Management and Operations of Networks, Services, and Systems

Short course presentation

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Devops for networking

- Insight from Cloud
  - quick deployment cycle
  - build rather than buy
  - automate test and deployment
  - embrace failure
- Network ‘harder’
  - Less virtual -- cables, device access
  - heterogeneous device API
  - multiple protocols, topologies
  - Hardware bundle

Goals of curricular unit

- Fundamental concepts of network management
- Techniques for automated network management

Practical approach

- Deploy different networks and services – docker, python
- Aiming at automating the most of its management / FCAPS aspects

- Example services:
  - Web and load balancing
  - Network management software
  - SME network and services, including DNS and dynamic routing
  - Virtual private networks
  - SDN controllers, dynamic network creation

- Choose one topic for the final project

Learning outcomes

- Discuss network management mechanisms
- Understand network operations
- Apply programming to network management
- Discuss NFV and SDN

Program

- Fundamentals of network management
- Fundamentals of enterprise networks
- Topics in programming and automation
- Topics in network softwarization

Methods

- Lecture
  - Flipped classroom
  - Autonomous search of information
  - Lectures for discussing concepts
- Lab
  - Assignments, deployment and automation
- Project

Grading and requirements

- Distributed with final exam
- Exam 50%, Project report 50%
- Need to develop the project and submit a report for it.

- Programming, computer networking, communication protocols.

References

- Programming, network management
  - https://nornir.readthedocs.io/en/latest/index.html
- Network Topologies
  - https://www.usenix.org/system/files/nsdi21-ferguson.pdf
- Virtualization, software
  - https://www.docker.com , https://kubernetes.io
  - https://github.com/Icinga/docker-icinga2
- Virtualization, network
  - https://ryu-sdn.org
  - https://opennetworking.org/onos/

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