



Junos[®] OS

Gx-Plus Feature Guide for Subscriber Services

Release
13.2



Published: 2013-07-31

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Junos® OS Gx-Plus Feature Guide for Subscriber Services

13.2

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Supported Platforms

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

- MX Series

Using the Examples in This Manual

If you want to use the examples in this manual, you can use the **load merge** or the **load merge relative** command. These commands cause the software to merge the incoming configuration into the current candidate configuration. The example does not become active until you commit the candidate configuration.

If the example configuration contains the top level of the hierarchy (or multiple hierarchies), the example is a *full example*. In this case, use the **load merge** command.

If the example configuration does not start at the top level of the hierarchy, the example is a *snippet*. In this case, use the **load merge relative** command. These procedures are described in the following sections.

Merging a Full Example

To merge a full example, follow these steps:

1. From the HTML or PDF version of the manual, copy a configuration example into a text file, save the file with a name, and copy the file to a directory on your routing platform.

For example, copy the following configuration to a file and name the file **ex-script.conf**. Copy the **ex-script.conf** file to the **/var/tmp** directory on your routing platform.

```
system {
  scripts {
    commit {
      file ex-script.xml;
    }
  }
}
interfaces {
  fxp0 {
    disable;
    unit 0 {
      family inet {
        address 10.0.0.1/24;
      }
    }
  }
}
```

2. Merge the contents of the file into your routing platform configuration by issuing the **load merge** configuration mode command:

```
[edit]
user@host# load merge /var/tmp/ex-script.conf
load complete
```

Merging a Snippet

To merge a snippet, follow these steps:

1. From the HTML or PDF version of the manual, copy a configuration snippet into a text file, save the file with a name, and copy the file to a directory on your routing platform.

For example, copy the following snippet to a file and name the file **ex-script-snippet.conf**. Copy the **ex-script-snippet.conf** file to the **/var/tmp** directory on your routing platform.

```
commit {
  file ex-script-snippet.xml; }
```

2. Move to the hierarchy level that is relevant for this snippet by issuing the following configuration mode command:

```
[edit]
user@host# edit system scripts
[edit system scripts]
```

3. Merge the contents of the file into your routing platform configuration by issuing the **load merge relative** configuration mode command:

```
[edit system scripts]
user@host# load merge relative /var/tmp/ex-script-snippet.conf
load complete
```

For more information about the **load** command, see the *CLI User Guide*.

Documentation Conventions

Table 1 on page xi 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.

Table 2 on page xi defines the text and syntax conventions used in this guide.

Table 2: Text and Syntax Conventions

Convention	Description	Examples
Bold text like this	Represents text that you type.	To enter configuration mode, type the configure command: user@host> configure
Fixed-width text like this	Represents output that appears on the terminal screen.	user@host> show chassis alarms No alarms currently active

Table 2: Text and Syntax Conventions (*continued*)

Convention	Description	Examples
<i>Italic text like this</i>	<ul style="list-style-type: none"> Introduces or emphasizes important new terms. Identifies book names. Identifies RFC and Internet draft titles. 	<ul style="list-style-type: none"> A policy <i>term</i> is a named structure that defines match conditions and actions. <i>Junos OS System Basics Configuration Guide</i> RFC 1997, <i>BGP Communities Attribute</i>
<i>Italic text like this</i>	Represents variables (options for which you substitute a value) in commands or configuration statements.	Configure the machine's domain name: [edit] root@# set system domain-name <i>domain-name</i>
Text like this	Represents names of configuration statements, commands, files, and directories; configuration hierarchy levels; or labels on routing platform components.	<ul style="list-style-type: none"> To configure a stub area, include the stub statement at the [edit protocols ospf area area-id] hierarchy level. The console port is labeled CONSOLE.
< > (angle brackets)	Enclose optional keywords or variables.	stub <default-metric metric>;
(pipe symbol)	Indicates a choice between the mutually exclusive keywords or variables on either side of the symbol. The set of choices is often enclosed in parentheses for clarity.	broadcast multicast <i>(string1 string2 string3)</i>
# (pound sign)	Indicates a comment specified on the same line as the configuration statement to which it applies.	rsvp { # Required for dynamic MPLS only
[] (square brackets)	Enclose a variable for which you can substitute one or more values.	community name members [community-ids]
Indentation and braces ({ })	Identify a level in the configuration hierarchy.	[edit] routing-options { static { route default { nexthop <i>address</i> ; retain; } } }
;(semicolon)	Identifies a leaf statement at a configuration hierarchy level.	
GUI Conventions		
Bold text like this	Represents graphical user interface (GUI) items you click or select.	<ul style="list-style-type: none"> In the Logical Interfaces box, select All Interfaces. To cancel the configuration, click Cancel.
> (bold right angle bracket)	Separates levels in a hierarchy of menu selections.	In the configuration editor hierarchy, select Protocols>Ospf .

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

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- 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>.
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- 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

- [Gx-Plus in Subscriber Access Networks on page 3](#)

CHAPTER 1

Gx-Plus in Subscriber Access Networks

- [Gx-Plus for Provisioning Subscribers Overview on page 3](#)
- [Understanding Gx-Plus Interactions Between the Router and the PCRF on page 5](#)
- [Messages Used by Diameter Applications on page 10](#)
- [Diameter AVPs and Diameter Applications on page 15](#)

Gx-Plus for Provisioning Subscribers Overview

Gx-Plus is a Diameter-based application that extends the capability of the Gx interface. The 3rd Generation Partnership Project (3GPP) defined Gx as the online policy interface between the Policy Control and Charging Rules Function (PCRF) and the Policy and Charging Enforcement Function (PCEF), to provide control over policy and flow-based charges for subscribers. The PCRF is a centralized policy decision point that deploys business policy rules to allocate broadband network resources and manages flow-based charges for subscribers and services. The router functions as the PCEF in this environment.

Gx-Plus provides provisioning, activation, and deactivation of services; threshold triggers for service statistics processing; service accounting; subscriber session termination; fault recovery; and event (subscriber login and logout) notifications. The terminology typically used for PCRFs varies slightly from standard Junos OS terminology. The terms listed in [Table 3 on page 3](#) are interchangeable.

Table 3: Differences Between Gx-Plus and Junos OS Terminology

Gx-Plus	Junos OS
policy	service
rule	service
rule install or installation	service activation or instantiation
rule uninstall	service deactivation
usage monitoring	service accounting

Gx-Plus enables the router acting as a PCEF to exchange Diameter Credit-Control Application (DCCA) messages with a PCRF residing on a server to request credit

authorization and service provisioning for authenticated subscribers. When an application requests AAA to activate a subscriber's session, the router sends a Credit-Control-Request (CCR) message to determine whether the subscriber has credit for the desired services and to request provisioning of those services from the PCRF policy manager.

The PCRF responds with a Credit-Control-Answer (CCA) message that indicates success or failure for credit authorization. If the subscriber has sufficient credit for the requested services, credit is authorized. If the subscriber has insufficient credit for the services, credit authorization fails.

The CCA can include services to be activated for the subscriber. If the response times out, the subscriber is logged in but only default services—if present—are activated for the subscriber. The router interprets the omission of the Result-Code AVP from the CCA as a provisioning authorization failure and does not allow the subscriber to log in.

When a subscriber client application, such as DHCP, sends a subscriber logout notice to AAA, the router in turn sends a CCR message to the PCRF to request subscriber termination. The PCRF acknowledges the logout with a CCA message.

Different Diameter message types exchanged by the router and the PCRF contain different sets of attribute-value pairs (AVPs). If data for an AVP is not available for a request to the PCRF, that AVP is omitted from the message. If the PCRF subsequently has insufficient information to decide on the request, it may deny the request.

Gx-Plus establishes sessions that correspond to IPv4 DHCP sessions on dual-stack IPv6/IPv4 or IPv4-only subscriber interfaces, depending on the access profile. By default, IPv6 information is not communicated to the PCRF. You must explicitly configure Gx-Plus to include IPv6 information. When you do so, Gx-Plus can establish sessions that correspond to DHCPv6 sessions on IPv6-enabled subscriber interfaces and on dual-stack IPv6/IPv4-enabled interfaces.

For dual-stack DHCP subscribers (DHCPv4 and DHCPv6 on the same VLAN), each DHCP session is treated as a separate Gx-Plus session. However, only a single Gx-Plus session exists for dual-stack PPP sessions.

Gx-Plus includes the following fault tolerance and recovery capabilities:

- Unlimited retries of unacknowledged provisioning requests
- Unlimited retries of logout requests
- Router event notification
- Router discovery



NOTE: More than one Diameter-based application (function), such as Gx-Plus or JSRC, can run on a router simultaneously.

**Related
Documentation**

- [Messages Used by Diameter Applications on page 10](#)
- [Diameter AVPs and Diameter Applications on page 15](#)

- [Understanding Gx-Plus Interactions Between the Router and the PCRF on page 5](#)
- [Configuring Gx-Plus on page 27](#)

Understanding Gx-Plus Interactions Between the Router and the PCRF

This topic describes the sequences of Diameter messages exchanged by means of Gx-Plus between the Policy Control and Rules Charging Function (PCRF) and the router acting as a Policy and Charging Enforcement Function (PCEF) as they interact to perform the following tasks for subscriber access:

- Subscriber login
- Fault tolerance and event notification
- Subscriber audit
- Subscriber logout

Subscriber Login

Gx-Plus provisioning is enabled for subscribers when you include the **provisioning-order gx-plus** statement at the **[edit access profile *profile-name*]** hierarchy level. When an application requests AAA to activate the subscriber's session, the router sends a CCR-I message to the PCRF to request provisioning for the subscriber session. The CCR-I message must include the Juniper-Virtual-Router, Framed-IP-Address, and NAS-Port-ID AVPs. The request is not generated when no IPv4 address has been assigned to the subscriber, when IPv6 is enabled and an IPv6 address has been assigned, or when the NAS-Port-ID is unknown.

The PCRF returns a CCA-I message that includes the Result-Code AVP (AVP code 268). The router considers a CCA-I that does not include the Result-Code AVP as a failed response. The CCA-I can return the Charging-Rule-Install AVP (AVP code 1001), which identifies services to be activated.

If the Result-Code value is `DIAMETER_SUCCESS` (2001), the router communicates to AAA that the requested service is activated. If the Result-Code value is `DIAMETER_AUTHORIZATION_REJECTED`, the router communicates to AAA that the service activation is not permitted. If the Result-Code AVP has any other value, or is missing, the request is retried. A total of three CCR-I messages can be sent.

If the PCRF does not indicate success or failure, then by default the router continues to send requests, but the retry requests are CCR-N messages (no-response notifications) that include the Juniper-Provisioning-Source AVP (AVP code 2101). This AVP indicates that the router has local decision-making authority to provision services in the absence of a PCRF response to the CCR-I. This AVP is not present in the CCR-I message.

A subscriber login initiates the following sequence of events:

1. A client application—such as DHCP, PPP, or static subscriber sessions—requests AAA to authenticate the subscriber.
2. Authentication begins if the subscriber access profile specifies RADIUS authentication. Login continues when the authentication is successful. Login fails when the **authentication-order** statement in the profile does not specify RADIUS authentication or no authentication. Login fails unless the **authentication-order** statement in the profile specifies RADIUS authentication or no authentication. Login also fails when authentication fails.
3. Default services are activated for the subscriber. Any services that the authentication server includes in the authentication grant are activated. Additionally, a default service may have been configured for the client application.
4. If the subscriber access profile specifies Gx-Plus provisioning, the router initiates the Gx-Plus message exchange by sending a CCR-I message to the PCRF. The router waits for the PCRF to respond with a CCA-I message within a non-configurable timeout period.

When the PCRF responds within the timeout period and includes the Charging-Rule-Install AVP in the CCA-I message, subscriber login is delayed while the router deactivates any default services and attempts to activate the specified services.

- If all the specified services are activated, then the login completes.
- If any of the services cannot be activated, the router sends the PCRF a CCR-U message with the status of the services (a rule report). The PCRF responds to this message with a CCA-U that can contain a new set of services for activation.
- The router ignores any default services, even if the CCA-I message does not include any services. In this circumstance, no services are activated.

If the PCRF does not return a CCA-I within the timeout period, subscriber login completes.

- The router searches first for services returned from the authentication server and activates any it finds. If no such services are found, then the router activates any locally configured default services. Subscriber login completes when default service activation is successful, but fails when any default service fails to activate. Because default services are not required to be present, login also completes when no default services are found.
- If login completes (with or without a default service), the router periodically resends the CCR-I message to the PCRF. If the PCRF subsequently returns a CCA-I, the router deactivates the default service, if any, and then activates any services included in the CCA-I. If the message does not include any services, then no services are activated, not even a default service.
- If any of the services contained in the CCA-I cannot be activated, the router sends the PCRF a CCR-U message with the status of the services (a rule report). The PCRF responds to this message with a CCA-U that can contain a new set of services for activation.

5. The router begins to monitor session accounting statistics if the CCA-I message includes any threshold triggers for usage monitoring. The Usage-Monitoring-Information AVP (AVP code 1067) contains the threshold triggers in the Granted-Service-Unit AVP (AVP code 431). The triggers are the values granted by the PCRF for the following statistics: duration of the session, input octets count, output octets count, and total octets count.
 - a. If the service statistics meet or exceed any of these trigger thresholds during the session, the router sends a CCR-U message to the PCRF with accounting information in the Usage-Monitoring-Information AVP (AVP code 1067). The AVP now contains the Used-Service-Unit AVP (AVP code 446) to report the current values for all four statistics.
 - b. In response, the PCRF may return a CCA-U message with the Usage-Monitoring-Information AVP, which can include any of the following: the Granted-Service-Unit AVP with new threshold triggers (absolute values rather than increments to the previous thresholds), the Charging-Rule-Install AVP (AVP code 1001) for service activations, or the Charging-Rule-Remove AVP (AVP code 1002) for service deactivations.



NOTE: The router does not aggregate statistics across services.

6. When the subscriber logs out, the router sends a CCR-T message (termination notice) to the PCRF, which responds with a CCA-T message.

