A

admin VDC
description 2-1

C

Cisco Nexus 7000 Series 32-port Gbps Ethernet modules
port group interface allocation 1-6, 4-4
class-map limits A-1
configuration files
VDC support 1-8
configuration limits A-1
configuration modes
description 1-10
control plane policing. See CoPP
CoPP
VDC support 1-13
CPU shares 5-13

D

default user roles
network-admin 1-9
network-operator 1-9
vdc-admin 1-9
vdc-operator 1-9
default VDC
description 1-4
documentation
additional publications i-x
related 2-5, 3-7

E

examples
VDC management 5-26

F

Fabric Extender, VDC support 1-13
fault isolation
description (figure) 1-12
FCoE
configuring 4-10
VDC support 1-13
feature support
description 1-13

G

guidelines
creating VDCs 2-2, 4-6

H

HA
VDC support 1-13
HA policies
changing for VDCs 5-18
description 4-2
high availability. See HA

I

infrastructure layer

description 1-3
interfaces
allocating 1-5, 4-2
allocating FCoE 5-2
allocating to storage VDCs 5-2
allocating to VDCs 5-9
allocation 5-2
IP tunnels
VDC support 1-13

K

kernel
description 1-3

L

licensing
VDC resource templates 3-3
limitations
creating VDCs 2-2, 4-6
limit-resource module-type command 5-14
limits, configuration A-1
logical resources
description 1-7
namespaces 1-7

M

MAC addresses
per VDC 5-7
management connections
description 1-11
match criteria limit A-1

N

namespaces
description 1-7
limitations 1-8
network-operator roles
description 1-9

P

physical resource
description 1-5
policy map limits A-1
port groups 1-6
allocation requirements 1-6, 4-4
prerequisites
creating VDCs 4-6

R

rate limits
VDC support 1-13
related documentation
creating VDCs 4-17
resource templates
description 1-8

S

service policy limits A-1
storage VDC
configuring 4-10
superuser roles. See network-admin roles
supervisor
modules 2-1

T

troubleshooting
storage VDCs 4-10

U

user roles
- description 1-9
- See also default user roles

V

vdc-admin roles
- description 1-9

VDC configuration
- saving 5-20
- verifying 5-26

VDC management
- example configurations 5-26
- guidelines 5-8
- HA policies 5-6
- interface allocation 5-2
- limitations 5-8
- prerequisites 5-8
- resource limits 5-6
- saving to startup configuration 5-6

vdc-operator roles
- description 1-9

VDC resources
- changing limits 5-13
- description 1-5

VDC resource template
- configuring 3-4

VDC resource templates
- applying 5-11
- default limits 3-2
- description 3-1
- example configuration 3-7
- guidelines 3-3
- limitations 3-3
- resources 3-1
- verifying configuration 3-7

VDCs
- allocating interfaces 5-9
- applying VDC resource templates 5-11
- architecture 1-3
- changing HA policies 5-18
- changing resource limits 5-13
- CLI prompt format 5-9
- communication between 1-4
- configuration files 1-8
- creating 4-1 to 4-5, 4-8 to 4-12
- creation process 4-7
- default settings 4-7
- default user roles 1-9
- deleting 5-25
- description 1-1
- example setup dialog 4-13
- fault isolation (figure) 1-12
- FCoE 1-4
- feature support 1-13
- guidelines for creating 2-2, 4-6
- infrastructure layer 1-3
- initializing 4-5, 4-12
- kernel 1-3
- limitations for creating 2-2, 4-6
- management 1-9 to 1-12
- management connections 1-11
- managing 5-8 to 5-26
- namespaces 1-7
- prerequisites for creating 4-6
- reloading 5-7, 5-23
- resource templates 1-8
- restarting 5-6, 5-24
- restarting from HA failures 5-7
- resuming 5-22
- shared interfaces 1-5
- storage 1-4
- suspending 5-6, 5-21
- verifying configuration 4-13, 5-26

Cisco Nexus 7000 Series NX-OS Virtual Device Context Configuration Guide

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Cisco Nexus 7000 Series NX-OS Virtual Device Context Configuration Guide

CONTENTS

INDEX

New and Changed Information i-vii

Preface ix

Audience ix

Document Organization ix

Document Conventions x

Related Documentation x

Documentation Feedback xii

Obtaining Documentation and Submitting a Service Request xii

CHAPTER 1

Overview 1-1

Information About VDCs 1-1

VDC Architecture 1-3

Kernel and Infrastructure Layer 1-3

MAC Addresses 1-4

Default VDC 1-4

Communication Between VDCs 1-4

Storage VDCs 1-4

VDC Resources 1-5

Physical Resources 1-5

Logical Resources 1-7

VDC Resource Templates 1-8

Configuration Files 1-8

VDC Management 1-9

VDC Default User Roles 1-9

Configuration Modes 1-10

VDC Management Connections 1-11

VDC Fault Isolation 1-12

Cisco NX-OS Feature Support in VDCs 1-13

CHAPTER 2

Configuring an Admin VDC 2-1

Admin VDCs 2-1

Prerequisites for Admin VDCs 2-1

Creating an Admin VDC 2-2

Guidelines and Limitations for Creating Admin VDCs 2-2
Configuring an Admin VDC 2-3
Configuration Examples for Admin VDCs 2-4
Additional References for Admin VDCs 2-5
Related Documents for Admin VDCs 2-5
Feature History for Admin VDCs 2-6

CHAPTER 3 **Configuring VDC Resource Templates** 3-1
Information About VDC Resource Templates 3-1
Licensing Requirements for VDC Templates 3-3
Guidelines and Limitations for VDC Resource Templates 3-3
VDC Resource Templates 3-4
Configuring VDC Resource Templates 3-4
Verifying the VDC Resource Template Configuration 3-7
Configuration Example for VDC Resource Template 3-7
Additional References for VDC Resource Templates 3-7
Related Documents for VDC Resource Templates 3-7
Feature History for VDC Resource Templates 3-8

CHAPTER 4 **Creating VDCs** 4-1
Information About Creating VDCs 4-1
Storage VDCs 4-2
High-Availability Policies 4-2
Allocating Interfaces 4-2
VDC Management Connections 4-5
Initializing a New VDC 4-5
Licensing Requirements for VDCs 4-5
Prerequisites for Creating VDCs 4-6
Guidelines and Limitations for VDCs 4-6
Default Settings for Creating VDCs 4-7
Process for Creating VDCs 4-7
Creating VDCs 4-8
Initializing a VDC 4-12
Verifying the VDC Configuration 4-13
Configuration Example for Ethernet VDC Creation and Initialization 4-13
Configuration Examples for Default and Nondefault VDCs 4-16
Example Running Configuration from the Default VDC 4-16

Example Running Configuration from a Nondefault VDC 4-16
Additional References for Creating VDCs 4-17
Related Documents for Creating VDCs 4-17
Feature History for Creating VDCs 4-17

CHAPTER 5 **Managing VDCs** 5-1
Information About Managing VDCs 5-1
Interface Allocation 5-2
VDC Resource Limits 5-6
HA Policies 5-6
Saving All VDC Configurations to the Startup Configuration 5-6
Suspending and Resuming VDCs 5-6
VDC Reload 5-7
MAC Addresses 5-7
VDC Boot Order 5-7
Licensing Requirements for Managing VDCs 5-7
Prerequisites for Managing VDCs 5-8
Guidelines and Limitations for Managing VDCs 5-8
Managing VDCs 5-8
Changing the Nondefault VDC Prompt Format 5-9
Allocating Interfaces to an Ethernet VDC 5-9
Applying a VDC Resource Template 5-11
Changing VDC Resource Limits 5-13
Displaying Example for show vdc detail Output 5-18
Changing the HA Policies 5-18
Saving VDC Configurations 5-20
Suspending a Nondefault VDC 5-21
Resuming a Nondefault VDC 5-22
Reloading a Nondefault VDC 5-23
Configuring the VDC Boot Order 5-24
Deleting a VDC 5-25
Verifying the VDC Configuration 5-26
Configuration Examples for VDC Management 5-26
Additional References 5-27
Related Documents for Managing VDCs 5-27
Feature History for Managing VDCs 5-28

APPENDIX A **VDC Configuration Limits** A-1

New and Changed Information

This chapter provides release-specific information for each new and changed feature in the *Cisco Nexus 7000 Series NX-OS Virtual Device Context Configuration Guide*. The latest version of this document is available at the following Cisco website:
http://www.cisco.com/en/US/products/ps9402/products_installation_and_configuration_guides_list.html

To check for additional information about Cisco NX-OS releases, see the *Cisco Nexus 7000 Series NX-OS Release Notes* available at the following Cisco website:
http://www.cisco.com/en/US/products/ps9402/prod_release_notes_list.html

Table 1 summarizes the new and changed features for the *Cisco Nexus 7000 Series NX-OS Virtual Device Context Configuration Guide*, and tells you where they are documented.

Table 1 New and Changed Features

Feature	Description	Changed in Release	Where Documented
Switchwide VDC mode	Added the ability to enable specific line cards in the chassis and prevent others from powering on.	6.1(3)	Chapter 5, “Managing VDCs”
F2E Series modules.	Added support for F2E Series as part of F2 Series modules.	6.1(2)	Chapter 5, “Managing VDCs”
Admin VDC	Added support for admin VDC.	6.1(1)	Chapter 2, “Configuring an Admin VDC” and Chapter 4, “Creating VDCs”
Supervisor modules, Number of VDCs and storage VDCs.	Added support for the new supervisor modules and the supported number of VDCs. Added support for storage VDCs.	6.1(1)	Chapter 1, “Overview,” Chapter 2, “Configuring an Admin VDC,” and Chapter 4, “Creating VDCs”
CPU Shares	Added support for CPU shares on a VDC.	6.1(1)	Chapter 5, “Managing VDCs”
VDC resource limits	Added support for M2 Series modules.	6.1(1)	Chapter 5, “Managing VDCs”
VDC resource limits	Added support for F2 Series modules.	6.0(1)	Chapter 5, “Managing VDCs”
FCoE	Added support for storage VDCs and the FCoE feature.	5.2(1)	Chapter 1, “Overview,” Chapter 2, “Configuring an Admin VDC,”, and Chapter 4, “Creating VDCs”
MAC addresses	The default VDC has a MAC address, and subsequent nondefault VDCs that are created are assigned MAC addresses.	5.2(1)	Chapter 5, “Managing VDCs”

Table 1 New and Changed Features (continued)

Feature	Description	Changed in Release	Where Documented
VDC resource limits	Added support for M Series modules.	5.2(1)	Chapter 5, "Managing VDCs"
N7K-F132XP-15 module	Added support for the N7K-F132XP-15 module.	5.1(1)	Chapter 1, "Overview," Chapter 4, "Creating VDCs" and Chapter 5, "Managing VDCs"
VDC resource limits	Added the ability to configure ERSPAN monitor session resource limits.	5.1(1)	Chapter 5, "Managing VDCs"
VDC resource limits	The range for the minimum and maximum values changed for the **limit-resource m4route-mem**, **limit-resource m6route-mem**, **limit-resource u4route-mem**, **limit-resource u6route-mem**, and **limit-resource vrf** commands.	5.0(2)	Chapter 3, "Configuring VDC Resource Templates" and Chapter 5, "Managing VDCs"
Restarting VDCs	The **vdc restart** command was replaced by the **reload vdc** command.	4.2(4)	Chapter 5, "Managing VDCs"
Suspending and resuming VDCs	You can suspend and resume nondefault VDCs.	4.2(1)	Chapter 5, "Managing VDCs"
Restarting VDCs	You can restart active nondefault VDCs and nondefault VDCs in the failed state.	4.2(1)	Chapter 5, "Managing VDCs"
Reloading VDCs	You can reload nondefault VDCs.	4.2(1)	Chapter 5, "Managing VDCs"
VDC prompt format	You can change the format of the CLI prompt for nondefault VDCs.	4.2(1)	Chapter 5, "Managing VDCs"
VDC boot order	You can configure the boot order for nondefault VDCs.	4.2(1)	Chapter 5, "Managing VDCs"
VDCs and tunnel interfaces	You can put tunnel interfaces into nondefault VDCs and VRFs.	4.2(1)	Chapter 1, "Overview"
IPv4 and IPv6 unicast route memory resources	Changed the default value for the maximum limits.	4.1(2)	Chapter 3, "Configuring VDC Resource Templates" and Chapter 5, "Managing VDCs"
Multicast route memory resources	Added IPv4 and IPv6 multicast route memory resources.	4.1(2)	Chapter 3, "Configuring VDC Resource Templates" and Chapter 5, "Managing VDCs"
Port channel resource	Changed the default value for the maximum limit.	4.1(2)	Chapter 3, "Configuring VDC Resource Templates" and Chapter 5, "Managing VDCs"
IPv4 unicast route memory resource	Changed the default maximum value from 256 to 320.	4.0(2)	Chapter 3, "Configuring VDC Resource Templates" and Chapter 5, "Managing VDCs"
IPv6 unicast route memory resource	Changed the default maximum value from 256 to 192.	4.0(2)	Chapter 3, "Configuring VDC Resource Templates" and Chapter 5, "Managing VDCs"

Preface

This preface describes the audience, organization and conventions of the *Cisco Nexus 7000 Series NX-OS Virtual Device Context Configuration Guide*. It also provides information on how to obtain related documentation.

This chapter includes the following sections:

- Audience, page ix
- Document Organization, page ix
- Document Conventions, page x
- Related Documentation, page x
- Obtaining Documentation and Submitting a Service Request, page xii

Audience

This publication is for experienced network administrators who configure and maintain Cisco NX-OS devices.

Document Organization

This publication is organized into the following chapters:

Title	Description
Chapter 1, “Overview”	Presents an overview of virtual device contexts (VDCs).
Chapter 2, “Configuring an Admin VDC”	Provides information about configuring an Admin VDC.
Chapter 3, “Configuring VDC Resource Templates”	Provides information about creating and configuring VDC resource templates.
Chapter 4, “Creating VDCs”	Provides information about creating VDCs.
Chapter 5, “Managing VDCs”	Provides information about managing VDCs.
Appendix A, “VDC Configuration Limits”	Lists the maximum number of VDCs and VDC resource templates that can be created.

Document Conventions

Command descriptions use these conventions:

Convention	Description
boldface font	Commands and keywords are in boldface.
italic font	Arguments for which you supply values are in italics.
[ ]	Elements in square brackets are optional.
[x | y | z]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.

Screen examples use these conventions:

`screen font`	Terminal sessions and information that the switch displays are in screen font.
`boldface screen font`	Information that you must enter is in boldface screen font.
`italic screen font`	Arguments for which you supply values are in italic screen font.
< >	Nonprinting characters, such as passwords, are in angle brackets.
[ ]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.

This document uses the following conventions:

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

Caution Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

Related Documentation

Cisco NX-OS includes the following documents:

Release Notes

Cisco Nexus 7000 Series NX-OS Release Notes, Release 6.1

NX-OS Configuration Guides

Cisco Nexus 7000 Series NX-OS Configuration Examples, Release 5.x
Configuring the Cisco Nexus 2000 Series Fabric Extender
Cisco Nexus 7000 Series NX-OS FabricPath Configuration Guide
Configuring Feature Set for FabricPath
Cisco NX-OS FCoE Configuration Guide for Cisco Nexus 7000 and Cisco MDS 9500
Cisco Nexus 7000 Series NX-OS Fundamentals Configuration Guide, Release 6.x
Cisco Nexus 7000 Series NX-OS High Availability and Redundancy Guide
Cisco Nexus 7000 Series NX-OS Interfaces Configuration Guide, Release 6.x
Cisco Nexus 7000 Series NX-OS Layer 2 Switching Configuration Guide
Cisco Nexus 7000 Series NX-OS LISP Configuration Guide
Cisco Nexus 7000 Series NX-OS MPLS Configuration Guide
Cisco Nexus 7000 Series NX-OS Multicast Routing Configuration Guide
Cisco Nexus 7000 Series NX-OS OTV Configuration Guide
Cisco Nexus 7000 Series OTV Quick Start Guide
Cisco Nexus 7000 Series NX-OS Quality of Service Configuration Guide, Release 6.x
Cisco Nexus 7000 Series NX-OS SAN Switching Configuration Guide
Cisco Nexus 7000 Series NX-OS Security Configuration Guide, Release 6.x
Cisco Nexus 7000 Series NX-OS System Management Configuration Guide, Release 6.x
Cisco Nexus 7000 Series NX-OS Unicast Routing Configuration Guide, Release 6.x
Cisco Nexus 7000 Series NX-OS Virtual Device Context Quick Start Guide

NX-OS Command References

Cisco Nexus 7000 Series NX-OS Command Reference Master Index
Cisco Nexus 7000 Series NX-OS FabricPath Command Reference
Cisco NX-OS FCoE Command Reference for Cisco Nexus 7000 and Cisco MDS 9500
Cisco Nexus 7000 Series NX-OS Fundamentals Command Reference
Cisco Nexus 7000 Series NX-OS High Availability Command Reference
Cisco Nexus 7000 Series NX-OS Interfaces Command Reference
Cisco Nexus 7000 Series NX-OS Layer 2 Switching Command Reference
Cisco Nexus 7000 Series NX-OS LISP Command Reference
Cisco Nexus 7000 Series NX-OS MPLS Command Reference
Cisco Nexus 7000 Series NX-OS Multicast Routing Command Reference
Cisco Nexus 7000 Series NX-OS OTV Command Reference
Cisco Nexus 7000 Series NX-OS Quality of Service Command Reference
Cisco Nexus 7000 Series NX-OS SAN Switching Command Reference
Cisco Nexus 7000 Series NX-OS Security Command Reference

Cisco Nexus 7000 Series NX-OS System Management Command Reference

Cisco Nexus 7000 Series NX-OS Unicast Routing Command Reference

Cisco Nexus 7000 Series NX-OS Virtual Device Context Command Reference

Other Software Documents

Cisco NX-OS Licensing Guide

Cisco Nexus 7000 Series NX-OS MIB Quick Reference

Cisco Nexus 7000 Series NX-OS Software Upgrade and Downgrade Guide, Release 6.x

Cisco NX-OS System Messages Reference

Cisco Nexus 7000 Series NX-OS Troubleshooting Guide

Cisco NX-OS XML Interface User Guide

Documentation Feedback

To provide technical feedback on this document, or to report an error or omission, please send your comments to nexus7k-docfeedback@cisco.com. We appreciate your feedback.

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html

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

Overview

This chapter describes virtual device contexts (VDCs) supported on Cisco NX-OS devices.

This chapter includes the following sections:

- Information About VDCs, page 1-1
- VDC Architecture, page 1-3
- VDC Resources, page 1-5
- VDC Management, page 1-9
- VDC Fault Isolation, page 1-12
- Cisco NX-OS Feature Support in VDCs, page 1-13

Information About VDCs

The Cisco NX-OS software supports VDCs, which partition a single physical device into multiple logical devices that provide fault isolation, management isolation, address allocation isolation, service differentiation domains, and adaptive resource management. You can manage a VDC instance within a physical device independently. Each VDC appears as a unique device to the connected users. A VDC runs as a separate logical entity within the physical device, maintains its own unique set of running software processes, has its own configuration, and can be managed by a separate administrator.

