РОССИЙСКИЙ УНИВЕРСИТЕТ ДРУЖБЫ НАРОДОВ

Факультет физико-математических и естественных наук

ОТЧЕТ
ПО ЛАБОРАТОРНОЙ РАБОТЕ №7

дисциплина: Сетевые технологии

Студент: Талебу Тенке Франк Устон

Группа: НФИбд-02-23

МОСКВА

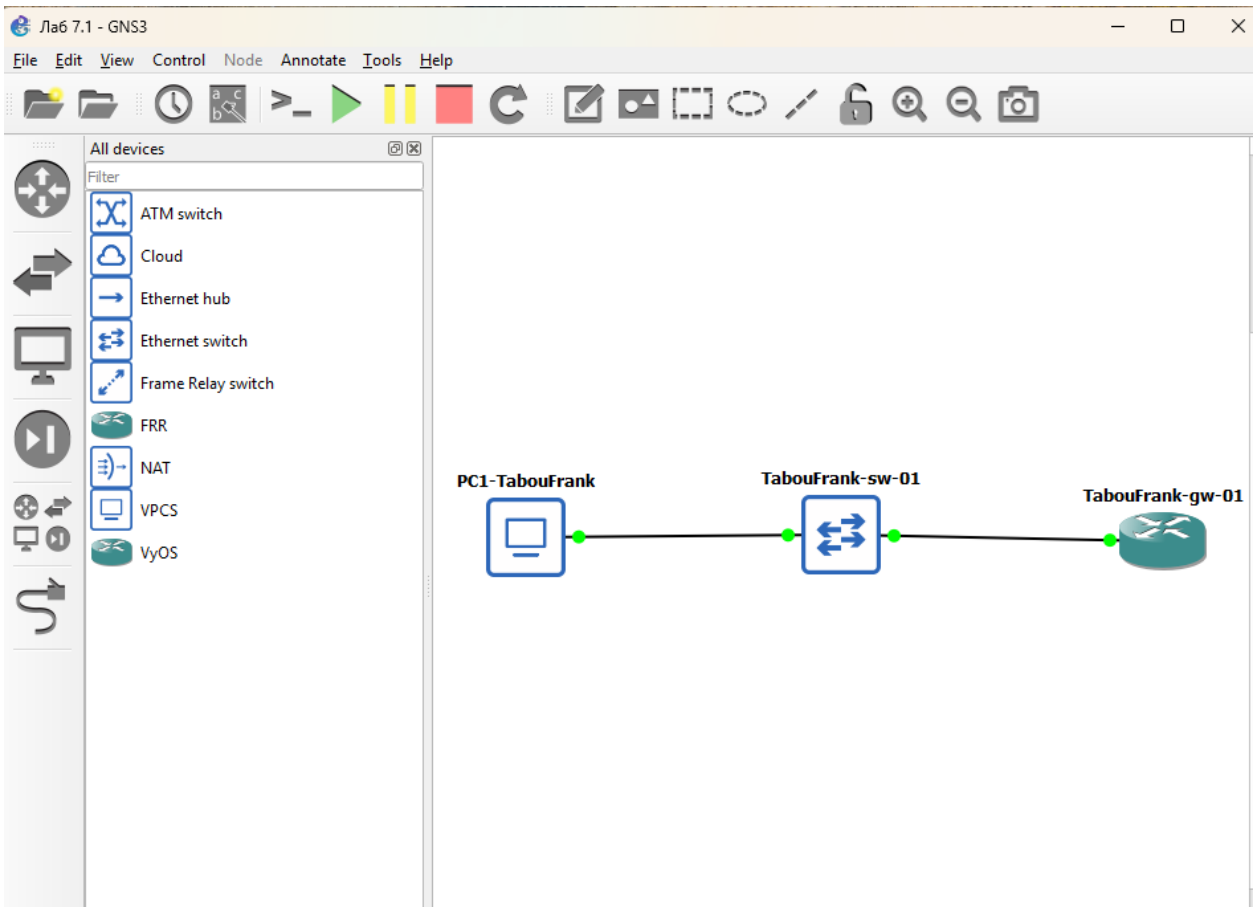
2025 г.

Цель:

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

Задания:

1. Настройка DHCP в случае IPv4
2. Настройка DHCP в случае IPv6


Лаб 7.1 - GNS3
File Edit View Control Node Annotate Tools Help
All devices
Filter
ATM switch
Cloud
Ethernet hub
Ethernet switch
Frame Relay switch
FRR
NAT
VPCS
VyOS
PC1-TabouFrank
TabouFrank-sw-01
TabouFrank-gw-01

