

Лабораторная работа №7

Адресация IPv4 и IPv6. Настройка DHCP / DHCPv6

Авдадаев Джамал Геланиевич

20 декабря 2025

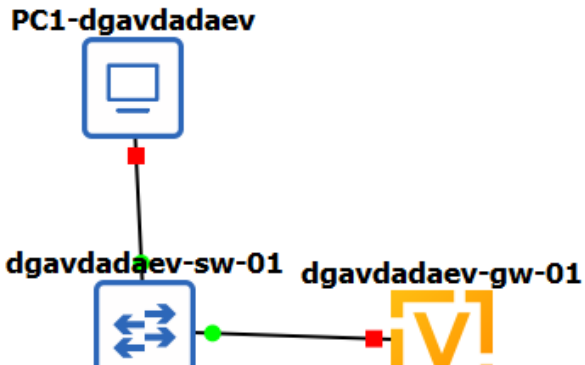
Цель работы

Получить навыки настройки службы DHCP на сетевом оборудовании для распределения адресов IPv4 и IPv6:

- DHCP (IPv4)
- DHCPv6 Stateless (SLAAC + доп. параметры)
- DHCPv6 Stateful (выдача IPv6-адресов)

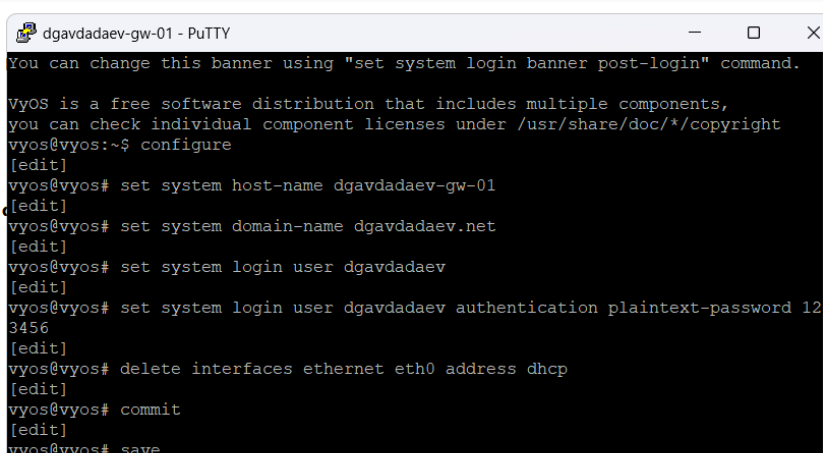
DHCP для IPv4

- Сегмент: PC1 → sw-01 → gw-01
- Шлюз: 10.0.0.1/24
- Клиент получает параметры по DHCP



Базовая настройка VyOS

- Заданы host-name и domain-name
- Создан пользователь dgavdadaev
- Отключён DHCP на eth0

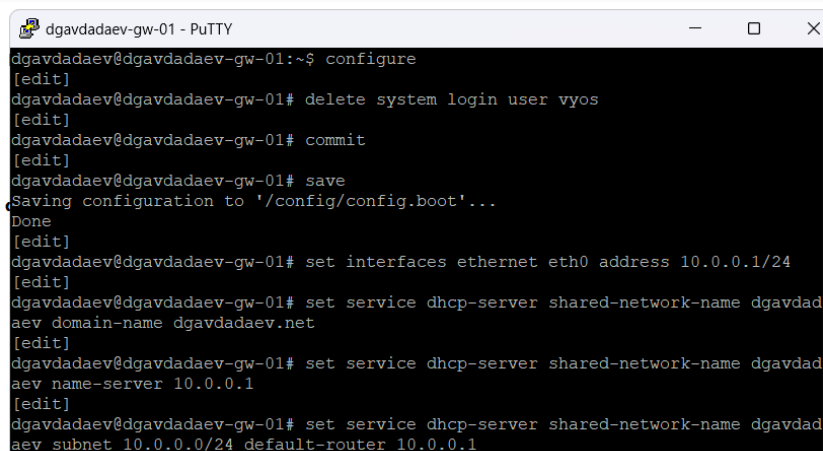


```
dgavdadaev-gw-01 - PuTTY
You can change this banner using "set system login banner post-login" command.

VyOS is a free software distribution that includes multiple components,
you can check individual component licenses under /usr/share/doc/*/copyright
vyos@vyos:~$ configure
[edit]
vyos@vyos# set system host-name dgavdadaev-gw-01
[edit]
vyos@vyos# set system domain-name dgavdadaev.net
[edit]
vyos@vyos# set system login user dgavdadaev
[edit]
vyos@vyos# set system login user dgavdadaev authentication plaintext-password 123456
[edit]
vyos@vyos# delete interfaces ethernet eth0 address dhcp
[edit]
vyos@vyos# commit
[edit]
vyos@vyos# save
```

Адресация и DHCP-сервер (IPv4)

