OTUS

Проектирование модели сети с использованием dual-стека протоколов IPv4/v6

Меня хорошо видно & слышно?

👀 🔊

Защита проекта
Тема: Проектирование модели сети с использованием dual-стека протоколов IPv4/v6

Сенцов Андрей

Мне 41 год, работаю в сфере IT более 20 лет, последние 7 лет в должности системный администратор.

План защиты

Цель и задачи проекта

Какие технологии использовались

Что получилось

Выводы

Вопросы и рекомендации

Цель и задачи проекта

1. Реализовать технологии DHCP, NAT, VLAN в локальной сети:

2. Поднять сервер DHCP ipv4 и ipv6 на маршрутизаторе cisco

Что планировалось:

1. Создание небольшой сети в эмуляторе CTP
2. Настройка сервера DHCP ipv4 для локальной сети и системы видеонаблюдения
3. Настройка сервера DHCP ipv4\ipv6 для системы отельного телевидения
4. Настройка NAT на роутере, который получает адрес от провайдера
5. Разделение локальной сети на подсети с использованием технологии VLAN
6. Соединение двух сегментов сети с помощью статической маршрутизации
7. Реализация динамической маршрутизации OSPF на сегменте провайдера
8. Поднять туннель GRE от локальной сети до интернет провайдера

Какие технологии использовались

VLAN

Роутер на палочке

DHCP ipv4\ipv6

NAT

OSPF

Что получилось

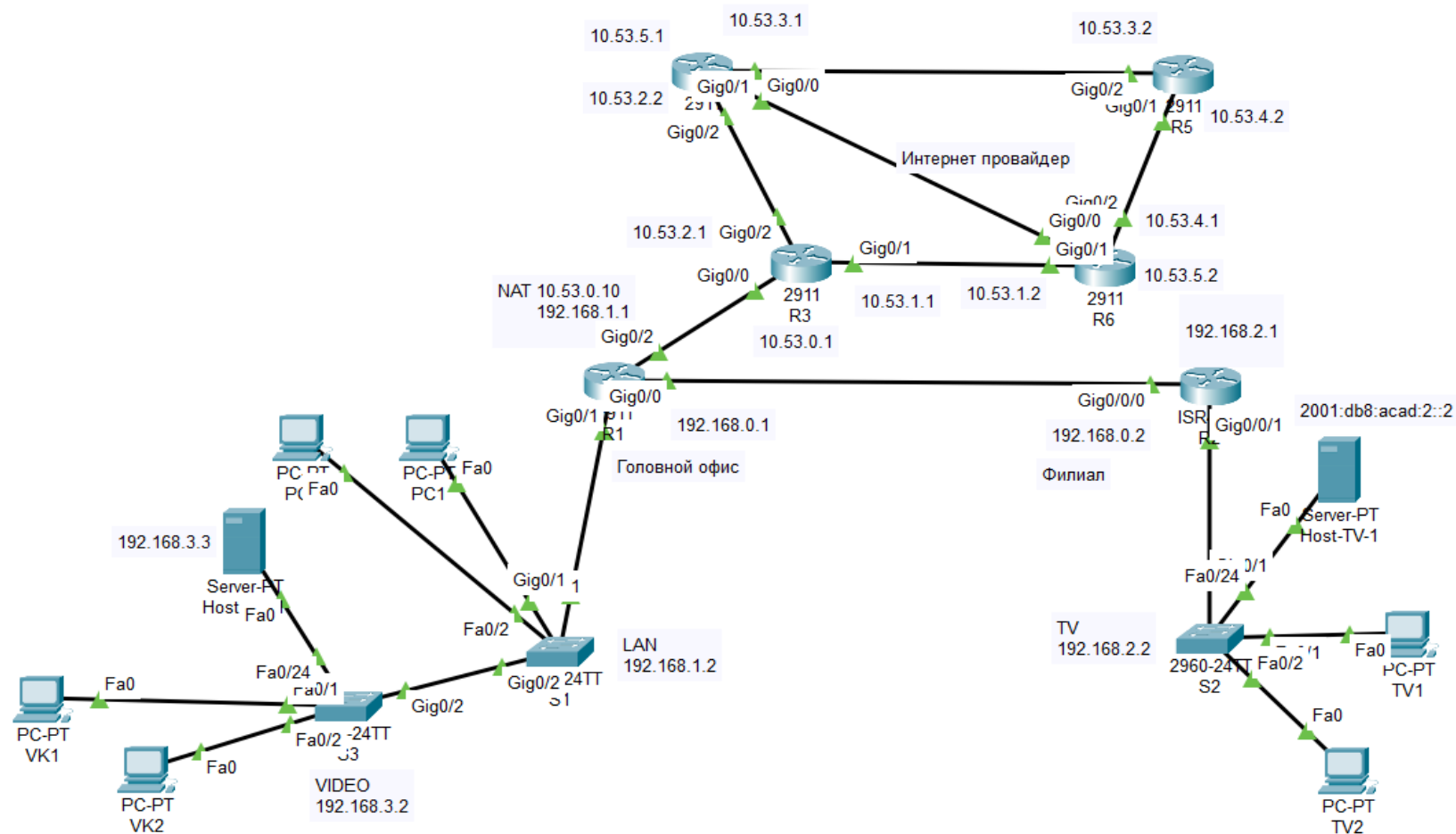**Разместите на слайде(-ах) артефакты проекта:**
- схемы (архитектура)
- ссылки на файлы в репозитории: https://github.com/SentsovAS/sentsov/tree/main/labs/final
- скрины экранов
- фото или видео

