Configuring Layer 3 Virtualization

This chapter describes how to configure Layer 3 virtualization.

This chapter includes the following sections:

- Layer 3 Virtualization, page 14-1
- Licensing Requirements for VRFs, page 14-5
- Prerequisites for VRF, page 10-6
- Guidelines and Limitations, page 14-5
- Default Settings, page 14-6
- Configuring VRFs, page 14-6
- Verifying the VRF Configuration, page 14-13
- Configuration Examples for VRF, page 14-13
- Related Topics, page 14-14
- Additional References, page 14-14
- Feature History for VRF, page 14-14

Layer 3 Virtualization

This section includes the following topics:

- Overview of Layer 3 Virtualization, page 14-1
- VRF and Routing, page 14-2
- VRF-Aware Services, page 14-3

Overview of Layer 3 Virtualization

Cisco NX-OS supports virtual routing and forwarding instances (VRFs). Each VRF contains a separate address space with unicast and multicast route tables for IPv4 and makes routing decisions independent of any other VRF.
Each router has a default VRF and a management VRF. All Layer 3 interfaces and routing protocols exist in the default VRF until you assign them to another VRF. The mgmt0 interface exists in the management VRF. With the VRF-lite feature, the switch supports multiple VRFs in customer edge (CE) switches. VRF-lite allows a service provider to support two or more Virtual Private Networks (VPNs) with overlapping IP addresses using one interface.

**Note**
The switch does not use Multiprotocol Label Switching (MPLS) to support VPNs.

### VRF and Routing

All unicast and multicast routing protocols support VRFs. When you configure a routing protocol in a VRF, you set routing parameters for the VRF that are independent of routing parameters in another VRF for the same routing protocol instance.

You can assign interfaces and route protocols to a VRF to create virtual Layer 3 networks. An interface exists in only one VRF. Figure 14-1 shows one physical network split into two virtual networks with two VRFs. Routers Z, A, and B exist in VRF Red and form one address domain. These routers share route updates that do not include router C because router C is configured in a different VRF.

**Figure 14-1 VRFs in a Network**

By default, Cisco NX-OS uses the VRF of the incoming interface to select which routing table to use for a route lookup. You can configure a route policy to modify this behavior and set the VRF that Cisco NX-OS uses for incoming packets.

Cisco NX-OS prevents route leakage (import or export) between VRFs.

### VRF-Lite

VRF-lite is a feature that enables a service provider to support two or more VPNs, where IP addresses can be overlapped among the VPNs. VRF-lite uses input interfaces to distinguish routes for different VPNs and forms virtual packet-forwarding tables by associating one or more Layer 3 interfaces with each VRF. Interfaces in a VRF can be either physical, such as Ethernet ports, or logical, such as VLAN SVIs, but a Layer 3 interface cannot belong to more than one VRF at any time.

**Note**
Multiprotocol Label Switching (MPLS) and MPLS control plane are not supported in the VRF-lite implementation.

**Note**
VRF-lite interfaces must be Layer 3 interfaces.
Send document comments to nexus3k-docfeedback@cisco.com.

VRF-Aware Services

A fundamental feature of the Cisco NX-OS architecture is that every IP-based feature is VRF aware. The following VRF-aware services can select a particular VRF to reach a remote server or to filter information based on the selected VRF:

- AAA—See the Cisco Nexus 7000 Series NX-OS Security Configuration Guide, Release 5.x, for more information.
- Call Home—See the Cisco Nexus 7000 Series NX-OS System Management Configuration Guide, Release 5.x, for more information.
- HSRP—See Chapter 17, “Configuring HSRP” for more information.
- HTTP—See the Cisco Nexus 7000 Series NX-OS Fundamentals Configuration Guide, Release 5.x, for more information.
- Licensing—See the Cisco NX-OS Licensing Guide for more information.
- NTP—See the Cisco Nexus 7000 Series NX-OS System Management Configuration Guide, Release 5.x, for more information.
- RADIUS—See the Cisco Nexus 7000 Series NX-OS Security Configuration Guide, Release 5.x, for more information.
- Ping and Traceroute—See the Cisco Nexus 7000 Series NX-OS Fundamentals Configuration Guide, Release 5.x, for more information.
- SSH—See the Cisco Nexus 7000 Series NX-OS Fundamentals Configuration Guide, Release 5.x, for more information.
- SNMP—See the Cisco Nexus 7000 Series NX-OS System Management Configuration Guide, Release 5.x, for more information.
- Syslog—See the Cisco Nexus 7000 Series NX-OS System Management Configuration Guide, Release 5.x, for more information.
- TACACS+—See the Cisco Nexus 7000 Series NX-OS Security Configuration Guide, Release 5.x, for more information.
- TFTP—See the Cisco Nexus 7000 Series NX-OS Fundamentals Configuration Guide, Release 5.x, for more information.
- VRRP—See Chapter 18, “Configuring VRRP” for more information.

See the appropriate configuration guide for each service for more information on configuring VRF support in that service.

This section contains the following topics:
- Reachability, page 14-3
- Filtering, page 14-4
- Combining Reachability and Filtering, page 14-4

Reachability

Reachability indicates which VRF contains the routing information necessary to get to the server providing the service. For example, you can configure an SNMP server that is reachable on the management VRF. When you configure that server address on the router, you also configure which VRF that Cisco NX-OS must use to reach the server.
Figure 14-2 shows an SNMP server that is reachable over the management VRF. You configure router A to use the management VRF for SNMP server host 192.0.2.1.

**Figure 14-2 Service VRF Reachability**

Filtering

Filtering allows you to limit the type of information that goes to a VRF-aware service based on the VRF. For example, you can configure a syslog server to support a particular VRF. Figure 14-3 shows two syslog servers with each server supporting one VRF. syslog server A is configured in VRF Red, so Cisco NX-OS sends only system messages generated in VRF Red to syslog server A.

**Figure 14-3 Service VRF Filtering**

Combining Reachability and Filtering

You can combine reachability and filtering for VRF-aware services. You configure the VRF that Cisco NX-OS uses to connect to that service as well as the VRF that the service supports. If you configure a service in the default VRF, you can optionally configure the service to support all VRFs.
Send document comments to nexus3k-docfeedback@cisco.com.

Figure 14-4 shows an SNMP server that is reachable on the management VRF. You can configure the SNMP server to support only the SNMP notifications from VRF Red, for example.

Figure 14-4 Service VRF Reachability Filtering

Licensing Requirements for VRFs

The following table shows the licensing requirements for this feature:

<table>
<thead>
<tr>
<th>Product</th>
<th>License Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco NX-OS</td>
<td>The default inband and outband management VRFs 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.</td>
</tr>
<tr>
<td>Cisco NX-OS</td>
<td>VRF-lite requires an Enterprise services license. For a complete explanation of the Cisco NX-OS licensing scheme, see the Cisco NX-OS Licensing Guide.</td>
</tr>
</tbody>
</table>

Guidelines and Limitations

VRFs have the following configuration guidelines and limitations:

- When you make an interface a member of an existing VRF, Cisco NX-OS removes all Layer 3 configuration. You should configure all Layer 3 parameters after adding an interface to a VRF.
- You should add the mgmt0 interface to the management VRF and configure the mgmt0 IP address and other parameters after you add it to the management VRF.
- If you configure an interface for a VRF before the VRF exists, the interface is operationally down until you create the VRF.
- Cisco NX-OS creates the default and management VRFs by default. You should make the mgmt0 interface a member of the management VRF.
- The **write erase boot** command does not remove the management VRF configuration. You must use the **write erase** command and then the **write erase boot** command.

