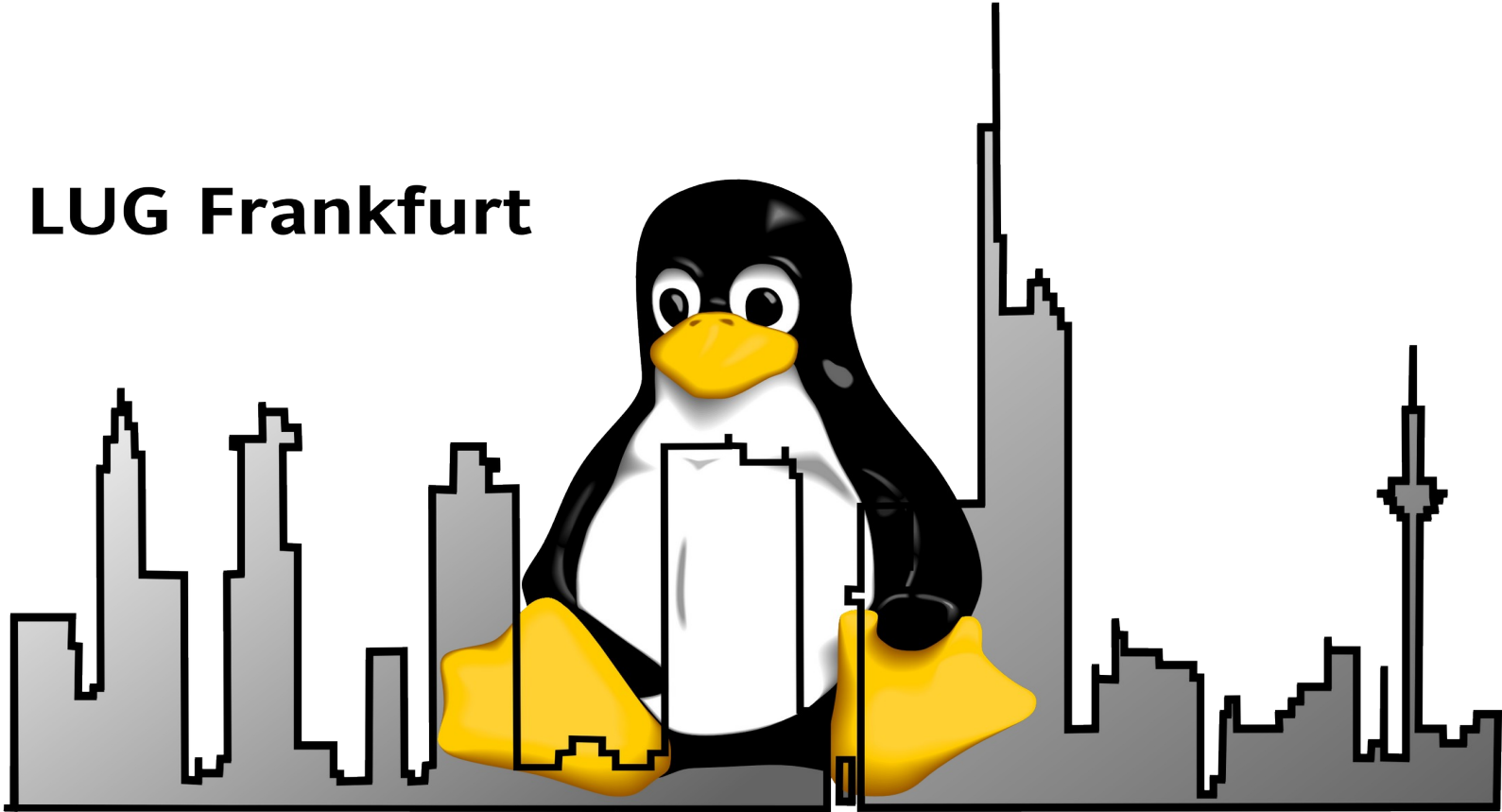
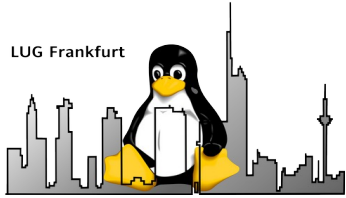


