

Tiered and Premium Services with QoS on JunosE Routers in an SRC-Managed Network



Published: 2013-11-25

Juniper Networks, Inc.
1194 North Mathilda Avenue
Sunnyvale, California 94089
USA
408-745-2000
www.juniper.net

Copyright © 2013, Juniper Networks, Inc. All rights reserved.

Juniper Networks, Junos, Steel-Belted Radius, NetScreen, and ScreenOS are registered trademarks of Juniper Networks, Inc. in the United States and other countries. The Juniper Networks Logo, the Junos logo, and JunosE are trademarks of Juniper Networks, Inc. All other trademarks, service marks, registered trademarks, or registered service marks are the property of their respective owners.

Juniper Networks assumes no responsibility for any inaccuracies in this document. Juniper Networks reserves the right to change, modify, transfer, or otherwise revise this publication without notice.

Tiered and Premium Services with QoS on JunosE Routers in an SRC-Managed Network
Copyright © 2013, Juniper Networks, Inc.
All rights reserved.

The information in this document is current as of the date on the title page.

YEAR 2000 NOTICE

Juniper Networks hardware and software products are Year 2000 compliant. Junos OS has no known time-related limitations through the year 2038. However, the NTP application is known to have some difficulty in the year 2036.

END USER LICENSE AGREEMENT

The Juniper Networks product that is the subject of this technical documentation consists of (or is intended for use with) Juniper Networks software. Use of such software is subject to the terms and conditions of the End User License Agreement ("EULA") posted at <http://www.juniper.net/support/eula.html>. By downloading, installing or using such software, you agree to the terms and conditions of that EULA.

Table of Contents

	About the Documentation	ix
	Documentation and Release Notes	ix
	Supported Platforms	ix
	Documentation Conventions	ix
	Documentation Conventions	x
	Documentation Feedback	xi
	Requesting Technical Support	xii
	Self-Help Online Tools and Resources	xii
	Opening a Case with JTAC	xiii
Part 1	Overview	
Chapter 1	Software Features Overview	3
	SRC Component Overview	3
Chapter 2	QoS on JunosE Routers	9
	QoS on JunosE Routers Overview	9
	Dynamically Managing QoS Profiles	9
	How QoS Profile Tracking Works	10
	Identifying QoS Services	10
	Determining the QoS Profile	11
	Setting Up Policy Groups	12
	Setting Up Services	13
	Reestablishing Default QoS Profile	13
	Example: How QTP Activates a QoS Service	13
Part 2	Configuration	
Chapter 3	Configuration Tasks for QoS Profile-Tracking	17
	Configuring QoS Profile-Tracking Plug-Ins (SRC CLI)	17
	Configuring QoS Profile-Tracking Plug-Ins (C-Web Interface)	19
	Configuring Search Filters for QoS Profile-Tracking Plug-Ins	19
	Updating QoS Profile Data in the Directory	21
	Query Fields	21
Chapter 4	Example	23
	Examples: Searching for QoS Information	23
Part 3	Index	
	Index	29

List of Figures

Part 2	Configuration	
Chapter 4	Example	23
	Figure 1: Searching for All QoS Profiles on a Router	23
	Figure 2: Searching for QoS Profiles in a Policy Group	24
	Figure 3: Searching for All Policy Groups on a Router	24

List of Tables

	About the Documentation	ix
	Table 1: Notice Icons	x
	Table 2: Notice Icons	x
	Table 3: Text Conventions	x
Part 1	Overview	
Chapter 1	Software Features Overview	3
	Table 4: Descriptions of SRC Components	3
Chapter 2	QoS on JunosE Routers	9
	Table 5: Examples of Concatenated QoS Profile Input Values	11
Part 2	Configuration	
Chapter 3	Configuration Tasks for QoS Profile-Tracking	17
	Table 6: Settings for Filter Strings	20

About the Documentation

- Documentation and Release Notes on page ix
- Supported Platforms on page ix
- Documentation Conventions on page ix
- Documentation Feedback on page xi
- Requesting Technical Support on page xii

Documentation and Release Notes

To obtain the most current version of all Juniper Networks® technical documentation, see the product documentation page on the Juniper Networks website at <http://www.juniper.net/techpubs/>.

If the information in the latest release notes differs from the information in the documentation, follow the product Release Notes.

Juniper Networks Books publishes books by Juniper Networks engineers and subject matter experts. These books go beyond the technical documentation to explore the nuances of network architecture, deployment, and administration. The current list can be viewed at <http://www.juniper.net/books>.

Supported Platforms

For the features described in this document, the following platforms are supported:

- C Series

Documentation Conventions

Table 1 on page x defines notice icons used in this guide.

Table 1: Notice Icons

Icon	Meaning	Description
	Informational note	Indicates important features or instructions.
	Caution	Indicates a situation that might result in loss of data or hardware damage.
	Warning	Alerts you to the risk of personal injury or death.
	Laser warning	Alerts you to the risk of personal injury from a laser.

Documentation Conventions

Table 1 on page x defines the notice icons used in this guide. Table 3 on page x defines text conventions used throughout this documentation.

Table 2: Notice Icons





Icon	Meaning	Description
	Informational note	Indicates important features or instructions.
	Caution	Indicates a situation that might result in loss of data or hardware damage.
	Warning	Alerts you to the risk of personal injury or death.
	Laser warning	Alerts you to the risk of personal injury from a laser.

