



# OSPF Forwarding Address Suppression in Translated Type-5 LSAs

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The OSPF Forwarding Address Suppression in Translated Type-5 LSAs feature causes a not-so-stubby area (NSSA) area border router (ABR) to translate Type-7 link state advertisements (LSAs) to Type-5 LSAs, but use the address 0.0.0.0 for the forwarding address instead of that specified in the Type-7 LSA. This feature causes routers that are configured not to advertise forwarding addresses into the backbone to direct forwarded traffic to the translating NSSA ABRs.

## History for the OSPF Forwarding Address Suppression in Translated Type-5 LSAs Feature

### Feature History

Release	Modification
12.2(15)T	This feature was introduced.
12.2(18)S	This feature was integrated into Cisco IOS Release 12.2(18)S.
12.2(27)SBC	This feature was integrated into Cisco IOS Release 12.2(27)SBC.

## Finding Support Information for Platforms and Cisco IOS Software Images

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## Prerequisites for OSPF Forwarding Address Suppression in Translated Type-5 LSAs

This document presumes you have OSPF configured on the networking device; it does not document other steps to configure OSPF.

## Information About OSPF Forwarding Address Suppression in Translated Type-5 LSAs

Before you configure the OSPF Forwarding Address Suppression in Translated Type-5 LSAs feature, you should understand the following concepts:

- [Benefits of OSPF Forwarding Address Suppression in Translated Type-5 LSAs, page 2](#)
- [When to Suppress OSPF Forwarding Address in Translated Type-5 LSAs, page 2](#)

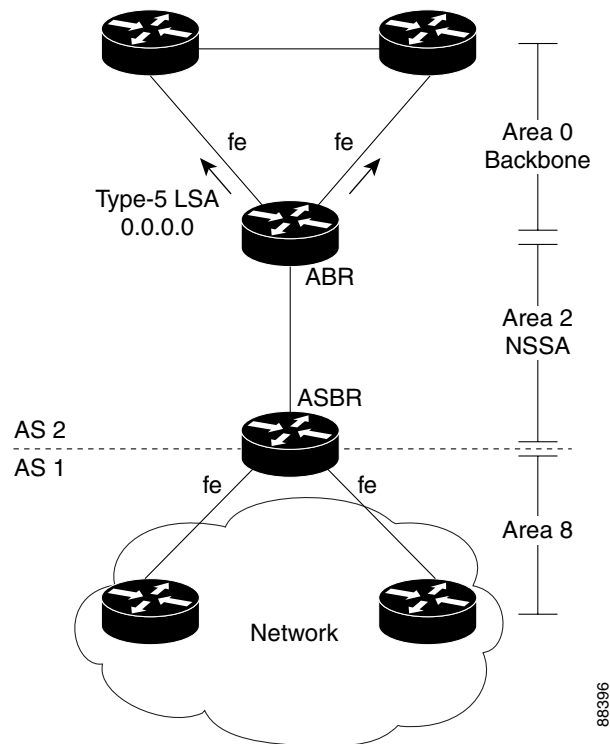
## Benefits of OSPF Forwarding Address Suppression in Translated Type-5 LSAs

The OSPF Forwarding Address Suppression in Translated Type-5 LSAs feature causes an NSSA ABR to translate Type-7 LSAs to Type-5 LSAs, but use the 0.0.0.0 as the forwarding address instead of that specified in the Type-7 LSA. This feature causes routers that are configured not to advertise forwarding addresses into the backbone to direct forwarded traffic to the translating NSSA ASBRs.

## When to Suppress OSPF Forwarding Address in Translated Type-5 LSAs

In [Figure 1](#), it would be advantageous to filter Area 2 addresses from Area 0 to minimize the number of routes introduced into the backbone (Area 0). However, using the **area range** command to consolidate and summarize routes at the area boundary—filtering the Area 2 addresses—will not work because the Area 2 addresses include forwarding addresses for Type-7 LSAs that are generated by the ASBR. If these Type-7 LSA forwarding addresses have been filtered out of Area 0, the backbone routers cannot reach the prefixes advertised in the translated Type-5 LSAs (autonomous system external LSAs).

Figure 1 OSPF Forwarding Address Suppression in Translated Type-5 LSAs



This problem is solved by suppressing the forwarding address on the ABR so that the forwarding address is set to 0.0.0.0 in the Type-5 LSAs that were translated from Type-7 LSAs. A forwarding address set to 0.0.0.0 indicates that packets for the external destination should be forwarded to the advertising OSPF router, in this case, the translating NSSA ABR.

