IES-City Framework Overview

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IoT-Enabled Smart City Framework

• Smart City technologies are being developed and deployed at a rapid pace.
• Many previous smart city deployments are custom solutions.
• A number of architectural design efforts are underway worldwide but have not yet converged.
• NIST and its partners are convening a public working group to distill a common set of architectural features from these architectural efforts and city stakeholders.

Goal: A reference framework for the development incremental and composable Smart Cities
### The Challenge - Divergent CPS/IoT Technology Landscape

#### Internet of Things Landscape 2016

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<th>Applications (Verticals)</th>
<th>Platforms &amp; Enablement (Horizontals)</th>
<th>Connectivity</th>
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The Challenge - Divergent CPS Standards Landscape

Having all these different standards efforts practically ensures one thing: There’s no way all of these devices will actually be able to all talk to each other until all this gets settled with either victory or a truce.

Ina Fried, re/code, July 2014
The Glass is Half Full

• There are Pivotal Points of Interoperability that can be identified

• Identifying them will speed their understanding and reduce the distance to interoperability

• Help the market decide
Pivotal Points of Interoperability - PPI

• If you standardize everything, you freeze out innovation.
• If you standardize nothing, you get non-interoperable clusters that can’t be easily integrated.

❖ The principle of Pivotal Points of Interoperability is to find consensus standardized interfaces that deal with composition of CPS without constraining innovation.
Pivotal Points of Interoperability (PPI)

Independent technology deployments

Potentially large distance to interoperability

With Pivotal Points of Interoperability

Minimize distance to interoperability

- e.g. REST APIs
- e.g. TLS 1.2
- e.g. IPv6 address
- e.g. Convert XML to JSON

Application Diversity
How to Discover Consensus

Process:
1) Transform architectures to CPS Framework normal form
2) Transform deployments to CPS Framework normal form
3) Compare results of 1) and 2)
4) Broaden consensus of intersections
5) Document Smart Cities Framework
Public Working Groups

Participants: City leaders (includes CTOs, CIOs, Innovation Officers), Experts, Companies, Technical Stakeholders, Researchers …
IES-City Framework Project Timeline

- Facilitate convergence and encourage harmonization among the many standards and consortia
- Produce a useful result in a short time certain
  - Minimum complexity
  - Actionable
  - Reduce barriers to interoperability/integration
- Not pick winners and losers – reveal PPI, not declare PPI
- Attract collaborators from the key architecture and standards efforts so that they can bring results to their efforts
- The group will be open and free for participation by anyone, anywhere in the world and documents produced by the group will be available to anyone and at no-cost at the group web site
How to Get Involved

• Collaboration Web Site:
  o [https://pages.nist.gov/smartcitiesarchitecture](https://pages.nist.gov/smartcitiesarchitecture)

• Mail list:
  o to email: smartcitiesarchitecture@nist.gov;
  o to join: smartcitiesarchitecture-request@nist.gov

• Working Groups
  o Application Framework
    ▪ Cochairs: Angelo Frascella, Vatsal Bhatt
  o Consensus PPI
    ▪ Cochairs: Stefano De Panfilis, Marty Burns
  o Deployed PPI
    ▪ Cochairs: David Boswarthick, Dan Hoffman