OSIsoft

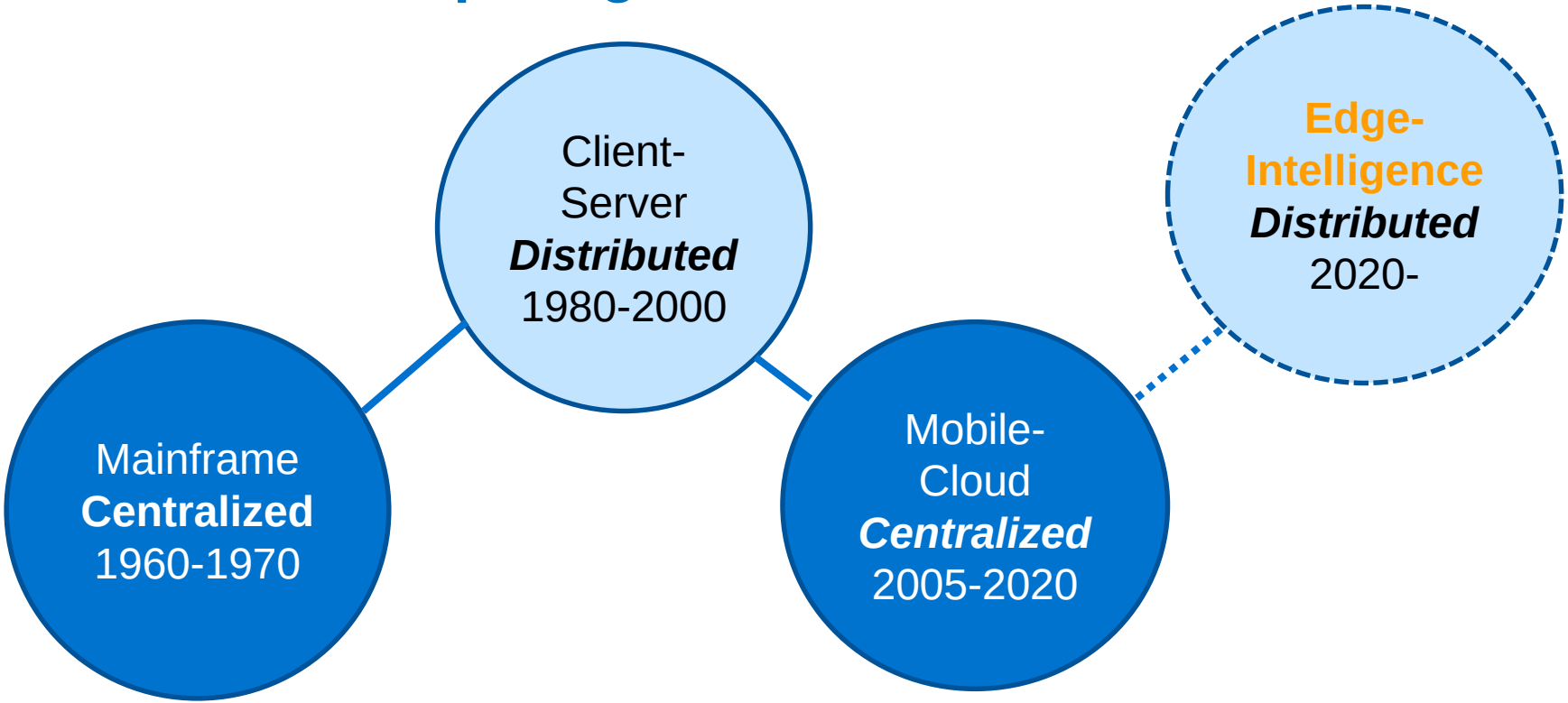
Regional Summit 2017

May 2-4, 2017 | West Palm Beach, FL

Digital Transformation: Leveraging the Edge

Presented by **Enrique Herrera – Market Principal**
OSIsoft LLC

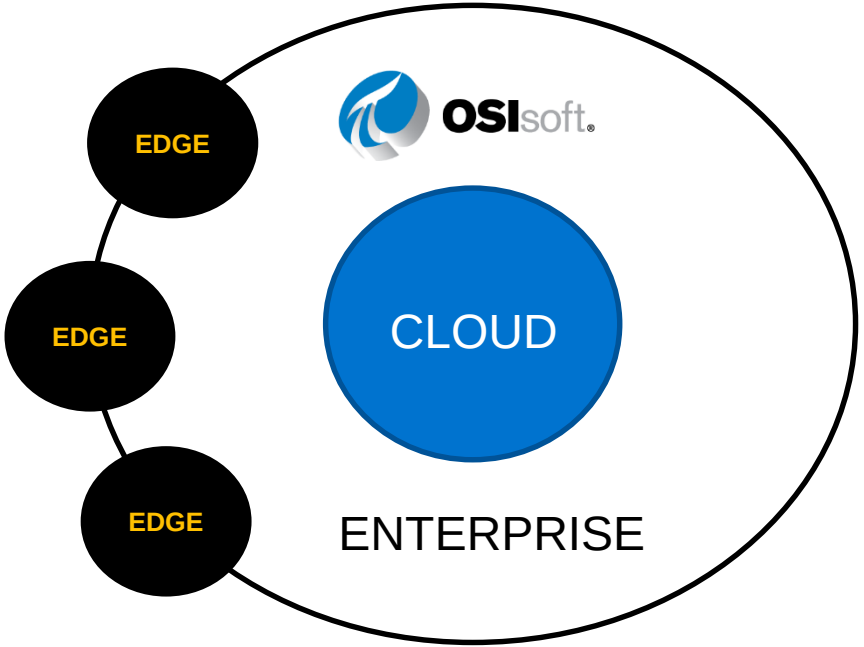
Distributed Computing takes us *Back to the Future*



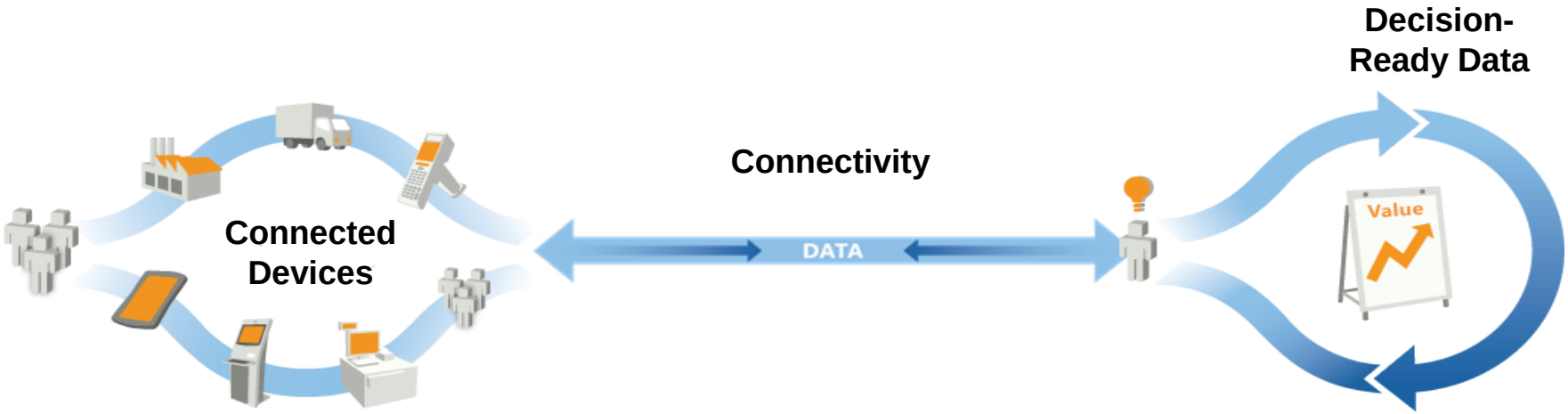
"The next multibillion-dollar tech market was quietly born this year, says A-list VC Peter Levine" Business Insider Dec. 16,2016

