Tampere University

COMP.SE.140 – Continuous Development and Deployment - DevOps

What is this course about

- How to design, implement, deploy and operate cloud applications.
- So, this is a DevOps course
- A lot about automation of the above

Course staff

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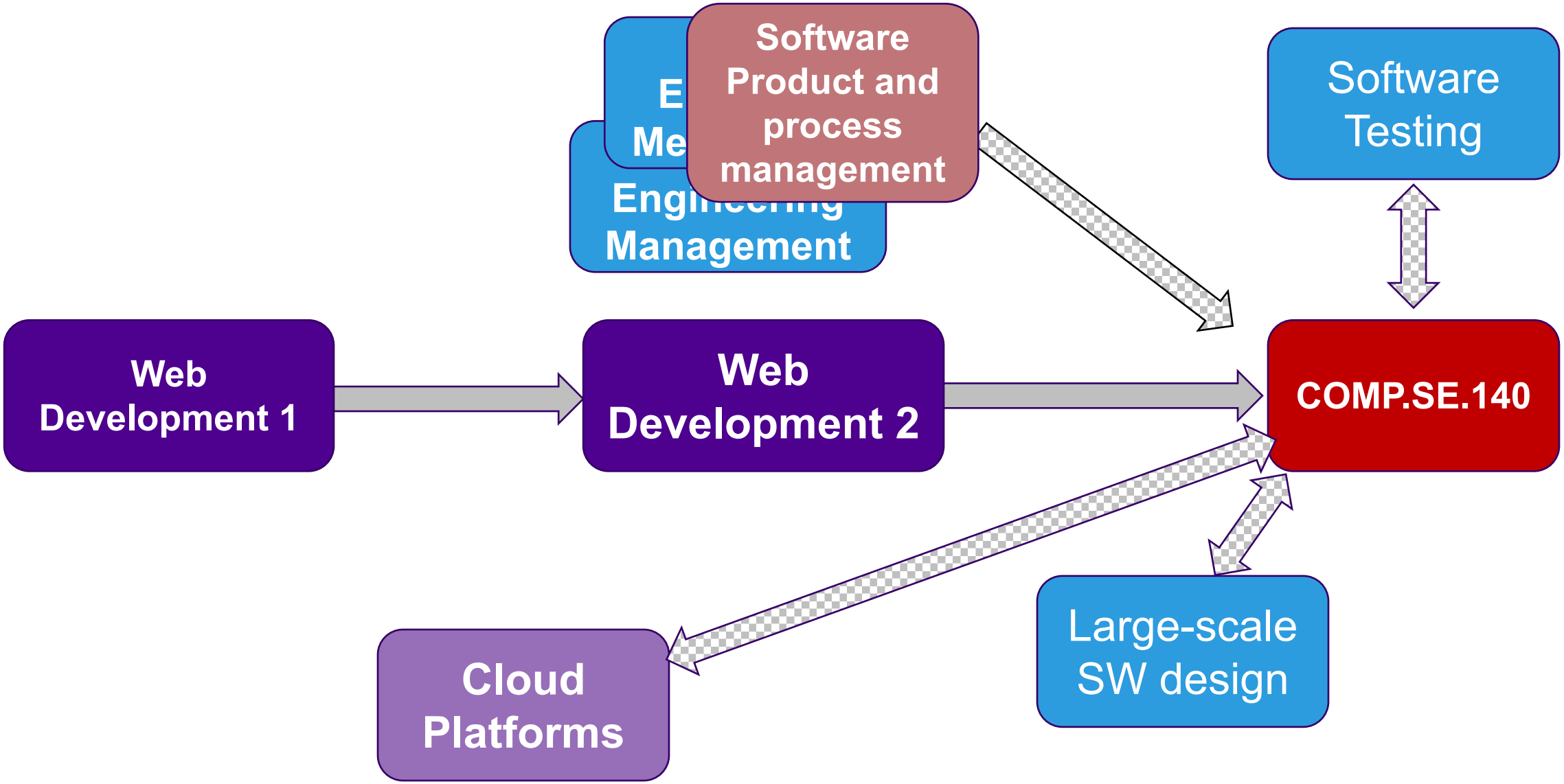
Software Product and process management
Software Testing
Web Development 1
Web Development 2
COMP.SE.140
Cloud Platforms
Large-scale SW design

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Pre-requisties required or not?

