

Администрирование сетевых подсистем

Лабораторная работа №2

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Информация

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Цель работы

Приобретение практических навыков по установке и конфигурированию DNS-сервера, усвоение принципов работы системы доменных имён.

Выполнение лабораторной работы

```
[user@server ~]$ sudo -i  
  
We trust you have received the usual lecture from the local System  
Administrator. It usually boils down to these three things:  
  
#1) Respect the privacy of others.  
#2) Think before you type.  
#3) With great power comes great responsibility.  
  
[sudo] password for user:  
[root@server ~]# dnf -y install bind bind-utils  
Extra Packages for Enterprise Linux 9 - x86_64 119 kB/s | 34 kB 00:00
```

Рис. 1: Установка bind и bind-utils

Выполнение лабораторной работы

```
[root@server ~]# nmcli connection edit eth0
==| nmcli interactive connection editor |==

Editing existing '802-3-ethernet' connection: 'eth0'

Type 'help' or '?' for available commands.
Type 'print' to show all the connection properties.
Type 'describe [<setting>.<prop>]' for detailed property description.

You may edit the following settings: connection, 802-3-ethernet (ethernet), 802-1x, dcb, sriov,
ethtool, match, ipv4, ipv6, hostname, link, tc, proxy
nmcli> remove ipv4.dns
nmcli> set ipv4.ignore-auto-dns yes
nmcli> set ipv4.dns 127.0.0.1
nmcli> save
Connection 'eth0' (52b757e4-3833-4753-b0eb-de0af7f26f57) successfully updated.
nmcli> quit
[root@server ~]# nmcli connection edit System| eth0
==| nmcli interactive connection editor |==

Editing existing '802-3-ethernet' connection: 'System eth0'

Type 'help' or '?' for available commands.
Type 'print' to show all the connection properties.
Type 'describe [<setting>.<prop>]' for detailed property description.

You may edit the following settings: connection, 802-3-ethernet (ethernet), 802-1x, dcb, sriov,
ethtool, match, ipv4, ipv6, hostname, link, tc, proxy
nmcli> ^C
nmcli> remove ipv4.dns
nmcli> set ipv4.ignore-auto-dns yes
nmcli> set ipv4.dns 127.0.0.1
nmcli> save
Connection 'System eth0' (5fb06bd0-0bb0-7ffb-45f1-d6edd65f3e03) successfully updated.
nmcli> quit
[root@server ~]#
```

Рис. 2: Установка dns-сервера, как основного для хоста

Выполнение лабораторной работы

```
[root@server ~]# systemctl restart NetworkManager
[root@server ~]# cat /etc/resolv.conf
# Generated by NetworkManager
nameserver 127.0.0.1
[root@server ~]# █
```

Рис. 3: Перезапуск сети и проверка изменений

Выполнение лабораторной работы

```
options {
    listen-on port 53 { 127.0.0.1; any; };
    listen-on-v6 port 53 { ::1; };
    directory    "/var/named";
    dump-file   [/var/named/data/cache_dump.db];
    statistics-file "/var/named/data/named_stats.txt";
    memstatistics-file "/var/named/data/named_mem_stats.txt";
    secroots-file  "/var/named/data/named.secroots";
    recursing-file "/var/named/data/named.recursing";
    allow-query   { localhost; 192.168.0.0/16; };
```

