



# Managing Network Adapters

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## Overview of the Cisco UCS C-Series Network Adapters



**Note**

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The procedures in this chapter are available only when a Cisco UCS C-Series network adapter is installed in the chassis.

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A Cisco UCS C-Series network adapter can be installed to provide options for I/O consolidation and virtualization support. The following adapters are available:

- Cisco UCS P81E Virtual Interface Card
- Cisco UCS VIC 1225 Virtual Interface Card
- Cisco UCS VIC 1385 Virtual Interface Card
- Cisco UCS VIC 1227T Virtual Interface Card
- Cisco UCS VIC 1387 Virtual Interface Card

The interactive *UCS Hardware and Software Interoperability Utility* lets you view the supported components and configurations for a selected server model and software release. The utility is available at the following URL: <http://www.cisco.com/web/techdoc/ucs/interoperability/matrix/matrix.html>

### **Cisco UCS P81E Virtual Interface Card**

The Cisco UCS P81E Virtual Interface Card is optimized for virtualized environments, for organizations that seek increased mobility in their physical environments, and for data centers that want reduced costs through NIC, HBA, cabling, and switch reduction and reduced management overhead. This Fibre Channel over Ethernet (FCoE) PCIe card offers the following benefits:

- Allows up to 16 virtual Fibre Channel and 16 virtual Ethernet adapters to be provisioned in virtualized or nonvirtualized environments using just-in-time provisioning, providing tremendous system flexibility and allowing consolidation of multiple physical adapters.
- Delivers uncompromising virtualization support, including hardware-based implementation of Cisco VN-Link technology and pass-through switching.
- Improves system security and manageability by providing visibility and portability of network policies and security all the way to the virtual machine.

The virtual interface card makes Cisco VN-Link connections to the parent fabric interconnects, which allows virtual links to connect virtual NICs in virtual machines to virtual interfaces in the interconnect. In a Cisco Unified Computing System environment, virtual links then can be managed, network profiles applied, and interfaces dynamically reprovisioned as virtual machines move between servers in the system.

### **Cisco UCS VIC 1225 Virtual Interface Card**

The Cisco UCS VIC 1225 Virtual Interface Card is a high-performance, converged network adapter that provides acceleration for the various new operational modes introduced by server virtualization. It brings superior flexibility, performance, and bandwidth to the new generation of Cisco UCS C-Series Rack-Mount Servers.

The Cisco UCS VIC 1225 implements the Cisco Virtual Machine Fabric Extender (VM-FEX), which unifies virtual and physical networking into a single infrastructure. It provides virtual-machine visibility from the physical network and a consistent network operations model for physical and virtual servers. In virtualized environments, this highly configurable and self-virtualized adapter provides integrated, modular LAN interfaces on Cisco UCS C-Series Rack-Mount Servers. Additional features and capabilities include:

- Supports up to 256 PCIe virtual devices, either virtual network interface cards (vNICs) or virtual host bus adapters (vHBAs), with high I/O operations per second (IOPS), support for lossless Ethernet, and 20 Gbps to servers.
- PCIe Gen2 x16 helps assure optimal bandwidth to the host for network-intensive applications with a redundant path to the fabric interconnect.
- Half-height design reserves full-height slots in servers for Cisco certified third-party adapters.
- Centrally managed by Cisco UCS Manager with support for Microsoft Windows, Red Hat Enterprise Linux, SUSE Linux, VMware vSphere, and Citrix XenServer.

### **Cisco UCS VIC 1385 Virtual Interface Card**

The Cisco UCS VIC 1385 Virtual Interface Card is a dual-port Enhanced Quad Small Form-Factor Pluggable (QSFP) 40 Gigabit Ethernet and Fibre Channel over Ethernet (FCoE)-capable half-height PCI Express (PCIe) card designed exclusively for Cisco UCS C-Series Rack Servers. It incorporates Cisco's next-generation

converged network adapter (CNA) technology, with a comprehensive feature set, providing investment protection for future feature software releases. The card enables a policy-based, stateless, agile server infrastructure that can present over 256 PCIe standards-compliant interfaces to the host that can be dynamically configured as either network interface cards (NICs) or host bus adapters (HBAs). In addition, the Cisco UCS VIC 1385 card supports Cisco Data Center Virtual Machine Fabric Extender (VM-FEX) technology, which extends the Cisco UCS fabric interconnect ports to virtual machines, simplifying server virtualization deployment.

The personality of the card is determined dynamically at boot time using the service profile associated with the server. The number, type (NIC or HBA), identity (MAC address and World Wide Name [WWN]), failover policy, bandwidth, and quality-of-service (QoS) policies of the PCIe interfaces are all determined using the service profile. The capability to define, create, and use interfaces on demand provides a stateless and agile server infrastructure. Additional features and capabilities include:

- Each PCIe interface created on the VIC is associated with an interface on the Cisco UCS fabric interconnect, providing complete network separation for each virtual cable between a PCIe device on the VIC and the interface on the fabric interconnect
- The Cisco UCS VIC 1385 Virtual Interface Card provides high network performance and low latency for the most demanding applications such as SMB-Direct, VMQ, DPDK, and Cisco NetFlow

### Cisco UCS VIC 1227T Virtual Interface Card

The Cisco UCS VIC 1227T Virtual Interface Card is a dual-port 10GBASE-T (RJ-45) 10-Gbps Ethernet and Fibre Channel over Ethernet (FCoE)-capable PCI Express (PCIe) modular LAN-on-motherboard (mLOM) adapter designed exclusively for Cisco UCS C-Series Rack Servers. New to Cisco rack servers, the mLOM slot can be used to install a Cisco VIC without consuming a PCIe slot, which provides greater I/O expandability. It incorporates next-generation converged network adapter (CNA) technology from Cisco, providing Fibre Channel connectivity over low-cost twisted pair cabling with a bit error rate (BER) of 10 to 15 up to 30 meters and investment protection for future feature releases. The mLOM card enables a policy-based, stateless, agile server infrastructure that can present up to 256 PCIe standards-compliant interfaces to the host that can be dynamically configured as either network interface cards (NICs) or host bus adapters (HBAs). In addition, the Cisco UCS VIC 1227T Virtual Interface Card supports Cisco Data Center Virtual Machine Fabric Extender (VM-FEX) technology, which extends the Cisco UCS fabric interconnect ports to virtual machines, simplifying server virtualization deployment. Additional features and capabilities include:

- Stateless and agile design - The personality of the card is determined dynamically at boot time using the service profile associated with the server. The number, type (NIC or HBA), identity (MAC address and World Wide Name [WWN]), failover policy, bandwidth, and quality-of-service (QoS) policies of the PCIe interfaces are all determined using the service profile. The capability to define, create, and use interfaces on demand provides a stateless and agile server infrastructure.
- Each PCIe interface created on the VIC is associated with an interface on the Cisco UCS fabric interconnect, providing complete network separation for each virtual cable between a PCIe device on the VIC and the interface on the fabric interconnect.
- Cisco SingleConnect technology provides an exceptionally easy, intelligent, and efficient way to connect and manage computing in the data center. Cisco SingleConnect technology dramatically simplifies the way that data centers connect to rack and blade servers, physical servers, virtual machines, LANs, SANs, and management networks.

### Cisco UCS VIC 1387 Virtual Interface Card

The Cisco UCS VIC 1387 Virtual Interface Card is a dual-port Enhanced Quad Small Form-Factor Pluggable (QSFP) 40 Gigabit Ethernet and Fibre Channel over Ethernet (FCoE)-capable half-height PCI Express (PCIe) card designed exclusively for Cisco UCS C-Series Rack Servers. It incorporates Cisco's next-generation converged network adapter (CNA) technology, with a comprehensive feature set, providing investment protection for future feature software releases. The card enables a policy-based, stateless, agile server infrastructure that can present over 256 PCIe standards-compliant interfaces to the host that can be dynamically configured as either network interface cards (NICs) or host bus adapters (HBAs). In addition, the Cisco UCS VIC 1387 card supports Cisco Data Center Virtual Machine Fabric Extender (VM-FEX) technology, which extends the Cisco UCS fabric interconnect ports to virtual machines, simplifying server virtualization deployment.

The personality of the card is determined dynamically at boot time using the service profile associated with the server. The number, type (NIC or HBA), identity (MAC address and World Wide Name [WWN]), failover policy, bandwidth, and quality-of-service (QoS) policies of the PCIe interfaces are all determined using the service profile. The capability to define, create, and use interfaces on demand provides a stateless and agile server infrastructure. Additional features and capabilities include:

- Each PCIe interface created on the VIC is associated with an interface on the Cisco UCS fabric interconnect, providing complete network separation for each virtual cable between a PCIe device on the VIC and the interface on the fabric interconnect
- The Cisco UCS VIC 1387 Virtual Interface Card provides high network performance and low latency for the most demanding applications such as SMB-Direct, VMQ, DPDK, and Cisco NetFlow

## Viewing Network Adapter Properties

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>show adapter</b> [ <i>index</i> ] [ <i>detail</i> ]	Displays adapter properties. To display the properties of a single adapter, specify the PCI slot number as the <i>index</i> argument.

This example displays the properties of adapter 2:

```
Server# scope chassis
Server /chassis # show adapter
PCI Slot Product Name   Serial Number   Product ID      Vendor
-----
1         UCS VIC 1225      FCH1613796C   UCSC-PCIE-C... Cisco Systems Inc

Server /chassis # show adapter 2 detail
PCI Slot 2:
  Product Name: UCS VIC 1225
  Serial Number: FCH1613796C
  Product ID: UCSC-PCIE-CSC-02
  Adapter Hardware Revision: 4
  Current FW Version: 2.1(0.291)
  NIV: Disabled
```

```
FIP: Enabled
Configuration Pending: no
CIMC Management Enabled : no
VID: V00
Vendor: Cisco Systems Inc
Description:
Bootloader Version: 2.1(0.291)
FW Image 1 Version: 2.1(0.291)
FW Image 1 State: RUNNING ACTIVATED
FW Image 2 Version: 1.6(0.547)
FW Image 2 State: BACKUP INACTIVATED
FW Update Status: Idle
FW Update Error: No error
FW Update Stage: No operation (0%)
FW Update Overall Progress: 0%
```

Server /chassis #

# Configuring Network Adapter Properties

## Before You Begin

- You must log in with admin privileges to perform this task.
- A supported Virtual Interface Card (VIC) must be installed in the chassis and the server must be powered on.

## Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>show adapter</b>	(Optional) Displays the available adapter devices.
<b>Step 3</b>	Server /chassis # <b>scope adapter index</b>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> . <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 4</b>	Server /chassis/adapter # <b>set fip-mode {disable   enable}</b>	Enables or disables FCoE Initialization Protocol (FIP) on the adapter card. FIP is enabled by default. <b>Note</b> We recommend that you disable this option only when explicitly directed to do so by a technical support representative.
<b>Step 5</b>	Server /chassis/adapter # <b>set lldp {disable   enable}</b>	Enables or disables Link Layer Discovery Protocol (LLDP) on the adapter card. LLDP is enabled by default. <b>Note</b> We recommend that you do not disable LLDP option, as it disables all the Data Center Bridging Capability Exchange protocol (DCBX) functionality.
<b>Step 6</b>	Server /chassis/adapter # <b>set niv-mode {disable   enable}</b>	Enables or disables Network Interface Virtualization (NIV) on the adapter card. NIV is disabled by default. If NIV mode is enabled, vNICs:

	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>• Can be assigned to a specific channel</li> <li>• Can be associated with a port profile</li> <li>• Can fail over to another vNIC if there are communication problems</li> </ul>
<b>Step 7</b>	Server /chassis/adapter # <b>configure-vmfex</b> <i>port-count</i>	If NIV mode is enabled, <i>port-count</i> specifies the number of VM FEX interfaces you want Cisco IMC to create, from 0 to 112.
<b>Step 8</b>	Server /chassis/adapter # <b>commit</b>	Commits the transaction to the system configuration.

This example configures the properties of adapter 1:

```
Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # set fip-mode enable
Server /chassis/adapter *# commit
Server /chassis/adapter #
```

## Managing vHBAs

### Guidelines for Managing vHBAs

When managing vHBAs, consider the following guidelines and restrictions:

- The Cisco UCS P81E Virtual Interface Card and Cisco UCS VIC 1225 Virtual Interface Card provide two vHBAs (fc0 and fc1). You can create up to 16 additional vHBAs on these adapter cards.



**Note** If Network Interface Virtualization (NIV) mode is enabled for the adapter, you must assign a channel number to a vHBA when you create it.

- When using the Cisco UCS P81E Virtual Interface Card or Cisco UCS VIC 1225 Virtual Interface Card in an FCoE application, you must associate the vHBA with the FCoE VLAN. Follow the instructions in the **Modifying vHBA Properties** section to assign the VLAN.
- After making configuration changes, you must reboot the host for settings to take effect.

## Viewing vHBA Properties

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>show host-fc-if</b> [ <b>fc0</b>   <b>fc1</b>   <i>name</i> ] [ <b>detail</b> ]	Displays properties of a single vHBA, if specified, or all vHBAs.

This example displays all vHBAs on adapter card 1 and the detailed properties of fc0:

```
Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # show host-fc-if
Name      World Wide Port Name      FC SAN Boot Uplink Port
-----
fc0       20:00:00:22:BD:D6:5C:35   Disabled   0
fc1       20:00:00:22:BD:D6:5C:36   Disabled   1

Server /chassis/adapter # show host-fc-if fc0 detail
Name fc0:
World Wide Node Name: 10:00:00:22:BD:D6:5C:35
World Wide Port Name: 20:00:00:22:BD:D6:5C:35
FC SAN Boot: Disabled
Persistent LUN Binding: Disabled
Uplink Port: 0
MAC Address: 00:22:BD:D6:5C:35
CoS: 3
VLAN: NONE
Rate Limiting: OFF
PCIe Device Order: ANY
EDTOV: 2000
RATOV: 10000
Maximum Data Field Size: 2112
Channel Number: 3
Port Profile:

Server /chassis/adapter #
```

## Modifying vHBA Properties

### Before You Begin

You must log in with admin privileges to perform this task.

## Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>show adapter</b>	(Optional) Displays the available adapter devices.
<b>Step 3</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 4</b>	Server /chassis/adapter # <b>scope host-fc-if</b> { <b>fc0</b>   <b>fc1</b>   <i>name</i> }	Enters the host Fibre Channel interface command mode for the specified vHBA.
<b>Step 5</b>	Server /chassis/adapter/host-fc-if # <b>set wwnn</b> <i>wwnn</i>	Specifies a unique World Wide Node Name (WWNN) for the adapter in the form hh:hh:hh:hh:hh:hh:hh:hh. Unless specified by this command, the WWNN is generated automatically by the system.
<b>Step 6</b>	Server /chassis/adapter/host-fc-if # <b>set wwpn</b> <i>wwpn</i>	Specifies a unique World Wide Port Name (WWPN) for the adapter in the form hh:hh:hh:hh:hh:hh:hh:hh. Unless specified by this command, the WWPN is generated automatically by the system.
<b>Step 7</b>	Server /chassis/adapter/host-fc-if # <b>set boot</b> { <b>disable</b>   <b>enable</b> }	Enables or disables FC SAN boot. The default is disable.
<b>Step 8</b>	Server /chassis/adapter/host-fc-if # <b>set persistent-lun-binding</b> { <b>disable</b>   <b>enable</b> }	Enables or disables persistent LUN binding. The default is disable.
<b>Step 9</b>	Server /chassis/adapter/host-fc-if # <b>set mac-addr</b> <i>mac-addr</i>	Specifies a MAC address for the vHBA.
<b>Step 10</b>	Server /chassis/adapter/host-fc-if # <b>set vlan</b> { <b>none</b>   <i>vlan-id</i> }	Specifies the default VLAN for this vHBA. Valid VLAN numbers are 1 to 4094; the default is none.
<b>Step 11</b>	Server /chassis/adapter/host-fc-if # <b>set cos</b> <i>cos-value</i>	Specifies the class of service (CoS) value to be marked on received packets unless the vHBA is configured to trust host CoS. Valid CoS values are 0 to 6; the default is 0. Higher values indicate more important traffic.  This setting is not functional in NIV mode.
<b>Step 12</b>	Server /chassis/adapter/host-fc-if # <b>set rate-limit</b> { <b>off</b>   <i>rate</i> }	Specifies a maximum data rate for the vHBA. The range is 1 to 10000 Mbps; the default is off.  This setting is not functional in NIV mode.
<b>Step 13</b>	Server /chassis/adapter/host-fc-if # <b>set order</b> { <b>any</b>   <i>0-99</i> }	Specifies the relative order of this device for PCIe bus device number assignment; the default is any.



	Command or Action	Purpose
<b>Step 14</b>	Server /chassis/adapter/host-fc-if # <b>set error-detect-timeout</b> <i>msec</i>	Specifies the error detect timeout value (EDTOV), the number of milliseconds to wait before the system assumes that an error has occurred. The range is 1000 to 100000; the default is 2000 milliseconds.
<b>Step 15</b>	Server /chassis/adapter/host-fc-if # <b>set resource-allocation-timeout</b> <i>msec</i>	Specifies the resource allocation timeout value (RATOV), the number of milliseconds to wait before the system assumes that a resource cannot be properly allocated. The range is 5000 to 100000; the default is 10000 milliseconds.
<b>Step 16</b>	Server /chassis/adapter/host-fc-if # <b>set max-field-size</b> <i>size</i>	Specifies the maximum size of the Fibre Channel frame payload (in bytes) that the vHBA supports. The range is 1 to 2112; the default is 2112 bytes.
<b>Step 17</b>	Server /chassis/adapter/host-fc-if # <b>scope error-recovery</b>	Enters the Fibre Channel error recovery command mode.
<b>Step 18</b>	Server /chassis/adapter/host-fc-if/error-recovery # <b>set fcp-error-recovery</b> { <b>disable</b>   <b>enable</b> }	Enables or disables FCP Error Recovery. The default is disable.
<b>Step 19</b>	Server /chassis/adapter/host-fc-if/error-recovery # <b>set link-down-timeout</b> <i>msec</i>	Specifies the link down timeout value, the number of milliseconds the uplink port should be offline before it informs the system that the uplink port is down and fabric connectivity has been lost. The range is 0 to 240000; the default is 30000 milliseconds.
<b>Step 20</b>	Server /chassis/adapter/host-fc-if/error-recovery # <b>set port-down-io-retry-count</b> <i>count</i>	Specifies the port down I/O retries value, the number of times an I/O request to a port is returned because the port is busy before the system decides the port is unavailable. The range is 0 to 255; the default is 8 retries.
<b>Step 21</b>	Server /chassis/adapter/host-fc-if/error-recovery # <b>set port-down-timeout</b> <i>msec</i>	Specifies the port down timeout value, the number of milliseconds a remote Fibre Channel port should be offline before informing the SCSI upper layer that the port is unavailable. The range is 0 to 240000; the default is 10000 milliseconds.
<b>Step 22</b>	Server /chassis/adapter/host-fc-if/error-recovery # <b>exit</b>	Exits to the host Fibre Channel interface command mode.
<b>Step 23</b>	Server /chassis/adapter/host-fc-if # <b>scope interrupt</b>	Enters the interrupt command mode.
<b>Step 24</b>	Server /chassis/adapter/host-fc-if/interrupt # <b>set interrupt-mode</b> { <b>intx</b>   <b>msi</b>   <b>msix</b> }	Specifies the Fibre Channel interrupt mode. The modes are as follows: <ul style="list-style-type: none"> <li>• <b>intx</b> —Line-based interrupt (INTx)</li> </ul>

	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>• <b>msi</b> —Message-Signaled Interrupt (MSI)</li> <li>• <b>msix</b> —Message Signaled Interrupts with the optional extension (MSIx). This is the recommended and default option.</li> </ul>
<b>Step 25</b>	Server /chassis/adapter/host-fc-if/interrupt # <b>exit</b>	Exits to the host Fibre Channel interface command mode.
<b>Step 26</b>	Server /chassis/adapter/host-fc-if # <b>scope port</b>	Enters the Fibre Channel port command mode.
<b>Step 27</b>	Server /chassis/adapter/host-fc-if/port # <b>set outstanding-io-count count</b>	Specifies the I/O throttle count, the number of I/O operations that can be pending in the vHBA at one time. The range is 1 to 1024; the default is 512 operations.
<b>Step 28</b>	Server /chassis/adapter/host-fc-if/port # <b>set max-target-luns count</b>	Specifies the maximum logical unit numbers (LUNs) per target, the maximum number of LUNs that the driver will discover. This is usually an operating system platform limitation. The range is 1 to 1024; the default is 256 LUNs.
<b>Step 29</b>	Server /chassis/adapter/host-fc-if/port # <b>exit</b>	Exits to the host Fibre Channel interface command mode.
<b>Step 30</b>	Server /chassis/adapter/host-fc-if # <b>scope port-f-logic</b>	Enters the Fibre Channel fabric login command mode.
<b>Step 31</b>	Server /chassis/adapter/host-fc-if/port-f-logic # <b>set flogi-retries {infinite   count}</b>	Specifies the fabric login (FLOGI) retries value, the number of times that the system tries to log in to the fabric after the first failure. Enter a number between 0 and 4294967295 or enter <b>infinite</b> ; the default is infinite retries.
<b>Step 32</b>	Server /chassis/adapter/host-fc-if/port-f-logic # <b>set flogi-timeout msec</b>	Specifies the fabric login (FLOGI) timeout value, the number of milliseconds that the system waits before it tries to log in again. The range is 1 to 255000; the default is 2000 milliseconds.
<b>Step 33</b>	Server /chassis/adapter/host-fc-if/port-f-logic # <b>exit</b>	Exits to the host Fibre Channel interface command mode.
<b>Step 34</b>	Server /chassis/adapter/host-fc-if # <b>scope port-p-logic</b>	Enters the Fibre Channel port login command mode.
<b>Step 35</b>	Server /chassis/adapter/host-fc-if/port-p-logic # <b>set plogi-retries count</b>	Specifies the port login (PLOGI) retries value, the number of times that the system tries to log in to the fabric after the first failure. The range is 0 and 255; the default is 8 retries.