Debian-router-Container

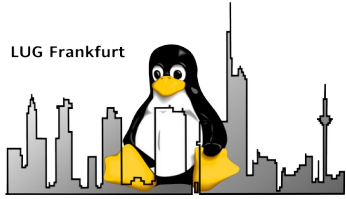
LUG Frankfurt





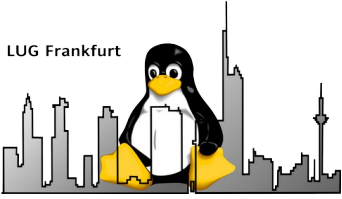
Inhalt

- Zusammenfassung Debian-Basis-Installation
- Motivation und Konzept für router+DNS+DHCP
- Container clonen
- Konfiguration router (fralug-rtg)
- Konfiguration fralug-local
- Ausblick auf DNS und DHCP



Zusammenfassung Basis-Installation

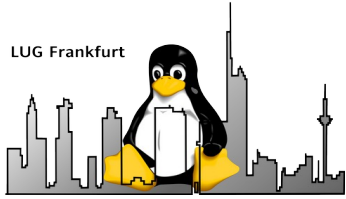
- Installation von Debian (inkl. Konfiguration)
- Installation nützlicher Tools
- Umstellen auf sid
- Ausdünnen der sid-Variante



Einstellungen fralug-basis

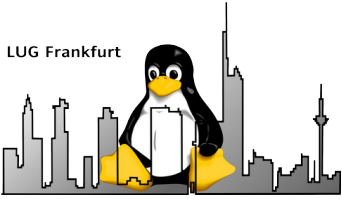
The screenshot shows the settings for a virtual machine named 'fralug-basis'. The interface is organized into several sections, each with a specific icon and title. The 'Allgemein' section provides basic information about the VM. The 'System' section details hardware specifications like memory and boot order. The 'Anzeige' section shows graphics settings. The 'Massenspeicher' section lists the storage controllers and their respective disks. The 'Audio', 'Netzwerk', and 'USB' sections show that these features are currently disabled. The 'Gemeinsame Ordner' section is empty. The 'Beschreibung' section contains a list of partitions.

Allgemein	Vorschau
Name: fralug-basis	
Betriebssystem: Debian (64-bit)	
Gruppen: fra-lug	
System	
Hauptspeicher: 1024 MB	
Bootreihenfolge: Optisch, Platte	
Chipsatz-Typ: ICH9	
Beschleunigung: Nested Paging, KVM-Paravirtualisierung	
Anzeige	
Grafikspeicher: 33 MB	
Grafikcontroller: VMSVGA	
Fernsteuerung: deaktiviert	
Aufnahme: deaktiviert	
Massenspeicher	
Controller: SATA	
SATA-Port 0: fralug-basis.vdi (normal, 10,00 GB)	
SATA-Port 1: [Optisches Laufwerk] debian-12.1.0-amd64-DVD-1.iso (3,72 GB)	
SATA-Port 2: fralug-basis-sw.vdi (normal, 1,00 GB)	
Audio	
deaktiviert	
Netzwerk	
Adapter 1: Intel PRO/1000 MT Desktop (Netzwerkbrücke, enx349971e08228)	
USB	
USB-Controller: OHCI, EHCI	
Gerätefilter: 0 (0 aktiv)	
Gemeinsame Ordner	
Keine	
Beschreibung	
master: 7-tux-sid	
Neuinstallation	
partitions	



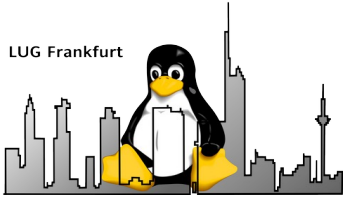
Inhalt

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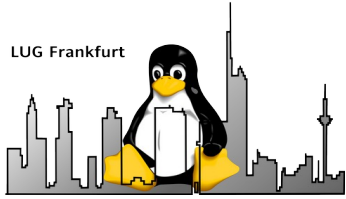
Motivation

