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Лабораторные работы 6-10
по “Сетевой безопасности”

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Ташкент – 2023

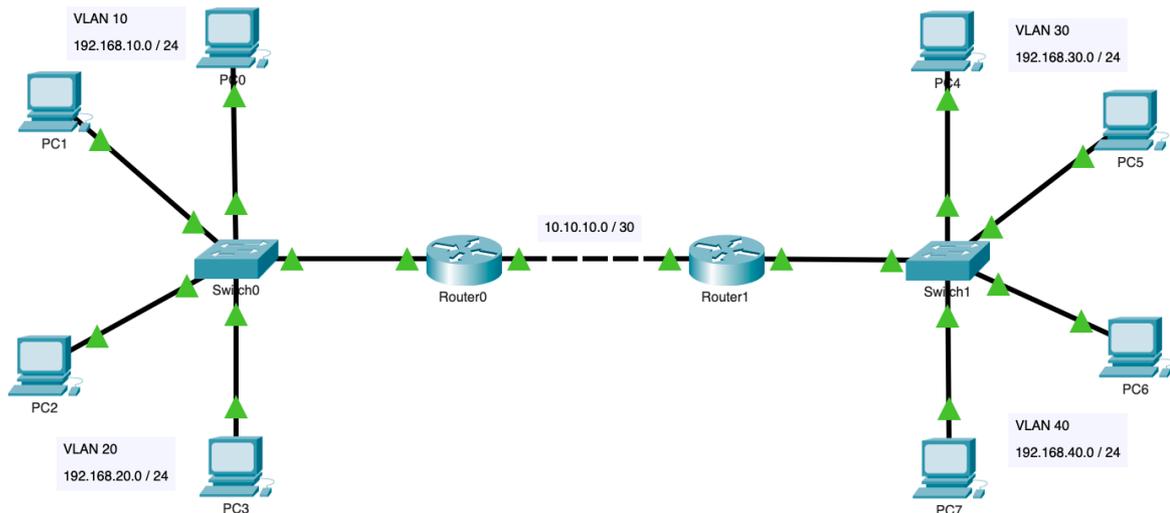
Лабораторная работа-6

Тема: Настройка динамической маршрутизации на основе протокола RIP

Цель работы: Освоение практических навыков по обеспечению безопасности в сети, построенный на протокола маршрутизации RIP.

Задача

1. Создайте топологию сети, построенной на основе протокола динамической маршрутизации RIP
2. Настройте интерфейсы маршрутизаторов R1, R2;
3. Настройте аутентификацию информационного потока в протоколе динамической маршрутизации
4. Изучите таблицу маршрутизации на каждом маршрутизаторе.



```
Xoshimov_1#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 10.10.10.0/30 is directly connected, GigabitEthernet0/0
L 10.10.10.1/32 is directly connected, GigabitEthernet0/0
192.168.10.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.10.0/24 is directly connected, GigabitEthernet0/1.10
L 192.168.10.254/32 is directly connected, GigabitEthernet0/1.10
192.168.20.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.20.0/24 is directly connected, GigabitEthernet0/1.20
L 192.168.20.254/32 is directly connected, GigabitEthernet0/1.20
R 192.168.30.0/24 [120/1] via 10.10.10.2, 00:00:05, GigabitEthernet0/0
R 192.168.40.0/24 [120/1] via 10.10.10.2, 00:00:05, GigabitEthernet0/0
```

1) Xoshimov_1#
Xoshimov_1#

```
Xoshimov_2#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 10.10.10.0/30 is directly connected, GigabitEthernet0/0
L 10.10.10.2/32 is directly connected, GigabitEthernet0/0
R 192.168.10.0/24 [120/1] via 10.10.10.1, 00:00:11, GigabitEthernet0/0
R 192.168.20.0/24 [120/1] via 10.10.10.1, 00:00:11, GigabitEthernet0/0
192.168.30.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.30.0/24 is directly connected, GigabitEthernet0/1.30
L 192.168.30.254/32 is directly connected, GigabitEthernet0/1.30
192.168.40.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.40.0/24 is directly connected, GigabitEthernet0/1.40
L 192.168.40.254/32 is directly connected, GigabitEthernet0/1.40
```

