Cloud Native BNG User Plane Command Reference for Cisco ASR 9000 Series Routers

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Preface

The Cisco IOS XR Software Release 7.3.1 introduces the support for cloud native broadband network gateway (cnBNG) user plane for the Cisco IOS XR platform. cnBNG is an architectural evolution that is based on Control and User Plane Separation (CUPS), where the control plane (CP) and user plane (UP) run in distinct and independent environments. This book describes the commands used for configuring and verifying cnBNG user plane functionality on Cisco ASR 9000 Series Routers.

For details on the cnBNG user plane functionality and related configurations, see the *Cloud Native BNG User Plane Configuration Guide for Cisco ASR 9000 Series Routers*.

The Preface contains these topics:

Changes to This Document

This table lists the changes made to this document since it was first printed.

Table 1: Changes to This Document

Date	Change Summary
February 2022	Republished for Release 7.4.2.
February 2021	Initial release of this document.

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cnBNG User Plane Configuration Commands

This chapter describes the Cisco IOS XR software commands that are used to configure the cloud native Broadband Network Gateway (cnBNG) user plane on Cisco ASR 9000 Series Routers. For details regarding the related configurations, see the *Cloud Native BNG User Plane Configuration Guide for Cisco ASR 9000 Series Routers*.

auto-loopback

To configure NOS adaptation layer (NAL) auto-loopback on the user plane of cloud native BNG, use the **auto-loopback** command in cnbng-nal configuration mode. To remove this configuration, use the **no** form of this command.

auto-loopback vrf { *vrf-name* | **default** } [**interface Loopback** *loopback-num*] [**primary-address** *ip-address*]

Syntax Description

vrf	Configures the VRF for the NAL auto-loopback.
vrf-name	Specifies the name of the NAL auto-loopback VRF.
default	Configures the default NAL auto-loopback VRF.
interface Loopback	Configures the NAL auto-loopback interface.
loopback-num	Specifies the NAL auto-loopback interface number.
primary-address	Configures the primary IP address of the NAL auto-loopback.
ip-address	Specifies the primary IP address of the NAL auto-loopback.

Command Default

None

Command Modes

cnbng-nal

Command History

Release	Modification
Release 7.3.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
config-services	read, write

This example shows how to configure NAL auto-loopback for a default VRF on the user plane of cloud native BNG:

```
Router(config)#cnbng-nal location 0/1/CPU0
Router(config-cnbng-nal)#auto-loopback vrf default interface Loopback1 primary-address
10.0.0.1
Router(config-cnbng-nal)#commit
```

cnbng-nal

To enter into the cnbng-nal configuration mode and to specify the NOS adaptation layer (NAL) configurations for the user plane of cloud native BNG (cnBNG), use the **cnbng-nal** command in Global Configuration mode.

cnbng-nal location *location*

Syntax Description

location *location*	Specifies the location of the cnBNG NAL node (route processor or line card).

Command Default

None

Command Modes

Global Configuration

Command History

Release	Modification
Release 7.3.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
config-services	read, write

This example shows how to enter into the cnbng-nal configuration mode:

```
Router(config)#cnbng-nal location 0/1/CPU0
Router(config-cnbng-nal)#
```

cp-association

To specify the retry count to start the cnBNG control plane-user plane (CP-UP) association, use the **cp-association** command in cnbng-nal configuration mode. To remove this configuration, use the **no** form of this command.

cp-association **retry-count** *count*

Syntax Description

retry-count *count*	Specifies the retry count to start the cnBNG CP-UP association. The range is 5 to 20.

Command Default

None

Command Modes

cnbng-nal

Command History

Release	Modification
Release 7.3.1	This command was introduced.

Usage Guidelines

It is mandatory to configure this **cp-association** command along with the other relevant CP server/UP server configurations to start the cnBNG CP-UP association.

You can use the **show cnbng-nal cp connection status location** command to verify if the retry count is configured or not. A sample output is given here:

```
Router#show cnbng-nal cp connection status location 0/0/CPU0
Wed Nov 18 14:32:30.101 IST

Location: 0/0/CPU0


User-Plane configurations:
--------------------------
IP             : 11.11.11.1
GTP Port       : 15002
PFCP Port      : 15003
VRF            : default


Control-Plane configurations:
-----------------------------
PRIMARY IP     : 11.11.11.2
GTP Port       : 2152
PFCP Port      : 8805

Retry count is not configured

Connection Status: Down
Connection Status time stamp: Wed Nov 18 14:32:15 2020

Connection Prev Status : Up
Connection Prev Status time stamp: Wed Nov 18 14:12:20 2020
```

```
Association status: Inactive
Association status time stamp: Wed Nov 18 14:31:08 2020
```

Task ID

Task ID	Operation
config-services	read, write

This example shows how to specify the retry count to start the cnBNG (CP-UP) association:

```
Router(config)#cnbng-nal location 0/1/CPU0
Router(config-cnbng-nal)#cp-association retry-count 5
Router(config-cnbng-nal)#commit
```

cp-server

To configure the server details of the control plane for cloud native BNG (cnBNG), use the **cp-server** command in cnbng-nal configuration mode. To remove this configuration, use the **no** form of this command.

cp-server primary ipv4 *ipv4-address*

Syntax Description

primary	Configures the details of the primary server of the control plane.
ipv4 *ipv4-address*	Specifies the IPv4 address of the primary server of the control plane.

Command Default

None

Command Modes

cnbng-nal

Command History

Release	Modification
Release 7.3.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
config-services	read, write

This example shows how to configure the primary server details of the control plane of cnBNG:

```
Router(config)#cnbng-nal location 0/1/CPU0
Router(config-cnbng-nal)#cp-server primary ipv4 198.51.100.1
Router(config-cnbng-nal)#commit
```

disable-secondary-address-notification

To disable internal notification messages between the software components during the secondary address update under the loopback interface on cnBNG user plane (UP), use the **disable-secondary-address-notification** command in cnbng-nal configuration mode. To remove this configuration, use the **no** form of this command.

disable-secondary-address-notification

Syntax Description

This command has no keywords or arguments.

Command Default

None

Command Modes

cnbng-nal

Command History

Release	Modification
Release 7.4.2	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
config-services	read, write

This example shows how to disable internal notification messages between the software components during the secondary address update for route provisioning on the cnBNG UP:

```
Router#configure
Router(config)#cnbng-nal location 0/RSP0/CPU0
Router(config-cnbng-nal-local)#disable-secondary-address-notification
Router(config-cnbng-nal-local)#commit
```

hostidentifier

To specify a host identifier for the cloud native BNG (cnBNG) NOS adaptation layer (NAL) instance, use the **hostidentifier** command in cnbng-nal configuration mode. To remove this configuration, use the **no** form of this command.

hostidentifier *hostname*

Syntax Description

hostname	Specifies the hostname of cnBNG NAL.

Command Default

None

Command Modes

cnbng-nal

Command History

Release	Modification
Release 7.3.1	This command was introduced.

Usage Guidelines

The host identifier string must match the user plane (UP) name configured in the control plane (CP) for the CP-UP association to come up.

Task ID

Task ID	Operation
config-services	read, write

This example shows how to specify a host identifier for the NAL instance on cnBNG user plane:

```
Router(config)#cnbng-nal location 0/1/CPU0
Router(config-cnbng-nal)#hostidentifier test-host
Router(config-cnbng-nal)#commit
```

ipoe fsol-flow-control

To configure flow control feature for IPoE protocol packets sent from cnBNG user plane (UP) to control plane (CP), use the **ipoe fsol-flow-control** command in *cnbng-nal* configuration mode. To remove the configuration, use the **no** form of this command.

ipoe fsol-flow-control *limit*

Syntax Description

limit	Specifies the maximum number of IPoE protocol packets to be sent from cnBNG UP to CP for each second. The limit ranges from 50 to 400; default being 100.

Command Default

Disabled, by default.

Command Modes

cnbng-nal

Command History

Release	Modification
Release 7.4.2	This command was introduced

Usage Guidelines

The IPoE protocol packets covered under this flow control feature include IPoE DHCPv4 DISCOVER and DHCPv6 SOLICIT messages.

Task ID

Task ID	Operations
config-services	read, write

Examples

This example shows how to specify the limit of IPoE protocol packets to be sent from cnBNG UP to CP for each second:

```
Router#configure
Router(config)#cnbng-nal location 0/0/CPU0
Router(config-cnbng-nal-local)#ipoe fsol-flow-control 70
Router(config-cnbng-nal-local)#commit
```

Related Commands

Command	Description
pppoe fsol-flow-control, on page 10	Configures flow control feature for PPPoE protocol packets sent from cnBNG user plane to control plane.

pppoe fsol-flow-control

To configure flow control feature for IPoE protocol packets sent from cnBNG user plane to control plane, use the **pppoe fsol-flow-control** command in *cnbng-nal* configuration mode. To remove the configuration, use the **no** form of this command.

pppoe fsol-flow-control *limit*

Syntax Description

limit	Specifies the number of PPPoE protocol packets to be sent from cnBNG UP to CP for each second. The limit ranges from 50 to 400; default being 100.

Command Default

Disabled, by default.

Command Modes

cnbng-nal

Command History

Release	Modification
Release 7.4.2	This command was introduced

Usage Guidelines

The PPPoE protocol packets covered under this flow control feature include PPPoE-PTA PADI (PPPoE Active Discovery Initiation), PPPoE-LAC PADI, and PPPOE-PTA DHCPV6 SOLICIT messages.

Task ID

Task ID	Operations
config-services	read, write

Examples

This example shows how to specify the limit of PPPoE protocol packets to be sent from cnBNG UP to CP for each second:

```
Router#configure
Router(config)#cnbng-nal location 0/0/CPU0
Router(config-cnbng-nal-local)#pppoe fsol-flow-control 60
Router(config-cnbng-nal-local)#commit
```

Related Commands

Command	Description
ipoe fsol-flow-control, on page 9	Configures flow control feature for IPoE protocol packets sent from cnBNG user plane to control plane.

route-summary

To configure the cnBNG NAL route summary tag, use the **route-summary** command in cnbng-nal configuration mode. To remove this configuration, use the **no** form of this command.

route-summary **tag** { *tag-value* | **default** }

Syntax Description

tag	Sets a tag value for the route.
tag-value	Specifies the tag value. The range is 1 to 4294967295.
default	Specifies the default tag (of value 1) for the NAL server subscriber route summary.

Command Default

None

Command Modes

cnbng-nal

Command History

Release	Modification
Release 7.3.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
config-services	read, write

This example shows how to configure the cnBNG NAL route summary tag:

```
Router(config)#cnbng-nal location 0/1/CPU0
Router(config-cnbng-nal)#route-summary tag 4
Router(config-cnbng-nal)#commit
```

secondary-address-update

To enable secondary address update under loopback during route provisioning on cnBNG user plane (UP), use the **secondary-address-update** command in cnbng-nal configuration mode. To remove this configuration, use the **no** form of this command.

secondary-address-update enable

Syntax Description

enable	Enables the secondary address update.

Command Default

None

Command Modes

cnbng-nal

Command History

Release	Modification
Release 7.3.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
config-services	read, write

This example shows how to enable secondary address update during route provisioning on the cnBNG user plane:

```
Router(config)#cnbng-nal location 0/1/CPU0
Router(config-cnbng-nal)#secondary-address-update enable
Router(config-cnbng-nal)#commit
```

up-cp-notification flow-control

To configure flow control feature for notification events sent from cnBNG user plane (UP) to control plane (CP), use the **up-cp-notification flow-control** command in *cnbng-nal* configuration mode. To remove the configuration, use the **no** form of this command.

up-cp-notification flow-control *limit*

Syntax Description

limit	Specifies the maximum number of notification events to be sent from cnBNG UP to CP for each second. The limit ranges from 20 to 400; default being 100.

Command Default

Disabled, by default.

Command Modes

cnbng-nal

Command History

Release	Modification
Release 7.4.2	This command was introduced

Usage Guidelines

This command is common for IPoE, PPPoE-PTA, and PPPoE-LAC sessions.

