实验5-2 配置DHCP

学习目标

* **掌握DHCP全局地址池的配置方法**
* **掌握DHCP接口地址池的配置方法**
* **掌握在交换机端口启用DHCP发现功能和IP地址分配功能的方法**

## **拓扑图**

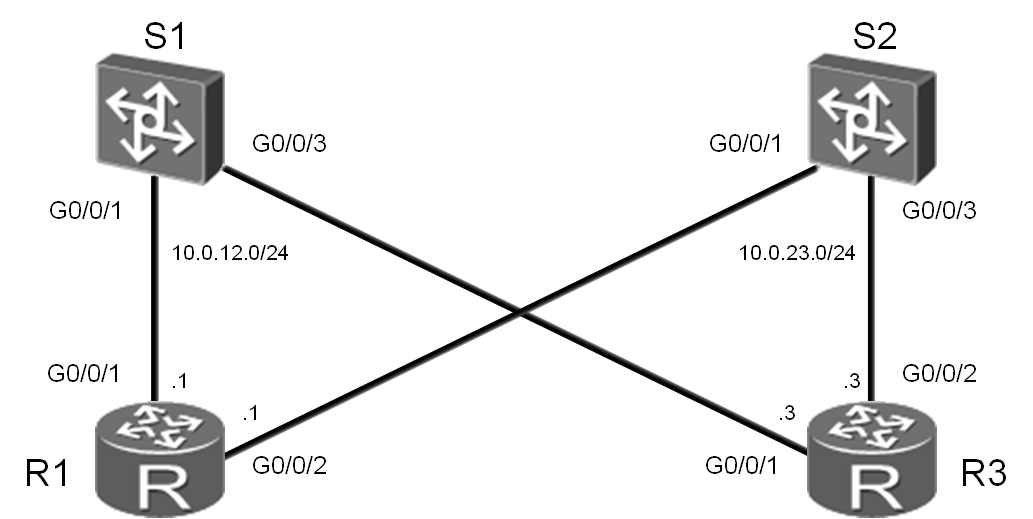


图5.2 配置DHCP实验拓扑图

场景

您是公司的网络管理员，公司网络需要配置DHCP业务，将网关路由器R1和R3配置为DHCP服务器，并配置全局地址池和接口地址池，为接入层设备分配IP地址。

操作步骤

1. 实验环境准备。

如果本任务中您使用的是空配置设备，需要从步骤1开始，并跳过步骤2。如果使用的设备包含上一个实验的配置，请直接从步骤2开始。

按照实验拓扑图进行基础配置以及IP编址，暂时关闭R1上的G0/0/2接口和R3上的G0/0/1接口。

<Huawei>system-view

Enter system view, return user view with Ctrl+Z.

[Huawei]sysname R1

[R1]interface GigabitEthernet 0/0/1

[R1-GigabitEthernet0/0/1]ip address 10.0.12.1 24

[R1-GigabitEthernet0/0/1]quit

<Huawei>system-view

Enter system view, return user view with Ctrl+Z.

[Huawei]sysname R3

[R3]interface GigabitEthernet 0/0/1

[R3-GigabitEthernet0/0/1]ip address 10.0.12.3 24

[R3-GigabitEthernet0/0/1]shutdown

[R3-GigabitEthernet0/0/1]quit

[R3]interface GigabitEthernet 0/0/2

[R3-GigabitEthernet0/0/2]ip address 10.0.23.3 24

<Quidway>system-view

Enter system view, return user view with Ctrl+Z.

[Quidway]sysname S1

<Quidway>system-view

Enter system view, return user view with Ctrl+Z.

