

Microsoft Hyper-V and Nexus 1000V Switch for Microsoft Hyper-V within a VMDC Architecture

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Preface

Compute consolidation through virtualization has been a consistent factor in data center trends over the last decade. Systems evolved from separate compute, network, and storage administrative silos to converged infrastructures and operational domains, and from traditional top-down network management and hierarchical infrastructure models, to newer models incorporating centralized controllers and increasingly virtualized, software-defined infrastructures.

Capex savings achieved by leveraging under utilized CPU and memory resources are a key driver of server virtualization. For many years, VMware has led the market for compute virtualization, but in recent years a more frequently encountered theme is that of hypervisor commoditization, as hypervisors from Microsoft, Citrix, and even open source projects have evolved to match, or in some cases exceed, VMware capabilities. As function and feature gaps narrow, some vendors have significantly lowered licensing costs to further hasten reevaluation of solution cost/benefit ratios, particularly for entry point use cases.

A key consideration for those virtualizing Windows environments is that there is no licensing for the Microsoft Hyper-V hypervisor. Microsoft offers Hyper-V in a free standalone version, or bundled into its Windows Server 2012 license. These advances are great news for customers, who now have more choices for virtualization solutions. Customers can select the virtualization environment which best meets their needs, in terms of cost, scale, performance, and application requirements.

The news for customers who adopt the Cisco Virtualized Multiservice Data Center (VMDC) reference model in their data centers is that a recent code release (Release 5.2(1)SM1(5.1)), enables the Nexus 1000V Switch for Microsoft Hyper-V to support advanced switching for Hyper-V virtual machines (VMs), along with Systems Center Virtual Machine Manager (SCVMM) integration. The networking benefits of the Nexus 1000V Switch for Microsoft Hyper-V were previously available only in vSphere environments (per-VM visibility, granular QoS, security policies, segmentation, and vPath service chaining for virtualized services such as Virtual Security Gateway), are now also available in the Windows Server 2012 environments.

This consistent operational model enables customers to leverage preferred management solutions. As noted, the Nexus 1000V Switch for Microsoft Hyper-V now offers SCVMM integration; for those who rely on Systems Center Operations Manager (SCOM), Cisco partnered with Jalasoft to develop an SCOM plug-in. Finally, for those who have Powershell expertise and prefer to use it for simple "CRUD" (create, update, delete) operations, the Nexus 1000V Switch for Microsoft Hyper-V offers RESTful APIs.

The Nexus 1000V Switch for Microsoft Hyper-V and Cisco VM Fabric Extender (VM-FEX) bring VM visibility and policy granularity to the virtualized compute environment as the "missing link" for service assurance in the architecture that VMDC addresses: highly consolidated, highly virtualized yet highly secure, multi-service public or private cloud data centers. This represents a significant step toward hypervisor-agnosticism and enhanced customer options, while maintaining key architectural advantages.

Document Goal

This document presents a "first look" at inserting SCVMM and Hyper-V-based compute resources into the compute tier of the VMDC reference architecture. We highlight differences from vSphere in terms of networking constructs, including policy profile implications and "tenancy."

The following areas are addressed:

- VMDC Architecture Overview—VMDC architectural components and framework
- Implementation Guidance—on deploying Nexus 1000V Switch for Microsoft Hyper-V and Hyper-V in a VMDC environment
- Management—Management tools for monitoring (SCOM) Hyper-V

Audience

The target audience for this document includes sales engineers, field consultants, professional services, IT managers, Cisco channel partner engineering staff, and customers who have need cloud-ready data centers or have an existing VMDC implementation, and are considering Hyper-V based compute resources.



CHAPTER

VMDC Architecture Overview

The VMDC solution provides design and implementation guidance for enterprises deploying private cloud services, and for service providers (SPs) building virtual private and public cloud services. The Cisco VMDC solution integrates various Cisco and third-party products that are part of the cloud computing ecosystem. Cisco's VMDC system defines an end-to-end architecture, which an organization may reference for the migration or build out of virtualized, multiservice data centers for new cloud-based service models such as Infrastructure as a Service (IaaS). Figure 1-1 shows the basic architectural framework for VMDC. The solution scope includes integrated compute, network, and storage components, a functional layered infrastructure, and service definitions for intra-DC, inter-DC, and automation and service assurance models.

Figure 1-1 Basic VMDC Architecture Framework



Refer to the Cisco Virtualized Multiservice Data Center site for additional details on VMDC.

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Validated VMDC architectural systems include a range of traditional hierarchical classic Ethernet models and a variety of Clos FabricPath-based models. Although this document focuses on inserting Hyper-V into a specific FabricPath-based topology model called a "Typical Data Center" design (for FabricPath), deployment considerations described in this document generally apply to all validated VMDC architectures.

VMDC "Typical Data Center" Design for FabricPath

A "Typical Data Center" design is a 2-tier FabricPath design, as shown in Figure 1-2. All VMDC architectures are built around modular building blocks called pods. Each pod uses a localized services attachment model. In a pod, Virtual Port Channels (vPCs) handle Layer 2 (L2) switching between the Edge devices and the compute. This provides an active-active environment that does not depend on Spanning Tree Protocol (STP) and converges quickly after failures. Figure 1-2 shows a VMDC pod using FabricPath between the Edge and Aggregation/Spine devices. In previously VMDC releases, vPCs were also used here as well. FabricPath replaces these vPCs.



Figure 1-2 VMDC 3.0.1 Typical Data Center Design

Hyper-V is used to implement hypervisor-based virtualization and enable the creation of VMs on physical servers. Hyper-V logically abstracts the server environment in terms of CPU, memory, and network touch points into multiple virtual software containers. In previous VMDC offerings, VMware's hypervisor was used.

The Cisco Nexus 1000V Switch for Microsoft Hyper-V L2 switch extends Cisco networking benefits to Microsoft Windows Server 2012 Hyper-V deployments. The Nexus 1000V Switch for Microsoft Hyper-V distributed virtual switching platform provides advanced features and is tightly integrated with the Hyper-V ecosystem.

Table 1-1 summarizes the capabilities and benefits of Cisco Nexus 1000V Switch for Microsoft Hyper-V switch when used in conjunction with Microsoft Hyper-V.

Capabilities	Features	Operational Benefits		
Advanced Switching	Private VLANs, Quality of Service (QoS), access control lists (ACLs), portsecurity, and Cisco vPath	Get granular control of virtual machine-to-virtual machine interaction.		
Security	Dynamic Host Configuration Protocol (DHCP) Snooping, Dynamic Address Resolution Protocol Inspection, and IP Source Guard	Reduce common security threats in data center environments.		
Monitoring	NetFlow, packet statistics, Switched Port Analyzer (SPAN), and Encapsulated Remote SPAN	Gain visibility into virtual machine-to-virtual machine traffic to reduce troubleshooting time.		
Manageability	Simple Network Management Protocol, NetConf, syslog, and other troubleshooting command-line interfaces	Use existing network management tools to manage physical and virtual environments.		
	Similar RBAC concept like physical switches – TACACS+, RADIUS	Centralize Access Control Management across physical and virtual switches		

Table 1-1 Nexus 1000V Switch for Microsoft Hyper-V Benefits

VMDC Tenancy Architecture

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The Expanded Palladium tenancy model provides flexibility in server VLANs placement in different zones, public and private. This model was further refined in VMDC 3.0.1 for the private cloud use case. Public virtual routing and forwarding instances (VRFs) are combined into one common public zone. The model assumes there is an "infrastructure" demilitarized zone (DMZ) above the common public zone, so there is no need for a separate protected front-end zone (and VRF) to accommodate per-tenant DMZs. This is a norm in the Enterprise environment. The public zone is shared across multiple user organizations or "tenants" (infrastructure zone) and provides access to the public Internet and serves as a shared resource zone. Figure 1-3 shows a simplified, high-level version of this model.



Figure 1-3 Expanded Palladium Tenancy Model

Microsoft Private Cloud Compared to VMware vSphere

Microsoft and VMware are both leading providers of cloud technologies. While their base technologies differ, their models exhibit the common functional components shown in Table 1-2.

Cloud Technology	Microsoft	VMware	Notes
Hypervisor	Hyper-V	ESXi	Both Type-1 Hypervisor
VM Management	SCVMM	vCenter Server	
Self-Service	App Controller	vCloud Director	
Monitoring	SCOM	vCenter Operations Management Suite	
Protection	Data Protection Manager	vSphere Data Protection	
Service Management	Service Manager	vCloud Automation Center	
Automation	Orchestrator	vCenter Orchestrator	

Table 1-2 Microsoft vs. VMWare Cloud Technologies

However, as might be expected, Microsoft and VMware terminology differs. Figure 1-4 highlights key terms in the Microsoft and VMware hypervisor ecosystems.

VMware ESX	Microsoft Hyper-V
vMotion	Live Migration
Virtual Distr. Switch (VDS)	Logical Switch
Folder/DataCenter	Host Group
vmknic	Host VNIC
Port-group	Virtual PP + VM Networks
Distributed Resource Scheduling (DRS)	Dynamic Optimization
Distrib. Power Mgmt (DPM)	Power Management
vCenter, vCloud Director	SCVMM, Orchestrator
Site Recovery Manager	Hyper-V Replica
Update Manager (VUM)	Update Services (WSUS)
Virtual Machine Disk (VMDK)	Virtual Hard Disk (VHDX)
VXLAN	NVGRE

Figure 1-4 Hypervisor Terminology Comparison

Microsoft and VMware also have different licensing practices, as summarized in Table 1-3.

Table 1-3 Microsoft and VMware Licensin	Table 1-3	Microsoft and VMware Licensing
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Cloud Technology	Microsoft	VMware	License Required?	
Hypervisor	Free	Free	Note: The Hypervisors are free to install. However, each VM will require a per vCPU license	
VM Management	Included with System Center	Sold Separately	Y	
Self-Service	Included with System Center	Part of vCloud Suite	Y	
Monitoring	Included with System Center	Included with vSphere	Y	
Protection	Included with System Center	Included with vSphere	Y	
Service Management	Included with System Center	Part of vCloud Suite	Y	
Automation	Included with System Center	Packaged with vCenter Server	Y	

vSphere Editions

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There are three editions of VMware vSphere: Standard, Enterprise, and Enterprise Plus. To support VM management, each edition requires the purchase of a vCenter Server. For Nexus 1000V Switch for Microsoft Hyper-V support, an Enterprise Plus license is also required.

Refer to the VMware vSphere with Operations Management website for additional details.



If Self-Service and Service Management are required, the user should consider purchasing the vCloud Suite, which includes a license for Enterprise Plus.

Microsoft Private Cloud Editions

Microsoft Private Cloud provides a Standard and a Datacenter Edition. The Standard Edition has a limitation on the number of vCPU and supported VMs, while the Datacenter Edition has unlimited support. The Nexus 1000V Switch for Microsoft Hyper-V is supported in both editions.

Refer to the Cisco Nexus 1000V Switch for Microsoft Hyper-V website for additional details on key benefits, features, and capabilities of Nexus 1000V with Microsoft Hyper-V.

Refer to the Microsoft Private Cloud website for additional details on key benefits, success stories, and how to evaluate or purchase Microsoft Hyper-V.

Refer to the Microsoft Private Cloud whitepaper for a comparative look at functionality, benefits, and economics.

Refer to VMware vSphere 5 vs. Microsoft Hyper-V 2012 for competitive performance results.

Interoperability

Both Microsoft and VMware can now manage multi-hypervisor environments.

Refer to the VMware vCenter Multi-Hypervisor Manager Documentation site to download the VMware vCenter Multi-Hypervisor Manager. Documentation for this plugin is also available on the webpage.

Microsoft System Center 2012 and SCVMM can manage multi-hypervisor environments. Refer to Managing VMware Infrastructure in VMM site for additional guidance.

VMDC Test Environment

Microsoft Hyper-V and Nexus 1000V Switch for Microsoft Hyper-V were tested in a VMDC 3.0.1 infrastructure. The system under test also leveraged the VMDC Virtual Management Infrastructure (VMI) for deploying the Nexus 1000V Switch for Microsoft Hyper-V Virtualized Switch Module (VSM).

Figure 1-5 shows how the Microsoft Hyper-V compute environment connects into the VMDC network infrastructure, VMI, and storage area network (SAN).

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Figure 1-5 VMDC Test Environment

Table 1-4 lists the system hardware components and their associated software versions.

Component	Typical VMDC Topology Software Version
Nexus 7000 (Aggregation-edge/Access-Edge/Core)	6.1.3
Nexus 5500 (Access-edge) w N2K-2232 and N2K-2248 FEX	5.2.1.N1.3
Catalyst 6500 (DSN and VSS)	12.2(33)SXJ3
ASA SM (In Extended Topology)	8.5(1)
ACE 30 (In Extended Topology)	A5.2.2
Unified Computing System	2.1.1(e)
Nexus 1000V Switch for Microsoft Hyper-V	5.2.1.SM1.5.1
1110 VSA	4.2(1)SP1(5.1a)
UCS Host OS	Windows Server 2012

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Component	Typical VMDC Topology Software Version
Virtual Machine Guest Operating System	CentOS 6.4
System Center Virtual Machine Manager	Windows Server 2012 UR2 Version 3.1.6020.0

Table 1-4 Hardware Components and Associated Software Versions (continued)



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Microsoft Private Cloud Implementation

In this section, we explore the implementation of a Microsoft Private Cloud solution through integrating the Microsoft Cloud OS into UCS. UCS is a computing systems comprising computing hardware, compute switching fabric, and virtualization and management software. These resources are integrated into a cohesive system that can be managed as an entity.

This provides unique benefits in the data center, such as:

- Hardware virtualization for streamlined deployment
- Ease of Cabling
- Single point of management for the compute resources (including blades, chassis and compute switching fabric)
- High Availability (including 1:N redundancy if desired)

Compute resources in the System Under Test included:

- 2 Cisco UCS 5108 Chassis
- 2 Cisco UCS 2208XP IOMs per chassis
- 2 Cisco UCS B200 M2 Blade Series Serves per chassis
- 2 Cisco UCS 6248UP Fabric Interconnects

The Cloud OS involves the simultaneous operation of several enterprise technologies including:

- UCS SAN Booting
- Windows Server 2012
- SQL Server 2012
- System Center 2012

Refer to the VMWare vSphere with Operations Management website for additional details on VMWare vSphere.

Refer to the Microsoft Private Cloud-Making it Real white paper to learn more about Microsoft's strategic and technical differentiation.

SAN Implementation

The B200 M2 Series server blades in UCS are configured to boot from SAN. UCS has two Fibre Channel port channels that connect Fabric A and Fabric B to two MDS switches. The MDS switches connect to a NetApp storage device.

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Details on the Service Profile creation for a server Hyper-V on UCS are found Figure 29 of the Deployment Guide.

Boot from SAN Procedures

Before starting, review the Common Errors during Windows SAN Boot Install on NetApp Storage Cisco internal document for lessons learned about the Windows SAN boot install.