	Command or Action	Purpose
<b>Step 36</b>	Server /chassis/adapter/host-fc-if/port-p-logic # <b>set plogi-timeout msec</b>	Specifies the port login (PLOGI) timeout value, the number of milliseconds that the system waits before it tries to log in again. The range is 1 to 255000; the default is 2000 milliseconds.
<b>Step 37</b>	Server /chassis/adapter/host-fc-if/port-p-logic # <b>exit</b>	Exits to the host Fibre Channel interface command mode.
<b>Step 38</b>	Server /chassis/adapter/host-fc-if# <b>scope scsi-io</b>	Enters the SCSI I/O command mode.
<b>Step 39</b>	Server /chassis/adapter/host-fc-if/scsi-io # <b>set cdb-wq-count count</b>	The number of command descriptor block (CDB) transmit queue resources to allocate. The range is 1 to 8; the default is 1.
<b>Step 40</b>	Server /chassis/adapter/host-fc-if/scsi-io # <b>set cdb-wq-ring-size size</b>	The number of descriptors in the command descriptor block (CDB) transmit queue. The range is 64 to 512; the default is 512.
<b>Step 41</b>	Server /chassis/adapter/host-fc-if/scsi-io # <b>exit</b>	Exits to the host Fibre Channel interface command mode.
<b>Step 42</b>	Server /chassis/adapter/host-fc-if# <b>scope trans-queue</b>	Enters the Fibre Channel transmit queue command mode.
<b>Step 43</b>	Server /chassis/adapter/host-fc-if/trans-queue # <b>set fc-wq-ring-size size</b>	The number of descriptors in the Fibre Channel transmit queue. The range is 64 to 128; the default is 64.
<b>Step 44</b>	Server /chassis/adapter/host-fc-if/trans-queue # <b>exit</b>	Exits to the host Fibre Channel interface command mode.
<b>Step 45</b>	Server /chassis/adapter/host-fc-if# <b>scope recv-queue</b>	Enters the Fibre Channel receive queue command mode.
<b>Step 46</b>	Server /chassis/adapter/host-fc-if/recv-queue # <b>set fc-rq-ring-size size</b>	The number of descriptors in the Fibre Channel receive queue. The range is 64 to 128; the default is 64.
<b>Step 47</b>	Server /chassis/adapter/host-fc-if/recv-queue # <b>exit</b>	Exits to the host Fibre Channel interface command mode.
<b>Step 48</b>	Server /chassis/adapter/host-fc-if # <b>commit</b>	Commits the transaction to the system configuration.  <b>Note</b> The changes will take effect upon the next server reboot.

This example configures the properties of a vHBA:

```
Server# scope chassis
Server /chassis # show adapter
-----
PCI Slot Product Name      Serial Number  Product ID      Vendor
-----
1         UCS VIC P81E      QCI1417A0QK   N2XX-ACPCI01   Cisco Systems Inc

Server /chassis # scope adapter 1
Server /chassis/adapter # scope host-fc-if fc1
Server /chassis/adapter/host-fc-if # set boot enable
Server /chassis/adapter/host-fc-if *# scope scsi-io
Server /chassis/adapter/host-fc-if/scsi-io *# set cdb-wq-count 2
Server /chassis/adapter/host-fc-if/scsi-io *# exit
Server /chassis/adapter/host-fc-if *# commit
Server /chassis/adapter/host-fc-if #
```

### What to Do Next

Reboot the server to apply the changes.

## Creating a vHBA

The adapter provides two permanent vHBAs. If NIV mode is enabled, you can create up to 16 additional vHBAs.

### Before You Begin

You must log in with user or admin privileges to perform this task.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>create</b> <b>host-fc-if</b> <i>name</i>	Creates a vHBA and enters the host Fibre Channel interface command mode. The <i>name</i> argument can be up to 32 ASCII characters.
<b>Step 4</b>	Server /chassis/adapter/host-fc-if # <b>set channel-number</b> <i>number</i>	(Optional) If NIV mode is enabled for the adapter, you must assign a channel number to this vHBA. The range is 1 to 1000.
<b>Step 5</b>	Server /chassis/adapter/host-fc-if # <b>commit</b>	Commits the transaction to the system configuration.  <b>Note</b> The changes will take effect upon the next server reboot.

This example creates a vHBA on adapter 1:

```
Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # create host-fc-if Vhba5
Server /chassis/adapter/host-fc-if *# commit
New host-fc-if settings will take effect upon the next server reset
Server /chassis/adapter/host-fc-if #
```

### What to Do Next

- Reboot the server to create the vHBA.
- If configuration changes are required, configure the new vHBA as described in [Modifying vHBA Properties](#), on page 7.

## Deleting a vHBA

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>delete</b> <b>host-fc-if</b> <i>name</i>	Deletes the specified vHBA.  <b>Note</b> You cannot delete either of the two default vHBAs, fc0 or fc1.
<b>Step 4</b>	Server /chassis/adapter # <b>commit</b>	Commits the transaction to the system configuration.  <b>Note</b> The changes will take effect upon the next server reboot.

This example deletes a vHBA on adapter 1:

```
Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # delete host-fc-if Vhba5
Server /chassis/adapter *# commit
Server /chassis/adapter #
```

## vHBA Boot Table

In the vHBA boot table, you can specify up to four LUNs from which the server can boot.

## Viewing the Boot Table

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>scope host-fc-if</b> { <b>fc0</b>   <b>fc1</b>   <i>name</i> }	Enters the host Fibre Channel interface command mode for the specified vHBA.
<b>Step 4</b>	Server /chassis/adapter/host-fc-if # <b>show boot</b>	Displays the boot table of the Fibre Channel interface.

This example displays the boot table for a vHBA:

```
Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # scope host-fc-if fc1
Server /chassis/adapter/host-fc-if # show boot
Boot Table Entry  Boot Target WWPN                Boot LUN ID
-----
0                  20:00:00:11:22:33:44:55          3
1                  20:00:00:11:22:33:44:56          5
Server /chassis/adapter/host-fc-if #
```

## Creating a Boot Table Entry

You can create up to four boot table entries.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>scope host-fc-if</b> { <b>fc0</b>   <b>fc1</b>   <i>name</i> }	Enters the host Fibre Channel interface command mode for the specified vHBA.

	Command or Action	Purpose
<b>Step 4</b>	Server /chassis/adapter/host-fc-if # <b>create-boot-entry</b> <i>wwpn lun-id</i>	Creates a boot table entry. <ul style="list-style-type: none"> <li>• <i>wwpn</i> — The World Wide Port Name (WWPN) for the boot target in the form hh:hh:hh:hh:hh:hh:hh:hh.</li> <li>• <i>lun-id</i> —The LUN ID of the boot LUN. The range is 0 to 255.</li> </ul>
<b>Step 5</b>	Server /chassis/adapter/host-fc-if # <b>commit</b>	Commits the transaction to the system configuration. <p><b>Note</b> The changes will take effect upon the next server reboot.</p>

This example creates a boot table entry for vHBA fc1:

```
Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # scope host-fc-if fc1
Server /chassis/adapter/host-fc-if # create-boot-entry 20:00:00:11:22:33:44:55 3
Server /chassis/adapter/host-fc-if *# commit
New boot table entry will take effect upon the next server reset
Server /chassis/adapter/host-fc-if #
```

## Deleting a Boot Table Entry

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> . <p><b>Note</b> The server must be powered on before you can view or change adapter settings.</p>
<b>Step 3</b>	Server /chassis/adapter # <b>scope</b> <b>host-fc-if</b> { <i>fc0</i>   <i>fc1</i>   <i>name</i> }	Enters the host Fibre Channel interface command mode for the specified vHBA.
<b>Step 4</b>	Server /chassis/adapter/host-fc-if # <b>show boot</b>	Displays the boot table. From the Boot Table Entry field, locate the number of the entry to be deleted.
<b>Step 5</b>	Server /chassis/adapter/host-fc-if # <b>delete boot</b> <i>entry</i>	Deletes the boot table entry at the specified position in the table. The range of <i>entry</i> is 0 to 3. The change will take effect upon the next server reset.
<b>Step 6</b>	Server /chassis/adapter/host-fc-if # <b>commit</b>	Commits the transaction to the system configuration. <p><b>Note</b> The changes will take effect upon the next server reboot.</p>

This example deletes boot table entry number 1 for the vHBA fc1:

```
Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # scope host-fc-if fc1
Server /chassis/adapter/host-fc-if # show boot
-----
Boot Table Entry  Boot Target WWPN          Boot LUN ID
-----
0                 20:00:00:11:22:33:44:55      3
1                 20:00:00:11:22:33:44:56      5

Server /chassis/adapter/host-fc-if # delete boot 1
Server /chassis/adapter/host-fc-if *# commit
New host-fc-if settings will take effect upon the next server reset
Server /chassis/adapter/host-fc-if # show boot
-----
Boot Table Entry  Boot Target WWPN          Boot LUN ID
-----
0                 20:00:00:11:22:33:44:55      3

Server /chassis/adapter/host-fc-if #
```

### What to Do Next

Reboot the server to apply the changes.

## vHBA Persistent Binding

Persistent binding ensures that the system-assigned mapping of Fibre Channel targets is maintained after a reboot.

## Enabling Persistent Binding

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> . <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>scope host-fc-if</b> { <b>fc0</b>   <b>fc1</b>   <i>name</i> }	Enters the host Fibre Channel interface command mode for the specified vHBA.
<b>Step 4</b>	Server /chassis/adapter/host-fc-if # <b>scope perbi</b>	Enters the persistent binding command mode for the vHBA.
<b>Step 5</b>	Server /chassis/adapter/host-fc-if/perbi # <b>set persistent-lun-binding enable</b>	Enables persistent binding for the vHBA.



	Command or Action	Purpose
<b>Step 6</b>	Server /chassis/adapter/host-fc-if/perbi # <b>commit</b>	Commits the transaction to the system configuration.

This example enables persistent binding for a vHBA:

```
Server# scope chassis
Server /chassis # scope adapter 4
Server /chassis/adapter # scope host-fc-if fc1
Server /chassis/adapter/host-fc-if # scope perbi
Server /chassis/adapter/host-fc-if/perbi # set persistent-lun-binding enable
Server /chassis/adapter/host-fc-if/perbi *# commit
Server /chassis/adapter/host-fc-if/perbi #
```

## Disabling Persistent Binding

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>scope host-fc-if</b> { <i>fc0</i>   <i>fc1</i>   <i>name</i> }	Enters the host Fibre Channel interface command mode for the specified vHBA.
<b>Step 4</b>	Server /chassis/adapter/host-fc-if # <b>scope perbi</b>	Enters the persistent binding command mode for the vHBA.
<b>Step 5</b>	Server /chassis/adapter/host-fc-if/perbi # <b>set persistent-lun-binding disable</b>	Disables persistent binding for the vHBA.
<b>Step 6</b>	Server /chassis/adapter/host-fc-if/perbi # <b>commit</b>	Commits the transaction to the system configuration.