The notification events covered under this flow control feature include locally generated messages on UP such as:

- subscriber delete notifications (say, during mark-and-sweep procedure, session deletion by UP administrator, and so on)
- PPP keep alive timer expiry notification

Task ID

Task ID	Operations
config-services	read, write

Examples

This example shows how to specify the limit of notification events sent from cnBNG UP to CP for each second:

```
Router#configure
Router(config)#cnbng-nal location 0/0/CPU0
Router(config-cnbng-nal-local)#up-cp-notification flow-control 70
Router(config-cnbng-nal-local)#commit
```

Related Commands

Command	Description
up-cp-stats flow-control , on page 14	Configures flow control feature for statistics events that are sent from cnBNG user plane to control plane.

up-cp-stats flow-control

To configure flow control feature for statistics events that are sent from cnBNG user plane (UP) to control plane (CP), use the **up-cp-stats flow-control** command in *cnbng-nal* configuration mode. To remove the configuration, use the **no** form of this command.

up-cp-stats flow-control *limit*

Syntax Description

limit	Specifies the maximum number of statistics events to be sent from cnBNG UP to CP for each second. The limit ranges from 20 to 500; default being 150.

Command Default

Disabled, by default.

Command Modes

cnbng-nal

Command History

Release	Modification
Release 7.4.2	This command was introduced

Usage Guidelines

This command is common for IPoE, PPPoE-PTA, and PPPoE-LAC sessions.

The statistics events covered under this flow control feature include locally generated messages like, subscriber session or service periodic statistics notification, that are sent from UP to CP.

Task ID

Task ID	Operations
config-services	read, write

Examples

This example shows how to specify the limit of statistics events sent from cnBNG UP to CP for each second:

```
Router#configure
Router(config)#cnbng-nal location 0/0/CPU0
Router(config-cnbng-nal-local)#up-cp-stats flow-control 70
Router(config-cnbng-nal-local)#commit
```

Related Commands

Command	Description
up-cp-notification flow-control , on page 13	Configures flow control feature for notification events sent from cnBNG user plane to control plane.

up-server

To configure the server details of the user plane for cloud native BNG (cnBNG), use the **up-server** command in cnbng-nal configuration mode. To remove this configuration, use the **no** form of this command.

up-server ipv4 *ipv4-address* [**gtp-port** *gtp-port-num*] [**pfcp-port** *pfcp-port-num*] [**vrf default**]

Syntax Description

ipv4 *ipv4-address*	Specifies the IPv4 address of the user plane server.
gtp-port *gtp-port-num*	Specifies the source GPRS Tunneling Protocol (GTP) port number of the user plane server. The range is 15002 to 15051.
pfcp-port *pfcp-port-num*	Specifies the source Packet Forwarding Control Protocol (PFCP) port number of the user plane server. The range is 15002 to 15051.
vrf default	Configures the default VRF of the user plane server.

Command Default

None

Command Modes

cnbng-nal

Command History

Release	Modification
Release 7.3.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
config-services	read, write

This example shows how to configure the UP server details of cnBNG:

```
Router(config)#cnbng-nal location 0/1/CPU0
Router(config-cnbng-nal)#up-server ipv4 192.0.2.1 gtp-port 15002 pfcp-port 15003 vrf default
Router(config-cnbng-nal)#commit
```

cnBNG User Plane Verification Commands

This chapter describes the Cisco IOS XR software commands that are used to verify the cloud native Broadband Network Gateway (cnBNG) user plane configuration on Cisco ASR 9000 Series Routers. For details regarding the related configurations, see the *Cloud Native BNG User Plane Configuration Guide for Cisco ASR 9000 Series Routers*.

show cnbng-nal access-interface

To view the IP subscriber access interface information for the NOS adaptation layer (NAL) on the user plane of cloud native BNG (cnBNG), use the **show cnbng-nal access-interface** command in EXEC mode.

show cnbng-nal access-interface *interface-type interface-path-id* **location** *location-id*

Syntax Description

interface-type interface-path-id	Displays information about the subscriber access interface for the specified interface type. Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information, use the question mark (?) online help function.
location *location-id*	(optional) Displays information about subscriber access interface for the specified location. The location argument is entered in the `rack/slot/module` notation.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 7.3.1	This command was introduced.
Release 24.1.1	The task id was changed from config-services to network.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
network	read, write

This example shows how to view the IP subscriber access interface information for bundle interface (`bundle-Ether 1.1`) :

```
Router# show cnbng-nal subscriber access-interface bundle-Ether 1.1

=====================
Location: 0/RSP0/CPU0
=====================
 Type PPPoE IPoE
 ==== ===== ====
Session Counts by State:
 initializing 0 0
 connecting 0 0
```

```
 connected 0 0
 activated 0 8000
 idle 0 0
 disconnecting 0 0
 Total: 0 8000
Session Counts by Address-Family:
 none 0 0
 ipv4 0 0
 ipv6 0 8000
 dual 0 0
 Total: 0 8000
=====================
Location: 0/RSP1/CPU0
=====================
 Type PPPoE IPoE
 ==== ===== ====
Session Counts by State:
 initializing 0 0
 connecting 0 0
 connected 0 0
 activated 0 8000
 idle 0 0
 disconnecting 0 0
 Total: 0 8000
Session Counts by Address-Family:
 none 0 0
 ipv4 0 0
 ipv6 0 8000
 dual 0 0
 Total: 0 8000
```

show cnbng-nal aipc

To view the AIPC statistics for the NOS adaptation layer (NAL) component on the user plane of cloud native BNG (cnBNG), use the **show cnbng-nal aipc** command in EXEC mode.

show cnbng-nal aipc { **client** | **server** } **location** { *location-id* | **all** }

Syntax Description

client		Displays the AIPC statistics of the client.
server		Displays the AIPC statistics of the server.
location	*location-id*	(optional) Displays information about AIPC statistics for the specified location. The location argument is entered in the `rack/slot/module` notation. You can specify a specific *location-id* in the `rack/slot/module` format or specify **location all** to view AIPC statistics for all locations.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 7.3.1	This command was introduced.
Release 24.1.1	The task id was changed from cisco-support to network.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
network	Read, write

This example shows how to view the APIC client information:

```
Router# show cnbng-nal aipc client location all
Mon Jan 18 17:22:27.001 UTC

Location: 0/RSP0/CPU0

client_name:               dhcpd
conn_present:              1
tx_attempt_count:          1100
tx_count:                  1100
notify_connect_count:      15
notify_queue_high_count:   0
notify_queue_low_count:    0
notify_queue_full_count:   0
notify_data_waiting_count: 0
```

```
notify_error_count:        0
notify_close_count:        14
notify_sendstatus_count:   1100
notify_open_count:         0
pulse_data_waiting_count:  0
queue_full:                0
queue_full_drop:           0
queue_ewouldblock_count:   0
outstanding_buffers:       0
cumulative_overflow_msgs:  0
hwm_overflow_msgs:         0
get_mtu_failure:           0
get_buffer_failure:        0
get_buffer_datap_failure:  0
conn_failure:              0
send_failure:              0
receive_failure:           0
release_buffer_failure:    0
overflow_q_flush_count:    14
```

show cnbng-nal chunk statistics

To view the chunk memory statistics information for the user plane of cloud native BNG (cnBNG), use the **show cnbng-nal chunk statistics** command in EXEC mode.

show cnbng-nal chunk statistics location { *location-id* | **all** }

Syntax Description

location *location-id*	Displays information about chunk memory statistics for the specified location. You can specify a specific *location-id* in the `rack/slot/module` format or specify **location all** to view statistics for all locations.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 7.3.1	This command was introduced.
Release 24.1.1	The task id was changed from cisco-support to network.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
network	read, write

This example shows how to view the chunk statistics information for all locations:

```
Router# show cnbng-nal chunk statistics location all
Mon Jan 18 17:25:11.953 UTC

Location: 0/RSP0/CPU0

Chunk Id    Chunk name                          Total allocs done  Total freed  Blocks in
 use
========    ==========                        =================  ===========  =============
0           nal transaction FSM chunk           100002             100002       0

1           nal message chunk                   50012              50012        0

2           nal im database chunk               50001              50001        0

3           nal rib context chunk               2                  2            0

4           nal subscriber fsm chunk            50001              50001        0

5           nal bulk disconnect chunk           50001              50001        0
```

```
6           nal replay msg chunk                0                0           0
7           nal recon msg chunk                 0                0           0
8           nal replay data chunk               0                0           0
9           nal recon sub entry                 0                0           0
10          nal replay data entry               0                0           0
11          nal spa param chunk                 100002           100002      0
12          nal spa packet inject chunk         0                0           0
13          nal spa packet punt chunk           0                0           0
14          nal udp packet chunk                4                0           4
15          nal timer infra chunk               4                4           0
16          nal spa req resp chunk              16384            0           16384
17          nal stats resp chunk                0                0           0
18          nal AF down chunk                   0                0           0
19          NAL SPA response chunk              50001            50001       0
20          NAL Subscriber stats chunk          0                0           0
21          NAL Keep alive packet chunk         0                0           0
22          NAL LCP timeout chunk               0                0           0
23          Reconcile response chunk            0                0           0
24          Route reconcile response chunk      11               11          0
25          nal spa req resp file chunk         100002           100002      0
26          nal disc history file chunk         50001            50001       0
27          Reconcile replay history chunk      0                0           0

Location: 0/1/CPU0
1           nal stats resp chunk                0                0           0
2           nal AF down chunk                   0                0           0
3           NAL SPA response chunk              50001            50001       0
4           NAL Subscriber stats chunk          0                0           0
5           NAL Keep alive packet chunk         0                0           0
6           NAL LCP timeout chunk               0                0           0
7           Reconcile response chunk            0                0           0
8           Route reconcile response chunk      11               11          0
```

This example shows how to view the chunk statistics information for the location 0/RSP0/CPU0.

```
Router# show cnbng-nal chunk statistics location 0/RSP0/CPU0
Location: 0/RSP0/CPU0
Chunk Id    Chunk name                          Total allocs done  Total freed  Blocks in
 use
========    ==========                        ==================  ===========  =============
0           nal transaction FSM chunk           100002             100002       0

1           nal message chunk                   50012              50012        0

2           nal im database chunk               50001              50001        0

3           nal rib context chunk               2                  2            0

4           nal subscriber fsm chunk            50001              50001        0

5           nal bulk disconnect chunk           50001              50001        0

6           nal replay msg chunk                0                  0            0

7           nal recon msg chunk                 0                  0            0

8           nal replay data chunk               0                  0            0

9           nal recon sub entry                 0                  0            0
```

show cnbng-nal configuration

To view the trace information for NOS adaptation layer (NAL) system database configuration component on the user plane of cloud native BNG (cnBNG), use the **show cnbng-nal configuration** command in EXEC mode.

show cnbng-nal configuration [**auto-loopback vrf** { *vrf-name* | **all** }] [**location** *location-id*]

Syntax Description

auto-loopback	Displays the NOS adaptation layer (NAL) autoloopback configuration on the user plane of cloud native BNG.
vrf *vrf-name*	Displays the NOS adaptation layer (NAL) autoloopback configuration for the specified VRF. Use **vrf all** to view the details for all VRFs.
location *location*	(optional) Displays information about NOS adaptation layer (NAL) configuration for the specified location. The location argument is entered in the `rack/slot/module` notation. You can specify a specific *location-id* in the `rack/slot/module` format or specify **location all** to view statistics for all locations.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 7.3.1	This command was introduced.
Release 24.1.1	The task id was changed from cisco-support to network.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
network	read, write

This example shows how to view the configuration for all locations:

```
Router# show cnbng-nal configuration location all
Mon Jan 18 17:28:59.492 UTC

Location: 0/RSP0/CPU0

Host-Identifier : asr9k-1
```

```
Summary-route Tag-value : 100


User-Plane configurations:
--------------------------
 IP             : 10.105.227.96
 GTP Port       : 2152
 PFCP Port      : 8805
 VRF            : default


Control-Plane configurations:
-----------------------------
 PRIMARY IP     : 10.84.102.235
 GTP Port       : 2152
 PFCP Port      : 8805

 Connection Status: Down
Association Status: Init

Location: 0/1/CPU0
```

