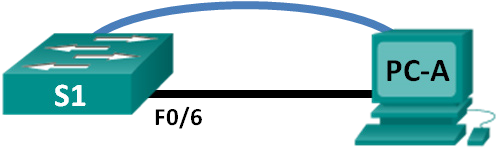
**1– Amaliy ishi.**

**Mavzu: Cisco Packet Tracer dasturida LAN va VLAN tarmoqlarni qurish.**

**Ishdan maqsad**

Kommutator qurilmasining tuzilishini, ishlash tamoyillarini hamda sozlash qoidalarini o‘rganishdan iborat.



2.1 – rasm. Tarmoq tuzilishi

# Manzillash jadvali

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Qurilma** | **Interfeys** | **IP-manzil** | **Tarmoq niqobi** | **Asosiy shlyuz** |
| S1 | VLAN 99 | 192.168.1.2 | 255.255.255.0 | 192.168.1.1 |
| PC-A | Tarmoq adapteri | 192.168.1.10 | 255.255.255.0 | 192.168.1.1 |

**Qisqacha nazariy ma’lumotlar**

Cisco kommutatorlarida kommutatorning virtual interfeysi (SVI) ga IP manzil qo‘yish mumkin. SVI yoki boshqarish manzili kommutatorga ko‘rsatkichlarni sozlash va ko‘rish maqsadida uzoqdan kirish uchun ishlatiladi. Agar SVI uchun VLAN 1 ga IP manzil o‘rnatilgan bo‘lsa, u holda VLAN 1 tarmog‘idagi hamma portlar avtomatik ravishda SVI boshqaruvining IP manziliga kirishi mumkin.

Laboratoriya ishini bajarishda topologiyani qurish va Cisco kommutatoriga konsol kabeli bilan bog‘lanish yoki uzoqdan kirish usuli (telnet yoki SSH) orqali kirishga ruxsat olish kerak. Kommutatorning asosiy ko‘rsatkichlarini sozlashdan oldin kommutatorning dastlabki holatini tekshirish kerak. Kommutatorning bu ko‘rsatkichlariga qurilmaning nomi, interfeysning nomi, lokal parollar, MOTD (qurilmaga kirishda kiruvchini ogohlantiruvchi xabar) banneri, IP manzil, statik MAC manzilni qo‘yilganligi kiradi.

**Kerakli resurslar:**

* 1 ta kommutator (Cisco 2960 operatsion tizimi Cisco IOS 15.0(2), obraz lanbasek9);
* 1 ta kompyuter (operatsion tizimi Windows 7, Vista yoki XP da emulyator terminal dasturi, Masalan: Tera Term, Patty);
* Cisco IOS qurilmasini konsol porti orqali sozlash uchun konsol kabeli;
* Ethernet kabeli.

# 1. Kommutatorni sozlashni tekshirish

* 1. **Topologiyaga mos ravishda kabellarni ulang**

1. Topologiyaga mos ravishda konsolli ulanishni o‘rnating. Bunda Ethernet kabelini PC-A ga ulamang (bu real qurilmaga ulanishda).

PC-A dan kommutatorga Tera Term yoki boshqa dastur yordamida konsolli ulanishni o‘rnating.

Nima sababdan kommutatorni boshlang‘ich sozlashda konsolli bog‘lanish qo‘llaniladi? Nimaga kommutatorga Telnet yoki SSH orqali ulanish mumkin emas?

* 1. **Kommutatorning dastlabki holatini tekshiring.**

Kommutatorni dastlabki holati: IOS ma’lumotlari, interfeys xususiyatlari, VLAN va flesh – xotira to‘g‘risidagi ma’lumotlarni tekshiramiz.

Kommutator IOS ning barcha buyruqlari imtiyoz rejimida bajarish mumkin. Imtiyoz rejimiga kirishda begonalarni qurilmadan foydalanishini oldini olish va global konfiguratsiya rejimiga to‘g‘ridan to‘g‘ri o‘tib ketmaslik hamda ishchi ko‘rsatkichlarni sozlash uchun ishlatiladigan buyruqlarga kirmaslik uchun parol yordamida cheklash kerak.

