Carrier Grade NAT Commands on Cisco IOS XR Software

This chapter describes the commands used to configure and use the Carrier Grade NAT (CGN).

For detailed information about CGN concepts, configuration tasks, and examples, see Cisco IOS XR Software Carrier Grade NAT Configuration Guide for the .

address (CGN NetflowV9 logging)

To enable the IPv4 address of the server that is used for logging the entries for the Network Address Translation (NAT) table, use the **address** command in CGN inside VRF external logging server configuration mode. To disable the Netflow server configuration, use the **no** form of this command.

address *address* **port** *number*

no address *address* **port** *number*

Syntax Description

address	IPv4 address of the server.
port	Configures the port that is used for logging. The address corresponds to the IPv4 address of the NetflowV9 logging server port, which corresponds to the UDP port number in which the NetflowV9 logging server listens for the Netflow logs.
number	Port number. Range is from 1 to 65535.

Command Default

If the **address** command is not configured, CGN NetflowV9 logging is disabled.

Command Modes

CGN inside VRF external logging server configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The CGN NetflowV9-based translation entry is used to create and delete the logs.

Task ID

Task ID	Operations
cgn	read, write

Examples

The following example shows how to configure the IPv4 address and port number 45 for NetFlow logging of the NAT table entries:

```
RP/0//CPU0:router# configure
RP/0//CPU0:router(config)# service cgn cgn1
RP/0//CPU0:router(config-cgn)# service-type nat44 nat1
RP/0//CPU0:router(config-cgn-nat44)# inside-vrf insidevrf1
```

```
RP/0//CPU0:router(config-cgn-invrf)# external-logging netflow version 9
RP/0//CPU0:router(config-cgn-invrf-af-extlog)# server
RP/0//CPU0:router(config-cgn-invrf-af-extlog-server)# address 2.3.4.5 port 45
```

Related Commands

Command	Description
external-logging (CGN), page 18	Enables the external-logging facility for an inside VRF of a CGN instance.
inside-vrf (CGN), page 22	Enters inside VRF configuration mode for a CGN instance.
server (CGN), page 41	Enables the logging server information for the IPv4 address and port for the server that is used for the netflowv9-based external-logging facility.
service cgn, page 43	Enables an instance for the CGN application.

address (CGN static-forward)

To enable the inside IPv4 address and port number for static forwarding for a CGN instance, use the **address** command in CGN inside VRF static port inside configuration mode. To disable this feature, use the **no** form of this command.

address *address* **port** *number*

no address *address* **port** *number*

Syntax Description

address	IPv4 address of an inside host server.
port	Configures the inside port for static forwarding. The **port** keyword allows a specific UDP, TCP, or ICMP port on a global address to be translated to a specific port on a local address.
number	Inside port number. For TCP and UDP, range is from 1 to 65535. For ICMP, range is from and 0 to 65535.

Command Default

None

Command Modes

CGN inside VRF static port inside configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operations
cgn	read, write

Examples

The following example shows how to configure the inside IPv4 address and port for static forwarding. CGN can dynamically allocate one free public IP address and port number from the configured outside address pool for an inside address and port.

```
RP/0//CPU0:router# configure
RP/0//CPU0:router(config)# service cgn cgn1
RP/0//CPU0:router(config-cgn)# service-type nat44 nat1
```

```
RP/0//CPU0:router(config-cgn-nat44)# inside-vrf ivrf
RP/0//CPU0:router(config-cgn-invrf)# protocol tcp
RP/0//CPU0:router(config-cgn-invrf-proto)# static-forward inside
RP/0//CPU0:router(config-cgn-ivrf-sport-inside)# address 10.20.30.10 port 1000
```

Related Commands

Command	Description
inside-vrf (CGN), page 22	Enters inside VRF configuration mode for a CGN instance.
protocol (CGN), page 35	Enters ICMP, TCP, and UDP protocol configuration mode for a given CGN instance.
service cgn, page 43	Enables an instance for the CGN application.
static-forward inside (CGN), page 62	Enables forwarding for the static port for an inside IPv4 address and inside port combination.
show cgn nat44 inside-translation, page 52	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.

alg ActiveFTP (CGN)

To enable the Application-Level Gateway (ALG) of Active FTP for a CGN NAT44 instance, use the **alg ActiveFTP** command in NAT44 configuration mode. To disable the support of ALG for the Active FTP, use the **no** form of this command.

alg ActiveFTP

no alg ActiveFTP

Syntax Description

This command has no arguments or keywords.

Command Default

By default, ActiveFTP ALG is disabled.

Command Modes

NAT44 configuration mode

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operations
cgn	read, write

Examples

The following example shows how to configure ALG for the active FTP connection for the CGN instance:

```
RP/0//CPU0:router# configure
RP/0//CPU0:router(config)# service cgn cgn1
RP/0//CPU0:router(config-cgn)# service-type nat44 nat1
RP/0//CPU0:router(config-cgn-nat44)# alg ActiveFTP
```

Related Commands

Command	Description
service cgn, page 43	Enables an instance for the CGN application.

clear cgn nat44

To clear all translation database entries that are created dynamically for the specific CGN instance, use the **clear cgn nat44** command in EXEC mode.

clear cgn nat44 *instance-name*

Syntax Description

instance-name	Instance name for NAT44.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 3.9.1	This command was introduced.
Release 4.0.0	NAT44 instance was included in the command syntax.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Caution Because the **clear cgn nat44** command clears all translation database entries and impacts the traffic on those translation entries, use this command with caution.

Task ID

Task ID	Operations
cgn	read

Examples

The following example shows how to clear all the translation entries for the cgn1 instance:

```
RP/0//CPU0:router# show cgn nat44 nat2 statistics

Statistics summary of NAT44 instance: 'nat2'
Number of active translations: 45631
Translations create rate: 5678
Translations delete rate: 6755
Inside to outside forward rate: 977
Outside to inside forward rate: 456
Inside to outside drops port limit exceeded: 0
Inside to outside drops system limit reached: 0
```

```
Inside to outside drops resorce depletion: 0
Outside to inside drops no translation entry: 0
Pool address totally free: 195

RP/0//CPU0:router# clear cgn nat44 nat2

RP/0//CPU0:router# show cgn nat44 nat2 statistics

Statistics summary of NAT44 Instance: 'nat2'
Number of active translations: 0 <<<<<<<<<<<<<< All the entries are deleted and provided
no new translation entires are created
Translations create rate: 5678
Translations delete rate: 6755
Inside to outside forward rate: 977
Outside to inside forward rate: 456
Inside to outside drops port limit exceeded: 0
Inside to outside drops system limit reached: 0
Inside to outside drops resorce depletion: 0
Outside to inside drops no translation entry: 0
Pool address totally free: 195
```

Related Commands

Command	Description
service cgn, page 43	Enables an instance for the CGN application.
show cgn nat44 inside-translation, page 52	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.
show cgn nat44 outside-translation, page 55	Displays the outside-address to inside-address translation details for a specified NAT44 instance.

clear cgn nat44 inside-vrf

To clear translation database entries that are created dynamically for the specified inside VRF, use the **clear cgn nat44 inside-vrf** command in EXEC mode.

clear cgn nat44 *instance-name* **inside-vrf** *vrf-name*

Syntax Description

instance-name	Instance name for NAT44.
vrf-name	Name for the inside VRF.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 3.9.1	This command was introduced.
Release 4.0.0	NAT44 instance was included in the command syntax.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Caution Because the **clear cgn nat44 inside-vrf** command clears all translation database entries for the specified inside-vrf and impacts the traffic on those translation entries, use this command with caution.

