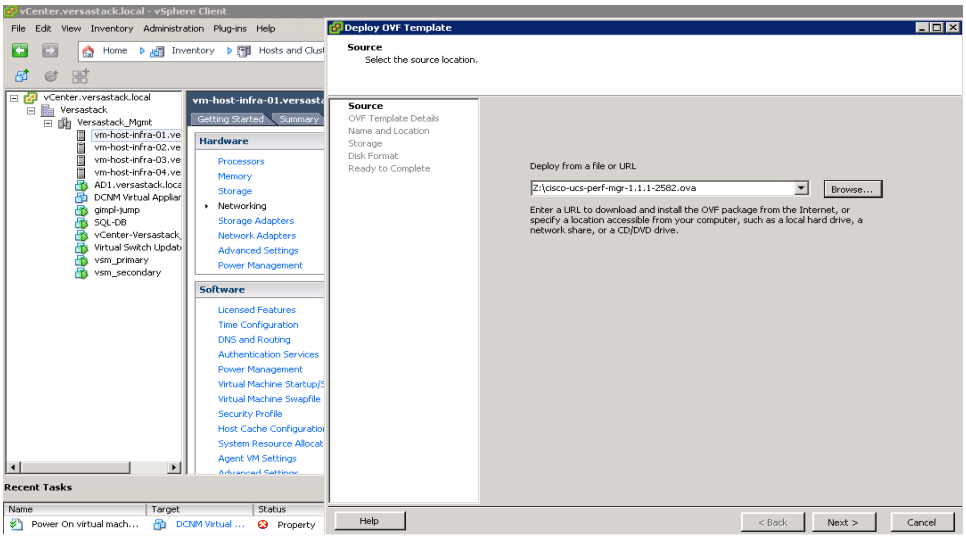
To deploy a VMware virtual machine, complete the following steps:

1. Log in and Download the UCS Performance Manager appliance package to your workstation from [www.cisco.com.](http://www.cisco.com)



2. Unzip the package.

3. From the vSphere client, click File, Deploy OVF Template and browse to the unzipped ova file.

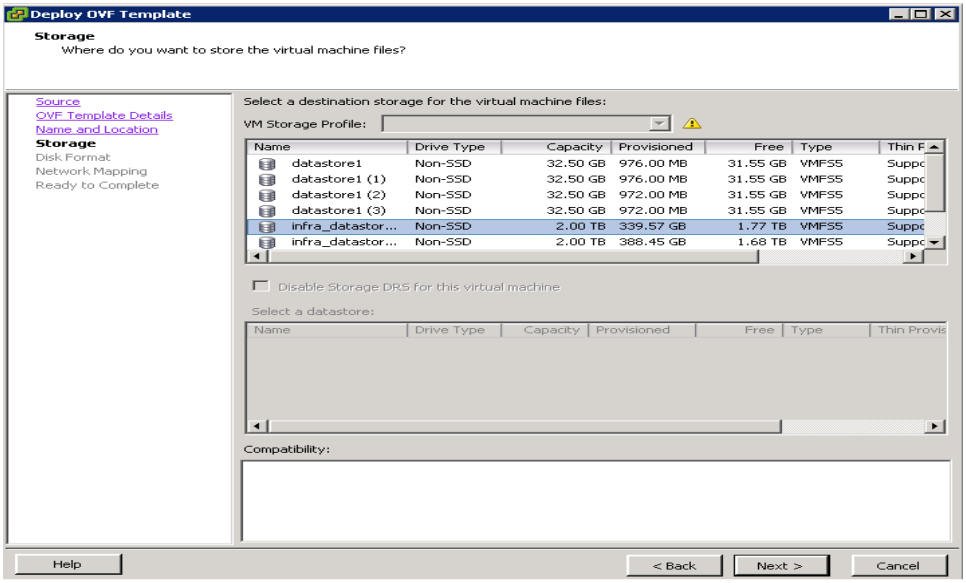


4. Click Next, then click Next again.

5. Review the license agreement. Click Next.

6. Click Next on the Name and Location screen.

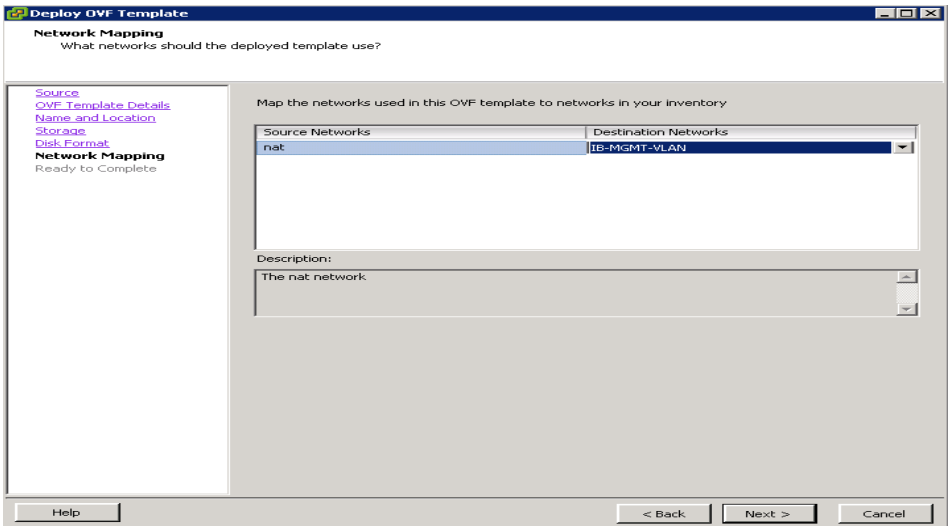
7. Select VersaStack as the Host Cluster and click Next.

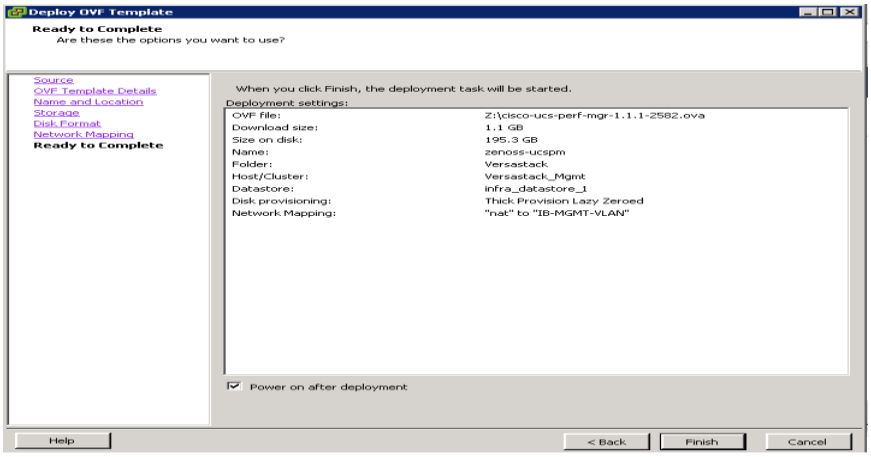


8. Select infra_datastore_1 as the Datastore and click Next.

9. Choose a disk format and Click Next.

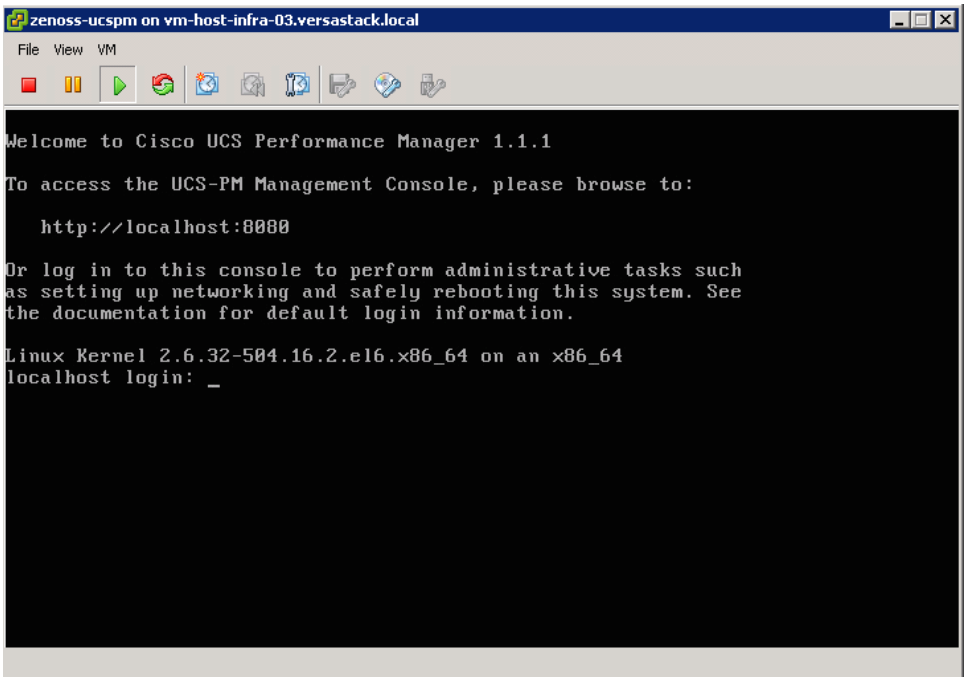
10. For Network Mapping make sure you have Management Mapped to IB-Mgmt and click Next.



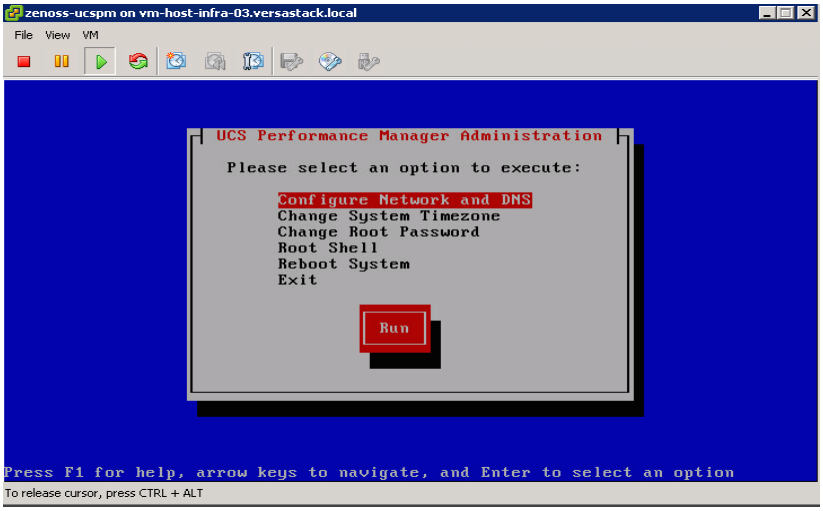


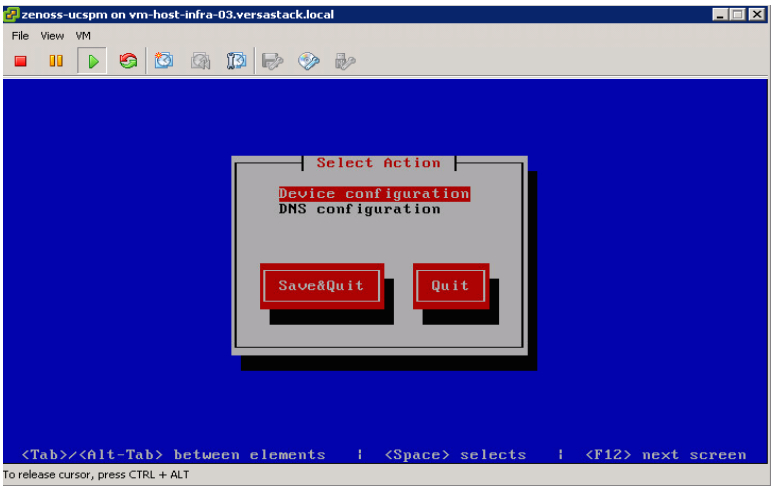
11. In the Ready to Complete panel, review the deployment settings, and then click Finish.

12. Gain access to the console interface of the Cisco UCS Performance Manager virtual machine, through VMware vSphere.



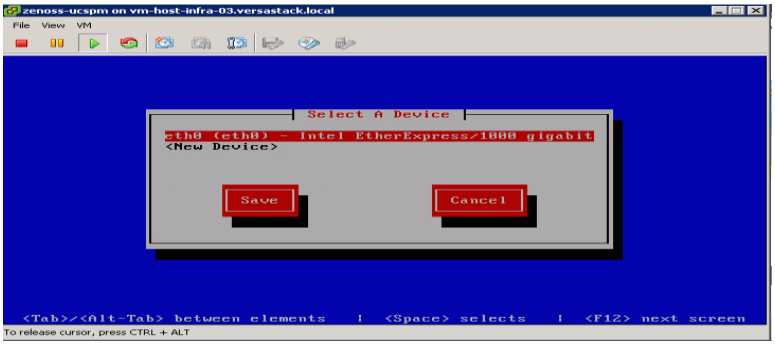
13. Log in to the virtual machine as root.





14. From the UCS Performance Manager Administration menu, use the UP-ARROW or DOWN-ARROW key to select Configure Network and DNS, and then press ENTER.