Data Infrastructure across various Computing Architectures

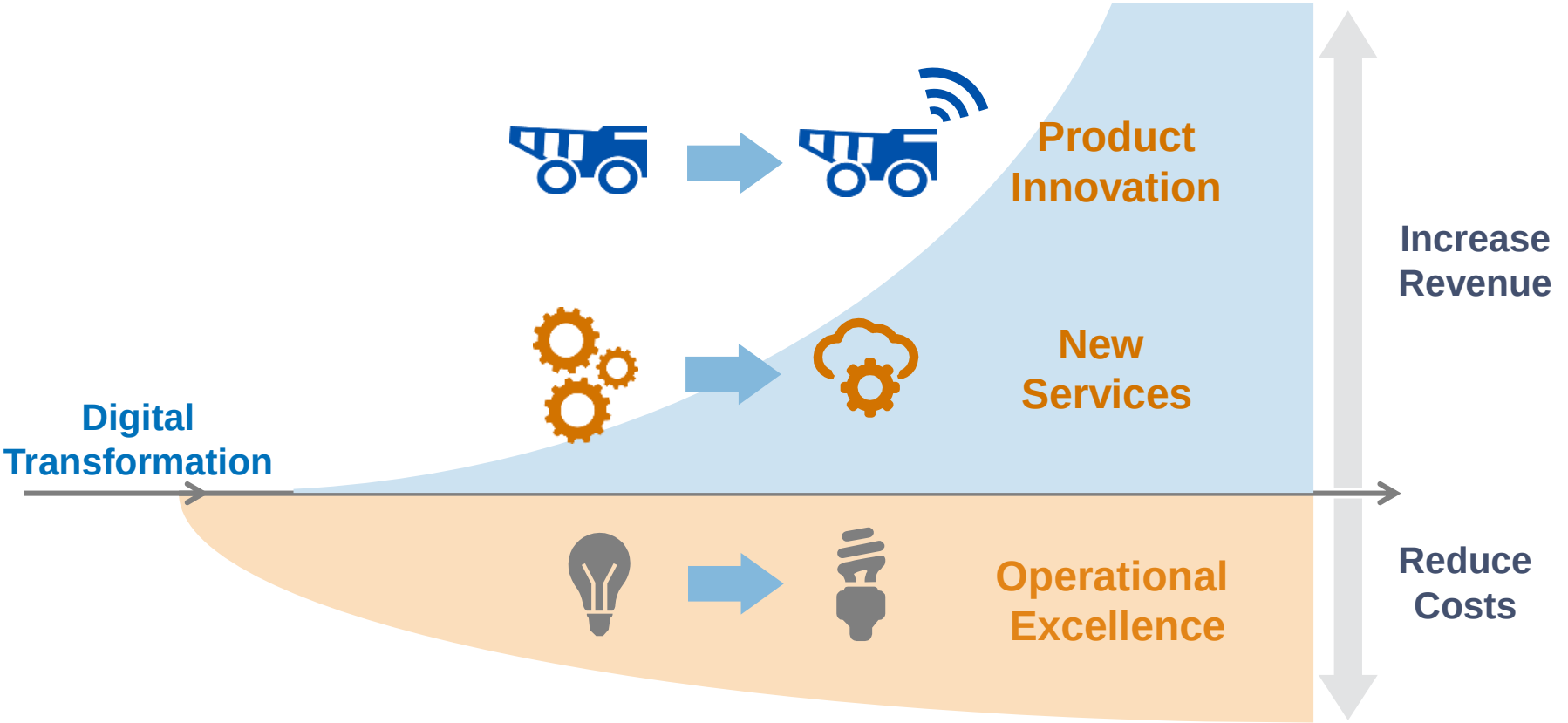
- ✓ Sense
- ✓ Infer
- ✓ Act



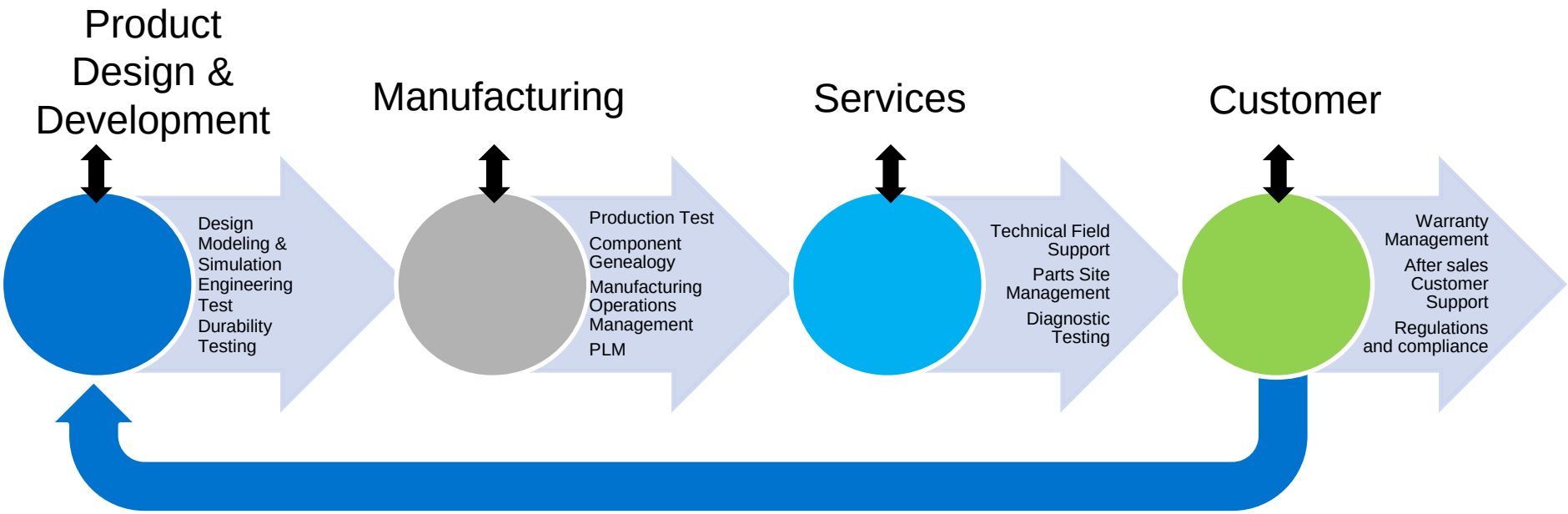
Architecture Pattern



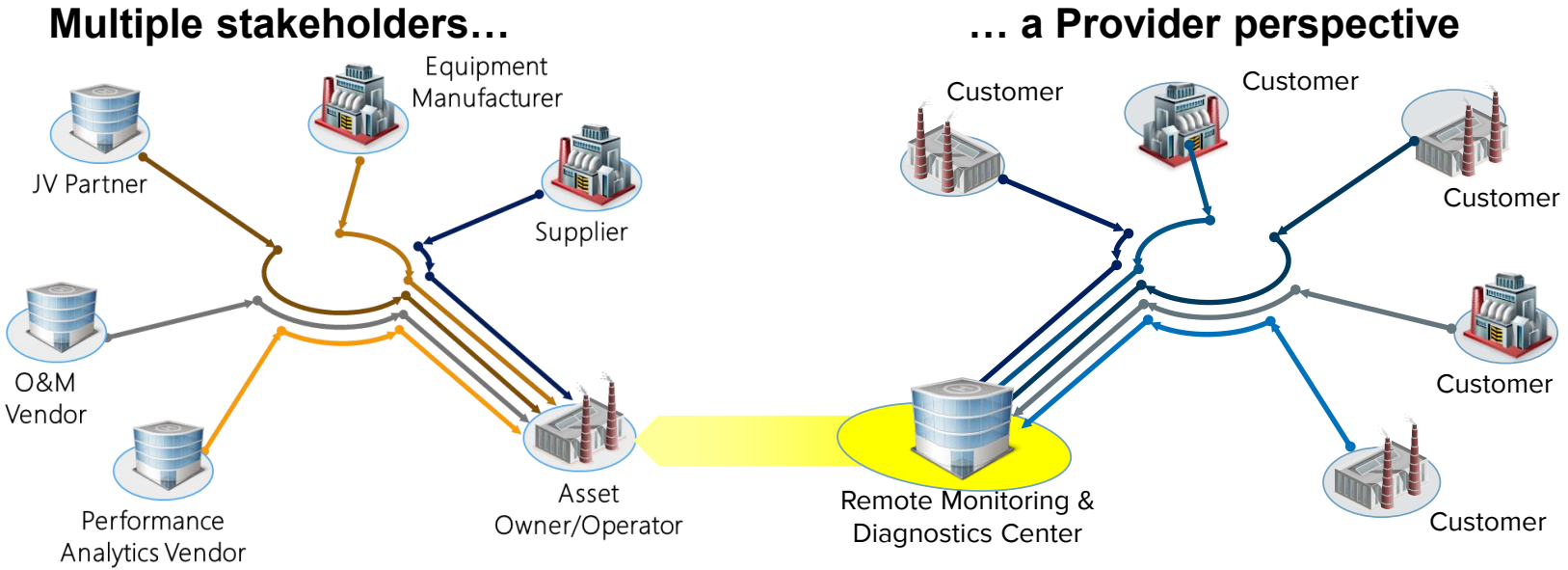
Digital Transformation: Our Opportunity



Product ‘Cradle to Grave’ Data Utilization



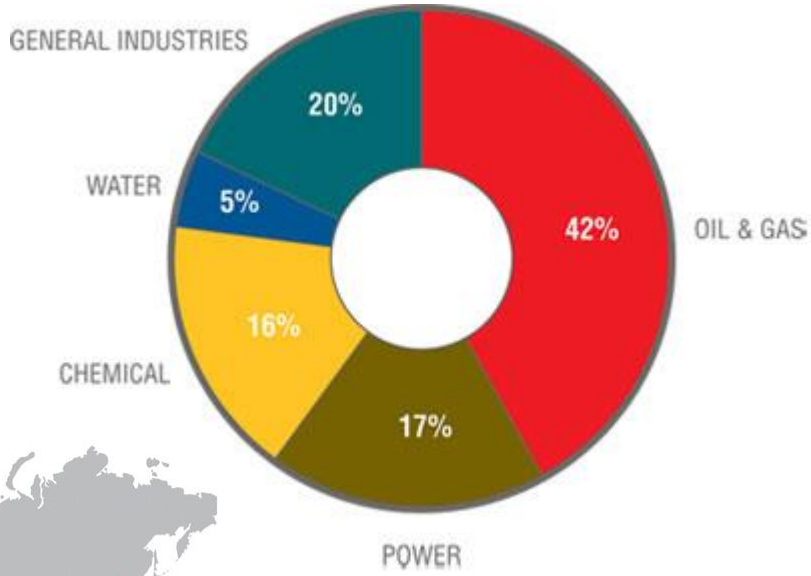
Connected Services

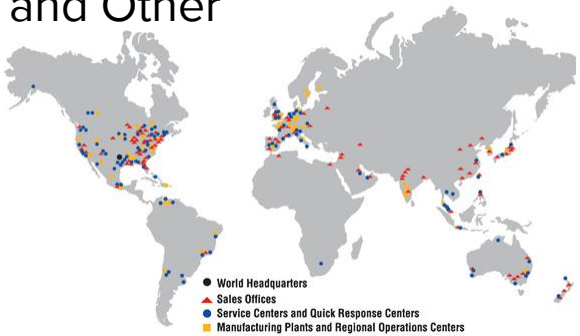


Service Provider can create value across multiple stakeholders and customers.

Global Rotating Equipment Monitoring

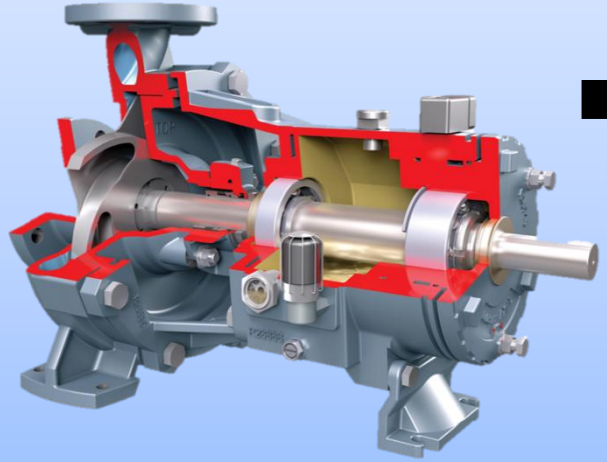
