

Contents

1 Configuring DHCP Client.....	1
1.1 Introduction.....	1
1.1.1 Overview.....	1
1.1.2 Principles.....	1
1.1.3 Protocols and Standards.....	2
1.2 Enabling DHCP Client Function.....	2
1.2.1 Overview.....	2
1.2.2 Restrictions and Guidelines.....	2
1.2.3 Procedure.....	2
1.3 Monitoring.....	2
1.4 Configuration Examples.....	3
1.4.1 Enabling DHCP Client Function.....	3

1 Configuring DHCP Client

1.1 Introduction

1.1.1 Overview

Dynamic Host Configuration Protocol (DHCP) is a local area network (LAN) protocol based on the User Datagram Protocol (UDP) for dynamically assigning reusable network resources over port 68, for example, IP addresses.

The DHCP works in client/server mode. A DHCP client sends a request message to a DHCP server to obtain an IP address and other configurations. When a DHCP client and a DHCP server are not in the same subnet, they need a DHCP relay agent to forward DHCP request and reply messages.

1.1.2 Principles

1. DHCP client

A DHCP client enables a device to automatically obtain an IP address and other configurations from a DHCP server.

For details about interaction between the DHCP client and server, see *Configuring DHCP*.

2. Lease renewal

Generally, a dynamic IP address assigned from a DHCP server to a DHCP client has a lease period (one day by default). After the lease period expires, the DHCP server will reclaim this IP address. If the DHCP client wants to continue to use this IP address, it automatically sends a DHCP REQUEST packet to the DHCP server at half of the lease period to renew the lease. If this IP address is valid, the DHCP server returns a DHCP ACK packet to inform the DHCP client that it has obtained a new IP address lease.

If the lease renewal operation performed at half of the lease period fails (for example, the DHCP server does not make a response), the DHCP client broadcasts another DHCP REQUEST packet at 7/8 of the lease period to renew the lease. The DHCP server renews the lease in the same way.

3. Network reconnection

When a DHCP client reconnects to the network after it goes offline, it does not need to send a DHCP DISCOVER packet but only broadcasts a DHCP REQUEST packet that carries the previously assigned IP address.

After receiving the DHCP REQUEST packet, the DHCP server returns a DHCP ACK packet to inform the DHCP client that it can continue to use the original IP address if this IP address is not assigned. If the original IP address has been assigned to another client, the DHCP server returns a DHCP NAK packet. Upon receiving the DHCP NAK packet, the DHCP client needs to re-send a DHCP DISCOVER packet to apply for a new IP address.

4. Lease release

When a DHCP client no longer needs to use the assigned IP address, it can send a DHCP RELEASE packet to inform the DHCP server, for the DHCP server to release the DHCP lease and reclaim the IP address. The

DHCP server saves the configuration information of the DHCP client temporarily for reuse in next IP address application by the DHCP client.

1.1.3 Protocols and Standards

- RFC 2131: Dynamic Host Configuration Protocol
- RFC 2132: DHCP Options and BOOTP Vendor Extensions
- RFC 3046: DHCP Relay Agent Information Option
- RFC 1542: Clarifications and Extensions for the Bootstrap Protocol

1.2 Enabling DHCP Client Function

1.2.1 Overview

After the DHCP Client function is enabled on a device, the device can dynamically obtain IP addresses and other configurations, such as the default gateway and Domain Name System (DNS) server.

1.2.2 Restrictions and Guidelines

The device supports DHCP client configurations on Ethernet, Frame Relay (FR), Point-to-Point Protocol (PPP), and High-Level Data Link Control (HDLC) interfaces.

1.2.3 Procedure

(1) Enter the privileged EXEC mode.

enable

(2) Enter the global configuration mode.

configure terminal

(3) Enter the interface configuration mode.

interface *interface-type interface-number*

(4) Enable the DHCP Client function on an interface.

ip address dhcp

No interface can obtain an IP address through DHCP by default.

1.3 Monitoring

Run the **show** commands to check the running status of a configured function to verify the configuration effect.

Run the **debug** commands to output debugging information.

