



Junos[®] OS

Address Assignment Pools Feature Guide for Subscriber Management

Release

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Junos[®] OS Address Assignment Pools Feature Guide for Subscriber Management

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Table of Contents

	About the Documentation	ix
	Documentation and Release Notes	ix
	Supported Platforms	ix
	Using the Examples in This Manual	ix
	Merging a Full Example	x
	Merging a Snippet	x
	Documentation Conventions	xi
	Documentation Feedback	xiii
	Requesting Technical Support	xiii
	Self-Help Online Tools and Resources	xiii
	Opening a Case with JTAC	xiv
Part 1	Overview	
Chapter 1	Address-Assignment Pools in Subscriber Access Networks	3
	Address-Assignment Pools Overview	3
	Address-Assignment Pools Licensing Requirements	4
	DHCPv6 Lease Timers	4
Part 2	Configuration	
Chapter 2	Configuration Tasks	9
	Configuring Address-Assignment Pools	9
	Configuring an Address-Assignment Pool Name and Addresses	10
	Configuring a Named Address Range for Dynamic Address Assignment	11
	Configuring Address-Assignment Pool Usage Threshold Traps	11
	Configuring Address-Assignment Pool Linking	12
	Configuring Static Address Assignment	13
	Configuring an Address-Assignment Pool for Router Advertisement	13
	Configuring DHCP Client-Specific Attributes	14
	DHCP Attributes for Address-Assignment Pools	14
	Configuring How the Extended DHCP Local Server Determines Which Address-Assignment Pool to Use	16
Chapter 3	Examples	19
	Example: Configuring an Address-Assignment Pool	19
	Example: Extended DHCP Local Server Configuration with Optional Pool Matching	20

Chapter 4	Configuration Statements	23
	[edit access address-assignment] Hierarchy Level	24
	abated-utilization (Address-Assignment Pools)	25
	abated-utilization-v6 (Address-Assignment Pools)	25
	address-assignment (Address-Assignment Pools)	26
	boot-file	27
	boot-server	27
	circuit-id (Address-Assignment Pools)	28
	dhcp-attributes (Address-Assignment Pools)	29
	dns-server	30
	domain-name (Address-Assignment Pools)	30
	family (Address-Assignment Pools)	31
	grace-period	32
	hardware-address	32
	high-utilization (Address-Assignment Pools)	33
	high-utilization-v6 (Address-Assignment Pools)	33
	host (Address-Assignment Pools)	34
	ip-address	34
	link (Address-Assignment Pools)	35
	maximum-lease-time	35
	name-server	36
	neighbor-discovery-router-advertisement (Address-Assignment Pools)	36
	netbios-node-type	37
	network	37
	option	38
	option-82 (Address-Assignment Pools)	39
	option-match	39
	pool (Address-Assignment Pools)	40
	preferred-lifetime (Address-Assignment Pools)	41
	prefix (Address-Assignment Pools)	42
	range (Address-Assignment Pools)	43
	remote-id	44
	router (Address-Assignment Pools)	44
	server-identifier (Address-Assignment Pools)	45
	sip-server-address	45
	sip-server-domain-name	46
	t1-percentage (Address-Assignment Pools)	47
	t2-percentage (Address-Assignment Pools)	48
	tftp-server	49
	valid-lifetime (Address-Assignment Pools)	49
	wins-server (Access)	50
Part 3	Administration	
Chapter 5	Monitoring Commands	53
	show network-access aaa statistics	54
	show network-access address-assignment pool	59

Part 4	Troubleshooting	
Chapter 6	Acquiring Troubleshooting Information	63
	Tracing General Authentication Service Processes	63
	Configuring the General Authentication Service Processes Trace Log Filename	64
	Configuring the Number and Size of General Authentication Service Processes Log Files	64
	Configuring Access to the Log File	64
	Configuring a Regular Expression for Lines to Be Logged	65
	Configuring Subscriber Filtering for General Authentication Service Trace Operations	65
	Configuring the Trace Operation	66
	Collecting Subscriber Access Logs Before Contacting Juniper Technical Support	67
Chapter 7	Troubleshooting Configuration Statements	71
	traceoptions (General Authentication Service)	72
Part 5	Index	
	Index	77

List of Tables

	About the Documentation	ix
	Table 1: Notice Icons	xi
	Table 2: Text and Syntax Conventions	xi
Part 2	Configuration	
Chapter 2	Configuration Tasks	9
	Table 3: DHCP Attributes	15
	Table 4: DHCPv6 Attributes	15
Part 3	Administration	
Chapter 5	Monitoring Commands	53
	Table 5: show network-access aaa statistics Output Fields	54
	Table 6: show network-access address-assignment pool Output Fields	59

About the Documentation

- Documentation and Release Notes on page ix
- Supported Platforms on page ix
- Using the Examples in This Manual on page ix
- Documentation Conventions on page xi
- Documentation Feedback on page xiii
- Requesting Technical Support on page xiii

Documentation and 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/>.

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

Juniper Networks Books publishes books by Juniper Networks engineers and subject matter experts. These books go beyond the technical documentation to explore the nuances of network architecture, deployment, and administration. The current list can be viewed at <http://www.juniper.net/books>.

Supported Platforms

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

- MX Series

Using the Examples in This Manual

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

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

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

Merging a Full Example

To merge a full example, follow these steps:

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

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

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

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

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

Merging a Snippet

To merge a snippet, follow these steps:

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

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

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

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

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

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

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

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

Documentation Conventions

Table 1 on page xi defines notice icons used in this guide.

Table 1: Notice Icons

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

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

Table 2: Text and Syntax Conventions

Convention	Description	Examples
Bold text like this	Represents text that you type.	To enter configuration mode, type the configure command: user@host> configure

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

Convention	Description	Examples
Fixed-width text like this	Represents output that appears on the terminal screen.	user@host> show chassis alarms No alarms currently active
<i>Italic text like this</i>	<ul style="list-style-type: none">Introduces or emphasizes important new terms.Identifies guide names.Identifies RFC and Internet draft titles.	<ul style="list-style-type: none">A policy <i>term</i> is a named structure that defines match conditions and actions.<i>Junos OS CLI User Guide</i>RFC 1997, <i>BGP Communities Attribute</i>
<i>Italic text like this</i>	Represents variables (options for which you substitute a value) in commands or configuration statements.	Configure the machine's domain name: [edit] root@# set system domain-name <i>domain-name</i>
Text like this	Represents names of configuration statements, commands, files, and directories; configuration hierarchy levels; or labels on routing platform components.	<ul style="list-style-type: none">To configure a stub area, include the stub statement at the [edit protocols ospf area area-id] hierarchy level.The console port is labeled CONSOLE.
< > (angle brackets)	Encloses optional keywords or variables.	stub <default-metric <i>metric</i>>;
(pipe symbol)	Indicates a choice between the mutually exclusive keywords or variables on either side of the symbol. The set of choices is often enclosed in parentheses for clarity.	broadcast multicast (<i>string1</i> <i>string2</i> <i>string3</i>)
# (pound sign)	Indicates a comment specified on the same line as the configuration statement to which it applies.	rsvp { # Required for dynamic MPLS only
[] (square brackets)	Encloses a variable for which you can substitute one or more values.	community name members [<i>community-ids</i>]
Indentation and braces ({ })	Identifies a level in the configuration hierarchy.	[edit] routing-options { static { route default { nexthop <i>address</i> ; retain; } } }
;(semicolon)	Identifies a leaf statement at a configuration hierarchy level.	
GUI Conventions		
Bold text like this	Represents graphical user interface (GUI) items you click or select.	<ul style="list-style-type: none">In the Logical Interfaces box, select All Interfaces.To cancel the configuration, click Cancel.

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

Convention	Description	Examples
> (bold right angle bracket)	Separates levels in a hierarchy of menu selections.	In the configuration editor hierarchy, select Protocols>Ospf .

Documentation Feedback

We encourage you to provide feedback, comments, and suggestions so that we can improve the documentation. You can send your comments to techpubs-comments@juniper.net, or fill out the documentation feedback form at <https://www.juniper.net/cgi-bin/docbugreport/>. If you are using e-mail, be sure to include the following information with your comments:

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

Requesting Technical Support

Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active J-Care or JNASC support contract, or are covered under warranty, and need post-sales technical support, you can access our tools and resources online or open a case with JTAC.

- 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.

Self-Help Online Tools and Resources

For quick and easy problem resolution, Juniper Networks has designed an online self-service portal called the Customer Support Center (CSC) that provides you with the following features:

- Find CSC offerings: <http://www.juniper.net/customers/support/>
- 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

You can open a case with JTAC on the Web or by telephone.

- Use the Case Management tool in the CSC at <http://www.juniper.net/cm/>.
- Call 1-888-314-JTAC (1-888-314-5822 toll-free in the USA, Canada, and Mexico).

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

PART 1

Overview

- [Address-Assignment Pools in Subscriber Access Networks on page 3](#)

CHAPTER 1

Address-Assignment Pools in Subscriber Access Networks

- [Address-Assignment Pools Overview on page 3](#)
- [Address-Assignment Pools Licensing Requirements on page 4](#)
- [DHCPv6 Lease Timers on page 4](#)

Address-Assignment Pools Overview

The address-assignment pool feature supports subscriber management and DHCP management functionality by enabling you to create centralized IPv4 and IPv6 address pools independently of the client applications that use the pools. The **authd** process manages the pools and the address allocation, whether the addresses come from local pools or from a RADIUS server. For example, multiple client applications, such as DHCP, can use the same address-assignment pool to provide addresses for their particular clients. Client applications can acquire addresses for either authenticated or unauthenticated clients.

Address-assignment pools support both dynamic and static address assignment. In dynamic address assignment, a client is automatically assigned an address from the address-assignment pool. In static address assignment, which is supported for IPv4 pools only, you reserve an address that is then always used by a particular client. Addresses that are reserved for static assignment are removed from the dynamic address pool and cannot be assigned to other clients.

You can configure named address ranges within an address-assignment pool. A named range is a subset of the overall address range. A client application can use named ranges to manage address assignment based on client-specific criteria. For example, for IPv4 address-assignment pools, you might create a named range that is based on a specific DHCP option 82 value. Then, when a DHCP client request matches the specified option 82 value, an address from the specified range is assigned to the client.

You can link address-assignment pools together to provide backup pools for address assignment. When the primary pool is fully allocated, the router or switch automatically switches to the linked, or secondary, pool and begins allocating addresses from that pool.

You can also explicitly identify that an address-assignment pool is used for ND/RA.

