

Public Cloud Services Intro



Who am I?



Prof. Dr.-Ing. Sebastian Graf

Cloud Computing & agile Softwareoperations
Institute IMVS, FHNW Brugg/Windisch

CV

- Dr.-Ing., University of Konstanz
- Sev. Startups as Software Engineer
- 8 years at SBB
 - Softwareengineer, -architect
 - Product Owner, Tools
 - Product Manager, Cloud and Tools

Who am I?



- **Prof. Dr.-Ing. Sebastian Graf**
Cloud Computing & agile Softwareoperations
Institute IMVS, FHNW Brugg/Windisch
- **E-Mail:** sebastian.graf@fhnw.ch
- **Mobile:** +41 56 202 80 83

Who is he?



– **Marc Merzinger**

E-Mail: marc.merzinger@fhnw.ch

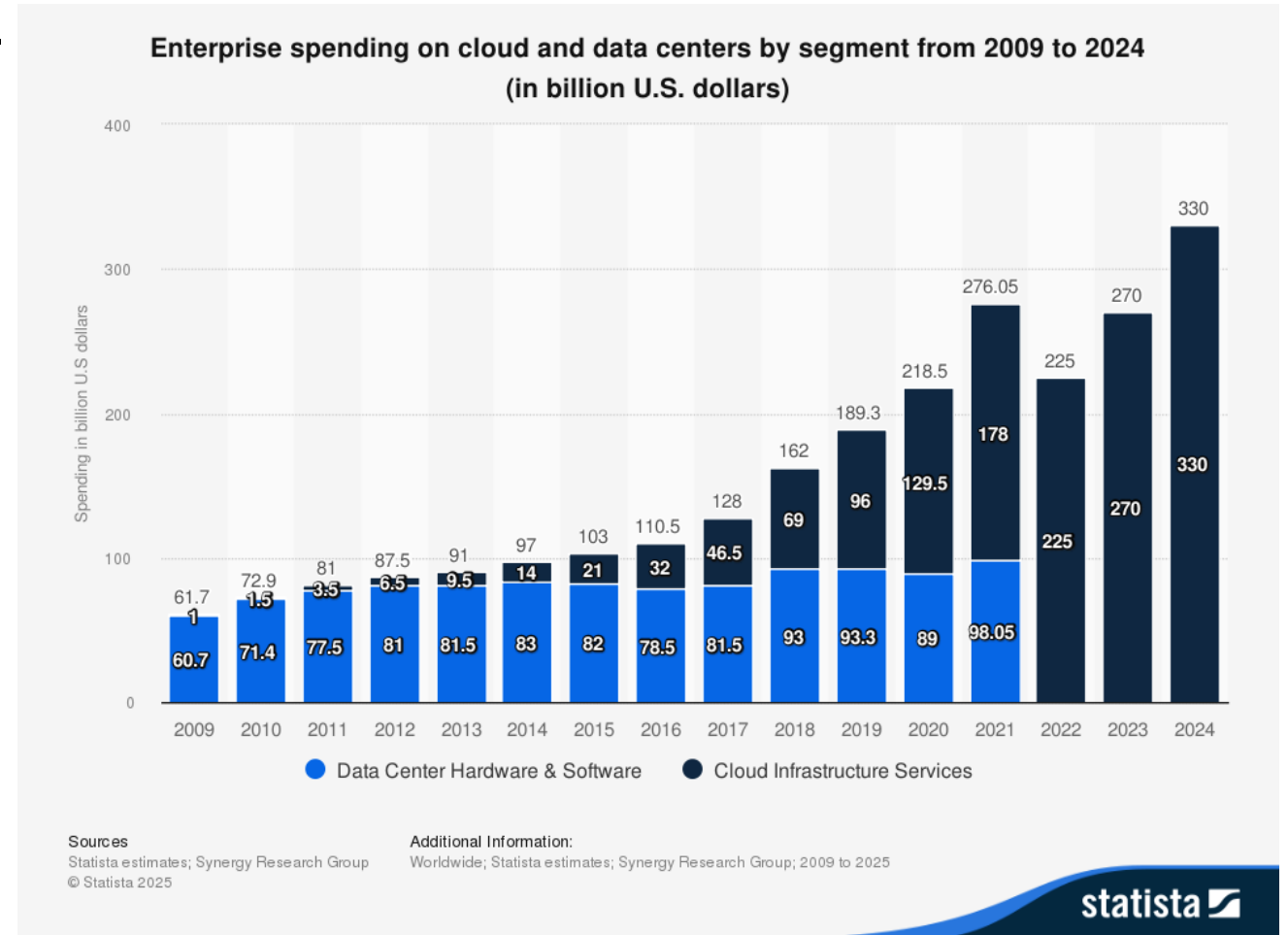
Former TI&M, now at mpirix AG

More Introduction by himself later in the lecture...

Market Share, Public Cloud

Sustainable change of procurement of IT-infrastructure:

- Continuous Increase of Cloud Resources VS static consumption of on-prem resources
- Public Cloud Services is software: Infrastructure and Software merge
- New Job Profiles: Cloud Engineer, DevOps Engineer
- New Responsibilities: Shift Left to Dev when it comes to Dev and Ops



But...

Analysis April 29, 2025

Trump tariffs threaten cloud price hike for European startups

