

Тема: Настройка виртуальной локальной сети (VLAN)

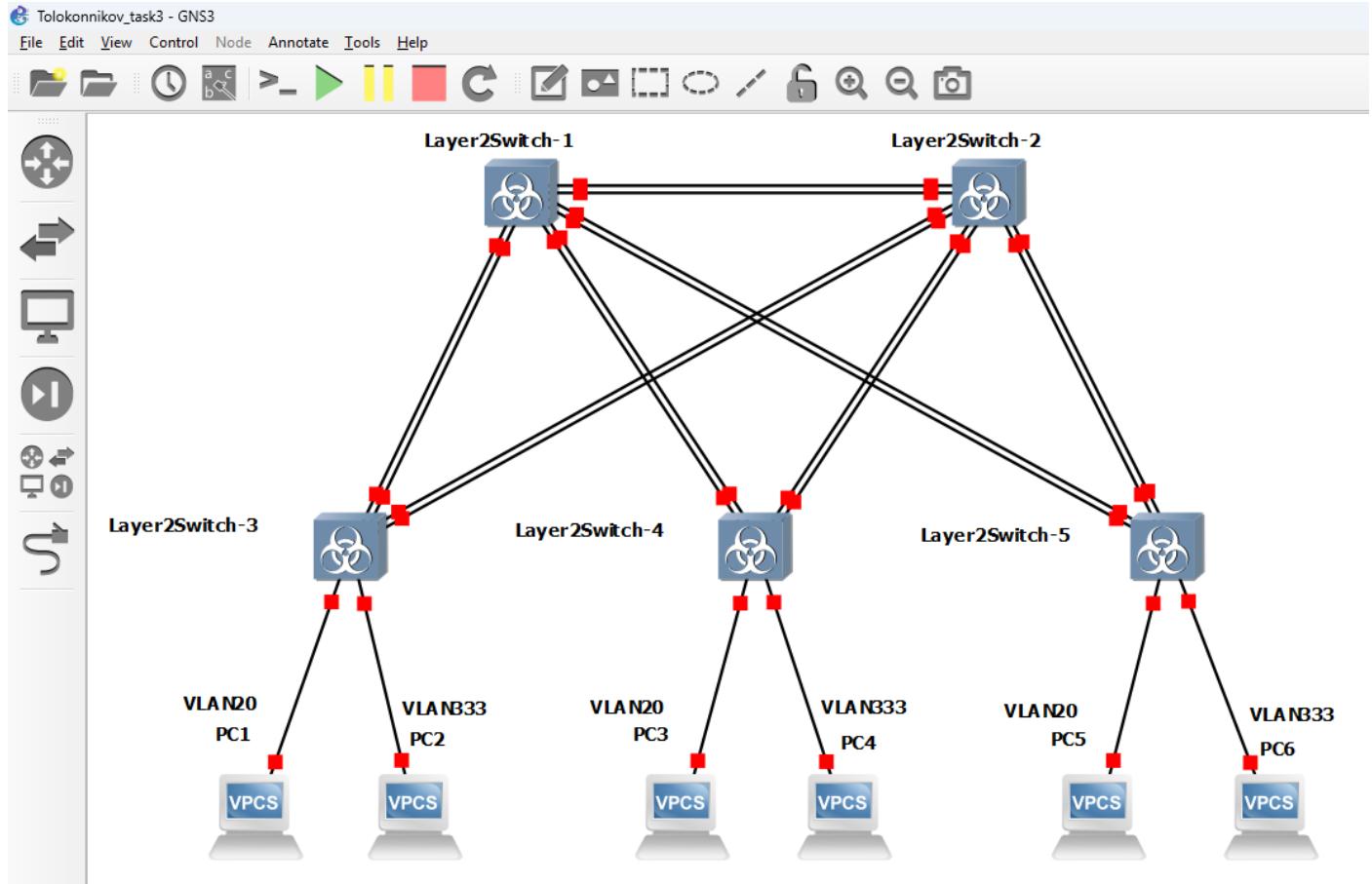
Все команды для настройки включаются в отчет в текстовом виде, не скриншоты.

nb! - отметка в тексте, "обратите особое внимание"

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



Дублировал template

Настройка коммутаторов

Layer2Switch-1:

КОМАНДЫ:

```
enable
configure terminal
vlan 20
name USERS_VLAN20
exit
vlan 333
name SPECIAL_VLAN33
exit
end
write memory
```

```

Switch>enable
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 20
Switch(config-vlan)#USERS_VLAN20
^
% Invalid input detected at '^' marker.

Switch(config-vlan)#name USERS_VLAN20
Switch(config-vlan)#exit
Switch(config)#vlan 333
Switch(config-vlan)#name SPECIAL_VLAN333
Switch(config-vlan)#exit
Switch(config)#end
Switch#
*Dec 9 12:31:02.664: %SYS-5-CONFIG_I: Configured from console by consolewrite m
emory
Building configuration...
Compressed configuration from 5206 bytes to 1985 bytes[OK]
Switch#
*Dec 9 12:31:10.443: %GRUB-5-CONFIG_WRITING: GRUB configuration is being update
d on disk. Please wait...
*Dec 9 12:31:11.202: %GRUB-5-CONFIG_WRITTEN: GRUB configuration was written to
disk successfully.
Switch#

```

Layer2Switch-2:

КОМАНДЫ:

```

enable
configure terminal
vlan 20
name USERS_VLAN20
exit
vlan 333
name SPECIAL_VLAN33
exit
end
write memory

```

```

Switch>enable
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 20
Switch(config-vlan)#name USERS_VLAN20
Switch(config-vlan)#exit
Switch(config)#vlan 333
Switch(config-vlan)#name SPECIAL_VLAN33
Switch(config-vlan)#exit
Switch(config)#end
Switch#
*Dec 9 12:34:34.594: %SYS-5-CONFIG_I: Configured from console by console
Switch#write memory
Building configuration...
Compressed configuration from 5206 bytes to 1985 bytes[OK]
Switch#
*Dec 9 12:34:46.019: %GRUB-5-CONFIG_WRITING: GRUB configuration is being updated on disk. Please wait...
*Dec 9 12:34:46.769: %GRUB-5-CONFIG_WRITTEN: GRUB configuration was written to disk successfully.
Switch#

