INTRODUCTION OF LASARIS

LAB OF SOFTWARE ARCHITECTURE AND INFORMATION SYSTEMS

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LAB OF SOFTWARE ARCHITECTURES AND INFORMATION SYSTEMS

FACULTY OF INFORMATICS
MASARYK UNIVERSITY, BRNO
Faculty of Informatics at Masaryk University

- **Masaryk University (MU)**
  - Established in **1919**
  - 2nd largest university in the Czech Republic (CR)
  - Indexed in the QS TopUniversities ranking
  - More than **40,000** students
  - **1,670** assist./assoc./full professors

- **Faculty of Informatics, MU**
  - Established in **1994**
  - 1st faculty of comp. science in CR
  - More than **2,200** students (incl. **111** Ph.D. students)
  - **60** assist./assoc./full professors
  - Excellence in numerous fields of **research**
FI MU Research Competences

RESEARCH & DEV. carried out in 4 research centres and 12 research labs.

- Enterprise Systems and Services
  - Software Architectures and Enterprise Systems
  - Service systems, modeling and execution

- Security and Embedded Systems
  - Security management, cryptographic protocols

- Large Scale Distributed Systems and Networks
  - Distributed computing and storage systems, scheduling and planning

- Data Management
  - Machine learning, data mining, advanced searching methods

- Formal Methods
  - Parallel algorithms for formal verification, analysis of stochastic processes and games

- Natural Language Processing

- Computer Graphics and Image Processing
Platforms of Industrial Cooperation

FI MU has long history of established forms of cooperation with industry:

- Technology Transfer Office of Masaryk University (TTO)  
  - Since 2005 by MU, now includes ICT pillar (CERIT-EU – Čermák, Pitner, Jurásek)

- Association of Industrial Partners (AIP)  
  - Established in 2007 at FI MU, with the goal to establish mutually beneficial cooperation of industry and academia, now managed by Bára Bühnová

- SSME Internship Partnership  
  - Established in 2009 within the SSME study programme at FI MU, with the aim to connect academia with industry via internship opportunities for SSME students.

- CERIT Science Park (CERIT SP)  
  - Established in 2014 at FI MU as a science-technology park and a business incubator promoting the excellence of FI MU and its partners in ICT research and innovation.
Lab of SW Architectures and Information Systems

- **History of LaSArIS**
  - Established in **2009**
  - Own premises since **2010**
  - Located at Botanicka 68a, Brno

- **Members**
  - 4 academics
  - 12 PhD students
  - 15+ undergraduate students

- **Teaching**
  - Programming (basic, enterprise, mobile – Java, C#, C, Ruby, XML)
  - Development methods (OO, architecture-based, agile, process management)
  - Soft skills (team work, communication)

- **Partners**
  - **Industrial cooperation** – research, student projects, teaching
    Red Hat, Honeywell, Siemens, Y Soft, Kentico, Mycroft Mind, and others
  - **Academic institutions** – research projects, teaching, conferences
    University of Vienna, Karlsruhe Institute of Technology (KIT), ...
Our research in the context of ‘Secure’

- **Research**
  - **Secure infrastructures**
    - Monitoring systems
    - Network security
  - **Smart grids**
    - Design
    - Communication technology
    - Secure operation
    - Reliable operation
Our research in the context of ‘Smart’

- **Domains**
  - Smart Grids
  - Smart buildings

- **Research**
  - **Monitoring and control**
    - Stream data processing
    - Big data anomaly detection
  - **Architecture design**
    - Smart infrastructure design
    - Quality optimization (reliability, latency, security)
  - **Modeling and simulation**
    - Analysis of what-if scenarios
    - Evaluation of design options, under uncertainty
  - **Visualization** – of surveillance data
  - **Persistence of large data** – and cloud computing
Contractual research projects

• **Smart Grid in the Czech Republic**
  - Architecture and operation of **smart metering**
    (Automated Metering Management – AMM)
  - **Safe and secure AMM**
  - Projects of contractual research
    - Communication technologies
    - Labs and testing
    - Home devices (for smart homes)

• **Cybernic Proving Ground (KyPo)**
  - Project The Ministry of the Interior of the Czech Republic for 2 years, opened in April 2015
  - Cloud environment (CERIT-SC) for the **simulation of network security-related processes**
  - ICS MU, Department of security computer network
  - LaSArIS – Visualization
Strategic projects at MU – C4e