There's growing concern that a rise in cloud computing costs could hit growth ambitions and delay profitability among Europe's startups

09 SEP 2025 | **PRESS RELEASES**

Investing in Europe's AI & Critical Tech: 41 European CEOs stand ready to invest in Europe's Competitiveness and Security

heise online > Microsoft > Strafgerichtshof: Microsofts E-Mail-Sperre als Weckruf für digitale Souveränität

Strafgerichtshof: Microsofts E-Mail-Sperre als Weckruf für digitale Souveränität

Microsoft hat nach Trump-Sanktionen das Mail-Konto des Chefanklägers des Internationalen Gerichtshofs blockiert. Kritiker: "Wir brauchen dringend Alternativen."

How U.S. tariffs are reshaping the tech landscape

The Trump Administration's tariffs levy a minimum 10% tax on global imports, heavily affecting tech industry supply chains.

ADVERTISEMENT

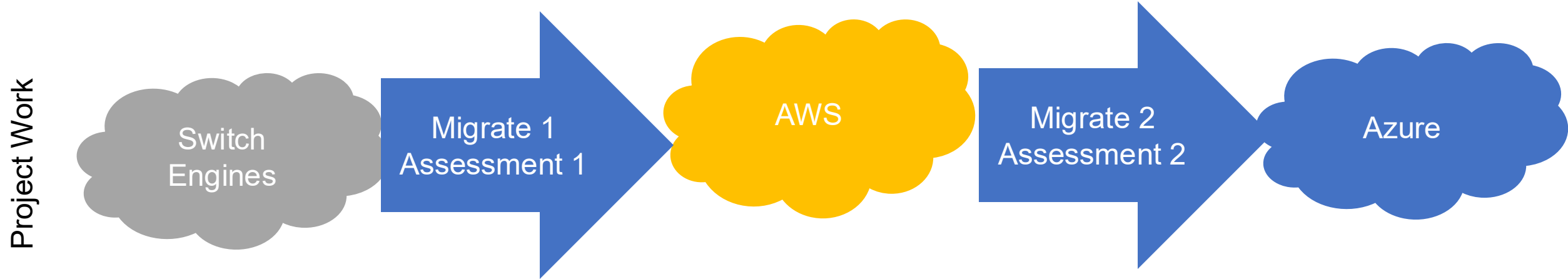


Learning Target

- Overview over different Cloud Providers
 - Community Cloud: Switch
 - Public Cloud: AWS / Azure
- Costs and Impacts on those Costs / Procurement
- Infrastructure as Code
 - Defining different Infrastructures as Sourcecode
 - Golden Paths / Best Practices
- Service Classes (mostly based on Container)
- Migration Paths between Infrastructures



