T Commands

This chapter describes the Cisco NX-OS Open Shortest Path First (OSPF) commands that begin with T.

timers lsa-arrival (OSPF)

To set the minimum interval in which the software accepts the same link-state advertisement (LSA) from Open Shortest Path First (OSPF) neighbors, use the **timers lsa-arrival** command. To return to the default, use the **no** form of this command.

timers lsa-arrival *milliseconds*

no timers lsa-arrival

Syntax Description

milliseconds	Minimum delay (in milliseconds) that must pass between acceptance of the same LSA arriving from neighbors. The range is from 10 to 600,000 milliseconds. The default is 1000 milliseconds.

Command Default

1000 milliseconds

Command Modes

Router configuration mode

VRF configuration mode

Command History

Release	Modification
5.2(1)N1(1)	This command was introduced.

Usage Guidelines

Use the **timers lsa arrival** command to configure the minimum interval for accepting the same LSA. The same LSA is an LSA instance that contains the same LSA ID number, LSA type, and advertising router ID. If an instance of the same LSA arrives sooner than the interval that is set, the software drops the LSA.

We recommend that you keep the *milliseconds* value of the **timers lsa-arrival** command less than or equal to the neighbors' *hold-interval* value of the **timers throttle lsa** command.

This command requires the LAN Base Services license.

Examples

This example shows how to set the minimum interval for accepting the same LSA at 2000 milliseconds:

```
switch(config)# router ospf 1
switch(config-router)# timers lsa-arrival 2000
switch(config-router)#
```

Related Commands

Command	Description
show ip ospf	Displays OSPF information.
timers throttle lsa	Sets rate-limiting values for LSAs being generated.

timers lsa-group-pacing (OSPF)

To change the interval at which Open Shortest Path First (OSPF) link-state advertisements (LSAs) are collected into a group and refreshed, checksummed, or aged, use the **timers lsa-group-pacing** command. To return to the default, use the **no** form of this command.

timers lsa-group-pacing *seconds*

no timers lsa-group-pacing

Syntax Description

seconds	Time (in seconds) in the interval in which LSAs are grouped and refreshed, checksummed, or aged. The range is from 1 to 1800 seconds. The default value is 240 seconds.

Command Default

The default interval for this command is 240 seconds. OSPF LSA group pacing is enabled by default.

Command Modes

Router configuration mode

VRF configuration mode

Command History

Release	Modification
5.2(1)N1(1)	This command was introduced.

Usage Guidelines

Use the **timers lsa-group-pacing** command to control the rate at which LSA updates occur and reduce the high CPU or buffer utilization that can occur when an area is flooded with a very large number of LSAs. The default settings for OSPF packet pacing timers are suitable for the majority of OSPF deployments. Do not change the packet pacing timers unless you have tried all other options to meet OSPF packet flooding requirements. You should try summarization, stub area usage, queue tuning, and buffer tuning before changing the default flooding timers. There are no guidelines for changing timer values; each OSPF deployment is unique and should be considered on a case-by-case basis.

Cisco Nexus 5500 groups the periodic refresh of LSAs to improve the LSA packing density for the refreshes in large topologies. The group timer controls the interval used for group refreshment of LSAs; however, this timer does not change the frequency that individual LSAs are refreshed (the default refresh rate is every 30 minutes).

The duration of the LSA group pacing is inversely proportional to the number of LSAs that the router is handling. For example, if you have about 10,000 LSAs, you should decrease the pacing interval. If you have a very small database (40 to 100 LSAs), you should increase the pacing interval to 10 to 20 minutes.

This command requires the LAN Base Services license.

Examples

This example shows how to configure OSPF group packet-pacing updates between LSA groups to occur in 60-second intervals for OSPF routing process 1:

```
switch(config)# router ospf 1
```

```
switch(config-router)# timers lsa-group-pacing 60
```

Related Commands

Command	Description
copy running-config startup-config	Saves the configuration changes to the startup configuration file.
show ip ospf	Displays general information about OSPF routing processes.

timers throttle lsa (OSPF)

To set rate-limiting values for Open Shortest Path First (OSPF) link-state advertisement (LSA) generation, use the **timers throttle lsa** command. To return to the default values, use the **no** form of this command.

timers throttle lsa *start-time hold-interval max-time*

no timers throttle lsa

Syntax Description

start-time	Start time (in milliseconds) that is used to calculate the subsequent rate limiting times for LSA generation. The range is from 0 to 5000 milliseconds. The default value is 0 milliseconds.
hold-interval	Incremental time (in milliseconds) that is used to calculate the subsequent rate limiting times for LSA generation. The range is from 50 to 30,000 milliseconds. The default value is 5000 milliseconds.
max-time	Maximum time (in milliseconds) that is used to calculate the subsequent rate limiting times for LSA generation. The range is from 50 to 30,000 milliseconds. The default value is 5000 milliseconds.

