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1 Configuring Track

1.1 Introduction

The reliable network service (RNS) tests the services provided by a peer device to monitor the service availability, integrity of the end-to-end connection, and service quality. With the RNS test results, you can learn the network performance in time and take measures accordingly to handle related network performance problems. Meanwhile, you can diagnose and locate network faults. The RNS test in this document is also called track test.

1.1.1 Basic Concepts

1. RNS Instance

An RNS instance can be treated as an RNS process. Before performing the RNS, you must create an RNS instance. In the RNS instance, you need to configure the RNS parameters, such as the test type, test destination address, and test frequency. The instance ID is globally unique.

2. RNS Test

RNS test aims to monitor the network connectivity, service availability, integrity of end-to-end connection, and service quality. For example, the RNS tests whether the domain name server (DNS) function of the device is normal. Currently, the RNS supports the following types of tests: RNS Test, DNS, TCP, UDP-Echo, and HTTP.

1.1.2 ICMP Echo Test

The Internet Control Message Protocol (ICMP) echo test is a basic function of the RNS, and is implemented in compliance with the RFC 2925. An ICMP packet is sent to check whether the destination is reachable and to calculate the network response time and packet loss rate.

An ICMP echo request packet is sent to the destination IP address based on the preset test time and frequency. Upon receipt of the ICMP echo request packet, an ICMP echo reply packet is returned from the destination IP address. Through the ICMP echo test, the response time and packet loss rate is calculated based on the information relating to the received ICMP echo reply packet, for example, the receipt time and number of packets. In this way, the current network performance and status are reflected. The ICMP echo test results and historical records are saved, and you can use the command line to display them.

⚠ Caution

The prerequisite for a successful ICMP echo test is that destination devices can correctly respond to ICMP echo request packets.

1.1.3 UDP Echo Test

User Datagram Protocol (UDP) echo is used to test the network accessibility and delay. When UDP packets are used to test the network accessibility and delay, the RNS server must be enabled on the peer end with the UDP port enabled, or the RNS server must be able to respond to ICMP port unreachable packets.

A UDP packet is sent to the destination IP address based on the preset test time and frequency. Upon receipt of the UDP packet, the device of the destination IP address replies by using such packet. Through the UDP echo test, the time required for packet round trip and packet loss rate are calculated based on the information relating to the received UDP packet from the server to reflect the current network performance and network conditions. The UDP echo test results and historical records are saved, and you can use the command line to display them.

1.1.4 DHCP Test

The Dynamic Host Configuration Protocol (DHCP) test is used to test the DHCP service function of the peer device and the network accessibility and delay. When DHCP packets are used to test the network accessibility and delay, the RNS service must be enabled on the peer end.

After the detection time and frequency are set, the DHCP test process is as follows:

1. The client sends a DHCP discovery packet to the test destination IP address, and the destination server replies with an offer packet after receiving the DHCP discovery detection packet.
2. After receiving the offer packet, the client replies with a request packet. The destination server receives the request packet and replies with an ack packet.
3. After receiving the ack packet, the client deems that the detection succeeds, and sends a cancel packet to the server.

The detection client calculates the time required for the client to obtain the IP address and the packet loss rate according to the information of the received DHCP ack packet, reflecting the current network performance and network conditions. The DHCP test results and historical records are saved. You can run the **show ip rns configuration** command to view them.

1.1.5 TCP Test

The Transmission Control Protocol (TCP) test is used to test the availability of a TCP connection. A TCP connection can be established based on the configured destination IP address and port ID. If the TCP connection is established successfully, the test succeeds; otherwise, the test fails.

1.1.6 DNS Test

In a DNS test, a DNS client is simulated to send a domain name resolution request to a specified DNS server. You can determine whether the DNS server is available and the domain name resolution speed by checking the domain name resolution result and the time required for domain name resolution. In the DNS test, the domain name resolution process is simulated, and the mapping between the resolved domain name and the IP address is not saved. The DNS test results and historical records are saved in the test group. You can use the command line to view them.

