

Лабораторная работа №15

Динамическая маршрутизация.

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НПИБД-01-22

Открытие проекта

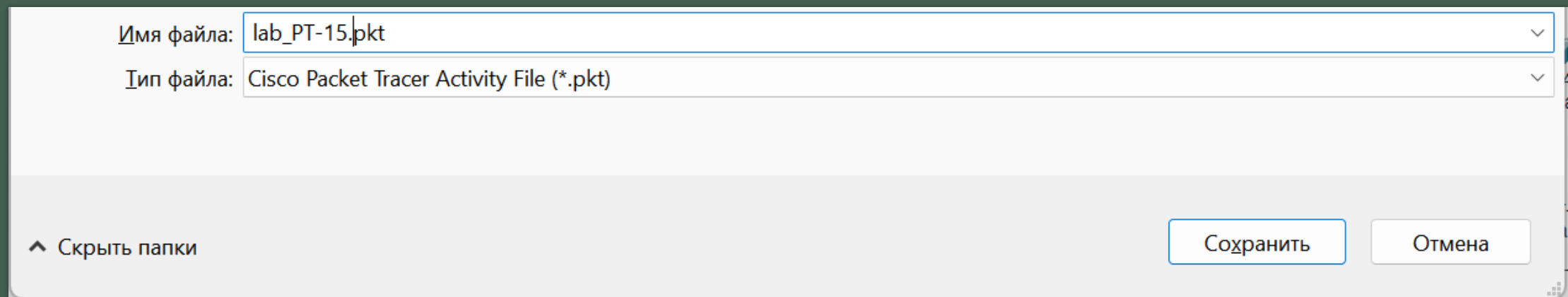
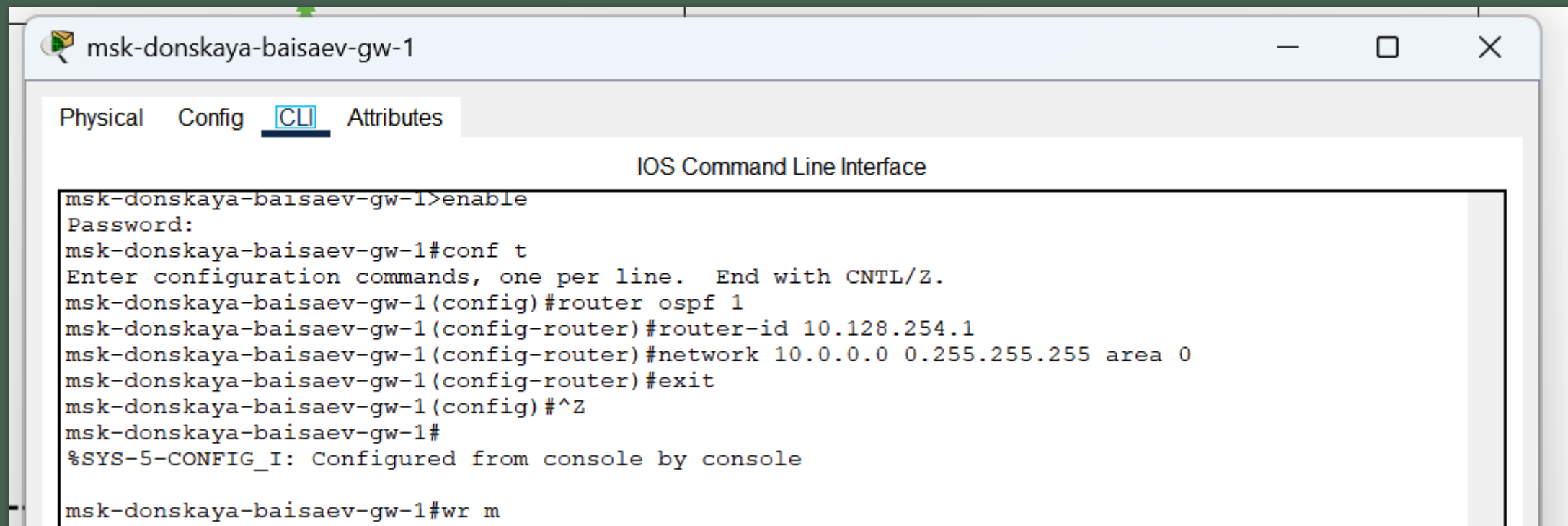


Рис. 1.1. Открытие проекта lab_PT-15.pkt.

Настройка OSPF

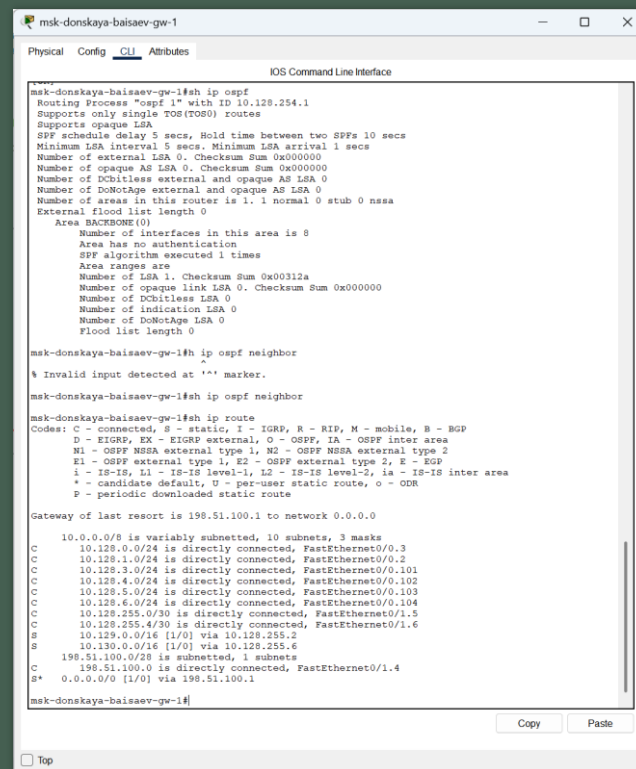


The screenshot shows a web-based configuration interface for a network device named 'msk-donskaya-baisaev-gw-1'. The 'CLI' tab is selected, displaying the 'IOS Command Line Interface'. The terminal output shows the following commands and responses:

```
msk-donskaya-baisaev-gw-1>enable
Password:
msk-donskaya-baisaev-gw-1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-baisaev-gw-1(config)#router ospf 1
msk-donskaya-baisaev-gw-1(config-router)#router-id 10.128.254.1
msk-donskaya-baisaev-gw-1(config-router)#network 10.0.0.0 0.255.255.255 area 0
msk-donskaya-baisaev-gw-1(config-router)#exit
msk-donskaya-baisaev-gw-1(config)#^Z
msk-donskaya-baisaev-gw-1#
%SYS-5-CONFIG_I: Configured from console by console
msk-donskaya-baisaev-gw-1#wr m
```

Рис. 1.2. Настройка OSPF на маршрутизаторе msk-donskaya-baisaev-gw-1 (включение процесса OSPF, назначение областей интерфейсам).

Проверка OSPF



The screenshot shows a terminal window titled "msk-donskaya-baisaev-gw-1" with tabs for "Physical", "Config", "CLI", and "Attributes". The "CLI" tab is active, displaying the "IOS Command Line Interface". The terminal output shows the results of several OSPF-related commands:

```
msk-donskaya-baisaev-gw-1#sh ip ospf
Routing Process "ospf 1" with ID 10.128.254.1
Supports only single TOS(TOS0) routes
Supports opaque LSA
SPF schedule delay 5 secs, Hold time between two SPFs 10 secs
Minimum LSA interval 5 secs, Minimum LSA arrival 1 secs
Number of external LSA 0, Checksum Sum 0x000000
Number of opaque AS LSA 0, Checksum Sum 0x000000
Number of DCHitless external and opaque AS LSA 0
Number of DoNotAge external and opaque AS LSA 0
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
External Flood list length 0
Area BACKBONE(0)
Number of interfaces in this area is 8
Area has no authentication
SPF algorithm executed 1 times
Area ranges are
Number of LSA 1, Checksum Sum 0x00312a
Number of opaque link LSA 0, Checksum Sum 0x000000
Number of DCHitless LSA 0
Number of Indication LSA 0
Number of DoNotAge LSA 0
Flood list length 0

msk-donskaya-baisaev-gw-1#sh ip ospf neighbor
% Invalid input detected at *** marker.

msk-donskaya-baisaev-gw-1#sh ip ospf neighbor
msk-donskaya-baisaev-gw-1#sh ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       O - EIGRP, EX - EIGRP external, D - 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, 0 - ODR
       P - periodic downloaded static route

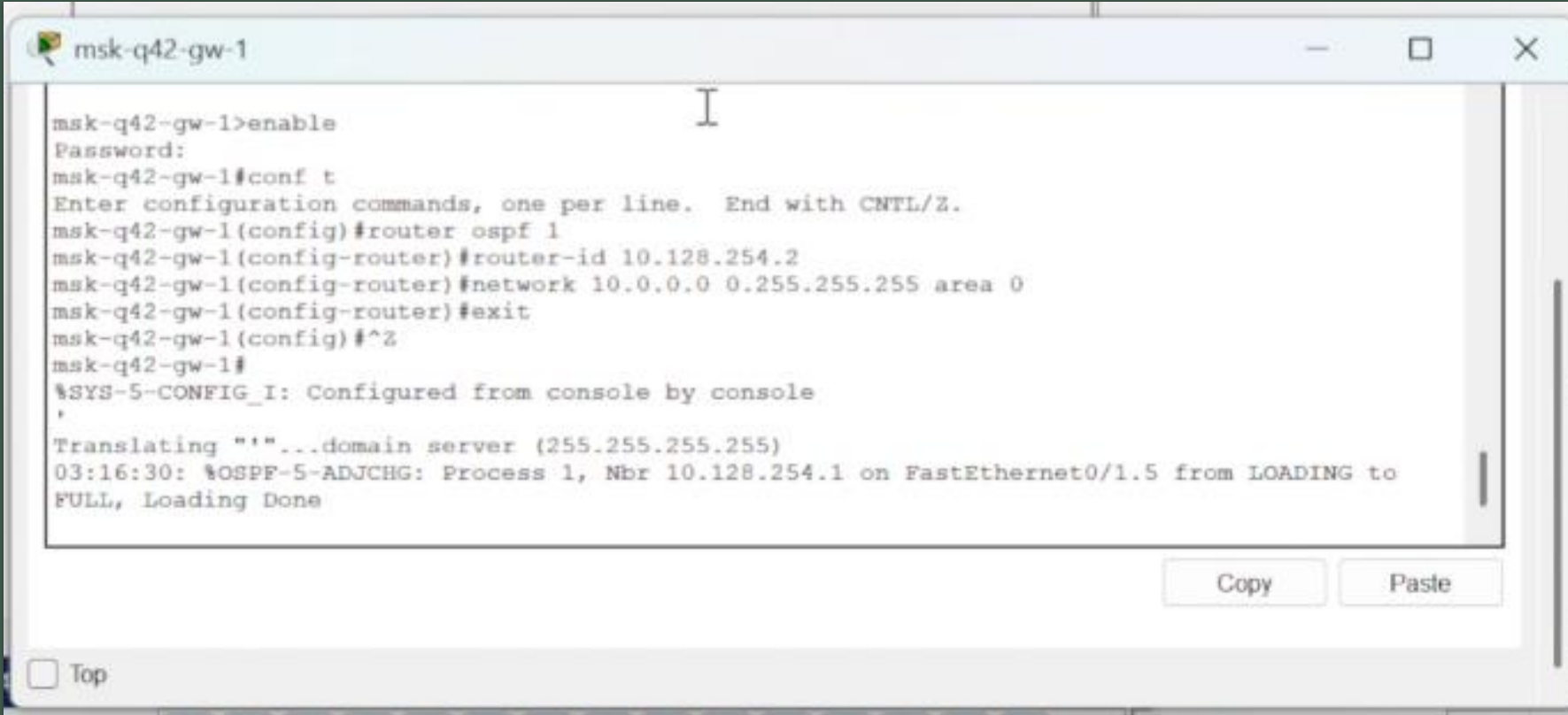
Gateway of last resort is 198.51.100.1 to network 0.0.0.0

10.0.0.0/8 is variably subnetted, 10 subnets, 3 masks
C 10.128.0.0/24 is directly connected, FastEthernet0/0.3
C 10.128.1.0/24 is directly connected, FastEthernet0/0.2
C 10.128.3.0/24 is directly connected, FastEthernet0/0.101
C 10.128.4.0/24 is directly connected, FastEthernet0/0.102
C 10.128.5.0/24 is directly connected, FastEthernet0/0.103
C 10.128.6.0/24 is directly connected, FastEthernet0/0.104
C 10.128.255.0/30 is directly connected, FastEthernet0/1.5
C 10.128.255.4/30 is directly connected, FastEthernet0/1.6
S 10.129.0.0/16 [1/0] via 10.128.255.2
S 10.130.0.0/16 [1/0] via 10.128.255.6
S 198.51.100.0/20 is subnetted, 1 subnets
S 198.51.100.0 is directly connected, FastEthernet0/1.4
S* 0.0.0.0/0 [1/0] via 198.51.100.1

msk-donskaya-baisaev-gw-1#
```

