



# JunosE™ Software for E Series™ Broadband Services Routers

## DHCP External Server

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## E Series and JunosE Documentation and Release Notes

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For a list of related JunosE documentation, see <http://www.juniper.net/techpubs/software/index.html>.

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

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

## Audience

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This guide is intended for experienced system and network specialists working with Juniper Networks E Series Broadband Services Routers in an Internet access environment.

## E Series and JunosE Text and Syntax Conventions

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

Table 1: Notice Icons







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

Table 2 on page x defines text and syntax conventions that we use throughout the E Series and JunosE documentation.

Table 2: Text and Syntax Conventions

Convention	Description	Examples
<b>Bold text like this</b>	Represents commands and keywords in text.	<ul style="list-style-type: none"> <li>Issue the <b>clock source</b> command.</li> <li>Specify the keyword <b>exp-msg</b>.</li> </ul>
<b>Bold text like this</b>	Represents text that the user must type.	<b>host1(config)#traffic class low-loss1</b>
Fixed-width text like this	Represents information as displayed on your terminal's screen.	<pre>host1#show ip ospf 2 Routing Process OSPF 2 with Router ID 5.5.0.250 Router is an Area Border Router (ABR)</pre>
<i>Italic text like this</i>	<ul style="list-style-type: none"> <li>Emphasizes words.</li> <li>Identifies variables.</li> <li>Identifies chapter, appendix, and book names.</li> </ul>	<ul style="list-style-type: none"> <li>There are two levels of access: <i>user</i> and <i>privileged</i>.</li> <li><i>clusterId</i>, <i>ipAddress</i>.</li> <li><i>Appendix A, System Specifications</i></li> </ul>
Plus sign (+) linking key names	Indicates that you must press two or more keys simultaneously.	Press Ctrl + b.

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

Convention	Description	Examples
<b>Syntax Conventions in the Command Reference Guide</b>		
Plain text like this	Represents keywords.	terminal length
<i>Italic text like this</i>	Represents variables.	<i>mask, accessListName</i>
(pipe symbol)	Represents a choice to select one keyword or variable to the left or to the right of this symbol. (The keyword or variable can be either optional or required.)	diagnostic   line
[ ] (brackets)	Represent optional keywords or variables.	[ internal   external ]
[ ]* (brackets and asterisk)	Represent optional keywords or variables that can be entered more than once.	[ level1   level2   l1 ]*
{ } (braces)	Represent required keywords or variables.	{ permit   deny } { in   out }  { <i>clusterId</i>   <i>ipAddress</i> }

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- Document or topic name
- URL or page number
- Software release version

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

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

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

## Opening a Case with JTAC

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- Call 1-888-314-JTAC (1-888-314-5822 toll-free in the USA, Canada, and Mexico).

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

## PART 1

# Overview

- [Understanding the DHCP External Server Functions on page 3](#)
- [Prerequisites for Configuring DHCP External Server on page 9](#)



## CHAPTER 1

# Understanding the DHCP External Server Functions

- [DHCP External Server Overview on page 3](#)
- [Preservation of Dynamic Subscriber Interfaces with DHCP External Server Overview on page 5](#)
- [DHCP External Server Identification of Clients with Duplicate MAC Addresses Overview on page 6](#)

## DHCP External Server Overview

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You can configure the E Series router to provide support for an external DHCP server. This enables the router, which is not running DHCP relay or DHCP proxy server, to monitor DHCP packets and to keep information for subscribers based on their IP address and MAC address. When the E Series router's DHCP external server application is used, all DHCP traffic to and from the DHCP server is monitored by the router.

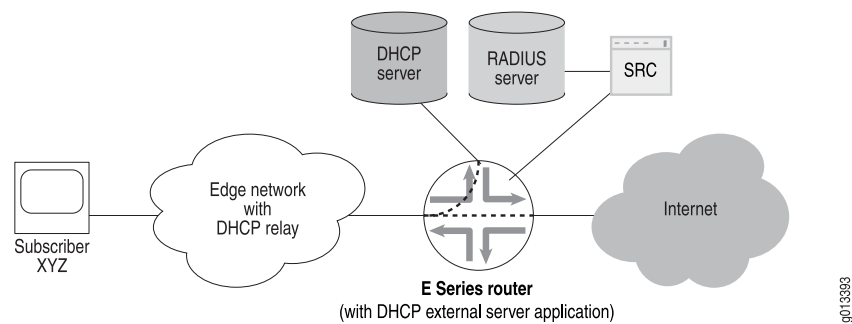
The services provided by integrating the E Series router's DHCP external server application with SRC software are similar to those provided when the DHCP local server is integrated with SRC software. The router's DHCP external application is used together with other features of the router to provide subscriber management. For additional information, see the *Configuring Subscriber Management* chapter.



**NOTE:** To ensure that DHCP external server with DHCP relay proxy processes unicast reply packets (such as renewal ACK and NAK packets), you must configure DHCP external server with the IP address of the DHCP relay proxy's giaddr. This configuration ensures that DHCP external server processes renewal ACK packets, which in turn enables the updating of client leases.

[Figure 1 on page 4](#) shows a network that includes an external DHCP server and the E Series router.

Figure 1: DHCP External Server



In [Figure 1 on page 4](#), the subscriber requests an address from the DHCP server through the E Series router. All communication between the subscriber and the DHCP server is monitored by the E Series router. After the subscriber receives an IP address, the subscriber is able to access the Internet and use the value-added services provided by the E Series router and by the SAE software. For this to occur, the edge network must be using a DHCP relay function.

When the subscriber requests an IP address from the DHCP server, the E Series router performs the following actions:

- Identifies the subscriber's IP address, MAC address, giaddr, and client identifier
- Extracts the lease time, creates a shadow lease, and starts its own lease timer that is associated with the subscriber

The E Series router views the subscriber as active once the subscriber sends a packet. The router then performs the following actions:

- Processes the subscriber's IP address by using a route map
- Extracts the dynamic subscriber interface profile (optional)
- Creates the subscriber's dynamic subscriber interface

If the SRC software is configured, the router also performs the following actions:

- Alerts the SRC software that the dynamic subscriber interface exists
- Alerts the SRC software that the subscriber's address exists and provides DHCP options

The SRC software then provides its enhanced services to the subscriber.

The E Series router monitors all traffic between the subscriber and the DHCP server, and resets the shadow lease by monitoring the DHCP server/client lease renewal. When the subscriber disconnects, the shadow lease will eventually expire. The E Series router then performs the following actions:

- Deletes the subscriber's dynamic subscriber interface
- Alerts the SRC software that the dynamic subscriber interface has been deleted
- Alerts the SRC software that the subscriber's address has been deleted



For additional information on managing client bindings, see *Viewing and Deleting DHCP Client Bindings*.

## Preservation of Dynamic Subscriber Interfaces with DHCP External Server Overview

You can configure the DHCP external server application to control whether the router preserves or deletes and re-creates a DHCP client's existing dynamic subscriber interface in certain situations.

The DHCP discovery process assigns an IP address to a DHCP client. A client initiates the discovery process on a primary IP interface in the router. When this process completes successfully, the IP subscriber manager application may create a dynamic subscriber interface for the client that exists with the client's primary interface. A client normally receives broadcast traffic, such as the traffic associated with the DHCP discovery process, on its primary interface. A client normally receives unicast traffic, such as the traffic associated with the DHCP renewal process, on its dynamic subscriber interface if one exists.

