

## Chapter 22

# Monitoring and Troubleshooting DHCP

This chapter describes the commands you can use to monitor and troubleshoot DHCP support on E-series routers.

- Setting Baselines for DHCP Statistics on page 456
- Monitoring Addresses Excluded from DHCP Local Server Use on page 458
- Monitoring DHCP Bindings on page 458
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- Monitoring DHCP External Server Statistics on page 464
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## Setting Baselines for DHCP Statistics

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

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

Tasks to set a baseline for DHCP statistics are:

- Setting a Baseline for DHCP Relay and Relay Proxy on page 456
- Setting a Baseline for DHCP Proxy Server Statistics on page 456
- Setting a Baseline for DHCP External Server Statistics on page 457
- Setting a Baseline for DHCP Local Server Statistics on page 457

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

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

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

```
host1#baseline dhcp relay
```

There is no **no** version.

### Setting a Baseline for DHCP Proxy Server Statistics

To set a baseline for DHCP proxy server statistics.

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

```
host1#baseline dhcp server
```

There is no **no** version.

### **Setting a Baseline for DHCP External Server Statistics**

To set a baseline for DHCP external server statistics.

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

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

There is no **no** version.

### **Setting a Baseline for DHCP Local Server Statistics**

To set a baseline for DHCP local server statistics:

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

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

There is no **no** version.

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

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

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

To set a baseline for DHCPv6 local server statistics:

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

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

### **Related Topics**

- **baseline dhcp** command
- **baseline ip dhcp-external** command
- **baseline ip dhcp-local** command
- **baseline ipv6 dhcpv6-local** command

## Monitoring Addresses Excluded from DHCP Local Server Use

**Purpose** Display addresses that have been excluded by the **ip dhcp-local excluded-address** command. The DHCP local server does not allocate excluded addresses, because they are already used by devices on the subnetwork.

**Action** To display excluded IP addresses:

```
host1(config)#show ip dhcp-local excluded
Dhcp Excluded Addresses
-----
      Pool      Low      High
      Address    Address
-----
default 10.10.1.1
default 10.10.1.5 10.10.1.30
cable2  10.10.2.1
home.com 10.10.3.1
cable4  10.10.4.1
cable5  10.10.5.1
```

**Meaning** Table 98 lists the **show ip dhcp-local excluded** command output fields.

**Table 98: show ip dhcp-local excluded Output Fields**

Field Name	Field Description
Pool	Name of the pool that contains the excluded address
Low Address	Excluded address or first address in a range of addresses
High Address	Last address in a range of addresses

### Related Topics

- **show ip dhcp-local excluded** command

## Monitoring DHCP Bindings

To monitor DHCP bindings, see:

- Monitoring DHCP Binding Information on page 459
- Monitoring DHCP Bindings (Displaying IP Address-to-MAC Address Bindings) on page 461
- Monitoring DHCP Bindings (Displaying DHCP Bindings Based on Binding ID) on page 461
- Monitoring DHCP Bindings (Local Server Binding Information) on page 462

## Monitoring DHCP Binding Information

**Purpose** Display DHCP client binding information.

Use the following keywords to qualify the binding information you want to display. All bindings are displayed if you do not specify an optional keyword.

- **external**—Displays DHCP external server bindings
- **local**—Displays DHCP local server bindings
- **relay-proxy**—Displays DHCP relay proxy bindings
- **detail**—Shows detailed information for the specified DHCP bindings
- **binding-id**—Displays information for the specified DHCP binding



**NOTE:** This command replaces the **show ip dhcp-external binding**, **show ip dhcp-external binding-id**, and **show ip dhcp-local binding** commands, which are deprecated and might be removed completely in a future release.

**Action** To display information about all DHCP bindings:

```
host1#show dhcp binding
BindingId      HwAddress      IpSubnet      IpAddress      Type      State
-----
3053453401     7000.0002.9365 0.0.0.0       192.168.0.90   external  bound
3053453402     7000.0003.9365 0.0.0.0       192.168.0.91   external  bound
3053453403     7000.0004.9365 0.0.0.0       192.168.0.92   external  bound
3053453404     7000.0005.9365 0.0.0.0       192.168.0.93   external  bound
3053453405     7000.0006.9365 0.0.0.0       192.168.0.94   external  bound
3053453406     7000.0007.9365 0.0.0.0       192.168.0.95   external  bound
3053453407     7000.0008.9365 0.0.0.0       192.168.0.96   external  bound
3053453408     7000.0009.9365 0.0.0.0       192.168.0.97   external  bound
3053453409     7000.000a.9365 0.0.0.0       192.168.0.98   external  bound
3053453410     7000.000b.9365 0.0.0.0       192.168.0.99   external  bound
3053453411     7000.000c.9365 0.0.0.0       192.168.0.100  external  bound
3053453412     7000.000d.9365 0.0.0.0       192.168.0.101  external  bound
3070230529     7000.0001.9365 0.0.0.0       192.168.0.2    relay-p    bound
3070230530     7000.0002.9365 0.0.0.0       192.168.0.90   relay-p    bound
3070230531     7000.0003.9365 0.0.0.0       192.168.0.91   relay-p    bound
3070230532     7000.0004.9365 0.0.0.0       192.168.0.92   relay-p    bound
3070230533     7000.0005.9365 0.0.0.0       192.168.0.93   relay-p    bound
3070230534     7000.0006.9365 0.0.0.0       192.168.0.94   relay-p    bound
```

To display information about a specific DHCP binding ID:

```
host1#show dhcp binding 3070230530
BindingId:      3070230530
HwAddress:      7000.0002.9365
IpSubnet:       0.0.0.0
IpAddress:      192.168.0.90
State:          bound
Type:           relay-p
Server:         192.168.15.1
Giaddr:         192.168.0.1
Lease:          3600
Remaining:      2079
```

```

IpInterface: GigabitEthernet1/0/1.101
ClientId:    45-41-48-00-01-70-00-00-02-93-65
Interface:
Relay Agent:

Agent Circuit Id: test circuit id
Agent Remote Id:  test remote id
Vendor Specific:  01-02-03-04-05-06-07-08-09-0a-0b-0c-0d-0e-0f-10
Unrecognized:     11-12-13-14-15-16-17-18-19-1a-1b-1c-1d-1e-1f-20

