The IoT Inc Business Meetup Silicon Valley

Opening remarks and guest presentation

Bruce Sinclair (Organizer): bruce@iot-inc.com

Target of Meetup

For business people selling products and services into IoT

but of course everyone else is welcome: techies, end-users, ...

Focus of presentations and discussions:

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Conferences

Internet of Things World

- I'm the opening keynote on May 10th!
- Take my one-day workshop on May 9th
- Discount codes
  - WEBINAR30 expires at noon tomorrow
  - WEBINAR20 doesn't expire

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Coming Up

Next Meeting, Thursday, June 2, 2016 at verizon

Mega Meetup2 will be in July or August in San Francisco

- Still looking for a space ~~big~~ mega enough

Other notes

- Presentation, recording of Meetup and announcements for today's meeting will be sent in one week to everyone who provided their email upon signup for this meeting or any other past Meetup
- Send announcements to me: My email: bruce@iot-inc.com
- Feel free to upload pictures and tweet with hashtag #iotbusiness
- Reviews would be great!

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Sponsor spots still available!

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Join us onsite or online on May 5 at 6PM PST
The Business of IoT
The Internet of Things
Capturing Value
with enterprise IoT
Jayraj Nair
Infosys
IoT-Inc. Meetup
© IoT-Inc 2015

Capturing Value with Enterprise IOT

Jayraj Nair, Head - IOT Practice

May 5 2016

Infosys®

Content

- Infosys at a glance
- Ecosystem Play - Industrial Internet Consortium & Industry 4.0
- Asset Efficiency & Industrial Digital Thread
- Smart City – Energy & Water Management
- Connected Care, Farm, Vehicle….
- Design Thinking - AiKiDo Services

Infosys at a glance

Infosys	People	Intellect	Values	Clients
Founded in Pune, India in 1981	176,000+ staff	World's largest corporate university	Transparency, ethics, and respect	4 out of top 5 US banks
$8.7 billion revenues	98 nationalities	2% of revenues invested in R&D	98.3% of projects delivered on time	6 out of top 10 global CPG
950 clients	97% of staff are university educated	More than 300 researchers	96.6% business is repeat business	8 out of top 10 global pharma.
50+ countries	22% with masters degrees or doctorates	Investing $500 million in Innovation Fund	2% of profits to the Infosys Foundation	4 out of top 5 global aerospace & defence
$40.3 billion market capitalization	94% are consultants and engineers	505 patents pending and 204 granted	Topped Asiamoney's Corporate Governance Poll in the 'domestic country' category	6 out of top 10 global telcos.

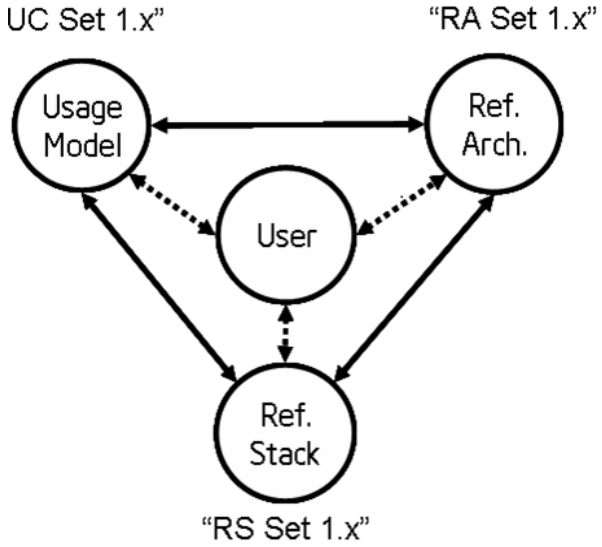
IOT is an Ecosystem Play !

