

Презентация по лабораторной работе №8

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Вводная часть

Цель работы

Приобрести практические навыки по настройке динамического распределения IP-адресов посредством протокола DHCP (Dynamic Host Configuration Protocol) в локальной сети.

Задание

1. Добавить DNS-записи для домена `donskaya.rudn.ru` на сервер `dns`.
2. Настроить DHCP-сервис на маршрутизаторе.
3. Заменить в конфигурации конечных устройствах статическое распределение адресов на динамическое.
4. При выполнении работы необходимо учитывать соглашение об именовании.

Выполнение лабораторной работы

Выполнение лабораторной работы

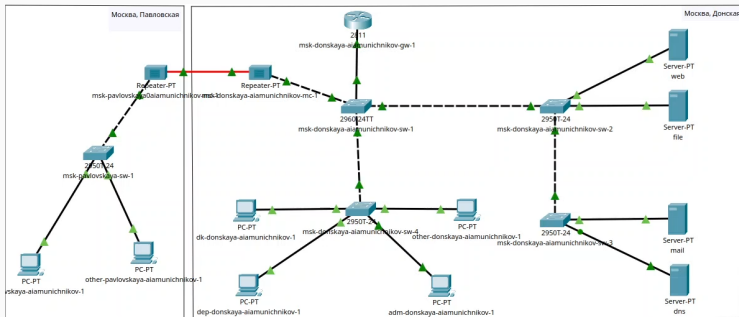


Рис. 1: Логическая схема локальной сети с добавленным DNS-сервером

Выполнение лабораторной работы

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up
%LINK-3-UPDOWN: Interface FastEthernet0/2, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to down
%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up

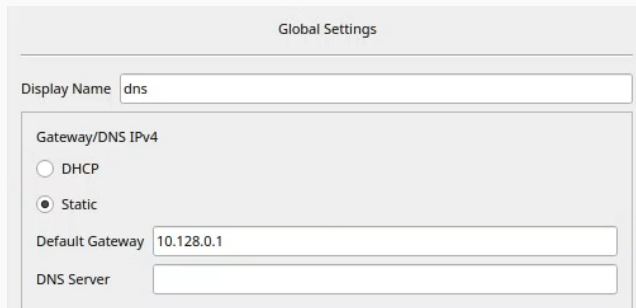
User Access Verification

Password:

msk-donskaya-aiamunichnikov-sw-3>enable
Password:
msk-donskaya-aiamunichnikov-sw-3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-aiamunichnikov-sw-3(config)#interface f0/2
msk-donskaya-aiamunichnikov-sw-3(config-if)#switchport mode access
                                     ^
% Invalid input detected at '^' marker.

msk-donskaya-aiamunichnikov-sw-3(config-if)#switchport mode access
msk-donskaya-aiamunichnikov-sw-3(config-if)#switchport access vlan3
                                     ^
% Invalid input detected at '^' marker.