15. Select Device Configuration, and press ENTER.



16. Select the Ethernet controller device, and then press ENTER.

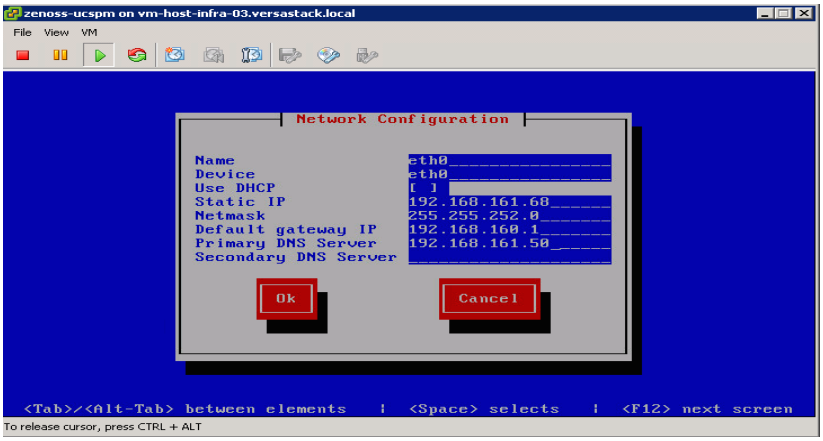
17. In the Network Configuration screen, modify the device settings.

18. To move down through the fields, use TAB. To move up, use SHIFT-TAB.

19. To select or deselect Use DHCP, use SPACE

20. Select OK and press ENTER to save the settings and return to the Select a Device screen.

21. Select Save and press ENTER to save the device configuration and return to the Configure Network and DNS screen.



22. Select Save&Quit and press ENTER to save the changes and return to the UCS Performance Manager Administration menu.

23. Use the UP-ARROW or DOWN-ARROW key to select Reboot System, and then press ENTER.

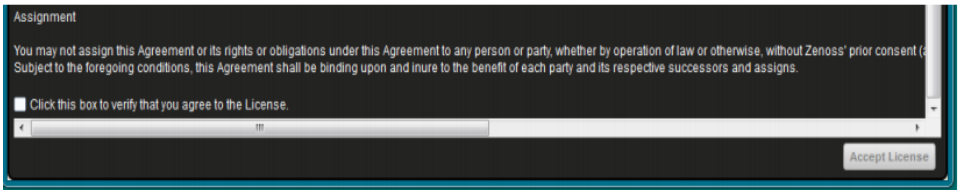
Setting up Cisco UCS Performance Manager

This section describes how to use the Cisco UCS Performance Manager Setup Wizard to provide your license key, define users and passwords, and set up Cisco UCS domains. To setup the Cisco UCS Performance Manager, complete the following steps:

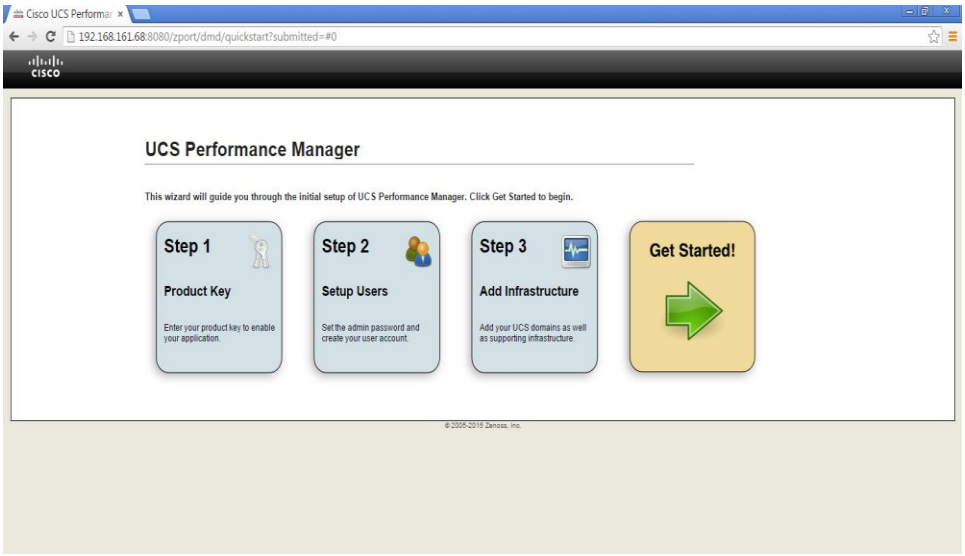
1. In a web browser, navigate to the login page of the Cisco UCS Performance Manager interface. Cisco UCS Performance Manager redirects the first login attempt to the Setup page, which includes the End User License Agreement (EULA) dialog.

2. Read through the agreement.

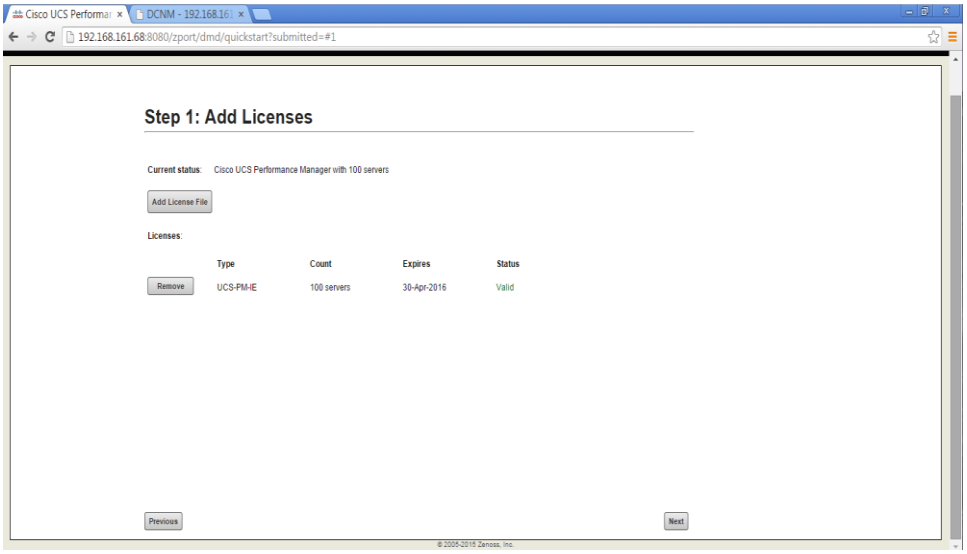
3. At the bottom of the EULA dialog, check the check box on the left side, and then click the Accept License button on the right side.



4. On the Cisco UCS Performance Manager Setup page, click Get Started.

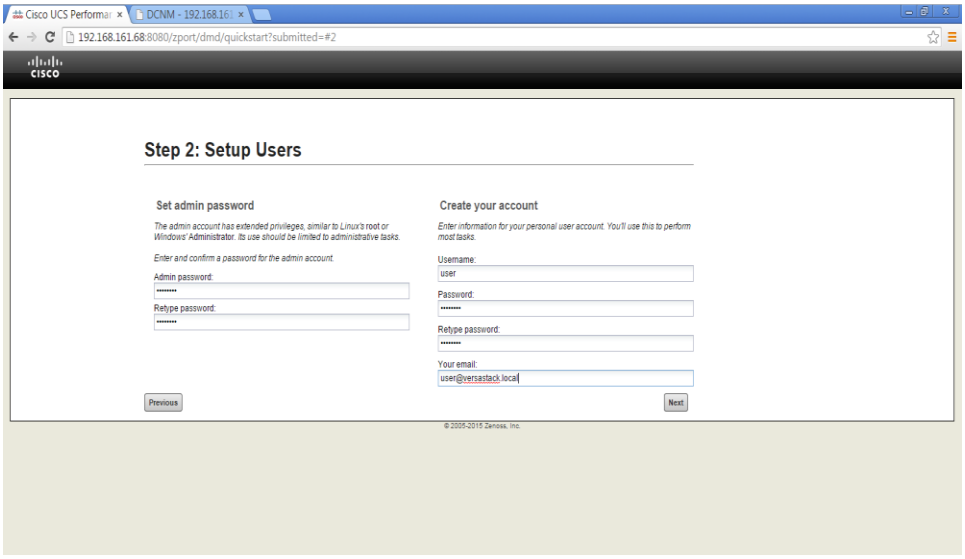


5. On the Add Licenses page, click Add License File.



6. Proceed to the next task or repeat the preceding step.

7. Verify the product name and number of servers in the Current Status field matches the product you purchased, click Next.



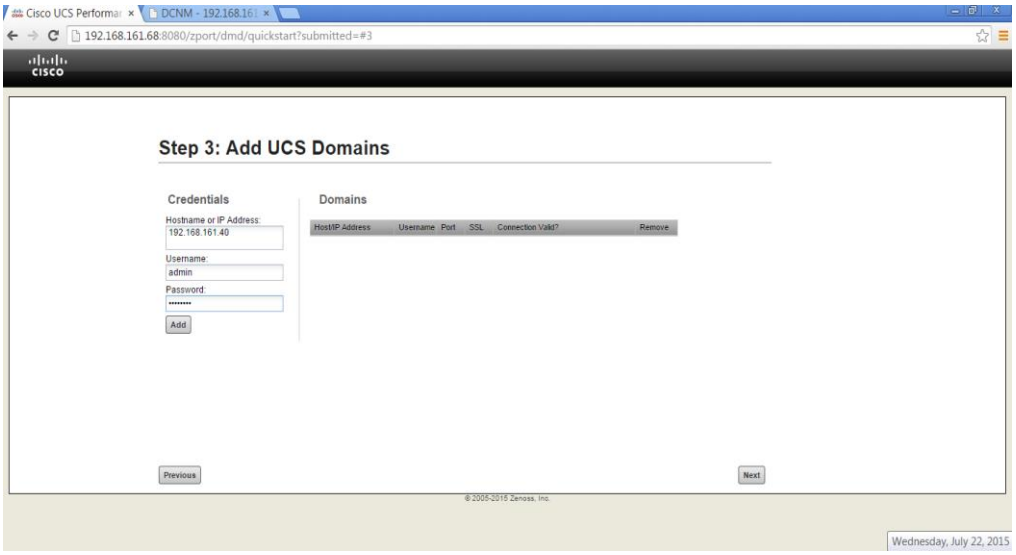
8. On the Setup Users page, enter a password for the admin user, and create an account for one additional user.

9. In the Set admin password area, enter and confirm a password for the admin user account.

10. In the Create your account area, create one additional administrative user account.

11. Click Next.

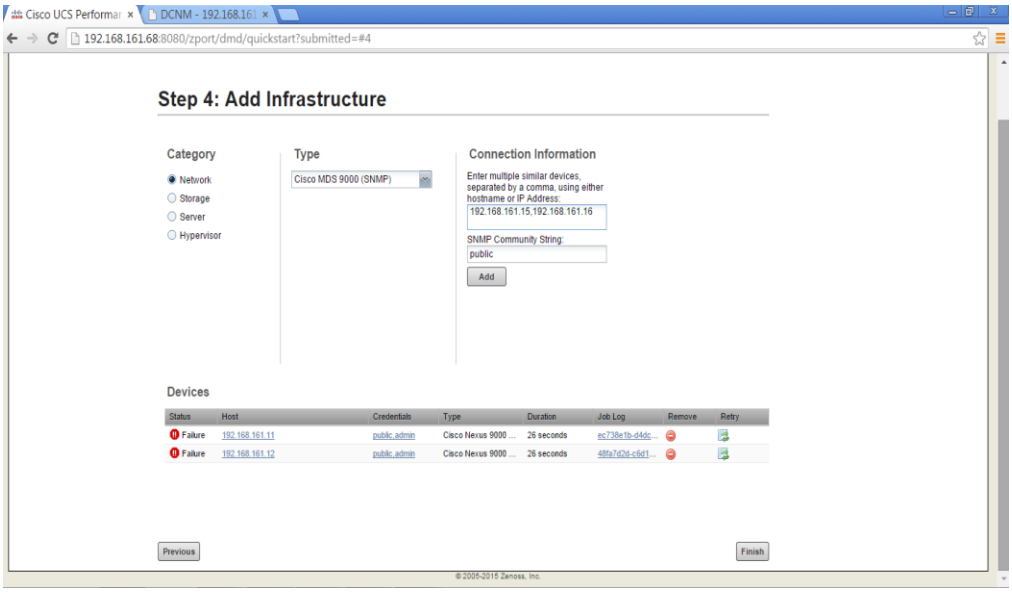
12. On the Add UCS Domains page, provide connection credentials for one or more domains.



