

O'ZBEKISTON RESPUBLIKASI AXBOROT TEXNOLOGIYALARI VA
KOMMUNIKATSIYA RIVOJLANTIRISH VAZIRLIGI

MUHAMMAD AL-XORAZIMIY NOMIDAGI TOSHKENT AXBOROT
TEXNOLOGIYALARI UNIVERSITETI

5-6-7-Laboratoriya

Kompyuter tarmoqlari

5-nos. fu.
15.04.23.
8-nos. x.
15-nos. fu.
15.04.23.


Tekshirdi: Saburova Nasiba

Bajardi: Solijonov Asadbek

Toshkent – 2023

R5 da

```
r3#show ipv6 route
IPv6 Routing Table - 11 entries
Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP
        U - Per-user Static route, M - MIPv6
        I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea, IS -
ISIS summary
        O - OSPF intra, OI - OSPF inter, OE1 - OSPF ext 1, OE2 -
OSPF ext 2
        ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
        D - EIGRP, EX - EIGRP external
S   ::/0 [1/0]
    via 2001:DB8:100::2
OI  2001:DB8:1::/120 [110/65]
    via FE80::209:7CFF:FE46:B901, Serial0/3/0
OI  2001:DB8:2::/120 [110/65]
    via FE80::2D0:BAFF:FE5A:7701, Serial0/3/1
O   2001:DB8:10::/126 [110/128]
    via FE80::209:7CFF:FE46:B901, Serial0/3/0
    via FE80::2D0:BAFF:FE5A:7701, Serial0/3/1
C   2001:DB8:20::/126 [0/0]
    via ::, Serial0/3/0
L   2001:DB8:20::2/128 [0/0]
    via ::, Serial0/3/0
C   2001:DB8:30::/126 [0/0]
```



```
S11-21#show ipv6 route
IPv6 Routing Table - 1 entries
Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP
        U - Per-user Static route, M - MIPv6
        I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary
        ND - ND Default, NDP - ND Prefix, DCE - Destination, NDR - Redirect
        O - OSPF intra, OI - OSPF inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2
        ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
        D - EIGRP, EX - EIGRP external
S   FE00::/5 [0/0]
    via Null0, receive
```


R3 da

```

-----
OSPF
OE2 :
C 2
L 2
OI 2
Solijonov>
Solijonov>show ipv6 route
IPv6 Routing Table - 1 entries
Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP
        U - Per-user Static route, M - MIPv6
        I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary
        ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect
        O - OSPF intra, OI - OSPF inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2
        ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
        D - EIGRP, EX - EIGRP external
L FF00::/8 [0/0]
  via Null0, receive
Solijonov>
Solijonov>

```

Активировано

R4 da

IOS Command Line Interface

```

R2#show ipv6 route
IPv6 Routing Table - 10 entries
Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP
        U - Per-user Static route, M - MIPv6
        I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea, IS -
        ISIS summary
        O - OSPF intra, OI - OSPF inter, OE1 - OSPF ext 1, OE2 -
        OSPF ext 2
        ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
        D - EIGRP, EX - EIGRP external
OE2 ::/0 [110/1]
  via FE80::2E0:F7FF:FE7A:2301, Serial0/3/0
OI 2001:DB8:1::/120 [110/65]
  via FE80::209:7CFF:FE46:B901, Serial0/3/1
C 2001:DB8:2::/120 [0/0]
  via ::, FastEthernet0/0
L 2001:DB8:2::1/128 [0/0]
  via ::, FastEthernet0/0
C 2001:DB8:10::/126 [0/0]
  via ::, Serial0/3/1
L 2001:DB8:10::2/128 [0/0]
  via ::, Serial0/3/1
O 2001:DB8:20::/126 [110/128]
  via FE80::209:7CFF:FE46:B901, Serial0/3/1

```

10

20

```

Asadbek#
Asadbek#show ipv6 route
IPv6 Routing Table - 1 entries
Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP
        U - Per-user Static route, M - MIPv6
        I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary
        ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect
        O - OSPF intra, OI - OSPF inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2
        ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
        D - EIGRP, EX - EIGRP external
L FF00::/8 [0/0]
  via Null0, receive
Asadbek#

