



Managing Subscribers

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Introduction

The SCE platform is subscriber aware, that is, it can relate traffic and usage to specific customers. This ability to map between IP flows and a specific subscriber allows the system to do the following:

- Maintain the state of each subscriber transmitting traffic through the platform
- Provide usage information for specific subscribers
- Enforce the appropriate policy on subscriber traffic (each subscriber can have a different policy)

Information About Subscribers

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What is a Subscriber?

In the Service Control solution, a subscriber is defined as a managed entity on the subscriber side of the SCE Platform to which accounting and policy are applied individually.

[Table 9-1](#) lists several examples of subscribers in Service Control solutions.

Table 9-1 **Subscriber Examples**

The Subscriber	Subscriber Characteristics	Subscriber (Entity) Identified By
	Managed Entity	
DSL residential subscriber	DSL residential user IP address	The list of IP addresses is allocated by a Radius server
Cable residential subscriber	Cable residential user	IP address The list of IP addresses of the CPEs is allocated dynamically by a DHCP server
Owner of a 3G-phone that is subscribed to data services	3G-phone owner	The MS-ISDN, which is dynamically allocated by a Radius server.
A corporate/enterprise customer of the service provider	The corporate/enterprise and the traffic it produces	The set of NAT-ed IP addresses, which are allocated statically
A CMTS	The CMTS and the broadband traffic of the Cable Modem users that connect to the Internet through the CMTS	<ul style="list-style-type: none"> • A range of IP addresses • A group of VLAN tags

Table 9-1 *Subscriber Examples (continued)*

The Subscriber	Subscriber Characteristics	
VPN-based subscriber (all or part of a VPN)	<ul style="list-style-type: none"> MPLS/VPN-based subscriber VLAN-based subscriber 	<ul style="list-style-type: none"> A set of IP addresses or ranges in a certain VPN A VLAN tag or range of VLAN tags All the IP addresses of a CE router, defined by a BGP community over a VPN
SCMP subscriber	SCMP subscriber	<p>A combination of the following three items:</p> <ul style="list-style-type: none"> IP address or range Manager-Id of the SCMP peer device Subscriber ID including the GUID. <p>Each subscriber is assigned a Manager-Id based on the management entity that created the subscriber. The possible managers are the SM, CLI and an SCMP peer device.</p>

Subscriber Modes in Service Control Solutions

Service Control solutions support several modes of handling subscribers:

- Subscriber-less mode
- Anonymous subscriber mode
- Static subscriber aware mode
- Dynamic subscriber aware mode

Note that not all the Service Control solutions support all modes.

The most basic mode is **Subscriber-less** mode. In this mode, there is no notion of subscriber in the system, and the entire link where the SCE platform is deployed is treated as a single subscriber. Global Application level analysis (such as total p2p, browsing) can be conducted, as well as global control (such as limiting total p2p to a specified percentage). From a configuration stand point, this is a turnkey system and there is no need to integrate or configure the system from a subscriber perspective.

In **Anonymous subscriber** mode, analysis is performed on an incoming network ID (IP address, VLAN or VPN ID), as the SCE platform creates an 'anonymous/on-the-fly' record for each subscriber. This permits analyzing traffic at an individual network ID level (for example, to identify/monitor what a particular 'subscriber' IP is currently doing) as well as control at this level (for example, to limit each subscriber's bandwidth to a specified amount, or block, or redirect). Anonymous-subscriber allows quick visibility into application and protocol usage without OSS integration, and permits the application of a uniform control scheme using predefined templates.

There are two possible **Subscriber Aware** modes. In these modes, subscriber IDs and currently used network IDs are provisioned into the SCE platform. The SCE platform can then bind usage to a particular subscriber, and enforce per-subscriber policies on the traffic. Named reports are supported (such as top

subscribers with the OSS IDs), quota-tracking (such as tracking a subscriber-quota over time even when network IDs change) as well as dynamic binding of packages to subscribers. The two Subscriber Aware modes are:

- **Static subscriber aware** — The network IDs are static. The system supports the definition of static-subscribers directly to the SCE platform. This is achieved by using the SCE platform CLI, and defining the list of subscribers, their network IDs and policy information using interactive configuration or import/export operations.
- **Dynamic subscriber aware** — The network IDs change dynamically for each subscriber login into the Service Provider's network. In this case, subscriber awareness is achieved by integrating with external provisioning systems (either directly or through the SM) to dynamically learn network-ID to subscriber mappings, and distribute them to the SCE platforms.

MPLS/VPN-based subscribers are supported only in the dynamic subscriber aware mode. The system must dynamically map the internal MPLS label and the MAC address of the PE to the correct VPN subscriber.

Subscriber Database: Capacity and Limits

The capacity of the subscriber database depends on three variables:

- **Subscriber context size:** Determined by the specific SML application loaded to the SCE platform. This size is multiplied by the number of subscribers.
- **Available memory per traffic processor:** The main memory consumers in a traffic processor are flows and subscribers. The total number of subscribers that can be supported is the number of subscribers per traffic processor multiplied by the number of traffic processors.
- **Available memory in the control processor:** The control processor holds one entry per subscriber. However, the control database is usually not the limiting factor regarding the number of subscribers, since the control processor entry (context size) is much smaller than the traffic processor entry.

Table 9-2 contains the maximum subscribers capacities for the SCE platform. Note the following:

- These capacities are the maximum limits imposed by the SCOS. Usually actual numbers would be lower due to large subscriber context size.
- There is a difference between the maximum number of network ID entries and the numbers of specific types of network IDs due to hardware limitations.

Table 9-2 Maximum Number of Subscribers and Network IDs

Platform	Subscribers	Network IDs	IP addresses	IP ranges	VLAN tags	Static Subscribers
SCE 1000	100,000	>100,000	100,000	>7900	2046	80,000
SCE 2000	200,000	>200,000	200,000	>7900	2046	80,000

Working with Large Numbers of Subscribers

A very large number of subscribers, approaching the upper limit of the SCOS capacity, is more typical in mobile installations. As the actual number of subscriber increases, the impact is expected to be approximately four flows per subscriber.

Actual Maximum Number of Subscribers

As shown in [Table 9-2](#), there is an absolute maximum numbers of subscribers based on SCOS capacity. However, the actual maximum number of subscribers supported is based on the limit specified while loading the SCA BB application.

There are two ways to specify the actual maximum number of subscribers:

- The capacity options mechanism: This mechanism is based on various capacity options supplied by the application. The actual capacity option used is either specified while loading the application or a previously-configured default capacity option is used.
- Specific capacity CLI command (see [Configuring the Actual Maximum Number of Subscribers, page 9-38](#)): This specific command overrides the capacity option configured when loading the application. It provides the following options:
40K, 80K, 120K, 200K

Subscriber Mapping Limits

Refer to [Table 9-3](#) for the maximum number of IP mappings permitted per single subscriber. An IP mapping may be either a single IP address or a range of addresses.

Table 9-3 Maximum Number of IP Mappings per Single Subscriber

Mode	Pure IP	Private IP
Standalone	1024	200
Cascade	300	50

Aging Subscribers

Subscribers can be aged automatically by the SCE platform. ‘Aging’ is the automatic removal of a subscriber, performed when no traffic sessions assigned to it have been detected for a certain amount of time. The most common usage for aging is for anonymous subscribers, since this is the easiest way to ensure that anonymous subscribers that have logged-out of the network are removed from the SCE platform and are no longer occupying resources. Aging time can be configured individually for introduced subscribers and for anonymous subscribers.

Introduced subscriber aging is not supported when using VPN-based subscribers.

VPN-Based Subscribers

A VPN-based subscriber contains a set of mappings of the form: IP@VpnName, where IP can be either a single IP address or a range of addresses. A VPN-based subscriber may be either VLAN-based or MPLS/VPN-based

Most VPN-based subscriber functionality is managed via the SM, with the role of the SCE platform CLI being more limited.

