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Forcing

CHAPTER 2

Additional References for IPv6 Routing: OSPFv3 Authentication Support with IPsec

Enabling

Verifying

Additional References for

CHAPTER 21

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CHAPTER 1

Configuring OSPF

This module describes how to configure Open

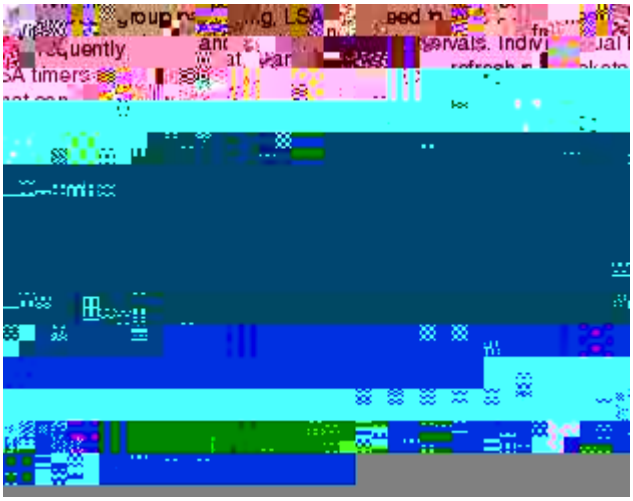
Because many routers might be attached to an OSPF network, a *designated router* is selected for

routing redistribution is not allowed in the stub area. However

OSPF uses the largest IP address configured

The figure below illustrates the case of refresh packets. The first timeline illustrates individual LSA timers; the second timeline illustrates individual LSA timers with group pacing.

Figure 3: OSPF LSAs on Individual Timers with Group Pacing



The group pacing interval is inversely proportional to the number of LSAs that the router is refreshing, checksumming, and aging. For example, if you have approximately 10,000 LSAs, decreasing the pacing interval would benefit

The former OSPF implementation for sending update packets needed to be more efficient. Some update packets were getting lost in cases where the link was slow, a neighbor could not receive the updates quickly enough, or the router was outout

DETAILED STEPS

DETAILED STEPS

Configuring OSPF for Nonbroadcast Networks

SUMMARY STEPS

1. **configure terminal**
2. **interface** *type*

DETAILED STEPS

Configuring Route Summarization Between OSPF Areas

Configuring Route Summarization When Redistributing Routes into OSPF

SUMMARY STEPS

1. **summary-address** {*ip-address mask* | *prefix mask*} [**not-advertise**][**tag** *tag* [**nssa-only**]

DETAILED STEPS

Generating a Default Route

SUMMARY STEPS

Configuring Lookup of DNS Names

SUMMARY STEPS

1. **enable**
2.

DETAILED STEPS

DETAILED STEPS

DETAILED STEPS

Logging Neighbors Going Up or Down

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router ospf** *process-id*
4.

Changing the LSA Group Pacing Interval

SUMMARY STEPS

1. **enable**
2. **configur**

Command	Purpose
show ip ospf	

Restrictions for OSPF

On systems with a large number of interfaces,

Router 2 Configuration

```
hostname Router 2
!
interface serial 0
 ip address 10.0.0.1 255.0.0.0
 ip ospf network point-to-multipoint
 encapsulation frame-relay
 frame-relay map ip 10.0.0.2 101 broadcast
 frame-relay map ip 10.0.0.4 102 broadcast
!
router ospf 1
 network 10.0.0.0 0.0.0.255 area 0
```

Router 3 Configuration

The following example

```
frame-relay local-dlci 301
frame-relay map ip 10.0.1.1
```

```
!
router ospf 1
 area 1 nssa
!
end
```

Device 2

Device 4

```
hostname Device4
!
```

```
LSA group pacing timer 240 secs
Interface flood
```

```
!
! Interface Ethernet0 is in area 10.9.50.0:
interface ethernet 0
 ip address 192.168.10.5 255.255.255.0
!
! Interface Ethernet1 is in area 2:
interface ethernet 1
 ip address 192.168.20.5 255.255.255.0
!
! Interface Ethernet2 is in area 2:
interface ethernet 2
 ip address 192.168.20.7 255.255.255.0
!
! Interface Ethernet3 is in area 3:
interface ethernet 3
 ip address 192.169.30.5 255.255.255.0
!
! Interface Ethernet4 is in area 0:
interface ethernet
```

Example: Complex Internal Router with ABR and ASBR

The following

Example: Complex OSPF Configuration for ABR

The following is a sample OSPF configuration:

```
interface ethernet 0
 ip address 192.0.2.201 255.255.255.0
 ip ospf authentication-key abcdefgh
 ip ospf cost 10
!
interface ethernet 1
 ip address 172.19.251.202
```

```
route map 1 permit
 match tag 5
 set metric 5
```

In the following configuration, a RIP-learned route for network 192.168.0.0 and an ISO-IGRP-learned route with prefix 49.0001.0002 are redistributed into an IS-IS Level 2 LSP with a metric of 5:

```
router
```

Example: Changing the OSPF Administrative Distances

The following configuration changes the external distance to

```
 network 192.168.45.50 0.0.0.255 area 0
!
dialer-list 1 protocol ip permit
```

Example: LSA Group Pacing

The following example

RFCs

T

CHAPTER 2

IPv6 Routing: OSPFv3

Open Shortest Path First version 3 (OSPFv3) is an IPv4 and IPv6 link-state routing protocol that supports IPv6 and IPv4 unicast address families (AFs).

The link-state ID in network LSAs and link LSAs is always the interface ID of the originating device on the link being described. For this reason, network LSAs and link LSAs are now the only LSAs whose size cannot

SUMMARY STEPS

1. **enable**
2. **show ospfv3** [*pr*

```
172.16.6.6         239         0x80000003  0             1           B
            Inter Area Prefix Link
```

CHAPTER 3

IPv6 Routing: OSPFv3 Authentication Support with IPsec

OSPFv3

DETAILED STEPS

Technical Assistance

CHAPTER

OSPFv2 Cryptographic Authentication

To prevent

Information About OSPFv2 Cryptographic Authentication

Configuring OSPFv2 Cryptographic Authentication

The

How to Configure OSPFv2 Cryptographic Authentication

Defining a Key Chain

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **key chain** *name*
4. **key** *key-id*
5. **key-string**

Example: Verifying a Key Chain

The following sample output from the **show key chain** command displays the key chain information:

```
Can be protected by per-prefix Loop-Free FastReroute
Can be used for per-prefix Loop-Free FastReroute repair paths
Index 1/1, flood queue length 0
Next 0x0(0)/0x0(0)
```

Additional References for OSPFv2 Cryptographic Authentication

Related Documents

Feature Information for OSPFv2 Cryptographic Authentication

Table 8: Feature Information for OSPFv2 Cryptographic Authentication

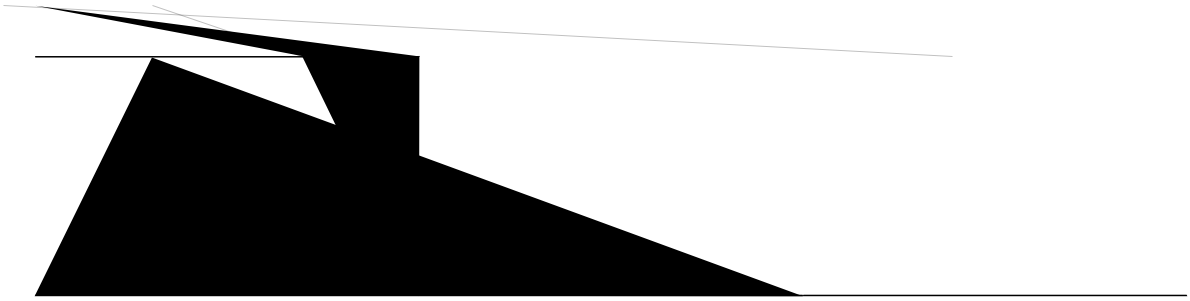
CHAPTER 3

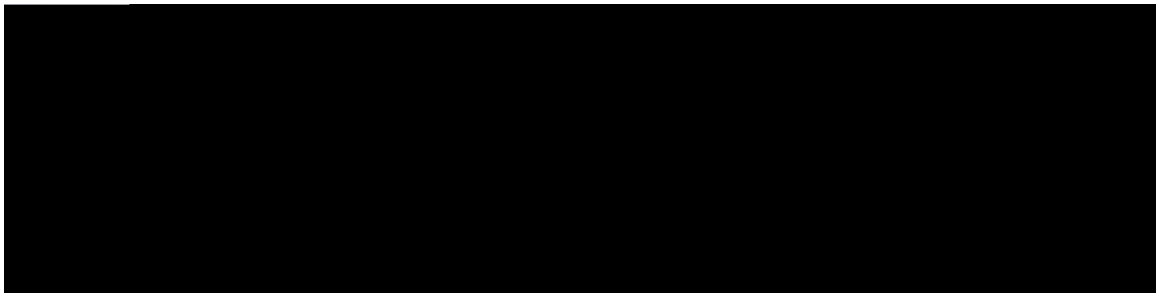
OSPFv3 External Path Preference Option

The Open

These rules apply when the same ASBR is reachable through multiple areas, or when trying to decide which of several AS-external-LSAs should be preferred. In the former case the paths all terminate at the same ASBR, an

Table 9: Feature Information for OSPFv3 External Path Preference Option





Enabling OSPFv3 Graceful Restart on a Graceful-Restart-Aware Router

The task can be performed in Cisco IOS XE Release 3.4S and later releases.

SUMMARY STEPS

1. **enable**

Example:

What to Do Next

Enabling OSPFv3 Graceful Restart on a Graceful-Restart-Aware Router

The task can be performed **in** releases prior to Cisco IOS XE Release 3.4S.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ipv6 router ospf** *process-id*
4. **graceful-restart helper** {**disable**

Example:

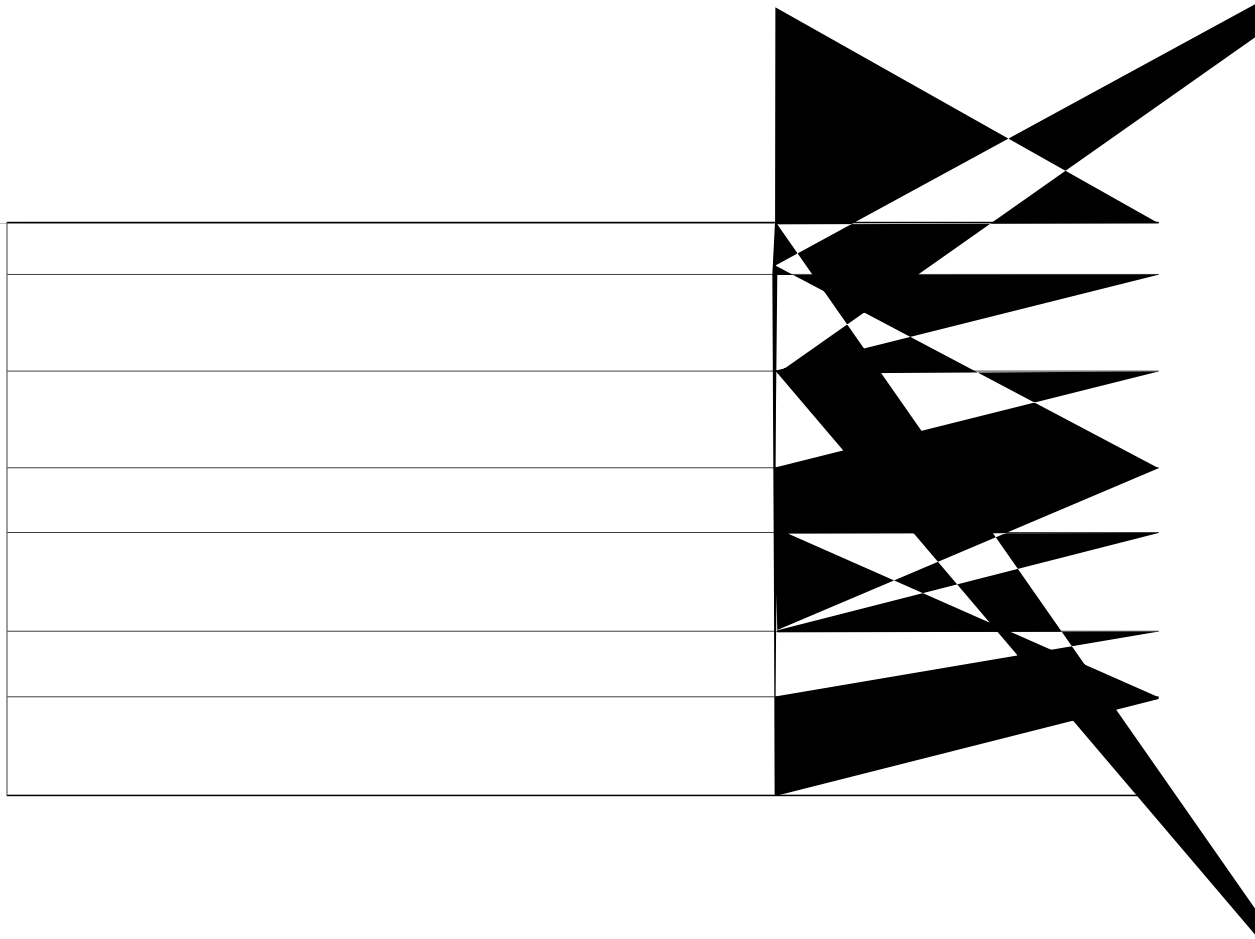
What to Do Next

Configuration Examples for OSPFv3 Graceful Restart

Example: Enabling OSPFv3 Graceful Restart

```
Router# show ipv6 ospf graceful-restart
Routing Process "ospf 1"
 Graceful Restart enabled
    restart-interval limit: 120 sec, last restart 00:00:15 ago (took 36 secs)
  Graceful Restart helper support enabled
  Router status : Active
  Router is running in SSO mode
  OSPF restart state : NO_RESTART
  Router ID 10.1.1.1, checkpoint Router ID 10.0.0.0
```

The following example



Feature Information for OSPFv3 Graceful Restart

The following

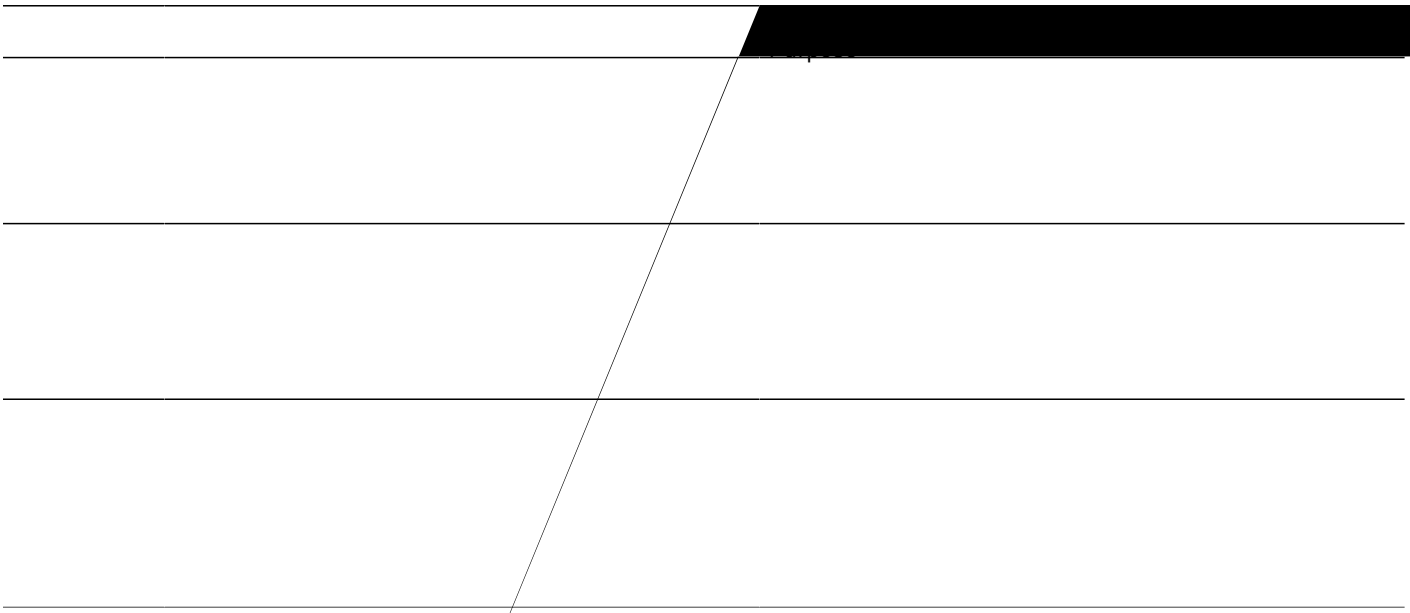
CHAPTER 7

Graceful Shutdown Support for OSPFv3

This feature provides the

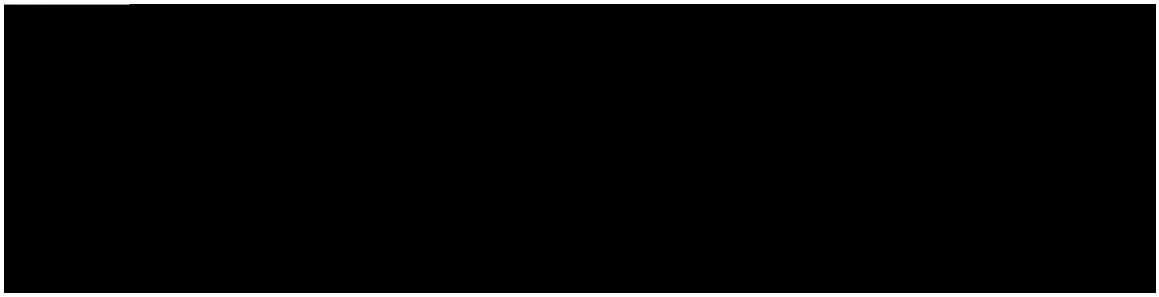
This feature also provides the ability to shut down OSPFv3 on a specific interface. In this case, OSPFv3 will not advertise the interface or form adjacencies over it; however, all of the OSPFv3 interface configuration will be

Configuring OSPFv3 Graceful Shutdown of the OSPFv3 Interface



Example: Configuring Graceful Shutdown of the OSPFv3 Interface

The following example shows



CHAPTER

options that allow you to configure a router that is running the Open Shortest Path First (OSPF) protocol to advertise a maximum or infinite metric to all neighbors.

When any of these

When this third option is configured, the router advertises a

Checksum: 0x175D
Length: 60
Area Border Router
AS Boundary Router
Number of Links: 3

Example Advertisement Until Routing Tables Converge

In the following example, a router that is running OSPF is configured to adver ed

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

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

SUMMARY STEPS

1.

Number of

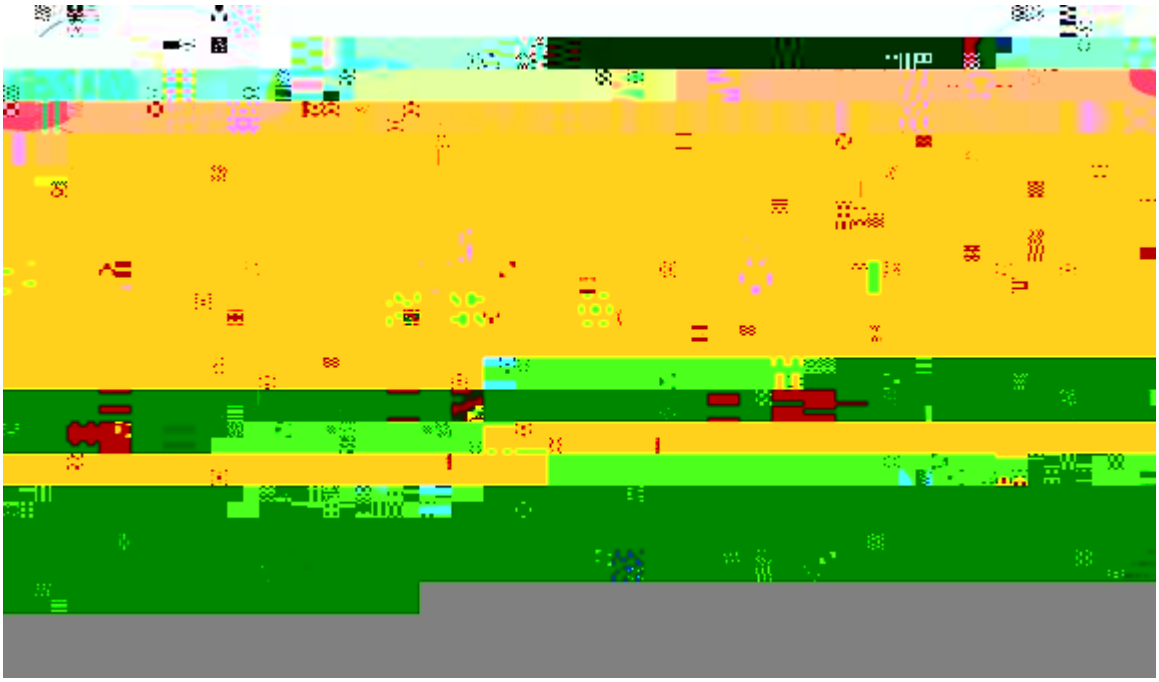
Example LSA Group Pacing

The following example configures OSPF group pacing

RFCs

RFC	Title
No	--

CHAPTER 10



For example, the figure above shows three client sites, each with backdoor links. Because each site runs OSPF within the same Area 1 configuration, all routing between the three sites follows the intraarea path across the backdoor links, rather than over the MPLS VPN backbone.

