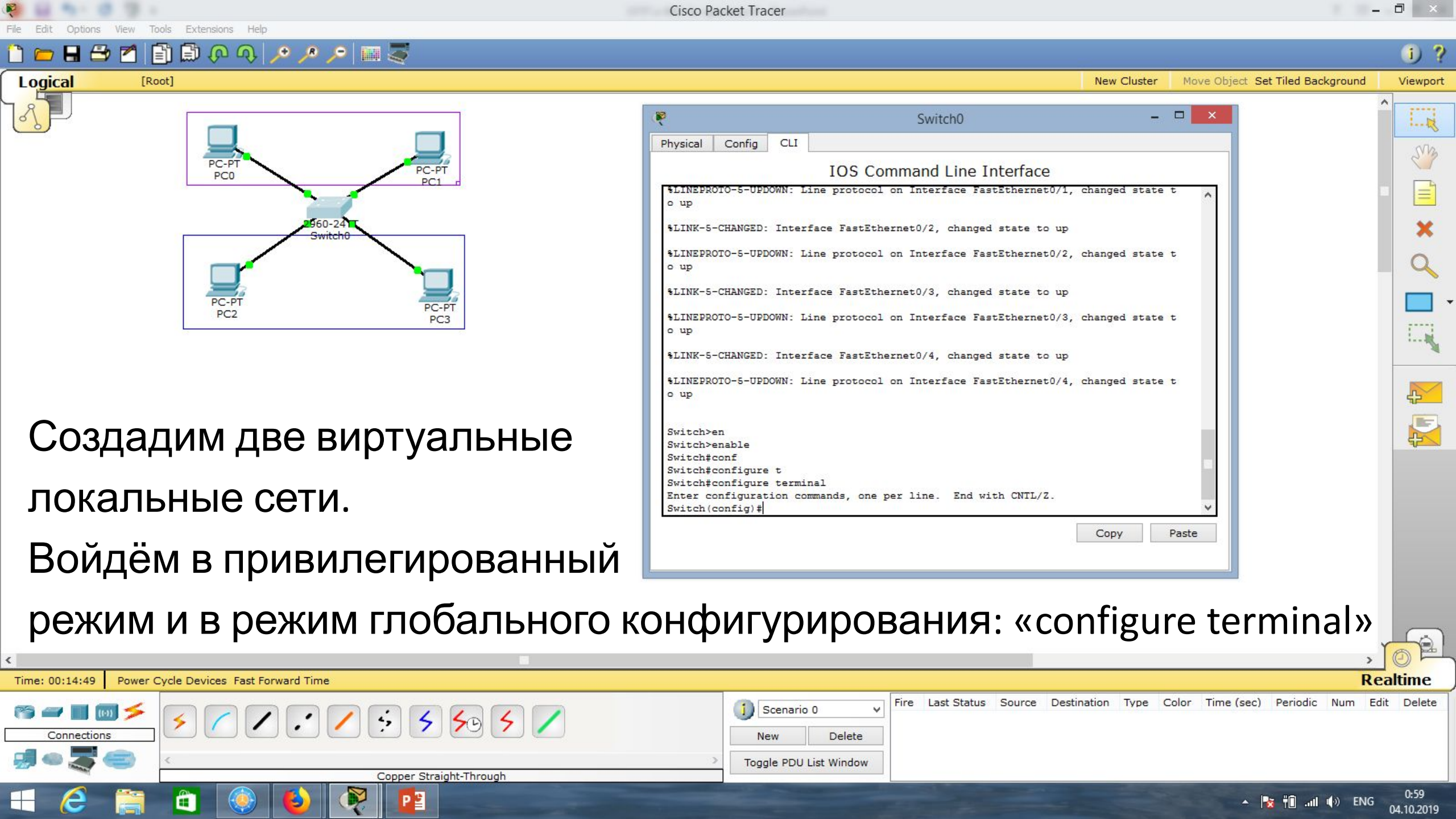
МДК.01.01

Организация, принципы построения и функционирования компьютерных сетей

3-курс

Практические занятия

Занятие 02

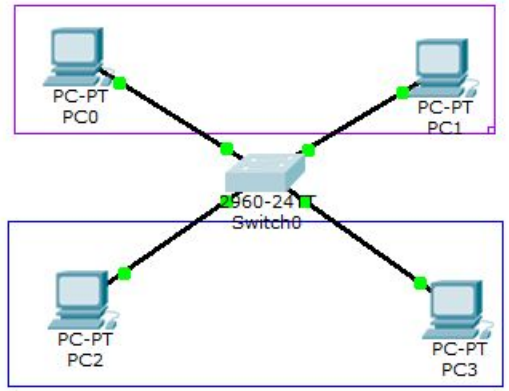

Cisco Packet Tracer
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC-PT PC0
PC-PT PC1
2960-24TT Switch0
PC-PT PC2
PC-PT PC3
Switch0
Physical
Config
CLI
IOS Command Line Interface
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/3, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/4, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/4, changed state to up
Switch>en
Switch>enable
Switch#conf
Switch#configure t
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#
Copy
Paste
Создадим две виртуальные локальные сети.
Войдём в привилегированный режим и в режим глобального конфигурирования: «configure terminal»
Time: 00:14:49
Power Cycle Devices Fast Forward Time
Realtime
Connections
Copper Straight-Through
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time (sec)
Periodic
Num
Edit
Delete
ENG
0:59
04.10.2019

Cisco Packet Tracer

File Edit Options View Tools Extensions Help

Logical [Root]

New Cluster Move Object Set Tiled Background Viewport



Switch0

Physical Config CLI

IOS Command Line Interface

```
%LINK-5-CHANGED: Interface FastEthernet0/3, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state t
o up

%LINK-5-CHANGED: Interface FastEthernet0/4, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/4, changed state t
o up


Switch>en
Switch>enable
Switch#conf
Switch#configure t
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan2
                 ^
% Invalid input detected at '^' marker.

Switch(config)#vlan 2
Switch(config-vlan)#nam
Switch(config-vlan)#name buh
Switch(config-vlan)#exit
Switch(config)#
```

Copy Paste

Создадим: «vlan 2», далее «name», дадим имя «buh». Далее «exit».