- 200 years of Fluid and Motion Control experience
- Rotating Equipment
  - Pumps, Valves, Seals, and Related Services
- Historically a “big iron” company
- 15k employees in more than 50 countries
- Power, Oil, Gas, Chemical and Other Industries





Evolving Business Model / Customer Needs

Equipment

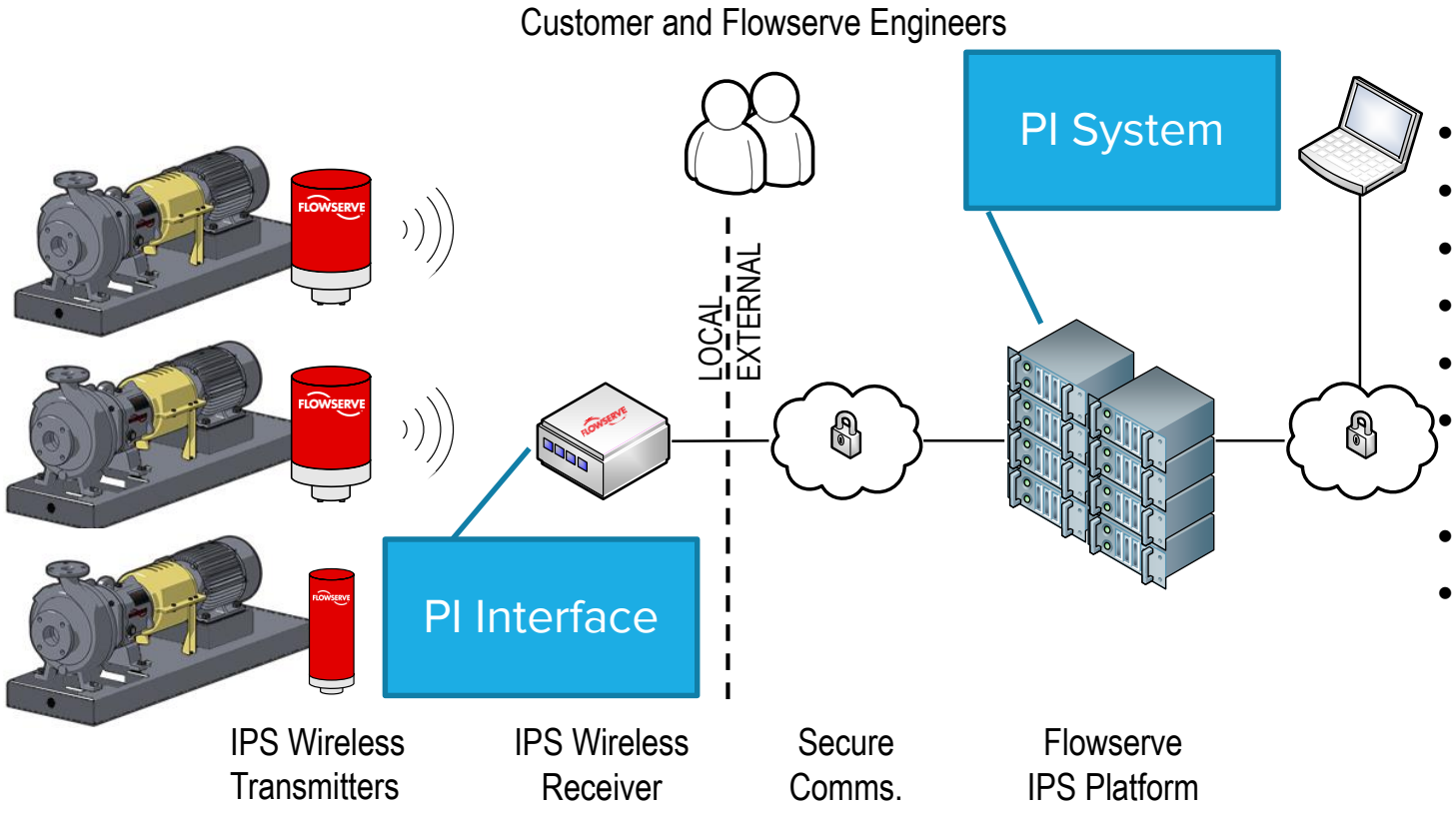


Services and Solutions

- Monitoring
- Reliability Solutions
- Repair and Maint.
- Field Services
- Training

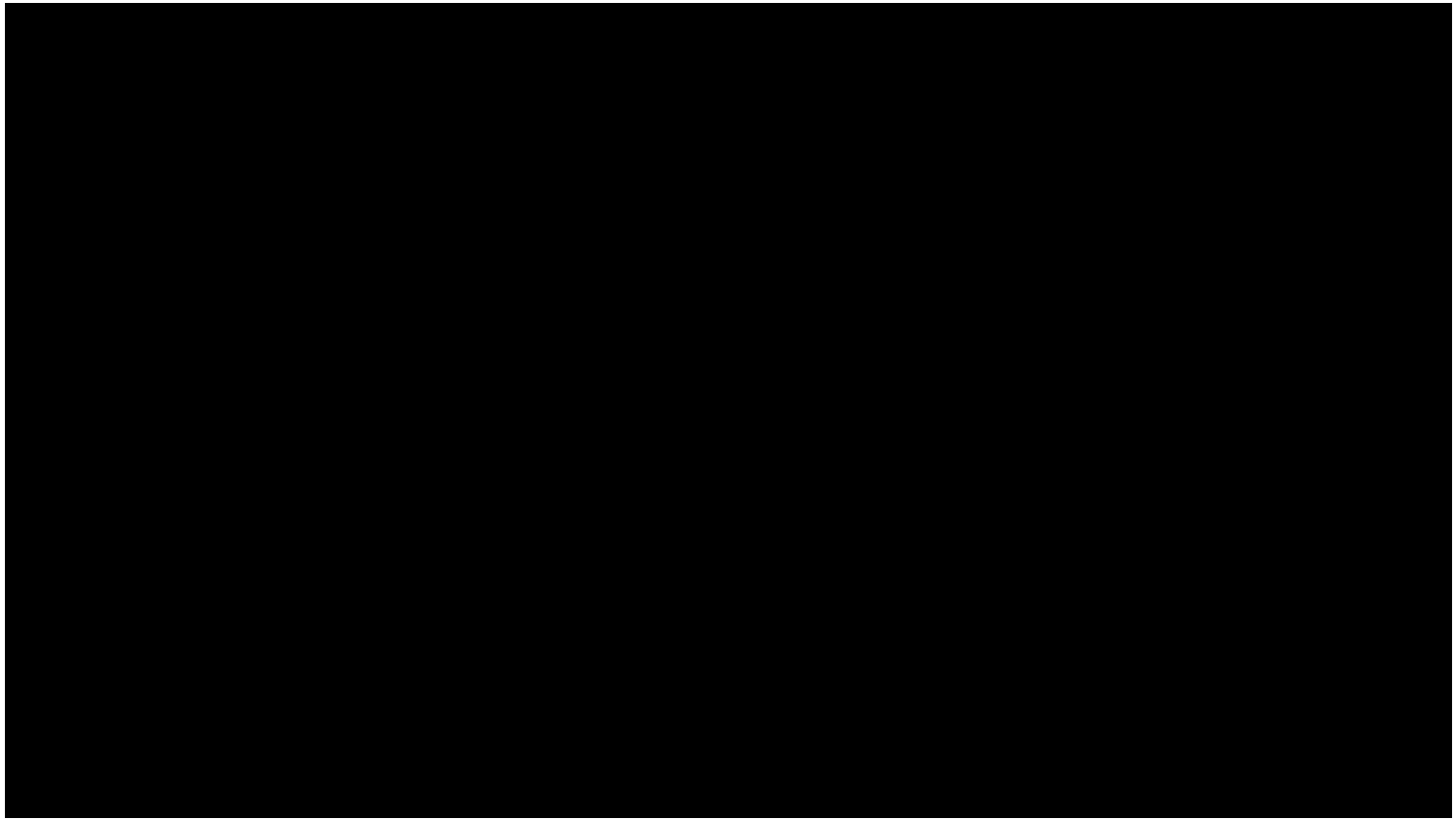
Performance | Reliability | Throughput | Efficiency

