



OSIsoft®

# Regional Summit 2017

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



REGIONAL SUMMIT 2017

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# OSIsoft Product Strategy & Customer Showcases



Presented by **Chris Nelson**  
Director, Visualization Products

# Our Vision: Industrial Digital Transformation

**Assets**



**Multiple  
Sensors**

**Sites**



**Multiple  
Assets**

**Enterprise**



**Multiple  
Plants**

**Community**



**Multiple  
Enterprises**



# An Evolving Ecosystem

**Expertise Providers**



**Business Partners**




**Service Providers**



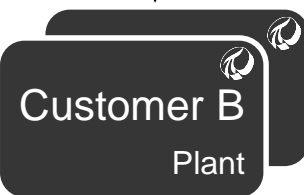
**OSIsoft Cloud Services**



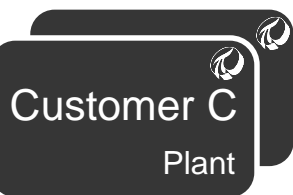
Enterprise  
**Customer A**  
Plant




Enterprise  
**Customer B**  
Plant



Enterprise  
**Customer C**  
Plant



Process Equipment    Control Hardware    IT Hardware    All Operational Data



- Remote
- Distributed
- Limited Bandwidth

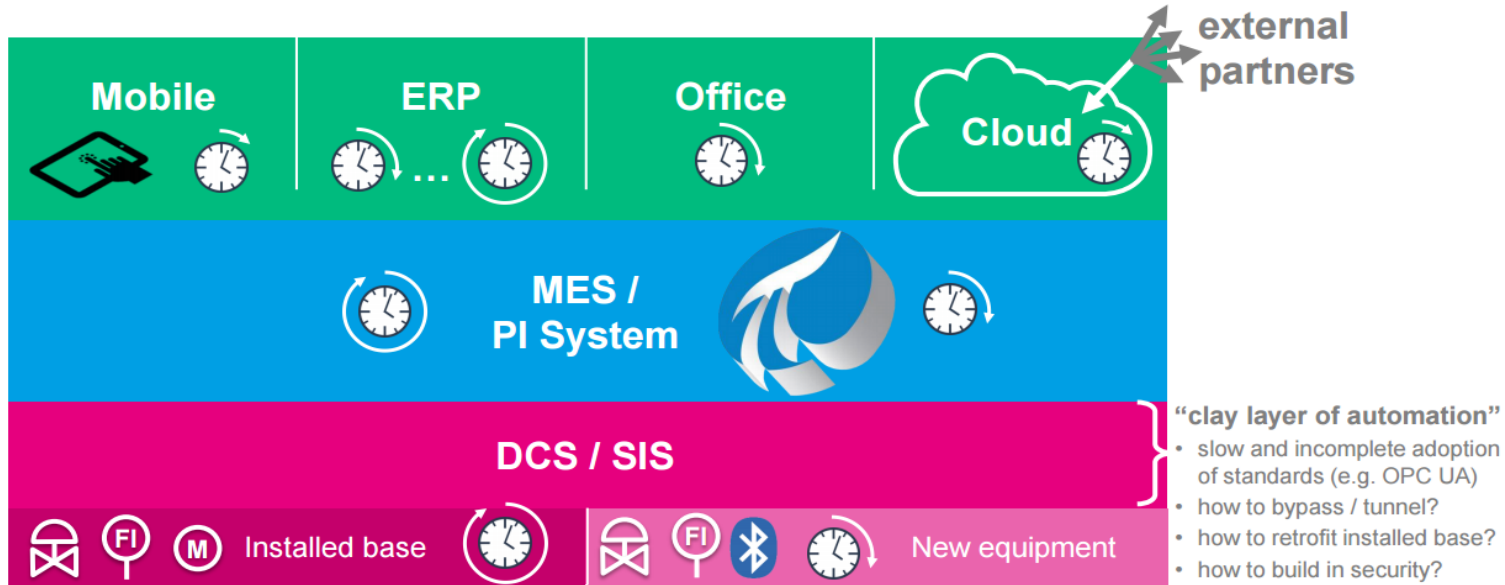


# Aligning with the Customer Journey

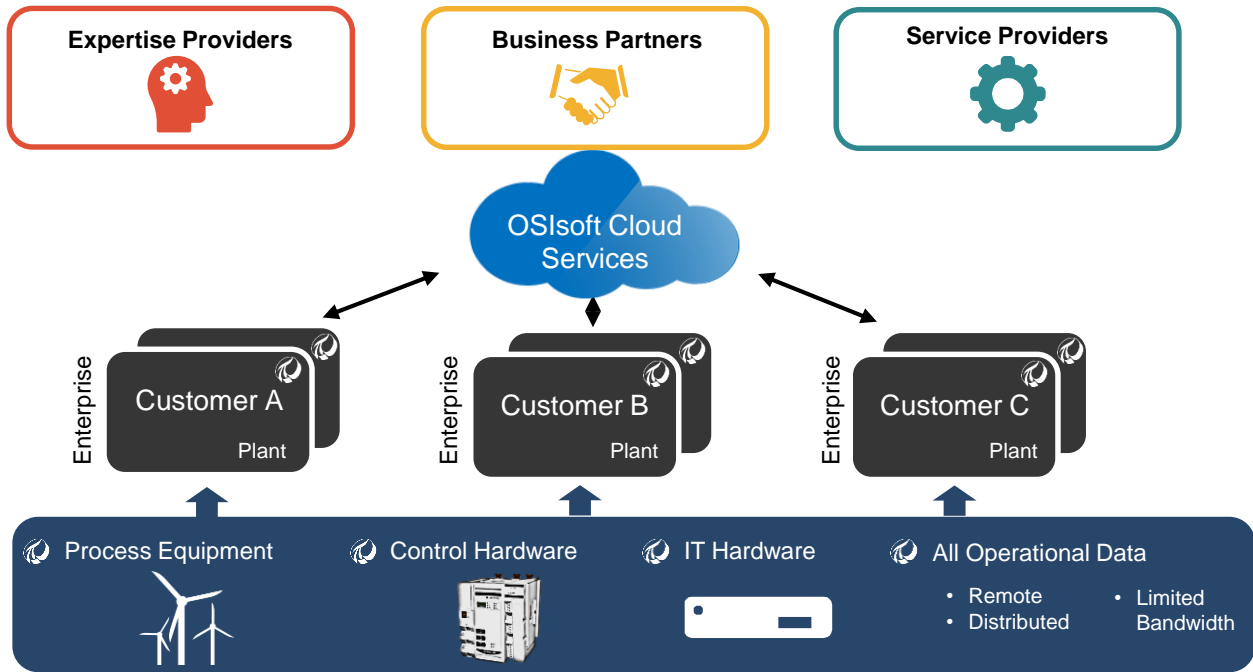


## Challenge #2: different innovation cycles

How can we leverage tech developments more quickly on a broad base?