VDCs also virtualize the control plane, which includes all those software functions that are processed by the CPU on the active supervisor module. The control plane supports the software processes for the services on the physical device, such as the routing information base (RIB) and the routing protocols.

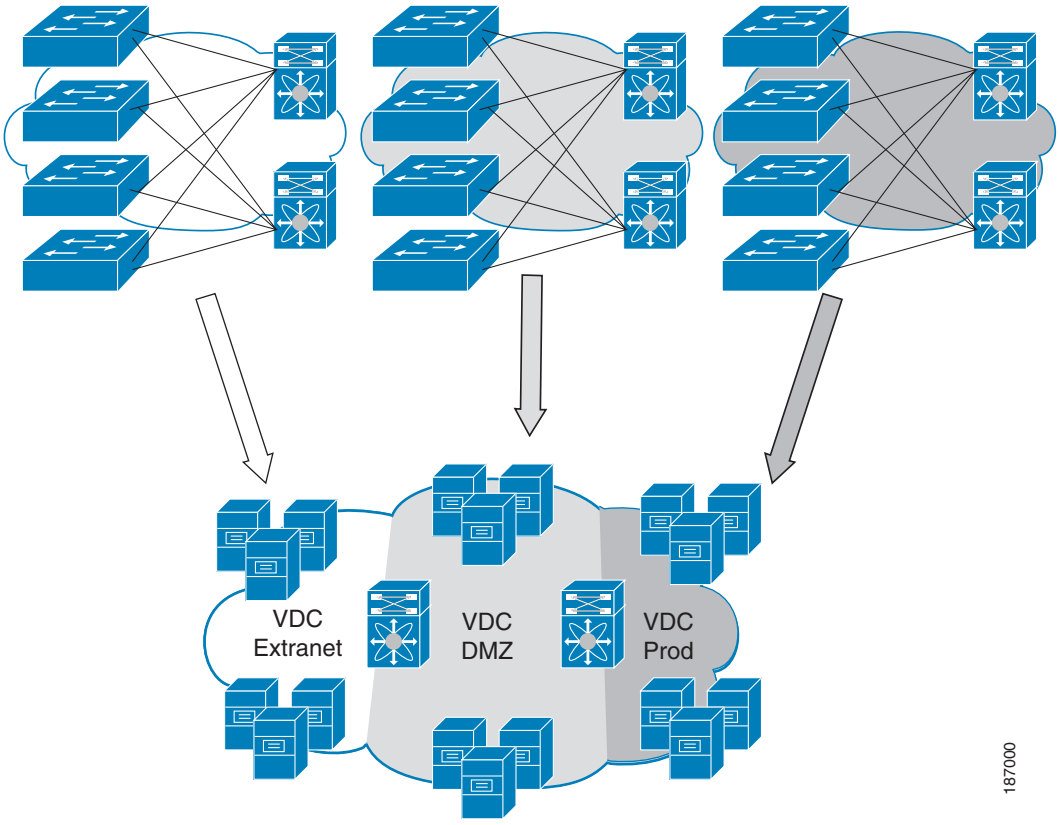
Beginning with Cisco NX-OS Release 5.2(1) for the Nexus 7000 Series devices, you can configure Fibre Channel over Ethernet (FCoE). See the *Cisco NX-OS FCoE Configuration Guide for Cisco Nexus 7000 and Cisco MDS 9500* for information on FCoE. Beginning with Cisco NX-OS Release 6.1(1), you can enable FCoE on the F2[F2E]48XP-25 Series with Supervisor 2 and Supervisor 2E modules. You must configure a dedicated storage VDC to run FCoE on the Cisco Nexus 7000 Series devices. See Chapter 5, "Managing VDCs," for information on configuring storage VDCs.

When you create a VDC, the Cisco NX-OS software takes several of the control plane processes and replicates them for the VDC. This replication of processes allows VDC administrators working in Ethernet VDCs to use virtual routing and forwarding instance (VRF) names and VLAN IDs independent of those used in other VDCs. Each VDC administrator essentially interacts with a separate set of processes, VRFs, and VLANs.

Note However, the numbers must be unique between FCoE and Ethernet VLANs. That is, the numbers used on the FCoE VLANs in the storage VDCs must be different than any of the VLAN numbers used in the Ethernet VDCs. You can repeat VLAN numbers within separate Ethernet VDCs. The VLAN numbering space for FCoE and Ethernet is shared only for those VDCs configured for port sharing. See the *Cisco NX-OS FCoE Configuration Guide for Cisco Nexus 7000 and Cisco MDS 9500* for information on configuring FCoE.

Figure 1-1 shows how the Cisco NX-OS software segments the physical device into VDCs. The benefits include VDC-level fault isolation, VDC-level administration, separation of data traffic, and enhanced security.

Figure 1-1 Segmentation of a Physical Device



VDC Architecture

The Cisco NX-OS software provides the base upon which VDCs are supported.

This section includes the following topics:

- Kernel and Infrastructure Layer, page 1-3
- MAC Addresses, page 1-4
- Default VDC, page 1-4
- Communication Between VDCs, page 1-4
- Communication Between VDCs, page 1-4
- Storage VDCs, page 1-4

Kernel and Infrastructure Layer

The basis of the Cisco NX-OS software is the kernel and infrastructure layer. A single instance of the kernel supports all of the processes and VDCs that run on the physical device. The infrastructure layer provides an interface between the higher layer processes and the hardware resources of the physical device, such as the ternary content addressable memory (TCAM). Having a single instance of this layer reduces the complexity for the management of the hardware resources and helps scale the Cisco NX-OS software performance by avoiding duplication of the system management process (see Figure 1-2).

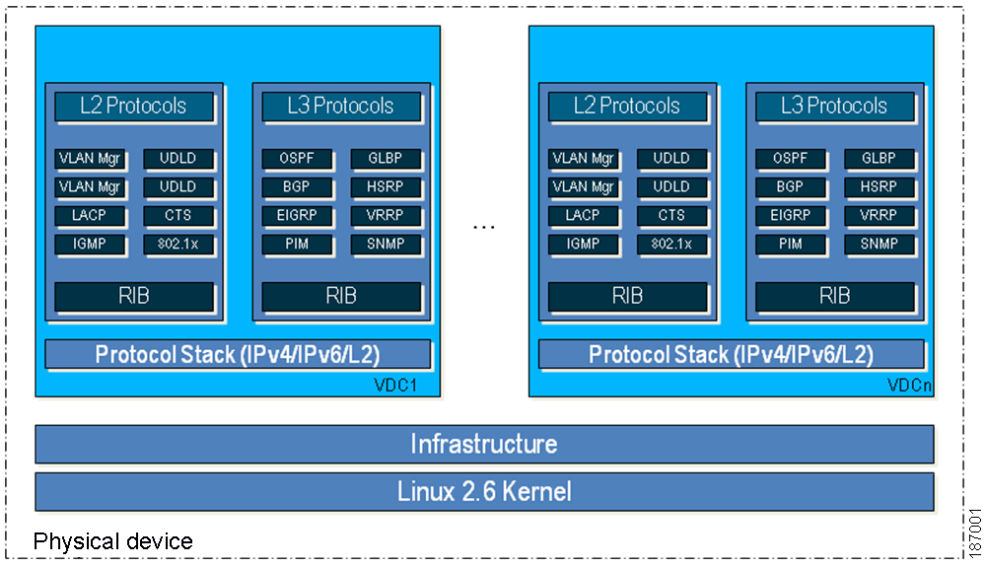
The infrastructure also enforces isolation across VDCs. A fault that is generated within a VDC does not impact the services in other VDCs. This feature limits the impact of software faults and greatly improves the reliability of the device.

Along with the infrastructure layer, some nonvirtualized services have only a single instance for all VDCs. These infrastructure services participate in creating VDCs, moving resources across VDCs, and monitoring individual protocol services within a VDC.

The Cisco NX-OS software creates a virtualized control plane for each VDC. The virtualized control plane within the VDCs processes all the protocol-related events.

All the Layer 2 and Layer 3 protocol services run within a VDC. Each protocol service started within a VDC runs independently of the protocol services in other VDCs. The infrastructure layer protects the protocol services within a VDC so that a fault or other problem in a service in one VDC does not impact other VDCs. The Cisco NX-OS software creates these virtualized services only when a VDC is created. Each VDC has its own instance of each service. These virtualized services are unaware of other VDCs and only work on resources assigned to that VDC. Only a user with the network-admin role can control the resources available to these virtualized services.

Figure 1-2 VDC Architecture



MAC Addresses

The default VDC has a MAC address. Subsequent nondefault VDCs that you create are assigned MAC addresses automatically as part of the bootup process.

Default VDC

The physical device always has at least one VDC, the default VDC (VDC 1). When you first log in to a new Cisco NX-OS device, you begin in the default VDC. You must be in the default VDC or admin VDC to create, change attributes for, or delete a nondefault VDC. Cisco NX-OS releases prior to 6.1 can support up to four VDCs, including the default VDC, which means that you can create up to three nondefault VDCs.

If you have the network-admin role privileges, you can manage the physical device and all VDCs from the default VDC (see the "VDC Default User Roles" section on page 1-9).

Communication Between VDCs

The Cisco NX-OS software does not support direct communication between VDCs on a single physical device. You must make a physical connection from a port allocated to one VDC to a port allocated to the other VDC to allow the VDCs to communicate (see the "Logical Resources" section on page 1-7).

Storage VDCs

The storage VDC is one of the nondefault VDCs and it does need a license. However, a storage VDC does not need a VDC license as it relies on the FCoE license installed to enable the FCoE function on the modules. Beginning with Cisco NX-OS Release 5.2(1) for the Nexus 7000 Series devices, you can

run FCoE on the F1, F2 and F2E Series modules. You can create separate storage VDCs to run FCoE. You can have only one storage VDC on the device, and you cannot configure the default VDC as a storage VDC.

After you create the storage VDC, you assign specified FCoE VLANs. Finally, you configure interfaces on the Cisco Nexus 7000 Series device as either dedicated FCoE interfaces or as shared interfaces, which can carry both Ethernet and FCoE traffic. See the *Cisco NX-OS FCoE Configuration Guide for Cisco Nexus 7000 and Cisco MDS 9500* for information on configuring FCoE.

For more information about creating VDCs with FCoE, see Chapter 4, "Creating VDCs,", *Cisco NX-OS Licensing Guide* and the *Cisco NX-OS FCoE Configuration Guide for Cisco Nexus 7000 and Cisco MDS 9500* book.

VDC Resources

If you have the network-admin user role, you can allocate physical device resources exclusively for the use of a VDC. Once a resource is assigned to a specific VDC, you can manage it only from that VDC. The Cisco NX-OS software allows you to control how the logical and physical resources are assigned to each VDC. Users logging directly into the VDC can only see this limited view of the device and can manage only those resources that the network administrator explicitly assigns to that VDC. Users within a VDC cannot view or modify resources in other VDCs.

Note You must have the network-admin role to allocate resources to a VDC (see the "VDC Default User Roles" section on page 1-9).

This section includes the following topics:

- Physical Resources, page 1-5
- Logical Resources, page 1-7
- VDC Resource Templates, page 1-8
- Configuration Files, page 1-8

Physical Resources

The only physical resources that you can allocate to a VDC are the Ethernet interfaces. For the Ethernet VDCs, each physical Ethernet interface can belong to only one VDC, including the default VDC, at any given time. When you are working with shared interfaces in the storage VDC, the physical interface can belong to both one Ethernet VDC and one storage VDC simultaneously, but to no more than one of each.

Initially, all physical interfaces belong to the default VDC (VDC 1). When you create a new VDC, the Cisco NX-OS software creates the virtualized services for the VDC without allocating any physical interfaces to it. After you create a new VDC, you can allocate a set of physical interfaces from the default VDC to the new VDC.

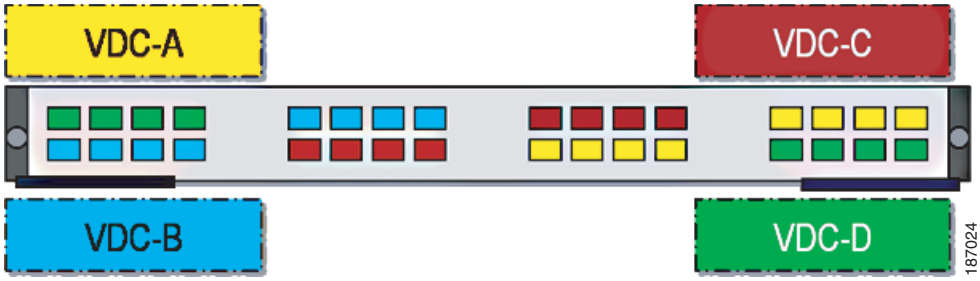
When you allocate an interface to a VDC, all configuration for that interface is erased. You, or the VDC administrator, must configure the interface from within the VDC. Only the interfaces allocated to the VDC are visible for configuration.

Note Beginning with Cisco Release 5.2(1) for Nexus 7000 Series devices, all members of a port group are automatically allocated to the VDC when you allocate an interface.

The following Cisco Nexus 7000 Series Ethernet modules have the following number of port groups and interfaces:

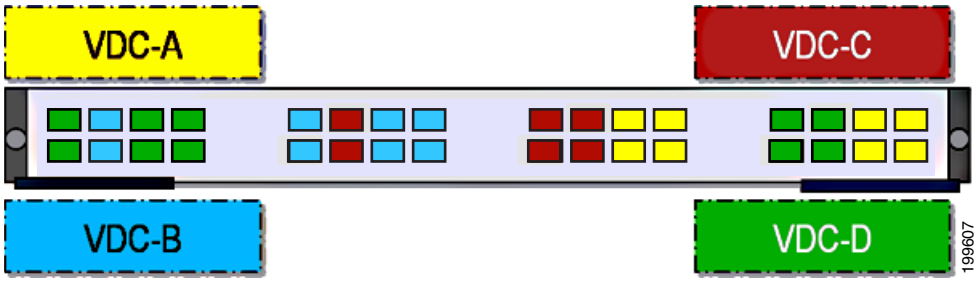
- N7K-M202CF-22L (1 interface x 2 port groups = 2 interfaces 100G modules)—There are no restrictions on the interface allocation between VDCs.
- N7K-M206FQ-23L (1 interface x 6 port groups = 6 interfaces 40G modules)—There are no restrictions on the interface allocation between VDCs.
- N7K-M224XP-23L (1 interface x 24 port groups = 24 interfaces 10G modules)—There are no restrictions on the interface allocation between VDCs.
- N7K-M108X2-12L (1 interface x 8 port groups = 8 interfaces)—There are no restrictions on the interface allocation between VDCs.
- N7K-M148GS-11L, N7K-M148GT-11, and N7K-M148GS-11 (12 interfaces x 4 port groups = 48 interfaces)—There are no restrictions on the interface allocation between VDCs, but we recommend that interfaces that belong to the same port group be in a single VDC.
- N7K-M132XP-12 (4 interfaces x 8 port groups = 32 interfaces)—Interfaces belonging to the same port group must belong to the same VDC. See the example for this module in Figure 1-3.
- N7K-M148GT-11L (same as non-L M148) (1 interface x 48 port groups = 48 interfaces)—There are no restrictions on the interface allocation between VDCs.
- N7K-M132XP-12L (same as non-L M132) (1 interface x 8 port groups = 8 interfaces)—All M132 cards require allocation in groups of 4 ports and you can configure 8 port groups.

Figure 1-3 Example Interface Allocation for Port Groups on a Cisco 7000 Series 10-Gbps Ethernet Module (N7K-M132XP-12)



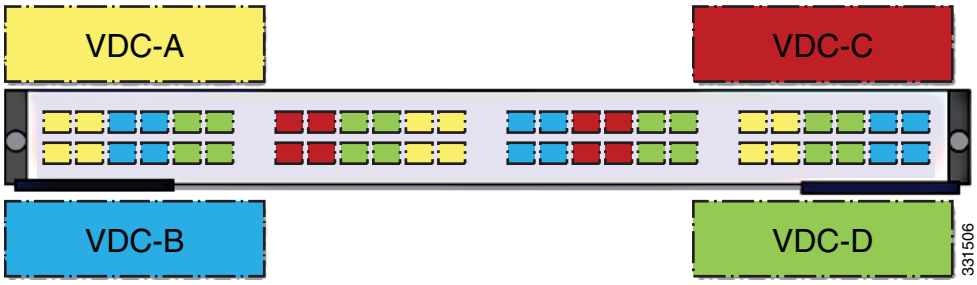
On the Cisco Nexus 7000 Series 32-port, 10-Gbps Ethernet module N7K-F132XP-15, you must allocate the interfaces on your physical device in the specified combination. This module has 16 port groups that consist of 2 ports each (2 interfaces x 16 port groups = 32 interfaces). Interfaces belonging to the same port group must belong to the same VDC (see Figure 1-4). For more information about ports that can be paired, see Chapter 4, "Creating VDCs." For more information about implementing FCoE on this module, see the *Cisco NX-OS FCoE Configuration Guide for Cisco Nexus 7000 and Cisco MDS 9500*.

Figure 1-4 Example Interface Allocation for Port Groups on a Cisco 7000 Series 10-Gbps Ethernet Module (N7K-F132XP-15)



On the Cisco Nexus 7000 Series 48-port, 10-Gbps Ethernet module N7K-F248XP-25[E], you must allocate the interfaces on your physical device in the specified combination. This module has 12 port groups that consist of 4 ports each (4 interfaces x 12 port groups = 48 interfaces). Interfaces belonging to the same port group must belong to the same VDC (see Figure 1-5).

Figure 1-5 Example Interface Allocation for Port Groups on the Cisco Nexus 7000 Series 10-Gbps Ethernet Module N7K-F248XP-25[E]



For more information on port groups on the Cisco Nexus 7000 Series 10-Gbps Ethernet modules, see the *Cisco Nexus 7000 Series Hardware Installation and Reference Guide*.

Logical Resources

Each VDC acts as a separate logical device within a single physical device, which means that all the namespaces are unique within a VDC. However, you cannot use an identical namespace within a storage VDC and an Ethernet VDC.

When you create a VDC, it has its own default VLAN and VRF that are not shared with other VDCs. You can also create other logical entities within a VDC for the exclusive use of that VDC. These logical entities, which include SPAN monitoring sessions, port channels, VLANs, and VRFs, are for Ethernet VDCs.

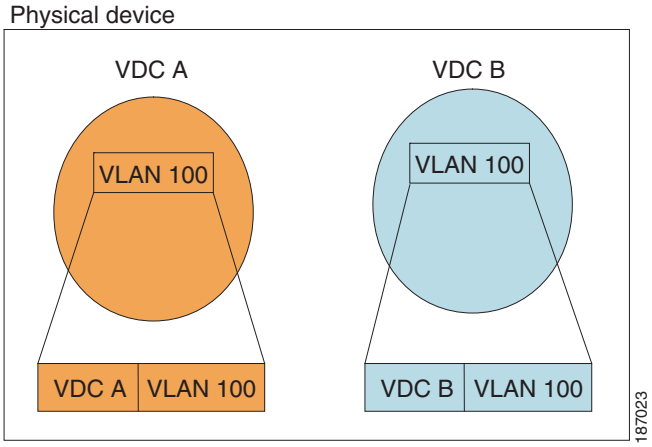
Note You can have a maximum of two SPAN monitoring sessions on your physical device.

