



# Carrier Grade NAT Commands on Cisco IOS XR Software

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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 Cisco CRS Router .

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## address (NAT44 NetflowV9)

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

<i>address</i>	IPv4 address of the server.
<b>port</b>	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.
<i>number</i>	Port number. Range is from 1 to 65535.

### Command Default

If the **address** command is not configured, NAT44 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.
Release 4.1.0	The usage guidelines was updated.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the 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. This NAT44 specific command will configure the ipv4 address and port number for the netflowV9 external logging facility. The address corresponds to the IPv4 address of the NetflowV9 logging server port, which in turn corresponds to the UDP port number in which the NetflowV9 logging server listens for the Netflow logs. The configurations for **path-mtu**, **refresh-rate** and **timeout** is applicable only when the ipv4 address and port number for the logging server has been configured.

**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/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cgn-nat44)# inside-vrf insidevrf1
RP/0/RP0/CPU0:router(config-cgn-invrf)# external-logging netflow version 9
RP/0/RP0/CPU0:router(config-cgn-invrf-af-extlog)# server
RP/0/RP0/CPU0:router(config-cgn-invrf-af-extlog-server)# address 2.3.4.5 port 45
```

**Related Commands**

Command	Description
<a href="#">external-logging (NAT44 Netflow), on page 49</a>	Enables external logging of a NAT44 instance.
<a href="#">inside-vrf (NAT44), on page 55</a>	Enters inside VRF configuration mode for a NAT44 instance.
<a href="#">server (NAT44), on page 98</a>	Enables the logging server information for the IPv4 address and port for the server that is used for the netflowv9-based external-logging facility.
<a href="#">service cgn, on page 100</a>	Enables an instance for the CGN application.

## address static-forward (NAT44)

To enable the inside IPv4 address and port number for static forwarding for a NAT44 instance, use the **address** command in NAT44 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

<i>address</i>	IPv4 address of an inside host server.
<b>port</b>	Configures the inside port for static forwarding. The <b>port</b> keyword allows a specific UDP, TCP, or ICMP port on a global address to be translated to a specific port on a local address.
<i>number</i>	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

NAT44 inside VRF static port inside configuration

### Command History

Release	Modification
Release 3.9.1	This command was introduced.
Release 4.1.0	The usage guidelines section was updated.

### Usage Guidelines

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

This NAT44 command configures the static port forwarding for an inside-ipv4 address and inside-port number combination. With this configuration, packets received inside with the configured inside-ipv4 address and inside-port number are forwarded using the displayed outside-ipv4address and outside-port number.

CGN can dynamically allocate one free public IP address and port number from the configured outside address pool for an inside address and port.

**Task ID**

Task ID	Operations
cg	read, write

**Examples**

This 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/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cg cgn1
RP/0/RP0/CPU0:router(config-cg)# service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cg-nat44)# inside-vrf v1
RP/0/RP0/CPU0:router(config-cg-invrf)# protocol tcp
RP/0/RP0/CPU0:router(config-cg-invrf-prot)# static-forward inside
RP/0/RP0/CPU0:router(config-cg-invrf-sport-inside)# address 10.20.30.10 port 1000
```

**Related Commands**

Command	Description
<b>protocol (NAT44)</b>	
<a href="#">protocol (CGN), on page 82</a>	Enters ICMP, TCP, and UDP protocol configuration mode for a given CGN instance.
<a href="#">service cg, on page 100</a>	Enables an instance for the CGN application.
<a href="#">show cg nat44 inside-translation, on page 126</a>	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.

## address-family (6rd)

To bind an ipv4 or ipv6 ServiceApp interface to a 6rd instance, use the **address-family** command in 6RD configuration mode. To unbind the ServiceApp interface, use the **no** form of this command.

**address-family** {ipv4|ipv6} **interface** ServiceApp *value*

**no address-family** {ipv4|ipv6} **interface** ServiceApp *value*

### Syntax Description

<b>ipv4</b>	Specifies the IPv4 address family.
<b>ipv6</b>	Specifies the IPv6 address family.
<b>interface</b>	Specifies the ServiceApp interface to be used.
<b>ServiceApp</b>	Specifies the SVI interface.
<i>value</i>	Interface value. The range is from 1 to 2000.

### Command Default

None

### Command Modes

6RD configuration

### Command History

Release	Modification
Release 4.3.1	This command was introduced.

### Usage Guidelines

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

### Task ID

Task ID	Operation
cgn	read, write

### Examples

This example shows how to bind ipv4 ServiceApp interface to a 6RD instance:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn-inst
```

```
RP/0/RP0/CPU0:router(config-cgn)# service-type tunnel v6rd 6rd1  
RP/0/RP0/CPU0:router(config-cgn-tunnel-6rd)# address-family ipv4  
RP/0/RP0/CPU0:router(config-cgn-6rd-afi)#interface ServiceApp 100
```

### Examples

This example shows how to bind ipv6 ServiceApp interface to a 6RD instance:

```
RP/0/RP0/CPU0:router# configure  
RP/0/RP0/CPU0:router(config)# service cgn cgn-inst  
RP/0/RP0/CPU0:router(config-cgn)# service-type tunnel v6rd 6rd1  
RP/0/RP0/CPU0:router(config-cgn-tunnel-6rd)# address-family ipv6  
RP/0/RP0/CPU0:router(config-cgn-6rd-afi)#interface ServiceApp 120
```

## address-family ipv4 (Stateless NAT64)

To enter the IPv4 address family configuration mode while configuring the Carrier Grade NAT (CGN), use the **address-family ipv4** command in an appropriate configuration mode. To disable support for an address family, use the **no** form of this command.

```
address-family ipv4 {interface ServiceApp| tcp mss| tos}
```

```
no address-family ipv4
```

### Syntax Description

<b>interface</b>	Specifies the ServiceApp interface to be used.
<b>ServiceApp</b>	Specifies the SEAPP SVI interface. The number of service application interfaces to be configured ranges from 1 to 2000.
<b>tcp</b>	Specifies the TCP protocol.
<b>mss</b>	Specifies the maximum segment size for TCP in bytes. The value of maximum segment size ranges from 28 to 1500.
<b>tos</b>	Type of service to be set when translating IPv6 to IPv4. The value of type of service ranges from 0 to 255.

### Command Default

None

### Command Modes

CGN-NAT64

### Command History

Release	Modification
Release 3.9.1	This command was introduced.
Release 4.1.0	Updated the Syntax and Usage Guidelines sections.

### Usage Guidelines

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

This command configures the ipv4 address family for NAT64 stateless XLAT.

### Task ID

Task ID	Operation
cgn	read, write

**Examples**

This example shows the tcp mss for the ipv4 address family:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router (config)# service cgn cgn1
RP/0/RP0/CPU0:router (config-cgn)# service-type nat64 stateless xlat
RP/0/RP0/CPU0:router (config-cgn-nat64-stateless)# address-family ipv4
RP/0/RP0/CPU0:router (config-cgn-nat64-stateless-afi)# tcp mss 200
```

## address-family ipv6 (Stateless NAT64)

To enter the IPv6 address family configuration mode, use the **address-family ipv6** command. To disable support for an address family, use the **no** form of this command.

```
address-family ipv6 {interface ServiceApp <1-2000>} {df override} {protocol| {icmp| reset-mtu}} tcp
mss <28-1500> traffic-class <0-255>
```

```
no address-family ipv6
```

### Syntax Description

<b>interface</b>	Indicates the ServiceApp interface to be used.
<b>ServiceApp</b>	SEAPP SVI Interface.
<1-2000>	Number of service application interfaces to be configured. Range is from 1 to 2000.
<b>df-override</b>	Override DF bit.
<b>protocol</b>	Select a protocol.
<i>icmp</i>	(Optional) ICMP protocol.
<i>reset-mtu</i>	(Optional) Reset maximum transmission unit when packet is too big.
<b>tcp</b>	TCP protocol.
<b>mss</b>	Maximum segment size for TCP in bytes.
<28-1500>	Maximum segment size to be used in bytes.
<b>traffic-class</b>	Traffic class to be set when translating from IPv4 to IPv6.

### Command Default

None

### Command Modes

CGN-NAT64

### Command History

Release	Modification
Release 4.1.0	This command was introduced.

**Usage Guidelines**

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

This command configures the ipv6 address family for NAT64 stateless XLAT.

**Task ID**

Task ID	Operation
cg	read, write

**Examples**

This example shows the traffic-class setting for the ipv6 address family:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# service-type nat64 stateless xlat1
RP/0/RP0/CPU0:router(config-cgn-nat64-stateless)# address-family ipv6
RP/0/RP0/CPU0:router(config-cgn-nat64-stless-afi)# traffic-class 25
```

**Related Commands**

Command	Description
<a href="#">df-override (CGN), on page 46</a>	Sets the do not fragment bit
<a href="#">protocol icmp reset-mtu (CGN), on page 88</a>	Resets the received packet size.
<a href="#">service cgn, on page 100</a>	Enables an instance for the CGN application.
<a href="#">traffic-class (CGN), on page 166</a>	Configures the traffic class value to be used when translating a packet from IPv4 to IPv6

## alg ActiveFTP (NAT44)

To enable the Application-Level Gateway (ALG) of Active FTP for a 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

Command History	Release	Modification
	Release 3.9.1	This command was introduced.
	Release 4.1.0	The Usage Guidelines section was updated.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the 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 NAT44 instance:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cgn-nat44)# alg ActiveFTP
```

## alg ftp (DS-LITE)

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

**alg ftp**

**no alg ftp**

### Syntax Description

<b>ftp</b>	Enables the FTP ALG.
------------	----------------------

### Command Default

None

### Command Modes

DS-Lite configuration mode

### Command History

Release	Modification
Release 4.2.1	This command was introduced.

### Usage Guidelines

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

### Task ID

Task ID	Operation
cgn	read, write

### Examples

This example shows how to enable support for FTP ALG:

```
RP/0/RP0/CPU0:router# config
RP/0/RP0/CPU0:router (config) #service cgn cgn1
RP/0/RP0/CPU0:router (config-cgn) #service-type ds-lite ds-lite1
RP/0/RP0/CPU0:router (config-cgn-ds-lite) #alg ftp
RP/0/RP0/CPU0:router (config-cgn-ds-lite) #
```

## alg pptpalg (NAT44)

To configure Point-to-Point Tunneling Protocol (PPTP) as the Application-Level Gateway (ALG) for a NAT44 instance, use the **alg pptpalg** command in NAT44 configuration mode. To undo the configuration, use the **no** form of this command.

**alg pptpalg**

**no alg pptpalg**

**Syntax Description** This command has no arguments or keywords.

**Command Default** By default, PPTP ALG is disabled.

**Command Modes** NAT44 configuration mode

Command History	Release	Modification
	Release 4.3.0	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the 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** This example shows how to configure ALG for the PPTP connection on NAT44 instance:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# service-type nat44 nat441
RP/0/RP0/CPU0:router(config-cgn-nat44)# alg pptpalg
```

Related Commands	Command	Description
	<a href="#">alg ActiveFTP (NAT44), on page 15</a>	Enables the Application-Level Gateway (ALG) of Active FTP for a NAT44 instance.

Command	Description
<a href="#">alg rtsp (NAT44), on page 21</a>	Enables the support for Application-Level Gateway (ALG) Real Time Streaming Protocol (RTSP).

## alg rtsp (DS-LITE)

To enable support for the Application-Level Gateway (ALG) Real Time Streaming Protocol (RTSP), use the **alg rtsp** command in the DS-Lite configuration mode. To disable the support, use the **no** form of this command.

**alg rtsp**

**no alg rtsp**

### Syntax Description

<b>rtsp</b>	Specifies the real time streaming protocol.
<b>server-port</b>	Specifies the port to be used for RTSP. The range is from 1 to 65535. The default port is 554.

### Command Default

By default, the **alg rtsp** is disabled.

### Command Modes

DS-Lite Configuration

### Command History

Release	Modification
Release 4.1.0	This command was introduced.

### Usage Guidelines

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

The application has to be directed to identify RTSP packets. The **alg rtsp** configuration command allows enabling of RTSP scan.

### Task ID

Task ID	Operation
cgn	read, write

### Examples

This example shows how to configure the **alg rtsp** command for a DS-Lite instance:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# service-type ds-lite ds-litel
RP/0/RP0/CPU0:router(config-cgn-ds-lite)# alg rtsp
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<a href="#">address-family ipv4 (Stateless NAT64), on page 11</a>	Enters the IPv4 address family configuration mode.
<a href="#">alg ActiveFTP (NAT44), on page 15</a>	Enables the Application-Level Gateway (ALG) of Active FTP for a NAT44 instance.
<a href="#">inside-vrf (NAT44), on page 55</a>	Enters inside VRF configuration mode for a NAT44 instance.
<a href="#">portlimit (NAT44), on page 77</a>	Limits the number of translation entries per source address.
<b>protocol (NAT44)</b>	
<a href="#">service cgn, on page 100</a>	Enables an instance for the CGN application.
<a href="#">service-type nat44, on page 106</a>	Enables a NAT44 instance for the CGN application.
<a href="#">refresh-direction (NAT44), on page 91</a>	Configures the Network Address Translation (NAT) mapping refresh direction for the specified CGN instance.

## alg rtsp (NAT44)

To configure Real Time Streaming Protocol (RTSP) as the Application-Level Gateway (ALG), use the **alg rtsp** command in the NAT44 configuration mode. To undo the configuration, use the **no** form of this command.

**alg rtsp server-port** *value*

**no alg rtsp**

### Syntax Description

<b>server-port</b>	Specifies the port to be used for RTSP.
<i>value</i>	Specifies the port number. The default port is 554. The range is from 1 to 65535

### Command Default

By default, the **alg rtsp** is disabled.

### Command Modes

NAT44 Configuration

### Command History

Release	Modification
Release 4.1.0	This command was introduced.

### Usage Guidelines

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

The application has to be directed to identify RTSP packets. The **alg rtsp** configuration command allows enabling of RTSP scan.

### Task ID

Task ID	Operation
cgn	read, write

### Examples

This example shows how to configure the **alg rtsp** command for the CGN instance:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cgn-nat44)# alg rtsp server-port 666
```

**Related Commands**

Command	Description
<a href="#">alg ActiveFTP (NAT44), on page 15</a>	Enables the Application-Level Gateway (ALG) of Active FTP for a NAT44 instance.

# attach port-set

To attach the port-set to the NAT inside-vrf instance, use the **attach port-set** command in the CGN inside VRF configuration mode. To remove the port-set from the inside-vrf instance, use the **no** form of this command.

**attach port-set** *name*

Syntax Description	
	<i>name</i> Specifies the port-set created.

Command Default	None
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Command Modes	CGN inside VRF configuration mode.
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Command History	Release	Modification
	Release 5.3.1	This command was introduced.

**Usage Guidelines**

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

A port-set is attached to the VRF instance that handles packets from the subscriber network (inside-VRF). Users can attach only one port-set to the NAT inside-vrf instance. If multiple port-sets are attached to the inside-vrf instance, then only the last attached port-set is considered for the NAPT operation. However, a port-set can be attached to multiple inside-vrf instances. If a port-set is in use by one or more NAT inside-vrf instances, users cannot delete that port-set until the associations with all NAT inside-vrf instances are removed. However, the user can modify the contents of port-set while they are in use and have the modifications take effect immediately.

Task ID	Task ID	Operation
	cg	read, write

**Examples**

The following example shows how to attach the port-set to an inside VRF instance:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cgn-nat44)# inside-vrf insidevrf1
```

**attach port-set**

```
RP/0/RP0/CPU0:router(config-cgn-invrif)#map-address pool 100.1.1.0/24  
RP/0/RP0/CPU0:router(config-cgn-invrif-afi)#attach port-set set1
```

## br (6rd)

To enable the Border Relay(BR) configuration, use the **br** command in 6RD configuration mode. To disable this feature, use the **no** form of this command.

**br** {ipv4| ipv6-prefix| source-address| unicast}

**no br**

### Syntax Description

<b>ipv4</b>	Specifies the IPv4 related configuration.
<b>ipv6-prefix</b>	Specifies the IPv6 prefix.
<b>source-address</b>	Specifies the source address for the tunnel.
<b>unicast</b>	Specifies the IPv6 unicast address.

### Command Default

None

### Command Modes

6RD configuration

### Command History

Release	Modification
Release 4.1.0	This command was introduced.

### Usage Guidelines

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

### Task ID

Task ID	Operation
cgcn	read, write

### Examples

This example shows how to configure the unicast address using the **br** configuration level commands :

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router#(config)# service cgn cgn1
RP/0/RP0/CPU0:router#(config-cgn) service-type tunnel v6rd 6rd1
RP/0/RP0/CPU0:router(config-cgn-tunnel-6rd)# br
RP/0/RP0/CPU0:router(config-cgn-tunnel-6rd)# ipv6-prefix 2001:db8::/32
```

```
RP/0/RP0/CPU0:router(config-cgn-tunnel-6rd)# source-address 10.2.2.2
RP/0/RP0/CPU0:router(config-cgn-tunnel-6rd)# ipv4 prefix length 0
RP/0/RP0/CPU0:router(config-cgn-tunnel-6rd)# ipv4 suffix length 0
RP/0/RP0/CPU0:router(config-cgn-tunnel-6rd-br)# unicast address 2001:db8:a02:202::1
```

**Related Commands**

Command	Description
<a href="#">ipv4 prefix (6rd), on page 61</a>	Assigns a value for the ipv4-prefix length to be used as part of both ends of tunnel.
<a href="#">ipv4 suffix (6rd), on page 63</a>	Assigns a value for the ipv4-suffix length to be used as part of both ends of a tunnel.
<a href="#">ipv6-prefix (6rd), on page 65</a>	Generates the delegated ipv6 prefix for a IPv6 Rapid Deployment (6RD) application.
<a href="#">source-address (6rd), on page 155</a>	Assigns an ipv4 address as the tunnel source address.
<a href="#">unicast address (6rd), on page 172</a>	Assigns an IPv6 address to be used for a IPv6 Rapid Deployment (6RD) Border Relay (BR) unicast configuration.

