Институт информационных технологий (ИИТ)

Кафедра инструментального и прикладного программного обеспечения(ИиППО)

ОТЧЕТ ПО ПРАКТИЧЕСКОЙ РАБОТЕ

по дисциплине «Технологии передачи данных»

Лабораторная работа №9

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СОДЕРЖАНИЕ

ХОД РАБОТЫ

Задача №1

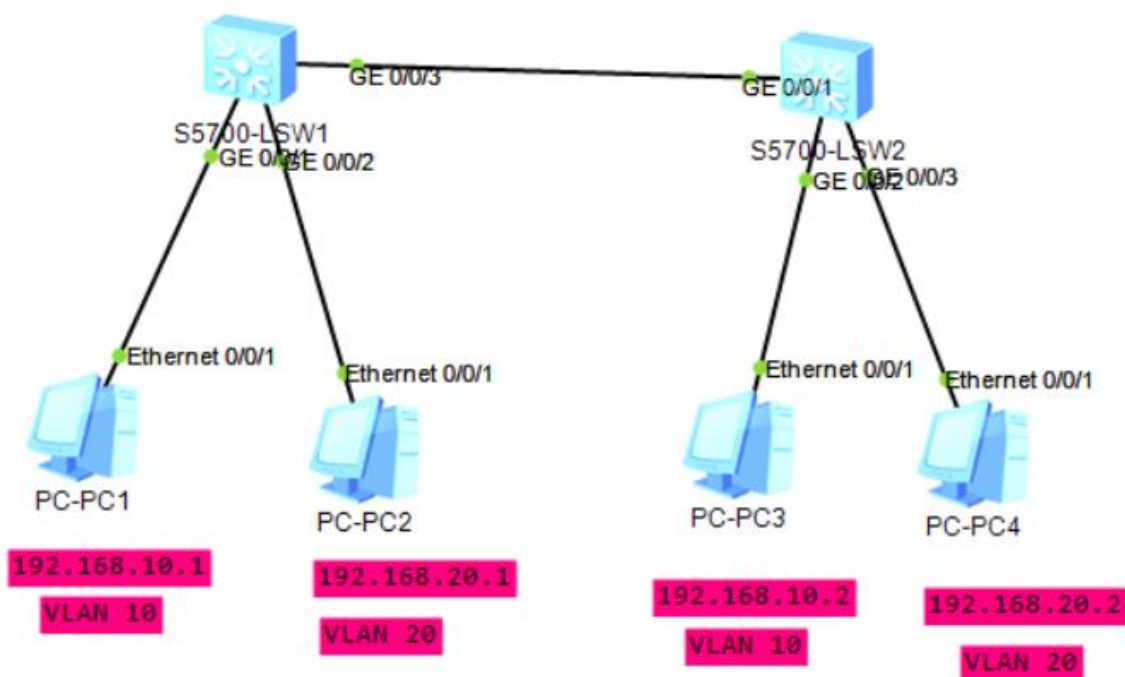В рамках данного шага происходит построение топологии (Рисунок 1).

Рисунок 1 – Топология сети

Далее предоставляется информация о конфигурации коммутаторов (Листинг 1 - 2).

Листинг 1 – Конфигурация коммутатора S1_Stoka

```
sysname S1_Stoka
#
vlan batch 10 20
#
cluster enable
ntdp enable
ndp enable
#
drop illegal-mac alarm
#
diffserv domain default
#
drop-profile default
#
aaa
 authentication-scheme default
 authorization-scheme default
 accounting-scheme default
```

```
domain default
 domain default_admin
 local-user admin password simple admin
 local-user admin service-type http
#
interface Vlanif1
#
interface MEth0/0/1
#
interface GigabitEthernet0/0/1
 port link-type access
 port default vlan 10
#
interface GigabitEthernet0/0/2
 port link-type access
 port default vlan 20
#
interface GigabitEthernet0/0/3
 port link-type trunk
 port trunk allow-pass vlan 10 20
#
#
interface NULL0
#
user-interface con 0
user-interface vty 0 4
#
return
```

