

Table of Contents

<u>How OSPF Injects a Default Route into a Normal Area</u>	1
<u>Document ID: 47868</u>	1
<u>Introduction</u>	1
<u>Prerequisites</u>	1
<u>Requirements</u>	1
<u>Components Used</u>	1
<u>Conventions</u>	1
<u>Configure</u>	1
<u>Network Diagram</u>	2
<u>Configurations</u>	2
<u>Verify</u>	3
<u>Examine the OSPF Database</u>	3
<u>Troubleshoot</u>	4
<u>Related Information</u>	4

How OSPF Injects a Default Route into a Normal Area

Document ID: 47868

Introduction

Prerequisites

- Requirements

- Components Used

- Conventions

Configure

- Network Diagram

- Configurations

Verify

- Examine the OSPF Database

Troubleshoot

Related Information

Introduction

This document shows how Open Shortest Path First (OSPF) injects a default route into a normal area. Default routes injected into a normal area can be originated by any OSPF router. The OSPF router does not, by default, generate a default route into the OSPF domain. In order for OSPF to generate a default route, you must use the **default-information originate** command.

There are two ways to advertise a default route into a normal area. The first is to advertise 0.0.0.0 into the OSPF domain, provided the advertising router already has a default route. The second is to advertise 0.0.0.0 regardless of whether the advertising router already has a default route. The second method can be accomplished by adding the keyword **always** to the **default-information originate** command.

Prerequisites

Requirements

There are no specific requirements for this document.

Components Used

This document is not restricted to specific software and hardware versions.

Conventions

For more information on document conventions, see the Cisco Technical Tips Conventions.

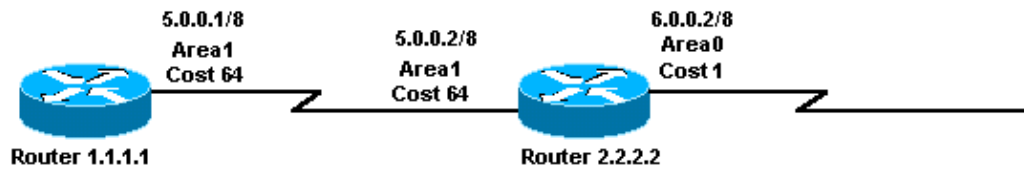
Configure

In this section, you are presented with the information to configure the features described in this document.

Note: To find additional information on the commands used in this document, use the Command Lookup Tool (registered customers only) .

Network Diagram

This document uses the network setup shown in this diagram.



Configurations

This document uses the configurations shown here.

- Router 1.1.1.1
- Router 2.2.2.2

Router 1.1.1.1
Current configuration: <pre>hostname r1.1.1.1 interface Loopback0 ip address 1.1.1.1 255.0.0.0 interface Serial2/1/0 ip address 5.0.0.1 255.0.0.0 router ospf 2 network 5.0.0.0 0.255.255.255 area 1 end</pre>

Router 2.2.2.2
Current configuration: <pre>hostname r2.2.2.2 interface Loopback0 ip address 2.2.2.2 255.0.0.0 interface Serial0/1/0 ip address 5.0.0.2 255.0.0.0 interface ATM1/0.20 ip address 6.0.0.2 255.0.0.0 router ospf 2 network 5.0.0.0 0.255.255.255 area 1 network 6.0.0.0 0.255.255.255 area 0 default-information originate</pre>

```
ip route 0.0.0.0 0.0.0.0 6.0.0.3
end
```

Verify

This section provides information you can use to confirm your configuration is working properly.

Certain **show** commands are supported by the Output Interpreter Tool (registered customers only) , which allows you to view an analysis of **show** command output.

- **show ip ospf database** Displays a list of the Link State Advertisements (LSAs) and types them into a link state database. This list shows only the information in the LSA header.
- **show ip ospf database external** Displays information only about the external LSAs.
- **show ip route** Displays the current status of the routing table.

Examine the OSPF Database

This output displays how the OSPF database looks given this network environment, using the **show ip ospf database** command.

```
r2.2.2.2#show ip ospf database
```

```
OSPF Router with ID (2.2.2.2) (Process ID 2)
```

```
Router Link States (Area 0)
```

Link ID	ADV Router	Age	Seq#	Checksum	Link count
2.2.2.2	2.2.2.2	600	0x80000001	0x9583	1

```
Summary Net Link States (Area 0)
```

Link ID	ADV Router	Age	Seq#	Checksum
5.0.0.0	2.2.2.2	600	0x80000001	0x8E61

```
Router Link States (Area 1)
```

Link ID	ADV Router	Age	Seq#	Checksum	Link count
1.1.1.1	1.1.1.1	864	0x8000005E	0xD350	2
2.2.2.2	2.2.2.2	584	0x8000001E	0xF667	2

```
Summary Net Link States (Area 1)
```

Link ID	ADV Router	Age	Seq#	Checksum
6.0.0.0	2.2.2.2	585	0x80000004	0xA87C

```
Type-5 AS External Link States
```

Link ID	ADV Router	Age	Seq#	Checksum	Tag
0.0.0.0	2.2.2.2	601	0x80000001	0xD0D8	0

Because it has a default route, Router 2.2.2.2 originates a type 5 LSA with a link ID of 0.0.0.0. This is the result of the **default-information originate** command in its OSPF configuration.

```
r2.2.2.2#show ip ospf database external 0.0.0.0
```

```
OSPF Router with ID (2.2.2.2) (Process ID 2)
```

Type-5 AS External Link States

```
LS age: 650
Options: (No TOS-capability, DC)
LS Type: AS External Link
Link State ID: 0.0.0.0 (External Network Number )
Advertising Router: 2.2.2.2
LS Seq Number: 80000001
Checksum: 0xD0D8
Length: 36
Network Mask: /0
    Metric Type: 2 (Larger than any link state path)
    TOS: 0
    Metric: 1
    Forward Address: 0.0.0.0
    External Route Tag: 0
```

```
r2.2.2.2#show ip route 0.0.0.0
S* 0.0.0.0/0 [1/0] via 6.0.0.3, 00:28:00, ATM1/0.20
```

```
r1.1.1.1#show ip route ospf
O IA 6.0.0.0/8 [110/65] via 5.0.0.2, 00:00:18, Serial2/1/0
O*E2 0.0.0.0/0 [110/1] via 5.0.0.2, 00:00:18, Serial2/1/0
```

You can also add the **always** keyword to the **default-information originate** command to make a router originate a 0.0.0.0 type 5 LSA even if the router does not have a default route in its routing table.

Troubleshoot

There is currently no specific troubleshooting information available for this configuration.

Related Information

- [OSPF Database Explanation Guide](#)
- [OSPF Support Page](#)
- [IP Routing Support Page](#)
- [Technical Support – Cisco Systems](#)

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Updated: Oct 21, 2004

Document ID: 47868