## bulk-port-alloc (NAT44)

To pre-allocate a number of contiguous outside ports in bulk and to reduce Netflow/Syslog data volume, use the **bulk-port-alloc** command in NAT44 configuration mode. To undo the bulk port allocation, use the **no** form of this command.

**bulk-port-alloc** *size size-value*

**no bulk-port-alloc** *size size-value*

<b>Syntax Description</b>	<p><b>size</b> <i>size-value</i> Specifies the port size for allocation. The value should be greater than or equal to one fourth of the port limit and less than twice the port limit. The allowed values are , 16, 32, 64, 128, 256, 512, 1024, 2048, and 4096.</p>
---------------------------	--

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	NAT44 Inside VRF configuration
----------------------	--------------------------------

<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 4.2.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 4.2.1	This command was introduced.
Release	Modification				
Release 4.2.1	This command was introduced.				

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

<b>Task ID</b>	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operation</th> </tr> </thead> <tbody> <tr> <td>cgn</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operation	cgn	read, write
Task ID	Operation				
cgn	read, write				

**Examples** This example shows how to allocate ports in bulk to reduce the syslog data volume:

```
RP/0/RP0/CPU0:router# config
RP/0/RP0/CPU0:router(config)#service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)#service-type nat44 nat441
RP/0/RP0/CPU0:router(config-cgn)#inside-vrf vrf1
RP/0/RP0/CPU0:router(config-cgn-ds-lite-invrf)#bulk-port-alloc size 64
RP/0/RP0/CPU0:router(config-cgn-ds-lite-invrf)#
```

**Related Commands**

Command	Description
<a href="#">external-logging (NAT44 Netflow)</a> , on page 49	Enables external logging of a NAT44 instance.
<b>protocol (NAT44)</b>	

# 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

<i>instance-name</i>	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 appropriate task IDs. If the 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/RP0/CPU0:router# show cgn nat44 nat2 statistics
Statistics summary of NAT44 instance: 'nat2'
Number of active translations: 45631
Translations create rate: 5678
```



# clear cgn nat44 inside-vrf counters

To clear the counters for sequence-check, use the **clear cgn nat44 inside-vrf counters** in EXEC mode.

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

<b>Syntax Description</b>	<b>counters</b>	Lists the counters for TCP sequence check
---------------------------	-----------------	---

**Command Default** None

**Command Modes** EXEC

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 5.1.1	This command was introduced.

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

<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	cgn	read, write

**Examples** The following example clears the counters for TCP sequence check.

```
RP/0/RP0/CPU0:router# clear cgn nat44 nat1 inside-vrf vrfl counters
```

## 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		
	<i>instance-name</i>	Instance name for NAT44.
	<i>vrf-name</i>	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 appropriate task IDs. If the 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**

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

```
RP/0/RP0/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/RP0/CPU0:router# clear cgn nat44 nat2 inside-vrf insidevrf1
```

```
RP/0/RP0/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
<a href="#">show cgn nat44 inside-translation, on page 126</a>	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.
<a href="#">show cgn nat44 outside-translation, on page 132</a>	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

<i>instance-name</i>	Instance name for NAT44.
<i>address</i>	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 appropriate task IDs. If the 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/RP0/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/RP0/CPU0:router# clear cgn nat44 nat1 ipaddress 10.0.0.0
```

```
RP/0/RP0/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
<a href="#">show cgn nat44 inside-translation, on page 126</a>	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.
<a href="#">show cgn nat44 outside-translation, on page 132</a>	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

<i>instance-name</i>	Instance name for NAT44.
<i>number</i>	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 appropriate task IDs. If the 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

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

```
RP/0/RP0/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/RP0/CPU0:router# clear cgn nat44 nat2 port 1231

RP/0/RP0/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
<a href="#">show cgn nat44 inside-translation, on page 126</a>	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.
<a href="#">show cgn nat44 outside-translation, on page 132</a>	Displays the outside-address to inside-address translation details for a specified NAT44 instance.

## clear cgn nat44 pptpCounters

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

**clear cgn nat44** *instance-name* **pptpCounters**

Syntax Description		
	<i>instance-name</i>	Name for the NAT44 CGN instance.
	<b>pptpCounters</b>	Specifies the PPTP counters that must be cleared.

Command Default	None
-----------------	------

Command Modes	EXEC
---------------	------

Command History	Release	Modification
	Release 4.3.0	This command was introduced.

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



**Caution** Because the **clear cgn nat44 pptpCounters** command clears all the PPTP counters, use this command with caution.

Task ID	Task ID	Operations
	cgn	read

# 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 {gre| udp| tcp| icmp}
```

## Syntax Description

<i>instance-name</i>	Name for the NAT44 CGN instance.
<b>protocol</b>	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.
Release 4.3.0	The keyword, <b>gre</b> was added.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the 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**

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

```
RP/0/RP0/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/RP0/CPU0:router# clear cgn nat44 nat2 protocol tcp

RP/0/RP0/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
<b>protocol (NAT44)</b>	
<a href="#">show cgn nat44 inside-translation, on page 126</a>	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.
<a href="#">show cgn nat44 outside-translation, on page 132</a>	Displays the outside-address to inside-address translation details for a specified NAT44 instance.

# clear cgn tunnel v6rd statistics

To clear all the statistics of a IPv6 Rapid Deployment (6RD) instance, use the **clear cgn tunnel v6rd statistics** command in EXEC mode.

**clear cgn tunnel v6rd** *instance-name* **statistics**

Syntax Description		
	<i>instance-name</i>	Specifies the name of the 6rd instance.
	<b>statistics</b>	6rd instance statistics.

**Command Default** None

**Command Modes** Exec

Command History	Release	Modification
	Release 4.3.1	This command was introduced.

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



**Caution**

Because the **clear cgn tunnel v6rd statistics** command clears all statistics counters, use this command with caution.

Task ID	Task ID	Operation
	cgn	read

**Examples**

This example shows the statistics entries for a 6RD instance:

```
RP/0/RP0/CPU0:router# show cgn tunnel v6rd 6rd1 statistics
Tunnel 6rd configuration
=====
Tunnel 6rd name: 6rd1
```

## clear cgn tunnel v6rd statistics

```

IPv6 Prefix/Length: 2001:db8::/32
Source address: 9.1.1.1
BR Unicast address: 2001:db8:901:101::1
IPv4 Prefix length: 0
IPv4 Suffix length: 0
TOS: 0, TTL: 255, Path MTU: 1280
Tunnel 6rd statistics
=====
IPv4 to IPv6
=====
Incoming packet count : 2296951183
Incoming tunneled packets count : 2296951183
Decapsulated packets : 0
ICMP translation count : 0
Insufficient IPv4 payload drop count : 0
Security check failure drops : 0
No DB entry drop count : 0
Unsupported protocol drop count : 0
Invalid IPv6 source prefix drop count : 2296951183
IPv6 to IPv4
=====
Incoming packet count : 0
Encapsulated packets count : 0
No DB drop count : 0
Unsupported protocol drop count : 0
IPv4 ICMP
=====
Incoming packets count : 0
Reply packets count : 0
Throttled packet count : 0
Nontranslatable drops : 0
Unsupported icmp type drop count : 0
IPv6 ICMP
=====
Incoming packets count : 0
Reply packets count : 0
Packet Too Big generated packets count : 0
Packet Too Big not generated packets count : 0
NA generated packets count : 0
TTL expiry generated packets count : 0
Unsupported icmp type drop count : 0
Throttled packet count : 0
IPv4 to IPv6 Fragments
=====
Incoming fragments count : 0
Reassembled packet count : 0
Reassembled fragments count : 0
ICMP incoming fragments count : 0
Total fragment drop count : 0
Fragments dropped due to timeout : 0
Reassembly throttled drop count : 0
Duplicate fragments drop count : 0
Reassembly disabled drop count : 0
No DB entry fragments drop count : 0
Fragments dropped due to security check failure : 0
Insufficient IPv4 payload fragment drop count : 0
Unsupported protocol fragment drops : 0
Invalid IPv6 prefix fragment drop count : 0
IPv6 to IPv4 Fragments
=====
Incoming ICMP fragment count : 0
RP/0/RP1/CPU0:#
=====

```

The RP/0/RP0/CPU0:router# **clear cgn tunnel v6rd 6rd1 statistics** command clears the output shown above.

**Related Commands**

Command	Description
<a href="#">show cgn tunnel v6rd statistics</a> , on page 149	Displays the statistics information for an IPv6 Rapid Deployment (6RD) instance.

# datapath-test

To test the integrity of the ServiceApp data path and to shut down the SVI in case of a failure, use the **datapath-test** command in the 6rd configuration mode. To undo the detection of the failure and shutdown, use the **no** form of this command.

**datapath-test** [**shut-down-on-failure**]

**no datapath-test** [**shut-down-on-failure**]

## Syntax Description

**shut-down-on-failure**

(Optional) If configured, the ServiceApp Interfaces for IPv4 and IPv6 are shut down when any of these interfaces fails.

Use this option only if redundant CGSEs capable of handling the traffic, when the failed ServiceApp interfaces are shutdown, are configured.

## Command Default

None

## Command Modes

6RD configuration

## Command History

Release	Modification
Release 5.2.0	This command was introduced.

## Usage Guidelines

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

## Task ID

Task ID	Operation
cgn	read, write

## Examples

This example shows how to shut down the interface:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router (config)# service cgn cgn-inst
RP/0/RP0/CPU0:router (config-cgn)# service-type tunnel v6rd 6rd1
RP/0/RP0/CPU0:router (config-cgn-tunnel-6rd)# address-family ipv4
```

```
RP/0/RP0/CPU0:router(config-cgn-6rd-afi)#interface ServiceApp 100
RP/0/RP0/CPU0:router(config-cgn-tunnel-6rd)# address-family ipv6
RP/0/RP0/CPU0:router(config-cgn-6rd-afi)#interface ServiceApp 101
RP/0/RP0/CPU0:router(config-cgn-tunnel-6rd-afi)# exit
RP/0/RP0/CPU0:router(config-cgn-tunnel-6rd)# datapath-test shut-down-on-failure
```

## df-override (CGN)

To set the DF (Do not Fragment) bit to 0, use the **df-override** command . To restore the default behavior, use the **no** form of this command.

**df-override**

**nodf-override**

Syntax Description	df-override	Specifies the df-override bit.
--------------------	-------------	--------------------------------

**Command Default** The **df-override** bit is set to 1.

**Command Modes** CGN-NAT64

Command History	Release	Modification
	Release 4.1.0	This command was introduced.

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

Use the **df-override** command to set the DF bit to 0 when translating IPv6 packets to IPv4 packets, provided the original IPv6 packet size is less than 1280 bytes and there is no Fragment header.

Task ID	Task ID	Operation
	cgcn	read, write

**Examples** This example shows how to configure the **df-override** command for the NAT64 stateless configuration.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router#(config)# service cgcn cgcn1
RP/0/RP0/CPU0:router#(config-cgcn) service-type nat64 stateless xlat1
RP/0/RP0/CPU0:router (config-cgcn-nat64-stateless) # ipv6-prefix 2010:db8:ff00::/40
RP/0/RP0/CPU0:router (config-cgcn-nat64-stateless) # address-family ipv6
RP/0/RP0/CPU0:router (config-cgcn-nat64-stateless-afi) # df-override
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<a href="#">address-family ipv6 (Stateless NAT64), on page 13</a>	Enters the IPv6 address family configuration mode.
<a href="#">interface ServiceApp, on page 57</a>	Enables the application SVI interface.
<a href="#">protocol icmp reset-mtu (CGN), on page 88</a>	Resets the received packet size.
<a href="#">service cgn, on page 100</a>	Enables an instance for the CGN application.
<a href="#">service-type nat64 (Stateless), on page 108</a>	Creates a nat64 stateless application
<a href="#">tcp mss (CGN), on page 157</a>	Adjusts the TCP maximum segment size value for a ServiceApp interface.
<a href="#">traffic-class (CGN), on page 166</a>	Configures the traffic class value to be used when translating a packet from IPv4 to IPv6

## dynamic port range start

To configure the dynamic port range start value for a CGN NAT 44 instance, use the **dynamic port range start** command in the EXEC mode. These ports include TCP, UDP, and ICMP.

**dynamic port range start** *value*

### Syntax Description

<i>value</i>	The value ranges between 1 to 65535.
--------------	--------------------------------------

### Command Default

When the value is not configured, then the dynamic translations start from 1024.

### Command Modes

CGN-NAT44 Configuration

### Command History

Release	Modification
Release 4.1.0	This command was introduced.

### Usage Guidelines

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

### Task ID

Task ID	Operation
cg	read, write

### Examples

This example shows how to execute the **dynamic port range start** value as 1048 for a NAT44 instance:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router#(config)# service cgn cgn1
RP/0/RP0/CPU0:router#(config-cgn) service-type nat44 nat1
RP/0/RP0/CPU0:router#(config-cgn-nat44) dynamic port range start 1048
```

## external-logging (NAT44 Netflow)

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

<b>netflow version 9</b>	Netflow version 9 protocol is used for external logging.
--------------------------	--

### Command Default

By default, external-logging is disabled.

### Command Modes

CGN Inside VRF NAT44 configuration mode

### Command History

Release	Modification
Release 3.9.1	This command was introduced.
Release 4.0.0	The keyword <b>netflow v9</b> has been modified to <b>netflow version 9</b> .

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the 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**

This example shows how to enter the configuration mode for the netflow version 9 external-logging facility:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router (config)# service cgn cgn1
RP/0/RP0/CPU0:router (config-cgn)# service-type nat44 nat1
RP/0/RP0/CPU0:router (config-cgn-nat44)# inside-vrf insidevrf1
RP/0/RP0/CPU0:router (config-cgn-invrf)# external-logging netflow version 9
RP/0/RP0/CPU0:router (config-cgn-invrf-af-extlog)# server
RP/0/RP0/CPU0:router (config-cgn-invrf-af-extlog-server)# address 10.10.0.0 port 50
```

## external-logging (NAT44 Syslog)

To enable the external-logging facility for syslog data, 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 syslog server** {**address** |{*address port number*} **host-name** |{*name*} **path-mtu** *value*  
**protocol** *protocol-type* }

**no external-logging syslog server** {**address** |{*address port number*} **host-name** |{*name*} **path-mtu** *value*  
**protocol** *protocol-type* }

### Syntax Description

<b>syslog</b>	Logs syslog information to an external server.
<b>server</b>	Specifies the location of the server to log the syslog information.
<b>address</b>	Specifies the IPv4 or IPv6 address of the server.
<b>host-name</b>	Specifies the host name used in syslog header.
<b>path-mtu</b>	Specifies the mtu of the path used for logging information.
<b>protocol</b>	Specifies the layer 4 protocol used for logging information.

### Command Default

By default, external-logging is disabled.

### Command Modes

CGN Inside VRF NAT44 configuration mode

### Command History

Release	Modification
Release 4.2.1	This command was introduced.

### Usage Guidelines

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

### Task ID

Task ID	Operation
cgn	read, write

**Examples**

This example show how to log syslog information for a NAT44 instance:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cgn-nat44)# inside-vrf insidevrf1
RP/0/RP0/CPU0:router(config-cgn-invrf)# external-logging syslog
RP/0/RP0/CPU0:router(config-cgn-invrf-syslog)# server
RP/0/RP0/CPU0:router(config-cgn-invrf-syslog-server)# address 10.10.0.0 port 50
RP/0/RP0/CPU0:router(config-cgn-invrf-syslog-server)#
```

## 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*

<b>Syntax Description</b>	<i>node-id</i>	Location of the service card for CGN that you want to configure. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
---------------------------	----------------	--

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	Global configuration
----------------------	----------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	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 appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	cgn	read, write
	root-lr	read, write

**Examples** This example shows how to configure the CGN service for location 0/2/CPU0:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# hw-module service cgn location 0/2/CPU0
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<a href="#">interface ServiceApp, on page 57</a>	Enables the application SVI interface.
<a href="#">interface ServiceInfra, on page 59</a>	Enables the infrastructure SVI interface.
<a href="#">service cgn, on page 100</a>	Enables an instance for the CGN application.
<a href="#">service-location (CGN), on page 101</a>	Enables the particular instance of the CGN application on the active and standby locations.

## inside-vrf (NAT44)

To enter inside VRF configuration mode for a NAT44 instance, use the **inside-vrf** command in NAT44 configuration mode. To disable this feature, use the **no** form of this command.

