

**MUHAMMAD AL-XORAZMIY NOMIDAGI  
TOSHKENT AXBOROT TEXNOLOGIYALARI  
UNIVERSITETI**



**Infokommunikatsiya injiniringgi yo'nalishi**  
**3-bosqich 431-22-guruh talabasi**  
**Shodibekov Jamshidbekning**  
**Kompyuter tarmoqlari**  
**fanidan bajargan amaliy ishi**

**Bajardi:** Shodibekov Jamshidbek

**Tekshirdi:** Akbarxonova Dildora

## **9- Amaliyot ishi**

### **WAN TARMOQLARIDA STATIK MARSHRUTLASH**

#### **1. Ishning maqsadi**

- Statik marshrutlar yordamida tarmoq yo'nalishlarini qo'lda belgilash va tarmoqni boshqarishni sozlash bo'yicha ko'nikmalarga ega bo'lish.

#### **2. Qisqa nazariy ma'lumotlar**

WAN (Wide Area Network) tarmoqlarida statik marshrutlash o'ziga xos muhim ahamiyatga ega. WAN tarmoqlarida aloqalar ko'pincha uzoq masofalarda bo'lib, marshrutlarni qo'lda sozlash yordamida tarmoqni yaxshi boshqarish mumkin. Statik marshrutlar yordamida, tarmoqdagi bog'lanishlar aniq va ishonchli bo'ladi. Qo'shimcha protokollar yoki avtomatik marshrutlash kerak emas.

*Statik marshrutlash* — bu tarmoq administratorlari tomonidan qo'lda konfiguratsiya qilinadigan marshrutlash usulidir. Bu metodda, tarmoqda ma'lum bir yo'nalish uchun yo'riqnomalar (marshrutlar) o'rnatiladi, va ular o'zgarmaydi, ya'ni faqat administrator tomonidan o'zgartiriladi. Statik marshrutlar tarmoqning yo'nalishlarini belgilaydi va ularni tarmoq qurilmalari (masalan, routerlar) o'rtasida ma'lumotlarni yuborish uchun ishlatiladi.

*Statik marshrutning tuzilishi.* Har bir statik marshrut quyidagi ma'lumotlarni o'z ichiga oladi:

- *Destination Network:* Qabul qiluvchi tarmoqning IP manzili va subnet maskasi.
- *Next Hop (Keyingi qadam):* Ma'lumotni Qabul qiluvchi tarmog'iga yetkazish uchun yo'riqnomada ko'rsatilgan keyingi routrning IP manzili.

- *Interfeys:* Ma'lumotni uzatish uchun foydalaniladigan routerning interfeysi (masalan, Ethernet yoki Serial interfeysi).

Misol:

- ip route 192.168.2.0 255.255.255.0 10.0.0.2

Bu marshrut 192.168.2.0/24 tarmog'iga yo'naltirilgan, va ma'lumotlar 10.0.0.2 manzili orqali uzatiladi.

*Statik marshrutlashning afzalliklari:*

- *Oddiy va arzon:* Statik marshrutlashda qo'shimcha protokollar yoki murakkab algoritmlar talab qilinmaydi, bu esa tizimni arzonlashtiradi.
- *Boshqarish oson:* Administratori tomonidan marshrutlar aniq va oson boshqariladi.
- *Xavfsiz:* Dinamik marshrutlash protokollariga qaraganda, statik marshrutlar xavfsizroq, chunki ular faqat tarmoq administratorlari tomonidan o'zgartiriladi va tarmoqning strukturasi bilgan holda to'g'ri sozlanadi.
- *Tez ishlash:* Statik marshrutlar qo'lda belgilanganligi sababli, routerlar marshrutlarni yangilashda vaqt sarflamaydi va bu tarmoqni tezroq ishlashini ta'minlaydi.

*Statik marshrutlashning kamchiliklari*

- *Moslashuvchan emas:* Statik marshrutlar avtomatik tarzda yangilanmaydi. Agar tarmoqda o'zgarishlar yuz bersa (masalan, routerning ishlamay qolishi), marshrutlar yangilanishi kerak. Aks holda tarmoqda aloqalar o'chib qolishi mumkin.
- *Kengaytirish qiyin:* Katta tarmoqda ko'plab statik marshrutlarni boshqarish murakkab bo'lishi mumkin. O'zgarishlar yoki qo'shimchalar kiritilganda har bir marshrutni qo'lda yangilash zarur bo'ladi.

- *Noaniqlik:* Agar administrator noto'g'ri marshrutni qo'shsa, tarmoqda ma'lumotlar noto'g'ri yo'nalishda yurishi yoki yo'qolishi mumkin.

### *Statik marshrutlashni konfiguratsiya qilish*

Statik marshrutlarni konfiguratsiya qilishda ip route buyruğidan foydalaniladi. Routerda statik marshrutlar qo'shish uchun quyidagi sintaksis ishlatiladi:

```
ip route [destination_network] [subnet_mask] [next_hop_ip]
[optional_parameters]
```

- *destination\_network:* Maqsadli tarmoqning IP manzili.
- *subnet\_mask:* Maqsadli tarmoqning subnet maskasi.
- *next\_hop\_ip:* Ma'lumotlar yuboriladigan keyingi routerning IP manzili.

Misol:

- `ip route 192.168.1.0 255.255.255.0 10.0.0.2` Bu marshrut 192.168.1.0/24 tarmog'iga yo'naltirilgan va 10.0.0.2 IP manzili orqali uzatiladi.

*Statik marshrut qo'shishning boshqa misollari:*

- *Default Route (Default marshrut):* Agar maqsadli tarmoq uchun aniq marshrut bo'lmasa, defolt marshrut yordamida ma'lumotlarni "default gateway" orqali yuborish mumkin.

```
ip route 0.0.0.0 0.0.0.0 192.168.1.1
```

- *Direkt marshrutlar:* Agar tarmoq to'g'ridan-to'g'ri routerga ulangan bo'lsa, unda next hop manzili kiritilmaydi, faqat interfeys ko'rsatiladi.

```
ip route 192.168.2.0 255.255.255.0 Serial0/0
```

*Statik marshrutlar bilan xatoliklarni aniqlash*

Statik marshrutlarda xatoliklar ko'proq qo'lda konfiguratsiya qilishda yuzaga keladi. Xatoliklarni aniqlash uchun quyidagi buyruqlardan foydalanish mumkin:

- *show ip route*: Bu buyruq routerdagi mavjud marshrutlarni ko'rsatadi.
- *ping*: Tarmoqdagi bog'lanishni tekshirish uchun ishlatiladi.
- *tracert*: Paketning tarmoq bo'ylab qanday yo'nalishda ketayotganini ko'rish uchun ishlatiladi.
- *show ip interface brief*: Interfeyslarning holatini tekshirish.

Vazifa: Jurnaldagi variantingiz asosida tarmoq quring.

## **5. Nazorat savollari**

1. Statik marshrutlash nima va dinamik marshrutlashdan qanday farqlash mumkin?
2. Statik marshrutdagi asosiy parametrlarni tushuntiring.?
3. Statik marshrutlashning afzalliklari va kamchiliklari nimalardan iborat?
4. Statik marshrutlashni qaysi tarmoq topologiyalarida ishlatish samarali bo'ladi?

## **Javoblar**

1. Statik marshrutlash: Qo'lda sozlanadi, o'zgarmas.  
Dinamik marshrutlash: Avtomatik, protokollar yordamida o'zgaradi (OSPF, RIP).

2. Statik marshrutdagi asosiy parametrlar:

Tarmoq manzili: Maqsad tarmoqni belgilaydi.  
Tarmoq niqobi: Tarmoqni aniqlash uchun ishlatiladi.  
Keyingi tugun: Maqsadga yo'naltiruvchi keyingi router IP-manzili.

### 3. Afzalliklar:

Oddiy va xavfsiz.

Tarmoq resurslari kam ishlatiladi.

Kamchiliklar:

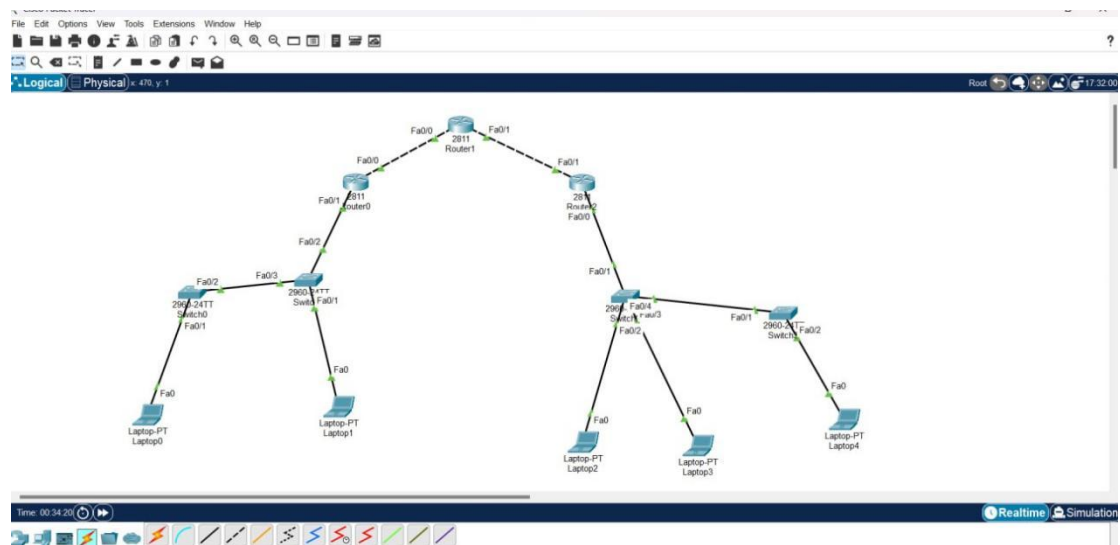
Qo'lda boshqaruv qiyin.

Dinamik o'zgarishlarga moslashuvchan emas.

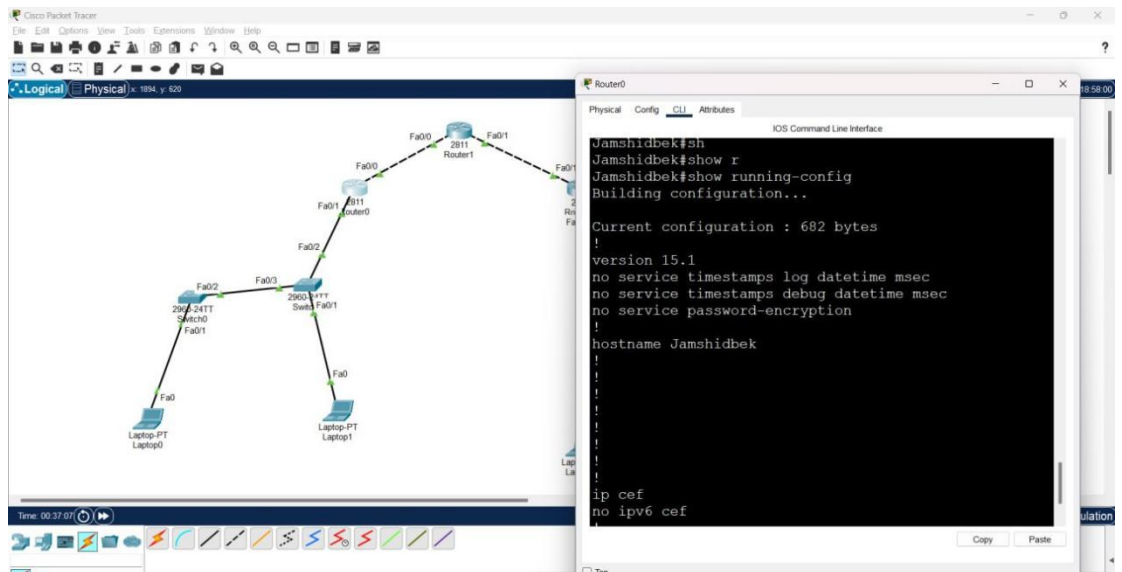
### 4. Qaysi topologiyalar uchun samarali?

