Identify how OSPF Injects a Default Route in a Normal Area

Contents

Introduction

This document describes how Open Shortest Path First (OSPF) can inject a default route into a normal area.

Prerequisites

Requirements

There are no specific requirements for this document.

Components Used

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

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

Conventions

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

Background Information

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 when you add the keyword always to the default-information originate command.

Configure

This section provides the steps to configure the features mentioned in this document.

Network Diagram

This document uses the network setup shown in this diagram.
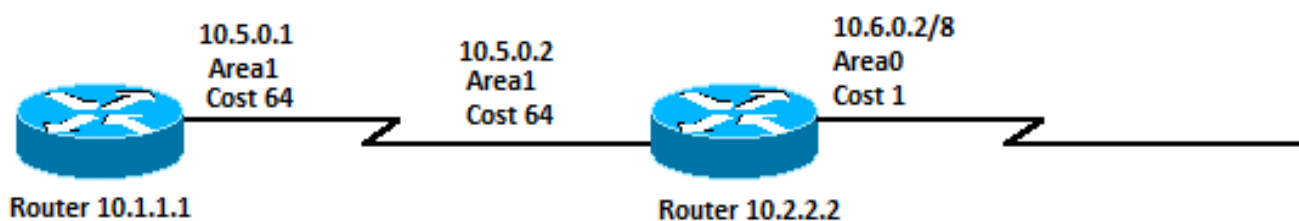
Network Diagram

Configurations

This document uses the configurations shown here:

- [Router 10.1.1.1](#)

- [Router 10.2.2.2](#)

Router 10.1.1.1

```
Current configuration:

hostname r10.1.1.1
!
interface Loopback0
 ip address 10.1.1.1 255.0.0.0
!
interface Serial2/1/0
 ip address 10.5.0.1 255.0.0.0
!
router ospf 2
 network 10.5.0.0 0.255.255.255 area 1
!
end
```

Router 10.2.2.2

```
<#root>
```

```
Current configuration:

hostname r10.2.2.2
!
interface Loopback0
 ip address 10.2.2.2 255.0.0.0
!
interface Serial0/1/0
 ip address 10.5.0.2 255.0.0.0
!
interface ATM1/0.20
 ip address 10.6.0.2 255.0.0.0
!
router ospf 2
 network 10.5.0.0 0.255.255.255 area 1
 network 10.6.0.0 0.255.255.255 area 0


default-information originate

!

ip route 0.0.0.0 0.0.0.0 10.6.0.3

!
end
```

Verify

This section provides information on how to verify your configuration works correctly.

Certain show commands are supported by the [Cisco CLI Analyzer](#) which allows you to view an analysis of show command output.

✎ **Note**: Only registered Cisco users can access internal Cisco tools and information.

- 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, with the show ip ospf database command.

<#root>

r10.2.2.2#

show ip ospf database
```

```
        OSPF Router with ID (10.2.2.2) (Process ID 2)

                Router Link States (Area 0)

Link ID    ADV Router    Age     Seq#          Checksum   Link count
10.2.2.2    10.2.2.2      600     0x80000001    0x9583         1

                Summary Net Link States (Area 0)

Link ID    ADV Router    Age     Seq#          Checksum
10.5.0.0    10.2.2.2      600     0x80000001    0x8E61

                Router Link States (Area 1)

Link ID    ADV Router    Age     Seq#          Checksum   Link count
10.1.1.1    10.1.1.1      864     0x8000005E    0xD350         2
10.2.2.2    10.2.2.2      584     0x8000001E    0xF667         2

                Summary Net Link States (Area 1)

Link ID    ADV Router    Age     Seq#          Checksum
10.6.0.0    10.2.2.2      585     0x80000004    0xA87C

                Type-5 AS External Link States

Link ID    ADV Router    Age     Seq#          Checksum   Tag

0.0.0.0    10.2.2.2      601     0x80000001    0xD0D8       0
```

Because it has a default route, Router 10.2.2.2 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.

<#root>

r10.2.2.2#

show ip ospf database external 0.0.0.0

```
        OSPF Router with ID (10.2.2.2) (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: 10.2.2.2
  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
```

```
r10.2.2.2#
```

show ip route 0.0.0.0

```
S* 10.0.0.0/0 [1/0] via 10.6.0.3, 00:28:00, ATM1/0.20
```

```
r10.1.1.1#
```

show ip route ospf

```
O IA 10.6.0.0/8 [110/65] via 10.5.0.2, 00:00:18, Serial2/1/0
```
O*E2 0.0.0.0/0 [110/1] via 10.5.0.2, 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.

Related Information

- OSPF Database Explanation Guide
- IP Routing Support
- Cisco Technical Support & Downloads