13. Click Add.

14. Verify for Connection Valid status as Success.

15. Click Next to continue to the Add Infrastructure page.



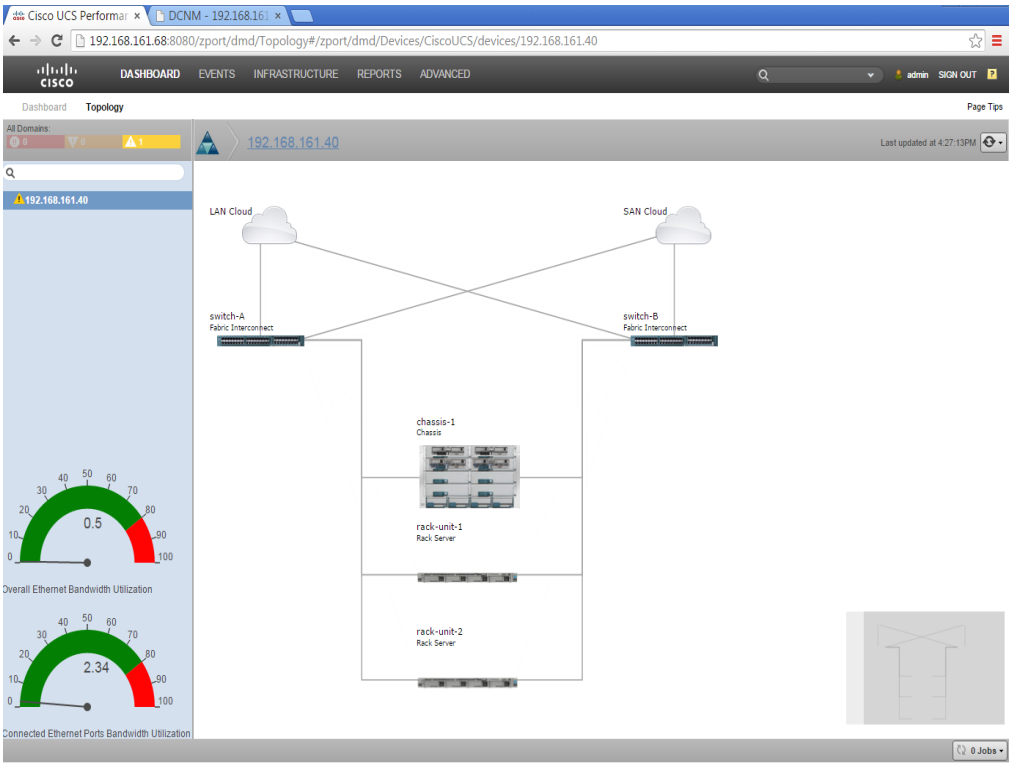
16. In the Category area, select Network.

17. In the Type list, select Cisco MDS 9000 (SNMP) and enter the IP addresses of the MDS 9148S switches in the connection details field.

18. Click Add.

19. Optionally add the ESX servers and the Nexus 9372's by selecting Hypervisor and Network with in the category.

20. Verify that the devices are discovered from the Dashboard and Topology.



For more information on Cisco UCS Performance Manager upgrade, configure and administration, please visit the web site: http://www.cisco.com/c/en/us/support/servers-unified-computing/ucs-performance-manager/tsd-products-support-series-home.html.

Backup Management and other Software

IBM Solutions

IBM is well known for management software. Added value to this solution can be obtained by installing IBM's Storage Management Console for VMware vCenter. Please visit the IBM website to obtain the latest version at http://www.ibm.com/us/en/.

For details about IBM backup and disaster recovery solutions, please refer to: http://www-03.ibm.com/systems/storage/solutions/backup-and-disaster-recovery/.

Bill of Materials

This Bill of Materials for VersaStack is for reference purposes and it only includes the major components and may or may not include components such as cables, SFPs, etc.

Bill of Materials for VersaStack

Part Number	Product Description	Quantity Required
IBM FlashSystem V9000 Components		
9846/9848-AC2	FlashSystem V9000 Control Enclosure	2
9846/9848-AE2	FlashSystem V9000 Storage Enclosure	1
AF1P	2m Fiber Cable (LC)	24
AH11	16Gb FC Adapter	4
AH10	8Gb FC Adapter	4
AF19	16Gb Flash Enclosure Optics (4 pack)	2
AHA1	Compression Accelerator	4
5641-RB7	IBM FlashSystem V9000 Software V7	1
AF25	5.7 TB MicroLatency Flash Module	12

Part Number	Product Description	Quantity Required
Cisco Nexus 9300 Switching Components		
N9K-C9372PX	Nexus 9300 with 48p 10G SFP+ and 6p 40G QSFP+	2
N3K-C3064-ACC-KIT	Nexus 9300	2

Part Number	Product Description	Quantity Required
	Accessory Kit	
NXA-FAN-30CFM-F	Nexus 2K/3K/9K Single Fan, port side exhaust airflow	8
CAB-9K12A-NA	Power Cord, 125VAC 13A NEMA 5-15 Plug, North America	4
N9K-PAC-650W-B	Nexus 9300 650W AC PS, Port-side Exhaust	4

Part Number	Product Description	Quantity Required
Cisco MDS FC Switch		
DS-C9148S-12PK9	MDS 9148S 16G FC switch, w/ 12 active ports	2
DS-9148S-KIT-CSCO	MDS 9148S Accessory Kit for Cisco	2
M9148S-PL12	MDS 9148S 16G FC 12-port upgrade license	2
DS-SFP-FC8G-SW	8 Gbps Fibre Channel SW SFP+, LC	16
DS-SFP-FC16G-SW	16 Gbps Fibre Channel SW SFP+, LC	16
CAB-9K12A-NA	Power Cord, 125VAC 13A NEMA 5-15 Plug, North America	4

Part Number	Product Description	Quantity Required
Cisco UCS Unified Compute System		
UCSB-5108-AC2	UCS 5108 Blade Server AC2 Chassis, 0 PSU/8 fans/0 FEX	1
UCS-IOM-2208XP	UCS 2208XP I/O Module (8 External, 32 Internal 10Gb Ports)	2
UCSB-5108-PKG-HW	UCS 5108 Packaging for chassis with half width blades.	1
N20-CBLKP	Power supply unit blanking panel for UCS 5108	1
N01-UAC1	Single phase AC power module for UCS 5108	1
N20-FAN5	Fan module for UCS 5108	8
N20-CBLKB1	Blade slot blanking panel for UCS 5108/single slot	4
N20-CAK	Accessory kit for UCS 5108 Blade Server Chassis	1

Part Number	Product Description	Quantity Required
UCSB-B200-M4	UCS B200 M4 w/o CPU, mem, drive bays, HDD, mezz	4
UCS-CPU-E52650D	2.30 GHz E5-2650 v3/105W 10C/25MB Cache/DDR4 2133MHz	8
UCS-MR-1X162RU-A	16GB DDR4-2133-MHz RDIMM/PC4-17000/dual rank/x4/1.2v	32
UCSB-MLOM-PT-01	Cisco UCS Port Expander Card (mezz) for VIC	4
UCSB-MLOM-40G-03	Cisco UCS VIC 1340 modular LOM for blade servers	4
UCSB-HS-EP-M4-F	CPU Heat Sink for UCS B200 M4 Socket 1 (Front)	4
UCSB-HS-EP-M4-R	CPU Heat Sink for UCS B200 M4 Socket 2 (Rear)	4
UCSB-LSTOR-BK	FlexStorage blanking panels w/o controller, w/o drive bays	8
UCSB-PSU-2500ACDV	2500W Platinum AC Hot	4

Part Number	Product Description	Quantity Required
	Plug Power Supply - DV	
CAB-C19-CBN	Cabinet Jumper Power Cord, 0 VAC 16A, C20-C19 Connectors	4

Part Number	Product Description	Quantity Required
Cisco UCS UCS-FI-6248UP Fabric Interconnect		
UCS-FI-6248UP	UCS 6248UP 1RU Fabric Int/No PSU/32 UP/ 12p LIC	2
UCS-ACC-6248UP	UCS 6248UP Chassis Accessory Kit	2
UCS-PSU-6248UP-AC	UCS 6248UP Power Supply/100-240VAC	4
UCS-BLKE-6200	UCS 6200 Series Expansion Module Blank	2
UCS-FAN-6248UP	UCS 6248UP Fan Module	4
UCS-FI-DL2	UCS 6248 Layer 2 Daughter Card	2
CAB-9K12A-NA	Power Cord, 1VAC 13A NEMA 5-15 Plug, North America	4

Part Number	Product Description	Quantity Required
Cisco FEX		
N2K-C2232PF	Nexus 2232PP with 16 FET, choice of airflow/power	2
NXA-AIRFLOW-SLV	Nexus Airflow Extension Sleeve	2
N2K-F10G-F10G	N2K Uplink option FET-10G to FET-10G	2
CAB-9K12A-NA	Power Cord, 125VAC 13A NEMA 5-15 Plug, North America	4
FET-10G	10G Line Extender for FEX	32
N2232PP-FA-BUN	Standard airflow pack: N2K-C2232PP-10GE, 2AC PS, 1Fan	1

Part Number	Product Description	Quantity Required
Cisco UCS Rack Servers		
UCSC-C220-M4S	UCS C220 M4 SFF w/o CPU, mem, HD, PCIe, PSU, rail kit	2
UCS-CPU-E52640D	2.60 GHz E5-2640 v3/90W 8C/20MB Cache/DDR4 1866MHz	4
UCS-MR-1X162RU-A	16GB DDR4-2133-MHz RDIMM/PC4-17000/dual	16

Part Number	Product Description	Quantity Required
	rank/x4/1.2v	
UCSC-MLOM-CSC-02	Cisco UCS VIC1227 VIC MLOM - Dual Port 10Gb SFP+	2
UCSC-CMAF-M4	Reversible CMA for C220 M4 friction & ball bearing rail kits	2
UCSC-RAILF-M4	Friction Rail Kit for C220 M4 rack servers	2
UCS-SD-32G-S	32GB SD Card for UCS servers	4
UCSC-PSU1-770W	770W AC Hot-Plug Power Supply for 1U C-Series Rack Server	4
CAB-9K12A-NA	Power Cord, 125VAC 13A NEMA 5-15 Plug, North America	4
N20-BBLKD	UCS 2.5 inch HDD blanking panel	16
UCSC-HS-C220M4	Heat sink for UCS C220 M4 rack servers	4
UCSC-MLOM-BLK	MLOM Blanking Panel	2

This Bill of Materials is using the Cisco 1300 series VIC for blade servers. The Cisco 1200 VIC series can be substituted for the 1300 series VIC. Please consult with the IBM and Cisco compatibility guides for the latest hardware supported.

Appendix

Build Windows Active Directory Server Virtual Machines

ESXi Host VM-Host-Infra-01

To build an Active Directory Server virtual machine (VM) for the `VM-Host-Infra-01` ESXi host, complete the following steps:

1. Log in to the host by using the VMware vSphere Client.
2. In the vSphere Client, select the host in the inventory pane.
3. Right-click the host and select New Virtual Machine.
4. Select Custom and click Next.
5. Enter a name for the VM. Click Next.
6. Select infra_datastore_1. Click Next.
7. Select Virtual Machine Version: 10. Click Next.
8. Verify that the Windows option and the Microsoft Windows Server 2008 R2 (64-bit) version are selected. Click Next.
9. Select two virtual sockets and one core per virtual socket. Click Next.
10. Select 4GB of memory. Click Next.
11. Select one network interface card (NIC).
12. For NIC 1, select the IB-MGMT Network option and the VMXNET 3 adapter. Click Next.
13. Keep the LSI Logic SAS option for the SCSI controller selected. Click Next.
14. Keep the Create a New Virtual Disk option selected. Click Next.
15. Make the disk size at least 60GB. Click Next.
16. Click Next.
17. Select the checkbox for Edit the Virtual Machine Settings Before Completion. Click Continue.
18. Click the Options tab.
19. Select Boot Options.

20. Select the Force BIOS Setup checkbox.

21. Click Finish.

22. From the left pane, expand the host field by clicking the plus sign (+).

23. Right-click the newly created AD Server VM and click Open Console.

24. Click the third button (green right arrow) to power on the VM.

25. Click the ninth button (CD with a wrench) to map the Windows Server 2008 R2 SP1 ISO, and then select Connect to ISO Image on Local Disk.

26. Navigate to the Windows Server 2008 R2 SP1 ISO, select it, and click Open.

27. Click in the BIOS Setup Utility window and use the right arrow key to navigate to the Boot menu. Use the down arrow key to select CD-ROM Drive. Press the plus (+) key twice to move CD-ROM Drive to the top of the list. Press F10 and Enter to save the selection and exit the BIOS Setup Utility.

28. The Windows Installer boots. Select the appropriate language, time and currency format, and keyboard. Click Next.

29. Click Install.

30. Make sure that the Windows Server 2008 R2 Standard (Full Installation) option is selected. Click Next.

31. Read and accept the license terms and click Next.

32. Select Custom (Advanced). Make sure that Disk 0 Unallocated Space is selected. Click Next to allow the Windows installation to complete.

33. After the Windows installation is complete and the VM has rebooted, click OK to set the Administrator password.

34. Enter and confirm the Administrator password and click the blue arrow to log in. Click OK to confirm the password change.

35. After logging in to the VM desktop, from the VM console window, select the VM menu. Under Guest, select Install/Upgrade VMware Tools. Click OK.

36. If prompted to eject the Windows installation media before running the setup for the VMware tools, click OK, then click OK.

37. In the dialog box, select Run setup64.exe.

38. In the VMware Tools installer window, click Next.

39. Make sure that Typical is selected and click Next.

40. Click Install. 41. Click Finish.

41. Click Yes to restart the VM.

42. After the reboot is complete, select the VM menu. Under Guest, select Send Ctrl+Alt+Del. Then enter the password to log in to the VM.

43. Set the time zone for the VM, IP address, gateway, and host name.

A reboot is required.

---

44. If necessary, activate Windows.

45. Download and install all required Windows updates.

This process requires several reboots.