- Related Documentation**
- [Configuring Address-Assignment Pools on page 9](#)
 - [DNS Address Assignment Precedence](#)
 - [Address-Assignment Pools Licensing Requirements on page 4](#)
 - [Example: Configuring an Address-Assignment Pool on page 19](#)
 - [Configuring an Extended DHCP Server with DHCPv6 on EX Series Switches \(CLI Procedure\)](#)

Address-Assignment Pools Licensing Requirements

The address-assignment pool feature is part of the Junos OS Subscriber Management Feature Pack license. You must install and properly configure the license to meet the requirements for using the address-assignment pool feature.

- Related Documentation**
- [Junos OS Feature Licenses](#)

DHCPv6 Lease Timers

Subscriber management supports configurable timers that you can use to manage the DHCPv6 address leases provided by address-assignment pools. In addition to the maximum-lease-time timer, which sets the maximum time for which the DHCPv6 server can grant a lease, you can use DHCP client-specific attributes to configure timers that govern the lifetimes of existing leases that have been obtained from an address-assignment pool.

The following list describes the configurable timers for DHCPv6 address-assignment pools:

- **preferred-lifetime**—Length of time that a valid address is in the preferred state and can be used without any restrictions. When the preferred-lifetime expires, the address becomes deprecated. A deprecated address should not be used for new communications, but might continue to be used for existing communications in certain cases.

If the valid-lifetime is also configured, the preferred-lifetime must be less than the valid-lifetime. The preferred-lifetime and the maximum-lease-time are mutually exclusive and cannot both be configured.

- **valid-lifetime**—Length of time that an address remains in the valid state, during which the address can be used for new or existing communications. When the valid-lifetime expires, the address becomes invalid, and can no longer be used.

If the preferred-lifetime is also configured, the valid-lifetime must be greater than the preferred-lifetime. The valid-lifetime and the maximum-lease-time are mutually exclusive and cannot both be configured.

- t1 percentage—Percentage of the **preferred-lifetime** that the client waits before contacting the DHCPv6 server that originally granted the lease to request that the address lease be extended. This timer is also called the renewal time.
- t2 percentage—Percentage of the **preferred-lifetime** that the client waits before sending a request to any available DHCPv6 server to extend the address lease. This timer is also called the rebind time.

**Related
Documentation**

- [Configuring DHCP Client-Specific Attributes on page 14](#)
- [DHCP Attributes for Address-Assignment Pools on page 14](#)

PART 2

Configuration

- [Configuration Tasks on page 9](#)
- [Examples on page 19](#)
- [Configuration Statements on page 23](#)

CHAPTER 2

Configuration Tasks

- [Configuring Address-Assignment Pools on page 9](#)
- [Configuring an Address-Assignment Pool Name and Addresses on page 10](#)
- [Configuring a Named Address Range for Dynamic Address Assignment on page 11](#)
- [Configuring Address-Assignment Pool Usage Threshold Traps on page 11](#)
- [Configuring Address-Assignment Pool Linking on page 12](#)
- [Configuring Static Address Assignment on page 13](#)
- [Configuring an Address-Assignment Pool for Router Advertisement on page 13](#)
- [Configuring DHCP Client-Specific Attributes on page 14](#)
- [DHCP Attributes for Address-Assignment Pools on page 14](#)
- [Configuring How the Extended DHCP Local Server Determines Which Address-Assignment Pool to Use on page 16](#)

Configuring Address-Assignment Pools

The address-assignment pool feature supports subscriber management functionality by enabling you to create address pools that can be shared by different client applications. An address-assignment pool can support either IPv4 address or IPv6 addresses. You cannot use the same pool for both types of address.



NOTE: You cannot use address-assignment pools with the J Series Services Routers DHCP server. Also, address-assignment pools are completely separate from services PIC-based L2TP LNS address pools, which you create with the `address-pool` statement at the `[edit access]` hierarchy level, and NAT pools, which you create with the `pool` statement at the `[edit services nat]` hierarchy level.

To configure an address-assignment pool:

1. Configure the address-assignment pool name and specify the addresses for the pool.
See [“Configuring an Address-Assignment Pool Name and Addresses” on page 10](#).
2. (Optional) Configure named ranges (subsets) of addresses.

See [“Configuring a Named Address Range for Dynamic Address Assignment” on page 11.](#)

3. (Optional) Configure address-assignment pool linking and specify the secondary pool to use when the primary pool is fully allocated.

See [“Configuring Address-Assignment Pool Linking” on page 12.](#)

4. (Optional) Create static address bindings (IPv4 only).

See [“Configuring Static Address Assignment” on page 13.](#)

5. (Optional) Configure attributes for DHCP clients.

See [“Configuring DHCP Client-Specific Attributes” on page 14.](#)

6. (Optional) Specify that the address-assignment pool is used for router advertisement.

See [“Configuring an Address-Assignment Pool for Router Advertisement” on page 13.](#)

**Related
Documentation**

- [Address-Assignment Pools Overview on page 3](#)
- [Address-Assignment Pools Licensing Requirements on page 4](#)
- [Example: Configuring an Address-Assignment Pool on page 19](#)

Configuring an Address-Assignment Pool Name and Addresses

To configure an address-assignment pool, you must specify the name of the pool and configure the addresses for the pool.

To configure an IPv4 address-assignment pool:

1. Configure the name of the pool and specify the IPv4 family.

```
[edit access]
user@host# edit address-assignment pool isp_1 family inet
```

2. Configure the network address and the prefix length of the addresses in the pool.

```
[edit access address-assignment pool isp_1 family inet]
user@host# set network 192.168.0.0/16
```

To configure an IPv6 address-assignment pool:

1. Configure the name of the pool and specify the IPv6 family.

```
[edit access]
user@host# edit address-assignment pool isp_2 family inet6
```

2. Configure the IPv6 network prefix for the address pool. The prefix specification is required when you configure an IPv6 address-assignment pool.

```
[edit access address-assignment pool isp_2 family inet6]
user@host# set prefix 2008:2009::/32
```

**Related
Documentation**

- [Address-Assignment Pools Overview on page 3](#)

- [Configuring Address-Assignment Pools on page 9](#)

Configuring a Named Address Range for Dynamic Address Assignment

You can optionally configure multiple named ranges, or subsets, of addresses within an address-assignment pool. During dynamic address assignment, a client can be assigned an address from a specific named range. To create a named range, you specify a name for the range and define the address range.

To create a named range within an IPv4 address-assignment pool:

1. Specify the name of the address-assignment pool and the IPv4 family.

```
[edit access]
user@host# edit address-assignment pool isp_1 family inet
```

2. Configure the name of the range and the lower and upper boundaries of the addresses in the range.

```
[edit access address-assignment pool isp_1 family inet]
user@host# set range southeast low 192.168.102.2 high 192.168.102.254
```

To create a named range within an IPv6 address-assignment pool:

1. Specify the name of the address-assignment pool and the IPv6 family.

```
[edit access]
user@host# edit address-assignment pool isp_2 family inet6
```

2. Configure the name of the range and define the range. You can define the range based on the lower and upper boundaries of the prefixes in the range, or based on the length of the prefixes in the range.

```
[edit access address-assignment pool isp_2 family inet6]
user@host# set range dsl-range low 2008:2010:2011:0100::/64 high
2008:2010:2011:ffff::/64
user@host# set range fiber-east prefix-length 48
```

- Related Documentation**
- [Address-Assignment Pools Overview on page 3](#)
 - [Configuring Address-Assignment Pools on page 9](#)

Configuring Address-Assignment Pool Usage Threshold Traps

You can receive advanced warning that an address pool or linked set of address pools is running short on available addresses by setting usage threshold traps. An address pool has SNMP thresholds associated with it that allow the local address server to signal SNMP traps when certain conditions exist. These thresholds include high utilization threshold and abated utilization threshold. If a pool's outstanding addresses exceed the high utilization threshold and the SNMP trap signaling is enabled, SNMP is notified. Likewise, when a pool's utilization drops below the abated threshold utilization threshold, SNMP is notified. When the system reaches the high utilization value, it sends warning

messages. When memory usage falls to the abated utilization value, the system stops sending warning messages.

To set the usage for threshold traps:

- Specify the percentage after which the address pool usage is exceeded that an SNMP trap is generated.

```
[edit access]
user@host# edit address-assignment high-utilization 95
```

To set the abated value for the trap:

- Specify the percentage below which the address pool usage is abated that an SNMP trap is generated.

```
[edit access]
user@host# edit address-assignment abated-utilization 80
```

- Related Documentation**
- [Address-Assignment Pools Overview on page 3](#)
 - [Example: Configuring an Address-Assignment Pool on page 19](#)

Configuring Address-Assignment Pool Linking

Address-assignment pool linking enables you to specify a secondary address pool for the router to use when the primary address-assignment pool is fully allocated. When the primary pool is has no available addresses, the router automatically switches over to the linked secondary pool and begins allocating addresses from that pool. The router uses a secondary pool only when the primary address-assignment pool is fully allocated.

You can create a chain of multiple linked pools. For example you can link pool A to pool B, and link pool B to pool C. When pool A has no available addresses, the router switches to using pool B for addresses. When pool B is exhausted, the router switches to pool C. There is no limit to the number of linked pools in a chain. However, you cannot create multiple links to or from the same pool—a pool can be linked to only one secondary pool, and a secondary pool can be linked from only one primary pool. Also, two linked primary and secondary pools must be of the same family type, either IPv4 or IPv6.

To link an address-assignment pool to a secondary pool:

1. Specify the name of the primary address-assignment pool.

```
[edit access]
user@host# edit address-assignment pool pool-name
```

2. Configure the secondary pool to which the primary pool will be linked.

```
[edit access address-assignment pool isp_1]
user@host# set link pool-name
```

- Related Documentation**
- [Address-Assignment Pools Overview on page 3](#)
 - [Address-Assignment Pools Licensing Requirements on page 4](#)

- [Example: Configuring an Address-Assignment Pool on page 19](#)

Configuring Static Address Assignment

You can optionally create a static IPv4 address binding by reserving a specific address for a particular client. The address is removed from the address-assignment pool so that it is not assigned to another client. When you reserve an address, you identify the client host and create a binding between the client MAC address and the assigned IP address. IPv6 address-assignment pools do not support static address binding.

To configure a static binding for an IPv4 address:

1. Specify the name of the IPv4 address-assignment pool containing the IP address you want to reserve for the client.

```
[edit access]
user@host# edit address-assignment pool isp_1 family inet
```

2. Specify the name of the client for the static binding, the client MAC address, and the IP address to reserve for the client. This configuration specifies that the client with MAC address 90:00:00:01:00:01 is always assigned IP address 192.168.44.12.

```
[edit access address-assignment pool isp_1 family inet]
user@host# set host svale6_boston_net hardware-address 90:00:00:01:00:01
ip-address 192.168.44.12
```

Related Documentation

- [Address-Assignment Pools Overview on page 3](#)
- [Configuring Address-Assignment Pools on page 9](#)

Configuring an Address-Assignment Pool for Router Advertisement

You can create an address-assignment pool that is explicitly used for router advertisement address assignment. You populate the address-assignment pool using the standard procedure, but you additionally specify that the pool is used for router advertisement.

