



Макетирование SOHO-сетей в Cisco Packet Tracer

Дроздов Никита Дмитриевич

3540901/02001

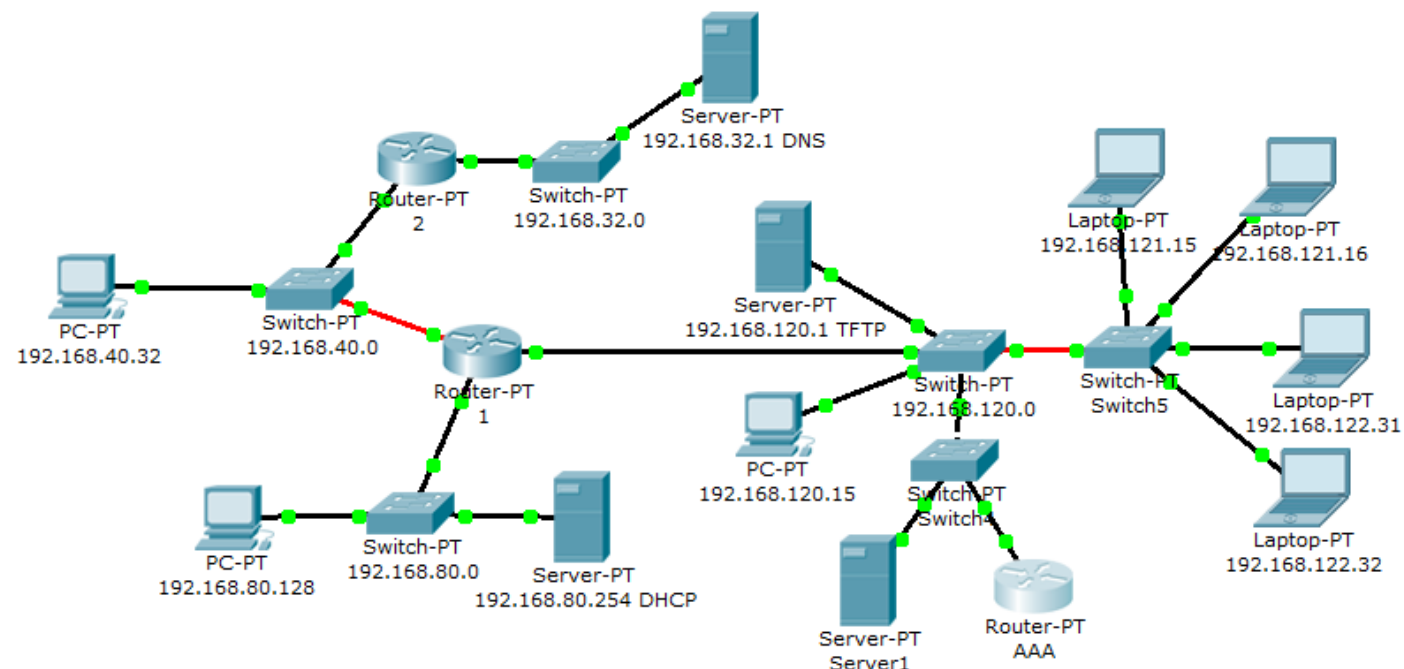
Цели работы

- Создать макет SOHO-сети, функционально аналогичный макету, созданному в лабораторной работе № 1;
- Развернуть в созданном макете SOHO-сети сервисы динамической конфигурации хостов (DHCP), разрешения символьных имён (DNS) и удалённой загрузки образов операционных систем (виртуальных машин) в соответствии с программой лабораторной работы № 3;
- Дополнить макет SOHO-сети необходимым оборудованием и развернуть в получившемся макете гибридной сети несколько дополнительных сетевых сервисов;
- Провести тестирование

