

# Access Gateway Function User Guide

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# About This Guide

The Access Gateway Function (AGF) provides subscribers with wireline access to the 5G core network and is an integral part of Junos Multi-Access User Plane solution. Use this document to learn more about Access Gateway Function on a MX Series router.

# 1

CHAPTER

## Overview

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# Overview of 5G

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5G is the fifth-generation technology standard for wireless networks. 5G delivers higher data speeds, lower latency, and supports more users, devices, and services while simultaneously improving network efficiency. As defined by 3GPP, the 5G core (5GC) network is a cloud-aligned, service-based architecture (SBA) and covers all 5G functions and interactions. The converged 5G core lays the foundation for a single subscriber profile and policy management for both existing wireline users with installed router gateway and new 5G wireless users. The converged core offers the following benefits:

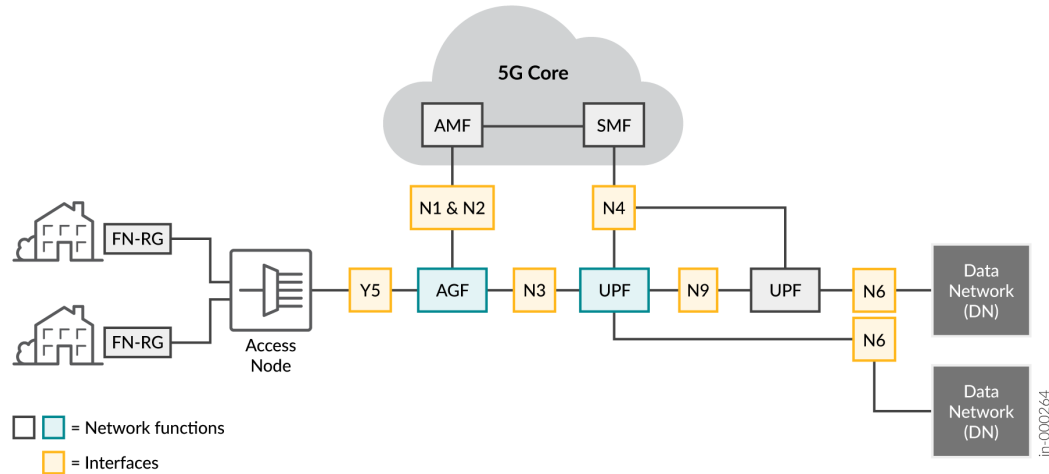
- Single control plane for wireline and wireless subscribers
- Ease of migration for existing subscribers to 5GC.
- Access with a wireline fixed network router gateway (FN-RG).
- Hybrid access with a 5G residential gateway (5G-RG) for increased bandwidth and increased availability.
- Single Operation Support System (OSS) and Business Support System (BSS) integration.

## Components in a 5GC Network

[Figure 1 on page 3](#) shows the key components for the 5GC network when the FN-RG connects to the 5GC with an AGF. [Table 1 on page 3](#) describes the key network functions and logical interfaces

between them. The interaction between the key network functions and logical interfaces are defined by the 3GPP. Other functions and interfaces defined in the 5G network are beyond the scope of this guide.

**Figure 1: Components in a 5GC Network**



**Table 1: Components of a 5G Network**

Functions and Interfaces	Description
Access Gateway Function (AGF)	<p>Provides access connection from residential gateways (RGs) to the 5GC.</p> <p>In adaptive mode, AGF emulates the N1 signaling for the FN-RG to connect to the 5G core. AGF also sends messages over the N2 interface to the AMF and Protocol Data Unit (PDU) session traffic over the N3 interface to the UPF.</p>
Access and Mobility Management function (AMF)	<p>Responsible for registration management, PDU session management and forwarding access facing traffic to and from the access network.</p>



Table 1: Components of a 5G Network (*Continued*)

Functions and Interfaces	Description
FN-RG	<p>Fixed network residential gateway connects the home network to the WAN.</p> <p>FN-RG is a wireline device and works in a wireline network. It does not send signaling associated with RAN found in 5GC networks. For FN-RG, N1 signaling originates on the AGF. The AGF acts as an endpoint on the 5GC and handles all N1 signaling on behalf of the FN-RG. No new hardware or changes to existing FN-RG hardware is required to work with AGF.</p>
Session Management function (SMF)	Establishes PDU sessions and interacts with the user plane function (UPF).
User plane function (UPF)	<p>Supports packet routing, forwarding, packet inspection, PDU session and flow-level QoS.</p> <p><b>NOTE:</b> UPF can be external or colocated with the AGF.</p>
N1	Interface from the user equipment (UE) to the AMF. The N1 interface uses non-access stratum (NAS) layer signaling to exchange UE information that is related to connection and session with the 5GC network.
N2	Control interface that connects the Access Gateway Function to the Access and Mobility Management function.
N3	Interface that connects the AGF to the UPF using the general packet radio service (GPRS) tunneling protocol (GTP). The N3 interface represents a PDU session.
N6	Interface that carries data between the UPF and the data network
N9	Interface that connects one UPF to another.

Table 1: Components of a 5G Network *(Continued)*

Functions and Interfaces	Description
Y5	Interface that connects an FN-RG to the AGF over the wireline access network. The Y5 interface is the equivalent of the V interface in wireline broadband networks.

## Access Gateway Function

### IN THIS SECTION

- [Access Gateway Function | 5](#)
- [Benefits of Access Gateway Function | 6](#)

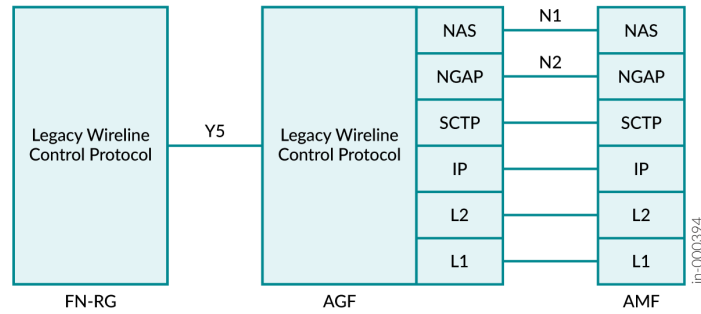
## Access Gateway Function

AGF on Junos OS provides an interworking solution between wireline connected devices and the 5GC. In adaptive mode, AGF manages the access connections between the RG and the 5GC by providing the 5G signaling that is used in the 5GC network. AGF provides IP connectivity, AAA services, and QoS services to subscribers on RG. Existing FN-RG connect to the 5GC using DHCP, DHCPv6, or PPPoE access protocols with AGF.

[Figure 2 on page 6](#) shows the legacy wireline control protocol stack used by the FN-RG, wireline AGF, and the AMF. The wireline AGF acts as a N1 termination point on behalf of the FN-RG. N1 signaling is

defined in the non-access stratum (NAS) protocol. N2 signaling is defined in the Next Generation Application Protocol (NGAP).

**Figure 2: Control Protocol Stack between FN-RG and 5GC**



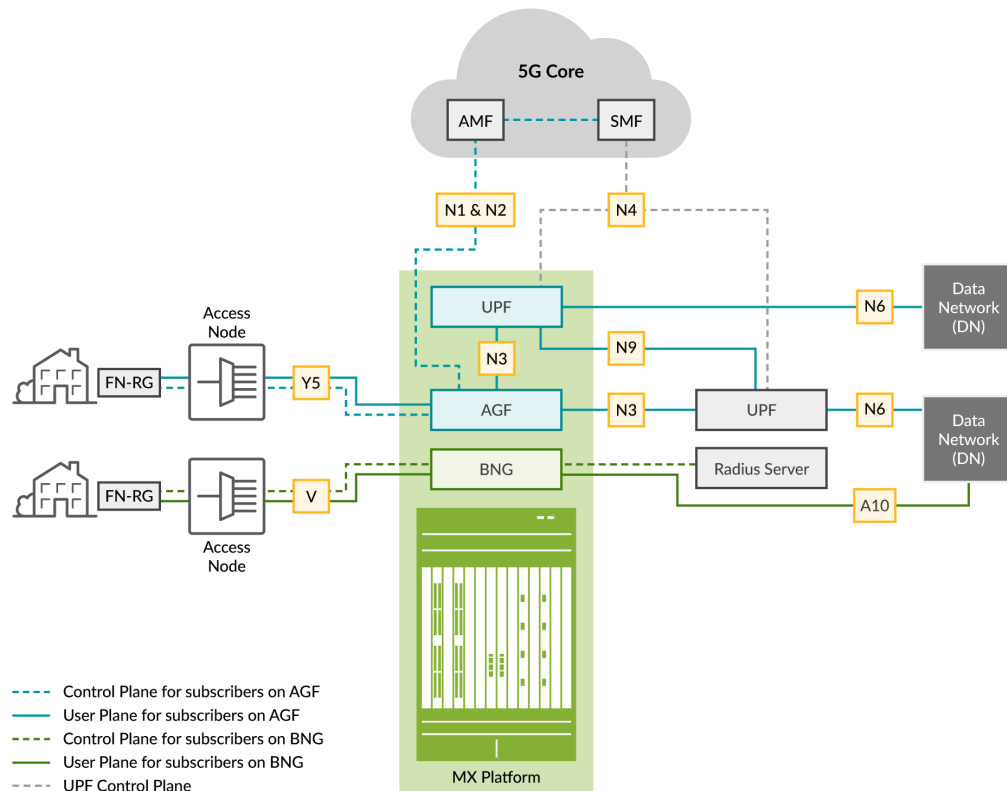
## Benefits of Access Gateway Function

The benefits of AGF include the following:

- Offers ease of migration for subscriber with existing customer premise equipment (CPE), such as an FN-RG, to the 5G core.
- Provides an interworking solution between wireline devices and the 5G core.
- Support existing hardware, such as FN-RG and MX series routers.
- Improved performance by optimizing data plane traffic with the UPF
- Ease of deployment with collocated BNG, AGF, and UPF on the same platform.

Figure 3 on page 7 shows the topology for subscriber access to their broadband service provider. Subscribers can access services through the traditional broadband network gateway (BNG) or through the AGF.

**Figure 3: Subscriber Access to a Data Network**



BNG connects to the FN-RG through an access node that aggregates traffic for service provider. The BNG routes the aggregated traffic to the service provider's network. The access node can be a DSLAM or an optical line termination (OLT). The BNG interacts with the FN-RG across the V interface and connects with the data network across the A10 interface.

AGF connects to the FN-RG through the V interface. AGF interworks on the wireline network to connect to the 5GC. From the 5GC point of view, the AGF is the equivalent of a 5G base station (gNodeB). In adaptive mode, AGF provides the N1, N2, and N3 signaling on behalf of FN-RGs when they connect to the 5GC. AGF provides the following services:

- Exchanges control plane data with the access management functions (AMF) and session management functions (SMF) through the N1 and N2 interfaces. N1 and N2 signaling are used to authenticate, authorize and manage sessions.
- Registers the FN-RG as UE with the AMF in the 5GC.

- Passes the allocated IP address from the SMF along to the FN-RG.
- Passes the PDU session setup information (gateways, DNS, etc) that is received from the 5GC for the FN-RG.
- Performs and enforces UE-level QoS and policy that it received from the 5GC.
- Sends and receives user plane data from the User Plane (UPF) through the N3 interface.

The MX series routers support colocated BNG, AGF, and UPF services. AGF is an integral part of Junos Multi-Access User Plane solution. See [Junos Multi-Access User Plane](#).

## Authentication and Registration

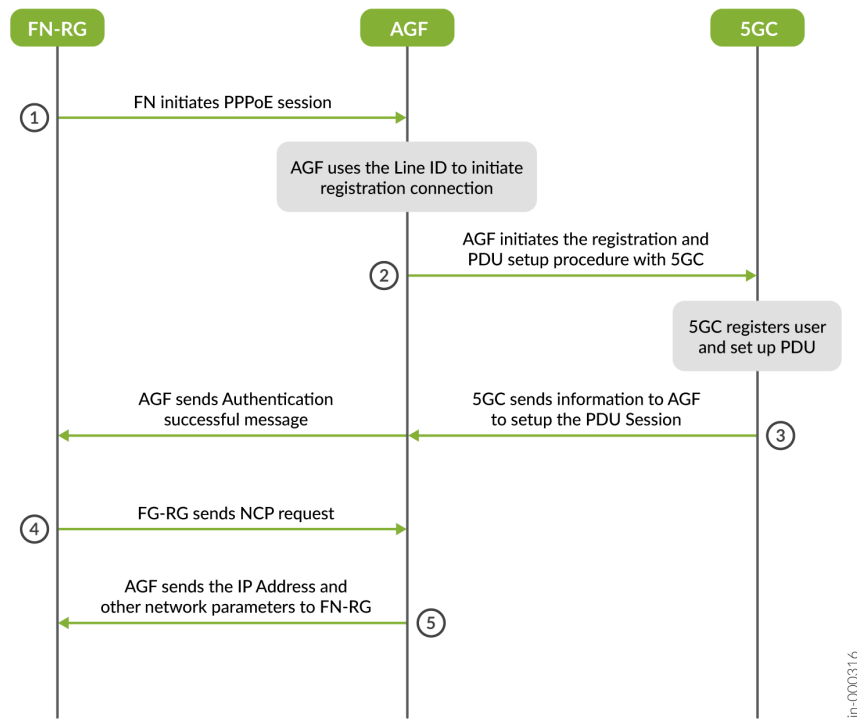
Authentication and registration of a subscriber's FN-RG on a 5GC network differs from authentication and registration on a wireline core network. The FN-RG uses a unique global line identifier (GLI) to connect to the 5GC network. The GLI contains a circuit ID and remote line ID. AGF uses the circuit ID and remote line ID in the GLI to construct a unique Subscription Permanent Identifier (SUPI) for each FN-RG. To preserve privacy, AGF converts the SUPI to a Subscription Concealed Identifier (SUCI). AGF then uses the SUCI to authenticate and to register a subscriber with the AMF on the 5GC.

Upon successful authentication, AMF allocates a Global Unique Temporary Identifier (GUTI) for the subscriber. The subscriber uses the GUTI during its registered session with the AMF. The GUTI contains information that identifies the user without revealing the user's permanent identity in the 5GC.

AGF supports both DHCP and PPPoE in authenticating users, registering users, and in allocating an IP Address to the FN-RG.

Figure 4 on page 9 shows a high-level view of the interaction for PPPoE between the FN-RG, AGF (in adaptive mode), and 5GC. Detail information on the registration process can be found in 3GPP TS 23.316.

Figure 4: High Level View of Authentication and Registration Using PPPoE



1. Point-to-point protocol over Ethernet (PPPoE) begins when the FN-RG sends a PADI message to the AGF.

The PADI message contains PPPoE tags that include the PPPoE Circuit ID and Remote ID tag.

2. AGF uses circuit line ID and remote line ID to generate the subscriber's identity. AGF then uses the subscriber's ID and the corresponding PPPoE tag to initiate a PPP connection.

Upon establishment of a PPPoE session, the FN-RG initiates the PPP authentication request. AGF generates the SUPI and SUCI from the Line ID. AGF then completes the registration and PDU session setup procedures with the 5GC over the N1 and N2 interface.

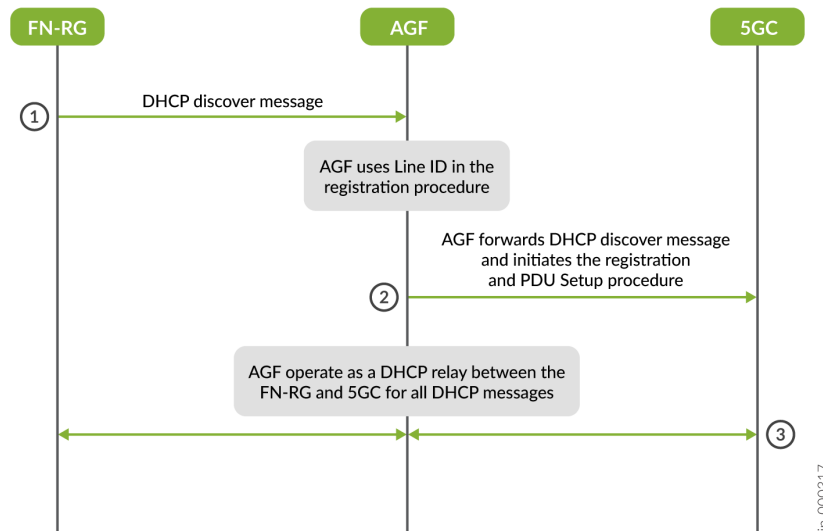
3. Upon successful registration in the 5GC, AGF responds with an authentication success message to the FN-RG.

4. FN-RG initiates Network Control Protocol (NCP) to establish different Network Layer protocols as part of establishing the PPP connections. The FN-RG sends either Internet Protocol Control Protocol (IPCP) for IPv4 or an IPv6CP request to the AGF.
5. Upon completion of the PPP connection, AGF sends the IPv4 Address that was received in the IPCP response during the PDU session setup procedure with the FN-RG.

On an IPv6CP request, AGF sends the Network ID that was part of the IPv6CP response. The AGF forwards the router advertisement (RA) containing the prefix that came from the 5GC.

Figure 5 on page 10 shows the DHCP interaction between the FN-RG, AGF (in adaptive mode), and 5GC is as follows:

**Figure 5: High Level View of Authentication and Registration Using DHCP**



1. DHCP begins when the FN-RG sends a DHCPv4 discover message to the AGF.

The DHCPv4 discover message contains the circuit ID and remote ID information in DHCP option 82.

2. Upon receiving the DHCP discover message from the FN-RG, AGF generates the SUPI/SUCI from the Line ID. AGF then initiates deferred IP addressed allocation. It starts the registration procedure and the PDU session setup procedure with the 5GC over the N1 and N2 interface.
3. AGF operates as the DHCP relay forwarding all DHCP messages between the FN-RG and the DHCP server on the 5GC.

## IP Address Allocation

Current Broadband Edge architecture utilizes RADIUS servers to deploy IP address. Under the 5G architecture, the SMF is responsible for providing IP addresses. AGF supports two methods of IP address allocation:

1. **NAS Signaling mode**—For PPPoE users, AGF sends a request for IP address to the AMF on the 5GC. The AMF forwards the request to the SMF. The SMF allocates IP address and sends the IP address back as part of the N1 NAS signaling.
2. **Deferred Mode** – For DHCP, AGF acts as a DHCP relay agent for the DHCP client (FN-RG). AGF forwards the DHCP Discover, Offer, Request, Acknowledgment (DORA) messages to the SMF by way of the the UPF on the N3 interface. AGF forwards DHCP messages by appending the GTP headers provided by the AMF in the N1 message. UPF forwards these DHCP messages to SMF. The SMF acts as a DHCP relay agent and forwards the DHCP messages to the DHCP server. The DHCP server allocates the IP address and sends the IP address by way of the UPF to AGF. AGF then forwards the IP addresses to the DHCP client running the FN-RG.

**NOTE:** AGF supports the deferred IP address procedure for IPv6.

## Routing Instances

AGF supports placing subscribers in different routing instances where each routing instance has its own routing table, routing policies, and interfaces. You can configure multiple routing instances to support the authentication and registration of subscribers to different AMFs and to support the routing of data packets to different UPFs.

