

Отчёт по практической работе 30

Землянский В. ИС223

Цель работы:

Настроить агрегирование каналов между коммутаторами в статическом режиме и с использованием протокола lscr для увеличения пропускной способности и отказоустойчивости сети.

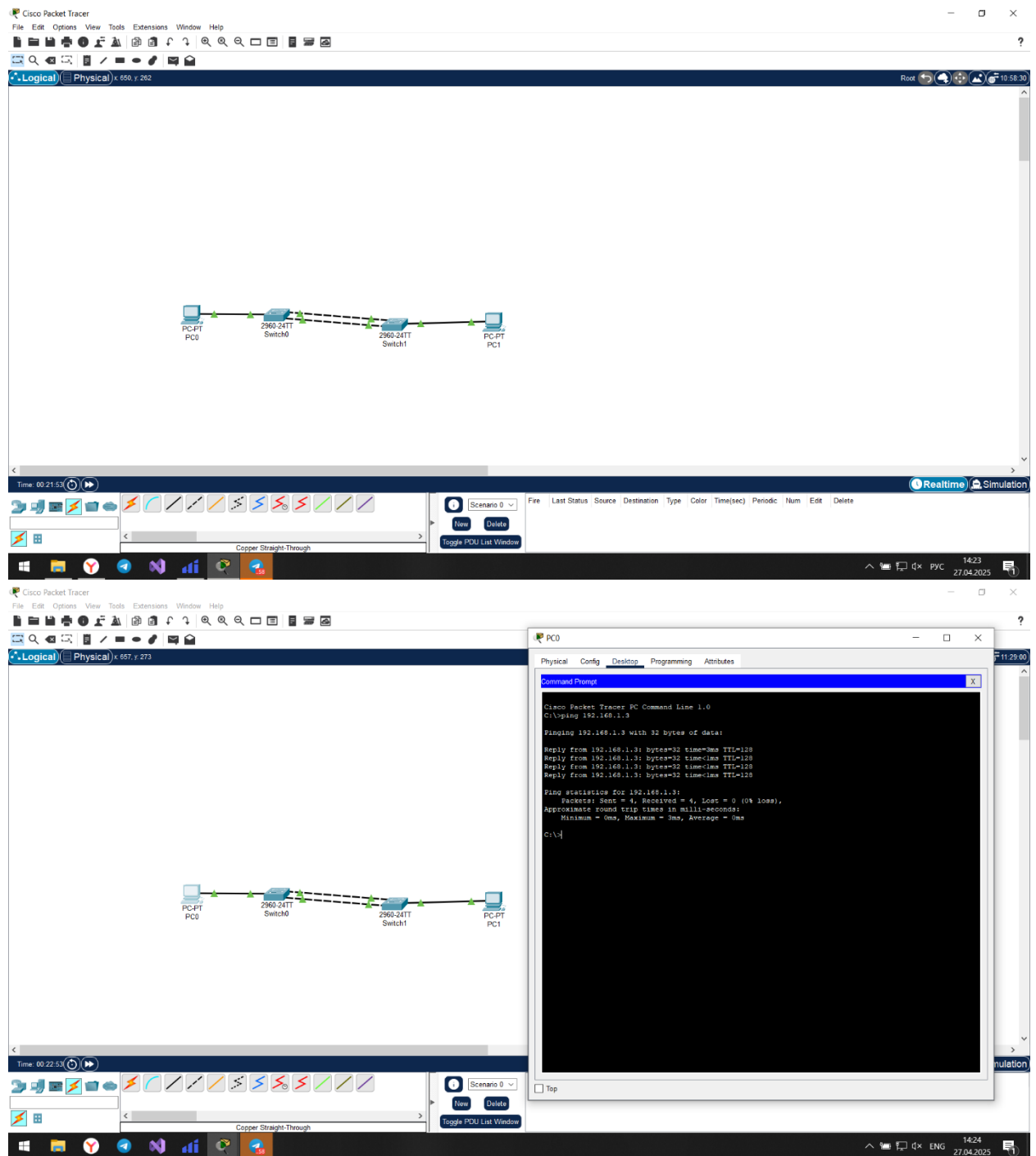
Ход выполнения работы:

- Построил сеть с двумя коммутаторами для первой части работы.
- Назначил ip адреса:
 - pc0: 192.168.1.2
 - pc1: 192.168.1.3
- На обоих коммутаторах настроил статическое агрегирование каналов:
 - Выполнил команду channel-group 1 mode on на портах fa0/1 и fa0/2.
- Проверил пинг между pc0 и pc1 пакеты успешно доставляются.
- Отключил один из портов (fa0/1) на switch0.
- Проверил пинг снова связь осталась работала второй линк.
- Вторая часть работы: динамическое агрегирование (lscr).
- Построил сеть с тремя обычными switch (switch0 switch1 switch2) и одним switch 3560.
- Подключил каждый обычный switch двумя линками к switch3560:
- Подключил три ПК к одному из обычных коммутаторов на порт fa0/3.
- Назначил айпи на них
- На switch3560 настроил lscr:
 - Включил channel-protocol lscr.
 - Выполнил команды channel-group X mode active для всех пар портов.
- На обычных Switch настроил lscr в пасс режиме:
 - channel-protocol lscr
 - channel-group X mode passive
- Проверил создание etherchannel:
 - Пинг между ПК проходит успешно.

- Отключил парочку из физических линков.

Связь осталась благодаря резервированию. Победас!

Скрины:



Cisco Packet Tracer

File Edit Options View Tools Extensions Window Help

Logical Physical 424 / 330

Physical Config CLI Attributes

IOS Command Line Interface

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Compiled Wed 26-Jun-13 02:45 by amguyen

Press RETURN to get started!

VLINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
VLINKPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
VLINK-5-CHANGED: Interface FastEthernet0/2, changed state to up
VLINKPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up
VLINK-5-CHANGED: Interface FastEthernet0/3, changed state to up
VLINKPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up

Switch>enable
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#interface range FastEthernet 0/1 - 2
Switch(config-if-range)#channel-group 1 mode on
Switch(config-if-range)#exit
Switch(config)#
Creating a port-channel interface Port-channel 1
VLINK-5-CHANGED: Interface Port-channel1, changed state to up
VLINKPROTO-5-UPDOWN: Line protocol on Interface Port-channel1, changed state to up

Switch(config)#interface FastEthernet0/1
Switch(config-if)#shutdown
Switch(config-if)#
VLINK-5-CHANGED: Interface FastEthernet0/1, changed state to administratively down
VLINKPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down

Copy Paste

Delete

Realtime Simulation

Time: 00:23:11

Copper Straight-Through

PC-PT PC0 2960-24TT Switch0

14:24 27.04.2025

Cisco Packet Tracer

File Edit Options View Tools Extensions Window Help

Logical Physical 440 / 300

Physical Config Desktop Programming Attributes

Command Prompt

Cisco Packet Tracer PC Command Line 1.0
C:\>ipconfig 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:
Reply from 192.168.1.3: bytes=32 time=1ms TTL=128
Reply from 192.168.1.3: bytes=32 time=1ms TTL=128
Reply from 192.168.1.3: bytes=32 time=1ms TTL=128
Reply from 192.168.1.3: bytes=32 time=1ms TTL=128
Ping statistics for 192.168.1.3:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>ipconfig 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:
Reply from 192.168.1.3: bytes=32 time=1ms TTL=128
Reply from 192.168.1.3: bytes=32 time=1ms TTL=128
Reply from 192.168.1.3: bytes=32 time=1ms TTL=128
Reply from 192.168.1.3: bytes=32 time=1ms TTL=128
Ping statistics for 192.168.1.3:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>