Setup of this Course



- Concepts
- Basic Concepts
 - IaaS/PaaS/SaaS
 - Infrastructure as Code
 - Container Services
 - Function as a service
 - AI
 - Databases
 - Networking / Connectivity
 - Security

Difference to last year

HS 2024

Grade:

Project based (50%)

- Case Study
- Quite free to do whatever one want

MSP (50%)

Content, theoretical:

- Service-oriented

HS 2025

Grade:

*Project based (2 * 25%)*

- Group-based (3-person fix)
- Concrete Task to be evaluated:
 - Migration from IaaS of one cloud to container service on the other cloud (AWS)
 - Migration from container service on other cloud (AWS) to FaaS to third cloud (Azure)

Written Exam (50%)

- Individually via Campla / Moodle

Content, theoretical:

- Use-case oriented
- Migration Path

Lecture Format

Lecture is design as non-remote lecture:

- Everything handled in the lecture might be part of the exam.
- We will discuss the assignments / show solutions in the lecture.
- If you are unable to attend, I might stream but do not rely on it.

At home:

After each lecture, there will be assignments counting towards the next migration:

<https://spd.pages.fhnw.ch/module/pcls/tutorials/assignments/public-cloud-services/hs25/index.html>

Additionally we will might provide learning paths for additional information to get into touch with public clouds, etc.

Projects: Migration between Clouds

Migrate a running application from one cloud to another:

- IaaS (SwitchEngines) → PaaS (ECS/AWS)
- PaaS (ECS/AWS) → FaaS (Azure)

Artifacts of each assessment:

- IaC of the infrastructure
- Short Screencast of Migration (max. 5min)
- Platform itself
- Short Report of Migration (3 points)

→ Deadline for these artifacts:

Sunday, 23:59 of KW42/KW48

- Short Question-Round related the artifacts in the group the next session



Projects: Migration between Clouds

Migrate a running application from one cloud to another:

- IaaS (SwitchEngines) → PaaS (ECS/AWS)
- PaaS (ECS/AWS) → FaaS (Azure)

What we provide:

- Accounts on Switch / AWS. / Azure
- DNS to be included in migration
- BSS-slots to work on the migration with guidance

Each migration counts towards 25% of the grade.
Should be in a group of exact 3.



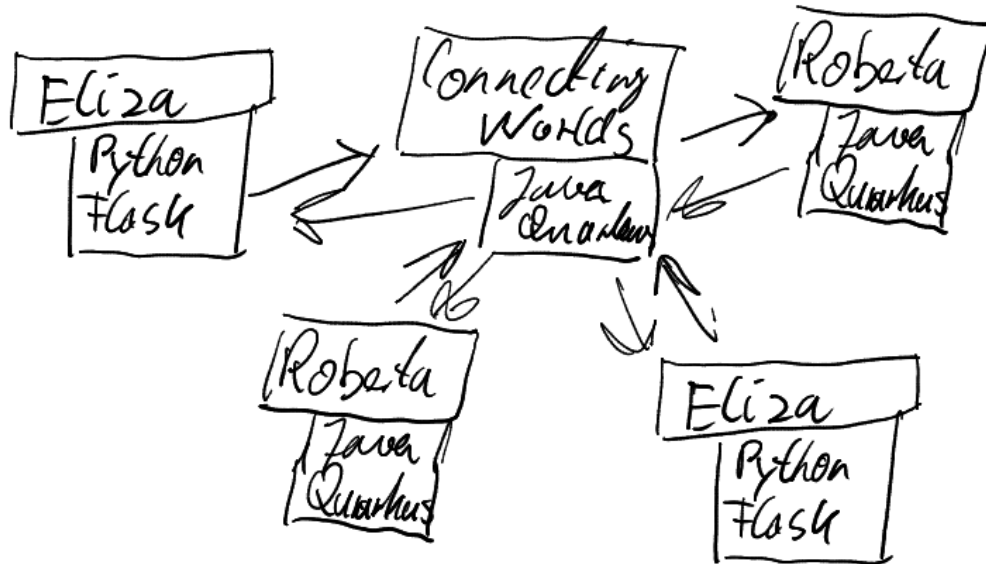
Written Exam

There will be a written exam in the last week (counting 50% of the grade):

