# LAB Journal Serie 1

Thomas Baumann & Tobias Weissert

## Exercise 1

* Set up Git repo
* Set up LAB-Journal
* Group assingment nr: n113
* Familiarize with the virtual lab setup
* Search RHEL 7 Networking guide
* Router VM edit config of ENS4

Router:  
Update /etc/resolve.conf  
search n113.nslab.ch nslab.ch  
search netlab.nslab.ch  
nameserver 193.5.80.80

Router:

Update /etc/hostname  
router.n113.nslab.ch

Router:

Update file: /etc/sysconfig/network-scripts/ifcfg-ens4  
DEVICE=ens4  
NM\_CONTROLLED=no  
TYPE=Ethernet  
ONBOOT=yes  
BOOTPROTO=none  
IPADDR=193.5.80.113  
PREFIX=27  
GATEWAY=193.5.80.1  
IPV4\_FAILURE\_FATAL=yes  
Name="System eth0"

Router:

Update file: /etc/sysconfig/network-scripts/ifcfg-ens3  
DEVICE=ens3  
NM\_CONTROLLED=no  
TYPE=Ethernet  
ONBOOT=yes  
BOOTPROTO=none  
IPADDR=193.5.82.129  
PREFIX=27  
GATEWAY=193.5.82.1  
IPV4\_FAILURE\_FATAL=yes  
Name="System eth0"

Router:

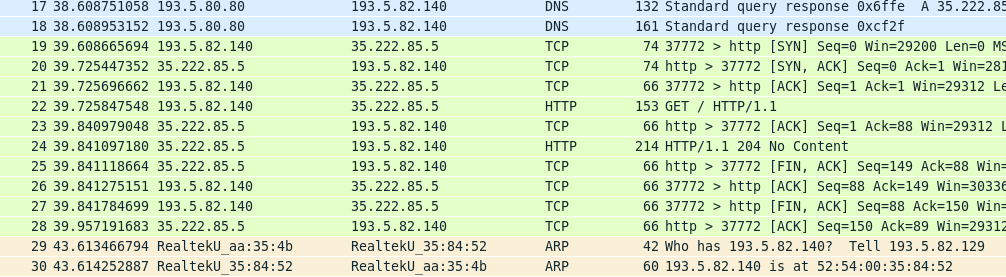
Update /etc/sysctl.conf  
Net.ipv4.ip\_forward = 1  
  
sysctl -p /etc/sysctl.conf  
systemctl restart network

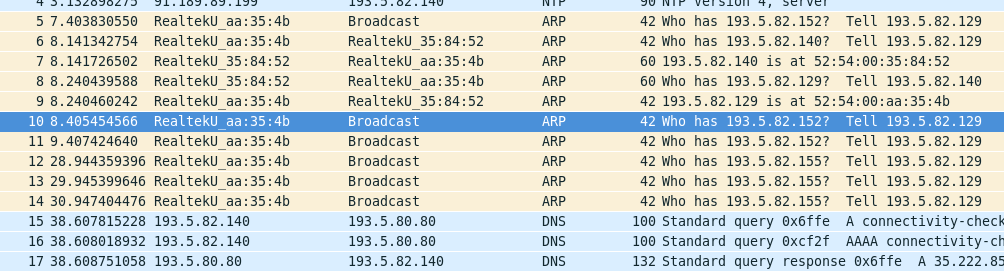
Router:

ping 8.8.8.8 ✓  
traceroute 8.8.8.8 ✓  
ping google.com ✓

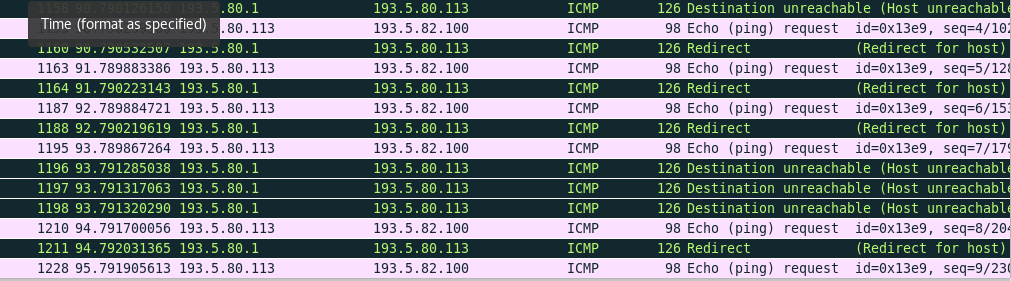
Client: - Set IP to manual: 193.5.82.128/27 Gateway: 193.5.82.129 - Set DNS Server to 193.5.80.80

### 5. März 2019

Tobias Weissert & Thomas Baumann Network capture 

ARP capture 

## Exercise 2

Router: ping 193.5.82.100 [Redirect host, nexthop: 193.5.80.112] 

Router: ip route add 193.5.82.96/27 via 193.5.80.112 dev ens4

Make route persistent create file /etc/sysconfig/network-scripts/route-ens4 193.5.82.96/27 via 193.5.80.112 dev ens4

## Exercise 3

Router: change /etc/sysconfig/network-scripts/ifcfg-ens3 and ifcfg-ens4

ONBOOT=no

Router: add to /etc/quagga/zebra.conf

log file /var/log/quagga/zebra.log

systemcpl start zebra

vtysh:  
conf t  
interface ens3  
ip address 193.5.82.129/27  
interface ens4  
ip address 193.80.113/27  
ip route 193.5.82.96/27 193.5.80.112  
ip route 193.5.82.96/27 ens4  
ip route 0.0.0.0/0 193.5.80.1  
write mem