Fault Tolerance and Event Notification

Although the probability is low, the PCRF and the router can have different values for the number of subscribers. This error can arise from the following scenarios:

- CCA-I loss: if no CCA-I is delivered to the router, then the PCRF considers a subscriber as provisioned whereas the router considers it not provisioned.
- CCR-T loss: if no CCR-T is delivered to the PCRF, then the PCRF considers a subscriber to be provisioned whereas the router considers the subscriber not provisioned (logged out).

Loss of messages can be greater during cold boots and high availability events. Unacknowledged CCR-I and CCR-T requests are retransmitted forever until a satisfactory response is received to reduce the incidence of failure, and significant events are reported to Gx-Plus. By default, the number of outstanding requests is limited to 40 to avoid overloading the PCRF. This limit reduces the possibility of losing requests. You can modify this number by including the **max-outstanding-requests** statement at the **[edit access-gx-plus global]** hierarchy level.

Gx-Plus does not rely on the connection state between devices to detect router or PCRF outages, because some events do not affect the connection state and others are not detected when there is a Diameter relay or proxy between the devices. Event notifications (JSER messages) are sent when certain events take place on the router. The Juniper-Event-Type AVP (AVP code 2103) in the message describes the event.

Event notifications are retried until Gx-Plus returns a JSEA message with a Result-Code value of DIAMETER_SUCCESS (2001) to acknowledge receipt of the event notification. When retrying notifications, one notification is sent for each outstanding event. No other request are sent as long as there is any outstanding event other than an application watch dog (AWD).

Table 4 on page 8 lists router events and the subsequent router and PCRF actions.

Table 4: Router Events, Router Actions, and PCRF Actions

Router Event	Router Action	PCRF Action
The router receives no response from the PCRF or an error response.	Send event notification.	Respond to event notification.
The configuration changes. Significant changes such as the origin host or realm and the Gx-Plus partition destination host or realm also increment the value of the Origin-State-Id AVP.	Send event notification.	Respond to event notification and perform discovery.
The router receives an explicit discovery request from the PCRF.	Send event notification.	Respond to event notification.
The router undergoes a cold boot and all sessions are lost. This can result from a catastrophic failure or power cycle.	Send event notification.	Respond to event notification and clear the database.
The router undergoes a warm boot.	Send event notification.	Respond to event notification and clear the database.
Recovery resources that are needed to continuously retry unacknowledged requests (CCR-N and CCR-T messages) are exhausted. The value of the Origin-State-Id AVP is incremented. This event is unlikely to occur.	Send event notification.	Respond to event notification and perform discovery.

An important aspect of Gx-Plus fault tolerance is that subscriber login and termination requests are retried (replayed) forever until a satisfactory response is received from the PCRF. In rare circumstances, this can result in a stack of pending requests being replayed over and over.

You can issue the **clear network-access gx-plus replay** command to clear all pending requests. This command causes Gx-Plus to send a JSER message to PCRF that includes the Juniper-Event-Type AVP (AVP code 2103) with a value of 3 indicating a discovery request. The PCRF then returns a JDER message to initiate discovery of all subscribers. When this discovery completes, all pending subscriber requests are cleared.

PCRF-Generated Discovery

The PCRF runs a discovery process in response to data loss, exhaustion of router resources, operator request, or router request. The JSDR message specifies the level of verbosity desired in the reply from Gx-Plus. The message also specifies whether the request is for data about a particular session or information similar to an SNMP Get-Bulk for all sessions.

Gx-Plus returns a JSDA message that indicates complete success, limited success, or an error. In the event of success, the requested data is also returned.

Subscriber Accounting

When the PCRF returns a CCA-I message to the router, the message may contain thresholds for any of several usage statistics for a subscriber service: Duration, input data, output data, or total data for the service session. Upon receipt of a threshold, the router begins monitoring the subscriber's service session activity for that statistic. When the usage statistic reaches the threshold, it triggers the router to send a Gx-Plus usage notification message (CCR-U) to the PCRF. In response, the PCRF may send a CCA-U message to specify a new threshold, activate new services, or deactivate current services.

The PCRF can also send a CCR-U message that explicitly requests usage monitoring for statistics at different levels. The router can monitor usage at the subscriber level or at the service level. The Granted-Service-Unit AVP in the message specifies one or more of the following the statistics:

- CC-Input-Octets
- CC-Output-Octets
- CC-Total-Octets
- CC-Time

If any other statistics are specified, the router sends the PCRF a CCA message indicating that incorrect statistics were requested. When the specified threshold for a monitored statistic is reached, the router sends a CCR-U that contains the usage report for the statistics. In response, the PCRF sends another CCA-R with new thresholds or a request to activate or deactivate services.

Subscriber Audit

The PCRF can send a reauthorization request (RAR message) to Gx-Plus at any time to determine whether a particular subscriber is still logged in. You can also manually trigger the PCRF to do so by issuing the **clear network-access aaa gx-plus replay** command.

The Session-Id AVP identifies the subscriber session. Gx-Plus returns an RAA message to provide status on the subscriber session. When the session is still up (found in the session database) the Result-Code AVP value in the RAA message is `DIAMETER_SUCCESS` (2001). When the session is not found, the Result-Code value is `DIAMETER_UNKNOWN_SESSION_ID` (5002). A Result-Code value of `DIAMETER_UNABLE_TO_DELIVER` (3002) indicates that Gx-Plus is not configured.

Subscriber Logout

When the client application sends a subscriber logout notice to AAA, Gx-Plus sends a CCR-T message to notify the PCRF that the provisioned subscriber session is being terminated. The PCRF returns a CCA-T message that includes the Result-Code AVP. If the Result-Code value is `DIAMETER_SUCCESS`, Gx-Plus notifies AAA, and AAA notifies the application that the logout is complete. If Gx-Plus does not receive a CCA-T message,

or if the Result-Code AVP has any other value or is missing, then the termination request is retried until the CCA-T message is returned with DIAMETER_SUCCESS.

Related Documentation

- [Gx-Plus for Provisioning Subscribers Overview on page 3](#)
- [Messages Used by Diameter Applications on page 10](#)
- [Diameter AVPs and Diameter Applications on page 15](#)
- [Configuring Gx-Plus on page 27](#)
- [Default Subscriber Service Overview](#)
- [Configuring a Default Subscriber Service](#)

Messages Used by Diameter Applications

The following Diameter applications are supported by Junos OS:

- JSRC—A Juniper Networks Diameter application registered with the IANA (<http://www.iana.org>) as Juniper Policy-Control-JSRC, with an ID of 16777244. Communicates with the SAE (remote SRC peer).
- PTSP—A Juniper Networks Diameter application registered with the IANA (<http://www.iana.org>) as Juniper JGx, with an ID of 16777273. Communicates with the SAE (remote SRC peer).
- Gx-Plus—An application that extends the 3GPP Gx interface for wireline use cases. 3GPP Gx is registered with the IANA (<http://www.iana.org>). Communicates with a PCRF.

If data for a particular AVP included in a message is not available to the router, Gx-Plus simply omits the AVP from the message it sends to the PCRF. If the PCRF determines it has insufficient information to make a decision, it may deny the request. The Diameter answer messages include the Result-Code AVP (AVP 268); the values of this AVP convey success, failure, or errors to the requestor.

Juniper Networks has also registered the Juniper-Session-Recovery application (16777296) and two new command codes (8388628 for Juniper-Session-Events and 8388629 for Juniper-Session-Discovery) with the IANA (<http://www.iana.org>).

[Table 5 on page 10](#) describes Diameter messages the applications use.

Table 5: Diameter Messages and Diameter Applications

Diameter Message	Code	Application	Description
AA-Request (AAR)	265	JSRC, PTSP	Request from the application to the SAE at new subscriber login or during SAE-application synchronization. The request can be one of three types: address-authorization, provisioning-request, or synchronization.

Table 5: Diameter Messages and Diameter Applications (*continued*)

Diameter Message	Code	Application	Description
AA-Answer (AAA)	265	JSRC, PTSP	Response from the SAE to the application's AA-Request message.
Abort-Session-Request (ASR)	274	JSRC, PTSP	Request from the SAE to the application to log out a provisioned subscriber.
Abort-Session-Answer (ASA)	274	JSRC, PTSP	Response from the application to the SAE's ASR message. If the application sends the logout request to AAA, the ASA message includes a success notification (ACK). If the logout failed, the ASA message includes a failure notification (NAK).
Accounting-Request (ACR)	271	JSRC, PTSP	Request from the SAE to the application or from the application to the SAE for statistics.
Accounting-Answer (ACA)	271	JSRC, PTSP	Response to the ACR message to provide statistics for each installed policy (service).

Table 5: Diameter Messages and Diameter Applications (*continued*)

Diameter Message	Code	Application	Description
Credit-Control-Request (CCR)	272	Gx-Plus	<p>Request from Gx-Plus to the PCRF at subscriber login, logout, or update.</p> <p>An initial request (CCR-I) is sent when a subscriber logs in and AAA is requested to activate the subscriber's session. Gx-Plus retries the CCR-I message if a CCA-I message is not received from the PCRF within 10 seconds. The CCR-I message is retried up to 3 times.</p> <p>If no CCA-I is received after the 4 CCR-I messages have been sent—the first message plus 3 retries—then Gx-Plus starts sending CCR-N messages. CCR-N messages are retried forever until a success or failure response is received from the PCRF. CCR-N messages include the Juniper-Provisioning-Source AVP (AVP code 2101) set to local to notify the PCRF that the router has the authority to make a local decision regarding subscriber service activation.</p> <p>An update request (CCR-U) message is sent when a usage threshold is reached. The CCR-U reports the actual usage for all statistics. The PCRF may return a CCA-U message that includes new monitoring thresholds, service activations, service deactivations.</p> <p>A CCR-U is also sent to report the status of service activation or deactivation.</p> <p>A termination request (CCR-T) is sent at subscriber logout to inform the PCRF that a provisioned subscriber session is being terminated. CCR-T messages are retried forever until a success response is received from the PCRF.</p>

Table 5: Diameter Messages and Diameter Applications (*continued*)

Diameter Message	Code	Application	Description
Credit-Control-Answer (CCA)	272	Gx-Plus	<p>Reply from the PCRF to a CCR message.</p> <p>In response to a CCR-I, the PCRF returns a CCA-I message that indicates success (DIAMETER_SUCCESS) or failure (DIAMETER_AUTHORIZATION_REJECTED) depending on whether the subscriber has sufficient credit for the requested services. All other responses are ignored and the CCR-I is retried.</p> <p>In response to a CCR-T, the PCRF returns a CCA-T message that indicates a successful termination with a value of 2001 (DIAMETER_SUCCESS) in the Result-Code AVP. All other responses are ignored and the CCR-T is retried.</p> <p>A CCA-N is a response to a CCR-N.</p>
Juniper-Session-Discovery-Request (JSDR)	8388629	Gx-Plus	Discovery request from the PCRF to Gx-Plus to discover subscriber sessions on the router.
Juniper-Session-Discovery-Answer (JSDA)	8388629	Gx-Plus	<p>Reply from router to a JSDR message; describes session information. The Result-Code AVP includes one of the following values, or an error value:</p> <ul style="list-style-type: none"> • 2001—DIAMETER_SUCCESS; the end of the database was reached, meaning all information has been sent. • 2002—DIAMETER_LIMITED_SUCCESS; some of the session information was sent, but more remains to be sent.
Juniper-Session-Event-Request (JSER)	8388628	Gx-Plus	Request from router to PCRF regarding events that take place on the router. Notifies the PCRF of certain events on the router by including the Juniper-Event-Type AVP (AVP code 2103). Events reported include cold or warm boots, explicit discovery requests, substantial configuration changes, non-response or error response from PCRF, and exhaustion of fault-tolerant resources.
Juniper-Session-Event-Answer (JSEA)	8388628	Gx-Plus	Reply from PCRF to a JSER message.
Push-Profile-Request (PPR)	288	JSRC, PTSP	Request from the SAE to the router to activate or deactivate services for a subscriber.

Table 5: Diameter Messages and Diameter Applications (*continued*)

Diameter Message	Code	Application	Description
Push-Profile-Answer (PPA)	288	JSRC, PTSP	Response from the router to the SAE's PPR message. Includes success or failure notification for each of the service activation or deactivation commands in the request.
Re-Auth-Request (RAR)	258	Gx-Plus	Audit request from the PCRF to router to determine whether a specific subscriber is still present.
Re-Auth-Answer (RAA)	258	Gx-Plus	Reply from router to a RAR message; indicates whether the subscriber is active. The Result-Code AVP includes one of the following values: <ul style="list-style-type: none"> • 2001—DIAMETER_SUCCESS; subscriber entry was found. • 5002—DIAMETER_UNKNOWN_SESSION_ID; subscriber entry was not found. • 3002—DIAMETER_UNABLE_TO_DELIVER; Gx-Plus is not configured.
Session-Resource-Query (SRQ)	277	JSRC, PTSP	Request from the router to the SAE or from the SAE to the router to initiate synchronization between router and the SAE.
Session-Resource-Reply (SRR)	277	JSRC, PTSP	Response to the SRQ message to begin synchronization.
Session-Termination-Request (STR)	275	JSRC, PTSP	Notification from the router to the SAE that a provisioned subscriber has logged out.
Session-Termination-Answer (STA)	275	JSRC, PTSP	Response from the SAE to the router's STR message. Includes success or failure notification.

Related Documentation

- [Juniper Networks Session and Resource Control \(SRC\) and JSRC Overview](#)
- [Understanding JSRC-SAE Interactions](#)
- [Juniper Networks Session and Resource Control \(SRC\) and PTSP Overview](#)
- [Understanding PTSP-SAE Interactions](#)
- [Gx-Plus for Provisioning Subscribers Overview on page 3](#)
- [Understanding Gx-Plus Interactions Between the Router and the PCRF on page 5](#)

Diameter AVPs and Diameter Applications

Diameter conveys information by including various attribute-value pairs (AVPs) in Diameter messages. [Table 6 on page 15](#) lists the standard Diameter AVPs used in interactions with the supported Diameter applications. Diameter reserves AVP code numbers 0 through 255 for RADIUS AVPs that are implemented in Diameter.

