Carrier Grade NAT Commands on Cisco IOS XR Software

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

To use commands of this module, 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 any command, contact your AAA administrator for assistance.

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 .

address (DS-LITE Netflow9)

To enable the IPv4 address of the server that is used for logging the entries for a DS-Lite instance, use the **address** command in CGN DS-Lite external logging server configuration mode. To disable the Netflow server configuration, use the **no** form of this command.

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

Syntax Description

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

Command Default

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

Command Modes

CGN DS-Lite external logging server configuration

Command History

Release	Modification
Release 4.2.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cgn	read, write

Examples

The following example shows how to configure the IPv4 address and port number 45 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-lite1
RP/0/RP0/CPU0:router(config-cgn-ds-lite)# external-logging netflow9
RP/0/RP0/CPU0:router(config-cgn-ds-lite-extlog)# server
RP/0/RP0/CPU0:router(config-cgn-ds-lite-extlog-server)# address 2.3.4.5 port 45
```

Related Commands

Command	Description
path-mtu (DS-LITE Netflow9), on page 125	Sets the Maximum Transmission Unit (MTU) of the path to log NetFlow-based external logging information.

Command	Description
refresh rate (DS-LITE Netflow9), on page 160	
timeout (DS-LITE Netflow9), on page 274	Configures the frequency at which the netflow9 template is refreshed or resent to the netflow9 server for a DS-Lite instance.

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*

Syntax Description

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

Command Default

If the **address** command is not configured, 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

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
external-logging (NAT44 Netflow), on page 92	Enables external logging of a NAT44 instance.
inside-vrf (NAT44), on page 101	Enters inside VRF configuration mode for a NAT44 instance.
server (NAT44), on page 166	Enables the logging server information for the IPv4 address and port for the server that is used for the netflowv9-based external-logging facility.
service cgn, on page 168	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

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

Command Default

None

Command Modes

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

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
cgn	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 cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cgn-nat44)# inside-vrf v1
RP/0/RP0/CPU0:router(config-cgn-invrf)# protocol tcp
```

```
RP/0/RP0/CPU0:router(config-cgn-invrf-proto)# static-forward inside
RP/0/RP0/CPU0:router(config-cgn-invrf-sport-inside)# address 10.20.30.10 port 1000
```

Related Commands

Command	Description
protocol (NAT44)	
protocol (CGN), on page 141	Enters ICMP, TCP, and UDP protocol configuration mode for a given CGN instance.
service cgn, on page 168	Enables an instance for the CGN application.
show cgn nat44 inside-translation, on page 217	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.

address (Stateful NAT64 Netflow Version 9)

To enable the IPv4 address of the server that is used for logging the entries for a NAT64 stateful instance, use the **address** command in NAT64 Stateful configuration mode. To disable the Netflow server configuration, use the **no** form of this command.

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

Syntax Description

address	IPv4 address of the server.
port	Configures the port that is used for logging. The address corresponds to the IPv4 address of the netflow version 9 logging server port, which corresponds to the UDP port number in which the netflow version 9 logging server listens for the Netflow logs.
number	Port number. Range is from 1 to 65535.

Command Default

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

Command Modes

NAT64 Stateful configuration mode

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cgn	read, write

Examples

The following example shows how to configure the IPv4 address and port number 45:

```
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 nat64 stateful nat64-inst
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)# external-logging netflow version 9
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)# server
RP/0/RP0/CPU0:router(config-cgn-nat64-extlog-server)# address 2.3.4.5 port 45
```

Related Commands

Command	Description
path-mtu (Stateful NAT64 Netflow Version 9), on page 130	Sets the Maximum Transmission Unit (MTU) of the path to log NetFlow-based external logging information.

Command	Description
refresh rate (Stateful NAT64 Netflow Version 9), on page 162	Configures the refresh rate to log NetFlow-based external logging information.
session-logging (Stateful NAT64 Netflow Version 9), on page 191	Enables session logging for a NAT64 Stateful instance.
timeout (Stateful NAT64 Netflow Version 9), on page 279	Configures the frequency at which the netflow-v9 template is refreshed or resent to the netflow-v9 server.

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*

Syntax Description

ipv4	Specifies the IPv4 address family.
ipv6	Specifies the IPv6 address family.
interface	Specifies the ServiceApp interface to be used.
ServiceApp	Specifies the SVI interface.
value	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

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

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
```

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**}

Syntax Description

interface	Specifies the ServiceApp interface to be used.
ServiceApp	Specifies the SEAPP SVI interface. The number of service application interfaces to be configured ranges from 1 to 2000.
tcp	Specifies the TCP protocol.
mss	Specifies the maximum segment size for TCP in bytes. The value of maximum segment size ranges from 28 to 1500.
tos	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

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

Task ID

Task ID	Operation
cgn	read, write

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 (DS-LITE)

To enter the IPv6 address family configuration mode for a DS-Lite instance, 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 *<1-244>*

Syntax Description

interface	Indicates the ServiceApp interface to be used.
ServiceApp	SEAPP SVI Interface.
<1-244>	Number of service application interfaces to be configured. Range is from 1 to 244.

Command Default

None

Command Modes

CGN-DS-Lite configuration mode

Command History

Release	Modification
Release 4.2.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to enter the IPv6 address family configuration mode 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-lite1
RP/0/RP0/CPU0:router(config-cgn-ds-lite)# address-family ipv6
RP/0/RP0/CPU0:router(config-cgn-ds-lite-afi)# interface serviceApp 200
RP/0/RP0/CPU0:router(config-cgn-ds-lite-afi)#
```

Related Commands

Command	Description
address-family ipv4 (Stateless NAT64), on page 15	Enters the IPv4 address family configuration mode.
address-family (Stateful NAT64), on page 23	Configures IPv4 or IPv6 address on a NAT64 instance.

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** | { *icmpreset-mtu* } } **tcp mss** *<28-1500>* **traffic-class** *<0-255>*

Syntax Description

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

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

Task ID

Task ID	Operation
cgn	read, write

Example

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
df-override (CGN), on page 83	Sets the do not fragment bit
protocol icmp reset-mtu (CGN), on page 152	Resets the received packet size.
service cgn, on page 168	Enables an instance for the CGN application.
traffic-class (CGN), on page 286	Configures the traffic class value to be used when translating a packet from IPv4 to IPv6

address-family (MAP-E)

To configure an IPv4 or IPv6 address for a MAP-E stateful instance, use the **address-family** command in MAP-E configuration mode. To undo the address configuration, use the **no** form of this command.

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

Syntax Description

ipv4	Specifies the IPv4 address family.
ipv6	Specifies the IPv6 address family.
interface	Specifies the ServiceApp interface to be used.
ServiceApp	Specifies the SVI interface.
value	Specifies the Interface value. The range is from 1 to 2000.
tcp	Specifies the TCP protocol.
mss	Specifies the Maximum Segment Size (MSS) for TCP in bytes.
size	Size of the segment in bytes. The range is from 28 to 1500.

Command Default

None

Command Modes

MAP-E configuration

Command History

Release	Modification
Release 4.3.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to configure ipv4 address for a MAP-E 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 map-e map-e-inst
RP/0/RP0/CPU0:router(config-cgn-map_e)# address-family ipv4
RP/0/RP0/CPU0:router(config-cgn-map_e-afi)#interface serviceApp 65
```

This example shows how to configure ipv6 address for a MAP-E 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 map-e map-e-inst
RP/0/RP0/CPU0:router(config-cgn-map_e)# address-family ipv6
RP/0/RP0/CPU0:router(config-cgn-map_e-afi)#interface serviceApp 66
```

Related Commands

Command	Description
aftr-endpoint-address (MAP-E), on page 25	Configures the IPv6 address of Address Family Transition Router (AFTR).
contiguous-ports (MAP-E), on page 76	Configures the number of contiguous ports for a MAP-E instance.
cpe-domain (MAP-E), on page 78	Configures the Customer Premises Equipment (CPE) domain parameters.
path-mtu (MAP-E), on page 126	Configures the path Maximum Transmission Unit (MTU) of the tunnel.
sharing-ratio (MAP-E), on page 192	Configures the port sharing ratio.

address-family (MAP-T)

To configure an IPv4 or IPv6 address for a MAP-T instance, use the **address-family** command in the MAP-T configuration mode. To undo the address configuration, use the **no** form of this command.

address-family {**ipv4** | **ipv6**} {**df-override** | **interface** | {**ServiceApp** *value*} | **tcp** | {**mss** *size*} | **traffic-class** | {*value*} | **tos**}

Syntax Description

ipv4	Specifies the IPv4 address family.
ipv6	Specifies the IPv6 address family.
df-override	Specifies the 'df' override bit.
interface	Specifies the ServiceApp interface to be used.
ServiceApp	Specifies the SVI interface.
value	Specifies the Interface value. The range is from 1 to 2000.
tcp	Specifies the TCP protocol.
mss	Specifies the Maximum Segment Size (MSS) for TCP in bytes.
size	Size of the segment in bytes. The range is from 28 to 1500.
traffic-class	Specifies the traffic class value to be set when translating from IPv4 to IPv6.
value	Value of the traffic-class. The range is from 0 to 255.
tos	Specifies the type of service value to be set when translating from IPv6 to IPv4. The range is from 0 to 255.

Command Default

None

Command Modes

MAP-T configuration

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

Unlike NAT64, ISM is used for only control plane and exception traffic, not for the bulk of the traffic.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to configure ipv4 address for a MAP-T 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 map-t map-t-inst
RP/0/RP0/CPU0:router(config-cgn-mapt)# address-family ipv4
RP/0/RP0/CPU0:router(config-cgn-mapt-afi)#tcp mss 565
```

This example shows how to configure ipv6 address for a MAP-T 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 map-t map-t-inst
RP/0/RP0/CPU0:router(config-cgn-mapt)# address-family ipv6
RP/0/RP0/CPU0:router(config-cgn-mapt-afi)#traffic-class 65
```

Related Commands

Command	Description
clear cgn map-t statistics, on page 49	Clears the statistics of a MAP-T instance.
contiguous-ports (MAP-T), on page 77	Configures the number of contiguous ports for a MAP-T instance.
cpe-domain (MAP-T), on page 80	Configures the Customer Premises Equipment (CPE) domain parameters.
external-domain (MAP-T), on page 88	Configures the external domain's IPv6 prefix to convert IPv4 addresses into IPv6 addresses and vice versa.
sharing-ratio (MAP-T), on page 193	Configures the port sharing ratio.
show cgn map-t statistics, on page 209	Displays the MAP-T instance statistics.
traceroute (MAP-T), on page 284	Configures traceroute translation algorithms.

address-family (Stateful NAT64)

To configure an IPv4 or IPv6 address for a NAT64 stateful instance, use the **address-family** command in NAT64 stateful configuration mode. To undo the address configuration, use the **no** form of this command.

address-family {**ipv4** | **ipv6**} [{**df-override** | **interface** | **protocol** | **tcp** | **traffic-class** | **tos**}]

Syntax Description

ipv4	Specifies the IPv4 address family.
ipv6	Specifies the IPv6 address family.
df-override	Specifies the 'df' override bit.
interface	Specifies the ServiceApp interface to be used.
ServiceApp	Specifies the SVI interface.
value	Specifies the Interface value. The range is from 1 to 2000.
protocol	Specifies the protocol.
icmp	ICMP protocol.
reset-mtu	Resets the maximum transmission unit of the packet.
tcp	TCP protocol.
mss	Specifies the Maximum Segment Size (MSS) for TCP in bytes.
size	Size of the segment in bytes. The range is from 28 to 1500.
traffic-class	Specifies the traffic class value to be set when translating from IPv4 to IPv6.
value	Value of the traffic-class. The range is from 0 to 255.
tos	Specifies the type of service value to be set when translating from IPv6 to IPv4. The range is from 0 to 255.

Command Default

None

Command Modes

NAT64 stateful configuration

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to configure ipv4 address on a NAT64 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 nat64 stateful nat64-inst
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)# address-family ipv4
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful-afi)#tcp mss 565
```

This example shows how to configure ipv6 address on a NAT64 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 nat64 stateful nat64-inst
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)# address-family ipv6
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful-afi)#traffic-class 65
```

Related Commands

Command	Description
dynamic-port-range (Stateful NAT64), on page 85	Configures ports dynamically.
external-logging (Stateful NAT64 Netflow), on page 94	Enables external logging of a NAT64 Stateful instance.
fragment-timeout (Stateful NAT64), on page 99	Specifies time interval to store packet fragments.
ipv4 (Stateful NAT64), on page 109	Assigns ipv4 address pool.
ipv6-prefix (Stateful NAT64), on page 113	Converts an IPv6 address to an IPv4 address.
portlimit (Stateful NAT64), on page 137	Restricts the number of ports used by an IPv6 address.
protocol (Stateful NAT64), on page 150	Enters the ICMP, TCP, and UDP protocol configuration mode.
refresh-direction (Stateful NAT64), on page 156	Specifies the outbound refresh direction.
service-type nat64 (Stateful NAT64), on page 181	Creates a NAT64 stateful instance.
tcp-policy (Stateful NAT64), on page 271	Enables TCP policy that allows IPv4 initiated TCP sessions.
ubit-reserved (Stateful NAT64), on page 290	Enables reserving ubits in an IPv6 address.

aftr-endpoint-address (MAP-E)

To configure the IPv6 address of Address Family Transition Router (AFTR), use the **aftr-endpoint-address** command in MAP-E configuration mode. To undo the configuration, use the **no** form of this command.

aftr-endpoint-address *address*

Syntax Description

address	Specifies the IPv6 address of the AFTR.

Command Default

None

Command Modes

MAP-E configuration

Command History

Release	Modification
Release 4.3.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to configure the AFTR address for a MAP-E 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 map-e map-e-inst
RP/0/RP0/CPU0:router(config-cgn-map_e)# aftr-endpoint-address 2001:db8:100::40
```

Related Commands

Command	Description
address-family (MAP-E), on page 19	Configures IPv4 or IPv6 address for a MAP-E instance.
contiguous-ports (MAP-E), on page 76	Configures the number of contiguous ports for a MAP-E instance.
cpe-domain (MAP-E), on page 78	Configures the Customer Premises Equipment (CPE) domain parameters.
path-mtu (MAP-E), on page 126	Configures the path Maximum Transmission Unit (MTU) of the tunnel.
sharing-ratio (MAP-E), on page 192	Configures the port sharing ratio.

aftr-tunnel-endpoint-address (DS-LITE)

To assign an IPv6 tunnel endpoint address for a DS-lite instance, use the **aftr-tunnel-endpoint-address** in DS-Lite configuration mode. To unassign the address for the ds-lite instance, use the **no** form of this command.

aftr-tunnel-endpoint-address *IPv6 address*

Syntax Description

IPv6 address	Specifies the IPv6 address of the tunnel endpoint.

Command Default

None

Command Modes

DS-Lite configuration

Command History

Release	Modification
Release 4.2.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to assign an IPv6 tunnel endpoint address for a ds-lite instance:

```
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)#aftr-tunnel-endpoint-address 10:10::2
RP/0/RP0/CPU0:router(config-cgn-ds-lite)
```

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

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

No specific guidelines impact the use of this command.

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

Syntax Description

ftp	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

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

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

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

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cgn	read, write

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
alg ActiveFTP (NAT44), on page 27	Enables the Application-Level Gateway (ALG) of Active FTP for a NAT44 instance.
alg rtsp (NAT44), on page 32	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

Syntax Description

rtsp	Specifies the real time streaming protocol.
server-port	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

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

Example

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-lite1
RP/0/RP0/CPU0:router(config-cgn-ds-lite)# alg rtsp
```

Related Commands

Command	Description
address-family ipv4 (Stateless NAT64), on page 15	Enters the IPv4 address family configuration mode.
alg ActiveFTP (NAT44), on page 27	Enables the Application-Level Gateway (ALG) of Active FTP for a NAT44 instance.
inside-vrf (NAT44), on page 101	Enters inside VRF configuration mode for a NAT44 instance.
portlimit (NAT44), on page 135	Limits the number of translation entries per source address.

Command	Description
protocol (NAT44)	
service cgn, on page 168	Enables an instance for the CGN application.
service-type nat44, on page 180	Enables a NAT44 instance for the CGN application.
refresh-direction (NAT44), on page 155	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*

Syntax Description

server-port	Specifies the port to be used for RTSP.
value	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

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

Example

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
alg ActiveFTP (NAT44), on page 27	Enables the Application-Level Gateway (ALG) of Active FTP for a NAT44 instance.

alg rtsp (Stateful NAT64)

To configure Real Time Streaming Protocol (RTSP) as the Application-Level Gateway (ALG), use the **alg rtsp** command in Stateful NAT64 configuration mode. To undo the configuration, use the **no** form of this command.

alg rtsp server-port *value*

Syntax Description

server-port	Specifies the port to be used for RTSP.
value	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

Stateful NAT64

Command History

Release	Modification
Release 4.3.1	This command was introduced.

Usage Guidelines

The application must be directed to identify RTSP packets. The **alg rtsp** configuration command enables RTSP scan.

Task ID

Task ID	Operation
cgn	read, write

Example

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 nat64 stateful nat1
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)# alg rtsp server-port 666
```

Related Commands

Command	Description
address-family (Stateful NAT64), on page 23	Configures IPv4 or IPv6 address on a NAT64 instance.
dynamic-port-range (Stateful NAT64), on page 85	Configures ports dynamically.
external-logging (Stateful NAT64 Netflow), on page 94	Enables external logging of a NAT64 Stateful instance.
fragment-timeout (Stateful NAT64), on page 99	Specifies time interval to store packet fragments.

Command	Description
ipv4 (Stateful NAT64), on page 109	Assigns ipv4 address pool.
ipv6-prefix (Stateful NAT64), on page 113	Converts an IPv6 address to an IPv4 address.
portlimit (Stateful NAT64), on page 137	Restricts the number of ports used by an IPv6 address.
protocol (Stateful NAT64), on page 150	Enters the ICMP, TCP, and UDP protocol configuration mode.
refresh-direction (Stateful NAT64), on page 156	Specifies the outbound refresh direction.
tcp-policy (Stateful NAT64), on page 271	Enables TCP policy that allows IPv4 initiated TCP sessions.
ubit-reserved (Stateful NAT64), on page 290	Enables reserving ubits in an IPv6 address.

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

name	Specifies the port-set created.

Command Default

None

Command Modes

CGN inside VRF configuration mode.

Command History

Release	Modification
Release 5.3.1	This command was introduced.

Usage Guidelines

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
cgn	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
RP/0/RP0/CPU0:router(config-cgn-invrf)#map-address pool 100.1.1.0/24
RP/0/RP0/CPU0:router(config-cgn-invrf-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**}

Syntax Description

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

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

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
ipv4 prefix (6rd), on page 105	Assigns a value for the ipv4-prefix length to be used as part of both ends of tunnel.

Command	Description
ipv4 suffix (6rd), on page 107	Assigns a value for the ipv4-suffix length to be used as part of both ends of a tunnel.
ipv6-prefix (6rd), on page 111	Generates the delegated ipv6 prefix for a IPv6 Rapid Deployment (6RD) application.
source-address (6rd), on page 267	Assigns an ipv4 address as the tunnel source address.
unicast address (6rd), on page 292	Assigns an IPv6 address to be used for a IPv6 Rapid Deployment (6RD) Border Relay (BR) unicast configuration.

br-endpoint-address (MAP-E)

To configure the IPv6 address of BR, use the **br-endpoint-address** command in MAP-E configuration mode. To undo the configuration, use the **no** form of this command.

br-endpoint-address *address*

Syntax Description

address	Specifies the IPv6 address of the BR.

Command Default

None

Command Modes

MAP-E configuration

Command History

Release	Modification
Release 5.3.2	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgv6	read, write

This example shows how to configure the BR address for a MAP-E instance:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# service cgv6 cgv6-1
RP/0/RP0/CPU0:router(config-cgv6)# Service-inline interface TenGigE0/0/0/0
RP/0/RP0/CPU0:router(config-cgv6)#  service-type-map_e map1
RP/0/RP0/CPU0:router(config-cgv6-map-e)#  cpe-domain ipv4 Prefix 120.2.1.0/24
RP/0/RP0/CPU0:router(config-cgv6-map-e)#  cpe-domain ipv6 prefix 9020:da8:2::/48
RP/0/RP0/CPU0:router(config-cgv6-map-e)#   sharing-ratio 256
RP/0/RP0/CPU0:router(config-cgv6-map-e)#   contiguous-ports 16
RP/0/RP0/CPU0:router(config-cgv6-map-e)#    br-endpoint-address 9020:da8:2:ffff::1
```

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*

Syntax Description

size *size-value*	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 8, 16, 32, 64, 128, 256, 512, 1024, 2048, and 4096.

Command Default

None

Command Modes

NAT44 Inside VRF configuration

Command History

Release	Modification
Release 4.2.1	This command was introduced.
Release 5.2.0	The minimum size for bulk port allocation was reduced to 8.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

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
external-logging (NAT44 Netflow), on page 92	Enables external logging of a NAT44 instance.
protocol (NAT44)	

bulk-port-alloc (DS-LITE)

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 DS-Lite configuration mode. To undo the bulk port allocation, use the **no** form of this command.

bulk-port-alloc size

Syntax Description

size	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.

