

**МОСКОВСКИЙ АВИАЦИОННЫЙ ИНСТИТУТ
(НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ УНИВЕРСИТЕТ)**

**Институт №8 «Компьютерные науки и прикладная математика»
Кафедра 806 «Вычислительная математика и программирование»**

**Лабораторная работа №2
по курсу «Вычислительные сети и телекоммуникации»**

**Настройка L2-коммутаторов с избыточными подключениями и
VLAN**

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Условие

Цель работы: Научиться конфигурировать многоуровневые коммутаторы *L2/L3* с *VLAN*, *RSTP*, *LACP*, использовать *inter – VLAN routing*, настраивать статическую маршрутизацию и конечный пользовательский *NAT* на *Cisco*.

Вариант: 29.

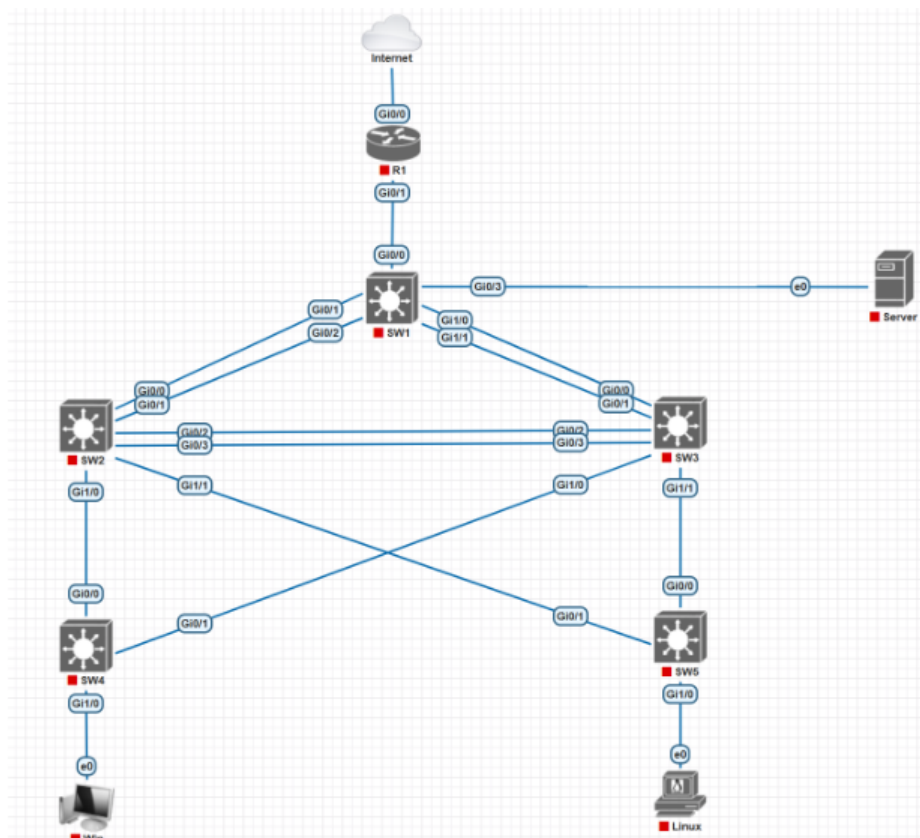


Рис. 1: Схема сети

Задачи:

1. Настроить имена узлов для коммутаторов и маршрутизатора в соответствии с именами, указанными в топологии.
2. Сменить пароль администратора (пароль доступа к привилегированному режиму *enable* для *Cisco*) на вариант ЛР для соответствующего устройства.
3. Создать пользователя *checker* с максимальным административным уровнем доступа и паролем “PfxtvXtrth!” без кавычек на коммутаторе и маршрутизаторе.
4. Настроить на маршрутизаторе *R1* IP-адреса интерфейсов в соответствии с вариантом задания.
5. Настроить на маршрутизаторе *R1* встроенный DNS-сервер с передачей запросов на сервер *QuadNine* (9.9.9.9), включить удаленные запросы.
6. Переключить интерфейсы коммутаторов опорной сети в режим *trunk* 802.1q за исключением access-портов (*GigabitEthernet1/0*) на *SW4* и *SW5*.

