

Routed packet trigger subscriber sessions

This chapter introduces the routed packet trigger subscriber session feature, designed for Layer 3 access environments where traditional Layer 2-based discovery mechanisms—such as MAC addresses or PPPoE—are unavailable.

By leveraging the first unclassified routed IPv4 packet as a trigger, cnBNG can dynamically establish, manage, and enforce policies for subscribers.

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Feature Summary

Table 1: Feature Summary

Applicable Product(s) or Functional Area	cnBNG
Applicable Platform(s)	SMI
Feature Default Setting	Disabled – Configuration Required
Related Changes in this Release	First Release

Revision History

Table 2: Revision History

Revision Details	Release
First introduced.	2026.04.0

cnBNG routed packet trigger subscriber sessions

The routed packet trigger subscriber session is an IPoE subscriber session initiation method that

- uses the first unclassified routed IPv4 packet to validate the network access path before dynamically creating subscriber sessions in Layer 3 environments
- identifies subscribers by utilizing their source IP address, parent interface, and User Plane (UP) name instead of traditional Layer 2 identifiers, and
- enables the Control Plane (CP) to apply subscriber policies and program the session on the UP through PFCP signaling.

Table 3: Feature History Table

Feature Name	Release Information	Feature Description
cnBNG routed packet trigger subscriber sessions	2026.04.0	You can now support subscriber session initiation in routed Layer 3 access networks where traditional Layer 2 discovery mechanisms are unavailable. This enables scalable, IP-based session management and dynamic policy enforcement for routed broadband subscribers. The feature uses the first unclassified routed IPv4 packet to trigger the Control Plane, which dynamically programs the User Plane via PFCP.

Routed packet trigger subscriber sessions

Traditional cnBNG subscriber session models depend on Layer 2 identifiers and discovery mechanisms such as MAC addresses, DHCP packets, or PPPoE discovery messages. In routed access environments, these identifiers are not available to the Broadband Network Gateway.

Because subscriber traffic reaches the UP as routed IP traffic, cnBNG cannot dynamically create subscriber sessions by using traditional Layer 2 packet-trigger workflows.

The routed packet trigger subscriber session feature addresses this limitation by using the first unclassified routed IPv4 packet as the trigger for subscriber session creation.

When the UP receives an unclassified routed IP packet, the UP forwards the trigger information to the CP, and the CP dynamically creates the subscriber session through PFCP signaling.

To uniquely identify and maintain subscriber sessions in routed access deployments, the feature uses IP-based session identifiers instead of Layer 2 identifiers such as MAC addresses.

Subscriber session identifiers

Identifier	Description
Subscriber source IP address	Identifies the subscriber session
Parent interface	Identifies the access interface associated with the subscriber
UP name	Identifies the UP handling the subscriber session

Benefits of routed packet trigger subscriber sessions

- Supports routed subscriber access deployments
- Eliminates dependency on Layer 2 discovery mechanisms
- Enables IP-based packet-triggered subscriber session creation
- Supports dynamic policy enforcement for routed IP subscribers
- Provides scalable subscriber session management for routed broadband networks

Restrictions for routed packet trigger subscriber sessions

- IP addresses can’t be reused in same UP.
- Access-Interface and Subscriber should be configured in same VRF.
- If an Access-Interface is used for Routed-Packet-Trigger subscribers, it can’t be used for any other subscriber type.

Configure routed packet trigger subscriber sessions

Configure routed packet trigger subscriber sessions to enable cnBNG to dynamically create IPoE subscriber sessions when the UP receives the first unclassified routed IPv4 packet on an access interface.

Follow these steps to configure routed packet trigger subscriber sessions.

Procedure

Step 1 Create a profile template for the base and accounting feature.

a) Configure feature template with idle-timeout.

Include the idle-timeout command to configure the subscriber inactivity period.

Example:

```
profile feature-template ipoe-template
 idle-timeout 600
 ipv4
```

```
  mtu 1500
 exit
exit
```

b) Configure accounting template with periodic-interval.

Example:

```
profile feature-template acct-template
 session-accounting
  enable
  aaa-profile aaa-prof1
  periodic-interval 1200
 exit
exit
```

c) Set attribute format for routed-ipoe.

Example:

```
profile attribute-format routed-ipoe
format-string %s@ip.broadband.is
format-order [ addr ]
exit
```

d) Define AAA profile for authentication, authorization, and accounting.

