DHCP Client on WAN Interfaces

Feature History for DHCP Client on WAN Interfaces

Release	Modification
12.2(8)T	This feature was introduced.
12.2(27)SBA	This feature was integrated into Cisco IOS Release 12.2(27)SBA.

Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at http://www.cisco.com/go/fn. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

This document describes the DHCP Client on WAN Interfaces feature in Cisco IOS Release 12.2(8)T and includes the following sections:

Feature Overview

The DHCP Client on WAN Interfaces feature extends the Dynamic Host Configuration Protocol (DHCP) to allow a DHCP client to acquire an IP address over PPP over ATM (PPPoA) and certain ATM interfaces. By using DHCP rather than the IP Control Protocol (IPCP), a DHCP client can acquire other useful information such as DNS addresses, the DNS default domain name, and the default route.

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The configuration of PPPoA and Classical IP and ARP over ATM already allows for a broadcast capability over the interface (using the **broadcast** keyword on the ATM interface). Most changes in this feature are directed at removing already existing restrictions on what types of interfaces are allowed to send out DHCP packets (previously, dialer interfaces have not been allowed). This feature also ensures that DHCP RELEASE messages are sent out the interface before a connection is allowed to be broken.

Benefits

DHCP is beneficial on WAN interfaces because it can be used to acquire information such as DNS server addresses, the DNS default domain name, and the default route.

Restrictions

This feature works with ATM point-to-point interfaces and will accept any encapsulation type. For ATM multipoint interfaces, this feature is only supported using the aal5snap encapsulation type combined with Inverse ARP. Inverse ARP, which builds an ATM map entry, is necessary to send unicast packets to the server (or relay agent) on the other end of the connection. Inverse ARP is only supported for the aal5snap encapsulation type.

For multipoint interfaces, an IP address can be acquired using other encapsulation types because broadcast packets are used. However, unicast packets to the other end will fail because there is no ATM map entry and thus DHCP renewals and releases also fail.

See the "Troubleshooting Tips" section of this document for more information.

Related Features and Technologies

- ATM
- DHCP Client

Related Documents

- *Cisco IOS IP Configuration Guide*, Release 12.2
- *Cisco IOS IP Command Reference, Vol 1 of 3: Addressing and Services*, Release 12.2
- *Cisco IOS Dial Technologies Configuration Guide*, Release 12.2
- *Cisco IOS Dial Technologies Command Reference*, Release 12.2
- *Cisco IOS Wide-Area Networking Configuration Guide*, Release 12.2
- *Cisco IOS Wide-Area Networking Command Reference*, Release 12.2

Supported Platforms

- Cisco 800 series
- Cisco 805
- Cisco 806

- Cisco 820
- Cisco 828
- Cisco 1720
- Cisco 1721
- Cisco 1750
- Cisco 1751
- Cisco 2420
- Cisco 2600 series
- Cisco 3620
- Cisco 3631
- Cisco 3640
- Cisco 3660
- Cisco 3725
- Cisco 3745
- Cisco 7100
- Cisco 7200 series
- Cisco 7500 series

Determining Platform Support Through Cisco Feature Navigator

Cisco IOS software is packaged in feature sets that support specific platforms. To get updated information regarding platform support for this feature, access Cisco Feature Navigator. Cisco Feature Navigator dynamically updates the list of supported platforms as new platform support is added for the feature.

Cisco Feature Navigator is a web-based tool that enables you to quickly determine which Cisco IOS software images support a specific set of features and which features are supported in a specific Cisco IOS image. You can search by feature or release. Under the release section, you can compare releases side by side to display both the features unique to each software release and the features in common.

To access Cisco Feature Navigator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to cco-locksmith@cisco.com. An automatic check will verify that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password will be e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions at http://www.cisco.com/register.

Cisco Feature Navigator is updated regularly when major Cisco IOS software releases and technology releases occur. For the most current information, go to the Cisco Feature Navigator home page at the following URL:

http://www.cisco.com/go/fn

Supported Standards, MIBs, and RFCs

Standards

None

MIBs

None

To obtain lists of supported MIBs by platform and Cisco IOS release, and to download MIB modules, go to the Cisco MIB website on Cisco.com at the following URL:

http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

RFCs

No new or modified RFCs are supported by this feature.

Configuration Tasks

This feature has no new configuration commands; however, the **ip address dhcp** interface configuration command can now be configured on PPPoA and certain ATM interfaces.