```
inside-vrf vrf-name
no inside-vrf vrf-name
```

<b>Syntax Description</b>	<i>vrf-name</i>	Name for the inside VRF.
---------------------------	-----------------	--------------------------

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	NAT44 configuration
----------------------	---------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	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 appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **inside-vrf** command enters NAT44 inside VRF configuration mode.

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	cgcn	read, write

**Examples**

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cgn-nat44)# inside-vrf insidevrf1
RP/0/RP0/CPU0:router(config-cgn-invrf)#
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<a href="#">external-logging (NAT44 Netflow), on page 49</a>	Enables external logging of a NAT44 instance.
<b>protocol (NAT44)</b>	
<a href="#">service cgn, on page 100</a>	Enables an instance for the CGN application.
<a href="#">show cgn nat44 inside-translation, on page 126</a>	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.
<a href="#">show cgn nat44 outside-translation, on page 132</a>	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*

<b>Syntax Description</b>	<i>value</i>	Total number of service application interfaces to be configured. Range is from 1 to 244.
---------------------------	--------------	--

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	Global configuration
----------------------	----------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.9.1	This command was introduced.

<b>Usage Guidelines</b>	<p>To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.</p> <p>The total number of service application interfaces per multi-service PLIM card cannot exceed 889.</p> <p>The name of the serviceapp interfaces is <b>serviceapp n</b> where <b>n</b> can be a number between 1 to 244.</p>
-------------------------	--

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	interface	read, write

<b>Examples</b>	This example shows how to configure a <b>nat64</b> stateless service application interface:
-----------------	---

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)#service-type nat64 stateless xlat1
RP/0/RP0/CPU0:router(config-cgn-nat64-stateless)#ipv6-prefix 2010:db8:ff00::/40
RP/0/RP0/CPU0:router(config-cgn-nat64-stateless)#address-family ipv6
RP/0/RP0/CPU0:router(config-cgn-nat64-stateless-afi)#interface ServiceApp 461
```

This example shows how to configure 6rd service application interface:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)#service-type tunnel v6rd 6rd1
RP/0/RP0/CPU0:router(config-cgn-tunnel-6rd)#address-family ipv6
RP/0/RP0/CPU0:router(config-cgn-6rd-afi)#interface ServiceApp 46
```

This example shows how to configure a nat44 service application interface:

```
RP/0/RP0/CPU0:router#configure
RP/0/RP0/CPU0:router(config)#interface ServiceApp 1
RP/0/RP0/CPU0:router(config)#service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)#service type nat44 nat1
RP/0/RP0/CPU0:router(config-cgn-nat44)#address-family ipv4
```

# 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

<i>value</i>	Total 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 appropriate task IDs. If the 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 ISM.



### Note

The Infra SVI interface and its IPv4 address configuration are required to boot the CGSE. The IPv4 address is used as the source address of the netflow v9 logging packet.

## Task ID

Task ID	Operations
interface	read, write

## Examples

This example shows how to configure one service infrastructure interface:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface ServiceInfra 1
```

```
RP/0/RP0/CPU0:router(config-if)#ipv4 address 3.1.1.1 255.255.255.248  
RP/0/RP0/CPU0:router(config-if)#service-location 0/1/CPU0
```

## ipv4 prefix (6rd)

To assign a value for the ipv4-prefix length to be used as part of both ends of tunnel, use the **ipv4 prefix** command in 6RD configuration mode. To remove the ipv4 prefix, use the **no** form of this command.

**ipv4 prefix length** *value*

**no ipv4 prefix length** *value*

### Syntax Description

<b>length</b>	Indicates the IPv4 prefix length to be used while deriving the delegated IPv6 prefix.
<i>value</i>	IPv4 prefix length value. The range is from 0 to 31.

### Command Default

None

### Command Modes

6RD configuration

### Command History

Release	Modification
Release 4.1.0	This command was introduced.

### Usage Guidelines

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

This command assigns a value for the common ipv4 prefix length to be used as part of both ends of the tunnel. This is an optional br (Border Relay) tunnel configuration parameter. If this parameter is added or modified, the unicast address must be modified.

The sum of the ipv4 prefix length and ipv4 suffix length must not exceed 31. This value is used to calculate 6RD delegated prefix.

Once configured, the ipv4 prefix cannot be deleted individually. It must be deleted along with all the br tunnel configuration. If you want to ignore the prefix length, alternatively you can set it to zero along with the updated unicast address.

### Task ID

Task ID	Operation
cgn	read, write

**Examples**

This example shows how to configure the ipv4 prefix length:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router#(config)# service cgn cgn1
RP/0/RP0/CPU0:router#(config-cgn)service-type tunnel v6rd 6rd1
RP/0/RP0/CPU0:router (config-cgn-tunnel-6rd)# br
RP/0/RP0/CPU0:router (config-cgn-tunnel-6rd-br)# ipv4 prefix length 16
```

**Related Commands**

Command	Description
<a href="#">ipv4 suffix (6rd), on page 63</a>	Assigns a value for the ipv4-suffix length to be used as part of both ends of a tunnel.
<a href="#">ipv6-prefix (6rd), on page 65</a>	Generates the delegated ipv6 prefix for a IPv6 Rapid Deployment (6RD) application.
<a href="#">source-address (6rd), on page 155</a>	Assigns an ipv4 address as the tunnel source address.
<a href="#">unicast address (6rd), on page 172</a>	Assigns an IPv6 address to be used for a IPv6 Rapid Deployment (6RD) Border Relay (BR) unicast configuration.

## ipv4 suffix (6rd)

To assign a value for the ipv4-suffix length to be used as part of both ends of a tunnel, use the **ipv4 suffix** command in 6RD configuration mode. To remove the **ipv4 suffix**, use the **no** form of this command.

**ipv4 suffix length** *value*

**no ipv4 suffix length** *value*

Syntax Description	Command	Description
	<b>ipv4 suffix length</b>	Specifies the IPv4 suffix length to be used while deriving the delegated IPv6 prefix.
	<i>value</i>	Length of the IPv4 suffix. The range is from 0 to 31.

**Command Default** None

**Command Modes** 6RD configuration

Command History	Release	Modification
	Release 4.1.0	This command was introduced.

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

This command assigns a value for the common ipv4 suffix length to be used as part of both ends of the tunnel. This is an optional br (Border Relay) tunnel configuration parameter. If this parameter is added or modified, the unicast address should also be modified.



**Note** The sum of the **ipv4 prefix** length and **ipv4 suffix** length must not exceed 31. This value is used to calculate 6RD delegated prefix.



**Note** Once configured, the ipv4 suffix cannot be deleted individually. It must be deleted along with all the br tunnel configuration. If you want to ignore the prefix length, alternatively you can set it to zero along with the updated unicast address.

**Task ID**

Task ID	Operation
cgn	read, write

**Examples**

This example shows how to configure the ipv4 suffix length:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router# (config)# service cgn cgn1
RP/0/RP0/CPU0:router# (config-cgn) service-type tunnel v6rd 6rd1
RP/0/RP0/CPU0:router (config-cgn-tunnel-6rd) # br
RP/0/RP0/CPU0:router (config-cgn-tunnel-6rd-br) # ipv4 suffix length 15
```

**Related Commands**

Command	Description
<a href="#">ipv4 prefix (6rd), on page 61</a>	Assigns a value for the ipv4-prefix length to be used as part of both ends of tunnel.
<a href="#">ipv6-prefix (6rd), on page 65</a>	Generates the delegated ipv6 prefix for a IPv6 Rapid Deployment (6RD) application.
<a href="#">source-address (6rd), on page 155</a>	Assigns an ipv4 address as the tunnel source address.
<a href="#">unicast address (6rd), on page 172</a>	Assigns an IPv6 address to be used for a IPv6 Rapid Deployment (6RD) Border Relay (BR) unicast configuration.

## ipv6-prefix (6rd)

To generate the delegated ipv6 prefix for a IPv6 Rapid Deployment (6RD) application, use the **ipv6-prefix** command in 6RD configuration mode. To remove the ipv6 prefix assigned for the application, use the **no** form of this command.

**ipv6-prefix** X:X::X/length *IPv6 subnet mask*

**no ipv6-prefix** X:X::X/length *IPv6 subnet mask*

<b>Syntax Description</b>	<i>X:X::X/length</i>	IPv6 address.
<b>Command Default</b>	None	
<b>Command Modes</b>	6RD configuration	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.1.0	This command was introduced.

### Usage Guidelines

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

The **ipv6-prefix** command is used for Border Relay (BR) tunnel configurations. It is used to generate a delegated ipv6 prefix for the BR-related configuration. This is a mandatory br tunnel parameter. All mandatory parameters must be added or deleted at the same time.



**Note** For a given 6RD domain, there is exactly one 6RD prefix. The **ipv6-prefix** command is used to convert the ipv4 address into ipv6 address for use by the 6RD domain.



**Note** For a 6RD tunnel, configure the **ipv6-prefix**, **ipv4 source-address**, and **unicast IPv6 address** in a single commit operation. Once configured, the **ipv6-prefix** cannot be deleted individually. It must be deleted along with all the br tunnel configuration parameters.

**Task ID**

Task ID	Operation
cgn	read, write

**Examples**

This example shows how to enter the ipv6-prefix for the 6RD CGN instance:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router# (config)# service cgn cgn1
RP/0/RP0/CPU0:router# (config-cgn) service-type tunnel v6rd 6rd1
RP/0/RP0/CPU0:router (config-cgn-tunnel-6rd) # br
RP/0/RP0/CPU0:router (config-cgn-tunnel-6rd-br) # ipv6-prefix 2010:db8:ff00::/40
```

**Related Commands**

Command	Description
<a href="#">ipv4 prefix (6rd), on page 61</a>	Assigns a value for the ipv4-prefix length to be used as part of both ends of tunnel.
<a href="#">ipv4 suffix (6rd), on page 63</a>	Assigns a value for the ipv4-suffix length to be used as part of both ends of a tunnel.
<a href="#">source-address (6rd), on page 155</a>	Assigns an ipv4 address as the tunnel source address.
<a href="#">unicast address (6rd), on page 172</a>	Assigns an IPv6 address to be used for a IPv6 Rapid Deployment (6RD) Border Relay (BR) unicast configuration.

## mss (NAT44)

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

<i>size</i>	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 appropriate task IDs. If the 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
cgcn	read, write

### Examples

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgcn cgcn1
RP/0/RP0/CPU0:router(config-cgcn)# service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cgcn-nat44)# inside-vrf insidevrf1
```

```
RP/0/RP0/CPU0:router(config-cgn-invrif)# protocol tcp  
RP/0/RP0/CPU0:router(config-cgn-invrif-PROTO)# mss 1100
```

# nat-mode

To enter the predefined mode for NAT44, use the **nat-mode** command. To disable this mode, use the **no nat-mode** command.

**nat-mode** {predefined}

**no nat-mode** {predefined}

## Syntax Description

<b>predefined</b>	Maps a private IP address to a specific port range of the corresponding public IP address. This keyword is for the predefined mode.
-------------------	---

## Command Default

None

## Command Modes

Global configuration mode

## Command History

Release	Modification
Release 4.3.2	This command was introduced.
Release 5.2.0	This command was modified.

## Usage Guidelines

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

## Task ID

Task ID	Operation
cgcn	read, write

## Examples

```

Applicable until Release 5.1.x.
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgcn cgcn1
RP/0/RP0/CPU0:router(config-cgcn)# service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cgcn-nat44)# inside-vrf insidevrf1
RP/0/RP0/CPU0:router(config-cgcn-invrif)# map address-pool 198.12.0.0/24
RP/0/RP0/CPU0:router(config-cgcn-invrif)# nat-mode predefined
RP/0/RP0/CPU0:router(config-cgcn-invrif-natmode)#
Applicable for Release 5.2.x and above.
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgcn cgcn1
RP/0/RP0/CPU0:router(config-cgcn)#service-type nat44 nat1

```

```
RP/0/RP0/CPU0:router(config-cgn-nat44)#inside-vrf insidevrf1  
RP/0/RP0/CPU0:router(config-cgn-invrf)#map outside-vrf blue address-pool 100.0.0.0/24  
RP/0/RP0/CPU0:router(config-cgn-invrf)#nat-mode  
RP/0/RP0/CPU0:router(config-cgn-invrf-natmode)#predefined private-pool 103.1.106.0/24
```

## path-mtu (6rd)

To configure the ipv4 tunnel MTU (Maximum Transmission Unit) size in bytes, use the **path-mtu** command in 6RD configuration mode. To reset the MTU to its default value, use the **no** form of this command.

**path-mtu** *value*

**no path-mtu**

<b>Syntax Description</b>	<i>value</i>	Path-MTU value, in bytes. The range is from 1280 to 1480.
---------------------------	--------------	---

<b>Command Default</b>	None	
------------------------	------	--

<b>Command Modes</b>	6RD configuration	
----------------------	-------------------	--

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.1.0	This command was introduced.

**Usage Guidelines**

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

This command configures the path MTU size, in bytes, for the ipv4 tunnel. If the size of any incoming packet is more than this path MTU, then an ICMP error is sent as a response.

<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	cgn	read, write

**Examples**

This example shows how to configure the **path-mtu** with the value of 1500:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn) service-type tunnel v6rd 6rd1
RP/0/RP0/CPU0:router(config-cgn-tunnel-6rd)# path-mtu 1500
```

## path-mtu (NAT44 Netflow Version 9)

To configure the path Maximum Transmission Unit (MTU) for the netflowv9-based external-logging facility for the inside VRF of a NAT44 instance, use the **path-mtu** command in NAT44 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

<i>value</i>	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

NAT44 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 appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

This NAT44 specific command configures the value of the path-mtu for the netflowv9 based external logging facility for an inside-VRF of NAT44 instance.

This command restricts the maximum size of the Netflow-v9 logging packet. The path-mtu value ranges from 100 to 9200. The netflowv9-based external-logging facility is exported by using the NAT table entries.



#### Note

Only when the ipv4 address and port number for the logging server has been configured, the configurations for path-mtu, refresh-rate and timeout are applied.

### 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/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cgn-nat44)# inside-vrf insidevrf1
RP/0/RP0/CPU0:router(config-cgn-invrf)# external-logging netflow version 9
RP/0/RP0/CPU0:router(config-cgn-invrf-af-extlog)# server
RP/0/RP0/CPU0:router(config-cgn-invrf-af-extlog-server)# path-mtu 2900
```

**Related Commands**

Command	Description
<a href="#">external-logging (NAT44 Netflow), on page 49</a>	Enables external logging of a NAT44 instance.
<a href="#">inside-vrf (NAT44), on page 55</a>	Enters inside VRF configuration mode for a NAT44 instance.
<a href="#">server (NAT44), on page 98</a>	Enables the logging server information for the IPv4 address and port for the server that is used for the netflowv9-based external-logging facility.
<a href="#">service cgn, on page 100</a>	Enables an instance for the CGN application.

## pcp-server (DS-LITE)

To configure a PCP server for a DS-Lite instance, use the **pcp-server** command in DS-Lite configuration mode. To undo the configuration, use the **no** form of this command.

**pcp-server port** *port number*

**no pcp-server port** *port number*

### Syntax Description

<b>pcp-server</b>	Specifies the PCP server to be configured.
<b>port</b>	Specifies the port of the PCP server.
<i>port number</i>	The port number range is from 1 to 65535. The default port number is <b>5351</b> .

### Command Default

None

### Command Modes

DS-Lite configuration mode

### Command History

Release	Modification
Release 4.3.0	This command was introduced.

### Usage Guidelines

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

### Task ID

Task ID	Operation
cg	read, write

### Examples

This example shows how to configure a PCP server for a DS-Lite instance:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn-inst
RP/0/RP0/CPU0:router(config-cgn)# service-type ds-lite ds-lite-inst
RP/0/RP0/CPU0:router(config-cgn-ds-lite)# pcp-server port 66
```

## pcp-server (NAT44)

To configure a PCP server for a NAT44 instance, use the **pcp-server** command in NAT44 configuration mode. To undo the configuration, use the **no** form of this command.

**pcp-server address** *IPv4 address* **port** *port number*

**no pcp-server address** *IPv4 address* **port** *port number*

### Syntax Description

<b>pcp-server</b>	Specifies the PCP server to be configured.
<b>address</b>	Specifies the address of the PCP server.
<i>IPv4 address</i>	IPv4 address.
<b>port</b>	Specifies the port of the PCP server.
<i>port number</i>	The port number range is from 1 to 65535. The default port number is <b>5351</b> .

### Command Default

None

### Command Modes

Exec

### Command History

Release	Modification
Release 4.3.0	This command was introduced.

### Usage Guidelines

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

### Task ID

Task ID	Operation
cgn	read, write

### Examples

This example shows how to configure a PCP server for a NAT44 instance:

```
RP/0/RP0/CPU0:router# configure
```

```
RP/0/RP0/CPU0:router(config)# service cgn cgn-inst  
RP/0/RP0/CPU0:router(config-cgn)# service-type nat44 nat-44-inst  
RP/0/RP0/CPU0:router(config-cgn-nat44)# inside-vrf vrf-inst  
RP/0/RP0/CPU0:router(config-cgn-invrif)# pcp-server address 10.2.2.30 port 66
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<a href="#">pcp-server (DS-LITE), on page 74</a>	Configures a Port Control Protocol (PCP) server for a DS-Lite instance.