Time: 00:18:54 Power Cycle Devices Fast Forward Time

Realtime

Connections

Copper Straight-Through

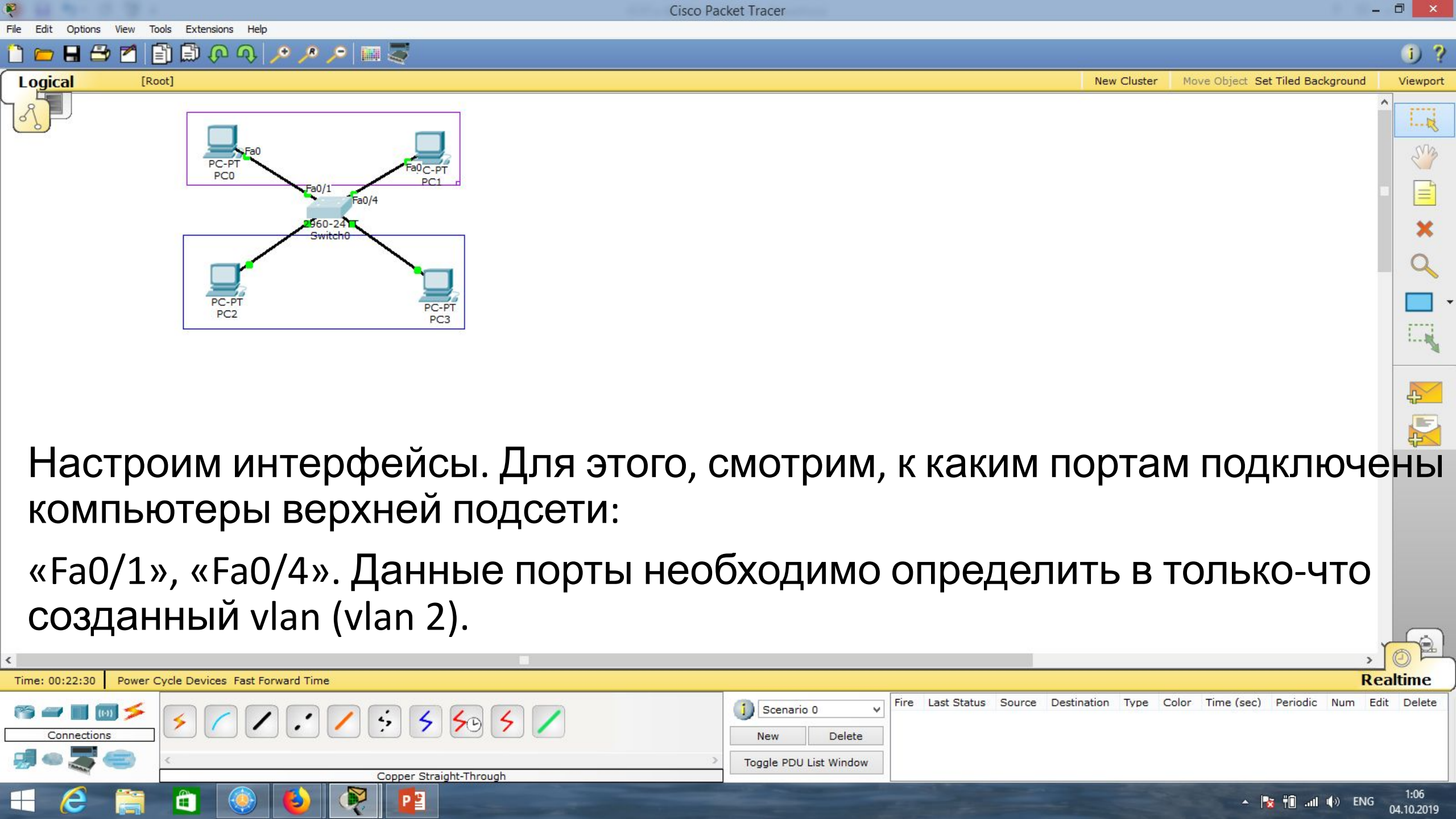
Scenario 0

New Delete

Toggle PDU List Window

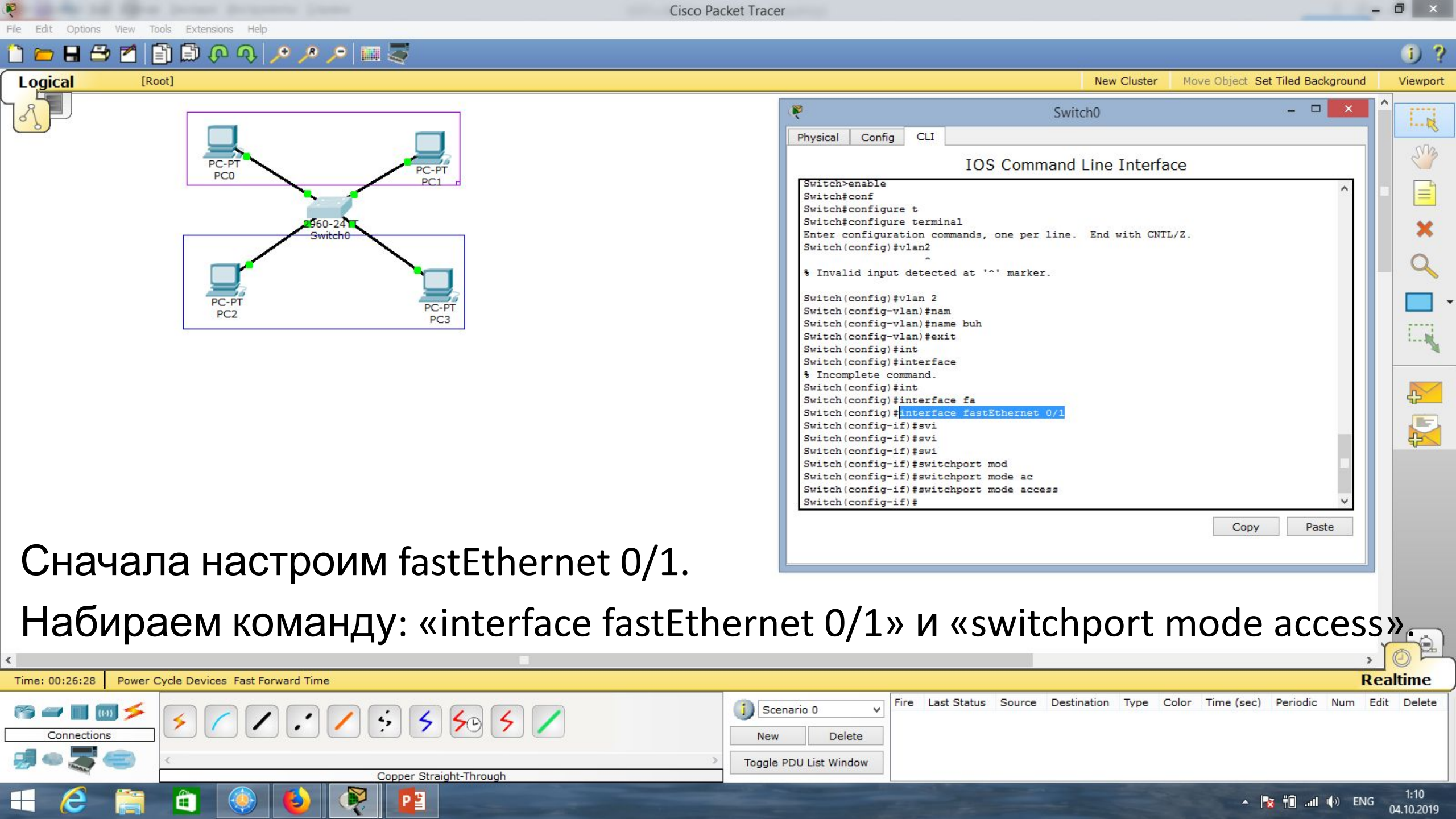
Fire	Last Status	Source	Destination	Type	Color	Time (sec)	Periodic	Num	Edit	Delete

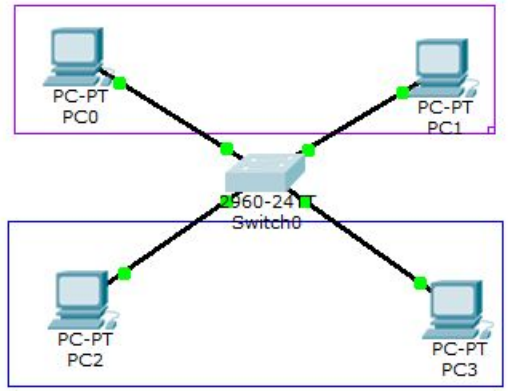
ENG 1:03 04.10.2019



Настроим интерфейсы. Для этого, смотрим, к каким портам подключены компьютеры верхней подсети:

«Fa0/1», «Fa0/4». Данные порты необходимо определить в только-что созданный vlan (vlan 2).


Cisco Packet Tracer
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC-PT PC0
PC-PT PC1
2960-24TT Switch0
PC-PT PC2
PC-PT PC3
Switch0
Physical
Config
CLI
IOS Command Line Interface
Switch>enable
Switch#conf
Switch#configure t
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan2
% Invalid input detected at '^' marker.
Switch(config)#vlan 2
Switch(config-vlan)#nam
Switch(config-vlan)#name buh
Switch(config-vlan)#exit
Switch(config)#int
Switch(config)#interface
% Incomplete command.
Switch(config)#int
Switch(config)#interface fa
Switch(config)#interface fastEthernet 0/1
Switch(config-if)#svi
Switch(config-if)#svi
Switch(config-if)#swi
Switch(config-if)#switchport mod
Switch(config-if)#switchport mode ac
Switch(config-if)#switchport mode access
Switch(config-if)#
Copy
Paste
Сначала настроим fastEthernet 0/1.
Набираем команду: «interface fastEthernet 0/1» и «switchport mode access».
Time: 00:26:28
Power Cycle Devices Fast Forward Time
Realtime
Connections
Copper Straight-Through
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time (sec) Periodic Num Edit Delete
ENG
1:10
04.10.2019



Switch0

Physical | Config | CLI

IOS Command Line Interface

```
Switch(config)#vlan2
                  ^
% Invalid input detected at '^' marker.

Switch(config)#vlan 2
Switch(config-vlan)#nam
Switch(config-vlan)#name buh
Switch(config-vlan)#exit
Switch(config)#int
Switch(config)#interface
% Incomplete command.
Switch(config)#int
Switch(config)#interface fa
Switch(config)#interface fastEthernet 0/1
Switch(config-if)#svi
Switch(config-if)#svi
Switch(config-if)#swi
Switch(config-if)#switchport mod
Switch(config-if)#switchport mode ac
Switch(config-if)#switchport mode access
Switch(config-if)#swi
Switch(config-if)#switchport ac
Switch(config-if)#switchport access vl
Switch(config-if)#switchport access vlan 2
Switch(config-if)#exit
Switch(config)#
```

Copy | Paste

Набираем команду:

«switchport access vlan 2». Далее «exit».

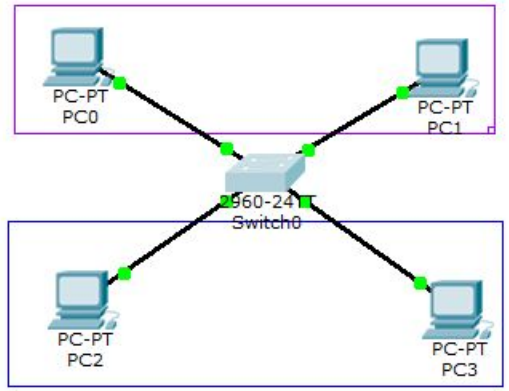
Далее проделываем тоже самое для fastEthernet 0/4. Набираем команду:

«interface fastEthernet 0/4», «switchport mode access» «switchport access vlan 2».

Cisco Packet Tracer

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport



Switch0

Physical Config CLI

IOS Command Line Interface

```
Switch(config-if)#swi
Switch(config-if)#switchport mod
Switch(config-if)#switchport mode ac
Switch(config-if)#switchport mode access vl
Switch(config-if)#switchport mode access vlan 2
                                    ^
% Invalid input detected at '^' marker.

Switch(config-if)#swi
Switch(config-if)#switchport mod
Switch(config-if)#switchport mode ac
Switch(config-if)#switchport mode access
Switch(config-if)#swi
Switch(config-if)#switchport ac
Switch(config-if)#switchport access vl
Switch(config-if)#switchport access vlan 2
Switch(config-if)#exit
Switch(config)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#
Switch#
Switch#sho
Switch#show vla
Switch#show vlan
```

Copy Paste

Далее «exit».

Выходим из режима глобального конфигурирования: «end». Далее «exit».

Просмотрим все виртуальные локальные сети, набираем: «show vlan».

Time: 00:38:14 Power Cycle Devices Fast Forward Time Realtime

Connections

Copper Straight-Through

Scenario 0 New Delete Toggle PDU List Window

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

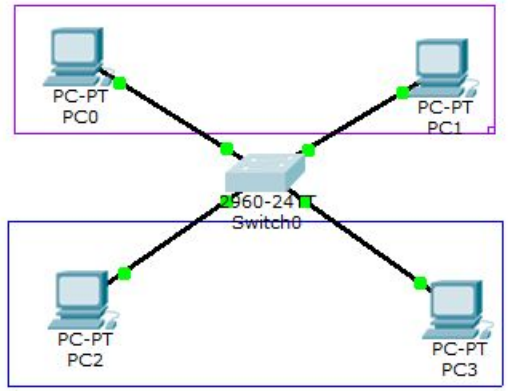
ENG 1:22 04.10.2019

Cisco Packet Tracer

File Edit Options View Tools Extensions Help

Logical [Root]

New Cluster Move Object Set Tiled Background Viewport



Switch0

Physical Config CLI

IOS Command Line Interface

```
VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/2, Fa0/3, Fa0/5, Fa0/6
                                                 Fa0/7, Fa0/8, Fa0/9, Fa0/10
                                                 Fa0/11, Fa0/12, Fa0/13, Fa0/14
                                                 Fa0/15, Fa0/16, Fa0/17, Fa0/18
                                                 Fa0/19, Fa0/20, Fa0/21, Fa0/22
                                                 Fa0/23, Fa0/24, Gig1/1, Gig1/2
2    buh                               active    Fa0/1, Fa0/4
1002 fddi-default                      act/unsup
1003 token-ring-default                act/unsup
1004 fddinet-default                   act/unsup
1005 trnet-default                     act/unsup

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
1    enet  100001     1500  -      -      -        -    -        0      0
2    enet  100002     1500  -      -      -        -    -        0      0
1002 fddi  101002     1500  -      -      -        -    -        0      0
1003 tr    101003     1500  -      -      -        -    -        0      0
1004 fdnet 101004     1500  -      -      -        ieee -        0      0
1005 trnet 101005     1500  -      -      -        ibm  -        0      0

Remote SPAN VLANs
------------------------------------------------------------------------------
```

Copy Paste

Появилась строка VLAN:

«2 buh active Fa0/1, Fa0/4».

Time: 00:41:13 Power Cycle Devices Fast Forward Time

Realtime

Connections

Copper Straight-Through

Scenario 0

New Delete

Toggle PDU List Window

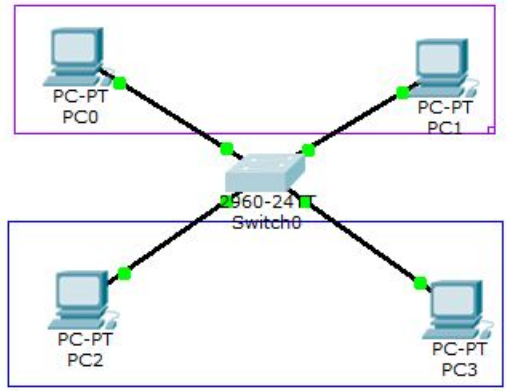
Fire | Last Status | Source | Destination | Type | Color | Time (sec) | Periodic | Num | Edit | Delete

ENG 1:25 04.10.2019

Cisco Packet Tracer

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport



Switch0

Physical Config CLI

IOS Command Line Interface

```
Remote SPAN VLANs
------------------------------------------------------------------------------


Primary Secondary Type              Ports
------- --------- ----------------- ------------------------------------------
Switch#sho
Switch#show vl
Switch#show vlan br
Switch#show vlan brief

VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/2, Fa0/3, Fa0/5, Fa0/6
                                                 Fa0/7, Fa0/8, Fa0/9, Fa0/10
                                                 Fa0/11, Fa0/12, Fa0/13, Fa0/14
                                                 Fa0/15, Fa0/16, Fa0/17, Fa0/18
                                                 Fa0/19, Fa0/20, Fa0/21, Fa0/22
                                                 Fa0/23, Fa0/24, Gig1/1, Gig1/2
2    buh                               active    Fa0/1, Fa0/4
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                   active
1005 trnet-default                     active
Switch#
```

Copy Paste

Можно использовать другую команду для просмотра VLAN: «show vlan brief».

Видим тот же результат, строку:

«2 buh active Fa0/1, Fa0/4».