Листинг 2 – Конфигурация коммутатора S2_Stoka

```
sysname S2_Stoka
#
vlan batch 10 20
#
cluster enable
ntdp enable
ndp enable
#
drop illegal-mac alarm
#
diffserv domain default
#
drop-profile default
#
aaa
 authentication-scheme default
 authorization-scheme default
 accounting-scheme default
 domain default
 domain default_admin
 local-user admin password simple admin
 local-user admin service-type http
#
interface Vlanif1
#
interface MEth0/0/1
#
interface GigabitEthernet0/0/1
 port link-type trunk
 port trunk allow-pass vlan 10 20
```

```
#
interface GigabitEthernet0/0/2
 port link-type access
 port default vlan 10
#
interface GigabitEthernet0/0/3
 port link-type access
 port default vlan 20
#
interface NULL0
#
user-interface con 0
user-interface vty 0 4
#
return
```

Далее проверим работоспособность сети (Рисунок 2).


```
PC>ping 192.168.10.2

Ping 192.168.10.2: 32 data bytes, Press Ctrl_C to break
From 192.168.10.2: bytes=32 seq=1 ttl=128 time=78 ms
From 192.168.10.2: bytes=32 seq=2 ttl=128 time=62 ms
From 192.168.10.2: bytes=32 seq=3 ttl=128 time=63 ms
From 192.168.10.2: bytes=32 seq=4 ttl=128 time=63 ms
From 192.168.10.2: bytes=32 seq=5 ttl=128 time=78 ms

--- 192.168.10.2 ping statistics ---
  5 packet(s) transmitted
  5 packet(s) received
  0.00% packet loss
  round-trip min/avg/max = 62/68/78 ms

PC>tracert 192.168.10.2

traceroute to 192.168.10.2, 8 hops max
(ICMP), press Ctrl+C to stop
 1   192.168.10.2   62 ms   63 ms   62 ms

PC>ping 192.168.20.1

Ping 192.168.20.1: 32 data bytes, Press Ctrl_C to break
From 192.168.10.1: Destination host unreachable
From 192.168.10.1: Destination host unreachable
From 192.168.10.1: Destination host unreachable
From 192.168.10.1: Destination host unreachable
From 192.168.10.1: Destination host unreachable

--- 192.168.1.200 ping statistics ---
  5 packet(s) transmitted
  0 packet(s) received
  100.00% packet loss
```

Рисунок 2 – Проверка работоспособности

Задача №2

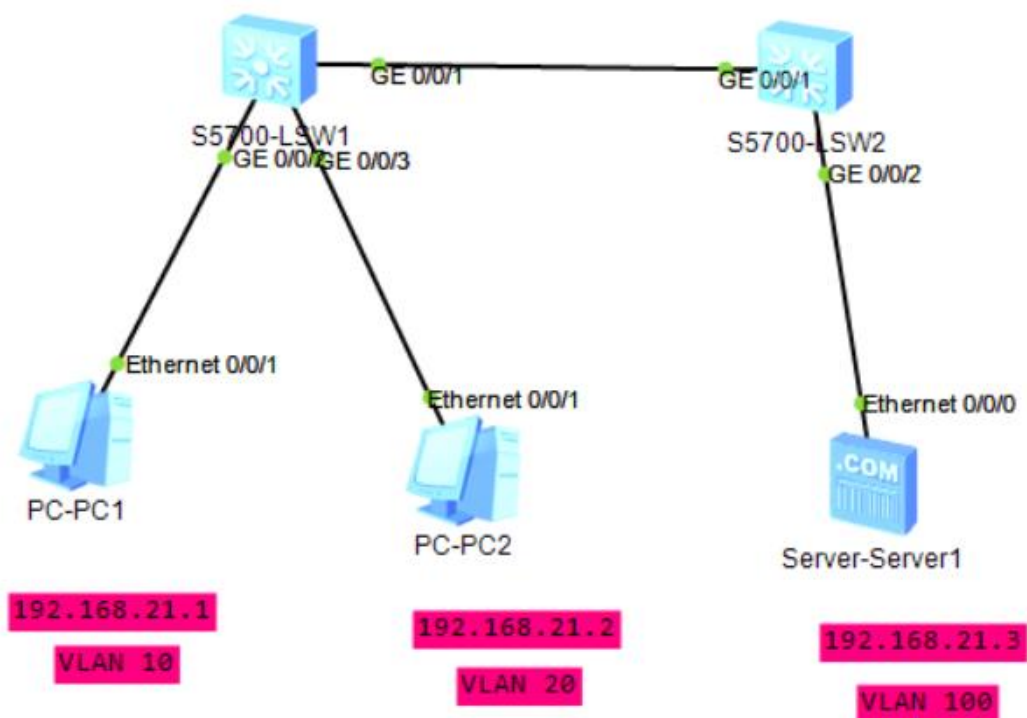В рамках данного шага производится создание топологии (Рисунок 3).