## portlimit (NAT44)

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

<i>value</i>	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 appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

This is a NAT44 service type specific command to be applied for each CGN instance.

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
cgcn	read, write

### Examples

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cgn-nat44)# portlimit 500
```

**Related Commands**

Command	Description
<a href="#">service cgn, on page 100</a>	Enables an instance for the CGN application.

## portlimit (NAT44\_Inside-VRF)

To limit the number of translation entries of each source address, for each VRF instance, use the **portlimit** command in Inside-VRF configuration mode. To return to the default value of 100, use the **no** form of this command.

**portlimit** *value*

**no portlimit**

### Syntax Description

<i>value</i>	Value for the port limit. The range is from 1 to 65535.
--------------	---

### Command Default

By default, there are 100 translation entries for each VRF instance.

### Command Modes

Inside-VRF configuration

### Command History

Release	Modification
Release 4.3.1	This command was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the 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

This example shows how to set the port-limit of 500 for a VRF instance:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cgn-nat44)# inside-vrf invrf1
RP/0/RP0/CPU0:router(config-cgn-invrf)# portlimit 500
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<a href="#">bulk-port-alloc (NAT44), on page 27</a>	Allocates a number of contiguous outside ports in bulk to reduce Netflow/Syslog data volume.
<a href="#">external-logging (NAT44 Netflow), on page 49</a>	Enables external logging of a NAT44 instance.
<a href="#">external-logging (NAT44 Syslog), on page 51</a>	Enables external logging of the syslog data for a NAT44 instance.

## port-set

To create a port-set with a unique name, use the **port-set** command in the Carrier Grade NAT (CGN) configuration mode. To delete the port-set, use the **no** form of this command.

**port-set** *name*

**no port-set**

### Syntax Description

<i>name</i>	Specifies the name of the port-set to be created.
-------------	---

### Command Default

None

### Command Modes

CGN configuration mode

### Command History

Release	Modification
Release 5.3.1	This command was introduced.

### Usage Guidelines

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

Each port-set can contain up to 20 ports per UDP or TCP transport protocol. If a port-set is in use by one or more NAT inside-vrf instances, users cannot delete that port-set until the associations with all NAT inside-vrf instances are removed. However, the user can modify the contents of port-set while they are in use and the modifications take effect immediately.

### Task ID

Task ID	Operation
cg	read, write

### Examples

This example shows how to create a port-set for a CGN instance:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# port-set set1
RP/0/RP0/CPU0:router(config-cgn-portset)#
```

## 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} {mss|<28-1500>} {static-forward inside address|<A.B.C.D>|port|<1-65535>}
no protocol {icmp|tcp|udp}
```

### Syntax Description

<b>icmp</b>	Enters ICMP protocol configuration mode.
<b>tcp</b>	Enters TCP protocol configuration mode.
<b>udp</b>	Enters UDP protocol configuration mode.
<b>&lt;28-1500&gt;</b>	Maximum segment size to be used in bytes.
<b>static-forward</b>	Configures a static port.
<b>inside</b>	Specifies inside network configuration..
<b>address</b>	Specifies the inside address for static-forward.
<b>&lt;A.B.C.D&gt;</b>	Specifies the inside IP address.
<b>address</b>	Specifies the port number for static-forward.

### 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 appropriate task IDs. If the 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**

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cgn-nat44)# inside-vrf insidevrf1
RP/0/RP0/CPU0:router(config-cgn-invrf)# protocol icmp
RP/0/RP0/CPU0:router(config-cgn-invrf-icmp)# static-forward inside address 192.0.2.1 port 650
```

**Related Commands**

Command	Description
<a href="#">service cgn, on page 100</a>	Enables an instance for the CGN application.
<a href="#">show cgn nat44 inside-translation, on page 126</a>	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.
<a href="#">show cgn nat44 outside-translation, on page 132</a>	Displays the outside-address to inside-address translation details for a specified NAT44 instance.

## protocol (port-preservation)

To enter the TCP and UDP protocol configuration mode and specify the ports to be preserved, use the **protocol** command in the port-set configuration mode. To remove the ports that are preserved, use the **no** form of this command.

```
protocol {udp|tcp} {preserve-portsport-number}
```

```
no protocol {udp|tcp} {preserve-portsport-number}
```

### Syntax Description

<b>udp</b>	Enters the UDP protocol configuration mode.
<b>tcp</b>	Enters the TCP protocol configuration mode.
<b>preserve-ports</b>	Preserves the ports.
<i>port number</i>	Port number. The range is from 1 to 4294967295. Users can enter up to 20 port numbers separated by space per protocol.

### Command Default

None

### Command Modes

Port-set configuration mode.

### Command History

Release	Modification
Release 5.3.1	This command was introduced.

### Usage Guidelines

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

The **no** form of the protocol command must not be used when the port-set is in use by an inside-vrf instance. However, users can modify the port-numbers under the TCP or UDP protocol.

### Task ID

Task ID	Operation
cgn	read, write

**Examples**

This example shows how to enter the protocol configuration mode and specify the ports to be preserved:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# port-set set1
RP/0/RP0/CPU0:router(config-cgn-portset)# protocol udp
RP/0/RP0/CPU0:router(config-cgn-PROTO)# preserve-port 1021 1031 1041 1101 1202 1303 1404
15015 1606

RP/0/RP0/CPU0:router(config-cgn-portset)# protocol tcp
RP/0/RP0/CPU0:router(config-cgn-PROTO)# preserve-port 1020 1050 1100 1200 1300 1400 1500
1600
```

## protocol (NAT44)

To enter the ICMP, TCP, and UDP protocol configuration mode, use the **protocol** command. To remove all features that are enabled under the protocol configuration mode, use the **no** form of this command.

**protocol** {**gre**| **icmp**| **tcp**| **udp**} {**session**| *active* | *initial*} {**timeout** *value*}

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

### Syntax Description

<b>gre</b>	Enters the GRE protocol configuration mode.
<b>icmp</b>	Enters the ICMP protocol configuration mode.
<b>tcp</b>	Enters the TCP protocol configuration mode.
<b>udp</b>	Enters the UDP protocol configuration mode.
<b>session</b>	Session related configuration.
<i>active</i>	Active session timeout
<i>initial</i>	Initial session timeout
<b>timeout</b>	Session timeout
<i>value</i>	Timeout in seconds. The range is from 1 to 65535.

### Command Default

None

### Command Modes

NAT44 configuration mode

### Command History

Release	Modification
Release 4.1.0	This command was introduced.
Release 4.3.0	The keyword, <b>gre</b> was added.

**Usage Guidelines**

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

The protocol command enters the appropriate CGN AFI configuration mode.

**Task ID**

Task ID	Operation
cgcn	read, write

**Examples**

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router#(config)# service cgn cgn1
RP/0/RP0/CPU0:router#(config-cgn) service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cgn-nat44) # protocol icmp timeout 120
```

This example shows how to configure the UDP protocol for a CGN instance:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router#(config)# service cgn cgn1
RP/0/RP0/CPU0:router#(config-cgn) service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cgn-nat44) # protocol udp session initial timeout 120
RP/0/RP0/CPU0:router(config-cgn-nat44) # protocol udp session active timeout 180
```

This example shows how to configure the TCP protocol for a CGN instance:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router#(config)# service cgn cgn1
RP/0/RP0/CPU0:router#(config-cgn) service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cgn-nat44) # protocol tcp session active timeout 180
```

**Examples**

This example shows how to configure GRE for a NAT44 instance:

```
RP/0/RP0/CPU0:router#configure
RP/0/RP0/CPU0:router(config)#service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)#service-type nat44 nat44-1
RP/0/RP0/CPU0:router(config-cgn-nat44) # protocol gre
RP/0/RP0/CPU0:router(config-cgn-nat44-PROTO)#
```

## protocol icmp reset-mtu (CGN)

To reset the received packet size to 1280 when the received ipv4 ICMP packet size is less than 1280 bytes, use the **protocol icmp reset-mtu** command . To copy the received icmp packet size when translating ipv4 to ipv6 packets, use the **no** form of this command.

**protocolicmpreset-mtu**

**no protocolicmpreset-mtu**

**Syntax Description** This command has no keywords or arguments.

**Command Default** Received packet size will be copied when translating ipv4 to ipv6 for icmp packets.

**Command Modes** CGN-NAT64

Command History	Release	Modification
	Release 4.1.0	This command was introduced.

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

When the icmp reset-mtu protocol is enabled, the ICMP packet size is reset to 1280.

Task ID	Task ID	Operation
	cgn	read, write

**Examples** This example shows how to configure the icmp reset-mtu protocol for a CGN instance:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router# (config)# service cgn cgn1
RP/0/RP0/CPU0:router# (config-cgn) service-type nat64 stateless xlat1
RP/0/RP0/CPU0:router (config-cgn-nat64-stateless) # ipv6-prefix 2010:db8:ff00::/40
RP/0/RP0/CPU0:router (config-cgn-nat64-stateless) # address-family ipv6
RP/0/RP0/CPU0:router (config-cgn-nat64-stateless-afi) # protocol icmp
RP/0/RP0/CPU0:router (config-cgn-nat64-stateless-icmp) # reset-mtu
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<a href="#">address-family ipv6 (Stateless NAT64), on page 13</a>	Enters the IPv6 address family configuration mode.
<a href="#">ipv6-prefix (6rd), on page 65</a>	Generates the delegated ipv6 prefix for a IPv6 Rapid Deployment (6RD) application.
<a href="#">service cgn, on page 100</a>	Enables an instance for the CGN application.
<a href="#">service-type nat64 (Stateless), on page 108</a>	Creates a nat64 stateless application
<a href="#">traceroute (CGN), on page 164</a>	Configures a range of ipv4 addresses that are to be used for mapping when a non-translatable ipv6 address is received.
<a href="#">ubit-reserved (CGN), on page 170</a>	Reserves the bits 64 to 71 for the IPv6 addresses.

## reassembly-enable (6rd)

To reassemble fragmented packets, use the **reassembly-enable** command in 6RD configuration mode. To disable the reassembly of fragmented packets, use the **no** form of this command.

**reassembly-enable**

**no reassembly-enable**

**Syntax Description** This command has no keywords or arguments.

**Command Default** By default, reassembly is not allowed.

**Command Modes** 6RD configuration

Command History	Release	Modification
	Release 4.1.0	This command was introduced.

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

Task ID	Task ID	Operation
	cgn	read, write

**Examples** This example shows how to apply the **reassembly-enable** command for a 6RD tunnel:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router#(config)# service cgn cgn1
RP/0/RP0/CPU0:router#(config-cgn) service-type tunnel v6rd 6rd1
RP/0/RP0/CPU0:router(config-cgn-tunnel-6rd)# reassembly-enable
```

## refresh-direction (NAT44)

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 appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

This is a NAT44 service type specific command to be applied for each CGN instance.

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/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router (config)# service cgn cgn1
RP/0/RP0/CPU0:router (config-cgn)# service-type nat44 nat1
RP/0/RP0/CPU0:router (config-cgn-nat44)# refresh-direction outbound
```

**Related Commands**

Command	Description
<a href="#">service cgn, on page 100</a>	Enables an instance for the CGN application.

## refresh-rate (NAT44 Netflow Version 9)

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*

<b>Syntax Description</b>	<i>value</i>	Value, in packets, for the refresh rate. Range is from 1 to 600.
---------------------------	--------------	--

<b>Command Default</b>	<i>value</i> : 500
------------------------	--------------------

<b>Command Modes</b>	CGN inside VRF external logging server configuration
----------------------	--

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.9.1	This command was introduced.

<b>Usage Guidelines</b>	<p>To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.</p> <p>The netflowv9-based logging facility requires that a logging template be sent to the server periodically. The refresh-rate value implies that after sending that number of packets to the server, the template is resent. The timeout value implies that after that number of minutes have elapsed since the template was last sent, the template is resent to the logging server. The refresh-rate and timeout values are mutually exclusive; that is, the one that expires first, is the one taken into consideration for resending the template.</p>
-------------------------	---



<b>Note</b>	Only when the ipv4 address and port number for the logging server has been configured, the configurations for <b>path-mtu</b> , <b>refresh-rate</b> and <b>timeout</b> are applied.
-------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	cgn	read, write

**Examples**

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cgn-nat44)# inside-vrf insidevrf1
RP/0/RP0/CPU0:router(config-cgn-invrf)# external-logging netflow version 9
RP/0/RP0/CPU0:router(config-cgn-invrf-af-extlog)# server
RP/0/RP0/CPU0:router(config-cgn-invrf-af-extlog-server)# refresh-rate 50
```

**Related Commands**

Command	Description
<a href="#">external-logging (NAT44 Netflow), on page 49</a>	Enables external logging of a NAT44 instance.
<a href="#">inside-vrf (NAT44), on page 55</a>	Enters inside VRF configuration mode for a NAT44 instance.
<a href="#">server (NAT44), on page 98</a>	Enables the logging server information for the IPv4 address and port for the server that is used for the netflowv9-based external-logging facility.
<a href="#">service cgn, on page 100</a>	Enables an instance for the CGN application.
<a href="#">show cgn nat44 statistics, on page 144</a>	Displays the contents of the NAT44 CGN instance statistics.

## reset-df-bit (6rd)

To reset the Do Not Fragment (DF) bit to enable anycast mode, use the **reset-df-bit** command in 6RD configuration mode. To disable the anycast mode, use the **no** form of this command.

**reset-df-bit**

**no reset-df-bit**

**Syntax Description** This command has no keywords or arguments.

**Command Default** Anycast mode is disabled.

**Command Modes** 6RD configuration

Command History	Release	Modification
	Release 4.1.0	This command was introduced.

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

Task ID	Task ID	Operation
	cgn	read, write

**Examples** This example shows how to reset the DF bit:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router#(config)# service cgn cgn1
RP/0/RP0/CPU0:router#(config-cgn) service-type tunnel v6rd 6rd1
RP/0/RP0/CPU0:router(config-cgn-tunnel-6rd)# reset-df-bit
```

# sequence-check

To configure sequence number check in the TCP configuration, use the **sequence-check** command. To disable this sequence check, use the **no sequence-check** command.

**sequence-check**

**no sequence-check**

## Syntax Description

**diff-window** This optional keyword allows user to configure a value equal to the difference between the expected and received sequence numbers. The range for this value is 0 to 1,073,725,440.

If this keyword is not specified, then the difference is automatically computed for each TCP session based on the negotiated window size while establishing a connection.

It is recommended that the user does not configure a specific diff-window. This value will be decided based on the client-server negotiation for every TCP session. But if there are particular deployment scenarios, the diff-window can be configured with a value from the specified range.

## Command Default

None

## Command Modes

NAT44 Configuration Mode

## Command History

Release	Modification
Release 5.1.1	This command was introduced.

## Usage Guidelines

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

If a packet's sequence number is not the same as the expected value (which is equal to expected sequence number +/- diff-window), even then the packet is accepted. This is because there could be a packet loss along the way. If the value of diff-window is 0, then the sequence number of each packet should be an exact match of the expected sequence number.

## Task ID

Task ID	Operation
cgn	read, write

## Examples

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cgn-nat44)# inside-vrf insidevrf1
RP/0/RP0/CPU0:router(config-cgn-invrf)#firewall protocol tcp
RP/0/RP0/CPU0:router(config-cgn-invrf)#sequence-check
```

## server (NAT44)

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 NAT44 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** NAT44 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 appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **server** command enters NAT44 inside VRF address family external logging server configuration mode.

The NAT44 server command configures the ipv4 address and port number for the server to be used for netflowv9 based external logging facility for an inside-VRF of a NAT44 instance.



**Note** Only when the ipv4 address and port number for the logging server has been configured, the configurations for **path-mtu**, **refresh-rate** and **timeout** are applied.

### Task ID

Task ID	Operations
cgn	read, write

### Examples

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cgn-nat44)# inside-vrf insidevrf1
```

```
RP/0/RP0/CPU0:router(config-cgn-invrfr)# external-logging netflow version 9
RP/0/RP0/CPU0:router(config-cgn-invrfr-af-extlog)# server
RP/0/RP0/CPU0:router(config-cgn-invrfr-af-extlog-server)# address 10.10.0.0 port 50
```

**Related Commands**

Command	Description
<a href="#">address (NAT44 NetflowV9), on page 5</a>	Enables the IPv4 address of the server that is used for logging the entries for the Network Address Translation (NAT) table.
<a href="#">external-logging (NAT44 Netflow), on page 49</a>	Enables external logging of a NAT44 instance.
<a href="#">inside-vrf (NAT44), on page 55</a>	Enters inside VRF configuration mode for a NAT44 instance.
<a href="#">path-mtu (NAT44 Netflow Version 9), on page 72</a>	Configures the path Maximum Transmission Unit (MTU) for the netflowv9-based external-logging facility for the inside VRF of a NAT44 instance.
<a href="#">refresh-rate (NAT44 Netflow Version 9), on page 93</a>	Configures the refresh rate to log NetFlow-based external logging information for an inside VRF of a CGN instance.
<a href="#">service cgn, on page 100</a>	Enables an instance for the CGN application.
<a href="#">show cgn nat44 statistics, on page 144</a>	Displays the contents of the NAT44 CGN instance statistics.
<a href="#">timeout (NAT44 Netflow Version 9), on page 161</a>	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

<i>instance-name</i>	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 appropriate task IDs. If the 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/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router (config)# service cgn cgn1
RP/0/RP0/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

<b>preferred-active</b> <i>node-id</i>	Specifies the location in which the active CGN application starts. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
<b>preferred-standby</b> <i>node-id</i>	(Optional) Specifies the location in which the standby CGN application starts. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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 appropriate task IDs. If the 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/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn-nat44)# service-location preferred-active 0/1/CPU0
preferred-standby 0/4/CPU0
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<a href="#">hw-module service cgn location, on page 53</a>	Enables a CGN service role on a specified location.
<a href="#">interface ServiceApp, on page 57</a>	Enables the application SVI interface.
<a href="#">interface ServiceInfra, on page 59</a>	Enables the infrastructure SVI interface.
<a href="#">service cgn, on page 100</a>	Enables an instance for the CGN application.