Dr Richard Soley, Dr Henning Banthien
Bosch Connected World 2016, Berlin

industrial internet CONSORTIUM

PLATTFORM INDUSTRIE 4.0

User Driven Innovation



Infosys Led IIC Approved Testbeds - Reference Solutions

BOSCH Invented for life

Infosys

ThingWorx A PTC Business

INDUSTRIAL INTERNET CONSORTIUM

rti

Schneider Electric

CISCO

NATIONAL INSTRUMENTS

IBM

ORACLE

M2Mi Machine-to-Machine Intelligence Corporation

intel

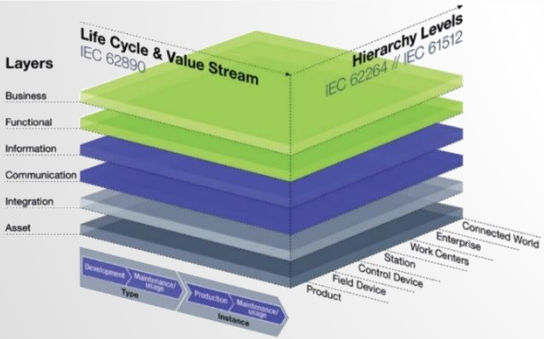
EMC²

http://www.iiconsortium.org/test-beds.htm

Solutions Interoperability (IIC and I4.0)

Maintenance, Operations, Service, Energy, Information Efficiency of fixed/moving Assets

Design Engineering ⇔ Manufacturing ⇔ Service
"Brilliant Factory"



Source: Plattform Industrie 4.0

Infosys led IIC Testbeds : IIRA & RAMI4.0

Dr Henning Banthien - Industrie 4.0, Dr Richard Soley - IIC, Jayraj Nair - Infosys
Hannover Messe 2016, Hannover

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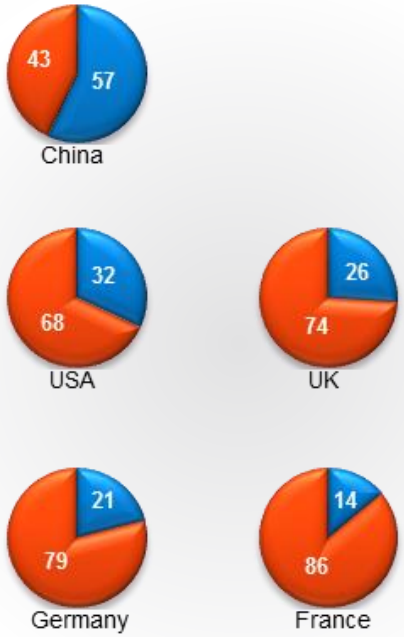
Typical Layers of an IOT Stack

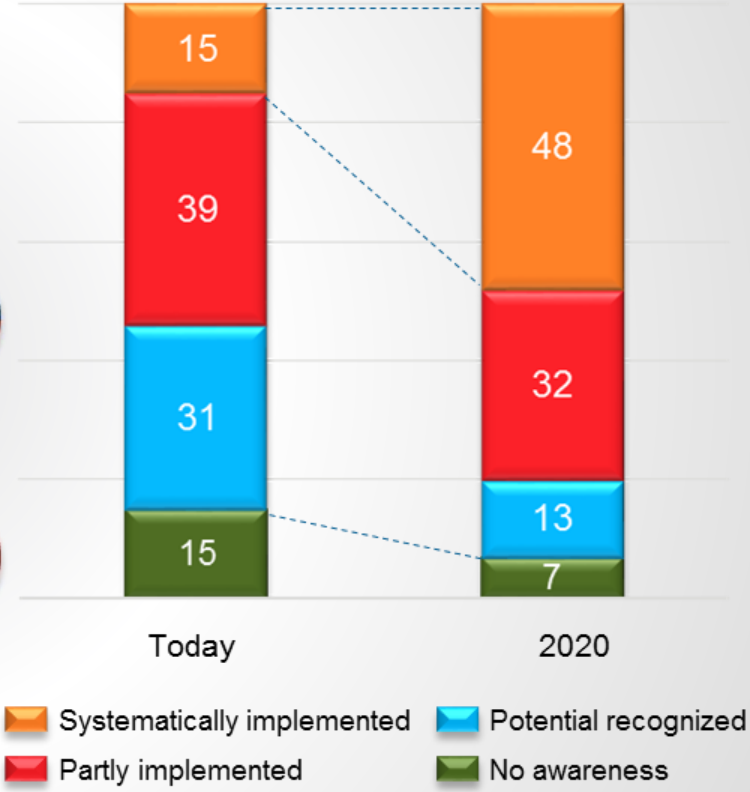
1	2	3	4	5
Intelligent Devices	Connectivity	Device Management	Enterprise Integration	Business Analytics
Hardware and Software Embedded Design of Intelligent Devices Intelligent Gateways Device Security Multiple Protocols i.e. MQTT, AMQP, STOMP MODBUS, PROFINET, OPC	Connectivity solution around WiFi, ZigBee, BlueTooth, Zwave, 3G, 4G moving to 5G SIM, M2M Connectivity Management Traffic Engineering Network Ops Device Ops	Management of End Devices for State, Status, Data Modeling Cloud Hosting Device Software Management, Policy, Rules Engine Complex Event Processing Security and Integrity of Data	Database Integration CRM Integration Data Warehouse Workflow Management Workforce Management Enterprise Mobility	Stream Processing Actionable Analytics Data Visualization Statistical Computing Business Dashboards Predictive and Prescriptive Analytics Business Insights Monetization and Continuous Improvement

