

Лабораторная работа №4

1) Для заданной на схеме schema-lab4 сети, состоящей из управляемых коммутаторов и персональных компьютеров настроить на коммутаторах логическую топологию используя протокол IEEE 802.1Q, для передачи пакетов VLAN333 между коммутаторами использовать Native VLAN

Конфигурация L2-SW-1, L2-SW-2

```
switch# vlan 20
switch# name VLAN20
switch# vlan 333
switch# name VLAN333

switch# conf t
switch# int range g0/0-3,g1/0-3
switch# shut
switch# switchport trunk encapsulation dot1q
switch# switchport trunk native vlan 333
switch# switchport trunk allowed 20,333
switch# switchport mode trunk
switch# no shut
```

Конфигурация L2-SW-3, L2-SW-4, L2-SW-5

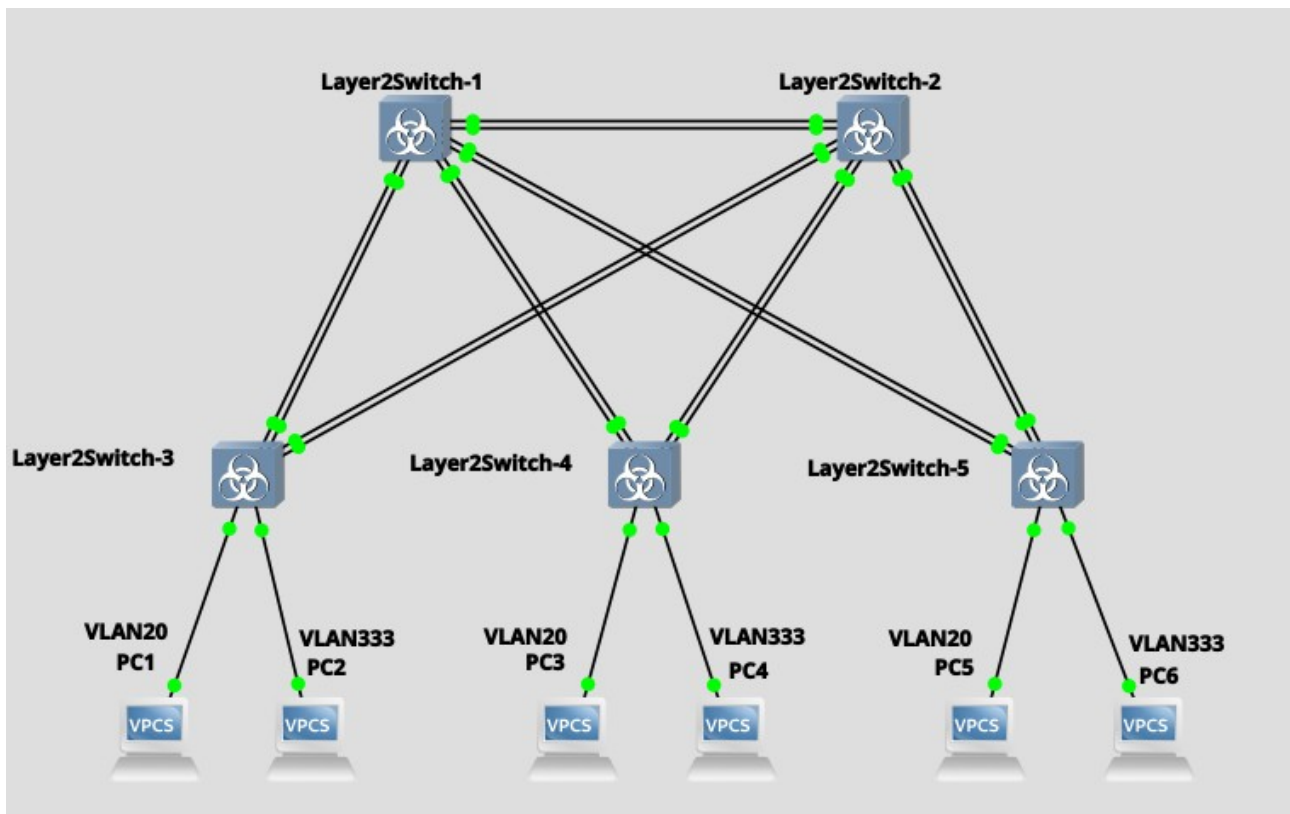
```
switch# vlan 20
switch# name VLAN20
switch# vlan 333
switch# name VLAN333

switch# int range g0/0-3
switch# shut
switch# switchport trunk encapsulation dot1q
switch# switchport trunk native vlan 333
switch# switchport trunk allowed 20,333
switch# switchport mode trunk
switch# no shut
```

```
switch# int g1/0
switch# shut
switch# switchport access vlan 20
switch# switchport mode access
switch#no shut
```

```
switch# int g1/1
switch# shut
switch# switchport access vlan 333
switch# switchport mode access
switch#no shut
```