```

**Meaning** Table 99 lists the **show dhcp binding** command output fields.

**Table 99: show dhcp binding Output Fields**

Field Name	Field Description
BindingId	Client binding ID
HwAddress	MAC address of client
IpSubnet	For DHCP local server bindings, the subnet of the IP address assigned to the client; 0.0.0.0 for DHCP external server and DHCP relay proxy bindings
IpAddress	IP address assigned to client
State	State of the DHCP client binding
Type	Binding type; external (DHCP external server), local (DHCP local server), or relay-p (DHCP relay proxy)
Server	IP address of the DHCP server that allocated the client IP address
Giaddr	For DHCP relay proxy the IP address of the DHCP relay proxy; for DHCP local server bindings, the IP address of the DHCP relay that sent the packet or 0.0.0.0 if the packet comes from the client; for DHCP external server bindings, the giaddr from the DHCP packet
Lease	Total time for which the IP address is available, in seconds
Remaining	Time remaining on the current lease, in seconds
IpInterface	IP interface that is associated with the client
ClientId	DHCP Option 61 received from the client
Interface	Subinterface for DHCP local server bindings; does not apply to DHCP external server and DHCP relay proxy
Relay Agent	Indicates Relay Agent Information option (option 82)
Agent Circuit Id	Suboption 1 of the DHCP Relay Agent information option
Agent Remote Id	Suboption 2 of the DHCP relay agent information option
Vendor Specific	Suboption 9 of the DHCP relay agent information option

## Related Topics

- **show dhcp binding** command

## Monitoring DHCP Bindings (Displaying IP Address-to-MAC Address Bindings)



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

**Purpose** Display the mapping between the assigned IP address and the MAC address of the subscriber's computer.

**Action** To display the DHCP IP address to MAC address bindings:

```
host1#show ip dhcp-external binding
```

```

                                Dhcp External Binding
                                -----
      Hardware      IPAddress      Server      Lease      Expire      Interface
      -----
3000.0001.9365    10.1.1.2      10.9.3.3      3600      3540      ip201.1.1.2

```

**Meaning** Table 100 lists the **show ip dhcp-external binding** command output fields

**Table 100: show ip dhcp-external binding Output Fields**

Field Name	Field Description
Hardware	MAC address of subscriber's computer
IpAddress	Subscriber client's IP address
Server	DHCP server's address
Lease	Time for which the IP address is available, in seconds
Expire	Time remaining on the current lease, in seconds
Interface	Interface that is associated with the subscriber's computer

## Related Topics

- **show ip dhcp-external binding** command

## Monitoring DHCP Bindings (Displaying DHCP Bindings Based on Binding ID)



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

**Purpose** Display binding information for all DHCP clients.

**Action** To display DHCP binding information:

```
host1(config)#show ip dhcp-external binding-id
```

```

                                Dhcp External Binding Ids
                                -----
      Binding      Hardware      IpAddress
      Id
3193657721    3000.0001.9365    10.1.1.2

```

**Meaning** Table 101 lists the **show ip dhcp-external binding-id** command output fields.

**Table 101: show ip dhcp-external binding-id**

Field Name	Field Description
Binding Id	DHCP client binding ID option value associated with the user
Hardware	MAC address of the subscriber's computer
IpAddress	IP address assigned to the client

## Related Topics

- **show ip dhcp-external binding-id** command

## Monitoring DHCP Bindings (Local Server Binding Information)



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

**Purpose** Display DHCP local server binding information for DHCP local server clients. Optionally, specify an IP address or an interface to display binding information for a particular address or interface.

**Action** To display DHCP local server binding information for a specific IP address:

```
host1#show ip dhcp-local binding 192.168.1.3
```

```

                                Dhcp Local Bindings
                                -----
    Address      Hardware      Lease      Interface      State
    -----
    192.168.1.3  11-11-22-22-33-33  (600)    fastEthernet 5/0  expired
  
```

To display DHCP local server binding information for a specific interface:

```
host1#show ip dhcp-local binding interface fastethernet 5/0.2
```

```

                                Dhcp Local Bindings
                                -----
    Address      Hardware      Lease      Interface      State
    -----
    192.168.0.6  40-00-00-0b-00-01  240      fastEthernet 5/0.2  bound
    192.168.0.7  40-00-00-0c-00-01  240      fastEthernet 5/0.2  bound
    192.168.1.3  11-11-22-22-33-33  (600)    fastEthernet 5/0.2  expired
  
```

**Meaning** Table 102 lists the **show ip dhcp-local binding** command output fields.

**Table 102: show ip dhcp-local binding Output Fields**

Field Name	Field Description
Address	IP address
Hardware	MAC address of subscriber's computer
Lease	Infinite, or the number of seconds in which the IP address is available; grace period is shown in parentheses for clients in a grace period



**Table 102: show ip dhcp-local binding Output Fields (continued)**

Field Name	Field Description
Interface	Interface whose statistics are reported
State	Binding state; expired or released state for clients currently in the grace period

### Related Topics

- `show ip dhcp-local binding` command

## Monitoring DHCP External Server Configuration Information

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

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

```
host1(config)#show ip dhcp-external configuration
Dhcp External : Enabled
Auto-Configure : Enabled
Server-Sync : Enabled
Disregard-Giaddr-Next-Hop : Enabled

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

**Meaning** Table 103 lists the `show ip dhcp-external configuration` command output fields.

**Table 103: show ip dhcp-external configuration Output Fields**

Field Name	Field Description
Dhcp External	Enabled or disabled
Auto-Configure	Enabled or disabled
Server-Sync	Enabled or disabled
Disregard-Giaddr-Next-hop	Enabled or disabled
Servers	DHCP servers whose traffic is monitored by the E-series router

### Related Topics

- `show ip dhcp-external configuration` command

## Monitoring DHCP External Server Statistics

**Purpose** Display statistics for all external DHCP servers, or for a specific server.

**Action** To display statistics for a DHCP external server:

```
host1(config)#show ip dhcp-external statistics server-address 100.20.32.1
DHCP External Statistics
Server Address 10.10.32.1
-----
      Item          Count
-----
memUsage           136
bindings            1
request             69
ack (request)      1120
renew              38611
ack (renew)        38611
nak                 42
release            68
lease expirations  0
```

**Meaning** Table 104 lists the `show ip dhcp-external statistics` command output fields.

**Table 104: show ip dhcp-external statistics Output Fields**

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

### Related Topics

- `show ip dhcp-external statistics` command

## Monitoring DHCP Local Address Pools

---

**Purpose** Display the DHCP local pool configurations.

**Action** To display information about the local address pool:

```
host1#show ip dhcp-local pool

*****
Pool Name - ispBoston
Pool Id - 6
Domain Name - ispBoston
Network - 10.10.0.0
Mask - 255.255.255.0
NETBIOS Node Type - 1
Lease - Days:0 Hours:0 Minutes:24 Seconds:0
Grace Period - Days:0 Hours:0 Minutes:10 Seconds:0
Grace period for released leases enabled
DNS Servers
  10.10.1.1
NETBIOS Name Servers
  10.10.1.1
  10.10.1.2
Default Routers
  10.10.1.3
Server Address - 10.10.20.8
Linked Pool - cable5
High utilization threshold - 85%
Abated utilization threshold - 75%
Current utilization - 0%
Utilization trap disabled.
Shared pool allocations - 25
```

To display information about local address pool groups:

```
host1#show ip dhcp-local pool groups

DHCP Local Server Pool Groups
There is 1 group configured

*****
Group Name: pool8_7-1-Group
  Total Addresses Available: 145
  Total Addresses In Use:    0
  High Utilization Thresh:   85%
  Abated Utilization Thresh: 75%
  Current Utilization:       0%
  Trap Enabled:              no
===== Pools =====
  pool8_7-1
  pool8_7-2
  pool8_7-3
  pool8_7-4
  pool8_7-5
```

**Meaning** Table 105 lists the **show ip dhcp-local pool** command output fields.

**Table 105: show ip dhcp-local pool Output Fields**

Field Name	Field Description
Pool Name	Name of the DHCP local pool
Pool Id	ID of the pool
Domain Name	Domain name assigned to the pool
Network	Addresses that the DHCP local server can provide from the pool
Mask	Subnet mask that goes with the network address
NETBIOS Node Type	Type of NetBIOS server: 1 = Broadcast 2 = Peer-to-peer 4 = Mixed 8 = Hybrid
Lease	Time for which the supplied IP address is valid
Grace Period	Length of grace period
Grace period for released leases	Status of the grace period for released leases; enabled or disabled
DNS Servers	Address of each DNS server assigned to the pool
NETBIOS Name Servers	NetBIOS server assigned to subscribers
Default Routers	Address of default router used for subscribers
Server Address	DHCP server address that is sent to subscribers
Linked Pool	Names of any pools that are linked to this pool
High utilization threshold	Threshold at which the utilization trap is triggered, if the trap is enabled
Abated utilization threshold	Threshold at which the utilization trap is reenabled after the trap has been triggered
Current utilization	Percentage of local address pool currently used
Utilization trap	Status of the utilization trap, which is generated when the high utilization threshold is reached; enabled or disabled
Shared pool allocations	Number of addresses allocated to shared pools
Group Name	Group name; based on the name of the original pool
Total Addresses Available	Number of addresses in the group
Total Addresses In Use	Number of addresses currently being used
Trap Enabled	Status of utilization trap, yes or no
Pools	Names of pools in the group

## Related Topics

- **show ip dhcp-local pool** command

## Monitoring DHCP Local Server Authentication Information

**Purpose** Display the DHCP local server's AAA authentication configuration information and statistics.

**Action** To display DHCP local server AAA authentication configuration:

```
host1#show ip dhcp-local auth config
```

DHCP Local Server Authentication Configuration

```
User-Prefix      : ERX4-Boston
Domain           : ISP1.com
Password         : to4TooL8
Virtual Router   : included
Circuit Type     : included
Circuit ID       : included
MAC Address      : excluded
Option 82        : excluded
```

To display DHCP local server AAA authentication statistics:

```
host1#show ip dhcp-local auth statistics
```

DHCP Local Server Authentication Statistics

```
-----#-----
      Item                      Count
-----#-----
auth requests                  10
auth request failures          0
auth grants                    9
auth denies                    1
```

**Meaning** Table 106 lists the `show ip dhcp-local auth` command output fields.

**Table 106: show ip dhcp-local auth Output Fields**

Field Name	Field Description
User-Prefix	Client's user prefix
Domain	Client's domain
Password	Password used to authenticate client
Virtual Router	Client's virtual router; excluded or included
Circuit Type	Client's circuit type; excluded or included
Circuit ID	Client's circuit ID; excluded or included
MAC Address	Client's MAC address; excluded or included
Option 82	Status of client's option 82 field; excluded or included
auth requests	Number of authorization requests received by this DHCP local server
auth request failures	Number of authorization requests that have failed
auth grants	Number of authorization requests that have been granted
auth denies	Number of authorization requests that have been denied

## Related Topics

- `show ip dhcp-local auth` command

## Monitoring DHCP Local Server Configuration

**Purpose** Display the DHCP local server's configuration information.

**Action** To display configuration settings for DHCP local server:

```
host1#show ip dhcp-local

*****
      DHCP Local Server Configuration
Mode: Standalone
SNMP Traps Enabled - no
Unique Client IDs  - enabled
```

**Meaning** Table 107 lists the `show ip dhcp-local` command output fields.

**Table 107: show ip dhcp-local Output Fields**

Field Name	Field Description
Mode	DHCP local server mode, equal-access or standalone
SNMP Traps Enabled	Status of DHCP local traps support, yes or no
Unique Client IDs	Status of duplicate client ID and duplicate hardware address detection, enabled or disabled

## Related Topics

- `show ip dhcp-local` command

## Monitoring DHCP Local Server Leases

**Purpose** Display lease information for a specific IP address or for all DHCP local server leases.

**Action** To display information about a specific DHCP local server lease:

```
host1#show ip dhcp-local leases 192.168.0.3

      Dhcp Local Leases
      -----
Address          Hardware          Lease          Initiated/Renewed
-----
192.168.0.3      10-06-10-00-10-33    120            THU SEP 08 2005 08:02:11 UTC

Address          Expiration          Remaining
-----
192.168.0.3      THU SEP 08 2005 08:04:11 UTC    79

Address          Initial Lease Start
-----
192.168.0.3      THU SEP 08 2005 08:01:12 UTC
```

To display information about all DHCP local server leases:

```
host1#show ip dhcp-local leases
```

```

                                Dhcp Local Leases
                                -----
Address      Hardware      Lease      Initiated/Renewed
-----
192.168.0.2  10-06-10-00-10-32  120        THU JUL 06 2006 08:02:11 UTC
192.168.0.3  10-06-10-00-10-33  120        THU JUL 06 2006 08:02:11 UTC
192.168.55.4 10-06-10-00-10-34  (600)      THU JUL 06 2006 09:57:22 UTC
192.168.55.5 10-06-10-00-10-35  infinite    THU JUL 06 2006 08:03:10 UTC
Address      Expiration      Remaining
-----
192.168.0.2  THU JUL 06 2006 08:04:11 UTC  80
192.168.0.3  THU JUL 06 2006 08:04:11 UTC  80
192.168.55.4 THU JUL 06 2006 10:07:22 UTC  575
192.168.55.5 THU JUL 06 2006 08:04:11 UTC  infinite
Address      Initial Lease Start
-----
10.1.0.2     THU JUL 06 2006 08:01:12 UTC
10.1.0.3     THU JUL 06 2006 08:01:12 UTC
192.168.55.4 THU JUL 06 2006 09:54:19 UTC
192.168.55.5 THU JUL 06 2006 08:03:10 UTC

```

**Meaning** Table 108 lists the `show ip dhcp-local leases` command output fields.

**Table 108: show ip dhcp-local leases Output Fields**

Field Name	Field Description
Address	IP address
Hardware	MAC address of the subscriber's computer
Lease	Infinite, or the number of seconds in which the IP address is available; grace period in parentheses for clients in the grace period
Initiated/Renewed	Day, date, and time the lease was most recently initiated or renewed; start time of grace period for clients in the grace period
Expiration	Day, date, and time the lease expires; expiration time of grace period for clients in the grace period
Remaining	Infinite, or the number of seconds remaining in the lease, if any; remaining time of grace period for clients in the grace period
Initial Lease Start	Day, date, and time the lease was initiated

## Related Topics

- `show ip dhcp-local leases` command

## Monitoring DHCP Local Server Statistics

**Purpose** Display statistics for the DHCP local server.

**Action** To display all DHCP local server statistics:

```
host1#show ip dhcp-local statistics
```

```
DHCP Local Server Statistics
-----
      Item                Count
-----
memUsage                  184
bindings                  2
--Receive Statistics--
discover                  8
request(accept)          10
request(renew)            6
request(rebind)          2
request(other)           6
decline                   0
release                   6
inform                    0
total in packet          38
in error                  0
in discard                0
unknown client packet    6
--Transmit Statistics--
offer                     8
ack(accept)              10
ack(renew)                6
ack(rebind)              2
nak                       6
nak(renew)                0
nak(rebind)              0
total out packet         32
out error                 0
out discard               0
```

To display DHCP local server statistics for a specific interface:

```
host1#show ip dhcp-local statistics interface atm 4/0.32
```

```
DHCP Local Server SubInterface Statistics
      Interface      Item                Count
-----
ATM4/0.32
Receive Statistics
discover              4
request(accept)      5
request(renew)        1
request(rebind)       1
request(other)        3
decline               0
release               3
inform                0
total in packet      17
in error              0
in discard            0
unknown client packet 3
```



## Transmit Statistics

offer	4
ack(accept)	5
ack(renew)	1
ack(rebind)	1
nak	3
nak(renew)	0
nak(rebind)	0
total out packet	14
out error	0
out discard	0

**Meaning** Table 109 lists the **show ip dhcp-local statistics** command output fields.

**Table 109: show ip dhcp-local statistics**

Field Name	Field Description
memUsage	Number of bytes of memory used by the DHCP local server
bindings	Number of leased IP addresses currently assigned
Receive Statistics	Statistics for packets that have been received
discover	Number of DHCP discover messages received
request(accept)	Number of DHCP requests accepted
request(renew)	Number of DHCP requests for renewal received
request(rebind)	Number of DHCP requests for rebinding received
request(other)	Number of DHCP unknown requests received
decline	Number of DHCP decline messages received
release	Number of DHCP release messages received
inform	Number of DHCP inform messages received
total in packet	Number of packets received
in error	Number of packets received with errors that prevent further processing; count is independent of the message-type counters
in discard	Number of packets received that are discarded due to system resource issues; count is independent of the message-type counters
unknown client packet	Number of nonrequest packets that have no entry in the local server database received
Transmit Statistics	Statistics for packets that have been transmitted
offer	Number of DHCP offer messages sent
ack(accept)	Number of DHCP acknowledgments sent in response to accepted requests
ack(renew)	Number of DHCP acknowledgments sent in response to renewal requests
ack(rebind)	Number of DHCP acknowledgments sent in response to rebinding requests
nak	Number of DHCP NAK messages sent in response to requests that cannot be bound or that are unknown to this local server
nak(renew)	Number of DHCP NAK messages sent in response renewal requests

**Table 109: show ip dhcp-local statistics (continued)**

Field Name	Field Description
nak(rebind)	Number of DHCP NAK messages sent in response to rebinding requests
total out packet	Number of packets sent by the DHCP local server
out error	Number of packets that cannot be transmitted due to protocol errors or configuration errors; count is independent of the message-type counters
out discard	Number of packets that cannot be transmitted due to system resource issues; count is independent of the message-type counters

## Related Topics

- `show ip dhcp-local statistics` command

## Monitoring DHCP Option 60 Information

**Purpose** Display configuration and action information for the DHCP vendor-option (option 60) feature.

- Use the command without additional keywords to display information for all vendor option configurations.
- Use the **vendor-option-relay-server** keyword and server address to display information for option 60 strings that match a configured string that results in the packets being sent to the specified vendor-option server.
- Use the **default** keyword to display information for option 60 strings that do not match a configured vendor-option string.

**Action** To display information for all vendor option configurations:

```
host1#show dhcp vendor-option
```

```
Codes:
```

- \* - the configured vendor-string is an exact-match
- default - all DHCP client packets not matching a configured vendor-string
- implied - the DHCP application is configured but has not been enabled with the vendor-option command
- drop - the DHCP application responsible for the action has not been configured yet therefore all packets for this application will be dropped

```
Total 4 entries.
```

Vendor-option	Action
Juniper	relay to 10.10.1.1 (rx: 0)
default(*)	relay to 192.168.5.5 (rx: 0, no-match: 0)
someString(*)	relay to 192.168.7.7 (rx: 0)
someString2(*)	local-server (rx: 0)

To display information for option 60 strings that match a configured string:

```

host1#show dhcp vendor-option vendor-option-relay-server 10.10.1.1
Codes:
*          - the configured vendor-string is an exact-match
default    - all DHCP client packets not matching a configured vendor-string
implied    - the DHCP application is configured but has not been enabled
              with the vendor-option command
drop       - the DHCP application responsible for the action has not been
              configured yet therefore all packets for this application
              will be dropped
Total 4 entries.
Vendor-option      Action
-----
Juniper            relay to 10.10.1.1 (rx: 0)

```

**Meaning** Table 110 lists the `show dhcp vendor-option` command output fields.

**Table 110: show dhcp vendor-option Output Fields**

Field Name	Field Description
Vendor-option	Option 60 string; an asterisk (*) indicates that the string exactly matches a configured option 60 string, default indicates the action to take when the string does not match a configured option 60 string
Action	Action to take for the indicated string match; drop, forward to local-server, proxy client server, or all configured DHCP vendor option servers; or relay to the specified DHCP server
rx	Received packets that match a vendor-option string
no-match	Received packets that do not match a vendor-option string; no-match statistics appear only for default entries

## Related Topics

- `show dhcp vendor-option` command

## Monitoring DHCP Packet Capture Settings

**Purpose** Display the configuration for per-interface DHCP packet logging.

**Action** To display configuration information about the DHCP packet capture feature:

```

host1#show ip dhcp-capture

Dhcp Capture Configuration
-----
Router  Interface  Type  Priority
-----
default ip3/1      Rx/Tx  low/low
default ip5/1      Rx     high

```

**Meaning** Table 111 lists the **show ip dhcp-capture** command output fields.

**Table 111: show ip dhcp-capture Output Fields**

Field Name	Field Description
Router	Router name
Interface	Interface whose DHCP packets are logged
Type	Packet type to be logged, Rx (received), Tx (transmitted), or Rx/Tx (all)
Priority	Priority assigned to logged packets, low or high

## Related Topics

- **show ip dhcp-capture** command

## Monitoring DHCP Relay Configuration Information

**Purpose** Display DHCP relay configuration information and the IP addresses of the configured DHCP servers.

**Action** To display information about the DHCP relay configuration and the IP address of the DHCP servers.

```

host1#show dhcp relay

DHCP Relay Configuration
-----
Mode: Proxy
  Restore Client Timeout: 72
  Send First Offer: off
  Inhibit Access Route Creation: off
  Assign Giaddr to Source IP: off
  Layer 2 Unicast Replies: off
  Giaddr Selects Interface: off
  Broadcast Flag Replies: on
  Relay Agent Information Option (82):
    Override Giaddr: off
    Override Option: off
    Trust All Clients: off
    Preserve Option From Trusted Clients: off
  Circuit-ID Sub-option (1): on
    select - hostname
    select - exclude-subinterface-id
  Remote-ID Sub-option (2): on
  Vendor-Specific Sub-option (9): on
    select - layer2-circuit-id
    select - user-packet-class

DHCP Server Addresses
-----
30.3.7.1

```

**Meaning** Table 112 lists the **show dhcp relay** command output fields.

**Table 112: show dhcp relay Output Fields**

Field Name	Field Description
Mode	DHCP relay mode; either Standard (DHCP relay mode) or Proxy (DHCP relay proxy mode)
Restore Client Timeout	(DHCP relay proxy mode only) number of hours
Send First Offer	On or off
Inhibit Access Route Creation	On or off
Assign Giaddr to Source IP	On or off
Layer 2 Unicast Replies	On or off
Giaddr Selects Interface	On or off
Broadcast Flag Replies	On or off
Override Giaddr	On or off
Override Option	On or off
Trust All Clients	On or off
Preserve Option From Trusted Clients	On or off
Circuit-ID Sub-option (1)	On or off; when on includes a list of selected suboptions
Remote-ID Sub-option (2)	On or off
Vendor-Specific Sub-option (9)	On or off; when on includes a list of selected suboptions
DHCP Server Addresses	IP addresses of configured DHCP servers

## Related Topics

- **show dhcp relay** commands

## Monitoring DHCP Relay Proxy Statistics

**Purpose** Display statistics for the DHCP relay proxy.



**NOTE:** The **show dhcp relay statistics** command displays additional DHCP statistics that the router reports for both DHCP relay and DHCP relay proxy.

**Action** To display DHCP relay proxy statistics:

```
host1#show dhcp relay proxy statistics
```

DHCP Relay/Proxy Statistics								
Address	Disc.	Offer	Req.	Ack	Nak	Decline	Release	Inform
192.168.1.1	9	0	0	0	0	0	0	0
192.168.1.2	9	0	0	0	0	0	0	0
192.168.32.1	9	5	5	5	0	0	0	0