Task ID

Task ID	Operations
cgn	read

Examples

The following example shows how to clear the translation database entries for the inside VRF named ivrf:

```
RP/0//CPU0:router# show cgn nat44 nat2 inside-translation protocol tcp inside-vrf insidevrf1
 inside-address 192.168.6.23 port start 23 end 56

Inside-translation details
----------------------------------
NAT44 instance : nat2
Inside-VRF     : insidevrf1
```

```
-------------------------------------------------------------------------------------------------
Outside Protocol Inside Outside Translation Inside Outside
Address Source Source Type to to
Port Port Outside Inside
Packets Packets
-------------------------------------------------------------------------------------------------
12.168.6.231 tcp 34 2356 alg 875364 65345
12.168.6.98 tcp 56 8972 static 78645 56343
12.168.2.12 tcp 21 2390 static 45638 89865
12.168.2.123 tcp 34 239 dynamic 809835 67854

RP/0//CPU0:router# clear cgn nat44 nat2 inside-vrf insidevrf1

RP/0//CPU0:router# show cgn nat44 nat2 inside-translation protocol tcp inside-vrf insidevrf1
 inside-address 192.168.6.23 port start 23 end 56

Inside-translation details
-----------------------------------
NAT44 instance : nat2
Inside-VRF     : insidevrf1
-------------------------------------------------------------------------------------------------
Outside Protocol Inside Outside Translation Inside Outside
Address Source Source Type to to
Port Port Outside Inside
Packets Packets
-------------------------------------------------------------------------------------------------
```

Related Commands

Command	Description
inside-vrf (CGN), page 22	Enters inside VRF configuration mode for a CGN instance.
show cgn nat44 inside-translation, page 52	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.
show cgn nat44 outside-translation, page 55	Displays the outside-address to inside-address translation details for a specified NAT44 instance.

clear cgn nat44 ipaddress

To clear translation database entries that are created dynamically for the specified IPv4 address, use the **clear cgn nat44 ipaddress** command in EXEC mode.

clear cgn nat44 *instance-name* **ipaddress** *address*

Syntax Description

instance-name	Instance name for NAT44.
address	Specifies the IPv4 address for which the translation entries must be cleared.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 3.9.1	This command was introduced.
Release 4.0.0	NAT44 instance was included in the command syntax.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Caution Because the **clear cgn nat44 ipaddress** command clears all translation database entries for the specified IPv4 address and impacts the traffic on those translation entries, use this command with caution.

Task ID

Task ID	Operations
cgn	read

Examples

The following example shows how to clear the translation database entries for the specified IPv4 address:

```
RP/0//CPU0:router# show cgn nat44 nat1 inside-translation protocol tcp inside-vrf insidevrf1
 inside-address 192.168.6.23 port start 23 end 56

Inside-translation details
----------------------------------
```

```
NAT44 instance  : nat1
Inside-VRF    : insidevrf1
-----------------------------------------------------------------------------------------------
Outside Protocol Inside Outside Translation Inside Outside
Address Source Source Type to to
Port Port Outside Inside
Packets Packets
-----------------------------------------------------------------------------------------------
12.168.6.231 tcp 34 2356 alg 875364 65345
12.168.2.123 tcp 34 239 dynamic 809835 67854

RP/0//CPU0:router# clear cgn nat44 nat1 ipaddress 10.0.0.0

RP/0//CPU0:router# show cgn nat44 nat1 inside-translation protocol tcp inside-vrf insidevrf1
 inside-address 192.168.6.23 port start 23 end 56

Inside-translation details
----------------------------------
NAT44 instance : nat1
Inside-VRF     : insidevrf1
-----------------------------------------------------------------------------------------------
Outside Protocol Inside Outside Translation Inside Outside
Address Source Source Type to to
Port Port Outside Inside
Packets Packets
-----------------------------------------------------------------------------------------------
```

Related Commands

Command	Description
show cgn nat44 inside-translation, page 52	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.
show cgn nat44 outside-translation, page 55	Displays the outside-address to inside-address translation details for a specified NAT44 instance.

clear cgn nat44 port

To clear the translation database entries that are created dynamically for the specified inside port number, use the **clear cgn nat44 port** command in EXEC mode.

clear cgn nat44 *instance-name* **port** *number*

Syntax Description

instance-name	Instance name for NAT44.
number	Port number. Range is from 1 to 65535.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 3.9.1	This command was introduced.
Release 4.0.0	NAT44 instance was included in the command syntax.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Caution Because the **clear cgn nat44 port** command clears all translation database entries for the specified port and impacts the traffic on those translation entries, use this command with caution.

Task ID

Task ID	Operations
cgn	read

Examples

The following example shows how to clear the translation database entries for port number 1231:

```
RP/0//CPU0:router# show cgn nat44 nat2 inside-translation protocol tcp inside-vrf insidevrf1
inside-address 192.168.6.23 port start 1231 end 1231

Inside-translation details
----------------------------------
NAT44 instance : nat2
Inside-VRF     : insidevrf1
```

```
-------------------------------------------------------------------------------------------------
Outside Protocol Inside Outside Translation Inside Outside
Address Source Source Type to to
Port Port Outside Inside
Packets Packets
-------------------------------------------------------------------------------------------------
12.168.6.231 tcp 1231 2356 alg 875364 65345

RP/0//CPU0:router# clear cgn nat44 nat2 port 1231

RP/0//CPU0:router# show cgn nat44 nat2 inside-translation protocol tcp inside-vrf insidevrf1
 inside-address 192.168.6.23 port start 1231 end 1231

Inside-translation details
----------------------------------
NAT44 instance : nat2
Inside-VRF     : insidevrf1
-------------------------------------------------------------------------------------------------
Outside Protocol Inside Outside Translation Inside Outside
Address Source Source Type to to
Port Port Outside Inside
Packets Packets
-------------------------------------------------------------------------------------------------
```

Related Commands

Command	Description
show cgn nat44 inside-translation, page 52	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.
show cgn nat44 outside-translation, page 55	Displays the outside-address to inside-address translation details for a specified NAT44 instance.

clear cgn nat44 protocol

To clear translation database entries that are created dynamically for the specified protocol, use the **clear cgn nat44 protocol** command in EXEC mode.

clear cgn nat44 *instance-name* **protocol** { **udp | tcp | icmp** }

Syntax Description

instance-name	Name for the NAT44 CGN instance.
protocol	Specifies the protocol for which the translation entries must be cleared.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 3.9.1	This command was introduced.
Release 4.0.0	NAT44 instance was included in the command syntax.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Caution Because the **clear cgn nat44 protocol** command clears all translation database entries for the specified protocol and impacts the traffic on those translation entries, use this command with caution.