# An Evolving Ecosystem



## Focus Areas

Display and Data Sharing

Fleet-Wide Operations Questions

PI Vision

Evolution of the PI System

Accessing all Operations Data



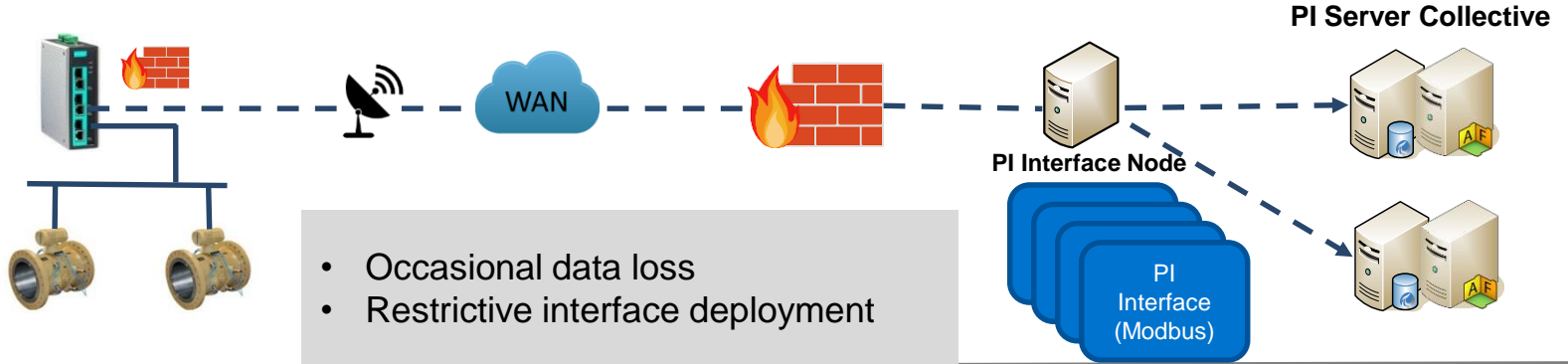
# 1

## Accessing all Operational Data

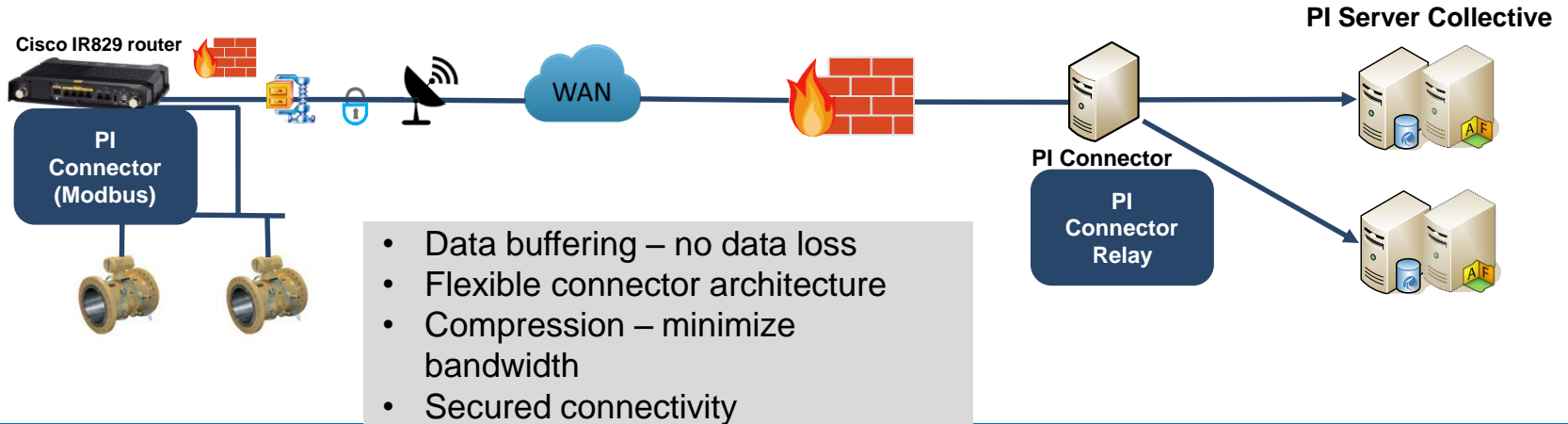


# TransCanada Extends PI System Connectivity to the Edge

Before



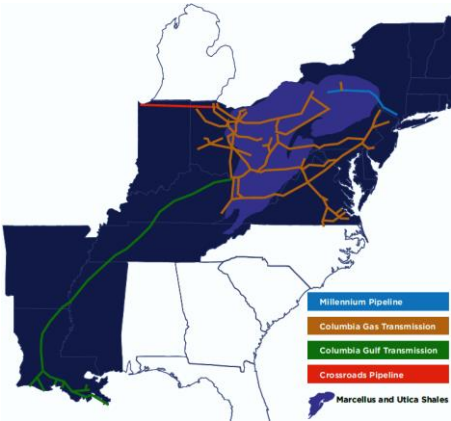
After





# Source Categories

## Your Equipment



## Control Hardware

**Rockwell Automation**



## Equipment Vendors

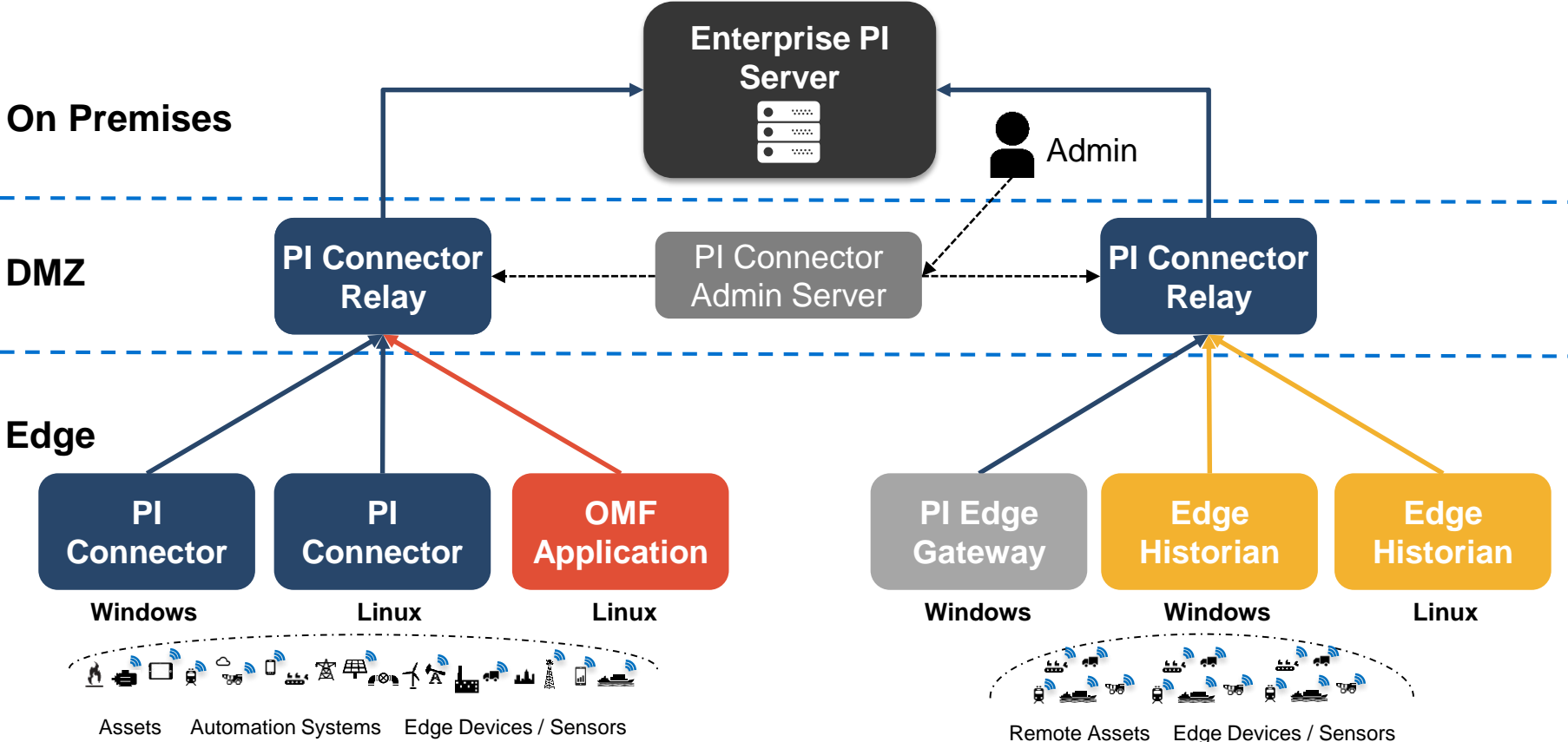


## IT Hardware



Cisco IR809 router  
Cisco IOx (Linux)

# Next Generation Data Collection Architecture



# Featuring PI System Connector



**Brian Caserta**  
*Programmer Analyst*



**Keith Ward**  
*Senior Staff Engineer*



**Don Morrison**  
*Real Time Data Engineer*



**Brian Faivre**  
*Brewmaster, Operations*  
**Tim Alexander**  
*Assistant Brewmaster,  
Engineering & Technology*





## **SPP: Helping our members work together to keep the lights on ... today and in the future.**

- Located in Little Rock, Arkansas
- Approx. 600 employees
- Reliability Services
- Market Systems Operation
- Transmission Planning

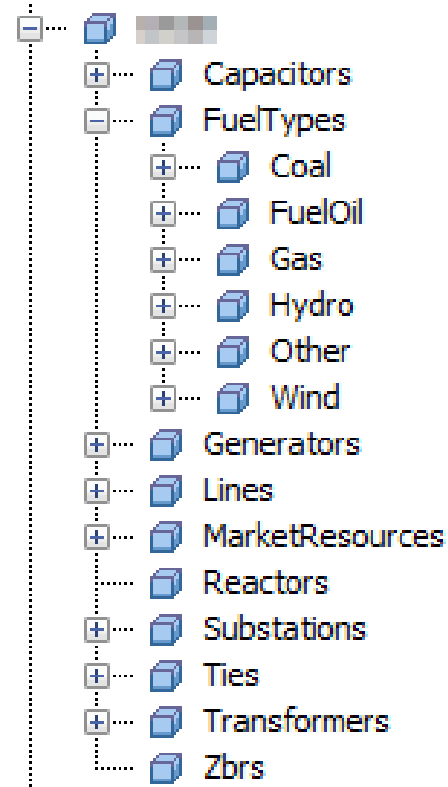






# Asset Framework at SPP

- Tag creation is based on templates
- Monthly process with custom plug-ins
- Limited set of real-time model changes based on changes to network topology

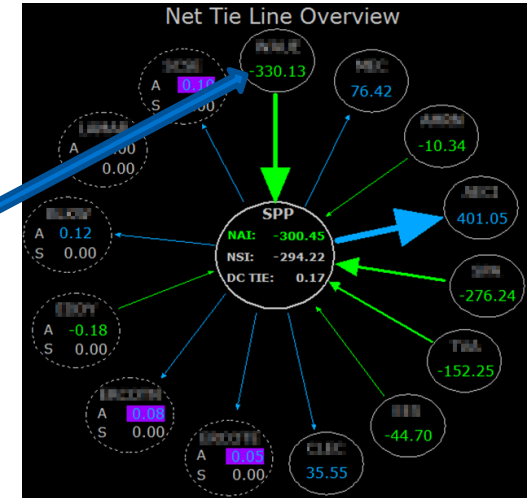




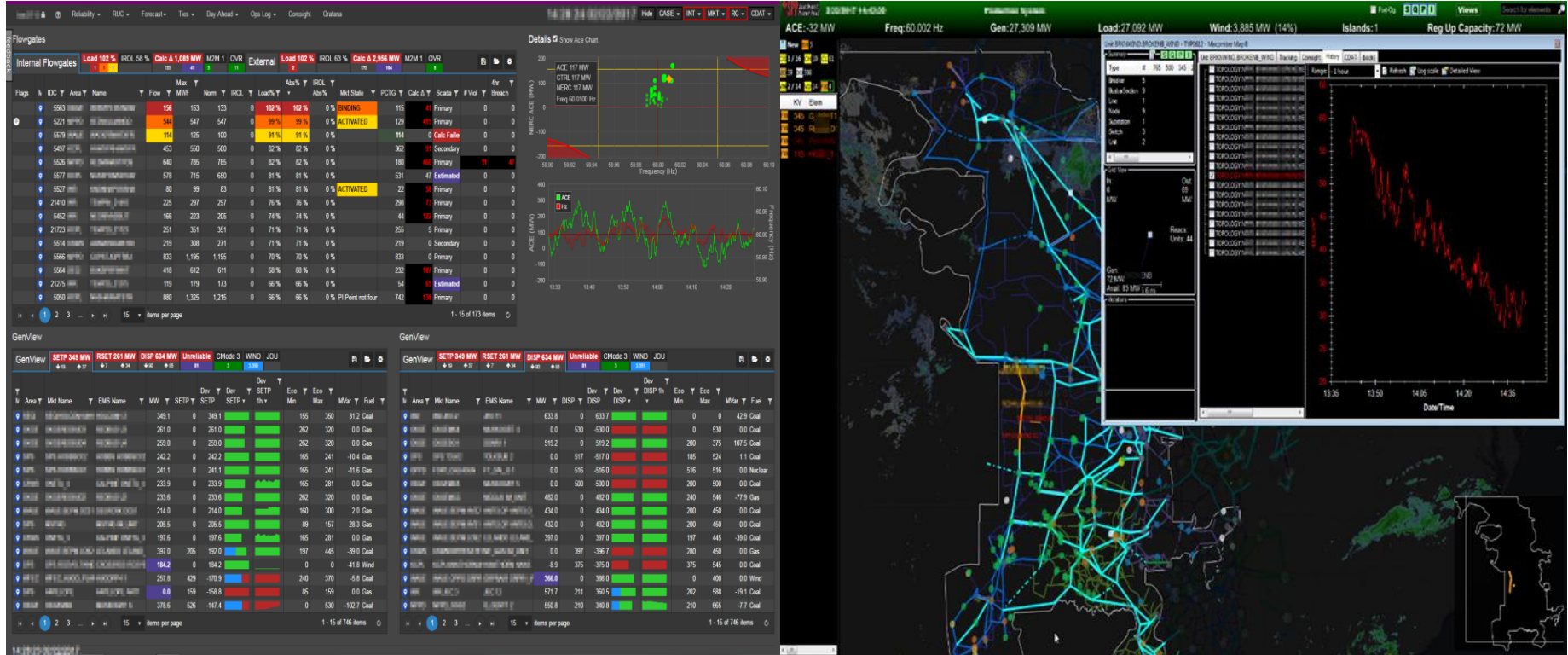
# PI Data in Real-time Displays

- Reliability and awareness
- PI tags directly reported on real-time displays
- Uses PI Analytics for calculated values
- Analytics use existing hierarchy for calculations