Command Default

None

Command Modes

DS-Lite configuration

Command History

Release	Modification
Release 4.2.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

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 ds-lite ds-lite1
RP/0/RP0/CPU0:router(config-cgn-ds-lite)#bulk-port-alloc size 64
RP/0/RP0/CPU0:router(config-cgn-ds-lite)#
```

Related Commands

Command	Description
protocol (NAT44)	

clear cgn ds-lite

To clear all translation database entries that are created dynamically for the specific DS-Lite instance, use the **clear cgn ds-lite** command in EXEC mode .

clear cgn ds-lite *instance-name*

Syntax Description

instance-name	Instance name for DS-Lite.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 4.2.1	This command was introduced.

Usage Guidelines

Caution Because the **clear cgn ds-lite** 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

clear cgn ds-lite ipaddress

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

clear cgn ds-lite *instance-name* **ipaddress** *address*

Syntax Description

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

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 4.2.1	This command was introduced.

Usage Guidelines

Caution Because the **clear cgn ds-lite 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

clear cgn ds-lite port

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

clear cgn ds-lite *instance-name* **port** *number*

Syntax Description

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

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 4.2.1	This command was introduced.

Usage Guidelines

Caution Because the **clear cgn ds-lite 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

clear cgn ds-lite protocol

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

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

Syntax Description

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

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 4.2.1	This command was introduced.

Usage Guidelines

Caution Because the **clear cgn ds-lite 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

clear cgn ds-lite statistics

To clear all the statistics for a ds-lite instance, use the**clear cgn ds-lite statistics** command in EXEC mode.

clear cgn ds-lite *instance-name* **statistics**

Syntax Description

instance-name	Specifies the name of the DS-Lite instance.
statistics	Specifies the DS-Lite statistics.

Command Default

None

Command Modes

Exec

Command History

Release	Modification
Release 4.2.1	This command was introduced.

Usage Guidelines

Caution Because the **clear cgn ds-lite statistics** command clears all statistics counters, use this command with caution.

Task ID

Task ID	Operation
cgn	read

Related Commands

Command	Description
clear cgn nat44 port, on page 59	Clears the translation database entries that are created dynamically for the specified inside port number.
clear cgn nat44 protocol, on page 62	Clears translation database entries that are created dynamically for the specified protocol.

clear cgn map-e statistics

To clear all statistics of a MAP-E instance, use the **clear cgn map-e statistics** command in EXEC mode.

clear cgn map-e *instance-name* **statistics**

Syntax Description

instance-name	Name of the map-e instance.
statistics	Specifies the map-e statistics.

Command Default

None

Command Modes

Exec

Command History

Release	Modification
Release 4.3.1	This command was introduced.

Usage Guidelines

Caution Because the **clear cgn map-e statistics** command clears all statistics counters, use this command with caution.

Task ID

Task ID	Operation
cgn	read

Examples

This example shows how to clear the statistics entries for a MAP-E instance:

```
RP/0/RP0/CPU0:router# show cgn map-e m1 statistics

MAP-E IPv4 to IPv6 counters:
====================================

Total Incoming Count : 0
Total Drop Count : 0
Total Output Count : 0

TCP Incoming Count : 0
TCP Output Count : 0
UDP Incoming Count : 0
UDP Output Count : 0
ICMPv4 Incoming Count : 0
ICMPv4 Output Count : 0

Invalid UIDB Drop Count : 0
NoDb Drop Count : 0
```

```
TTL Expire Drop Count : 0
Invalid IP Destination Drop Count : 0
Packet Exceeding Path MTU Drop Count : 0
Unsupported Protocol Drop Count : 0

ICMPv4 Generated for TTL Expire Count : 0
ICMPv4 Generated for Error Count : 0
ICMPv4 Packets Rate-Limited Count : 0

TCP MSS Changed Count : 0

MAP-E IPv6 to IPv4 counters:
====================================

Total Incoming Count : 0
Total Drop Count : 0
Total Output Count : 0

TCP Incoming Count : 0
TCP Output Count : 0
UDP Incoming Count : 0
UDP Output Count : 0
ICMPv4 Incoming Count : 0
ICMPv4 Output Count : 0
Invalid UIDB Drop Count : 0
NoDb Drop Count : 0
TTL Expire Drop Count : 0
Invalid IPv6 Destination Drop Count : 0
Invalid Source Prefix Drop Count : 0
Unsupported Protocol Drop Count : 0

ICMPv6 Input Count : 0
ICMPv6 Invalid UIDB Drop Count : 0
ICMPv6 NoDb Drop Count : 0
ICMPv6 TTL Expire Drop Count : 0
ICMPv6 Invalid IPv6 Destination Drop Count : 0
ICMPv6 Unsupported Type Drop Count : 0
ICMPv6 Invalid NxtHdr Drop Count: 0
ICMPv6 Frag Drop Count : 0
ICMPv6 Forus Count : 0
ICMPv6 Echo Response Received Count : 0
ICMPv6 Echo Replies Count : 0
ICMPv6 Translated to ICMPV4 Output Count : 0

ICMPv6 Generated for TTL Expire Count : 0
ICMPv6 Generated for Error Count : 0
ICMPv6 Packets Rate-Limited Count : 0

TCP MSS Changed Count: 0

MAP-E IPv4 Frag counters received from V4 cloud:
================================================

Total Input Count: 0
Total Drop Count: 0
Reassembled Output Count : 0

TCP Input Count: 0
UDP Input Count: 0
ICMPv4 Input Count: 0

Invalid UIDB Drop Count : 0
NoDb Drop Count : 0
Unsupported Protocol Drop Count : 0
```

```
Throttled Count : 0
Timeout Drop Count: 0
Duplicates Drop Count : 0

MAP-E Inner IPv4 Frag counters received from V6 cloud:
=====================================================

Total Input Count : 0
Total Drop Count : 0
Total Output Count : 0

TCP Input Count : 0
UDP Input Count : 0
ICMPv4 Input Count : 0

Invalid Source Prefix Drop Count : 0
Unsupported Protocol Drop count : 0
Throttled Count : 0
Timeout Drop Count : 0
Duplicates Drop Count : 0

ICMPv6 Generated for Error Count : 0
ICMPv6 Packets Rate-Limited Count : 0

TCP MSS Changed Count : 0

The RP/0/RP0/CPU0:router# clear cgn map-e m1 statistics command clears the output
shown above.
```

Related Commands

Command	Description
show cgn map-e statistics, on page 204	Displays the MAP-E instance statistics.

clear cgn map-t statistics

To clear all the statistics of a MAP-T instance, use the **clear cgn map-t statistics** command in EXEC mode.

clear cgn map-t *instance-name* **statistics**

Syntax Description

instance-name	Specifies the name of the map-t instance.
statistics	Specifies the map-t statistics.

Command Default

None

Command Modes

Exec

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

Caution Because the **clear cgn map-t 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 MAP-T instance:

```
RP/0/RP0/CPU0:router# show cgn map-t m1 statistics

MAP-T IPv6 to IPv4 counters:
====================================

TCP Incoming Count: 0
TCP NonTranslatable Drop Count: 0
TCP Invalid NextHdr Drop Count: 0
TCP NoDb Drop Count: 0
TCP Translated Count: 0
UDP Incoming Count: 0
UDP NonTranslatable Drop Count: 0
UDP Invalid Next Hdr Drop Count: 0
UDP No Db Drop Count: 0
UDP Translated Count: 0

ICMP Total Incoming Count: 0
ICMP No DB Drop Count: 0
ICMP Fragment drop count: 0
ICMP Invalid NxtHdr Drop Count: 0
```

```
ICMP Nontanslatable Drop Count: 0
ICMP Nontanslatable Fwd Count: 0
ICMP UnsupportedType Drop Count: 0
ICMP Err Translated Count: 0
ICMP Query Translated Count: 0

Subsequent Fragment Incoming Count: 0
Subsequent Fragment NonTranslateable Drop Count: 0
Invalid NextHdr Drop Count: 0
Subsequent Fragment No Db Drop Count: 0
Subsequent Fragment Translated Count: 0

Extensions/Options Incoming Count: 0
Extensions/Options Drop Count: 0
Extensions/Options Forward Count: 0

Extensions/Options No DB drop Count: 0
Unsupported Protocol Count: 0

MAP-T IPv4 to IPv6 counters:
====================================

TCP Incoming Count: 0
TCP No Db Drop Count: 0
TCP Translated Count: 0

UDP Incoming Count: 0
UDP No Db Drop Count: 0
UDP Translated Count: 0
UDP FragmentCrc Zero Drop Count: 0
UDP CrcZeroRecy Sent Count: 0
UDP CrcZeroRecy Drop Count: 0

ICMP Total Incoming Count: 0
ICMP No Db Drop Count: 0
ICMP Fragment drop count: 0
ICMP UnsupportedType Drop Count: 0
ICMP Err Translated Count: 0
ICMP Query Translated Count: 0

Subsequent Fragment Incoming Count: 0
Subsequent Fragment No Db Drop  Count: 0
Subsequent Fragment Translated Count: 0

Options Incoming Count: 0
Options Drop Count: 0
Options Forward Count: 0
Options No DB drop Count: 0
Unsupported Protocol Count: 0

ICMP generated counters :
=======================

IPv4 ICMP Messages generated count: 0
IPv6 ICMP Messages generated count: 0
```

The RP/0/RP0/CPU0:router# **clear cgn map-t m1 statistics** command clears the output shown above.

Related Commands

Command	Description
address-family (MAP-T), on page 21	Configures IPv4 or IPv6 address for a MAP-T instance.

Command	Description
contiguous-ports (MAP-T), on page 77	Configures the number of contiguous ports for a MAP-T instance.
cpe-domain (MAP-T), on page 80	Configures the Customer Premises Equipment (CPE) domain parameters.
external-domain (MAP-T), on page 88	Configures the external domain's IPv6 prefix to convert IPv4 addresses into IPv6 addresses and vice versa.
sharing-ratio (MAP-T), on page 193	Configures the port sharing ratio.
show cgn map-t statistics, on page 209	Displays the MAP-T instance statistics.
traceroute (MAP-T), on page 284	Configures traceroute translation algorithms.

clear cgn nat44

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

clear cgn nat44 *instance-name*

Syntax Description

instance-name	Instance name for NAT44.

Command Default

None

Command Modes

EXEC

Command History

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

Usage Guidelines

⚠

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
Translations delete rate: 6755
Inside to outside forward rate: 977
Outside to inside forward rate: 456
Inside to outside drops port limit exceeded: 0
Inside to outside drops system limit reached: 0
Inside to outside drops resorce depletion: 0
Outside to inside drops no translation entry: 0
Pool address totally free: 195
```

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

RP/0/RP0/CPU0:router# show cgn nat44 nat2 statistics

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

Related Commands

Command	Description
service cgn, on page 168	Enables an instance for the CGN application.
show cgn nat44 inside-translation, on page 217	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.
show cgn nat44 outside-translation, on page 223	Displays the outside-address to inside-address translation details for a specified NAT44 instance.

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**

Syntax Description

counters	Lists the counters for TCP sequence check

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 5.1.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

Example

The following example clears the counters for TCP sequence check.

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

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

Command Default

None

Command Modes

EXEC

Command History

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

Usage Guidelines

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
show cgn nat44 inside-translation, on page 217	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.
show cgn nat44 outside-translation, on page 223	Displays the outside-address to inside-address translation details for a specified NAT44 instance.

clear cgn nat44 ipaddress

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

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

Syntax Description

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

Command Default

None

Command Modes

EXEC

Command History

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

Usage Guidelines

⚠

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
show cgn nat44 inside-translation, on page 217	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.
show cgn nat44 outside-translation, on page 223	Displays the outside-address to inside-address translation details for a specified NAT44 instance.

clear cgn nat44 port

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

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

Syntax Description

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

Command Default

None

Command Modes

EXEC

Command History

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

Usage Guidelines

⚠

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
show cgn nat44 inside-translation, on page 217	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.
show cgn nat44 outside-translation, on page 223	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

instance-name	Name for the NAT44 CGN instance.
pptpCounters	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

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

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

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 3.9.1	This command was introduced.
Release 4.0.0	NAT44 instance was included in the command syntax.
Release 4.3.0	The keyword, **gre** was added.

Usage Guidelines

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
protocol (NAT44)	
show cgn nat44 inside-translation, on page 217	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.
show cgn nat44 outside-translation, on page 223	Displays the outside-address to inside-address translation details for a specified NAT44 instance.

clear cgn nat64 stateful

To clear all translation database entries that are created dynamically for the specific NAT64 stateful instance, use the **clear cgn nat64 stateful** command in EXEC mode.

clear cgn nat64 stateful *instance-name*

Syntax Description

instance-name	NAT64 stateful instance.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

Caution Because the **clear cgn nat64 stateful** 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

Related Commands

Command	Description
clear cgn nat64 stateful counters, on page 65	Clears all the counters that are created for a NAT64 stateful instance
clear cgn nat64 stateful ipaddress, on page 66	Clears translation database entries that are created dynamically for the specified IPv6 address.
clear cgn nat64 stateful port, on page 68	Clears the translation database entries that are created dynamically for the specified port number
clear cgn nat64 stateful protocol, on page 70	Clears the translation database entries that are created dynamically for the specified protocol
clear cgn nat64 stateful statistics, on page 72	Clears all the statistics for a nat64 stateful instance

clear cgn nat64 stateful counters

To clear all the counters created for a NAT64 stateful instance, use the **clear cgn nat64 stateful counters** command in EXEC mode.

clear cgn nat64 stateful *instance-name* **counters**

Syntax Description

instance-name	NAT64 stateful instance.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

Caution Because the **clear cgn nat64 stateful counters** command clears all counters, use this command with caution.

Task ID

Task ID	Operations
cgn	read

Related Commands

Command	Description
clear cgn nat64 stateful, on page 64	Clears all translation database entries that are created dynamically for the specific NAT64 stateful instance
clear cgn nat64 stateful ipaddress, on page 66	Clears translation database entries that are created dynamically for the specified IPv6 address.
clear cgn nat64 stateful port, on page 68	Clears the translation database entries that are created dynamically for the specified port number
clear cgn nat64 stateful protocol, on page 70	Clears the translation database entries that are created dynamically for the specified protocol
clear cgn nat64 stateful statistics, on page 72	Clears all the statistics for a nat64 stateful instance

clear cgn nat64 stateful ipaddress

To clear translation database entries that are created dynamically for the specified IPv6 address, use the **clear cgn nat64 stateful ipaddress** command in EXEC mode.

clear cgn nat64 stateful *instance-name* **ipaddress** *ipv6 address* [**port** *port number* **protocol** [**icmp** | **tcp** | **udp**] | **protocol** [**icmp** | **tcp** | **udp**] **port** *port number*]

Syntax Description

instance-name	Instance name for stateful NAT64.
ipv6 address	Specifies the IPv6 address for which the translation entries must be cleared.
protocol	Displays the name of the protocols.
icmp	Displays the ICMP protocol.
tcp	Displays the TCP protocol.
udp	Displays the UDP protocol.
port	Displays the range of the port numbers from 1 to 65535.
port number	Specifies the port number within the range.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

Caution Because the **clear cgn nat64 stateful ipaddress** command clears all translation database entries for the specified IPv6 address and impacts the traffic on those translation entries, use this command with caution.

Task ID

Task ID	Operations
cgn	read

Related Commands

Command	Description
clear cgn nat64 stateful, on page 64	Clears all translation database entries that are created dynamically for the specific NAT64 stateful instance
clear cgn nat64 stateful counters, on page 65	Clears all the counters that are created for a NAT64 stateful instance
clear cgn nat64 stateful port, on page 68	Clears the translation database entries that are created dynamically for the specified port number
clear cgn nat64 stateful protocol, on page 70	Clears the translation database entries that are created dynamically for the specified protocol
clear cgn nat64 stateful statistics, on page 72	Clears all the statistics for a nat64 stateful instance

clear cgn nat64 stateful port

To clear the translation database entries that are created dynamically for the specified port number, use the **clear cgn nat64 stateful port** command in EXEC mode.

clear cgn nat64 stateful *instance-name* **port** *port number* [**ipaddress** *IPv6 address* **protocol** [**icmp** | **tcp** | **udp**] | **protocol** [**icmp** | **tcp** | **udp**] **ipaddress** *IPv6 address*]

Syntax Description

instance-name	Instance name for stateful NAT64.
port number	Specifies the port number within the range.
protocol	Displays the name of the protocols.
icmp	Displays the ICMP protocol.
tcp	Displays the TCP protocol.
udp	Displays the UDP protocol.
ipv6 address	Specifies the IPv6 address for which the translation entries must be cleared.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

Caution Because the **clear cgn nat64 stateful 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

Related Commands

Command	Description
clear cgn nat64 stateful, on page 64	Clears all translation database entries that are created dynamically for the specific NAT64 stateful instance
clear cgn nat64 stateful counters, on page 65	Clears all the counters that are created for a NAT64 stateful instance

Command	Description
clear cgn nat64 stateful ipaddress, on page 66	Clears translation database entries that are created dynamically for the specified IPv6 address.
clear cgn nat64 stateful protocol, on page 70	Clears the translation database entries that are created dynamically for the specified protocol
clear cgn nat64 stateful statistics, on page 72	Clears all the statistics for a nat64 stateful instance

clear cgn nat64 stateful protocol

To clear the translation database entries that are created dynamically for the specified protocol, use the **clear cgn nat64 stateful protocol** command in EXEC mode.

clear cgn nat64 stateful *instance-name* **protocol** {**icmp** | **tcp** | **udp**} [[**ipaddress** *IPv6 address* **port** *port number*] | [**port** *port number* **ipaddress** *IPv6 address*]]

Syntax Description

instance-name	Instance name for stateful NAT64.
port number	Specifies the port number within the range.
protocol	Displays the name of the protocols.
icmp	Displays the ICMP protocol.
tcp	Displays the TCP protocol.
udp	Displays the UDP protocol.
ipv6 address	Specifies the IPv6 address for which the translation entries must be cleared.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

Caution Because the **clear cgn nat64 stateful 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

Related Commands

Command	Description
clear cgn nat64 stateful, on page 64	Clears all translation database entries that are created dynamically for the specific NAT64 stateful instance
clear cgn nat64 stateful counters, on page 65	Clears all the counters that are created for a NAT64 stateful instance

Command	Description
clear cgn nat64 stateful ipaddress, on page 66	Clears translation database entries that are created dynamically for the specified IPv6 address.
clear cgn nat64 stateful port, on page 68	Clears the translation database entries that are created dynamically for the specified port number
clear cgn nat64 stateful statistics, on page 72	Clears all the statistics for a nat64 stateful instance

clear cgn nat64 stateful statistics

To clear all the statistics for a nat64 stateful instance, use the**clear cgn nat64 stateful statistics** command in EXEC mode.

clear cgn nat64 stateful *instance-name* **statistics**

Syntax Description

instance-name	Specifies the name of the nat64 stateful instance.
statistics	Specifies the nat64 stateful statistics.

Command Default

None

Command Modes

Exec

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

Caution Because the **clear cgn nat64 stateful statistics** command clears all statistics counters, use this command with caution.

Task ID

Task ID	Operation
cgn	read

Related Commands

Command	Description
clear cgn nat64 stateful, on page 64	Clears all translation database entries that are created dynamically for the specific NAT64 stateful instance
clear cgn nat64 stateful counters, on page 65	Clears all the counters that are created for a NAT64 stateful instance
clear cgn nat64 stateful ipaddress, on page 66	Clears translation database entries that are created dynamically for the specified IPv6 address.
clear cgn nat64 stateful port, on page 68	Clears the translation database entries that are created dynamically for the specified port number
clear cgn nat64 stateful protocol, on page 70	Clears the translation database entries that are created dynamically for the specified protocol

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

instance-name	Specifies the name of the 6rd instance.
statistics	6rd instance statistics.

Command Default

None

Command Modes

Exec

Command History

Release	Modification
Release 4.3.1	This command was introduced.

Usage Guidelines

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
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
show cgn tunnel v6rd statistics, on page 251	Displays the statistics information for an IPv6 Rapid Deployment (6RD) instance.

clear cgv6 map-e statistics

To clear all the statistics for a map-e instance, use the**clear cgv6 map-e statistics** command in EXEC mode.

clear cgv6 map-e *instance-name* **statistics**

Syntax Description

instance-name	Specifies the name of the MAP-E instance.
statistics	Specifies the MAP-E statistics.

Command Default

None

Command Modes

Exec

Command History

Release	Modification
Release 5.3.2	This command was introduced.

Usage Guidelines

Caution Because the **clear cgv6 map-e statistics** command clears all statistics counters, use this command with caution.

Task ID

Task ID	Operation
cgv6	read

contiguous-ports (MAP-E)

To configure the number of contiguous ports for a MAP-E instance, use the **contiguous-ports** command in MAP-E configuration mode. To undo the configuration, use the **no** form of this command.

contiguous-ports *number*

Syntax Description

number	Number of contiguous ports. The value is in powers of 2. The range is from 1 to 65535.

Command Default

None

Command Modes

MAP-E configuration

Command History

Release	Modification
Release 4.3.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to configure the number of contiguous ports for a MAP-E 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 map-e map-e-inst
RP/0/RP0/CPU0:router(config-cgn-map_e)# contiguous-ports 8
```

Related Commands

Command	Description
address-family (MAP-E), on page 19	Configures IPv4 or IPv6 address for a MAP-E instance.
aftr-endpoint-address (MAP-E), on page 25	Configures the IPv6 address of Address Family Transition Router (AFTR).
cpe-domain (MAP-E), on page 78	Configures the Customer Premises Equipment (CPE) domain parameters.
path-mtu (MAP-E), on page 126	Configures the path Maximum Transmission Unit (MTU) of the tunnel.
sharing-ratio (MAP-E), on page 192	Configures the port sharing ratio.

contiguous-ports (MAP-T)

To configure the number of contiguous ports for a MAP-T instance, use the **contiguous-ports** command in MAP-T configuration mode. To undo the configuration, use the **no** form of this command.

contiguous-ports *number*

Syntax Description

number	Number of contiguous ports. The value is in powers of 2. The range is from 1 to 65535.

Command Default

None

Command Modes

MAP-T configuration

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to configure the number of contiguous ports for a MAP-T 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 map-t map-t-inst
RP/0/RP0/CPU0:router(config-cgn-mapt)# contiguous-ports 8
```

Related Commands

Command	Description
address-family (MAP-T), on page 21	Configures IPv4 or IPv6 address for a MAP-T instance.
clear cgn map-t statistics, on page 49	Clears the statistics of a MAP-T instance.
cpe-domain (MAP-T), on page 80	Configures the Customer Premises Equipment (CPE) domain parameters.
external-domain (MAP-T), on page 88	Configures the external domain's IPv6 prefix to convert IPv4 addresses into IPv6 addresses and vice versa.
sharing-ratio (MAP-T), on page 193	Configures the port sharing ratio.
show cgn map-t statistics, on page 209	Displays the MAP-T instance statistics.
traceroute (MAP-T), on page 284	Configures traceroute translation algorithms.

cpe-domain (MAP-E)

To configure the Customer Premises Equipment (CPE) domain parameters, use the **cpe-domain** command in MAP-E configuration mode. To undo the configuration, use the **no** form of this command.

cpe-domain {**ipv4** | **ipv6**}[**prefix** *address*]

Syntax Description

ipv4	Specifies IPv4 parameters.
ipv6	Specifies IPv6 parameters.
prefix	Specifies the CPE domain IPv4 or IPv6 prefix.
address / length	IPv4 or IPv6 address and subnet mask.