msk-donskaya-aiamunichnikov-sw-3(config-if)#switchport access vlan 3
msk-donskaya-aiamunichnikov-sw-3(config-if)#
```



The image shows a configuration window titled "Global Settings". Inside the window, there is a "Display Name" field with the value "dns". Below this, there is a section for "Gateway/DNS IPv4" configuration. It contains two radio buttons: "DHCP" (unselected) and "Static" (selected). Under the "Static" option, there are two text input fields: "Default Gateway" with the value "10.128.0.1" and "DNS Server" which is currently empty.

Global Settings

Display Name

Gateway/DNS IPv4

☐ DHCP

☒ Static

Default Gateway

DNS Server

Рис. 3: Конфигурация dns-сервера

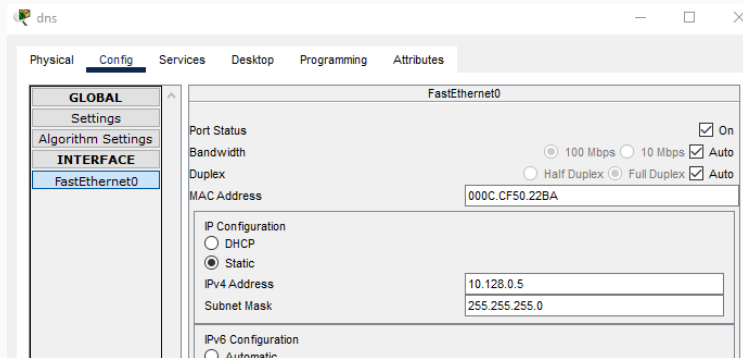


Рис. 4: Конфигурация dns-сервера

Выполнение лабораторной работы.

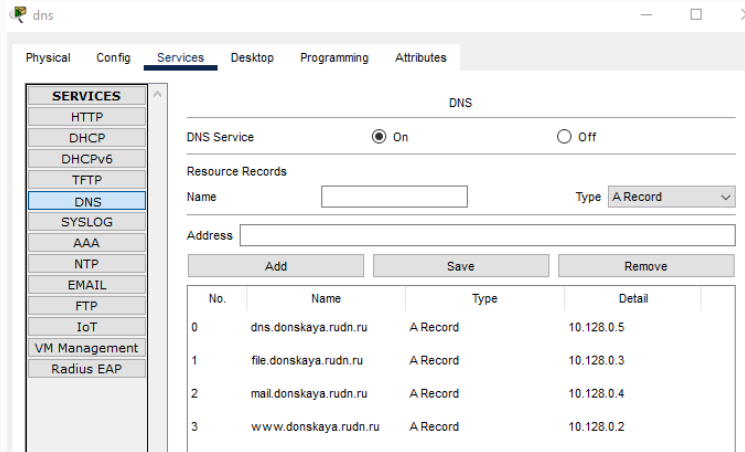


Рис. 5: Окно настройки сервиса DNS

Таблица 1: Регламент выделения ip-адресов (для сети класса C) {#tbl:reg}

IP-адреса	Назначение
1	Шлюз
2–19	Сетевое оборудование
20–29	Серверы
30–199	Компьютеры, DHCP
200–219	Компьютеры, Static
220–229	Принтеры
230–254	Резерв

Выполнение лабораторной работы

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.104, changed state to up
```

```
msk-donskaya-aiamunichnikov-gw-01>enable
```

```
Password:
```

```
msk-donskaya-aiamunichnikov-gw-01#conf t
```

```
Enter configuration commands, one per line. End with CNTL/Z.
```

```
msk-donskaya-aiamunichnikov-gw-01(config)#ip name server 10.128.0.5
```

```
^
```

```
% Invalid input detected at '^' marker.
```

```
msk-donskaya-aiamunichnikov-gw-01(config)#ip name server 10.-28.0.5^Z
```

```
msk-donskaya-aiamunichnikov-gw-01#
```

```
%SYS-5-CONFIG_I: Configured from console by console
```

```
msk-donskaya-aiamunichnikov-gw-01#conf t
```

```
Enter configuration commands, one per line. End with CNTL/Z.
```

```
msk-donskaya-aiamunichnikov-gw-01(config)#ip name-server 10.128.0.5
```

```
msk-donskaya-aiamunichnikov-gw-01(config)#service dhcp
```

```
msk-donskaya-aiamunichnikov-gw-01(config)#ip dhcp pool dk
```

```
msk-donskaya-aiamunichnikov-gw-01(dhcp-config)#network 10.128.3.0 255.0.0.0
```

```
msk-donskaya-aiamunichnikov-gw-01(dhcp-config)#default-router 10.128.0.5
```

```
msk-donskaya-aiamunichnikov-gw-01(dhcp-config)#exit
```

```
msk-donskaya-aiamunichnikov-gw-01(config)#ip dhcp excluded address 10.128.3.1
```

```
^
```

```
% Invalid input detected at '^' marker.
```

```
msk-donskaya-aiamunichnikov-gw-01(config)#ip dhcp excluded address 10.128.3.1 10.128.3.29
```

```
^
```

```
% Invalid input detected at '^' marker.
```

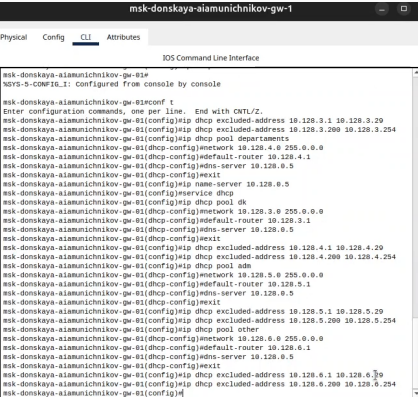
```
msk-donskaya-aiamunichnikov-gw-01(config)#ip dhcp exculed-address 10.128.3.1 10.128.3.29
```

```
^
```

```
% Invalid input detected at '^' marker.
```

```
msk-donskaya-aiamunichnikov-gw-01(config)#ip dhcp exculed-address 10.128.3.1 10.128.3.29
```