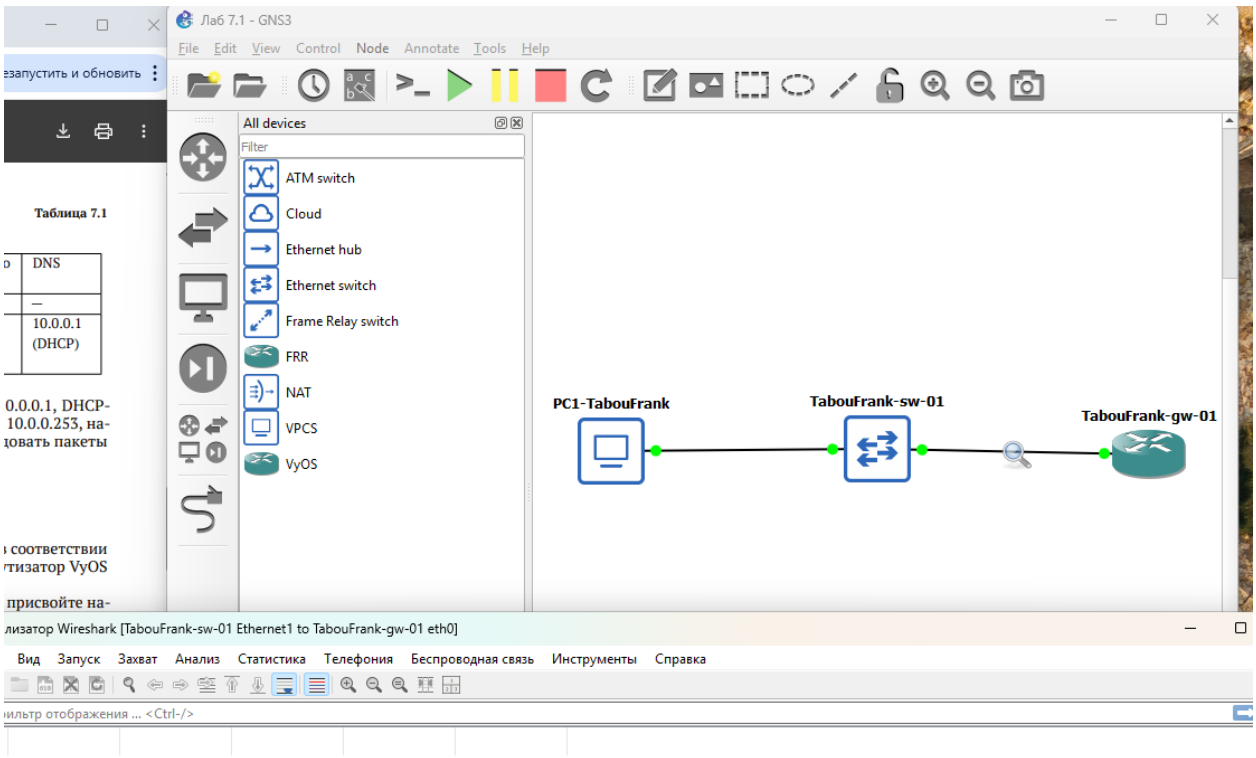


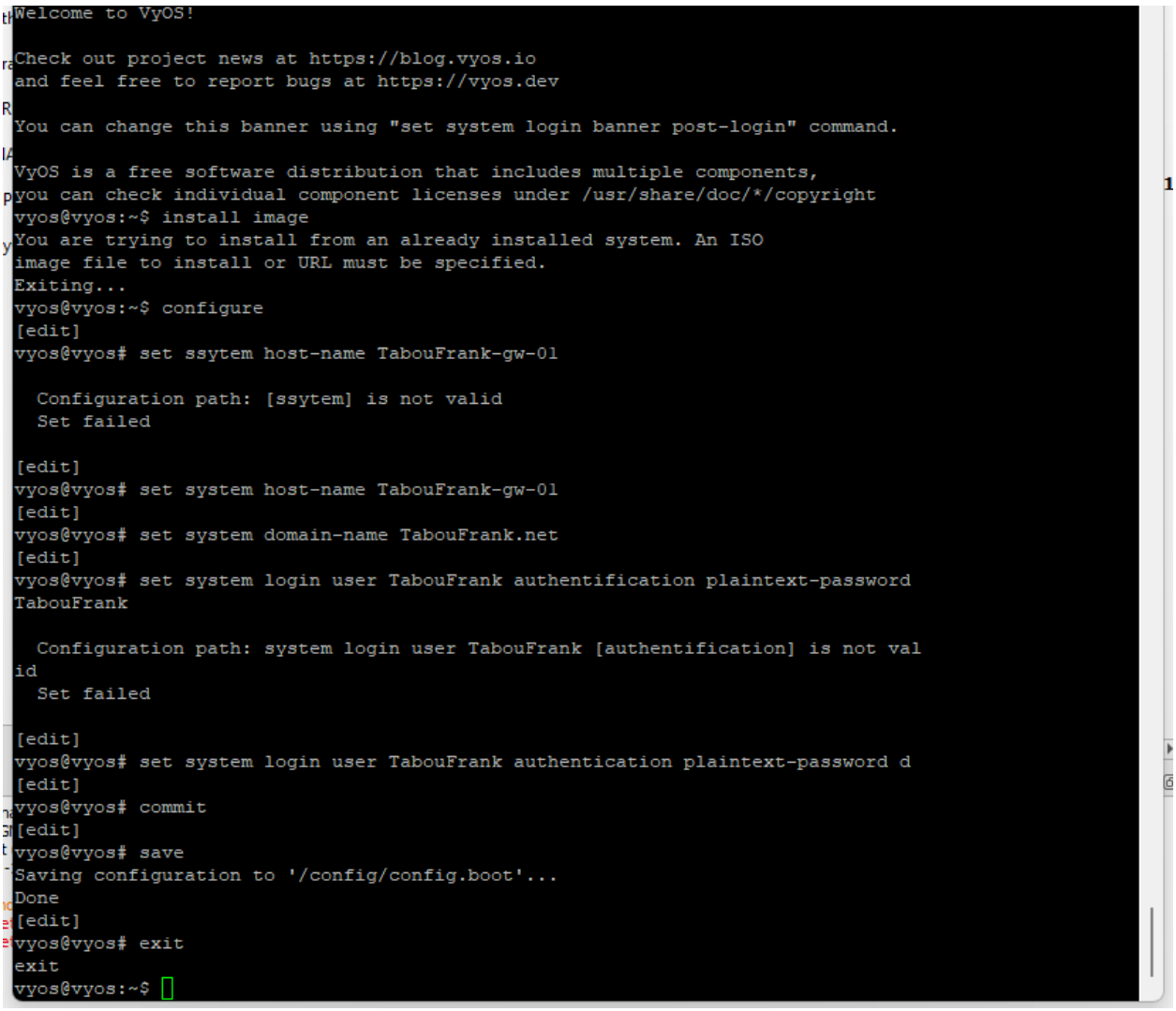
Таблица 7.1

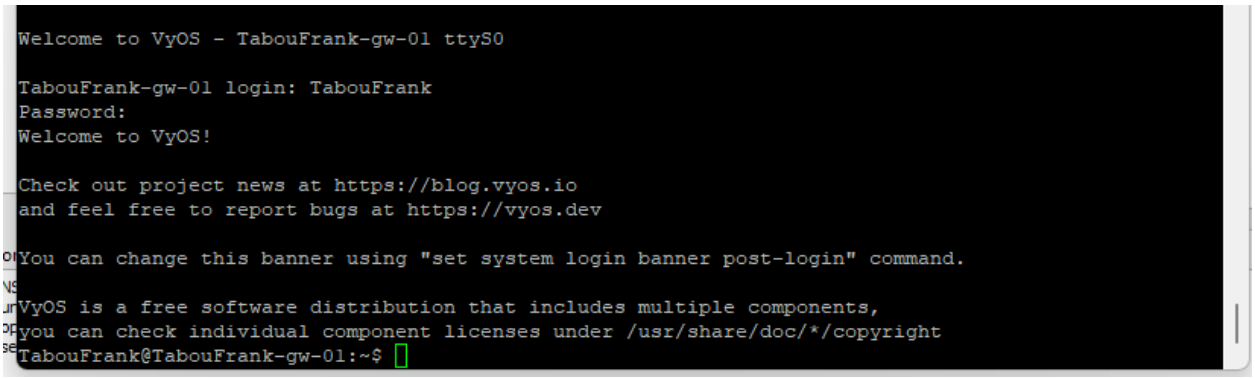
DNS	
–	
10.0.0.1 (DHCP)	

0.0.0.1, DHCP-
10.0.0.253, на-
довать пакеты

соответствии
тизатор VyOS

присвойте на-


Welcome to VyOS!
Check out project news at https://blog.vyos.io
and feel free to report bugs at https://vyos.dev
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:~$ install image
You are trying to install from an already installed system. An ISO
image file to install or URL must be specified.
Exiting...
vyos@vyos:~$ configure
[edit]
vyos@vyos# set ssytem host-name TabouFrank-gw-01
Configuration path: [ssytem] is not valid
Set failed
[edit]
vyos@vyos# set system host-name TabouFrank-gw-01
[edit]
vyos@vyos# set system domain-name TabouFrank.net
[edit]
vyos@vyos# set system login user TabouFrank authentification plaintext-password
TabouFrank
Configuration path: system login user TabouFrank [authentification] is not val
id
Set failed
[edit]
vyos@vyos# set system login user TabouFrank authentication plaintext-password d
[edit]
vyos@vyos# commit
[edit]
vyos@vyos# save
Saving configuration to '/config/config.boot'...
Done
[edit]
vyos@vyos# exit
exit
vyos@vyos:~$


Welcome to VyOS - TabouFrank-gw-01 ttyS0
TabouFrank-gw-01 login: TabouFrank
Password:
Welcome to VyOS!
Check out project news at https://blog.vyos.io
and feel free to report bugs at https://vyos.dev
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
TabouFrank@TabouFrank-gw-01:~$

```
Welcome to VyOS - TabouFrank-gw-01 ttyS0

TabouFrank-gw-01 login: TabouFrank
Password:
Welcome to VyOS!

Check out project news at https://blog.vyos.io
and feel free to report bugs at https://vyos.dev

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
TabouFrank@TabouFrank-gw-01:~$ configure
[edit]
TabouFrank@TabouFrank-gw-01# delete system login user vyos
[edit]
TabouFrank@TabouFrank-gw-01# commit
[edit]
TabouFrank@TabouFrank-gw-01# save
Saving configuration to '/config/config.boot'...
Done
[edit]
TabouFrank@TabouFrank-gw-01#
```

```
Welcome to VyOS - TabouFrank-gw-01 ttyS0

TabouFrank-gw-01 login: TabouFrank
Password:
Welcome to VyOS!

Check out project news at https://blog.vyos.io
and feel free to report bugs at https://vyos.dev

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
TabouFrank@TabouFrank-gw-01:~$ configure
[edit]
TabouFrank@TabouFrank-gw-01# delete system login user vyos
[edit]
TabouFrank@TabouFrank-gw-01# commit
[edit]
TabouFrank@TabouFrank-gw-01# save
Saving configuration to '/config/config.boot'...
Done
[edit]
TabouFrank@TabouFrank-gw-01# set interfaces ethernet eth0 address 10.0.0.1/24
[edit]
nk domain-name TabouFrank.net

  Configuration path: service dhcp-server [shared-network-nae] is not valid
  Set failed

[edit]
nk domain-name TabouFrank.net et service dhcp-server shared-network-nae TabouFran
ank domain-name TabouFrank.netet service dhcp-server shared-network-name TabouFr
[edit]
ank name-server 10.0.0.1-01# set service dhcp-server shared-network-name TabouFr
[edit]
ank subnet 10.0.0.0/24 default-router 10.0.0.1server shared-network-name TabouFr
[edit]
ank subnet 10.0.0.0/24 range hosts start 10.0.0.2ver shared-network-name TabouFr
[edit]
ank subnet 10.0.0.0/24 range hosts stop 10.0.0.253
[edit]
TabouFrank@TabouFrank-gw-01#
```

```
[edit]
TabouFrank@TabouFrank-gw-01# set interfaces ethernet eth0 address 10.0.0.1/24

  Configuration path: [interfaces ethernet eth0 address 10.0.0.1/24] already exists

[edit]
TabouFrank@TabouFrank-gw-01# save
Warning: you have uncommitted changes that will not be saved.

Saving configuration to '/config/config.boot'...
Done
[edit]
TabouFrank@TabouFrank-gw-01# commit

Can't configure both static IPv4 and DHCP address on the same interface

[[interfaces ethernet eth0]] failed
[ service dhcp-server ]
None of the configured subnets have an appropriate primary IP address on
any broadcast interface configured, nor was there an explicit listen-
address configured for serving DHCP relay packets!

[[service dhcp-server]] failed
Commit failed
[edit]
TabouFrank@TabouFrank-gw-01# address dhcp

  Invalid command: [address]

[edit]
TabouFrank@TabouFrank-gw-01# show configuration commands |match eth0

  Configuration path: [configuration] is not valid
  Show failed

[edit]
TabouFrank@TabouFrank-gw-01# show configuration commands | match eth0

  Configuration path: [configuration] is not valid
  Show failed

[edit]
TabouFrank@TabouFrank-gw-01# delete interfaces ethernet eth0 address dhcp
[edit]
TabouFrank@TabouFrank-gw-01# set interfaces ethernet eth0 address 10.0.0.1/24

  Configuration path: [interfaces ethernet eth0 address 10.0.0.1/24] already exists

[edit]
TabouFrank@TabouFrank-gw-01# show configuration commands | match eth0

  Configuration path: [configuration] is not valid
  Show failed

[edit]
TabouFrank@TabouFrank-gw-01# commit
[edit]
TabouFrank@TabouFrank-gw-01#
```

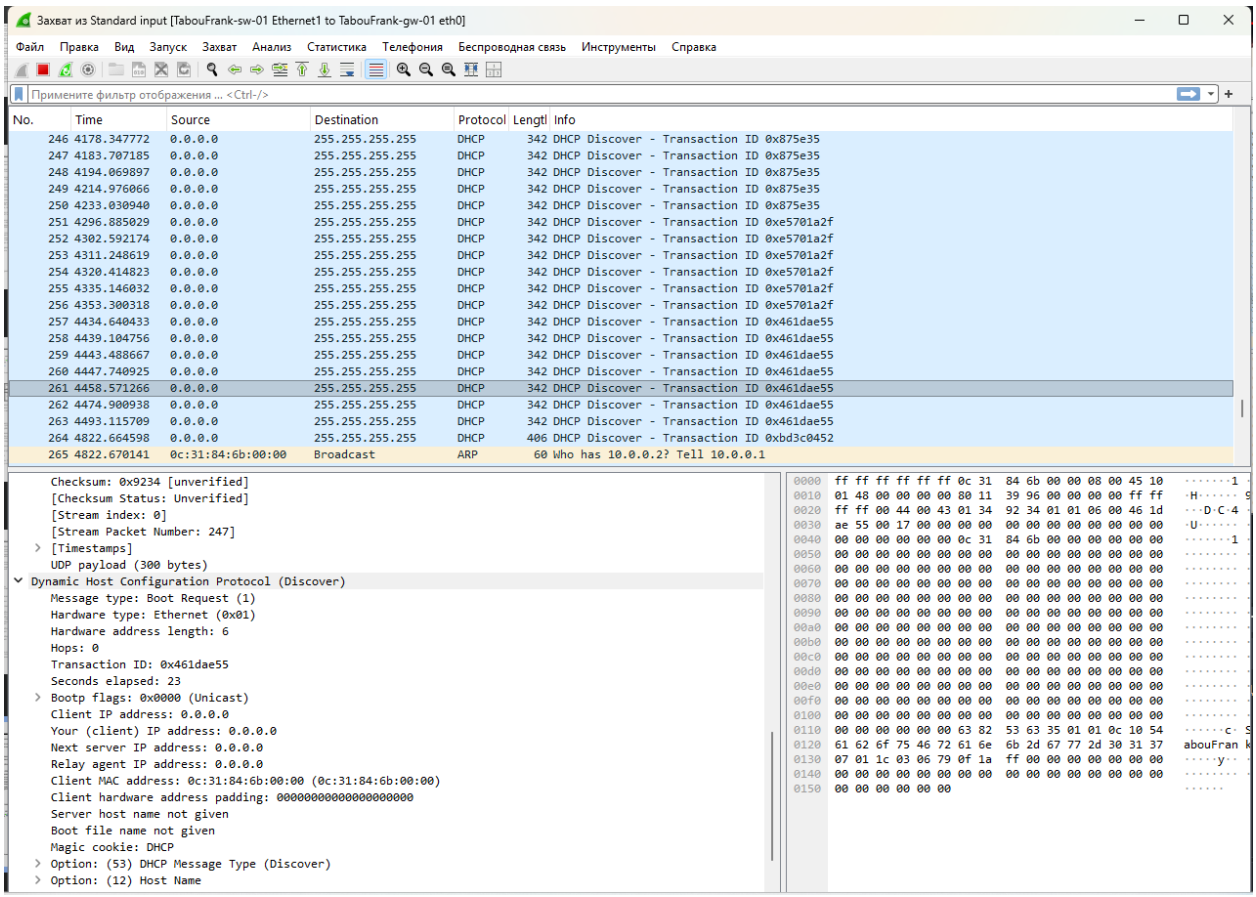
```
TabouFrank@TabouFrank-gw-01# save
Saving configuration to '/config/config.boot'...
Done
[edit]
TabouFrank@TabouFrank-gw-01# exit
exit
TabouFrank@TabouFrank-gw-01:~$ show dhcp server statistics
Pool          Size    Leases    Available  Usage
----------  ------  --------  -----------  -------
TabouFrank     252         0          252  0%
TabouFrank@TabouFrank-gw-01:~$ show dhcp server leases
IP address    Hardware address    State    Lease start    Lease expiration    Remaining    Pool    Hostname
------------  ------------------  -------  -------------  ------------------  -----------  ------  ----------
TabouFrank@TabouFrank-gw-01:~$
```

```
TabouFrank@TabouFrank-gw-01:~$ show interfaces
Codes: S - State, L - Link, u - Up, D - Down, A - Admin Down
Interface        IP Address                        S/L  Description
---------        ----------                        ---  -----------
eth0             10.0.0.1/24                       u/u
eth1             -                                 u/D
eth2             -                                 u/D
lo               127.0.0.1/8                       u/u
                 ::1/128
TabouFrank@TabouFrank-gw-01:~$
```

