

МИНИСТЕРСТВО ОБРАЗОВАНИЯ, НАУКИ И МОЛОДЕЖНОЙ
ПОЛИТИКИ КРАСНОДАРСКОГО КРАЯ
ГОСУДАРСТВЕННОЕ БЮДЖЕТНОЕ ПРОФЕССИОНАЛЬНОЕ
ОБРАЗОВАТЕЛЬНОЕ УЧРЕЖДЕНИЕ КРАСНОДАРСКОГО КРАЯ
«КРАСНОДАРСКИЙ КОЛЛЕДЖ ЭЛЕКТРОННОГО
ПРИБОРОСТРОЕНИЯ»

Выпускная квалификационная работа на тему:

Проектирование сети организации «Новые Информационные Технологии»

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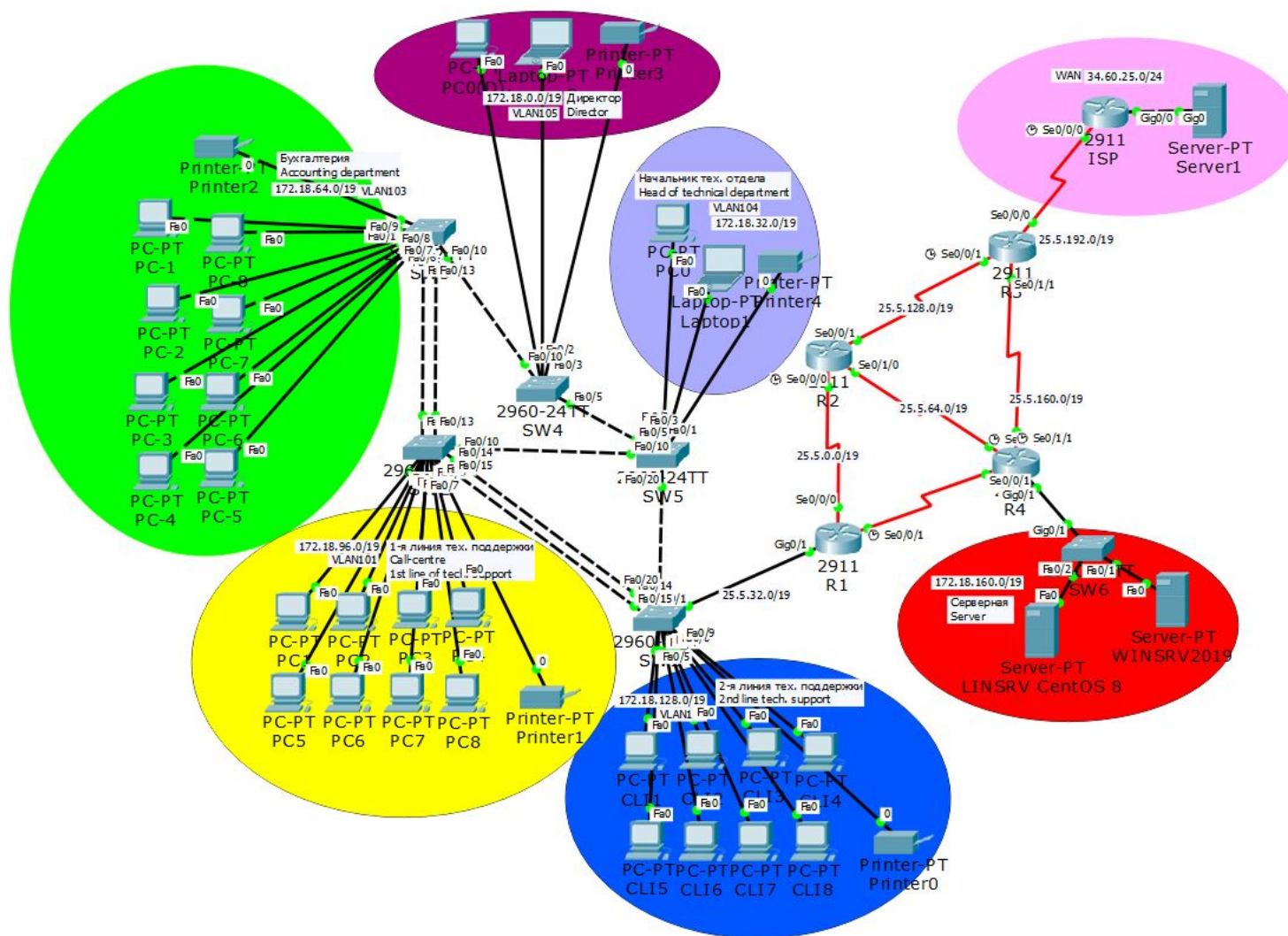
Рецензент: Исмаилов Э.Р.

