Smart Grid Cyber-Physical Systems

NIST Smart Grid and Cyber-Physical Systems

Newsletter September 2015

Transactive Energy Challenge: Kickoff Event (Sept. 10-11, 2015)

On Sept. 10-11, 2015, NIST will be hosting a kickoff event for the NIST Transactive Energy Modeling and Simulation Challenge for the Smart Grid (TE Challenge) in Gaithersburg, Maryland. To view the preliminary agenda and register for the event, please visit the conference website. Registration is encouraged by Thursday, September 3.

The TE Challenge will bring researchers and companies with simulation tools together with utilities, product developers, and other grid stakeholders to create and demonstrate modeling and simulation platforms while applying transactive energy approaches to real grid problems. "Transactive energy," as defined by the GridWise Architecture Council's Transactive Energy Framework, refers to "a system of economic and control mechanisms that allows the dynamic balance of supply and demand across the entire electrical infrastructure using value as a key operational parameter."

Initiated by NIST and developed in collaboration with federal partners and industry, the TE Challenge will help the industry better understand the potential for TE and create a path for real-world trial implementations. The TE Challenge website and TE Challenge collaboration site provide information about the challenge timeline, goals, and potential participants.

For a brief introduction to the Challenge, readers may want to check out the one-hour webinar held on August 6. The webinar, presented by TE leaders from NIST and the Smart Grid Interoperability Panel (SGIP), presented draft plans of some organizations planning to participate, as well as information about how you can get involved and benefit from the Challenge. Visit http://www.sgip.org/webinars to see the archive.

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“Facility Smart Grid Information Model” Reaches Key Milestone

With the recent release for public comment of the Facility Smart Grid Information Model (FSGIM), homes, offices, factories, and other buildings are moving significantly closer to becoming full partners in supporting and managing the electric grid. The proposed FSGIM standard (ASHRAE/NEMA Standard 201P) defines an abstract, object-oriented information model that provides electrical energy consumers with a common basis to describe, manage, and communicate about electrical energy consumption and forecasts.

According to Steve Bushby, manager of the NIST Embedded Intelligence in Buildings Program and chair of Standard Project Committee (SPC) 201P that developed the standard, “the potential benefits of this standard—for both energy providers and facility owners—are very significant. Almost all electricity is consumed in a building of some kind. This standard attempts to capture the breadth and diversity of these consumers by using the term ‘facility.’” SPC 201P is sponsored by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) and the National Electrical Manufacturers Association (NEMA).

Among the many energy management applications enabled by this standard are potential game-changers, such as on-site generation, demand response, electrical storage, and peak demand management. This standard builds on and integrates with other smart grid standards, including Green Button energy usage standards, BACnet, Smart Energy Profile (SEP) 2.0, IEC’s Common Information Model (CIM), and IEC 61850.

The standard development process, which often requires many years, was accelerated by the establishment of the Smart Grid Interoperability Panel’s (SGIP) PAP-17 in 2010 (co-chairs Steve Bushby, NIST, and Marty Burns, NIST). PAP-17 played an important role by developing use cases that served as the basis for deciding what needed to be included in the model.

According to Mr. Bushby, “Many experts and organizations helped drive the standard development process forward. SPC 201P has had contributions from over 50 individual technical experts representing utilities, consumer interests, and manufacturers of products for residential, commercial, and industrial buildings. It’s been a labor of love for many of us.”

The resulting comprehensive document can be downloaded at the ASHRAE website. The 45-day public comment period ends on October 6, 2015. Instructions on how to comment are also provided online. The draft standard is also being considered for designation as an international standard (ISO/WD 17800).

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Seeking Participants in the ANSI/NEMA SG-IPRM Canvass Group

The Smart Grid Interoperability Panel (SGIP) and the National Electrical Manufacturers Association (NEMA) are working together to convert the Interoperability Process Reference Manual (IPRM) into an ANSI/NEMA standard. This effort is seeking volunteers to participate in a canvassing committee for the purpose of developing an American National Standard.

The IPRM is a foundational element of the vision of the SGIP Smart Grid Testing and Certification

Committee (SGTCC). The SGTCC developed and issued the IPRM to detail the committee's recommendations on testing and certification processes and best practices that enhance the introduction of interoperable products in the marketplace. These recommendations build upon international standards-based processes for interoperability testing and certification.

The IPRM defines a process by which stakeholders in the smart grid sector may procure, test, and assert interoperability between disparate vendors of smart grid products to identified standards. This standard will define 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. Finally, this standard will describe an implementation approach.

The group is seeking participants in the following categories:

1. General Interest: Organization or individual that has an interest in the use of equipment included in the scope of this standard (i.e., smart grid products), but doesn't use it directly;
2. Producer: Manufacturer of equipment included in the scope of this standard;
3. Testing Laboratory: Organization that tests equipment included in the scope of this standard to established specifications; and
4. User: Organization that uses equipment included in the scope of this standard. We especially need additional participants in the User category.

