Cisco UCS Manager VM-FEX for Hyper-V CLI Configuration Guide, Release 4.0

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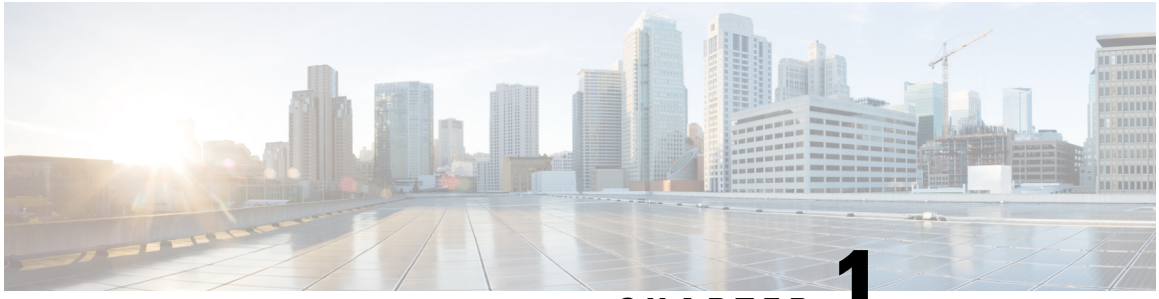


CHAPTER 1

Introduction

Overview of Virtualization

Virtualization allows you to create multiple Virtual Machines (VMs) to run in isolation, side by side on the same physical machine.

Each virtual machine has its own set of virtual hardware (RAM, CPU, NIC) upon which an operating system and fully configured applications are loaded. The operating system sees a consistent, normalized set of hardware regardless of the actual physical hardware components.

In a virtual machine, both hardware and software are encapsulated in a single file for rapid provisioning and moving between physical servers. You can move a virtual machine, within seconds, from one physical server to another for zero-downtime maintenance and continuous workload consolidation.

The virtual hardware makes it possible for many servers, each running in an independent virtual machine, to run on a single physical server. The advantages of virtualization include better use of computing resources, greater server density, and seamless server migration.

Overview of Cisco Virtual Machine Fabric Extender

A virtualized server implementation consists of one or more VMs that run as guests on a single physical server. The guest VMs are hosted and managed by a software layer called the hypervisor or virtual machine manager (VMM). Typically, the hypervisor presents a virtual network interface to each VM and performs Layer 2 switching of traffic from a VM to other local VMs or to another interface to the external network.

Working with a Cisco virtual interface card (VIC) adapter, the Cisco Virtual Machine Fabric Extender (VM-FEX) bypasses software-based switching of VM traffic by the hypervisor for external hardware-based switching in the fabric interconnect. This method reduces the load on the server CPU, provides faster switching, and enables you to apply a rich set of network management features to local and remote traffic.

VM-FEX extends the IEEE 802.1Qbh port extender architecture to the VMs by providing each VM interface with a virtual Peripheral Component Interconnect Express (PCIe) device and a virtual port on a switch. This solution allows precise rate limiting and quality of service (QoS) guarantees on the VM interface.

Important In Cisco UCS Manager Release 4.0(1), VM-FEX is not supported with Cisco UCS 6454 Fabric Interconnects.

Virtualization with a Virtual Interface Card Adapter

A Cisco VIC adapter is a converged network adapter (CNA) that is designed for both bare metal and VM-based deployments. The VIC adapter supports static or dynamic virtualized interfaces, which includes up to 116 virtual network interface cards (vNICs).

There are two types of vNICs used with the VIC adapter—static and dynamic. A static vNIC is a device that is visible to the OS or hypervisor. Dynamic vNICs are used for VM-FEX by which a VM is connected to a veth port on the Fabric Interconnect.

VIC adapters support VM-FEX to provide hardware-based switching of traffic to and from virtual machine interfaces.

Single Root I/O Virtualization

Single Root I/O Virtualization (SR-IOV) allows multiple VMs running a variety of guest operating systems to share a single PCIe network adapter within a host server. SR-IOV allows a VM to move data directly to and from the network adapter, bypassing the hypervisor for increased network throughput and lower server CPU burden. Recent x86 server processors include chipset enhancements, such as Intel VT-x technology, that facilitate direct memory transfers and other operations required by SR-IOV.

The SR-IOV specification defines two device types:

- Physical Function (PF)—Essentially a static vNIC, a PF is a full PCIe device that includes SR-IOV capabilities. PFs are discovered, managed, and configured as normal PCIe devices. A single PF can provide management and configuration for a set of virtual functions (VFs).
- Virtual Function (VF)—Similar to a dynamic vNIC, a VF is a full or lightweight virtual PCIe device that provides at least the necessary resources for data movements. A VF is not managed directly but is derived from and managed through a PF. One or more VFs can be assigned to a VM.

SR-IOV is defined and maintained by the Peripheral Component Interconnect Special Interest Group (PCI-SIG), an industry organization that is chartered to develop and manage the PCI standard. For more information about SR-IOV, see the following URL:

https://www.intel.com/content/www/us/en/pci-express/pci-sig-sr-iov-primer-sr-iov-technology-paper.html

The Microsoft Hyper-V hypervisor supports SR-IOV.

The following Cisco Virtual Interface Cards support SR-IOV with VM-FEX:

- Cisco UCS Virtual Interface Card 1240
- Cisco UCS Virtual Interface Card 1280

- Cisco UCS Virtual Interface Card 1225
- Cisco UCS Virtual Interface Card 1225T
- Cisco UCS Virtual Interface Card 1227
- Cisco UCS Virtual Interface Card 1227T
- Cisco UCS Virtual Interface Card 1340
- Cisco UCS Virtual Interface Card 1380
- Cisco UCS Virtual Interface Card 1385
- Cisco UCS Virtual Interface Card 1387

VM-FEX for Hyper-V

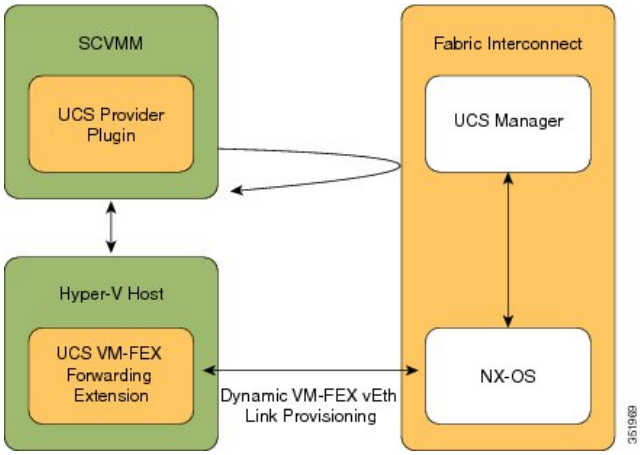
Overview of the Cisco UCS VM-FEX with Microsoft SCVMM Architecture

Cisco UCS Manager (UCSM) and Microsoft System Center Virtual Machine Manager (SCVMM) integration extends the Virtual Machine Fabric Extender (VM-FEX) technology to the Microsoft virtualization platform. The architecture allows Cisco UCSM to configure the networking objects that Microsoft SCVMM uses to set up its networking stacks. Microsoft SCVMM uses the networking objects that are created by Cisco UCSM and deploys them on the Microsoft Hyper-V host that hosts the VMs.

The Hyper-V uses Single Root I/O Virtualization (SR-IOV) technology to deploy virtual connections. The VM's interface gets mapped to the virtual function. The SR-IOV support was added to Cisco UCS Release 2.1 to allow the deployment of VM-FEX in Microsoft Hyper-V hosts, but it lacked a centralized VM network management. Release supports the management plane integration with Microsoft SCVMM and provides a centralized VM network management for the Hyper-V hosts. The deployment leverages the SR-IOV technology that is available on the Cisco virtual interface card (VIC) adapters and enables Cisco UCS fabric interconnects (FIs) to be VM aware.

Figure 1 shows the Cisco UCS VM-FEX with Microsoft SCVMM architecture.

