Übungsprotokoll

SYTB – Systemtechnik Betriebssysteme

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Übungsbezeichnung:

DHCP und DNS Server einrichten

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1 Aufgabenstellung

DHCP und DNS Server aufsetzen.

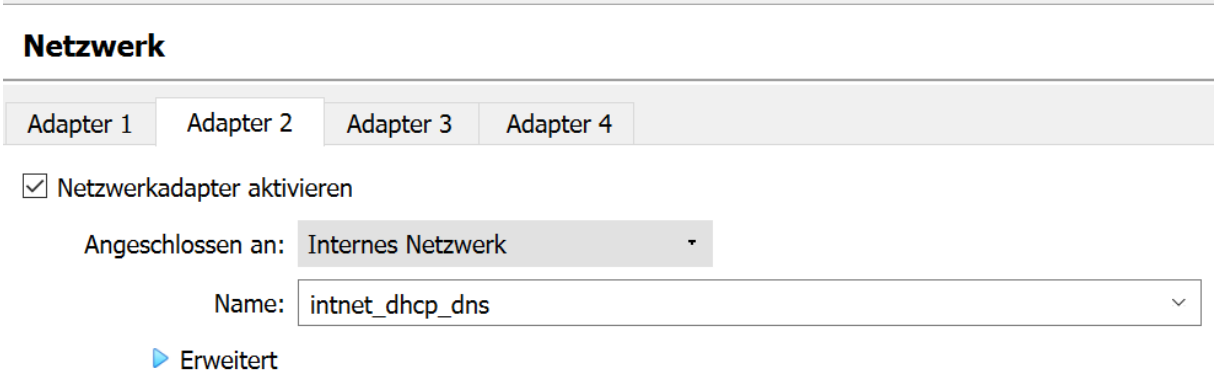
2 Theoretische Grundlagen

Ein DHCP Server vergibt automatisch IP-Adressen aus einem IP-Adress-Pool. Ein DNS Server wandelt Adressen von Wörter in IP-Adressen um, sodass zum Beispiel orf.at erreichen kann.

3 Übungsdurchführung

3.1 DHCP Server

3.1.1 Netzwerkkarte hinzufügen



3.1.2 ISC DHCP Server installieren

```
Passwort:
root@debian:~# apt install isc-dhcp-server
Paketlisten werden gelesen… Fertig
Abhängigkeitsbaum wird aufgebaut… Fertig
Statusinformationen werden eingelesen… Fertig
Die folgenden zusätzlichen Pakete werden installiert:
  libirs-export161 libisccfg-export163 policycoreutils selinux-utils
Vorgeschlagene Pakete:
  isc-dhcp-server-ldap
Die folgenden NEUEN Pakete werden installiert:
  isc-dhcp-server libirs-export161 libisccfg-export163 policycoreutils
  selinux-utils
0 aktualisiert, 5 neu installiert, 0 zu entfernen und 0 nicht aktualisiert.
Es müssen 1.702 kB an Archiven heruntergeladen werden.
Nach dieser Operation werden 6.915 kB Plattenplatz zusätzlich benutzt.
Möchten Sie fortfahren? [J/n]
```

3.1.3 Netzwerkkarte konfigurieren

3.1.3.1 Netzwerkmanager deaktivieren und stoppen

```
root@debian:~# systemctl disable --now NetworkManager
root@debian:~#
```

3.1.3.2 Konfiguration in /etc/network/interfaces für networking

```
  GNU nano 5.4
# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

source /etc/network/interfaces.d/*

# The loopback network interface
auto lo
iface lo inet loopback

auto enp0s3
iface enp0s3 inet dhcp

auto enp0s8
iface enp0s8 inet static
        address 192.168.21.1
        netmask 255.255.255.0
```

```
root@debian:~# systemctl restart networking
root@debian:~# ip -c a
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: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 08:00:27:6c:c8:1c brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
       valid_lft 85131sec preferred_lft 85131sec
    inet6 fe80::a00:27ff:fe6c:c81c/64 scope link noprefixroute
       valid_lft forever preferred_lft forever
3: enp0s8: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 08:00:27:a2:b5:a4 brd ff:ff:ff:ff:ff:ff
    inet 192.168.21.1/24 brd 192.168.21.255 scope global enp0s8
       valid_lft forever preferred_lft forever
root@debian:~#
```