Table 3: Text Conventions

Convention	Description	Examples
Bold text like this	<ul style="list-style-type: none"> Represents keywords, scripts, and tools in text. Represents a GUI element that the user selects, clicks, checks, or clears. 	<ul style="list-style-type: none"> Specify the keyword exp-msg. Run the install.sh script. Use the pkgadd tool. To cancel the configuration, click Cancel.

Table 3: Text Conventions (*continued*)

Bold text like this	Represents text that the user must type.	user@host# set cache-entry-age <i>cache-entry-age</i>
Fixed-width text like this	Represents information as displayed on your terminal's screen, such as CLI commands in output displays.	<pre> nic-locators { login { resolution { resolver-name /realms/ login/A1; key-type LoginName; value-type SaeId; } } </pre>
Regular sans serif typeface	<ul style="list-style-type: none"> Represents configuration statements. Indicates SRC CLI commands and options in text. Represents examples in procedures. Represents URLs. 	<ul style="list-style-type: none"> system ldap server{ stand-alone; Use the request sae modify device failover command with the force option user@host# ... http://www.juniper.net/techpubs/software/management/sdx/api-index.html
<i>Italic sans serif typeface</i>	Represents variables in SRC CLI commands.	user@host# set local-address <i>local-address</i>
Angle brackets	In text descriptions, indicate optional keywords or variables.	Another runtime variable is <gfwif>.
Key name	Indicates the name of a key on the keyboard.	Press Enter.
Key names linked with a plus sign (+)	Indicates that you must press two or more keys simultaneously.	Press Ctrl + b.
<i>Italic typeface</i>	<ul style="list-style-type: none"> Emphasizes words. Identifies book names. Identifies distinguished names. Identifies files, directories, and paths in text but not in command examples. 	<ul style="list-style-type: none"> There are two levels of access: <i>user</i> and <i>privileged</i>. <i>SRC-PE Getting Started Guide</i>. <i>o=Users, o=UMC</i> The <i>/etc/default.properties</i> file.
Backslash	At the end of a line, indicates that the text wraps to the next line.	<pre> Plugin.radiusAcct-1.class=\ net.juniper.smgmt.sae.plugin\ RadiusTrackingPluginEvent </pre>
Words separated by the symbol	Represent a choice to select one keyword or variable to the left or right of this symbol. (The keyword or variable may be either optional or required.)	diagnostic line

Documentation Feedback

We encourage you to provide feedback, comments, and suggestions so that we can improve the documentation. You can send your comments to techpubs-comments@juniper.net, or fill out the documentation feedback form at

<https://www.juniper.net/cgi-bin/docbugreport/> . If you are using e-mail, be sure to include the following information with your comments:

- Document or topic name
- URL or page number
- Software release version (if applicable)

Requesting Technical Support

Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active J-Care or JNASC support contract, or are covered under warranty, and need post-sales technical support, you can access our tools and resources online or open a case with JTAC.

- JTAC policies—For a complete understanding of our JTAC procedures and policies, review the *JTAC User Guide* located at <http://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.pdf>.
- Product warranties—For product warranty information, visit <http://www.juniper.net/support/warranty/>.
- JTAC hours of operation—The JTAC centers have resources available 24 hours a day, 7 days a week, 365 days a year.

Self-Help Online Tools and Resources

For quick and easy problem resolution, Juniper Networks has designed an online self-service portal called the Customer Support Center (CSC) that provides you with the following features:

- Find CSC offerings: <http://www.juniper.net/customers/support/>
- Search for known bugs: <http://www2.juniper.net/kb/>
- Find product documentation: <http://www.juniper.net/techpubs/>
- Find solutions and answer questions using our Knowledge Base: <http://kb.juniper.net/>
- Download the latest versions of software and review release notes: <http://www.juniper.net/customers/csc/software/>
- Search technical bulletins for relevant hardware and software notifications: <https://www.juniper.net/alerts/>
- Join and participate in the Juniper Networks Community Forum: <http://www.juniper.net/company/communities/>
- Open a case online in the CSC Case Management tool: <http://www.juniper.net/cm/>

To verify service entitlement by product serial number, use our Serial Number Entitlement (SNE) Tool: <https://tools.juniper.net/SerialNumberEntitlementSearch/>

Opening a Case with JTAC

You can open a case with JTAC on the Web or by telephone.

- Use the Case Management tool in the CSC at <http://www.juniper.net/cm/>.
- Call 1-888-314-JTAC (1-888-314-5822 toll-free in the USA, Canada, and Mexico).

For international or direct-dial options in countries without toll-free numbers, see <http://www.juniper.net/support/requesting-support.html>.

PART 1

Overview

- [Software Features Overview on page 3](#)
- [QoS on JunosE Routers on page 9](#)

CHAPTER 1

Software Features Overview

- [SRC Component Overview on page 3](#)

SRC Component Overview

The SRC software is a dynamic system. It contains many components that you use to build a subscriber management environment. You can use these tools to customize and extend the SRC software for your use and to integrate the SRC software with other systems. The SRC software also provides the operating system and management tools for C Series Controllers.

[Table 4 on page 3](#) gives a brief description of the components that make up the SRC software.