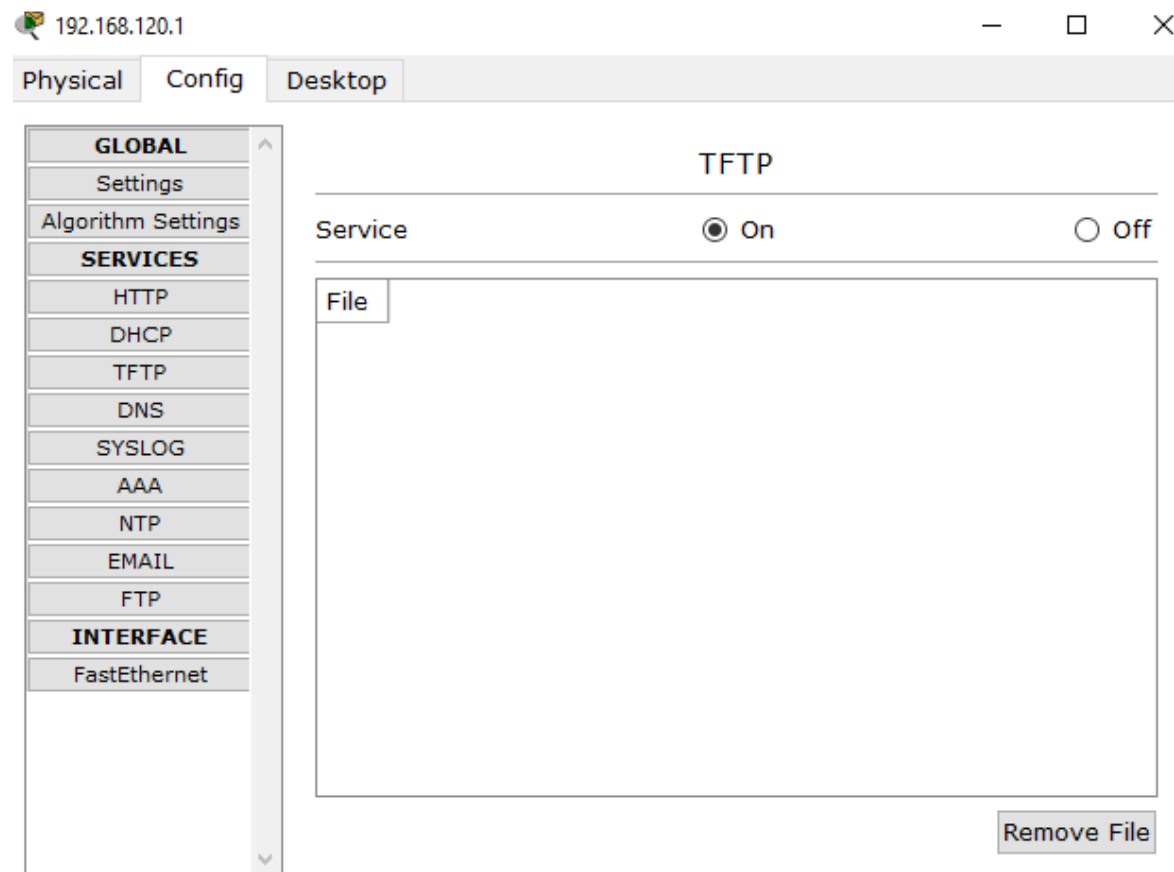
Сведения о системе

Название	Версия	Объем ОЗУ
NetBSD	9.1	1,5 GB
FreeBSD	12	1,5 GB
Linux Ubuntu	16.04 LTS	2 GB
Windows 7		1 GB
Windows XP		1 GB