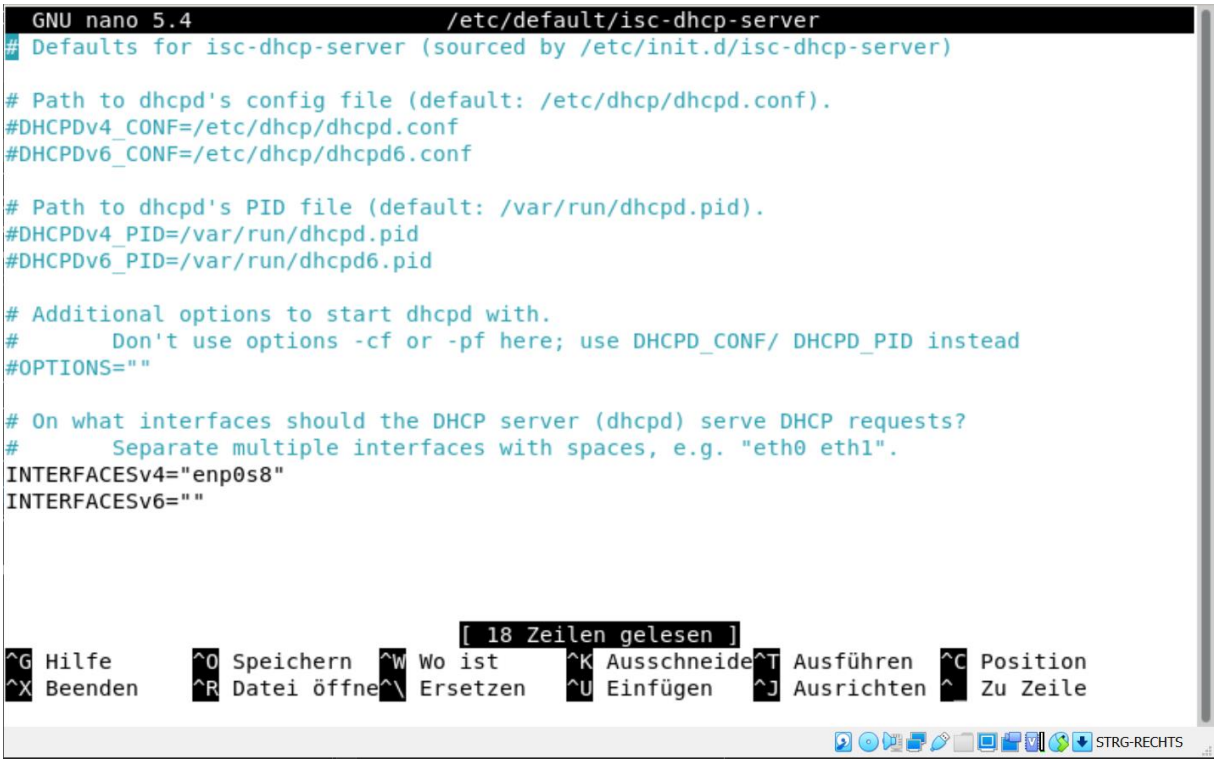
3.1.4 DHCP-Server konfigurieren

3.1.4.1 /etc/dhcp/dhcpd.conf

```
  GNU nano 5.4                          dhcpd.conf
# dhcpd.conf
#
# Sample configuration file for ISC dhcpd
#

# option definitions common to all supported networks...
#option domain-name "felixnet.local";
option domain-name-servers 192.168.21.1;

default-lease-time 600;
max-lease-time 7200;

# The ddns-updates-style parameter controls whether or not the server will
# attempt to do a DNS update when a lease is confirmed. We default to the
# behavior of the version 2 packages ('none', since DHCP v2 didn't
# have support for DDNS.)
ddns-update-style none;

# If this DHCP server is the official DHCP server for the local
# network, the authoritative directive should be uncommented.
authoritative;

# Use this to send dhcp log messages to a different log file (you also
# have to hack syslog.conf to complete the redirection).
#log-facility local7;

# No service will be given on this subnet, but declaring it helps the
# DHCP server to understand the network topology.

#subnet 10.152.187.0 netmask 255.255.255.0 {
#}

# This is a very basic subnet declaration.

subnet 192.168.21.0 netmask 255.255.255.0 {
  range 192.168.21.10 192.168.21.254;
  option routers 192.168.21.1;
}

# This declaration allows BOOTP clients to get dynamic addresses,
# which we don't really recommend.
```

Das Netzwerk 192.168.21.0 hat 9 statische Serverplätze frei und der DHCP-Server 192.168.21.1 vergibt Adressen von 192.168.21.10 bis 192.168.21.254.