A DHCP client that has successfully completed the discovery process and has been assigned an IP address in the DHCP external server application is referred to as a *bound client*. An IP address is leased to a client for a specified period of time. Before the lease period expires, most bound DHCP clients typically use the DHCP renewal process to extend their IP address lease. However, some bound DHCP clients might extend their IP address lease by restarting the DHCP discovery process instead of using the DHCP renewal process.

When a bound DHCP client on a dynamic subscriber interface extends its address lease by restarting the discovery process on its primary IP interface, you can configure the DHCP external server application to control whether the client's existing dynamic subscriber interface is preserved, or deleted and re-created. By default, the DHCP external server preserves the client's existing dynamic subscriber interface in this situation. To configure the DHCP external server to delete and re-create the client's dynamic subscriber interface after the client restarts discovery, you must issue the **ip dhcp-external recreate-subscriber-interface** command from Global Configuration mode.

When a bound DHCP client restarts the discovery process on a different primary IP interface than the interface on which it initiated the original discovery process, the DHCP external server application always deletes and re-creates the existing dynamic subscriber interfaces for that client.

You must use the **ip dhcp-external recreate-subscriber-interface** command within a specific virtual router context. Because you issue this command on a per-virtual router basis, different virtual routers configured in the same router can use different settings for this command.

In some lower-numbered JunosE Software releases, the default behavior for the DHCP external server was to delete and re-create the dynamic subscriber interface after a bound client restarted the discovery process on its primary IP interface. If you are upgrading the JunosE Software on the router from one of these releases to the current release, keep in mind that you must explicitly issue the **ip dhcp-external recreate-subscriber-interface** command to continue to delete and re-create the dynamic subscriber interface. The

router no longer deletes and re-creates the dynamic subscriber interface by default in this situation.

See *DHCP External Server* in the *Known Behavior* section of the *JunosE Release Notes* for a list of the JunosE releases in which deleting and re-creating the dynamic subscriber interface was the default behavior for the DHCP external server.

**Related  
Documentation**

- [Configuring DHCP External Server to Control Preservation of Dynamic Subscriber Interfaces on page 18](#)
- [ip dhcp-external recreate-subscriber-interface on page 39](#)

## DHCP External Server Identification of Clients with Duplicate MAC Addresses Overview

You can configure the DHCP external server application to use a combination of the media access control (MAC) address and the gateway IP address (giaddr) to uniquely identify DHCP clients attached to the router. Using this feature enables you to manage DHCP clients in network environments in which MAC addresses are not unique.

In some network environments where the DHCP external server application manages DHCP clients from multiple DHCP relays, the same MAC address might be assigned to more than one DHCP client. This can occur, for example, when network adapters are manufactured with the same hardware address, resulting in duplicate MAC addresses among the DHCP clients attached to the router.

To better manage DHCP clients in network environments with multiple DHCP relays in which MAC addresses are not unique, you can configure the DHCP external server application to use a combination of the MAC address and the giaddr to uniquely identify the clients connected to the router. This setting for DHCP external server is also referred to as *duplicate MAC mode*.

By default, DHCP external server uses only the MAC address to uniquely identify DHCP clients. The default setting for DHCP external server is also referred to as *unique MAC mode*.

To enable duplicate MAC mode for the DHCP external server application, you must issue the **dhcp-external duplicate-mac-address** command from Global Configuration mode. To restore the default behavior and re-enable unique MAC mode, issue the **no dhcp-external duplicate-mac-address** command.

## Configuration Guidelines for Using Duplicate MAC Mode

Observe the following guidelines when you configure the DHCP external server application to use a combination of the MAC address and giaddr to uniquely identify DHCP clients, otherwise known as enabling duplicate MAC mode:

- Unlike other commands for configuring DHCP external server, the **dhcp-external duplicate-mac-address** command applies globally to all instances of the DHCP external server application on the router, and is not issued on a per-VR basis.
- Although the same MAC address can be assigned to more than one DHCP client in the network, MAC addresses must be unique for each giaddr assigned by a DHCP relay in the network when duplicate MAC mode is enabled.
- As is the case with unique MAC mode, client IP addresses managed by the DHCP external server application must be unique across all VRs configured on the router.
- You can configure DHCP external server to support both duplicate MAC mode (by issuing the **dhcp-external duplicate-mac-address** command) and creation of subscriber state information based on lease renewals (by issuing the **ip dhcp-external server-sync** command) simultaneously.
- DHCP external server supports the following VR topology changes for DHCP clients regardless of whether duplicate MAC mode is enabled or disabled:
  - A client roams across VRs; this might occur, for example, when a laptop computer moves to a different building in a campus network.
  - A client is assigned to a different VR; this might occur, for example, when a quality of service (QoS) policy assigns a client to a different VR during the DHCP binding process.
- When DHCP external server is configured to support unique MAC mode, which is the default, it uses only the MAC address to uniquely identify DHCP clients. Consequently, when unique MAC mode is enabled, the MAC addresses for all DHCP clients must be unique across all VRs configured on the router.

## Restrictions for Using Duplicate MAC Mode to Manage Clients

The following restrictions apply when you configure the DHCP external server application to use a combination of the MAC address and giaddr to uniquely identify DHCP clients, otherwise known as duplicate MAC mode:

- You can issue the **dhcp-external duplicate-mac-address** command at any time to enable duplicate MAC mode. However, you *cannot* issue the **no dhcp-external duplicate-mac-address** command to restore the default setting, unique MAC mode, if DHCP external server is configured for duplicate MAC mode and is currently managing any DHCP clients.
- Do not enable duplicate MAC mode for the DHCP external server application when it is configured in the same VR with either of the following:
  - An instance of the DHCP relay application that is currently managing host routes

- Any instance of the DHCP relay proxy application
- When you enable duplicate MAC mode, the DHCP external server application ignores notifications of new clients from the RADIUS relay server application because these notifications do not include the giaddr.

**Related  
Documentation**

- *Configuring DHCP External Server to Uniquely Identify Clients with Duplicate MAC Addresses*
- [dhcp-external duplicate-mac-address on page 34](#)

## CHAPTER 2

# Prerequisites for Configuring DHCP External Server

- [DHCP External Server Configuration Requirements on page 9](#)

## DHCP External Server Configuration Requirements

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To configure the E Series router to support an external DHCP server, you enable the DHCP external server application on the router. If you are using DHCP packet detection, you must also specify each external DHCP server that determines which packets are monitored. The E Series router monitors all DHCP traffic between subscriber clients and the specified DHCP servers.

### **Related Documentation**

- [Configuring DHCP External Server to Uniquely Identify Clients with Duplicate MAC Addresses](#)
- [Enabling and Disabling the DHCP External Server Application on page 13](#)



## PART 2

# Configuration

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- [Interworking of DHCP External Server and Ethernet DSLAMs on page 15](#)
- [Dynamic Subscriber Interfaces and DHCP Relay Functions on page 17](#)
- [Duplicate MAC Mode for DHCP External Servers on page 23](#)
- [Configuring Baselines for DHCP External Server Statistics on page 27](#)
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## CHAPTER 3

# Configuration Tasks for DHCP External Server

- [Enabling and Disabling the DHCP External Server Application on page 13](#)
- [Synchronizing the DHCP External Application and the Router on page 13](#)
- [Monitoring DHCP Traffic Between Remote Clients and DHCP Servers on page 14](#)
- [Deleting Clients from a Virtual Router's DHCP Binding Table on page 14](#)

## Enabling and Disabling the DHCP External Server Application

Use to enable the DHCP external server application on the E Series router. Use the **no** version of the command to disable the application.

