Advanced Computer Networking (ACN)

Exercise 1 – Intro

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Outline

Announcements

For questions and problems:

- Always use this mail address: acn@net.in.tum.de
- If you have problems with our infrastructure / setup write us a mail
- If you have feedback for our audio / video / streaming setup, please let us know

Bonus

$$\begin{aligned} \text{creditsExercise} &\in [0, 60] \\ \text{creditsProject} &\in [0, 10] \\ \text{creditsExam} &\in [0, 75] \end{aligned}$$

$$\text{creditsBonus} = \min(15, (\text{creditsExercise}/6 + \text{creditsProject}))$$

$$\text{finalGrade} = \begin{cases} \text{grade}(\text{creditsExam} + \text{creditsBonus}) & \text{, if grade}(\text{creditsExam}) \in [1.0, 4.0] \\ \text{grade}(\text{creditsExam}) & \text{, otherwise} \end{cases}$$

Remarks:

- **the bonus is valid for both the endterm and retake exam!**
- **the bonus of the previous semester is NOT valid for this semester!**

How to get access?

- Every TUM student has an LRZ Gitlab account, use your LRZ ID to login (e. g. ta12xiz)
- We need to match you (especially your TUMonline account) to your Gitlab account
- For this we have a webservice:

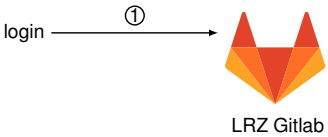
`https://acn.net.in.tum.de/auth`

- The website asks you to login both into TUMonline and Gitlab
- Once this was successful, you are granted access to the required Git repositories
- Additionally, we fetch all `ssh` public keys you uploaded to Gitlab for VM access
- If this is not the case, let us know so we can help you

You get access to these repositories:

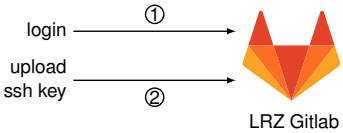
- Your personal repository
- Material
- Template

VM Infrastructure



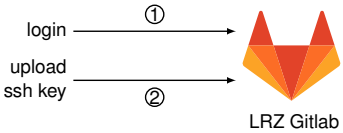
1. Login to `https://gitlab.lrz.de`

VM Infrastructure



1. Login to `https://gitlab.lrz.de`
2. Upload public `ssh` key

VM Infrastructure



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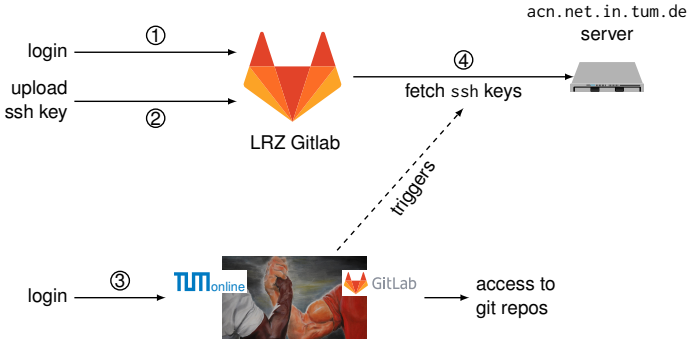

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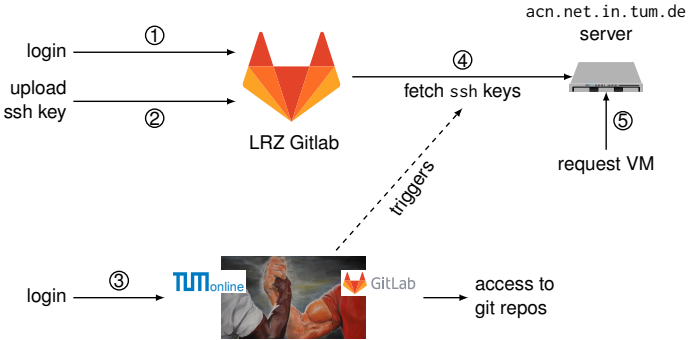
2. Upload public `ssh` key
3. Login to `https://acn.net.in.tum.de/auth`
4. Fetching of `ssh` key is triggered

VM Infrastructure



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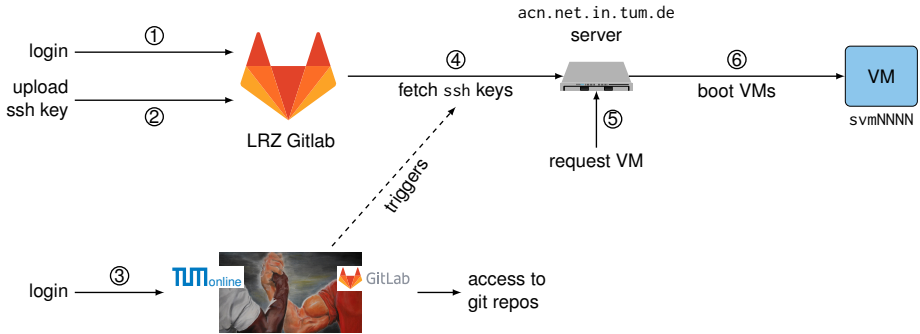
5 SSH into `svm@acn.net.in.tum.de`, requesting your VM

