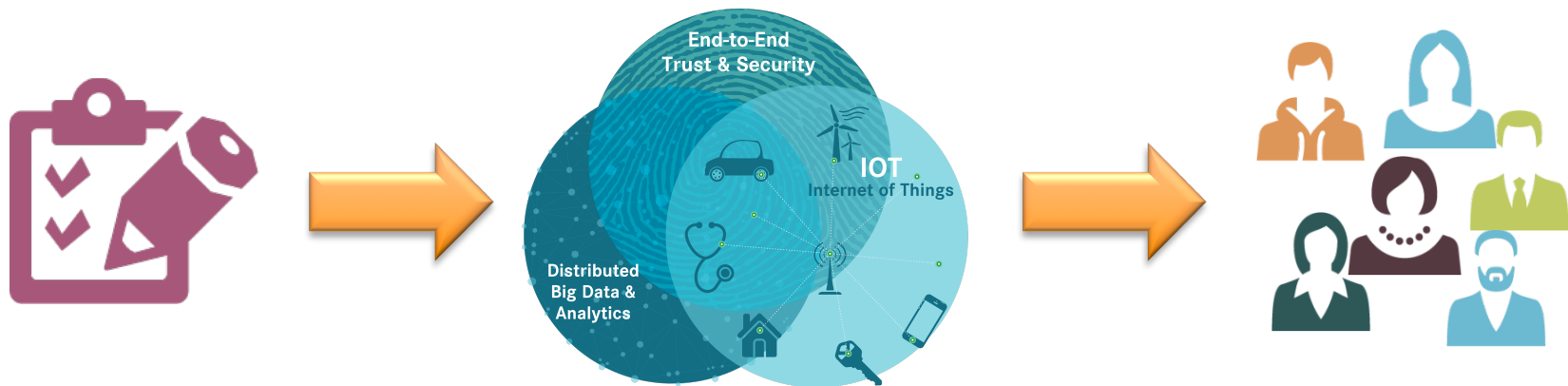


Collaborative Innovation Program



Internet2 CINO Initiatives Working Groups
Collaborative Innovation Community Meeting

11 January 2016

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Meeting Objectives

- Welcome & Thank You
- Cisco IoT World Forum Recap – December 2015
- CINO Initiatives Working Groups' 2015 Accomplishments
- 2016 CINO Initiatives Plans
- E2ET&S for IoT Workshop
- Smart Cities/Campus Focus Group Launch
- Key Information & Communications Technology Trends for the R&E Community
- Next Steps

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Cisco IoT World Forum: December 6-8, 2015 in Dubai



The Internet2 community was well represented:

- Both Florence Hudson and IoT working group co-chair Dr. Raj Veeramani from University of Wisconsin-Madison moderated sessions of the the IoT World Forum Research Symposium
- Florence also led a panel of Internet2 members and partners on “Collaborative Innovation Communities for IoT” including University of Wisconsin-Madison, IBM, HEAnet, and IEEE

<http://www.iotwf.com/>

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Innovation Working Group Operations Timeline: 2015 – Startup year, but lots to be proud of. Thanks to you!



1Q

- Member survey on open collaborative innovation ideas

2Q

- Announced working groups based on member survey
- Attracted co-chairs and members
- Working Groups Startup
- Monthly meetings
- Gathered & reviewed use cases

3Q

- **E2ET&S**: SDP Webinar held 9/1/15; session at SC15
- **E2ET&S/loT**: Developed workshop proposal on E2ET&S for loT with IEEE, NSF
- **E2ET&S**: Connected several use cases to TIER and InCommon
- **loT**: Developed loT Sandbox with IBM
- **loT**: White paper on loT Taxonomy

4Q

- TechEx in-person meetings to discuss recommendations
- Gathered new input
- **loT**: White paper on Smart Grid R&D with E2ET&S
- **loT**: White paper on Power over Ethernet

Innovation Working Group Operations Timeline: 2016 We evolve and grow

1H

- **DBDA**: Develop Healthcare/Life Sciences (HCLS) strategy
- **DBDA**: Develop Digital Humanities/Humanists strategy
- **DBDA**: NSF Big Data Hub projects
- **E2ET&S/IoT**: E2ET&S for IoT workshop(s)
- **IoT**: Smart Campus focus group
- **IoT**: Smart Grid testbed planning
- **IoT**: Expand IoT Sandbox to more Partners
- Increase researcher engagement
- Continue education & awareness for new innovation opportunities

2H

- **All**: E2ET&S collaboration across extended community
- **DBDA**: Digital Humanities strategy continuation
- **DBDA/IoT**: Continue IoT and DBDA strategy development
- **IoT**: Smart Grid Testbed pilots
- **IoT**: Smart Campus enablement
- **IoT**: Assess/extend Sandbox approach