Либо продемонстрируйте проект отдельно.

Структурная схема сети

Таблица адресации

Устройство	Интерфейс	IP-адрес	Маска подсети	Шлюз
R1	G0/0	192.168.0.1	255.255.255.0	
	G0/1.11	192.168.1.1	255.255.255.0	
	G0/1.3	192.168.3.1	255.255.255.0	
	G0/2	10.53.0.10	255.255.255.0	
	Tunel 0	10.0.0.1	255.255.255.0	
R2	G0/0/0	192.168.0.2	255.255.255.0	
	G0/0/1.2	192.168.2.1	255.255.255.0	
		2001:db8:acad:2::1/64		
		fe80::1		
R3	G0/0	10.53.0.1	255.255.255.0	
	G0/1	10.53.1.1	255.255.255.0	
	G0/2	10.53.2.1	255.255.255.0	
R4	G0/1	10.53.3.1	255.255.255.0	
	G0/2	10.53.2.2	255.255.255.0	
R5	G0/1	10.53.4.2	255.255.255.0	
	G0/2	10.53.3.2	255.255.255.0	
R6	G0/1	10.53.1.2	255.255.255.0	
	G0/2	10.53.4.1	255.255.255.0	

Таблица адресации

Устройство	Интерфейс	IP-адрес	Маска подсети	Шлюз
S1	VLAN 11	192.168.1.2	255.255.255.0	192.168.1.1
S2	VLAN 2	192.168.2.2	255.255.255.0	192.168.2.1
S3	VLAN 3	192.168.3.2	255.255.255.0	192.168.1.1
PC1	NIC	DHCP	DHCP	DHCP
PC2	NIC	DHCP	DHCP	DHCP
VK1	NIC	DHCP	DHCP	DHCP
VK2	NIC	DHCP	DHCP	DHCP
TV1	NIC	DHCP	DHCP	DHCP
TV2	NIC	DHCP	DHCP	DHCP
Host-VK-1		192.168.3.3	255.255.255.0	192.168.1.1
Host-TV-1		2001:DB8:ACAD:2::2\64		