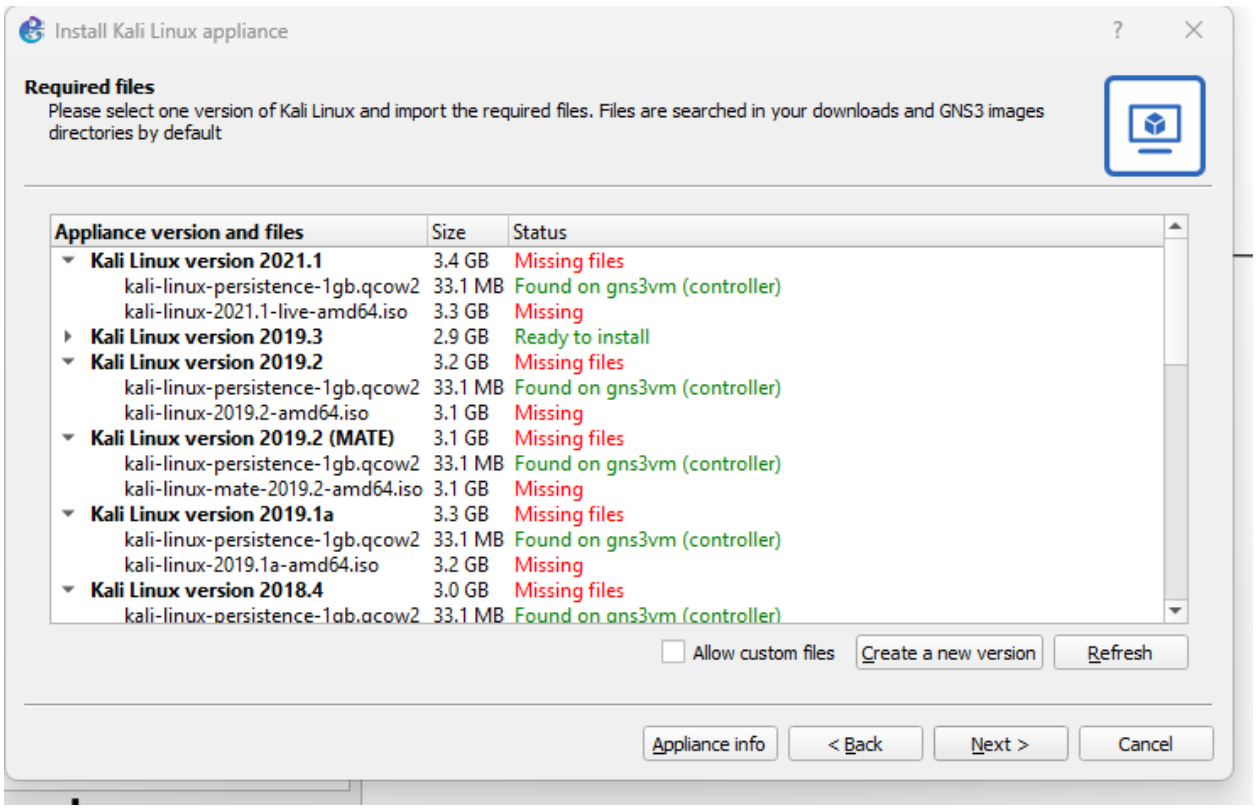
```
VPCS> ip dhcp -d
Opcode: 1 (REQUEST)
Client IP Address: 0.0.0.0
Your IP Address: 0.0.0.0
Server IP Address: 0.0.0.0
Gateway IP Address: 0.0.0.0
Client MAC Address: 00:50:79:66:68:00
Option 53: Message Type = Discover
Option 12: Host Name = VPCS
Option 61: Client Identifier = Hardware Type=Ethernet MAC Address = 00:50:79:66:
68:00

Opcode: 1 (REQUEST)
Client IP Address: 0.0.0.0
Your IP Address: 0.0.0.0
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 = Discover
Option 12: Host Name = VPCS
Option 61: Client Identifier = Hardware Type=Ethernet MAC Address = 00:50:79:66:
68:00

Opcode: 2 (REPLY)
Client IP Address: 0.0.0.0
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 = Offer
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 = TabouFrank.net

Opcode: 1 (REQUEST)
Client IP Address: 10.0.0.2
Your IP Address: 0.0.0.0
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 = Request
Option 54: DHCP Server = 10.0.0.1
```

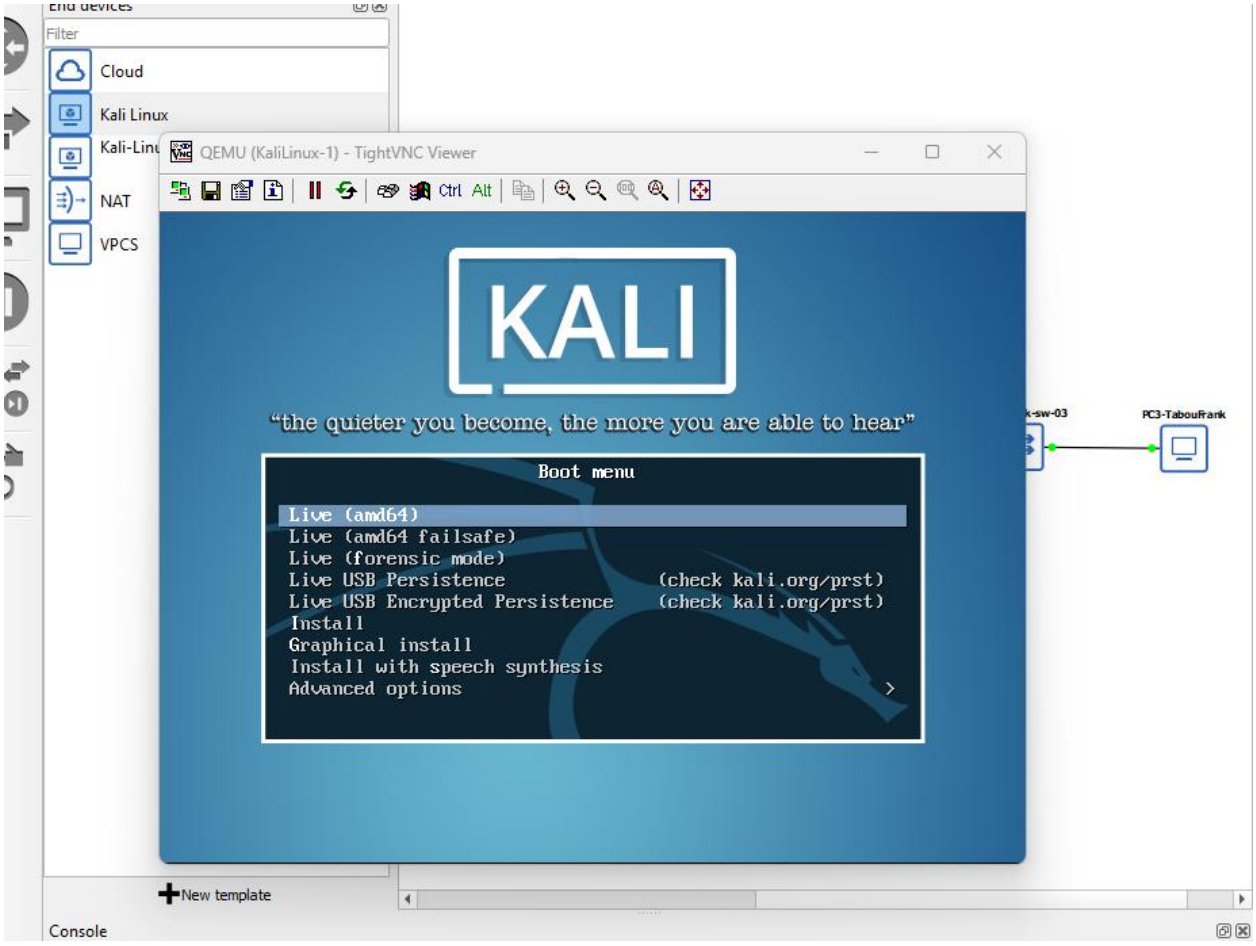
```
VPCS> save
Saving startup configuration to startup.vpc
.  done

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  : 86264, 86400/43200/75600
DOMAIN NAME : TabouFrank.net
MAC         : 00:50:79:66:68:00
LPORT       : 10054
RHOST:PORT  : 127.0.0.1:10055
MTU         : 1500

VPCS> ping 10.0.0.1 -c 2

84 bytes from 10.0.0.1 icmp_seq=1 ttl=64 time=3.137 ms
84 bytes from 10.0.0.1 icmp_seq=2 ttl=64 time=2.496 ms

VPCS>
```

```
TabouFrank@TabouFrank-gw-01:~$ show dhcp server statistics
Pool          Size    Leases    Available  Usage
----------  ------  --------  -----------  -------
TabouFrank     252         1          251  0%
TabouFrank@TabouFrank-gw-01:~$ show dhcp server statistics
Pool          Size    Leases    Available  Usage
----------  ------  --------  -----------  -------
TabouFrank     252         1          251  0%
TabouFrank@TabouFrank-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   2026/01/03 23:50:18  2026/01/04 23:50:18  23:51:55     TabouFrank  VPCS
TabouFrank@TabouFrank-gw-01:~$
```

