CHAPTER 20

Configuring Object Tracking

This chapter describes how to configure object tracking on Cisco NX-OS devices.

This chapter includes the following sections:

Information About Object Tracking

Object tracking allows you to track specific objects on the network, such as the interface line protocol state, IP routing, and route reachability, and take action when the tracked object's state changes. This feature allows you to increase the availability of the network and shorten recovery time if an object state goes down.

This section includes the following topics:

Object Tracking Overview

The object tracking feature allows you to create a tracked object that multiple clients can use to modify the client behavior when a tracked object changes. Several clients register their interest with the tracking process, track the same object, and each take different actions when the object state changes.

Clients include the following features:

- Hot Standby Redundancy Protocol (HSRP)
- Gateway Load Balancing Protocol (GLBP)
- Embedded Event Manager (EEM)

The object tracking monitors the status of the tracked objects and communicates any changes made to interested clients. Each tracked object is identified by a unique number that clients can use to configure the action to take when a tracked object changes state.

Cisco NX-OS tracks the following object types:

- Interface line protocol state—Tracks whether the line protocol state is up or down.
- Interface IP routing state—Tracks whether the interface has an IP address and IP routing is enabled and active.
- IP route reachability—Tracks whether the route exists and is reachable from the local device.

For example, you can configure HSRP to track the line protocol of the interface that connects one of the redundant routers to the rest of the network. If that link protocol goes down, you can modify the priority of the affected HSRP router and cause a switchover to a backup router that has better network connectivity

High Availability

Object tracking supports high availability through stateful restarts. A stateful restart occurs when the object tracking process crashes. Object tracking also supports stateful switchover on a dual supervisor system. Cisco NX-OS applies the runtime configuration after the switchover.

You can also use object tracking to modify the behavior of a client to improve overall network availability.

Virtualization Support

Object tracking supports Virtual Routing and Forwarding (VRF) instances. VRFs exist within virtual device contexts (VDCs). By default, Cisco NX-OS places you in the default VDC and default VRF unless you specifically configure another VDC and VRF. By default, Cisco NX-OS tracks the route reachability state of objects in the default VRF. If you want to track objects in another VRF, you must configure the object to be a member of that VRF (see "Configuring Object Tracking for a nonDefault VRF" section on page 20-5).

For more information, see the *Cisco Nexus 7000 Series NX-OS Virtual Device Context Configuration Guide, Release 4.0* and see Chapter 14, "Configuring Layer 3 Virtualization."

Licensing Requirements for Object Tracking

The following table shows the licensing requirements for this feature:

Product	License Requirement
NX-OS	Object tracking requires 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 NX-OS licensing scheme, see the *Cisco Nexus 7000 Series NX-OS Licensing Guide, Release 4.0*.

Prerequisites for Object Tracking

Object tracking has the following prerequisites:

- If you configure VDCs, install the Advanced Services license and enter the desired VDC (see the *Cisco Nexus 7000 Series NX-OS Virtual Device Context Configuration Guide, Release 4.0).*

Guidelines and Limitations

Object tracking has the following guidelines and limitations:

- Supports up to 500 tracked objects per VDC.
- Supports IPv4 addresses only.
- Supports Ethernet, subinterfaces, port channels, loopback interfaces, and VLAN interfaces.
- Supports one tracked object per HSRP group or GLBP group.

Configuring Object Tracking

This section includes the following topics:

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.

Configuring Object Tracking for an Interface

You can configure Cisco NX-OS to track the line protocol or IP routing state of an interface.

BEFORE YOU BEGIN

Ensure that you are in the correct VDC (or use the **switchto vdc** command).

SUMMARY STEPS

1. **config t**
2. **track** *object-id* **interface** *interface-type number* {**ip routing** | **line-protocol**}
3. **show track** [*object-id*]
4. **copy running-config startup-config**

DETAILED STEPS

	Command	Purpose
Step 1	**config t** **Example:** switch# config t switch(config)#	Enters configuration mode.
Step 2	**track** *object-id* **interface** *interface-type number* {**ip routing** | **line-protocol**} **Example:** switch(config)# track 1 interface ethernet 1/2 line-protocol switch(config-track#	Creates a tracked object for an interface and enters tracking configuration mode. The *object-id* range is from 1 to 500.
Step 3	**show track** [*object-id*] **Example:** switch(config-track)# show track 1	(Optional) Displays object tracking information.
Step 4	**copy running-config startup-config** **Example:** switch(config-track)# copy running-config startup-config	(Optional) Saves this configuration change.