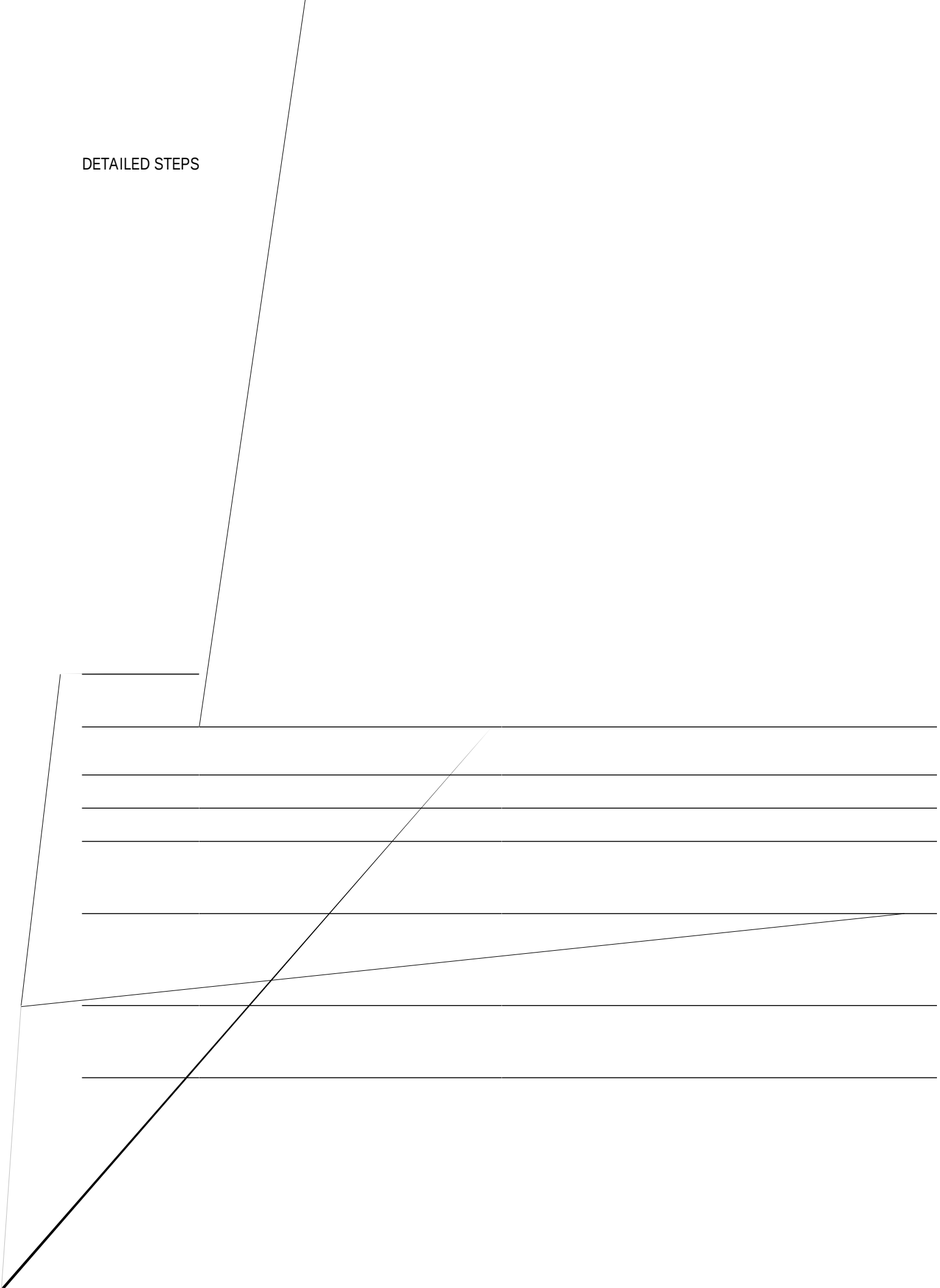
The following example shows

Known

How to Configure an OSPF Sham-Link

Creating a Sham-Link

DETAILED STEPS



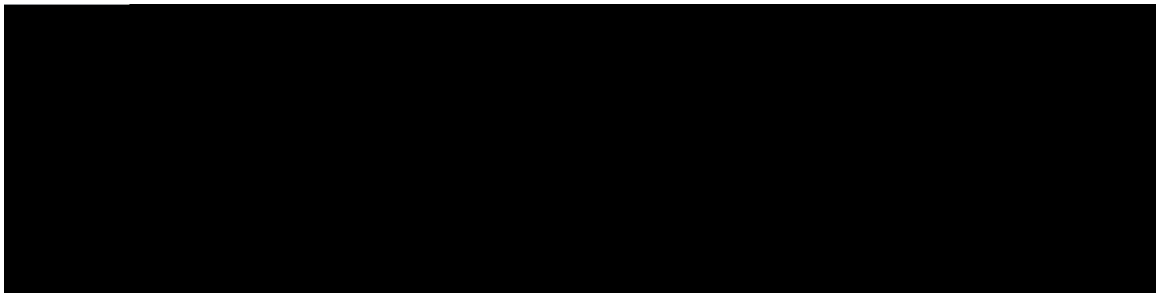
The figure below shows

10.3.1.7/32 **10.3.1.2**

```
Router1(config)# router
```

Glossary

BGP --Border Gateway Protocol. Interdomain routing protocol that exchanges reachability information with other BGP systems. I Tj 1F4 10 Tf 1 0 0 1 149.29086527



CHAPTER

```
 ip vrf forwarding grc
 ip address 192.168.2.1 255.255.255.252
...
!
router ospf 9000 vrf
```

Standards

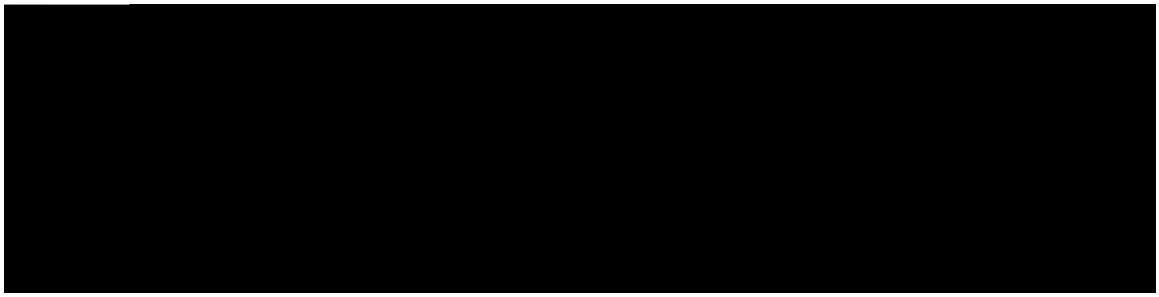
Feature Information for OSPF Support for Multi-VRF on CE Routers

PE Router --Provider Edge router, an edge router in the P network, defined as a P router which attaches directly to a C router.

P Network --MPLS-capable service provider core network. P routers perform MPLS.

P Router --Provider router, a router in the P network.

SPF --shortest path first. A



How to Configure OSPFv2 Multiarea Adjacency

Configuring OSPFv2 Multiarea Adjacency

SUMMAR

The following is a sample output from the **show ip ospf interface** command.

RFCs

Information About OSPFv2 Autoroute Exclude

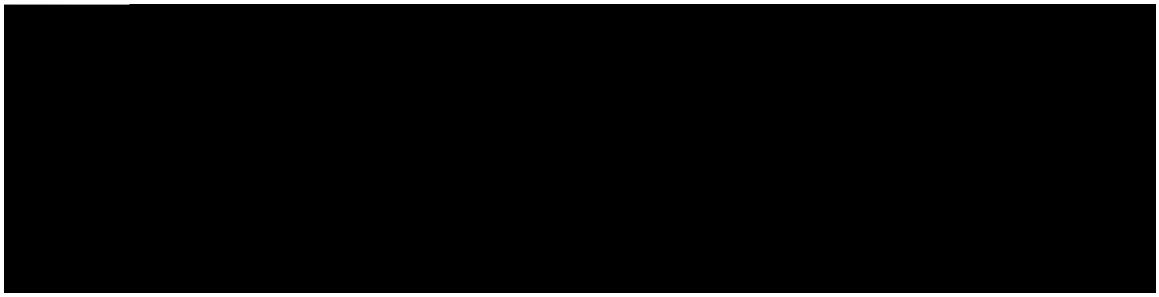
Overview of OSPFv2 Autoroute Exclude

The Autoroute feature is an IP routing method that forces OSPF to use MPLS TE tunnels to build paths for IP traffic routes.

The Autoroute feature enables all routes to use TE

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.

