BGP Cost Community

The BGP Cost Community feature introduces the cost extended community attribute. The cost community is a non-transitive extended community attribute that is passed to internal BGP (iBGP) and confederation peers but not to external BGP (eBGP) peers. The cost community feature allows you to customize the local route preference and influence the best path selection process by assigning cost values to specific routes.

History for the BGP Cost Community Feature

Release	Modification
12.0(24)S	This feature was introduced.
12.3(2)T	This feature was integrated into Cisco IOS Release 12.3(2)T.
12.2(18)S	This feature was integrated Cisco IOS Release 12.2(18)S.
12.0(27)S	The *BGP Cost Community Support for EIGRP MPLS VPN PE-CE with Backdoor Links* feature was introduced. It provides support for mixed EIGRP MPLS VPN network topologies that contain back door routes.
12.3(8)T	The *BGP Cost Community Support for EIGRP MPLS VPN PE-CE with Backdoor Links* feature was integrated into Cisco IOS Release 12.3(8)T. It provides support for mixed EIGRP MPLS VPN network topologies that contain back door routes.
12.2(25)S	The *BGP Cost Community Support for EIGRP MPLS VPN PE-CE with Backdoor Links* feature was integrated into Cisco IOS Release 12.2(25)S. It provides support for mixed EIGRP MPLS VPN network topologies that contain back door routes.
12.2(27)SBC	This feature was integrated into Cisco IOS Release 12.2(27)SBC.

Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at http://www.cisco.com/go/fn. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

CISCO SYSTEMS

Corporate Headquarters:
Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA

Contents

Prerequisites for the BGP Cost Community Feature

This document assumes that BGP is configured in your network and that peering has been established.

Restrictions for the BGP Cost Community Feature

The following restrictions apply to the BGP Cost Community feature:

- The BGP Cost Community feature can be configured only within an autonomous system or confederation. The cost community is a non-transitive extended community that is passed to iBGP and confederation peers only and is not passed to eBGP peers.
- The BGP Cost Community feature must be supported on all routers in the autonomous system or confederation before cost community filtering is configured. The cost community should be applied consistently throughout the local autonomous system or confederation to avoid potential routing loops.
- Multiple cost community set clauses may be configured with the **set extcommunity cost** command in a single route map block or sequence. However, each set clause must be configured with a different ID value (0-255) for each point of insertion (POI). The ID value determines preference when all other attributes are equal. The lowest ID value is preferred.

Information About the BGP Cost Community Feature

To configure the BGP Cost Community feature, you must understand the following concepts:

BGP Cost Community Overview

The cost community is a non-transitive extended community attribute that is passed to iBGP and confederation peers but not to eBGP peers. The configuration of the BGP Cost Community feature allows you to customize the BGP best path selection process for a local autonomous system or confederation.

The cost community attribute is applied to internal routes by configuring the **set extcommunity cost** command in a route map. The cost community set clause is configured with a cost community ID number (0-255) and cost number (0-4294967295). The cost number value determines the preference for the path. The path with the lowest cost community number is preferred. Paths that are not specifically configured with the cost community attribute are assigned a default cost number value of 2147483647 (The midpoint between 0 and 4294967295) and evaluated by the best path selection process accordingly. In the case where two paths have been configured with the same cost number value, the path selection process will then prefer the path with the lowest cost community ID. The cost extended community attribute is propagated to iBGP peers when extended community exchange is enabled with the **neighbor send-community** command.

The following commands can be used to apply the route map that is configured with the cost community set clause:

- **aggregate-address**
- **neighbor default-originate route-map** {**in** | **out**}
- **neighbor route-map**
- **network route-map**
- **redistribute route-map**

How the BGP Cost Community Influences the Best Path Selection Process

The cost community attribute influences the BGP best path selection process at the point of insertion (POI). By default, the POI follows the IGP metric comparison. When BGP receives multiple paths to the same destination, it uses the best path selection process to determine which path is the best path. BGP automatically makes the decision and installs the best path into the routing table. The POI allows you to assign a preference to o a specific path when multiple equal cost paths are available. If the POI is not valid for local best path selection, the cost community attribute is silently ignored.

