NIST Smart Grid and CPS Newsletter

November 2016

NIST/IEEE Workshop, “Timing Challenges in the Smart Grid,” Brings Diverse Stakeholders Together (October 26, 2016)

A lively—and timely—workshop on timing challenges in the smart grid brought together 80 experts from a wide range of organizations. The October 26 workshop, held at NIST-Gaithersburg, provided an opportunity for the diverse stakeholders from utilities, system integrators, national labs, academia, and government to learn about each other’s expertise and needs, as well as future plans and priorities.

In addition to those attending the workshop in person, nearly 100 other individuals followed along online on the workshop webcast. The webcast, along with the presentations, is archived on the workshop webpage.

Precision timing—such as one microsecond synchronization to a traceable time and frequency reference—is an issue of growing interest and concern to engineers and scientists working with the smart grid and other cyber-physical systems. The greatly expanded use of synchrophasors for wide-area monitoring, along with the increasing use of traveling wave fault detection and other new technologies, requires precision timing. These new capabilities offer increased flexibility to grid operators, but they also raise time-related security concerns.

At the workshop, those opportunities, concerns, and challenges were addressed in a unique forum composed of power system experts, timing experts, and communications experts. The diversity of attendees enabled the workshop to make progress in identifying and analyzing:

- the practical challenges that are currently being experienced in wide-area time synchronization in current measurement and control deployments; and
- timing-related barriers that prevent the power industry from realizing future measurement and control technologies.

The outcomes of the workshop will inform a NIST report summarizing the challenges and potential solutions for wide-area clock synchronization as well as prioritizing future R&D and standards efforts in precision timing for power systems and other domains.

Back to Top

Global City Teams Challenge Launches “SuperClusters” at Kickoff Event (October 25-26, 2016)

The Global City Teams Challenge (GCTC), now entering its third year, embarked on a new phase with the SuperCluster Kickoff Event, held in Washington, D.C., on October 25-26, 2016. At the two-day event, over 250 participants from local government, industry, non-profits, universities, and international cities began work on “SuperClusters”—multi-city, multi-stakeholder deployments of smart city projects in sectors such as transportation, public safety, and energy.

The creation of these multi-team SuperClusters will enable existing GCTC action clusters to work together, thereby increasing the scale and impact of their efforts. Examples of grand challenges to be tackled include multi-city resilience to large-scale natural disasters, intelligent transportation systems that work in any city, and regional air quality improvements through coordinated local action.

The Kickoff Event, held at the Grand Hyatt Washington, began with a half-day plenary session featuring talks by smart city leaders representing both federal and local government. The program continued with one-and-a-half days of working sessions that led to the establishment of “Seed SuperClusters” in the following six areas:

- Transportation
- Public WiFi
- Safety/Resilience/Disaster/Emergency
- Energy and Water
- Information Dashboards
- Healthcare/Environment

In the coming weeks, each of these SuperClusters will be meeting regularly by conference call as they begin developing blueprints and implementation plans. In the very near future, each SuperCluster will announce how to get involved with their particular project (watch the website for updated information).

Dr. Sokwoo Rhee, NIST lead for the GCTC program, said, “We also expect to see additional SuperClusters being formed as a result of discussions and collaborations that began at the Kickoff Event. My guidance for those considering the establishment of a SuperCluster is simple: ‘Size matters. Scope matters. And results matter.’”

During the first few months of 2017, each SuperCluster will be holding a face-to-face meeting to solidify and accelerate project implementation. Then, in June/July 2017, the SuperCluster phase will culminate at the GCTC Expo, an event that has in the past (June 2015 and June 2016) attracted several thousand visitors as well as significant media attention.

Back to Top

NIST and Eleven Cities and Communities Working Together on Innovative Smart City Technologies

The White House’s Office of Science and Technology Policy (OSTP) and the National Institute of Standards and Technology (NIST) recently announced the selection of four teams to receive grant funding through the Replicable Smart City Technologies (RSCT) Cooperative Agreement Program.

The RSCT program is an important element of NIST's Global City Teams Challenge (GCTC), a collaborative platform enabling local governments, nonprofit organizations, academic institutions, technologists, and private corporations from all over the world to form project teams to work on groundbreaking Internet of Things (IoT) applications within the smart city environment.

Four projects, involving eleven cities and communities, were selected for RSCT funding. These projects involve these communities taking a lead role in one key element of the overall program—establishing measurable performance metrics, thereby helping drive the adoption of replicable, standards-based solutions that improve the quality of life for residents of communities of all sizes.

The four RSCT projects, described below, address important public issues such as urban air pollution, flood prediction, and rapid emergency response for seniors endangered by in-home accidents.