Task ID

Task ID	Operations
cgn	read

Examples

The following example shows how to clear the translation database entries for the TCP protocol:

```
RP/0//CPU0:router# show cgn nat44 nat2 inside-translation protocol tcp inside-vrf insidevrf1
 inside-address 192.168.6.23 port start 1231 end 1231

Inside-translation details
----------------------------------
NAT44 instance : nat2
Inside-VRF     : insidevrf1
```

```
-------------------------------------------------------------------------------------------------
Outside Protocol Inside Outside Translation Inside Outside
Address Source Source Type to to
Port Port Outside Inside
Packets Packets
-------------------------------------------------------------------------------------------------
12.168.6.231 tcp 1231 2356 alg 875364 65345

RP/0//CPU0:router# clear cgn nat44 nat2 protocol tcp

RP/0//CPU0:router# show cgn nat44 nat2 inside-translation protocol tcp inside-vrf insidevrf1
 inside-address 192.168.6.23 port start 1231 end 1231

Inside-translation details
----------------------------------
NAT44 instance : nat2
Inside-VRF     : insidevrf1
-------------------------------------------------------------------------------------------------
Outside Protocol Inside Outside Translation Inside Outside
Address Source Source Type to to
Port Port Outside Inside
Packets Packets
-------------------------------------------------------------------------------------------------
```

Related Commands

Command	Description
protocol (CGN), page 35	Enters ICMP, TCP, and UDP protocol configuration mode for a given CGN instance.
show cgn nat44 inside-translation, page 52	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.
show cgn nat44 outside-translation, page 55	Displays the outside-address to inside-address translation details for a specified NAT44 instance.

external-logging (CGN)

To enable the external-logging facility for an inside VRF of a CGN instance, use the **external-logging** command in CGN inside VRF NAT44 configuration mode. To disable external-logging, use the **no** form of this command.

external-logging netflow version 9

no external-logging netflow version 9

Syntax Description

netflow version 9	Netflow version 9 protocol is used for external logging.

Command Default

By default, external-logging is disabled.

Command Modes

CGN Inside VRF NAT44 configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.
Release 4.0.0	The keyword **netflow v9** has been modified to **netflow version 9** .

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **external-logging** command enters CGN inside VRF address family external logging configuration mode.

You can use NetFlow to export NAT table entries.

The external-logging facility supports only netflow version 9.

Task ID

Task ID	Operations
cgn	read, write

Examples

The following example shows how to enter the configuration mode for the netflowv9 external-logging facility:

```
RP/0//CPU0:router# configure
RP/0//CPU0:router(config)# service cgn cgn1
RP/0//CPU0:router(config-cgn)# service-type nat44 nat1
RP/0//CPU0:router(config-cgn-nat44)# inside-vrf insidevrf1
```

```
RP/0//CPU0:router(config-cgn-invrf)# external-logging netflow version 9
RP/0//CPU0:router(config-cgn-invrf-af-extlog)#
```

Related Commands

Command	Description
inside-vrf (CGN), page 22	Enters inside VRF configuration mode for a CGN instance.
path-mtu (CGN), page 32	Configures the path Maximum Transmission Unit (MTU) for the netflowv9-based external-logging facility for the inside VRF of a CGN instance.
refresh-rate (CGN), page 39	Configures the refresh rate to log NetFlow-based external logging information for an inside VRF of a CGN instance.
service cgn, page 43	Enables an instance for the CGN application.
timeout (CGN), page 64	Configures the timeout for the ICMP session for a CGN instance.

hw-module service cgn location

To enable a CGN service role on a specified location, use the **hw-module service cgn location** command in global configuration mode. To disable the CGN service role at the specified location, use the **no** form of this command.

hw-module service cgn location *node-id*

no hw-module service cgn location *node-id*

Syntax Description

node-id	Location of the service card for CGN that you want to configure. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

None

Command Modes

Global configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operations
cgn	read, write
root-lr	read, write

Examples

The following example shows how to configure the CGN service for location 0/2/CPU0:

```
RP/0//CPU0:router# configure
RP/0//CPU0:router(config)# hw-module service cgn location 0/2/CPU0
```

Related Commands

Command	Description
interface ServiceApp, page 24	Enables the application SVI interface.
interface ServiceInfra, page 26	Enables the infrastructure SVI interface.

Command	Description
service cgn, page 43	Enables an instance for the CGN application.
service-location (CGN), page 44	Enables the particular instance of the CGN application on the active and standby locations.

inside-vrf (CGN)

To enter inside VRF configuration mode for a CGN instance, use the **inside-vrf** command in CGN configuration mode. To disable this feature, use the **no** form of this command.

inside-vrf *vrf-name*

no inside-vrf *vrf-name*

Syntax Description

vrf-name	Name for the inside VRF.

Command Default

None

Command Modes

CGN configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **inside-vrf** command enters CGN inside VRF configuration mode.

Task ID

Task ID	Operations
cgn	read, write

Examples

The following example shows how to enter inside VRF configuration mode:

```
RP/0//CPU0:router# configure
RP/0//CPU0:router(config)# service cgn cgn1
RP/0//CPU0:router(config-cgn)# service-type nat44 nat1
RP/0//CPU0:router(config-cgn-nat44)# inside-vrf insidevrf1
RP/0//CPU0:router(config-cgn-invrf)#
```

Related Commands

Command	Description
external-logging (CGN), page 18	Enables the external-logging facility for an inside VRF of a CGN instance.
map (CGN), page 28	Maps an outside VRF and address pool to an inside vrf.

Command	Description
protocol (CGN), page 35	Enters ICMP, TCP, and UDP protocol configuration mode for a given CGN instance.
service cgn, page 43	Enables an instance for the CGN application.
show cgn nat44 inside-translation, page 52	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.
show cgn nat44 outside-translation, page 55	Displays the outside-address to inside-address translation details for a specified NAT44 instance.

interface ServiceApp

To enable the application SVI interface, use the **interface ServiceApp** command in global configuration mode. To disable a particular service application interface, use the **no** form of this command.

interface ServiceApp *value*

no interface ServiceApp *value*

Syntax Description

value	Number of service application interfaces to be configured. Range is from 1 to 2000.

Command Default

None

Command Modes

Global configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The total number of service application interfaces per multi-service PLIM card cannot exceed 889.

Task ID

Task ID	Operations
interface	read, write

Examples

The following example shows how to configure one service application interface:

```
RP/0//CPU0:router# configure
RP/0//CPU0:router(config)# interface ServiceApp 1
RP/0//CPU0:router(config-if)#
```

Related Commands

Command	Description
interface ServiceInfra, page 26	Enables the infrastructure SVI interface.
service cgn, page 43	Enables an instance for the CGN application.

Command	Description
service-location (CGN), page 44	Enables the particular instance of the CGN application on the active and standby locations.

interface ServiceInfra

To enable the infrastructure SVI interface, use the **interface ServiceInfra** command in global configuration mode. To disable a particular service infrastructure interface, use the **no** form of this command.

interface ServiceInfra *value*

no interface ServiceInfra *value*

Syntax Description

value	Number of service infrastructure interfaces to be configured. Range is from 1 to 2000.

Command Default

None

Command Modes

Global configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Only one service infrastructure interface can be configured per multi-service PLIM card.

Task ID

Task ID	Operations
interface	read, write

Examples

The following example shows how to configure one service infrastructure interface:

```
RP/0//CPU0:router# configure
RP/0//CPU0:router(config)# interface ServiceInfra 1
RP/0//CPU0:router(config-if)#
```

Related Commands

Command	Description
interface ServiceApp, page 24	Enables the application SVI interface.
service cgn, page 43	Enables an instance for the CGN application.

Command	Description
service-location (CGN), page 44	Enables the particular instance of the CGN application on the active and standby locations.

map (CGN)

To map an outside VRF and address pool to an inside vrf, use the **map** command in CGN inside VRF NAT44 configuration submode. To remove the outside VRF and address pool mapping for the specified inside VRF of a CGN instance, use the **no** form of this command.

map [**outside-vrf** *outside-vrf-name*] **address-pool** *address* / *prefix*

no map [**outside-vrf** *outside-vrf-name*] **address-pool** *address* / *prefix*

Syntax Description

outside-vrf	(Optional) Maps to a given outside VRF.
outside-vrf-name	(Optional) Name of outside VRF.
address-pool	Configures the outside address pool.
address/*prefix*	Network address and prefix for the address pool. The prefix must not be less than 16.