Time: 00:49:16 Power Cycle Devices Fast Forward Time Realtime

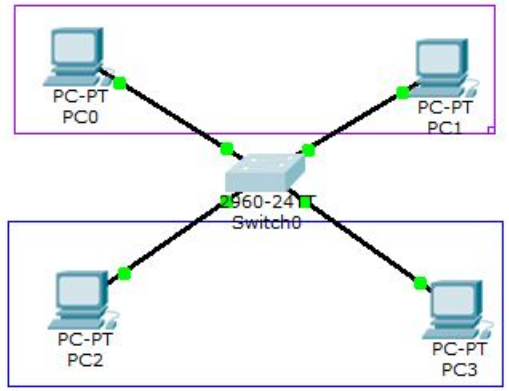
Connections

Copper Straight-Through

Scenario 0 New Delete Toggle PDU List Window

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

ENG 1:33 04.10.2019



Switch0

Physical | Config | CLI

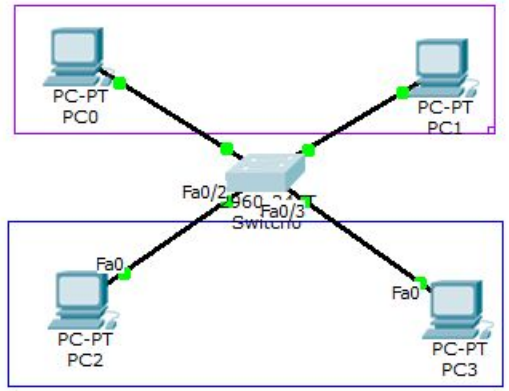
IOS Command Line Interface

```
VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/2, Fa0/3, Fa0/5, Fa0/6
                                                 Fa0/7, Fa0/8, Fa0/9, Fa0/10
                                                 Fa0/11, Fa0/12, Fa0/13, Fa0/14
                                                 Fa0/15, Fa0/16, Fa0/17, Fa0/18
                                                 Fa0/19, Fa0/20, Fa0/21, Fa0/22
                                                 Fa0/23, Fa0/24, Gig1/1, Gig1/2
2    buh                               active    Fa0/1, Fa0/4
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                   active
1005 trnet-default                     active
Switch#
Switch#
Switch#
Switch#conf
Switch#configure t
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan 3
Switch(config-vlan)#nam
Switch(config-vlan)#name user
Switch(config-vlan)#exit
Switch(config)#
```

Copy | Paste

Создадим vlan 3 в режим глобального конфигурирования: «configure terminal».

Набираем: «vlan 3», далее «name», дадим имя «user». Далее «exit».



Повторяем те же действия для создания подсети vlan 3.

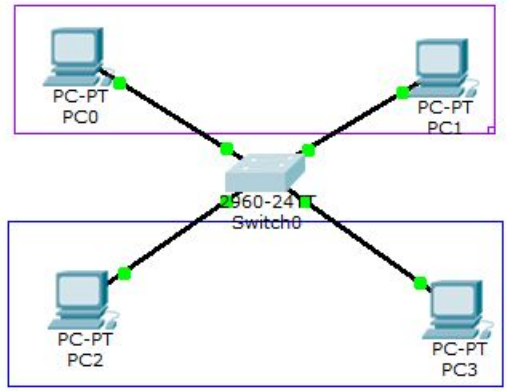
Смотрим, к каким портам подключены компьютеры нижней подсети: «Fa0/2», «Fa0/3».

Эти порты необходимо определить в новый vlan (vlan 3).

Cisco Packet Tracer

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport



Switch0

Physical Config CLI

IOS Command Line Interface

```
1003 token-ring-default                active
1004 fddinet-default                   active
1005 trnet-default                     active
Switch#
Switch#
Switch#
Switch#conf
Switch#configure t
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan 3
Switch(config-vlan)#nam
Switch(config-vlan)#name user
Switch(config-vlan)#exit
Switch(config)#int
Switch(config)#interface fa
Switch(config)#interface fastEthernet 0/3
Switch(config-if)#swi
Switch(config-if)#switchport mod
Switch(config-if)#switchport mode ac
Switch(config-if)#switchport mode access
Switch(config-if)#swi
Switch(config-if)#switchport ac
Switch(config-if)#switchport access vlan 3
Switch(config-if)#exit
Switch(config)#
```

Copy Paste

Настроим fastEthernet 0/3.

Набираем команду:

«interface fastEthernet 0/3»,

«switchport mode access», «switchport access vlan 3». Далее «exit».

Time: 00:55:57 Power Cycle Devices Fast Forward Time Realtime

Connections

Copper Straight-Through

Scenario 0 New Delete Toggle PDU List Window

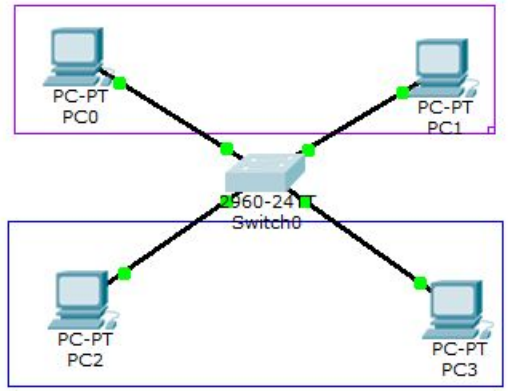
Fire | Last Status | Source | Destination | Type | Color | Time (sec) | Periodic | Num | Edit | Delete

ENG 1:40 04.10.2019

Cisco Packet Tracer

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport



Switch0

Physical Config CLI

IOS Command Line Interface

```
Switch(config)#int
Switch(config)#interface fa
Switch(config)#interface fastEthernet 0/3
Switch(config-if)#swi
Switch(config-if)#switchport mod
Switch(config-if)#switchport mode ac
Switch(config-if)#switchport mode access
Switch(config-if)#swi
Switch(config-if)#switchport ac
Switch(config-if)#switchport access vlan 3
Switch(config-if)#exit
Switch(config)#int
Switch(config)#interface fa
Switch(config)#interface fastEthernet 0/2
Switch(config-if)#swi
Switch(config-if)#switchport mod
Switch(config-if)#switchport mode ac
Switch(config-if)#switchport mode access
Switch(config-if)#swi
Switch(config-if)#switchport ac
Switch(config-if)#switchport access vlan 3
Switch(config-if)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#
```

Copy Paste

Точно также настроим fastEthernet 0/2.

Набираем команду:

«interface fastEthernet 0/2»,

«switchport mode access», «switchport access vlan 3». Далее «end».

Time: 00:59:10 Power Cycle Devices Fast Forward Time Realtime

Connections

Serial DCE

Scenario 0 New Delete Toggle PDU List Window

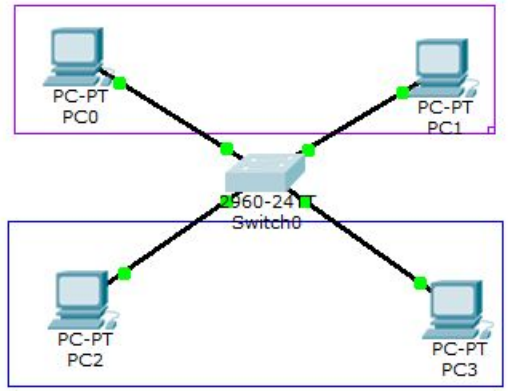
Fire | Last Status | Source | Destination | Type | Color | Time (sec) | Periodic | Num | Edit | Delete

ENG 1:43 04.10.2019

Cisco Packet Tracer

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport



Switch0

Physical Config CLI

IOS Command Line Interface

```
Switch(config-if)#switchport ac
Switch(config-if)#switchport access vlan 3
Switch(config-if)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#sho
Switch#show vl
Switch#show vlan br
Switch#show vlan brief

VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                                 Fa0/9, Fa0/10, Fa0/11, Fa0/12
                                                 Fa0/13, Fa0/14, Fa0/15, Fa0/16
                                                 Fa0/17, Fa0/18, Fa0/19, Fa0/20
                                                 Fa0/21, Fa0/22, Fa0/23, Fa0/24
                                                 Gig1/1, Gig1/2
2    buh                               active    Fa0/1, Fa0/4
3    user                              active    Fa0/2, Fa0/3
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                   active
1005 trnet-default                     active
Switch#
```

Copy Paste

Просмотрим все виртуальные локальные сети, набираем: «show vlan brief».

Теперь у нас есть две строки VLAN:

«2 buh active Fa0/1, Fa0/4»

«3 user active Fa0/2, Fa0/3».

Time: 01:00:32 Power Cycle Devices Fast Forward Time Realtime

Connections

Copper Straight-Through

Scenario 0 New Delete Toggle PDU List Window

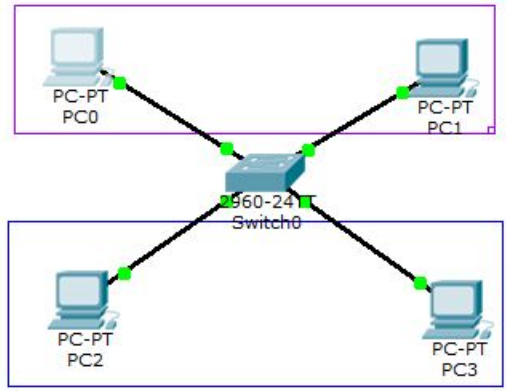
Fire | Last Status | Source | Destination | Type | Color | Time (sec) | Periodic | Num | Edit | Delete

ENG 1:44 04.10.2019

Cisco Packet Tracer

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport



PC0

IP Configuration

IP Configuration

DHCP Static

IP Address 192.168.2.1

Subnet Mask 255.255.255.0

Default Gateway

DNS Server

IPv6 Configuration

DHCP Auto Config Static

IPv6 Address /

Link Local Address FE80::202:4AFF:FE7E:25E4

IPv6 Gateway

IPv6 DNS Server

Web Browser

Cisco IP Communicator

Поочерёдно настроим IP-адреса. Сначала – для первого компьютера.

Time: 01:02:41 Power Cycle Devices Fast Forward Time Realtime

Connections

Copper Straight-Through

Scenario 0 New Delete Toggle PDU List Window

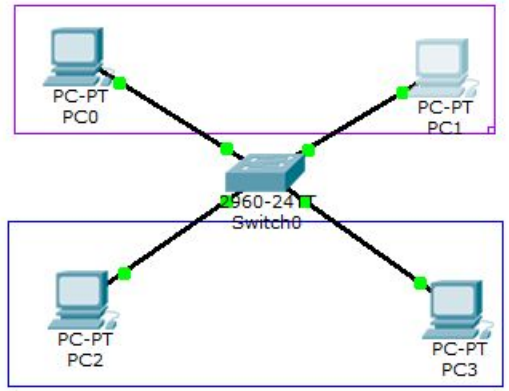
Fire | Last Status | Source | Destination | Type | Color | Time (sec) | Periodic | Num | Edit | Delete

ENG 1:46 04.10.2019

Cisco Packet Tracer

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport



PC1

IP Configuration X

IP Configuration

DHCP Static

IP Address 192.168.2.2

Subnet Mask 255.255.255.0

Default Gateway

DNS Server

IPv6 Configuration

DHCP Auto Config Static

IPv6 Address /

Link Local Address FE80::209:7CFF:FE23:83EB

IPv6 Gateway

IPv6 DNS Server

Web Browser

Cisco IP Communicator

Далее – для второго компьютера.

Time: 01:03:52 Power Cycle Devices Fast Forward Time Realtime

Connections

Copper Straight-Through

Scenario 0 New Delete Toggle PDU List Window

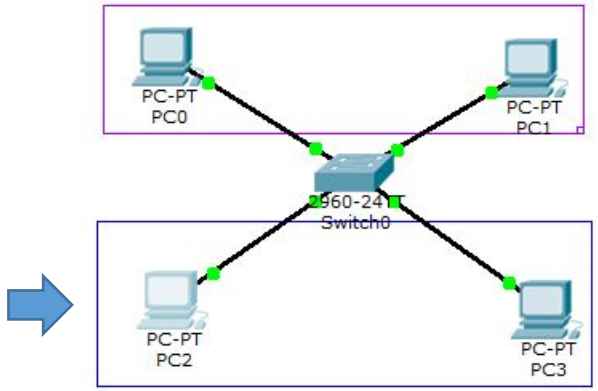
Fire | Last Status | Source | Destination | Type | Color | Time (sec) | Periodic | Num | Edit | Delete

ENG 1:48 04.10.2019

Cisco Packet Tracer

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport



PC2

IP Configuration X

IP Configuration

DHCP Static

IP Address 192.168.3.1

Subnet Mask 255.255.255.0

Default Gateway

DNS Server

IPv6 Configuration

DHCP Auto Config Static

IPv6 Address /

Link Local Address FE80::204:9AFF:FE55:D917

IPv6 Gateway

IPv6 DNS Server

Web Browser

Cisco IP Communicator

… для третьего компьютера.