7. Организовать на коммутаторах *SW1*, *SW2*, *SW3* группы портов между соседними коммутаторами в кольце в каналы *EtherChannel* в режиме *LACPactive*, перевести каналы *EtherChannel* в транк 802.1q.
8. Настроить *VLANs* на коммутаторах в соответствии с таблицей конфигурации в варианте вручную или (*) с помощью *VTP*.
9. Настроить *STP* на коммутаторах таким образом, чтобы для всех *VLAN SW1* являлся *root bridge*, а на коммутаторах *SW4* и *SW5* root-портами являлись интерфейсы *GigabitEthernet0/0*.
10. Разрешить на всех транковых портах коммутаторов только *VLAN* из таблицы в явном виде. На интерфейсе *GigabitEthernet0/0* на коммутаторе *SW1* (в сторону маршрутизатора *R1*) разрешить только *VLAN Internet*.
11. Настроить на коммутаторе *SW1* IP-адрес на интерфейсе *VLAN Internet* в соответствии с вариантом задания, адрес DNS-сервера (адрес маршрутизатора *R1*) и маршрут по умолчанию на маршрутизатор *R1*.
12. На коммутаторе *SW1* назначить IP-адреса во всех *VLAN* и включить *ip routing*.
13. Назначить IP-адреса в *Management VLAN* на всех коммутаторах согласно варианту и установить маршрут по умолчанию на адрес коммутатора *SW1*.
14. Настроить на всех коммутаторах в качестве DNS-сервера адрес маршрутизатора *R1*.
15. Настроить на маршрутизаторе *R1* статические маршруты на сети из таблицы *VLAN*, ведущие на коммутатор ядра *SW1*.
16. Настроить на маршрутизаторе *R1* трансляцию адресов (*NAT*) для доступа в интернет IP-адресов из *VLAN Internet*, используя в качестве глобального адреса адрес на интерфейсе *GigabitEthernet0/0*.
17. Настроить на коммутаторе *SW1* DHCP-сервер во *VLAN Internet* и *Cash*, используя пулы адресов с маской /24, маршрут по умолчанию на *SW1* и DNS-сервер на *R1*. Назначить исключения в пулах для статических адресов, назначенных сетевым устройствам.
18. Перевести порты *GigabitEthernet1/0* на коммутаторах *SW4* и *SW5* в режим *access* и назначить им *VLAN Internet* (*SW4*) и *Cash* (*SW5*) соответственно. Проверить доступ в Интернет с узла *Win* (*Windows10*) в режиме *DHCP*.
19. Настроить сервер *Server* под управлением *Ubuntu 20.04* интерфейс *eth0* в режиме *trunk* 802.1Q со всеми *VLAN* из таблицы, используя *netplan* и статические адреса из варианта. Проверить доступ в Интернет с сервера, а также доступ к серверу с узла *Win* и узла *Linux*.

Допустимые средства конфигурации: Разрешается использовать консоль маршрутизатора и коммутаторов без ограничений. Запрещается использовать web-интерфейс для настройки коммутаторов и маршрутизатора.