```

Layer2Switch-3:

```

enable
configure terminal
vlan 20

```

```
name USERS_VLAN20
exit
vlan 333
name SPECIAL_VLAN333
exit
end
write memory
Switch#enable
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 20
Switch(config-vlan)#name USERS_VLAN20
Switch(config-vlan)#exit
Switch(config)#vlan 333
Switch(config-vlan)#name SPECIAL_VLAN333
Switch(config-vlan)#exit
Switch(config)#end
Switch#write memory
Building configuration...
Compressed configuration from 5071 bytes to 1965 bytes[OK]
*Dec  9 12:48:34.210: %SYS-5-CONFIG_I: Configured from console by console
*Dec  9 12:48:37.881: %GRUB-5-CONFIG_WRITING: GRUB configuration is being updated on
disk. Please wait...
Switch#
*Dec  9 12:48:38.616: %GRUB-5-CONFIG_WRITTEN: GRUB configuration was written to disk
successfully.
```

И потом ещё КОМАНДЫ

Layer2Switch-3:

```
enable
configure terminal
interface GigabitEthernet1/0
description "TO_PC1_VLAN20"
switchport mode access
switchport access vlan 20
no shutdown
exit
interface GigabitEthernet1/1
description "TO_PC2_VLAN333"
switchport mode access
switchport access vlan 333
no shutdown
exit
end
write memory
```

```
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#interface GigabitEthernet1/0
Switch(config-if)# description "TO_PC1_VLAN20"
Switch(config-if)# switchport mode access
Switch(config-if)# switchport access vlan 20
Switch(config-if)# no shutdown
Switch(config-if)# exit
Switch(config)#interface GigabitEthernet1/1
Switch(config-if)# description "TO_PC2_VLAN333"
Switch(config-if)# switchport mode access
Switch(config-if)# switchport access vlan 333
Switch(config-if)# no shutdown
Switch(config-if)# exit
Switch(config)#end
Switch#write memory
*Dec  9 12:51:24.734: %SYS-5-CONFIG_I: Configured from console by console
Building configuration...
Compressed configuration from 5129 bytes to 1992 bytes[OK]
Switch#
*Dec  9 12:51:30.061: %GRUB-5-CONFIG_WRITING: GRUB configuration is being updated on
disk. Please wait...
*Dec  9 12:51:30.802: %GRUB-5-CONFIG_WROTTEN: GRUB configuration was written to disk
successfully.
```

Layer2Switch-4:

```
enable
configure terminal
interface GigabitEthernet1/0
description "TO_PC3_VLAN20"
switchport mode access
switchport access vlan 20
no shutdown
exit
interface GigabitEthernet1/1
description "TO_PC4_VLAN333"
switchport mode access
switchport access vlan 333
no shutdown
exit
end
write memory
```

```

Switch>enable
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 20
Switch(config-vlan)#name USERS_VLAN20
Switch(config-vlan)#exit
Switch(config)#vlan 333
Switch(config-vlan)#name SPECIAL_VLAN333
Switch(config-vlan)#exit
Switch(config)#configure terminal
^
% Invalid input detected at '^' marker.

Switch(config)#interface GigabitEthernet1/0
Switch(config-if)#description "TO_PC3_VLAN20"
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 20
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#interface GigabitEthernet1/1
Switch(config-if)#description "TO_PC4_VLAN333"
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 333
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#end
Switch#write memory
Building configuration...
Compressed configuration from 5129 bytes to 1992 bytes
*Dec 9 12:53:09.536: %PM-3-INTERNALERROR: Port Manager Internal Software Error
(vlan > 0 && vlan < PM_MAX_VLANS: ../switch/pm/pm_vlan.c: 870: pm_vlan_test_port
list)
-Traceback= 1C492C9z F385ABz FA54E0z FA5617z F9398Bz F93DD7z 3013F8Fz F9CD75z F4
2DD8z 10C9EAEz F48DBDz F5DE6Cz 32915A5z 3290D9Bz 3290B5Cz 3291A3Az
*Dec 9 12:53:09.536: %PM-3-INTERNALERROR: Port Manager Internal Software Error
(pm_vlan_test_portlist(vlan, pd->globalNumber): ../switch/pm/pm_vlan.c: 1777: pm
_vlan_rem_port)
-Traceback= 1C492C9z F385ABz FA578Bz F9398Bz F93DD7z 3013F8Fz F9CD75z F42DD8z 10C9EAEz
*Dec 9 12:53:09.537: %PM-3-INTERNALERROR: Port Manager Internal Software Error (vlan >
-Traceback= 1C492C9z F385ABz FA58F1z FA5665z F9398Bz F93DD7z 3013F8Fz F9CD75z F42DD8z 1
*Dec 9 12:53:09.537: %BIT-4-OOUTOFRANGE: bit 0 is not in the expected range of 1 to 409
-Traceback= 1C492C9z 196C71Fz 196BF98z FA5699z F9398Bz F93DD7z 3013F8Fz F9CD75z F42DD8z
*Dec 9 12:53:09.537: %PM-3-INTERNALERROR: Port Manager Internal Software Error (pm_vtp
n_rem_port)
-Traceback= 1C492C9z F385ABz FA5700z F9398Bz F93DD7z 3013F8Fz F9CD75z F42DD8z 10C9EAEz
*Dec 9 12:53:09.537: %BIT-4-OOUTOFRANGE: bit 0 is not in the expected range of 1 to 409
-Traceback= 1C492C9z 196C71Fz 196C008z FA56A7z F9398Bz F93DD7z 3013F8Fz F9CD75z F42DD8z
*Dec 9 12:53:09.667: %SYS-5-CONFIG_I: Configured from console by console[OK]
Switch#
*Dec 9 12:53:13.353: %GRUB-5-CONFIG_WRITING: GRUB configuration is being updated on di
*Dec 9 12:53:14.085: %GRUB-5-CONFIG_WRIITTEN: GRUB configuration was written to disk su
```

