**DEPARTMENT OF DISTRIBUTED AND DEPENDABLE SYSTEMS**

**RESEARCH AREAS AND EXCELLENCE**

**MISSION**

Research and education in the advanced techniques for building reliable software especially in the field of distributed and dependable systems. This comprises model-driven development, formal verification techniques, performance measurement and modeling, and other fields.

**RESEARCH TOPICS**

- Verification of software systems.
- Performance evaluation of computer systems.

- Systematic development of dependable software for smart cyber-physical systems (CPS) and Internet-of-Things (IoT).
- Component-based software development.
MAIN CAPABILITIES

• Software model checking of C and Java, security analysis of PHP code.
• Models and techniques for runtime self-adaptivity and self-awareness of CPS.
• Methods and tools for network-precise simulations of large-scale deployment of smart CPS.
• Communication models for opportunistic knowledge sharing in networks with limited connectivity.
• Supporting complete development life-cycle of smart CPS (requirements engineering, development, testing, verification, deployment).
• Runtime platforms for analysis and experiments with smart CPS.

TOOLS, PLATFORMS, TECHNOLOGIES

DiSL – software framework for building dynamic program analysis tools through program instrumentation
SPL – framework for evaluating and reflecting software performance in the context of agile software development
Weverca – framework for analysis of PHP applications
DEECo – Component model for Dependable Emergent Ensembles of Components
IRM – Invariant Refinement method for designing CPS
BEEN – a generic tool for automated benchmarking in a heterogeneous distributed environment
SOFA 2, SOFA-HI – a hierarchical component-based system for software-intensive systems

KEY RESEARCH EQUIPMENT

• Equipment for testing cyber-physical systems.
• Fully equipped laboratory for testing robotic systems.
• A farm of servers for testing cloud-connected cyber-physical systems.

PARTNERSHIPS AND COLLABORATIONS

ACADEMIC PARTNERS

• Institute of Computer Science of Academy of Sciences, Czech Republic
• Department of Computer Science, Faculty of Informatics, Masaryk University, Czech Republic
• Department of Computer Science and Engineering, University of West Bohemia, Czech Republic
• Karlsruhe Institute of Technology, Germany
• Mälardalen University, Sweden
• Ludwig-Maximilians-Universität, Germany
• University of Lugano, Switzerland
• TU Dresden, Germany
• TU Chemnitz, Germany

INDUSTRY PARTNERS

VW, ABB, Honeywell, Cisco, Oracle

MAIN RECENT PROJECTS