The procedure for configuring an RNS instance test is as follows:

- (1) Create an instance and configure the test based on the test type.
- (2) Start the instance.
- (3) Use the RNS instance to construct a packet of the specific test type and send the packet to the peer end.
- (4) Upon receipt of the test packet, the peer end returns a reply packet of the corresponding type.
- (5) The RNS instance calculates the packet loss rate and round trip time based on whether a reply packet is received and the time of reply packet receipt.

- (6) Run the **show** or **debug** command to view the test result.

1.1.7 Track Support for the RNS

Objects that can be tracked include: the test result of an RNS instance, RNS list status, link status on an interface, and track list status. When the track status changes, an action of other modules is triggered. The working process of track is described below by taking different track objects as examples.

- Configure a track object for tracking the test result of an RNS instance.
 - When the test result of the RNS instance changes, the RNS module sends a status change message to the track module.
 - The track module receives the test result. After the preset delay, if the test result remains unchanged, the status of the track object is modified, and the module of the track object is notified of the modification. If the test result recovers within the period, the status of the track object is not modified and the corresponding module is not notified.
- Configure a track object for tracking the link status of an interface.
 - If the link status of the interface is up, the status of the track object is also up.
 - If the link status of the interface is down, the status of the track object is also down.
- Configure a track object for tracking the test result of an RNS instance.
 - If the RNS test succeeds, the status of the track object is also up.
 - If the RNS test fails, the status of the track object is also down.
- Configure a track object for tracking the test result of an RNS list.
 - The result can be the AND or OR operation result of all member status.
 - If the result of this track object is set to the AND operation result of all member status, and the AND result of the status of all the track RNS objects is up, the status of this track object is up. So long as the RNS test result of one track RNS object is down, the status of this track object is also down.
 - If the result of this track object is set to the OR operation result of all member status, and the OR result of the status of all the track RNS objects is down, the status of this track object is down. So long as the RNS test result of one track RNS object is up, the status of this track object is also up.
- Configure a track object for tracking the status of a track list.
 - Set the result of the track object to the AND operation result of all member status.
 - When the AND operation result of all member status is up, the status of this track object is also up.
 - When the AND operation result of all member status is down the status of this track object is also down.
- Configure a track list member.

Configure a track list member. The status of the member can be the same as or contrary to that of the corresponding track object.
- Adjust the delay for notifying the status change of a track object.
 - A longer delay indicates that it takes more time before the module that is concerned with the track object is informed of the status.
 - A shorter delay indicates that it takes less time before the module that is concerned with the track object is informed of the status.

1.2 Configuration Task Summary

RNS configuration includes the following tasks:

- (1) [Configuring Basic Features of RNS](#)
- (2) [Configuring the ICMP Echo Test](#)
- (3) [Configuring the DNS Test](#)
- (4) [Configuring the TCP Connection Test](#)
- (5) [Configuring the UDP Echo Test](#)
- (6) [Configuring the DHCP Test](#)
- (7) [Configuring the Track Support for the RNS](#)

1.3 Configuring Basic Features of RNS

1.3.1 Overview

Configure details of an RNS test instance to complete basic configuration of the RNS instance. Brief configuration is also available. Configure and start an RNS instance at a time.

1.3.2 Restrictions and Guidelines

- In detailed configuration mode, if you do not configure the test type after entering the IP RNS mode by running the command, the RNS instance is not created.
- In detailed configuration mode, after configuring an RNS instance, you need to run the **ip rns schedule** command to configure the startup policy; otherwise, the test is not implemented.

1.3.3 Procedure

- (1) Enter the privileged EXEC mode.

```
enable
```

- (2) Enter the global configuration mode.

```
configure terminal
```

- (3) Define an RNS operation object.

```
ip rns operation-number [ { dns destination-hostname name-server ipv4-address | icmp-echo destination-ipv4-address | tcp-connect destination-ipv4-address port-number } [ frequency interval ] [ timeout interval ] [ threshold interval ] ]
```

No track operation object is created by default.