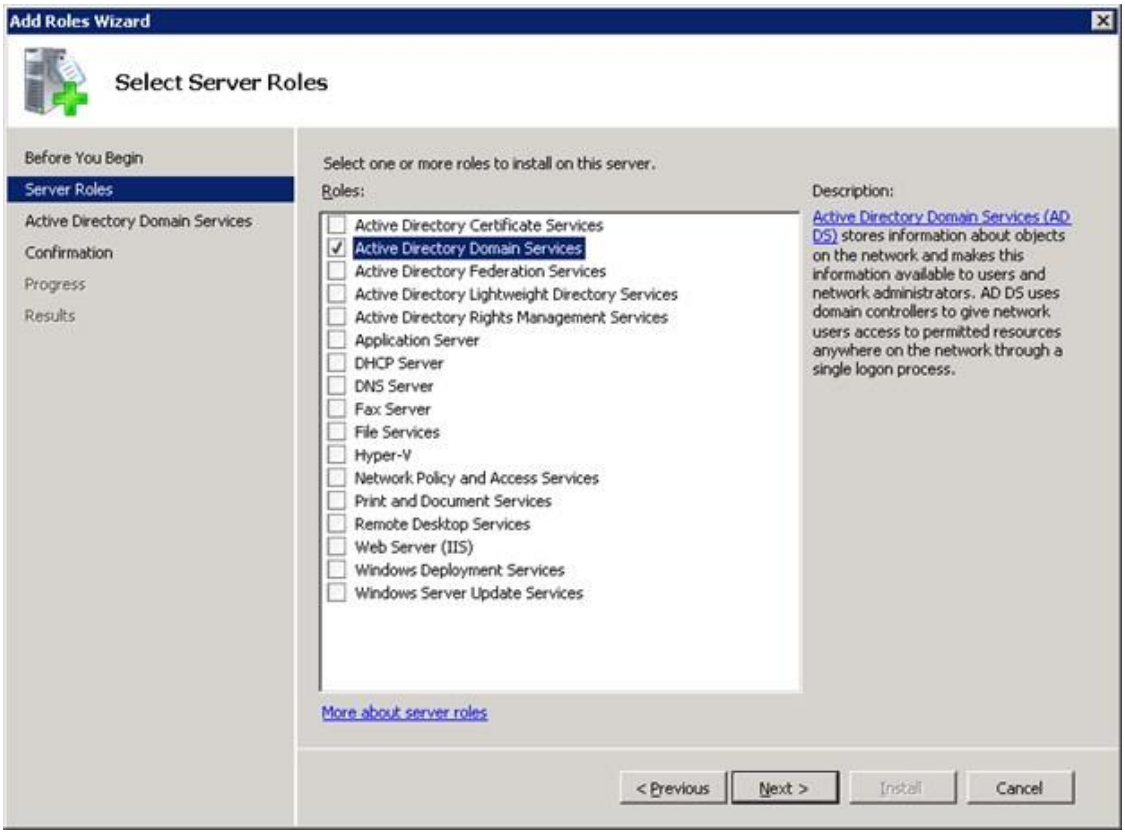
---

46. Open Server Manager.

47. On the left, click Roles, the select Add Roles on the right.

48. Click Next.

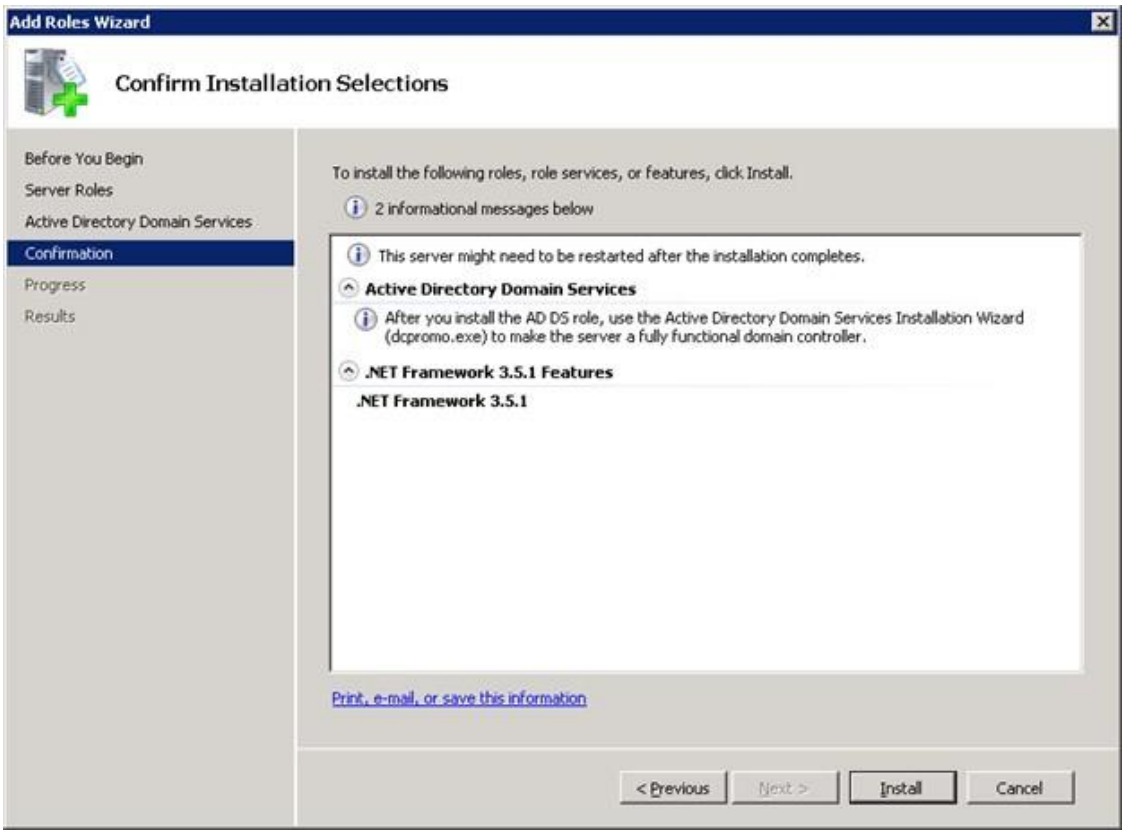
49. In the list, select the checkbox next to Active Directory Domain Services. 51. In the popup, click Add Required Features to add .NET Framework 3.5.1.

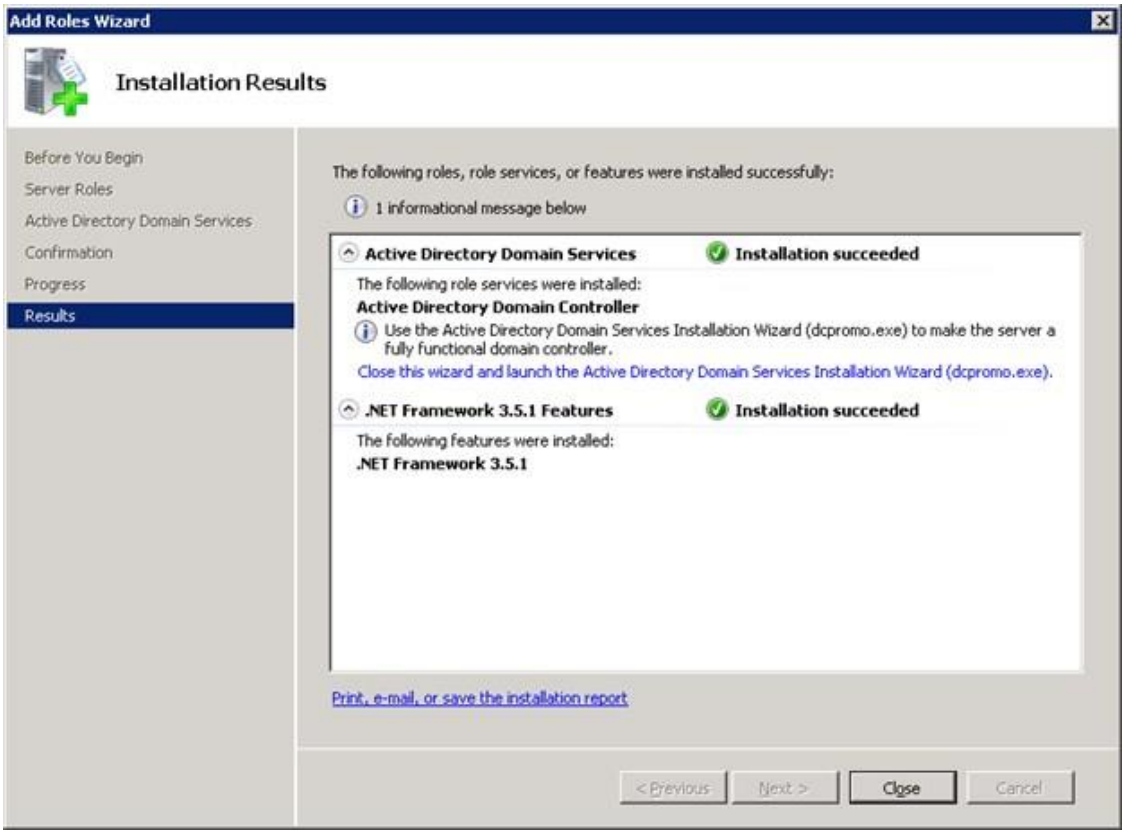


50. Click Next.

51. Click Next.

52. Click Install.



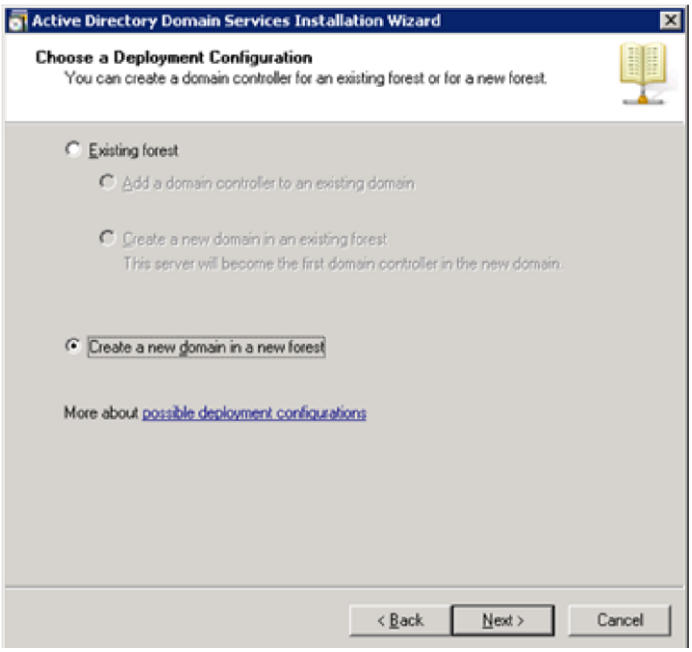


53. In the middle of the window, click Close this wizard and launch the Active Directory Domain Services Installation Wizard (dcpromo.exe).

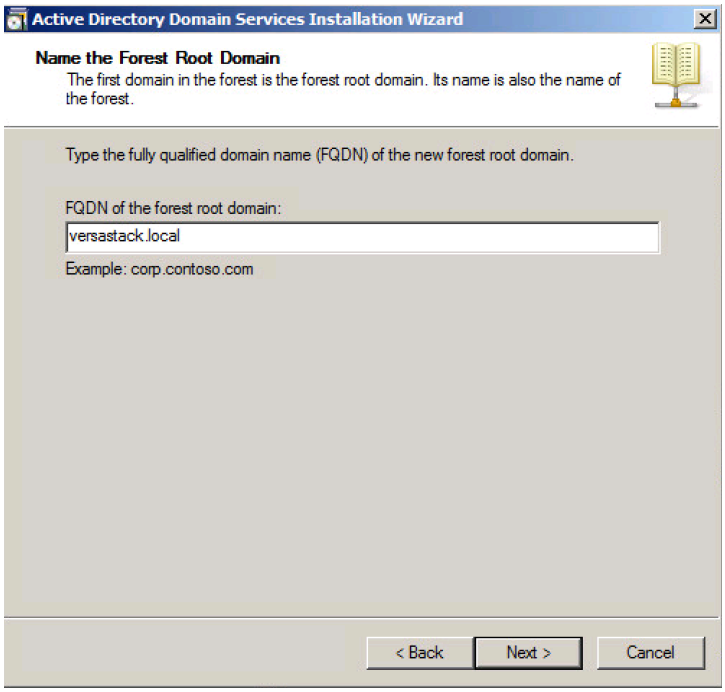
54. In the Active Directory Domain Services Installation Wizard, click Next.