- We do not want to set bureaucratic rules, but
  - In order to teach advanced topics, we need to assume that the students know quite a lot.
    - Since we have separate courses, we do not want to teach everything here
  - We want that the required effort is reasonable for 5 cu.

- All teaching in this course assumes that you are starting second (theoretically last) year of master studies

What do we expect in practice

- Basics of “process” side of software engineering, (e.g what is Agile, really)
- Understand basics of operating systems and have sufficient mastering of Linux command line.
- Know basics of cloud, virtualization and docker.
- Be fluent in programming with technologies used cloud applications. You can use Java, JavaScript, Python or Golang, ...
- Know version management and be fluent with git
- Basics of TCP/IP, e.g. what is "NAT".

2020

- About half of those with missing background decided to postpone
- More than half who decided to try, either dropped out failed

=> 25% succeeded

2021

- 72 students initially registered
- Many without background decided to skip
- Many stopped during the course

=> 26 (36%) succeeded

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2022

- Initially registered: 124
- Finally passed: 58 (that is 47%)

Sounds bad

- But for those who have the assumed background, the success date is pretty good considering that this is not a compulsory course.
- Anyways: this may be the most demanding course in SW engineering programs and meant to be one on the very last courses.

2023 (as of 28.8)

- Enrolled in SISU: 139
- Enrolled in plus.tuni.fI: 113
- Questionary filled: 76
  - 14 does not live in Tampere
  - 40 has substantial load from their employer
  - 48 has prefer on-line learning

Course content

- Theory-part
  - Lectures (mainly videos from last year) and reading material
  - Discussion and info-sessions (On-campus, on-line, on-??)
- 3-6 Hands-on exercises
  - We use https://plus.tuni.fi/comp.se.140/fall-2023/ and https://course-gitlab.tuni.fi/ for returning
- A small project
  - You will build a continuous deployment pipeline for a small application
  - Details will be published early October