Step 1 Shutdown all but one path to the boot logical unit number (LUN)

Microsoft supports only one path to the boot LUN when installing the OS. The Fibre Channel port channel (FC Po10) that connects to the MDS switches was disabled in UCS Manager (UCSM). All but one member of the second Fibre Channel port channel (FC Po20) was disabled.

Step 2 Map to fiber over Ethernet network interface card (fNIC) drivers and ISO image (Optional)

During OS installation, fNIC drivers must be installed in order to scan for the SAN boot LUN. To do this, map to the driver location using the UCS KVM console connection Virtual Media tab before starting the installation, and map to the ISO location of the OS to be installed.

As shown in Figure 2-1, in order to map to more than one image at a time, the FNIC drivers were copied locally (C:tmp in the Drive column). The ISO OS installation image was on a mapped drive to a network share.

Instead of mapping to both images at the same time, you could map and unmap as needed to go between the fNIC drivers and the OS during installation. However, mapping to multiple images supports not having to unmap and remap during installation.

Figure 2-1 shows a display from the KVM Virtual Media tab for what was mapped.

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Virtual Media	1						
lient View							
Mapped	Read Only	Drive					Exit
		🚽 A: - Floppy					Create Image
	×.	🗟 E: - CD/DVD					Add Image
	1	🔊 D: - CD/DVD					
>	1	🚽 C:\tmp\x64.ing					Remove Image
V	V	Y: ISO (VMDC4)	Win2012\en_wir	ndows_server_2	012_x64		Details ±
V		<mark>⊭2</mark> Y:¥SO\WMDC4≬	Win2012\en_wir	ndows_server_2	012_x64		Details ±
		<mark>₽</mark> ₽ <u>¥:≬\$0\\MDC4\</u> }	Win2012\jen_wir	ndows_server_2	012_x64		Details ±
etails	Mapped		Win2012\en_win	ndows_server_2	Duration		Details ±
etails Target Drive	Mapped		Read Bytes				Details ±
etails Target Drive irrtual CD/DVD Removable Disk	Mapped	Το	Read Bytes	Write Bytes	Duration		
etails Target Drive Tirbual CD/DVD	Mapped	To 50\VMDC4\Win2012 mp\w64.lmg - Flopp	Read Bytes	Write Bytes	Duration 00:00:01		
etails Target Drive irtual CD/DVD iemovable Disk	Mapped Y: \tr C: \tr	To 50\VMDC4\Win2012 mp\w64.lmg - Flopp	Read Bytes	Write Bytes	Duration 00:00:01		
etails Target Drive irtual CD/DVD iemovable Disk	Mapped Y: \tr C: \tr	To 50\VMDC4\Win2012 mp\w64.lmg - Flopp	Read Bytes	Write Bytes	Duration 00:00:01		
etails Target Drive irtual CD/DVD iemovable Disk	Mapped Y: \tr C: \tr	To 50\VMDC4\Win2012 mp\w64.lmg - Flopp	Read Bytes	Write Bytes	Duration 00:00:01		

Figure 2-1 Mapped KVM Virtual Media

If you forget to remap to an ISO image, the disk comes online but Windows fails to install and produces the following error:

	Name	Total Size	Free Space	Туре
S?	Disk 6 Unallocated Space	20.0 GB	20.0 GB	
9	Disk 8 Unallocated Space	20.0 GB	20.0 GB	Offline
6	Install Windows			x
€⊉ Be	le le			OK
Wind	4			
				Next

Figure 2-2 Forgot to re-map to ISO image



To proceed to the next step, you must remove the driver CD, insert the Windows CD, and refresh.

Step 3 Verify the NetApp LUNs are type **Windows GPT**. There are 2 Windows options for Type in the NetApp used during the testing, Windows and Windows GPT.

Figure 2-3 NetApp LUN configuration for B-Series Servers

UNs									
LUN Management Initiator Groups									
🔒 Create 🛛 🔒 Clone	🗟 Edit 🗙 Delete 🛛 🚳 Status 🔻	GRefresh							
Name	Container Path	Thin Provisioned	Available Size	Total Size	% Used	Туре	Status		
V2-C1B1-P1_boot	/vol/V2_C1B1_P1_boot_vol	No	200.03 GB	200.03 GB	0.0%	Windows GPT	\varTheta Online	_	
V2-C1B2-P1_boot	/vol/V2_C1B2_P1_boot_vol	No	199.94 GB	200.03 GB	0.04%	Windows GPT	😔 Online		
V2-C1B3-P1_boot	/vol/V2_C1B3_P1_boot_vol	No	192.11 GB	200.03 GB	3.96%	Windows GPT	😔 Online		
V2-C1B4-P1_boot	/vol/V2_C1B4_P1_boot_vol	No	199.94 GB	200.03 GB	0.04%	Windows GPT	😔 Online		

Deployment Guidelines

- **1.** Refer to Windows Boot from Fibre Channel SAN guide for an overview and the detailed instructions the administrator should follow.
- **2.** Refer to Support for booting from a Storage Area Network (SAN) for information about booting a Windows server from a SAN.

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3. Shutdown all but one path to Boot LUN.

Refer to Windows Setup in a boot from SAN configuration reports. Setup was unable to create a new system partition or locate an existing system partition.

4. Configure the NetApp Boot LUN as Windows GUID Partition Table (GPT).

Microsoft Windows Server 2012 and Hyper-V Implementation

This section covers Microsoft Windows Server 2012 and Hyper-V implementation. A common misconception of Microsoft Hyper-V is that it is a Type-2 hypervisor because installation of Windows Server 2012 is required. However, Hyper-V is considered a Type-1 hypervisor because VMs can interface directly with the hypervisor layer, bypassing the operating system layer.

There are two versions of Hyper-V. The first is a standalone product called Microsoft Hyper-V Server 2012. This free product is available for download from Microsoft. The second version is the Hyper-V feature bundled with Microsoft Windows Server 2012.

For Microsoft Server 2008 R2, there were three editions: Standard, Enterprise, and Datacenter. For Windows Server 2012, the Enterprise edition was eliminated. The Standard and Datacenter editions support installing Hyper-V.

/ V2-C2B3-P1 (Chassis - 2 Server - 3) - KVM Console	. 🗗 🗙
le View Macros Tools Help	
🖁 Boot Server 🔄 Shutdown Server 🧕 Reset	
VM Console Properties	
VM Virtual Media	
VM Virtual Media Select the operating system you want to install Operating system Architecture Date modified Windows Server 2012 Datacenter (Server Core Installation) x64 7/26/2012 Windows Server 2012 Datacenter (Server with a GUI) x64 7/26/2012 Description: This option is useful when a GUI is required—for example, to provide backward compatibility for an application that cannot be run on a Server Core installation. All server roles and features are supported. You can switch to a different installation option later. See "Windows Server Installation Options."	
	-
	► ►

Figure 2-4 Data Center Edition

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The choice between Standard and Datacenter Edition depends upon the number of active VMs required in the datacenter. Standard Edition supports a maximum of two VMs, but the Datacenter Edition does not limit active VMs.

Microsoft Windows Server 2012 Installation

The Windows Server 2012 edition (Standard or Datacenter) to be installed depends upon the product key entered. To simplify installation, use the GUI to install Windows Server 2012 using the GUI. This is also the reason why it is better to install the full Windows Server 2012 instead of the standalone Hyper-V server.

Step 1 Install Windows Server 2012.

Refer to the Installing Windows Server 2012 site for detailed guidance.

Step 2 After the installation completes, install the Cisco eNIC drivers to enable the network interface cards (NICs). The drivers are available on the Cisco software download site.

Figure 2-5 NIC Driver Installation



Step 3 After the NICs are enabled, verify that the server joins an Active Directory (AD) domain. This also satisfies the Network Time Protocol (NTP) requirement.

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	nassis - 2 Server - 3) - KYM Console	
View Macros		
	Shutdown Server 🤐 Reset	
M Console Properti	ies	
M Virtual Media	C unter an	_ 0 ×
	System	
€ ⊜ ▼ ↑	🛿 🕨 Control Panel 🕨 All Control Panel Items 🕨 System	V C Search Control Panel P
Control Panel H	laura -	
Control Partier	System Properties	x er
Device Manag	Computer Name/Domain Changes	
Remote setting		
Advanced syst	You can change the name and the membership of this omputer computer. Changes might affect access to network resources.	Windows Server [®] 2012
	Computer name:	┘
	V2-C2B3-P1	X5690 @ 3.47GHz 3.46 GHz (2 processors)
	Full computer name:	
	V2-C2B3-P1	x64-based processor
	More	available for this Display
	Member of	*
	Domain:	😵 Change settings
	vmdc.net	
	O Workgroup:	
	WORKGROUP	
See also	OK Cancel	ctivation
Action Center		
Windows Upd	OK Cancel Apply	·
<u> </u>		▲ 🕞 😨 🕼 7:14 PM ▲ 🕞 🕼 6/19/2013
ogged in ascomp	uteToken_@10.0.64.100 Not registered with UCS Central	System Time: 2013-06-1971

Figure 2-6 Joining an AD Domain

- **Step 4** On the AD server, verify that the **Administrator** account has Domain Administrator access. Add the **scymmadmin** account and grant it the Domain Administrator access.
- **Step 5** On the Windows Server 2012 server, verify that the AD **Administrator** and **scvmmadmin** accounts are available and add them if they are not available. After AD **Administrator** and **scvmmadmin** accounts are available, log off and log on as the Domain Administrator.

🇼 / ¥2-C2	283-P1 (Chassis - 2 Server	- 3) - KVM Console			
File View	Macros Tools Help				
👍 Boot Ser	rver 🜙 Shutdown Server	🥝 Reset			
KVM Console	e Properties				
KVM Virtua	al Media				
-	1 . The second	0 00 0	o o oo o		
		User Accounts	X		
Rec		osci Accounts			
Us	sers Advanced				
	🚛 Use the list below t	o grant or deny users	access to your computer,		
	and to change pas	swords and other sett	ings.	anager	
	Users for this computer:			stem32\cmd.exe	X
	User Name	Domain	Group	erved.	<u>^</u>
	Administrator	VMDC	Administrators		=
	Numerator Administrator	V2-C2B3-P1	Administrators		
	🗟 scvmmadmin	VMDC	Administrators		
	a constant a	Add	Remove Properties		
	6				
	Password for Administrate	r			
		password, press Ctrl-,	Alt-Del and select Change		
	Password.	r			
		l	Reset Password		×
_					
		ОК	Cancel Apply	\$	н
		UK			
		Cin	<u>\$2</u>	▲ P> @	1:04 PM
					0/15/2013
🔒 Logged in	ascomputeToken@10.0	.64.100 Not register	ed with UCS Central	55	stem Time: 2013-06-19T15:56/

Figure 2-7 Administrator and scvmmadmin Accounts

Step 6 After logging in, turn off the Windows Firewall in the Windows Firewall control panel.

ſ



Figure 2-8 Disabling Windows Firewall

Step 7 Verify that Windows Server 2012 can access the internet and activate Windows.

P	Windows Activation		- 🗆 X								
🍥 💿 🔹 🛧 🏲 🕨 Control Panel 🕨	System and Security + Action Center + Windows Activation	✓ C Search Control Pane	ρ,								
ð	Windows isn't activated										
ſ		×									
Windows Activation											
	This might take a few minutes										
		· · · · ·									
		\odot									
		Ŭ									
			Cancel								

Figure 2-9 Windows Activation

Microsoft Hyper-V Installation

Although Microsoft Hyper-V is included in Windows Server 2012, Hyper-V is not installed by default. After the initial Windows Server 2012 install finishes, the System Administrator must add the Hyper-V role manually. This section outlines the steps to install and configure Hyper-V.

Step 1 In Server Manager, bring up Add Roles and Features Wizard.

ſ

Re.				Server Manager	r					-	D X
	L	Add Roles and Features Wi	zard		x		<u>a</u>	IF			
	Select server role	Select one or more roles to install on the selecte Roles		DESTINATION SERV V2-C283-P1.vmdc			- (2)	Mana <u>o</u>	ge Tools	View	Help
	Instaliation Type Server Selection Server Roles Peatures Application Server Role Services Hyper-V Virtual Switches Migration Default Stores Confirmation Results	Active Directory Rights Management Se Application Server DHCP Server DNS Server Fac Server Fac Server Bitle And Storage Services (Installed) Bitle And Storage Services (Installed) Destrop Access Services Print and Document Services Remote Access Remote Desktop Services Volume Activation Services	vices you ca virtual Each vi isolate allows	ption -V provides the services that in use to create and manag machines and their resour titual machine is a virtualiza tete system that operates is desecution environment. T you to run multiple operat is simultaneously.	ge rces. red n an This					Hid	e =
		Web Server (IIS) Windows Deployment Services Windows Server Update Services <pre></pre>	us Next >	Install Cance	-1	Servers 1 ageability					
		Performance	Services			rices					
		BPA results	Performance		Perf	formance					
			BPA results		BPA	results					~

Figure 2-10 Add Roles and Features Wizard

Step 2 In the Wizard, click **Next** until the "Server Roles" window appears. Verify that the **Hyper-V** role is selected and click **Next**. In the **Features** window, verify that **Failover Clustering** and **Multipath I/O** are selected.

Ъ	Add Roles and Features Wizard	_ _ X
Select features		DESTINATION SERVER WIN-0JFUJ49ER67
Before You Begin	Select one or more features to install on the selected server.	
Installation Type	Features	Description
Server Selection	Client for NFS	Multipath I/O, along with the
Server Roles	Data Center Bridging	Microsoft Device Specific Module
Features	Enhanced Storage	(DSM) or a third-party DSM, provides support for using multiple
Confirmation	✓ Failover Clustering	data paths to a storage device on
Results	Group Policy Management	Windows.
110230100	Ink and Handwriting Services	
	Internet Printing Client	
	IP Address Management (IPAM) Server	
	iSNS Server service	
	LPR Port Monitor	
	Management OData IIS Extension	
	Media Foundation	
	Message Queuing	
	✓ Multipath I/O	
	Network Load Balancing	
	< III >	
	< Previous Next	> Install Cancel

Figure 2-11 Features Wizard

Step 3 With the Hyper-V role selected, the Wizard prompts for the creation of virtual switches. Depending on the number of available NICs, it is a good practice to create at least one switch for management. At the same time, reserve at least one NIC for the Nexus 1000V Switch for Microsoft Hyper-V.

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Ъ.	Add Ro	les and Features Wizard	_ D X
Create Virtual Sw Before You Begin Installation Type Server Selection Server Roles Features Hyper-V Virtual Switches	Vitual machines require role, you can create virtu One virtual switch will b at least one virtual switc can add, remove, and m Network adapters: Name V Ethernet	: virtual switches to communicate with other compute al machines and attach them to a virtual switch. e created for each network adapter you select. We re h now to provide virtual machines with connectivity t odify your virtual switches later by using the Virtual S Description Cisco VIC Ethernet Interface	DESTINATION SERVER V2-C283-P1.vmdc.net ers. After you install this commend that you create o a physical network. You
Virtual Switches Migration Default Stores Confirmation Results	Ethernet 2	Cisco VIC Ethernet Interface Cisco VIC Ethernet Interface III t you reserve one network adapter for remote access o not select it for use with a virtual switch.	>
		< Previous Next >	Install Cancel

Figure 2-12 Creating Virtual Switches

Step 4 Verify that Live Migrations are selected. This is a key advantages of Hyper-V.