- Abgeschotteter Bereich für Netzwerktests
 - Firewall
 - DNS und DHCP
 - Windows-Zugriffe ins Internet blockieren
- System-Updates prüfen



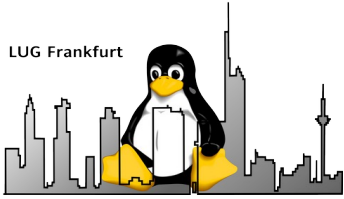
Konzept

- Vier Container
 - fralug-rtg (router-gateway-firewall)
 - fralug-local (Testmaschine)
 - fralug-dns (DNS-Server)
 - fralug-dhcp (DHCP-Server)
- Getrennte Container für jede Funktion



Inhalt

- Zusammenfassung Debian-Basis-Installation
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fralug-basis clonen

- fralug-basis aktualisieren
- vollständigen Clone erstellen mit VBoxManage (geführter Modus)

```
su - ${USER} -c "VBoxManage clonevm ${ALT} --name=${NEU} --register --mode=all --groups=${GROUP}"
```

Neuer VM-Name und -Pfad

Name:

Pfad:

Typ des Klon

vollständiger Klon

verknüpfter Klon

Sicherungspunkte

aktueller Zustand

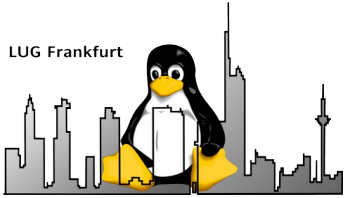
alles

Zusätzliche Optionen

MAC-Adressen-Richtlinie:

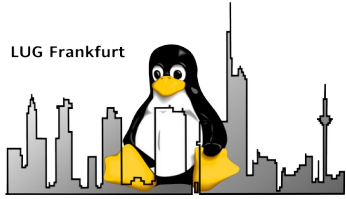
Zusätzliche Optionen: Namen der Platten behalten

Hardware-UUIDs beibehalten



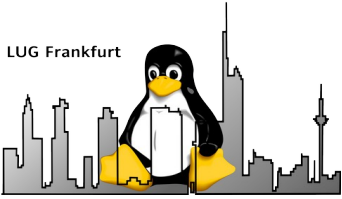
Clones anpassen

- fralug-basis → fralug-rtg
 - fralug-basis → fralug-local
 - Lokale Anpassungen vornehmen
 - **Eineindeutige** UUIDs aller Partitionen!
 - Dateien anpassen: hosts, hostname, fstab, grub, dhclient.conf
 - *clone_vm.sh* : vollständiger Clone inkl. lokalen Anpassungen
- Beide im Hausnetz als eigenständige Maschinen sichtbar.



Inhalt

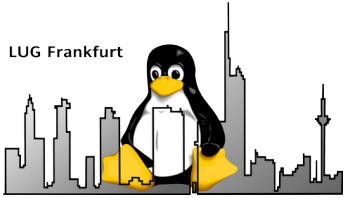
- Zusammenfassung Debian-Basis-Installation
- Motivation und Konzept für router+DNS+DHCP
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- **Konfiguration router (fralug-rtg)**
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fralug-rtg-1

- Zweite Netzwerkschnittstelle zur Verfügung stellen

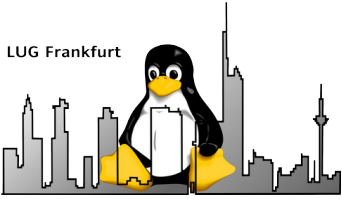
The screenshot shows the Windows Network settings window. On the left is a navigation pane with the following items: Allgemein, System, Anzeige, Massenspeicher, Audio, **Netzwerk** (highlighted), Serielle Schnittstellen, USB, Gemeinsame Ordner, and Benutzerschnittstelle. The main pane is titled 'Netzwerk' and has four tabs: Adapter 1, Adapter 2, Adapter 3, and Adapter 4. Under the 'Adapter 1' tab, the 'Netzwerkadapter aktivieren' checkbox is checked. The 'Angeschlossen an:' dropdown is set to 'Internes Netzwerk'. The 'Name:' field contains 'fralug-net'. The 'Erweitert' section is expanded, showing 'Adaptertyp:' set to 'Intel PRO/1000 MT Desktop (82540EM)', 'Promiscuous-Modus:' set to 'verweigern (deny)', and 'MAC-Adresse:' set to '080027070958'. The 'Kabel verbunden' checkbox is also checked.



