



# Internet2 CINO (IoT) Working Group Community Meeting

8 February 2016

Chairs

Ed Aractingi, Marshall University

Brian Stengel, University of Pittsburgh

Raj Veeramani, U Wisconsin-Madison

Steve Wallace, Indiana University

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# Meeting Objectives

- E2ET&S for IoT Workshop Debrief
- IoT Sandbox Next Steps
- Smart Cities/Campus Focus Group
- Next Steps

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# IoT Working Group Plan (Page 1 of 2)

Initiative/Use Case	Description	Plan
<b>Network Segmentation for IoT</b>	Use of network segmentation to ensure additional IoT connected devices don't undermine overall network security; Cisco blog post in <i>The Security Ledger</i> <a href="http://bit.ly/1A1acwl">http://bit.ly/1A1acwl</a>	<ul style="list-style-type: none"> <li>Webinar held February 2, 2016. Slides and recording available: <a href="http://bit.ly/1Q2eDcl">http://bit.ly/1Q2eDcl</a></li> </ul>
<b>End to End Trust &amp; Security Open Architecture for IoT</b>	Create a point of view and recommended next steps to develop a comprehensive End to End Trust & Security Open Architecture for the Internet of Things	<ul style="list-style-type: none"> <li>February 4, 2016, workshop in cooperation with IEEE, NSF, and George Washington University</li> </ul>
<b>IoT Taxonomy</b>	Determine a common definition for IoT	<ul style="list-style-type: none"> <li>Draft white paper available on our Wiki: <a href="http://bit.ly/1IN4XWE">http://bit.ly/1IN4XWE</a></li> </ul>
<b>IoT Sandbox and IoT Stack</b>	Determine the components of IT infrastructure for IoT enablement and create a sandbox environment for university researchers to test and pilot	<ul style="list-style-type: none"> <li>Develop IoT Sandbox technical model and business model for IoT collaborative development, with IBM and extend to others</li> <li>IBM in Sandbox 2015, expand in 2016 to include other vendors like AWS</li> </ul>
<b>Internet of Medical Things</b>	How to best leverage – securely – IoT for medical devices	<ul style="list-style-type: none"> <li>Develop plan for Healthcare / Life Sciences including Internet of Medical Things in 2016</li> <li>Florence Hudson on June 2016 IEEE panel for connected healthcare (<a href="http://bit.ly/1W6x1W">http://bit.ly/1W6x1W</a>)</li> </ul>

# IoT Working Group Plan (Page 2 of 2)

Initiative/Use Case	Description	Plan
<b>Smarter Cities / Campuses: Smart Grid with E2E IoT Trust &amp; Security Architecture</b>	Use of the Internet2 network to enable research on smart grid communication and collaboration, to extend to smarter cities.	<ul style="list-style-type: none"> <li>• Whitepaper (available on our Wiki: <a href="http://bit.ly/1iJ0N5V">http://bit.ly/1iJ0N5V</a>) on opportunity to leverage the Internet2 network for Smart Grid R&amp;D with End to End Trust &amp; Security</li> </ul>
<b>Building &amp; Wireless Waterways Testbed</b>	Collaboration between the Port of Pittsburgh Commission, University of Pittsburgh, and Internet2 to bring cyberinfrastructure as a service to researchers	<ul style="list-style-type: none"> <li>• Collaborating with DARPA, NIST, member universities, and utilities on how to best leverage the Internet2 network as a Smart Grid testbed</li> </ul>
<b>Electric Vehicles</b>		<ul style="list-style-type: none"> <li>• Consider demo using SDN for IoT authentication, configuration, and security</li> </ul>
<b>Power over Ethernet</b>	Provide overview and practical examples of Power over Ethernet and how it relates to IoT, including PoE devices, capabilities, campus facilities that can be part of PoE, and funding sources	<ul style="list-style-type: none"> <li>• PoE Draft whitepaper available on our Wiki: <a href="http://bit.ly/1OuREdW">http://bit.ly/1OuREdW</a></li> <li>• January 2016 NSF presentation on Applications &amp; Services in 2021 (<a href="http://bit.ly/1TO3WR1">http://bit.ly/1TO3WR1</a>)</li> <li>• February 2016 NSF presentation on Future Wireless Cities (<a href="http://bit.ly/1TO3WR1">http://bit.ly/1TO3WR1</a>)</li> </ul>



# E2ET&S for IoT Workshop: February 4, 2016



**Do You Have a Vested Interest in End-to-End Trust and Security for the Internet of Things?**

Help identify challenges, give your point of view, provide valuable insights, and offer recommendations that will help drive IoT development.

**A Call for Technology Leaders and Innovators**

IEEE, Internet2, and the National Science Foundation (NSF) as well as a host of other sponsors are working together to gather industry technologists who can help drive the Internet of Things (IoT) conversation and contribute to the development of an open architectural framework.

