CATALYZING THE INTERNET OF THINGS AND SMART CITIES

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Internet of Things (IoT) and Smart Cities

Service
Data Analytics
Communications
Hardware

Information Flow
Applications
Infrastructure

NIST
Public Sector IoT: Smart Cities and Communities

- Smart City: Use smart technologies such as IoT and CPS to improve the quality of life in cities and communities
- Many smart community efforts are one-off projects with heavy emphasis on customization and inadequate consideration for future upgradability and extensibility
- Lack of clear measurability of success impedes broader adoption of the solutions
- As a result, many Smart Cities/Communities deployments are isolated and do not enjoy the economy of scale.
Global City Teams Challenge

- Establish and demonstrate replicable, scalable and sustainable models for incubation and deployment of interoperable, standard-based IoT solutions and demonstrate their measurable benefits in Smart Communities/Cities
The Approach

Smart City Projects
- New York
- Las Vegas
- Austin
- Washington DC
- Montgomery County
- Others ...

Europe
- Amsterdam
- Genoa
- Valencia
- Others

Asia
- Chikuma
- Busan, Daegu

Technology Innovators
- Sensor Systems
- Cyber/Physical Security
- Wearable devices
- Infrastructure
- Cloud Services
- Medical Services
- Visualization
- Utilities
- Robotics
- Building Controls
- Etc. ...

Action Clusters (Teams)
- Air quality, Climate, Traffic management
- Renewable energy, Green Technologies, Microgrids
- Emergency response, Disaster resilience
- Building automation, Manufacturing
- Healthcare
- Security, Others ...

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- Montgomery County
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Africa, South America, Australia, etc.
- New York
- Las Vegas
- Austin
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- Others ...

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Africa, South America, Australia, etc.
Over 120 Cities in GCTC 2015 & 2016 (Partial list shown):

- Portland, OR
- Newport News, VA
- Greenville, SC
- Raleigh, NC
- Montgomery County, MD
- Winooski, VT
- Santa Rosa, CA
- New York, NY
- Washington, DC
- Kansas City, MO
- Nashville, TN
- Austin, TX
- Amsterdam (Netherlands)
- Genova, Perugia (Italy)
- Coruna, Valencia (Spain)
- Saint-Quentin (France)
- Abuja City, Obia-Akpor City (Nigeria)
- Busan, Seoul, Daegu (Korea)
- Chikuma (Japan)
GCTC 2015 Expo on June 1 at National Building Museum in Washington DC

- Exhibitions and presentations from over 60 teams in partnership with 50+ municipal governments and 200+ companies/universities/organizations
- Special Session with the King Willem-Alexander and Queen Maxima of the Netherlands
- Keynote Speeches
  - Anthony Foxx, US Secretary of Transportation
  - Tom Kalil, Deputy Director of White House Office of Science and Technology Policy
  - Willie May, Director of NIST and Under Secretary of Commerce
  - Jim Kurose, Assistant Director, NSF
- 1500 attendees including smart cities experts, CPS/IoT stakeholders, cities, communities, federal governments, industry and academia
- 50+ media outlets from around the world
StormSense Project
Forecasting Flooding from Storm Surge, Rain, and Tide

LinkNYC by City Bridge
First-of-its-kind communications network that will bring the fastest available municipal Wi-Fi to millions of New Yorkers and visitors

Greenville Smart City Vision

Public Sector Apps built on the IoT
- Identify existing open standards and protocols that will allow varying devices to share their ecosystem securely
- Products make up a real-world test bed
- Many use cases will be demonstrated

University of California-Irvine, Massachusetts Institute of Technology, IBM, Intel, AT&T, SigFox, Brivo Labs, Senseware, N5 Sensors, the Telemedicine and Advanced Technology Research Center (TATRC), Respondr, Del Ray Analytics, biobright, EIC Data, IoTDC, Captiva, Earth Networks, Victory Housing and more to come
Connected, Intelligent Transit

Smart City Applications
- PSU PORTAL
- "Big Data"
- Regional Transportation Data
- Warehouse
- Intel
- Air Quality Sensors

City of Portland
- NW Portland Neighborhood
- Parking Management Policy
- Parking Management Technology

Flexible Public Lighting
Amsterdam

A new and open public lighting system operating independently of public lighting device vendor and communication technology. Municipalities control public lighting themselves, resolve power failures faster and save energy.

- Open source technology
- Open platform
- Scalable
- designed for cloud infrastructures

A startup company by: alliander

Bringin Internet of Things Know-How to High School Students

Today’s students will be building the smart cities and communities of tomorrow. The time to start learning is now.

Why?
- Strengthen STEM education and interest
- Learn about open hardware and software
- Learn to program hardware and sensors
- Learn how to share and analyze data
- Consider ways to leverage high-speed connectivity where available

Students study the data and identify similarities and differences.
Students build sensor pods that measure data in each school location.
Students share real-time data across the country.
Build and Learn through workshops and hackathons.

