Smart Cities & Industrial IoT: OSIsoft and Qualcomm Collaboration

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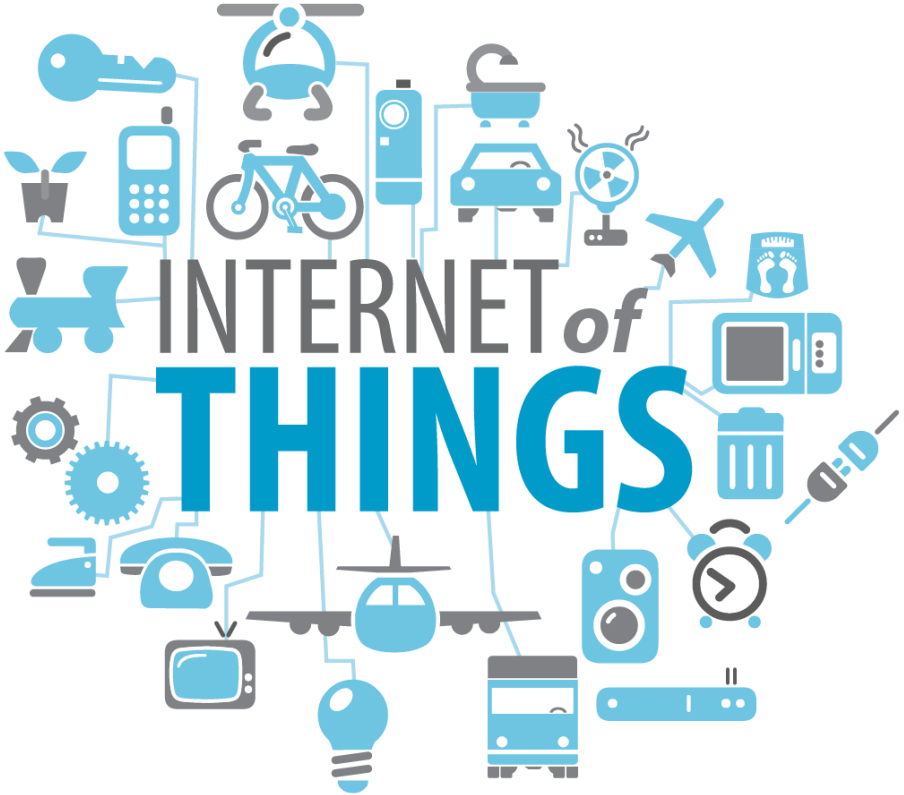
Ashok Tipirneni, Qualcomm

Agenda

- Collaboration between Qualcomm and OSIsoft
- Smart Campus Project
- Future Direction
- Q&A



Opening Thoughts

- M2M and Sensor Data is NOT new to Operations Technology
- The PI System has been used over 30 years to integrate data from Industrial Systems and create actionable information
- We're extending these capabilities in multiple directions
  - Data Ingestion (PI Connectors) – leveraging IoT technologies to get closer to the edge directly connecting to Assets and Sensors
  - Integrators – Enabling Business Intelligence, Predictive Analytics, Machine Learning
  - Geospatial Integrator – Visualization in a Geospatially oriented world

The big question…

Instead of getting 100,000 data streams and context from one-plant into PI System… how do you go about getting data from thousands of distributed nodes (IoT) into PI System?

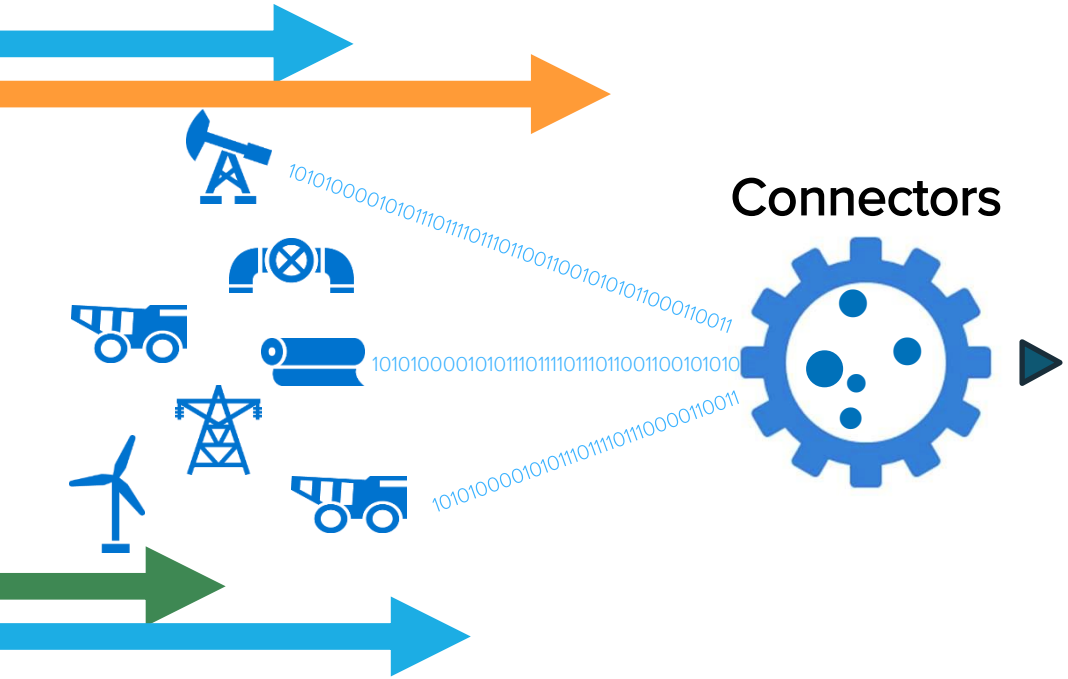
What's new to help answer that question?