Конфигурации сетевого оборудования

Конфигурация R1

```
1 Building configuration...
2
3 *Apr 22 14:46:50.946: %PLATFORM-5-SIGNATURE_VERIFIED: Image 'flash0:/vios-
  adventerprisek9-m' passed code signing verification
4
5 Current configuration : 4005 bytes
6 !
7 version 15.7
8 service timestamps debug datetime msec
9 service timestamps log datetime msec
10 service password-encryption
11 !
12 hostname R1
13 !
14 boot-start-marker
15 boot-end-marker
16 !
17 !
18 enable secret 5 $1$qmK0$Pw1m5qYeYHyFq7shlXh4b1
19 !
20 aaa new-model
21 !
22 !
23 aaa authentication login default local
24 !
25 !
26 !
27 !
28 !
29 aaa session-id common
30 !
31 !
32 !
33 mmi polling-interval 60
34 no mmi auto-configure
35 no mmi pvc
36 mmi snmp-timeout 180
37 !
38 !
39 !
40 !
41 !
42 no ip icmp rate-limit unreachable
43 !
44 !
45 !
46 !
47 !
48 !
49 ip domain name faq8.ru
50 ip name-server 9.9.9.9
51 ip cef
52 no ipv6 cef
53 !
```

```
54 multilink bundle-name authenticated
55 !
56 !
57 !
58 !
59 username admin privilege 15 password 7 15130F010D24797D
60 username checker privilege 15 password 7 0123001C4F1D3E1B33584648
61 !
62 redundancy
63 !
64 no cdp log mismatch duplex
65 !
66 ip tcp synwait-time 5
67 !
68 !
69 !
70 !
71 !
72 !
73 !
74 !
75 !
76 !
77 !
78 !
79 !
80 interface GigabitEthernet0/0
81   ip address dhcp hostname R1
82   ip nat outside
83   ip virtual-reassembly in
84   duplex auto
85   speed auto
86   media-type rj45
87   !
88 interface GigabitEthernet0/1
89   no ip address
90   ip virtual-reassembly in
91   duplex auto
92   speed auto
93   media-type rj45
94   !
95 interface GigabitEthernet0/1.129
96   encapsulation dot1Q 129
97   ip address 192.168.129.1 255.255.255.0
98   !
99 interface GigabitEthernet0/1.229
100   encapsulation dot1Q 229
101   ip address 192.168.229.1 255.255.255.0
102   ip nat inside
103   ip virtual-reassembly in
104   !
105 interface GigabitEthernet0/2
106   no ip address
107   shutdown
108   duplex auto
109   speed auto
110   media-type rj45
111   !
```

```

112 interface GigabitEthernet0/3
113     no ip address
114     shutdown
115     duplex auto
116     speed auto
117     media-type rj45
118     !
119     ip forward-protocol nd
120     !
121     !
122     no ip http server
123     no ip http secure-server
124     ip dns server
125     ip nat source list 1 interface GigabitEthernet0/0 overload
126     ip nat inside source list 1 interface GigabitEthernet0/0 overload
127     ip route 192.168.29.0 255.255.255.0 192.168.29.201
128     ip route 192.168.129.0 255.255.255.0 192.168.129.201
129     ip route 192.168.229.0 255.255.255.0 192.168.229.201
130     ip ssh version 2
131     !
132     ipv6 ioam timestamp
133     !
134     !
135     access-list 1 permit 192.168.229.0 0.0.0.255
136     !
137     !
138     !
139     control-plane
140     !
141     banner exec ^C
142     *****
143     * IOSv is strictly limited to use for evaluation, demonstration and IOS *
144     * education. IOSv is provided as-is and is not supported by Cisco's *
145     * Technical Advisory Center. Any use or disclosure, in whole or in part, *
146     * of the IOSv Software or Documentation to any third party for any *
147     * purposes is expressly prohibited except as otherwise authorized by *
148     * Cisco in writing. *
149     *****^C
150     banner incoming ^C
151     *****
152     * IOSv is strictly limited to use for evaluation, demonstration and IOS *
153     * education. IOSv is provided as-is and is not supported by Cisco's *
154     * Technical Advisory Center. Any use or disclosure, in whole or in part, *
155     * of the IOSv Software or Documentation to any third party for any *
156     * purposes is expressly prohibited except as otherwise authorized by *
157     * Cisco in writing. *
158     *****^C
159     banner login ^C
160     *****
161     * IOSv is strictly limited to use for evaluation, demonstration and IOS *
162     * education. IOSv is provided as-is and is not supported by Cisco's *
163     * Technical Advisory Center. Any use or disclosure, in whole or in part, *
164     * of the IOSv Software or Documentation to any third party for any *
165     * purposes is expressly prohibited except as otherwise authorized by *
166     * Cisco in writing. *
167     *****^C
168     !
169     line con 0

```

```
170 exec-timeout 0 0
171 privilege level 15
172 logging synchronous
173 line aux 0
174 exec-timeout 0 0
175 privilege level 15
176 logging synchronous
177 line vty 0 4
178 transport input ssh
179 !
180 no scheduler allocate
181 !
182 end
```