Рис. 1.3. Проверка состояния протокола OSPF на маршрутизаторе msk-donskaya-baisaev-gw-1 (просмотр статуса всех соседей в заданном сегменте, вывод информации из таблицы маршрутизации).

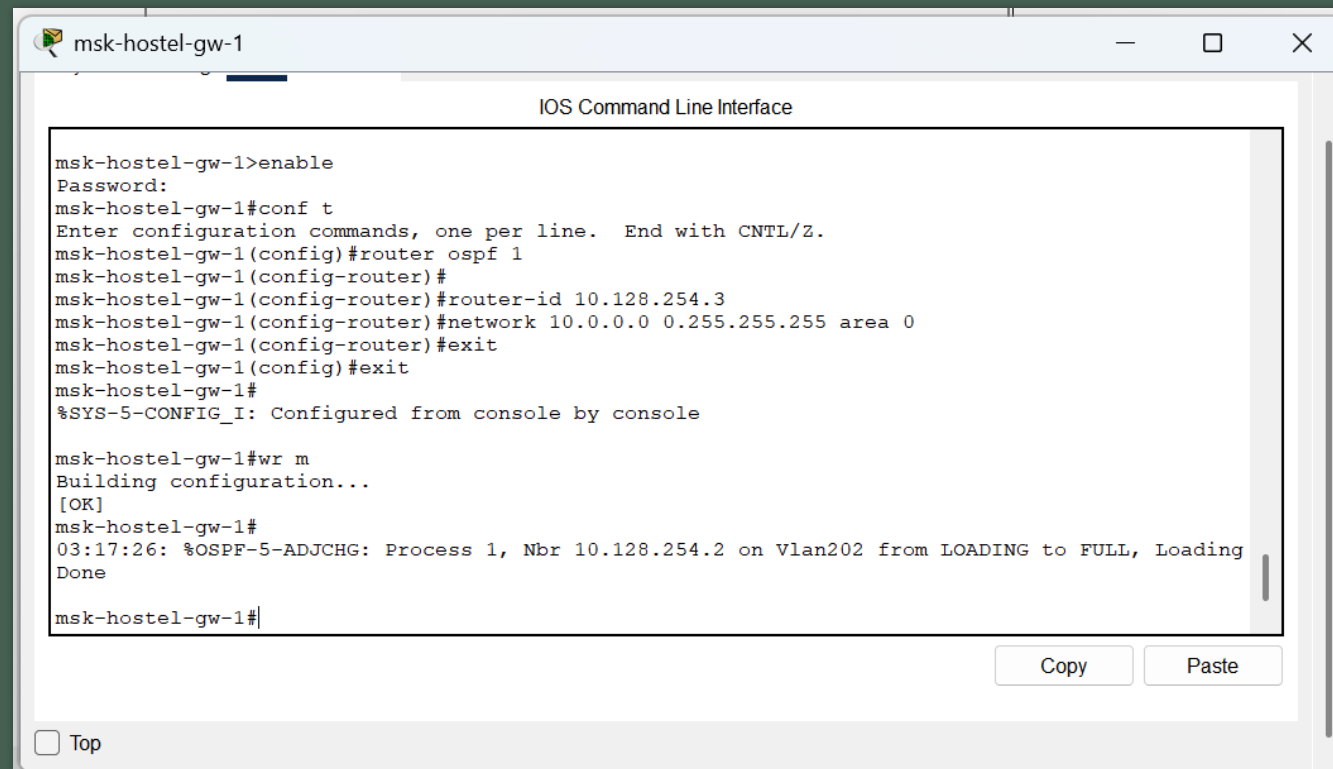
Настройка оборудования



```
msk-q42-gw-1>enable
Password:
msk-q42-gw-1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
msk-q42-gw-1(config)#router ospf 1
msk-q42-gw-1(config-router)#router-id 10.128.254.2
msk-q42-gw-1(config-router)#network 10.0.0.0 0.255.255.255 area 0
msk-q42-gw-1(config-router)#exit
msk-q42-gw-1(config)#^Z
msk-q42-gw-1#
%SYS-5-CONFIG_I: Configured from console by console
'
Translating ""...domain server (255.255.255.255)
03:16:30: %OSPF-5-ADJCHG: Process 1, Nbr 10.128.254.1 on FastEthernet0/1.5 from LOADING to
FULL, Loading Done
```

Рис. 1.4. Настройка маршрутизатора msk-q42-gw-1.

Настройка оборудования

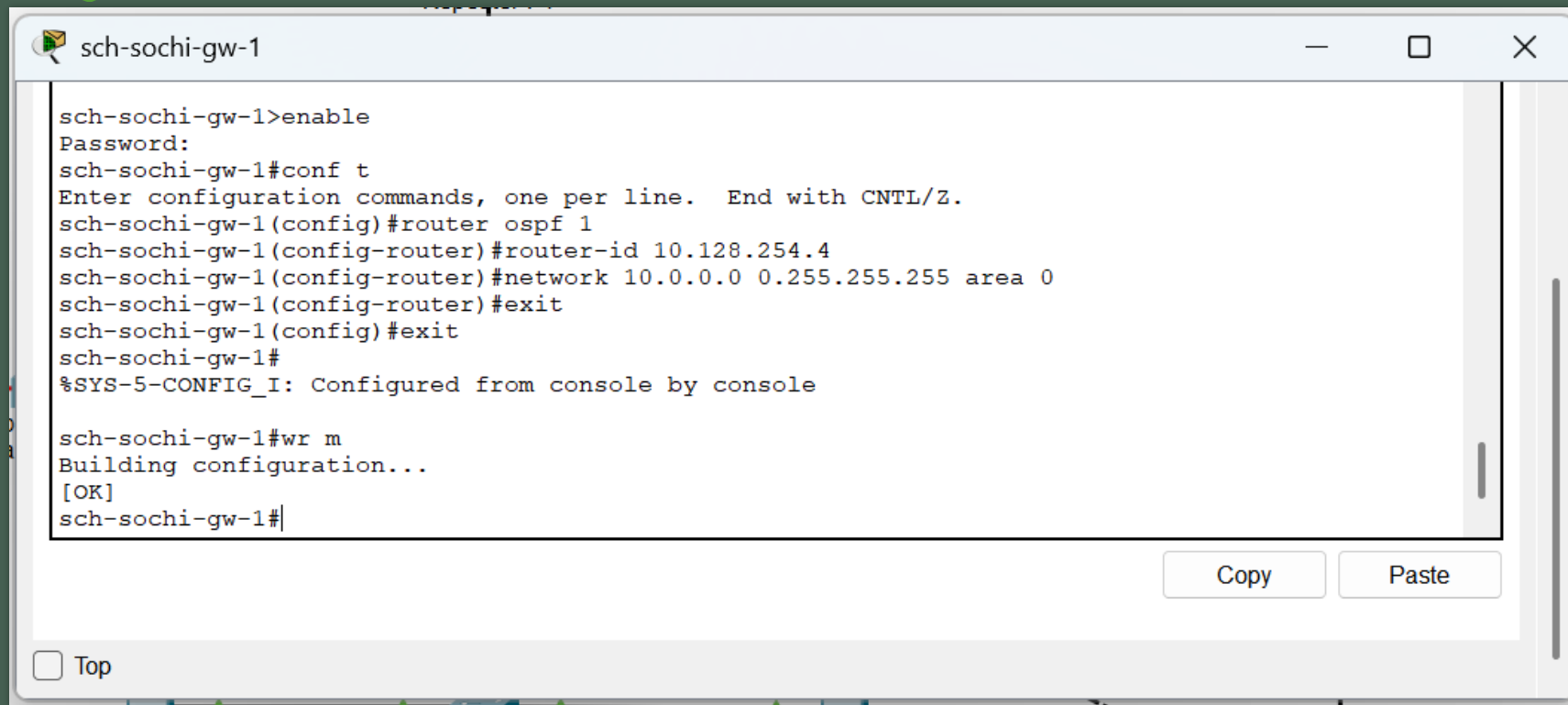


```
msk-hostel-gw-1>enable
Password:
msk-hostel-gw-1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
msk-hostel-gw-1(config)#router ospf 1
msk-hostel-gw-1(config-router)#
msk-hostel-gw-1(config-router)#router-id 10.128.254.3
msk-hostel-gw-1(config-router)#network 10.0.0.0 0.255.255.255 area 0
msk-hostel-gw-1(config-router)#exit
msk-hostel-gw-1(config)#exit
msk-hostel-gw-1#
%SYS-5-CONFIG_I: Configured from console by console

msk-hostel-gw-1#wr m
Building configuration...
[OK]
msk-hostel-gw-1#
03:17:26: %OSPF-5-ADJCHG: Process 1, Nbr 10.128.254.2 on Vlan202 from LOADING to FULL, Loading
Done
msk-hostel-gw-1#
```

Рис. 1.5. Настройка маршрутизирующего коммутатора msk-hostel-gw-1.

