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Отчет по лабораторной работе №6 по курсу «Компьютерные сети»

Тема Разбиение сети на подсети. Настройка DHCP-сервера в сетевом эмуляторе

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Задание

Вариант №6

Для локальной общей сети был выделен частный адрес **192.168.6.0/24**.

Разделить сеть на 5 подсетей.

1. Подсети 1 и 5 должны поддерживать до 16 устройств.
2. Подсети 2 и 4 должны поддерживать до 5 устройств.
3. Подсеть 3 должна поддерживать только 2 устройства.

Настроить DHCP-сервера для выдачи адресов.

1. Для подсети 1 настроить отдельный DHCP-сервер.
2. Для подсети 2 настроить в качестве DHCP-сервера маршрутизатор 1.
3. Для подсетей 4 и 5 настроить в качестве DHCP-сервера маршрутизатор 2.

Разбиение сети на подсети

Номер подсети	Максимальное количество хостов в подсети	Адрес подсети	Диапазон адресов подсети	Маска подсети
1	16	192.168.6.0	192.168.6.1 - 192.168.6.30	255.255.255.224(/27)
2	5	192.168.6.64	192.168.6.65 - 192.168.6.70	255.255.255.248(/29)
3	2	192.168.6.80	192.168.6.81 - 192.168.6.82	255.255.255.252(/30)
4	5	192.168.6.72	192.168.6.73 - 192.168.6.78	255.255.255.248(/29)
5	16	192.168.6.32	192.168.6.33 - 192.168.6.62	255.255.255.224(/27)

Таблица 1 – Разбиение сети на подсети

Настройка DHCP-серверов

Настройка 1-ой подсети

The screenshot shows the DHCP configuration page in a network management system. The sidebar on the left lists various services, with 'DHCP' selected. The main configuration area is titled 'DHCP' and includes the following settings:

- Interface:** FastEthernet0 (selected from a dropdown)
- Service:** On (radio button selected)
- Pool Name:** serverPool
- Default Gateway:** 192.168.6.30
- DNS Server:** 0.0.0.0
- Start IP Address:** 192.168.6.1 (split into four input fields: 192, 168, 6, 1)
- Subnet Mask:** 255.255.255.224 (split into four input fields: 255, 255, 255, 224)
- Maximum Number of Users:** 31
- TFTP Server:** 0.0.0.0
- WLC Address:** 0.0.0.0

At the bottom, there are 'Add', 'Save', and 'Remove' buttons. Below these is a table summarizing the configuration:

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
serverPool	192.168...	0.0.0.0	192.168...	255.255...	31	0.0.0.0	0.0.0.0