Конфигурация SW1

```
1 Building configuration...
2
3 Current configuration : 5006 bytes
4 !
5 ! Last configuration change at 14:44:18 UTC Mon Apr 22 2024
6 !
7 version 15.2
8 service timestamps debug datetime msec
9 service timestamps log datetime msec
10 service password-encryption
11 service compress-config
12 !
13 hostname SW1
14 !
15 boot-start-marker
16 boot-end-marker
17 !
18 !
19 enable secret 5 $1$a5bF$FF0KNvWDqUuro5XvzxVEe0
20 !
21 username admin privilege 15 password 7 050A020228421C50
22 username checker privilege 15 password 7 08114A561D0F3D03001F0445
23 aaa new-model
24 !
25 !
26 aaa authentication login default local
27 !
28 !
29 !
30 !
31 !
32 !
33 aaa session-id common
34 !
35 !
36 !
37 !
38 !
39 !
40 ip dhcp excluded-address 192.168.229.201
41 ip dhcp excluded-address 192.168.29.201
42 ip dhcp excluded-address 192.168.229.1
```



```
43 ip dhcp excluded-address 192.168.129.201 192.168.129.205
44 ip dhcp excluded-address 192.168.129.2
45 ip dhcp excluded-address 192.168.229.2
46 ip dhcp excluded-address 192.168.29.2
47 ip dhcp excluded-address 192.168.129.1
48 !
49 ip dhcp pool VLAN229
50 network 192.168.229.0 255.255.255.0
51 default-router 192.168.229.201
52 dns-server 192.168.229.1
53 !
54 ip dhcp pool VLAN329
55 network 192.168.29.0 255.255.255.0
56 default-router 192.168.29.201
57 !
58 !
59 ip domain-name faq8.ru
60 ip name-server 192.168.229.1
61 ip cef
62 no ipv6 cef
63 !
64 !
65 !
66 spanning-tree mode pvst
67 spanning-tree extend system-id
68 spanning-tree vlan 1-99,129,229,329 priority 24576
69 !
70 !
71 !
72 !
73 !
74 !
75 !
76 !
77 !
78 !
79 !
80 !
81 !
82 !
83 !
84 interface Port-channel1
85 switchport trunk allowed vlan 129,229,329
86 switchport trunk encapsulation dot1q
87 switchport mode trunk
88 !
89 interface Port-channel2
90 switchport trunk allowed vlan 129,229,329
91 switchport trunk encapsulation dot1q
92 switchport mode trunk
93 !
94 interface GigabitEthernet0/0
95 switchport trunk allowed vlan 129,229
96 switchport trunk encapsulation dot1q
97 switchport mode trunk
98 negotiation auto
99 !
100 interface GigabitEthernet0/1
```

```
101 | switchport trunk allowed vlan 129,229,329
102 | switchport trunk encapsulation dot1q
103 | switchport mode trunk
104 | negotiation auto
105 | channel-group 1 mode active
106 | !
107 | interface GigabitEthernet0/2
108 | switchport trunk allowed vlan 129,229,329
109 | switchport trunk encapsulation dot1q
110 | switchport mode trunk
111 | negotiation auto
112 | channel-group 1 mode active
113 | !
114 | interface GigabitEthernet0/3
115 | switchport trunk allowed vlan 129,229,329
116 | switchport trunk encapsulation dot1q
117 | switchport mode trunk
118 | negotiation auto
119 | !
120 | interface GigabitEthernet1/0
121 | switchport trunk allowed vlan 129,229,329
122 | switchport trunk encapsulation dot1q
123 | switchport mode trunk
124 | negotiation auto
125 | channel-group 2 mode active
126 | !
127 | interface GigabitEthernet1/1
128 | switchport trunk allowed vlan 129,229,329
129 | switchport trunk encapsulation dot1q
130 | switchport mode trunk
131 | negotiation auto
132 | channel-group 2 mode active
133 | !
134 | interface GigabitEthernet1/2
135 | negotiation auto
136 | !
137 | interface GigabitEthernet1/3
138 | negotiation auto
139 | !
140 | interface Vlan129
141 | ip address 192.168.129.201 255.255.255.0
142 | !
143 | interface Vlan229
144 | ip address 192.168.229.201 255.255.255.0
145 | !
146 | interface Vlan329
147 | ip address 192.168.29.201 255.255.255.0
148 | !
149 | ip default-gateway 192.168.229.1
150 | ip forward-protocol nd
151 | !
152 | no ip http server
153 | no ip http secure-server
154 | !
155 | ip route 0.0.0.0 0.0.0.0 Vlan229 192.168.229.1
156 | ip ssh version 2
157 | ip ssh server algorithm encryption aes128-ctr aes192-ctr aes256-ctr
158 | ip ssh client algorithm encryption aes128-ctr aes192-ctr aes256-ctr
```

```
159 |
160 |
161 |
162 |
163 |
164 |
165 |
166 |
167 control-plane
168 |
169 banner exec ^C
170 IOSv - Cisco Systems Confidential -
171
172 Supplemental End User License Restrictions
173
174 This IOSv software is provided AS-IS without warranty of any kind. Under no
    circumstances may this software be used separate from the Cisco Modeling Labs
    Software that this software was prov
175 ided with, or deployed or used as part of a production environment.
176
177 By using the software, you agree to abide by the terms and conditions of the Cisco End
    User License Agreement at http://www.cisco.com/go/eula. Unauthorized use or
    distribution of this softwa
178 re is expressly prohibited.
179 ^C
180 banner incoming ^C
181 IOSv - Cisco Systems Confidential -
182
183
184 Supplemental End User License Restrictions
185
186 This IOSv software is provided AS-IS without warranty of any kind. Under no
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187 ided with, or deployed or used as part of a production environment.
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    User License Agreement at http://www.cisco.com/go/eula. Unauthorized use or
    distribution of this softwa
190 re is expressly prohibited.
191 ^C
192 banner login ^C
193 IOSv - Cisco Systems Confidential -
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195 Supplemental End User License Restrictions
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198 ided with, or deployed or used as part of a production environment.
199
200 By using the software, you agree to abide by the terms and conditions of the Cisco End
    User License Agreement at http://www.cisco.com/go/eula. Unauthorized use or
    distribution of this softwa
201 re is expressly prohibited.
202 ^C
203 |
204 line con 0
```

```
205 | line aux 0
206 | line vty 0 4
207 |   transport input ssh
208 | !
209 | !
210 | end
```