Imtiyoz to‘plamiga foydalanuvchi rejimining buyruqlari kiradi. SHuningdek boshqa buyruqli rejimlarga o‘tishni bajaruvchi **configure** buyrug‘i kiradi. Imtiyoz rejimiga kirish uchun **Enable** buyrug‘ini kiriting.

**a**. Imtiyoz rejimiga o‘tish uchun foydalanuvchi rejimida kommutatorga Switch> **enable** buyrug‘ini yozing.

Switch> **enable**

Switch#

Qatordagi o‘zgarish imtiyoz rejimiga o‘tganligiga e’tibor bering.

Kommutatorning konfiguratsiyasini tekshirish uchun imtiyoz rejimida **show running-config** buyrug‘ini kiriting. Agar kommutatorda sozlangan fayllar saqlangan bo‘lsa, ularni o‘chirib tashlang.

**b.** "Running configuration" faylini o‘rganing

Switch# **show running-config**

2960 kommutatori nechta FastEthernet interfeyslari mavjud? \_\_\_\_\_\_\_\_

2960 kommutatori nechta Gigabit Ethernet interfeyslari mavjud? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

VTY-kanalining diapazon qiymati qancha? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**c.** Tezkor xotira qurilmasi (TXQ - ОЗУ) (NVRAM) dagi zagruzka konfiguratsiya (startup configuration) faylini o‘rganing.

Switch# **show startup-config**

startup-config is not present

Nimaga bu xabar paydo bo‘ldi ? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**d.** VLAN 1 uchun SVI xarakteristikalarini o‘rganing.

Switch# **show interface vlan1**

VLAN 1 tarmog‘i uchun IP-manzil qo‘yilganmi? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

SVI qanday MAC-manzilga ega? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Ushbu interfeys yoqilganmi? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Switch# **show ip interface vlan1** qanday ma’lumotlar chiqdi?

**e.** Kommutatorning Cisco IOS operatsion tizimi to‘g‘risidagi ma’lumotni o‘rganing. Switch# **show version**

Hozirda ishlab turgan kommutator qaysi Cisco IOS operatsion tizimda ishlaydi? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Tizimning fayl obrazi qanday nomlanadi? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Kommutatordagi VLAN tarmog‘i parametrlarini dastlabki holatini o‘rganing?

Switch# **show vlan**

VLAN 1 tarmog‘iga qanday nom berilgan? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Ushbu VLAN qanday portlarga ega? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# 2. Tarmoq qurilmasining asosiy ko‘rsatkichlarini sozlash

**2.1.** Kommutatorning asosiy parametrlari: qurilmaning nomi, lokal parollar, MOTD (qurilmaga kirishda kiruvchini ogohlantiruvchi xabar) banneri, boshqaruv manzili va Telnet orqali kirishlarni sozlang

1. Agar kommutatorning NVRAM xotirasida konfiguratsiyaning fayli saqlanmagan bo‘lsa, siz imtiyoz rejimda bo‘lasiz. Agar qator Switch> ga o‘zgargan bo‘lsa **enable** ni yozing.

Switch> **enable**

Switch#

1. Global konfiguratsiya rejimiga o‘ting.

Switch# **configure terminal**

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

Switch(config)#

Global konfiguratsiya rejimini ko‘rsatish uchun qator yana o‘zgardi.

1. Kommutatorga nom bering.

Switch(config)# **hostname S1**

S1(config)#

1. Parolni shifrlanishini sozlang.

S1(config)# **service password-encryption**

S1(config)#

1. Imtiyoz rejimiga kirish uchun maxfiy parol sifatida **class** bering.

S1(config)# **enable secret class**

S1(config)#

1. DNS da xohlamagan izlashlarni bekor qiling.

S1(config)# **no ip domain-lookup**

S1(config)#

1. MOTD (qurilmaga kirishda kiruvchini ogohlantiruvchi xabar) bannerini sozlang.

S1(config)# **banner motd #**

Enter Text message. End with the character ‘#’.

**Unauthorized access is strictly prohibited. #**

1. Rejimlarga o‘tishdagi o‘tishlarni sozlanganligini tekshiring.

S1(config)# **exit**

S1#

\*Mar 1 00:19:19.490: %SYS-5-CONFIG\_I: Configured from console by console

S1# **exit**

S1 con0 is now available

**Press RETURN to get started.**

Unauthorized access is strictly prohibited.