VLAN S1 show vlan на устройствах Cisco используется для отображения информации о VLAN (виртуальных локальных областях) в коммутаторе. Эта команда крайне полезна для управления и мониторинга конфигурации VLAN в сети.

```
S1#show vlan

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active
2    TV                               active
3    VIDEO                            active
11   LAN                              active    Fa0/1, Fa0/2
999  parkimglot                       active    Fa0/3, Fa0/4, Fa0/5, Fa0/6
                                                Fa0/7, Fa0/8, Fa0/9, Fa0/10
                                                Fa0/11, Fa0/12, Fa0/13, Fa0/14
                                                Fa0/15, Fa0/16, Fa0/17, Fa0/18
                                                Fa0/19, Fa0/20, Fa0/21, Fa0/22
                                                Fa0/23, Fa0/24
1000 native                           active
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Transl Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
1    enet  100001     1500  -      -      -        -    -        0      0
2    enet  100002     1500  -      -      -        -    -        0      0
3    enet  100003     1500  -      -      -        -    -        0      0
11   enet  100011     1500  -      -      -        -    -        0      0
999  enet  100999     1500  -      -      -        -    -        0      0
1000 enet  101000     1500  -      -      -        -    -        0      0
1002 fddi  101002     1500  -      -      -        -    -        0      0
1003 tr    101003     1500  -      -      -        -    -        0      0
1004 fdnet 101004     1500  -      -      -        ieee -        0      0
1005 trnet 101005     1500  -      -      -        ibm  -        0      0

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Transl Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
```

VLAN S2

```
S2#show vlan

VLAN Name                             Status    Ports
---- -------------------------------- ---------
--------------------------------
1    default                          active
2    TV                               active    Fa0/1, Fa0/2, Fa0/24
3    VIDEO                            active
11   LAN                              active
999  parkinglot                       active    Fa0/3, Fa0/4, Fa0/5, Fa0/6
                                                 Fa0/7, Fa0/8, Fa0/9, Fa0/10
                                                 Fa0/11, Fa0/12, Fa0/13,
Fa0/14
                                                 Fa0/15, Fa0/16, Fa0/17,
Fa0/18
                                                 Fa0/19, Fa0/20, Fa0/21,
Fa0/22
                                                 Fa0/23, Gig0/2
1000 native                           active
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Transl
Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------
------
1    enet  100001     1500  -      -      -        -    -        0      0
2    enet  100002     1500  -      -      -        -    -        0      0
3    enet  100003     1500  -      -      -        -    -        0      0
11   enet  100011     1500  -      -      -        -    -        0      0
999  enet  100999     1500  -      -      -        -    -        0      0
1000 enet  101000     1500  -      -      -        -    -        0      0
1002 fddi  101002     1500  -      -      -        -    -        0      0
1003 tr    101003     1500  -      -      -        -    -        0      0
1004 fdnet 101004     1500  -      -      -        ieee -        0      0
1005 trnet 101005     1500  -      -      -        ibm  -        0      0

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Transl
Trans2
```

VLAN S3

```
S3#show vlan

VLAN Name                             Status    Ports
---- -------------------------------- ---------
--------------------------------
1    default                          active
2    TV                               active
3    VIDEO                            active    Fa0/1, Fa0/2, Fa0/24
11   LAN                              active
999  parkinglot                       active    Fa0/3, Fa0/4, Fa0/5, Fa0/6
                                                Fa0/7, Fa0/8, Fa0/9, Fa0/10
                                                Fa0/11, Fa0/12, Fa0/13,
Fa0/14
                                                Fa0/15, Fa0/16, Fa0/17,
Fa0/18
                                                Fa0/19, Fa0/20, Fa0/21,
Fa0/22
                                                Fa0/23, Gig0/1
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Transl
Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------
------
1    enet  100001     1500  -      -      -        -    -        0      0
2    enet  100002     1500  -      -      -        -    -        0      0
3    enet  100003     1500  -      -      -        -    -        0      0
11   enet  100011     1500  -      -      -        -    -        0      0
999  enet  100999     1500  -      -      -        -    -        0      0
1002 fddi  101002     1500  -      -      -        -    -        0      0
1003 tr    101003     1500  -      -      -        -    -        0      0
1004 fdnet 101004     1500  -      -      -        ieee -        0      0
1005 trnet 101005     1500  -      -      -        ibm  -        0      0

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Transl
Trans2
```

