МИНИСТЕРСТВО НАУКИ И ВЫСШЕГО ОБРАЗОВАНИЯ РОССИЙСКОЙ ФЕДЕРАЦИИ

Санкт-Петербургский национальный исследовательский университет информационных технологий, механики и оптики

Мегафакультет трансляционных информационных технологий

Факультет информационных технологий и программирования

Лабораторная работа №4

Проектирование локальной сети в среде моделирования

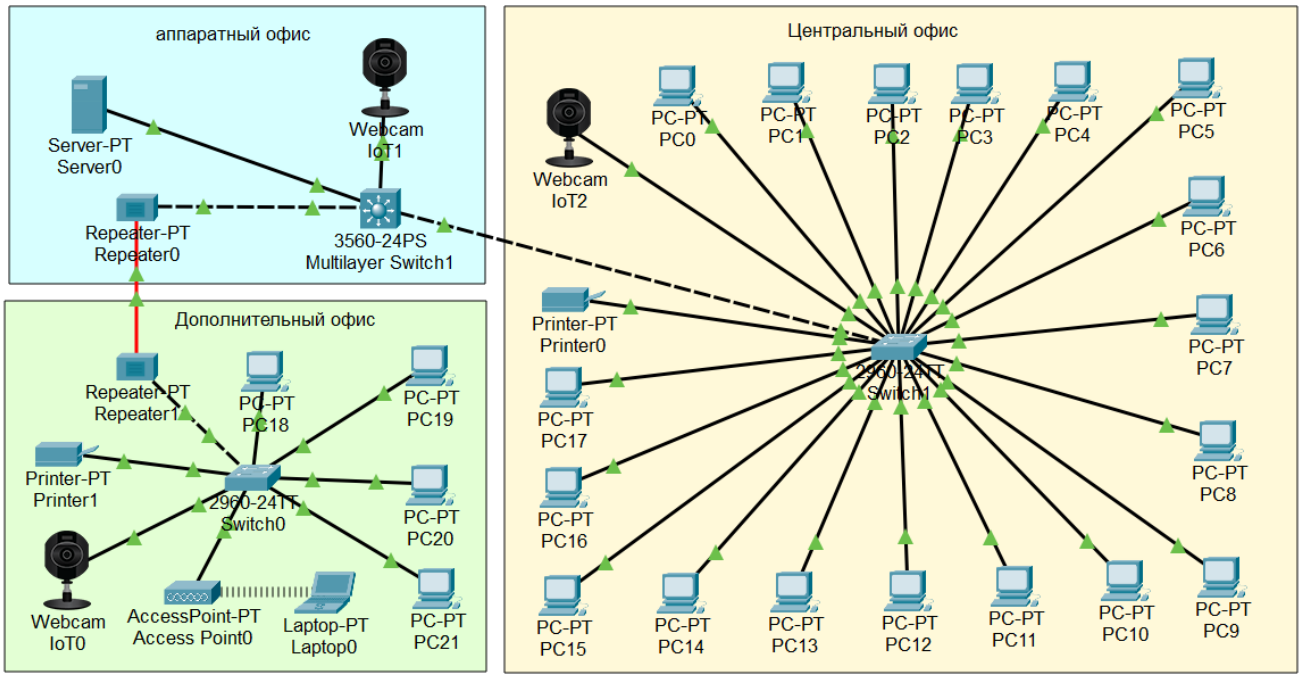
Выполнила студент группы №**М33091**

Зыонг Тхи Хуэ Линь
Исрат
Проверил

САНКТ-ПЕТЕРБУРГ

2024

Logical: Logical



Артефакты:

1) **ФАЙЛ МОДЕЛИ**
2) **КОМАНДЫ IOS, НЕОБХОДИМЫЕ, ДЛЯ КОНФИГУРИРОВАНИЯ КОММУТАТОРОВ СЕТИ ДО КОНЕЧНОГО 4 СОСТОЯНИЯ.**

На Multilayer Switch 3560-24PS:

Создание VLANs

```
Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 10
Switch(config-vlan)#vlan 20
Switch(config-vlan)#vlan 30
Switch(config-vlan)#vlan 40
Switch(config-vlan)#
Switch(config-vlan)#int vlan 10
Switch(config-if)#
%LINK-5-CHANGED: Interface Vlan10, changed state to up
ip address 10.10.0.1 255.255.255.0
Switch(config-if)#int vlan 20
Switch(config-if)#
%LINK-5-CHANGED: Interface Vlan20, changed state to up
ip address 10.20.0.1 255.255.255.0
Switch(config-if)#int vlan 30
Switch(config-if)#
%LINK-5-CHANGED: Interface Vlan30, changed state to up
ip address 10.30.0.1 255.255.255.0
Switch(config-if)#int vlan 40
Switch(config-if)#
%LINK-5-CHANGED: Interface Vlan40, changed state to up
ip address 10.40.0.2 255.255.255.0
Switch(config-if)#end
```

Режим конфигурации Trunk/Access на интерфейсах:

```
Switch(config-if)#int range fa0/3 - 4
Switch(config-if-range)#switchport trunk en
Switch(config-if-range)#switchport trunk encapsulation d
Switch(config-if-range)#switchport trunk encapsulation dot1q
Switch(config-if-range)#sw
Switch(config-if-range)#switchport mode trunk
Switch(config)#interface FastEthernet0/2
Switch(config-if)#switchport access vlan 30
Switch(config)#interface FastEthernet0/1
Switch(config-if)#switchport access vlan 40
```

На switch 2960-24TT в Дополнительном офисе:

Создание VLANs

```
Switch>en
Switch#conf
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 10
Switch(config-vlan)#vlan 20
Switch(config-vlan)#vlan 30
Switch(config-vlan)#vlan 40
Switch(config-vlan)#
```

Режим конфигурации Trunk/Access на интерфейсах:

```
Switch(config-vlan)#int range fa0/1-4
Switch(config-if-range)#switch
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#sw
Switch(config-if-range)#switchport access vlan 20
Switch(config-if-range)#exit
Switch(config)#int fa0/7
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 20
Switch(config-if)#int fa0/6
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 30
Switch(config-if)#int fa0/5
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 10
Switch(config-if)#
Switch(config)#interface FastEthernet0/8
Switch(config-if)#switchport mode trunk
```

На switch 2960-24TT в Центральном офисе:

Создание VLANs

```
Switch>en
Switch#conf
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 10
Switch(config-vlan)#vlan 20
Switch(config-vlan)#vlan 30
Switch(config-vlan)#vlan 40
Switch(config-vlan)#
```