Layer2Switch-5:

```

enable
configure terminal
interface GigabitEthernet1/0
description "TO_PC5_VLAN20"
switchport mode access
switchport access vlan 20
no shutdown
exit
interface GigabitEthernet1/1
```

```

description "TO_PC6_VLAN333"
switchport mode access
switchport access vlan 333
no shutdown
exit
end
write memory
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 20
Switch(config-vlan)#name USERS_VLAN20
Switch(config-vlan)#exit
Switch(config)#vlan 333
Switch(config-vlan)#name SPECIAL_VLAN333
Switch(config-vlan)#exit
Switch(config)#interface GigabitEthernet1/0
Switch(config-if)#description "TO_PC5_VLAN20"
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 20
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#interface GigabitEthernet1/1
Switch(config-if)#description "TO_PC6_VLAN333"
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 333
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#end
Switch#write memory
Building configuration...
Compressed configuration from 5122 bytes to 1987 bytes[OK]
*Dec 9 12:54:31.667: %SYS-5-CONFIG_I: Configured from console by co
nsole
*Dec 9 12:54:35.286: %GRUB-5-CONFIG_WRITING: GRUB configuration is
being updated on disk. Please wait...
Switch#
*Dec 9 12:54:36.030: %GRUB-5-CONFIG_WRITTEN: GRUB configuration was
written to disk successfully.

```

Счастье на этом не заканчивается. Теперь нужно сделать порты коммутаторов, соединённых линками друг с другом, trunk-портами.

Для Layer2Switch-1

КОМАНДЫ:

```

enable
configure terminal
interface Gi0/0
switchport mode trunk
switchport trunk native vlan 333
switchport trunk allowed vlan 20,333
description "Trunk to SW2"
no shutdown
exit
interface Gi0/1
switchport mode trunk
switchport trunk native vlan 333
switchport trunk allowed vlan 20,333

```

```
description "Trunk to SW2"
no shutdown
exit
interface Gi0/2
switchport mode trunk
switchport trunk native vlan 333
switchport trunk allowed vlan 20,333
description "Trunk to SW3"
no shutdown
exit
interface Gi0/3
switchport mode trunk
switchport trunk native vlan 333
switchport trunk allowed vlan 20,333
description "Trunk to SW3"
no shutdown
exit
interface Gi1/0
switchport mode trunk
switchport trunk native vlan 333
switchport trunk allowed vlan 20,333
description "Trunk to SW4"
no shutdown
exit
interface Gi1/1
switchport mode trunk
switchport trunk native vlan 333
switchport trunk allowed vlan 20,333
description "Trunk to SW4"
no shutdown
exit
interface Gi1/2
switchport mode trunk
switchport trunk native vlan 333
switchport trunk allowed vlan 20,333
description "Trunk to SW5"
no shutdown
exit
interface Gi1/3
switchport mode trunk
switchport trunk native vlan 333
switchport trunk allowed vlan 20,333
description "Trunk to SW5"
no shutdown
exit
end
write memory
```

```
Switch#enable
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#interface Gi0/0
Switch(config-if)#switchport mode trunk
Command rejected: An interface whose trunk encapsulation is "Auto" can not be configured to "trunk" mode.
Switch(config-if)#switchport trunk native vlan 333
Switch(config-if)#switchport trunk allowed vlan 20,333
Switch(config-if)#description "Trunk to SW2"
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#interface Gi0/1
Switch(config-if)#switchport mode trunk
Command rejected: An interface whose trunk encapsulation is "Auto" can not be configured to "trunk" mode.
Switch(config-if)#switchport trunk native vlan 333
Switch(config-if)#switchport trunk allowed vlan 20,333
Switch(config-if)#description "Trunk to SW2"
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#interface Gi0/2
Switch(config-if)#switchport mode trunk
Command rejected: An interface whose trunk encapsulation is "Auto" can not be configured to "trunk" mode.
Switch(config-if)#switchport trunk native vlan 333
Switch(config-if)#switchport trunk allowed vlan 20,333
Switch(config-if)#description "Trunk to SW3"
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#interface Gi0/3
Switch(config-if)#switchport mode trunk
Command rejected: An interface whose trunk encapsulation is "Auto" can not be configured to "trunk" mode.
Switch(config-if)#switchport trunk native vlan 333
Switch(config-if)#switchport trunk allowed vlan 20,333
Switch(config-if)#description "Trunk to SW3"
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#interface Gil/0
Switch(config-if)#switchport mode trunk
Command rejected: An interface whose trunk encapsulation is "Auto" can not be configured to "trunk" mode.
Switch(config-if)#switchport trunk native vlan 333
Switch(config-if)#switchport trunk allowed vlan 20,333
Switch(config-if)#description "Trunk to SW4"
Switch(config-if)#no shutdown
Switch(config-if)#exit
```

```

Switch(config)#interface Gi1/1
Switch(config-if)#switchport mode trunk
Command rejected: An interface whose trunk encapsulation is "Auto" can not be configured to "trunk" mode.
Switch(config-if)#switchport trunk native vlan 333
Switch(config-if)#switchport trunk allowed vlan 20,333
Switch(config-if)#description "Trunk to SW4"
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#interface Gi1/2
Switch(config-if)#switchport mode trunk
Command rejected: An interface whose trunk encapsulation is "Auto" can not be configured to "trunk" mode.
Switch(config-if)#switchport trunk native vlan 333
Switch(config-if)#switchport trunk allowed vlan 20,333
Switch(config-if)#description "Trunk to SW5"
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#interface Gi1/3
Switch(config-if)#switchport mode trunk
Command rejected: An interface whose trunk encapsulation is "Auto" can not be configured to "trunk" mode.
Switch(config-if)#switchport trunk native vlan 333
Switch(config-if)#switchport trunk allowed vlan 20,333
Switch(config-if)#description "Trunk to SW5"
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#end
Switch#write memory
Building configuration...
Compressed configuration from 6006 bytes to 2317 bytes[OK]
*Dec 9 13:13:33.941: %SYS-5-CONFIG_I: Configured from console by console
*Dec 9 13:13:37.694: %GRUB-5-CONFIG_WRITING: GRUB configuration is being updated on disk. Please wait...
Switch#
*Dec 9 13:13:38.438: %GRUB-5-CONFIG_WRITTEN: GR
UB configuration was written to disk successfull
y.
Switch#
```