Table 6: Standard Diameter AVPs

Attribute Number	Diameter AVP	Application	Description	Type
1	User-Name	Gx-Plus, JSRC	Specifies the username. For a subscriber managed by AAA, the value is the subscriber's login name. For a static interface, the value is the interface name, which is used as the subscriber's login name.	UTF8String
8	Framed-IP-Address	Gx-Plus, JSRC, PTSP	Identifies the IPv4 address configured for the subscriber. This is the same value as for RADIUS Framed-IP-Address attribute [8].	OctetString
55	Event-Timestamp	Gx-Plus, JSRC, PTSP	Specifies the time of the event that triggered the message in which this AVP is included. Time is indicated in seconds since January 1, 1900, 00:00 UTC.	Time
85	Acct-Interim-Interval	JSRC, PTSP	<p>Number of seconds between each interim accounting update for this session.</p> <p>The router uses the following guidelines for interim accounting:</p> <ul style="list-style-type: none"> Attribute value is within the acceptable range (600 through 86,400 seconds)—Accounting is updated at the specified interval. Attribute value is less than the minimum acceptable value—Accounting is updated at the minimum interval (600 seconds). Attribute value is greater than the maximum acceptable value—Accounting is updated at the maximum interval (86,400 seconds). 	Unsigned32
87	NAS-Port-Id	Gx-Plus, JSRC, PTSP	Identifies the port of the NAS that authenticates the user. This is the same value as for RADIUS NAS-Port-Id attribute [87].	UTF8String
263	Session-ID	Gx-Plus, JSRC, PTSP	Specifies the subscriber session identifier. The router assigns the value to uniquely identify a subscriber session.	UTF8String

Table 6: Standard Diameter AVPs (*continued*)

Attribute Number	Diameter AVP	Application	Description	Type
268	Result-Code	Gx-Plus, JSRC, PTSP	<p>Indicates whether a request completed successfully. Provides an error code if the request failed.</p> <p>The following classes are recognized by Diameter:</p> <ul style="list-style-type: none"> • 1xxx—Informational • 2xxx—Success • 3xxx—Protocol errors • 4xxx—Transient errors • 5xxx—Permanent failures <p>Unrecognized classes, which begin with numerals 6–9 or 0, are handled as permanent failures.</p> <p>JSRC and PTSP support the following values; all non-success values are treated as permanent failures:</p> <ul style="list-style-type: none"> • 1001—DIAMETER MULTI ROUND AUTH • 2001—DIAMETER SUCCESS • 5002—DIAMETER UNKNOWN SESSION ID • 5012—DIAMETER UNABLE TO COMPLY <p>JSRC also supports the following value, which is treated as a permanent failure:</p> <ul style="list-style-type: none"> • 3004—DIAMETER TOO BUSY; this is a transient condition, typically when the router already has a request in process for a specified subscriber. <p>Gx-Plus supports the following values for errors in a PCRF response; when these values are received or the response is malformed or unrecognizable, the request is retried.</p> <ul style="list-style-type: none"> • 3001—DIAMETER COMMAND NOT SUPPORTED; the application is not running or the command is not recognized. • 3004—DIAMETER TOO BUSY; the received message is above either the quota of downstream transactions or the outstanding message memory limit for messages from the network. • 5012—DIAMETER UNABLE TO COMPLY; the received message is greater than the local limit. 	Unsigned32

Table 6: Standard Diameter AVPs (*continued*)

Attribute Number	Diameter AVP	Application	Description	Type
277	Auth-Session-State	JSRC, PTSP	Indicates whether AAA session state is maintained. <ul style="list-style-type: none"> 0—STATE MAINTAINED 1—NO STATE MAINTAINED 	Enumerated
295	Termination-Cause	JSRC, PTSP	Indicates the reason why a session was terminated on the access device. <ul style="list-style-type: none"> 1—DIAMETER LOGOUT 2—DIAMETER SERVICE NOT PROVIDED 3—DIAMETER BAD ANSWER 4—DIAMETER ADMINISTRATIVE 5—DIAMETER LINK BROKEN 6—DIAMETER AUTH EXPIRED 7—DIAMETER USER MOVED 8—DIAMETER SESSION TIMEOUT 	Enumerated
415	CC-Request-Number	Gx-Plus	Identifies a request within a session. The combination of Session-Id and CC-Request-Type is globally unique. The number is incremented for each request during the course of a session. The number is reset when a router high availability event takes place.	Unsigned32
416	CC-Request-Type	Gx-Plus	Specifies the type of credit control request: <ul style="list-style-type: none"> INITIAL REQUEST (1) UPDATE REQUEST (2) TERMINATION_REQUEST (3) EVENT REQUEST (4) 	Enumerated
431	Granted-Service-Unit	Gx-Plus	Contains the amount that can be provided of one or more of the following requested units specified by the client: CC-Input-Octets, CC-Output-Octets, CC-Time, or CC-Total-Octets. Included in CCA-I messages, and may be included in CCA-U messages.	Grouped
446	Used-Service-Unit	Gx-Plus	Contains the amount of the requested units that have been actually used; measured from 4 when the service is activated. The units are one or more of the following requested units specified by the client: CC-Input-Octets, CC-Output-Octets, CC-Time, or CC-Total-Octets. Included in CCR-U messages.	Grouped

Table 6: Standard Diameter AVPs (*continued*)

Attribute Number	Diameter AVP	Application	Description	Type
480	Accounting-Record-Type	JSRC, PTSP	<p>Specifies the type of account record for service accounting:</p> <ul style="list-style-type: none"> • INTERIM_RECORD—Accounting record sent between the start and stop records, at intervals specified by the Acct-Interim-Interval AVP (AVP code 85). It contains cumulative accounting data for the existing accounting session. • START_RECORD—Accounting record sent when the service is activated to initiate the accounting session. It contains accounting data relevant to the initiation of that session. • STOP_RECORD—Accounting record sent when the service is deactivated to terminate the accounting session. It contains cumulative data relevant to that session. 	Enumerated
1001	Charging-Rule-Install	Gx-Plus	Requests the installation of the rule (activation of the service) designated by the included Charging-Rule-Name AVP (1005). This AVP has a vendor ID of 10415 (3GPP).	Grouped
1002	Charging-Rule-Remove	Gx-Plus	Requests the removal of the rule (deactivation of the service) designated by the included Charging-Rule-Name AVP (1005). This AVP has a vendor ID of 10415 (3GPP).	Grouped
1005	Charging-Rule-Name	Gx-Plus	Name of a specific rule that has been installed, modified, or removed.	OctetString
1066	Monitoring-Key	Gx-Plus	Specifies which of the monitoring structures to use. Included in Charging-Rule-Install AVP (1001). The MX router does not support aggregation of statistics across services, so the value of this AVP must be different for each service. This AVP has a vendor ID of 10415 (3GPP).	OctetString
1067	Usage-Monitoring-Information	Gx-Plus	Sets monitoring thresholds. When service statistics match at least one of the granted service values, the router sends a CCR-U report with the current statistics to the PCRF. Includes the Monitoring-Key AVP (1066) and the Granted-Service-Unit AVP (431). This AVP has a vendor ID of 10415 (3GPP).	Grouped

Juniper Networks AVPs are used in addition to the standard Diameter AVPs. These AVPs have an enterprise number of 2636. [Table 7 on page 19](#) lists the Juniper Networks AVPs that the supported Diameter applications use.

Table 7: Juniper Networks Diameter AVPs

Attribute Number	Diameter AVP	Application	Description	Type
2004	Juniper-Service-Bundle	JSRC	Specifies the name of the service bundle.	OctetString
2010	Juniper-DHCP-Options	JSRC	Specifies the client's DHCP options.	OctetString
2011	Juniper-DHCP-GI-Address	JSRC	Specifies the DHCP relay agent's IP address.	OctetString
2020	Juniper-Policy-Install	JSRC, PTSP	Specifies policies to be activated for the subscriber. Includes Juniper-Policy-Name and Juniper-Policy-Definition	Grouped
2021	Juniper-Policy-Name	JSRC, PTSP	Defines the name of a policy decision.	OctetString
2022	Juniper-Policy-Definition	JSRC, PTSP	Defines a policy decision. Includes Juniper-Policy-Name, Juniper-Template-Name, and Juniper-Substitution.	Grouped
2023	Juniper-Template-Name	JSRC, PTSP	Profile name defined by the router. PTSP supports only the <code>__svc_rule__</code> policy template.	UTF8String
2024	Juniper-Substitution	JSRC, PTSP	Defines the substitution attributes. Includes Juniper-Substitution-Name and Juniper-Substitution-Value.	OctetString
2025	Juniper-Substitution-Name	JSRC, PTSP	Defines the name of the variable to be replaced.	OctetString
2026	Juniper-Substitution-Value	JSRC, PTSP	Defines the value of the variable to be replaced.	OctetString
2027	Juniper-Policy-Remove	JSRC, PTSP	Specifies policies to be deactivated for the subscriber. Includes Juniper-Policy-Name.	Grouped
2035	Juniper-Policy-Failed	JSRC, PTSP	Specifies the name of the policy activation or deactivation that failed.	OctetString
2038	Juniper-Policy-Success	JSRC, PTSP	Specifies the name of the policy activation or deactivation that succeeded.	OctetString
2046	Juniper-Logical-System	JSRC, PTSP	Specifies the logical system.	UTF8String
2047	Juniper-Routing-Instance	JSRC, PTSP	Specifies the routing instance.	UTF8String
2048	Juniper-Jsrc-Partition	JSRC, PTSP	Specifies the logical system and routing instance for the subscriber or request. Includes Juniper-Logical-System and Juniper-Routing-Instance	Grouped

Table 7: Juniper Networks Diameter AVPs (*continued*)

Attribute Number	Diameter AVP	Application	Description	Type
2050	Juniper-Request-Type	JSRC, PTSP	Describes the type of request: <ul style="list-style-type: none"> 1—ADDRESS_AUTHORIZATION 2—PROVISIONING_REQUEST 3—SYNCHRONIZATION 	Enumerated
2051	Juniper-Synchronization-Type	JSRC, PTSP	Describes the type of synchronization: <ul style="list-style-type: none"> 1—FULL-SYNC 2—FAST-SYNC 3—NO-STATE-TO-SYNC 	Enumerated
2052	Juniper-Synchronization	JSRC, PTSP	Describes the state of synchronization: <ul style="list-style-type: none"> 1—NO-SYNC; this is the default state 2—SYNC-IN-PROGRESS 3—SYNC-COMPLETE 	Enumerated
2053	Juniper-Acct-Record	JSRC, PTSP	Statistics data for each policy installed for this subscriber. Includes Juniper-Policy-Name.	Grouped
2054	Juniper-Acct-Collect	JSRC, PTSP	Specifies whether to collect accounting data for the installed policy (service) when included in the Juniper-Policy-Install AVP: <ul style="list-style-type: none"> 1—COLLECT_ACCT 2—NOT_COLLECT_ACCT 	Enumerated
2058	Juniper-State-ID	JSRC, PTSP	Specifies the value assigned to each synchronization cycle for the purpose of identifying which messages to discard. All solicited requests containing the same Juniper-State-ID belong to the same Session-Resource-Query (SRQ) synchronization cycle. Messages from a previous synchronization cycle are discarded. When a new cycle begins, the value of the Juniper-State-ID AVP is increased by 1. NOTE: For solicited synchronization requests, the SRQ message contains the incremented Juniper-State-ID value. For unsolicited synchronization requests, the Session-Resource-Reply (SRR) message contains the incremented Juniper-State-ID value.	Unsigned32
2100	Juniper-Virtual-Router	Gx-Plus, JSRC	Specifies the name of the virtual router associated with the session.	UTF8String

Table 7: Juniper Networks Diameter AVPs (*continued*)

Attribute Number	Diameter AVP	Application	Description	Type
2101	Juniper-Provisioning-Source	Gx-Plus	Specifies the provisioning source for the session in CCR-N and JSDA messages: <ul style="list-style-type: none"> 1—Local 2—Remote 	Enumerated
2102	Juniper-Provisioning-Descriptor	Gx-Plus	Defines the group used in JSDA messages that includes the session ID, and optionally Juniper-Provisioning-Source and subscriber data.	Grouped
2103	Juniper-Event-Type	Gx-Plus	Communicates the event type in JSER messages: <ul style="list-style-type: none"> 1—Cold boot; all sessions are lost 2—Warm boot; sessions are preserved 3—Discovery requested by the operator 4—<i>Are you there?</i> (AYT); application level ping sent when the notification is due to no response or an erroneous response from the PCRF, or due to a configuration change. 5—AWD; application-level watchdog sent by the router when there has been no other activity for 15 seconds. The watchdog is sent every 5 seconds unless preempted by higher-priority synchronization event. 	Enumerated
2104	Juniper-Discovery-Descriptor	Gx-Plus	Defines the group used in JSDR and JSDA messages that includes parameters of a discovery request: discovery type, request string, verbosity, max results.	Grouped
2105	Juniper-Discovery-Type	Gx-Plus	Specifies the discovery subcommand for JSDR and JSDA messages: <ul style="list-style-type: none"> 1—Exact: look up the data for the specified session. 2—Bulk: Provide get-bulk kinds of information after the specified string. 3—Done: Stop retries for all sessions up to the specified session. 	Enumerated

Table 7: Juniper Networks Diameter AVPs (*continued*)

Attribute Number	Diameter AVP	Application	Description	Type
2106	Juniper-Verbosity-Level	Gx-Plus	Specifies the verbosity level for JSDR and JSDA messages: <ul style="list-style-type: none"> 1—Summary; include only the Session-Id AVP. 2—Brief; include the Session-Id, Juniper-Virtual-Router, and Framed-IP-Address AVPs. 3—Detail; include the Session-Id, Juniper-Provisioning-Source, Juniper-Virtual-Router, Framed-IP-Address, and Event-Timestamp AVPs. 4—Extensive; include all available session information. 	Enumerated
2107	Juniper-String-A	Gx-Plus	Specifies a generic string that is interpreted according to the context.	UTF8String
2108	Juniper-String-B	Gx-Plus	Specifies a generic string that is interpreted according to the context.	UTF8String
2109	Juniper-String-C	Gx-Plus	Specifies a generic string that is interpreted according to the context.	UTF8String
2110	Juniper-Unsigned32-A	Gx-Plus	Specifies a generic, unsigned 32-bit integer that is interpreted according to the context.	Unsigned32
2111	Juniper-Unsigned32-B	Gx-Plus	Specifies a generic, unsigned 32-bit integer that is interpreted according to the context.	Unsigned32
2112	Juniper-Unsigned32-C	Gx-Plus	Specifies a generic, unsigned 32-bit integer that is interpreted according to the context.	Unsigned32

Telelec AVPs are used only for Gx-Plus. These AVPs have an enterprise number of 21274. [Table 8 on page 22](#) lists the Telelec AVPs. These four variables are used to provide substitution values for user-defined CoS service variables.