This example shows how to configure object tracking for the line protocol state on Ethernet 1/2:

```
switch# config t
switch(config)# track 1 interface ethernet 1/2 line-protocol
switch(config-track)# copy running-config startup-config
```

Configuring Object Tracking for Route Reachability

You can configure Cisco NX-OS to track the existence and reachability of an IP route.

BEFORE YOU BEGIN

Ensure that you are in the correct VDC (or use the **switchto vdc** command).

SUMMARY STEPS

1. **config t**
2. **track** *object-id* **ip route** *ip-prefix/length* **reachability**
3. **show track** [*object-id*]
4. **copy running-config startup-config**

DETAILED STEPS

	Command	Purpose
Step 1	**config t** **Example:** switch# config t switch(config)#	Enters configuration mode.
Step 2	**track** *object-id* **ip route** *ip-prefix/length* **reachability** **Example:** switch(config)# track 2 ip route 192.0.2.0/8 reachability switch(config-track)#	Creates a tracked object for a route and enters tracking configuration mode. The *object-id* range is from 1 to 500.
Step 3	**show track** [*object-id*] **Example**: switch(config-track)# show track 1	(Optional) Displays object tracking information.
Step 4	**copy running-config startup-config** **Example:** switch(config-track)# copy running-config startup-config	(Optional) Saves this configuration change.

This example shows how to configure object tracking for a route in the default VRF.

```
switch# config t
switch(config)# track 2 ip route 192.0.2.0/8 reachability
switch(config-track)# copy running-config startup-config
```

Configuring Object Tracking for a nonDefault VRF

You can configure Cisco NX-OS to track an object in a specific VRF.

BEFORE YOU BEGIN

Ensure that you are in the correct VDC (or use the **switchto vdc** command).

SUMMARY STEPS

1. **config t**
2. **track** *object-id* **ip route** *ip-prefix/length* **reachability**
3. **vrf member** *vrf-name*
4. **show track** [*object-id*]
5. **copy running-config startup-config**

DETAILED STEPS

	Command	Purpose
Step 1	**config t** **Example:** switch# config t switch(config)#	Enters configuration mode.
Step 2	**track** *object-id* **ip route** *ip-prefix/length* **reachability** **Example:** switch(config)# track 3 ip route 209.165.201.0/8 reachability switch(config-track)#	Creates a tracked object for a route and enters tracking configuration mode. The *object-id* range is from 1 to 500.
Step 3	**vrf member** *vrf-name* **Example:** switch(config-track)# vrf member Red	Configures the VRF to use for tracking the configured object.
Step 4	**show track** [*object-id*] **Example:** switch(config-track)# show track 3	(Optional) Displays object tracking information.
Step 5	**copy running-config startup-config** **Example:** switch(config-track)# copy running-config startup-config	(Optional) Saves this configuration change.

This example shows how to configure object tracking for a route and use VRF Red to look up reachability information for this object:

```
switch# config t
switch(config)# track 2 ip route 209.165.201.0/8 reachability
switch(config-track)# vrf member Red
switch(config-track)# copy running-config startup-config
```

This example shows how to modify tracked object 2 to use VRF Blue instead of VRF RED to look up reachability information for this object:

```
switch# config t
switch(config)# track 2
switch(config-track)# vrf member Blue
switch(config-track)# copy running-config startup-config
```

Verifying Object Tracking Configuration

To verify object tracking configuration information, use the following commands:

Command	Purpose
show track [*object-id*] [**brief**]	Displays the object tracking information for one or more objects.
show track [*object-id*] **interface** [**brief**]	Displays the interface-based object tracking information.
show track [*object-id*] **ip route** [**brief**]	Displays the IP route-based object tracking information.

Object Tracking Example Configuration

This example shows how to configure object tracking for route reachability and use VRF Red to look up reachability information for this route:

```
switch# config t
switch(config)# track 2 ip route 209.165.201.0/8 reachability
switch(config-track)# vrf member Red
switch(config-track)# copy running-config startup-config
```

Related Topics

See the following topics for information related to object tracking:

- Chapter 14, “Configuring Layer 3 Virtualization”
- Chapter 17, “Configuring GLBP”
- Chapter 18, “Configuring HSRP”

Default Settings

Table 20-1 lists the default settings for object tracking parameters.

Table 20-1 Default Object Tracking Parameters

Parameters	Default
Tracked Object VRF	member of default VRF

Additional References

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

- Related Documents, page 20-8

- Standards, page 20-8

Related Documents

Related Topic	Document Title
Object Tracking CLI commands	*Cisco Nexus 7000 Series NX-OS Unicast Routing Command Reference, Release 4.0*
Configuring the Embedded Event Manager	*Cisco Nexus 7000 Series NX-OS System Management Configuration Guide, Release 4.0*

Standards

Standards	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	—