Ага, забыл прописать инкапсуляцию

Для Layer2Switch-1

КОМАНДЫ:

```

enable
configure terminal
interface Gi0/0
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 333
switchport trunk allowed vlan 20,333
description "Trunk to SW2"
no shutdown
exit
interface Gi0/1
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 333
switchport trunk allowed vlan 20,333
description "Trunk to SW2"
no shutdown
exit
interface Gi0/2
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 333
switchport trunk allowed vlan 20,333
description "Trunk to SW3"
```

```
no shutdown
exit
interface Gi0/3
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 333
switchport trunk allowed vlan 20,333
description "Trunk to SW3"
no shutdown
exit
interface Gi1/0
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 333
switchport trunk allowed vlan 20,333
description "Trunk to SW4"
no shutdown
exit
interface Gi1/1
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 333
switchport trunk allowed vlan 20,333
description "Trunk to SW4"
no shutdown
exit
interface Gi1/2
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 333
switchport trunk allowed vlan 20,333
description "Trunk to SW5"
no shutdown
exit
interface Gi1/3
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 333
switchport trunk allowed vlan 20,333
description "Trunk to SW5"
no shutdown
exit
end
write memory
```

```
Switch>
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL-Z
Switch(config)#interface Gi0/0
Switch(config-if)# switchport trunk encapsulation dot1q
Switch(config-if)# switchport mode trunk
Switch(config-if)# switchport trunk native vlan 333
Switch(config-if)# switchport trunk allowed vlan 20,333
Switch(config-if)# description "Trunk to SW2"
Switch(config-if)# no shutdown
Switch(config-if)# exit
Switch(config)#interface Gi0/1
Switch(config-if)# switchport trunk encapsulation dot1q
Switch(config-if)# switchport mode trunk
Switch(config-if)# switchport trunk native vlan 333
Switch(config-if)# switchport trunk allowed vlan 20,333
Switch(config-if)# description "Trunk to SW2"
Switch(config-if)# no shutdown
Switch(config-if)# exit
Switch(config)#interface Gi0/2
Switch(config-if)# switchport trunk encapsulation dot1q
Switch(config-if)# switchport mode trunk
Switch(config-if)# switchport trunk native vlan 333
Switch(config-if)# switchport trunk allowed vlan 20,333
Switch(config-if)# description "Trunk to SW3"
Switch(config-if)# no shutdown
Switch(config-if)# exit
Switch(config)#interface Gi0/3
Switch(config-if)# switchport trunk encapsulation dot1q
Switch(config-if)# switchport mode trunk
Switch(config-if)# switchport trunk native vlan 333
Switch(config-if)# switchport trunk allowed vlan 20,333
Switch(config-if)# description "Trunk to SW3"
Switch(config-if)# no shutdown
Switch(config-if)# exit
Switch(config)#interface Gi1/0
Switch(config-if)# switchport trunk encapsulation dot1q
Switch(config-if)# switchport mode trunk
Switch(config-if)# switchport trunk native vlan 333
Switch(config-if)# switchport trunk allowed vlan 20,333
Switch(config-if)# description "Trunk to SW4"
Switch(config-if)# no shutdown
Switch(config-if)# exit
Switch(config)#interface Gi1/1
Switch(config-if)# switchport trunk encapsulation dot1q
Switch(config-if)# switchport mode trunk
Switch(config-if)# switchport trunk native vlan 333
Switch(config-if)# switchport trunk allowed vlan 20,333
Switch(config-if)# description "Trunk to SW4"
Switch(config-if)# no shutdown
Switch(config-if)# exit
Switch(config)#interface Gi1/2
Switch(config-if)# switchport trunk encapsulation dot1q
Switch(config-if)# switchport mode trunk
Switch(config-if)# switchport trunk native vlan 333
Switch(config-if)# switchport trunk allowed vlan 20,333
Switch(config-if)# description "Trunk to SW5"
Switch(config-if)# no shutdown
Switch(config-if)# exit
Switch(config)#interface Gi1/3
Switch(config-if)# switchport trunk encapsulation dot1q
Switch(config-if)# switchport mode trunk
Switch(config-if)# switchport trunk native vlan 333
Switch(config-if)# switchport trunk allowed vlan 20,333
Switch(config-if)# description "Trunk to SW5"
Switch(config-if)# no shutdown
Switch(config-if)# exit
Switch(config)#end
Switch#write memory
*Dec  9 13:32:08.797: %SYS-5-CONFIG_I: Configured from console by console
```