When you create a logical entity in a VDC, only users in that VDC can use it even when it has the same identifier as another logical entity in another VDC. The Cisco NX-OS software supports up to four VDCs and, therefore, 16,384 unique VLANs. A VDC administrator can configure VLAN IDs

independently of the VLAN IDs used in other Ethernet VDCs on the same physical device. For example, if VDC administrators for Ethernet VDC A and Ethernet VDC B both create VLAN 100, these VLANs are internally mapped to separate unique identifiers (see Figure 1-6).

For more information on VDC support and the maximum number of VLANs, see the *Cisco Nexus 7000 Series NX-OS Verified Scalability Guide.*

Figure 1-6 Example VLAN Configuration for Ethernet VDCs



Note When you are working with both storage VDCs and Ethernet VDCs, the VLAN ID and logical entity must be entirely separate for the storage VDCs.

VDC Resource Templates

A network administrator can allocate resources to VDCs using resource templates. Each resource template describes how a set of resources are allocated to a VDC. When you create a VDC, you use a VDC resource template to set limits on the number of certain logical entities that you can create in the VDC. These logical entities include port channels, SPAN monitor sessions, VLANs, IPv4 and IPv6 route memory, and VRFs. You can create a VDC resource template or use the default VDC resource template provided by the Cisco NX-OS software.

For more information about VDC resource templates, see Chapter 3, "Configuring VDC Resource Templates."

Configuration Files

Each VDC maintains a separate configuration file in NVRAM, reflecting the configuration of interfaces allocated to the VDC and any VDC-specific configuration elements such as VDC user accounts and VDC user roles. The separation of the VDC configuration files provides security and fault isolation that protects a VDC from configuration changes on another VDC.

Separate VDC configuration files also provide configuration isolation. The resources in each VDC might have IDs that overlap without affecting the configuration of the other VDCs. For example, the same VRF IDs, port-channel numbers, VLAN IDs, and management IP address can exist on multiple Ethernet VDCs.

VDC Management

Each VDC can be managed by a different VDC administrator. An action taken by a VDC administrator in one VDC does not impact users in other VDCs. A VDC administrator within a VDC can create, modify, and delete the configuration for resources allocated to VDC with no impact to other VDCs.

This section includes the following topics:

- VDC Default User Roles, page 1-9
- Configuration Modes, page 1-10
- VDC Management Connections, page 1-11

VDC Default User Roles

The Cisco NX-OS software has default user roles that the network administrator can assign to the user accounts that administer VDCs. These user roles make available a set of commands that the user can execute after logging into the device. All commands that the user is not allowed to execute are hidden from the user or return an error.

Note You must have the network-admin or vdc-admin role to create user accounts in a VDC.

The Cisco NX-OS software provides default user roles with different levels of authority for VDC administration as follows:

- network-admin—The network-admin role exists only in the default VDC and allows access to all the global configuration commands (such as **reload** and **install**) and all the features on the physical device. A custom user role is not granted access to these network-admin-only commands or to other commands that are scoped admin-only. Only the network administrator can access all the commands that are related to the physical state of the device. This role can perform system-impacting functions such as upgrading software and running an Ethernet analyzer on the traffic. Network administrators can create and delete VDCs, allocate resources for these VDCs, manage device resources reserved for the VDCs, and configure features within any VDC. Network administrators can also access nondefault VDCs using the **switchto vdc** command from the default VDC. When network administrators switch to a nondefault VDC, they acquire vdc-admin permissions, which are the highest permissions available in a nondefault VDC.
- network-operator—The network-operator role exists only in the default VDC and allows users to display information for all VDCs on the physical device. This role allows access to all the network-operator-only **show** commands such as the **show running-config vdc** and **show install all status** command. Users with network-operator roles can access nondefault VDCs using the **switchto vdc** command from the default VDC.
- vdc-admin—Users who have the vdc-admin role can configure all features within a VDC. Users with either the network-admin or vdc-admin role can create, modify, or remove user accounts within the VDC. All configurations for the interfaces allocated to a VDC must be performed within the VDC. Users with the vdc-admin role are not allowed to execute any configuration commands related to the physical device.
- vdc-operator—Users assigned with the vdc-operator role can display information only for the VDC. Users with either the network-admin or vdc-admin role can assign the vdc-operator role to user accounts within the VDC. The vdc-operator role does not allow the user to change the configuration of the VDC.

If you do not need more than three VDCs, we recommend that you leave the default VDC as an admin VDC and use the other VDCs as active data-plane virtual switches on Supervisor 1 module. Make sure to restrict default VDC access to a select few administrators who are allowed to modify the global configuration (network-admin role). Remember that you can configure some features (such as Control Plane Policing [CoPP] and rate limits only in the default VDC. You cannot configure the default VDC as a storage VDC.

If the default VDC must be used for data-plane traffic, administrators who require default VDC configuration access but not global configuration access should be assigned with the vdc-admin role. This role restricts administrative functions to the default VDC exclusively and prevents access to global VDC configuration commands.

For more information about user accounts and roles, see the *Cisco Nexus 7000 Series NX-OS Security Configuration Guide, Release 6.x*.

Configuration Modes

The Cisco NX-OS software has two main configuration modes for VDCs, VDC configuration mode in the default VDC and global configuration mode within the VDC itself.

In the VDC configuration mode in the default VDC, you can allocate interfaces to the VDCs and change VDC attributes. You can enter VDC configuration mode from global configuration mode on the default VDC. Only users with the network-admin role can access VDC configuration mode.

This example shows how to enter VDC configuration mode:

```
switch# config t
switch(config)# vdc Enterprise
switch(config-vdc)#
```

This example shows how to switch to VDC Enterprise from the default VDC:

```
switch# switchto vdc Enterprise
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
Copyright (c) 2002-2012, Cisco Systems, Inc. All rights reserved.
The copyrights to certain works contained in this software are
owned by other third parties and used and distributed under
license. Certain components of this software are licensed under
the GNU General Public License (GPL) version 2.0 or the GNU
Lesser General Public License (LGPL) Version 2.1. A copy of each
such license is available at
http://www.opensource.org/licenses/gpl-2.0.php and
http://www.opensource.org/licenses/lgpl-2.1.php
```

In the global configuration mode in a VDC, you can configure Cisco NX-OS features for nondefault VDCs. You can access this configuration mode by logging in to the VDC and entering global configuration mode.You must have a user role that allows read and write access to the VDC to use this configuration mode.

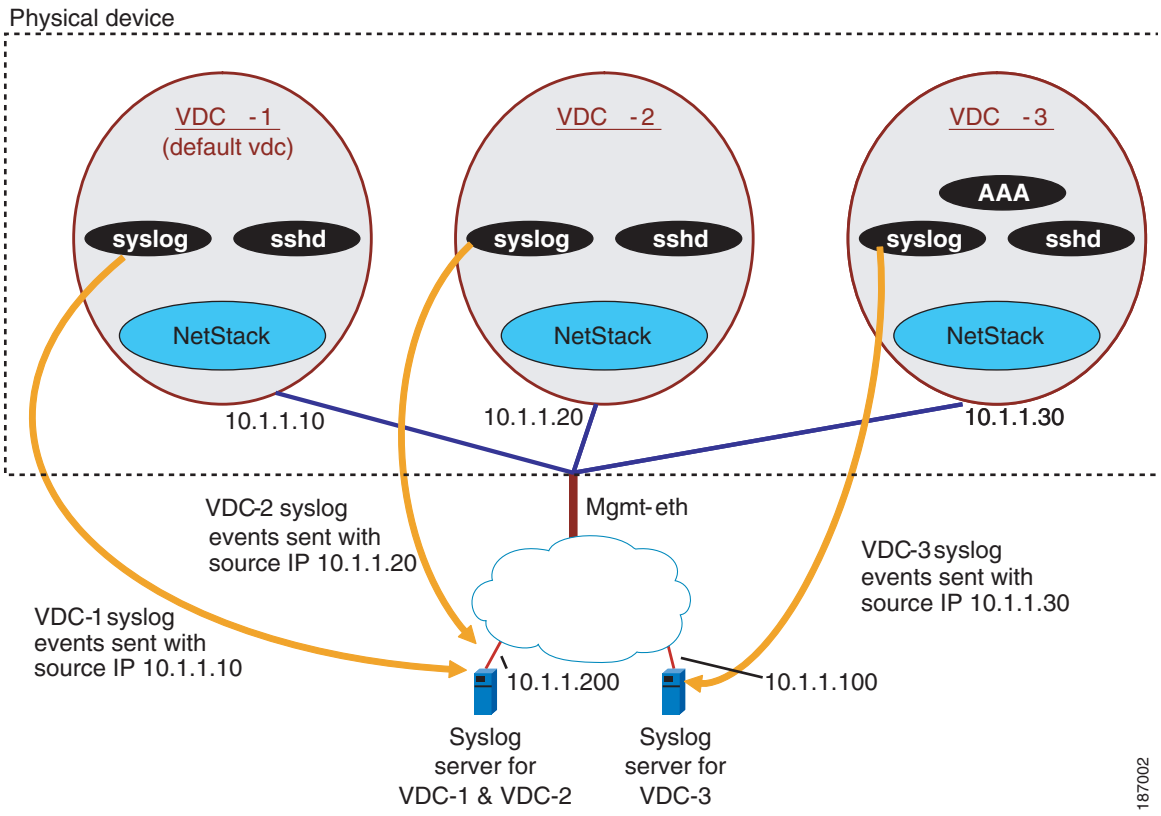
This example shows how to enter global configuration mode for a VDC:

```
switch-Enterprise# config t
switch-Enterprise(config)#
```

VDC Management Connections

The Cisco NX-OS software provides a virtual management (mgmt 0) interface for out-of-band management for each VDC. You can configure this interface with a separate IP address that is accessed through the physical mgmt 0 interface (see Figure 1-7). Using the virtual management interface allows you to use only one management network, which can share the AAA servers and syslog servers among the VDCs.

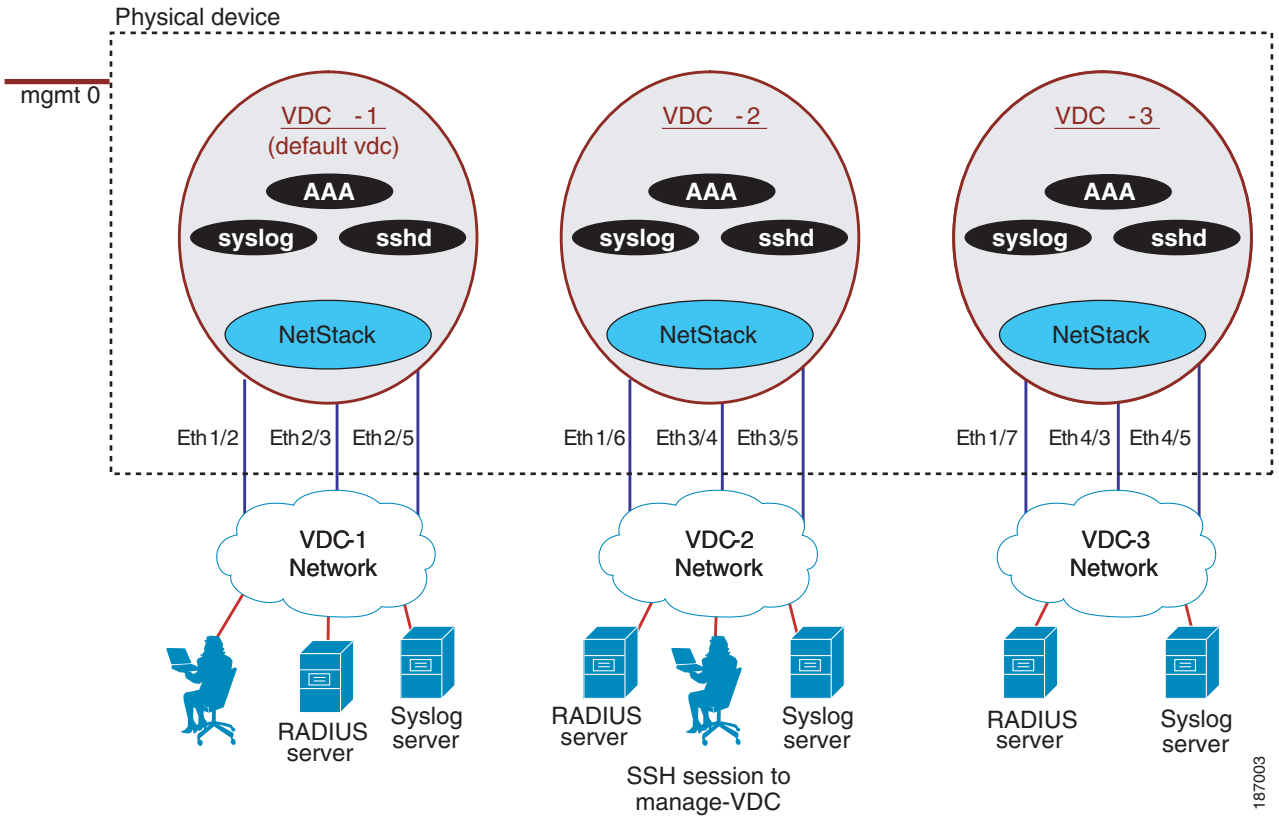
Figure 1-7 Out-of-Band VDC Management Example



VDCs also support in-band management. You can access the VDC using one of the Ethernet interfaces that are allocated to the VDC (see Figure 1-8). Using the in-band management allows you to use only separate management networks, which ensures the separation of the AAA servers and syslog servers among the VDCs.

Note The admin VDC and the storage VDC do not support the in-band management.

Figure 1-8 In-Band VDC Management Example

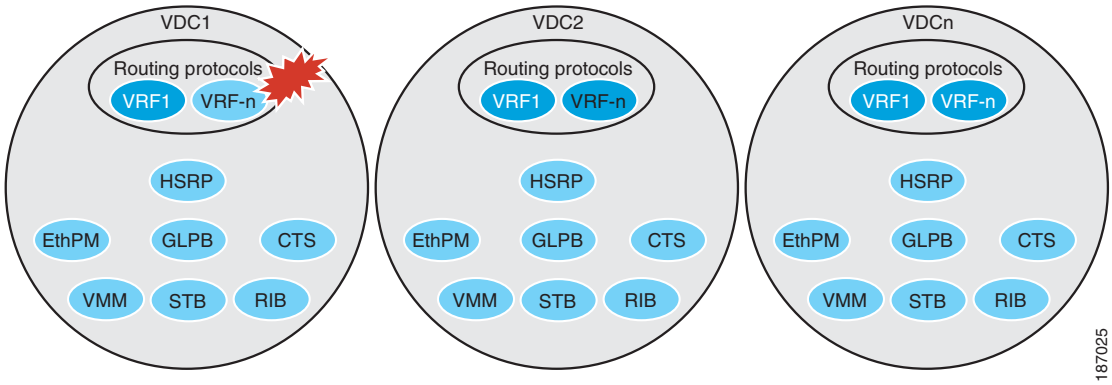


VDC Fault Isolation

The VDC architecture can prevent failures within one VDC from impacting other VDCs on the same physical device. For instance, an Open Shortest Path First (OSPF) process that fails in one VDC does not affect the OSPF processes in other VDCs in the same physical device.

Figure 1-9 shows that a fault in a process running in VDC 1 does not impact any of the running processes in the other VDCs.

Figure 1-9 Fault Isolation within VDCs



The Cisco NX-OS software also provides debugging and syslog message logging at the VDC level. VDC administrators can use these tools to troubleshoot problems with the VDC.

For more information about VDC troubleshooting, see the *Cisco Nexus 7000 Series NX-OS Troubleshooting Guide*.

The Cisco NX-OS software incorporates high availability (HA) features that minimize the impact on the data plane if the control plane fails or a switchover occurs. The different HA service levels provide data plane protection, including service restarts, stateful supervisor module switchovers, and in-service software upgrades (ISSUs). All of these high availability features support VDCs.

For more information about HA in the Cisco NX-OS software, see the *Cisco Nexus 7000 Series NX-OS High Availability and Redundancy Guide*.

Cisco NX-OS Feature Support in VDCs

VDC support for the Cisco NX-OS software features varies, depending on the feature. For most of the Cisco NX-OS software features, configuration and operation are local to the current VDC. However, exceptions are as follows:

- Control Plane Policing (CoPP)—Because of the hardware support, you can configure CoPP policies only in the default and the admin VDCs. The CoPP policies apply across all VDCs on the physical device.
- Fabric Extender—You must install the Cisco Nexus 2000 Series Fabric Extender feature set in the default and admin VDCs before you can enable the Fabric Extender in any VDC (including the default VDC). For more information about the Fabric Extender, see the *Configuring the Cisco Nexus 2000 Series Fabric Extender.*
- FabricPath—You must install the FabricPath feature set in the default and admin VDCs before you can enable FabricPath in any VDC (including the default VDC). For more information about FabricPath see the *Cisco NX-OS FabricPath Configuration Guide for Nexus 7000.*
- FCoE—You must install the FCoE feature set in the default and admin VDCs before you can enable FCoE in any VDC (including the default VDC). For more information about FCoE, see Chapter 4, "Creating VDCs," and the *Cisco NX-OS FCoE Configuration Guide for Nexus 7000 and MDS 9500.*
- Multiprotocol Label Switching(MPLS)—You must install the MPLS feature set in the default and admin VDCs before you can enable MPLS in any VDC (including the default VDC). For more information about MPLS, see the *Cisco Nexus 7000 Series NX-OS MPLS Configuration Guide.*
- Rate limits—Because of the hardware support, you can configure rate limits only in the default VDC. The rate limits apply across all VDCs on the physical device.
- IP tunnels—In Cisco NX-OS releases prior to 4.2, you can create VDC tunnels only in the default VDC. However, beginning with Cisco NX-OS Release 4.2(1), you can put tunnel interfaces into nondefault VDCs and VRFs.
- FCoE—Beginning with the Cisco NX-OS Release 5.2(1) for the Nexus 7000 Series devices, VDCs have FCoE support to provide users with local area network (LAN)/storage area network (SAN) management separation on one physical Ethernet interface. The Cisco NX-OS supports both Ethernet and FCoE only in nondefault VDCs that control the Ethernet and storage portions of the network. You can have only one storage VDC configured on the device.

For information on VDC support for a specific feature, see the configuration information for that feature.

Configuring an Admin VDC

This chapter describes how to configure an admin virtual device context (VDC) on Cisco NX-OS devices.

This chapter includes the following sections:

- Admin VDCs, page 2-1
- Admin VDC, page 2-1
- Prerequisites for Admin VDCs, page 2-1
- Creating an Admin VDC, page 2-2
- Guidelines and Limitations for Creating Admin VDCs, page 2-2
- Configuring an Admin VDC, page 2-3
- Configuration Examples for Admin VDCs, page 2-4
- Additional References for Admin VDCs, page 2-5
- Feature History for Admin VDCs, page 2-6

Admin VDCs

Beginning with Cisco NX-OS Release 6.1 you can enable an admin VDC at the initial system bootup through a setup script. It is an optional step and the creation of an admin VDC is not required. An admin VDC is used for administrative functions only.