[Quidway]sysname S2

1. 清除设备上已有的配置。

重新开启R3上的G0/0/2接口。

[R3]interface GigabitEthernet 0/0/2

[R3-GigabitEthernet0/0/2]undo shutdown

1. 进行其他准备配置。

关闭S1和S2上其他无关端口。

[S1]interface GigabitEthernet 0/0/9

[S1-GigabitEthernet0/0/9]shutdown

[S1-GigabitEthernet0/0/9]quit

[S1]interface GigabitEthernet 0/0/10

[S1-GigabitEthernet0/0/10]shutdown

[S1-GigabitEthernet0/0/10]quit

[S1]interface GigabitEthernet 0/0/13

[S1-GigabitEthernet0/0/13]shutdown

[S1-GigabitEthernet0/0/13]quit

[S1]interface GigabitEthernet 0/0/14

[S1-GigabitEthernet0/0/14]shutdown

[S2]interface GigabitEthernet 0/0/6

[S2-GigabitEthernet0/0/6]shutdown

[S2]interface GigabitEthernet 0/0/7

[S2-GigabitEthernet0/0/7]shutdown

[S2-GigabitEthernet0/0/7]quit

[S2]interface GigabitEthernet 0/0/9

[S2-GigabitEthernet0/0/9]shutdown

[S2-GigabitEthernet0/0/9]quit

[S2]interface GigabitEthernet 0/0/10

[S2-GigabitEthernet0/0/10]shutdown

[S2-GigabitEthernet0/0/10]quit

[R1]interface GigabitEthernet 0/0/2

[R1-GigabitEthernet0/0/2]ip address 10.0.23.1 24

[R1-GigabitEthernet0/0/2]shutdown

确认S1上的G0/0/9，G0/0/10，G0/0/13，G0/0/14端口已关闭，S2上的G0/0/6，G0/0/7， G0/0/9，G0/0/10端口已关闭。

<S1>display interface brief

…output omit…

Interface PHY Protocol InUti OutUti inErrors outErrors

GigabitEthernet0/0/1 up up 0.01% 0.01% 0 0

GigabitEthernet0/0/2 up up 0.01% 0.01% 0 0

GigabitEthernet0/0/3 down down 0% 0% 0 0

GigabitEthernet0/0/4 up up 0% 0.01% 0 0

GigabitEthernet0/0/5 up up 0% 0.01% 0 0

GigabitEthernet0/0/6 down down 0% 0% 0 0

GigabitEthernet0/0/7 down down 0% 0% 0 0

GigabitEthernet0/0/8 down down 0% 0% 0 0

GigabitEthernet0/0/9 \*down down 0% 0% 0 0

GigabitEthernet0/0/10 \*down down 0% 0% 0 0

GigabitEthernet0/0/11 down down 0% 0% 0 0

GigabitEthernet0/0/12 down down 0% 0% 0 0

GigabitEthernet0/0/13 \*down down 0% 0% 0 0

GigabitEthernet0/0/14 \*down down 0% 0% 0 0

…output omit…

<S2>display interface brief

…output omit…

GigabitEthernet0/0/1 up up 0% 4.06% 0 0

GigabitEthernet0/0/2 up up 0% 4.06% 0 0

GigabitEthernet0/0/3 up up 0% 4.06% 0 0

GigabitEthernet0/0/4 up up 0% 20.40% 0 0

GigabitEthernet0/0/5 up up 0% 20.40% 0 0

GigabitEthernet0/0/6 \*down down 0% 2.04% 0 0

GigabitEthernet0/0/7 \*down down 2.03% 2.03% 0 0

GigabitEthernet0/0/8 down down 0% 0% 0 0

GigabitEthernet0/0/9 \*down down 1.91% 1.91% 0 0

GigabitEthernet0/0/10 \*down down 3.95% 0.12% 0 0

GigabitEthernet0/0/11 up up 0% 4.06% 0 0

GigabitEthernet0/0/12 up up 0% 4.06% 0 0

…output omit…

确认R1上只有G0/0/2端口被关闭，R3上只有G0/0/1端口被关闭。

<R1>display ip interface brief

…output omit…

GigabitEthernet0/0/1 10.0.12.1/24 up up

GigabitEthernet0/0/2 10.0.23.1/24 \*down down

…output omit…

<R3>display ip interface brief

…output omit…

GigabitEthernet0/0/1 10.0.12.3/24 \*down down

GigabitEthernet0/0/2 10.0.23.3/24 up up

…output omit…

1. 启用DHCP功能。

默认情况下，DHCP功能并未启用。在路由器上启用DHCP功能。

[R1]dhcp enable

[R3]dhcp enable

1. 创建全局IP地址池。

在R1和R2上分别创建名为pool1和pool2的地址池，并配置地址池中地址的起始范围、网关地址和地址租期。

[R1]ip pool pool1

Info: It's successful to create an IP address pool.