Improve Collaboration with Technology



- PI Collective
- PI Server
- Asset Framework
- Notifications
- PI Interfaces
- PI OLEDB Enterprise
- PI ProcessBook
- PI WebParts

Flowserve Delivers Services



360 Degree Electric Power Solution Vision

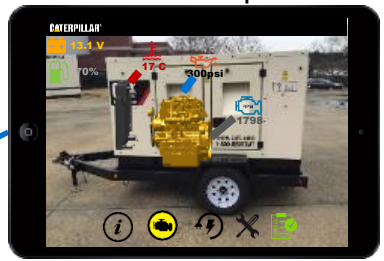
Enterprise Data Hub
Integration

BIG DATA
ANALYTICS

BUSINESS
ENTERPRISE
SYSTEMS

Dealer/Customer/CAT Apps

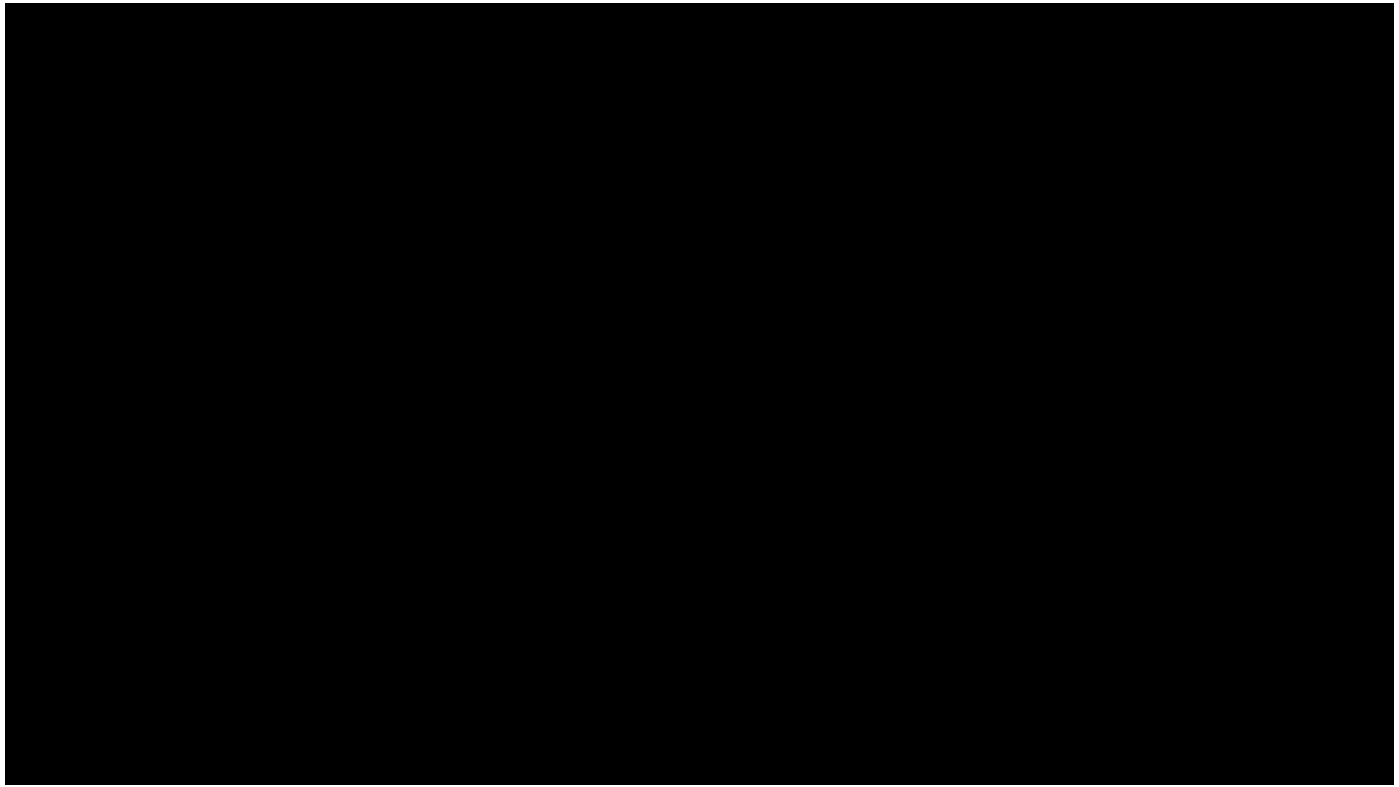
Augmented Reality
Service & Inspection



Remote Diagnostic
& Service

Digital Twin Simulation
& Analytics

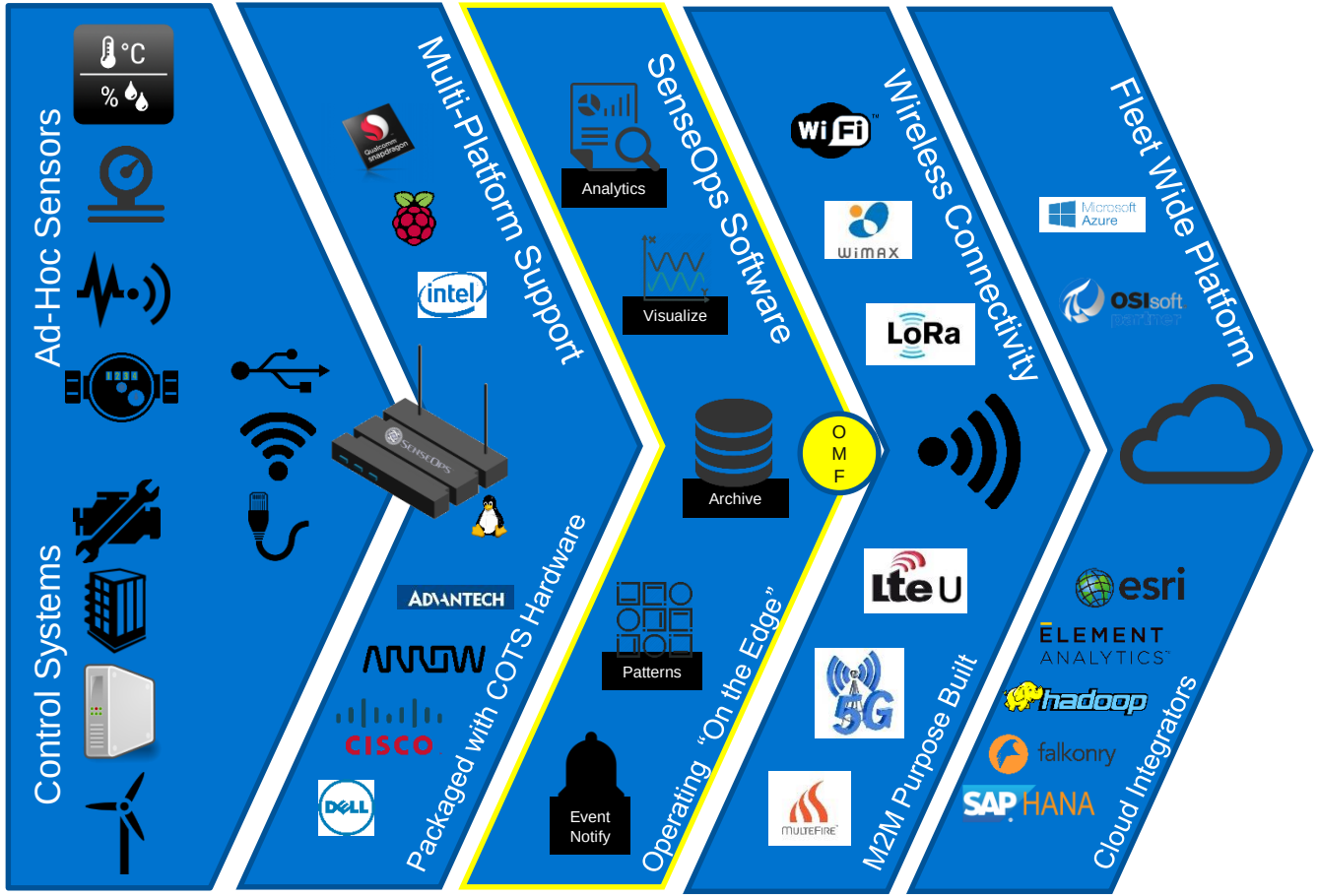
CAT Connect



Connecting the Unconnected

Presented by **Dave Roberts – dave@senseops.com**
CEO/Founder @

UNDERLYING MAGIC – THE SENSEOPS SOLUTION



- **Consult:** Define appropriate COTS Sensor & I/O pattern for the Use Case
- **Mobilize:** Procure/Construct and Deploy Use-Case Specific IoT "Kit" (sensors, I/O, Gateway)
- **Run:** SenseOps proprietary software to acquire, store, and analyze data "at the edge"
- **Interconnect:** Leverage existing managed networks, or deploy purpose built M2M network
- **Fleet Scale:** Aggregate cloud-appropriate data for fleet analytics and integration with other cloud apps

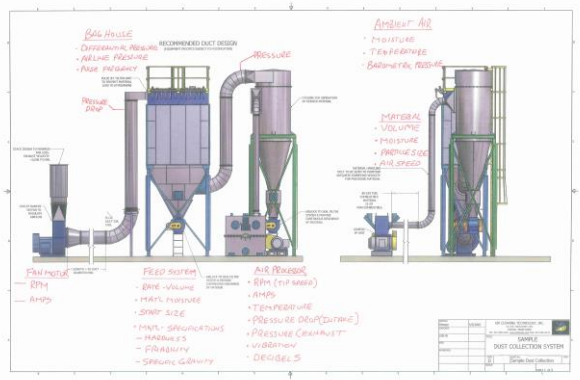
Example customer – Mueller Brown Milling

- $400k Milling Machine with 33% Energy Efficiency over mechanical milling (e.g. ball mill)
