

LASARIS STRATEGY FOR THE NEXT DECADE 2020

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LAB OF SOFTWARE ARCHITECTURES
AND INFORMATION SYSTEMS

FACULTY OF INFORMATICS
MASARYK UNIVERSITY, BRNO



Lab of SW Architectures and Information Systems

- **History of Lasaris**

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

- **Teaching**

- **Programming** (basic, enterprise, mobile – Java, C#, C, Ruby, XML)
- **Development** methods (OO, quality, architectures, agile, process management)
- **Soft skills** (team work, communication)
- **Critical infrastructures, cyberphysical** systems

Lab of SW Architectures and Information Systems

- Fundamental research
 - *„The crucial task is not to find answers but to find questions.“*
- **Applied research**
 - *„Crucial is to solve real problems using methods no matter whether they already exist or not.“*

Lab of SW Architectures and Information Systems

- **Complex** Problems from Reality
- **Combining Methods** from Computer Science and other Disciplines (law, sociology, management, services)
- Usually have a „**Customer**“ who can validate what we do
- **Collaboration** is the Key

Lab of SW Architectures and Information Systems

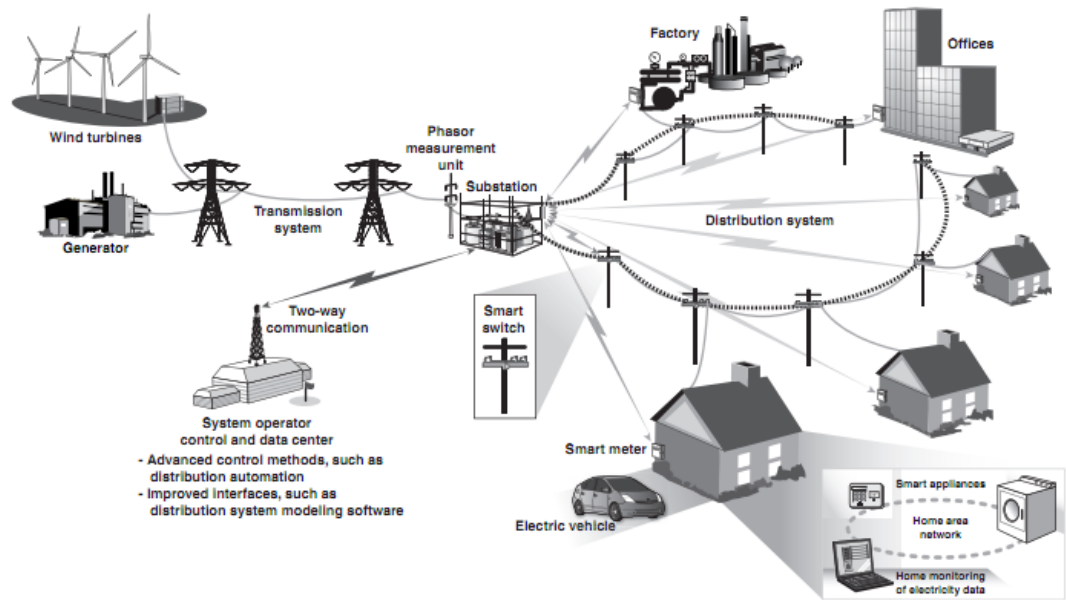
- Long-term Research Projects
 - C₄e
 - Technology Transfer @MU
 - NC₃
 - CIH
 - Technology Platform for Cybersecurity

Major Research Projects

- **C₄e**
- **Smart Grids**
 - TAČR SecureFlex
 - TAČR National Center of Competence NC₃
- **Kypo** (Cyber Range)
 - **SABU** finishing, **Kypo II** ongoing
 - **Kypo III** ongoing
- **PostDoc@MU**
- **H2020** projects
 - **Concordia** ongoing

Our Research in „Smart“ Areas

- Domains
 - Smart grids
 - Smart buildings
 - Smart cities
 - Internet of Things
- Research
 - Monitoring and control
 - Architecture design
 - Modeling and simulation
 - Visualization
 - Big data
 - Cloud computing
 - Cyberphysical systems



© GAO, U.S. Congress

- **(OP VVV) Excellent research program – Czech Cybercrime Center of Excellence**

Three research programmes (pillars):

- **Computer security**
- **Secure and safe design**
- **Law of secure societies**

- **FI: Paradise, Lasaris, DISA labs**

- **Key strategic partners**

- **University of Vienna, Faculty of Informatics**
 - Renate Motschnig, Gerald Quirchmayr, Stefanie Rinderle-Ma



Cybersecurity Innovation Hub

What are Digital Innovation Hubs

- „*Digital Innovation Hubs* are ecosystems that consist of **SMEs, large industries, startups, researchers, accelerators, and investors**. They aim to create the best conditions for long-term business success for all involved.“