Рисунок 3 – Топология сети

Далее предоставляется информация о конфигурации коммутаторов (Листинг 3-4).

Листинг 3 – Конфигурация коммутатора S1_Stoka

```
sysname S1_Stoka
#
vlan batch 10 20 100
#
cluster enable
ntdp enable
ndp enable
#
drop illegal-mac alarm
#
diffserv domain default
#
drop-profile default
#
aaa
 authentication-scheme default
 authorization-scheme default
 accounting-scheme default
 domain default
 domain default_admin
 local-user admin password simple admin
 local-user admin service-type http
#
interface Vlanif1
```

```
#
interface MEth0/0/1
#
interface GigabitEthernet0/0/1
 port hybrid tagged vlan 10 20 100
#
interface GigabitEthernet0/0/2
 port hybrid pvid vlan 10
 port hybrid untagged vlan 10 100
#
interface GigabitEthernet0/0/3
 port hybrid pvid vlan 20
 port hybrid untagged vlan 20 100
#
interface NULL0
#
user-interface con 0
user-interface vty 0 4
#
return
```

Листинг 4 – Конфигурация коммутатора S2_Stoka

```
sysname S2_Stoka
#
vlan batch 10 20 100
#
cluster enable
ntdp enable
ndp enable
#
drop illegal-mac alarm
#
diffserv domain default
#
drop-profile default
#
aaa
 authentication-scheme default
 authorization-scheme default
 accounting-scheme default
 domain default
 domain default_admin
 local-user admin password simple admin
 local-user admin service-type http
#
interface Vlanif1
#
interface MEth0/0/1
#
interface GigabitEthernet0/0/1
 port hybrid tagged vlan 10 20 100
#
interface GigabitEthernet0/0/2
 port hybrid pvid vlan 100
 port hybrid untagged vlan 10 20 100
#
user-interface con 0
user-interface vty 0 4
#
return
```

Далее необходимо проверить работоспособность топологии (Рисунок 4).


```
PC>ping 192.168.21.3

Ping 192.168.21.3: 32 data bytes, Press Ctrl_C to break
From 192.168.21.3: bytes=32 seq=1 ttl=255 time=63 ms
From 192.168.21.3: bytes=32 seq=2 ttl=255 time=47 ms
From 192.168.21.3: bytes=32 seq=3 ttl=255 time=47 ms
From 192.168.21.3: bytes=32 seq=4 ttl=255 time=47 ms
From 192.168.21.3: bytes=32 seq=5 ttl=255 time=62 ms

--- 192.168.21.3 ping statistics ---
  5 packet(s) transmitted
  5 packet(s) received
  0.00% packet loss
  round-trip min/avg/max = 47/53/63 ms

PC>ping 192.168.21.2

Ping 192.168.21.2: 32 data bytes, Press Ctrl_C to break
From 192.168.21.1: Destination host unreachable
From 192.168.21.1: Destination host unreachable
From 192.168.21.1: Destination host unreachable
From 192.168.21.1: Destination host unreachable
From 192.168.21.1: Destination host unreachable

--- 192.168.21.2 ping statistics ---
  5 packet(s) transmitted
  0 packet(s) received
  100.00% packet loss
```