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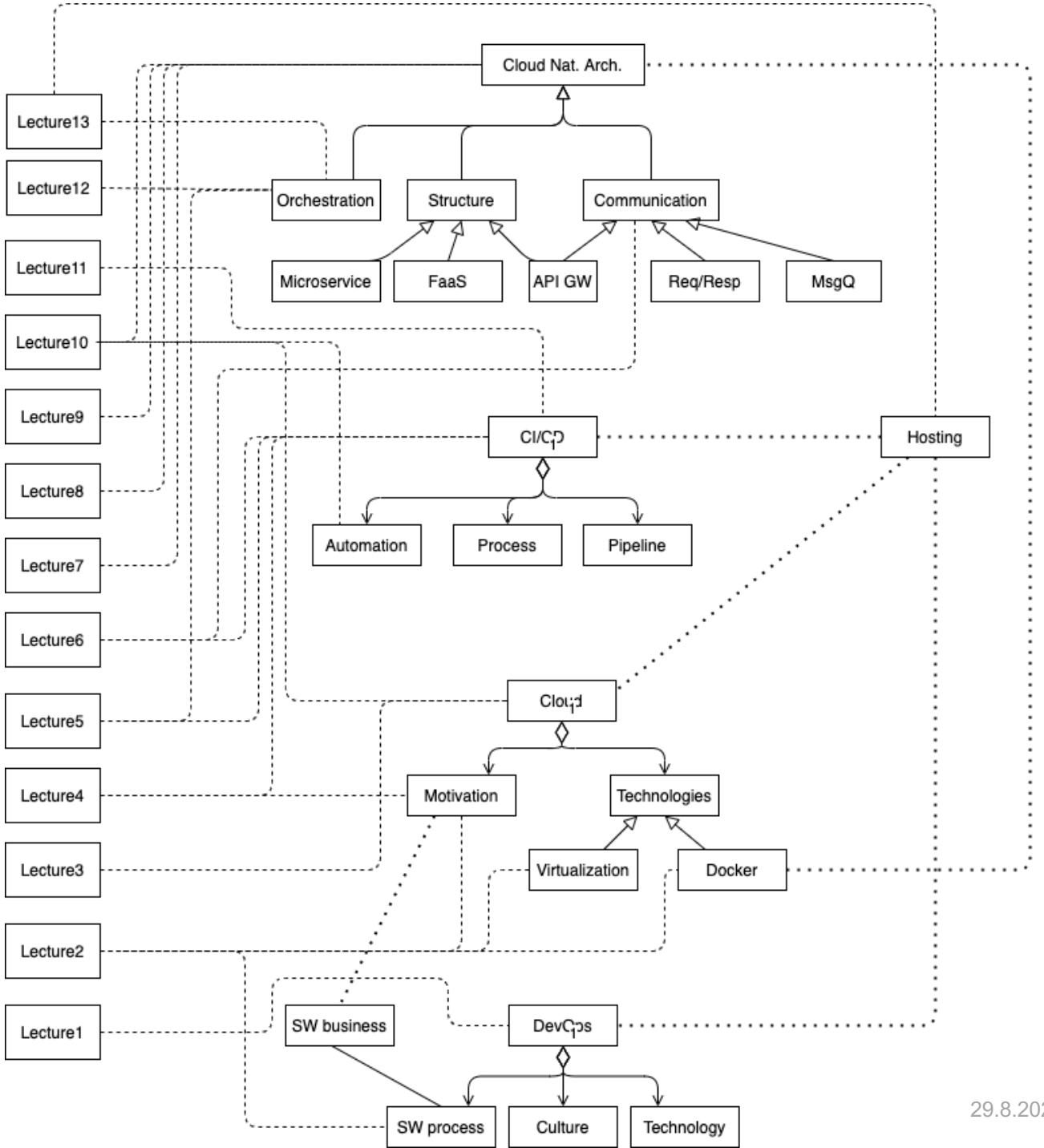
Content map



Project

- In which language?
  - YAML
  - JavaScript, Python, Golang…
- The main parts are
  - building of the pipeline
  - Cloud-friendly application structure

Teaching

- “Lectures”
  - Would be fun if I had active audience (and many people consider old-fashioned)
  - We will use old videos, but some new content provided by lectures.
  - Instead, let’s have some discussion sessions (not necessary every week)

Tools and environments we uses

- plus.tuni.fi
- course-gitlab.tuni.fi
- Linux virtual machine

On-line exercises

- 3-6 exercises
- To
  - get hands-on view to content
  - prepare for the project