This example disables persistent binding for a vHBA:

```
Server# scope chassis
Server /chassis # scope adapter 4
Server /chassis/adapter # scope host-fc-if fc1
Server /chassis/adapter/host-fc-if # scope perbi
Server /chassis/adapter/host-fc-if/perbi # set persistent-lun-binding disable
Server /chassis/adapter/host-fc-if/perbi *# commit
Server /chassis/adapter/host-fc-if/perbi #
```

## Rebuilding Persistent Binding

### Before You Begin

Persistent binding must be enabled in the vHBA properties.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>scope host-fc-if</b> { <b>fc0</b>   <b>fc1</b>   <i>name</i> }	Enters the host Fibre Channel interface command mode for the specified vHBA.
<b>Step 4</b>	Server /chassis/adapter/host-fc-if # <b>scope perbi</b>	Enters the persistent binding command mode for the vHBA.
<b>Step 5</b>	Server /chassis/adapter/host-fc-if/perbi # <b>rebuild</b>	Rebuilds the persistent binding table for the vHBA.

This example rebuilds the persistent binding table for a vHBA:

```
Server# scope chassis
Server /chassis # scope adapter 4
Server /chassis/adapter # scope host-fc-if fc1
Server /chassis/adapter/host-fc-if # scope perbi
Server /chassis/adapter/host-fc-if/perbi # rebuild

Server /chassis/adapter/host-fc-if/perbi #
```

## Managing vNICs

### Guidelines for Managing vNICs

When managing vNICs, consider the following guidelines and restrictions:

- The Cisco UCS P81E Virtual Interface Card and Cisco UCS VIC 1225 Virtual Interface Card provide two default vNICs (eth0 and eth1). You can create up to 16 additional vNICs on these adapter cards.



**Note** If Network Interface Virtualization (NIV) mode is enabled for the adapter, you must assign a channel number to a vNIC when you create it.

- After making configuration changes, you must reboot the host for settings to take effect.

Cisco C-series servers use Remote Direct Memory Access (RDMA) over Converged Ethernet (RoCE) for packet transfers. RoCE defines the mechanism of performing RDMA over ethernet, based on the similar mechanism of RDMA over Infiniband. However, RoCE, with its performance oriented characteristics, delivers a superior performance compared to traditional network socket implementation because of the lower latency, lower CPU utilization and higher utilization of network bandwidth. RoCE meets the requirement of moving large amount of data across networks very efficiently.

The RoCE firmware requires the following configuration parameters provided by Cisco UCS Manager for better vNIC performance:

- Queue Pairs
- Memory Regions
- Resource Groups

## Viewing vNIC Properties

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>show host-eth-if</b> [ <b>eth0</b>   <b>eth1</b>   <i>name</i> ] [ <b>detail</b> ]	Displays properties of a single vNIC, if specified, or all vNICs.
<b>Step 4</b>	Server /chassis/adapter # <b>show ext-eth-if</b> [ <b>detail</b> ]	Displays the external ethernet interfaces' details.

Following examples display the brief properties of all vNICs and the detailed properties of eth0 and the external interfaces:

```
Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # show host-eth-if
Name      MTU  Uplink Port  MAC Address      CoS  VLAN  PXE  Boot  iSCSI  Boot  usNIC
-----
eth0      1500 0           74:A2:E6:28:C6:AE N/A  N/A   disabled disabled 0
eth1      1500 1           74:A2:E6:28:C6:AF N/A  N/A   disabled disabled 0
srg       1500 0           74:A2:E6:28:C6:B2 N/A  N/A   disabled disabled 64
hhh       1500 0           74:A2:E6:28:C6:B3 N/A  N/A   disabled disabled 0
```

```
Server /chassis/adapter # show host-eth-if eth0 detail
Name eth0:
  MTU: 1500
  Uplink Port: 0
  MAC Address: 00:22:BD:D6:5C:33
  CoS: 0
```

```

Trust Host CoS: disabled
PCI Link: 0
PCI Order: ANY
VLAN: NONE
VLAN Mode: TRUNK
Rate Limiting: OFF
PXE Boot: disabled
iSCSI Boot: disabled
usNIC: 0
Channel Number: N/A
Port Profile: N/A
Uplink Failover: disabled
Uplink Failback Timeout: 5
aRFS: disabled
VMQ: disabled
NVGRE: disabled
VXLAN: disabled
RDMA Queue Pairs: 1
RDMA Memory Regions: 4096
RDMA Resource Groups: 1
CDN Name: VIC-1-eth0

```

```

Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # show ext-eth-if

```

Port	MAC Address	Link State	Encap..	Mode	Admin Speed	Oper..Speed	Link Training
0	74:A2:E6:28:C6:A2	Link	CE		40Gbps	40Gbps	N/A
Yes	Yes						
1	74:A2:E6:28:C6:A3	Link	CE		40Gbps	40Gbps	N/A
Yes	Yes						

```

Server /chassis/adapter # show ext-eth-if detail

```

```

C220-FCH1834V23X /chassis/adapter # show ext-eth-if detail
Port 0:

```

```

MAC Address: 74:A2:E6:28:C6:A2
Link State: Link
Encapsulation Mode: CE
Admin Speed: 40Gbps
Operating Speed: 40Gbps
Link Training: N/A
Connector Present: Yes
Connector Supported: Yes
Connector Type: QSFP_XCVR_CR4
Connector Vendor: CISCO
Connector Part Number: 2231254-3
Connector Part Revision: B

```

```

Port 1:

```

```

MAC Address: 74:A2:E6:28:C6:A3
Link State: Link
Encapsulation Mode: CE
Admin Speed: 40Gbps
Operating Speed: 40Gbps
Link Training: N/A
Connector Present: Yes
Connector Supported: Yes
Connector Type: QSFP_XCVR_CR4
Connector Vendor: CISCO
Connector Part Number: 2231254-3
Connector Part Revision: B

```

```

Server /chassis/adapter #

```

## Modifying vNIC Properties

### Before You Begin

You must log in with admin privileges to perform this task.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>show adapter</b>	(Optional) Displays the available adapter devices.
<b>Step 3</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> . <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 4</b>	Server /chassis/adapter # <b>scope host-eth-if</b> { <b>eth0</b>   <b>eth1</b>   <i>name</i> }	Enters the host Ethernet interface command mode for the specified vNIC.
<b>Step 5</b>	Server /chassis/adapter/host-eth-if # <b>set mtu</b> <i>mtu-value</i>	Specifies the maximum transmission unit (MTU) or packet size that the vNIC accepts. Valid MTU values are 1500 to 9000 bytes; the default is 1500.
<b>Step 6</b>	Server /chassis/adapter/host-eth-if # <b>set uplink</b> { <b>0</b>   <b>1</b> }	Specifies the uplink port associated with this vNIC. All traffic for this vNIC goes through this uplink port.
<b>Step 7</b>	Server /chassis/adapter/host-eth-if # <b>set mac-addr</b> <i>mac-addr</i>	Specifies a MAC address for the vNIC in the form hh:hh:hh:hh:hh:hh or hhhh:hhhh:hhhh.
<b>Step 8</b>	Server /chassis/adapter/host-eth-if # <b>set cos</b> <i>cos-value</i>	Specifies the class of service (CoS) value to be marked on received packets unless the vNIC is configured to trust host CoS. Valid CoS values are 0 to 6; the default is 0. Higher values indicate more important traffic. <b>Note</b> If NIV is enabled, this setting is determined by the switch, and the command is ignored.
<b>Step 9</b>	Server /chassis/adapter/host-eth-if # <b>set trust-host-cos</b> { <b>disable</b>   <b>enable</b> }	Specifies whether the vNIC will trust host CoS or will remark packets. The behavior is as follows: <ul style="list-style-type: none"> <li>• <b>disable</b> —Received packets are remarked with the configured CoS. This is the default.</li> <li>• <b>enable</b> —The existing CoS value of received packets (host CoS) is preserved.</li> </ul>
<b>Step 10</b>	Server /chassis/adapter/host-eth-if # <b>set order</b> { <b>any</b>   <i>0-99</i> }	Specifies the relative order of this device for PCI bus device number assignment; the default is any.
<b>Step 11</b>	Server /chassis/adapter/host-eth-if # <b>set vlan</b> { <b>none</b>   <i>vlan-id</i> }	Specifies the default VLAN for this vNIC. Valid VLAN numbers are 1 to 4094; the default is none.

	Command or Action	Purpose
		<b>Note</b> If NIV is enabled, this setting is determined by the switch, and the command is ignored.
<b>Step 12</b>	Server /chassis/adapter/host-eth-if # <b>set vlan-mode</b> {access   trunk}	<p>Specifies the VLAN mode for the vNIC. The modes are as follows:</p> <ul style="list-style-type: none"> <li>• <b>access</b> —The vNIC belongs to only one VLAN. When the VLAN is set to access mode, any frame received from the specified default VLAN (1-4094) that is received from the switch with a TAG removes that TAG when it is sent to the host OS through the vNIC.</li> <li>• <b>trunk</b> —The vNIC can belong to more than one VLAN. This is the default.</li> </ul> <p><b>Note</b> If NIV is enabled, this setting is determined by the switch, and the command is ignored.</p>
<b>Step 13</b>	Server /chassis/adapter/host-eth-if # <b>set rate-limit</b> {off   rate}	<p>Specifies a maximum data rate for the vNIC. The range is 1 to 10000 Mbps; the default is off.</p> <p><b>Note</b> If NIV is enabled, this setting is determined by the switch, and the command is ignored.</p>
<b>Step 14</b>	Server /chassis/adapter/host-eth-if # <b>set boot</b> {disable   enable}	Specifies whether the vNIC can be used to perform a PXE boot. The default is enable for the two default vNICs, and disable for user-created vNICs.
<b>Step 15</b>	Server /chassis/adapter/host-eth-if # <b>set channel-number</b> <i>number</i>	If NIV mode is enabled for the adapter, select the channel number that will be assigned to this vNIC. The range is 1 to 1000.
<b>Step 16</b>	Server /chassis/adapter/host-eth-if # <b>set port-profile</b> <i>name</i>	<p>If NIV mode is enabled for the adapter, select the port profile that should be associated with the vNIC.</p> <p><b>Note</b> The <i>name</i> must be a port profile defined on the switch to which this server is connected.</p>
<b>Step 17</b>	Server /chassis/adapter/host-eth-if # <b>set uplink-failover</b> {disable   enable}	If NIV mode is enabled for the adapter, enable this setting if traffic on this vNIC should fail over to the secondary interface if there are communication problems.
<b>Step 18</b>	Server /chassis/adapter/host-eth-if # <b>set uplink-failback-timeout</b> <i>seconds</i>	<p>After a vNIC has started using its secondary interface, this setting controls how long the primary interface must be available before the system resumes using the primary interface for the vNIC.</p> <p>Enter a number of <i>seconds</i> between 0 and 600.</p>
<b>Step 19</b>	Server /chassis/adapter/host-eth-if # <b>set vmq</b> {disable   enable}	<p>Enables or disables Virtual Machine Queue (VMQ) for this adapter.</p> <p><b>Note</b> Ensure that VMQ is not enabled when SR-IOV or netflow is enabled on the adapter.</p>

