



## **Cisco UCS Manager VM-FEX for Hyper-V CLI Configuration Guide, Release 2.1**

**First Published:** November 16, 2012

**Last Modified:** October 17, 2013

### **Americas Headquarters**

Cisco Systems, Inc.  
170 West Tasman Drive  
San Jose, CA 95134-1706  
USA  
<http://www.cisco.com>  
Tel: 408 526-4000  
800 553-NETS (6387)  
Fax: 408 527-0883

Text Part Number: OL-26741-01

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS MANUAL ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

THE SOFTWARE LICENSE AND LIMITED WARRANTY FOR THE ACCOMPANYING PRODUCT ARE SET FORTH IN THE INFORMATION PACKET THAT SHIPPED WITH THE PRODUCT AND ARE INCORPORATED HEREIN BY THIS REFERENCE. IF YOU ARE UNABLE TO LOCATE THE SOFTWARE LICENSE OR LIMITED WARRANTY, CONTACT YOUR CISCO REPRESENTATIVE FOR A COPY.

The Cisco implementation of TCP header compression is an adaptation of a program developed by the University of California, Berkeley (UCB) as part of UCB's public domain version of the UNIX operating system. All rights reserved. Copyright © 1981, Regents of the University of California.

NOTWITHSTANDING ANY OTHER WARRANTY HEREIN, ALL DOCUMENT FILES AND SOFTWARE OF THESE SUPPLIERS ARE PROVIDED "AS IS" WITH ALL FAULTS. CISCO AND THE ABOVE-NAMED SUPPLIERS DISCLAIM ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THOSE OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OR ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Any Internet Protocol (IP) addresses and phone numbers used in this document are not intended to be actual addresses and phone numbers. Any examples, command display output, network topology diagrams, and other figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses or phone numbers in illustrative content is unintentional and coincidental.

Cisco and the Cisco logo are trademarks or registered trademarks of Cisco and/or its affiliates in the U.S. and other countries. To view a list of Cisco trademarks, go to this URL: <http://www.cisco.com/go/trademarks>. Third-party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1110R)

© 2013 Cisco Systems, Inc. All rights reserved.



## CONTENTS

---

### Preface

#### Preface vii

Audience vii

Conventions vii

Related Documentation ix

Obtaining Documentation and Submitting a Service Request ix

---

### CHAPTER 1

#### Introduction 1

Overview of Virtualization 1

Overview of Cisco Virtual Machine Fabric Extender 1

Virtualization with a Virtual Interface Card Adapter 2

VM-FEX for Hyper-V 2

Overview of VM-FEX for Hyper-V 2

Cisco UCS Manager Components 2

Single Root I/O Virtualization 3

---

### CHAPTER 2

#### Configuring VM-FEX for Hyper-V 5

Guidelines and Prerequisites for VM-FEX on Hyper-V 5

Procedure for Configuring VM-FEX for Hyper-V 6

---

### CHAPTER 3

#### Configuring UCS Components for VM-FEX 7

Creating a Dynamic vNIC Connection Policy for VM-FEX for Hyper-V 7

Configuring a Service Profile for VM-FEX for Hyper-V 9

Creating a Service Profile for VM-FEX for Hyper-V 9

Creating the PF Interface 10

Associating the Service Profile with a Server 11

Creating a Port Profile for VM-FEX for Hyper-V 12

Creating a Cluster 13

Creating a Profile Client for VM-FEX for Hyper-V 14

---

**CHAPTER 4**

**Configuring the Hyper-V Host Server 17**

Installing the Host Server Operating System 17

Obtaining the Cisco Drivers and Utilities for VM-FEX for Hyper-V 18

Installing the PF Driver and VM-FEX Switch Driver 18

Installing the Port Profile Utility and Management Snap-in 19

Creating the Virtual Switch in Microsoft Hyper-V Manager 20

---

**CHAPTER 5**

**Configuring the Hyper-V Virtual Machines 21**

Creating the VMs in Microsoft Hyper-V Manager 21

Installing the VF Driver 22

Managing the Port Profile 23

Using Microsoft PowerShell 23

Attaching the Port Profile with PowerShell 23

Detaching the Port Profile with PowerShell 25

Using the Cisco Port Profile Management Snap-in 26

Attaching the Port Profile with the Port Profile Management Snap-in 26

Detaching the Port Profile with the Port Profile Management Snap-in 27

---

**APPENDIX A**

**Configuring Policies 29**

Configuring Dynamic vNIC Connection Policies 29

Dynamic vNIC Connection Policy 29

Creating a Dynamic vNIC Connection Policy 30

Deleting a Dynamic vNIC Connection Policy 31

Viewing Dynamic vNIC Properties in a VM 32

Creating a Custom Adapter Policy for SR-IOV 33

---

**APPENDIX B**

**Configuring Port Profiles 35**

Port Profiles 35

Creating a Port Profile 35

Deleting a Port Profile 37

Adding a Named VLAN to a Port Profile 38

Deleting a Named VLAN from a Port Profile 39

Port Profile Clients 39

[Adding a Port Profile Client to a Port Profile](#) 39

[Deleting a Port Profile Client from a Port Profile](#) 41





## Preface

---

This preface includes the following sections:

- [Audience, page vii](#)
- [Conventions, page vii](#)
- [Related Documentation, page ix](#)
- [Obtaining Documentation and Submitting a Service Request, page ix](#)

## Audience

This guide is intended primarily for data center administrators with responsibilities and expertise in one or more of the following:

- Server administration
- Storage administration
- Network administration
- Network security

## Conventions

| Text Type       | Indication   |
|-----------------|--|
| GUI elements    | GUI elements such as tab titles, area names, and field labels appear in <b>this font</b> .<br>Main titles such as window, dialog box, and wizard titles appear in <b>this font</b> . |
| Document titles | Document titles appear in <i>this font</i> .   |
| TUI elements    | In a Text-based User Interface, text the system displays appears in <code>this font</code> .   |
| System output   | Terminal sessions and information that the system displays appear in <code>this font</code> .  |

| Text Type    | Indication  |
|--------------|---|
| CLI commands | CLI command keywords appear in <b>this font</b> .<br>Variables in a CLI command appear in <i>this font</i> .                |
| [ ]          | Elements in square brackets are optional.   |
| {x   y   z}  | Required alternative keywords are grouped in braces and separated by vertical bars.   |
| [x   y   z]  | Optional alternative keywords are grouped in brackets and separated by vertical bars.                                       |
| string       | A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks. |
| < >          | Nonprinting characters such as passwords are in angle brackets.   |
| [ ]          | Default responses to system prompts are in square brackets.   |
| !, #         | An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.                   |

**Note**

Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the document.

**Tip**

Means *the following information will help you solve a problem*. The tips information might not be troubleshooting or even an action, but could be useful information, similar to a Timesaver.

**Caution**

Means *reader be careful*. In this situation, you might perform an action that could result in equipment damage or loss of data.

**Timesaver**

Means *the described action saves time*. You can save time by performing the action described in the paragraph.



**Warning****IMPORTANT SAFETY INSTRUCTIONS**

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device.

SAVE THESE INSTRUCTIONS

## Related Documentation

### UCS Documentation Roadmaps

For a complete list of all B-Series documentation, see the *Cisco UCS B-Series Servers Documentation Roadmap* available at the following URL: <http://www.cisco.com/go/unifiedcomputing/b-series-doc>.

For a complete list of all C-Series documentation, see the *Cisco UCS C-Series Servers Documentation Roadmap* available at the following URL: <http://www.cisco.com/go/unifiedcomputing/c-series-doc>.

### Microsoft Hyper-V Documentation

For more information about virtualization using Microsoft Hyper-V, see the following URL: <http://www.microsoft.com/en-us/server-cloud/windows-server/hyper-v.aspx>.

### Other Documentation Resources

An ISO file containing all B and C-Series documents is available at the following URL: <http://www.cisco.com/cisco/software/type.html?mdfid=283853163&flowid=25821>. From this page, click **Unified Computing System (UCS) Documentation Roadmap Bundle**.

The ISO file is updated after every major documentation release.

Follow [Cisco UCS Docs on Twitter](#) to receive document update notifications.

## Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly [What's New in Cisco Product Documentation](#), which also lists all new and revised Cisco technical documentation.

Subscribe to the *What's New in Cisco Product Documentation* as a Really Simple Syndication (RSS) feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service and Cisco currently supports RSS version 2.0.

Follow [Cisco UCS Docs on Twitter](#) to receive document update notifications.





## CHAPTER

# 1

## Introduction

---

This chapter includes the following sections:

- [Overview of Virtualization, page 1](#)
- [Overview of Cisco Virtual Machine Fabric Extender, page 1](#)
- [Virtualization with a Virtual Interface Card Adapter, page 2](#)
- [VM-FEX for Hyper-V, page 2](#)

## 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.

## Virtualization with a Virtual Interface Card Adapter

A Cisco VIC adapter, such as the Cisco UCS M81KR Virtual Interface Card, is a converged network adapter (CNA) that is designed for both single-OS and VM-based deployments. The VIC adapter supports static or dynamic virtualized interfaces, which includes up to 128 virtual network interface cards (vNICs).