To enable the DHCP external server application on the router:

- Issue the **service dhcp-external** command:

```
host1(config)#service dhcp-external
```

To disable the DHCP external server application on the router:

- Issue the **no service dhcp-external** command:

```
host1(config)#no service dhcp-external
```

### Related Documentation

- [service dhcp-external on page 47](#)

## Synchronizing the DHCP External Application and the Router

In some cases the router and the DHCP external application might not be synchronized. For example, an unsynchronized condition might occur when you first enable the DHCP external server application. You can resynchronize and create subscriber state information that is based on lease renewals.

To synchronize the external DHCP server with the E Series router:

- Issue the **ip dhcp-external server-sync** command from Global Configuration mode:

```
host1(config)#ip dhcp-external server-sync
```

- Related Documentation**
- [ip dhcp-external server-sync on page 41](#)

## Monitoring DHCP Traffic Between Remote Clients and DHCP Servers

---

You can configure the router to monitor DHCP packets between remote clients and specified DHCP servers. You can specify up to four DHCP servers.

To monitor DHCP packets between remote clients and a DHCP server:

- Issue the **ip dhcp-external server-address** command and specify the IP address of the DHCP server:

```
host1(config)#ip dhcp-external server-address 10.10.10.1
host1(config)#ip dhcp-external server-address 10.20.10.1
```

You can specify a maximum of four DHCP servers to monitor.

- Related Documentation**
- [ip dhcp-external server-address on page 40](#)

## Deleting Clients from a Virtual Router's DHCP Binding Table

---

You can delete clients from a virtual router's DHCP binding table. You can delete all clients or a specific client.



**NOTE:** This command is deprecated and might be removed completely in a future release. The function provided by this command has been replaced by the **dhcp delete-binding** command.

To delete clients from a virtual router's DHCP binding table, issue the **dhcp-external delete-binding** command in Privileged Exec configuration mode:

- To delete all clients:

```
host1#dhcp-external delete-binding all
```

- To delete a specific client:

```
host1#dhcp-external delete-binding binding-id 3972819365
```

- Related Documentation**
- [dhcp delete-binding on page 30](#)
  - [dhcp-external delete-binding on page 33](#)

# Interworking of DHCP External Server and Ethernet DSLAMs

- [Configuring Interoperation with Ethernet DSLAMs on page 15](#)

## Configuring Interoperation with Ethernet DSLAMs

---

The DHCP external server application uses the giaddr it receives in DHCP server-destined packets to determine the next hop for a subscriber's access routes. However, when interoperating with Ethernet digital subscriber line access multiplexers (DSLAMs), using the giaddr sent by the DSLAM can result in traffic being dropped. To ensure that traffic is forwarded properly, you can configure the DHCP external server application to disregard the DSLAM's giaddr and learn the subscriber's correct next-hop address.

The dropped traffic situation can occur because of the way some DSLAMs create the giaddr that is sent to the DHCP external server application. Some Ethernet DSLAMs use a DHCP relay implementation that inserts giaddr values and relay agent options in DHCP packets that are received from end users. The intent is that this information is provided to a DHCP server, which uses the values to determine the configuration parameters for the subscriber.

However, when the DHCP external server application receives the giaddr from an Ethernet DSLAM, the application installs the subscriber access route with the Ethernet DSLAM's IP address as the next hop. This operation results in the subscriber-destined traffic being incorrectly sent to the Ethernet DSLAM, which cannot process the traffic.

To avoid dropping the traffic in this situation, use the **ip set dhcp-external disregard-giaddr-next-hop** command to configure the DHCP external server application to ignore the giaddr when determining the next hop for the subscriber access routes. The E Series router then uses Address Resolution Protocol (ARP) to discover the subscriber's IP address and sends the traffic to the learned IP address.

To configure the DHCP external server application to ignore the giaddr when determining the next hop for the subscriber access routes:

- Issue the **ip dhcp-external disregard-giaddr-next-hop** command from Global Configuration mode:

```
host1(config)#ip dhcp-external disregard-giaddr-next-hop
```

**Related Documentation** • [ip dhcp-external disregard-giaddr-next-hop on page 38](#)

# Dynamic Subscriber Interfaces and DHCP Relay Functions

- [Configuring the DHCP External Server to Support the Creation of Dynamic Subscriber Interfaces on page 17](#)
- [Configuring DHCP External Server to Control Preservation of Dynamic Subscriber Interfaces on page 18](#)
- [Configuring Dynamic Subscriber Interfaces for Interoperation with DHCP Relay and DHCP Relay Proxy on page 19](#)

## Configuring the DHCP External Server to Support the Creation of Dynamic Subscriber Interfaces

---

You can configure the DHCP external server to support the creation of dynamic subscriber interfaces. This configuration requires that the user's DHCP control traffic and data traffic traverse the same client-facing ingress port on the E Series router.

You must use the **ip dhcp-external auto-configure** command within a specific virtual router context.

To configure the DHCP external server to support the creation of dynamic subscriber interfaces:

- Issue the **ip dhcp-external auto-configure** command from Global Configuration mode:

```
host1(config)#ip dhcp-external auto-configure
```

To configure the DHCP external server to support the creation of dynamic subscriber interfaces built over dynamic VLANs that are based on the agent-circuit-id option (suboption 1) of the option 82 field in DHCP messages, include the **agent-circuit-identifier** keyword.

- Issue the **ip dhcp-external auto-configure** command with the **agent-circuit-identifier** keyword from Global Configuration mode:

```
host1(config)#ip dhcp-external auto-configure agent-circuit-identifier
```

The use of the option 82 field enables you to stack an IP interface that is associated with a particular subscriber over a dynamically created VLAN; the VLAN is dynamically

created based on the agent-circuit-id option (suboption 1) that is contained in the DHCP option 82 field.

For information about configuring agent-circuit-id–based dynamic VLAN subinterfaces, see the *Configuring Dynamic Interfaces Using Bulk Configuration* chapter in the *JunosE Link Layer Configuration Guide*.

**Related Documentation** • [ip dhcp-external auto-configure on page 37](#)

---

## Configuring DHCP External Server to Control Preservation of Dynamic Subscriber Interfaces

---

You can configure the DHCP external server application to delete and re-create the dynamic subscriber interface after a bound client restarts the discovery process on the its primary IP interface. By default, the DHCP external server preserves the existing dynamic subscriber interface in this situation.

Deleting and re-creating the dynamic subscriber interface for a DHCP client may trigger additional authentication, authorization, and accounting (AAA) services if AAA is configured on the router. Therefore, issuing the **ip dhcp-external recreate-subscriber-interface** command to delete and re-create the dynamic subscriber interface is useful if you want to use AAA services to validate and collect subscriber information during a restart of the DHCP discovery process.

Preserving the client's dynamic subscriber interface is useful if deleting and re-creating the dynamic subscriber interface might result in a service interruption.

To enable the DHCP external server application to delete and re-create the dynamic subscriber interface after a bound client restarts the discovery process on its primary IP interface:

- Issue the **ip dhcp-external recreate-subscriber-interface** command from Global Configuration mode:

```
host1:vr1(config)#ip dhcp-external recreate-subscriber-interface
```

To restore the DHCP external server default behavior to preserve the dynamic subscriber interface after a bound client restarts the discovery process on its primary IP interface:

- Issue the **no ip dhcp-external recreate-subscriber-interface** command from Global Configuration mode:

```
host1:vr1(config)#no ip dhcp-external recreate-subscriber-interface
```



**NOTE:** If you are upgrading the JunosE Software on the router from a release in which the DHCP external server deleted and re-created the dynamic subscriber interface by default, you must explicitly issue the **ip dhcp-external recreate-subscriber-interface** command in the current release to delete and re-create the dynamic subscriber interface. The router no longer deletes and re-creates the dynamic subscriber interface by default in this situation.