Command Default

None

Command Modes

MAP-E configuration

Command History

Release	Modification
Release 4.3.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to configure the CPE domain's IPv6 prefix:

```
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 map-e map-e-inst
RP/0/RP0/CPU0:router(config-cgn-map_e)# cpe-domain ipv6 prefix 10:2::24/32
```

This example shows how to configure the CPE domain's IPv4 prefix:

```
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 map-e map-e-inst
RP/0/RP0/CPU0:router(config-cgn-map_e)# cpe-domain ipv4 prefix 202.38.102.0/24
```

Related Commands

Command	Description
address-family (MAP-E), on page 19	Configures IPv4 or IPv6 address for a MAP-E instance.

Command	Description
aftr-endpoint-address (MAP-E), on page 25	Configures the IPv6 address of Address Family Transition Router (AFTR).
contiguous-ports (MAP-E), on page 76	Configures the number of contiguous ports for a MAP-E instance.
path-mtu (MAP-E), on page 126	Configures the path Maximum Transmission Unit (MTU) of the tunnel.
sharing-ratio (MAP-E), on page 192	Configures the port sharing ratio.

cpe-domain (MAP-T)

To configure the Customer Premises Equipment (CPE) domain parameters, use the **cpe-domain** command in MAP-T configuration mode. To undo the configuration, use the **no** form of this command.

cpe-domain {**ipv4** | **ipv6**}[**prefix** *address*]

Syntax Description

ipv4	Specifies IPv4 parameters.
ipv6	Specifies IPv6 parameters.
prefix	Specifies the CPE domain IPv4 or IPv6 prefix.
address / length	Specifies IPv4 or IPv6 address and subnet mask.

Command Default

None

Command Modes

MAP-T configuration

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to configure the CPE domain's IPv6 prefix:

```
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 map-t map-t-inst
RP/0/RP0/CPU0:router(config-cgn-mapt)# cpe-domain ipv6 prefix 10:2::24/32
```

This example shows how to configure the CPE domain's IPv4 prefix:

```
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 map-t map-t-inst
RP/0/RP0/CPU0:router(config-cgn-mapt)# cpe-domain ipv4 prefix 202.38.102.0/24
```

Related Commands

Command	Description
address-family (MAP-T), on page 21	Configures IPv4 or IPv6 address for a MAP-T instance.

Command	Description
clear cgn map-t statistics, on page 49	Clears the statistics of a MAP-T instance.
contiguous-ports (MAP-T), on page 77	Configures the number of contiguous ports for a MAP-T instance.
external-domain (MAP-T), on page 88	Configures the external domain's IPv6 prefix to convert IPv4 addresses into IPv6 addresses and vice versa.
sharing-ratio (MAP-T), on page 193	Configures the port sharing ratio.
show cgn map-t statistics, on page 209	Displays the MAP-T instance statistics.
traceroute (MAP-T), on page 284	Configures traceroute translation algorithms.

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**}]

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

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

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

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

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
cgn	read, write

Example

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 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)# df-override
```

Related Commands

Command	Description
address-family ipv6 (Stateless NAT64), on page 17	Enters the IPv6 address family configuration mode.
interface ServiceApp, on page 102	Enables the application SVI interface.
protocol icmp reset-mtu (CGN), on page 152	Resets the received packet size.
service cgn, on page 168	Enables an instance for the CGN application.

Command	Description
service-type nat64 (Stateless), on page 183	Creates a nat64 stateless application
tcp mss (CGN), on page 270	Adjusts the TCP maximum segment size value for a ServiceApp interface.
traffic-class (CGN), on page 286	Configures the traffic class value to be used when translating a packet from IPv4 to IPv6

dynamic-port-range (Stateful NAT64)

To configure ports dynamically ranging from 1 to 65535, use the **dynamic-port-range** command in NAT64 stateful configuration mode. To undo the configuration, use the **no** form of this command.

dynamic-port-range start *port-number*

Syntax Description

start	Specifies the starting range of port numbers.
value	Specifies the port number to be dynamically configured. The range is from 1 to 65535.

Command Default

None

Command Modes

NAT64 stateful configuration mode

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to dynamically configure ports for a NAT64 stateful 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 nat64 stateful nat64-inst
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)# dynamic-port-range start 66
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)#
```

Related Commands

Command	Description
address-family (Stateful NAT64), on page 23	Configures IPv4 or IPv6 address on a NAT64 instance.
external-logging (Stateful NAT64 Netflow), on page 94	Enables external logging of a NAT64 Stateful instance.
fragment-timeout (Stateful NAT64), on page 99	Specifies time interval to store packet fragments.
ipv4 (Stateful NAT64), on page 109	Assigns ipv4 address pool.
ipv6-prefix (Stateful NAT64), on page 113	Converts an IPv6 address to an IPv4 address.

Command	Description
portlimit (Stateful NAT64), on page 137	Restricts the number of ports used by an IPv6 address.
protocol (Stateful NAT64), on page 150	Enters the ICMP, TCP, and UDP protocol configuration mode.
refresh-direction (Stateful NAT64), on page 156	Specifies the outbound refresh direction.
service-type nat64 (Stateful NAT64), on page 181	Creates a NAT64 stateful instance.
tcp-policy (Stateful NAT64), on page 271	Enables TCP policy that allows IPv4 initiated TCP sessions.
ubit-reserved (Stateful NAT64), on page 290	Enables reserving ubits in an IPv6 address.

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

value	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

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

Example

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-domain (MAP-T)

To configure the external domain's IPv6 prefix to convert IPv4 addresses into IPv6 addresses, use the **external-domain** command in MAP-T configuration mode. To undo the configuration, use the **no** form of this command.

external-domain ipv6 prefix *address subnet mask*

Syntax Description

ipv6	Specifies IPv6 parameters.
prefix	Specifies the external domain IPv6 prefix.
address / length	Specifies IPv4 or IPv6 address and subnet mask.

Command Default

None

Command Modes

MAP-T configuration

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to configure the external domain's IPv6 prefix:

```
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 map-t map-t-inst
RP/0/RP0/CPU0:router(config-cgn-mapt)# external-domain ipv6 prefix 10:2::24/64
```

Related Commands

Command	Description
address-family (MAP-T), on page 21	Configures IPv4 or IPv6 address for a MAP-T instance.
clear cgn map-t statistics, on page 49	Clears the statistics of a MAP-T instance.
contiguous-ports (MAP-T), on page 77	Configures the number of contiguous ports for a MAP-T instance.
cpe-domain (MAP-T), on page 80	Configures the Customer Premises Equipment (CPE) domain parameters.

Command	Description
sharing-ratio (MAP-T), on page 193	Configures the port sharing ratio.
show cgn map-t statistics, on page 209	Displays the MAP-T instance statistics.
traceroute (MAP-T), on page 284	Configures traceroute translation algorithms.

external-logging (DS-LITE Netflow9)

To enable the external-logging facility for a DS-Lite instance, use the **external-logging** command in DS-Lite configuration mode. To disable external-logging, use the **no** form of this command.

external-logging netflow9

Syntax Description

netflow9	Netflow version 9 protocol is used for external logging.

Command Default

By default, external-logging is disabled.

Command Modes

DS-Lite configuration mode

Command History

Release	Modification
Release 4.2.1	This command was introduced.

Usage Guidelines

The external-logging facility supports only netflow version 9.

Task ID

Task ID	Operations
cgn	read, write

This example shows how to externally log data 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-lite-inst
RP/0/RP0/CPU0:router(config-cgn-ds-lite)# external-logging netflow9
RP/0/RP0/CPU0:router(config-cgn-ds-lite-extlog)#
```

external-logging (DS-LITE Syslog)

To enable the external-logging facility for a DS-Lite instance, use the **external-logging** command in DS-Lite 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*} }

Syntax Description

syslog	Logs syslog information to an external server.
server	Specifies the location of the server to log the syslog information.
address	Specifies the IPv4 or IPv6 address of the server.
host-name	Specifies the host name used in syslog header.
path-mtu	Specifies the mtu of the path used for logging information.

Command Default

By default, external-logging is disabled.

Command Modes

DS-Lite configuration mode

Command History

Release	Modification
Release 4.2.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to log syslog information for a DS-Lite instance:

```
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)#external-logging syslog
RP/0/RP0/CPU0:router(config-cgn-ds-lite-extlog)#server
RP/0/RP0/CPU0:router(config-cgn-ds-lite-extlog-server)#address 10.2.1.10 port 65
RP/0/RP0/CPU0:router(config-cgn-ds-lite-extlog-server)#
```

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

Syntax Description

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

Command Default

By default, external-logging is disabled.

Command Modes

CGN Inside VRF NAT44 configuration mode

Command History

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

Usage Guidelines

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* }

Syntax Description

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

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

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)#
```

external-logging (Stateful NAT64 Netflow)

To enable the external-logging facility for a NAT64 stateful instance, use the **external-logging** command in NAT64 Stateful configuration mode. To disable external-logging, use the **no** form of this command.

external-logging netflow version 9

Syntax Description

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

Command Default

By default, external-logging is disabled.

Command Modes

NAT64 stateful configuration mode

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

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 cgn-inst
RP/0/RP0/CPU0:router(config-cgn)# service-type nat64 stateful nat64-inst
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)# external-logging netflow version 9
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)#
```

Related Commands

Command	Description
address-family (Stateful NAT64), on page 23	Configures IPv4 or IPv6 address on a NAT64 instance.
dynamic-port-range (Stateful NAT64), on page 85	Configures ports dynamically.
fragment-timeout (Stateful NAT64), on page 99	Specifies time interval to store packet fragments.
ipv4 (Stateful NAT64), on page 109	Assigns ipv4 address pool.
ipv6-prefix (Stateful NAT64), on page 113	Converts an IPv6 address to an IPv4 address.
portlimit (Stateful NAT64), on page 137	Restricts the number of ports used by an IPv6 address.

Command	Description
protocol (Stateful NAT64), on page 150	Enters the ICMP, TCP, and UDP protocol configuration mode.
refresh-direction (Stateful NAT64), on page 156	Specifies the outbound refresh direction.
service-type nat64 (Stateful NAT64), on page 181	Creates a NAT64 stateful instance.
tcp-policy (Stateful NAT64), on page 271	Enables TCP policy that allows IPv4 initiated TCP sessions.
ubit-reserved (Stateful NAT64), on page 290	Enables reserving ubits in an IPv6 address.

filter-policy

To enable address and port-based filtering, use the **filter-policy** command. To undo this configuration, use the **no filter-policy** command.

filter-policy

Syntax Description

ignore-port	This keyword is used to ignore the checking based on port. If this keyword is not specified, then the address as well as the port are checked.

Command Default

This command is disabled by default.

Command Modes

NAT44 Configuration Mode

Command History

Release	Modification
Release 5.1.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

Example

This example shows how to configure filter policy 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)#filter-policy
```

filter-policy (Stateful NAT64)

To configure address-dependant filter policy, use the **filter-policy** command in NAT64 stateful configuration mode. To undo the configuration, use the **no** form of this command.

filter-policy

Syntax Description

This command has no keywords or arguments.

Command Default

None

Command Modes

NAT64 stateful configuration mode

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to configure address-dependant filter policy for a NAT64 stateful 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 nat64 stateful nat64-inst
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)# filter-policy
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)#
```

firewall

To enter the firewall mode and the protocol sub-mode, use the **firewall** command. To exit the firewall mode, use the **no firewall** command.

firewall

Syntax Description

protocol tcp	By specifying this keyword, the TCP protocol is selected. And the TCP related configuration can be defined.

Command Default

None

Command Modes

NAT44 Configuration Mode

Command History

Release	Modification
Release 5.1.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

Example

This example shows how to define TCP-related configuration 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)#firewall protocl tcp
```

fragment-timeout (Stateful NAT64)

To specify the time interval to store packet fragments, use the **fragment-timeout** command in NAT64 stateful configuration mode. To delete the time interval, use the **no** form of this command. The default timeout value is 2 seconds.

fragment-timeout *value*

Syntax Description

value	Specifies the timeout value in seconds. The range is from 0 to 15.

Command Default

2 seconds

Command Modes

NAT64 stateful configuration mode

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to specify the time interval to store packet fragments for a NAT64 stateful 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 nat64 stateful nat64-inst
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)# fragment-timeout 10
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)#
```

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*

Syntax Description

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

Command Default

None

Command Modes

Global configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
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

Command	Description
interface ServiceApp, on page 102	Enables the application SVI interface.
interface ServiceInfra, on page 104	Enables the infrastructure SVI interface.
service cgn, on page 168	Enables an instance for the CGN application.
service-location (CGN), on page 169	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*

Syntax Description

vrf-name	Name for the inside VRF.

Command Default

None

Command Modes

NAT44 configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

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

Task ID

Task ID	Operations
cgn	read, write

Examples

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

```
RP/0/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

Command	Description
external-logging (NAT44 Netflow), on page 92	Enables external logging of a NAT44 instance.
protocol (NAT44)	
service cgn, on page 168	Enables an instance for the CGN application.
show cgn nat44 inside-translation, on page 217	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.
show cgn nat44 outside-translation, on page 223	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*

Syntax Description

value	Total number of service application interfaces to be configured. Range is from 1 to 2442000.

Command Default

None

Command Modes

Global configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

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

The name of the serviceapp interfaces is **serviceapp n** where **n** can be a number between 1 to 2442000.

Task ID

Task ID	Operations
interface	read, write

Examples

This example shows how to configure a **nat64** 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
```

This example shows how to configure a **DDoS TMS** service application interface:

```
RP/0/RP0/CPU0:router#configure
RP/0/RP0/CPU0:router(config)#interface ServiceApp 1
RP/0/RP0/CPU0:router(config-if)#service sesh sesh1
```

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*

Syntax Description

value	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

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*

Syntax Description

length	Indicates the IPv4 prefix length to be used while deriving the delegated IPv6 prefix.
value	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

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

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
ipv4 suffix (6rd), on page 107	Assigns a value for the ipv4-suffix length to be used as part of both ends of a tunnel.

Command	Description
ipv6-prefix (6rd), on page 111	Generates the delegated ipv6 prefix for a IPv6 Rapid Deployment (6RD) application.
source-address (6rd), on page 267	Assigns an ipv4 address as the tunnel source address.
unicast address (6rd), on page 292	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*

Syntax Description

ipv4 suffix length	Specifies the IPv4 suffix length to be used while deriving the delegated IPv6 prefix.
value	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

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

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
ipv4 prefix (6rd), on page 105	Assigns a value for the ipv4-prefix length to be used as part of both ends of tunnel.
ipv6-prefix (6rd), on page 111	Generates the delegated ipv6 prefix for a IPv6 Rapid Deployment (6RD) application.
source-address (6rd), on page 267	Assigns an ipv4 address as the tunnel source address.
unicast address (6rd), on page 292	Assigns an IPv6 address to be used for a IPv6 Rapid Deployment (6RD) Border Relay (BR) unicast configuration.

ipv4 (Stateful NAT64)

To assign an ipv4 address pool to be used by a NAT64 stateful instance and to map an internal ipv6 address to a public ipv4 address, use the **ipv4** command in NAT64 stateful configuration mode. To unassign the address pool, use the **no** form of this command.

The maximum number of address pools that can be assigned is 8.

ipv4 address-pool *address/prefix*

Syntax Description

address-pool	Specifies the IPv4 address pool.
address/prefix	Indicates the start address and prefix of the address pool

Command Default

None

Command Modes

NAT64 stateful configuration mode

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to assign an IPv4 address pool for a NAT64 stateful 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 nat64 stateful nat64-inst
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)# ipv4 address-pool 10.2.2.24/3
```

Related Commands

Command	Description
address-family (Stateful NAT64), on page 23	Configures IPv4 or IPv6 address on a NAT64 instance.
dynamic-port-range (Stateful NAT64), on page 85	Configures ports dynamically.
external-logging (Stateful NAT64 Netflow), on page 94	Enables external logging of a NAT64 Stateful instance.
fragment-timeout (Stateful NAT64), on page 99	Specifies time interval to store packet fragments.

Command	Description
ipv6-prefix (Stateful NAT64), on page 113	Converts an IPv6 address to an IPv4 address.
portlimit (Stateful NAT64), on page 137	Restricts the number of ports used by an IPv6 address.
protocol (Stateful NAT64), on page 150	Enters the ICMP, TCP, and UDP protocol configuration mode.
refresh-direction (Stateful NAT64), on page 156	Specifies the outbound refresh direction.
service-type nat64 (Stateful NAT64), on page 181	Creates a NAT64 stateful instance.
tcp-policy (Stateful NAT64), on page 271	Enables TCP policy that allows IPv4 initiated TCP sessions.
ubit-reserved (Stateful NAT64), on page 290	Enables reserving ubits in an IPv6 address.

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*

Syntax Description

X:X::X/length	IPv6 address.

Command Default

None

Command Modes

6RD configuration

Command History

Release	Modification
Release 4.1.0	This command was introduced.

Usage Guidelines

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

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
ipv4 prefix (6rd), on page 105	Assigns a value for the ipv4-prefix length to be used as part of both ends of tunnel.
ipv4 suffix (6rd), on page 107	Assigns a value for the ipv4-suffix length to be used as part of both ends of a tunnel.
source-address (6rd), on page 267	Assigns an ipv4 address as the tunnel source address.
unicast address (6rd), on page 292	Assigns an IPv6 address to be used for a IPv6 Rapid Deployment (6RD) Border Relay (BR) unicast configuration.

ipv6-prefix (Stateful NAT64)

To convert an IPv6 address to an IPv4 address, use the **ipv6-prefix** command in NAT64 stateful configuration mode. To use the default prefix - 64:FF9B::/96, use the **no** form of this command.

ipv6-prefix *ipv6 address and prefix*

Syntax Description

ipv6 address and prefix	Specifies the IPv6 address and prefix.

Command Default

Default prefix - 64:FF9B::/96

Command Modes

NAT64 stateful configuration mode

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to configure an IPv6 prefix:

```
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 nat64 stateful nat64-inst
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)# ipv6-prefix 2001:db8::/32
```

Related Commands

Command	Description
address-family (Stateful NAT64), on page 23	Configures IPv4 or IPv6 address on a NAT64 instance.
dynamic-port-range (Stateful NAT64), on page 85	Configures ports dynamically.
external-logging (Stateful NAT64 Netflow), on page 94	Enables external logging of a NAT64 Stateful instance.
fragment-timeout (Stateful NAT64), on page 99	Specifies time interval to store packet fragments.
ipv4 (Stateful NAT64), on page 109	Assigns ipv4 address pool.
portlimit (Stateful NAT64), on page 137	Restricts the number of ports used by an IPv6 address.

Command	Description
protocol (Stateful NAT64), on page 150	Enters the ICMP, TCP, and UDP protocol configuration mode.
refresh-direction (Stateful NAT64), on page 156	Specifies the outbound refresh direction.
service-type nat64 (Stateful NAT64), on page 181	Creates a NAT64 stateful instance.
tcp-policy (Stateful NAT64), on page 271	Enables TCP policy that allows IPv4 initiated TCP sessions.
ubit-reserved (Stateful NAT64), on page 290	Enables reserving ubits in an IPv6 address.

map (NAT44)

To map an outside VRF and address pool to an inside vrf, use the **map** command in CGN inside VRF NAT44 configuration submode. To explicitly pair the inside and the outside Service Application Interfaces (ServiceApps), use the **outsideserviceapp** option. Suppose if there are 4 or more ServiceApps configured, then there are chances that two or more inside ServiceApps get paired to the same outside ServiceApp, thus excluding other outside ServiceApps. Because of this mapping, the unpaired ServiceApps may drop traffic in the egress path. Hence the explicit pairing is required between an inside ServiceApp and an outside ServiceApp. To remove the outside VRF, explicit ServiceApp pairing, and address pool mapping for the specified inside VRF of a CGN instance, use the **no** form of this command.

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

Syntax Description

outsideserviceapp	Pairs the inside and the outside ServiceApps explicitly.
serviceapp	Service application interfaces that need to be paired.
serviceapp-number	Number that indicates each ServiceApp. The range is from 1 to 2000.
outside-vrf	Maps to a given outside VRF.
outside-vrf-name	Name of outside VRF.
number	Number that indicates each service application. The range is from 1 to 2000.
address-pool	Address pool to which the inside VRF is mapped.
address/*prefix*	Network address and prefix for the address pool. The prefix must not be less than 16.
address/*prefix*	Network address and prefix for the address pool. The minimum prefix value is 30.

Command Default

None

Command Modes

CGN inside VRF NAT44 configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

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

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

There is only one NAT44 instance for each CGN instance. An inside-VRF can be present in only one CGN instance. One inside-VRF can be mapped to only one outside-VRF. There can be multiple non-overlapping address-pools in a particular outside-VRF. The address pools being used on a CRS box for the outside-VRFs must not overlap with each other. An outside-VRF can be present in multiple CGN instances with different address pools. If the outside-VRF name is not specified, the default VRF is enabled.

Task ID

Task ID	Operations
cgn	read, write

Examples

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

```
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)# map outside-vrf outsidevrf1 address-pool
10.2.2.0/24
```

This example shows how to explicitly pair the inside and outside ServiceApps.

```
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)# map outsideserviceapp serviceapp 2 outside-vrf ovrf1
 address-pool 10.2.2.0/24
```

Related Commands

Command	Description
inside-vrf (NAT44), on page 101	Enters inside VRF configuration mode for a NAT44 instance.
service cgn, on page 168	Enables an instance for the CGN application.
show cgn nat44 inside-translation, on page 217	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.
show cgn nat44 outside-translation, on page 223	Displays the outside-address to inside-address translation details for a specified NAT44 instance.

map (DS-LITE)

To map a private IPv4 source address coming over the DS-Lite tunnel to an address in a IPv4 public address pool, use the **map** command in CGN DS-Lite configuration mode. To undo the mapping, use the **no** form of this command.

map address-pool *address/prefix*

Syntax Description

address-pool	Specifies the IPv4 map address pool.
address/prefix	Specifies the address and prefix for the address pool.