Focus on Outcome – Start with analytics and insights that matter

Industry 4.0 : Asset Efficiency Global Survey

- Energy efficiency
- Maintenance efficiency
- Information efficiency
- Operational efficiency





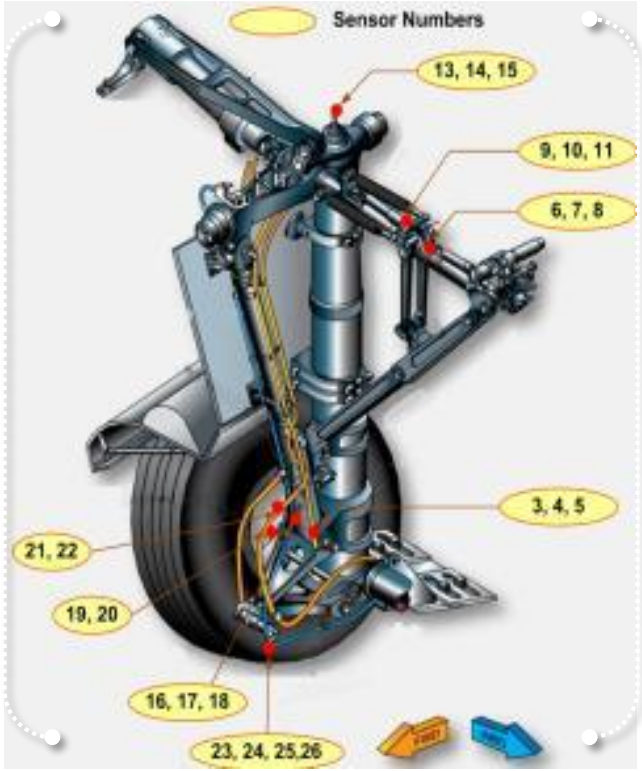
Industry 4.0 Maturity Model

Industrial Partners

Academic Partners

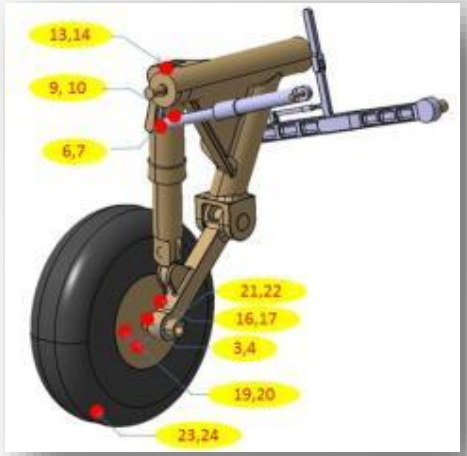
https://www.infosys.com/engineering-services/white-papers/Documents/industrial-internet-consortium-architecture.pdf

Asset Efficiency : Aircraft Landing Gear



- Understand failures modes.
- Identify parameters to be monitored.
- Identify sensors and develop sensor integration
- Security & Device Management, IOT Platform
- Develop data, operational models – digital twin
- Develop connectivity, sensor based network
- Data analytics – Diagnostics & prognostics.
- Predictive analytics - Infosys Information Platform.
- Visualization & Service Management.