For a list of the JunosE releases in which deleting and re-creating the dynamic subscriber interface was the default behavior for the DHCP external server, see *DHCP External Server* in the *Known Behavior* section of the *JunosE Release Notes*.

#### Related Documentation

- [Preservation of Dynamic Subscriber Interfaces with DHCP External Server Overview on page 5](#)
- [ip dhcp-external recreate-subscriber-interface on page 39](#)

## Configuring Dynamic Subscriber Interfaces for Interoperation with DHCP Relay and DHCP Relay Proxy

When you configure the DHCP relay application or the DHCP relay proxy application in the same virtual router (VR) as the DHCP external server application, we recommend that you define interface profiles to create the dynamic subscriber interfaces when the primary IP interface is static. Otherwise, the gateway IP address (giaddr) used for DHCP rebind or renewal requests might be inconsistent. Renewal requests apply only when DHCP relay proxy is configured in the same VR as DHCP external server.

The use of inconsistent giaddrs results in the transmission of negative acknowledgment (NAK) messages from the DHCP server and the removal of existing DHCP client bindings.

To apply an interface profile to a dynamic subscriber interface:

1. Define the interface profile.

```

host1(config)#profile dsiTest
host1(config-profile)#ip unnumbered loopback 5500
host1(config-profile)#exit

```

2. Define a route map in the VR in which the static primary IP interface resides.

```

host1(config)#virtual-router relay
Proceed with new virtual-router creation? [confirm]
host1:relay(config)#route-map dsiTest
host1:relay(config-route-map)#set ip interface-profile dsiTest
host1:relay(config-route-map)#exit

```

3. Define a loopback interface with a host mask in the VR in which the static primary IP interface resides.

```

host1:relay(config)#interface loopback 5500
host1:relay(config-if)#ip address 71.23.1.2/32

```

4. Enable the static primary IP interface to support creation of dynamic subscriber interfaces, and apply the route map to the IP interface subscriber in the static primary IP interface configuration.

```

host1:relay(config)#interface fastEthernet 5/5.100
host1:relay(config-if)#ip unnumbered loopback 5500
host1:relay(config-if)#ip auto-configure ip-subscriber exclude-primary
host1:relay(config-if)#ip route-map ip-subscriber dsiTest

```

Use the **exclude-primary** keyword in the **ip auto-configure ip-subscriber** command to specify that the primary interface cannot be assigned to a subscriber.

5. If you have issued the **ip dhcp-external server-sync** command to resynchronize the DHCP external server application with the router and to support creation of subscriber state information based on lease renewals, you must do either of the following to ensure that the unicast acknowledgment (ACK) response to the renewal request has a route back to the DHCP client that generated the renewal request:

- Enable the packet detection feature on the static primary IP interface in the context of the VR in which the static primary interface resides.

```

host1:relay(config-if)#ip auto-detect ip-subscriber

```

Issuing the **ip auto-detect ip-subscriber** command creates a dynamic subscriber interface back to the DHCP client when the router receives a packet with a source IP address that does not match any entries in the demultiplexer table. This method requires you to configure the primary IP interface to support creation of dynamic subscribers interfaces, which is accomplished by issuing the **ip auto-configure ip-subscriber exclude-primary** command, as shown in Step 4.

- Configure an explicit network route in the context of the VR in which the static primary interface resides to provide connectivity back to the DHCP client.

```

host1:relay(config)#ip route 71.23.0.0/24 fastEthernet 5/5.100

```

#### Related Documentation

- [ip auto-configure ip-subscriber on page 35](#)
- [ip auto-detect ip-subscriber on page 36](#)
- [ip dhcp-external server-sync on page 41](#)



- [ip route on page 43](#)
- [ip route-map ip-subscriber on page 45](#)
- [set ip interface-profile on page 46](#)



## CHAPTER 6

# Duplicate MAC Mode for DHCP External Servers

- [Configuring DHCP External Server to Control Preservation of Dynamic Subscriber Interfaces on page 23](#)
- [Configuring DHCP External Server to Re-Authenticate Auto-Detected Dynamic Subscriber Interfaces on page 25](#)

## Configuring DHCP External Server to Control Preservation of Dynamic Subscriber Interfaces

---

You can configure the DHCP external server application to delete and re-create the dynamic subscriber interface after a bound client restarts the discovery process on the its primary IP interface. By default, the DHCP external server preserves the existing dynamic subscriber interface in this situation.

Deleting and re-creating the dynamic subscriber interface for a DHCP client may trigger additional authentication, authorization, and accounting (AAA) services if AAA is configured on the router. Therefore, issuing the **ip dhcp-external recreate-subscriber-interface** command to delete and re-create the dynamic subscriber interface is useful if you want to use AAA services to validate and collect subscriber information during a restart of the DHCP discovery process.

Preserving the client's dynamic subscriber interface is useful if deleting and re-creating the dynamic subscriber interface might result in a service interruption.

To enable the DHCP external server application to delete and re-create the dynamic subscriber interface after a bound client restarts the discovery process on its primary IP interface:

- Issue the **ip dhcp-external recreate-subscriber-interface** command from Global Configuration mode:

```
host1:vr1(config)#ip dhcp-external recreate-subscriber-interface
```

To restore the DHCP external server default behavior to preserve the dynamic subscriber interface after a bound client restarts the discovery process on its primary IP interface:

- Issue the **no ip dhcp-external recreate-subscriber-interface** command from Global Configuration mode:

```
host1:vr1(config)#no ip dhcp-external recreate-subscriber-interface
```



**NOTE:** If you are upgrading the JunosE Software on the router from a release in which the DHCP external server deleted and re-created the dynamic subscriber interface by default, you must explicitly issue the **ip dhcp-external recreate-subscriber-interface** command in the current release to delete and re-create the dynamic subscriber interface. The router no longer deletes and re-creates the dynamic subscriber interface by default in this situation.

For a list of the JunosE releases in which deleting and re-creating the dynamic subscriber interface was the default behavior for the DHCP external server, see *DHCP External Server* in the *Known Behavior* section of the *JunosE Release Notes*.

---

**Related Documentation**

- [Preservation of Dynamic Subscriber Interfaces with DHCP External Server Overview on page 5](#)
- [ip dhcp-external recreate-subscriber-interface on page 39](#)

## Configuring DHCP External Server to Re-Authenticate Auto-Detected Dynamic Subscriber Interfaces

---

You can use the **ip re-authenticate-auto-detect ip-subscriber** command to re-authenticate the auto-detected subscribers or Dynamic Subscriber Interfaces (DSIs) created on static and dynamic primary IP interfaces, using the DHCP options when the DHCP external application manages the DSIs following a cold boot. The **no** version negates the command or restores the defaults.

To enable the IP Subscriber Manager application to re-authenticate the auto-detected subscribers created on static and dynamic primary IP interfaces after a cold boot:

- Issue the **ip re-authenticate-auto-detect ip-subscriber** command from Interface Configuration or Profile Configuration mode:

```
host1:vr1(config)#ip re-authenticate-auto-detect ip-subscriber
```

### Related Documentation

- [Preservation of Dynamic Subscriber Interfaces with DHCP External Server Overview on page 5](#)
- [ip dhcp-external recreate-subscriber-interface on page 39](#)



# Configuring Baselines for DHCP External Server Statistics

- [Setting Baselines for DHCP Statistics on page 27](#)

## Setting Baselines for DHCP Statistics

---

You can use the **baseline dhcp** commands to set statistics baselines for DHCP operations. The router implements the baseline by reading and storing the statistics at the time the baseline is set and then subtracting this baseline when you retrieve baseline-relative statistics.