Для Layer2Switch-2

КОМАНДЫ:

```
enable
configure terminal
interface Gi0/0
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 333
switchport trunk allowed vlan 20,333
description "Trunk to SW1"
no shutdown
exit
interface Gi0/1
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 333
switchport trunk allowed vlan 20,333
description "Trunk to SW1"
no shutdown
exit
interface Gi0/2
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 333
switchport trunk allowed vlan 20,333
description "Trunk to SW3"
no shutdown
exit
interface Gi0/3
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 333
switchport trunk allowed vlan 20,333
description "Trunk to SW3"
no shutdown
exit
interface Gi1/0
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 333
switchport trunk allowed vlan 20,333
description "Trunk to SW4"
no shutdown
exit
interface Gi1/1
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 333
switchport trunk allowed vlan 20,333
description "Trunk to SW4"
no shutdown
exit
```

```
interface Gi1/2
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 333
switchport trunk allowed vlan 20,333
description "Trunk to SW5"
no shutdown
exit
interface Gi1/3
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 333
switchport trunk allowed vlan 20,333
description "Trunk to SW5"
no shutdown
exit
end
write memory
```

```
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#interface Gi0/0
Switch(config-if)#switchport trunk encapsulation dot1q
Switch(config-if)#switchport mode trunk
Switch(config-if)#switchport trunk native vlan 333
Switch(config-if)#switchport trunk allowed vlan 20,333
Switch(config-if)#description "Trunk to SW1"
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#interface Gi0/1
Switch(config-if)#switchport trunk encapsulation dot1q
Switch(config-if)#switchport mode trunk
Switch(config-if)#switchport trunk native vlan 333
Switch(config-if)#switchport trunk allowed vlan 20,333
Switch(config-if)#description "Trunk to SW1"
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#interface Gi0/2
Switch(config-if)#switchport trunk encapsulation dot1q
Switch(config-if)#switchport mode trunk
Switch(config-if)#switchport trunk native vlan 333
Switch(config-if)#switchport trunk allowed vlan 20,333
Switch(config-if)#description "Trunk to SW3"
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#interface Gi0/3
Switch(config-if)#switchport trunk encapsulation dot1q
Switch(config-if)#switchport mode trunk
Switch(config-if)#switchport trunk native vlan 333
Switch(config-if)#switchport trunk allowed vlan 20,333
Switch(config-if)#description "Trunk to SW3"
Switch(config-if)#no shutdown
Switch(config-if)#exit
```

```
Switch(config)#interface Gil/0
Switch(config-if)#switchport trunk encapsulation dot1q
Switch(config-if)#switchport mode trunk
Switch(config-if)#switchport trunk native vlan 333
Switch(config-if)#switchport trunk allowed vlan 20,333
Switch(config-if)#description "Trunk to SW4"
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#interface Gil/1
Switch(config-if)#switchport trunk encapsulation dot1q
Switch(config-if)#switchport mode trunk
Switch(config-if)#switchport trunk native vlan 333
Switch(config-if)#switchport trunk allowed vlan 20,333
Switch(config-if)#description "Trunk to SW4"
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#interface Gil/2
Switch(config-if)#switchport trunk encapsulation dot1q
Switch(config-if)#switchport mode trunk
Switch(config-if)#switchport trunk native vlan 333
Switch(config-if)#switchport trunk allowed vlan 20,333
Switch(config-if)#description "Trunk to SW5"
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#interface Gil/3
Switch(config-if)#switchport trunk encapsulation dot1q
Switch(config-if)#switchport mode trunk
Switch(config-if)#switchport trunk native vlan 333
Switch(config-if)#switchport trunk allowed vlan 20,333
Switch(config-if)#description "Trunk to SW5"
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#end
Switch#write memory
Building configuration...
Compressed configuration from 6494 bytes to 2479 bytes[OK]
*Dec 9 13:33:31.526: %SYS-5-CONFIG_I: Configured from console by console
*Dec 9 13:33:35.772: %GRUB-5-CONFIG_WRITING: GRUB configuration is being updated on disk. Please wait...
Switch#
*Dec 9 13:33:36.528: %GRUB-5-CONFIG_WRITTEN: GRUB configuration was written to disk successfully. █
```

Для Layer2Switch-3, Layer2Switch-4, Layer2Switch-5 команды не отличаются

КОМАНДЫ:

```
enable
configure terminal
interface Gi0/0
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 333
switchport trunk allowed vlan 20,333
description "Trunk to SW1"
no shutdown
exit
interface Gi0/1
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 333
switchport trunk allowed vlan 20,333
description "Trunk to SW1"
no shutdown
exit
interface Gi0/2
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 333
switchport trunk allowed vlan 20,333
description "Trunk to SW2"
no shutdown
exit
interface Gi0/3
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 333
switchport trunk allowed vlan 20,333
description "Trunk to SW2"
no shutdown
exit
end
write memory
```

```
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#interface Gi0/0
Switch(config-if)#switchport trunk encapsulation dot1q
Switch(config-if)#switchport mode trunk
Switch(config-if)#switchport trunk native vlan 333
Switch(config-if)#switchport trunk allowed vlan 20,333
Switch(config-if)#description "Trunk to SW1"
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#interface Gi0/1
Switch(config-if)#switchport trunk encapsulation dot1q
Switch(config-if)#switchport mode trunk
Switch(config-if)#switchport trunk native vlan 333
Switch(config-if)#switchport trunk allowed vlan 20,333
Switch(config-if)#description "Trunk to SW1"
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#interface Gi0/2
Switch(config-if)#switchport trunk encapsulation dot1q
Switch(config-if)#switchport mode trunk
Switch(config-if)#switchport trunk native vlan 333
Switch(config-if)#switchport trunk allowed vlan 20,333
Switch(config-if)#description "Trunk to SW2"
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#interface Gi0/3
Switch(config-if)#switchport trunk encapsulation dot1q
Switch(config-if)#switchport mode trunk
Switch(config-if)#switchport trunk native vlan 333
Switch(config-if)#switchport trunk allowed vlan 20,333
Switch(config-if)#description "Trunk to SW2"
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#end
Switch#write memory
Building configuration...
Compressed configuration from 5767 bytes to 2264 bytes
*Dec  9 13:40:17.158: %SYS-5-CONFIG_I: Configured from console by console[OK]
Switch#
```

```
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#interface Gi0/0
Switch(config-if)#switchport trunk encapsulation dot1q
Switch(config-if)#switchport mode trunk
Switch(config-if)#switchport trunk native vlan 333
Switch(config-if)#switchport trunk allowed vlan 20,333
Switch(config-if)#description "Trunk to SW1"
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#interface Gi0/1
Switch(config-if)#switchport trunk encapsulation dot1q
Switch(config-if)#switchport mode trunk
Switch(config-if)#switchport trunk native vlan 333
Switch(config-if)#switchport trunk allowed vlan 20,333
Switch(config-if)#description "Trunk to SW1"
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#interface Gi0/2
Switch(config-if)#switchport trunk encapsulation dot1q
Switch(config-if)#switchport mode trunk
Switch(config-if)#switchport trunk native vlan 333
Switch(config-if)#switchport trunk allowed vlan 20,333
Switch(config-if)#description "Trunk to SW2"
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#interface Gi0/3
Switch(config-if)#switchport trunk encapsulation dot1q
Switch(config-if)#switchport mode trunk
Switch(config-if)#switchport trunk native vlan 333
Switch(config-if)#switchport trunk allowed vlan 20,333
Switch(config-if)#description "Trunk to SW2"
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#end
Switch#write memory
Building configuration...
Compressed configuration from 5767 bytes to 2264 bytes[OK]
Switch#
*Dec  9 13:40:34.891: %SYS-5-CONFIG_I: Configured from console by console
*Dec  9 13:40:42.990: %GRUB-5-CONFIG_WRITING: GRUB configuration is being updated on disk. Please wait...[
```

```
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#interface Gi0/0
Switch(config-if)#switchport trunk encapsulation dot1q
Switch(config-if)#switchport mode trunk
Switch(config-if)#switchport trunk native vlan 333
Switch(config-if)#switchport trunk allowed vlan 20,333
Switch(config-if)#description "Trunk to SW1"
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#interface Gi0/1
Switch(config-if)#switchport trunk encapsulation dot1q
Switch(config-if)#switchport mode trunk
Switch(config-if)#switchport trunk native vlan 333
Switch(config-if)#switchport trunk allowed vlan 20,333
Switch(config-if)#description "Trunk to SW1"
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#interface Gi0/2
Switch(config-if)#switchport trunk encapsulation dot1q
Switch(config-if)#switchport mode trunk
Switch(config-if)#switchport trunk native vlan 333
Switch(config-if)#switchport trunk allowed vlan 20,333
Switch(config-if)#description "Trunk to SW2"
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#interface Gi0/3
Switch(config-if)#switchport trunk encapsulation dot1q
Switch(config-if)#switchport mode trunk
Switch(config-if)#switchport trunk native vlan 333
Switch(config-if)#switchport trunk allowed vlan 20,333
Switch(config-if)#description "Trunk to SW2"
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#end
Switch#write memory
Building configuration...
Compressed configuration from 5766 bytes to 2262 bytes
*Dec  9 13:37:16.433: %SYS-5-CONFIG_I: Configured from console by console[OK]
Switch#
*Dec  9 13:37:20.045: %GRUB-5-CONFIG_WRITING: GRUB configuration is being updated on disk. Please wait...
*Dec  9 13:37:20.781: %GRUB-5-CONFIG_WRITTEN: GRUB configuration was written to disk successfully.
```