Table 8: Telelec Diameter AVPs

Attribute Number	Diameter AVP	Application	Description	Type
5555	Telelec-Charging-Rule-Argument-Name	Gx-Plus	Defines the name of the service variable to be replaced.	OctetString
5556	Telelec-Charging-Rule-Argument-Value	Gx-Plus	Defines the value of the service variable to be replaced.	OctetString

Table 8: Tekelec Diameter AVPs (*continued*)

Attribute Number	Diameter AVP	Application	Description	Type
5557	Tekelec-Charging-Rule-Argument	Gx-Plus	Defines the substitution attributes used to replace service variables. Includes Tekelec-Charging-Rule-Argument-Name AVP (5555) and Tekelec-Charging-Rule-Argument-Value AVP (5556).	Grouped
5558	Tekelec-Charging-Rule-With-Arguments	Gx-Plus	Requests the installation of the rule (activation of the service) designated by the included Charging-Rule-Name AVP (1005). Requested service variable substitutions are provided by the optionally included Tekelec-Charging-Rule-Argument AVP (5557).	Grouped

**Related
Documentation**

- *Understanding JSRC-SAE Interactions*
- *Understanding PTSP-SAE Interactions*
- [Understanding Gx-Plus Interactions Between the Router and the PCRF on page 5](#)
- *Diameter Base Protocol Overview*
- *Juniper Networks Session and Resource Control (SRC) and JSRC Overview*
- *Juniper Networks Session and Resource Control (SRC) and PTSP Overview*
- [Gx-Plus for Provisioning Subscribers Overview on page 3](#)

PART 2

Configuration

- [Configuration Overview on page 27](#)
- [Configuration Tasks for Gx-Plus on page 29](#)
- [Configuration Statements on page 33](#)

CHAPTER 2

Configuration Overview

- [Configuring Gx-Plus on page 27](#)

Configuring Gx-Plus

You can configure the Gx-Plus client application to work with a PCRF policy manager residing on a server. The PCRF is a centralized policy decision point that deploys business rules to allocate broadband network resources and manage subscribers and services. AAA on the router (acting as the PCEF) uses Gx-Plus to request service provisioning from the PCRF.



NOTE: Contact the Juniper Networks Technical Assistance Center (JTAC) for information on supported PCRFs.

To configure Gx-Plus:

1. Configure the Gx-Plus partition.
See [“Configuring the Gx-Plus Partition” on page 29](#).
2. Configure Gx-Plus global attributes: the number of outstanding requests permitted and the inclusion of IPv6 subscribers.
See [“Configuring Gx-Plus Global Attributes” on page 30](#).
3. Configure Gx-Plus provisioning for subscribers.
See [“Provisioning Subscribers with Gx-Plus” on page 31](#).
4. (Optional) Override PCRF control of a subscriber session to correct services or troubleshoot a problem.
See [“Disabling PCRF Control of a Subscriber Session” on page 75](#).
5. (Optional) Configure Gx-Plus event tracing as part of general authentication service tracing operations.
See [“Tracing General Authentication Service Processes” on page 77](#).

Related Documentation

- [Gx-Plus for Provisioning Subscribers Overview on page 3](#)

CHAPTER 3

Configuration Tasks for Gx-Plus

- [Configuring the Gx-Plus Partition on page 29](#)
- [Configuring Gx-Plus Global Attributes on page 30](#)
- [Provisioning Subscribers with Gx-Plus on page 31](#)

Configuring the Gx-Plus Partition

Gx-Plus works within a specific logical system: routing instance context, called a partition.



NOTE: Currently, only a single partition is supported; you must configure it within the default logical system: routing instance context.

Before you configure the Gx-Plus partition, perform the following task:

- Configure the Diameter instance at the **[edit diameter]** hierarchy level. See *Configuring Diameter*.

Configuration for the Gx-Plus partition consists of naming the partition and then associating a Diameter instance, the PCRF hostname, and the PCRF realm with the partition.

To configure the Gx-Plus partition:

1. Create the partition or specify the name of an existing partition.

```
[edit access gx-plus]
user@host# set partition partition-name
```

2. Specify the Diameter instance for the Gx-Plus partition.



NOTE: Currently, only the default Diameter instance, *master*, is supported.

```
[edit access gx-plus partition partition-name]
user@host# set diameter-instance instance-name
```

3. (Optional) Configure the destination host for the Gx-Plus partition.

```
[edit access gx-plus partition partition-name]
user@host# set destination-host hostname
```

4. Configure the destination realm for the Gx-Plus partition.

```
[edit access gx-plus partition partition-name]  
user@host# set destination-realm realm
```

The following example shows a Gx-Plus partition configuration.

```
gx-plus {  
  partition partition1 {  
    diameter-instance master;  
    destination-host pcrf1;  
    destination-realm generic.example.com;  
  }  
}
```

- Related Documentation**
- [Configuring Gx-Plus on page 27](#)
 - [Gx-Plus for Provisioning Subscribers Overview on page 3](#)

Configuring Gx-Plus Global Attributes

You can configure attributes that apply to all Gx-Plus partitions globally.

When a request from Gx-Plus to the PCRF is not answered or is improperly answered, Gx-Plus keeps retrying the request until it receives an appropriate answer. If the number of requests grows too large, the PCRF can become overloaded and messages can be lost. To reduce this risk, you can set a limit on the number of outstanding requests to the PCRF that Gx-Plus can retry.

By default, Gx-Plus does not include IPv6 subscribers in Gx-Plus provisioning requests to the PCRF. Instead, Gx-Plus only establishes sessions that correspond to IPv4 DHCP sessions on dual-stack IPv6/IPv4 or IPv4-only subscriber interfaces. You must explicitly configure Gx-Plus to include IPv6 information. When you do so, Gx-Plus can establish sessions that correspond to DHCPv6 sessions on IPv6-enabled subscriber interfaces and on dual-stack IPv6/IPv4-enabled interfaces.

To configure Gx-Plus global attributes:

1. (Optional) Set a limit on the number of outstanding requests.

```
[edit access gx-plus global]  
user@host# set max-outstanding-requests number
```

2. (Optional) Include IPv6 subscribers in provisioning requests.

```
[edit access gx-plus global]  
user@host# set include-ipv6
```

For example to limit the number of outstanding requests to 30 and to include IPv6 subscribers:

```
[edit access gx-plus global]  
user@host# set max-outstanding-requests 30  
user@host# set include-ipv6
```

- Related Documentation**
- [Configuring Gx-Plus on page 27](#)
 - [Gx-Plus for Provisioning Subscribers Overview on page 3](#)

Provisioning Subscribers with Gx-Plus

You can configure AAA to use Gx-Plus to request provisioning from a PCRF to instantiate services for an authenticated subscriber.

Before you configure Gx-Plus provisioning for subscribers, perform the following task:

- Create the subscriber access profile at the **[edit access profile]** hierarchy level. See *Configuring an Access Profile for Subscriber Management*.

To configure Gx-Plus provisioning:

- Specify **gx-plus** as the provisioning method in the profile.

```
[edit access profile profile-name]  
user@host# set provisioning-order gx-plus
```

- Related Documentation**
- [Configuring Gx-Plus on page 27](#)
 - [Gx-Plus for Provisioning Subscribers Overview on page 3](#)

CHAPTER 4

Configuration Statements

- [\[edit access gx-plus\] Hierarchy Level on page 33](#)
- [\[edit access profile\] Hierarchy Level on page 33](#)

[\[edit access gx-plus\] Hierarchy Level](#)

```
access {
  gx-plus {
    global {
      include-ipv6;
      max-outstanding-requests number;
    }
    partition partition-name {
      diameter-instance instance-name;
      destination-host hostname;
      destination-realm realm;
    }
  }
}
```

Related Documentation

- [Gx-Plus for Provisioning Subscribers Overview on page 3](#)
- [Configuring Gx-Plus on page 27](#)

[\[edit access profile\] Hierarchy Level](#)

```
access {
  profile profile-name {
    accounting {
      accounting-stop-on-access-deny;
      accounting-stop-on-failure;
      coa-immediate-update;
      coa-no-override service-class-attribute;
      duplication;
      immediate-update;
      order [ accounting-method ];
      statistics (time | volume-time);
      update-interval minutes;
      wait-for-acct-on-ack;
    }
    authentication-order [ authentication-methods ];
  }
}
```

```
authorization-order jsrc;
client client-name {
    ...
}
domain-name-server;
domain-name-server-inet;
domain-name-server-inet6;
provisioning-order (gx-plus | jsrc);
radius {
    accounting-server [ ip-address ];
    attributes {
        exclude {
            ...
        }
    }
    ignore {
        framed-ip-netmask;
        input-filter;
        logical-system-routing-instance;
        output-filter;
    }
}
authentication-server [ ip-address ];
options {
    accounting-session-id-format (decimal | description);
    calling-station-id-delimiter delimiter-character;
    calling-station-id-format {
        agent-circuit-id;
        agent-remote-id;
        interface-description;
        nas-identifier;
    }
    client-accounting-algorithm (detail | round-robin);
    client-authentication-algorithm(detail | round-robin);
    coa-dynamic-variable-validation;
    ethernet-port-type-virtual;
    interface-description-format {
        exclude-adapter;
        exclude-sub-interface;
    }
    nas-identifier identifier-value;
    nas-port-extended-format {
        adapter-width width;
        ae-width width;
        port-width width;
        slot-width width;
        stacked-vlan-width width;
        vlan-width width;
        atm {
            adapter-width width;
            port-width width;
            slot-width width;
            vci-width width;
            vpi-width width;
        }
    }
}
nas-port-id-delimiter delimiter-character;
```



```

    nas-port-id-format {
        agent-circuit-id;
        agent-remote-id;
        interface-description;
        nas-identifier;
    }
    nas-port-type {
        ethernet {
            port-type;
        }
    }
    revert-interval interval;
    vlan-nas-port-stacked-format;
}
}
radius-server server-address {
    accounting-port port-number;
    port port-number;
    retry attempts;
    routing-instance routing-instance-name;
    secret password;
    max-outstanding-requests value;
    source-address source-address;
    timeout seconds;
}
service {
    accounting-order (activation-protocol | radius);
}
session-options {
    client-idle-timeout minutes;
    client-session-timeout minutes;
}
}
}

```

Related Documentation

- [AAA Service Framework Overview](#)

destination-host (Gx-Plus)

Syntax	<code>destination-host <i>hostname</i>;</code>
Hierarchy Level	[edit access gx-plus partition <i>partition-name</i>]
Release Information	Statement introduced in Junos OS Release 11.2.
Description	Configure the host on which the PCRF application resides.
Options	<i>hostname</i> —Host on which the PCRF is installed.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring Gx-Plus on page 27• Configuring the Gx-Plus Partition on page 29

destination-realm (Gx-Plus)

Syntax	<code>destination-realm <i>realm</i>;</code>
Hierarchy Level	[edit access gx-plus partition <i>partition-name</i>]
Release Information	Statement introduced in Junos OS Release 11.2.
Description	Configure the realm in which the PCRF host resides.
Options	<i>realm</i> —Realm in which the PCRF host resides.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring Gx-Plus on page 27• Configuring the Gx-Plus Partition on page 29

diameter

```
Syntax diameter {
    network-element element-name {
        forwarding {
            route dne-route-name {
                destination realm realm-name <host hostname>;
                function function-name <partition partition-name>;
                metric route-metric;
            }
        }
        function function-name;
        peer peer-name {
            priority priority-number;
        }
    }
    origin {
        host hostname;
        realm realm-name;
    }
    peer peer-name {
        address ip-address;
        connect-actively {
            port port-number;
            transport transport-name;
        }
        logical-system logical-system-name <routing-instance routing-instance-name>;
        routing-instance routing-instance-name;
    }
    transport transport-name {
        address;
        logical-system logical-system-name <routing-instance routing-instance-name>;
        routing-instance routing-instance-name;
    }
}
```

Hierarchy Level [\[edit\]](#)

Release Information Statement introduced in Junos OS Release 9.6.

Description Configure the Diameter base protocol for subscriber management.

