BGP Support for Sequenced Entries in Extended Community Lists

This feature introduces automatic sequencing of individual entries in Border Gateway Protocol (BGP) extended community lists. This feature also introduces the ability to remove or resequence extended community list entries without deleting the entire existing extended community list.

Feature History for the BGP Support for Sequenced Entries in Extended Community Lists Feature

Release	Modification
12.2(25)S	This feature was introduced.
12.3(11)T	This feature was integrated into Cisco IOS Release 12.3(11)T.
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.

Contents

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How to Sequence Extended Community Lists

This section contains the following tasks:

Configuring Extended Community-list Sequencing

Perform this task to sequence and resequence extended community lists.

IP Extended Community-list Configuration Mode

This feature introduces IP Extended community-list configuration mode. Both named and numbered extended community lists can be configured in IP Extended community-list configuration mode. To enter IP Extended community-list configuration mode, the **ip extcommunity-list** command is entered with either the **expanded** or **standard** keyword followed by the extended community-list name. This configuration mode supports all of the functions that are available in global configuration mode. In addition, you can perform the following operations:

- Configure sequence numbers for extended community list entries
- Resequence existing sequence numbers for extended community list entries
- Configure an extended community list to use default values

Default Sequence Numbering

Extended community list entries start with the number 10 and increment by 10 for each subsequent entry when no sequence number is specified, when default behavior is configured, and when an extended community list is resequenced without specifying the first entry number or the increment range for subsequent entries.

Resequencing Extended Community-lists

Extended community-list entries are sequenced and resequenced on a per-extended community-list basis. The **resequence** command can be used without any arguments to set all entries in a list to default sequence numbering. The **resequence** command also allows you to set the sequence number of the first entry and increment range for each subsequent entry. The range of configurable sequence numbers is from 1 to 2147483647.

Restrictions

A sequence number is applied to all extended community-list entries by default regardless of the configuration mode. Explicit sequencing and resequencing of extended community list entries can only be configured in IP Extended community-list configuration mode and not in global configuration mode.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip extcommunity-list {***expanded-list-number* | **expanded** *list-name* | *standard-list-number* | **standard** *list-name* }
4. [*sequence-number*] { **deny** [*regular-expression*] | **exit** | **permit** [*regular-expression*] | **resequence** [*starting-sequence*] [*sequence-increment*]}
5. [*sequence-number*] {**deny** [**rt** *extcom-value*] [**soo** *extcom-value*] | **exit** | **permit** [**rt** *extcom-value*] [**soo** *extcom-value*] | **resequence** [*starting-sequence*] [*sequence-increment*] }
6. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**ip extcommunity-list** {*expanded-list-number* | **expanded** *list-name* | *standard-list-number* | **standard** *list-name* } **Example:** `Router(config)# ip extcommunity-list standard NAMED_LIST`	Enters IP Extended community-list configuration mode to create or configure an extended community-list. • The example creates a standard named extended community list.
Step 4	[*sequence-number*] { **deny** [*regular-expression*] | **exit** | **permit** [*regular-expression*] | **resequence** [*starting-sequence*] [*sequence-increment*]} **Example:** `Router(config-extcom-list# 100 deny (A-Z)* (a-z)*`	Configures an expanded extended community list. • The example creates an expanded extended community list entry with the sequence number 100 that will deny any a route target or route origin pattern that matches any letter.

	Command or Action	Purpose
Step 5	[*sequence-number*] {**deny** [**rt** *extcom-value*] [**soo** *extcom-value*] | **exit** | **permit** [**rt** *extcom-value*] [**soo** *extcom-value*] | **resequence** [*starting-sequence*] [*sequence-increment*] } **Example:** `Router(config-extcom-list)# 1000 permit rt 64512:10 soo 65535:20`	Creates an extended community-list and controls access to it. • The example creates a standard named extended community list with a sequence number 1000 that will permit routes from route target 64512:10 and site of origin 65535:20 The route target or site of origin extended community value can be one of the following combinations: • autonomous-system-number : network-number • ip-address : network-number
Step 6	**end** **Example:** `Router(config-extcom-list)# end`	Exits IP Extended community-list configuration mode and enters privileged EXEC mode.

Verifying Extended Community-list Sequences

Perform this task to verify the configuration of extended community-list sequences.

SUMMARY STEPS

1. **show ip extcommunity-list** [*list-number* | *list-name*]

DETAILED STEPS

	Command or Action	Purpose
Step 1	**show ip extcommunity-list** [*list-number* | *list-name*] **Example:** `Router# show ip extcommunity-list`	Displays routes that are permitted by an extended community list.

