

NAT DIA Tracker

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Feature history of NAT DIA tracker

This table describes the developments of this feature, by release.

Table 1: Feature history

Feature name	Release information	Description
NAT DIA Tracker for Cisco IOS XE Catalyst SD-WAN Devices	Cisco IOS XE Catalyst SD-WAN Release 17.3.1a Cisco vManage Release 20.3.1	This feature allows you to confi periodically to determine if the i You can configure the DIA track You can apply the tracker to a tra **Ethernet** or the **Cisco VPN Int**
Dual Endpoint Support for Interface Status Tracking on Cisco IOS XE Catalyst SD-WAN Devices	Cisco IOS XE Catalyst SD-WAN Release 17.7.1a Cisco vManage Release 20.7.1	This feature allows you to confi SD-WAN Manager system temp Despite having an active Interne inactive. This condition leads to single endpoint tracker, you can You can configure tracker groups system template and associate ea

Feature name	Release information	Description
NAT DIA Tracker for IPv6 Interface	Cisco IOS XE Catalyst SD-WAN Release 17.11.1a Cisco vManage Release 20.11.1	NAT DIA tracker is now supported You can configure IPv6 DIA tracker options under transport profile in co
ICMP Endpoint Tracker for NAT DIA for IPv4 or IPv6 Interfaces	Cisco IOS XE Catalyst SD-WAN Release 17.13.1a Cisco Catalyst SD-WAN Manager Release 20.13.1	This feature allows you to configure can configure ICMP probes for NAT You can configure the ICMP tracker under transport profile in configurat Configure a **Tracker DIA Stabilize** rapid tracker status changes that cau

NAT DIA trackers

A NAT DIA tracker is a network feature that

- uses IP SLA probes sourced from the transport interface to assess internet or external network availability against configured latency thresholds
- withdraws NAT routes from the service VPN and reroutes traffic to the SD-WAN overlay when the network becomes unavailable, and reinstalls NAT routes when connectivity is restored, and
- supports tracker groups with multiple endpoints and requires IPv4 or IPv6 tracker types to match the interface address configuration.

The DIA tracker determines whether the internet or an external network is unavailable. NAT DIA Tracking is useful when NAT is enabled on a transport interface in VPN 0, allowing router data traffic to exit directly to the internet.

How NAT DIA tracking works

When the internet or external network becomes unavailable, the router may continue forwarding traffic based on the NAT route in the service VPN. Internet-bound traffic is then dropped.

To prevent this, configure a DIA tracker on the edge router to monitor the transport interface. The tracker periodically probes the interface and reports its status to the associated attach points.

When configured on a transport interface, the interface IP address is used as the source IP address for probe packets.

Probe monitoring and latency thresholds

IP SLA monitors probe status and measures probe round-trip time. It compares the measured values with the configured latency threshold.

When the latency exceeds the configured threshold, the tracker considers the network unavailable.

NAT route withdrawal and restoration

When the tracker determines that the local internet is unavailable, the router withdraws the NAT route from the service VPN and reroutes traffic to the overlay based on the local routing configuration.

The router continues to periodically check the path. When connectivity is restored, it reinstalls the NAT route to the internet.

Tracker groups

From Cisco IOS XE Catalyst SD-WAN Release 17.7.1a, you can configure a tracker group containing two endpoint trackers and associate the group with an interface.

Using two endpoints helps prevent false negatives caused by an internal or external network being incorrectly marked as unavailable.

IPv6 support

From Cisco IOS XE Catalyst SD-WAN Release 17.11.1a, you can configure NAT DIA trackers on IPv6 interfaces.

The tracker or tracker group address type must match the interface address configuration:

- An IPv4 interface address requires an IPv4 tracker.
- An IPv6 interface address requires an IPv6 tracker.
- A dual-stack interface can use both IPv4 and IPv6 trackers, respectively.

Restrictions for NAT DIA tracker

Restrictions for Cisco IOS XE Catalyst SD-WAN Release 17.10.1a and Earlier Releases

1. In Cisco IOS XE Release 17.6.x and earlier, NAT DIA trackers are not supported on dialer interfaces. Starting with Cisco IOS XE Catalyst SD-WAN Release 17.7.1a, subinterfaces and dialer interfaces support single-endpoint and dual-endpoint trackers.
2. DNS URL endpoints are not supported on CCisco IOS XE Catalyst SD-WAN devices.
3. You can apply only one tracker or tracker group to an interface.
4. The NAT fallback feature is supported only from Cisco IOS XE Catalyst SD-WAN Release 17.3.2.
5. The IP address of a tunnel with the address `169.254.x.x` is not supported for tracking the Zscaler endpoint on manual tunnels.
6. You must configure at least two single-endpoint trackers to create a tracker group.
7. A tracker group can contain a maximum of two single-endpoint trackers.
8. In Cisco IOS XE Release 17.10.1 and earlier, you cannot configure an IPv4 tracker on an IPv6 interface or vice versa. The tracker will not become active.