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

## VM-FEX for Hyper-V

### Overview of VM-FEX for Hyper-V

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, performing 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 physical ports, but also between virtual interfaces (VIFs) that correspond to the vNICs on the VMs.

## Cisco UCS Manager Components

### Cluster

The Cisco UCS cluster is a grouping of hypervisors that can be distributed across multiple hosts. In a Hyper-V system, the cluster is analogous to the distributed virtual switch (DVS) in a VMware ESX system.

In the current Cisco UCS Hyper-V implementation, the cluster defines the scope of the port profile and is the boundary of the migration domain. When multiple Hyper-V hosts are associated to a cluster, you can migrate a VM from one host to another within the cluster.

### Port Profiles

Port profiles contain the properties and settings that are used to configure virtual interfaces in Cisco UCS. The port profiles are created and administered in Cisco UCS Manager. After a port profile is created, assigned

to, and actively used by a cluster, any changes made to the networking properties of the port profile in Cisco UCS Manager are immediately applied to the cluster with no need for a host reboot.

### Port Profile Client

The port profile client is a cluster to which a port profile is applied.

## 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:

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

Hypervisors that support SR-IOV include Linux KVM and Microsoft Hyper-V.

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

- Cisco UCS M81KR Virtual Interface Card
- Cisco UCS P81E Virtual Interface Card
- Cisco UCS Virtual Interface Card 1280
- Cisco UCS Virtual Interface Card 1240
- Cisco UCS Virtual Interface Card 1225





## CHAPTER 2

# Configuring VM-FEX for Hyper-V

This chapter includes the following sections:

- [Guidelines and Prerequisites for VM-FEX on Hyper-V, page 5](#)
- [Procedure for Configuring VM-FEX for Hyper-V, page 6](#)

## Guidelines and Prerequisites for VM-FEX on Hyper-V

Consider the following guidelines and prerequisites for Cisco UCS Manager when configuring VM-FEX on Hyper-V:

- The host must be managed by Cisco UCS Manager Release 2.1 or later.
- The host adapters must be Cisco VIC adapters.  
For more information about installing a Cisco VIC adapter, see the *Cisco UCS 5108 Server Chassis Hardware Installation Guide*.
- The predefined "SRIOV" BIOS policy enables Virtualization Technology (VT), Direct Cache Access, VT For Directed I/O, and Interrupt Remap. Do not change these settings.
- The predefined "SRIOV" adapter policy supports a host with up to 32 CPU threads. For a host with more than 32 threads, you must create a new adapter policy in which the number of interrupts is equal to the number of CPU threads.
- Do not configure more than one dynamic vNIC connection policy on a static vNIC.
- An SR-IOV PF cannot be used as an iSCSI vNIC.

Consider the following guidelines and prerequisites for Microsoft Windows 2012 when configuring VM-FEX on Hyper-V:

- The host operating system must be an edition of Windows Server 2012 or later that includes Hyper-V support.  
For more information about installing Microsoft Hyper-V, see the Microsoft Windows Server documentation.
- Microsoft Windows 2008 and 2008 R2 are supported, but VMs running Windows 2012 will benefit from an accelerated I/O path.

# Procedure for Configuring VM-FEX for Hyper-V

## Before You Begin

Verify that the prerequisites listed in [Guidelines and Prerequisites for VM-FEX on Hyper-V](#), on page 5 are met, including software, host operating system, and BIOS settings.

## Procedure

|               | Command or Action   | Purpose  |
|---------------|---|--|
| <b>Step 1</b> | In the UCS CLI, configure the dynamic vNIC connection policy, service profile, cluster, and port profile. | For more information, see <a href="#">Configuring UCS Components for VM-FEX</a> , on page 7.     |
| <b>Step 2</b> | Prepare the host server and VMs and install the Cisco drivers and utilities.                              | For more information, see <a href="#">Configuring the Hyper-V Host Server</a> , on page 17.      |
| <b>Step 3</b> | On the Hyper-V host, configure the virtual switch, create the VMs, and attach a port profile.             | For more information, see <a href="#">Configuring the Hyper-V Virtual Machines</a> , on page 21. |





## Configuring UCS Components for VM-FEX

This chapter includes the following sections:

- [Creating a Dynamic vNIC Connection Policy for VM-FEX for Hyper-V, page 7](#)
- [Configuring a Service Profile for VM-FEX for Hyper-V, page 9](#)
- [Creating a Port Profile for VM-FEX for Hyper-V, page 12](#)
- [Creating a Cluster, page 13](#)
- [Creating a Profile Client for VM-FEX for Hyper-V, page 14](#)

### Creating a Dynamic vNIC Connection Policy for VM-FEX for Hyper-V

The vNICs created by this procedure become VFs when they are associated with an SR-IOV PF in a service profile. The maximum number of VFs that you can create depends on the number of adapters and the number of configured PFs and vHBAs, according to the following formula:

Number of dynamic vNICs = (116 \* number of adapters) - number of PFs - number of vHBAs

#### Before You Begin

For more information on dynamic vNIC connection policies, see [Configuring Policies, on page 29](#).

#### Procedure

|               | Command or Action  | Purpose   |
|---------------|--|---|
| <b>Step 1</b> | UCS-A# <b>scope org</b> <i>org-name</i>                                | Enters organization mode for the specified organization. To enter the root organization mode, enter / as the <i>org-name</i> .  |
| <b>Step 2</b> | UCS-A /org # <b>create dynamic-vnic-conn-policy</b> <i>policy-name</i> | Creates the specified vNIC connection policy and enters organization vNIC connection policy mode.<br><br>The <i>policy-name</i> can be between 1 and 32 alphanumeric characters. You cannot use spaces or any special characters other than - |

|               | Command or Action  | Purpose   |
|---------------|--|---|
|               |  | (hyphen) or _ (underscore), and you cannot change this name after the object has been saved.<br><br><b>Note</b> 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. |
| <b>Step 3</b> | UCS-A<br>/org/dynamic-vnic-conn-policy<br># <b>set desc</b> <i>description</i>   | (Optional)<br>Provides a description for the policy.<br><br>Enter up to 256 characters. You can use any characters or spaces except ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).<br><br>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 <b>show</b> command output.   |
| <b>Step 4</b> | UCS-A<br>/org/dynamic-vnic-conn-policy<br># <b>set adapter-policy</b><br><i>policy-name</i>  | Specifies the Ethernet adapter policy to use for this policy. The adapter policy must already exist.<br><br>For Hyper-V, specify the predefined <b>Windows</b> adapter policy.  |
| <b>Step 5</b> | UCS-A<br>/org/dynamic-vnic-conn-policy<br># <b>set dynamic-eth</b><br>{ <i>dynamic-eth-num</i>   <b>off</b> }                              | Specifies the number of dynamic vNICs to use for this policy.<br><br>Enter an integer between 0 and the maximum number as determined by the following formula:<br><br>Number of dynamic vNICs = (116 * number of adapters) - number of PFs - number of vHBAs  |
| <b>Step 6</b> | UCS-A<br>/org/dynamic-vnic-conn-policy<br># <b>set protection</b> { <b>protected</b>   <b>protected-pref-a</b>   <b>protected-pref-b</b> } | (Optional)<br>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:<br><br><ul style="list-style-type: none"> <li>• <b>protected</b>—Cisco UCS uses whichever fabric is available.</li> <li>• <b>protected-pref-a</b>—Cisco UCS attempts to use fabric A, but fails over to fabric B if necessary.</li> <li>• <b>protected-pref-b</b>—Cisco UCS attempts to use fabric B, but fails over to fabric A if necessary.</li> </ul>   |
| <b>Step 7</b> | UCS-A<br>/org/dynamic-vnic-conn-policy<br># <b>commit-buffer</b>   | Commits the transaction.  |

The following example shows how to create a dynamic vNIC connection policy named MyDynVnicConnPolicy that uses the predefined Windows adapter policy for 21 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 Windows
UCS-A /org/dynamic-vnic-conn-policy* # set desc "Dynamic vNIC for Eth policy"
UCS-A /org/dynamic-vnic-conn-policy* # set dynamic-eth 21
UCS-A /org/dynamic-vnic-conn-policy* # commit-buffer
UCS-A /org/dynamic-vnic-conn-policy #
```

## Configuring a Service Profile for VM-FEX for Hyper-V

### Creating a Service Profile for VM-FEX for Hyper-V

The service profile created by this procedure configures the BIOS settings required for Hyper-V.

#### Before You Begin

For more information on configuring service profiles, see the *Cisco UCS Manager CLI Configuration Guide*.

#### Procedure

|               | Command or Action  | Purpose   |
|---------------|--|---|
| <b>Step 1</b> | UCS-A# <b>scope org org-name</b>   | Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .  |
| <b>Step 2</b> | UCS-A /org # <b>create service-profile profile-name instance</b>                                 | Creates the specified service profile instance and enters organization service profile mode.<br><br>Enter a unique <i>profile-name</i> to identify this service profile.<br><br>This name can be between 2 and 32 alphanumeric characters. You cannot use spaces or any special characters other than - (hyphen), _ (underscore), : (colon), and . (period), and this name must be unique across all service profiles and service profile templates within the same organization. |
| <b>Step 3</b> | UCS-A /org/service-profile # <b>set bios-policy SRIOV</b>  | The predefined <b>SRIOV</b> BIOS policy configures the required BIOS settings for Hyper-V.  |
| <b>Step 4</b> | Configure other desired profile settings, but do not configure a dynamic vNIC connection policy. |   |

The following example shows how to create a service profile instance and commit the transaction:

```
UCS-A# scope org /
UCS-A /org # create service-profile SPHyperV instance
UCS-A /org/service-profile* # set bios-policy SRIOV
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

### What to Do Next

- Create PF vNIC for the service profile.
- Associate the service profile with a server.