### 12. März 2019

Tobias Weissert & Thomas Baumann

vtysh:  
conf t  
no ip route 193.5.82.96/27 193.5.80.112  
no ip route 193.5.82.96/27 ens4  
no ip route 0.0.0.0/0 193.5.80.1  
no ip address 193.5.82.129/27  
  
ip address 193.5.82.129/24  
ping 8.8.8.8 ✓

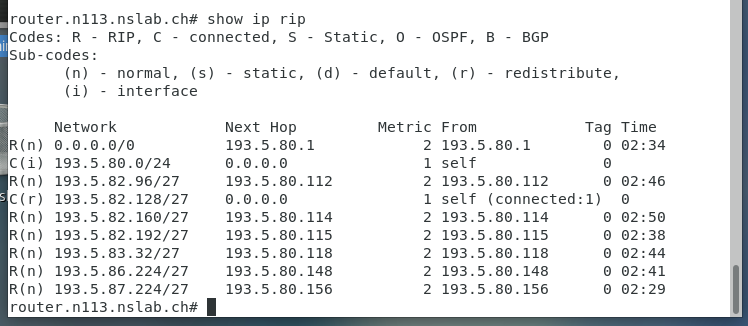
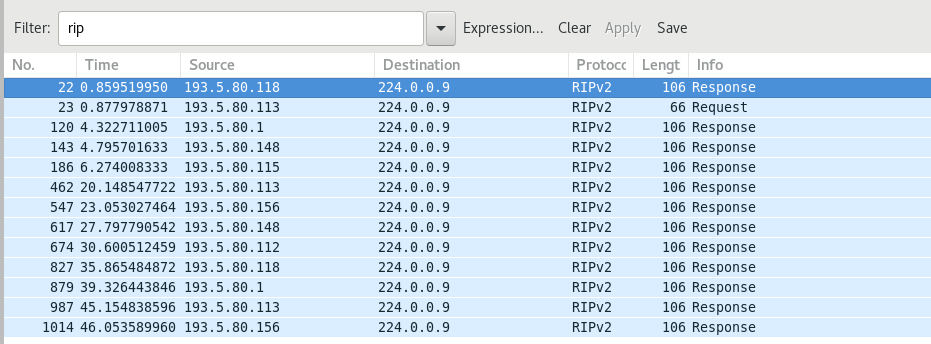
## Exercise 4

Router: add to /etc/quagga/ripd.conf

log file /etc/quagga/ripd.conf

systemctl start ripd  
Log contains: RIPd starting

chown quagga.quagga /var/log/qzagga/ripd.conf  
vtysh  
no ip route 0.0.0.0/ 193.5.80.1  
conf t key chain demonet  
key 1  
key-string demo$rip  
interface ens4  
ip rip authentication mode md5  
ip rip authentication key-chain demonet  
  
router rip  
redistribute connected  
network 193.5.80.0/24  
network ens4  
distance 100 193.5.80.0/24  
ping 8.8.8.8 ✓

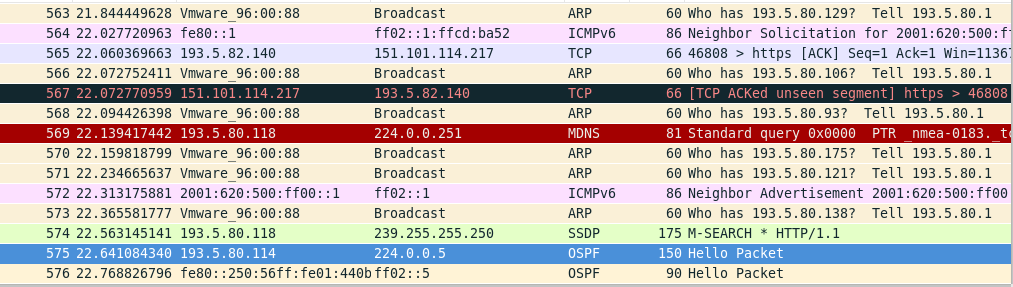
## Exercise 5

Router: add to /etc/quagga/ospfd.conf

log file /var/log/quagga/ospfd.conf

systemctl start ospfd  
ospf starting  
chown quagga.quagga /var/log/qzagga/ospfd.conf

vtysh coinf t  
router ospf  
ospf router-id 193.5.80.113  
interface ens4  
ip ospf authentication message-digest  
ip ospf message-digest-key 1 md5 demo$ospf  
redistribute connected  
network 193.5.80.0/24 area 0.0.0.0  
area 0.0.0.0 range 193.5.80.0/24  
area 0.0.0.0 authentication message-digest  
systemctl enable ospfd