- 60 min duration, **Montag, 16.12.2026, 12:15h, 6.-1D09, Foyerraum A**
- Moodle with Campla
 - Test Exam one week before to check your setup
 - You are responsible to ensure you laptop will be able to work with Campla / Moodle
- Closed Book
 - Concepts
 - Multiple Choice
- Also notes from the lecture not directly mentioned on the slides might be part of the exam
 - This includes also the practical parts
 - O'Reilly-List: <https://learning.oreilly.com/playlists/a27d30d7-f139-4476-9c3a-e0abeb0f89da/>
 - Drehbuch: <https://sgi.pages.fhnw.ch/moduluebersicht/pcls/drehbuch.html>



Given Microservice Architecture

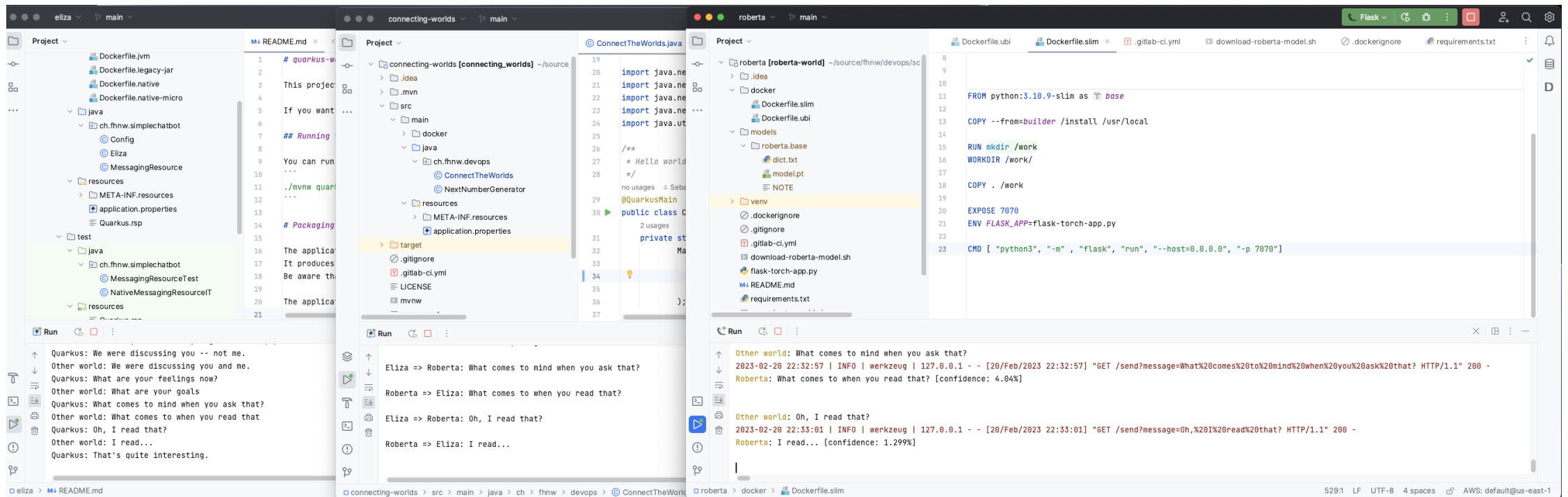


Chatting LLMs:

- Chatbots to be implemented by you
 - You can reuse your chatbot...
 - Quality of LLM is not evaluated...(maybe this might change in the AI-block...)
- “Connecting Worlds”
 - Message Broker
 - Provided by us
 - Templates to be forked and adapted by you to connect your services



