



OSPFv3 Fast Convergence - LSA and SPF Throttling

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Feature History for OSPFv3 Fast Convergence - LSA and SPF Throttling

This table provides release and platform support information for the features explained in this module.

These features are available in all the releases subsequent to the one they were introduced in, unless noted otherwise.

Release	Feature Name and Description	Supported Platform
Cisco IOS XE 17.18.1	OSPFv3 Fast Convergence - LSA and SPF Throttling: OSPFv3 Fast Convergence: LSA and SPF Throttling is a network enhancement feature that improves OSPFv3 network stability and convergence speed by dynamically regulating how frequently LSAs are updated and how often the SPF algorithm is triggered, especially during periods of network instability.	Cisco C9350 Series Smart Switches Cisco C9610 Series Smart Switches

OSPFv3 Fast Convergence: LSA and SPF Throttling

OSPFv3 Fast Convergence: LSA and SPF Throttling is a network enhancement feature that improves OSPFv3 (Open Shortest Path First version 3) network stability and convergence speed by dynamically regulating how frequently link-state advertisements (LSAs) are updated and how often the shortest-path first (SPF) algorithm is triggered, especially during periods of network instability.

OSPFv3 typically uses static, user-configurable timers (measured in seconds) to limit the frequency of SPF calculations and LSA generation. This can slow down convergence, especially when rapid response is required.

The LSA and SPF throttling feature allows these rate-limiting timers to be configured in milliseconds rather than seconds, allowing for subsecond convergence. Instead of fixed intervals, the throttling mechanism increases (backs off) or decreases (speeds up) the timer based on network stability.

Configure OSPFv3 Fast Convergence: LSA and SPF Throttling

The following sections provide configuration information about OSPFv3 Fast Convergence: LSA and SPF throttling.

Tune LSA and SPF Timers for OSPFv3 Fast Convergence

To tune LSA and SPF timers for OSPFv3 fast convergence, perform this procedure:

Procedure

Step 1 **enable**

Example:

```
Device> enable
```

Enables privileged EXEC mode.

Enter your password, if prompted.

Step 2 **configure terminal**

Example:

```
Device# configure terminal
```

Enters global configuration mode.

Step 3 **router ospfv3 process-id**

Example:

```
Device(config)# router ospf 15
```

Enables OSPFv3 routing and enters router configuration mode.

process-id: The process ID is an internally used, identification parameter that is locally assigned. Each OSPF has a unique process ID.

Process ID can be a positive integer from 1 to 65535.

Step 4 **timers lsa arrival** *milliseconds*

Example:

```
Device(config-router)# timers lsa arrival 300
```

Sets the minimum interval (in milliseconds) at which the device must wait before accepting a new instance of the same LSA from the OSPFv3 neighbors.

Step 5 **timers pacing flood** *milliseconds*

Example:

```
Device(config-router)# timers pacing flood 30
```

Controls the time interval (in milliseconds) between batches of Link-State Advertisements (LSAs) that are flooded out OSPFv3 interfaces.

Step 6 **timers pacing lsa-group** *seconds*

Example:

```
Device(config-router)# timers pacing lsa-group 300
```

Controls the interval (in seconds) at which OSPFv3 devices group and send multiple LSA acknowledgments together, rather than sending each one immediately.

Step 7 **timers pacing retransmission** *milliseconds*

Example:

```
Device(config-router)# timers pacing retransmission 100
```

Specifies the interval (in milliseconds) between retransmissions of OSPFv3 LSAs that have not been acknowledged by neighbors.

Configure LSA and SPF Throttling for OSPFv3 Fast Convergence

To configure LSA and SPF throttling for OSPFv3 fast convergence, perform this procedure:

Procedure

Step 1 **enable**

Example:

```
Device> enable
```

Enables privileged EXEC mode.

Enter your password, if prompted.

Step 2 **configure terminal**

Example:

```
Device# configure terminal
```

Enters global configuration mode.

Step 3 **ipv6 router ospf** *process-id*

Example:

```
Device(config)# ipv6 router ospf 1
```

Enables OSPFv3 router configuration mode.

process-id: The process ID is an internally used, identification parameter that is locally assigned. Each OSPF has a unique process ID.

Process ID can be a positive integer from 1 to 65535.

Step 4 **timers throttle spf** *spf-start spf-hold spf-max-wait*

Example:

```
Device(config-router)# timers throttle spf 200 200 200
```

Controls how OSPFv3 delays and schedules SPF calculations when there are frequent topology changes. Instead of recalculating routes immediately for every change, it uses a dynamic, throttled approach to optimize convergence speed and network stability.

- *spf-start*: Initial delay (in milliseconds) before running the first SPF calculation after a topology change.
- *spf-hold*: Minimum hold time (in milliseconds) between consecutive SPF calculations when changes persist.
- *spf-max-wait*: Maximum wait time (in milliseconds) between SPF calculations if instability continues.

Step 5 **timers throttle lsa** *start-interval hold-interval max-interval*

Example:

```
Device(config-router)# timers throttle lsa 200 200 200
```

Controls how frequently OSPFv3 generates and floods Link-State Advertisements (LSAs) during periods of network change. This throttling helps achieve fast convergence while protecting the router and network from excessive LSA generation during instability.

- *start-interval*: Initial delay (in milliseconds) before generating the first LSA after a change.
- *hold-interval*: Minimum time (in milliseconds) to wait before generating the next LSA if changes persist.
- *max-interval*: Maximum wait time (in milliseconds) between LSA generations during persistent instability.

Step 6 **timers lsa arrival** *milliseconds*

Example:

```
Device(config-router)# timers lsa arrival 300
```

Sets the minimum interval (in milliseconds) at which the device must wait before accepting a new instance of the same LSA from the OSPFv3 neighbors.

Step 7 **timers pacing flood** *milliseconds*

Example:

```
Device(config-router)# timers pacing flood 30
```

Controls the time interval (in milliseconds) between batches of Link-State Advertisements (LSAs) that are flooded out OSPFv3 interfaces.

Configuration Example for LSA and SPF Throttling for OSPFv3 Fast Convergence

The following example show how to display the configuration values for SPF and LSA throttling timers:

```
Device# show ipv6 ospf

Routing Process "ospfv3 1" with ID 10.9.4.1
Event-log enabled, Maximum number of events: 1000, Mode: cyclic
  It is an autonomous system boundary router
  Redistributing External Routes from,
    ospf 2
  Initial SPF schedule delay 5000 msec
  Minimum hold time between two consecutive SPF 10000 msec
  Maximum wait time between two consecutive SPF 10000 msec
  Minimum LSA interval 5 sec
  Minimum LSA arrival 1000 msec
```