To create an address-assignment pool that is used for router advertisement:

1. Configure the IPv6 address-assignment pool.
See [“Configuring Address-Assignment Pools” on page 9](#)
2. Specify that the address-assignment pool is used for router advertisement.

```
[edit access address-assignment]
user@host# set neighbor-discovery-router-advertisement chi-fiber-ra
```

Related Documentation

- [Address-Assignment Pools Overview on page 3](#)
- [Example: Configuring an Address-Assignment Pool on page 19](#)

Configuring DHCP Client-Specific Attributes

You use the address-assignment pool feature to include application-specific attributes when clients obtain an address. The client application, such as DHCP, uses the attributes to determine how addresses are assigned, and to also provide optional application-specific characteristics to the client. For example, the DHCP application might specify that a client that matches certain prerequisite information is dynamically assigned an address from a particular named range. Based on which named range is used, DHCP specifies additional DHCP attributes such as the boot file that the client uses, the lease grace period, and the maximum lease time.

You use the `dhcp-attributes` statement to configure DHCP client-specific attributes for address-assignment pools. “[DHCP Attributes for Address-Assignment Pools](#)” on page 14 describes the supported attributes you can configure for IPv4 and IPv6 address-assignment pools.

To configure address-assignment pool attributes for DHCP clients:

1. Specify the name and IP family of the address-assignment pool.

```
[edit access]
user@host# edit address-assignment pool isp_1 family inet
```

2. Configure optional DHCP client attributes.

```
[edit access address-assignment pool isp_1 family inet]
user@host# set dhcp-attributes boot-server 192.168.200.100 grace-period 3600
maximum-lease-time 18000
```



NOTE: The DNS name server addresses that are configurable as DHCP attributes can also be configured globally at the routing instance level and in access profiles. For more information, see *DNS Name Server Address Overview*.

Related Documentation

- [Address-Assignment Pools Overview on page 3](#)
- [Configuring Address-Assignment Pools on page 9](#)
- [DHCP Attributes for Address-Assignment Pools on page 14](#)

DHCP Attributes for Address-Assignment Pools

Table 3 on page 15 describes the DHCP client attributes that you can use with the `dhcp-attributes` statement when you configure address-assignment pools.

Table 4 on page 15 describes the DHCPv6 client attributes for configuring IPv6 address-assignment pools.

Table 3: DHCP Attributes

Attribute	Description	DHCP Option
<code>boot-file</code>	Boot filename advertised to the client, and used by the client to complete configuration.	67
<code>boot-server</code>	Boot server containing the boot file.	66
<code>domain-name</code>	Domain in which clients search for a DHCP server host.	15
<code>grace-period</code>	Grace period offered with the lease.	—
<code>maximum-lease-time</code>	Maximum lease time allowed by the DHCP server.	51
<code>name-server</code>	IP address of DNS server to which clients can send DNS queries.	6
<code>netbios-node-type</code>	NetBIOS node type.	46
<code>option</code>	User-defined options.	—
<code>option-match</code>	Option 82 value is mapped to named address range.	—
<code>router</code>	IP address for routers on the subnetwork.	3
<code>server-identifier</code>	IP address used as the DHCP source address	54
<code>tftp-server</code>	Trivial File Transfer Protocol (TFTP) server that the client uses to obtain the client configuration file.	150
<code>wins-server</code>	IP address of the Windows NetBIOS name server.	44

Table 4: DHCPv6 Attributes

Attribute	Description	DHCPv6 Option
<code>dns-server</code>	IPv6 address of DNS server to which clients can send DNS queries.	23
<code>grace-period</code>	Grace period offered with the lease.	—
<code>maximum-lease-time</code>	Maximum lease time allowed by the DHCP server.	—
<code>option</code>	User-defined options.	—
<code>preferred-lifetime</code>	Length of time that a valid address is in the preferred state. When the preferred lifetime expires, the address becomes deprecated.	—

Table 4: DHCPv6 Attributes (*continued*)

Attribute	Description	DHCPv6 Option
sip-server-address	IPv6 address of SIP outbound proxy server.	22
sip-server-domain-name	Domain name of the SIP outbound proxy server.	21
t1-percentage	Percentage of the preferred-lifetime that the client (router) waits before sending renew messages to the DHCPv6 server that granted the original lease to extend the client's lease.	–
t2-percentage	Percentage of the preferred-lifetime that the client (router) waits before sending rebind messages to any available DHCPv6 server to extend the client's lease.	–
valid-lifetime	Length of time that the address remains in the valid state. When the lifetime expires, the address becomes invalid.	–

Related Documentation

- [Address-Assignment Pools Overview on page 3](#)
- [Configuring Address-Assignment Pools on page 9](#)
- [Configuring DHCP Client-Specific Attributes on page 14](#)
- [dhcp-attributes \(Address-Assignment Pools\) on page 29](#)

Configuring How the Extended DHCP Local Server Determines Which Address-Assignment Pool to Use

You can specify the match order in which the extended DHCP local server uses the client data to determine the address-assignment pool that provides the IP address and configuration for a DHCP client. You use the **pool-match-order** statement to specify the match order. If you do not specify the **pool-match-order**, the router (or switch) uses the default **ip-address-first** matching to select the address pool. After DHCP local server determines the address assignment pool to use, the server performs the matching based on the criteria you specified in the pool configuration.

In the default **ip-address-first** matching, the server selects the address-assignment pool to use by matching the IP address in the client DHCP request with the network address of the address-assignment pool. If the client request contains the gateway IP address (**giaddr**), the local server matches the **giaddr** to the address-assignment pool's address. If there is no **giaddr** in the request, then the DHCP local server matches the IP address of the receiving interface to the address of the address-assignment pool.

In **external-authority** matching, the DHCP local server receives the address assignment from an external authority, such as RADIUS or Diameter. If RADIUS is the external authority, the DHCP local server uses the Framed-IPv6-Pool attribute (RADIUS attribute 100) to select the pool. If Diameter is the external authority, the server uses the Diameter counterpart of the Framed-IPv6-Pool attribute to determine the pool.

For IPv4 address-assignment pools, you can optionally configure the extended DHCP local server to match the DHCP relay agent information option (option 82) in the client DHCP packets to a named range in the address-assignment pool used for the client. Named ranges are subsets within the overall address-assignment pool address range, which you can configure when you create the address-assignment pool.



NOTE: To use the DHCP local server option 82 matching feature with an IPv4 address-assignment pool, you must ensure that the `option-82` statement is included in the `dhcp-attributes` statement for the address-assignment pool.

To configure the matching order the extended DHCP local server uses to determine the address-assignment pool used for a client:

1. Access the **pool-match-order** configuration.

```
[edit system services dhcp-local-server]
user@host# edit pool-match-order
```

2. Specify the pool matching methods in the order in which the router (switch) performs the methods. You can specify the methods in any order. All methods are optional—the router (switch) uses the **ip-address-first** method by default.

- Configure the router (switch) to use an external addressing authority.

```
[edit system services dhcp-local-server pool-match-order]
user@host# set external-authority
```

- Configure the router (switch) to use the ip-address-first method.

```
[edit system services dhcp-local-server pool-match-order]
user@host# set ip-address-first
```

- (IPv4 address-assignment pools only) Specify the option 82 matching method.

```
[edit system services dhcp-local-server pool-match-order]
user@host# set option-82
```

Related Documentation

- [Address-Assignment Pools Overview on page 3](#)
- [Configuring Address-Assignment Pools on page 9](#)
- [Extended DHCP Local Server Overview](#)
- [Example: Extended DHCP Local Server Configuration with Optional Pool Matching on page 20](#)

CHAPTER 3

Examples

- [Example: Configuring an Address-Assignment Pool on page 19](#)
- [Example: Extended DHCP Local Server Configuration with Optional Pool Matching on page 20](#)

Example: Configuring an Address-Assignment Pool

This example shows an address-assignment pool configuration that creates two pools, one for IPv4 DHCP clients (**isp_1**) , and a second pool (**chi-fiber-ra**) that is used for router advertisement.

```
[edit access]
address-assignment {
  network-discovery-router-advertisement chi-fiber-ra;
  pool isp_1 {
    family inet {
      network 192.168.0.0/16;
      range southeast {
        low 192.168.102.2 high 192.168.102.254;
      }
      range northeast {
        low 192.168.119.2 high 192.168.119.250;
      }
    }
    host svale6.boston.net {
      hardware-address 90:00:00:01:00:01;
      ip-address 192.168.44.12;
    }
    dhcp-attributes {
      option-match {
        option-82 {
          circuit-id fiber range northeast;
        }
        option-82 {
          circuit-id cable_net range southeast;
        }
      }
    }
    boot-file boot.client;
    boot-server 192.168.200.100;
    grace-period 3600;
    maximum-lease-time 18000;
    netbios-node-type p-node;
  }
}
```

```
        router 192.168.44.44 192.168.44.45;
    }
}
}
pool chi-fiber-ra {
    family inet6 {
        prefix 2008:2009:2010::/48;
        range fiber3 {
            low 2008:2009:2010::1/64;
            high 2008:2009:2010::5/64;
        }
    }
}
```

This example creates an IPv4 address-assignment pool named **isp-1**, which contains two named address ranges, **southeast** and **northeast**. The address-assignment pool also contains a static binding for client **host sval6.boston.net**. The **ISP_1** pool configuration also includes the **dhcp-attributes** statement, indicating that the pool is used for DHCP clients. If the option 82 **circuit-id** entry matches the string **fiber**, then DHCP assigns the client an address from the **northeast** range. If the option 82 **circuit-id** matches the string **cable_net**, DHCP assigns an address from the **southeast** range.

The second address-assignment pool created in this example is **chi-fiber-ra**. The **neighbor-discovery-router-advertisement** statement at the beginning of the syntax specifies that this named address-assignment pool is used for router advertisement. The syntax at the end of the example configures the address-assignment pool named **chi-fiber-ra**.

- Related Documentation**
- [Address-Assignment Pools Overview on page 3](#)
 - [Configuring Address-Assignment Pools on page 9](#)
 - [Configuring an Address-Assignment Pool for Router Advertisement on page 13](#)

Example: Extended DHCP Local Server Configuration with Optional Pool Matching

This example shows an extended DHCP local server configuration that includes optional IPv4 address-assignment pool matching and interface groups. For pool matching, this configuration specifies that the DHCP local server first check the response from an external authentication authority (for example, RADIUS) and use the Framed-IPv6-Pool attribute to determine the address-assignment pool to use for the client address. If no external authority match is found, the DHCP local server then uses ip-address-first matching together with the option 82 information to match the named address range for client IPv4 address assignment. The option 82 matching must also be included in the address-assignment pool configuration.

```
[edit system services]
dhcp-local-server {
    group group_one {
        interface fe-0/0/2.0;
        interface fe-0/0/2.1;
    }
    group group_two {
```

```
interface fe-0/0/3.0;  
interface fe-0/0/3.1;  
}  
pool-match-order {  
  external-authority  
  ip-address-first;  
  option-82;  
}  
}
```



NOTE: The interface type in this topic is just an example. The fe- interface type is not supported by EX Series switches.

