



OSPF Update Packet-Pacing Configurable Timers

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Feature History for OSPF Update Packet-Pacing Configurable Timers

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 | OSPF Update Packet-Pacing Configurable Timers: OSPF Update Packet-Pacing Configurable Timers is an enhancement feature that allows to configure the rate at which OSPF LSA flood pacing, retransmission pacing, and group pacing updates occur. | Cisco C9350 Series Smart Switches Cisco C9610 Series Smart Switches |

OSPF Update Packet-Pacing Configurable Timers

OSPF Update Packet-Pacing Configurable Timers is an enhancement feature that allows to configure the rate at which Open Shortest Path First (OSPF) link-state advertisement (LSA) flood pacing, retransmission pacing, and group pacing updates occur. In rare situations, you might need to change OSPF packet-pacing default timers to mitigate CPU or buffer utilization issues associated with flooding very large numbers of LSAs.

Types of OSPF Packet-Pacing Configurable Timers

There are three types of OSPF packet-pacing configurable timers available:

- **OSPF Flood Pacing Timers:**

These timers control the inter-packet spacing between consecutive link-state update packets as they are sent out from the OSPF transmission queue.

By spacing out the flood of new LSAs, the device can manage its resources more effectively. This approach prevents a sudden surge of traffic that could overwhelm the CPU or buffers.

- **OSPF Retransmission Pacing Timers:**

These timers govern the inter-packet spacing between consecutive link-state update packets that are being retransmitted from the OSPF retransmission queue.

Similar to flood pacing, this helps prevent a device from being overwhelmed by retransmissions, especially in unstable network environments where LSAs might be lost and need to be resent. It ensures a more controlled and gradual retransmission process.

- **OSPF Group Pacing Timers (Cisco IOS XE Specific):**

Cisco IOS XE software introduces this feature to group the periodic refresh of LSAs. This grouping aims to improve the LSA packing density. More LSAs can be sent in fewer packets during refreshes, which is beneficial in large network topologies.

Guidelines to configure OSPF Update Packet-Pacing Configurable Timers

Do not change the packet-pacing timers unless all other options to meet OSPF packet flooding requirements have been exhausted. Network operators should prefer summarization, stub area usage, queue tuning, and buffer tuning before changing the default timers.

There are no guidelines for changing timer values because each OSPF deployment is unique and should be considered on a case-by-case basis. The network operator assumes the risks associated with changing the default timer values.

How to configure OSPF Packet-Pacing Timers

This section provides information on configuring OSPF packet-pacing timers.

Configure OSPF Packet-Pacing Timers

Perform this task to configure OSPF packet-pacing timers.

Before you begin

**Caution**

The default settings for OSPF packet-pacing timers are suitable for the majority of OSPF deployments. You should change the default timers only as a last resort.

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 ospf process-id [vrf vrf-name]****Example:**

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

Enables OSPF routing and enters router configuration mode.

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

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

- *vrf*: Indicates that the OSPF process is being configured for a specific VRF.

- *vrf-name*: Specifies the name of the VRF for which this OSPF process is being created.

Step 4 **timers pacing flood milliseconds****Example:**

```
Device(config-router)# timers pacing flood 15
```

Configures a flood packet-pacing timer delay, in milliseconds.

Step 5 **end****Example:**

```
Device(config-router)# end
```

Returns to privileged EXEC mode.

(Optional) Configure a Retransmission Packet-Pacing Timer

Perform this task to configure a retransmission packet-pacing timer.

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 ospf process-id [vrf vrf-name]**

Example:

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

Enables OSPF routing and enters router configuration mode.

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

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

- *vrf*: Indicates that the OSPF process is being configured for a specific VRF.
- *vrf-name*: Specifies the name of the VRF for which this OSPF process is being created.

Step 4 **timers pacing retransmission milliseconds**

Example:

```
Device(config-router)# timers pacing retransmission 15
```

Configures a retransmission packet-pacing timer delay, in milliseconds.

Step 5 **end**

Example:

```
Device(config-router)# end
```

Returns to privileged EXEC mode.