Table 17: Feature Information for OSPFv2 Autoroute Exclude



CHAPTER

How to Configure OSPFv3 Address Families

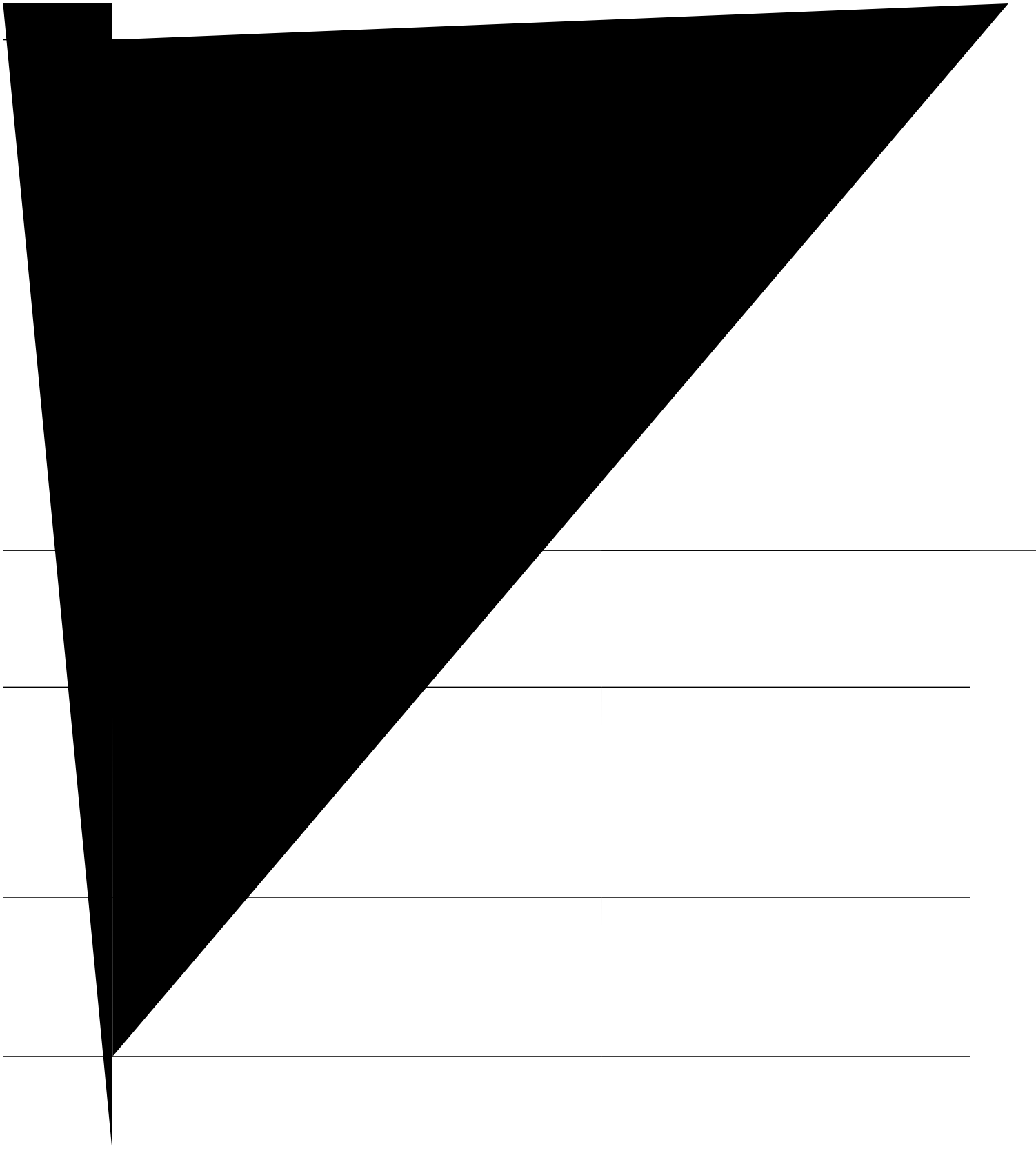
Configuring the OSPFv3 Router Process

Once you have completed step 3 and entered OSPFv3 router configuration

	Command or Action	Purpose
		Configures the router to send

SUMMARY STEPS

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



SUMMARY STEPS

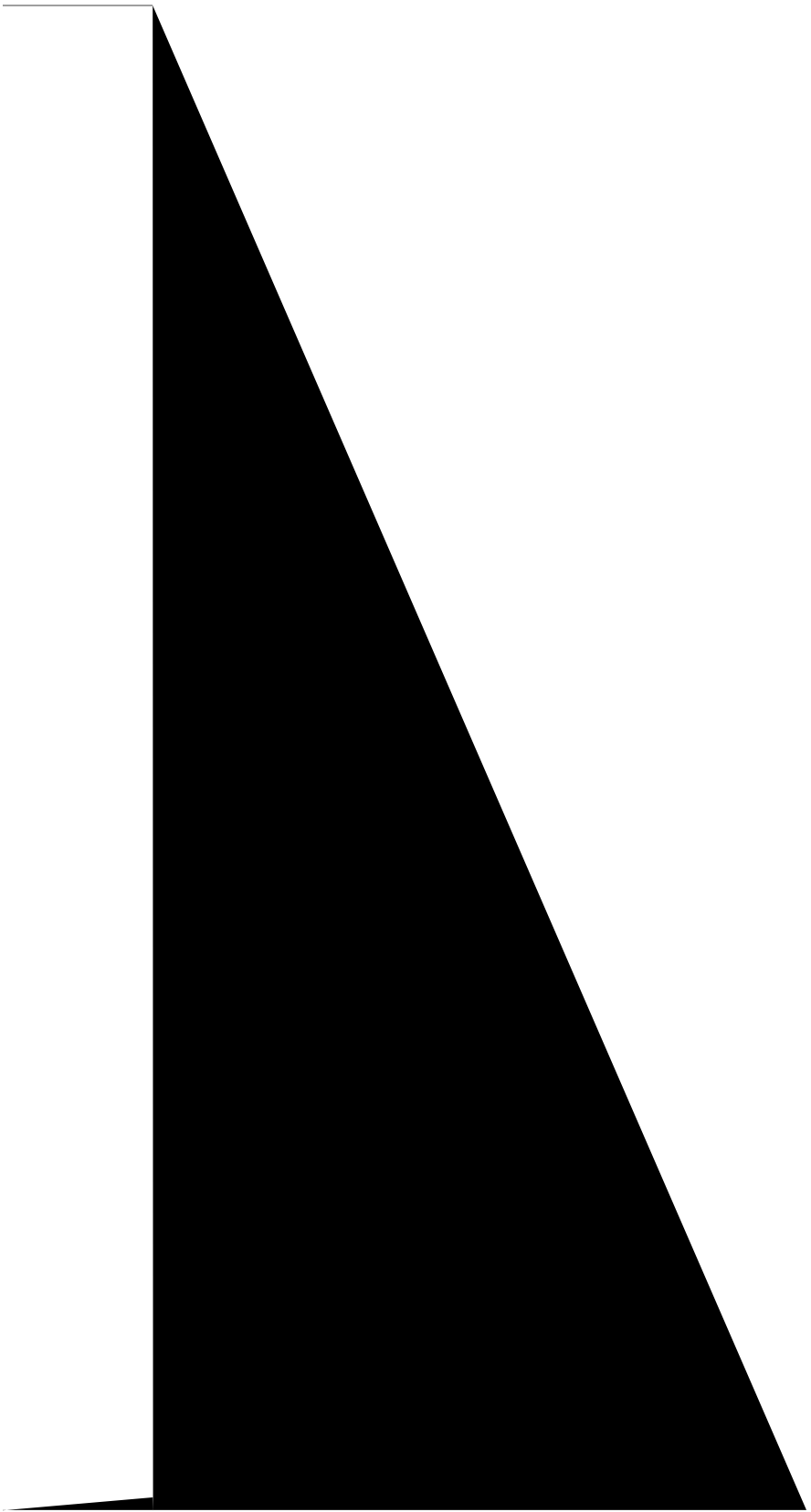
1. **enable**
2. **configure terminal**

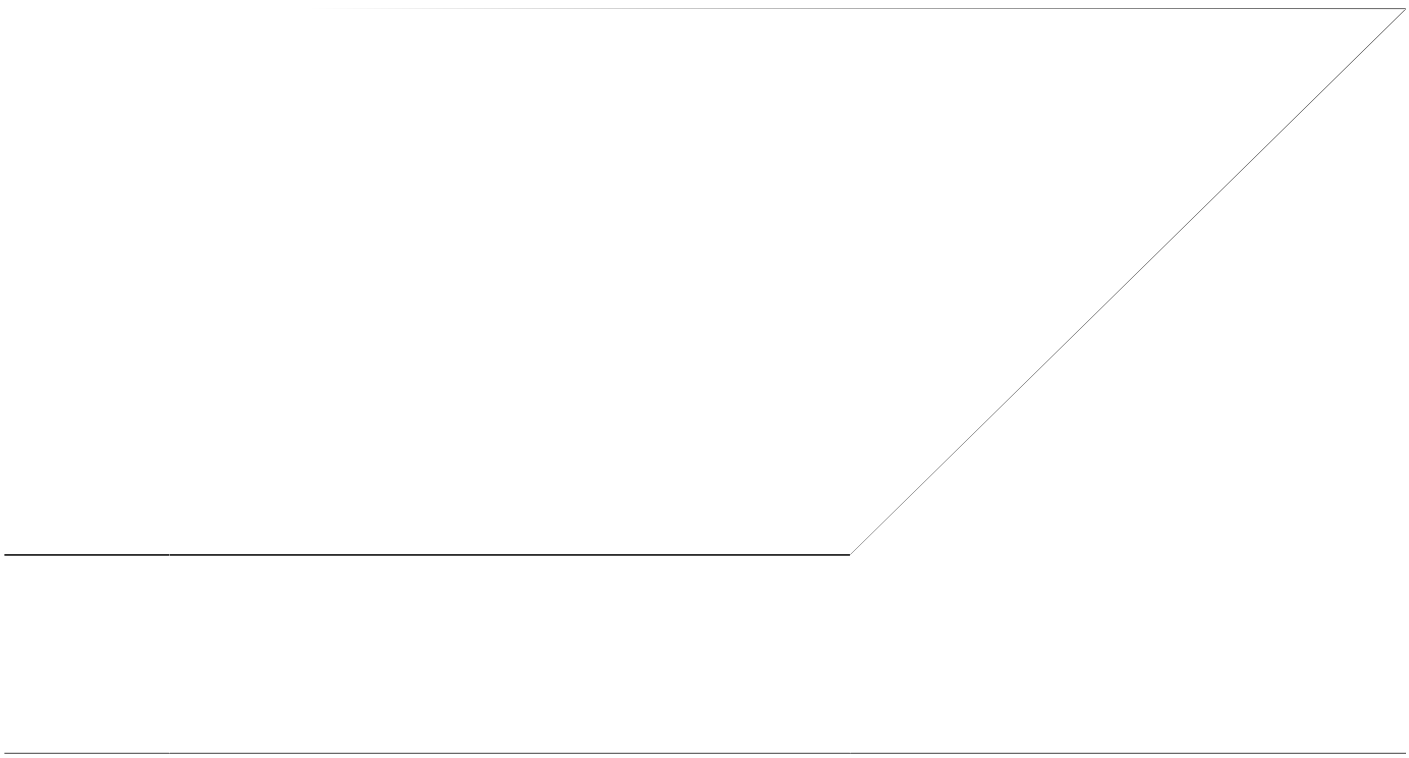
351.588 Tm(2.)Tj/F4 10 Tf1 000U45 1445XU

Enabling OSPFv3 on an Interface

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type number*
4. Do one of the





Defining an OSPFv3 Area Range

This task

Configuration Examples for OSPFv3 Address Families

Example: Configuring OSPFv3 Address Families

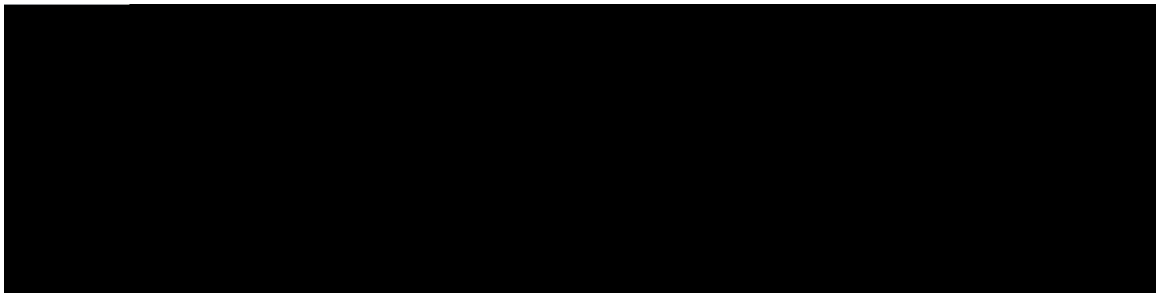
```
Device# show ospfv3
 Routing Process "ospfv3 1" with ID 10.0.0.1
 Supports



                        SFamtly                         SegSM
```

Feature Name	Releases	Feature Information
		The OSPFv3 address

Feature Name	Releases	Feature Information
		neighbor, **show ospfv3 request-list**, **show ospfv3 retransmission-list**, **show ospfv3 statistics**, **show ospfv3 summary-pr**



CHAPTER

To perform non-IPsec cryptographic authentication, OSPFv3 devices append a special

How to Configure OSPFv3 Authentication Trailer

Configuring OSPFv3 Authentication T

Technical Assistance

Description	Link
	http://

CHAPTER 10

Autoroute Announce and Forwarding Adjacencies For OSPFv3

The Autoroute Announce and Forwarding Adjacencies for OSPFv3 feature advertises IPv6 routes over MPLS/TE IPv4 tunnels. This module describes how to configure the Autoroute Announce and Forwarding Adjacencies for OSPFv3 feature.

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 theand

```
   area 1 mpls traffic-engineering tunnel-tail af loopback
   !
  !
!
```

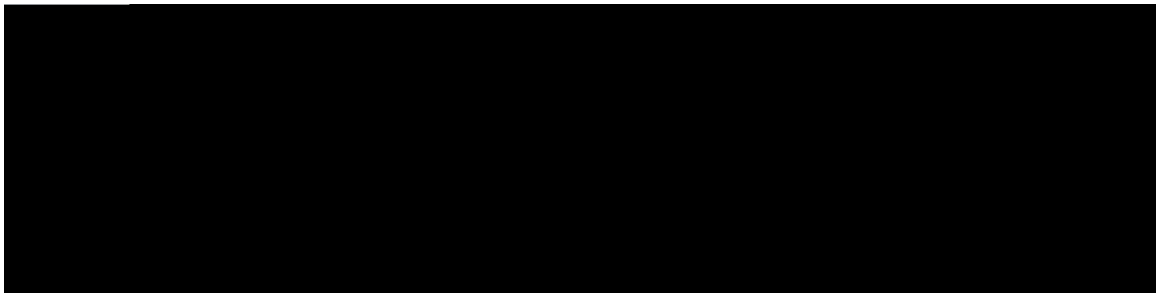
Additional References for Autoroute Announce and Forwarding Adjacencies For OSPFv3

Related Documents

Related Topic	Document Title
	Cisco IOS

Feature Information for Autoroute Announce and Forwarding Adjacencies For OSPFv3

The following table provides release information about the feature or features described in this module. This table lists



CHAPTER

- Multiprotocol Label Switching (MPLS) TE tunnels must be

DETAILED STEPS

Additional References for OSPFv3 Autoroute Exclude

Related Documents

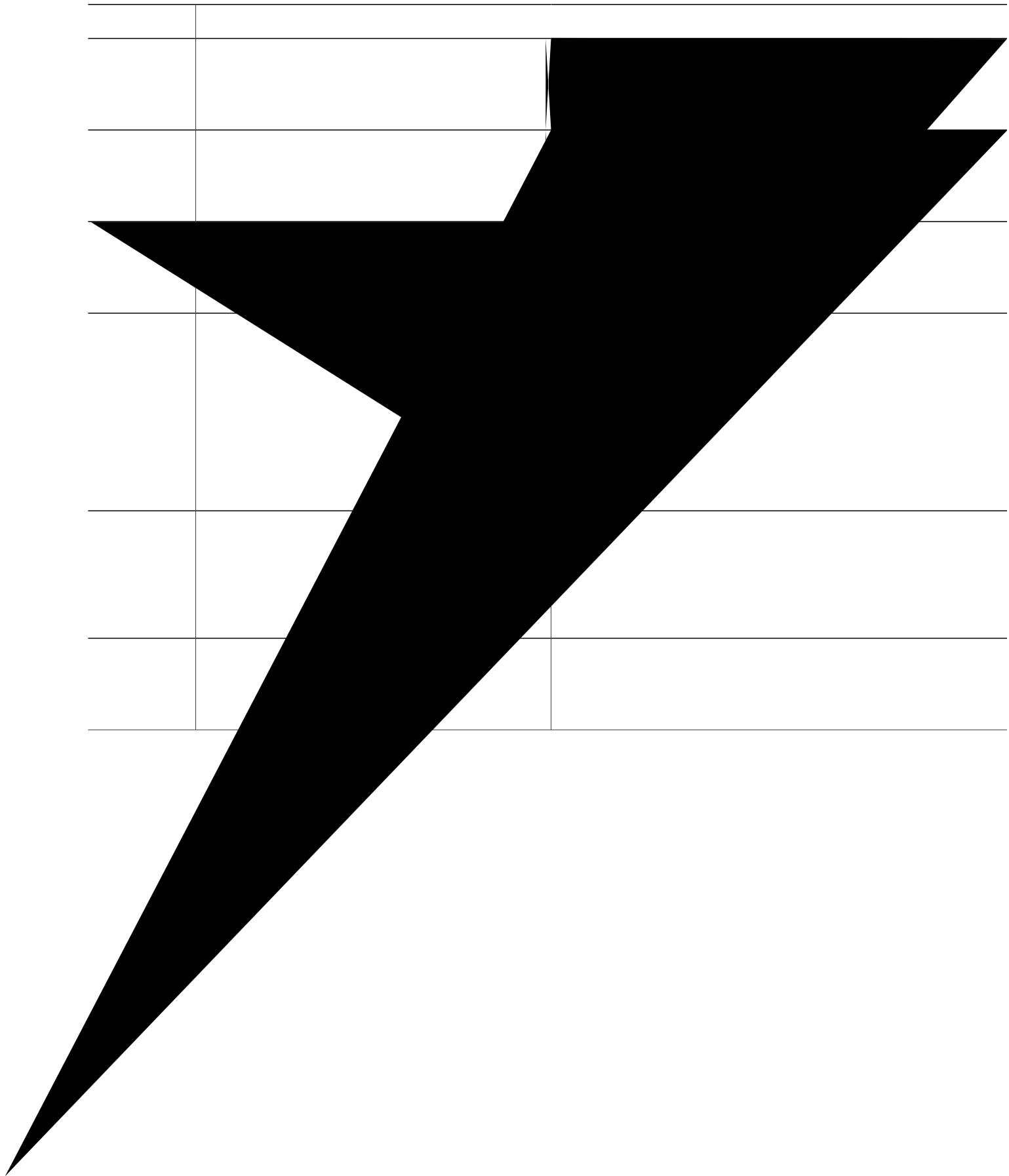
Feature Information for OSPFv3 Autoroute Exclude