Multiple paths can be configured with the cost community attribute for the same POI. The path with the lowest cost community ID is considered first. In other words, all of the cost community paths for a specific POI are considered, starting with the one with the lowest cost community. Paths that do not contain the cost community (for the POI and community ID being evaluated) are assigned the default community cost value (2147483647). If the cost community values are equal, then cost community comparison proceeds to the next lowest community ID for this POI.

Note Paths that are not configured with the cost community attribute are considered by the best path selection process to have the default *cost-value* (half of the maximum value [4294967295] or 2147483647).

Applying the cost community attribute at the POI allows you to assign a value to a path originated or learned by a peer in any part of the local autonomous system or confederation. The cost community can be used as a “tie breaker” during the best path selection process. Multiple instances of the cost community can be configured for separate equal cost paths within the same autonomous system or confederation. For example, a lower cost community value can be applied to a specific exit path in a

network with multiple equal cost exits points, and the specific exit path will be preferred by the BGP best path selection process. See the scenario described in the Influencing Route Preference in a Multi-Exit IGP Network section.

Cost Community Support for Aggregate Routes and Multipaths

Aggregate routes and multipaths are supported by the BGP Cost Community feature. The cost community attribute can be applied to either type of route. The cost community attribute is passed to the aggregate or multipath route from component routes that carry the cost community attribute. Only unique IDs are passed, and only the highest cost of any individual component route will be applied to the aggregate on a per-ID basis. If multiple component routes contain the same ID, the highest configured cost is applied to the route. For example, the following two component routes are configured with the cost community attribute via an inbound route map:

- 10.0.0.1 (POI=IGP, ID=1, Cost=100)
- 192.168.0.1 (POI=IGP, ID=1, Cost=200)

If these component routes are aggregated or configured as a multipath, the cost value 200 (POI=IGP, ID=1, Cost=200) will be advertised because it is the highest cost.

If one or more component routes does not carry the cost community attribute or if the component routes are configured with different IDs, then the default value (2147483647) will be advertised for the aggregate or multipath route. For example, the following three component routes are configured with the cost community attribute via an inbound route map. However, the component routes are configured with two different IDs.

- 10.0.0.1 (POI=IGP, ID=1, Cost=100)
- 172.16.0.1 (POI=IGP, ID=2, Cost=100)
- 192.168.0.1 (POI=IGP, ID=1, Cost=200)

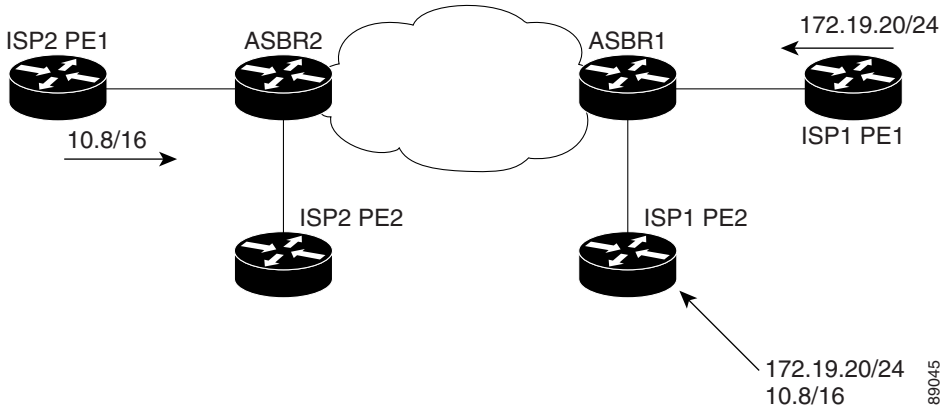
The single advertised path will include the aggregated cost communities as follows:

- {POI=IGP, ID=1, Cost=2147483647} {POI=IGP, ID=2, Cost=2147483647}

Influencing Route Preference in a Multi-Exit IGP Network

Figure 1 shows an Interior Gateway Protocol (IGP) network with two autonomous system boundary routers (ASBRs) on the edge. Each ASBR has an equal cost path to network 10.8/16.