The remaining statements are explained separately.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- *Configuring Diameter*

diameter-instance (Gx-Plus)

Syntax	<code>diameter-instance <i>instance-name</i>;</code>
Hierarchy Level	[edit access gx-plus partition <i>partition-name</i>]
Release Information	Statement introduced in Junos OS Release 11.2.
Description	Specify the Diameter instance associated with the Gx-Plus partition.
Options	<i>instance-name</i> —Name of the Diameter instance. Currently, only master is supported.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring Gx-Plus on page 27• Configuring the Gx-Plus Partition on page 29

function (Diameter Network Element)

Syntax	<code>function <i>function-name</i>;</code>
Hierarchy Level	[edit diameter network-element <i>element-name</i>]
Release Information	Statement introduced in Junos OS Release 10.1. Support for PTSP introduced in Junos OS Release 10.2. Support for Gx-Plus introduced in Junos OS Release 11.2.
Description	Specify the application (function) associated with a Diameter network element.
Default	By default, all functions are associated with (supported by) the network element.
Options	<i>function-name</i> —Application (function) associated with the route. Gx-Plus, JSRC, and packet-triggered subscribers are the applications currently supported.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring Diameter• Configuring Diameter Network Elements

function (Diameter Route)

Syntax	<code>function <i>function-name</i> <partition <i>partition-name</i>>;</code>
Hierarchy Level	[edit diameter network-element <i>element-name</i> forwarding route <i>dne-route-name</i>]
Release Information	Statement introduced in Junos OS Release 9.6. Support for PTSP introduced in Junos OS Release 10.2. Support for Gx-Plus introduced in Junos OS Release 11.2.
Description	Specify the application (function) associated with a destination and metric. Together, these three elements define a route reachable through a Diameter network element.
Default	All functions are associated with the route.
Options	<i>function-name</i> —Application (function) associated with the route. Gx-Plus, JSRC, and packet-triggered-subscribers are the applications currently supported. <i>partition partition-name</i> —(Optional) Partition associated with the application (function).
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring Diameter • Configuring Diameter Network Elements

global (Gx-Plus)

Syntax	<pre>global { include-ipv6; max-outstanding-requests <i>number</i>; }</pre>
Hierarchy Level	[edit access gx-plus]
Release Information	Statement introduced in Junos OS Release 11.2.
Description	Configure global attributes for the Gx-Plus application. The remaining statements are explained separately.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring Gx-Plus on page 27

gx-plus (Gx-Plus)

Syntax	<pre>gx-plus { global { include-ipv6; max-outstanding-requests <i>number</i>; } partition <i>partition-name</i> { diameter-instance <i>instance-name</i>; destination-host <i>hostname</i>; destination-realm <i>realm</i>; } }</pre>
Hierarchy Level	[edit access]
Release Information	Statement introduced in Junos OS Release 11.2.
Description	<p>Configure the Gx-Plus application to interact with a PCRF to authorize and provision subscribers.</p> <p>The remaining statements are explained separately.</p>
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring Gx-Plus on page 27

include-ipv6 (Gx-Plus)

Syntax	<pre>include-ipv6;</pre>
Hierarchy Level	[edit access gx-plus global]
Release Information	Statement introduced in Junos OS Release 12.3.
Description	Include IPv6 subscribers in Gx-Plus provisioning requests.
Default	By default, IPv6 subscribers are not included.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring Gx-Plus Global Attributes on page 30• Configuring Gx-Plus on page 27

max-outstanding-requests (Gx-Plus)

Syntax	<code>max-outstanding-requests <i>number</i>;</code>
Hierarchy Level	[edit access <code>gx-plus</code> global]
Release Information	Statement introduced in Junos OS Release 11.2.
Description	Limit the number of outstanding requests to the PCRF that Gx-Plus can retry when the requests are improperly answered. Too many requests risks overloading the PCRF and increases the chance of losing messages.
Options	<p><i>number</i>—Number of outstanding requests from Gx-Plus to the PCRF that can exist at any time.</p> <p>Default: 40</p> <p>Range: 2 through 40</p>
Required Privilege Level	<p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring Gx-Plus Global Attributes on page 30 • Configuring Gx-Plus on page 27

partition (Gx-Plus)

Syntax	<pre>partition <i>partition-name</i> { diameter-instance <i>instance-name</i>; destination-host <i>hostname</i>; destination-realm <i>realm</i>; }</pre>
Hierarchy Level	[edit access <code>gx-plus</code>]
Release Information	Statement introduced in Junos OS Release 11.2.
Description	Configure a Gx-Plus partition.
Options	<p><i>partition-name</i>—Name of the Gx-Plus partition.</p> <p>The remaining statements are explained separately.</p>
Required Privilege Level	<p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring Gx-Plus on page 27 • Configuring the Gx-Plus Partition on page 29

provisioning-order

Syntax	provisioning-order (gx-plus jsrc);
Hierarchy Level	[edit access profile <i>profile-name</i>]
Release Information	Statement introduced in Junos OS Release 9.6. Support for Gx-Plus introduced in Junos OS Release 11.2.
Description	Configure AAA to use the specified application for subscriber service provisioning.
Options	<p>gx-plus—Specify Gx-Plus as the application used to communicate with a PCRF for subscriber service provisioning.</p> <p>jsrc—Specify JSRC as the application used to communicate with the SAE for subscriber service provisioning. JSRC is used in an SRC environment to request services from the SAE for an authenticated subscriber. JSRC attempts to activate these services. If successful, JSRC returns an ACK message. If unsuccessful, the subscriber is denied access.</p>
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• <i>Configuring JSRC</i>• <i>Provisioning Subscribers with JSRC</i>• Configuring Gx-Plus on page 27• Provisioning Subscribers with Gx-Plus on page 31

traceoptions (General Authentication Service)

Syntax	<pre> traceoptions { file <i>filename</i> <files <i>number</i>> <match <i>regular-expression</i> > <size <i>maximum-file-size</i>> <world-readable no-world-readable>; flag <i>flag</i>; no-remote-trace; } </pre>
Hierarchy Level	[edit system processes general-authentication-service]
Release Information	Statement introduced in Junos OS Release 9.0.
Description	Configure tracing options for the general authentication service.
Options	<p>file <i>filename</i>—Name of the file to receive the output of the tracing operation. All files are placed in the directory <code>/var/log</code>.</p> <p>files <i>number</i>—(Optional) Maximum number of trace files to create before overwriting the oldest one. If you specify a maximum number of files, you also must specify a maximum file size with the size option.</p> <p>Range: 2 through 1000</p> <p>Default: 3 files</p> <p>flag <i>flag</i>—Tracing operation to perform. To specify more than one tracing operation, include multiple flag statements. You can include the following flags:</p> <ul style="list-style-type: none"> • address-assignment—Trace address-assignment pool events • all—Trace all tracing operations • configuration—Trace configuration events • framework—Trace authentication framework events • gx-plus—Trace Gx-Plus events • jsrc—Trace JSRC events • ldap—Trace LDAP authentication events • local-authentication—Trace local authentication events • radius—Trace RADIUS authentication events • user-access—Trace user access events, such as login, logout, and authenticate. <p>match <i>regular-expression</i>—(Optional) Refine the output to include lines that contain the regular expression.</p> <p>no-remote-trace—Disable remote tracing.</p> <p>no-world-readable—(Optional) Disable unrestricted file access.</p>

size *maximum-file-size*—(Optional) Maximum size of each trace file. By default, the number entered is treated as bytes. Alternatively, you can include a suffix to the number to indicate kilobytes (KB), megabytes (MB), or gigabytes (GB). If you specify a maximum file size, you also must specify a maximum number of trace files with the **files** option.

Syntax: *sizek* to specify KB, *sizem* to specify MB, or *sizeg* to specify GB

Range: 10240 through 1073741824

Default: 128 KB

world-readable—(Optional) Enable unrestricted file access.

Required Privilege	trace—To view this statement in the configuration.
Level	trace-control—To add this statement to the configuration.

Related Documentation	<ul style="list-style-type: none">• Tracing General Authentication Service Processes on page 77
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PART 3

Administration

- [Monitoring the Gx-Plus Function and Diameter on page 47](#)
- [Monitoring Commands on page 49](#)

CHAPTER 5

Monitoring the Gx-Plus Function and Diameter

- [Verifying Diameter Node, Instance, and Route Information on page 47](#)
- [Verifying and Managing Diameter Function Information on page 48](#)

Verifying Diameter Node, Instance, and Route Information

Purpose View Diameter node information:

Action • To display summary information about all Diameter nodes:

`user@host> show diameter`

- To display summary information about all Diameter nodes and add information about Diameter functions, instances, network elements, and peers:

`user@host> show diameter brief`

- To display brief information about all Diameter nodes and add information about Diameter routes:

`user@host> show diameter detail`

- To display summary information about all Diameter instances:

`user@host> show diameter instance`

- To display detailed information about all Diameter instances:

`user@host> show diameter instance detail`

- To display information about a specific Diameter instance, add the instance name to the command:

`user@host> show diameter instance master`

`user@host> show diameter instance detail master`

- To display summary information about all Diameter routes:

`user@host> show diameter route`

- To display detailed information about all Diameter routes:

`user@host> show diameter route detail`

- To display information about a specific Diameter route, add the route name to the command:

```
user@host> show diameter route dne-route2
```

```
user@host> show diameter route detail dne-route2
```

**Related
Documentation**

- *Configuring Diameter*
- [Configuring Gx-Plus on page 27](#)
- *Junos OS Operational Mode Commands*

Verifying and Managing Diameter Function Information

Purpose View or clear Diameter function information:

Action

- To display summary information about all functions associated with Diameter:

```
user@host> show diameter function
```
- To display detailed information about all functions associated with Diameter:

```
user@host> show diameter function detail
```
- To display information about a specific function associated with Diameter, add the function name to the command:

```
user@host> show diameter function jsrsc
```

```
user@host> show diameter function detail ptsp
```
- To display summary statistics about all functions associated with Diameter:

```
user@host> show diameter function statistics
```
- To display detailed statistics about all functions associated with Diameter:

```
user@host> show diameter function statistics detail
```
- To display statistics about a specific function associated with Diameter, add the function name to the command:

```
user@host> show diameter function statistics gx-plus
```

```
user@host> show diameter function statistics detail jsrsc
```
- To delete current statistics for all functions associated with Diameter:

```
user@host>clear diameter function statistics
```
- To delete current statistics for a specific function associated with Diameter:

```
user@host>clear diameter function gx-plus statistics
```

**Related
Documentation**

- *Configuring Diameter*
- [Configuring Gx-Plus on page 27](#)
- *Junos OS Operational Mode Commands*

CHAPTER 6

Monitoring Commands

clear diameter function statistics

Syntax	clear diameter function < <i>function-name</i> > statistics
Release Information	Command introduced in Junos OS Release 9.6. Support for PTSP introduced in Junos OS Release 10.2. Support for Gx-Plus introduced in Junos OS Release 11.2.
Description	Clear current statistics accumulated for a specified function (application) or for all functions associated with the Diameter instance.
Options	<i>function-name</i> —(Optional) Clear statistics for the specified function. Currently, Gx-Plus, JSRC, and packet-triggered-subscribers are supported functions.
Required Privilege Level	clear
Related Documentation	<ul style="list-style-type: none">• Gx-Plus for Provisioning Subscribers Overview on page 3• <i>Juniper Networks Session and Resource Control (SRC) and JSRC Overview</i>• <i>PTSP Overview</i>• show diameter on page 53• show diameter function on page 59• show diameter function statistics on page 63
List of Sample Output	clear diameter function statistics on page 50
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

clear diameter function statistics

```
user@host> clear diameter function jsrc statistics
```


clear network-access gx-plus replay

Syntax	clear network-access gx-plus replay
Release Information	Command introduced in Junos OS Release 11.2.
Description	Clear pending Gx-Plus login and logout requests (replays). Sends JSER message to PCRF that includes the Juniper-Event-Type AVP (AVP code 2103) with a value of 3 indicating a discovery request. The PCRF returns a JDER message to initiate discovery of all subscribers. When this discovery completes, all pending subscriber requests are cleared.
Options	This command has no options.
Required Privilege Level	clear
Related Documentation	<ul style="list-style-type: none">• clear network-access gx-plus statistics on page 52• show network-access gx-plus on page 66
List of Sample Output	clear network-access gx-plus replay on page 51
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

clear network-access gx-plus replay

```
user@host> clear network-access gx-plus replay
```

clear network-access gx-plus statistics

Syntax	clear network-access gx-plus statistics
Release Information	Command introduced in Junos OS Release 11.2.
Description	Clear Gx-Plus statistics.
Options	This command has no options.
Required Privilege Level	clear
Related Documentation	<ul style="list-style-type: none">• show network-access gx-plus on page 66
List of Sample Output	clear network-access gx-plus statistics on page 52
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

clear network-access gx-plus statistics

```
user@host> clear network-access gx-plus statistics
```

show diameter

Syntax	show diameter <brief detail summary>
Release Information	Command introduced in Junos OS Release 9.6.
Description	Display information about the Diameter node.
Options	brief detail summary —(Optional) Display the specified level of output. The summary output is displayed by default and includes Diameter node status. The brief output adds summary information about functions, instances, network elements, and peers. The detail output adds summary information about routes.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • clear diameter function statistics on page 50 • <i>clear diameter peer</i> • show diameter function on page 59 • <i>show diameter instance</i> • <i>show diameter network-element</i> • <i>show diameter peer</i> • <i>show diameter route</i>
List of Sample Output	show diameter brief on page 56 show diameter detail on page 57 show diameter summary on page 57
Output Fields	Table 9 on page 53 lists the output fields for the show diameter command. Output fields are listed in the approximate order in which they appear.

