

How the `bgp deterministic-med` Command Differs from the `bgp always-compare-med` Command

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Introduction

Prerequisites

- Requirements

- Components Used

- Conventions

Background Information

Command Examples

- Example 1: Both Commands Disabled

- Example 2: `bgp deterministic-med` Disabled, `bgp always-compare-med` Enabled

- Example 3: `bgp deterministic-med` Enabled, `bgp always-compare-med` Disabled

- Example 4: Both Commands Enabled

NetPro Discussion Forums – Featured Conversations

Related Information

Introduction

There is sometimes confusion between the two Border Gateway Protocol (BGP) configuration commands `bgp deterministic-med` and `bgp always-compare-med`. This document explains the differences in how the `bgp deterministic-med` and `bgp always-compare-med` commands can affect Multi Exit Discriminator (MED)-based path selection and how each command changes the behavior of BGP when choosing a best route.

Prerequisites

Requirements

There are no specific requirements for this document.

Components Used

The information in this document is based on the Cisco IOS® Software Release 12.2(10b).

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, make sure that you understand the potential impact of any command.

Conventions

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

Background Information

There are two BGP configuration commands that can influence the MED-based path selection, the `bgp deterministic-med` and the `bgp always-compare-med` commands.

Enabling the **bgp deterministic-med** command ensures the comparison of the MED variable when choosing routes advertised by different peers in the same autonomous system. Enabling the **bgp always-compare-med** command ensures the comparison of the MED for paths from neighbors in different autonomous systems. The **bgp always-compare-med** command is useful when multiple service providers or enterprises agree on a uniform policy for setting MED. Thus, for network X, if Internet Service Provider A (ISP A) sets the MED to 10, and ISP B sets the MED to 20, both ISPs agree that ISP A has the better performing path to X.

Note: The **bgp deterministic-med** and **bgp always-compare-med** commands are not enabled by default. Also, the two commands are separate; enabling one does not automatically enable the other.

Command Examples

The examples in this section demonstrate how the **bgp deterministic-med** and **bgp always-compare-med** commands can influence MED-based path selection.

Note: Cisco Systems recommends enabling the **bgp deterministic-med** command in all new network rollouts. For existing networks, the command must either be deployed on all routers at the same time, or incrementally, with care to avoid possible internal BGP (iBGP) routing loops.

For example, consider the following routes for network 10.0.0.0/8:

```
entry1: AS(PATH) 500, med 150, external, rid 172.16.13.1
entry2: AS(PATH) 100, med 200, external, rid 1.1.1.1
entry3: AS(PATH) 500, med 100, internal, rid 172.16.8.4
```

The order in which the BGP routes were received is entry3, entry2, and entry1. (Entry3 is the oldest entry in the BGP table, and entry1 is the newest one.)

Note: When BGP receives multiple routes to a particular destination, it lists them in the reverse order that they were received, from the newest to the oldest. BGP then compares the routes in pairs, starting with the newest entry and moving toward the oldest entry (starting at top of the list and moving down). For example, entry1 and entry2 are compared. The better of these two is then compared to entry3, and so on.

Example 1: Both Commands Disabled

Entry1 and entry2 are compared first. Entry2 is chosen as the better of these two because it has a lower router ID. The MED is not checked because the paths are from a different neighbor autonomous system. Next, entry2 is compared to entry3. Entry2 is chosen as the best path because it is external.

Example 2: bgp deterministic-med Disabled, bgp always-compare-med Enabled

Entry1 is compared to entry2. These entries are from different neighbor autonomous systems, but since the **bgp always-compare-med** command is enabled, MED is used in the comparison. Of these two entries, entry1 is better because it has a lower MED. Next, entry1 is compared to entry3. The MED is checked again because the entries are now from the same autonomous system. Entry3 is chosen as the best path.

Example 3: bgp deterministic-med Enabled, bgp always-compare-med Disabled

When the **bgp deterministic-med** command is enabled, routes from the same autonomous system are grouped together, and the best entries of each group are compared. The BGP table looks like this:

```
entry1: AS(PATH) 100, med 200, external, rid 1.1.1.1
entry2: AS(PATH) 500, med 100, internal, rid 172.16.8.4
entry3: AS(PATH) 500, med 150, external, rid 172.16.13.1
```

There is a group for AS 100 and a group for AS 500. The best entries for each group are compared. Entry1 is the best of its group because it is the only route from AS 100. Entry2 is the best for AS 500 because it has the lowest MED. Next, entry1 is compared to entry2. Since the two entries are not from the same neighbor autonomous system, the MED is not considered in the comparison. The external BGP route wins over the internal BGP route, making entry1 the best route.

Example 4: Both Commands Enabled

The comparisons in this example are the same as in Example 3, except for the last comparison between entry2 and entry1. The MED is taken into account for the last comparison because the **bgp always-compare-med** command is enabled. Entry2 is selected as the best path.

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