Figure 1 Multi-Exit Point IGP Network



Both paths are considered to be equal by BGP. If multipath loadsharing is configured, both paths will be installed to the routing table and will be used to load balance traffic. If multipath load balancing is not configured, then BGP will select the path that was learned first as the best path and install this path to the routing table. This behavior may not be desirable under some conditions. For example, the path is learned from ISP1 PE2 first, but the link between ISP1 PE2 and ASBR1 is a low-speed link.

The configuration of the cost community attribute can be used to influence the BGP best path selection process by applying a lower cost community value to the path learned by ASBR2. For example, the following configuration is applied to ASBR2.

```
route-map ISP2_PE1 permit 10
 set extcommunity cost 1 1
 match ip address 13
!
ip access-list 13 permit 10.8.0.0 0.0.255.255
```

The above route map applies a cost community number value of 1 to the 10.8.0.0 route. By default, the path learned from ASBR1 will be assigned a cost community value of 2147483647. Because the path learned from ASBR2 has lower cost community value, this path will be preferred.

BGP Cost Community Support for EIGRP MPLS VPN PE-CE with Backdoor Links

Before EIGRP Site of Origin (SoO) BGP Cost Community support was introduced, BGP preferred locally sourced routes over routes learned from BGP peers. Back door links in an EIGRP MPLS VPN topology will be preferred by BGP if the back door link is learned first. (A back door link, or a route, is a connection that is configured outside of the VPN between a remote and main site. For example, a WAN leased line that connects a remote site to the corporate network).

The “pre-bestpath” point of insertion (POI) was introduced in the BGP Cost Community feature to support mixed EIGRP VPN network topologies that contain VPN and backdoor links. This POI is applied automatically to EIGRP routes that are redistributed into BGP. The “pre-best path” POI carries

the EIGRP route type and metric. This POI influences the best path calculation process by influencing BGP to consider this POI before any other comparison step. No configuration is required. This feature is enabled automatically for EIGRP VPN sites when Cisco IOS Release 12.0(27)S is installed to a PE, CE, or back door router.

For information about configuring EIGRP MPLS VPNs, refer to the MPLS VPN Support for EIGRP Between Provider Edge and Customer Edge document in Cisco IOS Release 12.0(27)S.

For more information about the EIGRP MPLS VPN PE-CE Site of Origin (SoO) feature, refer to the EIGRP MPLS VPN PE-CE Site of Origin (SoO) feature documentation in Cisco IOS Release 12.0(27)S.

How to Configure the BGP Cost Community Feature

This section contains the following procedures:

Configuring the BGP Cost Community

To configure the cost community, perform the steps in this section.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router bgp** *as-number*
4. **neighbor** *ip-address* **remote-as** *as-number*
5. **address-family ipv4** [**mdt** | **multicast** | **tunnel** | **unicast** [**vrf** *vrf-name*] | **vrf** *vrf-name*] | **ipv6** [**multicast** | **unicast**] | **vpnv4** [**unicast**]
6. **neighbor** *ip-address* **route-map** *map-name* {**in** | **out**}
7. **exit**
8. **route-map** *map-name* {**permit** | **deny**}[*sequence-number*]
9. **set extcommunity cost igp** *community-id cost-value*
10. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables higher privilege levels, such as privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**router bgp** *as-number* **Example:** `Router(config)# router bgp 50000`	Enters router configuration mode to create or configure a BGP routing process.
Step 4	**neighbor** *ip-address* **remote-as** *as-number* **Example:** `Router(config-router)# neighbor 10.0.0.1 remote-as 101`	Establishes peering with the specified neighbor or peer-group.
Step 5	**address-family ipv4** [**mdt** | **multicast** | **tunnel** | **unicast** [**vrf** *vrf-name*] | **vrf** *vrf-name*] | **ipv6** [**multicast** | **unicast**] | **vpnv4** [**unicast**] **Example:** `Router(config-router)# address-family ipv4`	Places the router in address family configuration mode.
Step 6	**neighbor** *ip-address* **route-map** *map-name* {**in** | **out**} **Example:** `Router(config-router)# neighbor 10.0.0.1 route-map MAP-NAME in`	Applies an incoming or outgoing route map for the specified neighbor or peer-group.
Step 7	**exit** **Example:** `Router(config-router)# exit`	Exits router configuration mode and enters global configuration mode.
Step 8	**route-map** *map-name* {**permit** | **deny**} [*sequence-number*] **Example:** `Router(config)# route-map MAP-NAME permit 10`	Enters route map configuration mode to create or configure a route map.