Command Default

None

Command Modes

CGN DS-Lite configuration mode

Command History

Release	Modification
Release 4.2.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to map a private IPv4 source address coming over the DS-Lite tunnel to an address in a IPv4 public address pool:

```
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)#map address-pool 10.1.1.2/2
RP/0/RP0/CPU0:router(config-cgn-ds-lite)#
```

mirror-packets

To enable the mirroring the data packets and filter the traffic based on the set of parameters, use the mirror-packets command in CGN inside VRF external logging server configuration mode. To disable the configuration, use the no form of this command.

mirror-packets *destination-ipv4-address protocol-type port source-prefix collector-ipv4-address*

Syntax Description

mirror-packets	Configures the data traffic to be mirrored to a configured destination (host) IPv4 address.
destination-ipv4-address	IPv4 address of the destination (host)
protocol type	The protocol type used.
port	Configures the inside port for static forwarding. The port keyword allows a specific UDP, TCP, or ICMP port on a global address to be translated to a specific port on a private address.
source-prefix	Source IPv4 address.
collector-ipv4-address	IPv4 address of the collector.

Command Default

Command Modes

CGN inside VRF external logging server configuration

Command History

Release	Modification
Release 5.2.2	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

Example

The following example shows how to configure mirroring the data packets with the destination IPv4 address, protocol type, port number, source-prefix, and collector IPv4 address.

```
service cgn cgn1
 service-location preferred-active 0/1/CPU0
 service-type nat44 nat1
  inside-vrf BLR_BTM3
   mirror-packets
    destination-ipv4-address 201.22.3.45
```

```
     protocol-type tcp udp
     port 4002
     source-prefix 100.1.1.252/30
    !
    collector-ipv4-address 187.2.4.5
   !
  !
 !
!
```

mss (DS-LITE)

To enable the TCP maximum segment size (MSS) adjustment value for a DS-Lite instance and to adjust the MSS value of the TCP SYN packets going through, use the **mss** command in DS-Lite configuration mode. To disable the packets to override the TCP MSS value, use the **no** form of this command.

mss *size*

Syntax Description

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

Command Default

By default, the TCP maximum segment size (MSS) adjustment is disabled.

Command Modes

DS-Lite configuration mode

Command History

Release	Modification
Release 4.2.1	This command was introduced.

Usage Guidelines

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

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

Task ID

Task ID	Operations
cgn	read, write

This example shows how to configure the mss value for a DS-Lite instance:

```
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)#protocol tcp
RP/0/RP0/CPU0:router(config-cgn-ds-lite-proto)#mss 66
```

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*

Syntax Description

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

Command Default

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

Command Modes

CGN inside VRF NAT44 protocol configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

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

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

Task ID

Task ID	Operations
cgn	read, write

Examples

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

```
RP/0/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 tcp
RP/0/RP0/CPU0:router(config-cgn-invrf-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**}

Syntax Description

predefined	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

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

```
Applicable until Release 5.1.x.
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)# map address-pool 198.12.0.0/24
RP/0/RP0/CPU0:router(config-cgn-invrf)# nat-mode predefined
RP/0/RP0/CPU0:router(config-cgn-invrf-natmode)#

Applicable for Release 5.2.x and above.
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)#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*

Syntax Description

value	Path-MTU value, in bytes. The range is from 1280 to 1480.

Command Default

None

Command Modes

6RD configuration

Command History

Release	Modification
Release 4.1.0	This command was introduced.

Usage Guidelines

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.

Task ID

Task ID	Operation
cgn	read, write

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 (DS-LITE)

To assign the path Maximum Transmission Unit (MTU) for the tunnel between routers for every ds-lite instance, use the **path-mtu** command in DS-Lite configuration mode. To delete the mtu value, use the **no** form of this command.

path-mtu *value*

Syntax Description

value	Specifies the MTU value of the tunnel in bytes. The range is from 1280 to 9216. The default value is 1280, which is the minimum IPv6 path MTU.

Command Default

None

Command Modes

DS-Lite configuration

Command History

Release	Modification
Release 4.2.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to assign the path mtu for the tunnel between routers:

```
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)#path-mtu 1282
RP/0/RP0/CPU0:router(config-cgn-ds-lite)#
```

Related Commands

Command	Description
protocol (NAT44)	

path-mtu (DS-LITE Netflow9)

To set the Maximum Transmission Unit (MTU) of the path to log NetFlow-based external logging information of a DS-Lite instance, use the **path-mtu** command in DS-Lite external logging server configuration mode. To return to the default behavior, use the **no** form of this command.

path-mtu *value*

Syntax Description

value	Specifies the path mtu value in bytes. The range is from 100 to 2000.

Command Default

None

Command Modes

DS-Lite external logging server configuration mode

Command History

Release	Modification
Release 4.2.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to set the path-mtu value 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-lite1
RP/0/RP0/CPU0:router(config-cgn-ds-lite)# external-logging netflow9
RP/0/RP0/CPU0:router(config-cgn-ds-lite-extlog)# server
RP/0/RP0/CPU0:router(config-cgn-ds-lite-extlog-server)# path-mtu 200
```

Related Commands

Command	Description
address (DS-LITE Netflow9), on page 6	
refresh rate (DS-LITE Netflow9), on page 160	
timeout (DS-LITE Netflow9), on page 274	Configures the frequency at which the netflow9 template is refreshed or resent to the netflow9 server for a DS-Lite instance.

path-mtu (MAP-E)

To configure the path Maximum Transmission Unit (MTU) of the tunnel, use the **path-mtu** command in MAP-E configuration mode. To undo the configuration, use the **no** form of this command.

path-mtu *value*

Syntax Description

value	Tunnel path MTU value, in bytes. The range is from 1280 to 9216.

Command Default

None

Command Modes

MAP-E configuration

Command History

Release	Modification
Release 4.3.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to configure the tunnel path MTU value:

```
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 map-e map-e-inst
RP/0/RP0/CPU0:router(config-cgn-map_e)# path-mtu 1300
```

Related Commands

Command	Description
address-family (MAP-E), on page 19	Configures IPv4 or IPv6 address for a MAP-E instance.
aftr-endpoint-address (MAP-E), on page 25	Configures the IPv6 address of Address Family Transition Router (AFTR).
contiguous-ports (MAP-E), on page 76	Configures the number of contiguous ports for a MAP-E instance.
cpe-domain (MAP-E), on page 78	Configures the Customer Premises Equipment (CPE) domain parameters.
sharing-ratio (MAP-E), on page 192	Configures the port sharing ratio.

path mtu

To configure the path Maximum Transmission Unit (MTU) of the tunnel, use the path-mtu command in MAP-T configuration mode. To undo the configuration, use the no form of this command.

path-mtu*value*
no path-mtu*value*

Syntax Description

value	Tunnel path MTU value, in bytes. The range is from 100 to 2000.

Command Default

None

Command Modes

MAP-T configuration

Command History

Release	Modification
Release 6.2.1	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	Operations
cgn	read, write

Examples

This example shows how to configure the tunnel path MTU value:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# service cgn cgn-inst
RP/0/RSP0/CPU0:router(config-cgn)# service-type map-t-cisco map-t-inst
RP/0/RSP0/CPU0:router(config-cgn)# address-family ipv4
RP/0/RSP0/CPU0:router(config-cgn-mapt-afi)# path-mtu 1300
```

Note If the path-mtu value is not specified, 1500 bytes is considered as the default Tunnel Path MTU value for IPv4 packets. For IPv6 packets the default value is 1280 bytes.

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*

Syntax Description

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

Command Default

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

Command Modes

NAT44 inside VRF address family external logging server configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

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
external-logging (NAT44 Netflow), on page 92	Enables external logging of a NAT44 instance.
inside-vrf (NAT44), on page 101	Enters inside VRF configuration mode for a NAT44 instance.
server (NAT44), on page 166	Enables the logging server information for the IPv4 address and port for the server that is used for the netflowv9-based external-logging facility.
service cgn, on page 168	Enables an instance for the CGN application.

path-mtu (Stateful NAT64 Netflow Version 9)

To set the Maximum Transmission Unit (MTU) of the path to log NetFlow-based external logging information for a NAT64 Stateful instance, use the **path-mtu** command in NAT64 Stateful configuration mode. To return to the default behavior, use the **no** form of this command.

path-mtu *value*

Syntax Description

value	Specifies the path mtu value in bytes. The range is from 100 to 2000.

Command Default

None

Command Modes

NAT64 Stateful configuration mode

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to set the path-mtu value for a NAT64 Stateful 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 nat64 stateful nat64-inst
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)# external-logging netflow version 9
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)# server
RP/0/RP0/CPU0:router(config-cgn-nat64-extlog-server)# path-mtu 200
```

Related Commands

Command	Description
address (Stateful NAT64 Netflow Version 9), on page 12	
refresh rate (Stateful NAT64 Netflow Version 9), on page 162	Configures the refresh rate to log NetFlow-based external logging information.
session-logging (Stateful NAT64 Netflow Version 9), on page 191	Enables session logging for a NAT64 Stateful instance.

Command	Description
timeout (Stateful NAT64 Netflow Version 9), on page 279	Configures the frequency at which the netflow-v9 template is refreshed or resent to the netflow-v9 server.

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*

Syntax Description

pcp-server	Specifies the PCP server to be configured.
port	Specifies the port of the PCP server.
port number	The port number range is from 1 to 65535. The default port number is **5351**.

Command Default

None

Command Modes

DS-Lite configuration mode

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

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*

Syntax Description

pcp-server	Specifies the PCP server to be configured.
address	Specifies the address of the PCP server.
IPv4 address	IPv4 address.
port	Specifies the port of the PCP server.
port number	The port number range is from 1 to 65535. The default port number is **5351**.

Command Default

None

Command Modes

Exec

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

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-invrf)# pcp-server address 10.2.2.30 port 66
```

Related Commands

Command	Description
pcp-server (DS-LITE), on page 132	Configures a Port Control Protocol (PCP) server for a DS-Lite instance.

port-limit (DS-LITE)

To restrict the number of entries per private IPv4 address for a given ds-lite instance, use the **port-limit** command in DS-Lite configuration mode. To delete the port-limit values, use the **no** form of this command.

port-limit *value*

Syntax Description

value	Specifies the value of the port-limit. The range is from 1 to 65535. The default value is 100.

Command Default

None

Command Modes

DS-Lite configuration

Command History

Release	Modification
Release 4.2.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to restrict the number of entries per address on a given DS-Lite instance:

```
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)#port-limit 500
RP/0/RP0/CPU0:router(config-cgn-ds-lite)#
```

Related Commands

Command	Description
protocol (NAT44)	

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*

Syntax Description

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

Command Default

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

Command Modes

CGN configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

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
cgn	read, write

Examples

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

```
RP/0/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
service cgn, on page 168	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*

Syntax Description

value	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

No specific guidelines impact the use of this command.

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

Command	Description
bulk-port-alloc (NAT44), on page 39	Allocates a number of contiguous outside ports in bulk to reduce Netflow/Syslog data volume.
external-logging (NAT44 Netflow), on page 92	Enables external logging of a NAT44 instance.
external-logging (NAT44 Syslog), on page 93	Enables external logging of the syslog data for a NAT44 instance.

portlimit (Stateful NAT64)

To restrict the number of ports used by an IPv6 address, use the **portlimit** command in NAT64 stateful configuration mode. To use the default port limit of 100 per NAT64 instance, use the **no** form of this command.

portlimit *value*

Syntax Description

value	Specifies the port limit value. The range is from 1 to 65535.

Command Default

100 ports per NAT64 stateful instance

Command Modes

NAT64 stateful configuration mode

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to set a port limit on a NAT64 stateful 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 nat64 stateful nat64-inst
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)# portlimit 600
```

Related Commands

Command	Description
address-family (Stateful NAT64), on page 23	Configures IPv4 or IPv6 address on a NAT64 instance.
dynamic-port-range (Stateful NAT64), on page 85	Configures ports dynamically.
external-logging (Stateful NAT64 Netflow), on page 94	Enables external logging of a NAT64 Stateful instance.
fragment-timeout (Stateful NAT64), on page 99	Specifies time interval to store packet fragments.
ipv4 (Stateful NAT64), on page 109	Assigns ipv4 address pool.
ipv6-prefix (Stateful NAT64), on page 113	Converts an IPv6 address to an IPv4 address.

Command	Description
protocol (Stateful NAT64), on page 150	Enters the ICMP, TCP, and UDP protocol configuration mode.
refresh-direction (Stateful NAT64), on page 156	Specifies the outbound refresh direction.
service-type nat64 (Stateful NAT64), on page 181	Creates a NAT64 stateful instance.
tcp-policy (Stateful NAT64), on page 271	Enables TCP policy that allows IPv4 initiated TCP sessions.
ubit-reserved (Stateful NAT64), on page 290	Enables reserving ubits in an IPv6 address.

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*

Syntax Description

name	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

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
cgn	read, write

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)#
```

private-pool

To create a pool of private addresses that have to be assigned to the subscribers in a VPN Routing and Forwarding (VRF), use the **private-pool** command. To disable the pool of addresses, use the **no private-pool** command.

private-pool *ip address/prefix*

Syntax Description

ip address/prefix	Specifies the address and the prefix for the private pool of IP addresses.

Command Default

none

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 4.3.2	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

Example

This example shows how to configure a private pool of IP addresses:

```
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)# map address-pool 198.12.0.0/16
RP/0/RP0/CPU0:router(config-cgn-invrf)# nat-mode predefined
RP/0/RP0/CPU0:router(config-cgn-invrf-natmode)# private-pool 192.1.106.0/16
```

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>*}

Syntax Description

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

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
service cgn, on page 168	Enables an instance for the CGN application.
show cgn nat44 inside-translation, on page 217	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.
show cgn nat44 outside-translation, on page 223	Displays the outside-address to inside-address translation details for a specified NAT44 instance.

protocol (External Logging)

To configure the protocol to be used to transfer the NetFlow and Syslog records for external logging, use the **protocol** command.

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

Syntax Description

tcp	Enables reliable log transfer feature. TCP is used to transfer the NetFlow and Syslog records to an external NetFlow or Syslog server.
udp	UDP is used to transfer the NetFlow and Syslog records to an external NetFlow or Syslog server.

Command Default

UDP is the default protocol used to transfer the NetFlow and Syslog records.

Command Modes

CGN Inside VRF NAT44 configuration mode

Command History

Release	Modification
Release 4.2.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

Example

This example shows how to configure the TCP as the protocol to transfer the NetFlow records:

```
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
RP/0/RP0/CPU0:router(config-cgn-invrf-af-extlog-server)#protocol tcp
```

This example shows how to configure the TCP as the protocol to transfer the Syslog records:

```
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)# protocol tcp
```

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-ports***port-number***}**

Syntax Description

udp	Enters the UDP protocol configuration mode.
tcp	Enters the TCP protocol configuration mode.
preserve-ports	Preserves the ports.
port number	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

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

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 (DS-LITE)

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

Syntax Description

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

Command Default

None

Command Modes

DS-Lite configuration mode

Command History

Release	Modification
Release 4.2.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to configure TCP protocol for a DS-Lite instance:

```
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)#protocol tcp
```

```
RP/0/RP0/CPU0:router(config-cgn-ds-lite-proto)# session active timeout 56
RP/0/RP0/CPU0:router(config-cgn-ds-lite-proto)#
```

This example shows how to configure static forwarding in a TCP session for a DS-Lite instance:

```
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)#protocol tcp
RP/0/RP0/CPU0:router(config-cgn-ds-lite-proto)#static-forward inside address
RP/0/RP0/CPU0:router(config-cgn-ds-lite-proto-addr)#tunnel-source 10:2::2/22 host 10.1.1.2
 port 64
RP/0/RP0/CPU0:router(config-cgn-ds-lite-proto-addr)#
```

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***}**

Syntax Description

gre	Enters the GRE protocol configuration mode.
icmp	Enters the ICMP protocol configuration mode.
tcp	Enters the TCP protocol configuration mode.
udp	Enters the UDP protocol configuration mode.
session	Session related configuration.
active	Active session timeout
initial	Initial session timeout
timeout	Session timeout
value	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, **gre** was added.

Usage Guidelines

The protocol command enters the appropriate CGN AFI configuration mode.

Task ID

Task ID	Operation
cgn	read, write

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
```

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 (Stateful NAT64)

To enter the ICMP, TCP, and UDP protocol configuration mode, use the **protocol** command in NAT64 stateful configuration mode. To remove all features that are enabled under the protocol configuration mode, use the **no** form of this command.

protocol {**icmp** | **tcp** | **udp**} [**{address***IPv4 address***} {port***port number***} {timeout***value***} {v4-init-timeout***value***} session** {**active** | **initial**}]

Syntax Description

icmp	Enters the ICMP protocol configuration mode.
tcp	Enters the TCP protocol configuration mode.
udp	Enters the UDP protocol configuration mode.
address	Specifies the IPv4 address for which the timeout value to be set.
IPv4 address	IPv4 address.
port	Specifies the port for which the timeout value to be set.
port number	Port number. the range is from 1 to 65535.
timeout	Specifies the session timeout
value	Timeout in seconds. The range is from 1 to 65535.
v4-init-timeout	Specifies the v4 initiated sessions for which the timeout value to be set.
value	Timeout in seconds. The range is from 1 to 65535.
session	Specifies the session related configuration.
active	Active session timeout
initial	Initial session timeout

Command Default

None

Command Modes

NAT64 stateful configuration mode

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to configure timeout for a TCP session per NAT64 stateful 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 nat64 stateful nat64-inst
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)#protocol tcp
RP/0/RP0/CPU0:router(config-cgn-nat64-stful-proto)#session active timeout 90
```

This example shows how to configure timeout for a UDP session per NAT64 stateful 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 nat64 stateful nat64-inst
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)#protocol udp
RP/0/RP0/CPU0:router(config-cgn-nat64-stful-proto)#timeout 90
```

This example shows how to configure timeout for an ICMP session per NAT64 stateful 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 nat64 stateful nat64-inst
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)#protocol icmp
RP/0/RP0/CPU0:router(config-cgn-nat64-stful-proto)#timeout 90
```

Related Commands

Command	Description
address-family (Stateful NAT64), on page 23	Configures IPv4 or IPv6 address on a NAT64 instance.
dynamic-port-range (Stateful NAT64), on page 85	Configures ports dynamically.
external-logging (Stateful NAT64 Netflow), on page 94	Enables external logging of a NAT64 Stateful instance.
fragment-timeout (Stateful NAT64), on page 99	Specifies time interval to store packet fragments.
ipv4 (Stateful NAT64), on page 109	Assigns ipv4 address pool.
ipv6-prefix (Stateful NAT64), on page 113	Converts an IPv6 address to an IPv4 address.
portlimit (Stateful NAT64), on page 137	Restricts the number of ports used by an IPv6 address.
refresh-direction (Stateful NAT64), on page 156	Specifies the outbound refresh direction.
service-type nat64 (Stateful NAT64), on page 181	Creates a NAT64 stateful instance.
tcp-policy (Stateful NAT64), on page 271	Enables TCP policy that allows IPv4 initiated TCP sessions.
ubit-reserved (Stateful NAT64), on page 290	Enables reserving ubits in an IPv6 address.

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

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

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

Task ID

Task ID	Operation
cgn	read, write

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

Command	Description
address-family ipv6 (Stateless NAT64), on page 17	Enters the IPv6 address family configuration mode.
ipv6-prefix (6rd), on page 111	Generates the delegated ipv6 prefix for a IPv6 Rapid Deployment (6RD) application.
service cgn, on page 168	Enables an instance for the CGN application.
service-type nat64 (Stateless), on page 183	Creates a nat64 stateless application
traceroute (CGN), on page 282	Configures a range of ipv4 addresses that are to be used for mapping when a non-translatable ipv6 address is received.

Command	Description
ubit-reserved (CGN), on page 288	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

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

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

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

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

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
service cgn, on page 168	Enables an instance for the CGN application.

refresh-direction (Stateful NAT64)

To specify the outbound refresh direction, use the **refresh-direction** command in NAT64 stateful configuration mode. To delete refresh direction, use the **no** form of this command.

refresh-direction

Syntax Description

This command has no keywords or arguments.

Command Default

None

Command Modes

NAT64 stateful configuration mode

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to specify the outbound refresh direction for a NAT64 stateful 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 nat64 stateful nat64-inst
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)# refresh-direction outbound
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)#
```

Related Commands

Command	Description
address-family (Stateful NAT64), on page 23	Configures IPv4 or IPv6 address on a NAT64 instance.
dynamic-port-range (Stateful NAT64), on page 85	Configures ports dynamically.
external-logging (Stateful NAT64 Netflow), on page 94	Enables external logging of a NAT64 Stateful instance.
fragment-timeout (Stateful NAT64), on page 99	Specifies time interval to store packet fragments.
ipv4 (Stateful NAT64), on page 109	Assigns ipv4 address pool.
ipv6-prefix (Stateful NAT64), on page 113	Converts an IPv6 address to an IPv4 address.
portlimit (Stateful NAT64), on page 137	Restricts the number of ports used by an IPv6 address.

Command	Description
protocol (Stateful NAT64), on page 150	Enters the ICMP, TCP, and UDP protocol configuration mode.
service-type nat64 (Stateful NAT64), on page 181	Creates a NAT64 stateful instance.
tcp-policy (Stateful NAT64), on page 271	Enables TCP policy that allows IPv4 initiated TCP sessions.
ubit-reserved (Stateful NAT64), on page 290	Enables reserving ubits in an IPv6 address.

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*

Syntax Description

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

Command Default

value : 500

Command Modes

CGN inside VRF external logging server configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

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.

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 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
external-logging (NAT44 Netflow), on page 92	Enables external logging of a NAT44 instance.
inside-vrf (NAT44), on page 101	Enters inside VRF configuration mode for a NAT44 instance.
server (NAT44), on page 166	Enables the logging server information for the IPv4 address and port for the server that is used for the netflowv9-based external-logging facility.
service cgn, on page 168	Enables an instance for the CGN application.
show cgn nat44 statistics, on page 232	Displays the contents of the NAT44 CGN instance statistics.

refresh rate (DS-LITE Netflow9)

To configure the refresh rate to log NetFlow-based external logging information of a DS-Lite instance, use the **refresh-rate** command in DS-Lite external logging server configuration mode. To return to the default value, use the **no** form of this command.

refresh-rate *value*

Syntax Description

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

Command Default

value : 500

Command Modes

DS-Lite external logging server configuration

Command History

Release	Modification
Release 4.2.1	This command was introduced.