**Related
Documentation**

- *Extended DHCP Local Server Overview*
- [Address-Assignment Pools Overview on page 3](#)

CHAPTER 4

Configuration Statements

- [\[edit access address-assignment\] Hierarchy Level](#) on page 24
- [abated-utilization \(Address-Assignment Pools\)](#) on page 25
- [abated-utilization-v6 \(Address-Assignment Pools\)](#) on page 25
- [address-assignment \(Address-Assignment Pools\)](#) on page 26
- [boot-file](#) on page 27
- [boot-server](#) on page 27
- [circuit-id \(Address-Assignment Pools\)](#) on page 28
- [dhcp-attributes \(Address-Assignment Pools\)](#) on page 29
- [dns-server](#) on page 30
- [domain-name \(Address-Assignment Pools\)](#) on page 30
- [family \(Address-Assignment Pools\)](#) on page 31
- [grace-period](#) on page 32
- [hardware-address](#) on page 32
- [high-utilization \(Address-Assignment Pools\)](#) on page 33
- [high-utilization-v6 \(Address-Assignment Pools\)](#) on page 33
- [host \(Address-Assignment Pools\)](#) on page 34
- [ip-address](#) on page 34
- [link \(Address-Assignment Pools\)](#) on page 35
- [maximum-lease-time](#) on page 35
- [name-server](#) on page 36
- [neighbor-discovery-router-advertisement \(Address-Assignment Pools\)](#) on page 36
- [netbios-node-type](#) on page 37
- [network](#) on page 37
- [option](#) on page 38
- [option-82 \(Address-Assignment Pools\)](#) on page 39
- [option-match](#) on page 39
- [pool \(Address-Assignment Pools\)](#) on page 40
- [preferred-lifetime \(Address-Assignment Pools\)](#) on page 41

- [prefix \(Address-Assignment Pools\)](#) on page 42
- [range \(Address-Assignment Pools\)](#) on page 43
- [remote-id](#) on page 44
- [router \(Address-Assignment Pools\)](#) on page 44
- [server-identifier \(Address-Assignment Pools\)](#) on page 45
- [sip-server-address](#) on page 45
- [sip-server-domain-name](#) on page 46
- [t1-percentage \(Address-Assignment Pools\)](#) on page 47
- [t2-percentage \(Address-Assignment Pools\)](#) on page 48
- [tftp-server](#) on page 49
- [valid-lifetime \(Address-Assignment Pools\)](#) on page 49
- [wins-server \(Access\)](#) on page 50

[edit access address-assignment] Hierarchy Level

```
access {
  address-assignment {
    abated-utilization percentage;
    abated-utilization-v6 percentage;
    high-utilization percentage;
    high-utilization-v6 percentage;
    neighbor-discovery-router-advertisement ndra-pool-name;
    pool pool-name {
      family family {
        dhcp-attributes {
          [protocol-specific attributes]
        }
        host hostname {
          hardware-address mac-address;
          ip-address ip-address;
        }
        network ip-prefix /<prefix-length>;
        prefix ipv6-prefix;
        range range-name {
          high upper-limit;
          low lower-limit;
          prefix-length prefix-length;
        }
      }
    }
  }
  link pool-name;
}
```

Related Documentation

- [Address-Assignment Pools Overview](#) on page 3
- [Configuring Address-Assignment Pools](#) on page 9

abated-utilization (Address-Assignment Pools)

Syntax	<code>abated-utilization <i>percentage</i>;</code>
Hierarchy Level	[edit access address-assignment], [edit routing-instances <i>routing-instance-name</i> address-assignment]
Release Information	Statement introduced in Junos OS Release 11.2.
Description	Generate SNMP traps for DHCP address pools or linked set of address pools. No SNMP traps are generated unless a value is configured.
Default	Abated utilization is not set. Delete the abated-utilization value to unset.
Options	<i>percentage</i> —Threshold below which an SNMP trap clear is generated. Range: 1 through 98
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Address-Assignment Pools Overview on page 3 • Configuring Address-Assignment Pool Usage Threshold Traps on page 11

abated-utilization-v6 (Address-Assignment Pools)

Syntax	<code>abated-utilization-v6 <i>percentage</i>;</code>
Hierarchy Level	[edit access address-assignment], [edit routing-instances <i>routing-instance-name</i> address-assignment]
Release Information	Statement introduced in Junos OS Release 11.2.
Description	Generate SNMP traps for DHCPv6 address pools or linked set of address pools. No SNMP traps are generated unless a value is configured.
Default	Abated utilization is not set. Delete the abated-utilization value to unset.
Options	<i>percentage</i> —Threshold below which an SNMP trap clear is generated. Range: 1 through 98
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Address-Assignment Pools Overview on page 3 • Configuring Address-Assignment Pool Usage Threshold Traps on page 11

address-assignment (Address-Assignment Pools)

```
Syntax  address-assignment {
        abated-utilization percentage;
        abated-utilization-v6 percentage;
        high-utilization percentage;
        high-utilization-v6 percentage;
        neighbor-discovery-router-advertisement ndra-pool-name;
        pool pool-name {
            family family {
                dhcp-attributes {
                    protocol-specific attributes;
                }
            }
            host hostname {
                hardware-address mac-address;
                ip-address ip-address;
            }
            network ip-prefix / <prefix-length>;
            prefix ipv6-prefix;
            range range-name {
                high upper-limit;
                low lower-limit;
                prefix-length prefix-length;
            }
        }
        link pool-name;
    }
```

Hierarchy Level [edit access]

Release Information Statement introduced in Junos OS Release 9.0.
Statement introduced in Junos OS Release 12.1 for EX Series switches.

Description Configure address-assignment pools that can be used by different client applications.



NOTE: Subordinate statement support depends on the platform. See individual statement topics for more detailed support information.

Options *pool-name*—Name assigned to an address-assignment pool.

The remaining statements are explained separately.

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

Related Documentation

- [Address-Assignment Pools Overview on page 3](#)
- [Configuring Address-Assignment Pools on page 9](#)

- *Configuring an Address-Assignment Pool for L2TP LNS with Inline Services*
- *Configuring a DHCP Server on Switches (CLI Procedure)*

boot-file

Syntax	<code>boot-file filename;</code>
Hierarchy Level	[edit access address-assignment pool <i>pool-name</i> family inet dhcp-attributes]
Release Information	Statement introduced in Junos OS Release 9.0.
Description	Set the boot file advertised to DHCP clients. After the client receives an IP address and the boot file location from the DHCP server, the client uses the boot image stored in the boot file to complete DHCP setup. This is equivalent to DHCP option 67.
Options	<i>filename</i> —Location of the boot file on the boot server. The filename can include a pathname.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring Address-Assignment Pools on page 9 • boot-server on page 27

boot-server

Syntax	<code>boot-server (address hostname);</code>
Hierarchy Level	[edit access address-assignment pool <i>pool-name</i> family inet dhcp-attributes]
Release Information	Statement introduced in Junos OS Release 9.0.
Description	Configure the name of the boot server advertised to DHCP clients. The client uses a boot file located on the boot server to complete DHCP setup. This is equivalent to DHCP option 66.
Options	<i>address</i> —IPv4 address of a boot server. <i>hostname</i> —Fully qualified hostname of a boot server.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring Address-Assignment Pools on page 9 • boot-file on page 27

circuit-id (Address-Assignment Pools)

Syntax	<code>circuit-id <i>value</i> range <i>named-range</i>;</code>
Hierarchy Level	[edit access address-assignment pool <i>pool-name</i> family inet dhcp-attributes option-match option-82]
Release Information	Statement introduced in Junos OS Release 9.0.
Description	Configure the address-assignment pool <i>named-range</i> to use for a particular option 82 Agent Circuit ID value.
Options	<p><i>value</i>—String for the Agent Circuit ID suboption (suboption 1) of the DHCP relay agent information option (option 82) in DHCP packets.</p> <p><i>range named-range</i>—Name of the address-assignment pool range to use.</p>
Required Privilege Level	<p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Configuring Address-Assignment Pools on page 9

dhcp-attributes (Address-Assignment Pools)

Syntax	<pre> dhcp-attributes { boot-file filename; boot-server (address hostname); dns-server [ipv6-address]; domain-name domain-name; grace-period seconds; maximum-lease-time seconds; name-server [server-list]; netbios-node-type node-type; option { [(id-number option-type option-value) (id-number array option-type option-value)]; } option-match { option-82 { circuit-id value range named-range; remote-id value range named-range; } } preferred-lifetime seconds; router [router-address]; server-identifier ip4-address; sip-server-address [ipv6-address]; sip-server-domain-name domain-name; t1-percentage percentage; t2-percentage percentage; tftp-server address; valid-lifetime seconds; wins-server [servers]; } </pre>
Hierarchy Level	[edit access address-assignment pool <i>pool-name</i> family <i>family</i>]
Release Information	<p>Statement introduced in Junos OS Release 9.0.</p> <p>Statement introduced in Junos OS Release 12.3 for EX Series switches.</p>
Description	<p>Configure address pools that can be used by different client applications.</p> <p>The remaining statements are explained separately.</p>
Required Privilege Level	<p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Address-Assignment Pools Overview on page 3 • DHCP Attributes for Address-Assignment Pools on page 14 • Configuring Address-Assignment Pools on page 9 • Configuring DHCP Client-Specific Attributes on page 14 • Configuring a DHCP Server on Switches (CLI Procedure)

dns-server

Syntax	<code>dns-server <i>ipv6-address</i>;</code>
Hierarchy Level	[edit access address-assignment pool <i>pool-name</i> family inet6 dhcp-attributes]
Release Information	Statement introduced in Junos OS Release 10.0.
Description	Specify a DNS server to which clients can send DNS queries. This is equivalent to DHCPv6 option 23. To specify multiple DNS servers, add multiple dns-server statements in order of preference.
Options	<i>ipv6-address</i> —IPv6 address of a DNS server.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Address-Assignment Pools Overview on page 3• Configuring Address-Assignment Pools on page 9

domain-name (Address-Assignment Pools)

Syntax	<code>domain-name <i>domain-name</i>;</code>
Hierarchy Level	[edit access address-assignment pool <i>pool-name</i> family inet dhcp-attributes]
Release Information	Statement introduced in Junos OS Release 9.0.
Description	Configure the name of the domain in which clients search 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.
Options	<i>domain-name</i> —Name of the domain.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring Address-Assignment Pools on page 9

family (Address-Assignment Pools)

Syntax

```
family family {
    dhcp-attributes {
        [protocol-specific attributes]
    }
    host hostname {
        hardware-address mac-address;
        ip-address ip-address;
    }
    network ip-prefix/<prefix-length>;
    prefix ipv6-prefix;
    range range-name {
        high upper-limit;
        low lower-limit;
        prefix-length prefix-length;
    }
}
```

Hierarchy Level [edit access address-assignment **pool** *pool-name*]

Release Information Statement introduced in Junos OS Release 9.0.
Statement introduced in Junos OS Release 12.3 for EX Series switches.