Краснодар 2022

Заданием предусмотрено

- Проектирование сети организации с соблюдением технических требований
- Выбор аппаратного обеспечения сети
- Конфигурация сетевого и серверного оборудования
- Реализация сетевой безопасности

Администрирование сети организации



Выбор оборудования



Маршрутизатор Cisco 2911



Коммутатор Cisco 2960 24-TT

Настройка коммутаторов

```
Enter configuration commands, one per line. End with CNTL/Z.
SW2(config)#int vlan 101
SW2(config-if)#
%LINK-5-CHANGED: Interface Vlan101, changed state to up

SW2(config-if)#ip add
SW2(config-if)#ip address 172.18.96.10 255.255.224.0
SW2(config-if)#ex
SW2(config)#interf
SW2(config)#interface fas
SW2(config)#interface fastEthernet 0/1-8
^
% Invalid input detected at '^' marker.

SW2(config)#interface range fastEthernet 0/1-8
SW2(config-if-range)#switchport access vlan 101
SW2(config-if-range)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan101, changed state to up

SW2(config-if-range)#interface range fastEthernet 0/8-24
SW2(config-if-range)#switchport mode trunk
```

Copy

```
SW1(config)#interface ran
SW1(config)#interface range fa
SW1(config)#interface range fastEthernet 0/14-15
SW1(config-if-range)#cha
SW1(config-if-range)#channel-group 1 mode on
SW1(config-if-range)#
Creating a port-channel interface Port-channel 1

%LINK-5-CHANGED: Interface Port-channel 1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel 1, changed state to up
```

```
Changing VTP domain name from NULL to
SW1(config)#
%LINK-5-CHANGED: Interface Vlan102, ch

%LINEPROTO-5-UPDOWN: Line protocol on

SW1(config)#vtp password cisco
Setting device VLAN database password
SW1(config)#vtp version 2
SW1(config)#vtp mode server
Device mode already VTP SERVER.
SW1(config)#
```

```
SW1(config)#interface port-channel 1
SW1(config-if)#swit
SW1(config-if)#switchport mode trunk

SW1(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel 1, changed

%LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel 1, changed

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/14, chang

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/14, chang

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/15, chang

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/15, chang

SW1(config-if)#trunk
^
% Invalid input detected at '^' marker.

SW1(config-if)#switchport trunk allowed vlan 101,102,103,104,105

%%EC-5-COMPATIBLE: Fa0/14 is compatible with port-channel members

%%EC-5-COMPATIBLE: Fa0/15 is compatible with port-channel members
SW1(config-if)#s
```

Настройка маршрутизаторов

```
IOS Command Line Interface

R1(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1.103, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1.103, changed
state to up

R1(config-subif)#encapsulation dot1Q 103
R1(config-subif)#ip address 172.18.64.1 255.255.224.0
R1(config-subif)#ip helper-address 172.18.160.20
R1(config-subif)#int gig0/1.105
R1(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1.105, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1.105, changed
state to up

R1(config-subif)#encapsulation dot1Q 105
R1(config-subif)#ip address 172.18.0.1 255.255.224.0
R1(config-subif)#ip helper-address 172.18.160.20
R1(config-subif)#int gig0/1.104
R1(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1.104, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1.104, changed
state to up

R1(config-subif)#encapsulation dot1Q 104
R1(config-subif)#ip address 172.18.32.1 255.255.224.0
R1(config-subif)#ip helper-address 172.18.160.20
R1(config-subif)#
```

```
R1(config)#
R1(config)#router
R1(config)#router o
R1(config)#router ospf 1
R1(config-router)#router
R1(config-router)#router-id 1.1.1.1
R1(config-router)#network 172.18.64.0 0.0.31.255 area 0
R1(config-router)#network 172.18.96.0 0.0.31.255 area 0
R1(config-router)#network 172.18.128.0 0.0.31.255 area 0
R1(config-router)#network 172.18.0.0 0.0.31.255 area 0
R1(config-router)#network 172.18.32.0 0.0.31.255 area 0
R1(config-router)#default-
R1(config-router)#default-information o
R1(config-router)#default-information originate
R1(config-router)#
```

```
ISP(config)#access-list 2 permit 172.18.0.0 0.0.31.255
ISP(config)#access-list 3 permit 172.18.64.0 0.0.31.255
ISP(config)#access-list 4 permit 172.18.96.0 0.0.31.255
ISP(config)#access-list 4 permit 172.18.128.0 0.0.31.255
ISP(config)#access-list 6 permit 172.18.160.0 0.0.31.255
ISP(config)#access-list 5 permit 172.18.128.0 0.0.31.255
ISP(config)#access-list 4 permit 172.18.96.0 0.0.31.255
ISP(config)#ip nat inside source list 1 pool DNAT_DATA8
ISP(config)#ip nat inside source list 2 pool DNAT_DATA8
ISP(config)#ip nat inside source list 3 pool DNAT_DATA8
ISP(config)#ip nat inside source list 4 pool DNAT_DATA8
ISP(config)#ip nat inside source list 5 pool DNAT_DATA8
ISP(config)#ip nat inside source list 6 pool DNAT_DATA8
ISP(config)#
```


Настройка Windows Server

Select server roles

Select one or more roles to install on the selected server.