Ties		
General	Child Elements	Attributes
Filter		
Name	Value	
MW	-330.1279 MW	
MW_INUSECALC	-331.5974 MW	
SEMW	-349.6807 MW	
SUM_INTEGRATED_IMWH	-0.5212362 MW	
SUM_INTEGRATED_XMWH	0.2147445 MW	



# PI Data in Real-time Displays (cont.)



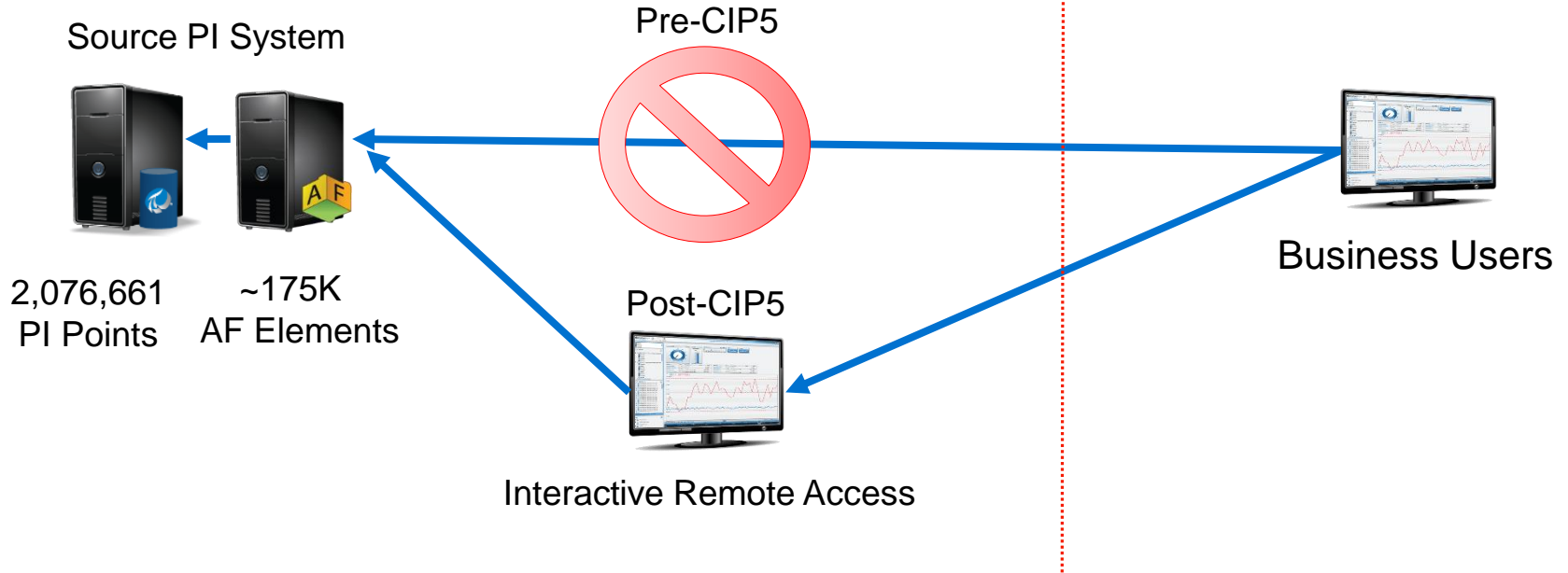
# Challenge – Business Users Need the Data

## Working with NERC: Critical Infrastructure Protection

**Operations**

**Corporate**

(Electronic Security Perimeter)

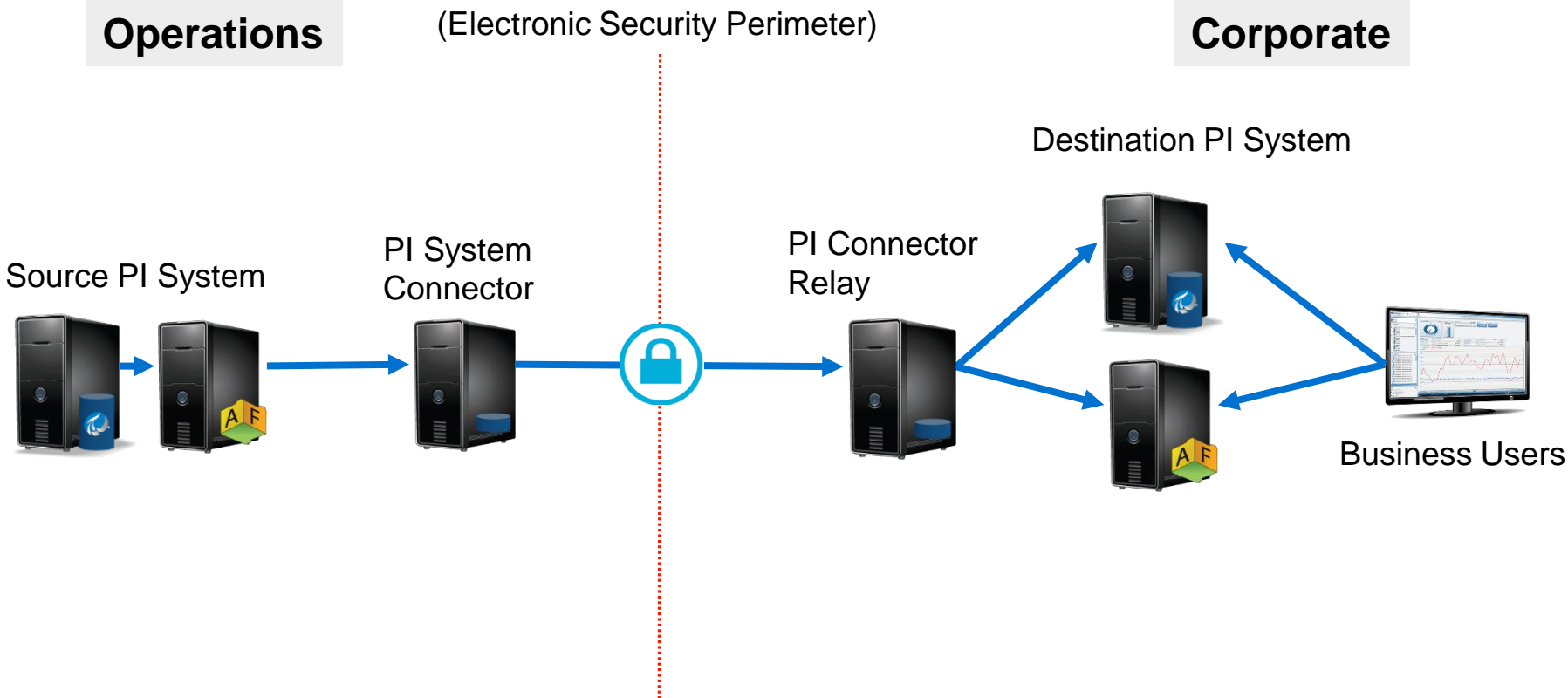


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# Solution – Replicate PI Servers with PI System Connector



