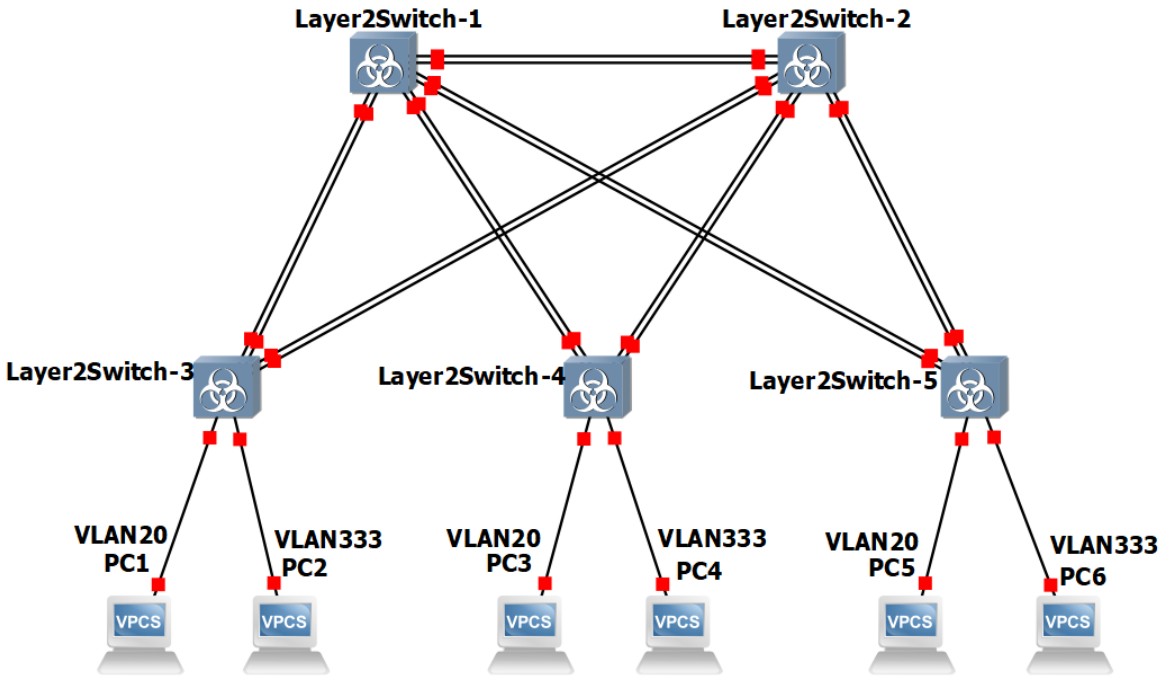
Лабораторная работа №3

Тема: Настройка виртуальной локальной сети (VLAN)

1) Для заданной на схеме schema-lab3 сети, состоящей из управляемых коммутаторов и персональных компьютеров



настроила на коммутаторах логическую топологию, используя протокол IEEE 802.1Q, для передачи пакетов VLAN333 между коммутаторами использовала Native VLAN. Для этого на каждом коммутаторе были использованы данные команды (пример для SW3):