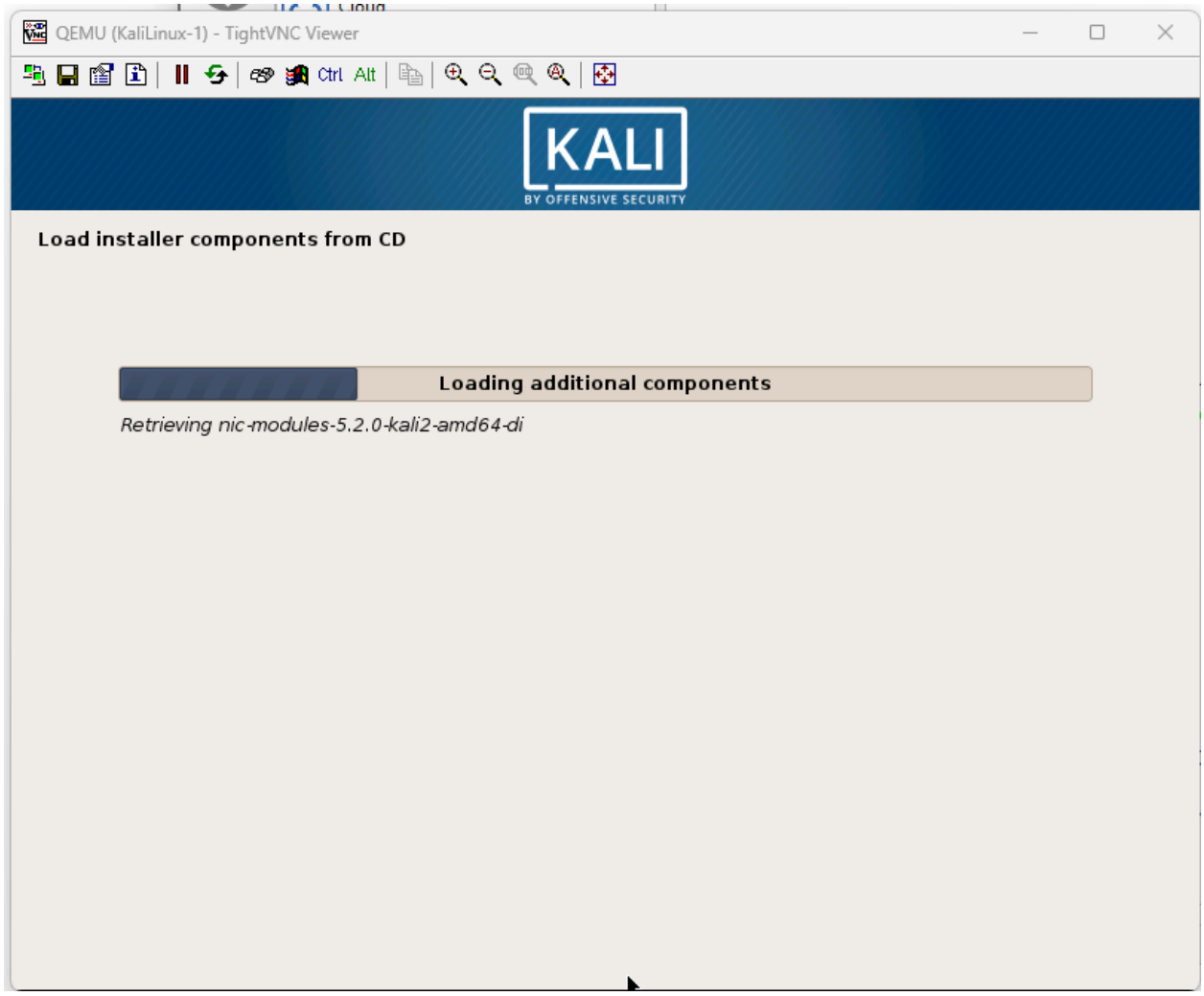

Захват из Standard input [TabouFrank-sw-01 Ethernet1 to TabouFrank-gw-01 eth0]
Файл Правка Вид Запуск Захват Анализ Статистика Телефония Беспроводная связь Инструменты Справка
Примените фильтр отображения ... <Ctrl-/>
No. Time Source Destination Protocol Lengtl Info
246 4178.347772 0.0.0.0 255.255.255.255 DHCP 342 DHCP Discover - Transaction ID 0x875e35
247 4183.707185 0.0.0.0 255.255.255.255 DHCP 342 DHCP Discover - Transaction ID 0x875e35
248 4194.069897 0.0.0.0 255.255.255.255 DHCP 342 DHCP Discover - Transaction ID 0x875e35
249 4214.976066 0.0.0.0 255.255.255.255 DHCP 342 DHCP Discover - Transaction ID 0x875e35
250 4233.030940 0.0.0.0 255.255.255.255 DHCP 342 DHCP Discover - Transaction ID 0x875e35
251 4296.885029 0.0.0.0 255.255.255.255 DHCP 342 DHCP Discover - Transaction ID 0xe5701a2f
252 4302.592174 0.0.0.0 255.255.255.255 DHCP 342 DHCP Discover - Transaction ID 0xe5701a2f
253 4311.248619 0.0.0.0 255.255.255.255 DHCP 342 DHCP Discover - Transaction ID 0xe5701a2f
254 4320.414823 0.0.0.0 255.255.255.255 DHCP 342 DHCP Discover - Transaction ID 0xe5701a2f
255 4335.146032 0.0.0.0 255.255.255.255 DHCP 342 DHCP Discover - Transaction ID 0xe5701a2f
256 4353.300318 0.0.0.0 255.255.255.255 DHCP 342 DHCP Discover - Transaction ID 0xe5701a2f
257 4434.640433 0.0.0.0 255.255.255.255 DHCP 342 DHCP Discover - Transaction ID 0x461dae55
258 4439.104756 0.0.0.0 255.255.255.255 DHCP 342 DHCP Discover - Transaction ID 0x461dae55
259 4443.488667 0.0.0.0 255.255.255.255 DHCP 342 DHCP Discover - Transaction ID 0x461dae55
260 4447.740925 0.0.0.0 255.255.255.255 DHCP 342 DHCP Discover - Transaction ID 0x461dae55
261 4458.571266 0.0.0.0 255.255.255.255 DHCP 342 DHCP Discover - Transaction ID 0x461dae55
262 4474.900938 0.0.0.0 255.255.255.255 DHCP 342 DHCP Discover - Transaction ID 0x461dae55
263 4493.115709 0.0.0.0 255.255.255.255 DHCP 342 DHCP Discover - Transaction ID 0x461dae55
264 4822.664598 0.0.0.0 255.255.255.255 DHCP 406 DHCP Discover - Transaction ID 0xbd3c0452
265 4822.670141 0c:31:84:6b:00:00 Broadcast ARP 60 Who has 10.0.0.2? Tell 10.0.0.1
Checksum: 0x9234 [unverified]
[Checksum Status: Unverified]
[Stream index: 0]
[Stream Packet Number: 247]
[Timestamps]
UDP payload (300 bytes)
Dynamic Host Configuration Protocol (Discover)
Message type: Boot Request (1)
Hardware type: Ethernet (0x01)
Hardware address length: 6
Hops: 0
Transaction ID: 0x461dae55
Seconds elapsed: 23
Bootp flags: 0x0000 (Unicast)
Client IP address: 0.0.0.0
Your (client) IP address: 0.0.0.0
Next server IP address: 0.0.0.0
Relay agent IP address: 0.0.0.0
Client MAC address: 0c:31:84:6b:00:00 (0c:31:84:6b:00:00)
Client hardware address padding: 00000000000000000000
Server host name not given
Boot file name not given
Magic cookie: DHCP
Option: (53) DHCP Message Type (Discover)
Option: (12) Host Name
0000 ff ff ff ff ff ff 0c 31 84 6b 00 00 08 00 45 10
0010 01 48 00 00 00 00 80 11 39 96 00 00 00 00 ff ff
0020 ff ff 00 44 00 43 01 34 92 34 01 01 06 00 46 1d
0030 ae 55 00 17 00 00 00 00 00 00 00 00 00 00 00 00
0040 00 00 00 00 00 00 0c 31 84 6b 00 00 00 00 00 00
0050 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0060 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0070 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0080 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0090 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00a0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00b0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00c0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00d0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00e0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00f0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0100 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0110 00 00 00 00 00 00 63 82 53 63 35 01 01 0c 10 54
0120 61 62 6f 75 46 72 61 6e 6b 2d 67 77 2d 30 31 37
0130 07 01 1c 03 06 79 0f 1a ff 00 00 00 00 00 00 00
0140 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0150 00 00 00 00 00 00