Kichik tarmoqlar.

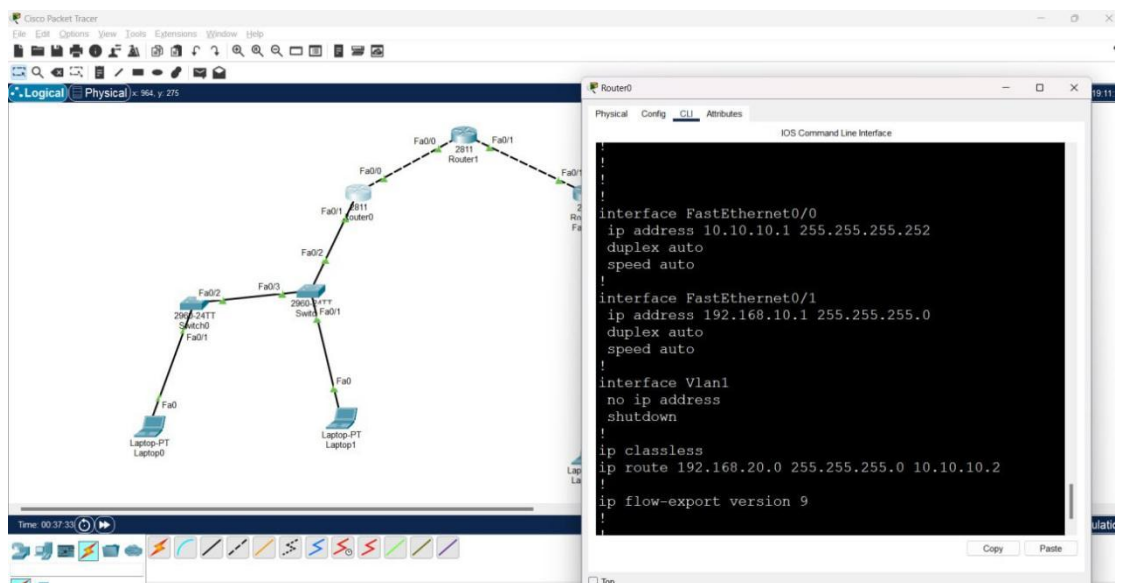
O'zgarmaydigan, oddiy topologiyalar.