Before configuring this feature, consider the following caution.



#### Caution

Configuring this feature causes the router to be noncompliant with RFC 1587. Also, suboptimal routing might result because there might be better paths to reach the destination's forwarding address. This feature should not be configured without careful consideration and not until the network topology is understood.

## How to Suppress OSPF Forwarding Address in Translated Type-5 LSAs

This section contains the following procedure:

- [Suppressing OSPF Forwarding Address in Translated Type-5 LSAs, page 3](#)

### Suppressing OSPF Forwarding Address in Translated Type-5 LSAs

This task describes how to suppress OSPF forwarding address in translated Type-5 LSAs. Before configuring this feature, consider the following caution.

**Caution**

Configuring this feature causes the router to be noncompliant with RFC 1587. Also, suboptimal routing might result because there might be better paths to reach the destination's forwarding address. This feature should not be configured without careful consideration and not until the network topology is understood.

**SUMMARY STEPS**

1. **enable**
2. **configure terminal**
3. **router ospf *process-id***
4. **area *area-id* nssa translate type7 suppress-fa**
5. **end**

**DETAILED STEPS**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Router> enable	Enables higher privilege levels, such as privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Router# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>router ospf <i>process-id</i></b>  <b>Example:</b> Router(config)# router ospf 1	Enables OSPF routing and enters router configuration mode. <ul style="list-style-type: none"> <li>• The <i>process-id</i> argument identifies the OSPF process.</li> </ul>
<b>Step 4</b>	<b>area <i>area-id</i> nssa translate type7 suppress-fa</b>  <b>Example:</b> Router(config-router)# area 10 nssa translate type7 suppress-fa	Configures an area as a not-so-stubby-area (NSSA) and suppresses the forwarding address in translated Type-7 LSAs.
<b>Step 5</b>	<b>end</b>  <b>Example:</b> Router(config-router)# end	Exits configuration mode and returns to privileged EXEC mode.

# Configuration Examples for OSPF Forwarding Address Suppression in Translated Type-5 LSAs

This section provides the following configuration example:

- [Suppressing OSPF Forwarding Address in Translated Type-5 LSAs: Example, page 5](#)

## Suppressing OSPF Forwarding Address in Translated Type-5 LSAs: Example

This example suppresses the forwarding address in translated Type-5 LSAs:

```
interface ethernet 0
 ip address 10.93.1.1 255.255.255.0
 ip ospf cost 1
!
interface ethernet 1
 ip address 10.94.1.1 255.255.255.0
!
router ospf 1
 network 10.93.0.0 0.0.255.255 area 0.0.0.0
 network 10.94.0.0 0.0.255.255 area 10
 area 10 nssa translate type7 suppress-fa
```

## Additional References

For additional information related to OSPF, see the following sections:

- [Related Documents, page 5](#)
- [Standards, page 5](#)
- [MIBs, page 6](#)
- [RFCs, page 6](#)
- [Technical Assistance, page 6](#)

## Related Documents

Related Topic	Document Title
Configuring OSPF	<i>Cisco IOS IP Configuration Guide</i> , Release 12.2
OSPF commands	<i>Cisco IOS IP Command Reference, Volume 2 of 3: Routing Protocols</i> , Release 12.2

## Standards

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

## MIBs

MIBs	MIBs Link
<ul style="list-style-type: none"> <li>•</li> <li>•</li> </ul>	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: <a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a>

## RFCs

RFCs	Title
Configuring the OSPF Forwarding Address Suppression in Translated Type-5 LSAs feature causes the router to be noncompliant with RFC 1587.	<i>The OSPF NSSA Option</i>

## Technical Assistance

Description	Link
The Cisco Technical Support website contains thousands of pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.	<a href="http://www.cisco.com/techsupport">http://www.cisco.com/techsupport</a>

## Command Reference

This section documents new and modified commands only.

- [area nssa translate](#)
- [show ip ospf](#)

## area nssa translate

To configure an area as a not-so-stubby area (NSSA) and configure the Open Shortest Path First (OSPF) Forwarding Address Suppression in Translated Type-5 LSAs feature, use the **area nssa translate** command in router configuration mode. To remove the NSSA distinction from the area, use the **no** form of this command.

```
area area-id nssa translate type7 suppress-fa
```

```
no area area-id nssa translate type7 suppress-fa
```

### Syntax Description

<i>area-id</i>	Identifier of the area for which authentication is to be enabled. The identifier can be specified as either a decimal value or an IP address.
<b>translate</b>	Translates one type of LSA to another type of LSA. This keyword takes effect only on an NSSA area border router (ABR) or NSSA Autonomous System Boundary Router (ASBR).
<b>type7</b>	Translates a Type-7 LSA to a Type-5 LSA. This keyword takes effect only on an NSSA ABR or an NSSA ASBR.
<b>suppress-fa</b>	Suppresses the forwarding address of the Type-7 LSAs from being placed in the Type-5 LSAs. This keyword takes effect only on an NSSA ABR or an NSSA ASBR.