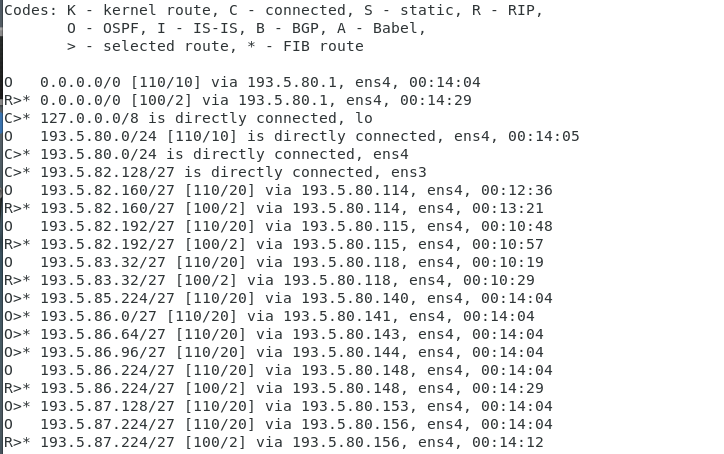


OSPF Capture

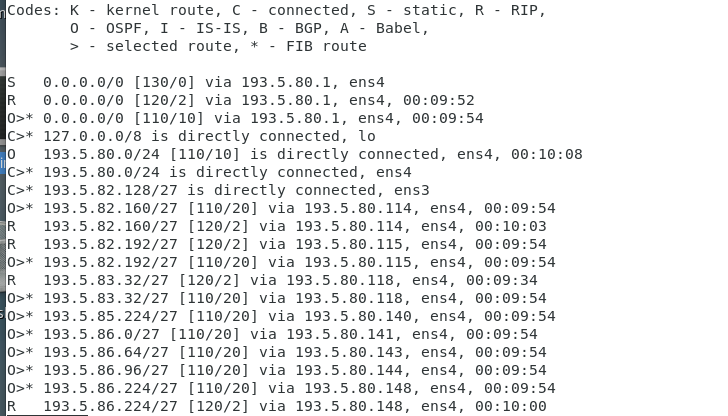
## Exercise 6

### 19. März 2019

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 RIP has a higher priority

router rip  
distance 120 193.5.82.160/27  
ip route 192.5.80.1 0.0.0.0/0 130



Static route

### 26. März 2019 IETF 104

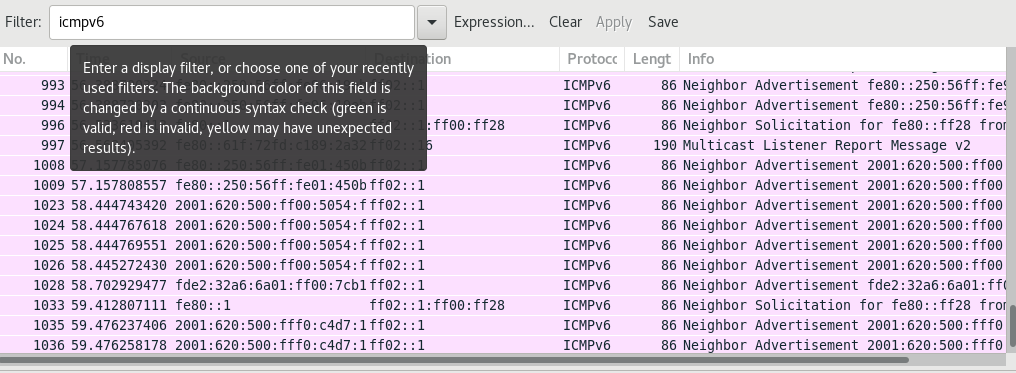
# LAB Journal Serie 2

### 2. April 2019

Tobias Weissert & Thomas Baumann

ip -6 addr

ping6 www.switch.ch ✓



Router advertisment

Source address in the router advertisment is the virtual network adapter of the VM host.

vtysh conf t interface ens4  
ipv6 address 2001:620:500:FF00::FF0D/64  
ipv6 address FE80::FF0D/64  
  
vtysh conf t interface ens3  
ipv6 address 2001:620:500:FF0D::1/64  
ipv6 address FE80::1/64  
write mem

vtysh conf t interface ens4  
ipv6 route ::/0 FE80::FC54:FF:FEE7:8557 250  
write mem

ping6 switch.ch ✓  
ping6 -i ens4 fe80::1 ✓

### 09. April 2019

Tobias Weissert & Thomas Baumann ## Exercise 9 we prefer quagga

vtysh conf t interface ens3  
no ipv6 ns suppress-ra  
ipv6 nd prefix 2001:620:500:FF0D::/64  
write mem

edit /etc/sysctl.conf

net.ipv6.conf.all.forwaring = 1

client

ip a  
ipv6: 2001:620:500:FF0D:1116:6EE0:E63F:5D24/64 ✓  
ping6 2001:620:FF00::FF0D ✓  
  
ntptime  
ifconfig ens3  
echo e0576a5c5d45a0005054fffeaa354b | sha1sum - | cut -c31-40  
vtysh interface ens3  
ipv6 address fdf8:f06a:90f5::/48  
ipv6 nd prefix fdf8:f06a:90f5::/48

## Exercise 10

edit /etc/quagga/ripngd.conf

log file /var/log/quagga/ospf6.conf

chown quagga.quagga /var/log/quagga/ripngd.conf  
vtysh  
router ripng  
redistribute connected

### 23. April 2019

Tobias Weissert & Thomas Baumann

# Serie 3 DHCP and DNS

## Exercise 12

edit /etc/sysconfig/network

NETWORKING=yes  
NETWORKING\_IPV6=yes  
NOZEROCONF=yes  
GATEWAY=193.5.82.129  
IPV6\_DEFAULTDEV=ens3  
IPV6\_DEFAULTGW=FE80::1

edit /etc/sysconfig/network-scripts/ifcfg-ens3

BOOTPROTO=static  
DEVICE=ens3  
ONBOOT=yes  
PREFIX=27  
IPADDR=193.5.82.130  
IPV6INIT=yes  
IPV6\_AUTOCONF=no  
IPV6ADDR=2001:620:500:FF0D::20/64  
NM\_CONTROLLED=no

hostnamectl set-hostname ns.n113.nslab.ch  
rpm -qa | grep dhcp

edit /etc/dhcp/dhcpd.conf

option domain-name "ns113.nslab.ch";  
option domain-name-servers 193.5.82.130, 193.5.80.80;  
  
default-lease-time 300;  
max-lease-time 7200;  
  
log-facility local7;  
  
subnet 193.5.82.128 netmask 255.255.255.224 {  
 range 193.5.82.144 193.5.82.158;  
 option routers 193.5.80.113;  
}

systemctl start dhcpd  
systemctl enable dhcpd

Change Client 1 from fix IP address to DHCP Client 1 got the first IP address in the range 193.5.82.144

edit /etc/dhcp/dhcpd.conf

host client1 {  
 hardware ethernet 52:54:00:35:84:52;  
 fixed-address 193.5.82.150  
}

Client 1 got the new IP address 193.5.82.150

## Exercise 13

edit /etc/dhcp/dhcpd6.conf option dhcp6.name-servers 2001:620:500:ff0d::20; option dhcp6.domain-search “n113.nslab.ch”;

subnet6 2001:620:500:ff0d::/64 {  
 range6 2001:620:500:ff0d::40 2001:620:500:ff0d::2000;  
}

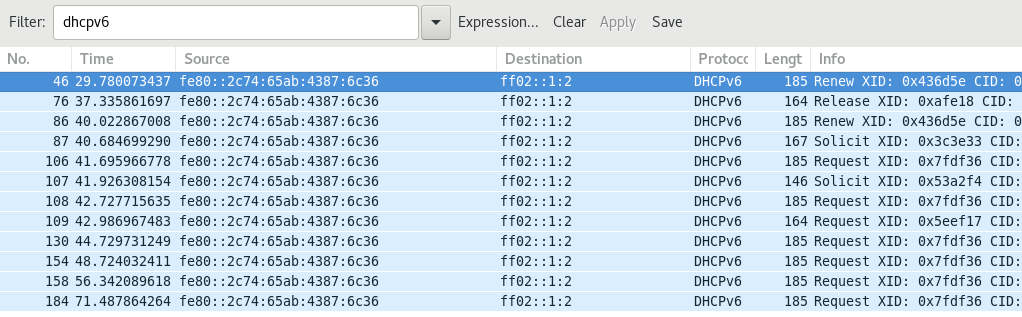
dhcp6 start

client1 got a ipv6 address

vtysh conf interface ens3  
ipv6 nd managed-config-flag  
ipv6 nd other-config-flag  
ipv6 nd ra-invervall 60  
no ipv6 nd suppress-ra  
write mem

