NIST Smart Grid and CPS Newsletter

May 2016

Transactive Energy Community Gathers in Portland, including NIST Transactive Energy Challenge Teams

The mood was upbeat as the transactive energy (TE) community gathered last week for the third Transactive Energy Systems Conference and Workshop (Portland, Oregon, May 17-19, 2016). With 150 attendees from around the world, the participants listened to keynote talks and plenary panels from TE leaders. They also engaged in a series of interactive workshop sessions, providing important feedback and guidance about the next steps needed to advance the field.

Opening keynote speaker Audrey Zibelman, chair of the New York State Public Service Commission, set the context with her insightful remarks laying out the commission's ambitious initiative, "Reforming the Energy Vision (REV)." She described the significant transformation anticipated in the distribution system, stressing the important role that TE will play in its implementation.

A plenary panel on the final day of the conference spotlighted the NIST Transactive Energy Modeling and Simulation Challenge for the Smart Grid (TE Challenge). TE Challenge team leaders described their progress to date, with six out of seven teams giving presentations. The critical role of modeling and simulation was a key theme throughout the conference.

David Holmberg, NIST, who is heading up the TE Challenge program, reported that the Challenge has now passed the midpoint of Phase 1. Formally launched at a Kickoff workshop in September 2015, Phase 1 will conclude later this year with the TE Challenge Summit (Gaithersburg, Maryland, September 20-21, 2016).

The work products from Phase 1—a series of white papers—will provide important components (e.g., scenarios, use cases, business case models, etc.) to be used in Phase 2. The second phase, to be launched in September 2016, will emphasize comparable TE modeling and simulations using reference grids and scenarios and the co-simulation platform developed in Phase I.

Please visit the TE Challenge Collaboration Site for information on each of the seven teams. Further details about the Challenge are also outlined in "Transactive Energy Getting Real? Progress with the TE Challenge," a February 2016 webinar (presentation and recording).

For additional details about many of the presentations from the TES 2016 meeting, including those related to the TE Challenge, please visit the conference website. Conference organizers announced that the conference proceedings will be published later this year.

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New Standard Provides Framework for Smart Grid Testing and Certification

Earlier this month, the National Electrical Manufacturers Association (NEMA) published a new standard, The Smart Grid Interoperability Process Reference Manual, ANSI/NEMA SG-IPRM 1-2015 (IPRM). The standard codifies a publication, the Interoperability Process Reference Manual (IPRM), which was developed and refined over the past six years by the Smart Grid Testing and Certification Committee (SGTCC) of the Smart Grid Interoperability Panel (SGIP).

The SGTCC had been established as one of SGIP's standing committees when NIST launched the organization in November 2009. The SGTCC has served as one of the important ways that NIST has sought to carry out the Energy Independence and Security Act of 2007 (EISA), which assigned NIST the "primary responsibility to coordinate development of a framework that includes protocols and model standards for information management to achieve interoperability of Smart Grid devices and systems…"

Cuong Nguyen—who serves as the lead for NIST's Smart Grid Testing and Certification Project, vice chair of the SGTCC, and chair of the NEMA committee that drove the standard development process—said, "Since the establishment of the SGIP and its SGTCC in 2009, we've been strong proponents of the importance of testing and certification for smart grid interoperability. While standards do promote interoperability, they don't guarantee interoperability. Testing programs are needed to ensure that products are both compliant with standards and interoperable. The IPRM embodies the SGTCC's vision for the smart grid testing and certification ecosystem."

The IPRM standard defines a process by which industry stakeholders may procure, test, and assert interoperability between disparate vendors of smart grid products built to identified standards. For example, the IPRM process defines requirements and recommendations for general test policies, test suite specifications, test profiles, interoperability testing and certification authority technical programs, governance, laboratory qualifications, and process improvements.

A more detailed discussion about the new standard is planned next month during a June 23 webinar hosted by the SGIP. SGTCC members will discuss the motivation for the development of this framework, provide a high-level overview of the standard, and describe the standardization process. Please watch SGIP's webinar webpage for registration information.

In addition, for a more personal discussion, please see Nguyen's article, "A 'Certified' Stamp for the Smart Grid," in NIST's "Taking Measure" blog.

This new standard was a joint effort of NEMA's Distribution Automation Technical Committee and SGIP's Smart Grid Testing and Certification Committee. ANSI/NEMA SG-IPRM 1-2016 is available in hard copy or electronic download from the NEMA Standards Store at www.nema.org.

The SGTCC's plans for 2016 include the development of a user's guide for the standard. The user's guide will include further guidance on how to establish an Interoperability Testing and Certification Authority (ITCA) as well as answers to frequently asked questions. The committee is seeking participants for a new working group to develop this user's guide. If you are interested in participating, please contact Cuong Nguyen, Vice Chair of the SGTCC, at cuong.nguyen@nist.gov.