Command Default

None

Command Modes

CGN inside VRF NAT44 configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **map** command maps the inside VRF to an outside VRF and assigns an outside address pool for the mapping.

If the outside VRF name is not specified, the default VRF is considered.

Task ID

Task ID	Operations
cgn	read, write

Examples

The following example shows how to configure the outside VRF and to assign the outside address pool for the mapping:

```
RP/0//CPU0:router# configure
RP/0//CPU0:router(config)# service cgn cgn1
RP/0//CPU0:router(config-cgn)# service-type nat44 nat1
RP/0//CPU0:router(config-cgn-nat44)# inside-vrf insidevrf1
RP/0//CPU0:router(config-cgn-invrf)# map outside-vrf outsidevrf1 address-pool 100.10.0.0/16
```

Related Commands

Command	Description
inside-vrf (CGN), page 22	Enters inside VRF configuration mode for a CGN instance.
service cgn, page 43	Enables an instance for the CGN application.
show cgn nat44 inside-translation, page 52	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.
show cgn nat44 outside-translation, page 55	Displays the outside-address to inside-address translation details for a specified NAT44 instance.

mss (CGN)

To enable the TCP maximum segment size (MSS) adjustment value for an inside VRF of a specified CGN instance and to adjust the MSS value of the TCP SYN packets going through, use the **mss** command in CGN inside VRF NAT44 protocol configuration mode. To disable the packets to override the TCP MSS value, use the **no** form of this command.

mss *size*

no mss *size*

Syntax Description

size	Size, in bytes, to be applied for the MSS value. Range is from 28 to 1500.

Command Default

Default is disabled for the TCP maximum segment size (MSS) adjustment.

Command Modes

CGN inside VRF NAT44 protocol configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The MSS value, which is configured using the **mss** command, overrides the MSS value that is set in the received TCP packets. The range for MSS value is from 28 to 1500.

The **mss** command adjusts the MSS value of the TCP SYN packets.

Task ID

Task ID	Operations
cgn	read, write

Examples

The following example shows how to configure TCP MSS value as 1100 for the CGN instance:

```
RP/0//CPU0:router# configure
RP/0//CPU0:router(config)# service cgn cgn1
RP/0//CPU0:router(config-cgn)# service-type nat44 nat1
RP/0//CPU0:router(config-cgn-nat44)# inside-vrf insidevrf1
RP/0//CPU0:router(config-cgn-invrf)# protocol tcp
RP/0//CPU0:router(config-cgn-invrf-proto)# mss 1100
```

Related Commands

Command	Description
inside-vrf (CGN), page 22	Enters inside VRF configuration mode for a CGN instance.
protocol (CGN), page 35	Enters ICMP, TCP, and UDP protocol configuration mode for a given CGN instance.
service cgn, page 43	Enables an instance for the CGN application.

path-mtu (CGN)

To configure the path Maximum Transmission Unit (MTU) for the netflowv9-based external-logging facility for the inside VRF of a CGN instance, use the **path-mtu** command in CGN inside VRF address family external logging server configuration mode. To revert back to the default of 1500, use the **no** form of this command. This command restricts the maximum size of the Netflow-version 9 logging packet

path-mtu *value*

no path-mtu *value*

Syntax Description

value	Value, in bytes, of the path-mtu for the netflowv9-based external-logging facility. Range is from 100 to 9200.

Command Default

By default, the value of the path-mtu for the netflowv9-based external-logging facility is set to 1500.

Command Modes

CGN inside VRF address family external logging server configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The netflowv9-based external-logging facility can be exported by using the NAT table entries.

Task ID

Task ID	Operations
cgn	read, write

Examples

The following example shows how to configure the path-mtu with the value of 2900 for the netflowv9-based external-logging facility:

```
RP/0//CPU0:router# configure
RP/0//CPU0:router(config)# service cgn cgn1
RP/0//CPU0:router(config-cgn)# service-type nat44 nat1
RP/0//CPU0:router(config-cgn-nat44)# inside-vrf insidevrf1
RP/0//CPU0:router(config-cgn-invrf)# external-logging netflow version 9
RP/0//CPU0:router(config-cgn-invrf-af-extlog)# server
RP/0//CPU0:router(config-cgn-invrf-af-extlog-server)# path-mtu 2900
```

Related Commands

Command	Description
external-logging (CGN), page 18	Enables the external-logging facility for an inside VRF of a CGN instance.
inside-vrf (CGN), page 22	Enters inside VRF configuration mode for a CGN instance.
server (CGN), page 41	Enables the logging server information for the IPv4 address and port for the server that is used for the netflowv9-based external-logging facility.
service cgn, page 43	Enables an instance for the CGN application.

portlimit (CGN)

To limit the number of translation entries per source address, use the **portlimit** command in CGN configuration mode. To revert back to the default value of 100, use the **no** form of this command.

portlimit *value*

no portlimit *value*

Syntax Description

value	Value for the port limit. Range is from 1 to 65535.

Command Default

If the port limit is not configured, the default value is 100 per CGN instance.

Command Modes

CGN configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **portlimit** command configures the port limit per subscriber for the system, including TCP, UDP, and ICMP. In addition, the **portlimit** command restricts the number of ports that is used by an IPv4 address; for example, it limits the number of CNAT entries per IPv4 address in the CNAT table.

Task ID

Task ID	Operations
cgn	read, write

Examples

This example shows how the port-limit needs can increased from the default value of 100 to a higher value of 500:

```
RP/0//CPU0:router# configure
RP/0//CPU0:router(config)# service cgn cgn1
RP/0//CPU0:router(config-cgn)# service-type nat44 nat1
RP/0//CPU0:router(config-cgn-nat44)# portlimit 500
```

Related Commands

Command	Description
service cgn, page 43	Enables an instance for the CGN application.

protocol (CGN)

To enter ICMP, TCP, and UDP protocol configuration mode for a given CGN instance, use the **protocol** command in the appropriate configuration mode. To remove all the features that are enabled under the protocol configuration mode, use the **no** form of this command.

protocol { **icmp | tcp | udp** }

no protocol { **icmp | tcp | udp** }

Syntax Description

icmp	Enters ICMP protocol configuration mode.
tcp	Enters TCP protocol configuration mode.
udp	Enters UDP protocol configuration mode.

Command Default

None

Command Modes

CGN inside VRF NAT44 configuration mode

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **protocol** command enters the appropriate CGN NAT44 configuration mode.

Task ID

Task ID	Operations
cgn	read, write

Examples

The following example shows how to configure the ICMP protocol for a CGN instance:

```
RP/0//CPU0:router# configure
RP/0//CPU0:router(config)# service cgn cgn1
RP/0//CPU0:router(config-cgn)# service-type nat44 nat1
RP/0//CPU0:router(config-cgn-nat44)# protocol icmp
RP/0//CPU0:router(config-cgn-proto)#
```

Related Commands

Command	Description
service cgn, page 43	Enables an instance for the CGN application.
show cgn nat44 inside-translation, page 52	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.
show cgn nat44 outside-translation, page 55	Displays the outside-address to inside-address translation details for a specified NAT44 instance.

refresh-direction (CGN)

To configure the Network Address Translation (NAT) mapping refresh direction for the specified CGN instance, use the **refresh-direction** command in NAT44 configuration mode. To revert back to the default value of the bidirection, use the **no** form of this command.

refresh-direction Outbound

no refresh-direction Outbound

Syntax Description

Outbound	Configures only the refresh direction for outbound.

