

## Extended DHCP Local Server Overview

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You can enable the router to function as an extended DHCP local server and configure the extended DHCP local server options on the router. The extended DHCP local server provides an IP address and other configuration information in response to a client request.

The extended DHCP local server enhances traditional DHCP server operation in which the client address pool and client configuration information reside on the DHCP server. With the extended DHCP local server, the client address and configuration information reside in centralized address-assignment pools, which are managed independently of the DHCP local server and which can be shared by different client applications.

The extended DHCP local server also supports advanced pool matching and the use of named address ranges. You can also configure the local server to use DHCP option 82 information in the client PDU to determine which named address range to use for a particular client. The client configuration information, which is configured in the address-assignment pool, includes user-defined options, such as boot server, grace period, and lease time.

Configuring the DHCP environment that includes the extended DHCP local server requires two independent configuration operations, which you can complete in any order. In one operation, you configure the extended DHCP local server on the router and specify how the DHCP local server determines which address-assignment pool to use. In the other operation, you configure the address-assignment pools used by the DHCP local server. The address-assignment pools contain the IP addresses, named address ranges, and configuration information for DHCP clients. See *Configuring Address-Assignment Pools* for details about creating and using address-assignment pools.



**NOTE:** The extended DHCP local server and the address-assignment pools used by the server must be configured in the same logical system and routing instance.

You cannot configure the extended DHCP local server and extended DHCP relay on the same interface.

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To configure the extended DHCP local server on the router, you include the `dhcp-local-server` statement at the [edit system services] hierarchy level. See the [edit system services dhcp-local-server] Hierarchy Level for the complete DHCP local server syntax.

You can also include the `dhcp-local-server` statement at the following hierarchy levels:

- [edit logical-systems *logical-system-name* system services]
- [edit logical-systems *logical-system-name* routing-instances *routing-instance-name* system services]
- [edit routing-instances *routing-instance-name* system services]

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## ***Interaction Among the DHCP Client, Extended DHCP Local Server, and Address-Assignment Pools***

In a typical carrier edge network configuration, the DHCP client is on the subscriber's computer, and the DHCP local server is configured on the router. The following steps provide a high-level description of the interaction among the DHCP local server, DHCP client, and address-assignment pools:

1. The DHCP client sends a discover packet to one or more DHCP local servers in the network to obtain configuration parameters and an IP address for the subscriber.
2. Each DHCP local server that receives the discover packet then searches its address-assignment pool for the client address and configuration options. Each local server creates an entry in its internal client table to keep track of the client state, then sends a DHCP offer packet to the client.
3. On receipt of the offer packet, the DHCP client selects the DHCP local server from which to obtain configuration information and sends a request packet indicating the DHCP local server that will grant the address and configuration information.
4. The selected DHCP local server sends an acknowledgement packet to the client that contains the client address lease and configuration parameters. The server also installs the host route and ARP entry, and then monitors the lease state.

## ***Providing DHCP Client Configuration Information***

When the extended DHCP application receives a response from an external authentication server, the response might include information in addition to the IP address and subnet mask. The extended DHCP application uses the information from the authentication grant for the response the DHCP application sends to the DHCP client. The DHCP application can either send the information in its original form or the application might merge the information with local configuration specifications. For example, if the authentication grant includes an address pool name and a local configuration specifies DHCP attributes for that pool, the extended DHCP application merges the authentication results and the attributes in the reply that the server sends to the client.

A local configuration is optional — a client can be fully configured by the external authentication service. However, if the external authentication service does not provide client configuration, you must configure the local address-assignment pool to provide the configuration for the client. When a local configuration specifies options, the extended DHCP application adds the local configuration options to the offer PDU the server sends to the client. If the two sets of options overlap, the options in the authentication response from the external service take precedence.

When you use RADIUS to provide the authentication, the additional information might be in the form of RADIUS attributes and Juniper Networks VSAs. The following table shows the information that RADIUS might include in the authentication grant. See RADIUS Attributes and Juniper Networks VSAs Supported by the AAA Service Framework for a complete list of RADIUS attributes and Juniper Networks VSAs that the extended DHCP applications supports for subscriber access management.

| Attribute Number            | Attribute Name           | Description                                       |
|-----------------------------|--------------------------|---|
| RADIUS attribute 8          | Framed-IP-Address        | Client IP address                                 |
| RADIUS attribute 9          | Framed-IP-Netmask        | Subnet mask for client IP address (DHCP option 1) |
| Juniper Networks VSA 26-4   | Primary-DNS              | Primary domain server (DHCP option 6)             |
| Juniper Networks VSA 26-5   | Secondary-DNS            | Secondary domain server (DHCP option 6)           |
| Juniper Networks VSA 26-6   | Primary-WINS             | Primary WINS server (DHCP option 44)              |
| Juniper Networks VSA 26-7   | Secondary-WINS           | Secondary WINS server (DHCP option 44)            |
| RADIUS attribute 88         | Framed-Pool              | Address assignment pool name                      |
| RADIUS attribute 27         | Session-Timeout          | Lease time  |
| Juniper Networks VSA 26-109 | DHCP-Guided-Relay-Server | DHCP relay server                                 |

## Minimal Configuration for Clients

The extended DHCP local server provides a minimal configuration to the DHCP client if the client does not have DHCP option 55 configured. The server provides the subnet mask of the address-assignment pool that is selected for the client. In addition to the subnet mask, the server provides the following values to the client if the information is configured in the selected address-assignment pool:

- **router**—A router located on the client's subnet. This statement is the equivalent of DHCP option 3.
- **domain name**—The name of the domain in which the client searches for a DHCP server host. This is the default domain name that is appended to hostnames that are not fully qualified. This is equivalent to DHCP option 15.
- **domain name server**—A Domain Name System (DNS) name server that is available to the client to resolve hostname-to-client mappings. This is equivalent to DHCP option 6.

## DHCP Local Server and Address-Assignment Pools

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- Related Topics**
- [Configuring Address-Assignment Pools](#)
  - [Configuring How the Extended DHCP Local Server Determines Which Address-Assignment Pool To Use](#)
  - [Dynamic Profile Attachment to DHCP Subscriber Interfaces Overview](#)
  - [Using External AAA Authentication Services with DHCP](#)
  - [Tracing Extended DHCP Operations](#)
  - [Verifying and Managing DHCP Local Server Configuration](#)
  - [Example: Minimum Extended DHCP Local Server Configuration](#)
  - [Example: Extended DHCP Local Server Configuration with Optional Pool Matching](#)