- (4) Configure the proactive threshold monitoring and triggering mechanism of the RNS test.

```
ip rns reaction-configuration operation-number react { allfail | rtt | timeout } [ action-type track ] [ threshold-type { average [ number-of-measurements ] | consecutive [ occurrences ] | immediate | never | xofy [ x-value y-value ] } ] [ threshold-value max-threshold min-threshold ]
```

The proactive threshold monitoring and triggering mechanism is not configured for the test by default.

- (5) Enable an RNS instance to trigger another RNS instance.

ip rns reaction-trigger *source-operation-number target-operation-number*

The trigger mechanism when the monitoring threshold exceeds the expectation is not configured for the test by default.

- (6) Configure scheduling parameters of an RNS instance.

ip rns schedule *operation-number* [**life** { **forever** | *period* }] [**start-time** { *hh:mm* [*:ss*] [*month day* | *day month*]] [**pending** | **now** | **after** *hh:mm:ss*] [**recurring**]

No scheduling policy is configured for the test by default.

- (7) Configure the **ip rns restart** command to restart an RNS instance.

ip rns restart *operation-number*

To restart an IP RNS instance in pending status of scheduling, perform this configuration (or directly configure scheduling start: **ip rns schedule** *operation-number* **start-time now**).

The test restart function is not configured by default.

- (8) Run the **ip rns reset** command to clear the RNS test configuration.

ip rns reset

Perform this configuration if you need to clear configurations of all the RNS instances, for example, when a lot of instances are configured but configuration errors are found.

The RNS test clearing function is not configured by default.

- (9) Configure the **ip rns server** command to enable the server function.

ip rns-server udp-echo *port-number*

This configuration is mandatory when you need to enable the RNS server for UDP echo tests.

The server function of UDP echo test is not configured by default.

1.4 Configuring the ICMP Echo Test

1.4.1 Overview

Create an RNS test instance of ICMP echo type.

1.4.2 Restrictions and Guidelines

You must first configure the RNS basic features.

1.4.3 Procedure

- (1) Enter the privileged EXEC mode.

enable

- (2) Enter the global configuration mode.

configure terminal

- (3) Enter the interface configuration mode.

interface *interface-type interface-number*

- (4) Create an RNS test instance of ICMP echo type.


```
icmp-echo { oob { destination-ipv4-address | destination-hostname [ name-server ipv4-address ] } [
source-ipaddr ipv4-address ] via interface-type interface-number next-hop ipv4-address } | { { destination-
ipv4-address | destination-hostname [ name-server ipv4-address ] } [ source-ipaddr ipv4-address |
source-interface interface-type interface-number] [ [ af-direct ] out-interface interface-type interface-
number [ next-hop ipv4-address ] ] }
```

```
icmp-echo { destination-ipv4-address | destination-hostname [ name-server ipv4-address ] } [ source-
ipaddr ipv4-address | source-interface interface-type interface-number ] [
[ af-direct ] out-interface interface-type interface-number [ next-hop ipv4-address ] ]
```

No test of ICMP echo type is created by default.

- (5) (Optional) Configure the repeat test interval.

```
frequency interval
```

The default test interval is **60** seconds.

- (6) (Optional) Configure the tag parameter.

```
tag tag-name
```

No test tag is configured by default.

- (7) (Optional) Configure the time threshold parameter.

```
threshold interval
```

The default upper threshold of test is **5** seconds.

- (8) (Optional) Configure the timeout period.

```
timeout interval
```

The default timeout interval of a test is **5** seconds.

- (9) (Optional) Configure the type of service (TOS) parameter.

```
tos tos-values
```

The default TOS value for IPv4 packet of the test is **0**.

- (10) (Optional) Configure the virtual routing and forwarding (VRF) of an RNS test.

```
vrf vrf-name
```

No VRF name is configured for the test by default.