[R1-ip-pool-pool1]network 10.0.12.0 mask 24

[R1-ip-pool-pool1]gateway-list 10.0.12.1

[R1-ip-pool-pool1]lease day 1 hour 12

[R1]interface GigabitEthernet 0/0/1

[R1-GigabitEthernet0/0/1]dhcp select global

[R3]ip pool pool2

Info: It's successful to create an IP address pool.

[R3-ip-pool-pool2]network 10.0.23.0 mask 24

[R3-ip-pool-pool2]gateway-list 10.0.23.3

[R3-ip-pool-pool2]lease day 1 hour 12

[R3]interface GigabitEthernet 0/0/2

[R3-GigabitEthernet0/0/2]dhcp select global

在路由器上执行**display ip pool name** <*name*>命令，查看配置的IP地址池中的参数。

<R1>display ip pool name pool1

Pool-name : pool1

Pool-No : 0

Lease : 1 Days 12 Hours 0 Minutes

Domain-name : -

DNS-server0 : -

NBNS-server0 : -

Netbios-type : -

Position : Local Status : Unlocked

Gateway-0 : 10.0.12.1

Network : 10.0.12.0

Mask : 255.255.255.0

VPN instance : --

-------------------------------------------------------------------------- Start End Total Used Idle(Expired) Conflict Disable

--------------------------------------------------------------------------

10.0.12.1 10.0.12.254 253 0 253(0) 0 0

--------------------------------------------------------------------------

配置S1通过缺省管理端口VLANIF 1向DHCP服务器（R1）申请IP地址。在S2上使用相同配置向R3申请IP地址。

[S1]dhcp enable

[S1]interface Vlanif 1

[S1-Vlanif1]ip address dhcp-alloc

<S1>display ip interface brief

…output omit…

Interface IP Address/Mask Physical Protocol

MEth0/0/1 unassigned down down

NULL0 unassigned up up(s)

Vlanif1 10.0.12.254/24 up up

验证S1从R1上名为pool1的DHCP地址池获取IP地址，S2从R3上名为pool2的DHCP地址池获取IP地址。

<R1>display ip pool name pool1

Pool-name : pool1

Pool-No : 0

Lease : 1 Days 12 Hours 0 Minutes

Domain-name : -

DNS-server0 : -

NBNS-server0 : -

Netbios-type : -

Position : Local Status : Unlocked

Gateway-0 : 10.0.12.1

Network : 10.0.12.0

Mask : 255.255.255.0

VPN instance : --

--------------------------------------------------------------------------

Start End Total Used Idle(Expired) Conflict Disable

--------------------------------------------------------------------------

10.0.12.1 10.0.12.254 253 1 252(0) 0 0

-------------------------------------------------------------------------

<R3>display ip pool name pool2

Pool-name : pool2

Pool-No : 0

Lease : 1 Days 12 Hours 0 Minutes

Domain-name : -

DNS-server0 : -

NBNS-server0 : -

Netbios-type : -

Position : Local Status : Unlocked

Gateway-0 : 10.0.23.3

Network : 10.0.23.0

Mask : 255.255.255.0

VPN instance : --

--------------------------------------------------------------------------

Start End Total Used Idle(Expired) Conflict Disable

--------------------------------------------------------------------------

10.0.23.1 10.0.23.254 253 1 252(0) 0 0

--------------------------------------------------------------------------

进行新的配置前，确保R1和R3上的全局地址池配置已经完成。

1. 创建接口地址池。

关闭R1上的G0/0/1接口，R3上的G0/0/2接口。

[R1]interface GigabitEthernet 0/0/1

[R1-GigabitEthernet0/0/1]shutdown

[R3]interface GigabitEthernet 0/0/2

[R3-GigabitEthernet0/0/2]shutdown

执行**dhcp select interface**命令开启接口的DHCP服务功能，指定路由器从接口地址池分配地址。此时，我们还不希望激活网络中的DHCP服务，所以先不用开启这两个接口。