Restrictions for Cisco IOS XE Catalyst SD-WAN Release 17.11.1a

- API URL endpoints are supported only on IPv6 DIA trackers and are not supported on IPv4 DIA trackers.
- You cannot use IPv4 and IPv6 trackers in the same tracker group.
- You must configure the `allow service all` command under the TLOC tunnel interface for IPv6 trackers to work with a TLOC tunnel interface.
- Multiple NAT66 DIA interfaces are not supported.

Restrictions for Cisco IOS XE Catalyst SD-WAN Release 17.13.1a

The name resolution process is not bound to the Ethernet (ET) interface. Name resolution uses the VPN 0 routing table and can exit through any active interface with the appropriate routing configuration.

ICMP endpoint tracker for NAT DIA

Minimum supported release: Cisco IOS XE Catalyst SD-WAN Release 17.13.1a and Cisco Catalyst SD-WAN Manager Release 20.13.1.

You can configure ICMP endpoint trackers on NAT-enabled IPv4 or IPv6 transport interfaces that support NAT DIA.

An ICMP endpoint tracker monitors the internet path to an external service by sending probes to a configured endpoint. The tracker monitors the probe responses to detect failures along the path. If the number of probes exceed the configured multiplier value, or if the ICMP probes exceed the configured threshold, the tracker considers the external endpoint unreachable and makes the transport interface unavailable for DIA.

ICMP probes help reduce failover time when a transport interface becomes unavailable for DIA.

You can configure an ICMP endpoint tracker using either an endpoint IP address or a DNS name. If you configure multiple IPv4 or IPv6 trackers, you can group them into a tracker group.

Types of ICMP endpoint trackers for NAT DIA

You can configure these types of ICMP endpoint trackers for NAT DIA:

Tracker	Supported tracker type	Tracker endpoint type
Single NAT DIA ICMP tracker	IPv4, IPv6	Endpoint IP, DNS
NAT DIA ICMP tracker group	IPv4, IPv6	Endpoint IP
NAT DIA mixed tracker group (HTTP and ICMP)	IPv4, IPv6	Endpoint IP

Note Ensure that you configure a host route to direct traffic through the NAT DIA interface on which you configured the ICMP tracker. This ensures that the intended interface receives the ICMP probes.

If the external endpoint is reachable through an interface other than the interface configured for the ICMP tracker, the probes might use the alternate interface. As a result, the probes might egress through an unintended interface, preventing the tracker from monitoring the intended interface.

Restrictions for ICMP trackers

- You cannot configure ICMP endpoint tracker type through feature templates.
- You cannot configure both an IPv4 and an IP6 tracker type in the same tracker group.
- You can configure the ICMP endpoint tracker for NAT DIA for the following interfaces only:
  1. Ethernet Interfaces
  2. Ethernet (PPPoE) Interfaces
  3. Subinterfaces
- If only one DIA interface (default route) is configured, and the ICMP tracker goes down, the default route is withdrawn.

Workflow for NAT DIA tracker on IPv4 interfaces

This section lists the workflow to configure and verify NAT DIA tracker on IPv4 interfaces and identifies the minimum supported releases.

Minimum supported release: Cisco IOS XE Catalyst SD-WAN Release 17.7.1a and Cisco vManage Release 20.7.1

1. Configure an interface tracker using a **Cisco System** template. From Cisco IOS XE Catalyst SD-WAN Release 17.7.1a, you can configure a dual tracker or a tracker group.
2. Apply the tracker to a transport interface.
3. Verify NAT DIA tracker configuration.

Configure NAT DIA tracker on IPv4 interfaces

Configure NAT DIA tracker on IPv4 interfaces using configuration groups

Minimum supported release: Cisco IOS XE Catalyst SD-WAN Release 17.11.1a and Cisco vManage Release 20.11.1

Use these steps to Configure NAT DIA tracker on IPv4 interfaces using configuration groups.

1. From the Cisco SD-WAN Manager menu, choose **Configuration** > **Configuration Groups**

   .

Procedure

Step 1 From the Cisco SD-WAN Manager menu, choose **Configuration** > **Configuration Groups**.

In Cisco IOS XE Catalyst SD-WAN Release 17.11.1a and earlier, choose **Configuration** > **Templates** > **Configuration Groups**.

Step 2 Configure a Tracker in a Transport and Management Profile.