- (11) Configure the protocol payload size for the test.

```
request-data-size bytes
```

The default protocol payload size is **36** bytes for the tests of ICMP echo and UDP echo types.

1.5 Configuring the DNS Test

1.5.1 Overview

Create an RNS test instance of DNS type.

1.5.2 Restrictions and Guidelines

You must first configure the RNS basic features.

1.5.3 Procedure

- (1) Enter the privileged EXEC mode.

enable

- (2) Enter the global configuration mode.

configure terminal

- (3) Create an RNS test instance of DNS type.

```
dns { oob destination-hostname name-server ipv4-address [ source-ipaddr ipv4-address ] via interface-type interface-number next-hop ipv4-address } | { destination-hostname name-server ipv4-address [ source-ipaddr ipv4-address ] [ [ af-direct ] out-interface interface-type interface-number [ next-hop ipv4-address ] ] }
```

```
dns destination-hostname name-server ipv4-address [ source-ipaddr ipv4-address ] [ [ af-direct ] out-interface interface-type interface-number [ next-hop ipv4-address ] ]
```

No test of DNS type is created by default.

Caution

For the commands (**frequency**, **tag**, **threshold**, **timeout**, and **tos**) of configuring common optional parameters of a test, see [1.4 Configuring the ICMP Echo Test](#). They are omitted here.

1.6 Configuring the TCP Connection Test

1.6.1 Overview

Create an RNS test instance of TCP type to implement a TCP connection test.

1.6.2 Restrictions and Guidelines

- You must first configure the RNS basic features.
- The target host must be able to respond to the TCP connection request.

1.6.3 Procedure

- (1) Enter the privileged EXEC mode.

enable

- (2) Enter the global configuration mode.

configure terminal

- (3) Create an RNS test instance of TCP type.

```
tcp-connect { destination-ipv4-address | destination-hostname [ name-server ipv4-address ] } port-number [ source-ipaddr ipv4-address ] [ [ af-direct ] out-interface interface-type interface-number next-hop ipv4-address ]
```

No test of TCP type is configured by default.

⚠ Caution

For the commands (**frequency**, **tag**, **threshold**, **timeout**, and **tos**) of configuring common optional parameters of a test, see [1.4 Configuring the ICMP Echo Test](#). They are omitted here.

1.7 Configuring the UDP Echo Test

1.7.1 Overview

Create an RNS test instance of UDP echo type and implement the UDP echo test.

1.7.2 Restrictions and Guidelines

- You must first configure the basic features of the RNS and RNS server.
- The RNS server must be enabled to provide server functions.

1.7.3 Procedure

(1) Enter the privileged EXEC mode.

```
enable
```

(2) Enter the global configuration mode.

```
configure terminal
```

(3) Create an RNS test instance of UDP echo type.

```
udp-echo { oob destination-ipv4-address port-number [ via interface-type interface-number next-hop  
next-hop-ip ] | destination-ipv4-address port-number [ out-interface interface-type interface-number next-  
hop next-hop-ip ] }
```

```
udp-echo destination-ipv4-address port-number [ out-interface interface-type interface-number next-hop  
next-hop-ip ]
```

No test object of UDP echo type is configured by default.

⚠ Caution

For the commands (**frequency**, **tag**, **threshold**, **timeout**, and **tos**) of configuring common optional parameters of a test, see [1.4 Configuring the ICMP Echo Test](#). They are omitted here.

1.8 Configuring the DHCP Test

1.8.1 Overview

Create an RNS test instance of DHCP type to implement a DHCP test.

1.8.2 Restrictions and Guidelines

You must first configure the basic features of RNS and the IP address of the outbound port.

1.8.3 Procedure

(1) Enter the privileged EXEC mode.

enable

(2) Enter the global configuration mode.

configure terminal

(3) Create an RNS test instance of DHCP type.

dhcp *destination-ipv4-address out-interface out-interface next-hop next_ip_address*

▲ Caution

For the commands (**frequency, tag, threshold, timeout, and tos**) of configuring common optional parameters of a test, see [1.4 Configuring the ICMP Echo Test](#). They are omitted here.