Table 4: Descriptions of SRC Components

Component	Description
Server Components	
Service activation engine (SAE)	<ul style="list-style-type: none">• Authorizes, activates, and deactivates subscriber and service sessions by interacting with systems such as Juniper Networks routers, cable modem termination system (CMTS) devices, RADIUS servers, and directories.• Collects accounting information about subscribers and services from routers, and stores the information in RADIUS accounting servers, flat files, and other accounting databases.• Provides plug-ins and application programming interfaces (APIs) for starting and stopping subscriber and service sessions and for integrating with systems that authorize subscriber actions and track resource usage.
Subscriber Information Collector (SIC)	Used in conjunction with the MX Series router running the packet-triggered subscribers and policy control (PTSP) solution, the SIC listens for RADIUS accounting events from IP edge devices (accounting clients) and stores them in the Session State Registrar (SSR), or forwards them to a remote AAA server, allowing the SRC software to gain increased subscriber awareness. Additionally, the SIC can optionally edit accounting events before routing them.
Juniper Policy Server (JPS)	Acts as a policy decision point (PDP) and policy enforcement point (PEP) that manages the relationships between application managers and CMTS devices in a PCMM environment.

Table 4: Descriptions of SRC Components *(continued)*

Component	Description
Network information collector (NIC)	Collects information about the state of the network and can provide a mapping from a given type of network data to another type of network data.
Redirect Server	Redirects HTTP requests received from IP Filter to a captive portal page.
3GPP Gateway	The SRC Third-Generation Partnership Project (3GPP) gateway is a Diameter-based component in the SRC software, which provides integration with 3GPP Policy and Charging Control environments, to provide fixed-mobile convergence (FMC). The SRC 3GPP gateway provides Gx-based integration with the Policy and Charging Rules Function (PCRF). The SRC 3GPP gateway uses the Gx interface to mediate between the PCRF and Juniper Networks routers like the E Series Broadband Services routers and MX Series routers. The Gx interface on the SRC 3GPP gateway communicates with the PCRF using the Diameter protocol.
Web Application Service	The SRC software includes a Web application server that hosts the Web Services Gateway and the Volume Tracking Application (SRC VTA). In production environments, this application server is designed to host only these applications. However, you can load your own applications into this server for testing or demonstration purposes.
Web Services Gateway	<p>Allows a gateway client—an application that is not part of the SRC network—to interact with SRC components through a Simple Object Access Protocol (SOAP) interface.</p> <p>The Web Services Gateway provides the Dynamic Service Activator which allows a gateway client to dynamically activate and deactivate SRC services for subscribers and to run scripts that manage the SAE.</p>
Repository	
Directory	<p>The SRC software includes the Juniper Networks database, which is a built-in Lightweight Directory Access Protocol (LDAP) directory for storing all SRC data including services, policies, and small subscriber databases.</p> <p>For large subscriber databases, you must supply your own directory.</p>
Session State Registrar (SSR)	The SSR is a stateless, highly reliable and highly available database cluster. When used in conjunction with an MX Series router running the packet-triggered subscribers and policy control (PTSP) solution, the SSR stores the IP edge attachment subscriber sessions data learned from IP edge devices in the centralized SSR database.
SRC Configuration and Management Tools	

Table 4: Descriptions of SRC Components (*continued*)

Component	Description
SRC command line interface (CLI)	Provides a way to configure the SRC software on a C Series Controller from a Junos OS–like CLI. The SRC CLI includes the policies, services, and subscribers CLI, which has separate access privileges.
C-Web interface	Provides a way to configure, monitor, and manage the SRC software on a C Series Controller through a Web browser. The C-Web interface includes a policies, services, and subscribers component, which has separate access privileges.
Simple Network Management Protocol (SNMP) agent	Monitors system performance and availability. It runs on all the SRC hosts and makes management information available through SNMP tables and sends notifications by means of SNMP traps.
Service Management Applications (Run on external system)	
IMS Services Gateway	Integrates into an IP multimedia system (IMS) environment. The SRC software provides a Diameter protocol-based interface that allows the SRC software to integrate with services found on the application layer of IMS.
SRC Programming Interfaces	
NETCONF API	Allows you to configure or request information from the NETCONF server on a C Series Controller that runs the SRC software. Applications developed with the NETCONF API run on a system other than a C Series Controller.
CORBA plug-in service provider interface (SPI)	Tracks sessions and enables linking the rest of the service provider's operations support system (OSS) with the SRC software so that the OSS can be notified of events in the life cycle of SAE sessions. Hosted plug-ins only.
CORBA remote API	Provides remote access to the SAE core API. Applications that use these extensions to the SRC software run on a system other than a C Series Controller.
NIC access API	Performs NIC resolutions. Applications that use these extensions to the SRC software run on a system other than a C Series Controller.
SAE core API	Controls the behavior of the SRC software. Applications that use these extensions to the SRC software run on a system other than a C Series Controller.