	Command or Action	Purpose
<b>Step 20</b>	Server /chassis/adapter/host-eth-if # <b>set arfs</b> { <b>disable</b>   <b>enable</b> }	Enables or disables Accelerated Receive Flow steering (aRFS) for this adapter.
<b>Step 21</b>	Server /chassis/adapter/host-eth-if # <b>scope interrupt</b>	Enters the interrupt command mode.
<b>Step 22</b>	Server /chassis/adapter/host-eth-if/interrupt # <b>set interrupt-count</b> <i>count</i>	Specifies the number of interrupt resources. The range is 1 to 514; the default is 8. In general, you should allocate one interrupt resource for each completion queue.
<b>Step 23</b>	Server /chassis/adapter/host-eth-if/interrupt # <b>set coalescing-time</b> <i>usec</i>	The time to wait between interrupts or the idle period that must be encountered before an interrupt is sent. The range is 1 to 65535 microseconds; the default is 125. To turn off coalescing, enter 0 (zero).
<b>Step 24</b>	Server /chassis/adapter/host-eth-if/interrupt # <b>set coalescing-type</b> { <b>idle</b>   <b>min</b> }	The coalescing types are as follows: <ul style="list-style-type: none"> <li>• <b>idle</b> —The system does not send an interrupt until there is a period of no activity lasting as long as the time specified in the coalescing time configuration.</li> <li>• <b>min</b> —The system waits for the time specified in the coalescing time configuration before sending another interrupt event. This is the default.</li> </ul>
<b>Step 25</b>	Server /chassis/adapter/host-eth-if/interrupt # <b>set interrupt-mode</b> { <b>intx</b>   <b>msi</b>   <b>msix</b> }	Specifies the Ethernet interrupt mode. The modes are as follows: <ul style="list-style-type: none"> <li>• <b>intx</b> —Line-based interrupt (PCI INTx)</li> <li>• <b>msi</b> —Message-Signaled Interrupt (MSI)</li> <li>• <b>msix</b> —Message Signaled Interrupts with the optional extension (MSI-X). This is the recommended and default option.</li> </ul>
<b>Step 26</b>	Server /chassis/adapter/host-eth-if/interrupt # <b>exit</b>	Exits to the host Ethernet interface command mode.
<b>Step 27</b>	Server /chassis/adapter/host-eth-if # <b>scope rcv-queue</b>	Enters receive queue command mode.
<b>Step 28</b>	Server /chassis/adapter/host-eth-if/rcv-queue # <b>set rq-count</b> <i>count</i>	The number of receive queue resources to allocate. The range is 1 to 256; the default is 4.
<b>Step 29</b>	Server /chassis/adapter/host-eth-if/rcv-queue # <b>set rq-ring-size</b> <i>size</i>	The number of descriptors in the receive queue. The range is 64 to 4094; the default is 512.

	Command or Action	Purpose
<b>Step 30</b>	Server /chassis/adapter/host-eth-if/recv-queue # <b>exit</b>	Exits to the host Ethernet interface command mode.
<b>Step 31</b>	Server /chassis/adapter/host-eth-if # <b>scope trans-queue</b>	Enters transmit queue command mode.
<b>Step 32</b>	Server /chassis/adapter/host-eth-if/trans-queue # <b>set wq-count</b> <i>count</i>	The number of transmit queue resources to allocate. The range is 1 to 256; the default is 1.
<b>Step 33</b>	Server /chassis/adapter/host-eth-if/trans-queue # <b>set wq-ring-size</b> <i>size</i>	The number of descriptors in the transmit queue. The range is 64 to 4094; the default is 256.
<b>Step 34</b>	Server /chassis/adapter/host-eth-if/trans-queue # <b>exit</b>	Exits to the host Ethernet interface command mode.
<b>Step 35</b>	Server /chassis/adapter/host-eth-if # <b>scope comp-queue</b>	Enters completion queue command mode.
<b>Step 36</b>	Server /chassis/adapter/host-eth-if/comp-queue # <b>set cq-count</b> <i>count</i>	The number of completion queue resources to allocate. The range is 1 to 512; the default is 5.  In general, the number of completion queues equals the number of transmit queues plus the number of receive queues.
<b>Step 37</b>	Server /chassis/adapter/host-eth-if/comp-queue # <b>exit</b>	Exits to the host Ethernet interface command mode.
<b>Step 38</b>	Server /chassis/adapter/host-eth-if/ # <b>set rdma_mrnumber</b>	Sets the number of memory regions to be used per adapter. The values range from 4096 to 524288.
<b>Step 39</b>	Server /chassis/adapter/host-eth-if/ # <b>set rdma_qpnumber</b>	Sets the number of queue pairs to be used per adapter. The values range from 1-8192 queue pairs.
<b>Step 40</b>	Server /chassis/adapter/host-eth-if/ # <b>set rdma_resgrpnumber</b>	Sets the number of resource groups to be used. The values range from 1-128 resource groups.  <b>Note</b> After committing the RoCE details, you are required to reboot the server for the changes to take place.
<b>Step 41</b>	Server /chassis/adapter/host-eth-if # <b>scope offload</b>	Enters TCP offload command mode.
<b>Step 42</b>	Server /chassis/adapter/host-eth-if/offload # <b>set tcp-segment-offload</b> { <b>disable</b>   <b>enable</b> }	Enables or disables TCP Segmentation Offload as follows: <ul style="list-style-type: none"> <li>• <b>disable</b> —The CPU segments large TCP packets.</li> <li>• <b>enable</b> —The CPU sends large TCP packets to the hardware to be segmented. This option may</li> </ul>



	Command or Action	Purpose
		<p>reduce CPU overhead and increase throughput rate. This is the default.</p> <p><b>Note</b> This option is also known as Large Send Offload (LSO).</p>
<b>Step 43</b>	<pre>Server /chassis/adapter/host-eth-if/offload # set tcp-rx-checksum-offload {disable   enable}</pre>	<p>Enables or disables TCP Receive Offload Checksum Validation as follows:</p> <ul style="list-style-type: none"> <li>• <b>disable</b> —The CPU validates all packet checksums.</li> <li>• <b>enable</b> —The CPU sends all packet checksums to the hardware for validation. This option may reduce CPU overhead. This is the default.</li> </ul>
<b>Step 44</b>	<pre>Server /chassis/adapter/host-eth-if/offload # set tcp-tx-checksum-offload {disable   enable}</pre>	<p>Enables or disables TCP Transmit Offload Checksum Validation as follows:</p> <ul style="list-style-type: none"> <li>• <b>disable</b> —The CPU validates all packet checksums.</li> <li>• <b>enable</b> —The CPU sends all packet checksums to the hardware for validation. This option may reduce CPU overhead. This is the default.</li> </ul>
<b>Step 45</b>	<pre>Server /chassis/adapter/host-eth-if/offload # set tcp-large-receive-offload {disable   enable}</pre>	<p>Enables or disables TCP Large Packet Receive Offload as follows:</p> <ul style="list-style-type: none"> <li>• <b>disable</b> —The CPU processes all large packets.</li> <li>• <b>enable</b> —The hardware reassembles all segmented packets before sending them to the CPU. This option may reduce CPU utilization and increase inbound throughput. This is the default.</li> </ul>
<b>Step 46</b>	<pre>Server /chassis/adapter/host-eth-if/offload # exit</pre>	Exits to the host Ethernet interface command mode.
<b>Step 47</b>	<pre>Server /chassis/adapter/host-eth-if # scope rss</pre>	Enters Receive-side Scaling (RSS) command mode.
<b>Step 48</b>	<pre>Server /chassis/adapter/host-eth-if/rss # set rss {disable   enable}</pre>	Enables or disables RSS, which allows the efficient distribution of network receive processing across multiple CPUs in multiprocessor systems. The default is enable for the two default vNICs, and disable for user-created vNICs.
<b>Step 49</b>	<pre>Server /chassis/adapter/host-eth-if/rss # set rss-hash-ipv4 {disable   enable}</pre>	Enables or disables IPv4 RSS. The default is enable.

	Command or Action	Purpose
<b>Step 50</b>	Server /chassis/adapter/host-eth-if/rss # <b>set rss-hash-tcp-ipv4 {disable   enable}</b>	Enables or disables TCP/IPv4 RSS. The default is enable.
<b>Step 51</b>	Server /chassis/adapter/host-eth-if/rss # <b>set rss-hash-ipv6 {disable   enable}</b>	Enables or disables IPv6 RSS. The default is enable.
<b>Step 52</b>	Server /chassis/adapter/host-eth-if/rss # <b>set rss-hash-tcp-ipv6 {disable   enable}</b>	Enables or disables TCP/IPv6 RSS. The default is enable.
<b>Step 53</b>	Server /chassis/adapter/host-eth-if/rss # <b>set rss-hash-ipv6-ex {disable   enable}</b>	Enables or disables IPv6 Extension RSS. The default is disable.
<b>Step 54</b>	Server /chassis/adapter/host-eth-if/rss # <b>set rss-hash-tcp-ipv6-ex {disable   enable}</b>	Enables or disables TCP/IPv6 Extension RSS. The default is disable.
<b>Step 55</b>	Server /chassis/adapter/host-eth-if/rss # <b>exit</b>	Exits to the host Ethernet interface command mode.
<b>Step 56</b>	Server /chassis/adapter/host-eth-if # <b>commit</b>	Commits the transaction to the system configuration. <b>Note</b> The changes will take effect upon the next server reboot.

This example configures the properties of a vNIC:

```
Server# scope chassis
Server /chassis # show adapter
-----
PCI Slot Product Name Serial Number Product ID Vendor
-----
1 UCS VIC P81E QCI1417A0QK N2XX-ACPCI01 Cisco Systems Inc

Server /chassis # scope adapter 1
Server /chassis/adapter # scope host-eth-if Test1
Server /chassis/adapter/host-eth-if # set uplink 1
Server /chassis/adapter/host-eth-if # enable vmq
Server /chassis/adapter/host-eth-if # enable arfs
Server /chassis/adapter/host-eth-if *# scope offload
Server /chassis/adapter/host-eth-if/offload *# set tcp-segment-offload enable
Server /chassis/adapter/host-eth-if/offload *# exit
Server /chassis/adapter/host-eth-if *# commit
Server /chassis/adapter/host-eth-if #
```

### What to Do Next

Reboot the server to apply the changes.

## Enabling or Disabling Link Training on External Ethernet Interfaces

Link training for the port profile on the external ethernet interfaces of the specified vNIC can be enabled or disabled.