host client1 {  
 hardware ethernet 52:54:00:35:84:52;  
 fixed-address6 2001:620:500:ff0d::50;  
}

dhclient -6 -r  
dhclient -6



DHCP 6 Capture

## Exercise 14

Add /var/named/named.conf

zone "." IN{  
 type hint;  
 file "/var/named/named.cache";  
};  
  
zone "n113.nslab.ch" {  
 type master;  
 file "/var/named/fwd-n113.nslab.ch";  
};

update fwd-n113.nslab.ch

;  
; BIND Zone File  
;  
$TTL 300  
@ IN SOA ns.n113.nslab.ch root.n113.nslab.ch (  
 2018050301 ; Serial  
 600 ; Refresh  
 300 ; Retry  
 7200 ; Expire  
 1200 ) ; Negative Cache TTL  
  
@ IN NS ns  
ns IN A 193.5.82.130  
ns IN AAAA 2001:620:500:ff0D::20

systemctl named start

less var/log/messages > all zones loaded and running

add to named.conf

listen-on port 53 {any}  
listen-on-v6 port 53 {any}

client01

dig any ns.n113.nslab.ch

## Exercise 15

create file /var/named/rev-n113.nslab.ch

;  
; BIND Zone File  
;  
$TTL 300  
@ IN SOA ns.n113.nslab.ch root.n113.nslab.ch (  
 2018050301 ; Serial  
 600 ; Refresh  
 300 ; Retry  
 7200 ; Expire  
 1200 ) ; Negative Cache TTL  
  
 IN NS ns.113.nslab.ch.  
130 IN PTR ns.113.nslab.ch.

create file /var/named/rev6-n113.nslab.ch

;  
; BIND Zone File  
;  
$TTL 300  
@ IN SOA ns.n113.nslab.ch root.n113.nslab.ch (  
 2018050301 ; Serial  
 600 ; Refresh  
 300 ; Retry  
 7200 ; Expire  
 1200 ) ; Negative Cache TTL  
  
;D.0 IN NS ns.113.nslab.ch.  
;D.0 IN PTR ns.113.nslab.ch.  
@ IN NS ns.113.nslab.ch.  
0.2.0.0.0.0.0.0.0.0.0.0.0.0.0 IN PTR ns.n113.nslab.ch.

client01

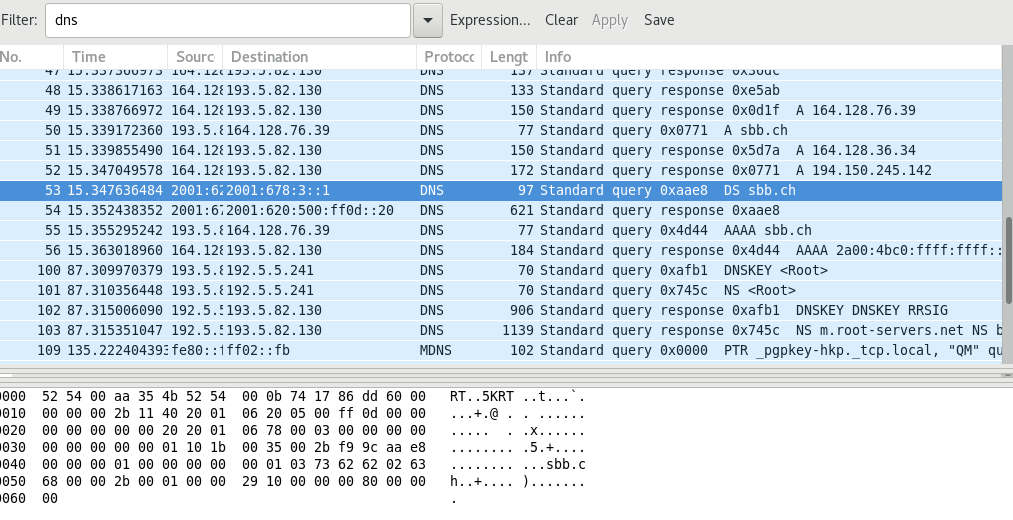
dig any 193.5.82.130

## Exercise 16

already done earlier

## Exercise 17

nslookup sbb.ch



nslookup for sbb.ch

named.conf

include "/etc/rndc.key";  
  
controls {  
 inet 127.0.0.1 allow { localhost; } keys { "rndc-key"; };  
};

systemctl restart named  
rndc status  
rndc dumpdb -cache  
  
cat /var/named/data/cache\_dump.db

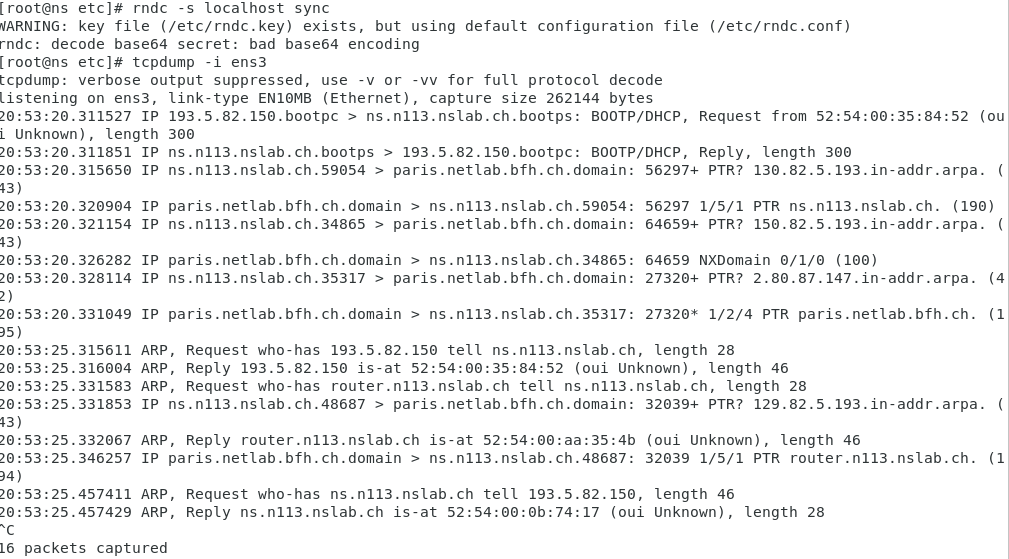
## Exercise 18

add to /etc/dhcpd.conf

update-optimization false;  
update-static-leases false;

