

## Dynamic Variables Overview

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Variables constitute the dynamic component of a dynamic profile. You use variables in dynamic profiles as placeholders for dynamically obtained information that the dynamic profiles use to configure subscriber interfaces.

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### How Dynamic Variables Work

Dynamic variables are data placeholders that you define and place in dynamic profiles. When a particular event occurs on an interface (for example, a DHCP client accesses the interface), the dynamic profiles obtain data to fill these placeholders from one of three possible sources—the interface receiving an incoming client data packet, an externally configured server (for example, RADIUS), an internal default value associated with each user-configurable variable.

For your convenience, JUNOS provides several predefined variables that you can use within a dynamic profile. Most of these variables relate to interface-specific data obtained directly from the interface that receives an incoming client data packets (for example, interface name, interface unit value, and so on). When a client accesses the interface, the router software extracts the necessary interface data, propagates this data to the dynamic profile, and then uses the dynamic profile to configure the interface for the accessing client.

You define user-defined variables for individual dynamic profiles at the `[dynamic-profiles profile-name variables]` hierarchy level. At this hierarchy level, you create an association between a variable call value (for example, `$junos-igmp-version`) that appears in the body of the dynamic profile and data associated with that call value that is managed in an externally configured server (for example, a RADIUS VSA managed on a RADIUS server) or defined as a default value in the **variables** stanza. When an event occurs on an interface to trigger the instantiation of a dynamic profile for the interface, the JUNOS router software obtains values for each variable from an external server (for example, from RADIUS authentication and authorization VSAs) during the subscriber authentication process or from the default value if the external server is not available or does not contain a value for the variable to use. At run time, the variables are replaced by these actual values and are used to configure the subscriber interface.



**NOTE:** Most variables have a default value already configured in the JUNOS router software. The purpose of these defaults is to ensure that the dynamic profile contains a valid value if one is not created and assigned during dynamic profile configuration. However, we strongly recommend that you specifically define variables instead and not rely on the existence of an internal JUNOS default.

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## JUNOS Predefined Variables

JUNOS software contains several predefined variables. The dynamic profile obtains and replaces data for these variables from an incoming client data packet. You can specify these variables in the body of a dynamic profile without first having to define the variables at the [dynamic-profiles *profile-name* variables] hierarchy level. Table 1 provides a list of predefined variables, their descriptions, and where in the JUNOS hierarchy you can configure them.

**Table 1: JUNOS Predefined Variables and Definitions**

Variable	Definition
<b>Subscriber Interfaces — Static VLAN Interfaces</b>	
\$junos-interface-ifd-name	Name of the dynamic interface to which the subscriber access client connects. Its primary use is in creating single or multiple subscribers on a statically created interface. You specify this variable at the [dynamic-profiles <i>profile-name</i> interfaces] hierarchy level.
\$junos-underlying-interface-unit	Obtains the unit number for the underlying interface. It specifies the use of the underlying interface for the subscriber. You specify this variable at the [dynamic-profiles <i>profile-name</i> interfaces <i>\$junos-interface-ifd-name</i> ] hierarchy for the unit statement.
<b>Subscriber Interfaces — Dynamic IP Demux Interfaces</b>	
\$junos-interface-unit	Creates a unit number for a dynamic demux interface or VLAN interface. The router supplies this information when the subscriber accesses the network. You specify this variable at the [dynamic-profiles <i>profile-name</i> interfaces <i>interface-name</i> ] hierarchy level for the unit statement.
\$junos-subscriber-ip-address	IP address of the subscriber. You specify this variable at the [dynamic-profiles <i>profile-name</i> interfaces <i>demux0</i> unit family <i>inet</i> <i>demux-source</i> ] hierarchy level.  This variable is also used for creating access-internal routes.
\$junos-underlying-interface	Creates a logical underlying interface for a dynamic demux interface. DHCP supplies this information when the subscriber logs in. You specify this variable at the [dynamic profiles <i>profile-name</i> interfaces <i>demux0</i> unit " <i>\$junos-interface-unit</i> " <i>demux-options</i> ] hierarchy level for the underlying-interface statement.  When configured, the underlying interface is used to determine the <i>\$junos-underlying-interface</i> , <i>\$junos-underlying-interface-unit</i> , and <i>\$junos-ifd-name</i> variables. For example, if the receiving logical interface is <i>ge-0/0/0.1</i> , the <i>\$junos-underlying-interface</i> variable is set to <i>ge-0/0/0</i> and the <i>\$junos-underlying-interface-unit</i> variable is set to 1.  This variable is also used for creating access-internal routes.
<b>Access and Access-Internal Routes</b>	