VRF-lite has the following guidelines and limitations:

- A switch with VRF-lite has a separate IP routing table for each VRF, which is separate from the global routing table.
- Because VRF-lite uses different VRF tables, the same IP addresses can be reused. Overlapped IP addresses are allowed in different VPNs.
VRF-lite does not support all MPLS-VRF functionality; it does not support label exchange, LDP adjacency, or labeled packets.

Multiple virtual Layer 3 interfaces can be connected to a VRF-lite switch.

The switch supports configuring a VRF by using physical ports, VLAN SVIs, or a combination of both. The SVIs can be connected through an access port or a trunk port.

The Layer 3 TCAM resource is shared between all VRFs. To ensure that any one VRF has sufficient CAM space, use the `maximum routes` command.

The total number of routes supported by all the VRF's is limited by the size of the TCAM.

VRF-lite supports BGP, RIP, and static routing.

VRF-lite does not support EIGRP.

VRF-lite does not affect the packet switching rate.

Multicast cannot be configured on the same Layer 3 interface at the same time.

## Default Settings

Table 14-1 lists the default settings for VRF parameters.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configured VRFs</td>
<td>default, management</td>
</tr>
<tr>
<td>routing context</td>
<td>default VRF</td>
</tr>
</tbody>
</table>

## Configuring VRFs

This section contains the following topics:

- Creating a VRF, page 14-6
- Assigning VRF Membership to an Interface, page 14-8
- Configuring VRF Parameters for a Routing Protocol, page 14-9
- Configuring a VRF-Aware Service, page 14-11
- Setting the VRF Scope, page 14-12

**Note** If you are familiar with the Cisco IOS CLI, be aware that the Cisco NX-OS commands for this feature might differ from the Cisco IOS commands that you would use.

## Creating a VRF

You can create a VRF in a switch.
SUMMARY STEPS

1. configure terminal
2. vrf context name
3. ip route {ip-prefix | ip-addr ip-mask} {[next-hop | nh-prefix] | [interface next-hop | nh-prefix]} [tag tag-value [pref]]
4. (Optional) show vrf [vrf-name]
5. (Optional) copy running-config startup-config

DETAILED STEPS

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>configure terminal</td>
</tr>
</tbody>
</table>
| Example:| switch# configure terminal
         | switch(config)# |
| Step 2  | vrf context name |
| Example:| switch(config)# vrf definition
         | Enterprise
         | switch(config-vrf)# |
| Step 3  | ip route {ip-prefix | ip-addr ip-mask} {[next-hop | nh-prefix] | [interface next-hop | nh-prefix]} [tag tag-value [pref]] |
| Example:| switch(config-vrf)# ip route 192.0.2.0/8
         | ethernet 1/2 192.0.2.4 |
| Step 4  | show vrf [vrf-name] |
| Example:| switch(config-vrf)# show vrf Enterprise |
| Step 5  | copy running-config startup-config |
| Example:| switch(config)# copy running-config startup-config |

Use the no vrf context command to delete the VRF and the associated configuration:

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>no vrf context name</td>
<td>Deletes the VRF and all associated configuration.</td>
</tr>
<tr>
<td>Example:</td>
<td>switch(config)# no vrf context Enterprise</td>
</tr>
</tbody>
</table>

Any commands available in global configuration mode are also available in VRF configuration mode.
This example shows how to create a VRF and add a static route to the VRF:

```
switch# configure terminal
switch(config)# vrf context Enterprise
switch(config-vrf)# ip route 192.0.2.0/8 ethernet 1/2
switch(config-vrf)# exit
switch(config)# copy running-config startup-config
```

Assigning VRF Membership to an Interface

You can make an interface a member of a VRF.

**BEFORE YOU BEGIN**

Assign the IP address for an interface after you have configured the interface for a VRF.