To configure routing instances for PPPoE subscribers, set the `target-routing-instance` in the `[edit access domain map]` hierarchy or set the `subscriber-context` under the `[edit access]` hierarchy. You will need to apply authentication attributes to subscribers. To apply attributes to PPP subscribers, use the `aaa-options` statement at the `[edit dynamic-profiles profile-name interfaces pp0 unit $junos-interface-unit ppp-options]` hierarchy level.

To configure routing instances for DHCP subscribers, set the `target-routing-instance` in the `[edit access domain map]` hierarchy. AGF assigns the domain name to the subscriber using the DHCP group configuration.

You can also configure multiple routing instance to route the data packets to different UPFs. To configure the UPF routing-instance and local tunnel endpoint for the GTPU tunnel to the UPF, set the `routing-instance` and `ip-address` in the `[edit services agf user-planes]` hierarchy.



# User Plane Function

The UPF is the data plane in the 5GC. UPF provides the following functionality:

- Subscriber tunnel encapsulations (GTP-U)
- Packet routing and forwarding
- QoS and buffering
- Policy enforcement
- Statistics gathering and reporting
- Enacts Lawful Intercept requests
- Optional advanced services

Once the AGF has authenticated the subscriber and established a PDU session, the SMF selects the UPF for the subscriber. .

Juniper supports the UPF both on a dedicated MX platform as well as colocated on an MX running both AGF and UPF. You can configure the UPF as the target UPF or to be an intermediate UPF. As a target UPF, it communicates with the data network over the N6 interface. As an intermediate UPF, it performs the role of an uplink classifiers and communicates with other UPFs over the N9 interface.

## AGF and UPF Colocation

Juniper supports the colocation of UPFs on the same MX router. In the 5G architecture, AGF forwards data packets to the UPF over the N3 Interface. Conceptually, the colocated AGF and UPF send data packets internally over the N3 interface to each other. When the UPF and AGF are colocated, you can still configure the UPF to be both a target UPF and an intermediate UPF.

When you colocate AGF with UPF, the UPF operates on the edge of the network. This allows user application data to have lower latency and higher throughput.

To enable a colocated UPF, include `colocated-user-plane` in the `[edit services agf user-planes user-plane-name]` hierarchy.

For more information on configuring UPFs, see <https://www.juniper.net/documentation/us/en/software/junos/multi-access-user-plane/topics/topic-map/cups-saegw-overview.html>

# Quality of Service

Quality of service in 5G is defined with QoS flows. A QoS Flow represents the finest granularity of QoS differentiation in the PDU Session. Each QoS flow is identified by a unique identifier called QoS Flow Identifier (QFI) and QoS parameters that describe the characteristics of the traffic packet flow. The SMF controls the QoS and passes QoS characteristics to the UPF and AGF when the PDU session is being established. The UPF enforces the QoS flow for a particular PDU session, while the AGF manages the aggregate of all QoS flow going to the RG.

5GC supports up to 64 QFIs for a single PDU session. The QoS flow parameters include 5G QoS identifier (5QI). 5QI maps to well-defined QoS characteristics, such as priority level, averaging window, maximum data burst volume, and so on. The standard 5QI values and QoS characteristics mappings are defined in 3GPP Specification 23.501.

Although UPF sends the QFI to identify QoS flows, AGF does not use QFI to classify the packets. AGF uses Differentiated Services Code Point (DSCP) in the GTP header that is coming sent by the UPF over the N3 interface to classify the traffic. The SMF sends the Transport Level Marking (TLM) to the UPF. The UPF marks the GTP header in the outgoing N3 packets to the AGF. AGF uses the DSCP in this GTP header to classify the packets and standard Junos CoS classification configuration to classify and to shape the traffic.

If operators choose to use the per subscriber CoS parameters per household, the BBF standards specifies that operators should use Router Gateway Level Wireline Access Characteristics (RG-LWAC) to describe the CoS limits and scope of service for the specified subscriber or a group of subscribers on a router. To configure the QoS characteristics of legacy access networks, AGF uses RG-LWAC information from the 5GC to set CoS queue shaping, firewall filters, policers. AGF leverages the existing shaping, policers and firewall filters on Junos OS. AGF uses the existing rewrite rules to set the PCP or DSCP value in the packet header sent to the access network.

For downstream traffic, the UPF sets the DSCP value based on packet priority that was set by the 5GC and sends it to the AGF. The AGF uses hierarchical policers to shape traffic downstream:

- Maps the outer DSCP value to a forwarding class
- Assigns the forwarding class to an output queue.
- Assigns the forwarding class to scheduler based on the forwarding class priority.
- Applies the RG-LWAC or local configuration to classify the traffic and to rewrite the PCP or DSCP value when it is needed.

For more information on CoS, see [CoS for Subscriber Access Overview](#)

# SCTP

## IN THIS SECTION

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- [SCTP connection to the AMF | 15](#)

## SCTP Overview

Stream Control Transmission Protocol (SCTP) is an IP Transport Layer protocol. SCTP exists at an equivalent level with User Datagram Protocol (UDP) and Transmission Control Protocol (TCP), which provides transport layer functions to many Internet applications. SCTP is a message stream reliable connection-oriented transport protocol with the following features:

- Multi-stream protocol—SCTP provides mechanism to maintain multiple streams of messages per SCTP endpoint. Applications for different priority message delivery, strict message order delivery within stream or bypassing sequence delivery service within stream use multi stream protocol.
- User data fragmentation—If a message size is more than path Maximum Transmission unit (MTU) limit. In order to send these messages, it is fragmented in different data chunks and sent in different SCTP packets. SCTP header has a flag to mark last chunk of fragmented message. On the receiver side, all fragmented chunks are reassembled and passed it to the upper layer protocol.
- Chunk bundling—This feature provides an option to enable chunks from multiple messages to be bundled in single SCTP packet. SCTP packet at the receiver end disassembles chunks before delivering to the upper layer protocol.
- Packet validation—You can include a verification tag in SCTP header to uniquely identify SCTP association session. Use a new verification tag for the re-incarnation of session. This provides protection against masquerade attacks and against stale SCTP packets from previous association.
- Multi home support—SCTP provides means to specify list of local transport addresses for SCTP endpoint which is exchanged during association startup. This advertises at other end point about available destination address and source address in SCTP packet received after establishing SCTP association. Other SCTP endpoint establishes route for each of received destination address and use it for high availability of data transfer.

## SCTP connection to the AMF

AGF uses Stream Control Transmission Protocol (SCTP) to transport Next Generation Application protocol (NGAP) messages for control plane signaling with the AMFs. Stream Control Transmission Protocol (SCTP) is a transport-layer protocol that ensures reliable, in-sequence transport of data. SCTP provides multihoming support where one or both endpoints of a connection can consist of more than one IP address. This enables transparent failover between redundant network paths. The SCTP association is a connection between two SCTP endpoints. AGF creates a Transport Layer Network Association (TNLA) between endpoints on the AGF and AMF.

**Figure 6: SCTP Multihoming**

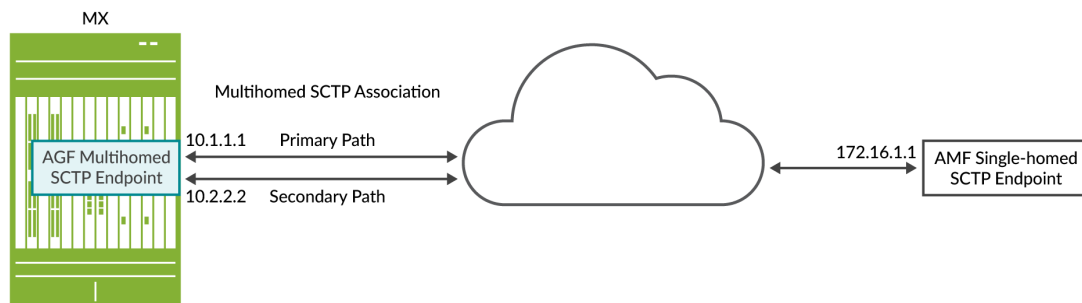


Figure 6 on page 15 shows a multihomed AGF SCTP endpoint and a single-homed AMF SCTP endpoint. With AGF SCTP endpoint multihoming, you can designate one of the AGF endpoints (IP address) as the primary path. If the primary path fails, SCTP switches to the secondary path. AGF supports the following:

- Multihomed local endpoint.
- Routing instances to AMFs.
- Up to 10 TNLAs per AMF.
- Load balancing of UEs across all TNLAs that support UE-associated signaling.

You can configure SCTP connections to AMFs in the `[edit services agf amf]` hierarchy.

# AGF Telemetry using Junos Telemetry Interface

AGF uses Junos telemetry interface (JTI) to export telemetry data from a device to a collector to help you monitor the health of your network and the traffic carried within it. JTI gathers telemetry data through a "push" model instead of traditional "pull" models such as CLI or SNMP. Data delivery is automated and real-time. You can use AGF-specific sensors to collect data on AGF interactions and use the data to improve the design of your network, optimize traffic engineering, and gain early detection to problems occurring on individual devices.

For information about AGF sensors, see [Telemetry Sensor Explorer](#). For information about JTI, see [Junos Telemetry Interface User Guide](#).

## Supported Standards

- *Broadband Forum TR-456—5G Wireless Wireline Convergence Architecture*
- *Broadband Forum TR-470—5G FMC Architecture*
- *3GPP TS 23.316, Release 16—Wireless and wireline convergence access support for the 5G System (5GS)*
- *3GPP TS 23.501, Release 16—System Architecture for the 5G System*
- *3GPP TS 24.501, Release 16—NAS procedures in the 5G system*
- *3GPP TS 29.281, Release 16—GPRS Tunneling Protocol UP GTPv1-U*
- *3GPP TS 38.413, Release 16—NG Application Protocol*

# 2

CHAPTER

## Configure AGF

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# Overview of Configuring AGF

The network functions in a 5GC network interact with one another to support the user connectivity. AGF is deployed between the RG and the AMF and UPF.

1. Configure the protocol that subscribers use to access and authenticate to the AMF.
  - a. Using PPPoE.
  - b. Using DHCP Relay.
2. Configure AGF services.

## Configure PPP support for AGF

### IN THIS SECTION

- [Procedure](#) | 18

This example describes how to configure AGF to support a subscriber using PPPoE for authentication.

## Procedure

### CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the [edit] hierarchy level.

```
set dynamic-profiles autoconf-vlan-demux routing-instances "$junos-routing-instance" interface
"$junos-interface-name" any
set dynamic-profiles autoconf-vlan-demux interfaces pp0 unit "$junos-interface-unit" ppp-options
chap
```

```

set dynamic-profiles autoconf-vlan-demux interfaces pp0 unit "$junos-interface-unit" ppp-options
pap
set dynamic-profiles autoconf-vlan-demux interfaces pp0 unit "$junos-interface-unit" ppp-options
aaa-options nas-5g-access-options
set dynamic-profiles autoconf-vlan-demux interfaces pp0 unit "$junos-interface-unit" pppoe-
options underlying-interface "$junos-underlying-interface"
set dynamic-profiles autoconf-vlan-demux interfaces pp0 unit "$junos-interface-unit" pppoe-
options server
set dynamic-profiles autoconf-vlan-demux interfaces pp0 unit "$junos-interface-unit" no-
keepalives
set dynamic-profiles autoconf-vlan-demux interfaces pp0 unit "$junos-interface-unit" family inet
unnumbered-address "$junos-loopback-interface"
set dynamic-profiles autoconf-vlan-demux interfaces pp0 unit "$junos-interface-unit" family
inet6 unnumbered-address "$junos-loopback-interface"
set access profile NAS-5G-AGF authentication-order nas-5g
set access nas-5g max-outstanding-requests 1000
set access nas-5g request-retry 3
set access nas-5g timeout 30
set access aaa-options NAS-5G-ACCESS-OPTIONS access-profile NAS-5G-AGF
set access aaa-options NAS-5G-ACCESS-OPTIONS aaa-context AMF-RI
set access aaa-options NAS-5G-ACCESS-OPTIONS subscriber-context UE-RI-1
set access domain map DOMAIN1.COM aaa-routing-instance AMF-RI
set access domain map DOMAIN1.COM access-profile nas-5g-agf
set access domain map DOMAIN1.COM target-routing-instance UE-RI-1
set routing-instances UE-RI-1 instance-type virtual-router
set routing-instances UE-RI-1 interface xe-2/0/1.3
set routing-instances UE-RI-1 interface lo0.1

```

## Step-by-Step Procedure

### 1. Configure dynamic profile for the PPP subscriber.

```

[edit]
user@host# set dynamic-profiles autoconf-vlan-demux routing-instances "$junos-routing-
instance" interface "$junos-interface-name" any
user@host# set dynamic-profiles autoconf-vlan-demux interfaces pp0 unit "$junos-interface-
unit" ppp-options chap
user@host# set dynamic-profiles autoconf-vlan-demux interfaces pp0 unit "$junos-interface-
unit" ppp-options pap
user@host# set dynamic-profiles autoconf-vlan-demux interfaces pp0 unit "$junos-interface-
unit" ppp-options aaa-options nas-5g-access-options

```



```

user@host# set dynamic-profiles autoconf-vlan-demux interfaces pp0 unit "$junos-interface-
unit" pppoe-options underlying-interface "$junos-underlying-interface"
user@host# set dynamic-profiles autoconf-vlan-demux interfaces pp0 unit "$junos-interface-
unit" pppoe-options server
user@host# set dynamic-profiles autoconf-vlan-demux interfaces pp0 unit "$junos-interface-
unit" no-keepalives
user@host# set dynamic-profiles autoconf-vlan-demux interfaces pp0 unit "$junos-interface-
unit" family inet unnumbered-address "$junos-loopback-interface"
user@host# set dynamic-profiles autoconf-vlan-demux interfaces pp0 unit "$junos-interface-
unit" family inet6 unnumbered-address "$junos-loopback-interface"

```

2. Set the access authentication for the subscriber group to authenticate using Non-Access Stratum (NAS) signaling.

```

[edit]
user@host# set access profile NAS-5G-AGF authentication-order nas-5g

```

3. Configure the following options for NAS signaling between the AGF and the AMF.

- Maximum number of outstanding request—This is the number of unanswered request messages from the AMF
- Number of retries—The number of attempts for a registration or deregistration request .
- Timeout—The duration that AGF waits for a response from AMF.

```

[edit]
user@host# set access nas-5g max-outstanding-requests 1000
user@host# set access nas-5g request-retry 3
user@host# set access nas-5g timeout 30

```

4. Define the profile with a set of AAA option for the PPP subscriber.

- Create the access profile (access-profile for the subscriber group).
- Specify the logical-system:routing-instance that the subscriber session uses for AAA (RADIUS) interactions.

- Specify the logical-system:routing-instance where the subscriber interface is placed. In this case, we are using the default routing instance.

```
[edit]
user@host# set access aaa-options NAS-5G-ACCESS-OPTIONS access-profile NAS-5G-AGF
user@host# set access aaa-options NAS-5G-ACCESS-OPTIONS aaa-context AMF-RI
user@host# set access aaa-options NAS-5G-ACCESS-OPTIONS subscriber-context UE-RI-1
```

Alternative, you can create a domain map and apply the domain map to the access profile.

```
[edit]
user@host# set access domain map DOMAIN1.COM aaa-routing-instance AMF-RI
user@host# set access domain map DOMAIN1.COM access-profile NAS-5G-AGF
user@host# set access domain map DOMAIN1.COM target-routing-instance UE-RI-1
```

## 5. Configure the routing instance.

```
[edit]
user@host# set routing-instances UE-RI-1 instance-type virtual-router
user@host# set routing-instances UE-RI-1 interface xe-2/0/1.3
user@host# set routing-instances UE-RI-1 interface lo0.1
```

For more information on PPP Subscribers, see <https://www.juniper.net/documentation/us/en/software/junos/subscriber-mgmt-access/topics/topic-map/ppp-access-network-overview.html>

# Configure DHCP support for AGF

## IN THIS SECTION

- [Procedure | 22](#)

This example describes how to configure AGF to support subscribers authentication with DHCP. In this example, we configure DHCP relay to forward DHCP request and reply packets between the subscriber (DHCP client) and the DHCP server on the 5GC.

## Procedure

### CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the [edit] hierarchy level.

```
set group AGF_SUBSCRIBER_GROUP authentication password $abc123
set group AGF_SUBSCRIBER_GROUP authentication username-include user-prefix USER
set group AGF_SUBSCRIBER_GROUP access-profile NAS-5G-AGF
set group AGF_SUBSCRIBER_GROUP overrides trust-option-82
set group AGF_SUBSCRIBER_GROUP interface xe-1/0/0.0
set access profile NAS-5G-AGF authentication-order nas-5g
set access domain map DOMAIN1.COM aaa-routing-instance default
set access domain map DOMAIN1.COM access-profile NAS-5G-AGF
set access domain map DOMAIN1.COM target-routing-instance UE-RI-1
set access nas-5g max-outstanding-requests 1000
set access nas-5g request-retry 3
set access nas-5g timeout 30
set routing-instances UE-RI-1 instance-type virtual-router
set routing-instances UE-RI-1 interface xe-2/0/1.3
set routing-instances UE-RI-1 interface lo0.1
```

### Step-by-Step Procedure

1. Create a group with the authentication that need to the access interface.

```
[edit forwarding-options dhcp-relay]
user@host# set group AGF_SUBSCRIBER_GROUP authentication password $abc123
user@host# set group AGF_SUBSCRIBER_GROUP authentication username-include user-prefix USER
```

2. Create an access profile (access-profile) for the group subscribers that will be authenticating in the 5GC and attach the profile to the DHCP relay agent.

```
[edit forwarding-options dhcp-relay]
user@host# set group AGF_SUBSCRIBER_GROUP access-profile NAS-5G-AGF
```

3. Configure the router to always accept DHCP client packets that contain option 82 information.

```
[edit forwarding-options dhcp-relay]
user@host# set group AGF_SUBSCRIBER_GROUP overrides trust-option-82
```

4. Specify the interface that the DHCP subscribers will connect to.

```
[edit forwarding-options dhcp-relay]
user@host# set group AGF_SUBSCRIBER_GROUP interface xe-1/0/0.0
```

5. Set the access authentication for the subscriber group to authenticate using Non-Access Stratum (NAS) signaling.

```
[edit]
user@host# set access profile NAS-5G-AGF authentication-order nas-5g
```

6. Create the domain map and apply the domain map to the access profile.

```
edit]
user@host# set access domain map DOMAIN1.COM aaa-routing-instance default
user@host# set access domain map DOMAIN1.COM access-profile NAS-5G-AGF
user@host# set access domain map DOMAIN1.COM target-routing-instance UE-RI-1
```

7. Configure the following options for NAS signaling between the AGF and the AMF.

- Maximum number of outstanding request—This is the number of unanswered request messages from the AMF
- Number of retries—The number of attempts for a registration or deregistration request .
- Timeout—The duration that AGF waits for a response from AMF.

```
[edit]
user@host# set access nas-5g max-outstanding-requests 1000
user@host# set access nas-5g request-retry 3
user@host# set access nas-5g timeout 30
```

## 8. Configure the routing instance.

```
[edit]
user@host# set routing-instances UE-RI-1 instance-type virtual-router
user@host# set routing-instances UE-RI-1 interface xe-2/0/1.3
user@host# set routing-instances UE-RI-1 interface lo0.1
```

For more information on DHCP Subscribers, see <https://www.juniper.net/documentation/us/en/software/junos/subscriber-mgmt-access/topics/topic-map/dhcp-subscriber-access-overview.html>

# Configure AGF services

## IN THIS SECTION

- Procedure | 24

This example describes how to configure AGF services to support residential gateways as they connect to the 5GC.