- End-Use Customers asked Vortex for Lease Structure
  - $20,000/Month but Vortex took Operating Risk
- Vortex Offers Customers Material Type Throughput per Month Contract
  - Results in $38-40k Month in Revenue per machine to Vortex

9min Video With CEO

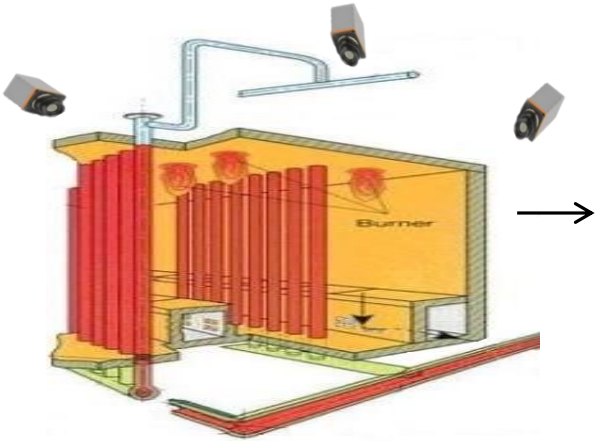
SenseOps Approach

- "Mobilization Fee" to implement SenseOps "Kit" at 1st Site
- Subscription per machine/month SaaS Recurring Revenue to SenseOps – 3 year contract
- Reduced/Amortized "Mobilization Fee" on future machines (per Kit install)
- Customer forecasting 16 installs in 2017

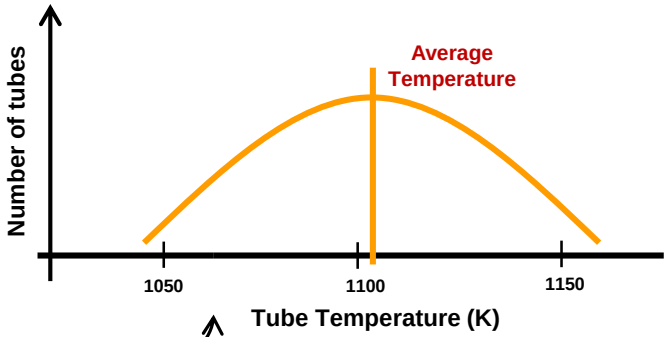


Thermal Cameras improve Praxair Methane Reformer

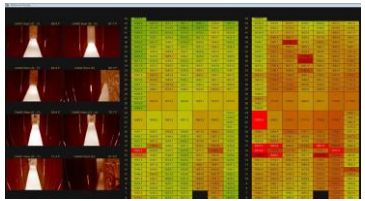
Steam-Methane Reformer Furnace

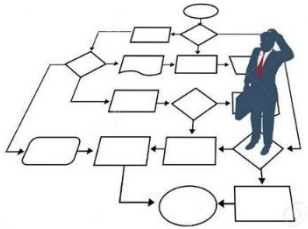


Temperature Distribution



Fuel Flow-meters





Improving Distribution Reliability with Smart Fault Indicators and the PI System

Presented by **Cameron D. Sherding,** *Sr. Software Engineer*

DTE Energy

Contact Information

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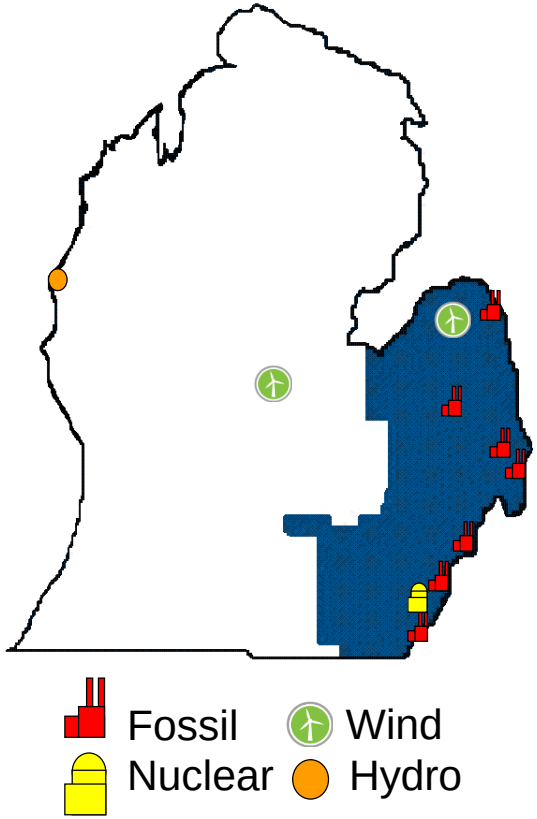
Sr. Software Engineer
DTE Electric Company

Profile of DTE Electric

- 12th Largest US electric utility
- 2.2 million customers
- 671 distribution substations
- 46,000 miles of power lines