## Creating the PF Interface

This procedure creates the SR-IOV PF interface.

### Before You Begin

For more information on configuring service profiles, see the *Cisco UCS Manager CLI Configuration Guide*.

### Procedure

|               | Command or Action   | Purpose   |
|---------------|---|---|
| <b>Step 1</b> | UCS-A# <b>scope org</b> <i>org-name</i>   | Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .  |
| <b>Step 2</b> | UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>   | Enters organization service profile mode for the specified service.   |
| <b>Step 3</b> | UCS-A /org/service-profile # <b>create vnic</b> <i>vnic-name</i> <b>fabric a</b>                        | Creates a vNIC for the service profile and enters organization service profile vNIC mode.   |
| <b>Step 4</b> | UCS-A /org/service-profile/vnic # <b>set adapter-policy</b> SRIOV                                       | <p>Specifies the <b>SRIOV</b> adapter policy to use for the vNIC.</p> <p><b>Note</b> The predefined <b>SRIOV</b> adapter policy supports up to 32 CPU threads. If the server has more than 32 CPU threads, you must create and specify a custom adapter policy that supports a number of interrupts equal to the number of CPU threads. Follow the instructions in <a href="#">Creating a Custom Adapter Policy for SR-IOV</a>, on page 33.</p> |
| <b>Step 5</b> | UCS-A /org/service-profile/vnic # <b>create dynamic-conn-policy-ref</b> <i>dynamic-conn-policy-name</i> | Specify the dynamic vNIC connection policy that you created using the predefined <b>Windows</b> adapter policy.   |
| <b>Step 6</b> | Configure other desired profile settings.   |   |
| <b>Step 7</b> | UCS-A /org/service-profile/vnic # <b>exit</b>   | Returns to service-profile mode.  |

|               | Command or Action                                    | Purpose  |
|---------------|--|--|
| <b>Step 8</b> | UCS-A /org/service-profile #<br><b>commit-buffer</b> | Commits the transaction to the system configuration. |

The following example shows how to create a PF interface and commit the transaction:

```
UCS-A# scope org /
UCS-A /org # scope service-profile SPHyperV
UCS-A /org/service-profile # create vnic vnicPF0 fabric a
UCS-A /org/service-profile/vnic* # set adapter-policy SRIOV
UCS-A /org/service-profile/vnic* # create dynamic-conn-policy-ref MyDynVnicConnPolicy
UCS-A /org/service-profile/vnic* # exit
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

## Associating the Service Profile with a Server

### Procedure

|               | Command or Action  | Purpose  |
|---------------|--|--|
| <b>Step 1</b> | UCS-A# <b>scope org</b> <i>org-name</i>  | Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> . |
| <b>Step 2</b> | UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>                                      | Enters organization service profile mode for the service profile.  |
| <b>Step 3</b> | UCS-A /org/service-profile # <b>associate</b> { <b>server</b> <i>chassis-id</i> / <i>slot-id</i> } | Associates the service profile with a server.  |
| <b>Step 4</b> | UCS-A /org/service-profile #<br><b>commit-buffer</b>   | Commits the transaction to the system configuration.   |

The following example associates the service profile named SPHyperV with the server in slot 4 of chassis 1 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope service-profile SPHyperV
UCS-A /org/service-profile* # associate server 1/4
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

# Creating a Port Profile for VM-FEX for Hyper-V



## Note

In a VM-FEX for Hyper-V system, the following conditions apply:

- The **set max-ports** command applies to the cluster; there is no distributed virtual switch (DVS).
- The **set host-nwio-perf** command has no effect.

## Before You Begin

For general information about port profiles and profile clients, see [Configuring Port Profiles](#), on page 35.

## Procedure

|               | Command or Action  | Purpose  |
|---------------|--|--|
| <b>Step 1</b> | UCS-A# <b>scope system</b>   | Enters system mode.  |
| <b>Step 2</b> | UCS-A /system # <b>scope vm-mgmt</b>   | Enters system VM management mode.  |
| <b>Step 3</b> | UCS-A /system/vm-mgmt # <b>scope profile-set</b>   | Enters system VM management profile set mode.  |
| <b>Step 4</b> | UCS-A /system/vm-mgmt/profile-set # <b>create port-profile</b> <i>profile-name</i>         | Creates the specified port profile and enters system VM management profile set port profile mode.<br><br>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. |
| <b>Step 5</b> | UCS-A<br>/system/vm-mgmt/profile-set/port-profile #<br><b>set descr</b> <i>description</i> | (Optional)<br>Provides a description for the port profile.<br><br><b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks do not appear in the description field of any <b>show</b> command output.             |
| <b>Step 6</b> | UCS-A<br>/system/vm-mgmt/profile-set/port-profile #<br><b>create vlan</b> <i>vlan-name</i> | Specifies a VLAN to use for the port profile.  |
| <b>Step 7</b> | UCS-A<br>/system/vm-mgmt/profile-set/port-profile/vlan # <b>set default-net</b> <i>yes</i> | Sets the VLAN as the default network.  |

|                | Command or Action   | Purpose   |
|----------------|---|---|
| <b>Step 8</b>  | UCS-A<br>/system/vm-mgmt/profile-set/port-profile/vlan<br># <b>exit</b>     | Returns to port profile mode.   |
| <b>Step 9</b>  | Configure any other desired settings.                                       | Detailed information about port profile configuration can be found in <a href="#">Configuring Port Profiles, on page 35</a> . In many cases, the default settings are sufficient. |
| <b>Step 10</b> | UCS-A<br>/system/vm-mgmt/profile-set/port-profile #<br><b>commit-buffer</b> | Commits the transaction.  |

The following example shows how to create and configure a port profile named MyProfile 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 MyProfile
UCS-A /system/vm-mgmt/profile-set/port-profile* # set descr "This is my port profile"
UCS-A /system/vm-mgmt/profile-set/port-profile* # create vlan vlan701
UCS-A /system/vm-mgmt/profile-set/port-profile/vlan* # set default-net yes
UCS-A /system/vm-mgmt/profile-set/port-profile/vlan* # exit
UCS-A /system/vm-mgmt/profile-set/port-profile* # commit-buffer
UCS-A /system/vm-mgmt/profile-set/port-profile #
```

### What to Do Next

Create a cluster and a profile client.

## Creating a Cluster

We recommend that you create one or more dedicated clusters for Hyper-V instead of using the default cluster automatically created by Cisco UCS Manager.

### Procedure

|               | Command or Action   | Purpose   |
|---------------|---|---|
| <b>Step 1</b> | UCS-A# <b>scope system</b>  | Enters system mode.   |
| <b>Step 2</b> | UCS-A /system # <b>scope vm-mgmt</b>  | Enters system VM management mode.   |
| <b>Step 3</b> | UCS-A /system/vm-mgmt # <b>scope cluster-set</b>                                    | Enters system VM management cluster set mode.   |
| <b>Step 4</b> | UCS-A<br>/system/vm-mgmt/cluster-set #<br><b>create cluster</b> <i>cluster-name</i> | Creates the specified port cluster and enters cluster mode.<br>The cluster name can be between 1 and 16 alphanumeric characters.<br>You cannot use spaces or any special characters other than - (hyphen) |

|               | Command or Action   | Purpose   |
|---------------|---|---|
|               |   | and _ (underscore), and you cannot change the name after the cluster has been saved.  |
| <b>Step 5</b> | UCS-A<br>/system/vm-mgmt/cluster-set/cluster<br># <b>set id</b> <i>cluster-id</i> | Creates a unique identifier for the cluster.<br><br>The <i>cluster-id</i> must contain exactly 34 hexadecimal (0-9 and a-f) characters and 4 dashes (-) in the following format:<br>XXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXXXXXXXXXX.<br>For example: 01234567-0123-4567-89ab-0123456789abcd. |
| <b>Step 6</b> | UCS-A<br>/system/vm-mgmt/cluster-set/cluster<br># <b>commit-buffer</b>            | Commits the transaction.  |

The following example shows how to create a cluster and commit the transaction:

```
UCS-A# scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope cluster-set
UCS-A /system/vm-mgmt/cluster-set # create cluster MyCluster
UCS-A /system/vm-mgmt/cluster-set/cluster* # set cluster-id
87654321-0123-4567-abcd-0123456789abcdef
UCS-A /system/vm-mgmt/cluster-set/cluster* # commit-buffer
UCS-A /system/vm-mgmt/cluster-set/cluster #
```

## Creating a Profile Client for VM-FEX for Hyper-V

In a Hyper-V system, the profile client determines the cluster to which the port profile is applied.

