

Практическая работа №8.

Тема: «Использование DHCP-протокола».

Цель работы: изучить использование DHCP-протокола.

Ход работы

Пример №1.

1. Открываем Cisco Packet Tracer и приступаем к настройке схемы (рис. 8.1):

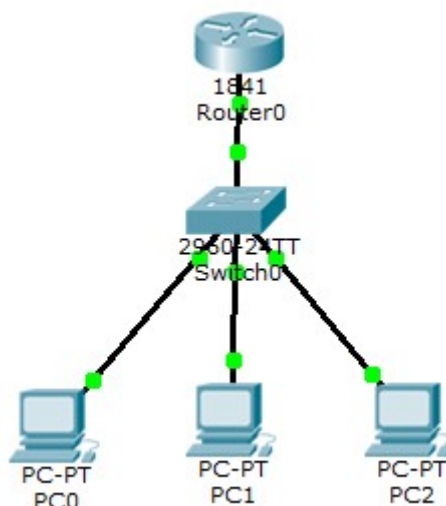


Рис.8.1. Исходная схема

2. Настраиваем Router0.

Настраиваем порт fa0/0, по которому подключен Switch0 и присваиваем порту ip-адрес.

```
Router>enable
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int fa0/0
Router(config-if)#no shutdown
Router(config-if)#
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#exit
```

3. Настраиваем DHCP.

```
Router(config)#ip dhcp pool DHCP
Router(dhcp-config)#network 192.168.1.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.1.1
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#exit
Router(config)#
```

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Утверд.							

4. Исключаем определенные ip-адреса из выдачи DHCP. Это ip – адреса сервера и роутера.

```
Router(config)#ip dhcp excluded-address 192.168.1.100
Router(config)#ip dhcp excluded-address 192.168.1.1
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

5. Настраиваем ip – адреса на компьютерах (рис. 8.2).

Рис.8.2. Настройка ip-адресов

6. Проверяем взаимодействие командой ping, пропинговав с PC0 шлюз, PC1, PC2. Ping успешен (рис. 8.3).

```
PC>ping 192.168.1.1
Pinging 192.168.1.1 with 32 bytes of data:
Reply from 192.168.1.1: bytes=32 time=0ms TTL=255
Reply from 192.168.1.1: bytes=32 time=4ms TTL=255
Reply from 192.168.1.1: bytes=32 time=0ms TTL=255
Reply from 192.168.1.1: bytes=32 time=0ms TTL=255
Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 4ms, Average = 1ms
PC>ping 192.168.1.2
Pinging 192.168.1.2 with 32 bytes of data:
Reply from 192.168.1.2: bytes=32 time=5ms TTL=128
Reply from 192.168.1.2: bytes=32 time=4ms TTL=128
Reply from 192.168.1.2: bytes=32 time=4ms TTL=128
Reply from 192.168.1.2: bytes=32 time=4ms TTL=128
Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 4ms, Maximum = 5ms, Average = 4ms
PC>ping 192.168.1.3
Pinging 192.168.1.3 with 32 bytes of data:
Reply from 192.168.1.3: bytes=32 time=0ms TTL=128
Reply from 192.168.1.3: bytes=32 time=0ms TTL=128
Reply from 192.168.1.3: bytes=32 time=0ms TTL=128
Reply from 192.168.1.3: bytes=32 time=0ms TTL=128
Ping statistics for 192.168.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
PC>ping 192.168.1.4
Pinging 192.168.1.4 with 32 bytes of data:
Reply from 192.168.1.4: bytes=32 time=0ms TTL=128
Reply from 192.168.1.4: bytes=32 time=0ms TTL=128
Reply from 192.168.1.4: bytes=32 time=0ms TTL=128
Reply from 192.168.1.4: bytes=32 time=0ms TTL=128
Ping statistics for 192.168.1.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Рис.8.3. Проверка взаимодействия

Таким образом, настроена раздача IP – адресов по DHCP.

Пример №2.

1. Открываем Cisco Packet Tracer и приступаем к настройке схемы (рис. 8.4).:

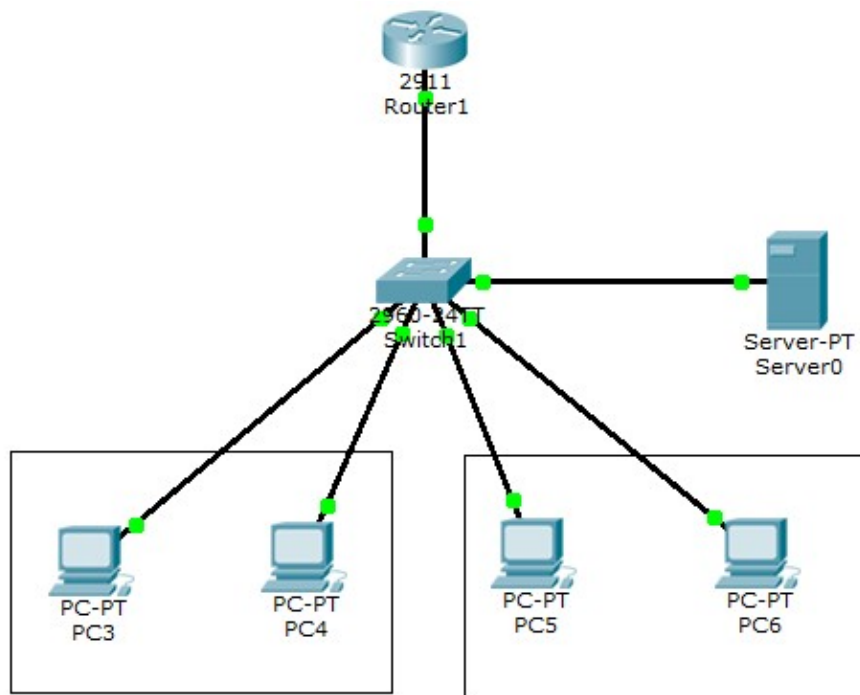


Рис. 8.4. Исследуемая схема сети

2. Настраиваем Switch1.

Создаем vlan.

```
Switch(config)#vlan 2
Switch(config-vlan)#name VLAN2
Switch(config-vlan)#exit
Switch(config)#vlan 3
Switch(config-vlan)#name VLAN3
Switch(config-vlan)#exit
Switch(config)#vlan 4
Switch(config-vlan)#name DHCP
Switch(config-vlan)#exit
Switch(config)#
```

Настраиваем порты.

```
Switch(config)#int range fa0/2-3
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 2
Switch(config-if-range)#exit
Switch(config)#int range fa0/4-5
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 3
Switch(config-if-range)#exit
Switch(config)#int fa0/6
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 4
Switch(config-if)#exit
```

Прокидываем vlan на Router0.

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```

Switch(config-if)#switchport mode trunk
Switch(config-if)#switchport trunk allowed vlan 2,3,4
Switch(config-if)#exit
Switch(config)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#wr mem
Building configuration...
[OK]
Switch#

```

Просматриваем настройки с помощью команды show run.

```

interface FastEthernet0/1
  switchport trunk allowed vlan 2-4
  switchport mode trunk
!
interface FastEthernet0/2
  switchport access vlan 2
  switchport mode access
!
interface FastEthernet0/3
  switchport access vlan 2
  switchport mode access
!
interface FastEthernet0/4
  switchport access vlan 3
  switchport mode access
!
interface FastEthernet0/5
  switchport access vlan 3
  switchport mode access
!
interface FastEthernet0/6
  switchport access vlan 4
  switchport mode access
!
--More--

```

3. Настраиваем Router1

Создаем сабинтерфейсы.

```

Router(config)#int gi0/0.2
Router(config-subif)#encapsulation dot1Q 2
Router(config-subif)#ip address 192.168.2.1 255.255.255.0
Router(config-subif)#exit
Router(config)#int gi0/0.3
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0.3, changed state to

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0
ate to up

Router(config-subif)#encapsulation dot1Q 3
Router(config-subif)#ip address 192.168.3.1 255.255.255.0
Router(config-subif)#exit
Router(config)#int gi0/0.4
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0.4, changed state to

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0
ate to up

Router(config-subif)#encapsulation dot1Q 4
Router(config-subif)#ip address 192.168.4.1 255.255.255.0
Router(config-subif)#exit
Router(config)#

```

Просматриваем настройки с помощью команды show run.

```
.
interface GigabitEthernet0/0
  no ip address
  duplex auto
  speed auto
!
interface GigabitEthernet0/0.2
  encapsulation dot1Q 2
  ip address 192.168.2.1 255.255.255.0
!
interface GigabitEthernet0/0.3
  encapsulation dot1Q 3
  ip address 192.168.3.1 255.255.255.0
!
interface GigabitEthernet0/0.4
  encapsulation dot1Q 4
  ip address 192.168.4.1 255.255.255.0
!
interface GigabitEthernet0/1
  no ip address
  duplex auto
  speed auto
  shutdown
!
```

4. Настраиваем DHCP сервер.

IP Configuration

☐ DHCP

☒ Static

IP Address

192.168.4.2

Subnet Mask

255.255.255.0

Default Gateway

192.168.4.1

DNS Server

5. Проверяем командой ping. Ping успешен (рис. 8.5).