Table 2: Tracker

Field	Description
Tracker Name*	Name of the tracker. The name can be up to 128 alphanumeric characters.
Endpoint Tracker Type*	Choose a tracker type to configure endpoint trackers: • **http** • **icmp** This tracker type is available from Cisco Catalyst SD-WAN Manager Release 20.13.1.
Endpoint	Choose an endpoint type: • **Endpoint IP**: When you choose this option, the following field appears: **Endpoint IP**: IP address of the endpoint. This is the destination on the internet to which the probes are sent to determine the status of an endpoint. • **Endpoint DNS Name**: When you choose this option, the following field appears: **Endpoint DNS Name**: DNS name of the endpoint. This is the destination on the internet to which probes are sent to determine the status of the endpoint. The DNS name can contain a minimum of one character and a maximum of 253 characters. • **Endpoint API URL**: When you choose this option, the following field appears: **API URL of endpoint***: API URL for the endpoint of the tunnel. This is the destination on the internet to which probes are sent to determine the status of the endpoint.
Interval	Time interval between probes to determine the status of the configured endpoint. From Cisco Catalyst SD-WAN Manager Release 20.13.1, this option is called **Probe Interval**, allowing you to configure the time interval between probes. Range: 20 to 600 seconds Default: 60 seconds (1 minute). From Cisco Catalyst SD-WAN Manager Release 20.13.1, if you select **icmp** as the endpoint tracker type, the default probe interval is 2 seconds.

Field	Description
Multiplier	Number of times probes are sent before declaring that the endpoint is down. Range: 1 to 10 Default: 3
Threshold	Wait time for the probe to return a response before declaring that the configured endpoint is down. Range: 100 to 1000 milliseconds Default: 300 milliseconds

Step 3 Configure **Tracker Group**.

Table 3: Tracker Group

Field	Description
Tracker Elements*	This field is displayed only if you chose **Tracker Type** as the **Tracker Group**. Add the existing interface tracker names, separated with a space. When you add this tracker to the template, the tracker group is associated with these individual trackers, and you can then associate the tracker group to an interface.
Tracker Boolean	This field is displayed only if you chose **Tracker Type** as the **Tracker Group**. Select **AND** or **OR**. **OR** is the default boolean operation. An **OR** ensures that the transport interface status is reported as active if either one of the associated trackers of the tracker group reports that the interface is active. If you select the **AND** operation, the transport-interface status is reported as active if both the associated trackers of the tracker group report that the interface is active.

Step 4 After you create a configuration group, add devices to the group. For more information, see Add Devices to a Configuration Group in *Cisco Catalyst SD-WAN Configuration Groups Reference Guide*. You can then go ahead and deploy the devices associated to the configuration group. For more information, see Deploy Devices in *Cisco Catalyst SD-WAN Configuration Groups Reference Guide*.

Configure NAT DIA tracker on IPv4 interfaces using CLI commands

Configure NAT DIA trackers on IPv4 interfaces using CLI add-on feature templates or CLI device templates. You can configure individual endpoint trackers or combine multiple endpoint trackers into a tracker group.

Minimum supported release: Cisco IOS XE Catalyst SD-WAN Release 17.7.1a and Cisco vManage Release 20.7.1

- Single end point tracker
- Endpoint tracker group

Configure a single IPv4 endpoint tracker using CLI commands

Minimum supported release: Cisco IOS XE Catalyst SD-WAN Release 17.7.1a andCisco vManage Release 20.7.1

Use these steps to configure a single IPv4 endpoint tracker using CLI commands.

Procedure

Step 1 Enter configuration mode.

```
Device# config-transaction
```

Step 2 Configure an endpoint tracker.

```
Device(config)# endpoint-tracker tracker1
```

Step 3 Configure the endpoint IP address.

```
Device(config-endpoint-tracker)# endpoint-ip ip-address
```

Step 4 Configure the tracking parameters.

```
Device(config-endpoint-tracker)# threshold value
Device(config-endpoint-tracker)# multiplier value
Device(config-endpoint-tracker)# interval value
```

Step 5 Set the tracker type to interface.

```
Device(config-endpoint-tracker)# tracker-type interface
```

Configure an IPv4 tracker group using CLI commands

Use these steps to configure an IPv4 tracker group using CLI commands

A tracker group can contain a combination of IP-address-based and DNS-based endpoint trackers. Use the **boolean** command to specify how the tracker group evaluates the status of its member trackers.

Procedure

Step 1 Configure an IPv4 endpoint tracker using an IP address:

```
endpoint-tracker tracker-name1
 tracker-type interface
 endpoint-ip ip-address
 threshold value
 multiplier value
 interval value
```

Step 2 Configure an IPv4 endpoint tracker using a DNS name:

```
endpoint-tracker tracker-name2
 tracker-type interface
 endpoint-dns-name dns-name
 threshold value
```

```
 multiplier value
 interval value
```

Step 3 Configure the tracker group:

```
endpoint-tracker tracker-group-name
```

Step 4 Configure the tracker type:

```
tracker-type tracker-group
```

Step 5 Configure the Boolean logic for the tracker group:

```
boolean {and | or}
```

Step 6 Add the endpoint trackers to the tracker group:

```
tracker-elements tracker-name1 tracker-name2
```

Step 7 Apply the tracker group to an interface:

```
interface interface-name
 endpoint-tracker tracker-group-name
```