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NIST Cyber-Physical Systems Public Working Group Releases "Framework for Cyber-Physical Systems"

On May 26, the NIST Cyber-Physical Systems Public Working Group (CPS PWG) released its "Framework for Cyber-Physical Systems, Release 1.0." The document—developed in partnership with industry, academic, and government experts—is intended to help manufacturers create new CPS that can work seamlessly with other such smart systems that bridge the physical and computational worlds. According to NIST's David Wollman, the framework provides a CPS analysis

methodology for understanding, designing, building, operating, and assuring CPS, including those with multi-domain applications.

“Creating a complex device involves a lot of people with varying interests and concerns, from the designers to the engineers to the safety assurance testers,” says Ed Griffor, who co-chairs NIST’s Cyber-Physical Systems Public Working Group together with NIST’s David Wollman and Chris Greer. “What the framework provides is an organized treatment of concerns so the group can address and manage them all effectively. It will prompt them to think of concerns they may not be aware of, and support understanding and integration of different CPS.”

While the field is still new, a common characteristic of CPS is the tight integration of physical and computing devices—such as movement sensors that inform your fitness bracelet how far you have walked, or the computer controlling the transmission and antilock brakes in your car. Whatever the purpose of a given CPS, the draft framework outlines the common attributes that its subparts share with other CPS devices and systems, and indicates what it must do to interact successfully with the broader CPS environment.

The document reflects nearly two years’ effort by the public working group, and addresses public comments received after the publication of the draft “Framework for Cyber-Physical Systems, Release 0.7” in September 2015. For detailed information about the CPS PWG, along with the Framework document, please visit the collaboration site at https://pages.nist.gov/cpspwg/.

Some of the concepts outlined in the CPS Framework are also being considered in other communities. For example, “trustworthiness,”—a cluster of concerns covering security, privacy, safety, reliability, and resilience—is discussed in a recently released NIST document, “Systems Security Engineering: Considerations for a Multidisciplinary Approach in the Engineering of Trustworthy Secure Systems—NIST Special Publication 800-160.”

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Upcoming Meeting: Global Cities Team Challenge, June 13-14, 2016

The Global Cities Team Challenge (GCTC) Expo, convened by NIST and US Ignite, will be held next month in Austin, Texas. The expo will bring together over 80 cities from around the world to showcase and exhibit their Action Cluster projects. Registration for the GCTC Expo is free and includes complimentary access to the exhibition floor of the two co-located events, the US Ignite Application Summit and the Smart City Innovation Summit. For additional information about the GCTC program, please visit http://www.nist.gov/cps/sagc.cfm and www.globalcityteams.org.

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Upcoming Meeting: IoT-Enabled Smart City Framework, June 15-16, 2016

The IES-City Framework project is off and running, and a mid-project workshop will be held in Austin, Texas, on June 15-16, 2016. The purpose of the workshop is to review the progress of the three working groups, who all expect to have work in progress to discuss. In the next phase of the project, the three working groups will collaborate to plan the final deliverable. Find additional information on the event at https://pages.nist.gov/smartcitiesarchitecture/events/. The registration link is available online.

The IES-City Framework project, launched in March 2016, will:

- compare and distill current architectural efforts for smart cities and the Internet of Things (IoT);
- identify pivotal points of interoperability (PPI) across the many existing and deployed architectures; and

- produce a consensus framework document of common architectural features.

This framework document will help cities employ interoperable and scalable smart city solutions that will meet the needs of their communities.

Participation in the working groups and framework activity is open to anyone. For additional details, see https://pages.nist.gov/smartcitiesarchitecture/.

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Upcoming Meeting: IEEE/NIST Workshop on Timing Challenges in the Smart Grid, October 26, 2016

NIST will host the IEEE/NIST Workshop on Timing Challenges in the Smart Grid (Gaithersburg, Maryland, October 26, 2016). The goals of the workshop are to clearly identify and analyze:

- 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.

Workshop organizers plan to initiate discussion on potential solutions and evaluate the need for standard and metrology enhancements. A NIST report summarizing the challenges of wide-area clock synchronization and potential solutions will be drafted.

The workshop steering committee has issued a call for abstracts on the following topics:

- Stakeholder perspective of wide-area time synchronization needs and challenges
- Future applications requiring wide-area time synchronization and timing requirements for distributed measurement and control
- Research / practice in GPS receiver calibration and testing
- Research / practice in assembling techniques to enable fault tolerant wide-area time synchronization
- Research / practice in deploying and testing IEEE1588 (using Power Profile or wide-area deployment)

Please submit an abstract to tsg_steering@nist.gov by July 17, 2016.

For additional details about the workshop and its organizers, please visit the workshop webpage.

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SGIP Update

SGIP's 2016 Annual Conference, which will be called the 2016 Grid Modernization Summit, will be held November 7-10, 2016, at the Capital Hilton in Washington, D.C. With a speaker program composed of utility, vendor, and industry senior executives, FERC, government, regulators, national labs, and consultants, the theme is "Accelerating Transformation."

NIST staff members continue to participate actively in SGIP technical sessions and will be contributing to the conference.

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