2) Xoshimov_2#
Xoshimov_2#

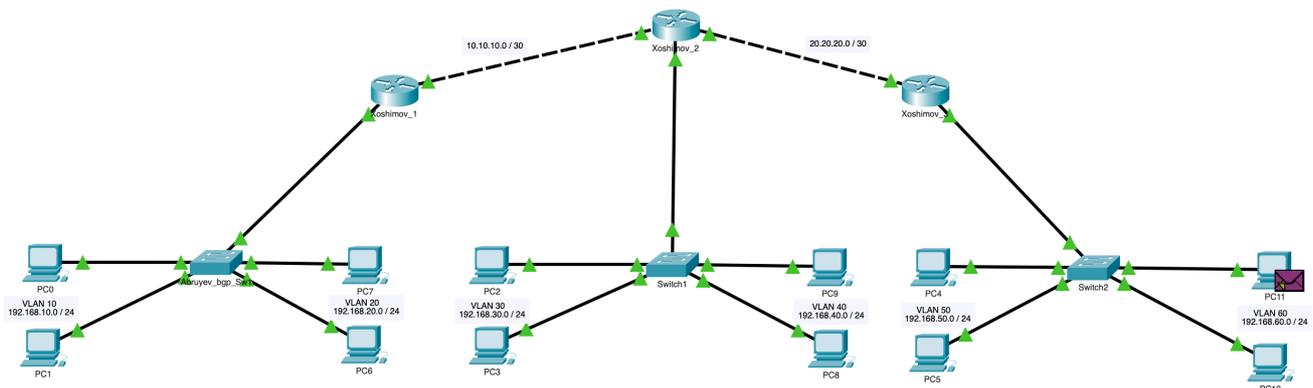
Лабораторная работа-7

Тема: Настройка динамической маршрутизации на основе протокола BGP

Цель работы: Освоение практических навыков по обеспечению безопасности в сети, построенный на протокола маршрутизации BGP.

Задача

1. Создайте топологию сети, построенной на основе протокола динамической маршрутизации BGP
2. Настройте интерфейсы маршрутизаторов R1, R2 и R3;
3. Настройте аутентификацию информационного потока в протоколе динамической маршрутизации
4. Изучите таблицу маршрутизации на каждом маршрутизаторе.



```
Xoshimov_3#show ip route
Xoshimov_3#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is not set

20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 20.20.20.0/30 is directly connected, GigabitEthernet0/1
L 20.20.20.0/32 is directly connected, GigabitEthernet0/1
B 192.168.10.0/24 [20/0] via 20.20.20.1, 00:00:00
B 192.168.20.0/24 [20/0] via 20.20.20.1, 00:00:00
B 192.168.30.0/24 [20/0] via 20.20.20.1, 00:00:00
B 192.168.40.0/24 [20/0] via 20.20.20.1, 00:00:00
C 192.168.50.0/24 is variably subnetted, 2 subnets, 2 masks
L 192.168.50.0/24 is directly connected, GigabitEthernet0/0.50
L 192.168.50.254/32 is directly connected, GigabitEthernet0/0.50
L 192.168.60.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.60.0/24 is directly connected, GigabitEthernet0/0.60
L 192.168.60.0/24 is directly connected, GigabitEthernet0/0.60

Xoshimov_2#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 10.10.10.0/30 is directly connected, GigabitEthernet0/1
L 10.10.10.0/32 is directly connected, GigabitEthernet0/1
C 20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 20.20.20.0/30 is directly connected, GigabitEthernet0/2
L 20.20.20.0/32 is directly connected, GigabitEthernet0/2
B 192.168.10.0/24 [20/0] via 10.10.10.1, 00:00:00
B 192.168.20.0/24 [20/0] via 10.10.10.1, 00:00:00
B 192.168.30.0/24 is variably subnetted, 2 subnets, 2 masks
L 192.168.30.0/24 is directly connected, GigabitEthernet0/0.30
L 192.168.30.254/32 is directly connected, GigabitEthernet0/0.30
L 192.168.40.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.40.0/24 is directly connected, GigabitEthernet0/0.40
L 192.168.40.0/24 is directly connected, GigabitEthernet0/0.40
B 192.168.50.0/24 [20/0] via 20.20.20.2, 00:00:00
B 192.168.60.0/24 [20/0] via 20.20.20.2, 00:00:00

Xoshimov_1#
Xoshimov_1#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 10.10.10.0/30 is directly connected, GigabitEthernet0/1
L 10.10.10.0/32 is directly connected, GigabitEthernet0/1
L 192.168.10.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.10.0/24 is directly connected, GigabitEthernet0/0.10
L 192.168.10.254/32 is directly connected, GigabitEthernet0/0.10
C 192.168.20.0/24 is variably subnetted, 2 subnets, 2 masks
L 192.168.20.0/24 is directly connected, GigabitEthernet0/0.20
L 192.168.20.254/32 is directly connected, GigabitEthernet0/0.20
B 192.168.30.0/24 [20/0] via 10.10.10.2, 00:00:00
B 192.168.40.0/24 [20/0] via 10.10.10.2, 00:00:00
B 192.168.50.0/24 [20/0] via 10.10.10.2, 00:00:00
B 192.168.60.0/24 [20/0] via 10.10.10.2, 00:00:00
```