enable

configure terminal

// Если есть подключение к PC

int gigabiethernet 1/0

description PC1-VLAN20

switchport mode access

switchport access vlan 20

no shutdown

exit

int gigabiethernet 1/1

description PC2-VLAN333

switchport mode access

switchport access vlan 333

no shutdown

exit

int gigabiethernet 0/0

description Trunk-to-Layer2Switch-1_1

switchport mode trunk

switchport trunk native vlan 333

switchport trunk allowed vlan 20,333

no shutdown

exit

int gigabiethernet 0/1

description Trunk-to-Layer2Switch-1_2

switchport mode trunk

switchport trunk native vlan 333

switchport trunk allowed vlan 20,333

no shutdown

exit

int gigabiethernet 0/2

description Trunk-to-Layer2Switch-2_1

switchport mode trunk

switchport trunk native vlan 333

switchport trunk allowed vlan 20,333

no shutdown

exit

int gigabiethernet 0/3

description Trunk-to-Layer2Switch-2_2

switchport mode trunk

switchport trunk native vlan 333

switchport trunk allowed vlan 20,333

no shutdown

exit

2) Проверила доступность персональных компьютеров, находящихся в одинаковых VLAN и недоступность находящихся в различных.

```
PC1> ping 192.168.20.2

84 bytes from 192.168.20.2 icmp_seq=1 ttl=64 time=2.220 ms
84 bytes from 192.168.20.2 icmp_seq=2 ttl=64 time=4.305 ms
84 bytes from 192.168.20.2 icmp_seq=3 ttl=64 time=9.667 ms
84 bytes from 192.168.20.2 icmp_seq=4 ttl=64 time=4.887 ms
84 bytes from 192.168.20.2 icmp_seq=5 ttl=64 time=9.115 ms

PC1> ping 192.168.20.3

84 bytes from 192.168.20.3 icmp_seq=1 ttl=64 time=7.837 ms
84 bytes from 192.168.20.3 icmp_seq=2 ttl=64 time=14.092 ms
84 bytes from 192.168.20.3 icmp_seq=3 ttl=64 time=9.429 ms
84 bytes from 192.168.20.3 icmp_seq=4 ttl=64 time=6.218 ms
84 bytes from 192.168.20.3 icmp_seq=5 ttl=64 time=4.692 ms

PC1> ping 192.168.33.1

No gateway found

PC1> ping 192.168.33.2

No gateway found

PC1> ping 192.168.33.3

No gateway found
```

```
ping 192.168.33.2

84 bytes from 192.168.33.2 icmp_seq=1 ttl=64 time=15.022 ms
84 bytes from 192.168.33.2 icmp_seq=2 ttl=64 time=6.991 ms
84 bytes from 192.168.33.2 icmp_seq=3 ttl=64 time=6.582 ms
84 bytes from 192.168.33.2 icmp_seq=4 ttl=64 time=13.142 ms
84 bytes from 192.168.33.2 icmp_seq=5 ttl=64 time=4.693 ms

PC2> ping 192.168.33.3

84 bytes from 192.168.33.3 icmp_seq=1 ttl=64 time=9.328 ms
84 bytes from 192.168.33.3 icmp_seq=2 ttl=64 time=12.520 ms
84 bytes from 192.168.33.3 icmp_seq=3 ttl=64 time=2.520 ms
84 bytes from 192.168.33.3 icmp_seq=4 ttl=64 time=12.190 ms
84 bytes from 192.168.33.3 icmp_seq=5 ttl=64 time=11.438 ms

PC2> ping 192.168.20.1

No gateway found

PC2> ping 192.168.20.2

No gateway found

PC2> ping 192.168.20.3

No gateway found
```

```
PC3> ping 192.168.20.1

84 bytes from 192.168.20.1 icmp_seq=1 ttl=64 time=6.142 ms
84 bytes from 192.168.20.1 icmp_seq=2 ttl=64 time=7.192 ms
84 bytes from 192.168.20.1 icmp_seq=3 ttl=64 time=7.772 ms
84 bytes from 192.168.20.1 icmp_seq=4 ttl=64 time=3.658 ms
84 bytes from 192.168.20.1 icmp_seq=5 ttl=64 time=3.904 ms

PC3> ping 192.168.20.3

84 bytes from 192.168.20.3 icmp_seq=1 ttl=64 time=16.965 ms
84 bytes from 192.168.20.3 icmp_seq=2 ttl=64 time=1.474 ms
84 bytes from 192.168.20.3 icmp_seq=3 ttl=64 time=5.934 ms
84 bytes from 192.168.20.3 icmp_seq=4 ttl=64 time=7.137 ms
84 bytes from 192.168.20.3 icmp_seq=5 ttl=64 time=7.842 ms

PC3> ping 192.168.33.1

No gateway found

PC3> ping 192.168.33.2

No gateway found

PC3> ping 192.168.33.3

No gateway found
```