Figure 1: Cisco UCS VM-FEX with Microsoft SCVMM Architecture



Cisco UCSM

Cisco UCSM deploys the service profiles and provisions the baremetal as part of the service profile deployment. While configuring the service profile network settings for the Hyper-V hosts, the administrators have to make sure that the SR-IOV support is enabled. The network administrator defines the networking objects, for example, the VLANs and the port profiles in Cisco UCSM. These objects get pushed to Cisco NX-OS in the fabric interconnect (FI). The server administrator installs the Cisco UCS provider plugin on Microsoft SCVMM.

Microsoft SCVMM

The Cisco UCS provider plugin enables Microsoft SCVMM to pull the networking objects from Cisco UCSM, use them natively, and deploy them on the Hyper-V hosts. The hosts that are being added to the host groups are the same servers that Cisco UCSM has deployed using the service profiles. It also pulls the network configuration that is specified in Cisco UCSM and pushes it to the Hyper-V host. When you deploy a Logical Switch on the Hyper-V host, the driver extension gets pushed to the host.

The Cisco UCS VM-FEX forwarding extension is a driver extension that is situated on the Hyper-V host. It ensures that the packets are forwarded to the fabric interconnect (FI) and the switching occurs in the FI. The FI is aware of all the MAC addresses of the VMs. The VM-FEX forwarding extension driver gets the configuration from Microsoft SCVMM and instructs Cisco NX-OS to provision a virtual Ethernet interface for virtunal NICs (vNICs) that come up on the host.

Dynamic VM-FEX vEth Link Provisioning connects the Hyper-v host and Cisco NX-OS. When a VM is online or when you power on a VM, its network card sends a VIC attach using the Cisco VIC protocol and it gets dynamically connected to the FI.

Hyper-V Host

Microsoft Hyper-V is a virtualization package for Windows Server 2012 and later releases on an x86-64 hardware platform. Hyper-V uses x86 hardware virtualization extensions (for example, Intel VT-x) to implement a hypervisor that hosts VMs as userspace processes.

With VM-FEX for Hyper-V, the hypervisor performs no switching of VM traffic. Working with an installed VIC adapter, the hypervisor acts as an interface virtualizer, and performs the following functions:

- For traffic going from a VM to the VIC, the interface virtualizer identifies the source vNIC so that the VIC can explicitly tag each of the packets generated by that vNIC.
- For traffic received from the VIC, the interface virtualizer directs the packet to the specified vNIC.

All switching is performed by the external fabric interconnect, which can switch not only between the physical ports, but also between the virtual interfaces (VIFs) that correspond to the vNICs on the VMs.

VM-FEX for Hyper-V Support in Cisco UCS Manager 4.0

In Cisco UCS Manager Release 4.0(1), VM-FEX for Hyper-V, on Windows Server 2012 R2, is supported with Cisco UCS VIC 12xx and VIC 13xx adapters. Single Root I/O Virtualization, on page 2 details the supported VIC adapters.

In Cisco UCS Manager Release 4.0(1), VM-FEX for Hyper-V, on Windows Server 2012 R2, is not supported with Cisco UCS VIC 14xx adapters.

Networking Terminology

Refer to the following Microsoft networking terminology for more information on the networking objects.

Logical Switch

A logical switch is the native distributed virtual switch (DVS) by Microsoft. It is a template that you can use to instantiate a virtual switch from. You can define a native switch and attach an extension to it. It is known as a switch extension.

Fabric Network

A fabric network is a logical network that has network segments (VLANs) that span across multiple sites. A fabric network can have one or more network sites.

Network Site

A network site includes site-specific network segments. It is also known as a fabric network definition (FND). A network site can have one or more network segments.

Network Segment

A network segment is also known as a VM Network Definition (VMND). It consists of a VLAN and an IP pool.

VM Network

A VM network references a network segment. It is used by the tenant as a network that the network tenants can attach their VMs to. It is the tenant's view of the network.

Virtual Port Profile

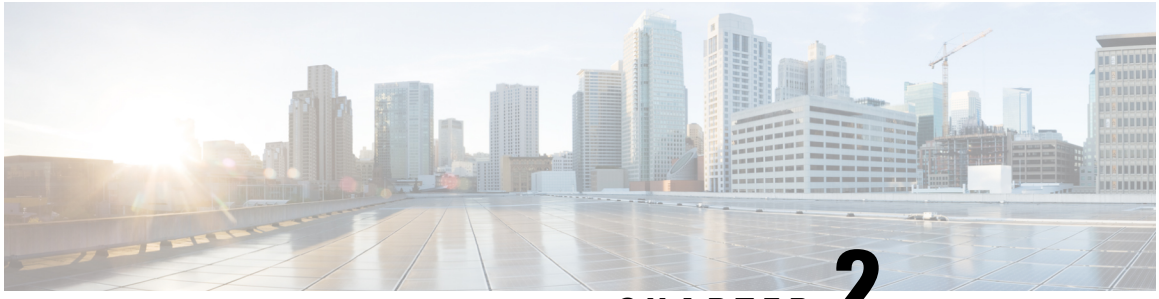
A virtual port profile is a profile that defines the quality of service (QoS)/service level agreement (SLA) for a vNIC.

Uplink Port Profile

An uplink port profile carries a list of allowed network segments for a physical network interface card (PNIC).

Reference

For more information on the networking objects, see **Configuring Logical Networking in VMM Overview** at http://technet.microsoft.com/en-us/library/jj721568.aspx.



CHAPTER 2

Configuring Networking Objects in Cisco UCS Manager

Understanding the Cisco UCSM and Microsoft SCVMM Workflow

See the following steps for a complete workflow of Cisco UCSM with Microsoft SCVMM:

1. Configure the service profile network settings for the Hyper-V hosts.
2. Configure VLANs and IP pools.
3. Configure the fabric network sets, the fabric network, the network site, and the network segment.
4. Associate a VM network to the network segment.
5. Create a Microsoft SCVMM provider.
6. Create a logical switch.
7. Configure an uplink port profile (UPP).
8. Create a virtual port profile (VPP) (for example, port classification for Microsoft).
9. Create a port profile client for the virtual port profile (VPP) and choose the logical switch that was created under the Microsoft SCVMM provider.
10. Install the Cisco UCS provider plugin in SCVMM.
11. Create a Network Service instance on the provider. The provider fetches all the network definitions from Cisco UCSM. The users can schedule the polls for periodic updates.

12. Create a logical switch in SCVMM by checking the **Enable single root I/O virtualization (SR-IOV)** check box and adding Cisco UCSM's logical switch as an extension. Choose an appropriate uplink port profile and virtual port profile.
13. Create a VM network in SCVMM and choose the network segment from the drop-down list.
14. Attach the Hyper-V hosts to SCVMM.
15. Deploy the logical switch to the Hyper-V host.
16. Create a VM instance in SCVMM. Assign the VM NIC to a VM network and the port classification.
17. Power on the VM and load the eNIC driver on the VM. The eNIC driver now establishes a network link with the Cisco UCS fabric interconnect (FI). The FI enforces the port classification as per the assigned port profile properties.
18. Verify the VM vNICs in the Cisco UCSM GUI.

Configuring Service Profile Network Settings for Hyper-V Hosts

As a prerequisite for the Hyper-V host that you plan on using in the Cisco UCS cluster, configure the service profile network settings first. In the **Modify vNIC** window in the GUI, configure the dynamic vNIC connection policy on the static vNIC.

- In the **Adapter Performance Profile** panel, select an **SRIOV** adapter policy for static vNICs.
- In the **Connection Policies** panel, select **Dynamic vNIC** connection policy on one or more static vNICs that you plan on using.
- In the **Connection Policies** panel, click **Add** to create a dynamic vNIC connection policy. A new window opens.
- Select **windows** as the adapter policy for the dynamic vNIC.
- Specify the number of dynamic vNICs.
- Click **OK**.

After completing the steps outlined in this section, SR-IOV is enabled on the vNICs. For more information on configuring policies, see Configuring Policies, on page 31.

