

# 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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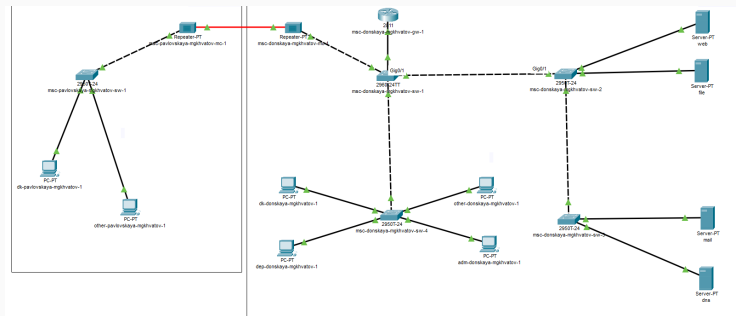
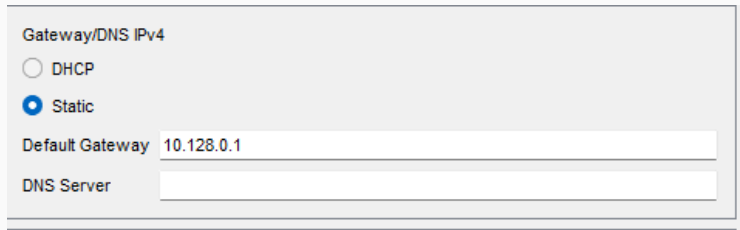


Рис. 1: Логическая схема локальной сети с добавленным DNS-сервером

```
msc-donskaya-mgkhvatov-sw-3>en
Password:
msc-donskaya-mgkhvatov-sw-3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msc-donskaya-mgkhvatov-sw-3(config)#interface f0/2
msc-donskaya-mgkhvatov-sw-3(config-if)#switchport mode access
msc-donskaya-mgkhvatov-sw-3(config-if)#switchport access vlan 3
msc-donskaya-mgkhvatov-sw-3(config-if)#exit
msc-donskaya-mgkhvatov-sw-3(config)#
```

Рис. 2: Активация порта





Gateway/DNS IPv4

☐ DHCP

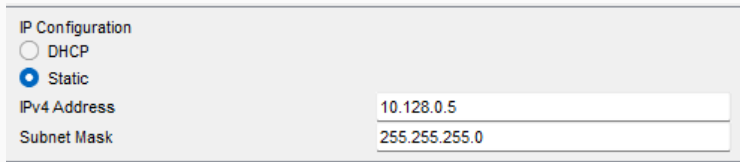
☒ Static

Default Gateway

DNS Server

The image shows a configuration window for 'Gateway/DNS IPv4'. It has two radio buttons: 'DHCP' and 'Static'. The 'Static' option is selected, indicated by a blue dot. Below the radio buttons, there are two text input fields. The first is labeled 'Default Gateway' and contains the IP address '10.128.0.1'. The second is labeled 'DNS Server' and is currently empty.

Рис. 3: Конфигурация dns-сервера



IP Configuration

☐ DHCP

☒ Static

IPv4 Address 10.128.0.5

Subnet Mask 255.255.255.0

The image shows a configuration window for IP settings. Under 'IP Configuration', the 'Static' radio button is selected. Below this, the 'IPv4 Address' is set to '10.128.0.5' and the 'Subnet Mask' is set to '255.255.255.0'.

Рис. 4: Конфигурация dns-сервера

# Выполнение лабораторной работы

Physical Config **Services** Desktop Programming Attributes

**SERVICES**

- HTTP
- DHCP
- DHCPv6
- TFTP
- DNS**
- SYSLOG
- AAA
- NTP
- EMAIL
- FTP
- IoT
- VM Management
- Radius EAP

DNS

DNS Service ☒ On ☐ Off

Resource Records

Name  Type **A Record** ▼

Address

No.	Name	Type	Detail
0	www.donskaya.rudn.ru	A Record	10.128.0.2
1	dns.donskaya.rudn.ru	A Record	10.128.0.5
2	file.donskaya.rudn.ru	A Record	10.128.0.3
3	mail.donskaya.rudn.ru	A Record	10.128.0.4