- Distributed intelligence with edge processing power resulting in "smarter" sensors and devices.
- New "elastic" technologies that can consume high volumes of data from edge devices (Cloud, Hadoop, ML, Analytics)
- Connectivity and communications standards are becoming cheaper.

What's the Qualcomm & OSIsoft Collaboration About

1. Test and Deploy Connectors on Qualcomm enabled Gateways and Devices and Multiple Embedded OS
2. Demonstrate highly distributed data acquisition into PI System
3. Hybrid Architectural Approach
    1. Connecting to Systems (e.g. BACNET to BMS)
    2. Connecting to Sensors (e.g. Alljoyn)
    3. Connecting to Vendors' Services
4. Storing and Presenting Time Series/Context to best-in-class Analytics (Integrators)
5. Engage Customers and Partners in Early Adopter Projects

PI Connectors



- Data source is the system of record
- Data collected in terms of assets as defined by the data source
- Assets auto-created in PI AF
- Tags auto-created in PI Data Archive, linked to PI AF Elements
- Events collected and stored in Event Frames
- Easy to configure

See TechCon: Collect your Data in Context Using PI Connectors
Thursday 16:20-16:50

Qualcomm Smart Campus Project

Qualcomm Smart Cities

Smart Cities

World population living in urban environments

~50 % Today

~70 % in 2050

Bluetooth


NFC


3G/4G


Powerline


Wi-Fi

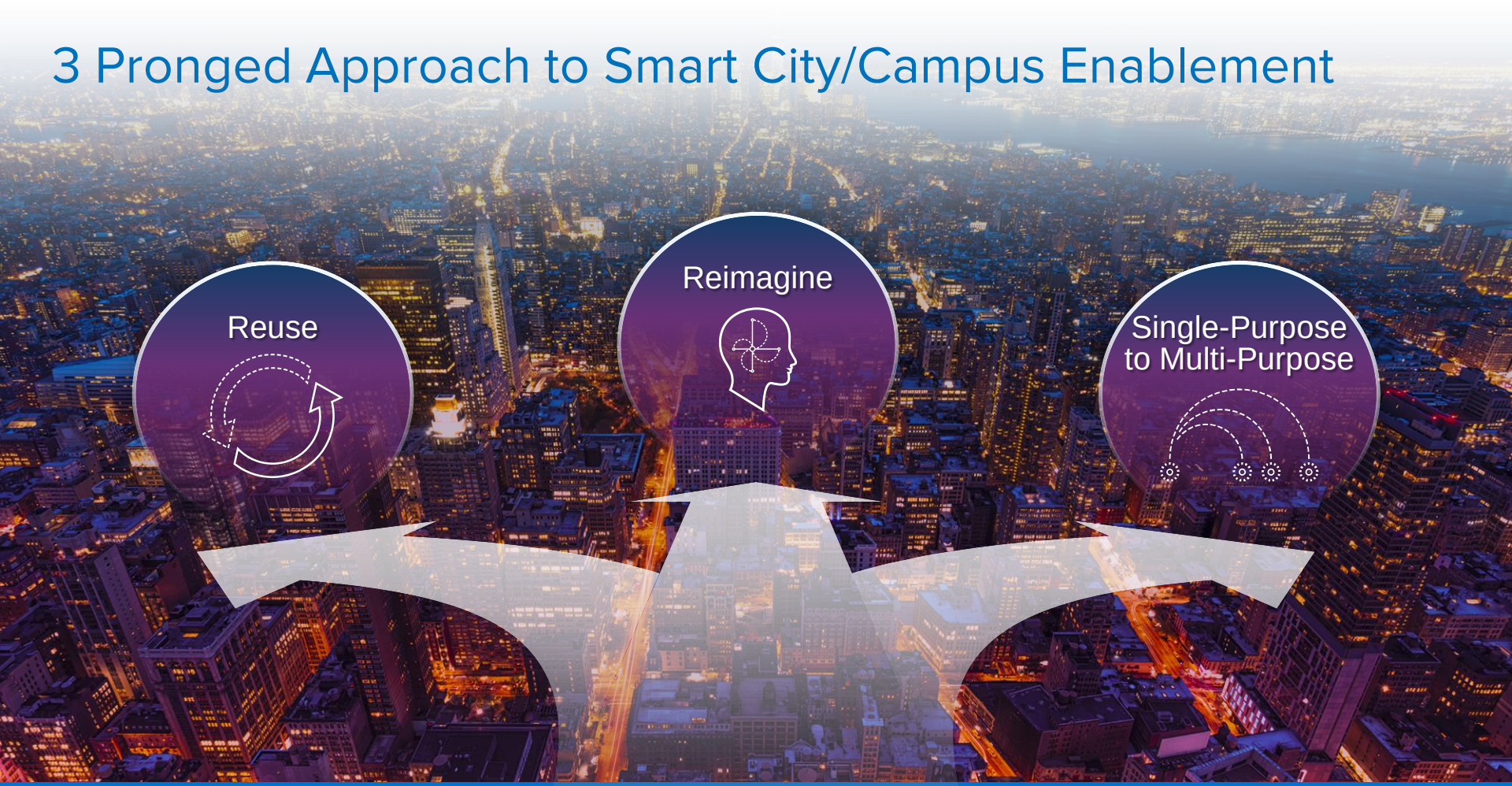

Fiber


Ethernet

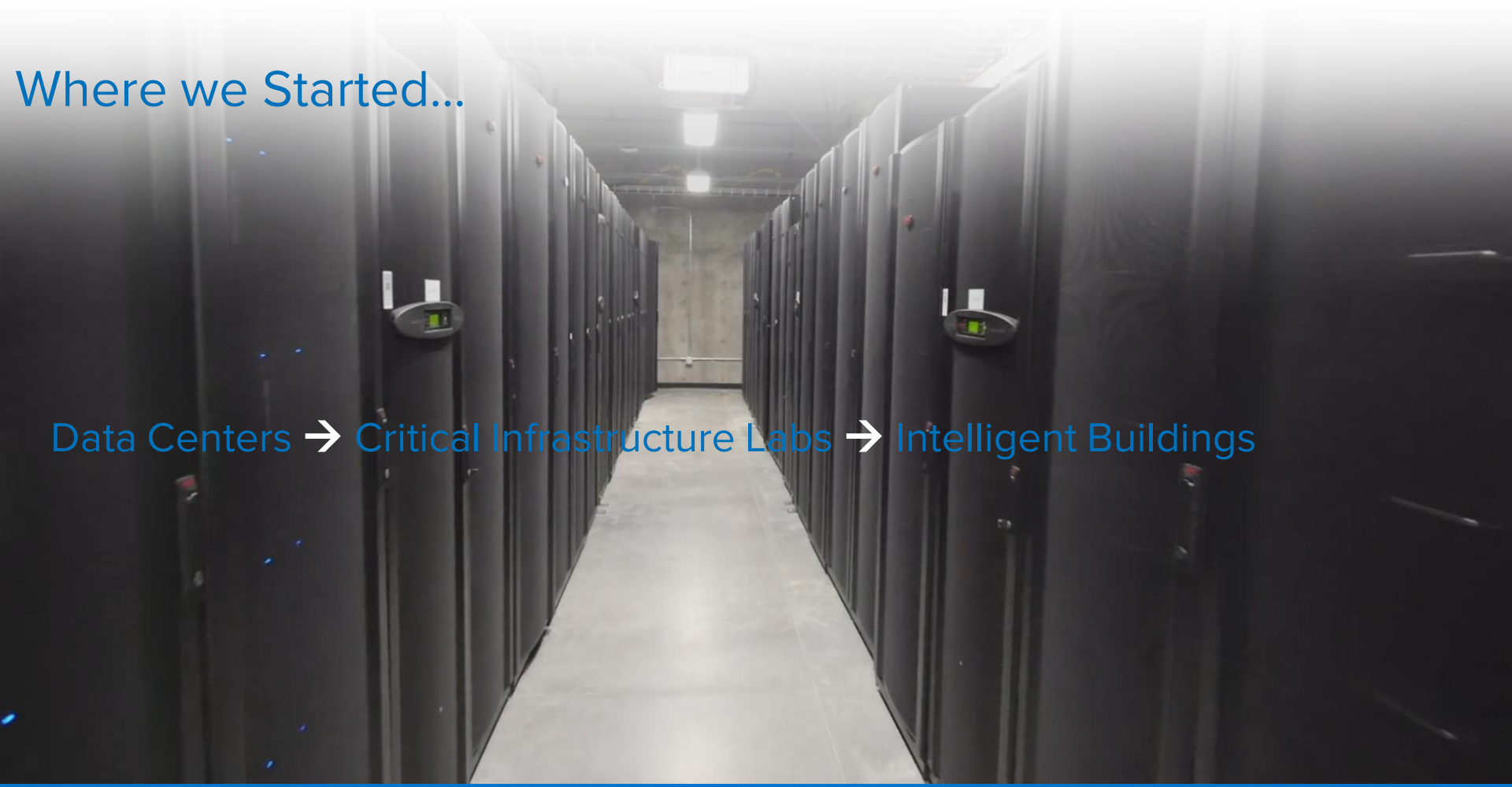

Smart gateways & small cells