1.9 Configuring the Track Support for the RNS

1.9.1 Overview

Configure track support for RNS, including the test results of track RNS, the link status of the interface, the status of track list, and the status of RNS test list.

1.9.2 Restrictions and Guidelines

- To configure the track function to track the test result of an RNS instance, you need to configure the related RNS instance.
- To configure the track function to track the link status of an interface, you need to configure the related interface.
- To configure the track function to track the status of a track list, you need to configure the members for the related track list.
- To configure the track function to track the status of an RNS list, you need to configure the members for the related RNS list.

1.9.3 Procedure

(1) Enter the privileged EXEC mode.

enable

(2) Enter the global configuration mode.

configure terminal

(3) Enter the interface configuration mode.

interface *interface-type interface-number*

(4) Configure the track object. Select at least one of the following to configure.

- Configure to track the link status of an interface.

track *object-number interface interface-type interface-number line-protocol*

- o Configure to track the RNS test result.

track *object-number* **rns** *entry-number*

- o Configure to track the status of a track list.

track *object-number* **list** **boolean** { **and** | **or** }

- o Configure to track the status of an RNS list.

track *object-number* **rns-list** *men-list* { **and** | **or** }

- (5) Configure the notification delay of a track object.

delay { **up** *interval* [**down** *interval*] | [**down** *interval*] **up** *interval* }

Configure the delay for notifying the tracking status change from up to down or from down to up, or configure both at the same time.

No delay is set by default for notifying the track object status change from up to down or from down to up.

- (6) Configure a track member.

object *object-number* [**not**]

No member object is configured by default.

1.10 Monitoring

This section describes the **show** commands used for checking the running status of a configured function to verify the configuration effect.

Run the **debug** command to display debugging information.

▲ Caution

- The output debugging information occupies system resources. Therefore, disable the debugging function immediately after use.

Table 1-1 RNS Monitoring

Command	Purpose
show ip rns configuration [<i>operation-number</i>]	Displays the configuration of one or more RNS instances.
show ip rns collection-statistics [<i>operation-number</i>]	Displays the detailed statistics of one or more RNS instances.
show ip rns operational-state [<i>operation-number</i>]	Displays the current status of one or more RNS instances.
show ip rns-server udp-echo	Displays the RNS server configuration.
show ip rns reaction-configuration [<i>operation-number</i>]	Displays the proactive threshold monitoring information of one or more RNS instances.

Command	Purpose
show ip rns reaction-trigger [<i>operation-number</i>]	Displays information about the test triggered by one or more RNS instances.
show ip rns statistics [<i>operation-number</i>]	Displays the brief statistics of one or more RNS instances.
show track [<i>object-number</i>]	Displays the statistics of one or more track objects.
show track client	Displays the statistics of a track client.
debug track { all proc-event rdnd-event client }	Debugs the track module.
debug rns { all interface lib rdnd-event restart rns_id [0, 500] }	Debugs the RNS module.
debug rns-server {udp-echo} { event fail packet }	Debugs the RNS server module.

1.11 Configuration Examples

1.11.1 Configuring the ICMP Echo Test

1. Requirements

Configure an RNS test of ICMP echo type, which must be started immediately and take effect permanently.

2. Topology

Figure 1-1 Topology for Configuring the ICMP Echo Test



3. Notes

Configure RNS instance 1 and related parameters on Device A.