Схема



2) Проверить доступность персональных компьютеров, находящихся в одинаковых VLAN и недоступность находящихся в различных, результаты задокументировать

PC1:

To PC2

```
PC1> ping 192.168.1.2
host (192.168.0.1) not reachable
```

To PC3

```
PC1> ping 192.168.0.3
84 bytes from 192.168.0.3 icmp_seq=1 ttl=64 time=9.744 ms
84 bytes from 192.168.0.3 icmp_seq=2 ttl=64 time=8.003 ms
84 bytes from 192.168.0.3 icmp_seq=3 ttl=64 time=7.855 ms
84 bytes from 192.168.0.3 icmp_seq=4 ttl=64 time=2.015 ms
84 bytes from 192.168.0.3 icmp_seq=5 ttl=64 time=6.510 ms
```

To PC4

```
PC1> ping 192.168.1.3  
  
host (192.168.0.1) not reachable
```

To PC5

```
PC1> ping 192.168.0.4  
  
84 bytes from 192.168.0.4 icmp_seq=1 ttl=64 time=6.505 ms  
84 bytes from 192.168.0.4 icmp_seq=2 ttl=64 time=6.686 ms  
84 bytes from 192.168.0.4 icmp_seq=3 ttl=64 time=7.073 ms  
84 bytes from 192.168.0.4 icmp_seq=4 ttl=64 time=7.322 ms  
84 bytes from 192.168.0.4 icmp_seq=5 ttl=64 time=7.337 ms
```

To PC6

```
PC1> ping 192.168.1.4  
  
host (192.168.0.1) not reachable
```

PC2:

To PC3

```
PC2> ping 192.168.0.3  
  
host (192.168.1.1) not reachable
```

To PC4

```
PC2> ping 192.168.1.3  
  
84 bytes from 192.168.1.3 icmp_seq=1 ttl=64 time=1.451 ms  
84 bytes from 192.168.1.3 icmp_seq=2 ttl=64 time=13.485 ms  
84 bytes from 192.168.1.3 icmp_seq=3 ttl=64 time=6.662 ms  
84 bytes from 192.168.1.3 icmp_seq=4 ttl=64 time=7.135 ms  
84 bytes from 192.168.1.3 icmp_seq=5 ttl=64 time=8.022 ms
```

To PC5

```
PC2> ping 192.168.0.4  
  
host (192.168.1.1) not reachable
```

To PC6

```
PC2> ping 192.168.1.4  
  
84 bytes from 192.168.1.4 icmp_seq=1 ttl=64 time=8.146 ms  
84 bytes from 192.168.1.4 icmp_seq=2 ttl=64 time=2.719 ms  
84 bytes from 192.168.1.4 icmp_seq=3 ttl=64 time=9.548 ms  
84 bytes from 192.168.1.4 icmp_seq=4 ttl=64 time=7.623 ms  
84 bytes from 192.168.1.4 icmp_seq=5 ttl=64 time=6.994 ms
```

PC3:

To PC4

```
PC3> ping 192.168.1.3  
  
host (192.168.0.1) not reachable
```

To PC5

```
PC3> ping 192.168.0.4  
  
84 bytes from 192.168.0.4 icmp_seq=1 ttl=64 time=7.300 ms  
84 bytes from 192.168.0.4 icmp_seq=2 ttl=64 time=3.280 ms  
84 bytes from 192.168.0.4 icmp_seq=3 ttl=64 time=6.102 ms  
84 bytes from 192.168.0.4 icmp_seq=4 ttl=64 time=6.804 ms  
84 bytes from 192.168.0.4 icmp_seq=5 ttl=64 time=2.176 ms
```

To PC6

```
PC3> ping 192.168.1.4  
  
17 host (192.168.0.1) not reachable
```

PC4:

To PC5

```
PC4> ping 192.168.0.4  
  
host (192.168.1.1) not reachable
```

To PC6

```
PC4> ping 192.168.1.4  
  
84 bytes from 192.168.1.4 icmp_seq=1 ttl=64 time=1.920 ms  
84 bytes from 192.168.1.4 icmp_seq=2 ttl=64 time=4.846 ms  
84 bytes from 192.168.1.4 icmp_seq=3 ttl=64 time=2.471 ms  
84 bytes from 192.168.1.4 icmp_seq=4 ttl=64 time=8.993 ms  
84 bytes from 192.168.1.4 icmp_seq=5 ttl=64 time=4.778 ms
```

PC5:

To PC6

```
Bad command: "PING 192.168.1.4". Use ? for help.  
  
PC5> ping 192.168.1.4  
  
host (192.168.0.1) not reachable  
(217  
e (21  
e (21 PC5>  
7.71.138.4:3080)
```

Компьютеры в разных vlan не пингуется потому что это разные сети, чтобы они смогли взаимодействовать нужен маршрутизатор или коммутатор L3, так же у них разные широковещательные домены. Благодаря vlan мы разделяем сеть на подсети в одном коммутаторе без покупки дополнительного оборудования

3) Перехватить в Wireshark пакеты с тегами и без тегов

Выполним ping с PC1 с vlan 20 на PC5 с vlan 20, и отследим пакеты с помощью Wireshark

*- [Layer2Switch-3 Ethernet2 to Layer2Switch-2 Ethernet2]						
Файл Правка Вид Запуск Захват Анализ Статистика Телефония Беспроводная связь Инструменты Справка						
vlan && icmp						
No.	Time	Source	Destination	Protocol	Length	Info
123	80.144601	192.168.0.2	192.168.0.4	ICMP	102	Echo (ping) request id=0xa6a2, seq=1/256, ttl=64 (reply in 124)
124	80.145728	192.168.0.4	192.168.0.2	ICMP	102	Echo (ping) reply id=0xa6a2, seq=1/256, ttl=64 (request in 123)
125	81.146623	192.168.0.2	192.168.0.4	ICMP	102	Echo (ping) request id=0xa7a2, seq=2/512, ttl=64 (reply in 126)
126	81.156333	192.168.0.4	192.168.0.2	ICMP	102	Echo (ping) reply id=0xa7a2, seq=2/512, ttl=64 (request in 125)
129	82.157136	192.168.0.2	192.168.0.4	ICMP	102	Echo (ping) request id=0xa8a2, seq=3/768, ttl=64 (reply in 130)
130	82.160264	192.168.0.4	192.168.0.2	ICMP	102	Echo (ping) reply id=0xa8a2, seq=3/768, ttl=64 (request in 129)
131	83.161333	192.168.0.2	192.168.0.4	ICMP	102	Echo (ping) request id=0xa9a2, seq=4/1024, ttl=64 (reply in 132)
132	83.163839	192.168.0.4	192.168.0.2	ICMP	102	Echo (ping) reply id=0xa9a2, seq=4/1024, ttl=64 (request in 131)
135	84.164762	192.168.0.2	192.168.0.4	ICMP	102	Echo (ping) request id=0xaaa2, seq=5/1280, ttl=64 (reply in 136)
136	84.172990	192.168.0.4	192.168.0.2	ICMP	102	Echo (ping) reply id=0xaaa2, seq=5/1280, ttl=64 (request in 135)