Макет сети



Подключение TFTP



Подключение DHCP

DHCP

Interface FastEthernet0 Service ☒ On ☐ Off

Pool Name serverPool

Default Gateway 192.168.80.2

DNS Server 192.168.32.1

Start IP Address 192 168 32 1

Subnet Mask: 255 255 255 0

Maximum Number of Users : 100

TFTP Server: 0.0.0.0

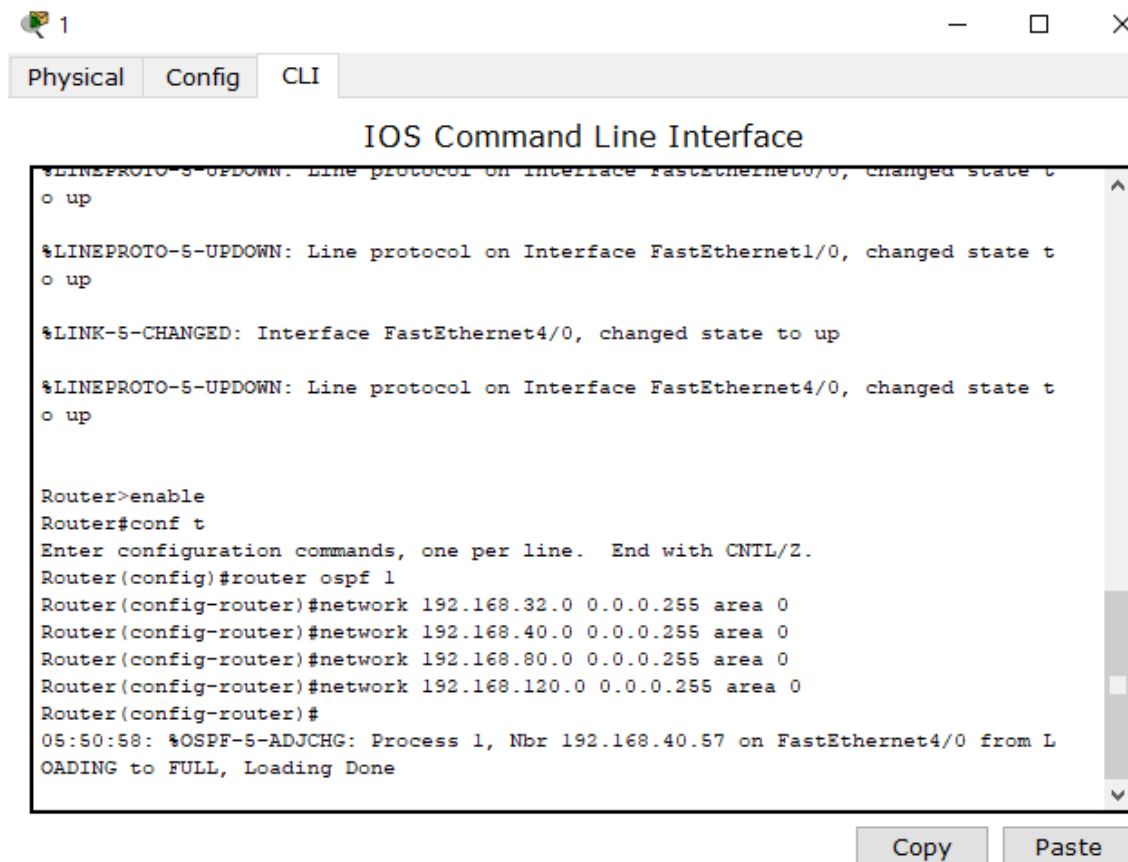
WLC Address: 0.0.0.0

Add Save Remove

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
serverPool	0.0.0.0	0.0.0.0	0.0.0.0	0.0.0.0	512	0.0.0.0	0.0.0.0

< >

Подключение OSPF



The screenshot shows a Cisco IOS Command Line Interface (CLI) window. At the top, there are tabs for 'Physical', 'Config', and 'CLI'. The title bar of the window says 'IOS Command Line Interface'. The main text area displays the following commands and system messages:

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state t
o up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state t
o up

%LINK-5-CHANGED: Interface FastEthernet4/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet4/0, changed state t
o up

Router>enable
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router ospf 1
Router(config-router)#network 192.168.32.0 0.0.0.255 area 0
Router(config-router)#network 192.168.40.0 0.0.0.255 area 0
Router(config-router)#network 192.168.80.0 0.0.0.255 area 0
Router(config-router)#network 192.168.120.0 0.0.0.255 area 0
Router(config-router)#
05:50:58: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.40.57 on FastEthernet4/0 from L
OADING to FULL, Loading Done
```

At the bottom right of the window, there are 'Copy' and 'Paste' buttons.

Подключение AAA на сервере

AAA

Service ☒ On ☐ Off Radius Port

Network Configuration

Client Name Client IP

Secret ServerType

	Client Name	Client IP	Server Type	Key
1	Drozdov	192.16...	Radius	1

User Setup

Username Password

	Username	Password
1	Drozdov	1

Подключение AAA на маршрутизаторе

```
Processor board ID PT0123 (0123)
PT2005 processor: part number 0, mask 01
Bridging software.
X.25 software, Version 3.0.0.
4 FastEthernet/IEEE 802.3 interface(s)
2 Low-speed serial(sync/async) network interface(s)
32K bytes of non-volatile configuration memory.
63488K bytes of ATA CompactFlash (Read/Write)

      --- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/
no]: n

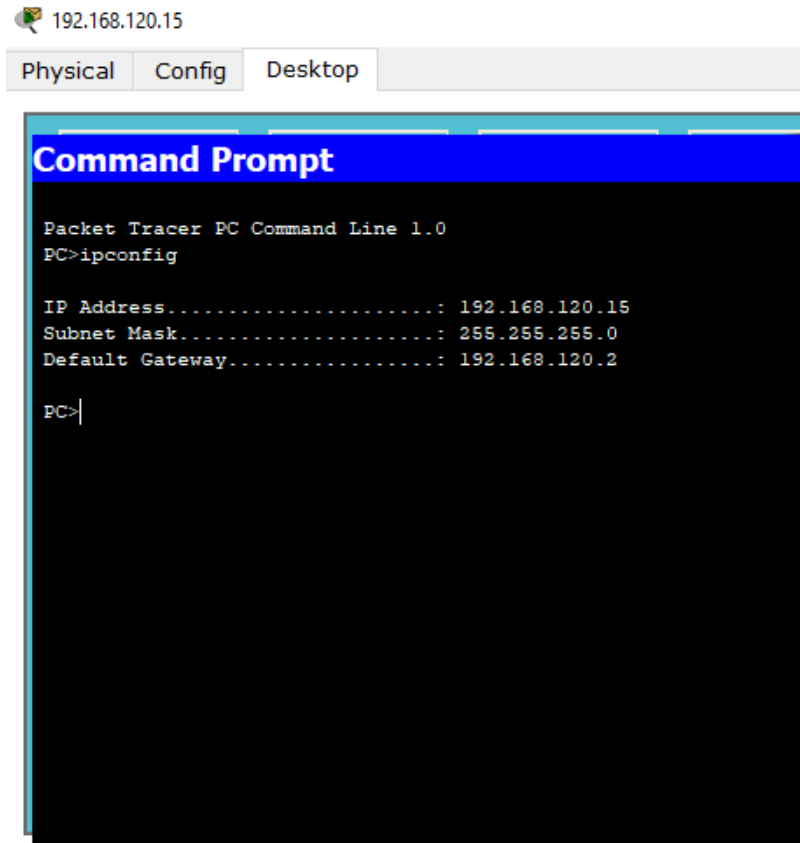
Press RETURN to get started!