# After-the-fact Analysis in the Corporate Environment





# Evolution of the PI System

# 2





# Current Focus: Evolution of the PI System

## Expand



Increase the **volume & velocity** of operations data

## Extend



Associate **quality** information with measured values

## Ease



PI system tools designed to work across the enterprise

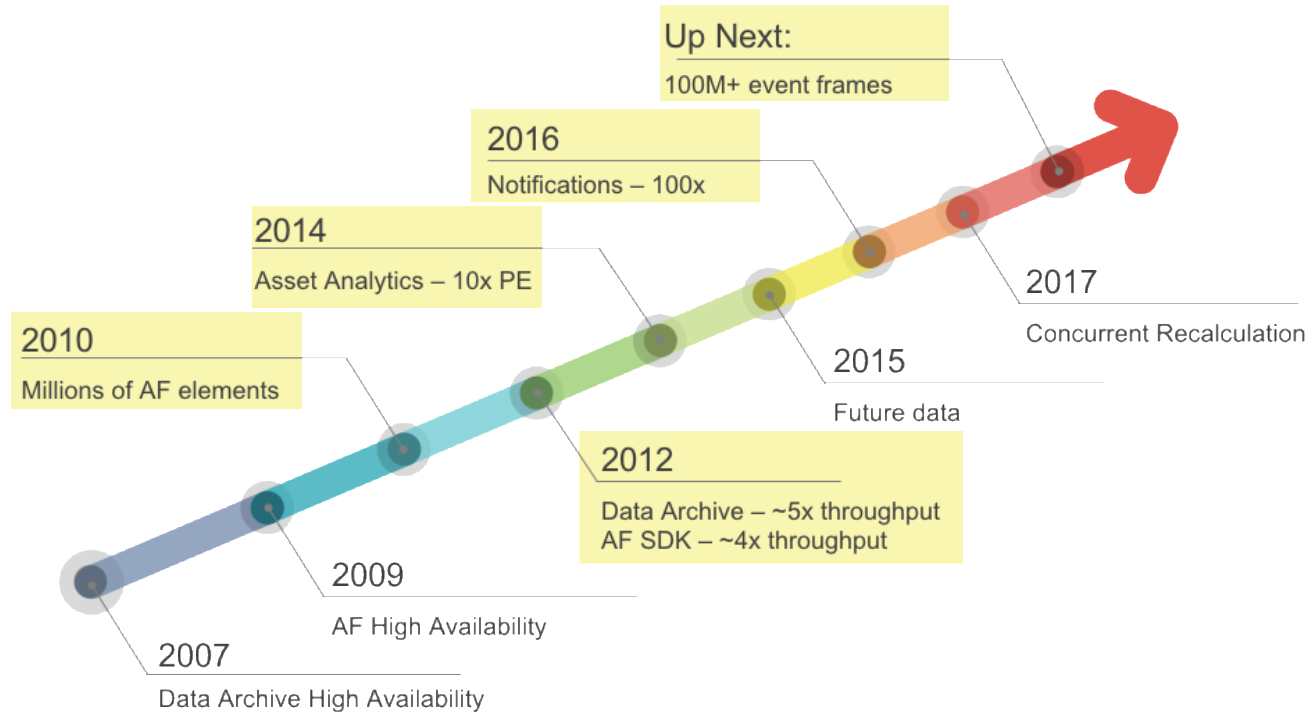


# Expand the PI System: Performance and Scalability

Expand



Increase the **volume & velocity** of operations data



# Extend the PI System: Data Quality

## Extend



Associate **quality** information with measured values

### Data Collection



Collect quality information from source systems

### Storage



Natively associate quality information with data

### Asset Analytics



Calculations take into account quality of inputs

### Developer Technologies



Ingress and egress of data with quality via programmatic means

### Visualization



Display data with quality information

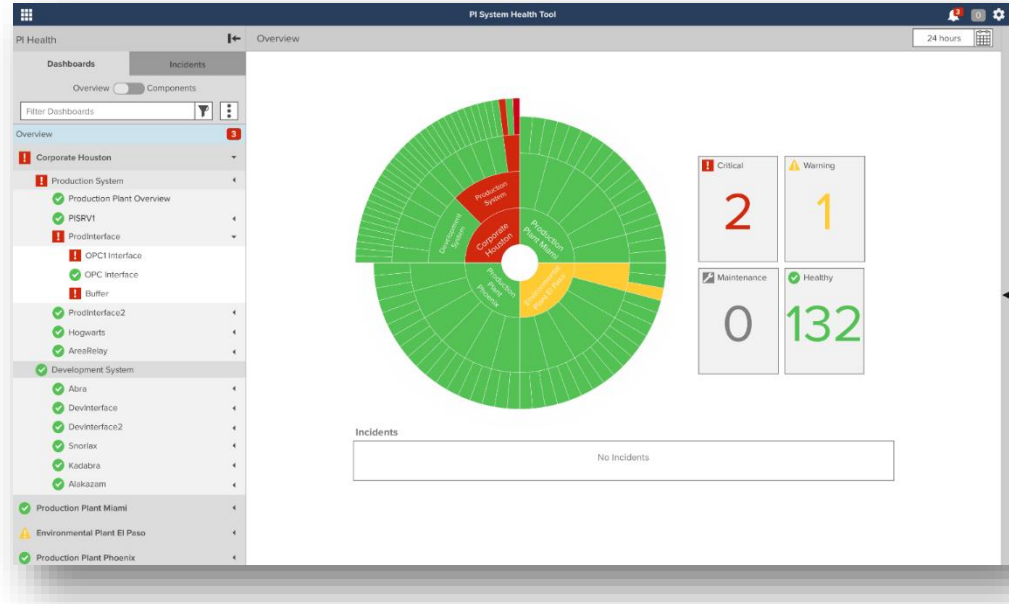


# Ease of Use with the PI System: Management and Administration

Ease



PI system tools  
designed to work  
across the enterprise



# Featuring PI Notifications 2016 R2



**Brian Caserta**  
*Programmer Analyst*



**Keith Ward**  
*Senior Staff Engineer*



**Don Morrison**  
*Real Time Data Engineer*



**Brian Faivre**  
*Brewmaster, Operations*  
**Tim Alexander**  
*Assistant Brewmaster,  
Engineering & Technology*



# Our model has succeeded in each generation of technology

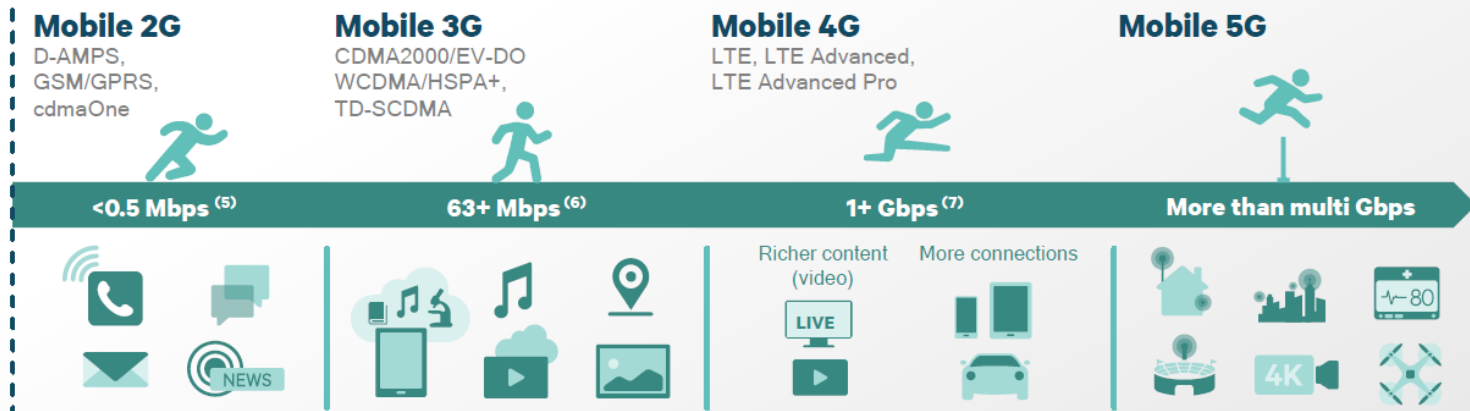
## Technology complexity is accelerating—we solve complex problems for the industry

Mobile everywhere

~7.3B

Global cellular connections\*

\*GSMA Intelligence, Jan. '16



### Why we win

#### Scale, reach and technology/IP powerhouse

**~119,000**  
Total worldwide patents<sup>^</sup>

**295+** 3G licensees<sup>^</sup>  
**170+** single-mode 4G only licensees<sup>^</sup>

**~1.56B 3G/4G**  
Est. global devices shipped in CY2015 <sup>\*\*</sup>(4)

**932M**  
MSM chipsets shipped in FY2015

#### Technology leadership<sup>\*\*\*</sup>



**#1 in RF**



**#1 in 3G/4G LTE modem**



**#1 in smartphone apps processor/SoC**

(4), (5), (6) and (7) See footnotes included in the appendix section at the end of the presentation

<sup>^</sup>Source: Qualcomm Incorporated granted and pending patents as of Jan. '16; licensee count as of Jan. '16

<sup>\*\*</sup> Guidance as of Jan. 27, 2016.

<sup>\*\*\*</sup>Sources: IHS, Jan. '16 (RF); Strategy Analytics, Dec. '15 (modem, AP)



# A Little Background on Our Use of PI



Monitor 80 Datacenters worldwide

- Buildings
- Over 500+ Labs, Server Rooms and Communications Closets
- 3 Co-gens

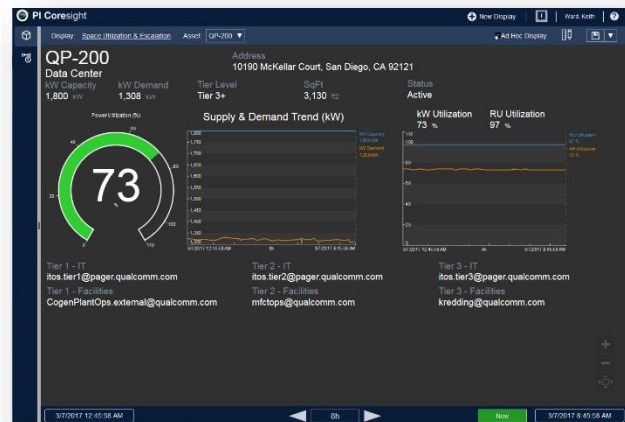


Leverage Coresight for Health of Datacenters



**OSI**soft.

- 80K PI points soon to be 100K
- 10K + elements
- 574 templates
- 13K + notification rules
- 20K analyses

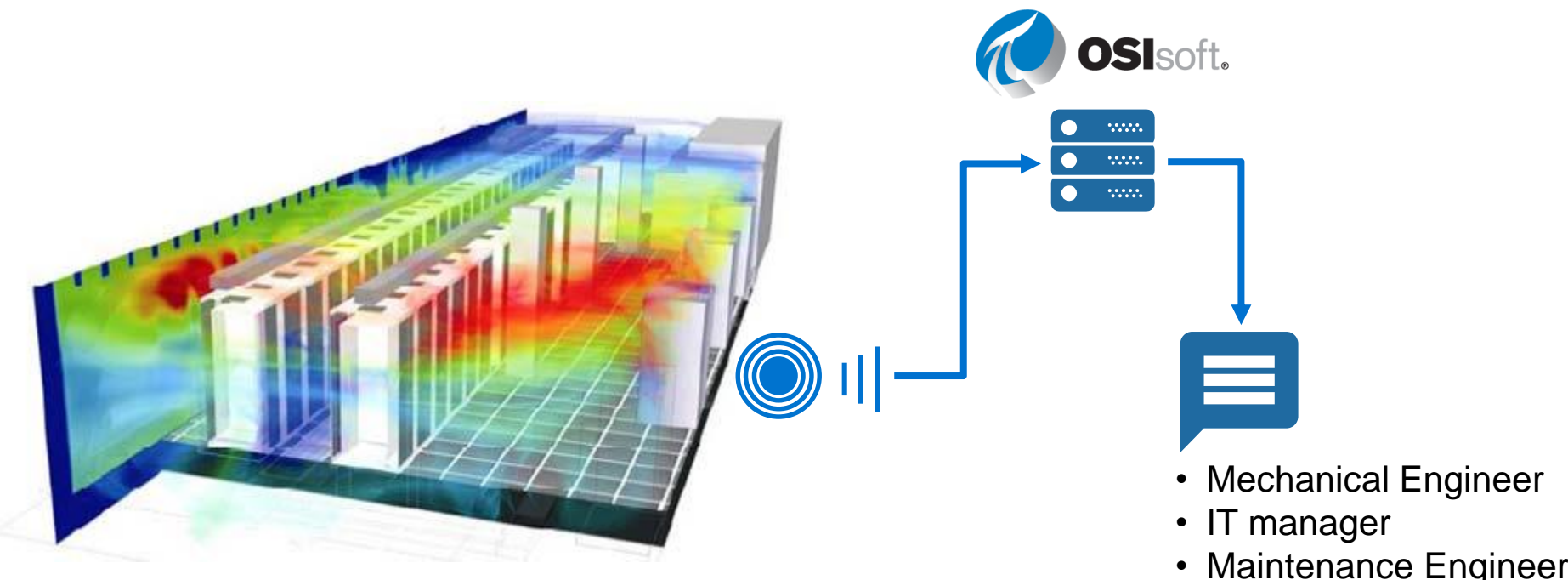


OSIsoft.