Рисунок 1 – Настройка сервера

PC1.1

Physical **Config** Desktop Programming Attributes

FastEthernet0

Port Status

☒ On

Bandwidth

☐ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex

☐ Half Duplex ☒ Full Duplex ☒ Auto

MAC Address

00D0.BA71.B8CD

IP Configuration

☒ DHCP ☐ Static

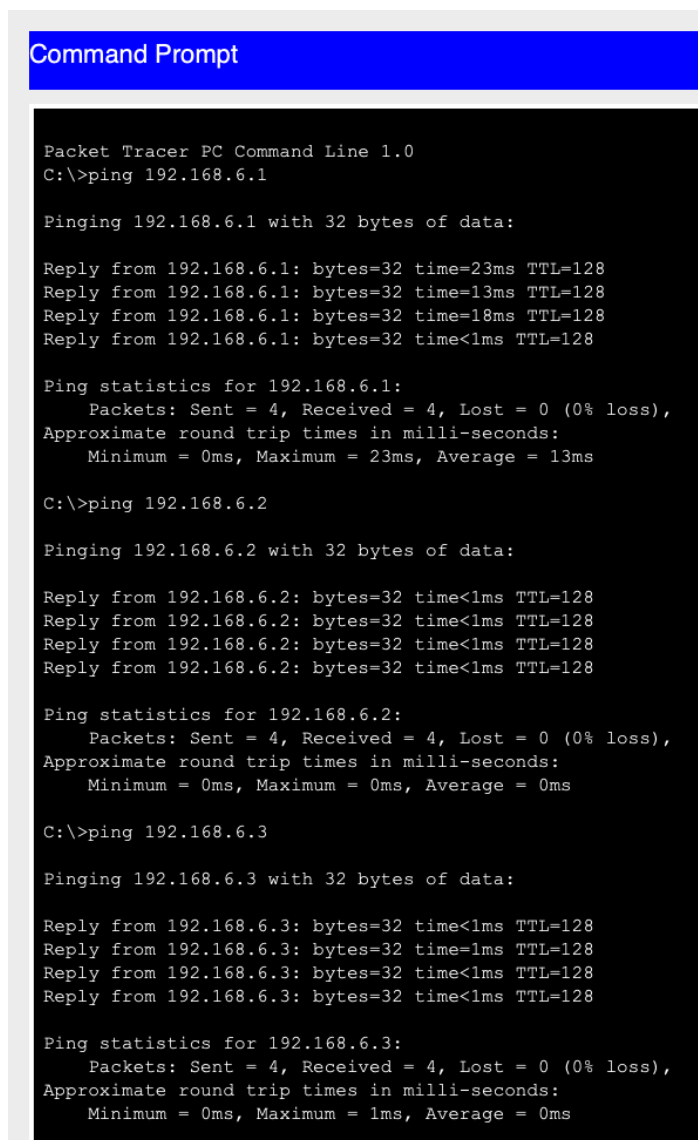
IPv4 Address

192.168.6.1

Subnet Mask

255.255.255.0

Рисунок 2 – Автоматическая выдача адреса конечному хосту



The image shows a screenshot of a 'Command Prompt' window within a Packet Tracer environment. The window title is 'Command Prompt'. The text inside shows a series of ping commands and their results. First, the user enters 'C:\>ping 192.168.6.1'. The output shows four successful replies from 192.168.6.1 with varying times (23ms, 13ms, 18ms, <1ms) and a TTL of 128. Ping statistics for 192.168.6.1 show 4 packets sent, 4 received, 0% loss, and average round trip times of 0ms, 23ms, and 13ms. Next, the user enters 'C:\>ping 192.168.6.2'. The output shows four successful replies from 192.168.6.2 with times <1ms and TTL=128. Ping statistics for 192.168.6.2 show 4 packets sent, 4 received, 0% loss, and average round trip times of 0ms, 0ms, and 0ms. Finally, the user enters 'C:\>ping 192.168.6.3'. The output shows four successful replies from 192.168.6.3 with times <1ms and TTL=128. Ping statistics for 192.168.6.3 show 4 packets sent, 4 received, 0% loss, and average round trip times of 0ms, 1ms, and 0ms.

```
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.6.1

Pinging 192.168.6.1 with 32 bytes of data:

Reply from 192.168.6.1: bytes=32 time=23ms TTL=128
Reply from 192.168.6.1: bytes=32 time=13ms TTL=128
Reply from 192.168.6.1: bytes=32 time=18ms TTL=128
Reply from 192.168.6.1: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.6.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 23ms, Average = 13ms

C:\>ping 192.168.6.2

Pinging 192.168.6.2 with 32 bytes of data:

Reply from 192.168.6.2: bytes=32 time<1ms TTL=128
Reply from 192.168.6.2: bytes=32 time<1ms TTL=128
Reply from 192.168.6.2: bytes=32 time<1ms TTL=128
Reply from 192.168.6.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.6.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.6.3

Pinging 192.168.6.3 with 32 bytes of data:

Reply from 192.168.6.3: bytes=32 time<1ms TTL=128
Reply from 192.168.6.3: bytes=32 time=1ms TTL=128
Reply from 192.168.6.3: bytes=32 time<1ms TTL=128
Reply from 192.168.6.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.6.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Рисунок 3 – Проверка соединения между хостами в сети

Настройка 2-ой, 4-ой и 5-ой подсетей

Настройка будет приведена на примере 2-ой подсети. Для 4-ой и 5-ой подсетей процесс аналогичен.

The screenshot shows the Cisco IOS configuration interface for the GigabitEthernet0/0/1 interface. The 'Config' tab is selected. The left sidebar shows a tree structure with 'GLOBAL' (Settings, Algorithm Settings), 'ROUTING' (Static, RIP), 'SWITCHING' (VLAN Database), and 'INTERFACE' (GigabitEthernet0/0/0, GigabitEthernet0/0/1). The main area displays the configuration for GigabitEthernet0/0/1:

- Port Status: ☒ On
- Bandwidth: ☐ 1000 Mbps ☒ 100 Mbps ☐ 10 Mbps ☒ Auto
- Duplex: ☐ Half Duplex ☒ Full Duplex ☒ Auto
- MAC Address: 000B.BE3C.C402
- IP Configuration:
 - IPv4 Address: 192.168.6.70
 - Subnet Mask: 255.255.255.248
- Tx Ring Limit: 10

Рисунок 4 – Настройка роутера