Рис. 4: Настройка направления для DNS-запросов

Выполнение лабораторной работы

```
[root@server etc]# nano /etc/named.conf
[root@server etc]# firewall-cmd --add-service=dns
success
[root@server etc]# firewall-cmd --add-service=dns --permanent
success
[root@server etc]# lsof | grep UDP
lsof: WARNING: can't stat() fuse.gvfsd-fuse file system /run/user/1001/gvfs
      Output information may be incomplete.
avahi-dns 685           avahi  12u    IPv4          19385  0t0  UDP  *:dns
avahi-dns 689           avahi  13u    IPv6          19386  0t0  UDP  *:dns
avahi-dns 695           avahi  14u    IPv4          19387  0t0  UDP  *:15695
avahi-dns 695           avahi  15u    IPv6          19388  0t0  UDP  *:148579
chrony-d 615           chrony 5u    IPv4          19161  0t0  UDP  localhost:323
chrony-d 615           chrony 6u    IPv6          19162  0t0  UDP  localhost:323
named 6996             named 32u    IPv4          36777  0t0  UDP  localhost:domain
named 6996             named 33u    IPv4          36778  0t0  UDP  localhost:domain
named 6996             named 38u    IPv6          36781  0t0  UDP  localhost:domain
named 6996             named 39u    IPv6          36782  0t0  UDP  localhost:domain
named 6996 6997 isc-net-0 named 32u    IPv4          36777  0t0  UDP  localhost:domain
named 6996 6997 isc-net-0 named 33u    IPv4          36778  0t0  UDP  localhost:domain
named 6996 6997 isc-net-0 named 38u    IPv6          36781  0t0  UDP  localhost:domain
named 6996 6997 isc-net-0 named 39u    IPv6          36782  0t0  UDP  localhost:domain
named 6996 6998 isc-net-0 named 32u    IPv4          36777  0t0  UDP  localhost:domain
named 6996 6998 isc-net-0 named 33u    IPv4          36778  0t0  UDP  localhost:domain
named 6996 6998 isc-net-0 named 38u    IPv6          36781  0t0  UDP  localhost:domain
named 6996 6998 isc-net-0 named 39u    IPv6          36782  0t0  UDP  localhost:domain
named 6996 6999 isc-net-0 named 32u    IPv4          36777  0t0  UDP  localhost:domain
named 6996 6999 isc-net-0 named 33u    IPv4          36778  0t0  UDP  localhost:domain
named 6996 6999 isc-net-0 named 38u    IPv6          36781  0t0  UDP  localhost:domain
named 6996 6999 isc-net-0 named 39u    IPv6          36782  0t0  UDP  localhost:domain
named 6996 7000 isc-net-0 named 32u    IPv4          36777  0t0  UDP  localhost:domain
named 6996 7000 isc-net-0 named 33u    IPv4          36778  0t0  UDP  localhost:domain
named 6996 7000 isc-net-0 named 38u    IPv6          36781  0t0  UDP  localhost:domain
named 6996 7000 isc-net-0 named 39u    IPv6          36782  0t0  UDP  localhost:domain
named 6996 7001 isc-timer   named 32u    IPv4          36777  0t0  UDP  localhost:domain
named 6996 7001 isc-timer   named 33u    IPv4          36778  0t0  UDP  localhost:domain
named 6996 7001 isc-timer   named 38u    IPv6          36781  0t0  UDP  localhost:domain
named 6996 7001 isc-timer   named 39u    IPv6          36782  0t0  UDP  localhost:domain
named 6996 7002 isc-socket  named 32u    IPv4          36777  0t0  UDP  localhost:domain
named 6996 7002 isc-socket  named 33u    IPv4          36778  0t0  UDP  localhost:domain
named 6996 7002 isc-socket  named 38u    IPv6          36781  0t0  UDP  localhost:domain
named 6996 7002 isc-socket  named 39u    IPv6          36782  0t0  UDP  localhost:domain
named 6996 7003 isc-socket  named 32u    IPv4          36777  0t0  UDP  localhost:domain
named 6996 7003 isc-socket  named 33u    IPv4          36778  0t0  UDP  localhost:domain
```

Рис. 5: Внесение изменений в настройки межсетевого экрана

Выполнение лабораторной работы

```
options {
    listen-on port 53 { 127.0.0.1; any; };
    listen-on-v6 port 53 { ::1; };
    directory      "/var/named";
    dump-file     "/var/named/data/cache_dump.db";
    statistics-file "/var/named/data/named_stats.txt";
    memstatistics-file "/var/named/data/named_mem_stats.txt";
    secroots-file   "/var/named/data/named.secroots";
    recursing-file  "/var/named/data/named.reCURsing";
    allow-query     { localhost; 192.168.0.0/16; };
    forwardes { 192.168.1.1; };
    forward first;
```

Рис. 6: Добавление перенаправления для DNS-запросов

Выполнение лабораторной работы

```
    reduce such attack on user
*/
recursion yes;

dnssec-enable no;
dnssec-validation no;
```

Рис. 7: Отключение DNSSEC

Выполнение лабораторной работы

```
GNU nano 5.6.1
$TTL 1D
@ IN SOA      @ server.user.net. (
                  2024072700      ; serial
                  1D              ; refresh
                  1H              ; retry
                  1W              ; expire
                  3H )            ; minimum
NS      @
A       192.168.1.1
$ORIGIN user.net.
server A      192.168.1.1
ns     A      192.168.1.1
```