create rndc.conf

server localhost {  
 key "rndc-key";  
};  
key "rndc-key" {  
 algorithm hmac-md5;  
 secret "<key>";  
};

rndc dumpdb -cache 

update dhcpd.conf

# update dns config each time  
update-optimization false;  
update-static-leases true;  
  
key DHCP\_UPDATER {  
 algorithm hmac-md5;  
 secret Qq6gGm8yExOc7ltYRutSV47prHBMiG2Ty9okFt1zEvLmwfBGZ8UEO3VyG5uq;  
};  
  
zone n113.nslab.ch. {  
 primary 193.5.82.130;  
 key DHCP\_UPDATER;  
}  
  
zone 128.82.5.193.in-addr.arpa. {  
 primary 193.5.82.130;  
 key DHCP\_UPDATER;  
}

add ipv6

zone D.0.F.F.0.0.5.0.0.2.6.0.1.0.0.2.ip6.arpa. {  
 primary ns.113.nslab.ch;  
 key DHCP\_UPDATER;  
}

# Exercise 4

Edit etc/sysconfig/network-scripts/ifcfg-ens

BOOTPROTO=static  
DEVICE=ens3  
ONBOOT=yes  
NM\_CONTROLLED=no  
IPADDR=193.5.82.131  
NETMASK=255.255.255.224  
GATEWAY=193.5.82.225  
IPV6\_DEFAULTDEV=ens3  
IPV6\_DEFAULTGW=FE80::1  
IPV6ADDR=2001:620:500:FF0D::25  
IPV6INIT=yes  
IPV6\_AUTOCONFIG=no  
NETWORKING\_IPV6=yes  
NOZEROCONF=yes

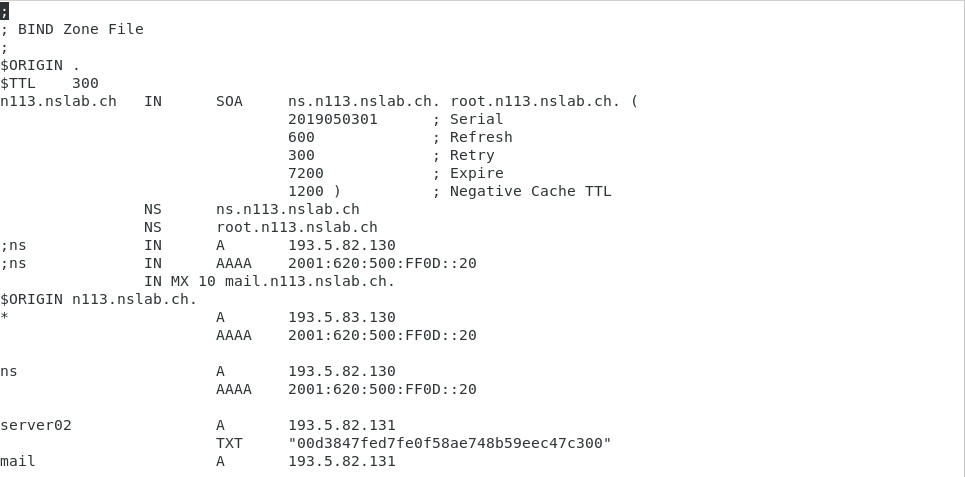
hostnamectl set-hostname mail.n116.nslab.ch  
systemctl restart network

Add DNS Server to Server2 Add to sysconfig/resolf.conf

nameserver localhost

Check internet connection ✅

Add DNS entry for Mail fwd-ns113.nslab.ch

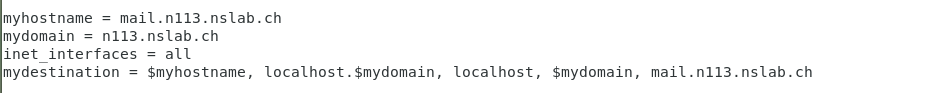


‘DNS Configuration’

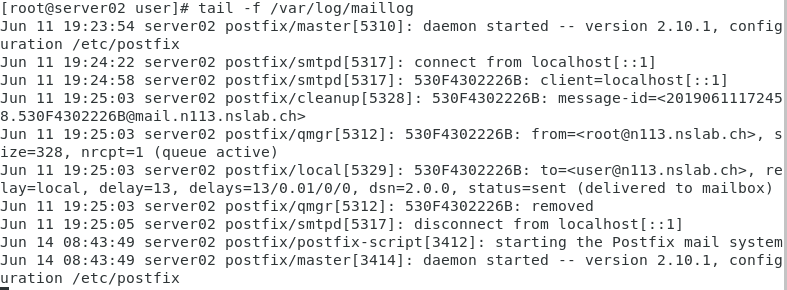
Edit main.cf

myhostname = mail.n113.nslab.ch  
mydomain = n113.nslab.ch  
inet\_interfaces = all  
mydestination = $myhostname, localhost.$mydomain, localhost, $mydomain, mail.n113.nslab.ch

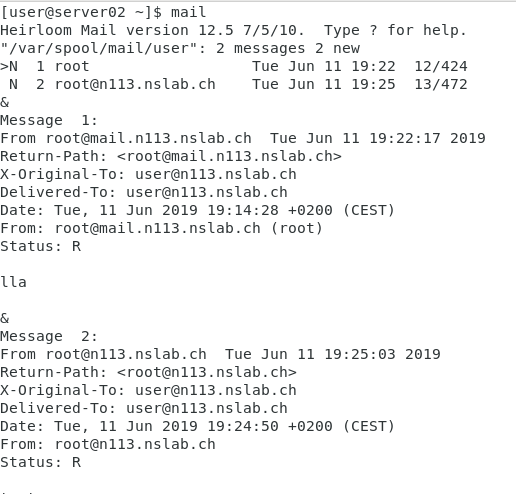
telnet localhost 25  
  
Trying 193.5.82.131...  
Connected to mail.  
Escape character is '^]'.  
220 mail.n113.nslab.ch ESMTP Postfix  
EHLO n113.nslab.ch  
250-mail.n113.nslab.ch  
250-PIPELINING  
250-SIZE 10240000  
250-VRFY  
250-ETRN  
250-ENHANCEDSTATUSCODES  
250-8BITMIME  
250 DSN  
MAIL FROM: user@n113.nslab.ch  
250 2.1.0 Ok  
RCPT TO: user@n113.nslab.ch  
250 2.1.5 Ok  
DATA  
354 End data with <CR><LF>.<CR><LF>  
Subject: test  
test test  
.  
250 2.0.0 Ok: queued as 6E4F723977E7  
QUIT  
221 2.0.0 Bye  
Connection closed by foreign host.