Smart Mobility
Eindhoven

Research themes Smart Mobility

ICT / Embedded Systems
Stable and safe embedded distributed system design

Automotive Technology
Cars as sustainable zero emission vehicles

Insight Transport and Logistics
Process controls for more efficient planning

Intelligent Transport Systems
Cars as computers on wheels sharing data

Mobility and Traffic
Models for insight in mobility patterns and road traffic user interaction

TU/e
Technische Universiteit Eindhoven
University of Technology

Modular and electrical vehicles
Novo, the world’s first modular car

Autonomous vehicles
Current Partners of GCTC 2016

- Partners
  - US-Ignite
  - US Government Agencies: NSF, ITA, DoT, State Department, GSA, NCO/NITRD, Census, NTIA
  - Non-US Central Governments: Netherlands, Italy, South Korea, Japan
  - Corporations: IBM, at&t, Intel, GE
  - Non-profits: FIWARE, World e-Governments (WeGO), Industrial Internet Consortium (IIC), MetroLab Network, R20, ICMA, USGBC, PTI
- Participating Members (partial list)
  - Qualcomm, Bosch, Siemens, Microsoft, CH2HL, Mueller Water, PEPCO, Hitachi, Sensity Systems, Big Belly, Senseware, Link Labs, Vizias, Pecan Street, Inc., InterInnov, TeamDev, Hostabeem, MIT, Vanderbilt, Carnegie Mellon University, Georgia Institute of Technology, University of North Texas, George Washington University, Wireless Research Center NC, Downtown DC BID, IoT Dev Labs, Inc, National Capital Planning Commission (NCPC) and more
- More than 60 cities and 200+ organizations/companies around the world are currently participating.
GCTC 2016

• Aims to demonstrate quantifiable/measurable benefits to the cities and communities
  ◦ Traffic jam reduction by 20%?
  ◦ Air pollution reduction by 25%?
  ◦ Energy reduction by 30%?

• 20-month process (2 Phases)
  ◦ 1st Phase by June 2016 – Team building phase
  ◦ 2nd Phase by June 2017 – Implementation phase

• Tech Jam: March 22-23, 2016, NIST
  ◦ Over 60 Action Clusters has presented their plans and identified additional partners
  ◦ Office Hours by NSF, ITA and industry Partners
  ◦ Poster sessions by participants
GCTC Expo, June 13-14, 2016

- GCTC 2016 Phase I Expo: June 13-14, 2016, Austin Convention Center, Austin, TX, United States
  - Featuring exhibitions and project presentations from Action Clusters, and opportunities to engage with other teams and Smart City leaders from industry, government, and academia
  - A short project plan needs to be submitted by April 29, 2016 to be considered for 2016 Expo presentation and exhibition - See the instructions at: https://www.us-ignite.org/globalcityteams/participation-guide
  - Although the GCTC Expo is co-located with US Ignite’s Application Summit and the Smart Cities Innovation Summit, the GCTC Expo is a separate and distinct event. The GCTC Expo will have its own exhibition space and its own process for registration. Acceptance as a speaker or exhibitor by the US Ignite Application Summit or the Smart Cities Innovation Summit events does not entitle an organization to speak or exhibit at the GCTC Expo
For More Information

• Contact
  ◦ Sokwoo Rhee (sokwoo.rhee@nist.gov)

• Challenge web site: Meet the action clusters
  ◦ www.globalcityteams.org

• GCTC 2016 Tech Jam Webcast
  ◦ http://www.nist.gov/cps/gctc-smart-city-webcast.cfm

• GCTC 2016 Expo (Austin, TX, USA, June 13-14, 2016)
  ◦ http://www.gctcexpo.org/

• Social Media
  ◦ Twitter #globalcityteams
  ◦ Linkedin Group https://www.linkedin.com/groups/8285610
Funding Opportunities for GCTC

- **NSF EAGER Grant**
  - Up to $300,000 for each award for fundamental research inherent to the real-world problems.
  - Grant applications are due **April 1, 2016**.
  - For US participants who is an active member of a GCTC Action Cluster, working on a project that will build upon the results of a previous or active NSF-funded project.

- **US-Ignite GCTC Leadership Fund**
  - Cash awards to exceptional Action Clusters and travel support to the GCTC Expo in June 2016, available to both US and non-US participants.
  - Applications are due **April 15th, 2016**.
  - Info: [https://www.us-ignite.org/globalcityteams/leadership-fund/](https://www.us-ignite.org/globalcityteams/leadership-fund/)

- **NIST Replicable Smart City Technologies (RSCT) Grant Program**
  - For US local governments participating in the GCTC.
  - Three $100,000 awards for US local governments participating in the GCTC.
  - The application deadline is **May 12, 2016**.