This example shows how to view the autoloopback configuration for all VRFs:

```
Router# show cnbng-nal configuration auto-loopback vrf all
Mon Feb 15 11:08:56.419 UTC

Location: 0/RSP0/CPU0

NAL Auto-Loopback DB:
---------------------

 VRF - default
 Interface-Name List:
 ---------------------
 Loopback0
 Primary-IP: 12.0.0.1
 Loopback1
 Primary-IP: 12.0.0.1
```

show cnbng-nal counters

To view the counter information for the user plane of cloud native BNG (cnBNG), use the **show cnbng-nal counters** command in EXEC mode.

show cnbng-nal counters type { **SPA** | **accounting** | **all** | **cp-recon** | **error** | **histogram** | **spa-lib** | **subscriber** | **svm** | **watermark** } [**location** *location*]

Syntax Description

type	Displays the counters for the specified counter types. The following are the counter types: • SPA: Displays Subscriber Provisioning Agent (SPA) counters. • accounting: Displays accounting counters • all: Displays all counters • Cp-recon: Displays CP Recon counters • error: Displays Error counters • histogram: Displays histogram counters • packets : Displays packet counters • spa-lib: Displays SPA LIB counters • subscriber: Displays subscriber counters • svm: Displays SVM counters • watermark: Displays watermark counters
location *location-id*	(optional) Displays information about counters for the specified location. The location argument is entered in the `rack/slot/module` notation. You can specify a specific *location-id* in the `rack/slot/module` format or specify **location all** to view counters for all locations.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 7.3.1	This command was introduced.
Release 24.1.1	The task id was changed from cisco-support to network.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
network	read, write

This example shows how to view counters for SPA:

```
Router# show cnbng-nal counters type SPA
Mon Jan 18 17:30:29.178 UTC

Location: 0/RSP0/CPU0

SPA Counters
------------

Counter name                      Value
==============                    =====
IPOE Sub Create OK                50001
GEN SPA Create Req                50001
GEN Sub Create Res                50001
GEN Blkdic adm more               1
GEN Blkdis rsp FSM                50001
GEN GTPu pkt sent                 4
GEN Evt Notif Fail                50001
GEN Mutex create                  12
GEN Timer start                   4
GEN Route prov                    11
GEN Timer expiry                  4
GEN PFCP start                    7
GEN GTPu start                    4
GEN Trans create                  7
GEN Trans delete                  4
GEN Rt prov done                  11
GEN Rtprov res ok                 6
```

This example shows how to filter for SPA library:

```
Router# show cnbng-nal counters type all | beg SPA LIB
Sun Aug 2 20:44:07.902 UTC
SPA LIB Counters
----------------
Counter name Value
============= =====
pfcp_rx_counter 6899
pfcp_tx_counter 6900
gtpu_tx_counter 9048
gtpu_rx_counter 7510
pfcp_keepalive_tx_counter 891
pfcp_keepalive_rx_counter 890
SPA API counters
----------------------
```

This example shows how to view information of all counters:

```
Router# show cnbng-nal counters type all
Mon Jan 18 17:31:29.688 UTC

Location: 0/RSP0/CPU0

Subscriber Counters
-------------------
```

```
Counter name                    Value
============                    =====
IPOE INTF Created               50001
IPOE INTF Delete                50001
IPOE IPv4 caps down             50001
IPOE IPv4 caps up               50001
IPOE IPv6 caps down             50001
IPOE IPv6 caps up               50001
IPOE IPv4 Rou add               50001
IPOE IPv4 Rou del               50001
IPOE IPv4 fram add              50001
IPOE IPv4 fram del              50001
IPOE IPv6 Rou add               50001
IPOE IPv6 Rou del               50001
IPOE IPv6 fram add              50001
IPOE IPv6 fram del              50001
IPOE IPv6 PD add                50001
IPOE IPv6 PD del                50001
GEN Blkdis q empty              1
GEN DB cache hit                1864147
GEN DB cache miss               1232501
PPPoE SPIO attach               1


Error Counters
--------------

Counter name                    Value
============                    =====
GEN Rtprov res fail             5


Accounting Counters
-------------------

Counter name                    Value
============                    =====


SVM Counters
------------

Counter name                    Value
============                    =====
Sess created                    50001
Sess deleted                    50001
UP install req                  50001
UP installed                    100001
UP assoc req                    100001
UP associated                   100001
PD req                          100001
PD cfg                          50001
PD                              100001
Activate req                    50001
Activated                       50001
Delete CB                       50001
Cleanup                         50001
Recons                          50000
Recon start                     2
Recon end                       2
```

```
SPA Counters
------------

Counter name                    Value
=============                   =====
IPOE Sub Create OK              50001
GEN SPA Create Req              50001
GEN Sub Create Res              50001
GEN Blkdic adm more             1
GEN Blkdis rsp FSM              50001
GEN GTPu pkt sent               4
GEN Evt Notif Fail              50001
GEN Mutex create                12
GEN Timer start                 4
GEN Route prov                  11
GEN Timer expiry                4
GEN PFCP start                  7
GEN GTPu start                  4
GEN Trans create                7
GEN Trans delete                4
GEN Rt prov done                11
GEN Rtprov res ok               6


CP Recon Counters
------------------

Counter name                    Value
=============                   =====


Packet Counters
------------------

Counter name                    Value
=============                   =====


SPA LIB Counters
----------------

Counter name                            Value
=============                           =====
association_status                      0
transport_status                        0


Histogram/API Performance Stats
-------------------------------

API name                        1ms     10ms    100ms   1s      5s      10s
   20s     50s     100s
========                        ===     ====    =====   ==      ==      ===
   ===     ===     ====
IPOE Sub Create                 0       0       0       48777   1224    0
   0       0       0
IPOE Sub Update                 0       0       0       0       0       0
```

```
   0         0         0
IPOE Sub Delete                0         0         0         160       49841     0
   0         0         0
IPOE Int Crt                   0         1         31531     18469     0         0
   0         0         0
IPOE Int Upd                   0         0         0         0         0         0
   0         0         0
IPOE Int Del                   0         0         0         169       49832     0
   0         0         0
IPOE SVM Sess Create           0         0         2808      47172     21        0
   0         0         0
IPOE SVM Sess Update           0         0         0         0         0         0
   0         0         0
IPOE SVM Sess Delete           3         2915      34410     12673     0         0
   0         0         0
IPOE V4 RT Inst                115       38956     8805      2125      0         0
   0         0         0
IPOE V4 RT Del                 532       44916     4498      55        0         0
   0         0         0
IPOE V4 FR Inst                107       38952     8815      2127      0         0
   0         0         0
IPOE V4 FR Del                 542       44901     4503      55        0         0
   0         0         0
IPOE V6 RT Inst                126       38440     9809      1626      0         0
   0         0         0
IPOE V6 RT Del                 843       44838     4294      26        0         0
   0         0         0
IPOE V6 PD RT Inst             128       38424     9820      1629      0         0
   0         0         0
IPOE V6 PD RT Del              838       44814     4323      26        0         0
   0         0         0
IPOE V6 FR Inst                131       38371     9816      1683      0         0
   0         0         0
IPOE V6 FR Del                 835       44836     4304      26        0         0
   0         0         0
PPPOE Sub Create               0         0         0         0         0         0
   0         0         0
PPPOE Sub Update               0         0         0         0         0         0
   0         0         0
PPPOE Sub Delete               0         0         0         0         0         0
   0         0         0
PPPOE Int Crt                  0         0         0         0         0         0
   0         0         0
PPPOE Int Upd                  0         0         0         0         0         0
   0         0         0
PPPOE Int Del                  0         0         0         0         0         0
   0         0         0
PPPOE SVM Sess Create          0         0         0         0         0         0
   0         0         0
PPPOE SVM Sess Update          0         0         0         0         0         0
   0         0         0
PPPOE SVM Sess Delete          0         0         0         0         0         0
   0         0         0
PPPOE V4 RT Inst               0         0         0         0         0         0
   0         0         0
PPPOE V4 RT Del                0         0         0         0         0         0
   0         0         0
PPPOE V4 FR Inst               0         0         0         0         0         0
   0         0         0
PPPOE V4 FR Del                0         0         0         0         0         0
   0         0         0
PPPOE V6 RT Inst               0         0         0         0         0         0
   0         0         0
PPPOE V6 RT Del                0         0         0         0         0         0
```

```
   0         0         0
PPPOE V6 PD RT Inst             0         0         0         0         0         0
   0         0         0
PPPOE V6 PD RT Del              0         0         0         0         0         0
   0         0         0
PPPOE V6 FR Inst                0         0         0         0         0         0
   0         0         0
PPPOE V6 FR Del                 0         0         0         0         0         0
   0         0         0
GEN Per trans                   0         0         0         48853     51149     0
   0         0         0
GEN CDM Lookup                  0         0         0         0         0         0
   0         0         0
GEN CDM Insert                  47239     2762      0         0         0         0
   0         0         0
GEN CDM Update                  146687    3316      0         0         0         0
   0         0         0
GEN Eval Lookup                 49838     163       0         0         0         0
   0         0         0
```

```
Watermark Performance Stats
---------------------------

                                                          Average Time              Minimum Time
           Maximum Time
                                                          ------------              ------------
           ------------
API name                        Req count       Sec   MSec   NSec         Sec   MSec   NSec
         Sec   MSec   NSec
========                        =========       ===   ====   ====         ===   ====   ====
         ===   ====   ====
IPOE Sub Create                 50001           0     574    515792       0     133    0
          2     883    0
IPOE Sub Update                 0               0     0      0            0     0      0
          0     0      0
IPOE Sub Delete                 50001           2     52     368521       0     953    0
          4     70     0
IPOE Int Crt                    50001           0     89     804869       0     9      0
          0     943    0
IPOE Int Upd                    0               0     0      0            0     0      0
          0     0      0
IPOE Int Del                    50001           1     981    457744       0     917    0
          4     11     0
IPOE SVM Sess Create            50001           0     358    201129       0     31     0
          1     187    0
IPOE SVM Sess Update            0               0     0      0            0     0      0
          0     0      0
IPOE SVM Sess Delete            50001           0     70     839397       0     1      0
          0     294    0
IPOE V4 RT Inst                 50001           0     11     100024       0     1      0
          0     368    0
IPOE V4 RT Del                  50001           0     5      773691       0     1      0
          0     133    0
IPOE V4 FR Inst                 50001           0     11     118684       0     1      0
          0     368    0
IPOE V4 FR Del                  50001           0     5      775731       0     1      0
          0     133    0
IPOE V6 RT Inst                 50001           0     10     419698       0     101    0
          0     368    0
IPOE V6 RT Del                  50001           0     4      937393       0     1      0
          0     121    0
IPOE V6 PD RT Inst              50001           0     10     435878       0     101    0
```

```
          0     368     0
IPOE V6 PD RT Del               50001           0     4       948452        0     1       0
          0     121     0
IPOE V6 FR Inst                 50001           0     10      577531        0     100     0
          0     367     0
IPOE V6 FR Del                  50001           0     4       939493        0     1       0
          0     121     0
PPPOE Sub Create                0               0     0       0             0     0       0
          0     0       0
PPPOE Sub Update                0               0     0       0             0     0       0
          0     0       0
PPPOE Sub Delete                0               0     0       0             0     0       0
          0     0       0
PPPOE Int Crt                   0               0     0       0             0     0       0
          0     0       0
PPPOE Int Upd                   0               0     0       0             0     0       0
          0     0       0
PPPOE Int Del                   0               0     0       0             0     0       0
          0     0       0
PPPOE SVM Sess Create           0               0     0       0             0     0       0
          0     0       0
PPPOE SVM Sess Update           0               0     0       0             0     0       0
          0     0       0
PPPOE SVM Sess Delete           0               0     0       0             0     0       0
          0     0       0
PPPOE V4 RT Inst                0               0     0       0             0     0       0
          0     0       0
PPPOE V4 RT Del                 0               0     0       0             0     0       0
          0     0       0
PPPOE V4 FR Inst                0               0     0       0             0     0       0
          0     0       0
PPPOE V4 FR Del                 0               0     0       0             0     0       0
          0     0       0
PPPOE V6 RT Inst                0               0     0       0             0     0       0
          0     0       0
PPPOE V6 RT Del                 0               0     0       0             0     0       0
          0     0       0
PPPOE V6 PD RT Inst             0               0     0       0             0     0       0
          0     0       0
PPPOE V6 PD RT Del              0               0     0       0             0     0       0
          0     0       0
PPPOE V6 FR Inst                0               0     0       0             0     0       0
          0     0       0
PPPOE V6 FR Del                 0               0     0       0             0     0       0
          0     0       0
GEN Per trans                   100002          1     335     305446        0     133     0
          4     113     0
GEN CDM Lookup                  0               0     0       0             0     0       0
          0     0       0
GEN CDM Insert                  50001           0     0       55297         0     0       0
          0     4       0
GEN CDM Update                  150003          0     0       22164         0     0       0
          0     4       0
GEN Eval Lookup                 50001           0     0       3259          0     0       0
          0     1       0
```

show cnbng-nal cp connection status

To view the connection status information of the NAL transport user and control plane server, use the **show cnbng-nal cp connection status** command in EXEC mode.

show cnbng-nal cp connection status [**location** *location*]

Syntax Description

location *location-id*	(optional) Displays information about the connection status for the specified location. The location argument is entered in the `rack/slot/module` notation. You can specify a specific *location-id* in the `rack/slot/module` format or specify **location all** to view statistics for all locations.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 7.3.1	This command was introduced.
Release 24.1.1	The task id was changed from cisco-support to network.