Usage Guidelines

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 refresh rate value of 50 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-lite1
RP/0/RP0/CPU0:router(config-cgn-ds-lite)# external-logging netflow9
RP/0/RP0/CPU0:router(config-cgn-ds-lite-extlog)# server
RP/0/RP0/CPU0:router(config-cgn-ds-lite-extlog-server)# refresh-rate 50
```

Related Commands

Command	Description
address (DS-LITE Netflow9), on page 6	
path-mtu (DS-LITE Netflow9), on page 125	Sets the Maximum Transmission Unit (MTU) of the path to log NetFlow-based external logging information.

Command	Description
timeout (DS-LITE Netflow9), on page 274	Configures the frequency at which the netflow9 template is refreshed or resent to the netflow9 server for a DS-Lite instance.

refresh rate (Stateful NAT64 Netflow Version 9)

To configure the refresh rate to log NetFlow-based external logging information for a NAT64 Stateful instance, use the **refresh-rate** command in NAT64 Stateful configuration mode. To return to the default value of 500 packets, use the **no** form of this command.

refresh-rate *value*

Syntax Description

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

Command Default

500 packets

Command Modes

NAT64 Stateful configuration mode

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
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 cgn-inst
RP/0/RP0/CPU0:router(config-cgn)# service-type nat64 stateful nat64-inst
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)# external-logging netflow version 9
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)# server
RP/0/RP0/CPU0:router(config-cgn-nat64-extlog-server)# refresh-rate 50
```

Related Commands

Command	Description
address (Stateful NAT64 Netflow Version 9), on page 12	
path-mtu (Stateful NAT64 Netflow Version 9), on page 130	Sets the Maximum Transmission Unit (MTU) of the path to log NetFlow-based external logging information.
session-logging (Stateful NAT64 Netflow Version 9), on page 191	Enables session logging for a NAT64 Stateful instance.

Command	Description
timeout (Stateful NAT64 Netflow Version 9), on page 279	Configures the frequency at which the netflow-v9 template is refreshed or resent to the netflow-v9 server.

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

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

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

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

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

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

Example

```
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 protocl 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

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

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-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
```

Related Commands

Command	Description
address (NAT44 NetflowV9), on page 8	Enables the IPv4 address of the server that is used for logging the entries for the Network Address Translation (NAT) table.

Command	Description
external-logging (NAT44 Netflow), on page 92	Enables external logging of a NAT44 instance.
inside-vrf (NAT44), on page 101	Enters inside VRF configuration mode for a NAT44 instance.
path-mtu (NAT44 Netflow Version 9), on page 128	Configures the path Maximum Transmission Unit (MTU) for the netflowv9-based external-logging facility for the inside VRF of a NAT44 instance.
refresh-rate (NAT44 Netflow Version 9), on page 158	Configures the refresh rate to log NetFlow-based external logging information for an inside VRF of a CGN instance.
service cgn, on page 168	Enables an instance for the CGN application.
show cgn nat44 statistics, on page 232	Displays the contents of the NAT44 CGN instance statistics.
timeout (NAT44 Netflow Version 9), on page 277	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*

Syntax Description

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

Command Default

None

Command Modes

Global configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

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*]

Syntax Description

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

Command Default

None

Command Modes

CGN configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

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

Command	Description
hw-module service cgn location, on page 100	Enables a CGN service role on a specified location.
interface ServiceApp, on page 102	Enables the application SVI interface.
interface ServiceInfra, on page 104	Enables the infrastructure SVI interface.
service cgn, on page 168	Enables an instance for the CGN application.

service location MAP-T

To enable the particular instance of the CGN application on the active location, 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*
no service-location preferred-active*node-id*

Syntax Description

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

Command Default

None

Command Modes

CGN configuration

Command History

Release	Modification
Release 6.2.1	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	Operations
cgn	read, write

Examples

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

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# service cgv6 cgn1
RP/0/RSP0/CPU0:router(config-cgn)# service-location preferred-active node1
```

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*

Syntax Description

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

Command Modes

Interface configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

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

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

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

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

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

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cgn	read, write

Examples

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

```
RP/0/RP0/CPU0:router#
service redundancy revert service-type secgn preferred-active 0/1/cpu0
RP/0/RP0/CPU0:router#
```

service-type ds-lite

To enable a DS-Lite instance for the CGN application, use the **service-type ds-lite** command in CGN submode. To disable the DS-Lite instance of the CGN application, use the **no** form of this command.

service-type ds-lite *instance-name* [{**address-family** | **aftr-tunnel-endpoint-address** | **alg** | **bulk-port-alloc** | **external-logging** | **ipv4-aftr-address** | **map** | **path-mtu** | **port-limit** | **protocol**}]

Syntax Description

instance-name	Specifies the name of the ds-lite instance that is configured.
address-family	Configures the address family related information.
aftr-tunnel-endpoint-address	Specifies the IPv6 address of the tunnel endpoint.
alg	Configures the Application Level Gateway type to be used.
bulk-port-alloc	Allocates ports in bulk to reduce Netflow/Syslog data volume.
external-logging	Enables external logging.
ipv4-aftr-address	IPv4 address for ICMP messages.
map	IPv4 map address pool for inside addresses.
path-mtu	IPv6 mtu value.
port-limit	Limits the number of entries per address.
protocol	Specifies the transport protocol used.

Command Default

None

Command Modes

CGN submode (CONFIG-CGN)

Command History

Release	Modification
Release 4.2.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cgn	read, write

Examples

This example shows how to configure the ds-lite 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 ds-lite ds-lite1
```

service-type map-e

To create a MAP-E instance, use the **service-type map-e** command in MAP-E configuration mode. To delete the instance, use the **no** form of this command.

service-type map-e *instance-name*{**address-family** | **aftr-endpoint-address** | **contiguous-ports** | **cpe-domain** | **path-mtu** | **sharing-ratio**}

Syntax Description

instance-name	Name of the MAP-E instance.
address-family	Specifies the address family configuration.
aftr-endpoint-address	Specifies the IPv6 address of Address Family Transition Router (AFTR).
contiguous-ports	Specifies the number of contiguous ports for a MAP-E instance.
cpe-domain	Specifies the Customer Premises Equipment (CPE) domain parameters.
path-mtu	Specifies the Maximum Transmission Unit (MTU) value of the tunnel, in bytes.
sharing-ratio	Configures the port sharing ratio. The value is in powers of 2.

Command Default

None

Command Modes

MAP-E configuration mode

Command History

Release	Modification
Release 4.3.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to create a MAP-E 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 map-e map-e-inst
```

Related Commands

Command	Description
address-family (MAP-E), on page 19	Configures IPv4 or IPv6 address for a MAP-E instance.
aftr-endpoint-address (MAP-E), on page 25	Configures the IPv6 address of Address Family Transition Router (AFTR).
contiguous-ports (MAP-E), on page 76	Configures the number of contiguous ports for a MAP-E instance.
cpe-domain (MAP-E), on page 78	Configures the Customer Premises Equipment (CPE) domain parameters.
path-mtu (MAP-E), on page 126	Configures the path Maximum Transmission Unit (MTU) of the tunnel.
sharing-ratio (MAP-E), on page 192	Configures the port sharing ratio.

service-type map-t

To create a MAP-T instance, use the **service-type map-t** command in MAP-T configuration mode. To delete the instance, use the **no** form of this command.

service-type map-t *instance-name* {**address-family** | **contiguous-ports** | **cpe-domain** | **external-domain** | **sharing-ratio** | **traceroute**}

Syntax Description

instance-name	Indicates the name of the MAP-T instance.
address-family	Specifies the address family configuration.
contiguous-ports	Specifies the Port Set ID (PSID) configuration.
cpe-domain	Specifies the Customer Premises Equipment (CPE) domain parameters.
external-domain	Specifies the external domain parameters.
sharing-ratio	Configures the port sharing ratio. The value is in powers of 2.
traceroute	Specifies traceroute configuration.

Command Default

None

Command Modes

MAP-T configuration mode

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

From Release 5.3.2, MAP-T is supported only on Cisco ASR 9000 High Density 100GE Ethernet line cards.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to create a MAP-T 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 map-t map-t-inst
RP/0/RP0/CPU0:router(config-cgn-map-t)#
```

Related Commands

Command	Description
address-family (MAP-T), on page 21	Configures IPv4 or IPv6 address for a MAP-T instance.

Command	Description
clear cgn map-t statistics, on page 49	Clears the statistics of a MAP-T instance.
contiguous-ports (MAP-T), on page 77	Configures the number of contiguous ports for a MAP-T instance.
cpe-domain (MAP-T), on page 80	Configures the Customer Premises Equipment (CPE) domain parameters.
external-domain (MAP-T), on page 88	Configures the external domain's IPv6 prefix to convert IPv4 addresses into IPv6 addresses and vice versa.
sharing-ratio (MAP-T), on page 193	Configures the port sharing ratio.
show cgn map-t statistics, on page 209	Displays the MAP-T instance statistics.
traceroute (MAP-T), on page 284	Configures traceroute translation algorithms.

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**}]

Syntax Description

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

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 (Stateful NAT64)

To create a NAT64 stateful instance, use the **service-type nat64** command in NAT64 configuration mode. To delete the instance, use the **no** form of this command. A maximum of 64 instances can be created.

service-type nat64 stateful *instance-name*{**address-family** | **ipv6-prefix** | **ipv4** | **ubit-reserved** | **portlimit** | **protocol** | **fragment-timeout** | **external-logging** | **filter-policy**}

Syntax Description

stateful	Specifies the IPv4 to IPv6 stateful translation.
instance-name	Indicates the name of the NAT64 stateful instance.
address-family	Specifies the address family configuration.
alg	Specifies the Application Level Gateway (ALG) to be used.
ipv6-prefix	Specifies the IPv6 prefix to translate an IPv4 address to IPv6.
ipv4	Specifies the IPv4 address.
portlimit	Limits the number of entries per address.
protocol	Specifies the one of the transport protocol - ICMP, TCP, or UDP.
fragment-timeout	Specifies the time interval for fragment storage.
external-logging	Enables external logging.
filter-policy	Configures address-dependent filtering policy.
ubit-reserved	Enable reserving ubits in IPv6 address

Command Default

None

Command Modes

NAT64 configuration mode

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to create a NAT64 stateful 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 nat64 stateful nat64-inst
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)#
```

Related Commands

Command	Description
address-family (Stateful NAT64), on page 23	Configures IPv4 or IPv6 address on a NAT64 instance.
alg rtsp (Stateful NAT64), on page 33	Configures Real Time Streaming Protocol (RTSP) as the Application-Level Gateway (ALG).
dynamic-port-range (Stateful NAT64), on page 85	Configures ports dynamically.
external-logging (Stateful NAT64 Netflow), on page 94	Enables external logging of a NAT64 Stateful instance.
fragment-timeout (Stateful NAT64), on page 99	Specifies time interval to store packet fragments.
ipv4 (Stateful NAT64), on page 109	Assigns ipv4 address pool.
ipv6-prefix (Stateful NAT64), on page 113	Converts an IPv6 address to an IPv4 address.
portlimit (Stateful NAT64), on page 137	Restricts the number of ports used by an IPv6 address.
protocol (Stateful NAT64), on page 150	Enters the ICMP, TCP, and UDP protocol configuration mode.
refresh-direction (Stateful NAT64), on page 156	Specifies the outbound refresh direction.
tcp-policy (Stateful NAT64), on page 271	Enables TCP policy that allows IPv4 initiated TCP sessions.
ubit-reserved (Stateful NAT64), on page 290	Enables reserving ubits in an IPv6 address.

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**}]

Syntax Description

stateless	Specifies the IPv4 to IPv6 Stateless translation.
instance	Indicates the name of the NAT64 stateless instance.
address-family	Specifies the address-family related configuration.
traceroute	Indicates the traceroute related configuration.
ipv6-prefix	Specifies the IPv6 prefix to be used to translate IPv4 address to IPv6 address.
ubit-reserved	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

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
cgn	read, write

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**

Syntax Description

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

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

Task ID

Task ID	Operation
cgn	read, write

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*

Syntax Description

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

Command Default

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

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

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

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

Command Modes

NAT44 protocol configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

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

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

- UDP initial session timeout value reverts back to the default value of 30.
- UDP active session timeout value reverts back to the default value of 120.
- TCP initial session timeout value reverts back to the default value of 120.
- TCP active session timeout value reverts back to the default value of 1800.

Task ID

Task ID	Operations
cgn	read, write

Examples

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
protocol (NAT44)	
service cgn, on page 168	Enables an instance for the CGN application.
show cgn nat44 inside-translation, on page 217	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.
show cgn nat44 outside-translation, on page 223	Displays the outside-address to inside-address translation details for a specified NAT44 instance.
timeout (NAT44), on page 275	Configures the timeout for the ICMP session for a CGN instance.

session (DS-LITE)

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

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

Syntax Description

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

Command Default

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

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

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

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

Command Modes

CGN DS-Lite protocol configuration

Command History

Release	Modification
Release 4.2.1	This command was introduced.

Usage Guidelines

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

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

- UDP initial session timeout value reverts back to the default value of 30.
- UDP active session timeout value reverts back to the default value of 120.
- TCP initial session timeout value reverts back to the default value of 120.
- TCP active session timeout value reverts back to the default value of 1800.

Task ID

Task ID	Operations
cgn	read, write

Examples

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 ds-lite ds-lite1
RP/0/RP0/CPU0:router(config-cgn-ds-lite)# 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 ds-lite ds-lite1
RP/0/RP0/CPU0:router(config-cgn-ds-lite)# 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 ds-lite ds-lite1
RP/0/RP0/CPU0:router(config-cgn-ds-lite)# 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 ds-lite ds-lite1
RP/0/RP0/CPU0:router(config-cgn-ds-lite)# protocol udp
RP/0/RP0/CPU0:router(config-cgn-proto)# session active timeout 90
```

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

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

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

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-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)# session logging
```

Related Commands

Command	Description
session-logging (NAT44 Netflow Version 9), on page 190	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

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

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

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 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-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)# session logging
```

Related Commands

Command	Description
session-logging (DS-LITE Netflow9), on page 189	Enables session logging for a DS-Lite instance.

session-logging (Stateful NAT64 Netflow Version 9)

To enable session logging for a NAT64 Stateful instance, use the **session-logging** command in NAT64 Stateful configuration mode.

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

session-logging

Syntax Description

This command has no keywords or arguments.

Command Default

By default, session logging is disabled.

Command Modes

Stateful NAT64 configuration mode

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to enable session logging for a NAT64 Stateful 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 nat64 stateful nat64-inst
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)# external-logging netflow version 9
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)# server
RP/0/RP0/CPU0:router(config-cgn-nat64-extlog-server)# session logging
```

Related Commands

Command	Description
address (Stateful NAT64 Netflow Version 9), on page 12	
path-mtu (Stateful NAT64 Netflow Version 9), on page 130	Sets the Maximum Transmission Unit (MTU) of the path to log NetFlow-based external logging information.
refresh rate (Stateful NAT64 Netflow Version 9), on page 162	Configures the refresh rate to log NetFlow-based external logging information.
timeout (Stateful NAT64 Netflow Version 9), on page 279	Configures the frequency at which the netflow-v9 template is refreshed or resent to the netflow-v9 server.

sharing-ratio (MAP-E)

To configure the port sharing ratio, use the **sharing-ratio** command in MAP-E configuration mode. To undo the configuration, use the **no** form of this command.

sharing-ratio *value*

Syntax Description

value	Value of the port sharing ratio in powers of 2. The range is from 1 to 32768.

Command Default

None

Command Modes

MAP-E configuration

Command History

Release	Modification
Release 4.3.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to configure the port sharing ratio:

```
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 map-e map-e-inst
RP/0/RP0/CPU0:router(config-cgn-map_e)# sharing-ratio 8
```

Related Commands

Command	Description
address-family (MAP-E), on page 19	Configures IPv4 or IPv6 address for a MAP-E instance.
aftr-endpoint-address (MAP-E), on page 25	Configures the IPv6 address of Address Family Transition Router (AFTR).
contiguous-ports (MAP-E), on page 76	Configures the number of contiguous ports for a MAP-E instance.
cpe-domain (MAP-E), on page 78	Configures the Customer Premises Equipment (CPE) domain parameters.
path-mtu (MAP-E), on page 126	Configures the path Maximum Transmission Unit (MTU) of the tunnel.

sharing-ratio (MAP-T)

To configure the port sharing ratio, use the **sharing-ratio** command in MAP-T configuration mode. To undo the configuration, use the **no** form of this command.

sharing-ratio *value*

Syntax Description

value	Specifies the value of the port sharing ratio. The range is from 1 to 32768 in powers of 2.

Command Default

None

Command Modes

MAP-T configuration

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to configure the port sharing ratio:

```
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 map-t map-t-inst
RP/0/RP0/CPU0:router(config-cgn-mapt)# sharing-ratio 8
```

Related Commands

Command	Description
address-family (MAP-T), on page 21	Configures IPv4 or IPv6 address for a MAP-T instance.
clear cgn map-t statistics, on page 49	Clears the statistics of a MAP-T instance.
contiguous-ports (MAP-T), on page 77	Configures the number of contiguous ports for a MAP-T instance.
cpe-domain (MAP-T), on page 80	Configures the Customer Premises Equipment (CPE) domain parameters.
external-domain (MAP-T), on page 88	Configures the external domain's IPv6 prefix to convert IPv4 addresses into IPv6 addresses and vice versa.
show cgn map-t statistics, on page 209	Displays the MAP-T instance statistics.

Command	Description
traceroute (MAP-T), on page 284	Configures traceroute translation algorithms.

show cgn ds-lite inside-translation

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

show cgn ds-lite *instance-name* **inside-translation protocol** {**icmp** | **tcp** | **udp**} [**translation-type** {**alg** | **all** | **dynamic** | **pcp-explicit-dynamic** | **pcp-implicit-dynamic** | **static**}] | **tunnel-v6-source-address** *IPv6 address* **inside-address** *IPv4 address* **port start** *number* **end** *number*

Syntax Description

instance-name	Name of the DS- lite instance that is configured.
protocol	Displays the name of the protocols.
icmp	Displays the ICMP protocol.
tcp	Displays the TCP protocol.
udp	Displays the UDP protocol.
translation-type	(Optional) Displays the translation type.
alg	(Optional) Displays only the ALG translation entries.
all	(Optional) Displays all the translation entries, for example, alg, dynamic, and static.
pcp-explicit-dynamic	Displays Port Control Protocol (PCP) explicit translation entries.
pcp-implicit-dynamic	Displays Port Control Protocol (PCP) implicit translation entries
dynamic	(Optional) Displays only the dynamic translation entries.
static	(Optional) Displays only the static translation entries.
tunnel-v6-source-address*IPv6 address*	(Optional) Displays information for the IPv6 address family.
inside-address*address*	Displays the inside address.
port	Displays the range of the port numbers.
start *number*	The start port from which the translation table entries should be displayed.
end *number*	The end port till which the translation table entries should be displayed.

Command Default

None

Command Modes

Exec

Command History

Release	Modification
Release 4.2.1	This command was introduced.

Syntax Description

This command has no keywords or arguments.

Task ID

Task ID	Operation
cgn	read

This example displays the translation table entries for a particular DS-Lite instance:

```
-------------------------------------------------------------------------------------------------
DSLite  instance : dslite1,   Tunnel-Source-Address : 2001 :db8 ::1, Inside Source Address
 10.1.1.1
-------------------------------------------------------------------------------------------------
Outside            Protocol   Inside    Outside     Translation      Inside         Outside
Address                       Source    Source      Type               to           to
                              Port      Port                         Outside      Inside
                                                                     Packets      Packets
-------------------------------------------------------------------------------------------------

132.16.6.65       tcp         314      5554          dyn             875364         5345
132.16.6.65       udp         11333    43337         dyn             334333         873334
```

This example shows the sample output for PCP translations:

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

show cgn ds-lite dsl1 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 : dsl1
Inside-VRF     : red
-------------------------------------------------------------------------------------------------

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

  200.10.1.78       udp     14           34655         pcp_explicit     7            0
  200.10.1.78       udp     14           34655         pcp_implicit     7            0
```

show cgn ds-lite outside-translation

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

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

Syntax Description

instance-name	Name of the NAT44 instance that is configured.
protocol	Displays the name of the protocols.
icmp	Displays the ICMP protocol.
tcp	Displays the TCP protocol.
udp	Displays the UDP protocol.
translation-type	(Optional) Displays the translation type.
alg	(Optional) Displays only the ALG translation entries.
all	(Optional) Displays all the translation entries, for example, alg, dynamic, and static.
pcp-explicit-dynamic	Displays Port Control Protocol (PCP) explicit translation entries.
pcp-implicit-dynamic	Displays Port Control Protocol (PCP) implicit translation entries
dynamic	(Optional) Displays only the dynamic translation entries.
static	(Optional) Displays only the static translation entries.
outside-address	Displays the outside address for the inside VRF.
address	Outside address.
port	Displays the range of the port numbers.
start *number*	Displays the start of the port number.
end *number*	Displays the end of the port number.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 4.2.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cgn	read

Example

This example displays the translation table entries for an outside address for a particular DS-Lite instance:

```
-------------------------------------------------------------------------------------------------------------
DSLite  instance : dslite1, Tunnel-Source-Address : 2001 :db8 ::1, Outside Source Address
100.1.1.1
-------------------------------------------------------------------------------------------------------------
Inside  Protocol   Inside    Outside     Translation    Inside            Outside
Address            Source    Source      Type             to                to
                   Port      Port                      Outside           Inside
                                                       Packets           Packets
-------------------------------------------------------------------------------------------------------------

10.16.6.65 tcp     314       5554         dyn           875364            5345
10.16.6.65 udp     11333     43337        dyn           334333            873334
```

show cgn ds-lite pool utilization

To display the outside address pool utilization details for a specified DS-Lite instance, use the **show cgn ds-lite pool-utilization** command in EXEC mode.

show cgn ds-lite *instance-name* **pool-utilization address-range** *start-address end-address*

Syntax Description

ds-lite*instance-name*	Name of the ds-lite instance that is configured.
address-range	Displays the range for the outside address.
start-address	Range for the start address of the outside address pool. The range of the IPv4 addresses cannot be more than 255 consecutive IPv4 addresses.
end-address	Range for the end address of the outside address pool.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 4.2.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cgn	read

This example displays the utilization of the outside address pool for a DS-Lite instance:

```
--------------------------------------------------------------------------
DS-Lite  instance : dslite1
--------------------------------------------------------------------------
Outside      Number       Number
Address      of           of
             Free ports   Used ports
--------------------------------------------------------------------------
17.16.6.23   123          64388
17.16.6.120  58321        6190
17.16.6.98   98           64413
17.16.6.2    1234         60123
```

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

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

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read

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 ds-lite statistics

To display the contents of the DS-Lite instance statistics, use the **show cgn ds-lite statistics** command in EXEC mode.

show cgn ds-lite *instance-name* **statistics**

Syntax Description

instance-name	Name of the configured DS-Lite instance.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 4.2.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cgn	read

This command displays the statistics corresponding to DS-Lite instances:

```
Statistics summary of cgn: 'cgn1'
Number of active translations: 45631
Translations create rate: 5678
Translations delete rate: 6755
Inside to outside forward rate: 977
Outside to inside forward rate: 456
Inside to outside drops port limit exceeded: 0
Inside to outside drops system limit reached: 0
Inside to outside drops resource depletion: 0
Outside to inside drops no translation entry: 0
Pool address totally free: 195
Pool address used: 23
```

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

Name	Description
Number of active translations	Translation entries allocated in the database.
Translations create rate/ Translations delete rate	Rate in sessions per second.
Inside to outside forward rate/Outside to inside forward rate	Rate in packets per second.