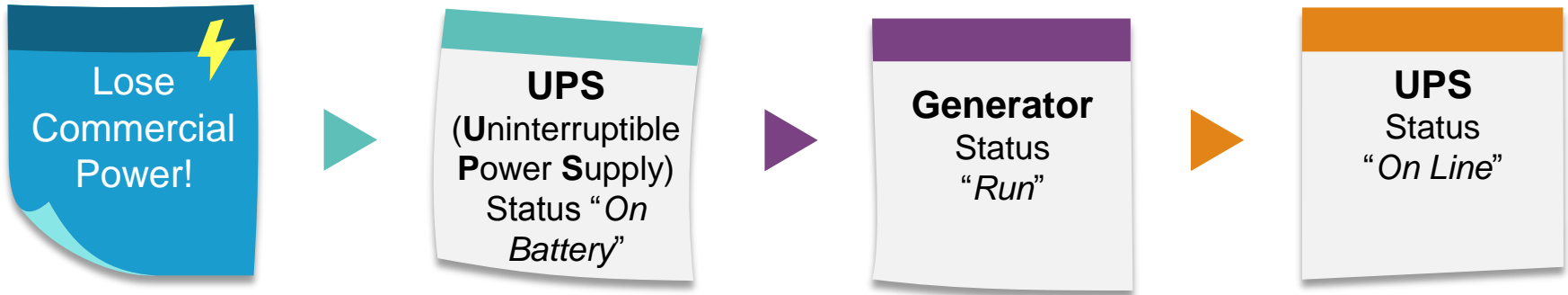
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# Managing Temperature to Avoid Downtime

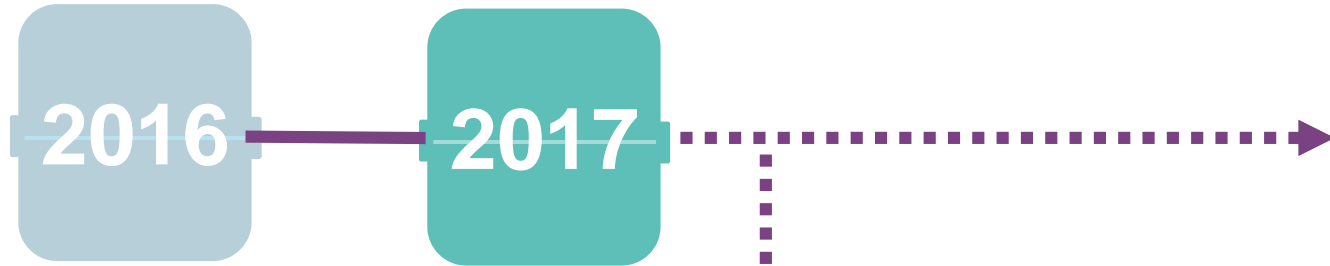


# Aggregating Notifications Helps Manage the Business



- Ensures system is self-healing as designed
- Identify breaks in the process, and a course of action
- User is often not on site, sequence or missing notifications signal an issue

# Future Opportunities



- Investigating the use of Redfish Connector
- Discovering new use cases and areas to improve performance and save costs every week!



# 3

## Visualizing Operations Data

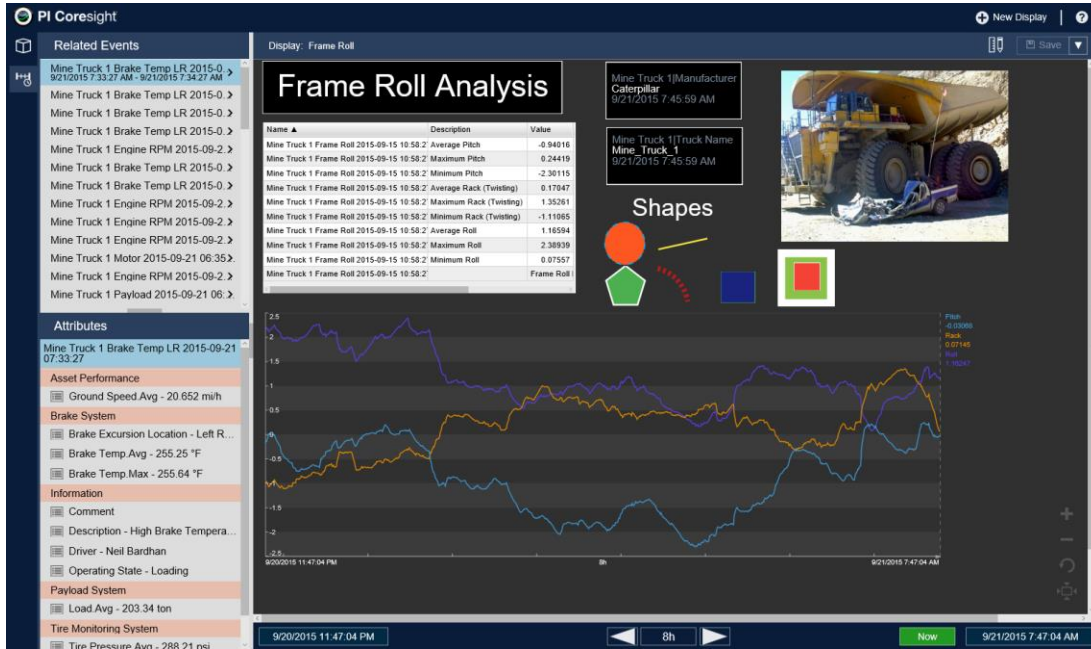


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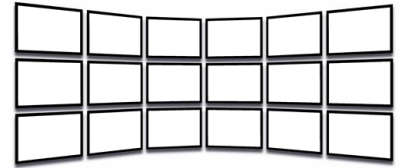
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# Next Generation Integrated Visualization

Process monitoring | Ad-hoc analytics | Dashboards | Data entry



## Anywhere



Time series | Events | Assets | Analytics | Notifications

# One Vision:

A unified visualization infrastructure to support your needs across the enterprise in a seamless, powerful, extensible environment.





# PI Vision Roadmap

2016

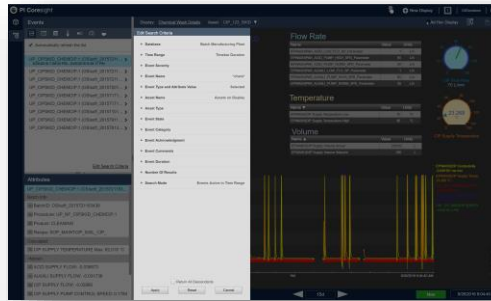
- **New Display Editor**
- Monitoring
- Phone / Tablet
- Event Details
- PB Viewer
- Ad Hoc Analysis / Event Comparison

2016 R2

- **Event Search**
- Trend Configuration
- Event Details
- Adhoc Analysis / Event Comparison
- Event Detail (phone)

2017

- **Collections**
- Events Table
- Graphic Library
- Pinned Events
- Scatter Plot
- Drill-in Navigation



# PI Vision 2017

## Drill-in Navigation

Mine Truck Landing Page

Mine Truck 2 Overview

Manufacturer	Type	Driver	Ground Speed
Volvo	V90	Tommy TooFast	0 mph
Route B	Running	Operation State	Load 0 ton

## Collections

Model PizzaStar Speed

Model Jcar SuperVan Speed

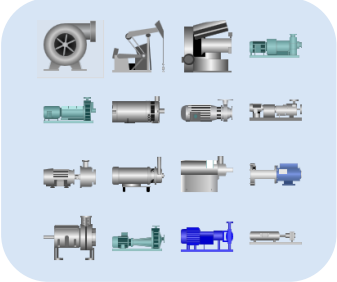
Model StoreRunner Speed

## Pinned Events

Search Results

- OSisoft\_201581181621 (CLEANING)
- OSisoft\_2015810231135 (CLEANING)
- OSisoft\_201581202655 (CLEANING)
- OSisoft\_2015810232451 (CLEANING)
- OSisoft\_20158519028 (CLEANING)
- OSisoft\_201585185135 (CLEANING)
- OSisoft\_2015853150 (CLEANING)
- OSisoft\_201584104839 (CLEANING)
- OSisoft\_201584103941 (CLEANING)

## Graphic Library



## Events Table

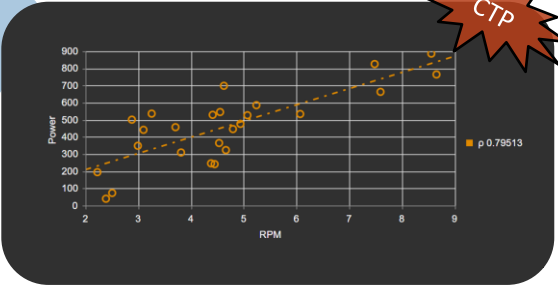
CTP

Start Time	End Time	Acknowledgment
2017-01-26 08:21:43.000	2017-01-26 07:14:43.000	Acknowledge
2017-01-26 07:23:43.000	2017-01-26 07:34:13.000	Acknowledged
2017-01-26 08:25:13.000	2017-01-26 08:25:13.000	Acknowledged
2017-01-26 08:29:43.000	2017-01-26 8:57:13.000	Acknowledge

## Asset Comparison Table

Asset	Manufacturer	Driver	Engine RPM	Load	Status
Mine Truck 1	Caterpillar	Jason Rice	0	0	Running
Mine Truck 2	Volvo	Tommy TooFast	0	0	Running
Mine Truck 3	Komatsu	Edna Thompson	1,682.6	159.87	Running
Mine Truck 4	Caterpillar	Revill Swivel	0	0	Running
Mine Truck 5	Volvo	John Sintias	0	0	Running
Mine Truck 6	Komatsu	Steve Kwan	1,744.9	194.14	Running
Mine Truck 7	Volvo	Brian Bostwick	0	0	Running
Mine Truck 8	Caterpillar	Steve Kia	0	0	Running
Mine Truck 9	Caterpillar	Justin Brown	0	0	Running
Mine Truck 10	Volvo	Bob Bonkers	1,719.7	157.74	Running

## XY Plot



# 4

## Fleet-Wide Operations Questions



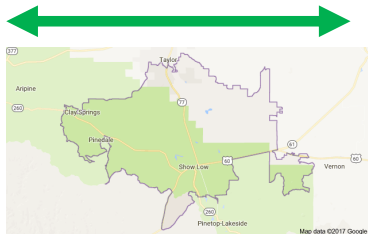
# What is a Deep Query vs. a Wide Query?