☐ Top

## Выполнение лабораторной работы

```
msc-donskaya-mgkhvatov-gw-1>en
Password:
msc-donskaya-mgkhvatov-gw-1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msc-donskaya-mgkhvatov-gw-1(config)#ip name server 10.128.0.5
^
% Invalid input detected at '^' marker.

msc-donskaya-mgkhvatov-gw-1(config)#ip name-server 10.128.0.5
msc-donskaya-mgkhvatov-gw-1(config)#service dhcp
msc-donskaya-mgkhvatov-gw-1(config)#dhcp pool dk
^
% Invalid input detected at '^' marker.

msc-donskaya-mgkhvatov-gw-1(config)#ip dhcp pool dk
msc-donskaya-mgkhvatov-gw-1(dhcp-config)#network 10.128.3.0 255.255.255.0
msc-donskaya-mgkhvatov-gw-1(dhcp-config)#default-router 10.128.3.1
msc-donskaya-mgkhvatov-gw-1(dhcp-config)#dns-server 10.128.0.5
msc-donskaya-mgkhvatov-gw-1(dhcp-config)#exit
msc-donskaya-mgkhvatov-gw-1(config)#ip dhcp excluded-address 10.128.3.1 10.128.3.29
msc-donskaya-mgkhvatov-gw-1(config)#ip dhcp excluded-address 10.128.3.200 10.128.3.254
msc-donskaya-mgkhvatov-gw-1(config)#ip dhcp pool departments
msc-donskaya-mgkhvatov-gw-1(dhcp-config)#network 10.128.4.0 255.255.255.0
msc-donskaya-mgkhvatov-gw-1(dhcp-config)#default-router 10.128.4.1
msc-donskaya-mgkhvatov-gw-1(dhcp-config)#dns-server 10.128.0.5
msc-donskaya-mgkhvatov-gw-1(dhcp-config)#exit
msc-donskaya-mgkhvatov-gw-1(config)#dhcp pool adm
^
% Invalid input detected at '^' marker.

msc-donskaya-mgkhvatov-gw-1(config)#ip dhcp pool adm
msc-donskaya-mgkhvatov-gw-1(dhcp-config)#network 10.128.5.0 255.255.255.0
msc-donskaya-mgkhvatov-gw-1(dhcp-config)#default-router 10.128.5.1
msc-donskaya-mgkhvatov-gw-1(dhcp-config)#dns-server 10.128.0.5
msc-donskaya-mgkhvatov-gw-1(dhcp-config)#exit
msc-donskaya-mgkhvatov-gw-1(config)#ip dhcp excluded-address 10.128.5.1 10.128.5.29
msc-donskaya-mgkhvatov-gw-1(config)#ip dhcp excluded-address 10.128.5.200 10.128.5.254
msc-donskaya-mgkhvatov-gw-1(config)#ip dhcp pool other
msc-donskaya-mgkhvatov-gw-1(dhcp-config)#network 10.128.6.0 255.255.255.0
msc-donskaya-mgkhvatov-gw-1(dhcp-config)#default-router 10.128.6.1
msc-donskaya-mgkhvatov-gw-1(dhcp-config)#dns-server 10.128.0.5
msc-donskaya-mgkhvatov-gw-1(dhcp-config)#exit
msc-donskaya-mgkhvatov-gw-1(config)#ip dhcp excluded-address 10.128.6.1 10.128.6.29
msc-donskaya-mgkhvatov-gw-1(config)#ip dhcp excluded-address 10.128.6.200 10.128.6.254
```

# Выполнение лабораторной работы

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

msc-donskaya-mgkhvatov-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                : 6
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 / 6 / 254

Pool departments :
Utilization mark (high/low)      : 100 / 0
Subnet size (first/next)         : 0 / 0
Total addresses                   : 254
Leased addresses                  : 0
Excluded addresses                : 6
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 / 6 / 254

Pool adm :
Utilization mark (high/low)      : 100 / 0
Subnet size (first/next)         : 0 / 0
Total addresses                   : 254
Leased addresses                  : 0
Excluded addresses                : 6
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 / 6 / 254

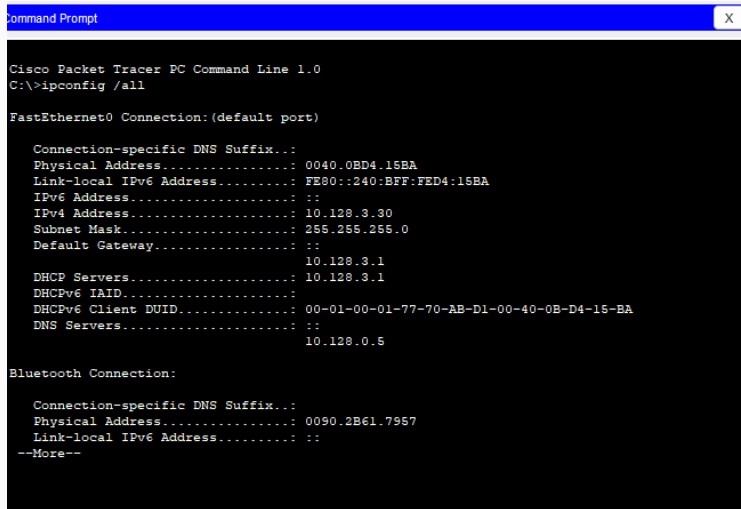
Pool other :
Utilization mark (high/low)      : 100 / 0
Subnet size (first/next)         : 0 / 0
Total addresses                   : 254
Leased addresses                  : 0
Excluded addresses                : 6
Pending event                     : none