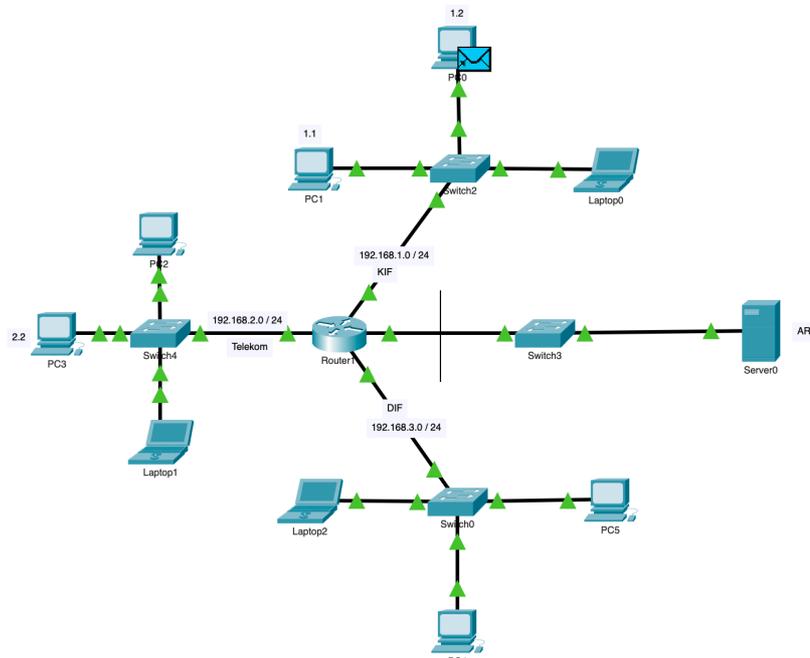

Лабораторная работа-8

Тема : Настройки списка ACL

Цель работы: Изучение правил создания, настройки и проверки списков ACL, используемых в сетях передачи данных.

Задача

1. Создайте сеть по Standart ACL и введите параметры конфигурации согласно списку правил.
2. Создайте сеть по Extended ACL и введите параметры конфигурации в соответствии со списком правил.
3. Проанализировать список правил, включенных в роутер.



Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Failed	PC3	Server0	IC...		0.000	N	0	(...)	
	Successful	Lapt...	Server0	IC...		0.000	N	1	(...)	
	Successful	PC0	Server0	IC...		0.000	N	2	(...)	
	Failed	PC5	Server0	IC...		0.000	N	3	(...)	

```
Xoshimov#show access-lists
Standard IP access list 1
 10 permit host 192.168.1.1
 20 permit host 192.168.1.2 (3 match(es))
 30 deny 192.168.1.0 0.0.0.255
 40 permit host 192.168.2.1
 50 deny host 192.168.2.2 (5 match(es))
 60 permit 192.168.2.0 0.0.0.255
 70 permit host 192.168.3.1
 80 permit host 192.168.3.3 (4 match(es))
 90 deny 192.168.3.0 0.0.0.255 (4 match(es))
```

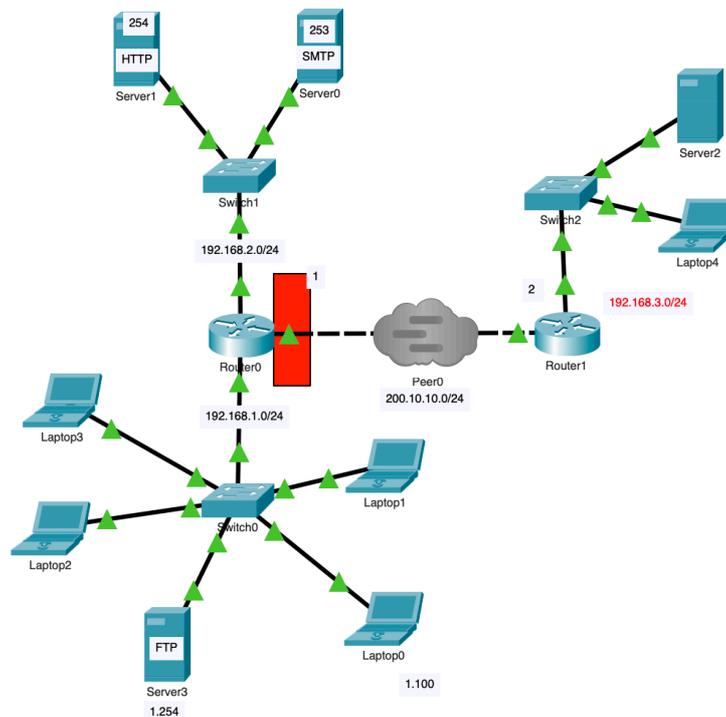

Лабораторная работа-9

Тема: Расширенный список ACL

Цель работы: Изучение правил создания, настройки и проверки списков ACL, используемых в сетях передачи данных.

Задача

1. Создайте сеть по Standart ACL и введите параметры конфигурации согласно списку правил.
2. Создайте сеть по Extended ACL и введите параметры конфигурации в соответствии со списком правил.
3. Проанализировать список правил, включенных в роутер.