4. Procedure

Perform the following configuration on Device A:

```

DeviceA> enable
DeviceA# configure terminal
DeviceA(config)# ip rns 1
DeviceA(config-ip-rns)# icmp-echo 10.2.2.2
DeviceA(config-ip-rns-icmp-echo)# exit
DeviceA(config)# ip rns schedule 1 start-time now life forever
  
```

5. Verification

Run the **show ip rns configuration** command to display the instance configuration.

```
DeviceA# show ip rns configuration 1
Entry number: 1
Tag:
Type of operation to perform: icmp-echo
Operation timeout (milliseconds): 5000
Operation frequency (milliseconds): 60000
Threshold (milliseconds): 5000
Recurring (Starting Everyday): FALSE
Life (seconds): forever
Next Scheduled Start Time:Start Time already passed
Target address/Source address: 10.2.2.2/0.0.0.0
Request size (ARR data portion): 36
```

1.11.2 Configuring the DNS Test

1. Requirements

Configure an RNS test of DNS type, which must be started immediately and take effect permanently.

2. Topology

Figure 1-1 Topology for Configuring the DNS Test



3. Notes

Configure RNS instance 1 and related parameters on Device A.

4. Procedure

Perform the following configuration on Device A:

```
DeviceA> enable
DeviceA# configure terminal
DeviceA(config)# ip rns 1
DeviceA(config-ip-rns)# dns www.abc.com name-server 10.2.2.2
DeviceA(config-ip-rns-dns)# exit
DeviceA(config)# ip rns schedule 1 start-time now life forever
```

5. Verification

Run the **show ip rns configuration** command to display the instance configuration.

```
DeviceA# show ip rns configuration 1
Entry number: 1
Tag:
Type of operation to perform: dns
```

```

Operation timeout (milliseconds): 5000
Operation frequency (milliseconds): 60000
Threshold (milliseconds): 5000
Recurring (Starting Everyday): FALSE
Life (seconds): foerver
Next Scheduled Start Time:Start Time already passed
Target host name: www.abc.com
Name Server: 10.2.2.2

```

6. Common Errors

The DNS IP address is incorrect.

1.11.3 Configuring the TCP Connect Test

1. Requirements

Configure an RNS test of TCP type, which must be started immediately and take effect permanently.

2. Topology

Figure 1-1 Topology for Configuring the TCP Connect Test



3. Notes

Configure RNS instance 1 and related parameters on Device A.

4. Procedure

Perform the following configuration on Device A:

```

DeviceA> enable
DeviceA# configure terminal
DeviceA(config)# ip rns 1
DeviceA(config-ip-rns)# tcp-connect 10.2.2.2 8000
DeviceA(config-ip-rns-tcp)# exit
DeviceA(config)# ip rns schedule 1 start-time now life forever

```

5. Verification

Run the **show ip rns configuration** command to display the instance configuration.

```

DeviceA# show ip rns configuration 1
Entry number: 1
Tag:
Type of operation to perform: tcp-connect
Operation timeout (milliseconds): 5000
Operation frequency (milliseconds): 60
Threshold (milliseconds): 5000
Recurring (Starting Everyday): FALSE

```



```
Life (seconds): foerver
Next Scheduled Start Time:Start Time already passed
Target Address: 10.2.2.2
Target Port: 8000
```

6. Common Errors

- The target host does not respond to the TCP connection request.
- The configured TCP port for the RNS test is incorrect.

1.11.4 Configuring the UDP Echo Test

1. Requirements

Configure an RNS test of UDP echo type, which must be started immediately and take effect permanently.

2. Topology

Figure 1-1 Topology for Configuring the UDP Echo Test



3. Notes

Configure RNS instance 1 and related parameters on Device A.