**Table 1: JUNOS Predefined Variables and Definitions (continued)**

Variable	Definition
<code>\$junos-framed-route-ip-address-prefix</code>	Route prefix of an access route. You specify this variable at the [edit dynamic-profiles <i>profile-name</i> routing-options access hierarchy level for the route statement.
<code>\$junos-framed-route-nexthop</code>	Next-hop address of an access route. You specify this variable at the [edit dynamic-profiles <i>profile-name</i> routing-options access route <i>address</i> hierarchy level for the next-hop statement.
<code>\$junos-framed-route-cost</code>	Cost metric of an access route. You specify this variable at the [edit dynamic-profiles <i>profile-name</i> routing-options access route <i>address</i> hierarchy level for the metric statement.
<code>\$junos-framed-route-distance</code>	Distance of an access route. You specify this variable at the [edit dynamic-profiles <i>profile-name</i> routing-options access route <i>address</i> hierarchy level for the preference statement.
<code>\$junos-subscriber-ip-address</code>	<p>IP address of a subscriber identified in an access-internal route. You specify this variable at the [edit dynamic-profiles <i>profile-name</i> routing-options access-internal hierarchy level for the route statement.</p> <p>This variable is also used for creating dynamic IP demux interfaces.</p>
<code>\$junos-underlying-interface</code>	<p>Logical underlying interface of an access-internal route. DHCP supplies this information when the subscriber logs in. You specify this variable at the [edit dynamic-profiles <i>profile-name</i> routing-options access-internal route <i>address</i> hierarchy level for the qualified-next-hop statement.</p> <p>This variable is also used for creating dynamic IP demux interfaces.</p>
<code>\$junos-subscriber-mac-address</code>	MAC address for a subscriber identified in an access-internal route. You specify this variable at the [edit dynamic-profiles <i>profile-name</i> routing-options access-internal route <i>address</i> qualified-next hop <i>underlying-interface</i> hierarchy level for the mac-address statement.
<b>Dynamic Protocols</b>	
<code>\$junos-interface-name</code>	<p>Name of the dynamic interface to which the subscriber access client connects. Its use is in dynamically enabling IGMP on the subscriber interface. You specify this variable at the [dynamic-profiles <i>profile-name</i> protocols igmp] hierarchy level for the interface statement.</p> <p>The interface name is derived from concatenating the <i>\$junos-interface-ifd-name</i> and the <i>\$junos-underlying-interface-unit</i> variables obtained when a subscriber is created dynamically at the [dynamic-profiles <i>profile-name</i> interfaces] hierarchy level.</p>
<b>Dynamic CoS — RADIUS-obtained Scheduler-Map Name and Traffic-Shaping Parameters</b>	

