Министерство образования Республики Беларусь

Учреждение образования

БЕЛОРУССКИЙ ГОСУДАРСТВЕННЫЙ УНИВЕРСИТЕТ

ИНФОРМАТИКИ И РАДИОЭЛЕКТРОНИКИ

Факультет компьютерных систем и сетей

Кафедра электронных вычислительных машин

ОТЧЕТ

по лабораторной работе №2

по дисциплине АОКС

Вариант №859

|  |  |
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Минск 2022

**Теоретическая часть**

**1.** Для применения в лабораторной работе был выбран выбран L3-коммутатор. Использование такого коммутатора, который устанавливается вместо L2-коммутатора, а не «маршрутизатора на палке», подключённого только к одному коммутатору, позволяет подключить к осуществляющему маршрутизацию устройству сразу несколько коммутаторов, то есть трафик проходит через большее количество каналов, увеличивается пропускная способность.

Такое решение сократит количество переходов для требующих маршрутизации пакетов. В случае установки «маршрутизатора на палке», коммутатор, к которому он был бы подключён столкнулся с большим количеством транзитного трафика.

Дополнительными причинами выбора в пользу L3-коммутаора послужили – отсутствие необходимости в подключения внешних связей в топологию, в функциях, которые доступны только в маршрутизаторах, таких как VPN, NAT и иных.

**2.** Для настройки агрегации каналов был выбран [LACP](http://xgu.ru/wiki/LACP) (Link Aggregation Control Protocol) стандартный протокол. Его рекомендует cisco и он более унверсальный.

**3.** В качестве port-security были применены достаточно жесткие настройки, а именно: макс кол-во ip – 1 и режим запоминания ip – sticky. Это должно повысить безопасность адм. сети.