Troubleshooting Tips

- An ATM primary interface is always multipoint.
- An ATM subinterface can be multipoint or point-to-point.
- If you are using a point-to-point interface, the routing table determines when to send a packet to the interface and ATM map entries are not needed. Consequently, Inverse ARP, which builds ATM map entries, is not needed.
- If you are using a multipoint interface you must use Inverse ARP to discover the IP address of the other side of the connection.
- You can specify Inverse ARP through the **protocol ip inarp** interface configuration command. You must use the aal5snap encapsulation type when using Inverse ARP because it is the only encapsulation type that supports Inverse ARP.

Configuration Examples

This section provides the following configuration examples:

- ATM Primary Interface (Multipoint) Using aal5snap Encapsulation and Inverse ARP Example
- ATM Point-to-Point Subinterface Using aa15snap Encapsulation Example
- ATM Point-to-Point Subinterface Using aa15nlpid Encapsulation Example
- ATM Point-to-Point Subinterface Using aa15mux PPP Encapsulation Example

ATM Primary Interface (Multipoint) Using aal5snap Encapsulation and Inverse ARP Example

In the following example, the **protocol ip 255.255.255.255 broadcast** configuration is needed because there must be an ATM map entry to recognize the broadcast flag on the permanent virtual circuit (PVC). You can use any ATM map entry. The **protocol ip inarp** configuration is needed so the ATM Inverse ARP can operate on the interface such that the system on the other side can be pinged once an address is assigned by DHCP.

```
interface atm0
  ip address dhcp
  pvc 1/100
    encapsulation aal5snap
    broadcast
    protocol ip 255.255.255.255 broadcast
   protocol ip inarp
```

ATM Point-to-Point Subinterface Using aa15snap Encapsulation Example

The following example shows an ATM point-to-point subinterface configuration using aa15snap encapsulation:

```
interface atm0.1 point-to-point
  ip address dhcp
  pvc 1/100
    encapsulation aal5snap
    broadcast
```

ATM Point-to-Point Subinterface Using aa15nlpid Encapsulation Example

The following example shows an ATM point-to-point subinterface configuration using aa15nlpid encapsulation:

```
interface atm0.1 point-to-point
  ip address dhcp
  pvc 1/100
    encapsulation aal5nlpid
    broadcast
```

ATM Point-to-Point Subinterface Using aa15mux PPP Encapsulation Example

The following example shows an ATM point-to-point subinterface configuration using aa15mux PPP encapsulation:

```
interface atm0.1 point-to-point
  pvc 1/100
  encapsulation aal5mux ppp virtual-template1
  broadcast
!
interface virtual-template1
  ip address dhcp
```

Command Reference

This section documents the modified **ip address dhcp** command. All other commands used with this feature are documented in the Cisco IOS Release 12.2 command reference publications.

- **ip address dhcp**

ip address dhcp

To acquire an IP address on an interface from the Dynamic Host Configuration Protocol (DHCP), use the **ip address dhcp** command in interface configuration mode. To remove any address that was acquired, use the **no** form of this command.

ip address dhcp [**client-id** *interface-name*] [**hostname** *host-name*]

no ip address dhcp [**client-id** *interface-name*] [**hostname** *host-name*]

Syntax Description

client-id	(Optional) Specifies the client identifier. By default, the client identifier is an ASCII value. The **client-id** *interface-name* option sets the client identifier to the hexadecimal MAC address of the named interface.
interface-name	(Optional) The interface name from which the MAC address is taken.
hostname	(Optional) Specifies the host name.
host-name	(Optional) Name of the host to be placed in the DHCP option 12 field. This name need not be the same as the host name entered in global configuration mode.

Defaults

The host name is the globally configured host name of the router.
The client identifier is an ASCII value.

Command Modes

Interface configuration

Command History

Release	Modification
12.1(2)T	This command was introduced.
12.1(3)T	The **client-id** keyword and *interface-name* argument were added.
12.2(3)	The **hostname** keyword and *host-name* argument were added. The behavior of the **client-id** *interface-name* option changed. See the "Usage Guidelines" section for details.
12.2(8)T	The command was expanded for use on PPP over ATM (PPPoA) interfaces and certain ATM interfaces.
12.2(27)SBA	This command was integrated into Cisco IOS Release 12.2(27)SBA.

Usage Guidelines

Note Prior to Release 12.2(8)T, the **ip address dhcp** command could be used only on Ethernet interfaces.

The **ip address dhcp** command allows any interface to dynamically learn its IP address by using the DHCP protocol. It is especially useful on Ethernet interfaces that dynamically connect to an internet service provider (ISP). Once assigned a dynamic address, the interface can be used with the Port Address Translation (PAT) of Cisco IOS Network Address Translation (NAT) to provide Internet access to a privately addressed network attached to the router.