Настройка оборудования

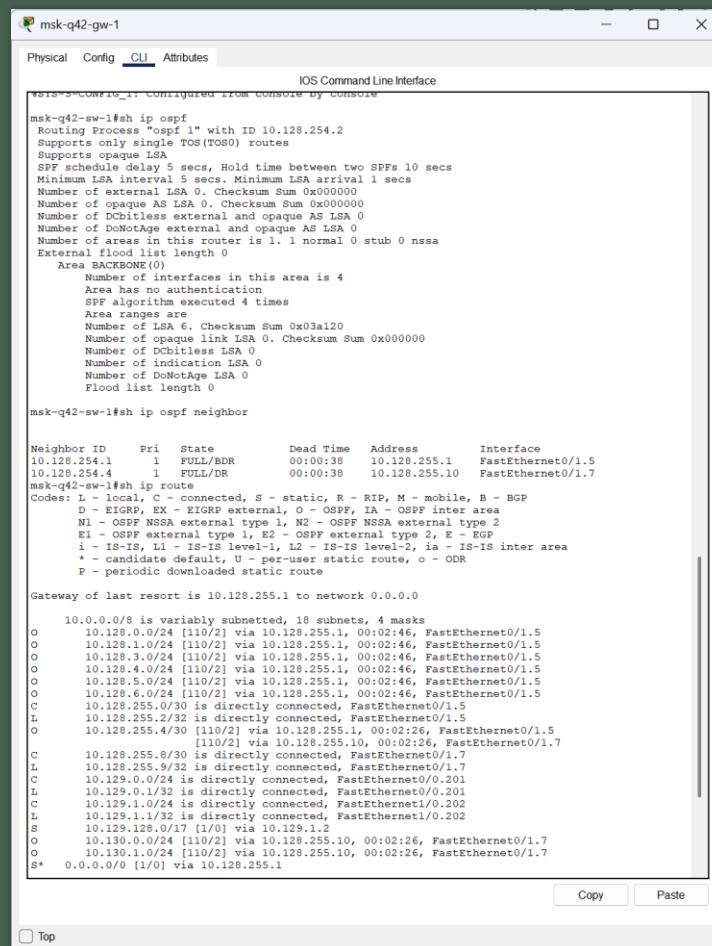


```
sch-sochi-gw-1>enable
Password:
sch-sochi-gw-1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
sch-sochi-gw-1(config)#router ospf 1
sch-sochi-gw-1(config-router)#router-id 10.128.254.4
sch-sochi-gw-1(config-router)#network 10.0.0.0 0.255.255.255 area 0
sch-sochi-gw-1(config-router)#exit
sch-sochi-gw-1(config)#exit
sch-sochi-gw-1#
%SYS-5-CONFIG_I: Configured from console by console

sch-sochi-gw-1#wr m
Building configuration...
[OK]
sch-sochi-gw-1#
```

Рис. 1.6. Настройка маршрутизатора sch-sochi-gw-1.

Проверка OSPF



The screenshot shows a Cisco IOS Command Line Interface window titled 'msk-q42-gw-1'. The window has tabs for 'Physical', 'Config', 'CLI', and 'Attributes', with 'CLI' selected. The CLI shows the following commands and output:

```
msk-q42-sw-1#sh ip ospf
Routing Process "ospf 1" with ID 10.128.254.2
Supports only single TOS(TOS0) routes
Supports opaque LSA
SPF schedule delay 5 secs, Hold time between two SPFs 10 secs
Minimum LSA interval 5 secs. Minimum LSA arrival 1 secs
Number of external LSA 0, Checksum Sum 0x0000000
Number of opaque AS LSA 0, Checksum Sum 0x0000000
Number of DCbitless external and opaque AS LSA 0
Number of DoNotAge external and opaque AS LSA 0
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
External flood list length 0
  Area BACKBONE(0)
    Number of interfaces in this area is 4
    Area has no authentication
    SPF algorithm executed 4 times
    Area ranges are
      Number of LSA 6, Checksum Sum 0x03a120
      Number of opaque link LSA 0, Checksum Sum 0x0000000
      Number of DCbitless LSA 0
      Number of indication LSA 0
      Number of DoNotAge LSA 0
      Flood list length 0

msk-q42-sw-1#sh ip ospf neighbor

Neighbor ID      Pri   State           Dead Time   Address        Interface
10.128.254.1      1    FULL/DR         00:00:38    10.128.255.1   FastEthernet0/1.5
10.128.254.4      1    FULL/DR         00:00:38    10.128.255.10  FastEthernet0/1.7

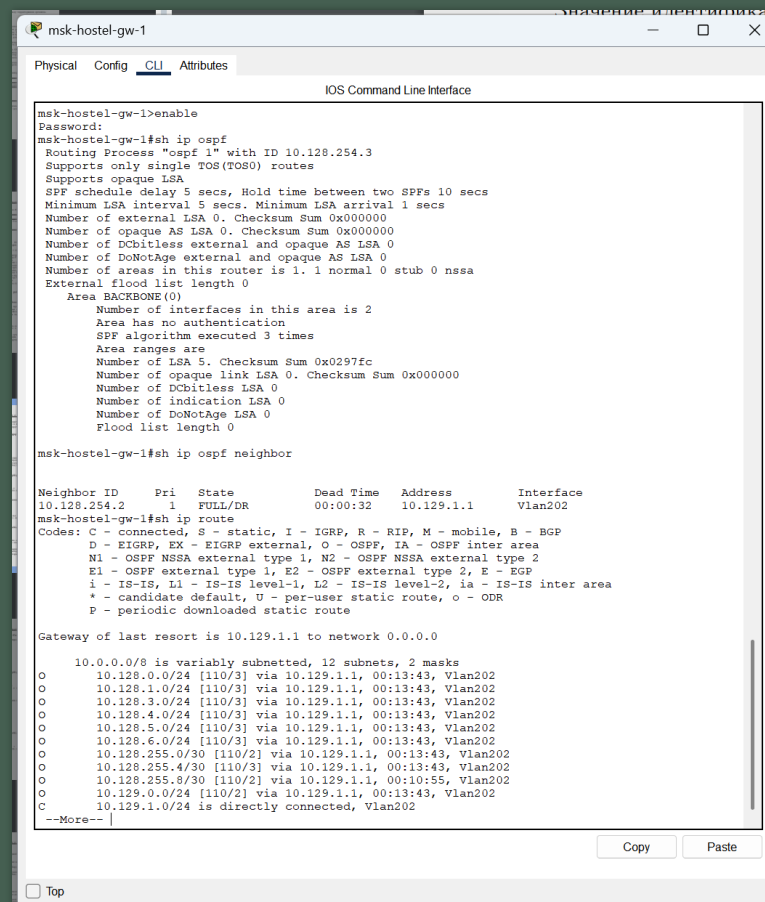
msk-q42-sw-1#sh ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - 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 10.128.255.1 to network 0.0.0.0

O    10.0.0.0/8 is variably subnetted, 18 subnets, 4 masks
O    10.128.0.0/24 [110/2] via 10.128.255.1, 00:02:46, FastEthernet0/1.5
O    10.128.1.0/24 [110/2] via 10.128.255.1, 00:02:46, FastEthernet0/1.5
O    10.128.3.0/24 [110/2] via 10.128.255.1, 00:02:46, FastEthernet0/1.5
O    10.128.4.0/24 [110/2] via 10.128.255.1, 00:02:46, FastEthernet0/1.5
O    10.128.5.0/24 [110/2] via 10.128.255.1, 00:02:46, FastEthernet0/1.5
O    10.128.6.0/24 [110/2] via 10.128.255.1, 00:02:46, FastEthernet0/1.5
C    10.128.255.0/30 is directly connected, FastEthernet0/1.5
L    10.128.255.2/32 is directly connected, FastEthernet0/1.5
O    10.128.255.4/30 [110/2] via 10.128.255.1, 00:02:26, FastEthernet0/1.5
    [110/2] via 10.128.255.10, 00:02:26, FastEthernet0/1.7
C    10.128.255.8/30 is directly connected, FastEthernet0/1.7
L    10.128.255.9/32 is directly connected, FastEthernet0/1.7
C    10.129.0.0/24 is directly connected, FastEthernet0/0.201
L    10.129.0.1/32 is directly connected, FastEthernet0/0.201
C    10.129.1.0/24 is directly connected, FastEthernet1/0.202
L    10.129.1.1/32 is directly connected, FastEthernet1/0.202
S    10.129.128.0/17 [1/0] via 10.129.1.2
O    10.130.0.0/24 [110/2] via 10.128.255.10, 00:02:26, FastEthernet0/1.7
O    10.130.1.0/24 [110/2] via 10.128.255.10, 00:02:26, FastEthernet0/1.7
S*   0.0.0.0/0 [1/0] via 10.128.255.1
```

Рис. 1.7. Проверка состояния протокола OSPF на маршрутизаторе msk-q42-gw-1.

