

**МДК.01.01**

**Организация, принципы  
построения и функционирования  
компьютерных сетей  
3-курс**

**Практические занятия**

Занятие 23



Logical

[Root]

New Cluster

Move Object

Set Tiled Background

Viewport

## Тема: Поиск и устранение неисправностей (часть 2).

Предположим, что вы устроились на новую работу.

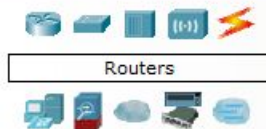
Предыдущий системный администратор оставил лишь схему соединения.

Предположим, что на некоторое время в офисе отключали свет.

А после включения некоторые настройки оборудования сбились и возникло множество проблем.

Time: 00:06:00 Power Cycle Devices Fast Forward Time

Realtime



Routers



(Select a Device to Drag and Drop to the Workspace)

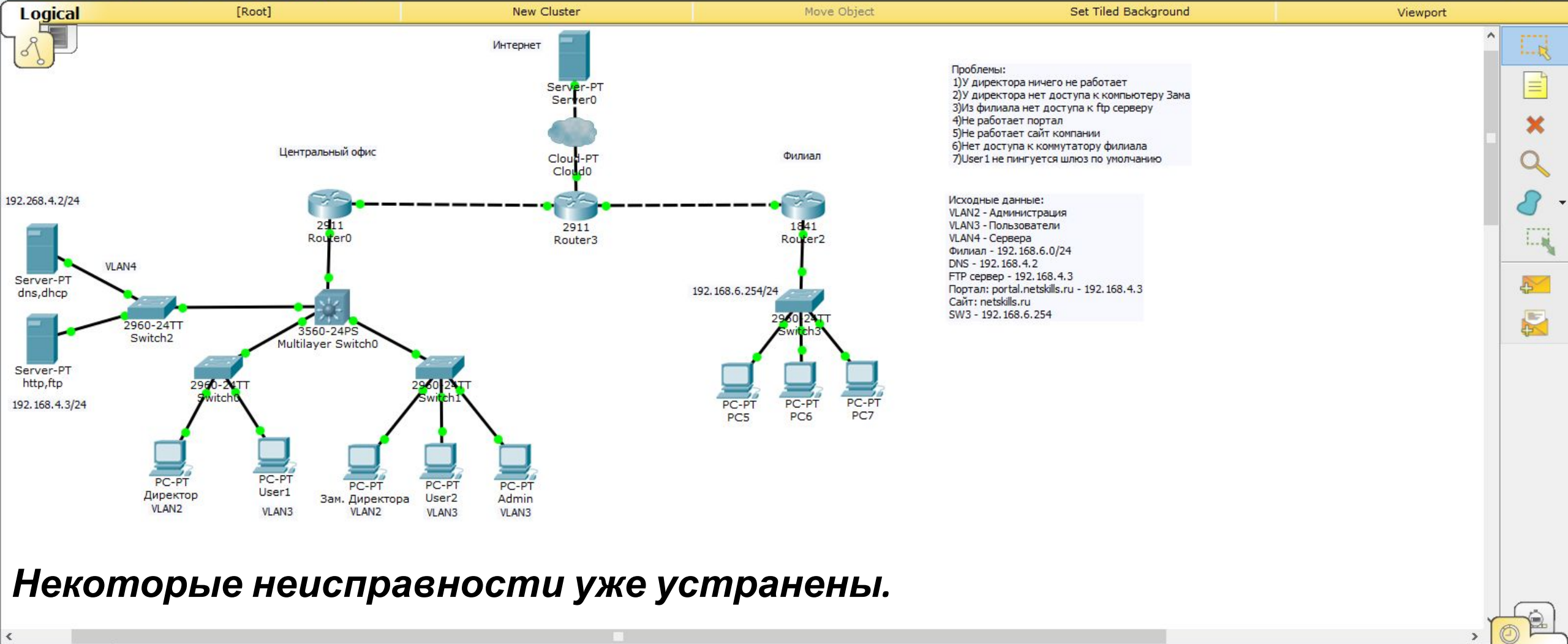
Scenario 0

New Delete

Toggle PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
------	-------------	--------	-------------	------	-------	-----------	----------	-----	------	--------



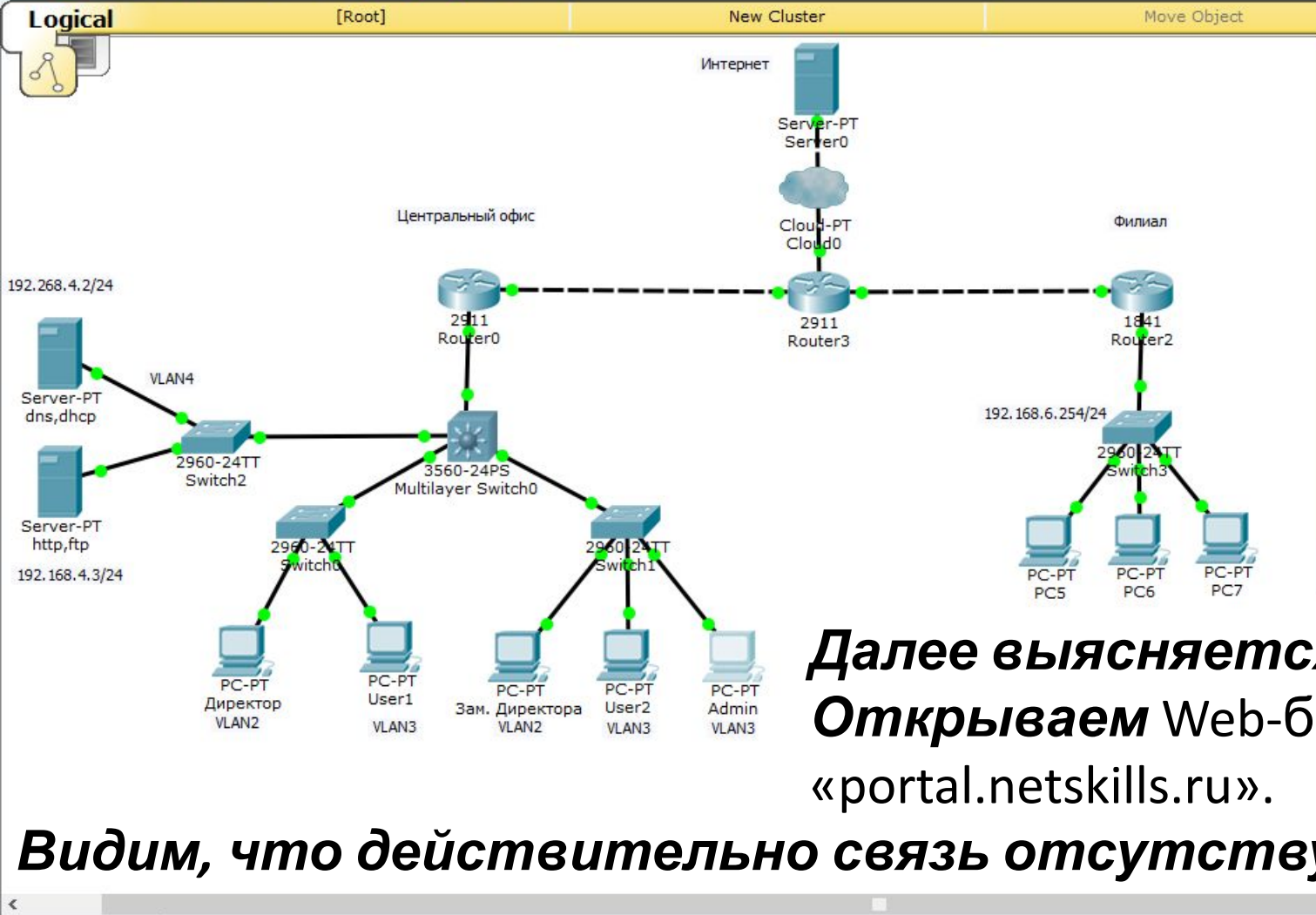


**Некоторые неисправности уже устранены.**

Scenario 0

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

Router-PT



**Web Browser**

< > URL  Go Stop

Host Name Unresolved

**Далее выясняется, что не работает портал. Открываем Web-браузер и проверяем это: «portal.netskills.ru».**

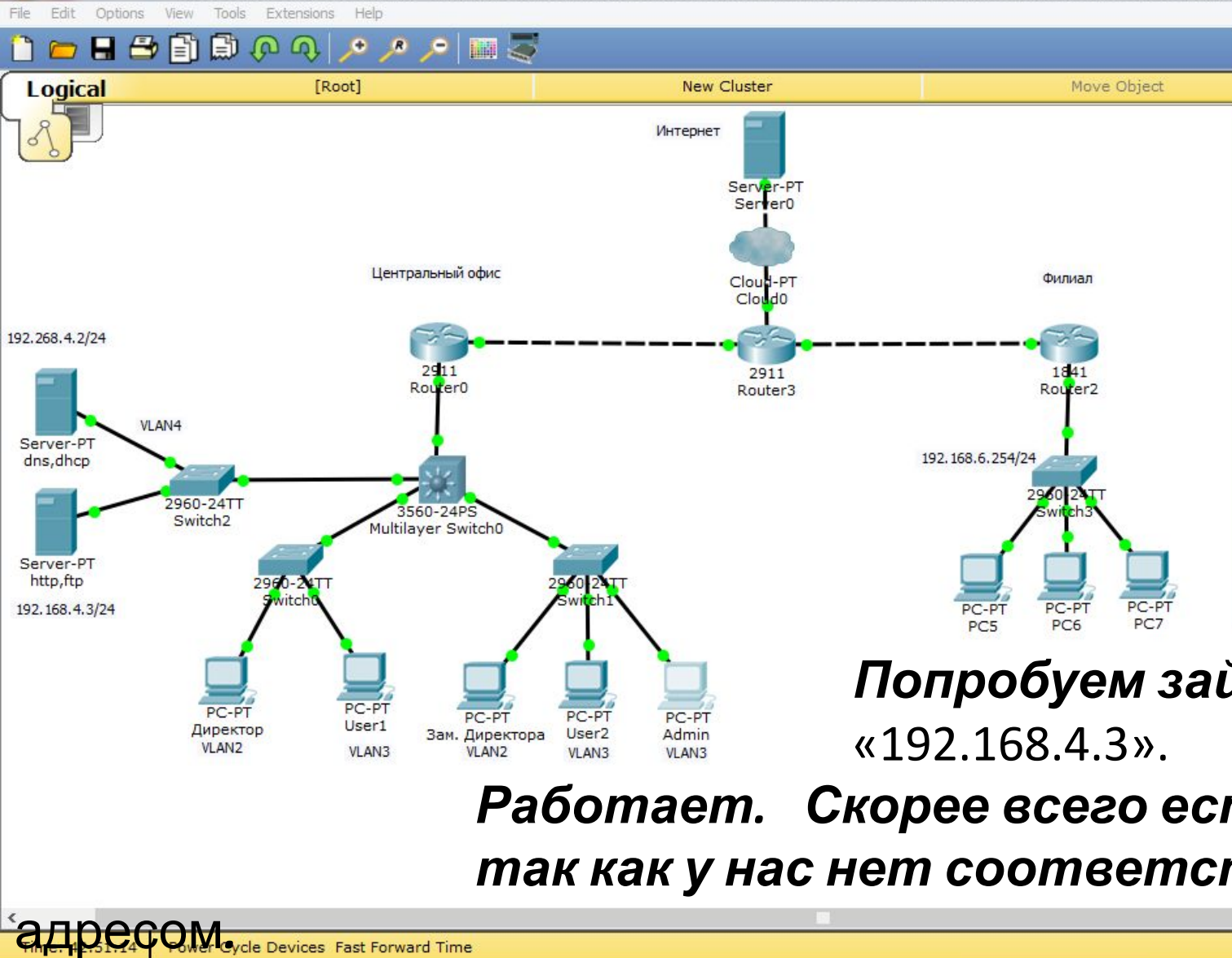
**Видим, что действительно связь отсутствует.**

Scenario 0

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

New Delete

Toggle PDU List Window



Admin

Physical Config Desktop Custom Interface

Web Browser

URL  Go Stop

Cisco Packet Tracer

Welcome to NetSkills. Opening doors to new opportunities. Mind Wide Open.

Quick Links:

- [A small page](#)
- [Copyrights](#)
- [Image page](#)
- [Image](#)

**Попробуем зайти по ip-адресу:  
«192.168.4.3».**

**Работает. Скорее всего есть проблема с DNS-сервером,  
так как у нас нет соответствия имени сайта с его ip-**

**адресом.**

Realtime

Scenario 0

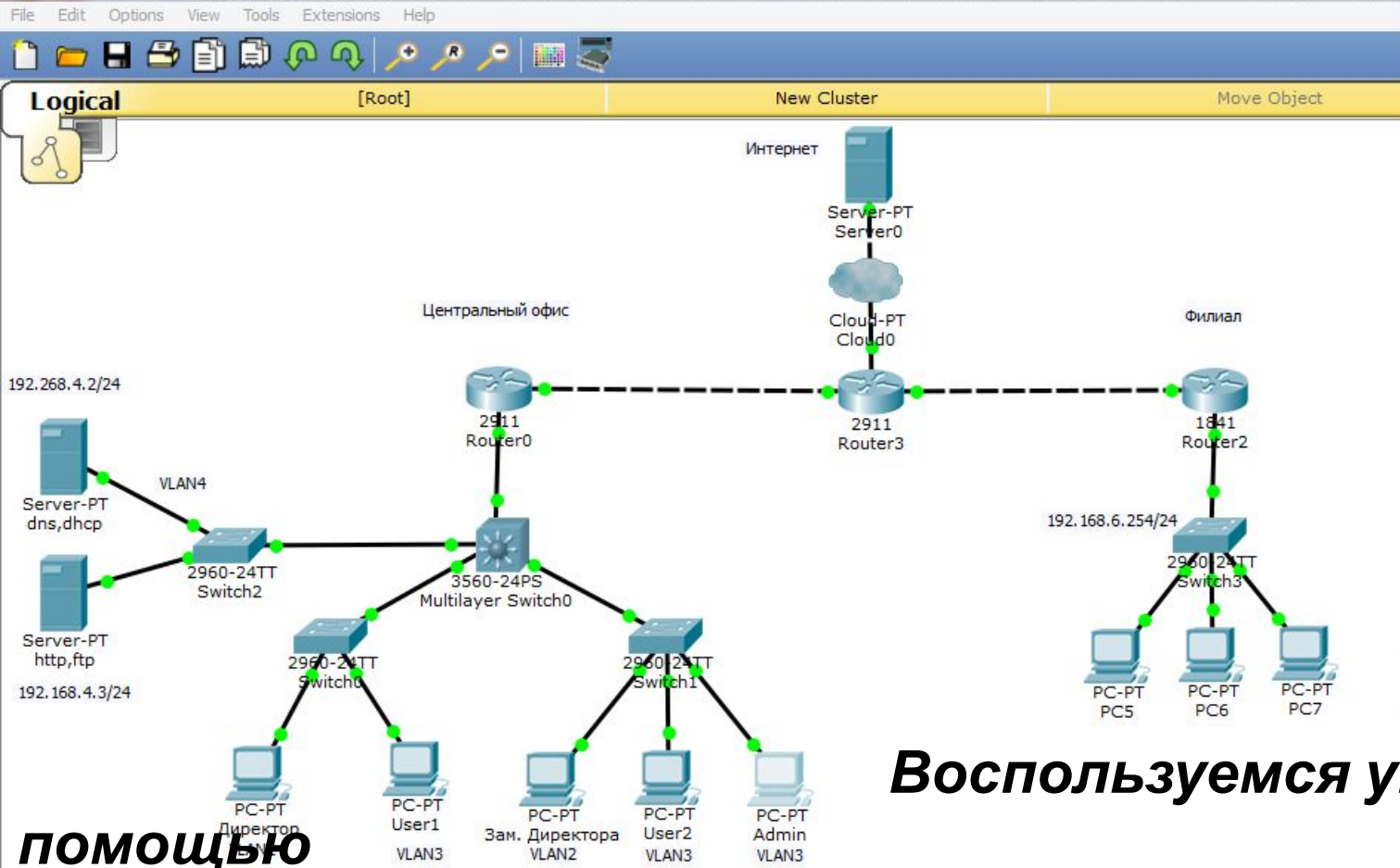
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

Toggle PDU List Window

2901

1841 1941 2620XM 2621XM 2811 2901 2911 819 Generic Generic

Windows taskbar: 16:59 16.02.2020



```

Admin
Physical Config Desktop Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>telnet 192.168.6.3
Trying 192.168.6.3 ...
% Connection refused by remote host
PC>ssh 192.168.6.3
Invalid Command.

PC>
PC>
PC>
PC>nslookup

Server: [192.168.4.2]
Address: 192.168.4.2

>portal.netskills.ru
Server: [192.168.4.2]
Address: 192.168.4.2
*** UnKnown can't find portal.netskills.ru: Non-existent domain.
  