Рисунок 4 – Проверка работоспособности

Задача №3

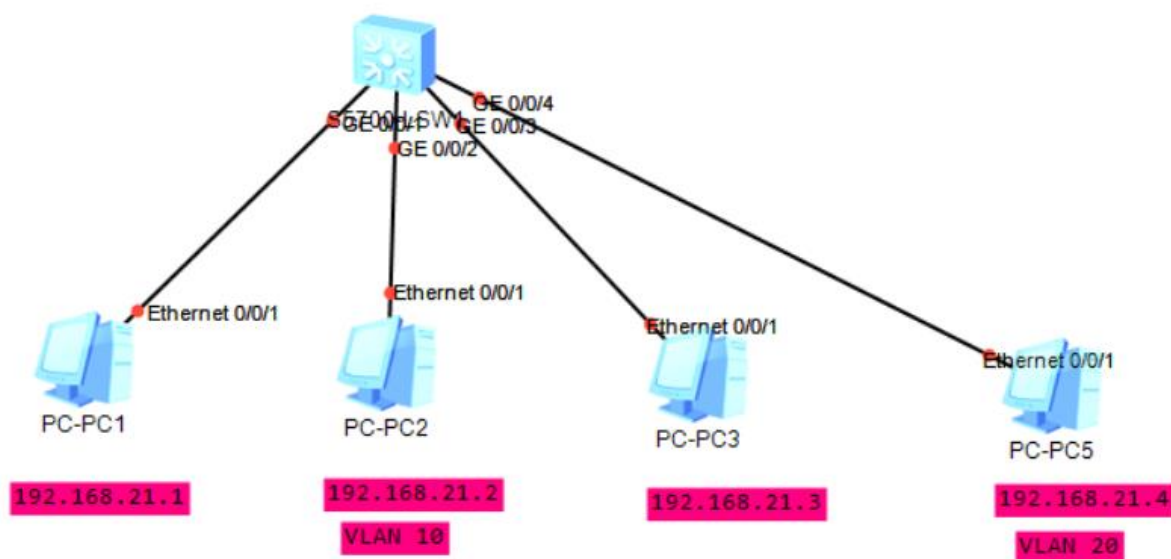В рамках данного шага производится создание топологии (Рисунок 5).

Рисунок 5 – Топология сети

Далее предоставляется информация о конфигурации коммутатора (Листинг 5).

Листинг 5 – Конфигурация коммутатора S1_Stoka

```
sysname S1_Stoka
#
vlan batch 10 20
#
cluster enable
ntdp enable
ndp enable
#
drop illegal-mac alarm
#
diffserv domain default
#
drop-profile default
#
vlan 10
 mac-vlan mac-address 5489-98d6-6345 priority 0
 mac-vlan mac-address 5489-9830-66ee priority 0
 mac-vlan mac-address 5489-988c-529c priority 0
vlan 20
 mac-vlan mac-address 5489-98d5-7148 priority 0
#
aaa
 authentication-scheme default
 authorization-scheme default
 accounting-scheme default
 domain default
 domain default_admin
 local-user admin password simple admin
 local-user admin service-type http
#
interface Vlanif1
#
interface MEth0/0/1
#
interface GigabitEthernet0/0/1
 port hybrid untagged vlan 10
#
interface GigabitEthernet0/0/2
 port hybrid untagged vlan 10
 mac-vlan enable
#
interface GigabitEthernet0/0/3
 port hybrid untagged vlan 10
 mac-vlan enable
#
interface GigabitEthernet0/0/4
 port hybrid tagged vlan 20
 mac-vlan enable
#
user-interface con 0
user-interface vty 0 4
#
return
```