Microservice Architecture

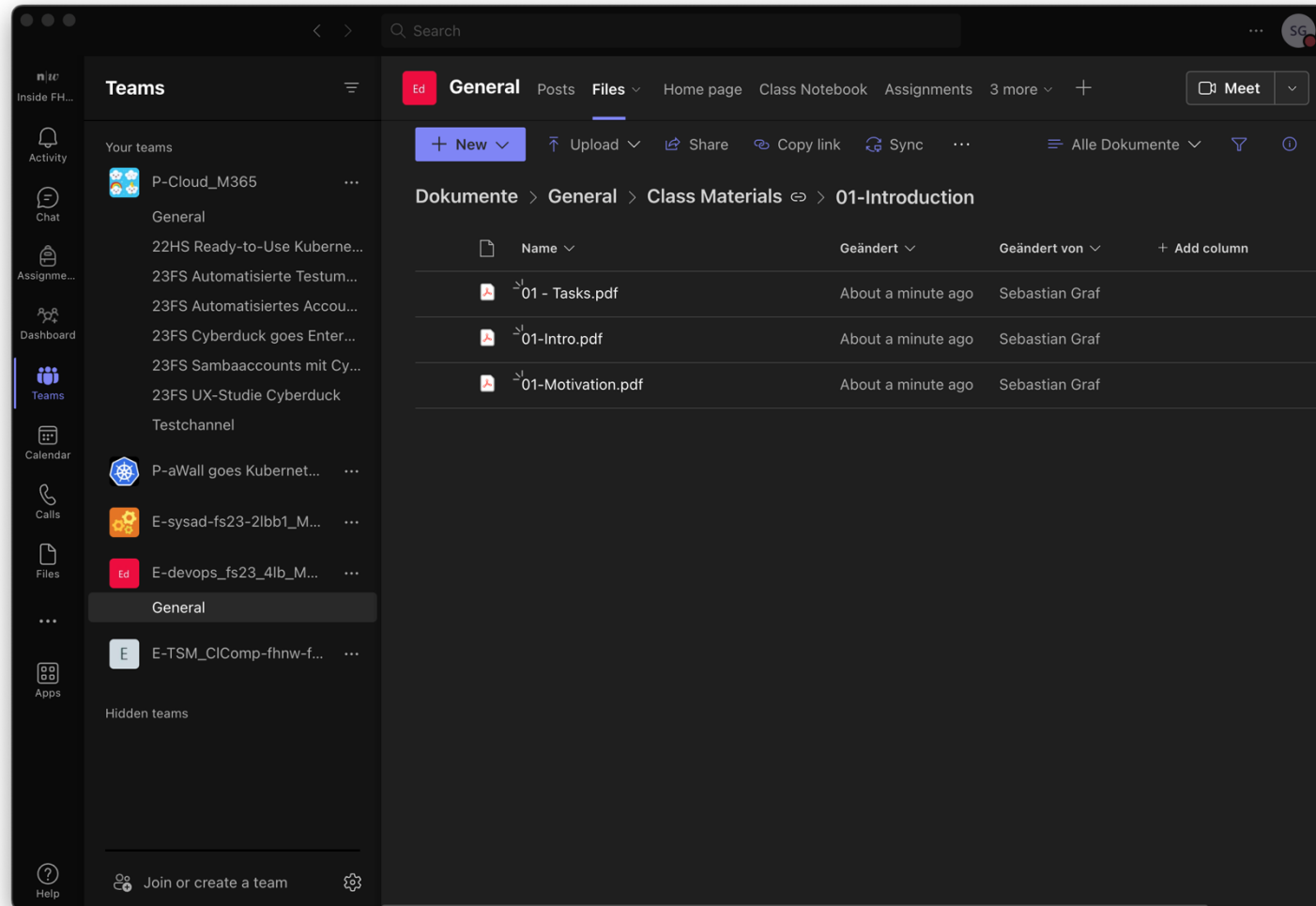


Technical base

- Programming languages for chatbot:
 - Java (GraalVM / Quarkus)
 - Python (Flask)
 - Go (Gin)
- IaC-Stack:
 - Git
 - Azure-CLI / az
 - AWS-CLI / aws
 - Tofu / terraform
 - Ansible
- Server site platforms:
 - GitLab
 - AKS
 - Switch Engines
 - AWS