Caution

The output debugging information occupies system resources. Therefore, disable the debugging function immediately after use.

Table 1-1 Monitoring

Command	Purpose
show dhcp lease	Displays lease information of a DHCP client.
debug ip dhcp client	Debugs DHCP packets.

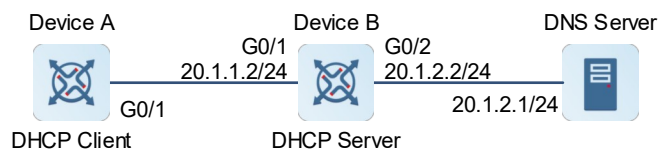
1.4 Configuration Examples

1.4.1 Enabling DHCP Client Function

1. Requirements

As shown in [Figure 1-1](#), GigabitEthernet 0/1 on Device A uses DHCP to obtain an IP address and DNS server address 20.1.1.1/24 from Device B (DHCP server).

2. Topology

Figure 1-1 DHCP Client Function

3. Notes

- Enable the DHCP Client function on GigabitEthernet 0/1 of Device A.
- Enable the DHCP Server function on Device B and configure address pool parameters as required.

4. Procedure

(1) Configure Device A:

Enable the DHCP Client service on GigabitEthernet 0/1.

```
DeviceA> enable
DeviceA# configure terminal
DeviceA(config)# interface gigabitethernet 0/1
DeviceA(config-if-GigabitEthernet 0/1)# ip address dhcp
```

(2) Configure Device B:

Enable the DHCP Server service.

```
DeviceB> enable
DeviceB# configure terminal
DeviceB(config)# service dhcp
```

Configure the interface IP address used to connect to the DHCP client.

```
DeviceB(config)# interface gigabitethernet 0/1
DeviceB(config-if-GigabitEthernet 0/1)# ip address 20.1.1.2 255.255.255.0
```

```
DeviceB(config-if-GigabitEthernet 0/1)# exit
```

Configure the interface IP address used to connect to the DNS server.

```
DeviceB(config)# interface gigabitethernet 0/2
DeviceB(config-if-GigabitEthernet 0/2)# ip address 20.1.2.2 255.255.255.0
DeviceB(config-if-GigabitEthernet 0/2)# exit
```

Configure a dynamic address pool.

```
DeviceB(config)# ip dhcp pool User
DeviceB(dhcp-config)# network 20.1.1.0 255.255.255.0
DeviceB(dhcp-config)# dns-server 20.1.2.1
DeviceB(dhcp-config)# exit
```

Configure excluded IP addresses.

```
DeviceB(config)# ip dhcp excluded-address 20.1.1.2
```

(3) Configure the DNS server:

Set the DNS server IP address to 20.1.2.1/24. (Omitted)

5. Verification

Run the **show dhcp lease** command on Device B to display the IP address information obtained from an interface.

```
DeviceB# show dhcp lease
Temp IP addr: 20.1.1.1 for peer on Interface: GigabitEthernet 0/1
Temp sub net mask: 255.255.255.0
  DHCP Lease server: 20.1.1.2, state: 7 Bound
  DHCP transaction id: ca811331
  Lease: 14400 secs, Renewal: 7200 secs, Rebind: 12600 secs
  Next timer fires after: 4916 secs
  Retry count: 0 Client-ID: 0158696cc59347
```

Run the **show hosts** command on Device A to display DNS server information obtained from an interface.

```
DeviceA# show hosts
Name servers are:
20.1.2.1 dynamic from DHCP
Host                                     type      Address                               TTL(sec)
```

6. Configuration Files

- Device A configuration file

```
hostname DeviceA
!
interface gigabitethernet 0/1
ip address dhcp
!
```

- Device B configuration file

```
hostname DeviceB
!
service dhcp
```

```
ip dhcp excluded-address 20.1.1.2
!  
interface gigabitethernet 0/1  
ip address 20.1.1.2 255.255.255.0  
!  
interface gigabitethernet 0/2  
ip address 20.1.2.2 255.255.255.0  
!  
ip dhcp pool User  
network 20.1.1.0 255.255.255.0  
dns-server 20.1.2.1  
!
```