Table 4: Descriptions of SRC Components (*continued*)

Component	Description
Script services	Provides an interface to call scripts that supply custom services such as provisioning policies on a number of systems across a network.
VTA API	The Volume Tracking Application (VTA) API is a Simple Object Access Protocol (SOAP) interface that allows developers to create gateway clients and that administrators use to manage VTA subscribers and sessions. The SRC Web Services Gateway allows a gateway client—an application that is not part of the SRC network—to interact with SRC components, such as the VTA, through a SOAP interface.
Authorization and Accounting Applications	
AAA RADIUS servers	Authenticates subscribers and authorizes their access to the requested system or service. Accepts accounting data—time active and volume of data sent—about subscriber and service sessions. RADIUS servers run on a system other than a C Series Controller.
SRC Admission Control Plug-In (SRC ACP)	Authorizes and tracks subscribers' use of network resources associated with services that the SRC application manages.
Flat file accounting	Stores tracking data to accounting flat files that can be made available to external systems that send the data to a rating and billing system.
Volume Tracking Application	<p>The SRC Volume Tracking Application (SRC VTA) is an SRC component that allows service providers to track and control the network usage of subscribers and services. You can control volume and time usage on a per-subscriber or per-service basis. This level of control means that service providers can offer tiered services that use volume as a metric, while also controlling abusive subscribers and applications.</p> <p>When a subscriber or service exceeds bandwidth limits (or quotas), the SRC VTA can take actions including imposing rate limits on traffic, sending an e-mail notification, or charging extra for additional bandwidth consumed.</p>
Demonstration Applications (available on the Juniper Networks Web site)	
Enterprise Audit Plug-In	Defines a callback interface, which receives events when IT managers complete specified operations.
Enterprise Manager Portal	<p>Allows service providers to provision services for enterprise subscribers on routers running JunosE or Junos OS and allows IT managers to manage services.</p> <p>Enterprise Manager Portal can be used with NAT Address Management Portal to allow service providers to manage public IP addresses for use with NAT services on routers running Junos OS and to allow IT managers to make requests about public IP addresses through the Enterprise Manager Portal.</p>

Table 4: Descriptions of SRC Components (*continued*)

Component	Description
Monitoring Agent application	Integrates IP address managers, such as a DHCP server or a RADIUS server, into an SRC-managed network so that the SAE is notified about subscriber events. The Monitoring Agent application runs on a Solaris platform.
Residential service selection portals	Provides a framework for building Web applications that allow residential and enterprise subscribers to manage their own network services. It comes with several full-featured sample Web applications that are easy to customize and suitable for deployment. The Residential service selection portals run on a Solaris platform.
Sample enterprise service portal	Lets service providers supply an interface to their business customers for managing and provisioning services.

Related Documentation

- *SRC Product Description*

CHAPTER 2

QoS on JunosE Routers

- [QoS on JunosE Routers Overview on page 9](#)
- [Dynamically Managing QoS Profiles on page 9](#)

QoS on JunosE Routers Overview

Tiered Internet access and premium services such as video on demand, gaming, or videoconferencing require quality-of-service (QoS) profiles to be running on the subscriber interface on the router running JunosE Software. The router allows only one QoS profile to be attached to an interface at one time. Therefore, as a subscriber activates and deactivates different services, the QoS profile running on the interface needs to change. Also, as subscribers activate services, they may have multiple QoS services running at the same time; for example, internet-gold with videoconferencing.

With the SRC software, you can:

- Dynamically manage QoS profiles on the router running JunosE Software to control a combination of services that require QoS.
- Update the directory with a list of QoS profiles that are currently configured on a router running JunosE Software.
- Search the directory for QoS policy information.

Related Documentation

- [Dynamically Managing QoS Profiles on page 9](#)
- [*Delivering QoS Services in a Cable Environment*](#)
- [Configuring QoS Profile-Tracking Plug-Ins \(SRC CLI\) on page 17](#)
- [Updating QoS Profile Data in the Directory on page 21](#)
- [Examples: Searching for QoS Information on page 23](#)

Dynamically Managing QoS Profiles

The SAE provides a QoS-tracking plug-in (QTP) that you can use to ensure that, as a subscriber activates and deactivates services, the required QoS profile is attached to the subscriber interface. With the QTP, the QoS profile selected is based on the activation state of an aggregation of services, not just one service.

For example, a subscriber activates a QoS service on a subscriber interface that requires a QoS profile that supports 512 best effort. The subscriber then activates a faster service (for example, 1024 best effort), as well as video on demand, and now has two QoS services running on an interface. The subscriber now needs a QoS profile to be attached to the interface that supports both video on demand and 1024 best-effort service. The QTP can determine which QoS profile the subscriber needs, and can cause the existing QoS profile to be removed from the subscriber interface and the new QoS profile to be attached to the interface.

Note that if a profile is installed on a subscriber interface and the QTP installs a new profile, the new profile is based on QoS services that are currently active. The new profile does not combine the functionality of the previous profile with the new profile. For example, if a subscriber has a default policy with QoS profile be-512 installed on the subscriber interface, and the subscriber activates a video-on-demand service, the QTP does not combine the functionality of be-512 with the profile that supports video on demand.

How QoS Profile Tracking Works

The SAE manages policies on router interfaces through service sessions. Service session configurations contain the policy that needs to be installed on an interface when a service is activated. The policy definition can include the name of a QoS profile to attach to the interface when the policy is installed.

When you set up the QTP, you create a QoS profile attachment service. The purpose of this service is to attach the required QoS profile to an interface. This service is hidden from subscribers and is under only QTP control.

Because profiles need to be changed only when QoS services are activated or deactivated, the QTP tracks services and reacts to service state changes by adjusting the QoS profile attachment as needed by deactivating and activating the QoS profile attachment service.