Router>enable
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#enable secret 1
Router(config)#username Drozdov privilege 15 secret 1
```

Подключение VLAN

```
Switch>enable
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 2
Switch(config-vlan)#name vlan2
Switch(config-vlan)#exit
Switch(config)#int
Switch(config)#interface fas
Switch(config)#interface fastEthernet 0/1
Switch(config-if)#swit
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 2
Switch(config-if)#exit
Switch(config)#interface fastEthernet 1/1
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 2
Switch(config-if)#exit
Switch(config)#vlan 3
Switch(config-vlan)#name vlan3
Switch(config-vlan)#exit
Switch(config)#interface fastEthernet 2/1
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 3
Switch(config-if)#exit
Switch(config)#interface fastEthernet 3/1
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 3
Switch(config-if)#exit
Switch(config)#exit
Switch#
%SYS-5-CONFIG_I: Configured from console by console
```

Использование команды ipconfig



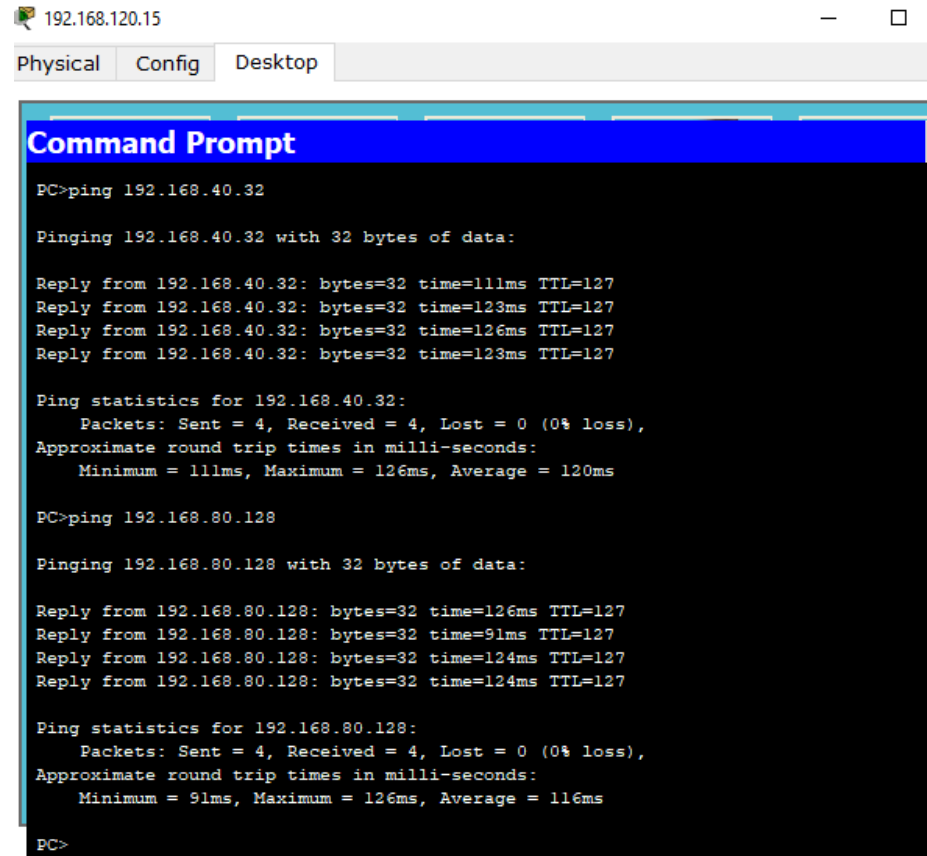
The screenshot shows a Packet Tracer PC interface for the IP address 192.168.120.15. The 'Config' tab is selected. A 'Command Prompt' window is open, displaying the output of the 'ipconfig' command. The output shows the IP address, subnet mask, and default gateway.

```
192.168.120.15
Physical Config Desktop
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ipconfig

IP Address.....: 192.168.120.15
Subnet Mask.....: 255.255.255.0
Default Gateway...: 192.168.120.2

PC>|
```

Использование команды ping



The screenshot shows a network simulator interface with a top bar containing 'Physical', 'Config', and 'Desktop' tabs. Below the tabs is a 'Command Prompt' window. The window has a blue title bar and a black background with white text. The text shows two ping commands being executed from a PC with IP 192.168.120.15. The first command is 'ping 192.168.40.32', and the second is 'ping 192.168.80.128'. Both commands show successful results with 0% loss and round trip times in milliseconds.