The following table provides release information about the feature or

CHAPTER 10

OSPFv2 IP FRR Local Microloop Avoidance

DETAILED STEPS



```
microloop avoidance rib-update-delay 6500
!
```

Additional References for OSPFv2 IP FRR Local Microloop Avoidance

Related Documents

Table 22: Feature Information for OSPFv2 IP FRR Local Microloop Avoidance

CHAPTER 19

of sensitive data

How to Configure OSPFv2-OSPF Live-Live

Configuring OSPFv2-OSPF Live-Live

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip multicast-routing**
4. **ip multicast rpf multitopology**
5. **global-address-family ipv4 multicast**
6. **topology** {*topology-A* |

DETAILED STEPS

```
!
global-address-family ipv4
```

Technical Assistance

CHAPTER 20

OSPF Forwarding Address Suppression in

Information About OSPF Forwarding Address Suppression

Benefits of OSPF Forwarding Address Suppression

indicates that packets for the external destination should be forwarded to the advertising OSPF device, in this case, the translating NSSA ABR.

Before configuring this feature, consider the following caution.

Configuring this feature causes the device to be

Related Documents

Information About OSPF Inbound Filtering Using Route Maps with a Distribute List

Benefits of OSPF Route-Map-Based-Filtering

Users can define a route map to prevent OSPF routes from being added to the routing table. This filtering happens at the moment whe s

How to Configure OSPF Inbound Filtering Using Route Maps

Configuring OSPF Inbound Filtering Using a Route Map

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **route-map** *map-tag* [**permit** | **deny**] [*sequence-number*]
4. **match**

```
!
router ospf            è
```

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 resolv	http://www.cisco.com/cisco/web/support/index.html

CHAPTER 22

OSPF Shortest Path First Throttling

The OSPF Shortest Path First Throttling feature makes it possible to configure shortest path first (SPF) scheduling in millisecond intervals and to potentially delay SPF calculations during network instability. SPF is scheduled to calculate the Shortest Path Tree (SPT) when there is a change in topology

The SPF timing can be better explained

How to Configure OSPF SPF Throttling

Configuring OSPF SPF Throttling

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router ospf** *process-id*
4. **timers throttle spf** *spf-start spf-hold spf-max-wait*
5. **end**

DETAILED STEPS

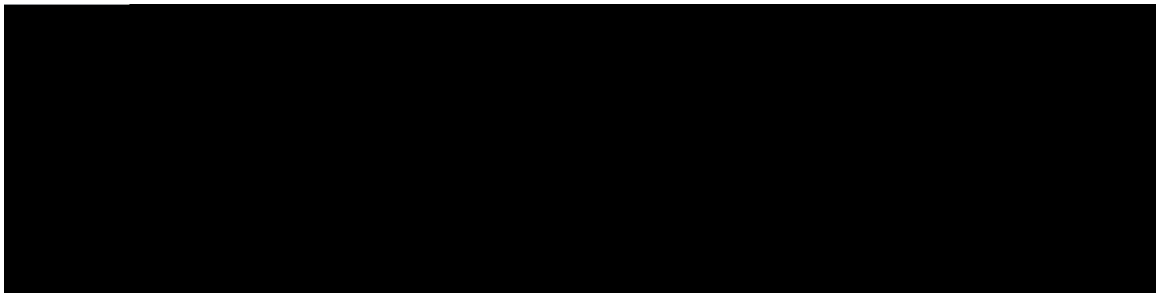
Verifying SPF Throttle Values

To verify SPF throttle timer values, use the **show ip ospf** command. The values are displayed

Related Documents

Feature Information for OSPF Shortest Path First Throttling

The following table provides release information about the feature or features described in this module. This table lists only the software



How to Configure OSPF Fast Hello Packets

Configuring OSPF Fast Hello Packets

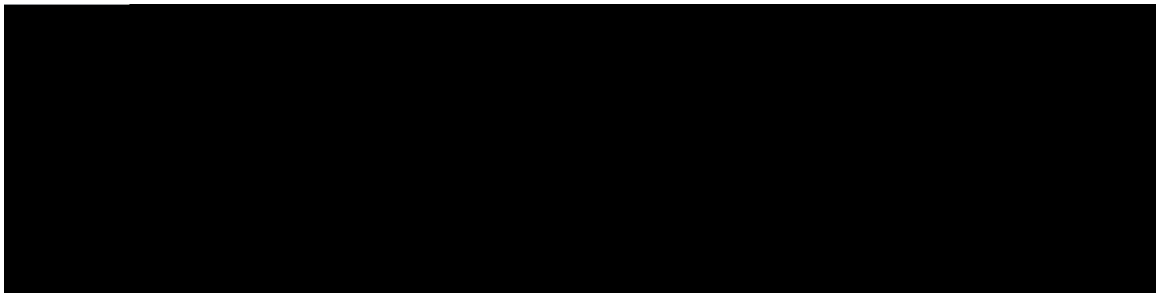
SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type number*
4. **ip ospf dead-interval minimal hello-multiplier** *multiplier*
5. **end**
6. **show ip ospf interface** [*interface-type interface-number*]

DETAILED STEPS

Feature Information for OSPF Support for Fast Hello Packets

The following



CHAPTER

Information About OSPF Incremental SPF

c

Standards

Use

CHAPTER 29

OSPF Limit on Number of Redistributed Routes

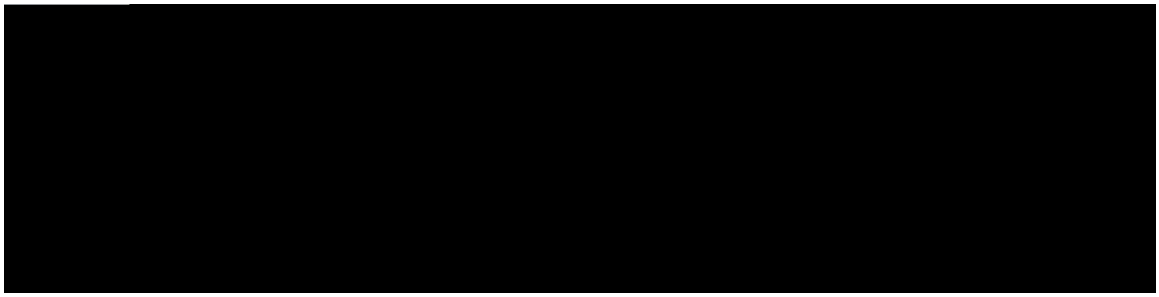
Open Shortest Path First (OSPF) supports a user-defined maximum number of prefixes (routes) that are allowed to

SUMMARY STEPS

	Command or Action	Purpose
		• This example causes two warnings: one at 80 percent of 1000 (800

Additional References

Related Documents



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

SUMMARY STEPS

1. **enable**
2.

	Command or Action	Purpose
		Configures LSA

Related Topic	Document Title
OSPFv3 Fast Convergence: LSA and SPF Throttling	"*OSPF Link-State Advertisement Throttling* " module

Standards and RFCs

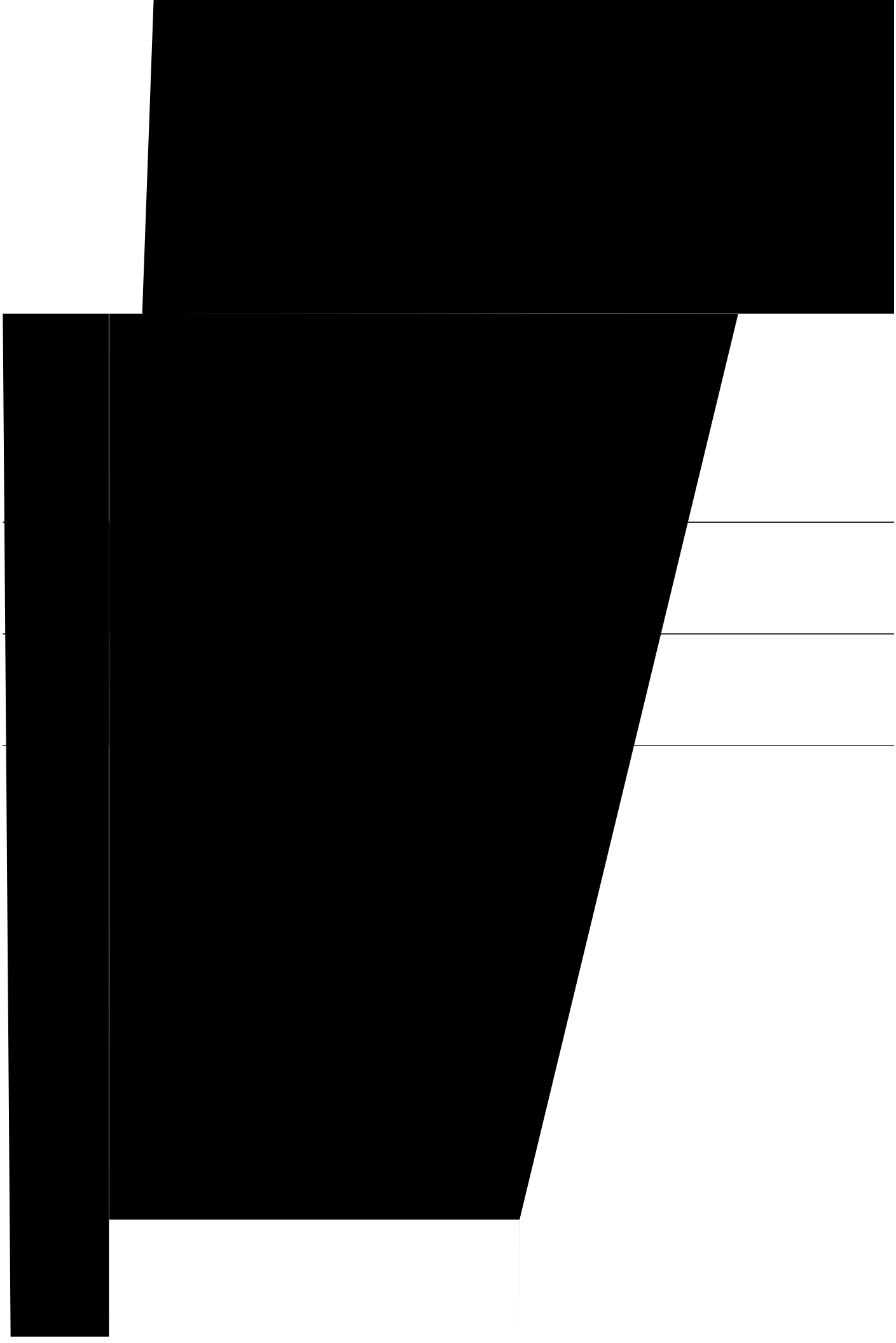
Table 30: Feature Information for OSPFv3 Fast Convergence: LSA and SPF Throttling

CHAPTER 27

OSPFv3 Max-Metric Router LSA

The Open Shortest Path

Pi hen



Additional References for OSPF Nonstop Routing

Related Documents

CHAPTER 28

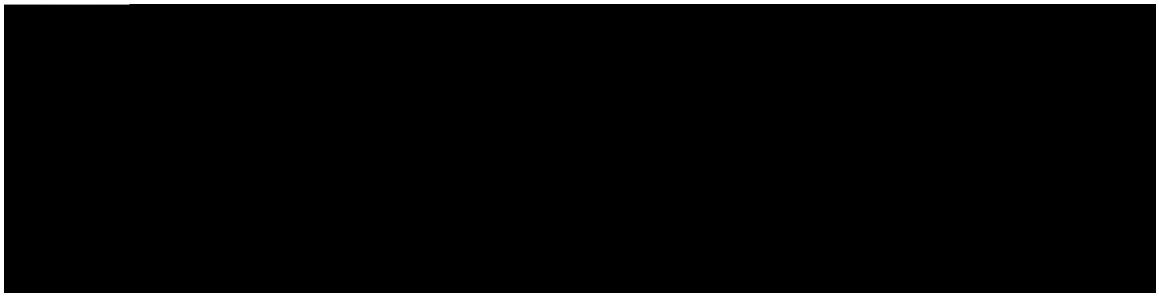
OSPF Link-State Advertisement Throttling

The OSPF Link-State Advertisement

Information About OSPF LSA Throttling

DETAILED STEPS

Related Documents



Prerequisites for OSPF Support for Unlimited Software VRFs per PE Router

You must have OSPF configured in your network.

