

ОТЧЁТ

Лабораторная работа №3

“Настройка виртуальной локальной сети (VLAN)”

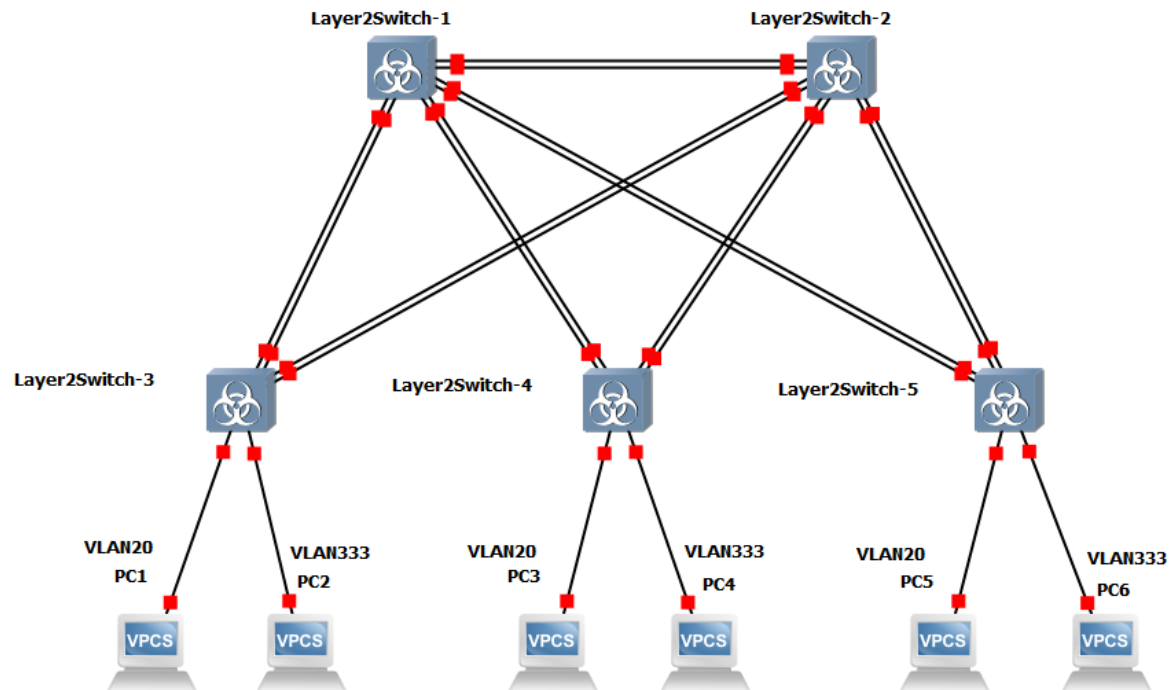
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Новосибирск, 2026

Ход работы

1. Для заданной на схеме schema-lab3 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.



Прописываем адреса у VPCS

```
ip 192.168.1.16 //16-21
```

```
save
```

Возникла ошибка из-за файла, пришлось удалить и создать заново

```
enable
```

```
delete flash:vlan.dat
```

```
reload
```

Вспомогательные команды

```
show cdp neighbors
```

```
configure terminal
```

```
vlan 20
```

```
name VLAN20
```

```
exit
```

```
vlan 333
```

```
name VLAN333
```

```
exit
```

```
end  
wr
```

конфигурация портов на sw5

```
mac address-table  
show interfaces  
enable  
configure terminal  
interface Gi1/1  
switchport access vlan 333  
no shutdown  
end  
wr
```

```
configure terminal  
interface Gi1/0  
switchport access vlan 20  
no shutdown  
end  
wr
```

```
configure terminal  
interface Gi0/3  
switchport mode trunk  
switchport trunk encapsulation dot1q  
switchport trunk native vlan 333  
switchport trunk allowed vlan 333  
no shutdown  
end  
wr  
copy running-config startup-config
```

```
configure terminal  
interface Gi0/2  
switchport mode trunk  
switchport trunk encapsulation dot1q  
switchport trunk allowed vlan 20  
no shutdown  
end  
wr  
copy running-config startup-config
```

конфигурация SW2 к SW5

```
configure terminal  
interface Gi1/2  
switchport mode trunk  
switchport trunk encapsulation dot1q  
switchport trunk allowed vlan 20  
no shutdown  
end  
wr
```

copy running-config startup-config

конфигурация SW2

```
configure terminal
interface Gi1/3
switchport mode trunk
switchport trunk encapsulation dot1q
switchport trunk native vlan 333
switchport trunk allowed vlan 333
no shutdown
end
wr
```

конфигурация SW2 к SW4
Gig 1/0 Vlan20

```
configure terminal
interface Gi1/0
switchport mode trunk
switchport trunk encapsulation dot1q
switchport trunk allowed vlan 20
no shutdown
end
wr
```