Roles	Description
<input type="checkbox"/> Active Directory Certificate Services	
<input checked="" type="checkbox"/> Active Directory Domain Services	File and iS technolog file server space utili files to bri over a file node, and NFS prot
<input type="checkbox"/> Active Directory Federation Services	
<input type="checkbox"/> Active Directory Lightweight Directory Services	
<input type="checkbox"/> Active Directory Rights Management Services	
<input type="checkbox"/> Device Health Attestation	
<input checked="" type="checkbox"/> DHCP Server	
<input checked="" type="checkbox"/> DNS Server	
<input type="checkbox"/> Fax Server	
<input checked="" type="checkbox"/> File and Storage Services (1 of 12 installed)	
<input checked="" type="checkbox"/> File and iSCSI Services	
<input checked="" type="checkbox"/> Storage Services (Installed)	
<input type="checkbox"/> Host Guardian Service	
<input type="checkbox"/> Hyper-V	
<input type="checkbox"/> Network Policy and Access Services	
<input type="checkbox"/> Print and Document Services	
<input type="checkbox"/> Remote Access	
<input type="checkbox"/> Remote Desktop Services	
<input type="checkbox"/> Volume Activation Services	
<input type="checkbox"/> Web Server (IIS)	

Active Directory Domain Services Configuration Wizard

Domain Controller Options

Deployment Configuration

- Domain Controller Options
- Additional Options
- Paths
- Review Options
- Prerequisites Check
- Installation
- Results

Select functional level of the new forest and root domain

Forest functional level: Windows Server 2016

Domain functional level: Windows Server 2016

Specify domain controller capabilities

- Domain Name System (DNS) server
- Global Catalog (GC)
- Read only domain controller (RODC)

Type the Directory Services Restore Mode (DSRM) password

Password: [masked]

Confirm password: [masked]

Active Directory Domain Services Configuration Wizard

Deployment Configuration

Select the deployment operation

- Add a domain controller to an existi
- Add a new domain to an existing for
- Add a new forest

Specify the domain information for this

Root domain name:

DHCP

New Scope Wizard

IP Address Range

You define the scope address range by identifying a set of consecutive IP addresses.

Configuration settings for DHCP Server

Enter the range of addresses that the scope distributes.

Start IP address: 172 . 18 . 0 . 1

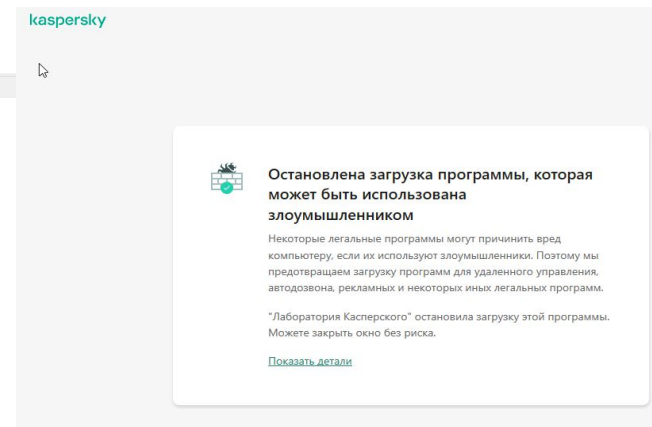
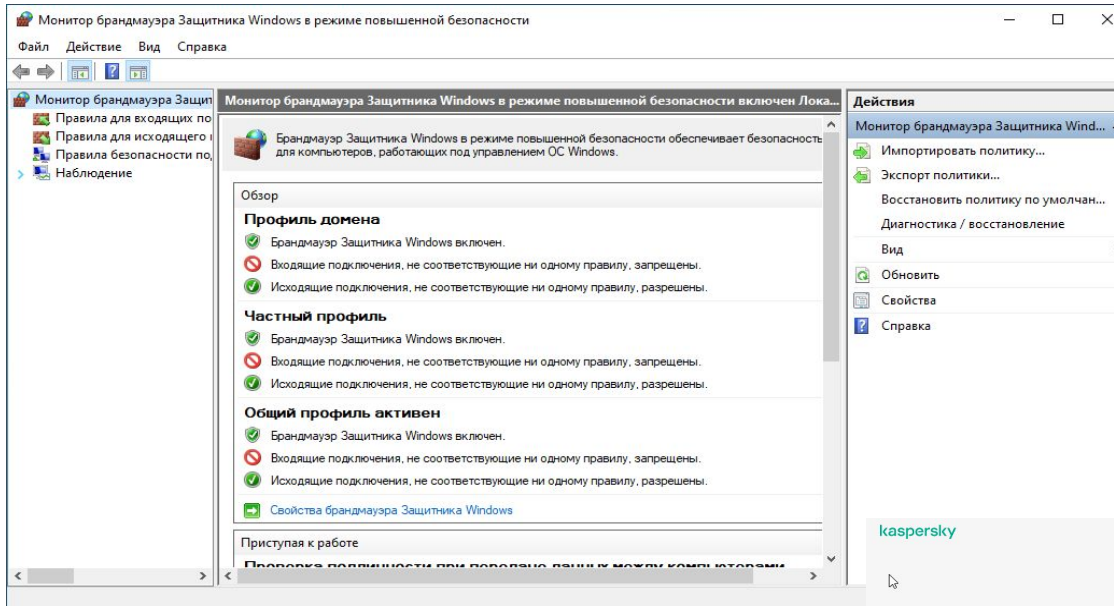
End IP address: 172 . 18 . 0 . 254