Выполнение лабораторной работы



```
msk-donskaya-aiaamunichnikov-gw-1
Physical Config CLI Attributes
IOS Command Line Interface
msk-donskaya-aiaamunichnikov-gw-01#
SYS-5-CONFIG-I: Configured from console by console
msk-donskaya-aiaamunichnikov-gw-01#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-aiaamunichnikov-gw-01(config)#ip dhcp excluded-address 10.128.3.1 10.128.3.20
msk-donskaya-aiaamunichnikov-gw-01(config)#ip dhcp excluded-address 10.128.3.200 10.128.3.254
msk-donskaya-aiaamunichnikov-gw-01(config)#ip dhcp pool departments
msk-donskaya-aiaamunichnikov-gw-01(dhcp-config)#network 10.128.4.0 255.0.0.0
msk-donskaya-aiaamunichnikov-gw-01(dhcp-config)#default-router 10.128.4.1
msk-donskaya-aiaamunichnikov-gw-01(dhcp-config)#dns-server 10.128.0.5
msk-donskaya-aiaamunichnikov-gw-01(dhcp-config)#exit
msk-donskaya-aiaamunichnikov-gw-01(config)#ip name-server 10.128.0.5
msk-donskaya-aiaamunichnikov-gw-01(config)#service dhcp
msk-donskaya-aiaamunichnikov-gw-01(config)#ip dhcp pool dk
msk-donskaya-aiaamunichnikov-gw-01(dhcp-config)#network 10.128.3.0 255.0.0.0
msk-donskaya-aiaamunichnikov-gw-01(dhcp-config)#default-router 10.128.3.1
msk-donskaya-aiaamunichnikov-gw-01(dhcp-config)#dns-server 10.128.0.5
msk-donskaya-aiaamunichnikov-gw-01(dhcp-config)#exit
msk-donskaya-aiaamunichnikov-gw-01(config)#ip dhcp excluded-address 10.128.4.1 10.128.4.20
msk-donskaya-aiaamunichnikov-gw-01(config)#ip dhcp excluded-address 10.128.4.200 10.128.4.254
msk-donskaya-aiaamunichnikov-gw-01(config)#ip dhcp pool adm
msk-donskaya-aiaamunichnikov-gw-01(dhcp-config)#network 10.128.5.0 255.0.0.0
msk-donskaya-aiaamunichnikov-gw-01(dhcp-config)#default-router 10.128.5.1
msk-donskaya-aiaamunichnikov-gw-01(dhcp-config)#dns-server 10.128.0.5
msk-donskaya-aiaamunichnikov-gw-01(dhcp-config)#exit
msk-donskaya-aiaamunichnikov-gw-01(config)#ip dhcp excluded-address 10.128.5.1 10.128.5.20
msk-donskaya-aiaamunichnikov-gw-01(config)#ip dhcp excluded-address 10.128.5.200 10.128.5.254
msk-donskaya-aiaamunichnikov-gw-01(config)#ip dhcp pool other
msk-donskaya-aiaamunichnikov-gw-01(dhcp-config)#network 10.128.6.0 255.0.0.0
msk-donskaya-aiaamunichnikov-gw-01(dhcp-config)#default-router 10.128.6.1
msk-donskaya-aiaamunichnikov-gw-01(dhcp-config)#dns-server 10.128.0.5
msk-donskaya-aiaamunichnikov-gw-01(dhcp-config)#exit
msk-donskaya-aiaamunichnikov-gw-01(config)#ip dhcp excluded-address 10.128.6.1 10.128.6.20
msk-donskaya-aiaamunichnikov-gw-01(config)#ip dhcp excluded-address 10.128.6.200 10.128.6.254
msk-donskaya-aiaamunichnikov-gw-01(config)#
```