VIDEO

3 Pronged Approach to Smart City/Campus Enablement

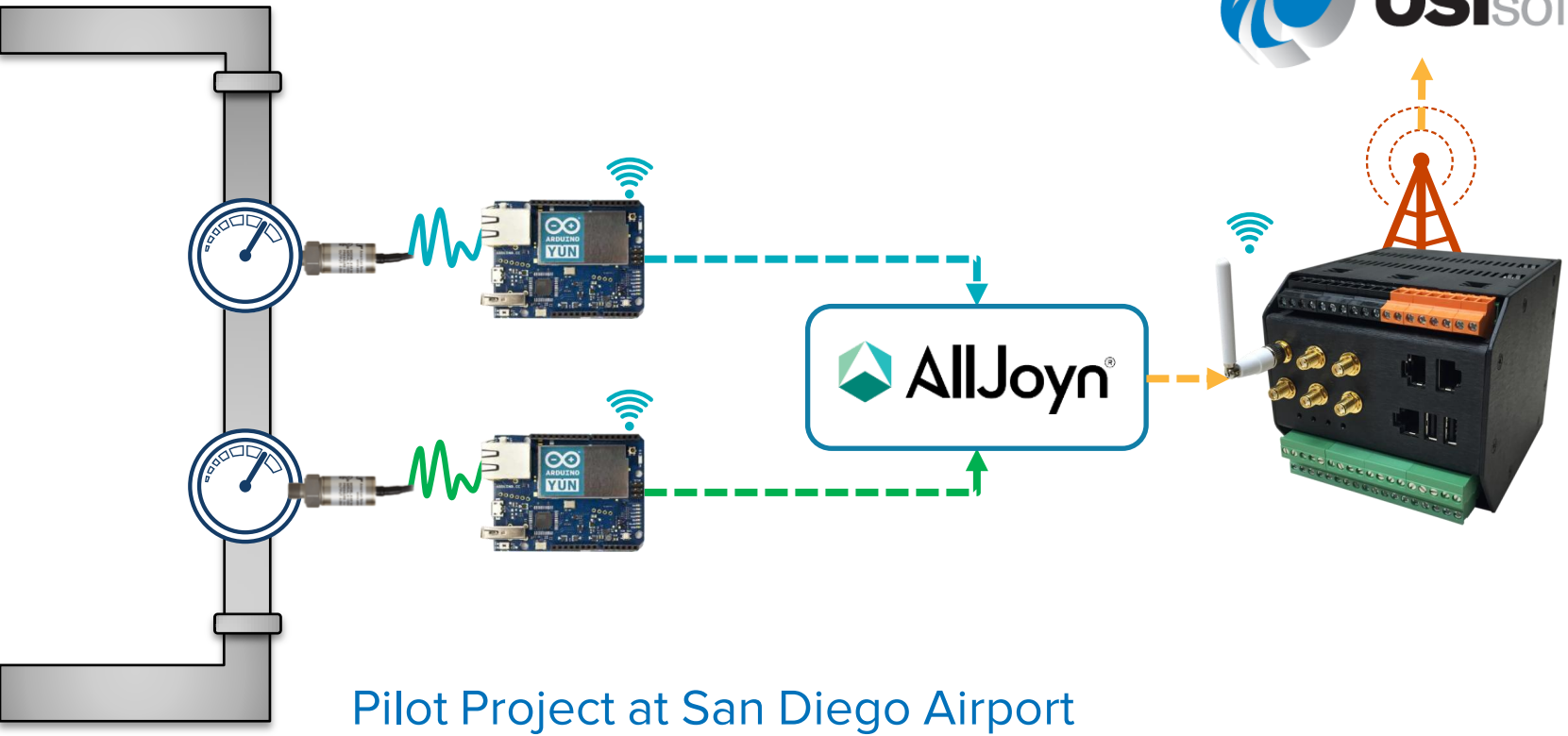


Where we Started…



Data Centers → Critical Infrastructure Labs → Intelligent Buildings

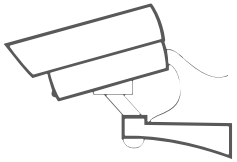
San Diego Airport Deployment



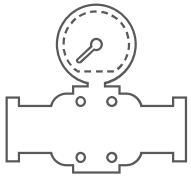
Pilot Project at San Diego Airport

Intelligent Buildings

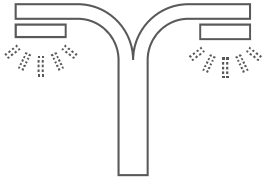
Connectivity solutions to increase efficiencies, revenues and cost savings



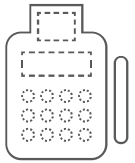
Security



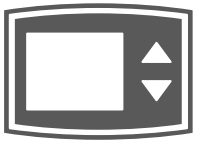
Water



Lighting

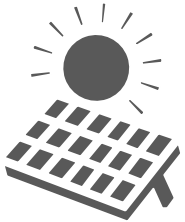


Waste Management



Heating / Cooling

Appliances



Power / Solar

Goals of Smart Campus