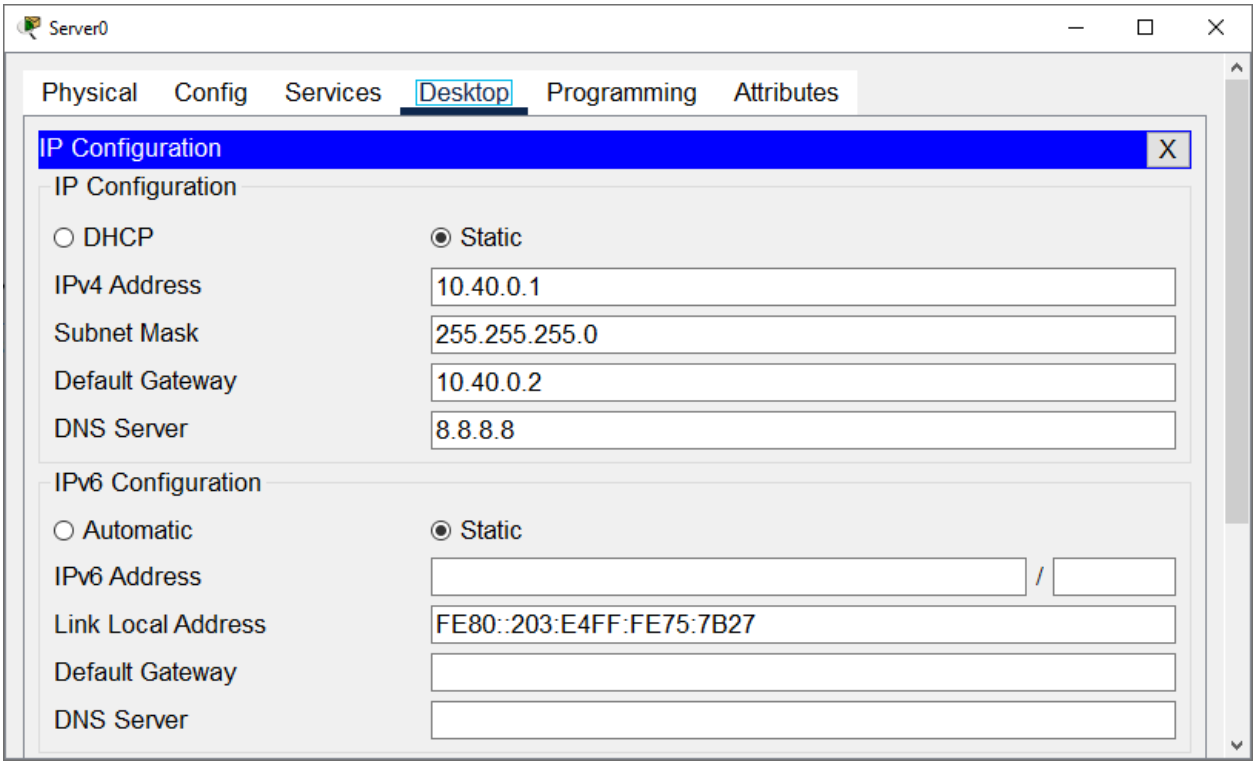
Режим конфигурации Trunk/Access на интерфейсах:

```
Switch(config-vlan)#int range fa0/1-18
Switch(config-if-range)#sw
Switch(config-if-range)#switchport mode a
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#sw
Switch(config-if-range)#switchport acc
Switch(config-if-range)#switchport access vlan 10
Switch(config-if-range)#
Switch(config-if-range)#int fa0/19
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 30
Switch(config-if)#int fa0/20
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 20
Switch(config)#interface FastEthernet0/21
Switch(config-if)#switchport mode trunk
```