The SCE platform CLI can be used to do the following:

- Display VPN-related mappings
- Monitor bypassed VPNs
- View all automatic VLAN VPNs
- Clear upstream VPN mappings
- Clear all automatic VLAN VPNs (only VPNs that have no active subscriber mappings).

Automatic VLAN VPNs

The SCE platform will automatically create a new VPN under the following conditions

- The VPN name does not currently exist
- and
- The VPN name is a number in the range [0 to 2046]

The number is used as the VLAN mapping of the newly created VPN. VLAN mappings cannot be added to automatic VPNs.

Synchronizing Subscriber Information in a Cascade System

In a hot standby, cascade setup with full redundancy, the external provisioning server updates only the active SCE platform. However, the standby SCE platform must always be updated with the latest subscriber-related information (login, logout). This is required to minimize information loss in case of fail-over. In general, the only entity that is allowed to change subscriber information in the standby SCE platform is the active SCE platform. The standby SCE platform does not accept any subscriber operations (it returns a STANDBY_VIOLATION error instead), and it also does not generate any asynchronous subscriber notifications (such as pull-response or logout-notification).

There are only two exceptions to this rule:

- Standby SCE platform can change subscriber information of the default subscriber.
- Standby SCE platform can perform subscriber aging.

Therefore, when working as a pair, the active SCE platform constantly updates the standby SCE platform with external data information. In addition, the standby SCE platform constantly requests external data information from the active SCE platform. The synchronization is bi-directional to ensure that the subscriber databases in both SCE platforms are identical.

Note that external data is only relevant for introduced subscribers (both static and dynamic). It has no meaning for anonymous subscribers or the default subscriber. No more than two minutes of external data information will be lost by the standby SCE platform if a fail-over occurs.

The following subscriber information is considered as external data:

- Subscriber name
- Mappings (all supported types – IPs, VLANs, MPLS/VPN)
- Tunables
- Manager name
- Aging time
- Lease time
- The is-static flag

Only the active SCE platform communicates with the SM. The SM is aware of the active/standby state of each SCE platform, and is also aware of a fail-over.

Specifically, this means the following:

- In push mode, the SM pushes events to the active SCE platform, which updates the standby SCE platform.
- In pull mode, only the active SCE platform pulls subscribers from the SM.
- The standby SCE platform can create anonymous subscribers based on the updates received from the active SCE platform, but does not generate pull-response for them.
- If SCE-SM connection failure, the SM handles the SCE recovery of the active SCE platform only. The active SCE platform propagates the information to the standby SCE platform.

Anonymous Groups and Subscriber Templates

An anonymous group is a specified IP range, possibly assigned a subscriber template. When an anonymous group is configured, the SCE platform generates anonymous subscribers for that group when it detects traffic with an IP address that is in the specified IP range. If a subscriber template has been assigned to the group, the anonymous subscribers generated have properties as defined by that template. If no subscriber template has been assigned, the default template is used.

Anonymous groups can have overlapping IP ranges. When the SCE detects traffic for an IP address which is contained in more than one anonymous group, the group with the longest prefix is used to create the anonymous subscriber for that IP address.

Subscriber templates are identified by a number from 0-199. Subscriber templates 1-199 are defined in csv formatted subscriber template files. However, template #0 cannot change; it always contains the default values.

If an anonymous group is not explicitly assigned a template, the group uses template #0.

Important Information

- Maximum number of anonymous groups—1000
- Maximum rate of creating anonymous subscribers—360 per second
- Maximum number of subscriber templates—200 (numbered 0-199)

Information About Subscriber Files

- [Subscriber Files, page 9-8](#)
- [Subscriber Default csv File Format, page 9-8](#)
- [Subscriber anonymous Groups csv File Format, page 9-9](#)

Subscriber Files



Note

MPLS/VPN-based subscribers cannot be defined, imported, or exported by a subscriber file.

Individual subscribers, anonymous groups, and subscriber templates may all be defined in csv files. A csv file is a text file in a comma-separated-values format. Microsoft Excel™ can be used to view and create such files. The subscriber data is imported into the system using the appropriate CLI command. The SCE platform can also export the currently configured subscribers, subscriber templates and anonymous groups to csv-formatted files.

Subscriber csv files and subscriber template csv files are application-specific. Refer to the relevant application documentation for the definition of the file format.

Each line in a csv file should contain either a comment (beginning with the character '#'), or a list of comma-separated fields.

Subscriber csv files are application-specific, but a default format is defined by the SCE, which is used when the application does not choose to over-ride it. The application might over-ride the format when additional data is desired for each subscriber or subscriber template. Refer to the relevant Service Control Application documentation to see if the application defines a different format.

Subscriber template csv files are application-specific. Refer to the relevant Service Control Application documentation of the file format.

Anonymous groups csv files are not application specific. Their format is described below.

Subscriber Default csv File Format

Each line has the following structure:

name, mappings, packageId

- **Name** — is the subscriber name
- **Mappings** — contains one or more mappings, specifying the Tunnel IDs or IP addresses mapped to this subscriber. Multiple mappings are separated by semi-colon. Tunnel IDs and IP address/range cannot be specified for the same subscriber. The following mapping formats are supported:
 - IP address — in dotted decimal notation. Example: 10.3.4.5
 - IP address range — dotted decimal, followed by the amount of significant bits. Note that the non-significant bits (As determined by the mask) must be set to zero. Example: 10.3.0.0/16. Example for a bad range: 10.1.1.1/24 (Should be 10.1.1.0/24).
- **packageId** — the ID of the package to which the subscriber is assigned

Here is an example of a subscriber csv file in the default format:

```
# A comment line
sub7, 10.1.7.0/24, 1
sub8, 10.1.11.32, 1
sub9, 10.2.22.10, 2
sub10, 10.3.33.10, 2
sub11, 10.4.44.10, 1
sub12, 10.1.11.90; 10.3.0.0/16, 2
```

Subscriber anonymous Groups csv File Format

Each line has the following structure:

name, IP-range, template-index, manager-name (optional)

- **name** — is the anonymous group name
- **IP-range** — dotted decimal, followed by the amount of significant bits. Example: 10.3.0.0/16
- **template-index** — is the index of the subscriber template to be used by subscribers belonging to this anonymous group.
- **manager-name (optional)** — is either SM or the name of the SCMP peer. Use "SM" to pull subscribers from the SM (if it exists). If not specified, "SM" is assumed.

Here is an example of an anonymous groups csv file:

```
# Yet another comment line
anon1, 10.1.1.0/24, 1, 1
anon2, 10.1.2.0/24, 2, 2
anon3, 10.1.3.0/32, 3, 3
anon4, 10.1.4.0/24, 3, 3
anon5, 10.1.5.0/31, 2
anon6, 10.1.6.0/30, 1
anon7, 0.0.0.0/0, 1
```

Importing and Exporting Subscriber Information

Use the following commands to import subscriber data from csv files and to export subscriber data to these files:

- subscriber import csv-file
- subscriber export csv-file
- subscriber anonymous-group import csv-file
- subscriber anonymous-group export csv-file
- subscriber template import csv-file
- subscriber template export csv-file

These subscriber management commands are LineCard interface commands. Make sure that you are in LineCard Interface command mode.



Note

MPLS/VPN-based subscribers cannot be defined, imported, or exported by a subscriber file.

Options

The following option is available:

- **filename** — the name of the csv file.

How to Import Subscriber Information

Step 1 From the SCE(config if)# prompt, type **subscriber import csv-file filename** and press **Enter**.

Imports the subscriber information from the specified file.

Imported subscriber information is added to the existing subscriber information. It does not overwrite the existing data.

If the information in the imported file is not valid, the command will fail during the verification process before it is actually applied.

How to Export Subscriber Information



Note

Only subscribers managed by CLI commands are exported. To export subscribers managed by the SM, use the SM GUI or CLU (see the [Cisco Service Control Management Suite Subscriber Manager User Guide](#).)