Inside to outside drops port limit exceeded	Packets dropped because the port-limit for the inside user has exceeded.
Inside to outside drops system limit reached	Packets dropped as a result of reaching the system limit.
Inside to outside drops resource depletion	Packets dropped because no public L4 port could be allocated.
Outside to inside drops no translation entry	Packets dropped due to lack of entry in the translation database.
Pool address totally free	Addresses available from the pool.
Pool address used	Addresses utilized from the pool.

Related Commands

Command	Description
show cgn ds-lite inside-translation, on page 195	Displays the translation table entries for an inside-address to outside-address for a specified DS-Lite CGN instance
show cgn ds-lite outside-translation, on page 197	
show cgn ds-lite pool utilization, on page 199	

show cgn map-e statistics

To display the MAP-E instance statistics, use the **show cgn map-e statistics** command in EXEC mode.

show cgn map-e *instance-name* **statistics**

Syntax Description

instance-name	Name of the configured MAP-E instance.
statistics	Specifies the statistics of the configured MAP-E instance.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 4.3.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cgn	read

Examples

This output shows the statistics entries for a MAP-E instance:

```
RP/0/RP0/CPU0:router# show cgn map-e m1 statistics

MAP-E IPv4 to IPv6 counters:
====================================

Total Incoming Count : 0
Total Drop Count : 0
Total Output Count : 0

TCP Incoming Count : 0
TCP Output Count : 0
UDP Incoming Count : 0
UDP Output Count : 0
ICMPv4 Incoming Count : 0
ICMPv4 Output Count : 0

Invalid UIDB Drop Count : 0
NoDb Drop Count : 0
TTL Expire Drop Count : 0
Invalid IP Destination Drop Count : 0
Packet Exceeding Path MTU Drop Count : 0
Unsupported Protocol Drop Count : 0

ICMPv4 Generated for TTL Expire Count : 0
```

```
ICMPv4 Generated for Error Count : 0
ICMPv4 Packets Rate-Limited Count : 0

TCP MSS Changed Count : 0

MAP-E IPv6 to IPv4 counters:
====================================

Total Incoming Count : 0
Total Drop Count : 0
Total Output Count : 0

TCP Incoming Count : 0
TCP Output Count : 0
UDP Incoming Count : 0
UDP Output Count : 0
ICMPv4 Incoming Count : 0
ICMPv4 Output Count : 0
Invalid UIDB Drop Count : 0
NoDb Drop Count : 0
TTL Expire Drop Count : 0
Invalid IPv6 Destination Drop Count : 0
Invalid Source Prefix Drop Count : 0
Unsupported Protocol Drop Count : 0

ICMPv6 Input Count : 0
ICMPv6 Invalid UIDB Drop Count : 0
ICMPv6 NoDb Drop Count : 0
ICMPv6 TTL Expire Drop Count : 0
ICMPv6 Invalid IPv6 Destination Drop Count : 0
ICMPv6 Unsupported Type Drop Count : 0
ICMPv6 Invalid NxtHdr Drop Count: 0
ICMPv6 Frag Drop Count : 0
ICMPv6 Forus Count : 0
ICMPv6 Echo Response Received Count : 0
ICMPv6 Echo Replies Count : 0
ICMPv6 Translated to ICMPV4 Output Count : 0

ICMPv6 Generated for TTL Expire Count : 0
ICMPv6 Generated for Error Count : 0
ICMPv6 Packets Rate-Limited Count : 0

TCP MSS Changed Count: 0

MAP-E IPv4 Frag counters received from V4 cloud:
================================================

Total Input Count: 0
Total Drop Count: 0
Reassembled Output Count : 0

TCP Input Count: 0
UDP Input Count: 0
ICMPv4 Input Count: 0

Invalid UIDB Drop Count : 0
NoDb Drop Count : 0
Unsupported Protocol Drop Count : 0
Throttled Count : 0
Timeout Drop Count: 0
Duplicates Drop Count : 0

MAP-E Inner IPv4 Frag counters received from V6 cloud:
================================================
```

```
Total Input Count : 0
Total Drop Count : 0
Total Output Count : 0

TCP Input Count : 0
UDP Input Count : 0
ICMPv4 Input Count : 0

Invalid Source Prefix Drop Count : 0
Unsupported Protocol Drop count : 0
Throttled Count : 0
Timeout Drop Count : 0
Duplicates Drop Count : 0

ICMPv6 Generated for Error Count : 0
ICMPv6 Packets Rate-Limited Count : 0

TCP MSS Changed Count : 0
```

Name	Description
Total incoming count	Total number of packets coming from the public network
Total Drop Count	Total number of packets dropped by the router
Total Output Count	Total number of packets equal to the difference between the incoming packets and the dropped packets
TCP Incoming Count	Number of TCP packets coming from the public network
TCP Output Count	Number of TCP packets that were sent out
UDP Incoming Count	Number of UDP packets coming from the public network
UDP Output Count	Number of UDP packets that were sent out
ICMPv4 Incoming Count	Number of ICMPv4 packets embedded in the IPv6 packets
ICMPv4 Output Count	Number of ICMP packets sent out
Invalid UIDB Drop Count	Number of packets dropped due to the UIDB entries being invalid
NoDb Drop Count	Number of packets dropped due to the absence of any mapping

TTL Expire Drop Count	Number of packets dropped due to the expiry of TTL.
Invalid IP Destination Drop Count	Number of packets dropped due to the destination IP address being invalid
Packet Exceeding Path MTU Drop Count	Number of large packets dropped as they are too big and exceed the MTU size
Unsupported Protocol Drop Count	Number of packets dropped as they do not belong to any of the three supported protocols such as TCP, UDP, and ICMP
ICMPv4 Generated for TTL Expire Count	Number of ICMPv4 packets generated when TTL expires
ICMPv4 Generated for Error Count	Number of ICMPv4 packets generated for different error conditions
ICMPv4 Packets Rate-Limited Count	Number of ICMPv4 packets that were not generated due to rate limit
TCP MSS Changed Count	Number of TCP packets for which the MSS (Maximum Size Segment) value has been changed
Reassembled Output Count	Number of fragmented packets that have been reassembled
Invalid Source Prefix Drop Count	Number of packets dropped due to the prefix check failure
ICMPv6 Invalid NxtHdr Drop Count	Number of ICMPv6 packets as their protocol header does not consist ICMP
ICMPv6 Frag Drop Count	Number of ICMPv6 packets dropped due to the fragmentation
ICMPv6 Forus Count	
ICMPv6 Echo Response Received Count	Number of ICMPv6 acknowledgment packets for echo replies
ICMPv6 Echo Replies Count	Number of ICMPv6 echo requests sent
ICMPv6 Translated to ICMPV4 Output Count	Number of ICMPv6 packets that were translated to ICMPv4 packets

Throttled Count	Number of excess fragments that were dopped
Timeout Drop Count	Number of packets that were dropped as all the fragments of that packet were not received
Duplicates Drop Count	Number of fragmented packets dropped as they were duplicates

Related Commands

Command	Description
clear cgn map-e statistics, on page 46	Clears all statistics of a MAP-E instance.

show cgn map-t statistics

To display the MAP-T instance statistics, use the **show cgn map-t statistics** command in EXEC mode.

show cgn map-t *instance-name* **statistics**

Syntax Description

instance-name	Specifies the name of the configured MAP-T instance.
statistics	Specifies the statistics of the configured MAP-T instance.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cgn	read

Examples

This output shows the statistics entries for a MAP-T instance:

```
RP/0/RP0/CPU0:router# show cgn map-t m1 statistics

MAP-T IPv6 to IPv4 counters:
====================================

TCP Incoming Count: 0
TCP NonTranslatable Drop Count: 0
TCP Invalid NextHdr Drop Count: 0
TCP No Db Drop Count: 0
TCP Translated Count: 0
UDP Incoming Count: 0
UDP NonTranslatable Drop Count: 0
UDP Invalid Next Hdr Drop Count: 0
UDP No Db Drop Count: 0
UDP Translated Count: 0

ICMP Total Incoming Count: 0
ICMP No DB Drop Count: 0
ICMP Fragment drop count: 0
ICMP Invalid NxtHdr Drop Count: 0
ICMP Nontranslatable Drop Count: 0
ICMP Nontranslatable Fwd Count: 0
ICMP UnsupportedType Drop Count: 0
ICMP Err Translated Count: 0
```

```
ICMP Query Translated Count: 0

Subsequent Fragment Incoming Count: 0
Subsequent Fragment NonTranslateable Drop Count: 0
Invalid NextHdr Drop Count: 0
Subsequent Fragment No Db Drop Count: 0
Subsequent Fragment Translated Count: 0

Extensions/Options Incoming Count: 0
Extensions/Options Drop Count: 0
Extensions/Options Forward Count: 0

Extensions/Options No DB drop Count: 0
Unsupported Protocol Count: 0

MAP-T IPv4 to IPv6 counters:
====================================

TCP Incoming Count: 0
TCP No Db Drop Count: 0
TCP Translated Count: 0

UDP Incoming Count: 0
UDP No Db Drop Count: 0
UDP Translated Count: 0
UDP FragmentCrc Zero Drop Count: 0
UDP CrcZeroRecy Sent Count: 0
UDP CrcZeroRecy Drop Count: 0

ICMP Total Incoming Count: 0
ICMP No Db Drop Count: 0
ICMP Fragment drop count: 0
ICMP UnsupportedType Drop Count: 0
ICMP Err Translated Count: 0
ICMP Query Translated Count: 0

Subsequent Fragment Incoming Count: 0
Subsequent Fragment No Db Drop  Count: 0
Subsequent Fragment Translated Count: 0

Options Incoming Count: 0
Options Drop Count: 0
Options Forward Count: 0
Options No DB drop Count: 0
Unsupported Protocol Count: 0

ICMP generated counters :
=======================

IPv4 ICMP Messages generated count: 0
IPv6 ICMP Messages generated count: 0
```

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
TCP Incoming Count	Number of incoming TCP packets.

TCP NonTranslatable Drop Count	Number of TCP packets dropped without translating.
TCP Invalid NextHdr Drop Count	Packets dropped due to invalid Next hop.
TCP No Db Drop Count	Packets dropped because of missing MAP-T configuration.
TCP Translated Count	Number of TCP packets translated.
UDP Incoming Count	Number of incoming UDP packets.
UDP NonTranslatable Drop Count	Number of UDP packets dropped without translating.
UDP Invalid Next Hdr Drop Count	Packets dropped due to invalid Next hop.
UDP No Db Drop Count	Indicates missing MAP-T configuration.
UDP Translated Count	Number of UDP packets translated.
ICMP Total Incoming Count	Number of incoming ICMP packets.
ICMP No DB Drop Count	Packets dropped because of missing MAP-T configuration.
ICMP Fragment drop count	Number of ICMP fragments dropped.
ICMP Invalid NextHdr Drop Count	Packets dropped due to invalid Next hop.
ICMP Nontranslatable Drop Count	Number of ICMP packets dropped without translating.
ICMP Nontranslatable Forward Count	Number of ICMP packets forwarded without translating.
ICMP UnsupportedType Drop Count	Number of ICMP packets dropped because of the unsupported type.
ICMP Error Translated Count	Number of ICMP packets with error in translation.
ICMP Query Translated Count	Number of translated IPv6 to IPv4 ICMP query output packets.
Subsequent Fragment Incoming Count	Number of incoming fragments
Subsequent Fragment NonTranslateable Drop Count	Number of fragments dropped without translating.

Invalid NextHdr Drop Count	Number of packets dropped because of invalid next hop.
Subsequent Fragment No Db Drop Count	Number of fragments dropped.
Subsequent Fragment Translated Count	Number of fragments translated.
Extensions/Options Incoming Count	Incoming packets with extended options in the header
Extensions/Options Drop Count	Packets dropped with extended options in the header.
Extensions/Options Forward Count	Packets forwarded with extended options in the header.
Extensions/Options No DB drop Count	Packets dropped due to missing configuration and with extended options in the header.
Unsupported Protocol Count	Packets dropped due to unsupported Layer-4 protocol.

Related Commands

Command	Description
address-family (MAP-T), on page 21	Configures IPv4 or IPv6 address for a MAP-T instance.
clear cgn map-t statistics, on page 49	Clears the statistics of a MAP-T instance.
contiguous-ports (MAP-T), on page 77	Configures the number of contiguous ports for a MAP-T instance.
cpe-domain (MAP-T), on page 80	Configures the Customer Premises Equipment (CPE) domain parameters.
external-domain (MAP-T), on page 88	Configures the external domain's IPv6 prefix to convert IPv4 addresses into IPv6 addresses and vice versa.
sharing-ratio (MAP-T), on page 193	Configures the port sharing ratio.
traceroute (MAP-T), on page 284	Configures traceroute translation algorithms.

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
instance-name	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

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

Example

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
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
Number of Out2In drops due to TCP sequence mismatch	Number of packets dropped for not being in the sequence
Number of Outside to inside TCP sequence mismatch	Number of TCP packets dropped for not being in the sequence
Total number of sessions created due to Out2In packets	Number of sessions created with both Inside-to-Outside and Outside-to-Inside packets
Number of Out2In drops due to end point filtering	Number of packets dropped if Endpoint-Dependent Mapping is configured
Number of translations created	Total number of translations created
Number of translations deleted	Total number of translations cleared after the timeout
Number of sessions created	Total number of sessions created
Number of sessions deleted	Total number of sessions deleted
Syslog/Netflow translation create records generated	Number of translation create records generated for Syslog or NetFlow
Syslog/Netflow translation delete records generated	Number of translation create records deleted for Syslog or NetFlow
Syslog/Netflow sessions create records generated	Number of session create records generated for Syslog or NetFlow
Syslog/Netflow sessions delete records generated	Number of session delete records generated for Syslog or NetFlow
Number of Netflow packets generated	Number of packets generated for NetFlow
Number of Syslog packets generated	Number of packets generated for Syslog
Dropped Netflow packets due to congestion	Number of NetFlow packets dropped due to system errors
Dropped Syslog packets due to congestion	Number of Syslog packets dropped due to system errors
Average usage of bulk allocated ports	Percentage of the usage of the bulk allocated ports
Average number of bulk-allocations made	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

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

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read

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

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

port	Displays the range of the port numbers.
start *number*	The start port from which the translation table entries should be displayed.
end *number*	The end port till which the translation table entries should be displayed.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 3.9.1	This command was introduced.
Release 4.0.0	NAT44 instance was included to the command.
Release 4.3.0	The keyword, **gre** was added.

Usage Guidelines

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

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

```
.
.
12.168.2.123   tcp       34       3899         dynamic          9835       6785
```

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

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         Protocol  Inside       Outside       Translation   Inside      Outside
   Address                   Source       Source        Type          to          to
                             Port         Port                        Outside     Inside
                                                                      Packets     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
clear cgn nat44 inside-vrf , on page 55	Clears translation database entries that are created dynamically for the specified inside VRF.
clear cgn nat44 port, on page 59	Clears the translation database entries that are created dynamically for the specified inside port number.
clear cgn nat44 protocol, on page 62	Clears translation database entries that are created dynamically for the specified protocol.
protocol (NAT44)	
service cgn, on page 168	Enables an instance for the CGN application.
show cgn nat44 outside-translation, on page 223	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

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

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read

Example

```
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

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

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 3.9.1	This command was introduced.
Release 4.0.0	The NAT44 instance was included to the command. The **address-family** keyword was removed.
Release 4.3.0	The keyword, **gre** was added.

Usage Guidelines

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                  Destination Destination   Type          to         to
                         Port        Port                      Outside    Inside
                                                               Packets    Packets
-------------------------------------------------------------------------------------------
13.16.6.23   tcp         314         56            dynamic       8753       5345
13.16.6.23   tcp         819         329           alg           8901       890
13.16.6.23   tcp         40          178           alg           97654      4532
13.16.6.23   tcp         503         761           static        43215      8765
13.16.6.23   tcp         52          610           dynamic       7645       876
.
.
.
.
.

13.16.6.23   tcp         390          621           static       67532       1234
```

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          Protocol  Outside      Inside         Translation  Inside      Outside
   Address                   Destination  Destination    Type         to          to
                             Port         Port                        Outside     Inside
                                                                      Packets     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
clear cgn nat44 inside-vrf , on page 55	Clears translation database entries that are created dynamically for the specified inside VRF.
clear cgn nat44 port, on page 59	Clears the translation database entries that are created dynamically for the specified inside port number.

Command	Description
clear cgn nat44 protocol, on page 62	Clears translation database entries that are created dynamically for the specified protocol.
protocol (NAT44)	
service cgn, on page 168	Enables an instance for the CGN application.
show cgn nat44 inside-translation, on page 217	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

nat44*instance-name*	Name of the NAT44 instance that is configured.
inside-vrf	Displays the contents for the inside VRF.
vrf-name	Name for the inside VRF.
address-range	Displays the range for the outside address.
start-address	Range for the start address of the outside address pool. The range of the IPv4 addresses cannot be more than 255 consecutive IPv4 addresses.
end-address	Range for the end address of the outside address pool.

Command Default

None

Command Modes

EXEC

Command History

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

Usage Guidelines

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             Number            Number
Address             of                of
                    Free ports        Used ports
------------------------------------------------------------------------------
17.16.6.23          123               64388
17.16.6.120         58321             6190
17.16.6.98          98                64413
17.16.6.2           1234              60123
.
.
.
.
.
.
.
.
.
18.12.6.12          678               52789
```

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

Related Commands

Command	Description
inside-vrf (NAT44), on page 101	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

instance-name	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

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cgn	read

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
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

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

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read

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
show cgn nat44 inside-translation, on page 217	Displays the translation table entries for an inside-address to outside-address for a specified NAT44 CGN instance.
show cgn nat44 outside-translation, on page 223	Displays the outside-address to inside-address translation details for a specified NAT44 instance.
show cgn nat44 pool-utilization, on page 227	Displays the outside address pool utilization details for a specified NAT44 instance.
show cgn nat44 statistics, on page 232	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

instance-name	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 **summary** keyword was removed.

Usage Guidelines

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

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 resorce depletion: 0
No translation entry drops: 0
PPTP active tunnels: 1
PPTP active channels: 2
PPTP ctrl message drops: 4

Pool address totally free: 255
Pool address used: 1
Pool address usage:
------------------------------------------------
External Address       Ports Used
------------------------------------------------
52.52.52.215           3
------------------------------------------------
```

show cgn nat64 stateful counters

To display the counter details of IPv4 and IPv6 stateful translations, use the **show cgn nat64 stateful counters** command in EXEC mode.

show cgn nat64 stateful *instance-name* **counters**

Syntax Description

instance-name	Name of the configured Stateful NAT64 instance.

Command Default

None

Command Modes

Exec mode

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read

This example shows the details of IPv4 and IPv6 stateful translations:

```
RP/0/RP0/CPU0:router# show cgn nat64 stateful nat1 counters

Stateful NAT64 IPv6 to IPv4 counters:
=====================================

TCP Incoming Count                          : 0
TCP NonTranslatable Drop Count              : 0
TCP State Drop Count                        : 0
TCP NoDb Drop Count                         : 0
TCP Translated Count                        : 0
UDP Incoimg Count                           : 0
UDP NonTranslatable Drop Count              : 0
UDP No DB Drop Count                        : 0
UDP Translated Count                        : 0
ICMP Total Incoming Count                   : 0
ICMP No DB Drop Count                       : 0
ICMP Nontranslatable Drop Count             : 0
ICMP Query Translated Count                 : 0
ICMP Error Incoming Count                   : 0
ICMP Error No DB Drop Count                 : 0
ICMP Error Invalid Nxt Hdr Drop Count       : 0
ICMP Error NonTranslatable Drop Count       : 0
ICMP Error Unsupported Type Count           : 0
ICMP Error Translated Count                 : 0
Fragment Incoming Count                     : 0
Fragment Forward Count                      : 0
```

```
Fragment Drop Count                          : 0
Fragment Throttle Count                      : 0
Fragment Timeout Count                       : 0
Fragment TCP Input Count                     : 0
Fragment UDP Input Count                     : 0
Fragment ICMP Input Count                    : 0
Fragment Invalid Input Count                 : 0
Extensions/Options Incoming Count            : 0
Extensions/Options Drop Count                : 0
Extensions/Options Forward Count             : 0
Extensions/Options No DB drop Count          : 0
Unsupported Protocol Count                   : 0

Stateful NAT64 IPv4 to IPv6 counters
=====================================

TCP Incoming Count                           : 0
TCP NoDb Drop Count                          : 0
TCP V4 Init Policy Drop Count                : 0
TCP State Drop Count                         : 0
TCP Translated Count                         : 0
UDP Incoimg Count                            : 0
UDP No DB Drop Count                         : 0
UDP Filter Drop Count                        : 0
UDP Translated Count                         : 0
UDP Crc Zero Drop Count                      : 0
UDP FragmentCrc Zero Drop Count              : 0
UDP CrcZeroRecy Sent Count                   : 0
UDP CrcZeroRecy Drop Count                   : 0
ICMP Total Incoming Count                    : 0
ICMP No DB Drop Count                        : 0
ICMP Filter drop Count                       : 0
ICMP Query Translated Count                  : 0
ICMP Error Incoming Count                    : 0
ICMP Error No DB Drop Count                  : 0
ICMP Error Unsupported Type Count            : 0
ICMP Error Unsupported Protocol Count        : 0
ICMP Error Translated Count                  : 0
Fragment Incoming Count                      : 0
Fragment Forward Count                       : 0
Fragment Drop Count                          : 0
Fragment Throttle Count                      : 0
Fragment Timeout Count                       : 0
Fragment TCP Input Count                     : 0
Fragment UDP Input Count                     : 0
Fragment ICMP Input Count                    : 0
Options Incoming Count                       : 0
Options Drop Count                           : 0
Options Forward Count                        : 0
Options No DB drop count                     : 0
Options Unsupported Protocol Count           : 0

ICMP generated counters :
=========================
IPv4 ICMP Messages generated count           : 0
IPv6 ICMP Messages generated count           : 0
```

Related Commands

Command	Description
show cgn nat64 stateful inside-translation, on page 237	Displays the translation table entries for an inside-address to outside-address for a specified NAT64 stateful instance.