Configuration settings that propagate to DHCP Client

Length: 19

Subnet mask: 255 . 255 . 224 . 0

Реализация сетевой безопасности



Настройка Linux сервера

```
Docs: man:systemd-sysv-generator(8)
Process: 3011 ExecStop=/etc/rc.d/init.d/tac_plus stop (code=exited,
Process: 3025 ExecStart=/etc/rc.d/init.d/tac_plus start (code=exited)
Tasks: 1 (limit: 23384)
Memory: 2.3M
CGroup: /system.slice/tac_plus.service
└─3035 /usr/bin/tac_plus -C /etc/tac_plus.conf
```

```
Jun 04 15:49:47 LINSRV systemd[1]: Starting LSB: TACACS+ server based on Cisco s>
Jun 04 15:49:47 LINSRV tac_plus[3025]: /etc/rc.d/init.d/tac_plus: line 22: [: =>
Jun 04 15:49:47 LINSRV tac_plus[3033]: Reading config
Jun 04 15:49:47 LINSRV tac_plus[3033]: Version F4.0.4.26 Initialized 1
Jun 04 15:49:47 LINSRV tac_plus[3025]: Starting tacacs+: [ OK ]
Jun 04 15:49:47 LINSRV tac_plus[3035]: uid=0 euid=0 gid=0 egid=0 s=0
Jun 04 15:49:47 LINSRV systemd[1]: Started LSB: TACACS+ server based on Cisco s>
lines 1-18/18 (END)
```

```
Docs: man:chronyd(8)
man:chrony.conf(5)
Main PID: 964 (chronyd)
Tasks: 1 (limit: 23384)
Memory: 3.4M
CGroup: /system.slice/chronyd.service
└─964 /usr/sbin/chronyd
```

```
May 30 15:31:45 LINSRV chronyd[964]: Source 91.209.94.10 online
May 30 15:31:45 LINSRV chronyd[964]: Source 192.36.143.130 online
May 30 15:33:39 LINSRV chronyd[964]: Source 185.189.12.50 offline
May 30 15:33:39 LINSRV chronyd[964]: Source 80.249.145.122 offline
May 30 15:33:39 LINSRV chronyd[964]: Source 91.209.94.10 offline
May 30 15:33:39 LINSRV chronyd[964]: Source 192.36.143.130 offline
May 30 15:33:39 LINSRV chronyd[964]: Source 185.189.12.50 online
May 30 15:33:39 LINSRV chronyd[964]: Source 80.249.145.122 online
```

```
[root@LINSRV ~]# rpm -qa tcpdump net-tools nano curl vim lynx
tcpdump-4.9.3-1.el8.x86_64
curl-7.61.1-14.el8.x86_64
nano-2.9.8-1.el8.x86_64
net-tools-2.0-0.52.20160912git.el8.x86_64
[root@LINSRV ~]# █
```

```
Profile name ens33S
Device ens33 (00:0C:29:79:EE:52)

ETHERNET

IPv4 CONFIGURATION <Manual>
Addresses 172.18.160.21/19 <Remove>
<Add...>
Gateway 172.18.160.1
DNS servers <Add...>
Search domains <Add...>
```

Спасибо за внимание!