```
192.168.120.15
Physical Config Desktop

Command Prompt

PC>ping 192.168.40.32

Pinging 192.168.40.32 with 32 bytes of data:

Reply from 192.168.40.32: bytes=32 time=111ms TTL=127
Reply from 192.168.40.32: bytes=32 time=123ms TTL=127
Reply from 192.168.40.32: bytes=32 time=126ms TTL=127
Reply from 192.168.40.32: bytes=32 time=123ms TTL=127

Ping statistics for 192.168.40.32:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 111ms, Maximum = 126ms, Average = 120ms

PC>ping 192.168.80.128

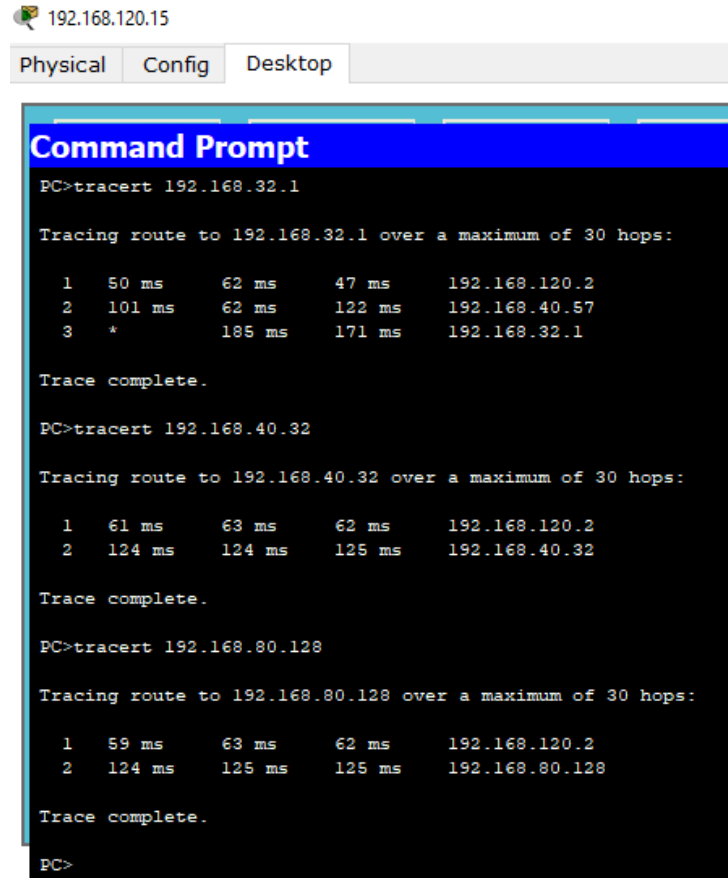
Pinging 192.168.80.128 with 32 bytes of data:

Reply from 192.168.80.128: bytes=32 time=126ms TTL=127
Reply from 192.168.80.128: bytes=32 time=91ms TTL=127
Reply from 192.168.80.128: bytes=32 time=124ms TTL=127
Reply from 192.168.80.128: bytes=32 time=124ms TTL=127

Ping statistics for 192.168.80.128:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 91ms, Maximum = 126ms, Average = 116ms

PC>
```

Использование команды tracert



192.168.120.15

Physical Config Desktop

```
Command Prompt
PC>tracert 192.168.32.1

Tracing route to 192.168.32.1 over a maximum of 30 hops:

  1  50 ms    62 ms    47 ms    192.168.120.2
  2  101 ms   62 ms    122 ms   192.168.40.57
  3  *        185 ms   171 ms   192.168.32.1

Trace complete.

PC>tracert 192.168.40.32

Tracing route to 192.168.40.32 over a maximum of 30 hops:

  1  61 ms    63 ms    62 ms    192.168.120.2
  2  124 ms   124 ms   125 ms   192.168.40.32

Trace complete.