## Procedure

### CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the [edit] hierarchy level.

```
set services agf node-name AGF-NODE1
set services agf node-id 1
set services agf plmn te-plmn mcc 123
set services agf plmn te-plmn mnc 456
set services agf tracking-area 0 plmn te-plmn s-nssai 0 sst v2x sd 5
```

```

set services agf tracking-area 0 plmn te-plmn s-nssai 1 sst miot sd4
set services agf amf AMF1 node-id 1
set services agf amf AMF1 ip-address 10.1.1.7 port 38412
set services agf amf AMF1 local-endpoint ip-address 10.1.1.1 primary
set services agf amf AMF1 local-endpoint ip-address 10.20.1.1
set services agf amf AMF1 default-amf
set services agf user-planes UPF_DEFAULT ip-address 10.1.7.1
set services agf user-planes UPF_DEFAULT data-network-name DEFAULT-DN
set services agf user-planes UPF_COLOCATED 10.255.20.149
set services agf user-planes UPF_COLOCATED data-network-name COLOCATED-DN
set services agf user-planes UPF_COLOCATED colocated-user-plane ip-endpoint-address 10.255.20.149
set routing-instances AMF-RI instance-type virtual-router
set routing-instances AMF-RI interface xe-2/0/2.1

```

## Step-by-Step Procedure

### 1. Configure the AGF node.

```

[edit services agf]
user@host# set node-name AGF-NODE1
user@host# set node-id 1

```

### 2. Configure the supported Public Land Mobile Network (PLMN) and tracking area.

```

[edit services agf]
user@host# set plmn te-plmn mcc 123
user@host# set plmn te-plmn mnc 456
user@host# set tracking-area 0 plmn te-plmn s-nssai 0 sst v2x sd 5
user@host# set tracking-area 0 plmn te-plmn s-nssai 1 sst miot sd4

```

### 3. Configure the connection to the AMF. The AMF IP address must be reachable in the configured AMF routing-instance. Configure the SCTP local endpoint on the AGF. If you are configuring a multihoming association, specify one local endpoint as a primary endpoint.

```

[edit services agf]
user@host# set services agf amf AMF1 node-id 1
user@host# set services agf amf AMF1 ip-address 10.1.1.7 port 38412
user@host# set services agf amf AMF1 local-endpoint ip-address 10.1.1.1 primary
user@host# set services agf amf AMF1 local-endpoint ip-address 10.20.1.1

```

```
user@host# set services agf amf AMF1 default-amf
user@host# set services agf amf AMF1 routing-instance AMF1-RI-1
```

4. Configure the user plane information. If you are configuring an UPF on the MX router, you must specify that the UPF is colocated and configure the colocated-user-plane information.

```
[edit services agf]
user@host# set services agf user-planes UPF_DEFAULT ip-address 10.1.7.1
user@host# set services agf user-planes UPF_DEFAULT data-network-name DEFAULT-DN
user@host# set services agf user-planes UPF_COLOCATED 10.255.20.149
user@host# set services agf user-planes UPF_COLOCATED data-network-name COLOCATED-DN
user@host# set services agf user-planes UPF_COLOCATED colocated-user-plane ip-endpoint-
address 10.255.20.149
```

5. Configure the routing instance to the AMF.

```
[edit]
user@host# set routing-instances AMF-RI instance-type virtual-router
user@host# set routing-instances AMF-RI interface xe-2/0/2.1
```

# 3

CHAPTER

## Configuration Statements

---

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user-planes | 40

---



# agf

## IN THIS SECTION

- [Syntax | 28](#)
- [Hierarchy Level | 29](#)
- [Description | 29](#)
- [Options | 29](#)
- [Required Privilege Level | 30](#)
- [Release Information | 30](#)

## Syntax

```
agf {
  amf name {
    default-amf;
    ip-address ip-address;
    local-endpoint {
      initial-tnla-weight-factor initial-tnla-weight-factor;
      ip-address name {
        primary;
      }
    }
    node-id node-id;
    offline;
    port port;
    routing-instance routing-instance;
    tracking-area name;
  }
}
```

```
node-id node-id;
node-name node-name;
plmn name {
```

```
mcc mcc;  
mnc mnc;  
}  
tracking-area code {  
  plmn name {  
    s-nssai name {  
      sd sd;  
      sst(embb | miot | url1c | v2x);  
    }  
  }  
}  
user-planes name {  
  colocated-user-plane {  
    ip-endpoint-address ip-endpoint-address;  
  }  
  data-network-name data-network-name;  
  ip-address ip-address;  
  routing-instance routing-instance;  
}  
}
```

## Hierarchy Level

[edit services]

## Description

Configuration for access gateway function

## Options

**node-id**                      AGF node identifier

- **Range:** 0 through 255

**node-name**                      AGF node name

The remaining statements are explained separately. See [CLI Explorer](#).

## Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

## Release Information

Statement introduced in Junos OS Release 22.3R1.

# amf

### IN THIS SECTION

- [Syntax | 31](#)
- [Hierarchy Level | 31](#)
- [Description | 31](#)
- [Options | 32](#)
- [Required Privilege Level | 32](#)
- [Release Information | 32](#)

## Syntax

```
amf name {  
  <default-amf;  
  ip-address ip-address;  
  local-endpoint {  
    initial-tnla-weight-factor initial-tnla-weight-factor;  
    ip-address name {  
      primary;  
    }  
  }  
  node-id node-id;  
  offline;  
  port port;  
  routing-instance routing-instance;  
  tracking-area name;  
}
```

## Hierarchy Level

[edit services [agf](#)]

## Description

Configure the connection to the access and mobility management function (AMF).

## Options

<b>name</b>	Name of the AMF.
<b>default-amf</b>	Specifies this is the default AMF.
<b>ip-address</b>	IP address of the SCTP endpoint on the AMF.
<b>node-id</b>	AMF node identifier. <ul style="list-style-type: none"> <li>• <b>Range:</b> 0 through 255</li> </ul>
<b>offline</b>	Disables communication with this AMF.
<b>port</b> <i>port number</i>	The port number on the SCTP endpoint. <ul style="list-style-type: none"> <li>• <b>Default:</b> 38412</li> <li>• <b>Range:</b> 0 through 65535</li> </ul>
<b>routing-instance</b>	Routing instance for AMF connectivity

The remaining statements are explained separately. See [CLI Explorer](#).

## Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

## Release Information

Statement introduced in Junos OS Release 22.3R1.

# local-endpoint

## IN THIS SECTION

- [Syntax | 33](#)
- [Hierarchy Level | 33](#)
- [Description | 34](#)
- [Options | 34](#)
- [Required Privilege Level | 34](#)
- [Release Information | 34](#)

## Syntax

```
local-endpoint {  
  initial-tnla-weight-factor initial-tnla-weight-factor;  
  ip-address name {  
    <primary>;  
  }  
}
```

## Hierarchy Level

```
[edit services agf amf]
```

## Description

AMF local endpoint

## Options

**initial-tnla-weight-factor** The weight factor assigned to the SCTP association. The weight factor is passed to the AMF for load balancing. The AMF assigns the weight factor and is used in load balancing. The AGF recommends the initial TNLA weight factor as the SCTP tunnel is being established.

- **Default:** 128
- **Range:** 1 through 255

**ip-address *ip-address*** Specifies the SCTP endpoint on the AGF.

**primary** (Optional) Identifies the SCTP endpoint as a primary path.

The remaining statements are explained separately. See [CLI Explorer](#).

## Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

## Release Information

Statement introduced in Junos OS 22.3R1.

# plmn

## IN THIS SECTION

- [Syntax | 35](#)
- [Hierarchy Level | 35](#)
- [Description | 35](#)
- [Options | 36](#)
- [Required Privilege Level | 36](#)
- [Release Information | 36](#)

## Syntax

```
plmn name {  
    mcc mcc;  
    mnc mnc;  
}
```

## Hierarchy Level

```
[edit services agf]
```

## Description

Configure the public land mobile networks (PLMNs) that AGF supports.



## Options

<b>name</b>	Public land mobile network name
<b>mcc</b> <i>mcc</i>	Mobile country code
<b>mnc</b> <i>mnc</i>	Mobile network code

## Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

## Release Information

Statement introduced in Junos OS Release 22.3R1.

# s-nssai

### IN THIS SECTION

- [Syntax | 37](#)
- [Hierarchy Level | 37](#)
- [Description | 37](#)
- [Options | 37](#)
- [Required Privilege Level | 38](#)
- [Release Information | 38](#)

## Syntax

```
s-nssai name {  
    sd sd;  
    sst(embb | miot | urllc | v2x);  
}
```

## Hierarchy Level

```
[edit services agf tracking-area name plmn]
```

## Description

Configure the Single network slice selection assistance information. the S-NSSAI is used to uniquely identify a Network Slice and consists of two components. For FN-RG, the AGF sends a proxy S-NSSAI message to the AMF during the initial setup.

- SST—Slice Service type
- SD—Selection Differentiator

## Options

<b>name</b>	Single network slice selection assistance information identifier <ul style="list-style-type: none"><li>• <b>Range:</b>0 through 128</li></ul>
<b>sd</b>	Selection differentiator <ul style="list-style-type: none"><li>• <b>Default:</b> 0</li></ul>

- **Range:** 0 through 16777215

**sst**

Slice service type

- embb—Enhanced mobile broadband slice
- miot—Massive IoT
- urllic—Ultra-reliable, low latency communications
- v2x—V2X services

## Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

## Release Information

Statement introduced in Junos OS Release 22.3R1.

# tracking-area

### IN THIS SECTION

- Syntax | 39
- Hierarchy Level | 39
- Description | 39
- Options | 39
- Required Privilege Level | 40
- Release Information | 40

## Syntax

```
tracking-area code {  
  plmn name {  
    s-nssai name {  
      sd sd;  
      sst(embb | miot | urllc | v2x);  
    }  
  }  
}
```

## Hierarchy Level

[edit services [agf](#)]

## Description

Tracking area for the AMF.

## Options

<b>name</b>	Tracking area code <ul style="list-style-type: none"><li>• <b>Range:</b> 0 through 16777215</li></ul>
<b>plmn</b>	Public land mobile network name

The remaining statements are explained separately. See [CLI Explorer](#).

## Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

## Release Information

Statement introduced in Junos OS Release 22.3R1.

# user-planes

### IN THIS SECTION

- [Syntax | 40](#)
- [Hierarchy Level | 41](#)
- [Description | 41](#)
- [Options | 41](#)
- [Required Privilege Level | 41](#)
- [Release Information | 42](#)

## Syntax

```
user-planes name {  
  colocated-user-plane {  
    ip-endpoint-address ip-endpoint-address;  
  }  
  data-network-name data-network-name;  
  ip-address ip-address;
```

```
routing-instance routing-instance;  
}
```

## Hierarchy Level

```
[edit services agf]
```

## Description

Configure a tunnel to the User Plane Function (UPF).

## Options

<b>name</b>	User plane name
<b>colocated-user-plane</b>	Specify there is a co-located UPF. The <i>ip-endpoint-address ip-endpoint-address</i> is the IP address of the UPF.
<b>data-network-name</b>	Data network name
	Name of the data network
<b>ip-address <i>ip-endpoint-address</i></b>	User plane ip address
<b>routing-instance</b>	User plane routing instance

The remaining statements are explained separately. See [CLI Explorer](#).

## Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

## Release Information

Statement introduced in Junos OS Release 22.3R1.

# 4

CHAPTER

## Operational Commands

---

`clear network access nas-5g statistics` | 44

`clear services agf nas statistics` | 45

`clear services agf ngap amf` | 46

`show network access nas-5g` | 47

`show services agf nas` | 53

`show services agf ngap` | 57

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`show subscribers summary` | 119

---



# clear network access nas-5g statistics

## IN THIS SECTION

- [Syntax | 44](#)
- [Description | 44](#)
- [Options | 44](#)
- [Required Privilege Level | 44](#)
- [Release Information | 45](#)

## Syntax

```
clear network-access nas-5g statistics
```

## Description

Clears the counter tracking network NAS 5G messages.

## Options

none

## Required Privilege Level

view

## Release Information

Command introduced in Junos OS Release 22.3R1.

# clear services agf nas statistics

### IN THIS SECTION

- [Syntax | 45](#)
- [Description | 45](#)
- [Options | 45](#)
- [Required Privilege Level | 46](#)
- [Release Information | 46](#)

## Syntax

```
clear services agf nas statistics
```

## Description

Clears Non-Access Stratum messaging information that AGF has collected.

## Options

none

## Required Privilege Level

view

## Release Information

Command introduced in Junos OS Release 22.3R1.

# clear services agf ngap amf

### IN THIS SECTION

- [Syntax | 46](#)
- [Description | 46](#)
- [Options | 47](#)
- [Required Privilege Level | 47](#)
- [Release Information | 47](#)

## Syntax

```
clear services agf ngap amf  
<amf-name>  
statistics
```

## Description

Clears N1 messages sent to AGF from Access and Mobility Management Functions (AMFs).

## Options

<i>amf-name</i>	(Optional) Clears the statistics for a particular AMF.
<b>statistics</b>	Clears the statistics for all AMFs.

## Required Privilege Level

view

## Release Information

Command introduced in Junos OS Release 22.3R1.

# show network access nas-5g

### IN THIS SECTION

- [Syntax | 48](#)
- [Description | 48](#)
- [Options | 48](#)
- [Required Privilege Level | 48](#)
- [Output Fields | 48](#)
- [Sample Output | 51](#)
- [Release Information | 53](#)

## Syntax

```
show network access nas-5g (state | statistics)
```

## Description

Displays statistics on the interactions that occurs between AGF and other network functions during subscriber authentication.

## Options

- state** Displays the status of 5G connections
- statistics** Displays the statistics for 5GC connections.

## Required Privilege Level

view

## Output Fields

[Table 2 on page 48](#) lists the output fields for the `show network access nas-5g` command.

**Table 2: show network access nas-5g**

Field Name	Field Description
Connection up transitions	Number of NAS connections that has been established.

**Table 2: show network access nas-5g (Continued)**

Field Name	Field Description
Connection down transitions	Number of NAS connection that has been shutdown.
Connection errors	Number of NAS connections that failed.
Total messages sent	Total number of NAS signaling messages sent.
Total messages received	Total number of NAS signaling messages received.
Total request retries	Total number of NAS signaling messages retry attempts.
Total request timeouts	Number of request messages that timed out.
Authentication request attempts	Number of attempted authentication request messages.
Authentication request messages sent	Number of authentication request messages sent successfully.
Authentication request messages authenticated	Number of authentication request messages that has been authenticated.
Authentication request failures	Number of authentication request messages that failed.
Authentication response failures	Number of errors encountered during the processing of authentication response messages.

**Table 2: show network access nas-5g (Continued)**

Field Name	Field Description
Authentication request timeouts	Number of timed out authentication request messages.
Maximum number of outstanding requests exceeded failures	Number of times the outstanding requests have exceeded the failure count.
Session terminate request messages sent	Number of session termination request messages sent.
Session terminate response messages received	Number of session termination response messages received
Session terminate request message failures	Number of session termination request messages that failed.
Session terminate request timeouts	Number of session termination request messages that timed out.
Session command logout received	Number of session logout command messages received.
Session command logout receive failures	Number of session logout command messages that were received and failed.
Session disconnect request sent	Number of session disconnect request messages sent.
Session disconnect request send failures	Number of errors encountered while sending the session disconnect request messages.

**Table 2: show network access nas-5g (Continued)**

Field Name	Field Description
Session disconnect response received	Number of session disconnect response messages received.
Session disconnect response receive failures	Number of errors encountered during the processing of session disconnect response messages.
Number of outstanding requests	The number of pending sessions that have not been processed.
Total number of allocated messages	Total number of messages allocated in memory

## Sample Output

### show network-access nas-5g state

```
user@host> show network-access nas-5g state
```

```
NAS-5G module state information
  Connection state: UP
  Total number of subscribers: 11
```

### show network-access nas-5g statistics

```
user@host> show network-access nas-5g statistics
```

```
NAS-5G module
statistics
```



```
Connection up transitions:
2
Connection down transitions:
1
Connection errors:
0

Total messages sent:
11

Total messages received:
11
Total request retries:
0
Total request timeouts:
0
Authentication request attempts:
5
Authentication request messages sent:
5
Authentication request messages authenticated:
5
Authentication request failures:
0
Authentication response failures:
0
Authentication request timeouts:
0
Maximum number of outstanding requests exceeded failures:
0
Session terminate request messages sent:
6
Session terminate response messages received:
6
Session terminate request message failures:
0
Session terminate response failures:
0
Session terminate request timeouts:
0
Number of outstanding requests:
0
```

```
Total number of allocated messages:  
0
```

## Release Information

Command introduced in Junos OS Release 22.3R1.

# show services agf nas

### IN THIS SECTION

- [Syntax | 53](#)
- [Description | 54](#)
- [Options | 54](#)
- [Required Privilege Level | 54](#)
- [Output Fields | 54](#)
- [Sample Output | 56](#)
- [Release Information | 57](#)

## Syntax

```
show services agf nas (statistics | user-equipment <ue-id>  
<session-id session-id>  
<brief | detail | extensive | summary > )
```

## Description

Displays information about the Non-Access Stratum (NAS) operation between AGF and the user equipments.

## Options

<b>statistics</b>	(Optional) Displays the statistics for different NAS messages that are sent and received on the the AGF.
<b>user-equipment</b> <i>ue-id</i>	(Optional) Displays NAS connection information on user equipments.
<b>session-id</b> <i>session-id</i>	Displays information for a specified session id.
<b>brief   detail   extensive   summary</b>	(Optional) Display the specified level of output.

## Required Privilege Level

view

## Output Fields

Table 3 on page 54 lists the output fields for the `show services agf nas` command.

Table 3: show-services-agf-nas

Field Name	Field Description
Message counts	Number of messages sent and received by the AGF.
Messages received	Type and number NAS signaling messages that has received sent by the AGF.