For more information about profile clients, see [Port Profile Clients](#), on page 39.

### Procedure

|               | Command or Action  | Purpose   |
|---------------|--|---|
| <b>Step 1</b> | UCS-A# <b>scope system</b>   | Enters system mode.   |
| <b>Step 2</b> | UCS-A /system # <b>scope vm-mgmt</b>   | Enters system VM management mode.   |
| <b>Step 3</b> | UCS-A /system/vm-mgmt # <b>scope profile-set</b>   | Enters system VM management profile set mode.   |
| <b>Step 4</b> | UCS-A /system/vm-mgmt/profile-set # <b>scope port-profile</b> <i>profile-name</i>              | Enters system VM management profile set port profile mode for the specified port profile.   |
| <b>Step 5</b> | UCS-A<br>/system/vm-mgmt/profile-set/port-profile #<br><b>create client</b> <i>client-name</i> | Creates the specified port profile client and enters system VM management profile set port profile client mode.<br><br>This name can be between 1 and 16 alphanumeric characters. You cannot use spaces or any special characters other than - (hyphen) and _ |



|               | Command or Action  | Purpose   |
|---------------|--|---|
|               |  | (underscore), and you cannot change this name after the object has been saved.  |
| <b>Step 6</b> | UCS-A<br>/system/vm-mgmt/profile-set/port-profile/client<br># <b>set descr</b> <i>description</i>    | (Optional)<br>Provides a description for the port profile client.<br><br><b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks do not appear in the description field of any <b>show</b> command output. |
| <b>Step 7</b> | UCS-A<br>/system/vm-mgmt/profile-set/port-profile/client<br># <b>set cluster</b> <i>cluster-name</i> | Specifies the cluster to which the port profile is applied.   |
| <b>Step 8</b> | UCS-A<br>/system/vm-mgmt/profile-set/port-profile/client<br># <b>commit-buffer</b>                   | Commits the transaction.  |

The following example shows how to create a port profile client named MyClient that applies the port profile to the cluster named MyCluster 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 # scope port-profile MyProfile
UCS-A /system/vm-mgmt/profile-set/port-profile* # create client MyClient
UCS-A /system/vm-mgmt/profile-set/port-profile/client* # set descr "This is the client for my port profile"
UCS-A /system/vm-mgmt/profile-set/port-profile/client* # set cluster MyCluster
UCS-A /system/vm-mgmt/profile-set/port-profile/client* # commit-buffer
UCS-A /system/vm-mgmt/profile-set/port-profile/client #
```





## Configuring the Hyper-V Host Server

---

This chapter includes the following sections:

- [Installing the Host Server Operating System, page 17](#)
- [Obtaining the Cisco Drivers and Utilities for VM-FEX for Hyper-V, page 18](#)
- [Installing the PF Driver and VM-FEX Switch Driver, page 18](#)
- [Installing the Port Profile Utility and Management Snap-in, page 19](#)
- [Creating the Virtual Switch in Microsoft Hyper-V Manager, page 20](#)

### Installing the Host Server Operating System

#### Before You Begin

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

#### Procedure

---

- Step 1** Install Windows 2012 Server with Hyper-V on the host server.
  - Step 2** Open the Windows Server Manager.
  - Step 3** In the Windows Server Manager, add the Hyper-V role.
- 

#### What to Do Next

Install the Cisco drivers and utilities.

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

## 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 and installation utilities 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_2.0.24` for release 2.0.24.
  - Step 4** Open and read the `readme.txt` file for the latest information about installing and configuring VM-FEX for Hyper-V.
  - Step 5** On the Cisco Developer Network, access the Cisco UCS VM-FEX Resources page at this URL: <http://developer.cisco.com/web/unifiedcomputing/vmfex/resources>. You will need to enter your credentials for the Cisco Developer Network.
  - Step 6** Click **VM-FEX Tools for Development** and follow the instructions to download the archive file.
  - Step 7** Unpack the downloaded archive file. The VM-FEX tools installation file `VMFEX_TOOLS_64_<version>.msi` is contained in the VM-FEX Tools for Development/`VMFEX_TOOLS-<version>` directory of the unpacked archive content.
- 

## Installing the PF Driver and VM-FEX Switch Driver

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

### 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_2.0.24.MSI` for release 2.0.24.
- Step 3** Select **Custom** installation.
- Step 4** If necessary, expand **VIO drivers** to display the driver list.
- Step 5** Click **VIC iSCSI dump** and select **Entire feature will be unavailable**.

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

- Step 6** Click **VIC Teaming** and select **Entire feature will be unavailable**.
  - Step 7** Click **VICManagement** and select **Entire feature will be unavailable**.
  - Step 8** Click **Next** and follow the instructions to install the drivers.
- 

## Installing the Port Profile Utility and Management Snap-in

This task installs the Port Profile Utility and, optionally, the Port Profile Management Snap-in on a server. You must install the Port Profile Utility on the Hyper-V host server. For port profile management, you can use either the Port Profile Management Snap-in or Microsoft PowerShell with custom Cisco scripts.

If you choose to use the Port Profile Management Snap-in, you can install it on the host server, a VM, or a remote computer. From a remote computer, you can use the Port Profile Management Snap-in to manage multiple Hyper-V hosts.



**Note** If you install the Port Profile Management Snap-in on a remote computer, be sure that the computer has connectivity to both the Cisco UCS Manager and the Hyper-V host server.

---

### 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 server, open the `VMFEX_TOOLS-version` directory in the contents of the mounted ISO file.
  - Step 2** Run `VMFEX_TOOLS_64_version.msi` as administrator.
  - Step 3** If you do not intend to run the Port Profile Management Snap-in from this server, select the **Typical** installation and skip to Step 8. In this case, only the Port Profile Utility is installed. If you intend to run the Port Profile Management Snap-in from this server, proceed to the next step.
  - Step 4** Select the **Custom** installation.
  - Step 5** If necessary, expand the **Vmfex utilities** to display the feature list.
  - Step 6** Click **Vmfex Port Profile Manager** and select **Entire feature will be installed on local hard drive**. This option installs the Port Profile Management Snap-in.
  - Step 7** Click **Vmfex Port Profile Utilities** and select **Entire feature will be installed on local hard drive**.
  - Step 8** Click **Next** and follow the instructions to install the software.
-

# Creating the Virtual Switch in Microsoft Hyper-V Manager

## Procedure

---

- Step 1** On the Hyper-V host server, open the Microsoft Hyper-V Manager and navigate to the Virtual Switch Manager.
  - Step 2** In the navigation frame, click **New virtual network switch**.
  - Step 3** In the **Virtual Switch Properties** pane, enter a **Name** for the virtual switch.
  - Step 4** Select **External network** and choose the Cisco VIC Ethernet interface from the drop-down list.
  - Step 5** Check the check box for **Allow management operating system to share this network adapter**.
  - Step 6** Check the check box for **Enable single-root I/O virtualization (SR-IOV)**.
  - Step 7** Click **Apply**.  
If a confirmation is requested, click **OK**.
  - Step 8** Click **OK**.
  - Step 9** In the navigation frame, under the newly-created virtual switch, click **Extensions**.  
The **Virtual Switch Extensions** pane appears.
  - Step 10** In the **Virtual Switch Extensions** pane, under **Switch extensions**, select **Cisco Vmflex Switch** and leave the other check boxes unselected.
  - Step 11** Click **Apply**.  
If a confirmation is requested, click **OK**.
  - Step 12** Click **OK**.
- 

## What to Do Next

Create the VMs in Microsoft Hyper-V Manager.



## Configuring the Hyper-V Virtual Machines

This chapter includes the following sections:

- [Creating the VMs in Microsoft Hyper-V Manager, page 21](#)
- [Installing the VF Driver, page 22](#)
- [Managing the Port Profile, page 23](#)

### Creating the VMs in Microsoft Hyper-V Manager

This procedure creates a VM using the **New Virtual Machine Wizard** in the Microsoft Hyper-V Manager. For more information on creating and configuring a new VM, see the Microsoft Windows documentation.

Perform this task for each VM in the Hyper-V cluster.

#### Before You Begin

In Microsoft Hyper-V Manager, create a virtual switch.

#### Procedure

- Step 1** In the **Actions** frame of Microsoft Hyper-V Manager, click **New**.
- Step 2** From the drop-down list, select **Virtual Machine** to launch the **New Virtual Machine Wizard**.
- Step 3** In the **New Virtual Machine Wizard**, click **Next** to create a VM with a custom configuration.
- Step 4** Complete the **Specify Name and Location** menu and click **Next**.
- Step 5** Complete the **Assign Memory** menu and click **Next**.
- Step 6** In the **Configure Networking** menu, select the virtual switch from the **Connection** drop-down list. and click **Next**.
- Step 7** Click **Next**.
- Step 8** Complete the **Connect Virtual Hard Disk** menu and click **Next**.
- Step 9** View the **Summary** and click **Finish**.  
Microsoft Hyper-V Manager displays a list of the VMs.

- Step 10** In the list of VMs, right-click the new VM and select **Settings**.
- Step 11** In the **Navigation** pane, click the **Processor** object and specify 4 virtual processors.
- Step 12** In the **Navigation** pane, expand the **Network Adapter** object and click **Hardware Acceleration**. The **Hardware Acceleration** pane appears.
- Step 13** Scroll to the bottom of the pane and check the check box for **Enable SR-IOV**.
- Step 14** Click **Apply**.
- Step 15** Click **OK**.
- Step 16** Open Powershell on the server and enter the following command: `Set-VMNetworkAdapter -Name adapter-name -VMName vm-name - IovQueuePairsRequested rq-num`

**Example:**