- Implemented in plus.tuni.fi

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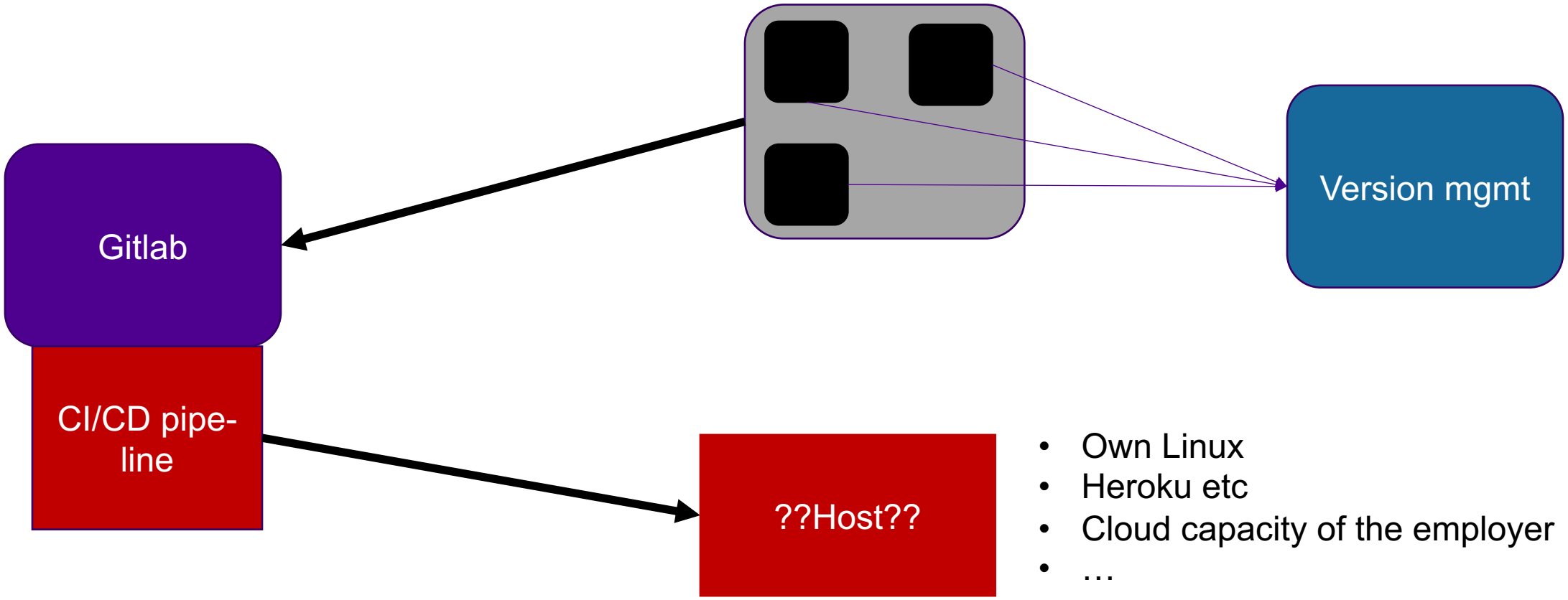
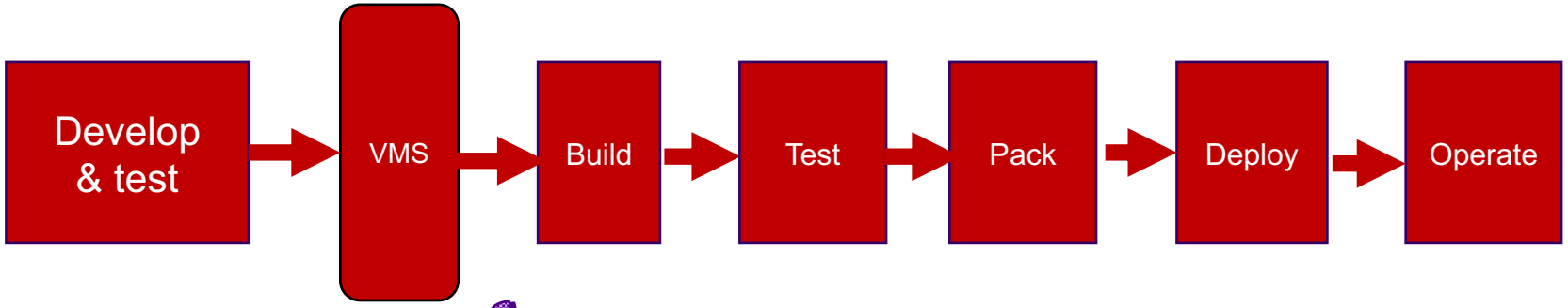
Project