Customer	Count	Load
Residential	1,920k	34%
Commercial	197k	44%
Industrial	1k	22%



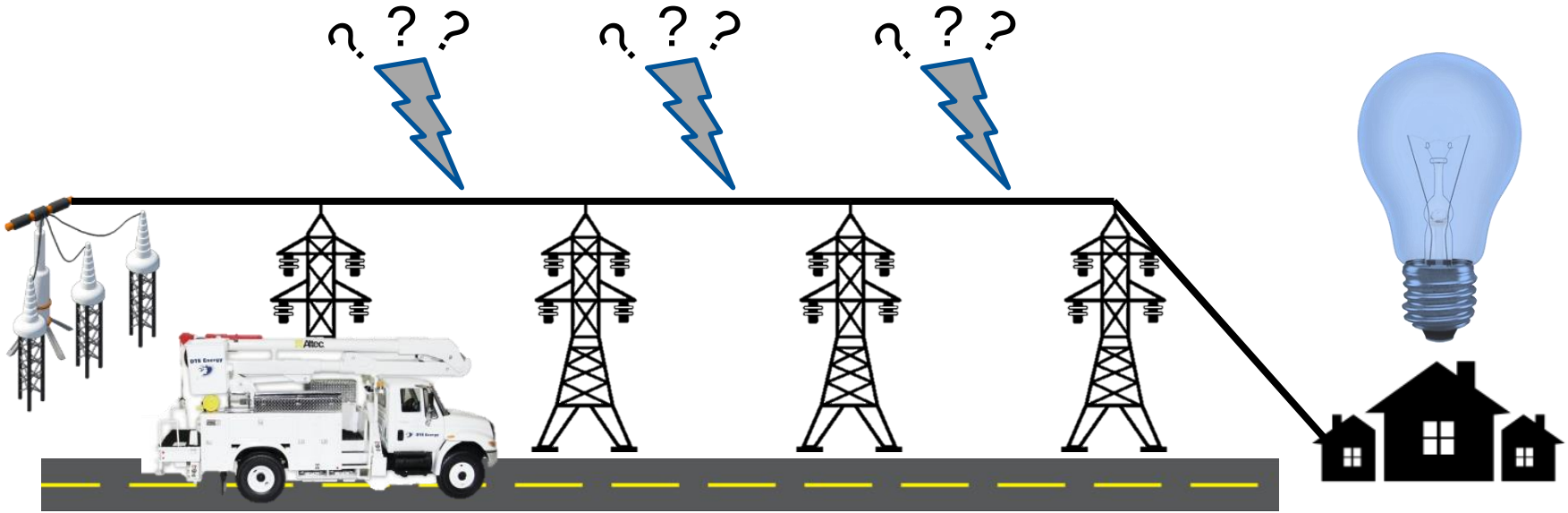
Business Challenges

Reduce CAIDI = average duration of power outage

1. Ground crews need to locate faults faster
   - Quickly locating the source of these faults is critical to minimizing restoration time
   - Circuit patrol times can take up to an hour
2. Increase visibility of electrical load on circuits
   - Aging substations may be demoed in the near future
   - SCADA is not a cost-effective option

Business Challenge

Patrol times are long when you don't know where the fault is



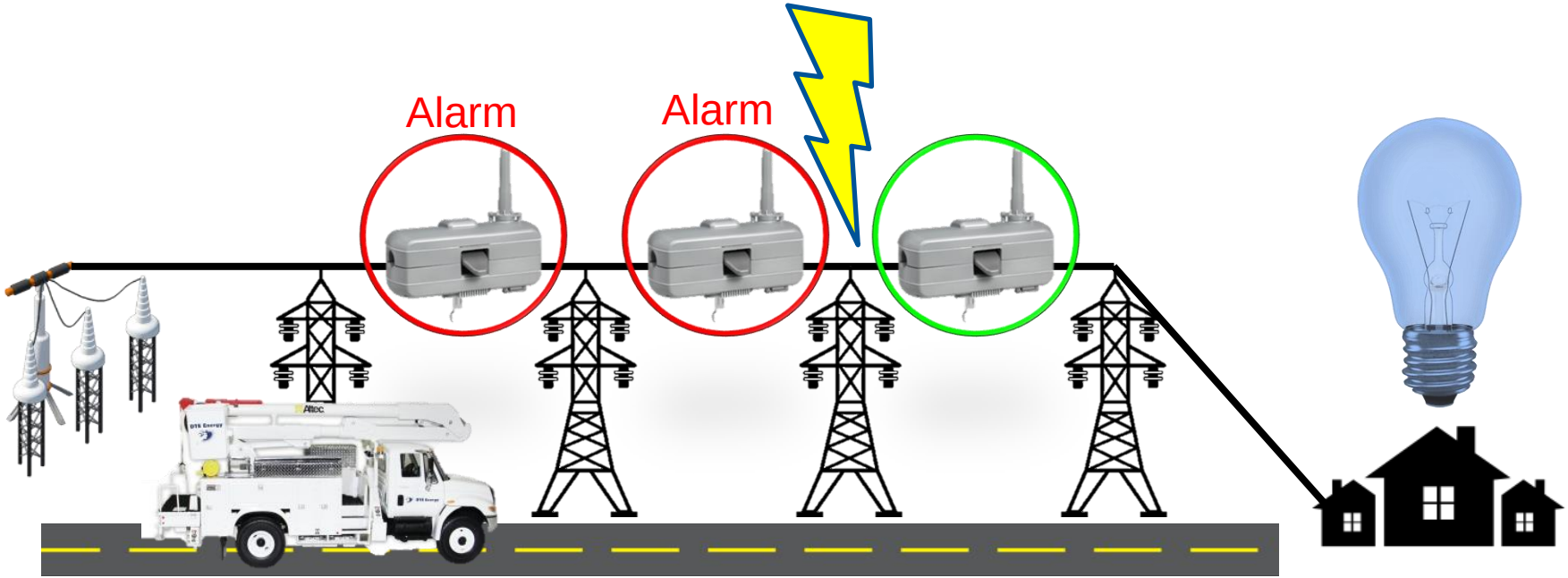
Examples of Ground Faults

Contact with Trees

Failing Pole Top Transformer

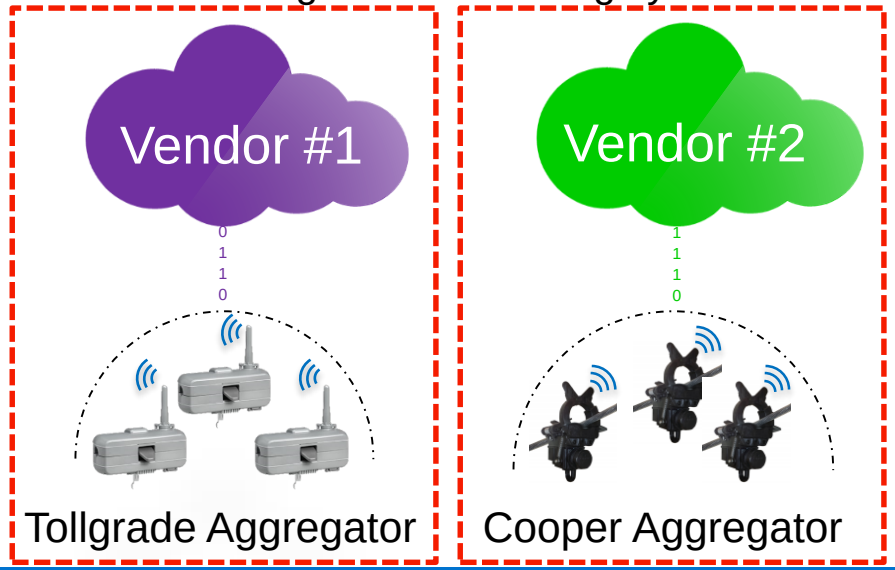
Failing Underground Cable

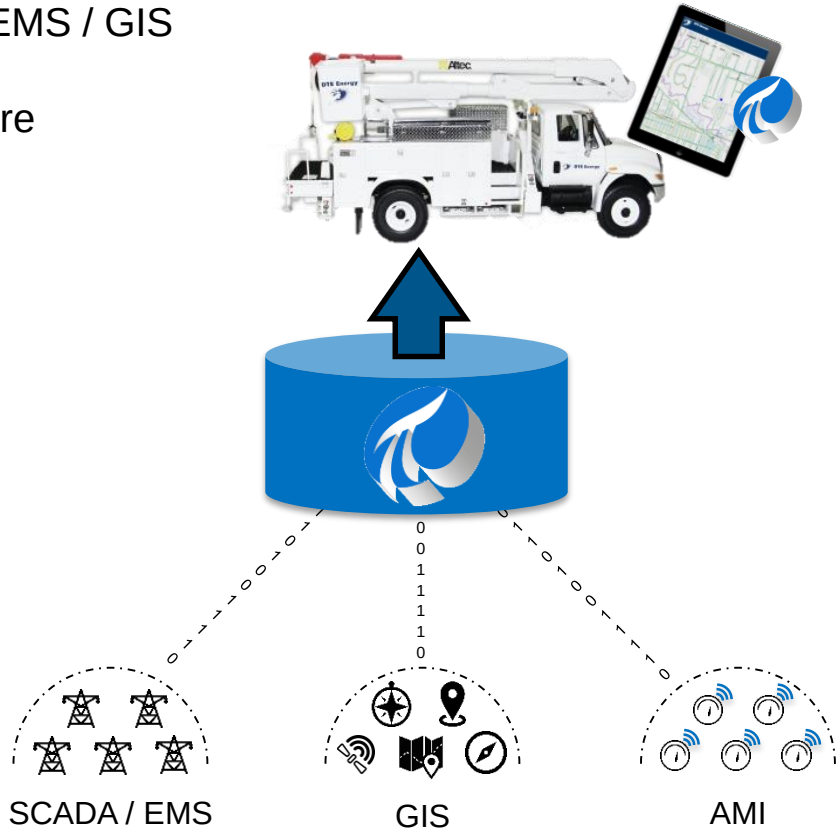
Sensors provide visibility into fault location



Downsides with going straight to the cloud

- Data is isolated from other OT data eg: SCADA / EMS / GIS
- Requires training a team on new tools
- Complicates using new sensor vendors in the future
- Project requirements
  - Must host our own data
  - Must integrate with existing systems