## Deep Query



For meter at 123 Washington St, which days in the last 20 years had missing readings?

## Wide Query



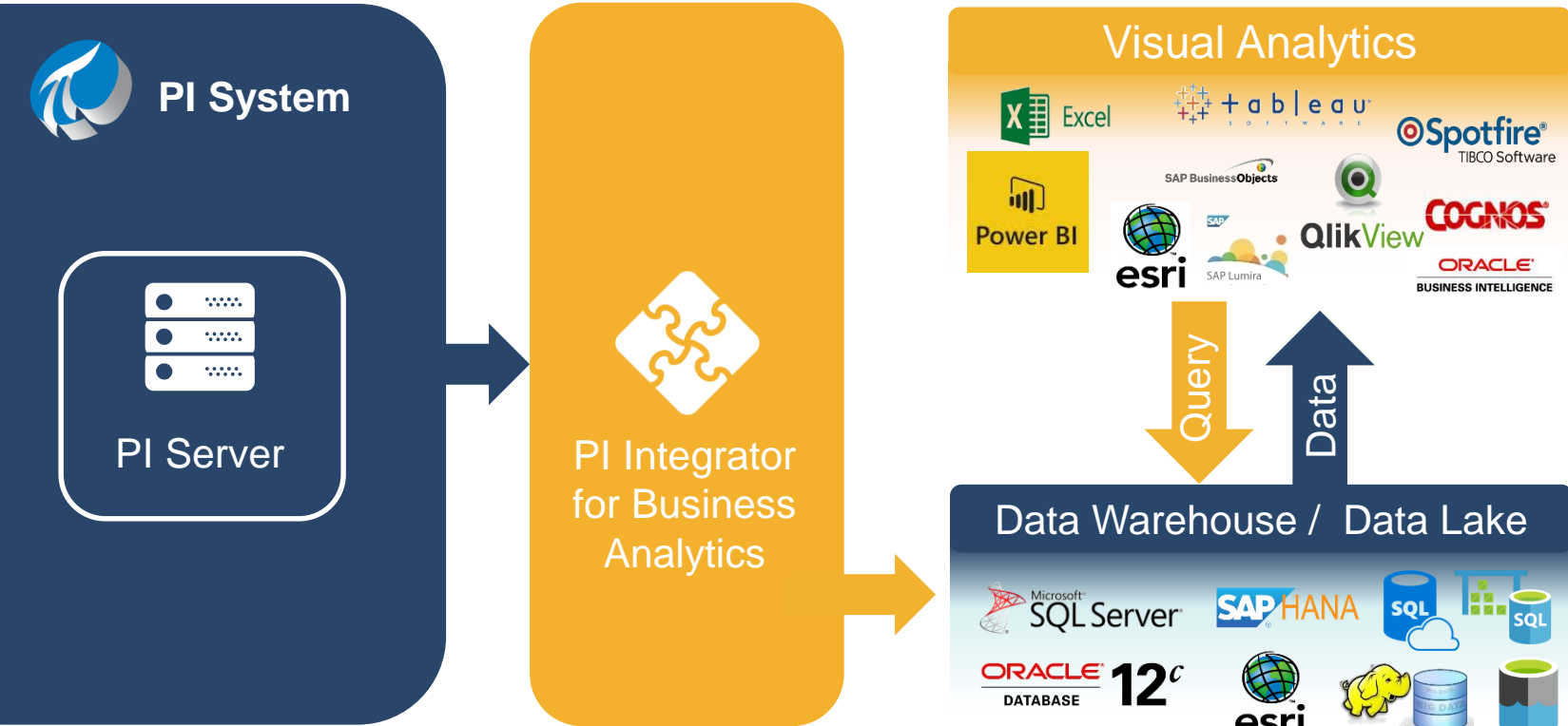
Which meters in zip code 85901 had missing readings yesterday?

# How does a Wide Query Help Me?

- Fleet asset performance
- Pattern Searches
- Aggregates across assets
- Performance diagnosis
- Asset maintenance diagnosis



# You Can Do This Today Using PI + Integrators



# Advanced Integrations – Supported Systems

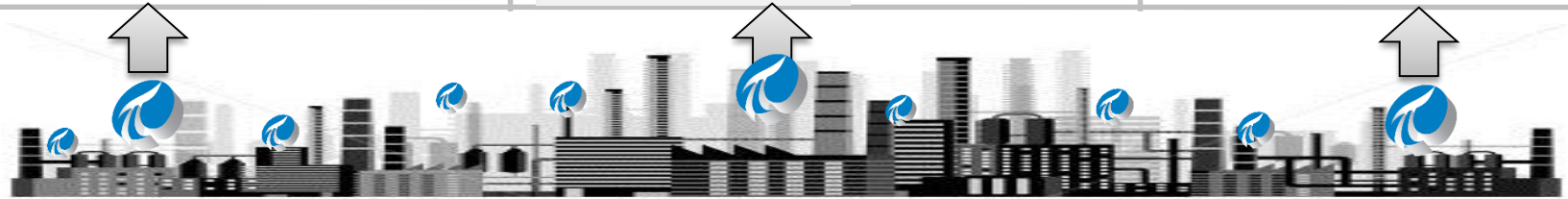
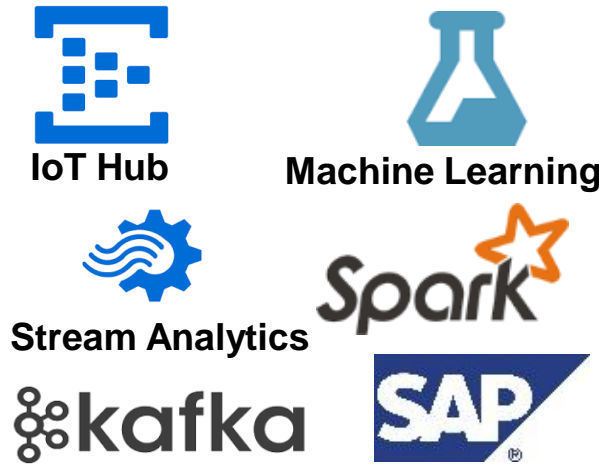
## Visual Analytics