```

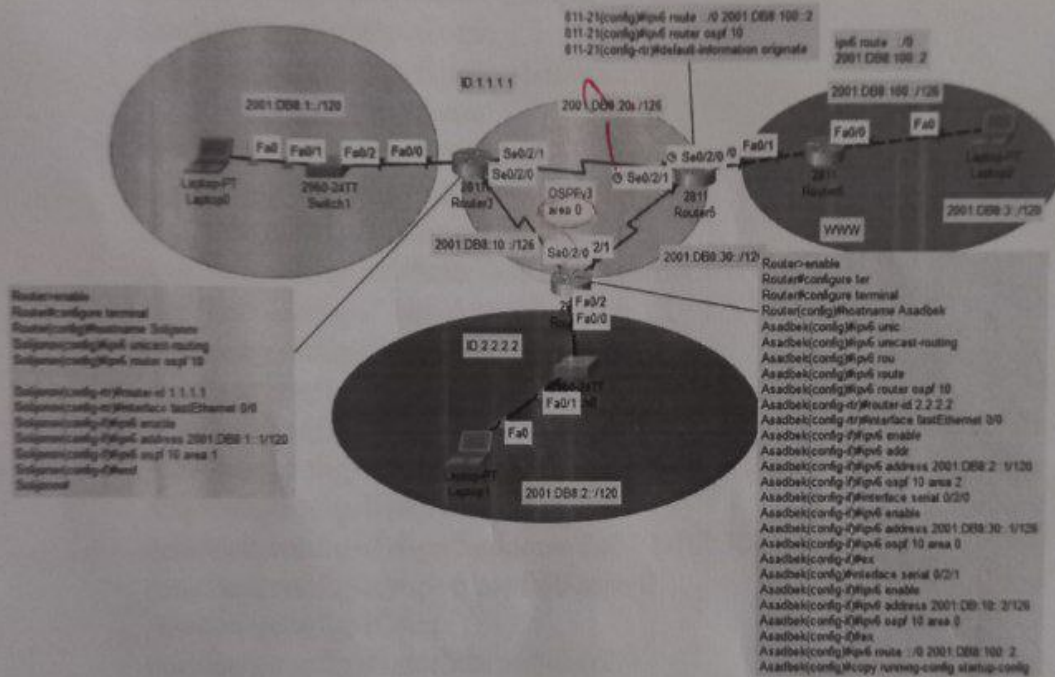
Активировано

Laboratoriya ishi – 7

3.3. Vazifani bajarish ketma ketligi

OSPFv3 dinamik marshrutizatsiya protokolini sozlashni o'rganish:

- tarmoq topologiyasini 5.3-rasm bo'yicha o'rganing;
- R1, R2 va R3 marshrutizatorlarining interfeyslarini sozlang va tekshiring;
- OSPFv3 protokolini sozlaymiz va tekshiramiz;
- har bir marshrutizatorning marshrutizatsiya jadvalini o'rganamiz.



5.3-rasm. Tarmoq topologiyasi

Kompyuterlarga 5.3-rasmda ko'rsatilgan toplogiya boyicha IP manzillarni kiriting.

1. Marshrutiztorning interfeyslariga variant bo'yicha manzillarni sozlang.

a) R3 marshrutizatorning konfiguratsiyasini sozlaymiz.

```
Router>enable
Router#configure terminal
Router(config)#hostname Solijonov
Solijonov(config)#ipv6 unicast-routing
Solijonov(config)#ipv6 router ospf 10

Solijonov(config-rtr)#router-id 1.1.1.1
Solijonov(config-rtr)#interface fastEthernet 0/0
Solijonov(config-rtr-if)#ipv6 enable
```

Computer network
15.08.2023
29.01.2023


```
Solijonov(config-if)#ipv6 address 2001:DB8:1::1/120
Solijonov(config-if)#ipv6 ospf 10 area 1
Solijonov(config-if)#end
Solijonov#
```