55. Click Next.

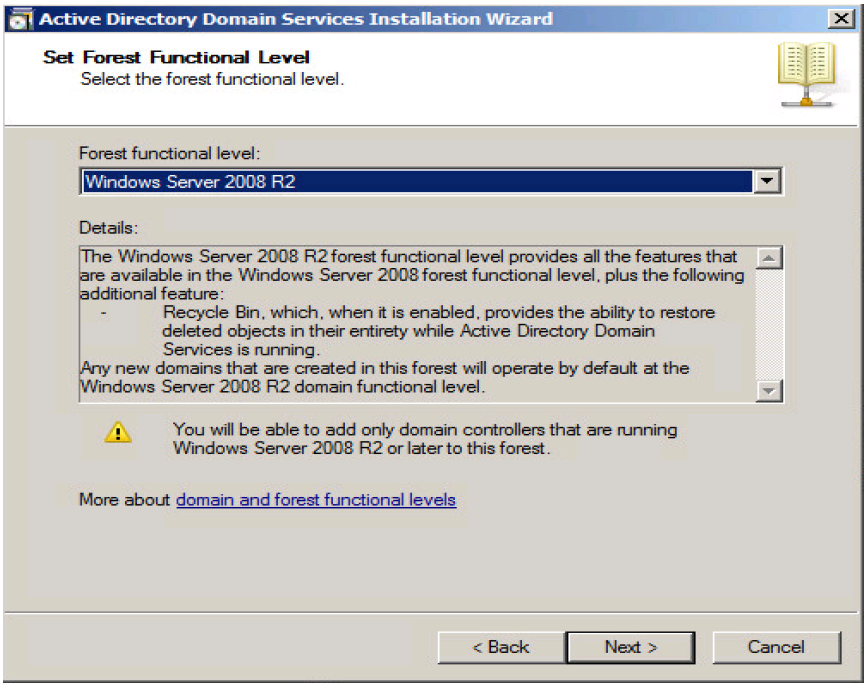
56. Select "Create a new domain in a new forest" and click Next.



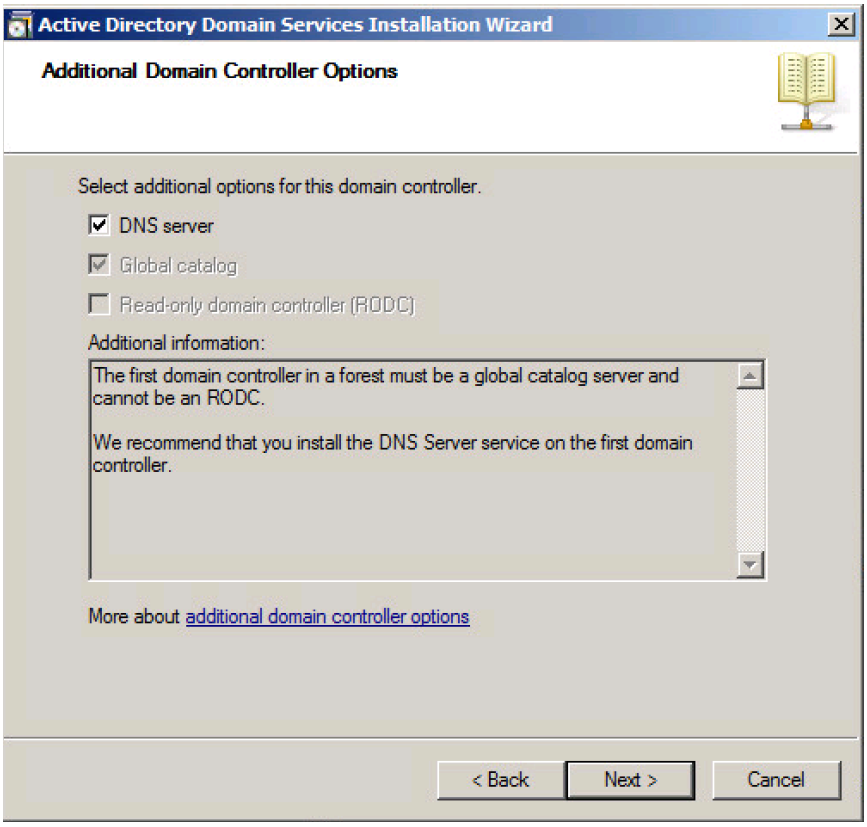
57. Type the FQDN of the Windows domain for this VersaStack and click Next.



58. Select the appropriate forest functional level and click Next.



59. Keep DNS server selected and click Next.



60. If one or more DNS servers exist that this domain can resolve from, select Yes to create a DNS delegation. If this AD server is being created on an isolated network, select No, to not create a DNS delegation. The remaining steps in this procedure assume a DNS delegation is not created. Click Next.

61. Click Next to accept the default locations for database and log files.
62. Enter and confirm <<var_password>> for the Directory Services Restore Mode Administrator Password. Click Next.
63. Review the Summary information and click Next. Active Directory Domain Services will install.
64. Click Finish.
65. Click Restart Now to restart the AD Server.
66. After the machine has rebooted, log in as the domain Administrator.
67. Open the DNS Manager by clicking Start > Administrative Tools > DNS.
68. Optional: Add Reverse Lookup Zones for your IP address ranges.
69. Expand the Server and Forward Lookup Zones. Select the zone for the domain. Right-click and select New Host (A or AAAA). Populate the DNS Server with Host Records for all components in the VersaStack.
70. Optional: Build a second AD server VM. Add this server to the newly created Windows Domain and activate Windows. Install Active Directory Domain Services on this machine. Launch dcpromo.exe at the end of this installation. Choose to add a domain controller to a domain in an existing forest. Add this domain controller to the domain created earlier. Complete the installation of this second domain controller. After vCenter Server is installed, affinity rules can be created to keep the two AD servers running on different hosts.

Cisco Nexus 9000 Example Configurations

Cisco Nexus 9000 A

```
VersaStack_nexus9k_A#



VersaStack_nexus9k_A# sh runn



!Command: show running-config
!Time: Thu Sep 10 18:29:58 2015


version 6.1(2)I3(4b)
switchname VersaStack_nexus9k_A
```

```
vdc VersaStack_nexus9k_A id 1
  allocate interface Ethernet1/1-54
  limit-resource vlan minimum 16 maximum 4094
  limit-resource vrf minimum 2 maximum 4096
  limit-resource port-channel minimum 0 maximum 511
  limit-resource u4route-mem minimum 248 maximum 248
  limit-resource u6route-mem minimum 96 maximum 96
  limit-resource m4route-mem minimum 58 maximum 58
  limit-resource m6route-mem minimum 8 maximum 8


cfs eth distribute
feature udld
feature lacp
feature vpc
logging level vpc 5


logging level aaa 5
logging level cdp 6
logging level monitor 6
logging level otm 5
logging level radius 5
logging level spanning-tree 6
username admin password 5 $1$cKpcGJCk$L13EI7E/kT7yugetZGc4z1  role network-admin
ssh key rsa 2048
ip domain-lookup
no service unsupported-transceiver
copp profile strict
snmp-server user admin network-admin auth md5 0x2727a9ca03efa8aac32b8a529849f2ad
priv 0x2727a9ca03efa8aac32b8a529849f2ad localizedkey
snmp-server host 192.168.161.67 traps version 2c public udp-port 2162
rmon event 1 log trap public description FATAL(1) owner PMON@FATAL
rmon event 2 log trap public description CRITICAL(2) owner PMON@CRITICAL
```

```
rmon event 3 log trap public description ERROR(3) owner PMON@ERROR
rmon event 4 log trap public description WARNING(4) owner PMON@WARNING
rmon event 5 log trap public description INFORMATION(5) owner PMON@INFO
ntp server 192.168.160.254

vlan 1-2,11,3172-3174
vlan 2
  name Native-VLAN
vlan 11
  name IB-MGMT-VLAN
vlan 3172
  name NFS-VLAN
vlan 3173
  name vMotion-VLAN
vlan 3174
  name VM-Traffic-VLAN

spanning-tree port type edge bpduguard default
spanning-tree port type edge bpdufilter default
spanning-tree port type network default
vrf context management
  ip route 0.0.0.0/0 192.168.160.1
hardware qos ns-buffer-profile mesh
vpc domain 10
  peer-switch
  role priority 10
  peer-keepalive destination 192.168.161.12 source 192.168.161.11
  delay restore 150
  peer-gateway
  auto-recovery
  ip arp synchronize
```

```
interface port-channel10
  description vPC peer-link
  switchport mode trunk
  switchport trunk native vlan 2
  switchport trunk allowed vlan 11,3172-3174
  spanning-tree port type network
  vpc peer-link

interface port-channel11
  description IB-MGMT
  switchport mode trunk
  switchport access vlan 11
  switchport trunk allowed vlan 11
  spanning-tree port type network
  vpc 11

interface port-channel13
  description UCS-VersaStack-Flash-A
  switchport mode trunk
  switchport trunk native vlan 2
  switchport trunk allowed vlan 11,3172-3174
  spanning-tree port type edge trunk
  mtu 9216
  vpc 13

interface port-channel14
  description UCS-VersaStack-Flash-B
  switchport mode trunk
  switchport trunk native vlan 2
  switchport trunk allowed vlan 11,3172-3174
  spanning-tree port type edge trunk
```

```
  mtu 9216
  vpc 14

interface Ethernet1/1

interface Ethernet1/2

interface Ethernet1/3

interface Ethernet1/4

interface Ethernet1/5

interface Ethernet1/6

interface Ethernet1/7

interface Ethernet1/8

interface Ethernet1/9

interface Ethernet1/10

interface Ethernet1/11

interface Ethernet1/12

interface Ethernet1/13

interface Ethernet1/14

interface Ethernet1/15
```

```
interface Ethernet1/16

interface Ethernet1/17

interface Ethernet1/18

interface Ethernet1/19

interface Ethernet1/20

interface Ethernet1/21

interface Ethernet1/22

interface Ethernet1/23

interface Ethernet1/24

interface Ethernet1/25
  description UCS-VersaStack-Flash-A:1/25
  switchport mode trunk
  switchport trunk native vlan 2
  switchport trunk allowed vlan 11,3172-3174
  mtu 9216
  channel-group 13 mode active

interface Ethernet1/26
  description UCS-VersaStack-Flash-B:1/26
  switchport mode trunk
  switchport trunk native vlan 2
  switchport trunk allowed vlan 11,3172-3174
```

```
  mtu 9216
  channel-group 14 mode active

interface Ethernet1/27

interface Ethernet1/28

interface Ethernet1/29

interface Ethernet1/30

interface Ethernet1/31

interface Ethernet1/32

interface Ethernet1/33

interface Ethernet1/34

interface Ethernet1/35

interface Ethernet1/36

interface Ethernet1/37

interface Ethernet1/38

interface Ethernet1/39

interface Ethernet1/40

interface Ethernet1/41
```

```
interface Ethernet1/42

interface Ethernet1/43

interface Ethernet1/44

interface Ethernet1/45

interface Ethernet1/46

interface Ethernet1/47

interface Ethernet1/48
  description IB-MGMT-SWITCH_uplink
  switchport mode trunk
  switchport access vlan 11
  switchport trunk allowed vlan 11
  channel-group 11 mode active

interface Ethernet1/49
  description VPC Peer VersaStack_nexus9k_B:1/49
  switchport mode trunk
  switchport trunk native vlan 2
  switchport trunk allowed vlan 11,3172-3174
  channel-group 10 mode active

interface Ethernet1/50
  description VPC Peer VersaStack_nexus9k_B:1/50
  switchport mode trunk
  switchport trunk native vlan 2
  switchport trunk allowed vlan 11,3172-3174
```

```
  channel-group 10 mode active

interface Ethernet1/51

interface Ethernet1/52

interface Ethernet1/53

interface Ethernet1/54

interface mgmt0
  vrf member management
  ip address 192.168.161.11/22
line console
line vty
boot nxos bootflash:/n9000-dk9.6.1.2.I3.4b.bin
logging logfile messages 6



VersaStack_nexus9k_A# exit
```