Description Configure the protocol family for the address-assignment pool.



NOTE: Subordinate statement support depends on the platform. See individual statement topics for more detailed support information.

Options *family*—Protocol family:

- **inet**—Internet Protocol version 4 suite
- **inet6**—Internet Protocol version 6 suite

The remaining statements are explained separately.

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

Related Documentation

- [Address-Assignment Pools Overview on page 3](#)
- [Configuring Address-Assignment Pools on page 9](#)

grace-period

Syntax	<code>grace-period <i>seconds</i>;</code>
Hierarchy Level	[edit access address-assignment pool <i>pool-name</i> family (inet inet6) dhcp-attributes]
Release Information	Statement introduced in Junos OS Release 9.0.
Description	Configure the amount of time that the client retains the address lease after the lease expires. The address cannot be reassigned to another client during the grace period.
Options	<i>seconds</i> —Number of seconds the lease is retained. Range: 0 through 4,294,967,295 seconds Default: 0 (no grace period)
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring Address-Assignment Pools on page 9

hardware-address

Syntax	<code>hardware-address <i>mac-address</i>;</code>
Hierarchy Level	[edit access address-assignment pool <i>pool-name</i> family (inet inet6) host <i>hostname</i>]
Release Information	Statement introduced in Junos OS Release 9.0.
Description	Specify the MAC address of the client. This is the hardware address that identifies the client on the network.
Options	<i>mac-address</i> —MAC address of the client.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring Address-Assignment Pools on page 9

high-utilization (Address-Assignment Pools)

Syntax	<code>high-utilization <i>percentage</i>;</code>
Hierarchy Level	<code>[edit access address-assignment],</code> <code>[edit routing-instances <i>routing-instance-name</i> address-assignment]</code>
Release Information	Statement introduced in Junos OS Release 11.2.
Description	Generate an SNMP trap when the DHCP address pool or linked set of address pools use surpasses the specified percentage.
Default	High utilization is not set. Delete the high-utilization value to unset.
Options	<i>percentage</i> —Percentage used to generate a trap. Range: 2 through 99
Required Privilege Level	<code>admin</code> —To view this statement in the configuration. <code>admin-control</code> —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Address-Assignment Pools Overview on page 3 • Configuring Address-Assignment Pool Usage Threshold Traps on page 11

high-utilization-v6 (Address-Assignment Pools)

Syntax	<code>high-utilization-v6 <i>percentage</i>;</code>
Hierarchy Level	<code>[edit access address-assignment],</code> <code>[edit routing-instances <i>routing-instance-name</i> address-assignment]</code>
Release Information	Statement introduced in Junos OS Release 11.2.
Description	Generate an SNMP trap when the DHCPv6 address pool or linked set of address pools use surpasses the specified percentage.
Default	High utilization is not set. Delete the high-utilization value to unset.
Options	<i>percentage</i> —Percentage used to generate a trap. Range: 2 through 99
Required Privilege Level	<code>admin</code> —To view this statement in the configuration. <code>admin-control</code> —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Address-Assignment Pools Overview on page 3 • Configuring Address-Assignment Pool Usage Threshold Traps on page 11

host (Address-Assignment Pools)

Syntax	<code>host <i>hostname</i> { <i>hardware-address</i> <i>mac-address</i>; <i>ip-address</i> <i>ip-address</i>; }</code>
Hierarchy Level	[edit access address-assignment <i>pool</i> <i>pool-name</i> <i>family</i> (inet inet6)]
Release Information	Statement introduced in Junos OS Release 9.0.
Description	Configure a static binding for the specified client.
Options	<i>hostname</i> —Name of the client. The remaining statements are explained separately.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Address-Assignment Pools Overview on page 3• Configuring Address-Assignment Pools on page 9

ip-address

Syntax	<code>ip-address <i>ip-address</i>;</code>
Hierarchy Level	[edit access address-assignment pool <i>pool-name</i> family inet <i>host</i> <i>hostname</i>]
Release Information	Statement introduced in Junos OS Release 9.0.
Description	Specify the reserved IP address assigned to the client.
Options	<i>ip-address</i> —IP version 4 (IPv4) address.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring Address-Assignment Pools on page 9• Configuring Static Address Assignment on page 13

link (Address-Assignment Pools)

Syntax	<code>link <i>pool-name</i>;</code>
Hierarchy Level	[edit access address-assignment pool <i>pool-name</i>]
Release Information	Statement introduced in Junos OS Release 10.2.
Description	Configure the name of the secondary address-assignment pool that is linked to a primary address-assignment pool. The secondary pool provides backup pool for local address assignment.
Options	<i>pool-name</i> —Name assigned to the address-assignment pool.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Address-Assignment Pools Overview on page 3 • Configuring Address-Assignment Pools on page 9 • Configuring Address-Assignment Pool Linking on page 12

maximum-lease-time

Syntax	<code>maximum-lease-time <i>seconds</i>;</code>
Hierarchy Level	[edit access address-assignment pool <i>pool-name</i> family (inet inet6) dhcp-attributes]
Release Information	Statement introduced in Junos OS Release 9.0.
Description	Specify the maximum length of time, in seconds, that the lease is held for a client if the client does not renew the lease. This is equivalent to DHCP option 51. The maximum-lease-time is mutually exclusive with both the preferred-lifetime and the valid-lifetime , and cannot be configured with either timer.
Options	<i>seconds</i> —Maximum number of seconds the lease can be held. Range: 30 through 4,294,967,295 seconds Default: 86,400 (24 hours)
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring Address-Assignment Pools on page 9 • DHCP Attributes for Address-Assignment Pools on page 14 • preferred-lifetime (Address-Assignment Pools) on page 41 • valid-lifetime (Address-Assignment Pools) on page 49

name-server

Syntax	<code>name-server [<i>server-names</i>];</code>
Hierarchy Level	[edit access address-assignment pool <i>pool-name</i> family inet dhcp-attributes]
Release Information	Statement introduced in Junos OS Release 9.0.
Description	Configure one or more Domain Name System (DNS) name servers available to the client to resolve hostname-to-client mappings. This is equivalent to DHCP option 6.
Options	<i>server-names</i> —IP addresses of the domain name servers, listed in order of preference.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring Address-Assignment Pools on page 9

neighbor-discovery-router-advertisement (Address-Assignment Pools)

Syntax	<code>neighbor-discovery-router-advertisement <i>ndra-pool-name</i>;</code>
Hierarchy Level	[edit access address-assignment]
Release Information	Statement introduced in Junos OS Release 10.1.
Description	Configure the name of the address-assignment pool used to assign the router advertisement prefix.
Options	<i>ndra-pool-name</i> —Name of the address-assignment pool.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Address-Assignment Pools Overview on page 3• Configuring an Address-Assignment Pool for Router Advertisement on page 13

netbios-node-type

Syntax	<code>netbios-node-type <i>node-type</i>;</code>
Hierarchy Level	[edit access address-assignment pool <i>pool-name</i> family inet dhcp-attributes]
Release Information	Statement introduced in Junos OS Release 9.0.
Description	Specify the NetBIOS node type. This is equivalent to DHCP option 46.
Options	<p><i>node-type</i>—One of the following node types:</p> <ul style="list-style-type: none"> • b-node—Broadcast node • h-node—Hybrid node • m-node—Mixed node • p-node—Peer-to-peer node
Required Privilege Level	<p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring Address-Assignment Pools on page 9

network

Syntax	<code>network <i>ip-prefix</i></<i>prefix-length</i>>;</code>
Hierarchy Level	[edit access address-assignment pool <i>pool-name</i> family inet]
Release Information	Statement introduced in Junos OS Release 9.0.
Description	Configure subnet information for an IPv4 address-assignment pool.
Options	<p><i>ip-prefix</i>—IP version 4 address or prefix value.</p> <p><i>prefix-length</i>—(Optional) Subnet mask.</p>
Required Privilege Level	<p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring Address-Assignment Pools on page 9

option

Syntax	<pre>option { [(id-number option-type option-value) (id-number array option-type option-value)]; }</pre>
Hierarchy Level	[edit access address-assignment pool <i>pool-name</i> family (inet inet6) dhcp-attributes]
Release Information	Statement introduced in Junos OS Release 9.0. hex-string option type introduced in Junos OS Release 13.3.
Description	Specify user-defined options that are added to client packets.
Options	<p>array—An option can include an array of option types.</p> <p>id-number—Any whole number. The ID number is used to index the option and must be unique across a DHCP server.</p> <p>option-type—Any of the following types: byte, byte-stream, flag, hex-string, integer, ip-address, short, string, unsigned-integer, or unsigned-short.</p> <p>option-value—Value associated with an option. The option value must be compatible with the option type (for example, an On or Off value for a flag type).</p>
Required Privilege Level	<p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Configuring Address-Assignment Pools on page 9

option-82 (Address-Assignment Pools)

Syntax	option-82 { circuit-id <i>value range named-range</i> ; remote-id <i>value range named-range</i> ; }
Hierarchy Level	[edit access address-assignment pool <i>pool-name</i> family inet dhcp-attributes option-match]
Release Information	Statement introduced in Junos OS Release 9.0.
Description	Specify the list of option 82 suboption match criteria used to select the named address range used for the client. The server matches the option 82 value in the user PDU to the specified option 82 match criteria and uses the named address range associated with the string. The remaining statements are explained separately.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring Address-Assignment Pools on page 9

option-match

Syntax	option-match { option-82 { circuit-id <i>value range named-range</i> ; remote-id <i>value range named-range</i> ; } }
Hierarchy Level	[edit access address-assignment pool <i>pool-name</i> family inet dhcp-attributes]
Release Information	Statement introduced in Junos OS Release 9.0.
Description	Specify a list of match criteria used to determine which named address range in the address-assignment pool to use. The extended DHCP local server matches this information to the match criteria specified in the client PDUs. For example, for option 82 match criteria, the server matches the option 82 value in the user PDU to the specified option 82 string and uses the named range associated with the string. The remaining statements are explained separately.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring Address-Assignment Pools on page 9

pool (Address-Assignment Pools)

Syntax

```
pool pool-name {
    family family {
        dhcp-attributes {
            [ protocol-specific attributes ]
        }
        host hostname {
            hardware-address mac-address;
            ip-address ip-address;
        }
        network ip-prefix /<prefix-length>;
        prefix ipv6-prefix;
        range range-name {
            high upper-limit;
            low lower-limit;
            prefix-length prefix-length;
        }
    }
    link pool-name;
}
```

Hierarchy Level [edit access [address-assignment](#)]

Release Information Statement introduced in Junos OS Release 9.0.
Statement introduced in Junos OS Release 12.1 for EX Series switches.