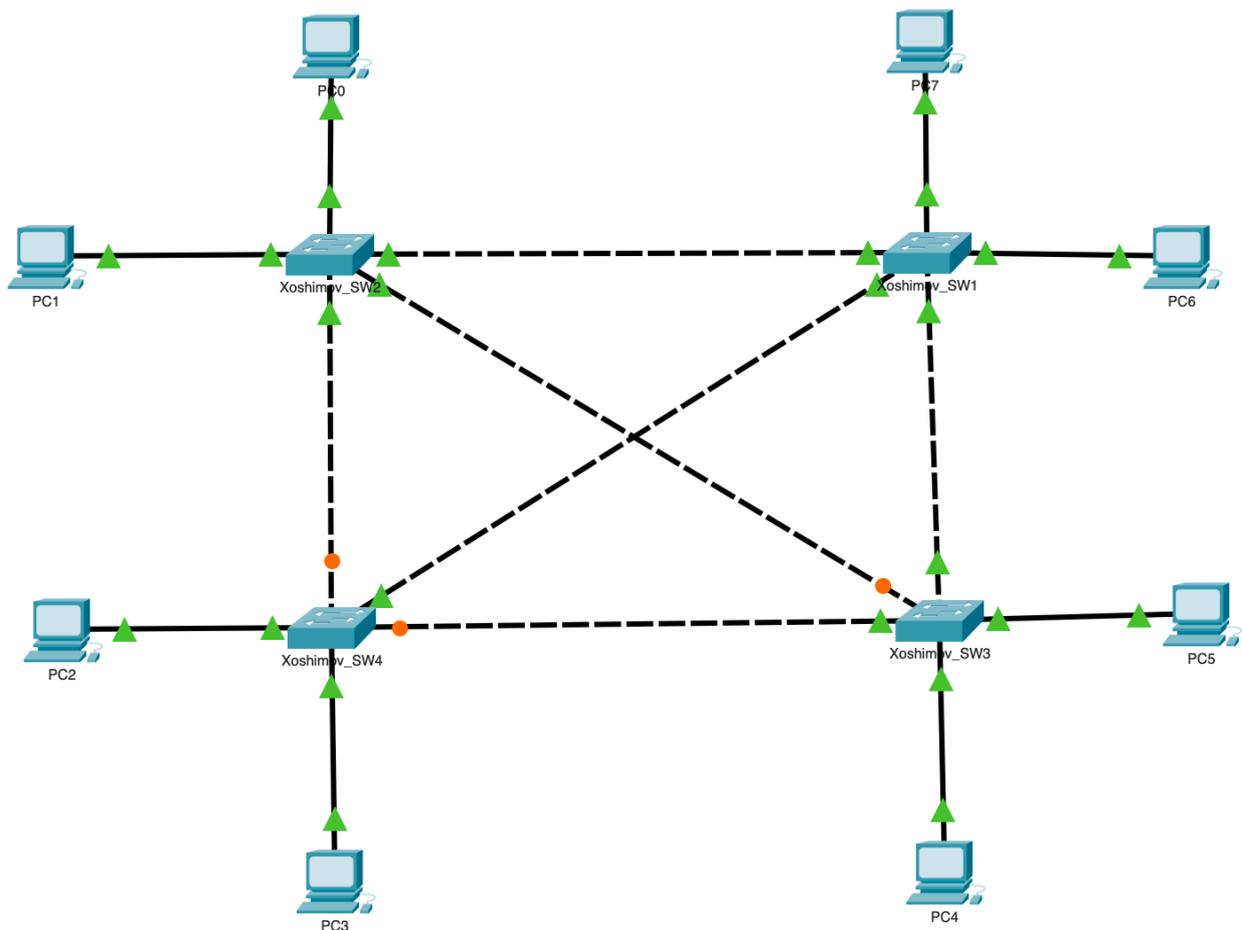


```
Router#show access-lists
Extended IP access list 100
 10 permit tcp any 192.168.2.0 0.0.0.255 eq www
 20 permit tcp any 192.168.2.0 0.0.0.255 eq smtp
 30 permit tcp any eq www 192.168.1.0 0.0.0.255
 40 permit tcp any eq 443 192.168.1.0 0.0.0.255
 50 permit icmp any 192.168.1.0 0.0.0.255 echo
```

Лабораторная работа-10

Тема: Настройка протокол резервирования – STP и протоколов агрегирования – LACP, PAGP

Цель работы: Освоение практических навыков по настройке протоколов канального уровня STP, RSTP, LACP, PAGP.



```
VLAN0001
Spanning tree enabled protocol ieee
Root ID    Priority    32769
           Address    0000.0C25.37DD
           This bridge is the root
           Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec

Bridge ID  Priority    32769 (priority 32768 sys-id-ext 1)
           Address    0000.0C25.37DD
           Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec
           Aging Time 20
```

Interface	Role	Sts	Cost	Prio.Nbr	Type
Fa0/1	Desg	FWD	19	128.1	P2p
Fa0/2	Desg	FWD	19	128.2	P2p
Fa0/3	Desg	FWD	19	128.3	P2p
Fa0/4	Desg	FWD	19	128.4	P2p
Fa0/5	Desg	FWD	19	128.5	P2p

