DHCP Configuration

Table of Contents

Chapter 1   Configuring DHCP

1.1   DHCP Overview

Dynamic Host Configuration Protocol (DHCP) is used to provide some network configuration parameters for the hosts on the Internet, which is described in details in RFC 2131. One of the major functions of DHCP on OLT is to distribute IPs on an interface. DHCP supports the following three IP distribution mechanism:

- Automatic – The DHCP server automatically distributes an everlasting IP for a certain client to use it.

- Dynamic – The DHCP server distributes an IP for a client to use it for a fixed time or until the client forsakes the IP.

- Manual – The administrator of the DHCP server manually specifies an IP and sends it to a client through DHCP.

1.1.1   DHCP Application

DHCP can be applied at the following cases:

- If you want to distribute an IP address, network segment and related resources (e.g. the corresponding gateway) to an Ethernet interface, you can realize it through the settings of DHCP client.

- When an interface of OLT connects A at the peer terminal through PPP and another interface of OLT can access the DHCP server, you can obtain an IP from the DHCP server through DHCP and then distribute the IP to device A through IPCP.

1.1.2   Advantages of DHCP

DHCP has the following strong points:

- Fastening the settings;

- Reducing configuration errors;

- Controlling IP addresses of some interfaces of OLT through the DHCP server

1.1.3   DHCP Terms

DHCP is based on the server/client mode. So the DHCP server and the DHCP client must exist at the same time:

- DHCP-server – It releases or withdraws DHCP-related resources.

- DHCP client – It obtains IP from the DHCP server and apply the IP on the local system.

In a word, there exists lease time during the process of dynamic DHCP distribution:

- Lease time – it means the effective period of an IP, which starts from the distribution. After the lease time, the DHCP server withdraws the IP. To continue to use this IP, the DHCP client needs to apply it again.

1.2 Configuring DHCP Client

1.2.1 Configuration Task List of DHCP Client

- Obtaining an IP for an Ethernet Interface
- Designating an Address for the DHCP Server
- Setting the Parameters of DHCP
- Obtaining an IP from the DHCP Server for PPP Communication
- Monitoring DHCP

1.2.2 DHCP Client Configuration Tasks

a. Obtaining an IP for an Ethernet interface

Run the following command on the Ethernet interface to obtain an IP for an Ethernet interface of OLT through DHCP:

Command	Remarks
ip address dhcp	Sets the IP address of an Ethernet interface through DHCP.

b. Designating an address for the DHCP server

If knowing the addresses of some DHCP servers, you can specify these servers' addresses on OLT so as to reduce the time of protocol processing. You can run the following command in global mode:

Command	Remarks
ip dhcp-server *ip-address*	Specifies the IP address of the DHCP server.

This command is optional when it is used to obtain an IP for an Ethernet interface.

c. Setting the parameters of DHCP

To adjust the parameters of DHCP communication according to actual requirements, run the following commands in global mode:

Command	Remarks
ip dhcp client minlease *seconds*	Specifies the acceptable minimum lease time.
ip dhcp client retransmit *count*	Specifies the retransmission times for DHCP packet.
ip dhcp client select *seconds*	Specifies the processing time of SELECT.

The above-mentioned commands are optional when they are used to obtain an IP for an Ethernet interface.

d. Obtaining an IP from the DHCP server for PPP communication

For the example of this solution, please refer to section "*PPP Configuration*."

e. Monitoring DHCP

To browse related information of the DHCP server, which is discovered by OLT currently, run the following command in EXEC mode:

Command	Remarks
show dhcp server	Displays related information about the DHCP server, which is known by OLT.

To browse which IP address is currently used by OLT, run the following command in EXEC mode:

Command	Remarks
show dhcp lease	Displays IP resources, which are currently used by OLT, and related information.

Additionally, if you use DHCP to distribute an IP for an Ethernet interface, you can also run show interface to browse whether the IP address required by the Ethernet interface is successfully acquired.

1.2.3   Configuration Example of DHCP Client

a. Example of obtaining an IP for an Ethernet interface

The following example shows how to distribute an IP for Ethernet interface 1/1 through DHCP.

```
!
interface vlan1
 ip address dhcp
```

1.3   Configuring DHCP Server

1.3.1   Configuration Task List of DHCP Client

- Enabling the DHCP server
- Setting the ICMP checkup parameter
- Setting the database storage parameter
- Setting the address pool of DHCP server
- Setting the parameter of the address pool of DHCP server
- Monitoring DHCP server
- Clearing DHCP server's information

1.3.2   DHCP Configuration Tasks

a. Enabling the DHCP server

To enable the DHCP server and distribute IP addresses for DHCP client, run the following commands in global mode (thereupon, the DHCP server also supports the relay operation; As to those IPs that the DHCP server cannot distribute, the interface on which IP helper-address is configured will forward the DHCP request)

Command	Remarks

ip dhcpd enable	Enables the DHCP server.
no ip dhcpd enable	Disables the DHCP server.

b. Setting the ICMP checkup parameter

You can adjust the parameters of ICMP packet transmission according to actual requirements when the DHCP server is checking addresses.

To set the number of ICMP packets to be sent, run the following command in global mode:

Command	Remarks
ip dhcpd ping packets *pkgs*	Sets how many ICMP packets to be sent during address checkup.