fralug-rtg-2

- Statische IP-Adresse für das „Heimnetz“
/etc/network/interfaces

```
# The primary network interface
allow-hotplug enp0s3
iface enp0s3 inet static
    address 10.aa.bb.195
    netmask 255.255.255.0
    network 10.aa.bb.0
    broadcast 10.aa.bb.255
    gateway 10.aa.bb.254
```



DNS-„Heimnetz“

- Die neue statische IP-Adresse dem „heimischen“ DNS-Server bekannt machen (z.B. Fritzbox).

Gerät hinzufügen

Geben Sie einen Namen und die MAC-Adresse des Netzwerkgerätes ein.

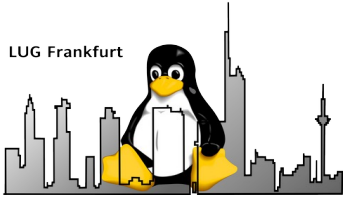
Name

MAC-Adresse

Geben Sie die IP-Adresse ein, die dem Netzwerkgerät fest zugewiesen werden soll.

IP-Adresse

- fralug-rtg ist mit Namen im „Heimnetz“ zu erreichen.

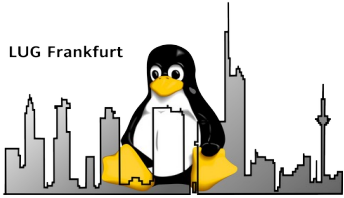


fralug-rtg-3

- Statische IP-Adresse für das lokale Netz
`/etc/network/interfaces`

```
# The secondary network interface
allow-hotplug enp0s8
iface enp0s8 inet static
    address 10.cc.bb.254
    netmask 255.255.255.0
    network 10.cc.bb.0
    broadcast 10.cc.bb.255
```

- Für Server sind statische IP-Adressen erforderlich!

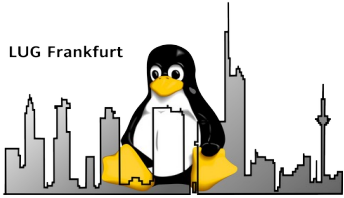


fralug-rtg-4

- Netzwerk nach den Änderungen (**ip addr li**)

```
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc
      pfifo_fast state UP group default qlen 1000
    link/ether 08:00:27:36:8C:52 brd ff:ff:ff:ff:ff:ff
    inet 10.aa.bb.195/24 brd 10.aa.bb.255 scope global enp0s3
      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 08:00:27:07:09:58 brd ff:ff:ff:ff:ff:ff
    inet 10.cc.bb.254/24 brd 10.cc.bb.255 scope global enp0s8
      valid_lft forever preferred_lft forever
```

fralug-rtg-5

- „Sprechende“ Namen für Netzwerkinterfaces aktivieren

```
/etc/udev/rules.d/70-persistent-net.rules
```

```
# device: enp0s3
```

```
SUBSYSTEM=="net", ATTR{address}=="08:00:27:36:8C:52", NAME="homenet"
```

```
# device: enp0s8
```

```
SUBSYSTEM=="net", ATTR{address}=="08:00:27:07:09:58", NAME="fralug-net"
```

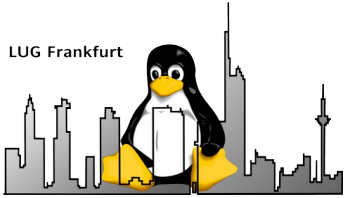
```
/etc/network/interfaces
```

```
allow-hotplug homenet
```

```
iface homenet inet static
```

```
allow-hotplug fralug-net
```

```
iface fralug-net inet static
```