Models: Building a Digital Twin



Asset Model
Physical to Digital

Data Model
Data to Information

Cognitive Model
Diagnostics to Prognostics

Service Model
Reactive to Proactive

Asset Efficiency - Reference Architecture

Edge Tier

Temperature & Other Sensors

Wired/ Wireless

Maintenance computer or Quick Access Rec or Gateway

Aircraft

Internet or USB

Platform Tier

Infosys Information Platform

Data Analytics and Big Data Management

Open REST APIs

GE Predix UI

Asset Model

GE Predix

Device Management, Data Acquisition

M2M Transactional Data

TLS

Enterprise Tier

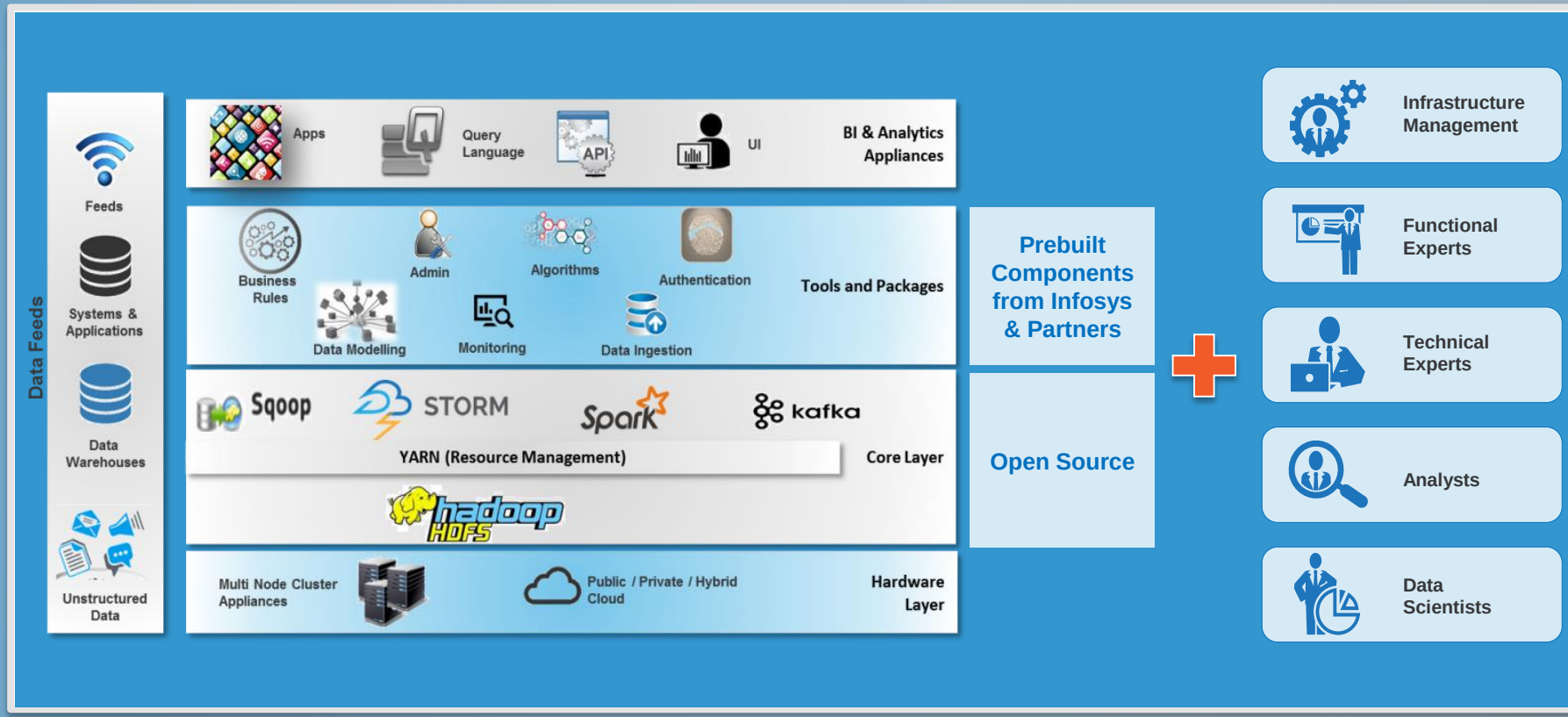