Проверка OSPF



The screenshot shows a terminal window titled "msk-hostel-gw-1" with tabs for "Physical", "Config", "CLI", and "Attributes". The "CLI" tab is active, displaying the "IOS Command Line Interface". The user has entered the command "enable" and then "show ip ospf". The output shows the OSPF configuration for area 0, including the interface list, LSA counts, and the neighbor table. The neighbor table shows a single neighbor at 10.129.1.1 on interface Vlan202. The user then enters the command "show ip ospf neighbor". The output shows the neighbor table with columns for Neighbor ID, Pri, State, Dead Time, Address, and Interface. The neighbor 10.129.1.1 is in the FULL/DR state. The user then enters the command "show ip route". The output shows the routing table with various routes, including static routes and OSPF routes. The user then enters the command "show ip ospf neighbor". The output shows the neighbor table with columns for Neighbor ID, Pri, State, Dead Time, Address, and Interface. The neighbor 10.129.1.1 is in the FULL/DR state. The user then enters the command "show ip route". The output shows the routing table with various routes, including static routes and OSPF routes.

```
msk-hostel-gw-1>enable
msk-hostel-gw-1#sh ip ospf
Routing Process "ospf 1" with ID 10.128.254.3
Supports only single TOS(TOS0) routes
Supports opaque LSA
SPF schedule delay 5 secs, Hold time between two SPFs 10 secs
Minimum LSA interval 5 secs, Minimum LSA arrival 1 secs
Number of external LSA 0. Checksum Sum 0x000000
Number of opaque AS LSA 0. Checksum Sum 0x000000
Number of DCbitless external and opaque AS LSA 0
Number of DoNotAge external and opaque AS LSA 0
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
External flood list length 0
Area BACKBONE(0)
Number of interfaces in this area is 2
Area has no authentication
SPF algorithm executed 3 times
Area ranges are
Number of LSA 5. Checksum Sum 0x0297fc
Number of opaque link LSA 0. Checksum Sum 0x000000
Number of DCbitless LSA 0
Number of indication LSA 0
Number of DoNotAge LSA 0
Flood list length 0

msk-hostel-gw-1#sh ip ospf neighbor

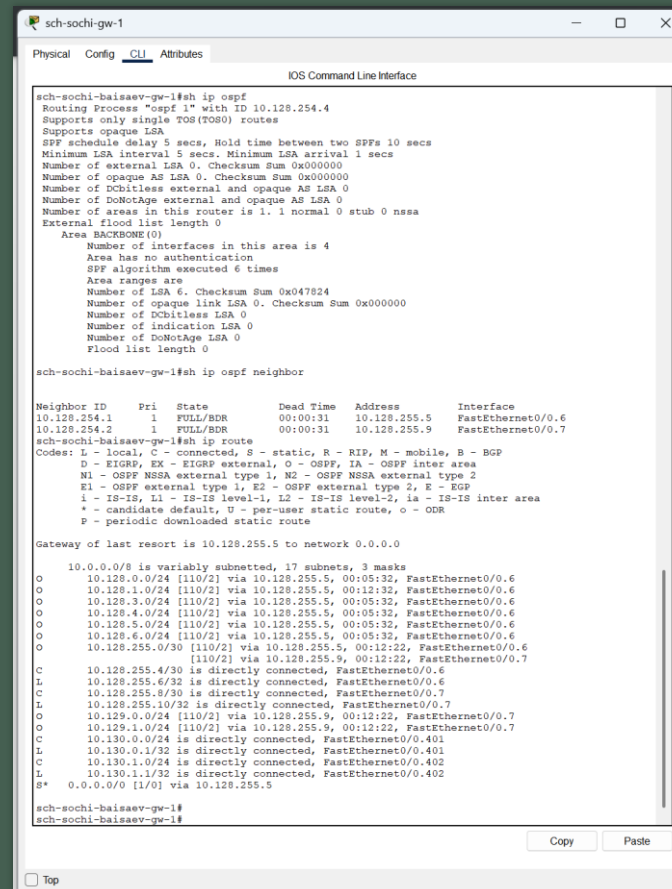
Neighbor ID Pri State Dead Time Address Interface
10.128.254.2 1 FULL/DR 00:00:32 10.129.1.1 Vlan202

msk-hostel-gw-1#sh 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 10.129.1.1 to network 0.0.0.0
10.0.0.0/8 is variably subnetted, 12 subnets, 2 masks
O 10.128.0.0/24 [110/3] via 10.129.1.1, 00:13:43, Vlan202
O 10.128.1.0/24 [110/3] via 10.129.1.1, 00:13:43, Vlan202
O 10.128.3.0/24 [110/3] via 10.129.1.1, 00:13:43, Vlan202
O 10.128.4.0/24 [110/3] via 10.129.1.1, 00:13:43, Vlan202
O 10.128.5.0/24 [110/3] via 10.129.1.1, 00:13:43, Vlan202
O 10.128.6.0/24 [110/3] via 10.129.1.1, 00:13:43, Vlan202
O 10.128.255.0/30 [110/2] via 10.129.1.1, 00:13:43, Vlan202
O 10.129.255.4/30 [110/3] via 10.129.1.1, 00:13:43, Vlan202
O 10.128.255.8/30 [110/2] via 10.129.1.1, 00:10:55, Vlan202
O 10.129.0.0/24 [110/2] via 10.129.1.1, 00:13:43, Vlan202
C 10.129.1.0/24 is directly connected, Vlan202
--More--
```

Рис. 1.8. Проверка состояния протокола OSPF на маршрутизирующем коммутаторе msk-hostel-gw-1.

Проверка OSPF



```
sch-sochi-gw-1
Physical Config CLI Attributes
IOS Command Line Interface

sch-sochi-baisaev-gw-1#sh ip ospf
Routing Process "ospf 1" with ID 10.128.254.4
Supports only single TOS(TOS0) routes
Supports opaque LSA
SPF schedule delay 5 secs, Hold time between two SPFs 10 secs
Minimum LSA interval 5 secs, Minimum LSA arrival 1 secs
Number of external LSA 0, Checksum Sum 0x000000
Number of opaque AS LSA 0, Checksum Sum 0x000000
Number of DCbitless external and opaque AS LSA 0
Number of DoNotAge external and opaque AS LSA 0
Number of areas in this router is 1, 1 normal 0 stub 0 nssa
External flood list length 0
Area BACKBONE(0)
  Number of interfaces in this area is 4
  Area has no authentication
  SPF algorithm executed 6 times
  Area ranges are
    Number of LSA 6, Checksum Sum 0x047824
  Number of opaque link LSA 0, Checksum Sum 0x000000
  Number of DCbitless LSA 0
  Number of indication LSA 0
  Number of DoNotAge LSA 0
  Flood list length 0

sch-sochi-baisaev-gw-1#sh ip ospf neighbor

Neighbor ID      Pri   State           Dead Time   Address        Interface
10.128.254.1      1    FULL/BDR        00:00:31    10.128.255.5    FastEthernet0/0.6
10.128.254.2      1    FULL/BDR        00:00:31    10.128.255.9    FastEthernet0/0.7

sch-sochi-baisaev-gw-1#sh 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

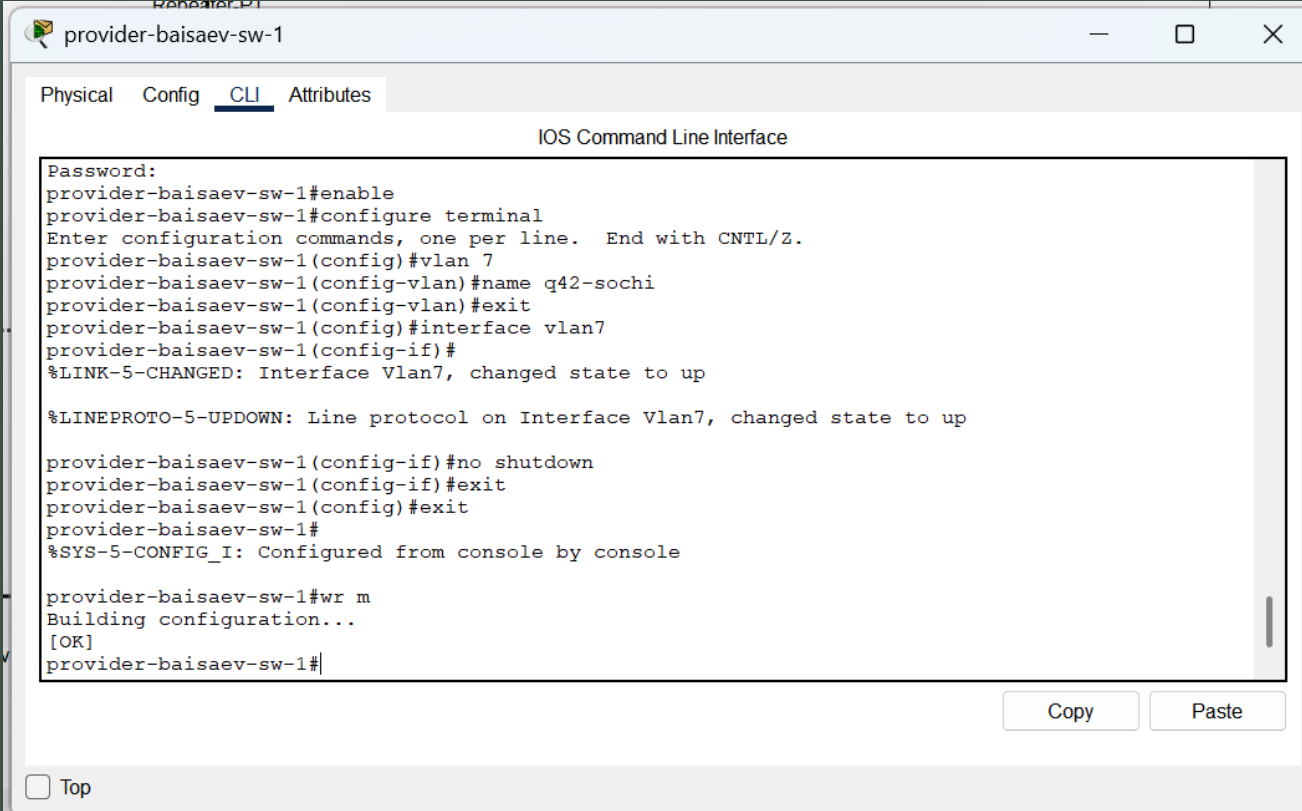
Gateway of last resort is 10.128.255.5 to network 0.0.0.0

 10.0.0.0/8 is variably subnetted, 17 subnets, 3 masks
O   10.128.0.0/24 [110/2] via 10.128.255.5, 00:05:32, FastEthernet0/0.6
O   10.128.1.0/24 [110/2] via 10.128.255.5, 00:12:32, FastEthernet0/0.6
O   10.128.3.0/24 [110/2] via 10.128.255.5, 00:05:32, FastEthernet0/0.6
O   10.128.4.0/24 [110/2] via 10.128.255.5, 00:05:32, FastEthernet0/0.6
O   10.128.5.0/24 [110/2] via 10.128.255.5, 00:05:32, FastEthernet0/0.6
O   10.128.6.0/24 [110/2] via 10.128.255.5, 00:05:32, FastEthernet0/0.6
O   10.128.255.0/30 [110/2] via 10.128.255.5, 00:12:22, FastEthernet0/0.6
C   10.128.255.4/30 is directly connected, FastEthernet0/0.6
L   10.128.255.6/32 is directly connected, FastEthernet0/0.6
C   10.128.255.8/30 is directly connected, FastEthernet0/0.7
L   10.128.255.10/32 is directly connected, FastEthernet0/0.7
O   10.129.0.0/24 [110/2] via 10.128.255.9, 00:12:22, FastEthernet0/0.7
O   10.129.1.0/24 [110/2] via 10.128.255.9, 00:12:22, FastEthernet0/0.7
C   10.130.0.0/24 is directly connected, FastEthernet0/0.401
L   10.130.0.1/32 is directly connected, FastEthernet0/0.401
C   10.130.1.0/24 is directly connected, FastEthernet0/0.402
L   10.130.1.1/32 is directly connected, FastEthernet0/0.402
S*  0.0.0.0/0 [1/0] via 10.128.255.5

sch-sochi-baisaev-gw-1#
sch-sochi-baisaev-gw-1#
```

Рис. 1.9. Проверка состояния протокола OSPF на маршрутизаторе sch-sochi-gw-1.

