



DHCP Client on WAN Interfaces

First Published: February 25, 2002

Last Updated: September 12, 2008

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.

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.

Finding Feature Information in This Module

Your Cisco IOS software release may not support all of the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. To reach links to specific feature documentation in this module and to see a list of the releases in which each feature is supported, use the “[Feature Information for DHCP Client on WAN Interfaces](#)” section on page 9.

Finding Support Information for Platforms and Cisco IOS and Catalyst OS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS and Catalyst OS software image support. To access Cisco Feature Navigator, go to <http://www.cisco.com/go/cfn>. An account on Cisco.com is not required.

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Restrictions for DHCP Client on WAN Interfaces

This feature works with ATM point-to-point interfaces and will accept any encapsulation type. For ATM multipoint interfaces, this feature is supported only using the aal5snap encapsulation type combined with Inverse ARP (InARP), 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. InARP is supported only 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.

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.

Information About DHCP Client on WAN Interfaces

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.

To configure the DHCP Client on WAN Interfaces feature, you should understand the following concept:

- [DHCP, page 2](#)

DHCP

DHCP is an Internet protocol for automating the configuration of computers that use TCP/IP. DHCP can be used to automatically assign IP addresses, to deliver TCP/IP stack configuration parameters such as the subnet mask and default router, and to provide other configuration information such as the addresses for printer, time and news servers.

Client computers configured to use DHCP for IP assignment do not need to have a statically assigned IP address. In addition, they generally do not need to have addresses configured for DNS servers or WINS servers, as these are also set by the DHCP server.

Dynamic addressing simplifies network administration because the software keeps track of IP addresses rather than requiring an administrator to manage the task. This means that a new computer can be added to a network without the need to manually assign it a unique IP address. Many ISPs use dynamic IP addressing for dial-up users.

How to Configure DHCP Client on WAN Interfaces

This section contains the following procedures:

- [Configuring an ATM Primary Interface \(Multipoint\) Using aal5snap Encapsulation and InARP, page 3](#)
- [Configuring an ATM Point-to-Point Subinterface Using aa15snap Encapsulation, page 3](#)
- [Configuring an ATM Point-to-Point Subinterface Using aa15nlpid Encapsulation, page 4](#)
- [Configuring an ATM Point-to-Point Subinterface Using aa15mux PPP Encapsulation, page 4](#)

Configuring an ATM Primary Interface (Multipoint) Using aal5snap Encapsulation and InARP

To configure an ATM primary interface (multipoint) using aal5snap encapsulation and InARP, perform the steps in this section.

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

Configuring an ATM Point-to-Point Subinterface Using aa15snap Encapsulation

To configure an ATM point-to-point subinterface using aa15snap encapsulation, perform the steps in this section.

```
interface atm0.1 point-to-point
  ip address dhcp
  pvc 1/100
    encapsulation aa15snap
    broadcast
```

Configuring an ATM Point-to-Point Subinterface Using aa15nlpid Encapsulation

To configure an ATM point-to-point subinterface using aa15nlpid encapsulation, perform the steps in this section.

```
interface atm0.1 point-to-point
 ip address dhcp
 pvc 1/100
  encapsulation aa15nlpid
  broadcast
```

Configuring an ATM Point-to-Point Subinterface Using aa15mux PPP Encapsulation

To configure an ATM point-to-point subinterface using aa15mux PPP encapsulation, perform the steps in this section.

```
interface atm0.1 point-to-point
 pvc 1/100
  encapsulation aa15mux ppp virtual-templ1
  broadcast
!
interface virtual-templ1
 ip address dhcp
```

Configuration Examples for DHCP Client on WAN Interfaces

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.

This section provides the following configuration examples:

- [Configuring an ATM Primary Interface \(Multipoint\) Using aal5snap Encapsulation and InARP: Example](#)
- [Configuring an ATM Point-to-Point Subinterface Using aa15snap Encapsulation: Example](#)
- [Configuring an ATM Point-to-Point Subinterface Using aa15nlpid Encapsulation: Example](#)
- [Configuring an ATM Point-to-Point Subinterface Using aa15mux PPP Encapsulation: Example](#)

Configuring an ATM Primary Interface (Multipoint) Using aal5snap Encapsulation and InARP: Example

The following example shows how to configure an ATM primary interface (multipoint) using aal5snap encapsulation and InARP.