**Before You Begin**

You must log in with admin privileges to perform this task.

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>show adapter</b>	(Optional) Displays the available adapter devices.
<b>Step 3</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 4</b>	Server /chassis / adapter # <b>scope</b> <b>ext-eth-if</b> 0   1 <i>name</i>	Enters the external ethernet interface command mode for the specified vNIC.
<b>Step 5</b>	Server /chassis / adapter / ext-eth-if # <b>set link-training</b> on   off	Enables or disables the link training for the specified vNIC.
<b>Step 6</b>	Server /chassis / adapter / ext-eth-if * # <b>commit</b>	Commits the transaction to the system configuration.

This example shows how to enable or disable link training on the external ethernet interface.

```

Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # scope ext-eth-if 1
Server /chassis/adapter/ext-eth-if* # set link-training on
Server /chassis/adapter/ext-eth-if# commit
You may lose connectivity to the Cisco IMC and may have to log in again.
Do you wish to continue? [y/N] y
Port 1:
  MAC Address: 74:A2:E6:28:C6:A3
  Link State: Link
  Encapsulation Mode: CE
  Admin Speed: 40Gbps
  Operating Speed: -
  Link Training: N/A
  Connector Present: Yes
  Connector Supported: Yes
  Connector Type: QSFP_XCVR_CR4
  Connector Vendor: CISCO
  Connector Part Number: 2231254-3
  Connector Part Revision: B
    
```

## Creating a vNIC

The adapter provides two permanent vNICs. You can create up to 16 additional vNICs.

**Before You Begin**

You must log in with user or admin privileges to perform this task.

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>create host-eth-if</b> <i>name</i>	Creates a vNIC and enters the host Ethernet interface command mode. The <i>name</i> argument can be up to 32 ASCII characters.
<b>Step 4</b>	Server /chassis/adapter/host-eth-if # <b>set channel-number</b> <i>number</i>	(Optional) If NIV mode is enabled for the adapter, you must assign a channel number to this vNIC. The range is 1 to 1000.
<b>Step 5</b>	Server /chassis/adapter/host-eth-if # <b>commit</b>	Commits the transaction to the system configuration.  <b>Note</b> The changes will take effect upon the next server reboot.

This example creates a vNIC on adapter 1:

```
Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # create host-eth-if Vnic5
Server /chassis/adapter/host-eth-if *# commit
New host-eth-if settings will take effect upon the next server reset
Server /chassis/adapter/host-eth-if #
```

## Deleting a vNIC

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>delete host-eth-if</b> <i>name</i>	Deletes the specified vNIC.  <b>Note</b> You cannot delete either of the two default vNICs, eth0 or eth1.
<b>Step 4</b>	Server /chassis/adapter # <b>commit</b>	Commits the transaction to the system configuration.

	Command or Action	Purpose
		<b>Note</b> The changes will take effect upon the next server reboot.

This example deletes a vNIC on adapter 1:

```
Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # delete host-eth-if Vnic5
Server /chassis/adapter *# commit
Server /chassis/adapter #
```

## Creating Cisco usNIC Using the Cisco IMC CLI



**Note**

Even though several properties are listed for Cisco usNIC in the usNIC properties dialog box, you must configure only the following properties because the other properties are not currently being used.

- cq-count
- rq-count
- tq-count
- usnic-count

### Before You Begin

You must log in to the Cisco IMC CLI with administrator privileges to perform this task.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	server# <b>scope chassis</b>	Enters chassis command mode.
<b>Step 2</b>	server/chassis# <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> Make sure that the server is powered on before you attempt to view or change adapter settings. To view the index of the adapters configured on your server, use the <b>show adapter</b> command.
<b>Step 3</b>	server/chassis/adapter# <b>scope host-eth-if</b> { <b>eth0</b>   <b>eth1</b> }	Enters the command mode for the vNIC. Specify the Ethernet ID based on the number of vNICs that you have configured in your environment. For example, specify <b>eth0</b> if you configured only one vNIC.

	Command or Action	Purpose
<b>Step 4</b>	server/chassis/adapter/host-eth-if# <b>create usnic-config 0</b>	Creates a usNIC config and enters its command mode. Make sure that you always set the index value to 0.  <b>Note</b> To create a Cisco usNIC for the first time for a given vNIC using the Cisco IMC CLI, you must first create a <b>usnic-config</b> . Subsequently, you only need to scope into the <b>usnic-config</b> and modify the properties for Cisco usNIC. For more information about modifying Cisco usNIC properties, see <a href="#">Modifying a Cisco usNIC value using the Cisco IMC CLI</a> , on page 31.
<b>Step 5</b>	server/chassis/adapter/host-eth-if/usnic-config# <b>set cq-count count</b>	Specifies the number of completion queue resources to allocate. We recommend that you set this value to 6.  The number of completion queues equals the number of transmit queues plus the number of receive queues.
<b>Step 6</b>	server/chassis/adapter/host-eth-if/usnic-config# <b>set rq-count count</b>	Specifies the number of receive queue resources to allocate. We recommend that you set this value to 6.
<b>Step 7</b>	server/chassis/adapter/host-eth-if/usnic-config# <b>set tq-count count</b>	Specifies the number of transmit queue resources to allocate. We recommend that you set this value to 6.
<b>Step 8</b>	server/chassis/adapter/host-eth-if/usnic-config# <b>set usnic-count number of usNICs .</b>	Specifies the number of Cisco usNICs to create. Each MPI process that is running on the server requires a dedicated Cisco usNIC. Therefore, you might need to create up to 64 Cisco usNICs to sustain 64 MPI processes running simultaneously. We recommend that you create at least as many Cisco usNICs, per Cisco usNIC-enabled vNIC, as the number of physical cores on your server. For example, if you have 8 physical cores on your server, create 8 Cisco usNICs.
<b>Step 9</b>	server/chassis/adapter/host-eth-if/usnic-config# <b>commit</b>	Commits the transaction to the system configuration.  <b>Note</b> The changes take effect when the server is rebooted.
<b>Step 10</b>	server/chassis/adapter/host-eth-if/usnic-config# <b>exit</b>	Exits to host Ethernet interface command mode.
<b>Step 11</b>	server/chassis/adapter/host-eth-if# <b>exit</b>	Exits to adapter interface command mode.

	Command or Action	Purpose
<b>Step 12</b>	server/chassis/adapter# <b>exit</b>	Exits to chassis interface command mode.
<b>Step 13</b>	server/chassis# <b>exit</b>	Exits to server interface command mode.
<b>Step 14</b>	server# <b>scope bios</b>	Enters Bios command mode.
<b>Step 15</b>	server/bios# <b>scope advanced</b>	Enters the advanced settings of BIOS command mode.
<b>Step 16</b>	server/bios/advanced# <b>set IntelVTD Enabled</b>	Enables the Intel Virtualization Technology.
<b>Step 17</b>	server/bios/advanced# <b>set ATS Enabled</b>	Enables the Intel VT-d Address Translation Services (ATS) support for the processor.
<b>Step 18</b>	server/bios/advanced# <b>set CoherencySupport Enabled</b>	Enables Intel VT-d coherency support for the processor.
<b>Step 19</b>	server /bios/advanced# <b>commit</b>	Commits the transaction to the system configuration.  <b>Note</b> The changes take effect when the server is rebooted.

This example shows how to configure Cisco usNIC properties:

```

Server # scope chassis
server /chassis # show adapter
server /chassis # scope adapter 2
server /chassis/adapter # scope host-eth-if eth0
server /chassis/adapter/host-eth-if # create usnic-config 0
server /chassis/adapter/host-eth-if/usnic-config *# set usnic-count 64
server /chassis/adapter/host-eth-if/usnic-config *# set cq-count 6
server /chassis/adapter/host-eth-if/usnic-config *# set rq-count 6
server /chassis/adapter/host-eth-if/usnic-config *# set tq-count 6
server /chassis/adapter/host-eth-if/usnic-config *# commit
Committed settings will take effect upon the next server reset
server /chassis/adapter/host-eth-if/usnic-config # exit
server /chassis/adapter/host-eth-if # exit
server /chassis/adapter # exit
server /chassis # exit
server # exit
server# scope bios
server /bios # scope advanced
server /bios/advanced # set IntelVTD Enabled
server /bios/advanced *# set ATS Enabled*
server /bios/advanced *# set CoherencySupport Enabled
server /bios/advanced *# commit
Changes to BIOS set-up parameters will require a reboot.
Do you want to reboot the system?[y|N]y
A system reboot has been initiated.

```

## Modifying a Cisco usNIC value using the Cisco IMC CLI

### Before You Begin

You must log in to the Cisco IMC GUI with administrator privileges to perform this task.

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	server# <b>scope chassis</b>	Enters chassis command mode.
<b>Step 2</b>	server/chassis# <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> Make sure that the server is powered on before you attempt to view or change adapter settings. To view the index of the adapters configured on your server, use the <b>show adapter</b> command.
<b>Step 3</b>	server/chassis/adapter# <b>scope host-eth-if</b> { <b>eth0</b>   <b>eth1</b> }	Enters the command mode for the vNIC. Specify the Ethernet ID based on the number of vNICs that you have configured in your environment. For example, specify <b>eth0</b> if you configured only one vNIC.
<b>Step 4</b>	server/chassis/adapter/host-eth-if# <b>scope usnic-config 0</b>	Enters the command mode for the usNIC. Make sure that you always set the index value as 0 to configure a Cisco usNIC.
<b>Step 5</b>	server/chassis/adapter/host-eth-if/usnic-config# <b>set usnic-count</b> <i>number of usNICs</i> .	Specifies the number of Cisco usNICs to create. Each MPI process running on the server requires a dedicated Cisco usNIC. Therefore, you might need to create up to 64 Cisco usNIC to sustain 64 MPI processes running simultaneously. We recommend that you create at least as many Cisco usNIC, per Cisco usNIC-enabled vNIC, as the number of physical cores on your server. For example, if you have 8 physical cores on your server, create 8 usNICs.
<b>Step 6</b>	server /chassis/adapter/host-eth-if/usnic-config# <b>commit</b>	Commits the transaction to the system configuration.  <b>Note</b> The changes take effect when the server is rebooted.
<b>Step 7</b>	server/chassis/adapter/host-eth-if/usnic-config# <b>exit</b>	Exits to host Ethernet interface command mode.
<b>Step 8</b>	server/chassis/adapter/host-eth-if# <b>exit</b>	Exits to adapter interface command mode.
<b>Step 9</b>	server/chassis/adapter# <b>exit</b>	Exits to chassis interface command mode.
<b>Step 10</b>	server/chassis# <b>exit</b>	Exits to server interface command mode.