Command Default

If the NAT refresh direction is not configured, the default is bidirectional.

Command Modes

NAT44 configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Translation entries that do not have traffic flowing for specific time period are timed out and deleted to prevent unnecessary usage of system resources. Any traffic for a particular translation entry refreshes the entry and prevents it getting timed out. Usually, the refresh is based on packets coming from both inside and outside. This is referred to as bi-directional refresh mechanism. However, bidirectional refresh can lead to denial of service (DoS) attacks because someone from the outside can periodically refresh the entries even though there is no inside traffic.

When NAT refresh direction is configured as Outbound, the translation entries are refreshed only by traffic flowing from inside to outside and prevent DoS attacks.

Task ID

Task ID	Operations
cgn	read, write

Examples

The following example shows how to configure the mapping refresh direction for outbound:

```
RP/0//CPU0:router# configure
RP/0//CPU0:router(config)# service cgn cgn1
```

```
RP/0//CPU0:router(config-cgn)# service-type nat44 nat1
RP/0//CPU0:router(config-cgn-nat44)# refresh-direction outbound
```

Related Commands

Command	Description
service cgn, page 43	Enables an instance for the CGN application.

refresh-rate (CGN)

To configure the refresh rate to log NetFlow-based external logging information for an inside VRF of a CGN instance, use the **refresh-rate** command in CGN inside VRF external logging server configuration mode. To revert back to the default value of 500 packets, use the **no** form of this command.

refresh-rate *value*

no refresh-rate *value*

Syntax Description

value	Value, in packets, for the refresh rate. Range is from 1 to 600.

Command Default

value : 500

Command Modes

CGN inside VRF external logging server configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The netflowv9-based logging facility requires that a logging template be sent to the server periodically. After sending many packets to the server, the template is resent.

Task ID

Task ID	Operations
cgn	read, write

Examples

The following example shows how to configure the refresh rate value of 50 for NetFlow logging for the NAT table entries:

```
RP/0//CPU0:router# configure
RP/0//CPU0:router(config)# service cgn cgn1
RP/0//CPU0:router(config-cgn)# service-type nat44 nat1
RP/0//CPU0:router(config-cgn-nat44)# inside-vrf insidevrf1
RP/0//CPU0:router(config-cgn-invrf)# external-logging netflow version 9
RP/0//CPU0:router(config-cgn-invrf-af-extlog)# server
RP/0//CPU0:router(config-cgn-invrf-af-extlog-server)# refresh-rate 50
```

Related Commands

Command	Description
external-logging (CGN), page 18	Enables the external-logging facility for an inside VRF of a CGN instance.
inside-vrf (CGN), page 22	Enters inside VRF configuration mode for a CGN instance.
server (CGN), page 41	Enables the logging server information for the IPv4 address and port for the server that is used for the netflowv9-based external-logging facility.
service cgn, page 43	Enables an instance for the CGN application.
show cgn nat44 statistics, page 60	Displays the contents of the NAT44 CGN instance statistics.

server (CGN)

To enable the logging server information for the IPv4 address and port for the server that is used for the netflowv9-based external-logging facility, use the **server** command in CGN inside VRF external logging configuration mode. To disable this feature, use the **no** form of this command. External logging of NAT Entries gets disabled.

server

no server

Syntax Description

This command has no arguments or keywords.

Command Modes

CGN inside VRF external logging configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **server** command enters CGN inside VRF address family external logging server configuration mode.

Task ID

Task ID	Operations
cgn	read, write

Examples

The following example shows how to configure the logging information for the IPv4 address and server:

```
RP/0//CPU0:router# configure
RP/0//CPU0:router(config)# service cgn cgn1
RP/0//CPU0:router(config-cgn)# service-type nat44 nat1
RP/0//CPU0:router(config-cgn-nat44)# inside-vrf insidevrf1
RP/0//CPU0:router(config-cgn-invrf)# external-logging netflow version 9
RP/0//CPU0:router(config-cgn-invrf-af-extlog)# server
RP/0//CPU0:router(config-cgn-invrf-af-extlog-server)#
```

Related Commands

Command	Description
address (CGN NetflowV9 logging), page 3	Enables the IPv4 address of the server that is used for logging the entries for the Network Address Translation (NAT) table.

Command	Description
external-logging (CGN), page 18	Enables the external-logging facility for an inside VRF of a CGN instance.
inside-vrf (CGN), page 22	Enters inside VRF configuration mode for a CGN instance.
path-mtu (CGN), page 32	Configures the path Maximum Transmission Unit (MTU) for the netflowv9-based external-logging facility for the inside VRF of a CGN instance.
refresh-rate (CGN), page 39	Configures the refresh rate to log NetFlow-based external logging information for an inside VRF of a CGN instance.
service cgn, page 43	Enables an instance for the CGN application.
show cgn nat44 statistics, page 60	Displays the contents of the NAT44 CGN instance statistics.
timeout (CGN logging), page 66	Configures the frequency at which the netflow-v9 template is refreshed or resent to the netflow-v9 server.

service cgn

To enable an instance for the CGN application, use the **service cgn** command in global configuration mode. To disable the instance of the CGN application, use the **no** form of this command.

service cgn *instance-name*

no service cgn *instance-name*

Syntax Description

instance-name	Name of the CGN instance that is configured.

Command Default

None

Command Modes

Global configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **service cgn** command enters CGN configuration mode.

Task ID

Task ID	Operations
cgn	read, write

Examples

The following example shows how to configure the instance named cgn1 for the CGN application:

```
RP/0//CPU0:router# configure
RP/0//CPU0:router(config)# service cgn cgn1
RP/0//CPU0:router(config-cgn)#
```

service-location (CGN)

To enable the particular instance of the CGN application on the active and standby locations, use the **service-location** command in CGN configuration mode. To disable the instance that runs at the location of the CGN application, use the **no** form of this command.

service-location preferred-active *node-id* [**preferred-standby** *node-id*]

no service-location preferred-active *node-id* [**preferred-standby** *node-id*]

Syntax Description

preferred-active *node-id*	Specifies the location in which the active CGN application starts. The *node-id* argument is entered in the *rack/slot/module* notation.
preferred-standby *node-id*	(Optional) Specifies the location in which the standby CGN application starts. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

None

Command Modes

CGN configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operations
cgn	read, write

Examples

The following example shows how to specify active and standby locations for the CGN application:

```
RP/0//CPU0:router# configure
RP/0//CPU0:router(config)# service cgn cgn1
RP/0//CPU0:router(config-cgn)# service-type nat44 nat1
RP/0//CPU0:router(config-cgn-nat44)# service-location preferred-active 0/1/CPU0
preferred-standby 0/4/CPU0
```

Related Commands

Command	Description
hw-module service cgn location, page 20	Enables a CGN service role on a specified location.
interface ServiceApp, page 24	Enables the application SVI interface.
interface ServiceInfra, page 26	Enables the infrastructure SVI interface.
service cgn, page 43	Enables an instance for the CGN application.

service-location (interface)

To configure the location of the CGN service for the infrastructure service virtual interface (SVI), use the **service-location** command in interface configuration mode. To disable this feature, use the **no** form of this command.