Example: Configure an IPv4 tracker group

```
Device# config-transaction
Device(config)# endpoint-tracker tracker1
Device(config-endpoint-tracker)# tracker-type interface
Device(config-endpoint-tracker)# endpoint-ip 10.1.1.1
Device(config-endpoint-tracker)# threshold 100
Device(config-endpoint-tracker)# multiplier 5
Device(config-endpoint-tracker)# interval 30
!
Device(config)# endpoint-tracker tracker2
Device(config-endpoint-tracker)# tracker-type interface
Device(config-endpoint-tracker)# endpoint-dns-name cisco.com
Device(config-endpoint-tracker)# threshold 100
Device(config-endpoint-tracker)# multiplier 5
Device(config-endpoint-tracker)# interval 30
!
Device(config)# endpoint-tracker tracker-group1
Device(config-endpoint-tracker)# tracker-type tracker-group
Device(config-endpoint-tracker)# boolean or
Device(config-endpoint-tracker)# tracker-elements tracker1 tracker2
!
Device(config)# interface GigabitEthernet0/0/1
Device(config-if)# endpoint-tracker tracker-group1
```

Configure an ICMP tracker for NAT DIA using CLI commands

Provides CLI configuration steps to enable ICMP tracking for NAT DIA by defining single endpoints and tracker groups.

Minimum supported release: Cisco IOS XE Catalyst SD-WAN Release 17.13.1a and Cisco Catalyst SD-WAN Manager Release 20.13.1.

You can configure ICMP tracking for NAT DIA using a CLI add-on profile or the Transport profile in a configuration group.

You can configure an ICMP tracker for a single endpoint or create a tracker group to track multiple endpoints.

Configure an ICMP tracker for a single endpoint

To configure an ICMP tracker for an endpoint IP address, enter these commands:

```
Device# config-transaction
Device(config)# endpoint-tracker tracker-name
Device(config-endpoint-tracker)# tracker-type interface-icmp
Device(config-endpoint-tracker)# endpoint-ip ip-address
Device(config-endpoint-tracker)# threshold value
Device(config-endpoint-tracker)# multiplier value
Device(config-endpoint-tracker)# icmp-interval value
```

To configure an ICMP tracker for a DNS endpoint, use these commands:

```
Device# config-transaction
Device(config)# endpoint-tracker tracker-name
Device(config-endpoint-tracker)# tracker-type interface-icmp
Device(config-endpoint-tracker)# endpoint-dns-name dns-name
Device(config-endpoint-tracker)# threshold value
Device(config-endpoint-tracker)# multiplier value
Device(config-endpoint-tracker)# icmp-interval value
```

Configuration examples

Configure single endpoint NAT DIA tracker using CLI commands

This example shows how to configure a single endpoint NAT DIA tracker:

```
config-transaction
    endpoint-tracker tracker1
    tracker-type interface
    endpoint-ip 10.1.1.1
    threshold 100
    multiplier 5
    interval 20
exit
```

Configure tracker groups using CLI commands

This example shows how to configure a tracker group with two trackers (two endpoints). You can create tracker groups to probe an interface from Cisco IOS XE Catalyst SD-WAN Release 17.7.1a.

```
config-transaction
    endpoint-tracker tracker1
    endpoint-ip 10.1.1.1
    interval 20
    threshold 100
    multiplier 1
    tracker-type interface
exit

endpoint-tracker tracker2
    endpoint-dns-name www.cisco.com
    interval 600
    threshold 1000
    multiplier 10
    tracker-type interface
exit

endpoint-tracker group1
    tracker-type tracker-group
```

```
    boolean or
    tracker-elements tracker1 tracker2
exit
```

This example shows how to apply a tracker group to an interface and configure it in the supported interfaces:

```
interface GigabitEthernet0/0/1
    endpoint-tracker group1
```

Stabilize NAT DIA tracker status

From Cisco IOS XE Catalyst SD-WAN Release 17.13.1a, you can configure the Tracker DIA Stabilize Status setting to stabilize endpoint-tracker state transitions and prevent rapid interface flaps caused by frequent tracker status changes.

The setting applies to HTTP and ICMP endpoint trackers across Direct Internet Access (DIA) interfaces. It stabilizes tracker state transitions from DOWN to UP.

Endpoint tracker operation

When you configure an endpoint tracker for an interface, the tracker monitors endpoint reachability by sending HTTP or ICMP probes.

The tracker status changes are mentioned below:

Table 4: Tracker status changes

Probe result	Tracker status
Successful probe	UP
Unsuccessful probe	DOWN

To prevent frequent changes in tracker status, the tracker uses a multiplier to determine how many consecutive successful probes are required before declaring an endpoint reachable.

Multiplier and retry behavior

The multiplier specifies the number of probe attempts used to determine endpoint reachability. The supported range is 1–10, and the default value is 3.

The multiplier is used to verify endpoint reachability before the tracker transitions to UP. When the configured multiplier is 3, the tracker requires three consecutive successful probes before changing its status to UP.