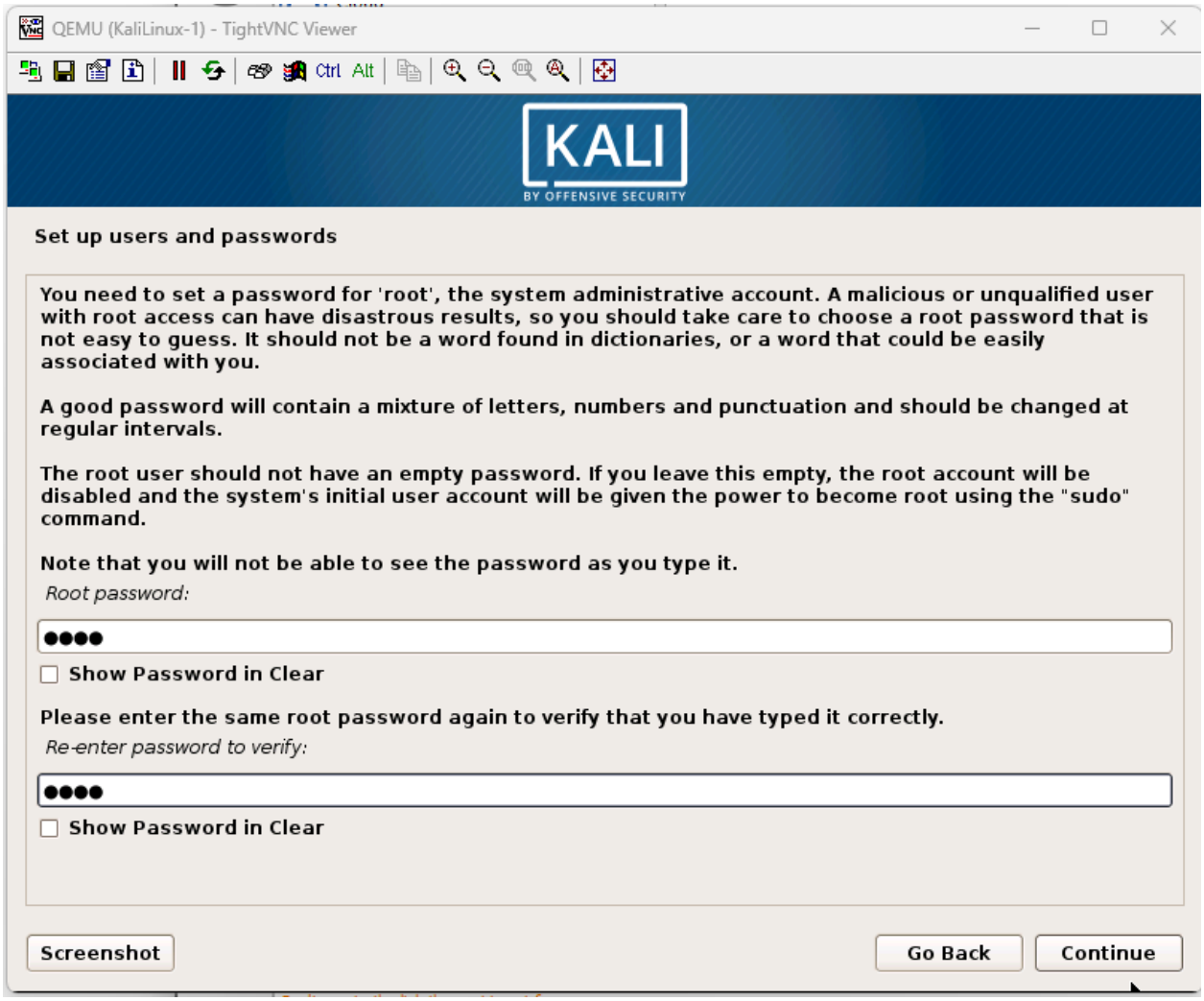
```
TabouFrank@TabouFrank-gw-01:~$ show log | grep dhcp
Jan 03 22:41:51 dhclient-script-vyos[1846]: Deleting search domains with tag "dhcp-eth0" via vyos-hostsd-client
Jan 03 22:41:52 vyos-hostsd[608]: Request data: {"type": "search_domains", "op": "delete", "data": ["dhcp-eth0"]}
Jan 03 22:41:52 dhclient-script-vyos[1846]: Deleting nameservers with tag "dhcp-eth0" via vyos-hostsd-client
Jan 03 22:41:52 vyos-hostsd[608]: Request data: {"type": "name_servers", "op": "delete", "data": ["dhcp-eth0"]}
Jan 03 22:43:47 dhclient-script-vyos[2089]: Deleting search domains with tag "dhcp-eth0" via vyos-hostsd-client
Jan 03 22:43:47 vyos-hostsd[608]: Request data: {"type": "search_domains", "op": "delete", "data": ["dhcp-eth0"]}
Jan 03 22:43:47 dhclient-script-vyos[2089]: Deleting nameservers with tag "dhcp-eth0" via vyos-hostsd-client
Jan 03 22:43:47 vyos-hostsd[608]: Request data: {"type": "name_servers", "op": "delete", "data": ["dhcp-eth0"]}
Jan 03 22:45:55 dhclient-script-vyos[2139]: Deleting search domains with tag "dhcp-eth0" via vyos-hostsd-client
Jan 03 22:45:55 vyos-hostsd[608]: Request data: {"type": "search_domains", "op": "delete", "data": ["dhcp-eth0"]}
Jan 03 22:45:55 dhclient-script-vyos[2139]: Deleting nameservers with tag "dhcp-eth0" via vyos-hostsd-client
Jan 03 22:45:55 vyos-hostsd[608]: Request data: {"type": "name_servers", "op": "delete", "data": ["dhcp-eth0"]}
Jan 03 22:47:42 dhclient-script-vyos[2173]: Deleting search domains with tag "dhcp-eth0" via vyos-hostsd-client
Jan 03 22:47:42 vyos-hostsd[608]: Request data: {"type": "search_domains", "op": "delete", "data": ["dhcp-eth0"]}
Jan 03 22:47:42 dhclient-script-vyos[2173]: Deleting nameservers with tag "dhcp-eth0" via vyos-hostsd-client
Jan 03 22:47:42 vyos-hostsd[608]: Request data: {"type": "name_servers", "op": "delete", "data": ["dhcp-eth0"]}
Jan 03 22:49:20 dhclient-script-vyos[2221]: Deleting search domains with tag "dhcp-eth0" via vyos-hostsd-client
Jan 03 22:49:20 vyos-hostsd[608]: Request data: {"type": "search_domains", "op": "delete", "data": ["dhcp-eth0"]}
Jan 03 22:49:20 dhclient-script-vyos[2221]: Deleting nameservers with tag "dhcp-eth0" via vyos-hostsd-client
Jan 03 22:49:20 vyos-hostsd[608]: Request data: {"type": "name_servers", "op": "delete", "data": ["dhcp-eth0"]}
Jan 03 22:50:59 dhclient-script-vyos[2271]: Deleting search domains with tag "dhcp-eth0" via vyos-hostsd-client
Jan 03 22:50:59 vyos-hostsd[608]: Request data: {"type": "search_domains", "op": "delete", "data": ["dhcp-eth0"]}
Jan 03 22:50:59 dhclient-script-vyos[2271]: Deleting nameservers with tag "dhcp-eth0" via vyos-hostsd-client
Jan 03 22:50:59 vyos-hostsd[608]: Request data: {"type": "name_servers", "op": "delete", "data": ["dhcp-eth0"]}
Jan 03 22:53:23 dhclient-script-vyos[2320]: Deleting search domains with tag "dhcp-eth0" via vyos-hostsd-client
Jan 03 22:53:23 vyos-hostsd[608]: Request data: {"type": "search_domains", "op": "delete", "data": ["dhcp-eth0"]}
Jan 03 22:53:23 dhclient-script-vyos[2320]: Deleting nameservers with tag "dhcp-eth0" via vyos-hostsd-client
Jan 03 22:53:23 vyos-hostsd[608]: Request data: {"type": "name_servers", "op": "delete", "data": ["dhcp-eth0"]}
Jan 03 22:55:47 dhclient-script-vyos[2371]: Deleting search domains with tag "dhcp-eth0" via vyos-hostsd-client
Jan 03 22:55:47 vyos-hostsd[608]: Request data: {"type": "search_domains", "op": "delete", "data": ["dhcp-eth0"]}
Jan 03 22:55:47 dhclient-script-vyos[2371]: Deleting nameservers with tag "dhcp-eth0" via vyos-hostsd-client
Jan 03 22:55:47 vyos-hostsd[608]: Request data: {"type": "name_servers", "op": "delete", "data": ["dhcp-eth0"]}
Jan 03 22:58:05 dhclient-script-vyos[2427]: Deleting search domains with tag "dhcp-eth0" via vyos-hostsd-client
Jan 03 22:58:05 vyos-hostsd[608]: Request data: {"type": "search_domains", "op": "delete", "data": ["dhcp-eth0"]}
Jan 03 22:58:05 dhclient-script-vyos[2427]: Deleting nameservers with tag "dhcp-eth0" via vyos-hostsd-client
Jan 03 22:58:05 vyos-hostsd[608]: Request data: {"type": "name_servers", "op": "delete", "data": ["dhcp-eth0"]}
Jan 03 23:00:20 dhclient-script-vyos[2489]: Deleting search domains with tag "dhcp-eth0" via vyos-hostsd-client
Jan 03 23:00:20 vyos-hostsd[608]: Request data: {"type": "search_domains", "op": "delete", "data": ["dhcp-eth0"]}
Jan 03 23:00:20 dhclient-script-vyos[2489]: Deleting nameservers with tag "dhcp-eth0" via vyos-hostsd-client
Jan 03 23:00:20 vyos-hostsd[608]: Request data: {"type": "name_servers", "op": "delete", "data": ["dhcp-eth0"]}
Jan 03 23:00:57 sudo[2607]: TabouFrank : TTY=ttyS0 ; PWD=/home/TabouFrank ; USER=root ; COMMAND=/usr/bin/sh -c /us
r/sbin/vyshim /usr/libexec/vyos/conf_mode/dhcp_server.py
Jan 03 23:00:57 vyos-configd[610]: Received message: {"type": "node", "data": "/usr/libexec/vyos/conf_mode/dhcp_se
rver.py"}
Jan 03 23:02:07 dhclient-script-vyos[2646]: Deleting search domains with tag "dhcp-eth0" via vyos-hostsd-client
Jan 03 23:02:07 vyos-hostsd[608]: Request data: {"type": "search_domains", "op": "delete", "data": ["dhcp-eth0"]}
Jan 03 23:02:07 dhclient-script-vyos[2646]: Deleting nameservers with tag "dhcp-eth0" via vyos-hostsd-client
Jan 03 23:02:07 vyos-hostsd[608]: Request data: {"type": "name_servers", "op": "delete", "data": ["dhcp-eth0"]}
Jan 03 23:03:53 dhclient-script-vyos[2680]: Deleting search domains with tag "dhcp-eth0" via vyos-hostsd-client
Jan 03 23:03:53 vyos-hostsd[608]: Request data: {"type": "search_domains", "op": "delete", "data": ["dhcp-eth0"]}
Jan 03 23:03:53 dhclient-script-vyos[2680]: Deleting nameservers with tag "dhcp-eth0" via vyos-hostsd-client
Jan 03 23:03:53 vyos-hostsd[608]: Request data: {"type": "name_servers", "op": "delete", "data": ["dhcp-eth0"]}
Jan 03 23:06:23 dhclient-script-vyos[2714]: Deleting search domains with tag "dhcp-eth0" via vyos-hostsd-client
Jan 03 23:06:23 vyos-hostsd[608]: Request data: {"type": "search_domains", "op": "delete", "data": ["dhcp-eth0"]}
Jan 03 23:06:23 dhclient-script-vyos[2714]: Deleting nameservers with tag "dhcp-eth0" via vyos-hostsd-client
```