Cisco Nexus 9000 B

```
VersaStack_nexus9k_B#



!Command: show running-config
!Time: Thu Sep 10 18:26:14 2015

version 6.1(2)I3(4b)
switchname VersaStack_nexus9k_B
```

```
vdc VersaStack_nexus9k_B id 1
  allocate interface Ethernet1/1-54
  limit-resource vlan minimum 16 maximum 4094
  limit-resource vrf minimum 2 maximum 4096
  limit-resource port-channel minimum 0 maximum 511
  limit-resource u4route-mem minimum 248 maximum 248
  limit-resource u6route-mem minimum 96 maximum 96
  limit-resource m4route-mem minimum 58 maximum 58
  limit-resource m6route-mem minimum 8 maximum 8


cfs eth distribute
feature udld
feature lacp
feature vpc
logging level vpc 5


logging level aaa 5
logging level cdp 6
logging level monitor 6
logging level otm 5
logging level radius 5
logging level spanning-tree 6
username admin password 5 $1$lcR9IS65$9aVGBC4Hxva9j45ss3lE91  role network-admin
ssh key rsa 2048
ip domain-lookup
no service unsupported-transceiver
copp profile strict
snmp-server user admin network-admin auth md5 0xb559c5eb732b5743e31f14e5dfeeb86a
priv 0xb559c5eb732b5743e31f14e5dfeeb86a localizedkey
snmp-server host 192.168.161.67 traps version 2c public udp-port 2162
rmon event 1 log trap public description FATAL(1) owner PMON@FATAL
rmon event 2 log trap public description CRITICAL(2) owner PMON@CRITICAL
```

```
rmon event 3 log trap public description ERROR(3) owner PMON@ERROR
rmon event 4 log trap public description WARNING(4) owner PMON@WARNING
rmon event 5 log trap public description INFORMATION(5) owner PMON@INFO
ntp server 192.168.160.254

vlan 1-2,11,3172-3174
vlan 2
  name Native-VLAN
vlan 11
  name IB-MGMT-VLAN
vlan 3172
  name NFS-VLAN
vlan 3173
  name vMotion-VLAN
vlan 3174
  name VM-Traffic-VLAN

spanning-tree port type edge bpduguard default
spanning-tree port type edge bpdufilter default
spanning-tree port type network default
vrf context management
  ip route 0.0.0.0/0 192.168.160.1
hardware qos ns-buffer-profile mesh
vpc domain 10
  peer-switch
  role priority 20
  peer-keepalive destination 192.168.161.11 source 192.168.161.12
  delay restore 150
  peer-gateway
  ip arp synchronize
```

```
interface port-channel10
  description vPC peer-link
  switchport mode trunk
  switchport trunk allowed vlan 11,3172-3174
  spanning-tree port type network
  vpc peer-link

interface port-channel11
  description IB-MGMT
  switchport mode trunk
  switchport access vlan 11
  switchport trunk allowed vlan 11
  spanning-tree port type network
  vpc 11

interface port-channel13
  description UCS-VersaStack-Flash-A
  switchport mode trunk
  switchport trunk native vlan 2
  switchport trunk allowed vlan 11,3172-3174
  spanning-tree port type edge trunk
  mtu 9216
  vpc 13

interface port-channel14
  description UCS-VersaStack-B
  switchport mode trunk
  switchport trunk native vlan 2
  switchport trunk allowed vlan 11,3172-3174
  spanning-tree port type edge trunk
  mtu 9216
  vpc 14
```

```
interface Ethernet1/1

interface Ethernet1/2

interface Ethernet1/3

interface Ethernet1/4

interface Ethernet1/5

interface Ethernet1/6

interface Ethernet1/7

interface Ethernet1/8

interface Ethernet1/9

interface Ethernet1/10

interface Ethernet1/11

interface Ethernet1/12

interface Ethernet1/13

interface Ethernet1/14

interface Ethernet1/15

interface Ethernet1/16
```

```
interface Ethernet1/17

interface Ethernet1/18

interface Ethernet1/19

interface Ethernet1/20

interface Ethernet1/21

interface Ethernet1/22

interface Ethernet1/23

interface Ethernet1/24

interface Ethernet1/25
  description UCS-VersaStack-Flash-B:1/25
  switchport mode trunk
  switchport trunk native vlan 2
  switchport trunk allowed vlan 11,3172-3174
  mtu 9216
  channel-group 14 mode active

interface Ethernet1/26
  description UCS-VersaStack-Flash-A:1/26
  switchport mode trunk
  switchport trunk native vlan 2
  switchport trunk allowed vlan 11,3172-3174
  mtu 9216
  channel-group 13 mode active
```

```
interface Ethernet1/27

interface Ethernet1/28

interface Ethernet1/29

interface Ethernet1/30

interface Ethernet1/31

interface Ethernet1/32

interface Ethernet1/33

interface Ethernet1/34

interface Ethernet1/35

interface Ethernet1/36
  description IB-MGMT-SWITCH_uplink
  switchport access vlan 11

interface Ethernet1/37

interface Ethernet1/38

interface Ethernet1/39

interface Ethernet1/40

interface Ethernet1/41
```

```
interface Ethernet1/42

interface Ethernet1/43

interface Ethernet1/44

interface Ethernet1/45

interface Ethernet1/46

interface Ethernet1/47

interface Ethernet1/48
  switchport mode trunk
  switchport access vlan 11
  switchport trunk allowed vlan 11
  channel-group 11 mode active

interface Ethernet1/49
  description VPC Peer VersaStack_nexus9k_A:1/49
  switchport mode trunk
  switchport trunk allowed vlan 11,3172-3174
  channel-group 10 mode active

interface Ethernet1/50
  description VPC Peer VersaStack_nexus9k_A:1/50
  switchport mode trunk
  switchport trunk allowed vlan 11,3172-3174
  channel-group 10 mode active

interface Ethernet1/51
```

```
interface Ethernet1/52

interface Ethernet1/53

interface Ethernet1/54

interface mgmt0
  vrf member management
  ip address 192.168.161.12/22
line console
line vty
boot nxos bootflash:/n9000-dk9.6.1.2.I3.4b.bin
logging logfile messages 6



VersaStack_nexus9k_B# exit
```

Cisco MDS Example Configurations

MDS 9148S A

```
VersaStack-MDS-A#


sh runn


!Command: show running-config
!Time: Thu Sep 10 12:55:58 2015

version 6.2(9c)
power redundancy-mode redundant
```

```
feature npiv
feature fport-channel-trunk
role name default-role
  description This is a system defined role and applies to all users.
  rule 5 permit show feature environment
  rule 4 permit show feature hardware
  rule 3 permit show feature module
  rule 2 permit show feature snmp
  rule 1 permit show feature system
username admin password 5 $1$sKRMPQYi$/NAdDEi2J44GW9n9cQhY40  role network-admin
ssh key rsa 2048
ip domain-lookup
ip host VersaStack-MDS-A  192.168.161.15
aaa group server radius
snmp-server user admin network-admin auth md5 0x6f53059324fc0a02a20aca0a0e62a0a4
priv 0x6f53059324fc0a02a20aca0a0e62a0a4 localizedkey
snmp-server host 192.168.161.67 traps version 2c public udp-port 2162
rmon event 1 log trap public description FATAL(1) owner PMON@FATAL
rmon event 2 log trap public description CRITICAL(2) owner PMON@CRITICAL
rmon event 3 log trap public description ERROR(3) owner PMON@ERROR
rmon event 4 log trap public description WARNING(4) owner PMON@WARNING
rmon event 5 log trap public description INFORMATION(5) owner PMON@INFO
ntp server 192.168.160.254
vsan database
  vsan 101
  vsan 201
device-alias database
  device-alias name VersaStack-SE-BE1 pwwn 50:05:07:60:5e:83:cc:81
  device-alias name VersaStack-SE-BE2 pwwn 50:05:07:60:5e:83:cc:91
  device-alias name VersaStack-SE-BE3 pwwn 50:05:07:60:5e:83:cc:a1
  device-alias name VersaStack-SE-BE4 pwwn 50:05:07:60:5e:83:cc:b1
  device-alias name VM-Host-Infra-01-A pwwn 20:00:00:25:b5:01:0a:2f
```

```
  device-alias name VM-Host-Infra-02-A pwwn 20:00:00:25:b5:01:0a:3f
  device-alias name VM-Host-Infra-03-A pwwn 20:00:00:25:b5:01:0a:0f
  device-alias name VM-Host-Infra-04-A pwwn 20:00:00:25:b5:01:0a:1f
  device-alias name VersaStack-ContA-BE1 pwwn 50:05:07:68:0c:11:22:71
  device-alias name VersaStack-ContA-BE2 pwwn 50:05:07:68:0c:31:22:71
  device-alias name VersaStack-ContA-FE1 pwwn 50:05:07:68:0c:21:22:71
  device-alias name VersaStack-ContA-FE3 pwwn 50:05:07:68:0c:51:22:71
  device-alias name VersaStack-ContB-BE1 pwwn 50:05:07:68:0c:11:22:67
  device-alias name VersaStack-ContB-BE2 pwwn 50:05:07:68:0c:31:22:67
  device-alias name VersaStack-ContB-FE1 pwwn 50:05:07:68:0c:21:22:67
  device-alias name VersaStack-ContB-FE3 pwwn 50:05:07:68:0c:51:22:67

device-alias commit

fcdomain fcid database
  vsan 101 wwn 24:01:00:2a:6a:c2:df:00 fcid 0x670000 dynamic
  vsan 101 wwn 20:00:00:25:b5:01:0a:0f fcid 0x670001 dynamic
!              [VM-Host-Infra-03-A]
  vsan 101 wwn 20:00:00:25:b5:01:0a:1f fcid 0x670002 dynamic
!              [VM-Host-Infra-04-A]
  vsan 101 wwn 20:00:00:25:b5:01:0a:2f fcid 0x670003 dynamic
!              [VM-Host-Infra-01-A]
  vsan 101 wwn 20:00:00:25:b5:01:0a:3f fcid 0x670004 dynamic
!              [VM-Host-Infra-02-A]
  vsan 101 wwn 50:05:07:68:0c:21:22:67 fcid 0x670100 dynamic
!              [VersaStack-ContB-FE1]
  vsan 101 wwn 50:05:07:68:0c:21:22:71 fcid 0x670200 dynamic
!              [VersaStack-ContA-FE1]
  vsan 201 wwn 50:05:07:68:0c:11:22:71 fcid 0x940000 dynamic
!              [VersaStack-ContA-BE1]
  vsan 101 wwn 50:05:07:68:0c:51:22:67 fcid 0x670300 dynamic
!              [VersaStack-ContB-FE3]
```

```
  vsan 201 wwn 50:05:07:68:0c:11:22:67 fcid 0x940100 dynamic
!              [VersaStack-ContB-BE1]
  vsan 101 wwn 50:05:07:68:0c:51:22:71 fcid 0x670400 dynamic
!              [VersaStack-ContA-FE3]
  vsan 201 wwn 50:05:07:68:0c:31:22:67 fcid 0x940200 dynamic
!              [VersaStack-ContB-BE2]
  vsan 201 wwn 50:05:07:68:0c:31:22:71 fcid 0x940300 dynamic
!              [VersaStack-ContA-BE2]
  vsan 201 wwn 50:05:07:60:5e:83:cc:81 fcid 0x940400 dynamic
!              [VersaStack-SE-BE1]
  vsan 201 wwn 50:05:07:60:5e:83:cc:a1 fcid 0x940500 dynamic
!              [VersaStack-SE-BE3]
  vsan 201 wwn 50:05:07:60:5e:83:cc:91 fcid 0x940600 dynamic
!              [VersaStack-SE-BE2]
  vsan 201 wwn 50:05:07:60:5e:83:cc:b1 fcid 0x940700 dynamic
!              [VersaStack-SE-BE4]


interface port-channel1
  channel mode active
  switchport rate-mode dedicated
vsan database
  vsan 101 interface port-channel1
  vsan 101 interface fc1/5
  vsan 101 interface fc1/6
  vsan 101 interface fc1/7
  vsan 101 interface fc1/8
  vsan 201 interface fc1/9
  vsan 201 interface fc1/10
  vsan 201 interface fc1/11
