Configurable DHCP Client

The Configurable DHCP Client feature provides the flexibility to include various configuration options for the Dynamic Host Configuration Protocol (DHCP) client. A DHCP client is defined as an Internet host using DHCP to obtain configuration parameters such as an IP address.

Feature History for the Configurable DHCP Client Feature

Release	Modification
12.3(2)XF	This feature was introduced.
12.3(8)T	This feature was integrated into Cisco IOS Release 12.3(8)T.
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.

Contents

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Information About Configurable DHCP Client

To configure the DHCP client, you must understand the following concepts:

- DHCP Client Operation, page 2
- Design of the Configurable DHCP Client Feature, page 2

DHCP Client Operation

DHCP provides a framework for passing configuration information to hosts on a TCP/IP network. A DHCP client is an Internet host using DHCP to obtain configuration parameters such as an IP address. Figure 1 shows the basic steps that occur when a DHCP client requests an IP address from a DHCP server. The client, Host A, sends a DHCPDISCOVER broadcast message to locate a DHCP server. A DHCP server offers configuration parameters (such as an IP address, a MAC address, a domain name, and a lease for the IP address) to the client in a DHCPOFFER unicast message.

Figure 1 **DHCP Request for an IP Address from a DHCP Server**
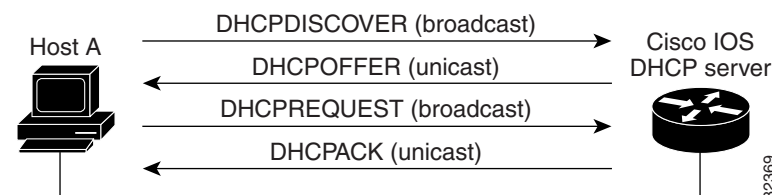
A DHCP client may receive offers from multiple DHCP servers and can accept any one of the offers; however, the client usually accepts the first offer it receives. Additionally, the offer from the DHCP server is not a guarantee that the IP address will be allocated to the client; however, the server usually reserves the address until the client has had a chance to formally request the address.

The client returns a formal request for the offered IP address to the DHCP server in a DHCPREQUEST broadcast message. The DHCP server confirms that the IP address has been allocated to the client by returning a DHCPACK unicast message to the client.

Design of the Configurable DHCP Client Feature

The Configurable DHCP Client feature allows a DHCP client to use a user-specified client identifier, class identifier, or suggested lease time when requesting an address from a DHCP server.

Configuration parameters and other control information are carried in tagged data items that are stored in the options field of the DHCP message. The Configurable DHCP Client feature provides flexibility by allowing the following options to be configured for a DHCP client:

- Option 12—This option specifies the name of the client. The name may or may not be qualified with the local domain.
- Option 51—This option is used in a client request (DHCPDISCOVER or DHCPREQUEST) to allow the client to request a lease time for the IP address.
- Option 55—This option allows the DHCP client to request certain options from the DHCP server. The **ip dhcp client request** command allows the system administrator to turn off some of the requested options, thus removing them from the request list.

- Option 60—This option allows the user to configure the vendor class identifier string to use in the DHCP interaction.

- Option 61—This option is used by DHCP clients to specify their unique identifier. DHCP servers use this value to index their database of address bindings. This value is expected to be unique for all clients in an administrative domain.

How to Configure the DHCP Client

This section contains the following procedure:

- Configuring the DHCP Client, page 3

Configuring the DHCP Client

Perform this task to configure the DHCP client.

Prerequisites

You must configure the **ip dhcp client** commands before entering the **ip address dhcp** command on an interface to ensure that the DHCPDISCOVER messages that are generated contain the correct option values. The **ip dhcp client** commands are checked only when an IP address is acquired from DHCP. If any of the **ip dhcp client** commands are entered after an IP address has been acquired from DHCP, it will not take effect until the next time the router acquires an IP address from DHCP. This means that the new configuration will only take effect after either the **ip address dhcp** command or the **release dhcp** and **renew dhcp** EXEC commands have been configured.