Figure 2-13 Live Migration Option

L	Add Roles and Features Wizard	_ D X
Cirtual Machine Before You Begin Installation Type Server Selection Server Roles Features Hyper-V Virtual Switches Migration Default Stores		DESTINATION SERVER V2-C283-P1.vmdcnet thines on this server. used for live migrations. If gs after you install the role. set up constrained source server.
Confirmation Results	Inis protocol is more secure but requires you to set up constrained de environment to perform tasks such as live migration when managing th If this server will be part of a cluster, do not enable migration now. Inste server for live migration, including specifying networks, when you create < Previous Next >	his server remotely. ad, you will configure the

Step 5 Use the Defaults for the rest of the Wizard. Once the installation completes, reboot the server. The Windows Server 2012 server might reboot several times to install the added Roles and Features. This is normal. Simply wait until all the installation completes.

<u>Note</u>

Run Windows Update to ensure that all installed components are running the latest versions.

Figure 2-14 Windows Update

•	Windows Update		L		x
🔄 💿 👻 🕇 🐝 🕨 Control Pa	nel 🔸 All Control Panel Items 🔺 Windows Update	~ ¢	Search Control Panel	ş	2
Control Panel Home	Windows Update				
Check for updates					
Change settings	Checking for updates				
View update history					
Restore hidden updates					
	Most recent check for updates: Never				
	Updates were installed: Never				
	You receive updates: For Windows and other products from Microsoft Update				
See also					
Installed Updates					

SQL Server 2012 Installation

Before setting up Microsoft System Center 2012, we highly recommend that the System Administrator sets up a dedicated Microsoft SQL Server 2012 instance. Although System Center can install SQL Express, it is prudent to use the full version of SQL Server because it enables users to back up the database or set up MSCS clustering, which supports easy database recovery if a disaster occurs.

Step 1 Installing the SQL Server is straightforward. Unless MSCS clustering is required, no Windows Server 2012 customization is needed. Simply install Windows Server 2012 (either Standard or Enterprise) and then install SQL Server 2012 onto Windows Server 2012. After installation finishes, run Windows Update to obtain the latest patches and updates.

Refer to Install SQL Server 2012 from the Installation Wizard guide for information on installing SQL server.

Step 2 Verify that all SQL Server services are running and bring up the SQL Server Configuration Manager.

🖀 Sql Server Configuration Manager 📃 🗖												
File Action View Help Image: Second S												
 SQL Server Configuration Manager (Local) SQL Server Services SQL Server Network Configuration (32bit) SQL Native Client 11.0 Configuration (32bit) SQL Server Network Configuration SQL Server Network Configuration 	Name SQL Server Integr SQL Full-text Filte SQL Server (MSS SQL Server Analy SQL Server Repor SQL Server Browser SQL Server Agent	Running Running Running Running Stopped	Start Mode Automatic Manual Automatic Automatic Automatic Manual Automatic	Log On As NT Service\MsDtsS NT Service\MSSQL NT Service\MSSQL NT Service\MSSQL VMDC\Administrator NT AUTHORITY\LO NT Service\SQLSER	Process ID 1260 2716 1320 1360 1396 0 2088	Service Type SQL Server Analysis Server Report Server SQL Agent						

Figure 2-15 SQL Server Configuration Manager

Step 3 Add, view, delete, or perform maintenance on any databases using SQL Server Management Studio.

Microsoft SQL Server Management Studio (Administrator) _ 0 × File Edit View Debug Tools Window Help 🎦 🕶 🖅 😅 🛃 🤰 🔔 New Query 📑 🔧 📸 🤧 🖓 🖓 🖉 // - 🗠 - 💭 - 🖏 🖓 🙀 🕨 - 🛛 🖄 🚆 Object Explorer Connect 🕶 📑 📑 👕 🐼 🗉 🐻 VMI-HYPERV-SQL (SQL Server 11.0.3128 🖃 🚞 Databases 🗉 🚞 System Databases 🗉 🧰 Database Snapshots 표 🧻 OperationsManager 🗄 🧻 ReportServer ReportServerTempDB 🕀 间 SC01 🖃 🧻 VirtualManagerDB2 Database Diagrams 🗉 🚞 Views ⊞ 🚞 Synonyms ⊞ 🚞 Programmability 🗉 🚞 Service Broker 🗉 🚞 Storage 🗉 🧻 VirtualManagerDB3 🗉 🚞 Security 🗉 🚞 Server Objects E
 Replication 🗉 🚞 AlwaysOn High Availability 🗉 📸 SQL Server Agent

Figure 2-16 SQL Server Management Studio



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The necessary databases are automatically created when any System Center 2012 components are installed. No user intervention is necessary.

Deployment Guidelines

- **1.** If a System Center 2012 component cannot communicate with SQL Server 2012, the problem might be caused by Windows Firewall. Disable Windows Firewall on all servers.
- 2. We highly recommend making periodic database backups to ensure effective disaster recovery. For more information about database backups, refer to Create a Full Database Backup (SQL Server).
- **3.** Before installing System Center 2012, the System Administrator should create a test database and verify that all servers can connect to that test database.

Microsoft System Center 2012

This section describes Microsoft System Center 2012 (MSC) and System Center Virtual Machine Manager 2012 (SCVMM).

Refer to Installing System Center 2010 – Virtual Machine Manager for installation guidance.

SCVMM is part of MSC. Evaluation copies of MSC can be downloaded from the Microsoft System Center 2012 website.

SCVMM can reside on a VM or a physical server. The Administrator can base the decision on preference and the availability of resources.

SCVMM requires a MS-SQL database server and an Active Directory server with the existing setup.

- **Step 1** Connect the Windows Server 2012 server to the AD domain where the Hyper-V servers resides on.
- Step 2 The installation prompts for database information and automatically create a database instance on the server. If no database server is available, MS-SQL Express is automatically installed. After the installation finishes, the Virtual Machine Management (VMM) Console icon should appear on the Windows Server 2012 desktop.

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Figure 2-17 Virtual Machine Management Console Icon

Step 3 Bring up the VMM Console. You can now add Hyper-V hosts and the Nexus 1000V Switch for Microsoft Hyper-V.

Administrator - VMI-SCVMM.vmdc.	net - Virtu	al Machir	ne Manag	ger								_ 0	x
Home Folder													^ 🕜
Create Create Virtual Service Machine - Create Create Host Cloud Group Create	Create VM Network	Assign Cloud Cloud	Overview		Services how	VM Networks	PowerShell Jobs PRO Window						
VMs and Services < N	VMs (0)												
ổ Tenants													٩
a Clouds	Name	St *	Vir 👻	Availa	Host	Cloud	Job Status	Ŧ	0	" Us	* CPU A	Service	Opera
🚢 VM Networks						There are no	o items to show in th	is view					
길 Storage													
🚞 All Hosts													
													*
w VMs and Services													
Pabric													
🧮 Library													
🖺 Jobs													
Settings													
•													

Figure 2-18 VMM Console

Deployment Guidelines

SCVMM requires .NET Framework 3.5 and .NET Framework 4.0 to be installed on the Windows Server 2012 server that SCVMM resides on. While .NET 4.0 can easily be added through the Roles and Features Wizard, installing .NET 3.5 through the same wizard will only result in an error. This is a known Microsoft issue. The only workaround to this issue is to use the following method.

- 1. Verify that the Windows Server 2012 server can connect to the internet.
- 2. Bring up the KVM console using UCSM.
- 3. Mount the Windows Server 2012 installation media onto the CD/DVD drive (D:).
- 4. Enter the following command on a DOS prompt:

```
dism /online /enable-feature /featurename:NetFX3 /all /Source:d:\sources\sxs
/LimitAccess
```

Figure 2-19 dism Output

C:\Users\administrator.NEWTECH>dism /online /enable-feature /featuren. /all /Source:D:\sources\sxs /LimitAccess	ame:NetFX3
Deployment Image Servicing and Management tool Version: 6.2.9200.16384	
Image Version: 6.2.9200.16384	
Enabling feature(s) [====================================	
C:\Users\administrator.NEWTECH>	

5. Repeat the same command and procedure for "asp.net".

dism /online /enable-feature /featurename:iis-aspnet /all /Source:d:\sources\sxs
/LimitAccess

This should satisfy all the prerequisites for SCVMM.

Virtual Switch Module Installation on Nexus 1110

The Cisco Nexus 1000V Switch for Microsoft Hyper-V Distributed Virtual Switch requires a Virtual Supervisor Module (VSM) for control and management. The VSM controls multiple Virtual Ethernet Modules (VEMs) as one logical modular switch. However, while a physical switch uses linecards for Ethernet connectivity, VEMs are logical entities running in software inside physical servers.

In this test setup, VSMs were deployed in a Nexus 1110 Virtual Service Appliance (VSA), instead of in a Windows Server 2012 blade with Hyper-V enabled. From an architectural perspective, the idea is that the VSA resides in the management pod (called "VMI"), colocated with other management servers, rather than with production resources.

The deployment procedure for the Nexus 1000V Switch for Microsoft Hyper-V VSMs (VSBs) for Hyper-V is the same as for VMware deployments.

Refer to Installing VSM on Cisco Cloud Service Platform for additional guidance.

Refer to Cisco Nexus Virtual Services Appliance Release Notes, Release 4.2(1)SP1(5.1a) for more information about new features and caveats.

Deployment Guidelines

1. Use the correct ISO image for Hyper-V.

When creating the VSB, use the correct ISO for Hyper-V, as described in Step 4 of *Configuring Virtual Service Blades* in the Configuration guide.

2. Use a unique Domain ID in the VSM.

The Domain ID configured in the VSBs must be different than the domain ID used for the Nexus 1110 VSA. If domain IDs are not unique, the secondary VSA continuously reboots and message similar to this is seen:

```
2013 Jun 1 10:07:53 vsm-1 %KERN-1-SYSTEM_MSG: Dropping received frames from duplicate VSM saddr (0x1010000) - kernel
```



See CSCtq75997 more information.

1





Nexus 1000V Switch for Microsoft Hyper-V Configuration

This section describes how to configure the Nexus 1000V Switch for Microsoft Hyper-V in a VMDC solution.

- VSM CLI Configuration
- SCVMM Configuration

Figure 3-1 compares the SCVMM and Nexus 1000V Switch for Microsoft Hyper-V terminology that will be referenced in each section.

The reader should be familiar with these terms to better understand the role of each object as it pertains to the entire configuration and how each relates to SCVMM and the Nexus 1000V Switch for Microsoft Hyper-V.

SCVMM Terminology	Cisco Nexus 1000V Terminology
Logical Networks	Logical Networks
Network Sites	Network Segment Pools
VM Network Definitions	Network Segments
IP-Pools	IP-Pools & IP-Pool Templates
Port-Classifications	Port-profiles

Figure 3-1 SCVMM and Nexus 1000V Switch for Microsoft Hyper-V Terminology

Network and Tenants Under Test

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Three private tenants and one public tenant logical networks were created.

Six **network segment pools** were created, three public (T1, T2, T3) and three private (PT1, PT2, PT3). The three public network segment pools were configured as members of the public tenant logical network; the three private network segment pools were each configured as an individual member of a the three private tenant logical networks.

Only one **network segment** per public network segment pool was created. Two network segments per private network segment pool were created.

The **IP pool templates** and **port-profiles** are described in the IP Pool templates and Port-profiles sections later in the doc.

The configuration looks like this:

```
logical network PublicTenants
   network segment pool T1
      network segment T1-NetworkSegment101
   network segment pool T2
      network segment T2-NetworkSegment102
   network segment pool T3
      network segment T3-NetworkSegment103
logical network PrivateTenant1
   network segment pool PT1
      network segment PT1-NetworkSegment2013
      network segment PT1-NetworkSegment2014
logical network PrivateTenant3
   network segment pool PT2
      network segment PT2-NetworkSegment2023
      network segment PT2-NetworkSegment2024
logical network PrivateTenant3
   network segment pool PT3
      network segment PT3-NetworkSegment2033
      network segment PT3-NetworkSegment2034
```

Refer to Cisco Nexus 1000V for Microsoft Hyper-V Network Segmentation Manager Configuration Guide for more information about Microsoft networking concepts, command details, and implementation.

Refer to Cisco Nexus 1000V for Microsoft Hyper-V Release Notes, Release 5.2(1)SM1(5.1) for new features and caveats.

Nexus 1000V Switch for Microsoft Hyper-V VSM CLI Configuration

This section describes how to configure the Nexus 1000V with Hyper-V using the Network Segmentation Manager (NSM) CLI on the VSM.

Step 1 Create Logical Networks.

A logical network (for example, internet, intranet, DMZ) is a connectivity abstraction that models separate networks managed by an enterprise. Logical network abstraction hides VLANs and IP subnets from users (VM network administrators, the tenant administrators, and the server administrators), except for the fabric administrator managing the physical fabric.

In other words, a logical network is composed of one or more network segment pools and each network segment pool is a group of VLANS, IP subnets, or VLAN/IP subnet pairs.

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The following logical networks configuration shows three private tenants and one public tenant.

nsm logical network PublicTenants nsm logical network PrivateTentant1 nsm logical network PrivateTentant2
nsm logical network PrivateTentant3

Step 2 Create Network Segments Pools.

A network segment is associated with a unique broadcast domain and facilitates the availability of the network resources to a VM. SCVMM uses the VM networks and the VM subnets to provide the isolated virtual machine networks.

When a Nexus 1000V manages the virtual network, the VMM administrator creates the VM networks that use external isolation. To create external isolation, the network administrator creates network segments on the Nexus 1000V and provisions the isolated networks using VLANs and private VLANs.

Note

In Nexus 1000V for Microsoft Hyper-V, a VLAN is not created to define a bridge domain. Instead, a network segment is created on the VSM. Creating a network segment triggers VLAN auto-creation.

The following configuration shows network segment pools.

nsm network segment pool T1 nsm network segment pool T2 nsm network segment pool PT1 nsm network segment pool PT2 nsm network segment pool PT3

Step 3 Add each Network Segment Pool to the Logical Network.

The T1, T2, and T3 segment pools are members of the same public tenant logical network. The PT1, PT2, and PT3 segment pools are members of unique logical networks.

The following configuration shows mapping for network segment pools into logical networks.

```
nsm network segment pool T1
member-of logical network PublicTenants
nsm network segment pool T2
member-of logical network PublicTenants
nsm network segment pool T3
member-of logical network PublicTenants
nsm network segment pool PT1
member-of logical network PrivateTentant1
nsm network segment pool PT2
member-of logical network PrivateTentant2
nsm network segment pool PT3
member-of logical network PrivateTentant3
```

Step 4 Create IP Pool Templates.

Server administrators can manage IP addresses for the virtual environment using IP pool templates. You can use the IP pool templates to assign a range of IP addresses to hosts and VMs in the Microsoft SCVMM-managed environment. When creating an IP pool template for a VM network, you can define a range of IP addresses for VMs managed by SCVMM.