Asset Efficiency Solution

Others Systems:

- Scheduling
- In-flight dashboards

IT Infrastructure

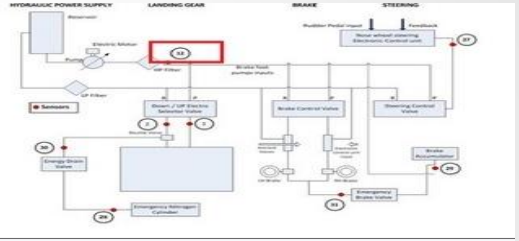
Building Blocks – Infosys Information Platform

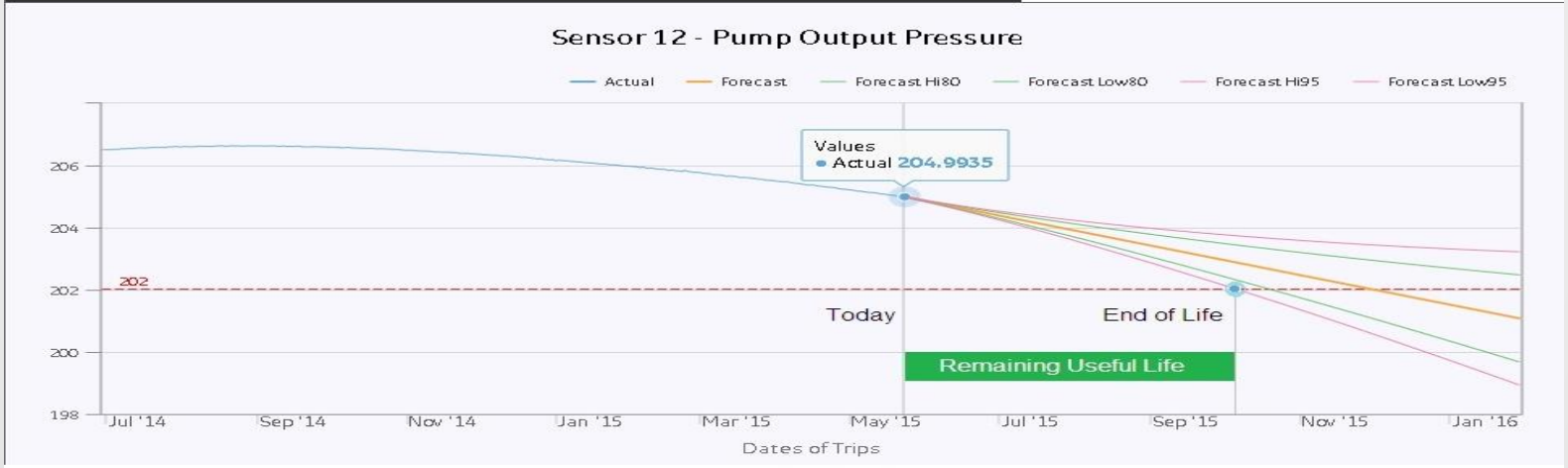


Predictive Maintenance : Predix

GE Digital

Trip Start (Date)	Trip Latest (Date)	Current Trips
6/30/2014	5/26/2015	850
Threshold	**Estimate End of Life (Date)**	**Remaining Useful Life (Trips)**
$_{min}202 - 211_{max}$ (bar)	10/7/2015	540





http://www.iiconsortium.org/asset-efficiency.htm http://www.iiconsortium.org/industrial-digital-thread.htm