Note The service profile for VM-FEX configuration must have at least 2 eNICs created on it, one for VM-FEX and another for communication with SCVMM. If there is just one eNIC on the service profile to implement SRIOV and talk to SCVMM, the configuration will not work when a logical switch is deployed on the eNIC.

Configuring a VLAN

For more information on creating VLANs, see the CLI configuration guide for the Cisco UCSM version that you are using.

Configuring an IP Pool

Configure an IP pool in the VM tab.

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope system**	Enters system mode.
Step 2	UCS-A /system # **scope vm-mgmt**	Enters system VM management mode.
Step 3	UCS-A /system/vm-mgmt # **scope vnetset**	Enters VM network set (vnetset) mode.
Step 4	UCS-A /system/vm-mgmt/vnetset # **create ip-pool** *SCJ2-pool*	Creates an IP pool.
Step 5	UCS-A /system/vm-mgmt/vnetset/ip-pool # **set** {*dhcp-support* | *guid* | *net-bios* | ...}*ip-pool-name*	Sets DHCP support and Netbios mode. **Note** Do not configure the GUID. It is automatically generated by the Cisco UCSM.
Step 6	UCS-A /system/vm-mgmt/vnetset/ip-pool # **create** {*block* | *dns-suffix* | *wins-server* }*ip-pool-name*	Sets DNS suffix and wins-server mode.
Step 7	UCS-A /system/vm-mgmt/vnetset/ip-pool/dns-suffix # **commit-buffer**	Commits the transaction. **Note** Configuring both IPv6 and IPv4 IP pools at the same time is not supported. When configuring the IP pool blocks, only one block is supported.

Example

The following example shows how to create an IP pool and commit the transaction:

```
UCS-A # scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope vnetset
UCS-A /system/vm-mgmt/vnetset # create ip-pool SJC-pool
UCS-A /system/vm-mgmt/vnetset/ip-pool # create block 192.168.100.1 192.168.100.200
192.168.100.10 255.255.255.0
UCS-A /system/vm-mgmt/vnetset/ip-pool/dns-suffix # commit-buffer
UCS-A /system/vm-mgmt/vnetset/ip-pool # create dns-suffix test-cli.com
UCS-A /system/vm-mgmt/vnetset/ip-pool/dns-suffix # commit-buffer
UCS-A /system/vm-mgmt/vnetset/ip-pool # create wins-server test-wins
UCS-A /system/vm-mgmt/vnetset/ip-pool/wins-server # set ipv4-address 10.10.8.8
UCS-A /system/vm-mgmt/vnetset/ip-pool/wins-server # commit-buffer
UCS-A /system/vm-mgmt/vnetset/ip-pool/wins-server # exit
UCS-A /system/vm-mgmt/vnetset/ip-pool # scope dns-suffix test-cli.com
UCS-A /system/vm-mgmt/vnetset/ip-pool/dns-suffix # set host-name test.com
UCS-A /system/vm-mgmt/vnetset/ip-pool/dns-suffix # commit-buffer
UCS-A /system/vm-mgmt/vnetset/ip-pool # set net-bios active
UCS-A /system/vm-mgmt/vnetset/ip-pool # commit-buffer
UCS-A /system/vm-mgmt/vnetset/ip-pool # set dhcp-support supported
UCS-A /system/vm-mgmt/vnetset/ip-pool # commit-buffer
UCS-A /system/vm-mgmt/vnetset/ip-pool # exit
```

Configuring a Fabric Network

Configure a Fabric Network in the VM tab.

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope system**	Enters system mode.
Step 2	UCS-A /system # **scope vm-mgmt**	Enters system VM management mode.
Step 3	UCS-A /system/vm-mgmt # **scope vnetset**	Enters VM network set (vnetset) mode.
Step 4	UCS-A /system/vm-mgmt/vnetset # **create fabric-network** *fabric-network-name*	Creates a Fabric Network.
Step 5	UCS-A /system/vm-mgmt/vnetset/fabric-network # **commit-buffer**	Commits the transaction.

Example

The following example shows how to create a Fabric Network:

```
UCS-A # scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope vnetset
UCS-A /system/vm-mgmt/vnetset # create fabric-network blizzard
UCS-A /system/vm-mgmt/vnetset/fabric-network # commit-buffer
```

Configuring a Network Site

Configure a Network Site in the VM tab.

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope system**	Enters system mode.
Step 2	UCS-A /system # **scope vm-mgmt**	Enters system VM management mode.
Step 3	UCS-A /system/vm-mgmt # **scope vnetset**	Enters VM network set (vnetset) mode.
Step 4	UCS-A /system/vm-mgmt/vnetset # **create fabric-network** *fabric-network-name*	Creates a Fabric Network.
Step 5	UCS-A /system/vm-mgmt/vnetset/fabric-network # **create network-site** *network-site-name*	Creates a Network Site.

	Command or Action	Purpose
Step 6	UCS-A /system/vm-mgmt/vnetset/fabric-network/network-site # **commit-buffer**	Commits the transaction.

Example

The following example shows how to create a Network Site:

```
UCS-A # scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope vnetset
UCS-A /system/vm-mgmt/vnetset # create fabric-network blizzard
UCS-A /system/vm-mgmt/vnetset/fabric-network # create network-site blizzard-SJC
UCS-A /system/vm-mgmt/vnetset/fabric-network/network-site # commit-buffer
```

Configuring a Network Segment

Configure a Network Segment in the VM tab.

Before you begin

Configure a Network Site before configuring a Network Segment.

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope system**	Enters system mode.
Step 2	UCS-A /system # **scope vm-mgmt**	Enters system VM management mode.
Step 3	UCS-A /system/vm-mgmt # **scope vnetset**	Enters VM network set (vnetset) mode.
Step 4	UCS-A /system/vm-mgmt/vnetset # **create fabric-network** *fabric-network-name*	Creates a Fabric Network.
Step 5	UCS-A /system/vm-mgmt/vnetset/fabric-network # **create network-site** *network-site-name*	Creates a Network Site.
Step 6	UCS-A /system/vm-mgmt/vnetset/fabric-network/network-site # **create network-segment** *network-segment-name*	Creates a Network Segment.
Step 7	UCS-A /system/vm-mgmt/vnetset/fabric-network/network-site/network-segment # **set ippool-name** *ippool-name*	Sets an IP pool name.

	Command or Action	Purpose
Step 8	UCS-A /system/vm-mgmt/vnetset/fabric-network/network-site/network-segment # **set max-ports** *max-ports-number*	Sets the maximum number of ports.
Step 9	UCS-A /system/vm-mgmt/vnetset/fabric-network/network-site/network-segment # **create eth-if 1301**	Sets the VLAN.
Step 10	UCS-A /system/vm-mgmt/vnetset/fabric-network/network-site/network-segment # **commit buffer**	Commits the transaction.
Step 11	UCS-A /system/vm-mgmt/vnetset/fabric-network/network-site/network-segment # **exit**	Exits the mode.

Example

The following example shows how to create a Network Segment with a VLAN and an IP pool:

```
UCS-A # scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope vnetset
UCS-A /system/vm-mgmt/vnetset # create fabric-network blizzard
UCS-A /system/vm-mgmt/vnetset/fabric-network # create network-site blizzard-SJC
UCS-A /system/vm-mgmt/vnetset/fabric-network/network-site #
create network-segment blizzard-SJC
UCS-A /system/vm-mgmt/vnetset/fabric-network/network-site/network-segment #
set ippool-name SJC-pool
UCS-A /system/vm-mgmt/vnetset/fabric-network/network-site/network-segment #
set max-ports 250
UCS-A /system/vm-mgmt/vnetset/fabric-network/network-site/network-segment #
commit buffer
UCS-A /system/vm-mgmt/vnetset/fabric-network/network-site/network-segment #
create eth-if 1301
UCS-A /system/vm-mgmt/vnetset/fabric-network/network-site/network-segment/eth-if #
commit buffer
UCS-A /system/vm-mgmt/vnetset/fabric-network/network-site/network-segment/eth-if #
exit
```

Configuring a VM Network

Configure a VM Network in the VM tab.