4. Procedure

Perform the following configuration Device A:

```
DeviceA> enable
DeviceA# configure terminal
DeviceA(config)# ip rns 1
DeviceA(config-ip-rns)# udp-echo 10.2.2.2 1025
DeviceA(config-ip-rns-udp-echo)# exit
DeviceA(config)# ip rns schedule 1 start-time now life forever
```

Perform the following configuration on Device B:

```
DeviceB> enable
DeviceB# configure terminal
DeviceB(config)# ip rns-server udp-echo 1025
```

5. Verification

Run the **show ip rns configuration** command to display the instance configuration.

```
DeviceA# show ip rns configuration 1
Entry number: 1
Tag:
Type of operation to perform: udp-echo
Operation timeout (milliseconds): 5000
Operation frequency (milliseconds): 60000
```

```

Threshold (milliseconds): 5000
Target Address: 10.2.2.2
Target Port: 1025
Request size (ARR data portion): 36

```

Run the **show ip rns-server udp-echo** command to display the RNS server configuration.

```

DeviceA# show ip rns-server udp-echo
  UDP-Echo-Server:10000
  Receive packets number: 0
  Reflect packets success number: 0
  Reflect packets fail number: 0

```

6. Common Errors

The UDP server port configured on the client is not correct.

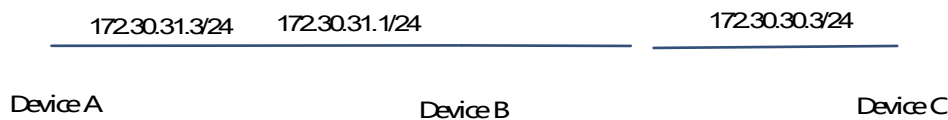
1.11.5 Configuring the DHCP Test

1. Requirements

Configure an RNS test of DHCP type, which must be started immediately and take effect permanently.

2. Topology

Figure 1-1 Topology for Configuring the DHCP Test



3. Notes

Configure RNS instance 1 and related parameters on Device A.

4. Procedure

Perform the following configuration on Switch A:

```

DeviceA> enable
DeviceA# configure terminal
DeviceA(config)# ip rns 1
DeviceA(config-ip-rns)# dhcp 172.30.30.3 out-interface GigabitEthernet 1/0/1
next-hop 172.30.31.1
DeviceA(config-ip-rns-dhcp)# exit
DeviceA(config)# ip rns schedule 1 start-time now life forever

```

5. Verification

Run the **show ip rns configuration** command to display the instance configuration.

```

DeviceA# show ip rns configuration 1
Entry number: 1
Tag:

```

```
Type of operation to perform: dhcp
Operation timeout (milliseconds): 5000
Operation frequency (milliseconds): 60000
Threshold (milliseconds): 5000
Recurring (Starting Everyday): FALSE
Life (seconds): forever
Next Scheduled Start Time: Start Time already passed
Target address/Source address: 172.30.30.3/172.30.31.252
Out-interface: GigabitEthernet 1/0/1
Next-hop address: 172.30.31.1
```

6. Common Errors

- The DHCP service is not enabled on the server.
- No IP address is configured for the outbound interface of the client.

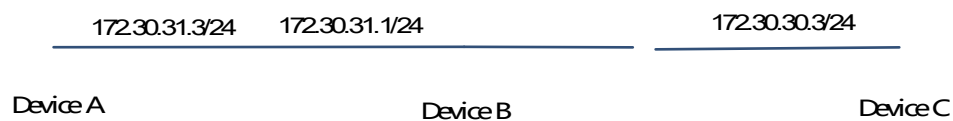
1.11.6 Configuring to Track Link Status of an Interface

1. Requirements

Configure track object 3 to track the link status of the interface GigabitEthernet 0/1.

2. Topology

Figure 1-1 Topology for Configuring to Track the Link Status of an Interface



3. Notes

- Configure a track object to track the link status of an interface.
- Configure the delay for notifying the status change from up to down.

4. Procedure

Perform the following configuration on Device A:

```
DeviceA> enable
DeviceA# configure terminal
DeviceA(config)# track 3 interface gigabitethernet 0/1 line-protocol
DeviceA (config-track)# delay down 10
```

5. Verification

Disable the interface GigabitEthernet 0/1, namely, change the link status to down. Immediately check the status of the track object, and verify that the status is still up. Check the status of the track object 10s later, and verify that the status changes to down.

```
DeviceA# show track 3
Track 3
```

```
Interface GigabitEthernet 0/1
The state is Up, delayed Down (5 secs remaining)
  1 change, current state last: 300 secs
Delay up 0 secs, down 10 secs
```

6. Common Errors

- The track object for tracking an RNS test is configured, but the RNS test is not configured.
- The track object for tracking the link status of an interface is configured, but the corresponding interface is not configured.
- The track object for tracking the status of a track list is configured, but no member of the RNS list is configured.
- The track object configured for tracking an RNS list is configured, but the RNS test is not configured.

