

# Adjust Administrative Distance for Route Selection in Cisco IOS Routers Configuration Example

Document ID: 113153

## Contents

### Introduction

#### Prerequisites

- Requirements
- Components Used
- Conventions

#### Configure

- Network Diagram
- Configurations

#### Verify

- On Router R2

#### Related Information

## Introduction

This document describes how to change the administrative distance value of the routing protocol in order to influence the route selection in Cisco routers.

Administrative distance is the feature that routers use in order to select the best path when there are two or more different routes to the same destination from two different routing protocols. Administrative distance defines the reliability of a routing protocol. The smaller the administrative distance value, the more reliable the protocol.

**Note:** When you change the default distances, it can lead to routing loops in the network. Change the administrative distance with caution and only after you have thought through what you want to achieve.

## Prerequisites

### Requirements

There are no specific prerequisites for this document.

### Components Used

The configurations in this document is based on the Cisco 3700 series router on Cisco IOS Software Release 12.4 (15)T 13.

### Conventions

Refer to Cisco Technical Tips Conventions for more information on document conventions.

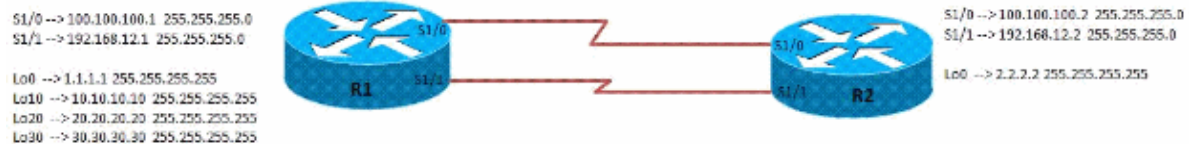
## Configure

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

**Note:** Use the Command Lookup Tool (registered customers only) to find more information on the commands used in this document.

## Network Diagram

Here the router R1 and R2 are connected via parallel serial lines. The routers R1 and R2 are configured with BGP and OSPF. The default administrative distance of OSPF is 110 while that of the eBGP is 20. With the command **distance**, we changed the AD value of BGP to 190. Prior to this command, the router R2 preferred the BGP routes over OSPF since they had the default AD values configured. After the AD value of the BGP changed, the OSPF routes takes the precedence.



## Configurations

This document uses these configuration

- Router R1 Configuration
- Router R2 Configuration

R1 Configuration
<pre>interface Loopback0 ip address 1.1.1.1 255.255.255.255 ! ! interface Loopback10 ip address 10.10.10.10 255.255.255.255 ! ! interface Loopback20 ip address 20.20.20.20 255.255.255.255 ! ! interface Loopback30 ip address 30.30.30.30 255.255.255.255 ! ! interface Serial1/0 ip address 100.100.100.1 255.255.255.0 serial restart-delay 0 clock rate 64000 ! ! interface Serial1/1 ip address 192.168.12.1 255.255.255.0 serial restart-delay 0 clock rate 64000 ! ! router ospf 10 router-id 1.1.1.1 log-adjacency-changes network 1.1.1.1 0.0.0.0 area 0</pre>

```

network 10.10.10.10 0.0.0.0 area 0
network 20.20.20.20 0.0.0.0 area 0
network 100.100.100.1 0.0.0.0 area 0
!
router bgp 123
no synchronization
bgp router-id 1.1.1.1
bgp log-neighbor-changes
network 10.10.10.10 mask 255.255.255.255
network 20.20.20.20 mask 255.255.255.255
network 30.30.30.30 mask 255.255.255.255
neighbor 2.2.2.2 remote-as 100
neighbor 2.2.2.2 ebgp-multihop 5
neighbor 2.2.2.2 update-source Loopback0
no auto-summary
!
```

## R2 Configuration

```

interface Loopback0
ip address 2.2.2.2 255.255.255.255
!
!
interface Serial1/0
ip address 100.100.100.2 255.255.255.0
serial restart-delay 0
clock rate 64000
!
!
interface Serial1/1
ip address 192.168.12.2 255.255.255.0
serial restart-delay 0
clock rate 64000
!
!
router ospf 10
router-id 2.2.2.2
log-adjacency-changes
network 2.2.2.2 0.0.0.0 area 0
network 100.100.100.2 0.0.0.0 area 0
!
router bgp 100
no synchronization
bgp router-id 2.2.2.2
bgp log-neighbor-changes
neighbor 1.1.1.1 remote-as 123
neighbor 1.1.1.1 ebgp-multihop 5
neighbor 1.1.1.1 update-source Loopback0
distance 190 1.1.1.1 0.0.0.0

Changed the AD value of BGP as 190!

no auto-summary
!
```

## Verify

Use the commands described in this section in order to verify the configuration .