Scenario 0

New Delete

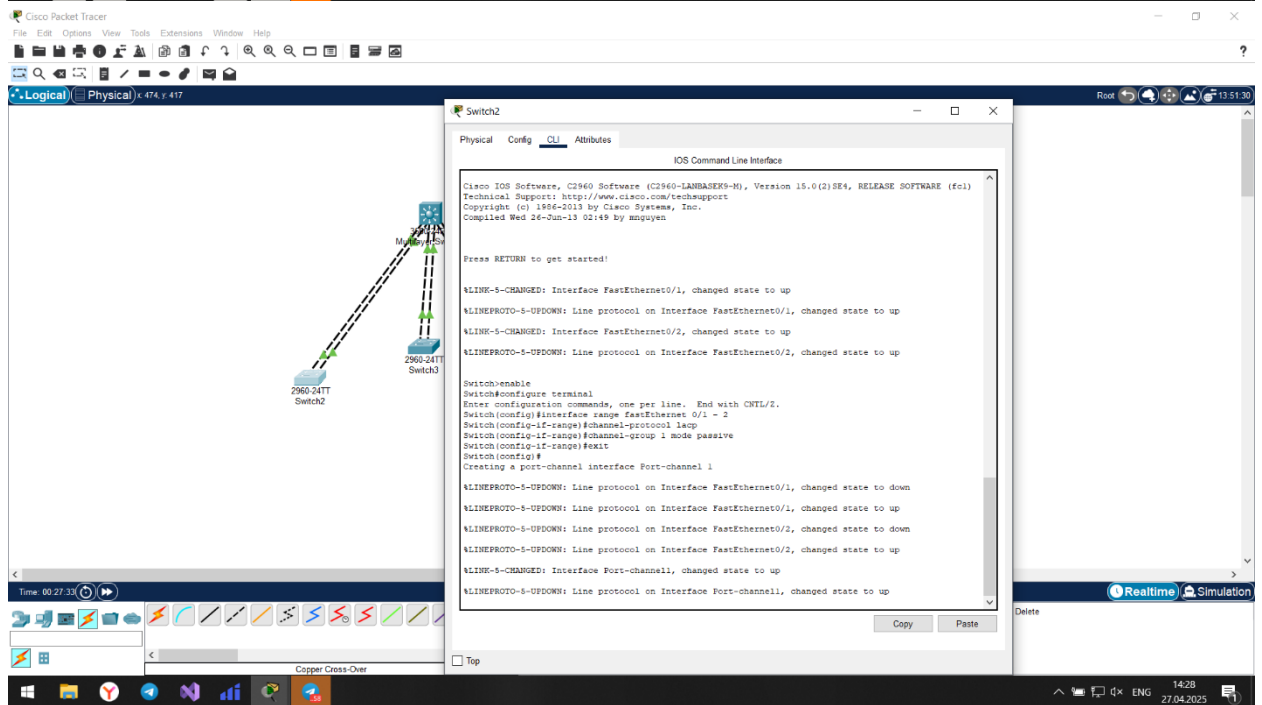
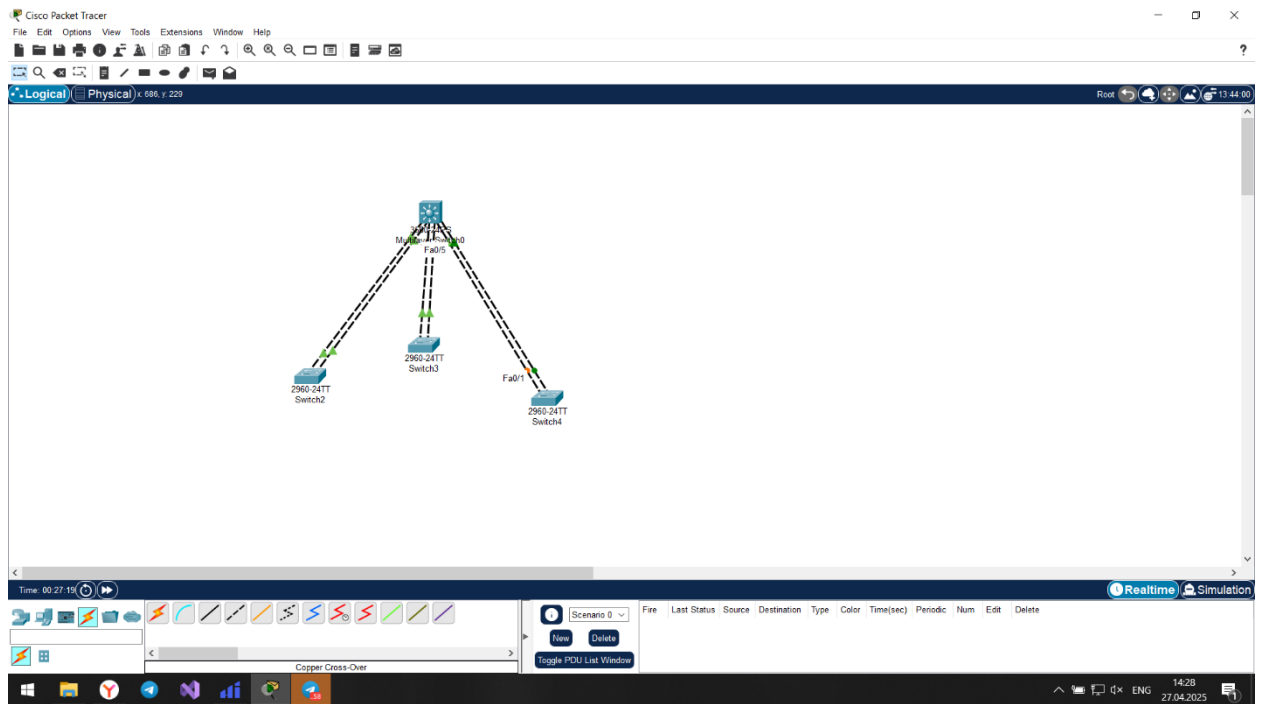
Toggle PDU List Window