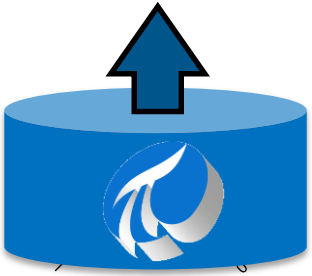
An Infrastructure Approach to using IoT Sensors

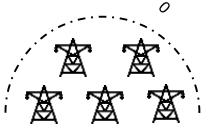
Benefits

- Agnostic to sensor providers
- Easily scale from POC to full size deployment
- Seamless integration with backend systems

The Full PI stack at work

- **Collect**: PI Interface for DNP3
- **Store/Contextualize**: PI Server / AF
- **Deliver**: PI Notifications / AF SDK / Esri Arc GIS / Coresight





Tollgrade Aggregator

Cooper Aggregator

SCADA / EMS

GIS

AMI

Web Based Status Dashboard – Outage Response Team

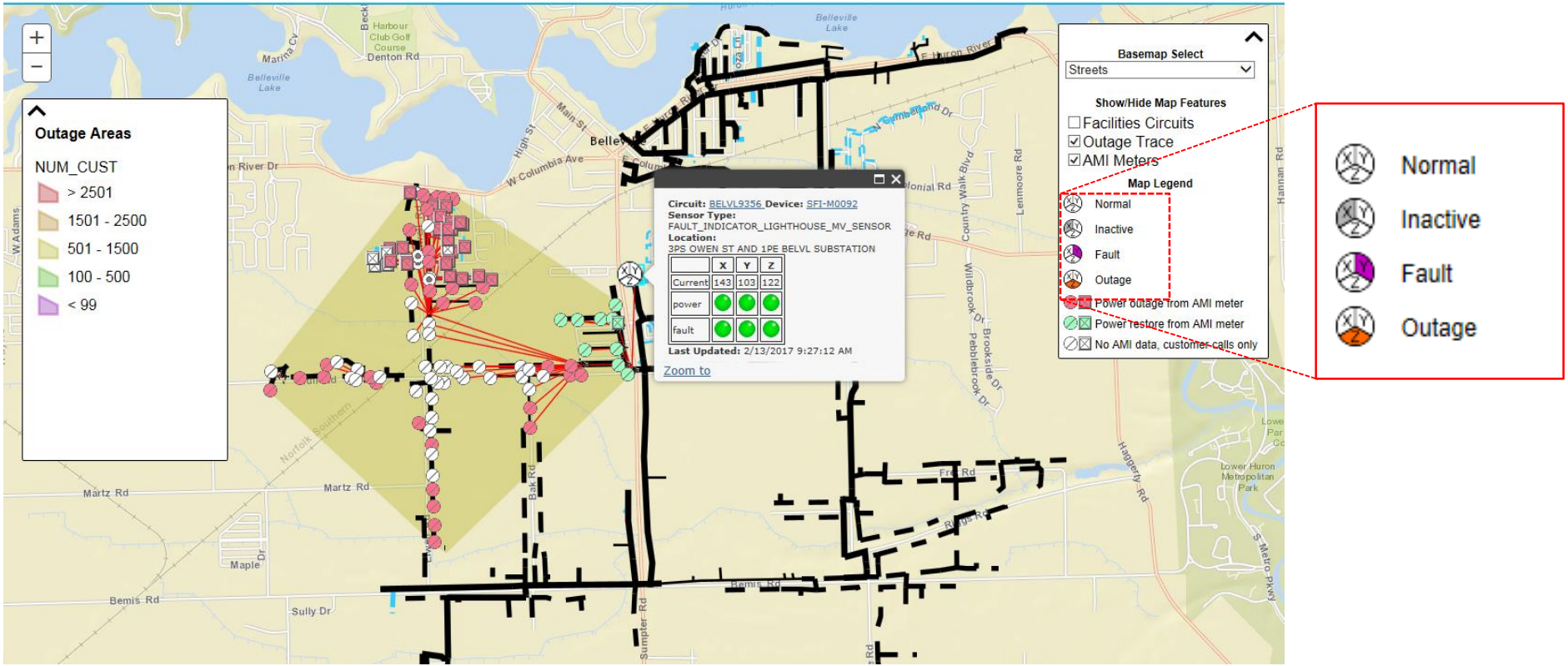
Normal Conditions

Circuit	SFI	Type	X Amps	Y Amps	Z Amps	Status	Fault	Fault Amps X	Fault Amps Y	Fault Amps Z	Status
											ALL
ALNPK1369	SFI-A0118	Tollgrade	252	234	235			-	-	-	Normal
ALNPK1671	SFI-A0117	Tollgrade	80	81	55			-	-	-	Normal
ALNPK1671	SFI-A0115	Tollgrade	75	73	74			-	-	-	Normal
ALNPK1833	SFI-A0116	Tollgrade	148	0	130			-	-	-	Normal
ALNPK1916	SFI-A0113	Tollgrade	218	160	197			-	-	-	Normal
ALNPK2044	SFI-A0112	Tollgrade	285	229	247			-	-	-	Normal

During Fault

PATON8920	SFI-H0163	42.484643	-83.220885	0	0	25				0	0	0	Power Out
PATON8920	SFI-H0160	42.502483	-83.214623	0	0	0				0	0	0	Telemetry Error
PATON8920	SFI-H0161	42.502313	-83.214563	0	0	0				3520	0	3520	Telemetry Error
PATON8920	SFI-H0162	42.488473	-83.221135	0	0	0				0	0	3520	Telemetry Error

Outage Map – Service Operations and Dispatch



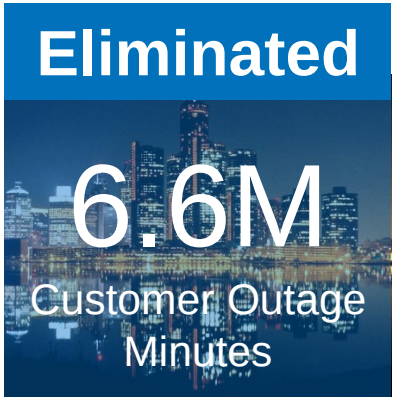
Project History

2014
- **95 locations**
- Proof of Concept

2015
- **600 locations**
- AF SDK Map Integration

2016
- **1200+ locations**
- Full scale deployment

2017
- **3000 locations**
- PI Integrator for Esri ArcGIS
- Underground Fault Detection
- CYME project



Less Wires, More Data:
Harnessing new technology at the network edge

Presented by **Martin Davis, Vice President of IT, J.D. Irving Ltd**
Keith Flynn, President & Founder, RtTech Software Inc.

IRVING

RtTECH SOFTWARE

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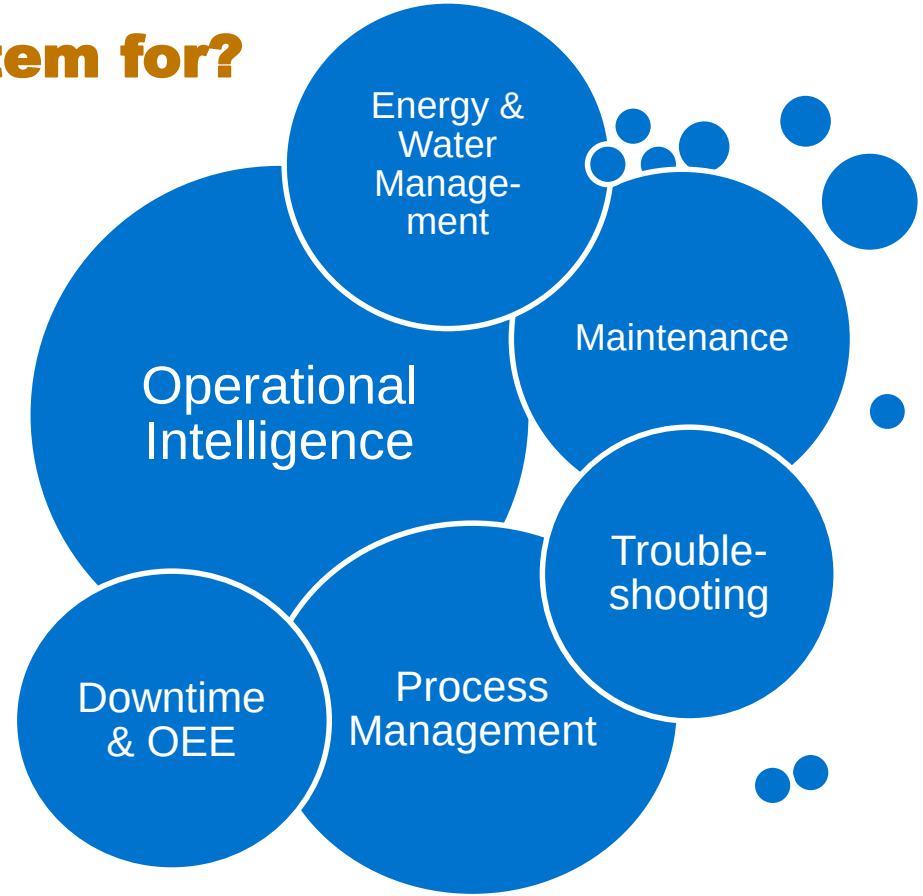
IoT & OSIsoft – J.D. Irving & RtTech

What do we use the PI System for?