The following configurations shows IP pool templates that were created.

```
nsm ip pool template PT1-VL2013-IP-Pool
    ip address 200.1.3.2 200.1.3.250
    network 200.1.3.0 255.255.255.0
    default-router 200.1.3.253
nsm ip pool template PT1-VL2014-IP-Pool
    ip address 200.1.4.2 200.1.4.250
    network 200.1.4.0 255.255.255.0
    default-router 200.1.4.253
nsm ip pool template PT2-VL2023-IP-Pool
```

```
ip address 200.2.3.2 200.2.3.250
  network 200.2.3.0 255.255.255.0
  default-router 200.2.3.253
nsm ip pool template PT2-VL2024-IP-Pool
 ip address 200.2.4.2 200.2.4.250
  network 200.2.4.0 255.255.255.0
  default-router 200.2.4.253
nsm ip pool template PT3-VL2033-IP-Pool
  ip address 200.3.3.2 200.3.3.250
  network 200.3.3.0 255.255.255.0
  default-router 200.3.3.253
nsm ip pool template PT3-VL2034-IP-Pool
  ip address 200.3.4.2 200.3.4.250
  network 200.3.4.0 255.255.255.0
  default-router 200.3.4.253
nsm ip pool template T1-VL101-IP-Pool
 ip address 10.101.1.2 10.101.1.250
  network 10.101.1.0 255.255.255.0
  default-router 10.101.1.253
nsm ip pool template T2-VL102-IP-Pool
 ip address 10.102.1.2 10.102.1.250
 network 10.102.1.0 255.255.255.0
  default-router 10.102.1.253
nsm ip pool template T3-VL103-IP-Pool
  ip address 10.103.1.2 10.103.1.250
```

ip address 10.103.1.2 10.103.1.2
network 10.103.1.0 255.255.255.0
default-router 10.103.1.253

Step 5 Create Network Segments.

Configure each network segment to be a member of the previously configured network segment pools. Configure each network segment as an access port with an access VLAN. Import the previously configured IP pool for each network segment. Publish each network segment.

The Step 9VM Network Creation., page 3-36 commands are added automatically and appear later in this section when configuring VM networks in SCVMM.

VM networks enable the SCVMM administrator to create an isolated virtual Layer 3 (L3) network. Each VM network can have multiple VM subnets (virtual L2 domain). Microsoft SCVMM 2012 supports VLAN-backed and network virtualization (NVGRE)-backed VM networks. The Nexus 1000V supports VLAN-backed VM networks only.

The following configuration shows network segments that were created.

```
nsm network segment T1-NetworkSegment101
 member-of network segment pool T1
  switchport access vlan 101
  ip pool import template T1-VL101-IP-Pool
  publish network segment
  switchport mode access
nsm network segment T2-NetworkSegment102
 member-of network segment pool T2
  switchport access vlan 102
  ip pool import template T2-VL102-IP-Pool
  publish network segment
  switchport mode access
nsm network segment T3-NetworkSegment103
  member-of network segment pool T3
  switchport access vlan 103
  ip pool import template T3-VL103-IP-Pool
  publish network segment
```

switchport mode access

```
nsm network segment PT1-NetworkSegment2013
 member-of vmnetwork PT1-NetworkSegment2013
 member-of network segment pool PT1
  switchport access vlan 2013
  ip pool import template PT1-VL2013-IP-Pool
  publish network segment
  switchport mode access
nsm network segment PT1-NetworkSegment2014
 member-of network segment pool PT1
 switchport access vlan 2014
  ip pool import template PT1-VL2014-IP-Pool
 publish network segment
  switchport mode access
nsm network segment PT2-NetworkSegment2023
  member-of network segment pool PT2
  switchport access vlan 2023
  ip pool import template PT2-VL2023-IP-Pool
 publish network segment
  switchport mode access
nsm network segment PT2-NetworkSegment2024
 member-of network segment pool PT2
  switchport access vlan 2024
  ip pool import template PT2-VL2024-IP-Pool
  publish network segment
  switchport mode access
nsm network segment PT3-NetworkSegment2033
 member-of network segment pool PT3
  switchport access vlan 2033
  ip pool import template PT3-VL2033-IP-Pool
  publish network segment
  switchport mode access
nsm network segment PT3-NetworkSegment2034
 member-of network segment pool PT3
  switchport access vlan 2034
  ip pool import template PT3-VL2034-IP-Pool
  publish network segment
  switchport mode access
```

Step 6 Create Port profiles.

Unlike the Nexus 1000V for ESX, in which a port profile identifies both network policy and network isolation (VLAN), SCVMM networking decouples this information into a VM network and the port classification. When the Nexus 1000V is used with Hyper-V, the network administrator creates network segments to isolate networks. The SCVMM server administrator uses network segments in the resulting VM networks. The network administrator defines creates port profiles to define port policy. The server administrator uses port profiles to create a port classification.

To deploy a VM to the virtual access layer, choose the port classification, VM network, and the VM subnet. When a VM is deployed, a port profile is dynamically created on the Nexus 1000V for each unique combination of port classification, VM network, and VM subnet. All other VMs deployed with the same policy to this network reuse the dynamic port profile, which is a combination of network isolation and network policy.

Note The generated profile should be neither modified nor inherited in other port profiles.

When a port-attach notification is received, the port profile globally unique identifier (GUID) and network segment GUID are generated. A GUID provides a unique reference for the port profile and the network segment.

When a GUID is generated, a new port profile, combining the port profile and the VLAN, is created on the VSM. This auto-created port-profile is inherited on the interface. If more than one port uses the same combination of port profile and network segment, the port profile is shared. Port profiles are dynamically created during the interface attach process.

The following configuration shows port-profiles that were created.

```
port-profile type vethernet T1-PortProfile
 no shutdown
  state enabled
 publish port-profile
port-profile type vethernet T2-PortProfile
 no shutdown
 state enabled
 publish port-profile
port-profile type vethernet T3-PortProfile
 no shutdown
 state enabled
 publish port-profile
port-profile type vethernet PT1-PortProfile
 no shutdown
 state enabled
 publish port-profile
port-profile type vethernet PT2-PortProfile
 no shutdown
 state enabled
 publish port-profile
port-profile type vethernet PT3-PortProfile
 no shutdown
  state enabled
 publish port-profile
```

Step 7 Create Uplink Port Profile and Network Uplink.

An uplink port profile is essentially a template that defines a list of network segment pools to be associated with any (physical) network adapters to which the uplink port profile is applied. An uplink port profile enables you to specify protocols and port policy for the uplink adapter, using an Ethernet port profile to be specified.

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The following configuration shows uplink port-profiles.

```
port-profile type ethernet UplinkPortProfile
channel-group auto mode on mac-pinning
no shutdown
max-ports 512
state enabled
nsm network uplink UCS-Uplink
import port-profile UplinkPortProfile
allow network segment pool T1
allow network segment pool T2
allow network segment pool T3
allow network segment pool PT1
allow network segment pool PT2
allow network segment pool PT2
allow network segment pool PT3
publish network uplink
```

<u>Note</u>

When a new segment is created and tied to an existing network segment pool in the list under the network uplink, VLANs are inherited in the NSM created profile as shown.

The following configuration shows an Ethernet UCS-Uplink port-profile.

```
port-profile type ethernet UCS-Uplink
inherit port-profile UplinkPortProfile
switchport mode trunk
switchport trunk allowed vlan 101-103,2013-2014,2023-2024,2033-2034
no shutdown
max-ports 512
description NSM created profile. Do not delete.
state enabled
```

```
<u>Note</u>
```

The Switchport allow vlan add command is not needed.

Nexus 1000V Part 2: SCVMM Configuration

This section provides guidance on how to create the N1000V logical switch (VSM and VEMs) in Hyper-V through SCVMM.

Step 1 Download Cisco Nexus 1000V Package.

The Nexus 1000V for Hyper-V package (zip file) is available at the download URL location provided with the software. Complete the following steps to download the package.

Download the Cisco Nexus 1000V for Microsoft Hyper-V package for Microsoft System Center Virtual Machine Manager (SCVMM) 2012. The package contains the following files:

- Virtual Supervisor Module (VSM) ISO (n1000vh-dk9.5.2.1.SM1.5.1.iso)
- Virtual Ethernet Module (VEM) MSI package (Nexus1000V-VEM-5.2.1.SM1.5.1.msi)
- Cisco VSEM Provider MSI package (Nexus1000V-VSEMProvider-5.2.1.SM1.5.1.msi)
- Cisco SCVMM VM Template (Cisco Nexus1000V VSM Template)
- Cisco Installer App (Cisco.Nexus1000VInstaller.UI.exe)
- **Step 2** Install the Virtual Switch Extension Manager Provider.

To establish communication between SCVMM and the Nexus 1000V VSM, the Virtual Switch Extension Manager (VSEM) provider must be installed on the SCVMM server.

a. Run the Cisco VSEM Provider MSI package (Nexus1000V-VSEMProvider-5.2.1.SM1.5.1.msi) that comes with the Nexus 1000V Package.

Follow the link to where the MSI was downloaded and double-click MSI to run it.

b. Follow the prompts as shown in Figure 3-2, Figure 3-3, and Figure 3-4 until the install is complete.

🎉 💽 🗓 = I	Application Tools	VMM		-	D X
File Home Share View	v Manage				~ 0
€ 💮 ≠ ↑ 🏭 « Nexus1000.	∧5.2.1.SM1.5.1 → VMM	✓ C	Search VMN	N	p
🚖 Favorites Name		Date mo	dified 1	Гуре	Size
	SM Template	6/3/201	2.8.35 DM F	ile folder	
🎉 Downloads	Open Fi	le - Security Warning	×	Windows Instal	ler
Elibraries Documents Music Pictures Videos Local Disk (C;)	Name:1\VMM Type: Windows	iis file. Are you sure you want to run this RNexus1000V-VSEMProvider-5.2.1.SM1.5. Installer Package MDC4\N1KV\n1000vh-dk9.5.2.1.SM1.5.1\F Run Canc	I.O.msi Jexu		
😴 CIFS (\\dssg-neta					
2 items 1 item selected 684 KB		III			>
2 items interniselected boy Kb					Care west

Figure 3-2 Run the MSI Installer

Γ

🎉 🛃 🚺 = I		Application To	iols VMM	x
File Home	Share View	Manage		~ 🔞
€ 🖲 ד ↑ 퉱	« Nexus1000v.5.2	.1.SM1.5.1 → V	/MM V C Search VMM	P,
🚖 Favorites	붱	Cisco Nex	xus 1000V VSEM Provider Setup	Size
💻 Desktop 鷆 Downloads			Please read the Cisco Nexus 1000V VSEM File folder Provider License Agreement Windows Installer.	
 Recent places Libraries Documents Music Pictures Videos Videos Computer Local Disk (C:) CIFS (\\dssg-n 	(1)) CIS(ו ו ו כס.	IMPORTANT: PLEASE READ THIS END USER LICENSE AGREEMENT CAREFULLY. DOWNLOADING, INSTALLING OR USING CISCO OR CISCO-SUPPLIED SOFTWARE CONSTITUTES ACCEPTANCE OF THIS AGREEMENT. CISCO SYSTEMS, INC. OR ITS SUBSIDIARY LICENSING THE SOFTWARE INSTEAD OF CISCO SYSTEMS, INC. ("CISCO") IS WILLING TO LICENSE ITS SOFTWARE INSTEAD OF CISCO SYSTEMS, INC. ("CISCO") IS WILLING TO LICENSE ITS SOFTWARE TO YOU ONLY UPON THE CONDITION THAT YOU ACCEPT ALL OF THE TERMS CONTAINED IN THIS END USER LICENSE AGREEMENT FLUS ANY ADDITIONAL LIMITATIONS ON THE LICENSE SET FORTH IN	
👽 Network		Print	Back Vinstall Cancel	
2 items 1 item sele	cted 684 KB		111	>

Figure 3-3 Read and Accept the License Agreement



Figure 3-4 Select Finish when the Installer completes

Step 3 Verify that VSEM Provider is installed properly.

Go to **Settings > Configuration Providers**. Confirm that **Cisco Systems Nexus 1000V** is listed as a **Configuration Provider**.

Home							^ 😢
* 🗐 🦵	22 PowerShell						
Create Import Backup Console Add-in	P RO						
Import Backup	~						
Settings <	Configuration Providers (2)						
🔙 General							٩
4 🎎 Security	Name	Status	Туре 👻	Version	Publisher	Manufacturer	Model
👶 User Roles	Cisco Systems Nexus 1000V	Active	Virtual Switc		Cisco Syste	Cisco Syste	Nexus 1000V
🛃 Run As Accounts	Ø Microsoft Network Load Balancing (NLB)	Active	Load balancer	3.1.6011.0	System Cent	Microsoft	Network Loa
Servicing Windows							
Configuration Providers							
i System Center Settings							
Console Add-ins							
Add-Ins							
	Cisco Systems Nexus 1000V						~
	Description: Provider for Cisco Systems Nexus 1000	W/ Minton Constants					
	Description: Provider for Cisco Systems Nexus Tool	JV VIRtual Switch i	extension Manager				
	 Cisco Systems Nexus 1000V 						
WMs and Services							
Fabric							
🧮 Library							
📋 Jobs							
Settings							
-							

Figure 3-5 Cisco VSEM Provider installed

Step 4 Copy VEM MSI to SCVMM repository.

The VEM is an MSI file that must be placed in the following location on the SCVMM server: ALLUSERSPROFILE%\Switch Extension Drivers, for example, C:\ProgramData\Switch Extension Drivers. SCVMM uses the MSI file during the Add host operation to install VEM code on the host.



I

Do not install VEM code on the SCVMM server; only copy the file to the specified location.

Step 5 Add VSEM (Connect SCVMM to VSM).

The following procedures add the VSEM that was just installed. This step is required to connect SCVMM to the VSM in Hyper-V.

In these steps, the login account and the MGMT IP address configured in the VSM are needed to establish the communication between SCVMM and the VSM. Once the VSEM is added, the configuration that was created in the CLI of the VSM can be pulled in the SCVMM.

a. Right-click Switch Extension Manager and select Virtual Switch Extension Manager...

	Services Virtual Machines Hosts	Window	View Dependent Resources Dependencies	Refresh Refresh	Remove Remove	Properties Properties	
abric «	Virtual Switch Extension	on Manager	s (0)				
All Hosts	Name					Co	onnection string
PXE Servers Update Server Volm Server Volm Server Networking Volume Servers MAC Address Pools Coad Balancers VIP Templates Servers VIP Templates	Switch Extension Mana	ger					
Wr rempates Witch Extension M Witches Witches Wative Port Profiles Wr Classifications							
Contract synchronizes Contract synchronizes Port Classifications VMs and Services							
Native Port Profiles Port Classifications VMs and Services Fabric							
Mative Port Profiles Port Classifications VMs and Services							
White Sources VMs and Services Fabric							

Figure 3-6 Add VSEM

b. Add the Connection string and select **Run As Account.**

10.0.72.101 is the IP address of the VSM created on the Nexus 1110x. The created account uses the login credentials required to log in to VSM.