**Table 3: show-services-agf-nas (Continued)**

Field Name	Field Description
Messages sent	Type and number of NAS signaling messages that has been sent by the AGF.
PDU ID	PDU identifier
Session ID	Session Identifier
Session State	<p>The status of the session:</p> <ul style="list-style-type: none"> <li>• Inactive</li> <li>• Activating</li> <li>• Active</li> <li>• Deactivating</li> <li>• Deactivated</li> </ul>
UE ID	User Equipment Identifier
UE State	<p>Status of the User Equipment.</p> <ul style="list-style-type: none"> <li>• Initial</li> <li>• Registering</li> <li>• Registered</li> <li>• Deregistering</li> <li>• Deregistered</li> <li>• Releasing</li> </ul>

## Sample Output

### show services agf nas statistics

```
user@host> show services agf nas user-equipment
```

UE id	UE State	PDU id	Session State	Session id
10076162	Registered	1	Active	4

### show services agf nas statistics

```
user@host> show services agf nas statistics
```

#### Message counts:

Sent	13
Sent discards	0
Received	6
Receive discards	0

#### Messages sent:

Registration Request	2
Registration Complete	2
Deregistration Request	1
Deregistration Accept	0
Identity Response	0
Authentication Response	0
Authentication Failure	0
Security Mode Complete	0
Security Mode Reject	0
Service Request	0
UL Nas Transport	4
5GMM Status	0
PDU Session Establishment Request	2
PDU Session Modification Complete	0
PDU Session Modification Reject	0
PDU Session Release Request	1

PDU Session Release Complete	1
5GSM Status	0

#### Messages received:

Registration Accept	2
Registration Reject	0
Deregistration Accept	1
Deregistration Request	0
Identity Request	0
Authentication Request	0
Authentication Result	0
Authentication Reject	0
Security Mode Command	0
Service Accept	0
Service Reject	0
DL Nas Transport	3
5GMM Status	0
PDU Session Establishment Accept	2
PDU Session Establishment Reject	0
PDU Session Modification Command	0
PDU Session Release Command	1
PDU Session Release Reject	0
5GSM Status	0

## Release Information

Command introduced in Junos OS Release 22.3R1.

## show services agf ngap

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## Syntax

```
show services agf ngap (amf <amf-name>| user-equipment <ue-id>
<brief | detail | summary>)
```

## Description

Displays information about the Next Generation application Protocol operations.

## Options

<b>amf</b> <i>amf-name</i>	Optional) Displays NGAP information on the AMF
<b>user-equipment</b> <i>ue-id</i>	(Optional) Displays NGAP information user equipments (UEs).
<b>brief   detail   summary</b>	(Optional) Display the specified level of output.

## Required Privilege Level

view

## Output Fields

Table 4 on page 59 lists the AMF output fields for the `show services agf ngap` command.

**Table 4: show services agf ngap (AMF outputs)**

Field Name	Field Description
AMF	AMF name in the configuration.
Backup AMF name	FQDN of the backup AMF for the Globally Unique AMF ID (GUAMI). The GUAMI is provided by the AMF during the NG Setup Procedure. If the AMF does not provide a backup AMF name, then None is displayed.
Default	Identifies whether the AMF is configured as a default AMF. <ul style="list-style-type: none"> <li>• Yes—This is configured as the default AMF.</li> <li>• No—This is not a default AMF</li> </ul>
IP address	IP address configured for the AMF
MCC	Mobile Country Code
MNC	Mobile Network Code
Name	Globally unique, fully qualified domain name (FQDN) provided by the AMF during the NG Setup Procedure. This should be published in the DNS.
Node id	Uniquely configured AMF node ID used internally by the AGF to identify the AMF
Overload State	Current AMF overload state. When the AMF is in the overload state, AGF does not select the AMF for any new UE setups
Port	Port number that is configured for the AMF. Defaults to port 38412 if it is not configured.



Table 4: show services agf ngap (AMF outputs) (Continued)

Field Name	Field Description
Routing Instance	Configured AMF routing instance. The IP address for the AMF must be reachable in the configured routing instance.
SD	Slice Differentiator
Served GUAMI	<p>List of Global Unique AMF Identifier. The GUAMI consists of:</p> <ul style="list-style-type: none"> <li>• PLMN ID—Public Land Mobile Network identifier. Consists of an MCC and MNC.</li> <li>• Region ID—AMF Region identifier.</li> <li>• AMF Set ID—AMF set identifier. The AMF set ID identifies the AMF set within the AMF region.</li> <li>• Pointer—AMF pointer . The AMF pointer identifies one or more AMFs within the AMF set</li> </ul>
SST	<p>Service Slice Type</p> <ul style="list-style-type: none"> <li>• Emmb—Enhanced mobile broadband.</li> <li>• Miot— Massive IoT</li> <li>• Ullc—Ultra-reliable, low latency communications</li> <li>• V2x—Vehicle-to-everything</li> </ul>
State	<p>Status of the AMF.</p> <ul style="list-style-type: none"> <li>• Offline—The AGF is not connected to the AMF.</li> <li>• Offline (Admin) —The AGF is administratively disabled. The AMF configuration was not found.</li> <li>• Connecting—The AGF is in the process of connecting to the AMF.</li> <li>• Initializing—The AGF is in the initial NG Setup Procedure.</li> <li>• Online—The AGF has completed the NG Setup Procedure and is ready to service UE contexts.</li> </ul>

**Table 4: show services agf ngap (AMF outputs) (Continued)**

Field Name	Field Description
Tracking areas	Configured AMF tracking areas.
UE count	Current number of UEs being serviced by the AMF.

[Table 5 on page 61](#) lists the UE output fields for the `show services agf ngap` command.

**Table 5: show services agf ngap Output Fields (UE outputs)**

Field Name	Field Description
AMF	Name of the AMF servicing the UE.
AMF GUAMI	Global Unique AMF Identifier assigned to service the UE context.
AMF UE ID	UE identifier allocated by the AMF.
RM State	<p>Current registration management state. Registration management state is defined by the 3GPP.</p> <ul style="list-style-type: none"> <li>• RM_REGISTERED—The UE is registered with the 5GC.</li> <li>• RM_DEREGISTERED—The UE is NOT registered with the 5GC.</li> </ul>
State	<p>Current Internal NGAP UE state.</p> <ul style="list-style-type: none"> <li>• Establishing—The UE context is being setup in the AMF.</li> <li>• Established—The UE context setup is complete.</li> <li>• Releasing —The UE has requested the AMF to release the UE logical NG connection</li> <li>• Released —The UE context has been released.</li> </ul>

**Table 5: show services agf ngap Output Fields (UE outputs) (Continued)**

Field Name	Field Description
Type	UE Type. <ul style="list-style-type: none"> <li>• FN-RG</li> <li>• 5G-RG</li> </ul>
UE identifier	User Equipment identifier. The identifier uniquely identifies the UE within the AGF.

[Table 6 on page 62](#) lists the PDU session output fields for the `show services agf ngap` command.

**Table 6: show services agf ngap Output Fields (PDU Session)**

Field Name	Field Description
AGF IP address	Local AGF ip address.
Local GTP tunnel	The local GTP tunnel attributes for the PDU session as allocated by the AGF.
PDU Session id	PDU session identifier. allocated by the 5GC.
Remote GTP tunnel	The remote GTP tunnel attributes for the PDU session as allocated by the UPF.
SD	Slice Differentiator
S-NSSAI	Single Network Service Slice Assistance Information. Consists of SST and SD values.
SST	Service Slice Type <ul style="list-style-type: none"> <li>• Embb—Enhanced mobile broadband.</li> <li>• Miot— Massive IoT</li> <li>• Urllc—Ultra-reliable, low latency communications</li> <li>• V2x—Vehicle-to-everything</li> </ul>

**Table 6: show services agf ngap Output Fields (PDU Session) (Continued)**

Field Name	Field Description
State	<p>Current state of the PDU session.</p> <ul style="list-style-type: none"> <li>• Activating—The PDU session resource setup is in progress.</li> <li>• Active—The PDU session has been setup and is active on the AGF.</li> <li>• Failed—The PDU session setup failed on the AGF.</li> </ul>
TEID	GTP tunnel endpoint identifier.
UPF IP address	Remote GTP tunnel endpoint ip address.

## Sample Output

### show services agf ngap amf

```
user@host> show services agf ngap amf
```

AMF	Routing instance	Default	State	Overload	UEs
amf1	default	Yes	Online	Off	1

### show services agf ngap amf detail

```
user@host> show services agf ngap amf detail
```

```
AMF: amf.spirent.com
  Name:          amf.spirent.com
  Node id:       1
```

```

Default:      Yes
Ip address:   10.1.1.7
Port:        38412
Routing instance: default
Tracking areas: 0
State:       Online
Overload state: Off
UE count:    1

```

TNLA: 1

```

Type:      Static
Usage type: UE and Non-UE associated signalling
Weight factor: 128
State:     Established
Packets sent: 16
Packets received: 10
Local ip address Port
10.1.1.1      55465
Peer ip address Port      State
10.1.1.7*    38412    Active

```

Served GUAMI	PLMN id	Region id	Set id	Pointer	Backup AMF name
0x123456090207	123456	9	8	7	

None

PLMN id: 123456 (MCC: 123, MNC: 456)

SST: Embb, SD: 0

SST: Miot, SD: 0

SST: Urllc, SD: 0

## show services agf ngap user-equipment detail

```
user@host> show services agf ngap user-equipment detail
```

UE identifier: 33

```

State:      Established
RM state:   RM-REGISTERED
Type:       FN-RG
AMF:        amf1
AMF UE id:  3690987520

```

```

AMF GUAMI:      0x123456090207
PLMN id:        MCC: 123, MNC: 456
AMF region id:  9
AMF set id:      8
AMF pointer:     7

```

```

PDU session id: 1
  State: Active
  S-NSSAI: SST: Emmb, SD: 0
  Remote GTP tunnel
    TEID: 0x001e8480
    UPF ip address: 10.250.1.62
    QoS flow identifier: 1
  Local GTP tunnel
    TEID: 0x000000e9
    AGF ip address: 10.1.1.51

```

## Release Information

Command introduced in Junos OS Release 22.3R1.

# show subscribers

## IN THIS SECTION

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## Syntax

```
show subscribers
<detail | extensive | terse>
<aci-interface-set-name aci-interface-set-name>
<address address>
<agent-circuit-identifier agent-circuit-identifier>
<agent-remote-identifier agent-remote-identifier>
<aggregation-interface-set-name interface-set-name>
<client-type client-type>
<count>
<id session-id <accounting-statistics>>
<interface interface <accounting-statistics>>
<logical-system logical-system>
<mac-address mac-address>
<physical-interface physical-interface-name>
<profile-name profile-name>
<routing-instance routing-instance>
<stacked-vlan-id stacked-vlan-id>
<sub-system (agf | bng)>
<subscriber-state subscriber-state>
<user-name user-name>
<vci vci-identifier>
<vpi vpi-identifier>
<vlan-id vlan-id>
```

## Description

Display information for active subscribers on both the BNG and AGF subsystems. When you have subscribers logged in to both BNG and AGF, you can display the outputs specific to either subsystem with the `sub-system` option.

See ["Sample Output for AGF" on page 116](#) for subscriber session information on the AGF subsystem.

## Options

- detail | extensive  
| terse

(Optional) Display the specified level of output.
- aci-interface-set-name

(Optional) Display all dynamic subscriber sessions that use the specified agent circuit identifier (ACI) interface set. Use the ACI interface set name generated by the router, such as aci-1003-ge-1/0/0.4001, and not the actual ACI value found in the DHCP or PPPoE control packets.
- address

(Optional) Display subscribers whose IP address matches the specified address. You must specify the IPv4 or IPv6 address prefix without a netmask (for example, 192.0.2.0). If you specify the IP address as a prefix with a netmask (for example, 192.0.2.0/32), the router displays a message that the IP address is invalid, and rejects the command.
- agent-circuit-identifier

(Optional) Display all dynamic subscriber sessions whose ACI value matches the specified string. You can specify either the complete ACI string or a substring. To specify a substring, you must enter characters that form the beginning of the string, followed by an asterisk (\*) as a wildcard to substitute for the remainder of the string. The wildcard can be used only at the end of the specified substring; for example:

```
user@host1> show subscribers agent-circuit-identifier substring*
```

Junos OS Release	Substring Support
Junos OS Release 13.3R1	You can specify a substring without a wildcard.
Starting in Junos OS Release 14.1R1	You must specify the complete ACI string; you cannot specify a wildcard.
Starting in Junos OS Release 15.1R7, 16.1R7, 16.2R3, 17.1R3, 17.2R3, 17.3R3, 17.4R2, 18.1R2, 18.2R1	You can specify a substring, but you must include the wildcard character at the end of the substring.

- agent-remote-identifier

(Optional) Display all dynamic subscriber sessions whose ARI value matches the specified string. You must specify the complete ACI string; you cannot specify a wildcard.



<b>aggregation- interface-set- name <i>interface- set-name</i></b>	(Optional) Display summary information for the specified aggregation node interface set, including interface, VLAN ID, username and LS:RI.
<b><i>client-type</i></b>	<p>(Optional) Display subscribers whose client type matches one of the following client types:</p> <ul style="list-style-type: none"> <li>• <code>dhcp</code>—DHCP clients only.</li> <li>• <code>dot1x</code>—Dot1x clients only.</li> <li>• <code>essm</code>—ESSM clients only.</li> <li>• <code>fixed-wireless-access</code>—Fixed wireless access clients only.</li> <li>• <code>fwauth</code>—FwAuth (authenticated across a firewall) clients only.</li> <li>• <code>l2tp</code>—L2TP clients only.</li> <li>• <code>mlppp</code>—MLPPP clients only.</li> <li>• <code>ppp</code>—PPP clients only.</li> <li>• <code>pppoe</code>—PPPoE clients only.</li> <li>• <code>static</code>—Static clients only.</li> <li>• <code>vlan</code>—VLAN clients only.</li> <li>• <code>vlan-oob</code>—VLAN out-of-band (ANCP-triggered) clients only.</li> <li>• <code>vpls-pw</code>—VPLS pseudowire clients only.</li> <li>• <code>xauth</code>—Xauth clients only.</li> </ul>
<b>count</b>	(Optional) Display the count of total subscribers and active subscribers for any specified option. You can use the <code>count</code> option alone or with the <code>address</code> , <code>client-type</code> , <code>interface</code> , <code>logical-system</code> , <code>mac-address</code> , <code>profile-name</code> , <code>routing-instance</code> , <code>stacked-vlan-id</code> , <code>subscriber-state</code> , or <code>vlan-id</code> options.
<b>id <i>session-id</i></b>	(Optional) Display a specific subscriber session whose session ID matches the specified subscriber ID. You can display subscriber IDs by using the <code>show subscribers extensive</code> or the <code>show subscribers interface extensive</code> commands.
<b>id <i>session-id</i> accounting- statistics</b>	(Optional) Display accurate subscriber accounting statistics for a subscriber session with the specified ID. Requires the <code>actual-transmit-statistics</code> statement to be

configured in the dynamic profile for the dynamic logical interface. If the statement is not configured, a value of 0 is displayed for accounting statistics.

<b><i>interface</i></b>	(Optional) Display subscribers whose interface matches the specified interface.
<b><i>interface accounting-statistics</i></b>	(Optional) Display subscriber accounting statistics for the specified interface. Requires the <code>actual-transmit-statistics</code> statement to be configured in the dynamic profile for the dynamic logical interface.
<b><i>logical-system</i></b>	(Optional) Display subscribers whose logical system matches the specified logical system.
<b><i>mac-address</i></b>	(Optional) Display subscribers whose MAC address matches the specified MAC address.
<b><i>physical-interface-name</i></b>	(M120, M320, and MX Series routers only) (Optional) Display subscribers whose physical interface matches the specified physical interface.
<b><i>profile-name</i></b>	(Optional) Display subscribers whose dynamic profile matches the specified profile name.
<b><i>routing-instance</i></b>	(Optional) Display subscribers whose routing instance matches the specified routing instance.
<b><i>stacked-vlan-id</i></b>	(Optional) Display subscribers whose stacked VLAN ID matches the specified stacked VLAN ID.
<b>subsystem (agf   bng)</b>	(Optional) Displays subscriber information on the AGF or BNG subsystem.
<div> <p><b>NOTE:</b> The subsystem option is only available when both both AGF and BNG subscribers are logged into the router at the same time.</p> </div>	
<b><i>subscriber-state</i></b>	(Optional) Display subscribers whose subscriber state matches the specified subscriber state (ACTIVE, CONFIGURED, INIT, TERMINATED, or TERMINATING).
<b><i>user-name</i></b>	(M120, M320, and MX Series routers only) (Optional) Display subscribers whose username matches the specified subscriber name.
<b><i>vci-identifier</i></b>	(MX Series routers with MPCs and ATM MICs with SFP only) (Optional) Display active ATM subscribers whose ATM virtual circuit identifier (VCI) matches the specified VCI identifier. The range of values is 0 through 255.

- vpi-identifier*

(MX Series routers with MPCs and ATM MICs with SFP only) (Optional) Display active ATM subscribers whose ATM virtual path identifier (VPI) matches the specified VPI identifier. The range of values is 0 through 65,535.
- vlan-id*

(Optional) Display subscribers whose VLAN ID matches the specified VLAN ID, regardless of whether the subscriber uses a single-tagged or double-tagged VLAN. For subscribers using a double-tagged VLAN, this option displays subscribers where the inner VLAN tag matches the specified VLAN ID. To display only subscribers where the specified value matches only double-tagged VLANs, use the *stacked-vlan-id* *stacked-vlan-id* option to match the outer VLAN tag.

**NOTE:** Because of display limitations, logical system and routing instance output values are truncated when necessary.

## Required Privilege Level

view

## Output Fields

Table 7 on page 70 lists the output fields for the `show subscribers` command. Output fields are listed in the approximate order in which they appear.

Table 7: show subscribers Output Fields

Field Name	Field Description
Interface	Interface associated with the subscriber. The router or switch displays subscribers whose interface matches or begins with the specified interface.  The * character indicates a continuation of addresses for the same session.

**Table 7: show subscribers Output Fields (Continued)**

Field Name	Field Description
IP Address/VLAN ID	Subscriber IP address or VLAN ID associated with the subscriber in the form <i>tpid.vlan-id</i>  No IP address or VLAN ID is assigned to an L2TP tunnel-switched session. For these subscriber sessions the value is Tunnel-switched.
User Name	Name of subscriber.
LS:RI	Logical system and routing instance associated with the subscriber.
Type	Subscriber client type (DHCP, FWA, GRE, L2TP, PPP, PPPoE, STATIC-INTERFACE, VLAN).
IP Address	Subscriber IPv4 address.
IP Netmask	Subscriber IP netmask.  (MX Series) This field displays 255.255.255.255 by default. For tunneled or terminated PPP subscribers only, this field displays the actual value of Framed-IP-Netmask when the SDB_FRAMED_PROTOCOL attribute in the session database is equal to AUTHD_FRAMED_PROTOCOL_PPP. This occurs in the use case where the LNS generates access-internal routes when it receives Framed-IP-Netmask from RADIUS during authorization. When it receives Framed-Pool from RADIUS, the pool mask is ignored and the default /32 mask is used.
Primary DNS Address	IP address of primary DNS server.  This field is displayed with the extensive option only when the address is provided by RADIUS.
Secondary DNS Address	IP address of secondary DNS server.  This field is displayed with the extensive option only when the address is provided by RADIUS.