```

**ПОМОЩЬЮ**

**Воспользуемся утилитой nslookup. С**

**неё можно узнать у DNS-сервера ip-адрес по**

**имени**

**или наоборот. Набираем: «nslookup», далее набираем имя:**

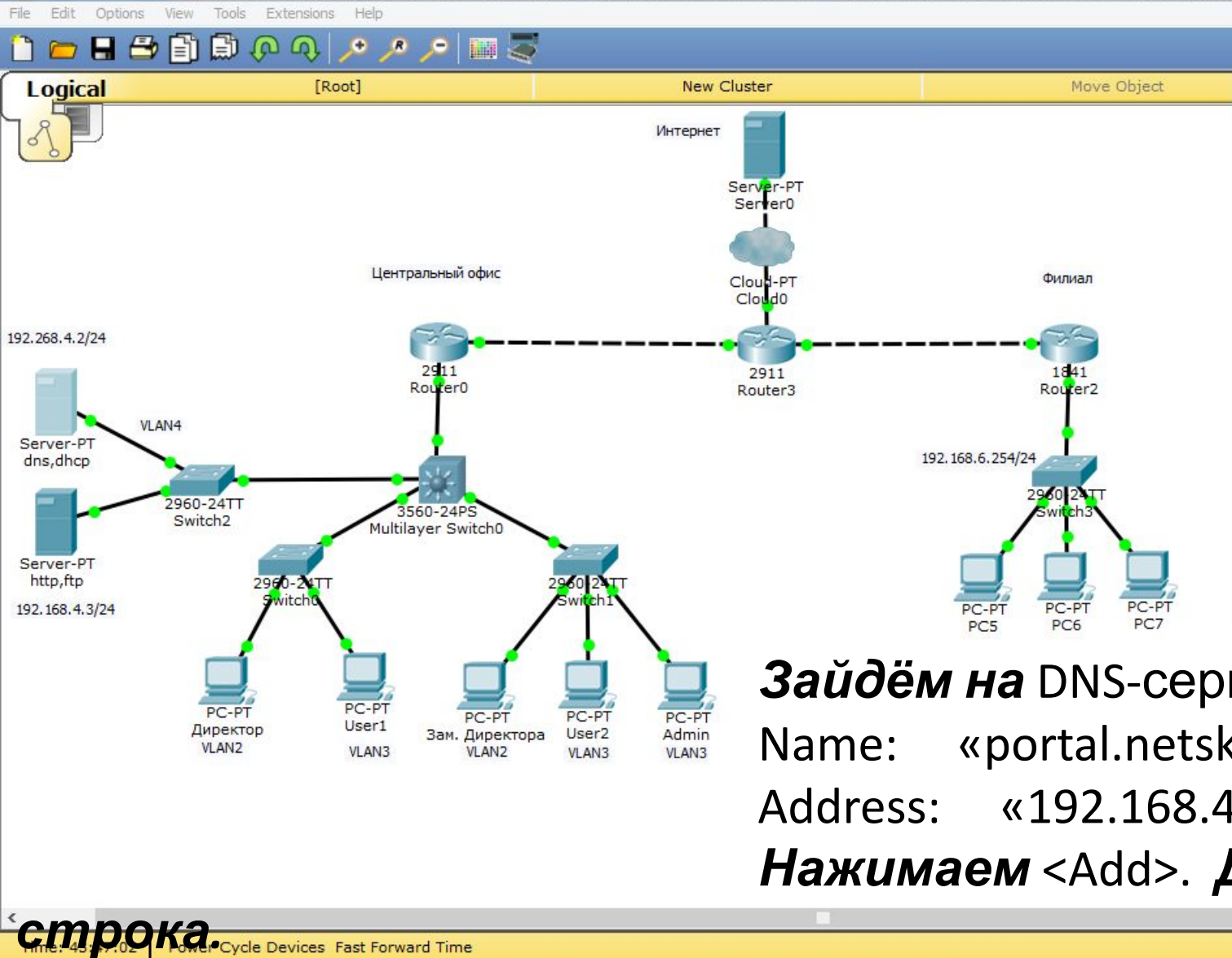
**«portal.netskills.ru». Видим, что для этой записи нет соответствия ip-адреса.**

Realtime

Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete	
1841	1941	2620XM	2621XM	2811	2901	2911	819	Generic	Generic

819HGW

Windows taskbar: File Explorer, PowerPoint, Firefox, Word, Excel, etc. System tray: 17:08, 16.02.2020



dns,dhcp

Physical Config Services Desktop Custom Interface

**SERVICES**

- HTTP
- DHCP
- DHCPv6
- TFTP
- DNS**
- SYSLOG
- AAA
- NTP
- EMAIL
- FTP

**DNS**

DNS Service  On  Off

Resource Records

Name  Type

Address

No.	Name	Type	Detail
0	netskills.ru	A Record	210.210.1.3

**Зайдём на DNS-сервер, добавим новую запись.**

Name: «portal.netskills.ru»

Address: «192.168.4.3».

**Нажимаем <Add>. Должна появиться новая**

**строка.**

Realtime

Scenario 0

New Delete

Toggle PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
------	-------------	--------	-------------	------	-------	-----------	----------	-----	------	--------

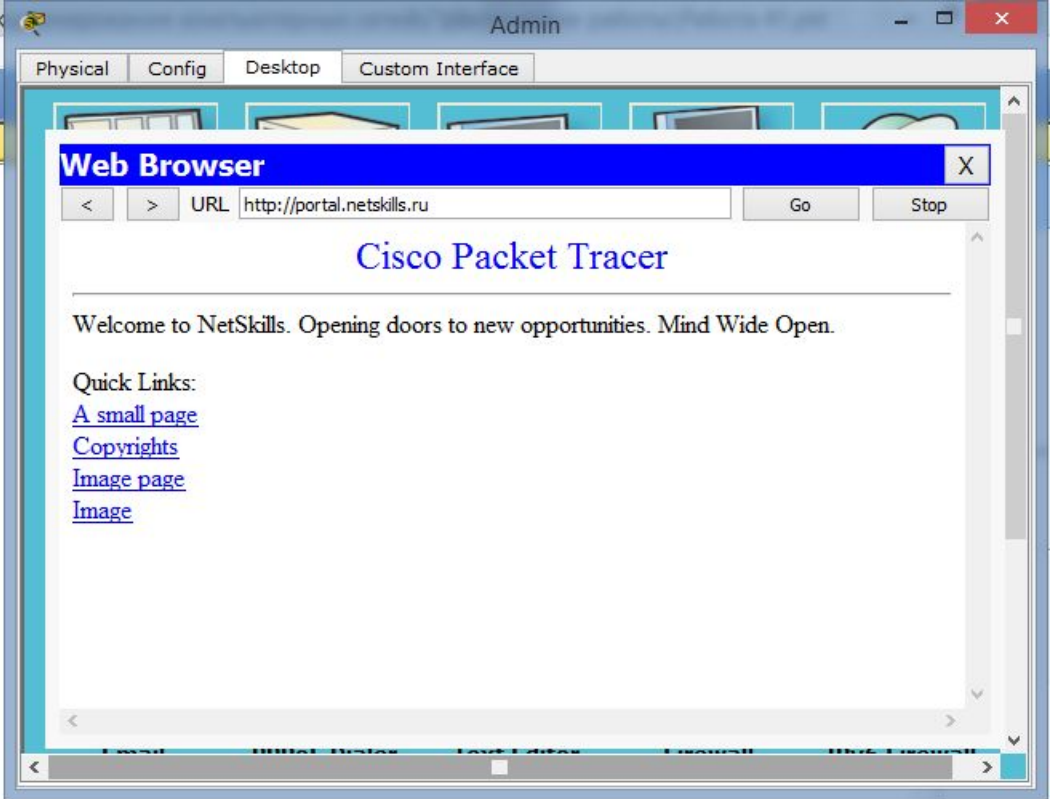
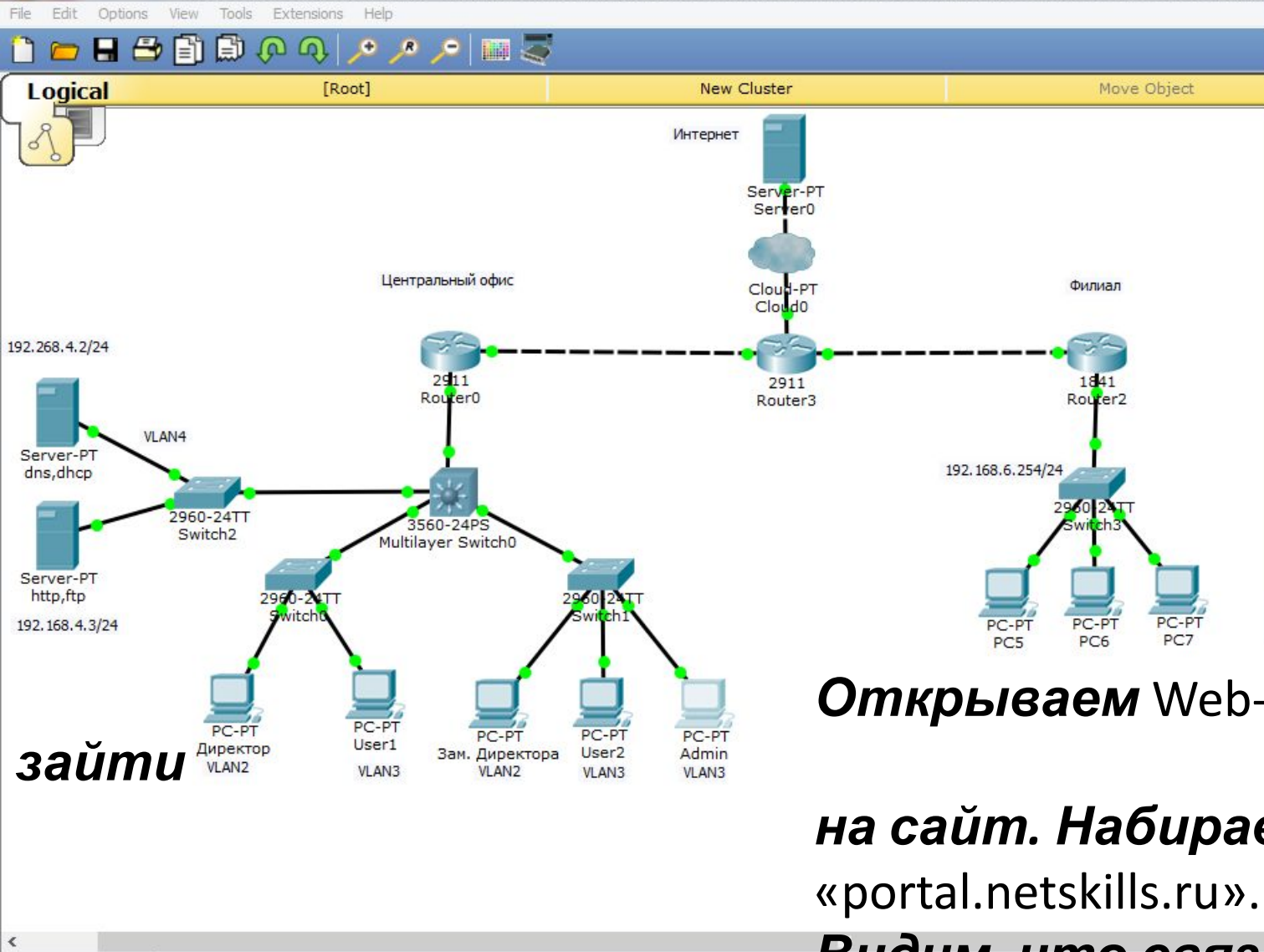
Router-PT

1841 1941 2620XM 2621XM 2811 2901 2911 819 Generic Generic

Windows taskbar: 17:56 16.02.2020







**зайти**

**Открываем Web-браузер, попробуем снова на сайт. Набираем: «portal.netskills.ru». Видим, что связь появилась.**

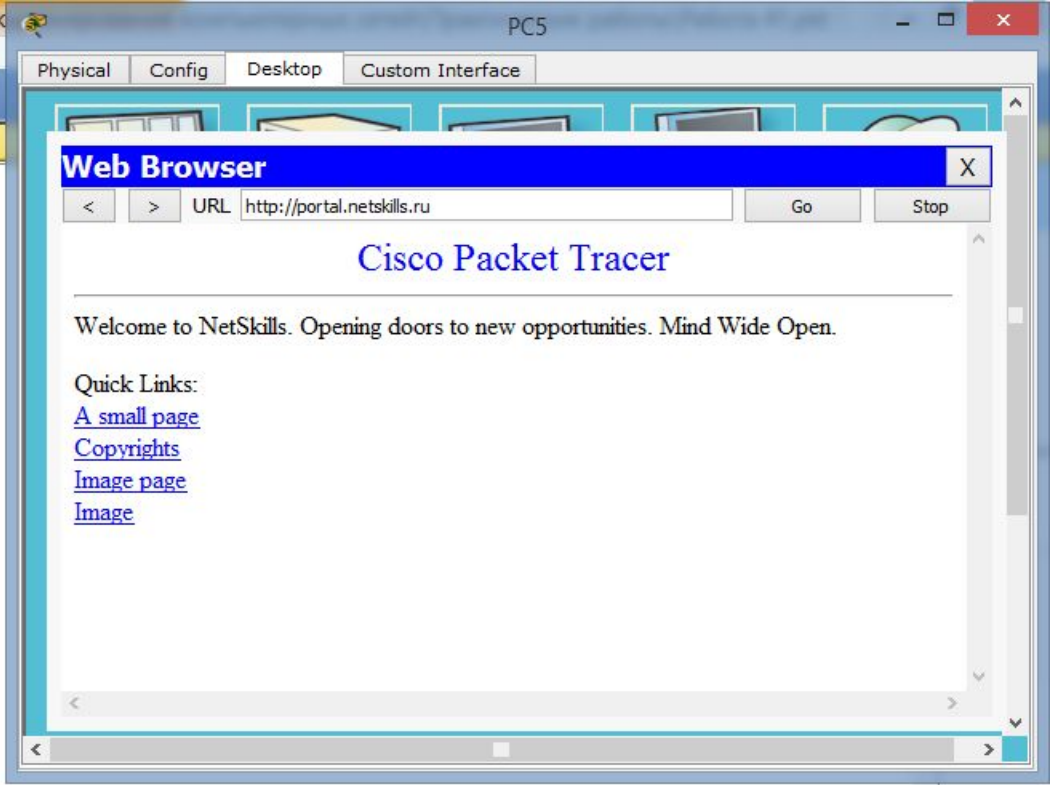
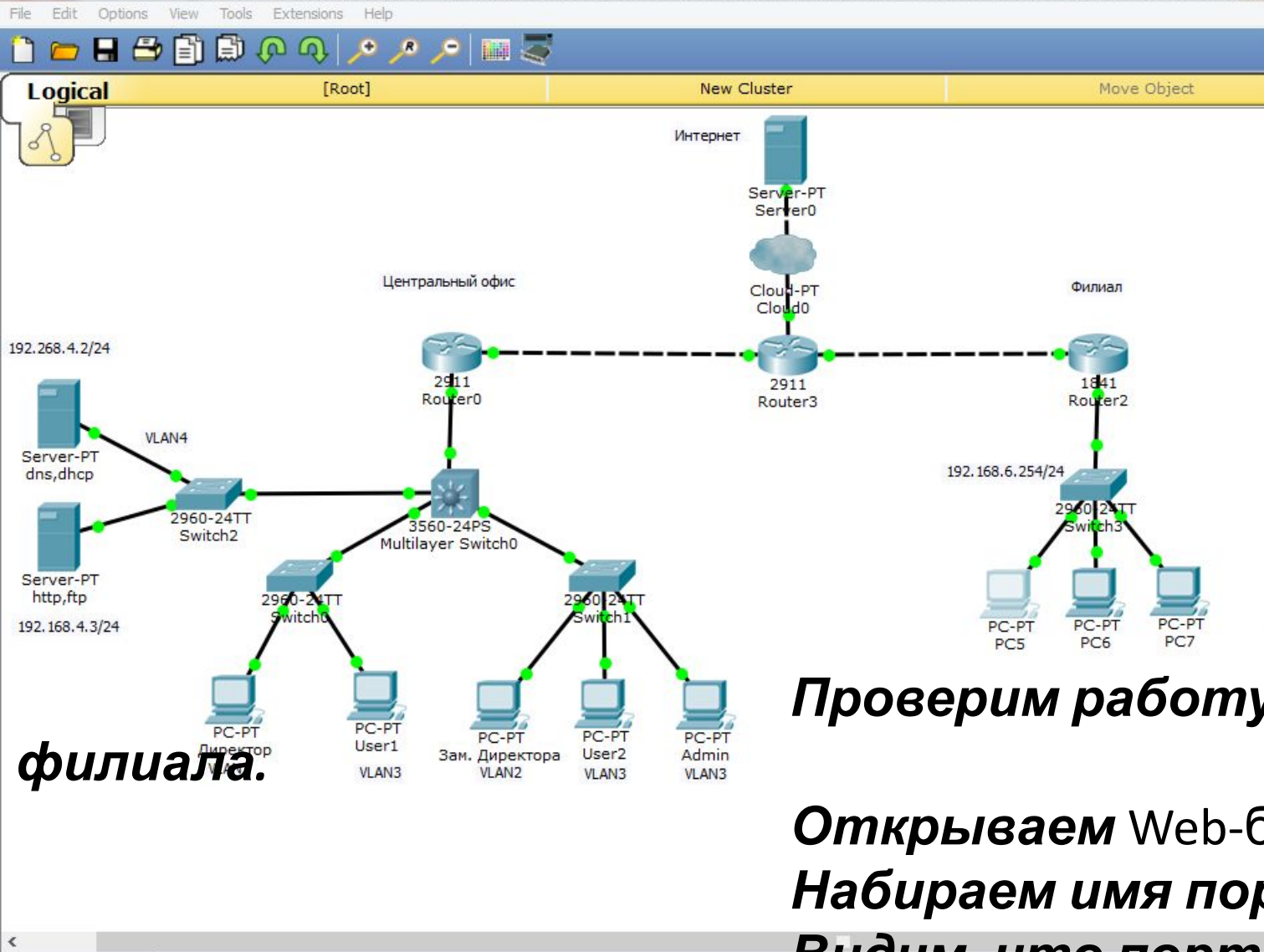
Time: 43:59:32 Power Cycle Devices Fast Forward Time Realtime