3.1.4.2 /etc/default/isc-dhcp-server

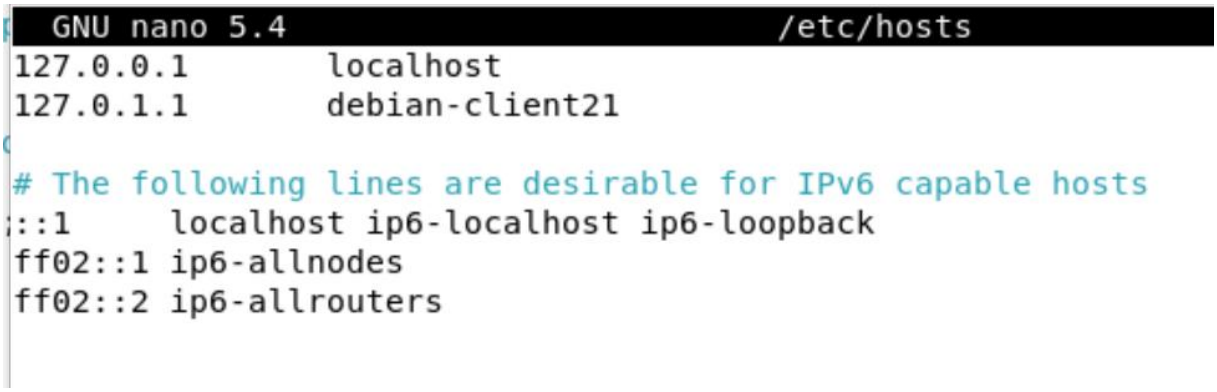


3.1.5 einen Client ins interne Net holen

3.1.5.1 Hostname ändern

Name des Debian Clients.

3.1.5.2 Hosts ändern



Hier ändern wir den Hostnamen ebenfalls.

3.1.5.3 Die Netzwerkkonfiguration überprüfen

```
root@debian-client21:~# ip -c a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group defaul
t 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: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP
group default qlen 1000
    link/ether 08:00:27:ec:a9:6b brd ff:ff:ff:ff:ff:ff
    inet 192.168.21.10/24 brd 192.168.21.255 scope global dynamic noprefixroute
enp0s3
       valid_lft 593sec preferred_lft 593sec
root@debian-client21:~#
```

Client hat richtige IP-Adresse.

```
  GNU nano 5.4                                                        /
# The format of this file is documented in the dhcpd.leases(5) manual page.
# This lease file was written by isc-dhcp-4.4.1

# authoring-byte-order entry is generated, DO NOT DELETE
authoring-byte-order little-endian;

lease 192.168.21.10 {
  starts 4 2021/10/14 11:35:40;
  ends 4 2021/10/14 11:45:40;
  cltt 4 2021/10/14 11:35:40;
  binding state active;
  next binding state free;
  rewind binding state free;
  hardware ethernet 08:00:27:ec:a9:6b;
  uid "\001\010\000'\354\251k";
  client-hostname "debian-client21";
}
```

Der DHCP Server speichert die Lease Time in der Datei /var/lib/dhcp/dhcpd.leases.