‘Mail Configuration’



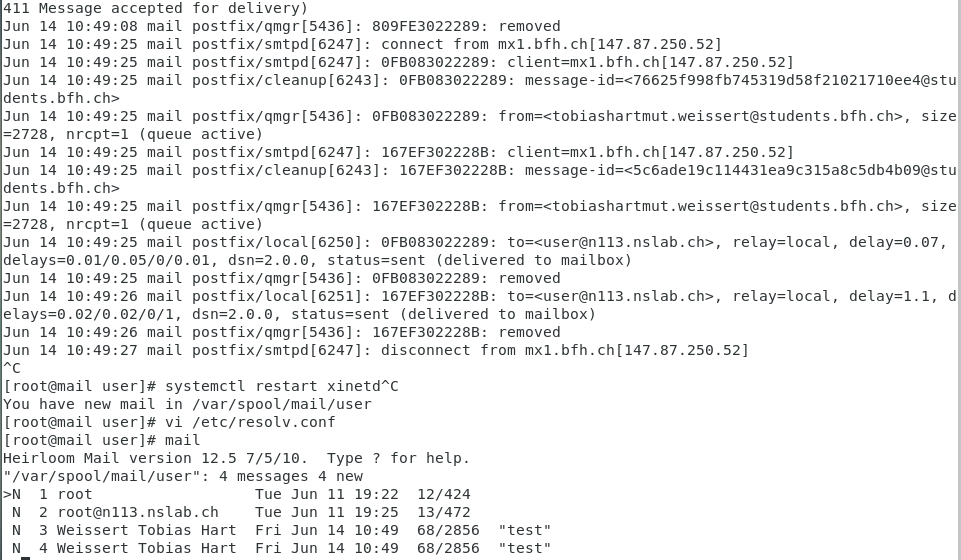
‘Mail Log’



‘Mail Inbox’

sudo apt install mailutils Install satelite system with n113.nslab.ch as relay

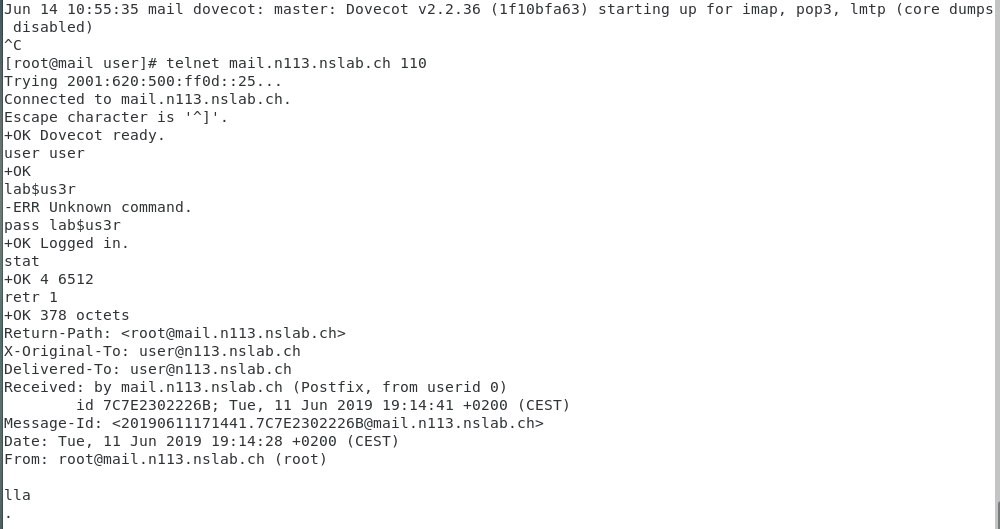
echo test | mail -s "das ist ein Test" thomas.baumann@students.bfh.ch



‘Send and recieve Mail’

dovecot already installed create file /etc/dovecot/local.conf

systemctl start dovecot  
telnet mail.n113.nslab.ch 110

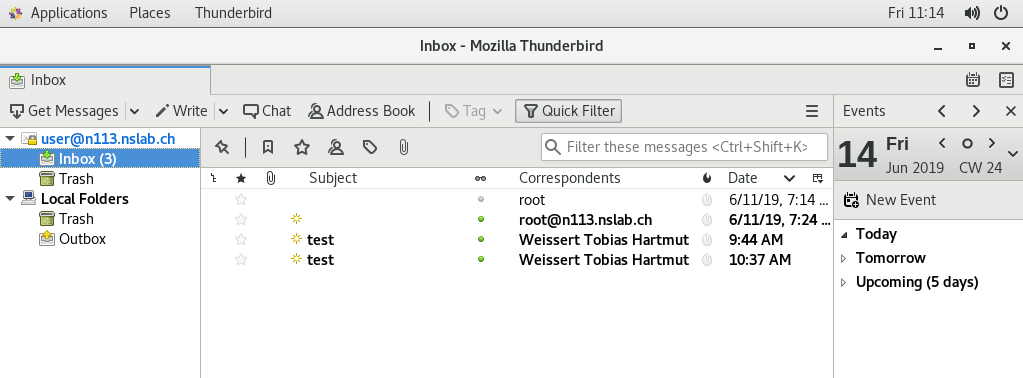


‘dovecot’