Конфигурация *SW2*

```
1 | Building configuration...
2 |
3 | Current configuration : 4297 bytes
4 | !
5 | ! Last configuration change at 14:44:27 UTC Mon Apr 22 2024
6 | !
7 | version 15.2
8 | service timestamps debug datetime msec
9 | service timestamps log datetime msec
10 | service password-encryption
11 | service compress-config
12 | !
13 | hostname SW2
14 | !
15 | boot-start-marker
16 | boot-end-marker
17 | !
18 | !
19 | enable secret 5 $1$2L/o$/9I00.9rHRU37maQk0JwAO
20 | !
21 | username admin privilege 15 password 7 045A0FOB062F1E17
22 | username checker privilege 15 password 7 15220D14103C13303A273D63
23 | aaa new-model
24 | !
25 | !
26 | aaa authentication login default local
27 | !
28 | !
29 | !
30 | !
31 | !
32 | !
33 | aaa session-id common
34 | !
35 | !
36 | !
37 | !
38 | !
39 | !
40 | !
41 | !
42 | ip domain-name faq8.ru
43 | ip name-server 192.168.229.1
44 | ip cef
45 | no ipv6 cef
46 | !
47 | !
48 | !
49 | spanning-tree mode pvst
```

```
50 spanning-tree extend system-id
51 !
52 !
53 !
54 !
55 !
56 !
57 !
58 !
59 !
60 !
61 !
62 !
63 !
64 !
65 !
66 interface Port-channel1
67     switchport trunk allowed vlan 129,229,329
68     switchport trunk encapsulation dot1q
69     switchport mode trunk
70 !
71 interface Port-channel3
72     switchport trunk allowed vlan 129,229,329
73     switchport trunk encapsulation dot1q
74     switchport mode trunk
75 !
76 interface GigabitEthernet0/0
77     switchport trunk allowed vlan 129,229,329
78     switchport trunk encapsulation dot1q
79     switchport mode trunk
80     negotiation auto
81     channel-group 1 mode active
82 !
83 interface GigabitEthernet0/1
84     switchport trunk allowed vlan 129,229,329
85     switchport trunk encapsulation dot1q
86     switchport mode trunk
87     negotiation auto
88     channel-group 1 mode active
89 !
90 interface GigabitEthernet0/2
91     switchport trunk allowed vlan 129,229,329
92     switchport trunk encapsulation dot1q
93     switchport mode trunk
94     negotiation auto
95     channel-group 3 mode active
96 !
97 interface GigabitEthernet0/3
98     switchport trunk allowed vlan 129,229,329
99     switchport trunk encapsulation dot1q
100    switchport mode trunk
101    negotiation auto
102    channel-group 3 mode active
103 !
104 interface GigabitEthernet1/0
105     switchport trunk allowed vlan 129,229,329
106     switchport trunk encapsulation dot1q
107     switchport mode trunk
```

```
108 negotiation auto
109 !
110 interface GigabitEthernet1/1
111     switchport trunk allowed vlan 129,229,329
112     switchport trunk encapsulation dot1q
113     switchport mode trunk
114     negotiation auto
115 !
116 interface GigabitEthernet1/2
117     negotiation auto
118 !
119 interface GigabitEthernet1/3
120     negotiation auto
121 !
122 interface Vlan129
123     ip address 192.168.129.202 255.255.255.0
124 !
125 ip default-gateway 192.168.129.201
126 ip forward-protocol nd
127 !
128 no ip http server
129 no ip http secure-server
130 !
131 ip route 0.0.0.0 0.0.0.0 Vlan129 192.168.129.201
132 ip ssh version 2
133 ip ssh server algorithm encryption aes128-ctr aes192-ctr aes256-ctr
134 ip ssh client algorithm encryption aes128-ctr aes192-ctr aes256-ctr
135 !
136 !
137 !
138 !
139 !
140 !
141 !
142 !
143 control-plane
144 !
145 banner exec ^C
146 IOSv - Cisco Systems Confidential -
147
148 Supplemental End User License Restrictions
149
150 This IOSv software is provided AS-IS without warranty of any kind. Under no
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151 ided with, or deployed or used as part of a production environment.
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153 By using the software, you agree to abide by the terms and conditions of the Cisco End
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154 re is expressly prohibited.
155 ^C
156 banner incoming ^C
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161 This IOSv software is provided AS-IS without warranty of any kind. Under no
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165 re is expressly prohibited.
166 ^C
167 banner login ^C
168 IOSv - Cisco Systems Confidential -
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170 Supplemental End User License Restrictions
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172 This IOSv software is provided AS-IS without warranty of any kind. Under no
    circumstances may this software be used separate from the Cisco Modeling Labs
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173 ided with, or deployed or used as part of a production environment.
174
175 By using the software, you agree to abide by the terms and conditions of the Cisco End
    User License Agreement at http://www.cisco.com/go/eula. Unauthorized use or
    distribution of this softwa
176 re is expressly prohibited.
177 ^C
178 !
179 line con 0
180 line aux 0
181 line vty 0 4
182     transport input ssh
183 !
184 !
185 end

