Data center networks lab

“Cloud networks”






Background

- Cloud based services
  - run on off the shelf servers in data centres
  - Organisations swap CAPEX for OPEX
  - easy to scale resources up and down based on need
  - “Everything is being cloudified”
    - 5G core network functions (NFV)
    - Data storage
    - Processing, computation
    - web services
  - the data center is a placeholder for the virtual universe
    - it has it’s own way of dealing with networking

The two aspects in this lab

- Testing before deployment in live environment
  - Since many services share the same hardware platform in virtual instances, deploying new services and protocols is dangerous
  - emulate datacenter networks and test engineering solutions first (mininet)
- Hands on experience with configuration of virtual networks using the inbuilt native Linux support
  - know how it works in practice, not just theory

The COVID lab, E:4155

- 6 stations with room for 2 students per desk, please keep the distance
- Registered students access, SALTO lock need to activate card
- Booking of work space through the course web site
- If a computer doesn’t work, email tutor with machine name for reinstallation
- Login as: student, password: cloudnetworking (root password also: cloudnetworking)

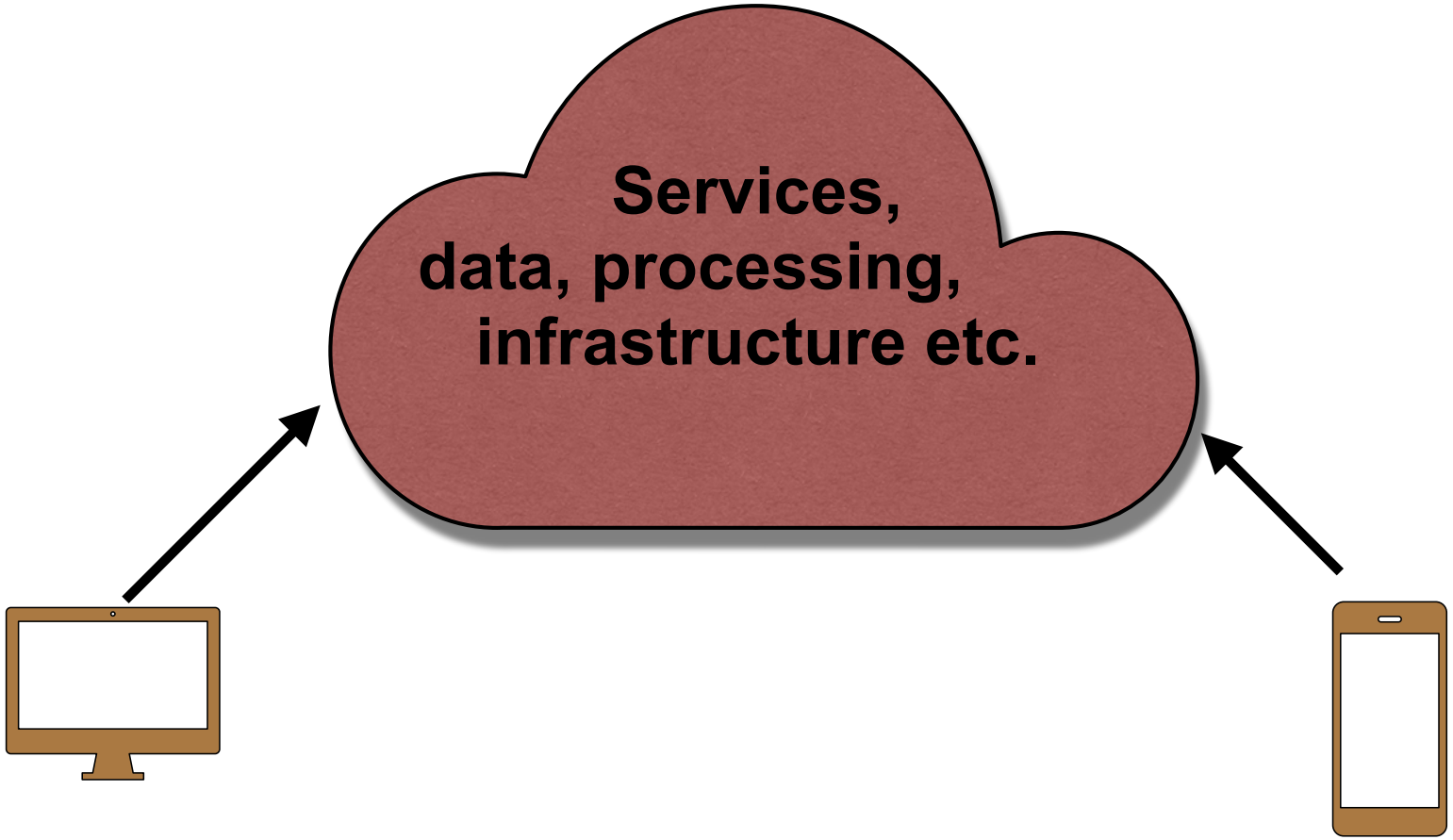
Basic setup, Linux

- Since all students login with the same credentials, you cannot store anything on the lab PCs. ALWAYS save files on a USB disk.
- You will be working with a clean Linux distro, Ubuntu.
- On the left hand side, open up a Terminal and start following the lab instructions
- The lab will run self-contained on a single PC where the network components will be virtualised using the native Linux virtualisation support.