Table 9: show diameter Output Fields

Field Name	Field Description	Level of Output
Diameter process id	ID number of the Diameter process.	All levels
Functions	Number of functions associated with Diameter.	All levels
Connected functions	Number of functions with active Diameter connections.	All levels
Instances	Number of configured Diameter instances.	All levels

Table 9: show diameter Output Fields (*continued*)

Field Name	Field Description	Level of Output
Network elements (NEs)	Number of configured Diameter network elements.	All levels
Connected NEs	Number of Diameter network elements with active connections.	All levels
Peers	Number of Diameter peer nodes.	All levels
Activated peers	Number of Diameter peers with active connections.	All levels
Open peers	Number of peers in the open state, without active network element connections but available for a connection.	All levels
Transports	Number of transports configured.	All levels
Requests queued for network transmit	Number of requests waiting to be sent to the Diameter peers.	All levels
Answers queued for network transmit	Number of replies waiting to be sent to the Diameter peers.	All levels
Expected answers from network	Number of replies expected to be received from the Diameter peers.	All levels
Requests queued for function transmit	Number of requests waiting to be sent to the functions associated with Diameter.	All levels
Answers queued for function transmit	Number of replies waiting to be sent to the functions associated with Diameter.	All levels
Expected answers from functions	Number of replies expected to be received from the functions associated with Diameter.	All levels
Memory used by network transmit queues	Amount of memory consumed by network transmit queues.	All levels
Memory used by function transmit queues	Amount of memory consumed by function transmit queues.	All levels
Origin-state-id	Value of the Origin-State-ID AVP.	All levels
Function	Name of the function for which information is displayed.	brief detail
State	State of the Diameter connection with the function: Connected or Disconnec (disconnected).	brief detail

Table 9: show diameter Output Fields (*continued*)

Field Name	Field Description	Level of Output
Upstream Transaction Utilization	Percent of upstream traffic used for this function.	brief detail
Downstream Transaction Utilization	Percent of downstream traffic used for this function.	brief detail
Net Queue Buffer Utilization	Percent of network transmission buffer used for this function.	brief detail
Func Queue Buffer Utilization	Percent of function transmission buffer used for this function.	brief detail
Routed Dests	Number of destinations that have this function associated with their routes.	brief detail
Name	Name of the Diameter instance.	brief detail
Origin-Realm	Value of Origin-Realm attribute-value pair (AVP).	brief detail
Origin Host	Value of Origin-Host AVP.	brief detail
NE-Total	Number of configured network elements.	brief detail
NE-Connected	Number of network elements with active Diameter connections.	brief detail
Name	Name of the Diameter network element.	brief detail
Instance	Name of the Diameter instance in which the network element is configured.	brief detail
State	State of the network element: <ul style="list-style-type: none"> • Connecting—None of the network element peers are in the open state and available for connection. • Selecting—One network element peer is connected and the network element is waiting for another peer to reach the open state so that it can be connected. • Partially-Connected—One network element peer is in the open state and connected. • Post-selection-delay—Three or more peers are in the open state and the network element is waiting to deactivate the peers in excess of two. • Fully-connected—Two network element peers are in the open state and connected. 	brief detail
Primary Peer	Primary peer for the network element, based on the configured peer priority.	brief detail
Secondary Peer	Secondary peer for the network element, based on the configured peer priority.	brief detail
Peer	Name of the peer.	brief detail

Table 9: show diameter Output Fields (*continued*)

Field Name	Field Description	Level of Output
Instance	Name of the Diameter instance in which the peer is configured.	brief detail
State	State of the peer: <ul style="list-style-type: none"> • Bad-Config—Misconfiguration. • Bad-Remote—Remote side does not conform to one of the decisions or is sending malformed messages. • Closed—Normal disconnect due to a request from the remote site or due to excessive watchdog timeouts. • Destructing—Peer to be deleted on the next timer tick. Until then, it performs no actions. • Disabled—Peer is administratively disabled. • Internal-error—Internal error has been detected and the peer is in the process of restarting. • No-Activation—Peer is not used by any Diameter network element. • Rejected—Connection was rejected by remote side of the connection. • Suspended—All other reasons to be suspended. 	brief detail
NE-Count	Number of network elements associated with the peer.	brief detail
Activated Count	Activation status of the peer: <ul style="list-style-type: none"> • 1—Peer is activated. • 0—Peer is not activated. 	brief detail
Primary Count	Status of the peer: primary (1) or secondary (0).	brief detail
Secondary Count	Status of the peer: secondary (0) or primary (1).	brief detail
Route	Name of the Diameter route.	detail
NE	Name of the Diameter network element in which the route is configured	detail
Instance	Name of the Diameter instance in which the route is configured.	detail
Valid	Determination of whether the route is valid: yes or no .	detail
Up	State of the route: yes for an active route, no for an inactive route.	detail

Sample Output

show diameter brief

```
user@host> show diameter brief
```

```
Diameter node:
  Diameter process id      :    1446
  Functions                 :      4
  Connected functions      :      2
```

```

Instances                               : 1
Network elements(NEs)                  : 1
Connected NEs                           : 0
Peers                                   : 2
Activated peers                         : 1
Open peers                             : 0
Transports                             : 1
Requests queued for network transmit   : 0
Answers queued for network transmit    : 0
Expected answers from network          : 0
Requests queued for function transmit  : 0
Answers queued for function transmit   : 0
Expected answers from functions        : 0
Memory used by network transmit queues : 0
Memory used by function transmit queues : 0
Origin-state-id                        : 0

```

Diameter function list:

Function	State	Upstream Transaction Utilization %	Downstream Transaction Utilization %	Net Queue Buffer Utilization %	Func Queue Buffer Utilization %	Routed Dests
charging-	Disconnec	0	0	0	0	0
gx-plus	Connected	0	0	0	0	1
jsrc	Connected	0	0	0	0	0
packet-tr	Disconnec	0	0	0	0	0

Diameter instances:

Name	Origin-Realm	Origin-Host	NE-Total	NE-Connected
master	orrr	ohhh	1	0

Diameter network-elements:

Name	Instance	State	Primary Peer	Secondary Peer
n0	master	Connecting	<NONE>	<NONE>

Diameter peer list:

Peer	Instance	State	NE-Count	Activated Count	Primary Count	Secondary Count
p0	master	Suspended	1	1	0	0
p100	master	No-Activation	0	0	0	0

show diameter detail

```
user@host> show diameter detail
```

```
...
```

Diameter routes:

Route	NE	Instance	Valid	Up
dne-route1	dne1	master	yes	no

show diameter summary

```
user@host> show diameter summary
```

Diameter node:

```

Diameter process id      : 1446
Functions                 : 4
Connected functions      : 2
Instances                 : 1
Network elements(NEs)    : 1
Connected NEs            : 0
Peers                     : 2

```

Activated peers	:	1
Open peers	:	0
Transports	:	1
Requests queued for network transmit	:	0
Answers queued for network transmit	:	0
Expected answers from network	:	0
Requests queued for function transmit	:	0
Answers queued for function transmit	:	0
Expected answers from functions	:	0
Memory used by network transmit queues	:	0
Memory used by function transmit queues	:	0
Origin-state-id	:	0

show diameter function

Syntax	show diameter function <brief detail summary> <function-name>
Release Information	Command introduced in Junos OS Release 9.6. Support for PTSP introduced in Junos OS Release 10.2. Support for Gx-Plus introduced in Junos OS Release 11.2.
Description	Display information about all functions associated with Diameter instances or only the specified function.
Options	<p>brief detail summary—(Optional) Display the specified level of output. The summary output is displayed by default and includes basic function information. The brief output displays the summary information in a different format. The detail output adds information to the brief output.</p> <p>function-name—(Optional) Display information for only the specified function. Currently, Gx-Plus, JSRC, and packet-triggered-subscribers are supported functions.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • clear diameter function statistics on page 50 • show diameter on page 53 • show diameter function statistics on page 63
List of Sample Output	show diameter function on page 61 show diameter function brief on page 61 show diameter function detail (JSRC) on page 61 show diameter function detail (Gx-Plus) on page 62
Output Fields	Table 10 on page 59 lists the output fields for the show diameter function command. Output fields are listed in the approximate order in which they appear.

Table 10: show diameter function Output Fields

Field Name	Field Description	Level of Output
Function name	Name of the function for which information is displayed.	All levels
State	State of the Diameter connection with the function.	All levels
Upstream transaction utilization	Percent of upstream traffic used for this function.	All levels

Table 10: show diameter function Output Fields (*continued*)

Field Name	Field Description	Level of Output
Downstream transaction utilization	Percent of downstream traffic used for this function.	All levels
Network transmit buffer utilization	Percent of network transmission buffer used for this function.	All levels
Function transmit buffer utilization	Percent of function transmission buffer used for this function.	All levels
Routed destinations	Number of destinations that have this function associated with their routes.	All levels
Requests queued for network tx	Number of requests waiting to be sent to the Diameter peers for this function.	detail
Pending answers from network	Number of replies expected from the Diameter peers for this function.	detail
Answers queued for function tx	Number of replies waiting to be sent to this function.	detail
Total upstream transactions pending	Total number of messages queued for this function.	detail
Upstream transactions limit	Total number of messages queued for this function.	detail
Requests queued for function tx	Number of requests waiting to be sent to this function.	detail
Pending answers from function	Number of replies expected to be received from this function.	detail
Answers queued for network tx	Number of replies waiting to be sent to this function.	detail
Total downstream transactions pending	Total number of messages queued for the Diameter peers.	detail
Downstream transactions limit	Maximum number of messages that can be queued for the Diameter peers.	detail
Buffers used by network tx queue	Number of buffers used by messages queued for the Diameter peers.	detail
Limit on network tx queue buffers	Maximum buffer capacity available for messages queued for the Diameter peers.	detail

Table 10: show diameter function Output Fields (*continued*)

Field Name	Field Description	Level of Output
Buffers used by function tx queue	Number of buffers used by messages queued for this function.	detail
Limit on function tx queue buffers	Maximum buffer capacity available for messages queued for this function.	detail
Origin-state-id	Value of the Origin-State-ID AVP.	detail

Sample Output

show diameter function

```
user@host> show diameter function
```

```
Diameter function list:
```

Function	State	Upstream Transaction Utilization %	Downstream Transaction Utilization %	Net Queue Buffer Utilization %	Func Queue Buffer Utilization %	Routed Dests
jsrc	Disconnect	0	0	0	0	0

show diameter function brief

```
user@host> show diameter function brief
```

```
Diameter function:
```

```
Function name           : gx-plus
State                   : Connected
Upstream transaction utilization : 0 %
Downstream transaction utilization : 0 %
Network transmit buffer utilization : 0 %
Function transmit buffer utilization : 0 %
Routed destinations     : 1

Function name           : jsrc
State                   : Disconnected
Upstream transaction utilization : 0 %
Downstream transaction utilization : 0 %
Network transmit buffer utilization : 0 %
Function transmit buffer utilization : 0 %
Routed destinations     : 0
```

show diameter function detail (JSRC)

```
user@host> show diameter function detail
```

```
Diameter function:
```

```
Function name           : jsrc
State                   : Disconnected
Upstream transaction utilization : 0 %
Downstream transaction utilization : 0 %
Network transmit buffer utilization : 0 %
```

```
Function transmit buffer utilization : 0 %
Routed destinations                 : 0
Requests queued for network tx      : 0
Pending answers from network        : 0
Answers queued for function tx       : 0
Total upstream transactions pending  : 0
Upstream transactions limit          : 1024
Requests queued for function tx      : 0
Pending answers from function        : 0
Answers queued for network tx        : 0
Total downstream transactions pending : 0
Downstream transactions limit        : 1024
Buffers used by network tx queue     : 0
Limit on network tx queue buffers    : 10485760
Buffers used by function tx queue     : 0
Limit on function tx queue buffers    : 10485760
```

show diameter function detail (Gx-Plus)

```
user@host> show diameter function gx-plus detail
```

```
Diameter function:
Function name           : gx-plus
State                   : Connected
Upstream transaction utilization : 0 %
Downstream transaction utilization : 0 %
Network transmit buffer utilization : 0 %
Function transmit buffer utilization : 0 %
Routed destinations     : 1
Requests queued for network tx : 0
Pending answers from network : 0
Answers queued for function tx : 0
Total upstream transactions pending : 0
Upstream transactions limit : 1024
Requests queued for function tx : 0
Pending answers from function : 0
Answers queued for network tx : 0
Total downstream transactions pending : 0
Downstream transactions limit : 1024
Buffers used by network tx queue : 0
Limit on network tx queue buffers : 10485760
Buffers used by function tx queue : 0
Limit on function tx queue buffers : 10485760
Origin-state-id         : 0
```

show diameter function statistics

Syntax	show diameter function statistics <brief detail summary> <function-name>
Release Information	Command introduced in Junos OS Release 9.6. Support for PTSP introduced in Junos OS Release 10.2. Support for Gx-Plus introduced in Junos OS Release 11.2.
Description	Display statistics about all functions associated with Diameter instances or only the specified function.
Options	<p>brief detail summary—(Optional) Display the specified level of output. The summary output is displayed by default and includes basic function statistics. The brief output displays the summary information in a different format and adds numbers accumulated since the Diameter node was started. The detail output adds information to the brief output.</p> <p>function-name—(Optional) Display information for only the specified function. Currently, Gx-Plus, JSRC, and packet-triggered-subscribers are supported functions. When you specify a function, the brief output is displayed by default, even when you explicitly specify summary.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • clear diameter function statistics on page 50 • show diameter on page 53 • show diameter function on page 59
List of Sample Output	show diameter function statistics on page 65 show diameter function statistics brief on page 65 show diameter function statistics detail on page 65
Output Fields	Table 11 on page 63 lists the output fields for the show diameter function statistics command. Output fields are listed in the approximate order in which they appear.

Table 11: show diameter function statistics Output Fields

Field Name	Field Description	Level of Output
Function	Name of the function for which information is displayed.	All levels
Delivered Requests	Number of requests delivered by Diameter to the application.	All levels
Delivered Answers	Number of answers delivered by Diameter to the application.	All levels
Delivered Messages	Total number of messages delivered by Diameter to the application.	All levels

Table 11: show diameter function statistics Output Fields (*continued*)

Field Name	Field Description	Level of Output
Forwarded Requests	Number of requests sent by Diameter to the network.	All levels
Forwarded Answers	Number of answers sent by Diameter to the network.	All levels
Forwarded Messages	Number of messages sent by Diameter to the network.	All levels
Function name	Name of the function for which information is displayed.	All levels
Over-limit network requests	Number of requests sent to Diameter peers that exceeded the limit on the network transmit queue.	detail
Over-limit network answers	Number of answers sent to Diameter peers that exceeded the limit on the network transmit queue.	detail
Over-limit network messages	Total number of messages sent to Diameter peers that exceeded the limit on the network transmit queue.	detail
Failed to deliver requests	Number of requests sent by Diameter to its application that were not successfully delivered.	detail
Failed to deliver answers	Number of answers sent by Diameter to its application that were not successfully delivered.	detail
Failed to deliver messages	Total number of messages sent by Diameter to its application that were not successfully delivered.	detail
Over-limit function requests	Number of requests sent to Diameter peers that exceeded the limit on the function transmit queue.	detail
Over-limit function answers	Number of answers sent to Diameter peers that exceeded the limit on the function transmit queue.	detail
Over-limit function messages	Total number of messages sent to Diameter peers that exceeded the limit on the function transmit queue.	detail
Failed to forward requests	Number of requests that were not successfully sent by Diameter to the network.	detail
Failed to forward answers	Number of answers that were not successfully sent by Diameter to the network.	detail
Failed to forward messages	Total number of messages that were not successfully sent by Diameter to the network.	detail

Sample Output

show diameter function statistics

```
user@host> show diameter function statistics
Diameter function statistics:
      Delivered Delivered Delivered Forwarded Forwarded Forwarded
Function Requests  Answers  Messages Requests  Answers  Messages
jsrc           0          0          0          0          0          0
```

show diameter function statistics brief

```
user@host> show diameter function statistics brief
Diameter function statistics:
Function name           : jsrc

Delivered requests      :          0          0
Delivered answers       :          0          0
Delivered messages      :          0          0
Forwarded requests      :          0          0
Forwarded answers       :          0          0
Forwarded messages      :          0          0
```

show diameter function statistics detail

```
user@host> show diameter function statistics detail
Diameter function statistics:
Function name           : jsrc

Delivered requests      :          0          0
Delivered answers       :          0          0
Delivered messages      :          0          0
Forwarded requests      :          0          0
Forwarded answers       :          0          0
Forwarded messages      :          0          0
Over-limit network requests :          0          0
Over-limit network answers :          0          0
Over-limit network messages :          0          0
Failed to deliver requests :          0          0
Failed to deliver answers  :          0          0
Failed to deliver messages :          0          0
Over-limit function requests :          0          0
Over-limit function answers :          0          0
Over-limit function messages :          0          0
Failed to forward requests :          0          0
Failed to forward answers  :          0          0
Failed to forward messages :          0          0
```

show network-access gx-plus

Syntax	show network-access gx-plus <state statistics sync-state>
Release Information	Command introduced in Junos OS Release 11.2.
Description	Display Gx-Plus provisioning state, synchronization state, and statistics information.
Options	state —(Optional) Display Gx-Plus provisioning state. statistics —(Optional) Display Gx-Plus statistics. sync-state —(Optional) Display Gx-Plus synchronization state.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • clear network-access gx-plus replay on page 51 • clear network-access gx-plus statistics on page 52
List of Sample Output	show network-access gx-plus state on page 67 show network-access gx-plus statistics on page 67 show network-access gx-plus sync-state on page 67
Output Fields	Table 12 on page 66 lists the output fields for the show network-access gx-plus command. Output fields are listed in the approximate order in which they appear.