Beginning with Cisco NX-OS Release 6.1, the Cisco NX-OS software supports Supervisor 2 and Supervisor 2E modules. With Supervisor 2/2E modules, the number of VDCs supported is increased. For the supported number of VDCs on Supervisor 2/2E modules, see the *Cisco Nexus 7000 Verified Scalability Guide*.

Prerequisites for Admin VDCs

Admin VDCs are supported on Supervisor 2 and Supervisor 2E modules only. When an admin VDC is enabled, only the mgmt0 port is allocated to the admin VDC.

Note The Advanced Services Package License and/or the VDC License are not required to enable the admin VDC.

Creating an Admin VDC

You can create an admin VDC in one of the following ways:

1. After a fresh switch bootup, a prompt is displayed to select the admin VDC. Choose **Yes** at the prompt to create an admin VDC. This option is recommended for brand new deployments. It is not recommended to use this option when migrating from Supervisor 1 to Supervisor 2/2E. For more information on the Supervisor 1 to Supervisor 2/2E migration procedure, see the following document: http://www.cisco.com/en/US/docs/switches/datacenter/hw/nexus7000/installation/guide/n7k_replacing.html#wp1051017

OR

2. Enter the **system admin-vdc** command after bootup. The default VDC becomes the admin VDC. All the nonglobal configuration in the default VDC is lost after you enter this command. This option is recommended for existing deployments where the default VDC is used only for administration and does not pass any traffic.

OR

3. You can change the default VDC to the admin VDC with the migrate option, **system admin-vdc migrate** *new vdc name*. After entering this command, the nonglobal configuration on a default VDC is migrated to the new migrated VDC. This option is recommended for existing deployments where the default VDC is used for production traffic whose downtime must be minimized.

Note If the default VDC has Fabric Extenders that are enabled and configured, the migration of the default VDC configuration can take several minutes.

Guidelines and Limitations for Creating Admin VDCs

Admin VDCs have the following configuration guidelines and limitations:

- No features or feature sets can be enabled in an admin VDC.
- No interfaces from any line card module can be allocated to an admin VDC. Only mgmt0 can be allocated to an admin VDC which means that for an admin VDC, only out-of-band management is possible through the mgmt0 interface and console port.
- When an admin VDC is enabled at bootup, it replaces the default VDC.
- Once an admin VDC is created, it cannot be deleted and it cannot be changed back to the default VDC. To change it back to the default VDC, erase the configuration and perform a fresh bootup.
- For the supported number of VDCs on Supervisor 2/2E modules, see the *Cisco Nexus 7000 Verified Scalability Guide*.

Guidelines and limitations for migrating to an admin VDC with **system admin-vdc** and **system admin-VDC migrate** commands:

- During the admin VDC migration, some feature configurations, such as access control lists (ACLs), are copied into the new VDC but they are not removed from the admin VDC. You have to explicitly remove any unwanted configurations in the admin VDC. While it is recommended to remove this configuration, keeping it does not cause any side effect.

Guidelines and limitations for migrating to an admin VDC with the **system admin-vdc migrate** command only:

- If you enable the VTP in the default VDC when you enter the **system admin-vdc migrate** command, the VTP configuration is not automatically migrated. After the migration is complete, you must reconfigure the VTP feature in the new VDC.
- If the time-zone is configured in the default VDC when you enter the **system admin-vdc migrate** command, the time-zone configuration is not automatically migrated. After the migration is complete, you must reconfigure the time-zone in the new VDC.
- As the management IP address in the default VDC is not migrated to the new VDC, some existing sessions are not automatically up in the new VDC. You have to configure a new IP address for the management interface in the VDC. Also, any external devices, for example, VPC keepalives over the management interface on the VPC peer or SNMP management stations should be reconfigured.
- During the migration, if the Cisco Nexus 7000 Series switches have enough system resources to spare, the resource limits of the default VDC are copied into the migrated VDC or the migration fails with an error message.
- If the default VDC has Fabric Extenders that are enabled and configured, the migration of the default VDC configuration can take several minutes.

Configuring an Admin VDC

SUMMARY STEPS

1. **config t**
2. **system admin-vdc** [**migrate** *new-vdc*]
3. **exit**
4. (Optional) **show vdc**
5. (Optional) **copy running-config startup-config**

DETAILED STEPS

	Command	Purpose
Step 1	**config t** **Example:** switch# config t switch(config)#	Enters global configuration mode.

	Command	Purpose
Step 2	**system admin-vdc** [**migrate** *new-vdc*] **Example:** switch(config)# system admin-vdc	Enables the admin VDC. Use this command to migrate the default VDC to the admin VDC. If the migrate option is not included in the command, the default VDC becomes the admin VDC and any additional configuration is removed. Otherwise, the configuration is migrated to a new VDC. **Note** The management Ethernet IP address is not migrated as part of the migration process between the default VDC and the admin VDC. When migrating the admin VDC, the following error message is displayed: "Interface mgmt0 will not have its IP address migrated to the new VDC."
Step 3	**exit** **Example:** switch(config-vdc)# exit switch(config)#	Exits the VDC configuration mode.
Step 4	**show vdc** **Example:** switch(config)# show vdc	(Optional) Displays the VDC status information.
Step 5	**copy running-config startup-config** **Example:** switch(config)# copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration. **Note** After you create a VDC, you must copy the default VDC running configuration to the startup configuration so that a VDC user can copy the new VDC running configuration to the startup configuration.

Configuration Examples for Admin VDCs

1. The following shows the prompts at a clean bootup to enable the admin VDC:

```
Enter the password for "admin":
Confirm the password for "admin":
Do you want to enable admin vdc (yes/no) [n]:yes

The following shows the show vdc output before the admin VDC is created:
switch(config)# sh vdc

vdc_id  vdc_name      state      mac                type        lc
------  --------      -----      ----------         ---------   ------
1       switch        active     00:26:98:0d:01:41  Ethernet    m1 f1 m1xl m2xl
2       vdc2          active     00:26:98:0d:01:42  Ethernet    m1 f1 m1xl m2xl
3       vdc3          active     00:26:98:0d:01:43  Ethernet    f2
```

2. The following shows the output of **system admin-vdc** command after bootup:

```
switch(config)# system admin-vdc
```

```
All non-global configuration from the default vdc will be removed, Are you sure
you want to continue? (yes/no) [no] yes

The following shows the show vdc output after executing system admin-vdc command:
switch(config)# sh vdc

vdc_id  vdc_name     state      mac                    type           lc
------  --------     -----      ----------             ---------      ------
1       switch       active     00:26:98:0d:01:41      Admin          None
2       vdc2         active     00:26:98:0d:01:42      Ethernet       m1 f1 m1xl m2xl
3       vdc3         active     00:26:98:0d:01:43      Ethernet       f2
```

3. The following shows the output of **system admin-vdc migrate** *new vdc name* command to migrate the default VDC to the admin VDC:

```
switch(config)# system admin-vdc migrate new-vdc
All non-global configuration from the default vdc will be removed, Are you sure
you want to continue? (yes/no) [no] yes
Note: Interface mgmt0 will not have its ip address migrated to the new vdc
Note: During migration some configuration may not be migrated.
Example: VTP will need to be reconfigured in the new vdc if it was enabled. Please
refer to configuration guide for details. Please wait, this may take a while
Note: Ctrl-C has been temporarily disabled for the duration of this command
2012 Jul 5 22:20:58 switch %$ VDC-1 %$ %VDC_MGR-2-VDC_ONLINE: vdc 4 has come
online
switch(config)#
```

The following shows the **show vdc** output after the admin VDC is created:

```
switch(config)# sh vdc

vdc_id  vdc_name        state      mac                type         lc
------  --------        -----      ----------         ---------    ------
1       switch          active     00:26:98:0d:01:41   Admin       None
2       vdc2            active     00:26:98:0d:01:42   Ethernet    m1 f1 m1xl m2xl
3       vdc3            active     00:26:98:0d:01:43   Ethernet    f2
4       new-vdc         active     00:26:98:0d:01:44   Ethernet    m1 f1 m1xl m2xl
switch(config)#
```

Additional References for Admin VDCs

For additional information related to implementing admin VDCs, see the following sections:

- Related Documents for Admin VDCs, page 2-5

Related Documents for Admin VDCs

Related Topic	Document Title
Cisco NX-OS licensing	*Cisco NX-OS Licensing Guide*
VDC commands	*Cisco Nexus 7000 Series NX-OS Virtual Device Context Command Reference*

Feature History for Admin VDCs

Table 2-1 lists the release history for this feature.

Table 2-1 Feature History for VDC Resource Templates

Feature Name	Releases	Feature Information
Admin VDC	6.1(1)	This feature was introduced on Supervisor 2 and Supervisor 2E modules.

Configuring VDC Resource Templates

This chapter describes how to configure virtual device context (VDC) resource templates on Cisco NX-OS devices.

This chapter includes the following sections:

- Information About VDC Resource Templates, page 3-1
- Licensing Requirements for VDC Templates, page 3-3
- Guidelines and Limitations for VDC Resource Templates, page 3-3
- VDC Resource Templates, page 3-4
- Configuring VDC Resource Templates, page 3-4
- Verifying the VDC Resource Template Configuration, page 3-7
- Configuration Example for VDC Resource Template, page 3-7
- Additional References for VDC Resource Templates, page 3-7
- Feature History for VDC Resource Templates, page 3-8

Information About VDC Resource Templates

VDC resource templates set the minimum and maximum limits for shared physical device resources when you create the VDC. The Cisco NX-OS software reserves the minimum limit for the resource to the VDC. Any resources allocated to the VDC beyond the minimum are based on the maximum limit and availability on the device.

You can explicitly specify a VDC resource template, or you can use the default VDC template provided by the Cisco NX-OS software. VDC templates set limits on the following resources:

- IPv4 multicast route memory
- IPv6 multicast route memory
- IPv4 unicast route memory
- IPv6 unicast route memory
- Port channels
- Switch Port Analyzer (SPAN) sessions
- VLANs
- Virtual routing and forwarding instances (VRFs)

Note The default IPv4 and IPv6 route memory available for all VDCs on the supervisor is 250 MB. Beginning with Cisco NX-OS Release 5.2(1), the default memory is 300 MB. This amount remains the same with both the 4-GB and the 8-GB supervisor. You can have approximately 11,000 routes, each with 16 next hops, in 16 MB of route memory. The **show routing memory estimate routes** *number-of-routes* **next-hops** *number-of-next-hops* command shows the amount of unicast RIB (IPv4 RIB and IPv6 RIB) shared memory needed to support the specified number of routes and next hops.

If you do not set a limit for a resource in a VDC resource template, the default limits for that resource are the same as those in the default VDC resource template. Table 3-1 lists the default template resource limits of the nondefault VDC.

Note You cannot change the limits in the default VDC resource template.

Table 3-1 Default Resource Limits for the Non default VDC

Resource	Minimum	Maximum
IPv4 multicast route memory[1]	8	8
IPv6 multicast route memory[1]	5	5
IPv4 unicast route memory[1]	8	8
IPv6 unicast route memory[1]	4	4
Port channels	0	768
SPAN sessions	0	2
ERSPAN Sessions	0	23
VLANs	16	4094
VRFs	2	4096
Inband SRC Session	0	1

1. Route memory is in megabytes.

Any changes that you make to a VDC resource template do not affect any VDCs that you created using that VDC resource template. To update a VDC with the new limits in the VDC resource, you must explicitly reapply the template to the VDC (see Chapter 5, “Managing VDCs”).

Table 3-2 lists the default template resource limits of the global default VDC.

Table 3-2 Default Resource Limits for the Default VDC

Resource	Minimum	Maximum
IPv4 multicast route memory[1]	58	58
IPv6 multicast route memory[1]	8	8
IPv4 unicast route memory[1]	96	96
IPv6 unicast routememory[1]	24	24
Port channels	0	768
SPAN sessions	0	2
ERSPAN Sessions	0	23
VLANs	16	4094
VRFs	2	4096
Inband SRC Session	0	1

1. Route memory is in megabytes.

Note Only the network administrator can change a VDC template in the default VDC.

Licensing Requirements for VDC Templates

Table 3-3 lists the licensing requirements for this feature:

Table 3-3 Licensing Requirements for VDC Templates

Product	License Requirement
Cisco NX-OS	VDC templates require no license. Any feature not included in a license package is bundled with the Cisco NX-OS system images and is provided at no extra charge to you. For a complete explanation of the Cisco NX-OS licensing scheme, see the *Cisco NX-OS Licensing Guide*.

Guidelines and Limitations for VDC Resource Templates

VDC templates have the following configuration guidelines and limitations:

- VDC templates can only be created by the network administrator in the default VDC.
- See the *Cisco Nexus 7000 Verified Scalability Guide* for information on the maximum supported number of VDC templates.

VDC Resource Templates

VDC resource templates describe the minimum and maximum resources that the VDC can use. If you do not specify a VDC resource template when you create a VDC, the Cisco NX-OS software uses the default template, vdc-default.

Note As an alternative to using VDC resource templates, you can change the individual resource limits after you create the VDC by changing an individual resource limit for a single VDC or by changing the resource limits in a nondefault VDC resource template and applying the template to the VDC. For information about managing VDC resource limits after you create a VDC, see Chapter 5, "Managing VDCs."

Note You can have a maximum of two SPAN monitoring sessions on your physical device.

You can change the individual resource limits after you create the VDC as follows:

- Change an individual resource limit for a single VDC.
- Change the resource limits in a nondefault VDC resource template and apply the template to the VDC.

For information about managing VDC resource limits after you create a VDC, see Chapter 5, "Managing VDCs."

Configuring VDC Resource Templates

The maximum amount of system resources assigned to a VDC is limited by the VDC resource template used when the VDC is created. You can create VDC resource templates that you can use when creating VDCs that have resource limits other than those provided in the default VDC resource template. For information about the maximum number of VDC resource templates that you can create, see Appendix A, "VDC Configuration Limits."

Note If you do not set limits for a resource in a VDC resource template, the default limits are the limits for that resource in the default VDC resource template (see Table 3-1 on page 3-2).

Note You can set only one value for the multicast and unicast route memory resources maximum and minimum limits. If you specify a minimum limit, that is the value for both the minimum and maximum limits and the maximum limit is ignored. If you specify only a maximum limit, that is the value for both the minimum and maximum limits.

Note You can have a maximum of two SPAN monitoring sessions on your physical device.

Note You cannot change the configuration of the default resource templates.

SUMMARY STEPS

1. **config t**
2. **vdc resource template** *vdc-template-name*
3. **limit-resource m4route-mem** [**minimum** *min-value*] **maximum** *max-value*
   limit-resource m6route-mem [**minimum** *min-value*] **maximum** *max-value*
   limit-resource monitor-session minimum *min-value* **maximum** {*max-value* | **equal-to-min**}
   limit-resource port-channel minimum *min-value* **maximum** {*max-value* | **equal-to-min**}
   limit-resource u4route-mem [**minimum** *min-value*] **maximum** *max-value*
   limit-resource u6route-mem [**minimum** *min-value*] **maximum** *max-value*
   limit-resource vrf minimum *min-value* **maximum** {*max-value* | **equal-to-min**}
4. **exit**
5. (Optional) **show vdc resource template**
6. (Optional) **copy running-config startup-config**

DETAILED STEPS

	Command	Purpose

Step 1	**config t**
	
	Example:
	`switch# config t`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**vdc resource template** *vdc-template-name*
	
	Example:
	`switch(config)# vdc resource template TemplateA`
	`switch(config-vdc-template)#`
		Specifies the VDC resource template name and enters VDC resource template configuration mode. The name is a maximum of 32 alphanumeric characters and is not case sensitive.

	Command	Purpose
Step 3	**limit-resource m4route-mem** [**minimum** *min-value*] **maximum** *max-value* **Example:** `switch(config-vdc-template)# limit-resource m4route-mem minimum 4 maximum 40`	Specifies the limits for IPv4 multicast route memory in megabytes. The range is from 1 to 90.
	limit-resource m6route-mem [**minimum** *min-value*] **maximum** *max-value* **Example:** `switch(config-vdc-template)# limit-resource m6route-mem minimum 4 maximum 8`	Specifies the limits for IPv6 multicast route memory in megabytes. The range is from 1 to 20.
	limit-resource monitor-session minimum *min-value* **maximum** {*max-value* | **equal-to-min**} **Example:** `switch(config-vdc-template)# limit-resource monitor-session minimum 1 maximum equal-to-min`	Specifies the limits for SPAN monitor session resources. The default minimum value is 0. The default maximum value is 2. The range is from 0 to 2. The **equal-to-min** keyword automatically sets the maximum limit equal to the minimum limit. **Note** You can have a maximum of two SPAN monitoring sessions on your physical device.
	limit-resource port-channel minimum *min-value* **maximum** {*max-value* | **equal-to-min**} **Example:** `switch(config-vdc-template)# limit-resource port-channel minimum 4 maximum 128`	Specifies the limits for port channels. The default minimum value is 0. The default maximum value is 768. The range is from 0 to 768. The **equal-to-min** keyword automatically sets the maximum limit equal to the minimum limit.
	limit-resource u4route-mem [**minimum** *min-value*] **maximum** *max-value* **Example:** `switch(config-vdc-template)# limit-resource u4route-mem minimum 4 maximum 40`	Specifies the limits for IPv4 unicast route memory in megabytes. The range is from 1 to 250.
	limit-resource u6route-mem [**minimum** *min-value*] **maximum** *max-value* **Example:** `switch(config-vdc-template)# limit-resource u6route-mem minimum 4 maximum 32`	Specifies the limits for IPv6 unicast route memory in megabytes. The range is from 1 to 100.
	limit-resource vrf minimum *min-value* **maximum** {*max-value* | **equal-to-min**} **Example:** `switch(config-vdc-template)# limit-resource vrf minimum 32 maximum 1000`	Specifies the limits for VRF. The range is from 2 to 1000. The **equal-to-min** keyword automatically sets the maximum limit equal to the minimum limit.

Step 4	**exit**
	
	Example:
	`switch(config-vdc-template)# exit`
	`switch(config)#`
		Exits VDC template configuration mode.

Step 5	**show vdc resource template** **Example:** `switch(config)# show vdc resource template`	(Optional) Displays VDC template configuration information.

	Command	Purpose
Step 6	**copy running-config startup-config** **Example:** `switch(config)# copy running-config startup-config`	(Optional) Copies the running configuration to the startup configuration.

Verifying the VDC Resource Template Configuration

To display VDC resource template configuration information, perform one of the following tasks:

Command	Purpose
show running-config {**vdc** | **vdc-all**}	Displays the VDC information in the running configuration.
show vdc resource template [*template-name*]	Displays the VDC template configuration.

For detailed information about the fields in the output from this command, see the *Cisco Nexus 7000 Series NX-OS Virtual Device Context Command Reference*.

Configuration Example for VDC Resource Template

The following example shows how to configure a VDC resource template:

```
vdc resource template TemplateA
  limit-resource port-channel minimum 4 maximum 128
  limit-resource span-ssn minimum 1 maximum equal-to-min
  limit-resource vlan minimum 32 maximum 1024
  limit-resource vrf minimum 32 maximum 1000
```

Additional References for VDC Resource Templates

For additional information related to implementing VDCs, see the following section:

- Related Documents for VDC Resource Templates, page 3-7

Related Documents for VDC Resource Templates

Related Topic	Document Title
Cisco NX-OS licensing	*Cisco NX-OS Licensing Guide*
VDC commands	*Cisco Nexus 7000 Series NX-OS Virtual Device Context Command Reference*

Feature History for VDC Resource Templates

Table 3-4 lists the release history for this feature.