The configured multiplier or retry value ensures that the tracker object is UP before notifying NAT. When the tracker transitions to UP, NAT installs the route.

This behavior helps prevent unnecessary interface flaps by ensuring that the endpoint is consistently reachable before the tracker status changes.

Enable tracker DIA status stabilization using configuration groups

Use these steps to enable tracker DIA status stabilization using configuration groups

Procedure

Step 1 From the Cisco SD-WAN Manager menu, choose **Configuration** > **Configuration Groups**.

For more information on creating a configuration group, see Configuration Group Workflows.

Step 2 Add a feature to the configuration group.

For more information on adding a feature, see Feature Management.

Step 3 Under **System Profile**, configure the **Basic** feature.

Step 4 Select **Track Settings**.

Step 5 Under **Tracker DIA Stabilize Status**, choose **Global** from the drop-down list, and enable the setting.

Step 6 Select **Save**.

Verify the configurations for NAT DIA tracker on IPv4 interfaces

You can verify the command syntax after you attach a template to a device. Use the following commands to verify the NAT DIA tracker configuration, check its operational status, and troubleshoot tracker-related issues.

Minimum supported release: Cisco IOS XE Catalyst SD-WAN Release 17.7.1a and Cisco vManage Release 20.7.1

Verify the configuration for an IPv4 Tracker

To verify whether the configuration is committed and the tracker is operational, use the **show endpoint-tracker interface GigabitEthernet1** command:

```
Device# show endpoint-tracker interface GigabitEthernet1

Interface          Record Name    Status    RTT in msecs    Probe ID    Next Hop
GigabitEthernet1   tracker-t1     UP        2               1           10.1.16.13
```

To display timer-related information for the tracker and troubleshoot tracker-related issues, use the **show endpoint-tracker records** command:

```
Device# show endpoint-tracker records

Record Name    Endpoint      EndPoint Type    Threshold    Multiplier    Interval
Tracker-Type
p1             10.1.16.13    IP                300          3             60
interface
```

The `show endpoint-tracker` command does not display NAT history records for a tracker when the interface is down and the network condition is invalid.

Verify the configuration for an ICMP tracker

From Cisco IOS XE Catalyst SD-WAN Release 17.13.1a, you can verify the command syntax after configuring an ICMP tracker.

To verify whether the configuration is committed and the tracker is operational, use the **show endpoint-tracker interface GigabitEthernet1** command:

```
Device# show endpoint-tracker interface GigabitEthernet1

Interface          Record Name    Status    RTT in msecs    Probe ID    Next Hop
GigabitEthernet1   tracker-t2     UP        2               1           10.1.16.13
```

Use these commands to verify the status of tracker groups and their associated endpoint trackers.

To display the status of a tracker group and its associated endpoint trackers, use the **show endpoint-tracker tracker-group** command:

```
Device# show endpoint-tracker tracker-group

Tracker Name              Element trackers name    Status          RTT in msec    Probe ID
interface-tracker-group   tracker1, tracker2       UP(UP OR UP)    1,1            53, 54
```

For ICMP endpoint trackers, the command also displays the address family:

```
Device# show endpoint-tracker tracker-group

Tracker Name    Element trackers name    Address Family    Status          RTT in msec
Probe ID
trackergroup1   tracker1, tracker2       IPv4              UP(UP OR UP)    1, 2
5, 4
```

To display the records for tracker groups and their associated endpoint trackers, use the **show endpoint-tracker records** command:

```
Device# show endpoint-tracker records

Record Name    Endpoint                EndPoint Type    Threshold    Multiplier    Interval
    Tracker-Type
group1         tracker1 OR tracker2     N/A              N/A          N/A           N/A
      tracker-group
group3         tracker3 OR tracker4     N/A              N/A          N/A           N/A
      tracker-group
tracker1       198.168.20.2              IP               300          3             60
       interface
tracker2       198.168.20.3              IP               300          3             60
       interface
tracker3       www.cisco.com.com         DNS_NAME         300          3             60
       interface
tracker4       www.cisco.com.com         DNS_NAME         300          3             60
       interface
```

To display the latest IP SLA operation summary for the tracker group, use the **show ip sla summary** command:

```
Device# show ip sla summary

IPSLAs Latest Operation Summary
Codes: * active, ^ inactive, ~ pending
All Stats are in milliseconds. Stats with u are in microseconds

ID    Type    Destination    Stats     Return Code    Last Run
*9    dns     10.1.1.1       RTT=3     OK             12 seconds ago
*10   http    10.1.1.10      RTT=89    OK             23 seconds ago
```

This example shows the IP SLA operation summary for ICMP endpoint trackers:

```
Device# show ip sla summary

IPSLAs Latest Operation Summary
Codes: * active, ^ inactive, ~ pending
All Stats are in milliseconds. Stats with u are in microseconds
```

```
ID    Type       Destination    Stats    Return Code    Last Run
*4    icmp-echo  10.1.29.99     RTT=1    OK             1 seconds ago
```