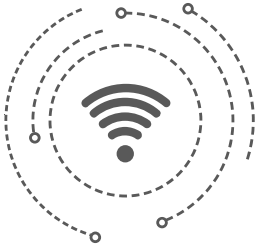
A live Smartcities technology showcase & sandbox in San Diego

- Solve key energy management challenges
  - An integrated, BMS agnostic energy management solution

- Showcase Qualcomm Smartcities technologies, Partner Products and solutions.
  - Partner products in live functional environment

- Use case development sandbox for building automation and campus management (and more..)

Creating an Ecosystem of partners

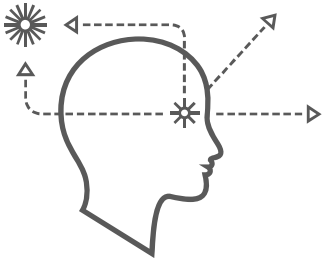


Technology Enablement

- QUALCOMM
- OSIsoft

New Product Development

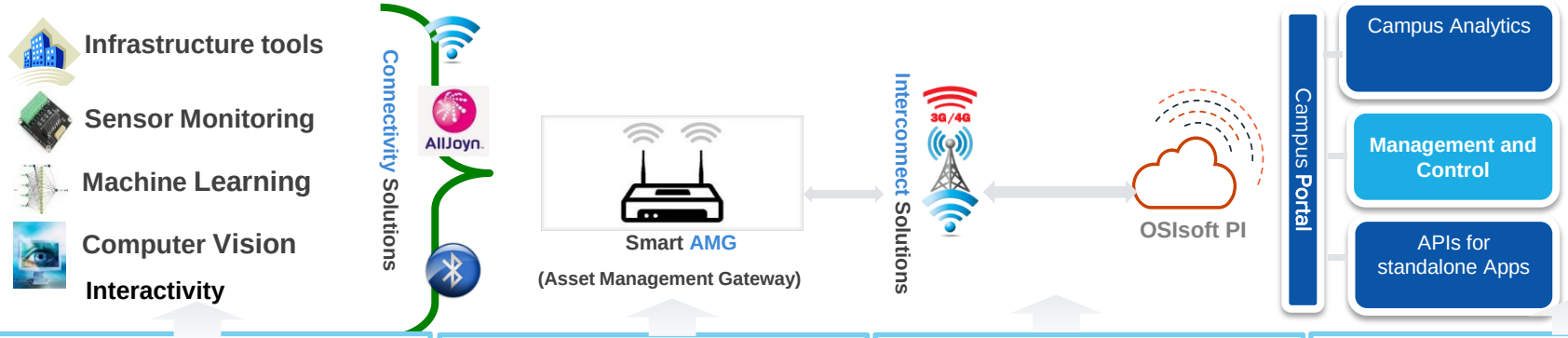
- Digi
- Itron



Systems Integrators

- CH2M
- Schneider Electric

Qualcomm Technologies in Smart Campus



At the **edge product**:

- MDM/8Xxx/7xxx Integrated connectivity modules
- Alljoyn (open) interoperability solutions
- Sensor advancements:
  - Low power image recognition tech
  - Always On Proximity sensors
  - Image processing

At the Gateway:

- IPQ : w/ Streamboost
- DSRC interoperability solutions
- Asset management IoT gateway
- Object recognition and computer vision

At the Interconnect

- 3G/4G connectivity technologies
- LTE- **U** : Unlicensed band
- LTE- **B**: Broadcast
- LTE- **D** : Direct

At the Data:

- Machine Learning Algorithms
- Pattern recognition and predictive analytics

Qualcomm Solutions and Technologies

Apps & Ecosystem






Software Frameworks

AllJoyn®

Qualcomm® AllPlay™

Qualcomm® Vuforia™

Lumicast

Qualcomm® iZat™

Boards/Reference Designs

Snapdragon Based Dev Board

MPQ Based Dev Board

Gobi Based Dev Board

Wi-Fi Based Dev Board

Processors/Chipsets

Qualcomm® snapdragon™

Qualcomm® gobi™

Qualcomm ATHEROS

Core Technologies

SoCs

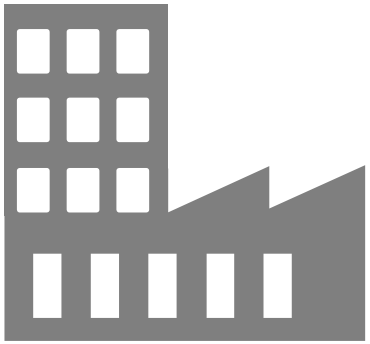
Connectivity

RF

Location & Sensors

System/OS

Transition from Intelligent Buildings



Buildings

Campus

Cities

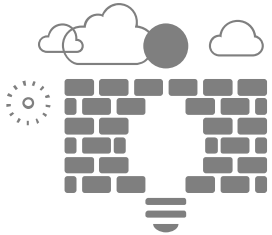
Smart Cities Market Verticals

Smart Building

- Connectivity
- Integrated Service

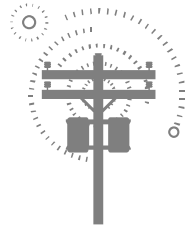
Smart Transportation

- Smart Mobility
- Smart Charging
- Smart Traffic
- Smart Parking



Smart Infrastructure

- Smart Water
- Smart Lighting
- Smart Waste Management



Smart Energy

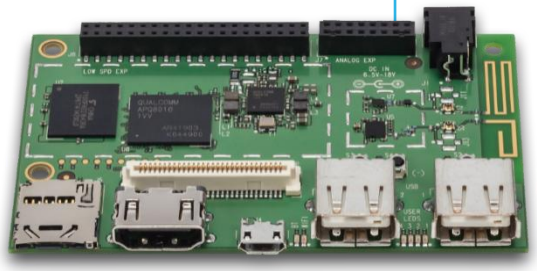
- Energy Efficiency
- Reduced Emissions
- Smart meters

Intelligent connectivity within and across City Verticals is key

Enabling Wireless Connectivity

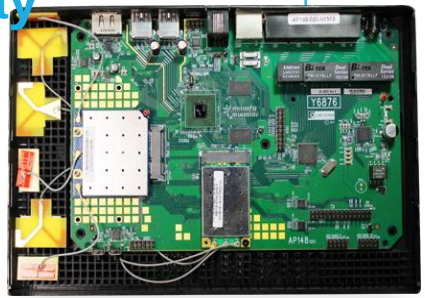
Asset Management Gateway

- Embedded operating system (Android-based)
- 3G, Wi-Fi, Bluetooth, GPS air interfaces
- 2 x USB plug-ins for ZigBee or other short-range radios
- External SMA connectors for all radio antennas
- Ethernet ports for MODBUS/TCP
- CANbus interface for DeviceNET and BACNet
- 2 external USB ports
- Analog & Digital I/O (expandable)
- 10 – 36 Volt DC power



DragonBoard 410c

- Windows 10 support (+Android & Linux)
- Quad-core ARM® Cortex™ A53 at up to 1.2 GHz per core
- 64-Bit capable
- Memory – LPDDR2/3 533MHz Single-channel 32-bit (4.2GBps) non-POP/ eMMC 4.51 SD 3.0 (UHS-I)
- Connectivity – integrated 802.11 b/g/n, BT/FM
- Power Management + Audio Codec