Report

- The lab has two components, the first is a walk through manual with some questions to be answered, shell commands given to be used and tested etc.
- Each group of maximum two students should hand in a report with all questions from parts one and two clearly and concisely answered. Unclear hand drawn figures and text will not be marked.

The cloud, logically

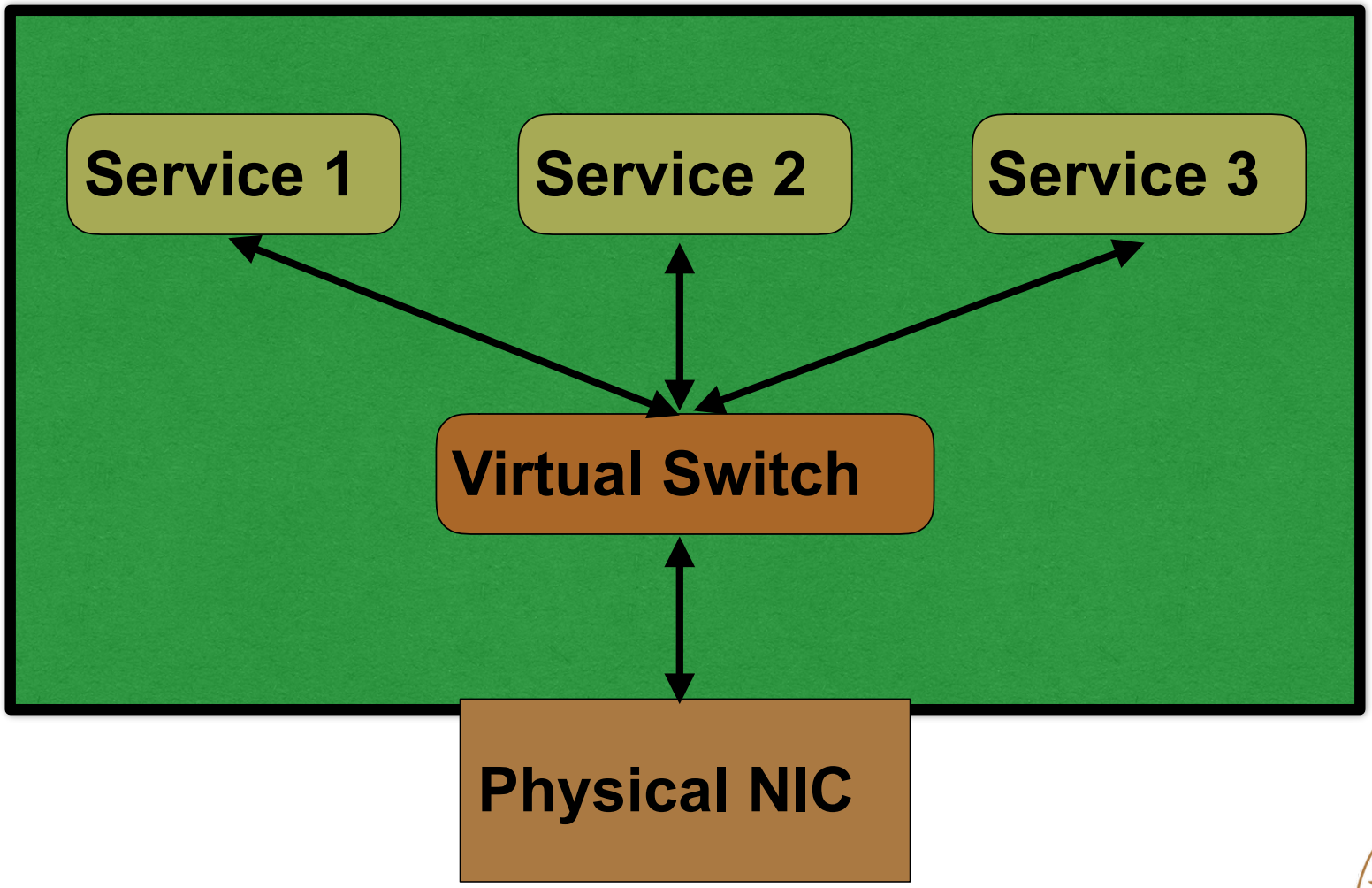


The cloud, in reality

Off the shelf servers, general computational platforms

- A single physical machine contains multiple virtual instances of services
- A service can be replicated on more machines as needed
- How do you make it look like a single service from the outside?
- The service part - Open Stack
- The network part - Open Flow
- Reference implementations currently, much open source
  - The place to start to learn Cloud computing

A single server



SDN

- At a larger scale, Software Defined Networking SDN.
- Key idea, separate management and data planes
- Forwarding switch and separate server function
- Allow forwarding policies to be updated at runtime using standard protocols and description formats (software defined)
- Allows much greater flexibility than the standard router paradigm when needed.

Lastly

- Check access to the lab
- If you are registered on the course at course start, you should have access
- If you do not feel at home with Linux, start playing with it now to save time later……..