Usage Guidelines

You can use this command to verify if the retry count is configured or not.

Task ID

Task ID	Operation
network	Read, write

This example shows how to view the connection status:

```
Router# show cnbng-nal cp connection status Fri Feb 19 11:27:31.178 UTC

Location: 0/RSP0/CPU0


User-Plane configurations:
--------------------------
IP             : 10.105.227.96
 GTP Port       : 2152
PFCP Port      : 8805
VRF            : default


Control-Plane configurations:
-----------------------------
PRIMARY IP     : 10.84.102.235
 GTP Port       : 2152
PFCP Port      : 8805
```

```
 Association retry count: 10

Connection Status: Up
Connection Status time stamp: Thu Feb 11 12:46:19 2021

Connection Prev Status : Down
Connection Prev Status time stamp: Thu Feb 11 12:44:55 2021

Association status: Active
Association status time stamp: Thu Feb 11 12:46:18 2021
```

This example shows how to view the connection status for a particular location, in this case, location `0/0/CPU0`:

```
Router# show cnbng-nal cp connection status location 0/0/CPU0
Wed Nov 18 14:32:30.101 IST

Location: 0/0/CPU0


User-Plane configurations:
--------------------------
IP             : 11.11.11.1
GTP Port       : 15002
PFCP Port      : 15003
VRF            : default


Control-Plane configurations:
-----------------------------
PRIMARY IP     : 11.11.11.2
GTP Port       : 2152
PFCP Port      : 8805

Retry count is not configured

Connection Status: Up
Connection Status time stamp: Thu Feb 11 12:46:19 2021

Connection Prev Status : Down
Connection Prev Status time stamp: Thu Feb 11 12:44:55 2021

Association status: Active
Association status time stamp: Thu Feb 11 12:46:18 2021
```

show cnbng-nal dynamic-routes

To view details of dynamic routes for the user plane of cloud native BNG (cnBNG), use the **show cnbng-nal dynamic-routes** command in EXEC mode.

show cnbng-nal dynamic-routes { **afi** { **ipv4** | **ipv6** } | **history** | **summary** } [**location** *location*]

Syntax Description

afi	Displays dynamic routes for the specified address family.
history	Displays the history of dynamic route provision request or response.
summary	Displays the summary of dynamic routes installed.
location *location-id*	(optional) Displays details of dynamic routes for the specified location. The location argument is entered in the `rack/slot/module` notation. You can specify a specific *location-id* in the `rack/slot/module` format or specify **location all** to view statistics for all locations.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 7.3.1	This command was introduced.
Release 24.1.1	The task id was changed from cisco-support to network.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
network	read, write

This example shows how to view the history details of the dynamic routes:

```
Router# show cnbng-nal dynamic-routes history
Mon Jan 18 18:47:19.231 UTC

Location: 0/RSP0/CPU0
----------------------

---------------- Index: 1 ----------------

Timestamp            : Dec 17 16:26:52.020584
Type                 : Response
Transaction id       : 220
```

```
Result               : 1
Router name          : asr9k-1
Error message        : Route provision request timed out
---------------- End of index: 1 ----------------

---------------- Index: 2 ----------------

Timestamp            : Dec 17 16:24:52.019863
Type                 : Request
Transaction id       : 220
Duration             : 0
Number of V4 entries : 1
Number of V6 entries : 1
Sync status          : SPA_ROUTE_SYNC_NONE

  V4 Routes
+-------------------------------------------------------------------------------------------------------+
|  Oper       VRF                               Route/mask              Gateway IP
Route tag |
+-------------------------------------------------------------------------------------------------------+
|  Create     default                           101.102.0.0/16          101.102.0.1
0         |
+-------------------------------------------------------------------------------------------------------+


  V6 Routes
+-------------------------------------------------------------------------------------------------------+
|  Oper       VRF                               Route/mask
 Route tag |
+-------------------------------------------------------------------------------------------------------+
|  Create     default                           201::/64
 0         |
+-------------------------------------------------------------------------------------------------------+

---------------- End of index: 2 ----------------

---------------- Index: 3 ----------------

Timestamp            : Dec 17 15:35:07.123205
Type                 : Response
Transaction id       : 210
Result               : 1
Router name          : asr9k-1
Error message        : Route provision request timed out
---------------- End of index: 3 ----------------

---------------- Index: 4 ----------------

Timestamp            : Dec 17 15:33:07.122542
Type                 : Request
Transaction id       : 210
Duration             : 0
Number of V4 entries : 1
Number of V6 entries : 1
Sync status          : SPA_ROUTE_SYNC_NONE

  V4 Routes
+-------------------------------------------------------------------------------------------------------+
|  Oper       VRF                               Route/mask              Gateway IP
Route tag |
+-------------------------------------------------------------------------------------------------------+
|  Create     default                           101.101.0.0/16          101.101.0.1
20        |
+-------------------------------------------------------------------------------------------------------+
```

```
  V6 Routes
+-------------------------------------------------------------------------------------------------------+
|  Oper       VRF                                 Route/mask
 Route tag |
+-------------------------------------------------------------------------------------------------------+
|  Create     default                             101::/64
 20        |
+-------------------------------------------------------------------------------------------------------+

---------------- End of index: 4 ----------------
```

This example shows how to view summary of the dynamic routes:

```
Router# show cnbng-nal dynamic-routes summary
Mon Jan 18 18:50:48.734 UTC

Location: 0/RSP0/CPU0
----------------------

Counter Name          Value
--------------------------------
V4 OC Entries         1
V6 OC Entries         0
V4 Primary Entries    1
V4 Secondary Entries  0
V4 RIB Entries        0
V6 RIB Entries        0
```

This example shows how to view the IPv6 address family dynamic routes for the location `0/RSP0/CPU0`.

```
Router# show cnbng-nal dynamic-routes afi ipv6 location 0/RSP0/CPU0
Thu Oct  1 06:13:39.715 UTC
Index                    : 1
Interface                : Loopback1 [0x00000120]
VRF                      : default
AFI                      : IPv6
Prefix                   : 1:2::2000/115
Secondary address        : NA
Route tag                : 0
State                    : RIB_REQ_COMPLETE
```

This example shows how to view the IPv4 address family dynamic routes for the location `0/RSP0/CPU0`.

```
Router# show cnbng-nal dynamic-routes afi ipv4 location 0/RSP0/CPU0
Thu Oct  1 06:10:18.621 UTC

   Index                    : 1

   Interface                : Loopback1 [0x000005E0]

   VRF                      : default

   AFI                      : IPv4

   Prefix                   : 11.0.0.0/15

   Secondary address        : 11.0.0.1

   Route tag                : 0

   State                    : RIB_REQ_COMPLETE
```

show cnbng-nal main events

To view details of NOS adaptation layer (NAL) events for the user plane of cloud native BNG (cnBNG), use the **show cnbng-nal main events** command in EXEC mode.

show cnbng-nal main events [**location** *location-id*]

Syntax Description

location *location-id*	(optional) Displays information about NAL events for the specified location. The location argument is entered in the `rack/slot/module` notation. You can specify a specific *location-id* in the `rack/slot/module` format or specify **location all** to view main events for all locations.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 7.3.1	This command was introduced.
Release 24.1.1	The task id was changed from cisco-support to network.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
network	read, write

This example shows how to view main events:

```
Router# show cnbng-nal main events
Mon Jan 18 18:54:08.121 UTC

Location: 0/RSP0/CPU0

==========
NAL events
==========
| Event Name                          | Time Stamp           | S, M
| Timer init done                     | Dec 17 12:26:46.272  | 0, 0
| RSI Connection Up                   | Dec 17 12:26:46.272  | 0, 0
| OT Connection Up                    | Dec 17 12:26:46.400  | 0, 0
| Subscriber DB Done                  | Dec 17 12:26:48.192  | 0, 0
| Subscriber FSM Init Done            | Dec 17 12:26:48.192  | 0, 0
| Logging init done                   | Dec 17 12:26:48.192  | 0, 0
| UPID Tbl Init Done                  | Dec 17 12:26:48.320  | 0, 0
| UPID User Info Done                 | Dec 17 12:26:48.320  | 0, 0
| Subscriber OC DB init done          | Dec 17 12:26:48.320  | 0, 0
| Trace init done                     | Dec 17 12:26:48.448  | 0, 0
```

```
| Sysmgr CDM Cleanup Regist Done          | Dec 17 12:26:48.448  | 0, 0
| Statsd resync start                     | Dec 17 12:26:50.240  | 0, 0
| Statsd resync end                       | Dec 17 12:26:50.240  | 0, 0
| Proc Ready                              | Dec 17 12:26:50.368  | 0, 0
| AIPC Init                               | Dec 17 12:26:50.368  | 0, 0
| SIR suspend trans                       | Dec 17 15:05:45.088  | 0, 0
| SIR Not Ready                           | Dec 17 15:05:45.088  | 0, 1
| SIR Ready                               | Dec 17 15:05:54.688  | 0, 1
| NAL SPA Registration Done               | Dec 22 17:23:18.144  | 0, 1
| SPA Chkpoint Init Done                  | Dec 22 17:23:18.144  | 0, 1

=========
IM events
=========
| Event Name                              | Time Stamp           | S, M
| IM conn up                              | Dec 17 12:26:48.192  | 0, 0
| IMC DB recon done                       | Dec 17 12:26:48.320  | 0, 0
| IPoE parent caps done                   | Dec 17 12:26:48.448  | 0, 0
| IPoE sub caps done                      | Dec 17 12:26:48.448  | 0, 0
| PPPoE parent caps done                  | Dec 17 12:26:48.448  | 0, 0
| PPPoE sub caps done                     | Dec 17 12:26:48.448  | 0, 0
| PPP NCP ipcp caps done                  | Dec 17 12:26:48.448  | 0, 0
| PPP NCP ipv6cp caps done                | Dec 17 12:26:48.448  | 0, 0
| IPoE attrs done                         | Dec 17 12:26:50.368  | 0, 0
| PPPoE attrs done                        | Dec 17 12:26:50.368  | 0, 0
| Loopback attrs done                     | Dec 17 12:26:50.368  | 0, 0

==========
SVM events
==========
| Event Name                              | Time Stamp           | S, M
| Subdb conn down                         | Dec 17 15:05:45.728  | 0, 1
| Subdb conn up                           | Dec 17 15:05:49.696  | 0, 1
| Subdb recon start                       | Dec 17 15:05:49.696  | 0, 1
| Subdb recon end                         | Dec 17 15:05:54.560  | 0, 1
| SVM recon done                          | Dec 17 15:05:54.560  | 0, 1

==========
RIB events
==========
| Event Name                              | Time Stamp           | S, M
| IPV4 RIB Conn Up                        | Dec 17 12:26:48.448  | 0, 0
| IPV6 RIB Conn Up                        | Dec 17 12:26:48.448  | 0, 0
| RIB recon done                          | Dec 17 12:26:50.368  | 0, 0

=========
CP events
=========
| Event Name                              | Time Stamp           | S, M

==========
CFG events
==========
| Event Name                              | Time Stamp           | S, M
| NAL parent-intf IPoE apply done         | Dec 17 12:26:46.400  | 0, 1
| NAL parent-intf PPPoE apply done        | Dec 17 12:26:46.400  | 0, 1
| SPA cfg un-apply failed                 | Dec 22 17:23:04.576  | 0, 1
| NAL Host-ID apply Done                  | Dec 22 17:23:18.144  | 0, 1
| up-server applied                       | Dec 22 17:23:18.144  | 0, 1
| SPA cfg apply failed                    | Dec 22 17:23:18.144  | 0, 1
| cp-server applied                       | Dec 22 17:23:18.144  | 0, 1
| NAL Auto-loopback apply done            | Dec 22 17:23:18.144  | 0, 1
| NAL CP src server apply done            | Dec 22 17:23:18.144  | 0, 1
| SPA cfg notified                        | Dec 22 17:23:18.144  | 0, 1
```

```
| Local-config apply done                | Dec 22 17:23:18.144  | 0, 1
```

show cnbng-nal periodic-stats

To view the periodic statistics of cloud native BNG process, use the **show cnbng-nal periodic-stats** command in EXEC mode.

