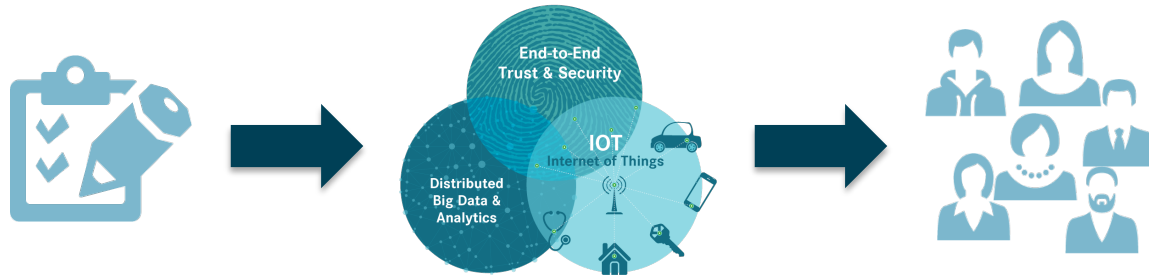


Collaborative Innovation Program



Internet2 CINO Initiatives Working Groups
Collaborative Innovation Community Meeting

31 August 2015



Meeting Objectives

- Review status of all three Innovation Working Groups and submitted use cases
 - End-to-End Trust & Security
 - Internet of Things
 - Distributed Big Data & Analytics
- Cross-working group collaboration opportunities
- Call to Action
- Questions & Answers



End-to-End Trust & Security Working Group



Co-Chairs

- Mark Cather, University of Maryland, Baltimore County
- Scot Ransbottom, Virginia Tech
- Donna Tatro, Princeton University

Mission:

- *Develop an architecture and implementation approach to enable “End-to-End Trust & Security” for the Research & Education community*



E2E Trust & Security Working Group Plan (1 of 2)



E2E T&S Use Cases	Leaders	Plan
Software Defined Perimeter (SDP)	<ul style="list-style-type: none">North Dakota State University	<ul style="list-style-type: none">Scheduled educational webinar with Junaid Islam, creator of SDP spec for Cloud Security Alliance for 9/1/15 (3PM ET)
Improved interoperability among university and hospital networks	<ul style="list-style-type: none">University of Pittsburgh	<ul style="list-style-type: none">Conduct survey of universities with hospitals to identify needs, then engage vendors for solutions
Network Segmentation for IOT	<ul style="list-style-type: none">MCNC	<ul style="list-style-type: none">Determine a common desired solutionPotential whitepaper or webinar to increase awareness
IPsec and Identity based firewalls	<ul style="list-style-type: none">North Dakota State University	<ul style="list-style-type: none">Steve Wallace engaging SDN/Security WGPotential to combine with External access to "research zone" systems use case (see next page)
End to End Trust & Security Open Architecture for IOT	<ul style="list-style-type: none">TBD - Pittsburgh, UMBC, VaTech, Princeton, UW, IU, Clemson, Marshall	<ul style="list-style-type: none">Develop unsolicited proposal for NSF supported workshop for End to End Trust & Security for the Internet of Things, submit to NSF September, workshop target date 4Q15/1Q16



E2E Trust & Security Working Group Plan (2 of 2)



IOT Use Cases	Leaders	Plan
Security for web-based mobile applications	• Virginia Tech	• Scheduled deep dive call for 9/8 • Connecting with a University of Chicago project underway
Preserving student privacy while enabling use of InCommon federated services	• Virginia Tech	• Scheduled deep dive call for 9/8 • Potential to leverage the National Strategy for Trusted Identity for Cyber Security (NSTIC) grant
Easily provision strong credentials in the form of a virtual campus ID card backed by a set of high-assurance personal X.509 certs	• Internet2/Penn State/Iowa	• Scheduled deep dive call for 9/8
Assign, manage, and revoke permissions on a platform to support collaborative work	• Brown	• Schedule deep dive call
External access to "research zone" systems	• Brown	• Schedule deep dive call • Potential to combine with IPsec and Identity Based Firewalls
Campus-based Computational Research Support	• Clemson	• Schedule deep dive call



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NSF Workshop Proposal: “End to End Trust & Security Open Architecture for the Internet of Things”



- **Goal:** 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.
- **Outcomes:** Report and *initial plan on the definition and scope* of an open architecture for End to End Trust and Security for IOT, and next steps to enable the development of this architecture
- **Target Audience:** *30-50 attendees* from U.S. Based Universities, U.S. Government Agencies, U.S. Regional Networks, IOT standards bodies (e.g., IEEE, IIC), and Internet2 staff



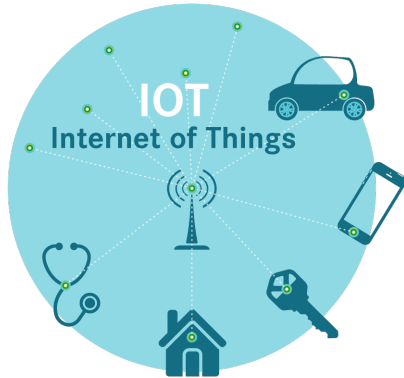
E2E Trust & Security Working Group Next Steps