PC>tracert 192.168.80.128

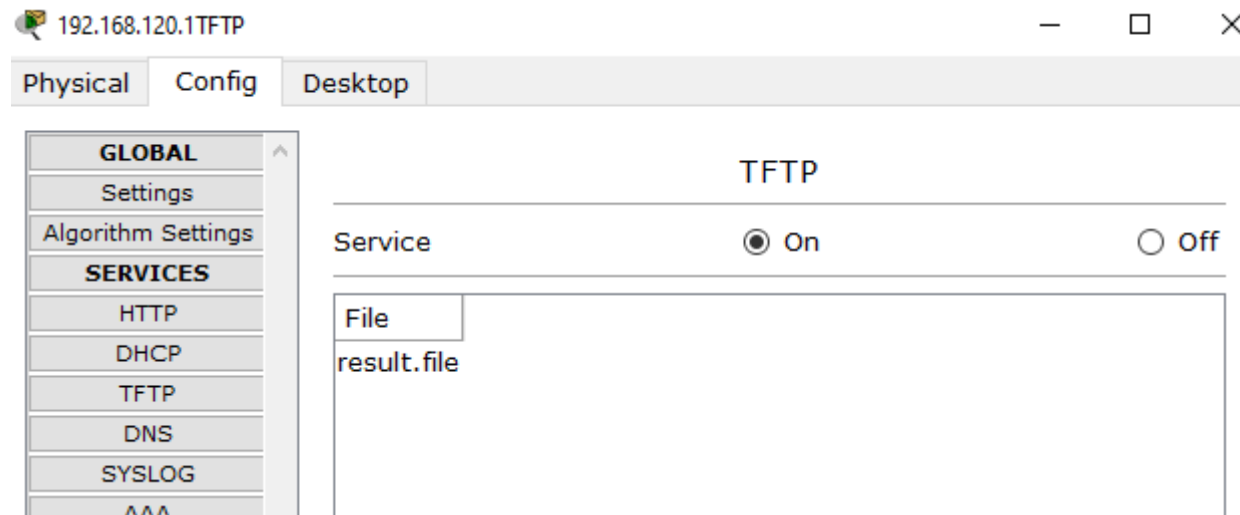
Tracing route to 192.168.80.128 over a maximum of 30 hops:

  1  59 ms    63 ms    62 ms    192.168.120.2
  2  124 ms   125 ms   125 ms   192.168.80.128

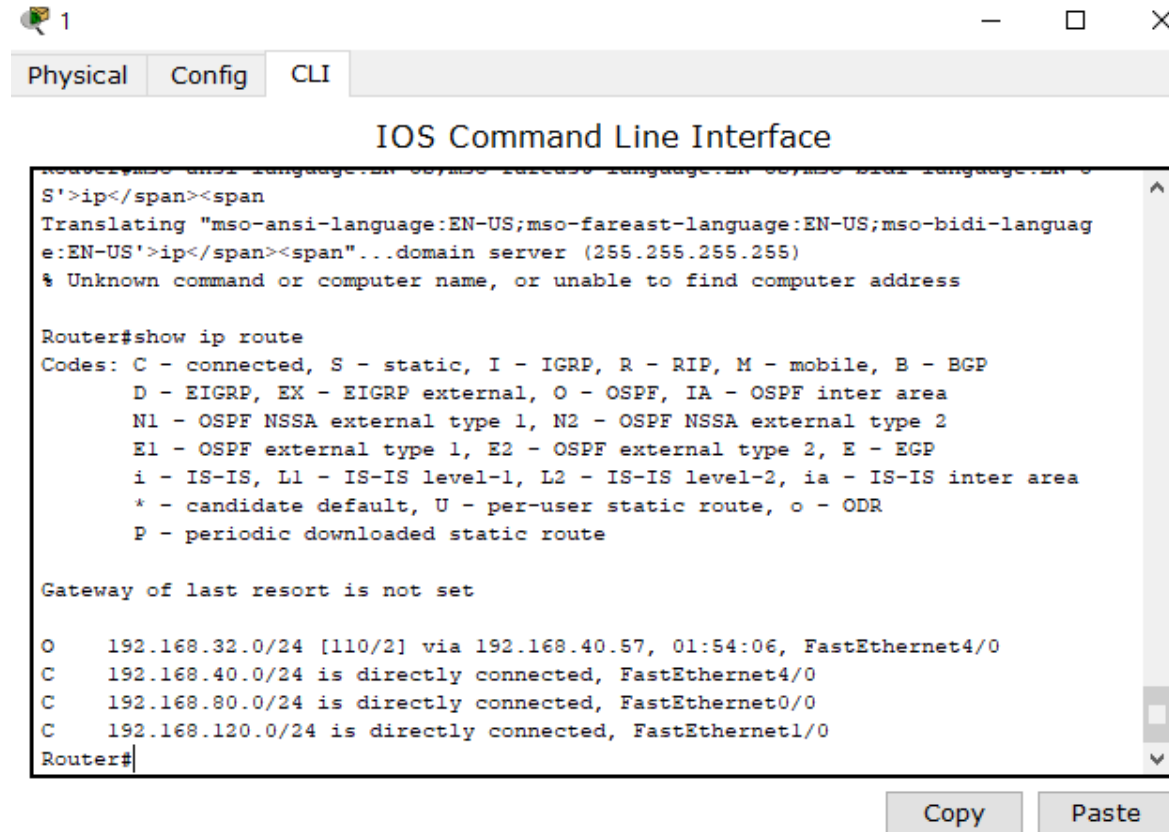
Trace complete.