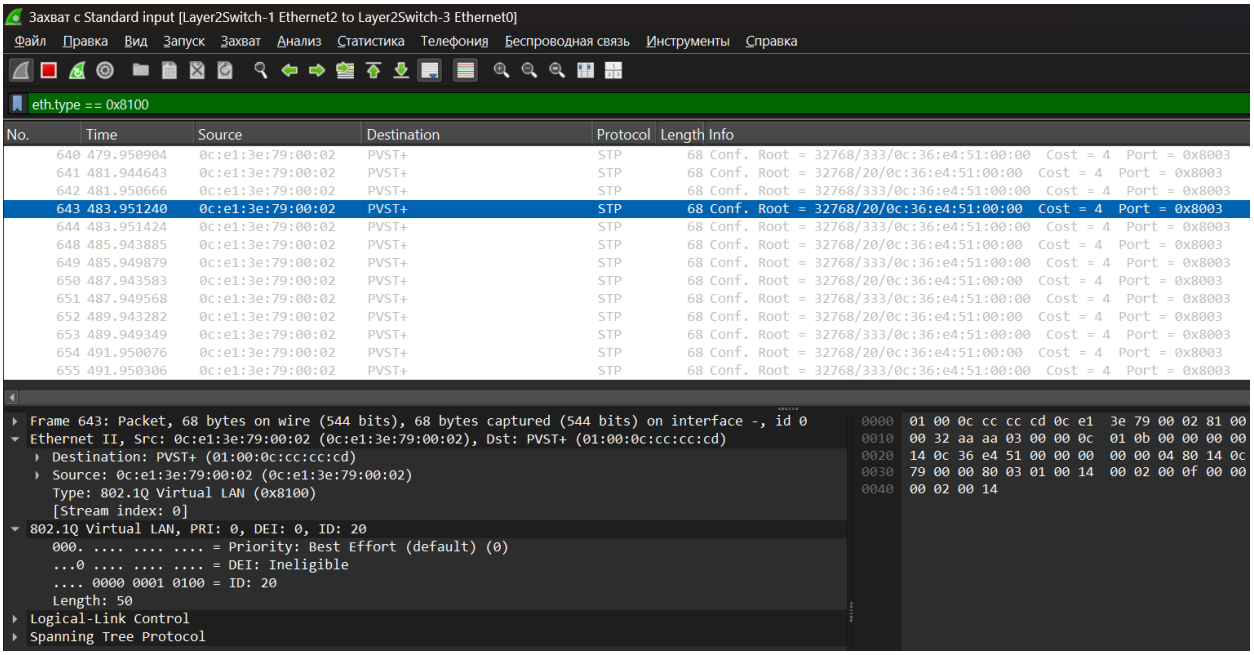
```
ping 192.168.33.1

84 bytes from 192.168.33.1 icmp_seq=1 ttl=64 time=9.889 ms
84 bytes from 192.168.33.1 icmp_seq=2 ttl=64 time=7.325 ms
84 bytes from 192.168.33.1 icmp_seq=3 ttl=64 time=13.748 ms
84 bytes from 192.168.33.1 icmp_seq=4 ttl=64 time=6.622 ms
84 bytes from 192.168.33.1 icmp_seq=5 ttl=64 time=7.185 ms

PC4> ping 192.168.33.3

84 bytes from 192.168.33.3 icmp_seq=1 ttl=64 time=11.931 ms
84 bytes from 192.168.33.3 icmp_seq=2 ttl=64 time=3.148 ms
84 bytes from 192.168.33.3 icmp_seq=3 ttl=64 time=7.832 ms
84 bytes from 192.168.33.3 icmp_seq=4 ttl=64 time=7.025 ms
84 bytes from 192.168.33.3 icmp_seq=5 ttl=64 time=7.163 ms

PC4> ping 192.168.20.1

No gateway found

PC4> ping 192.168.20.2

No gateway found

PC4> ping 192.168.20.3

No gateway found
```

```
PC5> ping 192.168.20.1

84 bytes from 192.168.20.1 icmp_seq=1 ttl=64 time=5.731 ms
84 bytes from 192.168.20.1 icmp_seq=2 ttl=64 time=8.622 ms
84 bytes from 192.168.20.1 icmp_seq=3 ttl=64 time=5.754 ms
84 bytes from 192.168.20.1 icmp_seq=4 ttl=64 time=7.124 ms
84 bytes from 192.168.20.1 icmp_seq=5 ttl=64 time=7.488 ms

PC5> ping 192.168.20.2

84 bytes from 192.168.20.2 icmp_seq=1 ttl=64 time=4.234 ms
84 bytes from 192.168.20.2 icmp_seq=2 ttl=64 time=10.319 ms
84 bytes from 192.168.20.2 icmp_seq=3 ttl=64 time=4.872 ms
84 bytes from 192.168.20.2 icmp_seq=4 ttl=64 time=6.872 ms
84 bytes from 192.168.20.2 icmp_seq=5 ttl=64 time=6.426 ms

PC5> ping 192.168.33.1

No gateway found

PC5> ping 192.168.33.2

No gateway found

PC5> ping 192.168.33.3

No gateway found
```