Time: 01:04:43 Power Cycle Devices Fast Forward Time Realtime

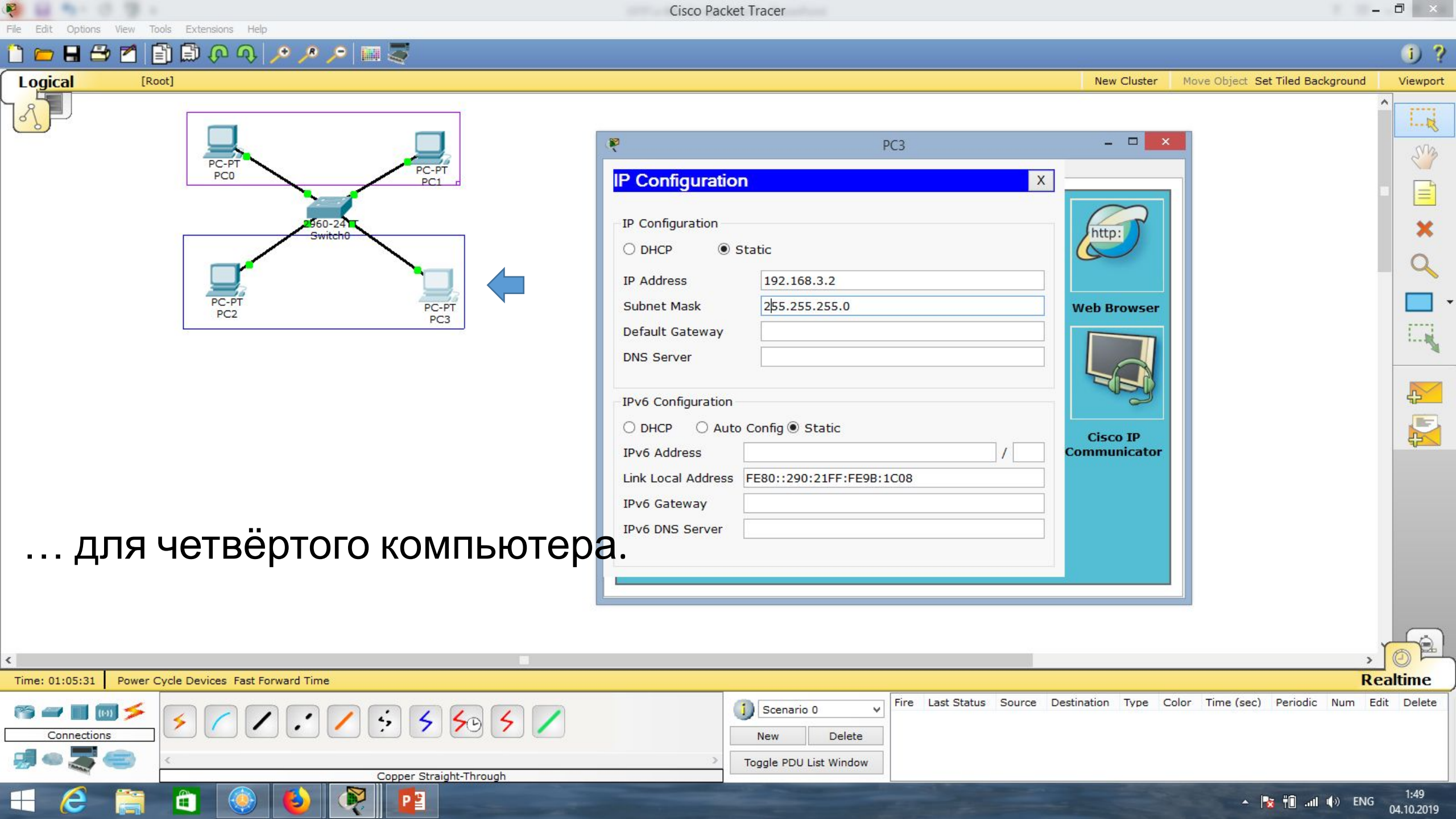
Connections

Copper Straight-Through

Scenario 0 New Delete Toggle PDU List Window

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

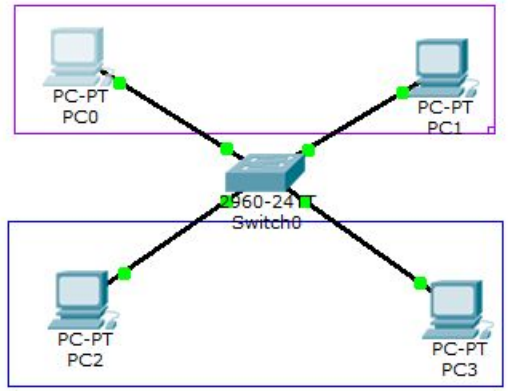
ENG 1:48 04.10.2019


Cisco Packet Tracer
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC-PT PC0
PC-PT PC1
2960-24TT Switch0
PC-PT PC2
PC-PT PC3
PC3
IP Configuration
X
IP Configuration
DHCP
Static
IP Address 192.168.3.2
Subnet Mask 255.255.255.0
Default Gateway
DNS Server
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address FE80::290:21FF:FE9B:1C08
IPv6 Gateway
IPv6 DNS Server
http:
Web Browser
Cisco IP Communicator
… для четвёртого компьютера.
Time: 01:05:31
Power Cycle Devices
Fast Forward Time
Realtime
Connections
Copper Straight-Through
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time (sec)
Periodic
Num
Edit
Delete
ENG
1:49
04.10.2019

Cisco Packet Tracer

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport



PC0

Physical Config Desktop Custom Interface

Command Prompt X

```
Packet Tracer PC Command Line 1.0
PC> ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

Reply from 192.168.2.2: bytes=32 time=1ms TTL=128
Reply from 192.168.2.2: bytes=32 time=0ms TTL=128
Reply from 192.168.2.2: bytes=32 time=0ms TTL=128
Reply from 192.168.2.2: bytes=32 time=0ms TTL=128

Ping statistics for 192.168.2.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

PC>
```

В подсети vlan 2

проверяем соединение первого компьютера со вторым. Связь есть.

Time: 01:07:45 Power Cycle Devices Fast Forward Time Realtime

Connections

Copper Straight-Through

Scenario 0 New Delete Toggle PDU List Window

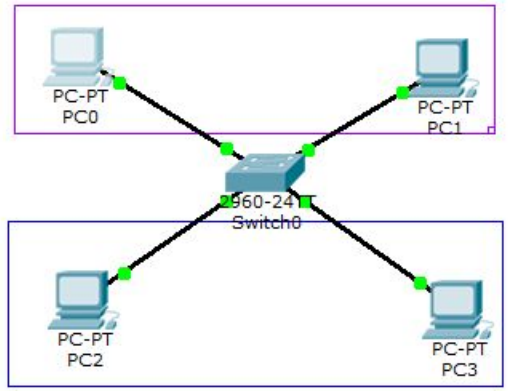
Fire Last Status Source Destination Type Color Time (sec) Periodic Num Edit Delete

ENG 1:51 04.10.2019

Cisco Packet Tracer

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport



PC0

Physical Config Desktop Custom Interface

Command Prompt X

```
PC> ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

Reply from 192.168.2.2: bytes=32 time=1ms TTL=128
Reply from 192.168.2.2: bytes=32 time=0ms TTL=128
Reply from 192.168.2.2: bytes=32 time=0ms TTL=128
Reply from 192.168.2.2: bytes=32 time=0ms TTL=128

Ping statistics for 192.168.2.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

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>
```

Проверяем соединение первого компьютера с компьютером другой подсети (vlan 3). Связи нет.

Time: 01:08:49 Power Cycle Devices Fast Forward Time Realtime

Connections

Copper Straight-Through

Scenario 0 New Delete Toggle PDU List Window

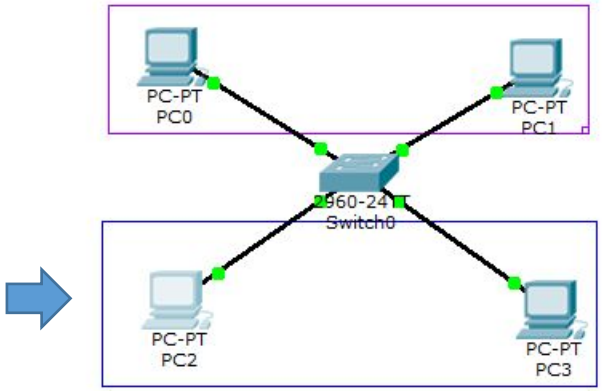
Fire | Last Status | Source | Destination | Type | Color | Time (sec) | Periodic | Num | Edit | Delete

ENG 1:53 04.10.2019

Cisco Packet Tracer

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport



PC2

Physical Config Desktop Custom Interface

Command Prompt

```
Packet Tracer PC Command Line 1.0
PC> ping 192.168.3.2

Pinging 192.168.3.2 with 32 bytes of data:

Reply from 192.168.3.2: bytes=32 time=1ms TTL=128
Reply from 192.168.3.2: bytes=32 time=0ms TTL=128
Reply from 192.168.3.2: bytes=32 time=0ms TTL=128
Reply from 192.168.3.2: bytes=32 time=0ms TTL=128

Ping statistics for 192.168.3.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

PC>
```

В подсети vlan 3

проверяем соединение первого компьютера со вторым. Связь есть.

Time: 01:10:16 Power Cycle Devices Fast Forward Time Realtime

Connections

Copper Straight-Through

Scenario 0 New Delete Toggle PDU List Window

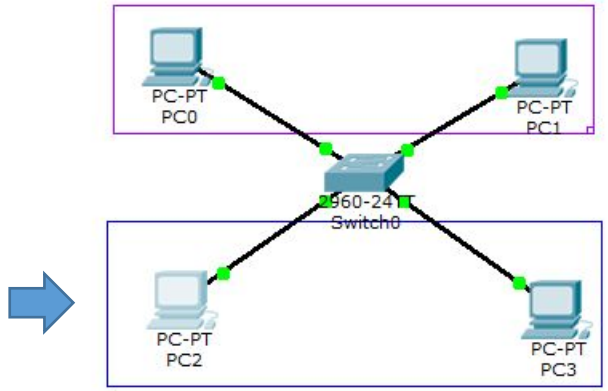
Fire | Last Status | Source | Destination | Type | Color | Time (sec) | Periodic | Num | Edit | Delete

ENG 1:54 04.10.2019

Cisco Packet Tracer

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport



PC2

Physical Config Desktop Custom Interface

Command Prompt

```
PC> ping 192.168.3.2

Pinging 192.168.3.2 with 32 bytes of data:

Reply from 192.168.3.2: bytes=32 time=1ms TTL=128
Reply from 192.168.3.2: bytes=32 time=0ms TTL=128
Reply from 192.168.3.2: bytes=32 time=0ms TTL=128
Reply from 192.168.3.2: bytes=32 time=0ms TTL=128

Ping statistics for 192.168.3.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

PC> ping 192.168.2.1

Pinging 192.168.2.1 with 32 bytes of data:

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

Ping statistics for 192.168.2.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

PC>
```

Проверяем соединение

первого компьютера с компьютером другой подсети (vlan 2). Связи нет.