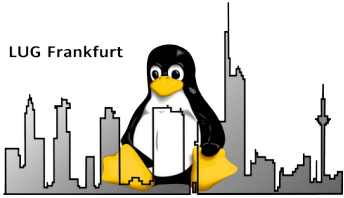


fralug-rtg-6

- Nach den Änderungen in udev und interfaces (**ip addr li**)

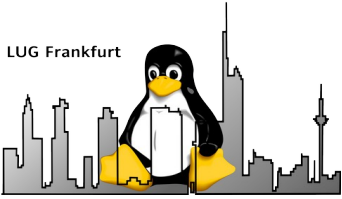
```
2: homenet: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc
          pfifo_fast state UP group default qlen 1000
   link/ether 08:00:27:36:8C:52 brd ff:ff:ff:ff:ff:ff
   altname enp0s3
   inet 10.aa.bb.195/24 brd 10.aa.bb.255 scope global homenet
      valid_lft forever preferred_lft forever
```

```
3: fralug-net: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc
          pfifo_fast state UP group default qlen 1000
   link/ether 08:00:27:07:09:58 brd ff:ff:ff:ff:ff:ff
   altname enp0s8
   inet 10.cc.bb.254/24 brd 10.cc.bb.255 scope global fralug-net
      valid_lft forever preferred_lft forever
```