Command	Description
show cgn nat64 stateful outside-translation, on page 239	Displays the translation table entries for an outside-address to inside-address for a specified NAT64 stateful instance.
show cgn nat64 stateful pool-utilization, on page 241	Displays the outside address pool utilization details for a specified NAT64 stateful instance.
show cgn nat64 stateful session, on page 243	Displays all the active destination sessions for a given source IPv6 address and port number.
show cgn nat64 stateful statistics, on page 245	Displays the contents of the NAT64 stateful instance statistics.

show cgn nat64 stateful inside-translation

To display the translation table entries for an inside-address to outside-address for a specified NAT64 stateful instance, use the **show cgn nat64 stateful inside-translation** command in EXEC mode.

show cgn nat64 stateful *instance-name* **inside-translation protocol** {**icmp** | **tcp** | **udp**} [**translation-type** {**alg** | **all** | **dynamic** | **static**}] **inside-address** *ipv6 address* **port start** *port number* **end** *port number*

Syntax Description

instance-name	Name of the NAT64 instance that is configured.
protocol	Displays the name of the protocols.
icmp	Displays the ICMP protocol.
tcp	Displays the TCP protocol.
udp	Displays the UDP protocol.
translation-type	(Optional) Displays the translation type.
alg	(Optional) Displays only the ALG translation entries.
all	(Optional) Displays all the translation entries, for example, alg, dynamic, and static.
dynamic	(Optional) Displays only the dynamic translation entries.
static	(Optional) Displays only the static translation entries.
inside-address	Displays the inside address for the protocol.
ipv6 address	IPv6 address.
port	Displays the range of the port numbers.
start *port number*	The start port from which the translation table entries should be displayed.
end *port number*	The end port till which the translation table entries should be displayed.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read

This example displays the translation table entries for an inside-address to outside-address for a specified NAT64 stateful instance:

```
RP/0/RP0/CPU0:router#
show cgn nat64 stateful nat1 inside-translation protocol tcp inside-address 2001:db8:ff00::1
 port start 23 end 56

Inside-translation details
----------------------------------
NAT64 Stateful instance : stful1
-------------------------------------------------------------------------------------------------------
Outside       Protocol   Inside      Outside     Translation     Inside            Outside
Address                  Source      Source      Type            to                to
                         Port        Port                        Outside           Inside
                                                                 Packets           Packets
-------------------------------------------------------------------------------------------------------
12.168.6.231    tcp      34          2356          alg           875364            65345
12.168.6.98     tcp      56          8972          static        78645             56343
12.168.2.12     tcp      21          2390          static        45638             89865
12.168.2.123    tcp      34           239          dynamic       809835            67854
.
.
.
.
.
12.168.2.123    tcp      34          3899          dynamic        9835             6785
```

Related Commands

Command	Description
show cgn nat64 stateful counters, on page 234	Displays the counter details of IPv4 and IPv6 stateful translations.
show cgn nat64 stateful outside-translation, on page 239	Displays the translation table entries for an outside-address to inside-address for a specified NAT64 stateful instance.
show cgn nat64 stateful pool-utilization, on page 241	Displays the outside address pool utilization details for a specified NAT64 stateful instance.
show cgn nat64 stateful session, on page 243	Displays all the active destination sessions for a given source IPv6 address and port number.
show cgn nat64 stateful statistics, on page 245	Displays the contents of the NAT64 stateful instance statistics.

show cgn nat64 stateful outside-translation

To display the translation table entries for an outside-address to inside-address for a specified NAT64 stateful instance, use the **show cgn nat64 stateful outside-translation** command in EXEC mode.

show cgn nat64 stateful *instance-name* **outside-translation protocol** {**icmp** | **tcp** | **udp**} [**translation-type** {**alg** | **all** | **dynamic** | **static**}] **outside-address** *ipv4 address* **port start** *port number* **end** *port number*

Syntax Description

instance-name	Name of the NAT64 instance that is configured.
protocol	Displays the name of the protocols.
icmp	Displays the ICMP protocol.
tcp	Displays the TCP protocol.
udp	Displays the UDP protocol.
translation-type	(Optional) Displays the translation type.
alg	(Optional) Displays only the ALG translation entries.
all	(Optional) Displays all the translation entries, for example, alg, dynamic, and static.
dynamic	(Optional) Displays only the dynamic translation entries.
static	(Optional) Displays only the static translation entries.
outside-address	Displays the outside address for the protocol.
ipv4 address	IPv4 address.
port	Displays the range of the port numbers.
start *port number*	The start port from which the translation table entries should be displayed.
end *port number*	The end port till which the translation table entries should be displayed.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read

This example displays the translation table entries for an outside-address to inside-address for a specified NAT64 stateful instance:

```
RP/0/RP0/CPU0:router#
show cgn nat64 stateful nat1 outside-translation protocol tcp outside-address 2001:db8:ff00::1
 port start 23 end 56

Outside-translation details
-----------------------------------
NAT64 Stateful instance : stful1
-------------------------------------------------------------------------------------------------------
Outside                 Protocol   Outside     Inside      Translation    Inside
 Outside
Address                            Source      Source      Type           to
 to
                                   Port        Port                       Outside
 Inside
                                                                          Packets
 Packets
-------------------------------------------------------------------------------------------------------
2001:471:1f11:251::1    udp        314         56          alg            8753
 51345
2001:471:1f11:251::1    udp        981         32919       alg            2901
 790
2001:471:1f11:251::1    udp        823         2919        alg            9901
 8911
2001:471:1f11:251::1    udp        2191        919         alg            9627
 9087
2001:471:1f11:251::1    udp        1981        119         alg            82901
 2345
2001:471:1f11:251::1    udp        981         3919        alg            1901
 12345
```

Related Commands

Command	Description
show cgn nat64 stateful counters, on page 234	Displays the counter details of IPv4 and IPv6 stateful translations.
show cgn nat64 stateful inside-translation, on page 237	Displays the translation table entries for an inside-address to outside-address for a specified NAT64 stateful instance.
show cgn nat64 stateful pool-utilization, on page 241	Displays the outside address pool utilization details for a specified NAT64 stateful instance.
show cgn nat64 stateful session, on page 243	Displays all the active destination sessions for a given source IPv6 address and port number.
show cgn nat64 stateful statistics, on page 245	Displays the contents of the NAT64 stateful instance statistics.

show cgn nat64 stateful pool-utilization

To display the outside address pool utilization details for a specified NAT64 stateful instance, use the **show cgn nat64 stateful pool-utilization** command in EXEC mode. The range of the IPv4 addresses must not be more than 255 consecutive IPv4 addresses.

show cgn nat64 stateful *instance-name* **pool-utilization address-range** *start-address end-address*

Syntax Description

instance-name	Name of the NAT64 instance that is configured.
address-range	Displays the range for the outside address.
start-address	Range for the start address of the outside address pool. The range of the IPv4 addresses cannot be more than 255 consecutive IPv4 addresses.
end-address	Range for the end address of the outside address pool.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
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 nat64 stateful nat1 pool-utilization address-range 17.16.6.23 17.16.6.125

Public-address-pool-utilization details
------------------------------------------------------------------------------
NAT64 stateful instance: stful1
------------------------------------------------------------------------------
Outside      Number        Number
Address      of            of
             Free ports    Used ports
------------------------------------------------------------------------------
17.16.6.23   123           64388
17.16.6.120  58321         6190
17.16.6.98   98            64413
```

```
17.16.6.2     1234           60123
.
.
.
.
.
.
.
.
.
17.12.6.12    678            52789
```

Related Commands

Command	Description
show cgn nat64 stateful counters, on page 234	Displays the counter details of IPv4 and IPv6 stateful translations.
show cgn nat64 stateful inside-translation, on page 237	Displays the translation table entries for an inside-address to outside-address for a specified NAT64 stateful instance.
show cgn nat64 stateful outside-translation, on page 239	Displays the translation table entries for an outside-address to inside-address for a specified NAT64 stateful instance.
show cgn nat64 stateful session, on page 243	Displays all the active destination sessions for a given source IPv6 address and port number.
show cgn nat64 stateful statistics, on page 245	Displays the contents of the NAT64 stateful instance statistics.

show cgn nat64 stateful session

To display all the active destination sessions for a given source IPv6 address and port number per NAT64 stateful instance, use the **show cgn nat64 stateful session** command in EXEC mode.

show cgn nat64 stateful *instance-name* **session protocol** {**icmp** | **tcp** | **udp**} [**translation-type** {**alg** | **all** | **dynamic** | **static**}] [**inside-address** *IPv6 address* **port** *port number*

Syntax Description

instance-name	Name of the NAT64 instance that is configured.
protocol	Displays the name of the protocols.
icmp	Displays the ICMP protocol.
tcp	Displays the TCP protocol.
udp	Displays the UDP protocol.
translation-type	(Optional) Displays the translation type.
alg	(Optional) Displays only the ALG translation entries.
all	(Optional) Displays all the translation entries, for example, alg, dynamic, and static.
dynamic	(Optional) Displays only the dynamic translation entries.
static	(Optional) Displays only the static translation entries.
inside-address	Displays the inside address.
address	IPv6 address of the source.
port	Port number of the source.
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

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read

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 nat64 stateful s1 session protocol tcp translation-type alg
inside-address2001:471:1f11:251::1port 123

Session details:
-----------------------------------------------------------------
NAT64 stateful instance: s1
-----------------------------------------------------------------
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
show cgn nat64 stateful counters, on page 234	Displays the counter details of IPv4 and IPv6 stateful translations.
show cgn nat64 stateful inside-translation, on page 237	Displays the translation table entries for an inside-address to outside-address for a specified NAT64 stateful instance.
show cgn nat64 stateful outside-translation, on page 239	Displays the translation table entries for an outside-address to inside-address for a specified NAT64 stateful instance.
show cgn nat64 stateful pool-utilization, on page 241	Displays the outside address pool utilization details for a specified NAT64 stateful instance.
show cgn nat64 stateful statistics, on page 245	Displays the contents of the NAT64 stateful instance statistics.

show cgn nat64 stateful statistics

To display the contents of the NAT64 stateful instance statistics, use the **show cgn nat64 stateful statistics** command in EXEC mode.

show cgn nat64 stateful *instance-name* **statistics**

Syntax Description

instance-name	Name of the configured NAT64 instance.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cgn	read

Examples

This output shows the statistics entries:

```
RP/0/RP0/CPU0:router#show cgn nat64 stateful s1 statistics

NAT 64 stateful statistics
--------------------------
Statistics summary of NAT64 stateful: 's1'
Number of active translations: 45631
Number of static translations: 1500
Number of dynamic translations: 44131

Number of sessions: 20
Input drops port limit exceeded: 0
Input drops system limit reached: 0
Inside to outside drops resource depletion: 0
Outside drops no translation entry: 0
Filtering drops: 0
Pool address totally free: 195
Pool address used: 23
```

The following table describes the fields seen in the output of the **show cgn nat64 stateful statistics** as shown in the above example:

Name	Description

Number of active translations	Translation entries allocated in the database.
Number of static translations	Statically created entries
Number of dynamic translations	Dynamically created entries
Number of sessions	Number of sessions that use the translation entries.
Input drops port limit exceeded	Packets dropped as a result of exceeding the port limit.
Input drops system limit reached	Packets dropped as a result of reaching the system limit.
Inside to outside drops resource depletion	Packets dropped because no public L4 port could be allocated.
Outside drops no translation entry	Packets dropped due to lack of entry in the translation database.
Filtering drops	Packets dropped because of the address filtering policy.
Pool address totally free	Addresses available from the pool.
Pool address used	Addresses utilized from the pool.

Related Commands

Command	Description
show cgn nat64 stateful counters, on page 234	Displays the counter details of IPv4 and IPv6 stateful translations.
show cgn nat64 stateful inside-translation, on page 237	Displays the translation table entries for an inside-address to outside-address for a specified NAT64 stateful instance.
show cgn nat64 stateful outside-translation, on page 239	Displays the translation table entries for an outside-address to inside-address for a specified NAT64 stateful instance.
show cgn nat64 stateful pool-utilization, on page 241	Displays the outside address pool utilization details for a specified NAT64 stateful instance.
show cgn nat64 stateful session, on page 243	Displays all the active destination sessions for a given source IPv6 address and port number.

show cgn nat44 static-map

To display the mapping details of static source or static destination address translation, use the show cgn nat44 static-map command.

show cgn nat44 *instance-name* **static-map i2o-src | i2o-dst inside-vrf** *vrf-name* { **forward** | **reverse} staticnat-address** *IP address*

Syntax Description

i2o-src	Displays the details of the Inside-to-Outside source mapping.
i2o-dst	Displays the details of the Inside-to-Outside destination mapping.
inside-vrf *vrf-name*	Specifies the inside VRF for which the translation details are needed.
forward	Specifies the premap IP address for the inside VRF for which the corresponding postmap IP address has been mapped is displayed.
reverse	Specifies the postmap IP address for the inside VRF for which the corresponding premap IP address has been mapped is displayed.
staticnat-address *IP address*	Specifies the static NAT address.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 5.2.0	This command was introduced.
Release 6.0	The new keyword **i2o-src** was added as part of Static Source NAT feature.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cgn	read

Examples

This example shows sample output for static destination address mapping:

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

```
show cgn nat44 nat1 static-map i2o-dst inside-vrf red2 forward staticnat-address 13.1.1.0
num-entries 100

Static DEST NAT Mapping details inside a Vrf
------------------------------------------------------------------------------------------------
NAT44 instance    : nat1
VRF               : red2
------------------------------------------------------------------------------------------------
Static NAT Address             Static NAT Mapped Address

------------------------------------------------------------------------------------------------
13.1.1.0                       12.1.1.0
RP/0/RSP0/CPU0:NAT44#
```

This example shows sample output for static source address mapping:

```
RP/0/RP0/CPU0:router # show cgn nat44 nat1 static-map i2o-src inside-vrf insidevrf1 forward
 staticnat-address 20.1.1.3
------------------------------------------------------------------------------------------------
NAT44 instance    : nat1
VRF name          : insidevrf1
------------------------------------------------------------------------------------------------
Address: Port      Mapped Address: Port    I2O Packet Count         O2I Packet Count

------------------------------------------------------------------------------------------------
20.1.1.3:17767         100.1.1.0:9158        0                        0

20.1.1.3:34299         100.1.1.0:42281       0                        0

……..……..
```

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

instance-name	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

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cgn	read

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
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 tunnelv6rd*6rd-instance***statistics**

Syntax Description

tunnel	Indicates the tunnel type.
v6rd	Specifies the 6rd information.
6rd-instance	Instance name.
statistics	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

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read

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
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
Incoming packet count	Total number of incoming packets
Incoming tunneled packets count	Total No of 6rd tunnel packets

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

Reassembly disabled drop count	Number of fragments dropped while reassembly is disabled.
No DB entry fragments drop count	Number of fragments dropped due to incomplete or missing 6rd configuration.
Fragments dropped due to security check failure	Number of fragments dropped due to missing IPv6 header.
Insufficient IPv4 payload fragment drop count	Number of fragments dropped due to missing IPv6 header.
Unsupported protocol fragment drops	Number of fragments dropped due to unsupported protocol.
Invalid IPv6 prefix fragment drop count	Number of fragments dropped due to invalid IPv6 prefix.

Related Commands

Command	Description
clear cgn tunnel v6rd statistics, on page 73	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

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

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

No specific guidelines impact the use of this command.

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

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
```

show cgv6 map-e statistics

To display the MAP-E instance statistics, use the **show cgv6 map-e statistics** command in EXEC mode.

show cgv6 map-e *instance-name* **statistics**

Syntax Description

instance-name	Name of the configured MAP-E instance.
statistics	Specifies the statistics of the configured MAP-E instance.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 5.3.2	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cgv6	read

Examples

This output shows the statistics entries for a MAP-E instance:

```
RP/0/RP0/CPU0:router# show cgv6 map-e map1 statistics

Cgv6 Map-e IPv6 to IPv4 counters:

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

Translated Udp Count: 0
Translated Tcp Count: 0
Translated Icmp Count: 0
Cgv6 Map-e IPv4 to IPv6 counters:

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

Translated Udp Count: 0
Translated Tcp Count: 0
Translated Icmp Count: 0
```

show cgv6 map-t statistics

To display the MAP-T instance statistics, use the show cgv6 map-t statistics command in EXEC mode.

show cgv6 map-t-cisco*instance-name***statistics**

Syntax Description

instance-name	Name of the configured MAP-T instance.
statistics	Specifies the statistics of the configured MAP-T instance.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 6.2.1	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	Operations
cgv6	read

Examples

This output shows the statistics entries for a MAP-T instance:

```
RP/0/RSP0/CPU0:router# show cgv6 map-t-cisco map1 statistics

Map-t-cisco IPv6 to IPv4 counters:
====================================

Translated Udp Count: 0

Translated Tcp Count: 0

Translated Icmp Count: 0


Map-t-cisco IPv4 to IPv6 counters:
====================================

Translated Udp Count: 0

Translated Tcp Count: 0

Translated Icmp Count: 0


Map-t-cisco exception IPv6 to IPv4 counters:
```

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

TCP Incoming Count: 0
TCP NonTranslatable Drop Count: 0
TCP Invalid NextHdr Drop Count: 0
TCP NoDb Drop Count: 0
TCP Translated Count: 0

UDP Incoming Count: 0
UDP NonTranslatable Drop Count: 0
UDP Invalid Next Hdr Drop Count: 0
UDP No Db Drop Count: 0
UDP Translated Count: 0

ICMP Total Incoming Count: 0
ICMP No DB Drop Count: 0
ICMP Fragment drop count: 0
ICMP Invalid NxtHdr Drop Count: 0
ICMP Nontanslatable Drop Count: 0
ICMP Nontanslatable Fwd Count: 0
ICMP UnsupportedType Drop Count: 0
ICMP Err Translated Count: 0
ICMP Query Translated Count: 0

Subsequent Fragment Incoming Count: 300
Subsequent Fragment NonTranslateable Drop Count: 200
Invalid NextHdr Drop Count: 0
Subsequent Fragment No Db Drop Count: 0
Subsequent Fragment Translated Count: 100

Extensions/Options Incoming Count: 0
Extensions/Options Drop Count: 0
Extensions/Options Forward Count: 0

Extensions/Options No DB drop Count: 0
Unsupported Protocol Count: 0

Map-t-cisco exception packets IPv4 to IPv6 counters:
=====================================

TCP Incoming Count: 0
TCP No Db Drop Count: 0
TCP Translated Count: 0

UDP Incoming Count: 0
UDP No Db Drop Count: 0
UDP Translated Count: 0
UDP FragmentCrc Zero Drop Count: 0
UDP CrcZeroRecy Sent Count: 0
UDP CrcZeroRecy Drop Count: 0

ICMP Total Incoming Count: 0
ICMP No Db Drop Count: 0
ICMP Fragment drop count: 0
ICMP UnsupportedType Drop Count: 0
ICMP Err Translated Count: 0
ICMP Query Translated Count
```

Description of the show output fields

Output Field	Description
Translated Udp Count	Number of UDP packets translated to IPv4/IPv6
Translated Tcp Count	Number of TCP packets translated to IPv4/IPv6
Translated Icmp Count	Number of TCP packets translated to IPv4/IPv6
TCP Incoming Count	Number of incoming packets on a port
TCP NonTranslatable Drop Count	Number of IPV4/IPV6 packets that were dropped because of translation to IPv4/IPv6 failure.
TCP Invalid NextHdr Drop Count	Number of packets that were dropped due to invalid next hop
TCP NoDb Drop Count	Number of packets for which there is no MAP-T configuration
TCP Translated Count	Number of TCP packets that were translated
UDP Incoming Count	Number of incoming UDP packets on a port
UDP NonTranslatable Drop Count	Number of IPV4/IPV6 packets that were dropped because of translation to IPv4/IPv6 failure.
UDP Invalid Next Hdr Drop Count	Number of packets that were dropped due to invalid next hop
UDP No Db Drop Count	Number of packets for which there is no MAP-T configuration
UDP Translated Count	Number of translated UDP packets
ICMP Total Incoming Count	Number of incoming ICMP packets on a port
ICMP No DB Drop Count	Number of ICMP packets for which there is no MAP-T configuration.
ICMP Fragment drop count	Number of ICMP fragmented packets that are dropped and not forwarded.
ICMP Invalid NxtHdr Drop Count	Number of packets that were dropped due to invalid next hop.
ICMP Nontanslatable Drop Count	Number of packets that could not be converted to IPv4/IPv6 and are dropped.
ICMP Nontanslatable Fwd Count	Number of packets that could not be converted to IPv4/Ipv6 and were forwarded to VSM
ICMP UnsupportedType Drop Count	Number of non ICMP packets that were dropped
ICMP Err Translated Count	Number of packets that had errors while translating to IPv4/IPv6
ICMP Query Translated Count	Number of ICMP packets that were translated to IPv4/IPv6

Output Field	Description
Subsequent Fragment Incoming Count	Number of incoming IPv6 packets that were fragmented.
Subsequent Fragment NonTranslateable Drop Count	Number of IPv6 packets dropped without translating.
Invalid NextHdr Drop Count	Number of packets that were dropped due to invalid next hop.
Subsequent Fragment No Db Drop Count	Number of IPv6 packets dropped due to missing MAP-T configuration
Subsequent Fragment Translated Count	Number of IPv6 packets that were translated.
Extensions/Options Incoming Count	Number of IPv6 packets that came in with extended options in the header.
Extensions/Options Drop Count	Number of IPv6 packets with extended options in the header that were dropped.
Extensions/Options Forward Count	Number of IPv6 packets with extended options in the header that were forwarded.
Extensions/Options No DB drop Count	Number of IPv6 packets with extended configuration in the header that were dropped due to missing MAP-T configuration
Unsupported Protocol Count	Number of Ipv6 packets dropped due to unsupported Layer-4 protocol.
UDP Incoming Count	Number of incoming UDP packets
UDP No Db Drop Count	Number of UDP packets for which there is no MAP-T configuration.
UDP Translated Count	Number of UDP packets translated to IPv4/IPv6
UDP FragmentCrc Zero Drop Count	Number of fragmented UDP packets dropped due to 0 checksum.
UDP CrcZeroRecy Sent Count	Number of packet with 0 checksum sent back to IPv4 ServiceApp. These packets are then recycled and sent back with valid checksum.
UDP CrcZeroRecy Drop Count	Number of UDP packets with 0 checksum that are not recycled and dropped.

show services redundancy

To display the current active and standby CGSE in an intra chassis redundancy setup, use the **show services redundancy** command in EXEC mode.

show services redundancy {**brief** | **detail** | **summary**}**location** *node-id*

Syntax Description

brief	Displays a brief view of redundant nodes of instances.
detail	Displays a detailed view of redundant nodes of instances.
summary	Displays a summary of redundant nodes of instances.
location *node-id*	Specifies the location. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read

Example

This example shows the sample output of **show services redundancy** command when the configured preferred active node 0/0/CPU0 is in Active state:

```
RP/0/RP0/CPU0:router#show services redundancy

Service type     Name                    Pref. Active        Pref. Standby
-------------------------------------------------------------------------------
ServiceInfra     ServiceInfra1           0/0/CPU0 Active
ServiceInfra     ServiceInfra2           0/2/CPU0 Active
ServiceCgn       cgn1                    0/0/CPU0 Active     0/2/CPU0 Standby
```

This example shows the sample output of **show services redundancy** command when the configured preferred standby node 0/2/CPU0 is in Active state:

```
RP/0/RP0/CPU0:router#show services redundancy
```

```
Service type     Name                    Pref. Active        Pref. Standby
-------------------------------------------------------------------------------
ServiceInfra     ServiceInfra1           0/0/CPU0 Active
ServiceInfra     ServiceInfra2           0/2/CPU0 Active
ServiceCgn       cgn1                    0/0/CPU0 Standby     0/2/CPU0 Active
```

show virtual-service

To display the output of the Virtual Machines (VM) of VSM, use the **show virtual-service** command in EXEC mode.

show virtual-services {**detail** | **global** | **list**}

Syntax Description

detail	Shows the output of the VMs in detail.
global	Shows the global information of the VMs.
list	Shows the list of service VMs.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 5.1.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read

Example

This example shows a sample output of the **show virtual-services** command.