**Table 7: show subscribers Output Fields (Continued)**

Field Name	Field Description
IPv6 Primary DNS Address	<p>IPv6 address of primary DNS server.</p> <p>This field is displayed with the extensive option only when the address is provided by RADIUS.</p>
IPv6 Secondary DNS Address	<p>IPv6 address of secondary DNS server.</p> <p>This field is displayed with the extensive option only when the address is provided by RADIUS.</p>
Domain name server inet	<p>IP addresses for the DNS server, displayed in order of configuration.</p> <p>This field is displayed with the extensive option only when the addresses are derived from the access profile or the global access configuration.</p>
Domain name server inet6	<p>IPv6 addresses for the DNS server, displayed in order of configuration.</p> <p>This field is displayed with the extensive option only when the addresses are derived from the access profile or the global access configuration.</p>
Primary WINS Address	IP address of primary WINS server.
Secondary WINS Address	IP address of secondary WINS server.
IPv6 Address	Subscriber IPv6 address, or multiple addresses.
IPv6 Prefix	Subscriber IPv6 prefix. If you are using DHCPv6 prefix delegation, this is the delegated prefix.
IPv6 User Prefix	IPv6 prefix obtained through NDRA.
IPv6 Address Pool	Subscriber IPv6 address pool. The IPv6 address pool is used to allocate IPv6 prefixes to the DHCPv6 clients.

**Table 7: show subscribers Output Fields (Continued)**

Field Name	Field Description
IPv6 Network Prefix Length	Length of the network portion of the IPv6 address.
IPv6 Prefix Length	Length of the subscriber IPv6 prefix.
Logical System	Logical system associated with the subscriber.
Routing Instance	Routing instance associated with the subscriber.
Interface	(Enhanced subscriber management for MX Series routers) Name of the enhanced subscriber management logical interface, in the form <code>demux0.nnnn</code> (for example, <code>demux0.3221225472</code> ), to which access-internal and framed subscriber routes are mapped.
Interface Type	Whether the subscriber interface is Static or Dynamic.

Table 7: show subscribers Output Fields *(Continued)*

Field Name	Field Description
Interface Set	<p>Internally generated name of the dynamic ACI or ALI interface set used by the subscriber session. The prefix of the name indicates the string received in DHCP or PPPoE control packets on which the interface set is based. For ALI interface sets, the prefix indicates that the value is configured as a trusted option to identify the subscriber line.</p> <p>The name of the interface set uses one of the following prefixes:</p> <ul style="list-style-type: none"> <li>• aci—ACI; for example, aci-1033-demux0.3221225524. This is the only prefix allowed for ACI interface sets.</li> <li>• ari—ARI; for example, ari-1033-demux0.3221225524.</li> <li>• aci+ari—Both the ACI and ARI; for example, aci+ari-1033-demux0.3221225524.</li> <li>• noids—Neither the ACI nor the ARI were received; for example, noids-1033-demux0.3221225524.</li> </ul> <p><b>NOTE:</b> ACI interface sets are configured with the agent-circuit-identifier autoconfiguration stanza. ALI interface sets are configured with the line-identity autoconfiguration stanza.</p> <p>Besides dynamic ACI and ALI interface sets, this field can be an interface set based on a substring of the ARI string. This occurs when the dynamic profile includes the predefined variable \$junos-pon-id-interface-set-name, and the profile is applied for a passive optical network (PON). The ARI string is inserted by the optical line terminal (OLT). The final substring in the string, unique for the PON, identifies individual subscriber circuits, and is used as the name of the interface set.</p>
Interface Set Type	Interface type of the ACI interface set: <i>Dynamic</i> . This is the only ACI interface set type currently supported.
Interface Set Session ID	Identifier of the dynamic ACI interface set entry in the session database.
Underlying Interface	Name of the underlying interface for the subscriber session.
Dynamic Profile Name	Dynamic profile used for the subscriber.

**Table 7: show subscribers Output Fields (Continued)**

Field Name	Field Description
Dynamic Profile Version	Version number of the dynamic profile used for the subscriber.
MAC Address	MAC address associated with the subscriber.
State	Current state of the subscriber session (Init, Configured, Active, Terminating, Tunneled).
L2TP State	Current state of the L2TP session, Tunneled or Tunnel-switched. When the value is Tunnel-switched, two entries are displayed for the subscriber; the first entry is at the LNS interface on the LTS and the second entry is at the LAC interface on the LTS.
Tunnel switch Profile Name	Name of the L2TP tunnel switch profile that initiates tunnel switching.
Local IP Address	IP address of the local gateway (LAC).
Remote IP Address	IP address of the remote peer (LNS).
PFE Flow ID	Forwarding flow identifier.
VLAN Id	VLAN ID associated with the subscriber in the form <i>tpid.vlan-id</i> .
Stacked VLAN Id	Stacked VLAN ID associated with the subscriber in the form <i>tpid.vlan-id</i> .
RADIUS Accounting ID	RADIUS accounting ID associated with the subscriber.



**Table 7: show subscribers Output Fields (Continued)**

Field Name	Field Description
Agent Circuit ID	<p>For the dhcp client type, option 82 agent circuit ID associated with the subscriber. The ID is displayed as an ASCII string unless the value has nonprintable characters, in which case it is displayed in hexadecimal format.</p> <p>For the vlan-oob client type, the agent circuit ID or access-loop circuit identifier that identifies the subscriber line based on the subscriber-facing DSLAM interface on which the subscriber request originates.</p>
Agent Remote ID	<p>For the dhcp client type, option 82 agent remote ID associated with the subscriber. The ID is displayed as an ASCII string unless the value has nonprintable characters, in which case it is displayed in hexadecimal format.</p> <p>For the vlan-oob client type, the agent remote ID or access-loop remote identifier that identifies the subscriber line based on the NAS-facing DSLAM interface on which the subscriber request originates.</p>
Aggregation Interface-set Name	<p>Value of the \$junos-aggregation-interface-set-name predefined variable; one of the following:</p> <ul style="list-style-type: none"> <li>• When the hierarchical-access-network-detection option is configured for the access lines and the value of the Access-Aggregation-Circuit-ID-ASCII attribute (TLV 0x0003) received either in the ANCP Port Up message or PPPoE PADR IA tags begins with a # character, then the variable takes the value of the remainder of the string after the # character.</li> <li>• When the hierarchical-access-network-detection option is not configured, or if the string does not begin with the # character, then the variable takes the value specified with the predefined-variable-defaults statement.</li> </ul>
Accounting Statistics	Actual transmitted subscriber accounting statistics by session ID or interface. Service accounting statistics are not included. These statistics do not include overhead bytes or dropped packets; they are the accurate statistics used by RADIUS. The statistics are counted when the actual-transmit-statistics statement is included in the dynamic profile.
DHCP Relay IP Address	IP address used by the DHCP relay agent.

**Table 7: show subscribers Output Fields (Continued)**

Field Name	Field Description
ATM VPI	(MX Series routers with MPCs and ATM MICs with SFP only) ATM virtual path identifier (VPI) on the subscriber's physical interface.
ATM VCI	(MX Series routers with MPCs and ATM MICs with SFP only) ATM virtual circuit identifier (VCI) for each VPI configured on the subscriber interface.
Login Time	Date and time at which the subscriber logged in.
DHCPv6 Options	len = number of hex values in the message. The hex values specify the type, length, value (TLV) for DHCPv6 options.
Server DHCP Options	len = number of hex values in the message. The hex values specify the type, length, value (TLV) for DHCP options.
Server DHCPv6 Options	len = number of hex values in the message. The hex values specify the type, length, value (TLV) for DHCPv6 options.
DHCPv6 Header	len = number of hex values in the message. The hex values specify the type, length, value (TLV) for DHCPv6 options.
Effective shaping-rate	Actual downstream traffic shaping rate for the subscriber, in kilobits per second.
IPv4 Input Service Set	Input service set in access dynamic profile.
IPv4 Output Service Set	Output service set in access dynamic profile.
PCEF Profile	PCEF profile in access dynamic profile.
PCEF Rule/Rulebase	PCC rule or rulebase used in dynamic profile.

**Table 7: show subscribers Output Fields (Continued)**

Field Name	Field Description
Dynamic configuration	Values for variables that are passed into the dynamic profile from RADIUS.
Service activation time	Time at which the first family in this service became active.
IPv4 rpf-check Fail Filter Name	Name of the filter applied by the dynamic profile to IPv4 packets that fail the RPF check.
IPv6 rpf-check Fail Filter Name	Name of the filter applied by the dynamic profile to IPv6 packets that fail the RPF check.
DHCP Options	len = number of hex values in the message. The hex values specify the type, length, value (TLV) for DHCP options, as defined in RFC 2132.
Session ID	ID number for a subscriber session.
Underlying Session ID	For DHCPv6 subscribers on a PPPoE network, displays the session ID of the underlying PPPoE interface.
Service Sessions	Number of service sessions (that is, a service activated using RADIUS CoA) associated with the subscribers.
Service Session ID	ID number for a subscriber service session.
Service Session Name	Service session profile name.
Session Timeout (seconds)	Number of seconds of access provided to the subscriber before the session is automatically terminated.
Idle Timeout (seconds)	Number of seconds subscriber can be idle before the session is automatically terminated.

**Table 7: show subscribers Output Fields (Continued)**

Field Name	Field Description
IPv6 Delegated Address Pool	Name of the pool used for DHCPv6 prefix delegation.
IPv6 Delegated Network Prefix Length	Length of the prefix configured for the IPv6 delegated address pool.
IPv6 Interface Address	Address assigned by the Framed-Ipv6-Prefix AAA attribute. This field is displayed only when the predefined variable \$junos-ipv6-address is used in the dynamic profile.
IPv6 Framed Interface Id	Interface ID assigned by the Framed-Interface-Id AAA attribute.
ADF IPv4 Input Filter Name	Name assigned to the Ascend-Data-Filter (ADF) interface IPv4 input filter (client or service session). The filter name is followed by the rules (in hexadecimal format) associated with the ADF filter and the decoded rule in Junos OS filter style.
ADF IPv4 Output Filter Name	Name assigned to the Ascend-Data-Filter (ADF) interface IPv4 output filter (client or service session). The filter name is followed by the rules (in hexadecimal format) associated with the ADF filter and the decoded rule in Junos OS filter style.
ADF IPv6 Input Filter Name	Name assigned to the Ascend-Data-Filter (ADF) interface IPv6 input filter (client or service session). The filter name is followed by the rules (in hexadecimal format) associated with the ADF filter and the decoded rule in Junos OS filter style.
ADF IPv6 Output Filter Name	Name assigned to the Ascend-Data-Filter (ADF) interface IPv6 output filter (client or service session). The filter name is followed by the rules (in hexadecimal format) associated with the ADF filter and the decoded rule in Junos OS filter style.
IPv4 Input Filter Name	Name assigned to the IPv4 input filter (client or service session).
IPv4 Output Filter Name	Name assigned to the IPv4 output filter (client or service session).

**Table 7: show subscribers Output Fields (Continued)**

Field Name	Field Description
IPv6 Input Filter Name	Name assigned to the IPv6 input filter (client or service session).
IPv6 Output Filter Name	Name assigned to the IPv6 output filter (client or service session).
IFL Input Filter Name	Name assigned to the logical interface input filter (client or service session).
IFL Output Filter Name	Name assigned to the logical interface output filter (client or service session).
DSL type	PPPoE subscriber's access line type reported by the PPPoE intermediate agent in a PADI or PADO packet in the Vendor-Specific-Tags TLV in subattribute DSL-Type (0x0091). The DSL type is one of the following types: ADSL, ADSL2, ADSL2+, OTHER, SDSL, VDSL, or VDSL2.
Frame/Cell Mode	<p>Mode type of the PPPoE subscriber's access line determined by the PPPoE daemon based on the received subattribute DSL-Type (0x0091):</p> <ul style="list-style-type: none"> <li>• Cell—When the DSL line type is one of the following: ADSL, ADSL2, or ADSL2+.</li> <li>• Frame—When the DSL line type is one of the following: OTHER, SDSL, VDSL, or VDSL2.</li> </ul> <p>The value is stored in the subscriber session database.</p>
Overhead accounting bytes	Number of bytes added to or subtracted from the actual downstream cell or frame overhead to account for the technology overhead of the DSL line type. The value is determined by the PPPoE daemon based on the received subattribute DSL-Type (0x0091). The value is stored in the subscriber session database.
Actual upstream data rate	Unadjusted upstream data rate for the PPPoE subscriber's access line reported by the PPPoE intermediate agent in a PADI or PADO packet in the Vendor-Specific-Tags TLV in subattribute Actual-Net-Data-Rate-Upstream (0x0081).

**Table 7: show subscribers Output Fields (Continued)**

Field Name	Field Description
Actual downstream data rate	Unadjusted downstream data rate for the PPPoE subscriber's access line reported by the PPPoE intermediate agent in a PADI or PADO packet in the Vendor-Specific-Tags TLV in subattribute Actual-Net-Data-Rate-Downstream (0x0082).
Adjusted downstream data rate	Adjusted downstream data rate for the PPPoE subscriber's access line, calculated by the PPPoE daemon and stored in the subscriber session database.
Adjusted upstream data rate	Adjusted upstream data rate for the PPPoE subscriber's access line, calculated by the PPPoE daemon and stored in the subscriber session database.
AGF Mode	Type of access.  Adaptive mode indicates a FN-RG.
Local TEID-U	Tunnel endpoint identifier on the BNG for the GTP-U user plane tunnel to the eNodeB. The identifier is allocated by the BNG.  A fully qualified local TEID-C consists of this identifier and the GTPU Tunnel Local IP address value.
Local TEID-C	Tunnel endpoint identifier on the BNG for the GTP-C control plane tunnel to the MME. The identifier is allocated by the BNG.  A fully qualified local TEID-C consists of this identifier and the GTPC Local IP address value.
Remote TEID-U	Tunnel endpoint identifier on the eNodeB for the GTP-U user plane tunnel to the BNG. The identifier is allocated by the eNodeB.  A fully qualified remote TEID-U consists of this identifier and the GTPU Tunnel Remote IP address value.
Remote TEID-C	Tunnel endpoint identifier on the MME for the GTP-C control plane tunnel to the BNG. The identifier is allocated by the MME.  A fully qualified remote TEID-C consists of this identifier and the GTPC Remote IP address value.

**Table 7: show subscribers Output Fields (Continued)**

Field Name	Field Description
GTPU Tunnel Remote IP address	<p>IP address of the S1-U interface on the eNodeB for the GTP-U tunnel endpoint.</p> <p>A fully qualified remote TEID-U consists of this address and the Remote TEID-U value.</p>
GTPU Tunnel Local IP address	<p>IP address of the S1-U interface on the BNG for the GTP-U tunnel endpoint.</p> <p>A fully qualified local TEID-U consists of this address and the Local TEID-U value</p>
GTPC Remote IP address	<p>IP address of the S11 interface on the MME for the GTP-C tunnel endpoint.</p> <p>A fully qualified remote TEID-C consists of this address and the Remote TEID-C value.</p>
GTPC Local IP address	<p>IP address of the S11 interface on the BNG for the GTP-C tunnel endpoint.</p> <p>A fully qualified local TEID-C consists of this address and the Local TEID-C value.</p>
Access Point Name	<p>Access point name (APN) for the user equipment. The APN corresponds to the connection and service parameters that the subscriber's mobile device can use for connecting to the carrier's gateway to the Internet.</p>
Tenant	<p>Name of the tenant system. You can create multiple tenant system administrators for a tenant system with different permission levels based on your requirements.</p>
Routing instance	<p>Name of the routing instance. When a custom routing instance is created for a tenant system, all the interfaces defined in that tenant system are added to that routing instance.</p>
Dynamic Profile Version Alias	<p>Configured name for a specific variation of a base dynamic profile. IT's presence indicates that the profile configuration is different from that of the base profile. The value is conveyed to the RADIUS server during authentication in the Client-Profile-Name VSA (26-4874-174).</p>

## Sample Output

### show subscribers (IPv4)

```
user@host> show subscribers
```

Interface	IP Address/VLAN ID	User Name	LS:RI
ge-1/3/0.1073741824	10		default:default
demux0.1073741824	203.0.113.10	WHOLESALE-CLIENT	default:default
demux0.1073741825	203.0.113.3	RETAILER1-CLIENT	test1:retailer1
demux0.1073741826	203.0.113.3	RETAILER2-CLIENT	test1:retailer2

### show subscribers (IPv6)

```
user@host> show subscribers
```

Interface	IP Address/VLAN ID	User Name	LS:RI
ge-1/0/0.0	2001:db8:c0:0:0:0/74	WHOLESALE-CLIENT	default:default
*	2001:db8:1/128	subscriber-25	default:default

### show subscribers (IPv4 and IPv6 Dual Stack)

```
user@host> show subscribers
```

Interface	IP Address/VLAN ID	User Name	LS:RI
demux0.1073741834	0x8100.1002 0x8100.1		default:default
demux0.1073741835	0x8100.1001 0x8100.1		default:default
pp0.1073741836	203.0.113.13	dualstackuser1@example1.com	default:ASP-1
*	2001:db8:1::/48		
*	2001:db8:1:1::/64		
pp0.1073741837	203.0.113.33	dualstackuser2@example1.com	default:ASP-1
*	2001:db8:1:2:5::/64		

### show subscribers (Single Session DHCP Dual Stack)

```
user@host> show subscribers
```

Interface	IP Address/VLAN ID	User Name	LS:RI
demux0.1073741364	192.168.10.10	dual-stack-retail35	default:default



```

2001:db8::100:0:0:0/74
2001:db8:3ffe:0:4::/64
default:default

```

### show subscribers (Single Session DHCP Dual Stack detail)

```

user@host> show subscribers id 27 detail
Type: DHCP
User Name: dual-stack-retail33
IP Address: 10.10.0.53
IPv6 Address: 2001:db8:3000:0:0:8003::2
IPv6 Prefix: 2001:db8:3ffe:0:4::/64
Logical System: default
Routing Instance: default
Interface: ae0.3221225472
Interface type: Static
Underlying Interface: ae0.3221225472
Dynamic Profile Name: dhcp-retail-18
MAC Address: 00:00:5E:00:53:02
State: Active
DHCP Relay IP Address: 10.10.0.1
Radius Accounting ID: 27
Session ID: 27
PFE Flow ID: 2
Stacked VLAN Id: 2000
VLAN Id: 1
Login Time: 2014-05-15 10:12:10 PDT
DHCP Options: len 60
00 08 00 02 00 00 00 01 00 0a 00 03 00 01 00 00 64 01 01 02
00 06 00 04 00 03 00 19 00 03 00 0c 00 00 00 00 00 00 00 00
00 00 00 00 00 19 00 0c 00 00 00 00 00 00 00 00 00 00 00 00

```

### show subscribers (LNS on MX Series Routers)

```

user@host> show subscribers
Interface      IP Address/VLAN ID  User Name      LS:RI
si-4/0/0.1    192.0.2.0           user@example.com default:default

```

## show subscribers (L2TP Switched Tunnels)

```
user@host> show subscribers
```

Interface	IP Address/VLAN ID	User Name	LS:RI
si-2/1/0.1073741842	Tunnel-switched	user@example.com	default:default
si-2/1/0.1073741843	Tunnel-switched	user@example.com	default:default

## show subscribers aggregation-interface-set-name

```
user@host> show subscribers aggregation-interface-set-name FRA*
```

Interface	IP Address/VLAN ID	User Name	LS:RI
ge-1/0/0.3221225472	50	ancp	default:isp1-subscriber