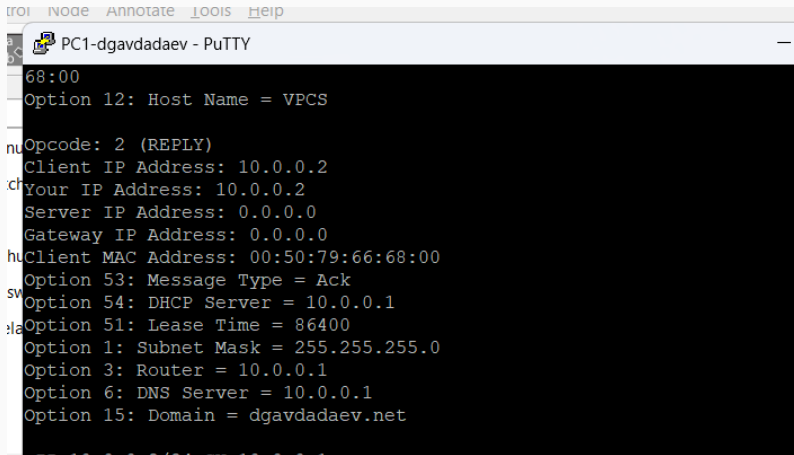
- eth0: 10.0.0.1/24
- Пул: 10.0.0.2–10.0.0.253
- DNS/Router: 10.0.0.1



```
dgavdadaev-gw-01 - PuTTY
dgavdadaev@dgavdadaev-gw-01:~$ configure
[edit]
dgavdadaev@dgavdadaev-gw-01# delete system login user vyos
[edit]
dgavdadaev@dgavdadaev-gw-01# commit
[edit]
dgavdadaev@dgavdadaev-gw-01# save
Saving configuration to '/config/config.boot'...
Done
[edit]
dgavdadaev@dgavdadaev-gw-01# set interfaces ethernet eth0 address 10.0.0.1/24
[edit]
dgavdadaev@dgavdadaev-gw-01# set service dhcp-server shared-network-name dgavdad
aev domain-name dgavdadaev.net
[edit]
dgavdadaev@dgavdadaev-gw-01# set service dhcp-server shared-network-name dgavdad
aev name-server 10.0.0.1
[edit]
dgavdadaev@dgavdadaev-gw-01# set service dhcp-server shared-network-name dgavdad
aev subnet 10.0.0.0/24 default-router 10.0.0.1
```

Получение параметров на PC1 (DHCP)

- Назначен IP: 10.0.0.2/24
- Lease Time: 86400 секунд
- Выданы: DNS, шлюз, домен



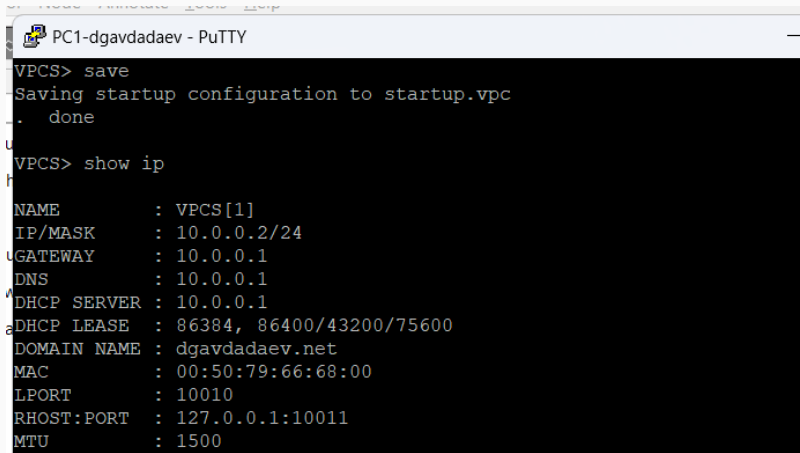
The screenshot shows a PuTTY terminal window titled "PC1-dgavdadaev - PuTTY". The terminal output displays the following DHCP parameters:

```
68:00
Option 12: Host Name = VPCS

Opcode: 2 (REPLY)
Client IP Address: 10.0.0.2
Your IP Address: 10.0.0.2
Server IP Address: 0.0.0.0
Gateway IP Address: 0.0.0.0
Client MAC Address: 00:50:79:66:68:00
Option 53: Message Type = Ack
Option 54: DHCP Server = 10.0.0.1
Option 51: Lease Time = 86400
Option 1: Subnet Mask = 255.255.255.0
Option 3: Router = 10.0.0.1
Option 6: DNS Server = 10.0.0.1
Option 15: Domain = dgavdadaev.net
```


Проверка конфигурации и связности

- show ip подтверждает параметры
- Шлюз: 10.0.0.1
- ping 10.0.0.1 успешен



The screenshot shows a PuTTY terminal window titled "PC1-dgavdadaev - PuTTY". The terminal displays the following commands and output:

```
VPCS> save
Saving startup configuration to startup.vpc
. done

VPCS> show ip
```

NAME	: VPCS[1]
IP/MASK	: 10.0.0.2/24
GATEWAY	: 10.0.0.1
DNS	: 10.0.0.1
DHCP SERVER	: 10.0.0.1
DHCP LEASE	: 86384, 86400/43200/75600
DOMAIN NAME	: dgavdadaev.net
MAC	: 00:50:79:66:68:00
LPORT	: 10010
RHOST:PORT	: 127.0.0.1:10011
MTU	: 1500

DHCP-статистика и аренды (VyOS)