R1 ning qolgan interface larini ham shu yo'sinda sozlaymiz.

b) R4 marshrutizatorning konfiguratsiyasini sozlaymiz.

```
Router>enable
Router#configure ter
Router#configure terminal
Router(config)#hostname Asadbek
Asadbek(config)#ipv6 unic
Asadbek(config)#ipv6 unicast-routing
Asadbek(config)#ipv6 rou
Asadbek(config)#ipv6 route
Asadbek(config)#ipv6 router ospf 10
Asadbek(config-rtr)#router-id 2.2.2.2
Asadbek(config-rtr)#interface fastEthernet 0/0
Asadbek(config-if)#ipv6 enable
Asadbek(config-if)#ipv6 addr
Asadbek(config-if)#ipv6 address 2001:DB8:2::1/120
Asadbek(config-if)#ipv6 ospf 10 area 2
Asadbek(config-if)#interface serial 0/2/0
Asadbek(config-if)#ipv6 enable
Asadbek(config-if)#ipv6 address 2001:DB8:30::1/126
Asadbek(config-if)#ipv6 ospf 10 area 0
Asadbek(config-if)#ex
Asadbek(config)#interface serial 0/2/1
Asadbek(config-if)#ipv6 enable
Asadbek(config-if)#ipv6 address 2001:DB8:10::2/126
Asadbek(config-if)#ipv6 ospf 10 area 0
Asadbek(config-if)#ex
Asadbek(config)#ipv6 route ::0 2001:DB8:100::2
Asadbek(config)#copy running-config startup-config
```

R5 internet bilan boglanganligi uchun *default-information originate* kommandasi yoziladi

```
Router>enable
Router#configure terminal
Router(config)#hostname 811-21
811-21(config)#ipv6 route ::0 2001
811-21(config)#ipv6 route ::0 2001:DB8:100::2
811-21(config)#ipv6 route ospf 10
```


CISCO PACKET TRACER DASTURIDA WAN TARMOQLARINI LOYIHALASH. STATIK VA DINAMIK MARSHRUTLASH

1. Ishning maqsadi

Ushbu laboratoriya ishi quyidagilar uchun mo'lallangan:

- Ma'lumot uzatish tarmoqlarida WAN tarmoqlarni qurish va statik marshrutizatsiyani sozlashni o'rganish.
- EIGRP masofa-vektor marshrutizatsiya protokolini sozlashni o'rganish.
- OSPFv3 dinamik marshrutizatsiya protokolini sozlashni o'rganish.

2. Qisqa nazariy ma'lumotlar

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*. Mashrut 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.

5-laboratoriya ishi

Router 2

811-21>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

40.0.0.0/8 is variably subnetted, 6 subnets, 3 masks

S 40.0.0.0/24 [1/0] via 40.0.3.2

S 40.0.2.0/24 [1/0] via 40.0.3.2

C 40.0.3.0/30 is directly connected, FastEthernet0/0

L 40.0.3.1/32 is directly connected, FastEthernet0/0

C 40.0.4.0/24 is directly connected, FastEthernet0/1

L 40.0.4.100/32 is directly connected, FastEthernet0/1

Router 0

ASADBEK>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

40.0.0.0/8 is variably subnetted, 8 subnets, 3 masks

S 40.0.0.0/24 [1/0] via 40.0.1.1

C 40.0.1.0/30 is directly connected, FastEthernet0/1

L 40.0.1.2/32 is directly connected, FastEthernet0/1

C 40.0.2.0/24 is directly connected, FastEthernet0/0

L 40.0.2.100/32 is directly connected, FastEthernet0/0

C 40.0.3.0/30 is directly connected, FastEthernet1/0

L 40.0.3.2/32 is directly connected, FastEthernet1/0

S 40.0.4.0/24 [1/0] via 40.0.3.1

Router1

SOLIJONOV>show ip route

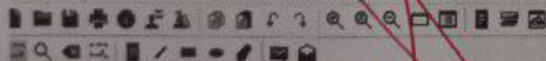
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
 D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
 N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
 E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
 i - IS-IS, L1 - IS-IS level-1, L2 - 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