- HCLS strategy execution
- HCLS testbed pilots
- Constant market insight gathering
- Innovation input from community





Ongoing Community Input

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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 TIPSS 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, 15 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

- **2 day event at the George Washington University Marvin Center in Washington, DC in conjunction with IEEE, NSF, and George Washington University**
 - Day 1, February 4, 2016: Deep technical workshop on E2ET&S for IoT open architecture needs, viewpoints, use cases
 - Day 2, February 5, 2016: IEEE ETAP ([Experts in Technology and Policy](#)) – *IEEE Invitation Only*
- **Goal:** For researchers, IT architects and security professionals from industry, government and academia to discuss and agree the scope of an end to end trust and security open architecture for IoT, resulting in a report out, identified research challenges, and point of view with recommended next steps.
- **Target audience of 100 to 150 attendees:** Universities, Agencies, IoT related Standards Organizations, U.S. Regional Research & Education Networks, Industry Players, Internet2 staff and Collaborative Innovation Community
 - Nearly 100 registrant requests and interest expressed by about a dozen for paper submissions
- *Updated Agenda available on the IoT Wiki (<http://bit.ly/1KDleHu>)*
- *Interested in attending? <http://bit.ly/1Rb29p7>*
- *Interested in submitting a paper? Send via email by January 15: d.ceruto@ieee.org*

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Launching Smart Cities/Campus 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:** Launch January 2016, followed by regular cadence of collaborative calls
- **Inaugural Participants:**



Others Interested? Email Emily Nichols enichols@Internet2.edu



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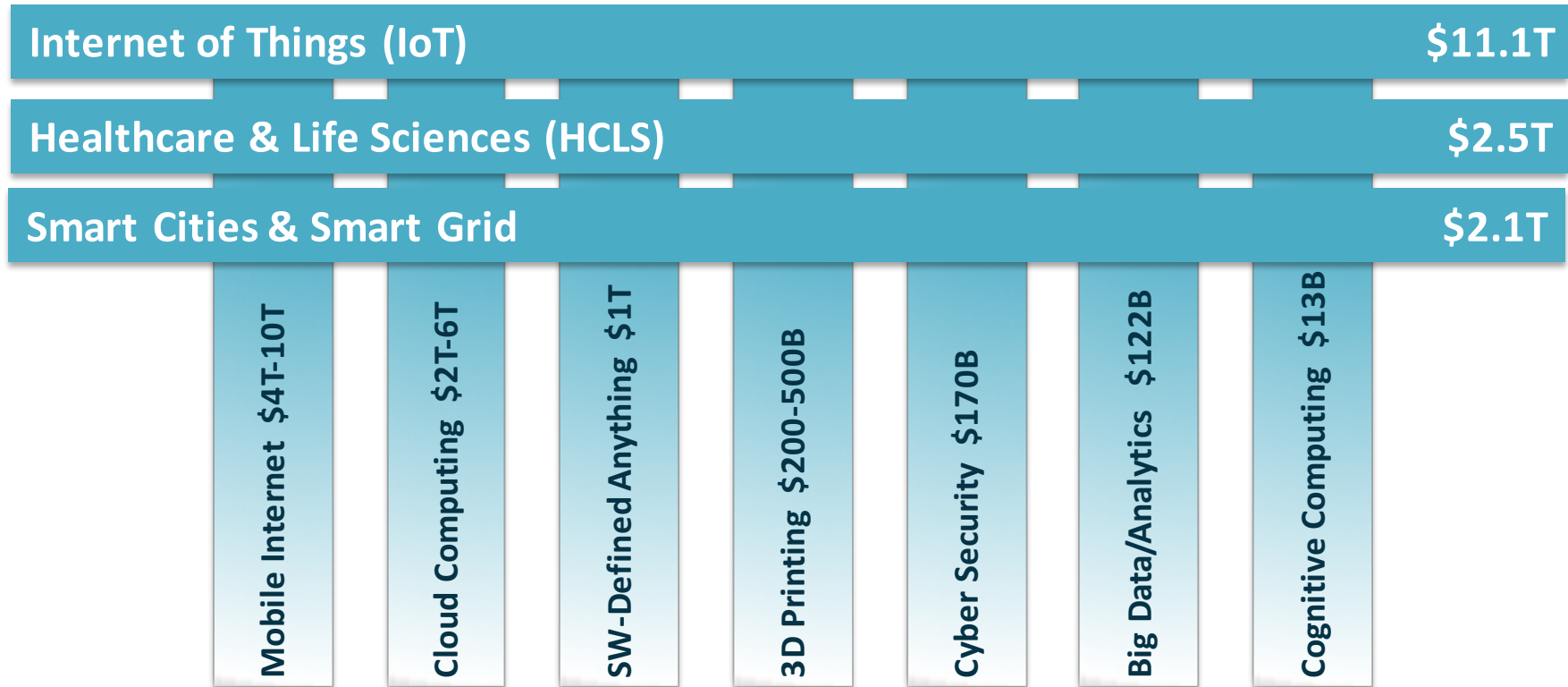
Internet2 Key Information and Communication Technology Trends for the Research & Education Community

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The Internet of Things, Healthcare & Life Sciences, and Smart Cities could represent \$15T in global economic value in 2025.