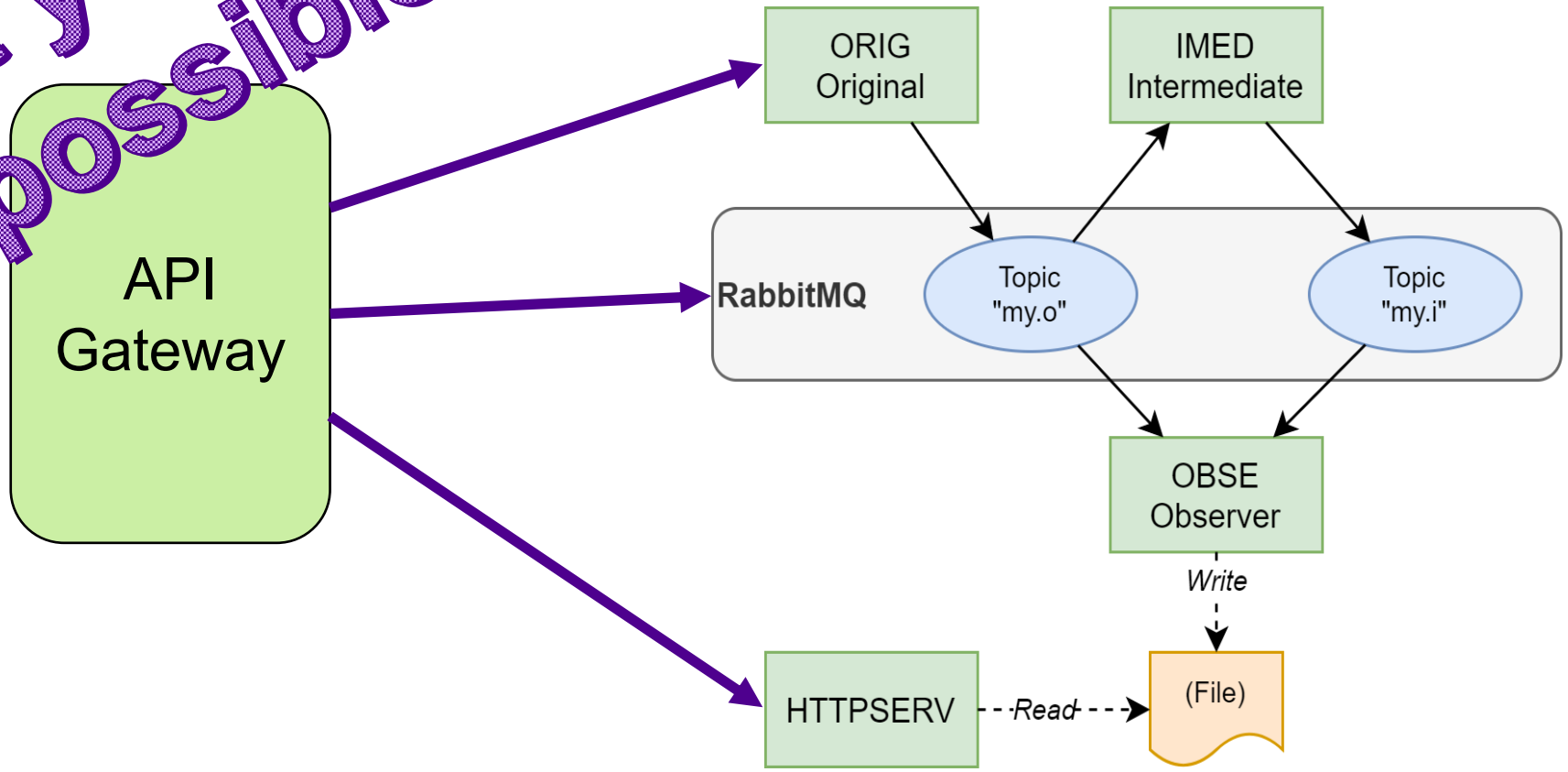


- Own Linux
- Heroku etc
- Cloud capacity of the employer
- …

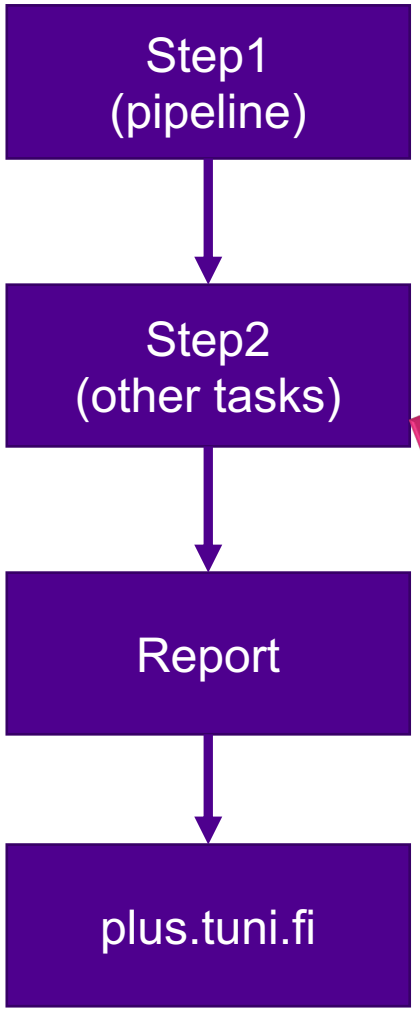
Project



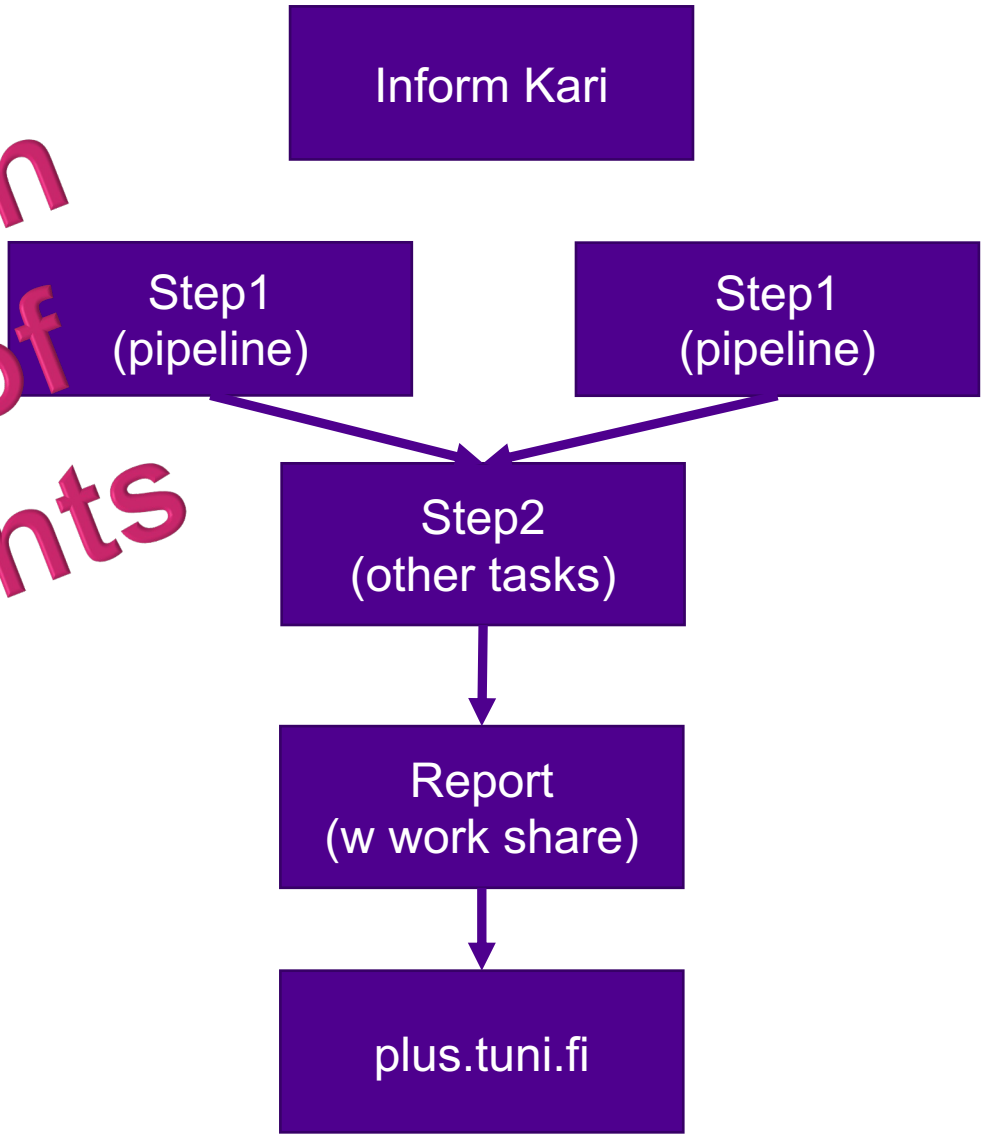
From last year, changes possible



Two options: individual or pair



Depends on number of participants



Device requirements

- By default the students should have an access to a Linux system
  - A virtual machine is recommended, e.g. VirtualBox on your PC,
    Note: m1-based Mac cannot run VirtualBox, but somebody could try
    https://mac.getutm.app/gallery/ubuntu-20-04 or
    https://multipass.run
  - Windows highly unrecommended
- A host that works as a deployment target for a project would be nice
  - There are free options

- We are also investigating availability computing resources at the university;
  it is probable that those can be accessed from the university premises, only.