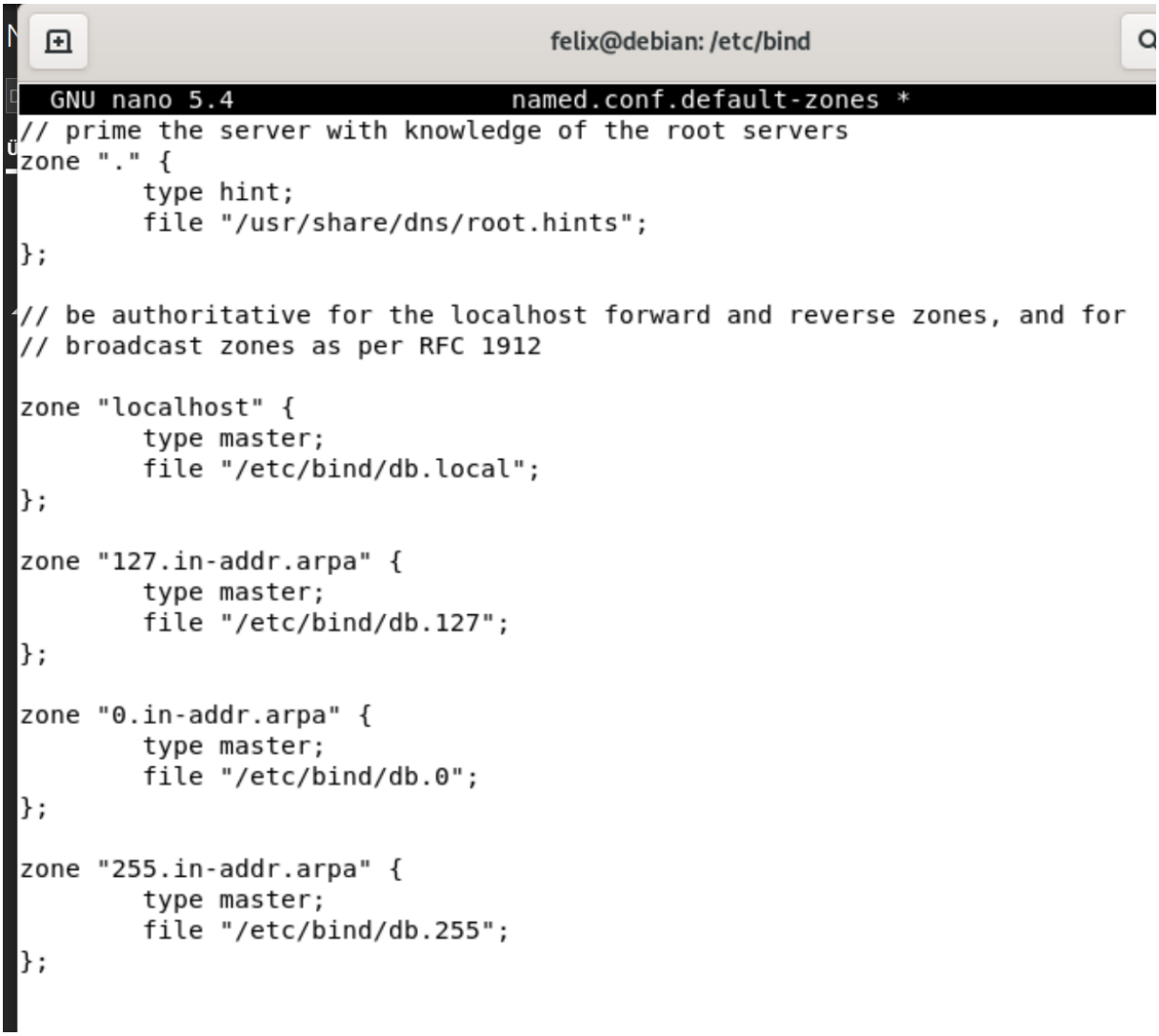
3.2 DNS Server

3.2.1 bind Verzeichnis konfigurieren

3.2.1.1 named.conf.local

```
 GNU nano 5.4                          named.conf.local
//
// Do any local configuration here
//

// Consider adding the 1918 zones here, if they are not used in your
// organization
//include "/etc/bind/zones.rfc1918";

zone "htl.com" {
        type master;
        file "/etc/bind/zones/db.htl.com";
};

zone "21.168.192.in-addr.arpa" {
        type master;
        file "/etc/bind/zones/db.192";
};
```