Time: 00:23:30

Copper Straight-Through

PC-PT PC0 2960-24TT Switch0 2960-24TT Switch1 PC-PT PC1

14:24 27.04.2025



Cisco Packet Tracer

File Edit Options View Tools Extensions Window Help

Logical Physical 496 x 372

Switch3

Physical Config CLI Attributes

IOS Command Line Interface

Press RETURN to get started.

```
Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#interface range fastEthernet 0/1 - 2
Switch(config-if-range)#channel-protocol lacp
Switch(config-if-range)#channel-group 2 mode passive
Switch(config-if-range)#exit
Switch(config)#
Creating a port-channel interface Port-channel 2
VLINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down
VLINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up
VLINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to down
VLINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up
VLINE-5-CHANGED: Interface Port-channel2, changed state to up
VLINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel2, changed state to up
```

Copy Paste

Realtime Simulation

Time: 00:27:41

Copper Cross-Over

Windows taskbar: File Explorer, Microsoft Edge, Teams, OneDrive, Outlook, etc.

Cisco Packet Tracer

File Edit Options View Tools Extensions Window Help

Logical Physical 440 x 440

Switch4

Physical Config CLI Attributes

IOS Command Line Interface

Press RETURN to get started!

```
Cisco IOS Software, C2960 Software (C2960-LANBASEK9-M), Version 15.0(2)SE4, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
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Compiled Wed 26-Jun-13 02:49 by anquyen

VLINE-5-CHANGED: Interface FastEthernet0/1, changed state to up
VLINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
VLINE-5-CHANGED: Interface FastEthernet0/2, changed state to up
VLINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up

Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#interface range fastEthernet 0/1 - 2
Switch(config-if-range)#channel-protocol lacp
Switch(config-if-range)#channel-group 3 mode passive
Switch(config-if-range)#exit
Switch(config)#
Creating a port-channel interface Port-channel 3
VLINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down
VLINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
VLINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to down
VLINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up
VLINE-5-CHANGED: Interface Port-channel3, changed state to up
VLINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel3, changed state to up
```

Copy Paste

Realtime Simulation

Time: 00:27:52

Copper Cross-Over

Windows taskbar: File Explorer, Microsoft Edge, Teams, OneDrive, Outlook, etc.