**SUMMARY STEPS**

1. configure terminal
2. interface interface-type slot/port
3. vrf member vrf-name
4. ip-address ip-prefix/length
5. (Optional) show vrf vrf-name interface interface-type number
6. (Optional) copy running-config startup-config

**DETAILED STEPS**

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong> configure terminal</td>
<td>Enters configuration mode.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>switch# configure terminal</td>
<td></td>
</tr>
<tr>
<td>switch(config)#</td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong> interface interface-type slot/port</td>
<td>Enters interface configuration mode.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>switch(config)# interface ethernet 1/2</td>
<td></td>
</tr>
<tr>
<td>switch(config-if)#</td>
<td></td>
</tr>
<tr>
<td><strong>Step 3</strong> vrf member vrf-name</td>
<td>Adds this interface to a VRF.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>switch(config-if)# vrf member</td>
<td></td>
</tr>
<tr>
<td>RemoteOfficeVRF</td>
<td></td>
</tr>
<tr>
<td><strong>Step 4</strong> ip address ip-prefix/length</td>
<td>Configures an IP address for this interface. You must do this step after you assign this interface to a VRF.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>switch(config-if)# ip address</td>
<td></td>
</tr>
<tr>
<td>192.0.2.1/16</td>
<td></td>
</tr>
</tbody>
</table>
Configuring VRFs

This example shows how to add an interface to the VRF:

```
switch# configure terminal
switch(config)# interface ethernet 1/2
switch(config-if)# vrf member RemoteOfficeVRF
switch(config-if)# ip address 192.0.2.1/16
switch(config-if)# copy running-config startup-config
```

**Configuring VRF Parameters for a Routing Protocol**

You can associate a routing protocol with one or more VRFs. See the appropriate chapter for information on how to configure VRFs for the routing protocol. This section uses OSPFv2 as an example protocol for the detailed configuration steps.

**SUMMARY STEPS**

1. `configure terminal`
2. `router ospf instance-tag`
3. `vrf vrf-name`
4. (Optional) `maximum-paths paths`
5. `interface interface-type slot/port`
6. `vrf member vrf-name`
7. `ip address ip-prefix/length`
8. `ip router ospf instance-tag area area-id`
9. (Optional) `copy running-config startup-config`

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 5</strong></td>
<td>show vrf vrf-name interface interface-type number</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>switch(config-vrf)# show vrf Enterprise interface ethernet 1/2</td>
</tr>
<tr>
<td><strong>Step 6</strong></td>
<td>copy running-config startup-config</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>switch(config)# copy running-config startup-config</td>
</tr>
</tbody>
</table>

(Optional) Displays VRF information.

(Optional) Saves this configuration change.

This example shows how to add an interface to the VRF:
## Configuring VRFs

### Detailed Steps

<table>
<thead>
<tr>
<th>Step</th>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td><code>configure terminal</code></td>
<td>Enters configuration mode.</td>
</tr>
</tbody>
</table>
| **Example:** | switch# configure terminal  
switch(config)# | |
| **2** | `router ospf instance-tag` | Creates a new OSPFv2 instance with the configured instance tag. |
| **Example:** | switch(config-vrf)# router ospf 201  
switch(config-router)# | |
| **3** | `vrf vrf-name` | Enters VRF configuration mode. |
| **Example:** | switch(config-router)# vrf  
RemoteOfficeVRF  
switch(config-router-vrf)# | |
| **4** | `maximum-paths paths` | (Optional) Configures the maximum number of equal OSPFv2 paths to a destination in the route table for this VRF. Used for load balancing. |
| **Example:** | switch(config-router-vrf)# maximum-paths  
4 | |
| **5** | `interface interface-type slot/port` | Enters interface configuration mode. |
| **Example:** | switch(config)# interface ethernet 1/2  
switch(config-if)# | |
| **6** | `vrf member vrf-name` | Adds this interface to a VRF. |
| **Example:** | switch(config-if)# vrf member  
RemoteOfficeVRF | |
| **7** | `ip address ip-prefix/length` | Configures an IP address for this interface. You must do this step after you assign this interface to a VRF. |
| **Example:** | switch(config-if)# ip address  
192.0.2.1/16 | |
| **8** | `ip router ospf instance-tag area area-id` | Assigns this interface to the OSPFv2 instance and area configured. |
| **Example:** | switch(config-if)# ip router ospf 201  
area 0 | |
| **9** | `copy running-config startup-config` | (Optional) Saves this configuration change. |
| **Example:** | switch(config)# copy running-config  
startup-config | |
This example shows how to create a VRF and add an interface to the VRF:

```
switch# configure terminal
switch(config)# vrf context RemoteOfficeVRF
switch(config-vrf)# exit
switch(config)# router ospf 201
switch(config-router)# vrf RemoteOfficeVRF
switch(config-router-vrf)# maximum-paths 4
switch(config-router-vrf)# interface ethernet 1/2
switch(config-if)# vrf member RemoteOfficeVRF
switch(config-if)# ip address 192.0.2.1/16
switch(config-if)# ip router ospf 201 area 0
switch(config-if)# exit
switch(config)# copy running-config startup-config
```