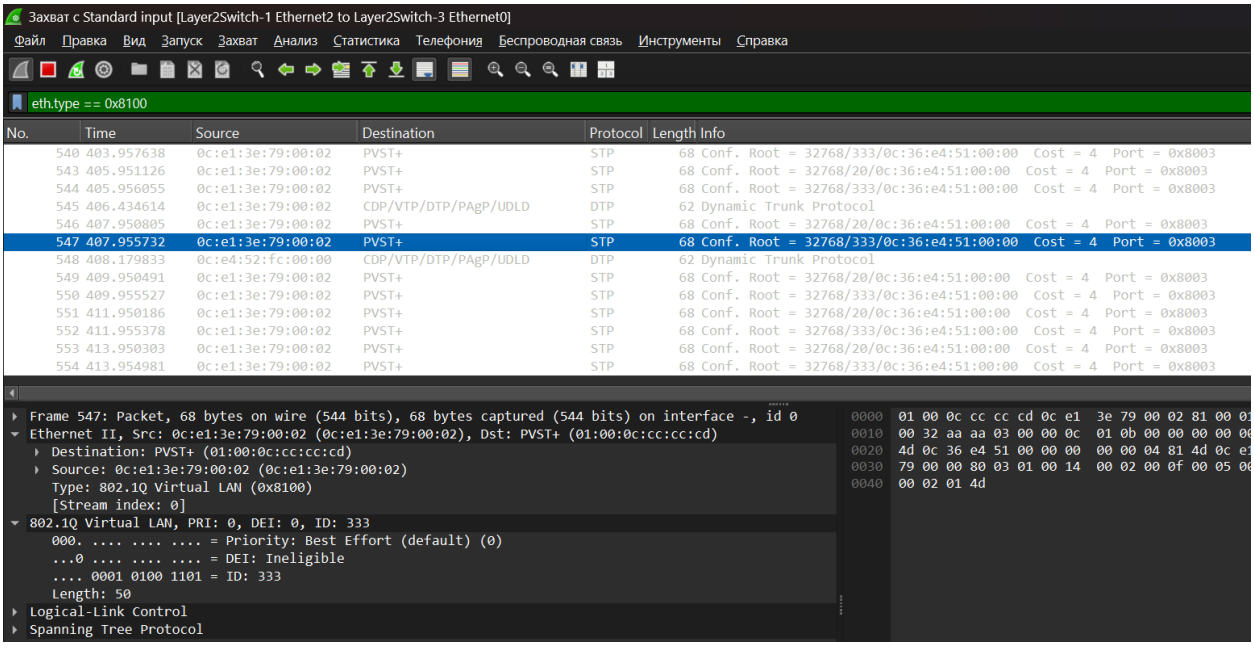
```
ping 192.168.33.1

84 bytes from 192.168.33.1 icmp_seq=1 ttl=64 time=7.071 ms
84 bytes from 192.168.33.1 icmp_seq=2 ttl=64 time=6.297 ms
84 bytes from 192.168.33.1 icmp_seq=3 ttl=64 time=9.156 ms
84 bytes from 192.168.33.1 icmp_seq=4 ttl=64 time=5.160 ms
84 bytes from 192.168.33.1 icmp_seq=5 ttl=64 time=9.307 ms

PC6> ping 192.168.33.2

84 bytes from 192.168.33.2 icmp_seq=1 ttl=64 time=6.315 ms
84 bytes from 192.168.33.2 icmp_seq=2 ttl=64 time=3.795 ms
84 bytes from 192.168.33.2 icmp_seq=3 ttl=64 time=7.276 ms
84 bytes from 192.168.33.2 icmp_seq=4 ttl=64 time=6.641 ms
84 bytes from 192.168.33.2 icmp_seq=5 ttl=64 time=13.912 ms

PC6> ping 192.168.20.1

No gateway found

PC6> ping 192.168.20.2

No gateway found

PC6> ping 192.168.20.3

No gateway found
```