```

Конфигурация SW3

```

1 Building configuration...
2
3 Current configuration : 4297 bytes
4 !
5 ! Last configuration change at 14:44:10 UTC Mon Apr 22 2024
6 !
7 version 15.2
8 service timestamps debug datetime msec
9 service timestamps log datetime msec
10 service password-encryption
11 service compress-config
12 !
13 hostname SW3
14 !
15 boot-start-marker
16 boot-end-marker
17 !
18 !
19 enable secret 5 $1$M150$nYbjykfqRWbKaSypNoUAm.
20 !
21 username admin privilege 15 password 7 104F0D140C194052
22 username checker privilege 15 password 7 046B0D1E1B37745A1B0D0D56
23 aaa new-model

```

```
24 | !
25 | !
26 | aaa authentication login default local
27 | !
28 | !
29 | !
30 | !
31 | !
32 | !
33 | aaa session-id common
34 | !
35 | !
36 | !
37 | !
38 | !
39 | !
40 | !
41 | !
42 | ip domain-name faq8.ru
43 | ip name-server 192.168.229.1
44 | ip cef
45 | no ipv6 cef
46 | !
47 | !
48 | !
49 | spanning-tree mode pvst
50 | spanning-tree extend system-id
51 | !
52 | !
53 | !
54 | !
55 | !
56 | !
57 | !
58 | !
59 | !
60 | !
61 | !
62 | !
63 | !
64 | !
65 | !
66 | interface Port-channel2
67 |   switchport trunk allowed vlan 129,229,329
68 |   switchport trunk encapsulation dot1q
69 |   switchport mode trunk
70 | !
71 | interface Port-channel3
72 |   switchport trunk allowed vlan 129,229,329
73 |   switchport trunk encapsulation dot1q
74 |   switchport mode trunk
75 | !
76 | interface GigabitEthernet0/0
77 |   switchport trunk allowed vlan 129,229,329
78 |   switchport trunk encapsulation dot1q
79 |   switchport mode trunk
80 |   negotiation auto
81 |   channel-group 2 mode active
```



```
82 | !
83 | interface GigabitEthernet0/1
84 |   switchport trunk allowed vlan 129,229,329
85 |   switchport trunk encapsulation dot1q
86 |   switchport mode trunk
87 |   negotiation auto
88 |   channel-group 2 mode active
89 | !
90 | interface GigabitEthernet0/2
91 |   switchport trunk allowed vlan 129,229,329
92 |   switchport trunk encapsulation dot1q
93 |   switchport mode trunk
94 |   negotiation auto
95 |   channel-group 3 mode active
96 | !
97 | interface GigabitEthernet0/3
98 |   switchport trunk allowed vlan 129,229,329
99 |   switchport trunk encapsulation dot1q
100 |   switchport mode trunk
101 |   negotiation auto
102 |   channel-group 3 mode active
103 | !
104 | interface GigabitEthernet1/0
105 |   switchport trunk allowed vlan 129,229,329
106 |   switchport trunk encapsulation dot1q
107 |   switchport mode trunk
108 |   negotiation auto
109 | !
110 | interface GigabitEthernet1/1
111 |   switchport trunk allowed vlan 129,229,329
112 |   switchport trunk encapsulation dot1q
113 |   switchport mode trunk
114 |   negotiation auto
115 | !
116 | interface GigabitEthernet1/2
117 |   negotiation auto
118 | !
119 | interface GigabitEthernet1/3
120 |   negotiation auto
121 | !
122 | interface Vlan129
123 |   ip address 192.168.129.203 255.255.255.0
124 | !
125 | ip default-gateway 192.168.129.201
126 | ip forward-protocol nd
127 | !
128 | no ip http server
129 | no ip http secure-server
130 | !
131 | ip route 0.0.0.0 0.0.0.0 Vlan129 192.168.129.201
132 | ip ssh version 2
133 | ip ssh server algorithm encryption aes128-ctr aes192-ctr aes256-ctr
134 | ip ssh client algorithm encryption aes128-ctr aes192-ctr aes256-ctr
135 | !
136 | !
137 | !
138 | !
139 | !
```

```
140 |
141 |
142 |
143 control-plane
144 |
145 banner exec ^C
146 IOSv - Cisco Systems Confidential -
147
148 Supplemental End User License Restrictions
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154 re is expressly prohibited.
155 ^C
156 banner incoming ^C
157 IOSv - Cisco Systems Confidential -
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159 Supplemental End User License Restrictions
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165 re is expressly prohibited.
166 ^C
167 banner login ^C
168 IOSv - Cisco Systems Confidential -
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    User License Agreement at http://www.cisco.com/go/eula. Unauthorized use or
    distribution of this softwa
176 re is expressly prohibited.
177 ^C
178 !
179 line con 0
180 line aux 0
181 line vty 0 4
182     transport input ssh
183 !
184 !
185 end
```

