

# Лабораторная работа №8

Настройка сетевых сервисов.DHCP

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## Информация

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## Вводная часть

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## 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

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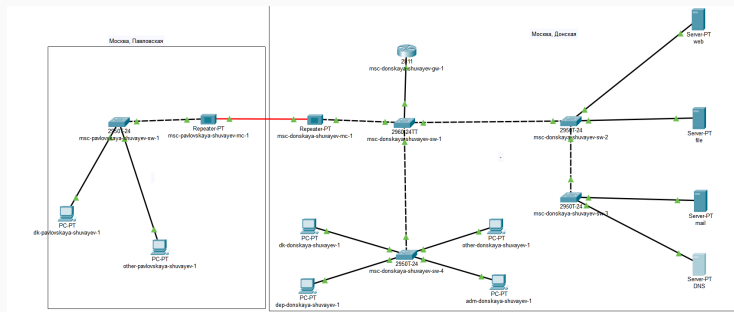


Figure 1: Логическая схема локальной сети с добавленным DNS-сервером

```
User Access Verification

Password:

msc-donskaya-shuvayev-sw-3>en
Password:
msc-donskaya-shuvayev-sw-3#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
msc-donskaya-shuvayev-sw-3(config)#interface f0/2
msc-donskaya-shuvayev-sw-3(config-if)#switchport mode access
msc-donskaya-shuvayev-sw-3(config-if)#switchport access vlan 3
msc-donskaya-shuvayev-sw-3(config-if)#exit
msc-donskaya-shuvayev-sw-3(config)#exit
msc-donskaya-shuvayev-sw-3#
%SYS-5-CONFIG_I: Configured from console by console
write m
Building configuration...
[OK]
msc-donskaya-shuvayev-sw-3#
```