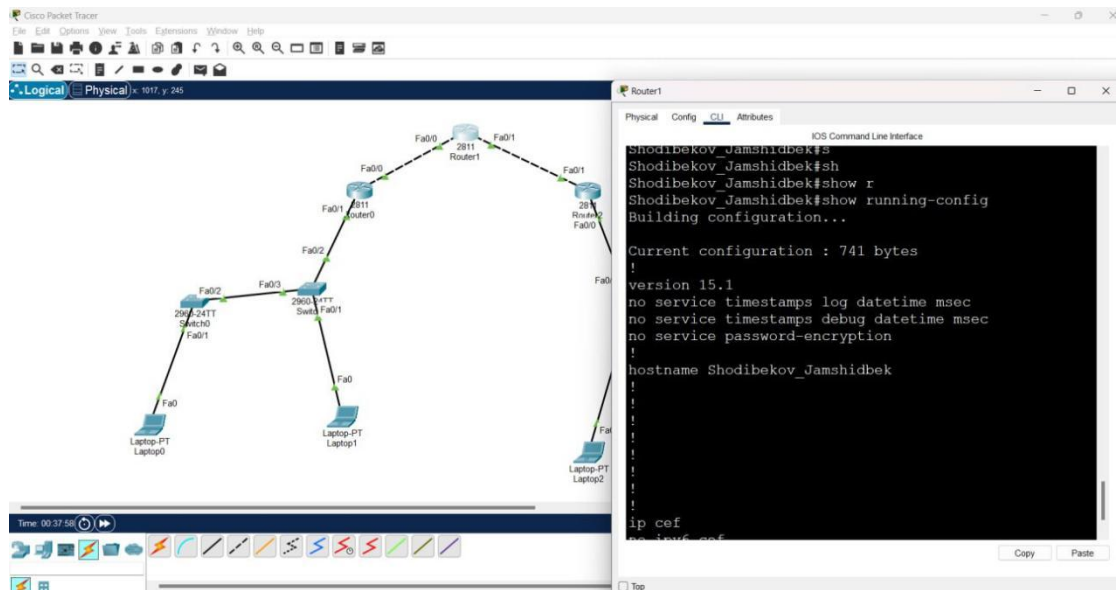
## TOPOLOGIYANING TUZULISHI



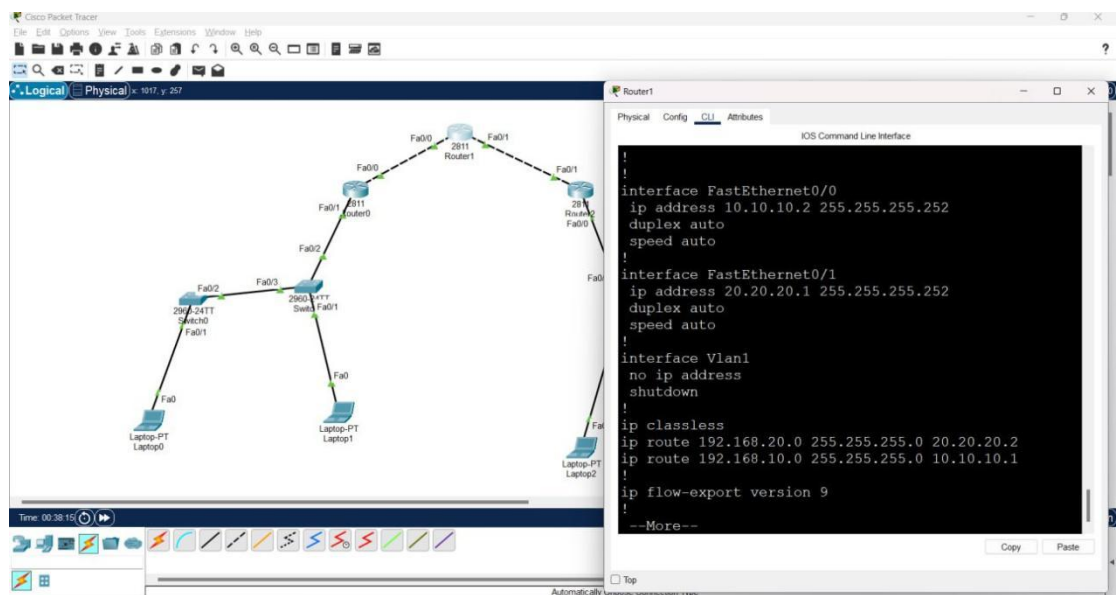
## HOSTNAME BERISH



## IP ROUTE BERISH

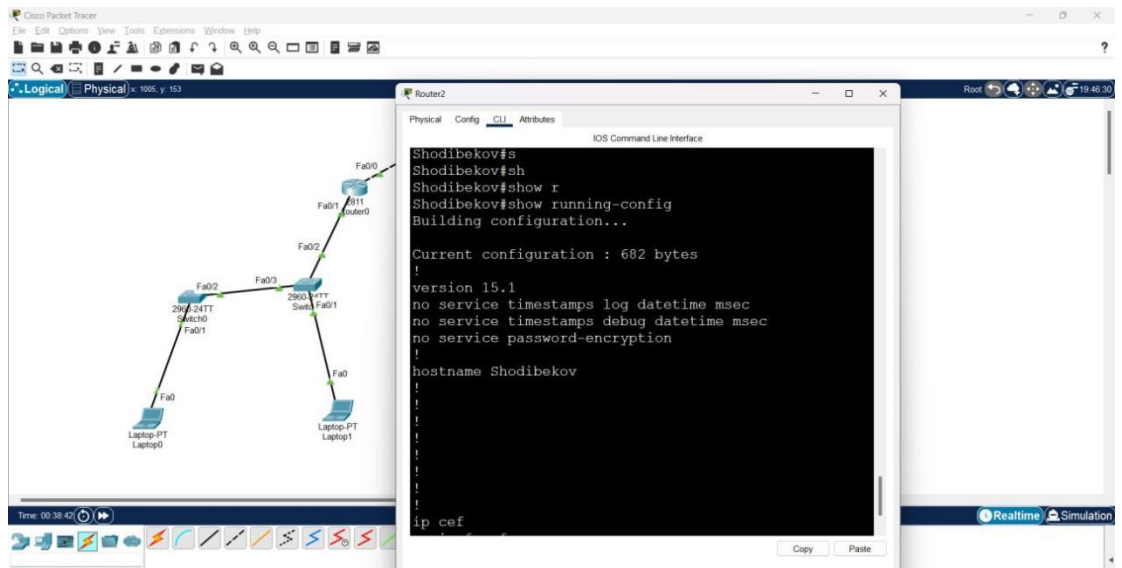


## ROUTER 1GA HOSTNAME BERISH

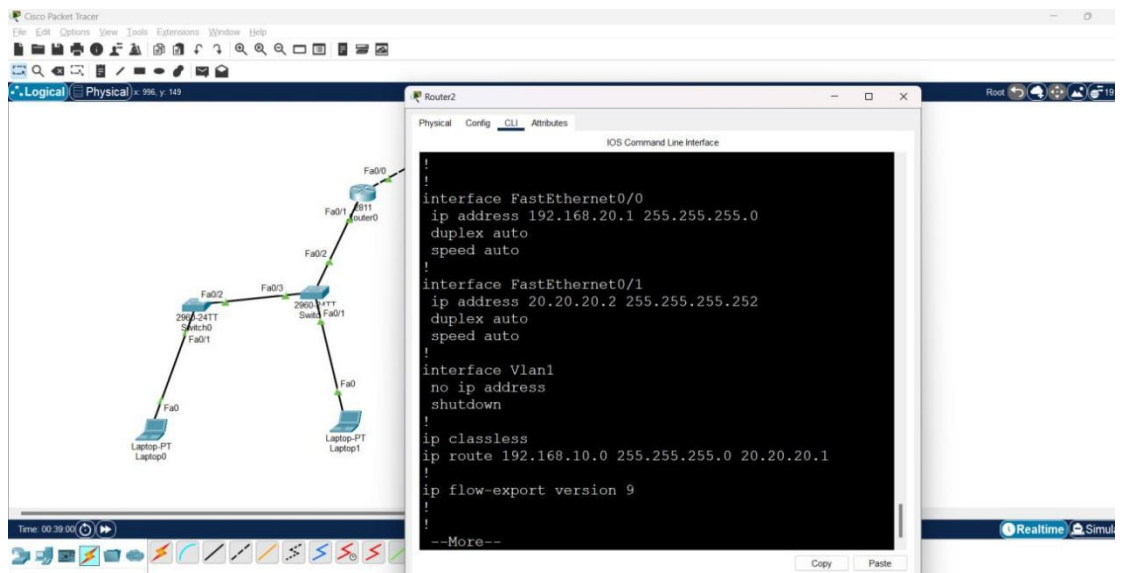


## R\_1 GA IP ROUTE JADVALI



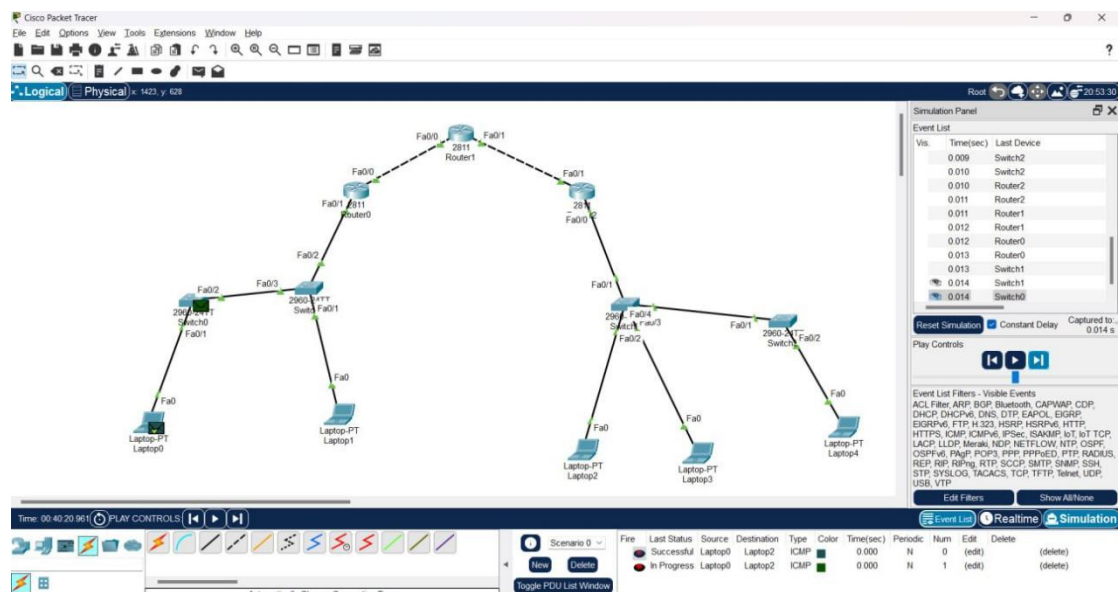


## R\_3GA HOSTNAME BERISH



## R\_3GA IP ROUTE BERISH





**Javob paketining qaytishi**

## 10 – AMALIYOT ISHI.

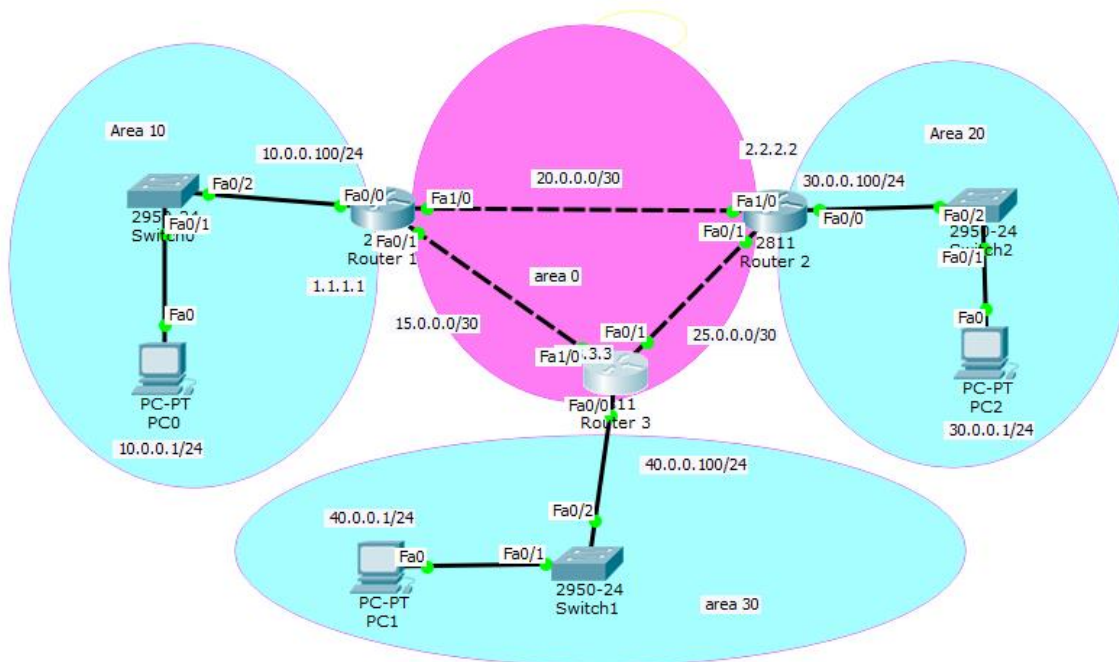
### WAN TARMOQLARIDA DINAMIK MARSHRUTLASH.

#### Ishdan maqsad

- OSPF protokolini ishlash tamoyillarini va vazifalarini, sozlashni o‘rganish;
- EIGRP masofaviy-vektor marshrutizatsiya protokolini sozlashni o‘rganish.

#### 1.Topshiriq

- tarmoq topologiyasini variant bo‘yicha o‘rganing
- R1, R2 va R3 marshrutizatorlarining interfeyslarini sozlang va tekshiring
- OSPF va EIGRP protokolini sozlang va tekshiring
- har bir marshrutizatorning marshrutizatsiya jadvalini o‘rganing



10.1 - rasm. Tarmoq topologiyasi

#### 2.Qisqacha nazariy ma'lumotlar

OSPF protokolining xususiyatlari:

- sinfsizlik – protokol sinfsiz ishlab chiqilgan. SHuningdek u VLSM ni ishlatish va CIDR marshrutizatsiyasida ishlaydi;

- samaradorlik – marshrutda o'zgarish bo'lsa, marshrutizatsiyani yangilash (doimiy bo'lmagan yangilanish)ni ishga tushiradi. Protokol optimal yo'lni tanlash uchun SPF ni qisqa yo'lni izlash algoritmini ishlatadi;

- marshrutizatsiya jadvalida tez bir xillikka erishish- tarmoq o'zgarganligini tez translyasiya qilish;

- masshtablik – kichik va katta tarmoqqa ishlatishga mo'ljallangan. Ierarxiya tuzilishni qo'llab quvvatlash uchun marshrutizatorni bitta maydon (area) ga guruhlash mumkin;

- xavfsizlik – MD 5 Message Digest autentifikatsiyasini qo'llab quvvatlaydi. Agar bu funksiya yoqilgan bo'lsa, OSPF marshrutizatorlari oldindan berilgan bir xil parolli teng huquqli tugundan marshrutizatsiyaning faqat shifrlangan xabarlarini qabul qiladi.

Administrativ distansiyasi (AD) – marshrut manbasining ishonchlilik qiymatini ko'rsatadi. OSPF protokolining AD si 110 ga teng.

Hamma marshrutizatsiya protokollari o'xshash komponentlarni ishlatadi. Hamma protokollar marshrutizatsiyaning ma'lumotlarini almashish uchun marshrutizatsiya protokolining xabarini ishlatadi. Xabar marshrutizatsiya algoritmi yordamida qayta ishlashini ta'minlovchi ma'lumotlar tuzilishini qurishga yordam beradi.

OSPF marshrutizatsiya protokolining 3 ta asosiy komponenti mavjud.

1. Ma'lumotlarning tuzulishi.
2. Marshrutizatsiya protokolining xabari
3. Algoritm

Cisco Systems kompaniyasining EIGRP protokoli IGRP protokolining dastlabki versiyasining takomillashtirilgan ko'rinishi hisoblaniladi.

Protokol gibrid hisoblanadi va Diffusing-Update Algorithm (DUAL) algoritmgacha asoslangan. U oraliq-vektorli va aloqa kanali holati bo'yicha protokollarning eng yaxshi jihatlari o'zida namoyon qiladi.

EIGRP ning oxirgi versiyasi marshrutizatsiya jadvali elementlarini buzg'unchilar yozib olishga imkon bermaydigan va MD5 kaliti asosida autentifikatsiyalaydigan himoyalash vositasiga ega.

Bundan tashqari, bugungi kunda EIGRP uchun IPv6 qo'llab quvvatlaydigan vositalar ishlab chiqilmoqda. EIGRP ning asosiy kamchiligi yopiq hisoblanishi va faqat Cisco Systems qurilmalarida ishlashidir.

EIGRP protokoli 5 xil paket turidan foydalaniladi.

- *Salomlashish (hello) paketi*. Qo'shni marshrutizatorlarni aniqlash va qo'shni marshrutizatorlar bilan bo'g'lanish munosabatlarini qo'llab quvvatlash uchun ishlatiladi.

- *Yangilash paketlari*. Marshrut to'g'risidagi ma'lumotlar qo'shni EIGRP qurilmalariga yuboriladi.

- *Tasdiqlash paketlari.* Ishonchli yetkazib berish yordamida yuborilgan EIGRP xabari olinganligini tasdiqlashda ishlatiladi.
- *So'rov paketlari.* Qo'shni qurilmalardan marshrutlarni so'rashda ishlatiladi.
- *Javob paketlari.* EIGRP so'roviga javob yuboriladi.

### 3.1. Ishni bajarish tartibi

Kompyuterlarga jurnaldagi variant bo'yicha IP manzillarni kiriting.

1. Marshrutiztorning interfeyslariga variant bo'yicha manzillarni sozlang.

Router#enable

Router#configure terminal

**a) R1 marshrutizatorga nom bering.**

Router(config)#hostname R1

**b) DNS izlashni o'chiring.** Bu noto'g'ri buyruq berilganda marshrutizator yozilgan noto'g'ri buyruqni izlay boshlaydi.