Конфигурация SW4

```
1 Building configuration...
2
3 Current configuration : 3579 bytes
4 !
5 ! Last configuration change at 14:44:37 UTC Mon Apr 22 2024
6 !
7 version 15.2
8 service timestamps debug datetime msec
9 service timestamps log datetime msec
10 service password-encryption
11 service compress-config
12 !
13 hostname SW4
14 !
15 boot-start-marker
16 boot-end-marker
17 !
18 !
19 enable secret 5 $1$y.j1$XUFy5YlBFyKG.J826FRwd/
20 !
21 username admin privilege 15 password 7 15130F010D24797D
22 username checker privilege 15 password 7 046B0D1E1B37745A1B0D0D56
23 aaa new-model
24 !
25 !
26 aaa authentication login default local
27 !
28 !
29 !
30 !
31 !
32 !
33 aaa session-id common
34 !
35 !
36 !
37 !
38 !
39 !
40 !
41 !
42 ip domain-name faq8.ru
43 ip name-server 192.168.229.1
44 ip cef
45 no ipv6 cef
46 !
47 !
48 !
49 spanning-tree mode pvst
50 spanning-tree extend system-id
51 !
52 !
53 !
54 !
55 !
56 !
```

```
57 | !
58 | !
59 | !
60 | !
61 | !
62 | !
63 | !
64 | !
65 | !
66 | interface GigabitEthernet0/0
67 |   switchport trunk allowed vlan 129,229,329
68 |   switchport trunk encapsulation dot1q
69 |   switchport mode trunk
70 |   negotiation auto
71 |   spanning-tree cost 3
72 | !
73 | interface GigabitEthernet0/1
74 |   switchport trunk allowed vlan 129,229,329
75 |   switchport trunk encapsulation dot1q
76 |   switchport mode trunk
77 |   negotiation auto
78 | !
79 | interface GigabitEthernet0/2
80 |   negotiation auto
81 | !
82 | interface GigabitEthernet0/3
83 |   negotiation auto
84 | !
85 | interface GigabitEthernet1/0
86 |   switchport access vlan 229
87 |   switchport mode access
88 |   negotiation auto
89 | !
90 | interface GigabitEthernet1/1
91 |   negotiation auto
92 | !
93 | interface GigabitEthernet1/2
94 |   negotiation auto
95 | !
96 | interface GigabitEthernet1/3
97 |   negotiation auto
98 | !
99 | interface Vlan129
100 |   ip address 192.168.129.204 255.255.255.0
101 | !
102 | ip default-gateway 192.168.129.201
103 | ip forward-protocol nd
104 | !
105 | no ip http server
106 | no ip http secure-server
107 | !
108 | ip route 0.0.0.0 0.0.0.0 Vlan129 192.168.129.201
109 | ip ssh version 2
110 | ip ssh server algorithm encryption aes128-ctr aes192-ctr aes256-ctr
111 | ip ssh client algorithm encryption aes128-ctr aes192-ctr aes256-ctr
112 | !
113 | !
114 | !
```

```
115 |
116 |
117 |
118 |
119 |
120 control-plane
121 |
122 banner exec ^C
123 IOSv - Cisco Systems Confidential -
124
125 Supplemental End User License Restrictions
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131 re is expressly prohibited.
132 ^C
133 banner incoming ^C
134 IOSv - Cisco Systems Confidential -
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136 Supplemental End User License Restrictions
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143 ^C
144 banner login ^C
145 IOSv - Cisco Systems Confidential -
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153 re is expressly prohibited.
154 ^C
155 |
156 line con 0
157 line aux 0
158 line vty 0 4
159 transport input ssh
160 |
```

```
161 | !
162 | end
```