- Used across our Manufacturing plants
- Includes:
  - Paper Mills
  - Tissue converting
  - Diaper
  - Frozen Food



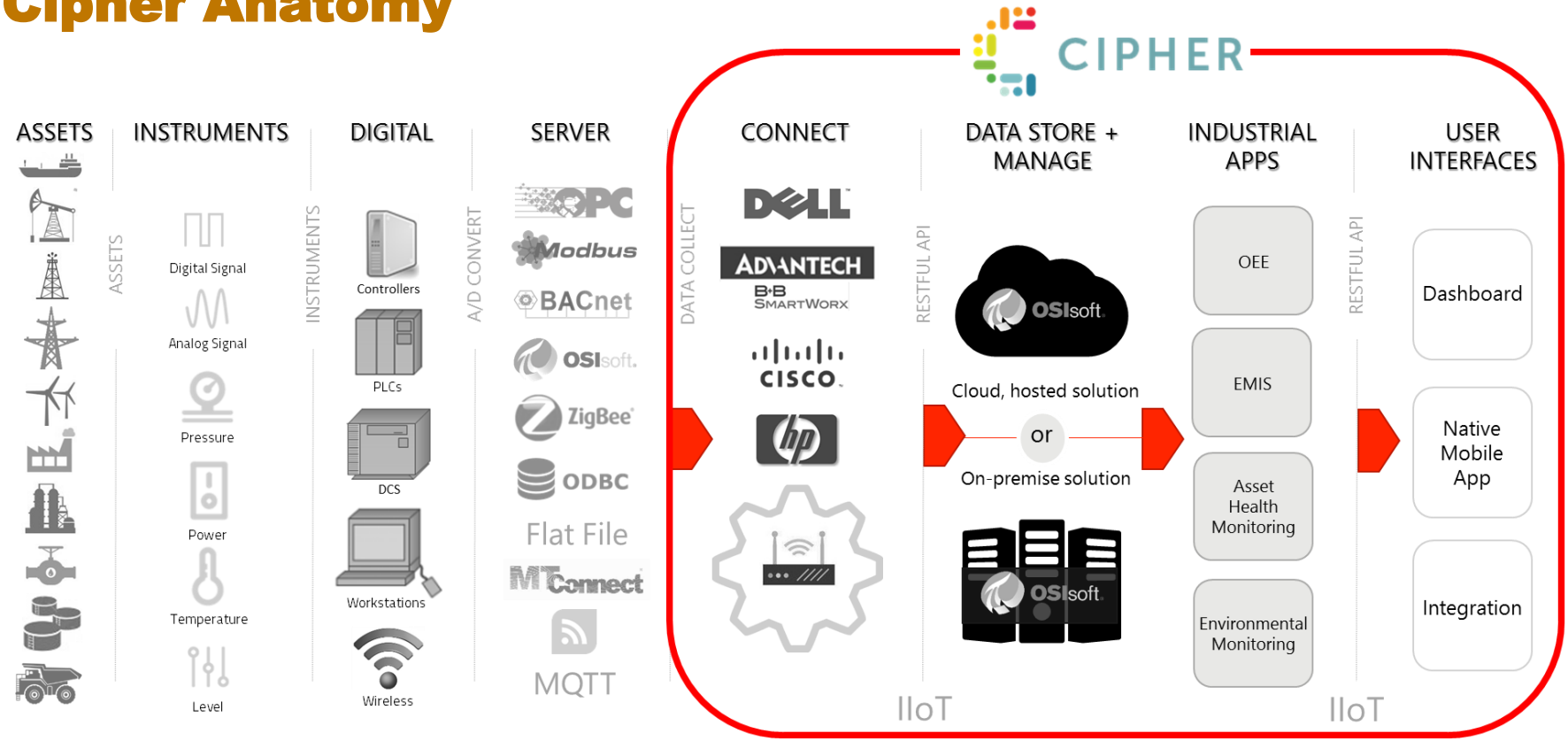
IoT & OSIsoft – J.D. Irving & RtTech

Common Challenges

- Assets not connected to the PI System have no real-time visibility
- What about limitations?
  - Isolated areas of a plant or in the field (outside the plant)?
  - Poor network quality?
  - Mobile assets?
- Or aging or outdated controls with low connectivity?
  - Upgrades are costly. Rip and Replace
  - Networking and installation significant

IoT & OSIsoft – J.D. Irving & RtTech

Cipher Anatomy



IoT & OSIsoft – J.D. Irving & RtTech

Cost of a conventional "Wired" system

Monitor 10 Assets:

$1000 per PLC CAPEX

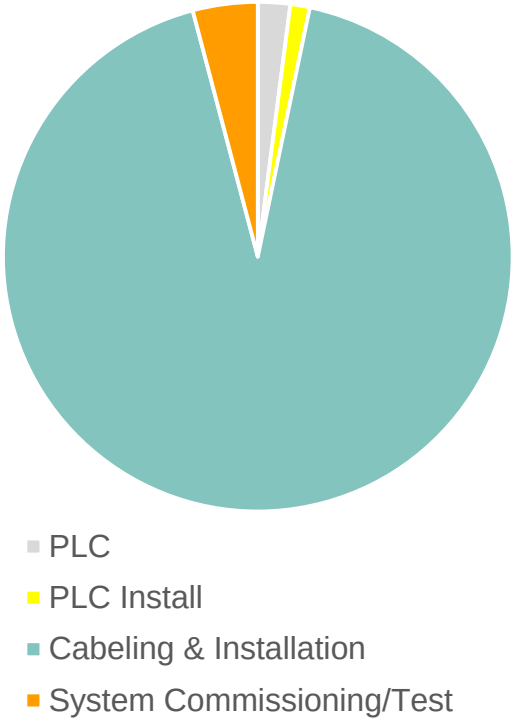
$300 per device installation

$15/ft cabling/conduit & installation

$1000 System commissioning/test

Total Project = $31,500

"The main cost of an asset monitoring system isn't the system itself, but the cabling deployment costs."



IoT & OSIsoft – J.D. Irving & RtTech

Wired vs Wireless: Savings

Monitor 10 Assets:

$600 Wzzard Gateway

$300 Gateway Installation

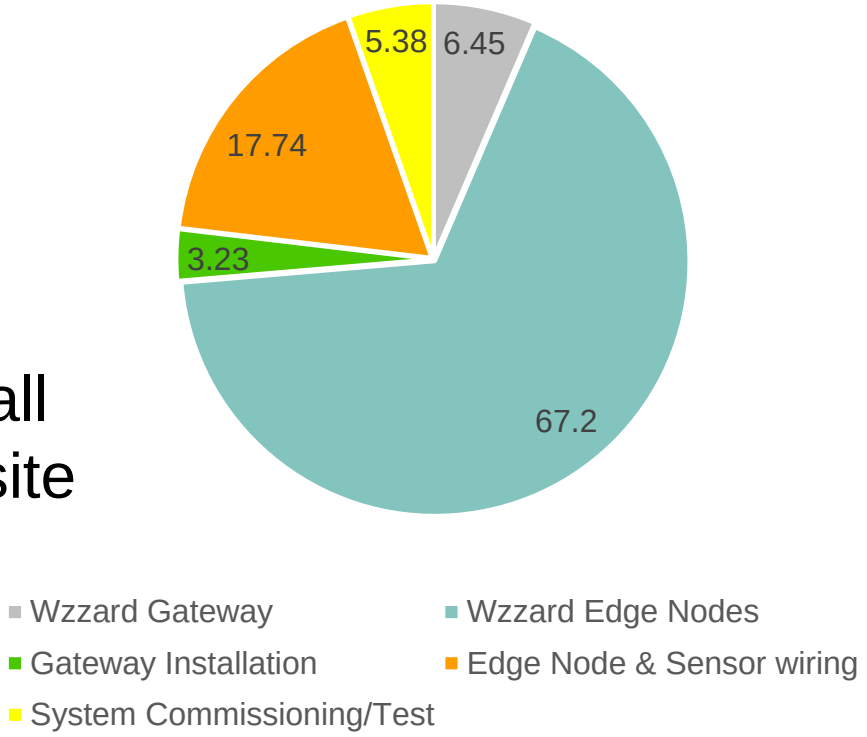
$6250 – 13 Edge Nodes

$1650 Edge Node/Sensor Install

$500 commissioning/ test per site

Total Project = $9,300

*$22,200 in savings, nearly **70%** !*



Takeaways

- Edge Technology enables the collection of data that was not possible before
- This enables Digital Transformation by:
  - Enabling Equipment manufactures to improve their Design and Resolve Customers issues using data. Also allows for new commercial models
  - Having Service Providers deliver new services within the values chain
  - Improve Operations (Downtime, Asset Performance)

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Thank You