SUMMARY STEPS

1. **enable**

2. **configure terminal**

3. **interface** *type number*

4. **ip dhcp client client-id** {*interface-name* | **ascii** *string* | **hex** *string*}

5. **ip dhcp client class-id** {**ascii** *string* | **hex** *string*}

6. **ip dhcp client lease** *days* [*hours*] [*minutes*]

7. **ip dhcp client hostname** *host-name*

8. [**no**] **ip dhcp client request** *option-name*

9. **ip address dhcp**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** Router> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** Router# configure terminal	Enters global configuration mode.
Step 3	**interface** *type number* **Example:** Router(config)# interface Ethernet 1	Configures an interface type and enters interface configuration mode.
Step 4	**ip dhcp client client-id** {*interface-name* | **ascii** *string* | **hex** *string*} **Example:** Router(config-if)# ip dhcp client client-id ascii mytest1	Specifies the client identifier. • When you specify the **no** form of this command, the configuration is removed and the system returns to using the default form. It is not possible to configure the system to not include a client identifier.
Step 5	**ip dhcp client class-id** {**ascii** *string* | **hex** *string*} **Example:** Router(config-if)# ip dhcp client class-id ascii my-class-id	Specifies the class identifier.
Step 6	**ip dhcp client lease** *days* [*hours*] [*minutes*] **Example:** Router(config-if)# ip dhcp client lease 2	Configures the duration of the lease for an IP address that is requested from a DHCP client to a DHCP server.
Step 7	**ip dhcp client hostname** *host-name* **Example:** Router(config-if)# ip dhcp client hostname router1	Specifies or modifies the host name sent in the DHCP message.

	Command or Action	Purpose

Step 8	[**no**] **ip dhcp client request** *option-name*
	
	Example:
	`Router(config-if)# no ip dhcp client request`
	`tftp-server-address`
		Configures a DHCP client to request an option from a DHCP server.
		
		• The option name can be **tftp-server-address**, **netbios-nameserver**, **vendor-specific**, **static-route**, **domain-name**, **dns-nameserver**, or **router**. By default, all these options are requested. The **no** form of the command instructs the system to not request certain options.

Step 9	**ip address dhcp** **Example:** `Router(config-if)# ip address dhcp`	Acquires an IP address on an interface from DHCP.

Troubleshooting Tips

To verify the configuration, you can use the **debug dhcp detail** EXEC command to display the DHCP packets that were sent and received. To display the server side of the DHCP interaction, use the **debug ip dhcp server packets** command.

Configuration Examples for the Configurable DHCP Client

This section provides the following configuration example:

•

Configurable DHCP Client: Example

The following example shows how to configure the DHCP client with various options on Ethernet interface 1:

```
interface Ethernet 1
 ip dhcp client client-id ascii my-test1
 ip dhcp client class-id ascii my-class-id
 ip dhcp client lease 0 1 0
 ip dhcp client hostname sanfran
 no ip dhcp client request tftp-server-address
 ip address dhcp
```

Additional References

The following sections provide references related to the Configurable DHCP Client feature.

Related Documents

Related Topic	Document Title
DHCP commands	*Cisco IOS IP Command Reference, Volume 1 of 4: Addressing and Services*, Release 12.3 T
DHCP configuration tasks	*Cisco IOS IP Configuration Guide*

Standards

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

MIBs

MIBs	MIBs Link
No new or modified MIBs are supported by this feature, and support for existing MIBs has not been modified by this feature.	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

RFCs	Title
RFC 2131	*Dynamic Host Configuration Protocol*
RFC 2132	*DHCP Options and BOOTP Vendor Extensions*

Technical Assistance

Description	Link
Technical Assistance Center (TAC) home page, containing 30,000 pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.	http://www.cisco.com/public/support/tac/home.shtml

Command Reference

This section documents modified commands. All other commands used with this feature are documented in the Cisco IOS Release 12.3 T command reference publications.

- **ip address dhcp**
- **ip dhcp client class-id**
- **ip dhcp client client-id**
- **ip dhcp client hostname**
- **ip dhcp client lease**
- **ip dhcp client request**

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 hostname.
	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 hostname entered in global configuration mode.

Defaults

The hostname is the globally configured hostname 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 Address Resolution Protocol 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 hostname 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 hostname 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.

Use of the ip address dhcp always results in the DHCP option 12 field (hostname option) being included in the DISCOVER message. By default, the hostname specified in option 12 will be the globally configured hostname 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 hostname 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 hostname 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 hostname 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 site 1 in the option 12 field:

```
hostname site 1
!
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 site 2 in the option 12 field:

```
hostname site 1
!
interface Ethernet 1
 ip address dhcp hostname site 2
```

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 site 1 in the option 12 field:

```
hostname site 1
!
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 site 2 in the option 12 field:

```
hostname site 1
!
interface Ethernet 1
 ip address dhcp client-id Ethernet 1 hostname site 2
```

Related Commands

Command	Description
ip dhcp pool	Configures a DHCP address pool on a Cisco IOS DHCP and enters DHCP pool configuration mode.
protocol ip inarp	Ensures that the mapping gets done automatically.

ip dhcp client class-id

To specify the class identifier, use the **ip dhcp client class-id** command in interface configuration mode. To remove the class identifier, use the **no** form of this command.

