SCOPE 2016

Submitted by Anonymous on Mon, 11/23/2015 - 4:00pm

Apr 11, 2016 7:00 am - 5:00 pm CEST

First International Workshop on Science of Smart City Operations and Platforms Engineering (SCOPE) in partnership with Global City Teams Challenge (GCTC)

Traditionally, cyber-physical systems (CPS) have been built using domain-specific closed architectures with self-contained resources. This traditional approach is inadequate for smart city solutions, which are inherently multi-domain and require crossing conventional organizational and infrastructure boundaries. This workshop focuses on new approaches to CPS that are based on open, extensible platforms and that arise from new partnerships between cities, industry, and academia.

Extensibility and smartness are critical to a new CPS paradigm. Extensibility is the capacity to accommodate change readily - adding new applications, for example - while preserving the original function. Smartness is the capacity of a system to learn and adapt to a changing environment and unplanned circumstances. This workshop will explore open, platform-based design approaches that enable smart and extensible city-scale solutions. Replicability, scalability and interoperability are core requirements of effective smart city solutions.

Replicability - the ability to deploy in many environments - provides for economies of scale. Scalability empowers communities large and small, including those experiencing rapid growth. Interoperability allows modular solutions, empowering communities with options to meet their needs and the ability to build systems over time through incremental budget investments. This workshop will explore provisions in existing and planned smart city deployments, including those by teams in the Global City Teams Challenge (GCTC), for replicability, scalability, and interoperability.

Among the challenges to developing a new CPS paradigm and developing effective smart city solutions are the following:

- Deriving a multi-tiered architecture that can integrate applications across domains, including water management, energy, disaster resilience transportation, healthcare, and many other applications essential to cities and their residents.
- Interactions between privacy, security, resilience, reliability, and safety from both theoretical and operational perspectives and lightweight cyber physical virtualization

technologies that ensure both cyber and physical resources can be accessed simultaneously and safely by multiple applications.
- Heterogeneity in both message layer and behavior layer is one of the biggest problems that is emerging when we consider that all these services need to be integrated together in order to provide useful services to the residents. Frameworks for solving the challenge of integrating heterogeneous and cross-domain data and services are critical.
- Autonomous online collaboration and coordination that ensure cyber and physical resources of the platform are managed and arbitrated correctly and efficiently, including the runtime verification required to validate the dynamic resource allocation and usage patterns, and the distributed and interactive decision making algorithms that require a high level of coordination across decisions to make the complete system work.
- Formal methods for analyzing the safety guarantees of the composed system and applications in the presence of uncertainty imposed by the dynamic properties of the platform.
- Closed loop operations in the context of the open nature of smart city platforms with on-line or real-time control and actuation to maintain desired operational set points, and standardized and interoperable mechanism to request and verify "actions" taken because of the data analysis.
- Metrics and key performance indicators (KPIs) that can measure the impact of smart city solutions and platforms.
- Smart city architectures for replicability and scalability across communities with diverse technical, governance, and cultural settings.
- Design strategies for interoperability and modularity that enable the composition of complex smart city systems from diverse elements.

Workshop Chairs

- Abhishek Dubey (Vanderbilt U)
- Aniruddha Gokhale (Vanderbilt U)
- Sokwoo Rhee (NIST)
- Monika Sturm (Siemens)

Steering Committee

- David Corman (NSF)
- Chris Greer (NIST)
- Keith Marzullo (NITRD)
- Douglas Schmidt (Vanderbilt U)
- Janos Sztipanovits (Vanderbilt U)

Program Committee

- Sherif Abdelwahed (Mississippi State U))
- Martin Burns (NIST)
- Charles Cattlett (Argon National Lab)
- Minyi Guo (Shanghai Jiao Tong U)

- Daniel Hoffman (Montgomery County)
- Sertac Karaman (MIT)
- Constantine Kontokosta(NYU)
- Martin Lehofer (Siemens)
- Hui Lui (Shanghai Jiao Tong U)
- Rahul Mangharam (UPenn)
- Rajat Mehrotra (DRI)
- Christoph Meinrenken (Columbia Univ)
- Umit Ozguner (Ohio State University)
- Radha Poovendran (UW)
- Nalini Venkatasubramanian (UC Irvine)

Kenote Speakers

- David Corman (NSF)
- Ina Homeier (Head of Unit Smart City, Urban Development and Planning, Vienna, Austria)
- Chris Greer (NIST)

Event Details

Location: Vienna, Austria
URL: http://cps-vo.org/group/SCOPE-16

Sync this event to your calendar

CPS Domains Energy Efficient Buildings Chemical Sector Commercial Facilities Sector Communications Sector Critical Manufacturing Sector Dams Sector Defense Industrial Base Sector Emergency Services Sector Energy Sector Financial Services Sector Food and Agriculture Sector Government Facilities Sector Healthcare and Public Health Sector Information Technology Sector Nuclear Reactors, Materials, and Waste Sector Transportation Systems Sector Water and Wastewater Systems Sector Architectures Architectures Smart Grid Concurrency and Timing Real-time Systems Platforms Control Energy Critical Infrastructure Real-Time Coordination Validation and Verification CPS Technologies Foundations CPS Week 2016 2016 Workshop