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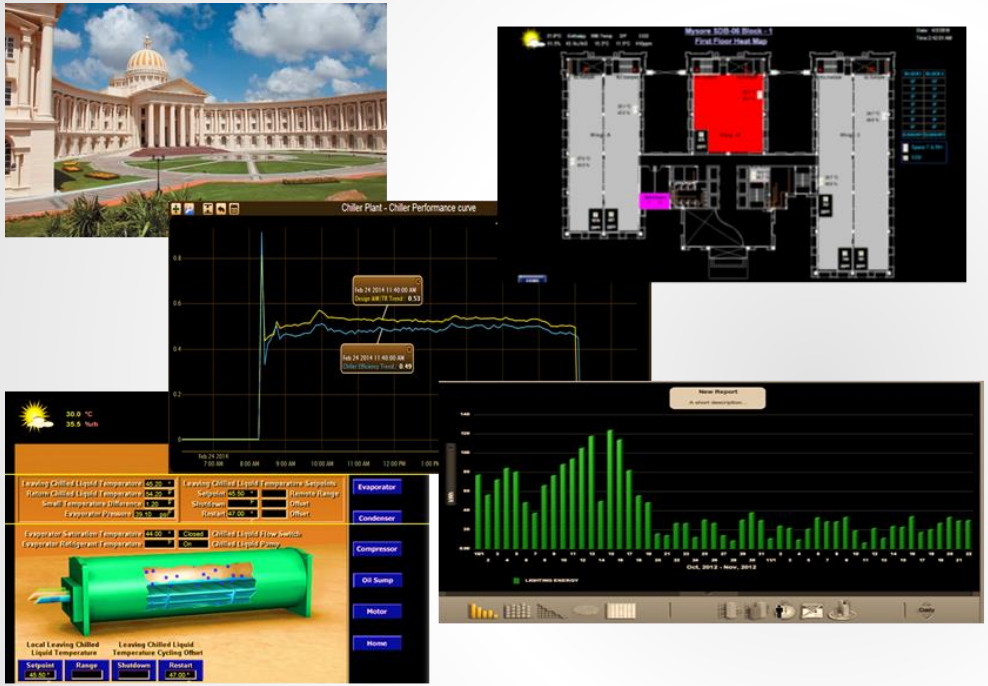
Smart Cities – Energy & Water Mgmt. Testbeds