Use the **delta** keyword with the **show dhcp** commands to display baselined statistics.

Tasks to set a baseline for DHCP statistics are:

1. [Setting a Baseline for DHCP Relay and Relay Proxy on page 27](#)
2. [Setting a Baseline for DHCP Proxy Server Statistics on page 27](#)
3. [Setting a Baseline for DHCP External Server Statistics on page 28](#)
4. [Setting a Baseline for DHCP Local Server Statistics on page 28](#)

### Setting a Baseline for DHCP Relay and Relay Proxy

To set a statistics baseline for DHCP relay and DHCP relay proxy:

- Issue the **baseline dhcp relay** command:

```
host1#baseline dhcp relay
```

There is no **no** version.

### Setting a Baseline for DHCP Proxy Server Statistics

To set a baseline for DHCP proxy server statistics.

- Issue the **baseline dhcp server** command:

```
host1#baseline dhcp server
```

There is no **no** version.

## Setting a Baseline for DHCP External Server Statistics

To set a baseline for DHCP external server statistics.

- Issue the **baseline ip dhcp-external** command:

```
host1#baseline ip dhcp-external
```

There is no **no** version.

## Setting a Baseline for DHCP Local Server Statistics

To set a baseline for DHCP local server statistics:

- Issue the **baseline ip dhcp-local** command:

```
host1#baseline ip dhcp-local
```

There is no **no** version.

To set a baseline for DHCP local server statistics for a specific ATM, Fast Ethernet, or Gigabit Ethernet interface:

- Issue the **baseline ip dhcp-local** command with the optional **interface** keyword to specify the type of interface and interface specifier:

```
host1#baseline ip dhcp-local interface atm 3/1
```

To set a baseline for DHCPv6 local server statistics:

- Issue the **baseline ipv6 dhcpv6-local** command:

```
host1#baseline ipv6 dhcpv6-local
```



## CHAPTER 8

# Configuration Commands

- `dhcp delete-binding`
- `dhcp-external delete-binding`
- `dhcp-external duplicate-mac-address`
- `ip auto-configure ip-subscriber`
- `ip auto-detect ip-subscriber`
- `ip dhcp-external auto-configure`
- `ip dhcp-external disregard-giaddr-next-hop`
- `ip dhcp-external recreate-subscriber-interface`
- `ip dhcp-external server-address`
- `ip dhcp-external server-sync`
- `ip re-authenticate-auto-detect ip-subscriber`
- `ip route`
- `ip route-map ip-subscriber`
- `set ip interface-profile`
- `service dhcp-external`

## dhcp delete-binding

**Syntax** To delete the DHCP client with the specified binding ID:

```
dhcp delete-binding bindingId
```

To delete all DHCP client bindings or all DHCP client bindings of a particular type on the specified subnet:

```
dhcp delete-binding { all | all-local | all-external | all-relay-proxy } [ subnetAddress ]
```

To delete DHCP client bindings of a particular type on the specified subnet:

```
dhcp delete-binding { local | external | relay-proxy } [ subnetAddress ]
```

To delete DHCP client bindings for the specified IP prefix:

```
dhcp delete-binding [ local | external | relay-proxy ] [ subnetAddress ] ip-prefix ipPrefix
```

To delete DHCP client bindings for the specified interface string:

```
dhcp delete-binding [ local | external | relay-proxy ] [ subnetAddress ] interface string
```

To delete DHCP client bindings without a lower-layer interface:

```
dhcp delete-binding [ local | external | relay-proxy ] [ subnetAddress ] no-interface
```

To delete DHCP client bindings for the specified agent-circuit-id suboption (suboption 1) string of the DHCP relay agent information option (option 82):

```
dhcp delete-binding [ local | external | relay-proxy ] [ subnetAddress ] circuit-id string
```

To delete DHCP client bindings for the specified agent-remote-id suboption (suboption 2) string of the DHCP relay agent information option (option 82):

```
dhcp delete-binding [ local | external | relay-proxy ] [ subnetAddress ] remote-id string
```

**Release Information** Command introduced in JunosE Release 8.1.0.  
**local**, **external**, **relay-proxy**, **interface**, **no-interface**, **ip-prefix**, **circuit-id**, and **remote-id** keywords and *subnetAddress*, *ipAddress*, and *string* variables added in JunosE Release 9.3.0.

**Description** Deletes the specified DHCP client bindings. There is no **no** version.



**NOTE:** This command replaces the deprecated **clear ip dhcp-local binding** and **dhcp-external delete-binding** commands, which may be removed completely in a future release.

- Options**
- *bindingId*—DHCP binding ID for a specific client
  - *all*—Specifies all DHCP local server, DHCP external server, and DHCP relay proxy client bindings
  - *all-local*—Specifies all DHCP local server client bindings
  - *all-external*—Specifies all DHCP external server client bindings
  - *all-relay-proxy*—Specifies all DHCP relay proxy client bindings
  - *local*—Specifies DHCP local server client bindings that meet the deletion criteria
  - *external*—Specifies DHCP external server client bindings that meet the deletion criteria
  - *relay-proxy*—Specifies DHCP relay proxy client bindings that meet the deletion criteria
  - *subnetAddress*—IP address of the subnet on which the DHCP clients reside
  - *ipPrefix*—IP prefix (address and subnetwork mask) of the DHCP clients; for example, 10.10.10.0/24
  - *no-interface*—Specifies DHCP clients without a lower-layer interface; use this keyword to delete DHCP client bindings configured over dynamic interfaces for which the lower-layer interface has been shut down
  - *string*—Regular expression string that represents the interface, circuit ID, or remote ID to be matched; you must enclose elements containing a space within double quotes (“*one element*”)

Each element is either a literal string, a metacharacter, or a combination. You can remove the special meaning of a metacharacter by preceding it with a backslash (\). Regular expressions support the following metacharacters:

- *^* Matches the beginning of the input string. Alternatively, when used as the first character within brackets—*[^ ]*—matches any number except the ones specified within the brackets.
- *\$* Matches the end of the input string
- *.* (period) Matches any single character, including white space
- *\** Matches 0 or more sequences of the immediately previous character or pattern.
- *+* Matches 1 or more sequences of the immediately previous character or pattern
- *?* Matches 0 or 1 sequence of the immediately previous character or pattern
- *( )* Specifies patterns for multiple use when followed by one of the multiplier metacharacters: asterisk *\**, plus sign *+*, or question mark *?*
- *[ ]* Matches any enclosed character; specifies a range of single characters
- *-* (hyphen) Used within brackets to specify a range of AS or community numbers
- *\_* (underscore) Matches a *^*, a *\$*, a comma, a space, a *{*, or a *}*. Placed on either side of a string to specify a literal and disallow substring matching. Numerals enclosed by underscores can be preceded or followed by any of the characters listed above
- *|* Matches characters on either side of the metacharacter; logical OR

You must specify the interface string as a regular expression without spaces; for example, `fastEthernet1.1/100` or `fastEthernet.*100`

The following rules apply for representing nonprintable character sequences in the circuit ID string or the remote ID string:

- To represent the binary sequence `0d 0a` (hex), use the string `'\\r\\n'`. This consists of four ASCII characters: `5c` for `\\`, `72` for `r`, `5c` for `\\`, and `6e` for `n`.