-
- Step 1** From the SCE(config if)# prompt, type **subscriber export csv-file *filename*** and press **Enter**.
Exports the subscriber information to the specified file.
-

How to Import a Subscriber Template

-
- Step 1** From the SCE(config if)# prompt, type **subscriber template import csv-file *filename*** and press **Enter**.
Imports the subscriber template from the specified file.
-

How to Export a Subscriber Template

-
- Step 1** From the SCE(config if)# prompt, type **subscriber template export csv-file *filename*** and press **Enter**.
Exports the subscriber template to the specified file.
-

Removing Subscribers and Templates

- [How to Remove a Specific Subscriber, page 9-12](#)
- [How to Remove All Introduced Subscribers, page 9-12](#)
- [How to Remove a Specific Anonymous Subscriber Group, page 9-13](#)
- [How to Remove All Anonymous Subscriber Groups, page 9-13](#)
- [How to Remove All Anonymous Subscribers, page 9-13](#)
- [How to Remove All Subscriber Templates, page 9-13](#)
- [How to Remove Subscribers by Device, page 9-14](#)

Use the following commands to remove all subscribers, anonymous groups, or subscriber templates from the system.

- `no subscriber all`
- `no subscriber anonymous-group all`
- `clear subscriber anonymous`
- `default subscriber template all`

Use the following commands to remove a specific subscriber or anonymous group from the system.

- `no subscriber name`
- `no subscriber anonymous-group name`

These subscriber management commands are LineCard interface commands (with the exception of the `clear subscriber anonymous` command, which is a Privileged Exec command). Make sure that you are in LineCard Interface command mode, and that the `SCE(config if)#` prompt appears in the command line.

How to Remove a Specific Subscriber

Options

The following option is available:

- **subscriber-name** — the name of the subscriber to be removed

-
- Step 1** From the `SCE(config if)#` prompt, type `no subscriber name subscriber-name` and press **Enter**.
Removes the specified subscriber.
-

How to Remove All Introduced Subscribers

-
- Step 1** From the `SCE(config if)#` prompt, type `no subscriber all` and press **Enter**.
Removes all introduced subscribers.
-

How to Remove a Specific Anonymous Subscriber Group

Options

The following option is available:

- **group-name** — the name of the anonymous subscriber group to be removed

Step 1 From the SCE(config if)# prompt, type **no subscriber anonymous-group name** *group-name* and press **Enter**.

Removes the specified anonymous subscriber group.

How to Remove All Anonymous Subscriber Groups

Step 1 From the SCE(config if)# prompt, type **no subscriber anonymous-group all** and press **Enter**.

Removes all anonymous subscriber groups.

How to Remove All Anonymous Subscribers

Step 1 From the SCE# prompt, type **clear interface linecard 0 subscriber anonymous all** and press **Enter**.

Removes all anonymous subscribers.



Note

The **clear subscriber anonymous** command is a **Privileged Exec** command.

How to Remove All Subscriber Templates

Step 1 From the SCE(config if)# prompt, type **default subscriber template all** and press **Enter**.

Removes all subscriber templates.

All anonymous subscribers will be assigned to the default subscriber template.

About VPN-Based Subscribers

All VPN-based subscribers must be cleared to change the tunneling mode. If there are VPN-based subscribers that the SM cannot remove for some reason (for example, if there is no communication between the SM and the SCE platform), use this command.

This command allows you to switch out of MPLS/VPN mode without reload when the SM is down.

**Note**

Use this command **ONLY** when the SCE platform is disconnected from the SM.

-
- Step 1** From the SCE(config if)# prompt, type **no subscriber all with-vpn-mappings** and press **Enter**.
Clears all VPN-based subscribers.
-

How to Remove Subscribers by Device

You can remove all subscribers managed by a specified device. The device can be either of the following:

- The SM
- A specified SCMP peer device

How to Remove Subscribers from the SM

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- Step 1** From the SCE(config if)# prompt, type **no subscriber sm all** and press **Enter**.
Clears all subscribers from the SM.
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How to Remove Subscribers from a Specified SCMP Peer Device

Options

The following option is available:

- **peer-device-name** — the name of the SCMP peer device from which to clear the subscribers.

-
- Step 1** From the SCE(config if)# prompt, type **no subscriber scmp name *peer-device-name* all** and press **Enter**.
Clears all subscribers from the specified SCMP peer device.
-

Creating Anonymous Groups

You can create anonymous groups in two ways:

- Define the group, along with the related IP address range, using the **subscriber anonymous-group** command. The SCE platform then generates anonymous subscribers for that group when it detects traffic with an IP address that is in the specified IP range.
- Create the group by importing anonymous groups from a csv file.

Groups can also be exported to a csv file.

For information on deleting anonymous groups, see [How to Remove a Specific Anonymous Subscriber Group, page 9-13](#) and [How to Remove All Anonymous Subscriber Groups, page 9-13](#).

Defining Anonymous Groups

Use this command to define an anonymous group, assigning the following to the group created:

- group name
- range of IP addresses
- subscriber template to be assigned to all subscribers within that IP range (optional)

How to Define an Anonymous Group

Options

The following options are available:

- **group-name** — name to be assigned to the anonymous group.
- **range** — range of IP addresses that defines this group.
- **template** — number of the subscriber template to assign to all subscribers in this group.

Default = 0

Step 1 From the SCE(config if)# prompt, type **subscriber anonymous-group name *group-name* ip-range *range* [template *template*]** and press **Enter**.

If no template is specified, the default template is applied to all subscribers in this group.

Importing and Exporting Anonymous Groups

- [How to Import Anonymous Groups, page 9-16](#)
- [How to Export Anonymous Groups, page 9-16](#)

How to Import Anonymous Groups

Options

The following option is available:

- **filename** — name of the csv file.

Step 1 From the SCE(config if)# prompt, type **subscriber anonymous-group import csv-file** *filename* and press **Enter**.

Creates anonymous groups by importing anonymous groups from the specified csv file.

Imported anonymous groups information is added to the existing anonymous groups information. It does not overwrite the existing data.

The SCE platform can support a maximum of 1000 anonymous groups.

How to Export Anonymous Groups

Options

The following option is available:

- **filename** — name of the csv file.

Step 1 From the SCE(config if)# prompt, type **subscriber anonymous-group export csv-file** *filename* and press **Enter**.

Exports all existing anonymous groups to the specified csv file.

Monitoring Subscribers

- [How to Monitor the Subscriber Database, page 9-17](#)
- [Displaying Subscribers, page 9-19](#)
- [Displaying Subscriber Information, page 9-24](#)
- [Displaying Anonymous Subscriber Information, page 9-26](#)
- [Managing VPNs and VPN Subscriber Mappings, page 9-28](#)

The CLI provides several commands that allow you to monitor subscribers. These commands can be used to display information regarding the following:

- Subscriber Database
- All subscribers meeting various criteria
- Individual subscriber information, such as properties and mappings
- Anonymous subscribers

Subscribers may be introduced to the SCE platform via the SCE platform CLI or via the Subscriber Manager. The monitoring commands may be used to monitor all subscribers and subscriber information, regardless of how the subscribers were introduced to the system.

Note that these commands are all in Viewer mode. Make sure that you are in the proper mode and that the SCE> prompt appears in the command line. Note also that you must specify 'linecard 0' in these commands.

How to Monitor the Subscriber Database

- [How to Display the Subscriber Database Counters, page 9-18](#)
- [Clearing the Subscriber Database Counters, page 9-19](#)

Use the following commands to display statistics about the subscriber database, and to clear the “total” and “maximum” counters.