Теперь даём ip VPCS

КОМАНДЫ:

ip 192.168.20.3 255.255.255.0

ip 192.168.33.3 255.255.255.0

Они у Switch3, пусть будут с тройками. И т.д.

ip 192.168.20.4 255.255.255.0

ip 192.168.33.4 255.255.255.0

А 33 как 333, но чтобы меньше 255 был пусть 33 будет

ip 192.168.20.5 255.255.255.0

ip 192.168.33.5 255.255.255.0

```
PC1> ip 192.168.20.3 255.255.255.0
Checking for duplicate address...
PC1 : 192.168.20.3 255.255.255.0
```

PC1> [REDACTED]

```
PC3> ip 192.168.20.4 255.255.255.0
Checking for duplicate address...
PC3 : 192.168.20.4 255.255.255.0
```

PC3> [REDACTED]

```
PC5> ip 192.168.20.5 255.255.255.0
Checking for duplicate address...
PC5 : 192.168.20.5 255.255.255.0
```

PC5> [REDACTED]

```
PC2> ip 192.168.33.3 255.255.255.0
Checking for duplicate address...
PC2 : 192.168.33.3 255.255.255.0
```

PC2> [REDACTED]

```
PC4> ip 192.168.33.4 255.255.255.0
Checking for duplicate address...
PC4 : 192.168.33.4 255.255.255.0
```

PC4> [REDACTED]

```
PC6> ip 192.168.33.5 255.255.255.0
Checking for duplicate address...
PC6 : 192.168.33.5 255.255.255.0
```

PC6> [REDACTED]

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

```
PC1> ping 192.168.20.4

84 bytes from 192.168.20.4 icmp_seq=1 ttl=64 time=9.326 ms
84 bytes from 192.168.20.4 icmp_seq=2 ttl=64 time=2.936 ms
84 bytes from 192.168.20.4 icmp_seq=3 ttl=64 time=9.352 ms
84 bytes from 192.168.20.4 icmp_seq=4 ttl=64 time=6.336 ms
84 bytes from 192.168.20.4 icmp_seq=5 ttl=64 time=9.127 ms

PC1> ping 192.168.33.4

host (255.255.255.0) not reachable

PC1> ping 192.168.20.5

84 bytes from 192.168.20.5 icmp_seq=1 ttl=64 time=7.643 ms
84 bytes from 192.168.20.5 icmp_seq=2 ttl=64 time=11.005 ms
84 bytes from 192.168.20.5 icmp_seq=3 ttl=64 time=6.311 ms
84 bytes from 192.168.20.5 icmp_seq=4 ttl=64 time=2.786 ms
84 bytes from 192.168.20.5 icmp_seq=5 ttl=64 time=8.346 ms

PC1> ping 192.168.33.5

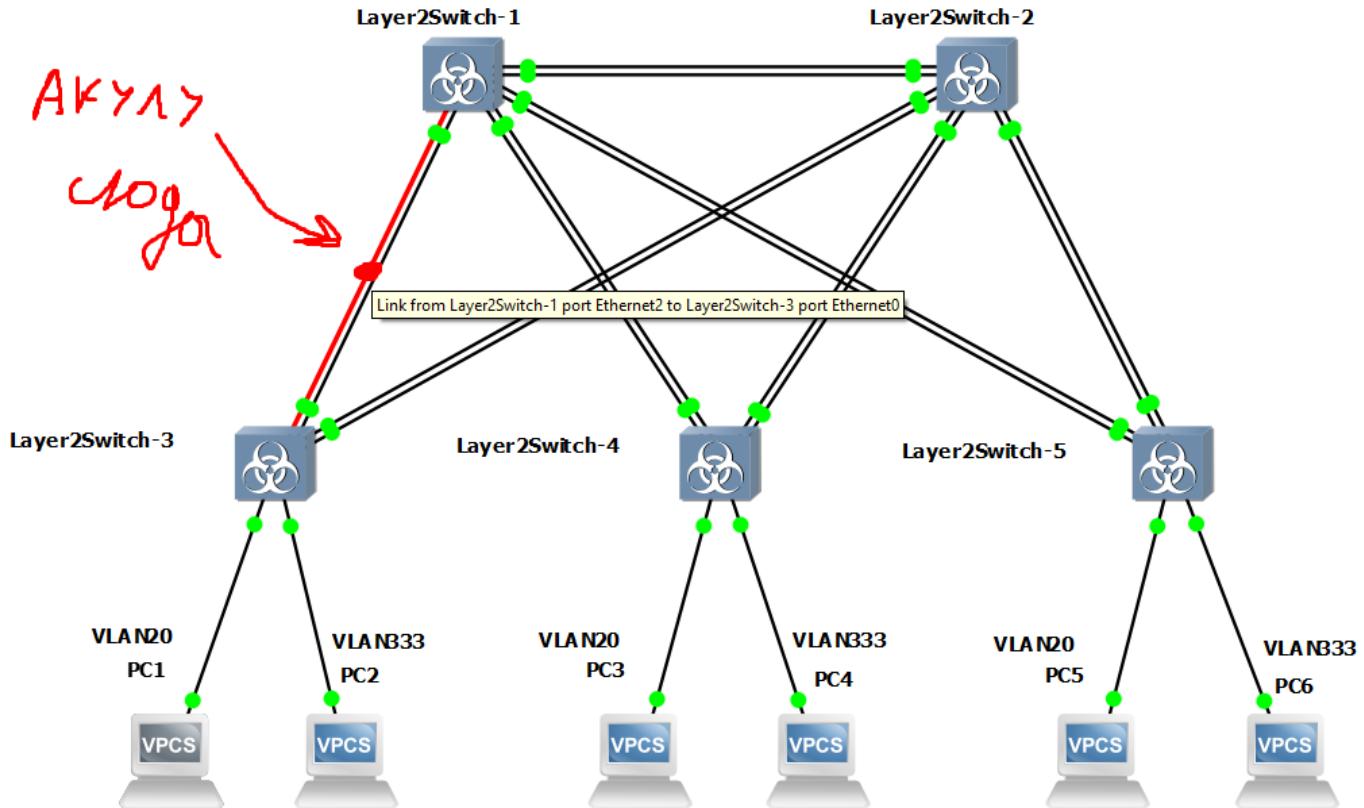
host (255.255.255.0) not reachable

PC1> █
```