For example, to match the sequence `74 65 73 74 0d 0a 6f 6e 65` (hex), use the string `'test\\r\\none'`. In this string, `74` is represented by `t`, `65` is represented by `e`, `73` is represented by `s`, `74` is represented by `t`, `0d 0a` is represented by `\\r\\n`, `6f` is represented by `o`, `6e` is represented by `n`, and `65` is represented by `e`.

- To represent the binary sequence `0d 00` (hex), use the string `'\\r'`. This consists of two ASCII characters: `5c` for `\\`, and `72` for `r`.
- To represent the binary sequence `0a 00` (hex), use the string `'\\n'`. This consists of two ASCII characters: `5c` for `\\`, and `6e` for `n`.

For example, to match the sequence `74 65 73 74 0a 00 6f 6e 65` (hex), use the string `'test\\none'`. In this string, `74` is represented by `t`, `65` is represented by `e`, `73` is represented by `s`, `74` is represented by `t`, `0a 00` is represented by `\\n`, `0a` is represented by `\\n`, `6f` is represented by `o`, `6e` is represented by `n`, and `65` is represented by `e`.

- To represent all other cases, use the string `'\\xab'`, where `ab` is a hex code of the byte. For example, to represent byte `3A`, use `'\\x3a'`. This consists of four ASCII characters: `5c` for `\\`, `78` for `x`, `33` for `3`, and `61` for `a`.

As another example, to match the sequence `74 65 73 74 f3 6f 6e 65` (hex), use the string `'test\\xf3one'`. In this string, `74` is represented by `t`, `65` is represented by `e`, `73` is represented by `s`, `74` is represented by `t`, byte `F3` is represented by `\\xf3`, `6f` is represented by `o`, `6e` is represented by `n`, and `65` is represented by `e`.

**Mode** Privileged Exec

**Related Documentation** • *Viewing and Deleting DHCP Client Bindings*

## dhcp-external delete-binding

---

**Syntax** dhcp-external delete-binding [ binding-id *bindingId* | all ]

**Release Information** Command introduced before JunosE Release 7.1.0.

**Description** Deletes a specific client binding or all bindings from the virtual router's DHCP binding table. There is no **no** version.



**NOTE:** This command is deprecated and might be removed completely in a future release. The function provided by this command has been replaced by the **dhcp delete-binding** command.

---

- Options**
- *bindingId*—DHCP binding ID associated with the user.
  - all—Specifies all bindings

**Mode** Privileged Exec

**Related Documentation**

- [Deleting Clients from a Virtual Router's DHCP Binding Table on page 14](#)

## dhcp-external duplicate-mac-address

---

**Syntax** [ no ] dhcp-external duplicate-mac-address

**Release Information** Command introduced in JunosE Release 9.3.0.

**Description** Configures the DHCP external server application to use a combination of the MAC address and the gateway IP address (giaddr) to uniquely identify DHCP clients attached to the router. This behavior is also referred to as *duplicate MAC mode*. The **no** version restores the default behavior, also known as *unique MAC mode*, which uses only the MAC address to uniquely identify DHCP clients.

**Mode** Global Configuration

- Related Documentation**
- [DHCP External Server Identification of Clients with Duplicate MAC Addresses Overview on page 6](#)
  - [Configuring DHCP External Server to Uniquely Identify Clients with Duplicate MAC Addresses](#)

## ip auto-configure ip-subscriber

<b>Syntax</b>	[ no ] ip auto-configure ip-subscriber [ include-primary   exclude-primary ]
<b>Release Information</b>	Command introduced before JunosE Release 7.1.0. <b>include-primary</b> and <b>exclude-primary</b> keywords added in JunosE Release 7.1.0.
<b>Description</b>	<p>Configures a primary IP interface to support creation of dynamic subscriber interfaces. The <b>include-primary</b> and <b>exclude-primary</b> keywords specify whether the primary interface can be assigned to a subscriber. The primary interface is not assigned to a subscriber by default.</p> <p>The router creates the required dynamic subscriber interfaces when the IP address is assigned to the associated subscriber. The address might be assigned by an external DHCP server, the DHCP local server, or the packet detect feature. The primary interface is not assigned to a subscriber by default.</p> <p>The <b>no</b> version disables creation of dynamic subscriber interfaces on this primary IP interface. Use the <b>no</b> version with the <b>include-primary</b> keyword to specify that the primary interface is not assigned to a subscriber.</p>
<b>Options</b>	<ul style="list-style-type: none"> <li>• <b>include-primary</b>—Specifies that the primary interface can be assigned to a subscriber; the <b>no</b> version disables the assignment of the primary interface</li> <li>• <b>exclude-primary</b>—Specifies that the primary interface cannot be assigned to a subscriber; the <b>no</b> version enables the assignment of the primary interface</li> </ul>
<b>Mode</b>	Interface Configuration, Profile Configuration, Subinterface Configuration
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <i>Configuring IPv4 Characteristics for a Profile</i></li> <li>• <i>Example: Configuring Dynamic Subscriber Interfaces</i></li> <li>• <i>Example: Configuring Dynamic Subscriber Interfaces Using Loopback Interfaces</i></li> <li>• <i>profile</i></li> <li>• <i>show ip interface</i></li> <li>• <i>show ip profile</i></li> <li>• <i>show profile</i></li> </ul>

## ip auto-detect ip-subscriber

---

**Syntax** [ no ] ip auto-detect ip-subscriber

**Release Information** Command introduced before JunosE Release 7.1.0.

**Description** Sets the router's packet detect feature, specifying that IP automatically detect packets that do not match any entries in the demultiplexer table. When an unmatched packet is detected, an event is generated that determines whether to create a dynamic subscriber interface or to configure an existing interface. The **no** version disables autodetection.

**Mode** Interface Configuration, Profile Configuration

**Related Documentation**

- [Configuring IPv4 Characteristics for a Profile](#)
- [Configuring Dynamic Subscriber Interfaces for Interoperation with DHCP Relay and DHCP Relay Proxy on page 19](#)
- [Example: Configuring Dynamic Subscriber Interfaces over GRE Tunnels](#)
- [profile](#)
- [show ip interface](#)
- [show ip profile](#)
- [show profile](#)



---

## ip dhcp-external auto-configure

---

<b>Syntax</b>	[ no ] ip dhcp-external auto-configure [ agent-circuit-identifier ]
<b>Release Information</b>	Command introduced before JunosE Release 7.1.0. <b>agent-circuit-identifier</b> keyword added in JunosE Release 7.3.0.
<b>Description</b>	Configures the E Series router to automatically create the user's DSI. This command is specific to a virtual router. The <b>no</b> version disables the autoconfigure feature.
<b>Options</b>	<ul style="list-style-type: none"><li>agent-circuit-identifier—Creates dynamic subscriber interfaces built over dynamic VLANs that are based on the agent-circuit-id option (suboption 1) of the option 82 field in DHCP messages.</li></ul>
<b>Mode</b>	Global Configuration
<b>Related Documentation</b>	<ul style="list-style-type: none"><li><a href="#">Configuring the DHCP External Server to Support the Creation of Dynamic Subscriber Interfaces on page 17</a></li></ul>

## ip dhcp-external disregard-giaddr-next-hop

---

**Syntax** [ no ] ip dhcp-external disregard-giaddr-next-hop

**Release Information** Command introduced before JunosE Release 7.1.0.

**Description** Configures the DHCP external application to disregard the giaddr in packets destined for the DHCP server when the next hop for a subscriber's access route is determined. The **no** version returns to the default, in which DHCP external uses the giaddr to determine the next hop.