This example shows the IP SLA operation summary for the endpoint trackers in a dual-tracker configuration:

```
Device# show ip sla summary

IPSLAs Latest Operation Summary
Codes: * active, ^ inactive, ~ pending
All Stats are in milliseconds. Stats with u are in microseconds

ID    Type    Destination    Stats    Return Code    Last Run
*53   http    10.1.1.1       RTT=2    OK             35 seconds ago
*54   http    10.1.1.10      RTT=2    OK             1 minute, 35 seconds ago
```

Verify IP SLA operations for NAT DIA trackers

Use the **show ip sla summary** command to view the status of IP SLA operations, including the operation type, destination, round-trip time (RTT), return code, and last run time.

This example shows IP SLA operations for DNS and HTTP trackers:

```
Device# show ip sla summary

IPSLAs Latest Operation Summary
Codes: * active, ^ inactive, ~ pending
All Stats are in milliseconds. Stats with u are in microseconds

ID           Type        Destination       Stats       Return Code     Last Run

*9           dns         10.1.1.1           RTT=3       OK          12 seconds ago
*10          http        10.1.1.10 .        RTT=89      OK          23 seconds ago
```

This example shows IP SLA operations for HTTP trackers:

```
Device# show ip sla summary
IPSLAs Latest Operation Summary
Codes: * active, ^ inactive, ~ pending
All Stats are in milliseconds. Stats with u are in microseconds
ID            Type       Destination      Stats   Return Code       Last Run
*53           http         10.1.1.1       RTT=2        OK        35 seconds ago
*54           http         10.1.1.10      RTT=2        OK        1 minute, 35 seconds ago
```

This example shows IP SLA operations for an ICMP endpoint tracker:

```
Device# show ip sla summary
IPSLAs Latest Operation Summary
Codes: * active, ^ inactive, ~ pending
All Stats are in milliseconds. Stats with u are in microseconds
ID            Type       Destination      Stats   Return Code       Last Run
*4           icmp-echo    10.1.29.99      RTT=1        OK        1 seconds ago
```

Configure NAT DIA tracker on IPv6 interfaces

Configure NAT DIA Tracker on IPv6 interfaces using configuration groups

Set up NAT DIA Tracker on IPv6 interfaces with configuration groups in Cisco SD-WAN Manager to enable IPv6 tracking for direct internet access as part of a configuration group workflow.

Minimum supported releases: Cisco IOS XE Catalyst SD-WAN Release 17.11.1a and Cisco vManage Release 20.11.1

Note You can configure the IPv6 DIA Tracker feature using a configuration group, device CLI template, or CLI-Add on feature template. This feature cannot be configured through a feature template.

Procedure

Step 1 From the Cisco SD-WAN Manager menu, choose **Configuration** > **Configuration Groups**.

In Cisco IOS XE Catalyst SD-WAN Release 17.11.1a and earlier, choose **Configuration** > **Templates** > **Configuration Groups**.

Step 2 Configure an IPv6 Tracker in a Transport and Management Profile.

Table 5: IPv6 Tracker

Field	Description
Type	Choose a feature from the drop-down list.
Feature Name*	Enter a name for the feature.
Description	Enter a description of the feature. The description can contain any characters and spaces.
Tracker Name*	Name of the tracker. The name can be up to 128 alphanumeric characters.
Endpoint Tracker Type*	Choose a tracker type to configure endpoint trackers: • **ipv6-interface** **Note** This tracker type is available only in Cisco Catalyst SD-WAN Manager Release 20.12.x and earlier. • **http** • **icmp** This tracker type is available from Cisco Catalyst SD-WAN Manager Release 20.13.1.

Field	Description
Endpoint	Choose an endpoint type: • **Endpoint DNS Name**: When you choose this option, the following field appears: **Endpoint DNS Name**: DNS name of the endpoint. This is the destination on the internet to which probes are sent to determine the status of the endpoint. The DNS name can contain a minimum of one character and a maximum of 253 characters. • **Endpoint IP**: When you choose this option, the following field appears: **Endpoint IP**: IPv6 address of the endpoint. This is the destination on the internet to which the probes are sent to determine the status of an endpoint. The IPv6 address can be a valid IPv6 address in dotted-decimal notation. • **Endpoint API URL**: When you choose this option, the following field appears: **API url of endpoint**: API URL of the endpoint. The API URL can be a valid URL as described by RFC 3986.
Interval	Time interval between probes to determine the status of the configured endpoint. From Cisco Catalyst SD-WAN Manager Release 20.13.1, this option is called **Probe Interval**, allowing you to configure the time interval between probes. Range: 20 to 600 seconds Default: 60 seconds (1 minute) From Cisco Catalyst SD-WAN Manager Release 20.13.1, if you select **icmp** as the endpoint tracker type, the default probe interval is 2 seconds.
Multiplier	Number of times probes are sent before declaring that the endpoint is down. Range: 1 to 10 Default: 3
Threshold	Wait time for the probe to return a response before declaring that the configured endpoint is down. Range: 100 to 1000 milliseconds Default: 300 milliseconds

Step 3 Configure IPv6 tracker group.