3) Перехватила в WireShark пакеты с тегами и без тегов.

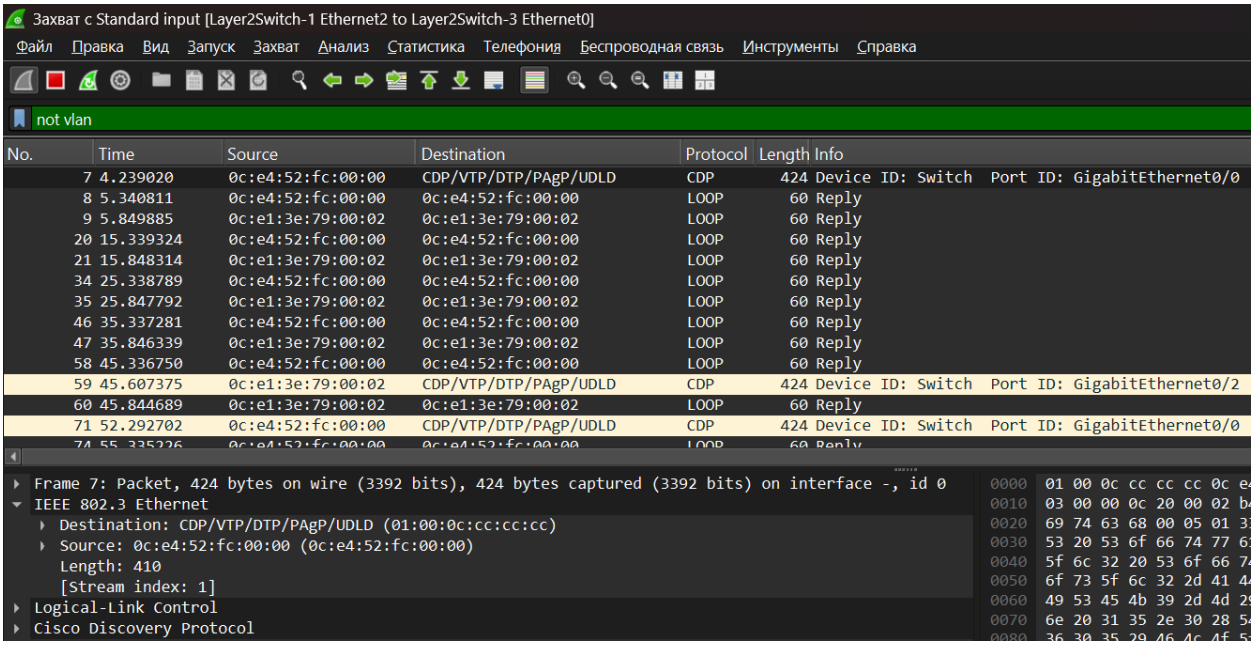
С тегом 20:



С тегом 333:

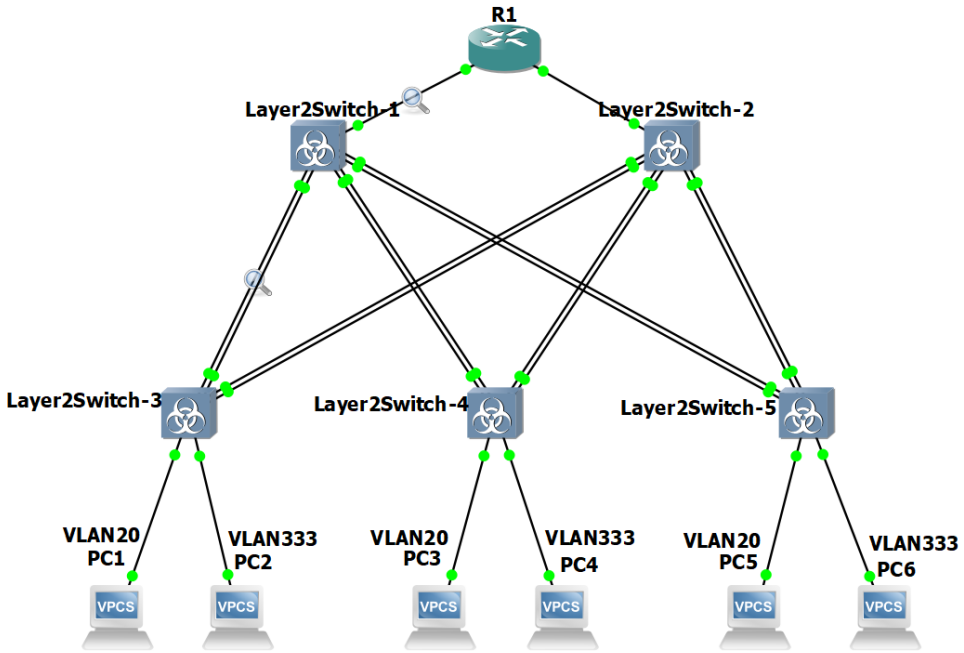


Без тега:



4) Сохранила файлы конфигураций устройств в виде набора файлов с именами, соответствующими именам устройств.

5*) Добавила в схему маршрутизатор, подключенный к коммутаторам Layer2Switch1 и Layer2Switch2, настроила через него маршрутизацию между VLAN.