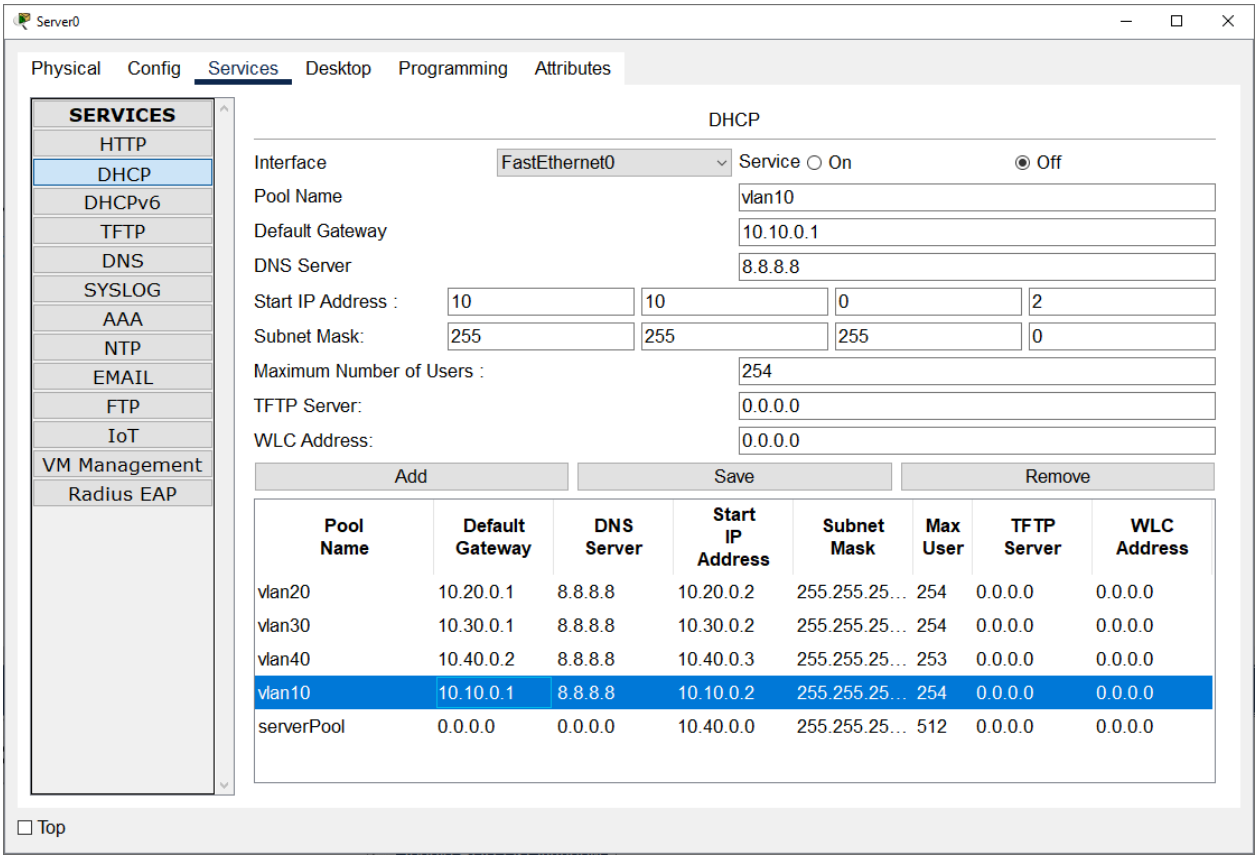
Конфигурации Server-PT

IP конфигурации: STATIC

Настройть IP-address/subnet/default gateway: Зайти сервер -> Desktop -> Ip Configuration.



Добавление DHCP pools:



конфигурирование DHCP-relay

На Multilayer Switch 3560-24PS CLI:

```
Switch(config)#int vlan 10
Switch(config-if)#ip helper-address 10.40.0.1
Switch(config-if)#int vlan 20
Switch(config-if)#ip helper-address 10.40.0.1
Switch(config-if)#int vlan 30
Switch(config-if)#ip helper-address 10.40.0.1
Switch(config-if)#int vlan 40
Switch(config-if)#ip helper-address 10.40.0.1
Switch(config-if)#
```