3.2.1.2 named.conf.default-zones



3.2.1.3 named.conf.option

```
 GNU nano 5.4                    named.conf.options
options {
        directory "/var/cache/bind";

        // If there is a firewall between you and nameservers you want
        // to talk to, you may need to fix the firewall to allow multiple
        // ports to talk.  See http://www.kb.cert.org/vuls/id/800113

        // If your ISP provided one or more IP addresses for stable
        // nameservers, you probably want to use them as forwarders.
        // Uncomment the following block, and insert the addresses replacing
        // the all-0's placeholder.

        // forwarders {
        //      0.0.0.0;
        // };

        //========================================================================
        // If BIND logs error messages about the root key being expired,
        // you will need to update your keys.  See https://www.isc.org/bind-keys
        //========================================================================
        dnssec-validation auto;

        listen-on { 192.168.21.1; 127.0.0.1; };
        listen-on-v6 { any; };
};
```

3.2.1.4 db.192

```
 GNU nano 5.4                          db.192
;
; BIND reverse data file for zone "felixnet.local"
;
$ORIGIN 21.168.192.in-addr.arpa.
$TTL    604800
@       IN      SOA     21DebianServer.felixnet.local. debian21.ns.felixnet.loc>
                     2021110401         ; Serial
                         604800         ; Refresh
                          86400         ; Retry
                        2419200         ; Expire
                         604800 )       ; Negative Cache TTL
;
@       IN      NS      21DebianServer.felixnet.local.
#1      IN      PTR     debian21.21DebianServer.felixnet.local.
1       IN      PTR     21DebianServer.felixnet.local.

                        [ 15 Zeilen gelesen ]
^G Hilfe     ^O Speichern ^W Wo ist    ^K Ausschneid^T Ausführen ^C Position
^X Beenden   ^R Datei öffn^\ Ersetzen  ^U Einfügen  ^J Ausrichten^_ Zu Zeile
Password:
```

3.2.1.5 db.felixnet.local

```
 GNU nano 5.4                    db.felixnet.local
;
; BIND data file for zone "felixnet.local"
;
$ORIGIN felixnet.local.
$TTL    604800
@       IN      SOA     21DebianServer.felixnet.local. debian21.felixnet.local.
                     2021110401         ; Serial
                         604800         ; Refresh
                          86400         ; Retry
                        2419200         ; Expire
                         604800 )       ; Negative Cache TTL
;
@               IN      NS      21DebianServer.felixnet.local.
21DebianServer  IN      A       192.168.21.1
```

3.2.2 Zonen Überprüfungsbefehle

3.2.2.1 named-checkconf

```
root@debian:/etc/bind# named-checkconf
root@debian:/etc/bind#
```

3.2.2.2 named-checkzone felixnet.local. db.felixnet.local

```
root@debian:/etc/bind/zones# named-checkzone felixnet.local. db.felixnet.local
zone felixnet.local/IN: loaded serial 2021110401
OK
```

3.2.2.3 named.checkzone 21.168.192.in-addr.arpa db.192

```
root@debian:/etc/bind/zones# named-checkzone 21.168.192.in-addr.arpa db.192
zone 21.168.192.in-addr.arpa/IN: loaded serial 2021110401
OK
```

3.2.2.4 nslookup 21DebianServer.felixnet.local

```
felix@debian-client21:~$ nslookup 21DebianServer.felixnet.local
Server:         192.168.21.1
Address:        192.168.21.1#53

Name:   21DebianServer.felixnet.local
Address: 192.168.21.1
```

3.2.2.5 ping 21DebianServer.felixnet.local

```
felix@debian-client21:~$ ping 21DebianServer.felixnet.local
PING 21DebianServer.felixnet.local (192.168.21.1) 56(84) bytes of data.
64 bytes from 21DebianServer.felixnet.local (192.168.21.1): icmp_seq=1 ttl=64 time=0.256 ms
64 bytes from 21DebianServer.felixnet.local (192.168.21.1): icmp_seq=2 ttl=64 time=0.727 ms
64 bytes from 21DebianServer.felixnet.local (192.168.21.1): icmp_seq=3 ttl=64 time=0.435 ms
^C
--- 21DebianServer.felixnet.local ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2030ms
rtt min/avg/max/mdev = 0.256/0.472/0.727/0.194 ms
felix@debian-client21:~$ ping 21DebianServer
```

4 Ergebnisse

DHCP und DNS Server sind fertig aufgesetzt und funktionsbereit.

5 Kommentar

Diese Übung war eine informative, interessante und gleichzeitig auch eine leichte Übung.