Description Configure the name of an address-assignment pool.



NOTE: Subordinate statement support depends on the platform. See individual statement topics for more detailed support information.

Options *pool-name*—Name assigned to the address-assignment pool.

The remaining statements are explained separately.

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

Related Documentation

- [Address-Assignment Pools Overview on page 3](#)
- [Configuring Address-Assignment Pools on page 9](#)
- [Configuring a DHCP Server on Switches \(CLI Procedure\)](#)

preferred-lifetime (Address-Assignment Pools)

Syntax	<code>preferred-lifetime <i>seconds</i>;</code>
Hierarchy Level	[edit access address-assignment pool <i>pool-name</i> family inet6 dhcp-attributes]
Release Information	Statement introduced in Junos OS Release 13.3.
Description	<p>Specify the length of time, in seconds, that the DHCPv6 server keeps the IPv6 prefix active. When the lifetime expires, the address is deprecated.</p> <p>If the valid-lifetime is also configured, the preferred-lifetime must be less than the valid-lifetime. The preferred-lifetime and the maximum-lease-time are mutually exclusive and cannot both be configured.</p>
Options	<p>seconds—Number of seconds that the IPv6 prefix is active.</p> <p>Range: 30 through 4,294,967,295 seconds</p> <p>Default: 86,400 (24 hours)</p>
Required Privilege Level	<p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring Address-Assignment Pools on page 9 • DHCP Attributes for Address-Assignment Pools on page 14 • maximum-lease-time on page 35 • valid-lifetime (Address-Assignment Pools) on page 49

prefix (Address-Assignment Pools)

Syntax	<code>prefix <i>ipv6-prefix</i>;</code>
Hierarchy Level	[edit access address-assignment <code>pool <i>pool-name</i></code> family inet6]
Release Information	Statement introduced in Junos OS Release 10.0. Statement introduced in Junos OS Release 12.3 for EX Series switches.
Description	Specify the IPv6 prefix for the IPv6 address-assignment pool. This statement is mandatory for IPv6 address-assignment pools.
Options	<i>ipv6-prefix</i> —The IPv6 prefix.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Address-Assignment Pools Overview on page 3• Configuring Address-Assignment Pools on page 9• <i>Configuring a DHCP Server on Switches (CLI Procedure)</i>• <i>Configuring an Extended DHCP Relay Server on EX Series Switches (CLI Procedure)</i>

range (Address-Assignment Pools)

Syntax	<pre>range <i>range-name</i> { high <i>upper-limit</i>; low <i>lower-limit</i>; prefix-length <i>prefix-length</i>; }</pre>
Hierarchy Level	[edit access address-assignment pool <i>pool-name</i> family (inet inet6)]
Release Information	<p>Statement introduced in Junos OS Release 9.0.</p> <p>IPv6 support introduced in Junos OS Release 10.0.</p> <p>Statement introduced in Junos OS Release 12.3 for EX Series switches.</p>
Description	Configure a named range of IPv4 addresses or IPv6 prefixes, used within an address-assignment pool.
Options	<p>high <i>upper-limit</i>—Upper limit of an address range or IPv6 prefix range.</p> <p>low <i>lower-limit</i>—Lower limit of an address range or IPv6 prefix range.</p> <p>prefix-length <i>prefix-length</i>—Assigned length of the IPv6 prefix.</p> <p><i>range-name</i>—Name assigned to the range of IPv4 addresses or IPv6 prefixes.</p>
Required Privilege Level	<p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Address-Assignment Pools Overview on page 3 • Configuring Address-Assignment Pools on page 9 • Configuring a DHCP Server on Switches (CLI Procedure)

remote-id

Syntax	<code>remote-id value range named-range;</code>
Hierarchy Level	[edit access address-assignment pool <i>pool-name</i> family inet dhcp-attributes option-match option-82]
Release Information	Statement introduced in Junos OS Release 9.0.
Description	Specify the address-assignment pool named range to use based on the particular option 82 Agent Remote ID value.
Options	<p>range <i>named-range</i>—Name of the address-assignment pool range to use.</p> <p>value—String for Agent Remote ID suboption (suboption 2) of the DHCP relay agent information option (option 82) in DHCP packets.</p>
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring Address-Assignment Pools on page 9

router (Address-Assignment Pools)

Syntax	<code>router [<i>router-address</i>];</code>
Hierarchy Level	[edit access address-assignment pool <i>pool-name</i> family inet dhcp-attributes]
Release Information	Statement introduced in Junos OS Release 9.0.
Description	Specify one or more routers located on the client's subnet. This statement is the equivalent of DHCP option 3.
Options	router-address —IP address of one or more routers.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring Address-Assignment Pools on page 9

server-identifier (Address-Assignment Pools)

Syntax	<code>server-identifier <i>ipv4-address</i>;</code>
Hierarchy Level	[edit access address-assignment pool <i>pool-name</i> family inet dhcp-attributes]
Release Information	Statement introduced in Junos OS Release 10.2.
Description	Specify the IP address that is used as the source address the DHCP server includes in IP packets when communicating with clients. The address is included in the DHCP packet in option 54.
Options	<i>ipv4-address</i> —IP address.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring Address-Assignment Pools on page 9

sip-server-address

Syntax	<code>sip-server-address <i>ipv6-address</i>;</code>
Hierarchy Level	[edit access address-assignment pool <i>pool-name</i> family <i>family</i> dhcp-attributes]
Release Information	Statement introduced in Junos OS Release 10.0.
Description	Specify a SIP outbound proxy server that DHCPv6 local server clients can use. This is equivalent to DHCPv6 option 22. To specify multiple serv <i>ipv6-addressers</i> , add multiple sip-server-address statements in order of preference.
Options	<i>ipv6-address</i> —IPv6 address of a SIP outbound proxy server.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Address-Assignment Pools Overview on page 3 • Configuring Address-Assignment Pools on page 9

[sip-server-domain-name](#)

Syntax	<code>sip-server-domain-name <i>domain-name</i>;</code>
Hierarchy Level	[edit access address-assignment pool <i>pool-name</i> family <i>family</i> dhcp-attributes]
Release Information	Statement introduced in Junos OS Release 10.0.
Description	Configure the domain name of the SIP outbound proxy server that DHCPv6 local server clients can use. This is equivalent to DHCPv6 option 21.
Options	<i>domain-name</i> —Name of the domain.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Address-Assignment Pools Overview on page 3• Configuring Address-Assignment Pools on page 9

t1-percentage (Address-Assignment Pools)

Syntax	<code>t1-percentage <i>percentage</i>;</code>
Hierarchy Level	[edit access address-assignment pool <i>pool-name</i> family inet6 dhcp-attributes]
Release Information	Statement introduced in Junos OS Release 13.3.
Description	<p>Specify a percentage of the preferred-lifetime value. After this percentage of the preferred-lifetime value elapses, the router requests an extension on its lease from the originating DHCPv6 server. The t1-percentage is also referred to as the renewal time.</p> <p>The t1-percentage value must be less than the t2-percentage value.</p>
Options	<p>percentage—Percentage of the preferred-lifetime value.</p> <p>Range: 0 through 100</p> <p>Default: If the t1-percentage value is not configured, the default is based on the preferred-lifetime value, as follows.</p> <ul style="list-style-type: none"> • If the preferred-lifetime value is finite, the default is 50 percent of the preferred-lifetime value. • If the preferred-lifetime value is infinite, the default is also infinite.
Required Privilege Level	<p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring Address-Assignment Pools on page 9 • DHCP Attributes for Address-Assignment Pools on page 14 • dhcp-attributes (Address-Assignment Pools) on page 29 • preferred-lifetime (Address-Assignment Pools) on page 41 • t2-percentage (Address-Assignment Pools) on page 48

t2-percentage (Address-Assignment Pools)

Syntax	t2-percentage <i>percentage</i> ;
Hierarchy Level	[edit access address-assignment pool <i>pool-name</i> <i>family</i> (inet inet6) <i>dhcp-attributes</i>]
Release Information	Statement introduced in Junos OS Release 13.3.
Description	<p>Specify a percentage of the preferred-lifetime value. After this percentage of the preferred-lifetime value elapses, the router requests an extension on its lease from any available DHCPv6 server. The t1-percentage is also referred to as the rebinding time.</p> <p>The t2-percentage value must be greater than the t1-percentage value.</p>
Options	<p>percentage—Percentage of the preferred-lifetime value.</p> <p>Range: 0 through 100</p> <p>Default: If the t2-percentage value is not configured, the default is based on the preferred-lifetime value.</p> <ul style="list-style-type: none">• If the preferred-lifetime value is finite, the default is 80 percent. of the preferred-lifetime value.• When the preferred-lifetime value is infinite, the default is also infinite.
Required Privilege Level	<p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Configuring Address-Assignment Pools on page 9• DHCP Attributes for Address-Assignment Pools on page 14• dhcp-attributes (Address-Assignment Pools) on page 29• preferred-lifetime (Address-Assignment Pools) on page 41• t1-percentage (Address-Assignment Pools) on page 47

tftp-server

Syntax	<code>tftp-server <i>ip-address</i>;</code>
Hierarchy Level	[edit access address-assignment pool <i>pool-name</i> family inet dhcp-attributes]
Release Information	Statement introduced in Junos OS Release 9.0.
Description	Specify the Trivial File Transfer Protocol (TFTP) server that the client uses to obtain the client configuration file. This is equivalent to DHCP option 150.
Options	<i>ip-address</i> —IP address of the TFTP server.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring Address-Assignment Pools on page 9

valid-lifetime (Address-Assignment Pools)

Syntax	<code>valid-lifetime <i>seconds</i>;</code>
Hierarchy Level	[edit access address-assignment pool <i>pool-name</i> family inet6 dhcp-attributes]
Release Information	Statement introduced in Junos OS Release 13.3.
Description	<p>Specify the length of time, in seconds, that the DHCPv6 server keeps the IPv6 prefix valid. When the lifetime expires, the address becomes invalid.</p> <p>If the preferred-lifetime is also configured, the valid-lifetime must be greater than the preferred-lifetime. The valid-lifetime and the maximum-lease-time are mutually exclusive and cannot both be configured.</p>
Options	<p><i>seconds</i>—Number of seconds that the IPv6 prefix is valid.</p> <p>Range: 30 through 4,294,967,295 seconds</p> <p>Default: 86,400 (24 hours)</p>
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring Address-Assignment Pools on page 9 • DHCP Attributes for Address-Assignment Pools on page 14 • maximum-lease-time on page 35 • preferred-lifetime (Address-Assignment Pools) on page 41

wins-server (Access)