<https://ec.europa.eu/digital-single-market/en/glossary>

Why Digital Innovation Hubs

- „DIH can help ensure that **every company**, small or large, high-tech or not, can grasp the digital opportunities. With **technical universities** or research organisations at the core, DIHs act as **one-stop-shops** where companies — especially SMEs, startups and mid-caps — can **get access to technology-testing, financing advice, market intelligence and networking opportunities**.“

<https://ec.europa.eu/digital-single-market/en/digital-innovation-hubs>



**Cybersecurity
Innovation
Hub**



CIH = registered fully functional hub



Digital Innovation Hubs

Cybersecurity innovation hub (DIH – CZ)

Click on the following link if you want to [propose a change of this HUB](#)

Contact Data

Coordinator (Research & Technology organization)

National centre of competence for cybersecurity

Coordinator website
<http://www.nc3.cz>

Year Established
2017

Location
Šumavská 15, 60200, Brno (Czech Republic)

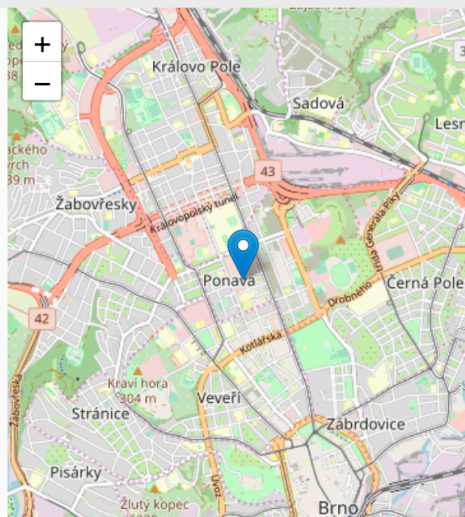
Website
<http://www.cybersecuritydih.cz>