Table 3-4 Feature History for VDC Resource Templates

Feature Name	Releases	Feature Information
VDC resource templates	6.0(1)	No change from Release 5.2.
VDC resource templates	5.2(1)	No change from Release 5.1.
VDC resource templates	5.1(1)	No change from Release 5.0.
IPv4 multicast route memory resource	5.0(2)	Changed the range for the minimum and maximum values.
IPv6 multicast route memory resource	5.0(2)	Changed the range for the minimum and maximum values.
IPv4 unicast route memory resource	5.0(2)	Changed the range for the minimum and maximum values.
IPv6 unicast route memory resource	5.0(2)	Changed the range for the minimum and maximum values.
VRF resource	5.0(2)	Changed the range for the minimum and maximum values.
VDC resource templates	4.2(1)	No change from Release 4.1(2).
IPv4 unicast route memory resource	4.1(2)	Changed the default maximum value from 256 to 8.
IPv6 unicast route memory resource	4.1(2)	Changed the default maximum value from 256 to 4.
Multicast route memory resources	4.1(2)	Added IPv4 and IPv6 multicast route memory resources.
Port channel resources	4.1(2)	Changed the default maximum value from 256 to 768.
IPv4 unicast route memory resource	4.0(2)	Changed the default maximum value from 256 to 320.
IPv6 unicast route memory resource	4.0(2)	Changed the default maximum value from 256 to 192.

Creating VDCs

This chapter describes how to create virtual device contexts (VDCs) on Cisco NX-OS devices.

This chapter includes the following sections:

- Information About Creating VDCs, page 4-1
- Licensing Requirements for VDCs, page 4-5
- Prerequisites for Creating VDCs, page 4-6
- Guidelines and Limitations for VDCs, page 4-6
- Default Settings for Creating VDCs, page 4-7
- Process for Creating VDCs, page 4-7
- Initializing a VDC, page 4-12
- Verifying the VDC Configuration, page 4-13
- Configuration Example for Ethernet VDC Creation and Initialization, page 4-13
- Configuration Examples for Default and Nondefault VDCs, page 4-16
- Additional References for Creating VDCs, page 4-17
- Feature History for Creating VDCs, page 4-17

Information About Creating VDCs

In Cisco NX-OS, only a user with the network-admin role can create VDCs.

Beginning with the Cisco NX-OS Release 5.2(1), you can run Fibre Channel over Ethernet (FCoE) on the Cisco Nexus 7000 Series devices. You must create a storage VDC to run FCoE. The storage VDC cannot be the default VDC and you can have one storage VDC on the device. See the *Cisco NX-OS FCoE Configuration Guide for Cisco Nexus 7000 and Cisco MDS 9500* for information on configuring FCoE.

This section includes the following topics:

- Storage VDCs, page 4-2
- High-Availability Policies, page 4-2
- Allocating Interfaces, page 4-2
- VDC Management Connections, page 4-5
- Initializing a New VDC, page 4-5

Storage VDCs

Beginning with Cisco NX-OS Release 5.2(1), you can run FCoE on the Cisco Nexus 7000 Series devices. You must create a separate storage VDC when you run FCoE on the device. Only one of the VDCs can be a storage VDC, and the default VDC cannot be configured as a storage VDC.

See the *Cisco NX-OS FCoE Configuration Guide for Cisco Nexus 7000 and Cisco MDS 9500* for information on configuring FCoE. You allocate specified FCoE VLANs to the storage VDC as well as specified interfaces.

You can configure shared interfaces that carry both Ethernet and Fibre Channel traffic. In this specific case, the same interface belongs to more than one VDC. The shared interface is allocated to both an Ethernet and a storage VDC.

High-Availability Policies

The high-availability (HA) policies for a VDC defines the action that the Cisco NX-OS software takes when an unrecoverable VDC fault occurs.

You can specify the HA policies for single supervisor module or dual supervisor module configurations when you create the VDC. The HA policy options are as follows:

- Single supervisor module configuration:
  - Bringdown—Puts the VDC in the failed state.
  - Reload— Reloads the supervisor module.
  - Restart—Takes down the VDC processes and interfaces and restarts it using the startup configuration.
- Dual supervisor module configuration:
  - Bringdown—Puts the VDC in the failed state.
  - Restart—Takes down the VDC processes and interfaces and restarts it using the startup configuration.
  - Switchover— Initiates a supervisor module switchover.

The default HA policies for a nondefault VDC that you create is restart for a single supervisor module configuration and switchover for a dual supervisor module configuration. The default HA policy for the default VDC is reload for a single supervisor module configuration and switchover for a dual supervisor module configuration.

For information about changing the HA policies after you create a VDC, see Chapter 5, “Managing VDCs.”

Allocating Interfaces

Note See the *Cisco NX-OS FCoE Configuration Guide for Cisco Nexus 7000 and Cisco MDS 9500* for information on allocating interfaces for storage VDCs and FCoE.

The only physical resources that you can allocate to a VDC are the physical interfaces. You can assign an interface to only one VDC, except in the specific case of shared interfaces that carry both Fibre Channel and Ethernet traffic. You allocate a shared interface to both an Ethernet VDC and to the storage VDC. When you move an interface from one VDC to another VDC, the interface loses its configuration.

When you first create a VDC, you can specifically allocate interfaces to it. All interfaces initially reside in the default VDC (VDC 1). After you allocate the interfaces to a VDC, you can only view and configure them from that specific VDC. You can also remove interfaces from a VDC by moving them back to the default VDC.

Caution When you move an interface, all configuration on the interface is lost and the interfaces are in the down state.

Note Beginning with Cisco Release 5.2(1) for Nexus 7000 Series devices, all members of a port group are automatically allocated to the VDC when you allocate an interface.

You must be aware of the hardware architecture of your platform when allocating interfaces to a VDC. You can allocate the interfaces on your physical device in any combination. Refer to Table 4-1 and Table 4-2 for the port numbering for the port groups.

Beginning with Cisco NX-OS Release 6.1, the following M2 Series modules are supported on Cisco Nexus 7000 Series platforms:

- 24-port 10G (N7K-M224XP-23L)
- 6-port 40G (N7K-M206FQ-23L)
- 2-port 100G (N7K-M202-CF-22L)

Note There is no port group restriction on M2 Series modules. Any port in M2 Series modules can be placed in any VDC.

Table 4-1 Port Numbers for Port Groups on the Cisco Nexus 7000 Series 32-Port, 10-Gbps Ethernet Module N7K-M132XP-12

Port Group	Port Numbers
Group 1	1, 3, 5, 7
Group 2	2, 4, 6, 8
Group 3	9, 11, 13, 15
Group 4	10, 12, 14, 16
Group 5	17, 19, 21, 23
Group 6	18, 20, 22, 24
Group 7	25, 27, 29, 31
Group 8	26, 28, 30, 32

You must allocate the interfaces on your physical device in the specified combination on the Cisco Nexus 7000 Series 32-port, 10-Gbps Ethernet module N7K-F132XP-15. This module has 16 port groups that consist of 2 ports each. You must assign the specified port pairs in the same VDC. Table 4-2 shows the port numbering for the port groups.

Table 4-2 Port Numbers for Port Groups on the Cisco Nexus 7000 Series 32-Port, 10-Gbps Ethernet Module N7K-F132XP-15

Port Group	Port Number
Group 1	1 and 2
Group 2	3 and 4
Group 3	5 and 6
Group 4	7 and 8
Group 5	9 and 10
Group 6	11 and 12
Group 7	13 and 14
Group 8	15 and 16
Group 9	17 and 18
Group 10	19 and 20
Group 11	21 and 22
Group 12	23 and 24
Group 13	25 and 26
Group 14	27 and 28
Group 15	29 and 30
Group 16	31 and 32

You must allocate the interfaces on your physical device in the specified combination on the Cisco Nexus 7000 Series 48-port, 10-Gbps Ethernet module N7K-F248XP-25[E]. This module has 12 port groups that consist of 4 ports each. You must assign all four ports in a port group to the same VDC. Table 4-3 shows the port numbering for the port groups.

Table 4-3 Port Numbers for Port Groups on the Cisco Nexus 7000 Series 10-Gbps Ethernet Module N7K-F248XP-25[E]

Port Group	Port Numbers
Group 1	1, 2, 3, 4
Group 2	5, 6, 7, 8
Group 3	9, 10, 11, 12
Group 4	13, 14, 15, 16
Group 5	17, 18, 19, 20
Group 6	21, 22, 23, 24
Group 7	25, 26, 27, 28
Group 8	29, 30, 31, 32

Table 4-3 Port Numbers for Port Groups on the Cisco Nexus 7000 Series 10-Gbps Ethernet Module N7K-F248XP-25[E]

Port Group	Port Numbers
Group 9	33, 34, 35, 36
Group 10	37, 38, 39, 40
Group 11	41, 42, 43, 44
Group 12	45, 46, 47, 48

For more information about port groups on the Cisco Nexus 7000 Series 32-port, 10-Gbps Ethernet modules, see the *Cisco Nexus 7000 Series Hardware Installation and Reference Guide*. For information about changing the interface allocation after you create a VDC, see Chapter 5, "Managing VDCs."

VDC Management Connections

The Cisco NX-OS software provides a virtual management (mgmt 0) interface for out-of-band management of each VDC. You can configure this interface with a separate IP address that is accessed through the physical mgmt 0 interface. You also use one of the Ethernet interfaces on the physical device for in-band management. For more information about management connections, see the "VDC Management Connections" section on page 1-11.

Initializing a New VDC

A new VDC is similar to a new physical device. You must set the VDC admin user account password and perform the basic configuration to establish connectivity to the VDC.

Licensing Requirements for VDCs

The following table shows the licensing requirements for VDCs:

Table 4-4 Licensing Requirements for VDC

Product	Supervisor Modules	No. of VDCs	License Requirement
Cisco NX-OS	Supervisor 1 modules	3 non default VDCs and 1 default VDC	You can use the Advanced Services Package License and the VDC License interchangeably on Supervisor 1 modules. You can create up to three non default VDCs on Supervisor 1 modules.
	Supervisor 2 modules	4 non default VDCs and 1 admin VDC	You can use the Advanced Services Package License and the VDC License interchangeably on Supervisor 2 modules. You can create up to four non default VDCs and 1 admin VDC on Supervisor 2 modules. If VDC1 is the default VDC, you can create three non default VDCs.
	Supervisor 2E modules	8 non default VDCs and 1 admin VDC	You can use a combination of Advanced Services and the VDC License or two VDC Licenses on Supervisor 2E modules. Each count of VDC License covers four VDCs. You can create up to eight non default VDCs and one admin VDC on Supervisor 2E modules. If VDC1 is the default VDC, you can create seven non default VDCs. For a complete explanation of the Cisco NX-OS licensing scheme and how to obtain and apply licenses, see the *Cisco Nexus 7000 Verified Scalability Guide* and *Cisco NX-OS Licensing Guide*.

Prerequisites for Creating VDCs

VDC creation has the following prerequisites:

- You are logged on to the default or admin VDC with a username that has the network-admin user role.
- The Advance Services Package License and/or the VDC license is installed for the additional VDCs.
- You have a name for the VDC.
- You have resources available on the physical device to allocate to the VDCs.

Guidelines and Limitations for VDCs

VDCs have the following configuration guidelines and limitations:

- Standard VDCs cannot share interfaces, VLANs, Virtual Routing and Forwarding (VRF) tables, or port channels.
- Only users with the network-admin role can create VDCs.
- The following guidelines and limitations apply to the **switchto vdc** command:
  - Only users with the network-admin or network-operator role can use the **switchto vdc** command. No other users are permitted to use it.
  - No user can grant permission to another role to use the **switchto vdc** command.
  - After a network-admin uses the **switchto vdc** command, this user becomes a vdc-admin for the new VDC. Similarly, after a network-operator uses the **switchto vdc** command, this user becomes a vdc-operator for the new VDC. Any other roles associated with the user are not valid after the **switchto vdc** command is entered.

  - After a network-admin or network-operator uses the **switchto vdc** command, this user cannot use this command to switch to another VDC. The only option is to use the **switchback** command to return to the original VDC.

- The VDCs do not support F2 and F2E Series modules by default. You can allocate F2/F2E ports to a VDC only after limiting the VDC module type to F2.
- F2 and F2E Series modules cannot exist in the same VDC with any other module type. This applies to both LAN and storage VDCs.
- F2 and F2E Series modules support FCoE only with Supervisor 2 modules.

Default Settings for Creating VDCs

Table 4-5 lists the default settings for VDC parameters.

Table 4-5 Default VDC Parameter Settings

Parameters	Default
Default VDC HA policies	**reload** for single supervisor module configurations **switchover** for dual supervisor module configurations
nondefault VDC HA policies	**restart** for single supervisor module configurations **switchover** for dual supervisor module configurations
VDC ID	First available
Interface allocation	Only on FCoE VDCs. For FCoE VDC, the module type support cannot be changed.

Process for Creating VDCs

To create VDCs, follow these steps:

Step 1 If necessary, create a VDC resource template (see Chapter 3, "Configuring VDC Resource Templates").

Step 2 Create the VDC and allocate interfaces (see the "Creating VDCs" section on page 4-8).

Step 3 Initialize the VDC (see the "Initializing a VDC" section on page 4-12).

Note Allocating interfaces to a VDC is optional. You can allocate the interfaces after you have verified the VDC configuration. For information about allocating interfaces, see the "Allocating Interfaces to an Ethernet VDC" section on page 5-9.

Note When creating an FCoE type VDC, you must enter the **type storage** command at the time the nondefault VDC is being created, because it cannot be specified later. You must also allocate specified VLANs as FCoE VLANs that will run only in the storage VDC. For details about implementing FCoE and allocating interfaces, see the *Cisco NX-OS FCoE Configuration Guide for Cisco Nexus 7000 and Cisco MDS 9500.*

Note You can enable FCoE on F1 Series modules with Supervisor 1 modules. You can also enable FCoE on F1 Series modules and on the F248XP-25[E] Series with Supervisor 2 and Supervisor 2E modules.

Note You cannot enable FCoE on F2 and F2E Series modules with Supervisor 1 modules.

Creating VDCs

You must create a VDC before you can use it.

Note VDC creation can take a few minutes to complete. Use the **show vdc** command to verify the completion of the create request.

BEFORE YOU BEGIN

Log in to the default or admin VDC as a network administrator.

Choose a VDC resource template if you want to use resource limits other than those limits provided in the default VDC resource template. If there is no resource template available with the limits you want to use, see Chapter 3, "Configuring VDC Resource Templates."

Note When creating an FCoE type VDC, you must enter the **type storage** command at the time the nondefault VDC is being created, because it cannot be specified later. For information on allocating FCoE VLANs and interfaces to the storage VDC, see the *Cisco NX-OS FCoE Configuration Guide for Cisco Nexus 7000 and Cisco MDS 9500*.

SUMMARY STEPS

1. **config t**
2. **vdc** {**switch** | *vdc-name*} [**ha-policy** {**dual-sup** {**bringdown** | **restart** | **switchover**} [**single-sup** {**bringdown** | **reload** | **restart**}] [**id** *vdc-number*] [**template** *template-name*] [**template** *template-name*] [**type storage**]
3. (Optional) [**no**] **allocate interface ethernet** *slot/port*

   [**no**] **allocate interface ethernet** *slot/port - last-port*

   [**no**] **allocate interface ethernet** *slot/port*, **ethernet** *slot/port*,...

4. (Optional) **show vdc membership**
5. (Optional) **show vdc shared membership**
6. **exit**
7. (Optional) **show vdc**
8. (Optional) **copy running-config startup-config**

DETAILED STEPS

	Command	Purpose
Step 1	**config t** **Example:** switch# config t switch(config)#	Enters global configuration mode.

Command	Purpose

Step 2 **vdc** {**switch** | *vdc-name*} [**ha-policy** {**dual-sup** {**bringdown** | **restart** | **switchover**} | **single-sup** {**bringdown** | **reload** | **restart**}] [**id** *vdc-number*] [**template** *template-name*] [**type storage**]
 	
Example:
`switch(config)# vdc admin-vdc`
`switch(config-vdc)#`
	Creates a VDC and enters the VDC configuration mode. The keywords and arguments are as follows:
	• **switch**—Specifies the default VDC. VDC number 1 is reserved for the default VDC.
	• *vdc-name*—Specifies a nondefault VDC. The VDC name can be a maximum of 32 characters. The VDC name cannot begin with a number. Nondefault VDC numbers are from 2 to 9. The next available number is assigned when creating a nondefault VDC.
	• **ha-policy dual-sup**:
	– **bringdown**—Puts the VDC in the failed state.
	– **restart**—Takes down the VDC processes and interfaces and restarts them using the startup configuration.
	– **switchover**—(Default) Initiates a supervisor module switchover.
	• **ha-policy single-sup**:
	– **bringdown**—Puts the VDC in the failed state.
	– **reload**—Reloads the supervisor module.
	– **restart**—(Default) Takes down the VDC processes and interfaces and restarts them using the startup configuration.
	• **id**—Specifies the VDC ID.
	• **template**—Specifies the VDC resource template. The default resource template is used if you do not specify one.
	• **type storage**—Specifies a non default VDC as a storage VDC.
	
	Note You must enter the **type storage** keyword when you create the nondefault VDC because you cannot specify this keyword after the nondefault VDC has been created. See the *Cisco NX-OS FCoE Configuration Guide for Cisco Nexus 7000 and Cisco MDS 9500* for information on configuring FCoE.

	Command	Purpose
Step 3	[**no**] **allocate interface ethernet** *slot/port* **Example:** switch(config-vdc)# allocate interface ethernet 2/1 Moving ports will cause all config associated to them in source vdc to be removed. Are you sure you want to move the ports? [yes] yes **Example:** switch(config-vdc)# allocate interface ethernet 2/2	(Optional) Allocates one interface to the VDC. The *slot/port* argument specifies the interface that you are allocating. Use the **no** option of the command to remove an interface from the VDC and place it in an unallocated pool.
	[**no**] **allocate interface ethernet** *slot/port* **-** *last-port* **Example:** switch(config-vdc)# allocate interface ethernet 2/1 - 4 Moving ports will cause all config associated to them in source vdc to be removed. Are you sure you want to move the ports? [yes] yes	(Optional) Allocates a range of interfaces on the same module to the VDC. The *slot* argument specifies the slot, the port argument specifies the first interface in the range, and the *last-port* argument specifies the last interface in the range that you are allocating.
	[**no**] **allocate interface ethernet** *slot/port*, **ethernet** *slot/port*, ... **Example:** switch(config-vdc)# allocate interface ethernet 2/1, ethernet 2/3, ethernet 2/5 Moving ports will cause all config associated to them in source vdc to be removed. Are you sure you want to move the ports? [yes] yes	(Optional) Allocates a list of interfaces to the VDC. The *slot/port* argument specifies the interface that you are allocating. You can specify several interfaces using commas as delimiters.
Step 4	**show vdc membership** **Example:** switch(config-vdc) show vdc membership	(Optional) Displays the interface membership for the VDCs.
Step 5	**show vdc shared membership** **Example:** switch(config-vdc) show vdc shared membership	(Optional) Displays the shared interface membership for the VDCs.
Step 6	**exit** **Example:** switch(config-vdc)# exit switch(config)#	Exits the VDC configuration mode.
Step 7	**show vdc** **Example:** switch(config)# show vdc	(Optional) Displays the VDC status information.