- 3Q15
 - Continue deep dives on submitted use cases
 - Determine use case overlap and collaboration with InCommon, TIER, SDN WG's
 - Draft unsolicited NSF proposal for workshop, “End to End Trust and Security Open Architecture for the Internet of Things”
 - Identify potential participants in E2ET&S for IOT workshop
- 4Q15
 - Determine potential innovations for E2ET&S
 - Schedule E2ET&S for IOT workshop, if funding approved



Internet of Things (IOT) Working Group



Co-Chairs

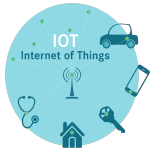
- Ed Aractingi, Marshall University
- Raj Veeramani, University of Wisconsin-Madison
- Steve Wallace, Indiana University

Mission:

- *Improve community awareness and understanding of the IOT, and its implications*
- *Identify research gaps and needs to be addressed*
- *Be a catalyst and enabler for collaborative IOT deployment and success worldwide*
- *Identify and support the investigation of IOT use cases to benefit Internet2 members*
- *Identify needs for and assist Internet2 in developing IOT services that can serve its members for IOT research and deployment*



Internet of Things Working Group Plan



IOT Use Cases	Leaders	Plan
<p>Smarter Cities</p> <ul style="list-style-type: none"> • <i>Smart Grid with E2E IOT Security Architecture</i> • <i>Smart Cities including Building & Wireless Waterways Testbeds</i> • <i>Electric Vehicles</i> 	<ul style="list-style-type: none"> • IBM, Northrop Grumman, Clemson, Indiana, Pitt • Pittsburgh • EV: Pittsburgh, UWMadison, Washington, Colorado State 	<ul style="list-style-type: none"> • <i>Smart Grid</i> – Draft whitepaper on needs and goals of Smart Grid with End to end trust & security (August) • <i>Smarter Cities</i> – Demo proposal using SDN for IOT authentication, configuration, security (TBD)
<p>End to End Trust & Security Open Architecture for IOT</p>	<ul style="list-style-type: none"> • TBD - Pittsburgh, UMBC, VaTech, UW, Princeton, IU, Clemson, Marshall 	<ul style="list-style-type: none"> • Develop unsolicited proposal for End to End Trust & Security Open Architecture for IOT, submit to NSF September, workshop target date 4Q15/1Q16
<p>IOT Sandbox and IOT Stack</p>	<ul style="list-style-type: none"> • IBM, Marshall, IU 	<ul style="list-style-type: none"> • Develop IOT Sandbox technical model and business model for IOT collaborative development, with IBM, Cisco & extend to others (3Q15) • Demo and Pilot Deployment (4Q15)
<p>Power Over Ethernet</p>	<ul style="list-style-type: none"> • Indiana, Clemson 	<ul style="list-style-type: none"> • Develop whitepaper (2H15)
<p>Internet of Medical Things</p>	<ul style="list-style-type: none"> • Hudson 	<ul style="list-style-type: none"> • Develop plan for Life Sciences / Healthcare (2H15)





IOT Working Group Next Steps

- 3Q15
 - Identify campuses and regional networks to collaborate on Smart Grid testbed leveraging Internet2 network
 - Prepare IOT Sandbox demo/pilot with universities for TechEx
 - Identify Campuses to be test beds for Smarter Cities
 - Draft unsolicited NSF proposal for workshop, “End to End Trust and Security Open Architecture for the Internet of Things”
- 4Q15
 - Architect IOT sandbox technical and business model pilot and demo
 - Schedule E2ET&S for IOT workshop



Distributed Big Data & Analytics Working Group



Distributed
Big Data &
Analytics

Co-Chairs

- Alex Feltus, Clemson University
- Sam Gustman, University of Southern California
- Marc Hoit, North Carolina State

Mission:

- *Determine the need for new innovations to enable the future of distributed big data and analytics, including potential evolution of Internet2 capabilities in advanced networking, cloud services, and federated identity to enable members to better manage and leverage distributed big data and analytics*



DBDA Working Group Plan

DBDA Use Cases	Leaders	Plan
Data Analytics of Campus-Scale Power System	<ul style="list-style-type: none"> Clemson 	<ul style="list-style-type: none"> Schedule deep dive call
Intelligent Management Systems Center	<ul style="list-style-type: none"> University of Cincinnati 	<ul style="list-style-type: none"> Schedule deep dive call
Machine Tool Ball Screw Health Monitoring	<ul style="list-style-type: none"> University of Cincinnati 	<ul style="list-style-type: none"> Schedule deep dive call
Bioinformatics	<ul style="list-style-type: none"> University of Cincinnati 	<ul style="list-style-type: none"> Schedule deep dive call
Computational Fluid Dynamics Research: Aerospace	<ul style="list-style-type: none"> University of Cincinnati 	<ul style="list-style-type: none"> Schedule deep dive call
Geography/Climate	<ul style="list-style-type: none"> University of Cincinnati 	<ul style="list-style-type: none"> Schedule deep dive call
High Energy Physics	<ul style="list-style-type: none"> University of Cincinnati 	<ul style="list-style-type: none"> Schedule deep dive call
Modeling and Simulations	<ul style="list-style-type: none"> University of Cincinnati 	<ul style="list-style-type: none"> Schedule deep dive call
USC Digital Repository	<ul style="list-style-type: none"> University of Southern California 	<ul style="list-style-type: none"> Schedule deep dive call