Рис. 7: Настройка DHCP-сервис на маршрутизаторе

Выполнение лабораторной работы

```
IOS Command Line Interface
msk-donskaya-aiaamunichnikov-gw-01(dhcp-config)#dns-server 10.128.0.5
msk-donskaya-aiaamunichnikov-gw-01(dhcp-config)#exit
msk-donskaya-aiaamunichnikov-gw-01(config)#ip dhcp excluded-address 10.128.6.1 10.128.6.29
msk-donskaya-aiaamunichnikov-gw-01(config)#ip dhcp excluded-address 10.128.6.200 10.128.6.254
msk-donskaya-aiaamunichnikov-gw-01(config)#exit
msk-donskaya-aiaamunichnikov-gw-01#
%SYS-5-CONFIG-I: Configured from console by console

msk-donskaya-aiaamunichnikov-gw-01#sh ip dhcp pool

Pool dk :
  Utilization mark (high/low)      : 100 / 0
  Subnet size (first/next)          : 0 / 0
  Total addresses                   : 16777214
  Leased addresses                  : 0
  Excluded addresses                : 8
  Pending event                    : none

  1 subnet is currently in the pool
  Current index      IP address range      Leased/Excluded/Total
  10.0.0.1           10.0.0.1 - 10.255.255.254  0 / 8 / 16777214

Pool departaments :
  Utilization mark (high/low)      : 100 / 0
  Subnet size (first/next)          : 0 / 0
  Total addresses                   : 16777214
  Leased addresses                  : 0
  Excluded addresses                : 8
  Pending event                    : none

  1 subnet is currently in the pool
  Current index      IP address range      Leased/Excluded/Total
  10.0.0.1           10.0.0.1 - 10.255.255.254  0 / 8 / 16777214

Pool adm :
  Utilization mark (high/low)      : 100 / 0
  Subnet size (first/next)          : 0 / 0
```

☐ Top

Рис. 8: Информация о пулах DHCP

```
msh-donskaya-aiaunichnikov-gw-01#sh ip dhcp binding
IP address      Client-ID/      Lease expiration    Type
                Hardware address
msh-donskaya-aiaunichnikov-gw-01#
```

Рис. 9: Информация о привязках выданных адресов

```
C:\>ipconfig

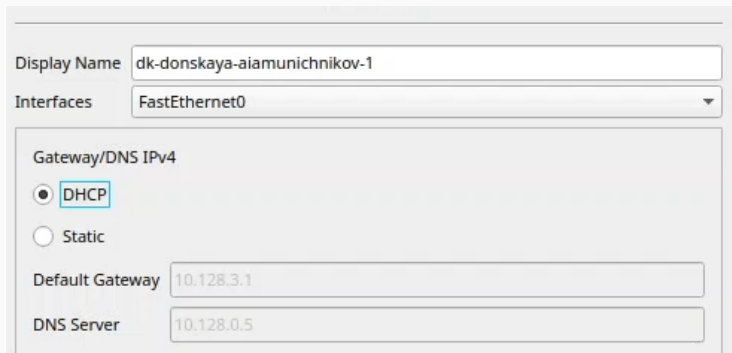
FastEthernet0 Connection:(default port)

    Connection-specific DNS Suffix...:
    Link-local IPv6 Address.....: FE80::207:ECFF:FE87:6365
    IPv6 Address.....: ::
    IPv4 Address.....: 10.128.3.2
    Subnet Mask.....: 255.255.255.0
    Default Gateway.....: ::
                           10.128.3.1

Bluetooth Connection:

    Connection-specific DNS Suffix...:
    Link-local IPv6 Address.....: ::
    IPv6 Address.....: ::
    IPv4 Address.....: 0.0.0.0
    Subnet Mask.....: 0.0.0.0
    Default Gateway.....: ::
                           0.0.0.0
```

Рис. 10: Просмотр статического ip-адреса



The screenshot shows a network configuration window. At the top, the 'Display Name' field contains 'dk-donskaya-aiaamunichnikov-1'. Below it, the 'Interfaces' dropdown menu is set to 'FastEthernet0'. The 'Gateway/DNS IPv4' section contains two radio buttons: 'DHCP' (which is selected and highlighted with a blue box) and 'Static'. Below the radio buttons, the 'Default Gateway' field contains '10.128.3.1' and the 'DNS Server' field contains '10.128.0.5'.