Настройка интерфейсов



The screenshot shows a window titled 'provider-baisaev-sw-1' with tabs for 'Physical', 'Config', 'CLI', and 'Attributes'. The 'CLI' tab is active, displaying the 'IOS Command Line Interface'. The terminal text is as follows:

```

Password:
provider-baisaev-sw-1#enable
provider-baisaev-sw-1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
provider-baisaev-sw-1(config)#vlan 7
provider-baisaev-sw-1(config-vlan)#name q42-sochi
provider-baisaev-sw-1(config-vlan)#exit
provider-baisaev-sw-1(config)#interface vlan7
provider-baisaev-sw-1(config-if)#
%LINK-5-CHANGED: Interface Vlan7, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan7, changed state to up

provider-baisaev-sw-1(config-if)#no shutdown
provider-baisaev-sw-1(config-if)#exit
provider-baisaev-sw-1(config)#exit
provider-baisaev-sw-1#
%SYS-5-CONFIG_I: Configured from console by console

provider-baisaev-sw-1#wr m
Building configuration...
[OK]
provider-baisaev-sw-1#

```

At the bottom right of the CLI window are 'Copy' and 'Paste' buttons. At the bottom left is a 'Top' button with a checkbox.

Рис. 1. 10. Настройка интерфейсов коммутатора provider-baisaev-sw-1.

Настройка оборудования

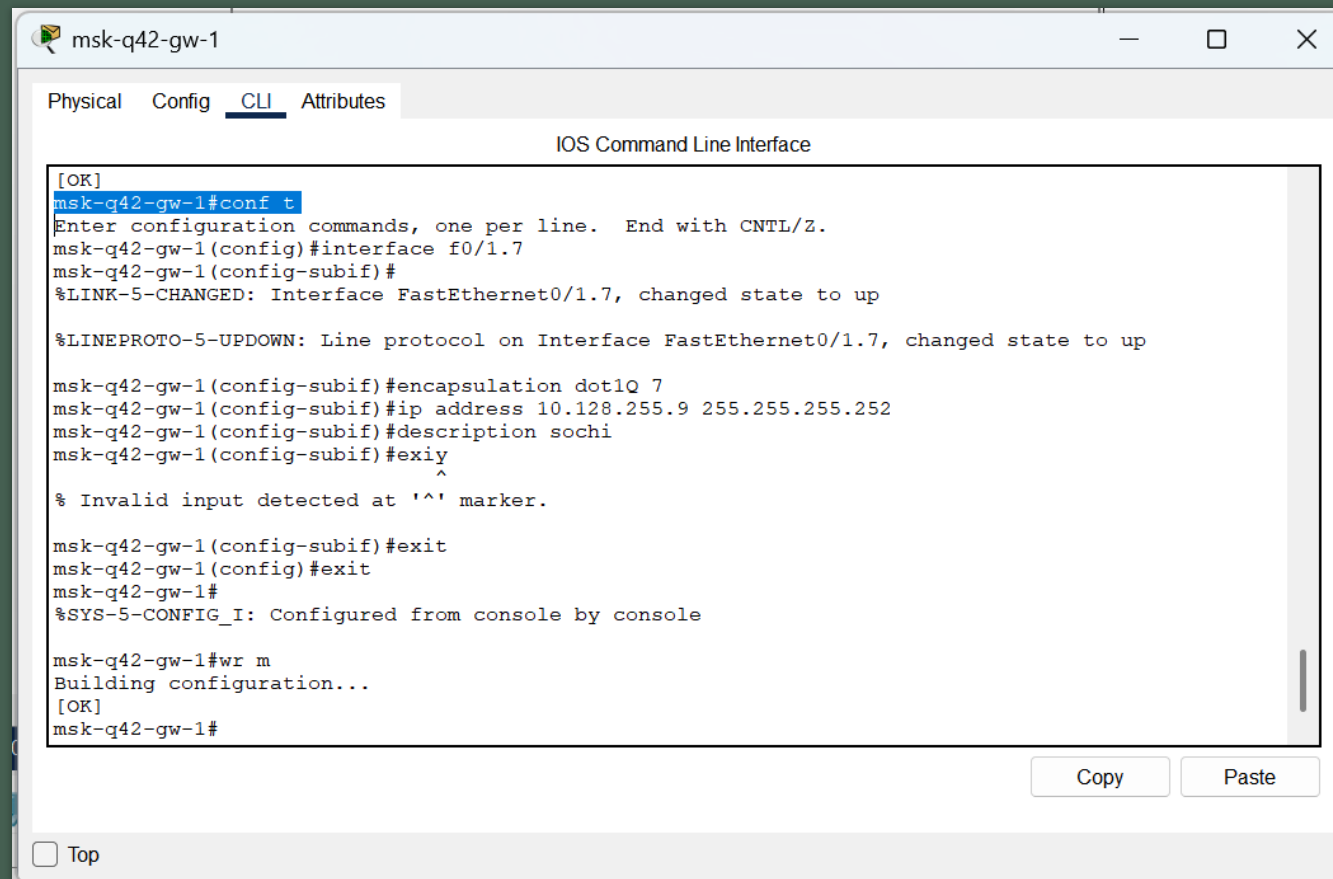
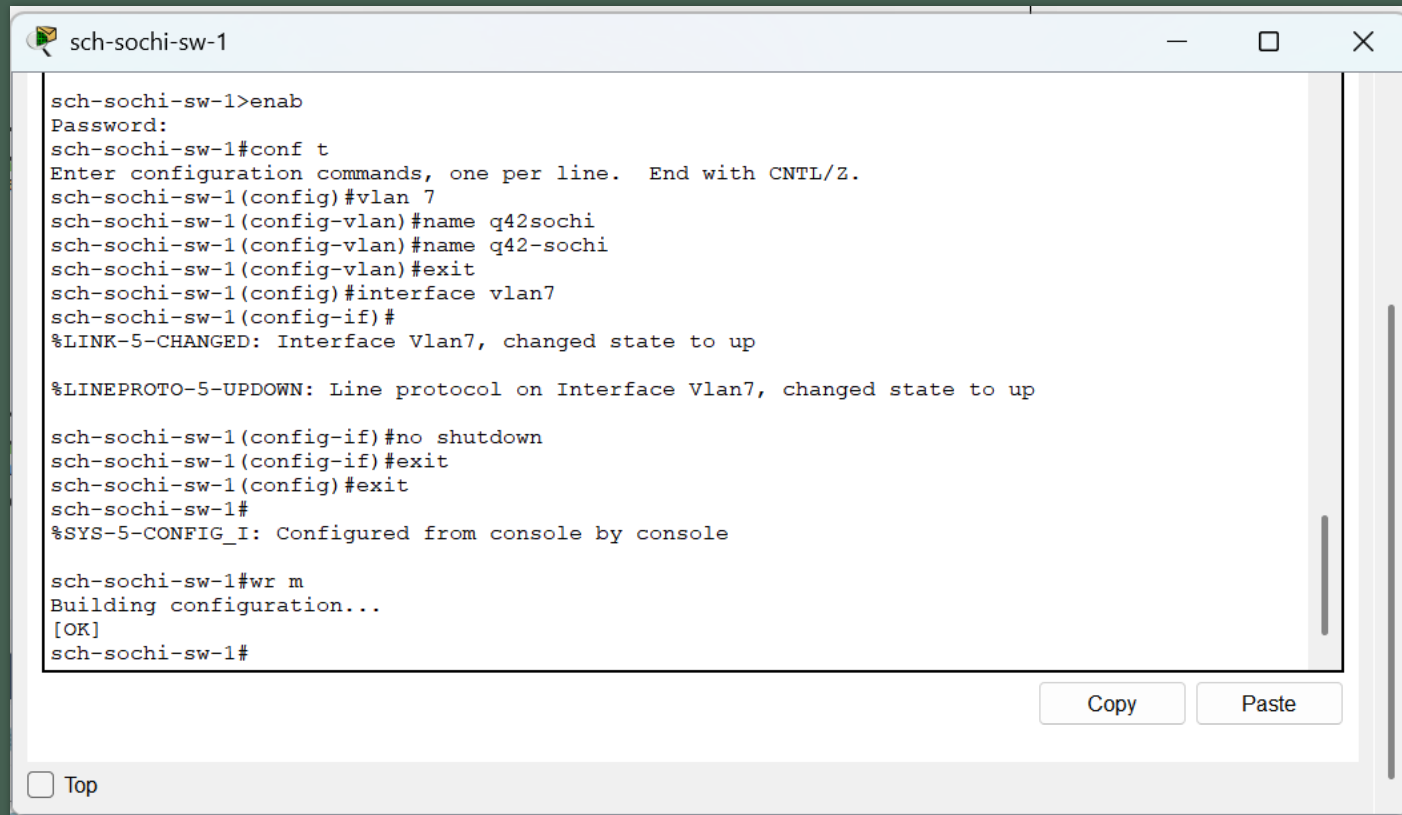


Рис. 1.11. Настройка маршрутизатора msk-q42-gw-1.