R1 (config)# no ip domain-lookup

**v) Parol 10 simvoldan kam bo'lmasligi kerak.**

R1 (config)# security passwords min-length 10

**g) cisco12345 deb shifrlangan ko'rinishda parolni o'rnating**

R1 (config)# enable secret cisco12345

**d) shifrlanmagan parollarni shifrlash uchun**

R1 (config)# service password-encryption

R1 (config)#interface FastEthernet0/0

R1(config-if)#ip address 10.0.0.100 255.255.255.0

R1 (config-if)#no shutdown

R1 (config-if)#exit

R1 (config)#interface FastEthernet0/1

R1 (config-if)#ip address 15.0.0.1 255.255.255.252

R1 (config-if)#no shutdown

R1 (config-if)#exit

R1 (config)#interface FastEthernet1/0

R1 (config-if)#ip address 20.0.0.1 255.255.255.252

R1 (config-if)#no shutdown

```
R1 (config-if)#router ospf 1
R1 (config-router)#router-id 1.1.1.1
R1 (config-router)#network 10.0.0.0 0.0.0.255 area 10
R1 (config-router)#network 15.0.0.0 0.0.0.3 area 0
R1 (config-router)#network 20.0.0.0 0.0.0.3 area 0
R1 (config-router)#exit
```

## **R2**

```
Router>enable
Router#configure terminal
Router(config)#hostname R2
R2 (config)#interface FastEthernet0/0
R2 (config-if)#ip address 30.0.0.100 255.255.255.0
R2 (config-if)#no shutdown
R2 (config-if)#exit
R2 (config)#interface FastEthernet0/1
R2 (config-if)#ip address 25.0.0.1 255.255.255.252
R2 (config-if)#no shutdown
R2 (config-if)#exit
R2 (config)#interface FastEthernet1/0
R2 (config-if)#ip address 20.0.0.2 255.255.255.252
R2 (config-if)#no shutdown
R2 (config-if)#router ospf 1
R2 (config-router)#router-id 2.2.2.2
R2 (config-router)#network 30.0.0.0 0.0.0.255 area 20
R2 (config-router)#network 20.0.0.0 0.0.0.3 area 0
R2 (config-router)#network 25.0.0.0 0.0.0.3 area 0
R2 (config-router)#exit
```

## **R3**

```
Router>enable
Router#configure terminal
Router(config)#hostname R3
R3 (config)#interface FastEthernet0/0
R3 (config-if)#ip address 40.0.0.100 255.255.255.0
R3 (config-if)#no shutdown
R3 (config-if)#exit
R3 (config)#interface FastEthernet0/1
R3 (config-if)#ip address 25.0.0.2 255.255.255.252
R3 (config-if)#no shutdown
```

```
R3 (config-if)#exit
R3 (config)#interface FastEthernet1/0
R3 (config-if)#ip address 15.0.0.2 255.255.255.252
R3 (config-if)#no shutdown
R3 (config-if)#router ospf 1
R3 (config-router)#router-id 3.3.3.3
R3 (config-router)#network 40.0.0.0 0.0.0.255 area 30
R3 (config-router)#network 15.0.0.0 0.0.0.3 area 0
R3 (config-router)#network 25.0.0.0 0.0.0.3 area 0
R3 (config-router)#exit
```

R1 da

### **Nazorat savollari**

1. Area nima uchun ishlatiladi?
2. Marshrutizatsiya jadvalida OSPF protokoli ishlatilganligi qanday aniqlanadi?
3. OSPF protokolida metrika qanday hisoblanadi?
4. 2 ta marshrut bir xil bo'lsa marshrutizator qanday ishlaydi?
5. EIGRP protokolida Area nima uchun ishlatiladi?
6. Marshrutizatsiya jadvalida EIGRP protokoli ishlatilganligi qanday aniqlanadi?
7. EIGRP protokolida metrika qanday hisoblanadi?
8. EIGRP protokolida qanday xabar turlari mavjud?

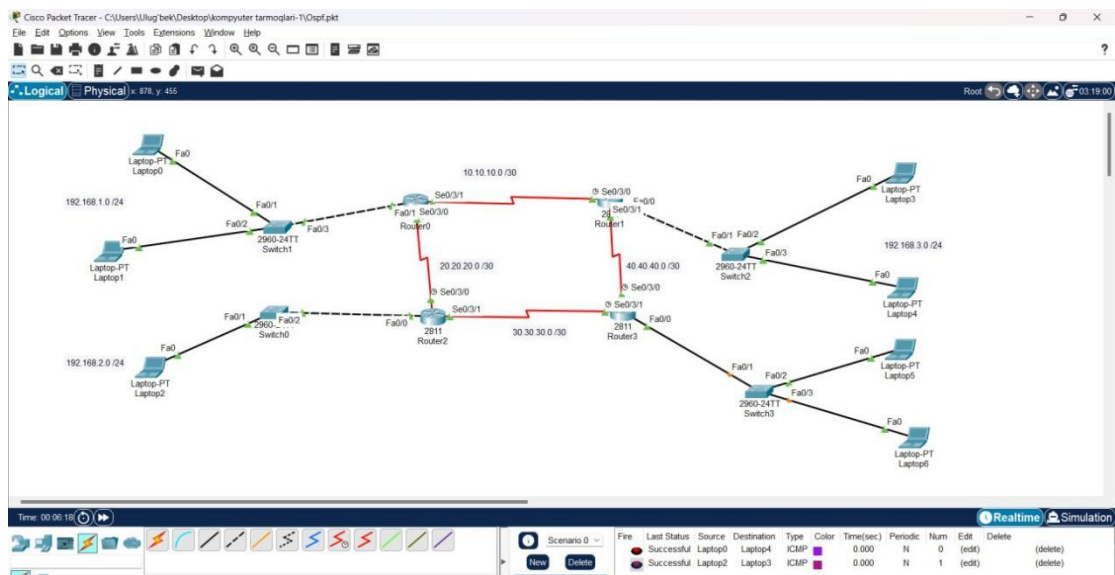
### **Javoblari:**

1. Area (hudud) OSPF protokolida tarmoqni kichik qismlarga bo'lish uchun ishlatiladi, bu esa marshrutlash jarayonini samarali qilish va marshrutlash jadvalini kamaytirishga yordam beradi.
2. OSPF marshrutlari jadvalda "O" yoki "O IA" (inter-area marshrut) prefiksi bilan ko'rsatiladi.



4.Marshrutizator **load balancing** (yukni teng taqsimlash) qiladi va trafikni ikkala marshrutga bo‘ladi.

5.EIGRP’da **Area** ishlatilmaydi. Bu faqat OSPF kabi ierarxik protokollarga xos.



## Topologiyaning tuzulishi





```
Router0
Physical Config CLI Attributes
IOS Command Line Interface

Jamshidbek_R_1#
Jamshidbek_R_1#
Jamshidbek_R_1#
Jamshidbek_R_1#
Jamshidbek_R_1#
Jamshidbek_R_1#
Jamshidbek_R_1#
Jamshidbek_R_1#
Jamshidbek_R_1#
Jamshidbek_R_1#sh
Jamshidbek_R_1#show c
Jamshidbek_R_1#show c
Jamshidbek_R_1#show cd
Jamshidbek_R_1#show cdp n
Jamshidbek_R_1#show cdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone
Device ID      Local Intrfce    Holdtme    Capability    Platform    Port ID
Switch         Fas 0/1             145        S             2960         Fas 0/3
Router         Ser 0/3/0           151        R             C2800        Ser 0/3/0
Router         Ser 0/3/1           92         R             C2800        Ser 0/3/0
Shodibekov     Ser 0/3/1           152        R             C2800        Ser 0/3/0
Jamshidbek_R_1#
Jamshidbek_R_1#
Jamshidbek_R_1#
Jamshidbek_R_1#
Jamshidbek_R_1#
```

## Show cdp neighbors

```
Router0
Physical Config CLI Attributes
IOS Command Line Interface

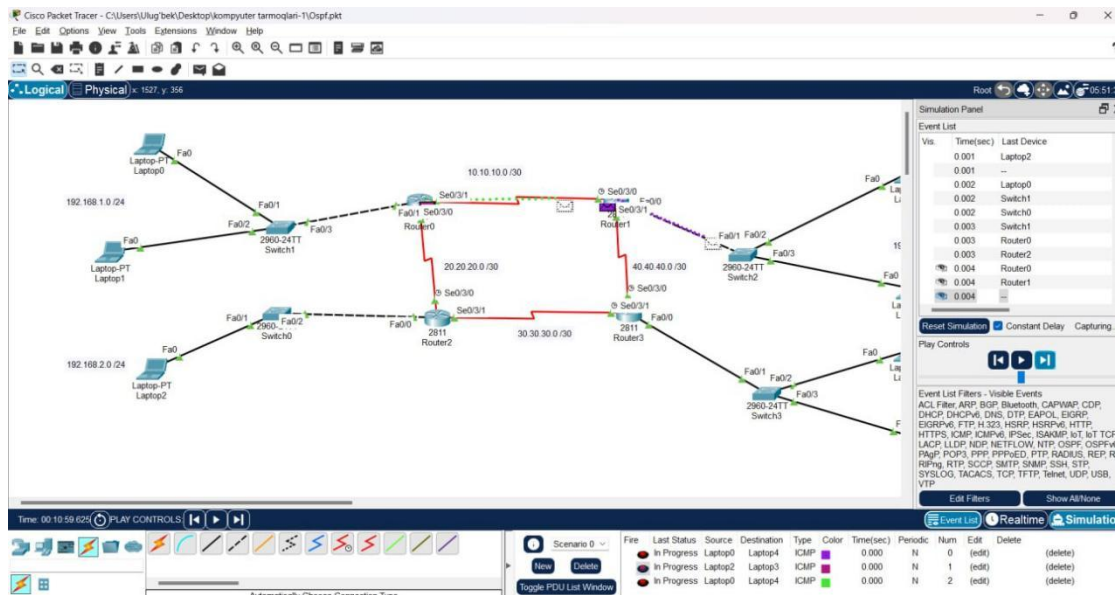
Jamshidbek_R_1#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

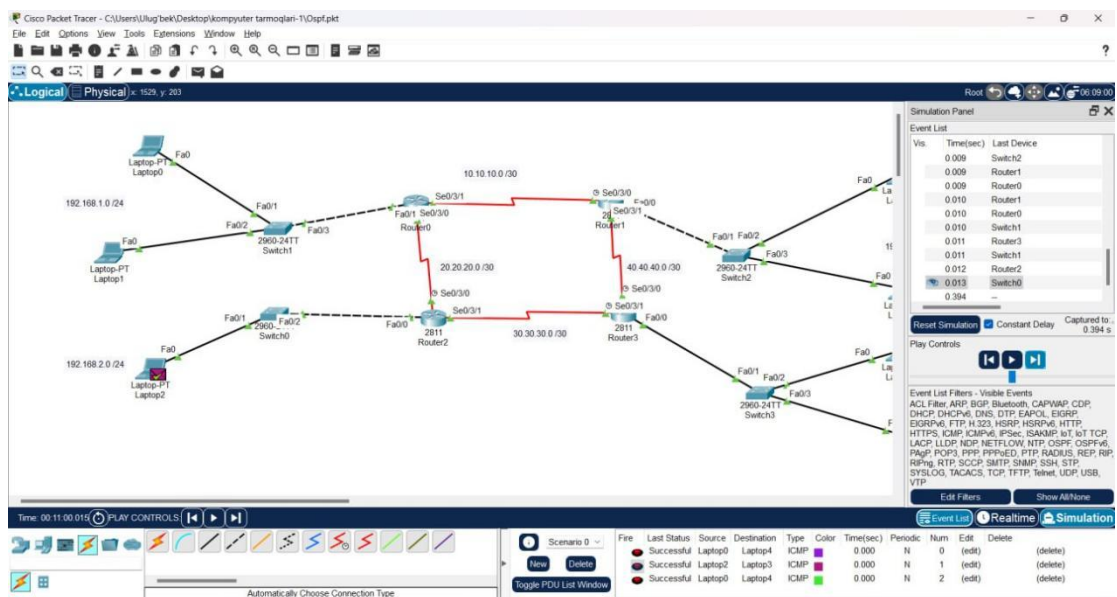
10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    10.10.10.0/30 is directly connected, Serial0/3/1
L    10.10.10.1/32 is directly connected, Serial0/3/1
C    20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    20.20.20.0/30 is directly connected, Serial0/3/0
L    20.20.20.1/32 is directly connected, Serial0/3/0
O    30.0.0.0/30 is subnetted, 1 subnets
O    30.30.30.0/30 [110/128] via 20.20.20.2, 00:09:50, Serial0/3/0
O    40.0.0.0/30 is subnetted, 1 subnets
O    40.40.40.0/30 [110/128] via 10.10.10.2, 00:09:50, Serial0/3/1
C    192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.168.1.0/24 is directly connected, FastEthernet0/1
L    192.168.1.1/32 is directly connected, FastEthernet0/1
O IA 192.168.2.0/24 [110/65] via 20.20.20.2, 00:09:40, Serial0/3/0
O IA 192.168.3.0/24 [110/65] via 10.10.10.2, 00:09:50, Serial0/3/1

Jamshidbek_R_1#
```

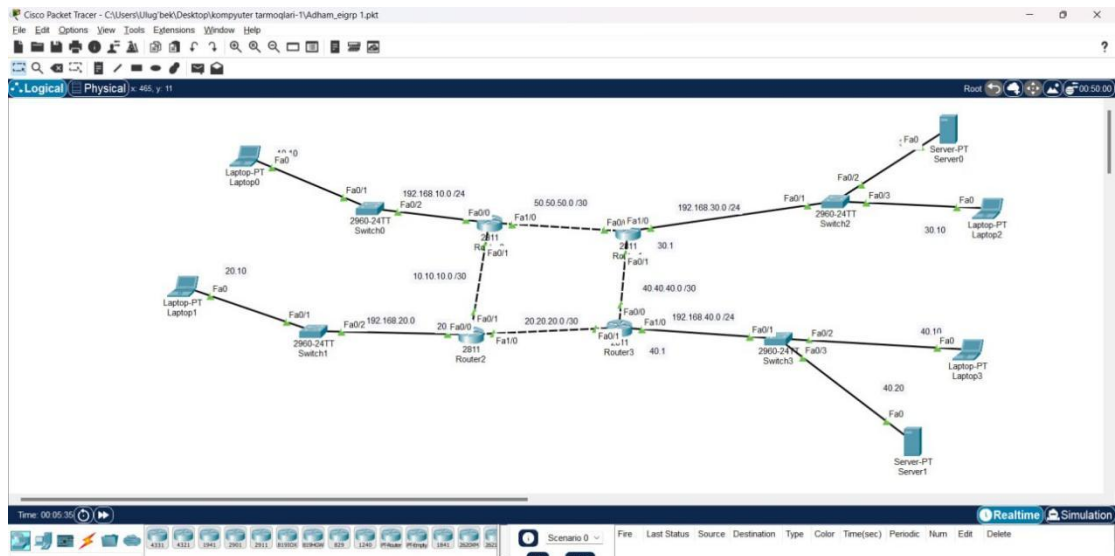
## Route jadvali



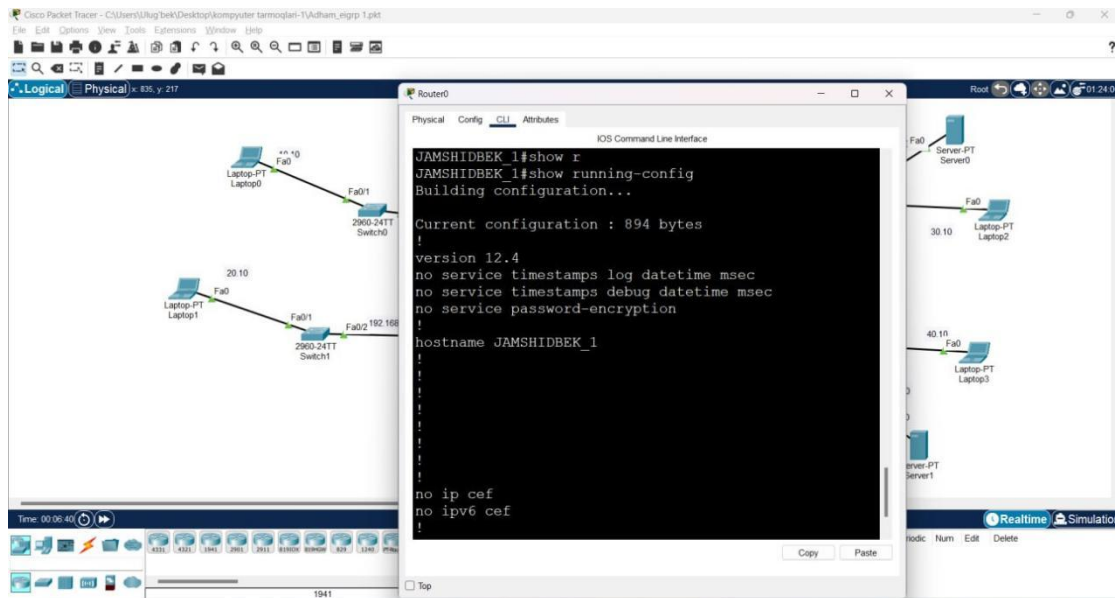
## Paket orqali ping berish



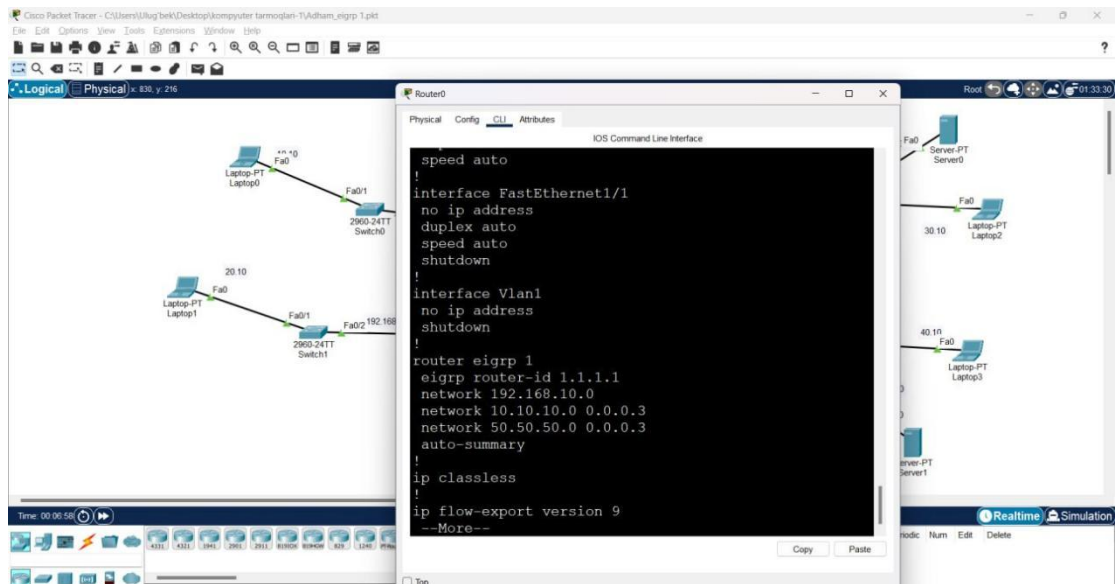
## Javob paketning qaytishi



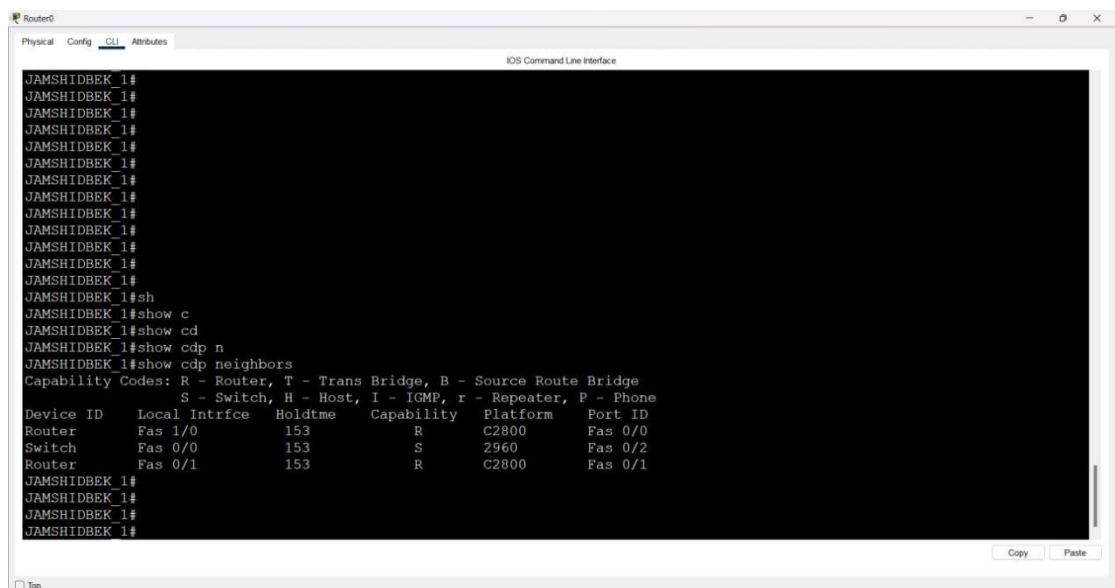
## Topologiyani tuzulishi



## Hostname berish



## Configuratsiya jadvali





```

Router0
Physical Config CLI Attributes
IOS Command Line Interface

JAMSHIDBEK_1#show ip rou
JAMSHIDBEK_1#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

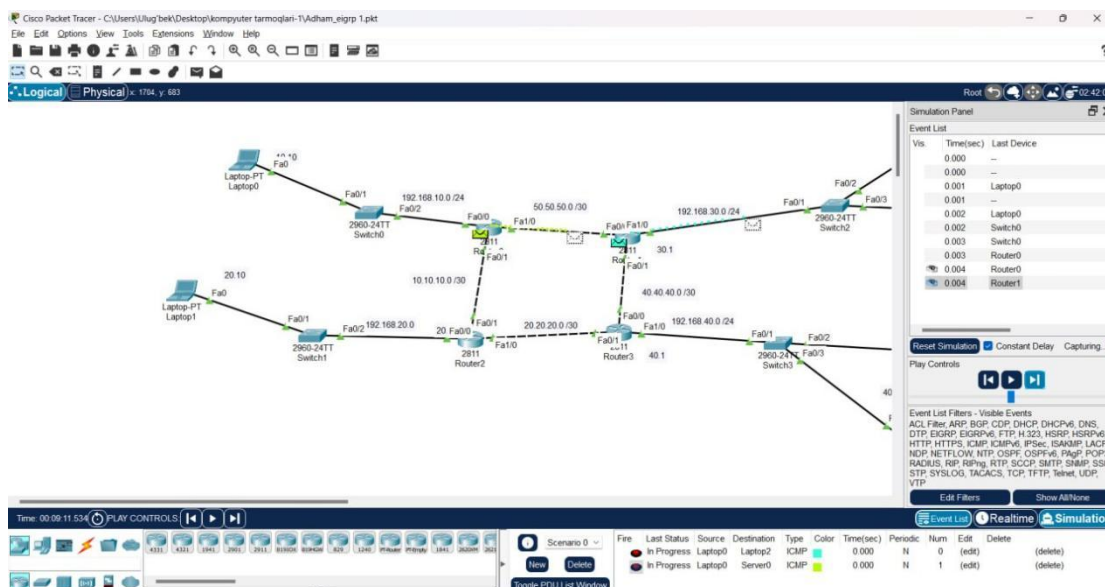
Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
D 10.0.0.0/8 is a summary, 00:08:04, Null0
C 10.10.10.0/30 is directly connected, FastEthernet0/1
D 20.0.0.0/8 [90/30720] via 10.10.10.2, 00:08:03, FastEthernet0/1
D 40.0.0.0/8 [90/30720] via 50.50.50.2, 00:08:03, FastEthernet1/0
D 50.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
D 50.0.0.0/8 is a summary, 00:08:04, Null0
C 50.50.50.0/30 is directly connected, FastEthernet1/0
C 192.168.10.0/24 is directly connected, FastEthernet0/0
D 192.168.20.0/24 [90/30720] via 10.10.10.2, 00:08:03, FastEthernet0/1
D 192.168.30.0/24 [90/30720] via 50.50.50.2, 00:08:03, FastEthernet1/0
D 192.168.40.0/24 [90/33280] via 50.50.50.2, 00:08:03, FastEthernet1/0
[90/33280] via 10.10.10.2, 00:08:02, FastEthernet0/1

JAMSHIDBEK_1#
JAMSHIDBEK_1#

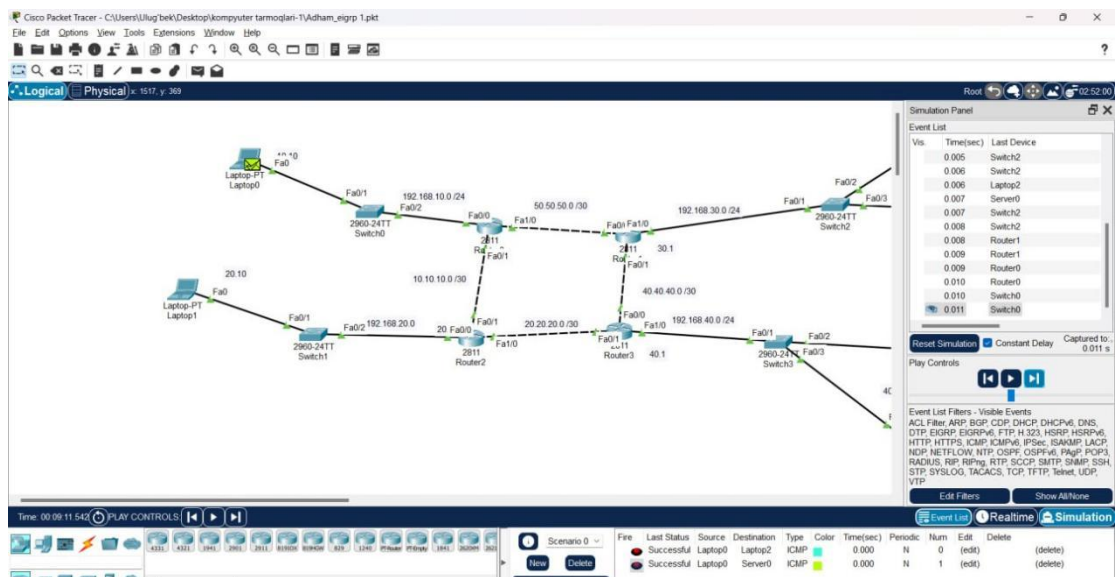
```

## Ip route jadvali



## Habar almash jarayoni





**Javob habarning qaytishi**

## **11-12-AMALIYOT ISHI**

### **CISCO PACKET TRACER DASTURIDA TELNET VA SSH PROTOKOLLARINING QO‘LLANILISHINI O‘RGANISH**

#### **1. Ishning maqsadi**

Ushbu laboratoriya ishidan maqsad quyidagilar hisoblanadi:

- Telnet orqali tarmoq qurilmalariga ulanish ko‘nikmalariga ega bo‘lish.
- SSH protokolini sozlashni o‘rganish.

#### **2. Qisqa nazariy ma’lumotlar**

Ilgari Telnet protokoli asosan tarmoq qurilmalarini uzoqdan sozlash uchun ishlatilgan. Shu bilan birga, u mijoz va server o‘rtasida uzatiladigan ma’lumotni shifrlashni ta’minlamaydi, bu tarmoq paketi analizatorlariga parollar va konfiguratsiya ma’lumotlarini ushlab olishga imkon beradi.

Secure Shell (SSH) bu yo‘riqnoma yoki boshqa tarmoq qurilmasiga xavfsiz terminal emulyatsion ulanishni o‘rnatadigan tarmoq protokoli. SSH tarmoq kanali orqali keladigan barcha ma’lumotlarni shifrlaydi va masofadan turib kompyuterning haqiqiylikini tekshirishni ta’minlaydi. SSH protokoli tobora Telnet o‘rnini egallamoqda – uni tarmoq mutaxassislari masofadan kirish vositasi sifatida tanlashmoqda. SSH

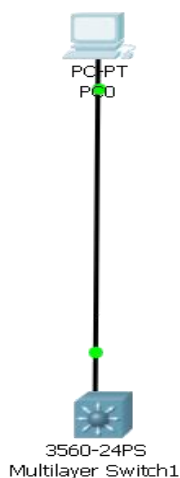
ko'pincha masofaviy qurilmaga kirish va buyruqlarni bajarish uchun ishlatiladi, ammo u shuningdek fayllarni tegishli SFTP yoki SCP protokollari orqali uzatishi mumkin.

SSH ishlashi uchun o'z-aro bog'langan aloqa tarmoq qurilmalarida SSH qo'llab-quvvatlashi sozlanishi kerak. Ushbu laboratoriyada siz marshrutizatorida SSH serverini yoqishingiz kerak va keyin SSH mijosi o'rnatilgan kompyuter yordamida ushbu marshrutizatorga ulanishingiz kerak. Lokal tarmoqlarda ulanish odatda Ethernet va IP-dan foydalanib o'rnatiladi.

### 3. Vazifa

Topshiriqni bajarishda berilgan namunaga asoslaning. Bunda qurilma manzillarini quyidagi ko'rinishda sozlang: 192.168.1.N. va 192.168.1.M. Bunda N jurnalidagi tartib raqamingizning ikkilangani! M esa uchlangani!

**3.1.** Quyidagi rasmda keltirilgan, bitta kompyuter va bitta Layer 3 kommutatoridan iborat topologiyani tuzing. Siz ularni bir-biriga ulab, o'rnatishni boshlashingiz kerak.



1-rasm. Bitta kompyuter va bitta L3 kommutatoridan iborat tarmoq.

Cisco-ga birinchi marta ulanganingizda, qurilmalarni bazaviy sozlashni amalga oshirishingiz kerak. Bunga Telnet protokoli yordamida ulanishni o'rnatish misol bo'ladi (barcha parollarni ochiq ko'rinishda uzatadigan va turli xil hujumlar uchun keng imkoniyatlarni ochadigan eskirgan protokol).

Sozlash uchun Putty dasturidan foydalanishingiz va unda Serial va COM-port ulanish turlarini tanlash kerak. Konsol oynasida quyidagilarni yozing:

```
Router>enable // Imtiyozli rejimga kirish
```

```
Router#erase startup-config // Parolni qayta tiklash, eski konfiguratsiyalarni o'chirish va qurilmani qayta yoqish kerak
```

```
Router#reload
```

**3.2.** Quyidagi buyruqlarni kiritib, tarmoq ulanishini ta'minlang va kommutatorda vlan 1 interfeysini sozlang:

*Agar darhol kommutator konsolida yaratilgandan so'ng dastlabki konfiguratsiya dialogini boshlash kerak bo'lsa - "Yo'q" javobini bering.*