I will present my toolsetup today at the end of the session for those interested

Communication



Anyone missing?

Gitlab

In “your” projects:

Your applications:

- One application -> one repository
- Build is mandatory
- Container Registry will be used

Your report-repository as fork from mine

<https://gitlab.fhnw.ch/spd/module/pcls>

Visibility is private for you and us



Tutorial

Templates for optional forking in your projects

- Assignment-Repository
- Visible

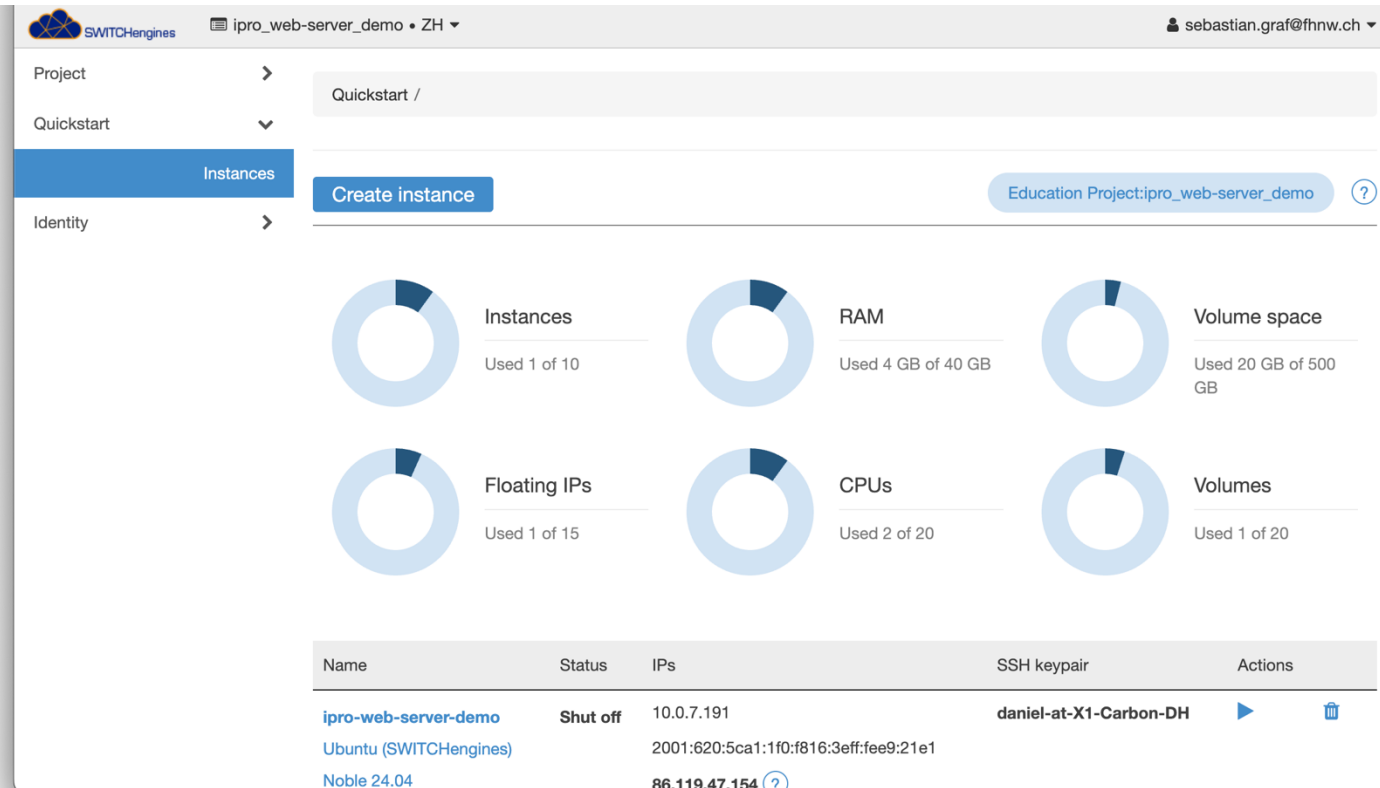
Solutions

- Discussed but not provided
- Not visible

Switch Engines