Scenario 0

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

Router-PT

Windows taskbar: 18:09 16.02.2020



**филиала.**

**Проверим работу портала с компьютера**

**Открываем Web-браузер.**

**Набираем имя портала: «portal.netskills.ru».**

**Видим, что портал заработал.**

Time: 44:08:58 Power Cycle Devices Fast Forward Time

Scenario 0

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
------	-------------	--------	-------------	------	-------	-----------	----------	-----	------	--------

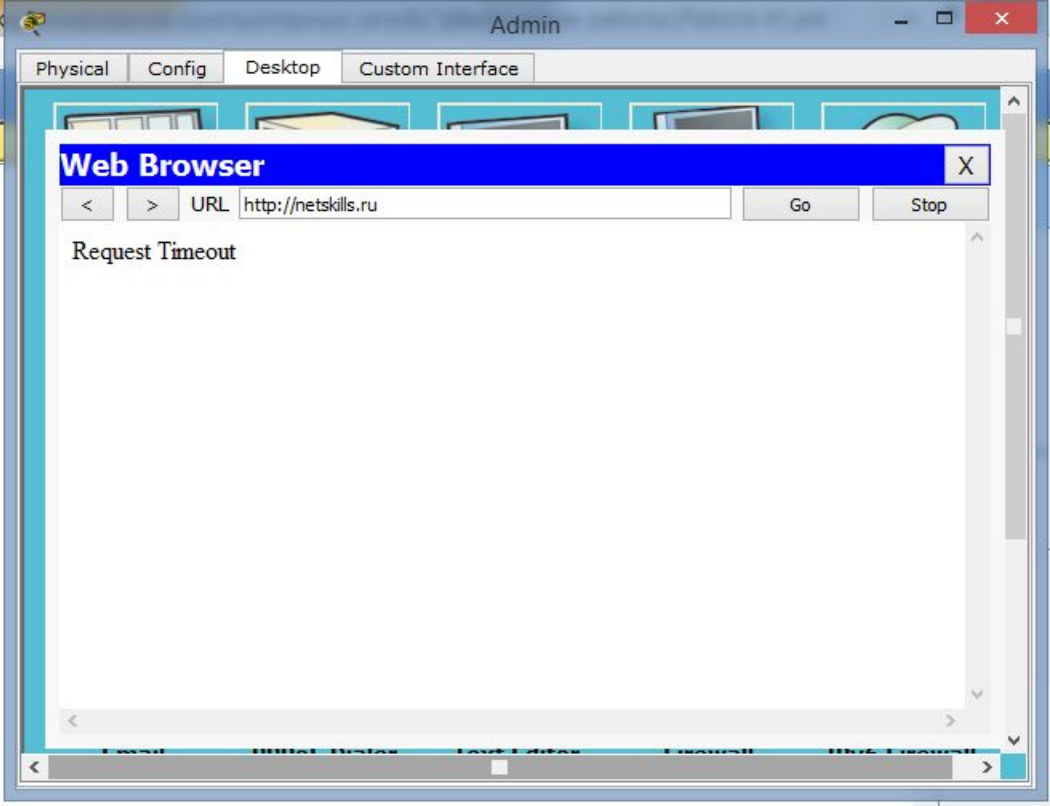
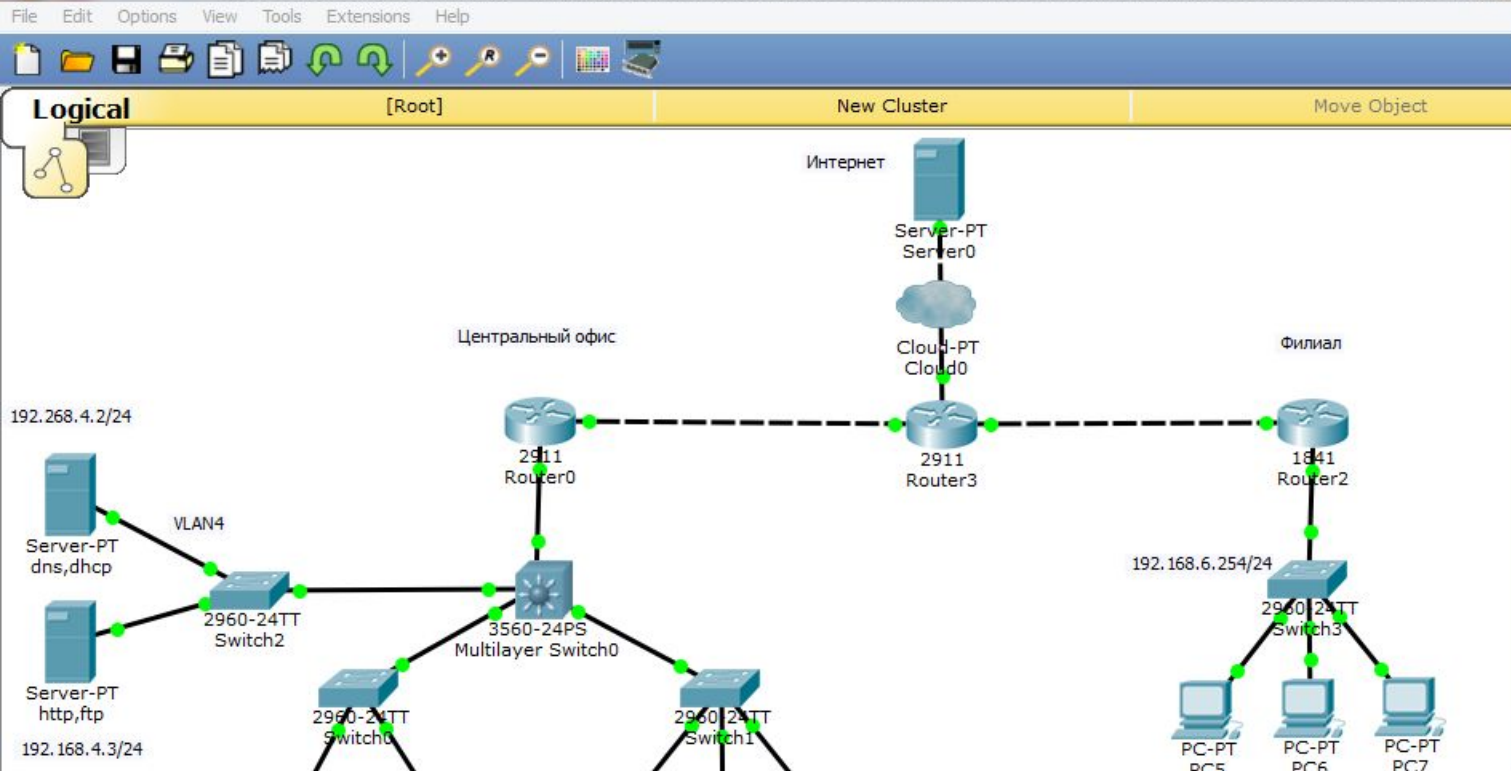
Realtime

1841 1941 2620XM 2621XM 2811 2901 2911 819 Generic Generic

2811

Windows taskbar: Internet Explorer, File Explorer, Mail, Calendar, PowerPoint, Firefox, Word, Excel, Packet Tracer.

System tray: ENG, 18:18, 16.02.2020



**Далее выясняется, что не работает сайт компании netskills.ru.**

**Проверяем эту информацию. Открываем Web-браузер и набираем имя сайта:**

**«netskills.ru» Видим, что действительно сайт не работает.**

Realtime

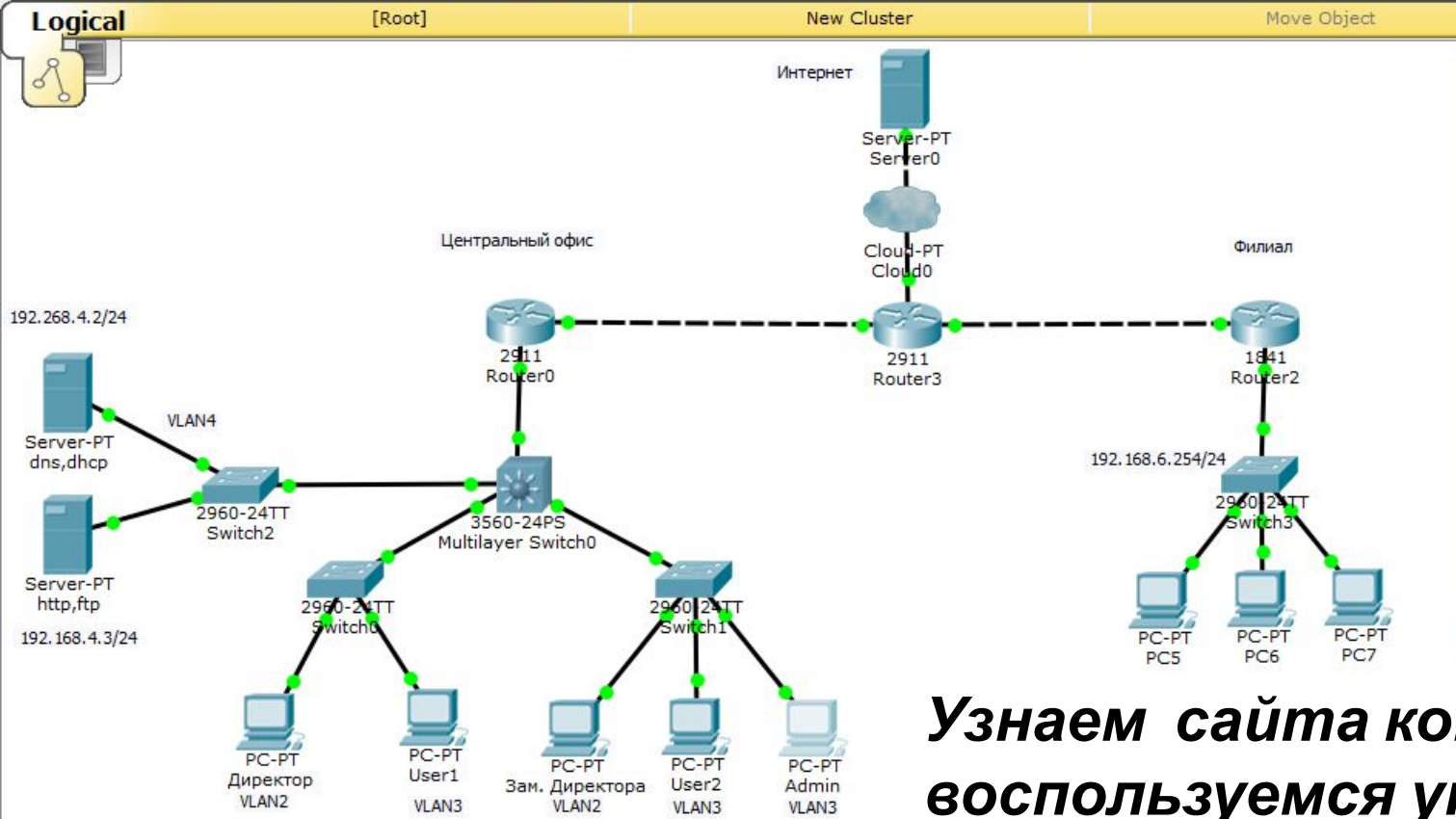
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
<div style="display: flex; justify-content: space-between;"> <span>Scenario 0</span> <span>New Delete</span> </div> <div style="display: flex; justify-content: space-between;"> <span>Toggle PDU List Window</span> </div>										

1841 1941 2620XM 2621XM 2811 2901 2911 819 Generic Generic

2911

Windows taskbar: Internet Explorer, File Explorer, Mail, Firefox, Word, Excel, etc.

System tray: 18:27, 16.02.2020



```

Command Prompt
>exit
PC>
PC>
PC>
PC>
PC>nslookup

Server: [192.168.4.2]
Address: 192.168.4.2

>
>netskills.ru
Server: [192.168.4.2]
Address: 192.168.4.2

Non-authoritative answer:
Name:   netskills.ru
Address: 210.210.1.3

```

**Узнаем сайта компании. Для этого снова воспользуемся утилитой nslookup.**

**С компьютера администратора набираем: «nslookup», далее набираем ИМЯ:**

**«netskills.ru» Видим, что этой записи соответствует ip-адреса:**

**«210.210.1.3».**

Realtime

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
<p>Scenario 0</p> <p>New Delete</p> <p>Toggle PDU List Window</p>										

Windows taskbar: 18:32 16.02.2020



Admin

Physical Config Desktop Custom Interface

**Command Prompt**

```

Non-authoritative answer:
Name:   netskills.ru
Address: 210.210.1.3

>
>exit
PC>
PC>ping 210.210.1.3

Pinging 210.210.1.3 with 32 bytes of data:

Reply from 210.210.1.3: bytes=32 time=19ms TTL=125
Reply from 210.210.1.3: bytes=32 time=14ms TTL=125
Reply from 210.210.1.3: bytes=32 time=13ms TTL=125
Reply from 210.210.1.3: bytes=32 time=13ms TTL=125

Ping statistics for 210.210.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 13ms, Maximum = 19ms, Average = 14ms

PC>
  