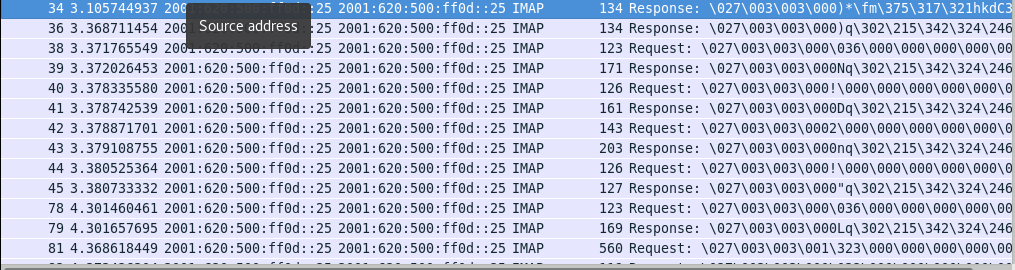
systemctl enable dovecot

edit /etc/dovecot/conf.d/10-ssl.conf

ssl = no  
disable\_plaintext\_auth = no



‘Thunderbird’



‘IMAP’

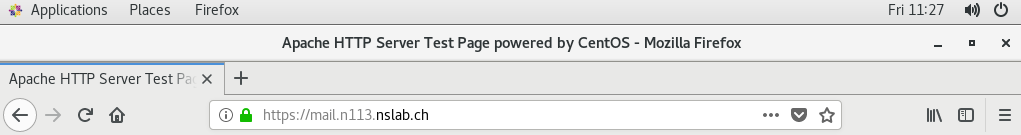
install https, php mod\_ssl

create file mail.conf in /etc/https/conf.d systemctl start httpd http://mail.n113.nslab.ch works

install certbot python2-certbot-apache

get lets encrypte certificate

https://mail.n113.nslab.ch works



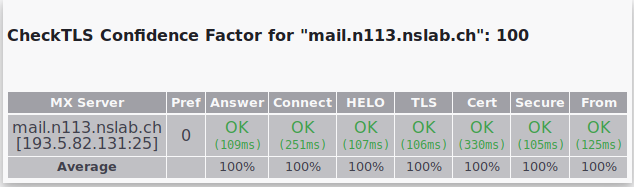
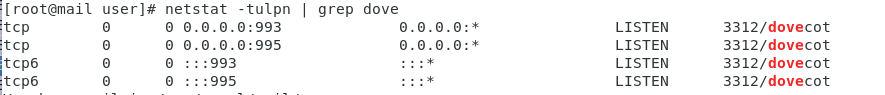
‘https’

edit /etc/postfix/master.cf and enable

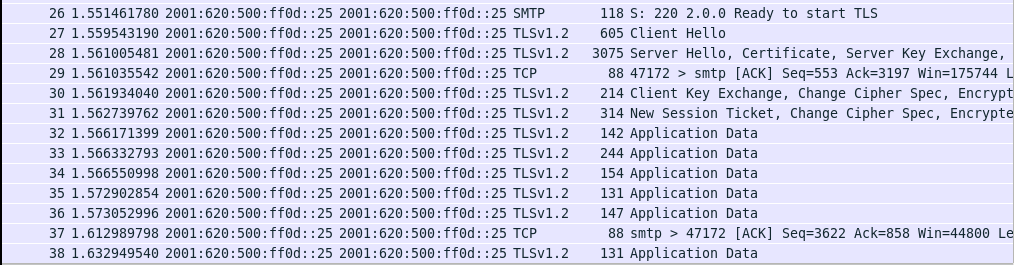
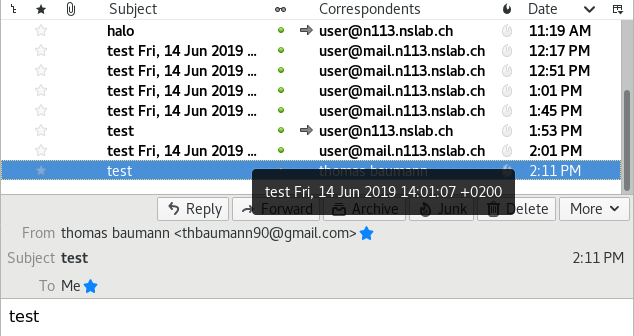
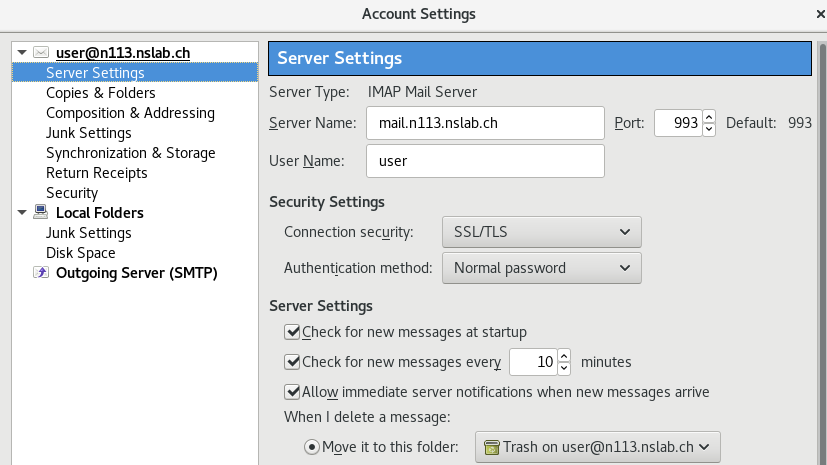
systemctl enable saslauthd systemctl restart postfix