Contact information

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Organization

Organizational form

Networked organization, without formal structure

Turnover
500.000-1.000.000

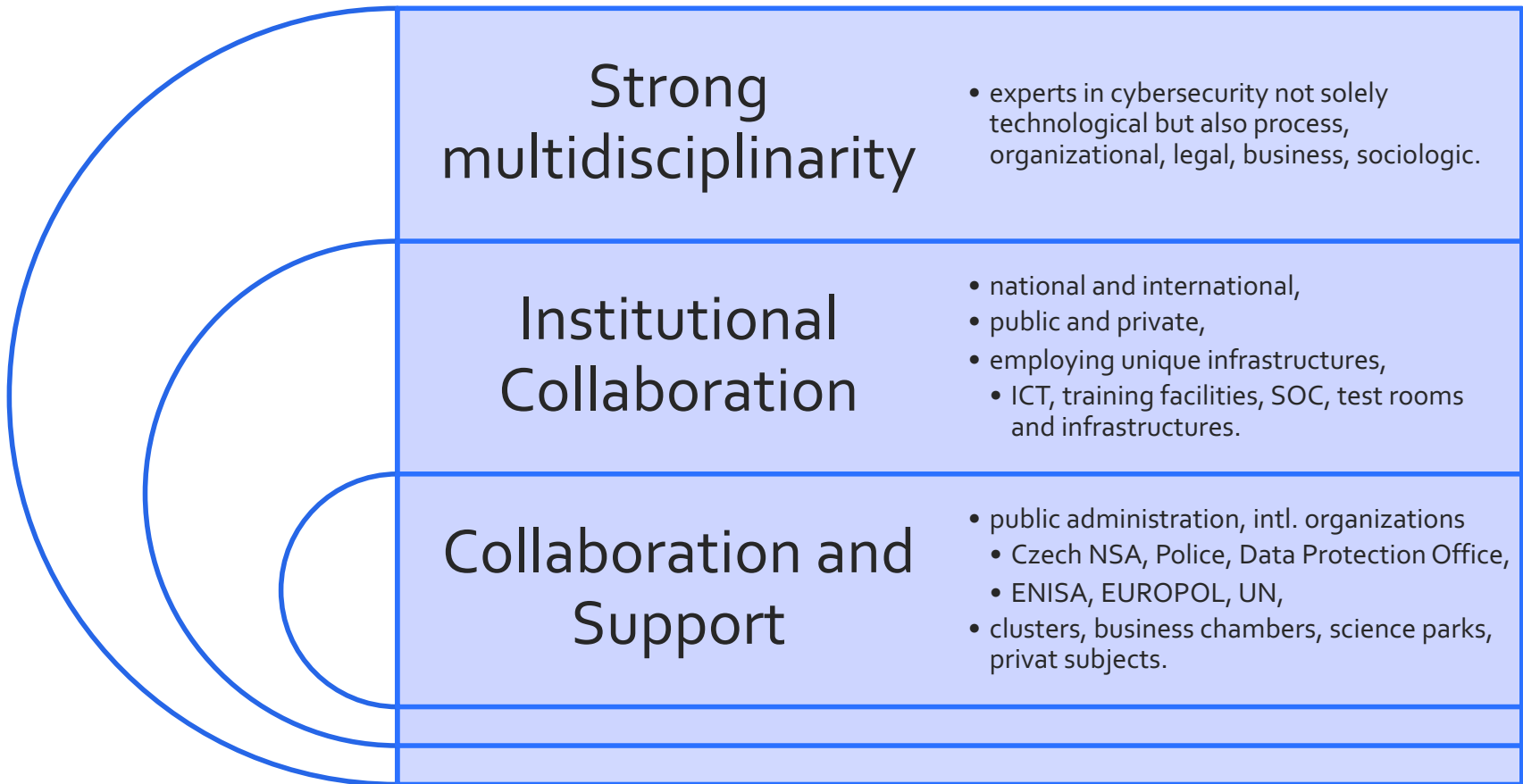
Number of employees
10-25

Evolutionary Stage

Fully operational

Geographical Scope

Cybersecurity Innovation Hub Specifics



CIH as Answer to Challenges

- **Cybersecurity @European and global level (C4e – Basic Research, NC3 - Applied Research, Contract Research)**
- Significant partner of key national cybersecurity authorities and activities (NSA, Ministry of Interior, Ministry of Defense, Ministry of Industry...)
- Partner of major **European networks (H2020)**
- **Industry, SME- and Large- Business Partners**
- Pillar of **Local and Regional Ecosystem** (Science Park, South-Moravian Innovation Center, RHK, NSMCluster, Industry 4.0 Cluster, SME, Technology Transfer,...)



Strategy, Structure & Management of CIH

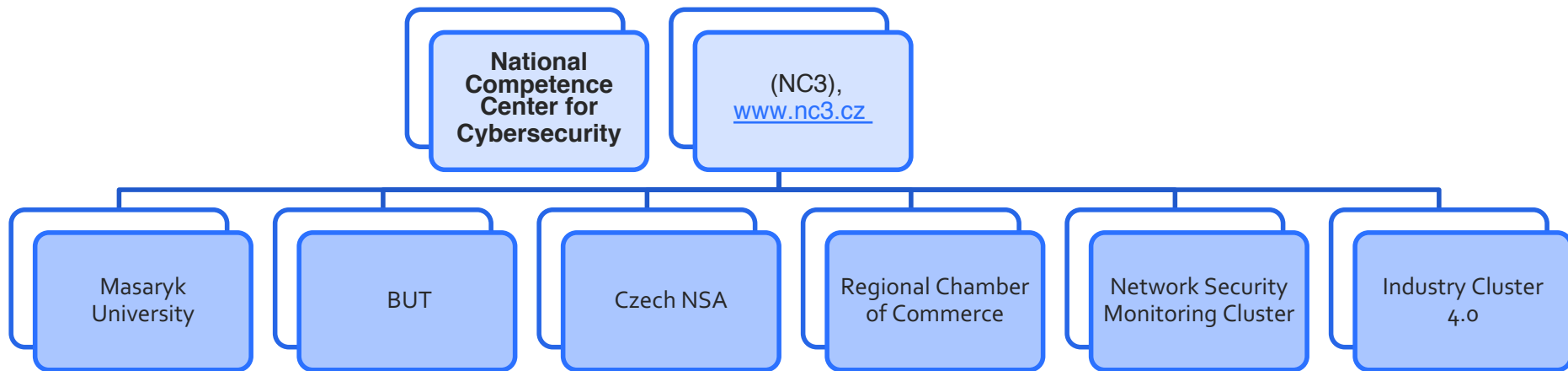
Strategic Development of CIH

- Coordinated with Government – development of **Czech NSA site** in Brno
- Related to strategic development of the University - **Pre-screening of Strategic Project, „Ageing Hub“ @MU**
- Related to other **DIH** for **HPC, AI** in CZ
- Related to **Industry 4.0** strategic plans

Structure and Management of CIH

- Coordinated by **National Cyber Security Competence Center (NC3)**, www.nc3.cz
- Partners
 - Masaryk University
 - Brno University of Technology
 - Czech National Cybersecurity Agency
 - Regional Chamber of Commerce
 - Network Security Monitoring Cluster
 - Industry Cluster 4.0