This example shows how to configure Cisco usNIC properties:

```
server # scope chassis
server /chassis # show adapter
```



```
server /chassis # scope adapter 2
server /chassis/adapter # scope host-eth-if eth0
server /chassis/adapter/host-eth-if # scope usnic-config 0
server /chassis/adapter/host-eth-if/usnic-config # set usnic-count 32
server /chassis/adapter/host-eth-if/usnic-config # commit
Committed settings will take effect upon the next server reset
server /chassis/adapter/host-eth-if/usnic-config # exit
server /chassis/adapter/host-eth-if # exit
server /chassis/adapter # exit
server /chassis # exit
server # exit
```

## Viewing usNIC Properties

### Before You Begin

You must log in with admin privileges to perform this task.

usNIC must be configured on a vNIC.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>scope host-eth-if</b> { <b>eth0</b>   <b>eth1</b>   <i>name</i> }	Enters the host Ethernet interface command mode for the specified vNIC.
<b>Step 4</b>	Server /chassis/adapter/host-eth-if # <b>show usnic-config</b> <i>index</i>	Displays the usNIC properties for a vNIC.

This example displays the usNIC properties for a vNIC:

```
Server # scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # scope host-eth-if eth0
Server /chassis/adapter/host-eth-if # show usnic-config 0
Idx usNIC Count TQ Count RQ Count CQ Count TQ Ring Size RQ Ring Size Interrupt Count
-----
0 113 2 2 4 256 512 4
Server /chassis/adapter/host-eth-if #
```

## Deleting Cisco usNIC from a vNIC

### Before You Begin

You must log in to Cisco IMC CLI with admin privileges to perform this task.

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	<code>server# scope chassis</code>	Enters chassis command mode.
<b>Step 2</b>	<code>server/chassis# scope adapter index</code>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> Make sure that the server is powered on before you attempt to view or change adapter settings. To view the index of the adapters configured on your server, use the <b>show adapter</b> command.
<b>Step 3</b>	<code>server/chassis/adapter# scope host-eth-if {eth0   eth1}</code>	Enters the command mode for the vNIC. Specify the Ethernet ID based on the number of vNICs that you have configured in your environment. For example, specify <b>eth0</b> if you configured only one vNIC.
<b>Step 4</b>	<code>Server/chassis/adapter/host-eth-if# delete usnic-config 0</code>	Deletes the Cisco usNIC configuration for the vNIC.
<b>Step 5</b>	<code>Server/chassis/adapter/host-eth-if# commit</code>	Commits the transaction to the system configuration  <b>Note</b> The changes take effect when the server is rebooted.

This example shows how to delete the Cisco usNIC configuration for a vNIC:

```
server # scope chassis
server/chassis # show adapter
server/chassis # scope adapter 1
server/chassis/adapter # scope host-eth-if eth0
server/chassis/adapter/host-eth-if # delete usnic-config 0
server/chassis/host-eth-if/iscsi-boot *# commit
New host-eth-if settings will take effect upon the next adapter reboot

server/chassis/host-eth-if/usnic-config #
```

## Configuring iSCSI Boot Capability

### Configuring iSCSI Boot Capability for vNICs

When the rack-servers are configured in a standalone mode, and when the VIC adapters are directly attached to the Nexus 5000 family of switches, you can configure these VIC adapters to boot the servers remotely from iSCSI storage targets. You can configure Ethernet vNICs to enable a rack server to load the host OS image from remote iSCSI target devices.

To configure the iSCSI boot capability on a vNIC:

- You must log in with admin privileges to perform this task.
- To configure a vNIC to boot a server remotely from an iSCSI storage target, you must enable the PXE boot option on the vNIC.



**Note** You can configure a maximum of 2 iSCSI vNICs for each host.

## Configuring iSCSI Boot Capability on a vNIC

You can configure a maximum of 2 iSCSI vNICs for each host.

### Before You Begin

- To configure a vNIC to boot a server remotely from an iSCSI storage target, you must enable the PXE boot option on the vNIC.
- You must log in with admin privileges to perform this task.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> . <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>scope host-eth-if</b> { <i>eth0</i>   <i>eth1</i>   <i>name</i> }	Enters the host Ethernet interface command mode for the specified vNIC.
<b>Step 4</b>	Server /chassis/adapter/host-eth-if # <b>create iscsi-boot</b> <i>index</i>	Creates the iSCSI boot index for the vNIC. At this moment, only 0 is allowed as the index.
<b>Step 5</b>	Server /chassis/adapter/host-eth-if/iscsi-boot* # <b>create iscsi-target</b> <i>index</i>	Creates an iSCSI target for the vNIC. The value can either be 0 or 1.
<b>Step 6</b>	Server /chassis/adapter/host-eth-if/iscsi-boot* # <b>set dhcp-net-settings enabled</b>	Enables the DHCP network settings for the iSCSI boot.
<b>Step 7</b>	Server /chassis/adapter/host-eth-if/iscsi-boot* # <b>set initiator-name</b> <i>string</i>	Sets the initiator name. It cannot be more than 223 characters.
<b>Step 8</b>	Server /chassis/adapter/host-eth-if/iscsi-boot* # <b>set dhcp-iscsi-settings enabled</b>	Enables the DHCP iSCSI settings.
<b>Step 9</b>	Server /chassis/adapter/host-eth-if/iscsi-boot* # <b>commit</b>	Commits the transaction to the system configuration. <b>Note</b> The changes will take effect upon the next server reboot.

This example shows how to configure the iSCSI boot capability for a vNIC:

```
Server # scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # scope host-eth-if eth0
Server /chassis/adapter/host-eth-if # create iscsi-boot 0
Server /adapter/host-eth-if/iscsi-boot *# set dhcp-net-settings enabled
Server /adapter/host-eth-if/iscsi-boot *# set initiator-name iqn.2012-01.com.adser:abcde
Server /adapter/host-eth-if/iscsi-boot *# set dhcp-iscsi-settings enabled
Server /adapter/host-eth-if/iscsi-boot *# commit
```

New host-eth-if settings will take effect upon the next server reset  
 Server /adapter/host-eth-if/iscsi-boot #

## Deleting an iSCSI Boot Configuration for a vNIC

### Before You Begin

You must log in with admin privileges to perform this task.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>scope host-eth-if</b> { <b>eth0</b>   <b>eth1</b>   <i>name</i> }	Enters the host Ethernet interface command mode for the specified vNIC.
<b>Step 4</b>	Server /chassis/adapter/host-eth-if # <b>delete iscsi-boot 0</b>	Deletes the iSCSI boot capability for the vNIC.
<b>Step 5</b>	Server /chassis/adapter/host-eth-if* # <b>commit</b>	Commits the transaction to the system configuration.  <b>Note</b> The changes will take effect upon the next server reboot.

This example shows how to delete the iSCSI boot capability for a vNIC:

```
Server # scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # scope host-eth-if eth0
Server /chassis/adapter/host-eth-if # delete iscsi-boot 0
Server /adapter/host-eth-if/iscsi-boot *# commit
New host-eth-if settings will take effect upon the next server reset
Server /adapter/host-eth-if/iscsi-boot #
```

# Managing VM FEX

## Virtual Machine Fabric Extender

Cisco Virtual Machine Fabric Extender (VM FEX) extends the (prestandard) IEEE 802.1Qbh port extender architecture to virtual machines. In this architecture, each VM interface is provided with a virtual Peripheral Component Interconnect Express (PCIe) device and a virtual port on a switch.

For this release, VM FEX supports the following cards and Operating systems:

Cards - Cisco UCS 1225 Virtual Interface Card

Operating Systems:

- VMware ESXi 5.1 Update 2
- VMware ESXi 5.5

VM FEX is not supported on Microsoft Hyper-V and Red Hat KVM for this release.

## Viewing VM FEX Properties

### Before You Begin

- The server must be powered on, or the properties will not display.
- A supported Virtual Interface Card (VIC) must be installed in the chassis and the server must be powered on.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>show vmfex</b> [detail]	Displays the general VM FEX properties. For field descriptions, see <a href="#">General Properties Settings</a> , on page 39.
<b>Step 4</b>	Server /chassis/adapter # <b>scope vmfex</b> <i>name</i>	Enters the command mode for the specified VM FEX interface.

	Command or Action	Purpose
<b>Step 5</b>	Server /chassis/adapter/vmfex # <b>show interrupt [detail]</b>	Displays Ethernet interrupt settings. For field descriptions, see <a href="#">Ethernet Interrupt Settings</a> , on page 40.
<b>Step 6</b>	Server /chassis/adapter/vmfex # <b>show rcv-queue [detail]</b>	Displays Ethernet receive queue settings. For field descriptions, see <a href="#">Ethernet Receive Queue Settings</a> , on page 40.
<b>Step 7</b>	Server /chassis/adapter/vmfex # <b>show trans-queue [detail]</b>	Displays Ethernet transmit queue settings. For field descriptions, see <a href="#">Ethernet Transmit Queue Settings</a> , on page 41.
<b>Step 8</b>	Server /chassis/adapter/vmfex # <b>show comp-queue [detail]</b>	Displays completion queue settings. For field descriptions, see <a href="#">Completion Queue Settings</a> , on page 41.
<b>Step 9</b>	Server /chassis/adapter/vmfex # <b>show offload [detail]</b>	Displays TCP offload settings. For field descriptions, see <a href="#">TCP Offload Settings</a> , on page 41.
<b>Step 10</b>	Server /chassis/adapter/vmfex # <b>show rss [detail]</b>	Displays RSS settings. For field descriptions, see <a href="#">Receive Side Scaling Settings</a> , on page 42.

This example displays the VM FEX properties:

```

Server /chassis/adapter # show vmfex detail
Name pts0:
  MTU: 1500
  Uplink Port: 0
  MAC Address: 00:00:00:00:00:00
  CoS: N/A
  Trust Host CoS:
  PCI Order:
  VLAN: N/A
  VLAN Mode: N/A
  Rate Limiting:
  PXE Boot: disabled
  Channel Number: 0
  Port Profile:
  Uplink Failover: Enabled
  Uplink Failback Timeout: 5

Server /chassis/adapter # scope vmfex pts0

Server /chassis/adapter/vmfex # show interrupt
Interrupt Count Coalescing Time (us) Coalescing Type Interrupt Mode
-----
6                125                    MIN                MSI

Server /chassis/adapter/vmfex # show rcv-queue
Receive Queue Count Receive Queue Ring Size
-----
4                    512

Server /chassis/adapter/vmfex # show trans-queue
Transmit Queue Count Transmit Queue Ring Size
-----
1                    256

```

```

Server /chassis/adapter/vmfex # show comp-queue
Completion Queue Count      Completion Queue Ring Size
-----
5                            1

Server /chassis/adapter/vmfex # show offload
TCP Segment Offload  TCP Rx Checksum  TCP Tx Checksum  Large Receive
-----
enabled              enabled          enabled          enabled

Server /chassis/adapter/vmfex # show rss
TCP Rx Side Scaling
-----
enabled

Server /chassis/adapter/vmfex #
    
```

## VM FEX Settings

The following tables describe the VM FEX settings that you can view.