```

Active Clients: 5
Clients to Restore: 0
Client Packets: 14
Server Packets: 10
Timed Out: 0
No Offers: 4
Modify Fail: 0

```

**Meaning** Table 113 lists the **show dhcp relay proxy statistics** command output fields.

**Table 113: show dhcp relay proxy statistics Output Fields**

Field Name	Field Description
Address	IP address of the DHCP server
Disc.	Number of discover messages sent to server
Offer	Number of offers received from a server
Req.	Number of requests sent to a server
Ack	Number of ACK messages received from a server
Nak	Number of NAK messages received from a server
Decline	Number of decline messages sent to a server
Release	Number of releases sent to a server
Inform	Number of information messages sent to a server
Active Clients	Number of clients being maintained by the relay proxy
Clients to Restore	Number of host routes installed without an active client (waiting for renewal)
Client Packets	Total number of packets received from clients
Server Packets	Total number of packets received from servers
Timed Out	Number of clients removed because of lease expiration
No Offers	Number of clients removed because no server sent an offer
Modify Fail	Number of clients deleted because the relay proxy failed to modify the DHCP packet

## Related Topics

- **show dhcp relay proxy statistics** command

## Monitoring DHCP Relay Statistics

**Purpose** Display DHCP packet error and relay agent option statistics that are reported for both DHCP relay and DHCP relay proxy, and also to display DHCP server statistics related only to DHCP relay.



**NOTE:** The **show dhcp relay proxy statistics** command displays additional DHCP statistics that the router reports only for DHCP relay proxy.

**Action** To display DHCP relay statistics:

```
host1#show dhcp relay statistics
```

```

                                DHCP Relay Statistics
                                -----
                                Statistic                               Values
                                -----
Packet error statistics (standard & proxy modes):
  dropped discover packets, no resources                             0
  dropped dhcp packets, no resources                                0
  dropped bad message operation packets                             0
  dropped unknown message type request packets                      0
  dropped unknown message type reply packets                        0
Relay Agent Option statistics (standard & proxy modes):
  add Relay Agent Option circuit ID suboption                      0n
  add Relay Agent Option remote ID suboption                       0n
  packets with giaddr override                                     0
  packets with Relay Agent Option override                         2
  packets forwarded with Relay Agent Option already present        4
  dropped packets with Relay Agent Option already present          3
  dropped giaddr spoof packets                                     0
DHCP server statistics (standard mode only):
  dropped duplicate request packets                                12
  packets transmitted to servers                                  38
  packets received from servers                                   26
  dropped unknown xid reply packets                                0
  dropped stale request packets                                   12

```

To display detailed statistics for DHCP relay only, use the optional **detail** keyword—this command displays DHCP server statistics and dropped unknown message type reply packets statistics:

```
host1#show dhcp relay statistics detail
```

```

                                DHCP Relay Detail Statistics
                                -----
                                Statistics                               10.10.1.1  192.168.32.12  192.168.32.1
                                -----
Dropped unknown message type replies  0           0           0
Dropped duplicate requests             6           6           0
Packets transmitted to server         6           6           26
Packets received from server          0           0           26
Dropped unknown xids replies          0           0           0
Dropped stale requests                6           6           0

```

**Meaning** Table 114 on page 477 lists the **show dhcp relay statistics** command output fields.

**Table 114: show dhcp relay statistics Output Fields**

Field Name	Field Description
<b>Packet error statistics (standard &amp; proxy modes)</b>	
dropped discover packets, no resources	Number of received DHCP relay discover messages that were discarded because of lack of resources
dropped dhcp packets, no resources	Number of received DHCP relay messages, other than discover messages, that were discarded because of lack of resources

**Table 114: show dhcp relay statistics Output Fields (continued)**

Field Name	Field Description
dropped bad message operation packets	Number of received DHCP relay messages that were discarded because their message operation (for example, bootrequest, bootreply) was unknown, possibly due to corruption
dropped unknown message type request packets	Number of received DHCP relay request messages that were discarded because their message type (for example, discover, offer-request) was unknown, possibly due to corruption
dropped unknown message type reply packets	Number of received DHCP relay reply messages that were discarded because their message type (for example, offer, ack) was unknown, possibly due to corruption
<b>Relay Agent Option statistics (standard &amp; proxy modes)</b>	
add Relay Agent Option circuit ID suboption	Status of circuit ID suboption, on or off
add Relay Agent Option remote ID suboption	Status of remote ID suboption, on or off
packets with giaddr override	Number of received DHCP relay requests whose giaddr field is overridden with IP address 0.0.0.0
packets with Relay Agent Option override	Number of received DHCP relay requests whose relay agent information option is overridden with an option string created by this relay agent
packets forwarded with Relay Agent Option already present	Number of received DHCP relay requests already containing the relay agent information option that were forwarded to DHCP servers
dropped packets with Relay Agent Option already present	Number of received DHCP relay requests that were discarded because they already contained the relay agent information option when this relay agent was configured to insert the option
dropped giaddr spoof packets	Number of received DHCP relay requests that were discarded because the gateway IP address field already contained this relay agent's IP address
<b>DHCP server statistics (standard mode only)</b>	
dropped duplicate request packets	Number of received DHCP relay requests that were discarded because they have a matching server address and XID of an outstanding DHCP server request
packets transmitted to servers	Number of DHCP relay requests successfully transmitted to DHCP servers
packets received from servers	Number of DHCP relay replies successfully received from DHCP servers
dropped unknown xid reply packets	Number of DHCP relay replies received from DHCP servers that were discarded because their server address and XID do not match an outstanding DHCP server request
dropped stale request packets	Number of DHCP relay requests sent to DHCP servers that were discarded because their replies timed out



## Related Topics

- `show dhcp relay statistics` command

## Monitoring DHCP Server and DHCP Relay Agent Statistics

**Purpose** Display DHCP proxy server statistics

**Action** To display statistics for the DHCP proxy server:

```
host1#show dhcp server statistics
DHCP Proxy Global Statistics
Messages from Unknown Servers 0
```

DHCP Proxy Server Statistics			
Statistic	Counts	Counts	Counts
DHCP Server Address	10.6.128.10	10.10.0.42	192.168.200.10
Discovers sent	0	0	0
Leases granted	0	0	0
Offers received	0	0	0
Requests sent	0	0	0
Acks received	0	0	0
Naks received	0	0	0
addresses declined	0	0	0
addresses released	0	0	0
Inform sent	0	0	0
unknown messages	0	0	0
bad messages	0	0	0

**Meaning** Table 115 lists the `show dhcp server statistics` command output fields

**Table 115: show dhcp server statistics Output Fields**

Field Name	Field Description
DHCP Server Address	IP address of the server
Discovers sent	Number of discover messages sent by the server
leases granted	Number of leases granted by the server
Offers received	Number of offers sent by the server
Requests sent	Number of requests sent to the server
Acks received	Number of acknowledgments received from the server
Naks received	Number of negative acknowledgments received from the server
addresses declined	Number of IP addresses rejected because they were already in use
addresses released	Number of IP addresses released back to the server
Inform sent	Number of inform messages sent to the server
unknown messages	Number of illegal DHCP messages or messages that cannot be handled by the router
bad messages	Number of messages not recognized as DHCP messages

## Related Topics

- `show dhcp server statistics` command

## Monitoring DHCP Server and Proxy Client Information

**Purpose** Display DHCP server and proxy client information.

**Action** To display information about the DHCP server and proxy clients:

```
host1#show dhcp server
```

DHCP Proxy Client Status:

```
-----
```

O	A	Address	Leases	Offers	Requests	Acks	Naks	Declines	Releases
E	E	10.6.128.10	0	0	0	0	0	0	0
E	E	10.6.128.11	0	0	0	0	0	0	0

**Meaning** Table 116 lists the `show dhcp server` command output fields.

**Table 116: show dhcp server Output Fields**

Field Name	Field Description
O	Read-only value that displays the operational status of the server
A	Read/write value that displays the administrative status of the server
E	Enabled; indicates that the server is being actively used to supply IP addresses to clients
D	Draining; indicates that the server is not accepting any new requests for addresses, but is maintaining the addresses that it has already assigned
X	Disabled; means that the server is not accepting any new requests for addresses and has no outstanding addresses
Address	IP address of a DHCP server
Leases	Number of IP address leases granted by the server
Offers	Number of offers sent by the server
Requests	Number of requests sent to the server
Acks	Number of acknowledgments received from the server
Naks	Number of negative acknowledgments received from the server
Declines	Number of IP addresses rejected because they were already in use
Releases	Number of IP addresses released back to the server

### Related Topics

- `show dhcp server` command

## Monitoring DHCPv6 Local Server Binding Information

**Purpose** Display the mapping between one or more IPv6 addresses and the DHCP unique ID of the subscriber's computer.

**Meaning** Table 117 lists the **show ipv6 dhcpv6-local statistics** command output fields.

**Table 117: show ipv6 dhcpv6-local binding Output Fields**

Field Name	Field Description
Prefix	IPv6 address
Client DUID	DHCP unique ID of subscriber's computer
Lease	Time for which the IPv6 address is available in seconds, or infinite
Intf	Router's interface that is associated with the subscriber's computer

**Action** To display the DHCP binding information for an IPv6 address:

```
host1#show ipv6 dhcpv6-local binding 2001:db8:4::/48
```

Prefix	Client DUID	Lease	Intf
-----	-----	-----	-----
2001:db8:4::/48	<LL 1/00A0DE113502>	infinite	FastEthernet 3/6.1

### Related Topics

- **show ipv6 dhcpv6-local binding** command

## Monitoring DHCPv6 Local Server DNS Search Lists

**Purpose** Display the DHCPv6 local servers DNS search list.

**Action** To display the DNS search list for DHCPv6 local servers:

```
host1#show ipv6 dhcpv6-local dns-domain-searchlist
Domain 1: xyzcorporation.net
Domain 2: xyzcorp.com
Domain 3: financeDomain.com
Domain 4: researchDomain.com
```

**Meaning** Table 118 lists the **show ipv6 dhcpv6-local dns-domain-searchlist** command output fields.

**Table 118: show ipv6 dhcpv6-local dns-domain-searchlist Output Fields**

Field Name	Field Description
Domain	Domains in the search list

### Related Topics

- **show ipv6 dhcpv6-local dns-domain-searchlist** command

## Monitoring DHCPv6 Local Server DNS Servers

**Purpose** Display a list of DNS servers configured on the DHCPv6 local server.

**Action** To display the list of DNS servers:

```
host1#show ipv6 dhcpv6-local dns-servers
DNS server 1: 2001:db8:18::
DNS server 2: 2001:db8:19::
DNS server 3: 2001:db8:20::
DNS server 4: 2001:db8:21::
```

**Meaning** Table 119 lists the `show ipv6 dhcpv6-local dns-servers` command output fields.

**Table 119: show ipv6 dhcpv6-local dns-servers Output Fields**

Field Name	Field Description
DNS server	IPv6 address of the DNS server

### Related Topics

- `show ipv6 dhcpv6-local dns-servers` command

## Monitoring DHCPv6 Local Server Prefix Lifetime

**Purpose** Display the DHCPv6 default prefix lifetime.

**Action** To display the DHCPv6 default prefix lifetime:

```
host1#show ipv6 dhcpv6-local prefix-lifetime
default prefix lifetime is 1 day, 12 hours, 30 minutes
```

**Meaning** Table 120 lists the `show ipv6 dhcpv6-local prefix-lifetime` command output fields.

**Table 120: show ipv6 dhcpv6-local prefix-lifetime Output Fields**

Field Name	Field Description
default prefix lifetime	Number of days, hours, and minutes

### Related Topics

- `show ipv6 dhcpv6-local prefix-lifetime` command

## Monitoring DHCPv6 Local Server Statistics

**Purpose** Display statistics for the DHCPv6 local server.

**Action** To display DHCPv6 local server statistics:

```
host1#show ipv6 dhcpv6-local statistics
```

```
DHCPv6 Local Server Statist
```

```
-----
      Item          Count
-----
memUsage           136
bindings            1
solicit rx          1
request(accept) rx  1
request(renew) rx   0
decline rx          0
release rx          0
inform rx           0
confirm rx          0
rebind rx           0
reconfigure tx      0
advertise tx        1
successful reply tx  1
failed reply tx      0
unknown msgs        0
bad msgs            0
```

**Meaning** Table 121 lists the `show ipv6 dhcpv6-local statistics` command output fields.

**Table 121: show ipv6 dhcpv6-local statistics Output Fields**

Field Name	Field Description
memUsage	Number of bytes of memory used by DHCPv6 local server
bindings	Number of leased IPv6 prefixes currently assigned
solicit rx	Number of DHCPv6 solicit messages received
request(accept) rx	Number of DHCPv6 request messages received
request(renew) rx	Number of DHCPv6 requests for renewal received
decline rx	Number of DHCPv6 decline messages received
release rx	Number of DHCPv6 release messages received
inform rx	Number of DHCPv6 information-request messages received
confirm rx	Number of DHCPv6 confirm messages received
rebind rx	Number of DHCPv6 rebind messages received
reconfigure tx	Number of DHCPv6 reconfigure messages transmitted
advertise tx	Number of DHCPv6 advertise messages transmitted
successful reply tx	Number of reply messages transmitted with success reply code
failed reply tx	Number of reply messages transmitted with reply codes other than success
unknown msgs	Unused field; always 0
bad msgs	Number of messages with errors received by the DHCPv6 local server

## Related Topics

- `show ipv6 dhcpv6-local statistics` command

## Monitoring Duplicate MAC Addresses Use By DHCP Local Server Clients

**Purpose** Display duplicate MAC addresses that are being used by DHCP local server clients. Optionally, display information for a specific duplicate MAC address.

**Action** To display information about a specific MAC address being used by multiple clients:

```
host1#show ip dhcp-local duplicate-clients 00-0D-61-7F-67-70
MAC    00-0D-61-7F-67-70
      Interface      Count      Time
      ATM 3/0.1      100        Sat Sept 17, 2005 06:00:51 UTC
      ATM 3/0.2      90         Sun Sept 18, 2005 09:00:00 UTC
```

**Meaning** Table 122 lists the `show ip dhcp-local duplicate-clients` command output fields.

**Table 122: show ip dhcp-local duplicate-clients Output Fields**

Field Name	Field Description
MAC	Duplicate MAC address
Interface	Interfaces used by the duplicate MAC address
Count	Number of times the duplicate MAC address has been detected
Time	Date and time the first duplication was detected

## Related Topics

- `show ip dhcp-local duplicate-clients` command

## Monitoring the Maximum Number of Available Leases

**Purpose** Display the maximum number of leases available for each VPI/VCI, VLAN, Ethernet subnetwork, or for a specific interface or subinterface.

**Action** To display the maximum number of leases available for each interface type:

```
host1(config)#show ip dhcp-local limits

*****
      DHCP Local Server Address Limits
      ATM Limit      - 5000
      VLAN Limit     - 2000
      Ethernet Limit - 1000
```

To display information about the maximum number of leases for a specific interface:

```
host1(config)#show ip dhcp-local limits interface atm 3/1
```

```

      Dhcp Local Interface Limits
      -----
Interface  Limit  Count  Denied  Total
-----
atm 3/1    300    127    5       29

```

To display information about the maximum number of leases on all interfaces:

```
host1(config)#show ip dhcp-local limits interface
```

```

      Dhcp Local Interface Limits
      -----
Interface  Limit  Count  Denied  Total
-----
fastEthernet0/0  200    0      0       0
atm 3/1        300    127    5       29
atm 4/2        5000   0      0       0
atm 5/1        5000   15     2       5

```

**Meaning** Table 123 lists the `show ip dhcp-local limits` command output fields.

**Table 123: show ip dhcp-local limits Output Fields**

Field Name	Field Description
ATM Limit	Number of leases available for each VPI/VCI
VLAN Limit	Number of leases available for each VLAN
Ethernet Limit	Number of leases available for each Ethernet subnet
Limit	Number of leases available to the specified interface or subinterface; indicates the configured value for the interface type unless a specific lease value is configured for the particular interface
Count	Number of active leases on the interface
Denied	Number of lease requests denied during the current denial period; this number is reset to zero (and the denial period restarted) when the number of active leases no longer exceeds the configured limit
Total Denied	Total number of lease requests denied on the interface since the interface became active

## Related Topics

- `show ip dhcp-local limits` command

## Monitoring Static IP Address and MAC Address Pairs Supplied by DHCP Local Server

**Purpose** Display the static IP address/MAC address pairs that the DHCP local server supplies in standalone mode.

**Action** To display information about static IP address/MAC address pairs:

```
host1#show ip dhcp-local reserved
Dhcp Reserved Addresses
-----
Pool      Address      Hardware
-----
cablemodem 10.44.44.100 12-34-12-34-12-34-00-00-00-00-00-00-00-00-00-00
cablemodem 10.44.44.101 22-33-22-33-22-33-00-00-00-00-00-00-00-00-00-00
```

**Meaning** Table 124 lists the `show ip dhcp-local reserved` command output fields.

**Table 124: show ip dhcp-local reserved Output Fields**

Field Name	Field Description
Pool	Name of pool in which the address is reserved
Address	IP address that is reserved
Hardware	Address for which the IP address is reserved

### Related Topics

- `show ip dhcp-local reserved` command

## Monitoring Status of DHCP Applications

**Purpose** Display which DHCP applications are configured whether they are active or inactive—displays the status of DHCP relay, DHCP relay proxy, DHCP local server, and DHCP external server.

**Action** To display the status of the configured DHCP applications:

```
host1#show dhcp summary
DHCP local-server configured and inactive
DHCP relay configured and active
```

**Meaning** Table 125 lists the `show dhcp summary` command output fields.

**Table 125: show dhcp summary Output Fields**

Field Name	Field Description
configured	Applications that are currently configured
active or inactive	Current status of the application

### Related Topics

- `show dhcp summary` command