Figure 2: Активация порта



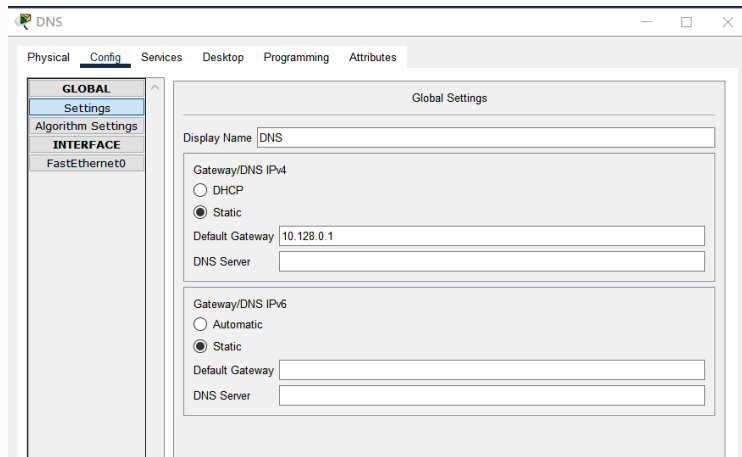


Figure 3: Конфигурация dns-сервера

# Выполнение лабораторной работы

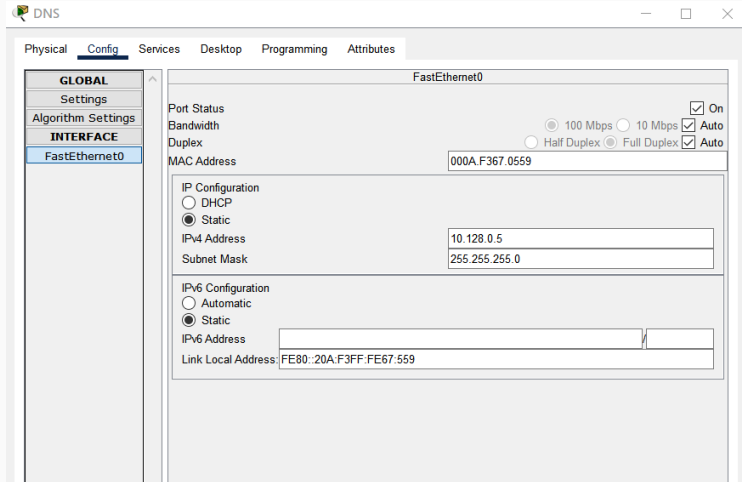


Figure 4: Конфигурация dns-сервера

## Выполнение лабораторной работы.

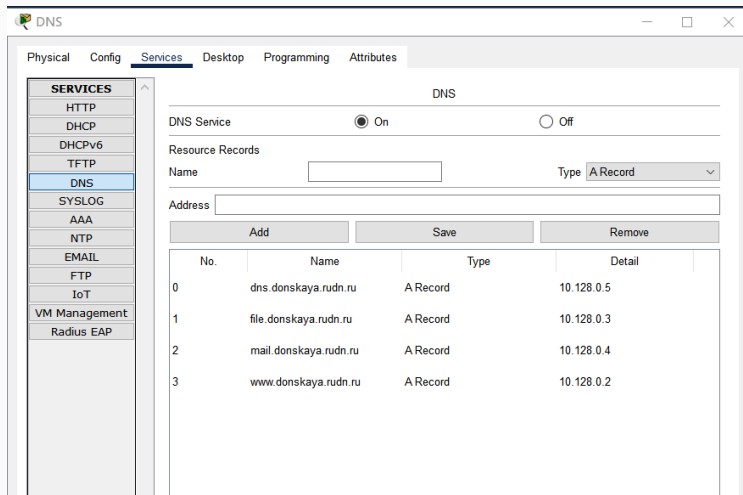


Figure 5: Окно настройки сервиса DNS

**Table 1:** Регламент выделения ip-адресов (для сети класса C)

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

User Access Verification

Password:

```
msc-donskaya-shuvayev-sw-3>en
```

Password:

```
msc-donskaya-shuvayev-sw-3#conf t
```

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

```
msc-donskaya-shuvayev-sw-3(config)#interface f0/2
```

```
msc-donskaya-shuvayev-sw-3(config-if)#switchport mode access
```

```
msc-donskaya-shuvayev-sw-3(config-if)#switchport access vlan 3
```

```
msc-donskaya-shuvayev-sw-3(config-if)#exit
```

```
msc-donskaya-shuvayev-sw-3(config)#exit
```

```
msc-donskaya-shuvayev-sw-3#
```

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

```
write m
```

```
Building configuration...
```

```
[OK]
```

```
msc-donskaya-shuvayev-sw-3#
```

Figure 6: Настройка DHCP-сервис на маршрутизаторе

```
m3c-donskaya-shuvayev-gw-1(config)#service dhcp
m3c-donskaya-shuvayev-gw-1(config)#ip dhcp pool dk
m3c-donskaya-shuvayev-gw-1(dhcp-config)#network 10.128.3.0 255.255.255.0
m3c-donskaya-shuvayev-gw-1(dhcp-config)#default-router 10.128.3.1
m3c-donskaya-shuvayev-gw-1(dhcp-config)#dns-server 10.128.0.5
^
% Invalid input detected at '^' marker.

m3c-donskaya-shuvayev-gw-1(dhcp-config)#dns-server 10.128.0.5
m3c-donskaya-shuvayev-gw-1(dhcp-config)#exit
m3c-donskaya-shuvayev-gw-1(config)#ip dhcp excluded-address 10.128.3.1 10.128.3.29
m3c-donskaya-shuvayev-gw-1(config)#ip dhcp excluded-address 10.128.3.200 10.128.3.254
m3c-donskaya-shuvayev-gw-1(config)#ip dhcp pool departments
m3c-donskaya-shuvayev-gw-1(dhcp-config)#network 10.128.4.0 255.255.255.0
m3c-donskaya-shuvayev-gw-1(dhcp-config)#default-router 10.128.4.1
m3c-donskaya-shuvayev-gw-1(dhcp-config)#dns-server 10.128.0.5
m3c-donskaya-shuvayev-gw-1(dhcp-config)#exit
m3c-donskaya-shuvayev-gw-1(config)#ip dhcp excluded-address 10.128.4.1 10.128.4.29
m3c-donskaya-shuvayev-gw-1(config)#ip dhcp excluded-address 10.128.4.200 10.128.4.254
m3c-donskaya-shuvayev-gw-1(config)#ip dhcp pool adm
m3c-donskaya-shuvayev-gw-1(dhcp-config)#network 10.128.5.0 255.255.255.0
m3c-donskaya-shuvayev-gw-1(dhcp-config)#default-router 10.128.5.1
^
% Invalid input detected at '^' marker.

m3c-donskaya-shuvayev-gw-1(dhcp-config)#default-router 10.128.5.1
m3c-donskaya-shuvayev-gw-1(dhcp-config)#dns-server 10.128.0.5
m3c-donskaya-shuvayev-gw-1(dhcp-config)#exit
m3c-donskaya-shuvayev-gw-1(config)#ip dhcp excluded-address 10.128.5.1 10.128.5.29
m3c-donskaya-shuvayev-gw-1(config)#ip dhcp excluded-address 10.128.5.200 10.128.5.254
m3c-donskaya-shuvayev-gw-1(config)#ip dhcp pool other
m3c-donskaya-shuvayev-gw-1(dhcp-config)#network 10.128.6.0 255.255.255.0
m3c-donskaya-shuvayev-gw-1(dhcp-config)#default-router 10.128.6.1
^
% Invalid input detected at '^' marker.

m3c-donskaya-shuvayev-gw-1(dhcp-config)#default-router 10.128.6.1
m3c-donskaya-shuvayev-gw-1(dhcp-config)#dns-server 10.128.0.5
m3c-donskaya-shuvayev-gw-1(dhcp-config)#exit
m3c-donskaya-shuvayev-gw-1(config)#ip dhcp excluded-address 10.128.6.1 10.128.6.29
m3c-donskaya-shuvayev-gw-1(config)#ip dhcp excluded-address 10.128.6.200 10.128.6.254
m3c-donskaya-shuvayev-gw-1(config)#
```