Economic value includes revenues, cost reductions & service improvements achieved

Sources: Internet2 CINO analysis; BizTech; Deloitte; Consultancy.uk; Forbes; Markets and Markets; McKinsey; US Department of Agriculture, Economic Research Services.



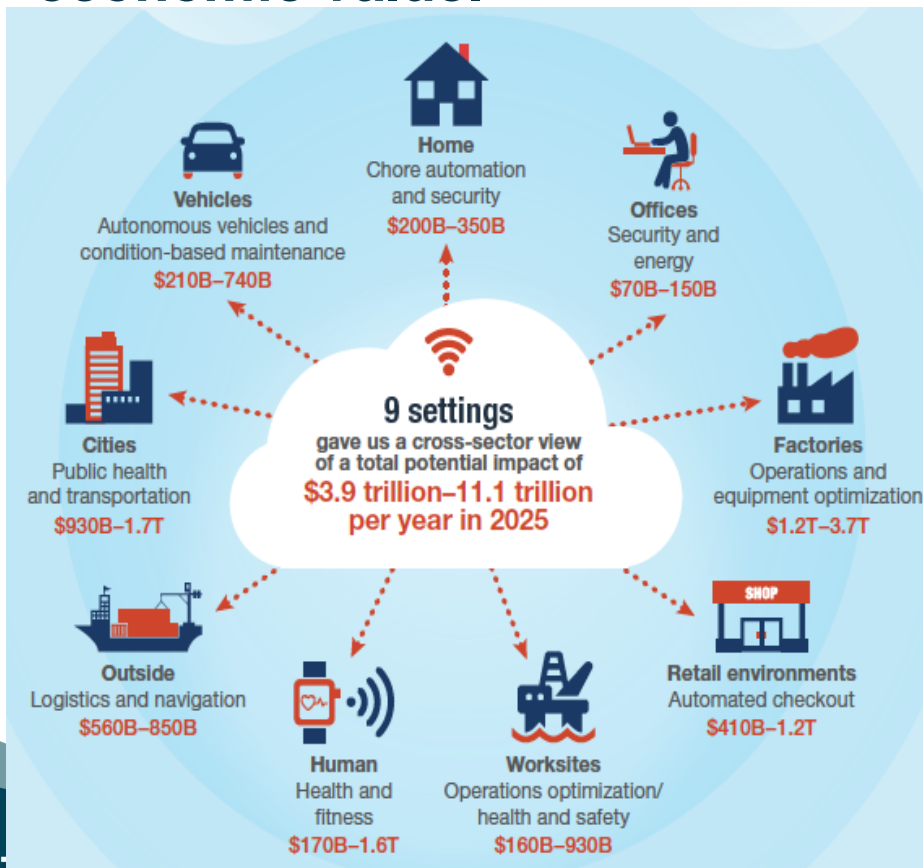
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In 2025, the Internet of Things could contribute \$11T of global economic value.

Internet of Things will connect billions of devices, generate large volumes of data, create transformational value, and need a secure network.

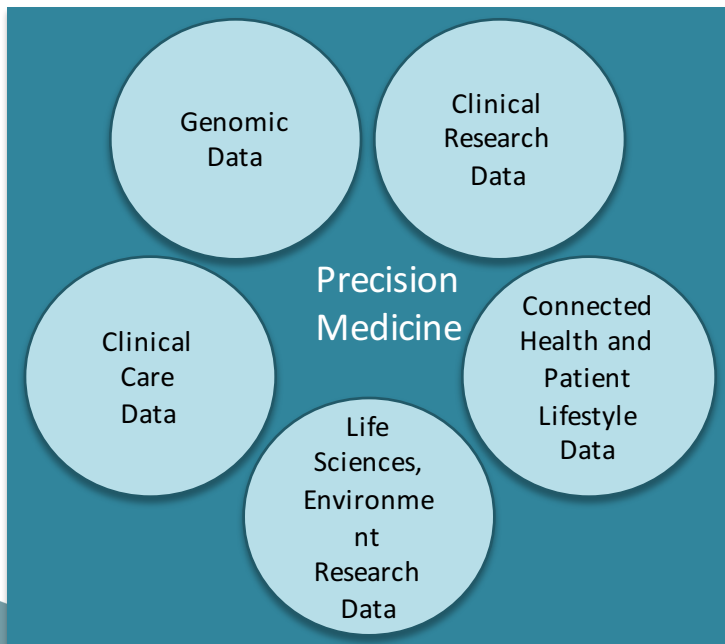
- IoT applies across many industries and use cases
- As the physical world becomes connected to the digital world, more “things” will be at play
- 2014: 13B+ Internet of Things devices
- By 2020: 25B to 200B “things” will be connected
- IoT is projected to deliver 2x IT economic value, representing 10% of global GDP
- Amount of IoT data will be ENORMOUS
 - Zettabytes (10^{21}) by 2020
 - Then Yottabytes (10^{24})
 - Then Brontobytes (10^{27})