Рис. 8: Изменения в файле user.net

Выполнение лабораторной работы

```
GNU nano 5.6.1                                         192.168.1
$TTL 1D
@      IN SOA  @ server.user.net. (
                                2023072700      ; serial
                                1D      ; refresh
                                1H      ; retry
                                1W      ; expire
                                3H )    ; minimum
        NS      @
        A       192.168.1.1
        PTR     server.user.net.
$ORIGIN 1.168.192.in-addr.arpa.
1      PTR     server.user.net.
1      PTR     ns.user.net
:
```

Рис. 9: Изменения в файле обратной зоны

Выполнение лабораторной работы

```
[root@server rz]# dig ns.user.net

; <>> DiG 9.16.23-RH <>> ns.user.net
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 61919
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
;; EDNS: version: 0, flags:; udp: 1232
;; COOKIE: a72f90288f3a5de601000000690f71125f2140c51514e9b9 (good)
;; QUESTION SECTION:
;ns.user.net.           IN      A

;; ANSWER SECTION:
ns.user.net.        86400   IN      A      192.168.1.1

;; Query time: 1 msec
;; SERVER: 127.0.0.1#53(127.0.0.1)
;; WHEN: Sat Nov 08 16:34:26 UTC 2025
;; MSG SIZE  rcvd: 84

[root@server rz]# ]
```

Рис. 10: Описание DNS-зоны ns.user.net

Выполнение лабораторной работы

```
[root@server rz]# host -l user.net
user.net name server user.net.
user.net has address 192.168.1.1
ns.user.net has address 192.168.1.1
server.user.net has address 192.168.1.1
[root@server rz]# host -a user.net
Trying "user.net"
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 8364
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 3, AUTHORITY: 0, ADDITIONAL: 0

;; QUESTION SECTION:
;user.net.           IN      ANY

;; ANSWER SECTION:
user.net.        86400   IN      SOA     user.net. server.user.net. 2024072700 86400 3600 604800 10800
user.net.        86400   IN      NS      user.net.
user.net.        86400   IN      A       192.168.1.1

Received 99 bytes from 127.0.0.1#53 in 6 ms
[root@server rz]# host -t A user.net
user.net has address 192.168.1.1
[root@server rz]# host -t PTR 192.168.1.1
1.1.168.192.in-addr.arpa domain name pointer server.user.net.
1.1.168.192.in-addr.arpa domain name pointer ns.user.net.1.168.192.in-addr.arpa.
[root@server rz]#
```

Рис. 11: Использование утилиты Host

Выполнение лабораторной работы

```
GNU nano 5.6.1                               dns.sh

#!/bin/bash

echo "Provisioning script $0"

echo "Install needed packages"
dnf -y install bind bind-utils

echo "Copy configuration files"
cp -R /vagrant/provision/server/dns/etc/* /etc
cp -R /vagrant/provision/server/dns/var/named/* /var/named

chown -R named:named /etc/named
chown -R named:named /var/named

restorecon -vR /etc
restorecon -vR /var/named

echo "Configure firewall"
firewall-cmd --add-service dns
firewall-cmd --add-service=dns --permanent

echo "Tuning SELinux"
setsebool named_write_master_zones 1
setsebool -P named_write_master_zones 1

echo "Change dns server address"
nmcli connection edit "System eth0" <<EOF
remove ipv4.dns
set ipv4.ignore-auto-dns yes
set ipv4.dns 127.0.0.1
save
quit
EOF
systemctl restart NetworkManager
:

echo "Start named service"
systemctl enable named
systemctl start named
```

Рис. 12: dns.sh

Выполнение лабораторной работы

```
config.vm.define "server", autostart: false do |server|
  server.vm.box = "rocky9"
  server.vm.hostname = 'server'

  server.vm.boot_timeout = 1440

  server.ssh.insert_key = false
  server.ssh.username = 'vagrant'
  server.ssh.password = 'vagrant'

  server.vm.network :private_network,
    ip: "192.168.1.1",
    virtualbox_intnet: true

  server.vm.provision "shell", path: "provision/server/01-dummy.sh"
  server.vm.provision "shell", path: "provision/server/dns.sh"
  server.vm.provider :virtualbox do |v|
    v.linked_clone = true
  end
  # Customize the amount of memory on the VM
  v.memory = 8192
  v.cpus = 2
  v.name = "server"
# Display the VirtualBox GUI when booting the machine
```

Рис. 13: Внесение изменений в Vagrantfile

Выводы

Во время выполнения данной лабораторной работы я приобрёл практические навыки по установке и конфигурированию DNS-сервера и усвоил принципы работы системы доменных имён.