Figure 7: Настройка DHCP-сервис на маршрутизаторе

## Выполнение лабораторной работы

```
[OK]
msc-donskaya-shuvayev-gw-1#sh ip dhcp pool

Pool dk :
Utilization mark (high/low)      : 100 / 0
Subnet size (first/next)          : 0 / 0
Total addresses                   : 254
Leased addresses                  : 0
Excluded addresses                : 8
Pending event                     : none

1 subnet is currently in the pool
Current index   IP address range      Leased/Excluded/Total
10.128.3.1      10.128.3.1 - 10.128.3.254  0 / 8 / 254

Pool departments :
Utilization mark (high/low)      : 100 / 0
Subnet size (first/next)          : 0 / 0
Total addresses                   : 254
Leased addresses                  : 0
Excluded addresses                : 8
Pending event                     : none

1 subnet is currently in the pool
Current index   IP address range      Leased/Excluded/Total
10.128.4.1      10.128.4.1 - 10.128.4.254  0 / 8 / 254

Pool adm :
Utilization mark (high/low)      : 100 / 0
Subnet size (first/next)          : 0 / 0
Total addresses                   : 254
Leased addresses                  : 0
Excluded addresses                : 8
Pending event                     : none

1 subnet is currently in the pool
Current index   IP address range      Leased/Excluded/Total
10.128.5.1      10.128.5.1 - 10.128.5.254  0 / 8 / 254

Pool other :
Utilization mark (high/low)      : 100 / 0
Subnet size (first/next)          : 0 / 0
Total addresses                   : 254
Leased addresses                  : 0
Excluded addresses                : 8
Pending event                     : none

1 subnet is currently in the pool
Current index   IP address range      Leased/Excluded/Total
10.128.6.1      10.128.6.1 - 10.128.6.254  0 / 8 / 254
msc-donskaya-shuvayev-gw-1#
```

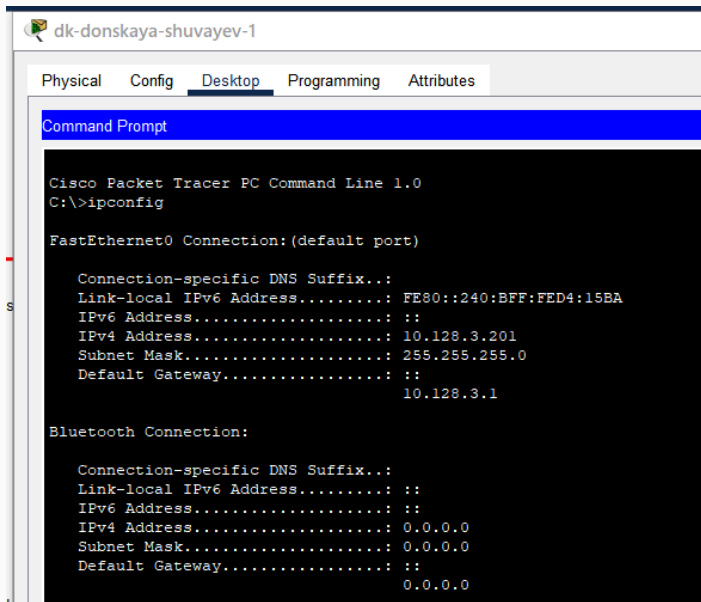
Figure 8: Информация о пулах DHCP

```
1 subnet is currently in the pool
Current index      IP address range      Leased/Excluded/Total
10.128.6.1        10.128.6.1 - 10.128.6.254  0 / 8 / 254
msc-donskaya-shuvayev-gw-1#sh ip dhcp binding
IP address      Client-ID/      Lease expiration      Type
                Hardware address
```