	Command or Action	Purpose
Step 9	**set extcommunity cost** [**igp**] *community-id cost-value* **Example:** `Router(config-route-map)# set extcommunity cost 1 100`	Creates a set clause to apply the cost community attribute. • Multiple cost community set clauses can be configured in each route map block or sequence. Each cost community set clause must have a different ID (0-255). The cost community set clause with the lowest *cost-value* is preferred by the best path selection process when all other attributes are equal. • Paths that are not configured with the cost community attribute will be assigned the default *cost-value*, which is half of the maximum value (4294967295) or 2147483647.
Step 10	**end** **Example:** `Router(config-route-map)# end`	Exits route map configuration mode and enters privileged EXEC mode.

Verifying the Configuration of the BGP Cost Community

BGP cost community configuration can be verified locally or for a specific neighbor. To verify the local configuration cost community, use the **show route-map** or **show running-config** command. To verify that a specific neighbor carries the cost community, use the **show ip bgp** *ip-address* command. The output from these commands displays the POI (IGP is the default POI), the configured ID, and configured cost. For large cost community values, the output from these commands will also show, with + and - values, the difference between the configured cost and the default cost. See the BGP Cost Community Verification Examples section for specific example output.

Troubleshooting Tips

- The **bgp bestpath cost-community ignore** command can be used to disable the evaluation of the cost community attribute to help isolate problems and troubleshoot issues that relate to BGP best path selection.
- The **debug ip bgp updates** command can be used to print BGP update messages. The cost community extended community attribute will be displayed in the output of this command when received from a neighbor. A message will also be displayed if a non-transitive extended community if received from an external peer.

Configuration Examples for the BGP Cost Community Feature

The following examples show the configuration and verification of this feature:

- BGP Cost Community Configuration Example, page 9
- BGP Cost Community Verification Examples, page 9

BGP Cost Community Configuration Example

The following example configuration shows the configuration of the **set extcommunity cost** command. The following example applies the cost community ID of 1 and cost community value of 100 to routes that are permitted by the route map. This configuration will cause the best path selection process to prefer this route over other equal cost paths that were not permitted by this route map sequence.

```
Router(config)# router bgp 50000
Router(config-router)# neighbor 10.0.0.1 remote-as 50000
Router(config-router)# neighbor 10.0.0.1 update-source Loopback 0
Router(config-router)# address-family ipv4
Router(config-router-af)# neighbor 10.0.0.1 activate
Router(config-router-af)# neighbor 10.0.0.1 route-map COST1 in
Router(config-router-af)# neighbor 10.0.0.1 send-community both
Router(config-router-af)# exit
Router(config)# route-map COST1 permit 10
Router(config-route-map)# match ip-address 1
Router(config-route-map)# set extcommunity cost 1 100
```

BGP Cost Community Verification Examples

BGP cost community configuration can be verified locally or for a specific neighbor. To verify the local configuration cost community, use the **show route-map** or **show running-config** command. To verify that a specific neighbor carries the cost community, use the **show ip bgp** *ip-address* command.