Example:

```
profile aaa aaa-prof1
authentication
method-order [ rad-server ]
exit
authorization
type subscriber method-order [ rad-server ]
username format routed-ipoe
password cisco
exit
accounting
method-order [ rad-server ]
exit
exit
```

Step 2 Activate the feature templates within the subscriber profile and authorize the subscriber.

Activate the required feature templates within the subscriber profile, specify the source IP address ranges using the matches command to identify valid trigger traffic, and configure AAA authorization to validate the subscriber.

Example:

```
profile subscriber subs-routed-pkt-trg
 class class-pkt-trg
  activate-feature-templates [ ipoe-template acct-template]
  matches
   match-type any
   match ipv4-source-address ascii [ 10.0.0.0/24 20.0.0.0/24]
  exit
  aaa authorize aaa-prof1
 exit
exit
user-plane
 instance 1
  user-plane asr9k-1
   peer-address ipv4 1.1.1.1
   subscriber-profile subs-routed-pkt-trg
  exit
```

```
 exit
exit
```

Step 3 Enable routed packet trigger subscriber sessions on the cnBNG UP.

Example:

```
interface Bundle-Ether1.100
 cnbng-nal
  ipsubscriber
   ipv4 routed
    initiator unclassified-ip
   !
  !
 !
```

Step 4 Verify the configuration in CP.

a) Verify the session count in the CP cluster.

Example:

```
bng# show subscriber session count
subscriber-details
{
  "sessionCount": 1
}
[cnbng] bng#
```

b) Verify the routed subscriber details using the show subscriber session detail command.

Ensure the `sesstype` is *routed-pkt-trg-ipoe* and `protocol-type` as *ip(1)*.

Example:

```
bng# show subscriber session detail
subscriber-details
{
  "subResponses": [
    {
      "subLabel": "16777218",
      "acct-sess-id": "01000002",
      "upf": "asr9k-1",
      "port-id": "Bundle-Ether1.100",
      "up-subs-id": "5",
      "sesstype": "routed-pkt-trg-ipoe",
      "state": "established",
      "subCreateTime": "Fri, 14 Aug 2026 05:20:04 UTC",
      "transId": "1",
      "initUpfName": "asr9k-1",
      "subsAttr": {
        "attrs": {
          "Authentic": "RADIUS(1)",
          "addr": "10.0.0.1",
          "physical-adapter": "5",
          "physical-chassis": "1",
          "physical-port": "4",
          "physical-slot": "2",
          "physical-subslot": "3",
          "port-type": "IP over Ethernet(39)",
          "protocol-type": "ip(1)",
          "string-session-id": "01000002",
          "username": "cnbng",
          "vrf": "vrf1"
        }
```

```
}
      },
```

Step 5 Verify the configuration on user plane.

a) Ensure that the IPoE routed session count for the 'activated' state matches the total expected session count.

Example:

```
Router-UP#show cnbng-nal subscriber all summary
=====================
Location: 0/RSP0/CPU0
=====================
                Type            PPPoE                   IPoE                    LAC
LNS

                ====            =====                   ====                    ===
===

                                                    L2-Conn         Routed

                                                    =======         ======

Session Counts by State:

        initializing            0               0               0               0
0

          connecting            0               0               0               0
0

           connected            0               0               0               0
0

           activated         0               0               1               0               0

                idle            0               0               0               0
0

       disconnecting            0               0               0               0
0

              Total:            0               0               1               0
0

Session Counts by Address-Family:

                none            0               0               0               0
0

                ipv4            0               0               1               0
0

                ipv6            0               0               0               0
0

                dual            0               0               0               0
0

                 lac            0               0               0               0
0

              Total:            0               0               1               0
0
```

b) Verify that the configured idle timeout matches the value applied on the device.

Example:

```
show cnbng-nal subscriber all detail

Routed IPv4 Prefix:      10.0.0.1
Cover Route Prefix:      4.1.1.0/24
Cover Route State:       Up
Inactivity Timeout:      600 sec(s)
```

What to do next

Monitor Protocol and Subscriber.

Monitor subscriber sessions

The Monitor Subscriber captures all the transactional logs for a given subscriber over a specified period of time. It also supports the simultaneous monitoring of multiple subscribers on a given cluster. This information allows to track all the events that had occurred for a given subscriber when the subscriber was coming up or going down. For more information, see Monitor Protocol and Subscriber.

Use subscriber IP-address and UPF to monitor subscriber for routed packet trigger sessions.

```
bng# monitor subscriber supi 10.0.0.1@asr9k-1
```