ſ

3	Add Virt	ual Switch Extension Manager Wizard	×
💐 General			
General Host Groups Summary	Select a manufactu	on settings for the extension manager to add rer, model, and configuration provider for the extension manager. Enter the nd credentials to be used.	
Summary	Manufacturer:	Cisco Systems, Inc.	*
	Model:	Nexus 1000V	-
	Provider:	Cisco Systems Nexus 1000V	•
	Connection string:	http://10.0.72.101	
	RunAs account:	VSM-Admin B	Browse
		Previous	Cancel

Figure 3-7 Add VSEM Wizard

Refer to Installing Cisco Nexus 1000v for Microsoft Hyper-V for more information about creating a **Run As Account**.

c. Verify that no additional configuration, such as proxy, is required.

Open a browser and test the connection to the VSM. Browse to http://<VSM IP Address>. Output similar to Figure 3-5 should be seen:



Figure 3-8 Browse to VSM

d. Select the host group to which the VSEM is available.

3	Add Virtual Switch Extension Manager Wizard
💐 Host Gr	oups
General	Host groups that can use this virtual switch extension manager
Host Groups	The virtual switch extension manager will be available to the following host groups.
Summary	All Hosts
	Previous Next Cancel

Figure 3-9 Add VSEM Wizard All Hosts

e. Confirm the VSEM settings and click Finish.

Figure 3-10	Add VSEM Wizard Confirm Settings
-------------	----------------------------------

9	Add Virtual Swit	ch Extension Manager \	Wizard	X
💐 Summan				
General Host Groups	Confirm the settings			View Script
Summary	Model: No Configuration provider: Ci Connection string: ht RunAs Account: VS	sco Systems, Inc. exus 1000V sco Systems Nexus 1000V tp://10.0.72.101 iM-Admin I Hosts		
			Previous	nish Cancel

f. Verify that Virtual Switch Extension Manager is installed.

Γ

II •	Home										^ 🔞
+ Create	Add Resources • Add	Overview	Resources	Services	Window	View Dependent Resources Dependencies	Refresh Refresh	Remove	Propertie		
Fabric	ADD			Virtual Switch Extensi	on Managa		Kerresh	Remove	Properse	5	
- <u>99</u> -			-	Virtual Switch Extensio	on Manage	ers (1)					٩
	All Hosts Library Servers PXE Servers			Name Cisco Nexus 1000	/ Chassis v	ersion 5.2(1)SM1(5.1)) - V2-Hyper	V-VSM-P1		onnection string ttp://10.0.72.101	
100	Update Server vCenter Server VMM Server										
T	Networking r Logical Netwo MAC Address										
	Load Balancer VIP Templates	5									
	Switch Extensi Logical Switch Native Port Pro Port Classificat	es ofiles									
	VMs and Servio										
1	Fabric										
=	Library										
0	lobs										
7	Settings										

Figure 3-11 Verify VSEM is installed

Step 6 Create Logical Switch in SCVMM.

After VSEM is added (Step 5), do the following:

- 1. Create a logical switch on VMM using VSEM.
- 2. Define extensions and port profiles for the logical switch.
- 3. Create classifications containing the native port profile and a port profile for each extension.
 - a. Right-click Logical Switch and select Create Logical Switch.

Home								^ 🔞
Create IP Pool Create Logical Network	Create Create	Add Resources •	Overview Fabric	역 Services @ Virtual Machines 한 Hosts	Window	View Dependent Resources	Remove	Properties
Create	nut striter	Add		10W	•	Dependencies	Remove	Properties
Fabric ¢	Logical Switches (0)						Anna an Talan an Anna a
P Servers								ام
All Hosts	Name							
Library Servers	Name							
PXE Servers			There	are no items to show in	i this view			
Update Server								
VCenter Servers								
VMM Server								
A 📥 Networking								
- Logical Networks								
MAC Address Pools								
Load Balancers								
VIP Templates								
B Switch Extension Managers								~
Logical Switz								
Native Port Create Logical Swi	itch							
Port Classifications								
Whs and Services								
Pabric								
🧮 Library								
📋 Jobs								
Settings								
•								

Figure 3-12 Create Logical Switch

b. Read the text and click Next.

Γ



Figure 3-13 Create Logical Switch Getting Started

c. Name the logical switch.

In this case, the hostname of the VSM was used. Use defaults for SR-IOV.

I



Figure 3-14 Create Logical Switch Name

d. Check the previously configured VSEM (V2-HyperV-VSM-P1) and click Next. The VSEM has the following attributes: Extension type: Forwarding
Extension Manager: Cisco Nexus 1000V Chassis Only one virtual switch extension can be selected.



Figure 3-15 Create Logical Switch Select VSEM

e. Select Team in the uplink mode field and click Add to add the uplink port profile.

Note The mode should always be **Team**, whether using a single uplink or multiple uplinks.

ſ



Figure 3-16 Create Logical Switch Select Add Uplink

f. Select the uplink port profile and click OK.

	😤 🔆 📫 🍙 🚺 Services 🝙	x	
igical arc	Create Logical Switch Wizard		ive Propert
🛒 Uplin	ste		ive Propert
	Add Uplink Port Profile		_
Getting Started	Select a port profile	tch	
brary Servers General	The port profile selected here will be available for use by the host physical	stance of this switch is	
KE Servers Extensions	adapter that connect to this logical switch.		
Center Server Uplink	Port profile: UCS-Uplink +		
MM Server Virtual Port	Summary		
working Summary	Host groups: All Hosts	eleti Add	
ogical Netwo	Network sites: PT1, PT2, PT3, T1, T2, T3	Edit	
IAC Address		Remove	
pad Balancen			
P Templates			
witch Extensi ogical Switch			<u> </u>
ative Port Pr			
ort Classificat			
ls and Servic	OK Cancel		
ric			
rary	Previous	Next Cancel	

Figure 3-17 Add Uplink Port Profile

g. Confirm the uplink port profile settings and click Next.

By default, the host group **All Hosts** is created in Hyper-V. The network sites PT1, PT2, PT3, T1, T2 and T3 were created during Nexus 1000V CLI configuration.

ſ

Create Logical	📽 🌠 Uplink	Cr	eate Logical Sw	itch Wizard		×	ive ive	Properties Properties	
abric	Getting Started General Extensions Uplink Virtual Port Summary	 t profile Team	s configured here a	that are part of this logic are available for use on hosts whe Network Sites PT1, PT2, PT3, T1, T2, T3		Add Edit Remove			۹ ۲
 Library Jobs Settings 				Previous	Next	Cancel			

Figure 3-18 Create Logical Switch Note Host Groups and the Network site

h. Specify the Port Classifications and click Next.

Port Classifications must be created in SCVMM and linked to port-profiles created in the VSM. The port-profiles were created previously in the "Nexus 1000V Switch for Microsoft Hyper-V VSM CLI Configuration" section on page 3-2; one port classification per port profile was created. When adding VMs to the logical switch, the port classification and VM network are selected when configuring network adapters (see VM Deployment).

Refer to **Creating Logical Switch in SCVMM** in Installing Cisco Nexus 1000V for Microsoft Hyper-V for additional guidance for creating port classifications.

ate Logical Cr Network	2	Create Lo	ogical Switch W	izard		x	ive	Properties
ic	🐖 Virtual F	Port					we	Properties
Servers All Hosts Library Servers PXE Servers	Getting Started General	Specify the port classif The port classifications configure virtual machines.		· ·	-			
🌆 Update Server	Extensions Uplink	Virtual ports:						
VCenter Server VMM Server	Virtual Port	Port Classification	Default False	Marked For Deletion		Add		
- Networking Ar Logical Netwo	Summary	PT2-PortProfile PT3-PortProfile	False False	False False		Edit Remove		
MAC Address		T1-PortProfile	False	False		Set Default		
VIP Templates Switch Extensi		T2-PortProfile T3-PortProfile	False False	False False		Clear Default	F	
Logical Switch Native Port Pri Port Classificat								
VMs and Servic								
Fabric								
Library Jobs				Previous	- Meg	t Cancel	111	
Settings								

Figure 3-19 Create Logical Switch Specify the Port Classifications

i. In the Summary panel, confirm the settings and click Finish to create the logical switch.

Figure 3-20 Create Logical Switch Specify Confirm Settings

ate Logical Cr		Create Lo	gical Switch Wizard		X	ive	Properties
c 🦷	Summary			A		ive	Properties
Servers All Hosts Library Servers Gene	ing Started	Confirm the settings			View Script		
Update Server VCenter Server VMM Server Virtu	nsions nk al Port mary	Name: Description: Single Root I/O Virtualization Switch uplink mode: Virtual switch extensions: Uplink port profile sets: Virtual port profile sets:	V2-HyperV-VSM-P1 1: Disabled Team V2-HyperV-VSM-P1 1 6				
VIP Templates VIP Templates Switch Extensi Logical Switch Native Port Pri Port Classificat VMs and Servic							
Fabric				Previous Finish	Cancel		
Jobs Settings				.8	aii	1	

ſ

j. Manually refresh the VSEM.

After the Nexus 1000V logical switch is created, manually refresh VSEM to force the updates to appear in SCVMM.

Home							^ 🔞
Add Create •	Resources Presenter Hosts	 PowerShell Jobs PRO 	View Dependent Resources	() Refresh	Remove	Properties	
Add	Show	Window	Dependencies	Refresh	Remove	Properties	
Fabric <	Virtual Switch Extension Manag	ers (1)					
Update Server							٩
vCenter Servers	Name					nection string	
PVMM Server	🧏 Cisco Nexus 1000V Chassis v	ersion 5.2(1)SM1(5	.1) - V2-HyperV-VSM	-P1	http:	//10.0.72.101	
🖌 📥 Networking							
1 Logical Networks							
🛎 MAC Address Pools							
🖄 Load Balancers							
VIP Templates							
Switch Extension Mana							
Logical Switches							
Port Classifications	Cisco Nexus 1000V Chassis ver	sion 5.2(1)SM1(5.1)	- V2-HyperV-VSM-P	1			v
Gateways							
	Extension manager information	on					
🕨 🧧 Storage 📃			on 5.2(1)SM1(5.1) -				
WMs and Services	V2-HyperV-V	SM-P1					
Pabric							
🧮 Library							
📋 Jobs							
Z Settings							
-							
Step 7 Add	d VEMs (Hosts) to the	e Nexus 100	0V.				

Figure 3-21 Manual Refresh of the VSEM

a. Right-click All Hosts and select Add Hyper-V Hosts and Clusters..

Create	Add Resources •	Overview Fabric Compl	liance Scan	Remedia	te Compliance Properties	Update Reassociate Agent	Window		
Create	Add	Show		Compli		Agent			
bric		< Hosts (0)							
Ser Ser	vers	<u></u>							ني .
	ll Hosts 🛛 🙀	Create Service	1	2S	* Role	Job Status	* CPU Average	Available Me	 Operating System
	brary Serve	Create Virtual Machine				There are no items to sho	w in this view		
-	XE Servers pdate Serve	Add Hyper-V Hosts and Clus	ters						
	Center Serve	Add Citrix XenServer Hosts a	nd Clusters						
_	MM Server	Add VMware ESX Hosts and	Clusters						
- Net	working	Create Host Group							
	ogical Netw 陷	Move							
	IAC Address 🗼	View Networking							
	oad Balance 🗙	Delete							
	IP Template	Properties							
	ogical Switches	managers							
	ative Port Profile	5							
p P	ort Classifications	5 +							
VIV	ls and Services								
ि Fat	nic								
Lib	rary								
	15								
Job									

Figure 3-22 Add Hyper-V Hosts

b. Select the appropriate computer location and click Next.

All hosts in the test bed were in a trusted Active Directory domain.

Figure 3-23 Add Hyper-V Hosts Windows Computer Location



c. Click Browse to see a list of Run As Accounts.

I



Figure 3-24 Add Hyper-V Hosts Specify Credentials

d. Select the Run As account created during the Hyper-V install.

The account is different than the **Run As account** used to install VSEM. The scymmadmin account was created in Active Directory and is a domain administrator account for the local domain.

See the "Microsoft Windows Server 2012 Installation" section on page 2-6 for more information about the scymmadmin account.

* +	III III	🕐 O		0 0 0		-
Create Add Resources	6		Add Resource \	Wizard	x	
Create Add	6 -					
Fabric	Credent		Select a Run As /	Account	×	
A PP Servers						
All Hosts	Resource location	Select a Run	As account			Operating Syste
🎄 Library Servers	Credentials			1	II the Hyper-V role and	
PXE Servers	Discovery scope	Name	Description	User Role		
🍺 Update Server		NT AUTHORITY	System			
📱 vCenter Server	Target resources	NT AUTHORITY	LocalS			
P VMM Server	Host settings	NT AUTHORITY	Netwo		Browse	
A 📥 Networking	Summary	VSM-Admin		Administrator		
1th Logical Netwo	Summary	Administrator		Administrator		
MAC Address		scymmadmin		Administrator		
🔛 Load Balancer						
VIP Templates					ator on the host	
🖳 Switch Extensi					e host as well as for	
🖫 Logical Switch					d manually, then they dded, the VMM service	-
D Native Port Pr				i	any future access to it.	
🚅 Port Classificat				Create Run As Accou	int	
w VMs and Servic				Oks Cancel		
Pabric						
🚟 Library				Previous	Next Cancel	
Jobs					411	
-						
Settings						

Figure 3-25 Add Hyper-V Hosts Select Run As Account

e. Enter the hostname of each host to add as a VEM and click Next.

eate Add 😭 • Resources	Add Resource Wizard	
eate Add C Discover	y scope	
Kervers All Hosts All Hosts Credentials Discovery scope VAIA Servers Update Server VAM Server VAM Server VAM Server VAM Server Mac Address Vond Balancer Vip Templates Switch Extenss Switch Extenss	Specify the search scope for virtual machine host candidates Search for computers by whole or partial names, FQDNs, and IP addresses. Alternatively, you may generate an Active Directory query to discover the desired computers. Specify Windows Server computers by names Specify an Active Directory query to search for Windows Server computers Enter the computer names of the hosts or host candidates that you want VMM to manage. Each computer names: Computer names: v2-c103-p1 v2-c104-p1 v2-c2b1-p1 v2-c2b1-p1 v2-c2b1-p1 v2-c2b2-p1	Operating Sys
Native Port Pn Port Classificat VMs and Servic Fabric Library	Skip AD verification Examples: server1 server1.contoso.com 10.0.1.1 2a01:110:1e:3:f8ffcfe44:23 Previous: Next: Cancel	
Jobs		

Figure 3-26 Add Hyper-V Hosts Enter Hostnames

f. After hosts are discovered, select each host to add and click Next.