```
PS C:\> Set-VMNetworkAdapter -Name vmnic1 -VMName vm1 -IovQueuePairsRequested 4
```

This command increases performance. The parameters of the command are as follows:

- *adapter-name*—The name of the VM network adapter.
- *vm-name*—The name of the VM.
- *rq-num*—The number of queue pairs requested, which should be equal to or less than the number of receive queues in the Ethernet adapter policy and equal to or less than the number of virtual CPUs assigned to the VM.

- Step 17** Return to the Microsoft Hyper-V Manager session.
- Step 18** In the list of VMs, right-click the new VM and select **Connect**. A console session to the VM appears.
- Step 19** Click the green Start icon to start the VM.

**What to Do Next**

Attach a port profile to the VM NIC.

## Installing the VF Driver

Perform this task on each VM to install the VF driver.

**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 VM, locate 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.
- Step 3** Select **Typical** installation.
- Step 4** Click **Next** and follow the instructions to install the drivers.

## Managing the Port Profile

Two methods are available for attaching the port profile to the VM network adapters:

- You can use Cisco scripts with Microsoft Powershell.
- You can use the Cisco Port Profile Management Snap-in that is installed with the Cisco VM-FEX Utilities.

You can choose either method.

## Using Microsoft PowerShell

### Attaching the Port Profile with PowerShell

Perform this task on the Hyper-V host server.

After installing the Cisco VM-FEX Port Profile Utilities from the Cisco UCS B-Series Blade Server Software Bundle, you can find scripts for administering VM network adapters using Microsoft Windows PowerShell in the following directory:

```
C:\Program Files\Cisco Systems\VIO Software\Utilities\Ethernet Utilities\vmfex
Utilities\Scripts
```

**Procedure**

|               | Command or Action  | Purpose  |
|---------------|--|--|
| <b>Step 1</b> | <p><code>powershell</code></p> <p><b>Example:</b><br/> <code>C:\&gt; powershell</code></p>   | Launch PowerShell on the server.   |
| <b>Step 2</b> | <p><code>cd "C:\Program Files\Cisco Systems\VIO Software\Utilities\Ethernet Utilities\vmfex Utilities\Scripts"</code></p> <p><b>Example:</b></p> | Changes the current directory to the directory that contains the PowerShell scripts. |

|               | Command or Action   | Purpose   |
|---------------|---|---|
|               | <pre>PS C:\&gt; cd "C:\Program Files\Cisco Systems\VIO Software\Utilities\Ethernet Utilities\vmfex Utilities\Scripts"</pre>   |   |
| <b>Step 3</b> | <p><b>. .\Backend.ps1</b></p> <p><b>Example:</b></p> <pre>PS C:\Program Files\Cisco Systems\VIO Software\Utilities\Ethernet Utilities\vmfex Utilities\Scripts&gt; . .\Backend.ps1</pre>   | Makes the scripts available in the current scope.   |
| <b>Step 4</b> | <p><b>. .\Util.ps1</b></p> <p><b>Example:</b></p> <pre>PS C:\Program Files\Cisco Systems\VIO Software\Utilities\Ethernet Utilities\vmfex Utilities\Scripts&gt; . .\Util.ps1</pre>   | Makes the scripts available in the current scope.   |
| <b>Step 5</b> | <p><b>cd \</b></p> <p><b>Example:</b></p> <pre>PS C:\Program Files\Cisco Systems\VIO Software\Utilities\Ethernet Utilities\vmfex Utilities\Scripts&gt; cd \</pre>   | Changes the current directory to the top level directory.   |
| <b>Step 6</b> | <p><b>Add-CiscoVmfexSwitchToCluster "switch-name" "cluster-id" "cluster-name"</b></p> <p><b>Example:</b></p> <pre>PS C:\&gt; Add-CiscoVmfexSwitchToCluster "VSwitch_1" "87654321-0123-4567-abcd-0123456789abcdef" "Cluster_1"</pre> | <p>Attaches the virtual switch to the cluster. The parameters are as follows:</p> <ul style="list-style-type: none"> <li>• <i>switch-name</i>—The virtual switch name you configured in the Virtual Switch Manager.</li> <li>• <i>cluster-id</i>—The cluster ID that you configured when you created a cluster in Cisco UCS Manager.</li> <li>• <i>cluster-name</i>—The cluster name that you configured in Cisco UCS Manager.</li> </ul> |
| <b>Step 7</b> | <p><b>Get-VM</b></p> <p><b>Example:</b></p> <pre>PS C:\&gt; Get-VM</pre>  | Displays a table of VMs. Note the <b>VM Name</b> in the first column.   |
| <b>Step 8</b> | <p><b>Get-VMNetworkAdapter -VMName vm-name  fl</b></p> <p><b>Example:</b></p> <pre>PS C:\&gt; Get-VMNetworkAdapter -VMName vm1  fl</pre>  | Displays a list of network adapter properties for the VM. For the <i>vm-name</i> parameter, enter the VM name as it appears in the <b>Name</b> column of the VM table.  |

|                | Command or Action   | Purpose   |
|----------------|---|---|
|                |   | In the network adapter properties list, note the <b>Id</b> and <b>VMId</b> properties.  |
| <b>Step 9</b>  | <p><b>\$ProfileId =</b><br/> <code>"{+[System.Guid]::NewGuid().tostring()+}"</code></p> <p><b>Example:</b><br/> PS C:\&gt; \$ProfileId =<br/> <code>"{+[System.Guid]::NewGuid().tostring()+}"</code></p>  | Creates a globally unique identifier (Guid) string and assigns it to a variable named <b>\$ProfileId</b> to be used as an identifier for the port profile. The variable name is arbitrary, but will be used in the next step.   |
| <b>Step 10</b> | <p><b>Add-CiscoVmfexPortProfile "vmid" \$ProfileId</b><br/> <code>"profile-name" "adapter-id"</code></p> <p><b>Example:</b><br/> PS C:\&gt; Add-CiscoVmfexPortProfile<br/> <code>"8be79ffd-0bf2-4a93-b9ee-81878755b469" \$ProfileId</code><br/> <code>"MyPortProfile_1"</code><br/> <code>"Microsoft:0D8E0F40-C010-45C2-91E7-33E21043FE83\</code><br/> <code>17F85D37-2ACD-42AD-981C-AC4BDAC0B8BD"</code></p> | <p>Attaches the VM network adapter to the port profile. The parameters are as follows:</p> <ul style="list-style-type: none"> <li>• <i>vmid</i>—The <b>VMId</b> property from the network adapter properties list.</li> <li>• <i>profile-name</i>—The profile name that you configured in Cisco UCS Manager.</li> <li>• <i>adapter-id</i>—The <b>Id</b> property from the network adapter properties list.</li> </ul> |
| <b>Step 11</b> | Perform steps 8 through 10 for each VM.   |   |

### What to Do Next

Reboot the Hyper-V host and test the IP connectivity of the host.

## Detaching the Port Profile with PowerShell

(Optional) To detach the port profile using PowerShell, perform this task on the Hyper-V host server.

### Procedure

|               | Command or Action   | Purpose  |
|---------------|---|--|
| <b>Step 1</b> | <p><b>powershell</b></p> <p><b>Example:</b><br/> C:\&gt; powershell</p>   | Launch PowerShell on the server.   |
| <b>Step 2</b> | <p><b>Delete-CiscoVmfexPortProfile "vmid" "adapter-id"</b></p> <p><b>Example:</b><br/> PS C:\&gt; Delete-CiscoVmfexPortProfile<br/> <code>"8be79ffd-0bf2-4a93-b9ee-81878755b469"</code></p> | <p>Deletes the VM network adapter from the port profile. The parameters are as follows:</p> <ul style="list-style-type: none"> <li>• <i>vmid</i>—The <b>VMId</b> property from the network adapter properties list.</li> </ul> |

|               | Command or Action   | Purpose  |
|---------------|---|--|
|               | "Microsoft:0D8E0F40-C010-45C2-91E7-C3E21043FE83\17F85D37-2ACD-42AD-981C-AC4BDAC0B8BD"   | <ul style="list-style-type: none"> <li><i>adapter-id</i>—The <b>Id</b> property from the network adapter properties list.</li> </ul>     |
| <b>Step 3</b> | <b>Remove-CiscoVmfexSwitchFromCluster "switch-name"</b><br><br><b>Example:</b><br>PS C:\> <b>Remove-CiscoVmfexSwitchFromCluster "vSwitch_1"</b> | Removes the virtual switch from the cluster. The <i>switch-name</i> is the virtual switch name configured in the Virtual Switch Manager. |

## Using the Cisco Port Profile Management Snap-in

### Attaching the Port Profile with the Port Profile Management Snap-in

#### Procedure

- 
- Step 1** On the server with the Port Profile Management Snap-in installed, double-click the desktop shortcut to launch the Cisco Vmfex Port-Profile Manager.
- Step 2** In the **Actions** pane, click **Add UCSM**.  
The **UCSM Login** dialog box appears.
- Step 3** In the **UCSM Login** dialog box, enter the **IP Address**, **User Name**, and **Password** for the Cisco UCS Manager (UCSM) system and click **OK**.  
The clusters and port profiles display in the center pane.
- Step 4** In the **Actions** pane, click **Add Host**.  
The **Connect to Hyper-V Server** dialog box appears.
- Step 5** In the **Connect to Hyper-V Server** dialog box, select **Local Computer** to add the current host or **Another Computer** to add a remote host.
- Step 6** If you selected **Another Computer**, enter the **Host Name/IP**, **User Name**, and **Password** for the remote host.  
The **Host Name** must be in the same domain as the Hyper-V host. If you enter an IP address instead of a host name, you must execute the following command in Powershell on the Hyper-V host:
- ```
Set-Item WSMAN:\localhost\Client\TrustedHosts <remote host ip>
```
- For example:
- ```
Set-Item WSMAN:\localhost\Client\TrustedHosts '192.0.20.1' -concatenate
```
- Step 7** Click **OK**.  
The center pane displays the host verification results. Any virtual switches attached to the host are listed under the host name in the **Navigation** pane.
- Step 8** To attach a virtual switch to a cluster, select **Attach to Cluster** under the switch name in the **Actions** pane.

The **Select Cluster** dialog box appears.

- Step 9** In the **Select Cluster** dialog box, select a cluster and click **OK**.  
The cluster name appears with the virtual switch name in the **Navigation** and **Actions** panes. If no cluster name appears, the switch belongs to the default cluster.
- Step 10** To attach the VM network adapters to a port profile, select one or more VM network adapters in the center pane and click **Attach/Modify Port Profile** under the selected items in the **Actions** pane.  
The **Select Port Profile** dialog box appears, displaying all port profiles in the virtual switch.
- Step 11** In the **Select Port Profile** dialog box, select a port profile and click **OK**.  
The port profile name appears with each VM network adapter in the **Navigation** pane.
- 

### What to Do Next

Reboot the Hyper-V host and test the IP connectivity of the host.

## Detaching the Port Profile with the Port Profile Management Snap-in

### Procedure

---

- Step 1** On the server with the Port Profile Management Snap-in installed, double-click the desktop shortcut to launch the Cisco Vmflex Port-Profile Manager.
- Step 2** To detach the VM network adapters from a port profile, select one or more VM network adapters in the center pane and click **Detach Port Profile** under the selected items in the **Actions** pane.
- Step 3** To detach the virtual switch from a cluster, select **Detach from Cluster** under the switch name in the **Actions** pane.  
The virtual switch cannot be detached from the cluster unless all VM network adapters under the switch are detached from their port profiles.
-





# Configuring Policies

---

This chapter includes the following sections:

- [Configuring Dynamic vNIC Connection Policies, page 29](#)
- [Creating a Custom Adapter Policy for SR-IOV, page 33](#)

## 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.

#### 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.

#### Static vNICs



**Note**

In a VM-FEX deployment, a VM will attach to a dynamic vNIC only if the VIC adapter has two static vNICs, one for each fabric. If a server contains more than one VIC adapter, each adapter must have two static vNICs configured.

## Server Migration



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

When the server comes back up, 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   |
|---------------|---|---|
| <b>Step 1</b> | UCS-A# <b>scope org</b> <i>org-name</i>   | Enters organization mode for the specified organization. To enter the root organization mode, enter / as the <i>org-name</i> .  |
| <b>Step 2</b> | UCS-A /org # <b>create dynamic-vnic-conn-policy</b><br><i>policy-name</i>                   | Creates the specified vNIC connection policy and enters organization vNIC connection policy mode.<br><br>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 has been saved.<br><br><b>Note</b> 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. |
| <b>Step 3</b> | UCS-A<br>/org/dynamic-vnic-conn-policy<br># <b>set desc</b> <i>description</i>              | (Optional)<br>Provides a description for the policy.<br><br>Enter up to 256 characters. You can use any characters or spaces except ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).<br><br>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 <b>show</b> command output.   |
| <b>Step 4</b> | UCS-A<br>/org/dynamic-vnic-conn-policy<br># <b>set adapter-policy</b><br><i>policy-name</i> | Specifies the Ethernet adapter policy to use for this policy. The adapter policy must already exist.  |



|               | Command or Action  | Purpose  |
|---------------|--|--|
| <b>Step 5</b> | UCS-A<br>/org/dynamic-vnic-conn-policy<br># <b>set dynamic-eth</b><br>{ <i>dynamic-eth-num</i>   <b>off</b> }                                    | Specifies the number of dynamic vNICs to use for this policy.  |
| <b>Step 6</b> | UCS-A<br>/org/dynamic-vnic-conn-policy<br># <b>set protection</b> { <b>protected</b>  <br><b>protected-pref-a</b>  <br><b>protected-pref-b</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: <ul style="list-style-type: none"> <li>• <b>protected</b>—Cisco UCS uses whichever fabric is available.</li> <li>• <b>protected-pref-a</b>—Cisco UCS attempts to use fabric A, but fails over to fabric B if necessary.</li> <li>• <b>protected-pref-b</b>—Cisco UCS attempts to use fabric B, but fails over to fabric A if necessary.</li> </ul> |
| <b>Step 7</b> | UCS-A<br>/org/dynamic-vnic-conn-policy<br># <b>commit-buffer</b>   | Commits the transaction.   |

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 desc "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   |
|---------------|--|---|
| <b>Step 1</b> | UCS-A# <b>scope org</b> <i>org-name</i>  | Enters organization mode for the specified organization. To enter the root organization mode, enter <i>/</i> as the <i>org-name</i> . |
| <b>Step 2</b> | UCS-A /org # <b>delete</b><br><b>dynamic-vnic-conn-policy</b> <i>policy-name</i> | Deletes the specified vNIC connection policy.   |
| <b>Step 3</b> | UCS-A /org # <b>commit-buffer</b>  | Commits the transaction.  |

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 running.

### Procedure

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

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

```
UCS-A# scope system
UCS-A /system # scope vm-mgmt

UCS-A /system/vm-mgmt # show virtual-machine
Virtual Machine:
  UUID: 420a00c8-934b-4ae3-6af5-2ce9b8bd0f44
  Service Profile: org-root/ls-PTS-ch6-7
  Server: sys/chassis-6/blade-7
  Status: Online
.
.
.
UCS-A /system/vm-mgmt # scope virtual-machine 420a08b0-cda7-9e0a-424f-01ec8653eea0
UCS-A /system/vm-mgmt/virtual-machine # show vnic detail

vNIC:
  Name: 4479
  Status: Online
  MAC Address: 00:50:56:8A:07:B5
  Profile Name: VM-mgmt
  Virtual Adapter: sys/chassis-1/blade-1/adapter-1/host-eth-9
  Vnic Dn: org-root/ls-PTS-ch1-1/ether-dynamic-prot-009
  Current Task:

UCS-A /system/vm-mgmt/virtual-machine #
```

## 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  |
|---------------|---|--|
| <b>Step 1</b> | UCS-A# <b>scope org</b> <i>org-name</i>                             | Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .   |
| <b>Step 2</b> | UCS-A /org # <b>create eth-policy</b> <i>name</i>                   | Creates an Ethernet adapter policy and enters organization Ethernet policy mode.<br><br>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.  |
| <b>Step 3</b> | UCS-A /org/eth-policy # <b>set descr</b> <i>description</i>         | (Optional)<br>Provides a description for the policy.<br><br><b>Note</b> 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 <b>show</b> command output. |
| <b>Step 4</b> | UCS-A /org/eth-policy # <b>set trans-queue count</b> <i>1</i>       | Configures the Ethernet transmit queue.  |
| <b>Step 5</b> | UCS-A /org/eth-policy # <b>set trans-queue ring-size</b> <i>256</i> |  |
| <b>Step 6</b> | UCS-A /org/eth-policy # <b>set recv-queue count</b> <i>4</i>        | Configures the Ethernet receive queue.   |
| <b>Step 7</b> | UCS-A /org/eth-policy # <b>set recv-queue ring-size</b> <i>512</i>  |  |

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

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 #
```



## Configuring Port Profiles

---

This chapter includes the following sections:

- [Port Profiles, page 35](#)
- [Creating a Port Profile, page 35](#)
- [Deleting a Port Profile, page 37](#)
- [Adding a Named VLAN to a Port Profile, page 38](#)
- [Deleting a Named VLAN from a Port Profile, page 39](#)
- [Port Profile Clients, page 39](#)
- [Adding a Port Profile Client to a Port Profile, page 39](#)
- [Deleting a Port Profile Client from a Port Profile, page 41](#)

### Port Profiles

Port profiles contain the properties and settings that you can use to configure virtual interfaces in Cisco UCS for VM-FEX. The port profiles are created and administered in Cisco UCS Manager. After a port profile is created, assigned to, and actively used by one or more clusters, any changes made to the networking properties of the port profile in Cisco UCS Manager are immediately applied to those clusters.

### Creating a Port Profile



**Note**

---

In a VM-FEX for Hyper-V system, the following conditions apply:

- The **set max-ports** command applies to the cluster; there is no distributed virtual switch (DVS).
  - The **set host-nwio-perf** command has no effect.
-

## Procedure

|                | Command or Action   | Purpose   |
|----------------|---|---|
| <b>Step 1</b>  | UCS-A# <b>scope system</b>  | Enters system mode.   |
| <b>Step 2</b>  | UCS-A /system # <b>scope vm-mgmt</b>  | Enters system VM management mode.   |
| <b>Step 3</b>  | UCS-A /system/vm-mgmt # <b>scope profile-set</b>  | Enters system VM management profile set mode.   |
| <b>Step 4</b>  | UCS-A /system/vm-mgmt/profile-set # <b>create port-profile</b> <i>profile-name</i>  | Creates the specified port profile and enters system VM management profile set port profile mode.   |
| <b>Step 5</b>  | UCS-A<br>/system/vm-mgmt/profile-set/port-profile<br># <b>set descr</b> <i>description</i>                                    | (Optional)<br>Provides a description for the port profile.<br><br><b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks do not appear in the description field of any <b>show</b> command output.  |
| <b>Step 6</b>  | UCS-A<br>/system/vm-mgmt/profile-set/port-profile<br># <b>set host-nwio-perf</b> { <b>high-performance</b><br>  <b>none</b> } | You can choose one of the following options:<br><br><ul style="list-style-type: none"> <li>• <b>high-performance</b></li> <li>• <b>none</b></li> </ul>  |
| <b>Step 7</b>  | UCS-A<br>/system/vm-mgmt/profile-set/port-profile<br># <b>set max-ports</b> <i>max-num</i>                                    | Specifies the maximum number of ports that the port profile can use.<br><br>The maximum number of ports that can be associated with a single distributed virtual switch (DVS) is 4096. If the DVS has only one associated port profile, that port profile can be configured with up to 4096 ports. However, if the DVS has more than one associated port profile, the total number of ports associated with all of those port profiles combined cannot exceed 4096. |
| <b>Step 8</b>  | UCS-A<br>/system/vm-mgmt/profile-set/port-profile<br># <b>set nw-control-policy</b> <i>policy-name</i>                        | Specifies the network control policy to use for the port profile.   |
| <b>Step 9</b>  | UCS-A<br>/system/vm-mgmt/profile-set/port-profile<br># <b>set pin-group</b> <i>group-name</i>                                 | Specifies the LAN pin group to use for the port profile.  |
| <b>Step 10</b> | UCS-A<br>/system/vm-mgmt/profile-set/port-profile<br># <b>set qos-policy</b> <i>policy-name</i>                               | Specifies the QoS policy to use for the port profile.   |

|                | Command or Action   | Purpose                  |
|----------------|---|--------------------------|
| <b>Step 11</b> | UCS-A<br>/system/vm-mgmt/profile-set/port-profile<br># <b>commit-buffer</b> | Commits the transaction. |

The following example shows how to create and configure a port profile named MyProfile 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 MyProfile
UCS-A /system/vm-mgmt/profile-set/port-profile* # set descr "This is my port profile"
UCS-A /system/vm-mgmt/profile-set/port-profile* # set max-ports 24
UCS-A /system/vm-mgmt/profile-set/port-profile* # set nw-control-policy ncp5
UCS-A /system/vm-mgmt/profile-set/port-profile* # set pin-group PinGroup54
UCS-A /system/vm-mgmt/profile-set/port-profile* # set qos-policy QosPolicy34
UCS-A /system/vm-mgmt/profile-set/port-profile* # commit-buffer
UCS-A /system/vm-mgmt/profile-set/port-profile #
```

### What to Do Next

Add a port profile client to the port profile.

## Deleting a Port Profile

You cannot delete a port profile if a VM is actively using that port profile.

### Procedure

|               | Command or Action  | Purpose   |
|---------------|--|---|
| <b>Step 1</b> | UCS-A# <b>scope system</b>   | Enters system mode.   |
| <b>Step 2</b> | UCS-A /system # <b>scope vm-mgmt</b>   | Enters system VM management mode.   |
| <b>Step 3</b> | UCS-A /system/vm-mgmt # <b>scope profile-set</b>                                   | Enters system VM management profile set mode.   |
| <b>Step 4</b> | UCS-A /system/vm-mgmt/profile-set # <b>delete port-profile</b> <i>profile-name</i> | Deletes the specified port profile.   |
| <b>Step 5</b> | UCS-A /system/vm-mgmt/profile-set # <b>commit-buffer</b>                           | Commits the transaction.<br>Cisco UCS Manager deletes the port profile and all associated port profile clients. |

The following example shows how to delete the port profile named MyProfile 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 # delete port-profile MyProfile
UCS-A /system/vm-mgmt/profile-set* # commit-buffer
UCS-A /system/vm-mgmt/profile-set #
```

## Adding a Named VLAN to a Port Profile

### Procedure

|               | Command or Action   | Purpose   |
|---------------|---|---|
| <b>Step 1</b> | UCS-A# <b>scope system</b>  | Enters system mode.   |
| <b>Step 2</b> | UCS-A /system # <b>scope vm-mgmt</b>  | Enters system VM management mode.   |
| <b>Step 3</b> | UCS-A /system/vm-mgmt # <b>scope profile-set</b>                                      | Enters system VM management profile set mode.   |
| <b>Step 4</b> | UCS-A /system/vm-mgmt/profile-set # <b>scope port-profile profile-name</b>            | Enters system VM management profile set port profile mode for the specified port profile.                                 |
| <b>Step 5</b> | UCS-A<br>/system/vm-mgmt/profile-set/port-profile #<br><b>create vlan vlan-name</b>   | Specifies a named VLAN to use for the port profile.<br><b>Note</b> You can create multiple VLANs for guest VLAN trunking. |
| <b>Step 6</b> | UCS-A<br>/system/vm-mgmt/profile-set/port-profile/vlan<br># <b>set default-net no</b> | (Optional)<br>Sets the default-net VLAN as the native VLAN in UCS Manager.  |
| <b>Step 7</b> | UCS-A<br>/system/vm-mgmt/profile-set/port-profile/vlan<br># <b>commit-buffer</b>      | Commits the transaction.  |

The following example shows how to add the VLAN named accounting to the port profile named MyProfile, set the VLAN as non-native, 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 # scope port-profile MyProfile
UCS-A /system/vm-mgmt/profile-set/port-profile # create vlan accounting
UCS-A /system/vm-mgmt/profile-set/port-profile/vlan* # set default-net no
UCS-A /system/vm-mgmt/profile-set/port-profile/vlan* # commit-buffer
UCS-A /system/vm-mgmt/profile-set/port-profile/vlan #
```



## Deleting a Named VLAN from a Port Profile

### Procedure

|               | Command or Action   | Purpose   |
|---------------|---|---|
| <b>Step 1</b> | UCS-A# <b>scope system</b>  | Enters system mode.   |
| <b>Step 2</b> | UCS-A /system # <b>scope vm-mgmt</b>  | Enters system VM management mode.   |
| <b>Step 3</b> | UCS-A /system/vm-mgmt # <b>scope profile-set</b>                                    | Enters system VM management profile set mode.   |
| <b>Step 4</b> | UCS-A /system/vm-mgmt/profile-set # <b>scope port-profile profile-name</b>          | Enters system VM management profile set port profile mode for the specified port profile. |
| <b>Step 5</b> | UCS-A<br>/system/vm-mgmt/profile-set/port-profile #<br><b>delete vlan vlan-name</b> | Deletes the specified named VLAN from the port profile.                                   |
| <b>Step 6</b> | UCS-A<br>/system/vm-mgmt/profile-set/port-profile #<br><b>commit-buffer</b>         | Commits the transaction.  |

The following example shows how to delete the VLAN named accounting from the port profile named MyProfile 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 # scope port-profile MyProfile
UCS-A /system/vm-mgmt/profile-set/port-profile # delete vlan accounting
UCS-A /system/vm-mgmt/profile-set/port-profile* # commit-buffer
UCS-A /system/vm-mgmt/profile-set/port-profile #
```

## Port Profile Clients

The port profile client determines the cluster or clusters to which a port profile is applied.

