

四川大學

《计算机网络》实验报告（5）



DHCP 设置与静态路由实验

专业 软件工程

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成绩分数 _____

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DHCP 设置与静态路由实验

1. 在路由器上配置 DHCP 的截图 1

```
The device is running!
[Huawei]interface vlanif 10
[Huawei-Vlanif10]quit
[Huawei]dhcp enable
[Huawei]interface vlanif 10
[Huawei-Vlanif10]dhcp select interface
[Huawei-Vlanif10]
May  8 2025 09:19:37-08:00 Huawei DS/4/DATASYNC_CFGCHANGE:OID 1.3.6.1.4.1.2011.5
.25.191.3.1 configurations have been changed. The current change number is 13, t
he change loop count is 0, and the maximum number of records is 4095.
May  8 2025 09:19:38-08:00 Huawei %%01PHY/1/PHY(1)[5]:      GigabitEthernet0/0/2:
change status to down
May  8 2025 09:19:38-08:00 Huawei %%01IFNET/4/IF_STATE(1)[6]:Interface Vlanif100
has turned into DOWN state.
May  8 2025 09:19:38-08:00 Huawei %%01IFNET/4/LINK_STATE(1)[7]:The line protocol
IP on the interface Vlanif100 has entered the DOWN state.
May  8 2025 09:19:39-08:00 Huawei %%01PHY/1/PHY(1)[8]:      GigabitEthernet0/0/2:
change status to up
May  8 2025 09:19:39-08:00 Huawei %%01IFNET/4/IF_STATE(1)[9]:Interface Vlanif100
has turned into UP state.
May  8 2025 09:19:39-08:00 Huawei %%01IFNET/4/LINK_STATE(1)[10]:The line protocol
IP on the interface Vlanif100 has entered the UP state.
[Huawei-Vlanif10]dhcp server gateway-list 10.10.10.1
^
Error: Unrecognized command found at '^' position.
[Huawei-Vlanif10]dhcp server domain-name example.com
```

图 1 路由器 1 配置 DHCP

2. 查看 DHCP 地址池信息的截图 2

```
May  8 2025 09:19:57-08:00 Huawei DS/4/DATASYNC_CFGCHANGE:OID 1.3.6.1.4.1.2011.5
.25.191.3.1 configurations have been changed. The current change number is 14, t
he change loop count is 0, and the maximum number of records is 4095.
[Huawei-Vlanif10]dhcp server dns-list 114.114.114.114
[Huawei-Vlanif10]
May  8 2025 09:20:07-08:00 Huawei DS/4/DATASYNC_CFGCHANGE:OID 1.3.6.1.4.1.2011.5
.25.191.3.1 configurations have been changed. The current change number is 15, t
he change loop count is 0, and the maximum number of records is 4095.
[Huawei-Vlanif10]display ip pool interface vlanif10
Pool-name       : vlanif10
Pool-No        : 0
Lease          : 1 Days 0 Hours 0 Minutes
Domain-name    : example.com
DNS-server0   : 114.114.114.114
NBNS-server0  : -
Netbios-type   : -
Position       : Interface      Status           : Unlocked
Gateway-0     : 10.10.10.1
Mask          : 255.255.255.0
VPN instance   : --
-----
Start          End            Total   Used   Idle(Expired)  Conflict  Disable
-----
10.10.10.1    10.10.10.254  253     0      253(0)        0         0
-----
[Huawei-Vlanif10]
```

图 2 查看 DHCP 地址池信息

3. 交换机上配置好 DHCP 服务后在 PC1 上 ping 10.10.10.1 wireshark 抓包截图 3

```

PC1
基础配置 命令行 组播 UDP发包工具 串口
From 10.10.10.1: bytes=32 seq=3 ttl=255 time=16 ms
From 10.10.10.1: bytes=32 seq=4 ttl=255 time=31 ms
From 10.10.10.1: bytes=32 seq=5 ttl=255 time=31 ms

--- 10.10.10.1 ping statistics ---
5 packet(s) transmitted
5 packet(s) received
0.00% packet loss
round-trip min/avg/max = 0/21/31 ms

PC>ping 10.10.10.1

Ping 10.10.10.1: 32 data bytes, Press Ctrl_C to break
From 10.10.10.1: bytes=32 seq=1 ttl=255 time=16 ms
From 10.10.10.1: bytes=32 seq=2 ttl=255 time=31 ms
From 10.10.10.1: bytes=32 seq=3 ttl=255 time=16 ms
From 10.10.10.1: bytes=32 seq=4 ttl=255 time=16 ms
From 10.10.10.1: bytes=32 seq=5 ttl=255 time=31 ms

--- 10.10.10.1 ping statistics ---
5 packet(s) transmitted
5 packet(s) received
0.00% packet loss
round-trip min/avg/max = 16/22/31 ms

PC>