  vsan 201 interface fc1/12
  vsan 201 interface fc1/13
```

```
  vsan 201 interface fc1/14
  vsan 201 interface fc1/15
  vsan 201 interface fc1/16
  vsan 201 interface fc1/17
  vsan 201 interface fc1/18
  vsan 201 interface fc1/19
  vsan 201 interface fc1/20
clock timezone EST -5 30
switchname VersaStack-MDS-A
line console
line vty
boot kickstart bootflash:/m9100-s5ek9-kickstart-mz.6.2.9c.bin
boot system bootflash:/m9100-s5ek9-mz.6.2.9c.bin
interface fc1/1
interface fc1/2
interface fc1/3
interface fc1/4
interface fc1/5
interface fc1/6
interface fc1/7
interface fc1/8
interface fc1/9
interface fc1/10
interface fc1/11
interface fc1/12
interface fc1/13
interface fc1/14
interface fc1/15
interface fc1/16
interface fc1/17
interface fc1/18
interface fc1/19
```

```
interface fc1/20
interface fc1/21
interface fc1/22
interface fc1/23
interface fc1/24
interface fc1/25
interface fc1/26
interface fc1/27
interface fc1/28
interface fc1/29
interface fc1/30
interface fc1/31
interface fc1/32
interface fc1/33
interface fc1/34
interface fc1/35
interface fc1/36
interface fc1/37
interface fc1/38
interface fc1/39
interface fc1/40
interface fc1/41
interface fc1/42
interface fc1/43
interface fc1/44
interface fc1/45
interface fc1/46
interface fc1/47
interface fc1/48
interface fc1/1
interface fc1/2
interface fc1/3
```

```
interface fc1/4
!Active Zone Database Section for vsan 101
zone name VM-Host-Infra-01-A vsan 101
    member pwwn 20:00:00:25:b5:01:0a:2f
!               [VM-Host-Infra-01-A]
    member pwwn 50:05:07:68:0c:21:22:71
!               [VersaStack-ContA-FE1]
    member pwwn 50:05:07:68:0c:51:22:71
!               [VersaStack-ContA-FE3]
    member pwwn 50:05:07:68:0c:21:22:67
!               [VersaStack-ContB-FE1]
    member pwwn 50:05:07:68:0c:51:22:67
!               [VersaStack-ContB-FE3]

zone name VM-Host-Infra-02-A vsan 101
    member pwwn 20:00:00:25:b5:01:0a:3f
!               [VM-Host-Infra-02-A]
    member pwwn 50:05:07:68:0c:21:22:71
!               [VersaStack-ContA-FE1]
    member pwwn 50:05:07:68:0c:51:22:71
!               [VersaStack-ContA-FE3]
    member pwwn 50:05:07:68:0c:21:22:67
!               [VersaStack-ContB-FE1]
    member pwwn 50:05:07:68:0c:51:22:67
!               [VersaStack-ContB-FE3]

zone name VM-Host-Infra-03-A vsan 101
    member pwwn 50:05:07:68:0c:21:22:71
!               [VersaStack-ContA-FE1]
    member pwwn 50:05:07:68:0c:51:22:71
!               [VersaStack-ContA-FE3]
    member pwwn 50:05:07:68:0c:21:22:67
```

```
!                [VersaStack-ContB-FE1]
    member pwwn 50:05:07:68:0c:51:22:67
!                [VersaStack-ContB-FE3]
    member pwwn 20:00:00:25:b5:01:0a:0f
!                [VM-Host-Infra-03-A]

zone name VM-Host-Infra-04-A vsan 101
    member pwwn 50:05:07:68:0c:21:22:71
!                [VersaStack-ContA-FE1]
    member pwwn 50:05:07:68:0c:51:22:71
!                [VersaStack-ContA-FE3]
    member pwwn 50:05:07:68:0c:21:22:67
!                [VersaStack-ContB-FE1]
    member pwwn 50:05:07:68:0c:51:22:67
!                [VersaStack-ContB-FE3]
    member pwwn 20:00:00:25:b5:01:0a:1f
!                [VM-Host-Infra-04-A]

zoneset name versastackzoneset vsan 101
    member VM-Host-Infra-01-A
    member VM-Host-Infra-02-A
    member VM-Host-Infra-03-A
    member VM-Host-Infra-04-A

zoneset activate name versastackzoneset vsan 101
do clear zone database vsan 101
!Full Zone Database Section for vsan 101
zone name VM-Host-Infra-01-A vsan 101
    member pwwn 20:00:00:25:b5:01:0a:2f
!                [VM-Host-Infra-01-A]
    member pwwn 50:05:07:68:0c:21:22:71
!                [VersaStack-ContA-FE1]
```

```
    member pwwn 50:05:07:68:0c:51:22:71
!               [VersaStack-ContA-FE3]
    member pwwn 50:05:07:68:0c:21:22:67
!               [VersaStack-ContB-FE1]
    member pwwn 50:05:07:68:0c:51:22:67
!               [VersaStack-ContB-FE3]

zone name VM-Host-Infra-02-A vsan 101
    member pwwn 20:00:00:25:b5:01:0a:3f
!               [VM-Host-Infra-02-A]
    member pwwn 50:05:07:68:0c:21:22:71
!               [VersaStack-ContA-FE1]
    member pwwn 50:05:07:68:0c:51:22:71
!               [VersaStack-ContA-FE3]
    member pwwn 50:05:07:68:0c:21:22:67
!               [VersaStack-ContB-FE1]
    member pwwn 50:05:07:68:0c:51:22:67
!               [VersaStack-ContB-FE3]

zone name VM-Host-Infra-03-A vsan 101
    member pwwn 50:05:07:68:0c:21:22:71
!               [VersaStack-ContA-FE1]
    member pwwn 50:05:07:68:0c:51:22:71
!               [VersaStack-ContA-FE3]
    member pwwn 50:05:07:68:0c:21:22:67
!               [VersaStack-ContB-FE1]
    member pwwn 50:05:07:68:0c:51:22:67
!               [VersaStack-ContB-FE3]
    member pwwn 20:00:00:25:b5:01:0a:0f
!               [VM-Host-Infra-03-A]

zone name VM-Host-Infra-04-A vsan 101
```

```
    member pwwn 50:05:07:68:0c:21:22:71
!               [VersaStack-ContA-FE1]
    member pwwn 50:05:07:68:0c:51:22:71
!               [VersaStack-ContA-FE3]
    member pwwn 50:05:07:68:0c:21:22:67
!               [VersaStack-ContB-FE1]
    member pwwn 50:05:07:68:0c:51:22:67
!               [VersaStack-ContB-FE3]
    member pwwn 20:00:00:25:b5:01:0a:1f
!               [VM-Host-Infra-04-A]

zoneset name versastackzoneset vsan 101
    member VM-Host-Infra-01-A
    member VM-Host-Infra-02-A
    member VM-Host-Infra-03-A
    member VM-Host-Infra-04-A

!Active Zone Database Section for vsan 201
zone name versastack vsan 201
    member pwwn 50:05:07:68:0c:11:22:71
!               [VersaStack-ContA-BE1]
    member pwwn 50:05:07:68:0c:31:22:71
!               [VersaStack-ContA-BE2]
    member pwwn 50:05:07:68:0c:11:22:67
!               [VersaStack-ContB-BE1]
    member pwwn 50:05:07:68:0c:31:22:67
!               [VersaStack-ContB-BE2]
    member pwwn 50:05:07:60:5e:83:cc:81
!               [VersaStack-SE-BE1]
    member pwwn 50:05:07:60:5e:83:cc:91
!               [VersaStack-SE-BE2]
    member pwwn 50:05:07:60:5e:83:cc:a1
```

```
!                [VersaStack-SE-BE3]
    member pwwn 50:05:07:60:5e:83:cc:b1
!                [VersaStack-SE-BE4]

zoneset name versastackzoneset vsan 201
    member versastack

zoneset activate name versastackzoneset vsan 201
do clear zone database vsan 201
!Full Zone Database Section for vsan 201
zone name versastack vsan 201
    member pwwn 50:05:07:68:0c:11:22:71
!                [VersaStack-ContA-BE1]
    member pwwn 50:05:07:68:0c:31:22:71
!                [VersaStack-ContA-BE2]
    member pwwn 50:05:07:68:0c:11:22:67
!                [VersaStack-ContB-BE1]
    member pwwn 50:05:07:68:0c:31:22:67
!                [VersaStack-ContB-BE2]
    member pwwn 50:05:07:60:5e:83:cc:81
!                [VersaStack-SE-BE1]
    member pwwn 50:05:07:60:5e:83:cc:91
!                [VersaStack-SE-BE2]
    member pwwn 50:05:07:60:5e:83:cc:a1
!                [VersaStack-SE-BE3]
    member pwwn 50:05:07:60:5e:83:cc:b1
!                [VersaStack-SE-BE4]

zoneset name versastackzoneset vsan 201
    member versastack
```

```
interface fc1/1
  port-license acquire
  channel-group 1 force
  no shutdown

interface fc1/2
  port-license acquire
  channel-group 1 force
  no shutdown

interface fc1/3
  port-license acquire
  channel-group 1 force
  no shutdown

interface fc1/4
  port-license acquire
  channel-group 1 force
  no shutdown

interface fc1/5
  switchport trunk mode off
  port-license acquire
  no shutdown

interface fc1/6
  switchport trunk mode off
  port-license acquire
  no shutdown

interface fc1/7
  switchport trunk mode off
```

```
  port-license acquire
  no shutdown

interface fc1/8
  switchport trunk mode off
  port-license acquire
  no shutdown

interface fc1/9
  switchport trunk mode off
  port-license acquire
  no shutdown

interface fc1/10
  switchport trunk mode off
  port-license acquire
  no shutdown

interface fc1/11
  switchport trunk mode off
  port-license acquire
  no shutdown

interface fc1/12
  switchport trunk mode off
  port-license acquire
  no shutdown

interface fc1/13
  switchport trunk mode off
  port-license acquire
  no shutdown
```

```
interface fc1/14
  switchport trunk mode off
  port-license acquire
  no shutdown

interface fc1/15
  switchport trunk mode off
  port-license acquire
  no shutdown

interface fc1/16
  switchport trunk mode off
  port-license acquire
  no shutdown

interface fc1/17
  port-license acquire
  no shutdown

interface fc1/18
  port-license acquire
  no shutdown

interface fc1/19
  port-license acquire
  no shutdown

interface fc1/20
  port-license acquire
  no shutdown
```

```
interface fc1/21
  port-license acquire

interface fc1/22
  port-license acquire

interface fc1/23
  port-license acquire

interface fc1/24
  port-license acquire

interface fc1/25
  port-license acquire

interface fc1/26
  port-license acquire

interface fc1/27
  port-license acquire

interface fc1/28
  port-license acquire

interface fc1/29
  port-license acquire

interface fc1/30
  port-license acquire

interface fc1/31
  port-license acquire
```

```
interface fc1/32
  port-license acquire

interface fc1/33
  port-license acquire

interface fc1/34
  port-license acquire

interface fc1/35
  port-license acquire

interface fc1/36
  port-license acquire

interface fc1/37
  port-license acquire

interface fc1/38
  port-license acquire

interface fc1/39
  port-license acquire

interface fc1/40
  port-license acquire

interface fc1/41
  port-license acquire

interface fc1/42
```

```
  port-license acquire

interface fc1/43
  port-license acquire

interface fc1/44
  port-license acquire

interface fc1/45
  port-license acquire

interface fc1/46
  port-license acquire

interface fc1/47
  port-license acquire

interface fc1/48
  port-license acquire

interface mgmt0
  ip address 192.168.161.15 255.255.252.0
ip default-gateway 192.168.160.1



VersaStack-MDS-A# exit
```