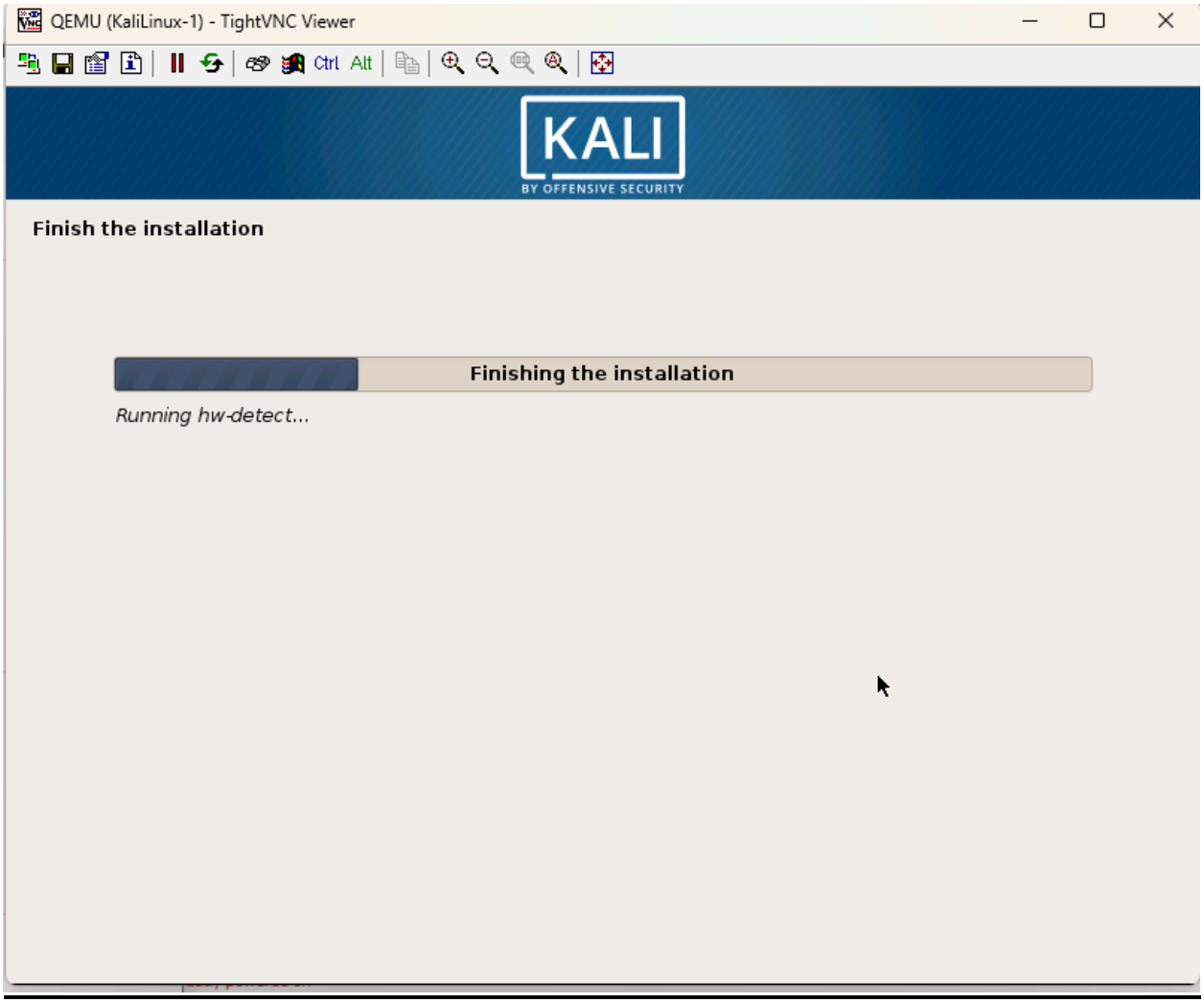

Install Kali Linux appliance
Required files
Please select one version of Kali Linux and import the required files. Files are searched in your downloads and GNS3 images directories by default
Appliance version and files
Size
Status
Kali Linux version 2021.1 3.4 GB Missing files
kali-linux-persistence-1gb.qcow2 33.1 MB Found on gns3vm (controller)
kali-linux-2021.1-live-amd64.iso 3.3 GB Missing
Kali Linux version 2019.3 2.9 GB Ready to install
Kali Linux version 2019.2 3.2 GB Missing files
kali-linux-persistence-1gb.qcow2 33.1 MB Found on gns3vm (controller)
kali-linux-2019.2-amd64.iso 3.1 GB Missing
Kali Linux version 2019.2 (MATE) 3.1 GB Missing files
kali-linux-persistence-1gb.qcow2 33.1 MB Found on gns3vm (controller)
kali-linux-mate-2019.2-amd64.iso 3.1 GB Missing
Kali Linux version 2019.1a 3.3 GB Missing files
kali-linux-persistence-1gb.qcow2 33.1 MB Found on gns3vm (controller)
kali-linux-2019.1a-amd64.iso 3.2 GB Missing
Kali Linux version 2018.4 3.0 GB Missing files
Allow custom files
Create a new version
Refresh
Appliance info
< Back
Next >
Cancel

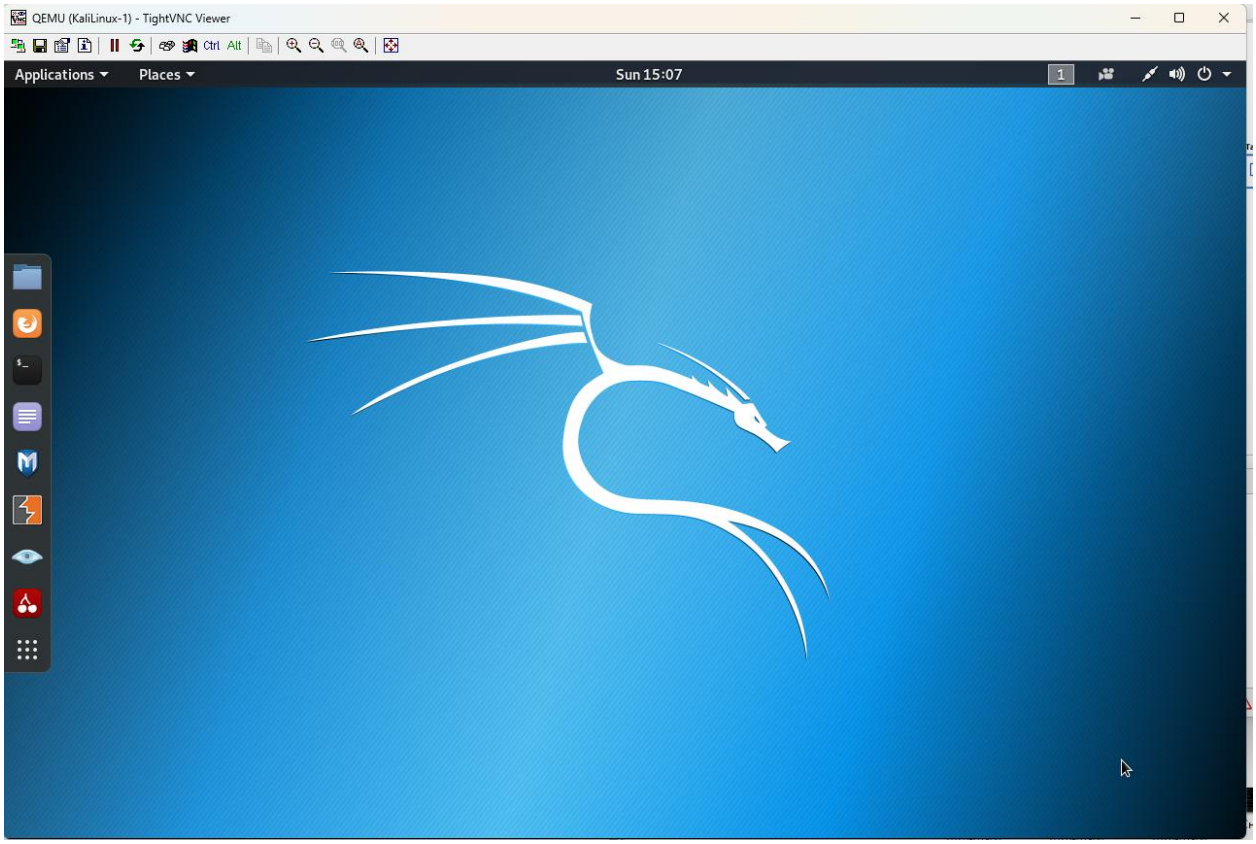

End devices
Filter
Cloud
Kali Linux
NAT
VPCS
QEMU (KaliLinux-1) - TightVNC Viewer
Ctrl Alt
KALI
"the quieter you become, the more you are able to hear"
Boot menu
Live (amd64)
Live (amd64 failsafe)
Live (forensic mode)
Live USB Persistence (check kali.org/prst)
Live USB Encrypted Persistence (check kali.org/prst)
Install
Graphical install
Install with speech synthesis
Advanced options
PC3-TabouRank
New template
Console

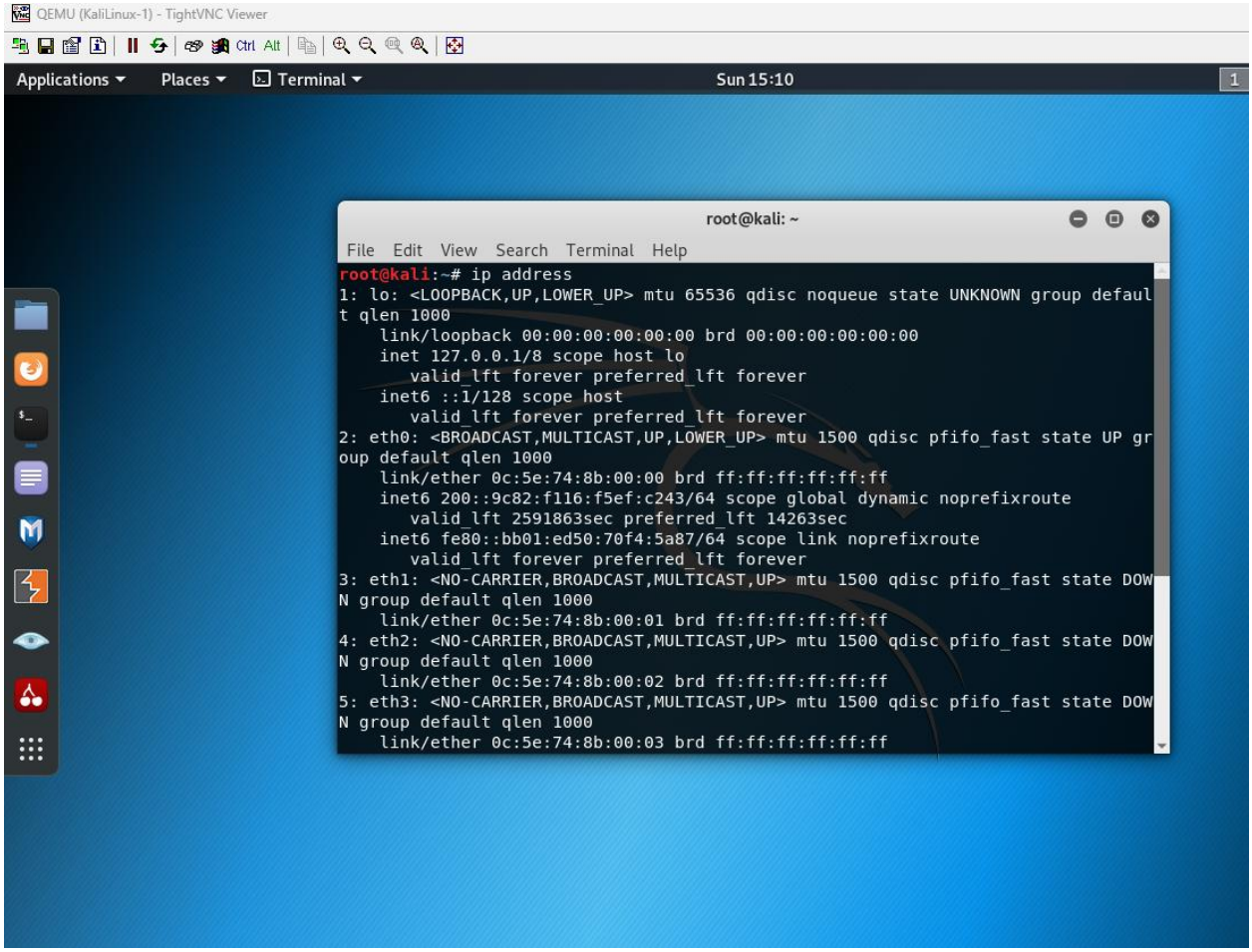
KALI
"the quieter you become, the more you are able to hear"
Boot menu
Live (amd64)
Live (amd64 failsafe)
Live (forensic mode)
Live USB Persistence (check kali.org/prst)
Live USB Encrypted Persistence (check kali.org/prst)
Install
Graphical install
Install with speech synthesis
Advanced options