**Практическая часть:**

**Рабочие конфигурации:**

**N2:**Current configuration : 3288 bytes

version 16.3.2

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

hostname Switch

no ip cef

ip routing

no ipv6 cef

spanning-tree mode pvst

spanning-tree vlan 10,20,100-101 priority 24576

interface Port-channel1

interface Port-channel3

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

interface Port-channel6

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

interface Port-channel7

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

interface GigabitEthernet1/0/1

interface GigabitEthernet1/0/2

interface GigabitEthernet1/0/3

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

channel-protocol lacp

channel-group 3 mode active

interface GigabitEthernet1/0/4

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

channel-protocol lacp

channel-group 3 mode active

interface GigabitEthernet1/0/5

interface GigabitEthernet1/0/6

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

channel-protocol lacp

channel-group 6 mode active

interface GigabitEthernet1/0/7

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

channel-protocol lacp

channel-group 6 mode active

interface GigabitEthernet1/0/8

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

channel-protocol lacp

channel-group 7 mode active

interface GigabitEthernet1/0/9

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

channel-protocol lacp

channel-group 7 mode active

…

interface Vlan1

no ip address

shutdown

interface Vlan10

mac-address 0002.4a9a.c601

ip address 133.138.10.100 255.255.255.128

interface Vlan20

mac-address 0002.4a9a.c602

ip address 146.85.169.182 255.255.255.248

interface Vlan100

mac-address 0002.4a9a.c603

ip address 99.146.203.190 255.255.255.192

interface Vlan101

mac-address 0002.4a9a.c604

ip address 103.105.96.100 255.255.224.0

ip classless

ip route 133.138.10.0 255.255.255.128 Vlan10

ip route 146.85.169.176 255.255.255.248 Vlan20

ip route 99.146.203.128 255.255.255.192 Vlan100

ip route 103.105.96.0 255.255.224.0 Vlan101

ip flow-export version 9

line con 0

line aux 0

line vty 0 4

login

end

**N3:**

Current configuration : 1722 bytes

version 15.0

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

hostname Switch

spanning-tree mode pvst

spanning-tree extend system-id

interface Port-channel3

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

interface FastEthernet0/1

interface FastEthernet0/2

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

channel-protocol lacp

channel-group 3 mode passive

interface FastEthernet0/3

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

channel-protocol lacp

channel-group 3 mode passive

interface FastEthernet0/4

interface FastEthernet0/5

interface FastEthernet0/6

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

interface FastEthernet0/7

interface FastEthernet0/8

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

…

interface Vlan1

no ip address

shutdown

line con 0

line vty 0 4

login

line vty 5 15

login

End

**N6:**

Current configuration : 1720 bytes

version 15.0

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

hostname Switch

spanning-tree mode pvst

spanning-tree extend system-id

interface Port-channel2

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

interface FastEthernet0/1

interface FastEthernet0/2

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

channel-protocol lacp

channel-group 2 mode active

interface FastEthernet0/3

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

interface FastEthernet0/4

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

channel-protocol lacp

channel-group 2 mode active

interface FastEthernet0/5

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

…

interface Vlan1

no ip address

shutdown

line con 0

line vty 0 4

login

line vty 5 15

login

End

**N8:**

Current configuration : 1738 bytes

version 15.0

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

hostname Switch

spanning-tree mode pvst

spanning-tree extend system-id

interface FastEthernet0/1

switchport access vlan 20

switchport mode access

spanning-tree portfast

spanning-tree bpduguard enable

interface FastEthernet0/2

switchport access vlan 10

switchport mode access

spanning-tree portfast

spanning-tree bpduguard enable

interface FastEthernet0/3

switchport access vlan 101

switchport mode access

switchport port-security

switchport port-security mac-address sticky

switchport port-security mac-address sticky 0010.11E0.4A91

spanning-tree portfast

spanning-tree bpduguard enable

interface FastEthernet0/4

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

interface FastEthernet0/5

interface FastEthernet0/6

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

…

interface Vlan1

no ip address

shutdown

line con 0

line vty 0 4

login

line vty 5 15

login

End

**N7:**

Current configuration : 1720 bytes

version 15.0

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

hostname Switch

spanning-tree mode pvst

spanning-tree extend system-id

interface Port-channel2

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

interface FastEthernet0/1

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

interface FastEthernet0/2

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

channel-protocol lacp

channel-group 2 mode active

interface FastEthernet0/3

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

channel-protocol lacp

channel-group 2 mode active

interface FastEthernet0/4

interface FastEthernet0/5

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

…

interface Vlan1

no ip address

shutdown

line con 0

line vty 0 4

login

line vty 5 15

login

End

**N1:**

Current configuration : 1284 bytes

version 15.0

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

hostname Switch

spanning-tree mode pvst

spanning-tree extend system-id

…

interface FastEthernet0/5

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

interface FastEthernet0/7

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

interface FastEthernet0/8

interface FastEthernet0/9

interface FastEthernet0/10

interface FastEthernet0/11

interface Vlan1

no ip address

shutdown

line con 0

line vty 0 4

login

line vty 5 15

End

**N5:**

version 15.0

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

hostname Switch

spanning-tree mode pvst

spanning-tree extend system-id

interface FastEthernet0/1

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunя

…

interface FastEthernet0/4

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

…

interface FastEthernet0/7

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

…

interface Vlan1

no ip address

shutdown

line con 0

line vty 0 4

login

line vty 5 15

login

End

**N4:**

version 15.0

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

hostname Switch

spanning-tree mode pvst

spanning-tree extend system-id

interface FastEthernet0/1

switchport access vlan 20

switchport mode access

spanning-tree portfast

spanning-tree bpduguard enable

interface FastEthernet0/2

switchport access vlan 10

switchport mode access

spanning-tree portfast

spanning-tree bpduguard enable

interface FastEthernet0/3

switchport access vlan 10

switchport mode access

spanning-tree portfast

spanning-tree bpduguard enable

interface FastEthernet0/4

interface FastEthernet0/5

switchport trunk native vlan 100

switchport trunk allowed vlan 10,20,100-101

switchport mode trunk

…

interface Vlan1

no ip address

shutdown

line con 0

line vty 0 4

login

line vty 5 15

login

End

Топология:

