



## Neighbor Discovery Commands

This module describes the Cisco IOS XR software commands used to configure the Neighbor Discovery Commands for Broadband Network Gateway (BNG) on the Cisco ASR 9000 Series Router. For details regarding the related configurations, refer to the *Cisco ASR 9000 Series Aggregation Services Router Broadband Network Gateway Configuration Guide*.

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.

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# ipv6 nd dad attempts (BNG)

To configure the number of consecutive neighbor solicitation messages that are sent on an interface while duplicate address detection is performed on the unicast IPv6 addresses of the interface, use the **ipv6 nd dad attempts** command in an appropriate configuration mode. To return the number of messages to the default value, use the **no** form of this command.

**ipv6 nd dad attempts** *value*

<b>Syntax Description</b>	<i>value</i> Number of neighbor solicitation messages. Range is 0 to 600. Configuring a value of 0 disables duplicate address detection processing on the specified interface; a value of 1 configures a single transmission without follow-up transmissions.						
<b>Command Default</b>	Duplicate address detection on unicast IPv6 addresses with the sending of one neighbor solicitation message is enabled. The default is one message.						
<b>Command Modes</b>	Interface configuration (not applicable for BNG) Dynamic template configuration (for BNG)						
<b>Command History</b>	<table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>Release 4.3.0</td><td>This command was supported in the dynamic template configuration mode for BNG.</td></tr> <tr> <td>Release 3.7.2</td><td>This command was introduced.</td></tr> </table>	Release	Modification	Release 4.3.0	This command was supported in the dynamic template configuration mode for BNG.	Release 3.7.2	This command was introduced.
Release	Modification						
Release 4.3.0	This command was supported in the dynamic template configuration mode for BNG.						
Release 3.7.2	This command was introduced.						
<b>Usage Guidelines</b>	<p>Duplicate address detection verifies the uniqueness of new unicast IPv6 addresses before the addresses are assigned to interfaces (the new addresses remain in a tentative state while duplicate address detection is performed). Duplicate address detection uses neighbor solicitation messages to verify the uniqueness of unicast IPv6 addresses.</p> <p>The DupAddrDetectTransmits node configuration variable (as specified in RFC 2462, <i>IPv6 Stateless Address Autoconfiguration</i>) is used to automatically determine the number of consecutive neighbor solicitation messages that are sent on an interface while duplicate address detection is performed on a tentative unicast IPv6 address.</p> <p>The interval between the sending of duplicate address detection neighbor solicitation messages (the duplicate address detection timeout interval) is specified by the neighbor discovery-related variable RetransTimer (as specified in RFC 2461, <i>Neighbor Discovery for IP Version 6 [IPv6]</i>), which is used to determine the time between retransmissions of neighbor solicitation messages to a neighbor when the address is being resolved or when the reachability of a neighbor is being probed. This is the same management variable used to specify the interval for neighbor solicitation messages during address resolution and neighbor unreachability detection. Use the <b>ipv6 nd ns-interval</b> command to configure the interval between neighbor solicitation messages that are sent during duplicate address detection.</p> <p>Duplicate address detection is suspended on interfaces that are administratively down. While an interface is administratively down, the unicast IPv6 addresses assigned to the interface are set to a pending state. Duplicate address detection is automatically restarted on an interface when the interface returns to being administratively up.</p> <p>For BNG, ensure you run this command in the dynamic template configuration mode. To enter the dynamic template configuration mode, run <b>dynamic-template</b> command in the Global Configuration mode.</p>						



**Note** An interface returning to administratively up restarts duplicate address detection for all of the unicast IPv6 addresses on the interface. While duplicate address detection is performed on the link-local address of an interface, the state for the other IPv6 addresses is still set to tentative. When duplicate address detection is completed on the link-local address, duplicate address detection is performed on the remaining IPv6 addresses.

When duplicate address detection identifies a duplicate address, the state of the address is set to duplicate and the address is not used. If the duplicate address is the link-local address of the interface, the processing of IPv6 packets is disabled on the interface and an error message similar to the following is issued:

```
ipv6_nd[145]: %IPv6_ND-3-ADDRESS_DUPLICATE : Duplicate address 111::1 has been detected
```

If the duplicate address is a global address of the interface, the address is not used and an error message similar to the following is issued:

```
%IPv6-4-DUPLICATE: Duplicate address 3000::4 on GigabitEthernet
```

All configuration commands associated with the duplicate address remain as configured while the state of the address is set to duplicate.

If the link-local address for an interface changes, duplicate address detection is performed on the new link-local address and all of the other IPv6 address associated with the interface are regenerated (duplicate address detection is performed only on the new link-local address).