Sw1)

```

VLAN0001
Spanning tree enabled protocol ieee
Root ID Priority 32769
      Address 0000.0C25.37DD
      Cost 19
      Port 1(FastEthernet0/1)
      Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 40961 (priority 40960 sys-id-ext 1)
      Address 00E0.F9A4.E232
      Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
      Aging Time 20

```

Sw2)

Interface	Role	Sts	Cost	Prio.Nbr	Type
Fa0/1	Root	FWD	19	128.1	P2p
Fa0/2	Desg	FWD	19	128.2	P2p
Fa0/3	Desg	FWD	19	128.3	P2p
Fa0/4	Desg	FWD	19	128.4	P2p
Fa0/5	Desg	FWD	19	128.5	P2p

```

VLAN0001
Spanning tree enabled protocol ieee
Root ID Priority 32769
      Address 0000.0C25.37DD
      Cost 19
      Port 1(FastEthernet0/1)
      Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 45057 (priority 45056 sys-id-ext 1)
      Address 000C.853D.764B
      Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
      Aging Time 20

```

Sw3)

Interface	Role	Sts	Cost	Prio.Nbr	Type
Fa0/1	Root	FWD	19	128.1	P2p
Fa0/2	Desg	FWD	19	128.2	P2p
Fa0/3	Altn	BLK	19	128.3	P2p
Fa0/4	Desg	FWD	19	128.4	P2p
Fa0/5	Desg	FWD	19	128.5	P2p

```

VLAN0001
Spanning tree enabled protocol ieee
Root ID Priority 32769
      Address 0000.0C25.37DD
      Cost 19
      Port 3(FastEthernet0/3)
      Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 53249 (priority 53248 sys-id-ext 1)
      Address 00E0.8FA5.430C
      Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
      Aging Time 20

```

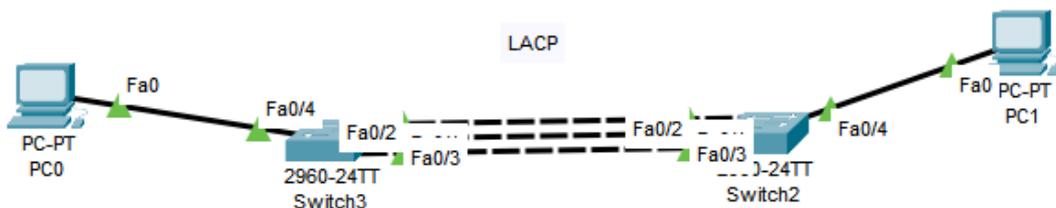
Sw4)

Interface	Role	Sts	Cost	Prio.Nbr	Type
Fa0/1	Altn	BLK	19	128.1	P2p
Fa0/2	Altn	BLK	19	128.2	P2p
Fa0/3	Root	FWD	19	128.3	P2p
Fa0/4	Desg	FWD	19	128.4	P2p
Fa0/5	Desg	FWD	19	128.5	P2p