> **ip dhcp client class-id** {**ascii** *string* | **hex** *string*}

> **no ip dhcp client class-id** {**ascii** *string* | **hex** *string*}

Syntax Description

ascii *string*	A unique ASCII string.
hex *string*	A unique hexadecimal value.

Defaults　　　　No class identifier is specified.

Command Modes　　　Interface configuration

Command History

Release	Modification
12.3(2)XF	This command was introduced.
12.3(8)T	This command was integrated into Cisco IOS Release 12.3(8)T.
12.2(27)SBA	This command was integrated into Cisco IOS Release 12.2(27)SBA.

Usage Guidelines　　The **ip dhcp client class-id** command is checked only when an IP address is acquired from DHCP. If the command is issued after an IP address has been acquired from DHCP, it will not take effect until the next time the router acquires an IP address from DHCP. This means that the new configuration will take effect only after either the **ip address dhcp** command or the **release dhcp** and **renew dhcp** EXEC commands have been configured.

The class identifier is used by vendors to specify the type of device that is requesting an IP address. For example, docsis 1.0 can be used for a cable modem and Cisco Systems, Inc. IP Phone can be used for a Cisco IP phone.

Examples　　　　The following example configures a class identifier with a hexadecimal string of ABCDEF1235:

```
interface Ethernet 1
 ip dhcp client class-id hex ABCDEF1235
```

Related Commands

Command	Description
ip address dhcp	Acquires an IP address on an interface from DHCP.
release dhcp	Performs an immediate release of a DHCP lease for an interface.
renew dhcp	Performs an immediate renewal of a DHCP lease for an interface.

ip dhcp client client-id

To specify a client identifier and override the default client identifier, use the **ip dhcp client client-id** command in interface configuration mode. To remove the overriding of the client identifier and return to the default form, use the **no** form of this command.

ip dhcp client client-id {*interface-name* | **ascii** *string* | **hex** *string*}

no ip dhcp client client-id {*interface-name* | **ascii** *string* | **hex** *string*}

Syntax Description

interface-name	The interface name from which the MAC address is taken.
ascii *string*	A unique ASCII string. The default value is cisco-*mac-name* where *mac* is the MAC address of the interface and *name* is the short form of the interface name.
hex *string*	A unique hexadecimal value.

Defaults

The client identifier is an ASCII value in the form cisco-*mac-name* where *mac* is the MAC address of the interface and *name* is the short form of the interface name.

Command Modes

Interface configuration

Command History

Release	Modification
12.3(2)XF	This command was introduced.
12.3(8)T	This command was integrated into Cisco IOS Release 12.3(8)T.
12.2(27)SBA	This command was integrated into Cisco IOS Release 12.2(27)SBA.

Usage Guidelines

The **ip dhcp client client-id** command is checked only when an IP address is acquired from DHCP. If the command is issued after an IP address has been acquired from DHCP, it will not take effect until the next time the router acquires an IP address from DHCP. This means that the new configuration will only take effect after either the **ip address dhcp** command or the **release dhcp** and **renew dhcp** EXEC commands have been configured.

When you specify the **no** form of this command, the configuration is removed and the system returns to using the default form. It is not possible to configure the system to not include a client identifier.

Examples

The following example shows how to configure a client identifier named test-client-id:

```
interface Ethernet 1
 ip dhcp client client-id ascii test-client-id
```

Related Commands	Command	Description
	ip address dhcp	Acquires an IP address on an interface from DHCP.
	release dhcp	Performs an immediate release of a DHCP lease for an interface.
	renew dhcp	Performs an immediate renewal of a DHCP lease for an interface.

ip dhcp client hostname

To specify or modify the hostname sent in the Dynamic Host Control Protocol message, use the **ip dhcp client hostname** command in interface configuration mode. To remove the hostname, use the **no** form of this command.

ip dhcp client hostname *host-name*

no ip dhcp client hostname *host-name*

Syntax Description

host-name	Name of the host.

Defaults

The hostname is the globally configured hostname of the router.

Command Modes

Interface configuration

Command History

Release	Modification
12.3(2)XF	This command was introduced.
12.3(8)T	This command was integrated into Cisco IOS Release 12.3(8)T.
12.2(27)SBA	This command was integrated into Cisco IOS Release 12.2(27)SBA.