Time: 01:11:40 Power Cycle Devices Fast Forward Time Realtime

Connections

Copper Straight-Through

Scenario 0 New Delete Toggle PDU List Window

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

ENG 1:55 04.10.2019

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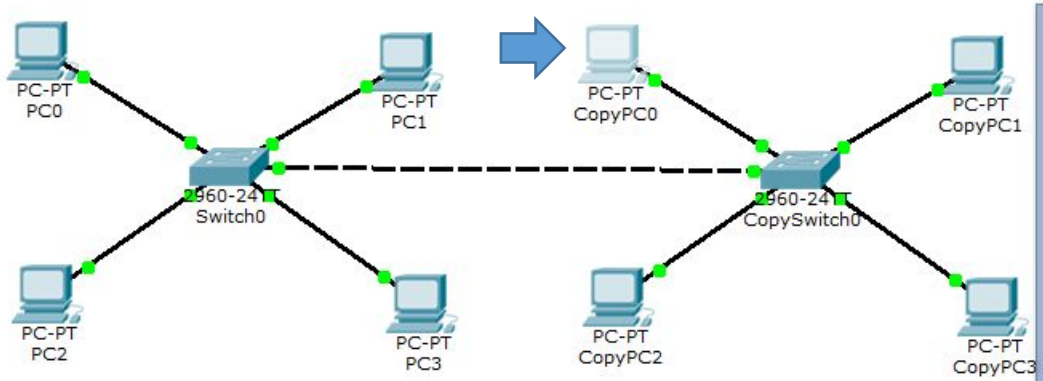
File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport



CopyPC0

IP Configuration

IP Configuration
DHCP Static
IP Address 192.168.2.3
Subnet Mask 255.255.255.0
Default Gateway
DNS Server

IPv6 Configuration
DHCP Auto Config Static
IPv6 Address /
Link Local Address FE80::202:17FF:FEDD:7399
IPv6 Gateway
IPv6 DNS Server

Web Browser
Cisco IP Communicator

Скопируем нашу сеть. Соединим коммутаторы кроссовым кабелем через порты GigabitEthernet.

Исправляем IP-адреса компьютеров.

Time: 01:22:14 Power Cycle Devices Fast Forward Time Realtime

Connections

Copper Cross-Over

Scenario 0 New Delete Toggle PDU List Window

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

ENG 2:06 04.10.2019

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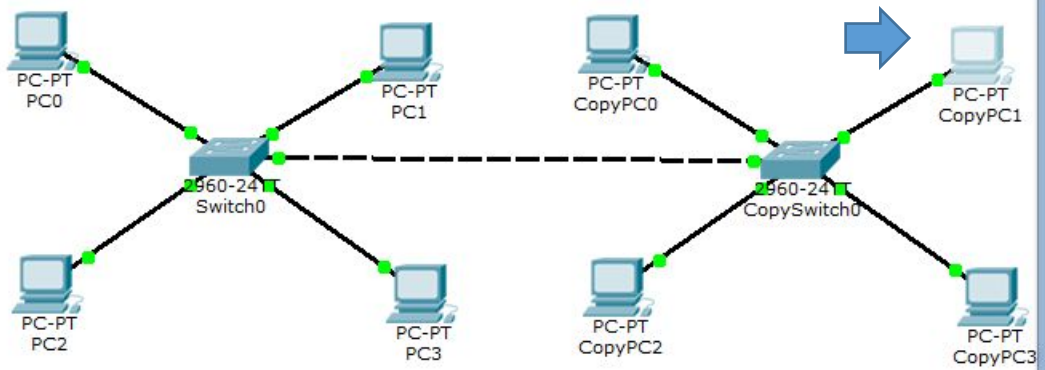
File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport



CopyPC1

IP Configuration X

IP Configuration

DHCP Static

IP Address 192.168.2.4

Subnet Mask 255.255.255.0

Default Gateway

DNS Server

IPv6 Configuration

DHCP Auto Config Static

IPv6 Address /

Link Local Address FE80::2E0:A3FF:FE14:9595

IPv6 Gateway

IPv6 DNS Server

Web Browser

Cisco IP Communicator

Исправляем IP-адреса компьютеров.

Time: 01:22:57 Power Cycle Devices Fast Forward Time Realtime

Connections

Copper Cross-Over

Scenario 0 New Delete Toggle PDU List Window

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

ENG 2:07 04.10.2019

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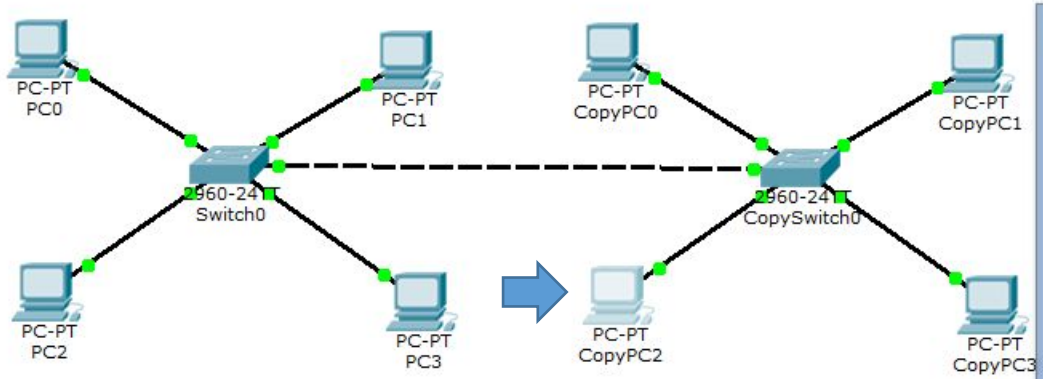
File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport



CopyPC2

IP Configuration

IP Configuration

DHCP Static

IP Address 192.168.3.3

Subnet Mask 255.255.255.0

Default Gateway

DNS Server

IPv6 Configuration

DHCP Auto Config Static

IPv6 Address /

Link Local Address FE80::2D0:58FF:FE9D:8283

IPv6 Gateway

IPv6 DNS Server

Web Browser

Cisco IP Communicator

Исправляем IP-адреса компьютеров.

Time: 01:23:38 Power Cycle Devices Fast Forward Time Realtime

Connections

Copper Cross-Over

Scenario 0 New Delete Toggle PDU List Window

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

ENG 2:07 04.10.2019

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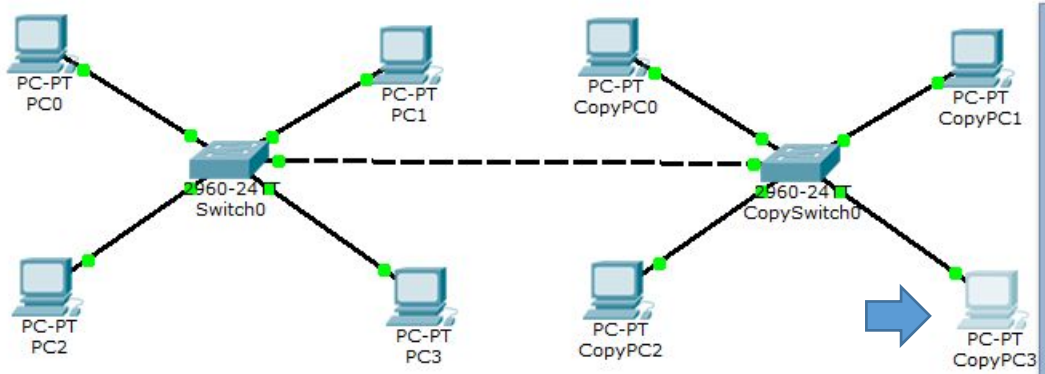
File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport



CopyPC3

IP Configuration

IP Configuration

DHCP Static

IP Address 192.168.3.4

Subnet Mask 255.255.255.0

Default Gateway

DNS Server

IPv6 Configuration

DHCP Auto Config Static

IPv6 Address /

Link Local Address FE80::210:11FF:FE4D:D3A1

IPv6 Gateway

IPv6 DNS Server

Web Browser

Cisco IP Communicator

Исправляем IP-адреса компьютеров.

Time: 01:24:26 Power Cycle Devices Fast Forward Time Realtime

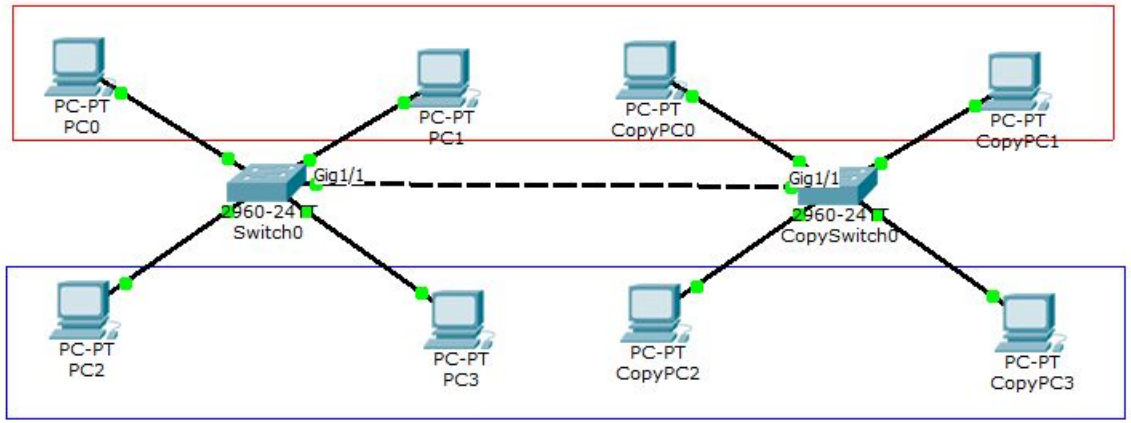
Connections

Copper Cross-Over

Scenario 0 New Delete Toggle PDU List Window

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

ENG 2:08 04.10.2019



Смотрим названия портов, через которые соединяются коммутаторы: «Gig1/1», «Gig1/1». У скопированного коммутатора все настройки сохранились: vlan 2, vlan 3. Настроим транк-порт. Он позволяет разбить физическое соединение на несколько логических для vlan 2 и vlan 3.

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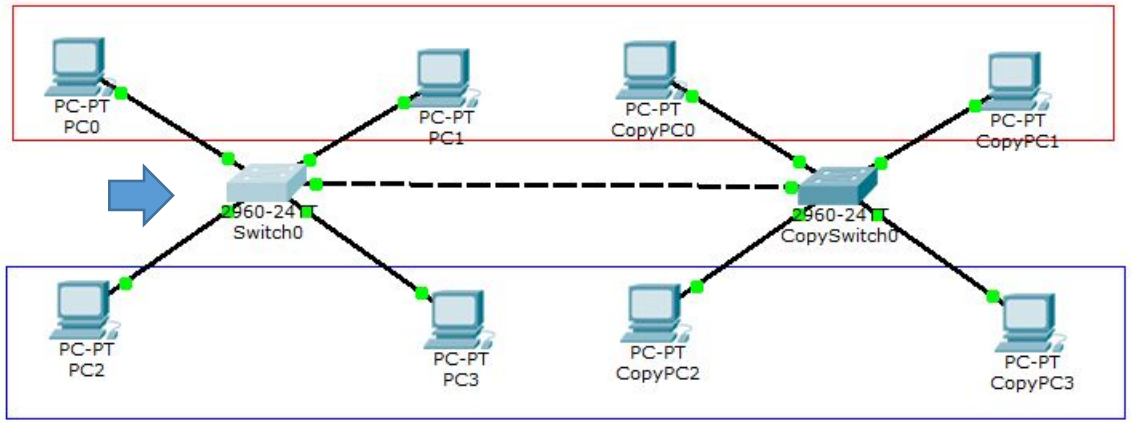
File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport



В режиме глобального конфигурирования («conf t»), выбираем команду: «interfaceEthernet 1/1», далее «switchport mode trunk».

Видим изменения: «… to up».