show cnbng-nal periodic-stats type { **SPA** | **accounting** | **all** | **cp-recon** | **error** | **histogram** | **spa-lib** | **subscriber** | **svm** | **watermark** } [**location** *location*]

Syntax Description

type	Displays the periodic statistics for the specified type. The following are the available types: • `SPA`: Displays the periodic statistics for SPA. • `accounting`: Displays the periodic statistics for accounting process. • `all` : Displays the periodic statistics for all process. • `cp-recon`: Displays the periodic statistics for CP recon process. • `error`: Displays the periodic statistics for error. • `histogram`: Displays the periodic statistics for histogram. • `packets`: Displays the periodic statistics for packets. • `spa-lib`: Displays the periodic statistics for SPA lib process. • `subscriber` : Displays the periodic statistics for subscriber sessions. • `svm` : Displays the periodic statistics for service manager process. • `watermark`: Displays the periodic statistics for watermark.
location *location-id*	(optional) Displays information about periodic statistics for the specified location. The location argument is entered in the `rack/slot/module` notation. You can specify a specific *location-id* in the `rack/slot/module` format or specify location `all` to view information for all locations.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 7.3.1	This command was introduced.
Release 24.1.1	The task id was changed from cisco-support to network.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
network	read, write

This example shows how to view the available periodic statistics type:

```
Router# show cnbng-nal  periodic-stats type ?
  SPA         SPA periodic-stats(cisco-support)
  accounting  Accounting periodic-stats(cisco-support)
  all         All periodic-stats(cisco-support)
  cp-recon    CP Recon periodic-stats(cisco-support)
  error       Error periodic-stats(cisco-support)
  histogram   Histogram periodic-stats(cisco-support)
  spa-lib     SPA LIB periodic-stats(cisco-support)
  subscriber  Subscriber periodic-stats(cisco-support)
  svm         SVM periodic-stats(cisco-support)
```

This example shows how to view the periodic statistics for histogram.

```
Router# show cnbng-nal  periodic-stats type histogram
Thu Aug 27 09:20:44.171 UTC

Location: 0/RSP0/CPU0

10Secs Periodic Stats
---------------------

Histogram/API Performance Stats
===============================

TimeStamp : Aug 27 09:20:40

API name                          1ms       10ms      100ms     1s        5s        10s
   20s       50s       100s
========                          ===       ====      =====     ==        ==        ===
   ===       ===       ====
IPOE Sub Create                   0         0         0         0         0         0
   0         0         0
IPOE Sub Update                   0         0         0         0         0         0
   0         0         0
IPOE Sub Delete                   0         0         0         0         0         0
   0         0         0
IPOE Int Crt                      0         0         0         0         0         0
   0         0         0
IPOE Int Upd                      0         0         0         0         0         0
   0         0         0
IPOE Int Del                      0         0         0         0         0         0
   0         0         0
IPOE SVM Sess Create              0         0         0         0         0         0
   0         0         0
IPOE SVM Sess Update              0         0         0         0         0         0
   0         0         0
IPOE SVM Sess Delete              0         0         0         0         0         0
   0         0         0
IPOE V4 RT Inst                   0         0         0         0         0         0
   0         0         0
IPOE V4 RT Del                    0         0         0         0         0         0
   0         0         0
IPOE V4 FR Inst                   0         0         0         0         0         0
   0         0         0
IPOE V4 FR Del                    0         0         0         0         0         0
```

```
   0         0         0
IPOE V6 RT Inst                0         0         0         0         0         0
   0         0         0
IPOE V6 RT Del                 0         0         0         0         0         0
   0         0         0
IPOE V6 PD RT Inst             0         0         0         0         0         0
   0         0         0
IPOE V6 PD RT Del              0         0         0         0         0         0
   0         0         0
IPOE V6 FR Inst                0         0         0         0         0         0
   0         0         0
IPOE V6 FR Del                 0         0         0         0         0         0
   0         0         0
PPPOE Sub Create               0         0         0         0         0         0
   0         0         0
PPPOE Sub Update               0         0         0         0         0         0
   0         0         0
PPPOE Sub Delete               0         0         0         0         0         0
   0         0         0
PPPOE Int Crt                  0         0         0         0         0         0
   0         0         0
PPPOE Int Upd                  0         0         0         0         0         0
   0         0         0
PPPOE Int Del                  0         0         0         0         0         0
   0         0         0
PPPOE SVM Sess Create          0         0         0         0         0         0
   0         0         0
PPPOE SVM Sess Update          0         0         0         0         0         0
   0         0         0
PPPOE SVM Sess Delete          0         0         0         0         0         0
   0         0         0
PPPOE V4 RT Inst               0         0         0         0         0         0
   0         0         0
PPPOE V4 RT Del                0         0         0         0         0         0
   0         0         0
PPPOE V4 FR Inst               0         0         0         0         0         0
   0         0         0
PPPOE V4 FR Del                0         0         0         0         0         0
   0         0         0
PPPOE V6 RT Inst               0         0         0         0         0         0
   0         0         0
PPPOE V6 RT Del                0         0         0         0         0         0
   0         0         0
PPPOE V6 PD RT Inst            0         0         0         0         0         0
   0         0         0
PPPOE V6 PD RT Del             0         0         0         0         0         0
   0         0         0
PPPOE V6 FR Inst               0         0         0         0         0         0
   0         0         0
PPPOE V6 FR Del                0         0         0         0         0         0
   0         0         0
GEN Per trans                  0         0         0         0         0         0
   0         0         0
GEN CDM Lookup                 0         0         0         0         0         0
   0         0         0
GEN CDM Insert                 0         0         0         0         0         0
   0         0         0
GEN CDM Update                 0         0         0         0         0         0
   0         0         0
GEN Eval Lookup                0         0         0         0         0         0
   0         0         0


TimeStamp : Aug 27 09:20:30
```

```
API name                        1ms       10ms      100ms     1s        5s        10s
   20s       50s       100s
========                        ===       ====      =====     ==        ==        ===
   ===       ===       ====
IPOE Sub Create                 0         0         0         0         0         0
   0         0         0
IPOE Sub Update                 0         0         0         0         0         0
   0         0         0
IPOE Sub Delete                 0         0         0         0         0         0
   0         0         0
IPOE Int Crt                    0         0         0         0         0         0
   0         0         0
IPOE Int Upd                    0         0         0         0         0         0
   0         0         0
IPOE Int Del                    0         0         0         0         0         0
   0         0         0
IPOE SVM Sess Create            0         0         0         0         0         0
   0         0         0
```

This example shows how to view the subscriber periodic statistics:

```
Router# show cnbng-nal periodic-stats type subscriber
Thu Aug 27 09:21:19.832 UTC

Location: 0/RSP0/CPU0

10Secs Periodic Stats
---------------------
                                   Aug 27      Aug 27      Aug 27      Aug 27      Aug
27      Aug 27
                                  09:21:10    09:21:00    09:20:50    09:20:40    09:20:30
    09:20:20
Subscriber periodic stats
=========================


30Secs Periodic Stats
---------------------
                                   Aug 27      Aug 27      Aug 27      Aug 27      Aug
27      Aug 27
                                  09:20:50    09:20:20    09:19:50    09:19:20    09:18:50
    09:18:20
Subscriber periodic stats
=========================


1Min Periodic Stats
-------------------
                                   Aug 27      Aug 27      Aug 27      Aug 27      Aug
27      Aug 27
                                  09:20:50    09:19:50    09:18:50    09:17:50    09:16:50
    09:15:50
Subscriber periodic stats
=========================


1Hour Periodic Stats
--------------------
                                   Aug 27      Aug 27      Aug 27      Aug 27      Aug
27      Aug 27
                                  09:02:50    08:02:50    07:02:50    06:02:50    05:02:50
```

```
    04:02:50
Subscriber periodic stats
=========================



4Hours Periodic Stats
---------------------
                                      Aug 27      Aug 27      Aug 26      Aug 26
                                     07:02:50    03:02:50    23:02:50    19:02:50
Subscriber periodic stats
=========================
```

This example shows how to view the periodic statistics for type SPA.

```
Router# show cnbng-nal  periodic-stats type spa
Thu Aug 27 09:21:46.697 UTC

Location: 0/RSP0/CPU0

10Secs Periodic Stats
---------------------
                                      Aug 27      Aug 27      Aug 27      Aug 27      Aug
27      Aug 27
                                    09:21:40    09:21:30    09:21:20    09:21:10    09:21:00
    09:20:50
SPA periodic stats
==================
GEN Trans state DWN                        0           0           0           0
  0           0
GEN Trans state UP                         0           0           0           0
  0           0
GEN PFCP pkt sent                          0           0           1           0
  0           1
GEN PFCP pkt punt                          0           0           1           0
  0           1
GEN Alloc count                            0           0           1           0
  0           1
GEN Free count                             0           0           1           0
  0           1
GEN Mutex create                           0           0           0           0
  0           0
GEN Mutex lock                             0           0           7           0
  0           7
GEN Mutex unlock                           0           0           7           0
  0           7
GEN Timer start                            0           0           1           0
  0           1
GEN Timer stop                             0           0           0           0
  0           0
GEN Route prov                             0           0           0           0
  0           0
GEN Timer expiry                           0           0           1           0
  0           1
GEN PFCP start                             0           0           0           0
  0           0
GEN GTPu start                             0           0           0           0
  0           0
GEN GTPu stop                              0           0           0           0
  0           0
GEN PFCP stop                              0           0           0           0
  0           0
GEN Trans create                           0           0           0           0
  0           0
GEN Trans delete                           0           0           0           0
```

```
  0           0
GEN Rt prov done                        0           0           0           0
  0           0
GEN Assoc status done                   0           0           0           0
  0           0
GEN Assoc status not done               0           0           0           0
  0           0
GEN Rtprov res ok                       0           0           0           0
  0           0


30Secs Periodic Stats
---------------------
                                      Aug 27      Aug 27      Aug 27      Aug 27      Aug
27      Aug 27
                                    09:21:20    09:20:50    09:20:20    09:19:50    09:19:20
    09:18:50
SPA periodic stats
==================
GEN Trans state DWN                     0           0           0           0
  0           0
GEN Trans state UP                      0           0           0           0
  0           0
GEN PFCP pkt sent                       1           1           1           1
  1           1
GEN PFCP pkt punt                       1           1           1           1
  1           1
GEN Alloc count                         1           1           1           1
  1           1
```

show cnbng-nal process-info

To view the process information of NOS Adaptation Layer (NAL) on the user plane of cloud native BNG (cnBNG), use the **show cnbng-nal process-info** command in EXEC mode.

show cnbng-nal process-info [**location** *location-id*]

Syntax Description

location *location-id*	(optional) Displays process information for the specified location. The location argument is entered in the `rack/slot/module` notation. You can specify a specific *location-id* in the `rack/slot/module` format or specify **location all** to view the process information for all locations.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 7.3.1	This command was introduced.
Release 24.1.1	The task id was changed from cisco-support to network.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
network	read, write