Key Pain Points within DBDA



Conduct survey within DBDA Working Group to better understand pain points

- Examples include:
 - Storing data
 - Moving data
 - Breakdown of data transfer
 - Challenge of 100gbps or 10gbps end to end around the world or across the U.S. to enable data transfer
 - Data accessibility
 - Identity
 - Tool sets
 - National scale infrastructure for collecting data & providing role-based access



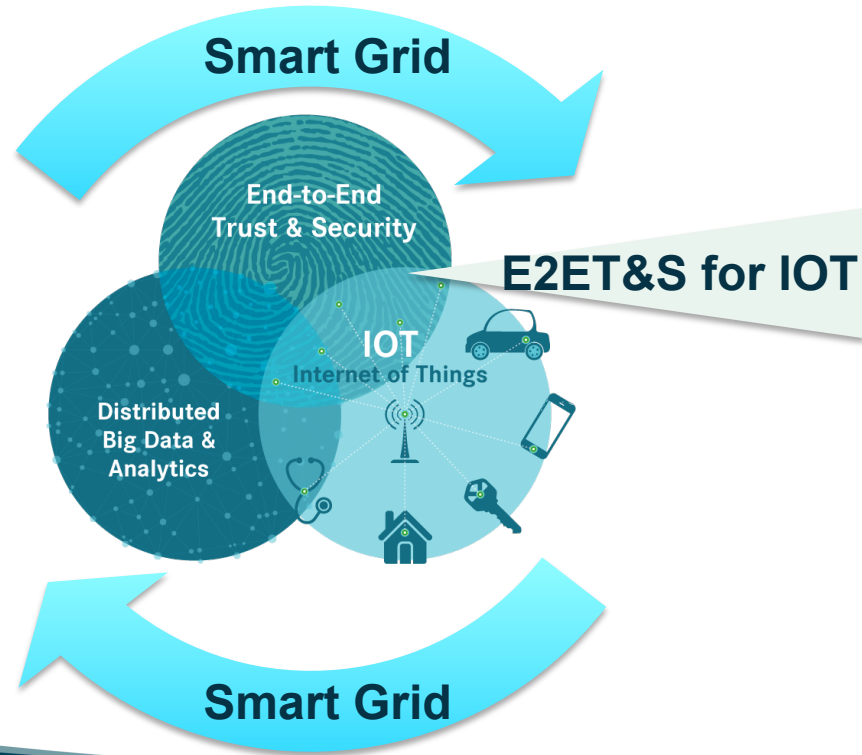
DBDA Working Group Next Steps



- 3Q15
 - Solicit additional case studies
 - Gather input from Internet2 community members regarding distributed big data and analytics pain points – use case input and / or member survey
 - Once sufficient number and range of use cases have been gathered, categorize and segment use cases
- 4Q15
 - Determine potential DBDA innovations



Collaboration Opportunities across the Collaborative Innovation Community WGs



Collaborative Innovation Community Group

Next Steps

- **Submissions welcome**
 - **DBDA:** Use cases, pain points, email to dbda-chairs@internet2.edu
 - **E2ET&S:** Experts in SDP or Network Segmentation for IOT, email to e2etschairs@internet2.edu
 - **IOT:** Smart Campus and Smart Grid testbed nominations, email to iotchairs@internet2.edu
 - **E2ET&S/IOT:** Nomination to participate in E2ET&S for IOT workshop, email to cino@internet2.edu
- **TechEx: October 4-7 in Cleveland, Ohio. Open meetings of the Innovation Working Groups.**
 - **E2ET&S:** Innovation Working Group meeting on Monday, Oct 5, 10:00 AM - 11:15 AM
 - **IOT:** Innovation Working Group meeting on Monday, Oct 5, 2:00 PM - 3:15 PM
 - **DBDA:** Innovation Working Group meeting on Tuesday, Oct 6, 8:45 AM – 10:00 AM
 - **Collaborative Innovation Community Meeting & Lunch** for all working groups and new participants on Tuesday, Oct 6, 12:30 PM – 2:00 PM, including Big Idea Hackathon enabled through Table Topics.
=>* Tweet your big ideas to **@FIoInternet2** and include **#TechEX15**





Questions & Answers...

Thank You

CINO@internet2.edu

@FIInternet2

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