

Сделаем 1 коммутатор корневым для протокола STP:

```
>spanning-tree vlan 1 priority 4096
```

Назначим VPCS адреса в диапазоне от 10.10.10.10 до 10.10.10.15 с маской 24:

```
ip 10.10.10.10/24
```

```
....
```

```
ip 10.10.10.15/24
```

Перейдем к коммутаторам 3, 4, 5 для объединения PC1,3,5 и PC2,4,6 в VLAN20, VLAN333:

```
SW3(config)#vlan 20
```

```
SW3(config-vlan)#name VLAN20
```

```
SW3(config)#vlan 333
```

```
SW3(config-vlan)#name VLAN333
```

(Интерфейс Gi1/0 подключен к PC1 , Gi1/1 к PC2)

```
SW3(config)#interface Gi1/0
```

```
SW3(config-if)#switchport mode access
```

```
SW3(config-if)#switchport access vlan 20
```

```
SW3(config)#interface Gi1/1
```

```
SW3(config-if)#switchport mode access
```

```
SW3(config-if)#switchport access vlan 333
```

(Интерфейсы Gi0/0, Gi0/1 подключены к коммутатору 1)

```
SW3(config)#interface Gi0/0
```

```
SW3(config-if)#switchport trunk encapsulation dot1q
```

```
SW3(config-if)#switchport mode trunk
```

```
SW3(config)#interface Gi0/1
```

```
SW3(config-if)#switchport trunk encapsulation dot1q
```

```
SW3(config-if)#switchport mode trunk
```

(Интерфейсы Gi0/2, Gi0/3 подключены к коммутатору 2)

```
SW3(config)#interface Gi0/2
```

```
SW3(config-if)#switchport trunk encapsulation dot1q
```

```
SW3(config-if)#switchport mode trunk
```

```
SW3(config)#interface Gi0/3
SW3(config-if)#switchport trunk encapsulation dot1q
SW3(config-if)#switchport mode trunk
```

```
SW3#show vlan
```

VLAN	Name	Status	Ports
1	default	active	
20	VLAN20	active	Gi1/0
100	VLAN100	active	
200	VLAN0200	active	
300	VLAN0300	active	
333	VLAN333	active	Gi1/1
1002	fddi-default	act/unsup	
1003	trcrf-default	act/unsup	
1004	fddinet-default	act/unsup	
1005	trbrf-default	act/unsup	

VLAN	Type	SAID	MTU	Parent	RingNo	BridgeNo	Stp	BrdgMode	Trans1	Trans2
1	enet	100001	1500	-	-	-	-	-	0	0
20	enet	100020	1500	-	-	-	-	-	0	0
100	enet	100100	1500	-	-	-	-	-	0	0
200	enet	100200	1500	-	-	-	-	-	0	0
300	enet	100300	1500	-	-	-	-	-	0	0
333	enet	100333	1500	-	-	-	-	-	0	0
1002	fddi	101002	1500	-	-	-	-	-	0	0

Проделаем те же действия для оставшихся коммутаторов (4, 5)

Проверим доступность PC4 к PC2:

```
>ping 10.10.10.11
```

```
PC4> ping 10.10.10.11

84 bytes from 10.10.10.11 icmp_seq=1 ttl=64 time=10.053 ms
84 bytes from 10.10.10.11 icmp_seq=2 ttl=64 time=9.911 ms
84 bytes from 10.10.10.11 icmp_seq=3 ttl=64 time=7.198 ms
84 bytes from 10.10.10.11 icmp_seq=4 ttl=64 time=9.513 ms
84 bytes from 10.10.10.11 icmp_seq=5 ttl=64 time=6.136 ms
```