Add 1	Add Reso	urce Wizard	×
Add	000118000		
j Target i	resources		11111111
s Resource location	Select the computers that y	ou want to add as hosts	- 0
ny Servers Credentials Servers	Discovered computers:		
Discovery scope	Computer Name	Operating System	Hypervisor
ter Server Target resources	v2-c2b1-p1.vmdc.net	Windows Server 2012 Datacenter	Hyper-V
A Server Host settings	v2-c1b3-p1.vmdc.net	Windows Server 2012 Datacenter	Hyper-V
riost setungs	v2-c1b4-p1.vmdc.net	Windows Server 2012 Datacenter	Hyper-V
summary	V2-c2b2-p1.vmdc.net	Windows Server 2012 Datacenter	Hyper-V
cal Netwo			
Address I Balancen			
l balancen Femplates			
ch Extensi			
cal Switch			
ve Port Pre			
Classificat			
ind Servic			
0	Select all Refresh	Stop	
у		Previous	Slext Cancel

Figure 3-27 Add Hyper-V Hosts Select the Hosts

g. Assign hosts to a host groups.

Leave Reassociate this host with the VMM environment unchecked and click Next.

Figure 3-28 Add Hyper-V Hosts Assign the Host Group

te Add 😭	Add Resource Wizard	
te Add Host se	ttings	
Servers Resource location All Hosts Credentials PXE Servers Discovery scope Update Server	Specify a host group and virtual machine placement path settings for hosts Assign the selected computers to the following host group: Host group:	 Operating Syste
VCenter Server VMM Server Vetworking Mic Gical Netwo Mic Address Load Balancer VIP Templates VIP Templates VIP Templates	If any of the selected hosts are currently managed by another Virtual Machine Manager (VMM) environment, select this option to reassociate the hosts with this VMM management server. Reassociate this host with this VMM environment VMM uses virtual machine placement paths as default locations to store virtual machines placed on a host. To add a new virtual machine placement path, specify a path and click Add. Add the following path:	
Switch Extensi Cogical Switch Cogical Switch Cogical Switch Cogical Switch Cogical Switch Cogical Switch Cogical Service Cogi	Add Selected virtual machine placement paths: Remove	
Fabric Library Jobs Settings	Previous Next Cancel	

h. Enable Live Migration and click Next.

Γ



Figure 3-29 Add Hyper-V Hosts Enable Live Migration

i. Confirm the Settings and click Finish.

reate Add rice Add rice Strees Servers Resource lo Credentials PXE Servers Credentials Discovery se Library Servers Discovery se Update Server Update Server VAM Server Host setting MAC Address Magnation S Magnation S Summary Summary Summary Summary Magnation S Summary S
WMs and Servic Fabric
Library

Figure 3-30 Add Hyper-V Hosts Confirm Settings

j. Verify All Hosts are seen in the All Hosts group.

Create Add Cverview Resources -	c Compliance ces		ate Compliance Properties	Update Reassociate Agent	Window		
bric <	Hosts (4)						
🖓 Servers							م
All Hosts	Name	Host Status	* Role	Job Status	- CPU Average	Available Me	· Operating System
🕴 v2-c1b3-p1	🕴 v2-c1b4-p1.vr	m OK	Host	Completed	2%	182.28 GB	Microsoft Windo.
👖 v2-c1b4-p1	🕴 v2-c2b1-p1.vr	m OK	Host	Completed	2 %	182.52 GB	Microsoft Windo.
🔰 v2-c2b1-p1	🕴 v2-c1b3-p1.vr	m OK	Host	Completed	0 %	0 KB	Microsoft Windo
🗿 v2-c2b2-p1	1 v2-c2b2-p1.vr	m OK	Host	Completed	4 %	182.58 GB	Microsoft Windo
Update Server Vcenter Servers VMM Server Networking							
VCenter Servers							
 VCenter Servers VMM Server 							
Center Servers VMM Server Networking VmL Logical Networks							
vCenter Servers VMM Server Networking Mc Address Pools							,
Venter Servers VMM Server VMM Server Networking Mc Address Pools Cad Balancers							,
Venter Servers VMM Server Networking The Logical Networks MAC Address Pools Load Balancers VIP Templates							
Venter Servers VMM Server Networking The Logical Networks AAC Address Pools VIP Templates VIP Templates VMS and Services							、
Venter Servers VMM Server Networking The Logical Networks Mac Address Pools VIP Templates VIP Templates VMs and Services Fabric Fabric							

Figure 3-31 Add Hyper-V Hosts Verify All Hosts

Step 8 Add Each Host to Logical switch.

a. Right-click the host to be added and select Properties.

Create Add Resources		ic rces ow		ate Compliance Properties	Update Reassociate Agent Agent	Window		
bric	د •	Hosts (1)						
All Hosts		Name	Host Status	Role	Job Status	- CPU Average	Available Me	· Operating System
V2-c1b3-p1 V2-c1b4-p1 V2-c2b1-p1 V2-c2b2-p1 V2-c2b2-p1 V2-c2b2-p1 Vpdate Servers Vpdate Servers VMM Server Vetworking MAC Address P MAC Address P MAC Address P Walancers VIP Templates	Power On Power Off View Status Start Mainten Stop Mainten Run Script Co	Machine Il Machines ance Mode ance Mode mmand	- OK	Host	Completed	0%	0 KB	Microsoft Windo
WMs and Service								
Pabric Fabric	Connect via R							
🧱 Library 📋 Jobs	Remove	-						
Jobs	Propertier 2	2						

b. Add New Logical Switch.

Γ

In the **Host Properties > Virtual Switches** window, select **New Virtual Switch** and **New Logical Switch** to add the host to the Nexus 1000V.

As seen in Figure 3-33, a standard External switch was already created for management. In Hyper-V, multiple switches can exist on the host.

* +	e	👘 🔾 🔶 📑	0	0 0	
Create Add Resources	8	v2-c1b3-p1.vi	mdc.net Properties		
Create Add Fabric Image: Servers ▲ Image: All Hosts Image: Servers Image: Servers <th>General Status Hardware Host Access Virtual Machine Paths Reserves Storage Virtual Switches Virtual Switches Placement Servicing Windows Custom Properties</th> <th>Vew Virtual Switch New Vertual Switch New Logical Switch New StarbSard Switch Cisco VIC Ethernet Interfa External</th> <th>Ime: -scription: • External Network adapter:</th> <th>Cisco VIC Ethernet Interface - Virtual Switcl Cisco VIC Ethernet Interface Cisco VIC Ethernet Interface - Virtual Switch ess using VLAN:</th> <th>P Operating System Microsoft Windo</th>	General Status Hardware Host Access Virtual Machine Paths Reserves Storage Virtual Switches Virtual Switches Placement Servicing Windows Custom Properties	Vew Virtual Switch New Vertual Switch New Logical Switch New StarbSard Switch Cisco VIC Ethernet Interfa External	Ime: -scription: • External Network adapter:	Cisco VIC Ethernet Interface - Virtual Switcl Cisco VIC Ethernet Interface Cisco VIC Ethernet Interface - Virtual Switch ess using VLAN:	P Operating System Microsoft Windo
Library	View Script			OK Cancel	
Jobs				OK CORCI	III.
Settings					

Figure 3-33 Host Properties New Logical Switch

c. Add physical adapters to the logical switch team.

There are two adapters, VIC Ethernet interface 3 and VIC Ethernet interface 4 that will be used on each host. Add these to the logical switch.

1

- Resources		1				
ate Add	General	💠 New Virtual Switch 👅 Ne	ew Virtual Network Adapter 🏋 De	lete		
Servers	Status Hardware	 Cisco VIC Ethernet Interfa External Cisco VIC Ethernet Interfa 	Logical switch: V2-HyperV-VSI The logical switch supports teamin more than one physical adapter the		 Operating S 	
v2-c1b3-p1	Host Access	External	single uplink. Physical adapters:	, ,		Microsoft W
🗿 v2-c2b1-p1		Logical Switch	Adapter	Uplink Port Prot	Add	
🗿 v2-c2b2-p1	Virtual Machine Paths		Cisco VIC Ethernet Interfa	UCS-Uplink	Remove	
Library Servers PXE Servers	Reserves		Cisco VIC Ethernet Interface Cisco VIC Ethernet Interface #2	2		
Update Server Vcenter Server	Storage		Cisco VIC Ethernet Interface			
F VMM Server	Virtual Switches					
Networking	Migration Settings					
🗯 MAC Address	Placement					
🔡 Load Balancen 🔄 VIP Templates	Servicing Windows					
VMs and Servic	Custom Properties		4 [•		
Fabric						
Library	View Script			OK	Cancel	-
Jobs					1000	3772

Figure 3-34 Host Properties Add Physical Adapter 1

Add the second physical adapter 2 and hit OK.

eate Add Resources eate Add			mdc.net Properties		
ric Add	General	🖕 New Virtual Switch 👅 Ne	w Virtual Network Adapter ᅟ 🗙 Delete		
Servers All Hosts	Status Hardware	Cisco VIC Ethernet Interfa External Cisco VIC Ethernet Interfa External	Logical switch: V2-HyperV-VSM-P1 The logical switch supports teaming which more than one physical adapter they will we single uplink.	 Operating Syst Microsoft Wind 	
v2-c1b4-p1	Host Access	V2-HyperV-VSM-P1	Physical adapters:		WICCOSOIL WIN
v2-c2b1-p1	Virtual Machine Paths	Logical Switch	Adapter Uplink P	Port Prof Add	
v2-c2b2-p1	Virtual Machine Paths		Cisco VIC Ethernet Interfa 🔻 UCS-U	plink Remove	
Elbrary Servers PXE Servers	Reserves		Cisco VIC Ethernet Interfa 🔻 UCS-U	plink •	
Update Server	Storage		Cisco VIC Ethernet Interface Cisco VIC Ethernet Interface #2 Cisco VIC Ethernet Interface #3		
VMM Server	Virtual Switches		Cisco VIC Ethernet Interface #4		
Networking	Migration Settings		~		
MAC Address	Placement				
🕍 Load Balancen 🔄 VIP Templates	Servicing Windows				
VMs and Servic	Custom Properties		*	•	
Fabric					
Library	View Script			OK Cancel	
Jobs				,	
Jobs					

Figure 3-35 Host Properties Add Physical Adapter 2

d. Click **OK** to continue to add host to the logical switch.

Γ

 eate Add Resources 		v2-c1b3-p1.v	mdc.net Proper	ties	X	-
eate Add	General	👍 New Virtual Switch 🔳 Ne	ew Virtual Network	Adapter 🗙 Delete		
ric M Servers	Status	Cisco VIC Ethernet Interfa External	Logical switch: The logical switc	V2-HyperV-VSM-P1 h supports teaming which means i	f vou connect	
All Hosts	Hardware	Cisco VIC Ethernet Interfa External		hysical adapter they will work toge		Operating System Microsoft Wir
🕴 v2-c1b4-p1	Host Access	V2-HyperV-VSM-P1 Logical Switch	Physical adapter			
<pre>v2-c2b1-p1 v2-c2b2-p1</pre>	Virtual Machine Paths		Adapter	Uplink Port Pro	Add	
Library Servers	Reserves	Virtual Wi	achine wanayei		- nemote	
PAE Servers Update Server VCenter Server	Storage	While Virtual Machine Manage temporarily lose network con on other network operations	nectivity. This may			
VMM Server	Virtual Switches	Do you want to continue?	in progress.			
- Networking	Migration Settings					
A Logical Netwo						
MAC Address	Placement			OK Cancel		
MAC Address				OK Cancel		
MAC Address Cload Balancen Cload VIP Templates	Servicing Windows		4			
MAC Address Load Balancer VIP Templates VMs and Servic	Servicing Windows					
	Servicing Windows		4		Cancel	
MAC Address Load Balancer VIP Templates VMs and Servic Fabric	Servicing Windows Custom Properties		4	······································	Cancel	114

Figure 3-36 Host Properties Continue to Add Host to Logical Switch

e. Verify that the VEM is installed on the VSM.

Figure 3-37 shows the output seen on the VSM when the VEM is added to the Logical switch.