- show interface linecard 0 subscriber db counters

The following counters are displayed:

- Current number of subscribers
- Current number of introduced subscribers
- Current number of anonymous subscribers
- Current number of active subscribers (with active traffic sessions)
- Current number of subscribers with mappings
- Current number of IP mappings
- Current number of vlan mappings
- Max number of subscribers that can be introduced
- Max number of subscribers with mappings
- Max number of subscribers with mappings date / time
- Total aggregated number introduced
- Total number of aged subscribers

- Total number of pull events
- Number of traffic sessions currently assigned to the default subscriber
- clear interface linecard 0 subscriber db counters

How to Display the Subscriber Database Counters

-
- Step 1** From the SCE# prompt, type **show interface linecard 0 subscriber db counters** and press **Enter**. Displays the subscriber database counters.
-

Monitoring the Subscriber Database: Examples

The following example shows the output from this command when MPLS is enabled.

```
SCE#show interface linecard 0 subscriber db counters
Current values:
=====
Subscribers: 2 used out of 99999 max.
Introduced subscribers: 2.
Anonymous subscribers: 0.
Subscribers with mappings: 2 used out of 99999 max.
SINGLE non-VPN IP mappings: 1.
non-VPN IP Range mappings: 1.
IP Range over VPN mappings: 1.
Single IP over VPN mappings: 3.
MPLS-based subscribers are enabled.
MPLS/VPN based subscribers are enabled.
MPLS/VPN mappings: 2 used out of 57344 max.
MPLS based VPNs with subscriber mappings: 2 used out of 2015 max.
Subscribers with open sessions: 0.
Subscribers with TIR mappings: 0.
Sessions mapped to the default subscriber: 0.
Peak values:
=====
Peak number of subscribers with mappings: 2
Peak number occurred at: 14:56:55 ISR MON June 9 2007
Peak number cleared at: 15:29:39 ISR MON June 9 2007
Event counters:
=====
Subscriber introduced: 2.
Subscriber pulled: 0.
Subscriber aged: 0.
Pull-request notifications sent: 0.
State notifications sent: 0.
Logout notifications sent: 0.
Subscriber mapping TIR contradictions: 0
```

The following example shows the output from this command when MPLS is disabled.

```
SCE#show interface linecard 0 subscriber db counters
Current values:
=====
Subscribers: 2 used out of 99999 max.
Introduced subscribers: 2.
Anonymous subscribers: 0.
Subscribers with mappings: 2 used out of 99999 max.
SINGLE non-VPN IP mappings: 1.
non-VPN IP Range mappings: 1.
IP Range over VPN mappings: 1.
Single IP over VPN mappings: 3.
VLAN based VPNs with subscribers: 0 used out of 2047
Subscribers with open sessions: 0.
Subscribers with TIR mappings: 0.
Sessions mapped to the default subscriber: 0.
Peak values:
=====
Peak number of subscribers with mappings: 2
Peak number occurred at: 14:56:55 ISR MON June 9 2007
Peak number cleared at: 15:29:39 ISR MON June 9 2007
Event counters:
=====
Subscriber introduced: 2.
Subscriber pulled: 0.
Subscriber aged: 0.
Pull-request notifications sent: 0.
State notifications sent: 0.
Logout notifications sent: 0.
Subscriber mapping TIR contradictions: 0
```

Clearing the Subscriber Database Counters

-
- Step 1** From the SCE# prompt, type **clear interface linecard 0 subscriber db counters** and press **Enter**. Clears the **total** and **maximum** counters.
-

Displaying Subscribers

- [Displaying Subscribers: All Current Subscriber Names, page 9-20](#)
- [Displaying Subscribers: By Subscriber Property or Prefix, page 9-20](#)
- [Displaying Subscribers: By Mapping \(IP Address, VPN, VLAN ID, or MPLS/VPN\), page 9-22](#)

You can display the names of all subscribers.

You can also display specific subscriber name(s) that meet various criteria:

- A subscriber property is equal to, larger than, or smaller than a specified value.
- Subscriber name matches a specific prefix or suffix.
- Mapped to a specified IP address range (may be within a specified VPN).
- Mapped to a specified VLAN ID.
- Mapped to a specified MPLS/VPN.

Use the following commands to display subscribers:

- **show interface linecard 0 subscriber all-names**
- **show interface linecard 0 subscriber [amount] [prefix 'prefix'] [property 'propertyname' equals|greater-than|less-than 'property-val']**
- **show interface linecard 0 subscriber [amount] prefix 'prefix'**
- **show interface linecard 0 subscriber [amount] suffix 'suffix'**
- **show interface linecard 0 subscriber mapping IP 'iprange' [VPN 'vpn-name']**
- **show interface linecard 0 subscriber [amount] mapping intersecting IP 'iprange' [VPN 'vpn-name']**
- **show interface linecard 0 subscriber mapping VLAN-id 'VLAN-id'**
- **show interface linecard 0 subscriber mapping MPLS-VPN PE-ID 'pe-id' BGP-label 'bgp-label'**

Displaying Subscribers: All Current Subscriber Names

You can display the names of all subscribers currently in the SCE subscriber database.

-
- Step 1** From the SCE> prompt, type **show interface linecard 0 subscriber all-names** and press **Enter**.
Displays the names of all subscribers currently in the SCE subscriber database.
-

Displaying Subscribers: By Subscriber Property or Prefix

You can search for all subscribers that match a specified value of one of the subscriber properties, or are greater than or less than the specified value. You can also search for all subscribers that match a specified prefix. You can also find out how many subscribers match any one of these criteria, rather than displaying all the actual subscriber names.

- [How to Display Subscribers That Match a Specified Value of a Subscriber Property, page 9-20](#)
- [How to Display Subscribers That Are Greater Than or Less Than a Specified Value of a Subscriber Property, page 9-21](#)
- [How to Display Subscribers That Match a Specified Prefix, page 9-21](#)
- [How to Display Subscribers That Match a Specified Suffix, page 9-21](#)
- [How to Display The Number of Subscribers That Match a Specified Value of a Subscriber Property, page 9-21](#)
- [How to Display the Number of Subscribers That Are Greater Than or Less Than a Specified Value of a Subscriber Property, page 9-22](#)
- [How to Display The Number of Subscribers That Match a Specified Prefix, page 9-22](#)

How to Display Subscribers That Match a Specified Value of a Subscriber Property

Options

The following options are available:

- **propertyname** — name of the subscriber property to match

- **property-val** — value of that subscriber property to match

Step 1 From the SCE> prompt, type **show interface linecard 0 subscriber property *propertyname* equals *property-val*** and press **Enter**.

How to Display Subscribers That Are Greater Than or Less Than a Specified Value of a Subscriber Property

Options

The following options are available:

- **propertyname** — name of the subscriber property to match
- **property-val** — value of that subscriber property to match

Step 1 From the SCE> prompt, type **show interface linecard 0 subscriber property *propertyname* greater-thanless-than *property-val*** and press **Enter**.

How to Display Subscribers That Match a Specified Prefix

Options

The following options are available:

- **prefix** — subscriber prefix to match

Step 1 From the SCE> prompt, type **show interface linecard 0 subscriber prefix *prefix*** and press **Enter**.

How to Display Subscribers That Match a Specified Suffix

Options

The following options are available:

- **suffix** — subscriber suffix to match

Step 1 From the SCE> prompt, type **show interface linecard 0 subscriber suffix *suffix*** and press **Enter**.