- Pool size: 252
- Active leases: 1
- Клиент: 10.0.0.2 (VPCS)

```
exit
dgavdadaev@dgavdadaev-gw-01:~$ show dhcp server statistics
Pool      Size    Leases   Available  Usage
-----
dgavdadaev    252      1       251    0%
dgavdadaev@dgavdadaev-gw-01:~$ show dhcp server leases
IP address  Hardware address  State    Lease start      Lease expiration
  Remaining    Pool             Hostname
-----
10.0.0.2    00:50:79:66:68:00  active   2025/12/20 07:27:51  2025/12/21 07:27:51
:51 23:58:45    dgavdadaev  VPCS
dgavdadaev@dgavdadaev-gw-01:~$
```

Рис. 6: Статистика DHCP-сервера и активные аренды

- Discover → Offer
- Request → ACK
- Назначение адреса подтверждено

```
Dec 20 07:26:53 dhcpd[3014]:  
Dec 20 07:26:53 dhcpd[3014]: Server starting service.  
Dec 20 07:27:47 dhcpd[3014]: DHCPDISCOVER from 00:50:79:66:68:00 via eth0  
Dec 20 07:27:48 dhcpd[3014]: DHCPOFFER on 10.0.0.2 to 00:50:79:66:68:00 (VPCS) v  
ia eth0  
Dec 20 07:27:51 dhcpd[3014]: DHCPREQUEST for 10.0.0.2 (10.0.0.1) from 00:50:79:6  
6:68:00 (VPCS) via eth0  
Dec 20 07:27:51 dhcpd[3014]: DHCPACK on 10.0.0.2 to 00:50:79:66:68:00 (VPCS) via  
eth0  
Dec 20 07:29:02 sudo[3107]: dgavdadaev : TTY=ttyS0 ; PWD=/home/dgavdadaev ; USER  
=root ; COMMAND=/usr/libexec/vyos/op_mode/show_dhcp.py --statistics  
Dec 20 07:29:05 sudo[3151]: dgavdadaev : TTY=ttyS0 ; PWD=/home/dgavdadaev ; USER  
=root ; COMMAND=/usr/libexec/vyos/op_mode/show_dhcp.py --leases  
dgavdadaev@dgavdadaev-gw-01:~$
```

Рис. 7: Журнал работы DHCP-сервера

Анализ DHCP-трафика (Wireshark)

- Последовательность DORA
- Опции: mask/router/DNS/domain/lease
- Корректная выдача параметров

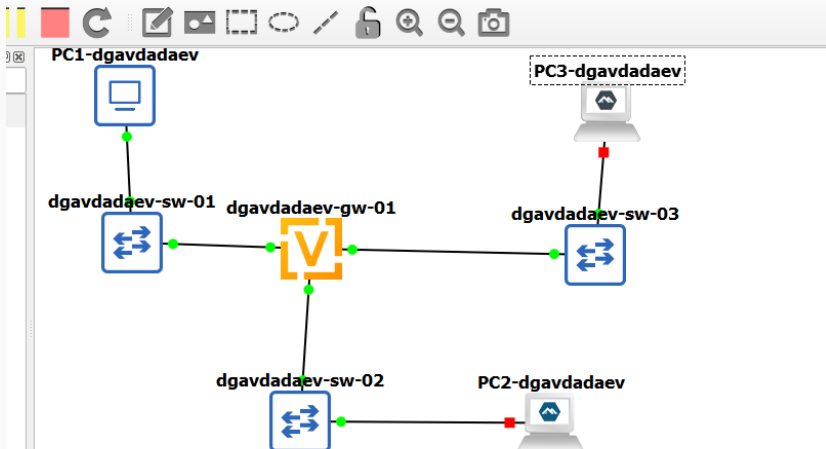
dhcp						
No.	Time	Source	Destination	Protocol	Length	Info
2	11.103117	0.0.0.0	255.255.255.255	DHCP	406	DHCP Discover - Transaction ID 0xc0fd3851
4	12.103385	0.0.0.0	255.255.255.255	DHCP	406	DHCP Discover - Transaction ID 0xc0fd3851
5	12.127295	10.0.0.1	10.0.0.2	DHCP	342	DHCP Offer - Transaction ID 0xc0fd3851
8	15.104100	0.0.0.0	255.255.255.255	DHCP	406	DHCP Request - Transaction ID 0xc0fd3851
9	15.119353	10.0.0.1	10.0.0.2	DHCP	342	DHCP ACK - Transaction ID 0xc0fd3851

[Stream index: 1]
[Stream Packet Number: 1]
> [Timestamps]
UDP payload (300 bytes)
Dynamic Host Configuration Protocol (Offer)
Message type: Boot Reply (2)
Hardware type: Ethernet (0x01)
Hardware address length: 6
Hops: 0
Transaction ID: 0xc0fd3851
Seconds elapsed: 0
> Bootp flags: 0x0000 (Unicast)
Client IP address: 0.0.0.0
Your (client) IP address: 10.0.0.2
Next server IP address: 0.0.0.0
Relay agent IP address: 0.0.0.0
Client MAC address: Private_66:68:00 (00:50:79:66:68:00)
Client hardware address padding: 00000000000000000000
Server host name not given
Boot file name not given
Magic cookie: DHCP
> Option: (53) DHCP Message Type (Offer)
> Option: (54) DHCP Server Identifier (10.0.0.1)