Конфигурация SW5

```
1 | Building configuration...
2 |
3 | Current configuration : 3579 bytes
4 | !
5 | ! Last configuration change at 14:44:38 UTC Mon Apr 22 2024
6 | !
7 | version 15.2
8 | service timestamps debug datetime msec
9 | service timestamps log datetime msec
10 | service password-encryption
11 | service compress-config
12 | !
13 | hostname SW5
14 | !
15 | boot-start-marker
16 | boot-end-marker
17 | !
18 | !
19 | enable secret 5 $1$cm07$Ed41JbX61JXRpuhJ2HvTa/
20 | !
21 | username admin privilege 15 password 7 1218011A1B055E5D
22 | username checker privilege 15 password 7 1335110A1F1A3C3E39302072
23 | aaa new-model
24 | !
25 | !
26 | aaa authentication login default local
27 | !
28 | !
29 | !
30 | !
31 | !
32 | !
33 | aaa session-id common
34 | !
35 | !
36 | !
37 | !
38 | !
39 | !
40 | !
41 | !
42 | ip domain-name faq8.ru
43 | ip name-server 192.168.229.1
44 | ip cef
45 | no ipv6 cef
46 | !
47 | !
48 | !
49 | spanning-tree mode pvst
50 | spanning-tree extend system-id
51 | !
52 | !
53 | !
```

```
54 |  
55 |  
56 |  
57 |  
58 |  
59 |  
60 |  
61 |  
62 |  
63 |  
64 |  
65 |  
66 interface GigabitEthernet0/0  
67   switchport trunk allowed vlan 129,229,329  
68   switchport trunk encapsulation dot1q  
69   switchport mode trunk  
70   negotiation auto  
71   spanning-tree cost 3  
72 |  
73 interface GigabitEthernet0/1  
74   switchport trunk allowed vlan 129,229,329  
75   switchport trunk encapsulation dot1q  
76   switchport mode trunk  
77   negotiation auto  
78 |  
79 interface GigabitEthernet0/2  
80   negotiation auto  
81 |  
82 interface GigabitEthernet0/3  
83   negotiation auto  
84 |  
85 interface GigabitEthernet1/0  
86   switchport access vlan 329  
87   switchport mode access  
88   negotiation auto  
89 |  
90 interface GigabitEthernet1/1  
91   negotiation auto  
92 |  
93 interface GigabitEthernet1/2  
94   negotiation auto  
95 |  
96 interface GigabitEthernet1/3  
97   negotiation auto  
98 |  
99 interface Vlan129  
100   ip address 192.168.129.205 255.255.255.0  
101 |  
102   ip default-gateway 192.168.129.201  
103   ip forward-protocol nd  
104 |  
105   no ip http server  
106   no ip http secure-server  
107 |  
108   ip route 0.0.0.0 0.0.0.0 Vlan129 192.168.129.201  
109   ip ssh version 2  
110   ip ssh server algorithm encryption aes128-ctr aes192-ctr aes256-ctr  
111   ip ssh client algorithm encryption aes128-ctr aes192-ctr aes256-ctr
```

```
112 |
113 |
114 |
115 |
116 |
117 |
118 |
119 |
120 control-plane
121 |
122 banner exec ^C
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125 Supplemental End User License Restrictions
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131 re is expressly prohibited.
132 ^C
133 banner incoming ^C
134 IOSv - Cisco Systems Confidential -
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144 banner login ^C
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    User License Agreement at http://www.cisco.com/go/eula. Unauthorized use or
    distribution of this softwa
153 re is expressly prohibited.
154 ^C
155 |
156 line con 0
157 line aux 0
```



```
158 | line vty 0 4
159 |   transport input ssh
160 |   !
161 |   !
162 | end
```

Ход выполнения работы

Листинг 1: Настройка *PortChannel*

```
1 | interface Port-Channel 1
2 | interface range gi0/0,gi0/1
3 | channel-group 1 mode active
```

Листинг 2: Перевод интерфейса в *trunk*

```
1 | interface Port-Channel 1
2 | switchport trunk encapsulation dot1q
3 | switchport mode trunk
4 | switchport trunk allowed vlan 12,22,32
```

Листинг 3: Настройка *VTP* клиент / сервер

```
1 | vtp domain faq8.ru
2 | vtp version 3
3 | vtp mode client
4 | vtp password 123
5 | vtp primary (server)
```

Листинг 4: Перевод порта в *access*

```
1 | int gig1/0
2 | switchport mode access
3 | switchport access vlan 22
```

Листинг 5: Настройка *STP* и его *Cost*

```
1 | show spanning-tree
2 | spanning-tree vlan 1-99 root primary
3 | int gig0/0
4 | spanning-tree cost 3
```

Листинг 6: Настройка *VLAN*

```
1 | interface FastEthernet0/0.10
2 | encapsulation dot1q 10
3 | ip address 192.168.29.1 255.255.255.0
4 | description Sales
```

Листинг 7: Настройка *NAT*

```
1 | int gig0/1.22
2 | ip nat inside
```

Выводы

Успешное выполнение лабораторной работы позволило мне приобрести практические навыки в конфигурировании L2-коммутаторов для создания сети с избыточными связями и виртуальными локальными сетями (*VLAN*).

Я получил ценный опыт в настройке ключевых протоколов и функций, включая *PortChannel*, *VLAN trunks*, *SVI*, маршрутизацию и *STP*.