Each team receives a dedicated
SwitchEngine-project:

- Shutdown at night
- Only single server is needed for hosting the application
- IaC integration will be part of provisioning

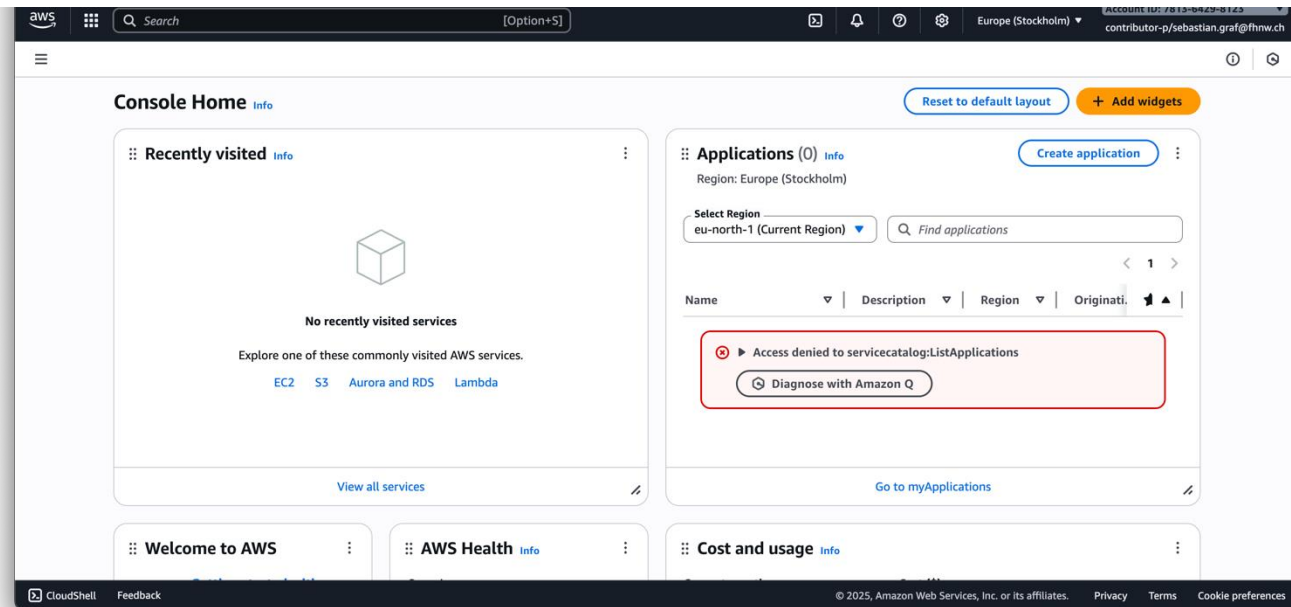


AWS



Your Account:

- Provided by AWS
- Operated by Cooperate IT
 - You will get an own account
- Home after first migration
- Needs to be provisioned via IaC
- Cost Efficiency will be evaluated



Azure

Your Resource Group:

- Provided by Azure
- Home after the second migration
- Needs to be provisioned via IaC
 - No AKS/Kubernetes
- Cost efficiency will be evaluated