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 InARP 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
```

Configuring an ATM Point-to-Point Subinterface Using aa15snap Encapsulation: Example

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

```
interface atm0.1 point-to-point
  ip address dhcp
  pvc 1/100
    encapsulation aa15snap
    broadcast
```

Configuring an ATM Point-to-Point Subinterface Using aa15nlpid Encapsulation: Example

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

```
interface atm0.1 point-to-point
  ip address dhcp
  pvc 1/100
    encapsulation aa15nlpid
    broadcast
```

Configuring an ATM Point-to-Point Subinterface Using aa15mux PPP Encapsulation: Example

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

```
interface atm0.1 point-to-point
  pvc 1/100
  encapsulation aa15mux ppp virtual-template1
  broadcast
!
interface virtual-template1
  ip address dhcp
```

Additional References

The following sections provide references related to the DHCP Client on WAN Interfaces feature.

Related Documents

Related Topic	Document Title
ATM configuration (including how to enable Inverse ARP on an ATM PVC)	Cisco IOS Asynchronous Transfer Mode Configuration Guide
ATM commands	Cisco IOS Asynchronous Transfer Mode Command Reference
DHCP client configuration	Cisco IOS IP Addressing Services Configuration Guide
DHCP client commands	Cisco IOS IP Addressing Services Command Reference
PPPoA configuration	Cisco IOS Dial Technologies Configuration Guide
PPPoA commands	Cisco IOS Dial Technologies Command Reference

Standards

Standard	Title
None	—

MIBs

MIB	MIBs Link
None	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
No new or modified RFCs are supported by this feature, and support for existing RFCs has not been modified by this feature.	—

Technical Assistance

Description	Link
<p>The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies.</p> <p>To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds.</p> <p>Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.</p>	<p>http://www.cisco.com/techsupport</p>

Command Reference

The following commands are introduced or modified in the feature or features documented in this module. For information about these commands, see the *Cisco IOS IP Addressing Services Command Reference* at http://www.cisco.com/en/US/docs/ios/ipaddr/command/reference/iad_book.html. For information about all Cisco IOS commands, use the Command Lookup Tool at <http://tools.cisco.com/Support/CLILookup> or a Cisco IOS master commands list.

- **ip address dhcp**

Feature Information for DHCP Client on WAN Interfaces

Table 1 lists the features in this module and provides links to specific configuration information. Only features that were introduced or modified in Cisco IOS Releases 12.2(1), 12.0(3)S, 12.2(33)SRA, 12.2(33)SXH, or later releases appear in the table.

Not all commands may be available in your Cisco IOS software release. For release information about a specific command, see the command reference documentation.

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which Cisco IOS and Catalyst OS software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to <http://www.cisco.com/go/cfn>. An account on Cisco.com is not required.



Note

Table 1 lists only the Cisco IOS software release that introduced support for a given feature in a given Cisco IOS software release train. Unless noted otherwise, subsequent releases of that Cisco IOS software release train also support that feature.

Table 1 Feature Information for DHCP Client on WAN Interfaces

Feature Name	Releases	Feature Information
DHCP Client on WAN Interfaces	12.2(8)T	<p>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.</p> <p>The following sections provide information about this feature:</p> <ul style="list-style-type: none"> • DHCP, page 2 • Configuring an ATM Primary Interface (Multipoint) Using aal5snap Encapsulation and InARP, page 3 • Configuring an ATM Point-to-Point Subinterface Using aa15snap Encapsulation, page 3 • Configuring an ATM Point-to-Point Subinterface Using aa15nlpid Encapsulation, page 4 • Configuring an ATM Point-to-Point Subinterface Using aa15mux PPP Encapsulation, page 4 <p>The following commands were introduced or modified: ip address dhcp.</p>

Glossary

ATM—Asynchronous Transfer Mode. The international standard for cell relay in which multiple service types (such as voice, video, or data) are conveyed in fixed-length (53-byte) cells. Fixed-length cells allow cell processing to occur in hardware, thereby reducing transit delays. ATM is designed to take advantage of high-speed transmission media, such as E3, SONET, and T3.

DHCP—Dynamic Host Configuration Protocol. Provides a mechanism for allocating IP addresses dynamically so that addresses can be reused when hosts no longer need them.

InARP—Inverse ARP (Address Resolution Protocol). Method of building dynamic routes in a network. Allows an access server to discover the network address of a device associated with a virtual circuit.

PPP—Point-to-Point Protocol. Successor to SLIP (Serial Line Internet Protocol) that provides router-to-router and host-to-network connections over synchronous and asynchronous circuits. Whereas SLIP was designed to work with IP, PPP was designed to work with several network layer protocols, such as IP, IPX (Internetwork Packet Exchange), and ARA (AppleTalk Remote Access). PPP also has built-in security mechanisms, such as CHAP (Challenge Handshake Authentication Protocol) and PAP (Password Authentication Protocol). PPP relies on two protocols: LCP (Link Control Protocol) and NCP (Network Control Protocol).

PPPoA—Point-to-Point Protocol over ATM. A network protocol for encapsulating PPP frames in ATM AAL5. It is used mainly with cable modem, DSL, and ADSL services.

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Any Internet Protocol (IP) addresses used in this document are not intended to be actual addresses. Any examples, command display output, and figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses in illustrative content is unintentional and coincidental.

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