[R1]interface GigabitEthernet 0/0/2

[R1-GigabitEthernet0/0/2]dhcp select interface

[R3]interface GigabitEthernet 0/0/1

[R3-GigabitEthernet0/0/1]dhcp select interface

从R1和R3的接口地址池中为DNS业务预留IP地址，并设置接口地址池的地址租期。

[R1-GigabitEthernet0/0/2]dhcp server dns-list 10.0.23.254

[R1-GigabitEthernet0/0/2]dhcp server excluded-ip-address 10.0.23.254

[R1-GigabitEthernet0/0/2]dhcp server lease day 1 hour 12

[R3-GigabitEthernet0/0/1]dhcp server dns-list 10.0.12.254

[R3-GigabitEthernet0/0/1]dhcp server excluded-ip-address 10.0.12.254

[R3-GigabitEthernet0/0/1]dhcp server lease day 1 hour 12

在路由器上执行**display ip pool interface**命令，查看配置的接口地址池参数。此处以R1为例。

<R1>display ip pool interface GigabitEthernet0/0/2

Pool-name : GigabitEthernet0/0/2

Pool-No : 1

Lease : 1 Days 12 Hours 0 Minutes

Domain-name : -

DNS-server0 : 10.0.23.254

NBNS-server0 : -

Netbios-type : -

Position : Interface Status : Unlocked

Gateway-0 : 10.0.23.1

Network : 10.0.23.0

Mask : 255.255.255.0

VPN instance : --

--------------------------------------------------------------------------

Start End Total Used Idle(Expired) Conflict Disable

--------------------------------------------------------------------------

10.0.23.1 10.0.23.254 253 0 252(0) 0 1

--------------------------------------------------------------------------

关闭S2上VLANIF 1接口以清除接口现有的IP地址，然后重新开启此接口以便重新从R1的接口地址池获取新的IP地址。

[S2]interface Vlanif 1

[S2-Vlanif1]shutdown

[S2-Vlanif1]undo shutdown

开启R1的G0/0/2接口，使R1可以通过此接口从接口地址池中分配IP地址。

[R1]interface GigabitEthernet0/0/2

[R1-GigabitEthernet0/0/2]undo shutdown

验证R1从接口地址池中为S2的VLANIF1接口分配了新的IP地址。

<R1>display ip pool interface GigabitEthernet0/0/2

Pool-name : GigabitEthernet0/0/2

Pool-No : 1

Lease : 1 Days 12 Hours 0 Minutes

Domain-name : -

DNS-server0 : 10.0.23.254

NBNS-server0 : -

Netbios-type : -

Position : Interface Status : Unlocked

Gateway-0 : 10.0.23.1

Network : 10.0.23.0

Mask : 255.255.255.0

VPN instance : --

--------------------------------------------------------------------------

Start End Total Used Idle(Expired) Conflict Disable

--------------------------------------------------------------------------

10.0.23.1 10.0.23.254 253 1 251(0) 0 1

--------------------------------------------------------------------------

<S2>display ip interface brief

…output omit…

Interface IP Address/Mask Physical Protocol

MEth0/0/1 unassigned down down

NULL0 unassigned up up(s)