**Mode** Global Configuration

**Related Documentation**

- [Configuring Interoperation with Ethernet DSLAMs on page 15](#)

---

## ip dhcp-external recreate-subscriber-interface

---

**Syntax** [ no ] ip dhcp-external recreate-subscriber-interface

**Release Information** Command introduced in JunosE Release 9.2.0.

**Description** Configures the DHCP external server application to delete and re-create the existing dynamic subscriber interface after a bound DHCP client extends its IP address lease by restarting the DHCP discovery process on its primary IP interface instead of by initiating the DHCP renewal process on its dynamic subscriber interface. This command is specific to a virtual router. The **no** version restores the default behavior, which preserves the dynamic subscriber interface after a bound client restarts the discovery process on its primary IP interface.

**Mode** Global Configuration

**Related Documentation**

- [Preservation of Dynamic Subscriber Interfaces with DHCP External Server Overview on page 5](#)
- [Configuring DHCP External Server to Control Preservation of Dynamic Subscriber Interfaces on page 18](#)

## ip dhcp-external server-address

---

**Syntax** [ no ] ip dhcp-external server-address *ipAddress*

**Release Information** Command introduced before JunosE Release 7.1.0.

**Description** Configures a DHCP server that is used to determine which DHCP packets are monitored. The **no** version removes the DHCP server.

**Options**

- *ipAddress*—IP address of the external DHCP server; you can specify a maximum of four servers

**Mode** Global Configuration

**Related Documentation**

- [Monitoring DHCP Traffic Between Remote Clients and DHCP Servers on page 14](#)

## ip dhcp-external server-sync

---

**Syntax** [ no ] ip dhcp-external server-sync

**Release Information** Command introduced before JunosE Release 7.1.0.

**Description** Creates subscriber state information based on lease renewals when the external DHCP server is unsynchronized with the E Series router. The **no** version disables this feature.

**Mode** Global Configuration

**Related Documentation**

- [Synchronizing the DHCP External Application and the Router on page 13](#)

## ip re-authenticate-auto-detect ip-subscriber

---

**Syntax** [ no ] ip re-authenticate-auto-detect ip-subscriber

**Release Information** Command introduced in JunosE Release 10.0.0.

**Description** Re-authenticates the auto-detected subscribers (dynamic subscriber interfaces) created on static and dynamic IP subscriber interfaces using the DHCP options **dhcp-options**, **dhcp-gi-address**, and **dhcp-mac-address** when the DHCP external application manages the subscriber addresses following a cold boot. The **no** version negates the command or restores the defaults.

**Mode** Interface Configuration, Profile Configuration

## ip route

**Syntax** `ip route [ vrf vrfName ] { ipAddress ipMask { ipNextHop  
 [ interfaceType interfaceSpecifier ] | interfaceType interfaceSpecifier } }  
 [ distance ] [ tag tagVal ] [ permanent ] [ [ verify rtr rtrIndex ]  
 [ verify bfd-liveness-detection [ minimum-interval minInterval ]  
 [ minimum-receive-interval minRecInterval ]  
 [ minimum-transmit-interval minTransInterval ] ] ] [ multiplier multValue ] ]  
 [ last-resort ] ] [ reject | discard ]`

`no ip route [ vrf vrfName ] ipAddress ipMask [ ipNextHop | interfaceType interfaceSpecifier  
 ] [ distance ]`

**Release Information** Command introduced before JunosE Release 7.1.0.  
**reject** and **discard** keywords added in JunosE Release 12.0.0.

**Description** Establishes static routes and can also enable Bidirectional Forwarding Detection (BFD) for the static route. The **no** version removes static routes or removes BFD from the static route.



**NOTE:** BFD sessions might not be maintained when the multiplier value is 1 and configured intervals are very short. We recommend that you do not use a multiplier value of 1 with very short intervals.

- Options**
- *vrfName*—Name of the VRF if the static route is being established within a VRF context; available only in Global Configuration mode
  - *ipAddress*—Destination IP address
  - *ipMask*—IP mask for the destination
  - *ipNextHop*—IP address of the next hop that can be used to reach the destination network
  - *interfaceType*—Interface type; see *Interface Types and Specifiers*
  - *interfaceSpecifier*—Particular interface; format varies according to interface type; see *Interface Types and Specifiers*
  - *distance*—Administrative distance for this route in the range 0–254
  - *tagVal*—Number in the range 0–4294967295 that identifies the tag for this route
  - permanent—Specifies that the route will not be removed, even if the interface shuts down
  - *verify rtr*—Installs the static route in the routing table only if the next hop to the specified destination address is resolved and if the specified RTR operation is currently reachable
  - *rtrIndex*—Number of the RTR operation to be verified; there is no default value

- `verify bfd-liveness-detection`—Installs the static route in the routing table only if the next hop to the specified destination address is verifiable by means of BFD liveness detection
- `minInterval`—Minimum proposed transmit interval and required receive interval for BFD control packets. It has the same effect as configuring the minimum receive interval and the minimum transmit interval to the same value. The range for the value is 10–65535 milliseconds except for ES2 4G LM, for which it is 100–65535 milliseconds. The default value is 300 milliseconds.
- `minRecInterval`—Minimum interval at which the local peer must receive BFD control packets sent by the remote peer. The range for the value is 10–65535 milliseconds except for ES2 4G LM, for which it is 100–65535 milliseconds. The default value is 300 milliseconds.
- `minTransInterval`—Minimum proposed interval between BFD control packets sent by the local peer. The range for the value is 10–65535 milliseconds except for ES2 4G LM, for which it is 100–65535 milliseconds. The default value is 300 milliseconds.
- `multValue`—Detection multiplier value that the remote peer router multiplies by the local peer’s negotiated transmit interval to determine the remote peer’s BFD liveness detection interval. This value is equal to the number of BFD packets that can be missed before the BFD session is declared down. The range for the value is 1–255. The default value is 3.
- `last-resort`—Installs the static route in the routing table even if the specified RTR operation is currently unreachable, provided that no other static route to the same network prefix is available
- `reject`—Discards packets received on the static route for the specified interface that are not processed by the router and sends ICMP unreachable messages to the originator. This option is available only for null interfaces
- `discard`—Discards packets received on the static route for the specified interface that are not processed by the router and does not send ICMP unreachable messages to the originator. This option is available only for null interfaces

**Mode** Global Configuration

**Related Documentation**

- *IP Default Route Overview*
- *Establishing an IP Static Route*
- *Enabling or Disabling the Transmission of ICMP Unreachable Messages for Static Routes on Null Interfaces*
- *Configuring IP Static Routes with Indirect Next Hops*
- *Next-Hop Verification for Static Routes Overview*
- *show ip route*
- *show ip static*



---

## ip route-map ip-subscriber

---

**Syntax** ip route-map ip-subscriber *routeMapName*  
no ip route-map ip-subscriber

**Release Information** Command introduced before JunosE Release 7.1.0.

**Description** Configures an interface for route-map processing and specifies the route map that is applied to the IP interface subscriber. If no route map is specified, then all packets will trigger the creation of a dynamic subscriber interface. The **no** version deletes the route map.