Figure 9: Информация о привязках выданных адресов



## Выполнение лабораторной работы



The screenshot shows the Cisco Packet Tracer PC Command Line interface for a PC named 'dk-donskaya-shuvayev-1'. The interface has tabs for 'Physical', 'Config', 'Desktop', 'Programming', and 'Attributes', with 'Desktop' currently selected. The 'Command Prompt' window displays the following configuration details:

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ipconfig

FastEthernet0 Connection: (default port)

    Connection-specific DNS Suffix...:
    Link-local IPv6 Address . . . . .: FE80::240:BFF:FED4:15BA
    IPv6 Address . . . . .: ::
    IPv4 Address . . . . .: 10.128.3.201
    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
```

# Выполнение лабораторной работы

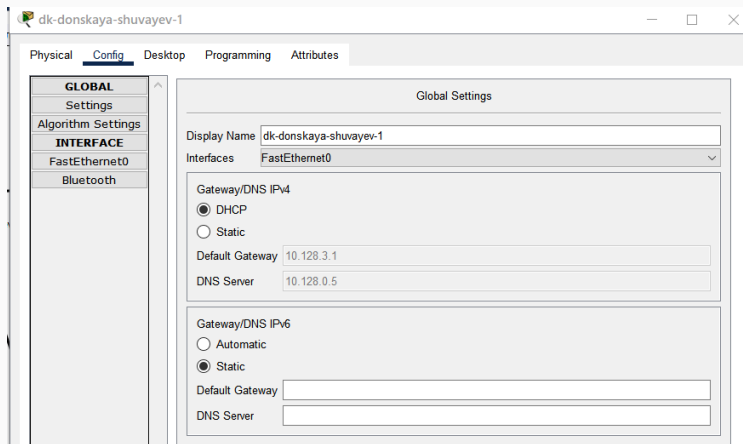


Figure 11: Замена в настройках статического распределения адресов на динамическое

```
C:\>ipconfig /all

FastEthernet0 Connection:(default port)

    Connection-specific DNS Suffix...:
    Physical Address.....: 0040.0BD4.15BA
    Link-local IPv6 Address.....: FE80::240:BFF:FED4:15BA
    IPv6 Address.....: ::
    IPv4 Address.....: 10.128.3.30
    Subnet Mask.....: 255.255.255.0
    Default Gateway.....: ::
                           10.128.3.1

    DHCP Servers.....: 10.128.3.1
    DHCPv6 IAID.....:
    DHCPv6 Client DUID.....: 00-01-00-01-77-70-AB-D1-00-40-0B-D4-15-BA
    DNS Servers.....: ::
                           10.128.0.5

Bluetooth Connection:

    Connection-specific DNS Suffix...:
    Physical Address.....: 0090.2B61.7957
    Link-local IPv6 Address.....: ::
    --More--
```

Figure 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 = 0ms, Average = 0ms
```