Cisco Packet Tracer

File Edit Options View Tools Extensions Window Help

Logical Physical 461 / 154

Multilayer Switch0

Physical Config CLI Attributes

IOS Command Line Interface

```
Switch>enable
Switch>configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#interface range fastEthernet 0/1 - 2
Switch(config-if-range)#channel-protocol lacp
Switch(config-if-range)#channel-group 1 mode active
Switch(config-if-range)#exit
Switch(config)#
Creating a port-channel interface Port-channel 1
VLINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down
VLINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
VLINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to down
VLINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up
Switch(config)#interface range fastEthernet 0/3 - 4
Switch(config-if-range)#channel-protocol lacp
Switch(config-if-range)#channel-group 2 mode active
Switch(config-if-range)#exit
Switch(config)#
Creating a port-channel interface Port-channel 2
VLINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to down
VLINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up
VLINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/4, changed state to down
VLINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/4, changed state to up
Switch(config)#interface range fastEthernet 0/5 - 6
Switch(config-if-range)#channel-protocol lacp
Switch(config-if-range)#channel-group 3 mode active
Switch(config-if-range)#exit
Switch(config)#
Creating a port-channel interface Port-channel 3
VLINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/5, changed state to down
```

Copy Paste Delete

Time: 00:29:04

Copper Cross-Over

Realtime Simulation

14:29 27.04.2025

Cisco Packet Tracer

File Edit Options View Tools Extensions Window Help

Logical Physical 391 / 403

PC2

Physical Config Desktop Programming Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>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),

C:\>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),

C:\>ping 192.168.1.4

Pinging 192.168.1.4 with 32 bytes of data:

Reply from 192.168.1.4: bytes=32 time=1ms TTL=128
Reply from 192.168.1.4: bytes=32 time=1ms TTL=128
Reply from 192.168.1.4: bytes=32 time=1ms TTL=128
Reply from 192.168.1.4: bytes=32 time=1ms TTL=128

Ping statistics for 192.168.1.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```

Time: 00:33:14

Copper Straight-Through

Scenario 0

New Delete

Toggle PDU List Window

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

14:34 27.04.2025

Cisco Packet Tracer

File Edit Options View Tools Extensions Window Help

Logical Physical 290 x 705

Time: 00:34:11

Scenario 0

New Delete

Toggle PDU List Window

Copper Straight-Through

PC3

Physical Config Desktop Programming Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time=1ms TTL=128
Reply from 192.168.1.2: bytes=32 time=1ms TTL=128
Reply from 192.168.1.2: bytes=32 time=1ms TTL=128
Reply from 192.168.1.2: bytes=32 time=1ms TTL=128

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

Cisco Packet Tracer

File Edit Options View Tools Extensions Window Help

Logical Physical 546 x 418

Time: 00:34:11

Scenario 0

New Delete

Toggle PDU List Window

Copper Straight-Through

PC2

Physical Config Desktop Programming Attributes

Command Prompt

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

C:\>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),

C:\>ping 192.168.1.4

Pinging 192.168.1.4 with 32 bytes of data:

Reply from 192.168.1.4: bytes=32 time=1ms TTL=128
Reply from 192.168.1.4: bytes=32 time=1ms TTL=128
Reply from 192.168.1.4: bytes=32 time=1ms TTL=128
Reply from 192.168.1.4: bytes=32 time=1ms TTL=128

Ping statistics for 192.168.1.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 192.168.1.4

Pinging 192.168.1.4 with 32 bytes of data:

Reply from 192.168.1.4: bytes=32 time=1ms TTL=128
Reply from 192.168.1.4: bytes=32 time=1ms TTL=128
Reply from 192.168.1.4: bytes=32 time=1ms TTL=128
Reply from 192.168.1.4: bytes=32 time=1ms TTL=128

Ping statistics for 192.168.1.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 9ms, Average = 3ms