```
Packet Tracer SERVER Command Line 1.0
SERVER>ping 192.168.4.1

Pinging 192.168.4.1 with 32 bytes of data:

Reply from 192.168.4.1: bytes=32 time=1ms TTL=255
Reply from 192.168.4.1: bytes=32 time=0ms TTL=255
Reply from 192.168.4.1: bytes=32 time=0ms TTL=255
Reply from 192.168.4.1: bytes=32 time=0ms TTL=255

Ping statistics for 192.168.4.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

SERVER>
```

Рис. 8.5. Проверка параметров

6. Заходим во вкладку Config, выбираем в меню DHCP и выполняем настройки (рис. 8.6.).

Server0

Physical Config Desktop Custom Interface

GLOBAL

Settings

Algorithm Settings

SERVICES

HTTP

DHCP

TFTP

DNS

SYSLOG

AAA

NTP

EMAIL

FTP

FIREWALL

IPv6 FIREWALL

INTERFACE

FastEthernet0

DHCP

Service ☒ On ☐ Off

Pool Name

Default Gateway

DNS Server

Start IP Address :

Subnet Mask:

Maximum number of Users :

TFTP Server:

Pool N	Default Gat	DNS Se	Start IP Ac	Subnet	Max Nu	TFTP
serv...	0.0.0.0	0.0.0.0	192.168....	255.2...	512	0.0.0.0
DHCP1	192.168.2.1	8.8.8.8	192.168....	255.2...	256	0.0.0.0
DHCP2	192.168.3.1	8.8.8.8	192.168....	255.2...	256	0.0.0.0

Рис. 8.6. Настройка параметров DHCP.

7. Перенаправляем запросы DHCP на сервер.

```
Router(config)#int gi0/0.2
Router(config-subif)#ip helper-address 192.168.4.2
Router(config-subif)#exit
Router(config)#int gi0/0.3
Router(config-subif)#ip helper-address 192.168.4.2
Router(config-subif)#exit
Router(config)#
```

8. Настраиваем IP – адреса на компьютерах (рис. 8.7).

PC3

IP Configuration

IP Configuration

☒ DHCP ☐ Static ☐ DHCP

IP Address

Subnet Mask

Default Gateway

DNS Server

IPv6 Configuration

☐ DHCP ☐ Auto Config ☒ Static

IPv6 Address

Link Local Address

IPv6 Gateway

IPv6 DNS Server

PC4

IP Configuration

IP Configuration

☒ DHCP ☐ Static ☐ DHCP

IP Address

Subnet Mask

Default Gateway

DNS Server

IPv6 Configuration

☐ DHCP ☐ Auto Config ☒ Static

IPv6 Address

Link Local Address

IPv6 Gateway

IPv6 DNS Server

PC5

IP Configuration

IP Configuration

☒ DHCP ☐ Static ☐ DHCP

IP Address

Subnet Mask

Default Gateway

DNS Server

IPv6 Configuration

☐ DHCP ☐ Auto Config ☒ Static

IPv6 Address

Link Local Address

IPv6 Gateway

IPv6 DNS Server

PC6

IP Configuration

IP Configuration

☒ DHCP ☐ Static ☐ DHCP

IP Address

Subnet Mask

Default Gateway

DNS Server

IPv6 Configuration

☐ DHCP ☐ Auto Config ☒ Static

IPv6 Address

Link Local Address

IPv6 Gateway

IPv6 DNS Server

Рис. 8.7. Настройка IP – адреса на компьютерах

9. Проверяем взаимодействие командой ping. Ping успешен (рис. 8.8.) .

```
PC>ping 192.168.2.1
Pinging 192.168.2.1 with 32 bytes of data:
Reply from 192.168.2.1: bytes=32 time=1ms TTL=255
Reply from 192.168.2.1: bytes=32 time=0ms TTL=255
Reply from 192.168.2.1: bytes=32 time=0ms TTL=255
Reply from 192.168.2.1: bytes=32 time=0ms TTL=255
Ping statistics for 192.168.2.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

PC>ping 192.168.2.2
Pinging 192.168.2.2 with 32 bytes of data:
Reply from 192.168.2.2: bytes=32 time=0ms TTL=128
Reply from 192.168.2.2: bytes=32 time=3ms TTL=128
Reply from 192.168.2.2: bytes=32 time=0ms TTL=128
Reply from 192.168.2.2: bytes=32 time=4ms TTL=128
Ping statistics for 192.168.2.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 4ms, Average = 1ms

PC>ping 192.168.3.1
Pinging 192.168.3.1 with 32 bytes of data:
Reply from 192.168.3.1: bytes=32 time=0ms TTL=255
Reply from 192.168.3.1: bytes=32 time=0ms TTL=255
Reply from 192.168.3.1: bytes=32 time=0ms TTL=255
Reply from 192.168.3.1: bytes=32 time=0ms TTL=255
Ping statistics for 192.168.3.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

PC>ping 192.168.3.2
Pinging 192.168.3.2 with 32 bytes of data:
Request timed out.
Reply from 192.168.3.2: bytes=32 time=0ms TTL=127
Reply from 192.168.3.2: bytes=32 time=0ms TTL=127
Reply from 192.168.3.2: bytes=32 time=0ms TTL=127
Ping statistics for 192.168.3.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

**Рис. 8.8. Проверка взаимодействия посредством выделенного
DHCP-сервера**

Таким образом, настроена раздача IP – адресов для двух сегментов посредством выделенного DHCP-сервера.

Контрольные вопросы

1. Что из себя представляет протокол DHCP?
2. Охарактеризуйте способы распределение IP-адресов.
3. Охарактеризуйте опции DHCP
4. Опишите процедуру настройки пула DHCP.
5. Что собой представляют классы параметров DHCP? Каковы их разновидности?