Subscribers who need their services managed by the QTP are subscribed to the QoS profile attachment service.

Identifying QoS Services

When you set up a service, you identify the service as a QoS service in one of the fields in the service definition. For example, you can assign a service name or category to indicate that the service is a QoS service, or you could assign the QTP instance name in the Tracking Plugin field.

When the SAE notifies the QTP that a service has been activated or deactivated, the QTP determines whether it is a QoS service by searching attributes in the service object. The QTP uses a search filter that you set up to search an attribute for the information that you assigned to the service to indicate that it is a QoS service.

For example, suppose you enter myqtp in the tracking plug-in field of QoS services to indicate that the service is a QoS service. You would set up the search filter to search tracking plug-in attributes for any service that contains myqtp:

```
(attribute.trackPlug=*myqtp*)
```


Or you might configure the category to indicate that a service is a QoS service. The following filter searches service category attributes for any entry that contains ultra, video on demand, or video telephony:

```
((serviceCategory=*ultra*)((serviceCategory=*video on
demand*)(serviceCategory=*video telephony*)))
```

To obtain a list of attribute names for the sspService object class, see the LDAP schema documentation in **SDK+AppSupport+Demos+Samples.tar.gz** file in the folder *SDK/doc/ldap* or on the Juniper Networks Web site at

<http://www.juniper.net/techpubs/software/management/src>

Determining the QoS Profile

After the QTP determines that a service is a QoS service, it needs to obtain the name of the QoS profile for the service. The QTP generates a QoS profile name based on active QoS services as follows:

1. Obtains QoS profile input values.

The QTP obtains these values by taking the value of an attribute in the service definition. You specify which attribute that you want the QTP to use as the input value. For example, you can specify the service name, the category, or the contents of the design and graphics attribute.

2. Compiles a list of the QoS profile input values.
3. Removes duplicate values from the list.
4. Sorts the remaining list by using a case-sensitive alphanumeric comparison.
5. Concatenates the values with a separator. The default value for the separator is a hyphen (-). You can specify a different separator.

[Table 5 on page 11](#) shows how lists of QoS profile input values are sorted and then concatenated.

Table 5: Examples of Concatenated QoS Profile Input Values

Input – QoS Profile Input Values	Output – Concatenated Name
be512, vod	be512-vod
game, be1024, vod	be1024-game-vod
be128	be128

6. Adds a prefix to the resulting name. The default prefix is qos-profile. (You can specify a different value.) The output from our examples now looks like this:

- qos-profile-be512-vod
- qos-profile-be1024-game-vod
- qos-profile-be128

The names that result from this process are the QoS profile names.

As you can see from this process, you need to design services and configure the QTP so that the resulting QoS profile names match the names of the QoS profiles configured on the router running JunosE Software.

Typically, a QoS designer creates a number of QoS profiles that support all the services that are expected to be used. This design results in various QoS profiles that need to be configured on each router. If a required QoS profile is not configured on the router, the hidden QoS profile attachment service cannot be activated. Services are still activated for the subscriber, but the services will not provide the expected traffic requirements. When this happens, the SAE logs the error but does not send an error message to the subscriber.

Setting Up Policy Groups

You need to create two types of policy groups in your QTP configuration. The QoS profile attachment service needs a policy group that attaches the required QoS profile to the subscriber interface when the attachment service is activated. QoS services need policy groups that classify traffic and specify the action to take on traffic that matches the classifier. (You can set up traffic classifiers to match any traffic.)

Policy Group for QoS Profile Attachment Service

The policy group for the hidden QoS profile attachment service must have an egress policy list with only one policy rule that contains a QoS profile attachment action. The QoS profile attachment action must have a variable parameter in the QoS profile field.



NOTE: The policy group for the QoS profile attachment service must contain only one egress policy list and must contain one and only one QoS profile attachment action. Otherwise, the SRC software will require a license for the hidden service.

When the profile attachment service is activated, the QTP substitutes the QoS profile attribute in the policy with the QoS profile name that it determined. The service then loads the policy.

The following example creates a policy group for the QoS profile attachment service. This policy group does not match any traffic.

1. Create a policy group called Pg-qos-attach, and add an egress policy list.
2. In the egress policy list, create a policy rule that has a QoS profile attachment action with QoS profile qpName.

By default, the QTP looks for qpName as the variable parameter.

When the QTP determines the required QoS profile name, it substitutes qpName with the value that it acquired.

Setting Up Services

You need to set up a QoS profile attachment service and QoS services. Both types of services are value-added (SSP) services.

In the QoS profile attachment service, assign the policy group that you configured for the service. For example, policyGroupName=Pg-qos-attach, ou=ent, o=Policies, o=umc.

In QoS services, assign the policy group that you configured for the service.

Subscribe subscribers to the QoS profile attachment service and to the appropriate QoS services.

Reestablishing Default QoS Profile

A default QoS profile may be installed on the subscriber interface before the QTP installs QoS profiles in response to the activation of QoS services. For example, a profile may have been attached to the subscriber interface when the default policy was installed. Once QoS services are no longer active on the interface, the QTP can reestablish the QoS profile that was installed on the interface before the QTP began tracking services and installing profiles on the interface.