(Optional) Configure a Group Packet-Pacing Timer

Perform this task to configure a group packet-pacing timer.

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 ospf process-id [vrf vrf-name]**

Example:

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

Enables OSPF routing and enters router configuration mode.

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

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

- *vrf*: Indicates that the OSPF process is being configured for a specific VRF.

- *vrf-name*: Specifies the name of the VRF for which this OSPF process is being created.

Step 4 **timers pacing lsa-group seconds**

Example:

```
Device(config-router)# timers pacing lsa-group 15
```

Configures an LSA group packet-pacing timer delay, in milliseconds.

Step 5 **end**

Example:

```
Device(config-router)# end
```

Returns to privileged EXEC mode.

Configuration examples of OSPF Update Packet-Pacing Timers

This section provides configuration examples of OSPF update packet-pacing timers.

Example: LSA Flood Pacing

The following example configures LSA flood pacing updates to occur in 50-millisecond intervals for OSPF routing process 1:

```
Device> enable
Device# configure terminal
Device(config)# router ospf 1
Device(config-router)# timers pacing flood 50
```

Example: LSA Retransmission Pacing Timer

The following example configures LSA retransmission pacing updates to occur in 100-millisecond intervals for OSPF routing process 1:

```
Device> enable
Device# configure terminal
Device(config)# router ospf 1
Device(config-router)# timers pacing retransmission 100
```

Example: LSA Group Pacing

The following example configures OSPF group pacing updates between LSA groups to occur in 75-second intervals for OSPF routing process 1:

```
Device> enable
Device# configure terminal
Device(config)# router ospf 1
Device(config-router)# timers pacing lsa-group 75
```

Verify OSPF Packet-Pacing Timers

To verify that OSPF packet pacing has been configured, use the **show ip ospf** privileged EXEC command. The output of the **show ip ospf** command will display the type and delay time of the configurable pacing timers (flood, retransmission, group).

The following sample output is from the **show ip ospf** command:

```
Router# show ip ospf
Routing Process "ospf 1" with ID 10.0.0.1 and Domain ID 10.20.0.1
Supports only single TOS(TOS0) routes
Supports opaque LSA
SPF schedule delay 5 secs, Hold time between two SPFs 10 secs
Minimum LSA interval 5 secs. Minimum LSA arrival 1 secs
LSA group pacing timer 100 secs
Interface flood pacing timer 55 msecs
Retransmission pacing timer 100 msecs
Number of external LSA 0. Checksum Sum 0x0
Number of opaque AS LSA 0. Checksum Sum 0x0
Number of DCbitless external and opaque AS LSA 0
```

```

Number of DoNotAge external and opaque AS LSA 0
Number of areas in this router is 2. 2 normal 0 stub 0 nssa
External flood list length 0
  Area BACKBONE(0)
    Number of interfaces in this area is 2
    Area has message digest authentication
    SPF algorithm executed 4 times
    Area ranges are
    Number of LSA 4. Checksum Sum 0x29BEB
    Number of opaque link LSA 0. Checksum Sum 0x0
    Number of DCbitless LSA 3
    Number of indication LSA 0
    Number of DoNotAge LSA 0
    Flood list length 0
  Area 172.16.26.0
    Number of interfaces in this area is 0
    Area has no authentication
    SPF algorithm executed 1 times
    Area ranges are
      192.168.0.0/16 Passive Advertise
    Number of LSA 1. Checksum Sum 0x44FD
    Number of opaque link LSA 0. Checksum Sum 0x0
    Number of DCbitless LSA 1
    Number of indication LSA 1
    Number of DoNotAge LSA 0
    Flood list length 0

```

Monitor and maintain OSPF Packet-Pacing Timers

| Command | Purpose |
|-------------------------------------|---|
| show ip ospf | Displays general information about OSPF routing processes. |
| show ip ospf neighbor | Displays OSPF neighbor information on a per-interface basis. |
| clear ip ospf redistribution | Clears route redistribution based on the OSPF routing process ID. |