## Adding a Port Profile Client to a Port Profile

### Procedure

|               | Command or Action          | Purpose             |
|---------------|----------------------------|---------------------|
| <b>Step 1</b> | UCS-A# <b>scope system</b> | Enters system mode. |

|                | Command or Action  | Purpose   |
|----------------|--|---|
| <b>Step 2</b>  | UCS-A /system # <b>scope vm-mgmt</b>   | Enters system VM management mode.   |
| <b>Step 3</b>  | UCS-A /system/vm-mgmt # <b>scope profile-set</b>   | Enters system VM management profile set mode.   |
| <b>Step 4</b>  | UCS-A /system/vm-mgmt/profile-set # <b>scope port-profile</b> <i>profile-name</i>                            | Enters system VM management profile set port profile mode for the specified port profile.   |
| <b>Step 5</b>  | UCS-A<br>/system/vm-mgmt/profile-set/port-profile #<br><b>create client</b> <i>client-name</i>               | Creates the specified port profile client and enters system VM management profile set port profile client mode.   |
| <b>Step 6</b>  | UCS-A<br>/system/vm-mgmt/profile-set/port-profile/client<br># <b>set descr</b> <i>description</i>            | (Optional)<br>Provides a description for the port profile client.<br><br><b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks do not appear in the description field of any <b>show</b> command output. |
| <b>Step 7</b>  | UCS-A<br>/system/vm-mgmt/profile-set/port-profile/client<br># <b>set data-center</b> <i>data-center-name</i> | (Optional)<br>Specifies the datacenter to which the port profile is applied.  |
| <b>Step 8</b>  | UCS-A<br>/system/vm-mgmt/profile-set/port-profile/client<br># <b>set folder</b> <i>folder-name</i>           | (Optional)<br>Specifies the datacenter folder to which the port profile is applied.   |
| <b>Step 9</b>  | UCS-A<br>/system/vm-mgmt/profile-set/port-profile/client<br># <b>set cluster</b> <i>name</i>                 | (Optional)<br>Specifies the cluster to which the port profile is applied.   |
| <b>Step 10</b> | UCS-A<br>/system/vm-mgmt/profile-set/port-profile/client<br># <b>commit-buffer</b>                           | Commits the transaction.  |

The following example shows how to create a port profile client named MyClient that applies the port profile to the default cluster 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 # scope port-profile MyProfile
UCS-A /system/vm-mgmt/profile-set/port-profile* # create client MyClient
UCS-A /system/vm-mgmt/profile-set/port-profile/client* # set descr "This is the client for my port profile"
UCS-A /system/vm-mgmt/profile-set/port-profile/client* # set cluster default
UCS-A /system/vm-mgmt/profile-set/port-profile/client* # commit-buffer
UCS-A /system/vm-mgmt/profile-set/port-profile/client #
```

## Deleting a Port Profile Client from a Port Profile

You cannot delete a port profile client if a VM is actively using the port profile with which the client is associated.

### Procedure

|               | Command or Action  | Purpose   |
|---------------|--|---|
| <b>Step 1</b> | UCS-A# <b>scope system</b>   | Enters system mode.   |
| <b>Step 2</b> | UCS-A /system # <b>scope vm-mgmt</b>   | Enters system VM management mode.   |
| <b>Step 3</b> | UCS-A /system/vm-mgmt # <b>scope profile-set</b>   | Enters system VM management profile set mode.   |
| <b>Step 4</b> | UCS-A /system/vm-mgmt/profile-set # <b>scope port-profile <i>profile-name</i></b>        | Enters system VM management profile set port profile mode for the specified port profile. |
| <b>Step 5</b> | UCS-A /system/vm-mgmt/profile-set/port-profile # <b>delete client <i>client-name</i></b> | Deletes the specified port profile client.  |
| <b>Step 6</b> | UCS-A /system/vm-mgmt/profile-set/port-profile # <b>commit-buffer</b>                    | Commits the transaction.  |

The following example shows how to delete the port profile client named OtherClient from the port profile named MyProfile 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 # scope port-profile MyProfile
UCS-A /system/vm-mgmt/profile-set/port-profile # delete client OtherClient
UCS-A /system/vm-mgmt/profile-set/port-profile* # commit-buffer
UCS-A /system/vm-mgmt/profile-set/port-profile #
```





## INDEX

### A

- adapter policy [33](#)
  - creating [33](#)
- adapters [2](#)
  - VIC [2](#)

### B

- BIOS [5](#)
  - required settings [5](#)

### C

- Cisco UCS Manager [2](#)
  - components for VM-FEX [2](#)
- Cisco VM-FEX [1](#)
- clients, port profiles [41](#)
  - deleting [41](#)
- cluster [2, 13](#)
  - creating [13](#)
  - definition [2](#)

### D

- distributed virtual switch [2](#)
  - definition [2](#)
- drivers [18, 22](#)
  - installing PF and switch [18](#)
  - installing VF [22](#)
  - obtaining [18](#)
- DVS [2](#)
  - definition [2](#)
- dynamic vNIC [32](#)
  - viewing properties [32](#)
- dynamic vNIC connection policies [31](#)
  - deleting [31](#)

- dynamic vNIC connection policy [7, 29, 30](#)
  - about [29](#)
  - creating [30](#)
  - creating for Hyper-V [7](#)

### H

- Hyper-V [2, 6](#)
  - configuration for VM-FEX [6](#)
  - definition [2](#)

### I

- IEEE 802.1Qbh [1](#)

### M

- migration domain [2](#)
  - definition [2](#)

### O

- operating system [17](#)
  - installation [17](#)

### P

- physical function (PF) [10, 18](#)
  - creating [10](#)
  - installing driver [18](#)
- policies [7, 29, 30](#)
  - dynamic vNIC connection [7, 29, 30](#)
    - about [29](#)
    - creating [30](#)
    - creating for Hyper-V [7](#)

- policy [33](#)
  - adapter [33](#)
- port profile [19, 23, 25, 26, 27, 39](#)
  - attaching with PowerShell [23](#)
  - attaching with the snap-in [26](#)
  - client [39](#)
  - detaching with PowerShell [25](#)
  - detaching with the snap-in [27](#)
  - installing manager and utility [19](#)
  - managing [23](#)
- port profile client [2, 39](#)
  - adding to port profile [39](#)
  - definition [2](#)
- port profiles [2, 12, 14, 35, 37, 39, 41](#)
  - about [35](#)
  - clients [39, 41](#)
    - deleting [41](#)
  - creating [12, 35](#)
  - creating profile clients [14](#)
  - definition [2](#)
  - deleting [37](#)
- Port profiles [38, 39](#)
  - VLANs [38, 39](#)
    - adding [38](#)
    - deleting [39](#)
- prerequisites [5](#)
- profile clients [14](#)
  - creating for Hyper-V [14](#)
- profiles [35, 39](#)
  - port [35, 39](#)

## S

- service profile [9, 11](#)
  - associating with a server [11](#)
  - creating [9](#)
- SR-IOV [3](#)
  - about [3](#)

## V

- VIC adapters [2](#)
  - virtualization [2](#)
- virtual function (VF) [22](#)
  - installing driver [22](#)
- virtual machines [1](#)
- virtual switch [20, 21](#)
  - creating in Windows [20, 21](#)
- virtualization [1, 2](#)
  - about [1](#)
  - VIC adapter [2](#)
  - VM-FEX [1](#)
    - about [1](#)
- VLANs [38, 39](#)
  - port profiles [38, 39](#)
    - adding [38](#)
    - deleting [39](#)
- VM-FEX [1, 6, 39](#)
  - about [1](#)
  - configuration [6](#)
  - port profiles [39](#)
- vNICs [29, 32](#)
  - dynamic vNIC connection policy [29](#)
  - viewing dynamic vNIC properties [32](#)