1 0 Virtual Supervisor Module Nexus1000V active * 2 0 Virtual Supervisor Module Nexus1000V na=standby 4 288 Virtual Ethernet Module NA ok 5 288 Virtual Ethernet Module NA ok 1 5.2(1)SM1(5,1) 0.0 ok 2 5.2(1)SM1(5,1) 0.0 0.0 4 5.2(1)SM1(5,1) 0.0 0.0 5 5.2(1)SM1(5,1) 0.0 0.0 5 5.2(1)SM1(5,1) Windows Server 2012 - Datacenter (6,2,9200, 6,30) 6 5.2(1)SM1(5,1) Windows Server 2012 - Datacenter (6,2,9200, 6,30) 6 5.2(1)SM1(5,1) Windows Server 2012 - Datacenter (6,2,9200, 6,30) 6 00-19-07-65-63-48 to 00-19-07-66-62-88 NA 1 00-19-07-65-63-48 to 00-19-07-66-62-88 NA 2 00-19-07-65-63-48 to 00-19-07-66-62-88 NA 2 00-19-07-65-63-48 to 00-19-07-66-62-88 NA 2 00-19-07-65-63-48 to 00-19-07-66-62-88 NA 4 02-00-0-00-06-00 to 02-00-06-080 NA 4 <t< th=""><th></th><th></th><th>SM-P1(conf. Module-Ty</th><th>íg=net–sēg≯# sho mod⊤ œ</th><th>Model</th><th></th><th>Status</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></t<>			SM-P1(conf. Module-Ty	íg=net–sēg≯# sho mod⊤ œ	Model		Status							
Image: Sector	1 2 4 5	0 0 288 288	Virtual S Virtual E Virtual E	pervisor Module thernet Module thernet Module	Nexus1000V NA NA		ha-standby ok ok							
2 5;2(1)SM1(5,1) 0;0 4 5;2(1)SM1(5,1) Windows Server 2012 - Datacenter (6,2,9200, 6,30) 5 5;2(1)SM1(5,1) Windows Server 2012 - Datacenter (6,2,9200, 6,30) 6 5;2(1)SM1(5,1) Windows Server 2012 - Datacenter (6,2,9200, 6,30) Mod MAC-Address(es) Server 2012 - Datacenter (6,2,9200, 6,30) 1 00-19-07-56-55-88 to 00-19-07-66-62-88 NA 2 00-19-07-56-55-88 to 00-19-07-66-62-88 NA 4 02-00-06-00-06-00 to 02-00-06-80 NA 5 02-00-06-00-06-00 to 02-00-06-80 NA 6 02-00-06-00-06 to 02-00-06-80 NA 6 02-00-06-00-06 to 02-00-06-80 NA 4 02-00-06-00-06 to 02-00-06-80 NA Mod Server-IP Server-UUID Server-Name 1 10,0,72,101 NA 2 10,0,72,101 NA 4 10,0,65,1 627037AB-FABE-E211-0025-B5910220004 V2-C1B4-P1 5 10,0,65,1 627037AB-FABE-E211-0025-B5910220004 V2-C2B1-P1 6 10,0,65,2 627037AB-FABE-E211-0025-B59102200002 V2-C2B2-P1 * this terminal session V2-HyperV-VSM-P1(config-met-seg)# V2-HyperV-VSM-P1(config-met-seg)# V2-HyperV-VSM-P1(config-met-seg)# V2-HyperV-VSM-P1(config-met-seg)# V2-HyperV-VSM-P1(config-met-seg)#	Mod	S⊎		Hw										
1 00-19-07-6c-5a-a8 to 00-19-07-6c-62-a8 NA 2 00-19-07-6c-5a-a8 to 00-19-07-6c-62-a8 NA 4 02-00-0c-00-04-00 to 02-00-00-00-480 NA 5 02-00-0c-00-06-00 to 02-00-0c-00-680 NA 6 02-00-0c-00-06-00 to 02-00-0c-00-680 NA 1 10.0.72,101 NA 1 10.0.72,101 NA 2 10.0.72,101 NA 1 10.0.65,4 6 627057AB-FABE-E211-0025-B5910220000 V2-C1B4-P1 5 10.0.65,1 6 627057AB-FABE-E211-0025-B5910220000 V2-C2B1-P1 6 10.0.65,2 6 627057AB-FABE-E211-0025-B59102200002 V2-C2B2-P1 * this terwinal session V2-HuperV-VSM-P1(config-net-seg)# V2-HuperV-VSM-P1(config-net-seg)# V2-HuperV-VSM-P1(config-net-seg)# V2-HuperV-VSM-P1(config-net-seg)# V2-HuperV-VSM-P1(config-net-seg)# V2-HuperV-VSM-P1(config-net-seg)# V2-HuperV-VSM-P1(config-net-seg)# V2-HuperV-VSM-P1(config-net-seg)# V2-HuperV-VSM-P1(config-net-seg)#	2 4 5	5.2(1) 5.2(1) 5.2(1)	SM1(5,1) SM1(5,1) SM1(5,1)	0.0 Windows Server 2012 Windows Server 2012	- Datacenter (6.2.920	0, 6,30)							
1 00-19-07-6c-5a-a8 to 00-19-07-6c-62-a8 NA 2 00-19-07-6c-5a-a8 to 00-19-07-6c-62-a8 NA 4 02-00-0c-00-04 to 02-00-0c-00-04-80 NA 5 02-00-0c-00-06-00 to 02-00-0c-80 NA 6 02-00-0c-00-06-00 to 02-00-0c-80 NA Mod Server-IP Server-UUID Server-Name 1 10.0.72.101 NA NA 2 10.0.72.101 NA NA 4 10.0.65.1 627037AB-FABE-E211-0025-B5910220004 V2-C1B4-P1 5 10.0.65.1 627037AB-FABE-E211-0025-B59102200002 V2-C2B1-P1 6 10.0.65.2 627037AB-FABE-E211-0025-B59102200002 V2-C2B2-P1 * this terminal session V2-HyperV-VSM-P1(config-met-seg)# V2-HyperV-VSM-P1(config-met-seg)# V2-HyperV-VSM-P1(config-met-seg)# V2-HyperV-VSM-P1(config-met-seg)# V2-HyperV-VSM-P1(config-met-seg)# V2-HyperV-VSM-P1(config-met-seg)# V2-HyperV-VSM-P1(config-met-seg)# V2-HyperV-VSM-P1(config-met-seg)#		MAC-Ad	dress(es)		Serial-Num									
1 10.0.72.101 NA NA 2 10.0.72.101 NA NA 4 10.0.65.4 627087AB-FABE-E211-0025-B59102200004 V2-C1B4-P1 5 10.0.65.1 627087AB-FABE-E211-0025-B59102200002 V2-C2B1-P1 6 10.0.65.2 627087AB-FABE-E211-0025-B59102200002 V2-C2B2-P1 * this terminal session V2-HugerV-VSM-P1(config-met-seg)# V2-HugerV-VSM-P1(config-met-seg)# V2-HugerV-VSM-P1(config-met-seg)# V2-HugerV-VSM-P1 XVEM_MGR-2-VEM_MGR_DETECTED; Host V2-C1B3-P1 detected as wodule 2013 Jun 10 f6:00:33 V2-HugerV-VSM-P1 XVEM_MGR-2-VEM_MGR-2-VEM_MGR_DETECTED; Host V2-C1B3-P1 detected as wodule V2-HugerV-VSM-P1(config-met-seg)#	1 2 4 5	00-19- 02-00- 02-00-	07-6c-5a-a 0c-00-04-0 0c-00-05-0	3 to 00-19-07-6c-62-a8 0 to 02-00-0c-00-04-80 0 to 02-00-0c-00-05-80	NA NA NA									
2 10.072_101 NA NA 4 10.0.65.4 627037AB-FABE-E211-0025-B5910220000 V2-C1B4-P1 5 10.0.65.1 627037AB-FABE-E211-0025-B5910220000 V2-C2B1-P1 6 10.0.65.2 627037AB-FABE-E211-0025-B5910220002 V2-C2B2-P1 * this terminal session V2-HugerV-VSM-P1(config-net-seg)# V2-HugerV-VSM-P1(config-net-seg)# V2-HugerV-VSM-P1(config-net-seg)# V2-HugerV-VSM-P1(config-net-seg)# U2-HugerV-VSM-P1 XVEM_MGR-2-VEM_MGR_DETECTED; Host V2-C1B3-P1 detected as wodule 2013 Jun 10 f6:00:33 V2-HugerV-VSM-P1 XVEM_MGR-2-VEM_MGR_DETECTED; Host V2-C1B3-P1 detected as wodule V2-HugerV-VSM-P1(config-net-seg)#	Mod	Server	-IP	Server-UUID		Serve	-Name							
V2-HyperV-VSM-P1(config=net=seg)# V2-HyperV-VSM-P1(config=net=seg)# V2-HyperV-VSM-P1(config=net=seg)# 2013 Jun 10 16:00:33 V2-HyperV-VSM-P1 %VEM_MGR-2-MOD_ONLINE: Module 3 is online V2-HyperV-VSM-P1(config=net=seg)# _	2 4 5	10,0,7 10,0,6 10,0,6	2,101 5,4 5,1	NA 627C87AB-FABE-E211-0025 627C87AB-FABE-E211-0025	-B59102200001	NA V2-C13 V2-C23	31-P1							
	V2-H V2-H V2-H	yperV-V yperV-V yperV-V	SM-P1(conf. SM-P1(conf. SM-P1(conf.	ig-net-seg)# ig-net-seg)# ig-net-seg)# 2013 Jun 10				IGR_DETECT	ED: Host	V2-C1B	3-P1 det	ected as	: module	3

f. After all hosts were added to the logical switch, they are seen as VEMs in the VSM. Execute **show module** on the VSM to verify these hosts are seen as VEMs.

1

Mod	Ports	Module-	Туре	Model	Status
1 2 3 4 5 6	0 0 288 288 288 288 288	Virtual Virtual Virtual Virtual	Supervisor Module Supervisor Module Ethernet Module Ethernet Module Ethernet Module Ethernet Module	Nexus1000V Nexus1000V NA NA NA NA	active * ha-standby ok ok ok ok
1od	S⊌		Hu		
123456 Mod- 123456	5.2(1) 5.2(1) 5.2(1) 5.2(1) 5.2(1) 5.2(1) 5.2(1) MAC-Ad 	07-6c-5a 0c-00-03 0c-00-04 0c-00-05	0.0 Windows Server 2012 Windows Server 2012 Windows Server 2012 Windows Server 2012	- Datacenter - Datacenter - Datacenter Serial-Num NA NA NA NA	(6.2.9200, 6.30) (6.2.9200, 6.30)
Mod	Server	-IP	Server-UUID		Server-Name
 1 2 3 4 5 6	10.0.7 10.0.7 10.0.6 10.0.6 10.0.6 10.0.6 10.0.6	2.101 5.3 5.4 5.1	- NA NA 627C87AB-FABE-E211-002 627C87AB-FABE-E211-002 627C87AB-FABE-E211-002 627C87AB-FABE-E211-002	5-B59102200004 5-B59102200001	V2-C1B4-P1 V2-C2B1-P1

Figure 3-38 All Host Added as a VEM

g. Verify interfaces are added to Logical Switch.

Because each host has two Cisco VIC Ethernet interfaces, two Ethernet interfaces per host are seen, along the port-channel interfaces.

These are:

Eth3/1 Eth3/2 Eth4/1 Eth4/2 Eth5/1 Eth5/2 Eth6/1 Eth6/2

Po1 Po2

Po3 Po4

ſ

These interfaces and port-channels can get verified by executing **show interface brief** on the VSM:

Port VRF		Stat	tus IP	Address		Speed	MTU
mgmt0		up	10,	0,72,101		1000	1500
Ethernet Interface	VLAN	Туре	Mode	Status	Reason	Speed	Port Ch #
Eth3/1	1	eth	trunk	up	none	10G	1
Eth3/2	1		trunk		none	10G	1
Eth4/1	1 1	eth			none	10G	2233
Eth4/2		eth			none	10G	2
Eth5/1	1 1	eth			none	10G	3
Eth5/2	1	eth			none	10G	3
Eth6/1	1	eth	trunk		none	10G	4
Eth6/2	1	eth	trunk	up	none	10G	4
Port-channel Interface	VLAN	Туре	Mode	Status	Reason	Speed	Protocol
Po1	1		trunk		none		G(D) none
Po2	1	eth			none		G(D) none
Po3	1	eth			none		G(D) none
Po4	1	eth	trunk	up	none	a-10	G(D) none
Port. VRF		Stat	tue TP	Address		Speed	MTLI

Figure 3-39 Show Interface Brief

Step 9 VM Network Creation.

After the Nexus 1000V Switch for Microsoft Hyper-V Logical switch has been installed, the VM Networks can get created.

a. Verify the Logical Networks created on the N1000V are seen in Hyper-V.

Create IP Pool Create Logical Network	^{te} Log	Create gical Switch	Add Resources •	Our in t	abric sources		Window	View Depend Resources		Properties
Create			Add		Show			Dependenci	ies Remove	Properties
ibric	۲	Logical Networks a	nd IP Pools (6)							
M Servers	-									£
All Hosts		Name		Subnet	Begin Address	End Addr	ess A	Available Add	Available Add	Available Add
🗿 v2-c1b3-p1		vity Cisco VIC Ett	iernet	1						
👖 v2-c1b4-p1		THT Cisco VIC Et	nernet							
🕴 v2-c2b1-p1		vity PrivateTenta	nt1							
👖 v2-c2b2-p1	E	vitr PrivateTenta	nt2							
http://www.commune.com/servers	- 11	vity PrivateTenta	nt3							
PXE Servers		vity PublicTenant	s							
Update Server										
VCenter Servers										
VMM Server										
The Logical Networks										2
🗯 MAC Address Pools										
🔛 Load Balancers										
🗷 VIP Templates 🛛 😽	-									
WMs and Services										
🔛 Fabric										
🚟 Library										
Jobs										
Settings										

Figure 3-40 Logical Networks

b. Right-click VM Network and select Create VM Network.

reate Create Virtual Create Create Ho ervice Machine - Cloud Group Create	st. Create VM Network	123	view VMs S	Services V	/M v works V	2 Vindow			
Is and Services	VM Networks	and IP Pools (2)							
a Clouds	Name		•			Subnet	A	vailable Addresses	
J VM Networks	📥 Cisco V	IC Ethernet Inter	ace - Virtual	Switch					
	VM Network	thernet Inter	ace #2 - Virti	ual Switch					
🛙 v2-c1b4-p1									
₩ v2-c2b1-p1 ₩ v2-c2b2-p1									
 v2-c2b1-p1 v2-c2b2-p1 VMs and Services 									
 v2-c2b1-p1 v2-c2b2-p1 VMs and Services 									
 v2-c2b1-p1 v2-c2b2-p1 VMs and Services Fabric 									

Figure 3-41 Create VM Network

c. Create the VM network name and select the logical network.

Administrator -	vmi-scvmm2.vmdc.net - V	irtual Machine Manager	- 0	x
Home	Folder			^ 🕐
23	놀 📑 🏝	a 🖉 🍈 🎄 🚣 👩		
Create Create Virtua Service Machine •	<u>\$</u> .	Create VM Network Wizard		
Service machine				
VMs and Services	🌲 Name			
🥵 Tenants	Name			٩
a Clouds	Isolation	Specify a name and description for the VM network	ddresses	
J. VM Networks		Name: T1-VL101		
ј Storage	Summary	Description:		
🔺 🚞 All Hosts		Logical network: PublicTenants		
v2-c1b3-p1 v2-c1b4-p1				
v2-c2b1-p1				
v2-c2b2-p1				
WMs and Servic				
🗓 Fabric				
🧮 Library		Previous Vext Cancel		~
Jobs			1	
Settings				
	*			

Figure 3-42 Create VM Network Name

d. Select the network segment.

Γ

Administrator -	vmi-scvmm2.vmdc.net - V	'irtual Machine Manager	_	D	x
Home	Folder				~ 🕜
*	🏝 📑 🏦				
Create Create Virtu	â.	Create VM Network Wizard			
Service Machine •					
VMs and Services	isolation				
🞲 Tenants					٩
Clouds	Name	Configure the isolation for this VM network, or select automatic to have it	ddresses		
VM Networks	Isolation	configured for you			
	Summary	O Automatic			
Storage		Specify an externally supplied VM network			
 All Hosts v2-c1b3-p1 		External VM network User defined T1-NetworkSegreent101			
v2-c1b4-p1		T2-NetworkSegment102			
🖉 v2-c2b1-p1		T3-NetworkSegment103			
₹ v2-c2b2-p1					
L.					
WMs and Servi					
🗓 Pabric					
🧮 Library		Previous Next Cancel			~
Jobs					
Settings					
	-				
	2 ᇘ 2 🖂	E	24	12:11	PM
e. Co	onfirm the VM	network settings.			

Figure 3-43 Select Network Segment

Figure 3-44 Confirm VM Network Settings


f. Follow the same steps to create the remaining VM Networks.

Home Folder				^
Assign Cloud Cloud	Ms Services VM Networks PRO Show Window			
Is and Services	 VM Networks and IP Pools (12) 			
🔥 Tenants				
a Clouds	Name	Subnet	Available Addresses	
	Lisco VIC Ethernet Interface #2 - Virtual Switch		1	
📥 VM Networks	New Virtual Switch0			
길 Storage	□			
All Hosts	PT1-VL2013-IP-Pool	200.1.3.0/24	247	
V2-Cluster	□ 🚣 PT1-VL2014			
🖉 v2-c1b3-p1	W PT1-VL2014-IP-Pool	200.1.4.0/24	249	
v2-c1b4-p1	□ 🚣 PT2-VL2023			
🖉 v2-c2b1-p1	WE PT2-VL2023-IP-Pool	200.2.3.0/24	249	
👖 v2-c2b2-p1	□ 📥 PT2-VL2024			
🗿 v2-c2b3-p1	WI PT2-VL2024-IP-Pool	200.2.4.0/24	249	
	🖃 🚢 PT3-VL2033			
	PT3-VL2033-IP-Pool	200.3.3.0/24	249	
	□ 📥 PT3-VL2034			
VMs and Services	WIT3-VL2034-IP-Pool	200.3.4.0/24	249	
	🗆 🖻 🎿 T1-VL101			
Pabric Fabric	T1-VL101-IP-Pool	10.101.1.0/24	249	
Library	□			
-	T2-VL102-IP-Pool	10.102.1.0/24	249	
Jobs	□ 🚣 T3-VL103			
Settings	T3-VL103-IP-Pool	10.103.1.0/24	249	

Figure 3-45 All VM Networks

g. Verify the network segment are now a "member-of" the correct VM Networks. This line of the configuration is automatically added to the CLI as noted Step 5Create Network Segments., page 3-4.

```
nsm network segment T1-NetworkSegment101
member-of vmnetwork T1-NetworkSegment101
member-of network segment pool T1
switchport access vlan 101
ip pool import template T1-VL101-IP-Pool
publish network segment
switchport mode access
```

At this point, the logical switch, including VSM and VEMs, is installed. VMs can now be added to the logical switch.

