Overview

Manual server management Hetzner cloud administration GUI

#### Create and publish a Hetzner account

#### • Sign up at https://accounts.hetzner.com/signUp.

### Note

ID card may be required, but no payment.

- Activate 2-factor authentication!
- Confirm your newly created account at your Moodle course.
- Upon confirmation by your lecturer a Hetzner project space e.g. »g01« corresponding to your Moodle group number should be visible after login.

### Your cloud project

- After login select »cloud« at the upper right menu or go to projects.
- Select your project e.g. »g01« and click on Security --> Members
   You should see yourself and your Moodle course project partner having »Admin« role assigned.

Server creation prerequisite: A Firewall

- Select Firewalls --> Create Firewall.
- Adapt settings and hit »Create Firewall«

Inbound rules

Just leave the two inbound rules port 22 and ICMP untouched.

Name

Either accept default or set to e.g. »basicFirewall«

Creating a server requires a firewall.

#### Your first server

#### Image:

Debian 12

#### Туре

# Shared vCpu x86 (Intel/AMD) / CX22 or cheapest

Upon hitting »Create and buy« you'll receive an E-Mail containing your server's IP and root password. You may reset root's password in the GUI's rescue tab.

#### Name

An identifier of your choice e.g. **myfirstserver**.

Firewalls

Your previously created firewall.

#### Server access by ssh

```
$ ssh root@95.216.187.60
The authenticity of host '95.216.187.60 (95.216.187.60)' can't be established.
ED25519 key fingerprint is SHA256:vpV7B+19RLQ+SwTMqtkk7YbICBhyhi20P780+WVEFMY.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '95.216.187.60' (ED25519) to the list of known hosts.
root@95.216.187.60's password:
You are required to change your password immediately (administrator enforced).
   . . .
The list of available updates is more than a week old.
To check for new updates run: sudo apt update
Changing password for root.
Current password:
New password:
Retype new password:
```

#### Server access by web gui

- In your cloud project select your server
- Hit the >\_ symbol in the upper right left of the actions button.
- Login using your emailed credentials.

## Tip

#### You may copy text into the console by disabling GUI-mode and re-enabling it subsequently.

#### Followup exercises

288. Server creation289. Server re-creation

Overview

Manual server management Using ssh Public / private key pair

#### Current server security flaws

Password based logins being notoriously prone to attacks.
 Solution: Use public/private key based ssh login.
 No updates: Software state of a most likely outdated installation image.

An elliptic ssh public / private key pair

id ad 2 E E 10	
IU_EUZSSI9	BEGIN OPENSSH PRIVATE KE
	QyNTUx0QAAACDZrjJrxfC/gCHcAhu
	3AAAAAtzc2gtZWQyNTUxOQAAACDZr AAAECjW290zPFjh2srRIloZdaO49c
(private kev)	Cmz+0/yE2w2AzVGDJMvTAAAAImdva gBAgM=
	END OPENSSH PRIVATE KEY-
id ed25519 nub	
	ssh-ed25519 AAAAC3NzaC1 C
(public key)	

ΞΥ----

bmUAAAAEbm9uZQAAAAAAAAAABAAAAMwAAAAtzc2gtZW u6CROIxAps/tP8hNsNgM1RgyTL0wAAAKiPQ5vcj0Ob rjJrxfC/gCHcAhu6CROIxAps/tP8hNsNgM1RgyTL0w cs7hgQ7A71mG8Z+SVDjdmuMmvF8L+AIdwCG7oJE4jE aWtAbWFydGluLXBjLWRhY2hib2R1bi5mcm10ei5ib3

- - - -

Cmz+0/yE2w2AzVGDJMvT goik@hdm-stuttgart.de

#### Safety considerations

#### Private key

- Keep it private!
- Define a good passphrase on key pair creation.
- Cannot be derived / reengineered from corresponding public key.

#### https://www.ssh.com/academy/ssh/passphrase:

A good passphrase should have at least 15, preferably 20 characters and be difficult to guess. It should contain upper case letters, lower case letters, digits, and preferably at least one punctuation character. No part of it should be derivable from personal information about the user or his/her family.

#### Public key

May be given to anybody.

#### ssh-keygen for elliptic key creation

\$ ssh-keygen -a 256 -t ed25519 1 -C "\$(hostname)-\$(date +'%d-%m-%Y')"
Generating public/private ed25519 key pair.
Enter file in which to save the key (/home/foo/.ssh/id\_ed25519):
Created directory '/home/foo/.ssh'.
Enter passphrase (empty for no passphrase): 2
Enter same passphrase again:
Your identification has been saved in /home/foo/.ssh/id\_ed25519 3
Your public key has been saved in /home/foo/.ssh/id\_ed25519.pub 4
...

#### Result of ssh-keygen execution (client side)

```
~/.ssh$ cd ~/.ssh
/home/foo/.ssh cat id_ed25519.pub >> authorized_keys 1
mistudent@w10m:~/.ssh$ ls -al
drwxr-xr-x 2 student mi 0 Okt 17 17:45 .
drwxr-xr-x 32 student mi 0 Okt 17 17:44 ..
-rw-r--r-- 1 student mi 396 Okt 17 17:45 authorized_keys 2
-rw----- 1 student mi 1675 Okt 17 17:38 id_ed25519 3
-rw-r--r-- 1 student mi 396 Okt 17 17:38 id_ed25519.pub 🕢
```

#### Append public key to list of authorized keys. 1

2

- Private key. 3
- Corresponding public key. 4



#### The authorized\_keys file may contain multiple lines containing public keys having access.

#### Transfer public key from client to server

7.27.3	2.138:/tmp	1
103	3.7KB/s	00:00
ssh/au	thorized_ke	eys 3

### Followup exercise

290. Improve your server's security!

Cleaning up!