	Command	Purpose
Step 8	**copy running-config startup-config** **Example:** `switch(config)# copy running-config startup-config`	(Optional) Copies the running configuration to the startup configuration. **Note** After you create a VDC, you must copy the default VDC running configuration to the startup configuration so that a VDC user can copy the new VDC running configuration to the startup configuration.

Initializing a VDC

A newly created VDC is much like a new physical device. To access a VDC, you must first initialize it. The initialization process includes setting the VDC admin user account password and optionally running the setup script (see the "Configuration Example for Ethernet VDC Creation and Initialization" section on page 4-13). The setup script helps you to perform basic configuration tasks such as creating more user accounts and configuring the management interface.

Note The VDC admin user account in the nondefault VDC is separate from the network admin user account in the default VDC. The VDC admin user account has its own password and user role.

BEFORE YOU BEGIN

Log in to the default or admin VDC as a network administrator.

Obtain an IPv4 or IPv6 address for the management interface (mgmt 0) if you want to use out-of-band management for the VDC.

SUMMARY STEPS

1. **switchto vdc** *vdc-name*
2. (Optional) **show vdc current-vdc**

DETAILED STEPS

	Command	Purpose

Step 1	**switchto vdc** *vdc-name*
	
	Example:
	`switch# switchto vdc NewVDC`
	`switch-NewVDC#`
		Switches to the VDC.

Step 2	**show vdc current-vdc** **Example:** `switch-NewVDC# show vdc current-vdc`	(Optional) Displays the current VDC number.

Verifying the VDC Configuration

To display the VDC configuration, perform one of the following tasks:

Command	Purpose
show running-config {**vdc** | **vdc-all**}	Displays the VDC information in the running configuration. Use this command in the default VDC to display the configuration for all VDCs on the physical device.
show vdc [*vdc-name*] [**detail**]	Displays the VDC status information. Use this command in the default VDC to display the status of all VDCs.
show vdc current-vdc	Displays the current VDC number.
show vdc membership [**status**]	Displays the VDC interface membership information. Use this command to ensure that you move the correct interfaces to a VDC.
show vdc shared membership	Displays the shared VDC interface membership information.
show vdc resource template	Displays the VDC template configuration. Use this command to verify the configuration of a VDC resource template before using it to create your VDC.

For information about the fields in the output from these commands, see the *Cisco Nexus 7000 Series NX-OS Virtual Device Context Command Reference*.

Configuration Example for Ethernet VDC Creation and Initialization

Note Beginning with the Cisco NX-OS Release 5.2(1), you can run FCoE on the Cisco Nexus Series 7000 devices. You must create a separate storage VDC to run FCoE. See the *Cisco NX-OS FCoE Configuration Guide for Cisco Nexus 7000 and Cisco MDS 9500* for an example of configuring a storage VDC.

The following example shows how to create and initialize a VDC:

```
switch# config t
switch(config)# vdc test
switch(config-vdc)# allocate interface ethernet 2/46
Moving ports will cause all config associated to them in source vdc to be removed. Are you
sure you want to move the ports?  [yes] yes
switch(config-vdc)# exit
switch(config)# switchto vdc test


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

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

  Enter the password for "admin":<password>
  Confirm the password for "admin":<password>
```

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

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

Please register Cisco Nexus7000 Family devices promptly with your
supplier. Failure to register may affect response times for initial
service calls. Nexus7000 devices must be registered to receive
entitled support services.

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

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


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

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

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

  Enter the switch name : Test

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

    Mgmt0 IPv4 address : 10.10.5.5

    Mgmt0 IPv4 netmask : 255.255.254.0

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

    IPv4 address of the default gateway : 10.10.5.1

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

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

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

    Type of ssh key you would like to generate (dsa/rsa/rsa1) : rsa

    Number of  key bits <768-2048> : 768

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

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

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

The following configuration will be applied:
  switchname Test
interface mgmt0
ip address 10.10.5.5 255.255.254.0
no shutdown
exit
vrf context management
ip route 0.0.0.0/0 10.10.5.1
exit
  telnet server enable
  ssh key rsa 768 force
  ssh server enable
  system default switchport shutdown
```

```
  system default switchport trunk mode on

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

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

[########################################] 100%

Cisco Data Center Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
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The copyrights to certain works contained herein are owned by
other third parties and are used and distributed under license.
Some parts of this software may be covered under the GNU Public
License or the GNU Lesser General Public License. A copy of
each such license is available at
http://www.gnu.org/licenses/gpl.html and
http://www.gnu.org/licenses/lgpl.html
switch-test# exit
switch#
```

The following example displays the prompt to choose admin VDC during the switch bootup:

```
  Enter the password for "admin":
  Confirm the password for "admin":

  Do you want to enable admin vdc (yes/no) [n]:yes
```

The following example shows how to change the name of a VDC:

```
n7k-ts-2# show vdc

vdc_id  vdc_name      state               mac
------  --------      -----               ----------
1       n7k-ts-2      active             00:22:55:7a:72:c1
2       c2            active             00:22:55:7a:72:c2
3       d2            active             00:22:55:7a:72:c3 <----! current name is 'd2'
4       dcn-sv        active             00:22:55:7a:72:c4

n7k-ts-2# switchto vdc d2

n7k-ts-2-d2(config)# hostname d2-new

n7k-ts-2-d2-new# 2010 Mar 16 18:40:40 n7k-ts-2-d2-new %$ VDC-3 %$
%VSHD-5-VSHD_SYSLOG_CONFIG_I: Configured from vty by  on console0

n7k-ts-2-d2-new# exit

n7k-ts-2# show vdc

vdc_id  vdc_name      state               mac
------  --------      -----               ----------
1       n7k-ts-2      active             00:22:55:7a:72:c1
2       c2            active             00:22:55:7a:72:c2
3       d2-new        active             00:22:55:7a:72:c3 <-----!!! VDC name changed
4       dcn-sv        active             00:22:55:7a:72:c4

n7k-ts-2# show running-config vdc

!Command: show running-config vdc

vdc d2-new id 3   <------------------ VDC name changed!!!!
  allocate interface
```

```
Ethernet1/1-9,Ethernet1/11,Ethernet1/13,Ethernet1/15,Ethern
et1/25,Ethernet1/27,Ethernet1/29,Ethernet1/31
  allocate interface Ethernet2/2-12
  boot-order 1
  limit-resource vlan minimum 16 maximum 4094
  limit-resource monitor-session minimum 0 maximum 2
  limit-resource vrf minimum 16 maximum 200
  limit-resource port-channel minimum 0 maximum 768
  limit-resource u4route-mem minimum 8 maximum 8
```

Configuration Examples for Default and Nondefault VDCs

This section includes the following topics:

- Example Running Configuration from the Default VDC, page 4-16
- Example Running Configuration from a Nondefault VDC, page 4-16

Example Running Configuration from the Default VDC

The following example shows a nondefault VDC configuration from the running configuration of the default VDC:

```
vdc payroll id 2
  limit-resource vlan minimum 16 maximum 4094
  limit-resource monitor-session minimum 0 maximum 2
  limit-resource vrf minimum 16 maximum 1000
  limit-resource port-channel minimum 0 maximum 192
  limit-resource u4route-mem minimum 8 maximum 80
  limit-resource u6route-mem minimum 4 maximum 48
```

Example Running Configuration from a Nondefault VDC

The following example shows the initial running configuration from a nondefault VDC:

```
version 4.0(1)
username admin password 5 $1$/CsUmTw5$/.3SZpb8LRsk9HdWAsQ501  role vdc-admin
telnet server enable
ssh key rsa 768 force
aaa group server radius aaa-private-sg
    use-vrf management
snmp-server user admin vdc-admin auth md5 0x061d8e733d8261dfb2713a713a95e87c priv
0x061d8e733d8261dfb2713a713a95e87c localizedkey
vrf context management
  ip route 0.0.0.0/0 10.10.5.1

interface Ethernet2/46

interface mgmt0
  ip address 10.10.5.5/23
```

Additional References for Creating VDCs

For additional information related to creating VDCs, see the following section:

- Related Documents for Creating VDCs, page 4-17

Related Documents for Creating VDCs

Related Topic	Document Title
Cisco NX-OS licensing	*Cisco NX-OS Licensing Guide*
Cisco Nexus 7000 Series 32-port 10-Gbps Ethernet modules	*Cisco Nexus 7000 Series Hardware Installation and Reference Guide*
Command reference	*Cisco Nexus 7000 Series NX-OS Virtual Device Context Command Reference*
FCoE commands	*Cisco NX-OS FCoE Command Reference for Cisco Nexus 7000 and Cisco MDS 9500*

Feature History for Creating VDCs

Table 4-6 lists the release history for this feature.

Table 4-6 Feature History for Creating VDC

Feature Name	Releases	Feature Information
F2E Series modules	6.1(2)	Added support for storage VDCs on F2E Series modules
Supervisor modules, Number of VDCs, and the VDC license	6.1(1)	Added support for the new supervisor modules and increased number of VDCs, support for storage VDCs on F2 Series modules,and the VDC license requirement for Supervisor 2 and additional VDCs.
F2 Series module	6.0(1)	Added support for the F2 Series module.
Creating VDCs	6.0(1)	No change from Release 5.2.
FCoE	5.2(1)	Added support for storage VDCs and the FCoE feature.
N7K-F132XP-15 module	5.1(1)	Added support for the N7K-F132XP-15 module.
Creating VDCs	4.2(1)	No change from Release 4.1(2).
IPv4 unicast route memory resource	4.1(2)	Changed the default maximum value from 256 to 8.
IPv6 unicast route memory resource	4.1(2)	Changed the default maximum value from 256 to 4.
Multicast route memory resources	4.1(2)	Added IPv4 and IPv6 multicast route memory resources.
Port channel resources	4.1(2)	Changed the default maximum value from 256 to 768.
IPv4 unicast route memory resource	4.0(2)	Changed the default maximum value from 256 to 320.
IPv6 unicast route memory resource	4.0(2)	Changed the default maximum value from 256 to 192.

Managing VDCs

This chapter describes how to manage virtual device contexts (VDCs) on Cisco NX-OS devices.

This chapter includes the following sections:

- Information About Managing VDCs, page 5-1
- Licensing Requirements for Managing VDCs, page 5-7
- Prerequisites for Managing VDCs, page 5-8
- Guidelines and Limitations for Managing VDCs, page 5-8
- Managing VDCs, page 5-8
- Verifying the VDC Configuration, page 5-26
- Configuration Examples for VDC Management, page 5-26
- Additional References, page 5-27
- Feature History for Managing VDCs, page 5-28

Information About Managing VDCs

After you create a VDC, you can change the interface allocation, VDC resource limits, and the single-supervisor and dual-supervisor high availability (HA) policies. You can also save the running configuration of all VDCs on the physical device to the startup configuration.

This section includes the following topics:

- Interface Allocation, page 5-2
- VDC Resource Limits, page 5-6
- HA Policies, page 5-6
- Saving All VDC Configurations to the Startup Configuration, page 5-6
- Suspending and Resuming VDCs, page 5-6
- VDC Reload, page 5-7
- MAC Addresses, page 5-7
- VDC Boot Order, page 5-7

Interface Allocation

Note See the *Cisco NX-OS FCoE Configuration Guide for Cisco Nexus 7000 and Cisco MDS 9500 Guide* for information on allocating interfaces for storage VDCs and FCoE.

When you create a VDC, you can allocate I/O interfaces to the VDC. Later, the deployment of your physical device might change, and you can reallocate the interfaces as necessary.

Note Beginning with Cisco Release 5.2(1) for Nexus 7000 Series devices, all members of a port group are automatically allocated to the VDC when you allocate an interface.

The following Cisco Nexus 7000 Series Ethernet modules have the following number of port groups and interfaces:

- N7K-M202CF-22L (1 interface x 2 port groups = 2 interfaces)—There are no restrictions on the interface allocation between VDCs.
- N7K-M206FQ-23L (1 interface x 6 port groups = 6 interfaces)—There are no restrictions on the interface allocation between VDCs.
- N7K-M224XP-23L (1 interface x 24 port groups = 24 interfaces)—There are no restrictions on the interface allocation between VDCs.
- N7K-M108X2-12L (1 interface x 8 port groups = 8 interfaces)—There are no restrictions on the interface allocation between VDCs.
- N7K-M148GS-11L, N7K-M148GT-11, N7K-M148GT-11L, and N7K-M148GS-11 (12 interfaces x 4 port groups = 48 interfaces)—There are no restrictions on the interface allocation between VDCs, but we recommend that *interfaces that belong to the same port group be in a single VDC*.
- N7K-M132XP-12 (4 interfaces x 8 port groups = 32 interfaces)—Interfaces belonging to the same port group must belong to the same VDC. See the example for this module in Figure 5-1.
- N7K-M148GT-11L (same as non-L M148) (1 interface x 48 port groups = 48 interfaces)—There are no restrictions on the interface allocation between VDCs.
- N7K-M132XP-12L (same as non-L M132) (1 interface x 8 port groups = 8 interfaces)—All M132 cards require allocation in groups of 4 ports and you can configure 8 port groups.

Figure 5-1 Example Interface Allocation for Port Groups on the Cisco Nexus 7000 Series 10-Gbps Ethernet Module N7K-M132XP-12

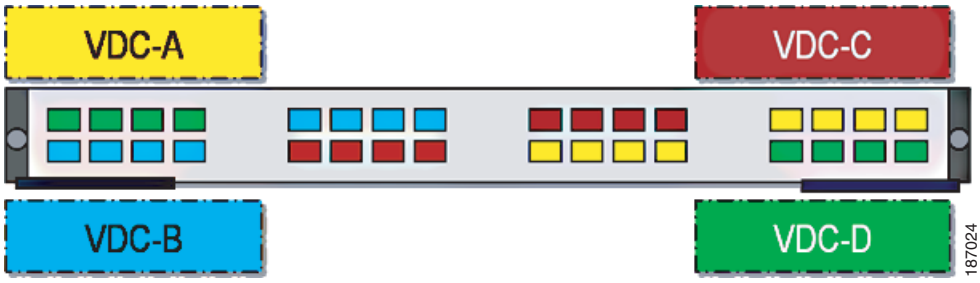

Table 5-1 shows the port numbering for the port groups.

Table 5-1 Port Numbers for Port Groups on the Cisco Nexus 7000 Series 10-Gbps Ethernet Module N7K-M132XP-12

Port Group	Port Numbers
Group 1	1, 3, 5, 7
Group 2	2, 4, 6, 8
Group 3	9, 11, 13, 15
Group 4	10, 12, 14, 16
Group 5	17, 19, 21, 23
Group 6	18, 20, 22, 24
Group 7	25, 27, 29, 31
Group 8	26, 28, 30, 32

On the Cisco Nexus 7000 Series 32-port, 10-Gbps Ethernet module N7K-F132XP-15, you must allocate the interfaces on your physical device in the specified combination. This module has 16 port groups that consist of 2 ports each (2 interfaces x 16 port groups = 32 interfaces). Interfaces belonging to the same port group must belong to the same VDC (see Figure 5-2).

Note You can configure the **limit-resource module-type** command only from the VDC configuration mode and not from a VDC resource template.

Figure 5-2 Example Interface Allocation for Port Groups on the Cisco Nexus 7000 Series 10-Gbps Ethernet Module N7K-F132XP-15

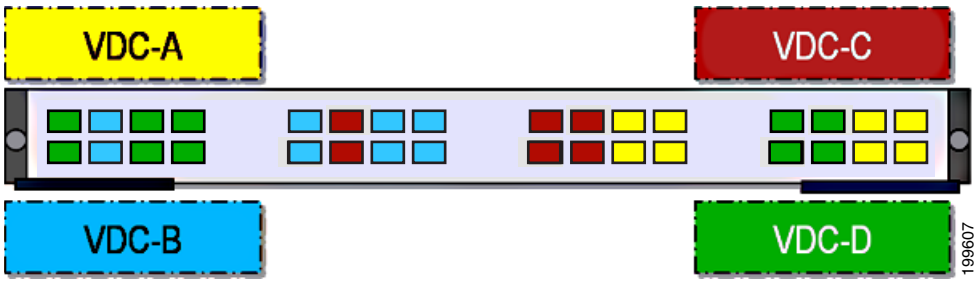

Table 5-2 shows the port numbering for the port groups.

Table 5-2 Port Numbers for Port Groups on the Cisco Nexus 7000 Series 10-Gbps Ethernet Module N7K-F132XP-15

Port Group	Port Numbers
Group 1	1 and 2
Group 2	3 and 4
Group 3	5 and 6
Group 4	7 and 8
Group 5	9 and 10

Table 5-2 Port Numbers for Port Groups on the Cisco Nexus 7000 Series 10-Gbps Ethernet Module N7K-F132XP-15 (continued)

Port Group	Port Numbers
Group 6	11 and 12
Group 7	13 and 14
Group 8	15 and 16
Group 9	17 and 18
Group 10	19 and 20
Group 11	21 and 22
Group 12	23 and 24
Group 13	25 and 26
Group 14	27 and 28
Group 15	29 and 30
Group 16	31 and 32

On the Cisco Nexus 7000 Series 48-port, 10-Gbps Ethernet module N7K-F248XP-25[E], you must allocate the interfaces on your physical device in the specified combination. This module has 12 port groups that consist of 4 ports each (4 interfaces x 12 port groups = 48 interfaces). Interfaces belonging to the same port group must belong to the same VDC (see Figure 5-3).

Figure 5-3 Example Interface Allocation for Port Groups on the Cisco Nexus 7000 Series 10-Gbps Ethernet Module N7K-F248XP-25[E]

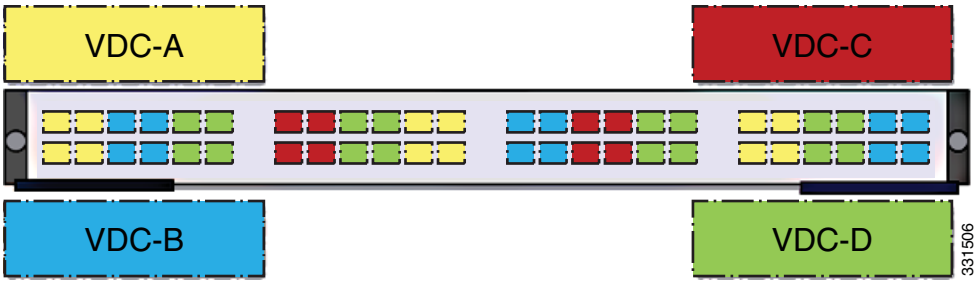

Table 5-3 shows the port numbering for the port groups.

Table 5-3 Port Numbers for Port Groups on the Cisco Nexus 7000 Series 10-Gbps Ethernet Module N7K-F248XP-25[E]

Port Group	Port Numbers
Group 1	1, 2, 3, 4
Group 2	5, 6, 7, 8
Group 3	9, 10, 11, 12
Group 4	13, 14, 15, 16
Group 5	17, 18, 19, 20
Group 6	21, 22, 23, 24

Table 5-3 Port Numbers for Port Groups on the Cisco Nexus 7000 Series 10-Gbps Ethernet Module N7K-F248XP-25[E] (continued)

Port Group	Port Numbers
Group 7	25, 26, 27, 28
Group 8	29, 30, 31, 32
Group 9	33, 34, 35, 36
Group 10	37, 38, 39, 40
Group 11	41, 42, 43, 44
Group 12	45, 46, 47, 48

For more information about port groups on the Cisco Nexus 7000 Series 10-Gbps Ethernet modules, see the *Cisco Nexus 7000 Series Hardware Installation and Reference Guide*.

Note When you add or delete interfaces, the Cisco NX-OS software removes the configuration and disables the interfaces.

When interfaces in different VDCs share the same port ASIC, reloading the VDC (with the **reload vdc** command) or provisioning interfaces to the VDC (with the **allocate interface** command) might cause short traffic disruptions (of 1 to 2 seconds) for these interfaces. If such behavior is undesirable, make sure to allocate all interfaces on the same port ASIC to the same VDC.

To see how the interfaces are mapping to the port ASIC, use this command:

 # slot *slot_number* **show hardware internal dev-port-map**