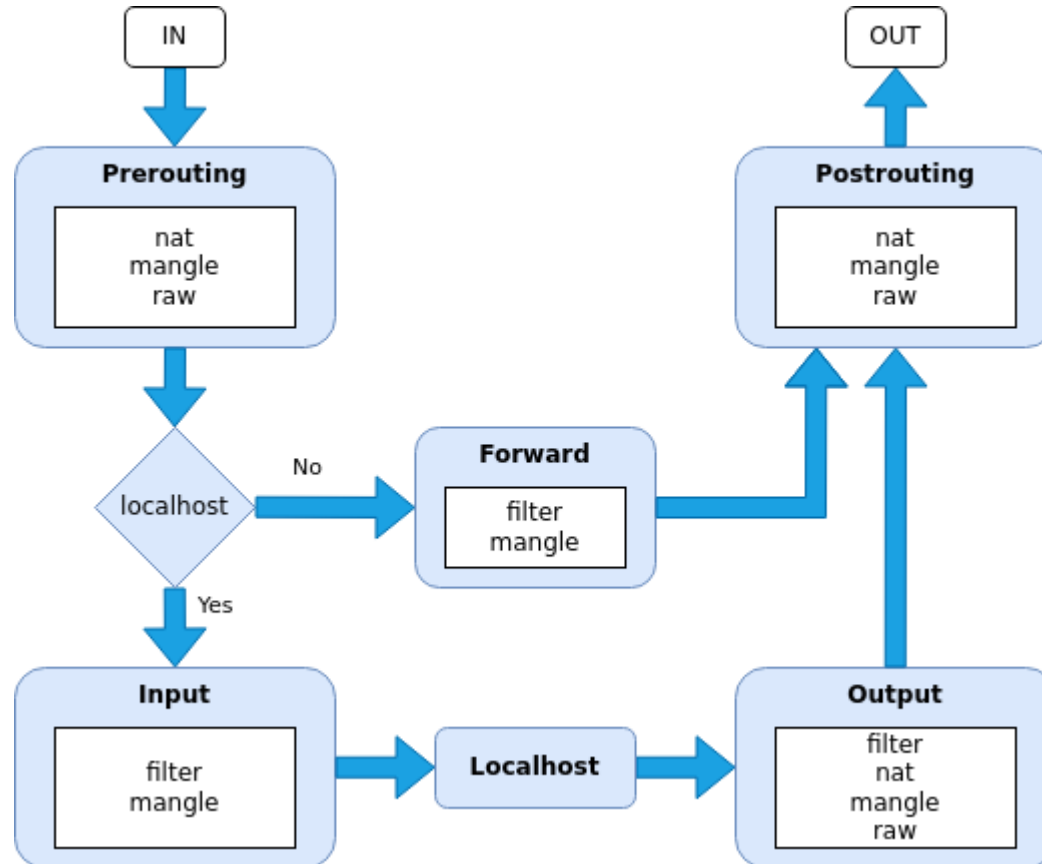
fralug-rtg-7

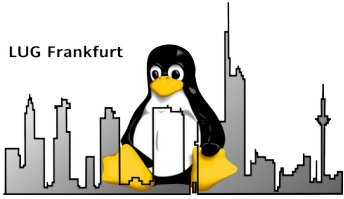
- Routing aktivieren
`/etc/sysctl.conf`
`net.ipv4.ip_forward=1`
- aptitude install iputils-ping
- aptitude install iptables iptables-persistent
- Firewall-Regeln in `/etc/iptables/rules.v4`



fralug-rtg-8

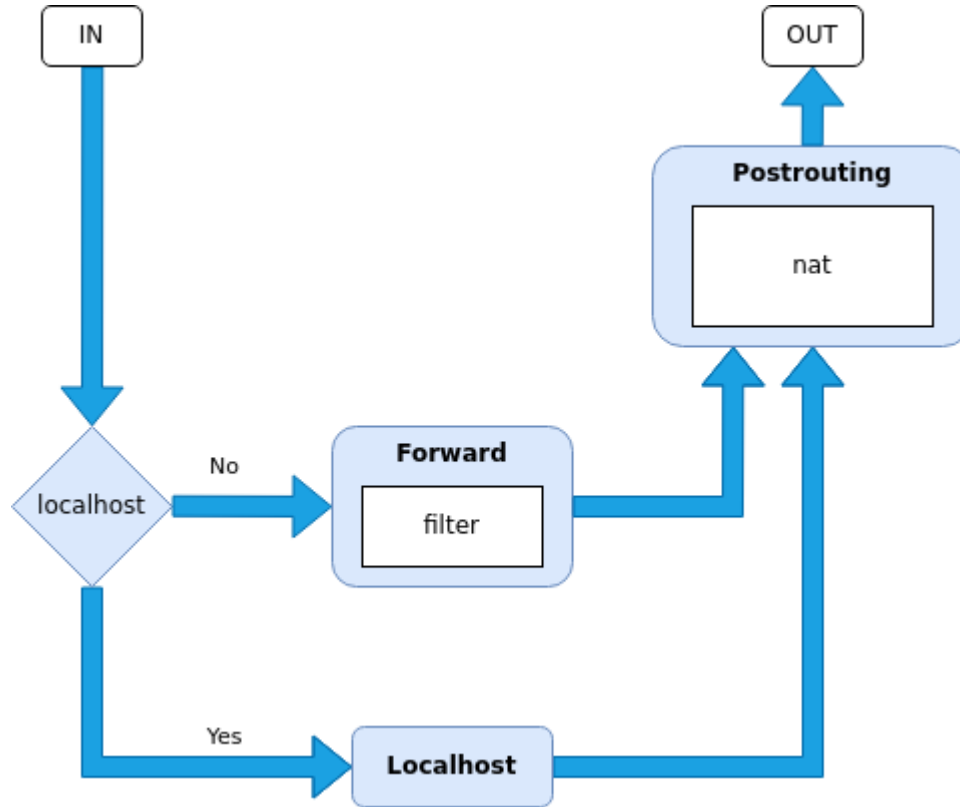
- Iptables-Routing

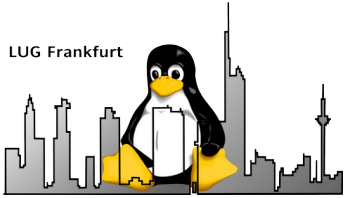




fralug-rtg-9

- Iptables-Routing





fralug-rtg-10

- Routing aktivieren (Skript einmal ausführen)

```
#!/bin/sh
```

```
# alte Einstellungen löschen
```

```
iptables -F
```

```
iptables -F -t nat
```

```
# fralug-net => homenet
```

```
iptables -A FORWARD -i fralug-net -s 10.cc.bb.0/24 -o homenet -j ACCEPT
```

```
# homenet => fralug-net
```