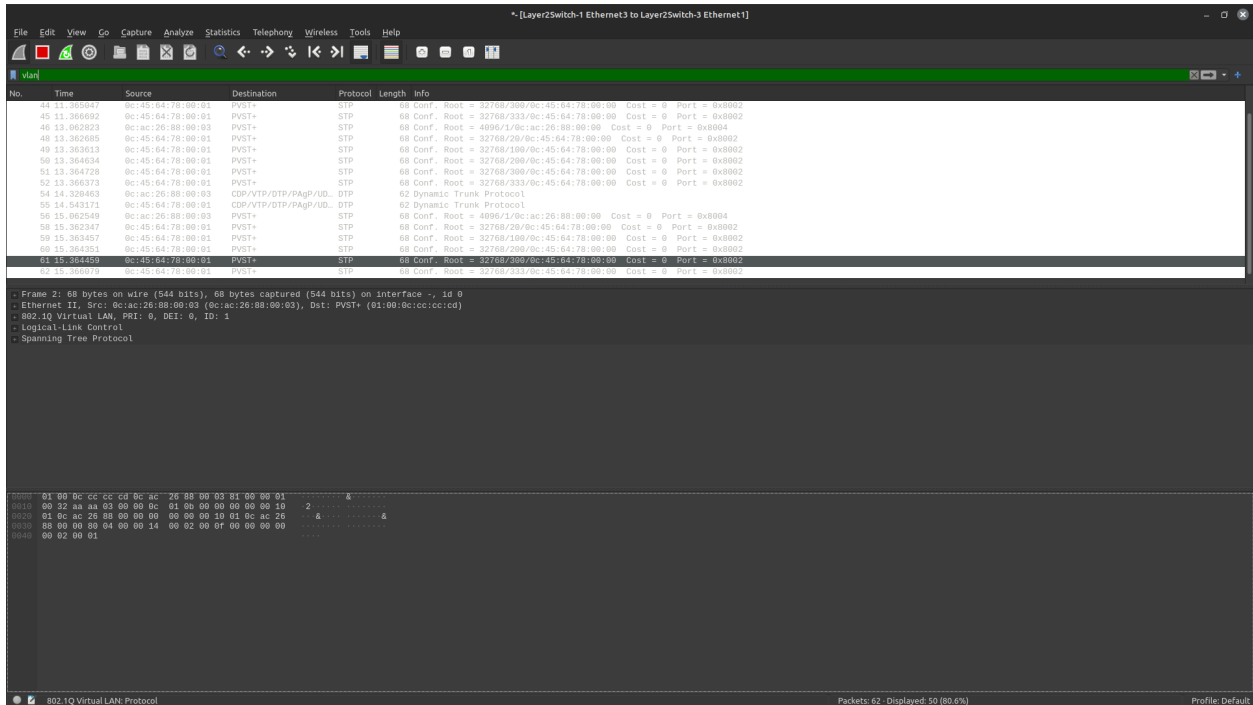
Проверим недоступность PC6 к PC3:

```
>ping 10.10.10.12
```

```
PC6> ping 10.10.10.12

host (10.10.10.12) not reachable
```

Пример захвата с тегами:



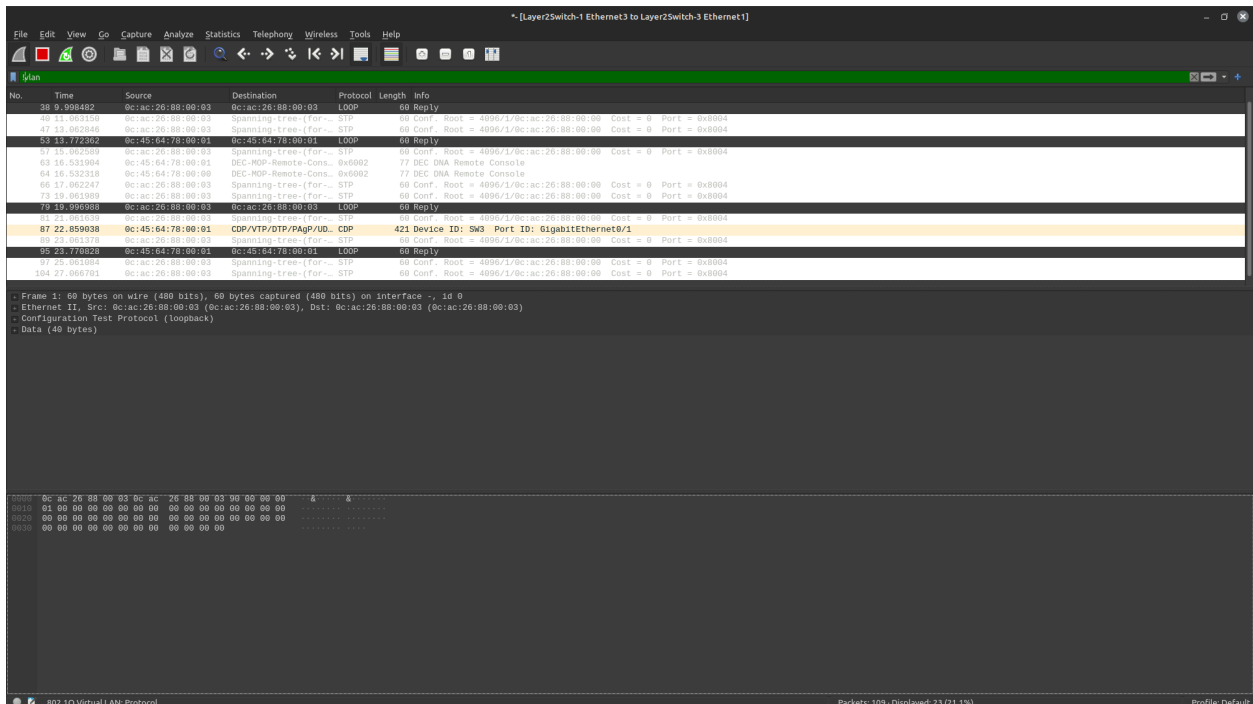
The screenshot shows a Wireshark capture of traffic on a virtual LAN interface. The capture is filtered by 'vlan'. The packet list shows several STP (Spanning Tree Protocol) frames, including BPDUs and configuration messages. The packet details pane shows the structure of an IEEE 802.1Q Virtual LAN frame, including the priority, destination MAC, source MAC, and VLAN ID. The packet bytes pane shows the raw data of the captured frames.

