

ICT FOR PRACTICE 2016, OSTRAVA, CZECH REPUBLIC

CYBERSECURITY EDUCATION FOR INFORMATION SYSTEM SPECIALISTS

Jan Ministr, Tomáš Pitner

LAB OF SOFTWARE ARCHITECTURES
AND INFORMATION SYSTEMS

FACULTY OF INFORMATICS
MASARYK UNIVERSITY



Content

- Information system requirements driven by technology and society
- Security requirements engineering
- Current studies, needs for change

Information systems security

- **traditional security requirements** on information systems are now **shifting** in several directions
- new **cloud-based development and deployment** technologies
- new **user-related security issues**
- complexity of **security requirements grows**

Technology-related security issues

- phenomenon of cloud computing brings many advantages mainly related to **efficient use of resources such as hardware and energy**
- Clouds reduce need for **locally trained professionals** for server maintenance
- **drawbacks**, it is more dynamic and **less under direct control** in the sense of traditional system perimeter

Security requirements engineering

- measures to ensure reliable and secure operation of infrastructures are **regulated by legal and governmental requirements**
- approaches to **ensuring the security** of information must be **more sophisticated**
- importance of **formal management and engineering** of security requirements for modern information systems
- **gap between the design phase** and the later implementation, deployment, and operation phases
- **extend Requirements Engineering** modelling to cope with Security Requirements

Secure design

- Propose **Security Resources Repository (SRR)**, together with the
- integration of the **Common Criteria (ISO/IEC 15408)**, and
- **SSE-CMM (ISO/IEC 21827)** into **software lifecycle model**

Current studies in cybersecurity and information systems

- Structure of studies
 - 3 year Bachelor-,
 - 2 year Master-, and
 - 4 years PhD-degree programs.
- most popular setup is **Bachelor** and subsequent **Master** study.
- Majority of students still come from Czechia and Slovakia
- However some of the Master programs can be studied in **English**.

Bachelor-degree program

- Students usually select:
- **Applied Informatics** or
- **Computer Systems and Data Processing.**
- For security experts oriented at networking, they might be interested in **Computer Networks.**

Master degree level

- **15 study fields** in total, the most relevant:
- **Security of information and communication technologies** and
- **Information systems**

Security of information and communication technologies

- **security of computer systems** and networks,
- **cryptography** and its applications,
- two orientations
 - **Security of ICT**
 - more *principles and technology* (ENG) and
 - **Cyber-security**
 - more *management and law* (CZE)

Information systems

- knowledge and skills needed in all stages of **development, management** and **modification** of information systems
- **analysis and requirements specification** and system design (architecture).

Future

- Urgent need to provide **advanced studies for** information system professionals aimed at design, implementation, deployment, and management of **security-assured information systems**

Security-assured Information Systems

- New study program profiles (out of 3):
 - architectures and technologies,
 - software engineering,
 - **security-assured information systems**
- Cross-specialization can be completed in **English.**

Structure of the security-related part

- All graduates have a basis in both views on security:
 - security **technology** and
 - security **management**.

Courses

- In **fundamentals**: Cryptography and cryptographic protocols, applied cryptography;
- In **secure software development**: Secure coding principles and practices, System verification and assurance;
- In **secure architectures and design**: Security architectures, Secure network design;
- In **advanced topics** such as **critical infrastructures**, or smart system security: Advanced topics in IT security.

Conclusion

- New study specialization in security-assured information systems reflects current demand for **security-aware information system professionals**.
- Continuation in form of a **multidisciplinary PhD-degree in topics of secure societies** is foreseen.