OSPF Update Packet-Pacing Configurable Timers

This module describes the OSPF Update Packet-Pacing Configurable Timers feature, which allows you to configure the rate at which OSPF LSA flood pacing, retransmission pacing, and group pacing updates occur.

Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see Bug Search Tool and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.

Restrictions on 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. Specifically, network operators should prefer summarization, stub area usage, queue tuning, and buffer tuning before changing the default timers. Furthermore, there are no guidelines for changing timer values; each OSPF deployment is unique and should be considered on a case-by-case basis. The network operator assumes risks that are associated with changing the default timer values.

Information About OSPF Update Packet-Pacing Configurable Timers

Functionality of the OSPF Update Packet-Pacing Timers

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

- Configuring OSPF flood pacing timers allows you to control interpacket spacing between consecutive link-state update packets in the OSPF transmission queue.
- Configuring OSPF retransmission pacing timers allows you to control interpacket spacing between consecutive link-state update packets in the OSPF retransmission queue.
- Cisco IOS XE software groups the periodic refresh of LSAs to improve the LSA packing density for the refreshes in large topologies. The group timer controls the interval that is used for group LSA refreshment; however, this timer does not change the frequency at which individual LSAs are refreshed (the default refresh occurs every 30 minutes).

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.

Benefits of OSPF Update Packet-Pacing Configurable Timers

The OSPF Update Packet-Pacing Configurable Timers feature provides the administrator with a mechanism to control the rate at which LSA updates occur in order to reduce high CPU or buffer utilization that can occur when an area is flooded with a very large number of LSAs.

How to Configure OSPF Packet-Pacing Timers

The tasks in this section describe how to configure and verify three OSPF update packet-pacing timers.

Configuring OSPF Packet-Pacing Timers

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.

To configure a flood packet-pacing timer, use the following commands beginning in global configuration mode:

SUMMARY STEPS

1. Router(config)# **router ospf** process-id
2. Router(config-router)# **timers pacing flood** milliseconds

DETAILED STEPS

	Command or Action	Purpose
Step 1	Router(config)# **router ospf** process-id	Places the router in router configuration mode and enables an OSPF routing process.
Step 2	Router(config-router)# **timers pacing flood** milliseconds	Configures a flood packet-pacing timer delay (in milliseconds).

Configuring a Retransmission Packet-Pacing Timer

To configure a retransmission packet-pacing timer, use the following commands beginning in global configuration mode:

SUMMARY STEPS

1. Router(config)# **router ospf** process-id
2. Router(config-router)# **timers pacing retransmission** milliseconds

DETAILED STEPS

	Command or Action	Purpose
Step 1	Router(config)# **router ospf** process-id	Places the router in router configuration mode and enables an OSPF routing process.
Step 2	Router(config-router)# **timers pacing retransmission** milliseconds	Configures a retransmission packet-pacing timer delay (in milliseconds).

Configuring a Group Packet-Pacing Timer

To configure a group packet-pacing timer, use the following commands beginning in router configuration mode:

SUMMARY STEPS

1. Router(config)# **router ospf** process-id
2. Router(config-router)# **timers pacing lsa-group** seconds

DETAILED STEPS

	Command or Action	Purpose
Step 1	Router(config)# **router ospf** process-id	Places the router in router configuration mode and enables an OSPF routing process.

	Command or Action	Purpose
Step 2	Router(config-router)# **timers pacing lsa-group** seconds	Configures an LSA group packet-pacing timer delay (in seconds).

Verifying 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
```

Troubleshooting Tips

If the number of OSPF packet retransmissions rapidly increases, increase the value of the packet-pacing timers. The number of OSPF packet retransmissions is displayed in the output of the show ip ospf neighbor command.

Monitoring and Maintaining OSPF Packet-Pacing Timers

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

Configuration Examples of OSPF Update Packet-Pacing

Example LSA Flood Pacing

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

```
Router(config)# router ospf 1
Router(config-router)# timers pacing flood 50
```

Example LSA Retransmission Pacing

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

```
Router(config)# router ospf 1
Router(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:

```
Router(config)# router ospf 1
Router(config-router)# timers pacing lsa-group 75
```

Additional References

For additional information related to the OSPF Update Packet-Pacing Configurable Timers feature, see the following references:

Related Documents

Related Topic	Document Title
Configuring OSPF	"Configuring OSPF"
OSPF commands	*Cisco IOS IP Routing: OSPF Command Reference*
Cisco IOS master command list, all releases	Cisco IOS Master Command List, All Releases

Standards

Standard	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	--

MIBs

MIB	MIBs Link
No new or modified MIBs are supported by this feature, and support for existing MIBs has not been modified by this feature.	To locate and download MIBs for selected platforms, Cisco IOS XE software releases , and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
No new or modified RFCs are supported by this feature, and support for existing RFCs has not been modified by this feature.	--

Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Feature Information for OSPF Update Packet-Pacing Configurable Timers

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.

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Table 1: Feature Information for OSPF Update Packet-Pacing Configurable Timers

Feature Name	Releases	Feature Information
OSPF Update Packet-Pacing Configurable Timers	Cisco IOS XE Release 2.1	The OSPF Update Packet-Pacing Configurable Timers feature allows you to configure the rate at which OSPF LSA flood pacing, retransmission pacing, and group pacing updates occur. The following commands are introduced or modified in the feature documented in this module: • **timers pacing flood** • **timers pacing lsa-group** • **timers pacing retransmission** • **show ip ospf**