Настройка оборудования



```
sch-sochi-sw-1>enab
Password:
sch-sochi-sw-1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
sch-sochi-sw-1(config)#vlan 7
sch-sochi-sw-1(config-vlan)#name q42sochi
sch-sochi-sw-1(config-vlan)#name q42-sochi
sch-sochi-sw-1(config-vlan)#exit
sch-sochi-sw-1(config)#interface vlan7
sch-sochi-sw-1(config-if)#
%LINK-5-CHANGED: Interface Vlan7, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan7, changed state to up

sch-sochi-sw-1(config-if)#no shutdown
sch-sochi-sw-1(config-if)#exit
sch-sochi-sw-1(config)#exit
sch-sochi-sw-1#
%SYS-5-CONFIG_I: Configured from console by console

sch-sochi-sw-1#wr m
Building configuration...
[OK]
sch-sochi-sw-1#
```

Copy Paste

☐ Top

Рис. 1.12. Настройка коммутатора sch-sochi-sw-1.

Настройка оборудования

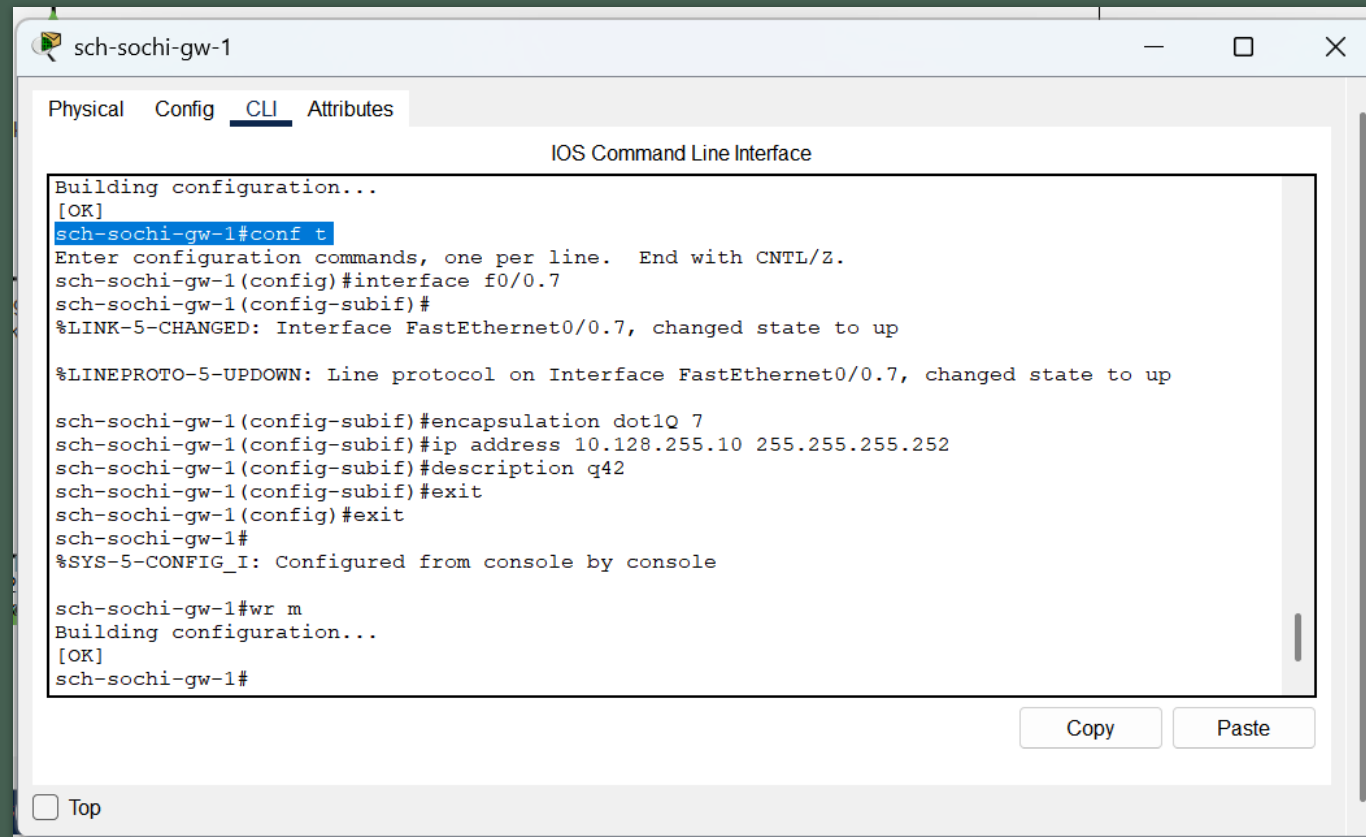
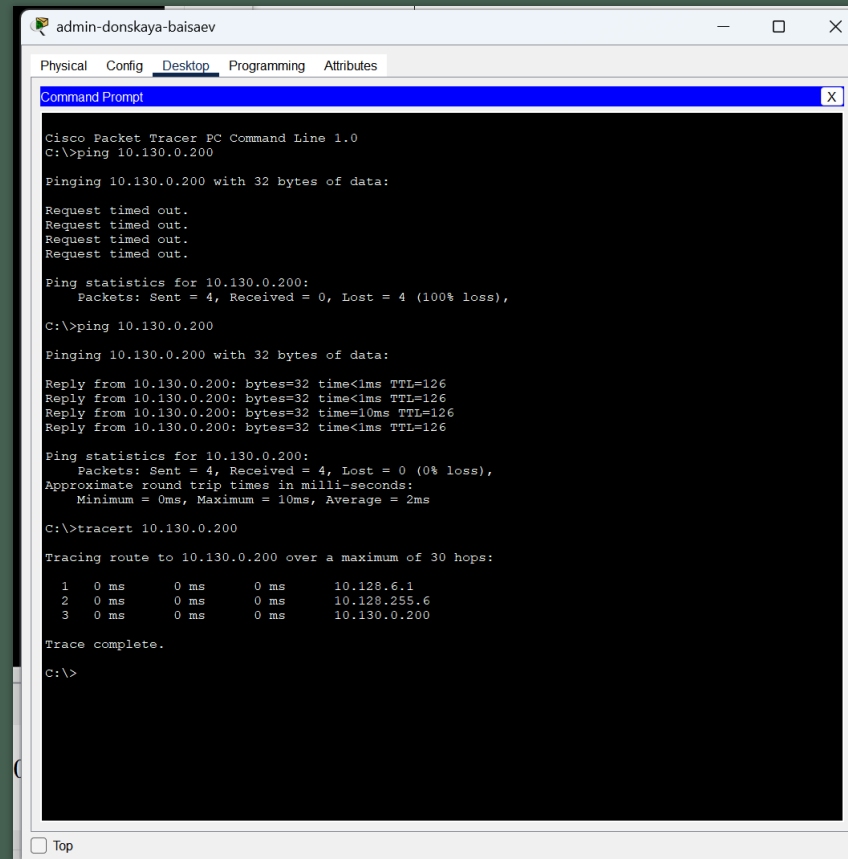


Рис. 1.13. Настройка маршрутизатора sch-sochi-gw-1.

Ping



The screenshot shows a Cisco Packet Tracer PC Command Line window for a device named 'admin-donskaya-baisaev'. The window has tabs for Physical, Config, Desktop, Programming, and Attributes. The Desktop tab is active, displaying a Command Prompt window. The Command Prompt shows the execution of the following commands and their outputs:

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 10.130.0.200

Pinging 10.130.0.200 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 10.130.0.200:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 10.130.0.200

Pinging 10.130.0.200 with 32 bytes of data:

Reply from 10.130.0.200: bytes=32 time<1ms TTL=126
Reply from 10.130.0.200: bytes=32 time<1ms TTL=126
Reply from 10.130.0.200: bytes=32 time=10ms TTL=126
Reply from 10.130.0.200: bytes=32 time<1ms TTL=126

Ping statistics for 10.130.0.200:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 10ms, Average = 2ms

C:\>tracert 10.130.0.200

Tracing route to 10.130.0.200 over a maximum of 30 hops:

  1  0 ms   0 ms   0 ms   10.128.6.1
  2  0 ms   0 ms   0 ms   10.128.255.6
  3  0 ms   0 ms   0 ms   10.130.0.200

Trace complete.