Роутер на палочке show ip route используется для отображения таблицы маршрутизации. Она предоставляет информацию о всех маршрутах, известных маршрутизатору, а также о том, как они были получены

```
R1#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter
area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

      10.0.0.0/8 is variably subnetted, 7 subnets, 2 masks
C        10.0.0.0/24 is directly connected, Tunnel0
L        10.0.0.1/32 is directly connected, Tunnel0
C        10.53.0.0/24 is directly connected, GigabitEthernet0/2
L        10.53.0.10/32 is directly connected, GigabitEthernet0/2
S        10.53.1.0/24 is directly connected, GigabitEthernet0/2
S        10.53.2.0/24 is directly connected, GigabitEthernet0/2
S        10.53.3.0/24 is directly connected, GigabitEthernet0/2
      192.168.0.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.0.0/24 is directly connected, GigabitEthernet0/0
L        192.168.0.1/32 is directly connected, GigabitEthernet0/0
      192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.1.0/24 is directly connected, GigabitEthernet0/1.11
L        192.168.1.1/32 is directly connected, GigabitEthernet0/1.11
S     192.168.2.0/24 is directly connected, GigabitEthernet0/0
      192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.3.0/24 is directly connected, GigabitEthernet0/1.3
L        192.168.3.1/32 is directly connected, GigabitEthernet0/1.3
```

```
R2#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter
area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

      192.168.0.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.0.0/24 is directly connected, GigabitEthernet0/0/0
L        192.168.0.2/32 is directly connected, GigabitEthernet0/0/0
S     192.168.1.0/24 is directly connected, GigabitEthernet0/0/0
      192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.2.0/24 is directly connected, GigabitEthernet0/0/1.2
L        192.168.2.1/32 is directly connected, GigabitEthernet0/0/1.2
S     192.168.3.0/24 is directly connected, GigabitEthernet0/0/0
```

Роутер на палочке show ip interface brief команда используется для быстрого просмотра состояния и IP-адресов всех интерфейсов маршрутизатора., show protocols

```
R1#show ip interface brief
Interface              IP-Address      OK? Method Status
Protocol
GigabitEthernet0/0     192.168.0.1     YES manual up            up
GigabitEthernet0/1     unassigned      YES unset  up            up
GigabitEthernet0/1.3   192.168.3.1     YES manual up            up
GigabitEthernet0/1.11  192.168.1.1     YES manual up            up
GigabitEthernet0/1.1000unassigned      YES unset  up            up
GigabitEthernet0/2     10.53.0.10      YES manual up            up
Loopback1              unassigned      YES unset  up            up
Tunnel0                10.0.0.1        YES manual up            up
Vlan1                  unassigned      YES unset  administratively down down
R1#show protocols
Global values:
  Internet Protocol routing is enabled
GigabitEthernet0/0 is up, line protocol is up
  Internet address is 192.168.0.1/24
GigabitEthernet0/1 is up, line protocol is up
GigabitEthernet0/1.3 is up, line protocol is up
  Internet address is 192.168.3.1/24
GigabitEthernet0/1.11 is up, line protocol is up
  Internet address is 192.168.1.1/24
GigabitEthernet0/1.1000 is up, line protocol is up
GigabitEthernet0/2 is up, line protocol is up
  Internet address is 10.53.0.10/24
Loopback1 is up, line protocol is up
Tunnel0 is up, line protocol is up
  Internet address is 10.0.0.1/24
Vlan1 is administratively down, line protocol is down
```

```
R2# show ip interface brief
Interface              IP-Address      OK? Method Status
Protocol
GigabitEthernet0/0/0   192.168.0.2     YES manual up            up
GigabitEthernet0/0/1   unassigned      YES manual up            up
GigabitEthernet0/0/1.2 192.168.2.1     YES manual up            up
GigabitEthernet0/0/1.1000unassigned        YES unset  up        up
Vlan1                  unassigned      YES unset  administratively down down
```

```
R2#show protocols
Global values:
  Internet Protocol routing is enabled
GigabitEthernet0/0/0 is up, line protocol is up
  Internet address is 192.168.0.2/24
GigabitEthernet0/0/1 is up, line protocol is up
GigabitEthernet0/0/1.2 is up, line protocol is up
  Internet address is 192.168.2.1/24
GigabitEthernet0/0/1.1000 is up, line protocol is up
Vlan1 is administratively down, line protocol is down
```