### General Properties Settings

Name	Description
<b>Name</b>	A user-defined name for the VM FEX.
<b>MTU</b>	The maximum transmission unit, or packet size, that this VM FEX accepts.
<b>Uplink Port</b>	The uplink port associated with this VM FEX. All traffic for this VM FEX goes through this uplink port.
<b>MAC Address</b>	The MAC address associated with the VM FEX.
<b>Class of Service</b>	The class of service to associate with traffic from this VM FEX.
<b>Trust Host CoS</b>	Whether the VM FEX can use the class of service provided by the host operating system.
<b>PCI Order</b>	The order in which this VM FEX will be used.
<b>Default VLAN</b>	The default VLAN for this VM FEX.
<b>VLAN Mode</b>	Whether VLAN trunking or access is configured.
<b>Rate Limit</b>	If rate limiting is configured, the maximum rate.
<b>Enable PXE Boot</b>	Whether the VM FEX can be used to perform a PXE boot.
<b>Channel Number</b>	If NIV mode is enabled for the adapter, the channel number assigned to this VM FEX.

Name	Description
<b>Port Profile</b>	If NIV mode is enabled for the adapter, the port profile associated with the VM FEX.  <b>Note</b> This field displays the port profiles defined on the switch to which this server is connected.
<b>Enable Uplink Failover</b>	If NIV mode is enabled for the adapter, whether traffic on this VM FEX should fail over to the secondary interface if there are communication problems.
<b>Failback Timeout</b>	After a VM FEX has started using its secondary interface, this setting controls how long the primary interface must be available before the system resumes using the primary interface for the VM FEX.

### Ethernet Interrupt Settings

Name	Description
<b>Interrupt Count</b> field	The number of interrupt resources allocated to this VM FEX.
<b>Coalescing Time</b> field	The time Cisco IMC waits between interrupts or the idle period that must be encountered before an interrupt is sent.
<b>Coalescing Type</b> field	This can be one of the following: <ul style="list-style-type: none"> <li>• <b>MIN</b>—The system waits for the time specified in the <b>Coalescing Time</b> field before sending another interrupt event.</li> <li>• <b>IDLE</b>—The system does not send an interrupt until there is a period of no activity lasting as least as long as the time specified in the <b>Coalescing Time</b> field.</li> </ul>
<b>Interrupt Mode</b> field	The preferred driver interrupt mode. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>MSIx</b>—Message Signaled Interrupts (MSI) with the optional extension.</li> <li>• <b>MSI</b>—MSI only.</li> <li>• <b>INTx</b>—PCI INTx interrupts.</li> </ul>

### Ethernet Receive Queue Settings

Name	Description
<b>Receive Queue Count</b> field	The number of receive queue resources allocated to this VM FEX.
<b>Receive Queue Ring Size</b> field	The number of descriptors in each receive queue.



**Ethernet Transmit Queue Settings**

Name	Description
<b>Transmit Queue Count</b> field	The number of transmit queue resources allocated to this VM FEX.
<b>Transmit Queue Ring Size</b> field	The number of descriptors in each transmit queue.

**Completion Queue Settings**

Name	Description
<b>Completion Queue Count</b> field	The number of completion queue resources allocated to this VM FEX.
<b>Completion Queue Ring Size</b> field	The number of descriptors in each completion queue.

**TCP Offload Settings**

Name	Description
<b>Enable TCP Segmentation Offload</b> field	If enabled, the CPU sends large TCP packets to the hardware to be segmented. If disabled, the CPU segments large packets. <b>Note</b> This option is also known as Large Send Offload (LSO).
<b>Enable TCP Rx Offload Checksum Validation</b> field	If enabled, the CPU sends all packet checksums to the hardware for validation. If disabled, the CPU validates all packet checksums.
<b>Enable TCP Tx Offload Checksum Generation</b> field	If enabled, the CPU sends all packets to the hardware so that the checksum can be calculated. If disabled, the CPU calculates all packet checksums.
<b>Enable Large Receive</b> field	If enabled, the hardware reassembles all segmented packets before sending them to the CPU. If disabled, the CPU processes all large packets.

**Receive Side Scaling Settings**

Name	Description
<b>Enable TCP Receive Side Scaling</b> field	Receive Side Scaling (RSS) distributes network receive processing across multiple CPUs in multiprocessor systems.  If enabled, network receive processing is shared across processors whenever possible. If disabled, network receive processing is always handled by a single processor even if additional processors are available.
<b>Enable IPv4 RSS</b> field	If enabled, RSS is enabled on IPv4 networks.
<b>Enable TCP-IPv4 RSS</b> field	If enabled, RSS is enabled for TCP transmissions across IPv4 networks.
<b>Enable IPv6 RSS</b> field	If enabled, RSS is enabled on IPv6 networks.
<b>Enable TCP-IPv6 RSS</b> field	If enabled, RSS is enabled for TCP transmissions across IPv6 networks.
<b>Enable IPv6 Extension RSS</b> field	If enabled, RSS is enabled for IPv6 extensions.
<b>Enable TCP-IPv6 Extension RSS</b> field	If enabled, RSS is enabled for TCP transmissions across IPv6 networks.

# Backing Up and Restoring the Adapter Configuration

## Exporting the Adapter Configuration

The adapter configuration can be exported as an XML file to a TFTP server.



**Important** If any firmware or BIOS updates are in progress, do not export the adapter configuration until those tasks are complete.

**Before You Begin**

A supported Virtual Interface Card (VIC) must be installed in the chassis and the server must be powered on. Obtain the TFTP server IP address.

**Procedure**

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter index</b>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .

	Command or Action	Purpose
		<p><b>Note</b> The server must be powered on before you can view or change adapter settings.</p>
<b>Step 3</b>	<p>Server /chassis/adapter # <b>export-vnic protocol remote server IP address</b></p>	<p>Starts the export operation. The adapter configuration file will be stored at the specified path and filename on the remote server at the specified IP address. The protocol can be one of the following:</p> <ul style="list-style-type: none"> <li>• TFTP</li> <li>• FTP</li> <li>• SFTP</li> <li>• SCP</li> <li>• HTTP</li> </ul> <p><b>Note</b> The Cisco UCS C-Series server now supports fingerprint confirmation of the server when you update firmware through a remote server. This option is available only if you choose SCP or SFTP as the remote server type.</p> <p>If you chose SCP or SFTP as the remote server type while performing this action, a prompt with the message Server (RSA) key fingerprint is &lt;server_finger_print_ID&gt; Do you wish to continue? Click y or n depending on the authenticity of the server fingerprint.</p> <p>The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.</p>

This example exports the configuration of adapter 1:

```
Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # export-vnic ftp 192.0.20.34 //test/dnld-ucs-k9-bundle.1.0.2h.bin
Server /chassis/adapter #
```

## Importing the Adapter Configuration



**Important** If any firmware or BIOS updates are in progress, do not import the adapter configuration until those tasks are complete.

### Before You Begin

You must log in with admin privileges to perform this task.

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>import-vnic</b> <i>tftp-ip-address path-and-filename</i>	Starts the import operation. The adapter downloads the configuration file from the specified path on the TFTP server at the specified IP address. The configuration will be installed during the next server reboot.

This example imports a configuration for the adapter in PCI slot 1:

```
Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # import-vnic 192.0.2.34 /ucs/backups/adapter4.xml
Import succeeded.
New VNIC adapter settings will take effect upon the next server reset.
Server /chassis/adapter #
```

**What to Do Next**

Reboot the server to apply the imported configuration.

## Restoring Adapter Defaults

**Before You Begin**

You must log in with admin privileges to perform this task.

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>adapter-reset-defaults</b> <i>index</i>	Restores factory default settings for the adapter at the PCI slot number specified by the <i>index</i> argument.  <b>Note</b> Resetting the adapter to default settings sets the port speed to 4 X 10 Gbps. Choose 40 Gbps as the port speed only if you are using a 40 Gbps switch.

This example restores the default configuration of the adapter in PCI slot 1:

```
Server# scope chassis
Server /chassis # adapter-reset-defaults 1
```

```

This operation will reset the adapter to factory default.
All your configuration will be lost.
Continue?[y|N] y
Server /chassis #

```

# Managing Adapter Firmware

## Adapter Firmware

A Cisco UCS C-Series network adapter contains the following firmware components:

- Adapter firmware —The main operating firmware, consisting of an active and a backup image, can be installed from the Cisco IMC GUI or CLI interface or from the Host Upgrade Utility (HUU). You can upload a firmware image from either a local file system or a TFTP server.
- Bootloader firmware—The bootloader firmware cannot be installed from the Cisco IMC. You can install this firmware using the Host Upgrade Utility.

## Installing Adapter Firmware



### Important

If any firmware or BIOS updates are in progress, do not install the adapter firmware until those tasks are complete.

### Before You Begin

You must log in with admin privileges to perform this task.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>update-adapter-fw</b> <i>tftp-ip-address path-and-filename</i> { <b>activate</b>   <b>no-activate</b> } [ <i>pci-slot</i> ] [ <i>pci-slot</i> ]	Downloads the specified adapter firmware file from the TFTP server, then installs the firmware as the backup image on one or two specified adapters or, if no adapter is specified, on all adapters. If the <b>activate</b> keyword is specified, the new firmware is activated after installation.
<b>Step 3</b>	Server /chassis # <b>recover-adapter-update</b> [ <i>pci-slot</i> ] [ <i>pci-slot</i> ]	(Optional) Clears an incomplete firmware update condition on one or two specified adapters or, if no adapter is specified, on all adapters.

This example begins an adapter firmware upgrade on the adapter in PCI slot 1:

```
Server# scope chassis
Server /chassis # update-adapter-fw 192.0.2.34 /ucs/adapters/adapter4.bin activate 1
Server /chassis #
```

### What to Do Next

To activate the new firmware, see [Activating Adapter Firmware](#), on page 46.

## Activating Adapter Firmware



### Important

While the activation is in progress, do not:

- Reset, power off, or shut down the server.
- Reboot or reset Cisco IMC.
- Activate any other firmware.
- Export technical support or configuration data.

### Before You Begin

You must log in with admin privileges to perform this task.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis# <b>activate-adapter-fw</b> <i>pci-slot</i> { <b>1</b>   <b>2</b> }	Activates adapter firmware image 1 or 2 on the adapter in the specified PCI slot.  <b>Note</b> The changes will take effect upon the next server reboot.

This example activates adapter firmware image 2 on the adapter in PCI slot 1:

```
Server# scope chassis
Server /chassis # activate-adapter-fw 1 2
Firmware image activation succeeded
Please reset the server to run the activated image
Server /chassis #
```

### What to Do Next

Reboot the server to apply the changes.

# Resetting the Adapter

## Before You Begin

You must log in with admin privileges to perform this task.

## Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server/chassis # <b>adapter-reset <i>index</i></b>	Resets the adapter at the PCI slot number specified by the <i>index</i> argument.  <b>Note</b> Resetting the adapter also resets the host.

This example resets the adapter in PCI slot 1:

```
Server# scope chassis
Server /chassis # adapter-reset 1
This operation will reset the adapter and the host if it is on.
You may lose connectivity to the CIMC and may have to log in again.
Continue?[y|N] y
Server /chassis #
```