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope system**	Enters system mode.
Step 2	UCS-A /system # **scope vm-mgmt**	Enters system VM management mode.
Step 3	UCS-A /system/vm-mgmt # **scope vnetset**	Enters VM network set (vnetset) mode.

	Command or Action	Purpose
Step 4	UCS-A /system/vm-mgmt/vnetset # **create vm-network** *vm-network-name*	Creates a VM Network.
Step 5	UCS-A /system/vm-mgmt/vnetset/vm-network # **set fabric-network-name** *fabric-network-name*	Sets the Fabric Network.
Step 6	(Optional) UCS-A /system/vm-mgmt/vnetset/vm-network # **set descr** *description*	Sets the description for the VM Network.
Step 7	UCS-A /system/vm-mgmt/vnetset/vm-network # **commit buffer**	Commits the transaction.
Step 8	UCS-A /system/vm-mgmt/vnetset/vm-network # **exit**	Exits the configuration.

Example

The following example shows how to create a VM Network:

```
UCS-A # scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope vnetset
UCS-A /system/vm-mgmt/vnetset # create vm-network VMN-SJC
UCS-A /system/vm-mgmt/vnetset/vm-network # set fabric-network-name blizzard
UCS-A /system/vm-mgmt/vnetset/vm-network # set descr blizzard_fabric_network
UCS-A /system/vm-mgmt/vnetset/vm-network # commit-buffer
UCS-A /system/vm-mgmt/vnetset/vm-network # exit
```

What to do next

Configure the Network Segment from the GUI.

Configuring SCVMM Provider

Configure a SCVMM provider in the VM tab.

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope system**	Enters system mode.
Step 2	UCS-A /system # **scope vm-mgmt**	Enters system VM management mode.
Step 3	UCS-A /system/vm-mgmt # **scope microsoft**	Enters Microsoft mode.
Step 4	UCS-A /system/vm-mgmt/microsoft # **create vmm-provider** *scvmm-provider-name*	Creates SCVMM provider.

	Command or Action	Purpose
Step 5	Required: UCS-A /system/vm-mgmt/microsoft/vmm-provider # **set** { *description* | *hostname*}	Sets the description and the IP address of the SCVMM provider. **Note** Enter the IP address of the server in this field. Due to a restriction, you cannot enter the DNS host name in the field.
Step 6	UCS-A /system/vm-mgmt/microsoft/vmm-provider # **commit-buffer**	

Example

The following example shows how to create a SCVMM provider:

```
UCS-A # scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope microsoft
UCS-A /system/vm-mgmt/vnetset/microsoft/ # create vmm-provider savbu-scvmm-02
UCS-A /system/vm-mgmt/vnetset/microsoft/vmm-provider # set hostname 10.0.0.10
UCS-A /system/vm-mgmt/vnetset/microsoft/vmm-provider # commit-buffer
```

Configuring Uplink Port Profiles

Configure the uplink port profiles in the VM tab.

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope system**	Enters system mode.
Step 2	UCS-A /system # **scope vm-mgmt**	Enters system VM management mode.
Step 3	UCS-A /system/vm-mgmt # **scope microsoft**	Enters Microsoft mode.
Step 4	UCS-A /system/vm-mgmt/microsoft # **scope vmm-provider** *scvmm-provider-name*	Creates SCVMM provider.
Step 5	Required: UCS-A /system/vm-mgmt/microsoft/vmm-provider # **create distributed-virtual-switch** *logical-switch-name*	Creates the distributed virtual switch, that is the logical switch for the profile client.
Step 6	Required: UCS-A /system/vm-mgmt/microsoft/vmm-provider/distributed-virtual-switch # **create uplink-pp** *uplink-pp-name*	Creates the uplink port profile for the profile client.

	Command or Action	Purpose
Step 7	Required: UCS-A /system/vm-mgmt/microsoft/vmm-provider/distributed-virtual-switch/uplink-pp # **add network-site** *network-site-name*	Adds a network site for the profile client.
Step 8	Required: UCS-A /system/vm-mgmt/microsoft/vmm-provider/distributed-virtual-switch/uplink-pp # **commit buffer**	Commits the transaction.

Example

The following example shows how to create an uplink port profile for the profile client:

```
UCS-A # scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope microsoft
UCS-A /system/vm-mgmt/vnetset/microsoft/ # scope vmm-provider savbu-scvmm-02
UCS-A /system/vm-mgmt/vnetset/microsoft/vmm-provider #
create distributed-virtual-switch LS-1
UCS-A /system/vm-mgmt/vnetset/microsoft/vmm-provider/distributed-virtual-switch #
create uplink-pp UPP-1
UCS-A /system/vm-mgmt/vnetset/microsoft/vmm-provider/distributed-virtual-switch/uplink-pp#
add network-site blizzard-SJC
UCS-A /system/vm-mgmt/vnetset/microsoft/vmm-provider/distributed-virtual-switch/uplink-pp#
commit buffer
```

Creating a Virtual Port Profile

Configure the virtual port profile in the VM tab.

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope system**	Enters system mode.
Step 2	UCS-A /system # **scope vm-mgmt**	Enters system VM management mode.
Step 3	UCS-A /system/vm-mgmt # **scope profile-set**	Enters system VM management profile set mode.
Step 4	UCS-A /system/vm-mgmt/profile-set # **create port-profile** *profile-name*	Creates the specified port profile and enters system VM management profile set port profile mode. This name can be between 1 and 16 alphanumeric characters. You cannot use spaces or any special characters other than - (hyphen) and _ (underscore), and you cannot change this name after the object has been saved.

	Command or Action	Purpose
Step 5	(Optional) UCS-A /system/vm-mgmt/profile-set/port-profile # **set descr** *description*	Provides a description for the port profile.
Step 6	Required: UCS-A /system/vm-mgmt/profile-set/port-profile # **set max-ports** *max-ports-number*	Sets the number for the maximum ports.
Step 7	Required: UCS-A /system/vm-mgmt/profile-set/port-profile # **set nw-control-policy** *policy-name*	Sets the network control policy.
Step 8	Required: UCS-A /system/vm-mgmt/profile-set/port-profile # **set profile-type sla-only**	Configures the port profile as SLA only. **Note** Select the type of the Port Profile as **`SLA Only`** for Hyper-V. For VM-FEX for Hyper-V, the VLANS are pushed from the network segment and not from the port profile.
Step 9	UCS-A /system/vm-mgmt/profile-set/port-profile # **commit-buffer**	Commits the transaction.

Example

The following example shows how to create and configure a port profile named SanJoseProfile and commit the transaction:

```
UCS-A# scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope profile-set
UCS-A /system/vm-mgmt/profile-set # create port-profile SanJoseProfile
UCS-A /system/vm-mgmt/profile-set/port-profile* # set descr "Blizzard-QOS"
UCS-A /system/vm-mgmt/profile-set/port-profile* # set max-ports 58
UCS-A /system/vm-mgmt/profile-set/port-profile* # set nw-control-policy access
UCS-A /system/vm-mgmt/profile-set/port-profile/vlan* # set profile-type sla-only
UCS-A /system/vm-mgmt/profile-set/port-profile* # commit-buffer
UCS-A /system/vm-mgmt/profile-set/port-profile # exit
```

What to do next

Create a profile client.

Configuring a Profile Client

Configure the profile client in the VM tab.