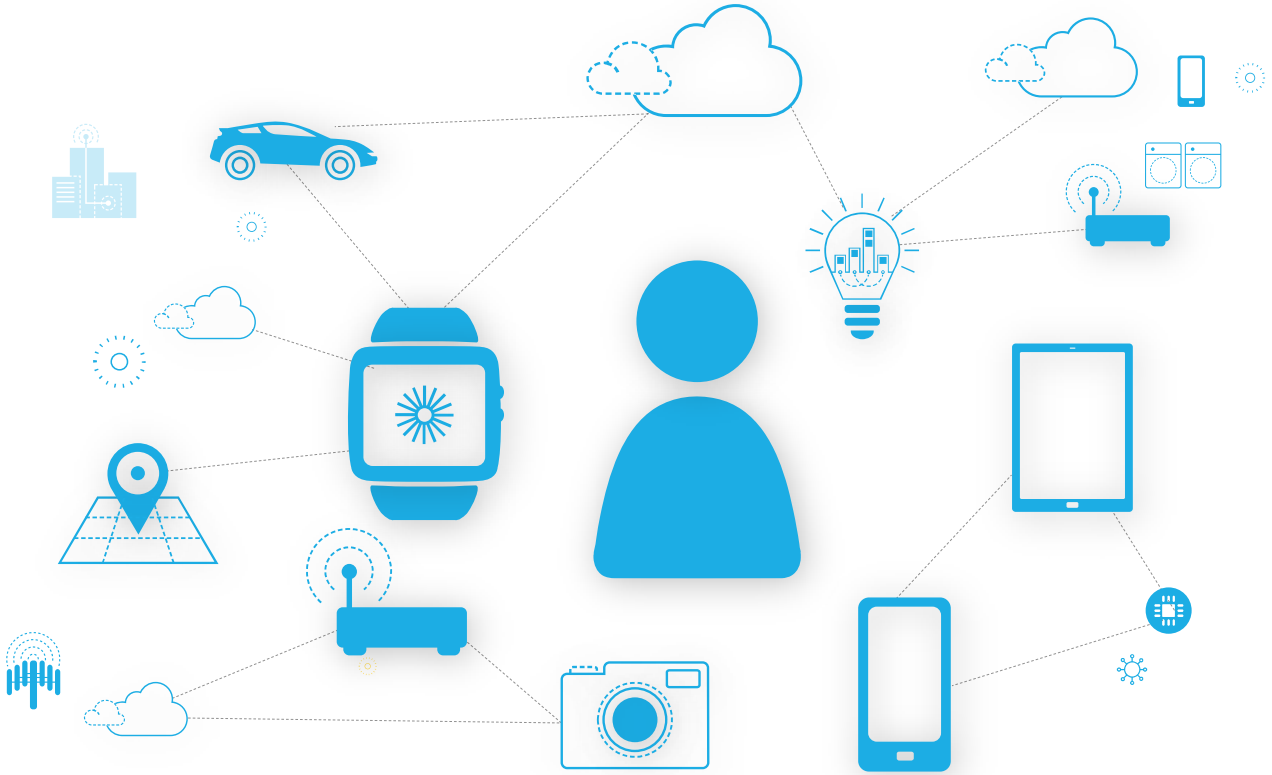


AP148 | IPQ Reference Bo

- Dual core 1.4GHz Krait with ~10,000 DMIPS
- Dual core NSS @ 740MHz processes 5Gbps traffic
- Quad core of Crypto5 security engine
- Highest DMIPS per Watt: ~4.3 DMIPS/Watt
- Universal interfaces: USB 3.0, SATA 3.0, PCIe 2.0
- Line rate NAT Ethernet Switch
- ~12.5W – can be supported by 802.3af

Qualcomm Krait is a product of Qualcomm Technologies, Inc.
Qualcomm Internet Processor is a product of Qualcomm Atheros, Inc.

Enabling the Intelligent Edge



Edge

end devices
+
access nodes

Caution – Futureware…

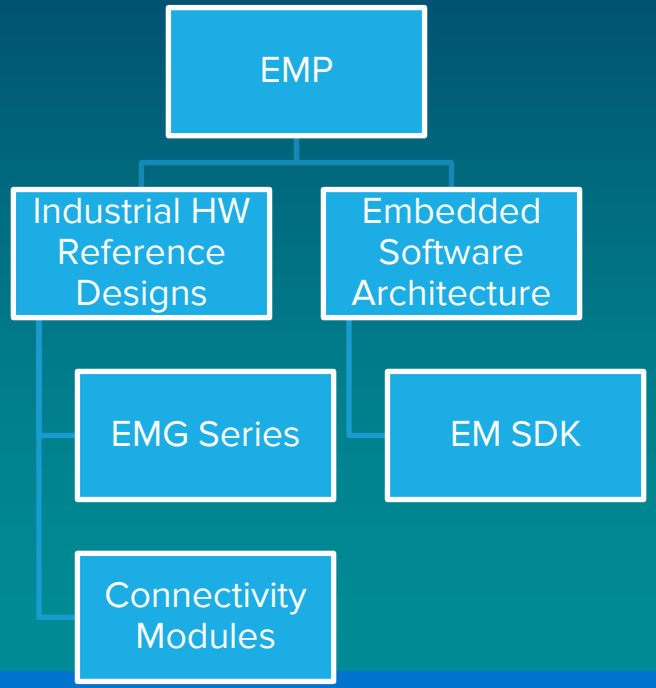
Qualcomm® Edge Management Platform (EMP)