```

**Проверим связь с этим ip-адресом:  
«ping 210.210.1.3».  
Связь есть.**

Routers

1841 1941 2620XM 2621XM 2811 2901 2911 819 Generic Generic

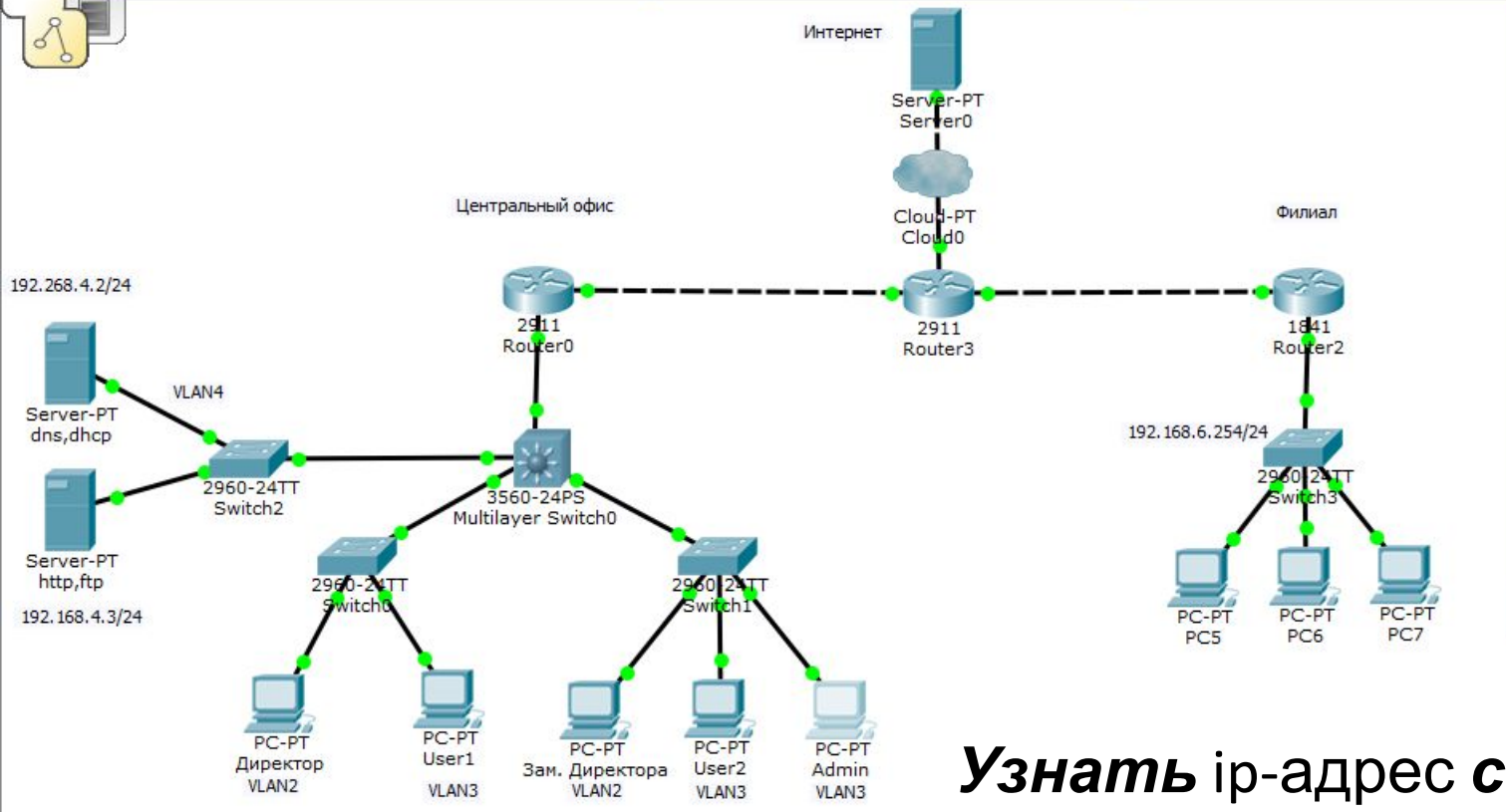
Router-PT-Empty

Scenario 0

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

New Delete

Toggle PDU List Window



**Command Prompt**

```

Reply from 210.210.1.3: bytes=32 time=13ms TTL=125

Ping statistics for 210.210.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 13ms, Maximum = 19ms, Average = 14ms

PC>ping netskills.ru

Pinging 210.210.1.3 with 32 bytes of data:

Reply from 210.210.1.3: bytes=32 time=16ms TTL=125
Reply from 210.210.1.3: bytes=32 time=15ms TTL=125
Reply from 210.210.1.3: bytes=32 time=14ms TTL=125
Reply from 210.210.1.3: bytes=32 time=14ms TTL=125

Ping statistics for 210.210.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 14ms, Maximum = 16ms, Average = 14ms

PC>
PC>
PC>

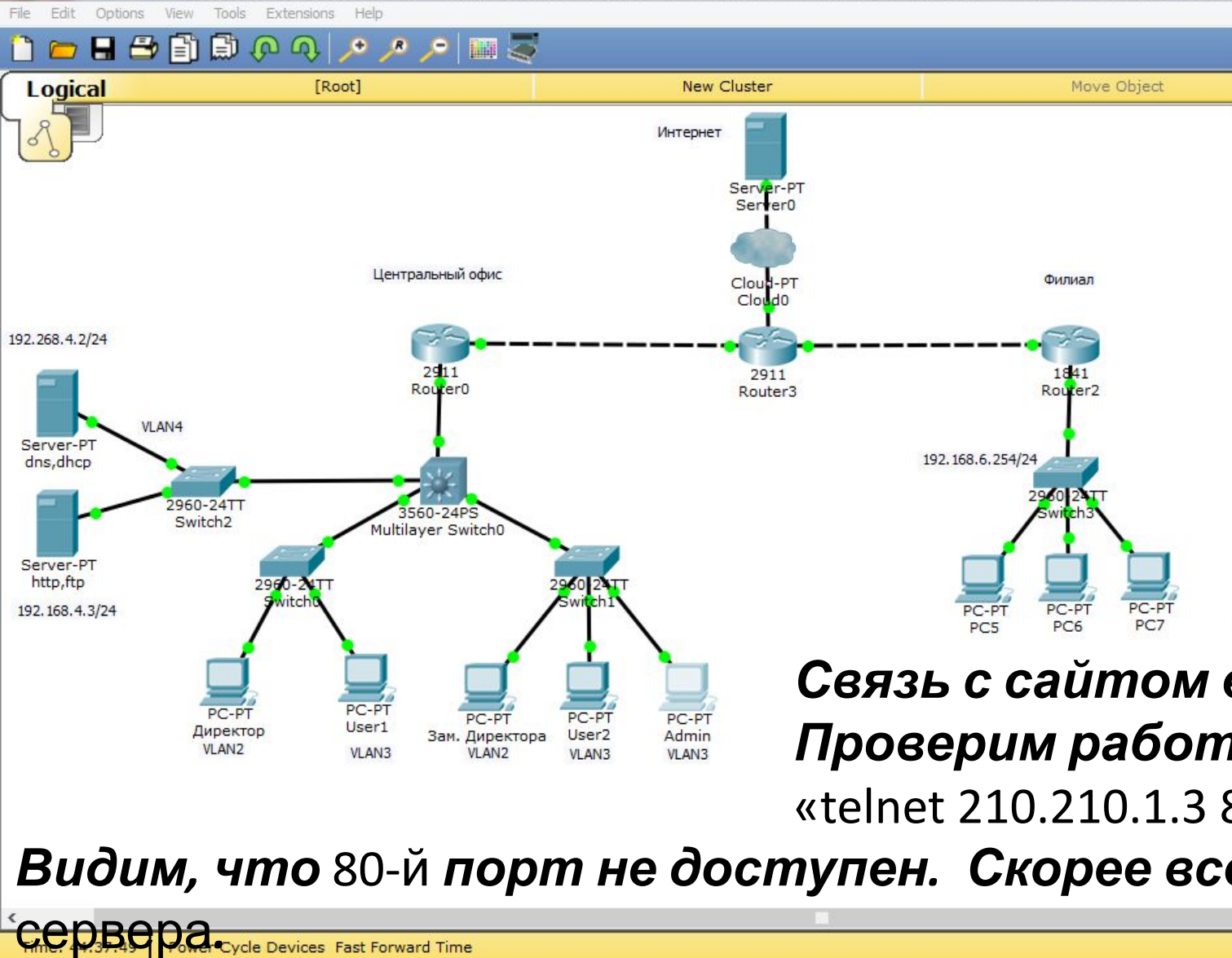
```

**способом:**

**Узнать ip-адрес сайта можно другим**

**«ping netskills.ru».**

**Видим, что нам сразу же сообщили ip-адрес сайта по его**



Admin

Physical Config Desktop Custom Interface

### Command Prompt

```

Packets: sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
  Minimum = 13ms, Maximum = 19ms, Average = 14ms

PC>ping netskills.ru

Pinging 210.210.1.3 with 32 bytes of data:

Reply from 210.210.1.3: bytes=32 time=16ms TTL=125
Reply from 210.210.1.3: bytes=32 time=15ms TTL=125
Reply from 210.210.1.3: bytes=32 time=14ms TTL=125
Reply from 210.210.1.3: bytes=32 time=14ms TTL=125

Ping statistics for 210.210.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 14ms, Maximum = 16ms, Average = 14ms

PC>
PC>
PC>telnet 210.210.1.3 80
Trying 210.210.1.3 ...
% Connection refused by remote host
PC>

```

**Связь с сайтом есть, но он не работает.  
Проверим работу Web-сервера командой:  
«telnet 210.210.1.3 80».**

**Видим, что 80-й порт не доступен. Скорее всего не запущена служба Web-сервера.**

Realtime

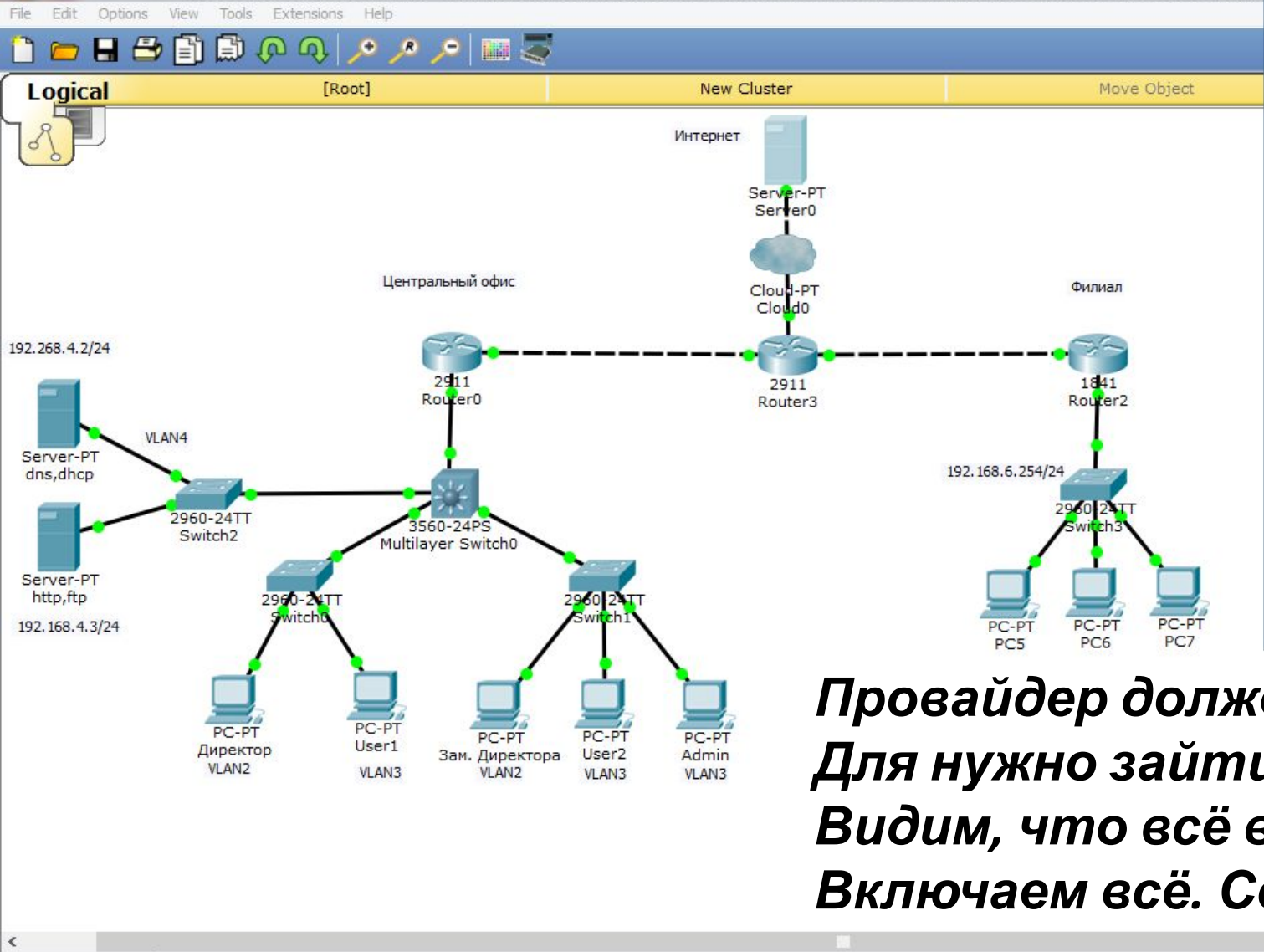
Scenario 0

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

Router-PT-Empty

1841 1941 2620XM 2621XM 2811 2901 2911 819 Generic Generic

Windows taskbar: 16.02.2020 18:48



Server0

Physical Config Services Desktop Custom Interface

**SERVICES**

- HTTP
- DHCP
- DHCPv6
- TFTP
- DNS
- SYSLOG
- AAA
- NTP
- EMAIL
- FTP

**HTTP**

HTTP  On  Off

HTTPS  On  Off

**File Manager**

	File Name	Edit	Delete
1	copyrights.html	(edit)	(delete)
2	cscoptlogo177x...		(delete)
3	helloworld.html	(edit)	(delete)
4	image.html	(edit)	(delete)
5	index.html	(edit)	(delete)

New File Import

**Провайдер должен проверить Web-сервер.  
Для нужно зайти на Services/HTTP.  
Видим, что всё выключено.  
Включаем всё. Связь должна появиться.**

Time: 44:46:57 Power Cycle Devices Fast Forward Time Realtime

Routers

1841 1941 2620XM 2621XM 2811 2901 2911 819 Generic Generic

819HGW

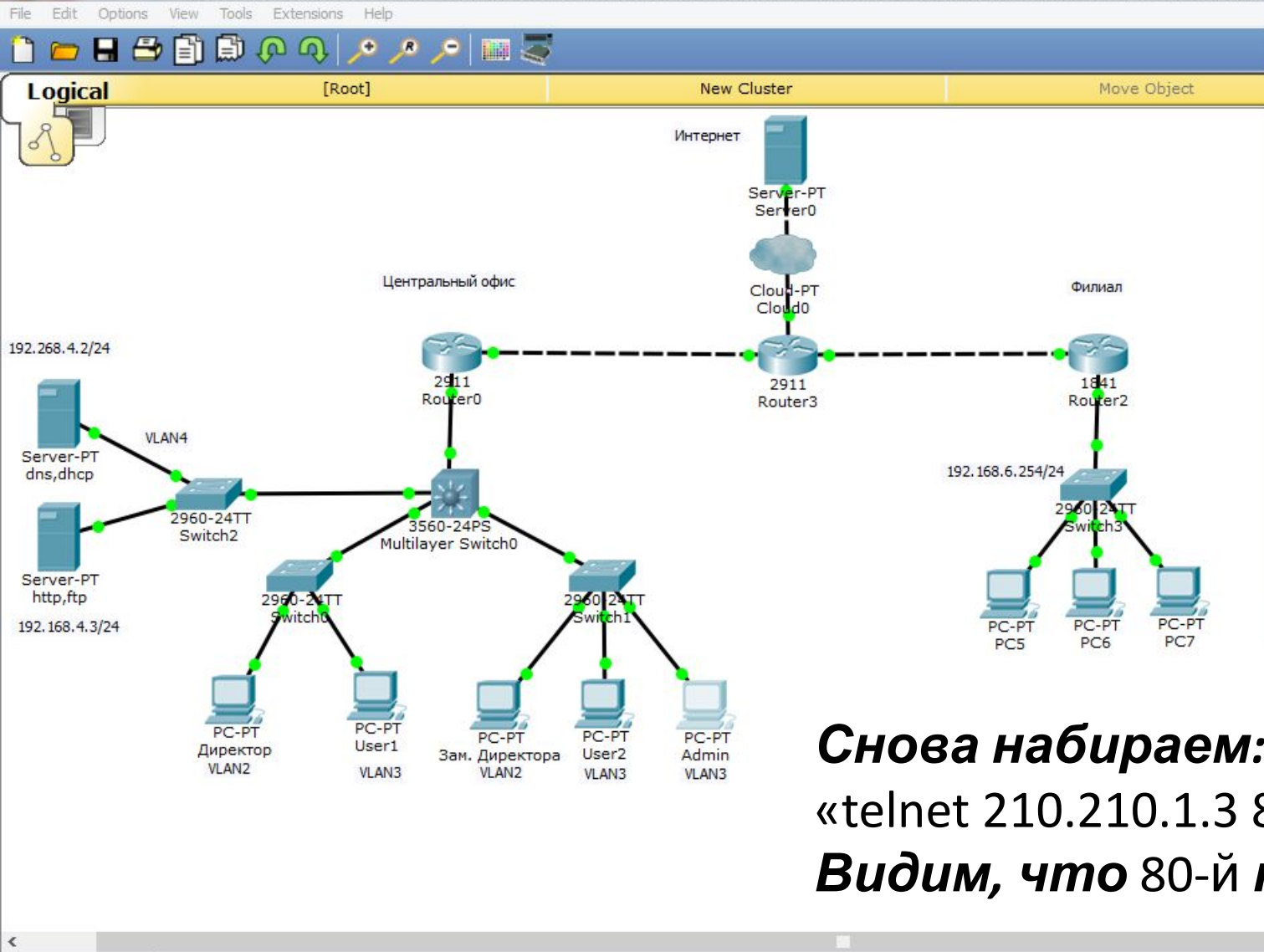
Scenario 0

New Delete

Toggle PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
------	-------------	--------	-------------	------	-------	-----------	----------	-----	------	--------