Рис. 11: Замена в настройках статического распределения адресов на динамическое

```
C:\>ipconfig

FastEthernet0 Connection:(default port)

    Connection-specific DNS Suffix...:
    Link-local IPv6 Address.....: FE80::207:ECFF:FE87:6365
    IPv6 Address.....: ::
    IPv4 Address.....: 10.128.3.30
    Subnet Mask.....: 255.255.255.0
    Default Gateway.....: ::
                           10.128.3.1

Bluetooth Connection:

    Connection-specific DNS Suffix...:
    Link-local IPv6 Address.....: ::
    IPv6 Address.....: ::
    IPv4 Address.....: 0.0.0.0
    Subnet Mask.....: 0.0.0.0
    Default Gateway.....: ::
                           0.0.0.0
```

Рис. 12: Просмотр динамически заданного ip-адреса

```
C:\>ping 10.128.5.30

Pinging 10.128.5.30 with 32 bytes of data:

Reply from 10.128.5.30: bytes=32 time<1ms TTL=127
Reply from 10.128.5.30: bytes=32 time<1ms TTL=127
Reply from 10.128.5.30: bytes=32 time<1ms TTL=127
Reply from 10.128.5.30: bytes=32 time<1ms TTL=127

Ping statistics for 10.128.5.30:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping www.donskaya.rudn.ru

Pinging 10.128.0.2 with 32 bytes of data:

Request timed out.
Reply from 10.128.0.2: bytes=32 time=1ms TTL=127
Reply from 10.128.0.2: bytes=32 time<1ms TTL=127
Reply from 10.128.0.2: bytes=32 time<1ms TTL=127

Ping statistics for 10.128.0.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Рис. 13: Проверка доступности устройств из разных подсетей

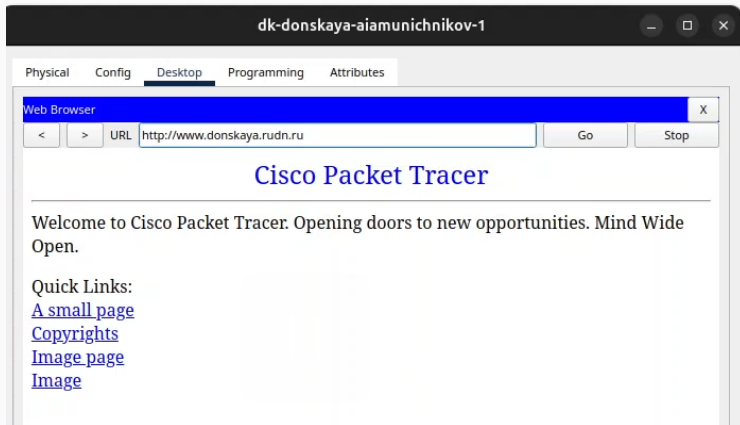


Рис. 14: Информация по адресу www.donskaya.rudn.ru

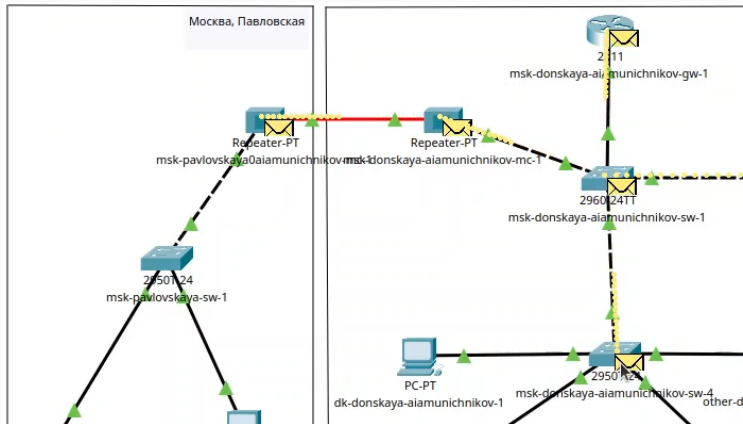


Рис. 15: Запрос адреса по протоколу DHCP в режиме симуляции

0.002	msk-donskaya-alamunichnikov-sw-3	mail	DHCP