Example: How QTP Activates a QoS Service

The following example shows the process that QTP uses when a subscriber activates a QoS service. In this example, QoS profile input values are taken from the service name attribute. The hidden QoS profile attachment service is named svc-qos-attach. The svc-qos-attach service contains a policy that has the variable parameter qpName assigned as the QoS profile name.

1. The subscriber does not have any active services.
2. The subscriber activates service be512, which is a QoS service.
 - a. The SAE sends a Service Session Start event to the QTP.
 - b. The QTP searches an attribute in the service definition and determines that the service is a QoS service.
 - c. Using the SAE Common Object Request Broker Architecture (CORBA) remote application programming interface (API), the QTP gets a list of the subscriber's active QoS services.

The list contains only service be512 because that is the only service that the subscriber has activated.

- d. The QTP adds the default prefix to the QoS profile input value to obtain the QoS profile name. The result is:


```
qos-profile-be512
```
- e. The QTP deactivates the hidden svc-qos-attach service. Because this svc-qos-attach service was not active before, this operation does not have any effect.

- f. The QTP activates the hidden svc-qos-attach service, and it substitutes variable parameter qpName with '\$qos-profile-be512' as the QoS profile name in the policy.
 - g. The policy loads qos-profile-be512 on the subscriber interface.
 3. The subscriber activates service vod, which is a QoS service.
 - a. The SAE sends a Service Session Start event to the QTP.
 - b. QTP searches attributes in active service definitions and determines that the service is a QoS service.
 - c. The QTP gets a list of the subscriber's active QoS services. The result is:
be512, vod
 - d. The QTP sorts the list and concatenates the QoS profile input values with the separator. The result is:
be512-vod
 - e. The QTP adds the default prefix to the concatenated name to obtain the QoS profile name. The result is:
qos-profile-be512-vod.
 - f. The QTP deactivates the hidden svc-qos-attach service.
 - g. The QTP activates the hidden svc-qos-attach service, and it substitutes variable parameter qpName with '\$qos-profile-be512-vod' as the QoS profile name in the policy.
 - h. The policy loads qos-profile-be512-vod.
 4. The subscriber deactivates service vod.
 - a. The QTP follows the same procedure as in Step 2 above and determines that the QoS profile name is qos-profile-vod.
 - b. The QTP deactivates the hidden svc-qos-attach service.
 - c. The QTP reactivates the hidden svc-qos-attach service, and it substitutes variable parameter qpName with '\$qos-profile-be512' as the QoS profile name in the policy.
 - d. The policy loads qos-profile-be512.

Related Documentation

- [QoS on JunosE Routers Overview on page 9](#)
- [Configuring QoS Profile-Tracking Plug-Ins \(SRC CLI\) on page 17](#)
- [Configuring QoS Profile Attachment Actions \(SRC CLI\)](#)
- [Configuring Search Filters for QoS Profile-Tracking Plug-Ins on page 19](#)
- [Updating QoS Profile Data in the Directory on page 21](#)

PART 2

Configuration

- [Configuration Tasks for QoS Profile-Tracking on page 17](#)
- [Example on page 23](#)

CHAPTER 3

Configuration Tasks for QoS Profile-Tracking

- [Configuring QoS Profile-Tracking Plug-Ins \(SRC CLI\) on page 17](#)
- [Configuring QoS Profile-Tracking Plug-Ins \(C-Web Interface\) on page 19](#)
- [Configuring Search Filters for QoS Profile-Tracking Plug-Ins on page 19](#)
- [Updating QoS Profile Data in the Directory on page 21](#)
- [Query Fields on page 21](#)

Configuring QoS Profile-Tracking Plug-Ins (SRC CLI)

Use the following configuration statements to configure the QoS profile tracking plug-in with the SRC CLI:

```
shared sae configuration plug-ins name name qos-profile-tracking {  
  threads threads ;  
  default-qos-profile default-qos-profile ;  
  separator separator ;  
  qos-profile-prefix qos-profile-prefix ;  
  service-selection-attribute service-selection-attribute ;  
  search-filter search-filter ;  
  invisible-qos-service invisible-qos-service ;  
  qos-profile-parameter-name qos-profile-parameter-name ;  
}
```

1. From configuration mode for the QoS profile tracking plug-in.

```
user@host# edit shared sae configuration plug-ins name QosTracking  
qos-profile-tracking
```

2. Configure the number of working threads that all QTP instances share when they process QTP events.

```
[edit shared sae configuration plug-ins name QosTracking qos-profile-tracking]  
user@host# set threads threads
```

3. Configure the name of the QoS profile that is attached to the interface when QoS services have been deactivated.

See [“Dynamically Managing QoS Profiles” on page 9](#).

```
[edit shared sae configuration plug-ins name QosTracking qos-profile-tracking]
user@host# set default-qos-profile default-qos-profile
```

4. Configure the character that is placed between QoS profile input values when the system concatenates the values during the process of creating QoS profile names.

```
[edit shared sae configuration plug-ins name QosTracking qos-profile-tracking]
user@host# set separator separator
```

5. Configure the prefix added to the QoS service name as part of the process to determine the name of the QoS profile that needs to be attached to an interface for a particular service.

```
[edit shared sae configuration plug-ins name QosTracking qos-profile-tracking]
user@host# set qos-profile-prefix qos-profile-prefix
```