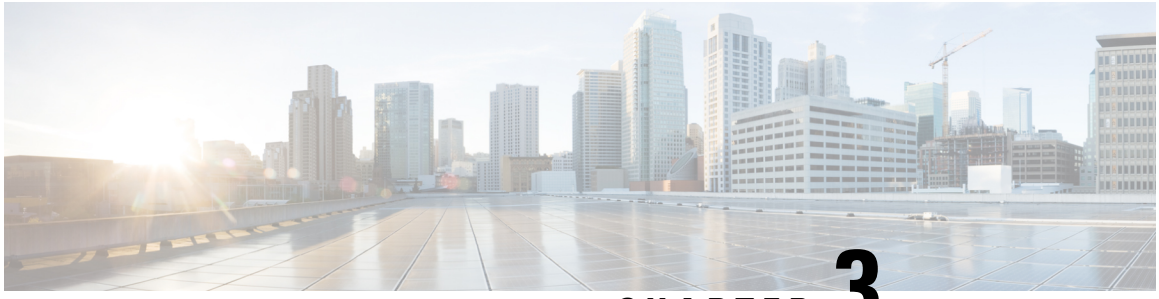
Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope system**	Enters system mode.
Step 2	UCS-A /system # **scope vm-mgmt**	Enters system VM management mode.
Step 3	UCS-A /system/vm-mgmt # **scope port-profile-set**	Enters system VM management profile set mode.
Step 4	UCS-A /system/vm-mgmt/profile-set # **create port-profile** *virtual-port-profile-name*	Creates the specified port profile and enters system VM management profile set port profile mode.
Step 5	UCS-A /system/vm-mgmt/profile-set/port-profile # **create client** *client-name*	Creates the port profile client and enters system VM management profile set port profile mode.
Step 6	UCS-A /system/vm-mgmt/profile-set/port-profile/client # **set cluster** *logical-switch-name*	Sets the cluster for the Logical Switch.
Step 7	UCS-A /system/vm-mgmt/profile-set/port-profile/client # **commit-buffer**	Commits the transaction. **Note** The **Datacenter** and **Folder** options are not supported for the SLA port profile.

Example

The following example shows how to create a profile client:

```
UCS-A# scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope port-profile-set
UCS-A /system/vm-mgmt/profile-set # create port-profile VPP1
UCS-A /system/vm-mgmt/profile-set/port-profile # create client test
UCS-A /system/vm-mgmt/profile-set/port-profile/client # set cluster ls1
UCS-A /system/vm-mgmt/profile-set/port-profile/client # commit-buffer
```



CHAPTER 3

Configuring Microsoft SCVMM

About Microsoft SCVMM Dependencies

Refer to the following Microsoft SCVMM dependencies for installing Microsoft SCVMM:

- Active Directory (AD) Services (2008 or 2012)

  The AD Domain Controller should have the following services:

  - AD DNS
  - AD DHCP (optional)
  - MSSQL 2008 (and later versions) database for SCVMM data store
    - SQL command line utilities
    - Windows Assessment and Deployment Kit (ADK 8.0)

Note If you see the error message `Error while enabling Windows feature: Netfx3`, enter the following command as an administrator: **`C:\> dism /online /enable-feature /featurename:netfx3 /all /source:d:\sources\sxs`**, where **d:\sources\sxs** is the Windows installation folder that is mapped to your machine on the D drive.

Installing Cisco Provider Plugin in SCVMM

The Cisco provider plugin pulls the networking objects from the Cisco UCSM into Microsoft SCVMM. Complete the following steps to install the Cisco provider plugin on Microsoft SCVMM:

Before you begin

Verify that the SCVMM server is in the same domain as the host, the host has an eNIC driver, and enable the administrator account.

Note See the Microsoft documentation for the prerequisites on bringing up the SCVMM server: http://technet.microsoft.com/en-us/library/gg610617.aspx

Procedure

Step 1 Install the Cisco UCSM Network Service provider package, for example, **CiscoProviderUCSMInstaller_1.1.14** on Microsoft SCVMM from your local drive. The installers are located in the **Installers** directory in the ISO image, for example, `ucs-bxxx-drivers\Windows\Installers\Cisco`.

When the installation is complete, the Cisco UCSM **Network Service Provider Package Setup** window appears.

Step 2 Click **Finish** to exit the setup wizard.

Creating a Network Service Instance

After you install the Cisco UCSM plugin, you can launch the SCVMM GUI and add a Network Service instance in the Microsoft SCVMM GUI.

Procedure

Step 1 In the Microsoft SCVMM GUI, click **Fabric**.

Step 2 This step is different for System Center 2012 R2 and System Center 2012 SP1 virtual machines.

- For System Center 2012 R2 and above, under **Networking**, right-click **Network Service** and choose **Add Network Service**.
- For System Center 2012 SP1, under **Networking**, right-click **Switch Extensions Manager** and choose **Add Virtual Switch Extension**.

The **Add Network Service** window appears. Enter the connection settings.

Step 3 In the Name tab in the left pane, enter the **Name** and **Description** for the Network Service.

Step 4 In the **Manufacturer** and **Model** tab in the left pane, choose the following from the drop-down list: Cisco Systems, Inc in the **Manufacturer** field.

- **Manufacturer** - for example, Cisco Systems Inc.
- **Model** - for example, Cisco UCSM

Step 5 In the **Credentials** tab, select **Run-As-account** from the browse list. Look for the account to access Cisco UCSM.

- If the account does not appear in the list, click **create-run-as-account**. To create an account, enter a Name and Description for the new **run-as-account**. In addition, put in the user name and password to access Cisco UCS Manager.
- Check the **validate domain credentials** and click **Finish**. The account is displayed in the **Select a Run as Account** window.
- Select the account to access Cisco UCS Manager.

Step 6 For the **Connection String** field in the left pane, enter the IP address of the Cisco UCSM , for example, http://10.2.2.2.

Step 7 The **Certificates** in the left pane does not require user input.

Step 8 For **Gather Information** in the left pane, click **Scan Provider** and verify the retrieved information from UCS Manager .

Step 9 For the **Host Group** in the left pane, choose the host groups that can use the Network Service.

Step 10 For the **Summary** in the left pane, confirm the settings, review the script, and click **Finish**.

Step 11 Check the status of the operation in the Jobs window. Once the task is complete, the Cisco UCSM is added to the Network Service.

Step 12 In the SCVMM GUI, choose the Cisco UCSM and click **Refresh**.

The networking objects are pulled from the Cisco UCSM into SCVMM. Only one Cisco UCSM per SCVMM is supported.

Note Known Issue: Refreshing the Network Service in SCVMM might result in errors that are harmless. You will see the following error: .

We do not recommend that you make changes to one or more network segments; Microsoft does not support these changes. We also recommend that you do not make any changes to one or more fabric networks, network sites, or the fabric network tree.

Creating a Logical Switch in SCVMM

A logical switch contains the configuration information that controls the behavior of the virtual switches across hosts in your data center.

Procedure

Step 1 Right click the Microsoft SCVMM instance and select **Create Logical Switch** option. The **Create Logical Switch Wizard** window appears.

Step 2 In the **General** tab, enter a name of the logical switch.

Step 3 (Optional) In the **Description** field, enter the description of the logical switch.

Step 4 Click **OK**.

Step 5 Click **Next**.

Step 6 In the **Settings** tab, select the minimum bandwidth mode from the drop down menu. Check the box to enable SR-IOV for the logical switch.

Step 7 In the **Extensions** tab, uncheck the **Microsoft Windows Filter** check box because the filtering extension is not allowed with the forwarding extension. This is a Microsoft restriction.

Step 8 Choose the **Virtual Switch Extensions** that you want to use with the logical switch. Choose the logical switch as the forwarding extension. This object is pulled from the Cisco UCSM.

Step 9 Click **Next**.

Step 10 In the **Virtual Port** tab, click **Add**. The **Add Virtual Port** window appears. Select the appropriate port classification from the drop down menu. Or create a new port classification.

If you created a port profile client earlier for the logical switch, you will see the name of the logical switch. When you check to select the logical switch, the port profile defined earlier will appear in the drop down menu. Check the box to include Hyper-V virtual network adapter port profile in this virtual port. Click browse to select the virtual network adapter port profile from the pre-defined list. If the list does not contain the right virtual network adapter port profile, you can create one by clicking the Create button. Provide the appropriate offload settings, security settings, and bandwidth setting.

Step 11 In the **Uplink** tab, click **New Uplink Port Profile**. The **Add Uplink Port Profile** window appears.