Vlanif1 10.0.23.253/24 up up

在上述回显信息，灰色部分表明R1从接口地址池中为客户端的VLANIF1接口分配了IP地址。

关闭S1上VLANIF 1接口以清除接口现有的IP地址，然后重新开启此接口以便重新从R3的接口地址池获取新的IP地址。

[S1]interface Vlanif 1

[S1-Vlanif1]shutdown

[S1-Vlanif1]undo shutdown

开启R3的G0/0/1接口，使R3可以通过此接口从接口地址池中分配IP地址。

[R3]interface GigabitEthernet 0/0/1

[R3-GigabitEthernet0/0/1]undo shutdown

验证R3从接口地址池中为S1的VLANIF1接口分配了新的IP地址。

<R3>display ip pool interface GigabitEthernet0/0/1

Pool-name : GigabitEthernet0/0/1

Pool-No : 1

Lease : 1 Days 12 Hours 0 Minutes

Domain-name : -

DNS-server0 : 10.0.12.254

NBNS-server0 : -

Netbios-type : -

Position : Interface Status : Unlocked

Gateway-0 : 10.0.12.3

Network : 10.0.12.0

Mask : 255.255.255.0

VPN instance : --

--------------------------------------------------------------------------

Start End Total Used Idle(Expired) Conflict Disable

--------------------------------------------------------------------------

10.0.12.1 10.0.12.254 253 1 251(0) 0 1

--------------------------------------------------------------------------

<S1>display ip interface brief

…output omit…

Interface IP Address/Mask Physical Protocol

MEth0/0/1 unassigned down down

NULL0 unassigned up up(s)

Vlanif1 10.0.12.253/24 up up

注意：交换机获取地址后会自动生成一条指向DHCP服务器的缺省静态路由，详见如下配置文件。

## **配置文件**

[R1]display current-configuration

[V200R007C00SPC600]

#

sysname R1

#

dhcp enable

#

ip pool pool1

gateway-list 10.0.12.1

network 10.0.12.0 mask 255.255.255.0

lease day 1 hour 12 minute 0

#

interface GigabitEthernet0/0/1

shutdown

ip address 10.0.12.1 255.255.255.0

dhcp select global

#

interface GigabitEthernet0/0/2

ip address 10.0.23.1 255.255.255.0

dhcp select interface

dhcp server excluded-ip-address 10.0.23.254

dhcp server lease day 1 hour 12 minute 0

dhcp server dns-list 10.0.23.254

#

user-interface con 0

authentication-mode password

set authentication password cipher %$%$+L'YR&IZt'4,)>-\*#lH",}%K-oJ\_M9+'lOU~bD

(\WTqB}%N,%$%$user-interface vty 0 4

#

return

[R3]display current-configuration

[V200R007C00SPC600]

#

sysname R3

#

dhcp enable

#

ip pool pool2

gateway-list 10.0.23.3

network 10.0.23.0 mask 255.255.255.0

lease day 1 hour 12 minute 0

#

interface GigabitEthernet0/0/1

ip address 10.0.12.3 255.255.255.0

dhcp select interface

dhcp server excluded-ip-address 10.0.12.254

dhcp server lease day 1 hour 12 minute 0

dhcp server dns-list 10.0.12.254

#

interface GigabitEthernet0/0/2

shutdown

ip address 10.0.23.3 255.255.255.0

dhcp select global

#

user-interface con 0

authentication-mode password

set authentication password cipher %$%$ksXDMg7Ry6yUU:63:DQ),#/sQg"@\*S\U#.s.bHW

xQ,y%#/v,%$%$

user-interface vty 0 4

#

return

<S1>display current-configuration

#

!Software Version V200R008C00SPC500

sysname S1

#

dhcp enable

#

interface Vlanif1

ip address dhcp-alloc

#

ip route-static 0.0.0.0 0.0.0.0 10.0.12.3

#

user-interface con 0

user-interface vty 0 4

#

return

<S2>display current-configuration

#

!Software Version V200R008C00SPC500

sysname S2

#

dhcp enable

#

interface Vlanif1

ip address dhcp-alloc

#

ip route-static 0.0.0.0 0.0.0.0 10.0.23.1

#

user-interface con 0

user-interface vty 0 4

#

return