C:\>
```

Cisco Packet Tracer

File Edit Options View Tools Extensions Window Help

Logical Physical 436 / 531

Time: 00:35:04

Scenario 0

New Delete

Toggle PDU List Window

Copper Straight-Through

PC3

Physical Config Desktop Programming Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time=1ms TTL=128
Reply from 192.168.1.2: bytes=32 time=1ms TTL=128
Reply from 192.168.1.2: bytes=32 time=1ms TTL=128
Reply from 192.168.1.2: bytes=32 time=1ms TTL=128

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time=1ms TTL=128
Reply from 192.168.1.2: bytes=32 time=1ms TTL=128
Reply from 192.168.1.2: bytes=32 time=1ms TTL=128
Reply from 192.168.1.2: bytes=32 time=1ms TTL=128

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

Top

14:36 27.04.2025

Cisco Packet Tracer

File Edit Options View Tools Extensions Window Help

Logical Physical 1646 / 75

Time: 00:35:20 233

PLAY CONTROLS

Scenario 0

New Delete

Toggle PDU List Window

Copper Straight-Through

Simulation Panel

Event List

Vis.	Time(sec)	Last Device
	0.000	
	0.001	PC2
	0.002	Switch2
	0.003	MultiLayer Switch0
	0.004	Switch4
	0.005	PC4

Reset Simulation

Constant Delay

Captured to: 0.005 s

Play Controls

Event List Filters - Visible Events

ACL Filter, ARP, BGP, Bluetooth, CAPWAP, CDP, DHCP, DHCPv6, DNS, DTP, EAPOL, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, Icmp, Icmpv6, LLDP, MVR, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, PPP, PPPoE, PTP, RADIUS, REP, RIP, RIPv2, RIPv3, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

Edit Filters

Show All/None

Event List Realtime Simulation

14:37 27.04.2025

Cisco Packet Tracer

File Edit Options View Tools Extensions Window Help

Logical Physical x 1000 y 564

Simulation Panel

Event List

Vis.	Time(sec)	Last Device
0.000	-	-
0.001	0.001	PC2
0.002	0.002	Switch2
0.003	0.003	Multilayer Switch0
0.004	0.004	Switch4
0.005	0.005	PC4

Reset Simulation Constant Delay Captured to: 0.005 s

Play Controls

Event List Filters - Visible Events

ACL Filter, ARP, BGP, Bluetooth, CAPWAP, CDP, DHCP, DHCPv6, DNS, DTP, EAPOL, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, Icmp, Icmpv6, LACP, LLDP, Meraki, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, PPP, PPPoE, PTP, RADIUS, REP, RIP, RIPv2, RIPv3, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

Edit Filters Show All/None

Scenario 0

New Delete

Toggle PDU List Window

Time: 00:35:20.230 PLAY CONTROLS

Copper Straight-Through

14:38 27.04.2025

Cisco Packet Tracer

File Edit Options View Tools Extensions Window Help

Logical Physical x 1014 y 207

Simulation Panel

Event List

Vis.	Time(sec)	Last Device
0.000	-	-
0.001	0.001	PC2
0.002	0.002	Switch2
0.003	0.003	Multilayer Switch0
0.004	0.004	Switch4
0.005	0.005	PC4

Reset Simulation Constant Delay Captured to: 0.005 s

Play Controls

Event List Filters - Visible Events

ACL Filter, ARP, BGP, Bluetooth, CAPWAP, CDP, DHCP, DHCPv6, DNS, DTP, EAPOL, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, Icmp, Icmpv6, LACP, LLDP, Meraki, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, PPP, PPPoE, PTP, RADIUS, REP, RIP, RIPv2, RIPv3, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

Edit Filters Show All/None

Scenario 0

New Delete

Toggle PDU List Window

Time: 00:35:20.230 PLAY CONTROLS

Copper Straight-Through

14:38 27.04.2025

Cisco Packet Tracer

File Edit Options View Tools Extensions Window Help

Logical Physical 1173 v.287

Simulation Panel

Event List

Vis.	Time(sec)	Last Device
	0.000	-
	0.001	PC2
	0.002	Switch2
	0.003	Multilayer Switch0
	0.004	Switch4
	0.005	PC4

Reset Simulation Constant Delay Captured to: 0.005 s

Play Controls

Event List Filters - Visible Events

ACL, Filter, ARP, BGP, Bluetooth, CAPWAP, CDP, DHCP, DHCPv6, DNS, DTP, EAPOL, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, iST, iST TGP, LACP, LLDP, Meraki, NCP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, PPP, PPPoE, PTP, RADIUS, REP, RIP, RIPv2, RIPv3, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

Edit Filters Show All/None

Scenario 0

New Delete

Toggle PDU List Window

Time: 00:35:20.232 PLAY CONTROLS

Copper Straight-Through

14:38 27.04.2025