```
Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip dhcp pool serverPool
Router(dhcp-config)#network 192.168.6.64 255.255.255.248
Router(dhcp-config)#ip default-router 192.168.6.70
^
% Invalid input detected at '^' marker.

Router(dhcp-config)#default-router 192.168.6.70
Router(dhcp-config)#|
```

Рисунок 5 – Настройка сервера

Server2.1

Physical

Config

Services

Desktop

Programming

Attributes

FastEthernet0

Port Status

☒ On

Bandwidth

☒ 100 Mbps

☐ 10 Mbps

☒ Auto

Duplex

☐ Half Duplex

☒ Full Duplex

☒ Auto

MAC Address

0060.70ED.38BC

IP Configuration

☒ DHCP

☐ Static

IPv4 Address

192.168.6.66

Subnet Mask

255.255.255.248

Рисунок 6 – Автоматическая выдача адреса конечному хосту

```
Command Prompt

Packet Tracer SERVER Command Line 1.0
C:\>ping 192.168.6.66

Pinging 192.168.6.66 with 32 bytes of data:

Reply from 192.168.6.66: bytes=32 time=33ms TTL=128
Reply from 192.168.6.66: bytes=32 time<1ms TTL=128
Reply from 192.168.6.66: bytes=32 time<1ms TTL=128
Reply from 192.168.6.66: bytes=32 time=17ms TTL=128

Ping statistics for 192.168.6.66:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 33ms, Average = 12ms

C:\>ping 192.168.6.65

Pinging 192.168.6.65 with 32 bytes of data:

Reply from 192.168.6.65: bytes=32 time<1ms TTL=128
Reply from 192.168.6.65: bytes=32 time<1ms TTL=128
Reply from 192.168.6.65: bytes=32 time<1ms TTL=128
Reply from 192.168.6.65: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.6.65:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.6.67

Pinging 192.168.6.67 with 32 bytes of data:

Reply from 192.168.6.67: bytes=32 time=1ms TTL=128
Reply from 192.168.6.67: bytes=32 time<1ms TTL=128
Reply from 192.168.6.67: bytes=32 time=1ms TTL=128
Reply from 192.168.6.67: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.6.67:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Рисунок 7 – Проверка соединения между хостами в сети


```
C:\>ping 192.168.6.2

Pinging 192.168.6.2 with 32 bytes of data:

Reply from 192.168.6.2: bytes=32 time<1ms TTL=128
Reply from 192.168.6.2: bytes=32 time<1ms TTL=128
Reply from 192.168.6.2: bytes=32 time<1ms TTL=128
Reply from 192.168.6.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.6.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.6.65

Pinging 192.168.6.65 with 32 bytes of data:

Reply from 192.168.6.65: bytes=32 time=11ms TTL=127
Reply from 192.168.6.65: bytes=32 time<1ms TTL=127
Reply from 192.168.6.65: bytes=32 time<1ms TTL=127
Reply from 192.168.6.65: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.6.65:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 11ms, Average = 2ms

C:\>ping 192.168.6.81

Pinging 192.168.6.81 with 32 bytes of data:

Reply from 192.168.6.81: bytes=32 time<1ms TTL=255
Reply from 192.168.6.81: bytes=32 time=30ms TTL=255
Reply from 192.168.6.81: bytes=32 time=3ms TTL=255
Reply from 192.168.6.81: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.6.81:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 30ms, Average = 8ms
```

Рисунок 8 – Проверка соединения между хостами в различных подсетях