PC>
```

Результат копирования flash-памяти на TFTP-сервер



Проверка OSPF на маршрутизаторе 1



The screenshot shows a Cisco IOS Command Line Interface window. At the top, there are tabs for 'Physical', 'Config', and 'CLI'. The title bar reads 'IOS Command Line Interface'. The main text area displays the following commands and output:

```
Router>ip</span><span>
Translating "mso-ansi-language:EN-US;mso-fareast-language:EN-US;mso-bidi-languag
e:EN-US">ip</span><span>...domain server (255.255.255.255)
% Unknown command or computer name, or unable to find computer address

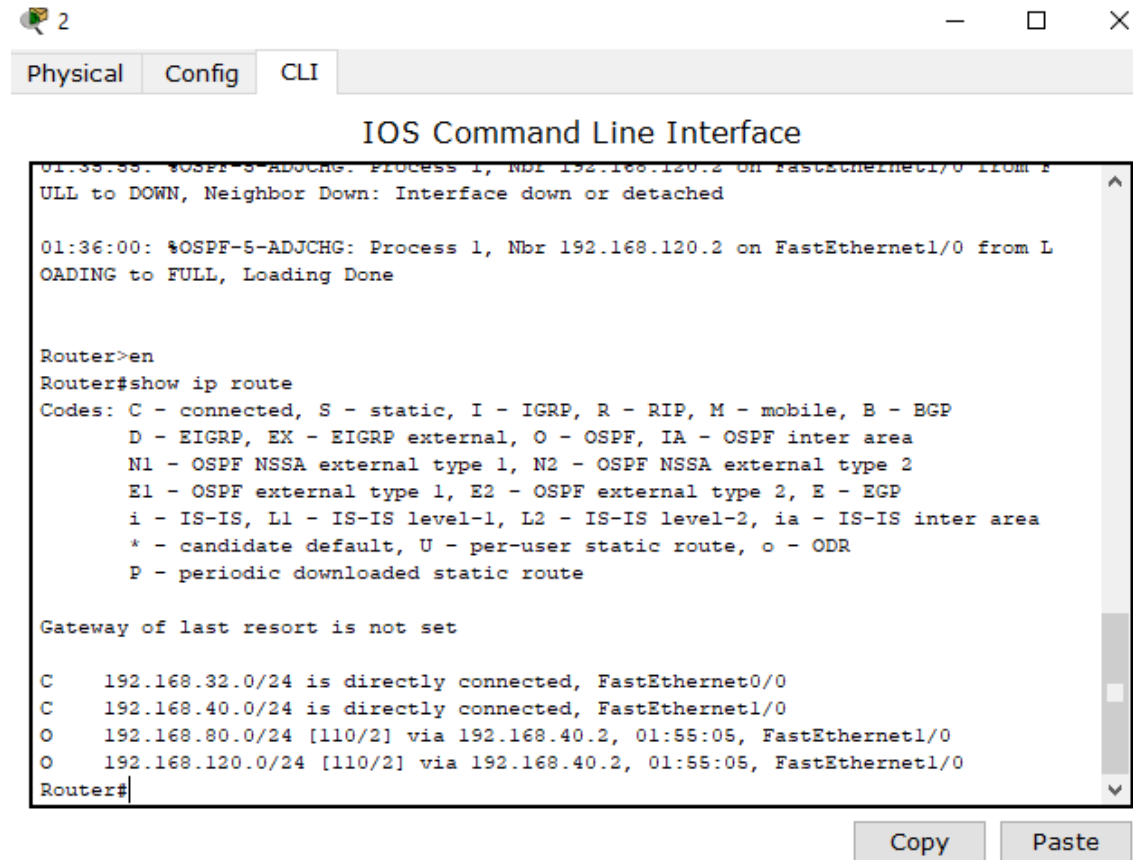
Router#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       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

O    192.168.32.0/24 [110/2] via 192.168.40.57, 01:54:06, FastEthernet4/0
C    192.168.40.0/24 is directly connected, FastEthernet4/0
C    192.168.80.0/24 is directly connected, FastEthernet0/0
C    192.168.120.0/24 is directly connected, FastEthernet1/0
Router#
```

At the bottom right of the window, there are 'Copy' and 'Paste' buttons.

Проверка OSPF на маршрутизаторе 2



The screenshot shows a Cisco IOS Command Line Interface window titled "IOS Command Line Interface". The window has tabs for "Physical", "Config", and "CLI". The CLI tab is active, displaying the following text:

```
01:35:55: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.120.2 on FastEthernet1/0 from L
ULL to DOWN, Neighbor Down: Interface down or detached

01:36:00: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.120.2 on FastEthernet1/0 from L
OADING to FULL, Loading Done