### Configuring a VRF-Aware Service

You can configure a VRF-aware service for reachability and filtering. See the “VRF-Aware Services” section on page 14-3 for links to the appropriate chapter or configuration guide for information on how to configure the service for VRFs. This section uses SNMP and IP domain lists as example services for the detailed configuration steps.

#### SUMMARY STEPS

1. configure terminal
2. snmp-server host ip-address [filter_vrf vrf-name] [use-vrf vrf-name]
3. vrf context [vrf-name]
4. ip domain-list domain-name [all-vrfs] [use-vrf vrf-name]
5. (Optional) copy running-config startup-config

#### DETAILED STEPS

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td><strong>configure terminal</strong></td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>switch# configure terminal</td>
<td></td>
</tr>
<tr>
<td>switch(config)#</td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td><strong>snmp-server host ip-address [filter-vrf vrf-name] [use-vrf vrf-name]</strong></td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>switch(config)# snmp-server host 192.0.2.1 use-vrf Red</td>
<td></td>
</tr>
<tr>
<td>switch(config-vrf)#</td>
<td></td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td><strong>vrf context vrf-name</strong></td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>switch(config)# vrf context Blue</td>
<td></td>
</tr>
<tr>
<td>switch(config-vrf)#</td>
<td></td>
</tr>
</tbody>
</table>
Chapter 14 Configuring Layer 3 Virtualization

**Send document comments to nexus3k-docfeedback@cisco.com.**

### Configuring VRFs

This example shows how to send SNMP information for all VRFs to SNMP host 192.0.2.1, reachable on VRF Red:

```
switch# configure terminal
switch(config)# snmp-server host 192.0.2.1 for-all-vrfs use-vrf Red
switch(config)# copy running-config startup-config
```

This example shows how to Filter SNMP information for VRF Blue to SNMP host 192.0.2.12, reachable on VRF Red:

```
switch# configure terminal
switch(config)# vrf definition Blue
switch(config-vrf)# snmp-server host 192.0.2.12 use-vrf Red
switch(config)# copy running-config startup-config
```

### Setting the VRF Scope

You can set the VRF scope for all EXEC commands (for example, `show` commands). This automatically restricts the scope of the output of EXEC commands to the configured VRF. You can override this scope by using the VRF keywords available for some EXEC commands.