## show subscribers client-type dhcp detail

```
user@host> show subscribers client-type dhcp detail
```

Type: DHCP

IP Address: 203.0.113.29

IP Netmask: 255.255.0.0

Logical System: default

Routing Instance: default

Interface: demux0.1073744127

Interface type: Dynamic

Dynamic Profile Name: dhcp-demux

MAC Address: 00:00:5e:00:53:98

State: Active

Radius Accounting ID: user :2304

Login Time: 2009-08-25 14:43:52 PDT

Type: DHCP

IP Address: 203.0.113.27

IP Netmask: 255.255.0.0

Logical System: default

Routing Instance: default

Interface: demux0.1073744383

Interface type: Dynamic

```

Dynamic Profile Name: dhcp-demux-prof
MAC Address: 00:00:5e:00:53:f3
State: Active
Radius Accounting ID: 1234 :2560
Login Time: 2009-08-25 14:43:56 PDT

```

### show subscribers client-type dhcp detail (DHCPv6)

```

user@host> show subscribers client-type dhcp detail
Type: DHCP
User Name: DEFAULTUSER
IPv6 Address: 2001:db8::2
IPv6 Prefix: 2001:db8:1::/64
Logical System: default
Routing Instance: default
Interface: demux0.3221225602
Interface type: Static
Underlying Interface: demux0.3221225602
Dynamic Profile Name: client-profile
MAC Address: 00:00:5E:00:53:01
State: Active
Radius Accounting ID: 142
Session ID: 142
PFE Flow ID: 148
Stacked VLAN Id: 1
VLAN Id: 1
Login Time: 2018-03-29 12:27:38 EDT
DHCP Options: len 56
00 08 00 02 00 00 00 01 00 0e 00 01 00 01 22 4f d0 33 00 11
01 00 00 01 00 03 00 0c 00 00 00 0a 00 04 9d 40 00 07 62 00
00 19 00 0c 00 00 00 0b 00 04 9d 40 00 07 62 00
Server DHCPV6 Options: len 94
00 0a 00 06 11 22 33 44 55 66 00 11 00 09 00 00 0c 4c 00 02
00 01 aa 00 11 00 20 00 00 0a 4c 00 02 00 02 32 33 00 03 00
03 34 35 36 00 05 00 06 31 32 33 34 35 36 00 06 00 01 31 00
11 00 09 00 00 0b 4c 00 02 00 01 bb 00 11 00 12 00 00 0d e9
00 01 00 03 aa bb cc 00 02 00 03 dd ee cc
DHCPV6 Header: len 4
01 fc e4 96

```

**show subscribers client-type dhcp extensive**

```

user@host> show subscribers client-type dhcp extensive
Type: DHCP
User Name: user
IP Address: 192.0.2.4
IP Netmask: 255.0.0.0
IPv6 Address: 2001:db8:3::103
IPv6 Prefix: 2001:db8::/68
Domain name server inet6: 2001:db8:1 abcd::2
Logical System: default
Routing Instance: default
Interface: ge-0/0/0.0
Interface type: Static
Underlying Interface: ge-0/0/0.0
MAC Address: 00:00:5e:00:53:01
State: Configured
Radius Accounting ID: 10
Session ID: 10
PFE Flow ID: 2
VLAN Id: 100
Agent Circuit ID: ge-0/0/0:100
Agent Remote ID: ge-0/0/0:100
Login Time: 2017-05-23 12:52:22 IST
DHCPV6 Options: len 69
00 01 00 0e 00 01 00 01 59 23 e3 31 00 10 94 00 00 01 00 08
00 02 00 00 00 19 00 29 00 00 00 00 00 04 9d 40 00 07 62 00
00 1a 00 19 00 09 3a 80 00 27 8d 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00
Server DHCP Options: len 13
3a 04 00 00 00 ff 00 3b 04 00 00 0f 00
Server DHCPV6 Options: len 8
00 0a 00 04 ab cd ef ab
DHCPV6 Header: len 4
01 00 00 04
IP Address Pool: al_pool30
IPv6 Address Pool: ia_na_pool
IPv6 Delegated Address Pool: prefix_delegate_pool

```

## show subscribers client-type fixed-wireless-access

```
user@host> show subscribers client-type fixed-wireless-access
```

Interface	IP Address/VLAN ID	User Name	LS:RI
ps1.3221225472	192.0.2.10	505024101215074	default:default
ps1.3221225473	192.0.2.11	505024101215075	default:default

## show subscribers client-type fixed-wireless-access detail (Detail)

```
user@host> show subscribers client-type fixed-wireless-access detail
```

### Type: FWA

User Name: 505024101215074

IP Address: 192.0.2.10

IP Netmask: 255.255.0.0

Interface: ps1.3221225472

Interface type: Dynamic

Dynamic Profile Name: fwa-profile

State: Active

Radius Accounting ID: 1

Session ID: 1

PFE Flow ID: 11

Login Time: 2019-04-10 14:10:12 PDT

Local TEID-U: 1

Local TEID-C: 1

Remote TEID-U: 2000000

Remote TEID-C: 1000000

GTPU Tunnel Remote IP Address: 203.0.113.1.3

GTPU Tunnel Local IP Address: 203.0.113.2.5

GTPC Remote IP Address: 203.0.113.1.2

GTPC Local IP Address: 203.0.113.1.1

Access Point Name: user21

## show subscribers client-type vlan-oob detail

```
user@host> show subscribers client-type vlan-oob detail
```

Type: VLAN-OOB

User Name: L2WS.line-aci-1.line-ari-1

Logical System: default

```

Routing Instance: ISP1
Interface: demux0.1073744127
Interface type: Dynamic
Underlying Interface: ge-1/0/0
Dynamic Profile Name: Prof_L2WS
Dynamic Profile Version: 1
State: Active
Radius Accounting ID: 1234
Session ID: 77
VLAN Id: 126
Core-Facing Interface: ge-2/1/1
VLAN Map Id: 6
Inner VLAN Map Id: 2001
Agent Circuit ID: line-aci-1
Agent Remote ID: line-ari-1
Login Time: 2013-10-29 14:43:52 EDT

```

### show subscribers count

```

user@host> show subscribers count
Total Subscribers: 188, Active Subscribers: 188

```

### show subscribers address detail (IPv6)

```

user@host> show subscribers address 203.0.113.137 detail
Type: PPPoE
User Name: pppoeTerV6User1Svc
IP Address: 203.0.113.137
IP Netmask: 255.0.0.0
IPv6 User Prefix: 2001:db8:0:c88::/32
Logical System: default
Routing Instance: default
Interface: pp0.1073745151
Interface type: Dynamic
Underlying Interface: demux0.8201
Dynamic Profile Name: pppoe-client-profile
MAC Address: 00:00:5e:00:53:53
Session Timeout (seconds): 31622400
Idle Timeout (seconds): 86400
State: Active

```

```

Radius Accounting ID: example demux0.8201:6544
Session ID: 6544
Agent Circuit ID: ifl3720
Agent Remote ID: ifl3720
Login Time: 2012-05-21 13:37:27 PDT
Service Sessions: 1

```

### show subscribers detail (IPv4)

```

user@host> show subscribers detail
Type: DHCP
IP Address: 203.0.113.29
IP Netmask: 255.255.0.0
Primary DNS Address: 192.0.2.0
Secondary DNS Address: 192.0.2.1
Primary WINS Address: 192.0.2.3
Secondary WINS Address: 192.0.2.4
Logical System: default
Routing Instance: default
Interface: demux0.1073744127
Interface type: Dynamic
Dynamic Profile Name: dhcp-demux-prof
MAC Address: 00:00:5e:00:53:98
State: Active
Radius Accounting ID: example :2304
Idle Timeout (seconds): 600
Login Time: 2009-08-25 14:43:52 PDT
DHCP Options: len 52
35 01 01 39 02 02 40 3d 07 01 00 10 94 00 00 08 33 04 00 00
00 3c 0c 15 63 6c 69 65 6e 74 5f 50 6f 72 74 20 2f 2f 36 2f
33 2d 37 2d 30 37 05 01 06 0f 21 2c
Service Sessions: 2

```

### show subscribers detail (IPv6)

```

user@host> show subscribers detail
Type: DHCP
User Name: pd-user1
IPv6 Prefix: 2001:db8:ffff:1::/32
Logical System: default

```

```

Routing Instance: default
Interface: ge-3/1/3.2
Interface type: Static
MAC Address: 00:00:5e:00:53:03
State: Active
Radius Accounting ID: 1
Session ID: 1
Login Time: 2011-08-25 12:12:26 PDT
DHCP Options: len 42
00 08 00 02 00 00 00 01 00 0a 00 03 00 01 00 51 ff ff 00 03
00 06 00 02 00 19 00 19 00 0c 00 00 00 00 00 00 00 00 00
00 00

```

### show subscribers detail (pseudowire Interface for GRE Tunnel)

```

user@host> show subscribers detail

```

Interface	IP Address/VLAN ID	User Name	LS:RI
ps0.3221225484	192.0.2.2		
ps0.3221225485	192.0.2.3		
demux0.3221225486	1		default:default
demux0.3221225487	1		default:default
demux0.3221225488	198.51.0.1		default:default
demux0.3221225489	198.51.0.2		default:default

### show subscribers detail (IPv6 Static Demux Interface)

```

user@host> show subscribers detail
Type: STATIC-INTERFACE
User Name: user@example.com
IPv6 Prefix: 2001:db8:3:4:5:6:7:aa/32
Logical System: default
Routing Instance: default
Interface: demux0.1
Interface type: Static
Dynamic Profile Name: junos-default-profile
State: Active
Radius Accounting ID: 185
Login Time: 2010-05-18 14:33:56 EDT

```



**show subscribers detail (L2TP LNS Subscribers on MX Series Routers)**

```

user@host> show subscribers detail
Type: L2TP
User Name: user@example.com
IP Address: 203.0.113.58
IP Netmask: 255.255.0.0
Logical System: default
Routing Instance: default
Interface: si-5/2/0.1073749824
Interface type: Dynamic
Dynamic Profile Name: dyn-lns-profile2
Dynamic Profile Version: 1
State: Active
Radius Accounting ID: 8001
Session ID: 8001
Login Time: 2011-04-25 20:27:50 IST

```

**show subscribers detail (L2TP Switched Tunnels)**

```

user@host> show subscribers detail
Type: L2TP
User Name: user@example.com
Logical System: default
Routing Instance: default
Interface: si-2/1/0.1073741842
Interface type: Dynamic
Dynamic Profile Name: dyn-lts-profile
State: Active
L2TP State: Tunnel-switched
Tunnel switch Profile Name: ce-lts-profile
Local IP Address: 203.0.113.51
Remote IP Address: 192.0.2.0
Radius Accounting ID: 21
Session ID: 21
Login Time: 2013-01-18 03:01:11 PST

Type: L2TP
User Name: user@example.com
Logical System: default

```

```

Routing Instance: default
Interface: si-2/1/0.1073741843
Interface type: Dynamic
Dynamic Profile Name: dyn-lts-profile
State: Active
L2TP State: Tunnel-switched
Tunnel switch Profile Name: ce-lts-profile
Local IP Address: 203.0.113.31
Remote IP Address: 192.0.2.1
Session ID: 22
Login Time: 2013-01-18 03:01:14 PST

```

### **show subscribers detail (Tunneled Subscriber)**

```

user@host> show subscribers detail
Type: PPPoE
User Name: user1@example.com
Logical System: default
Routing Instance: default
Interface: pp0.1
State: Active, Tunneled
Radius Accounting ID: 512

```

### **show subscribers detail (IPv4 and IPv6 Dual Stack)**

```

user@host> show subscribers detail
Type: VLAN
Logical System: default
Routing Instance: default
Interface: demux0.1073741824
Interface type: Dynamic
Dynamic Profile Name: svlanProfile
State: Active
Session ID: 1
Stacked VLAN Id: 0x8100.1001
VLAN Id: 0x8100.1
Login Time: 2011-11-30 00:18:04 PST

Type: PPPoE
User Name: dualstackuser1@example1.com

```

```

IP Address: 203.0.113.13
IPv6 Prefix: 2001:db8:1::/32
IPv6 User Prefix: 2001:db8:1:1::/32
Logical System: default
Routing Instance: ASP-1
Interface: pp0.1073741825
Interface type: Dynamic
Dynamic Profile Name: dualStack-Profile1
MAC Address: 00:00:5e:00:53:02
State: Active
Radius Accounting ID: 2
Session ID: 2
Login Time: 2011-11-30 00:18:05 PST

```

```

Type: DHCP
IPv6 Prefix: 2001:db8:1::/32
Logical System: default
Routing Instance: ASP-1
Interface: pp0.1073741825
Interface type: Static
MAC Address: 00:00:5e:00:53:02
State: Active
Radius Accounting ID: test :3
Session ID: 3
Underlying Session ID: 2
Login Time: 2011-11-30 00:18:35 PST
DHCP Options: len 42
00 08 00 02 0b b8 00 01 00 0a 00 03 00 01 00 00 64 03 01 02
00 06 00 02 00 19 00 19 00 0c 00 00 00 00 00 00 00 00 00 00
00 00

```

### show subscribers detail (ACI Interface Set Session)

```

user@host> show subscribers detail
Type: VLAN
Logical System: default
Routing Instance: default
Interface: ge-1/0/0
Interface Set: aci-1001-ge-1/0/0.2800
Interface Set Session ID: 0

```

```

Underlying Interface: ge-1/0/0.2800
Dynamic Profile Name: aci-vlan-set-profile-2
Dynamic Profile Version: 1
State: Active
Session ID: 1
Agent Circuit ID: aci-ppp-dhcp-20
Login Time: 2012-05-26 01:54:08 PDT

```

### show subscribers detail (PPPoE Subscriber Session with ACI Interface Set)

```

user@host> show subscribers detail
Type: PPPoE
User Name: ppphint2
IP Address: 203.0.113.15
Logical System: default
Routing Instance: default
Interface: pp0.1073741825
Interface type: Dynamic
Interface Set: aci-1001-demux0.1073741824
Interface Set Type: Dynamic
Interface Set Session ID: 2
Underlying Interface: demux0.1073741824
Dynamic Profile Name: aci-vlan-pppoe-profile
Dynamic Profile Version: 1
MAC Address: 00:00:5e:00:53:02
State: Active
Radius Accounting ID: 3
Session ID: 3
Agent Circuit ID: aci-ppp-dhcp-dvlan-50
Login Time: 2012-03-07 13:46:53 PST

```

### show subscribers detail (Dynamic Profile Version Alias)

```

user@host> show subscribers detail

Type: PPPoE
User Name: DEFAULTUSER
IP Address: 192.0.2.21
IP Netmask: 255.255.255.255
IPv6 Address: 2001:db8::17

```

```

Logical System: default
Routing Instance: default
Interface: pp0.3221225720
Interface type: Dynamic
Underlying Interface: demux0.3221225719
Dynamic Profile Name: pppoe-client-profile
Dynamic Profile Version Alias: profile-version1a
MAC Address: 00:00:5E:00:53:38
State: Active
Radius Accounting ID: 288
Session ID: 288
PFE Flow ID: 344
VLAN Id: 1
Login Time: 2019-09-23 10:40:56 IST

```

### show subscribers extensive

```

user@host> show subscribers extensive
Type: DHCP
User Name: uer@host
IP Address: 192.0.2.136
IP Netmask: 255.0.0.0
Logical System: default
Routing Instance: default
Interface: ge-0/0/0.0
Interface type: Static
Underlying Interface: ge-0/0/0.0
MAC Address: 00:10:94:00:00:01
State: Active
Radius Accounting ID: 15
Session ID: 15
PFE Flow ID: 2
VLAN Id: 100
Login Time: 2021-05-24 11:30:07 IST
DHCP Options: len 52
35 01 01 39 02 02 40 3d 07 01 00 10 94 00 00 01 33 04 00 00
00 3c 0c 15 63 6c 69 65 6e 74 5f 50 6f 72 74 20 2f 2f 31 2f
31 2d 30 2d 30 37 05 01 06 0f 21 2c
DHCP Header: len 44
01 01 06 00 00 00 00 1d 00 00 80 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 10 94 00 00 01 00 00 00 00 00

```

```

00 00 00 00
IP Address Pool: al_pool30
Access Line Attributes:
  Actual upstream data rate: 19998
  Actual downstream data rate: 79999
  Access loop encapsulation: 01 02 00

```

### show subscribers extensive (Aggregation Node Interface Set and DSL Forum Attributes)

```

user@host> show subscribers extensive
Type: VLAN-00B
User Name: ancp
Logical System: default
Routing Instance: isp1-subscriber
Interface: ge-1/0/0.3221225472
Interface type: Dynamic
Interface Set: FRA-DPU-C-100
Underlying Interface: ge-1/0/0
Core IFL Name: ge-1/0/4.0
Dynamic Profile Name: Prof_L2BSA
State: Active
Radius Accounting ID: 1
Session ID: 1
PFE Flow ID: 13
VLAN Id: 50
VLAN Map Id: 20
Inner VLAN Map Id: 1
Inner VLAN Tag Protocol Id: 0x88a8
Agent Circuit ID: circuit 201
Agent Remote ID: remote-id
Aggregation Interface-set Name: FRA-DPU-C-100
Login Time: 2018-05-29 08:43:42 EDT
Accounting interval: 72000
Dynamic configuration:
  junos-cos-scheduler-map: 100m
  junos-inner-vlan-tag-protocol-id: 0x88a8
  junos-vlan-map-id: 20

Type: PPPoE
IP Address: 192.85.128.1
IP Netmask: 255.255.255.255

```

```

Logical System: default
Routing Instance: default
Interface: pp0.3221225474
Interface type: Dynamic
Interface Set: ge-1/0/0
Underlying Interface: demux0.3221225473
Dynamic Profile Name: pppoe-client-profile-with-cos
MAC Address: 00:10:94:00:00:03
State: Active
Radius Accounting ID: 3
Session ID: 3
PFE Flow ID: 16
Stacked VLAN Id: 50
VLAN Id: 7
Agent Circuit ID: circuit 201
Agent Remote ID: remote-id
Aggregation Interface-set Name: FRA-DPU-C-100
Login Time: 2018-05-29 08:43:45 EDT
IP Address Pool: pool-1
Accounting interval: 72000
DSL type: G.fast
Frame/cell mode: Frame
Overhead accounting bytes: 10
Actual upstream data rate: 100000 kbps
Actual downstream data rate: 200000 kbps
Calculated downstream data rate: 180000 kbps
Calculated upstream data rate: 90000 kbps
Adjusted upstream data rate: 80000 kbps
Adjusted downstream data rate: 160000 kbps
DSL Line Attributes
  Agent Circuit ID: circuit 201
  Agent Remote ID: remote-id
  Actual upstream data rate: 100000
  Actual downstream data rate: 200000
  DSL type: G.fast
  Access Aggregation Circuit ID: #FRA-DPU-C-100
  Attribute type: 0xAA, Attribute length: 4
    198 51 100 78