Passing requirements

- Exam (50%)
  - Electronic
- Project (40%)
  - Details will be published in couple of weeks
- The on-line exercises (10%)

Course material

- Examples of recommended reading
  - Humble, Farley: Continuous Delivery: Reliable Software Releases through Build, Test, and Deployment Automation (Addison-Wesley Signature Series)
    - Classical book but a bit outdated – so only selected parts will be used
  - Summary part of “Lwakatare, Lucy Ellen: DevOps adoption and implementation in software development practice : concept, practices, benefits and challenges, ”, http://urn.fi/urn:isbn:9789526217116
  - Peter Mell; Timothy Grance (September 2011). The NIST Definition of Cloud Computing (Technical report). National Institute of Standards and Technology: U.S. Department of Commerce. doi:10.6028/NIST.SP.800-145. Special publication 800-145. https://nvlpubs.nist.gov/nistpubs/Legacy/SP/nistspecialpublication800-145.pdf

FAQ

- Q: Is this an AWS course?
- A: No. We will use AWS as on example in various places, but the philosophy is to stay technology and vendor neutral
- Q: Is this a Kubernetes course?
- A: No. You will hear about Kubernetes but this course is more about general principles.
- Q: How does this course relate to *TIE-23546 Cloud Platforms*?
- A: This course is a DevOps course aimed at master-level students majoring or with strong background on software engineering. TIE-23546 is for open university students and it's content focuses on infrastructure.
- Q: Can this course we taken remotely?
- A: Yes, but for the exam you need to use facilities of some Finnish university with a compatible exam room.
- Q: Are events recorded?
- A: Yes, and we also utilize the recordings from the last year.