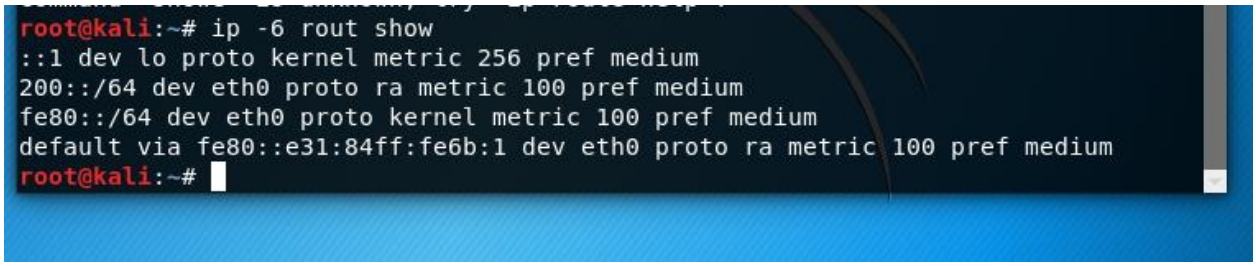

QEMU (KaliLinux-1) - TightVNC Viewer
Ctrl Alt
KALI
BY OFFENSIVE SECURITY
Load installer components from CD
Loading additional components
Retrieving nic-modules-5.2.0-kali2-amd64-di


QEMU (KaliLinux-1) - TightVNC Viewer
Ctrl
Alt
KALI
BY OFFENSIVE SECURITY
Set up users and passwords
You need to set a password for 'root', the system administrative account. A malicious or unqualified user with root access can have disastrous results, so you should take care to choose a root password that is not easy to guess. It should not be a word found in dictionaries, or a word that could be easily associated with you.
A good password will contain a mixture of letters, numbers and punctuation and should be changed at regular intervals.
The root user should not have an empty password. If you leave this empty, the root account will be disabled and the system's initial user account will be given the power to become root using the "sudo" command.
Note that you will not be able to see the password as you type it.
Root password:
Show Password in Clear
Please enter the same root password again to verify that you have typed it correctly.
Re-enter password to verify:
Show Password in Clear
Screenshot
Go Back
Continue


QEMU (KaliLinux-1) - TightVNC Viewer
Ctrl
Alt
KALI
BY OFFENSIVE SECURITY
Finish the installation
Finishing the installation
Running hw-detect...

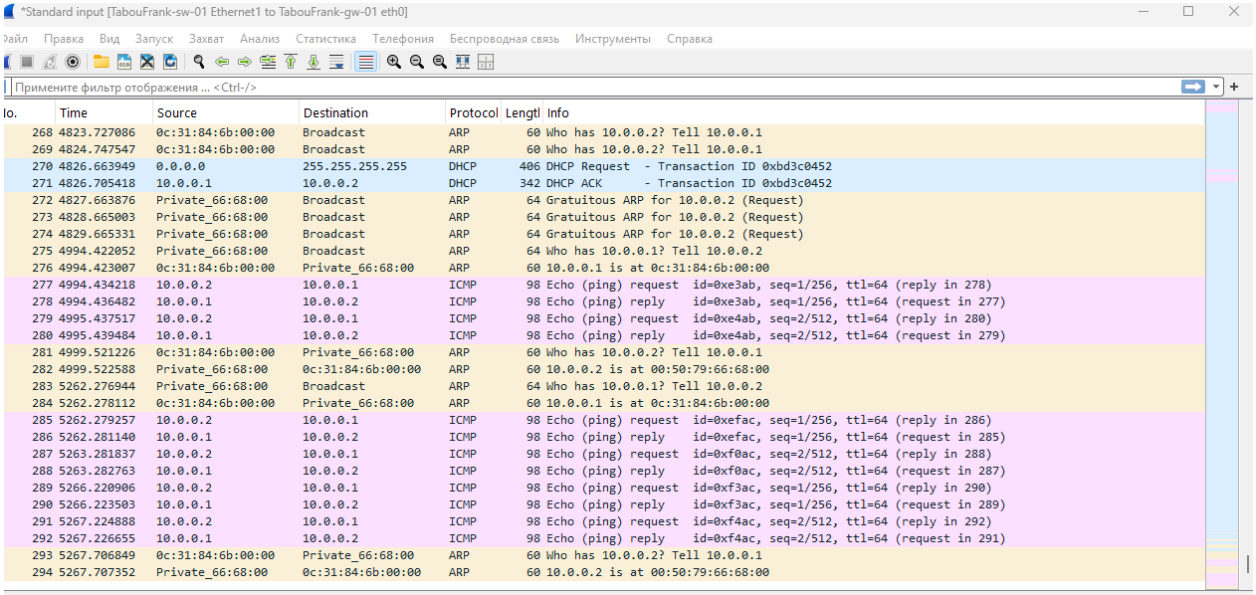

QEMU (KaliLinux-1) - TightVNC Viewer
Ctrl
Alt
Applications
Places
Sun 15:07
1

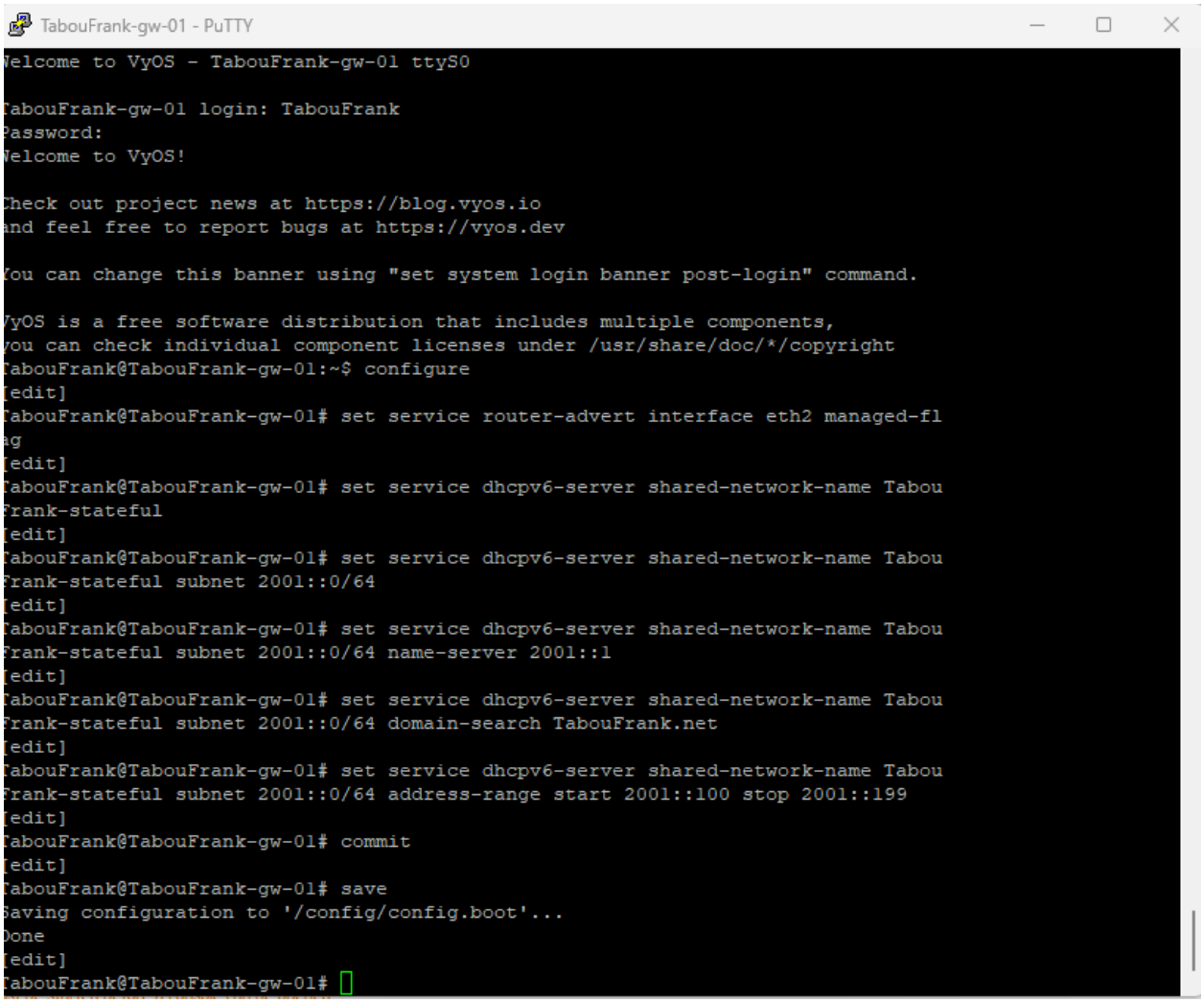

QEMU (KaliLinux-1) - TightVNC Viewer
Applications
Places
Terminal
Sun 15:10
root@kali: ~
File Edit View Search Terminal Help
root@kali:~# ip address
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
inet 127.0.0.1/8 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 group default qlen 1000
link/ether 0c:5e:74:8b:00:00 brd ff:ff:ff:ff:ff:ff
inet6 200::9c82:f116:f5ef:c243/64 scope global dynamic noprefixroute
valid_lft 2591863sec preferred_lft 14263sec
inet6 fe80::bb01:ed50:70f4:5a87/64 scope link noprefixroute
valid_lft forever preferred_lft forever
3: eth1: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc pfifo_fast state DOWN group default qlen 1000
link/ether 0c:5e:74:8b:00:01 brd ff:ff:ff:ff:ff:ff
4: eth2: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc pfifo_fast state DOWN group default qlen 1000
link/ether 0c:5e:74:8b:00:02 brd ff:ff:ff:ff:ff:ff
5: eth3: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc pfifo_fast state DOWN group default qlen 1000
link/ether 0c:5e:74:8b:00:03 brd ff:ff:ff:ff:ff:ff

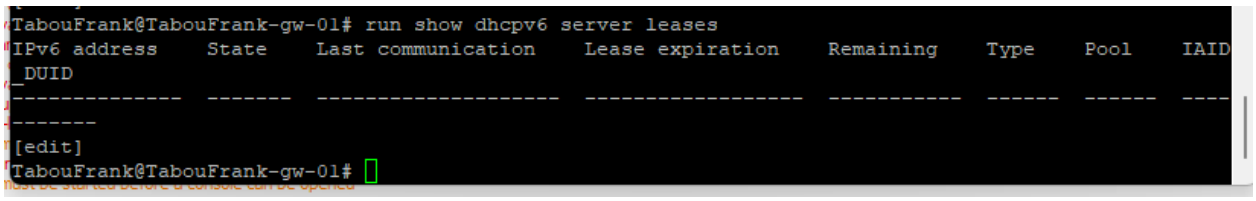

root@kali:~# ip -6 rout show
::1 dev lo proto kernel metric 256 pref medium
200::/64 dev eth0 proto ra metric 100 pref medium
fe80::/64 dev eth0 proto kernel metric 100 pref medium
default via fe80::e31:84ff:fe6b:1 dev eth0 proto ra metric 100 pref medium
root@kali:~#