Step 12 Choose the **Uplink Port Profile**. Click **New Virtual Network Adapter** to configure the network adapter settings in connectivity, VLAN ID, IP address configuration, and port profile classification.

Step 13 Click **OK**.

Step 14 Click **Next**.

Step 15 In the **Port Classification** field, click **Browse** and choose the default SR-IOV port profile.

Step 16 Choose the logical switch and the associated port profile.

Step 17 Choose **Include a virtual network adapter port profile in this virtual port.**

Step 18 Choose the SR-IOV profile as the native virtual network adapter port profile.

Step 19 Click **OK**.

The SR-IOV port profile is displayed in the **Virtual Port** tab.

Step 20 Click **Next**.

Step 21 In the left pane, click the **Summary** tab and confirm the settings.

Step 22 Click **Finish**.

The logical switch, the uplink port profile, and the port classification are displayed in the SCVMM GUI.

(Optional) Applying IP Pools for the VMs

You can apply the IP pools for the VMs. This step is optional.

Procedure

Step 1 Click **Library** in the Microsoft SCVMM GUI, select **VM Templates** under **Templates** menu.

Step 2 Right-click **Create VM Template**.

The **Create VM Template Wizard** window appears in the Microsoft SCVMM GUI.

Step 3 Click **Browse** and select a source for the new VM template.

Step 4 Required: Click **OK**.

Step 5 In the **VM Template Name** field, enter the VM template name.

Step 6 (Optional) In the **Description** field, enter the VM template description.

Step 7 Click **Next**.

Follow the prompts in the wizard to create the VM template.

Step 8 Use the template as a source to install the VM.

When you select a host and review virtual machine settings on a specific network adapter, the Cisco UCSM configuration specific to the logical network is pulled into SCVMM. You can apply IP pools for the VMs by using the template.

Note For more information about how to configure IP pools, see the Microsoft SCVMM documentation.

Creating a VM Network in SCVMM

You can configure the settings for the VM network.

Procedure

Step 1 Click **VMs and Services** in the Microsoft SCVMM GUI.

Step 2 Right-click **VM Networks** and select **Create VM Network**.

The **Create VM Network Wizard** window appears in the Microsoft SCVMM GUI.

Step 3 In the **Name** tab, specify the name of the VM network.

Step 4 In the **Isolation** tab, specify the name of the network manager for the VM network.

Step 5 (Optional) In the **Description** tab, specify the description of the VM network.

Step 6 Choose the logical network from the drop-down list.

The logical network is the fabric network that is created on the Cisco UCSM side.

Step 7 Click **Next**.

The system displays the VM network that is created for the fabric network on the Cisco UCSM side.

Step 8 In the **Isolation** tab, specify the isolation for the VM network.

Step 9 Click **Next**.

Step 10 Configure the settings for the VM network in the **Settings** tab.

Step 11 Click **Finish**.

The VM network is displayed in the Microsoft SCVMM GUI.

Note If you have a VM network, you can point it only to one network segment. If you have any offline VMs and they use a particular VM network, do not change the association of the VM networks. You can change the association only when the VMs are deleted.

Installing the Host Server Operating System

Before you begin

For detailed information about installing Windows Server 2012 or Windows Server 2012 R2 with Hyper-V, see the Microsoft Windows Server 2012 or Microsoft Windows Server 2012 R2 documentation.

Procedure

Step 1 Install Windows Server 2012 or Windows Server 2012 R2 with Hyper-V on the host server.

Step 2 Open the Windows Server Manager.

What to do next

Install the Cisco drivers and utilities.

Obtaining the Cisco Drivers and Utilities for VM-FEX for Hyper-V

Important VM-FEX for Hyper-Vis not supported with Cisco UCS VIC 14xx adapters.

Procedure

Step 1 From the Cisco support site, download the Cisco UCS B-Series Blade Server Software Bundle ISO file.

The Cisco UCS B-Series Blade Server Software Bundle contains drivers, installation utilities, and the Cisco UCS Provider Plugin for VM-FEX for Hyper-V.

Step 2 In the Cisco UCS Manager KVM settings, mount the software bundle ISO file as virtual media for access from your servers.

Step 3 From the host server, open the CSCO_VIO_INSTALLER_*version* directory in the ISO file.

Insert the release version number for *version* in the directory name. For example, the directory name is CSCO_VIO_INSTALLER_2.4.22 for Release 2.2(1).

Step 4 Open and read the readme.txt file for the latest information about installing and configuring VM-FEX for Hyper-V.

Installing the PF Driver and VM-FEX Switch Driver

Perform this task on the host server to install the Cisco VIO drivers and utilities.

Note The Cisco VM-FEX switch driver is installed by SCVMM when the SRIOV-enabled switches are created on the host.

Before you begin

The Cisco UCS B-Series Blade Server Software Bundle ISO file must be mounted on the server.

Procedure

Step 1 In Powershell on the host server, open the CSCO_VIO_INSTALLER_*version* directory in the contents of the mounted ISO file.

Step 2 Run CSCO_VIO_INSTALLER_64_*version*.msi as administrator.

Insert the release version number for *version* in the command name. For example, the command name is CSCO_VIO_INSTALLER_64_2.4.22.MSI for release 2.2(1).

Step 3 Choose **Typical** or **Custom**installation. If you choose **Typical** installation, it installs eNIC and fNIC drivers. If you choose **Custom** installation, complete steps 4 through 9.

Step 4 If necessary, expand **VIO drivers** to display the driver list.

Step 5 Click **VIC iSCSI dump** and choose **Entire feature will be unavailable**.

Caution The installation might fail if the iSCSI driver are not deselected.

Step 6 Click **VIC VM-FEX Forwarding Extension** and choose **Entire feature will be unavailable**.

Caution The installation might fail if the VIC VM-FEX forwarding extension driver are not deselected. The VIC VM-FEX forwarding extension is deployed from SCVMM 2012 as part of the logical switch deployment.

Step 7 Click **VIC Teaming** and choose **Entire feature will be unavailable**.

Step 8 Click **VICManagement** and choose **Entire feature will be unavailable**.

Step 9 Click **Next** and follow the instructions to install the drivers.

Attaching a Hyper-V Host to Microsoft SCVMM

Before you begin

- Install the operating system.
- Update the driver.
- Move the host to the same domain as the SCVMM.
- Disable the firewall.

Tip Cisco recommends that you install Hyper-V before adding the host to SCVMM. If you do not install Hyper-V before adding the host to SCVMM, a light version of Hyper-V, without a GUI, is installed.

Procedure

Step 1 In Microsoft SCVMM GUI, click **VMs and Services** in the bottom-left pane and then click **All Hosts**.

Step 2 Right-click and choose **Add Hyper-V Hosts and Clusters**.

Step 3 In the **Credentials** tab, provide the **Run as Account** details.

Note Enter domain administrator credentials in this tab.

Step 4 Click **Next**.

Step 5 In the **Discovery Scope** tab, add the hostname in the **Computer Name** pane.

The system discovers the host.

Step 6 In the **Target Resources** tab, choose the host and click **Next**.

If the Hyper-V role is not enabled on any of the selected servers, SCVMM enables the role on these servers as part of the Add Host process, that results in a restart of the server. If any of the servers have a pending restart, they are also restarted.

Step 7 Click **OK** to continue.

Step 8 In the **Host Settings** tab, assign the selected host to a host group.

Step 9 Click **Next**.

Step 10 In the **Migration Settings** tab, choose the live storage migration settings and click **Next**.

The default value for live storage migration is 2.

Step 11 Click **Finish**.

The virtual machine host is added in the Microsoft SCVMM GUI. After the host is added to Microsoft SCVMM, verify that a connection is established between the SCVMM and the host. While attaching a host, use the management interface. After the host is added, a warning message indicates that multipath I/O is not enabled for known storage arrays on the specified host. This is a known issue with Microsoft. The recommended

action is that if you want to provision the storage using SCVMM, you must enable multipath I/O for storage arrays that are being used on the host by adding the multipath I/O feature.