How to Display The Number of Subscribers That Match a Specified Value of a Subscriber Property

Options

The following options are available:

- **propertyname** — name of the subscriber property to match
- **property-val** — value of that subscriber property to match

-
- Step 1** From the SCE> prompt, type **show interface linecard 0 subscriber amount property *propertyname* equals *property-val*** and press **Enter**.
-

How to Display the Number of Subscribers That Are Greater Than or Less Than a Specified Value of a Subscriber Property

Options

The following options are available:

- **propertyname** — name of the subscriber property to match
- **property-val** — value of that subscriber property to match

-
- Step 1** From the SCE> prompt, type **show interface linecard 0 subscriber amount property *propertyname* greater-than/less-than *property-val*** and press **Enter**.
-

How to Display The Number of Subscribers That Match a Specified Prefix

Options

The following options are available:

- **prefix** — subscriber prefix to match

-
- Step 1** From the SCE> prompt, type **show interface linecard 0 subscriber amount prefix *prefix*** and press **Enter**.
-

Displaying Subscribers: By Mapping (IP Address, VPN, VLAN ID, or MPLS/VPN)

- [How to Display Subscribers That are Mapped to a Specified IP Address, or a Range of IP Addresses, page 9-23](#)
- [How to Display Subscribers That are Mapped to IP Addresses That are Included in a Given IP Address or IP Range, page 9-23](#)
- [How to Display Subscribers That are Mapped to a Specified VLAN ID, page 9-23](#)
- [How to Display Subscribers That are Mapped to a Specified MPLS/VPN, page 9-23](#)
- [How to Display Subscribers with No Mapping, page 9-24](#)
- [How to Display the Number of Subscribers That are Mapped To a Specified VLAN ID, page 9-24](#)
- [How to Display the Number of Subscribers with No Mapping, page 9-24](#)

You can display the subscribers who are mapped to any of the following:

- A specified IP address, or range of IP addresses (may be within a specified VPN)
- IP addresses intersecting a given IP address or IP range (may be within a specified VPN)
- A specified VLAN ID
- A specified MPLS/VPN

- no mapping

You can also display just the number of subscribers with a specified mapping, rather than listing the actual subscribers.

How to Display Subscribers That are Mapped to a Specified IP Address, or a Range of IP Addresses

Options

The following options are available:

- **ip-range** — IP address (x.x.x.x) or range of IP addresses (x.x.x.x/y) to match
- **vpn-name** (optional) — The name of the VPN in which to search for the IP address

Step 1 From the SCE> prompt, type **show interface linecard 0 subscriber mapping IP** *ip-range* [VPN *vpn-name*] and press **Enter**.

How to Display Subscribers That are Mapped to IP Addresses That are Included in a Given IP Address or IP Range

Options

The following options are available:

- **ip-range** — IP address (x.x.x.x) or range of IP addresses (x.x.x.x/y) to match
- **vpn-name** (optional) — The name of the VPN in which to search for the IP address

Step 1 From the SCE> prompt, type **show interface linecard 0 subscriber mapping included-in IP** *ip-range* [VPN *vpn-name*] and press **Enter**.

How to Display Subscribers That are Mapped to a Specified VLAN ID

Options

The following options are available:

- **VLAN-id** — VLAN ID to match

Step 1 From the SCE> prompt, type **show interface linecard 0 subscriber mapping VLAN-id** *VLAN-id* and press **Enter**.

How to Display Subscribers That are Mapped to a Specified MPLS/VPN

Options

The following options are available:

- **pe-id** — loopback IP address of the relevant PE router
- **bgp-label** — label of the relevant BGP LEG

Step 1 From the SCE> prompt, type **show interface linecard 0 subscriber mapping MPLS-VPN PE-ID *pe-id* bgp-label *BGP-label*** and press **Enter**.

How to Display Subscribers with No Mapping

Step 1 From the SCE> prompt, type **show interface linecard 0 subscriber mapping none** and press **Enter**.

How to Display the Number of Subscribers That are Mapped To a Specified VLAN ID

Options

The following options are available:

- **VLAN-id** — VLAN ID to match

Step 1 From the SCE> prompt, type **show interface linecard 0 subscriber amount mapping *VLAN-id*** and press **Enter**.

How to Display the Number of Subscribers with No Mapping

Step 1 From the SCE> prompt, type **show interface linecard 0 subscriber amount mapping none** and press **Enter**.

Displaying Subscriber Information

- [How to a Display Listing Of Subscriber Properties, page 9-25](#)
- [How to Display Complete Information for a Specified Subscriber, page 9-25](#)
- [How to Display the Values of Subscriber Properties For a Specified Subscriber, page 9-25](#)
- [How to Display Mappings For a Specified Subscriber, page 9-25](#)
- [How to Display OS Counters for a Specified Subscriber, page 9-26](#)

You can display the following information about a specified subscriber:

- values of the various subscriber properties
- mappings (IP address, VLAN-ID or MPLS/VPN)
- OS counters:
 - current number of flows
 - bandwidth

Use the following commands to display subscriber information:

- **show interface linecard 0 subscriber properties**
- **show interface linecard 0 subscriber name 'name'**
- **show interface linecard 0 subscriber name 'name' mappings**
- **show interface linecard 0 subscriber name 'name' counters**
- **show interface linecard 0 subscriber name 'name' properties**
- **show interface linecard 0 subscriber name 'name' vas-servers**

How to a Display Listing Of Subscriber Properties

Step 1 From the SCE> prompt, type **show interface linecard 0 subscriber properties** and press **Enter**.

How to Display Complete Information for a Specified Subscriber

Use this command to display complete information for a specified subscriber, including all values of subscriber properties and mappings.

Options

The following options are available:

- **name** — subscriber name

Step 1 From the SCE> prompt, type **show interface linecard 0 subscriber name *name*** and press **Enter**.

How to Display the Values of Subscriber Properties For a Specified Subscriber

Options

The following options are available:

- **name** — subscriber name

Step 1 From the SCE> prompt, type **show interface linecard 0 subscriber name *name* properties** and press **Enter**.

How to Display Mappings For a Specified Subscriber

Options

The following options are available:

- **name** — subscriber name

-
- Step 1** From the SCE> prompt, type **show interface linecard 0 subscriber name *name* mappings** and press **Enter**.
-

How to Display OS Counters for a Specified Subscriber

Options

The following options are available:

- **name** — subscriber name

-
- Step 1** From the SCE> prompt, type **show interface linecard 0 subscriber name *name* counters** and press **Enter**.
-

Displaying Anonymous Subscriber Information

- [How to Display Currently Configured Anonymous Groups, page 9-27](#)
- [How to Display Currently Configured Templates for Anonymous Groups, page 9-27](#)
- [How to Display the Current Configuration for a Specified Anonymous Group, page 9-27](#)
- [How to Display Subscribers in a Specified Anonymous Group, page 9-27](#)
- [How to Display All Subscribers Currently in Anonymous Groups, page 9-27](#)
- [How to Display the Number of Subscribers in a Specified Anonymous Group, page 9-27](#)
- [How to Display the Total Number Of Subscribers in all Anonymous Groups, page 9-28](#)

You can display the following information regarding the anonymous subscriber groups:

- aging (see [How to Display Aging for Anonymous Group Subscribers, page 9-41](#))
- currently configured anonymous groups
- currently configured subscriber templates
- configuration of a specified anonymous group
- number of subscribers in a specified anonymous group, or in all anonymous groups

Use the following commands to display anonymous subscriber information:

- **show interface linecard 0 subscriber templates [index]**
- **show interface linecard 0 subscriber anonymous-group [all] [name 'groupname']**
- **show interface linecard 0 subscriber amount anonymous [name 'groupname']**
- **show interface linecard 0 subscriber anonymous [name 'groupname']**

How to Display Currently Configured Anonymous Groups

-
- Step 1** From the SCE> prompt, type **show interface linecard 0 subscriber anonymous-group all** and press **Enter**.
-

How to Display Currently Configured Templates for Anonymous Groups

-
- Step 1** From the SCE> prompt, type **show interface linecard 0 subscriber templates** and press **Enter**.
-

How to Display the Current Configuration for a Specified Anonymous Group

Options

The following options are available:

- **group-name** — name of the anonymous subscriber group

-
- Step 1** From the SCE> prompt, type **show interface linecard 0 subscriber anonymous-group name *group-name*** and press **Enter**.
-

How to Display Subscribers in a Specified Anonymous Group

Options

The following options are available:

- **group-name** — name of the anonymous subscriber group

-
- Step 1** From the SCE> prompt, type **show interface linecard 0 subscriber anonymous name *group-name*** and press **Enter**.
-

How to Display All Subscribers Currently in Anonymous Groups

-
- Step 1** From the SCE> prompt, type **show interface linecard 0 subscriber anonymous** and press **Enter**.
-

How to Display the Number of Subscribers in a Specified Anonymous Group

Options

The following options are available:

- **group-name** — name of the anonymous subscriber group

-
- Step 1** From the SCE> prompt, type **show interface linecard 0 subscriber amount anonymous name *group-name*** and press **Enter**.
-

How to Display the Total Number Of Subscribers in all Anonymous Groups

-
- Step 1** From the SCE> prompt, type **show interface linecard 0 subscriber amount anonymous** and press **Enter**.
-

Managing VPNs and VPN Subscriber Mappings

- [How to Display VPN-Related Mappings, page 9-28](#)
- [How to Clear Upstream MPLS/VPN Mappings, page 9-29](#)
- [How to Clear Automatic VPNs, page 9-29](#)

How to Display VPN-Related Mappings

- [How to Display Mappings for a Specified VPN, page 9-28](#)
- [How to Display a Listing of All VPNs, page 9-29](#)

Use the following Viewer commands to display VPNs and VPN subscriber mappings. These commands display the following information:

- All the mappings for a specified VPN
- A listing of all currently logged-in VPNs
- A listing of all currently logged-in VPNs that were created automatically

How to Display Mappings for a Specified VPN

- [Options, page 9-28](#)
- [Displaying Mappings for a Specified VPN: Example, page 9-29](#)

Options

The following option is available:

- **vpn name** — The name of the VPN for which to display mappings.

-
- Step 1** From the SCE> prompt, type **show interface linecard 0 VPN name *vpn-name*** and press **Enter**.
-

Displaying Mappings for a Specified VPN: Example

```
SCE>show interface linecard 0 VPN name vpn1
VPN name: Vpn1
Downstream MPLS Mappings:
PE-ID = 1.0.0.1 Mpls Label = 20
PE-ID = 1.0.0.1 Mpls Label = 30
=====>Total Downstream Mappings: 2
Upstream MPLS Mappings:
=====>Total Upstream Mappings: 0
Number of subscriber mappings: 0
Explicitly introduced VPN
```

How to Display a Listing of All VPNs

Use this command to display a listing of all currently logged-in VPNs.

-
- Step 1** From the SCE> prompt, type **show interface linecard 0 VPN all-names** and press **Enter**.

Displaying a Listing of All VPNs: Example

```
SCE>show interface linecard 0 VPN all-names
```

How to Clear Upstream MPLS/VPN Mappings

Use this command to remove all learned upstream labels of a specified VPN.

Options

The following option is available:

- **vpn name** — The name of the VPN to clear.

-
- Step 1** From the SCE# prompt, type **clear interface linecard 0 VPN name *vpn-name* upstream mpls all** and press **Enter**.

This command, in effect, causes early label aging. Clearing the mappings allows relearning; labels will probably be quickly relearned after they have been cleared. Therefore, this command is useful when you want to update the VPN mappings without waiting for the standard aging period.

How to Clear Automatic VPNs

Use this command to remove all VLAN VPNs that were created automatically by the SCE platform. (Only removes VPNs that have no active subscriber mappings).

-
- Step 1** From the SCE# prompt, type **clear interface linecard 0 VPN automatic** and press **Enter**.
-

Subscriber Traffic Processor IP Ranges

- [Information About Traffic Processor IP Ranges, page 9-30](#)
- [How to Reserve Rules for TIRs, page 9-31](#)
- [How to Configure TIRs, page 9-32](#)
- [How to Remove TIRs and Subscriber Mappings, page 9-33](#)
- [How to Import and Export TIRs, page 9-34](#)
- [How to Monitor TIRs, page 9-35](#)

Information About Traffic Processor IP Ranges

- [Subscriber Mapping Modes, page 9-31](#)
- [Subscriber Mapping Conflicts, page 9-31](#)
- [Subscriber Rules for TIRs, page 9-31](#)



Note

Traffic Processor IP Range functionality is relevant only for IP-based subscribers. This functionality is not relevant for VLAN or MPLS/VPN subscribers.

In a Cable environment, the SCE platform supports the capability of associating all CPE machines in a single home network (i.e. behind a single cable modem) to a single subscriber-context and applying a single policy to this subscriber context. This is also relevant for cases where each CPE uses multiple global IP addresses (as opposed to a residential gateway that performs NAT and allows all CPE machines to share an IP address).

The SCE platform places no limit on the number of subscribers that can have multiple IP addresses. To achieve this, all IP addresses used by each CPE must use a common pool of addresses (usually that assigned with their downstream CMTS device/blade), and the subscriber that uses all these CPEs should be configured to a single traffic processor (a single PPC in the SCE platform).

Assigning subscribers to a specific traffic processor can be implemented in either of the following scenarios:

- All the IP ranges of a given CMTS/BRAS are configured to be processed by the same traffic processor. This can only be done if one SCE platform is handling several CMTS/BRAS (otherwise there is a load-balancing issue).
- The service provider can control the IP range from which the subscriber IP address is allocated based on additional criteria such as the subscriber type. In this case, the range can be used by the SCE platform to assign subscribers to a particular traffic processor, independent of the definition of the subscriber network ID.

In such cases the SCE platform (based on management configuration) can ensure that the various IP addresses (either ranges or single IPs) of each subscriber will actually be handled by the same traffic processor. This is accomplished by assigning a subscriber IP range (or specific IP address) to a configured Traffic Processor IP Range (TIR). Since each TIR is assigned to a traffic processor, the relevant subscriber IP range is also assigned to the matching traffic processor. Note that all ranges and single IPs of a specific subscriber must be assigned to the same traffic processor at any given time.

It is assumed that editing TIR configuration (addition or removal) is done infrequently. Also, that it is generally done either before the relevant IP ranges are in use or after they are no longer in use.

Subscriber Mapping Modes

The introduction of the TIR functionality provides two possible modes of subscriber mapping:

- Legacy subscriber mapping — ensures that all mappings of a single subscriber reach the same traffic processor by internal means, using a hash on the subscriber IP and/or using specific subscriber rules on the IP/range when required
- TIR subscriber mapping — generally (regarding any relevant subscribers) configures all mappings in a specific range to reach the same traffic processor, reducing the need for internal specific rule resources per subscriber.

TIRs functionality is not necessarily applicable to all subscribers. Therefore, while the user may choose to assign relevant subscribers to traffic processors via TIRs (TIRs subscriber mapping), the remaining subscribers are processed as usual (legacy subscriber mapping).

Subscriber Mapping Conflicts

It is important to note that while both subscriber mapping modes can co-exist in one deployment, any individual subscriber can be processed only in one mode or the other. The same subscriber cannot be processed partially using TIRs subscriber mappings and partially using legacy subscriber mappings. The resulting conflicting subscriber mappings will be rejected.

Another cause of conflicting subscriber mappings is when a subscriber is assigned a new range or single IP that is associated with a traffic processor, different from that with which the subscriber is already associated.

Conflicting mapping are rejected (any other subscriber mappings are accepted as is) in both cases below:

- Conflict between mappings of a single mapping request.
- Additive subscriber mappings that conflict with existing mappings.

Subscriber Rules for TIRs

The number of reserved rules for potential TIRs is configurable, and is at the expense of explicit subscriber rules. The total number of subscriber rules available is approximately 8000.

- The maximum number of allowed reserved rules is 4096. The remaining rules are reserved for explicit subscriber mappings usage (used by the SCE platform to enable the legacy internal OS allocation of subscribers to traffic processors).
- By default 0 (zero) rules are reserved for TIRs.
- Updating this configuration is a major system event and can only be performed when no subscriber mappings or TIRs are configured.

How to Reserve Rules for TIRs

Use these commands to reserve rules for TIRs and to restore default subscriber rule allocation.

Options

The following options are available:

- **#rules** — number of subscriber rules to be reserved for TIRs

Step 1 From the SCE(config if)# prompt, type **subscriber TP-mappings max-TP-IP-ranges #rules** and press **Enter**

Allocates the specified number of rules for TIRs, decreasing the number of explicit subscriber rules available.