Deployment Guidelines

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1. Manually refresh the VSEM. Hyper-V performs a periodic refresh every 30 minutes; changes in the Nexus 1000V are not automatically updated in Hyper-V. Manually refresh the VSEM to force updates to show up in SCVMM.

2. Manually remove NetSwitchTeam. If a host is deleted from SCVMM, NetSwitchTeam is not removed from the host.

If hosts are removed and added again, the hosts is not added to the logical switch because NetSwitchTeam still exists on the hosts.

This error is seen in the Jobs section:

Error (25238)

Creating the adapter team failed with error An internal error has occurred trying to contact the v2-c1b4-p1.vmdc.net server.

WinRM: URL: [http://v2-c1b4-p1.vmdc.net:5985], Verb: [GET], Resource: [http://schemas.microsoft.com/wbem/wsman/1/wmi/root/scvmm/ErrorInfo?ID=1001]

Check that WS-Management service is installed and running on server v2-c1b4-p1.vmdc.net. For more information use the command "winrm helpmsg hresult". If v2-c1b4-p1.vmdc.net is a host/library/update server or a PXE server role then ensure that VMM agent is installed and running. Recommended Action

ensure the team is functioning correctly and retry the operation

To clear this condition, open Windows PowerShell and do the following:

```
PS C:\Users\Administrator.VMDC> Get-NetSwitchTeam *
Name : V2-HyperV-VSM-P12b352411-1eff-4e95-bc84-9f0fb5a339a4
Members : {Ethernet 5, Ethernet 4}
```

PS C:\Users\Administrator.VMDC> Get-NetSwitchTeam | Remove-NetSwitchTeam

After the obsolete NetSwitchTeam is removed, the host can be added to the Logical switch.

3. Verify that hosts ports show up in VSM. In UCSM, each host had two MGMT and two DATA vNICs. The DATA vNICs were used for NetSwitchTeam. On one or two occasions, when a host was added to the Nexus 1000V logical switch, only one interface showed up in the VSM for that VEM, even though both interfaces were selected. The procedure to add the host to the Nexus 1000V had to be repeated, and the interface that did not show up had to be added to the newly created Nexus 1000V connection.

This can be verified by logging into the VSM and looking at the output **from show interface brief**. Look for the VEM and the ports. A **show port-channel summary** should shows those ports added to the port-channel.

- 4. Close and reopen SCVMM. On occasion, odd behavior was seen, such as hosts not responding to messages. Connecting to hosts using Remote Desktop Protocol (RDP) showed that the hosts were in the correct state. Closing and reopening the SCVMM app cleared this state. This is most likely a winrm issue that needs further investigation when it happens again.
- 5. Create a Gold Template for SCVMM. After three to four weeks, SCVMM became unstable. A new SCVMM was created, and a Gold Template was generated from that VM, in case the instability recurs.
- **6.** Refer to Cisco Nexus 1000V for Microsoft Hyper-V Installation Guide, Release 5.2(1)SM1(5.1) for information about creating the Nexus 1000V logical switch in Hyper-V SCVMM.

Adding VMs to Nexus V Switch for Hyper-V Logical Switch

This section shows the process for adding Virtual Machines to the Nexus 1000V Switch for Microsoft Hyper-V Logical switch.

Step 1 Go to the **VM Properties** page.

Right-click the VM and select Properties.

Step 2 Select **Hardware Configuration** and select the adapter to add to the logical switch.

There are two adapters in the test VMs. One connects to the Microsoft external switch for Management and the other connects to the Nexus 1000V.

Step 3 Select the VM network.

On the network adapter properties page, click **Browse** to see a list of available VM networks.

Home		Virtual Machine	-			^ @
Create Shut	Power Off Power Off Power Off		Storage	operties	×]
Down Create VMs and Services	General	Save As New:	<u> Disk ≪= SCSI Adapte</u> Select a VM Netv	r 🧯 DVD 🐨 Network Adar vork	x Remove	2
🤣 Tenants la Clouds	Status Hardware Configuration	Select a VM Netwo Change the network that		his service.	^	P
🚢 VM Networks	Checkpoints			م	Browse	V A C V A C
ј Storage	Custom Properties	Name Cisco VIC Ethernet Int	Description	Owner VMDC\Administrator	* *	V A C
 All Hosts W2-Cluster 	Settings	PT1-VL2013		VMDC\Administrator		V., A., C., V., A., C.,
v2-c1b3-p*	Actions	PT1-VL2014 PT2-VL2023		VMDC\Administrator VMDC\Administrator	E	
🕴 v2-c2b1-p	Servicing Windows	PT2-VL2024 PT3-VL2033		VMDC\Administrator		
<pre>v2-c2b2-p* v2-c2b3-p*</pre>	Dependencies	PT3-VL2033		VMDC\Administrator		
	Validation Errors	T1-VL101 T2-VL102		VMDC\Administrator	-	~
	Access		Create	/M Network Clear selectio	on v	^
🔯 VMs and Serv		1		OK Cancel		of virtual
E Fabric	A States				×	=
불 Library	View Script				OK Cancel	
Jobs						
Settings	Go to rela	ted object	Storage (1 di	sks)	Daily performance (CPU)	
	▼ Host: v2	2-c1b3-p1.vmdc.net	Total storage (20.00 GB):	2	Average 🔛

Figure 3-46 Select a VM Network

Step 4 Select the classification.

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After selecting the VM network, click the Classification drop-down and select the classification profile.



Figure 3-47 Select Classification

Step 5 After selecting the classification, click OK.

Step 6 Verify the Virtual Machine has been deployed by issuing a "show interface virtual" from the CLI of the VSM:

V2-HyperV-VSM-P1# show interface virtual

Port	Adapter	Owner	Мо	d Host
Veth1	Net Adapter	PT1-vSTC1-VL2013	3	V2-C1B3-P1
Veth2	Net Adapter	PT1-vSTC1-VL2014	3	V2-C1B3-P1
Veth3	Net Adapter	PT3-vSTC1-VL2033	3	V2-C1B3-P1
Veth4	Net Adapter	T1-vSTC1-VL101	3	V2-C1B3-P1
Veth5	Net Adapter	PT2-vSTC1-VL2023	4	V2-C1B4-P1
Veth6	Net Adapter	PT2-vSTC1-VL2024	4	V2-C1B4-P1
Veth7	Net Adapter	PT3-vSTC1-VL2034	4	V2-C1B4-P1
Veth8	Net Adapter	T2-vSTC1-VL102	4	V2-C1B4-P1
Veth9	Net Adapter	PT1-vSTC2-VL2013	5	V2-C2B1-P1
Veth10	Net Adapter	PT1-vSTC2-VL2014	5	V2-C2B1-P1
Veth11	Net Adapter	PT3-vSTC2-VL2033	5	V2-C2B1-P1
Veth12	Net Adapter	T3-vSTC1-VL103	5	V2-C2B1-P1
Veth13	Net Adapter	PT2-vSTC2-VL2023	6	V2-C2B2-P1
Veth14	Net Adapter	PT2-vSTC2-VL2024	6	V2-C2B2-P1
Veth15	Net Adapter	PT3-vSTC2-VL2034	6	V2-C2B2-P1
Veth16	Net Adapter	LM-Windows Server 2012 -0	1	4 V2-C1B4-P1
Veth17	Net Adapter	LM-Win2008-02	4	V2-C1B4-P1

Deployment Guidelines

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- 1. Select the correct interfaces when adding network adapters. In UCSM, each host has two MGMT and two DATA vNICs. From the Windows OS perspective, four VIC interfaces are presented. Ensure that the correct interfaces are selected when adding the hosts to virtual switches. Check the MAC addresses.
- **2.** Refer to **Connecting VMs to Logical Switch** in Cisco Nexus 1000v for Microsoft Hyper-V Installation Guide, Release 5.2(1)SM1(5.1) for more information.

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SCOM 2012 with UCS Management Pack

Microsoft System Center Operations Manager (SCOM) 2012 is a key component of Microsoft Private Cloud, and provides basic orchestration and monitoring for Private Cloud components. Cisco provides a plug-in for SCOM that enables users to monitor UCS. In order to minimize downtime, users can create e-mail alerts that report Private Cloud failures.

Installation and Configuration

Like SCVMM, SCOM a part of the Microsoft Private Cloud Suite. Users can install SCOM on the same server as the SCVMM, or on a standalone SCOM server. This decision depends upon resource restrictions and the preference of the System Administrator.

Before installation, ensure that the Windows Server 2012 server that SCOM will reside on can communicate with the SQL Server. No other adjustment to SQL is necessary. During SCOM installation, SQL automatically creates the necessary database and files.

Refer to the Microsoft System Center site for more installation details.

Deployment Guidelines

Since SQL 2012 resides on a standalone server separate from SCOM, the installation program might not be able to detect the SQL Server instance when attempted to install SQL Server Reporting Services (SSRS).

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Figure 4-1 SQL Server Instance

Operations Manager Setup	2
Configuration	
SQL Server instance for reporting services	
Select the SQL Server instance on which you want to host SQL Server Reporting Services (SSRS). This in Server Report Server will integrate the security of the selected SSRS instance with Operations Manager n Any reports that were previously installed on this SQL Server instance might become inaccessible.	
SQL Server instance	
Previous Next >	Cancel

This is normal, because SCOM expects a local installation of SQL Server Express. However, because the full version of SQL Server 2012 already exists in the ecosphere with backup and redundancy, the local installation of SQL Server Express was unnecessary. To work around this issue, perform the following step:

Ensure that both SQL Server and SCOM Server are in the same domain.

- 1. Install SCOM without the reporting server.
- 2. Install reporting services directly onto the SQL Server.
- **3.** On the SCOM Server, open and close the Operation Management Console and reporting service should now be available.

Cisco UCS Management Pack for SCOM

After the SCOM installation finishes, users can install a Cisco plug-in, UCS Management Pack, which is downloaded in the form of a Windows Installer (*.msi) file. This plug-in enables users to monitor various UCS components.

Before beginning the installation, download the UCS Management Pack.

The UCS Management Pack file, Cisco.UCS.MP.xxxx.vx.xx-x64.msi, should be saved on the desktop of the SCOM server. When the download finishes, double-click the file to install the program. When the installation finishes, a "Cisco Unified Computing System" folder should appear in SCOM.



Figure 4-2 Cisco Folder SCOM

For detailed information about installing and deploying UCS Management Pack, refer to the Quick Start Guide.

Monitors and Alerts

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In SCOM, users can view Private Cloud status and configuration information. Users can view the Cisco UCS folder for UCS status and configuration information. In order to minimize downtime, users can create e-mail alerts that report UCS failures.

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	Diagram - vmdc-hyperv - Operations Manager		_ D X
<u>F</u> ile <u>E</u> dit <u>V</u> iew <u>G</u> o Tas <u>k</u> s <u>T</u> ools <u>H</u> elp			
Search 👻 📮 🚼 👼 🔎 🔍	🗨 100% 🔹 👘 🚷 🕄 Layout direction 👻 🏇 Filter by health 👻 Layers 🖲 🚱 💽 📮 🐺 Scope	₽ Fi <u>r</u>	d 🚺 Tasks 🕡 🖕
Monitoring <	Diagram		 Tasks
Active Alerts		^	2
Discovered Inventory			Maintenance Mode 🔥
I Distributed Applications I ask Status			Start Maintenance Mode
INIX/Linux Computers			Edit Maintenance Mode
🔢 Windows Computers			Stop Maintenance Mode
Agentless Exception Monitoring	CiscoUCS		
 Application Monitoring Cisco Unified Computing System 			
Management Pack Events			
🙆 State Summary			
🔺 🚔 Cisco UCS Instance	* * *		
CiscoUCS			
Cisco UCS Manager - Cisco UCS			
CiscoUCS Alert View	CiscoUCS 🐳 CiscoUCS 🐳		
Signam	HW Invent Operating Service Pr		
Miscellaneous Alerts			
🙆 State Summary			
4 🚰 HW Inventory		~	
🗲 Diagram 🗸 🗸	٢	>	
< III >	Detail View	~	
Show or Hide Views			
New View 🕨	i Select any node or line on the diagram above to display its details		
Monitoring			
Authoring			
P Reporting			
🚳 Administration			
My Workspace			
•			
Ready			al.

Figure 4-3 SCOM UCS Diagram

		Ch	assis State View - v	/mdc-hyperv - Op	perations Manage	er			_ □ ×
le <u>E</u> dit <u>V</u> iew <u>G</u> o Tas <u>k</u> s <u>T</u> ools <u>H</u> elp									
Search 👻 🝦 🌆 Scope 👂 Fin	d 🚺 T <u>a</u> sks	? =							
onitoring	Chassis Sta	te View (2)							 Tasks
 Management Pack Events State Summary Cisco UCS Instance 	 State Health Health 			Config State ok ok	Connection Path A,B A,B	Connection St A,B A,B	LcTs 1969-12-31T19: 1969-12-31T19:		State Actions
CiscoUCS CiscoUCS Manager - CiscoUCS CiscoUCS AlertView CiscoUCS State View CiscoUCS State View Diagram									Start Maintenance Mo Edit Maintenance Mo Stop Maintenance Mo Personalize view
 ➢ Miscellaneous Aletts ➢ State Summary ➢ HW Inventory ➢ Diagram ▲ Chassis 									Tasks Tasks
Chassis Alert View Chassis State View State Summary (Chassis) State Summary (Chassis) State Alert View State Alert View State State View State State View									Navigation A Alert View Diagram View Event View Event View Performance View
🔊 State Summary (Blade)	~ <		111						State View
III >	Detail V	iew							 Report Tasks
how or Hide Views Iew View ▶		assis properties of	Chassis 2 Chassis 2					,	Agent Counts by Date
Monitoring	Desc	Path Name ription nguished Name	CiscoUCS\Chassis 2						Alerts
Reporting	Mod Revis		N20-C6508 0 FOX1637GBOD						Configuration Change Data Volume by Man
Administration	Vend User	or	Cisco Systems Inc						Data Volume by Worl Event Analysis
		ig State ection Path	2 ok						Health

Figure 4-4 Chassis State View

Summary

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Cisco Unified Computing System is a versatile computing platform capable of effectively supporting Microsoft Hyper-V and CloudOS. With the addition of Cisco Nexus 1000v, the virtual network becomes scalable and easy to manage. Utilizing the design and methodology of the Virtual Multiservice Data Center (VMDC), customers can build a highly secure, scalable, and self-serviceable private cloud to satisfy their infrastructure needs.

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