Restrictions for OSPF Support for Unlimited Software VRFs per PE Router

Only 32 processes per VRF can be supported.

How to Configure OSPF Support for Unlimited Software VRFs per PE Router

Configuring Unlimited Software VRFs per PE Router

	Command or Action	Purpose
	Example: `Router(config)# router ospf 1 vrf crf-1`	• The *process-id* argument

Example Verifying OSPF Support for Unlimited Software VRFs per PE Router

This example illustrates the

MIBs

MIB	MIBs Link
No new or modified MIBs are supported by	To locate and download MIBs for selected platforms, Cisco IOS XE releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

Table 33: Feature Information for OSPF Support for Unlimited Software VRFs per Provider Edge Router

Feature Name	Releases	Feature Information
		In a Multiprotocol Label Switching--Virtual Private Network (MPLS-VPN) deployment, each VPN routing and forwarding instance (VRF) needs a separate Open Shortest Path First (OSPF) process when configured to run OSPF. The OSPF Support for Unlimited Software VRFs per Pro r ε er

CHAPTER 30

OSPF Area Transit Capability

The OSPF

How to Disable OSPF Area Transit Capability

Disabling OSPF Area Transit Capability on an Area Border Router

SUMMARY STEPS

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

Related Documents

Related Topic	Document Title
Configuring OSPF	"Configuring OSPF"
	Cisf M n

Feature Information for OSPF Area Transit Capability

The following table

CHAPTER 31

OSPF Per-Interface Link-Local Signaling

The OSPF Per-Interface Link-Local Signaling feature allows you to selectively enable or disable Link-Local Signaling (LLS) for a specific interface regardless of the global (router level) setting that you have previously

LLS on an interface

```
 no ip directed-broadcast
!
router ospf 1
 log-adjacency-changes detail
 area 0 authentication message-digest
 redistribute connected subnets
 network 10.0.0.0 0.25     .25     .260
```

Related Documents

Feature Information for OSPF Per-Interface Link-Local Signaling

The following table provides release information about the feature or features described in this module. This table lis

CHAPTER 32

OSPF Link-State Database Overload Protection

The OSPF Link-State

Information About OSPF Link-State Database Overload Protection

Benefits of Using OSPF Link-State Database Overload Protection

The OSPF Link-State Database Overload Protection feature provides a mechanism at the OSPF level to limit the number of nonself-generated LSAs for a given OSPF process. When other routers in the network have been misconfigured, they

How to Configure OSPF Link-State Database Overload Protection

Limiting the Number of Self-Generating LSAs for an OSPF Process

SUMMARY STEPS

Opaque Link	0	0	0
Opaque Area	0	0	0
Subtotal			

MIBs

MIB	MIBs Link
	To locate and download MIBs for selected platforms, Cisco IOS XE releases, and feature sets, use Cisco MIB Locator found at the following URL: http:/

Prerequisites for OSPF MIB Support of RFC 1850 and Latest Extensions

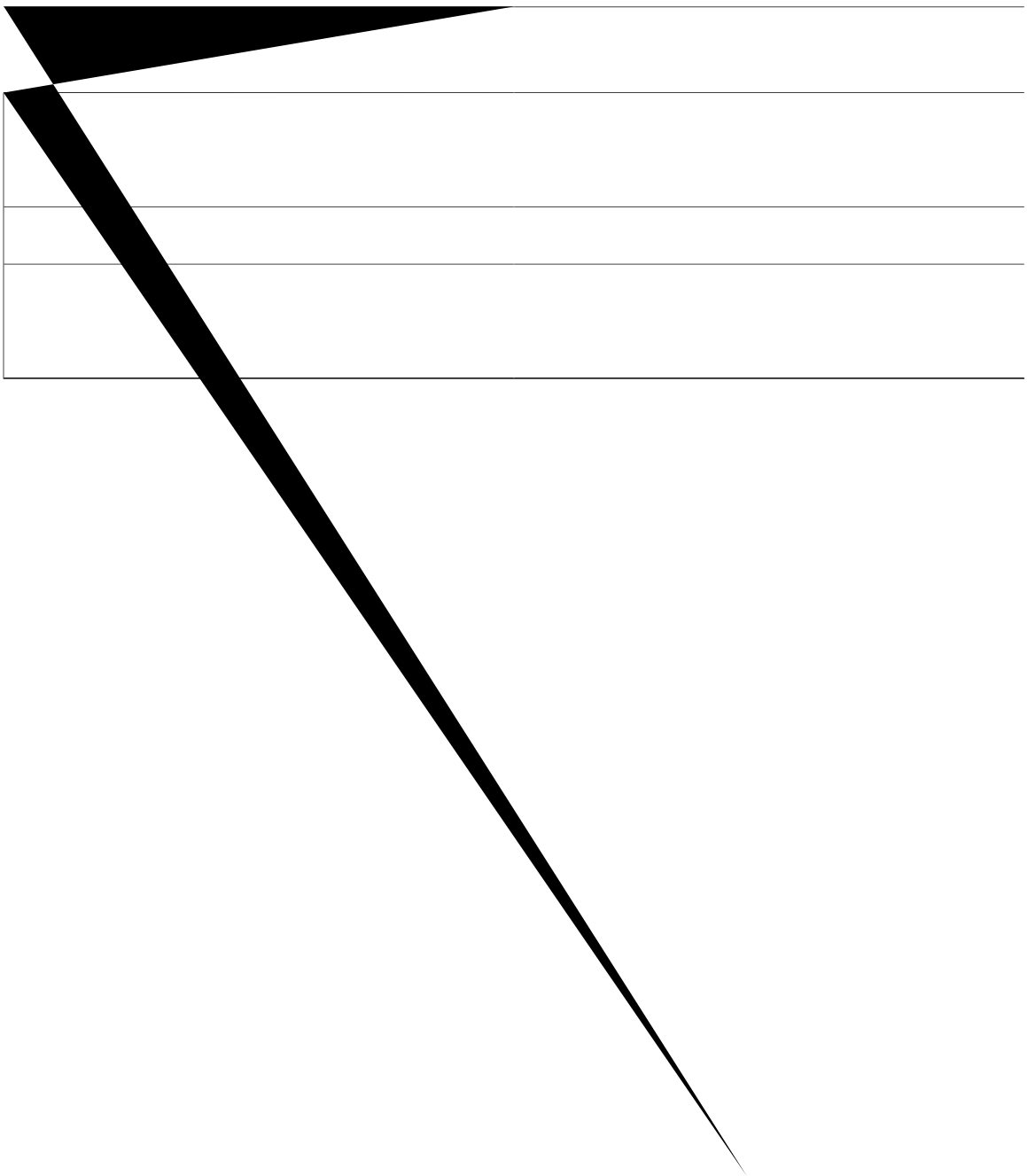
- OSPF must be configured on

The following scalar objects are added to OSPF-TRAP-MIB and are listed

- cospfRFC1583Compatibility
- cospfOpaqueLsaSupport
- cospfOpaqueASLsaCount
- cospfOpaqueASLsaCksumSum

For each of

CISCO-OSPF-MIB Table	New MIB Objects
	• cospfLocalLsdbIpAddress • cospfLocalLsdbAddressLessIf

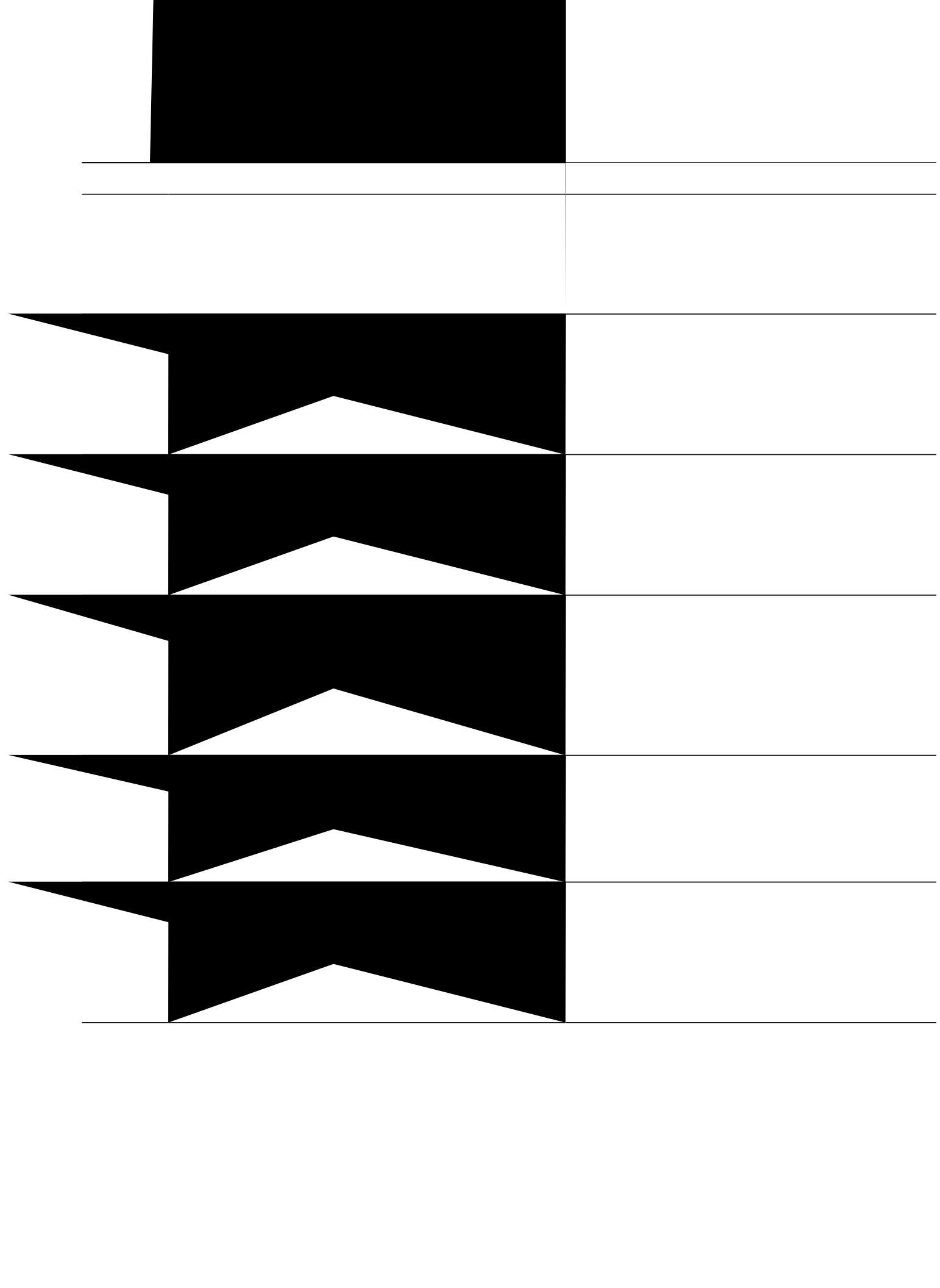


How to Enable OSPF MIB Support of RFC 1850 and Latest Extensions

Enabling OSPF MIB Support

Before You Begin

Before the



	Command or Action	Purpose
	Example:	

Configuration Examples for OSPF MIB Support of RFC 1850 and

Feature Name	Releases	Feature Information
		• **snmp-server enable traps ospf state-change**

CHAPTER 34

OSPF Enhanced Traffic Statistics

This document describes new and modified commands that provide enhanced OSPF traffic statistics for OSPFv2 and OSPFv3. The ability to collect and display more detailed traffic statistics increases high availability for the OSPF network by making the troubleshooting process more efficient.