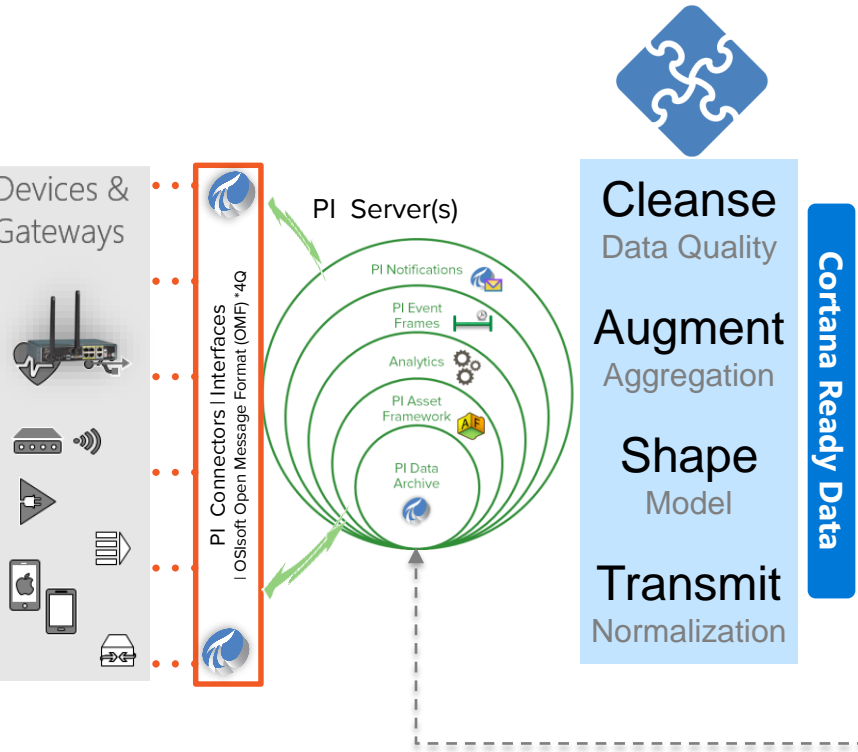
## Data Warehouse / Data Lake



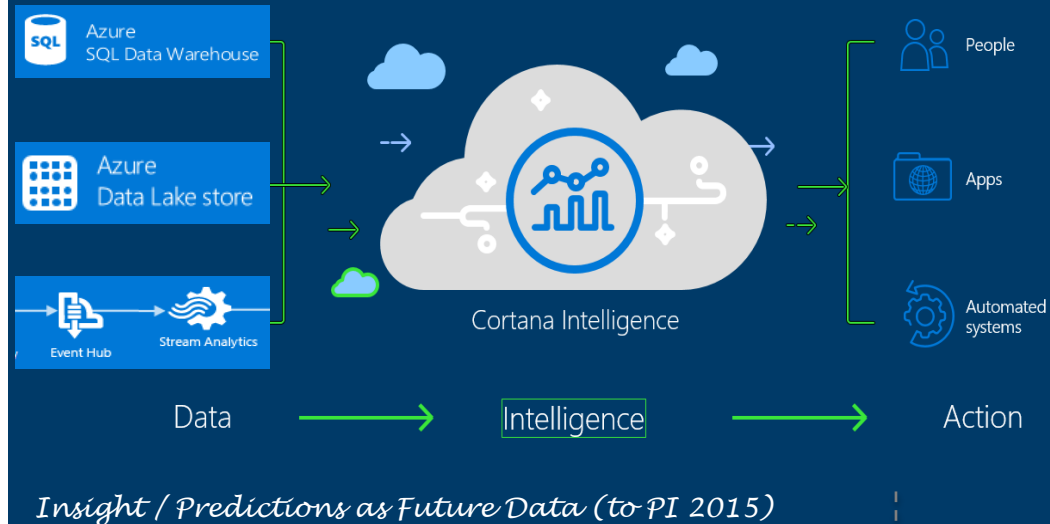
## Streaming Analytics – 2017



# PI Integrator for Microsoft Azure



# Cortana Intelligence





# Featuring PI Integrator for Microsoft Azure



**Brian Caserta**  
*Programmer Analyst*



**Keith Ward**  
*Senior Staff Engineer*



**Don Morrison**  
*Real Time Data Engineer*

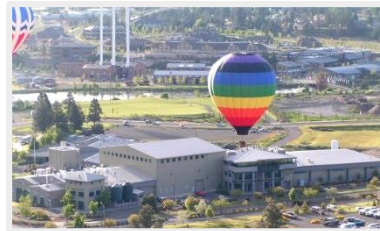


**Brian Faivre**  
*Brewmaster, Operations*  
**Tim Alexander**  
*Assistant Brewmaster,  
Engineering & Technology*

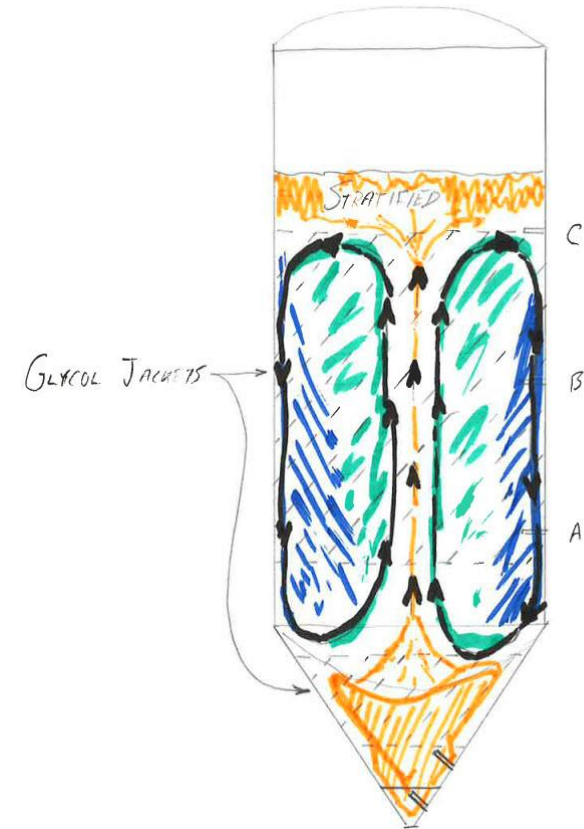
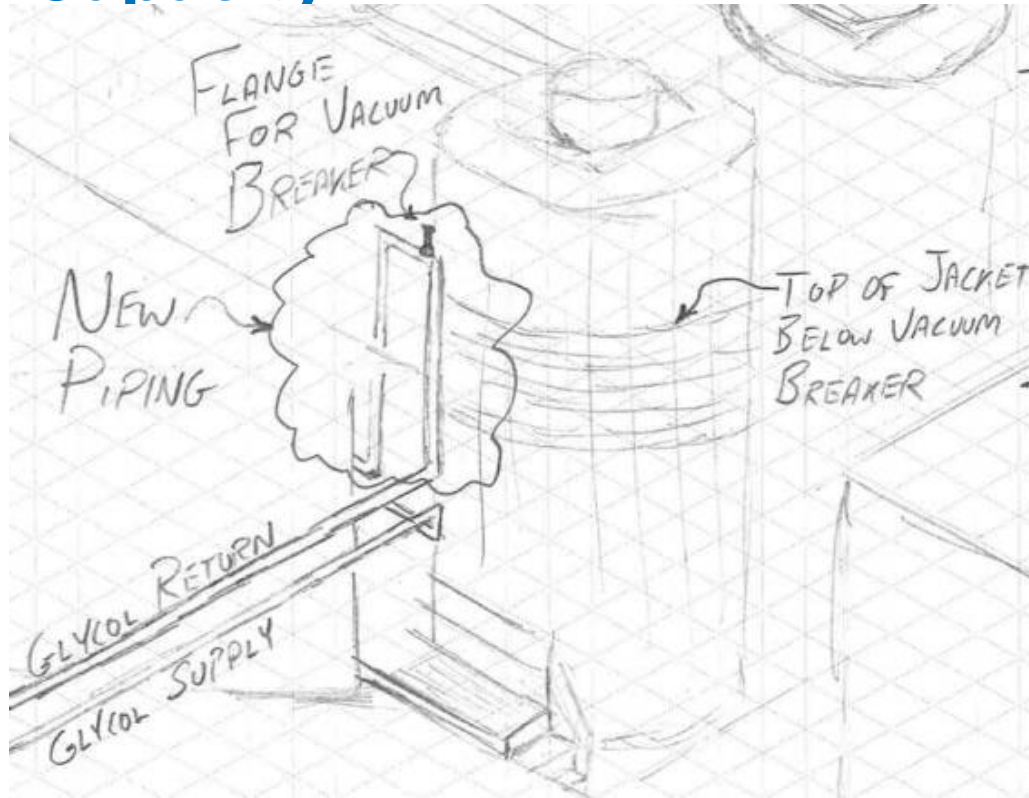




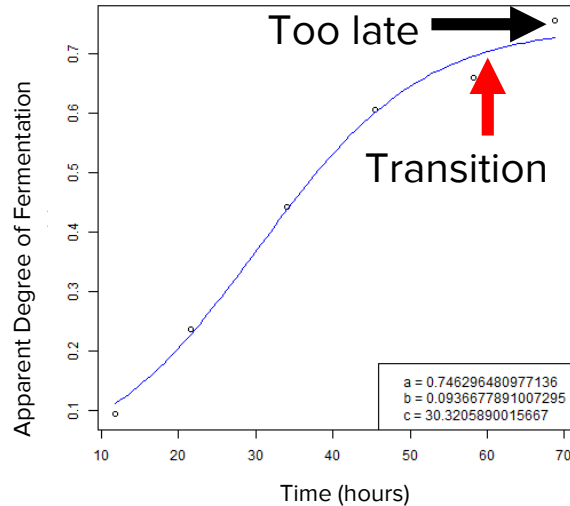
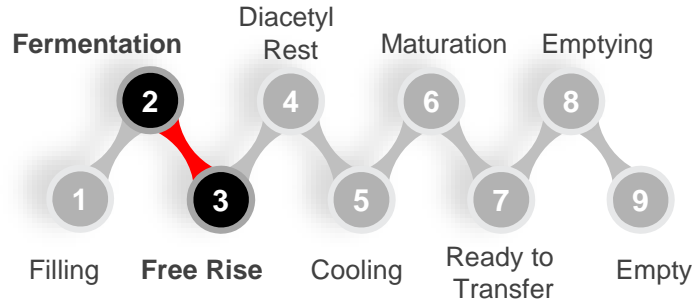
- Located in Bend, OR
- Founded in 1988
- Pub opened in Portland, OR in 2007
- 2 brewhouses
- 50+ vessels
- Bottling and kegging
- 7<sup>th</sup> largest US craft brewer



# Continually Improving Quality & Production Capacity



# Manually Measuring Density Creates Production Delays



## Goal

- Increase production volume

## Impact

- Up to 72 hours lost in production per batch

## Challenges

- Transition occurs between measurements

## Options

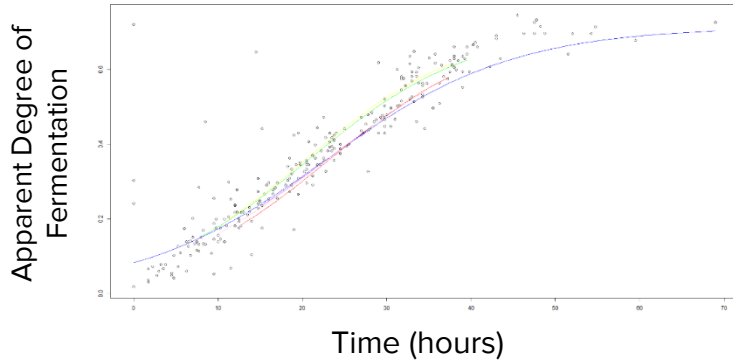
- Automate measurements: ~\$750K
- Predict transition from measurements

## Constraints

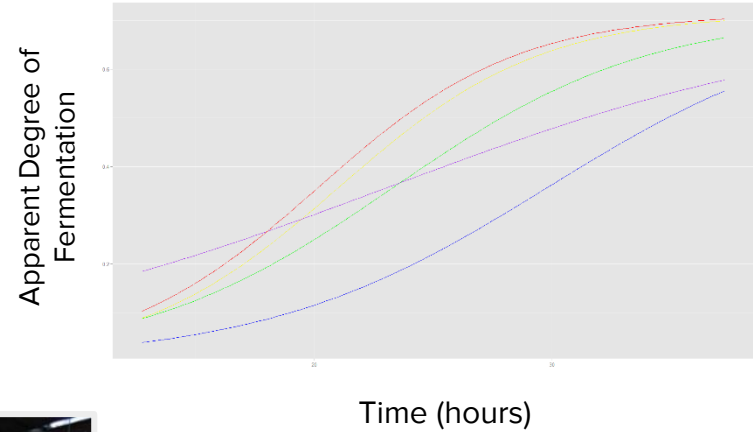
- 8-10 hours between measurements
- No large capital expenditure
- No fully-dedicated data scientists in-house

# Brand Portfolio & Facility Size Complicates Predictability

## Batch Variety



## Brand Diversity



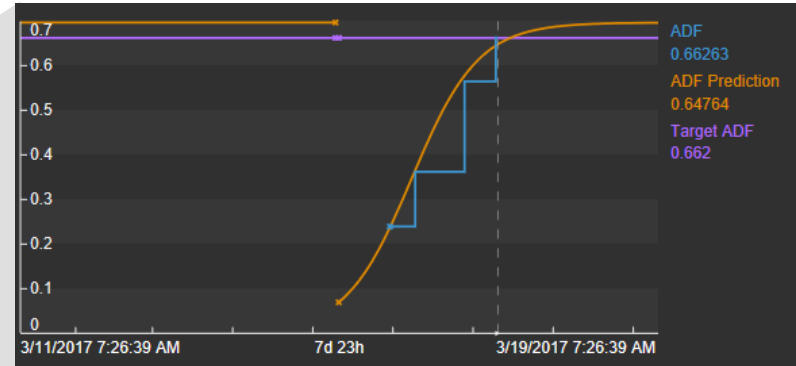
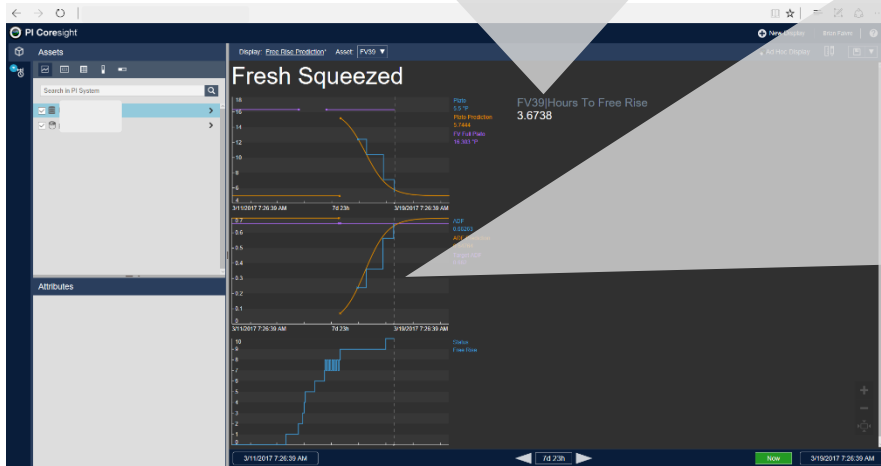
## 50+ Vessels