Gig 1/1 Vlan333

```
configure terminal
interface Gi1/1
switchport mode trunk
switchport trunk encapsulation dot1q
switchport trunk native vlan 333
switchport trunk allowed vlan 333
no shutdown
end
wr
```

Настройка SW4
Gig 0/2 Vlan20

```
configure terminal
interface Gi0/2
switchport mode trunk
switchport trunk encapsulation dot1q
switchport trunk allowed vlan 20
no shutdown
end
wr
```

```
Gig 0/3 Vlan333
configure terminal
interface Gi0/3
switchport mode trunk
switchport trunk encapsulation dot1q
switchport trunk native vlan 333
switchport trunk allowed vlan 333
no shutdown
end
wr
```

```
configure terminal
interface Gi1/1
switchport access vlan 333
no shutdown
end
wr
```

```
configure terminal
interface Gi1/0
switchport access vlan 20
no shutdown
end
wr
```

```
Настройка SW2 к SW3
Gig 0/2 Vlan20 Gig 0/3 Vlan333
configure terminal
interface Gi0/2
switchport mode trunk
switchport trunk encapsulation dot1q
switchport trunk allowed vlan 20
no shutdown
end
wr
```

```
configure terminal
interface Gi0/3
switchport mode trunk
switchport trunk encapsulation dot1q
switchport trunk native vlan 333
switchport trunk allowed vlan 333
no shutdown
end
wr
```

```
Настройка SW3 к SW2
Gig 0/2 Vlan20 Gig 0/3 Vlan333
```

```
configure terminal
interface Gi0/2
switchport mode trunk
switchport trunk encapsulation dot1q
switchport trunk allowed vlan 20
no shutdown
end
wr
```

```
configure terminal
interface Gi0/3
switchport mode trunk
switchport trunk encapsulation dot1q
switchport trunk native vlan 333
switchport trunk allowed vlan 333
no shutdown
end
wr
```

```
configure terminal
interface Gi1/1
switchport access vlan 333
no shutdown
end
wr
```

```
configure terminal
interface Gi1/0
switchport access vlan 20
no shutdown
end
wr
```

```
конфигурация портов на SW3 к SW1
sw3 Gig 0/0 Vlan20 Gig 0/1 Vlan333
configure terminal
interface Gi0/1
switchport mode trunk
switchport trunk encapsulation dot1q
switchport trunk native vlan 333
switchport trunk allowed vlan 333
no shutdown
end
wr
```

```
configure terminal
interface Gi0/0
switchport mode trunk
switchport trunk encapsulation dot1q
```

```
switchport trunk allowed vlan 20
no shutdown
end
wr
```

конфигурация портов на sw1 к sw3
sw1 Gig 0/2 Vlan20 Gig 0/3 Vlan333

```
configure terminal
interface Gi0/3
switchport mode trunk
switchport trunk encapsulation dot1q
switchport trunk native vlan 333
switchport trunk allowed vlan 333
no shutdown
end
wr
```

```
configure terminal
interface Gi0/2
switchport mode trunk
switchport trunk encapsulation dot1q
switchport trunk allowed vlan 20
no shutdown
end
wr
```

Настройка Sw1 к Sw2
Gig 0/0 Vlan20 Gig 0/1 Vlan333

```
configure terminal
interface Gi0/1
switchport mode trunk
switchport trunk encapsulation dot1q
switchport trunk native vlan 333
switchport trunk allowed vlan 333
no shutdown
end
wr
```

```
configure terminal
interface Gi0/0
switchport mode trunk
switchport trunk encapsulation dot1q
switchport trunk allowed vlan 20
no shutdown
end
wr
```

Настройка Sw2 к Sw1
Gig 0/0 Vlan20 Gig 0/1 Vlan333

```
configure terminal
interface Gi0/1
switchport mode trunk
switchport trunk encapsulation dot1q
switchport trunk native vlan 333
switchport trunk allowed vlan 333
no shutdown
end
wr
```

```
configure terminal
interface Gi0/0
switchport mode trunk
switchport trunk encapsulation dot1q
switchport trunk allowed vlan 20
no shutdown
end
wr
```

```
Настройка Sw1 к Sw4
Gig 1/1 Vlan333 Gig 1/0 Vlan20
configure terminal
interface Gi1/1
switchport mode trunk
switchport trunk encapsulation dot1q
switchport trunk native vlan 333
switchport trunk allowed vlan 333
no shutdown
end
wr
```

```
configure terminal
interface Gi1/0
switchport mode trunk
switchport trunk encapsulation dot1q
switchport trunk allowed vlan 20
no shutdown
end
wr
```

```
Настройка Sw4 к Sw1
Gig 0/1 Vlan333 Gig 0/0 Vlan20
```

```
configure terminal
interface Gi0/1
switchport mode trunk
switchport trunk encapsulation dot1q
switchport trunk native vlan 333
switchport trunk allowed vlan 333
no shutdown
end
wr
```



```
configure terminal
interface Gi0/0
switchport mode trunk
switchport trunk encapsulation dot1q
switchport trunk allowed vlan 20
no shutdown
end
wr
```