S1>

1. Foydalanuvchi rejimidan imtiyoz rejimiga o‘ting. Parol so‘ralganda **class** ni kiriting.

S1> **enable**

Password:

S1#

Izoh: kiritishda parol ko‘rinmaydi.

1. Kommutatorning SVI siga IP manzil qo‘yish uchun global rejimga kiring. Bu esa kommutatorni uzoqdan boshqarish imkoniyatini beradi.

S1 kommutatorni uzoqdagi PC-A kompyuter orqali boshqarishdan oldin kommutatorga IP manzil qo‘yish kerak. Kommutatorning dastlabki xolatidagi konfiguratsiyaga asosan kommutatorni boshqarish VLAN 1 orqali amalga oshiriladi. Lekin kommutatorning dastlabki konfiguratsiyasida administrativ VLAN sifatida VLAN 1 ni qo‘yish tavsiya qilinmaydi.

Boshqarish maqsadida VLAN 99 ni ishlating. VLAN 99 tasodifiy qilib olindi. Shu sababli siz boshqa VLAN lardan foydalanishingiz mumkin.

Dastlab, kommutatorda VLAN 99 ni yarating. Kommutatorning ichki virtual interfeys (SVI) VLAN 99 ga IP manzil 192.168.1.2 va tarmoq niqobi 255.255.255.0 ni sozlang.

S1# **configure terminal**

S1(config)# **vlan 99**

S1(config-vlan)# **exit**

S1(config)# **interface vlan99**

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan99, changed state to down

S1(config-if)# **ip address 192.168.1.2 255.255.255.0**

S1(config-if)# **no shutdown**

S1(config-if)# **exit**

S1(config)#

VLAN 99 interfeysi **no shutdown** buyrug‘i berilgan bo‘lsa ham o‘chirilganligiga e’tibor bering. Hozirgi xolatda VLAN 99 tarmog‘iga kommutatorning portlari biriktirilmaganligi sababli, bu interfeys o‘chgan.

k. VLAN 99 ga barcha portlarni biriktiramiz.

S1(config)# **interface range f0/1 – 24,g0/1 - 2**

S1(config-if-range)# **switchport access vlan 99**

S1(config-if-range)# **exit**

S1(config)#

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan99, changed state to up

Kompyuterlar o‘rtasida aloqani o‘rnatish uchun kompyuterlar ulangan kommutatordagi portlar bitta VLAN da bo‘lishi kerak.VLAN 1 interfeyslarining barchasi o‘chirilgan. Bir necha daqiqadan so‘ng VLAN 99 yonadi, chunki eng kamida bitta aktiv port (F0/6 portiga PC-A kompyuter ulangan) VLAN 99 tarmog‘iga ulangan.

1. Barcha foydalanuvchi portlar VLAN 99 tarmog‘ida ekanligiga ishonch hosil qilish uchun **show vlan brief** buyrug‘ini bering.

S1# **show vlan brief**

VLAN Name Status Ports

---- -------------------------------- --------- -------------------------------

1 default active

99 VLAN0099 active Fa0/1, Fa0/2, Fa0/3, Fa0/4

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

Gi0/1, Gi0/2

* 1. fddi-default act/unsup
  2. token-ring-default act/unsup
  3. fddinet-default act/unsup
  4. trnet-default act/unsup

1. S1 kommutator uchun IP shlyuzni o‘rnating. Agar tarmoqda bitta marshrutizator bo‘lsa va kommutatorda hech bir shlyuz o‘rnatilmagan bo‘lsa, kommutatorni boshqa tarmoqdan turib boshqarib bo‘lmaydi. Kommutator boshqa tarmoqlarning exo so‘rovlariga javob qaytarmaydi. Faraz qiling tashqi tarmoqqa chiqish uchun LAN ni marshrutizatorga uladingiz. Bizning misolda tashqi IP shlyuz hisobga olinmagan. Lekin tashqi tarmoqqa chiqish uchun marshrutizatorning LAN interfeysiga 192.168.1.1 ni beramiz. Buni kommutatorga asosiy shlyuz qilib o‘rnatamiz.