## service-location (interface)

To configure the location of a 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

<i>node-id</i>	Specifies the ID of the node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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 appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

### Task ID

Task ID	Operations
interface	read, write

### Examples

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface ServiceInfra 1
RP/0/RP0/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	
<b>secgn</b>	Specifies the CGN service.
<b>preferred-active <i>node-id</i></b>	Specifies the location from where the failover must start. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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 appropriate task IDs. If the 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/RP0/CPU0:router# service redundancy failover service-type secgn preferred-active
0/1/cpu0
RP/0/RP0/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

<b>secgn</b>	Specifies the CGN service.
<b>preferred-active <i>node-id</i></b>	Specifies the location from where the failover must start. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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 appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

### Task ID

Task ID	Operations
cgcn	read, write

### Examples

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

```
RP/0/RP0/CPU0:router#
service redundancy revert service-type secgn preferred-active 0/1/cpu0
RP/0/RP0/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* [**alg** **inside-vrf**] **portlimit** | **protocol** | **refresh-direction**]

**no service-type nat44** *instance-name*

### Syntax Description

<i>instance-name</i>	Name of the NAT44 instance that is configured.
<b>alg</b>	Configures the Application Level Gateway type to be used.
<b>inside-vrf</b>	Configures inside VRF.
<b>portlimit</b>	Limits the number of entries per address.
<b>protocol</b>	Specifies the Transport protocol.
<b>refresh-direction</b>	NAT refresh direction to be used.

### 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 appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The NAT44 instance name must be unique across all CGN NAT44 and NAT64 stateless instance names.

### Task ID

Task ID	Operations
cgn	read, write

**Examples**

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

```
RP/0/RP0/CPU0:router# configure  
RP/0/RP0/CPU0:router(config)# service cgn cgn1  
RP/0/RP0/CPU0:router(config-cgn)# service-type nat44 nat1
```

## service-type nat64 (Stateless)

Use the **service-type nat64** command to create a nat64 stateless application. To delete the nat64 stateless application, use the **no** form of this command.

**service-type nat64 stateless** *instance* [**address-family**| **traceroute**| **ipv6-prefix**| **ubit-reserved**]

**no service-type nat64 stateless***instance*

### Syntax Description

<b>stateless</b>	Specifies the IPv4 to IPv6 Stateless translation.
<i>instance</i>	Indicates the name of the NAT64 stateless instance.
<b>address-family</b>	Specifies the address-family related configuration.
<b>traceroute</b>	Indicates the traceroute related configuration.
<b>ipv6-prefix</b>	Specifies the IPv6 prefix to be used to translate IPv4 address to IPv6 address.
<b>ubit-reserved</b>	Enables reserving ubits in IPv6 address.

### Command Default

None

### Command Modes

CONFIG-CGN

### Command History

Release	Modification
Release 4.1.0	This command was introduced.

### Usage Guidelines

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

The NAT64 stateless instance name must be unique across all the CGN NAT44 and NAT64 stateless instance names. There can only be 64 service-type NAT64 configurations per Roddick line card or chassis spanning over different cards.

### Task ID

Task ID	Operation
cg	read, write

## Examples

This example shows how to configure the nat64 stateless instance named xlat1 for the CGN application:

```
RP/0/RP0/CPU0:router# configure  
RP/0/RP0/CPU0:router(config)# service cgn cgn1  
RP/0/RP0/CPU0:router(config-cgn)# service-type nat64 stateless xlat1
```

## service-type tunnel v6rd

To create an IPv6 Rapid Deployment (6RD) tunnel application, use the **service-type tunnel** command in CGN submode. To delete this instance of the 6RD tunnel application, use the **no** form of this command.

```
service-type tunnel v6rd instance address-family | br | path-mtu | reassembly-enable | reset-df-bit | tos | ttl
no service-type tunnel v6rd instance
```

### Syntax Description

<b>v6rd</b>	Specifies the 6RD configuration.
<i>instance</i>	Name of the 6RD instance.
<b>address-family</b>	Specifies the address-family related configuration.
<b>br</b>	Specifies the border relay related configuration.
<b>path-mtu</b>	Specifies the IPv6 MTU value.
<b>reassembly-enable</b>	Enables the reassembly operation.
<b>reset-df-bit</b>	Enables resetting of DF bit.
<b>tos</b>	Specifies the type of service to be used for IPv4 tunnel.
<b>ttl</b>	Specifies the time to live value to be used for IPv4 tunnel.

### Command Default

None

### Command Modes

CGN submode

### Command History

Release	Modification
Release 4.1.0	This command was introduced.

### Usage Guidelines

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

There can be 64 service-type 6RD tunnel configurations for each line card or chassis spanning over different cards.

**Task ID**

<b>Task ID</b>	<b>Operation</b>
cg	read, write

**Examples**

This example shows how to configure the 6RD tunnel instance for the CGN application:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# service-type tunnel v6rd 6rd1
RP/0/RP0/CPU0:router(config-cgn-tunnel-6rd)#
```

## session (NAT44)

To configure the timeout values for both active and initial sessions for TCP or UDP, use the **session** command in NAT44 protocol configuration mode. To revert 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

<b>active</b>	Configures the active session timeout for both TCP and UDP. The default value for UDP active session timeout is 120 seconds.
<b>initial</b>	Configures the initial session timeout.
<b>timeout</b>	Configures the timeout for either active or initial sessions.
<i>seconds</i>	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

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 appropriate task IDs. If the 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
cgcn	read, write

**Examples**

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cgn-nat44)# protocol tcp
RP/0/RP0/CPU0:router(config-cgn-PROTO)# session initial timeout 90
```

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cgn-nat44)# protocol tcp
RP/0/RP0/CPU0:router(config-cgn-PROTO)# session active timeout 90
```

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cgn-nat44)# protocol udp
RP/0/RP0/CPU0:router(config-cgn-PROTO)# session initial timeout 90
```

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cgn-nat44)# protocol udp
RP/0/RP0/CPU0:router(config-cgn-PROTO)# session active timeout 90
```

**Related Commands**

Command	Description
<b>protocol (NAT44)</b>	
<a href="#">service cgn</a> , <a href="#">on page 100</a>	Enables an instance for the CGN application.
<a href="#">show cgn nat44 inside-translation</a> , <a href="#">on page 126</a>	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.
<a href="#">show cgn nat44 outside-translation</a> , <a href="#">on page 132</a>	Displays the outside-address to inside-address translation details for a specified NAT44 instance.

Command	Description
<a href="#">timeout (NAT44), on page 159</a>	Configures the timeout for the ICMP session for a CGN instance.

## session-logging (DS-LITE Netflow9)

To enable session logging for a DS-Lite instance, use the **session-logging** command in DS-Lite configuration mode.

To disable session logging, use the **no** form of this command.

**session-logging**

**no session-logging**

**Syntax Description** This command has no keywords or arguments.

**Command Default** By default, session logging is disabled.

**Command Modes** DS-Lite configuration mode

Command History	Release	Modification
	Release 4.3.0	This command was introduced.

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

Task ID	Task ID	Operation
	cgcn	read, write

**Examples** This example shows how to enable session logging for a DS-Lite instance:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn-inst
RP/0/RP0/CPU0:router(config-cgn)# service-type ds-lite ds-lite-inst
RP/0/RP0/CPU0:router(config-cgn-nat44)# inside-vrf vrf-inst
RP/0/RP0/CPU0:router(config-cgn-invrfr)# external-logging netflow version 9
RP/0/RP0/CPU0:router(config-cgn-invrfr-af-extlog)# server
RP/0/RP0/CPU0:router(config-cgn-invrfr-af-extlog-server)# session logging
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<a href="#">session-logging (NAT44 Netflow Version 9)</a> , on page 117	Enables session logging for a NAT44 instance.

## session-logging (NAT44 Netflow Version 9)

To enable session logging for a NAT44 instance, use the **session-logging** command in NAT44 configuration mode.

To disable session logging, use the **no** form of this command.

**session-logging**

**no session-logging**

**Syntax Description** This command has no keywords or arguments.

**Command Default** By default, session logging is disabled.

**Command Modes** NAT44 configuration mode

### Command History

Release	Modification
Release 4.3.0	This command was introduced.

### Usage Guidelines

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

### Task ID

Task ID	Operation
cg	read, write

### Examples

This example shows how to enable session logging for a NAT44 instance:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cg cg-inst
RP/0/RP0/CPU0:router(config-cg)# service-type nat44 nat-44-inst
RP/0/RP0/CPU0:router(config-cg-nat44)# inside-vrf vrf-inst
RP/0/RP0/CPU0:router(config-cg-invr)# external-logging netflow version 9
RP/0/RP0/CPU0:router(config-cg-invr-af-extlog)# server
RP/0/RP0/CPU0:router(config-cg-invr-af-extlog-server)# session logging
```

**Related Commands**

Command	Description
<a href="#">session-logging (DS-LITE Netflow9), on page 115</a>	Enables session logging for a DS-Lite instance.

## show cgn ds-lite session

To display all the active destination sessions for a given source IPv4 address and port number per DS-Lite instance, use the **show cgn ds-lite session** command in EXEC mode.

```
show cgn ds-lite instance-name session protocol {icmp|tcp|udp} [translation-type {alg|all|dynamic|static}] [tunnel-v6-source-address IPv6 address inside-address IPv4 address port port number]
```

### Syntax Description

<b>session</b>	Specifies the active session for a given source IP address and port.
<i>instance-name</i>	Name of the DS-Lite instance that is configured.
<b>protocol</b>	Displays the name of the protocols.
<b>icmp</b>	Displays the ICMP protocol.
<b>tcp</b>	Displays the TCP protocol.
<b>udp</b>	Displays the UDP protocol.
<b>translation-type</b>	(Optional) Displays the translation type.
<b>alg</b>	(Optional) Displays only the ALG translation entries.
<b>all</b>	(Optional) Displays all the translation entries, for example, alg, dynamic, and static.
<b>dynamic</b>	(Optional) Displays only the dynamic translation entries.
<b>static</b>	(Optional) Displays only the static translation entries.
<b>ipv4</b>	(Optional) Displays information for the IPv4 address family.
<b>tunnel-v6-source-address</b>	Specifies the source tunnel IPv6 address.
<i>IPv6 address</i>	IPv6 address.
<b>inside-address</b>	Displays the inside address for the inside Virtual Routing Forwarding (VRF).
<i>IPv4 address</i>	IPv4 address of the source.
<b>port</b>	Port number of the source.

**show cgn ds-lite session**


---

*port-number* Specifies the port number range from 1 to 65535.

---

**Command Default** None

**Command Modes** Exec

**Command History**

Release	Modification
Release 4.3.0	This command was introduced.

**Usage Guidelines**

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

**Task ID**

Task ID	Operation
cgn	read

**Examples**

This example shows how to display all the active destination sessions for a given source IPv4 address and port number per DS-Lite instance:

```
RP/0/RP0/CPU0:router#
show cgn ds-lite ds-lite-inst session protocol tcp translation-type alg inside-address
10.1.1.50 port 123
```

```
Session details:
```

```
-----
DS-Lite instance: ds-lite-inst
-----
```

```
Outside address: 12.168.6.231
```

```
Outside port: 235
```

```
Translation type: alg
```

```
Protocol: tcp
-----
```

Destination IP	Destination Port
209.85.231.104	100
209.85.231.106	200
.	
.	
.	
209.85.231.178	579

# show cgn nat44 inside-vrf counters

To display the counters for sequence-check, use the **show cgn nat44 inside-vrf counters** command in EXEC mode.

**show cgn nat44** *instance-name* **inside-vrf** *instance-name* **counters**

Syntax Description	counters	Lists the counters for TCP sequence check
	<i>instance-name</i>	The name of the NAT44 instance

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 5.1.1	This command was introduced.
	Release 5.2.0	Additional counters were introduced.

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

Task ID	Task ID	Operation
	cgn	read, write

**Examples** The following example shows the counters for TCP sequence check.

```
RP/0/RP0/CPU0:router# show cgn nat44 nat1 inside-vrf vrf1 counters
```

```
Counters summary of NAT44 instance: 'nat1'
Number of Out2In drops due to TCP sequence mismatch: 0
Number of Outside to inside TCP sequence mismatch: 0
Total number of sessions created due to Out2In packets: 0
Number of Out2In drops due to end point filtering: 0
Number of translations created: 2019
Number of translations deleted: 2017
Number of sessions created: 190000
```

**show cgn nat44 inside-vrf counters**

```

Number of sessions deleted: 170000
Syslog/Netflow translation create records generated: 0
Syslog/Netflow translation delete records generated: 0
Syslog/Netflow sessions create records generated: 0
Syslog/Netflow sessions delete records generated: 0
Number of Netflow packets generated: 0
Number of Syslog packets generated: 0
Dropped Netflow packets due to congestion: 0
Dropped Syslog packets due to congestion: 0
Average usage of bulk allocated ports: 0
Average number of bulk-allocations made: 0

```

The following table describes the fields seen in the output of the **show cgn nat44 inside-vrf counters** as shown in the above example:

Name	Description
<b>Number of Out2In drops due to TCP sequence mismatch</b>	Number of packets dropped for not being in the sequence
<b>Number of Outside to inside TCP sequence mismatch</b>	Number of TCP packets dropped for not being in the sequence
<b>Total number of sessions created due to Out2In packets</b>	Number of sessions created with both Inside-to-Outside and Outside-to-Inside packets
<b>Number of Out2In drops due to end point filtering</b>	Number of packets dropped if Endpoint-Dependent Mapping is configured
<b>Number of translations created</b>	Total number of translations created
<b>Number of translations deleted</b>	Total number of translations cleared after the timeout
<b>Number of sessions created</b>	Total number of sessions created
<b>Number of sessions deleted</b>	Total number of sessions deleted
<b>Syslog/Netflow translation create records generated</b>	Number of translation create records generated for Syslog or NetFlow
<b>Syslog/Netflow translation delete records generated</b>	Number of translation create records deleted for Syslog or NetFlow
<b>Syslog/Netflow sessions create records generated</b>	Number of session create records generated for Syslog or NetFlow
<b>Syslog/Netflow sessions delete records generated</b>	Number of session delete records generated for Syslog or NetFlow
<b>Number of Netflow packets generated</b>	Number of packets generated for NetFlow
<b>Number of Syslog packets generated</b>	Number of packets generated for Syslog

<b>Dropped Netflow packets due to congestion</b>	Number of NetFlow packets dropped due to system errors
<b>Dropped Syslog packets due to congestion</b>	Number of Syslog packets dropped due to system errors
<b>Average usage of bulk allocated ports</b>	Percentage of the usage of the bulk allocated ports
<b>Average number of bulk-allocations made</b>	Percentage of the bulk allocations made from all the possible locations

## show cgn nat44 greEntries

To display the GRE channels of a PPTP tunnel, use the **show cgn nat44 greEntries** command in EXEC mode.

**show cgn nat44** *instance-name* **greEntries** **inside-vrf** *vrf-name* **tunnel-address** *address* **pns-port** *port-number* **call-id** **start** *value* **end** *value*

### Syntax Description

<i>instance-name</i>	Name of the configured NAT44 instance.
<b>greEntries</b>	GRE channels of the PPTP tunnel.
<b>inside-vrf</b>	The Virtual Routing Forwarding (VRF) for which the translation details are needed.
<i>vrf-name</i>	Name of the VRF.
<b>tunnel-address</b>	Address of the PPTP Network Server (PNS).
<b>pns-port</b>	Port number of the PNS. The range is from 1 to 65535.
<b>call-id</b>	Range of call IDs.
<i>value</i>	Value of the call IDs. The range is from 0 to 65535.

### Command Default

None

### Command Modes

Exec

### Command History

Release	Modification
Release 4.3.0	This command was introduced.

### Usage Guidelines

#### Task ID

Task ID	Operation
cgn	read

**Examples**

This example displays the GRE channel details:

```
RP/0/RP0/CPU0:router# show cgn nat44 nat1 greEntries
```

```
GRE-Channel details
```

```
-----  
NAT44 instance : instname  
Inside-VRF     : vrf name  
-----
```

```
      In Call Id      Out Call Id  
-----  
      xxxx           yyyy  
      aaaa           bbbb
```

## 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-vrf protocol {gre | icmp | tcp | udp} [translation-type {alg | all | dynamic | pcp-explicit-dynamic | pcp-implicit-dynamic | static}] inside-vrf vrf-name | tunnel-v6-source-address {source tunnel address | inside-address | address port | start | number | end | number}
```

### Syntax Description

<i>instance-name</i>	Name of the NAT44 instance that is configured.
<b>protocol</b>	Displays the name of the protocols.
<b>gre</b>	Displays the GRE protocol.
<b>icmp</b>	Displays the ICMP protocol.
<b>tcp</b>	Displays the TCP protocol.
<b>udp</b>	Displays the UDP protocol.
<b>translation-type</b>	(Optional) Displays the translation type.
<b>alg</b>	(Optional) Displays only the ALG translation entries.
<b>all</b>	(Optional) Displays all the translation entries, for example, alg, dynamic, and static.
<b>pcp-explicit-dynamic</b>	Displays Port Control Protocol (PCP) explicit translation entries.
<b>pcp-implicit-dynamic</b>	Displays Port Control Protocol (PCP) implicit translation entries
<b>dynamic</b>	(Optional) Displays only the dynamic translation entries.
<b>static</b>	(Optional) Displays only the static translation entries.
<b>ipv4</b>	(Optional) Displays information for the IPv4 address family.
<b>inside-vrf</b>	Displays the information for the inside VPN routing and forwarding (VRF) for the necessary translation details.
<i>vrf-name</i>	Name of the inside VRF.