The output of the **show route-map** command will display locally configured route-maps, match, set, continue clauses, and the status and configuration of the cost community attribute. The following sample output is similar to the output that will be displayed:

```
Router# show route-map

route-map COST1, permit, sequence 10
  Match clauses:
    as-path (as-path filter): 1
  Set clauses:
    extended community Cost:igp:1:100
  Policy routing matches: 0 packets, 0 bytes
route-map COST1, permit, sequence 20
  Match clauses:
    ip next-hop (access-lists): 2
  Set clauses:
    extended community Cost:igp:2:200
  Policy routing matches: 0 packets, 0 bytes
route-map COST1, permit, sequence 30
  Match clauses:
    interface FastEthernet0/0
    extcommunity (extcommunity-list filter):300
  Set clauses:
    extended community Cost:igp:3:300
  Policy routing matches: 0 packets, 0 bytes
```

The following sample output shows locally configured routes with large cost community values:

```
Router# show route-map

route-map set-cost, permit, sequence 10
  Match clauses:
  Set clauses:
    extended community RT:1:1 RT:2:2 RT:3:3 RT:4:4 RT:5:5 RT:6:6 RT:7:7
      RT:100:100 RT:200:200 RT:300:300 RT:400:400 RT:500:500 RT:600:600
      RT:700:700 additive
```

```
    extended community Cost:igp:1:4294967295 (default+2147483648)
      Cost:igp:2:200 Cost:igp:3:300 Cost:igp:4:400
      Cost:igp:5:2147483648 (default+1) Cost:igp:6:2147484648 (default+1001)
      Cost:igp:7:2147284648 (default-198999)
  Policy routing matches: 0 packets, 0 bytes
```

The output of the **show running config** command will display match, set, and continue clauses that are configured within a route-map. The following sample output is filtered to show only the relevant part of the running configuration:

```
Router# show running-config | begin route-map

route-map COST1 permit 20
 match ip next-hop 2
 set extcommunity cost igp 2 200
!
route-map COST1 permit 30
 match interface FastEthernet0/0
 match extcommunity 300
 set extcommunity cost igp 3 300
.
.
.
```

The output of the **show ip bgp** *ip-address* command can be used to verify if a specific neighbor carries a path that is configured with the cost community attribute. The cost community attribute information is displayed in the "Extended Community" field. The POI, the cost community ID, and the cost community number value are displayed. The following sample output shows that neighbor 172.16.1.2 carries a cost community with an ID of 1 and a cost of 100:

```
Router# show ip bgp 10.0.0.0

BGP routing table entry for 10.0.0.0/8, version 2
Paths: (1 available, best #1)
  Not advertised to any peer
  2 2 2
    172.16.1.2 from 172.16.1.2 (172.16.1.2)
      Origin IGP, metric 0, localpref 100, valid, external, best
      Extended Community: Cost:igp:1:100
```

If the specified neighbor is configured with the default cost community number value or if the default value is assigned automatically for cost community evaluation, "default" with + and - values will be displayed after the cost community number value in the output.

Where to Go Next

For information about configuring EIGRP MPLS VPNs, refer to the MPLS VPN Support for EIGRP Between Provider Edge and Customer Edge feature documentation introduced in Cisco IOS Release 12.0(27)S.

For more information about the EIGRP MPLS VPN PE-CE Site of Origin (SoO) feature, refer to the EIGRP MPLS VPN PE-CE Site of Origin (SoO) feature documentation introduced in Cisco IOS Release 12.0(27)S.

Additional References

For additional information related to the BGP Cost Community feature, refer to the following references:

Related Documents

Related Topic	Document Title
BGP Best Path Selection	*BGP Best Path Selection Algorithm*, Release 12.3T
BGP commands	*Cisco IOS IP Command Reference, Volume 2 of 4: Routing Protocols*, Release 12.3T
BGP configuration tasks	*Cisco IOS IP Configuration Guide,* Release 12.3

Standards

Standards	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	—

MIBs

MIBs	MIBs Link
No new or modified MIBs are supported by this feature, and support for existing MIBs has not been modified by this feature.	To obtain lists of supported MIBs by platform and Cisco IOS release, and to download MIB modules, go to the Cisco MIB website on Cisco.com at the following URL: http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

RFCs

RFCs	Title
draft-retana-bgp-custom-decision-00.txt	*BGP Custom Decision Process*

Technical Assistance

Description	Link
Technical Assistance Center (TAC) home page, containing 30,000 pages of searchable technical content, including links to products, technologies, solutions, technical tips, tools, and lots more. Registered Cisco.com users can log in from this page to access even more content.	TAC Home Page: http://www.cisco.com/public/support/tac/home.shtml BGP Support Page: http://www.cisco.com/cgi-bin/Support/browse/psp_view.pl?p=Internetworking:BGP

Command Reference

This section documents new commands only.