**Table 1: JUNOS Predefined Variables and Definitions (continued)**

Variable	Definition
\$junos-cos-scheduler-map	<p>Scheduler-map name configured in a traffic-control profile in a dynamic profile for used for subscriber access. The JUNOS software obtains this information from the RADIUS server when a subscriber authenticates over the static or dynamic subscriber interface to which the dynamic profile is attached.</p> <p>You reference this variable in the <code>scheduler-map</code> statement at the <code>[edit dynamic-profiles <i>profile-name</i> class-of-service traffic-control-profiles <i>profile-name</i>]</code> hierarchy level.</p> <p>NOTE: The scheduler map can be defined dynamically (at the <code>[edit dynamic-profiles <i>profile-name</i> class-of-service scheduler-maps]</code> hierarchy level) or statically (at the <code>[edit class-of-service scheduler-maps]</code> hierarchy level).</p>
\$junos-cos-shaping-rate	<p>Shaping rate configured in a traffic-control profile in a dynamic profile for subscriber access. The JUNOS software obtains this information from the RADIUS server when a subscriber authenticates over the static or dynamic subscriber interface to which the dynamic profile is attached.</p> <p>You reference this variable in the <code>shaping-rate</code> statement at the <code>[edit dynamic-profiles <i>profile-name</i> class-of-service traffic-control-profiles <i>profile-name</i>]</code> hierarchy level.</p>
\$junos-cos-guaranteed-rate	<p>Guaranteed rate configured in a traffic-control profile in a dynamic profile for subscriber access. The JUNOS software obtains this information from the RADIUS server when a subscriber authenticates over the static or dynamic subscriber interface to which the dynamic profile is attached.</p> <p>You reference this variable in the <code>guaranteed-rate</code> statement at the <code>[edit dynamic-profiles <i>profile-name</i> class-of-service traffic-control-profiles <i>profile-name</i>]</code> hierarchy level.</p>
\$junos-cos-delay-buffer-rate	<p>Delay-buffer rate configured in a traffic-control profile in a dynamic profile for subscriber access. The JUNOS software obtains this information from the RADIUS server when a subscriber authenticates over the static or dynamic subscriber interface to which the dynamic profile is attached.</p> <p>You reference this variable in the <code>delay-buffer-rate</code> statement at the <code>[edit dynamic-profiles <i>profile-name</i> class-of-service traffic-control-profiles <i>profile-name</i>]</code> hierarchy level.</p>
<b>Dynamic CoS — RADIUS-obtained Scheduler Name and Parameters</b>	
\$junos-cos-scheduler	<p>Name of a scheduler configured in a dynamic profile for subscriber access. The JUNOS software obtains this information from the RADIUS server when a subscriber authenticates over the static or dynamic subscriber interface to which the dynamic profile is attached.</p> <p>You reference this variable at the <code>[edit dynamic-profiles <i>profile-name</i> class-of-service schedulers]</code> hierarchy level.</p>

**Table 1: JUNOS Predefined Variables and Definitions (continued)**

Variable	Definition
\$junos-cos-scheduler-tx	<p>Transmit rate specified for a scheduler configured in a dynamic profile for subscriber access. The JUNOS software obtains this information from the RADIUS server when a subscriber authenticates over the static or dynamic subscriber interface to which the dynamic profile is attached.</p> <p>You reference this variable in the <b>transmit-rate</b> statement at the [edit dynamic-profiles <i>profile-name</i> class-of-service schedulers <i>scheduler-name</i>] hierarchy level.</p>
\$junos-cos-scheduler-bs	<p>Buffer size as a percentage of total buffer, specified for a scheduler configured in a dynamic profile for subscriber access. The JUNOS software obtains this information from the RADIUS server when a subscriber authenticates over the static or dynamic subscriber interface to which the dynamic profile is attached.</p> <p>You reference this variable in the <b>buffer-size</b> statement with the <b>percent</b> option at the [edit dynamic-profiles <i>profile-name</i> class-of-service schedulers <i>scheduler-name</i>] hierarchy level.</p>
\$junos-cos-scheduler-pri	<p>Packet-scheduling priority value specified for a scheduler configured in a dynamic profile for subscriber access. The JUNOS software obtains this information from the RADIUS server when a subscriber authenticates over the static or dynamic subscriber interface to which the dynamic profile is attached.</p> <p>You reference this variable in the <b>priority</b> statement at the [edit dynamic-profiles <i>profile-name</i> class-of-service schedulers <i>scheduler-name</i>] hierarchy level.</p>
\$junos-cos-scheduler-dropfile-low	<p>Name of the drop profile for random early detection (RED) for loss-priority level <b>low</b> specified for a scheduler configured in a dynamic profile for subscriber access. The JUNOS software obtains this information from the RADIUS server when a subscriber authenticates over the static or dynamic subscriber interface to which the dynamic profile is attached.</p> <p>You reference this variable in the <b>drop-profile</b> statement at the [edit dynamic-profiles <i>profile-name</i> class-of-service schedulers <i>scheduler-name</i> drop-profile-map loss-priority <b>low</b> protocol any] hierarchy level.</p> <p>NOTE: The drop profile must be configured statically (at the [edit class-of-service drop-profiles] hierarchy level) for loss-priority <b>low</b>.</p>