• (OP VVV) Excellent research program – Czech Cybercrime Center of Excellence
  • Three fields:
    • Computer security
    • Secure and safe design
    • Law of secure societies

• Key strategic partners
  • University of Vienna, Faculty of Informatics
    • Renate Motschnig, Gerald Quirchmayr, Stefanie Rinderle-Ma
Strategic projects – CERIT Scientific Cloud

• (OP VVV) Excellent research program – Scientific Cloud
  • Upgrade of infrastructure
  • Two in-house research fields:
    • BigData and large-scale computing architectures
    • High performance computing

• Key researchers
  • Aleš Křenek
  • Tomáš Pitner
  • Barbora Bühnová
  • Jiří Filipovič
Strategic projects at MU – PhD studies

• (OP VVV) PhD study program – Secure Knowledge Society
  • Three fields:
    • Informatics
    • Computer systems and technology
    • Secure societies

• Key strategic partners
  • University of Vienna, Faculty of Informatics
    • Renate Motschnig, Gerald Quirchmayr, Stefanie Rinderle-Ma
  • University of Edinburgh
  • University of Venezia
Innovation of Studies in Computer Security

• Master study program – Computer Security
  • Two fields: technology, management

• MU development project
  • From 2012 to 2014
  • Lead: Prof. Václav Matyáš

• Involved teams
  • Faculty of Informatics MU – Crocs, Lasaris
  • ICS MU, Department of security of computer network
  • Faculty of Law MU, Institute of Law and Technology
  • Faculty of Social Studies MU
  • Students of the involved faculties

• Cooperation with Czech National Security Agency (NBÚ)
Innovation of Studies in Computer Security

• Master study program – Information Systems
  • Now three fields
    • Architecture and technology
    • Software engineering
    • Security-assured information systems
  • Formal acceptance and accreditation will follow starting in 2016
  • Lead: Tomáš Pitner
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CERIT Science Park

• CERIT = Centre for Education, Research and Innovation in ICT

• CERIT Science Park
  • Opened in **September 2014** at FI MU
  • ICT Science Park and **Business Incubator**
  • Currently hosting **20 companies**
    – both start-ups and established ICT leaders

• Managed by **CERIT Executive Unit** (8 people)
• Supervised by the **Council for Industrial Cooperation**

• **Activities include**
  • Joint research, projects (CAES, LODIS)
  • Student projects and internships
  • Teaching in cooperation
  • Business breakfasts
VĚDECKOTECHNICKÝ PARK A INKUBÁTOR

Nově vybudovaný vědeckotechnický park v areálu Fakulty informatiky a Ústavu výpočetní techniky Masarykovy univerzity. Projekt vznikl v rámci Operačního programu Podnikání a inovace Ministerstva průmyslu a obchodu. CERIT Science Park poskytuje zázemí začínajícím podnikům i již zavedeným společnostem z oblasti ICT, které využívají synergie se špičkovými výzkumnými kapacitami MU.

**Creativity | Security | Partnership**

Propojení univerzitního a firemního prostředí vytváří unikátní ekosystém, který umožňuje dynamickou spolupráci univerzity s firmami v klíčových oblastech, jako je bezpečnost mobilních a datových sítí, bezpečnost energetických zařízení a dalších kritických infrastruktur, ochranu institucí a veřejnosti před kybernetickými útoky apod.

Provoz vědeckotechnického parku byl zahájen v září 2014. Celkové prostory parku pro využití firemním sektorem dosahují 2200 m² s kapacitou až 20 firem. Součástí vize parku je systematický budovat a podporovat prostředí pro kreativitu, inovace a unikátnost v IT.
Innovation of Technology Transfer at MU

- Technology-transfer Office
  - New ICT pillar (CERIT-EU)
  - Involved: Roman Čermák, Tomáš Pitner, Leoš Jurásek, Václav Matyáš
Activities for the Society

• **International Olympiads in Informatics**

• **Central European Olympiads in Informatics**
  • Secondary school students
  • Lead at MU: **Tomáš Pitner** and many more

• **Czechitas**
  • Secondary school students (young ladies)
  • Motivation for studying ICT
    • Seat in CERIT Science Park under negotiations
  • Lead at MU: **Bára Bühnová**
Thank you for your attention!

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