C:\>
```

Рис. 1.14. Ping по адресу 10.130.0.200.

Отслеживание пакета

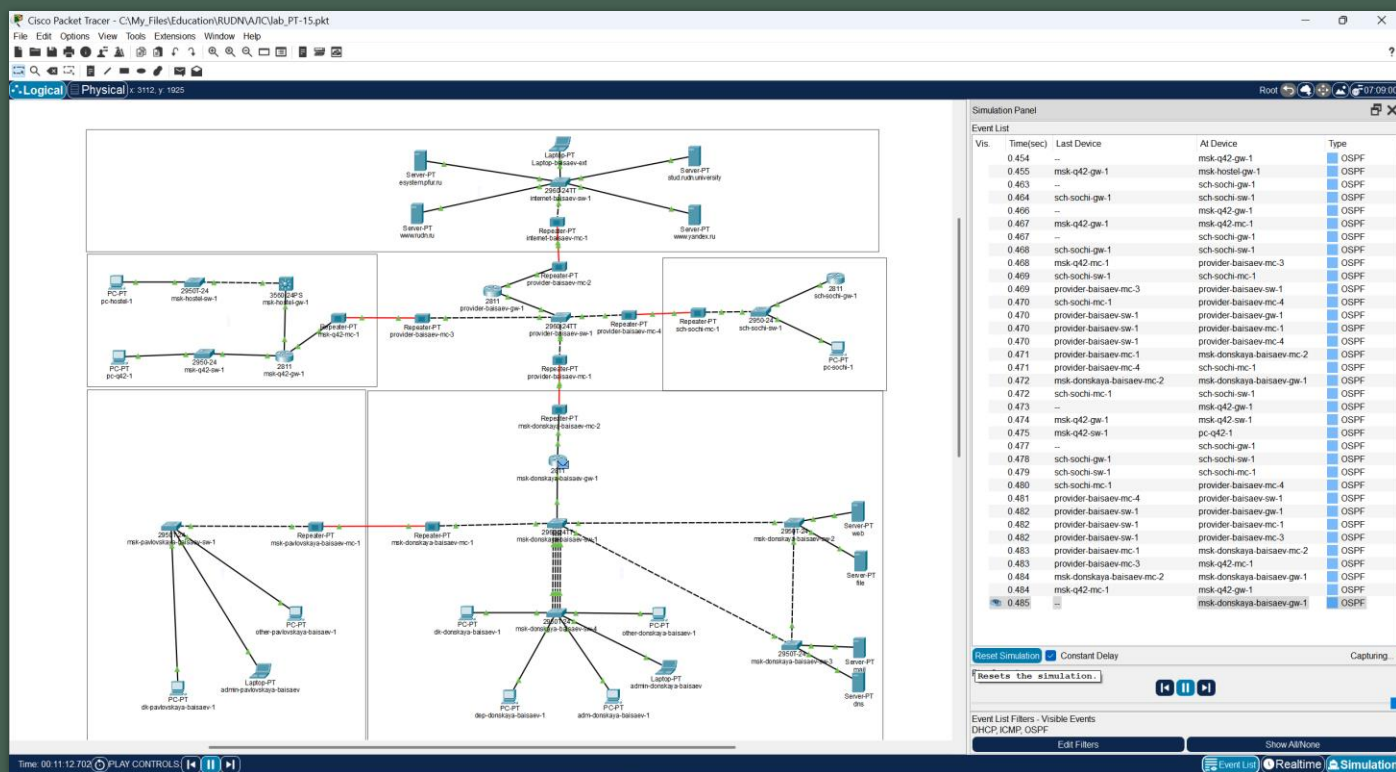
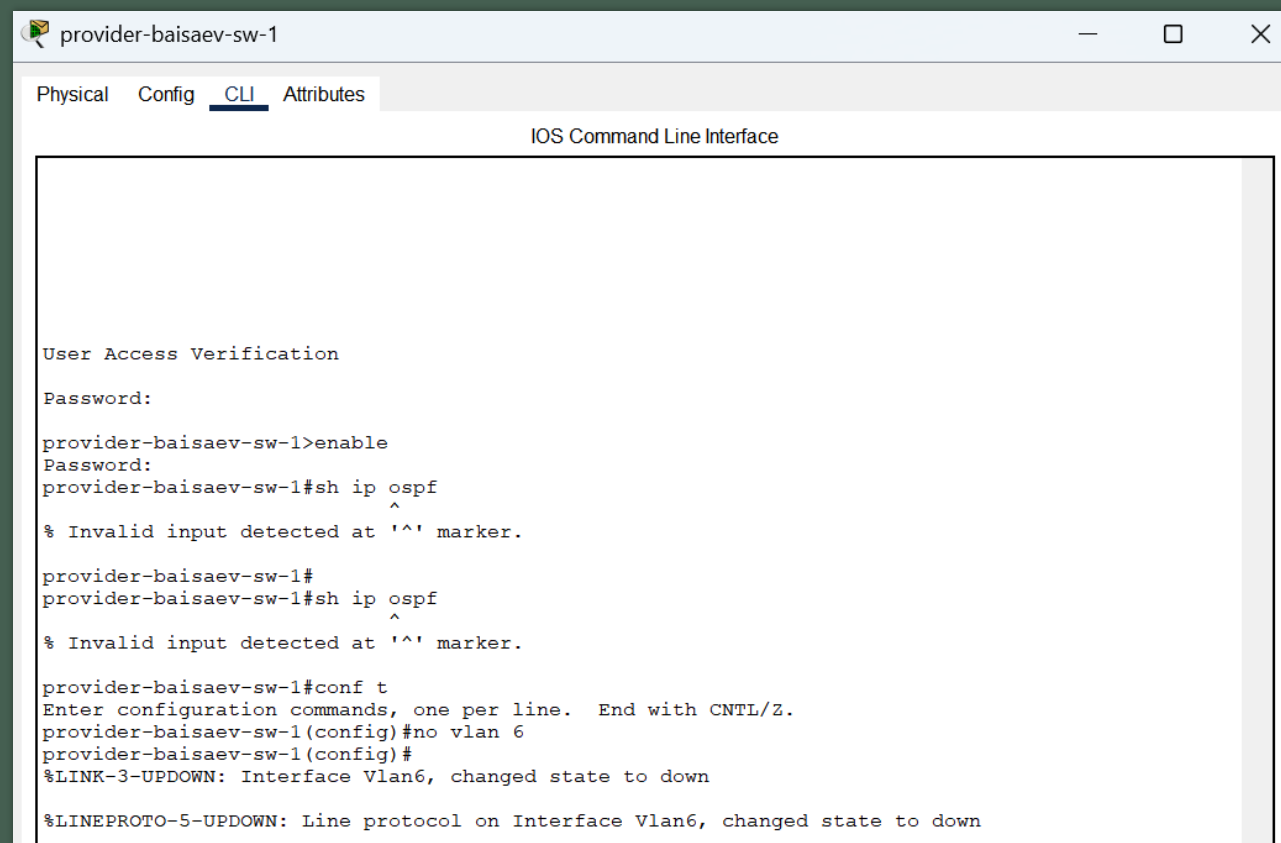


Рис. 1.15. Отслеживание в режиме симуляции движения пакета ICMP (OSPF) с ноутбука администратора сети на Донской в Москве до компьютера пользователя в филиале в г. Сочи.

Отключение vlan 6



The screenshot shows a web-based interface for a network device named 'provider-baisaev-sw-1'. The 'CLI' tab is selected, displaying the 'IOS Command Line Interface'. The terminal output shows the user entering 'enable' to reach privileged mode, followed by two failed attempts to run 'show ip ospf' due to an invalid input marker. Finally, the user enters 'configure terminal' and then 'no vlan 6', which results in two status messages: '%LINK-3-UPDOWN: Interface Vlan6, changed state to down' and '%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan6, changed state to down'.

```
provider-baisaev-sw-1>enable
Password:
provider-baisaev-sw-1#sh ip ospf
      ^
% Invalid input detected at '^' marker.

provider-baisaev-sw-1#sh ip ospf
      ^
% Invalid input detected at '^' marker.