### Defaults

No translation occurs.

### Command Modes

Router configuration

### Command History

Release	Modification
12.2(15)T	This command was introduced.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.

### Usage Guidelines

To configure the OSPF Forwarding Address Suppression in Translated Type-5 LSAs feature, configure the **translate type7 suppress-fa** keywords. Consider the following caution.



#### Caution

Configuring the OSPF Forwarding Address Suppression in Translated Type-5 LSAs feature causes the router to be noncompliant with RFC 1587. Also, suboptimal routing might result because there might be better paths to reach the destination's forwarding address. This feature should not be configured without careful consideration and not until the network topology is understood.

If the **translate** keyword is used in addition to the **no-redistribution** or **default-information originate** keywords, two separate lines for the **area nssa** command appear in the configuration file for ease of readability. For example, if **area 6 nssa no-redistribution translate type7 suppress-fa** is configured, the following lines would appear in the configuration file:

```
router ospf 1
  area 6 nssa no-redistribution
  area 6 nssa translate type7 suppress-fa
```

To remove the specified area from the software configuration, use the **no area area-id** command (with no other keywords). That is, the **no area area-id** command removes all area options, such as **area authentication**, **area default-cost**, **area nssa**, **area range**, **area stub**, and **area virtual-link**.

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## Examples

The following example causes OSPF to translate Type-7 LSAs from area 1 to Type-5 LSAs, but not place the Type-7 forwarding address into the Type-5 LSAs. OSPF places 0.0.0.0 as the forwarding address in the Type-5 LSAs.

```
router ospf 2
  network 172.19.92.0 0.0.0.255 area 1
  area 1 nssa translate type7 suppress-fa
```

# show ip ospf

To display general information about Open Shortest Path First (OSPF) routing Processes, use the **show ip ospf** command in EXEC mode.

```
show ip ospf [Process-id]
```

<b>Syntax Description</b>	<i>Process-id</i>	(Optional) Process ID. If this argument is included, only information for the specified routing process is included.
<b>Command Modes</b>	EXEC	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	10.0	This command was introduced.
	12.2(4)T	This command was modified to show packet pacing timers in the displayed output.
	12.2(15)T	This command was modified to show additional information if the OSPF Forwarding Address Suppression in Type-5 link-state advertisements (LSAs) feature is configured.
	12.0(25)S	The output of this command was expanded to display LSA throttling timers.
	12.3(2)T	The output of this command was expanded to display LSA throttling timers and the limit on redistributed routes.
	12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.

## Examples

The following is sample output from the **show ip ospf** command when entered without a specific OSPF Process ID:

```
Router# show ip ospf

Routing Process "ospf 201" 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 msec
Retransmission pacing timer 100 msec
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
```

show ip ospf

```

Number of opaque link LSA 0. Checksum Sum 0x0
Number of DChitless 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 DChitless LSA 1
Number of indication LSA 1
Number of DoNotAge LSA 0
Flood list length 0
    
```

Table 1 describes the significant fields shown in the display.

**Table 1** show ip ospf Field Descriptions

Field	Description
Routing Process “ospf 201” with ID 10.0.0.1	Process ID and OSPF router ID.
Supports...	Number of types of service supported (Type 0 only).
SPF schedule delay	Delay time of SPF calculations.
Minimum LSA interval	Minimum interval between link-state advertisements.
LSA group pacing timer	Configured LSA group pacing timer (in seconds).
Interface flood pacing timer	Configured LSA flood pacing timer (in milliseconds).
Retransmission pacing timer	Configured LSA retransmission pacing timer (in milliseconds).
Number of...	Number and type of link-state advertisements that have been received.
Number of external LSA	Number of external link-state advertisements.
Number of opaque AS LSA	Number of opaque link-state advertisements.
Number of DCbitless external and opaque AS LSA	Number of demand circuit external and opaque link-state advertisements.
Number of DoNotAge external and opaque AS LSA	Number of do not age external and opaque link-state advertisements.
Number of areas in this router is	Number of areas configured for the router.
External flood list length	External flood list length.