service-location *node-id*

no service-location *node-id*

Syntax Description

node-id	Specifies the ID of the node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Modes

Interface configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operations
cgn	read, write

Examples

The following example shows how to configure the service location for 0/1/CPU0:

```
RP/0//CPU0:router# configure
RP/0//CPU0:router(config)# interface ServiceInfra 1
RP/0//CPU0:router(config-if)# service-location 0/1/CPU0
```

service redundancy failover service-type

To initiate failover services to the preferred standby location, use the **service redundancy failover service-type** command in EXEC mode.

service redundancy failover service-type secgn preferred-active *node-id*

Syntax Description

secgn	Specifies the CGN service.
preferred-active *node-id*	Specifies the location from where the failover must start. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operations
cgn	read, write

Examples

The following example shows how to initiate the failover services for the preferred standby location:

```
RP/0//CPU0:router# service redundancy failover service-type secgn preferred-active 0/1/cpu0
RP/0//CPU0:router#
```

service redundancy revert service-type

To revert failed over services back to their preferred active location, use the **service redundancy revert service-type** command in EXEC mode.

service redundancy revert service-type secgn preferred-active *node-id*

Syntax Description

secgn	Specifies the CGN service.
preferred-active *node-id*	Specifies the location from where the failover must start. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operations
cgn	read, write

Examples

The following example shows how to revert the failed over services for the preferred active location:

```
RP/0//CPU0:router# service redundancy revert service-type secgn preferred-active 0/1/cpu0
RP/0//CPU0:router#
```

service-type nat44

To enable a NAT 44 instance for the CGN application, use the **service-type nat44** command in CGN submode. To disable the NAT44 instance of the CGN application, use the **no** form of this command.

service-type nat44 *instance-name*

no service-type nat44 *instance-name*

Syntax Description

instance-name	Name of the NAT44 instance that is configured.

Command Default

None

Command Modes

CGN submode (config-cgn)

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operations
cgn	read, write

Examples

The following example shows how to configure the NAT44 instance named nat1 for the CGN application:

```
RP/0//CPU0:router# configure
RP/0//CPU0:router(config)# service cgn cgn1
RP/0//CPU0:router(config-cgn)# service-type nat44 nat1
```

session (CGN)

To configure the timeout values for both active and initial sessions for TCP or UDP, use the **session** command in CGN NAT44 protocol configuration mode. To revert back to the default value for the TCP or UDP session timeouts, use the **no** form of this command.

session { **active | initial** } **timeout** *seconds*

no session { **active | initial** } **timeout** *seconds*

Syntax Description

active	Configures the active session timeout for both TCP and UDP. The default value for UDP active session timeout is 120 seconds.
initial	Configures the initial session timeout.
timeout	Configures the timeout for either active or initial sessions.
seconds	Timeout for either active or initial sessions. Range is from 1 to 65535.

Command Default

If the value for the UDP initial session timeout is not configured, the default value for the UDP initial session timeout is 30.

If the value for the UDP active session timeout is not configured, the default value for the UDP active session timeout is 120.

If the value for the TCP initial session timeout is not configured, the default value for the TCP initial session timeout is 120.

If the value for the TCP active session timeout is not configured, the default value for the TCP active session timeout is 1800 (30 minutes).

Command Modes

CGN NAT44 protocol configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

We recommend that you configure the timeout values for the protocol sessions carefully. For example, the values for the protocol and NAT functions must be configured properly.

If the **no** form of this command is specified, the following guidelines apply:

- UDP initial session timeout value reverts back to the default value of 30.

- UDP active session timeout value reverts back to the default value of 120.
- TCP initial session timeout value reverts back to the default value of 120.
- TCP active session timeout value reverts back to the default value of 1800.

Task ID

Task ID	Operations
cgn	read, write

Examples

The following example shows how to configure the initial session timeout value as 90 for TCP:

```
RP/0//CPU0:router# configure
RP/0//CPU0:router(config)# service cgn cgn1
RP/0//CPU0:router(config-cgn)# service-type nat44 nat1
RP/0//CPU0:router(config-cgn-nat44)# protocol tcp
RP/0//CPU0:router(config-cgn-proto)# session initial timeout 90
```

The following example shows how to configure the active timeout value as 90 for TCP:

```
RP/0//CPU0:router# configure
RP/0//CPU0:router(config)# service cgn cgn1
RP/0//CPU0:router(config-cgn)# service-type nat44 nat1
RP/0//CPU0:router(config-cgn-nat44)# protocol tcp
RP/0//CPU0:router(config-cgn-proto)# session active timeout 90
```

The following example shows how to configure the initial timeout value as 90 for UDP:

```
RP/0//CPU0:router# configure
RP/0//CPU0:router(config)# service cgn cgn1
RP/0//CPU0:router(config-cgn)# service-type nat44 nat1
RP/0//CPU0:router(config-cgn-nat44)# protocol udp
RP/0//CPU0:router(config-cgn-proto)# session initial timeout 90
```

The following example shows how to configure the active timeout value as 90 for UDP:

```
RP/0//CPU0:router# configure
RP/0//CPU0:router(config)# service cgn cgn1
RP/0//CPU0:router(config-cgn)# service-type nat44 nat1
RP/0//CPU0:router(config-cgn-nat44)# protocol udp
RP/0//CPU0:router(config-cgn-proto)# session active timeout 90
```

Related Commands

Command	Description
protocol (CGN), page 35	Enters ICMP, TCP, and UDP protocol configuration mode for a given CGN instance.
service cgn, page 43	Enables an instance for the CGN application.
show cgn nat44 inside-translation, page 52	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.
show cgn nat44 outside-translation, page 55	Displays the outside-address to inside-address translation details for a specified NAT44 instance.
timeout (CGN), page 64	Configures the timeout for the ICMP session for a CGN instance.

show cgn nat44 inside-translation

To display the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance, use the **show cgn nat44 inside-translation** command in EXEC mode.

show cgn nat44 *instance-name* **inside-translation protocol** { **icmp | tcp | udp** } [**translation-type** { **alg | all | dynamic | static** }] **inside-vrf** *vrf-name* **inside-address** *address* **port start** *number* **end** *number*

Syntax Description

instance-name	Name of the NAT44 instance that is configured.
protocol	Displays the name of the protocols.
icmp	Displays the ICMP protocol.
tcp	Displays the TCP protocol.
udp	Displays the UDP protocol.
translation-type	(Optional) Displays the translation type.
alg	(Optional) Displays only the ALG translation entries.
all	(Optional) Displays all the translation entries, for example, alg, dynamic, and static.
dynamic	(Optional) Displays only the dynamic translation entries.
static	(Optional) Displays only the static translation entries.
ipv4	(Optional) Displays information for the IPv4 address family.
inside-vrf	Displays the information for the inside VPN routing and forwarding (VRF) for the necessary translation details.
vrf-name	Name of the inside VRF.
inside-address	Displays the inside address for the inside VRF.
address	Inside address.
port	Displays the range of the port numbers.
start *number*	The start port from which the translation table entries should be displayed.
end *number*	The end port till which the translation table entries should be displayed.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 3.9.1	This command was introduced.
Release 4.0.0	NAT44 instance was included to the command.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **show cgn nat44 inside-translation** command displays the translation for entries that are based on the inside-vrf, inside IPv4 address, and the pool of the inside ports. The **inside-address** keyword must have a /32 address. Each entry is displayed with a field that informs whether it is static, ALG, or dynamic translation.

If the value of the translation type is not specified, all types of entries are displayed.