Далее необходимо проверить работоспособность сети (Рисунок 6).


```
PC>ping 192.168.21.2

Ping 192.168.21.2: 32 data bytes, Press Ctrl_C to break
From 192.168.21.2: bytes=32 seq=1 ttl=128 time=47 ms
From 192.168.21.2: bytes=32 seq=2 ttl=128 time=47 ms
From 192.168.21.2: bytes=32 seq=3 ttl=128 time=47 ms
From 192.168.21.2: bytes=32 seq=4 ttl=128 time=47 ms
From 192.168.21.2: bytes=32 seq=5 ttl=128 time=46 ms

--- 192.168.21.2 ping statistics ---
  5 packet(s) transmitted
  5 packet(s) received
  0.00% packet loss
  round-trip min/avg/max = 46/46/47 ms

PC>ping 192.168.21.3

Ping 192.168.21.3: 32 data bytes, Press Ctrl_C to break
From 192.168.21.3: bytes=32 seq=1 ttl=128 time=47 ms
From 192.168.21.3: bytes=32 seq=2 ttl=128 time=47 ms
From 192.168.21.3: bytes=32 seq=3 ttl=128 time=47 ms
From 192.168.21.3: bytes=32 seq=4 ttl=128 time=62 ms
From 192.168.21.3: bytes=32 seq=5 ttl=128 time=47 ms

--- 192.168.21.3 ping statistics ---
  5 packet(s) transmitted
  5 packet(s) received
  0.00% packet loss
  round-trip min/avg/max = 47/50/62 ms

PC>ping 192.168.21.4

Ping 192.168.21.4: 32 data bytes, Press Ctrl_C to break
From 192.168.21.1: Destination host unreachable
From 192.168.21.1: Destination host unreachable
From 192.168.21.1: Destination host unreachable
From 192.168.21.1: Destination host unreachable
From 192.168.21.1: Destination host unreachable

--- 192.168.21.4 ping statistics ---
  5 packet(s) transmitted
```

Рисунок 6 – Проверка работоспособности

Задача №4

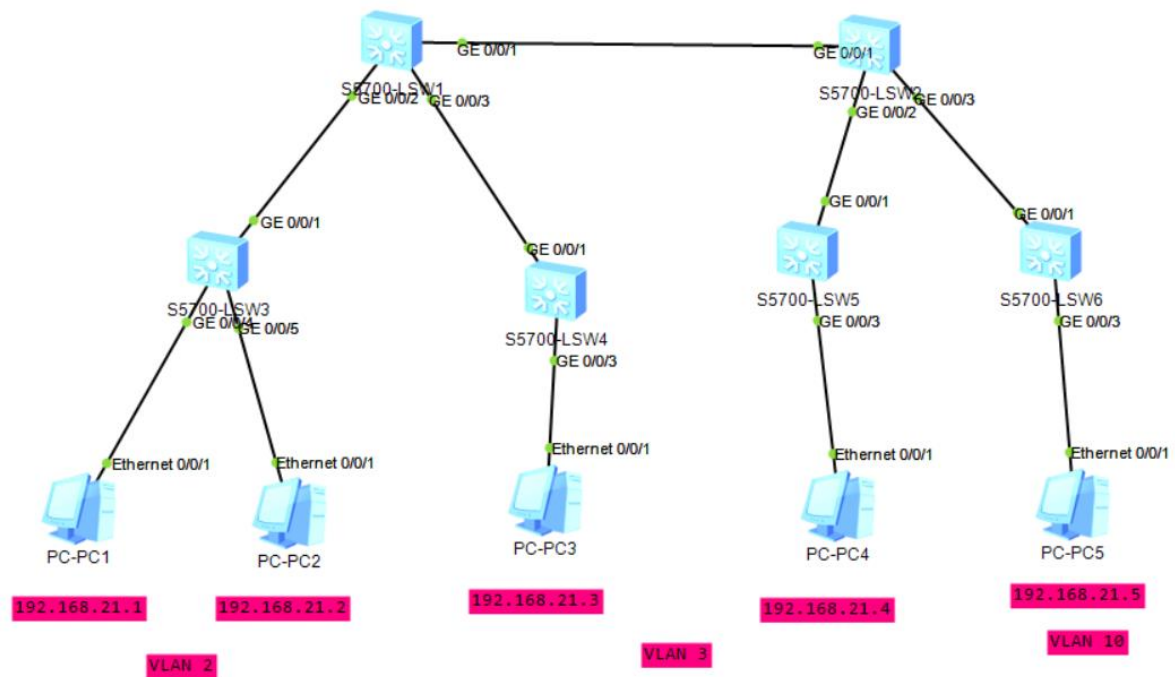В рамках данного шага производится создание топологии (Рисунок 7).