S1(config)# **ip default-gateway 192.168.1.1**

S1(config)#

1. Konsol port orqali kirishni ham chegaralash kerak. Dastlabki holatdagi konfiguratsiyaga asosan barcha konsolli ulanishlar parolsiz sozlangan bo‘lishi kerak. Konsol xabarlarini uzluksizligini ta’minlash uchun **logging synchronous** buyrug‘i kiritiladi.

S1(config)# **line con 0**

S1(config-line)# **password cisco**

S1(config-line)# **login**

S1(config-line)# **logging synchronous**

S1(config-line)# **exit**

S1(config)#

1. Kommutator telnet orqali kirishga ruxsat berishi uchun, ya’ni uzoqdan boshqarish uchun virtual bog‘lanish kanali (vty) ni sozlash kerak. Agar vty paroli qo‘yilmasa telnet orqali qurilmaga kirib bo‘lmaydi.

S1(config)# **line vty 0 15**

S1(config-line)# **password cisco**

S1(config-line)# **login**

S1(config-line)# **end**

S1#

\*Mar 1 00:06:11.590: %SYS-5-CONFIG\_I: Configured from console by console

**Login** buyrug‘i nima uchun kerak? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**2.2. PC-A kompyuteri uchun IP manzil qo‘ying.**

Manzillash jadvaliga muvofiq kompyuterga IP manzil va tarmoq niqobini o‘rnating. Ko‘rilayotgan topologiya uchun asosiy shlyuz kerak emas.

1. ekranning o‘ng tomondagi pastki burchagidagi belgiga sichqonchaning chap tugmasini 2 marta bosing.
2. “Подключение по локалной сети” belgisiga 2 marta sichqonchaning chap tugmasini bosing.
3. Chiqqan oynadan “Протокол Интернета TCP/IP” qatori tanlanib, “Свойства” tugmasi bosiladi.
4. Chiqqan oynadan **IP-manzil** va **tarmoq niqobi** kiritiladi.

**3. Tarmoq bog‘lanishni tekshiring**

**3.1. Kommutatorning konfiguratsiyasini chiqaring.**

Konsol orqali ulangan PC-A kompyuterda kommutatorning konfiguratsiyasini chiqaring. **Show run** buyrug‘i hozirgi konfiguratsiyani sahifa ko‘rinishida chiqaradi. Keyingi qatorlarni ko‘rish uchun ПРОБЕЛ tugmasi bosiladi.

**a.** Bu yerda konfiguratsiyaga misol keltirilgan. Kiritgan sozlanishlar sariq rangda ajratilgan. Konfiguratsiyaning boshqa parametrlari IOS ning o‘zida o‘rnatilgan sozlanish hisoblanadi.

S1# **show run**

Building configuration...

Current configuration : 2206 bytes !

version 15.0 no service pad service timestamps debug datetime msec service timestamps log datetime msec service password-encryption !

hostname S1 !

boot-start-marker

boot-end-marker !

enable secret 4 06YFDUHH61wAE/kLkDq9BGho1QM5EnRtoyr8cHAUg.2

no aaa new-model system mtu routing 1500 ! !

no ip domain-lookup !

**<output omitted>** !

interface FastEthernet0/24 switchport access vlan 99 !

interface GigabitEthernet0/1 !

interface GigabitEthernet0/2 !

interface Vlan1 no ip address no ip route-cache !

interface Vlan99 ip address 192.168.1.2 255.255.255.0 no ip route-cache ! ip default-gateway 192.168.1.1 ip http server ip http secure-server !

banner motd ^C Unauthorized access is strictly prohibited. ^C !

line con 0 password 7 104D000A0618 logging synchronous login line vty 0 4 password 7 14141B180F0B login line vty 5 15 password 7 14141B180F0B login ! end

**b.** Administrativ VLAN 99 ni parametrlarini tekshiring.

S1# **show interface vlan 99**

Vlan99 is up, line protocol is up

Hardware is EtherSVI, address is 0cd9.96e2.3d41 (bia 0cd9.96e2.3d41)

Internet address is 192.168.1.2/24 MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec, reliability 255/255, txload 1/255, rxload 1/255 Encapsulation ARPA, loopback not set

ARP type: ARPA, ARP Timeout 04:00:00

Last input 00:00:06, output 00:08:45, output hang never

Last clearing of "show interface" counters never

Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0

Queueing strategy: fifo

Output queue: 0/40 (size/max)

5 minute input rate 0 bits/sec, 0 packets/sec

5 minute output rate 0 bits/sec, 0 packets/sec

175 packets input, 22989 bytes, 0 no buffer

Received 0 broadcasts (0 IP multicast)

0 runts, 0 giants, 0 throttles

1. input erPOPs, 0 CRC, 0 frame, 0 overrun, 0 ignored
2. packets output, 64 bytes, 0 underruns

0 output erPOPs, 0 interface resets

0 output buffer failures, 0 output buffers swapped out

Ushbu interfeysning o‘tkazish polosasi qanday? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

VLAN 99 qanday xolatda? \_\_\_\_\_\_\_\_\_

**3.2. To‘g‘ridan to‘g‘ri bog‘lanishni exo so‘rov jo‘natish orqali tekshiring.**

**a.** PC-A kompyuterdan kommutatorning SVI interfeysining administrativ manziligi exo so‘rov jo‘nating.

C:\Users\User1> **ping 192.168.1.2**

PC-A kompyuter S1 kommutatorning MAC manzilini ARP protokoli yordamida olishi kerak. Birinchi paketni uzatishni kutish vaqti tugashi mumkin. Lekin exo – so‘rov amalga oshmasa, qurilmaning bazaviy sozlanishidagi nosozlikni tekshiring va sozlang.

* 1. **S1 kommutatorni uzoqdan boshqarishni tekshiring.**

Qurilmaga uzoqdan kirishni telnet orqali amalga oshiring. Bizning misolda kompyuter va kommutator yonma – yon joylashgan. Ishlab chiqarishda esa kompyuter 1 qavatda, kommutator boshqa qavatda joylashgan bo‘lishi mumkin. Shu sababli kommutatorni uzoqdan boshqarish uchun telnet dan foydalaniladi.

**Izoh**. Windows 7 muhitida telnet protokolini yoqish uchun administrator nomidan kirish so‘ralishi mumkin. Telnet kliyentini o‘rnatish uchun cmd oynasini oching va **pkgmgr /iu:«TelnetClient»** ni kiriting.

C:\Users\User1> **pkgmgr /iu:”TelnetClient”**

1. PC-A kompyuterning cmd oynasida S1 kommutatorga SVI administrativ manzil orqali ulanish uchun telnet buyrug‘ini kiriting. Parol — **cisco.**

C:\Users\User1> **telnet 192.168.1.2**

1. cisco parolini kiritgandan so‘ng foydalanuvchi rejimiga o‘tgan hisoblanadi. Imtiyoz rejimiga o‘ting.
2. Telnet seansini tugatish uchun  **exit** ni kiriting.
   1. **Kommutatorga kiritilgan o‘zgarishlarni saqlang.**

Konfiguratsiyani saqlang.

S1# **copy running-config startup-config**

Destination filename [startup-config]? **[Enter]**

Building configuration...

[OK] S1#

# 4. MAC-manzillar jadvalini boshqarish

**4.1. Kompyuterning MAC-manzilini yozing.**

PC-A kompyuterining cmd oynasiga **ipconfig /all** buyrug‘ini kiriting va kompyuterning tarmoq adapterining 2 pog‘onasini manzilini yozib oling.

**4.2. Kommutator qabul qilgan MAC- manzillarni aniqlang**

**Show mac address-table** buyrug‘i yordamida MAC manzillarni ko‘rib chiqing.

S1# **show mac address-table**

Nechta dinamik manzillar mavjud? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Dinamik MAC manzil PC-A kompyuterining MAC manziliga mos keladimi? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**4.3. Show mac address-table** buyrug‘ining parametrlarini sanang.

MAC-manzillar jadvalining parametrlarini ko‘rsating.

S1# **show mac address-table ?**

**show mac address-table** buyrug‘i uchun nechta parametr ochiq?

1. Faqat dinamik qabul qilingan MAC manzillarni ko‘rish uchun **show mac address-table dynamic** buyrug‘ini kiriting

S1# **show mac address-table dynamic**

Nechta dinamik manzillar mavjud? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. PC-A kompyuteri uchun MAC- manzilga qarang. . Bu buyruq uchun MAC-manzilning formati xxxx.xxxx.xxxx ko‘rinishida bo‘ladi.