6. Configure the name of the attribute in the service definition that you want the QTP to use as QoS profile input values.

```
[edit shared sae configuration plug-ins name QosTracking qos-profile-tracking]
user@host# set service-selection-attribute service-selection-attribute
```

7. Configure the search filter that the SAE uses to search service objects in the directory to find QoS services.

See [“Configuring Search Filters for QoS Profile-Tracking Plug-Ins” on page 19](#)

```
[edit shared sae configuration plug-ins name QosTracking qos-profile-tracking]
user@host# set search-filter search-filter
```

8. Configure the name of the hidden QoS profile attachment service that the QTP uses to attach QoS profiles to and remove QoS profiles from a router interface.

```
[edit shared sae configuration plug-ins name QosTracking qos-profile-tracking]
user@host# set invisible-qos-service invisible-qos-service
```

9. Configure the name of the variable parameter used in the QoS profile name field in the QoS profile attachment action of the policy group that is assigned to the hidden QoS service.

```
[edit shared sae configuration plug-ins name QosTracking qos-profile-tracking]
user@host# set qos-profile-parameter-name qos-profile-parameter-name
```

10. Verify your configuration.

```
[edit shared sae configuration plug-ins name QosTracking qos-profile-tracking]
user@host# show
threads 1;
default-qos-profile ;
separator -;
qos-profile-prefix qos-profile;
service-selection-attribute serviceName;
search-filter (attribute.trackPlug=);
invisible-qos-service svc-qos-attach;
qos-profile-parameter-name qpName;
```


- Related Documentation**
- [Updating QoS Profile Data in the Directory on page 21](#)
 - [Query Fields on page 21](#)
 - [Examples: Searching for QoS Information on page 23](#)
 - [QoS on JunosE Routers Overview on page 9](#)

Configuring QoS Profile-Tracking Plug-Ins (C-Web Interface)

To configure the QoS profile-tracking plug-in with the C-Web interface:

1. Click **Configure**, expand **Shared>SAE**, and then expand the SAE group for which you want to configure a QoS tracking plug-in.
2. From the side pane, click **Configuration>Plug Ins**.
3. Click the plug-in for which you want to configure QoS tracking, and then click **QoS Profile Tracking**.
The QoS Profile Tracking pane appears.
4. Click **Create**, enter information as described in the Help text in the main pane, and then click **Apply**.

- Related Documentation**
- [Updating QoS Profile Data in the Directory on page 21](#)
 - [Query Fields on page 21](#)
 - [Configuring QoS Profile-Tracking Plug-Ins \(SRC CLI\) on page 17](#)
 - [QoS on JunosE Routers Overview on page 9](#)

Configuring Search Filters for QoS Profile-Tracking Plug-Ins

The SAE uses a search filter to search service objects in the directory to find QoS services. You can set up the filter to search the values of any attribute in the service object, such as service name, category, or tracking plug-in. The search is successful when a value matches the filter.

To configure the search:

- Create a filter in a format similar to the LDAP search filter. [Table 6 on page 20](#) lists the values that you can use for filters. Each filter string <filter> contains a simplified LDAP query.

Table 6: Settings for Filter Strings

Filter String	Action
()	Matches no objects
(*)	Matches all objects
<p>List of <attribute>= <value> pairs</p> <p><attribute>—Name of a property or attribute <ldapAttributeName></p> <p><value>—One of the following</p> <ul style="list-style-type: none"> • * (asterisk) • Explicit string • String that contains an * <p>Note: To define a special character (* & , ! \) in a string, precede it with the backslash symbol (\).</p>	<ul style="list-style-type: none"> • If <value> is *, checks for any value. • If <value> is an explicit string, checks whether any value of the property matches the string, regardless of case. • If <value> is a string that contains a *, checks whether any value of the property contains the string, regardless of case.
(&<filter><filter>...)	True if all filters match
(<filter><filter>...)	True if at least one filter matches
(!<filter>)	True if the filter does not match

The default is attribute.trackPlug=; note that you need to add a search value after the equal sign. For example:

- To search tracking plug-in attributes for any entry that contains qtp:

```
(attribute.trackPlug=*qtp*)
```

- To search service category attributes for any entry that contains ultra, video on demand, or video telephony:

```
((serviceCategory=*ultra*)((serviceCategory=*video on demand*)(serviceCategory=*video telephony*)))
```

Related Documentation

- [Dynamically Managing QoS Profiles on page 9](#)
- [Configuring QoS Profile-Tracking Plug-Ins \(SRC CLI\) on page 17](#)
- [Updating QoS Profile Data in the Directory on page 21](#)
- For information about obtaining a list of attribute names for the sspService object class, see the documentation for the LDAP schema in **SDK+AppSupport+Demos+Samples.tar.gz** file in the folder *SDK/doc/ldap* or on the Juniper Networks Web site at

<http://www.juniper.net/techpubs/software/management/src>

- [Examples: Searching for QoS Information on page 23](#)

Updating QoS Profile Data in the Directory

You can update the directory with a list of QoS profiles that are currently configured on a router running JunosE Software.

Related Documentation

- [Dynamically Managing QoS Profiles on page 9](#)
- [Configuring QoS Profile-Tracking Plug-Ins \(SRC CLI\) on page 17](#)
- [Configuring Search Filters for QoS Profile-Tracking Plug-Ins on page 19](#)
- [Query Fields on page 21](#)
- [QoS on JunosE Routers Overview on page 9](#)

Query Fields

The following fields appear in the Query dialog box of the Policy Editor.