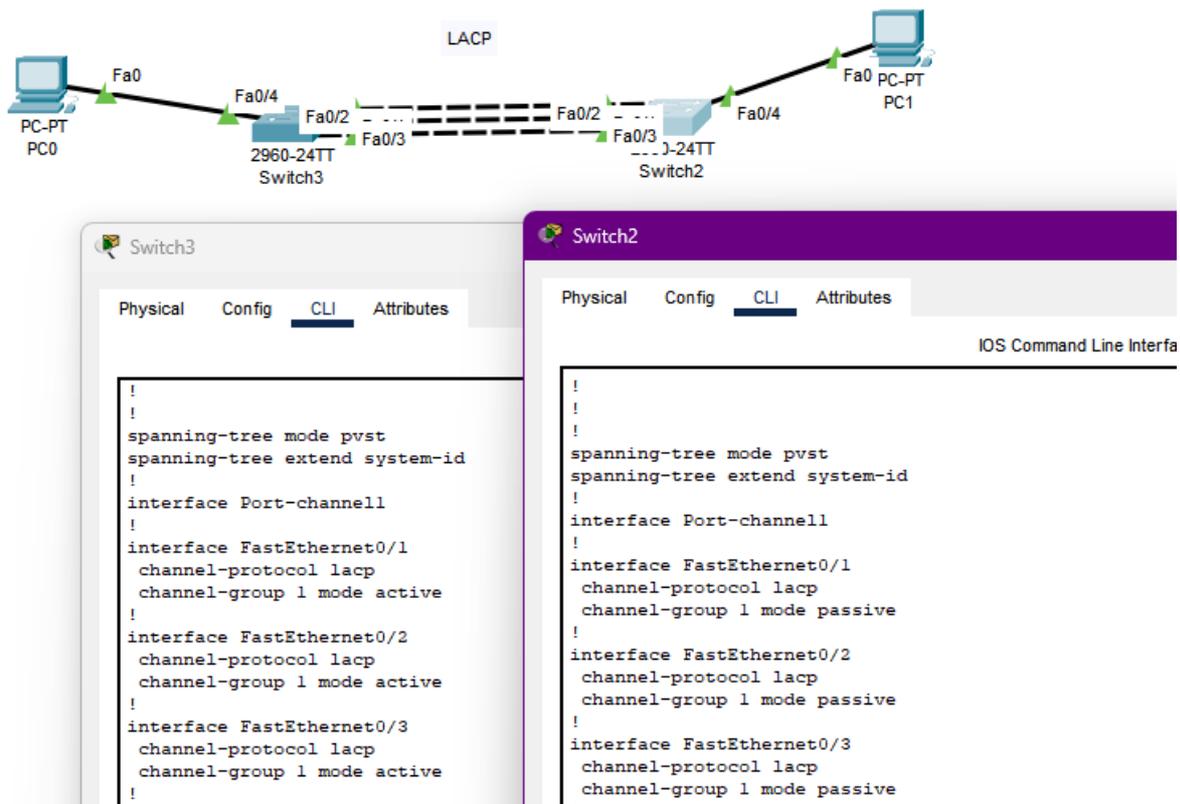
2. Задание по настройке протоколов агрегирования LACP и PAGP

- Настройка и проверка интерфейсов коммутатора S1, S2 как показано на рисунке 4.9;
- Конфигурация агрегаций каналов с помощью протоколов LACP или PagP;
- Изучение функций команд написанные на каждом коммутаторе.

LACP)



В топологии LACP левый коммутатор будет active, правый passive



PAGP)



В топологии PAGP левый коммутатор будет работать в режиме auto, правый desirable

```

Channel-group listing:
-----
Group: 1
-----
Port-channels in the group:
-----
Port-channel: Po1
-----
Age of the Port-channel = 00d:00h:04m:02s
Logical slot/port = 2/1      Number of ports = 4
GC = 0x00000000      HotStandBy port = null
Port state = Port-channel
Protocol = PAGP
Port Security = Disabled

Ports in the Port-channel:
-----
Index  Load  Port      EC state      No of bits
-----+-----+-----+-----+-----
0      00     Fa0/3     Desirable-S1  0
0      00     Fa0/1     Desirable-S1  0
0      00     Fa0/4     Desirable-S1  0
0      00     Fa0/2     Desirable-S1  0
Time since last port bundled: 00d:00h:04m:01s  Fa0/2
    
```

```

Channel-group listing:
-----
Group: 1
-----
Port-channels in the group:
-----
Port-channel: Po1
-----
Age of the Port-channel = 00d:00h:07m:01s
Logical slot/port = 2/1      Number of ports = 4
GC = 0x00000000      HotStandBy port = null
Port state = Port-channel
Protocol = PAGP
Port Security = Disabled

Ports in the Port-channel:
-----
Index  Load  Port      EC state      No of bits
-----+-----+-----+-----+-----
0      00     Fa0/3     Automatic     0
0      00     Fa0/1     Automatic     0
0      00     Fa0/4     Automatic     0
0      00     Fa0/2     Automatic     0
Time since last port bundled: 00d:00h:07m:00s  Fa0/2
    
```