0.002	msk-donskaya-alamunichnikov-sw-3	msk-donskaya-alamunichnikov-sw-2	DHCP
0.002	--	dns	DHCP
0.003	dns	msk-donskaya-alamunichnikov-sw-3	DHCP
0.003	msk-donskaya-alamunichnikov-sw-3	mail	DHCP
0.003	msk-donskaya-alamunichnikov-sw-3	msk-donskaya-alamunichnikov-sw-2	DHCP
0.003	msk-donskaya-alamunichnikov-sw-2	web	DHCP
0.003	msk-donskaya-alamunichnikov-sw-2	file	DHCP
0.003	msk-donskaya-alamunichnikov-sw-2	msk-donskaya-alamunichnikov-sw-1	DHCP
0.004	msk-donskaya-alamunichnikov-sw-3	mail	DHCP
0.004	msk-donskaya-alamunichnikov-sw-3	msk-donskaya-alamunichnikov-sw-2	DHCP
0.004	msk-donskaya-alamunichnikov-sw-2	web	DHCP
0.004	msk-donskaya-alamunichnikov-sw-2	file	DHCP
0.004	msk-donskaya-alamunichnikov-sw-2	msk-donskaya-alamunichnikov-sw-1	DHCP
0.004	msk-donskaya-alamunichnikov-sw-1	msk-donskaya-alamunichnikov-mc-1	DHCP
0.004	msk-donskaya-alamunichnikov-sw-1	msk-donskaya-alamunichnikov-gw-1	DHCP
0.004	msk-donskaya-alamunichnikov-sw-1	msk-donskaya-alamunichnikov-sw-4	DHCP
0.005	msk-donskaya-alamunichnikov-sw-2	web	DHCP
0.005	msk-donskaya-alamunichnikov-sw-2	file	DHCP
0.005	msk-donskaya-alamunichnikov-sw-2	msk-donskaya-alamunichnikov-sw-1	DHCP
0.005	msk-donskaya-alamunichnikov-sw-1	msk-donskaya-alamunichnikov-mc-1	DHCP
0.005	msk-donskaya-alamunichnikov-sw-1	msk-donskaya-alamunichnikov-gw-1	DHCP

Рис. 16: Список событий по DHCP запросу

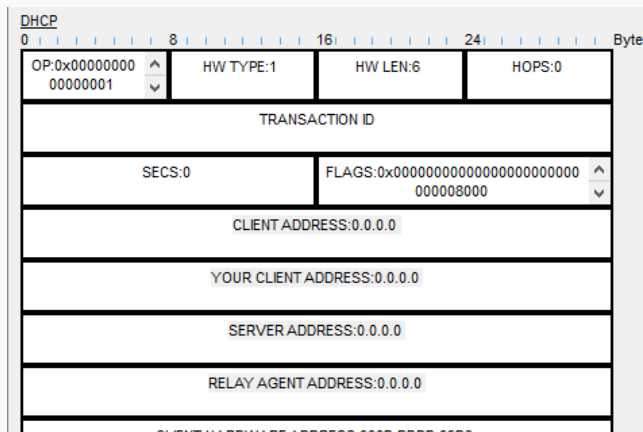


Рис. 17: DHCP запрос на выделение адреса. Заголовки пакета

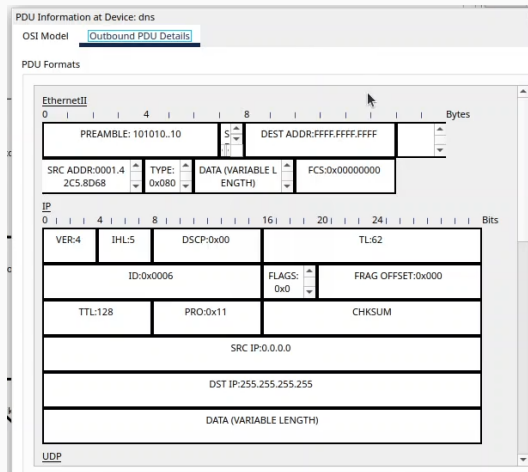


Рис. 18: DHCP ответ с выделенным адресом. Заголовки пакета

В процессе выполнения данной лабораторной работы я приобрел практические навыки по настройке динамического распределения IP-адресов посредством DHCP в локальной сети