Рисунок 7 – Топология сети

Далее предоставляется информация о конфигурации коммутаторов (Листинг 6 - 11).

Листинг 6 – Конфигурация коммутатора S1_Stoka

```
sysname S1_Stoka
#
vlan batch 2 to 3 10
#
cluster enable
ntdp enable
ndp enable
#
drop illegal-mac alarm
#
diffserv domain default
#
drop-profile default
#
vlan 10
 mac-vlan mac-address 5489-988e-35bf priority 0
#
aaa
 authentication-scheme default
 authorization-scheme default
 accounting-scheme default
 domain default
 domain default_admin
 local-user admin password simple admin
 local-user admin service-type http
#
interface Vlanif1
#
interface MEth0/0/1
#
interface GigabitEthernet0/0/1
```

```
port link-type trunk
 port trunk allow-pass vlan 2 to 3 10
#
interface GigabitEthernet0/0/2
 port link-type trunk
 port trunk allow-pass vlan 2 to 3 10
#
interface GigabitEthernet0/0/3
 port link-type trunk
 port trunk allow-pass vlan 2 to 3 10
#
user-interface con 0
user-interface vty 0 4
#
 return
```

Листинг 7 – Конфигурация коммутатора S2_Stoka

```
sysname S2_Stoka
#
vlan batch 2 to 3 10
#
cluster enable
ntdp enable
ndp enable
#
drop illegal-mac alarm
#
diffserv domain default
#
drop-profile default
#
vlan 10
 mac-vlan mac-address 5489-988e-35bf priority 0
#
aaa
 authentication-scheme default
 authorization-scheme default
 accounting-scheme default
 domain default
 domain default_admin
 local-user admin password simple admin
 local-user admin service-type http
#
interface Vlanif1
#
interface MEth0/0/1
#
interface GigabitEthernet0/0/1
 port link-type trunk
 port trunk allow-pass vlan 2 to 3 10
#
interface GigabitEthernet0/0/2
 port link-type trunk
 port trunk allow-pass vlan 2 to 3 10
#
interface GigabitEthernet0/0/3
 port link-type trunk
 port trunk allow-pass vlan 2 to 3 10
#
user-interface con 0
user-interface vty 0 4
 return
```

Листинг 8 – Конфигурация коммутатора S3_Stoka

```
sysname S3_Stoka
#
vlan batch 2 to 3 10
#
cluster enable
ntdp enable
ndp enable
#
drop illegal-mac alarm
#
diffserv domain default
#
drop-profile default
#
vlan 10
 mac-vlan mac-address 5489-988e-35bf priority 0
#
aaa
 authentication-scheme default
 authorization-scheme default
 accounting-scheme default
 domain default
 domain default_admin
 local-user admin password simple admin
 local-user admin service-type http
#
interface Vlanif1
#
interface MEth0/0/1
#
interface GigabitEthernet0/0/1
 port link-type trunk
 port trunk allow-pass vlan 2 to 3 10
#
interface GigabitEthernet0/0/2
 port link-type access
 port default vlan 2
#
interface GigabitEthernet0/0/3
 port link-type access
 port default vlan 2
#
interface GigabitEthernet0/0/4
 port hybrid pvid vlan 2
 port hybrid untagged vlan 2 10
#
interface GigabitEthernet0/0/5
 port hybrid pvid vlan 2
 port hybrid untagged vlan 2 10
#
user-interface con 0
user-interface vty 0 4
#
return
```