40.0.0.0/8 is variably subnetted, 6 subnets, 3 masks
 C 40.0.0.0/24 is directly connected, FastEthernet1/0
 L 40.0.0.100/32 is directly connected, FastEthernet1/0
 C 40.0.1.0/30 is directly connected, FastEthernet0/0
 L 40.0.1.1/32 is directly connected, FastEthernet0/0
 S 40.0.2.0/24 [1/0] via 40.0.1.2
 S 40.0.4.0/24 [1/0] via 40.0.1.2

Cisco Packet Tracer - C:\Users\user\Desktop\kompyuter tarmoqlari\5-amaliy ishl.pkt

File Edit Options View Tools Extensions Window Help



Logical Physical 125 / 32

Router1>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

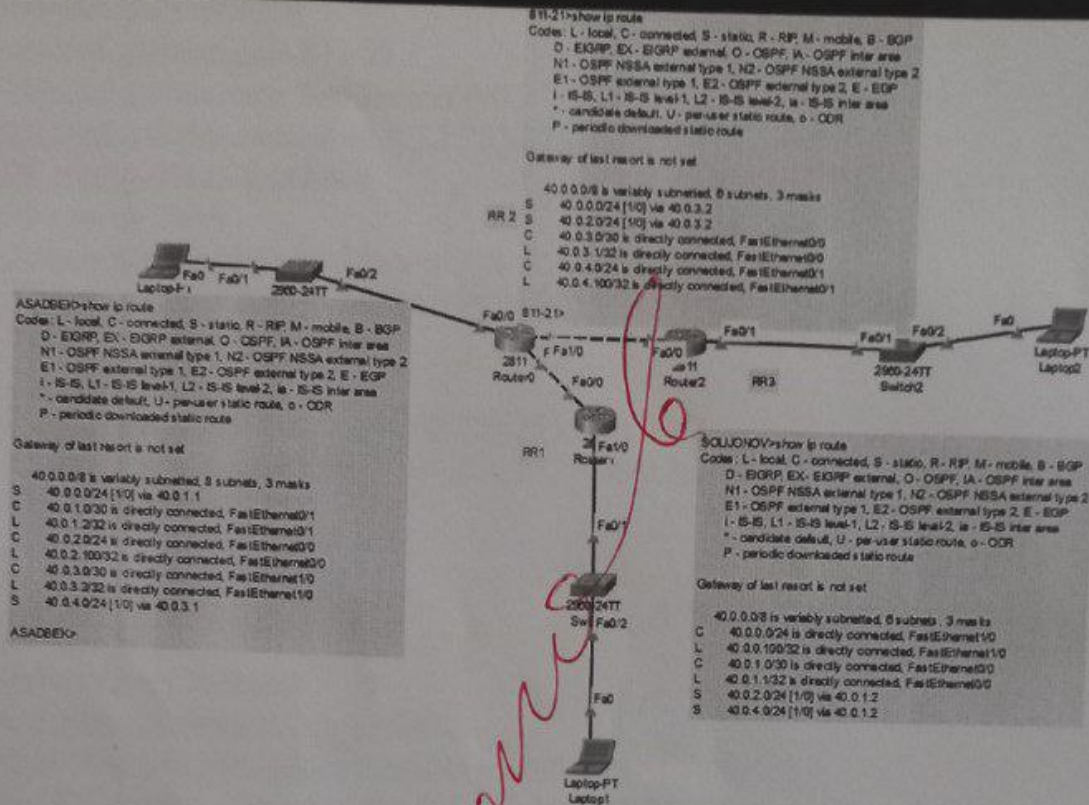
Gateway of last resort is not set

40.0.0.0/8 is variably subnetted, 6 subnets, 3 masks
 S 40.0.0.0/24 [1/0] via 40.0.1.2
 S 40.0.2.0/24 [1/0] via 40.0.1.2
 C 40.0.1.0/30 is directly connected, FastEthernet0/0
 L 40.0.1.1/32 is directly connected, FastEthernet0/0
 C 40.0.4.0/24 is directly connected, FastEthernet0/1
 L 40.0.4.100/32 is directly connected, FastEthernet0/1

ASADBEK>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
 40.0.0.0/8 is variably subnetted, 6 subnets, 3 masks
 S 40.0.0.0/24 [1/0] via 40.0.1.1
 L 40.0.1.2/32 is directly connected, FastEthernet0/1
 C 40.0.1.2/32 is directly connected, FastEthernet0/1
 C 40.0.2.0/24 is directly connected, FastEthernet0/0
 L 40.0.2.100/32 is directly connected, FastEthernet0/0
 C 40.0.0.0/30 is directly connected, FastEthernet1/0
 L 40.0.3.2/32 is directly connected, FastEthernet1/0
 S 40.0.4.0/24 [1/0] via 40.0.1.1

ASADBEK>

SOLIJONOV>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
 40.0.0.0/8 is variably subnetted, 6 subnets, 3 masks
 C 40.0.0.0/24 is directly connected, FastEthernet1/0
 L 40.0.0.100/32 is directly connected, FastEthernet1/0
 C 40.0.1.0/30 is directly connected, FastEthernet0/0
 L 40.0.1.1/32 is directly connected, FastEthernet0/0
 S 40.0.2.0/24 [1/0] via 40.0.1.2
 S 40.0.4.0/24 [1/0] via 40.0.1.2



5.2-rasm. WAN tarmoq topologiyasi

R1

```
Router>enable
Router#configure terminal
Router(config)#hostname SOLIJONOV
SOLIJONOV(config)#no ip domain-lookup
SOLIJONOV(config)#security passwords min-length 10
SOLIJONOV(config)#enable secret cisco 12345
SOLIJONOV(config)#service password-encryption
SOLIJONOV(config)#interface fastEthernet 1/0
SOLIJONOV(config-if)#ip address 40.0.0.100 255.255.255.0
SOLIJONOV(config-if)#no shut
SOLIJONOV(config-if)#no shutdown
SOLIJONOV(config-if)#ex
SOLIJONOV(config)#interface fastEthernet 0/0
SOLIJONOV(config-if)#ip address
SOLIJONOV(config-if)#ip address 40.0.1.1 255.255.255.252
SOLIJONOV(config-if)#no shutdown
SOLIJONOV(config-if)#ex
SOLIJONOV(config)#ip route
SOLIJONOV(config)#ip route 40.0.2.0 255.255.255.0 40.0.1.2
SOLIJONOV(config)#ip route 40.0.4.0 255.255.255.0 40.0.1.2
SOLIJONOV(config)#ex
```

R2


```
Router>enable
Router#configure terminal
Router(config)#hostname 811-21
811-21(config)#interface fastEthernet 0/0
811-21(config-if)#ip address 40.0.3.1 255.255.255.25
811-21(config-if)#no shutdown
811-21(config-if)#ex
811-21(config)#interface fastEthernet 0/1
811-21(config-if)#ip address 40.0.4.100 255.255.255.0
811-21(config-if)#no shutdown
811-21(config-if)#ex
811-21(config)#ip route 40.0.2.0 255.255.255.0 40.0.3.2
811-21(config)#ip route 40.0.0.0 255.255.255.0 40.0.3.2
811-21(config)#ex
```

R0

```
Router>enable
Router#configure terminal
Router(config)#hostname ASADBEK
ASADBEK(config)#interface fastEthernet 0/0
ASADBEK (config-if)#ip address 40.0.2.1 255.255.255.25
ASADBEK (config-if)#no shutdown
ASADBEK (config-if)#ex
ASADBEK (config)#interface fastEthernet 1/0
ASADBEK (config-if)#ip address 40.0.3
.100 255.255.255.0
ASADBEK (config-if)#no shutdown
ASADBEK (config-if)#ex
ASADBEK (config)#ip route 40.0.2.0 255.255.255.0 40.0.2.2
ASADBEK (config)#ip route 40.0.0.0 255.255.255.0 40.0.2.2
ASADBEK (config)#ex
```