To restore all rules as explicit subscriber rules, with no rules reserved for TIRs (default), use the following command:

- **default subscriber TP-mappings**

How to Configure TIRs

- [Options, page 9-32](#)
- [How to Create a TIR or Update a TIR, page 9-32](#)
- [How to Update a TIR Even If Subscriber Mappings Exist, page 9-33](#)

Options

The following options are available:

- **tir-name** — meaningful name assigned to this traffic processor IP range
- **ip-address/mask** — IP address and mask defining the IP range
- **traffic-processornumber** — number of the traffic processor to which this TIR is to be assigned
- **remove-subscriber-mappings** — Editing TIRs is permitted only if there are no subscriber mappings within the relevant IP ranges. Therefore, by default, if subscriber mappings already exist for the either an updated or an existing IP range, the command will fail. However, you can use this keyword to specify that any existing subscriber mappings in the IP range should be removed.

In this case the command will execute successfully even if subscriber mappings exist.

How to Create a TIR or Update a TIR

Step 1 From the SCE(config if)# prompt, type **subscriber TP-IP-range name tir-name IP-range ip-address/mask target-TP traffic-processornumber** and press **Enter**.

- **Creating** — Creates a TIR with the specified name and IP range and assigns it to the specified traffic processor
 - **Updating** — Updates the IP range and/or assigned traffic processor for the specified TIR.
 - **Updating the IP range** — If subscriber mappings exist for either the new or the old IP range, the command will fail.
-

How to Update a TIR Even If Subscriber Mappings Exist

-
- Step 1** From the SCE(config if)# prompt, type **subscriber TP-IP-range name *tir-name* IP-range *ip-address/mask* target-TP *traffic-processor-number* remove-subscriber-mappings** and press **Enter**.
If subscriber mappings exist for either the new or the old IP range, they will be removed and the command will execute successfully.
-

How to Remove TIRs and Subscriber Mappings

- [How to Remove a Specified TIR, page 9-33](#)
- [How to Remove All TIRs, page 9-34](#)
- [How to Remove Mappings from a Specified TIR, page 9-34](#)
- [How to Remove Mappings from a Specified IP Range, page 9-34](#)

Use these commands to remove existing TIRs and subscriber mappings. You can perform the following operations:

- Remove a specified TIR
- Remove all TIRs
- Remove all subscriber mappings assigned to a specified TIR
- Remove all subscriber mappings assigned to a specified IP range

As with updating a TIR, by default, if subscriber mappings already exist for the specified IP range, the command will fail. However, you can specify that any existing subscriber mappings in the IP range should be removed (**remove-subscriber-mappings** keyword). In this case the command will execute even if subscriber mappings exist.

How to Remove a Specified TIR

-
- Step 1** From the SCE(config if)# prompt, type **no subscriber TP-IP-range name *tir-name* [remove-subscriber-mappings]** and press **Enter**.
If subscriber mappings exist for this IP range, the command will fail. Specify **remove-subscriber-mappings** to remove any existing subscriber mappings for this IP range, and the command will execute successfully.
-

How to Remove All TIRs

Step 1 From the SCE(config if)# prompt, type **no subscriber TP-IP-range all [remove-subscriber-mappings]** and press **Enter**.

If subscriber mappings exist for this IP range, the command will fail. Specify **remove-subscriber-mappings** to remove any existing subscriber mappings for this IP range, and the command will execute successfully.

How to Remove Mappings from a Specified TIR

Step 1 From the SCE(config if)# prompt, type **no subscriber mappings included-in TP-IP-range name *tir-name*** and press **Enter**.

The **remove-subscriber-mappings** option is not applicable to this command.

How to Remove Mappings from a Specified IP Range

Step 1 From the SCE(config if)# prompt, type **no subscriber mappings included-in IP-range *ip-address/mask*** and press **Enter**.

The **remove-subscriber-mappings** option is not applicable to this command.

How to Import and Export TIRs

Use these commands to import TIR definitions from a csv file and to export TIR definitions to a csv file.

- [About TIR csv Files, page 9-34](#)
- [Options, page 9-35](#)
- [How to Import TIRs from a csv File, page 9-35](#)
- [How to Export TIRs to a csv File, page 9-35](#)

About TIR csv Files

Following is the format of the csv file:

range name, ip-address/mask-length, target-TP

- **range name** — The name of the to which the IP addresses will be assigned
- **ip-address/mask-length** — individual IP address of range of IP addresses indicated by IP address/mask
- **target-TP** — traffic processor to which the specified range will be assigned

- **remove-subscriber-mappings** — When importing TIR definitions, by default, if subscriber mappings already exist for any specified IP range, those IP ranges will not be updated by the import. However, you can use this keyword to specify that any existing subscriber mappings in the IP range should be removed.

In this case the command will execute successfully even if subscriber mappings exist.

Options

The following option is available:

- **filename** — the name of the csv file.

How to Import TIRs from a csv File

-
- Step 1** From the SCE(config if)# prompt, type **subscriber TP-IP-range import csv-file *file-name* [remove-subscriber-mappings]** and press **Enter**.

Imports the TIR definitions from the specified csv file.

If the **remove-subscriber-mappings** keyword is specified, if subscriber mappings exist for any specified IP range, they will be removed and the command will execute successfully. Otherwise, if subscriber mappings exist for any IP range, those IP ranges will not be updated.

How to Export TIRs to a csv File

-
- Step 1** From the SCE(config if)# prompt, type **subscriber TP-IP-range export csv-file *file-name*** and press **Enter**.

Exports current TIR definitions to the specified csv file.

The **remove-subscriber-mappings** option is not applicable to this command.

How to Monitor TIRs

- [How to Display Traffic Processor Mappings State, page 9-36](#)
- [How to Display the Configuration of a Specified TIR, page 9-36](#)
- [How to Display the Configuration of All TIRs, page 9-36](#)
- [How to Display Mappings Related to a Specified TIR, page 9-36](#)
- [How to Display the Number of Subscribers with Mappings Related to a Specified TIR, page 9-36](#)
- [How to Display Complete Subscriber Information, page 9-37](#)
- [How to Display All Subscribers Mapped to a Specified IP Range, page 9-37](#)
- [How to Display the Number of Subscribers Mapped to a Specified IP Range, page 9-37](#)

Use these commands to monitor TIRs and subscriber mappings. You can view the following:

- Traffic processor mappings state, including the partitioning between subscriber and TIR mappings, and the utilization of each.
- Configuration of a specified TIR Configuration of all TIRs
- All subscriber mappings related to a specified TIR
- Number of subscribers with mappings related to a specified TIR
- Information for a specified subscriber, including assigned TIR, where applicable
- All subscriber mappings in a specified IP range
- Number of subscribers with mappings in a specified IP range

How to Display Traffic Processor Mappings State

-
- Step 1** From the SCE> prompt, type **show interface linecard 0 subscriber TP-mappings statistics** and press **Enter**.
-

How to Display the Configuration of a Specified TIR

-
- Step 1** From the SCE> prompt, type **show interface linecard 0 subscriber TP-IP-range name *tir-name*** and press **Enter**.
-

How to Display the Configuration of All TIRs

-
- Step 1** From the SCE> prompt, type **show interface linecard 0 subscriber TP-IP-range all** and press **Enter**.
-

How to Display Mappings Related to a Specified TIR

-
- Step 1** From the SCE> prompt, type **show interface linecard 0 subscriber mapping included-in TP-IP-range name *tir-name*** and press **Enter**.
-

How to Display the Number of Subscribers with Mappings Related to a Specified TIR

-
- Step 1** From the SCE> prompt, type **show interface linecard 0 subscriber amount mapping included-in TP-IP-range name *tir-name*** and press **Enter**.
-

How to Display Complete Subscriber Information

-
- Step 1** From the SCE> prompt, type **show interface linecard 0 subscriber name** *name* and press **Enter**.
Displays complete subscriber information, including which TIR the subscriber belongs to (if applicable).
-

How to Display All Subscribers Mapped to a Specified IP Range

-
- Step 1** From the SCE> prompt, type **show interface linecard 0 subscriber mapping included-in TP-IP-range** *ip-address/mask* and press **Enter**.
-

How to Display the Number of Subscribers Mapped to a Specified IP Range

-
- Step 1** From the SCE> prompt, type **show interface linecard 0 subscriber amount mapping included-in TP-IP-range** *ip-address/mask* and press **Enter**.
-

Configuring the Actual Maximum Number of Subscribers

The actual maximum number of subscribers supported is based on the capacity option specified when loading the SCA BB application. If no capacity option is specified, the user-configured default capacity is used. However, you can override this capacity option using the following commands.