```

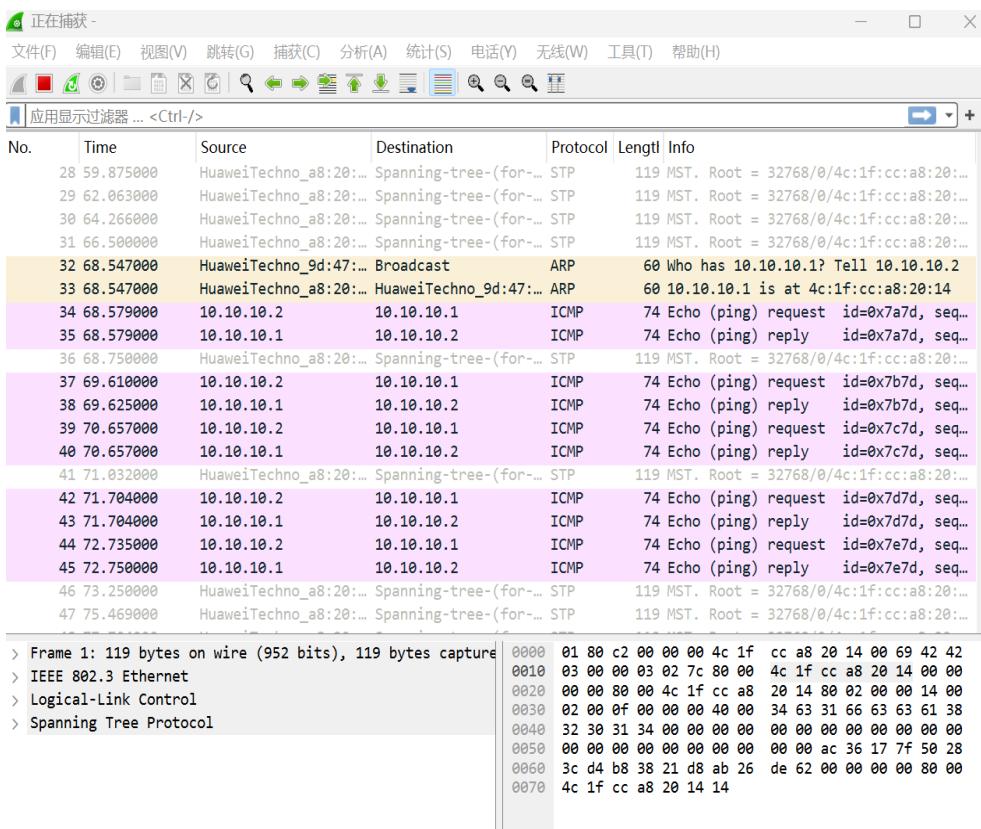


图 3 Ping 10.10.10.1 wireshark 抓包

4. 在 PC1 的设置里把静态路由改成 DHCP，然后在 PC1 的命令行里输入 ipconfig/renew 查看 PC 机上查看分配到的 IP 地址，网关地址，DNS 地址等

```

PC>ipconfig

Link local IPv6 address.....: fe80::5689:98ff:fe9d:471a
IPv6 address.....: :: / 128
IPv6 gateway.....: ::
IPv4 address.....: 10.10.10.2
Subnet mask.....: 255.255.255.0
Gateway.....: 0.0.0.0
Physical address.....: 54-89-98-9D-47-1A
DNS server.....:
PC>

```

图 4 ipconfig/renew 指令查看信息

- 5.按照下图流程把 3 台交换机都配置好静态路由之后，在 R1 命令行里输入 display ip routing-table 命令显示路由表截图 5

```

Please press enter to start cmd line!

<Huawei>system-view
Enter system view, return user view with Ctrl+Z.
[Huawei]display ip routing-table
Route Flags: R - relay, D - download to fib
-----
Routing Tables: Public
Destinations : 13      Routes : 13
Destination/Mask Proto Pre Cost      Flags NextHop      Interface
10.10.10.0/24  Static 60 0          RD   100.10.10.1  Ethernet0/0/0
10.10.20.0/24  Static 60 0          RD   100.10.20.1  Ethernet0/0/1
10.10.30.0/24  Static 60 0          RD   100.10.30.1  GigabitEthernet0/0/0
0/0/0          Direct 0 0          D    100.10.10.2  Ethernet0/0/0

```

图 5 display ip routing-table 指令

6. PC1 ping 通 200.10.70.1 的截图 6

```

PC>ping 200.10.70.1

Ping 200.10.70.1: 32 data bytes, Press Ctrl_C to break
From 200.10.70.1: bytes=32 seq=1 ttl=254 time=62 ms
From 200.10.70.1: bytes=32 seq=2 ttl=254 time=47 ms
From 200.10.70.1: bytes=32 seq=3 ttl=254 time=62 ms
From 200.10.70.1: bytes=32 seq=4 ttl=254 time=31 ms
From 200.10.70.1: bytes=32 seq=5 ttl=254 time=47 ms

--- 200.10.70.1 ping statistics ---
5 packet(s) transmitted
5 packet(s) received
0.00% packet loss
round-trip min/avg/max = 31/49/62 ms
PC>

```

图 6 PC1 ping 200.10.70.1

7. 文字解释 1 静态路由配置中下一条地址的作用。例如在本实验中，交换机配置的下一跳地址为何是 100.10.10.2？

(1) 下一跳地址的作用：

静态路由配置中，“下一跳地址”是指数据包到达目的网络之前，所要到达的下一个路由设备的 IP 地址。它告诉当前设备，数据包应该转发给谁，以继续向目的地址前进。

(2) 交换机配置的下一跳地址为何是 100.10.10.2？

本实验目标地址是 200.10.70.1，这个地址不在交换机本地的直连网段中，需要通过路由器转发数据包。交换机与路由器 AR1 之间通过 VLAN100 网络互联，交换机的接口地址是 100.10.10.1，而 AR1 的接口地址是 100.10.10.2。这两个地址处于同一网段内，是彼此的直连邻居。

交换机要将目的地址为 200.10.70.1 的数据包转发出去，就必须先把数据包送到与它相连的 AR1 路由器，即把数据包的下一跳设置为 100.10.10.2，由 AR1 继续根据其路由表决定下一步如何转发。

实验到此完成。