```

## show subscribers extensive (Passive Optical Network Circuit Interface Set)

```

user@host> show subscribers client-type dhcp extensive
Type: DHCP
IP Address: 192.0.2.136
IP Netmask: 255.255.0.0
Logical System: default
Routing Instance: default
Interface: demux0.1073741842
Interface type: Dynamic
Interface Set: ot101.xyz101-202
Underlying Interface: demux0.1073741841
Dynamic Profile Name: dhcp-profile
MAC Address: 00:00:5e:00:53:02
State: Active
Radius Accounting ID: user :19
Session ID: 19
VLAN Id: 1100
Agent Remote ID: ABCD01234|100M|AAAA01234|ot101.xyz101-202

Login Time: 2017-03-29 10:30:46 PDT
DHCP Options: len 97
35 01 01 39 02 02 40 3d 07 01 00 10 94 00 00 02 33 04 00 00
17 70 0c 15 63 6c 69 65 6e 74 5f 50 6f 72 74 20 2f 2f 32 2f
32 2d 31 2d 31 37 05 01 06 0f 21 2c 52 2b 02 29 41 42 43 44
30 31 32 33 34 7c 31 30 30 4d 7c 41 41 41 41 30 31 32 33 34
7c 6f 74 6c 30 31 2e 78 79 7a 31 30 31 2d 32 30 32
IP Address Pool: POOL-V4

```

## show subscribers extensive (DNS Addresses from Access Profile or Global Configuration)

```

user@host> show subscribers extensive
Type: DHCP
User Name: test-user@example-com
IP Address: 192.0.2.119
IP Netmask: 255.255.255.255
Domain name server inet: 198.51.100.1 198.51.100.2
IPv6 Address: 2001:db8::1:11
Domain name server inet6: 2001:db8:5001::12 2001:db8:3001::12
Logical System: default

```



```

Routing Instance: default
Interface: ge-2/0/3.0
Interface type: Static
Underlying Interface: ge-2/0/3.0
MAC Address: 00:00:5E:00:53:00
State: Active
Radius Accounting ID: 5
Session ID: 5
Login Time: 2017-01-31 11:16:21 IST
DHCP Options: len 53
35 01 01 39 02 02 40 3d 07 01 00 10 94 00 00 03 33 04 00 00
00 3c 0c 16 63 6c 69 65 6e 74 5f 50 6f 72 74 20 2f 2f 35 2f
31 32 2d 30 2d 30 37 05 01 06 0f 21 2c
IP Address Pool: v4-pool

```

### show subscribers extensive (DNS Addresses from RADIUS)

```

user@host> show subscribers extensive
Type: DHCP
User Name: test-user@example-com
IP Address: 192.0.2.119
IP Netmask: 255.255.255.255
Primary DNS Address: 198.51.100.1
Secondary DNS Address: 198.51.100.2
IPv6 Address: 2001:db8::1:11
IPv6 Primary DNS Address: 2001:db8:5001::12
IPv6 Secondary DNS Address: 2001:db8:3001::12
Logical System: default
Routing Instance: default
Interface: ge-2/0/3.0
Interface type: Static
Underlying Interface: ge-2/0/3.0
MAC Address: 00:00:5E:00:53:00
State: Active
Radius Accounting ID: 5
Session ID: 5
Login Time: 2017-01-31 11:16:21 IST
DHCP Options: len 53
35 01 01 39 02 02 40 3d 07 01 00 10 94 00 00 03 33 04 00 00
00 3c 0c 16 63 6c 69 65 6e 74 5f 50 6f 72 74 20 2f 2f 35 2f

```

```
31 32 2d 30 2d 30 37 05 01 06 0f 21 2c
```

```
IP Address Pool: v4-pool
```

### show subscribers extensive (IPv4 DNS Addresses from RADIUS, IPv6 from Access Profile or Global Configuration)

```
user@host> show subscribers extensive
Type: DHCP
User Name: test-user@example-com
IP Address: 192.0.2.119
IP Netmask: 255.255.255.255
Primary DNS Address: 198.51.100.1
Secondary DNS Address: 198.51.100.2
IPv6 Address: 2001:db8::1:11
Domain name server inet6: 2001:db8:5001::12 2001:db8:3001::12
Logical System: default
Routing Instance: default
Interface: ge-2/0/3.0
Interface type: Static
Underlying Interface: ge-2/0/3.0
MAC Address: 00:00:5E:00:53:00
State: Active
Radius Accounting ID: 5
Session ID: 5
Login Time: 2017-01-31 11:16:21 IST
DHCP Options: len 53
35 01 01 39 02 02 40 3d 07 01 00 10 94 00 00 03 33 04 00 00
00 3c 0c 16 63 6c 69 65 6e 74 5f 50 6f 72 74 20 2f 2f 35 2f
31 32 2d 30 2d 30 37 05 01 06 0f 21 2c
IP Address Pool: v4-pool
```

### show subscribers extensive (RPF Check Fail Filter)

```
user@host> show subscribers extensive
...
Type: VLAN
Logical System: default
Routing Instance: default
Interface: ae0.1073741824
```

```

Interface type: Dynamic
Dynamic Profile Name: vlan-prof
State: Active
Session ID: 9
VLAN Id: 100
Login Time: 2011-08-26 08:17:00 PDT
IPv4 rpf-check Fail Filter Name: rpf-allow-dhcp
IPv6 rpf-check Fail Filter Name: rpf-allow-dhcpv6
...

```

### **show subscribers extensive (L2TP LNS Subscribers on MX Series Routers)**

```

user@host> show subscribers extensive
Type: L2TP
User Name: user@example.com
IP Address: 203.0.113.58
IP Netmask: 255.255.0.0
Logical System: default
Routing Instance: default
Interface: si-5/2/0.1073749824
Interface type: Dynamic
Dynamic Profile Name: dyn-lns-profile2
Dynamic Profile Version: 1
State: Active
Radius Accounting ID: 8001
Session ID: 8001
Login Time: 2011-04-25 20:27:50 IST
IPv4 Input Filter Name: classify-si-5/2/0.1073749824-in
IPv4 Output Filter Name: classify-si-5/2/0.1073749824-out

```

### **show subscribers extensive (IPv4 and IPv6 Dual Stack)**

```

user@host> show subscribers extensive
Type: VLAN
Logical System: default
Routing Instance: default
Interface: demux0.1073741824
Interface type: Dynamic
Dynamic Profile Name: svlanProfile
State: Active

```

```

Session ID: 1
Stacked VLAN Id: 0x8100.1001
VLAN Id: 0x8100.1
Login Time: 2011-11-30 00:18:04 PST

Type: PPPoE
User Name: dualstackuser1@example1.com
IP Address: 203.0.113.13
IPv6 Prefix: 2001:db8:1::/32
IPv6 User Prefix: 2001:db8:1:1::/32
Logical System: default
Routing Instance: ASP-1
Interface: pp0.1073741825
Interface type: Dynamic
Dynamic Profile Name: dualStack-Profile1
MAC Address: 00:00:5e:00:53:02
State: Active
Radius Accounting ID: 2
Session ID: 2
Login Time: 2011-11-30 00:18:05 PST
IPv6 Delegated Network Prefix Length: 48
IPv6 Interface Address: 2001:db8:2016:1:1::1/64
IPv6 Framed Interface Id: 1:1:2:2
IPv4 Input Filter Name: FILTER-IN-pp0.1073741825-in
IPv4 Output Filter Name: FILTER-OUT-pp0.1073741825-out
IPv6 Input Filter Name: FILTER-IN6-pp0.1073741825-in
IPv6 Output Filter Name: FILTER-OUT6-pp0.1073741825-out

Type: DHCP
IPv6 Prefix: 2001:db8:1::/32
Logical System: default
Routing Instance: ASP-1
Interface: pp0.1073741825
Interface type: Static
MAC Address: 00:00:5e:00:53:02
State: Active
Radius Accounting ID: test :3
Session ID: 3
Underlying Session ID: 2
Login Time: 2011-11-30 00:18:35 PST
DHCP Options: len 42
00 08 00 02 0b b8 00 01 00 0a 00 03 00 01 00 00 64 03 01 02
00 06 00 02 00 19 00 19 00 0c 00 00 00 00 00 00 00 00 00 00

```

```
00 00
```

```
IPv6 Delegated Network Prefix Length: 48
```

### show subscribers extensive (ADF Rules )

```
user@host> show subscribers extensive
...
Service Session ID: 12
Service Session Name: SERVICE-PROFILE
State: Active
Family: inet
  ADF IPv4 Input Filter Name: __junos_adf_12-demux0.3221225474-inet-in
    Rule 0: 010101000b0101020b020200201811
      from {
        source-address 203.0.113.232;
        destination-address 198.51.100.0/24;
        protocol 17;
      }
      then {
        accept;
      }
```

### show subscribers extensive (Effective Shaping-Rate)

```
user@host> show subscribers extensive
Type: VLAN
Logical System: default
Routing Instance: default
Interface: demux0.1073741837
Interface type: Dynamic
Interface Set: ifset-1
Underlying Interface: ae1
Dynamic Profile Name: svlan-dhcp-test
State: Active
Session ID: 1
Stacked VLAN Id: 0x8100.201
VLAN Id: 0x8100.201
Login Time: 2011-11-30 00:18:04 PST
```

```
Effective shaping-rate: 31000000k
...
```

### show subscribers extensive (PPPoE Subscriber Access Line Rates)

```
user@host> show subscribers extensive
Type: PPPoE
IP Address: 198.51.100.1
IP Netmask: 255.255.255.255
Logical System: default
Routing Instance: default
Interface: pp0.3221225475
Interface type: Dynamic
Underlying Interface: demux0.3221225474
Dynamic Profile Name: pppoe-client-profile-with-cos
MAC Address: 00:00:5e:00:53:02
State: Active
Radius Accounting ID: 4
Session ID: 4
PFE Flow ID: 14
Stacked VLAN Id: 40
VLAN Id: 1
Agent Circuit ID: circuit0
Agent Remote ID: remote0
Login Time: 2017-04-06 15:52:32 PDT

User Name: DAVE-L2BSA-SERVICE
Logical System: default
Routing Instance: isp-1-subscriber
Interface: ge-1/2/4.3221225472
Interface type: Dynamic
Interface Set: ge-1/2/4
Underlying Interface: ge-1/2/4
Core IFL Name: ge-1/3/4.0
Dynamic Profile Name: L2BSA-88a8-400LL1300V0
State: Active
Radius Accounting ID: 1
Session ID: 1
PFE Flow ID: 14
VLAN Id: 13
VLAN Map Id: 102
```

```

Inner VLAN Map Id: 1
Agent Circuit ID: circuit-aci-3
Agent Remote ID: remote49-3
Login Time: 2017-04-05 16:59:29 EDT
Service Sessions: 4
IFL Input Filter Name: L2BSA-CP-400LL1300V0-ge-1/2/4.3221225472-in
IFL Output Filter Name: L2BSA-CP-400LL1300V0-ge-1/2/4.3221225472-out
Accounting interval: 900
DSL type: VDSL
Frame/Cell Mode: Frame
Overhead accounting bytes: -10
Actual upstream data rate: 1024 kbps
Actual downstream data rate: 4096 kbps
Adjusted downstream data rate: 3686 kbps
Adjusted upstream data rate: 922 kbps
Dynamic configuration:
  junos-vlan-map-id: 102
  Service Session ID: 5
  Service Session Name: SRL-L1
  State: Active
  Family: inet, inet6
  IFL Input Filter Name: L2BSA-FWF-in-10048-ge-1/2/4.3221225472-in
  IFL Output Filter Name: L2BSA-FWF-out-25088-ge-1/2/4.3221225472-out
  Service Activation time: 2017-04-05 16:59:30 EDT
Dynamic configuration:
  l2bsa-fwf-in: L2BSA-FWF-in-10048
  l2bsa-fwf-out: L2BSA-FWF-out-25088
  rldown: 25088
  rlup: 10048

```

### **show subscribers extensive (Subscriber Session Using PCEF Profile)**

```

user@host> show subscribers extensive
Type: VLAN
Logical System: default
Routing Instance: default
Interface: demux0.3221225517
Interface type: Dynamic
Underlying Interface: ge-1/0/3
Dynamic Profile Name: svlan-dhcp
State: Active

```

Session ID: 59  
 PFE Flow ID: 71  
 Stacked VLAN Id: 0x8100.1  
 VLAN Id: 0x8100.2  
 Login Time: 2017-03-28 08:23:08 PDT

Type: DHCP  
 User Name: pcefuser  
 IP Address: 192.0.2.26  
 IP Netmask: 255.0.0.0  
 Logical System: default  
 Routing Instance: default  
 Interface: demux0.3221225518  
 Interface type: Dynamic  
 Underlying Interface: demux0.3221225517  
 Dynamic Profile Name: dhcp-client-prof  
 MAC Address: 00:00:5e:00:53:01  
 State: Active  
 Radius Accounting ID: 60  
 Session ID: 60  
 PFE Flow ID: 73  
 Stacked VLAN Id: 1  
 VLAN Id: 2  
 Login Time: 2017-03-28 08:23:08 PDT  
 Service Sessions: 1  
 DHCP Options: len 9  
 35 01 01 37 04 01 03 3a 3b  
 IP Address Pool: pool-ipv4  
 IPv4 Input Service Set: tdf-service-set  
 IPv4 Output Service Set: tdf-service-set  
 PCEF Profile: pcef-prof-1  
 PCEF Rule/Rulebase: default  
 Dynamic configuration:  
   junos-input-service-filter: svc-filt-1  
   junos-input-service-set: tdf-service-set  
   junos-output-service-filter: svc-filt-1  
   junos-output-service-set: tdf-service-set  
   junos-pcef-profile: pcef-prof-1  
   junos-pcef-rule: default

Service Session ID: 61  
 Service Session Name: pcef-serv-prof  
 State: Active



```

Family: inet
IPv4 Input Service Set: tdf-service-set
IPv4 Output Service Set: tdf-service-set
PCEF Profile: pcef-prof-1
PCEF Rule/Rulebase: limit-fb
Service Activation time: 2017-03-28 08:31:19 PDT
Dynamic configuration:
    pcef-prof: pcef-prof-1
    pcef-rule1: limit-fb
    svc-filt: svc-filt-1
    svc-set: tdf-service-set

```

### **show subscribers aci-interface-set-name detail (Subscriber Sessions Using Specified ACI Interface Set)**

```
user@host> show subscribers aci-interface-set-name aci-1003-ge-1/0/0.4001 detail
```

```

Type: VLAN
Logical System: default
Routing Instance: default
Interface: ge-1/0/0.
Underlying Interface: ge-1/0/0.4001
Dynamic Profile Name: aci-vlan-set-profile
Dynamic Profile Version: 1
State: Active
Session ID: 13
Agent Circuit ID: aci-ppp-vlan-10
Login Time: 2012-03-12 10:41:56 PDT

```

```

Type: PPPoE
User Name: ppphint2
IP Address: 203.0.113.17
Logical System: default
Routing Instance: default
Interface: pp0.1073741834
Interface type: Dynamic
Interface Set: aci-1003-ge-1/0/0.4001
Interface Set Type: Dynamic
Interface Set Session ID: 13
Underlying Interface: ge-1/0/0.4001
Dynamic Profile Name: aci-vlan-pppoe-profile
Dynamic Profile Version: 1

```

```

MAC Address:
State: Active
Radius Accounting ID: 14
Session ID: 14
Agent Circuit ID: aci-ppp-vlan-10
Login Time: 2012-03-12 10:41:57 PDT

```

### **show subscribers agent-circuit-identifier detail (Subscriber Sessions Using Specified ACI Substring)**

```
user@host> show subscribers agent-circuit-identifier aci-ppp-vlan detail
```

```

Type: VLAN
Logical System: default
Routing Instance: default
Interface: ge-1/0/0.
Underlying Interface: ge-1/0/0.4001
Dynamic Profile Name: aci-vlan-set-profile
Dynamic Profile Version: 1
State: Active
Session ID: 13
Agent Circuit ID: aci-ppp-vlan-10
Login Time: 2012-03-12 10:41:56 PDT

```

```

Type: PPPoE
User Name: ppphint2
IP Address: 203.0.113.17
Logical System: default
Routing Instance: default
Interface: pp0.1073741834
Interface type: Dynamic
Interface Set: aci-1003-ge-1/0/0.4001
Interface Set Type: Dynamic
Interface Set Session ID: 13
Underlying Interface: ge-1/0/0.4001
Dynamic Profile Name: aci-vlan-pppoe-profile
Dynamic Profile Version: 1
MAC Address: 00:00:5e:00:53:52
State: Active
Radius Accounting ID: 14
Session ID: 14

```

Agent Circuit ID: aci-ppp-vlan-10  
Login Time: 2012-03-12 10:41:57 PDT

### show subscribers id accounting-statistics

```
user@host> show subscribers id 601 accounting-statistics
Session ID: 601
Accounting Statistics:
Input bytes : 199994
Output bytes : 121034
Input packets: 5263
Output packets: 5263
IPv6:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
```

### show subscribers interface accounting-statistics

```
user@host> show subscribers interface pp0.3221226949 accounting-statistics
Session ID: 501
Accounting Statistics:
Input bytes : 199994
Output bytes : 121034
Input packets: 5263
Output packets: 5263
IPv6:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0

Session ID: 502
Accounting Statistics:
Input bytes : 87654
Output bytes : 72108
Input packets: 3322
Output packets: 3322
IPv6:
```

```

Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0

Session ID: 503
Accounting Statistics:
Input bytes : 156528
Output bytes : 123865
Input packets: 7448
Output packets: 7448
IPv6:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0

```

### **show subscribers interface extensive**

```

user@host> show subscribers interface demux0.1073741826 extensive
Type: VLAN
User Name: user@test.example.com
Logical System: default
Routing Instance: testnet
Interface: demux0.1073741826
Interface type: Dynamic
Dynamic Profile Name: profile-vdemux-relay-23qos
MAC Address: 00:00:5e:00:53:04
State: Active
Radius Accounting ID: 12
Session ID: 12
Stacked VLAN Id: 0x8100.1500
VLAN Id: 0x8100.2902
Login Time: 2011-10-20 16:21:59 EST

Type: DHCP
User Name: user@test.example.com
IP Address: 192.0.2.0
IP Netmask: 255.255.255.0
Logical System: default
Routing Instance: testnet

```

```

Interface: demux0.1073741826
Interface type: Static
MAC Address: 00:00:5e:00:53:04
State: Active
Radius Accounting ID: 21
Session ID: 21
Login Time: 2011-10-20 16:24:33 EST
Service Sessions: 2

Service Session ID: 25
Service Session Name: SUB-QOS
State: Active

Service Session ID: 26
Service Session Name: service-cb-content
State: Active
IPv4 Input Filter Name: content-cb-in-demux0.1073741826-in
IPv4 Output Filter Name: content-cb-out-demux0.1073741826-out

```

### **show subscribers logical-system terse**

```

user@host> show subscribers logical-system test1 terse

```

Interface	IP Address/VLAN ID	User Name	LS:RI
demux0.1073741825	203.0.113.3	RETAILER1-CLIENT	test1:retailer1
demux0.1073741826	203.0.113.4	RETAILER2-CLIENT	test1:retailer2

### **show subscribers physical-interface count**

```

user@host> show subscribers physical-interface ge-1/0/0 count
Total subscribers: 3998, Active Subscribers: 3998

```

### **show subscribers routing-instance inst1 count**

```

user@host> show subscribers routing-instance inst1 count
Total Subscribers: 188, Active Subscribers: 183

