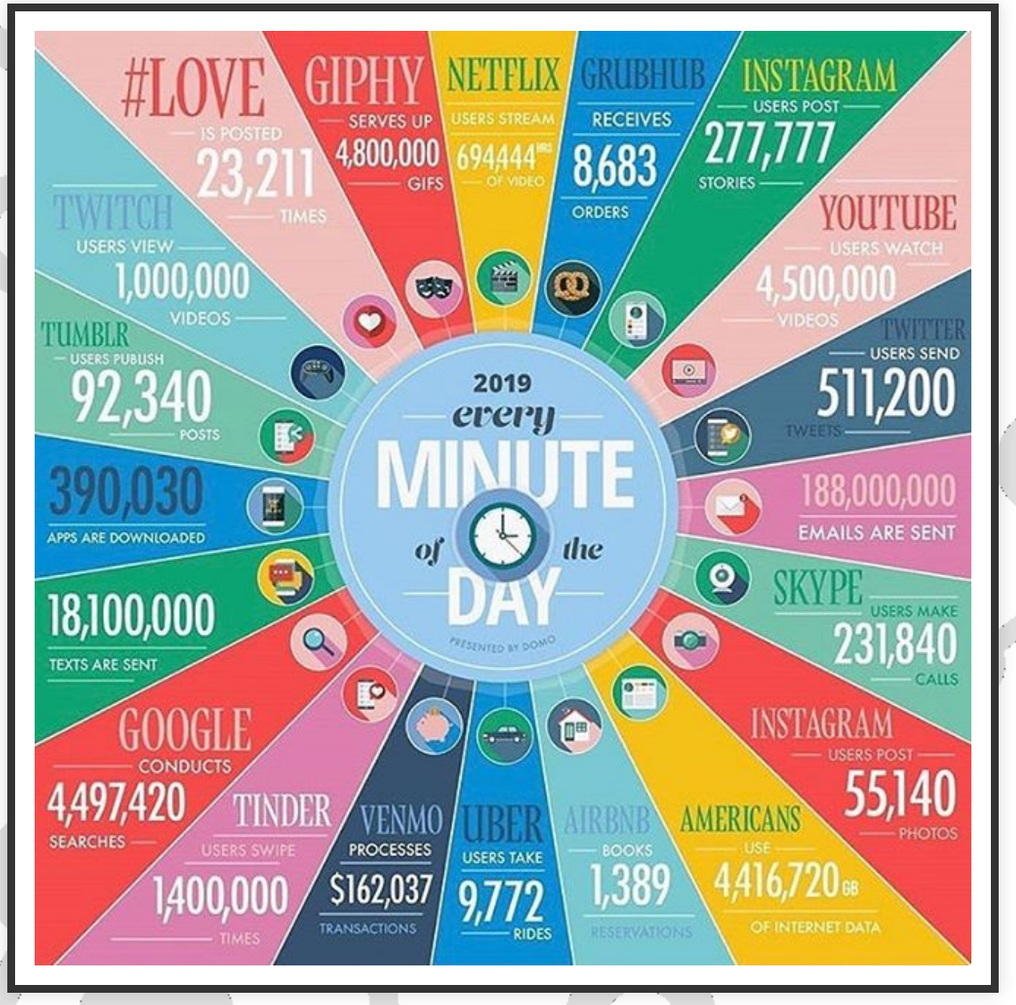
NETWORKS AND SECURITY



Jacob Aae Mikkelsen

WHY THIS COURCE

Globally: Lack 1.8 mil. IT security specialists by 2022

Denmark: Lack 19.000 it-professionels in 2030 especially in fields of security.

- https://erhvervsstyrelsen.dk/sites/default/files/media/rapport_-_virksomheders_behov_efter_digitale_kompetencer.pdf
- https://www.dr.dk/nyheder/udland/der-mangler-18-millioner-gode-hackere-om-fem-aar

WHO AM I?

- **Name:** Jacob Aae Mikkelsen
- **Nick:** Kokken (Educated chef many years ago)
- **Education:** Ms. in Computer Science from IMADA (jan. 2010)
- **Experience:** Esoft, TV-2, Gennemtænkt IT, Erhvervsstyrelsen through NineConsult A/S, Senior Engineer at Lego
- **Currently** Senior Architect at Cardlay (Fintech startup)
- **Network experience:** Responsible for internet at Roskilde Festival 2012 and 2013 (volunteer since 2007)
- **Contact info:** jamik@imada.sdu.dk (CC imada@grydeske.dk for faster response)

EXPECTATIONS

YOUR EXPECTATIONS

What are your expectations for this course?

MY EXPECTATIONS

- Participation
- Preparation, for lectures and tutorial sessions

GOALS

GOALS OF THE COURSE

What is the goals of this course?

- Learn how networks are implemented, focus on the internet
- Study issues in security, related to networks (authentication, encryption, privacy etc.)
- Be able to do initial pen-testing on an application

GOALS OF THE COURSE

Why?

- Become better programmers
- Secure computers and data better
- This course is created because the industry wish you know network and security topics → you are more valuable as an employee
  - DevOps culture prevalent in industry
- Try some hands on stuff, that hopefully are useful for you (tools, techniques, methods etc.)

OFFICIAL GOALS (1)

- Explain basic network concepts and the structure of the internet.
- Use sockets for network communication in applications.
- Explain functionality and interfaces for the application layer of the TCP/IP model and the functionality of DNS
- Explain functionality and interfaces for the transport layer of the TCP/IP model and the difference between UDP and TCP

OFFICIAL GOALS (2)

- Explain functionality and interfaces for the network layer of the TCP/IP model and explain basic routing algorithms, and routing in the internet.
- Explain functionality and interfaces for the link layer of the TCP/IP model, including error detection and correction.
- Explain characteristic differences between wireless and non-wireless networks.

OFFICIAL GOALS (3)

- Explain the concepts behind and applications of both symmetric and public key crypography.
- Explain concepts behind and implementation of the following:
  - Key distribution and user authentication.
  - Transport level security.
  - IpSec and VPN
  - Wireless network security.
  - Electronic mail security.

OFFICIAL GOALS (4)

- The problems causing recent security holes in software in contact with networks.
- Describe tools and methods used in penetration testing / hacking and its effects
- Explain techniques used to detect and prevent intruders and malicious software.
- Describe different types of firewalls, and their strengths and weaknesses

FORMAT

- 5 hours each week
- 3h lecture and 2h Tutorials each week
  - Check which class you have at tutorials
- Assignments
- Oral exam

FACEBOOK GROUP

Facebook group created for colaboration: **Networks and Security - SDU - 2019**

It is not mandatory

LECTURES

- Mostly slides
- Occasionally blackboard and chalk
- Discussion of current N&S topics from the news
- Some live demos (primarily tools and commands)
- Questions allowed (i.e. **recommended**)

TUTORIALS

- Usually some theoretical exercises
- Please bring own laptop (if possible)
- Some hands on exercises
  - Sniffing packets
  - Programing a bit

ASSIGNMENTS

- 9 or 10 parts.
- Must be approved, if you wish to attend the exam

> To have this element approved all but one assignments should be passed.

EXAM

- **Date:** ???
- **Practical:** No preparation time, no slides, etc.
- **Format:** Randomly selects a network or a security topic. Explain it in 10 minutes. Then questions on other materiel from course

> Curriculum is both materials covered in lectures and exercises

QUESTIONS?