Task ID	Task ID	Operations
	ipv6	read, write
	config-services	read, write

## Examples

This example (not applicable for BNG) shows how to set the number of consecutive neighbor solicitation messages for interface 0/2/0/1 to 1 and then display the state (tentative or duplicate) of the unicast IPv6 address configured for an interface:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface gigabitethernet 0/2/0/1
RP/0/RSP0/CPU0:router(config-if)# ipv6 nd dad attempts 1
RP/0/RSP0/CPU0:router(config-if)# Uncommitted changes found, commit them before
exiting(yes/no/cancel)? [cancel]:y
```

```
RP/0/RSP0/CPU0:router# show ipv6 interface
gigabitethernet2/2/0/0 is Up, line protocol is Up
  IPv6 is disabled, link-local address unassigned
  No global unicast address is configured
gigabitethernet2/2/0/1 is Up, line protocol is Up
  IPv6 is enabled, link-local address is fe80::203:fdff:fe1b:4501
  Global unicast address(es):
    1:4::1, subnet is 1:4::/64 [DUPLICATE]
  MTU is 1514 (1500 is available to IPv6)
```

```

ICMP redirects are disabled
ND DAD is enabled, number of DAD attempts 1
ND reachable time is 0 milliseconds
ND advertised retransmit interval is 0 milliseconds
ND router advertisements are sent every 200 seconds
ND router advertisements live for 1800 seconds
Hosts use stateless autoconfig for addresses.
gigabitethernet2/2/0/2 is Shutdown, line protocol is Down
IPv6 is enabled, link-local address is fe80::200:11ff:fe11:1111 [TENTATIVE]
Global unicast address(es):
  111::2, subnet is 111::/64 [TENTATIVE]
MTU is 1514 (1500 is available to IPv6)
ICMP redirects are enabled
ND DAD is enabled, number of DAD attempts 1
ND reachable time is 0 milliseconds
ND advertised retransmit interval is 0 milliseconds
ND router advertisements are sent every 200 seconds
ND router advertisements live for 1800 seconds
Hosts use stateless autoconfig for addresses.

```

For BNG, this example shows how to display the state (tentative or duplicate) of the unicast IPv6 address on the dynamic template configuration mode:

```

RP/0/RSP0/CPU0:router(config)# dynamic-template type ppp p1
RP/0/RSP0/CPU0:router(config-dynamic-template-type)# ipv6 nd dad attempts 1

```

#### Related Commands

Command	Description
<a href="#">ipv6 nd ns-interval (BNG), on page 9</a>	Configures the interval between IPv6 neighbor solicitation transmissions on an interface.

# ipv6 nd framed-prefix-pool

To set the IPv6 Neighbor Discovery (ND) framed prefix pool, use the **ipv6 nd framed-prefix-pool** command in the dynamic template configuration mode. To disable the framed prefix pool configuration, use the **no** form of this command.

**ipv6 nd framed-prefix-pool** *pool\_name*

<b>Syntax Description</b>	<i>pool_name</i> Specifies the framed address pool name.
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<b>Command Default</b>	None
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<b>Command Modes</b>	Dynamic template configuration
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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.3.0	This command was introduced.

<b>Usage Guidelines</b>	This value is included in all IPv6 router advertisements sent out from this interface. Very short intervals are not recommended in normal IPv6 operation. When a nondefault value is configured, the configured time is both advertised and used by the router itself.
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To enter the dynamic template configuration mode, run **dynamic-template** command in the Global Configuration mode.

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	config-services	read, write

## Examples

This example creates an IPv6 framed prefix pool in the dynamic template configuration mode:

```
RP/0/RSP0/CPU0:router(config)# dynamic-template type ppp p1
RP/0/RSP0/CPU0:router(config-dynamic-template-type)# ipv6 nd framed-prefix-pool pool1
```

# ipv6 nd hop-limit

To configure the IPv6 ND router advertisement (RA) hop limit on the VLAN, use the **ipv6 nd hop-limit** command in the dynamic template or cnbng-nal configuration mode. To clear IPv6 hop limit, use the **no** form of this command.

**ipv6 nd hop-limit unspecified**

<b>Syntax Description</b>	<p><b>unspecified</b> Notifies the unspecified IPv6 Neighbor Discovery (ND) RA hop limit value.</p> <p>If the value is 0 it means the hop-limit is unspecified in the RAs originating on the current VLAN.</p>						
<b>Command Default</b>	None						
<b>Command Modes</b>	<p>Dynamic template configuration</p> <p>cnbng-nal configuration (for Cloud Native BNG)</p>						
<b>Command History</b>	<table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>Release 7.10.1</td><td>This command was supported in the cnbng-nal configuration mode for Cloud Native BNG.</td></tr> <tr> <td>Release 4.3.0</td><td>This command was introduced.</td></tr> </table>	Release	Modification	Release 7.10.1	This command was supported in the cnbng-nal configuration mode for Cloud Native BNG.	Release 4.3.0	This command was introduced.
Release	Modification						
Release 7.10.1	This command was supported in the cnbng-nal configuration mode for Cloud Native BNG.						
Release 4.3.0	This command was introduced.						
<b>Usage Guidelines</b>	No specific guidelines impact the use of this command.						
<b>Task ID</b>	<table> <tr> <th>Task ID</th><th>Operation</th></tr> <tr> <td>config-services</td><td>read, write</td></tr> </table>	Task ID	Operation	config-services	read, write		
Task ID	Operation						
config-services	read, write						

This example shows how to configure the IPv6 ND router advertisement hop limit in dynamic template configuration mode:

```
Router(config)# dynamic-template type ppp p1
Router(config-dynamic-template-type)# ipv6 nd hop-limit unspecified
```

This example shows how to configure the IPv6 ND router advertisement hop limit in cnbng-nal configuration mode for Cloud Native BNG:

```
Router#configure
Router(config)#interface Bundle-Ether1.1
Router(config-subif)# cnbng-nal ipv6 nd hop-limit unspecified
```

## ipv6 nd managed-config-flag (BNG)

To set the managed address configuration flag in IPv6 router advertisements, use the **ipv6 nd managed-config-flag** command in an appropriate configuration mode. To clear the flag from IPv6 router advertisements, use the **no** form of this command.

**ipv6 nd managed-config-flag**

### Syntax Description

This command has no keywords or arguments.

### Command Default

The managed address configuration flag is not set in IPv6 router advertisements.

### Command Modes

Interface configuration (not applicable for BNG)

Dynamic template configuration (for BNG)

cnbng-nal configuration (for Cloud Native BNG)

### Command History

Release	Modification
Release 7.10.1	This command was supported in the cnbng-nal configuration mode for Cloud Native BNG.
Release 4.3.0	This command was supported in the dynamic template configuration mode for BNG.
Release 3.7.2	This command was introduced.

### Usage Guidelines

Setting the managed address configuration flag in IPv6 router advertisements indicates to attached hosts whether they should use stateful autoconfiguration to obtain addresses. If the flag is set, the attached hosts should use stateful autoconfiguration to obtain addresses. If the flag is not set, the attached hosts should not use stateful autoconfiguration to obtain addresses.

Hosts may use stateful and stateless address autoconfiguration simultaneously.

For BNG, ensure you run this command in the dynamic template configuration mode. To enter the dynamic template configuration mode, run **dynamic-template** command in the Global Configuration mode.

For Cloud Native BNG, ensure you run this command in the cnbng-nal configuration mode.

### Task ID

Task ID	Operations
ipv6	read, write
network	read, write
config-services	read, write

## Examples

This example (not applicable for BNG) shows how to configure the managed address configuration flag in IPv6 router advertisements on GigabitEthernet interface 0/1/1/0:

```
Router(config)# interface gigabitethernet 0/1/1/0
Router(config-if)# ipv6 nd managed-config-flag
```

For BNG, this example shows how to configure the managed address configuration flag in IPv6 router advertisements on dynamic template configuration mode:

```
Router(config)# dynamic-template type ppp p1
Router(config-dynamic-template-type)# ipv6 nd managed-config-flag
```

For Cloud Native BNG, this example shows how to configure the managed address configuration flag in IPv6 router advertisements in the cnbng-nalconfiguration mode:

```
Router#configure
Router(config)#interface Bundle-Ether1.1
Router(config-subif)# cnbng-nal ipv6 nd managed-config-flag
```



## ipv6 nd ns-interval (BNG)

To configure the interval between IPv6 neighbor solicitation retransmissions on an interface, use the **ipv6 nd ns-interval** command in an appropriate configuration mode. To restore the default interval, use the **no** form of this command.

**ipv6 nd ns-interval** *milliseconds*

<b>Syntax Description</b>	<i>milliseconds</i> Interval (in milliseconds) between IPv6 neighbor solicit transmissions. Range is 1000 to 3600000 (BNG) and 4294967295 (for Cloud Native BNG) .	
<b>Command Default</b>	0 milliseconds (unspecified) is advertised in router advertisements, and the value 1000 is used for the neighbor discovery activity of the router itself.	
<b>Command Modes</b>	Interface configuration (not applicable for BNG) Dynamic template configuration (for BNG) cnbng-nal configuration (for Cloud Native BNG)	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 7.10.1	This command was supported in the cnbng-nal configuration mode for Cloud Native BNG.
	Release 4.3.0	This command was supported in the dynamic template configuration mode for BNG.
	Release 3.7.2	This command was introduced.
<b>Usage Guidelines</b>	<p>This value is included in all IPv6 router advertisements sent out from this interface. Very short intervals are not recommended in normal IPv6 operation. When a nondefault value is configured, the configured time is both advertised and used by the router itself.</p> <p>For BNG, ensure you run this command in the dynamic template configuration mode. To enter the dynamic template configuration mode, run <b>dynamic-template</b> command in the Global Configuration mode.</p> <p>For cnBNG, ensure you run this command in the cnbng-nal configuration mode.</p>	
<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	ipv6	read, write
	network	read, write
	config-services	read, write

## Examples

This example (not applicable for BNG) configures an IPv6 neighbor solicit transmission interval of 9000 milliseconds for GigabitEthernet interface 0/1/1/0:

```
Router(config)# interface gigabitethernet 0/1/1/0
Router(config-if)# ipv6 nd ns-interval 9000
```

For BNG, this example configures an IPv6 neighbor solicit transmission interval of 9000 milliseconds in the dynamic template configuration mode:

```
Router(config)# dynamic-template type ppp p1
Router(config-dynamic-template-type)# ipv6 nd ns-interval 9000
```

For Cloud Native BNG, this example configures an IPv6 neighbor solicit transmission interval of 9000 milliseconds in the cnbng-nal configuration mode:

```
Router#configure
Router(config)#interface Bundle-Ether1.1
Router(config-subif)# cnbng-nal ipv6 nd ns-interval 9000
```

# ipv6 nd mtu suppress

To suppress the MTU option in IPv6 Neighbor Discovery (ND) Router Advertisement (RA) header, use the **ipv6 nd mtu** command in the dynamic template or cnbng-nal configuration mode. To disable IPv6 nd mtu, use the **no** form of this command.

**ipv6 nd mtu suppress**

<b>Syntax Description</b>	This command has no keywords or arguments.	
<b>Command Default</b>	None	
<b>Command Modes</b>	Dynamic template configuration cnbng-nal configuration (for Cloud Native BNG)	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 7.10.1	This command was supported in the cnbng-nal configuration mode for Cloud Native BNG.
	Release 4.3.0	This command was introduced.
<b>Usage Guidelines</b>	No specific guidelines impact the use of this command.	
<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	config-services	read, write

This example shows how to suppress the MTU option in IPv6 ND Router RA header in dynamic template configuration mode:

```
Router(config)# dynamic-template type ppp p1
Router(config-dynamic-template-type)# ipv6 nd mtu suppress
```

This example shows how to suppress the MTU option in IPv6 ND Router RA header in cnbng-nal configuration mode for Cloud Native BNG:

```
Router#configure
Router(config)#interface Bundle-Ether1.1
Router(config-subif)# cnbng-nal ipv6 nd mtu suppress
```

# ipv6 nd nud-enable

To enable the IPv6 neighbor un-reachability detection (NUD), use the **ipv6 nd nud-enable** command in the dynamic template or cnbng-nal configuration mode. To disable IPv6 NUD, use the **no** form of this command.

**ipv6 nd nud-enable**

<b>Syntax Description</b>	This command has no keywords or arguments.
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<b>Command Default</b>	None
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<b>Command Modes</b>	Dynamic template configuration cnbng-nal configuration (for Cloud Native BNG)
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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 7.10.1	This command was supported in the cnbng-nal configuration mode for Cloud Native BNG.
	Release 4.3.0	This command was introduced.

<b>Usage Guidelines</b>	No specific guidelines impact the use of this command.
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<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	config-services	read, write

This example shows how to enable IPv6 neighbor un-reachability detection in dynamic template configuration mode:

```
Router(config)# dynamic-template type ppp p1
Router(config-dynamic-template-type)# ipv6 nd nud-enable
```

This example shows how to enable IPv6 neighbor un-reachability detection in cnbng-nal configuration mode for Cloud Native BNG:

```
Router#configure
Router(config)#interface Bundle-Ether1.1
Router(config-subif)# cnbng-nal ipv6 nd nud-enable
```

## ipv6 nd other-config-flag (BNG)

To set the other stateful configuration flag in IPv6 router advertisements, use the **ipv6 nd other-config-flag** command in an appropriate configuration mode. To clear the flag from IPv6 router advertisements, use the **no** form of this command.

### ipv6 nd other-config-flag

#### Syntax Description

This command has no keywords or arguments.

#### Command Default

The other stateful configuration flag is not set in IPv6 router advertisements.

#### Command Modes

Interface configuration (not applicable for BNG)

Dynamic template configuration (for BNG)

cnbng-nal configuration (for Cloud Native BNG)

#### Command History

Release	Modification
Release 7.10.1	This command was supported in the cnbng-nal configuration mode for Cloud Native BNG.
Release 4.3.0	This command was supported in the dynamic template configuration mode for BNG.
Release 3.7.2	This command was introduced.

#### Usage Guidelines

The setting of the other stateful configuration flag in IPv6 router advertisements indicates to attached hosts how they can obtain autoconfiguration information other than addresses. If the flag is set, the attached hosts should use stateful autoconfiguration to obtain the other (nonaddress) information.



#### Note

If the managed address configuration flag is set using the **ipv6 nd managed-config-flag** command, then an attached host can use stateful autoconfiguration to obtain the other (nonaddress) information regardless of the setting of the other stateful configuration flag.

For BNG, ensure you run this command in the dynamic template configuration mode. To enter the dynamic template configuration mode, run **dynamic-template** command in the Global Configuration mode.

For cnBNG, ensure you run this command in the cnbng-nal configuration mode.

#### Task ID

Task ID	Operations
ipv6	read, write
network	read, write

Task ID	Operations
config-services	read, write

## Examples

This example (not applicable for BNG) configures the “other stateful configuration” flag in IPv6 router advertisements on GigabitEthernet interface 0/1/1/0:

```
Router(config)# interface gigabitethernet 0/1/1/0
Router(config-if)# ipv6 nd other-config-flag
```

For BNG, this example configures the other stateful configuration flag for IPv6 router advertisements in the dynamic template configuration mode:

```
Router(config)# dynamic-template type ppp p1
Router(config-dynamic-template-type)# ipv6 nd other-config-flag
```

For Cloud Native BNG, this example configures other stateful configuration flag for IPv6 router advertisements in the cnbng-nal configuration mode:

```
Router#configure
Router(config)#interface Bundle-Ether1.1
Router(config-subif)# cnbng-nal ipv6 nd other-config-flag
```

## Related Commands

Command	Description
<a href="#">ipv6 nd managed-config-flag (BNG), on page 7</a>	Sets the managed address configuration flag in IPv6 router advertisements.

# ipv6 nd ra dns server

To add the DNS server information in the IPv6 nd router advertisement message, use the **ipv6 nd ra dns server** command in the dynamic template configuration mode. To remove the DNS server information, use the **no** form of this command.

**ipv6 nd ra dns server** *IPv6 address* { *lifetime* | **infinite-lifetime** | **zero-lifetime** }

<b>Syntax Description</b>	<b>dns server</b> <i>IPv6 address</i>	Specifies the DNS server IPv6 address.  The format of the IPv6 address should be <i>x::x::y</i> .
	<i>lifetime</i>	Specifies the IPv6 RA DNS server lifetime interval in seconds.  It's a 32-bit unsigned integer. The maximum time in seconds over which these recursive DNS addresses are used for name resolution.
	<b>infinite-lifetime</b>	Sets the IPv6 RA DNS server lifetime to infinity and the lifetime doesn't expire.
	<b>zero-lifetime</b>	Sets the IPv6 RA DNS server lifetime to zero and DNS addresses is no longer used.

**Command Default** None

**Command Modes** Dynamic template configuration (for BNG)

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 7.10.1	This command was introduced.

**Usage Guidelines** For BNG, ensure you run this command in the dynamic template configuration mode. To enter the dynamic template configuration mode, run the **dynamic-template** command in the Global Configuration mode.

**Examples** For BNG, this example configures an IPv6 RA lifetime of 3500 seconds in the dynamic template configuration mode:

```
Router(config)# dynamic-template type ppp PPP_PTA_TEMPLATE
Router(config-dynamic-template-type)# ipv6 nd ra dns server 2620:119:35::35 3500
```

# ipv6 nd ra-initial

To set the IPv6 initial router advertisement count and interval, use the **ipv6 nd ra-initial** command in the dynamic template or cnbng-nal configuration mode. To restore the default interval, use the **no** form of this command.

**ipv6 nd ra-initial** *count interval*

<b>Syntax Description</b>	<i>value</i>	The initial count or the initial number of the IPv6 router advertisements. The value ranges from 0-32.
	<i>interval</i>	The interval (in seconds) between IPv6 router advertisement counts. The value ranges from 4-1800.
<b>Command Default</b>	None	
<b>Command Modes</b>	Dynamic template configuration cnbng-nal configuration	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 7.10.1	This command was introduced for Cloud Native BNG.
	Release 4.3.0	This command was supported in the dynamic template configuration mode for BNG.
<b>Usage Guidelines</b>	To enter the dynamic template configuration mode, run <b>dynamic-template</b> command in the Global Configuration mode.	
<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	config-services	read, write
<b>Examples</b>	<p>This example shows how to configure an IPv6 router advertisement count of 5 and an interval of 201 seconds in the dynamic template configuration mode:</p> <pre>Router(config)# <b>dynamic-template type ppp p1</b> Router(config-dynamic-template-type)# <b>ipv6 nd ra-initial 5 201</b></pre> <p>This example shows how to configure IPv6 router advertisement count of 5 and an interval of 201 seconds in cnbng-nal configuration mode for Cloud Native BNG:</p> <pre>Router#<b>configure</b></pre>	



```
Router(config)#interface Bundle-Ether1.1  
Router(config-subif)# cnbng-nal ipv6 nd ra-initial 5 201
```

**Related Commands**

Command	Description
<a href="#">ipv6 nd ra-interval (BNG), on page 18</a>	Configures the interval between IPv6 router advertisement transmissions on an interface.

# ipv6 nd ra-interval (BNG)

To configure the interval between IPv6 router advertisement transmissions on an interface, use the **ipv6 nd ra-interval** command in an appropriate configuration mode. To restore the default interval, use the **no** form of this command.

**ipv6 nd ra-interval** *seconds*

## Syntax Description

*seconds* The interval (in seconds) between IPv6 router advertisement transmissions.

## Command Default

*seconds* : 200 seconds

## Command Modes

Interface configuration (not applicable for BNG)

Dynamic template configuration (for BNG)

cnbng-nal configuration (for Cloud Native BNG)

## Command History

Release	Modification
Release 7.10.1	This command was supported in the cnbng-nal configuration mode for Cloud Native BNG.
Release 4.3.0	This command was supported in the dynamic template configuration mode for BNG.
Release 3.7.2	This command was introduced.

## Usage Guidelines

The interval between transmissions should be less than or equal to the IPv6 router advertisement lifetime if the router is configured as a default router by using the **ipv6 nd ra-lifetime** command. To prevent synchronization with other IPv6 nodes, randomly adjust the actual value used to within 20 percent of the specified value.

For BNG, ensure you run this command in the dynamic template configuration mode. To enter the dynamic template configuration mode, run **dynamic-template** command in the Global Configuration mode.

For Cloud Native BNG, ensure you run this command in the cnbng-nal configuration mode.

## Task ID

Task ID	Operations
ipv6	read, write
network	read, write
config-services	read, write

## Examples

This example (not applicable for BNG) configures an IPv6 router advertisement interval of 201 seconds on GigabitEthernet interface 0/1/1/0:

```
Router(config)# interface gigabitethernet 0/1/1/0
Router(config-if)# ipv6 nd ra-interval 201
```

For BNG, this example configures an IPv6 router advertisement interval of 201 seconds in the dynamic template configuration mode:

```
Router(config)# dynamic-template type ppp p1Router
Router(config-dynamic-template-type)# ipv6 nd ra-interval 201
```

For Cloud Native BNG, this example configures an IPv6 router advertisement interval of 201 seconds in the cnbng-nal configuration mode:

```
Router#configure
Router(config)#interface Bundle-Ether1.1
Router(config-subif)# cnbng-nal ipv6 nd ra-interval 201
```

#### Related Commands

Command	Description
<a href="#">ipv6 nd ra-lifetime (BNG), on page 20</a>	Configures the lifetime of an IPv6 router advertisement.

## ipv6 nd ra-lifetime (BNG)

To configure the router lifetime value in IPv6 router advertisements on an interface, use the **ipv6 nd ra-lifetime** command in an appropriate configuration mode. To restore the default lifetime, use the **no** form of this command.

**ipv6 nd ra-lifetime** *seconds*

<b>Syntax Description</b>	<i>seconds</i> The validity (in seconds) of this router as a default router on this interface.	
<b>Command Default</b>	<i>seconds</i> : 1800 seconds	
<b>Command Modes</b>	Interface configuration (not applicable for BNG) Dynamic template configuration (for BNG) cnbng-nal configuration (for Cloud Native BNG)	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 7.10.1	This command was supported in the cnbng-nal configuration mode for Cloud Native BNG.
	Release 4.3.0	This command was supported in the dynamic template configuration mode for BNG.
	Release 3.7.2	This command was introduced.
<b>Usage Guidelines</b>	<p>The router lifetime value is included in all IPv6 router advertisements sent out the interface. The value indicates the usefulness of the router as a default router on this interface. Setting the value to 0 indicates that the router should not be considered a default router on this interface. The router lifetime value can be set to a nonzero value to indicate that it should be considered a default router on this interface. The nonzero value for the router lifetime value should not be less than the router advertisement interval.</p> <p>For BNG, ensure you run this command in the dynamic template configuration mode. To enter the dynamic template configuration mode, run <b>dynamic-template</b> command in the Global Configuration mode.</p> <p>For Cloud Native BNG, ensure you run this command in the cnbng-nal configuration mode.</p>	
<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	ipv6	read, write
	network	read, write
	config-services	read, write

## Examples

This example (not applicable for BNG) configures an IPv6 router advertisement lifetime of 1801 seconds on GigabitEthernet interface 0/1/1/0:

```
Router(config)# interface gigabitethernet 0/1/1/0
Router(config-if)# ipv6 nd ra-lifetime 1801
```

For BNG, this example configures an IPv6 router advertisement lifetime of 1801 seconds in the dynamic template configuration mode:

```
Router(config)# dynamic-template type ppp p1
Router(config-dynamic-template-type)# ipv6 nd ra-lifetime 1801
```

For Cloud Native BNG, this example configures an IPv6 router advertisement lifetime of 1801 seconds in the cnbng-nal configuration mode:

```
Router#configure
Router(config)#interface Bundle-Ether1.1
Router(config-subif)# cnbng-nal ipv6 nd ra-lifetime 1801
```

## Related Commands

Command	Description
<a href="#">ipv6 nd ra-interval (BNG), on page 18</a>	Configures the interval between IPv6 router advertisement transmissions on an interface.

# ipv6 nd ra-unicast

To enable the IPv6 unicast router advertisement (RA), use the **ipv6 nd ra-unicast** command in the dynamic template or cnbng-nal configuration mode. To disable IPv6 unicast RA, use the **no** form of this command.

**ipv6 nd ra-unicast**

<b>Syntax Description</b>	This command has no keywords or arguments.
---------------------------	--

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

<b>Command Modes</b>	Dynamic template configuration cnbng-nal configuration
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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 7.10.1	This command was supported in the cnbng-nal configuration mode for Cloud Native BNG.
	Release 4.3.0	This command was introduced.

<b>Usage Guidelines</b>	No specific guidelines impact the use of this command.
-------------------------	--

<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	config-services	read, write

This example shows how to enable the IPv6 unicast router advertisement in dynamic template configuration mode:

```
Router(config)# dynamic-template type ppp p1
Router(config-dynamic-template-type)# ipv6 nd ra-unicast
```

This example shows how to enable the IPv6 unicast router advertisement in cnbng-nal configuration mode for Cloud Native BNG:

```
Router#configure
Router(config)#interface Bundle-Ether1.1
Router(config-subif)# cnbng-nal ipv6 nd ipv6 nd ra-unicast
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">dynamic-template</a>	Groups a set of configuration items that can be applied to a group of subscribers.