- The City of Portland, Oregon, will use low-cost sensors to improve air quality and the environment throughout the Portland area.
- Montgomery County, Maryland, will use its Safe Community Alert (SCALE) project, which links sensors in seniors' homes with emergency responders, to reduce the number of senior deaths due to in-home accidents.
- The City of Bellevue, Washington, will improve city-wide interconnectivity of department systems—including police and fire, civic services, transportation, utilities, environmental, and IT departments—to improve the efficiency and effectiveness of all city staff.
- The City of Newport News, Virginia, will use sensors and computer modeling to predict flood events to improve emergency response and reduce loss of life and property. Eight cities and communities in Virginia's Tidewater region are participating in this project.

In the coming months, NIST's smart city team will work closely with the awardees to gain insights and lessons learned from their projects, such as their approaches on technology integration and architecture. In addition, NIST is interested in standards-based approaches that create the ability to replicate and scale up the outcomes of their smart city projects to other cities and communities. For smart cities and communities across the nation and around the globe, the long-term goal is to enhance the quality of life for all their residents by more efficiently delivering essential community services, from transportation and energy to emergency response and health care.

Back to Top

Transactive Energy Challenge: Phase I Accomplishments, Phase II Plans, and Upcoming Workshop (December 6, 2016, in New York City)

During a September 20 webinar and virtual meeting, billed as the Phase I Capstone Program, participants in NIST's Transactive Energy Challenge (TE Challenge) highlighted the progress made since the Challenge's launch a year ago. The presentations, now available online, reviewed the work of seven teams that have worked for the past 12 months on different aspects of transactive energy. A new research team, which has worked since June to identify the requirements for a co-simulation platform architecture, also provided an overview of its results. Further details—including plans, participants, and publications—are available at the TE Challenge Collaboration Website.

Attention is now shifting to Phase II, which will focus on building modeling capability and tackling the many research questions that must be addressed as transactive energy concepts and use cases are explored and tested.

As the TE Challenge program moves forward, the NIST TE Challenge team wants to hear from technology companies, grid operators, and other stakeholders about future business models and challenges in the distributed energy resources (DER) revolution. To facilitate these interactions, NIST is holding two workshops on "Harnessing the Power of Distributed Energy Resources: Quantifying Transactive Energy and Economics."

The first workshop was held Thursday, October 20, 2016, in San Jose, CA. With 40 people in attendance, the meeting featured presentations from industry experts on the challenges and experience of DER integration and market operation. Mike Gravely (California Energy Commission) presented a keynote on the role of distributed resources in California's future, and David Holmberg (NIST) outlined the TE Challenge. Don Reeves (Silver Spring Networks) and Steve Bushby (NIST) addressed the technologies, tools, and techniques that impact the grid in a TE environment. Lorenzo Kristov (California ISO) and Avi Gopstein (NIST) spoke on the topic of ensuring the availability and delivery of TE services across markets. The final session included Audrey Lee (Advanced Microgrid Solutions) and Marty Burns (NIST) discussing validation of TE models. Each session was followed by questions and feedback from attendees. Presentations from the meeting are posted now on the event site.

The second workshop, with similar topics, will be held Tuesday, December 6, 2016, in Manhattan, NY. Venue details, agenda, and registration links for the December 6 workshop will be announced shortly. Technology companies, regulators, utilities, and other stakeholders are invited to join us for a dynamic and interactive program.

Back to Top

Upcoming Meeting: Smart Grid Interoperability Panel's Annual Conference (November 7-10, 2016)

Full program details are now available for SGIP's 2016 Annual Conference, which will be held November 7-10, 2016, at the Capital Hilton in Washington, D.C. The 2016 Grid Modernization Summit's theme is "Accelerating Transformation."

The event—open to SGIP members, non-members, and guests—will include the following activities:

The Executive Forum (one-and-a-half days on November 8-9) will feature a speaker program composed of utility, vendor, and industry senior executives, as well as leaders from FERC, the federal government, state regulatory commissions, and national labs.

- Dr. Chris Greer, Director of NIST's Smart Grid and Cyber-Physical Systems Program Office, will be one of three panelists at the Executive Forum's concluding session, "Final Words of Wisdom: Key Considerations for the Grid of the Future."

The Vendor Expo (one-and-a half days on November 8-9) will feature exhibit booths from a variety of companies and organizations serving the smart grid sector.

Working Group and Committee meetings (one-and-a-half days on November 9-10) will provide face-to-face meeting opportunities for many of SGIP's key technical groups. NIST staff playing leadership roles in groups that will be meeting in Washington include:

- Suzanne Lightman, Chair, Smart Grid Cybersecurity Committee (SGCC)
- Cuong Nguyen, Acting Chair, Smart Grid Testing and Certification Committee (SGTCC)

- Dr. Allen Hefner, Chair, Distributed, Renewables, Generation, and Storage (DRGS) Domain Expert Working Group (DEWG)

A one-day joint workshop (November 7) will be hosted by SGIP and the Korean Smart Grid Association (KSGA).

- NIST staff presenting at the workshop will include Suzanne Lightman, Cuong Nguyen, and Dr. Allen Hefner.

Back to Top