Table 12: show network-access gx-plus Output Fields

Field Name	Field Description
Gx-plus state	State of the Gx-Plus application, including the following: <ul style="list-style-type: none"> • Engine created • Partition configured • Configuration active • Diameter interface configured • Total number of entries—Number of provisioned, pending, and terminating subscribers. • Number of pending entries—Number of pending subscribers. • Number of pending logouts—Number of subscribers logging out.
Sync-Event	Type of synchronization event.
Timeout	Number of times notification sent without response.
Gx-plus general counters	Number and state of general events.
Gx-plus sync-event counters	Number and state of synchronization events.

Sample Output

show network-access gx-plus state

```
user@host> show network-access gx-plus state
Gx-plus state:
  Engine created           : yes
  Partition configured    : yes
  Configuration active     : yes
  Diameter interface configured : yes
  Total number of entries  : 0
  Number of pending entries : 0
  Number of pending logouts : 0
```

show network-access gx-plus statistics

```
user@host> show network-access gx-plus statistics
Gx-plus general counters:
  Counter                                     Value
  engine created                             1
  initial config: active                     1
  recovery: process restart                  1
  diameter-app initial config: success       1

Gx-plus sync-event counters:
  Category      Counter      Value
  warm-boot     activated    1

  warm-boot     posted       1

  warm-boot     response     1

  awd           posted       12

  awd           response     12
```

show network-access gx-plus sync-state

```
user@host> show network-access gx-plus sync-state
Gx-plus sync-events:
  Sync-Event      Timeout
  cold-boot       6100
```

show network-access aaa subscribers session-id

Syntax	show network-access aaa subscribers session-id session-id <brief detail>
Release Information	Command introduced in Junos OS Release 10.0.
Description	Display information about the specified subscriber session.
Options	session-id —ID of the subscriber session. brief detail —(Optional) Display the specified level of information.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • <i>Verifying and Managing Subscriber AAA Information</i> • <i>Activating and Deactivating Subscriber Services Locally with the CLI</i>
List of Sample Output	show network-access aaa subscribers session-id brief on page 70 show network-access aaa subscribers session-id detail on page 70
Output Fields	Table 13 on page 68 lists the output fields for the show network-access aaa subscribers session-id command. Output fields are listed in the approximate order in which they appear.

Table 13: show network-access aaa subscribers session-id Output Fields

Field Name	Field Description	Level of Output
Type and Client type	Type of client.	All levels
Accounting	Status of accounting, and type of accounting if accounting is on.	brief
Service type	Type of accounting: volume , time , volume+time , or na .	brief
Quota	Quota for service: volume (in Mbps) or time (seconds).	brief
Username	Name of the user logged in to the session.	detail
Stripped username	Username after the domain has been removed.	detail
Logical system/Routing instance and AAA Logical system/Routing instance	Name of the routing instance, logical system name, or both used for the session.	All levels

Table 13: show network-access aaa subscribers session-id Output Fields (continued)

Field Name	Field Description	Level of Output
Target Logical system/Routing instance	Logical system/routing instance to which the session is mapped.	detail
Access-profile	Access profile used for AAA services for the session.	detail
Session ID	ID of the subscriber session. The session ID value displayed under Service name is the service session ID.	detail
Accounting Session ID	ID of the accounting session (RADIUS attribute 44). The ID appears in decimal or description format, as specified by the accounting-session-id-format statement.	detail
Multi Accounting Session ID	Bundle ID for MLPPP sessions. Acct-Multi-Session-Id (RADIUS attribute 50) uses the value of the session database bundle session ID to enable RADIUS to link together multiple related sessions. The value of this field is zero when no MLPPP sessions exist.	detail
IP Address	IP address of the subscriber.	detail
Authentication State	State of the subscriber authentication session: AuthInit, AuthStart, AuthChallenge, AuthRedirect, AuthClntRespWait, AuthAcctVolStatsAckWait, AuthAcctStopAckWait, AuthServCreateRespWait, AuthLogoutStart, AuthStateActive, AuthClntLogoutRespWait, AuthProfileUpdateWait, AuthProvisionRespWait, AuthProvisionServiceCreationWait	detail
Gx-Plus Provisioning State	State of Gx-Plus provisioning: <ul style="list-style-type: none"> • ignored—Subscriber has no IPv4 address or NAS-Port-ID. • in-progress—Provisioning is in progress. • logout—Subscriber logout is in progress. • logout-done—Logout response has been received. • response-received—Provisioning response has been received. 	detail
Accounting State	State of the subscriber accounting session: Acc-Init, Acc-Start-Sent, Imm-Update-Stats-Pending, Acc-Interim-Sent, Acc-Stop-Stats-Pending, Acc-Stop-Sent, Acc-Stop-On-Fail-Deny-Sent, Acc-Stop-Ackd	detail

Table 13: show network-access aaa subscribers session-id Output Fields (*continued*)

Field Name	Field Description	Level of Output
Provisioning-type	Provisioning type for this session: <ul style="list-style-type: none"> gx-plus—Subscriber service uses Gx-Plus provisioning. jsrc—Subscriber service uses JSRC provisioning. none—Provisioning is not enabled. 	detail
Service name	Name of the attached service or policy. <ul style="list-style-type: none"> For JSRC-activated policies—displays the policy name. 	All levels
Service State	State of the service provided in the subscriber session.	detail
Session uptime	How long the session has been up, in <i>HH:MM:SS</i> .	All levels
Accounting status	Status of the accounting configuration for the service, on or off , and the type of accounting, time or volume+time . Configured in RADIUS Service-Statistics VSA [26-69].	detail
Service accounting session ID	ID of the service accounting session; RADIUS Acct-Session-Id attribute (44). The ID appears in decimal or description format, as specified by the accounting-session-id-format statement.	detail
Service accounting state	State of the service accounting session: Acc-Init , Acc-Start-Sent , Imm-Update-Stats-Pending , Acc-Interim-Sent , Acc-Stop-Stats-Pending , Acc-Stop-Sent , Acc-Stop-On-Fail-Deny-Sent , Acc-Stop-Ackd	detail
Accounting interim interval	Amount of time between interim accounting updates for this service, in seconds; RADIUS Service-Interim-Acct-Interval VSA [26-140] or Diameter Acct-Interim-Interval AVP (85).	detail

Sample Output

show network-access aaa subscribers session-id brief

```

user@host> show network-access aaa subscribers session-id 6 brief
Logical system/Routing instance  Client type  Session uptime  Accounting
default:default                  dhcp      00:01:29       on/time
Service name                     Service type  Quota           Accounting
filter-service                   -na-         -na-            off
1337994190863204450             -na-         -na-            off

```

show network-access aaa subscribers session-id detail

```

user@host> show network-access aaa subscribers session-id 5 detail

```

Type: dhcp
Username: larry@isp5.net
Stripped username: larry
AAA Logical system/Routing instance: default:default
Target Logical system/Routing instance: default:retail-onlinecompany-ca
Access-profile:retailer-onlinecompany-sjc
Session ID: 5
Accounting Session ID: jnpr ge-1/0/0.101:1
Multi Accounting Session ID: 0
IP Address: 192.168.44.104
Authentication State: AuthStateActive
Gx-Plus Provisioning State: response-received
Accounting State: Acc-Interim-Sent
Provisioning-type: jsrsc
Service name: filter-service-1
Service State: SvcActive
Session ID: 7
Session uptime: 00:01:33
Service name: 1337994190863204450
Service State: SvcActive
Session ID: 8
Session uptime: 00:01:33
Accounting status: on/volume+time
Service accounting session ID: 1:2-1322506006
Service accounting state: Acc-Interim-Sent
Accounting interim interval: 600

PART 4

Troubleshooting

- [Overriding PCRF Session Control to Troubleshoot a Session or Services on page 75](#)
- [Acquiring Troubleshooting Information on page 77](#)
- [Troubleshooting Command on page 85](#)
- [Troubleshooting Configuration Statement on page 87](#)

CHAPTER 7

Overriding PCRF Session Control to Troubleshoot a Session or Services

- [Disabling PCRF Control of a Subscriber Session on page 75](#)

Disabling PCRF Control of a Subscriber Session

When a subscriber has been provisioned with Gx-Plus, services for that subscriber can be activated and deactivated only by the PCRF. Accordingly, AAA rejects any RADIUS CoA requests for subscribers provisioned by Gx-Plus. Similarly, CLI-based service activation and deactivation do not work while a subscriber is remotely provisioned.

Network administrators without PCRF access or authority may need to override PCRF control on a particular subscriber session to troubleshoot the session or correct the subscriber services. You can disable PCRF control by issuing the **request network-access aaa subscriber set session-id** command. In response, the router sends a termination notice to the PCRF, but does not actually log out the subscriber.

When you have confirmed that provisioning is disabled, you can then activate or deactivate subscriber services for that session with the **request network-access aaa subscriber add session-id** and **request network-access aaa subscriber delete session-id** commands, respectively. These commands fail if provisioning is still enabled.

Another consequence of disabling provisioning for a subscriber session is that RADIUS change of authorization (CoA) messages can modify the session.

Before you begin, determine or verify the ID for the session by displaying the session IDs of all current subscribers with the **show subscribers detail** or **show network-access aaa subscribers** command.

To disable control by the PCRF over a subscriber session:

1. Disable provisioning for the specified subscriber session ID.

```
user@host> request network-access aaa subscriber set session-id subscriber-session-id  
provisioning-state none
```

2. (Optional) Verify that provisioning is disabled for the session.

```
user@host> show network-access aaa subscribers session-id subscriber-session-id  
detail
```

For example, to disable provisioning for subscriber larry:

```
user@host> show network-access aaa subscribers
Username      Logical system/Routing instance  Client type  Session-ID
...
larry         default:default                  dhcp         55
...

user@host> request network-access aaa subscriber set session-id 55 provisioning-state none
user@host> show network-access aaa subscribers session-id 55 detail
Type: dhcp
Username: larry@isp5.net
Stripped username: larry
AAA Logical system/Routing instance: default:default
Target Logical system/Routing instance: default:retail-onlinecompany-ca
Access-profile:retailer-onlinecompany-sjc
Session ID: 55
Accounting Session ID: 55
Multi Accounting Session ID: 0
IP Address: 192.168.44.104
Authentication State: AuthStateActive
Accounting State: Acc-Start-Send
Provisioning-type: none
Service name: basic-service
Service State: SvcActive
Session ID: 56
Session uptime: 00:01:45
```

Related Documentation

- *Activating and Deactivating Subscriber Services Locally with the CLI*

CHAPTER 8

Acquiring Troubleshooting Information

- [Tracing General Authentication Service Processes on page 77](#)
- [Configuring the General Authentication Service Processes Trace Log Filename on page 80](#)
- [Configuring the Number and Size of General Authentication Service Processes Log Files on page 80](#)
- [Configuring Access to the Log File on page 81](#)
- [Configuring a Regular Expression for Lines to Be Logged on page 81](#)
- [Configuring the Trace Operation on page 82](#)
- [Collecting Subscriber Access Logs Before Contacting Juniper Technical Support on page 82](#)

Tracing General Authentication Service Processes

The Junos OS trace operations feature tracks general authentication service operations and records events in a log file. By default, the tracing operation is inactive. To trace general authentication service processes, you specify flags in the **traceoptions** statement at the **[edit system processes general-authentication-service]** hierarchy level. The default tracing behavior is the following:

- Important events are logged in a file located in the **/var/log** directory. By default, the router uses the filename, **authd**. You can specify a different filename, but you cannot change the directory (**/var/log**) in which trace files are located.
- When the trace log file **filename** reaches 128 kilobytes (KB), it is compressed and renamed **filename.0.gz**. Subsequent events are logged in a new file called **filename**, until it reaches capacity again. At this point, **filename.0.gz** is renamed **filename.1.gz** and **filename** is compressed and renamed **filename.0.gz**. This process repeats until the number of archived files reaches the maximum file number. Then the oldest trace file—the one with the highest number—is overwritten.

You can optionally specify the number of trace files to be from 2 through 1000. You can also configure the maximum file size to be from 10 KB through 1 gigabyte (GB). For more information about how log files are created, see the *Junos OS System Log Messages Reference*.

- By default, only the user who configures the tracing operation can access log files. You can optionally configure read-only access for all users.