- **bgp bestpath cost-community ignore**
- **debug ip bgp updates**
- **set extcommunity cost**

bgp bestpath cost-community ignore

To configure a router that is running the Border Gateway Protocol (BGP) to not evaluate the cost community attribute during the best path selection process, use the **bgp bestpath cost-community ignore** command in router configuration mode. To return the router to default operation, use the **no** form of this command.

bgp bestpath cost-community ignore

no bgp bestpath cost-community ignore

Syntax Description

This command has no keywords or arguments.

Defaults

The behavior of this command is enabled by default until the cost community attribute is manually configured.

Command Modes

Router configuration

Command History

Release	Modification
12.0(24)S	This command was introduced.
12.3(2)T	This command was integrated into Cisco IOS Release 12.3(2)T.
12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.

Usage Guidelines

The **bgp bestpath cost-community ignore** command is used to disable the evaluation of the cost community attribute to help isolate problems and troubleshoot issues that relate to BGP path selection. This command can also be used to delay the activation of cost community attribute evaluation so that cost community filtering can be deployed in a large network at the same time.

Examples

In the following example, a router that is configured to not evaluate the cost community attribute during the best path selection process:

```
Router(config)# router bgp 50000
Router(config-router)# address-family ipv4 unicast
Router(config-router-af)# bgp bestpath cost-community ignore
```

Related Commands

Command	Description
set extcommunity cost	Creates a set clause to apply the cost community attribute to routes that pass through a route map.
show ip bgp	Displays entries in the BGP routing table.

debug ip bgp updates

To display information about the processing of BGP updates, use the **debug ip bgp update** command in privileged EXEC mode. To disable the display of BGP update information, use the **no** form of this command.

debug ip bgp updates [*access-list* | *expanded-access-list* | **in** | **out**]

no debug ip bgp updates

Syntax Description

access-list	(Optional) Specifies debugging messages for standard and extended access lists. The range that can be specified is from 1 to 199.
expanded-access-list	(Optional) Specifies debugging messages for expanded access lists. The range that can be specified is from 1300 to 2699.
in	(Optional) Specifies debugging messages for inbound BGP update information.
out	(Optional) Specifies debugging messages for outbound BGP update information.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(5)T	This command was introduced.
12.3(2)T	This command was integrated into Cisco IOS Release 12.3(2)T.
12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.

Examples

In the following sample output, the output shows that the BGP session was cleared between neighbor 10.4.9.21 and the local router 10.4.9.4:

```
Router# debug ip bgp updates

5w2d: %SYS-5-CONFIG_I: Configured from console by console
5w2d: BGP: 10.4.9.21 went from Idle to Active
5w2d: BGP: 10.4.9.21 open active, delay 7032ms
5w2d: BGP: 10.4.9.21 open active, local address 10.4.9.4
5w2d: BGP: 10.4.9.21 went from Active to OpenSent
5w2d: BGP: 10.4.9.21 sending OPEN, version 4, my as: 101
5w2d: BGP: 10.4.9.21 send message type 1, length (incl. header) 45
5w2d: BGP: 10.4.9.21 rcv message type 1, length (excl. header) 26
5w2d: BGP: 10.4.9.21 rcv OPEN, version 4
5w2d: BGP: 10.4.9.21 rcv OPEN w/ OPTION prameter len: 16
5w2d: BGP: 10.4.9.21 rcvd OPEN w/ optional parameter type 2 (Capability) len 6
5w2d: BGP: 10.4.9.21 OPEN has CAPABILITY code: 1, length 4
5w2d: BGP: 10.4.9.21 OPEN has MP_EXT CAP for afi/safi: 1/1
5w2d: BGP: 10.4.9.21 rcvd OPEN w/ optional parameter type 2 (Capability) len 2
5w2d: BGP: 10.4.9.21 OPEN has CAPABILITY code: 128, length 0
5w2d: BGP: 10.4.9.21 OPEN has ROUTE-REFRESH capability(old) for all address-fams
```

```
5w2d: BGP: 10.4.9.21 rcvd OPEN w/ optional parameter type 2 (Capability) len 2
5w2d: BGP: 10.4.9.21 OPEN has CAPABILITY code: 2, length 0
5w2d: BGP: 10.4.9.21 OPEN has ROUTE-REFRESH capability for all address-families
5w2d: BGP: 10.4.9.21 went from OpenSent to OpenConfirm
5w2d: BGP: 10.4.9.21 went from OpenConfirm to Established
5w2d: %BGP-5-ADJCHANGE: neighbor 10.4.9.21 Up
5w2d: BGP(0): 10.4.9.21 computing updates, afi 0, neighbor version 0, table ver0
5w2d: BGP(0): 10.4.9.21 update run completed, afi 0, ran for 0ms, neighbor vers1
5w2d: BGP(0): 10.4.9.21 initial update completed
```