Настройка Sw5 к Sw1

Gig 0/0 Vlan20 Gig 0/1 Vlan333

```
configure terminal
interface Gi0/1
switchport mode trunk
switchport trunk encapsulation dot1q
switchport trunk native vlan 333
switchport trunk allowed vlan 333
no shutdown
end
wr
```

```
configure terminal
interface Gi0/0
switchport mode trunk
switchport trunk encapsulation dot1q
switchport trunk allowed vlan 20
no shutdown
end
wr
```

Настройка Sw1 к Sw5

Gig 1/2 Vlan20 Gig 1/3 Vlan333

```
configure terminal
interface Gi1/3
switchport mode trunk
switchport trunk encapsulation dot1q
switchport trunk native vlan 333
switchport trunk allowed vlan 333
no shutdown
end
wr
```

```
configure terminal
interface Gi1/2
switchport mode trunk
switchport trunk encapsulation dot1q
switchport trunk allowed vlan 20
no shutdown
end
wr
```

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

Проверяем пинги устройств с Vlan333, а именно PC2, PC4, PC6

```
PC2> ping 192.168.1.17

192.168.1.17 icmp_seq=1 ttl=64 time=0.001 ms
192.168.1.17 icmp_seq=2 ttl=64 time=0.001 ms
192.168.1.17 icmp_seq=3 ttl=64 time=0.001 ms
192.168.1.17 icmp_seq=4 ttl=64 time=0.001 ms
192.168.1.17 icmp_seq=5 ttl=64 time=0.001 ms

PC2> ping 192.168.1.19

84 bytes from 192.168.1.19 icmp_seq=1 ttl=64 time=7.940 ms
84 bytes from 192.168.1.19 icmp_seq=2 ttl=64 time=6.081 ms
84 bytes from 192.168.1.19 icmp_seq=3 ttl=64 time=17.311 ms
84 bytes from 192.168.1.19 icmp_seq=4 ttl=64 time=9.060 ms
84 bytes from 192.168.1.19 icmp_seq=5 ttl=64 time=5.994 ms

PC2> ping 192.168.1.21

84 bytes from 192.168.1.21 icmp_seq=1 ttl=64 time=17.919 ms
84 bytes from 192.168.1.21 icmp_seq=2 ttl=64 time=2.848 ms
84 bytes from 192.168.1.21 icmp_seq=3 ttl=64 time=9.142 ms
84 bytes from 192.168.1.21 icmp_seq=4 ttl=64 time=6.351 ms
84 bytes from 192.168.1.21 icmp_seq=5 ttl=64 time=14.636 ms
```

```
PC2> ping 192.168.1.16

host (192.168.1.16) not reachable

PC2> ping 192.168.1.18

host (192.168.1.18) not reachable

PC2> ping 192.168.1.20

host (192.168.1.20) not reachable
```

Аналогичная проверка для Vlan20

```

PC1> ping 192.168.1.18

84 bytes from 192.168.1.18 icmp_seq=1 ttl=64 time=17.196 ms
84 bytes from 192.168.1.18 icmp_seq=2 ttl=64 time=3.455 ms
84 bytes from 192.168.1.18 icmp_seq=3 ttl=64 time=2.144 ms
84 bytes from 192.168.1.18 icmp_seq=4 ttl=64 time=8.340 ms
84 bytes from 192.168.1.18 icmp_seq=5 ttl=64 time=13.460 ms

PC1> ping 192.168.1.20

84 bytes from 192.168.1.20 icmp_seq=1 ttl=64 time=5.779 ms
84 bytes from 192.168.1.20 icmp_seq=2 ttl=64 time=12.018 ms
84 bytes from 192.168.1.20 icmp_seq=3 ttl=64 time=8.827 ms
84 bytes from 192.168.1.20 icmp_seq=4 ttl=64 time=6.229 ms
84 bytes from 192.168.1.20 icmp_seq=5 ttl=64 time=8.401 ms

```

```

PC1> ping 192.168.1.17

host (192.168.1.17) not reachable

PC1> ping 192.168.1.19

host (192.168.1.19) not reachable

PC1> ping 192.168.1.21

host (192.168.1.21) not reachable

```

Как видим, всё работает исправно и адреса из разных Vlan не пингуются.