*en*

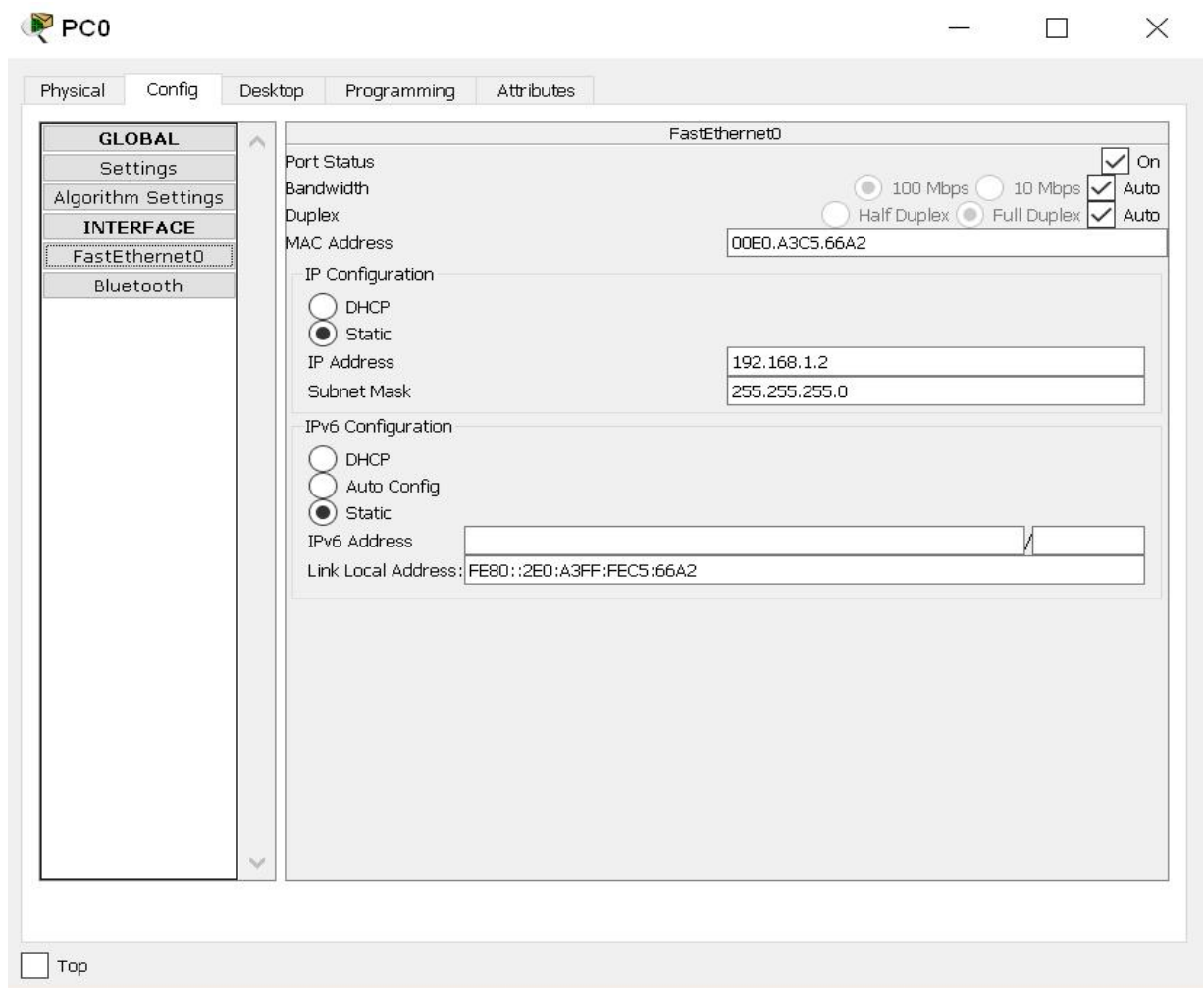
*conf t*

*interface vlan 1*

*ip address 192.168.1.1 255.255.255.0*

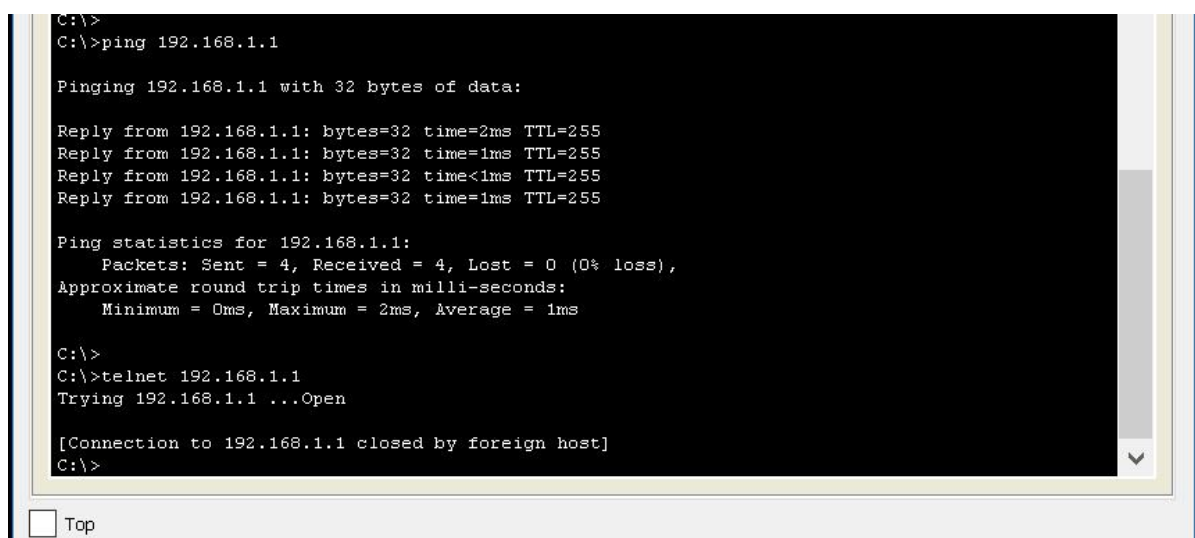
*no shutdown*

**3.3.** Kompyuterning tarmoq kartasini sozlang – FastEthernet0 sozlamalarida tarmoq manzilini ko'rsatamiz: 192.168.1.2. Odatda, barcha yangi kompyuterlar vlan 1 da bo'ladi (3.2-rasm).



3.2-rasm. Kompyuterning tarmoq kartasini sozlash oynasi

### 3.4. Ping utilitasi yordamida kommutator bilan ulanishni tekshiring (3.3-rasm).



3.3-rasm. Kommutator bilan ulanishni tekshirish uchun ping jo'natish

**3.5.** Autentifikatsiya protokolini sozlang. Tizim Telnet, SSH va FTP xizmatlari uchun 20 ta virtual tty/vty liniyasini qo'llab-quvvatlaydi. Yuqoridagi protokoldan foydalangan holda har bir seans bitta qatorni egallaydi. Shuningdek, qurilmangizdagi avtorizatsiya so'rovlarini tekshirish orqali umumiy xavfsizlikni kuchaytirishingiz mumkin. Chiqish buyrug'i yordamida kommutatorda umumiy konfiguratsiya (conf t) rejimiga qayting va quyidagi buyruqlarni kiriting:

*line vty 0 15*

*password cisco*

*login*

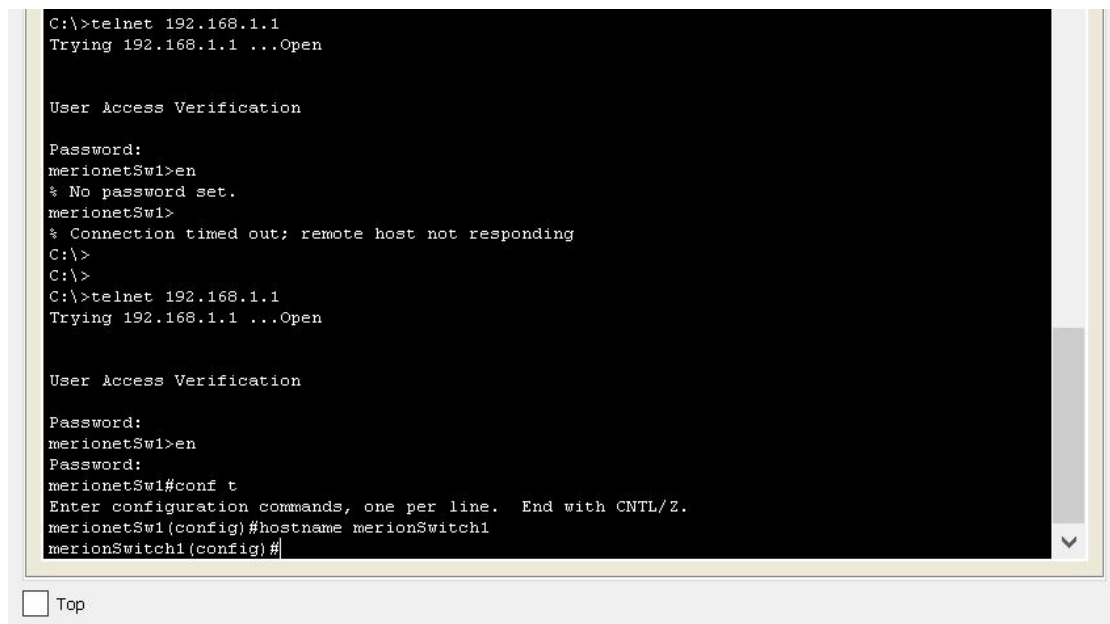
*end*

*Cisco paroli juda xavfli va faqat namoyish qilish uchun mo'ljallangan. Agar siz bunday parolni haqiqiy qurilmada qoldirsangiz, buzilish ehtimoli cheksizlikka intiladi.*

Endi Telnet orqali kommutatorga kirishga urinib ko'ring. Ammo, siz konfiguratsiyaga o'tsangiz va faollashtirish buyrug'ini bajarishga harakat qilsangiz, enable global rejimida parol o'rnatilmaganligi sababli bu mumkin emasligini ko'rasiz. Buni tuzatish uchun quyidagi buyruqlarni kiriting (3.4-rasm):

*conf t*

*enable password cisco*



```
C:\>telnet 192.168.1.1
Trying 192.168.1.1 ...Open

User Access Verification

Password:
merionetSw1>en
% No password set.
merionetSw1>
% Connection timed out; remote host not responding
C:\>
C:\>
C:\>telnet 192.168.1.1
Trying 192.168.1.1 ...Open

User Access Verification

Password:
merionetSw1>en
Password:
merionetSw1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
merionetSw1(config)#hostname merionSwitch1
merionSwitch1(config)#
```

☐ Top

3.4-rasm. Telnet orqali kommutatorga kirish

**3.6.** Kommutatorda SSH-ni sozlang – buning uchun siz host nomini, domen nomini ko’rsatishingiz va shifrlash kalitini yaratishingiz kerak.

Biz quyidagi buyruqlarni kiritamiz (asosiy konfiguratsiya rejimidan):

```
hostname merionet_sw1
ip domain name merionet
crypto key generate rsa
```

Kalitning uzunligini tanlang – avtomatik qiymati 512 bitga teng, SSH 2 versiyasi uchun minimal uzunlik 768 bit. Kalitlarni yaratish biroz vaqt talab etadi. Kalitni yaratgandan so’ng, biz kommutatorni sozlashni davom ettiramiz:

```
ip ssh version 2
line vty 0 15
transport input ssh
```

Endi Telnet orqali kira olmaysiz, chunki uni SSH bilan almashtirganmiz. Standart kirish logini – admin dan foydalanib, SSH-ga

kirishka urinib ko'ring. Keling, uni yanada munosib narsaga o'zgartiraylik (yana `conf t` dan):