Проверим, что компьютеры с одинаковыми VLAN доступны.

```
ping 192.168.20.3

84 bytes from 192.168.20.3 icmp_seq=1 ttl=64 time=3.391 ms
84 bytes from 192.168.20.3 icmp_seq=2 ttl=64 time=15.061 ms
84 bytes from 192.168.20.3 icmp_seq=3 ttl=64 time=10.163 ms
84 bytes from 192.168.20.3 icmp_seq=4 ttl=64 time=7.027 ms
84 bytes from 192.168.20.3 icmp_seq=5 ttl=64 time=7.829 ms

PC1> ping 192.168.20.2

84 bytes from 192.168.20.2 icmp_seq=1 ttl=64 time=8.207 ms
84 bytes from 192.168.20.2 icmp_seq=2 ttl=64 time=1.444 ms
84 bytes from 192.168.20.2 icmp_seq=3 ttl=64 time=2.994 ms
84 bytes from 192.168.20.2 icmp_seq=4 ttl=64 time=17.766 ms
84 bytes from 192.168.20.2 icmp_seq=5 ttl=64 time=13.405 ms
```

```
ping 192.168.33.2

84 bytes from 192.168.33.2 icmp_seq=1 ttl=64 time=7.888 ms
84 bytes from 192.168.33.2 icmp_seq=2 ttl=64 time=3.211 ms
84 bytes from 192.168.33.2 icmp_seq=3 ttl=64 time=7.740 ms
84 bytes from 192.168.33.2 icmp_seq=4 ttl=64 time=8.083 ms
84 bytes from 192.168.33.2 icmp_seq=5 ttl=64 time=21.333 ms

PC2> ping 192.168.33.3

84 bytes from 192.168.33.3 icmp_seq=1 ttl=64 time=12.923 ms
84 bytes from 192.168.33.3 icmp_seq=2 ttl=64 time=9.027 ms
84 bytes from 192.168.33.3 icmp_seq=3 ttl=64 time=5.343 ms
84 bytes from 192.168.33.3 icmp_seq=4 ttl=64 time=6.583 ms
84 bytes from 192.168.33.3 icmp_seq=5 ttl=64 time=7.240 ms
```

```
ping 192.168.20.1

84 bytes from 192.168.20.1 icmp_seq=1 ttl=64 time=10.715 ms
84 bytes from 192.168.20.1 icmp_seq=2 ttl=64 time=6.904 ms
84 bytes from 192.168.20.1 icmp_seq=3 ttl=64 time=6.360 ms
84 bytes from 192.168.20.1 icmp_seq=4 ttl=64 time=6.537 ms
84 bytes from 192.168.20.1 icmp_seq=5 ttl=64 time=6.520 ms

PC3> ping 192.168.20.3

84 bytes from 192.168.20.3 icmp_seq=1 ttl=64 time=10.283 ms
84 bytes from 192.168.20.3 icmp_seq=2 ttl=64 time=6.154 ms
84 bytes from 192.168.20.3 icmp_seq=3 ttl=64 time=10.119 ms
84 bytes from 192.168.20.3 icmp_seq=4 ttl=64 time=10.397 ms
84 bytes from 192.168.20.3 icmp_seq=5 ttl=64 time=3.035 ms
```

```
ping 192.168.33.1

84 bytes from 192.168.33.1 icmp_seq=1 ttl=64 time=7.394 ms
84 bytes from 192.168.33.1 icmp_seq=2 ttl=64 time=7.512 ms
84 bytes from 192.168.33.1 icmp_seq=3 ttl=64 time=6.844 ms
84 bytes from 192.168.33.1 icmp_seq=4 ttl=64 time=15.222 ms
84 bytes from 192.168.33.1 icmp_seq=5 ttl=64 time=14.896 ms

PC4> ping 192.168.33.3

84 bytes from 192.168.33.3 icmp_seq=1 ttl=64 time=17.006 ms
84 bytes from 192.168.33.3 icmp_seq=2 ttl=64 time=5.710 ms
84 bytes from 192.168.33.3 icmp_seq=3 ttl=64 time=2.912 ms
84 bytes from 192.168.33.3 icmp_seq=4 ttl=64 time=6.543 ms
84 bytes from 192.168.33.3 icmp_seq=5 ttl=64 time=12.968 ms
```

```
ping 192.168.20.1

84 bytes from 192.168.20.1 icmp_seq=1 ttl=64 time=12.738 ms
84 bytes from 192.168.20.1 icmp_seq=2 ttl=64 time=7.767 ms
84 bytes from 192.168.20.1 icmp_seq=3 ttl=64 time=5.551 ms
84 bytes from 192.168.20.1 icmp_seq=4 ttl=64 time=8.710 ms
84 bytes from 192.168.20.1 icmp_seq=5 ttl=64 time=6.964 ms

PC5> ping 192.168.20.2

84 bytes from 192.168.20.2 icmp_seq=1 ttl=64 time=2.491 ms
84 bytes from 192.168.20.2 icmp_seq=2 ttl=64 time=5.222 ms
84 bytes from 192.168.20.2 icmp_seq=3 ttl=64 time=9.415 ms
84 bytes from 192.168.20.2 icmp_seq=4 ttl=64 time=7.737 ms
84 bytes from 192.168.20.2 icmp_seq=5 ttl=64 time=13.909 ms
```

```
ping 192.168.33.1

84 bytes from 192.168.33.1 icmp_seq=1 ttl=64 time=12.961 ms
84 bytes from 192.168.33.1 icmp_seq=2 ttl=64 time=6.720 ms
84 bytes from 192.168.33.1 icmp_seq=3 ttl=64 time=7.198 ms
84 bytes from 192.168.33.1 icmp_seq=4 ttl=64 time=7.674 ms
84 bytes from 192.168.33.1 icmp_seq=5 ttl=64 time=7.188 ms

PC6> ping 192.168.33.2

84 bytes from 192.168.33.2 icmp_seq=1 ttl=64 time=5.834 ms
84 bytes from 192.168.33.2 icmp_seq=2 ttl=64 time=6.981 ms
84 bytes from 192.168.33.2 icmp_seq=3 ttl=64 time=11.938 ms
84 bytes from 192.168.33.2 icmp_seq=4 ttl=64 time=6.733 ms
84 bytes from 192.168.33.2 icmp_seq=5 ttl=64 time=8.330 ms
```