Table 6: IPv6 Tracker Group

Field	Description
Tracker Name	Enter a tracker name.

Field	Description
Tracker Elements	This field is displayed only if you chose **Tracker Type** as the **Tracker Group**. Add the existing interface tracker names (separated by a space). When you add this tracker to the template, the tracker group is associated with these individual trackers, and you can then associate the tracker group to an interface.
Tracker Boolean	This field is displayed only if you chose **Tracker Type** as the **Tracker Group**. Select **AND** or **OR**. **OR** is the default boolean operation. An **OR** ensures that the transport interface status is reported as active if either one of the associated trackers of the tracker group reports that the interface is active. If you select the **AND** operation, the transport-interface status is reported as active if both the associated trackers of the tracker group, report that the interface is active.

Step 4 After you create a configuration group, add devices to the group. For more information, see Add Devices to a Configuration Group in *Cisco Catalyst SD-WAN Configuration Groups Reference Guide*. You can then go ahead and deploy the devices associated to the configuration group. For more information, see Deploy Devices in *Cisco Catalyst SD-WAN Configuration Groups Reference Guide*.

Configure NAT DIA tracker on IPv6 interfaces using CLI commands

This task configures NAT DIA endpoint tracking on IPv6 interfaces using a CLI template, defines DNS-based or IPv6-address-based trackers, optionally combines them into tracker groups with Boolean logic, and applies trackers or groups to supported interfaces.

Configure an HTTP IPv4 tracker and an ICMP IPv6 tracker, or vice versa on Cisco Catalyst SD-WAN devices, from Cisco IOS XE Catalyst SD-WAN Release 17.13.1a

You can define IPv6 endpoint trackers and DNS trackers, create tracker groups that use Boolean operators, and apply them to interfaces as required by your design. Use ICMP tracking only where supported.

You can’t configure ICMP trackers using CLI templates.

Before you begin

Minimum supported releases: Cisco IOS XE Catalyst SD-WAN Release 17.11.1a and Cisco vManage Release 20.11.1

Follow these steps to configure NAT DIA trackers on IPv6 interfaces using CLI commands.

Procedure

Step 1 Configure an IPv6 endpoint tracker.

a) Configure the endpoint tracker for tracking the status of an endpoint.

endpoint-tracker*tracker-name*

b) Configure the tracker type for the tracker.

tracker-type*ipv6-interface*

Note From Cisco IOS XE Catalyst SD-WAN Release 17.13.1a, you can configure ICMP tracking for NAT DIA using *ipv6-interface-ICMP*.

c) Configure the IPv6 address of an endpoint.

ipv6-endpoint*ipv6-address*

Note You can't configure an IPv4 and an IPv6 tracker in the same tracker group.

Step 2 Configure a DNS tracker.

a) Configure the endpoint tracker for tracking the status of an endpoint.

endpoint-tracker*tracker-name*

b) Configure the tracker type for the tracker.

tracker-type*ipv6-interface*

Note From Cisco IOS XE Catalyst SD-WAN Release 17.13.1a, you can configure ICMP tracking for NAT DIA using *ipv6-interface-ICMP*.

c) Configure the domain name of an endpoint.

endpoint-DNS-name*DNS-name*

Step 3 Configure an IPv6 tracker group.

a) Configure the IPv6 endpoint trackers that you want to include in the tracker group. You can configure HTTP or ICMP IPv6 endpoint trackers.

b) Configure the IPv6 DNS trackers that you want to include in the tracker group. You can configure HTTP or ICMP DNS trackers on an IPv6 interface.

c) Configure an endpoint tracker for the tracker group:

endpoint-tracker*tracker-group-name*

d) Configure the tracker type for the tracker.

tracker-type*tracker-group*

Note From Cisco IOS XE Catalyst SD-WAN Release 17.13.1a, you can configure ICMP tracking for NAT DIA using *ipv6-interface-ICMP*.

e) Enable Boolean logic while configuring a tracker group.

boolean{**and** | **or**}

f) Add tracker names to create a dual endpoint tracker group.

tracker-elements*tracker1tracker2*

Step 4 Configure IPv4 and IPv6 tracker groups on the same interface.

a) Configure an IPv4 endpoint tracker.

Enter the following command to create the tracker and configure its endpoint IP address:

```
endpoint-tracker tracker-name
   tracker-type interface-ip
   endpoint-ip ipv4-address
```

b) Configure an IPv4 DNS tracker.