provider-baisaev-sw-1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
provider-baisaev-sw-1(config)#no vlan 6
provider-baisaev-sw-1(config)#
%LINK-3-UPDOWN: Interface Vlan6, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan6, changed state to down
```

Рис. 1.16. Временное отключение на коммутаторе провайдера vlan 6.

Отслеживание пакета

The screenshot displays the Cisco Packet Tracer interface. The main workspace shows a complex network topology with various devices including servers, switches, routers, and PCs. A packet trace window is open on the right side, showing a list of events. The table below represents the data shown in this window:

| Vis | Time(sec) | Last Device | At Device | Type |
|-------|-----------|---------------------------|---------------------------|------|
| 0.078 | | admin-donskaya-baisaev | msk-donskaya-baisaev-sw-4 | ICMP |
| 0.079 | | msk-donskaya-baisaev-sw-4 | other-donskaya-baisaev-1 | ICMP |
| 0.079 | | msk-donskaya-baisaev-sw-4 | msk-donskaya-baisaev-sw-1 | ICMP |
| 0.080 | | msk-donskaya-baisaev-sw-1 | msk-donskaya-baisaev-gw-1 | ICMP |
| 0.081 | | msk-donskaya-baisaev-gw-1 | msk-donskaya-baisaev-mc-2 | ICMP |
| 0.082 | | msk-donskaya-baisaev-mc-2 | provider-baisaev-mc-1 | ICMP |
| 0.083 | | provider-baisaev-mc-1 | provider-baisaev-sw-1 | ICMP |
| 0.084 | | provider-baisaev-sw-1 | provider-baisaev-mc-3 | ICMP |
| 0.085 | | provider-baisaev-mc-3 | msk-q42-mc-1 | ICMP |
| 0.086 | | msk-q42-mc-1 | msk-q42-gw-1 | ICMP |
| 0.087 | | msk-q42-gw-1 | msk-q42-mc-1 | ICMP |
| 0.088 | | msk-q42-mc-1 | provider-baisaev-mc-3 | ICMP |
| 0.089 | | provider-baisaev-mc-3 | provider-baisaev-sw-1 | ICMP |
| 0.090 | | provider-baisaev-sw-1 | provider-baisaev-mc-4 | ICMP |
| 0.091 | | provider-baisaev-mc-4 | sch-sochi-mc-1 | ICMP |
| 0.092 | | sch-sochi-mc-1 | sch-sochi-gw-1 | ICMP |
| 0.092 | | sch-sochi-gw-1 | msk-q42-gw-1 | ICMP |
| 0.093 | | msk-q42-gw-1 | msk-q42-mc-1 | ICMP |
| 0.093 | | sch-sochi-sw-1 | sch-sochi-gw-1 | ICMP |
| 0.094 | | msk-q42-mc-1 | provider-baisaev-mc-3 | ICMP |
| 0.094 | | sch-sochi-gw-1 | sch-sochi-sw-1 | ICMP |
| 0.095 | | provider-baisaev-mc-3 | provider-baisaev-sw-1 | ICMP |
| 0.095 | | sch-sochi-sw-1 | pc-sochi-1 | ICMP |
| 0.096 | | provider-baisaev-sw-1 | provider-baisaev-mc-4 | ICMP |
| 0.096 | | pc-sochi-1 | sch-sochi-sw-1 | ICMP |
| 0.097 | | provider-baisaev-mc-4 | sch-sochi-mc-1 | ICMP |
| 0.097 | | sch-sochi-sw-1 | sch-sochi-gw-1 | ICMP |
| 0.098 | | sch-sochi-mc-1 | sch-sochi-sw-1 | ICMP |
| 0.098 | | sch-sochi-gw-1 | sch-sochi-sw-1 | ICMP |
| 0.099 | | sch-sochi-sw-1 | sch-sochi-gw-1 | ICMP |
| 0.099 | | sch-sochi-sw-1 | sch-sochi-mc-1 | ICMP |
| 0.100 | | sch-sochi-gw-1 | sch-sochi-sw-1 | ICMP |
| 0.100 | | sch-sochi-mc-1 | provider-baisaev-mc-4 | ICMP |
| 0.101 | | sch-sochi-sw-1 | pc-sochi-1 | ICMP |
| 0.101 | | provider-baisaev-mc-4 | provider-baisaev-sw-1 | ICMP |
| 0.102 | | pc-sochi-1 | sch-sochi-sw-1 | ICMP |
| 0.102 | | provider-baisaev-sw-1 | provider-baisaev-mc-3 | ICMP |

The interface also includes a 'Simulation Panel' on the right with an 'Event List' and 'Play Controls' at the bottom. The status bar at the bottom shows the time as 00:17:33.007 and the simulation is running.

Рис. 1.17. Проверка изменения маршрута прохождения пакета ICMP в режиме симуляции с ноутбука администратора сети на Донской в Москве до компьютера пользователя в филиале в г. Сочи.

Ping

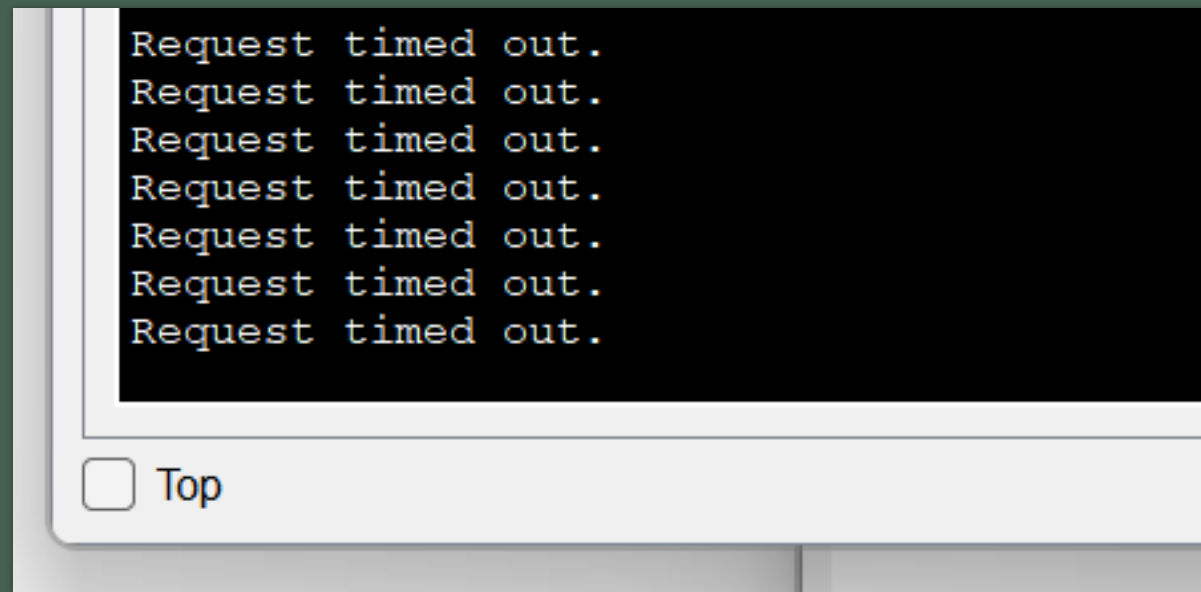
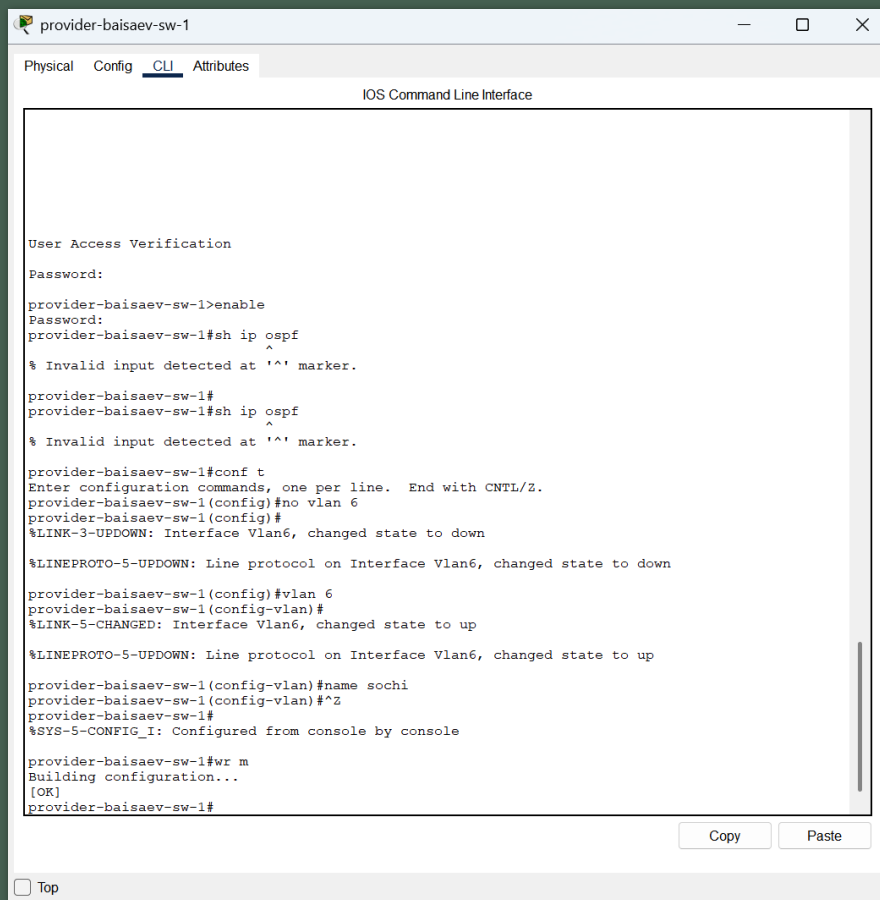


Рис. 1.18. Потеря пакетов.

Восстановление vlan 6



The screenshot shows a network simulator window titled "provider-baisaev-sw-1". It has tabs for "Physical", "Config", "CLI", and "Attributes", with "CLI" selected. The main area is labeled "IOS Command Line Interface" and displays a series of commands and system messages. The process involves enabling the switch, attempting to show the OSPF configuration (which fails due to an invalid input), entering configuration mode, disabling VLAN 6, creating a new VLAN 6 named "sochi", and finally saving the configuration.

```
provider-baisaev-sw-1#enable
Password:
provider-baisaev-sw-1#sh ip ospf
% Invalid input detected at '^' marker.

provider-baisaev-sw-1#
provider-baisaev-sw-1#sh ip ospf
% Invalid input detected at '^' marker.

provider-baisaev-sw-1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
provider-baisaev-sw-1(config)#no vlan 6
provider-baisaev-sw-1(config)#
%LINK-3-UPDOWN: Interface Vlan6, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan6, changed state to down

provider-baisaev-sw-1(config)#vlan 6
provider-baisaev-sw-1(config-vlan)#
%LINK-5-CHANGED: Interface Vlan6, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan6, changed state to up

provider-baisaev-sw-1(config-vlan)#name sochi
provider-baisaev-sw-1(config-vlan)#^Z
provider-baisaev-sw-1#
%SYS-5-CONFIG_I: Configured from console by console

provider-baisaev-sw-1#wr m
Building configuration...
[OK]
provider-baisaev-sw-1#
```

At the bottom of the window, there are "Copy" and "Paste" buttons, and a "Top" button with a checkbox.

Рис. 1.19. Восстановление на коммутаторе провайдера vlan 6.

Отслеживание пакета

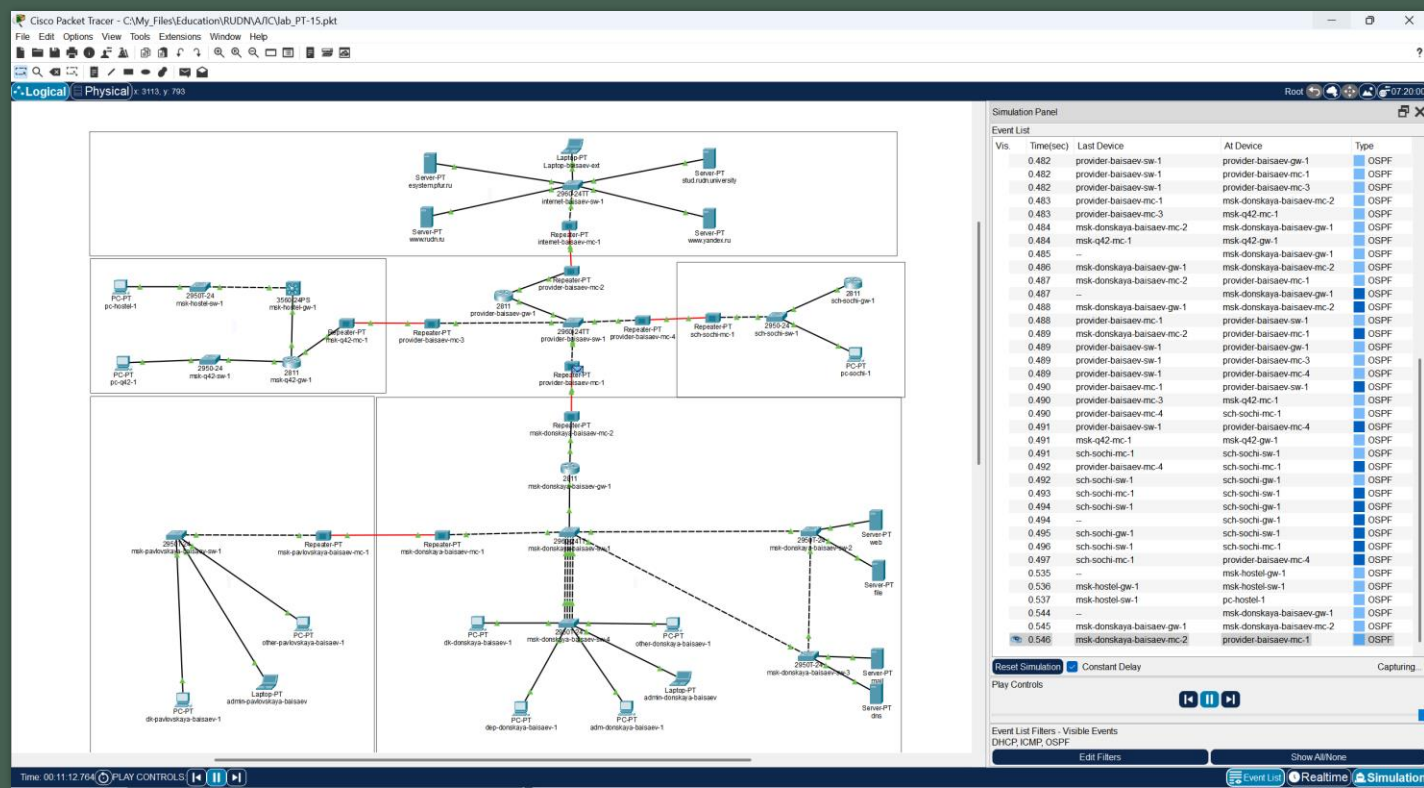


Рис. 1.20. Проверка изменения маршрута прохождения пакета ICMP в режиме симуляции с ноутбука администратора сети на Донской в Москве до компьютера пользователя в филиале в г. Сочи.

ВЫВОД

- В ходе выполнения лабораторной работы мы настроили динамическую маршрутизацию между территориями организации.

Спасибо за внимание!