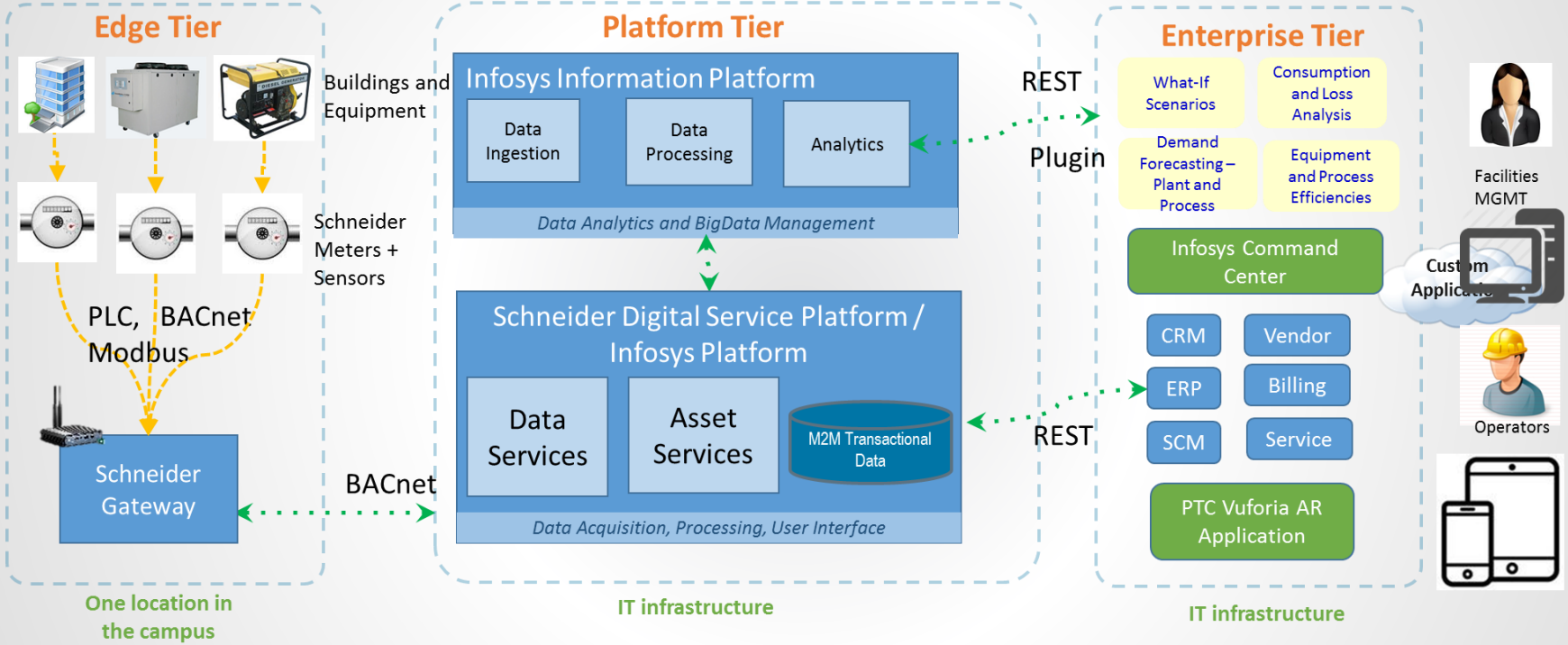


Mysore Campus : 338 Acres, 11,609,649 sqft, 15949 (E) + 14,900(T), 10,107 guestrooms, +3000 cars

http://www.iiconsortium.org/energy-management.htm

http://www.iiconsortium.org/water-management.htm

Energy Management Testbed – Reference Architecture

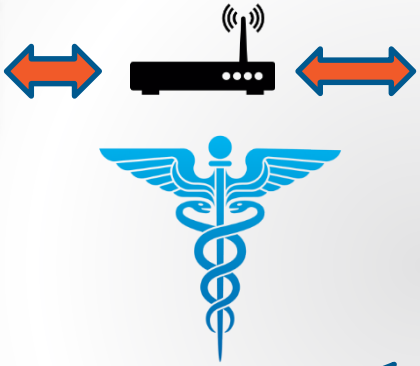


Reference Stack compatible with multiple ingredients at all IIRA tiers (Edge, Platform & Enterprise)

Connected Care Testbed – Reference Architecture

Infosys, PTC, RTI, MD PnP

Patient at Home
Patient in Clinic/Hospital



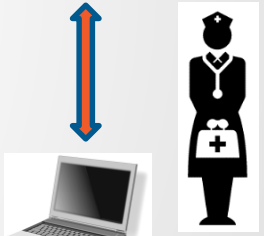
ThingWorx
A PTC Business
PTC Thingworx Cloud

Infosys
Infosys Information Platform (IIP)