Enabling SRIOV in SCVMM Failover Cluster

Before you begin

- All network interfaces on nodes in the cluster must have the same configuration (name, uplink VLANs and so on)
- The virtual switch must be a logical switch that can be provisioned on all Hyper-V nodes in the cluster.

Procedure

Step 1 Bring up two nodes with latest eNIC driver version.

Step 2 Create a cluster with these two nodes.

Step 3 Install SQL on a standalone node, which is not part of the cluster.

Step 4 Install SCVMM on the first node in the cluster. The Microsoft documentation, https://technet.microsoft.com/en-us/library/gg610678.aspx provides detailed information about this.

Step 5 Install SCVMM on the other node in the cluster. The Microsoft documentation, https://technet.microsoft.com/en-us/library/hh411279.aspx provides detailed information about this.

Step 6 Install the Cisco Provider Plugin on the first and second node. Please note that there is no need to bring down any node in the cluster while installing the Cisco Provider Plugin.

Step 7 Launch SCVMM and add a Hyper-V host.

Viewing the Host-side Configuration in Windows Server 2012

Following these guidelines for reviewing the host-side configuration in Windows Server 2012:

- Add the host to the domain. Verify that the domain host account has the administrator rights for adding a host to the domain.
- The Cisco eNIC driver for Windows Server 2012 has the following guidelines:
  - Note that the Cisco eNIC driver is an interface that facilitates communication between supported operating systems and Cisco UCS Virtual Interface Cards.
  - Make sure that the same driver is used for the hypervisor and VM.
- Configure the SR-IOV dynamic connection policy on the adapter in the service profile.
- Make sure that the Hyper-V role is enabled when the host is added to SCVMM.
- Make sure that the forwarding extension driver is installed on the host when the logical switch is created in SCVMM.

Deploying the Logical Switch to the Hyper-V Host

After you add a host to SCVMM, you must create a logical switch and attach it to that host. While attaching the host, it installs the extension drivers from SCVMM on the host.

Before you begin

Make sure that the data path interfaces are enabled for the Logical Switch and refresh the host.

Procedure

Step 1 In the Microsoft SCVMM GUI, in the**Host** tab, click **Properties**.

The **Properties** window for the selected host is displayed.

Step 2 Click the **Hardware** tab.

The available interfaces (network adapters) are displayed in the pane.

Step 3 Choose the management interface to display the details of the interface.

The interfaces are attached to various logical switches.

Step 4 Choose the interface that is not associated with any of the logical network connectivity to attach it to the logical switch.

Step 5 Click the **Virtual Switches** tab.

Step 6 Click **New Virtual Switch** and select the **New Logical Switch** option.

Step 7 Select the logical switch from the drop-down list in the **Logical Switch** field.

Step 8 In the **Physical Adapters** panel, select the first physical adapter.

When you select the logical switch, the uplink port profile is automatically selected for the logical switch. When you have multiple uplink port profiles, you can select one uplink port profile for the logical switch during the logical switch creation process.

Step 9 Click **OK**.

If the same interface is used by multiple switches, a message window indicates that while SCVMM applies the changes, the host might temporarily lose the connectivity. This event might have an adverse effect on other network operations in progress.

Step 10 Click **OK**.

The logical switch is now attached to the Hyper-V host.

Creating a VM in SCVMM

You can create a VM in SCVMM and attach the logical switch and the VM network to the VM vNICs.

Procedure

Step 1 Right-click the host in the Microsoft SCVMM GUI and choose **Create Virtual Machine**. The **Create Virtual Machine Wizard** window appears.

Step 2 Create a Virtual Machine (VM) and follow the hardware configuration steps.

Note There are multiple ways to configure the VMs. For more information, see the Microsoft documentation.

Step 3 In the **Configure Hardware** tab, choose a network adapter for the VM.

Step 4 In the **Connectivity** panel on the right side, click **Browse** in the **Connected to a VM network** field and choose a VM network that you created earlier.

Step 5 Click **OK**.

Step 6 Choose the MAC address type in the **MAC Address** field.

The MAC address can be **Dynamic** or **Static**.

Note Use the Microsoft recommended settings for the MAC address pool.

Step 7 In the **Port Profile** field, choose the port classification as **SR-IOV**.

Step 8 Click **Next**.

Step 9 In the **Select Destination** tab, choose **Place the virtual machine on a host** and choose the **Destination** as **All Hosts**.

Step 10 Click **Next**.

The destination host is highlighted.

Step 11 Click **Next**.

Step 12 In the **Configure Settings** tab, review the virtual machine settings and click **Next**.

Step 13 In the **Add Properties** tab, review the settings and click **Next**.

Step 14 In the **Summary** tab, confirm the settings and check the **Start the virtual machine after deploying it** check box.

Step 15 Click **Create**.

The VM network is created and it is displayed in the GUI. A warning message indicates that the system cannot set bandwidth setting on the virtual adapter for the SR-IOV switch. The recommended action is to check the native virtual port profile, correct the issue, and try again.

Step 16 Choose the VM in the GUI and click **Properties**.

Step 17 Verify the configured properties of the VM.

Step 18 After the VM is up, install the virtual function (VF) driver on the VM.

Use the same CSCO_VIO_INSTALLER_64 msi file that was used in Installing the PF Driver and VM-FEX Switch Driver, on page 25. For example, the command name is CSCO_VIO_INSTALLER_64_2.4.22.MSI for release 2.2(1).

Step 19 Choose **Typical** or **Custom** installation. If you choose **Custom** installation, install 'Cisco VIC VMNic Ethernet' and 'VIC Ethernet Utility'.

Verifying VM vNICs in Cisco UCSM GUI

You can verify the VM creation status in the Cisco UCSM GUI.

Procedure

Step 1 In the **Navigation** pane, click **VM**.

Step 2 Expand the **All** node.

Step 3 Expand **Virtual Machines** and verify that the VM is displayed in the GUI. In the **General** tab, verify the properties of the vNIC fields. You can verify the **Name**, **MAC address**, **Profile Name**, **VMND Name**, and **Status of the vNIC** fields.

APPENDIX A

Configuring Policies

Configuring Dynamic vNIC Connection Policies

Dynamic vNIC Connection Policy

Note In an SR-IOV topology, such as a Hyper-V or KVM cluster, a Virtual Function (VF) takes the place of the dynamic vNIC. The VF is essentially a restricted version of the dynamic vNIC, in which all system communication and configuration of the VF is performed through the associated physical function (PF).

The dynamic vNIC connection policy determines how the connectivity between VMs and dynamic vNICs is configured. This policy is required for Cisco UCS domains that include servers with VIC adapters on which you have installed VMs and configured dynamic vNICs.

Note Cisco UCS 6454 Fabric Interconnects do not support dynamic vNICs.

Ethernet Adapter Policy

Each dynamic vNIC connection policy includes an Ethernet adapter policy and designates the number of vNICs that can be configured for any server associated with a service profile that includes the policy.

For Hyper-V, use the predefined Ethernet adapter policy named Windows.

Server Migration

Note If you migrate a server that is configured with dynamic vNICs, the dynamic interface used by the vNICs fails and Cisco UCS Manager notifies you of that failure.

When the server comes back up, Cisco UCS Manager assigns new dynamic vNICs to the server. If you are monitoring traffic on the dynamic vNIC, you must reconfigure the monitoring source.