Edge Management Gateway Reference Designs and Software Solutions for the Industrial Internet

Overview

Qualcomm's Edge Management Platform or EMP, offers a series of hardware reference designs and software capabilities to address the connectivity, edge intelligence and interconnect (backhaul) requirements for the rapidly expanding Industrial Internet space.

- **Connectivity**: Short-medium range, proximate connectivity solutions and enablers such as 802.11x, 802.15.4, 802.15.1, DSRC, LTE-D
- **Edge Intelligence Platforms:** Application development for edge of network platforms– CPU, AP, GPU, GPS, RTOS/HLOS, Core Services
- **Interconnect**: Reliable backhaul connectivity via 3G/4G modems, Wi-Fi & Small Cells

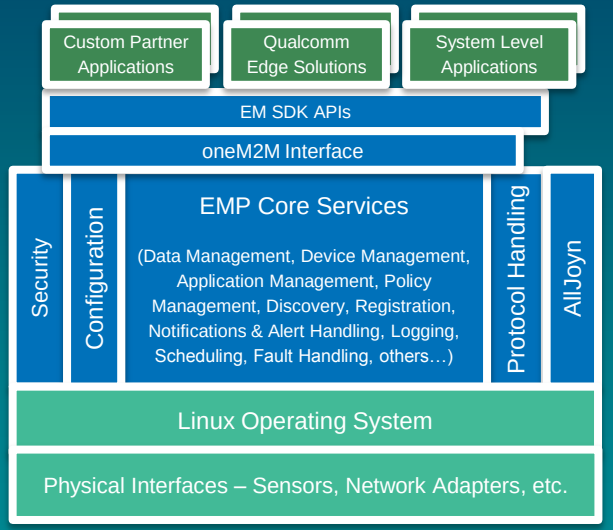


Qualcomm® Edge Management Software and Services

An Embedded Edge Platform and Software Development Kit for the Industrial Internet

- Embedded Software Platform for Industrial Gateway Devices
- Long Term Supported Linux Distro Optimized for Embedded Space
- Software Architecture Implements A Common Services Layer Approach
- Core SDK Objectives:
  - Enable Sensor Edge Connectivity
  - Simplify and Reduce Complexity
  - Enhance Interoperability Among Disparate Sensor Networks
  - Promote Security and Data Integrity

- Initial SDK Release Planned for Q1 2016



Edge Management Software & Services Architecture

Hom e

Summary

- PI Connectors on Gateways are a good start…
- OSIsoft and Qualcomm are collaborating to solve really big IoT challenges:
  - Supporting multiple operating systems at the edge…
  - Provision, Manage and Maintain at the edge…
  - Bi-directionality…
  - Security…
  - Enabling Ecospheres…
- Seeking Early Adopter engagements with Customers & Partners

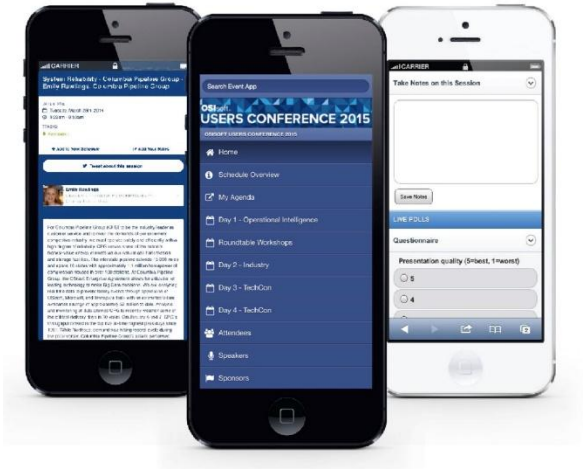
Questions

Please wait for the **microphone** before asking your questions

State your
name & company

Please don't forget to…

Complete the Online Survey for this session



http://eventmobi.com/emeauc15

감사합니다

谢谢

Danke

Gracias

Merci

Thank You

ありがとう

Спасибо

Obrigado