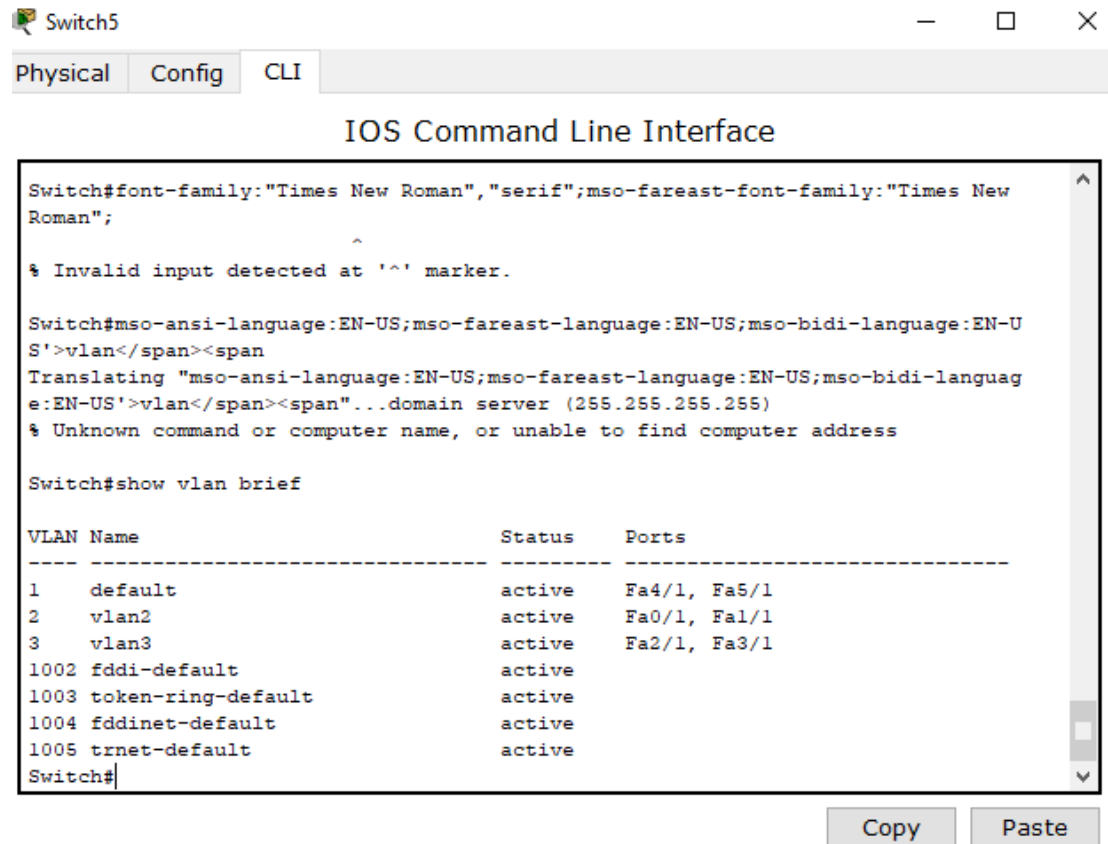
Router>en
Router#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 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

C    192.168.32.0/24 is directly connected, FastEthernet0/0
C    192.168.40.0/24 is directly connected, FastEthernet1/0
O    192.168.80.0/24 [110/2] via 192.168.40.2, 01:55:05, FastEthernet1/0
O    192.168.120.0/24 [110/2] via 192.168.40.2, 01:55:05, FastEthernet1/0
Router#
```

Below the terminal window, there are two buttons: "Copy" and "Paste".

Информация о VLAN



```
Switch5
Physical Config CLI
IOS Command Line Interface

Switch#font-family:"Times New Roman","serif";mso-fareast-font-family:"Times New Roman";
^
% Invalid input detected at '^' marker.

Switch#mso-ansi-language:EN-US;mso-fareast-language:EN-US;mso-bidi-language:EN-US'>vlan</span><span
Translating "mso-ansi-language:EN-US;mso-fareast-language:EN-US;mso-bidi-language:EN-US'>vlan</span><span"...domain server (255.255.255.255)
% Unknown command or computer name, or unable to find computer address

Switch#show vlan brief

VLAN Name                Status    Ports
-----
1    default                active    Fa4/1, Fa5/1
2    vlan2                  active    Fa0/1, Fa1/1
3    vlan3                  active    Fa2/1, Fa3/1
1002 fddi-default          active
1003 token-ring-default    active
1004 fddinet-default        active
1005 trnet-default          active
Switch#
```

Copy Paste

Выводы

- ♦ Создан макет SOHO-сети, функционально аналогичный макету, созданному в лабораторной работе № 1.
- ♦ Развернуты сетевые сервисы в соответствии с программой лабораторной работы № 3.
- ♦ Макет SOHO-сети дополнен необходимым оборудованием и новыми сетевыми сервисами.
- ♦ Было проведено тестирование макета.