This example shows how to the view the process information for a particular location.

```
Router# show cnbng-nal process-info location 0/RSP0/CPU0


Location: 0/RSP0/CPU0

 HA Pre_Init Role          : PRIMARY
 HA Role                   : PRIMARY
 Restart-flag              : FALSE
 card_type                 : 0
 Node-Id                   : 0
 Disc-Hist File-logging    : FALSE
 Test-server config-enabled: FALSE

 Proc-flags     : 8000FFBF

    OT Connection Status: UP
    IM Connection Status: UP
    IPv4 RIB Connection Status: UP
```

```
IPv6 RIB Connection Status: UP
```

show cnbng-nal process-readiness

To view the process-readiness state for NAL component for the user plane of cloud native BNG (cnBNG), use the **show cnbng-nal process-readiness** command in EXEC mode.

show cnbng-nal process-readiness [**location** *location-id*]

Syntax Description

location *location-id*	(optional) Displays information about process-readiness state for the specified location. The location argument is entered in the `rack/slot/module` notation. You can specify a specific *location-id* in the `rack/slot/module` format or specify **location all** to view process-readiness state for all locations.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 7.3.1	This command was introduced.
Release 24.1.1	The task id was changed from cisco-support to network.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
network	read, write

This example shows how to view the process-readiness:

```
Router# show cnbng-nal process-readiness

Location: 0/RSP1/CPU0

NAL resync pending flags:
        Service Resync Pending
        Interface Resync Pending
        IPv4 Route Resync Pending
        IPv6 Route Resync Pending

SIR status: not ready


Location: 0/RSP0/CPU0

NAL resync pending flags:
        NONE

SIR status: ready
```

Show cnbng-nal spa

To view the cloud native BNG Subscriber Provisioning Agent (SPA) options for the user plane of cloud native BNG (cnBNG), use the **show cnbng-nal spa** command in EXEC mode.

show cnbng-nal spa { **packets direction** { **inject** | **punt** } [**filter** { **cpid** *cp-id* | **mac-address** *mac-address* | **upid** *up-id* }] [**type gtpu**] | **pfcp-api structure dump** { **all** | **cpid** *cp-id* | **stats** | **upid** *up-id* } | **udp** } [**location** *location-id*]

Syntax Description

packets	Displays the packet history details of packets sent towards CPE and control plane (CP).
direction inject	Displays the packet history details of packets sent towards CPE.
direction punt	Displays the packet history details of packets sent towards control plane (CP).
filter	Filters for packet types based on the specified filter. You can filter based on the following: • `cpid`: Filters based on control plane ID specified in the range from 0 to 4294967295. `upid`: Filters based on user plane ID specified in the range from 0 to 4294967295 • `mac-address` : Filters based on MAC address specified Specify the MAC address in this format: `xxxx.xxxx.xxxx`
location *location-id*	Displays information about NAL events for the specified location. The location argument is entered in the `rack/slot/module` notation. You can specify a specific *location-id* in the `rack/slot/module` format or specify **location all** to view details for all locations.
type gtpu	Displays information about the packet type specified. For example, `GTPu` packets.
pfcp-api	Displays history details of SPA request to NAL and response.
structure	Displays the structure details between NAL and SPA.
dump	Displays the dumped SPA request history details.
udp	Displays information of UDP packets.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 7.3.1	This command was introduced.
Release 24.1.1	The task id was changed from cisco-support to network.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
network	read, write

This example shows how to view the SPA details for UDP packets:

```
Router# show cnbng-nal spa udp

Mon Feb 15 10:52:48.277 UTC
Packet              : [1],
    Source IP       : 10.84.102.235,
    Destination IP  : 10.105.227.96,
    Source port:    : 8805,
    Dest port       : 8805,
    Direction       : Inject (SPA -> NAL),
    Packet type     : PFCP,
    Timestamp       : Mon Feb 15 10:52:21 2021,

Packet              : [2],
    Source IP       : 10.105.227.96,
    Destination IP  : 10.84.102.235,
    Source port:    : 8805,
    Dest port       : 8805,
    Direction       : Punt (NAL -> SPA),
    Packet type     : PFCP,
    Timestamp       : Mon Feb 15 10:52:21 2021,

Packet              : [3],
    Source IP       : 10.84.102.235,
    Destination IP  : 10.105.227.96,
    Source port:    : 8805,
    Dest port       : 8805,
    Direction       : Inject (SPA -> NAL),
    Packet type     : PFCP,
    Timestamp       : Mon Feb 15 10:51:51 2021,

Packet              : [4],
    Source IP       : 10.105.227.96,
    Destination IP  : 10.84.102.235,
    Source port:    : 8805,
    Dest port       : 8805,
    Direction       : Punt (NAL -> SPA),
    Packet type     : PFCP,
    Timestamp       : Mon Feb 15 10:51:51 2021,

Packet              : [5],
    Source IP       : 10.84.102.235,
    Destination IP  : 10.105.227.96,
    Source port:    : 8805,
    Dest port       : 8805,
    Direction       : Inject (SPA -> NAL),
    Packet type     : PFCP,
    Timestamp       : Mon Feb 15 10:51:21 2021,

Packet              : [6],
    Source IP       : 10.105.227.96,
    Destination IP  : 10.84.102.235,
    Source port:    : 8805,
```

```
    Dest port       : 8805,
    Direction       : Punt (NAL -> SPA),
    Packet type     : PFCP,
    Timestamp       : Mon Feb 15 10:51:21 2021,

Packet              : [7],
    Source IP       : 10.84.102.235,
    Destination IP  : 10.105.227.96,
    Source port:    : 8805,
    Dest port       : 8805,
    Direction       : Inject (SPA -> NAL),
    Packet type     : PFCP,
    Timestamp       : Mon Feb 15 10:50:51 2021,

Packet              : [8],
    Source IP       : 10.105.227.96,
    Destination IP  : 10.84.102.235,
    Source port:    : 8805,
    Dest port       : 8805,
    Direction       : Punt (NAL -> SPA),
    Packet type     : PFCP,
    Timestamp       : Mon Feb 15 10:50:51 2021,
```

show cnbng-nal statistics

To view the NOS adaptation layer (NAL) trace statistics information for the user plane of cloud native BNG (cnBNG), use the **show cnbng-nal statistics** command in EXEC mode.

show cnbng-nal statistics trace [**location** *location-id*]

Syntax Description

trace	Displays the NAL trace information.
location *location-id*	(optional) Displays information about NAL trace for the specified location. The location argument is entered in the `rack/slot/module` notation. You can specify a specific *location-id* in the `rack/slot/module` format or specify **location all** to view NAL trace for all locations.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 7.3.1	This command was introduced.
Release 24.1.1	The task id was changed from cisco-support to network.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
network	read, write

This example shows how to view the trace statistics information:

```
Router# show cnbng-nal statistics trace
Mon Jan 18 19:10:23.384 UTC

Location: 0/RSP0/CPU0

[ NAL Trace Statistics ]

Count      Tracepoint
=====      ==========

1         [NALTP_183]
1         [NALTP_182]
1         [NALTP_1586]
#
```

show cnbng-nal subscriber

To view the NOS adaptation layer (NAL) subscriber information for the user plane of cloud native BNG (cnBNG), use the **show cnbng-nal subscriber** command in EXEC mode.

show cnbng-nal subscriber { **access-interface type num** | **afi** { **dual** | **ipv4** | **ipv6** } | **all** | **type** { **ipoe** | **pppoe** } } { **detail** | **summary** } [**location ID**] { **sub-interface type num** | **upid ID** | **vrf name** | **mac address** } **detail** [**location ID**] { **fadb** | **service-profile profile location ID** }

Syntax Description

access-interface	Displays information about subscriber access interface for the specified interface type. Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information, use the question mark (?) online help function.
afi	Displays the NAL process subscriber records for the specified type. • `dual` • `ipv4` • `ipv6`
all	Displays all subscriber sessions.
fadb	Displays the subscriber session or all available summary.
mac	Displays the subscriber MAC address information.
service-profile	Displays service profile details for the specified profile. You can use **all** option to view all the service profile.
sub-interface	Displays the subscriber interface details.
type	Displays the NAL process filter subscriber records for the following types: • **pppoe** • **ipoe**
upid	Displays the value of subscriber user plane ID.
vrf	Displays the records of the specified VRF name or the default VRF. Use `all` options to view details of all the VRF eateries.
detail	Displays detailed output of the subscriber records.
location	Displays information about subscriber for the specified location. The location argument is entered in the `rack/slot/module` notation. You can specify a specific *location-id* in the `rack/slot/module` format or specify **location all** to view subscriber information for all locations.

summary	Displays summary information of the subscriber session.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 7.3.1	This command was introduced.
Release 24.1.1	The task id was changed from cisco-support to network.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
network	read, write

This example shows how to view the summary of all the subscribers:

```
Router# show cnbng-nal subscriber all summary
Sun Aug  2 16:26:44.281 UTC
=====================
Location: 0/RSP0/CPU0
=====================

                Type            PPPoE           IPoE
                ====            =====           ====

Session Counts by State:
        initializing            0               0
          connecting            0               0
           connected            0               0
           activated            0               130
                idle            0               0
       disconnecting            0               0
              Total:            0               130


Session Counts by Address-Family:
                none            0               0
                ipv4            0               130
                ipv6            0               0
                dual            0               0
               Total:           0               130


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

   Location: 0/RSP0/CPU0

   =====================
```

```
                  Type         PPPoE       IPoE
                  ====         =====       ====


  Session Counts by State:
          initializing         0       0
            connecting         0       0
             connected         226     0
             activated         31774       0
                  idle         0       0
         disconnecting         0       0
                 Total:        32000       0



  Session Counts by Address-Family:
                  none         226     0
                  ipv4         7774        0
                  ipv6         0       0
                  dual         24000       0
                 Total:        32000       0
```

This example shows how to view the detailed information of all the subscribers:

```
Router# show cnbng-nal subscriber all detail
Mon Aug  3 00:00:14.624 UTC
Location: 0/2/CPU0
====================
Location: 0/RSP1/CPU0
====================
Interface:                Bundle-Ether1.1.ip2148413040
UPID:                     0x800e2e70
CPID:                     0x0100918f
PPPOE Session Id:         0x0000
Type:                     IPoE
IPv4 Address:             0.0.0.0
IPv4 Framed Route:
  Prefix:                 0.0.0.0/0
  Next Hop:               0.0.0.0
  Tag:                    0
IPv6 IANA Address:        1:5::345c
IPv6 IAPD Prefix:         2004:cd0:0:188d::/64
CPE link local Address:   ::
IPv6 Framed Route:
  Prefix:                 ::/0
  Next Hop:               ::
  Tag:                    0
```

```
IPv6 State:                UP, Sat Jul 25 02:09:55 2020
Mac Address:               5065.aaab.d864
Inner VLAN ID:             Not Set
Outer VLAN ID:             100
Outer VLAN Cos:            0
Outer VLAN DEI:            1
Created:                   Sat Jul 25 02:09:54 2020
State:                     Activated
Ifhandle:                  0x000b75a0
VRF:                       default
Access-interface:          Bundle-Ether1.1
 Attribute List: 0x5556aed3f878
1:  ipv6-enable     len=  4  value= 1(1)
2:  ipv4-unnumbered len=  9  value= Loopback1
3:  strict-rpf      len=  4  value= 1(1)
4:  ipv6-strict-rpf len=  4  value= 1(1)
5:  ipv4-icmp-unreachable len=  4  value= 1(1)
6:  ipv6-unreachable len=  4  value= 1(1)
7:  ipv4-mtu        len=  4  value= 1500(5dc)
8:  ipv6-mtu        len=  4  value= 1500(5dc)
Session Accounting:        enabled
Interim Interval:          1800 secs
Last interim timestamp:    Sun Aug  2 23:39:46 2020
Interim fail count: None
Last interim failed reason: NA
Last stats:
  BytesIn: 0
  BytesOut: 384570
  BytesInGiga: 0
  BytesOutGiga: 0
Feature IDs activated :
  0x800e2e71
```