On Thursday, 4 February 2016, IEEE has organized "IEEE End-to-End Trust and Security for the Internet of Things," a workshop that will be held at George Washington University. Together with our sponsors, we are seeking qualified technology leaders and innovators to participate as presenters and attendees at this invitation-only event.

**A Call for Presentations**

Industry, government, and academic professionals, including researchers, IT architects, security professionals, government agencies, industry associations, professors, and post-graduate students, are encouraged to develop and submit presentations that express viewpoints, make recommendations, and further the discussion on the subject of end-to-end trust and security for an open IoT architectural framework. Submissions should address the TIPPSS elements: trust, identity, privacy, protection, security, and safety.

The submissions will be reviewed, and the top fifteen selected will be presented at the IoT workshop on 4 February in Washington DC. Submissions that address policy will also be eligible for presentation at the "IEEE Experts in Technology and Policy Forum (ETAP)," which will take place at the same location on the following day.

**Proposal Submissions and Your Invitation**

Proposals will be accepted for consideration from - Monday, 4 January 2016, until midnight (EST), Friday, 16 January 2016. Further details are pending. If you have any questions, please submit them to the IEEE, via email.

We encourage you to share this information with your colleagues and other experts in end-to-end trust and security and the development of an open architecture for the Internet of Things.

To request your invitation to the "IEEE End-to-End Trust and Security for the Internet of Things" workshop, please complete our online form.

**About IEEE Internet Initiative**

The IEEE Internet Initiative connects the voice of the technical community to global policymaking for Internet governance, cybersecurity, and privacy to inform debate and decisions, and to help ensure trustworthy technology solutions and best practices. Through the Initiative, IEEE is connecting engineers, scientists, industry leaders, and others engaged in various technology and industry domains globally, with policy experts in order to expand knowledge about technology and its implications and impact on Internet governance issues, and to raise awareness of public policy issues and processes in the global technical community.

For information on how to get involved, please contact us at: [internetinitiative@ieee.org](mailto:internetinitiative@ieee.org)

- 2 day event at the George Washington University Marvin Center in Washington, DC in conjunction with IEEE, NSF, and George Washington University
- 150+ participants (180+ registrants), 35+ presentations (40 paper submissions)
- **Next Steps Summary:**
  - Connect with appropriate agencies: NSF and others
  - Define policy for TIPPSS, and liability component for software development
  - Ethics and education component: standards, DIYers, greater community
  - Identify places where accomplishments can be made – determine the solution, identify the problems and common solutions, create awareness
- **Potential workshop between Internet2 and IEEE for Education & Training**
- **Potential follow on workshop to keep the conversation going**

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# Expanding the IoT Sandbox

- **Goal:** Provide a portal and mechanisms for the Internet2 community to gain access to and develop new solutions for IoT utilizing Industry solutions that best enable the community to integrate IoT into curriculums, and develop IoT applications
- Currently includes the IBM BlueMix Foundation (Presented at TechEx <http://bit.ly/1MqvwSL>)
- Expanding to other Industry players, to potentially include:
  - Amazon Web Solutions AWS IoT <https://aws.amazon.com/iot/>
  - Apple's ResearchKit <https://developer.apple.com/researchkit/> or HealthKit <https://developer.apple.com/healthkit/>
  - Cisco's Internet of Things Dev Center <https://developer.cisco.com/iot>
  - Google Nest <https://nest.com/>
  - Microsoft (Presented at TechEx <http://bit.ly/1MqvwSL>)
  - OS|soft (Presented at TechEx <http://bit.ly/1MqvwSL>)



## Internet2 announces the IoT Sand-BOX Program

The IoT Sand-BOX Program makes available to Internet2 Members 50 student IoT kits, as-well-as IoT development training, and access to cloud-based IoT application resources. Internet2 Members will be able to use the Sand-BOX for for the duration of a semester.

Each kit contains:

- \* microcomputer (e.g., Raspberry Pi, Arduino, etc.)
- \* sensors (e.g., temp, light, pressure, distance, etc.)
- \* actuators (e.g., stepper motors, relays, etc.)
- \* breadboard, LEDs, and wire jumpers
- \* student and instructor documentation

The Internet2 Member will select among CINO's Sand-BOX partners (i.e., AWS, IBM BlueMix, and Azure) to provide access and training to their IoT cloud-based development environments.

# Launching Smart Cities/Campus CIO Advisory Council and Pilot Group

- **Tentative Goal:** Identify current best practices and develop next practices, use cases, and innovations in Smart Cities/Campus testbeds. Include opportunity to leverage the Internet2 network as a test bed and backbone for smart campus/cities, incorporating end-to-end trust and security elements
- **Timing:** Putting together a plan, launching February 2016
- **Inaugural Participants:**



Others Interested? Email Emily Nichols  
[enichols@Internet2.edu](mailto:enichols@Internet2.edu)

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# IoT Community Next Steps

- Smart Campus focus group participation – let us know if you want to participate or have potential use cases
- IoT Sandbox participation – let us know if you want to participate
- Smart Grid testbed – let us know if you want to participate

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