<b>inside-address</b>	Displays the inside address for the inside VRF.
<i>address</i>	Inside address.
<b>port</b>	Displays the range of the port numbers.
<b>start number</b>	The start port from which the translation table entries should be displayed.
<b>end number</b>	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.
Release 4.3.0	The keyword, <b>gre</b> was added.

**Usage Guidelines**

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the 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**

This example shows sample output from the **show cgn inside-translation** command:

```
RP/0/RP0/CPU0:router#
show cgn nat44 nat1 inside-translation protocol tcp inside-vrf insidevrf1 inside-address
192.168.6.23 port-range 23 56
```

## show cgn nat44 inside-translation

```

Inside-translation details
-----
NAT44 instance : nat1
Inside-VRF     : insidevrf1
-----

```

Outside Address	Protocol	Inside Source Port	Outside Source Port	Translation Type	Inside to Outside Packets	Outside to Inside 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

**Examples**

This example shows the sample output for PPTP and GRE:

```

RP/0/RP0/CPU0:router
show cgn nat44 inst1 inside-translation protocol gre inside-vrf ivrf inside-address 11.11.11.2
port start 1 end 65535

```

```

Inside-translation details
-----
NAT44 instance : inst1
Inside-VRF     : ivrf
-----

```

Outside Address	Protocol	Inside Source Port	Outside Source Port	Translation Type	Inside to Outside Packets	Outside to Inside Packets
52.52.52.215	gre	21	61746	alg	0	359423
52.52.52.215	gre	23	32489	alg	0	359423
52.52.52.215	gre	29	5940	alg	0	359423

**Note**

There is no Inside-to-Outside accounting during GRE translation. The value is always 'zero'.

**Examples**

This example shows the sample output for PCP translations:

```

RP/0/RP0/CPU0:router

show cgn nat44 nat1 inside-translation protocol udp inside-translation inside-vrf
red inside-address 11.11.11.12 port start 1 end 65535

```

```

Inside-translation details
-----
NAT44 instance : nat1
Inside-VRF     : red
-----

```

Outside Address	Protocol	Inside Source Port	Outside Source Port	Translation Type	Inside to Outside Packets	Outside to Inside Packets
-----------------	----------	--------------------	---------------------	------------------	---------------------------	---------------------------

```

-----
100.0.0.217      udp      14       34655    pcp_explicit  7          0
100.0.0.217      udp      14       34655    pcp_implicit  7          0

```

This table 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 (All/ALG/Dynamic/pcp-explicit-dynamic/pcp-implicit-dynamic/Static).
Inside to Outside Packets	Outbound Packets.
Outside to Inside Packets	Inbound Packets.

## Related Commands

Command	Description
<a href="#">clear cgn nat44 inside-vrf</a> , on page 32	Clears translation database entries that are created dynamically for the specified inside VRF.
<a href="#">clear cgn nat44 port</a> , on page 36	Clears the translation database entries that are created dynamically for the specified inside port number.
<a href="#">clear cgn nat44 protocol</a> , on page 39	Clears translation database entries that are created dynamically for the specified protocol.
<b>protocol (NAT44)</b>	
<a href="#">service cgn</a> , on page 100	Enables an instance for the CGN application.
<a href="#">show cgn nat44 outside-translation</a> , on page 132	Displays the outside-address to inside-address translation details for a specified NAT44 instance.

## show cgn nat44 mapping

To display the mapping from a private IP address to a public IP address or from a public IP address to a private IP address for NAT44 in both the classic mode and the predefined mode, use the **show cgn nat44 mapping** command.

**show cgn nat44** *instance-name* **mapping** {**inside-address** | **outside-address**} **inside-vrf** *vrf-instance* **start-addr** *start address* [**end-addr** *end address*]

### Syntax Description

<b>inside-address</b>	Displays the IPv4 address from the private pool.
<b>outside-address</b>	Displays the public IPv4 address.
<i>vrf-instance</i>	Name of the VRF.
<b>start-addr</b> <i>start address</i>	Start address for the IPv4 address range for which the mapping has to be displayed.
<b>end-addr</b> <i>end address</i>	Last address of the IPv4 address range for which the mapping has to be displayed.

### Command Default

None

### Command Modes

Exec

### Command History

Release	Modification
Release 4.3.2	This command was introduced.

### Usage Guidelines

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

### Task ID

Task ID	Operation
cgn	read

**Examples**

```
RP/0/RP0/CPU0:router#
show cgn nat44 nat1 mapping inside-address inside-vrf ins1 start-addr 192.1.106.0 end-addr
192.1.107.37
```

```
Session details:
```

```
-----
NAT44 instance: nat1
VRF             : ins1
-----
```

```
-----
Inside Ip      Outside IP      Type                Port Range          Ports Used
Address        Address
-----
192.1.107.0    198.12.0.28      Predefined          29696-36863         0
192.1.107.1    198.12.0.29      Predefined          29696-36863         1
.
.
.
192.1.107.37   198.12.0.57      Predefined          29696-36863         0
-----
```

This table describes the significant fields shown in the display.

**Table 2: show cgn nat44 mapping Field Descriptions**

Field	Description
NAT44 instance	Name of the NAT44 instance configured
inside-vrf	Name of the VRF configured
Outside IP Address	Public IPv4 address
Inside IP Address	IPv4 address from the private pool.
Type	Type of the NAT mode.
Port Range	The range of ports defined for the public IP addresses to which the mapping is done.
Ports Used	Specifies the number of translations that are currently being used by the subscriber. The value 0 indicates that the subscriber is not using address translation at that moment. The value that is equal to the number of ports in the range indicates that the subscriber might have exceeded the allocated limit because of which some packets might be dropped.

## 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** {**gre**| **icmp**| **tcp**| **udp**} [**translation-type** {**alg**| **all**| **dynamic**| **pcp-explicit-dynamic**| **pcp-implicit-dynamic**| **static**}] **outside-address** *address* **port start number end number**

### Syntax Description

<i>instance-name</i>	Name of the NAT44 instance that is configured.
<b>protocol</b>	Displays the name of the protocols.
<b>gre</b>	Displays the GRE protocol.
<b>icmp</b>	Displays the ICMP protocol.
<b>tcp</b>	Displays the TCP protocol.
<b>udp</b>	Displays the UDP protocol.
<b>translation-type</b>	(Optional) Displays the translation type.
<b>alg</b>	(Optional) Displays only the ALG translation entries.
<b>all</b>	(Optional) Displays all the translation entries, for example, alg, dynamic, and static.
<b>pcp-explicit-dynamic</b>	Displays Port Control Protocol (PCP) explicit translation entries.
<b>pcp-implicit-dynamic</b>	Displays Port Control Protocol (PCP) implicit translation entries.
<b>dynamic</b>	(Optional) Displays only the dynamic translation entries.
<b>static</b>	(Optional) Displays only the static translation entries.
<b>outside-address</b>	Displays the outside address for the inside VRF.
<i>address</i>	Outside address.
<b>port</b>	Displays the range of the port numbers.
<b>start number</b>	Displays the start of the port number.
<b>end number</b>	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 <b>address-family</b> keyword was removed.
	Release 4.3.0	The keyword, <b>gre</b> was added.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the 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** This example shows sample output from the **show cgn outside-translation** command:

```
RP/0/RP0/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      Protocol  Destination Destination Type         to      to
              Port      Port      Port
-----
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
.
.
.
.
```

`show cgn nat44 outside-translation`

```

.
13.16.6.23  tcp          390          621          static       67532       1234

```

**Examples**

This example shows the sample output for PPTP and GRE:

```
RP/0/RP0/CPU0:router
```

```
show cgn nat44 inst1 outside-translation protocol gre outside-address 52.52.52.215 port
start 1 end 65535
```

```
-----
Outside-translation details
-----
```

```
NAT44 instance : inst1
Outside-VRF    : default
-----
```

Inside Address	Protocol	Outside Destination Port	Inside Destination Port	Translation Type	Inside to Outside Packets	Outside to Inside Packets
11.11.11.2	gre	1492	43605	alg	0	359423
11.11.11.2	gre	3967	43575	alg	0	359423
11.11.11.2	gre	5940	29	alg	0	359423

**Note**

There is no Inside-to-Outside accounting during GRE translation. The value is always 'zero'.

This table describes the significant fields shown in the display.

**Table 3: 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/pcp-explicit-dynamic/pcp-implicit-dynamic/ALG/Static+ALG)
Inside to Outside Packets	Outbound Packets
Outside to Inside Packets	Inbound Packets

**Related Commands**

Command	Description
<a href="#">clear cgn nat44 inside-vrf</a> , on page 32	Clears translation database entries that are created dynamically for the specified inside VRF.
<a href="#">clear cgn nat44 port</a> , on page 36	Clears the translation database entries that are created dynamically for the specified inside port number.
<a href="#">clear cgn nat44 protocol</a> , on page 39	Clears translation database entries that are created dynamically for the specified protocol.
<b>protocol (NAT44)</b>	
<a href="#">service cgn</a> , on page 100	Enables an instance for the CGN application.
<a href="#">show cgn nat44 inside-translation</a> , on page 126	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. The range of the IPv4 addresses must not be more than 255 consecutive IPv4 addresses. Any range beyond the specified limit may hog the CGSE processors resulting in unresponsive CGN commands and Health monitoring test failures which causes subsequent CGSE reload, if auto reload is not disabled.

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

### Syntax Description

<b>nat44</b> <i>instance-name</i>	Name of the NAT44 instance that is configured.
<b>inside-vrf</b>	Displays the contents for the inside VRF.
<i>vrf-name</i>	Name for the inside VRF.
<b>address-range</b>	Displays the range for the outside address.
<i>start-address</i>	Range for the start address of the outside address pool. The range of the IPv4 addresses cannot be more than 255 consecutive IPv4 addresses.
<i>end-address</i>	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 appropriate task IDs. If the 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/RP0/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 Address	Number of Free ports	Number of 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

This table describes the significant fields shown in the display.

**Table 4: 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

 show cgn nat44 pool-utilization**Related Commands**

Command	Description
<a href="#">inside-vrf (NAT44), on page 55</a>	Enters inside VRF configuration mode for a NAT44 instance.

## show cgn nat44 pptpCounters

To display the statistics of NAT44 instance related to Point-to-Point Tunneling Protocol (PPTP) Application-Level Gateway (ALG), use the **show cgn nat44 pptpCounters** command in EXEC mode.

**show cgn nat44** *instance-name* **pptpCounters**

### Syntax Description

<i>instance-name</i>	Name of the configured NAT44 instance.
----------------------	--

### Command Default

None

### Command Modes

EXEC

### Command History

Release	Modification
Release 4.3.0	This command was introduced.

### Usage Guidelines

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

### Task ID

Task ID	Operations
cgn	read

### Examples

This example shows the statistics of PPTP ALG:

```
RP/0/RP0/CPU0:router# show cgn nat44 nat1 pptpCounters
```

```
PPTP Alg counters of NAT44 instance: 'nat1'
pptp active tunnels           : 0
pptp active channels         : 0
gre in2out fwds              : 0
gre out2in fwds              : 0
gre in2out drops             : 0
gre out2in drops             : 0
pptp ctrl msg drops          : 0
start ctrl connection reqs   : 0
start ctrl connection reply  : 0
stop ctrl connection reqs    : 0
stop ctrl connection reply   : 0
echo reqs                    : 0
```

**show cgn nat44 pptpCounters**

```
echo reply : 0
outbound connection reqs : 0
outbound connection reply : 0
inbound connection reqs : 0
inbound connection reply : 0
inbound connection connected : 0
call clear reqs : 0
call disconnect reqs : 0
wan error notify : 0
set link info : 0
```

## show cgn nat44 session

To display all the active destination sessions for a given source IPv4 address and port number per NAT44 instance, use the **show cgn nat44 session** command in EXEC mode.

```
show cgn nat44 instance-name session protocol {icmp| tcp| udp} [translation-type {alg| all| dynamic| static}] [inside-vrf vrf-instance inside-address IPv4 address port port number]
```

### Syntax Description

<b>session</b>	Specifies the active session for a given source IP address and port.
<i>instance-name</i>	Name of the NAT44 instance that is configured.
<b>protocol</b>	Displays the name of the protocols.
<b>icmp</b>	Displays the ICMP protocol.
<b>tcp</b>	Displays the TCP protocol.
<b>udp</b>	Displays the UDP protocol.
<b>translation-type</b>	(Optional) Displays the translation type.
<b>alg</b>	(Optional) Displays only the ALG translation entries.
<b>all</b>	(Optional) Displays all the translation entries, for example, alg, dynamic, and static.
<b>dynamic</b>	(Optional) Displays only the dynamic translation entries.
<b>static</b>	(Optional) Displays only the static translation entries.
<b>ipv4</b>	(Optional) Displays information for the IPv4 address family.
<b>inside-vrf</b>	Displays the information for the inside VPN routing and forwarding (VRF) for the necessary translation details.
<i>vrf-name</i>	Name of the inside VRF.
<b>inside-address</b>	Displays the inside address for the inside VRF.
<i>address</i>	IPv4 address of the source.
<b>port</b>	Port number of the source.
<i>port-number</i>	Specifies the port number range from 1 to 65535.

**Command Default** None

**Command Modes** Exec

Command History	Release	Modification
	Release 4.3.0	This command was introduced.

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

Task ID	Task ID	Operation
	cgn	read

**Examples** This example shows how to display all the active destination sessions for a given source IPv4 address and port number per NAT44 instance:

```
RP/0/RP0/CPU0:router#
show cgn nat44 nat44-inst session protocol tcp translation-type alg inside-address 10.1.1.50
port 123

Session details:
-----
NAT44 instance: nat44-inst
-----
Outside address: 12.168.6.231
Outside port: 235
Translation type: alg
Protocol: tcp
-----
Destination IP           Destination Port
209.85.231.104           100
209.85.231.106           200
.
.
.
209.85.231.178           579
```

Related Commands	Command	Description
	<a href="#">show cgn nat44 inside-translation, on page 126</a>	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.

Command	Description
<a href="#">show cgn nat44 outside-translation, on page 132</a>	Displays the outside-address to inside-address translation details for a specified NAT44 instance.
<a href="#">show cgn nat44 pool-utilization, on page 136</a>	Displays the outside address pool utilization details for a specified NAT44 instance.
<a href="#">show cgn nat44 statistics, on page 144</a>	Displays the contents of the NAT44 CGN instance statistics.

## 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	<i>instance-name</i>	Name of the configured NAT44 instance.
--------------------	----------------------	--

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 3.9.1	This command was introduced.
	Release 4.0.0	The <b>summary</b> keyword was removed.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the 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** This example shows the statistics entries:

```
RP/0/RP0/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 resource 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
-----

```

The following table describes the fields seen in the output of the **show cgn nat44 nat1 statistics** as shown in the above example:

Name	Description
<b>Number of active translations</b>	Translation entries allocated in the database.
<b>Translations create rate/Translations delete rate</b>	Rate in sessions per second.
<b>Inside to outside forward rate/Outside to inside forward rate</b>	Rate in packets per second.
<b>Inside to outside drops port limit exceeded</b>	Packets dropped because the port-limit for the inside user has exceeded
<b>Inside to outside drops system limit reached</b>	Packets dropped as a result of reaching the system limit.
<b>Inside to outside drops resource depletion</b>	Packets dropped because no public L4 port could be allocated.
<b>Outside to inside drops no translation entry</b>	Packets dropped due to lack of entry in the translation database.
<b>Pool address totally free</b>	Addresses available from the pool.
<b>Pool address used</b>	Addresses utilized from the pool.