No.	Time	Source	Destination	Protocol	Length	Info
44	11.366043	0c:45:64:78:00:01	0c:45:64:78:00:01	PVST+	68	Conf. Root = 32768/208/0c:45:64:78:00:00 Cost = 0 Port = 0x8002
45	11.366092	0c:45:64:78:00:01	0c:45:64:78:00:01	PVST+	68	Conf. Root = 32768/233/0c:45:64:78:00:00 Cost = 0 Port = 0x8002
46	13.062823	0c:ac:26:88:00:03	0c:ac:26:88:00:03	PVST+	68	Conf. Root = 4096/1/0c:ac:26:88:00:00 Cost = 0 Port = 0x8004
48	13.362685	0c:45:64:78:00:01	0c:45:64:78:00:01	PVST+	68	Conf. Root = 32768/28/0c:45:64:78:00:00 Cost = 0 Port = 0x8002
49	13.363613	0c:45:64:78:00:01	0c:45:64:78:00:01	PVST+	68	Conf. Root = 32768/108/0c:45:64:78:00:00 Cost = 0 Port = 0x8002
50	13.364534	0c:45:64:78:00:01	0c:45:64:78:00:01	PVST+	68	Conf. Root = 32768/208/0c:45:64:78:00:00 Cost = 0 Port = 0x8002
51	13.364728	0c:45:64:78:00:01	0c:45:64:78:00:01	PVST+	68	Conf. Root = 32768/308/0c:45:64:78:00:00 Cost = 0 Port = 0x8002
52	13.366373	0c:45:64:78:00:01	0c:45:64:78:00:01	PVST+	68	Conf. Root = 32768/333/0c:45:64:78:00:00 Cost = 0 Port = 0x8002
54	14.320483	0c:ac:26:88:00:03	0c:ac:26:88:00:03	CDP/VTP/DTP/PagP/UDL	62	Dynamic Trunk Protocol
55	14.543171	0c:45:64:78:00:01	0c:45:64:78:00:01	PVST+	68	Conf. Root = 4096/1/0c:ac:26:88:00:00 Cost = 0 Port = 0x8004
56	15.062549	0c:ac:26:88:00:03	0c:ac:26:88:00:03	PVST+	68	Conf. Root = 32768/28/0c:45:64:78:00:00 Cost = 0 Port = 0x8002
58	15.362347	0c:45:64:78:00:01	0c:45:64:78:00:01	PVST+	68	Conf. Root = 32768/108/0c:45:64:78:00:00 Cost = 0 Port = 0x8002
59	15.363457	0c:45:64:78:00:01	0c:45:64:78:00:01	PVST+	68	Conf. Root = 32768/208/0c:45:64:78:00:00 Cost = 0 Port = 0x8002
60	15.364351	0c:45:64:78:00:01	0c:45:64:78:00:01	PVST+	68	Conf. Root = 32768/308/0c:45:64:78:00:00 Cost = 0 Port = 0x8002
61	15.364559	0c:45:64:78:00:01	0c:45:64:78:00:01	PVST+	68	Conf. Root = 32768/333/0c:45:64:78:00:00 Cost = 0 Port = 0x8002