Condition Type

- Object to be searched.
- Value—router, QoS profile, or policy group
- Default—No value

Condition Value

- Name of the QoS profile, router, or policy group that you want to search.
- Value—Name of the router, QoS profile, or policy group. If you selected router or policy group as a condition type, you can select a name from the drop-down menu. If the condition type is QoS profile, continue selecting entries in the drop-down menu until you reach the name of a policy group.
- Default—No value

Find

- Object that you want to find. The software searches for this object on the QoS profile, router, or policy group defined in condition type and condition value.
- Value—Name of the router, QoS profile, or policy group. If you selected router or policy group as a condition type, you can select a name from the drop-down menu. If the condition type is QoS profile, continue selecting entries in the drop-down menu until you reach the name of a policy group.
- Default—No value

Supported

- Whether or not to search for the condition type that exists or does not exist on the router, QoS profile, or policy group.
- Value—Checked or unchecked
 - Checked—Searches for the condition type that is on the router, QoS profile, or policy group
 - Unchecked—Searches for the condition type that is not on the router, QoS profile, or policy group
- Default—No value

CHAPTER 4

Example

- Examples: Searching for QoS Information on page 23

Examples: Searching for QoS Information

The query example in [Figure 1 on page 23](#) searches for all QoS profiles on router chimera.

Figure 1: Searching for All QoS Profiles on a Router

The screenshot shows a 'Router Query' dialog box with the following fields and values:

- Aspect: QoS Profile Configuration
- Condition Type: Router
- Condition Value: chimera
- Find: QoS Profile
- Supported: ☒

The results area displays the following text:

```
The following QoS Profiles are supported by Router "chimera" for QoS Profile configuration:  
aaqp  
aaqp1  
atm-default  
ethernet-default  
serial-default  
server-default
```

At the bottom of the dialog are three buttons: Query, Clear, and Close.

The query in [Figure 2 on page 24](#) searches for QoS profiles in policy group DHCP.

Figure 2: Searching for QoS Profiles in a Policy Group

The Router Query window displays the following configuration:

- Aspect: QoS Profile Configuration
- Condition Type: Policy Group
- Condition Value: DHCP
- Find: QoS Profile
- Supported: ☒

The results pane shows: "The following QoS Profile is supported by Policy Group "DHCP" for QoS Profile Configuration: atm-default atm-vc atm-vp"

Buttons at the bottom: Query, Clear, Close

The query in [Figure 3 on page 24](#) searches for all policy groups that router bigfoot supports. For a policy group to be supported on a router, both the policy group and the router must contain the same QoS profile.

Figure 3: Searching for All Policy Groups on a Router

The Router Query window displays the following configuration:

- Aspect: QoS Profile Configuration
- Condition Type: Router
- Condition Value: bigfoot
- Find: Policy Group
- Supported: ☒

The results pane shows: "The following Policy Groups are supported by Router "bigfoot" for QoS Profile configuration:"

```

content-provider (policyGroupName=content-provider,o=Policies,o=UNC)
content-provider-fast (policyGroupName=content-provider-fast,o=Policies,o=UNC)
content-provider-medium (policyGroupName=content-provider-medium,o=Policies,o=UNC)
content-provider-slow (policyGroupName=content-provider-slow,o=Policies,o=UNC)
DHCP (policyGroupName=DHCP,o=Policies,o=UNC)
eglimit (policyGroupName=eglimit,ou=ent,o=Policies,O=UNC)
EntDefault (policyGroupName=EntDefault,ou=ent,o=Policies,O=UNC)
internet-fast (policyGroupName=internet-fast,o=Policies,o=UNC)
internet-medium (policyGroupName=internet-medium,o=Policies,o=UNC)
internet-slow (policyGroupName=internet-slow,o=Policies,o=UNC)
ISP (policyGroupName=ISP,o=Policies,o=UNC)
PPP (policyGroupName=PPP,o=Policies,o=UNC)
PPP-special (policyGroupName=PPP-special,o=Policies,o=UNC)
redirect (policyGroupName=redirect,ou=ent,o=Policies,O=UNC)

```

Buttons at the bottom: Query, Clear, Close

- Related Documentation**
- [Dynamically Managing QoS Profiles on page 9](#)
 - *Policy Management Overview*
 - *Policy Components*
 - [QoS on JunosE Routers Overview on page 9](#)

PART 3

Index

- [Index on page 29](#)

Index

C

conventions	
notice icons.....	x
text.....	x
customer support.....	xii
contacting JTAC.....	xii

D

directory	
description.....	4
directory server.....	4
documentation	
comments on.....	xi

L

LDAP (Lightweight Directory Access Protocol). *See*
 directory; directory server

M

manuals	
comments on.....	xi

N

notice icons.....	x
-------------------	---

Q

QoS (quality of service)	
searching for policies in directory.....	24
QoS profile-tracking plug-in	
description.....	9
QoS profiles, routers running JunosE Software	
how tracking works.....	9
managing dynamically.....	9
updating directory, using	
qosProfilePublish.....	21
quality of service. <i>See</i> QoS	

S

SRC components	
description.....	3
support, technical <i>See</i> technical support	

T

technical support	
contacting JTAC.....	xii
text conventions.....	x