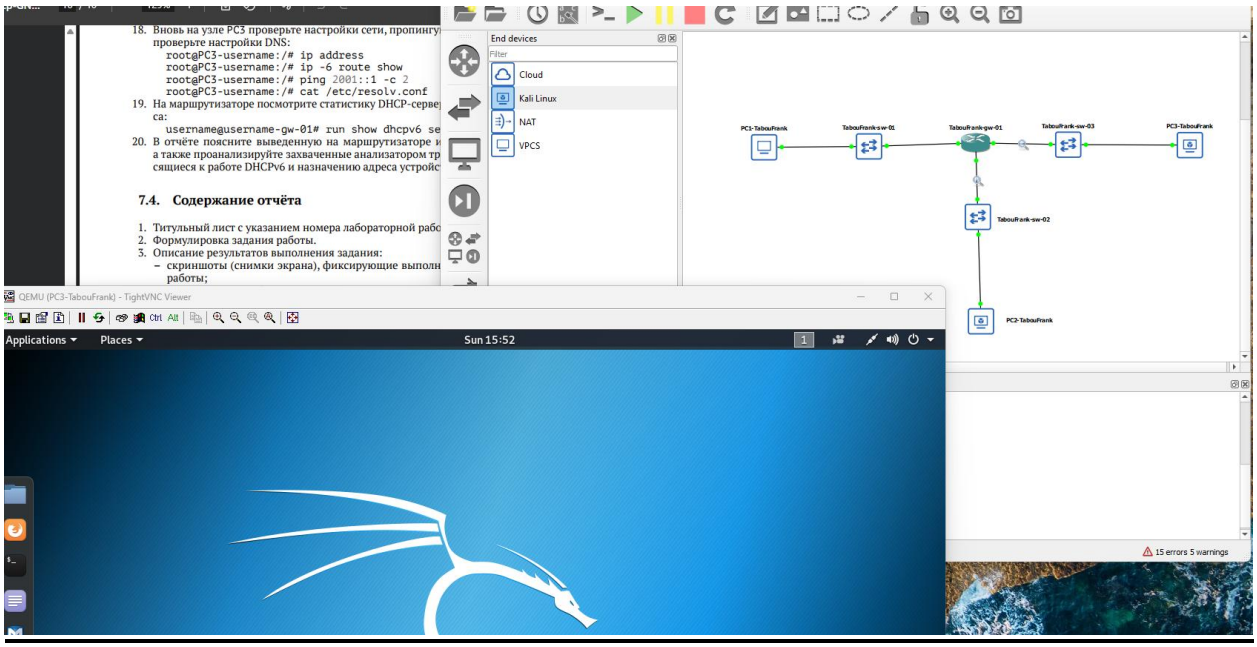
```
root@kali:~# ping 2000::1 -c 2
PING 2000::1(2000::1) 56 data bytes

--- 2000::1 ping statistics ---
2 packets transmitted, 0 received, 100% packet loss, time 1025ms

root@kali:~# ping 2000::1 -c 2
PING 2000::1(2000::1) 56 data bytes

--- 2000::1 ping statistics ---
2 packets transmitted, 0 received, 100% packet loss, time 1005ms
```

```
TabouFrank@TabouFrank-gw-01:~$ configure
[edit]
TabouFrank@TabouFrank-gw-01# run show dhcpv6 server leases
IPv6 address    State    Last communication    Lease expiration    Remaining
Type    Pool    IAID_DUID
--------------  -------  --------------------  ------------------  -----------
------  ------  -----------
[edit]
TabouFrank@TabouFrank-gw-01#
```


*Standard input [TabouFrank-sw-01 Ethernet1 to TabouFrank-gw-01 eth0]
Файл Правка Вид Запуск Захват Анализ Статистика Телефония Беспроводная связь Инструменты Справка
Примените фильтр отображения ... <Ctrl-/>
No. Time Source Destination Protocol Length Info
268 4823.727086 0c:31:84:6b:00:00 Broadcast ARP 60 Who has 10.0.0.2? Tell 10.0.0.1
269 4824.747547 0c:31:84:6b:00:00 Broadcast ARP 60 Who has 10.0.0.2? Tell 10.0.0.1
270 4826.663949 0.0.0.0 255.255.255.255 DHCP 406 DHCP Request - Transaction ID 0xbd3c0452
271 4826.705418 10.0.0.1 10.0.0.2 DHCP 342 DHCP ACK - Transaction ID 0xbd3c0452
272 4827.663876 Private_66:68:00 Broadcast ARP 64 Gratuitous ARP for 10.0.0.2 (Request)
273 4828.665003 Private_66:68:00 Broadcast ARP 64 Gratuitous ARP for 10.0.0.2 (Request)
274 4829.665331 Private_66:68:00 Broadcast ARP 64 Gratuitous ARP for 10.0.0.2 (Request)
275 4994.422052 Private_66:68:00 Broadcast ARP 64 Who has 10.0.0.1? Tell 10.0.0.2
276 4994.423007 0c:31:84:6b:00:00 Private_66:68:00 ARP 60 10.0.0.1 is at 0c:31:84:6b:00:00
277 4994.434218 10.0.0.2 10.0.0.1 ICMP 98 Echo (ping) request id=0xe3ab, seq=1/256, ttl=64 (reply in 278)
278 4994.436482 10.0.0.1 10.0.0.2 ICMP 98 Echo (ping) reply id=0xe3ab, seq=1/256, ttl=64 (request in 277)
279 4995.437517 10.0.0.2 10.0.0.1 ICMP 98 Echo (ping) request id=0xe4ab, seq=2/512, ttl=64 (reply in 280)
280 4995.439484 10.0.0.1 10.0.0.2 ICMP 98 Echo (ping) reply id=0xe4ab, seq=2/512, ttl=64 (request in 279)
281 4999.521226 0c:31:84:6b:00:00 Private_66:68:00 ARP 60 Who has 10.0.0.2? Tell 10.0.0.1
282 4999.522588 Private_66:68:00 0c:31:84:6b:00:00 ARP 60 10.0.0.2 is at 00:50:79:66:68:00
283 5262.276944 Private_66:68:00 Broadcast ARP 64 Who has 10.0.0.1? Tell 10.0.0.2
284 5262.278112 0c:31:84:6b:00:00 Private_66:68:00 ARP 60 10.0.0.1 is at 0c:31:84:6b:00:00
285 5262.279257 10.0.0.2 10.0.0.1 ICMP 98 Echo (ping) request id=0xefac, seq=1/256, ttl=64 (reply in 286)
286 5262.281140 10.0.0.1 10.0.0.2 ICMP 98 Echo (ping) reply id=0xefac, seq=1/256, ttl=64 (request in 285)
287 5263.281837 10.0.0.2 10.0.0.1 ICMP 98 Echo (ping) request id=0xf0ac, seq=2/512, ttl=64 (reply in 288)
288 5263.282763 10.0.0.1 10.0.0.2 ICMP 98 Echo (ping) reply id=0xf0ac, seq=2/512, ttl=64 (request in 287)
289 5266.220906 10.0.0.2 10.0.0.1 ICMP 98 Echo (ping) request id=0xf3ac, seq=1/256, ttl=64 (reply in 290)
290 5266.223503 10.0.0.1 10.0.0.2 ICMP 98 Echo (ping) reply id=0xf3ac, seq=1/256, ttl=64 (request in 289)
291 5267.224888 10.0.0.2 10.0.0.1 ICMP 98 Echo (ping) request id=0xf4ac, seq=2/512, ttl=64 (reply in 292)
292 5267.226655 10.0.0.1 10.0.0.2 ICMP 98 Echo (ping) reply id=0xf4ac, seq=2/512, ttl=64 (request in 291)
293 5267.706849 0c:31:84:6b:00:00 Private_66:68:00 ARP 60 Who has 10.0.0.2? Tell 10.0.0.1
294 5267.707352 Private_66:68:00 0c:31:84:6b:00:00 ARP 60 10.0.0.2 is at 00:50:79:66:68:00


TabouFrank-gw-01 - PuTTY
Welcome to VyOS - TabouFrank-gw-01 ttyS0
TabouFrank-gw-01 login: TabouFrank
Password:
Welcome to VyOS!
Check out project news at https://blog.vyos.io
and feel free to report bugs at https://vyos.dev
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
TabouFrank@TabouFrank-gw-01:~$ configure
[edit]
TabouFrank@TabouFrank-gw-01# set service router-advert interface eth2 managed-fl
ag
[edit]
TabouFrank@TabouFrank-gw-01# set service dhcpv6-server shared-network-name Tabou
Frank-stateful
[edit]
TabouFrank@TabouFrank-gw-01# set service dhcpv6-server shared-network-name Tabou
Frank-stateful subnet 2001::0/64
[edit]
TabouFrank@TabouFrank-gw-01# set service dhcpv6-server shared-network-name Tabou
Frank-stateful subnet 2001::0/64 name-server 2001::1
[edit]
TabouFrank@TabouFrank-gw-01# set service dhcpv6-server shared-network-name Tabou
Frank-stateful subnet 2001::0/64 domain-search TabouFrank.net
[edit]
TabouFrank@TabouFrank-gw-01# set service dhcpv6-server shared-network-name Tabou
Frank-stateful subnet 2001::0/64 address-range start 2001::100 stop 2001::199
[edit]
TabouFrank@TabouFrank-gw-01# commit
[edit]
TabouFrank@TabouFrank-gw-01# save
Saving configuration to '/config/config.boot'...
Done
[edit]
TabouFrank@TabouFrank-gw-01#


TabouFrank@TabouFrank-gw-01# run show dhcpv6 server leases
IPv6 address State Last communication Lease expiration Remaining Type Pool IAID
DUID
[edit]
TabouFrank@TabouFrank-gw-01#


18. Вновь на узле PC3 проверьте настройки сети, пропингуй
проверьте настройки DNS:
root@PC3-username:/# ip address
root@PC3-username:/# ip -6 route show
root@PC3-username:/# ping 2001::1 -c 2
root@PC3-username:/# cat /etc/resolv.conf
19. На маршрутизаторе посмотрите статистику DHCP-серве
са:
username@username-gw-01# run show dhcpv6 se
20. В отчёте поясните выведенную на маршрутизаторе и
а также проанализируйте захваченные анализатором тр
сящиеся к работе DHCPv6 и назначению адреса устройс
7.4. Содержание отчёта
1. Титульный лист с указанием номера лабораторной рабо
2. Формулировка задания работы.
3. Описание результатов выполнения задания:
– скриншоты (снимки экрана), фиксирующие выполн
работы;
End devices
Filter
Cloud
Kali Linux
NAT
VPCS
PC1-TabouFrank
TabouFranks-sw-01
TabouFrank-gw-01
TabouFrank-sw-03
PC3-TabouFrank
TabouFrank-sw-02
PC2-TabouFrank
QEMU (PC3-TabouFrank) - TightVNC Viewer
Applications
Places
Sun 15:52
15 errors 5 warnings

\

Выводы:

В процессе выполнения лабораторной работы я изучил работу DHCP для IPv4 и IPv6. Я понял разницу между ручной и автоматической настройкой адресов, а также между SLAAC и DHCPv6. В IPv4 DHCP полностью управляет адресацией, а в IPv6 возможны два режима — с сохранением состояния и без него. Также я научился настраивать DHCP-сервер на маршрутизаторе VyOS и анализировать процесс обмена сообщениями с помощью Wireshark.