**Options** • *routeMapName*—Name of route map

**Mode** Interface Configuration, Profile Configuration

**Related Documentation** • *Configuring IPv4 Characteristics for a Profile*  
• *profile*  
• *show ip profile*  
• *show profile*

## set ip interface-profile

---

**Syntax** set ip interface-profile *profileName*

no set ip interface-profile

**Release Information** Command introduced before JunosE Release 7.1.0.

**Description** Specifies a dynamic IP interface profile that is used in the route map. The **no** version removes the interface profile from the route map.

**Options** • *profileName*—Name of the dynamic profile

**Mode** Route Map Configuration

**Related Documentation** • *route-map*  
• *show route-map*

## service dhcp-external

---

**Syntax** [ no ] service dhcp-external

**Release Information** Command introduced before JunosE Release 7.1.0.

**Description** Enables the DHCP external server. The **no** version disables the DHCP external server and does not save the previous settings.

**Mode** Global Configuration

**Related Documentation**

- [Enabling and Disabling the DHCP External Server Application on page 13](#)
- *Configuring Subscriber Management with an External DHCP Server*
- *Monitoring Active IP Subscribers Created by Subscriber Management*



## PART 3

# Administration

- [Monitoring Tasks on page 51](#)
- [Monitoring Commands on page 55](#)



# Monitoring Tasks

- Monitoring DHCP External Server Configuration Information on page 51
- Monitoring DHCP External Server Duplicate MAC Address Setting on page 52
- Monitoring DHCP External Server Statistics on page 52

## Monitoring DHCP External Server Configuration Information

**Purpose** Display information about the router's DHCP external server application.

**Action** To display DHCP external server information:

```
host1#show ip dhcp-external configuration
Dhcp External : Enabled
Auto-Configure : Enabled
Server-Sync : Enabled
Disregard-Giaddr-Next-Hop : Enabled
Detect-Agent-Circuit-Id : Disabled
Recreate-Subscriber-Interface : Enabled
Duplicate-MAC-Address : Enabled

Servers:
-----
10.1.1.1
10.2.1.1
10.3.1.1
```

**Meaning** [Table 3 on page 51](#) lists the `show ip dhcp-external configuration` command output fields.

**Table 3: show ip dhcp-external configuration Output Fields**

Field Name	Field Description
Dhcp External	Enabled or disabled
Auto-Configure	Enabled or disabled
Server-Sync	Enabled or disabled
Disregard-Giaddr-Next-hop	Enabled or disabled
Detect-Agent-Circuit-Id	Enabled or disabled

Table 3: show ip dhcp-external configuration Output Fields (*continued*)

Field Name	Field Description
Recreate-Subscriber-Interface	Enabled or disabled
Duplicate-MAC-Address	Enabled or disabled
Servers	DHCP servers whose traffic is monitored by the E Series router

**Related Documentation**

- [show ip dhcp-external configuration on page 59](#)

## Monitoring DHCP External Server Duplicate MAC Address Setting

**Purpose** Display global configuration information for the DHCP external server application. Currently, this command displays the status of the method that DHCP external server uses to uniquely identify DHCP clients with duplicate MAC addresses.

**Action** To display the duplicate MAC address setting for DHCP external server:

```
host1#show dhcp-external
Duplicate MAC Address: Enabled
```

**Meaning** [Table 4 on page 52](#) lists the **show dhcp-external** command output fields.

Table 4: show dhcp-external Output Fields

Field Name	Field Description
Duplicate MAC Address	Status of the identification method for DHCP clients with duplicate MAC addresses: <ul style="list-style-type: none"> <li>• Enabled—DHCP external server uses a combination of the MAC address and giaddr to uniquely identify DHCP clients.</li> <li>• Disabled—(Default) DHCP external server uses only the MAC address to uniquely identify DHCP clients.</li> </ul>

**Related Documentation**

- [show dhcp-external on page 56](#)

## Monitoring DHCP External Server Statistics

**Purpose** Display statistics for all external DHCP servers.

**Action** To display statistics for all the DHCP external servers configured on the router:

```
host1(config)#show ip dhcp-external statistics
DHCP External Statistics
Server Address 10.10.32.1
-----
      Item          Count
-----
```



```

memUsage          136
bindings          1
request           69
ack (request)     1120
renew             38611
ack (renew)       38611
nak               42
release           68
lease expirations 0

```

**Meaning** [Table 5 on page 53](#) lists the `show ip dhcp-external statistics` command output fields.

**Table 5: show ip dhcp-external statistics Output Fields**

Field Name	Field Description
memUsage	Memory in bytes used by DHCP server
bindings	Number of IP addresses currently assigned
request	Number of DHCP request packets
ack (request)	Number of DHCP acknowledgment packets in response to DHCP requests
renew	Number of DHCP renew packets
ack (renew)	Number of DHCP acknowledgment packets in response to DHCP renewals
nak	Number of DHCP negative acknowledgment packets
release	Number of DHCP release packets
lease expirations	Number of lease expirations

**Related Documentation**

- [show ip dhcp-external statistics on page 60](#)



## CHAPTER 10

# Monitoring Commands

- `show dhcp-external`
- `show ip dhcp-external binding`
- `show ip dhcp-external binding-id`
- `show ip dhcp-external configuration`
- `show ip dhcp-external statistics`

## show dhcp-external

---

**Syntax** show dhcp-external

**Release Information** Command introduced in JunosE Release 9.3.0.

**Description** Displays global configuration information for the DHCP external server application. Currently, this command indicates whether the ability to use a combination of the MAC address and giaddr to uniquely identify DHCP clients with duplicate MAC addresses is enabled or disabled for the DHCP external server application.

**Mode** Privileged Exec

**Related Documentation**

- [Monitoring DHCP External Server Duplicate MAC Address Setting on page 52](#)

---

## show ip dhcp-external binding

---

**Syntax** show ip dhcp-external binding [ *filter* ]

**Release Information** Command introduced before JunosE Release 7.1.0.

**Description** Displays binding for DHCP external clients.



**NOTE:** This command is deprecated and might be removed completely in a future release. The function provided by this command has been replaced by the **show dhcp binding** command.

---

**Options** • *filter*—See *Filtering show Commands*

**Mode** Privileged Exec

**Related Documentation** • *Monitoring DHCP Bindings (Displaying IP Address-to-MAC Address Bindings)*

## show ip dhcp-external binding-id

---

**Syntax** show ip dhcp-external binding-id [ *filter* ]

**Release Information** Command introduced before JunosE Release 7.1.0.

**Description** Displays binding information for DHCP clients.



**NOTE:** This command is deprecated and might be removed completely in a future release. The function provided by this command has been replaced by the **show dhcp binding** command.

---

**Options** • *filter*—See *Filtering show Commands*

**Mode** Privileged Exec

**Related Documentation** • *Monitoring DHCP Bindings (Displaying DHCP Bindings Based on Binding ID)*

## show ip dhcp-external configuration

---

**Syntax** show ip dhcp-external configuration [ *filter* ]

**Release Information** Command introduced before JunosE Release 7.1.0.

**Description** Displays configuration information for the DHCP external server.

**Options** • *filter*—See *Filtering show Commands*

**Mode** Privileged Exec

**Related Documentation** • *Monitoring DHCP Local Server Configuration*

## show ip dhcp-external statistics

---

**Syntax** show ip dhcp-external statistics [ delta ] [ *filter* ]

**Release Information** Command introduced before JunosE Release 7.1.0.

**Description** Displays statistics for the DHCP external server.

- Options**
- delta—Displays baselined statistics
  - *filter*—See *Filtering show Commands*

**Mode** Privileged Exec

**Related Documentation**

- [Monitoring DHCP External Server Statistics on page 52](#)



PART 4

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