MDS 9148S B

```
VersaStack-MDS-B# sh runn



!Command: show running-config
!Time: Thu Sep 10 12:51:37 2015
```

```
version 6.2(9c)
power redundancy-mode redundant
feature npiv
feature fport-channel-trunk
role name default-role
  description This is a system defined role and applies to all users.
  rule 5 permit show feature environment
  rule 4 permit show feature hardware
  rule 3 permit show feature module
  rule 2 permit show feature snmp
  rule 1 permit show feature system
username admin password 5 $1$yq9x2ZVf$e.61ttAhQoB2hortQJhmU1  role network-admin
ssh key rsa 2048
ip domain-lookup
ip host VersaStack-MDS-B  192.168.161.16
aaa group server radius
snmp-server user admin network-admin auth md5 0x574860bd3b13b5ab5f7652b55cc19206
priv 0x574860bd3b13b5ab5f7652b55cc19206 localizedkey
snmp-server host 192.168.161.67 traps version 2c public udp-port 2162
rmon event 1 log trap public description FATAL(1) owner PMON@FATAL
rmon event 2 log trap public description CRITICAL(2) owner PMON@CRITICAL
rmon event 3 log trap public description ERROR(3) owner PMON@ERROR
rmon event 4 log trap public description WARNING(4) owner PMON@WARNING
rmon event 5 log trap public description INFORMATION(5) owner PMON@INFO
ntp server 192.168.160.254
vsan database
  vsan 102
  vsan 202
device-alias database
  device-alias name VersaStack-SE-BE5 pwwn 50:05:07:60:5e:83:cc:82
  device-alias name VersaStack-SE-BE6 pwwn 50:05:07:60:5e:83:cc:92
```

```
  device-alias name VersaStack-SE-BE7 pwwn 50:05:07:60:5e:83:cc:a2
  device-alias name VersaStack-SE-BE8 pwwn 50:05:07:60:5e:83:cc:b2
  device-alias name VM-Host-Infra-01-B pwwn 20:00:00:25:b5:01:0b:2f
  device-alias name VM-Host-Infra-02-B pwwn 20:00:00:25:b5:01:0b:3f
  device-alias name VM-Host-Infra-03-B pwwn 20:00:00:25:b5:01:0b:0f
  device-alias name VM-Host-Infra-04-B pwwn 20:00:00:25:b5:01:0b:1f
  device-alias name VersaStack-ContA-BE3 pwwn 50:05:07:68:0c:12:22:71
  device-alias name VersaStack-ContA-BE4 pwwn 50:05:07:68:0c:32:22:71
  device-alias name VersaStack-ContA-FE2 pwwn 50:05:07:68:0c:22:22:71
  device-alias name VersaStack-ContA-FE4 pwwn 50:05:07:68:0c:52:22:71
  device-alias name VersaStack-ContB-BE3 pwwn 50:05:07:68:0c:12:22:67
  device-alias name VersaStack-ContB-BE4 pwwn 50:05:07:68:0c:32:22:67
  device-alias name VersaStack-ContB-FE2 pwwn 50:05:07:68:0c:22:22:67
  device-alias name VersaStack-ContB-FE4 pwwn 50:05:07:68:0c:52:22:67

device-alias commit

fcdomain fcid database
  vsan 102 wwn 50:05:07:68:0c:22:22:71 fcid 0xa50000 dynamic
!              [VersaStack-ContA-FE2]
  vsan 102 wwn 50:05:07:68:0c:22:22:67 fcid 0xa50100 dynamic
!              [VersaStack-ContB-FE2]
  vsan 102 wwn 24:02:00:2a:6a:c2:de:c0 fcid 0xa50200 dynamic
  vsan 102 wwn 20:00:00:25:b5:01:0b:0f fcid 0xa50201 dynamic
!              [VM-Host-Infra-03-B]
  vsan 102 wwn 20:00:00:25:b5:01:0b:1f fcid 0xa50202 dynamic
!              [VM-Host-Infra-04-B]
  vsan 102 wwn 20:00:00:25:b5:01:0b:2f fcid 0xa50203 dynamic
!              [VM-Host-Infra-01-B]
  vsan 102 wwn 20:00:00:25:b5:01:0b:3f fcid 0xa50204 dynamic
!              [VM-Host-Infra-02-B]
  vsan 102 wwn 50:05:07:68:0c:52:22:67 fcid 0xa50300 dynamic
```

```
!              [VersaStack-ContB-FE4]
  vsan 102 wwn 50:05:07:68:0c:52:22:71 fcid 0xa50400 dynamic
!              [VersaStack-ContA-FE4]
  vsan 202 wwn 50:05:07:68:0c:32:22:71 fcid 0x7c0000 dynamic
!              [VersaStack-ContA-BE4]
  vsan 202 wwn 50:05:07:68:0c:32:22:67 fcid 0x7c0100 dynamic
!              [VersaStack-ContB-BE4]
  vsan 202 wwn 50:05:07:60:5e:83:cc:a2 fcid 0x7c0200 dynamic
!              [VersaStack-SE-BE7]
  vsan 202 wwn 50:05:07:60:5e:83:cc:82 fcid 0x7c0300 dynamic
!              [VersaStack-SE-BE5]
  vsan 202 wwn 50:05:07:60:5e:83:cc:b2 fcid 0x7c0400 dynamic
!              [VersaStack-SE-BE8]
  vsan 202 wwn 50:05:07:60:5e:83:cc:92 fcid 0x7c0500 dynamic
!              [VersaStack-SE-BE6]
  vsan 202 wwn 50:05:07:68:0c:12:22:67 fcid 0x7c0600 dynamic
!              [VersaStack-ContB-BE3]
  vsan 202 wwn 50:05:07:68:0c:12:22:71 fcid 0x7c0700 dynamic
!              [VersaStack-ContA-BE3]


interface port-channel2
  channel mode active
  switchport rate-mode dedicated
vsan database
  vsan 102 interface port-channel2
  vsan 102 interface fc1/5
  vsan 102 interface fc1/6
  vsan 102 interface fc1/7
  vsan 102 interface fc1/8
  vsan 202 interface fc1/9
  vsan 202 interface fc1/10
```

```
  vsan 202 interface fc1/11
  vsan 202 interface fc1/12
  vsan 202 interface fc1/13
  vsan 202 interface fc1/14
  vsan 202 interface fc1/15
  vsan 202 interface fc1/16
  vsan 202 interface fc1/17
  vsan 202 interface fc1/18
  vsan 202 interface fc1/19
  vsan 202 interface fc1/20
clock timezone EST -5 30
switchname VersaStack-MDS-B
line console
line vty
boot kickstart bootflash:/m9100-s5ek9-kickstart-mz.6.2.9c.bin
boot system bootflash:/m9100-s5ek9-mz.6.2.9c.bin
interface fc1/1
interface fc1/2
interface fc1/3
interface fc1/4
interface fc1/5
interface fc1/6
interface fc1/7
interface fc1/8
interface fc1/9
interface fc1/10
interface fc1/11
interface fc1/12
interface fc1/13
interface fc1/14
interface fc1/15
interface fc1/16
```

```
interface fc1/17
interface fc1/18
interface fc1/19
interface fc1/20
interface fc1/21
interface fc1/22
interface fc1/23
interface fc1/24
interface fc1/25
interface fc1/26
interface fc1/27
interface fc1/28
interface fc1/29
interface fc1/30
interface fc1/31
interface fc1/32
interface fc1/33
interface fc1/34
interface fc1/35
interface fc1/36
interface fc1/37
interface fc1/38
interface fc1/39
interface fc1/40
interface fc1/41
interface fc1/42
interface fc1/43
interface fc1/44
interface fc1/45
interface fc1/46
interface fc1/47
interface fc1/48
```

```
interface fc1/1
interface fc1/2
interface fc1/3
interface fc1/4
!Active Zone Database Section for vsan 102
zone name VM-Host-Infra-01-B vsan 102
    member pwwn 20:00:00:25:b5:01:0b:2f
!               [VM-Host-Infra-01-B]
    member pwwn 50:05:07:68:0c:22:22:71
!               [VersaStack-ContA-FE2]
    member pwwn 50:05:07:68:0c:52:22:71
!               [VersaStack-ContA-FE4]
    member pwwn 50:05:07:68:0c:22:22:67
!               [VersaStack-ContB-FE2]
    member pwwn 50:05:07:68:0c:52:22:67
!               [VersaStack-ContB-FE4]

zone name VM-Host-Infra-02-B vsan 102
    member pwwn 20:00:00:25:b5:01:0b:3f
!               [VM-Host-Infra-02-B]
    member pwwn 50:05:07:68:0c:22:22:71
!               [VersaStack-ContA-FE2]
    member pwwn 50:05:07:68:0c:52:22:71
!               [VersaStack-ContA-FE4]
    member pwwn 50:05:07:68:0c:22:22:67
!               [VersaStack-ContB-FE2]
    member pwwn 50:05:07:68:0c:52:22:67
!               [VersaStack-ContB-FE4]

zone name VM-Host-Infra-03-B vsan 102
    member pwwn 20:00:00:25:b5:01:0b:0f
!               [VM-Host-Infra-03-B]
```

```
    member pwwn 50:05:07:68:0c:22:22:71
!               [VersaStack-ContA-FE2]
    member pwwn 50:05:07:68:0c:52:22:71
!               [VersaStack-ContA-FE4]
    member pwwn 50:05:07:68:0c:22:22:67
!               [VersaStack-ContB-FE2]
    member pwwn 50:05:07:68:0c:52:22:67
!               [VersaStack-ContB-FE4]

zone name VM-Host-Infra-04-B vsan 102
    member pwwn 20:00:00:25:b5:01:0b:1f
!               [VM-Host-Infra-04-B]
    member pwwn 50:05:07:68:0c:22:22:71
!               [VersaStack-ContA-FE2]
    member pwwn 50:05:07:68:0c:52:22:71
!               [VersaStack-ContA-FE4]
    member pwwn 50:05:07:68:0c:22:22:67
!               [VersaStack-ContB-FE2]
    member pwwn 50:05:07:68:0c:52:22:67
!               [VersaStack-ContB-FE4]

zoneset name versastackzoneset vsan 102
    member VM-Host-Infra-01-B
    member VM-Host-Infra-02-B
    member VM-Host-Infra-03-B
    member VM-Host-Infra-04-B

zoneset activate name versastackzoneset vsan 102
do clear zone database vsan 102
!Full Zone Database Section for vsan 102
zone name VM-Host-Infra-01-B vsan 102
    member pwwn 20:00:00:25:b5:01:0b:2f
```

```
!               [VM-Host-Infra-01-B]
    member pwwn 50:05:07:68:0c:22:22:71
!               [VersaStack-ContA-FE2]
    member pwwn 50:05:07:68:0c:52:22:71
!               [VersaStack-ContA-FE4]
    member pwwn 50:05:07:68:0c:22:22:67
!               [VersaStack-ContB-FE2]
    member pwwn 50:05:07:68:0c:52:22:67
!               [VersaStack-ContB-FE4]

zone name VM-Host-Infra-02-B vsan 102
    member pwwn 20:00:00:25:b5:01:0b:3f
!               [VM-Host-Infra-02-B]
    member pwwn 50:05:07:68:0c:22:22:71
!               [VersaStack-ContA-FE2]
    member pwwn 50:05:07:68:0c:52:22:71
!               [VersaStack-ContA-FE4]
    member pwwn 50:05:07:68:0c:22:22:67
!               [VersaStack-ContB-FE2]
    member pwwn 50:05:07:68:0c:52:22:67
!               [VersaStack-ContB-FE4]

zone name VM-Host-Infra-03-B vsan 102
    member pwwn 20:00:00:25:b5:01:0b:0f
!               [VM-Host-Infra-03-B]
    member pwwn 50:05:07:68:0c:22:22:71
!               [VersaStack-ContA-FE2]
    member pwwn 50:05:07:68:0c:52:22:71
!               [VersaStack-ContA-FE4]
    member pwwn 50:05:07:68:0c:22:22:67
!               [VersaStack-ContB-FE2]
    member pwwn 50:05:07:68:0c:52:22:67
```

```
!               [VersaStack-ContB-FE4]

zone name VM-Host-Infra-04-B vsan 102
    member pwwn 20:00:00:25:b5:01:0b:1f
!               [VM-Host-Infra-04-B]
    member pwwn 50:05:07:68:0c:22:22:71
!               [VersaStack-ContA-FE2]
    member pwwn 50:05:07:68:0c:52:22:71
!               [VersaStack-ContA-FE4]
    member pwwn 50:05:07:68:0c:22:22:67
!               [VersaStack-ContB-FE2]
    member pwwn 50:05:07:68:0c:52:22:67
!               [VersaStack-ContB-FE4]

zoneset name versastackzoneset vsan 102
    member VM-Host-Infra-01-B
    member VM-Host-Infra-02-B
    member VM-Host-Infra-03-B
    member VM-Host-Infra-04-B

!Active Zone Database Section for vsan 202
zone name versastack vsan 202
    member pwwn 50:05:07:68:0c:12:22:67
!               [VersaStack-ContB-BE3]
    member pwwn 50:05:07:68:0c:32:22:67
!               [VersaStack-ContB-BE4]
    member pwwn 50:05:07:68:0c:12:22:71
!               [VersaStack-ContA-BE3]
    member pwwn 50:05:07:68:0c:32:22:71
!               [VersaStack-ContA-BE4]
    member pwwn 50:05:07:60:5e:83:cc:82
!               [VersaStack-SE-BE5]
```

```
    member pwwn 50:05:07:60:5e:83:cc:92
!               [VersaStack-SE-BE6]
    member pwwn 50:05:07:60:5e:83:cc:a2
!               [VersaStack-SE-BE7]
    member pwwn 50:05:07:60:5e:83:cc:b2
!               [VersaStack-SE-BE8]

zoneset name versastackzoneset vsan 202
    member versastack

zoneset activate name versastackzoneset vsan 202
do clear zone database vsan 202
!Full Zone Database Section for vsan 202
zone name versastack vsan 202
    member pwwn 50:05:07:68:0c:12:22:67
!               [VersaStack-ContB-BE3]
    member pwwn 50:05:07:68:0c:32:22:67
!               [VersaStack-ContB-BE4]
    member pwwn 50:05:07:68:0c:12:22:71
!               [VersaStack-ContA-BE3]
    member pwwn 50:05:07:68:0c:32:22:71
!               [VersaStack-ContA-BE4]
    member pwwn 50:05:07:60:5e:83:cc:82
!               [VersaStack-SE-BE5]
    member pwwn 50:05:07:60:5e:83:cc:92
!               [VersaStack-SE-BE6]
    member pwwn 50:05:07:60:5e:83:cc:a2
!               [VersaStack-SE-BE7]
    member pwwn 50:05:07:60:5e:83:cc:b2
!               [VersaStack-SE-BE8]

zoneset name versastackzoneset vsan 202
```

```
    member versastack


interface fc1/1
  port-license acquire
  channel-group 2 force
  no shutdown

interface fc1/2
  port-license acquire
  channel-group 2 force
  no shutdown

interface fc1/3
  port-license acquire
  channel-group 2 force
  no shutdown

interface fc1/4
  port-license acquire
  channel-group 2 force
  no shutdown

interface fc1/5
  switchport trunk mode off
  port-license acquire
  no shutdown

interface fc1/6
  switchport trunk mode off
  port-license acquire
  no shutdown
```

```
interface fc1/7
  switchport trunk mode off
  port-license acquire
  no shutdown

interface fc1/8
  switchport trunk mode off
  port-license acquire
  no shutdown

interface fc1/9
  switchport trunk mode off
  port-license acquire
  no shutdown

interface fc1/10
  switchport trunk mode off
  port-license acquire
  no shutdown

interface fc1/11
  switchport trunk mode off
  port-license acquire
  no shutdown

interface fc1/12
  switchport trunk mode off
  port-license acquire
  no shutdown

interface fc1/13
```

```
  switchport trunk mode off
  port-license acquire
  no shutdown

interface fc1/14
  switchport trunk mode off
  port-license acquire
  no shutdown

interface fc1/15
  switchport trunk mode off
  port-license acquire
  no shutdown

interface fc1/16
  switchport trunk mode off
  port-license acquire
  no shutdown

interface fc1/17
  port-license acquire
  no shutdown

interface fc1/18
  port-license acquire
  no shutdown

interface fc1/19
  port-license acquire
  no shutdown

interface fc1/20
```

```
  port-license acquire
  no shutdown

interface fc1/21
  port-license acquire

interface fc1/22
  port-license acquire

interface fc1/23
  port-license acquire

interface fc1/24
  port-license acquire

interface fc1/25
  port-license acquire

interface fc1/26
  port-license acquire

interface fc1/27
  port-license acquire

interface fc1/28
  port-license acquire

interface fc1/29
  port-license acquire

interface fc1/30
  port-license acquire
```

```
interface fc1/31
  port-license acquire

interface fc1/32
  port-license acquire

interface fc1/33
  port-license acquire

interface fc1/34
  port-license acquire

interface fc1/35
  port-license acquire

interface fc1/36
  port-license acquire

interface fc1/37
  port-license acquire

interface fc1/38
  port-license acquire

interface fc1/39
  port-license acquire

interface fc1/40
  port-license acquire

interface fc1/41
```

```
  port-license acquire

interface fc1/42
  port-license acquire

interface fc1/43
  port-license acquire

interface fc1/44
  port-license acquire

interface fc1/45
  port-license acquire

interface fc1/46
  port-license acquire

interface fc1/47
  port-license acquire

interface fc1/48
  port-license acquire

interface mgmt0
  ip address 192.168.161.16 255.255.252.0
ip default-gateway 192.168.160.1


VersaStack-MDS-B# exit
```

About the Authors

Sreenivasa Edula, Technical Marketing Engineer, Cisco UCS Data Center Solutions Engineering, Cisco Systems, Inc.

Sreeni has over 17 years of experience in Information Systems with expertise across Cisco Data Center technology portfolio, including DC architecture design, virtualization, compute, network, storage and cloud computing.

Dave Gimpl, Senior Technical Staff Member, IBM Systems

Dave has over 25 years of engineering experience in IBM's Systems group, and is the Chief Architect of the FlashSystem V9000 and has been involved in the development of the FlashSystem product range from its inception.