Admin

Physical Config Desktop Custom Interface

**Command Prompt**

```

PC>ping netskills.ru

Pinging 210.210.1.3 with 32 bytes of data:

Reply from 210.210.1.3: bytes=32 time=16ms TTL=125
Reply from 210.210.1.3: bytes=32 time=15ms TTL=125
Reply from 210.210.1.3: bytes=32 time=14ms TTL=125
Reply from 210.210.1.3: bytes=32 time=14ms TTL=125

Ping statistics for 210.210.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 14ms, Maximum = 16ms, Average = 14ms

PC>
PC>
PC>telnet 210.210.1.3 80
Trying 210.210.1.3 ...
% Connection refused by remote host
PC>
PC>
PC>telnet 210.210.1.3 80
Trying 210.210.1.3 ...Open
  
```

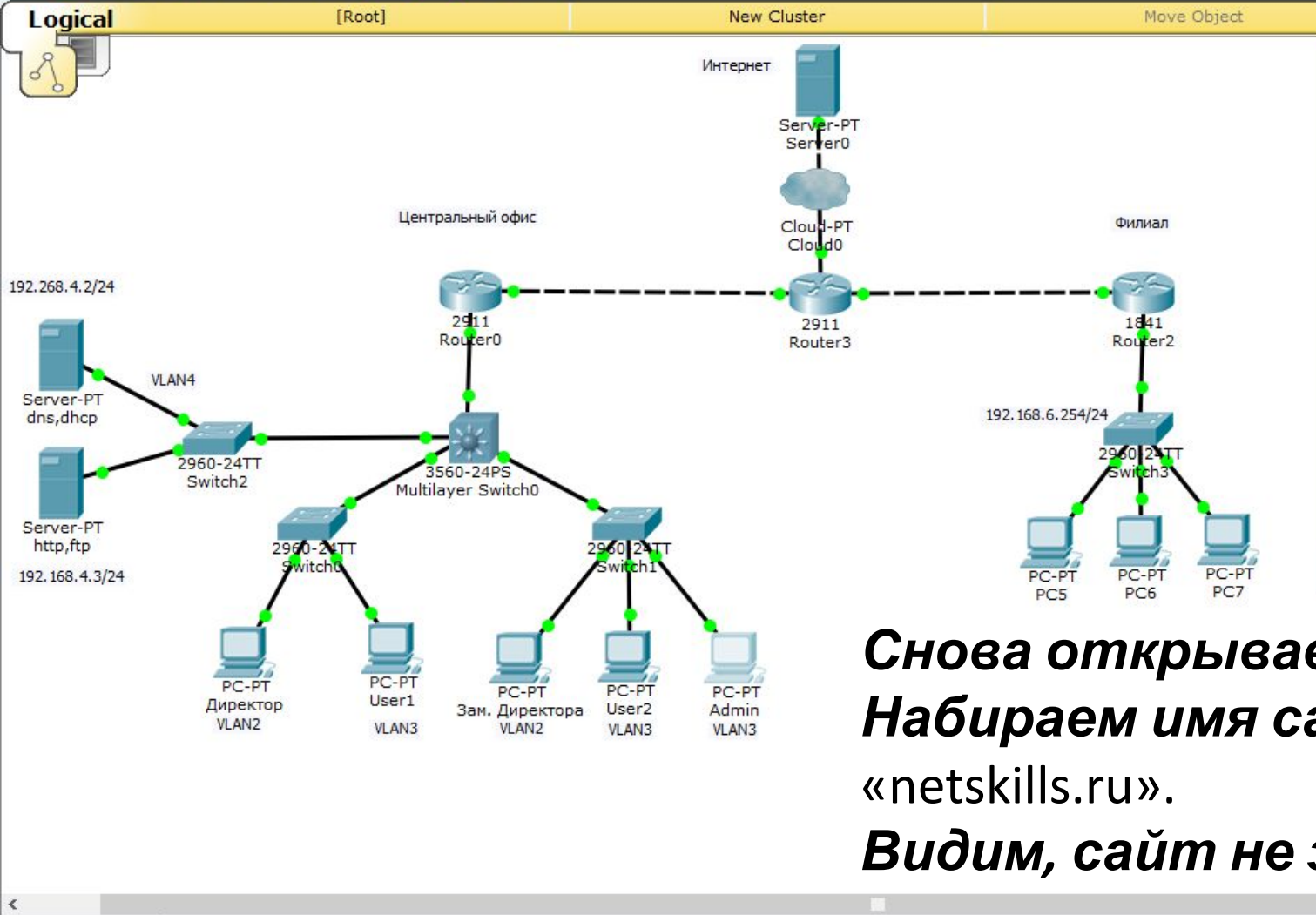
**Снова набираем:**  
**«telnet 210.210.1.3 80».**  
**Видим, что 80-й порт открыт.**

Routers

1841 1941 2620XM 2621XM 2811 2901 2911 819 Generic Generic

Scenario 0

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
Toggle PDU List Window										



**Web Browser**

URL:  Go Stop

Cisco Packet Tracer

Welcome to Netskills. Opening doors to new opportunities. Mind Wide Open.

Quick Links:

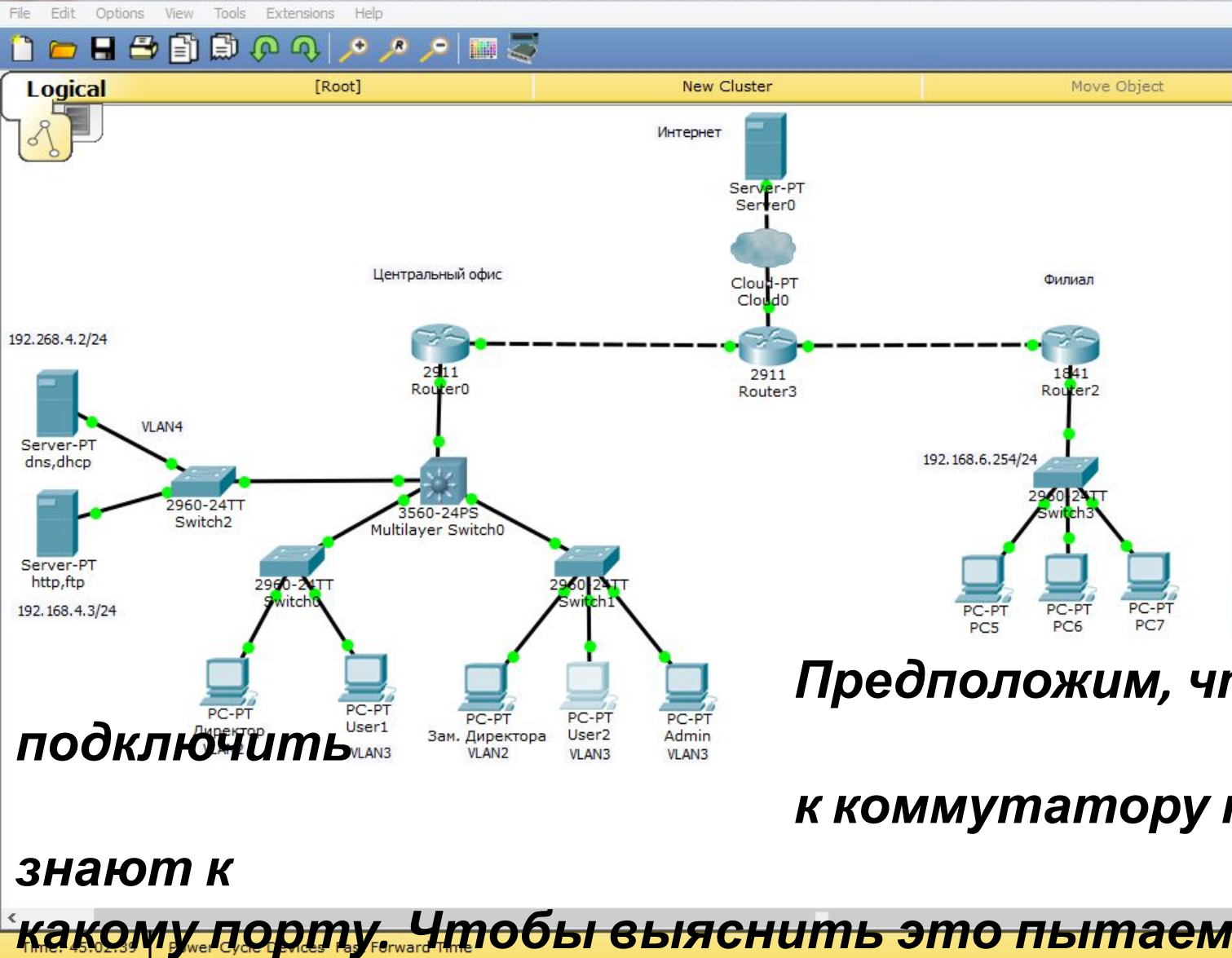
- [A small page](#)
- [Copyrights](#)
- [Image page](#)
- [Image](#)

**Снова открываем Web-браузер.  
 Набираем имя сайта:  
 «netskills.ru».  
 Видим, сайт не заработал.**

Routers: 1841, 1941, 2620XM, 2621XM, 2811, 2901, 2911, 819, Generic, Generic

819HGW

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
<p>Scenario 0</p> <p>New Delete</p> <p>Toggle PDU List Window</p>										



User2

Physical Config Desktop Custom Interface

**Command Prompt**

```

Packet Tracer PC Command Line 1.0
PC>ping 192.168.6.254

Pinging 192.168.6.254 with 32 bytes of data:

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

Ping statistics for 192.168.6.254:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

PC>
  
```

**Предположим, что в филиале хотят подключить к коммутатору новый компьютер, но не знают к какому порту. Чтобы выяснить это пытаемся подключиться к коммутатору филиала удалённо. Проверяем связь: «ping 192.168.6.254». Связи нет.**

Realtime

Fire	Last Status	Source	Destination	Type	Color	Time (sec)	Periodic	Num	Edit	Delete

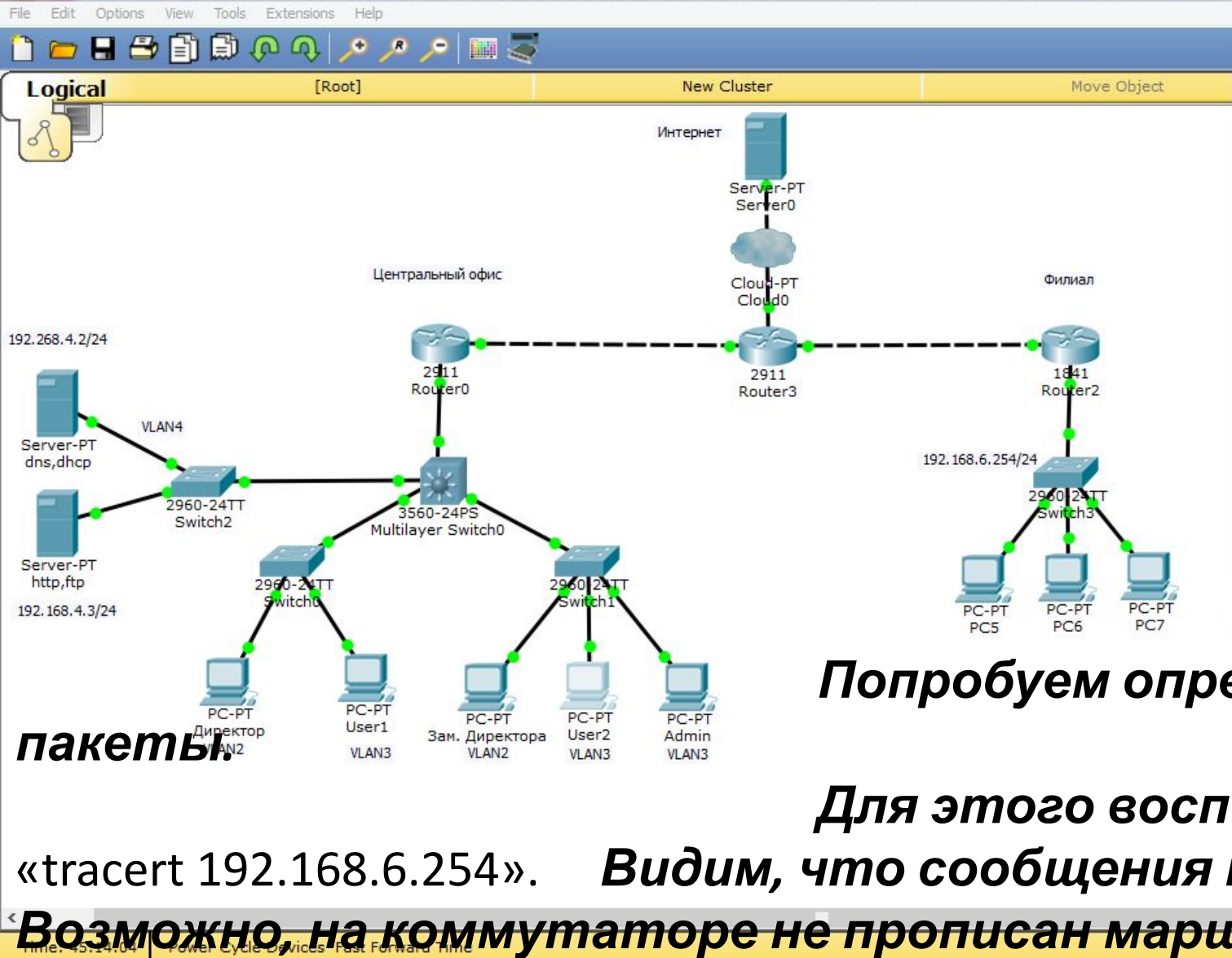
Routers: 1841, 1941, 2820XM, 2821XM, 2811, 2901, 2911, 819, (Generic), (Generic)

New Delete

Toggle PDU List Window

819HGW

Windows taskbar: 16.02.2020 19:13



Physical Config Desktop Custom Interface

**Command Prompt**

```

PC>
PC>
PC>
PC>
PC>tracert 192.168.6.254

Tracing route to 192.168.6.254 over a maximum of 30 hops:

 0  0 ms    0 ms    0 ms    192.168.3.1
 1  0 ms    0 ms    2 ms    192.168.5.1
 2  11 ms   11 ms   0 ms    192.168.10.1
 3  12 ms   10 ms   13 ms   192.168.10.6
 4  *      *      *
 5  *      *      *      Request timed out.
 6  *      *      *      Request timed out.
 7  *      *      *      Request timed out.
 8  *      *      *      Request timed out.
 9  *      *      *      Request timed out.
10 *      *      *      Request timed out.
11 *      *      *      Request timed out.
12 *      *      *      Request timed out.
13 *      *      *      Request timed out.
14 *      *      *      Request timed out.
15 *      *      *      Request timed out.
16 *      *      *