VM Infrastructure



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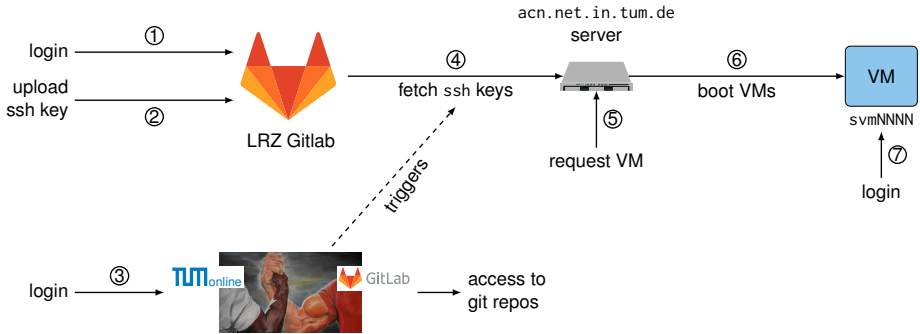
VM Infrastructure



1. Login to `https://gitlab.lrz.de`
2. Upload public `ssh` key
3. Login to `https://acn.net.in.tum.de/auth`
4. Fetching of `ssh` key is triggered
5. SSH into `svm@acn.net.in.tum.de`, requesting your VM
6. VM is booted
7. SSH into your personal VM after waiting for it to boot

VM Infrastructure

How to start your VM:

- You are provided with 1 VM for the exercise and the project
- To boot it run: `ssh svm@acn.net.in.tum.de`
- Login to individual VM:
  e. g. `ssh root@svm1234.net.in.tum.de`
- The VM is shut down after 12 hours of inactivity
- The VM contains a key for your Git repositories

```
$ ssh svm@acn.net.in.tum.de
PTY allocation request failed on channel 0
Creating/starting VMs: svm1234. This might take a while ( 30s)...

Your VM has been started. SSH host key fingerprints are as follows:

root@svm1345.net.in.tum.de

3072 SHA256:6rknTI86qh1Vjcb764Lqk2jOxPSuwyE6O/LnwL/Z6Lc root@svm1234 (RSA)
256 SHA256:266RQ4KVKqXQEfGFYerzUhOpDsc7RNngGaqSf5vIdFU root@svm1234 (ED25519)
3072 MD5:26:67:e7:ec:4e:18:d2:7c:5f:cf:c2:7a:6c:7b:a4:4b root@svm1234 (RSA)
256 MD5:01:4f:05:54:20:d5:17:1e:1a:df:af:85:91:b8:60:54 root@svm1234 (ED25519)

Connection to acn.net.in.tum.de closed.
```

Exercise

Procedure

- Each tutorial consists of a Jupyter Notebook file (e.g. `tutorial1.ipynb`)
- You submit your solutions via Git before the deadline
- We present a solution approach in the lecture afterwards
- These exercises will be streamed via `https://live.rbg.tum.de/` and will not be recorded
- You can correct / update your submission accordingly (Do not just copy-paste the solution)
- We provide a solution eventually
- **The content of the exercise is part of the exam!**

Grading

- 6 tutorial sheets, overall 60 bonus credits
- Both submissions are considered for the grading
- We provide the achieved credits after the correction via your Git repository
- Make sure your submission can be executed without errors
  - We do not fix syntax errors
  - We do not fix runtime errors
  - If the notebook cannot be executed on the provided VMs $\rightarrow$ no credits

Academic Misconduct

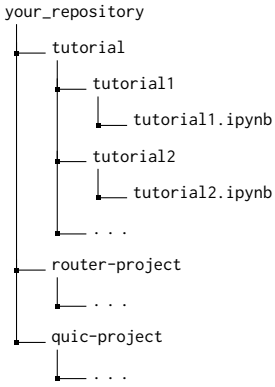
- We check your submissions for plagiarism
- Violating the academic code of conduct results in exclusion from the bonus system
- This means the exercise **and** the project

Exercise

Run the Notebook on the VM

- Build an SSH tunnel with port forwarding
  `ssh -L 1337:localhost:1337 root@svmXXXX.net.in.tum.de`
- Run the Jupyter Notebook on the VM: `jupyter notebook`
- Access the notebook with your browser: `http://localhost:1337`
- Make sure you **commit and push** your filled Jupyter Notebook file to your Git repository in time

Git Repository

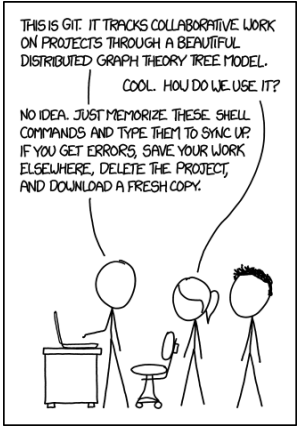


Exercise

Useful Git and SSH Commands

- Request repository access and trigger `ssh` key fetch
  `https://acn.net.in.tum.de/auth`
- Start your VMs
  `ssh svm@acn.net.in.tum.de [-i path/to/your/privatekey]`
- Merge resources into your repository
  `git remote add template git@gitlab.lrz.de:acn/terms/2023ws/template.git`
  `git remote update`
  `git merge --allow-unrelated-histories template/tutorial`
- Build an SSH tunnel to Jupyter Notebook VM and forward port
  `ssh -L localhost:1337:localhost:1337 root@svmXXXX.net.in.tum.de`
- Run Jupyter Notebook on the VM
  `jupyter notebook`
- ssh config for Git access

```
Host gitlab.lrz.de
 User git
 Identityfile path/to/privatekey
```



Tutorial 1

Deadlines

Start	October 26, 16:00
First submission	November 02, 14:00
Exercise lecture	November 02, 14:00
Second submission	November 9, 14:00

Content

- Will be available on Thursday in the template Git (branch: `tutorial`)
  - `tutorial/tutorial1/tutorial1.ipynb`
- Contains short questions about SSH, Git, Jupyter Notebook and IPv6