Маршрутизация:

```
Switch(config)#ip routing
```

3) **КОНСОЛЬНЫЙ ВЫВОД КОМАНД, ПОКАЗЫВАЮЩИХ КОНФИГУРАЦИЮ IP И VLAN НА КОММУТАТОРЕ CISCO 3560-24PS.**

```
Switch#show ip int brief
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/1        unassigned      YES unset  up                    up
FastEthernet0/2        unassigned      YES unset  up                    up
FastEthernet0/3        unassigned      YES unset  up                    up
FastEthernet0/4        unassigned      YES unset  up                    up
FastEthernet0/5        unassigned      YES unset  down                  down
FastEthernet0/6        unassigned      YES unset  down                  down
FastEthernet0/7        unassigned      YES unset  down                  down
FastEthernet0/8        unassigned      YES unset  down                  down
FastEthernet0/9        unassigned      YES unset  down                  down
FastEthernet0/10       unassigned      YES unset  down                  down
FastEthernet0/11       unassigned      YES unset  down                  down
FastEthernet0/12       unassigned      YES unset  down                  down
FastEthernet0/13       unassigned      YES unset  down                  down
FastEthernet0/14       unassigned      YES unset  down                  down
FastEthernet0/15       unassigned      YES unset  down                  down
FastEthernet0/16       unassigned      YES unset  down                  down
FastEthernet0/17       unassigned      YES unset  down                  down
FastEthernet0/18       unassigned      YES unset  down                  down
FastEthernet0/19       unassigned      YES unset  down                  down
FastEthernet0/20       unassigned      YES unset  down                  down
FastEthernet0/21       unassigned      YES unset  down                  down
FastEthernet0/22       unassigned      YES unset  down                  down
FastEthernet0/23       unassigned      YES unset  down                  down
FastEthernet0/24       unassigned      YES unset  down                  down
GigabitEthernet0/1     unassigned      YES unset  down                  down
GigabitEthernet0/2     unassigned      YES unset  down                  down
Vlan1                  unassigned      YES unset  administratively down down
Vlan10                 10.10.0.1       YES manual up                    up
Vlan20                 10.20.0.1       YES manual up                    up
Vlan30                 10.30.0.1       YES manual up                    up
Vlan40                 10.40.0.2       YES manual up                    up
Switch#
```

```
Switch#show vlan brief

VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                                 Fa0/9, Fa0/10, Fa0/11, Fa0/12
                                                 Fa0/13, Fa0/14, Fa0/15, Fa0/16
                                                 Fa0/17, Fa0/18, Fa0/19, Fa0/20
                                                 Fa0/21, Fa0/22, Fa0/23, Fa0/24
                                                 Gig0/1, Gig0/2
10   VLAN0010                          active
20   VLAN0020                          active
30   VLAN0030                          active    Fa0/2
40   VLAN0040                          active    Fa0/1
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                   active
1005 trnet-default                     active
Switch#
```

4) ДОКУМЕНТАЦИЮ НА СЕТЬ

a. VLAN

Number	**name**	**group**
10	Vlan10	компьютеры центрального офиса и клиенты, подключенные к WiFi в дополнительном офисе.
20	Vlan20	компьютеры и принтеры дополнительного офиса.
30	Vlan30	IP камеры, установленные в помещении центрального офиса, в аппаратной и дополнительном офисе
40	Vlan40	сервер (на нем следует настроить DHCP- сервер)

b. IP адресах,

- Server-PT (DHCP server): **STATIC**
  - IPv4: 10.40.0.1
  - Subnet Mask: 255.255.255.0
  - Default gateway: 10.40.0.2
  - DNS server: 8.8.8.8
- PC, printer, webcam: **DHCP**