The Output Interpreter Tool (registered customers only) (OIT) supports certain **show** commands. Use the OIT to view an analysis of **show** command output.

## On Router R2

### When the distance command is not applied on Router R2

Show ip route	
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2 E1 - OSPF external type 1, E2 - OSPF external type 2 I - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2 ia - IS-IS inter area, * - candidate default, U - per-user static route o - ODR, P - periodic downloaded static route, + - replicated route	
Gateway of last resort is not set	
	1.0.0.0/32 is subnetted, 1 subnets
O	1.1.1.1 [110/65] via 100.100.100.1, 00:00:03, Serial1/0
	2.0.0.0/32 is subnetted, 1 subnets
C	2.2.2.2 is directly connected, Loopback0
	10.0.0.0/32 is subnetted, 1 subnets
B	10.10.10.10 [20/0] via 1.1.1.1, 00:00:03
<i>BGP Router Preferred Over OSPF</i>	
	20.0.0.0/32 is subnetted, 1 subnets
B	20.20.20.20 [20/0] via 1.1.1.1, 00:00:03
<i>BGP Router Preferred Over OSPF</i>	
	30.0.0.0/32 is subnetted, 1 subnets
B	30.30.30.30 [20/0] via 1.1.1.1, 00:00:03
	100.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C	100.100.100.0/24 is directly connected, Serial1/0
L	100.100.100.2/32 is directly connected, Serial1/0
	192.168.12.0/24 is variably subnetted, 2 subnets, 2 masks
C	192.168.12.0/24 is directly connected, Serial1/1
L	192.168.12.2/32 is directly connected, Serial1/1

### When the distance command is applied on Router R2

Show ip route	
R2#sh ip route	
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2 E1 - OSPF external type 1, E2 - OSPF external type 2 I - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2 ia - IS-IS inter area, * - candidate default, U - per-user static route o - ODR, P - periodic downloaded static route, + - replicated route	
Gateway of last resort is not set	
	1.0.0.0/32 is subnetted, 1 subnets
O	1.1.1.1 [110/65] via 100.100.100.1, 00:00:03, Serial1/0
	2.0.0.0/32 is subnetted, 1 subnets
C	2.2.2.2 is directly connected, Loopback0
	10.0.0.0/32 is subnetted, 1 subnets
O	10.10.10.10 [110/65] via 100.100.100.1, 00:00:03, Serial1/0
<i>By increasing the AD of External BGP, OSPF takes precedence</i>	
	20.0.0.0/32 is subnetted, 1 subnets

```
O      20.20.20.20 [110/65] via 100.100.100.1, 00:00:03, Serial1/0
```

*By increasing the AD of External BGP, OSPF takes precedence*

```
      30.0.0.0/32 is subnetted, 1 subnets
```

```
B      30.30.30.30 [190/0] via 1.1.1.1, 00:00:03
```

```
      100.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
```

```
C      100.100.100.0/24 is directly connected, Serial1/0
```

```
L      100.100.100.2/32 is directly connected, Serial1/0
```

```
      192.168.12.0/24 is variably subnetted, 2 subnets, 2 masks
```

```
C      192.168.12.0/24 is directly connected, Serial1/1
```

```
L      192.168.12.2/32 is directly connected, Serial1/1
```

## Related Information

- [Route Selection in Cisco Routers](#)
- [OSPF Support Page](#)
- [BGP Support Page](#)
- [Technical Support & Documentation – Cisco Systems](#)

---

[Contacts & Feedback](#) | [Help](#) | [Site Map](#)

© 2013 – 2014 Cisco Systems, Inc. All rights reserved. [Terms & Conditions](#) | [Privacy Statement](#) | [Cookie Policy](#) | [Trademarks of Cisco Systems, Inc.](#)

---

Updated: Jul 26, 2011

Document ID: 113153

---