## Caution This is about \$MONEY \$

- Delete your server including the IPv4 addres
   per hour basis.
- You may optionally delete your firewall.

• Delete your server including the IPv4 address and its volume: All three are being billed on a

Overview

Manual server management Using ssh Passphrases and ssh agent

#### Tedious: Passphrase required for each remote login

>ssh root@learn.mi.hdm-stuttgart.de Enter passphrase for key '/home/goik/.ssh/id\_ed25519': root@learn:~# exit logout Connection to learn.mi.hdm-stuttgart.de closed. >ssh root@klausur.mi.hdm-stuttgart.de Enter passphrase for key '/home/goik/.ssh/id\_ed25519': root@klausur:~# exit logout Connection to klausur.mi.hdm-stuttgart.de closed.

#### Solving the passphrase issue



- Install ssh-agent or related on your system: Passphrase will be cached per session.
- Optional: Connect your password manager to the agent. Example: KeepassXC SSH Agent integration.

#### Behind the scenes: How does it work?

>printenv |grep SSH\_AUTH\_SOCK
SSH\_AUTH\_SOCK=/run/user/21100/keyring/ssh
>ps aux|grep ssh-agent
goik 6671 ... /usr/bin/ssh-agent -D -a /run/user/21100/keyring/.ssh
>ls -al /run/user/21100/keyring/ssh
srwxr-xr-x. 1 goik goik 0 Apr 12 09:58 /run/user/21100/keyring/ssh

Note: The "s" in srwxr-xr-x indicates a domain socket.

#### Followup exercises

# 291. ssh-agent installation

292. MI Gitlab access by ssh

Overview

 Intermediate host hopping

## workstation X.privateKey



#### Intermediate host hopping fails

goik@local> ssh root@learn.mi.hdm-stuttgart.de Linux learn 6.5.13-1-pve #1 SMP PREEMPT\_DYNAMIC PMX 6.5.13-1 (2024-02-05T13:50Z) x86\_64 ... root@learn:~# ssh klausur.mi.hdm-stuttgart.de root@klausur.mi.hdm-stuttgart.de: Permission denied (publickey).

### Intermediate host hopping options

- 1. Copy private key ~/.ssh/id\_ed25519 to intermediate host (and re-enter passphrase there).
- 2. Enable agent forwarding.

### Note

Agent authentication socket on originating client host required.

#### Enable ssh agent forwarding

```
# File ~/.ssh/config goik@local
. . .
Host learn.mi.hdm-stuttgart.de
  ForwardAgent yes # Forward ssh agent
• • •
```

```
goik@local> ssh root@learn.mi.hdm-stuttgart.de
Linux learn 6.5.13-1-pve #1 SMP ...
   . . .
root@learn:~#
root@learn:~# ssh klausur.mi.hdm-stuttgart.de
Linux klausur 6.8.8-4-pve #1 SMP ...
   • • •
root@klausur:~#
```

# to remote host.

### Followup exercise

293. ssh host hopping

Overview

Manual server management
"
Using ssh
"
Port forwarding

#### Forwarding port 80 to 2000 at localhost



### ssh -L localhost:2000:www.hdm-stuttgart.de:80 HostB

Frequent use e.g. connecting to remote database server

# Implicit for ssh-L localhost:2000:localhost:3306 ... # ssh -L 2000:localhost:3306 HostB # Mysql DB Server

```
# Originating host
#
$ telnet localhost:2000
Trying ::1...
Connected to localhost.
Escape character is '^]'.
DHost '127.0.0.1' is not allowed
to connect to this MariaDB server
```

### Followup exercise

294. ssh port forwarding

Overview

# 🗝 Using ssh

Manual server management 

### X11 browser application forwarding



### Followup exercise

#### 295. ssh X11 forwarding

Overview

Manual server management
Prerequisites

#### Shell / Bash

#### **Bash Guide for Beginners**

#### Choosing a text editor

- How to Use Nano

#### • Vim Introduction and Tutorial

#### Secure Shell

- Public/private keys, pass phrases
- Trusted hosts
- Port forwarding
- X11 forwarding
- ssh agent

The definitive guide, also available at SafariOnline

### Working with files

- rm, rmdir
- Is, file
- find / locate
- touch
- chmod / chown
- head, tail
- grep

### Network

- ip
- ping
- route
- traceroute

dig / nslookup

### Processes handling

- ps
- kill
- nice

# • top / htop

#### Followup exercises

#### 296. Enabling index based file search 297. Using the **tail** - f command

Overview

Manual server management Ubuntu / Debian Package management Prerequisites

#### Suggested readings:

- Debian package management introduction and reference.
- Using PPA in Ubuntu Linux

• 15 Practical Examples of "dpkg commands" for Debian Based Distros

### . deb packages

- Archive containing:
  - Files

  - trigger

# • Sample: firefox\_75.0-2\_amd64.deb

• Pre- and post installation scripts

### The dpkg command

#### • Query installed, install / update from file system and purge packages, i.e.:

> dpkg -i skypeforlinux-64.deb



- Low level package management
- Dependency unaware

```
ld
alF-conf/...
amd64...
all
<none>
<none>
<none> ...
```

#### The apt command

- Network based
- Dependency aware
- Automated system updates

```
#> apt update 1
• • •
4 packages can be upgraded
#> apt upgrade 2
    The following packages will be upgraded:
• • •
  libldap-2.4-2 libldap-common libssl1.1 openssl
• • •
Get:2 http://security.debian.org buster/updates/main ...
```

Hit:1 http://security.debian.org buster/updates InRelease

Get:1 http://security.debian.org buster/updates/main ...

#### Rationale using PPA's

- "Not available here"
- Version outdated
- Needing "bleeding edge" version

**Problems:**