## Examples

This example shows the statistics of PPTP and GRE entries:

```
RP/0/RP0/CPU0:router# show cgn nat44 nat1 statistics
```

```

Statistics summary of NAT44 instance: 'nat1'
Number of active translations: 3
Translations create rate: 0
Translations delete rate: 0
Inside to outside forward rate: 0
Outside to inside forward rate: 0
Inside to outside drops port limit exceeded: 0
Inside to outside drops system limit reached: 0
Inside to outside drops resource depletion: 0
No translation entry drops: 0
PPTP active tunnels: 1
PPTP active channels: 2
PPTP ctrl message drops: 4

```

```
show cgn nat44 statistics
```

```
Pool address totally free: 255  
Pool address used: 1  
Pool address usage:
```

```
-----  
External Address      Ports Used  
-----  
52.52.52.215         3  
-----
```

## show cgn pcpcounters

To display PCP related statistics per CGN instance, use the **show cgn pcpcounters** command in EXEC mode.

```
show cgn instance-name pcpcounters
```

Syntax Description	<i>instance-name</i>	Name of the CGN instance.
--------------------	----------------------	---------------------------

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 4.3.0	This command was introduced.

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

Task ID	Task ID	Operations
	cgn	read

**Examples** This command displays the statistics corresponding to CGN instances:

```
show cgn c1 pcpcounters
```

```
PCP counters of NAT44 instance: 'cgn1'
pcp input                : 3
pcp output               : 3
pcp service nat44        : 3
pcp service dslite       : 0
pcp drops                : 0
pcp in2out key in use    : 0
pcp throttle drops      : 0
pcp udp length           : 0
pcp nrequest             : 0
pcp minimum udp length   : 0
pcp maximum udp length   : 0
pcp mod4 length          : 0
```

## show cgn pcpcounters

```
pcp invalid 3rd party length      : 0
pcp invalid option                : 0
pcp version                      : 0
pcp invalid opcode                : 0
pcp invalid client ip             : 0
pcp invalid proto                 : 0
pcp invalid port                  : 0
pcp invalid vrfmap                : 0
pcp invalid external address      : 3
pcp out address in use            : 0
pcp exact match                   : 0
pcp exact entry created           : 0
pcp exact db allocation failed    : 0
pcp udb mismatch                  : 0
pcp exact db not allocated        : 3
pcp static entry present          : 0
pcp entry deleted                 : 0
pcp 3rd party option present      : 0
pcp map input                     : 3
pcp map minimum length            : 0
pcp map maximum length            : 0
pcp map invalid option            : 0
pcp map invalid option length     : 0
pcp map pref fail option          : 0
pcp map invalid delete request    : 0
pcp map delete request            : 0
pcp map create request            : 3
pcp map refresh                   : 0
pcp peer input                    : 0
pcp peer invalid length           : 0
pcp peer delete request           : 0
pcp peer create request           : 0
pcp peer address mismatch         : 0
pcp peer refresh                  : 0
```

## show cgn tunnel v6rd statistics

To display the IPv6 Rapid Deployment (6RD) tunnel statistics information for a CGN instance, use the **show cgn tunnel v6rd statistics** command in the EXEC mode.

**show cgn tunnel v6rd 6rd-instance statistics**

### Syntax Description

<b>tunnel</b>	Indicates the tunnel type.
<b>v6rd</b>	Specifies the 6rd information.
<i>6rd-instance</i>	Instance name.
<b>statistics</b>	Specifies the statistics details for 6rd.

### Command Default

None

### Command Modes

EXEC

### Command History

Release	Modification
Release 4.1.0	This command was introduced.

### Usage Guidelines

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

### Task ID

Task ID	Operation
cgcn	read

### Examples

This sample output shows the summary of the statistics entries:

```
RP/0/RP0/CPU0:router#show cgn tunnel v6rd 6rd1 statistics
Tunnel 6rd configuration
=====
Tunnel 6rd name: 6rd1
IPv6 Prefix/Length: 2001:db8::/32
Source address: 9.1.1.1
```

## show cgn tunnel v6rd statistics

```

BR Unicast address: 2001:db8:901:101::1
IPv4 Prefix length: 0
IPv4 Suffix length: 0
TOS: 0, TTL: 255, Path MTU: 1280
Tunnel 6rd statistics
=====
IPv4 to IPv6
=====
Incoming packet count : 2296951183
Incoming tunneled packets count : 2296951183
Decapsulated packets : 0
ICMP translation count : 0
Insufficient IPv4 payload drop count : 0
Security check failure drops : 0
No DB entry drop count : 0
Unsupported protocol drop count : 0
Invalid IPv6 source prefix drop count : 2296951183
IPv6 to IPv4
=====
Incoming packet count : 0
Encapsulated packets count : 0
No DB drop count : 0
Unsupported protocol drop count : 0
IPv4 ICMP
=====
Incoming packets count : 0
Reply packets count : 0
Throttled packet count : 0
Nontranslatable drops : 0
Unsupported icmp type drop count : 0
IPv6 ICMP
=====
Incoming packets count : 0
Reply packets count : 0
Packet Too Big generated packets count : 0
Packet Too Big not generated packets count : 0
NA generated packets count : 0
TTL expiry generated packets count : 0
Unsupported icmp type drop count : 0
Throttled packet count : 0
IPv4 to IPv6 Fragments
=====
Incoming fragments count : 0
Reassembled packet count : 0
Reassembled fragments count : 0
ICMP incoming fragments count : 0
Total fragment drop count : 0
Fragments dropped due to timeout : 0
Reassembly throttled drop count : 0
Duplicate fragments drop count : 0
Reassembly disabled drop count : 0
No DB entry fragments drop count : 0
Fragments dropped due to security check failure : 0
Insufficient IPv4 payload fragment drop count : 0
Unsupported protocol fragment drops : 0
Invalid IPv6 prefix fragment drop count : 0
IPv6 to IPv4 Fragments
=====
Incoming ICMP fragment count : 0
RP/0/RP1/CPU0:#
=====

```

The following table describes the fields seen as shown in the above example:

**Note**

The same field description is applicable to IPv4 and IPv6 packets appropriately.

Name	Description
------	-------------

<b>Incoming packet count</b>	Total number of incoming packets
<b>Incoming tunneled packets count</b>	Total No of 6rd tunnel packets
<b>Decapsulated packets</b>	Number of decapsulated packets
<b>ICMP translation count</b>	ICMPv4 to ICMPv6 translated count
<b>Insufficient IPv4 payload drop count</b>	Number of packets dropped due to missing IPv6 header.
<b>Security check failure drops</b>	Number of packets dropped due to security check failure.
<b>No DB entry drop count</b>	Number of packets dropped due to incomplete or missing 6rd configuration.
<b>Unsupported protocol drop count</b>	Number of packets dropped due to unsupported protocol.
<b>Invalid IPv6 source prefix drop count</b>	Number of packets dropped due to invalid IPv6 source prefix.
<b>Reply packets count</b>	Total ICMPv4 echo replies by the Border Relay (BR) router.
<b>Throttled packet count</b>	Total ICMPv4 packets which are rate-limited by the BR router
<b>Nontranslatable drops</b>	Number of packets dropped without translating.
<b>Unsupported icmp type drop count</b>	Number of packets dropped due to unsupported ICMP type.
<b>Packet Too Big generated packets count</b>	Total ICMPv6 Packet Too Big (PTB) messages generated by the BR router.
<b>Packet Too Big not generated packets count</b>	Total ICMPv6 packets for which PTB messages were not generated by the BR router.
<b>NA generated packets count</b>	Total ICMPv6 Neighbor Advertisement (NA) packets generated by the BR router.
<b>TTL expiry generated packets count</b>	Total ICMPv6 TTL expiry messages generated by the BR router.
<b>Incoming fragments count</b>	Number of incoming fragments.
<b>Reassembled packet count</b>	Number of reassembled packets.
<b>Reassembled fragments count</b>	Number of reassembled fragments.
<b>ICMP incoming fragments count</b>	Number of ICMP incoming fragments.

<b>Total fragment drop count</b>	Number of fragments dropped.
<b>Fragments dropped due to timeout</b>	Number of fragments dropped due to timeout.
<b>Reassembly throttled drop count</b>	Number of fragments throttled
<b>Duplicate fragments drop count</b>	Number of fragments dropped due to duplication (repeated fragment offset).
<b>Reassembly disabled drop count</b>	Number of fragments dropped while reassembly is disabled.
<b>No DB entry fragments drop count</b>	Number of fragments dropped due to incomplete or missing 6rd configuration.
<b>Fragments dropped due to security check failure</b>	Number of fragments dropped due to missing IPv6 header.
<b>Insufficient IPv4 payload fragment drop count</b>	Number of fragments dropped due to missing IPv6 header.
<b>Unsupported protocol fragment drops</b>	Number of fragments dropped due to unsupported protocol.
<b>Invalid IPv6 prefix fragment drop count</b>	Number of fragments dropped due to invalid IPv6 prefix.

**Related Commands**

<b>Command</b>	<b>Description</b>
<a href="#">clear cgn tunnel v6rd statistics, on page 41</a>	Clears all the statistics for a IPv6 Rapid Deployment (6RD) instance

# show cgn utilization throughput

To display the throughput of CGSE or CGSE-PLUS, use the **show cgn utilization throughput** command in the EXEC mode.

```
show cgn instance name utilization throughput [cpu <0-63 | all>][threshold <% threshold level>]
```

Syntax Description	Parameter	Description
	<i>instance name</i>	Specifies the CGN instance name.
	<b>throughput</b>	Displays the amount of traffic coming into CGSE or CGSE plus.
	<b>cpu</b> <0-63   all>	Displays the output for a particular core if specified (0-63) or for all the cores (all).
	<b>threshold</b> % <i>threshold level</i>	Specifies the data for only those cores that have exceeded the value specified by the % <i>threshold level</i> .

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 5.2.0	This command was introduced for the CGSE card.
	Release 5.3.1	The support is extended to the CGSE-PLUS card.

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

Task ID	Task ID	Operations
	cgn	read

**Examples** This example shows the statistics entries:

```
RP/0/RP0/CPU0:router# show cgn cgn1 utilization throughput cpu 50
```

## show cgn utilization throughput

```
RP/0/RP1/CPU0:Tasman#show cgn cgn1 utilization throughput cpu 50
Wed Nov 13 11:07:14.236 IST
```

```
-----
CGN instance name: cgn1
-----
```

CPU-core	Last 1sec		Last 5min		Peak value	
	kbps	pps	kbps	pps	kbps	pps
50	315487	84482	110222	59466	317358	84983

```
RP/0/RP0/CPU0:router# show cgn cgn1 utilization throughput cpu all threshold 95
```

```
RP/0/RP1/CPU0:Tasman#show cgn cgn1 utilization throughput cpu all threshold 95
Wed Nov 13 11:07:14.236 IST
```

```
-----
CGN instance name: cgn1
-----
```

CPU-core	Last 1sec		Last 5min		Peak value	
	kbps	pps	kbps	pps	kbps	pps
All	1898026	2754578	1156109	1267997	1939104	2765570
1	323628	86662	37467	39984	325282	87101
2	326496	87430	38583	40282	328023	87837
3	326518	87436	38754	40328	328154	87874
4	322071	86245	36192	39642	322560	86376
5	321637	86129	35896	39563	321947	86212
6	324229	86823	37511	39995	325704	87218
7	324823	86982	37584	40015	325398	87136
16	316152	84660	33221	38846	317694	85073
17	317522	85027	33620	38953	317892	85126
18	318519	85294	34582	39211	321171	86004
19	319617	85588	34828	39277	321462	86082
20	315326	84437	34440	39173	317657	85063
21	317369	84986	33711	38978	318448	85275
22	318165	85199	34286	39132	319460	85546
23	319498	85556	34749	39256	320719	85883
32	326556	87446	38969	40386	328875	88067
33	328916	88078	39689	40579	329917	88346
34	326772	87504	38468	40251	327437	87682
35	328819	88052	39784	40604	330525	88509
36	329144	88139	39706	40583	330047	88381
37	328244	87898	38945	40379	328303	87914
38	328307	87915	39324	40481	329267	88172
39	328561	87983	39131	40429	328725	88027
48	312809	83765	32430	38635	314288	84161
49	314632	84253	33120	38819	316297	84699
50	315110	84381	33490	38918	317358	84983
51	316219	84678	34241	39120	319348	85516
52	316477	84747	33504	38922	316477	84747
53	316312	84703	33686	38971	317093	84912
54	317167	84932	34219	39114	318265	85226
55	318280	85230	34520	39194	319203	85477

## source-address (6rd)

To assign an ipv4 address as the tunnel source address, use the **source-address** command in 6RD configuration mode. To remove the source address assigned to the tunnel, use the **no** form of this command.

**source-address** *address*

**no source-address** *address*

### Syntax Description

<i>address</i>	Indicates the Source IP address.
----------------	----------------------------------

### Command Default

None

### Command Modes

6RD configuration

### Command History

Release	Modification
Release 4.1.0	This command was introduced.

### Usage Guidelines

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

For a 6RD tunnel, configure the **ipv6-prefix**, **ipv4 source-address** and **unicast IPv6 address** in a single commit operation. Once configured, the source-address cannot be deleted individually. It must be deleted along with all **br** tunnel configuration parameters.

### Task ID

Task ID	Operation
cg	read, write

### Examples

This example shows how to configure the 6RD tunnel source-address:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cg cg1
RP/0/RP0/CPU0:router(config-cg)# service-type tunnel v6rd 6rd1
RP/0/RP0/CPU0:router(config-cg-tunnel-6rd)# br
RP/0/RP0/CPU0:router(config-cg-tunnel-6rd-br)# source-address 10.2.2.1
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<a href="#">ipv4 prefix (6rd), on page 61</a>	Assigns a value for the ipv4-prefix length to be used as part of both ends of tunnel.
<a href="#">ipv4 suffix (6rd), on page 63</a>	Assigns a value for the ipv4-suffix length to be used as part of both ends of a tunnel.
<a href="#">ipv6-prefix (6rd), on page 65</a>	Generates the delegated ipv6 prefix for a IPv6 Rapid Deployment (6RD) application.
<a href="#">unicast address (6rd), on page 172</a>	Assigns an IPv6 address to be used for a IPv6 Rapid Deployment (6RD) Border Relay (BR) unicast configuration.

## tcp mss (CGN)

Use the **tcp mss** command to adjust the TCP maximum segment size (MSS) value for a ServiceApp interface. To disable a particular service application interface, use the **no** form of this command.

```
tcp mss <28-1500>
```

```
notcpmss
```

<b>Syntax Description</b>	<28-1500>	Maximum segment size to be used in bytes.
---------------------------	-----------	---

**Command Default** tcp mss value is disabled by default.

**Command Modes** CGN-NAT64

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.1.0	This command was introduced.

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

If this configuration does not exist, TCP determines the maximum segment size based on the settings specified by the application process, interface maximum transfer unit (MTU), or MTU received from Path MTU Discovery. This is a NAT64 stateless translation command to be applied for each NAT64 stateless CGN instance. This command enables rewriting of the **tcp mss** value in the translated IPv4 packet (getting translated from IPv6 to IPv4), if the incoming **tcp mss** value is greater than the value configured by this command.