```

**пакеты.**

**Попробуем определить, где теряются**

**Для этого воспользуемся командой:**

**«tracert 192.168.6.254». Видим, что сообщения теряются на Router2.**

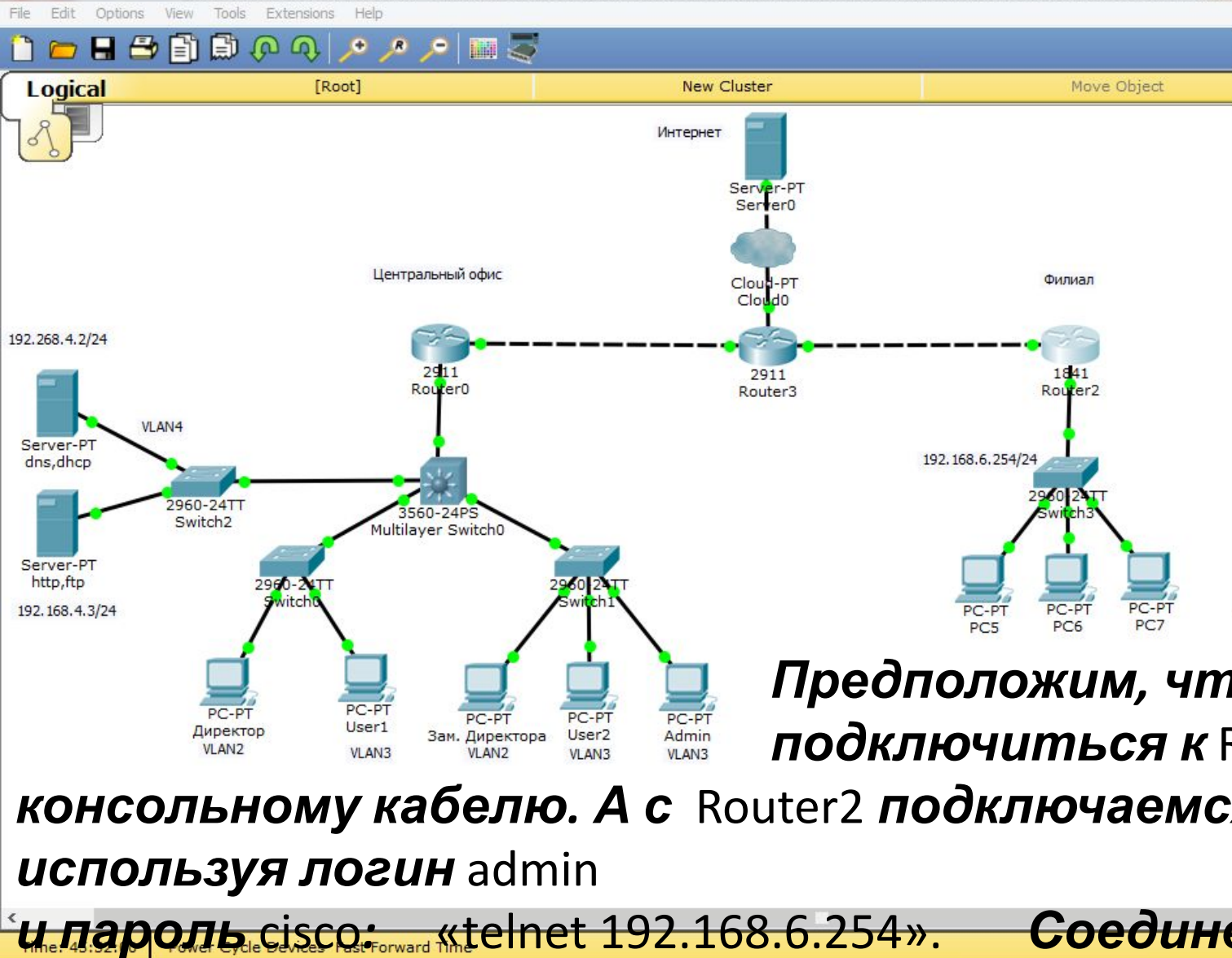
**Возможно, на коммутаторе не прописан маршрут по умолчанию.**

Scenario 0

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
[Empty table body]										

819HGW

Windows taskbar: 16.02.2020 19:25



```

Router2
Physical Config CLI
IOS Command Line Interface
up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to
up
Router>en
Router#
Router#
Router#telnet 192.168.6.254
Trying 192.168.6.254 ...Open

User Access Verification

Username: admin
Password:
Switch>
Switch>
Switch>
Switch> (You have open connections) [confirm]

[Connection to 192.168.6.254 closed by foreign host]
Router#
Copy Paste

```

**Предположим, что есть возможность подключиться к Router2, например, по консольному кабелю. А с Router2 подключаемся к коммутатору по telnet, используя логин admin и пароль cisco: «telnet 192.168.6.254».**

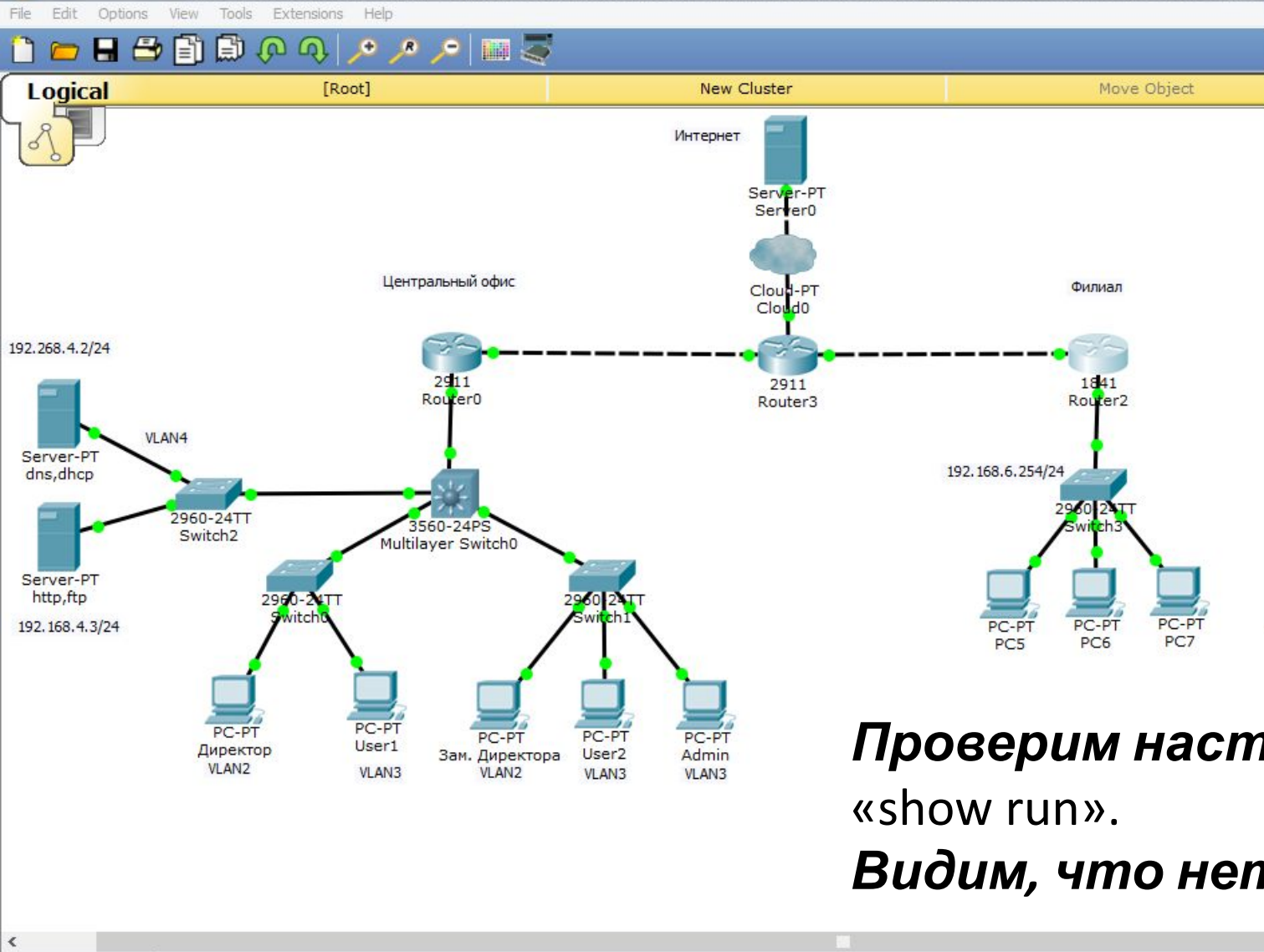
**Соединение прошло.**

Realtime

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
<div style="display: flex; justify-content: space-between;"> <span>Scenario 0</span> <span>New Delete</span> </div> <div style="display: flex; justify-content: space-between;"> <span>Toggle PDU List Window</span> </div>										

Router-PT-Empty

Windows taskbar: 20:03 16.02.2020



```
IOS Command Line Interface

interface FastEthernet0/24
!
interface GigabitEthernet0/1
!
interface GigabitEthernet0/2
!
interface Vlan1
 ip address 192.168.6.254 255.255.255.0
!
!
!
!
!
!
!
!
line con 0
!
line vty 0 4
 login local
line vty 5 15
 login
!
!
!
end

Switch#
```

**Проверим настройки коммутатора:  
«show run».  
Видим, что нет маршрута по умолчанию.**

Time: 46:03:12 Power Cycle Devices Fast Forward Time Realtime

Scenario 0

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
------	-------------	--------	-------------	------	-------	-----------	----------	-----	------	--------

New Delete Toggle PDU List Window

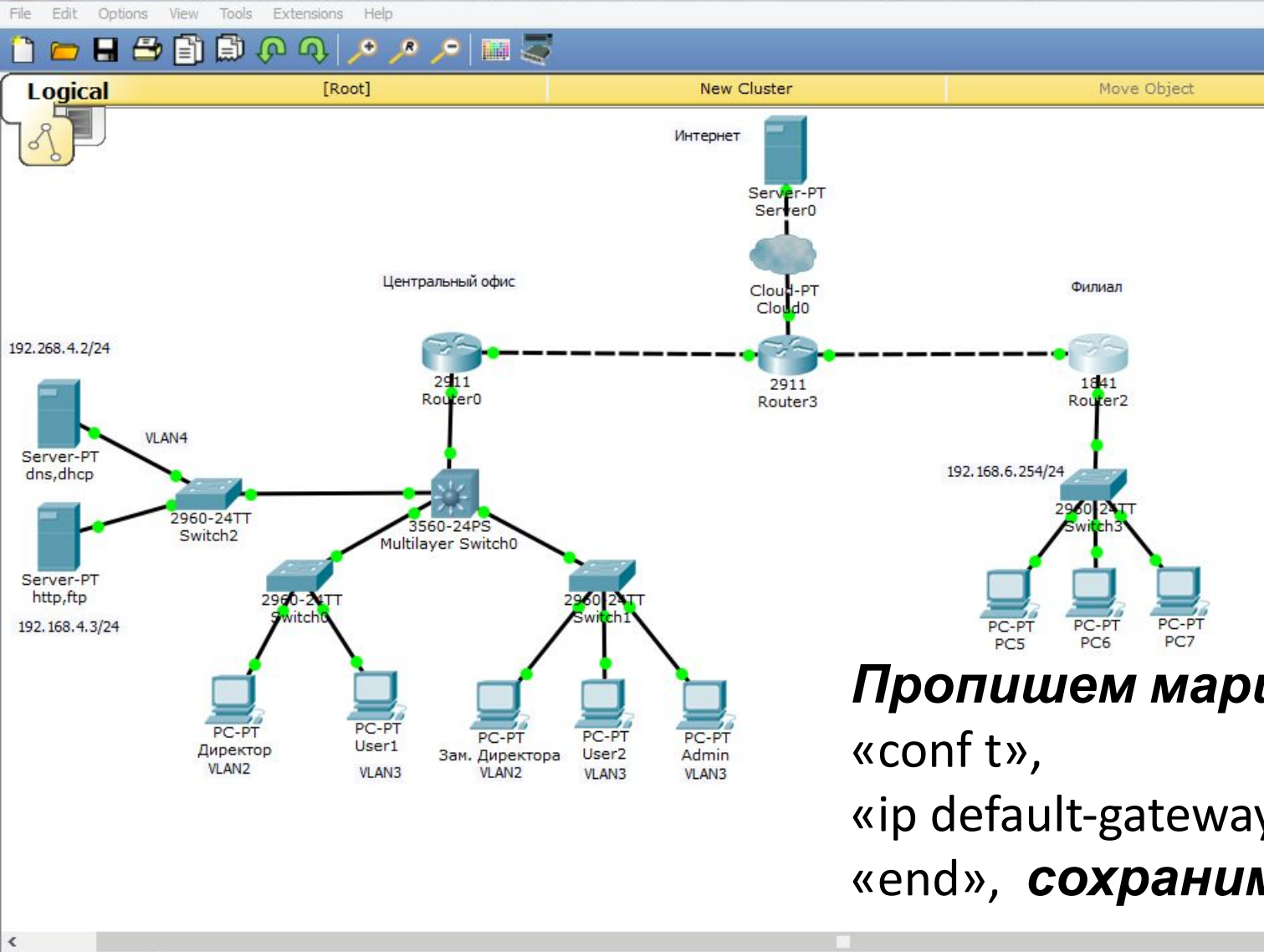
2620XM

1841 1941 2620XM 2621XM 2811 2901 2911 819 Generic Generic

2620XM

Windows Taskbar: Internet Explorer, File Explorer, Mail, Firefox, Word, Excel, etc.

System Tray: ENG, 20:15, 16.02.2020



Router2

Physical Config CLI

IOS Command Line Interface

```

login local
line vty 5 15
  login
  !
  !
end

Switch#
Switch#
Switch# conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#
Switch(config)#ip def
Switch(config)#ip default-gateway 192.168.6.1
Switch(config)#end
Switch#
Switch#wr mem
Building configuration...
[OK]
Switch#
Switch#

```

Copy Paste

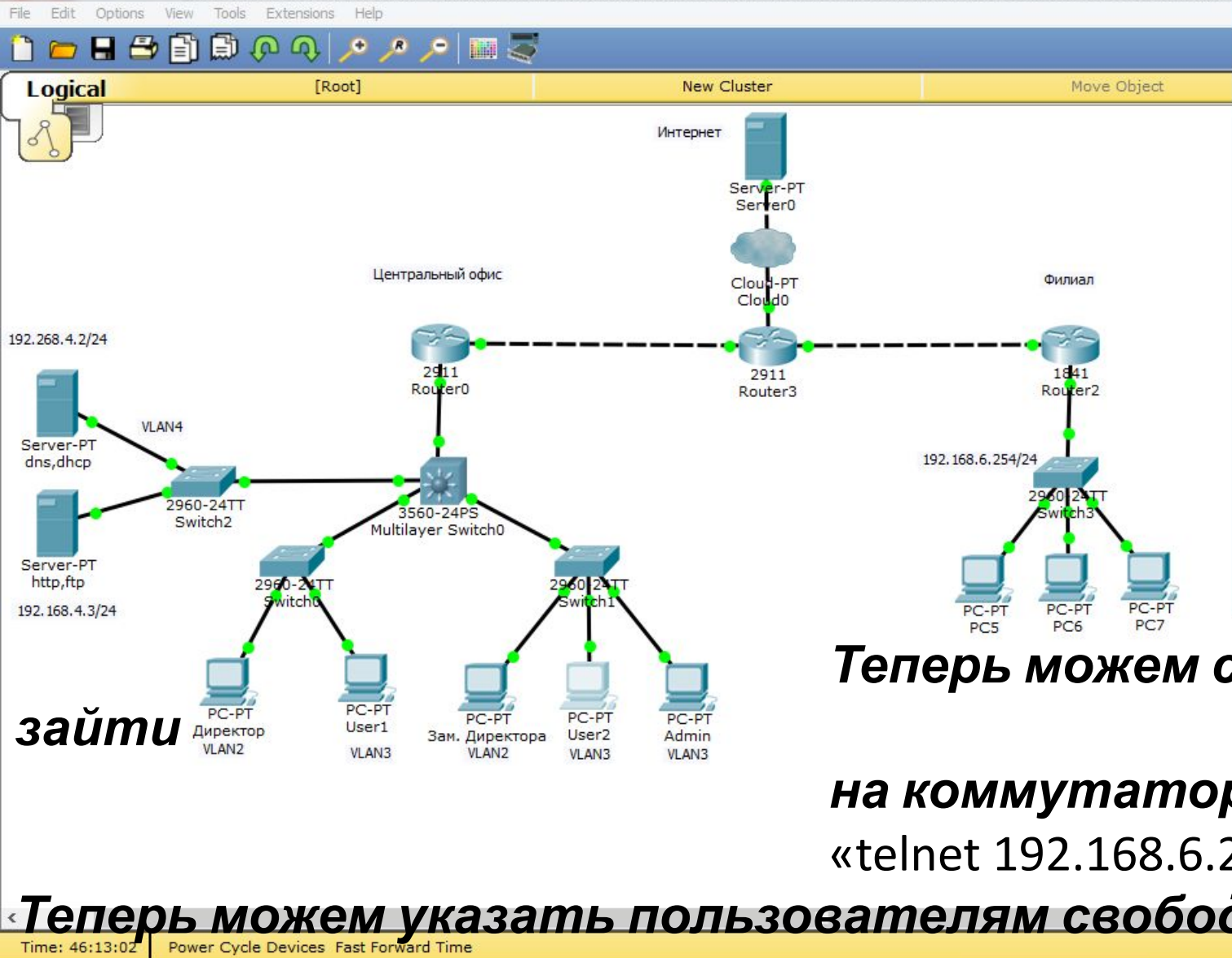
**Пропишем маршрут по умолчанию:**  
**«conf t»,**  
**«ip default-gateway 192.168.6.1»,**  
**«end», сохраним настройки «wr mem».**