S1# **show mac address-table address <PC-A MAC here>**

**4.4. Statik MAC manzilni o‘rnating.**

1. MAC-manzillar jadvalini o‘chiring.

Imtiyoz rejimida mavjud MAC manzillarni o‘chirish uchun **clear mac address-table** buyrug‘i ishlatiladi.

S1# **clear mac address-table dynamic**

1. MAC- manzillar jadvali o‘chganligiga ishonch hosil qiling.

S1# **show mac address-table**

Hozir jadvalda nechta statik MAC manzil mavjud?

Nechta dinamik manzil mavjud?

**c.** Qaytadan MAC manzillar jadvalini o‘rganing.

Bu vaqtda kompyuteringiz tarmoq adapteridan S1 kommutatorga kadr jo‘natib yuborgan. Yana MAC manzillar jadvaliga imtiyoz rejimida qarang va PC- A kompyuterining MAC manzilini kommutator qaytadan oldimi yoki yo‘qmi? Shuni aniqlang.

S1# **show mac address-table**

Nechta dinamik manzil mavjud?

Nimaga bu qiymat oldingisiga qaraganda o‘zgardi?

Agar kommutator PC – A uchun qaytadan MAC manzil olmagan bo‘lsa, PC-A dan kommutatorning IP manziliga VLAN 99 ga exo so‘rov yuboring va qaytadan **show mac address-table** buyrug‘ini kiriting.

**d.** Statik MAC-manzilni o‘rnating.

Kompyuterni qaysi port orqali ulanganligini aniqlash uchun portga statik MAC manzil qo‘yish mumkin.

F0/6 interfeysiga PC-A uchun yozilgan manzildan foydalanib statik MAC manzilni o‘rnating. 4.1- qismda MAC-manzil 0050.56BE.6C89 faqat misol sifatida ishlatilmoqda.

S1(config)# **mac address-table static 0050.56BE.6C89 vlan 99 interface fastethernet 0/6**

1. MAC-manzillar jadvalidagi yozuvlarni tekshiring.

S1# **show mac address-table**

Nechta dinamik manzillar mavjud ? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Nechta statik manzillar mavjud?

1. Statik MAC manzilni o‘chiring. Global rejimga kiring va buyruq qatorining boshiga nol qo‘ying.

S1(config)# **no mac address-table static 0050.56BE.6C89 vlan 99 interface fastethernet 0/6**

1. Statik MAC-manzil o‘chganligiga ishonch hosil qiling.

S1# **show mac address-table**

Nechta statik MAC manzil jadvalda mavjud? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Qisqacha nazariy ma’lumotlar**

Router-on-a-stick (ROS) usuli bilan VLAN lar o‘rtasida marshrutizatsiyaga yoki 3 – pog‘onadagi kommutatsiyani sozlashdan oldin bunday marshrutizatsiya turi to‘g‘risidagi bilimga va ko‘nikmaga ega bo‘lish tavsiya qilinadi. Bundan tashqari Siz tashkilotlarda kichik tarmoqlardagi VLANlar o‘rtasidagi interfeyslardagi marshrutizatsiyalarga to‘qnash kelishingiz mumkin. Ishlatilishini soddaligi bilan VLAN lar o‘rtasida marshrutizatsiyani afzallik usullaridan biri eskirgan usul hisoblanadi.

Ushbu laboratoriya ishida bitta marshrutizatorni beshta tarmoq bilan Fast Ethernet interfeysi orqali sozlash kerak bo‘ladi. Kommutatorlarda jami 5 ta VLAN tarmog‘ini sozlash va ushbu VLAN lar o‘rtasida marshrutizatsiyani amalga oshirish lozim.