In the following sample, the output shows that the local router is sending updates with the cost community:

```
Router# debug ip bgp updates out

*Mar 15 01:41:23.515:BGP(0):10.0.0.5 computing updates, afi 0, neighbor version 0, table
version 64, starting at 0.0.0.0
*Mar 15 01:41:23.515:BGP(0):10.0.0.5 send UPDATE (format) 0.0.0.0/0, next 10.0.0.2, metric
0, path , extended community Cost:igp:1:100
*Mar 15 01:41:23.515:BGP(0):10.0.0.5 send UPDATE (format) 10.2.2.0/24, next 10.20.20.10,
metric 0, path 10, extended community Cost:igp:8:22
*Mar 15 01:41:23.515:BGP(0):10.0.0.5 send UPDATE (format) 10.13.13.0/24, next 10.0.0.8,
metric 0, path
```

In the following sample, the output shows that the local router is receiving updates with the cost community:

```
Router# debug ip bgp updates in

*Jan  6 01:27:09.111:BGP(2):10.0.0.8 rcvd UPDATE w/ attr:nexthop 10.0.0.8, origin ?,
localpref 100, metric 0, path 10, extended community RT:100:1 Cost:igp:10:10
Cost:igp:11:11
```

set extcommunity cost

To create a set clause to apply the cost community attribute to routes that pass through a route map, use the **set extcommunity cost** command in route-map configuration mode. To delete the cost community set clause, use the **no** form of this command.

set extcommunity cost [**igp**] *community-id cost-value*

no set extcommunity cost [**igp**] *community-id cost-value*

Syntax Description

igp	(Optional) The IGP point of insertion (POI). The configuration of this keyword forces the cost community to be evaluated after the IGP distance to the next hop has been compared.
community-id	The ID for the configured extended community. The range is from 0 to 255.
cost-value	The configured cost that is set for matching paths in the route map. The range is from 0 to 4294967295.

Defaults

- The default cost value is applied to routes that are not configured with the cost community attribute when cost community filtering is enabled. The default *cost-value* is half of the maximum value (4294967295) or 2147483647.
- The IGP POI is applied by default a POI is not specified.

Command Modes

Route-map configuration

Command History

Release	Modification
12.0(24)S	This command was introduced into Cisco IOS Release 12.0(24)S.
12.3(2)T	This command was integrated.
12.2(18)S	This command was integrated.
12.0(27)S	Support for mixed EIGRP MPLS VPN network topologies that contain back door routes was introduced into Cisco IOS Release 12.0(27)S.
12.3(8)T	Support for mixed EIGRP MPLS VPN network topologies that contain back door routes was introduced into Cisco IOS Release 12.3(8)T.
12.2(25)S	Support for mixed EIGRP MPLS VPN network topologies that contain back door routes was introduced into Cisco IOS Release 12.2(25)S.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.