<ul style="list-style-type: none"> Frame 123: 102 bytes on wire (816 bits), 102 bytes captured (816 bits) on interface -, id 0 Ethernet II, Src: 00:50:79:66:68:02 (00:50:79:66:68:02), Dst: 00:50:79:66:68:04 (00:50:79:66:68:04) <ul style="list-style-type: none"> Destination: 00:50:79:66:68:04 (00:50:79:66:68:04) Source: 00:50:79:66:68:02 (00:50:79:66:68:02) Type: 802.1Q Virtual LAN (0x8100) 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 20 <ul style="list-style-type: none"> 000. = Priority: Best Effort (default) (0) ...0 = DEI: Ineligible 0000 0001 0100 = ID: 20 Type: IPv4 (0x0800) Internet Protocol Version 4, Src: 192.168.0.2, Dst: 192.168.0.4 Internet Control Message Protocol

И как видно фрейм передается по транк порту тегированный по стандарту IEEE 802.1Q, ID:20 это как раз наш vlan

Теперь выполним ping с PC2 с vlan 333 на PC4 с vlan 333

Файл Правка Вид Запуск Захват Анализ Статистика Телефония Беспроводная связь Инструменты Справка						
vlan && icmp						
No.	Time	Source	Destination	Protocol	Length	Info
42	28.621465	192.168.1.2	192.168.1.4	ICMP	98	Echo (ping) request id=0x73a2, seq=1/256, ttl=64 (reply in 43)
43	28.629440	192.168.1.4	192.168.1.2	ICMP	98	Echo (ping) reply id=0x73a2, seq=1/256, ttl=64 (request in 42)
44	29.630063	192.168.1.2	192.168.1.4	ICMP	98	Echo (ping) request id=0x74a2, seq=2/512, ttl=64 (reply in 45)
45	29.632417	192.168.1.4	192.168.1.2	ICMP	98	Echo (ping) reply id=0x74a2, seq=2/512, ttl=64 (request in 44)
48	30.634289	192.168.1.2	192.168.1.4	ICMP	98	Echo (ping) request id=0x75a2, seq=3/768, ttl=64 (reply in 49)
49	30.641149	192.168.1.4	192.168.1.2	ICMP	98	Echo (ping) reply id=0x75a2, seq=3/768, ttl=64 (request in 48)
50	31.642629	192.168.1.2	192.168.1.4	ICMP	98	Echo (ping) request id=0x76a2, seq=4/1024, ttl=64 (reply in 51)
51	31.648490	192.168.1.4	192.168.1.2	ICMP	98	Echo (ping) reply id=0x76a2, seq=4/1024, ttl=64 (request in 50)
54	32.650171	192.168.1.2	192.168.1.4	ICMP	98	Echo (ping) request id=0x77a2, seq=5/1280, ttl=64 (reply in 55)
55	32.651291	192.168.1.4	192.168.1.2	ICMP	98	Echo (ping) reply id=0x77a2, seq=5/1280, ttl=64 (request in 54)

<ul style="list-style-type: none"> Frame 45: 98 bytes on wire (784 bits), 98 bytes captured (784 bits) on interface -, id 0 Ethernet II, Src: 00:50:79:66:68:05 (00:50:79:66:68:05), Dst: 00:50:79:66:68:01 (00:50:79:66:68:01) Destination: 00:50:79:66:68:01 (00:50:79:66:68:01) Source: 00:50:79:66:68:05 (00:50:79:66:68:05) Type: IPv4 (0x0800) Internet Protocol Version 4, Src: 192.168.1.4, Dst: 192.168.1.2 Internet Control Message Protocol

Тут видно что пакет обычный без тега так как vlan 333 у нас native