КОМАНДЫ:

ping 192.168.20.4
ping 192.168.33.4
ping 192.168.20.4
ping 192.168.33.4

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



VPCS1

КОМАНДА:

ping 192.168.20.4

Захват с Standard input [Layer2Switch-1 Ethernet2 to Layer2Switch-3 Ethernet0]						
Файл	Правка	Вид	Запуск	Захват	Анализ	Статистика
File	Edit	View	Run	Capture	Analysis	Statistics
<input type="text"/> vlan.id == 20						
No.	Time	Source	Destination	Protocol	Length	Info
13	10.015377	0:c:5d:f1:b6:00:02	PVST+	STP	68	Conf. Root = 32768/20/0c:4d:88:72:00:00 Cost = 4 Port = 0x8003
15	12.018724	0:c:5d:f1:b6:00:02	PVST+	STP	68	Conf. Root = 32768/20/0c:4d:88:72:00:00 Cost = 4 Port = 0x8003
19	14.020710	0:c:5d:f1:b6:00:02	PVST+	STP	68	Conf. Root = 32768/20/0c:4d:88:72:00:00 Cost = 4 Port = 0x8003
21	16.025676	0:c:5d:f1:b6:00:02	PVST+	STP	68	Conf. Root = 32768/20/0c:4d:88:72:00:00 Cost = 4 Port = 0x8003
24	18.032719	0:c:5d:f1:b6:00:02	PVST+	STP	68	Conf. Root = 32768/20/0c:4d:88:72:00:00 Cost = 4 Port = 0x8003
26	20.034872	0:c:5d:f1:b6:00:02	PVST+	STP	68	Conf. Root = 32768/20/0c:4d:88:72:00:00 Cost = 4 Port = 0x8003
28	22.035864	0:c:5d:f1:b6:00:02	PVST+	STP	68	Conf. Root = 32768/20/0c:4d:88:72:00:00 Cost = 4 Port = 0x8003
32	24.037069	0:c:5d:f1:b6:00:02	PVST+	STP	68	Conf. Root = 32768/20/0c:4d:88:72:00:00 Cost = 4 Port = 0x8003
35	26.040084	0:c:5d:f1:b6:00:02	PVST+	STP	68	Conf. Root = 32768/20/0c:4d:88:72:00:00 Cost = 4 Port = 0x8003
38	28.044199	0:c:5d:f1:b6:00:02	PVST+	STP	68	Conf. Root = 32768/20/0c:4d:88:72:00:00 Cost = 4 Port = 0x8003
40	28.964327	Private_66:68:00	Broadcast	ARP	68	Who has 192.168.20.4? Tell 192.168.20.3
41	30.050439	0:c:5d:f1:b6:00:02	PVST+	STP	68	Conf. Root = 32768/20/0c:4d:88:72:00:00 Cost = 4 Port = 0x8003
43	32.055801	0:c:5d:f1:b6:00:02	PVST+	STP	68	Conf. Root = 32768/20/0c:4d:88:72:00:00 Cost = 4 Port = 0x8003
46	34.062388	0:c:5d:f1:b6:00:02	PVST+	STP	68	Conf. Root = 32768/20/0c:4d:88:72:00:00 Cost = 4 Port = 0x8003
48	36.068203	0:c:5d:f1:b6:00:02	PVST+	STP	68	Conf. Root = 32768/20/0c:4d:88:72:00:00 Cost = 4 Port = 0x8003
51	38.066295	0:c:5d:f1:b6:00:02	PVST+	STP	68	Conf. Root = 32768/20/0c:4d:88:72:00:00 Cost = 4 Port = 0x8003
53	40.071155	0:c:5d:f1:b6:00:02	PVST+	STP	68	Conf. Root = 32768/20/0c:4d:88:72:00:00 Cost = 4 Port = 0x8003
55	42.072486	0:c:5d:f1:b6:00:02	PVST+	STP	68	Conf. Root = 32768/20/0c:4d:88:72:00:00 Cost = 4 Port = 0x8003
58	44.073978	0:c:5d:f1:b6:00:02	PVST+	STP	68	Conf. Root = 32768/20/0c:4d:88:72:00:00 Cost = 4 Port = 0x8003
60	46.075183	0:c:5d:f1:b6:00:02	PVST+	STP	68	Conf. Root = 32768/20/0c:4d:88:72:00:00 Cost = 4 Port = 0x8003
63	48.079781	0:c:5d:f1:b6:00:02	PVST+	STP	68	Conf. Root = 32768/20/0c:4d:88:72:00:00 Cost = 4 Port = 0x8003
66	50.086480	0:c:5d:f1:b6:00:02	PVST+	STP	68	Conf. Root = 32768/20/0c:4d:88:72:00:00 Cost = 4 Port = 0x8003
> Frame 40: Packet, 68 bytes on wire (544 bits), 68 bytes captured (544 bits) on interface -, > Ethernet II, Src: Private_66:68:00 (00:50:79:66:68:00), Dst: Broadcast (ff:ff:ff:ff:ff:ff) > 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 20 > Address Resolution Protocol (request)						
<pre> 0000 ff ff ff ff ff ff 00 50 79 66 68 00 81 00 00 14 P yfh - . 0010 08 06 00 01 08 00 06 04 00 01 00 50 79 66 68 00 Pyfh - . 0020 c0 a8 14 03 ff ff ff ff c0 a8 14 04 00 00 00 00 00 00 0030 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0040 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 </pre>						