The **ip address dhcp** command also works with ATM point-to-point interfaces and will accept any encapsulation type. However, for ATM multipoint interfaces you must specify Inverse ARP via the **protocol ip inarp** interface configuration command and use only the aa15snap encapsulation type.

Some ISPs require that the DHCPDISCOVER message have a specific host name and client identifier that is the MAC address of the interface. The most typical usage of the **ip address dhcp client-id** *interface-name* **hostname** *host-name* command is when *interface-name* is the Ethernet interface where the command is configured and *host-name* is the host name provided by the ISP.

A client identifier (DHCP option 61) can be a hexadecimal or an ASCII value. By default, the client identifier is an ASCII value. The **client-id** *interface* option overrides the default and forces the use of the hexadecimal MAC address of the named interface.

Note Between Cisco IOS Releases 12.1(3)T and 12.2(3), the **client-id** optional keyword allowed the change of the fixed ASCII value for the client identifier. After Release 12.2(3), the optional **client-id** keyword forced the use of the hexadecimal MAC address of the named interface as the client identifier.

If a Cisco router is configured to obtain its IP address from a DHCP server, it sends a DHCPDISCOVER message to provide information about itself to the DHCP server on the network.

If you use the **ip address dhcp** command with or without any of the optional keywords, the DHCP option 12 field (host name option) is included in the DISCOVER message. By default, the host name specified in option 12 will be the globally configured host name of the router. However, you can use the **ip address dhcp hostname** *host-name* command to place a different name in the DHCP option 12 field than the globally configured host name of the router.

The **no ip address dhcp** command removes any IP address that was acquired, thus sending a DHCPRELEASE message.

You might need to experiment with different configurations to determine the one required by your DHCP server. Table 1 shows the possible configuration methods and the information placed in the DISCOVER message for each method.

Table 1 Configuration Method and Resulting Contents of the DISCOVER Message

Configuration Method	Contents of DISCOVER Messages
ip address dhcp	The DISCOVER message contains “cisco-*mac-address* -Eth1” in the client ID field. The *mac-address* is the MAC address of the Ethernet 1 interface and contains the default host name of the router in the option 12 field.
ip address dhcp hostname *host-name*	The DISCOVER message contains “cisco-*mac-address* -Eth1” in the client ID field. The *mac-address* is the MAC address of the Ethernet 1 interface, and contains *host-name* in the option 12 field.

Table 1 Configuration Method and Resulting Contents of the DISCOVER Message

Configuration Method	Contents of DISCOVER Messages
ip address dhcp client-id ethernet 1	The DISCOVER message contains the MAC address of the Ethernet 1 interface in the client ID field and contains the default host name of the router in the option 12 field.
ip address dhcp client-id ethernet 1 hostname *host-name*	The DISCOVER message contains the MAC address of the Ethernet 1 interface in the client ID field and contains *host-name* in the option 12 field.

Examples

In the examples that follow, the command **ip address dhcp** is entered for the Ethernet interface 1. The DISCOVER message sent by a router configured as shown in the following example would contain "cisco- *mac-address* -Eth1" in the client-ID field, and the value host1 in the option 12 field.

```
hostname host1
!
interface Ethernet 1
 ip address dhcp
```

The DISCOVER message sent by a router configured as shown in the following example would contain "cisco- *mac-address* -Eth1" in the client-ID field, and the value host2 in the option 12 field.

```
hostname host1
!
interface Ethernet 1
 ip address dhcp hostname host2
```

The DISCOVER message sent by a router configured as shown in the following example would contain the MAC address of the Ethernet 1 interface in the client-id field, and the value host1 in the option 12 field.

```
hostname host1
!
interface Ethernet 1
 ip address dhcp client-id Ethernet 1
```

The DISCOVER message sent by a router configured as shown in the following example would contain the MAC address of the Ethernet 1 interface in the client-id field, and the value host2 in the option 12 field.

```
hostname host1
!
interface Ethernet 1
 ip address dhcp client-id Ethernet 1 hostname host2
```

Related Commands

Command	Description
ip dhcp pool	Configures a DHCP address pool on a Cisco IOS DHCP Server and enters DHCP pool configuration mode.

Glossary

ATM—Asynchronous Transfer Mode.

DHCP—Dynamic Host Configuration Protocol.

INARP—Inverse ARP.

PPP—Point-to-Point Protocol.

PPPoA—Point-to-Point Protocol over ATM.