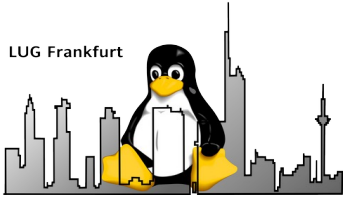
```
iptables -A FORWARD -i homenet -d 10.cc.bb.0/24 -o fralug-net -j ACCEPT
```

```
# catch all-Regel (muss immer als letztes stehen)
```

```
iptables -A FORWARD -j DROP
```

```
# masquerading (NAT) ins homenet
```

```
iptables -t nat -A POSTROUTING -s 10.cc.bb.0/24 -o homenet -j MASQUERADE
```



fralug-rtg-11a

iptables -L -v

Chain INPUT (policy ACCEPT 488 packets, 45880 bytes)

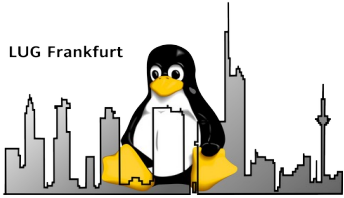
pkts	bytes	target	prot	opt	in	out	source	destination
------	-------	--------	------	-----	----	-----	--------	-------------

Chain FORWARD (policy ACCEPT 0 packets, 0 bytes)

pkts	bytes	target	prot	opt	in	out	source	destination
0	0	ACCEPT	all	--	fralug-net	homenet	10.cc.bb.0/24	anywhere
0	0	ACCEPT	all	--	homenet	fralug-net	anywhere	10.cc.bb.0/24
0	0	DROP	all	--	any	any	anywhere	anywhere

Chain OUTPUT (policy ACCEPT 492 packets, 47580 bytes)

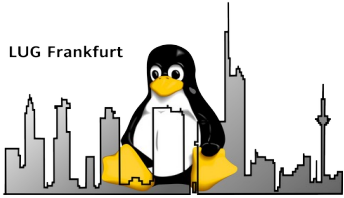
pkts	bytes	target	prot	opt	in	out	source	destination
------	-------	--------	------	-----	----	-----	--------	-------------



fralug-rtg-11b

iptables -t nat -L -v

```
Chain PREROUTING (policy ACCEPT 2 packets, 96 bytes)
  pkts bytes target    prot opt in      out     source      destination
Chain INPUT (policy ACCEPT 2 packets, 96 bytes)
  pkts bytes target    prot opt in      out     source      destination
Chain OUTPUT (policy ACCEPT 6 packets, 426 bytes)
  pkts bytes target    prot opt in      out     source      destination
Chain POSTROUTING (policy ACCEPT 6 packets, 426 bytes)
  pkts bytes target    prot opt in      out     source      destination
    0     0 MASQUERADE all  --  any      homenet  10.cc.bb.0/24  anywhere
```

fralug-rtg-12a

- iptables-save > /etc/iptables/rules.v4 (Teil 1)

*filter

:INPUT ACCEPT [0:0]

:FORWARD ACCEPT [0:0]

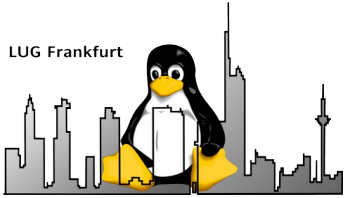
:OUTPUT ACCEPT [0:0]

-A **FORWARD** -s 10.cc.bb.0/24 -i fralug-net -o homenet -j **ACCEPT**

-A **FORWARD** -d 10.cc.bb.0/24 -i homenet -o fralug-net -j **ACCEPT**

-A **FORWARD** -j **DROP**

COMMIT



fralug-rtg-12b

- iptables-save > /etc/iptables/rules.v4 (Teil 2)