DHCPv6 Stateless

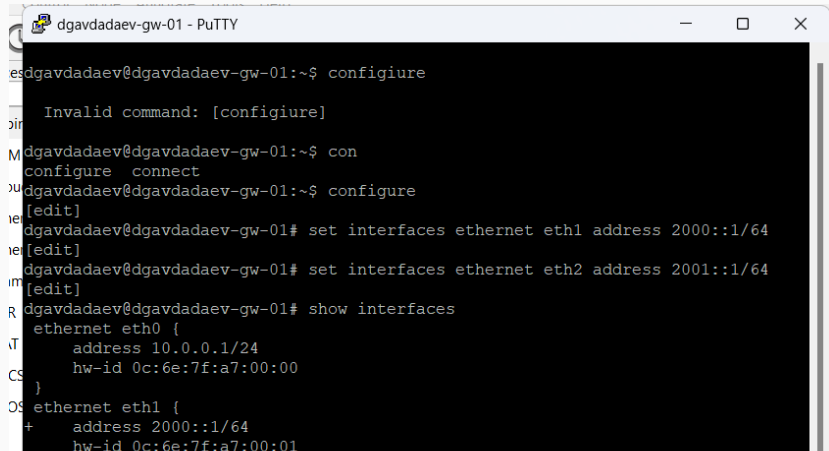
Расширенная топология для IPv6

- Добавлены сегменты через sw-02 и sw-03
- Клиенты: PC2 и PC3 (Kali Linux CLI)
- Захват трафика на линиях gw-01—sw-02 и gw-01—sw-03



IPv6-адресация интерфейсов VyOS

- eth1: 2000::1/64
- eth2: 2001::1/64
- Проверка через show interfaces

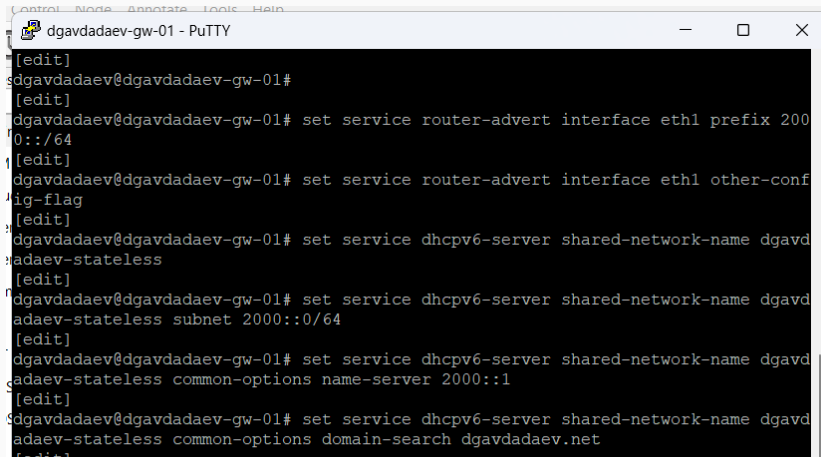


```
dgavdadaev@dgavdadaev-gw-01:~$ configiure
Invalid command: [configiure]

dgavdadaev@dgavdadaev-gw-01:~$ con
configure connect
dgavdadaev@dgavdadaev-gw-01:~$ configure
[edit]
dgavdadaev@dgavdadaev-gw-01# set interfaces ethernet eth1 address 2000::1/64
[edit]
dgavdadaev@dgavdadaev-gw-01# set interfaces ethernet eth2 address 2001::1/64
[edit]
dgavdadaev@dgavdadaev-gw-01# show interfaces
  ethernet eth0 {
    address 10.0.0.1/24
    hw-id 0c:6e:7f:a7:00:00
  }
  ethernet eth1 {
    address 2000::1/64
    hw-id 0c:6e:7f:a7:00:01
```

Stateless: RA + DHCPv6 (настройка)

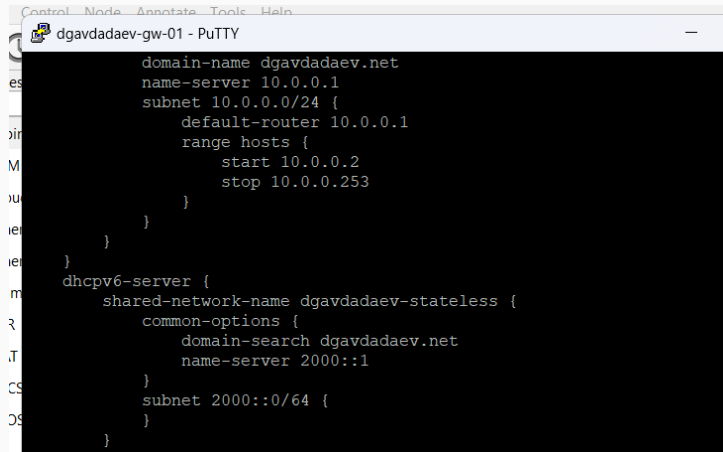
- RA prefix 2000::/64 (eth1)
- other-config-flag: доп. параметры через DHCPv6
- DHCPv6: DNS 2000::1 и domain-search



```
Control Node Annotate Logs Help
dgavdadaev-gw-01 - PuTTY
[edit]
dgavdadaev@dgavdadaev-gw-01#
[edit]
dgavdadaev@dgavdadaev-gw-01# set service router-advert interface eth1 prefix 200
0::/64
[edit]
dgavdadaev@dgavdadaev-gw-01# set service router-advert interface eth1 other-conf
ig-flag
[edit]
dgavdadaev@dgavdadaev-gw-01# set service dhcpv6-server shared-network-name dgavd
adaev-stateless
[edit]
dgavdadaev@dgavdadaev-gw-01# set service dhcpv6-server shared-network-name dgavd
adaev-stateless subnet 2000::0/64
[edit]
dgavdadaev@dgavdadaev-gw-01# set service dhcpv6-server shared-network-name dgavd
adaev-stateless common-options name-server 2000::1
[edit]
dgavdadaev@dgavdadaev-gw-01# set service dhcpv6-server shared-network-name dgavd
adaev-stateless common-options domain-search dgavdadaev.net
[edit]
```