Switch0

Physical Config CLI

IOS Command Line Interface

```
Switch>
Switch>en
Switch>enable
Switch#conf
Switch#configure t
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#int
Switch(config)#interface gig
Switch(config)#interface gigabitEthernet 1/1
Switch(config-if)#swi
Switch(config-if)#switchport mo
Switch(config-if)#switchport mode tr
Switch(config-if)#switchport mode trunk

Switch(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/1, changed stat
e to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/1, changed stat
e to up

Switch(config-if)#
```

Copy Paste

Time: 01:33:37 Power Cycle Devices Fast Forward Time Realtime

Connections

Copper Cross-Over

Scenario 0 New Delete Toggle PDU List Window

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

ENG 2:17 04.10.2019

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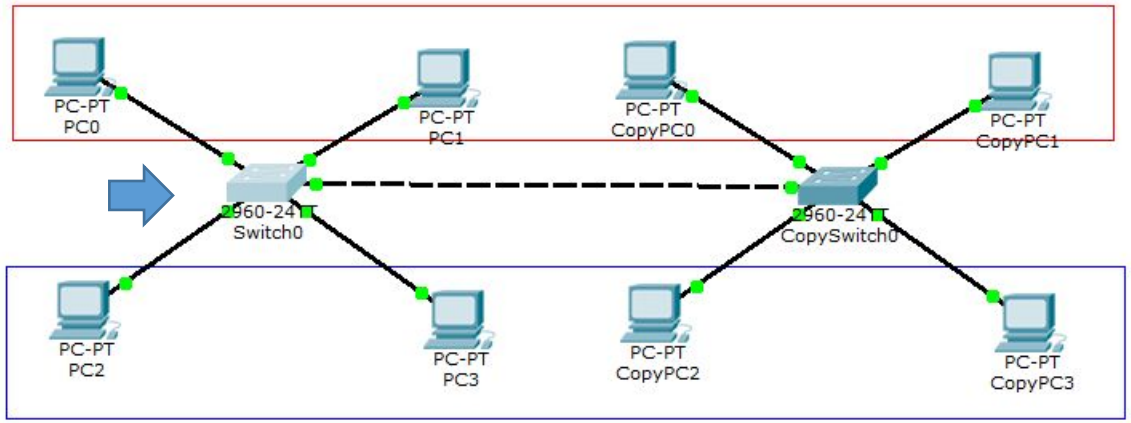
File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport



Vlan-ы, которые мы хотим передавать через данное физическое соединение, указываем через «,»: «switchport trunk allowed vlan 2,3», далее «exit».

Switch0

Physical Config CLI

IOS Command Line Interface

```
Switch#conf
Switch#configure t
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#int
Switch(config)#interface gig
Switch(config)#interface gigabitEthernet 1/1
Switch(config-if)#swi
Switch(config-if)#switchport mo
Switch(config-if)#switchport mode tr
Switch(config-if)#switchport mode trunk

Switch(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/1, changed stat
e to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/1, changed stat
e to up

Switch(config-if)#swi
Switch(config-if)#switchport tr
Switch(config-if)#switchport trunk all
Switch(config-if)#switchport trunk allowed vl
Switch(config-if)#switchport trunk allowed vlan 2,3
Switch(config-if)#exit
Switch(config)#
```

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Time: 01:36:02 Power Cycle Devices Fast Forward Time Realtime

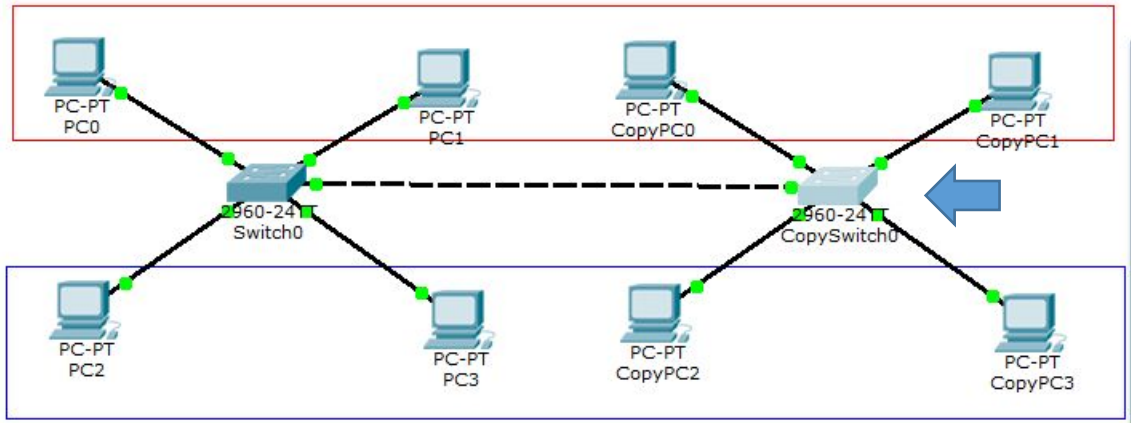
Connections

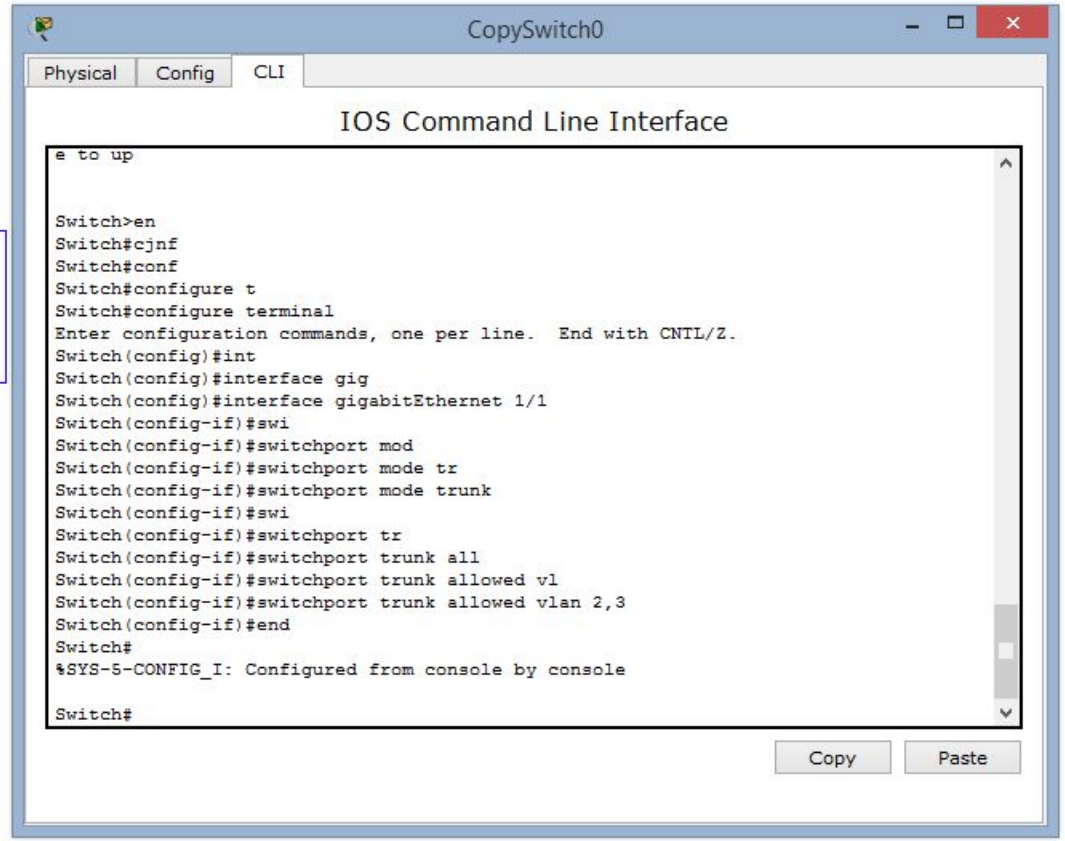
Coaxial

Scenario 0 New Delete Toggle PDU List Window

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

ENG 2:20 04.10.2019





Те же действия повторяем для второго коммутатора:

«conf t», «interfaceEthernet 1/1», «switchport trunk allowed vlan 2,3», далее «end».

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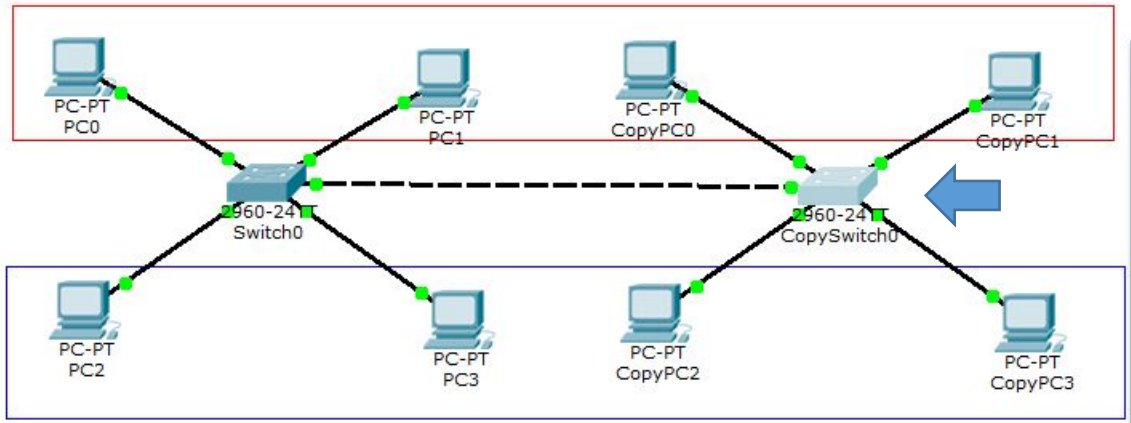
File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport



CopySwitch0

Physical Config CLI

IOS Command Line Interface

```
Switch#conf
Switch#configure t
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#int
Switch(config)#interface gig
Switch(config)#interface gigabitEthernet 1/1
Switch(config-if)#swi
Switch(config-if)#switchport mod
Switch(config-if)#switchport mode tr
Switch(config-if)#switchport mode trunk
Switch(config-if)#swi
Switch(config-if)#switchport tr
Switch(config-if)#switchport trunk all
Switch(config-if)#switchport trunk allowed vl
Switch(config-if)#switchport trunk allowed vlan 2,3
Switch(config-if)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#wr
Switch#write mem
Switch#write memory
Building configuration...
[OK]
Switch#
```

Copy Paste

Сохраним конфигурацию:

«write memory».

Time: 01:42:01 Power Cycle Devices Fast Forward Time Realtime

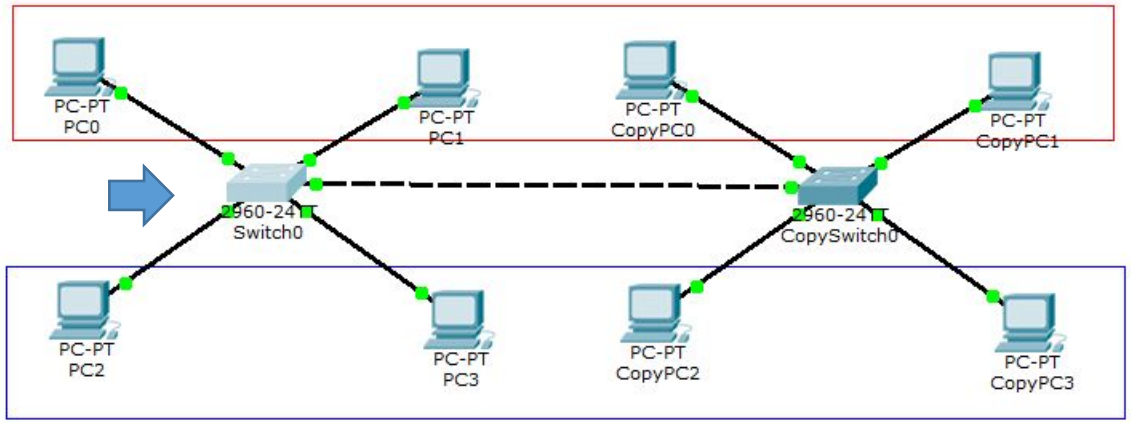
Connections

Copper Cross-Over

Scenario 0 New Delete Toggle PDU List Window

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

ENG 2:26 04.10.2019



Switch0

Physical | Config | CLI

IOS Command Line Interface

```
Switch(config-if)#switchport mo
Switch(config-if)#switchport mode tr
Switch(config-if)#switchport mode trunk

Switch(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/1, changed stat
e to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/1, changed stat
e to up

Switch(config-if)#swi
Switch(config-if)#switchport tr
Switch(config-if)#switchport trunk all
Switch(config-if)#switchport trunk allowed vl
Switch(config-if)#switchport trunk allowed vlan 2,3
Switch(config-if)#exit
Switch(config)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#wr
Switch#write mem
Building configuration...
[OK]
Switch#
```

Copy | Paste

Сохраним конфигурацию для другого коммутатора: «write memory».