To set the timeout time of ICMP response, run the following command in global mode:

Command	Remarks
ip dhcpd ping timeout *timeout*	Sets the timeout time of ICMP response.

c. Setting a parameter to clear the "Abandoned" mark

To set the interval of clearing the "Abandoned" mark, run the following command in global mode:

Command	Remarks
ip dhcpd abandon-time *time*	Sets the interface of clearing the "Abandoned" mark.

d. Setting the database storage parameter

To set the interval of storing the address distribution information to the agent database, run the following command in global mode:

Command	Remarks
ip dhcpd write-time *time*	Sets the interval for storing the address distribution information to the database agent.

e. Setting the address pool of DHCP server

To add the address pool of DHCP server, run the following command in global mode:

Command	Remarks
Ip dhcpd pool *name*	Adds the address pool of DHCP server and enters the configuration mode of the DHCP address pool.

f. Setting the parameter of the address pool of DHCP server

In the configuration mode of DHCP address pool, you can run the following commands to set related parameters.

To set the network address of the address pool of automatic distribution, run the following command:

Command	Remarks

network ip-addr netsubnet	Sets the network address of the address pool of automatic distribution.

To set the address range of automatic distribution, run the following command:

Command	Remarks
range *low-addr high-addr*	Sets the address range of automatic distribution.

To set the default route, which is distributed by the client, run the following command:

Command	Remarks
default-router *ip-addr* …	Sets the default route that is distributed to the client.

To set the address of DNS server, which is distributed to the client, run the following command:

Command	Remarks
dns-server *ip-addr* ...	Sets the address of DNS server, which is distributed to the client.

To set a domain name, which is distributed to the client, run the following command:

Command	Remarks
domain-name *name*	Sets a domain name, which is distributed to the client.

To set the time limitation of the address, which is distributed to the client, run the following command:

Command	Remarks
lease {*days* [*hours*][*minutes*] | *infinite* }	Sets the time limitation of the address, which is distributed to the client.

To set the address of the netbios name server, which is distributed to the client, run the following command:

Command	Remarks
netbios-name-server *ip-addr*...	Sets the address of the netbios name server, which is distributed to the client.

This command is used to configure the host name which is distributed to the client.

Command	Remarks
host *ip-addr netmask*	Sets the host's address of the address pool of automatic distribution.

To set the hardware address which is used to match up the client, run the following command:

Command	Remarks
hardware-address *hardware-address{ type}*	Matches the hardware address for matching up the client.

To set the client ID that is used to match up the client, run the following command:

Command	Remarks
client-identifier *unique-identifier*	Matches the ID of the client.

This command is used to configure the host name which is distributed to the client.

Command	Remarks
client-name *name*	Sets the host name, which is distributed to the client manually.

g. Monitoring DHCP server

To browse the current address distribution information of DHCP server, run the following command in EXEC mode:

Command	Remarks
show ip dhcpd binding	Displays the current address distribution information of DHCP server.

To browse the current packet statistics of DHCP server, run the following command in EXEC mode:

Command	Remarks
show ip dhcpd statistic	Displays the current packet statistics of DHCP server.

To browse the statistics of the address pool of DHCP server, run the following command in EXEC mode:

Command	Remarks
show ip dhcpd pool	Displays the statistics of the address pool of DHCP server.

h. Clearing DHCP server's information

To delete the current address distribution information of DHCP server, run the following command in EXEC mode:

Command	Remarks
clear ip dhcpd binding {*ip-addr*|*}	Deletes the specified address distribution information.

To delete the current packet statistics of DHCP server, run the following command in EXEC mode:

Command	Remarks
clear ip dhcpd statistic	Deletes the current packet statistics of DHCP server.

To deletes all configured **abandoned** marks, run the following command in EXEC mode:

Command	Remarks
clear ip dhcpd abandoned	Deletes the **abandoned** marks.

1.3.3 Configuration Example of DHCP Server

The following example shows how to set the timeout time of ICMP checkup packet to 200ms, the address pool to 1 and enable the DHCP server's service.

```
ip dhcpd ping timeout 2
ip dhcpd pool 1
 network 192.168.20.0 255.255.255.0
```

```
range 192.168.20.211 192.168.20.215
domain-name my315
default-router 192.168.20.1
dns-server 192.168.1.3 61.2.2.10
netbios-name-server 192.168.20.1
lease 1 12 0
!
ip dhcpd enable
```

1.4   Configuring DHCP Relay

1.4.1   Configuration Task List of DHCP Relay

- Enabling DHCP relay
- Disabling DHCP relay
- Setting the parameters of DHCP relay

1.4.2   DHCP Relay Configuration Tasks

a.   Enabling DHCP relay

If you want to enable DHCP relay on OLT, please enable DHCP server first. For details, please refer to section "*Enabling the DHCP Server.*"

b.   Disabling DHCP relay

If you want to disable DHCP relay on OLT, please disable the DHCP server first. For details, please refer to section "*Disabling the DHCP Server.*"

c.   Setting the parameters of DHCP relay

You can modify the destination address of DHCP relay according to requirements. The relay function of the DHCP packet is same in the mechanism of "Forwarding the UDP broadcast packet". You can refer to the command, ip forward-protocol udp.

1.4.3   DHCP Relay Configuration Example

In the following example, the DHCP relay is enabled, the DHCP-request packet that is received from Ethernet 1/1 will be relayed to 10.1.1.1 and at the same time the DHCP-relay packet that arrives 192.168.20.1 will be retransmitted out from Ethernet1/1.

```
interface vlan 1
 ip address 192.168.20.1 255.255.255.0
 ip help-address 10.1.1.1
!
ip dhcpd enable
```