ThingWorx
A PTC Business
PTC Thingworx Apps

Caregiver to reviews healthcare data

Patient Health Dashboard



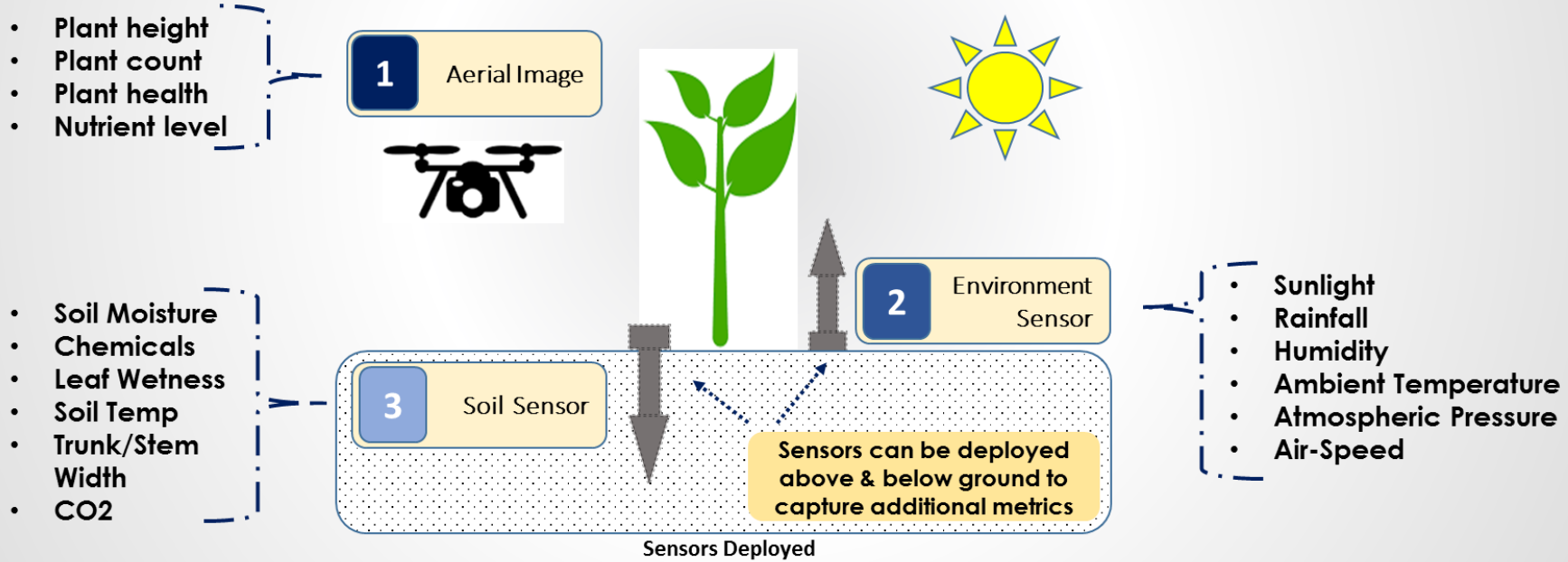
IIP provides data analytics layer
PTC Thingworx provides cloud services(data acquiring, storage, device management, microservices)

http://www.iiconsortium.org/connected-care.htm

Infosys

Precision Crop Management

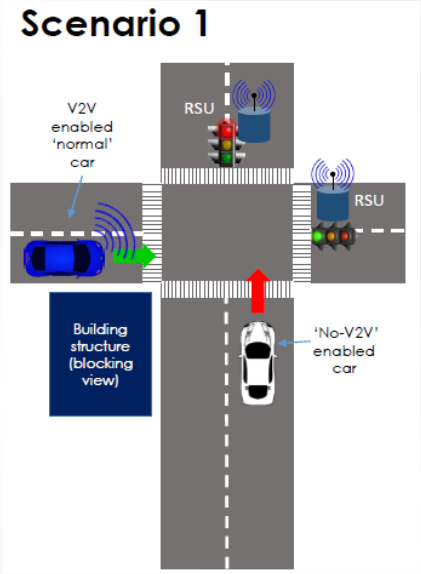
Crop Productivity/Yield : Optimum crop conditions, In-season interventions
Field Operations : coverage, drone directed sampling, Irrigation efficiency



IOT enabled Intelligent Transportation - Connected Vehicle

Collision Avoidance : Out-of-sight vehicle detection and communication
Road safety for pedestrians - crossings/traffic intersections
Active Driver Assist, Real-time Road conditions , Parking…

V2[X] enabled automobiles and infrastructure Intelligent Transportation Systems



AiKiDo Services

KNOWLEDGE CAPTURE & RENEWAL

Ki
Spirit, Energy, Morale

DESIGN LED INNOVATION

Dō
Way, Path, Purpose

Ai
Unifying, Combining, Fit

PLATFORMS & ECOSYSTEM

Let us realize Transformational Business Outcomes Together!

Thank You

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