The general authentication service tracing operations are described in the following sections:

- [Configuring the General Authentication Service Processes Trace Log Filename on page 78](#)
- [Configuring the Number and Size of General Authentication Service Processes Log Files on page 78](#)
- [Configuring Access to the Log File on page 79](#)
- [Configuring a Regular Expression for Lines to Be Logged on page 79](#)
- [Configuring the Trace Operation on page 79](#)

Configuring the General Authentication Service Processes Trace Log Filename

By default, the name of the file that records trace output for general authentication service is **authd**. You can specify a different name by including the **file** statement at the **[edit system processes general-authentication-service]** hierarchy level:

To configure the filename for general authentication service tracing operations:

- Specify the name of the file used for the trace output.

```
[edit system processes general-authentication-service traceoptions]  
user@host# set file aap_logfile_1
```

Configuring the Number and Size of General Authentication Service Processes Log Files

You can optionally specify the number of compressed, archived trace log files to be from 2 through 1000. You can also configure the maximum file size to be from 10 KB through 1 gigabyte (GB); the default size is 128 kilobytes (KB).

The archived files are differentiated by a suffix in the format **.number.gz**. The newest archived file is **.0.gz** and the oldest archived file is **.(maximum number)-1.gz**. When the current trace log file reaches the maximum size, it is compressed and renamed, and any existing archived files are renamed. This process repeats until the maximum number of archived files is reached, at which point the oldest file is overwritten.

For example, you can set the maximum file size to 2 MB, and the maximum number of files to 20. When the file that receives the output of the tracing operation, **filename**, reaches 2 MB, **filename** is compressed and renamed **filename.0.gz**, and a new file called **filename** is created. When the new **filename** reaches 2 MB, **filename.0.gz** is renamed **filename.1.gz** and **filename** is compressed and renamed **filename.0.gz**. This process repeats until there are 20 trace files. Then the oldest file, **filename.19.gz**, is simply overwritten when the next oldest file, **filename.18.gz** is compressed and renamed to **filename.19.gz**.

To configure the number and size of trace files:

- Specify the name, number, and size of the file used for the trace output, by including the **files** and **size** options with the **traceoptions** statement.

```
[edit system processes general-authentication-service traceoptions]
user@host# set file aap_logfile_1 files 20 size 2097152
```

Configuring Access to the Log File

By default, log files can be accessed only by the user who configures the tracing operation. You can allow all users to read the log file and you can explicitly set the default behavior of the log file.

To specify that all users can read the log file:

- Configure the log file to be world-readable.

```
[edit system processes general-authentication-service traceoptions]
user@host# set file aap_logfile_1 world-readable
```

To explicitly set the default behavior, in which the log file can only be read by the user who configured tracing:

- Configure the log file to be no-world-readable.

```
[edit system processes general-authentication-service traceoptions]
user@host# set file aap_logfile_1 no-world-readable
```

Configuring a Regular Expression for Lines to Be Logged

By default, the trace operation output includes all lines relevant to the logged events. You can refine the output by including regular expressions (regex) that will be matched.

To configure regular expressions to match:

- Configure the regular expression.

```
[edit system processes general-authentication-service traceoptions]
user@host# set file aap_logfile_1 match regular-expression
```

Configuring the Trace Operation

By default, only important events are logged. You can specify which trace operations are logged by including specific tracing flags. The following table describes the flags that you can include.

Flag	Description
address-assignment	Trace all address-assignment pool events
all	Trace all tracing operations
configuration	Trace configuration events
framework	Trace authentication framework events
gx-plus	Trace Gx-Plus events

Flag	Description
jsrc	Trace JSRC events
ldap	Trace LDAP authentication events
local-authentication	Trace local authentication events
radius	Trace RADIUS authentication events
user-access	Trace user access events, such as login, logout, and authenticate

To configure the flags for the event to be logged:

- Configure the flags.

```
[edit system processes general-authentication-service traceoptions]
user@host# set flag address-assignment
```

Configuring the General Authentication Service Processes Trace Log Filename

By default, the name of the file that records trace output for general authentication service is **authd**. You can specify a different name by including the **file** statement at the **[edit system processes general-authentication-service]** hierarchy level:

To configure the filename for general authentication service tracing operations:

- Specify the name of the file used for the trace output.

```
[edit system processes general-authentication-service traceoptions]
user@host# set file aap_logfile_1
```

Related Documentation

- [Tracing General Authentication Service Processes on page 77](#)
- [Configuring Address-Assignment Pools](#)

Configuring the Number and Size of General Authentication Service Processes Log Files

You can optionally specify the number of compressed, archived trace log files to be from 2 through 1000. You can also configure the maximum file size to be from 10 KB through 1 gigabyte (GB); the default size is 128 kilobytes (KB).

The archived files are differentiated by a suffix in the format **.number.gz**. The newest archived file is **.0.gz** and the oldest archived file is **.(maximum number)-1.gz**. When the current trace log file reaches the maximum size, it is compressed and renamed, and any existing archived files are renamed. This process repeats until the maximum number of archived files is reached, at which point the oldest file is overwritten.

For example, you can set the maximum file size to 2 MB, and the maximum number of files to 20. When the file that receives the output of the tracing operation, *filename*, reaches 2 MB, *filename* is compressed and renamed *filename.0.gz*, and a new file called *filename* is created. When the new *filename* reaches 2 MB, *filename.0.gz* is renamed *filename.1.gz* and *filename* is compressed and renamed *filename.0.gz*. This process repeats until there are 20 trace files. Then the oldest file, *filename.19.gz*, is simply overwritten when the next oldest file, *filename.18.gz* is compressed and renamed to *filename.19.gz*.

To configure the number and size of trace files:

- Specify the name, number, and size of the file used for the trace output, by including the **files** and **size** options with the **traceoptions** statement.

```
[edit system processes general-authentication-service traceoptions]
user@host# set file aap_logfile_1 files 20 size 2097152
```

Related Documentation

- [Tracing General Authentication Service Processes on page 77](#)

Configuring Access to the Log File

By default, log files can be accessed only by the user who configures the tracing operation. You can allow all users to read the log file and you can explicitly set the default behavior of the log file.

To specify that all users can read the log file:

- Configure the log file to be world-readable.

```
[edit system processes general-authentication-service traceoptions]
user@host# set file aap_logfile_1 world-readable
```

To explicitly set the default behavior, in which the log file can only be read by the user who configured tracing:

- Configure the log file to be no-world-readable.

```
[edit system processes general-authentication-service traceoptions]
user@host# set file aap_logfile_1 no-world-readable
```

Related Documentation

- [Tracing General Authentication Service Processes on page 77](#)

Configuring a Regular Expression for Lines to Be Logged

By default, the trace operation output includes all lines relevant to the logged events. You can refine the output by including regular expressions (regex) that will be matched.

To configure regular expressions to match:

- Configure the regular expression.

```
[edit system processes general-authentication-service traceoptions]
user@host# set file aap_logfile_1 match regular-expression
```

- Related Documentation**
- [Tracing General Authentication Service Processes on page 77](#)

Configuring the Trace Operation

By default, only important events are logged. You can specify which trace operations are logged by including specific tracing flags. The following table describes the flags that you can include.

Flag	Description
address-assignment	Trace all address-assignment pool events
all	Trace all tracing operations
configuration	Trace configuration events
framework	Trace authentication framework events
gx-plus	Trace Gx-Plus events
jsrc	Trace JSRC events
ldap	Trace LDAP authentication events
local-authentication	Trace local authentication events
radius	Trace RADIUS authentication events
user-access	Trace user access events, such as login, logout, and authenticate

To configure the flags for the event to be logged:

- Configure the flags.

```
[edit system processes general-authentication-service traceoptions]
user@host# set flag address-assignment
```

- Related Documentation**
- [Tracing General Authentication Service Processes on page 77](#)

Collecting Subscriber Access Logs Before Contacting Juniper Technical Support

Problem When you experience a subscriber access problem in your network, we recommend that you collect certain logs before you contact Juniper Technical Support. This topic shows you the most useful logs for a variety of network implementations. In addition to the relevant log information, you must also collect standard troubleshooting information and send it to Juniper Technical Support in your request for assistance.

Solution To collect standard troubleshooting information:

- Redirect the command output to a file.

```
user@host> request support information | save rsi-1
```

To configure logging to assist Juniper Technical Support:

1. Review the following blocks of statements to determine which apply to your configuration.

```
[edit]
set system syslog archive size 100m files 25
set system auto-configuration traceoptions file filename
set system auto-configuration traceoptions file filename size 100m files 25
set protocols ppp-service traceoptions file filename size 100m files 25
set protocols ppp-service traceoptions level all
set protocols ppp-service traceoptions flag all
set protocols ppp traceoptions file filename size 100m files 25
set protocols ppp traceoptions level all
set protocols ppp traceoptions flag all
set protocols ppp monitor-session all
set interfaces pp0 traceoptions flag all
set demux traceoptions file filename size 100m files 25
set demux traceoptions level all
set demux traceoptions flag all
set system processes dhcp-service traceoptions file filename
set system processes dhcp-service traceoptions file size 100m
set system processes dhcp-service traceoptions file files 25
set system processes dhcp-service traceoptions flag all
set class-of-service traceoptions file filename
set class-of-service traceoptions file size 100m
set class-of-service traceoptions flag all
set class-of-service traceoptions file files 25
set routing-options traceoptions file filename
set routing-options traceoptions file size 100m
set routing-options traceoptions flag all
set routing-options traceoptions file files 25
set interfaces traceoptions file filename
set interfaces traceoptions file size 100m
set interfaces traceoptions flag all
set interfaces traceoptions file files 25
set system processes general-authentication-service traceoptions file filename
set system processes general-authentication-service traceoptions file size 100m
set system processes general-authentication-service traceoptions flag all
set system processes general-authentication-service traceoptions file files 25
```

2. Copy the relevant statements into a text file and modify the log filenames as you want.
3. Copy the statements from the text file and paste them into the CLI on your router to configure logging.
4. Commit the logging configuration to begin collecting information.



NOTE: The maximum file size for DHCP local server and DHCP relay log files is 1 GB. The maximum number of log files for DHCP local server and DHCP relay is 1000.



BEST PRACTICE: Enable these logs only to collect information when troubleshooting specific problems. Enabling these logs during normal operations can result in reduced system performance.

**Related
Documentation**

- *Compressing Troubleshooting Logs from /var/logs to Send to Juniper Technical Support*

CHAPTER 9

Troubleshooting Command

request network-access aaa subscriber set session-id

Syntax	<code>request network-access aaa subscriber set session-id <i>subscriber-session-id</i> provisioning-state none</code>
Release Information	Command introduced in Junos OS Release 12.3.
Description	Release control of the PCRF over the specified subscriber session. In response, AAA clears the subscriber's provisioning state and sends a terminated request to the PCRF indicating the subscriber is no longer available.
Options	<i>subscriber-session-id</i> —ID of the subscriber session.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • Disabling PCRF Control of a Subscriber Session on page 75 • Activating and Deactivating Subscriber Services Locally with the CLI
List of Sample Output	request network-access aaa subscriber set session-id on page 86
Output Fields	When you enter this command, you are provided feedback on the status of your request. Table 14 on page 86 lists possible error messages that might be returned if the service activation fails.

Table 14: Service Activation/Deactivation Error Messages

Message	Description	Corrective Action
Error: AUTHD ISSU in progress	A unified ISSU operation is active.	Wait until the unified ISSU operation completes and then retry the service activation/deactivation.
Service activation/deactivation already in progress	Another service activation/deactivation operation is currently in progress.	Wait until the active operation completes and then retry the activation/deactivation operation.
Session identifier is not for a subscriber session	The session ID is incorrect.	Verify the correct session ID for the subscriber and then retry the activation/deactivation operation.

Sample Output

request network-access aaa subscriber set session-id

```
user@host> request network-access aaa subscriber set session-id session-id 49 provisioning-state none
Successful completion
```

CHAPTER 10

Troubleshooting Configuration Statement

traceoptions (General Authentication Service)

Syntax	<pre>traceoptions { file <i>filename</i> <files <i>number</i>> <match <i>regular-expression</i> > <size <i>maximum-file-size</i>> <world-readable no-world-readable>; flag <i>flag</i>; no-remote-trace; }</pre>
Hierarchy Level	[edit system processes general-authentication-service]
Release Information	Statement introduced in Junos OS Release 9.0.
Description	Configure tracing options for the general authentication service.
Options	<p>file <i>filename</i>—Name of the file to receive the output of the tracing operation. All files are placed in the directory <code>/var/log</code>.</p> <p>files <i>number</i>—(Optional) Maximum number of trace files to create before overwriting the oldest one. If you specify a maximum number of files, you also must specify a maximum file size with the size option.</p> <p>Range: 2 through 1000</p> <p>Default: 3 files</p> <p>flag <i>flag</i>—Tracing operation to perform. To specify more than one tracing operation, include multiple flag statements. You can include the following flags:</p> <ul style="list-style-type: none">• address-assignment—Trace address-assignment pool events• all—Trace all tracing operations• configuration—Trace configuration events• framework—Trace authentication framework events• gx-plus—Trace Gx-Plus events• jsrc—Trace JSRC events• ldap—Trace LDAP authentication events• local-authentication—Trace local authentication events• radius—Trace RADIUS authentication events• user-access—Trace user access events, such as login, logout, and authenticate. <p>match <i>regular-expression</i>—(Optional) Refine the output to include lines that contain the regular expression.</p> <p>no-remote-trace—Disable remote tracing.</p> <p>no-world-readable—(Optional) Disable unrestricted file access.</p>

size *maximum-file-size*—(Optional) Maximum size of each trace file. By default, the number entered is treated as bytes. Alternatively, you can include a suffix to the number to indicate kilobytes (KB), megabytes (MB), or gigabytes (GB). If you specify a maximum file size, you also must specify a maximum number of trace files with the **files** option.

Syntax: *sizek* to specify KB, *sizem* to specify MB, or *sizeg* to specify GB

Range: 10240 through 1073741824

Default: 128 KB

world-readable—(Optional) Enable unrestricted file access.

Required Privilege	trace—To view this statement in the configuration.
Level	trace-control—To add this statement to the configuration.

Related Documentation	<ul style="list-style-type: none">• Tracing General Authentication Service Processes on page 77
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PART 5

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