



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. |