LASARIS: FUTURE PERSPECTIVES

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LAB OF SOFTWARE ARCHITECTURES
AND INFORMATION SYSTEMS

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Critical IT infrastructures

Examples

Smart Grid infrastructure

- Wind turbines
- Generator
- Transmission system
- Phasor measurement unit
- Substation
- Distribution system
- Smart switch
- Two-way communication
- System operator control and data center
- Advanced control methods, such as distribution automation
- Improved interfaces, such as distribution system modeling software
- Smart meter
- Electric vehicle
- Factory
- Offices
- Smart appliances
- Home area network
- Home monitoring of electricity data
What do we aim for?

- Infrastructure we can **rely on**
  - Dependable IT infrastructure

- It's not just about **security**
  - **Reliability, availability, safety, survivability** are of equal importance!

- There are two types of troubles:
  - **Intentional** and **unintentional**

- **Human element** is a good part of it
  - Employees, internal IT admins, hackers

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Towards dependable IT infrastructures

- **Steps towards dependable critical infrastructures**
  - Design guidelines
  - Simulation and analysis
  - Monitoring and control
  - Response management

- Some of them help you to **prevent** an attack/failure, some to **recognize** an attack, some to ensure **safety under** attack, some to **recover**, some the **forensics after** the attack

- **Design guidelines for dependability**
  - **Fault/Failure** – Reliability, Availability
  - **Vulnerability/Attack** – Security, Safety, Survivability
Reliability/Availability

• **Fault avoidance**
  • **The development process** is organized so that faults in the system are detected and repaired before delivery to the customer.
  • **Verification and validation techniques** are used to discover and remove faults in a system before it is deployed.

• **Fault detection**
  • **Run-time techniques** to detect faults and failures.

• **Fault tolerance**
  • The system is designed so that faults in the delivered software do not result in system failure.

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Survivability = system ability to deliver essential services whilst it is under attack or after part of it was damaged.

- **Resistance**
  - Avoiding problems by building capabilities into the system to resist attack.

- **Recognition**
  - Detecting problems by building capabilities into the system to detect attacks and assess the resultant damage.

- **Recovery**
  - Tolerating problems by building capabilities into the system to deliver services whilst under attack.

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Future of critical infrastructures
Thank you for your attention!

- **Masaryk University (MU)**
  - Established in 1919
  - 2nd largest in Czechia
  - Around 35,000 students

- **Faculty of Informatics, MU**
  - Established in 1994
  - 1st faculty of comp. science
  - More than 2,000 students

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