```
+-----------------------------------------------------------------+
+-----------+++FRONT PANEL PORT TO ASIC INSTANCE MAP+++---------+
+-----------------------------------------------------------------+
FP port|PHYS |SECUR |MAC_0 |RWR_0 |L2LKP |L3LKP |QUEUE |SWICHF
    1      0      0      0      0      0      0      0      0
    2      0      0      0      0      0      0      0      0
    3      0      0      0      0      0      0      0      0
    4      0      0      0      0      0      0      0      0
    5      0      1      0      0      0      0      0      0
    6      0      1      0      0      0      0      0      0
    7      0      1      0      0      0      0      0      0
    8      0      1      0      0      0      0      0      0
    9      1      2      0      0      0      0      0      0
   10      1      2      0      0      0      0      0      0
   11      1      2      0      0      0      0      0      0
   12      1      2      0      0      0      0      0      0
   13      1      3      1      0      0      0      0      0
   14      1      3      1      0      0      0      0      0
   15      1      3      1      0      0      0      0      0
   16      1      3      1      0      0      0      0      0
   17      2      4      1      0      0      0      0      0
```

The interface number is listed in the FP port column, and the port ASIC number is listed in the MAC_0 column, which means that in the above example, interfaces 1 through 12 share the same port ASIC (0).

VDC Resource Limits

You can change the resource limits for your VDC individually or by applying a VDC resource template as your needs change. You can change the following limits for the following resources:

- IPv4 multicast route memory
- IPv6 multicast route memory
- IPv4 unicast route memory
- IPv6 unicast route memory
- Port channels
- Switched Port Analyzer (SPAN) monitor sessions
- VLANs
- Virtual routing and forwarding instances (VRFs)

HA Policies

The HA policy determines the action that the physical device takes when the VDC encounters an unrecoverable field. You can change the HA policy for the VDC that was specified when you created the VDC.

Note You cannot change the HA policies for the default VDC.

Saving All VDC Configurations to the Startup Configuration

From the VDC, a user with the vdc-admin or network-admin role can save the VDC configuration to the startup configuration. However, you might want to save the configuration of all VDCs to the startup configuration from the default VDC.

Suspending and Resuming VDCs

Users with the network-admin role can suspend and resume a nondefault VDC. You must save the VDC running configuration to the startup configuration before suspending the VDC. Otherwise, you will lose the changes to the running configuration when you resume the VDC. You cannot remove interfaces allocated to a suspended VDC. All other resources in use by the VDC are released while the VDC is suspended.

Note You cannot perform an in-service software upgrade (ISSU) when a VDC is suspended.

Note You cannot suspend the default VDC.

Caution Suspending a VDC disrupts all traffic on the VDC.

VDC Reload

You can load an active nondefault VDC that is in any state. The impact of reloading a nondefault VDC is similar to reloading a physical device. The VDC reloads using the startup configuration.

Note You cannot reload the default or admin VDC.

Caution Reloading a VDC disrupts all traffic on the VDC.

MAC Addresses

The default VDC has a management MAC address. Beginning with Cisco Release 5.2(1) for the Cisco Nexus 7000 Series devices, subsequent nondefault VDCs that you create are assigned MAC addresses automatically as part of the bootup process.

You will see a syslog message if there are not sufficient MAC addresses to supply all the VDCs on the device.

VDC Boot Order

You can specify the boot order for the VDCs on the Cisco NX-OS device. By default, all VDCs start in parallel with no guarantee as to which VDC completes starting first. Using the boot order value, the Cisco NX-OS software starts the VDCs in a predictable sequence. The boot order feature has the following characteristics:

- More than VDC can have the same boot order value. By default, all VDCs have the boot order value of 1.
- VDCs with the lowest boot order value boot first.
- The Cisco NX-OS software starts all VDCs with the same boot order value followed by the VDCs with the next highest boot order value.
- The Cisco NX-OS software starts VDCs that have the same boot order value in parallel.
- You cannot change the boot order for the default VDC; you can change the boot order only for nondefault VDCs.

Licensing Requirements for Managing VDCs

Refer to the Table 4-4 on page 4-6 for VDC licensing requirements.

Prerequisites for Managing VDCs

VDC management has the following prerequisites:

- You must have the network-admin user role.
- You must log in to the default VDC.

Guidelines and Limitations for Managing VDCs

VDC management has the following configuration guidelines and limitations:

- Only users with the network-admin user role can manage VDCs.
- You can change VDCs only from the default VDC.
- If sufficient MAC addresses to program the management port of all the nondefault VDCs are unavailable, do not program the MAC address in any of the nondefault VDCs.
- A syslog message is generated if sufficient MAC addresses are unavailable to program the management port in all VDCs.
- When a hardware issue occurs, syslog messages are sent to all VDCs.
- When you have back-to-back connected interfaces in two different Virtual and Routine Forwarding Instances (VRFs) within the same VDC, the Address Resolution Protocol (ARP) fails to complete and packet drops occur because the VRFs obtain their own source MAC addresses. If you need two interfaces on the same VDC with different VRFs, assign a static MAC address to the VRF interfaces.

Managing VDCs

This section includes the following topics:

- Changing the Nondefault VDC Prompt Format, page 5-9
- Allocating Interfaces to an Ethernet VDC, page 5-9
- Applying a VDC Resource Template, page 5-11
- Changing VDC Resource Limits, page 5-13
- Displaying Example for show vdc detail Output, page 5-18
- Changing the HA Policies, page 5-18
- Saving VDC Configurations, page 5-20
- Suspending a Nondefault VDC, page 5-21
- Resuming a Nondefault VDC, page 5-22
- Reloading a Nondefault VDC, page 5-23
- Configuring the VDC Boot Order, page 5-24
- Deleting a VDC, page 5-25

Changing the Nondefault VDC Prompt Format

You can change the format of the CLI prompt for nondefault VDCs. By default, the prompt format is a combination of the default VDC name and the nondefault VDC name. You can change the prompt to only contain the nondefault VDC name.

BEFORE YOU BEGIN

Log in to the default VDC with a username that has the network-admin user role.

SUMMARY STEPS

1. **config t**
2. [**no**] **vdc combined-hostname**
3. (Optional) **copy running-config startup-config vdc-all**

DETAILED STEPS

	Command	Purpose

Step 1	**config t**
	
	Example:
	`switch# config t`
	`switch(config)#`
		Enters configuration mode.

Step 2	[**no**] **vdc combined-hostname** **Example:** `switch(config)# no vdc combined-hostname`	Changes the format of the CLI prompt for the nondefault VDC. To change the prompt to show only the nondefault VDC name, use the **no** format of the command. By default, the CLI prompt for a nondefault VDC consists of the default VDC name and the nondefault VDC name.
Step 3	**copy running-config startup-config vdc-all** **Example:** `switch(config)# copy running-config startup-config vdc-all`	(Optional) Copies the running configuration for all the VDCs to the startup configuration. If you disable the combined hostname, this command prevents the VDC names from reverting back to their original format (with combined hostnames) after the running configuration is saved and the system is reloaded. Enter this command after turning off the combined hostname.

Allocating Interfaces to an Ethernet VDC

Note See the *Cisco NX-OS FCoE Configuration Guide for Cisco Nexus 7000 and Cisco MDS 9500* for information on allocating interfaces to storage VDCs for FCoE.

You can allocate one or more interfaces to a VDC. When you allocate an interface, you move it from one VDC to another VDC. The interfaces are in the down state after you move them.

Note When you allocate an interface, all configuration on the interface is lost.

Note Beginning with Cisco Release 5.2(1) for Nexus 7000 Series devices, all members of a port group are automatically allocated to the VDC when you allocate an interface.

BEFORE YOU BEGIN

Log in to the default VDC with a username that has the network-admin user role.

SUMMARY STEPS

1. **config t**
2. **vdc** *vdc-name*
3. **show vdc membership** [**status**]
4. [**no**] **allocate interface ethernet** *slot*/*port*

   [**no**] **allocate interface ethernet** *slot*/*port - last-port*

   [**no**] **allocate interface ethernet** *slot*/*port*, **ethernet** *slot*/*port*, ...
5. **exit**
6. (Optional) **show vdc membership** [**status**]
7. (Optional) **copy running-config startup-config**

DETAILED STEPS

	Command	Purpose

Step 1	**config t**
	
	Example:
	`switch# config t`
	`switch(config)#`
		Enters configuration mode.

Step 2	**vdc** *vdc-name*
	
	Example:
	`switch(config)# vdc Engineering`
	`switch(config-vdc)#`
		Specifies a VDC and enters VDC configuration mode.

Step 3	**show vdc membership** [**status**] **Example:** `switch(config-vdc)# show vdc membership`	(Optional) Displays the status of VDC interface membership.

	Command	Purpose
Step 4	[**no**] **allocate interface ethernet** *slot*/*port* **Example:** switch(config-vdc)# allocate interface ethernet 2/1 Moving ports will cause all config associated to them in source vdc to be removed. Are you sure you want to move the ports? [yes] yes	Allocates one interface to the VDC. Beginning with Cisco NX-OS Release 6.1(1), you can use the **no allocate interface ethernet** command to remove the interface from the VDC and place it in an unallocated pool.
	[**no**] **allocate interface ethernet** *slot*/*port* **-** *last-port* **Example:** switch(config-vdc)# allocate interface ethernet 2/1 - 4 Moving ports will cause all config associated to them in source vdc to be removed. Are you sure you want to move the ports? [yes] yes	Allocates a range of interfaces on the same module to the VDC.
	[**no**] **allocate interface ethernet** *slot*/*port*, **ethernet** *slot*/*port*, ... **Example:** switch(config-vdc)# allocate interface ethernet 2/1, ethernet 2/3, ethernet 2/5 Moving ports will cause all config associated to them in source vdc to be removed. Are you sure you want to move the ports? [yes] yes	Allocates a list of interfaces to the VDC.
Step 5	**exit** **Example:** switch(config-vdc)# exit switch(config)#	Exits VDC configuration mode.
Step 6	**show vdc membership** [**status**] **Example:** switch(config)# show vdc membership	(Optional) Displays VDC interface membership information.
Step 7	**copy running-config startup-config** **Example:** switch(config)# copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration. **Note** After you add an interface to a VDC, you must copy the default VDC running configuration to the startup configuration before users can copy the changed VDC running configuration to the startup configuration.

Applying a VDC Resource Template

You can change the VDC resource limits by applying a new VDC resource template. Changes to the limits take effect immediately except for the IPv4 and IPv6 route memory limits, which take effect after the next VDC reset, physical device reload, or physical device stateful switchover.

BEFORE YOU BEGIN

Log in to the default VDC with a username that has the network-admin user role.

SUMMARY STEPS

1. **config t**
2. **show vdc resource detail**
3. **vdc** *vdc-name*
4. **template** *template-name*
5. **exit**
6. (Optional) **show vdc** *vdc-name* **resource**
7. (Optional) **copy running-config startup-config**

DETAILED STEPS

	Command	Purpose

Step 1	**config t**
	
	Example:
	`switch# config t`
	`switch(config)#`
		Enters configuration mode.

Step 2	**show vdc resource detail** **Example:** `switch(config)# show vdc resource detail`	(Optional) Displays the resource information for all VDCs.

Step 3	**vdc** *vdc-name*
	
	Example:
	`switch(config)# vdc Engineering`
	`switch(config-vdc)#`
		Specifies a VDC and enters VDC configuration mode.

Step 4	**template** *template-name* **Example:** `switch(config-vdc)# template MyTemplate`	Applies a new resource template for the VDC.

Step 5	**exit**
	
	Example:
	`switch(config-vdc)# exit`
	`switch(config)#`
		Exits VDC configuration mode.

Step 6	**show vdc** *vdc-name* **resource** **Example:** `switch(config)# show vdc MyVDC resource`	(Optional) Displays the resource information for a specific VDC.
Step 7	**copy running-config startup-config** **Example:** `switch(config)# copy running-config startup-config`	(Optional) Copies the running configuration to the startup configuration.

Changing VDC Resource Limits

You can change the limits on the VDC resources. Changes to the limits take effect immediately except for the IPv4 and IPv6 routing table memory limits, which take effect after the next VDC reset, physical device reload, or physical device stateful switchover.

Note You can set only one value for the multicast and unicast route memory resources maximum and minimum limits. If you specify a minimum limit, that is the value for both the minimum and maximum limits and the maximum limit is ignored. If you specify only a maximum limit, that is the value for both the minimum and maximum limits.

Beginning with Cisco NX-OS Release 6.1, CPU shares are used to control the CPU resources among the VDCs by allowing you to prioritize VDC access to the CPU during CPU contention. CPU shares are supported on Supervisor 2 modules only. You can also configure the number of CPU shares on a VDC. For example, a VDC with 10 CPU shares gets twice the CPU time compared to a VDC that has 5 CPU shares.

Some features require that all modules in a chassis be of a certain type. Beginning with Cisco NX-OS Release 6.1(3), you can apply the switchwide VDC mode to prevent accidental insertion of a module or to restrict certain line cards from powering on in the system. For example, the result bundle hashing (RBH) modulo feature does not operate with M Series modules in the system. Use the **system module-type** command to apply the switchwide VDC mode. This command controls which line cards are allowed in the chassis. Otherwise widespread disruption is caused within a VDC.

Note The modules that you do not enable must not be powered on after you configure this feature and enter **yes.** An error message will force you to manually disable these modules before proceeding. This is to prevent major disruption and service issues within a VDC.

Note Refer to the *Cisco Nexus 7000 Verified Scalability Guide* to see the maximum number of supported SPAN sessions.

BEFORE YOU BEGIN

Log in to the default VDC with a username that has the network-admin user role.

SUMMARY STEPS

1. **config t**
2. [**no**] **system module-type** *module-type*
3. (Optional) **show vdc**
4. (Optional) **show vdc resource detail**
5. **vdc** *vdc-name*
6. **limit-resource m4route-mem** [**minimum** *min-value*] **maximum** *max-value*
   limit-resource m6route-mem [**minimum** *min-value*] **maximum** *max-value*
   limit-resource monitor-session minimum *min-value* **maximum** {*max-value* | **equal-to-min**}

limit-resource monitor-session-erspan-dst minimum *min-value* **maximum** {*max-value* | **equal-to-min**}

limit-resource port-channel minimum *min-value* **maximum** {*max-value* | **equal-to-min**}

limit-resource u4route-mem [**minimum** *min-value*] **maximum** *max-value*

limit-resource u6route-mem [**minimum** *min-value*] **maximum** *max-value*

limit-resource vlan minimum *min-value* **maximum** {*max-value* | **equal-to-min**}

limit-resource vrf minimum *min-value* **maximum** {*max-value* | **equal-to-min**}

limit-resource module-type *module type*

7. **cpu-shares** *shares*
8. **show vdc detail**
9. **exit**

DETAILED STEPS

	Command	Purpose
Step 1	**config t** **Example:** switch# config t switch(config)#	Enters configuration mode.
Step 2	[**no**]**system module-type** *module-type* **Example:** switch(config)# system module-type f1 m1 m2xl	Enters switchwide VDC mode. Specifies which modules can be enabled on a chassis. You can enable F1, F2, M1, M1XL and M2XL Series modules. There are no restrictions on the type of mix allowed for the **system module-type** command. The **system module-type** command allows a mix of F1, F2, M1, M1XL, and M2XL Series modules in the VDC. **Note** The **limit-resource module-type** command controls the restrictions on the module-types that can be mixed in the VDC. **Note** Use the **system module-type f2** command to allow F2E Series modules into a VDC. The ports from F2 and F2E Series modules can be allocated like any other ports. **Note** The modules that you do not enable must not be powered on after you configure this feature and enter **yes.** An error message will force you to manually disable these modules before proceeding. This prevents major disruption and service issues within a VDC. The **no** form of this command resets the configuration mode to allow all modules.
Step 3	**show vdc** **Example:** switch(config)# show vdc Switchwide mode is m1 f1 m1xl vdc_id vdc_name state mac ------ -------- ----- ---------- 1 switch active 00:18:ba:d8:80:51 lc ------ m1 f1 m1xl	(Optional) Shows which modules are enabled in the chassis.
Step 4	**show vdc resource detail** **Example:** switch(config)# show vdc resource detail	(Optional) Displays the resource information for all VDCs.

	Command	Purpose

Step 5	**vdc** *vdc-name*
	
	Example:
	`switch(config)# vdc Engineering`
	`switch(config-vdc)#`
		Specifies a VDC and enters VDC configuration mode.

Step 6	**limit-resource m4route-mem** [**minimum** *min-value*] **maximum** *max-value* **Example:** `switch(config-vdc)# limit-resource m4route-mem minimum 4 maximum 40`	Specifies the minimum and maximum limits for IPv4 multicast route memory in megabytes. The range is from 1 to 90.
	limit-resource m6route-mem [**minimum** *min-value*] **maximum** *max-value* **Example:** `switch(config-vdc)# limit-resource m6route-mem minimum 4 maximum 12`	Specifies the minimum and maximum limits for IPv6 multicast route memory in megabytes. The range is from 1 to 20.
	limit-resource monitor-session minimum *min-value* **maximum** {*max-value* | **equal-to-min**} **Example:** `switch(config-vdc)# limit-resource monitor-session minimum 0 maximum 1`	Configures the SPAN monitor session resource limits. The range is from 0 to 2. The **equal-to-min** keyword automatically sets the maximum limit equal to the minimum limit. **Note** You can have a maximum of two SPAN monitoring sessions on your physical device.
	limit-resource monitor-session-erspan-dst minimum *min-value* **maximum** {*max-value* | **equal-to-min**} **Example:** `switch(config-vdc)# limit-resource monitor-session-erspan-dst minimum 2 maximum 10`	Configures the ERSPAN monitor session resource limits. The range is from 0 to 23. The **equal-to-min** keyword automatically sets the maximum limit equal to the minimum limit.
	limit-resource port-channel minimum *min-value* **maximum** {*max-value* | **equal-to-min**} **Example:** `switch(config-vdc)# limit-resource port-channel minimum 0 maximum 128`	Configures the port-channel resource limits. The range is from 0 to 768. The **equal-to-min** keyword automatically sets the maximum limit equal to the minimum limit.
	limit-resource u4route-mem [**minimum** *min-value*] **maximum** *max-value* **Example:** `switch(config-vdc)# limit-resource u4route-mem minimum 16 maximum 40`	Specifies the minimum and maximum limits for IPv4 unicast route memory in megabytes. The range is from 1 to 250.
	limit-resource u6route-mem [**minimum** *min-value*] **maximum** *max-value* **Example:** `switch(config-vdc)# limit-resource u6route-mem minimum 16 maximum 32`	Specifies the minimum and maximum limits for IPv6 unicast route memory in megabytes. The range is from 1 to 100.

	Command	Purpose
	limit-resource vlan minimum *min-value* **maximum** {*max-value* | **equal-to-min**} **Example:** `switch(config-vdc)# limit-resource vlan minimum 24 maximum 2056`	Configures the VLAN resource limits. The range is from 16 to 4094. The **equal-to-min** keyword automatically sets the maximum limit equal to the minimum limit.
	limit-resource vrf minimum *min-value* **maximum** {*max-value* | **equal-to-min**} **Example:** `switch(config-vdc)# limit-resource vrf minimum 32 maximum 1000`	Configures the VRF resource limits. The VRF minimum and maximum range is from 2 to 1000. The **equal-to-min** keyword automatically sets the maximum limit equal to the minimum limit.
	limit-resource module-type *module type* **Example:** `switch(config-vdc)# limit-resource module-type m1 f1`	Configures the specified line card type. VDCs support the F1, F2, F2E, M1, M1XL, and M2XL Series module types. **Note** The **limit-resource module-type** command allows a mix of F1, M1, M1XL, and M2XL Series modules in the VDC. **Note** F2 and F2E Series modules cannot exist in the same VDC with F1, M1, M1XL, and M2XL Series modules. Use the l**imit-resource module-type f2** command to allow only F2 or F2E Series modules into a VDC. The ports from F2 and F2E Series modules can be allocated like any other ports.
Step 7	**cpu-shares** *shares* **Example:** `switch(config-vdc)# cpu-shares 10`	Sets the number of CPU shares on a VDC. The range is from 1 to 10. For example, a VDC with 10 CPU shares gets twice the CPU time compared to a VDC that has 5 CPU shares.
Step 8	**show vdc detail** **Example:** `switch(config)# show vdc detail`	(Optional) Displays the CPU shares on a VDC.

Step 9	**exit**
	
	Example:
	`switch(config-vdc)# exit`
	`switch(config)#`
		Exits VDC configuration mode.

Step 10	**show vdc** *vdc-name* **resource** **Example:** `switch(config)# show vdc MyVDC resource`	(Optional) Displays the VDC resource information.
Step 11	**copy running-config startup-config** **Example:** `switch(config)# copy running-config startup-config`	(Optional) Copies the running configuration to the startup configuration. If you disable the combined hostname, this command prevents the VDC names from reverting back to their original format (with combined hostnames) after the running configuration is saved and the system is reloaded. Enter this command after turning off the combined hostname.

Displaying Example for show vdc detail Output

The following example displays the output of **show vdc detail** command:

```
switch# show vdc detail

vdc id: 1
vdc name: switch
vdc state: active
vdc mac address: 00:26:51:cb:bf:41
vdc ha policy: RELOAD
vdc dual-sup ha policy: SWITCHOVER
vdc boot Order: 1
CPU Share: 5
CPU Share Percentage: 22%
vdc create time: Wed Jul 18 18:08:15 2012
vdc reload count: 0
vdc restart count: 0
vdc type: Admin
vdc supported linecards: None

vdc id: 2
vdc name: vdc2
vdc state: active
vdc mac address: 00:26:51:cb:bf:42
vdc ha policy: RESTART
vdc dual-sup ha policy: SWITCHOVER
vdc boot Order: 1
CPU Share: 10
CPU Share Percentage: 45%
vdc create time: Wed Jul 18 18:17:14 2012
vdc reload count: 0
vdc restart count: 0
vdc type: Ethernet
vdc supported linecards: m1 f1 m1xl m2xl

vdc id: 3
vdc name: new-vdc
vdc state: active
vdc mac address: 00:26:51:cb:bf:43
vdc ha policy: RESTART
vdc dual-sup ha policy: SWITCHOVER
vdc boot Order: 1
CPU Share: 7
CPU Share Percentage: 31%
vdc create time: Wed Jul 18 18:29:51 2012
vdc reload count: 0
vdc restart count: 0
vdc type: Ethernet
vdc supported linecards: m1 f1 m1xl m2xl

switch#
```

Changing the HA Policies

You can change the HA policies for a VDC. The VDC HA policies are as follows:

- Dual supervisor modules:
  - Bringdown—Puts the VDC in the failed state.

  - Restart—Restarts the VDC. This process includes shutting down all the interfaces within that VDC and stopping all the virtualized services processes. The Cisco NX-OS software restarts all the virtualized services saved in the startup configuration and brings the interfaces back up with the configuration saved in the startup configuration. Any configuration that you did not save in the startup configuration prior to the restart is lost.
  - Switchover—Initiates a supervisor module switchover.
- Single supervisor modules:
  - Bringdown—Puts the VDC in the failed state.
  - Reload—Reloads the supervisor module.

Caution With the reload action, any configuration that you did not save in the startup configuration prior to the reload is lost.

Note The reload action affects all interfaces and all VDCs on the physical device.

  - Restart—Restarts the VDC. This process includes shutting down all the interfaces within that VDC and stopping all the virtualized services processes. The Cisco NX-OS software restarts all the virtualized services saved in the startup configuration and brings the interfaces back up with the configuration saved in the startup configuration. Any configuration that you did not save in the startup configuration prior to the restart is lost.

Caution With the reload action, any configuration that you did not save in the startup configuration prior to the reload is lost.

Note You cannot change the HA policies for the default VDC.

BEFORE YOU BEGIN

Log in to the default VDC with a username that has the network-admin user role.

SUMMARY STEPS

1. **config t**
2. **vdc** *vdc-name*
3. **ha-policy** {**dual-sup** {**bringdown** | **restart** | **switchover**} | **single-sup** {**bringdown** | **reload** | **restart**}}
4. **exit**
5. (Optional) **show vdc detail**
6. (Optional) **copy running-config startup-config**

DETAILED STEPS

	Command	Purpose
Step 1	**config t** **Example:** switch# config t switch(config)#	Enters global configuration mode.
Step 2	**vdc** *vdc-name* **Example:** switch(config)# vdc Engineering switch(config-vdc)#	Specifies a VDC and enters VDC configuration mode.
Step 3	**ha-policy** {**dual-sup** {**bringdown** | **restart** | **switchover**} | **single-sup** {**bringdown** | **reload** | **restart**}}	Configures the HA policy for the VDC. The **dual-sup** and **single-sup** keyword values are as follows: • **bringdown**—Puts the VDC in the failed state. • **reload**— Initiates a supervisor module switchover for physical devices with two supervisor modules, or reloads physical devices with one supervisor module. • **restart**—Takes down the VDC processes and interfaces and restarts it using the startup configuration. • **switchover**—Initiates a supervisor module switchover. **Note** You cannot change the HA policies for the default VDC.
Step 4	**exit** **Example:** switch(config-vdc)# exit switch(config)#	Exits VDC configuration mode.
Step 5	**show vdc detail** **Example:** switch(config)# show vdc detail	(Optional) Displays VDC status information.
Step 6	**copy running-config startup-config** **Example:** switch(config)# copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration.

Saving VDC Configurations

You can save the configuration of all the VDCs on the physical device to the startup configuration.

BEFORE YOU BEGIN

Log in to the default VDC with a username that has the network-admin user role.

SUMMARY STEPS

1. **switchto vdc** *vdc-name*
2. **copy running-config startup-config**
3. **switchback**
4. **copy running-config startup-config vdc-all**

DETAILED STEPS

	Command	Purpose

Step 1	**switchto vdc** *vdc-name*
	
	Example:
	`switch# switchto vdc TestVDC`
	`switch-TestVDC#`
		Switches to the nondefault VDC.

Step 2	**copy running-config startup-config** **Example:** `switch-TestVDC# copy running-config startup-config`	Copies the running configuration for the VDC to the startup configuration.

Step 3	**switchback**
	
	Example:
	`switch-TestVDC# switchback`
	`switch#`
		Switches back to the default VDC.

Step 4	**copy running-config startup-config vdc-all** **Example:** `switch# copy running-config startup-config vdc-all`	Copies the running configuration for all the VDCs to the startup configuration.

Suspending a Nondefault VDC

You can suspend an active nondefault VDC. You must save the VDC running configuration to the startup configuration before suspending the VDC. Otherwise, you will lose the changes to the running configuration.

Note You cannot suspend the default and admin VDC.

Caution Suspending a VDC disrupts all traffic on the VDC.

BEFORE YOU BEGIN

Log in to the default VDC with a username that has the network-admin user role.

SUMMARY STEPS

1. **copy running-config startup-config vdc-all**
2. **config t**
3. **vdc** *vdc-name* **suspend**

DETAILED STEPS

	Command	Purpose
Step 1	**copy running-config startup-config vdc-all** **Example:** `switch# copy running-config startup-config vdc-all`	Copies the running configuration for all the VDCs to the startup configuration.

Step 2	**config t**
	
	Example:
	`switch# config t`
	`switch(config)#`
		Enters global configuration mode.

Step 3	**vdc** *vdc-name* **suspend** **Example:** `switch(config)# vdc TestVDC suspend`	Suspends a nondefault VDC.

Resuming a Nondefault VDC

You can resume a nondefault VDC from the suspended state. The VDC resumes with the configuration saved in the startup configuration.

BEFORE YOU BEGIN

Log in to the default VDC with a username that has the network-admin user role.

SUMMARY STEPS

1. **config t**
2. **no vdc** *vdc-name* **suspend**

DETAILED STEPS

	Command	Purpose
Step 1	**config t** **Example:** switch# config t switch(config)#	Enters global configuration mode.
Step 2	**no vdc** *vdc-name* **suspend** **Example:** switch(config)# no vdc TestVDC suspend	Resumes a suspended nondefault VDC.

Reloading a Nondefault VDC

You can load a nondefault VDC that is in a failed state. The VDC reloads using the startup configuration.

Note Use the **reload** command to reload the default VDC. Reloading the default VDC reloads all VDCs on the Cisco NX-OS device.

Caution Reloading a VDC disrupts all traffic on the VDC.

BEFORE YOU BEGIN

Log in to the nondefault VDC with a username that has the vdc-admin user role or use the **switchto vdc** command from the default VDC to access the nondefault VDC.

SUMMARY STEPS

1. **copy running-config startup-config vdc-all**
2. **reload vdc**

DETAILED STEPS

	Command	Purpose
Step 1	**copy running-config startup-config** **Example:** switch-TestVDC# copy running-config startup-config	Copies the running configuration for the nondefault VDC to the startup configuration.
Step 2	**reload vdc** **Example:** switch-TestVDC# reload vdc	Reloads a nondefault VDC.

Configuring the VDC Boot Order

You can configure the boot order for the VDCs on your Cisco NX-OS device.

Note You cannot change the boot order of the default VDC.

BEFORE YOU BEGIN

Log in to the default VDC with a username that has the network-admin user role.

SUMMARY STEPS

1. **config t**
2. **vdc** *vdc-name*
3. **boot-order** *number*
4. **exit**
5. (Optional) **show vdc detail**
6. **copy running-config startup-config vdc-all**

DETAILED STEPS

	Command	Purpose

Step 1	**config t**
	
	Example:
	`switch# config t`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**vdc** *vdc-name*
	
	Example:
	`switch(config)# vdc Engineering`
	`switch(config-vdc)#`
		Specifies a VDC and enters VDC configuration mode.

Step 3	**boot-order** *number* **Example:** `switch(config-vdc) boot-order 2`	Configures the boot order value for the VDC. The range for the *number* argument is from 1 to 4. The VDC starts from the lowest to the highest boot order value. You cannot change the boot order for the default VDC.

Step 4	**exit**
	
	Example:
	`switch(config-vdc)# exit`
	`switch(config)#`
		Exits VDC configuration mode.

Step 5	**show vdc detail** **Example:** `switch(config)# show vdc detail`	(Optional) Displays VDC status information.

	Command	Purpose
Step 6	**copy running-config startup-config vdc-all** **Example:** `switch(config)# copy running-config startup-config vdc-all`	Copies the running configuration for all the VDCs to the startup configuration.

Deleting a VDC

When you delete a VDC, the ports on the VDC are moved to unallocated interfaces. To allocate the interfaces back to the VDC, see the "Allocating Interfaces to an Ethernet VDC" section on page 5-9.

Note You cannot delete the default VDC (VDC 1)and the admin VDC.

Caution Deleting a VDC disrupts all traffic on the VDC.

BEFORE YOU BEGIN

Log in to the default or admin VDC with a username that has the network-admin user role.

SUMMARY STEPS

1. **config t**
2. **no vdc** *vdc-name*
3. **exit**
4. (Optional) **show vdc**
5. **copy running-config startup-config**

DETAILED STEPS

	Command	Purpose

Step 1	**config t**
	
	Example:
	`switch# config t`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**no vdc** *vdc-name*
	
	Example:
	`switch(config)# no vdc NewVDC`
	`Deleting this vdc will remove its config.`
	`Continue deleting this vdc? [yes] yes`
		Removes the VDC.
		
		Caution Deleting a VDC disrupts all traffic on the VDC and removes all configuration on all the interfaces allocated to the VDC.

	Command	Purpose

Step 3	**exit**
	
	Example:
	`switch(config)# exit`
	`switch#`
		Exits VDC configuration mode.

Step 4	**show vdc** **Example:** `switch# show vdc`	(Optional) Copies the running configuration to the startup configuration.
Step 5	**copy running-config startup-config** **Example:** `switch(config)# copy running-config startup-config`	Copies the running configuration to the startup configuration.

Verifying the VDC Configuration

To display the VDC configuration, perform one of the following tasks:

Command	Purpose
show running-config {**vdc** | **vdc-all**}	Displays the VDC information in the running configuration.
show vdc [*vdc-name*]	Displays the VDC configuration information.
show vdc detail	Displays the detailed information about many VDC parameters.
show vdc current-vdc	Displays the current VDC number.
show vdc membership [**status**]	Displays the VDC interface membership information.
show vdc resource template	Displays the VDC template configuration.
show resource	Displays the VDC resource configuration for the current VDC.
show vdc [*vdc-name*] **resource** [*resource-name*]	Displays the VDC resource configuration for all VDCs.
show mac vdc {*vdc_id*}	Displays the MAC address for a specific VDC.

For detailed information about the fields in the output from these commands, see the *Cisco Nexus 7000 Series NX-OS Virtual Device Context Command Reference*.

Configuration Examples for VDC Management

The following example shows how to allocate interfaces between VDCs for port groups on a Cisco Nexus 7000 Series 32-port, 10-Gbps Ethernet module as described in Figure 5-1 on page 5-2.

Note VDC-A is the default VDC.

```
config t
hostname VDC-A
vdc VDC-B
! Port group 2
allocate interfaces ethernet 2/2, ethernet 2/4, ethernet 2/6, ethernet 2/8
! Port group 3
allocate interfaces ethernet 2/9, ethernet 2/11, ethernet 2/13, ethernet 2/15
vdc VDC-C
! Port group 4
allocate interfaces ethernet 2/10, ethernet 2/12, ethernet 2/14, ethernet 2/16
! Port group 5
allocate interfaces ethernet 2/17, ethernet 2/19, ethernet 2/21, ethernet 2/23
vdc VDC-D
! Port group 6
allocate interfaces ethernet 2/18, ethernet 2/20, ethernet 2/22, ethernet 2/24
! Port group 7
allocate interfaces ethernet 2/25, ethernet 2/27, ethernet 2/29, ethernet 2/30
```

Additional References

For additional information related to managing VDCs, see the following sections:

- Related Documents for Managing VDCs, page 5-27

Related Documents for Managing VDCs

Related Topic	Document Title
Cisco NX-OS licensing	*Cisco NX-OS Licensing Guide*
Cisco Nexus 7000 Series 32-port, 10-Gbps Ethernet modules	*Cisco Nexus 7000 Series Hardware Installation and Reference Guide*
Command reference	*Cisco Nexus 7000 Series NX-OS Virtual Device Context Command Reference*
FCoE commands	*Cisco NX-OS FCoE Command Reference for Cisco Nexus 7000 and Cisco MDS 9500*

Feature History for Managing VDCs

Table 5-4 lists the release history for this feature.

Table 5-4 Feature History for Managing VDC

Feature Name	Releases	Feature Information
Switchwide VDC mode	6.1(3)	Added the ability to enable specific line cards in the chassis and prevent others from powering on.
Support for F2E Series modules	6.1(2)	Added support for F2E Series modules as part of the F2 Series modules.
Support for Supervisor 2 and M2 Series modules.	6.1(1)	Added support for Supervisor 2 and M2 Series modules.
CPU shares	6.1(1)	Added support for CPU shares on a VDC.
VDC resource limits	6.0(1)	Added support for F2 Series modules.
MAC addresses	5.2(1)	The default VDC has a MAC address, and subsequent nondefault VDCs that are created are assigned MAC addresses.
VDC resource limits	5.2(1)	Added support for M1XL Series modules.
N7K-F132XP-15 module	5.1(1)	Added support for the N7K-F132XP-15 module.
VDC resource limits	5.1(1)	Added the ability to configure ERSPAN monitor session resource limits.
VDC resource limits	5.0(2)	The range for the minimum and maximum values changed for the **limit-resource m4route-mem**, **limit-resource m6route-mem**, **limit-resource u4route-mem**, **limit-resource u6route-mem**, and **limit-resource vrf** commands.
Restarting VDCs	4.2(4)	The **vdc restart** command was replaced by the **reload vdc** command.
Suspending and resuming VDCs	4.2(1)	You can suspend and resume nondefault VDCs.
Restarting VDCs	4.2(1)	You can restart active nondefault VDCs and nondefault VDCs in the failed state.
Reloading VDCs	4.2(1)	You can reload nondefault VDCs.
VDC prompt format	4.2(1)	You can change the format of the CLI prompt for nondefault VDCs.
VDC boot order	4.2(1)	You can configure the boot order for nondefault VDCs.
IPv4 unicast route memory resource	4.1(2)	Changed the default maximum value from 256 to 8.
IPv6 unicast route memory resource	4.1(2)	Changed the default maximum value from 256 to 4.
Multicast route memory resources	4.1(2)	Added IPv4 and IPv6 multicast route memory resources.
Port channel resources	4.1(2)	Changed the default maximum value from 256 to 768.
IPv4 unicast route memory resource	4.0(2)	Changed the default maximum value from 256 to 320.
IPv6 unicast route memory resource	4.0(2)	Changed the default maximum value from 256 to 192.

VDC Configuration Limits

The configuration limits are documented in the *Cisco Nexus 7000 Series NX-OS Verified Scalability Guide*.