Task ID

Task ID	Operations
cgn	read

Examples

The following shows sample output from the **show cgn inside-translation** command:

```
RP/0//CPU0:router# show cgn nat44 nat1 inside-translation protocol tcp inside-vrf insidevrf1
 inside-address 192.168.6.23 port-range 23 56

Inside-translation details
----------------------------------
NAT44 instance : nat1
Inside-VRF     : insidevrf1
-------------------------------------------------------------------------------------------
Outside        Protocol  Inside   Outside     Translation      Inside       Outside
Address                  Source   Source      Type             to           to
                         Port     Port                         Outside      Inside
                                                               Packets      Packets
-------------------------------------------------------------------------------------------
12.168.6.231   tcp       34       2356        alg              875364       65345
12.168.6.98    tcp       56       8972        static           78645        56343
12.168.2.12    tcp       21       2390        static           45638        89865
12.168.2.123   tcp       34       239         dynamic          809835       67854
.
.
.
.
.
12.168.2.123   tcp       34       3899         dynamic          9835       6785
```

Table 1: show cgn inside-translation Field Descriptions, page 54 describes the significant fields shown in the display.

Table 1: show cgn inside-translation Field Descriptions

Field	Description
CGN instance	Name of the CGN instance configured
Inside-VRF	Name of the inside-vrf configured
Outside Address	Outside IPv4 address
Inside Source Port	Inside Source Port Number
Outside Source Port	Translated Source Port Number
Translation Type	Type of Translation (Static/Dynamic/ALG/ Static+ALG).
Inside to Outside Packets	Outbound Packets.
Outside to Inside Packets	Inbound Packets.

Related Commands

Command	Description
clear cgn nat44 inside-vrf, page 10	Clears translation database entries that are created dynamically for the specified inside VRF.
clear cgn nat44 port, page 14	Clears the translation database entries that are created dynamically for the specified inside port number.
clear cgn nat44 protocol, page 16	Clears translation database entries that are created dynamically for the specified protocol.
inside-vrf (CGN), page 22	Enters inside VRF configuration mode for a CGN instance.
protocol (CGN), page 35	Enters ICMP, TCP, and UDP protocol configuration mode for a given CGN instance.
service cgn, page 43	Enables an instance for the CGN application.
show cgn nat44 outside-translation, page 55	Displays the outside-address to inside-address translation details for a specified NAT44 instance.

show cgn nat44 outside-translation

To display the outside-address to inside-address translation details for a specified NAT44 instance, use the **show cgn nat44 outside-translation** command in EXEC mode.

show cgn nat44 *instance-name* **outside-translation protocol** { **icmp | tcp | udp** } [**translation-type** { **alg | all | dynamic | static** }] [**outside-vrf** *vrf-name*] **outside-address** *address* **port start** *number* **end** *number*

Syntax Description

instance-name	Name of the NAT44 instance that is configured.
protocol	Displays the name of the protocols.
icmp	Displays the ICMP protocol.
tcp	Displays the TCP protocol.
udp	Displays the UDP protocol.
translation-type	(Optional) Displays the translation type.
alg	(Optional) Displays only the ALG translation entries.
all	(Optional) Displays all the translation entries, for example, alg, dynamic, and static.
dynamic	(Optional) Displays only the dynamic translation entries.
static	(Optional) Displays only the static translation entries.
outside-vrf	(Optional) Displays the information for the outside VPN routing and forwarding (VRF) for the necessary translation details.
vrf-name	Name of the outside VRF.
outside-address	Displays the outside address for the inside VRF.
address	Outside address.
port	Displays the range of the port numbers.
start *number*	Displays the start of the port number.
end *number*	Displays the end of the port number.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 3.9.1	This command was introduced.
Release 4.0.0	The NAT44 instance was included to the command. The **address-family** keyword was removed.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

If you want to display the entries for a single port, the value for the end port must be equal to that of the start port. Each entry is displayed with a field that informs whether it is static, ALG, or dynamic translation.

If no VRF is specified, the entries are displayed for the default VRF.

If the value of the translation type is not specified, all types of entries are displayed.

Task ID

Task ID	Operations
cgn	read

Examples

The following shows sample output from the **show cgn outside-translation** command:

```
RP/0//CPU0:router# show cgn nat44 nat1 outside-translation protocol tcp outside-vrf
outsidevrf1 outside-address 10.64.23.45 port start 23 end 5

Outside-translation details
---------------------------------
NAT44 instance : nat1
Outside-VRF    : outsidevrf1
-------------------------------------------------------------------------------------------
Outside      Protocol    Outside     Inside        Translation   Inside     Outside
Address                  Destination Destination   Type          to         to
                         Port        Port                        Outside    Inside
                                                                 Packets    Packets
-------------------------------------------------------------------------------------------
13.16.6.23   tcp         314         56            dynamic       8753       5345
13.16.6.23   tcp         819         329           alg           8901       890
13.16.6.23   tcp         40          178           alg           97654      4532
13.16.6.23   tcp         503         761           static        43215      8765
13.16.6.23   tcp         52          610           dynamic       7645       876
.
.
.
.
.

13.16.6.23   tcp         390          621           static       67532       1234
```

Table 2: show cgn outside-translation Field Descriptions, page 57 describes the significant fields shown in the display.

Table 2: show cgn outside-translation Field Descriptions

Field	Description
NAT44 instance	Name of the NAT44 instance configured
Outside-VRF	Name of the Outside VRF configured
Outside Address	Outside IPv4 address
Protocol	Protocol Type (TCP/UDP/ICMP)
Outside Destination Port	Outside Destination Port
Inside Destination Port	Inside Destination Port
Translation Type	Type of Translation (Static/Dynamic/ALG/ Static+ALG)
Inside to Outside Packets	Outbound Packets
Outside to Inside Packets	Inbound Packets

Related Commands

Command	Description
clear cgn nat44 inside-vrf, page 10	Clears translation database entries that are created dynamically for the specified inside VRF.
clear cgn nat44 port, page 14	Clears the translation database entries that are created dynamically for the specified inside port number.
clear cgn nat44 protocol, page 16	Clears translation database entries that are created dynamically for the specified protocol.
inside-vrf (CGN), page 22	Enters inside VRF configuration mode for a CGN instance.
map (CGN), page 28	Maps an outside VRF and address pool to an inside vrf.
protocol (CGN), page 35	Enters ICMP, TCP, and UDP protocol configuration mode for a given CGN instance.
service cgn, page 43	Enables an instance for the CGN application.
show cgn nat44 inside-translation, page 52	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.

show cgn nat44 pool-utilization

To display the outside address pool utilization details for a specified NAT44 instance, use the **show cgn nat44 pool-utilization** command in EXEC mode.

show cgn nat44 *instance-name* **pool-utilization inside-vrf** *vrf-name* **address-range** *start-address end-address*

Syntax Description

instance-name	Name of the NAT44 instance that is configured.
inside-vrf	Displays the contents for the inside VRF.
vrf-name	Name for the inside VRF.
address-range	Displays the range for the outside address.
start-address	Range for the start address of the outside address pool. The range of the IPv4 addresses cannot be more than 255 consecutive IPv4 addresses.
end-address	Range for the end address of the outside address pool.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 3.9.1	This command was introduced.
Release 4.0.0	The NAT44 instance was included to the command syntax.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **show cgn nat44 pool-utilization** command displays the utilization of the outside address pool. In addition, this command displays the number of free and used ports per IPv4 address in the specified range.