My goals & thinking

- Tell “why” – you should understand the background of techniques and practices
- No ”repeat after me” thinking
- Teach principles instead of spesific technologies
- Avoid “Cargo Cult Programming”

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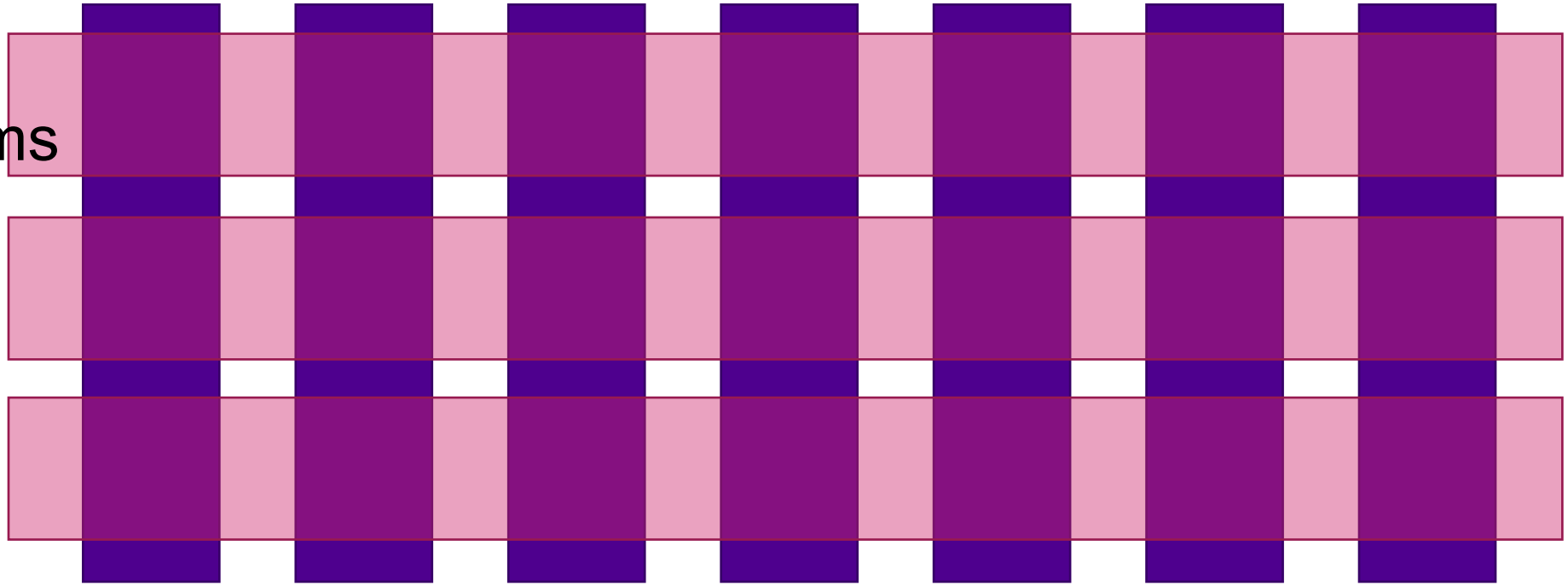
Created: 1 January 1967

What and why?

tools

ECO-systems
- Azure
- Amazon
- Google



Underlying principles

Course material will be in ”plus”.

- Previous years:
  - https://plus.cs.tut.fi/cloudapps/spring-2019/
  - https://plus.tuni.fi/tie-23536/autumn-2019/
  - https://plus.tuni.fi/comp.se.140/fall-2020/c01_intro/03_material/
  - https://plus.tuni.fi/comp.se.140/fall-2021/c01_intro/03_material/

  - https://plus.tuni.fi/comp.se.140/fall-2022/c01_intro/03_material/

First plus-”exercise” is a background check

- Already opened
- Second will be hands-on with Docker

Homeworks

05.09: Discussion about DevOps (Tue 05.09 at 1015 in TB207, Tietotalo)

- To prepare: watch https://tuni.cloud.panopto.eu/Panopto/Pages/Viewer.aspx?id=4b7b047e-1b85-4e53-89f8-ad9400924252 and read 2.1 and 2.2 from http://jultika.oulu.fi/files/isbn9789526217116.pdf

At the event we will discuss these and cover some new material

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About communication

- Email (yes, I assume that you read your tuni-mail regurlary. If you want me to use some other mail, let me know)
- Plussa