DHCP show ip dhcp binding используется для отображения информации о привязках DHCP, то есть о том, какие IP-адреса были выданы клиентам DHCP. Эта команда полезна для диагностики и управления динамическими IP-адресами в сети.

```
R1#show ip dhcp binding
IP address          Client-ID/              Lease expiration        Type
                    Hardware address
192.168.1.5         00D0.976E.254B          --                      Automatic
192.168.3.5         00D0.5819.2182          --                      Automatic
192.168.3.4         0001.42C7.AAA0          --                      Automatic

S1#show ip dhcp binding
IP address          Client-ID/              Lease expiration        Type
                    Hardware address
192.168.1.4         00D0.D3C9.1865          --                      Automatic
192.168.1.5         00D0.976E.254B          --                      Automatic

S2#show ip dhcp binding
IP address          Client-ID/              Lease expiration        Type
                    Hardware address
192.168.2.5         0001.43C5.D3E7          --                      Automatic
192.168.2.4         00D0.9775.C240          --                      Automatic


 ipv6 dhcp pool R1_LAN
  dns-server 2001:DB8:ACAD::2
  domain-name LAN.com


 ipv6 dhcp pool R2_TV
  dns-server 2001:DB8:ACAD::1
  domain-name TV.com
```

```
ip dhcp excluded-address 192.168.1.1 192.168.1.3
ip dhcp excluded-address 192.168.2.1 192.168.2.3
ip dhcp excluded-address 192.168.3.1 192.168.3.3
```

DHCP show ip\ipv6 dhcp pool Показывает конфигурацию текущих пулов DHCP, включая диапазоны доступных адресов.

```
R1#show ip dhcp pool

Pool R1_LAN :
 Utilization mark (high/low)    : 100 / 0
 Subnet size (first/next)       : 0 / 0
 Total addresses                : 254
 Leased addresses               : 2
 Excluded addresses             : 3
 Pending event                  : none

 1 subnet is currently in the pool
 Current index        IP address range                    Leased/Excluded/Total
 192.168.1.1          192.168.1.1      - 192.168.1.254    2    / 3     / 254

Pool R1_VIDEO :
 Utilization mark (high/low)    : 100 / 0
 Subnet size (first/next)       : 0 / 0
 Total addresses                : 254
 Leased addresses               : 2
 Excluded addresses             : 3
 Pending event                  : none

 1 subnet is currently in the pool
 Current index        IP address range                    Leased/Excluded/Total
 192.168.3.1          192.168.3.1      - 192.168.3.254    2    / 3     / 254
```

```
R2#show ipv6 dhcp pool
DHCPv6 pool: R2_TV
 DNS server: 2001:DB8:ACAD::1
 Domain name: TV.com
 Active clients: 0

R1#show ipv6 dhcp pool
DHCPv6 pool: R1_LAN
 DNS server: 2001:DB8:ACAD::2
 Domain name: TV.com
 Active clients: 0


R2#
%SYS-5-CONFIG_I: Configured from console by console
show ip dhcp pool

Pool R2_TV :
 Utilization mark (high/low)    : 100 / 0
 Subnet size (first/next)       : 0 / 0
 Total addresses                : 254
 Leased addresses               : 0
 Excluded addresses             : 3
 Pending event                  : none

 1 subnet is currently in the pool
 Current index        IP address range                    Leased/Excluded/
 Total
 192.168.2.1          192.168.2.1      - 192.168.2.254    0    / 3     / 254
```

DHCP

VK1

IP Configuration

Interface	FastEthernet0	

IP Configuration

● DHCP	○ Static	DHCP request successful.
IPv4 Address	192.168.3.4	
Subnet Mask	255.255.255.0	
Default Gateway	192.168.1.1	
DNS Server	192.168.1.1	

IPv6 Configuration

● Automatic	○ Static	Ipv6 request successful.
IPv6 Address	2001:DB8:ACAD:3:2D0:58FF:FE19:2182	/ 64
Link Local Address	FE80::2D0:58FF:FE19:2182	
Default Gateway	FE80::1	