This example shows how to view the information of all the subscribers:

```
Router# show cnbng-nal subscriber all
Fri Sep 11 06:07:52.343 UTC
   Codes: CN - Connecting, CD - Connected, AC - Activated,

        ID - Idle, DN - Disconnecting, IN - Initializing



   CPID(hex)  Interface              State  Mac Address     Subscriber IP Addr / Prefix
(Vrf) Ifhandle

-------------------------------------------------------------------------------------------------

   1005ca0    BE2.500.ip2149474448    AC     0010.942e.3b00  13.0.92.160 (default) 0x225e60

                                                            1:4::5c9f (IANA)

                                                            2003:db0:0:5c9e::/64 (IAPD)

   10053b2    BE2.500.ip2149466000    AC     0010.942e.3689  13.0.83.175 (default) 0xfdfe0

                                                            1:4::53b1 (IANA)

                                                            2003:db0:0:53b0::/64 (IAPD)

   1004c81    BE2.600.ip2149013936    AC     0010.942e.5230  13.0.76.129 (default) 0x4079a0

                                                            1:4::4c80 (IANA)
```

```
                                                          2003:db0:0:4c7f::/64 (IAPD)
1004aaa    BE2.500.ip2149353232    AC     0010.942e.3205  13.0.74.169 (default) 0x5192e0
                                                          1:4::4aa9 (IANA)
                                                          2003:db0:0:4aa8::/64 (IAPD)
1004927    BE2.600.ip2149518576    AC     0010.942e.50b1  13.0.73.116 (default) 0x219ba0
                                                          1:4::4926 (IANA)
                                                          2003:db0:0:4925::/64 (IAPD)
10047e4    BE2.800.ip2149422928    AC     0010.9431.a7c7  13.0.71.228 (default) 0x41ff60
                                                          1:4::47e4 (IANA)
                                                          2003:db0:0:47e2::/64 (IAPD)
1004777    BE2.600.ip2149520224    AC     0010.942e.5021  13.0.71.115 (default) 0x41420
                                                          1:4::4776 (IANA)
                                                          2003:db0:0:4775::/64 (IAPD)
1003a6d    BE2.800.ip2149369728    AC     0010.9431.a3a1  13.0.58.105 (default) 0x141360
                                                          1:4::3a6d (IANA)
                                                          2003:db0:0:3a6a::/64 (IAPD)
10038b7    BE2.600.ip2149362240    AC     0010.942e.4bb2  13.0.56.178 (default) 0x259aa0
                                                          1:4::38b6 (IANA)
                                                          2003:db0:0:38b5::/64 (IAPD)
10028ba    BE2.500.ip2149210768    AC     0010.942e.2873  13.0.40.185 (default) 0x129620
                                                          1:4::28b9 (IANA)
                                                          2003:db0:0:28b8::/64 (IAPD)
100247b    BE2.600.ip2149396320    AC     0010.942e.46a3  13.0.36.113 (default) 0x4b8e0
                                                          1:4::2471 (IANA)
                                                          2003:db0:0:2470::/64 (IAPD)
100207a    BE2.500.ip2149356496    AC     0010.942e.2663  13.0.32.117 (default) 0x1a9460
                                                          1:4::2079 (IANA)
                                                          2003:db0:0:2078::/64 (IAPD)
1001d3f    BE2.600.ip2149251360    AC     0010.942e.44d4  13.0.29.61 (default) 0xcc760
```

This example shows how to view the definition of the services and features used for subscribers:

```
Router# show cnbng-nal subscriber fadb
Mon Aug  3 00:03:12.858 UTC

Location: 0/RSP1/CPU0
```

```
==================

UPID:       0x800ec810
Service-ID: 0x04000003  Service-Name: JHV_VOICE
Feature-ID: 0x800ec812
 Attribute List: 0x559cba6d0008
1:  feature-acct-bitmask len=  4  value= 805306413(3000002d)
Accounting:               enabled
Interim fail count: None
Last interim failed reason: None
Last stats:
  BytesIn: 0
  BytesOut: 0
  BytesInGiga: 0
  BytesOutGiga: 0

UPID:       0x800e9470
Service-ID: 0x04000003  Service-Name: JHV_VOICE
Feature-ID: 0x800e9472
 Attribute List: 0x559cba6d0008
1:  feature-acct-bitmask len=  4  value= 805306413(3000002d)
Accounting:               enabled
Interim fail count: None
Last interim failed reason: None
Last stats:
  BytesIn: 0
  BytesOut: 0
  BytesInGiga: 0
  BytesOutGiga: 0

UPID:       0x800e7ee0
Service-ID: 0x04000003  Service-Name: JHV_VOICE
Feature-ID: 0x800e7ee2
 Attribute List: 0x559cba6d0008
1:  feature-acct-bitmask len=  4  value= 805306413(3000002d)
Accounting:               enabled
Interim fail count: None
Last interim failed reason: None
Last stats:
  BytesIn: 0
  BytesOut: 0
  BytesInGiga: 0
  BytesOutGiga: 0

UPID:       0x800e16e0
Service-ID: 0x04000004  Service-Name: LIVE_TV
Feature-ID: 0x800e16e1
 Attribute List: 0x559cba6d0008
1:  feature-acct-bitmask len=  4  value= 0(0)
Accounting:               disabled
Interim fail count: None
Last interim failed reason: None
Last stats:
  BytesIn: 0
  BytesOut: 0
  BytesInGiga: 0
  BytesOutGiga: 0

UPID:       0x800dda90
Service-ID: 0x04000003  Service-Name: JHV_VOICE
Feature-ID: 0x800dda91
 Attribute List: 0x559cba6d0008
1:  feature-acct-bitmask len=  4  value= 805306413(3000002d)
Accounting:               enabled
```

```
Interim fail count: None
Last interim failed reason: None
Last stats:
  BytesIn: 0
  BytesOut: 0
  BytesInGiga: 0
  BytesOutGiga: 0

UPID:       0x800dd4e0
Service-ID: 0x04000004  Service-Name: LIVE_TV
Feature-ID: 0x800dd4e1
 Attribute List: 0x559cba6d0008
1:  feature-acct-bitmask len=  4  value= 0(0)
Accounting:                disabled
Interim fail count: None
Last interim failed reason: None
Last stats:
  BytesIn: 0
  BytesOut: 0
  BytesInGiga: 0
  BytesOutGiga: 0
```

This example shows how to view the access-interface details on budge ether:

```
Router# show cnbng-nal subscriber access-interface bundle-Ether 1.1
Mon Aug  3 00:04:42.558 UTC
=====================
Location: 0/RSP0/CPU0
=====================

               Type            PPPoE           IPoE
               ====            =====           ====

Session Counts by State:
        initializing           0               0
          connecting           0               0
           connected           0               0
           activated           0               8000
                idle           0               0
       disconnecting           0               0
              Total:           0               8000


Session Counts by Address-Family:
               none            0               0
               ipv4            0               0
               ipv6            0               8000
               dual            0               0
              Total:           0               8000


=====================
Location: 0/RSP1/CPU0
=====================

               Type            PPPoE           IPoE
               ====            =====           ====

Session Counts by State:
        initializing           0               0
          connecting           0               0
           connected           0               0
           activated           0               8000
                idle           0               0
       disconnecting           0               0
```

```
              Total:            0               8000


Session Counts by Address-Family:
                none            0               0
                ipv4            0               0
                ipv6            0               8000
                dual            0               0
              Total:            0               8000
```

This example shows how to view the summary of IPOE details of the subscriber:

```
Router# show cnbng-nal subscriber type ipoe summary
Mon Aug  3 00:06:15.032 UTC
=====================
Location: 0/RSP0/CPU0
=====================

                Type            PPPoE           IPoE
                ====            =====           ====

Session Counts by State:
        initializing            0               0
          connecting            0               0
           connected            0               0
           activated            0               8000
                idle            0               0
       disconnecting            0               0
              Total:            0               8000


Session Counts by Address-Family:
                none            0               0
                ipv4            0               0
                ipv6            0               8000
                dual            0               0
              Total:            0               8000


=====================
Location: 0/RSP1/CPU0
=====================

                Type            PPPoE           IPoE
                ====            =====           ====

Session Counts by State:
        initializing            0               0
          connecting            0               0
           connected            0               0
           activated            0               8000
                idle            0               0
       disconnecting            0               0
              Total:            0               8000


Session Counts by Address-Family:
                none            0               0
                ipv4            0               0
                ipv6            0               8000
                dual            0               0
              Total:            0               8000
```

```
=====================
Location: 0/RSP0/CPU0
=====================

               Type  PPPoE  IPoE
               ====  =====  ====

Session Counts by State:
        initializing  0  0
          connecting  0  0
           connected  0  0
           activated  31031  0
                idle  0  0
       disconnecting  0  0
              Total:  31031  0


Session Counts by Address-Family:
               none  0  0
               ipv4  31031  0
               ipv6  0  0
               dual  0  0
             Total:  31031  0
```

show cnbng-nal subscriber disconnect-history

To view the subscriber disconnect history details, use the **show cnbng-nal subscriber disconnect-history** command in EXEC mode.

show cnbng-nal subscriber disconnect-history { **last** [**summary**] [**location** { *location* | **all** }] | **type** | **sub-interface** *intf-type intf-num* **location** *location* | **unique** [**summary**] [**location** { *location* | **all** }] }

Syntax Description

access-interface	Displays the subscriber disconnect information on the specifed access interface. Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information, use the question mark (?) online help function.
last	Displays the last available subscriber disconnect information on the specifed access interface.
type	Displays the NAL process filter subscriber records.
unique	Displays the information of the disconnected subscriber reason.
subinterface	Displays the subscriber disconnect information on the specifed access interface. Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information, use the question mark (?) online help function.
location *location-id*	(optional) Displays information about periodic statistics for the specified location. The location argument is entered in the `rack/slot/module` notation. You can specify a specific *location-id* in the `rack/slot/module` format or specify location `all` to view information for all locations.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 7.3.1	This command was introduced.
Release 24.1.1	The task id was changed from cisco-support to network.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
network	read, write

This example shows how to view disconnect history details of the subscriber:

```
Router# show cnbng-nal subscriber disconnect-history unique

Location: 0/RSP1/CPU0

| Count|       Last Interface      | Disconnected Reason | Last Time Disconnected
 Location: 0/1/CPU0
 Location: 0/RSP0/CPU0

| Count|       Last Interface      | Disconnected Reason | Last Time Disconnected
35494    Bundle-Ether1.1.ip2148328848         Disconnect by CP    Sat Jul 25 02:04:55 2020

14154    Bundle-Ether1.1.ip2148324096    Disconnect by clear CLI    Sat Jul 25 02:05:48
2020

 2777    Bundle-Ether1.1.ip2148194512    Disconnect due to create failure    Sat Jul 25
01:38:29 2020
```