Creating a Dynamic vNIC Connection Policy

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope org** *org-name*	Enters organization mode for the specified organization. To enter the root organization mode, enter / as the *org-name* .
Step 2	UCS-A /org # **create dynamic-vnic-conn-policy** *policy-name*	Creates the specified vNIC connection policy and enters organization vNIC connection policy mode. This name can be between 1 and 32 alphanumeric characters. You cannot use spaces or any special characters other than - (hyphen), _ (underscore), : (colon), and . (period), and you cannot change this name after the object is saved. **Note** Do not specify "default" as the value for the dynamic vNIC connection policy name. Cisco UCS Manager automatically resolves any empty policy references to "default". Any service profiles or service profile templates with only static vNICS defined will automatically reference the policy "default" when it is present. If you specify “default” for the dynamic vNIC connection policy name, then unexpected dynamic vNICs might be created on those service profiles or service profile templates.
Step 3	(Optional) UCS-A /org/dynamic-vnic-conn-policy # **set descr** *description*	Provides a description for the policy. Enter up to 256 characters. You can use any characters or spaces except ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal

	Command or Action	Purpose
		sign), > (greater than), < (less than), or ' (single quote). If your description includes spaces or nonalphanumeric characters, you must begin and end your description with double quotation marks. The quotation marks do not appear in the description field of any **show** command output.
Step 4	UCS-A /org/dynamic-vnic-conn-policy # **set adapter-policy** *policy-name*	Specifies the Ethernet adapter policy to use for this policy. The adapter policy must already exist.
Step 5	UCS-A /org/dynamic-vnic-conn-policy # **set dynamic-eth** {*dynamic-eth-num* | **off**}	Specifies the number of dynamic vNICs to use for this policy. Enter an integer between 0 and 256. The default is 54. **Note** Components of your system may limit this number to fewer than 256 vNICs.
Step 6	UCS-A /org/dynamic-vnic-conn-policy # **set protection** {**protected** | **protected-pref-a** | **protected-pref-b**}	Dynamic vNICs are always protected in Cisco UCS, but this command allows you to select a preferred fabric, if any. You can choose one of the following options: • **protected**—Cisco UCS uses whichever fabric is available. • **protected-pref-a**—Cisco UCS attempts to use fabric A, but fails over to fabric B if necessary. • **protected-pref-b**—Cisco UCS attempts to use fabric B, but fails over to fabric A if necessary.
Step 7	UCS-A /org/dynamic-vnic-conn-policy # **commit-buffer**	Commits the transaction.

Example

The following example shows how to create a dynamic vNIC connection policy named MyDynVnicConnPolicy that uses the system-provided Ethernet adapter policy for 12 dynamic vNICs and commit the transaction:

```
UCS-A# scope org /
UCS-A /org # create dynamic-vnic-conn-policy MyDynVnicConnPolicy
UCS-A /org/dynamic-vnic-conn-policy* # set adapter-policy
UCS-A /org/dynamic-vnic-conn-policy* # set descr "Dynamic vNIC for Eth policy"
```

```
UCS-A /org/dynamic-vnic-conn-policy* # set dynamic-eth 12
UCS-A /org/dynamic-vnic-conn-policy* # commit-buffer
UCS-A /org/dynamic-vnic-conn-policy #
```

Deleting a Dynamic vNIC Connection Policy

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope org** *org-name*	Enters organization mode for the specified organization. To enter the root organization mode, enter / as the *org-name* .
Step 2	UCS-A /org # **delete dynamic-vnic-conn-policy** *policy-name*	Deletes the specified vNIC connection policy.
Step 3	UCS-A /org # **commit-buffer**	Commits the transaction.

Example

The following example shows how to delete the dynamic vNIC connection policy named MyDynVnicConnPolicy and commit the transaction:

```
UCS-A# scope org /
UCS-A /org # delete dynamic-vnic-conn-policy MyDynVnicConnPolicy
UCS-A /org* # commit-buffer
UCS-A /org #
```

Viewing Dynamic vNIC Properties in a VM

Before you begin

The VM must be operational.

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope system**	Enters system mode.
Step 2	UCS-A /system # **scope vm-mgmt**	Enters VM management mode.
Step 3	(Optional) UCS-A /system/vm-mgmt # **show virtual-machine**	Displays the running virtual machines.
Step 4	UCS-A /system/vm-mgmt # **scope virtual-machine** *uuid*	Enters command mode for the virtual machine that contains the dynamic vNIC.
Step 5	UCS-A /system/vm-mgmt/virtual-machine # **show vnic [detail]**	Displays the vNIC properties.

Example

The following example shows how to display the properties of a dynamic vNIC in a VM:

Creating a Custom Adapter Policy for SR-IOV

The predefined **SRIOV** Ethernet adapter policy supports up to 32 CPU threads. If the server has more than 32 CPU threads, you must follow this procedure to create and specify a custom adapter policy that supports a number of interrupts equal to the number of CPU threads.

For more information about creating an adapter policy, see "Configuring Ethernet Adapter Policies" in the *Cisco UCS Manager CLI Configuration Guide*.

Before you begin

Determine the number of CPU threads used by your server using the **show server cpu** *chassis/blade* **detail** command.

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope org** *org-name*	Enters organization mode for the specified organization. To enter the root organization mode, type / as the *org-name* .
Step 2	UCS-A /org # **create eth-policy** *name*	Creates an Ethernet adapter policy and enters organization Ethernet policy mode. This name can be between 1 and 16 alphanumeric characters. You cannot use spaces or any special characters other than - (hyphen) and _ (underscore), and you cannot change this name after the object has been saved.
Step 3	(Optional) UCS-A /org/eth-policy # **set descr** *description*	Provides a description for the policy. **Note** If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any **show** command output.
Step 4	Required: UCS-A /org/eth-policy # **set trans-queue count 1**	Configures the Ethernet transmit queue.
Step 5	Required: UCS-A /org/eth-policy # **set trans-queue ring-size 256**	

	Command or Action	Purpose
Step 6	Required: UCS-A /org/eth-policy # **set recv-queue count 4**	Configures the Ethernet receive queue.
Step 7	Required: UCS-A /org/eth-policy # **set recv-queue ring-size 512**	
Step 8	Required: UCS-A /org/eth-policy # **set comp-queue count 5**	Configures the Ethernet completion queue.
Step 9	Required: UCS-A /org/eth-policy # **set interrupt coalescing-time 125**	
Step 10	Required: UCS-A /org/eth-policy # **set interrupt coalescing-type min**	
Step 11	Required: UCS-A /org/eth-policy # **set interrupt count** *interrupt-count*	Set *interrupt-count* equal to the number of CPU threads used by the server.
Step 12	Required: UCS-A /org/eth-policy # **set interrupt mode msi-x**	
Step 13	Required: UCS-A /org/eth-policy # **set offload large-receive enabled**	
Step 14	Required: UCS-A /org/eth-policy # **set offload tcp-rx-checksum enabled**	
Step 15	Required: UCS-A /org/eth-policy # **set offload tcp-segment enabled**	
Step 16	Required: UCS-A /org/eth-policy # **set offload tcp-tx-checksum enabled**	
Step 17	Required: UCS-A /org/eth-policy # **set rss receivesidescaling enabled**	
Step 18	UCS-A /org/eth-policy # **commit-buffer**	Commits the transaction to the system configuration.

Example

The following example configures a custom Ethernet adapter policy for SR-IOV with 40 threads and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # create eth-policy SRIOV
UCS-A /org/eth-policy* # set descr "This is an Ethernet adapter policy for SR-IOV."
UCS-A /org/eth-policy* # set trans-queue count 1
UCS-A /org/eth-policy* # set trans-queue ring-size 256
UCS-A /org/eth-policy* # set recv-queue count 4
UCS-A /org/eth-policy* # set recv-queue ring-size 512
UCS-A /org/eth-policy* # set comp-queue count 5
UCS-A /org/eth-policy* # set interrupt coalescing-time 125
UCS-A /org/eth-policy* # set interrupt coalescing-type min
UCS-A /org/eth-policy* # set interrupt count 40
UCS-A /org/eth-policy* # set interrupt mode msi-x
```

```
UCS-A /org/eth-policy* # set offload large-receive enabled
UCS-A /org/eth-policy* # set offload tcp-rx-checksum enabled
UCS-A /org/eth-policy* # set offload tcp-segment enabled
UCS-A /org/eth-policy* # set offload tcp-tx-checksum enabled
UCS-A /org/eth-policy* # set rss receivesidescaling enabled
UCS-A /org/eth-policy* # commit-buffer
UCS-A /org/eth-policy #
```