# ipv6 nd reachable-time (BNG)

To configure the amount of time that a remote IPv6 node is considered reachable after some reachability confirmation event has occurred, use the **ipv6 nd reachable-time** command in an appropriate configuration mode. To restore the default time, use the **no** form of this command.

**ipv6 nd reachable-time** *milliseconds*

<b>Syntax Description</b>	<i>milliseconds</i> The amount of time (in milliseconds) that a remote IPv6 node is considered reachable. The range is from 0 to 3600000.	
<b>Command Default</b>	0 milliseconds (unspecified) is advertised in router advertisements and 30000 (30 seconds) is used for the neighbor discovery activity of the router itself.	
<b>Command Modes</b>	Interface configuration (not applicable for BNG) Dynamic template configuration (for BNG) cnbng-nal configuration (for Cloud Native BNG)	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 7.10.1	This command was supported in the cnbng-nal configuration mode for Cloud Native BNG.
	Release 4.3.0	This command was supported in the dynamic template configuration mode for BNG.
	Release 3.7.2	This command was introduced.
<b>Usage Guidelines</b>	<p>The configured time enables the router to detect unavailable neighbors. Shorter configured times enable the router to detect unavailable neighbors more quickly; however, shorter times consume more IPv6 network bandwidth and processing resources in all IPv6 network devices. Very short configured times are not recommended in normal IPv6 operation.</p> <p>The configured time is included in all router advertisements sent out of an interface so that nodes on the same link use the same time value. A value of 0 indicates that the configured time is unspecified by this router.</p> <p>For BNG, ensure you run this command in the dynamic template configuration mode. To enter the dynamic template configuration mode, run <b>dynamic-template</b> command in the Global Configuration mode.</p> <p>For Cloud Native BNG, ensure you run this command in the cnbng-nal configuration mode.</p>	
<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	ipv6	read, write
	network	read, write

Task ID	Operations
config-services	read, write

## Examples

This example (not applicable for BNG) shows how to configure an IPv6 reachable time of 1,700,000 milliseconds for GigabitEthernet interface 0/1/1/0:

```
Router(config)# interface gigabitethernet 0/1/1/0
Router(config-if)# ipv6 nd reachable-time 1700000
```

For BNG, this example shows how to configure an IPv6 reachable time of 1,700,000 milliseconds in the dynamic template configuration mode:

```
Router(config)# dynamic-template type ppp p1
Router(config-dynamic-template-type)# ipv6 nd reachable-time 1700000
```

For Cloud Native BNG, shows how to configure an IPv6 reachable time of 1,700,000 milliseconds in the cnbng-nal configuration mode:

```
Router#configure
Router(config)#interface Bundle-Ether1.1
Router(config-subif)# cnbng-nal ipv6 nd reachable-time 1700000
```



# ipv6 nd router-preference

To set the IPv6 neighbor discovery router preference, use the **ipv6 nd router-preference** command in the dynamic template or cnbng-nal configuration mode. To disable IPv6 nd router preference, use the **no** form of this command.

**ipv6 nd router-preference low medium High**

<b>Syntax Description</b>	<b>low</b>	Specifies the router preference as low.
	<b>medium</b>	Specifies the router preference as medium.
	<b>high</b>	Specifies the router preference as high.
<b>Command Default</b>	None	
<b>Command Modes</b>	Dynamic template configuration cnbng-nal configuration (for Cloud Native BNG)	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 7.10.1	This command was supported in the cnbng-nal configuration mode for Cloud Native BNG.
	Release 4.3.0	This command was introduced.
<b>Usage Guidelines</b>	No specific guidelines impact the use of this command.	
<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	config-services	read, write

This example shows how to set the IPv6 neighbor discovery router preference in dynamic template configuration mode:

```
Router(config)# dynamic-template type ppp p1
Router(config-dynamic-template-type)# ipv6 nd router-preference high
```

This example shows how to set the IPv6 neighbor discovery router preference in cnbng-nal configuration mode for Cloud Native BNG:

```
Router#configure
Router(config)#interface Bundle-Ether1.1
Router(config-subif)# cnbng-nal ipv6 nd router-preference high
```

# ipv6 nd start-ra-on-ipv6-enable

To automatically send IPv6 router advertisements to a subscriber interface after configuring IPv6 (by using **ipv6-enable** command), use the **ipv6 nd start-ra-on-ipv6** command in the dynamic template or cnbng-nal configuration mode. To disable the IPv6 router advertisements, use the **no** form of this command.

**ipv6 nd [start-ra-on-ipv6-enable]**

## Syntax Description

This command has no keywords or arguments.