1.11.7 Configuring to Track the Status of Multiple Interfaces

1. Requirements

Configure track object 3. When track object 1 is up and object 2 is down, track object 3 is up.

2. Topology

Figure 1-1 Topology for Configuring to Track the Status of Multiple Interfaces



3. Notes

- Configure track objects 1 and 2.
- Configure track object 3, and its members include track objects 1 and 2.

4. Procedure

Perform the following configuration on Device A:

```
DeviceA# config
DeviceA(config)# track 1 interface gigabitEthernet 0/0 line-protocol
DeviceA(config-track)# delay up 20 down 40
DeviceA(config-track)# exit
DeviceA(config)# track 2 interface gigabitEthernet 0/1 line-protocol
DeviceA(config-track)# delay down 30
DeviceA(config-track)# exit
DeviceA(config)# track 3 list Boolean and
DeviceA(config-track)# object 1
DeviceA(config-track)# object 2 not
```

5. Verification

```
DeviceA# show track 3
Track 3
```

```
List boolean and
Object 1
Object 2 not
The state is Down
  1 change,current state last:10 secs
Delay up 0 secs,down 0 secs
```

1.11.8 Configuring to Track A Single RNS Instance

1. Requirements

Configure track object 5 to track the test result of RNS instance 7.

2. Notes

- Configure an RNS test.
- Configure a track object for tracking the test result of an RNS instance.
- Configure the delay for notifying the test result change from up to down and the delay for notifying the test result change from down to up.

3. Procedure

Perform the following configuration on Device A:

```
DeviceA> enable
DeviceA# configure terminal
DeviceA(config)# ip rns 7
DeviceA(config-ip-rns)# icmp-echo 2.2.2.2
DeviceA(config-ip-rns-icmp-echo)# exit
DeviceA(config)# ip rns schedule 7 start-time now life forever
DeviceA(config)# track 5 rns 7
DeviceA(config-track)# delay up 20 down 30
```

4. Verification

Make the test result of RNS instance 7 change from successful to unsuccessful. When the test result changes to unsuccessful, immediately check the status of track object 7, and verify that the status is still up. Check the status of the track object 30s later, and verify that the status changes to down.

```
DeviceA# show track 5
Track 5
  Reliable Network Service 7
  The state is Down
    2 change, current state last: 10 secs
  Delay up 20 secs, down 30 secs
```

1.11.9 Configuring to Track the Results of Multiple RNS Instances

1. Requirements

Configure track object 5 for tracking the test results of an RNS list (consisting of RNS instances 1, 2-5, and 8).

2. Notes

- Configure and start an RNS test.
- Configure a track object for tracking the test result of an RNS list.
- Configure the delay for notifying the test result change from up to down, and the delay for notifying the test result change from down to up.

3. Procedure

Perform the following configuration on Device A:

```
DeviceA> enable
DeviceA# configure terminal
DeviceA(config)# track 5 rns-list 1,2-5,8 and
DeviceA(config-track)# delay up 20 down 30
```

4. Verification

Make the test result of one of the RNS instances 1, 2-5, and 8 change from successful to unsuccessful. When the test result changes to unsuccessful, immediately check the status of track object 7, and verify that the status is still up. Check the status of the track object 30s later, and verify that the status changes to down.

```
DeviceA# show track 5
Track 5
  rns-list 1,2-5,8 and
  The state is Down
    2 change, current state last: 10 secs
Delay up 20 secs, down 30 secs
```