3. Перехватить в WireShark пакеты с тегами и без тегов (nb!), результаты задокументировать

11	10.047391	192.168.1.21	192.168.1.17	ICMP	98 Echo (ping) request	id=0x8c8c, seq=1/256, ttl=64 (reply in 12)
12	10.051402	192.168.1.17	192.168.1.21	ICMP	98 Echo (ping) reply	id=0x8c8c, seq=1/256, ttl=64 (request in 11)
→ 14	11.053492	192.168.1.21	192.168.1.17	ICMP	98 Echo (ping) request	id=0x8d8c, seq=2/512, ttl=64 (reply in 15)
← 15	11.059173	192.168.1.17	192.168.1.21	ICMP	98 Echo (ping) reply	id=0x8d8c, seq=2/512, ttl=64 (request in 14)
16	12.060912	192.168.1.21	192.168.1.17	ICMP	98 Echo (ping) request	id=0x8e8c, seq=3/768, ttl=64 (reply in 17)
17	12.067751	192.168.1.17	192.168.1.21	ICMP	98 Echo (ping) reply	id=0x8e8c, seq=3/768, ttl=64 (request in 16)
19	13.069366	192.168.1.21	192.168.1.17	ICMP	98 Echo (ping) request	id=0x8f8c, seq=4/1024, ttl=64 (reply in 20)
20	13.070578	192.168.1.17	192.168.1.21	ICMP	98 Echo (ping) reply	id=0x8f8c, seq=4/1024, ttl=64 (request in 19)
21	14.072704	192.168.1.21	192.168.1.17	ICMP	98 Echo (ping) request	id=0x908c, seq=5/1280, ttl=64 (reply in 22)
22	14.076426	192.168.1.17	192.168.1.21	ICMP	98 Echo (ping) reply	id=0x908c, seq=5/1280, ttl=64 (request in 21)

```

> Frame 15: Packet, 98 bytes on wire (784 bits), 98 bytes captured (784 bits) on interface -, id 0
▼ Ethernet II, Src: Private_66:68:01 (00:50:79:66:68:01), Dst: Private_66:68:05 (00:50:79:66:68:05)
  > Destination: Private_66:68:05 (00:50:79:66:68:05)
  > Source: Private_66:68:01 (00:50:79:66:68:01)
    Type: IPv4 (0x0800)
    [Stream index: 5]

```

Как видим Type: IPv4 (0x0800), значит тега нет

No.	Time	Source	Destination	Protocol	Length	Info
6	2.732193	192.168.1.20	192.168.1.18	ICMP	102	Echo (ping) request id=0x458d, seq=1/256, ttl=64 (reply in 7)
7	2.733868	192.168.1.18	192.168.1.20	ICMP	102	Echo (ping) reply id=0x458d, seq=1/256, ttl=64 (request in 6)
10	3.735494	192.168.1.20	192.168.1.18	ICMP	102	Echo (ping) request id=0x468d, seq=2/512, ttl=64 (reply in 11)
11	3.740549	192.168.1.18	192.168.1.20	ICMP	102	Echo (ping) reply id=0x468d, seq=2/512, ttl=64 (request in 10)
12	4.741807	192.168.1.20	192.168.1.18	ICMP	102	Echo (ping) request id=0x478d, seq=3/768, ttl=64 (reply in 13)
13	4.743928	192.168.1.18	192.168.1.20	ICMP	102	Echo (ping) reply id=0x478d, seq=3/768, ttl=64 (request in 12)
15	5.745272	192.168.1.20	192.168.1.18	ICMP	102	Echo (ping) request id=0x488d, seq=4/1024, ttl=64 (reply in 16)
16	5.752264	192.168.1.18	192.168.1.20	ICMP	102	Echo (ping) reply id=0x488d, seq=4/1024, ttl=64 (request in 15)
17	6.754817	192.168.1.20	192.168.1.18	ICMP	102	Echo (ping) request id=0x498d, seq=5/1280, ttl=64 (reply in 18)
18	6.758060	192.168.1.18	192.168.1.20	ICMP	102	Echo (ping) reply id=0x498d, seq=5/1280, ttl=64 (request in 17)

> Frame 11: Packet, 102 bytes on wire (816 bits), 102 bytes captured (816 bits) on interface -, id 0

▼ Ethernet II, Src: Private_66:68:02 (00:50:79:66:68:02), Dst: Private_66:68:04 (00:50:79:66:68:04)

> Destination: Private_66:68:04 (00:50:79:66:68:04)

> Source: Private_66:68:02 (00:50:79:66:68:02)

Type: 802.1Q Virtual LAN (0x8100)

[Stream index: 3]

> 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 20

> Internet Protocol Version 4, Src: 192.168.1.18, Dst: 192.168.1.20

> Internet Control Message Protocol

Тут тег есть Type: 802.1Q Virtual LAN (0x8100)

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

Export project

?

×

Readme file

Write a summary of the project.

Project: 'Stas-lab3-t' created on 2026-01-05

Author: John Doe <john.doe@example.com>

No project description was given

Help

< Back

Finish

Cancel