Usage Guidelines

The cost community attribute is applied to internal routes by configuring the **set extcommunity cost** command in a route map. The cost community set clause is configured with a cost community ID number (0-255) and a cost community number value (0-4294967295). The path with the lowest cost community number is preferred. In the case where two paths have been configured with the same cost community value, the path selection process will then prefer the path with the lower community ID.

The BGP Cost Community feature can be configured only within the same autonomous-system or confederation. The cost community is a non-transitive extended community. The cost community is passed to internal BGP (iBGP) and confederation peers only and is not passed to external BGP (eBGP) peers. The cost community allows you to customize the local preference and best path selection process for specific paths. The cost extended community attribute is propagated to iBGP peers when extended community exchange is enabled with the **neighbor send-community** command.

The following commands can be used to apply the route map with the cost community set clause:

- **aggregate-address**
- **neighbor default-originate route-map** {**in** | **out**}
- **neighbor route-map**
- **network route-map**
- **redistribute route-map**

Multiple cost community set clauses may be configured with the **set extcommunity cost** command in a single route map block or sequence. However, each set clause must be configured with a different ID value for each point of insertion (POI).

Aggregate routes and multipaths are supported by the BGP Cost Community feature. The cost community attribute can be applied to either type of route. The cost community attribute is passed to the aggregate or multipath route from component routes that carry the cost community attribute. Only unique IDs are passed, and only the highest cost of any individual component route will be applied to the aggregate on a per-ID basis. If multiple component routes contain the same ID, the highest configured cost is applied to the route. If one or more component routes does not carry the cost community attribute or if the component routes are configured with different IDs, then the default value (2147483647) will be advertised for the aggregate or multipath route.

Note The BGP cost community attribute must be supported on all routers in an autonomous system or confederation before cost community filtering is configured. The cost community should be applied consistently throughout the local autonomous system or confederation to avoid potential routing loops.

Support for EIGRP MPLS VPN Back Door Links

The “pre-bestpath” point of insertion (POI) has been introduced in the BGP Cost Community feature to support mixed EIGRP VPN network topologies that contain VPN and backdoor links. This POI is applied automatically to EIGRP routes that are redistributed into BGP. The “pre-best path” POI carries the EIGRP route type and metric. This POI influences the best path calculation process by influencing BGP to consider this POI before any other comparison step. No configuration is required. This feature is enabled automatically for EIGRP VPN sites when a supporting is installed to a PE, CE, or back door router.

Examples

The following example configuration shows the configuration of the **set extcommunity cost** command. The following example applies the cost community ID of 1 and cost community value of 100 to routes that are permitted by the route map. This configuration will cause the best path selection process to prefer this route over other equal cost paths that were not permitted by this route map sequence.

```
Router(config)# router bgp 50000
Router(config-router)# neighbor 10.0.0.1 remote-as 50000
Router(config-router)# neighbor 10.0.0.1 update-source Loopback 0
Router(config-router)# address-family ipv4
Router(config-router-af)# neighbor 10.0.0.1 activate
Router(config-router-af)# neighbor 10.0.0.1 route-map COST1 in
```

```
Router(config-router-af)# neighbor 10.0.0.1 send-community both
Router(config-router-af)# exit
Router(config)# route-map COST1 permit 10
Router(config-route-map)# match ip-address 1
Router(config-route-map)# set extcommunity cost 1 100
```

Related Commands

Command	Description
aggregate-address	Creates an aggregate entry in a BGP or multicast BGP database.
bgp bestpath cost-community ignore	Configures a router that is running BGP to not evaluate the cost community attribute during the best path selection process.
neighbor default-originate	Allows a BGP speaker (the local router) to send the default route 0.0.0.0 to a neighbor for use as a default route.
neighbor route-map	Applies a route map to incoming or outgoing routes.
network (BGP and multiprotocol BGP)	Specifies the networks to be advertised by the BGP and multiprotocol BGP routing processes.
redistribute (IP)	Redistributes routes from one routing domain into another routing domain.
show ip bgp	Displays entries in the BGP routing table.
show route-map	Displays all route maps configured or only the one specified.