Frame 2: 68 bytes on wire (544 bits), 68 bytes captured (544 bits) on interface -, id 0
Ethernet II, Src: 0c:ac:26:88:00:03 (0c:ac:26:88:00:03), Dst: PVST+ (01:00:0c:cc:cc:cd)
802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 1
Logical-Link Control
Spanning Tree Protocol

802.1Q Virtual LAN: Protocol Packets: 62 - Displayed: 50 (80.6%) Profile: Default

Пример захвата без тегов:



The screenshot shows a Wireshark capture of traffic on a virtual LAN interface. The capture is filtered by 'vlan'. The packet list shows several STP (Spanning Tree Protocol) frames, including BPDUs and configuration messages. The packet details pane shows the structure of an IEEE 802.1Q Virtual LAN frame, including the priority, destination MAC, source MAC, and VLAN ID. The packet bytes pane shows the raw data of the captured frames.

No.	Time	Source	Destination	Protocol	Length	Info
38	9.096482	0c:ac:26:88:00:03	0c:ac:26:88:00:03	LOOP	60	Reply
40	11.083158	0c:ac:26:88:00:03	0c:ac:26:88:00:03	Spanning-Tree-(For-...)	68	Conf. Root = 4096/1/0c:ac:26:88:00:00 Cost = 0 Port = 0x8004
41	13.062346	0c:ac:26:88:00:03	0c:ac:26:88:00:03	Spanning-Tree-(For-...)	68	Conf. Root = 4096/1/0c:ac:26:88:00:00 Cost = 0 Port = 0x8004
53	13.772362	0c:45:64:78:00:01	0c:45:64:78:00:01	LOOP	60	Reply
57	15.062588	0c:ac:26:88:00:03	0c:ac:26:88:00:03	Spanning-Tree-(For-...)	68	Conf. Root = 4096/1/0c:ac:26:88:00:00 Cost = 0 Port = 0x8004
63	16.532184	0c:45:64:78:00:01	0c:45:64:78:00:01	DEC-NOP-Remote-Conn.	77	DEC DNA Remote Console
64	16.532318	0c:45:64:78:00:01	0c:45:64:78:00:01	DEC-NOP-Remote-Conn.	77	DEC DNA Remote Console
66	17.062247	0c:ac:26:88:00:03	0c:ac:26:88:00:03	Spanning-tree-(for-...)	68	Conf. Root = 4096/1/0c:ac:26:88:00:00 Cost = 0 Port = 0x8004
73	18.061980	0c:ac:26:88:00:03	0c:ac:26:88:00:03	Spanning-tree-(for-...)	68	Conf. Root = 4096/1/0c:ac:26:88:00:00 Cost = 0 Port = 0x8004
74	18.062053	0c:ac:26:88:00:03	0c:ac:26:88:00:03	LOOP	60	Reply
81	21.083550	0c:ac:26:88:00:03	0c:ac:26:88:00:03	Spanning-tree-(for-...)	68	Conf. Root = 4096/1/0c:ac:26:88:00:00 Cost = 0 Port = 0x8004
87	22.859038	0c:45:64:78:00:01	0c:45:64:78:00:01	CDP/VTP/DTP/PagP/UDL	421	Device ID: SW3 Port ID: GigabitEthernet8/1
90	23.063170	0c:45:64:78:00:01	0c:45:64:78:00:01	LOOP	60	Reply
95	23.778829	0c:45:64:78:00:01	0c:45:64:78:00:01	Spanning-Tree-(For-...)	68	Conf. Root = 4096/1/0c:ac:26:88:00:00 Cost = 0 Port = 0x8004
97	25.083884	0c:ac:26:88:00:03	0c:ac:26:88:00:03	Spanning-Tree-(For-...)	68	Conf. Root = 4096/1/0c:ac:26:88:00:00 Cost = 0 Port = 0x8004
104	27.066782	0c:ac:26:88:00:03	0c:ac:26:88:00:03	Spanning-Tree-(For-...)	68	Conf. Root = 4096/1/0c:ac:26:88:00:00 Cost = 0 Port = 0x8004

Frame 1: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface -, id 0
Ethernet II, Src: 0c:ac:26:88:00:03 (0c:ac:26:88:00:03), Dst: 0c:ac:26:88:00:03 (0c:ac:26:88:00:03)
Configuration Test Protocol (loopback)
Data (40 bytes)

802.1Q Virtual LAN: Protocol Packets: 109 - Displayed: 23 (21.1%) Profile: Default

Файлы конфигурации и задокументированные пакеты находятся в папке configs4 в репозитории.