Usage Guidelines

The **ip dhcp client hostname** command is checked only when an IP address is acquired from DHCP. If the command is issued after an IP address has been acquired from DHCP, it will not take effect until the next time the router acquires an IP address from DHCP. This means that the new configuration will take effect only after either the **ip address dhcp** command or the **release dhcp** and **renew dhcp** EXEC commands have been configured.

Examples

The following example specifies the hostname of the DHCP client to hostA:

```
interface Ethernet 1
 ip dhcp client hostname hostA
```

Related Commands

Command	Description
ip address dhcp	Acquires an IP address on an interface from DHCP.
release dhcp	Performs an immediate release of a DHCP lease for an interface.
renew dhcp	Performs an immediate renewal of a DHCP lease for an interface.

ip dhcp client lease

To configure the duration of the lease for an IP address that is requested from a Dynamic Host Control Protocol client to a DHCP server, use the **ip dhcp client lease** command in interface configuration mode. To disable the client time limit and use the server settings, use the no form of this command.

    ip dhcp client lease *days* [*hours*] [*minutes*]

    no ip dhcp client lease

Syntax Description

days	Specifies the duration of the lease in days.
hours	(Optional) Specifies the number of hours in the lease. A *days* value must be supplied before you can configure an *hours* value.
minutes	(Optional) Specifies the number of minutes in the lease. A *days* value and an *hours* value must be supplied before you can configure a *minutes* value.

Defaults

A default lease time is not included in the DHCP DISCOVER messages sent by the client. The client accepts the lease time that the DHCP server sends.

Command Modes

Interface configuration

Command History

Release	Modification
12.3(2)XF	This command was introduced.
12.3(8)T	This command was integrated into Cisco IOS Release 12.3(8)T.
12.2(27)SBA	This command was integrated into Cisco IOS Release 12.2(27)SBA.

Usage Guidelines

The **ip dhcp client lease** command is checked only when an IP address is acquired from DHCP. If the command is issued after an IP address has been acquired from DHCP, it will not take effect until the next time the router acquires an IP address from DHCP. This means that the new configuration will take effect only after either the **ip address dhcp** command or the **release dhcp** and **renew dhcp** EXEC commands have been configured.

Examples

The following example shows a one-day lease:

```
ip dhcp client lease 1
```

The following example shows a one-hour lease:

```
ip dhcp client lease 0 1
```

The following example shows a one-minute lease:

```
ip dhcp client lease 0 0 1
```

Related Commands	Command	Description
	ip address dhcp	Acquires an IP address on an interface from DHCP.
	lease	Configures the duration of the lease for an IP address that is assigned from a DHCP server to a DHCP client.
	release dhcp	Performs an immediate release of a DHCP lease for an interface.
	renew dhcp	Performs an immediate renewal of a DHCP lease for an interface.

ip dhcp client request

To configure a Dynamic Host Configuration Protocfol client to request an option from a DHCP server, use the **ip dhcp client request** command in interface configuration mode. To remove the request for an option, use the **no** form of this command.

ip dhcp client request *option-name*

no ip dhcp client request *option-name*

Syntax Description

option-name	The option name can be one of the keywords **tftp-server-address**, **netbios-nameserver**, **vendor-specific**, **static-route**, **domain-name**, **dns-nameserver**, or **router**. By default, all these options are requested.

Defaults

All of the options are requested.

Command Modes

Interface configuration

Command History

Release	Modification
12.3(2)XF	This command was introduced.
12.3(8)T	This command was integrated into Cisco IOS Release 12.3(8)T.
12.2(27)SBA	This command was integrated into Cisco IOS Release 12.2(27)SBA.

Usage Guidelines

Because all options are requested, the usual form of the command is the **no** form. The options specified by the **no** form are removed from the DHCP originated address for the interface.

You can reinsert an option in the list of options requested by using the same command without the **no** keyword. Multiple options can be specified on one configuration line. However, each option will appear on a separate line in the running configuration.

The **ip dhcp client request** command is checked only when an IP address is acquired from DHCP. If the command is issued after an IP address has been acquired from DHCP, it will not take effect until the next time the router acquires an IP address from DHCP. This means that the new configuration will take effect only after either the **ip address dhcp** command or the **release dhcp** and **renew dhcp** EXEC commands have been configured.

Examples

The following example shows how to configure the DHCP client to remove the domain name server from the options requested from the DHCP server:

```
no ip dhcp client request dns-nameserver
```

Related Commands

Command	Description
ip address dhcp	Acquires an IP address on an interface from DHCP.
release dhcp	Performs an immediate release of a DHCP lease for an interface.
renew dhcp	Performs an immediate renewal of a DHCP lease for an interface.