Time: 46:07:37 Power Cycle Devices Fast Forward Time Realtime

Scenario 0

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

New Delete Toggle PDU List Window



User2

Physical Config Desktop Custom Interface

**Command Prompt**

```

PC>
PC>
PC>
PC>
PC>
PC>
PC>
PC>
PC>
PC>
PC>
PC>telnet 192.168.6.254
Trying 192.168.6.254 ...Open

User Access Verification

Username: admin
Password:
Switch>en
Password:
Switch#
Switch#
Switch#
  
```

**зайти**

**Теперь можем с удалённого компьютера на коммутатор филиала по telnet: «telnet 192.168.6.254».**

**Теперь можем указать пользователям свободный порт для подключения.**

Time: 46:13:02 Power Cycle Devices Fast Forward Time

Realtime

Scenario 0

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

New Delete

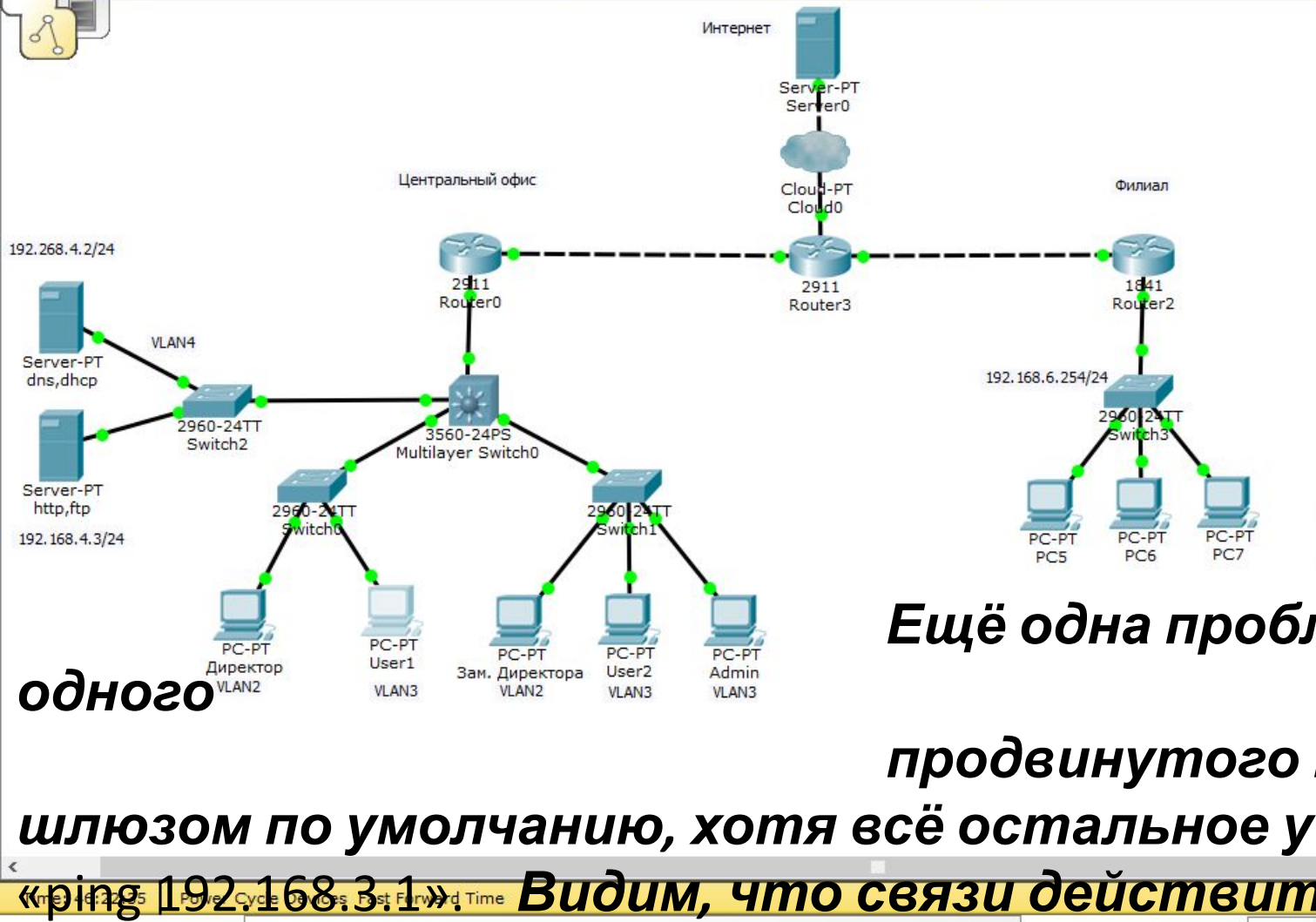
Toggle PDU List Window

2621XM

Windows taskbar: Internet Explorer, File Explorer, Mail, Firefox, Word, Excel, etc.

System tray: ENG, 20:25, 16.02.2020





User1

Physical Config Desktop Custom Interface

**Command Prompt**

```

Ping statistics for 192.168.6.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 11ms, Maximum = 12ms, Average = 11ms

PC>
PC>
PC>
PC>
PC>
PC>ping 192.168.3.1

Pinging 192.168.3.1 with 32 bytes of data:

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

Ping statistics for 192.168.3.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

PC>
  
```

**одного**

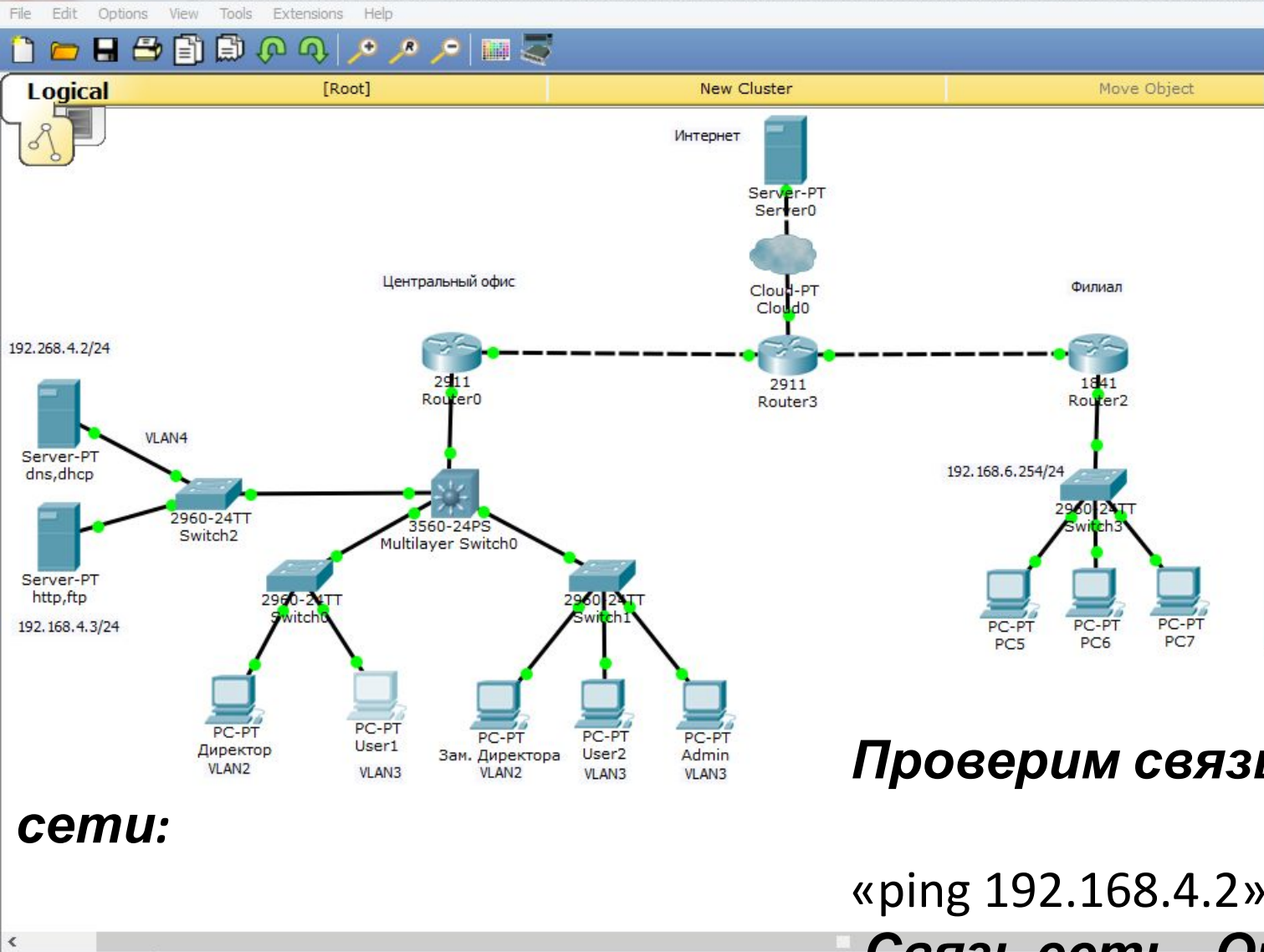
**Ещё одна проблема! Предположим, что у продвинутого пользователя нет связи со шлюзом по умолчанию, хотя всё остальное у него работает:**

**«ping 192.168.3.1». Видим, что связи действительно нет.**

Scenario 0

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

Toggle PDU List Window



Physical Config Desktop Custom Interface

**Command Prompt**

```

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

Ping statistics for 192.168.3.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

PC>
PC>
PC>ping 192.168.4.2

Pinging 192.168.4.2 with 32 bytes of data:

Request timed out.
Reply from 192.168.4.2: bytes=32 time=0ms TTL=127
Reply from 192.168.4.2: bytes=32 time=0ms TTL=127
Reply from 192.168.4.2: bytes=32 time=0ms TTL=127

Ping statistics for 192.168.4.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

PC>
  
```

**Проверим связь с другими сегментами**

**сети:**

«ping 192.168.4.2».

**Связь есть. Очень странно!**

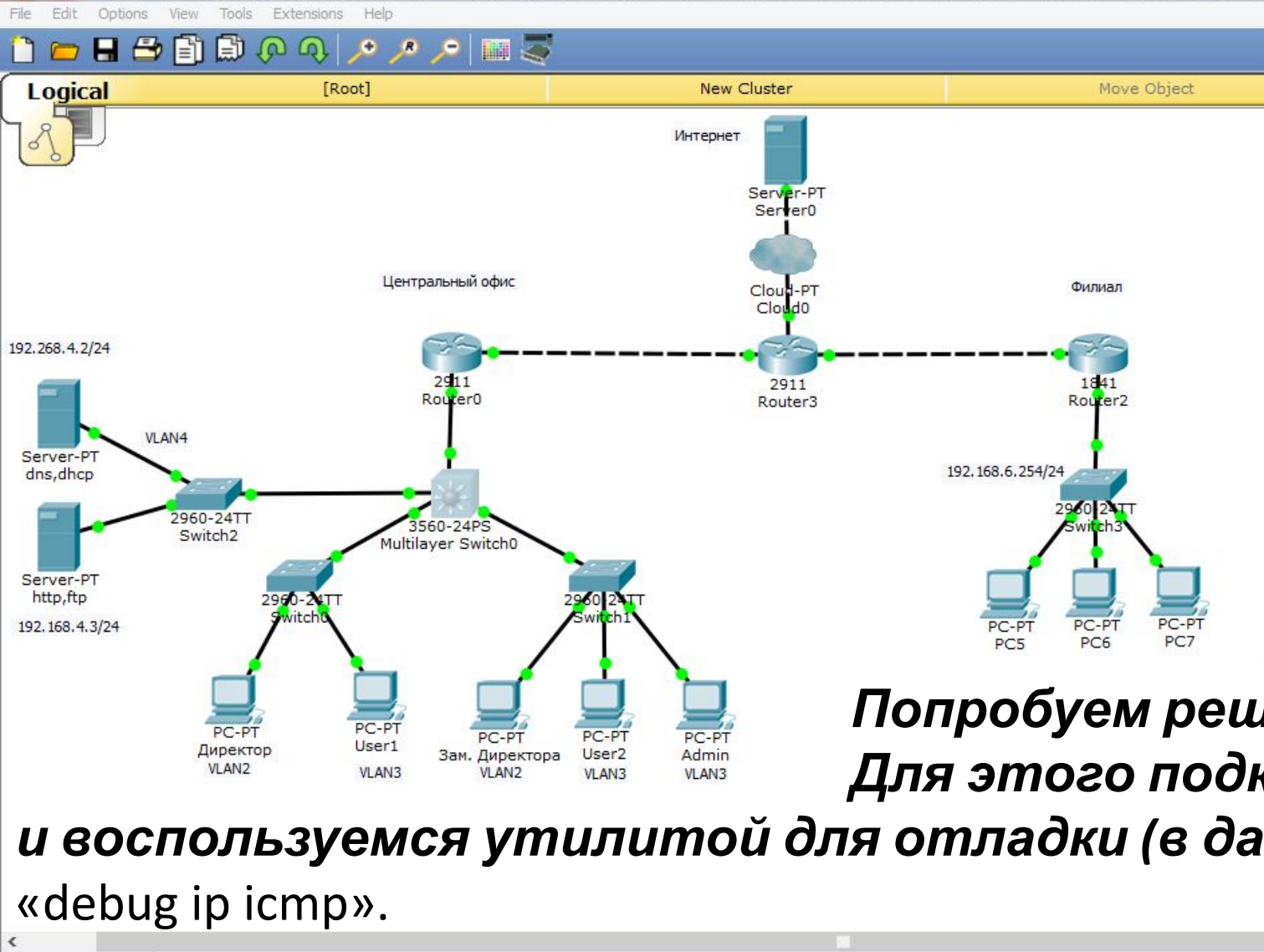
Time: 46:31:52 Power Cycle Devices Fast Forward Time

Scenario 0

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

Router-PT-Empty

Windows taskbar: 20:45 16.02.2020



Multilayer Switch0

Physical Config CLI

IOS Command Line Interface

```

Switch#debug ?
aaa          AAA Authentication, Authorization and Accounting
crypto       Cryptographic subsystem
custom-queue Custom output queuing
eigrp        EIGRP Protocol information
ephone       ethernet phone skinny protocol
frame-relay  Frame Relay
ip           IP information
ipv6         IPv6 information
ntp          NTP information
ppp          PPP (Point to Point Protocol) information

Switch#debug ip ?
eigrp        IP-EIGRP information
icmp         ICMP transactions
inspect      Stateful inspection events
nat          NAT events
ospf         OSPF information
packet       Packet information
rip          RIP protocol transactions
routing      Routing table events

Switch#debug ip icmp
ICMP packet debugging is on
Switch#
Switch#
Switch#
  
```

Copy Paste

**Попробуем решить эту проблему.  
Для этого подключаемся к L3-коммутатору  
и воспользуемся утилитой для отладки (в данном случае icmp-пакетов):**

**«debug ip icmp».**

Time: 46:29:23 Power Cycle Devices Fast Forward Time

Realtime

Scenario 0

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

Router-PT

1841 1941 2620XM 2621XM 2811 2901 2911 819 Generic Generic

Windows taskbar: File Explorer, PowerPoint, Firefox, Word, Excel, etc.

System tray: ENG, 20:42, 16.02.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions

Physical Config Desktop Custom Interface

Logical [Root]

192.268.4.2/24

Server-PT dns,dhcp

VLAN4

2960-24TT Switch2

Server-PT http,ftp

192.168.4.3/24

2960-24TT Switch0

PC-PT Директор VLAN2

PC-PT User1 VLAN3

PC-PT Зам. Директора VLAN2

PC-PT User2 VLAN3

PC-PT Admin VLAN3

Command Prompt

```

Reply from 192.168.4.2: bytes=32 time=0ms TTL=127
Reply from 192.168.4.2: bytes=32 time=0ms TTL=127

Ping statistics for 192.168.4.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

PC>
PC>
PC>
PC>ping 192.168.3.1

Pinging 192.168.3.1 with 32 bytes of data:

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

Ping statistics for 192.168.3.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

PC>
  
```

Multilayer Switch0

Physical Config CLI

IOS Command Line Interface

```

ntp          NTP information
ppp          PPP (Point to Point Protocol) information
Switch#debug ip ?
eigrp       IP-EIGRP information
icmp        ICMP transactions
inspect     Stateful inspection events
nat         NAT events
ospf        OSPF information
packet      Packet information
rip         RIP protocol transactions
routing     Routing table events
Switch#debug ip icmp
ICMP packet debugging is on
Switch#
Switch#
Switch#
ICMP: echo reply sent, src 192.168.3.1, dst 192.168.3.2

ICMP: echo reply sent, src 192.168.3.1, dst 192.168.3.2

ICMP: echo reply sent, src 192.168.3.1, dst 192.168.3.2

ICMP: echo reply sent, src 192.168.3.1, dst 192.168.3.2
  
```

Copy Paste

**Ещё раз проверяем связь со шлюзом:  
«ping 192.168.3.1».**

**Видим, что ICMP-пакеты на коммутатор приходят, но обратно не возвращаются.**

**Возможно, мешает Firewall.**

Time: 46:41:15 Power Cycle Devices Fast Forward Time

Realtime

Scenario 0

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

New Delete

Toggle PDU List Window

Routers

1841 1941 2620XM 2621XM 2811 2901 2911 819 Generic Generic

Router-PT-Empty

Windows Taskbar: Internet Explorer, File Explorer, Mail, Firefox, Word, Excel, etc.