The following is an excerpt of output from the **show ip ospf** command when the OSPF Forwarding Address Suppression in Type-5 LSAs feature is configured:

```

Router# show ip ospf
.
.
.
Area 2
    Number of interfaces in this area is 4
    
```

```

It is a NSSA area
Perform type-7/type-5 LSA translation, suppress forwarding address
.
.
.
Routing Process "ospf 1" with ID 192.168.0.1
Supports only single TOS(TOS0) routes
Supports opaque LSA
Supports Link-local Signaling (LLS)
Initial SPF schedule delay 5000 msec
Minimum hold time between two consecutive SPF 10000 msec
Maximum wait time between two consecutive SPF 10000 msec
Incremental-SPF disabled
Minimum LSA interval 5 sec
Minimum LSA arrival 1000 msec
LSA group pacing timer 240 sec
Interface flood pacing timer 33 msec
Retransmission pacing timer 66 msec
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 0. 0 normal 0 stub 0 nssa
External flood list length 0

```

Table 2 describes the significant fields shown in the display.

**Table 2** *show ip ospf Field Descriptions*

Field	Description
Area	OSPF area and tag.
Number of interfaces...	Number of interfaces configured in the area.
It is...	Possible types are internal, area border, or autonomous system boundary.
Routing Process "ospf 1" with ID 192.168.0.1	Process ID and OSPF router ID.
Supports...	Number of types of service supported (Type 0 only).
Initial SPF schedule delay	Delay time of SPF calculations at startup.
Minimum hold time	Minimum hold time between consecutive SPF calculations.
Maximum wait time	Maximum wait time between consecutive SPF calculations.
Incremental-SPF	Status of incremental SPF calculations.
Minimum LSA...	Minimum time interval (in seconds) between link-state advertisements, and maximum arrival time (in milliseconds) of link-state advertisements,
LSA group pacing timer	Configured LSA group pacing timer (in seconds).
Interface flood pacing timer	Configured LSA flood pacing timer (in milliseconds).
Retransmission pacing timer	Configured LSA retransmission pacing timer (in milliseconds).
Number of...	Number and type of link-state advertisements that have been received.
Number of external LSA	Number of external link-state advertisements.

**Table 2** *show ip ospf Field Descriptions (continued)*

Field	Description
Number of opaque AS LSA	Number of opaque link-state advertisements.
Number of DCbitless external and opaque AS LSA	Number of demand circuit external and opaque link-state advertisements.
Number of DoNotAge external and opaque AS LSA	Number of do not age external and opaque link-state advertisements.
Number of areas in this router is	Number of areas configured for the router listed by type.
External flood list length	External flood list length.

The following is sample output from the **show ip ospf** command. In this example, the user had configured the **redistribution maximum-prefix** command to set a limit of 2000 redistributed routes. Shortest Path First (SPF) throttling was configured with the **timers throttle spf** command.

```
Router# show ip ospf 1

Routing Process "ospf 1" with ID 10.0.0.1
Supports only single TOS(TOS0) routes
Supports opaque LSA
Supports Link-local Signaling (LLS)
It is an autonomous system boundary router
Redistributing External Routes from,
    static, includes subnets in redistribution
    Maximum limit of redistributed prefixes 2000
    Threshold for warning message 75%
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
```

Table 3 describes the significant fields shown in the display.

**Table 3** *show ip ospf Field Descriptions*

Field	Description
Routing Process "ospf 1" with ID 10.0.0.1	Process ID and OSPF router ID.
Supports ...	Number of Types of Service (TOS) supported.
It is ...	Possible types are internal, area border, or autonomous system boundary.
Redistributing External Routes from	Lists of redistributed routes, by protocol.
Maximum limit of redistributed prefixes	Value set in the <b>redistribution maximum-prefix</b> command to set a limit on the number of redistributed routes.
Threshold for warning message	Percentage set in the <b>redistribution maximum-prefix</b> command for the threshold number of redistributed routes needed to cause a warning message. The default is 75 percent of the maximum limit.
Initial SPF schedule delay	Delay (in milliseconds) before initial SPF schedule for SPF throttling. Configured with the <b>timers throttle spf</b> command.

**Table 3** show ip ospf Field Descriptions (continued)

Field	Description
Minimum hold time between two consecutive SPF	Minimum hold time (in milliseconds) between two consecutive SPF calculations for SPF throttling. Configured with the <b>timers throttle spf</b> command.
Maximum wait time between two consecutive SPF	Maximum wait time (in milliseconds) between two consecutive SPF calculations for SPF throttling. Configured with the <b>timers throttle spf</b> command.
Number of areas	Number of areas in router, area addresses, and so on.

The following is sample output from the **show ip ospf** command. In this example, the user had configured LSA throttling, and those lines of output are displayed in bold.

```
Router# show ip ospf 1

Routing Process "ospf 4" with ID 10.10.24.4
Supports only single TOS(TOS0) routes
Supports opaque LSA
Supports Link-local Signaling (LLS)
Initial SPF schedule delay 5000 msec
Minimum hold time between two consecutive SPFs 10000 msec
Maximum wait time between two consecutive SPFs 10000 msec
Incremental-SPF disabled
Initial LSA throttle delay 100 msec
Minimum hold time for LSA throttle 10000 msec
Maximum wait time for LSA throttle 45000 msec
Minimum LSA arrival 1000 msec
LSA group pacing timer 240 secs
Interface flood pacing timer 33 msec
Retransmission pacing timer 66 msec
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 1. 1 normal 0 stub 0 nssa
External flood list length 0
Area 24
  Number of interfaces in this area is 2
  Area has no authentication
  SPF algorithm last executed 04:28:18.396 ago
  SPF algorithm executed 8 times
  Area ranges are
  Number of LSA 4. Checksum Sum 0x23EB9
  Number of opaque link LSA 0. Checksum Sum 0x0
  Number of DCbitless LSA 0
  Number of indication LSA 0
  Number of DoNotAge LSA 0
  Flood list length 0
```

The following is sample output from the **show ip ospf** command. In this example, the user had configured the **redistribution maximum-prefix** command to set a limit of 2000 redistributed routes. Shortest Path First (SPF) throttling was configured with the **timers throttle spf** command.

```
Router# show ip ospf 1

Routing Process "ospf 1" with ID 100.0.0.1
Supports only single TOS(TOS0) routes
Supports opaque LSA
Supports Link-local Signaling (LLS)
```

```

It is an autonomous system boundary router
Redistributing External Routes from,
    static, includes subnets in redistribution
    Maximum limit of redistributed prefixes 2000
    Threshold for warning message 75%
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

```

Table 4 describes significant fields shown in the display.

**Table 4** show ip ospf Field Descriptions

Field	Description
Routing Process "ospf 201" with ID 192.168.11.1	Process ID and OSPF router ID.
Supports ...	Number of Types of service supported.
It is ...	Possible types are internal, area border, or autonomous system boundary.
Redistributing External Routes from	Lists of redistributed routes, by protocol.
Maximum limit of redistributed prefixes	Value set in the <b>redistribution maximum-prefix</b> command to set a limit on the number of redistributed routes.
Threshold for warning message	Percentage set in the <b>redistribution maximum-prefix</b> command for the threshold number of redistributed routes needed to cause a warning message. The default is 75 percent of the maximum limit.
Initial SPF schedule delay	Delay (in milliseconds) before the initial SPF schedule for SPF throttling. Configured with the <b>timers throttle spf</b> command.
Minimum hold time between two consecutive SPF's	Minimum hold time (in milliseconds) between two consecutive SPF calculations for SPF throttling. Configured with the <b>timers throttle spf</b> command.
Maximum wait time between two consecutive SPF's	Maximum wait time (in milliseconds) between two consecutive SPF calculations for SPF throttling. Configured with the <b>timers throttle spf</b> command.
Number of areas	Number of areas in router, area addresses, and so on.

The following is sample output from the **show ip ospf** command. In this example, the user had configured LSA throttling, and those lines of output are displayed in bold.

```

Router# show ip ospf 1

Routing Process "ospf 4" with ID 10.10.24.4
Supports only single TOS(TOS0) routes
Supports opaque LSA
Supports Link-local Signaling (LLS)
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
Incremental-SPF disabled

```

```
Initial LSA throttle delay 100 msec
Minimum hold time for LSA throttle 10000 msec
Maximum wait time for LSA throttle 45000 msec
Minimum LSA arrival 1000 msec
LSA group pacing timer 240 secs
Interface flood pacing timer 33 msec
Retransmission pacing timer 66 msec
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 1. 1 normal 0 stub 0 nssa
External flood list length 0
  Area 24
    Number of interfaces in this area is 2
    Area has no authentication
    SPF algorithm last executed 04:28:18.396 ago
    SPF algorithm executed 8 times
    Area ranges are
    Number of LSA 4. Checksum Sum 0x23EB9
    Number of opaque link LSA 0. Checksum Sum 0x0
    Number of DCbitless LSA 0
    Number of indication LSA 0
    Number of DoNotAge LSA 0
    Flood list length 0
```

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■ show ip ospf