VPCS2

КОМАНДА:

ping 192.168.33.4

Захват с Standard input [Layer2Switch-1 Ethernet3 to Layer2Switch-3 Ethernet1]

No.	Time	Source	Destination	Protocol	Length	Info
64	46.185174	0c:5d:f1:b6:00:03	PVST+	STP	68	Conf. Root = 32768/333/0c:4d:88:72:00:00 Cost = 4 Port = 0x8004
65	46.914120	0c:5d:f1:b6:00:03	0c:5d:f1:b6:00:03	LOOP	60	Reply
66	48.106103	0c:5d:f1:b6:00:03	PVST+	STP	68	Conf. Root = 32768/20/0c:4d:88:72:00:00 Cost = 4 Port = 0x8004
67	48.105006	0c:5d:f1:b6:00:03	PVST+	STP	68	Conf. Root = 32768/333/0c:4d:88:72:00:00 Cost = 4 Port = 0x8004
68	50.104733	0c:5d:f1:b6:00:03	PVST+	STP	68	Conf. Root = 32768/20/0c:4d:88:72:00:00 Cost = 4 Port = 0x8004
69	50.108341	0c:5d:f1:b6:00:03	PVST+	STP	68	Conf. Root = 32768/333/0c:4d:88:72:00:00 Cost = 4 Port = 0x8004
70	50.268429	0c:b4:32:5c:00:01	0c:b4:32:5c:00:01	LOOP	60	Reply
71	52.111723	0c:5d:f1:b6:00:03	PVST+	STP	68	Conf. Root = 32768/20/0c:4d:88:72:00:00 Cost = 4 Port = 0x8004
72	52.114301	0c:5d:f1:b6:00:03	PVST+	STP	68	Conf. Root = 32768/333/0c:4d:88:72:00:00 Cost = 4 Port = 0x8004
73	53.157072	Private_66:68:01	Broadcast	ARP	64	66:68:01 Broadcast 64 [who has 192.168.33.4? Tell 192.168.33.3]
74	54.115729	0c:5d:f1:b6:00:03	PVST+	STP	68	Conf. Root = 32768/20/0c:4d:88:72:00:00 Cost = 4 Port = 0x8004
75	54.119712	0c:5d:f1:b6:00:03	PVST+	STP	68	Conf. Root = 32768/333/0c:4d:88:72:00:00 Cost = 4 Port = 0x8004
76	56.121309	0c:5d:f1:b6:00:03	PVST+	STP	68	Conf. Root = 32768/20/0c:4d:88:72:00:00 Cost = 4 Port = 0x8004
77	56.126435	0c:5d:f1:b6:00:03	PVST+	STP	68	Conf. Root = 32768/333/0c:4d:88:72:00:00 Cost = 4 Port = 0x8004
78	56.939659	0c:5d:f1:b6:00:03	0c:5d:f1:b6:00:03	LOOP	60	Reply
79	58.123963	0c:5d:f1:b6:00:03	PVST+	STP	68	Conf. Root = 32768/20/0c:4d:88:72:00:00 Cost = 4 Port = 0x8004
80	58.128115	0c:5d:f1:b6:00:03	PVST+	STP	68	Conf. Root = 32768/333/0c:4d:88:72:00:00 Cost = 4 Port = 0x8004
81	60.126902	0c:5d:f1:b6:00:03	PVST+	STP	68	Conf. Root = 32768/20/0c:4d:88:72:00:00 Cost = 4 Port = 0x8004
82	60.131866	0c:5d:f1:b6:00:03	PVST+	STP	68	Conf. Root = 32768/333/0c:4d:88:72:00:00 Cost = 4 Port = 0x8004
83	60.275868	0c:b4:32:5c:00:01	0c:b4:32:5c:00:01	LOOP	60	Reply

```
> Frame 73: Packet, 64 bytes on wire (512 bits), 64 bytes captured (512 bits) on interface -, 
> Ethernet II, Src: Private_66:68:01 (00:50:79:66:68:01), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
> Address Resolution Protocol (request)
```

В первом случае видим заголовок

63 48.079781	0c:5d:f1:b6:00:02	PVST+	STP	68 Conf. Root = 32768/333/0c:4d:88:72:00:00
64 50.026420	0c:5d:f1:b6:00:02	PVST+	STP	68 Conf. Root = 32768/333/0c:4d:88:72:00:00
> Frame 40: Packet, 68 bytes on wire (544 bits), 68 bytes captured (544 bits) on interface -,				0
> Ethernet II, Src: Private_66:68:00 (00:50:79:66:68:00), Dst: Broadcast (ff:ff:ff:ff:ff:ff)				0
> 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 20				0
> Address Resolution Protocol (request)				0

А во втором нет

> Frame 73: Packet, 64 bytes on wire (512 bits), 64 bytes captured (512 bits) on interface -,
> Ethernet II, Src: Private_66:68:01 (00:50:79:66:68:01), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
> Address Resolution Protocol (request)

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

Сделано

5*) Опциональное задание: Добавить в схему маршрутизатор, подключенный к коммутаторам Layer2Switch1 и Layer2Switch2, настроить через него маршрутизацию между VLAN

Полезная информация: избыточные физические каналы можно поместить в отдельные VLAN и обойтись без STP