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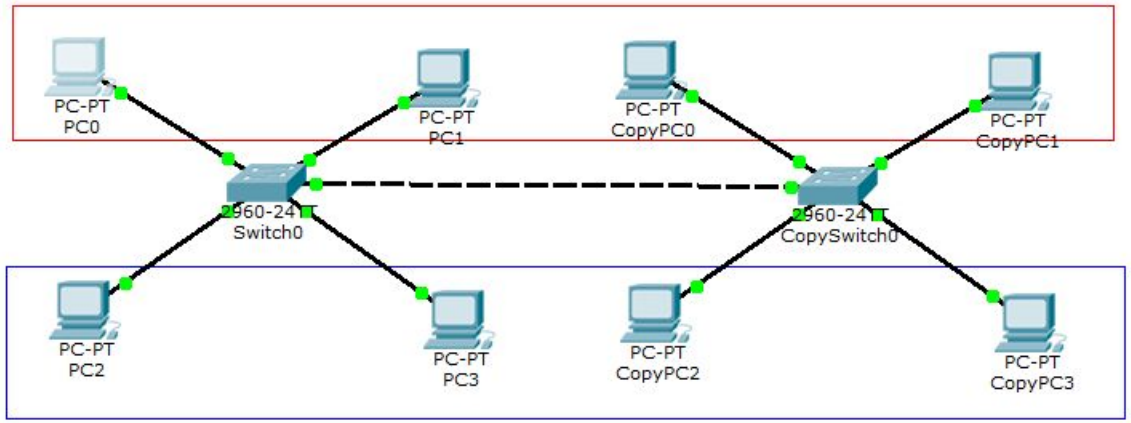
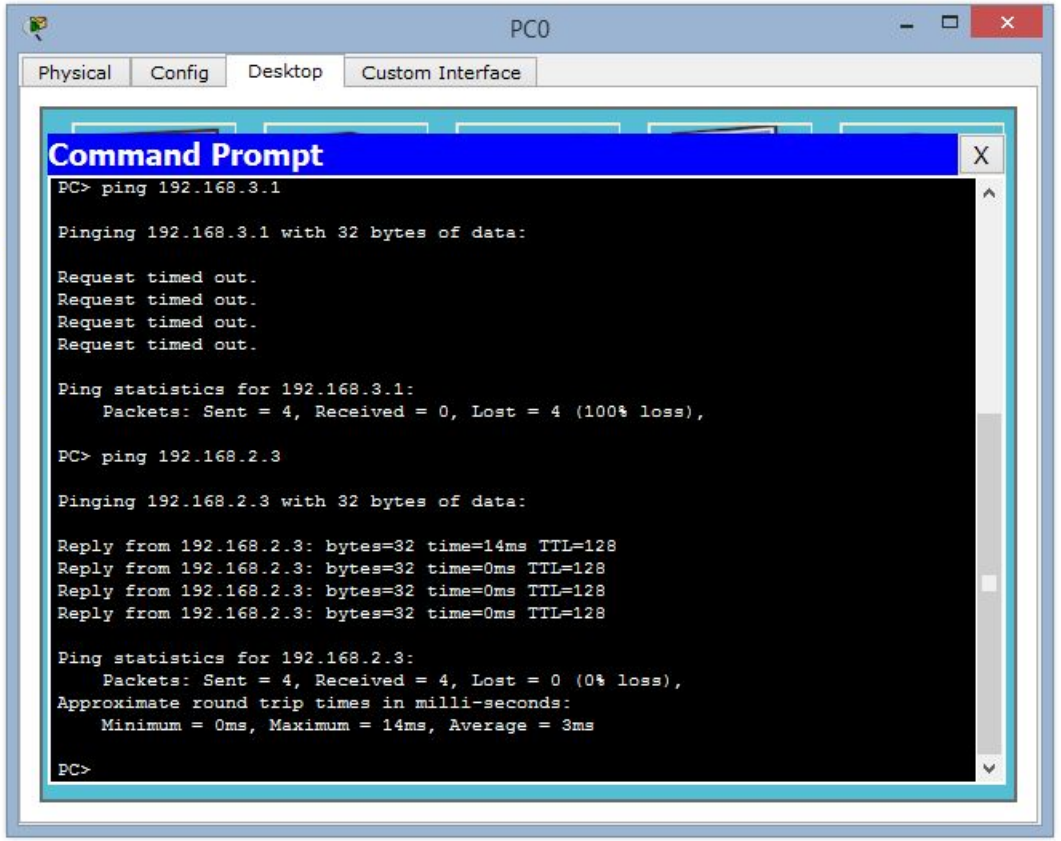
File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport





Проверим взаимодействия данных компьютеров. С компьютером ...3.1 чужой сети связи нет.

С компьютером …2.3 своей сети связь есть.

Time: 01:45:25 Power Cycle Devices Fast Forward Time Realtime

Connections

Copper Cross-Over

Scenario 0 New Delete Toggle PDU List Window

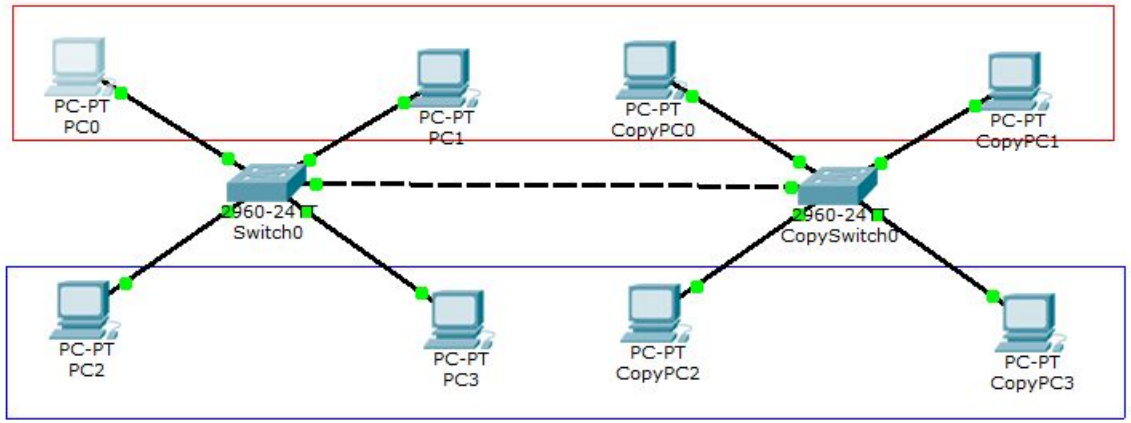
Fire Last Status Source Destination Type Color Time (sec) Periodic Num Edit Delete

ENG 2:29 04.10.2019

Cisco Packet Tracer - D:\Андрей\Компьютерные сети\МДК.01.01 Организация, принципы построения и функционирования компьютерных сетей\Практические работы\Работа 03.pkt

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport



PC0

Physical Config Desktop Custom Interface

Command Prompt

```
PC> ping 192.168.2.3

Pinging 192.168.2.3 with 32 bytes of data:

Reply from 192.168.2.3: bytes=32 time=14ms TTL=128
Reply from 192.168.2.3: bytes=32 time=0ms TTL=128
Reply from 192.168.2.3: bytes=32 time=0ms TTL=128
Reply from 192.168.2.3: bytes=32 time=0ms TTL=128

Ping statistics for 192.168.2.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 14ms, Average = 3ms

PC> ping 192.168.3.3

Pinging 192.168.3.3 with 32 bytes of data:

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

Ping statistics for 192.168.3.3:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

PC>
```

Видим, что с компьютерами чужой сети связи нет.

С компьютерами своей сети связь есть.

Time: 01:46:37 Power Cycle Devices Fast Forward Time Realtime

Connections

Copper Cross-Over

Scenario 0 New Delete Toggle PDU List Window

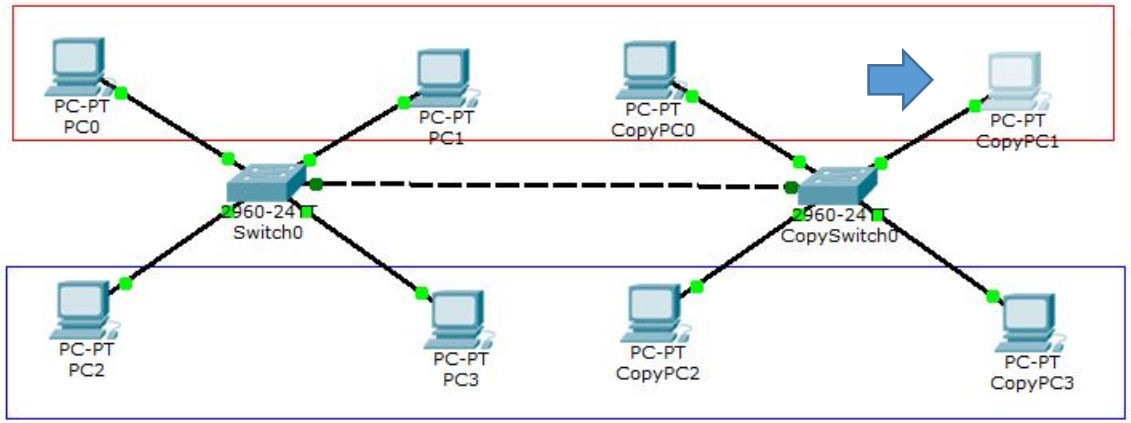
Fire | Last Status | Source | Destination | Type | Color | Time (sec) | Periodic | Num | Edit | Delete

ENG 2:30 04.10.2019

Cisco Packet Tracer - D:\Андрей\Компьютерные сети\МДК.01.01 Организация, принципы построения и функционирования компьютерных сетей\Практические работы\Работа 03.pkt

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport



CopyPC1

Physical Config Desktop Custom Interface

Command Prompt

```
Packet Tracer PC Command Line 1.0
PC> ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

Reply from 192.168.2.2: bytes=32 time=11ms TTL=128
Reply from 192.168.2.2: bytes=32 time=0ms TTL=128
Reply from 192.168.2.2: bytes=32 time=0ms TTL=128
Reply from 192.168.2.2: bytes=32 time=0ms TTL=128

Ping statistics for 192.168.2.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 11ms, Average = 2ms

PC> ping 192.168.3.2

Pinging 192.168.3.2 with 32 bytes of data:

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

Ping statistics for 192.168.3.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

PC>
```

Аналогичные действия можно провести с другими компьютерами.