Stateless: проверка конфигурации (VyOS)

- В конфигурации присутствуют dhcpv6-server и router-advert
- Shared-network-name: dgavdadaev-stateless
- Передаются общие опции (DNS, domain-search)

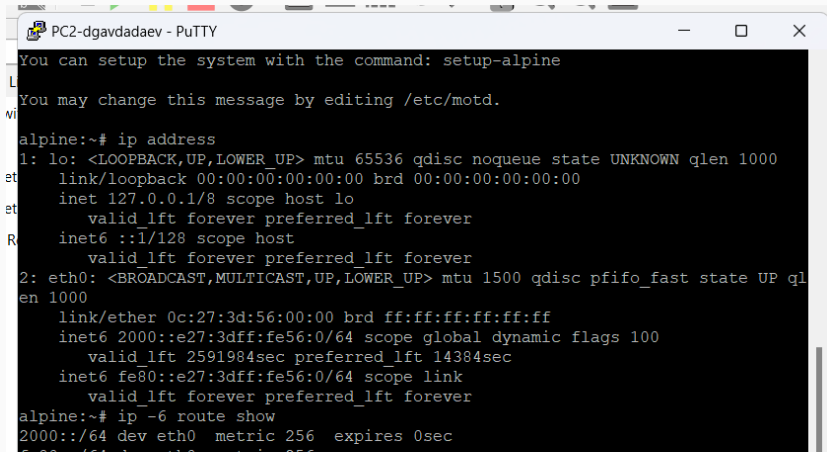


The screenshot shows a PuTTY terminal window titled "dgavdadaev-gw-01 - PuTTY". The terminal displays the following configuration:

```
Control Node Annotate Tools Help
dgavdadaev-gw-01 - PuTTY
domain-name dgavdadaev.net
name-server 10.0.0.1
subnet 10.0.0.0/24 {
    default-router 10.0.0.1
    range hosts {
        start 10.0.0.2
        stop 10.0.0.253
    }
}
}
}
dhcpv6-server {
    shared-network-name dgavdadaev-stateless {
        common-options {
            domain-search dgavdadaev.net
            name-server 2000::1
        }
        subnet 2000::0/64 {
        }
    }
}
```

PC2: IPv6-автоконфигурация (SLAAC)

- Получен глобальный адрес из 2000::/64
- Есть link-local fe80::/64
- Маршрут по умолчанию через RA



```
PC2-dgavdadaev - PuTTY
You can setup the system with the command: setup-alpine
You may change this message by editing /etc/motd.

alpine:~# ip address
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP ql
en 1000
    link/ether 0c:27:3d:56:00:00 brd ff:ff:ff:ff:ff:ff
    inet6 2000::e27:3dff:fe56:0/64 scope global dynamic flags 100
        valid_lft 2591984sec preferred_lft 14384sec
    inet6 fe80::e27:3dff:fe56:0/64 scope link
        valid_lft forever preferred_lft forever
alpine:~# ip -6 route show
2000::/64 dev eth0 metric 256 expires 0sec
```

PC2: проверка связности

- ping 2000::1 успешен
- Подтверждена работа RA/SLAAC
- Доступность шлюза обеспечена

```
alpine:~#  
alpine:~# ping 2000::1 -c 2  
PING 2000::1 (2000::1): 56 data bytes  
64 bytes from 2000::1: seq=0 ttl=64 time=3.052 ms  
64 bytes from 2000::1: seq=1 ttl=64 time=1.964 ms  
  
--- 2000::1 ping statistics ---  
2 packets transmitted, 2 packets received, 0% packet loss  
round-trip min/avg/max = 1.964/2.508/3.052 ms  
alpine:~# cat /etc/resolv.conf  
nameserver 10.0.2.3  
alpine:~#
```

Рис. 14: Ping 2000::1 с PC2

PC2: DNS-параметры (Stateless)