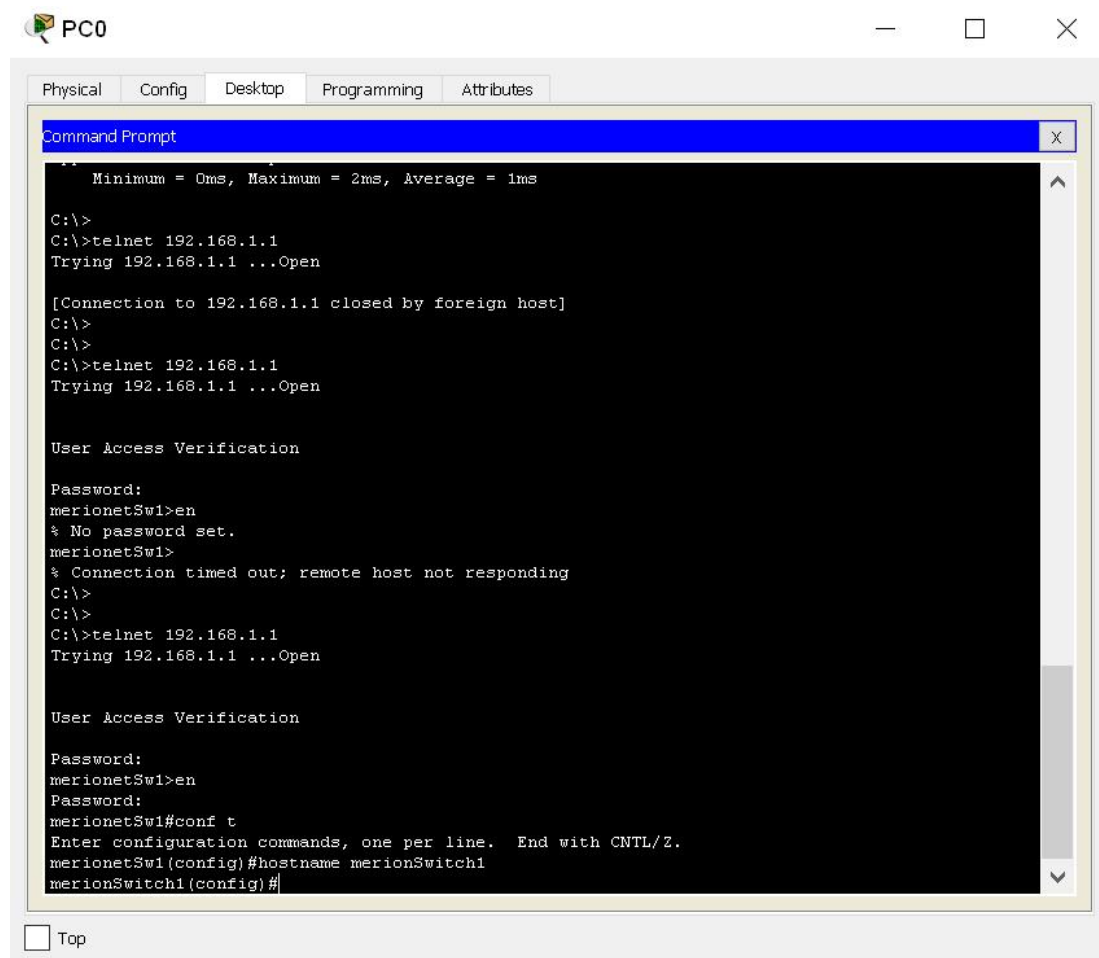
```
username admin secret cisco
```

```
line vty 0 15
```

```
login local
```

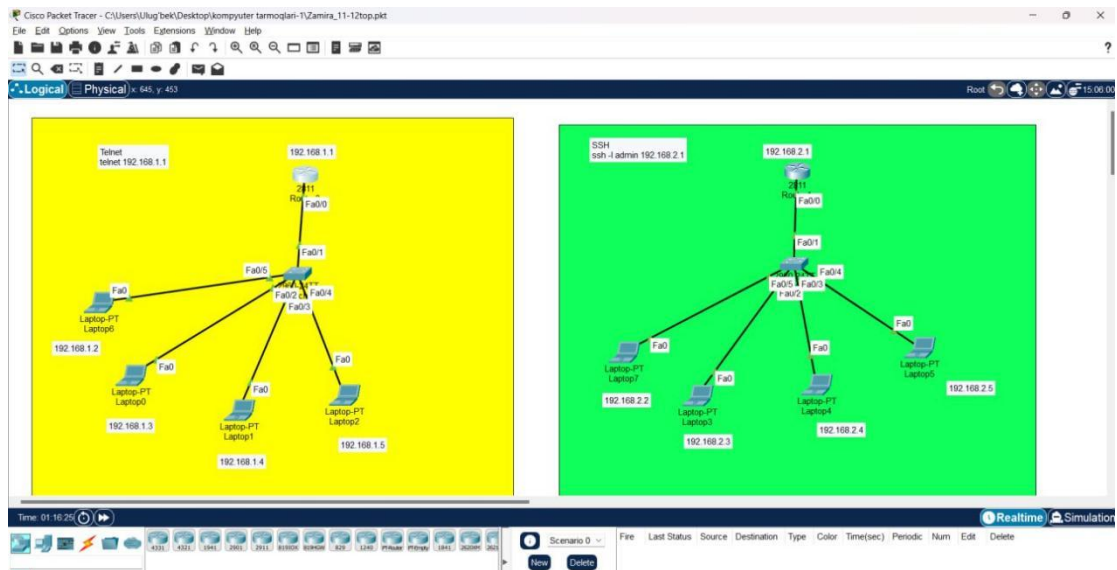
```
do wr
```

**3.7.** Kommutator ish stantsiyasiga kirish orqali sozlamalarni tekshiring va yangi sozlamalar kuchga kirganiga ishonch hosil qiling (3.5-rasm).

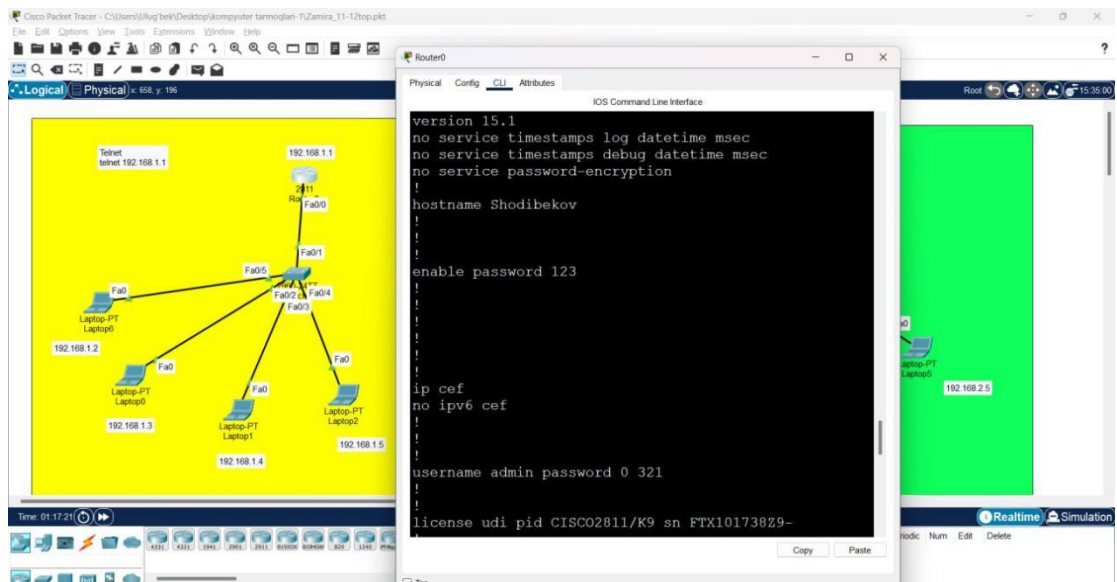


3.5-rasm. Sozlamalarni tekshirish

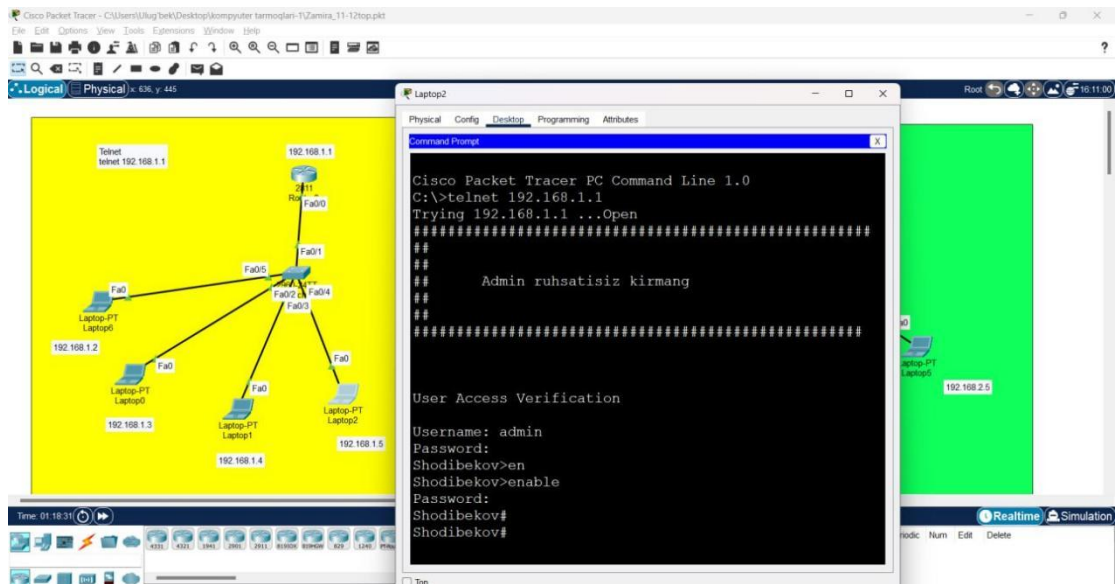




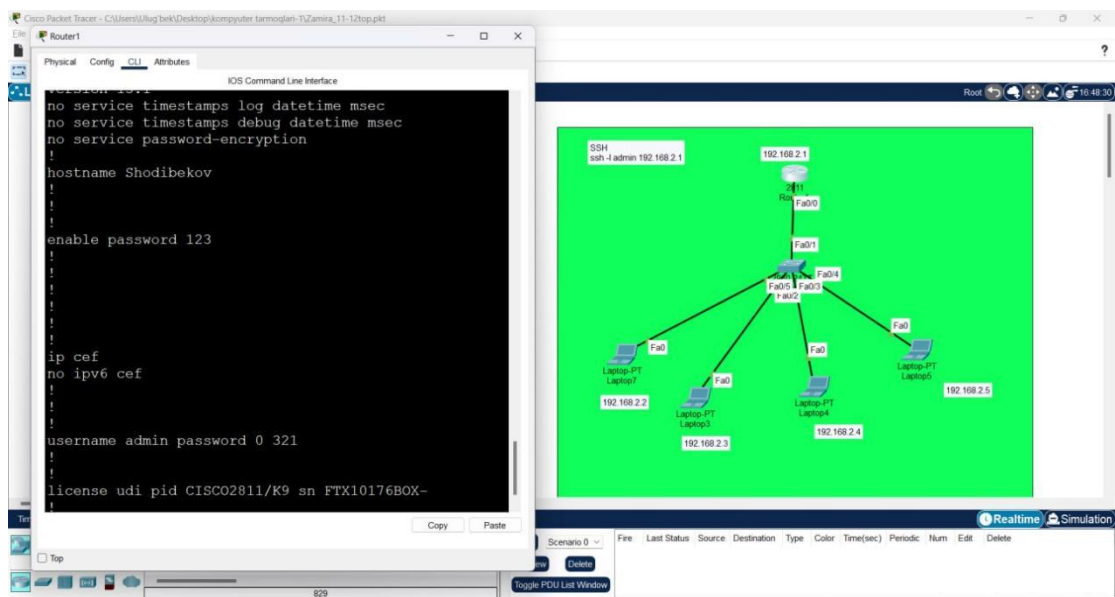
**Topologiyani tuzulishi**



**Hostname berish**



## Telnet orqali kirish



## Ssh sozlash