**Table 1: JUNOS Predefined Variables and Definitions (continued)**

Variable	Definition
\$junos-cos-scheduler-dropfile-medium-low	<p>Name of the drop profile for random early detection (RED) for loss-priority level <b>medium-low</b> specified for a scheduler configured in a dynamic profile for subscriber access. The JUNOS software obtains this information from the RADIUS server when a subscriber authenticates over the static or dynamic subscriber interface to which the dynamic profile is attached.</p> <p>You reference this variable in the <b>drop-profile</b> statement at the [edit dynamic-profiles <i>profile-name</i> class-of-service schedulers <i>scheduler-name</i> drop-profile-map loss-priority medium-low protocol any] hierarchy level.</p> <p>NOTE: The drop profile must be configured statically (at the [edit class-of-service drop-profiles] hierarchy level).</p>
\$junos-cos-scheduler-dropfile-medium-high	<p>Name of the drop profile for random early detection (RED) for loss-priority level <b>medium-high</b> specified for a scheduler configured in a dynamic profile for subscriber access. The JUNOS software obtains this information from the RADIUS server when a subscriber authenticates over the static or dynamic subscriber interface to which the dynamic profile is attached.</p> <p>You reference this variable in the <b>drop-profile</b> statement at the [edit dynamic-profiles <i>profile-name</i> class-of-service schedulers <i>scheduler-name</i> drop-profile-map loss-priority medium-high protocol any] hierarchy level.</p> <p>NOTE: The drop profile must be configured statically (at the [edit class-of-service drop-profiles] hierarchy level).</p>
\$junos-cos-scheduler-dropfile-high	<p>Name of the drop profile for random early detection (RED) for loss-priority level <b>high</b> specified for a scheduler configured in a dynamic profile for subscriber access. The JUNOS software obtains this information from the RADIUS server when a subscriber authenticates over the static or dynamic subscriber interface to which the dynamic profile is attached.</p> <p>You reference this variable in the <b>drop-profile</b> statement at the [edit dynamic-profiles <i>profile-name</i> class-of-service schedulers <i>scheduler-name</i> drop-profile-map loss-priority high protocol any] hierarchy level.</p> <p>NOTE: The drop profile must be configured statically (at the [edit class-of-service drop-profiles] hierarchy level).</p>

**Table 1: JUNOS Predefined Variables and Definitions (continued)**

Variable	Definition
\$junos-cos-scheduler-dropfile-any	<p>Name of the drop profile for random early detection (RED) for loss-priority level <i>any</i> specified for a scheduler configured in a dynamic profile for subscriber access. The JUNOS software obtains this information from the RADIUS server when a subscriber authenticates over the static or dynamic subscriber interface to which the dynamic profile is attached.</p> <p>You reference this variable in the <b>drop-profile</b> statement at the [edit dynamic-profiles <i>profile-name</i> class-of-service schedulers <i>scheduler-name</i> drop-profile-map loss-priority <i>any</i> protocol <i>any</i>] hierarchy level.</p> <p>NOTE: The drop profile must be configured statically (at the [edit class-of-service drop-profiles] hierarchy level).</p>

## User-Defined Variables

JUNOS software enables you to configure variables at the [dynamic-profiles *profile-name* variables] hierarchy level and associate those variables with supported RADIUS VSAs. The dynamic profile obtains and replaces data for these variables from an external server (for example, from RADIUS authentication and authorization VSAs) during the subscriber authentication process. At run time, the variables are replaced by these actual values (obtained from default information on the router or from the RADIUS server) and are used to configure the subscriber interface.

For a complete list of supported RADIUS VSAs for which you can create variable associations, see RADIUS Attributes and Juniper Networks VSAs Supported by the AAA Service Framework.

You can also configure the user-defined variables with a default value. The default value provides a standalone configuration for the associated statement or a backup for the statement configuration if the RADIUS server is inaccessible or the VSA attribute does not contain a value.

- Related Topics**
- Configuring a Basic Dynamic Profile
  - Configuring a Dynamic Profile for Client Access
  - Configuring a Dynamic Profile for Various Levels of Services
  - Configuring Predefined Internal Dynamic Variables in Dynamic Profiles
  - Configuring User-Defined Dynamic Variables in Dynamic Profiles
  - Dynamic Profiles Overview
  - Subscriber Interface Overview
  - Example: Firewall Dynamic Profile
  - Example: IGMP Dynamic Profile
  - RADIUS Attributes and Juniper Networks VSAs Supported by the AAA Service Framework