- До DHCPv6: DNS может быть отсутствующим/дефолтным
- После запроса: применяется DNS из DHCPv6
- Проверка через /etc/resolv.conf

```
alpine:~# udhcpc6 -i eth0
udhcpc6: started, v1.36.1
udhcpc6: sending discover
udhcpc6: sending select
udhcpc6: no IAADDR option, ignoring packet
udhcpc6: sending select
udhcpc6: sending select
udhcpc6: sending select
udhcpc6: sending select
udhcpc6: sending select
udhcpc failed to get a DHCP lease

udhcpc6: sending discover
udhcpc6: sending select
udhcpc6: no IAADDR option, ignoring packet
udhcpc6: sending select
udhcpc6: sending select
udhcpc6: sending select
^C
alpine:~# ping 2000::1 -c 2
PING 2000::1 (2000::1): 56 data bytes
64 bytes from 2000::1: seq=0 ttl=64 time=1.808 ms
64 bytes from 2000::1: seq=1 ttl=64 time=0.275 ms
```

- Таблица leases без выданных IPv6-адресов
- Stateless не распределяет адреса
- DHCPv6 используется для «неадресных» параметров

```
[edit]
dgavdadaev@dgavdadaev-gw-01# run show dhcpv6 server leases
IPv6 address      State      Last communication      Lease expiration      Remaining
Type      Pool      IAID_DUID
-----
[edit]
ns
dgavdadaev@dgavdadaev-gw-01#
```

IS3 management console.

Рис. 16: DHCPv6 leases (Stateless)

Stateless: анализ трафика (Wireshark)

- Solicit/Reply для параметров
- IAADDR отсутствует (адрес не выдаётся)
- Адрес формируется по SLAAC

No.	Time	Source	Destination	Protocol	Length	Info
22	66.651887	fe80::e6e:7fff:fea7...	fe80::e27:3dff:fe56...	ICMPv6	78	Neighbor Advertisement fe80::e6e:7fff:fea7:1 (rtr, s...
23	71.881880	fe80::e6e:7fff:fea7...	fe80::e27:3dff:fe56...	ICMPv6	86	Neighbor Solicitation for fe80::e27:3dff:fe56:0 from
24	71.882695	fe80::e27:3dff:fe56...	fe80::e6e:7fff:fea7...	ICMPv6	78	Neighbor Advertisement fe80::e27:3dff:fe56:0 (sol)
25	90.640951	fe80::e27:3dff:fe56...	ff02::1:2	DHCPv6	116	Solicit XID: 0x6d9a22 [ROOT-ONLY DOMAIN NAME]CID: 0...
26	90.651281	fe80::e6e:7fff:fea7...	fe80::e27:3dff:fe56...	DHCPv6	162	Advertise XID: 0x6d9a22 CID: 000300010c273d560000
27	90.651973	fe80::e27:3dff:fe56...	fe80::e6e:7fff:fea7...	ICMPv6	210	Destination Unreachable (Port unreachable)
28	90.760398	fe80::e27:3dff:fe56...	ff02::1:2	DHCPv6	134	Request XID: 0x6d9a22 [ROOT-ONLY DOMAIN NAME]CID: 0...
29	90.764693	fe80::e6e:7fff:fea7...	fe80::e27:3dff:fe56...	DHCPv6	162	Reply XID: 0x6d9a22 CID: 000300010c273d560000
30	90.766209	fe80::e27:3dff:fe56...	fe80::e6e:7fff:fea7...	ICMPv6	210	Destination Unreachable (Port unreachable)
31	93.850864	fe80::e27:3dff:fe56...	ff02::1:2	DHCPv6	182	Request XID: 0x6d9a22 [ROOT-ONLY DOMAIN NAME]CID: 0...
32	93.852489	fe80::e6e:7fff:fea7...	fe80::e27:3dff:fe56...	DHCPv6	162	Reply XID: 0x6d9a22 CID: 000300010c273d560000
33	93.853109	fe80::e27:3dff:fe56...	fe80::e6e:7fff:fea7...	ICMPv6	210	Destination Unreachable (Port unreachable)
34	96.910394	fe80::e27:3dff:fe56...	ff02::1:2	DHCPv6	182	Request XID: 0x6d9a22 [ROOT-ONLY DOMAIN NAME]CID: 0...
35	96.912111	fe80::e6e:7fff:fea7...	fe80::e27:3dff:fe56...	DHCPv6	162	Reply XID: 0x6d9a22 CID: 000300010c273d560000
36	96.912441	fe80::e27:3dff:fe56...	fe80::e6e:7fff:fea7...	ICMPv6	210	Destination Unreachable (Port unreachable)

Status Code: NoAddrAvail (2)

Status Message: No addresses available for this interface.

▼ Client Identifier

Option: Client Identifier (1)

Length: 10

DUID: 000300010c273d560000

DUID Type: link-layer address (3)

Hardware type: Ethernet (1)

Link-layer address: 0c:27:3d:56:00:00

Link-layer address (Ethernet): 0c:27:3d:56:00:00 (0c:27:3d:56:00:00)