Figure 13: Проверка доступности устройств из разных подсетей

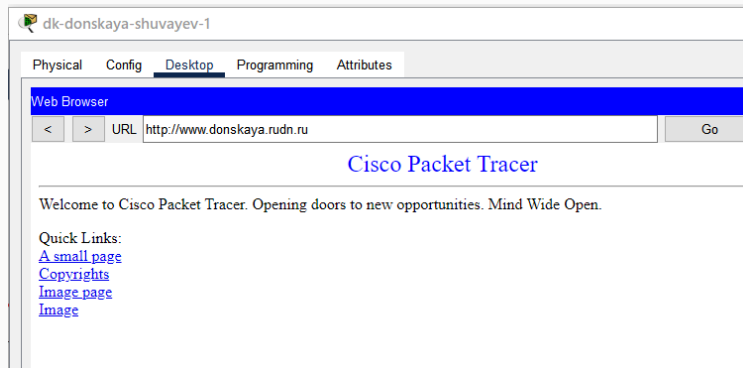


Figure 14: Информация по адресу www.donskaya.rudn.ru

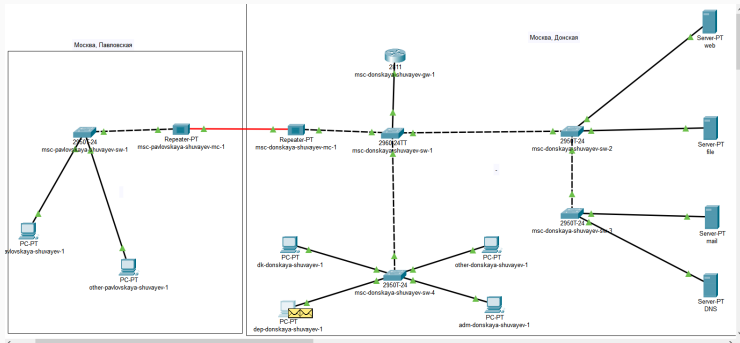


Figure 15: Запрос адреса по протоколу DHCP в режиме симуляции

## Выполнение лабораторной работы

Simulation Panel

Event List

	At Device	Type	
	dep-donskaya-shuvayev-1	DHCP	
	msc-donskaya-shuvayev-sw-4	DHCP	
	msc-donskaya-shuvayev-sw-1	DHCP	
	msc-donskaya-shuvayev-sw-1	DHCP	
	msc-donskaya-shuvayev-mc-1	DHCP	
	msc-donskaya-shuvayev-gw-1	DHCP	
	msc-donskaya-shuvayev-sw-2	DHCP	
	msc-donskaya-shuvayev-mc-1	DHCP	
	msc-donskaya-shuvayev-gw-1	DHCP	
	msc-donskaya-shuvayev-sw-2	DHCP	
	msc-pavlovskaya-shuvayev-mc-1	DHCP	
	msc-donskaya-shuvayev-sw-3	DHCP	
	msc-pavlovskaya-shuvayev-mc-1	DHCP	
	msc-donskaya-shuvayev-sw-3	DHCP	
	msc-pavlovskaya-shuvayev-sw-1	DHCP	
	msc-pavlovskaya-shuvayev-sw-1	DHCP	

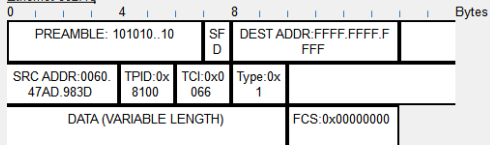
# Выполнение лабораторной работы

PDU Information at Device: msc-donskaya-shuvayev-gw-1

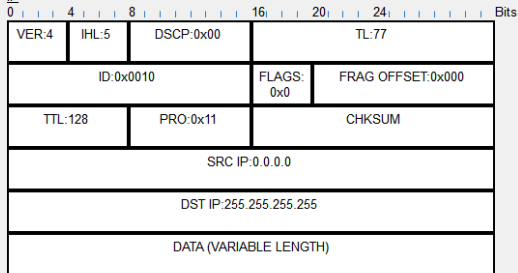
OSI Model Inbound PDU Details

PDU Formats

Ethernet 802.1q



IP



UDP



# Выполнение лабораторной работы

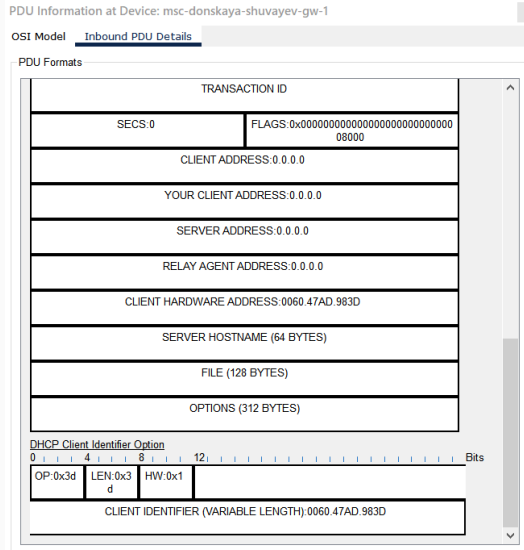


Figure 19. DHCP packet structure

## Выводы

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В процессе выполнения данной лабораторной работы я приобрел практические навыки по настройке динамического распределения IP-адресов посредством протокола DHCP (Dynamic Host Configuration Protocol) в локальной сети.