Task ID

Task ID	Operations
cgn	read

Examples

The following sample output shows the number of free and used global addresses and port numbers:

```
RP/0//CPU0:router# show cgn nat44 nat1 pool-utilization inside-vrf insidevrf4 address-range
 17.16.6.23 20.12.23.1

Public-address-pool-utilization details
------------------------------------------------------------------------------
NAT44 instance: nat1
VRF           : insidevrf4
------------------------------------------------------------------------------
Outside             Number            Number
Address             of                of
                    Free ports        Used ports
------------------------------------------------------------------------------
17.16.6.23          123               64388
17.16.6.120         58321             6190
17.16.6.98          98                64413
17.16.6.2           1234              60123
.
.
.
.
.
.
.
.
.
18.12.6.12          678               52789
```

Table 3: show cgn pool-utilization Field Descriptions, page 59 describes the significant fields shown in the display.

Table 3: show cgn pool-utilization Field Descriptions

Field	Description
NAT44 instance	Name of the NAT44 instance configured
VRF	Name of the Inside VRF configured
Outside Address	Outside IPv4 address.
Number of Free Ports	Total number of Free ports available for the given Outside IPv4 address
Number of Used Ports	Total number of Used ports for the given Outside IPv4 address

Related Commands

Command	Description
inside-vrf (CGN), page 22	Enters inside VRF configuration mode for a CGN instance.
map (CGN), page 28	Maps an outside VRF and address pool to an inside vrf.

show cgn nat44 statistics

To display the contents of the NAT44 CGN instance statistics, use the **show cgn nat44 statistics** command in EXEC mode.

show cgn nat44 *instance-name* **statistics**

Syntax Description

instance-name	Name of the NAT44 instance that is configured.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 3.9.1	This command was introduced.
Release 4.0.0	The **summary** keyword was removed.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Statistics provides the total number of active translation for a given NAT44 instance and other parameters. In addition, the outside IPv4 addresses, along with the current number of ports in use, are used for translation.

Task ID

Task ID	Operations
cgn	read

Examples

The following sample output shows the statistics entries:

```
RP/0//CPU0:router# show cgn nat44 nat1 statistics

Statistics summary of NAT44 instance: 'nat1'
Number of active translations: 34
Translations create rate: 0
Translations delete rate: 0
Inside to outside forward rate: 3
Outside to inside forward rate: 3
Inside to outside drops port limit exceeded: 0
Inside to outside drops system limit reached: 0
Inside to outside drops resorce depletion: 0
Outside to inside drops no translation entry: 9692754
Pool address totally free: 62
```

```
Pool address used: 2
Pool address usage:
-----------------------------------------------
External Address Ports Used
-----------------------------------------------
24.114.18.53 4
24.114.18.55 30
-----------------------------------------------
```

static-forward inside (CGN)

To enable forwarding for the static port for an inside IPv4 address and inside port combination, use the **static-forward inside** command in CGN inside VRF NAT44 protocol configuration mode. To disable static forwarding, use the **no** form of this command.

static-forward inside

no static-forward inside

Syntax Description

This command has no arguments or keywords.

Command Default

None

Command Modes

CGN inside VRF NAT44 protocol configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **static-forward inside** command enters CGN inside VRF static port inside configuration mode.

If the **static-forward inside** command is executed successfully along with the inside IPv4 address and port information, CGN can dynamically allocate one free outside IPv4 address and outside port number from the outside address pool. Common use for static PAT is to allow Internet users from the public network to access a server located in the private network.

Task ID

Task ID	Operations
cgn	read, write

Examples

The following example shows how to configure forwarding for the static port:

```
RP/0//CPU0:router# configure
RP/0//CPU0:router(config)# service cgn cgn1
RP/0//CPU0:router(config-cgn)# service-type nat44 nat1
RP/0//CPU0:router(config-cgn-nat44)# inside-vrf insidevrf1
RP/0//CPU0:router(config-cgn-invrf)# protocol tcp
RP/0//CPU0:router(config-cgn-invrf-proto)# static-forward inside
RP/0//CPU0:router(config-cgn-ivrf-sport-inside)#
```

Related Commands

Command	Description
inside-vrf (CGN), page 22	Enters inside VRF configuration mode for a CGN instance.
protocol (CGN), page 35	Enters ICMP, TCP, and UDP protocol configuration mode for a given CGN instance.
service cgn, page 43	Enables an instance for the CGN application.
show cgn nat44 statistics, page 60	Displays the contents of the NAT44 CGN instance statistics.

timeout (CGN)

To configure the timeout for the ICMP session for a CGN instance, use the **timeout** command in CGN NAT44 protocol configuration mode. To revert back to default value of 60 seconds, use the **no** form of this command.

timeout *seconds*

no timeout *seconds*

Syntax Description

seconds	Timeout value. Range is from 1 to 65535.

Command Default

The default ICMP timeout value is 60.

Command Modes

CGN NAT44 protocol configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

We recommend that you configure the timeout values for the protocol sessions carefully. For example, the values for the protocol and NAT functions must be configured properly.

Task ID

Task ID	Operations
cgn	read, write

Examples

The following example shows how to configure the timeout value as 908 for the ICMP session:

```
RP/0//CPU0:router# configure
RP/0//CPU0:router(config)# service cgn cgn1
RP/0//CPU0:router(config-cgn)# service-type nat44 nat1
RP/0//CPU0:router(config-cgn-nat44)# protocol icmp
RP/0//CPU0:router(config-cgn-proto)# timeout 908
```

Related Commands

Command	Description
protocol (CGN), page 35	Enters ICMP, TCP, and UDP protocol configuration mode for a given CGN instance.
service cgn, page 43	Enables an instance for the CGN application.
session (CGN), page 50	Configures the timeout values for both active and initial sessions for TCP or UDP.

timeout (CGN logging)

To configure the frequency at which the netflow-v9 template is refreshed or resent to the netflow-v9 server, use the **timeout** command in CGN inside VRF external logging server configuration mode.

To revert back to the default value of 30 minutes, use the **no** form of this command.

timeout *value*

no timeout *value*

Syntax Description

value	Value, in minutes, for the timeout. Range is from 1 to 3600.

Command Default

value : 30

Command Modes

CGN inside VRF external logging server configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

After a certain amount of minutes has elasped since the template was last sent, the timeout value is resent to the logging server.

Task ID

Task ID	Operations
cgn	read, write

Examples

The following example shows how to configure the timeout value as 50 for the NetFlow logging information for the NAT table entries:

```
RP/0//CPU0:router# configure
RP/0//CPU0:router(config)# service cgn cgn1
RP/0//CPU0:router(config-cgn)# service-type nat44 nat1
RP/0//CPU0:router(config-cgn-nat44)# inside-vrf insidevrf1
RP/0//CPU0:router(config-cgn-invrf)# external-logging netflow version 9
RP/0//CPU0:router(config-cgn-invrf-af-extlog)# server
RP/0//CPU0:router(config-cgn-invrf-af-extlog-server)# timeout 50
```

Related Commands

Command	Description
external-logging (CGN), page 18	Enables the external-logging facility for an inside VRF of a CGN instance.
inside-vrf (CGN), page 22	Enters inside VRF configuration mode for a CGN instance.
server (CGN), page 41	Enables the logging server information for the IPv4 address and port for the server that is used for the netflowv9-based external-logging facility.
service cgn, page 43	Enables an instance for the CGN application.
show cgn nat44 statistics, page 60	Displays the contents of the NAT44 CGN instance statistics.