PC1

IP Configuration

Interface	FastEthernet0	

IP Configuration

● DHCP	○ Static	DHCP request successful.
IPv4 Address	192.168.1.5	
Subnet Mask	255.255.255.0	
Default Gateway	192.168.1.1	
DNS Server	192.168.1.1	

IPv6 Configuration

● Automatic	○ Static	Ipv6 request successful.
IPv6 Address	2001:DB8:ACAD:0:5D08:4076:32D3:2441	/ 64
Link Local Address	FE80::2D0:97FF:FE6E:254B	
Default Gateway	FE80::1	
DNS Server	2001:DB8:ACAD:4::1	

TV1

IP Configuration

Interface	FastEthernet0	

IP Configuration

● DHCP	○ Static	DHCP request successful.
IPv4 Address	192.168.2.4	
Subnet Mask	255.255.255.0	
Default Gateway	192.168.2.1	
DNS Server	192.168.2.1	

IPv6 Configuration

● Automatic	○ Static	Ipv6 request successful.
IPv6 Address	2001:DB8:ACAD:0:C557:B7B5:A923:9B90	/ 64
Link Local Address	FE80::201:43FF:FEC5:D3E7	
Default Gateway	FE80::1	
DNS Server	2001:DB8:ACAD:2::1	

DHCP

TV1 — Command Prompt

```
C:\>ipconfig /all

FastEthernet0 Connection:(default port)

   Connection-specific DNS Suffix..: TV.com
   Physical Address................: 0001.43C5.D3E7
   Link-local IPv6 Address.........: FE80::201:43FF:FEC5:D3E7
   IPv6 Address....................: 2001:DB8:ACAD:0:C557:B7B5:A923:9B90
   IPv4 Address....................: 192.168.2.4
   Subnet Mask.....................: 255.255.255.0
   Default Gateway.................: FE80::1
                                     192.168.2.1
   DHCP Servers....................: 192.168.2.2
   DHCPv6 IAID.....................: 1789154621
   DHCPv6 Client DUID..............: 00-01-00-01-B7-E0-D5-72-00-01-43-C5-D3-
E7
   DNS Servers.....................: 2001:DB8:ACAD:2::1
                                     192.168.2.1
```

PC1 — Command Prompt

```
C:\>ipconfig /all

FastEthernet0 Connection:(default port)

   Connection-specific DNS Suffix..: LAN.com
   Physical Address................: 00D0.976E.254B
   Link-local IPv6 Address.........: FE80::2D0:97FF:FE6E:254B
   IPv6 Address....................: 2001:DB8:ACAD:0:5D08:4076:32D3:2441
   IPv4 Address....................: 192.168.1.5
   Subnet Mask.....................: 255.255.255.0
   Default Gateway.................: FE80::1
                                     192.168.1.1
   DHCP Servers....................: 192.168.1.2
   DHCPv6 IAID.....................: 1573012275
   DHCPv6 Client DUID..............: 00-01-00-01-B7-B5-A4-66-00-
D0-97-6E-25-4B
   DNS Servers.....................: 2001:DB8:ACAD:4::1
                                     192.168.1.1
```

NAT show ip nat translations используется на маршрутизаторах Cisco для отображения текущих трансляций сетевых адресов (NAT)