Configuration Examples for Sequenced Entries in Extended Community-lists

The following examples show how to configure and verify this feature:

- Sequenced Extended Community-list Entry Configuration: Example, page 5
- Resequenced Extended Community-list Entry Configuration: Example, page 5
- Sequenced Extended Community-list Entry Verification: Example, page 5

Sequenced Extended Community-list Entry Configuration: Example

The following example creates and configures a named extended community list that will permit routes only from route target 64512:10, 65000:20, 64535:30, and site of origin 65535:40. All other routes implicitly denied.

```
Router(config)# ip extcommunity-list standard NAMED_LIST
Router(config-extcom-list)# 1 permit rt 64512:10
Router(config-extcom-list)# 2 permit rt 65000:20
Router(config-extcom-list)# 3 permit rt 64535:30
Router(config-extcom-list)# 4 permit soo 65535:40
Router(config-extcom-list)# end
```

Resequenced Extended Community-list Entry Configuration: Example

The following example resequences the extended community list entries in the named community list. The first entry is resequenced to the number 50 and the range for each subsequent entry to follow by 100 (for example, 150, 250, 350, etc):

```
Router(config)# ip extcommunity-list standard NAMED_LIST
Router(config-extcom-list)# resequence 50 100
Router(config-extcom-list)# end
```

Sequenced Extended Community-list Entry Verification: Example

The following example uses the **show ip extcommunity-list** Exec command to display routes that are permitted by the named extended community list. This example also shows the configuration from the first example after it has been resequence with user-defined values.

```
Router# show ip extcommunity-list

Standard extended community-list NAMED_LIST
     50 permit RT:64512:10
     150 permit RT:64512:10
     250 permit RT:64512:10
     350 permit RT:64512:10
```

Additional References

The following sections provide references related to the BGP Support for Named Extended Community Lists feature.

Related Documents

Related Topic	Document Title
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
Regular Expressions	"Regular Expressions" appendix of the *Cisco IOS Terminal Services Configuration Guide*, Release 12.3T

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

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 modified commands.

- **ip extcommunity-list**
- **show ip extcommunity-list**

ip extcommunity-list

To create an extended community list to configure Virtual Private Network (VPN) route filtering, use the **ip extcommunity-list** command in global configuration mode. To delete the extended community list, use the **no** form of this command.

Global Configuration Mode CLI

ip extcommunity-list *expanded-list* [**expanded** *list-name* {**permit** | **deny**} [*regular-expression*] | *standard-list* | **standard** *list-name* {**permit** | **deny**} [**rt** *value*] [**soo** *value*]]

no **ip extcommunity-list** *expanded-list* [**expanded** *list-name* | *standard-list* | **standard** *list-name*]

To enter IP Extended community-list configuration mode to create or configure an extended community-list, use the **ip extcommunity-list** command in global configuration mode. To delete the entire extended community list, use the **no** form of this command. To delete a single entry, use the **no** form in IP Extended community-list configuration mode.

ip extcommunity-list *expanded-list* [**expanded** *list-name* | *standard-list* | **standard** *list-name*]

no ip extcommunity-list *expanded-list* [**expanded** *list-name* | *standard-list* | **standard** *list-name*]

Expanded IP Extended Community-List Configuration Mode CLI

[*sequence-number*] **deny** [*regular-expression*] [**exit** | **permit** [*regular-expression*] | **resequence**] [*starting-sequence*] [*sequence-increment*]

default {*sequence-number* | **deny** [*regular-expression*] | **exit** | **permit** [*regular-expression*] | **resequence** [*starting-sequence*] [*sequence-increment*]}

no {*sequence-number* | **deny** [*regular-expression*] | **permit** [*regular-expression*] | **resequence** [*starting-sequence*] [*sequence-increment*]}

Standard IP Extended Community-List Configuration Mode CLI

[*sequence-number*] **deny** [**rt** *value*] [**soo** *value*] [**exit** | **permit** [**rt** *value*] [soo *value*] | **resequence**] [*starting-sequence*] [*sequence-increment*]

default {*sequence-number* | **deny** [**rt** *value*] [**soo** *value*] | **exit** | **permit** [**rt** *value*] [**soo** *value*] | **resequence** [*starting-sequence*] [*sequence-increment*]}

no {*sequence-number* | **deny** [**rt** *value* | **soo** *value*] | **permit** [**rt** *value*] [**soo** *value*] | **resequence** [*starting-sequence*] [*sequence-increment*]}

Syntax Description

expanded-list	An expanded list number from 100 to 500 that identifies one or more permit or deny groups of extended communities.
standard-list	A standard list number from 1 to 99 that identifies one or more permit or deny groups of extended communities.
expanded *list-name*	Creates an expanded named extended community list and enters IP Extended community-list configuration mode.
standard *list-name*	Creates a standard named extended community list and enters IP Extended community-list configuration mode.