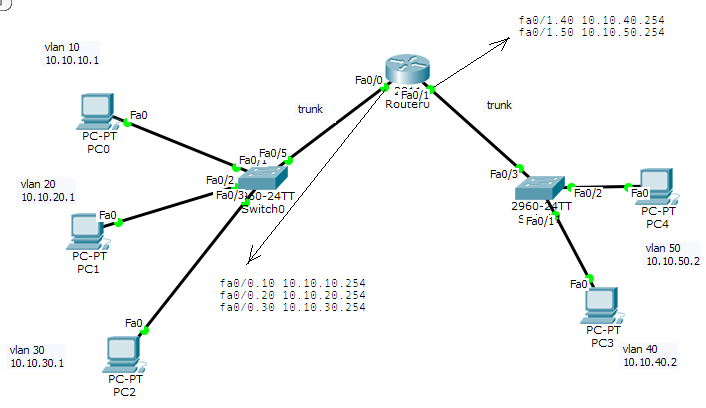
**Ishni bajarish tartibi**

1. **Tarmoqni tuzing va qurilmalarning bazaviy parametrlarini sozlang**

Laboratoriya ishining birinchi qismida tarmoq topologiyasini tuzing va kerak bo‘lsa barcha sozlangan konfiguratsiyalarni o‘chirib tashlang.

* 1. Topologiyaga mos ravishda tarmoqqa kabellarni ulang
  2. Initsializatsiyani bajaring, marshrutizatorni va kommutatorlarni ishga tushiring.
  3. R1 marshrutizator uchun bazaviy parametrlarni sozlang
* DNS izlashni o‘chiring
* qurilmaning nomini kiriting
* shifrlangan parol sifatida imtiyoz rejimida **class** deb kiriting
* konsol va VTY virtal terminal uchun **cisco** deb kiriting va aktivlashtiring
* Fa0/0 va Fa0/1 interfeyslarda manzillashni kiriting va ikkala interfeysni yoqing
  1. S1 va S2 kommutatorlarning bazaviy parametrlarini sozlang
* DNS izlashni o‘chiring
* qurilmaning nomini kiriting
* shifrlangan parol sifatida imtiyoz rejimida **class** deb kiriting
* Konsol va VTY virtal terminal uchun **cisco** deb kiriting va aktivlashtiring
  1. PC kompyuterlarda bazaviy parametrlarni sozlang

PC kompyuterlarda manzillash (4.1 - rasm) IP manzillarni va shlyuzlarni sozlang.



4.1 – rasm. Tarmoq topologiyasi

1. **Kommutatorni VLANlarga va trank aloqasiga sozlang**

Laboratoriya ishining ikkinchi qismida VLAN tarmog‘i va trank kanallari uchun kommutatorni sozlaysiz.

* 1. S1 kommutatorda VLAN tarmog‘ini sozlang.
* S1 kommutatorda VLAN 10 tarmog‘ini yarating;
* VLAN 20, VLAN 30 tarmoqlarini yarating;
* F0/5 interfeysini trank port qiling;
* F0/1 – F0/3 interfeyslarni mos ravishda VLAN 10, VLAN 20, VLAN 30 tarmoqlariga biriktirib, kirish portlari qilib belgilang.
  1. S2 kommutatorda VLAN tarmog‘ini sozlang.
* S2 kommutatorda VLAN 40 tarmog‘ini yarating;
* VLAN 50 tarmog‘ini yarating;
* F0/3 interfeysini trank port qiling;
* F0/1 va F0/2 interfeyslarni mos ravishda VLAN 40, VLAN 50 tarmoqlariga biriktirib, kirish portlari qilib belgilang.

1. **Trank aloqalarni, VLAN tarmoqlarni, marshrutizatsiya va ulanishlarni tekshiring**
   1. R1 marshrutizatorda marshrutizatsiya jadvalini tekshiring

* R1 marshrutizatorda **show ip route** buyrug‘ini bajaring. R1 marshrutizatorda qanday marshrutlar ko‘rsatilgan?
* S1 va S2 kommutatorlarda **show interface trunk** buyrug‘ini bering. F0/1 porti ikkala kommutatorda trank port qilinganmi?
* S1 va S2 kommutatorlarda **show vlan brief** buyrug‘ini bering. VLAN 10, 20, 30, 40, 50 tarmoqlari aktivligini va VLAN larga mos keluvchi portlar o‘rnatilganligini tekshiring. Nima sababdan F0/1 port hech qaysi aktiv VLAN larga tegishli emas?
* VLAN 10 dagi PC 0 dan VLAN 50 dagi PC 4 ga exo – so‘rov jo‘nating. Agar VLAN marshrutizatsiya to‘g‘ri ishlayotgan bo‘lsa, 10.10.10.0 va 10.10.50.0 tarmoqlari o‘rtasida exo – so‘rov muvoffaqiyatli bo‘lishi kerak.
* hamma qurilmalar o‘rtasida ulanish borligini tekshiring. Qurilmalar o‘rtasida exo – so‘rov muvoffaqiyatli bo‘lishi kerak. Agar exo – so‘rov jo‘natilmasa, tarmoqni nosozligini bartaraf qiling.