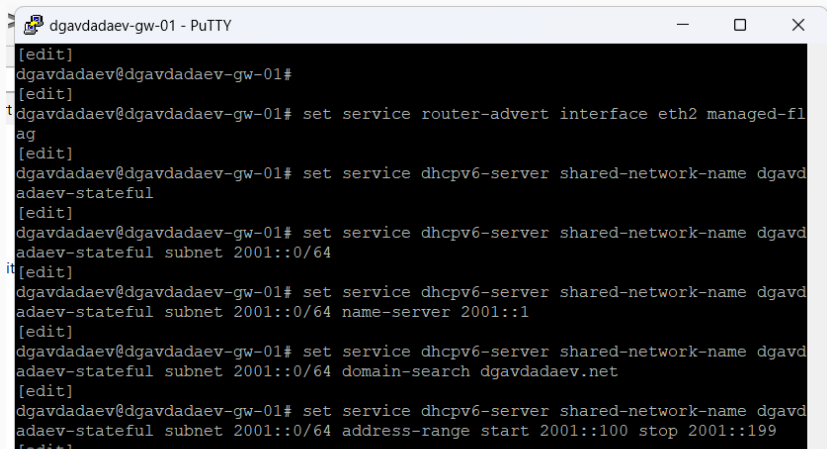
▼ Server Identifier

Option: Server Identifier (1)

DHCPv6 Stateful

Stateful: настройка RA и DHCPv6 (eth2)

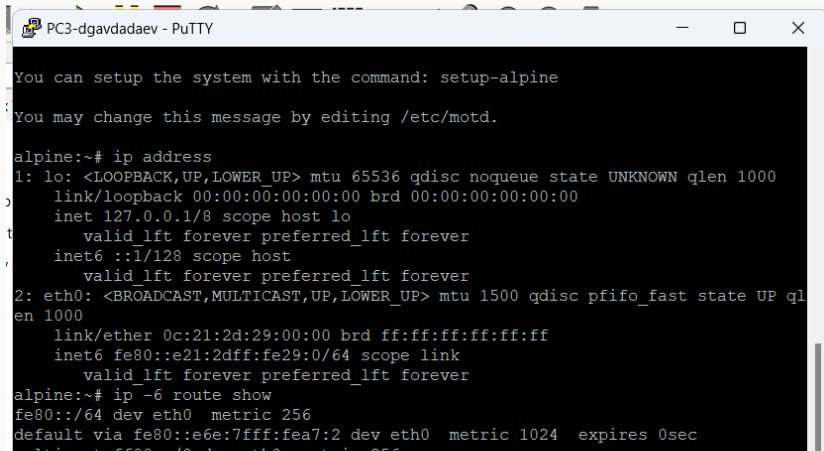
- managed-flag: адрес через DHCPv6
- Пул: 2001::100-2001::199
- DNS: 2001::1, domain-search: dgavdadaev.net



```
dgavdadaev-gw-01 - PuTTY
[edit]
dgavdadaev@dgavdadaev-gw-01#
[edit]
dgavdadaev@dgavdadaev-gw-01# set service router-advert interface eth2 managed-flag
[edit]
dgavdadaev@dgavdadaev-gw-01# set service dhcpv6-server shared-network-name dgavdadaev-stateful
[edit]
dgavdadaev@dgavdadaev-gw-01# set service dhcpv6-server shared-network-name dgavdadaev-stateful subnet 2001::0/64
[edit]
dgavdadaev@dgavdadaev-gw-01# set service dhcpv6-server shared-network-name dgavdadaev-stateful subnet 2001::0/64 name-server 2001::1
[edit]
dgavdadaev@dgavdadaev-gw-01# set service dhcpv6-server shared-network-name dgavdadaev-stateful subnet 2001::0/64 domain-search dgavdadaev.net
[edit]
dgavdadaev@dgavdadaev-gw-01# set service dhcpv6-server shared-network-name dgavdadaev-stateful subnet 2001::0/64 address-range start 2001::100 stop 2001::199
[edit]
```


Stateful: аренды DHCPv6 на VyOS

- Появляются активные leases
- Видны IAID/DUID клиента
- Адрес из диапазона 2001::100–2001::199



```
PC3-dgavdadaev - PuTTY

You can setup the system with the command: setup-alpine

You may change this message by editing /etc/motd.

alpine:~# ip address
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP qlen 1000
    link/ether 0c:21:2d:29:00:00 brd ff:ff:ff:ff:ff:ff
    inet6 fe80::e21:2dff:fe29:0/64 scope link
        valid_lft forever preferred_lft forever
alpine:~# ip -6 route show
fe80::/64 dev eth0 metric 256
default via fe80::e6e:7fff:fea7:2 dev eth0 metric 1024 expires 0sec
```

PC3: состояние до DHCPv6

- Присутствует link-local адрес
- Маршрут по умолчанию через RA
- DNS ещё не задан по IPv6

```
alpine:~# udhcpc6 -i eth0
udhcpc6: started, v1.36.1
udhcpc6: sending discover
udhcpc6: sending select
udhcpc6: IPv6 obtained, lease time 43200
alpine:~# ip address
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP qlen 1000
    link/ether 0c:21:2d:29:00:00 brd ff:ff:ff:ff:ff:ff
    inet6 fe80::e21:2dff:fe29:0/64 scope link
        valid_lft forever preferred_lft forever
alpine:~#
```