<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	cgn	read, write

**Examples** This example shows how to configure TCP MSS value as 1000 for a NAT64 stateless ServiceApp interface:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# service-type nat64 stateless xlat1
RP/0/RP0/CPU0:router(config-cgn-nat64-stateless)# interface ServiceApp 2
```

```
RP/0/RP0/CPU0:router(config-cgn-nat64-stateless)# address-family ipv4
RP/0/RP0/CPU0:router(config-cgn-nat64-stateless-afi)# tcp mss 1000
```

**Related Commands**

Command	Description
<a href="#">protocol (NAT44), on page 86</a>	Enters the ICMP, TCP, and UDP protocol configuration mode.
<a href="#">service cgn, on page 100</a>	Enables an instance for the CGN application.

## timeout (NAT44)

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

**timeout** *seconds*

**no timeout** *seconds*

### Syntax Description

<i>seconds</i>	Timeout value. Range is from 1 to 65535.
----------------	--

### Command Default

The default timeout value is 60 seconds.

### Command Modes

NAT44 protocol configuration

### Command History

Release	Modification
Release 3.9.1	This command was introduced.
Release 4.3.0	Support for GRE data channels was added.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the 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.

This is a NAT44 service type specific command to be applied for each CGN instance. This command configures the initial and active timeout value in seconds for TCP or UDP sessions for a CGN instance. For ICMP and GRE, the user can configure only the timeout value.



#### Note

The destination port/destination address timeout configuration is not supported for ICMP and GRE.

For TCP and UDP, the per port active timeout session is prioritized according to these criteria, higher to lower precedence:

- 1 A destination address and port combination
- 2 A destination address
- 3 A destination port

#### 4 Default protocol timeout

Enter up to 1000 timer entries (inclusive of port only, ip only or port/ip combo).

#### Task ID

Task ID	Operations
cgcn	read, write

#### Examples

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgcn cgcn1
RP/0/RP0/CPU0:router(config-cgcn)# service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cgcn-nat44)# protocol icmp
RP/0/RP0/CPU0:router(config-cgcn-PROTO)# timeout 908
```

This example shows how to configure the destination address value as 600 for the tcp session:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgcn cgcn1
RP/0/RP0/CPU0:router(config-cgcn)# service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cgcn-nat44)# inside-vrf red
RP/0/RP0/CPU0:router(config-cgcn-invrf)# protocol tcp
RP/0/RP0/CPU0:router(config-cgcn-invrf-PROTO)# address 40.1.1.2 timeout 600
```

This example shows how to configure the destination port value as 600 for the tcp session:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgcn cgcn1
RP/0/RP0/CPU0:router(config-cgcn)# service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cgcn-nat44)# inside-vrf red
RP/0/RP0/CPU0:router(config-cgcn-invrf)# protocol tcp
RP/0/RP0/CPU0:router(config-cgcn-invrf-PROTO)# port 80 timeout 600
```

This example shows how to configure timeout values for a GRE session:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgcn cgcn1
RP/0/RP0/CPU0:router(config-cgcn)# service-type nat44 nat44-1
RP/0/RP0/CPU0:router(config-cgcn-nat44)# protocol gre
RP/0/RP0/CPU0:router(config-cgcn-PROTO)# timeout 908
```

## timeout (NAT44 Netflow Version 9)

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

<i>value</i>	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 appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

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

The netflowv9 based logging requires that a logging template be sent to the server periodically. The timeout value implies that after that number of minutes has elapsed since the template was last sent, the template will be resent to the logging server. The refresh-rate value implies that after sending that number of packets to the server, the template will be resent. The timeout and refresh-rate values are mutually exclusive; that is, the one that expires first is the one considered for resending the template.



#### Note

Only when the ipv4 address and port number for the logging server has been configured, the configurations for **path-mtu**, **refresh-rate** and **timeout** are applied.

### Task ID

Task ID	Operations
cgn	read, write

**Examples**

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cgn-nat44)# inside-vrf insidevrf1
RP/0/RP0/CPU0:router(config-cgn-invrf)# external-logging netflow version 9
RP/0/RP0/CPU0:router(config-cgn-invrf-af-extlog)# server
RP/0/RP0/CPU0:router(config-cgn-invrf-af-extlog-server)# timeout 50
```

**Related Commands**

Command	Description
<a href="#">external-logging (NAT44 Netflow)</a> , on page 49	Enables external logging of a NAT44 instance.
<a href="#">inside-vrf (NAT44)</a> , on page 55	Enters inside VRF configuration mode for a NAT44 instance.
<a href="#">server (NAT44)</a> , on page 98	Enables the logging server information for the IPv4 address and port for the server that is used for the netflowv9-based external-logging facility.
<a href="#">service cgn</a> , on page 100	Enables an instance for the CGN application.

## tos (6rd)

To configure the IPv4 tunnel type of service, use the **tos** command in 6RD configuration mode. To disable the type of service, use the **no** form of this command.

**tos** *value*

**no tos** *value*

### Syntax Description

<i>value</i>	Value of the type of service to be set. The range is from 0 to 255.
--------------	---

### Command Default

None

### Command Modes

6RD configuration

### Command History

Release	Modification
Release 4.1.0	This command was introduced.

### Usage Guidelines

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

### Task ID

Task ID	Operation
cgn	read, write

### Examples

This example shows how to configure the 6RD tunnel type of service:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# service-type tunnel v6rd 6rd1
RP/0/RP0/CPU0:router(config-cgn-tunnel-6rd)# tos 25
```

## traceroute (CGN)

To configure a range of ipv4 addresses that are to be used for mapping when a non-translatable ipv6 address is received, use the **traceroute** command. To remove the pool of IPv4 addresses used for mapping the non-translatable IPv6 source addresses, use the **no** form of this command.

**traceroute translation address-pool**<*A.B.C.D/prefix IP subnet mask*>**algorithm** | *hash* | *random* | *tll*  
**no traceroutetranslation**

### Syntax Description

<b>translation</b>	Specifies the configuration related to translating traceroute addresses.
<b>address-pool</b>	Specifies the IPv4 address pool for traceroute addresses.
<i>A.B.C.D/ prefix IP subnet</i>	Indicates the start address and prefix for the address pool.
<b>algorithm</b>	Indicates the algorithm to translate IPv6 address to IPv4 address.
<i>hash</i>	Indicates the hashing algorithm.
<i>random</i>	Randomly generated algorithm.
<i>tll</i>	Specifies time to live algorithm.

### Command Default

None

### Command Modes

CGN-NAT64

### Command History

Release	Modification
Release 4.1.0	This command was introduced.

### Usage Guidelines

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

These IPv4 addresses are not allowed to be configured through this command:

- 1 127.0.0.1
- 2 224.0.0.0 onwards
- 3 All zero addresses

#### 4 Broadcast address

The value for prefix can range from 1 to 32. There is only one such map per instance of stateless ipv4 to ipv6 service-type. When there is no pool of IPv4 addresses to translate the non-translatable IPv6 source address, packets coming with non-translatable IPv6 source addresses are dropped.

Task ID	Task ID	Operation
	cg	read, write

#### Examples

This example shows how to configure the address-pool:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cg
```

This example shows how to configure the random algorithm:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cg
```

This example shows how to configure the hash algorithm:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cg
```

This example shows how to configure the TTL algorithm:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cg
```

#### Related Commands

Command	Description
<a href="#">address-family ipv4 (Stateless NAT64), on page 11</a>	Enters the IPv4 address family configuration mode.
<a href="#">address-family ipv6 (Stateless NAT64), on page 13</a>	Enters the IPv6 address family configuration mode.
<a href="#">ipv6-prefix (6rd), on page 65</a>	Generates the delegated ipv6 prefix for a IPv6 Rapid Deployment (6RD) application.
<a href="#">service cg</a> , on page 100	Enables an instance for the CGN application.
<a href="#">service-type nat64 (Stateless), on page 108</a>	Creates a nat64 stateless application
<a href="#">ubit-reserved (CGN), on page 170</a>	Reserves the bits 64 to 71 for the IPv6 addresses.

## traffic-class (CGN)

Use the **traffic-class** command to configure the traffic class value to be used when translating a packet from IPv4 to IPv6. To copy the traffic-class value from ipv4 packet, use the **no** form of this command.

**traffic-class** *value*

**no traffic-class** *value*

<b>Syntax Description</b>	<i>value</i>	The value of traffic class to be set. It ranges from 0 to 255.
---------------------------	--------------	--

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	CGN-NAT64
----------------------	-----------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.1.0	This command was introduced.

**Usage Guidelines**

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

<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	cgcn	read, write

**Examples**

This example shows how to configure the CGN-NAT64 traffic class value:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router# (config)# service cgn cgn1
RP/0/RP0/CPU0:router# (config-cgn) service-type nat64 stateless xlat1
RP/0/RP0/CPU0:router (config-cgn-nat64-stateless)# ipv6-prefix 2010:db8:ff00::/40
RP/0/RP0/CPU0:router (config-cgn-nat64-stateless)# address-family ipv6
RP/0/RP0/CPU0:router (config-cgn-nat64-stateless-afi)# interface ServiceApp 461
RP/0/RP0/CPU0:router (config-cgn-nat64-stateless-afi)# traffic-class 20
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<a href="#">address-family ipv6 (Stateless NAT64), on page 13</a>	Enters the IPv6 address family configuration mode.
<a href="#">df-override (CGN), on page 46</a>	Sets the do not fragment bit
<a href="#">service cgn, on page 100</a>	Enables an instance for the CGN application.
<a href="#">service-type nat64 (Stateless), on page 108</a>	Creates a nat64 stateless application

## ttl (6rd)

To configure the ipv4 tunnel time to live (ttl) , use the **ttl** command. To undo the configuration, use the **no** form of this command.

**ttl** *value*

**no ttl** *value*

### Syntax Description

<i>value</i>	Time-to-live value to be used for IPv4 tunnel. The range is from 1 to 255.
--------------	--

### Command Default

None

### Command Modes

6RD configuration

### Command History

Release	Modification
Release 4.1.0	This command was introduced.

### Usage Guidelines

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

### Task ID

Task ID	Operation
cgn	read, write

### Examples

This example shows how to configure the 6RD tunnel time to live value:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router# (config)# service cgn cgn1
RP/0/RP0/CPU0:router# (config-cgn) service-type tunnel v6rd 6rd1
RP/0/RP0/CPU0:router (config-cgn-tunnel-6rd)# ttl 25
```

### Related Commands

Command	Description
<a href="#">address-family (6rd)</a> , on page 9	Binds an ipv4 or ipv6 ServiceApp interface to a 6rd instance.

<b>Command</b>	<b>Description</b>
<a href="#">br (6rd), on page 25</a>	Enables the Border Relay(BR) configuration.
<a href="#">path-mtu (6rd), on page 71</a>	Configures the ipv4 tunnel MTU (Maximum Transmission Unit) size for an IPv6 Rapid Deployment (6RD) instance.
<a href="#">reassembly-enable (6rd), on page 90</a>	Reassembles the fragmented packets.
<a href="#">reset-df-bit (6rd), on page 95</a>	Enables anycast mode.
<b>tos (6rd)</b>	

## ubit-reserved (CGN)

To reserve the bits 64 to 71 in the IPv6 addresses, use the **ubit-reserved** command. To cancel the IPv6 addresses from getting reserved to bits 64 to 71, use the **no** form of this command. They may be used to store IPv4 address octets as part of translation.

**ubit-reserved**

**no ubit-reserved**

**Syntax Description** This command has no keywords or arguments.

**Command Default** None

**Command Modes** CGN-NAT64

### Command History

Release	Modification
Release 4.1.0	This command was introduced.

### Usage Guidelines

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

This is a NAT64 stateless translation command to be applied for each instance of NAT64 stateless of a CGN instance. When this configuration is enabled bits 64 to 71 in the IPv6 addresses are reserved for purposes including U-Bit. These are not used for translation purposes.

### Task ID

Task ID	Operation
cgn	read, write

### Examples

This example shows how to configure the nat64 stateless **ubit-reserved** option:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# service-type nat64 stateless xlat1
RP/0/RP0/CPU0:router(config-cgn-nat64-stateless)# ubit-reserved
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<a href="#">address-family ipv4 (Stateless NAT64), on page 11</a>	Enters the IPv4 address family configuration mode.
<a href="#">address-family ipv6 (Stateless NAT64), on page 13</a>	Enters the IPv6 address family configuration mode.
<a href="#">ipv6-prefix (6rd), on page 65</a>	Generates the delegated ipv6 prefix for a IPv6 Rapid Deployment (6RD) application.
<a href="#">service cgn, on page 100</a>	Enables an instance for the CGN application.
<a href="#">service-type nat64 (Stateless), on page 108</a>	Creates a nat64 stateless application
<a href="#">traceroute (CGN), on page 164</a>	Configures a range of ipv4 addresses that are to be used for mapping when a non-translatable ipv6 address is received.

## unicast address (6rd)

To assign an IPv6 address to be used for a IPv6 Rapid Deployment (6RD) Border Relay (BR) unicast configuration, use the **unicast address** command in 6RD configuration mode. To remove the assigned unicast address, use the **no** form of this command.

**unicast address** *address*

**no unicast address** *address*

### Syntax Description

<i>address</i>	IPv6 address used for unicast from IPv6 network.
----------------	--

### Command Default

None

### Command Modes

6RD configuration

### Command History

Release	Modification
Release 4.1.0	This command was introduced.

### Usage Guidelines

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

For a 6RD tunnel, configure the br with ipv6-prefix, ipv4 source-address and unicast IPv6 address in a single commit operation. Once configured, the unicast address cannot be deleted individually. It must be deleted along with all br (Border Relay) tunnel configuration parameters.

The ipv6 unicast address is derived from these: ipv6 prefix, ipv6 prefix length, ipv4 prefix length and ipv4 suffix length, and tunnel source address.

Here's the formula to calculate the IPv6 unicast address:

ipv6 unicast address = <ipv6-prefix> + (remove ipv4 prefix length bits from starting and ipv4 suffix length bits from ending of tunnel source address) :: <number>

### Task ID

Task ID	Operation
cgn	read, write

**Examples**

This example shows how to configure the 6RD tunnel unicast address:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# service-type tunnel v6rd 6rd1
RP/0/RP0/CPU0:router(config-cgn-tunnel-6rd)# br
RP/0/RP0/CPU0:router(config-cgn-tunnel-6rd-br)# unicast address 2001:db8:a02:102::1
```

**Related Commands**

Command	Description
<a href="#">ipv4 prefix (6rd), on page 61</a>	Assigns a value for the ipv4-prefix length to be used as part of both ends of tunnel.
<a href="#">ipv4 suffix (6rd), on page 63</a>	Assigns a value for the ipv4-suffix length to be used as part of both ends of a tunnel.
<a href="#">ipv6-prefix (6rd), on page 65</a>	Generates the delegated ipv6 prefix for a IPv6 Rapid Deployment (6RD) application.
<a href="#">source-address (6rd), on page 155</a>	Assigns an ipv4 address as the tunnel source address.

# virtual-service

To configure and activate a virtual service, use the **virtual-service** command. To disable the virtual service, use the **no virtual-service** command.

## Command Behavior in Different Command Modes

You can run this command in both global configuration mode as well as EXEC mode.

### virtual-service in Global Configuration Mode

**virtual-service** <virtual service name>**enable**

**no virtual-service** <virtual service name>**enable**

### Syntax Description

<virtual service name>	Specifies the name of the virtual service.
<b>enable</b>	Enables the virtual service.

### virtual-service in EXEC Mode

**virtual-service** {**connect name** virtual-service-name [**aux console node** node-name]} **install name** virtual-service-name| **uninstall name** virtual-service-name}

### Syntax Description

<b>connect name</b>	Connects to the virtual service. The keyword <b>name</b> specifies the name of the appliance.
<b>aux</b>	Connects to the aux port.
<b>console node</b>	Connects to the console port of the particular card specified by the keyword <b>node</b> .
<b>install name</b>	Installs the virtual service. The keyword <b>name</b> specifies the name of the appliance.
<b>uninstall name</b>	Uninstalls the virtual service. The keyword <b>name</b> specifies the name of the appliance.
<virtual service name>	Specifies the name of the virtual service. The virtual service name can contain only alphanumeric characters (A to Z, a to z, or 0 to 9) or an underscore (_). All other special characters are not allowed.
<node name>	Specifies the name of the card.

**Command Default** None

**Command Modes** Global Configuration mode and EXEC mode

Command History	Release	Modification
	Release 5.1.1	This command was introduced.

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



**Note** Use **Ctrl ^ e** to disconnect from the VM.

Task ID	Task ID	Operation
	eem	read, write

**Examples**

```
RP/0/RSP0/CPU0:router(config)#virtual-service enable
RP/0/RSP0/CPU0:router(config)#commit
```

**Examples** The following is an example of the **virtual-service connect** command:

```
RP/0/RSP0/CPU0:router #virtual-service connect name cgn1 console node 0/0/CPU0
RP/0/RSP0/CPU0:router #commit
```

The following is an example of the **virtual-service install** command:

```
RP/0/RSP0/CPU0:router #virtual-service install name cgn1 package
disk0:/asr9k-vsm-cgv6-5.2.2.02.ova node 0/7/CPU0
RP/0/RSP0/CPU0:router #commit
```

## vrf (cgn)

Use the **vrf** command to configure a VPN routing and forwarding (VRF) instance. To disable the VRF, use the **no** form of this command.

**vrf** *vrf-name*

**no vrf** *vrf-name*

### Syntax Description

<i>vrf-name</i>	The CGN application uses inside vrfs and outside vrfs exclusively. These names cannot be used: all, default, and global.
-----------------	--

### Command Default

None

### Command Modes

CONFIG-IF

### Command History

Release	Modification
Release 4.1.0	This command was introduced.

### Usage Guidelines

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



#### Note

The number of supported VRFs is platform specific. For the CGN application, use only these *vrf-names*: **insidevrf1** and **outsidevrf1**. The CGN application uses inside vrfs and outside vrfs exclusively, and the user needs to name and use them accordingly.

### Task ID

Task ID	Operation
ip services	read, write

### Examples

This example shows how to create an inside and outside VRF using the **vrf** command:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router (config)# vrf insidevrf1
```

```
RP/0/RP0/CPU0:router(config-vrf)# vrf outsidevrf1
RP/0/RP0/CPU0:router(config-vrf)# exit
```

**Related Commands**

Command	Description
<a href="#">hw-module service cgn location, on page 53</a>	Enables a CGN service role on a specified location.
<a href="#">interface ServiceApp, on page 57</a>	Enables the application SVI interface.
<a href="#">interface ServiceInfra, on page 59</a>	Enables the infrastructure SVI interface.
<a href="#">service cgn, on page 100</a>	Enables an instance for the CGN application.