New OSPF traffic statistics are collected and displayed to include the

Prerequisites for OSPF Enhanced Traffic Statistics

OSPFv2 or OSPFv3 must be configured on the router.

Configuration Examples for OSPF Enhanced Traffic Statistics

Example Displaying and Clearing Enhanced Traffic Statistics for OSPFv2

The following example shows display output for the **show ip ospf traffic** command for OSPFv2:

```
Router#
```

```
  Authentication 0,
OSPF LSA errors
  Type 0, Length 0, Data 0,
```

TX LS upd	10	1048
TX LS ack	4	256
TX Total	54	4392

RX LS ack	2	152
RX Total	17	

Standards

Standard	Title
None	--

Table 42: Feature Information for OSPF Enhanced Traffic Statistics for OSPFv2 and OSPFv3

Feature Name	Releases	Feature Information
		This document describes the detailed OSPF traffic

CHAPTER 39

TTL Security Support for OSPFv3 on IPv6

The Time To Live (TTL) Security Support for Open Shortest Path First version 3 (OSPFv3) on IPv6 feature increases protection against OSPFv3 denial of service attacks.

Prerequisites for TTL Security Support for OSPFv3 on IPv6

The TTL Security Support for OSPFv3 on IPv6 feature is available only on platforms with OSPFv3 routing capabilities.

Information About TTL Security Support for OSPFv3 on IPv6

OSPFv3 TTL Security Support for Virtual and Sham Links

In

How to Configure TTL Security Support for OSPFv3 on IPv6

Configuring TTL Security Support on Virtual Links for OSPFv3 on IPv6

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router ospfv3** [*process-id*]
4.

	Command or Action	Purpose
		Defines an OSPFv3 virtual link and

CHAPTER 30

Configuring OSPF TTL Security Check and OSPF Graceful Shutdown

This

Information About OSPF TTL Security Check and OSPF Graceful Shutdown

TTL Security Check for OSPF

When the TTL Security Check feature is enabled, OSPF sends outgoing packets with an IP header Time to Live (TTL) value of

connected to a network segment between the local and remote OSPF networks. This solution greatly reduces the effectiveness of Denial of Service (DoS) attacks against an OSPF autonomous system.

OSPF Graceful Shutdown

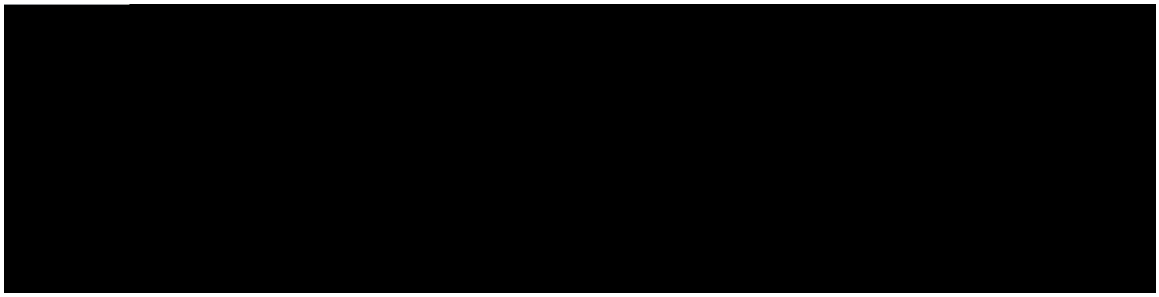
The OSPF Graceful Shutdown feature provides the ability to temporarily shut down the OSPF protocol in the least disruptive manner

	Command or Action	Purpose
		(Optional) Displays OSPF traffid

Configuring TTL security in an existing network is a three-step process:

1 Configure TTL

Table 44: Feature Information for Configuring OSPF TTL Security Check and OSPF Graceful Shutdown



CHAPTER

- SNMP must be enabled on

- cospfShamLinksEvents
- cospfShamLinksTable

OSPF Sham-Link Neighbor Support

The cospfShamLinkNbrTable table object describes all OSPF sham-link neighbor entries. The cospfShamLinkNbrTable allows access to the following

DETAILED STEPS

Enabling OSPF Sham-Link Retransmissions Traps

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **snmp-server enable traps ospf cisco-specific retransmit [packets [shamlink | virt-packets] | shamlink [packets |**

Enabling OSPF Sham-Link State Change Traps

```
Router(config)# snmp-server enable traps ospf cisco-specific retransmit shamlink
Router(config)# end
```

The **show running-config** command is entered to verify that the

MIBs

Table 45: Feature Information for OSPF Sham-Link MIB Support

Prerequisites for SNMP ifIndex Value for Interface ID in Data Fields

Before you can use

For both OSPFv2 and OSPFv3, if an interface does not have an SNMP ifIndex number and an interface

	Command or Action	Purpose
		If you configure an OSPFv3 routing process, that uses IPv6, you must

```
Enter configuration commands, one
```

```
Transmit Delay is 1 sec, State DR, Priority 1
Designated Router (ID) 172.16.0.1, local address FE80::A8BB:CCFF:FE00:6F02
No backup designated router on this network
Timer
```

```
  LS age: 151
  LS Type: Intra-Area-Prefix-LSA
  Link State ID: 1006
  Advertising Router: 172.16.0.1
  LS Seq Number: 80000001
  Checksum: 0x6E24
  Length: 44
  Referenced LSA Type: 2002
  Referenced Link State ID: 6
  Referenced Advertising Router: 172.16.0.1
  Number of Prefixes: 1
  Prefix Address: 2002:0:1::
  Prefix Length: 64, Options: None, Metric: 0
Router# show ipv6 ospf database router
```

Area Border Router
Number of

Table 46: Feature Information for OSPF: SNMP ifIndex V

CHAPTER 39

OSPFv2 Local RIB

Prerequisites for OSPFv2 Local RIB

Changing the Default Local RIB Criteria

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router ospf** *process-id* [**vrf** *vpn-name*]
4. **local-rib-criteria** [**forwarding-address**] [**inter-area-summary**] [**n**

	Command or Action	Purpose
	show ip ospf *process-id* **rib** [**redistribution**] [*network-prefix*] [*network-mask*] [**detail**] Example:	Displays information for the OSPF local RIB or locally redistributed routes.

Additional References

The following

Table 47: Feature Information for the OSPFv2 Local RIB

Feature Name	Releases	Feature Information
R		With the OSPFv2 Local RIB feature, each OSPF protocol instance has its own local Routing Information Base (RIB). The OSPF local RIB serves as the primary state for OSPF SPF route computation. The global RIB is not updated with intermediate results during the SPF. Instead, the

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip cef distributed**
4. **mpls traffic-eng tunnels**
5. **interface**

Do not use the **mpls traffic-eng autor**

Additional References

The following sections provide references related to OSPF Forwarding Adjacency.

Related Documents

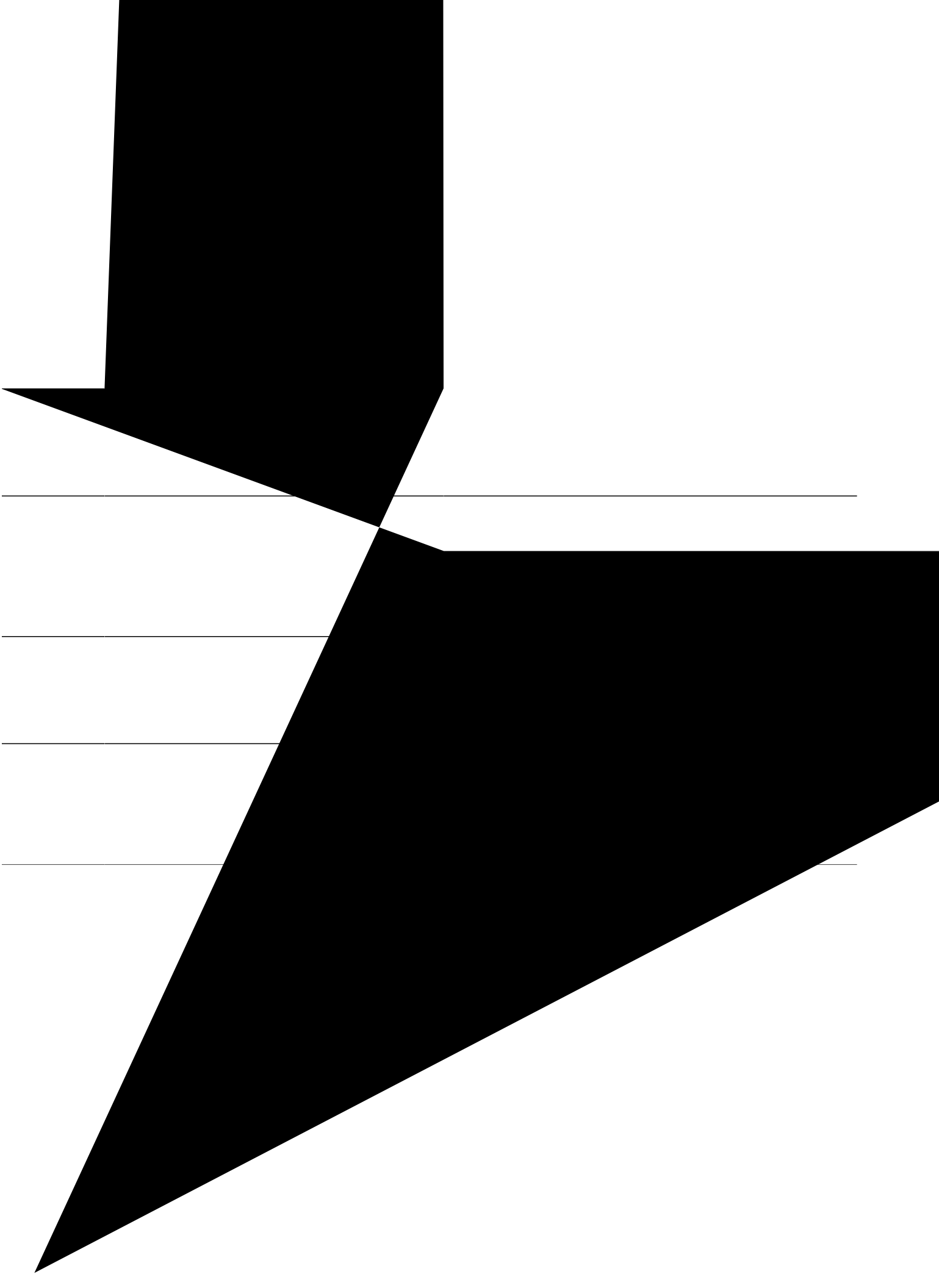
Technical Assistance

Description	Link
	http://

Restrictions on Enabling OSPFv2 on an Interface Basis

The **ip**

initialization is complete. To remove an



```
Router(config-if)# ip ospf
```

Table 48: Feature Information for Enabling OSPFv2 on an Interface Basis

CHAPTER 42

OSPF Nonstop Routing

The OSPF Nonstop Routing

Restrictions for OSPF NSR

- OSPF nonstop routing

Troubleshooting Tips

OSPF NSR can increase the

Additional References

Related Documents

Feature Information for OSPF NSR

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

CHAPTER 49

OSPFv3 NSR

The OSPFv3 NSR feature allows a router with redundant Route Processors (RPs)

extensions to the OSPFv3 protocol

DETAILED STEPS

Event-log enabled, Maximum number of

Number of

Additional References

Related Documents

Restrictions for OSPFv2 Loop-Free Alternate Fast Reroute

The OSPFv2 Loop-Free Alternate Fast Reroute feature is not supported on routers that are virtual links headends.