Syntax	<code>wins-server { <code>ipv4-address</code>; }</code>
Hierarchy Level	[edit access address-assignment pool <i>pool-name</i> family inet dhcp-attributes]
Release Information	Statement introduced in Junos OS Release 9.0.
Description	Specify one or more NetBIOS name servers (NBNS) that the client uses to resolve NetBIOS names. This is equivalent to DHCP option 44.
Options	<i>ipv4-address</i> —IP address of each NetBIOS name server; add them to the configuration in order of preference.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring Address-Assignment Pools on page 9

PART 3

Administration

- [Monitoring Commands on page 53](#)

CHAPTER 5

Monitoring Commands

- `show network-access aaa statistics`
- `show network-access address-assignment pool`

show network-access aaa statistics

Syntax	<pre>show network-access aaa statistics <accounting (detail)> <address-assignment (client pool <i>pool-name</i>)> <dynamic-requests> <radius></pre>
Release Information	<p>Command introduced in Junos OS Release 9.1.</p> <p>Option address-assignment introduced in Junos OS Release 10.0.</p> <p>Option radius introduced in Junos OS Release 11.4.</p> <p>Option detail introduced in Junos OS Release 13.3.</p>
Description	Display AAA accounting, address-assignment, dynamic request statistics, and RADIUS settings and statistics.
Options	<p>accounting (detail)—(Optional) Display AAA accounting statistics. The detail keyword displays additional accounting information</p> <p>address-assignment (client pool <i>pool-name</i>)—(Optional) Display AAA address-assignment client and pool statistics.</p> <p>dynamic-requests—(Optional) Display AAA dynamic requests.</p> <p>radius—(Optional) Display RADIUS settings and statistics.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> <i>Verifying and Managing Subscriber AAA Information</i>
List of Sample Output	<p>show network-access aaa statistics accounting on page 57</p> <p>show network-access aaa statistics accounting detail on page 57</p> <p>show network-access aaa statistics address-assignment client on page 57</p> <p>show network-access aaa statistics address-assignment pool on page 57</p> <p>show network-access aaa statistics dynamic-requests on page 58</p> <p>show network-access aaa statistics radius on page 58</p>
Output Fields	<p>Table 5 on page 54 lists the output fields for the show network-access aaa statistics command. Output fields are listed in the approximate order in which they appear.</p>

Table 5: show network-access aaa statistics Output Fields

Field Name	Field Description
Requests received	<ul style="list-style-type: none"> Number of accounting requests generated by the AAA framework. Number of dynamic requests received from the external server.
Accounting on requests	Number of accounting on requests sent from a client to a RADIUS accounting server.

Table 5: show network-access aaa statistics Output Fields (*continued*)

Field Name	Field Description
Accounting start requests	Number of accounting start requests sent from a client to a RADIUS accounting server.
Accounting interim requests	Number of accounting interim requests sent from a client to a RADIUS accounting server.
Accounting stop requests	Number of accounting stop requests sent from a client to a RADIUS accounting server.
Accounting Response failures	Number of accounting requests not acknowledged (NAK) by the accounting server.
Accounting Response Success	Number of accounting requests acknowledged by the accounting server.
Timed out requests	Number of accounting requests to the accounting server that timed out.
Accounting on responses	Number of accounting on requests acknowledged by the RADIUS accounting server.
Accounting start responses	Number of accounting start requests acknowledged by the RADIUS accounting server.
Accounting interim responses	Number of accounting interim requests acknowledged by the RADIUS accounting server.
Accounting stop responses	Number of accounting stop requests acknowledged by the RADIUS accounting server.
Accounting rollover requests	Number of accounting requests coming to a RADIUS accounting server after a previous server timing out.
Accounting unknown requests	Number of unknown accounting requests sent from a client to a RADIUS accounting server (for example, the header has invalid or unsupported information).
Accounting pending account requests	Number of accounting requests sent from a client to a RADIUS accounting server that are waiting for a response from the server.
Accounting malformed responses	Number of accounting responses from a RADIUS accounting server that have invalid or unexpected attributes.
Accounting retransmissions	Number of accounting requests made by a client to the RADIUS sever that were retransmitted.
Accounting bad authenticators	Number of accounting responses from a RADIUS accounting server that have an incorrect authenticator (for example, the client and server RADIUS secret do not match).
Accounting packets dropped	Number of accounting responses from a RADIUS accounting server that are dropped by a client.

Table 5: show network-access aaa statistics Output Fields (*continued*)

Field Name	Field Description
Client	Client type; for example, DHCP, Mobile IP, PPP.
Out of Memory	Number of times an address was not given to the client due to memory issues.
No Matches	Number of times there were no network matches for the pool.
Pool Name	Name of the address-assignment pool for this client.
Out of Addresses	Number of times there were no available addresses in the pool.
Address total	Number of addresses in the pool.
Addresses in use	Number of addresses in use.
Address Usage (percent)	Percentage of total addresses in use.
processed successfully	Number of dynamic requests processed successfully by the AAA framework.
errors during processing	Number of dynamic requests that resulted in processing errors by the AAA framework.
Link Name	Name of the secondary address-assignment pool to which the primary pool is linked.
Pool Usage	Percentage of allocated addresses in the specified address pool.
silently dropped	Number of dynamic requests dropped by the AAA framework due to multiple back-to-back or duplicate requests.
RADIUS Server	IP address of the RADIUS server to which the router is sending requests.
Profile	Name of the RADIUS profile associated with the RADIUS server. A RADIUS server can be associated with more than one RADIUS profile.
Configured	Configured maximum number of outstanding requests from the router to the RADIUS server for a specific profile. An outstanding request is a request to which the RADIUS server has not yet responded. The range of values is 0 through 2000 outstanding requests. The default value is 1000.
Current	Current number of outstanding requests from the router to the RADIUS server for a specific profile. An outstanding request is a request to which the RADIUS server has not yet responded.
Peak	Highest number of outstanding requests from the router to the RADIUS server for a specific profile at any point in time since the router was started or since the counter was last cleared. NOTE: If the value of this field is equal to the value of the Configured field, you may want to increase the value of the Configured field.

Table 5: show network-access aaa statistics Output Fields (*continued*)

Field Name	Field Description
Exceeded	Number of times that the router attempted to send requests to the RADIUS server in excess of the configured maximum value for a specific profile. NOTE: If the value of this field is nonzero, you may want to increase the value of the Configured field.

Sample Output

show network-access aaa statistics accounting

```
user@host> show network-access aaa statistics accounting
Accounting module statistics
  Requests received: 0
  Accounting Response failures: 0
  Accounting Response Success: 0
  Timed out requests: 0
```

show network-access aaa statistics accounting detail

```
user@host> show network-access aaa statistics accounting detail
Accounting module statistics
  Requests received: 261
    Accounting on requests: 261
    Accounting start requests: 0
    Accounting interim requests: 0
    Accounting stop requests: 0
  Accounting response failures: 0
  Accounting response success: 0
    Accounting on responses: 0
    Accounting start responses: 0
    Accounting interim responses: 0
    Accounting stop responses: 0
  Timed out requests: 260
  Accounting rollover requests: 0
  Accounting unknown responses: 0
  Accounting pending account requests: 1
  Accounting malformed responses: 0
  Accounting retransmissions: 783
  Accounting bad authenticators: 0
  Accounting packets dropped: 0
```

show network-access aaa statistics address-assignment client

```
user@host> show network-access aaa statistics address-assignment client
Address-assignment statistics
  Client: jdhcpd
  Out of Memory: 0
  No Matches: 2
```

show network-access aaa statistics address-assignment pool

```
user@host> show network-access aaa statistics address-assignment pool isp_1
Address-assignment statistics
  Pool Name: isp_1
  Pool Name: (all pools in chain)
  Out of Memory: 0
  Out of Addresses: 9
```

```
Address total: 47
Addresses in use: 47
Address Usage (percent): 100
```

show network-access aaa statistics dynamic-requests

```
user@host> show network-access aaa statistics dynamic-requests
requests received: 0
processed successfully: 0
errors during processing: 0
silently dropped: 0
```

show network-access aaa statistics radius

```
user@host> show network-access aaa statistics radius
Outstanding Requests
RADIUS Server    Profile    Configured    Current    Peak    Exceeded
172.28.32.239    prof1      1000          0          1000    14
                  prof2      500           17         432     0
171.27.82.211    myprof     200           0          200     27
12.1.11.254      pppoe-auth 111           0          1       0
```


show network-access address-assignment pool

Syntax	<code>show network-access address-assignment pool <i>pool-name</i></code> <code><logical-system <i>logical-system-name</i>></code> <code><routing-instance <i>routing-instance-name</i>></code>
Release Information	Command introduced in Junos OS Release 9.0.
Description	Display state information for each address-assignment pool.
Options	<p>none—Display information about clients that have obtained addresses from the address-assignment pool.</p> <p>pool <i>pool-name</i>—Display information about the specified address-assignment pool.</p> <p>logical-system <i>logical-system-name</i>—(Optional) Perform this operation on the specified logical system.</p> <p>routing-instance <i>routing-instance-name</i>—(Optional) Perform this operation on the specified routing instance.</p>
Required Privilege Level	view and system
List of Sample Output	show network-access address-assignment pool on page 59
Output Fields	Table 6 on page 59 lists the output fields for the show address-assignment pool command. Output fields are listed in the approximate order in which they appear.

Table 6: show network-access address-assignment pool Output Fields

Field Name	Field Description
IP address	IP address of the client.
Hardware address	MAC address of the client.
Type	Type of client.