* swaks -tlso -t user@n113.nslab.ch

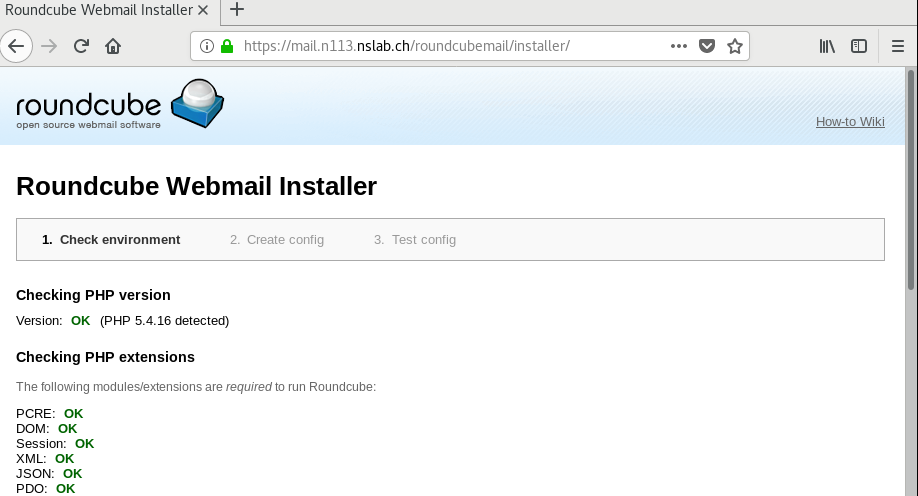
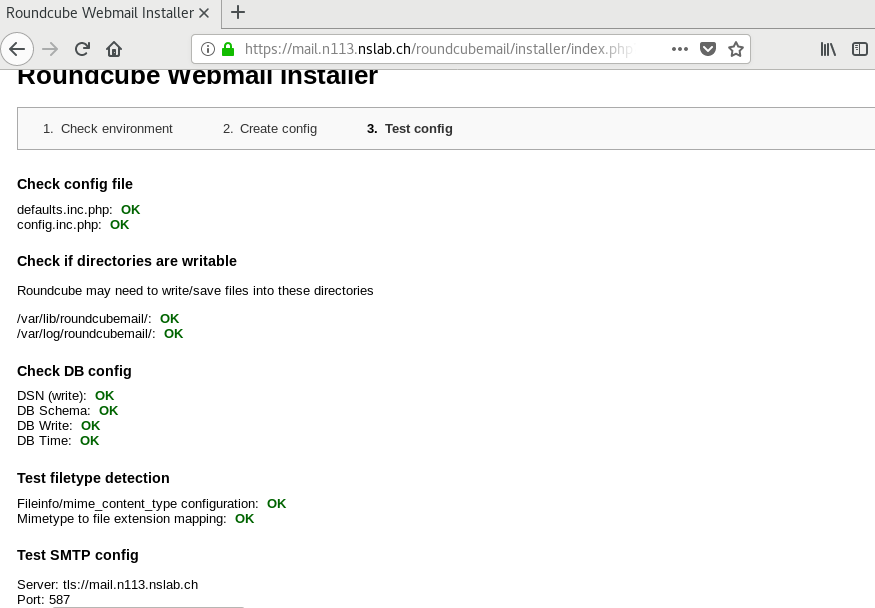
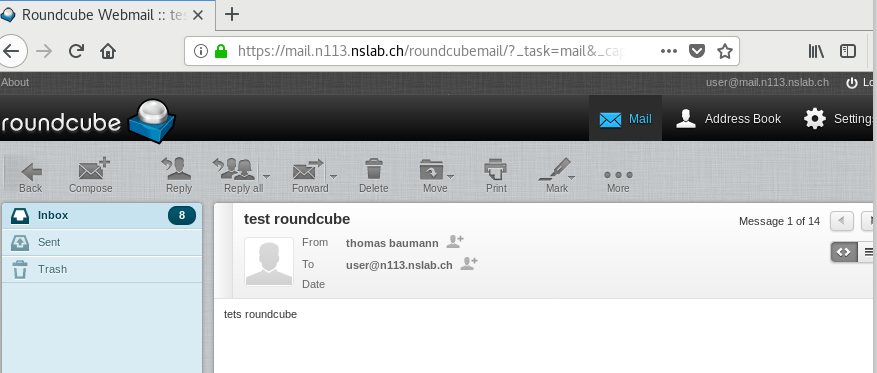
[root@mail postfix]# swaks -tlso -t user@n113.nslab.ch  
=== Trying mail.n113.nslab.ch:25...  
=== Connected to mail.n113.nslab.ch.  
<- 220 mail.n113.nslab.ch ESMTP Postfix  
 -> EHLO mail.n113.nslab.ch  
<- 250-mail.n113.nslab.ch  
<- 250-PIPELINING  
<- 250-SIZE 10240000  
<- 250-VRFY  
<- 250-ETRN  
<- 250-STARTTLS  
<- 250-ENHANCEDSTATUSCODES  
<- 250-8BITMIME  
<- 250 DSN  
 -> STARTTLS  
<- 220 2.0.0 Ready to start TLS  
=== TLS started with cipher TLSv1.2:ECDHE-RSA-AES256-GCM-SHA384:256  
=== TLS no local certificate set  
=== TLS peer DN="/CN=mail.n113.nslab.ch"  
 ~> EHLO mail.n113.nslab.ch  
<~ 250-mail.n113.nslab.ch  
<~ 250-PIPELINING  
<~ 250-SIZE 10240000  
<~ 250-VRFY  
<~ 250-ETRN  
<~ 250-ENHANCEDSTATUSCODES  
<~ 250-8BITMIME  
<~ 250 DSN  
 ~> MAIL FROM:<user@mail.n113.nslab.ch>  
<~ 250 2.1.0 Ok  
 ~> RCPT TO:<user@n113.nslab.ch>  
<~ 250 2.1.5 Ok  
 ~> DATA  
<~ 354 End data with <CR><LF>.<CR><LF>  
 ~> Date: Fri, 14 Jun 2019 13:01:28 +0200  
 ~> To: user@n113.nslab.ch  
 ~> From: user@mail.n113.nslab.ch  
 ~> Subject: test Fri, 14 Jun 2019 13:01:28 +0200  
 ~> Message-Id: <20190614130128.005228@mail.n113.nslab.ch>  
 ~> X-Mailer: swaks v20170101.0 jetmore.org/john/code/swaks/  
 ~>  
 ~> This is a test mailing  
 ~>  
 ~> .  
<~ 250 2.0.0 Ok: queued as 6F5DC32A9DE7  
 ~> QUIT  
<~ 221 2.0.0 Bye  
=== Connection closed with remote host.

* Edit /etc/dovecot/local.conf
* systemctl restart dovecot
* Test TLS 
* To limit access to “dovecot” to POP3S/IMAP4 
* Edit /etc/dovecot/local.conf and check log

Jun 14 13:49:36 mail dovecot: master: Dovecot v2.2.36 (1f10bfa63) starting up for imap, pop3 (core dumps disabled)

* Wireshark TLS 
* Receive Mail works 
* Config MUA 
* Sending and receving Mails works! # 25

yum install --enablerepo=epel roundcubemail

* Edit /etc/httpd/conf.d/roundcubemail.conf and verify if it works 
* Generate Roundcube conf and check if everything is ok: 
* Login to: https://mail.n124.nslab.ch/roundcubemail/
* Test Send and receive Mails
* Ingoing 
* Outgoing 