Time: 01:48:52 Power Cycle Devices Fast Forward Time Realtime

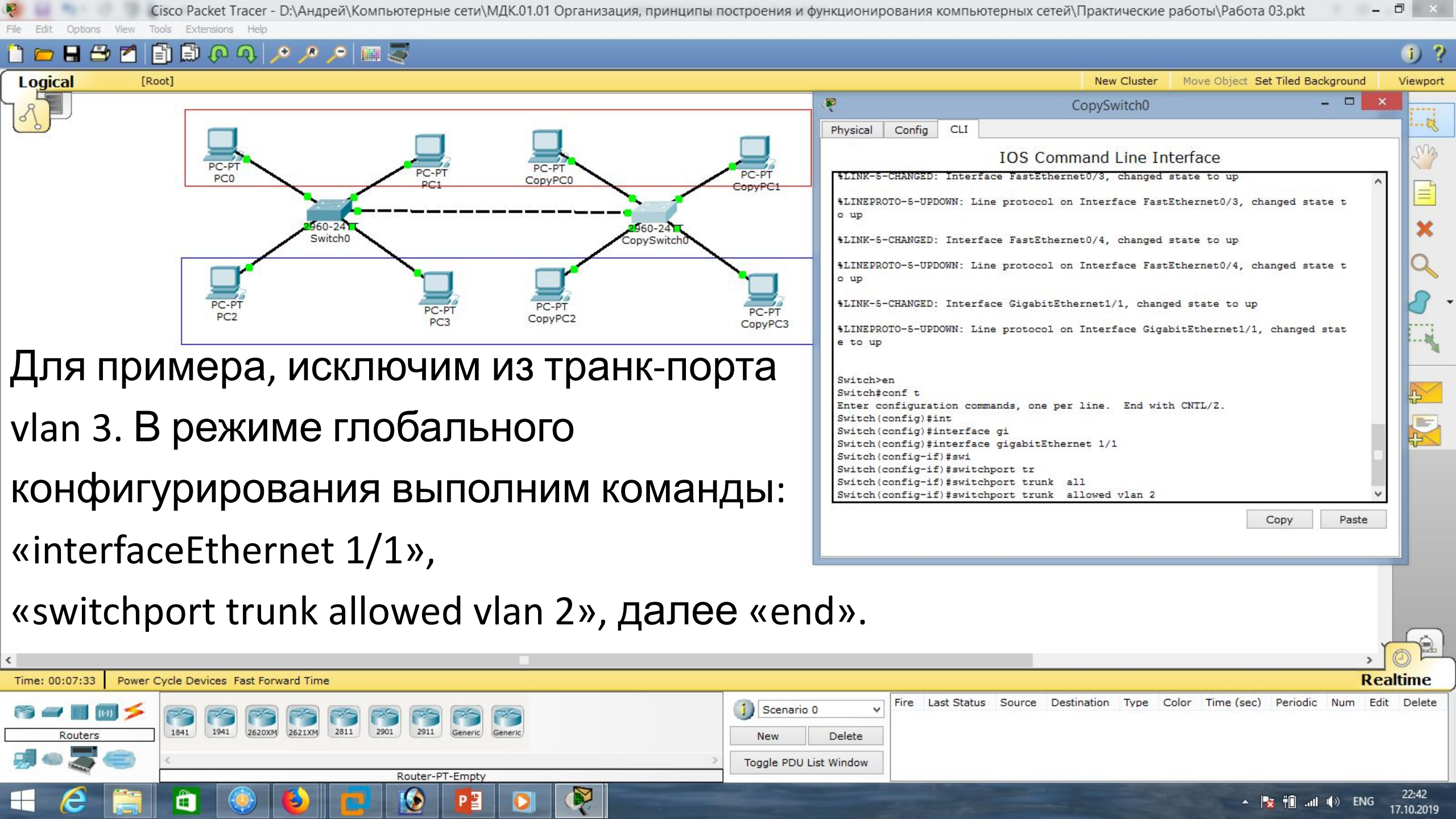
Connections

Copper Cross-Over

Scenario 0 New Delete Toggle PDU List Window

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

ENG 2:33 04.10.2019

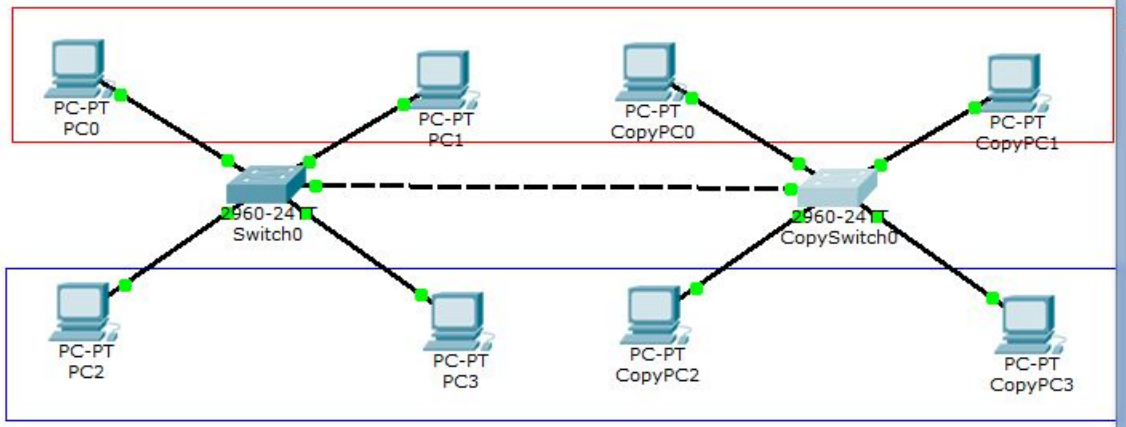


Для примера, исключим из транк-порта vlan 3. В режиме глобального конфигурирования выполним команды: «interfaceEthernet 1/1», «switchport trunk allowed vlan 2», далее «end».

Cisco Packet Tracer - D:\Андрей\Компьютерные сети\МДК.01.01 Организация, принципы построения и функционирования компьютерных сетей\Практические работы\Работа 03.pkt

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport



CopySwitch0

Physical Config CLI

IOS Command Line Interface

```
Switch#sho
Switch#show r
Switch#show run
Building configuration...

Current configuration : 1293 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Switch
!
!
!
!
spanning-tree mode pvst
!
interface FastEthernet0/1
 switchport access vlan 2
 switchport mode access
!
interface FastEthernet0/2
 switchport access vlan 3
 --More--
```

Copy Paste

Проверим то, что мы сконфигурировали, выполним команду: «show run».

Time: 00:16:26 Power Cycle Devices Fast Forward Time Realtime

Routers

1841 1941 2620XM 2621XM 2811 2901 2911 Generic Generic

Router-PT-Empty

Scenario 0 New Delete Toggle PDU List Window

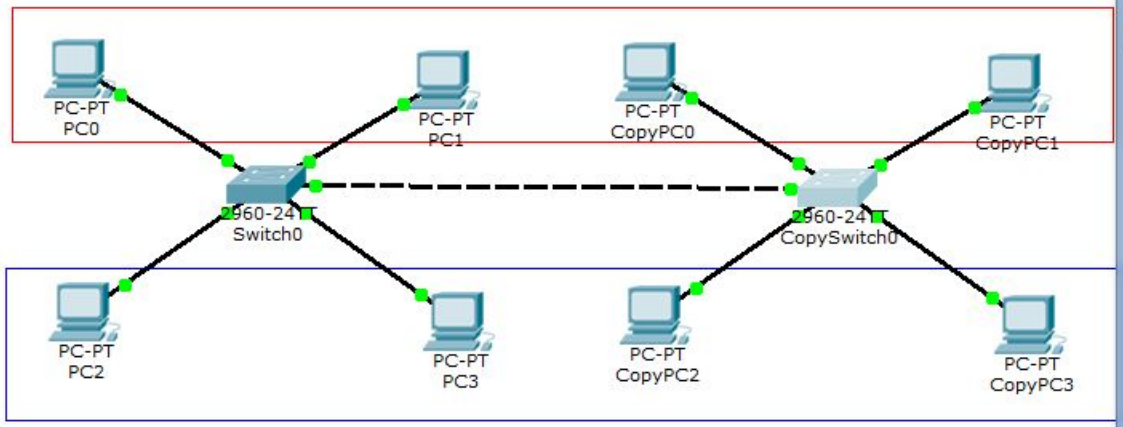
Fire Last Status Source Destination Type Color Time (sec) Periodic Num Edit Delete

ENG 22:51 17.10.2019

Cisco Packet Tracer - D:\Андрей\Компьютерные сети\МДК.01.01 Организация, принципы построения и функционирования компьютерных сетей\Практические работы\Работа 03.pkt

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport



CopySwitch0

Physical Config CLI

IOS Command Line Interface

```
!
interface FastEthernet0/21
!
interface FastEthernet0/22
!
interface FastEthernet0/23
!
interface FastEthernet0/24
!
interface GigabitEthernet1/1
 switchport trunk allowed vlan 2
 switchport mode trunk
!
interface GigabitEthernet1/2
!
interface Vlan1
 no ip address
 shutdown
!
!
line con 0
!
line vty 0 4
 login
line vty 5 15
 --More--
```

Copy Paste

Видим, что остался только vlan 2.

Time: 00:19:03 Power Cycle Devices Fast Forward Time Realtime

Routers

1841 1941 2620XM 2621XM 2811 2901 2911 Generic Generic

Router-PT-Empty

Scenario 0 New Delete Toggle PDU List Window

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

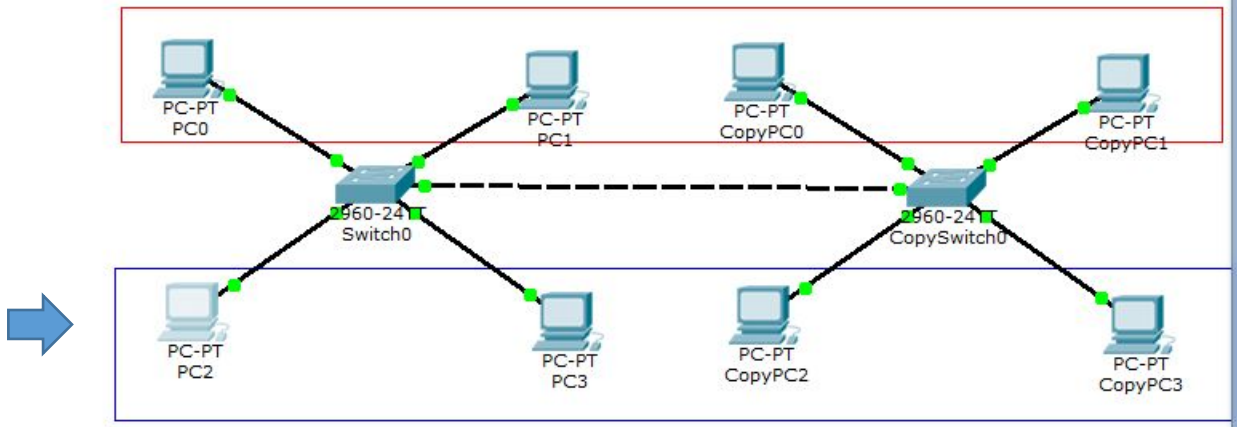
ENG 22:54 17.10.2019

Cisco Packet Tracer - D:\Андрей\Компьютерные сети\МДК.01.01 Организация, принципы построения и функционирования компьютерных сетей\Практические работы\Работа 03.pkt

File Edit Options View Tools Extensions Help

Logical [Root]

New Cluster Move Object Set Tiled Background Viewport



PC2

Physical Config Desktop Custom Interface

Command Prompt

```
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

PC>ping 192.168.2.4

Pinging 192.168.2.4 with 32 bytes of data:

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

Ping statistics for 192.168.2.4:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

PC>ping 192.168.3.4

Pinging 192.168.3.4 with 32 bytes of data:

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

Ping statistics for 192.168.3.4:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

PC>
```

Проверим теперь связь между компьютерами сети vlan 3 разных сегментов. Связи нет.

Time: 00:22:44 Power Cycle Devices Fast Forward Time

Realtime

Routers

1841 1941 2620XM 2621XM 2811 2901 2911 Generic Generic

Router-PT-Empty

Scenario 0

New Delete

Toggle PDU List Window

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

ENG 22:58 17.10.2019

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

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3. Компьютерные сети. Э. Таненбаум, 4-е издание, «Питер», Москва, Санк-Петербург, 2003.

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Спасибо за внимание!

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