## Command Default

On a dual stack environment, the IPv6 router advertisements are supported by default. The default behavior is that IPv6 neighbor discovery (ND) waits for the IPv6 stack to boot up before triggering a router advertisement.

## Command Modes

Dynamic template configuration mode (for BNG)  
cnbng-nal configuration (for Cloud Native BNG)

## Command History

Release	Modification
Release 7.10.1	This command was supported in the cnbng-nal configuration mode for Cloud Native BNG.
Release 6.0	This command was introduced.

## Usage Guidelines

For BNG, ensure you run this command in the dynamic template configuration mode. To enter the dynamic template configuration mode, run dynamic-template command in the Global Configuration mode.

For Cloud Native BNG, ensure you run this command in the cnbng-nal configuration mode.

This command can be used only for IPoE subscriber sessions

## Task ID

Task ID	Operation
ipv6	read,write
network	read,write
config-services	read,write

## Example

This example shows how to enable IPv6 router advertisements on an IPv4 subscriber interface:

```
Router(config)# dynamic-template type ipsubscriber ipv6ra
```

For Cloud Native BNG, this example shows how to enable IPv6 router advertisements in the cnbng-nal configuration mode:

```
Router#configure
Router(config)#interface Bundle-Ether1.1
Router(config-subif)# cnbng-nal ipv6 nd start-ra-on-ipv6-enable
```

**Related Commands**

Command	Description
show ipv6 nd idb interface <subscriber-interface> detail location <member-location>	Displays the usability status of interfaces configured for IPv6.

# ipv6 nd suppress-cache-learning

To suppress cache learning for IPv6 neighbor discovery, use the **ipv6 nd suppress-cache-learning** command in the dynamic template or cnbng-nal configuration mode. To disable cache learning suppress, use the **no** form of this command.

**ipv6 nd suppress-cache-learning**

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

**Command Default** None

**Command Modes** Dynamic template configuration (for BNG)  
cnbng-nal configuration (for Cloud Native BNG)

Command History	Release	Modification
	Release 7.10.1	This command was supported in the cnbng-nal configuration mode for Cloud Native BNG.
	Release 4.3.0	This command was introduced.

**Usage Guidelines** No specific guidelines impact the use of this command.

Task ID	Task ID	Operation
	config-services	read, write

This example shows how to suppress cache learning for IPv6 neighbor discovery in dynamic template configuration mode:

```
Router(config)# dynamic-template type ppp p1
Router(config-dynamic-template-type)# ipv6 nd suppress-cache-learning
```

For Cloud Native BNG, this example shows how to suppress cache learning for IPv6 neighbor discovery in the cnbng-nal configuration mode:

```
Router#configure
Router(config)#interface Bundle-Ether1.1
Router(config-subif)# cnbng-nal ipv6 nd suppress-cache-learning
```

# ipv6 nd suppress-ra (BNG)

To suppress IPv6 router advertisement transmissions on a LAN interface, use the **ipv6 nd suppress-ra** command in an appropriate configuration mode. To reenble the sending of IPv6 router advertisement transmissions on a LAN interface, use the **no** form of this command.

## ipv6 nd suppress-ra

### Syntax Description

This command has no keywords or arguments.

### Command Default

IPv6 router advertisements are automatically sent on other types of interlaces if IPv6 unicast routing is enabled on the interfaces. IPv6 router advertisements are not sent on other types of interfaces.

### Command Modes

Interface configuration (not applicable for BNG)

Dynamic template configuration (for BNG)

cnbng-nal configuration (for Cloud Native BNG)

### Command History

Release	Modification
Release 7.10.1	This command was supported in the cnbng-nal configuration mode for Cloud Native BNG.
Release 4.3.0	This command was supported in the dynamic template configuration mode for BNG.
Release 3.7.2	This command was introduced.

### Usage Guidelines

Use the **no ipv6 nd suppress-ra** command to enable the sending of IPv6 router advertisement transmissions on non-LAN interface types (for example, serial or tunnel interfaces).

For BNG, ensure you run this command in the dynamic template configuration mode. To enter the dynamic template configuration mode, run **dynamic-template** command in the Global Configuration mode.

### Task ID

Task ID	Operations
ipv6	read, write
network	read, write
config-services	read, write

### Examples

This example (not applicable for BNG) shows how to suppress IPv6 router advertisements on GigabitEthernet interface 0/1/1/0:

```
Router(config)# interface gigabitethernet 0/1/1/0
Router(config-if)# ipv6 nd suppress-ra
```

For BNG, this example shows how to suppress IPv6 router advertisements in the dynamic template configuration mode:

```
Router(config)# dynamic-template type ppp p1  
Router(config-dynamic-template-type)# ipv6 nd suppress-ra
```

For Cloud Native BNG, this example shows how to suppress IPv6 router advertisements in the cnbng-nal configuration mode:

```
Router# configure  
Router(config)# interface Bundle-Ether1.1  
Router(config-subif)# cnbng-nal ipv6 nd suppress-ra
```