Note the following:

- You must configure the override before you load the application (PQI file). The configured maximum number of subscribers takes effect when the next **load** command is executed.
- If you have disabled the capacity option and then the next time you load a new application you want to use the capacity option, you must re-enable the capacity option before loading the application file (see [How to Restore the Configured Capacity Option, page 9-38](#)).
- Use the **show subscriber max-subscribers** command to see what the current maximum number of subscribers is and whether the capacity option is enabled or disabled (see [How to Monitor the Maximum Number of Subscribers, page 9-39](#).)

How to Override the Configured Capacity Option

The default maximum number of subscribers is 80K.

-
- Step 1** If a policy configuration (PQB file) has been applied on SCE platform, use the SCA BB console to retrieve it and save it before proceeding.
- Step 2** Select the maximum number of subscribers:
From the SCE(config if)# prompt, type **subscriber max-subscribers (40K | 80K | 120K | 200K)** and press **Enter**.
- Step 3** Disable the application capacity option:
From the SCE(config if)# prompt, type **subscriber capacity-options disable** and press **Enter**.
- Step 4** Install the new application (PQI) file. (The configured subscriber maximum takes effect only after a new application file has been loaded.)
- Step 5** If you saved the policy configuration (PQB file), apply it to the SCE platform using the SCA BB console.
-

How to Restore the Configured Capacity Option

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- Step 1** If a policy configuration (PQB file) has been applied on SCE platform, use the SCA BB console to retrieve it and save it before proceeding.
- Step 2** From the SCE(config if)# prompt, type **subscriber capacity-options enable** and press **Enter**.
- Step 3** Install the new application (PQI) file. (The configured subscriber maximum takes effect only after a new application file has been loaded.)
- Step 4** If you saved the policy configuration (PQB file), apply it to the SCE platform using the SCA BB console.
-

How to Monitor the Maximum Number of Subscribers

Use this command to see the configured maximum number of subscribers and whether the capacity options are in effect or have been overridden.

Step 1 From the SCE> prompt, type **show interface linecard 0 subscriber max-subscribers** and press **Enter**.

Configuring Subscriber Aging

- [How to Enable Aging for Anonymous Group Subscribers, page 9-40](#)
- [How to Enable Aging for Introduced Subscribers, page 9-40](#)
- [How to Disable Aging for Anonymous Group Subscribers, page 9-40](#)
- [How to Disable Aging for Introduced Subscribers, page 9-41](#)
- [How to Set the Aging Timeout Period for Anonymous Group Subscribers, page 9-41](#)
- [How to Set the Aging Timeout Period for Introduced Subscribers, page 9-41](#)
- [How to Display Aging for Anonymous Group Subscribers, page 9-41](#)
- [How to Display Aging for Introduced Subscribers, page 9-41](#)

As explained previously ([Aging Subscribers, page 9-5](#)), aging is the automatic removal of a subscriber when no traffic sessions assigned to it have been detected for a certain amount of time. Aging may be enabled or disabled, and the aging timeout period (in minutes) can be specified.

Aging can be configured separately for introduced subscribers and for anonymous subscribers.

Use the following commands to configure and monitor aging.

- **[no] subscriber aging**
- **subscriber aging timeout**
- **show interface linecard 0 subscriber aging**

How to Enable Aging for Anonymous Group Subscribers

Step 1 From the SCE(config if)# prompt, type **subscriber aging anonymous** and press **Enter**.

How to Enable Aging for Introduced Subscribers



Note Introduced subscriber aging is not supported when using VPN-based subscribers

Step 1 From the SCE(config if)# prompt, type **subscriber aging introduced** and press **Enter**.

How to Disable Aging for Anonymous Group Subscribers

Step 1 From the SCE(config if)# prompt, type **no subscriber aging anonymous** and press **Enter**.

How to Disable Aging for Introduced Subscribers

Step 1 From the SCE(config if)# prompt, type **no subscriber aging introduced** and press **Enter**.

How to Set the Aging Timeout Period for Anonymous Group Subscribers

Options

The following option is available:

- **aging-time** — the time interval, in minutes, after which an inactive subscriber will be aged (2-14400).

Step 1 From the SCE(config if)# prompt, type **no subscriber aging anonymous timeout** *aging-time* and press **Enter**.

How to Set the Aging Timeout Period for Introduced Subscribers

Options

The following option is available:

- **aging-time** — the time interval, in minutes, after which an inactive subscriber will be aged (2-14400).

Step 1 From the SCE(config if)# prompt, type **no subscriber aging introduced timeout** *aging-time* and press **Enter**.

How to Display Aging for Anonymous Group Subscribers

Step 1 From the SCE> prompt, type **show interface linecard 0 subscriber aging anonymous** and press **Enter**.

How to Display Aging for Introduced Subscribers

Step 1 From the SCE> prompt, type **show interface linecard 0 subscriber aging introduced** and press **Enter**.

Configuring the SCE Platform/SM Connection

- [Options, page 9-42](#)
- [Configuring the Behavior of the SCE Platform in Case of SM Failure, page 9-42](#)
- [Configuring the SM-SCE Platform Connection Timeout, page 9-43](#)

The user can configure the behavior of the SCE platform in case of failure of the Subscriber Manager (SM):

- If SM functionality is critical to the operation of the system — configure the desired behavior of the SCE platform if any loss of connection with the SM (may be due either to failure of the SM or failure of the connection itself).
- If SM functionality is not critical to the operation of the system — no action needs to be configured. In this case you can specify that the system operational-status of the SCE platform should be 'warning' when the link is down.

Options

The following options are available:

- **action** — the action to take in case of failure of the SCE platform/SM connection
 - **force-failure** — force failure of SCE platform. The SCE platform then acts according to the behavior configured for the failure state.
 - **remove-mappings** — remove all current subscriber mappings.
 - **shut** — the SCE platform shuts down and quits providing service.
 - **none** (default) — take no action.
- **interval** — the time interval, in minutes, after which the connection is timed out

Configuring the Behavior of the SCE Platform in Case of SM Failure

Options

The following options are available:

- **action**—The specified action will be performed in case of loss of connection between the SCE platform and the SM.

Possible actions are:

- **force-failure** — Force failure of SCE platform. The SCE platform then acts according to the behavior configured for the failure state.
- **remove-mappings** — Remove all current subscriber mappings.
- **shut** — The SCE platform shuts down and quits providing service.
- **none** (default) — Take no action.

- **warning**—The system operational-status of the SCE platform should be 'warning' in case of loss of connection between the SCE platform and the SM. No action is taken.

To specify the action that the SCE platform will perform if the SCE-SM connection fails, use this command.

Step 1 From the SCE(config if)# prompt, type **subscriber sm-connection-failure action [force-failure|none|remove-mappings|shut]** and press **Enter**.

To specify that the system operational-status of the SCE platform should be 'warning' if the SCE-SM connection fails, use this command.

Step 1 From the SCE(config if)# prompt, type **subscriber sm-connection-failure warning** and press **Enter**.

Configuring the SM-SCE Platform Connection Timeout

You can also configure the timeout interval; the length of time that the SM-SCE platform connection is disrupted before a failed connection is recognized and the configured behavior is applied.

Options

The following option is available:

- **interval** — the timeout interval in seconds

Step 1 From the SCE(config if)# prompt, type **subscriber sm-connection-failure timeout *interval*** and press **Enter**.

Configures the connection timeout.