System Tray: 20:54 16.02.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions

User1

Physical Config Desktop Custom Interface

Logical [Root]

192.268.4.2/24

Server-PT dns,dhcp

VLAN4

2960-24TT Switch2

Server-PT http,ftp

192.168.4.3/24

2960-24TT Switch0

PC-PT Директор VLAN2

PC-PT User1 VLAN3

PC-PT Зам. Директора VLAN2

PC-PT User2 VLAN3

PC-PT Admin VLAN3

Firewall

Service  On  Off

Inbound Rules

Action Deny Protocol ICMP

Remote IP 192.168.3.1 Remote Wildcard Mask 0.0.0.0

Remote Port Local Port

Add Save Remove

Action	Protocol	Remote IP	Remote Wild Card	Remote Port
1 Deny	ICMP	192.168.3.1	0.0.0.0	-
2 Allow	IP	0.0.0.0	255.255.255.255	-

Multilayer Switch0

Physical Config CLI

IOS Command Line Interface

```

ntp          NTP information
ppp          PPP (Point to Point Protocol) information
Switch#debug ip ?
eigrp       IP-EIGRP information
icmp        ICMP transactions
inspect     Stateful inspection events
nat         NAT events
ospf        OSPF information
packet      Packet information
rip         RIP protocol transactions
routing     Routing table events
Switch#debug ip icmp
ICMP packet debugging is on
Switch#
Switch#
Switch#
Switch#
ICMP: echo reply sent, src 192.168.3.1, dst 192.168.3.2
ICMP: echo reply sent, src 192.168.3.1, dst 192.168.3.2
ICMP: echo reply sent, src 192.168.3.1, dst 192.168.3.2
ICMP: echo reply sent, src 192.168.3.1, dst 192.168.3.2
ICMP: echo reply sent, src 192.168.3.1, dst 192.168.3.2
  
```

Copy Paste

**Заходим в Firewall, выделяем первую строку**

**отключаем её, нажимаем <off>.**

Time: 46:46:02 Power Cycle Devices Fast Forward Time

Realtime

Scenario 0

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

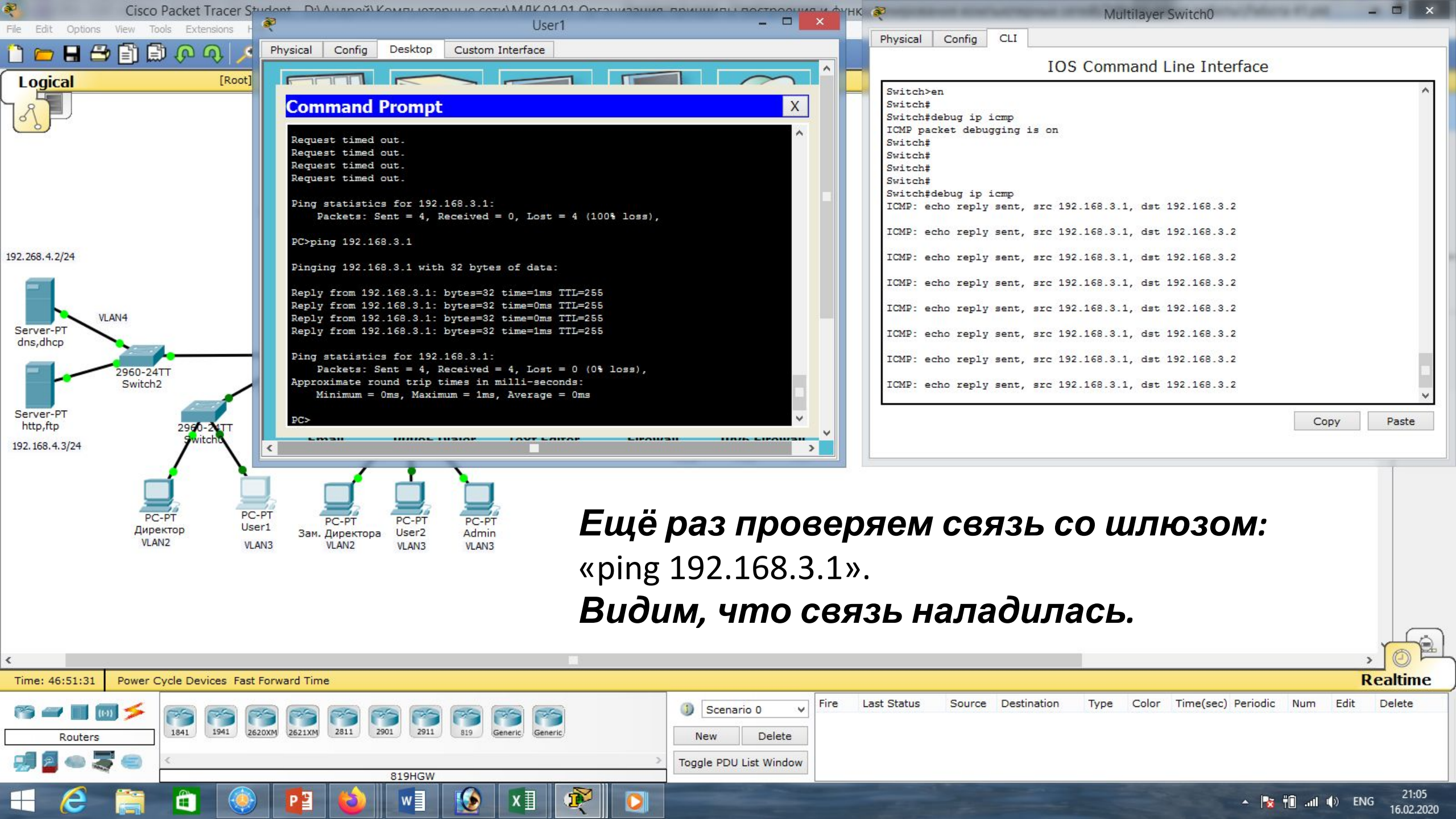
New Delete

Toggle PDU List Window

2911

Windows Taskbar: Internet Explorer, File Explorer, Microsoft Store, Google Chrome, Microsoft Word, Microsoft Excel, Cisco Packet Tracer

System Tray: ENG 20:59 16.02.2020



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

Ping statistics for 192.168.3.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

PC>ping 192.168.3.1

Pinging 192.168.3.1 with 32 bytes of data:

Reply from 192.168.3.1: bytes=32 time=1ms TTL=255
Reply from 192.168.3.1: bytes=32 time=0ms TTL=255
Reply from 192.168.3.1: bytes=32 time=0ms TTL=255
Reply from 192.168.3.1: bytes=32 time=1ms TTL=255

Ping statistics for 192.168.3.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

PC>
```

```
Switch>en
Switch#
Switch#debug ip icmp
ICMP packet debugging is on
Switch#
Switch#
Switch#
Switch#debug ip icmp
ICMP: echo reply sent, src 192.168.3.1, dst 192.168.3.2

ICMP: echo reply sent, src 192.168.3.1, dst 192.168.3.2

ICMP: echo reply sent, src 192.168.3.1, dst 192.168.3.2

ICMP: echo reply sent, src 192.168.3.1, dst 192.168.3.2

ICMP: echo reply sent, src 192.168.3.1, dst 192.168.3.2

ICMP: echo reply sent, src 192.168.3.1, dst 192.168.3.2

ICMP: echo reply sent, src 192.168.3.1, dst 192.168.3.2

ICMP: echo reply sent, src 192.168.3.1, dst 192.168.3.2

ICMP: echo reply sent, src 192.168.3.1, dst 192.168.3.2

ICMP: echo reply sent, src 192.168.3.1, dst 192.168.3.2

ICMP: echo reply sent, src 192.168.3.1, dst 192.168.3.2
```

**Ещё раз проверяем связь со шлюзом:  
«ping 192.168.3.1».  
Видим, что связь наладилась.**

Time: 46:51:31 Power Cycle Devices Fast Forward Time Realtime

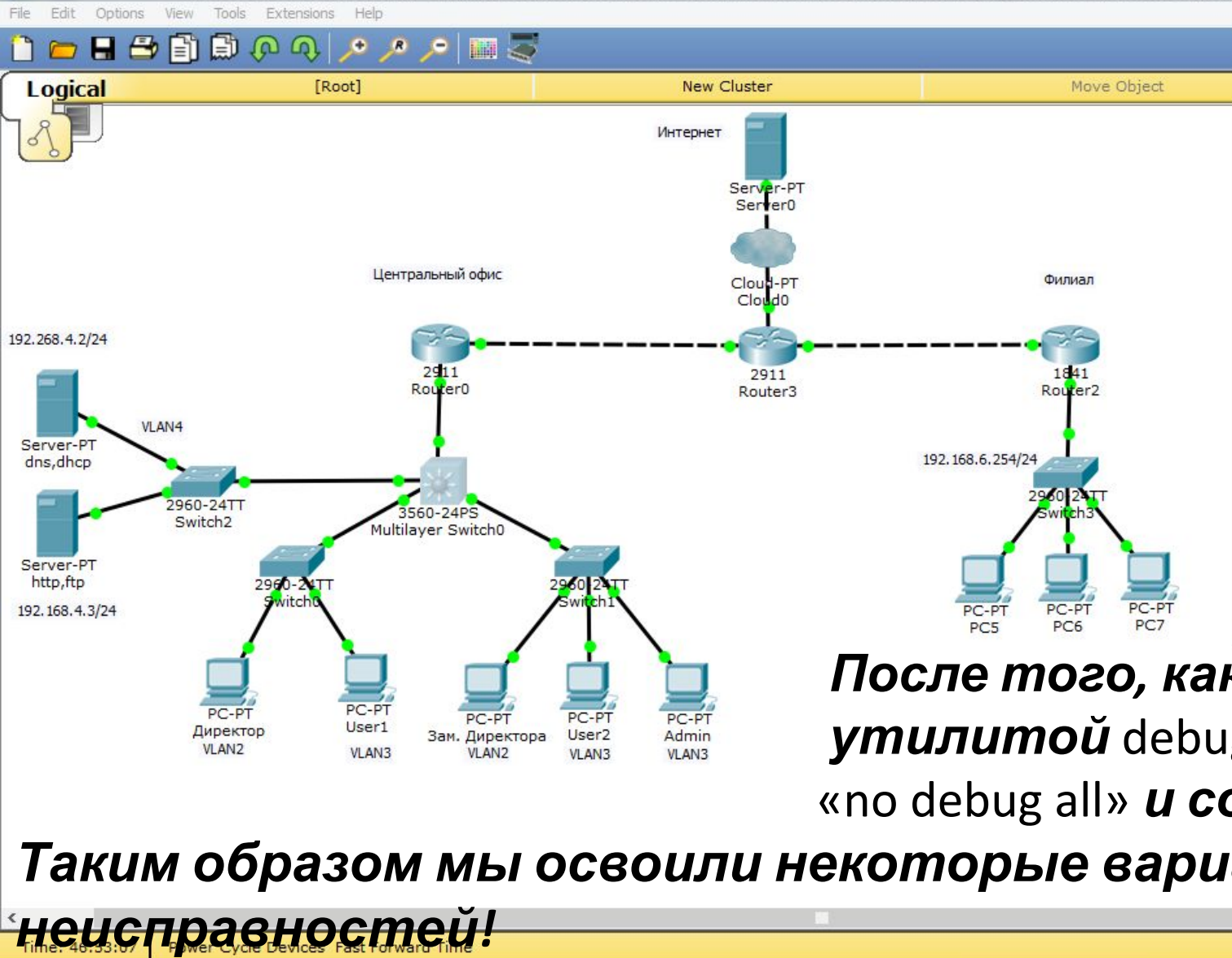
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
[Empty table body]										

Scenario 0 New Delete Toggle PDU List Window

819HGW

Windows taskbar: Internet Explorer, File Explorer, Microsoft Store, Google Chrome, Microsoft Word, Microsoft Excel, Task Scheduler, Windows Media Center.

System tray: ENG, 21:05, 16.02.2020



```

IOS Command Line Interface

ICMP: echo reply sent, src 192.168.3.1, dst 192.168.3.2
ICMP: echo reply sent, src 192.168.3.1, dst 192.168.3.2
ICMP: echo reply sent, src 192.168.3.1, dst 192.168.3.2

ICMP packet debugging is on
Switch#
Switch#
Switch#
Switch#no deb
Switch#no debug all
All possible debugging has been turned off
Switch#
Switch#
Switch#wr mem
Building configuration...
[OK]
Switch#
Switch#
Switch#
Switch#
  
```

**После того, как мы закончили работу с утилитой debug, её надо отключить: «no debug all» и сохраним настройки «wr mem».**

**Таким образом мы освоили некоторые варианты устранения неисправностей!**

Realtime

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
<div style="display: flex; justify-content: space-between;"> <span>Scenario 0</span> <span>New Delete</span> </div> <div style="display: flex; justify-content: space-between;"> <span>Toggle PDU List Window</span> </div>										

819HGW

Маска подсети	Маска в двоичной системе	Префикс	Количество адресов	Обратная маска
255.255.255.255	11111111.11111111.11111111.11111111	/32	1	0.0.0.0
255.255.255.254	11111111.11111111.11111111.11111110	/31	2	0.0.0.1
255.255.255.252	11111111.11111111.11111111.11111100	/30	4	0.0.0.3
255.255.255.248	11111111.11111111.11111111.11111000	/29	8	0.0.0.7
255.255.255.240	11111111.11111111.11111111.11110000	/28	16	0.0.0.15
255.255.255.224	11111111.11111111.11111111.11100000	/27	32	0.0.0.31
255.255.255.192	11111111.11111111.11111111.11000000	/26	64	0.0.0.63
255.255.255.128	11111111.11111111.11111111.10000000	/25	128	0.0.0.127
255.255.255.0	11111111.11111111.11111111.00000000	/24	256	0.0.0.255
255.255.254.0	11111111.11111111.11111110.00000000	/23	512	0.0.1.255
255.255.252.0	11111111.11111111.11111100.00000000	/22	1024	0.0.3.255
255.255.248.0	11111111.11111111.11111000.00000000	/21	2048	0.0.7.255
255.255.240.0	11111111.11111111.11110000.00000000	/20	4096	0.0.15.255
255.255.224.0	11111111.11111111.11100000.00000000	/19	8192	0.0.31.255
255.255.192.0	11111111.11111111.11000000.00000000	/18	16384	0.0.63.255
255.255.128.0	11111111.11111111.10000000.00000000	/17	32768	0.0.127.255
255.255.0.0	11111111.11111111.00000000.00000000	/16	65536	0.0.255.255
255.254.0.0	11111111.11111110.00000000.00000000	/15	131072	0.1.255.255
255.252.0.0	11111111.11111100.00000000.00000000	/14	262144	0.3.255.255
255.248.0.0	11111111.11111000.00000000.00000000	/13	524288	0.7.255.255
255.240.0.0	11111111.11110000.00000000.00000000	/12	1048576	0.15.255.255



# Список литературы:

1. Компьютерные сети. Н.В. Максимов, И.И. Попов, 4-е издание, переработанное и дополненное, «Форум», Москва, 2010.
2. Компьютерные сети. Принципы, технологии, протоколы, В. Олифер, Н. Олифер (5-е издание), «Питер», Москва, Санкт-Петербург, 2016.
3. Компьютерные сети. Э. Таненбаум, 4-е издание, «Питер», Москва, Санкт-Петербург, 2003.

# Список ссылок:

<http://blog.netskills.ru/2014/03/firewall-vs-router.html>

<https://drive.google.com/file/d/0B-5kZI7ixcSKS0ZIUHZ5WnhWeVk/view>

# Спасибо за внимание!

Преподаватель: Солодухин Андрей Геннадьевич

Электронная почта: [asoloduhin@kait20.ru](mailto:asoloduhin@kait20.ru)