Command Default

start-time: 0 milliseconds
hold-interval: 5000 milliseconds
max-time: 5000 milliseconds

Command Modes

Router configuration mode

VRF configuration mode

Command History

Release	Modification
5.2(1)N1(1)	This command was introduced.

Usage Guidelines

Use the **timers throttle lsa** command to rate-limit LSA generation.

This command requires the LAN Base Services license.

Examples

This example shows how to customize OSPF LSA throttling:

```
switch(config)# router ospf 1
switch(config-router)# timers throttle lsa 50 5000 6000
switch(config-router)#
```

Related Commands

Command	Description
copy running-config startup-config	Saves the configuration changes to the startup configuration file.
show ip ospf	Displays information about OSPF routing processes.
timers lsa arrival	Sets the minimum interval at which the software accepts the same LSA from OSPF neighbors.

timers throttle spf (OSPF)

To set the shortest-path first (SPF) best-path schedule initial delay time and the minimum hold between SPF best-path calculation for Open Shortest Path First (OSPF), use the **timers throttle spf** command. To turn off SPF throttling, use the **no** form of this command.

timers throttle spf *spf-start spf-hold spf-max-wait*

no timers throttle spf *spf-start spf-hold spf-max-wait*

Syntax Description

spf-start	Initial SPF schedule delay in milliseconds. The range is from 1 to 600,000 milliseconds.
spf-hold	Minimum hold time between two consecutive SPF calculations. The range is from 1 to 600,000 milliseconds.
spf-max-wait	Maximum wait time between two consecutive SPF calculations. The range is from 1 to 600,000 milliseconds.

Command Default

SPF throttling is not set.

Command Modes

Router configuration mode

VRF configuration mode

Command History

Release	Modification
5.2(1)N1(1)	This command was introduced.

Usage Guidelines

Use the **timers throttle spf** command to set the SPF timers.

The first wait interval between SPF calculations is the amount of time in milliseconds specified by the *spf-start* argument. Each consecutive wait interval is two times the current hold level in milliseconds until the wait time reaches the maximum time in milliseconds as specified by the *spf-maximum* argument. Subsequent wait times remain at the maximum until the values are reset or an LSA is received between SPF calculations.

Examples

This example shows how to configure a router configured with the start, hold, and maximum interval values for the **timers throttle spf** command set at 5, 1,000, and 90,000 milliseconds:

```
switch(config)# router ospf 1
switch(config-router)# timers throttle spf 5 1000 90000
switch(config-router)#
```

Related Commands

Command	Description
copy running-config startup-config	Saves the configuration changes to the startup configuration file.
show ip ospf	Displays information about OSPF routing processes.
timers lsa arrival	Sets the minimum interval at which the software accepts the same LSA from OSPF neighbors.
timers throttle lsa	Sets the rate limit for generating LSAs.

transmit-delay (OSPF virtual link)

To set the estimated time required to end a link-state update packet on the interface, use the **transmit-delay** command. To return to the default, use the **no** form of this command.

transmit-delay *seconds*

no transmit-delay

Syntax Description

seconds	Time (in seconds) required to send a link-state update. The range is from 1 to 65535 seconds. The default is 1 second.

Command Default

1 second

Command Modes

Router configuration mode

VRF configuration mode

Command History

Release	Modification
5.2(1)N1(1)	This command was introduced.

Usage Guidelines

Use the **transmit-delay** command in virtual link configuration to account for the transmission and propagation delays for the virtual link.

This command requires the LAN Base Services license.

Examples

This example sets the retransmit delay value to 3 seconds:

```
switch(config)# router ospf 201
switch(config-router)# area 22 virtual-link 192.0.2.1
switch(config-router-vlink)# transmit-delay 3
```

Related Commands

Command	Description
show ip ospf	Displays general information about Open Shortest Path First (OSPF) routing instances.