с. Коммутаторах,

Multilayer Switch 3560-24PS - аппаратный офис	**Switch 2960-24TT - Центральный офис**	**Switch 2960-24TT - Дополнительный офис**
FastEthernet0/1 (VLAN 40; access): connect to DHCP server **FastEthernet0/2** (VLAN 30; access): connect to webcam IoT1 **FastEthernet0/3** (trunk): connect to switch 2960 (extra office) **FastEthernet0/4** (trunk): connect to switch 2960 (center office)	**FastEthernet0/1-18** (VLAN 10; access): connect to 18 PCs **FastEthernet0/19** (VLAN 30; access): connect to webcam IoT2 **FastEthernet0/20** (VLAN 20; access): connect to printer **FastEthernet0/21** (trunk): connect to Multilayer Switch 3560-24PS	**FastEthernet0/1-4** (VLAN 20; access): connect to 4 PCs **FastEthernet0/5** (VLAN 10; access): connec to AccessPoint-PT **FastEthernet0/6** (VLAN 30; access): connect to webcam **FastEthernet0/7** (VLAN 20; access): connect to printer **FastEthernet0/8** (trunk): connect to Multilayer Switch 3560-24PS

```
Device Name: Multilayer Switch1
Device Model: 3560-24PS
Hostname: Switch

Port                Link   VLAN   IP
FastEthernet0/1     Up     40     <no
FastEthernet0/2     Up     30     <no
FastEthernet0/3     Up     --     <no
FastEthernet0/4     Up     --     <no
FastEthernet0/5     Down   1      <no
FastEthernet0/6     Down   1      <no
FastEthernet0/7     Down   1      <no
FastEthernet0/8     Down   1      <no
FastEthernet0/9     Down   1      <no
FastEthernet0/10    Down   1      <no
FastEthernet0/11    Down   1      <no
FastEthernet0/12    Down   1      <no
FastEthernet0/13    Down   1      <no
FastEthernet0/14    Down   1      <no
FastEthernet0/15    Down   1      <no
FastEthernet0/16    Down   1      <no
FastEthernet0/17    Down   1      <no
FastEthernet0/18    Down   1      <no
FastEthernet0/19    Down   1      <no
FastEthernet0/20    Down   1      <no
FastEthernet0/21    Down   1      <no
FastEthernet0/22    Down   1      <no
FastEthernet0/23    Down   1      <no
FastEthernet0/24    Down   1      <no
GigabitEthernet0/1  Down   1      <no
GigabitEthernet0/2  Down   1      <no
Vlan1               Down   1      <no
Vlan10              Up     10     10.
Vlan20              Up     20     10.
Vlan30              Up     30     10.
Vlan40              Up     40     10.

Physical Location: Intercity > Home Ci
```

```
Device Name: Switch1
Custom Device Model: 2960 IOS15
Hostname: Switch

Port                Link   VLAN
FastEthernet0/1     Up     10
FastEthernet0/2     Up     10
FastEthernet0/3     Up     10
FastEthernet0/4     Up     10
FastEthernet0/5     Up     10
FastEthernet0/6     Up     10
FastEthernet0/7     Up     10
FastEthernet0/8     Up     10
FastEthernet0/9     Up     10
FastEthernet0/10    Up     10
FastEthernet0/11    Up     10
FastEthernet0/12    Up     10
FastEthernet0/13    Up     10
FastEthernet0/14    Up     10
FastEthernet0/15    Up     10
FastEthernet0/16    Up     10
FastEthernet0/17    Up     10
FastEthernet0/18    Up     10
FastEthernet0/19    Up     30
FastEthernet0/20    Up     20
FastEthernet0/21    Up     --
FastEthernet0/22    Down   1
FastEthernet0/23    Down   1
FastEthernet0/24    Down   1
GigabitEthernet0/1  Down   1
GigabitEthernet0/2  Down   1
Vlan1               Down   1

Physical Location: Intercity > H
```

```
Device Name: Switch0
Custom Device Model: 2960 IOS15
Hostname: Switch

Port                Link   VLAN   IP
FastEthernet0/1     Up     20     --
FastEthernet0/2     Up     20     --
FastEthernet0/3     Up     20     --
FastEthernet0/4     Up     20     --
FastEthernet0/5     Up     10     --
FastEthernet0/6     Up     30     --
FastEthernet0/7     Up     20     --
FastEthernet0/8     Up     --     --
FastEthernet0/9     Down   1      --
FastEthernet0/10    Down   1      --
FastEthernet0/11    Down   1      --
FastEthernet0/12    Down   1      --
FastEthernet0/13    Down   1      --
FastEthernet0/14    Down   1      --
FastEthernet0/15    Down   1      --
FastEthernet0/16    Down   1      --
FastEthernet0/17    Down   1      --
FastEthernet0/18    Down   1      --
FastEthernet0/19    Down   1      --
FastEthernet0/20    Down   1      --
FastEthernet0/21    Down   1      --
FastEthernet0/22    Down   1      --
FastEthernet0/23    Down   1      --
FastEthernet0/24    Down   1      --
GigabitEthernet0/1  Down   1      --
GigabitEthernet0/2  Down   1      --
Vlan1               Down   1      <nc

Physical Location: Intercity > Home Ci
```