Внутренний адрес: 192.168.1.1
Внешний адрес: 10.53.0.10

```
R1(config)#do show ip nat translations
Pro  Inside global     Inside local      Outside local     Outside global
icmp 10.53.0.10:1024   192.168.3.3:5     10.53.0.1:5       10.53.0.1:1024
icmp 10.53.0.10:1025   192.168.3.3:6     10.53.0.1:6       10.53.0.1:1025
icmp 10.53.0.10:1026   192.168.3.3:7     10.53.0.1:7       10.53.0.1:1026
icmp 10.53.0.10:1027   192.168.3.3:8     10.53.0.1:8       10.53.0.1:1027
icmp 10.53.0.10:13     192.168.1.5:13    10.53.0.1:13      10.53.0.1:13
icmp 10.53.0.10:14     192.168.1.5:14    10.53.0.1:14      10.53.0.1:14
icmp 10.53.0.10:15     192.168.1.5:15    10.53.0.1:15      10.53.0.1:15
icmp 10.53.0.10:16     192.168.1.5:16    10.53.0.1:16      10.53.0.1:16
icmp 10.53.0.10:17     192.168.3.4:17    10.53.0.1:17      10.53.0.1:17
icmp 10.53.0.10:18     192.168.3.4:18    10.53.0.1:18      10.53.0.1:18
icmp 10.53.0.10:19     192.168.3.4:19    10.53.0.1:19      10.53.0.1:19
icmp 10.53.0.10:20     192.168.3.4:20    10.53.0.1:20      10.53.0.1:20
icmp 10.53.0.10:5      192.168.1.4:5     10.53.0.1:5       10.53.0.1:5
icmp 10.53.0.10:6      192.168.1.4:6     10.53.0.1:6       10.53.0.1:6
icmp 10.53.0.10:7      192.168.1.4:7     10.53.0.1:7       10.53.0.1:7
icmp 10.53.0.10:8      192.168.1.4:8     10.53.0.1:8       10.53.0.1:8
```

OSPF show ip route ospf используется на маршрутизаторах Cisco для отображения маршрутов, полученных через протокол OSPF (Open Shortest Path First). Данная команда позволяет увидеть, какие сети были анонсированы в OSPF, и их состояние в таблице маршрутизации

```
R3#show ip route ospf
      10.0.0.0/8 is variably subnetted, 11 subnets, 2 masks
O        10.53.3.0 [110/2] via 10.53.2.2, 00:51:22, GigabitEthernet0/2
O        10.53.4.0 [110/2] via 10.53.1.2, 00:51:32, GigabitEthernet0/1
O        10.53.5.0 [110/2] via 10.53.1.2, 00:02:30, GigabitEthernet0/1
                   [110/2] via 10.53.2.2, 00:02:30, GigabitEthernet0/2
```

```
R4#
%SYS-5-CONFIG_I: Configured from console by console
show ip route ospf
      10.0.0.0/8 is variably subnetted, 9 subnets, 2 masks
O        10.53.0.0 [110/2] via 10.53.2.1, 00:53:47, GigabitEthernet0/2
O        10.53.1.0 [110/2] via 10.53.2.1, 00:04:50, GigabitEthernet0/2
                   [110/2] via 10.53.5.2, 00:04:50, GigabitEthernet0/0
O        10.53.4.0 [110/2] via 10.53.3.2, 00:04:50, GigabitEthernet0/1
                   [110/2] via 10.53.5.2, 00:04:50, GigabitEthernet0/0
```

```
R5#show ip route ospf
      10.0.0.0/8 is variably subnetted, 8 subnets, 2 masks
O        10.53.0.0 [110/3] via 10.53.4.1, 00:55:21, GigabitEthernet0/1
                   [110/3] via 10.53.3.1, 00:55:21, GigabitEthernet0/2
O        10.53.1.0 [110/2] via 10.53.4.1, 00:55:21, GigabitEthernet0/1
O        10.53.2.0 [110/2] via 10.53.3.1, 00:55:21, GigabitEthernet0/2
O        10.53.5.0 [110/2] via 10.53.4.1, 00:06:24, GigabitEthernet0/1
                   [110/2] via 10.53.3.1, 00:06:24, GigabitEthernet0/2
```

```
R6#show ip route ospf
      10.0.0.0/8 is variably subnetted, 9 subnets, 2 masks
O        10.53.0.0 [110/2] via 10.53.1.1, 00:56:07, GigabitEthernet0/1
O        10.53.2.0 [110/2] via 10.53.1.1, 00:07:05, GigabitEthernet0/1
                   [110/2] via 10.53.5.1, 00:07:05, GigabitEthernet0/0
O        10.53.3.0 [110/2] via 10.53.4.2, 00:07:05, GigabitEthernet0/2
                   [110/2] via 10.53.5.1, 00:07:05, GigabitEthernet0/0
```