This example shows how to view last disconnect information of the subscriber:

```
Router# show cnbng-nal subscriber disconnect-history last location all

Disconnect-reason:         Disconnect by clear CLI
Disconnect-timestamp:      Sat Jul 25 02:05:48 2020
  Message Txn ID: 55663
  Session Txn ID: 1
  Failed at: Sat Jul 25 01:57:03 2020
  Feature Mask: 0x0
  SVM State: 0
  IPSUB flags: 0x600a200
  Pending callback: 0x2
  Data:

Interface:                 Bundle-Ether1.1.ip2148324096
UPID:                      0x800cd300
CPID:                      0x01007bd8
PPPOE Session Id:          0x0000
Type:                      IPoE
IPv4 Address:              0.0.0.0
IPv4 Framed Route:
  Prefix:                  0.0.0.0/0
  Next Hop:                0.0.0.0
  Tag:                     0
IPv6 IANA Address:         1:5::3de5
IPv6 IAPD Prefix:          2004:cd0:0:616::/64
CPE link local Address:    ::
IPv6 Framed Route:
  Prefix:                  ::/0
  Next Hop:                ::
  Tag:                     0
IPv6 State:                UP, Sat Jul 25 01:57:03 2020
Mac Address:               5065.aaab.cfbb
Inner VLAN ID:             Not Set
Outer VLAN ID:             100
Outer VLAN Cos:            0
```

```
Outer VLAN DEI:            1
Created:                   Sat Jul 25 02:05:48 2020
State:                     Init
Ifhandle:                  0x000323a0
VRF:                       default
Access-interface:          Bundle-Ether1.1
 Attribute List: 0x559125764408
1:  ipv6-enable     len=  4  value= 1(1)
2:  ipv4-unnumbered len=  9  value= Loopback1
3:  strict-rpf      len=  4  value= 1(1)
4:  ipv6-strict-rpf len=  4  value= 1(1)
5:  ipv4-icmp-unreachable len=  4  value= 1(1)
6:  ipv6-unreachable len=  4  value= 1(1)
7:  ipv4-mtu        len=  4  value= 1500(5dc)
8:  ipv6-mtu        len=  4  value= 1500(5dc)
Session Accounting:        enabled
Interim Interval:          1800 secs
Last interim timestamp:    Sat Jul 25 02:05:47 2020
Interim fail count: None
Last interim failed reason: NA
Last stats:
  BytesIn: 0
  BytesOut: 540
  BytesInGiga: 0
  BytesOutGiga: 0
Feature IDs activated :
  0x800cd301
  0x800cd302

[Event History]
UPID:  0x800cd300

| Event Name               | Time Stamp             | S, M
| Create                   | Jul 25 01:57:02.999679 | 0, 0
| New Session Request      | Jul 25 01:57:02.999686 | 0, 0
| Interface create         | Jul 25 01:57:02.999823 | 0, 0
| SVM create               | Jul 25 01:57:03.018268 | 0, 0
| UP Install(req)          | Jul 25 01:57:03.018321 | 0, 0
| UP Install(CB)           | Jul 25 01:57:03.019220 | 0, 0
| Last Assoc(req)          | Jul 25 01:57:03.019232 | 0, 0
| Last Assoc(CB)           | Jul 25 01:57:03.020160 | 0, 1
| Produce done(req)        | Jul 25 01:57:03.020233 | 0, 0
| IPv4 Caps Up             | Jul 25 01:57:03.188034 | 0, 0
| IPv6 Caps Up             | Jul 25 01:57:03.233210 | 0, 0
| Init data req            | Jul 25 01:57:03.254482 | 0, 1
| Init data cb             | Jul 25 01:57:03.369027 | 0, 1
| Client Session up        | Jul 25 01:57:03.379152 | 0, 0
| Produce done             | Jul 25 01:57:03.977629 | 0, 0
| IPv6 Up                  | Jul 25 01:57:03.977643 | 0, 0
| Session up notified      | Jul 25 01:57:03.977650 | 0, 0
| Stats start              | Jul 25 01:57:03.977841 | 0, 0
| Disconnect notified      | Jul 25 02:05:47.548202 | 0, 0
| Disconnect ack           | Jul 25 02:05:47.550293 | 0, 0
| IPv4 Caps Down           | Jul 25 02:05:47.652232 | 0, 0
| IPv6 Caps Down           | Jul 25 02:05:47.652333 | 0, 0
| Final stats              | Jul 25 02:05:47.753805 | 0, 0
| SVM delete               | Jul 25 02:05:47.780713 | 0, 0
| SVM cleanup              | Jul 25 02:05:48.283050 | 0, 0
Help: S - Sticky Event, M - Multiple Occurrence
```

show cnbng-nal vrf-table-info

To view the VRF table information for the user plane of cloud native BNG (cnBNG), use the **show cnbng-nal vrf-table-info** command in EXEC mode.

show cnbng-nal vrf-table-info vrf { *vrf-name* | **all** | **default** } [**location** *location-id*]

Syntax Description

vrf *vrf-name* or **vrf default**	Displays the VRF table information of the specified vrf name. You can specify a specific *vrf-name* or the **default** VRF. Use **all** to view all the VRF information.
location *location-id*	(optional) Displays information about VRF table, for the specified location. The location argument is entered in the `rack/slot/module` notation. You can specify a specific *location-id* in the `rack/slot/module` format or specify **location all** to view VRF table information for all locations.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 7.3.1	This command was introduced.
Release 24.1.1	The task id was changed from cisco-support to network.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
network	Read, write

This example shows how to view the VRF table information for the default VRF.

```
Router# show cnbng-nal vrf-table-info vrf default

Mon Feb 15 10:44:01.280 UTC

Location: 0/RSP0/CPU0

VRF: default

AFI: IPv4
table-id        : 0x0
proto-id        : NA
flags           : 0x0
in_sync         : 0
```

```
ref_count       : 0
max_ref_count   : 0
pending-routes  : 0

AFI: IPv6
table-id        : 0x0
proto-id        : NA
flags           : 0x0
in_sync         : 0
ref_count       : 0
max_ref_count   : 0
pending-routes  : 0
RP/0/RSP0/CPU0:ios#
```

This example shows how to view the VRF table information for a specific location.

```
Router# show cnbng-nal vrf-table-info vrf default location 0/RSP0/CPU0
Mon Feb 15 10:40:30.255 UTC

Location: 0/RSP0/CPU0

VRF: default

AFI: IPv4
table-id        : 0x0
proto-id        : NA
flags           : 0x0
in_sync         : 0
ref_count       : 0
max_ref_count   : 0
pending-routes  : 0

AFI: IPv6
table-id        : 0x0
proto-id        : NA
flags           : 0x0
in_sync         : 0
ref_count       : 0
max_ref_count   : 0
pending-routes  : 0
```

cnBNG User Plane Subscriber Management Commands

This chapter describes the Cisco IOS XR software commands that are used to configure subscriber management for the cnBNG user plane on Cisco ASR 9000 Series Routers. For details regarding the related configurations, see the Cloud Native BNG User Plane Configuration Guide for Cisco ASR 9000 Series Routers.

dhcp profile

To specify a DHCP profile for the Dynamic Host Configuration Protocol (DHCP) IPv4 and IPv6 component and to enter the profile mode, use the **profile** command in DHCP IPv4 or DHCP IPv6 configuration submode. To disable a profile and exit the profile mode, use the **no** form of this command.

dhcp { **ipv4** | **ipv6** } **profile** *profile_name* **cnbng**

Syntax Description

profile_name	Specifies the name of the profile that uniquely identifies the proxy or server.
cnbng	Creates a cloud native BNG (cnBNG) profile.

Command Default

None

Command Modes

DHCP IPv4 configuration

DHCP IPv6 configuration

Command History

Release	Modification
Release 7.4.2	Support for the DHCP IPv4 and DHCP IPv6 cnbng profile was added for cnBNG.

Usage Guidelines

The *profile-name* and the *class-name* should be unique per base profile.

Task ID

Task ID	Operations
ip-services	read, write

Examples

This example shows how to create a DHCPv4 cnBNG profile:

```
Router(config)#dhcp ipv4
Router(config-dhcpv4)#profile cnbng_1 cnbng
Router(config-dhcpv4-cnbng-profile)#exit
Router(config-dhcpv4)#interface bundle-Ether 1.1 cnbng profile cnbng_1
Router(config-dhcpv4)#interface bundle-Ether 2.1 cnbng profile cnbng_1
Router(config-dhcpv4)#commit
```

This example shows how to create a DHCPv6 cnBNG profile:

```
Router(config)#dhcp ipv6
Router(config-dhcpv4)#profile cnbng_1 cnbng
Router(config-dhcpv4-cnbng-profile)#exit
Router(config-dhcpv4)#interface bundle-Ether 1.1 cnbng profile cnbng_1
Router(config-dhcpv4)#interface bundle-Ether 2.1 cnbng profile cnbng_1
Router(config-dhcpv4)#commit
```

initiator dhcp

To enable DHCP as first-sign-of-life protocol for IPv4 or IPv6 subscriber, use the **initiator dhcp** command in the appropriate configuration submode. To disable this feature, use the **no** form of this command.

initiator dhcp

This command has no keywords or arguments.

Command Default

None

Command Modes

IP subscriber IPv4 L2-connected configuration

IP subscriber IPv6 L2-connected configuration

Command History

Release	Modification
Release 7.4.2	This command was introduced.

Usage Guidelines

This command is not supported for IPv6 routed subscriber.

Task ID

Task ID	Operation
network	read, write

This is an example of configuring the **initiator dhcp** command in the Interface configuration mode:

```
Router# configure
Router(config)# interface Bundle-Ether 56
Router(config-if)# ipsubscriber ipv4 l2-connected
Router(config-if-ipsub-ipv4-l2conn)# initiator dhcp
```

This is an example of configuring the **initiator dhcp** command in the Interface configuration mode:

```
Router# configure
Router(config)# interface Bundle-Ether 56
Router(config-if)# ipsubscriber ipv6 l2-connected
Router(config-cnbng-nal-ipsub-l2conn)# initiator dhcp
```

l2tp enable

To establish the LAC session on cloud native BNG (cnBNG), use the **l2tp enable** command in cnbng-nal configuration mode. To remove this configuration, use the **no** form of this command.

l2tp enable

This command has no keywords or arguments.

None

Command Modes

cnbng-nal

Command History

Release	Modification
Release 7.4.2	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
config-services	read, write

This example shows how to configure LAC on the user plane of cnBNG:

```
Router#configure
Router(config)#cnbng-nal location 0/0/CPU0
Router(config-cnbng-nal-local)#l2tp enable
Router(config-cnbng-nal-local)#commit
Router(config-cnbng-nal-local)#exit
```

lns enable

To establish the LNS session on cloud native BNG (cnBNG), use the **lns enable** command in cnbng-nal configuration mode. To remove this configuration, use the **no** form of this command.

lns enable

This command has no keywords or arguments.

None

Command Modes

cnbng-nal

Command History

Release	Modification
Release 7.4.2	This command was introduced.

Task ID

Task ID	Operation
config-services	read, write

This example shows how to configure LNS on the user plane of cnBNG:

```
Router(config)#interface bundle-ether 1.1
Router(config-subif)#ipv4 address 192.5.1.1 255.255.255.0
Router(config-subif)#ipv6 enable
Router(config-subif)#lns enable
Router(config-subif)#commit
Router(config-subif)#exit
```

pppoe enable

To enable pppoe on an interface, use the **pppoe enable** command in interface configuration mode. To disable the pppoe on the interface, use the **no** form of this command.

pppoe enable

This command has no keywords or arguments.

None

Command Modes

Interface configuration

Command History

Release	Modification
Release 7.4.2	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
ppp	read, write

This is an example for configuring the **pppoe enable** command in interface configuration mode:

```
Router#configure
Router(config)#interface Bundle-Ether100.10
Router(config-if)# pppoe enable
```

subscriber redundancy

To configure subscriber redundancy group, use the **subscriber redundancy** command in cnbng-nal configuration mode. To disable the subscriber redundancy, use the **no** form of this command.

subscriber-redundancy group *name* [{ **access-interface-list interface** *name* | **access-tracking** *name* | **core-tracking** *name* | **damping-timer-val** *value* | **fast-switchover-disable** | **route-tag** *value* | **virtual-mac** *mac-address* }]

Syntax Description

group *name*	Specifies the subscriber redundancy group name.
access-interface-listinterface *name*	Specifies the access interface for the specified subscriber redundancy group.
access-tracking *name*	Specifies the access tracking object for the specified subscriber redundancy group.
core-tracking *name*	Specifies the core tracking object for the specified subscriber redundancy group.
damping-timer-val *value*	Specifies the damping timer value for the specified subscriber redundancy group. Allowed range is from 60-600 seconds.
fast-switchover-disable	Disables the fast switchover mode for the specified subscriber redundancy group.
route-tag *value*	Specifies the route tag value to be applied for subnet routes. Allowed range is from 1 to 4294967295.
virtual-mac *mac-address value*	Specifies the virtual mac address for the specified subscriber redundancy group.

None

Command Modes

cnbng-nal configuration mode

Command History

Release	Modification
Release 7.8.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
config-services	read, write

This is an example of configure the subscriber redundancy group:

```
Router#configure
Router(config)#cnbng-nal location 0/0/CPU0
Router(config-cnbng-nal-local)#subscriber-redundancy
Router(config-cnbng-nal-sub-red)#group group1
Router(config-cnbng-nal-srg-grp)#virtual-mac 0aaa.0bbb.0c01
Router(config-cnbng-nal-srg-grp)# core-tracking core1
Router(config-cnbng-nal-srg-grp)#access-tracking track1
Router(config-cnbng-nal-srg-grp)#access-interface-list
Router(config-cfg-srg-grp-intf)#interface Bundle-Ether1.1
Router(config-cfg-srg-grp-intf)# exit
Router(config-cfg-srg-grp)# fast-switchover-disable
Router(config-cfg-srg-grp)# exit
```