```
RP/0/RSP0/CPU0:router#show virtual-service list
Virtual Service List:
Name             Status              Package Name
------------------------------------------------------------
cgn123          Installing        asr9k-vsm-cgv6.ova

RP/0/RSP0/CPU0:router#sh virtual-service list
Virtual Service List:
Name             Status              Package Name
------------------------------------------------------------
cgn123          Installed         asr9k-vsm-cgv6.ova
```

```
RP/0/RSP0/CPU0:router#show virtual-service detail  name cgn1 node 0/1/CPU0
Virtual Service cgn1 Detail
  State                    : Activated
  Node name                : 0/1/CPU0
  Node status              : Install Mgr Ready, SDR Mgr Ready
  Package information
    Name                   : asr9k-vsm-cgv6.ova
    Path                   : disk0:/asr9k-vsm-cgv6.ova
    Application
      Name                 : CGv6
      Installed version    : 1.0
      Description          : Carrier Grade NAT
    Signing
      Key type             : Unknown Package
      Method               : SHA1
    Licensing
      Name                 : Not Available
      Version              : Not Available

  Activated profile name   : None

  Resource reservation
   Disk   : 10000MB
   Memory : 32768MB
   CPU    : 75 (system CPU %)
   VCPU   : 60

  Attached devices
  #             Type Name      Alias
  1          Watchdog None      None
  2             CDROM hdc       ide0-1-0
  3               HDD hda       DD_10GB_UM_local
  4        Serial/aux None      serial1
  5     Serial/shell None      serial0
  6               NIC net1      net1
  7               NIC net1      net1
  8               NIC net1      net1
  9               NIC net1      net1
  10              NIC net1      net1
  11              NIC net1      net1
 12              NIC net1      net1
  13              NIC net1      net1
  14              NIC net1      net1
  15              NIC net1      net1
  16              NIC net1      net1
  17              NIC net1      net1

Network interfaces:
    Name
    TenGigE0/1/1/0
    TenGigE0/1/1/1
    TenGigE0/1/1/2
    TenGigE0/1/1/3
    TenGigE0/1/1/4
    TenGigE0/1/1/5
    TenGigE0/1/1/6
    TenGigE0/1/1/7
    TenGigE0/1/1/8
    TenGigE0/1/1/9
    TenGigE0/1/1/10
    TenGigE0/1/1/11

  Resource admission (without profile)
    Disk space             : 10000MB
```

```
    Memory                : 32768MB
    CPU                   : 100% system CPU 3:22 PM



RP/0/RSP0/CPU0:router#show virtual-service global
Virtual Service Global State and Virtualization Limits:

Infrastructure version  :  1.5
Total virtual services installed  :  1
Total virtual services activated  :  1

Machine types supported  : KVM
Machine types disabled   : none

Node information:
Node name: 0/RSP0/CPU0
    State: Connected

    Resource virtualization limits:
    Name                   Quota    Committed    Available
    -------------------------------------------------------
    Unavailable

Node name: 0/1/CPU0
    State: Connected (Install Mgr Ready, SDR Mgr Ready)

    Maximum VCPUs per virtual service : 75

    Resource virtualization limits:
    Name                   Quota    Committed    Available
    -------------------------------------------------------
    VCPU                      75         60         15
    system CPU (%)            93         75         18
    memory (MB)            58368      32766      25602
    disk (MB)              49152      10000      39152
    network interface         14         12          2
    crypto engine              4          0          4
```

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*

Syntax Description

address	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

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
cgn	read, write

This example shows how to configure the 6RD tunnel source-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)# source-address 10.2.2.1
```

Related Commands

Command	Description
ipv4 prefix (6rd), on page 105	Assigns a value for the ipv4-prefix length to be used as part of both ends of tunnel.
ipv4 suffix (6rd), on page 107	Assigns a value for the ipv4-suffix length to be used as part of both ends of a tunnel.
ipv6-prefix (6rd), on page 111	Generates the delegated ipv6 prefix for a IPv6 Rapid Deployment (6RD) application.
unicast address (6rd), on page 292	Assigns an IPv6 address to be used for a IPv6 Rapid Deployment (6RD) Border Relay (BR) unicast configuration.

static-forward inside

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

static-forward inside

Syntax Description

This command has no keywords or arguments.

Command Default

None

Command Modes

CGN inside VRF NAT44 protocol configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

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

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

Task ID

Task ID	Operations
cgn	read, write

Examples

This example shows how to configure static port forwarding:

```
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 tcp
RP/0/RP0/CPU0:router(config-cgn-invrf-proto)# static-forward inside
RP/0/RP0/CPU0:router(config-cgn-ivrf-sport-inside)#
```

static-mapping-file direction

To configure static destination address translation, use the **static-mapping-file direction** command. To delete the existing configuration, use the **no static-mapping-file direction** command.

static-mapping-file direction i20-dst *location of the .csv file*

Syntax Description

direction	Specifies the direction of static mapping.
i20-dst	Specifies the destination mapping in the Inside-to-Outside direction.
location of the .csv file	Specifies the name of the static mapping configuration file and its path.

Command Default

None

Command Modes

CGN inside VRF NAT44 protocol configuration

Command History

Release	Modification
Release 5.2.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cgn	read, write

Examples

This example shows how to configure static port forwarding:

```
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)# map outside-vrf blue2 outsideServiceApp ServiceApp4
 address-pool 119.0.0.0/19
RP/0/RP0/CPU0:router(config-cgn-invrf-afi)#  static-mapping-file direction i2o-dst /disk0:/
 30K.CSV
```

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>*

Syntax Description

<28-1500>	Maximum segment size to be used in bytes.

Command Default

tcp mss value is disabled by default.

Command Modes

CGN-NAT64

Command History

Release	Modification
Release 4.1.0	This command was introduced.

Usage Guidelines

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.

Task ID

Task ID	Operation
cgn	read, write

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
protocol (NAT44), on page 148	Enters the ICMP, TCP, and UDP protocol configuration mode.
service cgn, on page 168	Enables an instance for the CGN application.

tcp-policy (Stateful NAT64)

To enable TCP policy that allows IPv4 initiated TCP sessions, use the **tcp-policy** command in NAT64 stateful configuration mode. To disable the policy, use the **no** form of this command.

tcp-policy

Syntax Description

This command has no keywords or arguments.

Command Default

None

Command Modes

NAT64 stateful configuration mode

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to enable TCP policy that allows IPv4 initiated TCP sessions for a NAT64 stateful 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 nat64 stateful nat64-inst
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)# tcp-policy
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)#
```

Related Commands

Command	Description
address-family (Stateful NAT64), on page 23	Configures IPv4 or IPv6 address on a NAT64 instance.
dynamic-port-range (Stateful NAT64), on page 85	Configures ports dynamically.
external-logging (Stateful NAT64 Netflow), on page 94	Enables external logging of a NAT64 Stateful instance.
fragment-timeout (Stateful NAT64), on page 99	Specifies time interval to store packet fragments.
ipv4 (Stateful NAT64), on page 109	Assigns ipv4 address pool.
ipv6-prefix (Stateful NAT64), on page 113	Converts an IPv6 address to an IPv4 address.

Command	Description
portlimit (Stateful NAT64), on page 137	Restricts the number of ports used by an IPv6 address.
protocol (Stateful NAT64), on page 150	Enters the ICMP, TCP, and UDP protocol configuration mode.
refresh-direction (Stateful NAT64), on page 156	Specifies the outbound refresh direction.
service-type nat64 (Stateful NAT64), on page 181	Creates a NAT64 stateful instance.
ubit-reserved (Stateful NAT64), on page 290	Enables reserving ubits in an IPv6 address.

timeout (DS-LITE)

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

timeout *seconds*

Syntax Description

seconds	Timeout value. Range is from 1 to 65535.

Command Default

The default timeout value is 60 seconds

Command Modes

DS-Lite configuration mode

Command History

Release	Modification
Release 4.2.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to configure the timeout period for an ICMP session 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)# protocol icmp
RP/0/RP0/CPU0:router(config-cgn-ds-lite-proto)# timeout 999
```

timeout (DS-LITE Netflow9)

To configure the frequency at which the netflow9 template is refreshed or resent to the netflow9 server for a DS-Lite instance, use the **timeout** command in CGN DS-Lite external logging server configuration mode.

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

timeout *value*

Syntax Description

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

Command Default

value : 30

Command Modes

CGN DS-Lite external logging server configuration

Command History

Release	Modification
Release 4.2.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cgn	read, write

Examples

This example shows how to configure the timeout value as 50 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-lite1
RP/0/RP0/CPU0:router(config-cgn-ds-lite)# external-logging netflow9
RP/0/RP0/CPU0:router(config-cgn-ds-lite-extlog)# server
RP/0/RP0/CPU0:router(config-cgn-ds-lite-extlog-server)# timeout 50
```

Related Commands

Command	Description
address (DS-LITE Netflow9), on page 6	
path-mtu (DS-LITE Netflow9), on page 125	Sets the Maximum Transmission Unit (MTU) of the path to log NetFlow-based external logging information.
refresh rate (DS-LITE Netflow9), on page 160	

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*

Syntax Description

seconds	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

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
cgn	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 cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cgn-nat44)# protocol icmp
RP/0/RP0/CPU0:router(config-cgn-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 cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cgn-nat44)# inside-vrf red
RP/0/RP0/CPU0:router(config-cgn-invrf)# protocol tcp
RP/0/RP0/CPU0:router(config-cgn-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 cgn cgn1
RP/0/RP0/CPU0:router(config-cgn)# service-type nat44 nat1
RP/0/RP0/CPU0:router(config-cgn-nat44)# inside-vrf red
RP/0/RP0/CPU0:router(config-cgn-invrf)# protocol tcp
RP/0/RP0/CPU0:router(config-cgn-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 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-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*

Syntax Description

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

Command Default

value : 30

Command Modes

CGN inside VRF external logging server configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

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
external-logging (NAT44 Netflow), on page 92	Enables external logging of a NAT44 instance.
inside-vrf (NAT44), on page 101	Enters inside VRF configuration mode for a NAT44 instance.
server (NAT44), on page 166	Enables the logging server information for the IPv4 address and port for the server that is used for the netflowv9-based external-logging facility.
service cgn, on page 168	Enables an instance for the CGN application.

timeout (Stateful NAT64 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 NAT64 Stateful configuration mode.

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

timeout *value*

Syntax Description

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

Command Default

30 minutes

Command Modes

NAT64 Stateful configuration

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

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 cgn-inst
RP/0/RP0/CPU0:router(config-cgn)# service-type nat64 stateful nat64-inst
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)# external-logging netflow version 9
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)# server
RP/0/RP0/CPU0:router(config-cgn-nat64-extlog-server)# timeout 50
```

Related Commands

Command	Description
address (Stateful NAT64 Netflow Version 9), on page 12	
path-mtu (Stateful NAT64 Netflow Version 9), on page 130	Sets the Maximum Transmission Unit (MTU) of the path to log NetFlow-based external logging information.
refresh rate (Stateful NAT64 Netflow Version 9), on page 162	Configures the refresh rate to log NetFlow-based external logging information.

Command	Description
session-logging (Stateful NAT64 Netflow Version 9), on page 191	Enables session logging for a NAT64 Stateful instance.

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*

Syntax Description

value	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

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

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*hashrandomttl*

Syntax Description

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

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

1. 127.0.01
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
cgn	read, write

This example shows how to configure the address-pool:

```
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)# traceroute translation address-pool
121.1.2.0/24
```

This example shows how to configure the random algorithm:

```
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)# traceroute translation algorithm Random
```

This example shows how to configure the hash algorithm:

```
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)# traceroute translation algorithm Hash
```

This example shows how to configure the TTL algorithm:

```
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)# traceroute translation algorithm TTL
```

Related Commands

Command	Description
address-family ipv4 (Stateless NAT64), on page 15	Enters the IPv4 address family configuration mode.
address-family ipv6 (Stateless NAT64), on page 17	Enters the IPv6 address family configuration mode.
ipv6-prefix (6rd), on page 111	Generates the delegated ipv6 prefix for a IPv6 Rapid Deployment (6RD) application.
service cgn, on page 168	Enables an instance for the CGN application.
service-type nat64 (Stateless), on page 183	Creates a nat64 stateless application
ubit-reserved (CGN), on page 288	Reserves the bits 64 to 71 for the IPv6 addresses.

traceroute (MAP-T)

To configure traceroute translation algorithms, use the **traceroute** command in MAP-T configuration mode. To undo the configuration, use the **no** form of this command.

traceroute translation [[**address-pool** *address / subnet mask*] | [**algorithm** {**Hash** | **Random** | **TTL**}]]

Syntax Description

translation	Specifies the configurations related to translating traceroute addresses.
address-pool	Specifies the IPv4 address pool for traceroute addresses.
address / subnet mask	Specifies the start address and prefix of the IPv4 address pool.
algorithm	Specifies the algorithm to translate IPv6 address to IPv4 address. Can be Hash, Random, or TTL (Time-to-Live) algorithms.
Hash	Specifies the Hash algorithm for translation.
Random	Specifies the random entries for translation.
TTL	Specifies the TTL entries.

Command Default

None

Command Modes

MAP-T configuration

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to configure the traceroute translation algorithm:

```
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 map-t map-t-inst
RP/0/RP0/CPU0:router(config-cgn-mapt)# traceroute translation algorithm hash
```

Related Commands

Command	Description
address-family (MAP-T), on page 21	Configures IPv4 or IPv6 address for a MAP-T instance.
clear cgn map-t statistics, on page 49	Clears the statistics of a MAP-T instance.
contiguous-ports (MAP-T), on page 77	Configures the number of contiguous ports for a MAP-T instance.
cpe-domain (MAP-T), on page 80	Configures the Customer Premises Equipment (CPE) domain parameters.
external-domain (MAP-T), on page 88	Configures the external domain's IPv6 prefix to convert IPv4 addresses into IPv6 addresses and vice versa.
sharing-ratio (MAP-T), on page 193	Configures the port sharing ratio.
show cgn map-t statistics, on page 209	Displays the MAP-T instance statistics.

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*

Syntax Description

value	The value of traffic class to be set. It ranges from 0 to 255.

Command Default

None

Command Modes

CGN-NAT64

Command History

Release	Modification
Release 4.1.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

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

Command	Description
address-family ipv6 (Stateless NAT64), on page 17	Enters the IPv6 address family configuration mode.
df-override (CGN), on page 83	Sets the do not fragment bit
service cgn, on page 168	Enables an instance for the CGN application.
service-type nat64 (Stateless), on page 183	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*

Syntax Description

value	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

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

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
address-family (6rd), on page 14	Binds an ipv4 or ipv6 ServiceApp interface to a 6rd instance.
br (6rd), on page 36	Enables the Border Relay(BR) configuration.
path-mtu (6rd), on page 123	Configures the ipv4 tunnel MTU (Maximum Transmission Unit) size for an IPv6 Rapid Deployment (6RD) instance.
reassembly-enable (6rd), on page 154	Reassembles the fragmented packets.
reset-df-bit (6rd), on page 164	Enables anycast mode.
tos (6rd)	

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

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

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

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

Command	Description
address-family ipv4 (Stateless NAT64), on page 15	Enters the IPv4 address family configuration mode.
address-family ipv6 (Stateless NAT64), on page 17	Enters the IPv6 address family configuration mode.
ipv6-prefix (6rd), on page 111	Generates the delegated ipv6 prefix for a IPv6 Rapid Deployment (6RD) application.
service cgn, on page 168	Enables an instance for the CGN application.
service-type nat64 (Stateless), on page 183	Creates a nat64 stateless application

Command	Description
traceroute (CGN), on page 282	Configures a range of ipv4 addresses that are to be used for mapping when a non-translatable ipv6 address is received.

ubit-reserved (Stateful NAT64)

To enable reserving ubits in an IPv6 address for a NAT64 stateful instance, use the **ubit-reserved** command in NAT64 stateful configuration mode. To disable, use the **no** form of this command.

ubit reserved

Syntax Description

This command has no keywords or arguments.

Command Default

None

Command Modes

NAT64 stateful configuration mode

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
cgn	read, write

This example shows how to enable reserving ubits in IPv6 address for a NAT64 stateful 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 nat64 stateful nat64-inst
RP/0/RP0/CPU0:router(config-cgn-nat64-stateful)# ubit-reserved
```

Related Commands

Command	Description
address-family (Stateful NAT64), on page 23	Configures IPv4 or IPv6 address on a NAT64 instance.
dynamic-port-range (Stateful NAT64), on page 85	Configures ports dynamically.
external-logging (Stateful NAT64 Netflow), on page 94	Enables external logging of a NAT64 Stateful instance.
fragment-timeout (Stateful NAT64), on page 99	Specifies time interval to store packet fragments.
ipv4 (Stateful NAT64), on page 109	Assigns ipv4 address pool.
ipv6-prefix (Stateful NAT64), on page 113	Converts an IPv6 address to an IPv4 address.
portlimit (Stateful NAT64), on page 137	Restricts the number of ports used by an IPv6 address.

Command	Description
protocol (Stateful NAT64), on page 150	Enters the ICMP, TCP, and UDP protocol configuration mode.
refresh-direction (Stateful NAT64), on page 156	Specifies the outbound refresh direction.
service-type nat64 (Stateful NAT64), on page 181	Creates a NAT64 stateful instance.
tcp-policy (Stateful NAT64), on page 271	Enables TCP policy that allows IPv4 initiated TCP sessions.

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*

Syntax Description

address	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

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

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
ipv4 prefix (6rd), on page 105	Assigns a value for the ipv4-prefix length to be used as part of both ends of tunnel.

Command	Description
ipv4 suffix (6rd), on page 107	Assigns a value for the ipv4-suffix length to be used as part of both ends of a tunnel.
ipv6-prefix (6rd), on page 111	Generates the delegated ipv6 prefix for a IPv6 Rapid Deployment (6RD) application.
source-address (6rd), on page 267	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**

Syntax Description

<*virtual service name*>	Specifies the name of the virtual service.
enable	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* }

virtual-service { **autoActivate name** *service_name* **package** *ova_location* **location** *VSM_location* }

Syntax Description

connect name	Connects to the virtual service. The keyword **name** specifies the name of the appliance.
aux	Connects to the aux port.
console node	Connects to the console port of the particular card specified by the keyword **node**.
install name	Installs the virtual service. The keyword **name** specifies the name of the appliance.
uninstall name	Uninstalls the virtual service. The keyword **name** specifies the name of the appliance.
autoActivate name	Connects to the CGN NAT44 services.
package	Location of the CGN NAT44 services install package.
location	Location of the VSM line card.
<*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.
<*service_name*>	Specifies the name of the CGN NAT44 service.
<*node name*>	Specifies the name of the card.
<*ova_location*>	Specifies the location of the CGN NAT44 services install package.

<VSM_location>	Specifies the location of the VSM line card.

Command Default

None

Command Modes

Global Configuration mode and EXEC mode

Command History

Release	Modification
Release 5.1.1	This command was introduced.
Release 6.7	This command was modified.

Usage Guidelines

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

Task ID

Task ID	Operation
eem	read, write

Example for Global Configuration Mode

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

Example for EXEC Mode

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*

Syntax Description

vrf-name	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

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

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
hw-module service cgn location, on page 100	Enables a CGN service role on a specified location.
interface ServiceApp, on page 102	Enables the application SVI interface.
interface ServiceInfra, on page 104	Enables the infrastructure SVI interface.
service cgn, on page 168	Enables an instance for the CGN application.