```

**show subscribers stacked-vlan-id detail**

```

user@host> show subscribers stacked-vlan-id 101 detail
Type: VLAN
Interface: ge-1/2/0.1073741824
Interface type: Dynamic
Dynamic Profile Name: svlan-prof
State: Active
Stacked VLAN Id: 0x8100.101
VLAN Id: 0x8100.100
Login Time: 2009-03-27 11:57:19 PDT

```

**show subscribers stacked-vlan-id vlan-id detail (Combined Output)**

```

user@host> show subscribers stacked-vlan-id 101 vlan-id 100 detail
Type: VLAN
Interface: ge-1/2/0.1073741824
Interface type: Dynamic
Dynamic Profile Name: svlan-prof
State: Active
Stacked VLAN Id: 0x8100.101
VLAN Id: 0x8100.100
Login Time: 2009-03-27 11:57:19 PDT

```

**show subscribers stacked-vlan-id vlan-id interface detail (Combined Output for a Specific Interface)**

```

user@host> show subscribers stacked-vlan-id 101 vlan-id 100 interface ge-1/2/0.* detail
Type: VLAN
Interface: ge-1/2/0.1073741824
Interface type: Dynamic
Dynamic Profile Name: svlan-prof
State: Active
Stacked VLAN Id: 0x8100.101
VLAN Id: 0x8100.100
Login Time: 2009-03-27 11:57:19 PDT

```

**show subscribers user-name detail**

```

user@host> show subscribers user-name larry1 detail
Type: DHCP
User Name: larry1
IP Address: 203.0.113.37
IP Netmask: 255.255.0.0
Logical System: default
Routing Instance: default
Interface: ge-1/0/0.1
Interface type: Static
Dynamic Profile Name: foo
MAC Address: 00:00:5e:00:53:01
State: Active
Radius Accounting ID: 1
Session ID: 1
Login Time: 2011-11-07 08:25:59 PST
DHCP Options: len 52
35 01 01 39 02 02 40 3d 07 01 00 10 94 00 00 01 33 04 00 00
00 3c 0c 15 63 6c 69 65 6e 74 5f 50 6f 72 74 20 2f 2f 32 2f
37 2d 30 2d 30 37 05 01 06 0f 21 2c

```

**show subscribers vlan-id**

```

user@host> show subscribers vlan-id 100

```

Interface	IP Address	User Name
ge-1/0/0.1073741824		
ge-1/2/0.1073741825		

**show subscribers vlan-id detail**

```

user@host> show subscribers vlan-id 100 detail
Type: VLAN
Interface: ge-1/0/0.1073741824
Interface type: Dynamic
Dynamic Profile Name: vlan-prof-tpid
State: Active
VLAN Id: 100
Login Time: 2009-03-11 06:48:54 PDT

```

```
Type: VLAN
Interface: ge-1/2/0.1073741825
Interface type: Dynamic
Dynamic Profile Name: vlan-prof-tpid
State: Active
VLAN Id: 100
Login Time: 2009-03-11 06:48:54 PDT
```

### **show subscribers vpi vci extensive (PPPoE-over-ATM Subscriber Session)**

```
user@host> show subscribers vpi 40 vci 50 extensive
Type: PPPoE
User Name: testuser
IP Address: 203.0.113.2
IP Netmask: 255.255.0.0
Logical System: default
Routing Instance: default
Interface: pp0.0
Interface type: Static
MAC Address: 00:00:5e:00:53:02
State: Active
Radius Accounting ID: 2
Session ID: 2
ATM VPI: 40
ATM VCI: 50
Login Time: 2012-12-03 07:49:26 PST
IP Address Pool: pool_1
IPv6 Framed Interface Id: 200:65ff:fe23:102
```

### **show subscribers address detail (Enhanced Subscriber Management)**

```
user@host> show subscribers address 203.0.113.111 detail
Type: DHCP
User Name: simple_filters_service
IP Address: 203.0.113.111
IP Netmask: 255.0.0.0
Logical System: default
Routing Instance: default
Interface: demux0.3221225482
```



```

Interface type: Dynamic
Underlying Interface: demux0.3221225472
Dynamic Profile Name: dhcp-demux-prof
MAC Address: 00:00:5e:00:53:0f
State: Active
Radius Accounting ID: 11
Session ID: 11
PFE Flow ID: 15
Stacked VLAN Id: 210
VLAN Id: 209
Login Time: 2014-03-24 12:53:48 PDT
Service Sessions: 1
DHCP Options: len 3
35 01 01

```

### **show subscribers extensive (Tenant Systems)**

```

user@host:TSYS1> show subscribers extensive
Type: XAUTH
User Name: userX
+   Tenant: TSYS1
    Routing Instance: TSYS1-ri
IP Address: 192.0.2.0
IP Netmask: 203.0.113.0
Primary DNS Address: 198.51.100.0
Secondary DNS Address: 198.51.100.1
Dynamic Profile Name: radius
State: Active
Session ID: 1
Login Time: 2018-09-18 13:49:00 PDT

```

## **Sample Output for AGF**

The following sample output shows subscribers connected to the AGF:

**show subscribers extensive (DHCP on a FN-RG)**

```

user@host> show subscribers extensive
Type: DHCP
User Name: USER2
IP Address: 172.16.0.227
Logical System: default
Routing Instance: default
Interface: demux0.3221230587
Interface type: Dynamic
Underlying Interface: demux0.3221230586
Dynamic Profile Name: dhcp-profile
MAC Address: 00:44:46:44:44:44
State: Active
DHCP Relay IP Address: 10.1.0.1
Radius Accounting ID: 5128
Session ID: 5128
PFE Flow ID: 5185
Stacked VLAN Id: 1
VLAN Id: 1
Agent Circuit ID: aci1
Agent Remote ID: ari1
Login Time: 2022-04-26 09:24:56 PDT
Service Sessions: 1
DHCP Options: len 9
35 01 01 37 04 01 03 3a 3b
DHCP Header: len 44
01 01 06 00 10 bd b4 93 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 44 46 44 44 44 00 00 00 00 00 00
00 00 00 00
AGF Mode: Adaptive
Local TEID-U: 10183810
Remote TEID-U: 6354992
GTPU Tunnel Remote IP Address: 10.0.0.1
GTPU Tunnel Local IP Address: 10.0.0.1
5G-QFI: 1
IPv6 Framed Interface Id: 0:7fff:ffff:eea0
IPv4 Input Filter Name: RG-LWAC-V4-INPUT-FILTER-01-demux0.3221230587-in
IPv4 Output Filter Name: RG-LWAC-V4-OUTPUT-FILTER-01-demux0.3221230587-out
Access Line Attributes:
  Agent Circuit ID: aci1
  Agent Remote ID: ari1

```

Dynamic configuration:

```

junos-cos-guaranteed-rate: 1000000
junos-cos-guaranteed-rate-burst: 250000
  junos-cos-scheduler: GOLD
    junos-cos-scheduler-shaping-rate: 200000000
    junos-cos-scheduler-tx: 200000000
junos-cos-scheduler-map: DATA_VOICE_VIDEO_SMAP_UID1468
junos-cos-shaping-rate: 200000000
junos-cos-shaping-rate-burst: 50000
junos-cos-traffic-control-profile: TRAFFIC_CONTROL_PROFILE
junos-input-filter: RG-LWAC-V4-INPUT-FILTER-01
junos-input-ipv6-filter: RG-LWAC-V6-INPUT-FILTER-01
junos-output-filter: RG-LWAC-V4-OUTPUT-FILTER-01
junos-output-ipv6-filter: RG-LWAC-V6-OUTPUT-FILTER-01

```

Service Session ID: 5129

Service Session Name: SERVICE-PROFILE-BASIC-POLICER

State: Active

Family: inet

Service session type: Service-Profile

IPv4 Input Filter Name: CAP-POLICER-demux0.3221230587-in

IPv4 Output Filter Name: CAP-POLICER-demux0.3221230587-out

Service Activation time: 2022-04-26 09:24:57 PDT

Dynamic configuration:

```
bandwidth-limit: 200k
```

```
burst-size-limit: 75k
```

## Release Information

Command introduced in Junos OS Release 9.3.

`client-type`, `mac-address`, `subscriber-state`, and extensive options introduced in Junos OS Release 10.2.

`count` option usage with other options introduced in Junos OS Release 10.2.

Options `aci-interface-set-name` and `agent-circuit-identifier` introduced in Junos OS Release 12.2.

The `physical-interface` and `user-name` options introduced in Junos OS Release 12.3.

Options `vci` and `vpi` introduced in Junos OS Release 12.3R3 and supported in later 12.3Rx releases.

Options `vci` and `vpi` supported in Junos OS Release 13.2 and later releases. (Not supported in Junos OS Release 13.1.)

Enhanced subscriber management supported in Junos OS Release 15.1R3 on MX Series routers.

`accounting-statistics` option added in Junos OS Release 15.1R3 and 17.4R1 on MX Series routers.

`aggregation-interface-set-name` option added in Junos OS Release 18.4R1 on MX Series routers.

`sub-system` added in Junos OS Release 22.3R1.

## RELATED DOCUMENTATION

*Verifying and Managing Agent Circuit Identifier-Based Dynamic VLAN Configuration*

*Verifying and Managing Configurations for Dynamic VLANs Based on Access-Line Identifiers*

*Verifying and Managing Junos OS Enhanced Subscriber Management*

# show subscribers summary

## IN THIS SECTION

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## Syntax

```
show subscribers summary
<all>
```

```

<detail | extensive | terse>
<count>
<physical-interface physical-interface-name>
<logical-system logical-system pic | port | routing-instance routing-instance | slot>
<sub-system (agf | bng)>

```

## Description

Display summary information for subscribers.

## Options

<b>none</b>	Display summary information by state and client type for all subscribers.
<b>all</b>	(Optional) Display summary information by state, client type, and LS:RI.
<b>detail   extensive   terse</b>	(Not supported on MX Series routers) (Optional) Display the specified level of output.
<b>count</b>	(Not supported on MX Series routers) (Optional) Display the count of total subscribers and active subscribers for any specified option.
<b>logical-system</b> <i>logical-system</i>	(Optional) Display subscribers whose logical system matches the specified logical system.
<b>physical-interface</b> <i>physical-interface-name</i>	(M120, M320, and MX Series routers only) (Optional) Display a count of subscribers whose physical interface matches the specified physical interface, by subscriber state, client type, and LS:RI.
<b>pic</b>	(M120, M320, and MX Series routers only) (Optional) Display a count of subscribers by PIC number and the total number of subscribers.
<b>port</b>	(M120, M320, and MX Series routers only) (Optional) Display a count of subscribers by port number and the total number of subscribers.
<b>routing-instance</b> <i>routing-instance</i>	(Optional) Display subscribers whose routing instance matches the specified routing instance.

- slot** (M120, M320, and MX Series routers only) (Optional) Display a count of subscribers by FPC slot number and the total number of subscribers.
- sub-system (agf | bng)** (Optional) Display a count of subscribers using either AGF or BNG services.

**NOTE:** The subsystem option is only available when both both AGF and BNG subscribers are logged into the router at the same time.

**NOTE:** Due to display limitations, logical system and routing instance output values are truncated when necessary.

Starting from Junos OS 20.4R1 release, you need license to use the ESSM feature.

## Required Privilege Level

view

## Output Fields

Table 8 on page 122 lists the output fields for the `show subscribers summary` command. Output fields are listed in the approximate order in which they appear.

**Table 8: show subscribers summary Output Fields**

Field Name	Field Description	Level of Output
Subscribers by State	<p>Number of subscribers summarized by state. The summary information includes the following:</p> <ul style="list-style-type: none"> <li>• Init—Number of subscriber currently in the initialization state.</li> <li>• Configured—Number of configured subscribers.</li> <li>• Active—Number of active subscribers.</li> <li>• Terminating—Number of subscribers currently terminating.</li> <li>• Terminated—Number of terminated subscribers.</li> <li>• Total—Total number of subscribers for all states.</li> </ul>	detail none
Subscribers by Client Type	Number of subscribers summarized by client type. Client types can include DHCP, GRE, L2TP, PPP, PPPoE, STATIC-INTERFACE, VLAN, and VLAN-OOB. Also displays the total number of subscribers for all client types (Total).	detail extensive none
Subscribers by LS:RI	Number of subscribers summarized by logical system:routing instance (LS:RI) combination. Also displays the total number of subscribers for all LS:RI combinations (Total).	detail none
Subscribers by Connection Type	Number of subscribers summarized by connection type, Cross-connected or Terminated.	extensive
Subscribers by Sub-System	Number of subscribers on the subsystem—AGF or BNG as well as the total number of subscriber.	All levels

Table 8: show subscribers summary Output Fields (*Continued*)

Field Name	Field Description	Level of Output
Interface	<p>Interface associated with the subscriber. The router or switch displays subscribers whose interface matches or begins with the specified interface.</p> <p>The * character indicates a continuation of addresses for the same session.</p> <p>For aggregated Ethernet interfaces, the output of the summary (pic   port   slot) options prefixes the interface name with ae0:.</p> <p>For pseudowire IFDs, this field displays both the pseudowire and the associated logical tunnel (LT) and redundant logical tunnel (RLT) anchor interface. For example:</p> <pre>ps0: lt-2/1/0 ps1: rlt0: lt-4/0/0</pre>	All levels
Count	<p>Count of subscribers displayed for each PIC, port, or slot when those options are specified with the summary option. For an aggregated Ethernet configuration, the total subscriber count does not equal the sum of the individual PIC, port, or slot counts, because each subscriber can be in more than one aggregated Ethernet link.</p> <p>Multiple pseudowire interfaces can share a given logical tunnel or redundant logical tunnel anchor interface. Starting in Junos OS Release 18.1R1, the field displays subscribers per individual pseudowire interface.</p> <p>In earlier releases, the field displays the same number of subscribers for all pseudowire interfaces that share the same tunnel interface as their anchor point.</p>	detail extensive none
Total Subscribers	Total number of subscribers for all physical interfaces, all PICs, all ports, or all LS:RI slots.	detail extensive none
IP Address/VLAN ID	Subscriber IP address or VLAN ID associated with the subscriber in the form <i>tpid.vlan-id</i>	terse



**Table 8: show subscribers summary Output Fields (Continued)**

Field Name	Field Description	Level of Output
User Name	Name of subscriber.	terse
LS:RI	Logical system and routing instance associated with the subscriber.	terse

## Sample Output

### show subscribers summary

```
user@host> show subscribers summary
```

#### Subscribers by State

Active: 52194

Total: 52194

#### Subscribers by Client Type

DHCP: 10000

VLAN: 15997

VLAN-OOB: 3600

PPPoE: 15998

ESSM: 6599

Total: 52194

### show subscribers summary all

```
user@host> show subscribers summary all
```

#### Subscribers by State

Init 3

Configured 2

Active 183

Terminating 2

Terminated 1

TOTAL	191
-------	-----

#### Subscribers by Client Type

DHCP	107
PPP	76
VLAN	8

TOTAL	191
-------	-----

#### Subscribers by LS:RI

default:default	1
default:ri1	28
default:ri2	16
ls1:default	22
ls1:riA	38
ls1:riB	44
logsysX:routinstY	42

TOTAL	191
-------	-----

### show subscribers summary physical-interface

```
user@host> show subscribers summary physical-interface ge-1/0/0
```

#### Subscribers by State

```
Active: 3998
Total: 3998
```

#### Subscribers by Client Type

```
DHCP: 3998
Total: 3998
```

#### Subscribers by LS:RI

```
default:default: 3998
Total: 3998
```

### show subscribers summary physical-interface pic

```
user@host> show subscribers summary physical-interface ge-0/2/0 pic
```

#### Subscribers by State

```
Active: 4825
```

Total: 4825

#### Subscribers by Client Type

DHCP: 4825

Total: 4825

#### Subscribers by LS:RI

default:default: 4825

Total: 4825

### **show subscribers summary physical-interface port**

```
user@host> show subscribers summary physical-interface ge-0/3/0 port
```

#### Subscribers by State

Active: 4825

Total: 4825

#### Subscribers by Client Type

DHCP: 4825

Total: 4825

#### Subscribers by LS:RI

default:default: 4825

Total: 4825

### **show subscribers summary physical-interface slot**

```
user@host> show subscribers summary physical-interface ge-2/0/0 slot
```

#### Subscribers by State

Active: 4825

Total: 4825

#### Subscribers by Client Type

DHCP: 4825

Total: 4825

#### Subscribers by LS:RI

default:default: 4825

Total: 4825

**show subscribers summary pic**

```
user@host> show subscribers summary pic
Interface          Count
ge-1/0             1000
ge-1/3             1000

Total Subscribers: 2000
```

**show subscribers summary pic (Aggregated Ethernet Interfaces)**

```
user@host> show subscribers summary pic
Interface          Count
ae0: ge-1/0        801
ae0: ge-1/3        801

Total Subscribers: 801
```

**show subscribers summary port**

```
user@host> show subscribers summary port
Interface          Count
ge-5/0/1           201
ge-5/0/2           301

Total Subscribers: 502
```

**show subscribers summary port (Pseudowire Interfaces)**

```
user@host> show subscribers summary port
ps0: lt-2/1/0 10
ps1: lt-2/1/0 20

Total Subscribers: 30
```

**show subscribers summary port extensive**

```
user@host>show subscribers summary port extensive
```

```
Interface: xe-3/0/3
```

```
Port Count: 100
```

```
Detail:
```

```
Subscribers by Client Type
```

```
  PPPoE: 1
```

```
  ESSM: 99
```

```
Subscribers by Connection Type
```

```
  Terminated: 1
```

```
Interface: xe-3/1/3
```

```
Port Count: 3100
```

```
Detail:
```

```
Subscribers by Client Type
```

```
  PPPoE: 1600
```

```
  ESSM: 1100
```

```
  VLAN-OOB: 400
```

```
Subscribers by Connection Type
```

```
  Tunneled: 500
```

```
  Terminated: 1100
```

```
  Cross-connected: 400
```

```
Total Subscribers: 26197
```

**show subscribers summary slot**

```
user@host> show subscribers summary slot
```

```
Interface      Count
```

```
ge-1           2000
```

```
Total Subscribers: 2000
```

**show subscribers summary terse**

```
user@host> show subscribers summary terse
```

Interface	IP Address/VLAN ID	User Name	LS:RI
ge-1/3/0.1073741824	100		default:default

demux0.1073741824	203.0.113.10	WHOLESALE-CLIENT	default:default
demux0.1073741825	203.0.113.13	RETAILER1-CLIENT	test1:retailer1
demux0.1073741826	203.0.113.213	RETAILER2-CLIENT	test1:retailer2

### show subscribers summary (agf)

```
user@host> show subscribers summary
```

Subscribers by Sub-System

AGF: 3000

BNG: 0

Total: 3000

Subscribers by State

Active: 4000

Total: 4000

Subscribers by Client Type

VLAN: 1000

PPPoE: 3000

Total: 4000

### show subscribers summary sub-system agf

```
user@host> show subscribers summary sub-system agf
```

AGF Subscribers by State

Init: 3

Active: 12

Total: 15

AGF Subscribers by Client Type

DHCP: 2

PPPOE: 5

PPPOE-5G 5

TOTAL 12

## Release Information

Command introduced in Junos OS Release 10.2.

sub-system added in Junos OS Release 22.3R1.

### RELATED DOCUMENTATION

| [show subscribers](#) | 65