Create another tracker and configure its DNS endpoint.

```
endpoint-tracker tracker-name
   tracker-type interface-ip
   endpoint-dns-name dns-name
```

c) Configure an IPv6 endpoint tracker.

```
endpoint-tracker tracker-name
   tracker-type ipv6-interface
   ipv6-endpoint ipv6-address
```

d) Configure an IPv6 DNS tracker.

```
endpoint-tracker tracker-name
   tracker-type ipv6-interface
   endpoint-dns-name dns-name
```

e) Create an IPv4 tracker group and add the IPv4 trackers.

```
endpoint-tracker tracker-group-name
   tracker-type tracker-group
   boolean and
   tracker-elements tracker1 tracker2
```

f) Create an IPv6 tracker group and add the IPv6 trackers.

```
endpoint-tracker tracker-group-name
   tracker-type tracker-group
   boolean or
   tracker-elements tracker3 tracker4
```

Apply the tracker groups to the interface.

```
interface GigabitEthernet1
   endpoint-tracker tracker-group-name
   ipv6-endpoint-tracker tracker-group-name
```

Step 5 Configure an HTTP and an ICMP tracker in a tracker group.

Starting with Cisco IOS XE Catalyst SD-WAN Release 17.13.1a, you can configure an HTTP IPv4 tracker and an ICMP IPv6 tracker, or an HTTP IPv6 tracker and an ICMP IPv4 tracker, in the same tracker group on Cisco Catalyst SD-WAN devices.

a) Configure an HTTP endpoint tracker.

```
endpoint-tracker tracker1
   tracker-type interface
   endpoint-ip ipv4-address
```

b) Configure an ICMP endpoint tracker.

```
endpoint-tracker tracker2
   tracker-type ipv6-interface-icmp
   endpoint-ip ipv4-address
```

c) Create a tracker group and add both trackers.

```
endpoint-tracker tracker-group-name
   tracker-type tracker-group
   tracker-elements tracker1 tracker2
```

d) Apply the tracker group to an interface.

```
interface GigabitEthernet1
   endpoint-tracker tracker-group-name
```

Step 6 Apply an IPv6 tracker or tracker group to a supported IPv6 interface.

a) Enter interface configuration mode.

```
interface GigabitEthernet1
```

b) Apply the predefined IPv6 endpoint tracker or tracker group.

```
ipv6-endpoint-tracker tracker-name
```

Verify the configurations for NAT DIA tracker on IPv6 interfaces

Verify NAT DIA tracker behavior on IPv6 interfaces by reviewing sample outputs from the show endpoint-tracker and show endpoint-tracker tracker-group commands, and note the minimum supported release requirements.

Minimum supported releases: Cisco IOS XE Catalyst SD-WAN Release 17.11.1a and Cisco vManage Release 20.11.1

Verify endpoint tracker configuration

Use the **show endpoint-tracker** command to verify endpoint tracker configurations and monitor their status.

This examples show the command output for different IPv6 endpoint tracker configurations:

- This example shows a single IPv6 endpoint tracker configuration:

```
Device# show endpoint-tracker
endpoint-tracker t1 ipv6-endpoint 2001:DB8:1::1 tracker-type ipv6-interface
```

- This example shows an IPv6 endpoint tracker applied to an interface:

```
Device# show endpoint-tracker

Interface          Record Name  Status  Address Family  RTT in msecs  Probe ID  Next
Hop
GigabitEthernet1   t1           Up      IPv6            1             6
2001:DB8:1::1
```

- This example shows the output for a DNS tracker configuration:

```
Device# show endpoint-tracker

Interface          Record Name  Status  Address Family  RTT in msecs  Probe ID  Next
Hop
```

```
GigabitEthernet1   dns_t1       Up      IPv6            1             9
2001:DB8:1::1
```

Verify IPv6 tracker group

To verify the status of an IPv6 tracker group use the **show endpoint-tracker tracker-group** command.

```
Device# show endpoint-tracker tracker-group

Tracker Name  Element trackers name  Address Family  Status       RTT in msec  Probe ID
groupv6       t1, t2                 IPv6            UP(UP OR UP) 1, 0         10, 11
```

Verify IPv4 and IPv6 trackers on the same interface

This example shows the output when IPv4 and IPv6 endpoint trackers are configured on the same interface:

```
Device# show endpoint-tracker

Interface          Record Name  Status  Address Family  RTT in msecs  Probe ID  Next Hop
GigabitEthernet1   t1           Up      IPv4            1             7         10.0.29.99
GigabitEthernet1   t2          Up      IPv6           1            8         2001:DB8:1::1
```

Verify configuration for an ICMP tracker

From Cisco IOS XE Catalyst SD-WAN Release 17.13.1a, you can check the command syntax after you attach a template to a device.

This example shows the output of the **show endpoint-tracker** command for an IPv6 ICMP endpoint tracker applied to an interface:

```
Device# show endpoint-tracker

Interface          Record Name  Status  Address Family  RTT in msecs  Probe ID  Next Hop
GigabitEthernet1   t2          Up      IPv6           1            6         2001:DB8:1::1
```