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Healthcare & Life Sciences will increasingly leverage technology for analysis of volumes of data, improving insights and outcomes.

Confluence of data
to support Precision Medicine



Large data volumes and analytics opportunity generated by:

- Genomic data
- Clinical and fundamental research data
- Clinical care data and observations
- Patient input including lifestyle, travel
- Environmental data (weather, geography)
- Wearable health and wellness devices
- EMR/EHR
- Images (tumors, MRIs, etc.)
- Biobank data
- Biotechnology, medical technology, pharma
- Cognitive computing opportunity

Source: National Institutes of Health, "The Precision Medicine Initiative Cohort Program - Building a Research Foundation for 21st Century Medicine." September 2015.

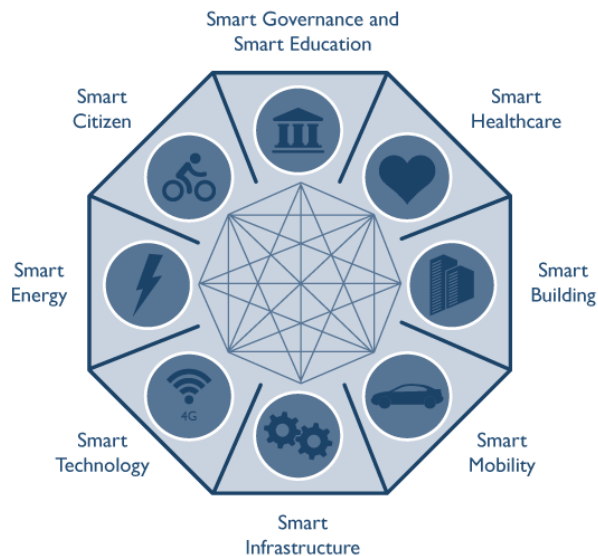
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Smart Cities, Campuses, & Communities will be built on a foundation of Internet of Things technologies.

SMART CITY CONCEPTS



Source: Frost & Sullivan

The White House “Smart Cities” initiative will help communities tackle key challenges.

- Projected \$160M in new investment during fiscal year 2016
- 20+ cities and 25+ universities are named participants
 - 20+ Internet2 university members, e.g., Case Western, NYU, Rice, UCSD, University of Chicago, UWMadison
 - Industry members (Cisco, GE, IBM, Microsoft)
- Development of “Internet of Things” applications testbeds
- Developing multi-sector, intercity collaborative models

Smart Campus initiatives enable American College and University Presidents’ Climate Commitment signees to deliver results.

Sources: Consultancy.uk, “Smart City Market Revenues to Grow to 2 Trillion by 2020.” 27 August 2015; Forbes, “Smart Cities – A \$1.5 Trillion Market Opportunity.” 19 June 2014; ACUPCC Reporting System; The White House, “FACT Sheet: Administration Announces New ‘Smart Cities’ Initiative to Help Communities Tackle Local Challenges and Improve City Services.” September 2015.

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Share your input on the Key ICT Trends

Access the full report on **Internet2 Key ICT Trends** (<http://bit.ly/1Jvs0p6>) and **tell us** (<http://bit.ly/1ZTLxDP>) how Internet2 can best support you.

- What are some of the most pressing challenges at your university?
- What keeps you up at night?
- What do you think Internet2 can do to help alleviate these concerns?

Complete our **short survey** (<http://svy.mk/1Z76bOx>) to share with us the importance of each trend to your institution and when you believe it will have the most impact on your campus.

Join the conversation on our **community forums** (<http://bit.ly/1ZTLxDP>) to influence future content, programming, workgroups, and events. Your input is vital as we create new resources and collaboration opportunities that propel industry innovation.

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Next Steps

- Register to attend the ***E2ET&S for IoT Workshop***, presentation submissions due January 15th
- ***IoT Sandbox*** – let us know if you want to participate
- ***NSF Big Data Hubs*** – let us know if you are participating
- ***Smart Cities/Campus Focus Group*** participation – let us know if you want to participate or have potential use cases
- Share your ***input on the Key ICT Trends***

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Questions & Answers...

Thank You

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