If you are interested in participating, please contact the group's Secretary, Khaled Masri, at khaled.masri@nema.org or the group's Chair, Cuong Nguyen, at cuong.nguyen@nist.gov.

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Global City Teams Challenge (GCTC): Gearing Up for GCTC 2016, Save the Date

Building on the momentum of the highly successful NIST Global City Teams Challenge (GCTC) 2015 program, smart city leaders are already looking ahead to next year. An important meeting for the next round of GCTC effort will be held at the NIST campus in Gaithersburg, Maryland, November 12-13, 2015. Please save the date! (More information, including the agenda, will be available soon.)

Sokwoo Rhee, Associate Director of NIST's Cyber-Physical Systems Program, said, "We are committed to building on the success of the GCTC and aim to convene a larger, even more global initiative that will support partnerships between local governments and innovators and advance Internet of Things (IoT) deployments in cities across the globe."

The GCTC program will have a presence at the Smart Cities Week 2015 event in Washington, DC, (Sept. 15-17, 2015). Sponsored by the Smart Cities Council, the program will include four GCTC-moderated sessions:

- "Smart City Champions" (Tuesday, 9/15, 2:00 – 3:30 p.m.)
- "Global City Team Conversations" (Tuesday, 9/15, 5:10 – 6:10 p.m.)
- "The Federal Role: U.S. Initiatives" (Wednesday, 9/16, 9:30 – 10:10 a.m.)
- "Accelerating Smart City Deployments" (special workshop event at Georgetown University,

640 Massachusetts Ave, NW, Thursday, 9/17, 1:00 – 5:30 p.m.)

Other sessions of special interest to the smart grid community include the following:

- “The Energy Grid: Foundation of Smart City 2.0”
- “Addressing Momentary Outages”
- “Microgrids, Smart Grids, and Energy Resilience”

Earlier this summer, the GCTC Expo (June 1, 2015, Washington, DC)—featuring more than 60 GCTC teams and 1300 attendees—brought the GCTC 2015 program to a festive conclusion. Archived video footage of all 60+ presentations and keynotes delivered at the Expo and copies of the presentation materials are now available online. (The June 2015 issue of this newsletter also includes further highlights of the event).

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"Identity and Access Management for Electric Utilities": Draft of NIST Cybersecurity Practice Guide Now Available

The National Cybersecurity Center of Excellence (NCCoE)—a public-private collaboration for accelerating the widespread adoption of integrated cybersecurity tools and technologies organization, established by NIST in 2012—has just released “Identity and Access Management for Electric Utilities, NIST Special Publication 1800-2” for public comment.

The guide addresses one of the key cybersecurity challenges faced by utilities today—identity and access management (IdAM). Many utilities have decentralized IdAM systems, which are controlled by numerous departments. Among potential negative outcomes resulting from this situation are the following:

- an increased risk of attack and service disruption
- an inability to identify potential sources of a problem or attack
- a lack of overall traceability and accountability regarding who has access to both critical and noncritical assets

Cybersecurity experts at the National Cybersecurity Center of Excellence (NCCoE) at NIST collaborated with the energy sector and technology vendors to develop an example solution to help energy companies better manage and control who has access to their networked resources, including buildings, equipment, information technology, and industrial control systems, using a centralized platform.

This newly available practice guide provides IT implementers and security engineers with a detailed architecture so that they can recreate the security characteristics of the example solution with the same or similar technologies. The solution is guided by NIST standards, best practices, and industry regulations, including the North American Electric Reliability Corporation’s (NERC) Critical Infrastructure Protection (CIP).

NCCoE is seeking comments on the draft guide—the approach, the architecture, and possible alternatives. The comment period is open through October 23, 2015. Comments will be made public after review and can be submitted anonymously. Submit comments online or via email to energy_nccoe@nist.gov.

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Smart Grid Interoperability Panel (SGIP) Update

The SGIP Annual Conference, Nov. 3-5, 2015, New Orleans, Louisiana, will feature a theme of "Advancing through Collaboration." The speaker program will feature utility, vendor, and industry senior executives. Registration information and the conference agenda are now available on the SGIP Annual Conference page. Special early bird registration and lodging rates are available through September 18, 2015.

SGIP's Catalog of Standards continues to expand, with six new entries approved by the SGIP membership last month. This brings the number of entries to 76. One of the newly approved entries includes a NIST publication, *NISTIR 7943 - Guideline for the Implementation of Coexistence for Low Frequency Narrowband Power Line Communication (NB-PLC) Standards in the Smart Grid*. This NISTIR, developed in conjunction with SGIP's PAP-15 (Chair, David Su, NIST), presents recommendations on the implementation of coexistence mechanisms for NB-PLC standards. The document also gives a short introduction of NB-PLC standards and their coexistence mechanisms. (A companion publication also developed with PAP-15, *NISTIR 7862 - Guideline for the Implementation of Coexistence for Broadband Power Line Communication Standards*, was added to the Catalog of Standards in 2013.)

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