To set the VRF scope, use the following command in EXEC mode:

```
Command Purpose
---
```

#### Step 4

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ip domain-list</strong> <code>domain-name</code>&lt;br&gt;<code>[all-vrfs] [use-vrf vrf-name]</code></td>
<td>Configures the domain list in the VRF and optionally configures the VRF that Cisco NX-OS uses to reach the domain name listed.</td>
</tr>
</tbody>
</table>

**Example:**

```
switch(config-vrf)# ip domain-list List
all-vrfs use-vrf Blue
switch(config-vrf)#
```

#### Step 5

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>copy running-config startup-config</strong></td>
<td>(Optional) Saves this configuration change.</td>
</tr>
</tbody>
</table>

**Example:**

```
switch(config)# copy running-config startup-config
```

### Command Purpose

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>routing-context vrf vrf-name</code></td>
<td>Sets the routing context for all EXEC commands. Default routing context is the default VRF.</td>
</tr>
</tbody>
</table>

**Example:**

```
switch# routing-context vrf red
switch#red#
```

To return to the default VRF scope, use the following command in EXEC mode:

```
Command Purpose
---
```

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>routing-context vrf default</strong></td>
<td>Sets the default routing context.</td>
</tr>
</tbody>
</table>

**Example:**

```
switch#red# routing-context vrf default
switch#
```
### Verifying the VRF Configuration

To display the VRF configuration information, perform one of the following tasks:

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>show vrf [vrf-name]</code></td>
<td>Displays the information for all or one VRF.</td>
</tr>
<tr>
<td><code>show vrf [vrf-name] detail</code></td>
<td>Displays detailed information for all or one VRF.</td>
</tr>
<tr>
<td><code>show vrf [vrf-name] [interface interface-type slot/port]</code></td>
<td>Displays the VRF status for an interface.</td>
</tr>
</tbody>
</table>

### Configuration Examples for VRF

This example shows how to configure VRF Red, add an SNMP server to that VRF, and add an instance of OSPF to VRF Red:

```bash
configure terminal
vrf context Red
snmp-server host 192.0.2.12 use-vrf Red
router ospf 201
interface ethernet 1/2
vrf member Red
ip address 192.0.2.1/16
ip router ospf 201 area 0
```

This example shows how to configure VRF Red and Blue, add an instance of OSPF to each VRF, and create an SNMP context for each OSPF instance in each VRF:

```bash
configure terminal
!Create the VRFs
vrf context Red
vrf context Blue
!Create the OSPF instances and associate them with each VRF
feature ospf
router ospf Lab
vrf Red
router ospf Production
vrf Blue
!Configure one interface to use ospf Lab on VRF Red
interface ethernet 1/2
vrf member Red
ip address 192.0.2.1/16
ip router ospf Lab area 0
no shutdown
!Configure another interface to use ospf Production on VRF Blue
interface ethernet 10/2
vrf member Blue
ip address 192.0.2.1/16
ip router ospf Production area 0
no shutdown
!Configure the SNMP server
snmp-server user admin network-admin auth md5 nbv-12345
snmp-server community public ro
!Create the SNMP contexts for each VRF
snmp-server context lab instance Lab vrf Red
snmp-server context production instance Production vrf Blue
```
Use the SNMP context `lab` to access the OSPF-MIB values for the OSPF instance Lab in VRF Red in this example.

Related Topics

The following topics can give more information on VRFs:

- *Cisco Nexus 7000 Series NX-OS Fundamentals Configuration Guide, Release 5.x*
- *Cisco Nexus 7000 Series NX-OS System Management Configuration Guide, Release 5.x*

Additional References

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

- Related Documents, page 14-14
- Standards, page 14-14

Related Documents

<table>
<thead>
<tr>
<th>Related Topic</th>
<th>Document Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>VRF CLI</td>
<td><em>Cisco Nexus 3000 Series Command Reference</em></td>
</tr>
</tbody>
</table>

Standards

<table>
<thead>
<tr>
<th>Standards</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.</td>
<td>—</td>
</tr>
</tbody>
</table>

Feature History for VRF

Table 14-2 lists the release history for this feature.

<table>
<thead>
<tr>
<th>Feature Name</th>
<th>Releases</th>
<th>Feature Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>VRF</td>
<td>5.0(3)U1(1)</td>
<td>This feature was introduced.</td>
</tr>
</tbody>
</table>