permit	Permits access for a matching condition.
deny	Denies access for a matching condition.
regular-expression	(Optional) An input string pattern to match against.
rt	(Optional) Specifies the route target (RT) extended community attribute. The **rt** keyword can be configured only with standard extended community lists and not expanded community lists.
soo	(Optional) Specifies the site of origin (SOO) extended community attribute. The **soo** keyword can be configured only with standard extended community lists and not expanded community lists.
value	Specifies the route target or site of origin extended community value. This value can be entered in one of the following formats: • autonomous-system-number : network-number • ip-address : network-number
sequence-number	(Optional) The sequence number of a named or numbered extended community list. This value can be a number from 1 to 2147483647.
default	(Optional) Sets a keyword or argument to default behavior or value.
exit	(Optional) Exits from IP Extended community-list configuration mode.
resequence	(Optional) Changes the sequences of extended community list entries to the default sequence numbering or to the specified sequence numbering. Extended community entries are sequenced by ten number increments by default.
starting-sequence	(Optional) Specifies the number for the first entry in an extended community list.
sequence-increment	(Optional) Specifies the increment range for each subsequent extended community entry.

Defaults

Extended community exchange is not enabled by default. It is enabled on a per-neighbor basis with the **neighbor send-community** command.

Once a permit value has been configured to match a given set of extended communities, the extended community list defaults to an implicit deny for all other values.

Extended community list entries start with the number 10 and increment by ten for each subsequent entry when no sequence number is specified, when default behavior is configured, and when an extended community list is resequenced without specifying the first entry number or the increment range for subsequent entries.

Command Modes

Global configuration
IP Extended community-list configuration

Command History

Release	Modification
12.1	This command was introduced.
12.0(22)S	The maximum number of expanded community list numbers was increased from 199 to 500.

Release	Modification
12.2(15)T	The maximum number of expanded community list numbers was increased from 199 to 500.
12.2(25)S	Support for the following was added in Cisco IOS Release 12.2(25)S: • Extended community-list sequencing • IP Extended community configuration mode • Named extended community lists
12.3(11)T	Support for the following was added in Cisco IOS Release 12.3(11)T: • Extended community-list sequencing • IP Extended community configuration mode • Named extended community lists
12.2(27)SBC	This command was integrated into the Cisco IOS Release 12.2(27)SBC.

Usage Guidelines

The **ip extcommunity-list** command is used to configure named or numbered extended community lists. Extended community attributes are used to filter routes for VPN routing and forwarding instances (VRFs) and Multiprotocol Label Switching (MPLS) Virtual Private Networks (VPNs). All of the standard rules of access lists apply to the configuration of extended community lists. The route target (RT) and site of origin (SOO) extended community attributes are supported by the standard range of extended community lists. Regular expressions are supported in expanded extended community lists. For information about configuring regular expressions, see the *Regular Expressions* appendix of the *Cisco IOS Terminal Services Configuration Guide*.

Route Target Extended Community Attribute

The route target (RT) extended community attribute is configured with the **rt** keyword. This attribute is used to identify a set of sites and VRFs that may receive routes that are tagged with the configured route target. Configuring the route target extended attribute with a route allows that route to be placed in the per-site forwarding tables that are used for routing traffic that is received from corresponding sites.

Site of Origin Extended Community Attribute

The site of origin (SOO) extended community attribute is configured with the **soo** keyword. This attribute uniquely identifies the site from which the provider edge (PE) router learned the route. All routes learned from a particular site must be assigned the same site of origin extended community attribute, regardless if a site is connected to a single PE router or multiple PE routers. Configuring this attribute prevents routing loops from occurring when a site is multihomed. The SOO extended community attribute is configured on the interface and is propagated into BGP through redistribution. The SOO should not be configured for stub sites or sites that are not multihomed.

IP Extended Community-List Configuration Mode

Named and numbered extended community lists can be configured in IP Extended community-list configuration mode. To enter IP Extended community-list configuration mode, enter the **ip extcommunity-list** command with either the **expanded** or **standard** keyword followed by the extended community list name. This configuration mode supports all of the functions that are available in global configuration mode. In addition, you can perform the following operations:

- Configure sequence numbers for extended community list entries
- Resequence existing sequence numbers for extended community list entries
- Configure an extended community list to use default values

Extended Community List Processing

When multiple values are configured in the same extended community list statement, a logical AND condition is created. All extended community values must match to satisfy an AND condition. When multiple values are configured in separate extended community list statements, a logical OR condition is created. The first list that matches a condition is processed.

Examples

Standard Extended Community-List Configuration Example

In the following example, an extended community list is configured that permits routes from route target 64512:10 and site of origin 65400:20 and denies routes from route target 65424:30 and site of origin 64524:40. List 1 shows a logical OR condition; the first match is processed. List 2 shows a logical AND condition; all community values must match in order for list 2 to be processed.

```
Router(config)# ip extcommunity-list 1 permit rt 64512:10
Router(config)# ip extcommunity-list 1 permit soo 65400:20
Router(config)# ip extcommunity-list 2 deny rt 65424:30 soo 64524:40
```

Expanded Extended Community-List Configuration Example

In the following example, an expanded extended community list is configured to deny advertisements from any path through or from autonomous system 65534 from being advertised to the 192.168.1.2 neighbor:

```
Router(config)# ip extcommunity-list 500 deny _65412_
Router(config)# router bgp 50000
Router(config-router)# address-family vpnv4
Router(config-router-af)# neighbor 172.16.1.1 remote-as 65412
Router(config-router-af)# neighbor 172.16.1.1 neighbor send-community extended
Router(config-router-af)# neighbor 192.168.1.2 remote-as 65534
Router(config-router-af)# neighbor 192.168.1.2 neighbor send-community extended
Router(config-router-af)# end
```

Named Extended Community-List Configuration Example

In the following example, a named extended community list is configured that will permit routes only from route target 65505:50. All other routes are implicitly denied.

```
Router(config)# ip extcommunity-list standard NAMED_LIST permit rt 65505:50
```

IP Extended Community-List Configuration Mode Example

In the following example, an expanded named extended community list is configured in IP Extended community-list configuration mode. A list entry is created with a sequence number 10 that will permit a route target or route origin pattern that matches any network number extended community from autonomous system 65412.

```
Router(config)# ip extcommunity-list RED
```

```
Router(config-extcom-list)# 10 permit 65412:[0-9][0-9][0-9][0-9][0-9]_
Router(config-extcom-list)# exit
```

Extended Community-List Resequencing Example

In the following example, the first list entry is resequenced to the number 50 and each subsequent entry is configured to increment by 100:

```
Router(config)# ip extcommunity-list BLUE
Router(config-extcom-list)# resequence 50 100
Router(config-extcom-list)# exit
```

Related Commands

Command	Description
export map	Configures an export route map for a VRF.
match extcommunity	Matches a BGP VPN extended community list.
set extcommunity	Sets BGP extended community attributes.
show ip extcommunity-list	Displays routes that are permitted by the extended community list.
show route-map	Displays configured route maps.

show ip extcommunity-list

To display routes that are permitted by an extended community list, use the **show ip extcommunity-list** command in EXEC mode.

show ip extcommunity-list [*list-number* | *list-name*]

Syntax Description

list-number	(Optional) Specifies an extended community list number from 1 to 500. A standard extended community list number is from 1 to 99. An expanded extended list is from 100 to 500.
list-name	(Optional) Specifies an extended community list name.

Defaults

If a specific extended community list number is not specified when the **show ip extcommunity-list** command is entered, all locally configured extended community lists will be displayed by default.

Command Modes

EXEC

Command History

Release	Modification
12.1	This command was introduced.
12.2(25)S 12.3(11)T	Support for named extended community lists was added. Minor formatting changes were made to the output.
12.2(27)SBC	This command was integrated into the Cisco IOS Release 12.2(27)SBC.

Examples

The following is sample output from the **show ip extcommunity-list** command in EXEC mode:

```
Router# show ip extcommunity-list

Standard extended community-list 1
     10 permit RT:64512:10
     20 permit SoO:65400:20
     30 deny RT:65424:30 SoO:64524:40
Standard extended community-list 99
     10 permit RT:65504:40 SoO:65505:50
     20 deny RT:65406:60 SoO:65307:70
Expanded extended community-list LIST_NAME
     10 permit 0-9* A-Z* a-z*
```

Table 1 describes the significant fields shown in the display.

Table 1 show ip extcommunity-list Field Descriptions

Field	Description
... extended community-list....	The type of extended community-list (standard or expanded), and the name or number of the extended community list.
10	The sequence number of the extended community list entry. 10 is the lowest default sequence number. Extended community lists increment by 10 when default values are configured.
permit/deny	Indicates a permit or deny sequence entry.
RT/SoO	Indicates the route target or the site of origin used in a standard extended community list.
0-9* A-Z* a-z*	Regular expression used in an expanded extended community list.

Related Commands

Command	Description
show route-map	Displays configured route maps.