Structure and Management of CIH



coordinates
partners

Inception and Development of CIH



www.nc3.cz



www.cybersecuritydih.cz

MUNI



Shared Strategy of CIH

NÚKIB 



Strategic Areas of CIH

- Area of **Research Strategy**
- Area of **National Strategic Cooperation**
- Area of **International Cooperation**
- Area of **Industrial Cooperation**

Main Sectors of CIH Activities

- **Electricity Supply** (transmission & distribution)
- Transport, storage & **communications**
- **Public administrattion** and defense
- **Education**



CIH Cooperates with Public Administration

- Cybersecurity Education Collaboration (**National CyberCzech Technical Exercise**)
- Collaboration on Policy and Legislation in Cybersecurity (**Cyber Security Act, Methodology**)
- Collaborate on system settings (**Cybersecurity Qualification Framework**)

CIH Cooperates with Industry

- **NC3 National Cyber Security Competence Center** – projects in:
 - **Industry 4.0** (Industrial Protocol Monitoring)
 - **Energy** (Transmission System Monitoring)
 - **Cybersecurity certification**
 - **Cybersecurity Education**
- Understanding and solving other complex tasks in **critical infrastructures** (electricity **transmission** and **distribution**) - activation of flexibility

National Competence Center for Cybersecurity

Národní centrum kompetence pro Kyberbezpečnost
s registračním číslem TNo1000077, pro období realizace
1.1.2019–31.12.2020.

Research Organizations in NC3

- Masaryk University
- Brno University of Technology
- CESNET, z. s. p. o.

Enterprises in NC3

- UNIS, a.s.
- Flowmon Networks a.s.
- CAMEA, spol. s r.o.
- Unicorn Systems a.s.
- AXENTA a.s.
- PRK Partners s.r.o.
- INDUSTRY CLUSTER 4.0, z. s.

- NC₃ Strategic Board
- Executive Committee
- International Advisory Board
- Tangible concept for real industrial needs and strengthening / visibility of the region – *KYPO₄INDUSTRY*
- Compound of **partial projects** with synergic links

CSIRT-MU

- **Computer Security Incident Response Team** of Masaryk University
- Part of the Institute of Computer Science
- Accredited by **Trusted Introducer**
- Long term experience with R&D in the field of network security monitoring
- csirt.muni.cz



Lasaris

- Lab of Software Architectures and Information Systems
- Focus on the **protection of critical information infrastructures**
- Development of **resilient architectures** of IT systems
- www.lasaris.cz

Institute of Law and Technology

- Focus on **technology law** (ICT law, data protection, intellectual property law, **energy law**, etc.)
- Long term cooperation with public authorities
- Expertise in the area of cybercrime & cyber security
- cyber.law.muni.cz



CyberRange (Kybernetický polygon, KYPO)

- www.kypo.cz
- Unique cloud-based virtualized infrastructure environment developed by CSIRT-MU, C4e, and NC3
- 3 main use-cases:
 - **Research**
 - **Digital forensics** (analysis and simulations)
 - **Cybersecurity trainings** & exercises
 - Expanding to **cyber-physical** world
 - **Testbeds** and **Industry 4.0** Apps

Cybersecurity and Industrial R&E Testbeds

- Currently expanding to **cyber-physical** world
- Cybersecurity of industrial control systems (SCADA)
- For research and education in professional programs nad PhD education

KYPO Lab Testbed – Status Sept 2019



South-Moravian Innovation Center

- Established 2001
- Joint-Venture of SouthMoravia, Brno
- + 4 Major Universities in Brno incl. MU
- Responsible for Maintenance of the Regional Innovation Strategy
- **Memorandum of Collaboration MU/FI + JIC**
- Member of **National Competence Center for Cybersecurity**



Education – FI – Master “professional” program

- Design based on **e-Competence Framework** (EN 16234-1)
- **Graduate profile:** The strong competitive advantage of the program graduates is the ability to **solve complex management-related problems** for which they can use the acquired skills.
- **Internship:** Obligatory part of the study plan is about **600 hours** of internship to enable students to gain the necessary practical experience.
- **Unique competence profile** of the student based on the intersection of **multiple areas** of knowledge that are relevant for managing the development of software systems and services, as well as cybersecurity management

Education – international

- **Joint doctoral degree** – with University of Haifa
- Masters study programs **NATO (Multinational Cyber Defense Education and Training Project)**
- Ad-hoc courses and trainings – NATO

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**
 - Supervised by the **Council for Industrial Cooperation**
- **Activities include**
 - Joint research, projects (CAES, LODIS)
 - Student projects and internships
 - Teaching in cooperation
 - Business breakfasts



Technology Platform for Cybersecurity

- **Ministry of Industry Programme**
- Mid-term financing (3 years, up to 5 M CZK)

Thank you for your attention!

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