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 / 6 / 254
```

```
msc-donskaya-mgkhvatov-gw-1#sh ip dhcp binding
IP address      Client-ID/      Lease expiration    Type
                Hardware address
msc-donskaya-mgkhvatov-gw-1#
```

Рис. 8: Информация о привязках выданных адресов

## Выполнение лабораторной работы



```
Command Prompt X

Cisco Packet Tracer PC Command Line 1.0
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--
```

Рис. 9: Просмотр статического ip-адреса

```
C:\>ping 10.128.3.30

Pinging 10.128.3.30 with 32 bytes of data:

Reply from 10.128.3.30: bytes=32 time<1ms TTL=127
Reply from 10.128.3.30: bytes=32 time<1ms TTL=127
Reply from 10.128.3.30: bytes=32 time<1ms TTL=127
Reply from 10.128.3.30: bytes=32 time<1ms TTL=127

Ping statistics for 10.128.3.30:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Рис. 10: Проверка доступности устройств из разных подсетей



```
Pinging 10.128.4.2 with 32 bytes of data:  
  
Request timed out.  
Reply from 10.128.4.2: bytes=32 time<1ms TTL=127  
Reply from 10.128.4.2: bytes=32 time=2ms TTL=127  
Reply from 10.128.4.2: bytes=32 time<1ms TTL=127  
  
Ping statistics for 10.128.4.2:  
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),  
Approximate round trip times in milli-seconds:  
    Minimum = 0ms, Maximum = 2ms, Average = 0ms
```

Рис. 11: Проверка доступности устройств из разных подсетей

## Выполнение лабораторной работы

Event List				
Vis.	Time(sec)	Last Device	At Device	Type
	0.836	msc-donskaya-mgkhvatov-sw-2	msc-donskaya-mgkhvatov-sw-1	STP
	0.836	msc-donskaya-mgkhvatov-mc-1	msc-pavlovskaya-mgkhvatov-mc-1	STP
	0.836	msc-donskaya-mgkhvatov-sw-4	other-donskaya-mgkhvatov-1	STP
	0.836	--	other-donskaya-mgkhvatov-1	ICMP
	0.837	msc-donskaya-mgkhvatov-sw-1	msc-donskaya-mgkhvatov-mc-1	STP
	0.837	msc-donskaya-mgkhvatov-sw-1	msc-donskaya-mgkhvatov-sw-4	STP
	0.837	msc-donskaya-mgkhvatov-sw-1	msc-donskaya-mgkhvatov-gw-1	STP
	0.837	msc-pavlovskaya-mgkhvatov-mc-1	msc-pavlovskaya-mgkhvatov-sw-1	STP
	0.837	other-donskaya-mgkhvatov-1	msc-donskaya-mgkhvatov-sw-4	ICMP
	0.838	msc-donskaya-mgkhvatov-mc-1	msc-pavlovskaya-mgkhvatov-mc-1	STP
	0.838	msc-pavlovskaya-mgkhvatov-sw-1	other-pavlovskaya-mgkhvatov-1	STP
	0.838	msc-donskaya-mgkhvatov-sw-4	msc-donskaya-mgkhvatov-sw-1	ICMP
	0.839	msc-pavlovskaya-mgkhvatov-mc-1	msc-pavlovskaya-mgkhvatov-sw-1	STP
	0.839	msc-donskaya-mgkhvatov-sw-1	msc-donskaya-mgkhvatov-gw-1	ICMP
	0.840	msc-donskaya-mgkhvatov-gw-1	msc-donskaya-mgkhvatov-sw-1	ICMP
	0.841	msc-donskaya-mgkhvatov-sw-1	msc-donskaya-mgkhvatov-sw-4	ICMP
	0.842	msc-donskaya-mgkhvatov-sw-4	dk-donskaya-mgkhvatov-1	ICMP
	0.843	dk-donskaya-mgkhvatov-1	msc-donskaya-mgkhvatov-sw-4	ICMP
	0.844	msc-donskaya-mgkhvatov-sw-4	msc-donskaya-mgkhvatov-sw-1	ICMP
	0.845	msc-donskaya-mgkhvatov-sw-1	msc-donskaya-mgkhvatov-gw-1	ICMP
	0.846	msc-donskaya-mgkhvatov-gw-1	msc-donskaya-mgkhvatov-sw-1	ICMP
	0.847	msc-donskaya-mgkhvatov-sw-1	msc-donskaya-mgkhvatov-sw-4	ICMP
Visible	0.848	msc-donskaya-mgkhvatov-sw-4	other-donskaya-mgkhvatov-1	ICMP

Рис. 12: Запрос в режиме симуляции

## 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.