*nat

:PREROUTING ACCEPT [0:0]

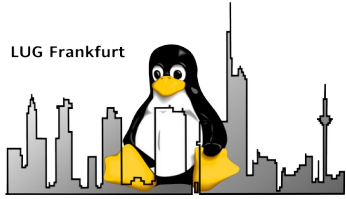
:INPUT ACCEPT [0:0]

:OUTPUT ACCEPT [0:0]

:POSTROUTING ACCEPT [4:359]

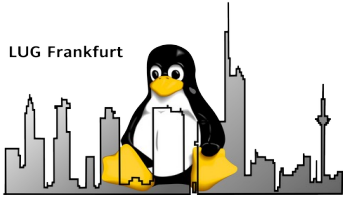
-A **POSTROUTING** -s 10.cc.bb.0/24 -o homenet -j **MASQUERADE**

COMMIT



Inhalt

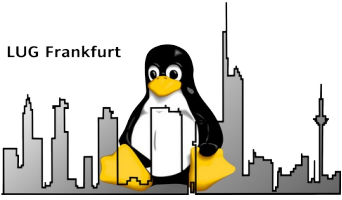
- Zusammenfassung Debian-Basis-Installation
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- **Konfiguration fralug-local**
- Ausblick auf DNS und DHCP



fralug-local-1

- Statische IP-Adresse für fralug-net
/etc/network/interfaces

```
# The primary network interface
allow-hotplug enp0s3
iface enp0s3 inet static
    address 10.cc.bb.10
    netmask 255.255.255.0
    network 10.cc.bb.0
    broadcast 10.cc.bb.255
    gateway 10.cc.bb.254
```



fralug-local-2

- aptitude install iputils-ping

A screenshot of the Network settings window in a Linux desktop environment. The window is titled "Netzwerk" and shows the configuration for "Adapter 1". The "Netzwerkadapter aktivieren" checkbox is checked. The "Angeschlossen an:" dropdown is set to "Internes Netzwerk". The "Name:" dropdown is set to "fralug-net". The "Erweitert" section is expanded, showing the "Adaptertyp:" dropdown set to "Intel PRO/1000 MT Desktop (82540EM)", the "Promiscuous-Modus:" dropdown set to "verweigern (deny)", and the "MAC-Adresse:" text field containing "080027070958". The "Kabel verbunden" checkbox is also checked. The left sidebar shows various system settings categories, with "Netzwerk" selected.

Netzwerk

Adapter 1 Adapter 2 Adapter 3 Adapter 4

Netzwerkadapter aktivieren

Angeschlossen an: Internes Netzwerk

Name: fralug-net

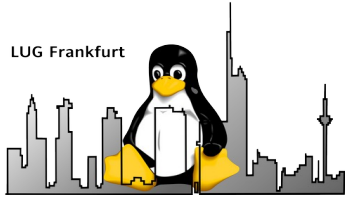
▼ Erweitert

Adaptertyp: Intel PRO/1000 MT Desktop (82540EM)

Promiscuous-Modus: verweigern (deny)

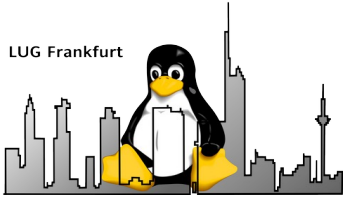
MAC-Adresse: 080027070958

Kabel verbunden



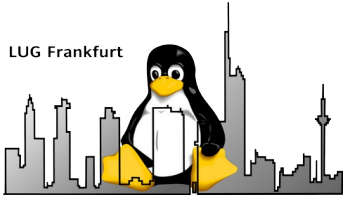
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- **Ausblick auf DNS und DHCP**



Ausblick

- Debian-Container fralug-dns und fralug-dhcp
- Statisches DNS (bind9)
- DDNS / DHCP (isc-dhcp)



Ende

**Danke für's zuhören und
viel Spaß mit Debian**

Fragen und Anmerkungen gerne an m1ist@hk-vision.de