Рис. 20: IPv6 и маршруты на PC3 до DHCPv6

PC3: получение IPv6 по DHCPv6

- DHCPv6-клиент получает IPv6-адрес
- Адрес относится к 2001::/64
- Процедура выдачи завершена успешно

```
alpine:~#  
alpine:~# ip -6 route show  
fe80::/64 dev eth0 metric 256  
default via fe80::e6e:7fff:fea7:2 dev eth0 metric 1024 expires 0sec  
multicast ff00::/8 dev eth0 metric 256  
alpine:~# cat /etc/resolv.conf  
search dgavdadaev.net  
nameserver 2001:0000:0000:0000:0000:0000:0001  
alpine:~# ping 2001::1 -c 2  
PING 2001::1 (2001::1): 56 data bytes  
64 bytes from 2001::1: seq=0 ttl=64 time=1.402 ms  
64 bytes from 2001::1: seq=1 ttl=64 time=3.708 ms  
  
--- 2001::1 ping statistics ---  
2 packets transmitted, 2 packets received, 0% packet loss  
round-trip min/avg/max = 1.402/2.555/3.708 ms  
alpine:~#
```

Рис. 21: Получение IPv6 по DHCPv6 на PC3

PC3: проверка после DHCPv6

- ping 2001::1 успешен
- DNS и search применены
- Маршрутизация корректна

```
[edit]
dgavdadaev@dgavdadaev-gw-01# run show dhcpv6 server leases
IPv6 address      State      Last communication      Lease expiration      Remaining
Type      Pool      IAID_DUID
-----
[edit]
dgavdadaev@dgavdadaev-gw-01# run show dhcpv6 server leases
IPv6 address      State      Last communication      Lease expiration      Remaining
Type      Pool      IAID_DUID
-----
2001::199         active    2025/12/20 07:47:10     2025/12/20 19:47:10     11:59:02
non-temporary     dgavdadaev-stateful  05:6e:f2:a9:00:03:00:01:0c:21:2d:29:00:00
[edit]
dgavdadaev@dgavdadaev-gw-01#
```

Рис. 22: Проверка IPv6/DNS на PC3

Stateful: анализ трафика (Wireshark)

- Solicit → Advertise → Request → Reply
- В Reply присутствует IA_NA (выдача адреса)
- Передаются DNS-параметры сервера

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	fe80::e21:2dff:fe29...	ff02::1:2	DHCPv6	116	Solicit XID: 0x266d1e [ROOT-ONLY DOMAIN NAME]CID: 000
2	0.002259	fe80::e6e:7fff:fea7...	fe80::e21:2dff:fe29...	DHCPv6	182	Advertise XID: 0x266d1e IAA: 2001::198 CID: 000300010c
3	0.004220	fe80::e21:2dff:fe29...	fe80::e6e:7fff:fea7...	ICMPv6	230	Destination Unreachable (Port unreachable)
4	0.119415	fe80::e21:2dff:fe29...	ff02::1:2	DHCPv6	134	Request XID: 0x266d1e [ROOT-ONLY DOMAIN NAME]CID: 000
5	0.120812	fe80::e6e:7fff:fea7...	fe80::e21:2dff:fe29...	DHCPv6	182	Reply XID: 0x266d1e IAA: 2001::193 CID: 000300010c212d
6	0.121169	fe80::e21:2dff:fe29...	fe80::e6e:7fff:fea7...	ICMPv6	230	Destination Unreachable (Port unreachable)
7	5.125024	fe80::e6e:7fff:fea7...	fe80::e21:2dff:fe29...	ICMPv6	86	Neighbor Solicitation for fe80::e21:2dff:fe29:0 from 0
8	5.125945	fe80::e21:2dff:fe29...	fe80::e6e:7fff:fea7...	ICMPv6	78	Neighbor Advertisement fe80::e21:2dff:fe29:0 (sol)
9	6.560167	fe80::e21:2dff:fe29...	2001::1	ICMPv6	118	Echo (ping) request id=0x06cf, seq=0, hop limit=64 (re
10	6.561032	2001::1	fe80::e21:2dff:fe29...	ICMPv6	118	Echo (ping) reply id=0x06cf, seq=0, hop limit=64 (requ
11	7.561271	fe80::e21:2dff:fe29...	2001::1	ICMPv6	118	Echo (ping) request id=0x06cf, seq=1, hop limit=64 (re
12	7.562949	2001::1	fe80::e21:2dff:fe29...	ICMPv6	118	Echo (ping) reply id=0x06cf, seq=1, hop limit=64 (requ

> Frame 5: 182 bytes on wire (1456 bits), 182 bytes captured (1456 bits) on interface -, id 0

> Ethernet II, Src: 0c:6e:7f:a7:00:02 (0c:6e:7f:a7:00:02), Dst: 0c:21:2d:29:00:00 (0c:21:2d:29:00:00)

> Internet Protocol Version 6, Src: fe80::e6e:7fff:fea7:2, Dst: fe80::e21:2dff:fe29:0

> User Datagram Protocol, Src Port: 547, Dst Port: 546

> DHCPv6

Message type: Reply (7)

Transaction ID: 0x266d1e

> Identity Association for Non-temporary Address

> Client Identifier

> Server Identifier

Итоги

- DHCP (IPv4) корректно распределяет адреса и параметры сети
- DHCPv6 Stateless: SLAAC выдаёт адрес, DHCPv6 — DNS/домен
- DHCPv6 Stateful: DHCPv6 выдаёт IPv6-адреса и ведёт учёт аренд