Sample Output

show network-access address-assignment pool

```

user@host> show network-access address-assignment pool sunnywest logical-system ls1
routing-instance routinst2
IP address      Hardware address  Type
192.168.2.1     00:05:1b:00:b9:01 DHCP
192.168.2.2     00:05:1b:00:b9:02 DHCP
192.168.2.3     00:05:1b:00:b9:03 DHCP
192.168.2.4     00:05:1b:00:b9:04 DHCP

```


PART 4

Troubleshooting

- [Acquiring Troubleshooting Information on page 63](#)
- [Troubleshooting Configuration Statements on page 71](#)

CHAPTER 6

Acquiring Troubleshooting Information

- [Tracing General Authentication Service Processes on page 63](#)
- [Collecting Subscriber Access Logs Before Contacting Juniper Technical Support on page 67](#)

Tracing General Authentication Service Processes

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

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

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

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

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

- [Configuring the General Authentication Service Processes Trace Log Filename on page 64](#)
- [Configuring the Number and Size of General Authentication Service Processes Log Files on page 64](#)

- [Configuring Access to the Log File on page 64](#)
- [Configuring a Regular Expression for Lines to Be Logged on page 65](#)
- [Configuring Subscriber Filtering for General Authentication Service Trace Operations on page 65](#)
- [Configuring the Trace Operation on page 66](#)

Configuring the General Authentication Service Processes Trace Log Filename

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

To configure the filename for general authentication service tracing operations:

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

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

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

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

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

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

To configure the number and size of trace files:

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

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

Configuring Access to the Log File

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

To specify that all users can read the log file:

- Configure the log file to be world-readable.

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

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

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

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

Configuring a Regular Expression for Lines to Be Logged

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

To configure regular expressions to match:

- Configure the regular expression.

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

Configuring Subscriber Filtering for General Authentication Service Trace Operations

You can apply filters to the general authentication service to limit tracing to particular subscribers or domains. Subscriber filtering simplifies troubleshooting in a scaled environment by enabling you to focus on a reduced set of trace results.

For subscriber usernames that have the expected form of *user@domain*, you can filter on the user, the domain, or both. You can use an asterisk (*) as a wildcard to substitute for characters at the beginning or end of either term to match a greater number of subscribers.



NOTE: You cannot filter results using a wildcard in the middle of the user or domain terms. For example, the following uses of the wildcard are not supported: *tom*25@example.com*, *tom125@ex*.com*.

When you enable filtering by username, traces that have insufficient information to determine the username are automatically excluded.

To configure subscriber filtering:

- Specify the filter.

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

Consider the following examples of using the wildcard for filtering:

- Filter results for the specific subscriber with the username, tom@example.com.

```
[edit system processes general-authentication-service traceoptions]
user@host# set filter user tom@example.com
```

- Filter results for all subscribers whose username begins with tom.

```
[edit system processes general-authentication-service traceoptions]
user@host# set filter user tom*
```

- Filter results for all subscribers whose username ends with tom.

```
[edit system processes general-authentication-service traceoptions]
user@host# set filter user *tom
```

- Filter results for subscribers with the username tom at all domains beginning with ex.

```
[edit system processes general-authentication-service traceoptions]
user@host# set filter user tom@ex*
```

- Filter results for all subscribers at all domains that end with ample.com.

```
[edit system processes general-authentication-service traceoptions]
user@host# set filter user *ample.com
```

- Filter results for all subscribers whose username begins with tom at domains that end with example.com.

```
[edit system processes general-authentication-service traceoptions]
user@host# set filter user tom*.*example.com
```

Configuring the Trace Operation

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

Flag	Description
address-assignment	Trace all address-assignment pool events
all	Trace all tracing operations
configuration	Trace configuration events
framework	Trace authentication framework events
gx-plus	Trace Gx-Plus events
jsrc	Trace JSRC events
ldap	Trace LDAP authentication events
local-authentication	Trace local authentication events

Flag	Description
radius	Trace RADIUS authentication events
user-access	Trace user access events, such as login, logout, and authenticate

To configure the flags for the event to be logged:

- Configure the flags.

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

Collecting Subscriber Access Logs Before Contacting Juniper Technical Support

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

Solution To collect standard troubleshooting information:

- Redirect the command output to a file.

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

To configure logging to assist Juniper Technical Support:

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

[edit]

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

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



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



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

**Related
Documentation**

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

CHAPTER 7

Troubleshooting Configuration Statements

- [traceoptions \(General Authentication Service\) on page 72](#)

traceoptions (General Authentication Service)

Syntax	<pre>traceoptions { file <i>filename</i> <files <i>number</i>> <match <i>regular-expression</i> > <size <i>maximum-file-size</i>> <world-readable no-world-readable>; filter { user <i>user@domain</i>; } flag <i>flag</i>; no-remote-trace; }</pre>
Hierarchy Level	[edit system processes general-authentication-service]
Release Information	Statement introduced in Junos OS Release 9.0.
Description	Configure tracing options for the general authentication service.
Options	<p>file <i>filename</i>—Name of the file to receive the output of the tracing operation. All files are placed in the directory <code>/var/log</code>.</p> <p>files <i>number</i>—(Optional) Maximum number of trace files to create before overwriting the oldest one. If you specify a maximum number of files, you also must specify a maximum file size with the size option.</p> <p>Range: 2 through 1000</p> <p>Default: 3 files</p> <p>filter—Additional filter to refine the output to display particular subscribers. Filtering based on the following subscriber identifier simplifies troubleshooting in a scaled environment.</p> <ul style="list-style-type: none">• user <i>user@domain</i>—Username of a subscriber. Optionally use an asterisk (*) as a wildcard to substitute for characters at the beginning or end of either term or both terms. <p>flag <i>flag</i>—Tracing operation to perform. To specify more than one tracing operation, include multiple flag statements. You can include the following flags:</p> <ul style="list-style-type: none">• address-assignment—Trace address-assignment pool events• all—Trace all tracing operations• configuration—Trace configuration events• framework—Trace authentication framework events• gx-plus—Trace Gx-Plus events• jsrc—Trace JSRC events• ldap—Trace LDAP authentication events• local-authentication—Trace local authentication events

- **radius**—Trace RADIUS authentication events
- **user-access**—Trace user access events, such as login, logout, and authenticate.

match *regular-expression*—(Optional) Refine the output to include lines that contain the regular expression.

no-remote-trace—Disable remote tracing.

no-world-readable—(Optional) Disable unrestricted file access.

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

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

Range: 10240 through 1073741824

Default: 128 KB

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

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

Related Documentation	<ul style="list-style-type: none"> • Tracing General Authentication Service Processes on page 63
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PART 5

Index

- [Index on page 77](#)

Index

Symbols

#, comments in configuration statements.....	xii
(), in syntax descriptions.....	xii
< >, in syntax descriptions.....	xii
[], in configuration statements.....	xii
{ }, in configuration statements.....	xii
(pipe), in syntax descriptions.....	xii

A

AAA	
subscriber statistics	
displaying.....	54
abated-utilization statement	
address-assignment pools.....	25
abated-utilization-v6 statement	
address-assignment pools.....	25
address assignment pools	
displaying.....	59
address-assignment pools	
abated-utilization.....	25
abated-utilization-v6.....	25
client attributes.....	14
configuring.....	9
DHCP attributes.....	14
mapping option 82.....	14
setting the grace period.....	14
setting the maximum lease time.....	14
setting the name server address.....	14
specifying NetBIOS node type.....	14
specifying router addresses.....	14
specifying the boot file	14
specifying the boot server	14
specifying the DNS server IPv6	
address.....	14
specifying the domain name to search.....	14
specifying the SIP server domain	
name.....	14
specifying the SIP server IPv6 address.....	14
specifying the source address.....	14
specifying the TFTP server.....	14

specifying the WINS server.....	14
specifying user-defined options.....	14
DHCPv6 attributes.....	14
specifying the preferred-lifetime.....	14, 29
specifying the t1-percentage.....	14, 29
specifying the t2-percentage.....	14, 29
specifying the valid-lifetime.....	14, 29
high-utilization.....	33
high-utilization-v6.....	33
license requirements.....	4
linking.....	12
name.....	10
named range.....	11
network address.....	10
router advertisement.....	36
static address.....	13
threshold traps.....	11
tracing operations.....	63
address-assignment statement	
address-assignment pools.....	26

B

boot-file statement.....	27
boot-server statement.....	27
braces, in configuration statements.....	xii
brackets	
angle, in syntax descriptions.....	xii
square, in configuration statements.....	xii

C

circuit-id statement	
address-assignment pools.....	28
client attributes	
address-assignment pools.....	14
comments, in configuration statements.....	xii
conventions	
text and syntax.....	xi
curly braces, in configuration statements.....	xii
customer support.....	xiii
contacting JTAC.....	xiii

D

DHCP local server	
address-assignment pool selection.....	16
lease timers.....	35
DHCP local server statements	
boot-file.....	27
boot-server.....	27
dns-server.....	30

dhcp-attributes statement		log files	
address-assignment pools.....	29	collecting for Juniper Technical Support.....	67
DHCPv6 local server		M	
lease timers.....	35, 41, 47, 49	manuals	
DHCPv6 local server statements		comments on.....	xiii
preferred-lifetime.....	41	maximum-lease-time statement.....	35
t1-percentage.....	47	N	
t2-percentage.....	48	name-server statement.....	36
valid-lifetime.....	49	neighbor-discovery-router-advertisement	
dns-server statement.....	30	statement	
documentation		address-assignment pools.....	36
comments on.....	xiii	netbios-node-type statement.....	37
domain-name statement		network statement.....	37
address-assignment pools.....	30	O	
F		option statement.....	38
family statement		option-82 statement	
address-assignment pools.....	31	address-assignment pools.....	39
font conventions.....	xi	option-match statement.....	39
G		P	
general authentication service		parentheses, in syntax descriptions.....	xii
subscriber filtering for tracing operations.....	65	pool statement	
tracing operations.....	63	address-assignment pools.....	40
grace-period statement.....	32	preferred-lifetime statement.....	41
Gx-Plus		prefix statement	
tracing operations.....	63	address-assignment pools.....	42
H		R	
hardware-address statement.....	32	range statement	
high-utilization statement		address-assignment pools.....	43
address-assignment pools.....	33	remote-id statement.....	44
high-utilization-v6 statement		router statement	
address-assignment pools.....	33	address-assignment pools.....	44
host statement		S	
address-assignment pools.....	34	server-identifier statement	
I		address-assignment pools.....	45
ip-address statement.....	34	show network-access aaa statistics command.....	54
J		show network-access address-assignment pool	
JSRC		command.....	59
tracing operations.....	63	sip-server-address statement.....	45
L		sip-server-domain-name statement.....	46
license requirements		support, technical See technical support	
address-assignment pools.....	4	syntax conventions.....	xi
link statement			
address-assignment pools.....	35		

T

t1-percentage statement.....	47, 48
t2-percentage statement.....	48
technical support	
collecting logs for.....	67
contacting JTAC.....	xiii
tftp-server statement.....	49
trace operations	
collecting logs for Juniper technical support.....	67
tracoptions statement	
address-assignment pools.....	72
general authentication service.....	72
tracing operations	
address-assignment pools.....	63
general authentication service.....	63
Gx-Plus.....	63
JSRC.....	63
troubleshooting subscriber access	
collecting logs for Juniper Technical Support.....	67

V

valid-lifetime statement.....	49
-------------------------------	----

W

wins-server statement.....	50
----------------------------	----

