



Configuring OSPFv3 Fast Convergence - LSA and SPF Throttling

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OSPFv3 Fast Convergence: LSA and SPF Throttling

The Open Shortest Path First version 3 (OSPFv3) link-state advertisement (LSAs) and shortest-path first (SPF) throttling feature provides a dynamic mechanism to slow down link-state advertisement updates in OSPFv3 during times of network instability. It also allows faster OSPFv3 convergence by providing LSA rate limiting in milliseconds.

Information About OSPFv3 Fast Convergence: LSA and SPF Throttling

Fast Convergence: LSA and SPF Throttling

The OSPFv3 LSA and SPF throttling feature provides a dynamic mechanism to slow down link-state advertisement updates in OSPFv3 during times of network instability. It also allows faster OSPFv3 convergence by providing LSA rate limiting in milliseconds.

OSPFv3 can use static timers for rate-limiting SPF calculation and LSA generation. Although these timers are configurable, the values used are specified in seconds, which poses a limitation on OSPFv3 convergence. LSA and SPF throttling achieves subsecond convergence by providing a more sophisticated SPF and LSA rate-limiting mechanism that is able to react quickly to changes and also provide stability and protection during prolonged periods of instability.

How to Configure OSPFv3 Fast Convergence: LSA and SPF Throttling

Tuning LSA and SPF Timers for OSPFv3 Fast Convergence

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

SUMMARY STEPS

1. `enable`
2. `configure terminal`

3. **router ospfv3** *[process-id]*
4. **timers lsa arrival** *milliseconds*
5. **timers pacing flood** *milliseconds*
6. **timers pacing lsa-group** *seconds*
7. **timers pacing retransmission** *milliseconds*

DETAILED STEPS

	Command or Action	Purpose
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 <i>[process-id]</i> Example: Device(config)# router ospfv3 1	Enables OSPFv3 router configuration mode for the IPv4 or IPv6 address family.
Step 4	timers lsa arrival <i>milliseconds</i> Example: Device(config-rtr)# timers lsa arrival 300	Sets the minimum interval at which the software accepts the same LSA from OSPFv3 neighbors.
Step 5	timers pacing flood <i>milliseconds</i> Example: Device(config-rtr)# timers pacing flood 30	Configures LSA flood packet pacing.
Step 6	timers pacing lsa-group <i>seconds</i> Example: Device(config-router)# timers pacing lsa-group 300	Changes the interval at which OSPFv3 LSAs are collected into a group and refreshed, checksummed, or aged.
Step 7	timers pacing retransmission <i>milliseconds</i> Example: Device(config-router)# timers pacing retransmission 100	Configures LSA retransmission packet pacing in IPv4 OSPFv3.

Configuring LSA and SPF Throttling for OSPFv3 Fast Convergence

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

SUMMARY STEPS

1. **enable**
2. **configure terminal**

3. `ipv6 router ospf process-id`
4. `timers throttle spf spf-start spf-hold spf-max-wait`
5. `timers throttle lsa start-interval hold-interval max-interval`
6. `timers lsa arrival milliseconds`
7. `timers pacing flood milliseconds`

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Device> <code>enable</code>	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Device# <code>configure terminal</code>	Enters global configuration mode.
Step 3	ipv6 router ospf process-id Example: Device(config)# <code>ipv6 router ospf 1</code>	Enables OSPFv3 router configuration mode.
Step 4	timers throttle spf spf-start spf-hold spf-max-wait Example: Device(config-rtr)# <code>timers throttle spf 200 200 200</code>	Turns on SPF throttling.
Step 5	timers throttle lsa start-interval hold-interval max-interval Example: Device(config-rtr)# <code>timers throttle lsa 300 300 300</code>	Sets rate-limiting values for OSPFv3 LSA generation.
Step 6	timers lsa arrival milliseconds Example: Device(config-rtr)# <code>timers lsa arrival 300</code>	Sets the minimum interval at which the software accepts the same LSA from OSPFv3 neighbors.
Step 7	timers pacing flood milliseconds Example: Device(config-rtr)# <code>timers pacing flood 30</code>	Configures LSA flood packet pacing.

Configuration Examples for OSPFv3 Fast Convergence: LSA and SPF Throttling

Example: Configuring 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's 10000 msec
  Maximum wait time between two consecutive SPF's 10000 msec
  Minimum LSA interval 5 sec
  Minimum LSA arrival 1000 msec

```

Additional References

Related Documents

Related Topic	Document Title
IPv6 addressing and connectivity	<i>IPv6 Configuration Guide</i>
OSPFv3 Fast Convergence: LSA and SPF Throttling	<i>OSPF Shortest Path First Throttling</i> module

Standards and RFCs

Standard/RFC	Title
RFCs for IPv6	IPv6 RFCs

Feature Information for OSPFv3 Fast Convergence: LSA and SPF Throttling

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Table 1: Feature Information for OSPFv3 Fast Convergence: LSA and SPF Throttling

Releases	Feature Information
Cisco IOS XE Gibraltar 16.11.1	The feature was introduced.