Листинг 9 – Конфигурация коммутатора S4_Stoka

```
sysname S4_Stoka
#
vlan batch 2 to 3 10
#
cluster enable
ntdp enable
```

Продолжение листинга 9

```
ndp enable
#
drop illegal-mac alarm
#
diffserv domain default
#
drop-profile default
#
vlan 10
 mac-vlan mac-address 5489-988e-35bf priority 0
#
aaa
 authentication-scheme default
 authorization-scheme default
 accounting-scheme default
 domain default
 domain default_admin
 local-user admin password simple admin
 local-user admin service-type http
#
interface Vlanif1
#
interface MEth0/0/1
#
interface GigabitEthernet0/0/1
 port link-type trunk
 port trunk allow-pass vlan 2 to 3 10
#
interface GigabitEthernet0/0/2
 port link-type access
 port default vlan 3
#
interface GigabitEthernet0/0/3
 port hybrid pvid vlan 3
 port hybrid untagged vlan 3 10
#
user-interface con 0
user-interface vty 0 4
#
return
```

Листинг 10 – Конфигурация коммутатора S5_Stoka

```
sysname S5_Stoka
#
vlan batch 2 to 3 10 to 11
#
cluster enable
ntdp enable
ndp enable
#
drop illegal-mac alarm
#
diffserv domain default
#
drop-profile default
#
vlan 10
 mac-vlan mac-address 5489-988e-35bf priority 0
#
aaa
 authentication-scheme default
 authorization-scheme default
```

```
accounting-scheme default
 domain default
 domain default_admin
 local-user admin password simple admin
 local-user admin service-type http
#
interface Vlanif1
#
interface MEth0/0/1
#
interface GigabitEthernet0/0/1
 port link-type trunk
 port trunk allow-pass vlan 2 to 3 10
#
interface GigabitEthernet0/0/2
 port link-type access
 port default vlan 3
#
interface GigabitEthernet0/0/3
 port hybrid pvid vlan 3
 port hybrid untagged vlan 3 10
#
user-interface con 0
user-interface vty 0 4
#
 return
```

Листинг 11 – Конфигурация коммутатора S6_Stoka

```
sysname S6_Stoka
#
vlan batch 2 to 3 10
#
cluster enable
ntdp enable
ndp enable
#
drop illegal-mac alarm
#
diffserv domain default
#
drop-profile default
#
vlan 10
 mac-vlan mac-address 5489-988e-35bf priority 0
#
aaa
 authentication-scheme default
 authorization-scheme default
 accounting-scheme default
 domain default
 domain default_admin
 local-user admin password simple admin
 local-user admin service-type http
#
interface Vlanif1
#
interface MEth0/0/1
#
interface GigabitEthernet0/0/1
 port link-type trunk
```

```
port trunk allow-pass vlan 2 to 3 10
#
interface GigabitEthernet0/0/2
 port link-type access
 port default vlan 10
#
interface GigabitEthernet0/0/3
 port hybrid untagged vlan 2 to 3 10
 mac-vlan enable
#
user-interface con 0
user-interface vty 0 4
#

 return
```

Далее необходимо проверить работоспособность топологии (Рисунок 8).

Рисунок 8 - Проверка работоспособности

ЗАКЛЮЧЕНИЕ

В ходе данной практической работы был создан прототипы сети в программном обеспечении eNSP и сконфигурированы виртуальные локальные сети при помощи технологии VLAN.

СПИСОК ИСТОЧНИКОВ

1. Олифер В.Г., Олифер В.А. Компьютерные сети. - 2-е изд. - Санкт-Петербург: Питер, 2021. - 1008 с.