The OSPFv2 Loop-Free Alternate Fast Reroute feature is supported only in global VPN routing and forwarding (VRF) OSPF instances.

You cannot configure a traffic engineering (TE) tunnel interface as a protected interface. Use the MPLS Traffic

Downstream Path

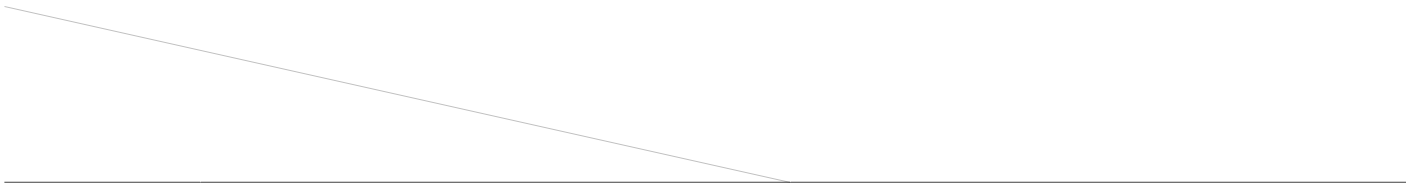
In the case of a

Note Only the following three match keywords are recognized in the route map: **match tag**, **match route-type**, and **match ip address prefix-list**.

>

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **route-map** *map-tag* [permit | deny] [*sequence-number*]
4. **match tag** *tag-name*
5. **exit**
6. **router ospf** *process-id*
7. **prefix-priority** *priority-level*



DETAILED STEPS

		Purpose

Example Specifying Prefix-Protection Priority

The following example shows how to specify which prefixes will be protected by LFA FRR:

```
Router(config)#
```


Feature Information for OSPFv2 Loop-Free Alternate Fast Reroute

CHAPTER 49

OSPFv3 MIB

The OSPFv3 MIB feature enables Ω Ω nar

Restrictions for OSPFv3 MIB Support

- To monitor multiple

DETAILED STEPS

Configuration Examples for OSPFv3 MIB

Example: Enabling and Verifying OSPFv3 MIB Traps

The following example shows how to enable all OSPFv3 error traps:

```
Device> enable
Device#
```

Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to	http://www.cisco.com/cisco/web/support/index.html

How to Configure Prefix Suppression Support for OSPFv3

Configuring Prefix Suppression Support of the OSPFv3 Process

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router ospfv3** *process-id* [**vrf** *vpn-name*]
4. **prefix-suppression**
5. **end**
6. **show ospfv3**

DETAILED STEPS

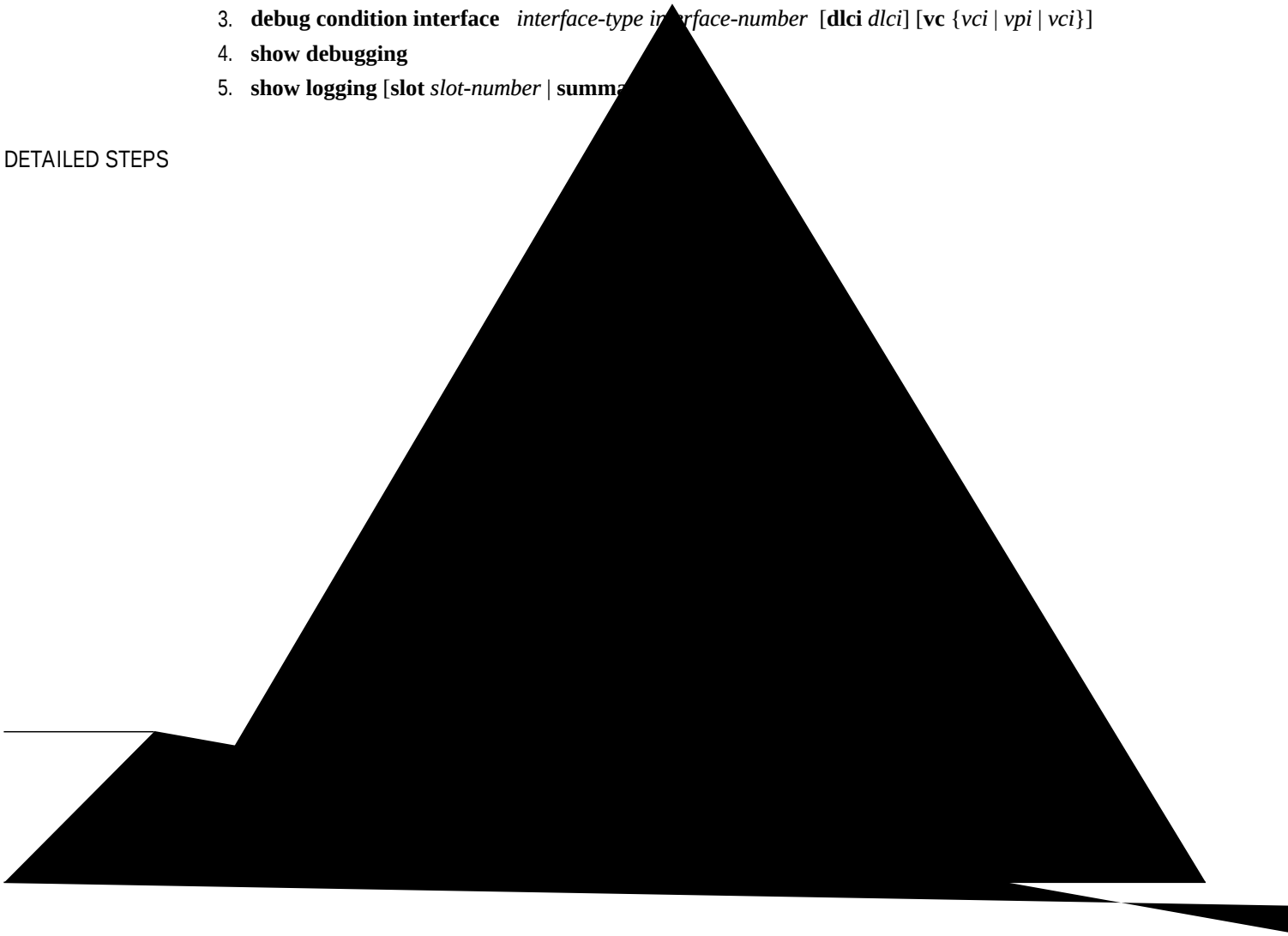
DETAILED STEPS

Troubleshooting IPv4 and IPv6 Prefix Suppression

SUMMARY STEPS

1. **enable**
2. **debug ospfv3 lsa-generation**
3. **debug condition interface** *interface-type interface-number* [**dlci** *dlci*] [**vc** {*vci* | *vpi* | *vci*}]
4. **show debugging**
5. **show logging** [**slot** *slot-number* | **summa**

DETAILED STEPS

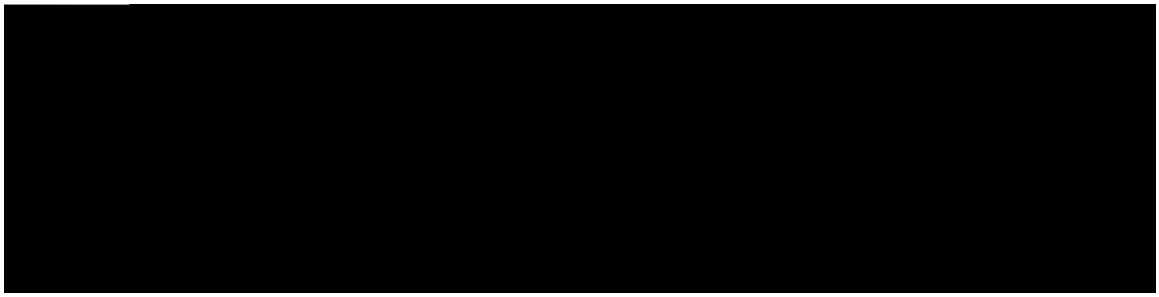


Configuration Examples for Prefix Suppression Support for OSPFv3

Example: Configuring Prefix Suppression Support for OSPFv3

The following example shows

FeaturSon 4n.



CHAPTER

- **ospfv3** *process-id* **—**Applies to an

	Command or Action	Purpose
		Configures an IPv6 address of the loopback interface on a

Configuring a Domain ID for an OSPFv3 PE-CE

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **vrf definition** *vrf-name*
4. **rd** *route-distinguisher*
5. **exit**
6. **router**

DETAILED STEPS

	Command or Action	Purpose
		Exists router address family mode and returns to privileged

ipv6

CHAPTER 48

OSPFv3 ABR Type 3 LSA Filtering

This feature extends

BR Type 3 LSA Filtering

Feature Information for OSPFv3 ABR Type 3 LSA Filtering

The following table provides release information about the feature or features described in this

How to Configure OSPFv3 Demand Circuit Ignore

Configuring Demand Circuit Ignore Support for OSPFv3

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type number*
4. Enter one of the following commands:
    - **ipv6 ospf demand-cir**

[redacted]

CHAPTER 30

Information About OSPF IPv4 Remote Loop-Free AIternate IP Fast Reroute

IP Fast Reroute

The IP fast reroute (IPFRR) LFA computation provides protection against link failure. Locally computed repair paths are used to prevent packet loss caused

	Command or Action	Purpose
		Configures the maximum distance to the tunnel endpoint in

CHAPTER 31

OSPFv3 Multiarea Adjacency

The OSPFv3 Multiarea Adjacency feature allows you to configure a link that multiple Open Shortest Path First version 3 (OSPFv3) areas can share to enable

Restrictions for OSPFv3 Multiarea Adjacency

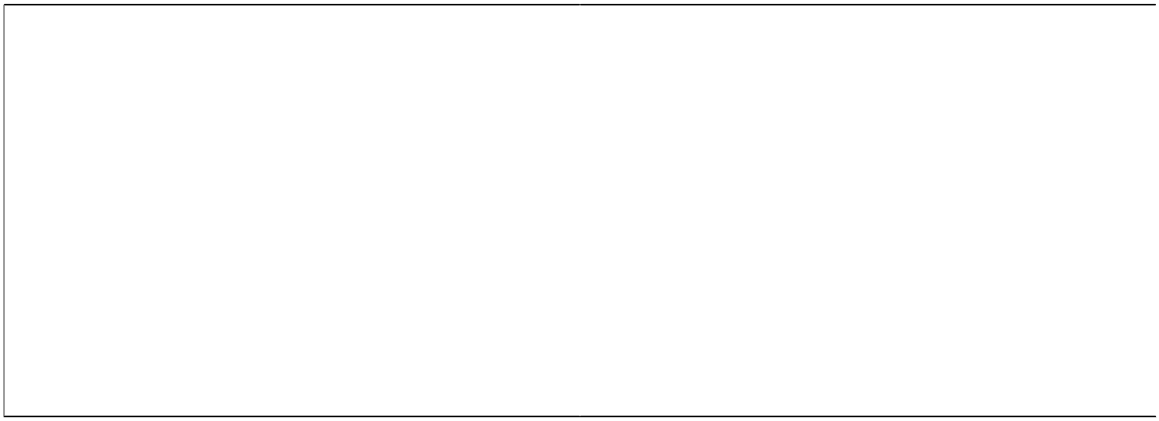
- A multiarea interface operates only if

How to Configure OSPFv3 Multiarea Adjacency

Configuring OSPFv3 Multiarea Adjacency

Sample Output for the **show ospfv3 multi-area** Command

To display information about OSPFv3 multiarea interfaces, use the **show ospfv3 multi-area** command in privileged EXEC mode.



CHAPTER 32

OSPF Limiting Adjacency Formations

The OSPF: Limit Simultaneous Adjacency Formations feature allows you to limit to the number of adjacencies in

Limit.

DETAILED STEPS

Example:

```
Device> enable
```

Enables privileged EXEC mode.