**Ilova A. Sozlash buyruqlari**

Router>enable

Router#configure terminal

Router(config)#interface FastEthernet0/0

Router(config-if)#no shutdown

Router(config-if)#exit

Router(config)#interface FastEthernet0/1

Router(config-if)#no shutdown

Router(config-if)# interface FastEthernet 0/0.10

Router(config-subif)#encapsulation dot1Q 10

Router(config-subif)#ip address 10.10.10.254 255.255.255.0

Router(config-subif)# interface FastEthernet 0/0.20

Router(config-subif)#encapsulation dot1Q 20

Router(config-subif)#ip address 10.10.20.254 255.255.255.0

Router(config-subif)# interface FastEthernet 0/0.30

Router(config-subif)#encapsulation dot1Q 30

Router(config-subif)#ip address 10.10.30.254 255.255.255.0

Router(config)# interface FastEthernet 0/1

Router(config-if)#no shutdown

Router(config-if)#exit

Router(config)# interface FastEthernet 0/1.40

Router(config-subif)#encapsulation dot1Q 40

Router(config-subif)#ip add 10.10.40.254 255.255.255.0

Router(config-subif)# interface FastEthernet 0/1.50

Router(config-subif)#encapsulation dot1Q 50

Router(config-subif)#ip add 10.10.50.254 255.255.255.0

Router(config-subif)#end

**Kommutator 0**

Switch>enable

Switch#configure terminal

Switch(config)#vlan 10

Switch(config-vlan)#exit

Switch(config)#vlan 20

Switch(config-vlan)#exit

Switch(config)#vlan 30

Switch(config-vlan)#exit

Switch(config)# interface FastEthernet 0/1

Switch(config-if)#switchport mode access

Switch(config-if)#switchport access vlan 10

Switch(config)# interface FastEthernet 0/2

Switch(config-if)#switchport mode access

Switch(config-if)#switchport access vlan 20

Switch(config)# interface FastEthernet 0/3

Switch(config-if)#switchport mode access

Switch(config-if)#switchport access vlan 30

Switch(config)# interface FastEthernet 0/5

Switch(config-if)#switchport mode trunk

**Kommutator S1**

Switch>enable

Switch#configure terminal

Switch(config)#vlan 40

Switch(config-vlan)#exit

Switch(config)#vlan 50

Switch(config-vlan)#exit

Switch(config)# interface FastEthernet 0/1

Switch(config-if)#switchport mode access

Switch(config-if)#switchport access vlan 40

Switch(config-if)# interface FastEthernet 0/2

Switch(config-if)#switchport mode access

Switch(config-if)#switchport access vlan 50

Switch(config-if)# interface FastEthernet 0/3

Switch(config-if)#switchport mode trunk

## **Nazorat savollari**

1. Kommutator uchun nima sababdan VTY kanalini sozlash kerak?
2. VLAN lar o‘rtasida eskirgan usulning afzalligi nimadan iborat?
3. Marshrutizatorlarda sub interfeys nima maqsadda yaratiladi?
4. Kommutatorlar o‘rtasida nechta rejim mavjud? Ishlashini tushuntiring
5. DNS izlashni o‘chirish nimaga kerak?
6. Qaysi interfeyslar trank rejimda ishlashi kerak?
7. Dot1q nima?
8. Nima sababdan interfeys interface FastEthernet0/0.10 deb yoziladi?
9. Sub interfeysga berilgan IP manzil kompyuterlar uchun qanday manzil hisoblanadi?
10. Switchport mode trunk qaysi interfeyslarga beriladi?
11. Switchport mode access qaysi interfeyslarga beriladi?

12. Nima uchun VLAN 1 ni boshqa raqamdagi VLAN ga o‘zgartirish kerak?

13. Parolni shifrlanmagan ko‘rinishda uzatilmasligi uchun nima qilish kerak?

14. Port interfeysiga statik MAC manzil nima uchun o‘rnatish kerak?

15. Show mac address-table nima uchun ishlatiladi?