OSPF show ip ospf neighbor Позволяет увидеть список соседей OSPF и их состояние.

```
R3#show ip ospf neighbor


Neighbor ID      Pri    State        Dead Time    Address       Interface
10.53.4.1         1     FULL/DR      00:00:32     10.53.1.2     GigabitEthernet0/1
10.53.3.1         1     FULL/DR      00:00:32     10.53.2.2     GigabitEthernet0/2
R3#
```

```
R4#show ip ospf neighbor


Neighbor ID      Pri    State        Dead Time    Address       Interface
10.53.4.2         1     FULL/DR      00:00:32     10.53.3.2     GigabitEthernet0/1
10.53.4.1         1     FULL/DR      00:00:31     10.53.5.2     GigabitEthernet0/0
10.53.2.1         1     FULL/BDR     00:00:31     10.53.2.1     GigabitEthernet0/2
```

```
R5#show ip ospf neighbor


Neighbor ID      Pri    State        Dead Time    Address       Interface
10.53.4.1         1     FULL/BDR     00:00:31     10.53.4.1     GigabitEthernet0/1
10.53.3.1         1     FULL/BDR     00:00:31     10.53.3.1     GigabitEthernet0/2
```

```
R6#show ip ospf neighbor


Neighbor ID      Pri    State        Dead Time    Address       Interface
10.53.3.1         1     FULL/BDR     00:00:32     10.53.5.1     GigabitEthernet0/0
10.53.2.1         1     FULL/BDR     00:00:32     10.53.1.1     GigabitEthernet0/1
10.53.4.2         1     FULL/DR      00:00:32     10.53.4.2     GigabitEthernet0/2
```

GRE Туннель

```
R1#show interface tunnel0
Tunnel0 is up, line protocol is up (connected)
  Hardware is Tunnel
  Internet address is 10.0.0.1/24
  MTU 17916 bytes, BW 100 Kbit/sec, DLY 50000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation TUNNEL, loopback not set
  Keepalive not set
  Tunnel source 10.53.0.10 (GigabitEthernet0/2), destination 10.53.0.1
  Tunnel protocol/transport GRE/IP
    Key disabled, sequencing disabled
    Checksumming of packets disabled
  Tunnel TTL 255
  Fast tunneling enabled
  Tunnel transport MTU 1476 bytes
  Tunnel transmit bandwidth 8000 (kbps)
  Tunnel receive bandwidth 8000 (kbps)
  Last input never, output never, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 1
  Queueing strategy: fifo
  Output queue: 0/0 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     0 packets input, 0 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     0 input packets with dribble condition detected
     0 packets output, 0 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
      0 unknown protocol drops
     0 output buffer failures, 0 output buffers swapped out
```

```
R3#show interfaces tunnel 0
Tunnel0 is up, line protocol is up (connected)
  Hardware is Tunnel
  Internet address is 10.0.0.2/24
  MTU 17916 bytes, BW 100 Kbit/sec, DLY 50000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation TUNNEL, loopback not set
  Keepalive not set
  Tunnel source 10.53.0.1 (GigabitEthernet0/0), destination 10.53.0.10
  Tunnel protocol/transport GRE/IP
    Key disabled, sequencing disabled
    Checksumming of packets disabled
  Tunnel TTL 255
  Fast tunneling enabled
  Tunnel transport MTU 1476 bytes
  Tunnel transmit bandwidth 8000 (kbps)
  Tunnel receive bandwidth 8000 (kbps)
  Last input never, output never, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 1
  Queueing strategy: fifo
  Output queue: 0/0 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     0 packets input, 0 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     0 input packets with dribble condition detected
     0 packets output, 0 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
      0 unknown protocol drops
     0 output buffer failures, 0 output buffers swapped out
```

Выводы

1.

2.

3.

Оцените работу над проектом и ответьте на вопросы:
1. У вас получилось достичь цели и выполнить все задачи?
2. Что далось легко, а с чем возникли трудности?
3. Сколько времени занял проект?
4. Насколько полезным оказался для вас проект от 1 до 10?
   a. 1 = я не научился ничему новому
   b. 10 = очень полезно, я получил новый опыт
5. Остались ли у вас вопросы по проекту?
6. Как вы планируете развиваться дальше?

Спасибо за внимание! ✨