# Predicting the Transition is a Low-cost, Accurate Option

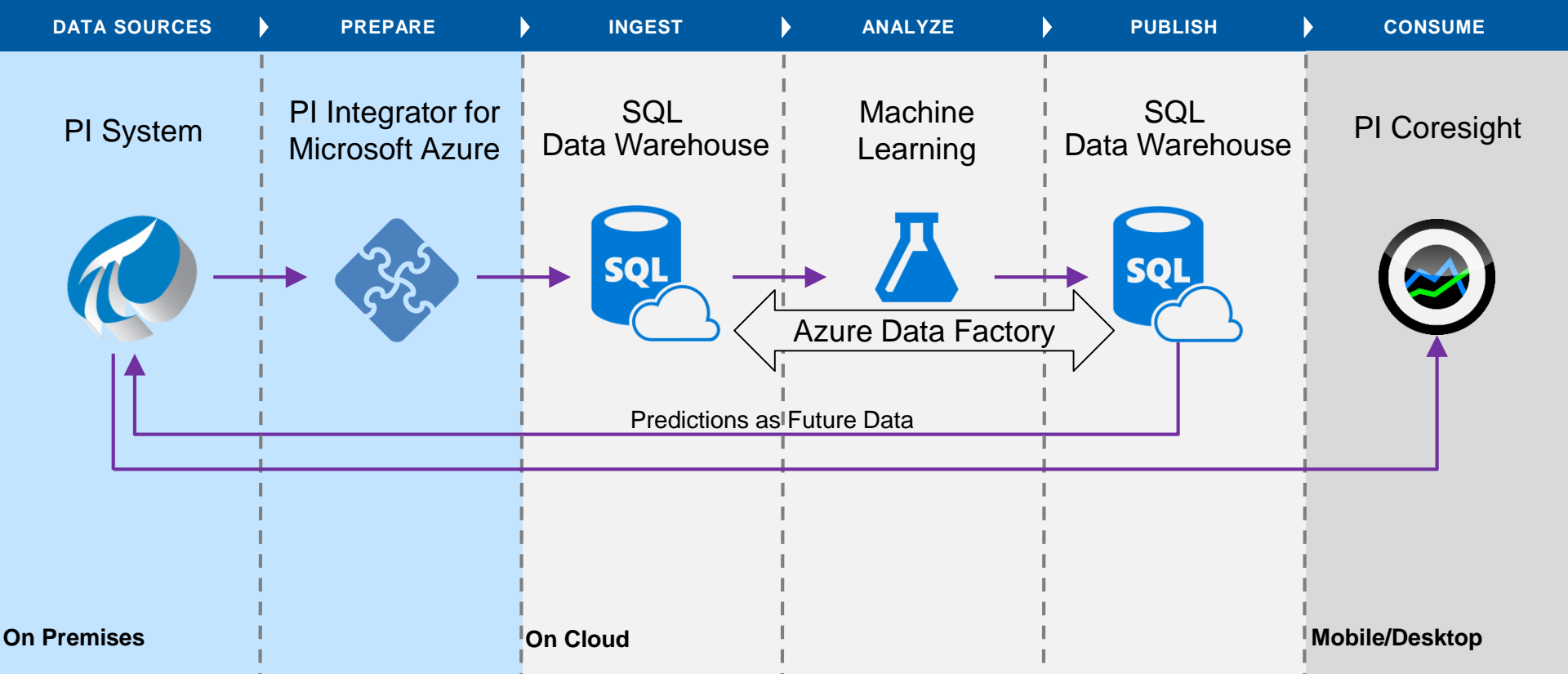
FV39|Hours To Free Rise  
3.6738

Indicate when transition happens



Use experience & predictions to ensure high quality beer

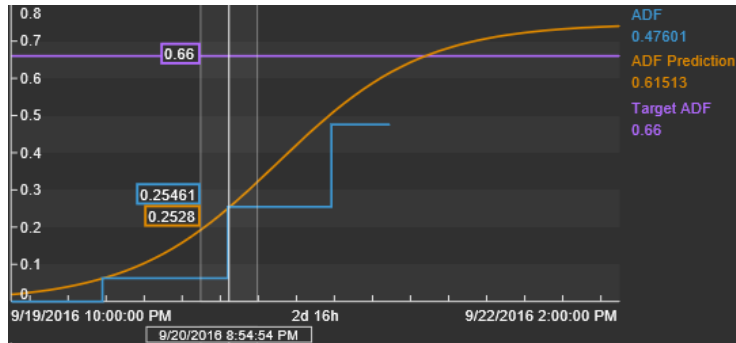
# Operationalizing Predictions with PI System and Azure



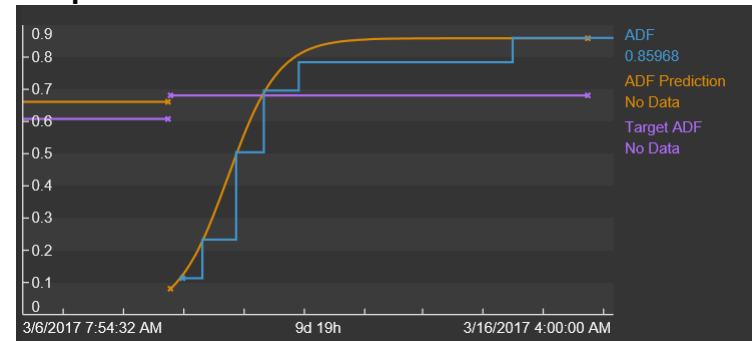


# Predicting Transitions for All Brands and All Vessels

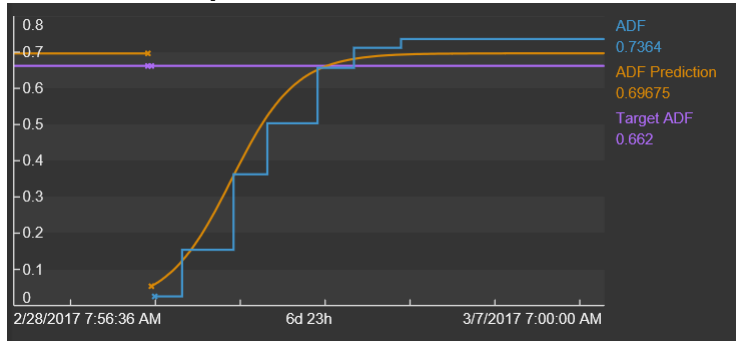
## Mirror Pond Pale Ale – Vessel 16



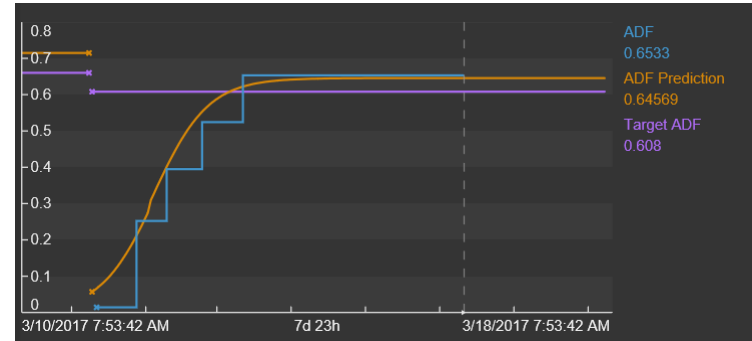
## Hop Slice Summer Ale – Vessel 27



## Fresh Squeezed IPA – Vessel 39

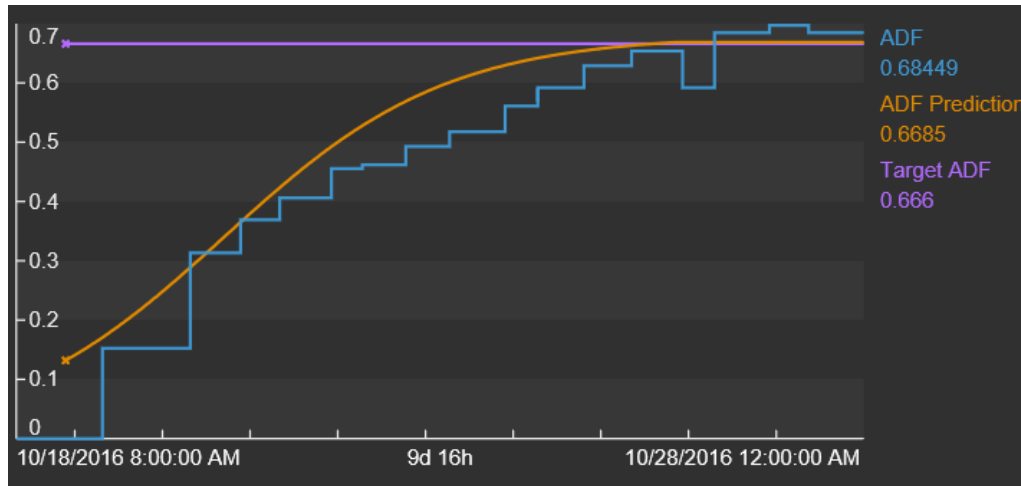


## Black Butte Porter – Vessel 45



# Detecting Early Deviations and Taking Corrective Action

## Obsidian Stout – Vessel 23



### Indications:

- Uncharacteristic fermentation

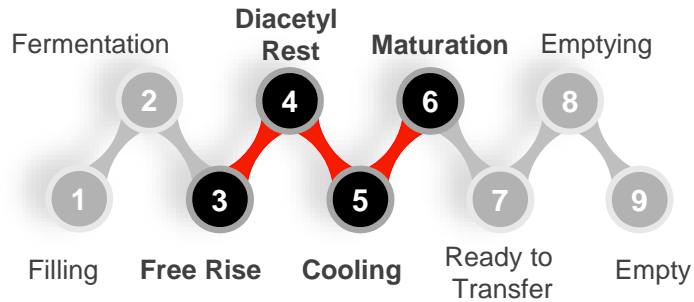
### Actions taken:

- Transition to free rise early

### Results:

- Production time reduced
- Batch saved
- Quality maintained

# Using PI System and Azure Setup for Future Projects

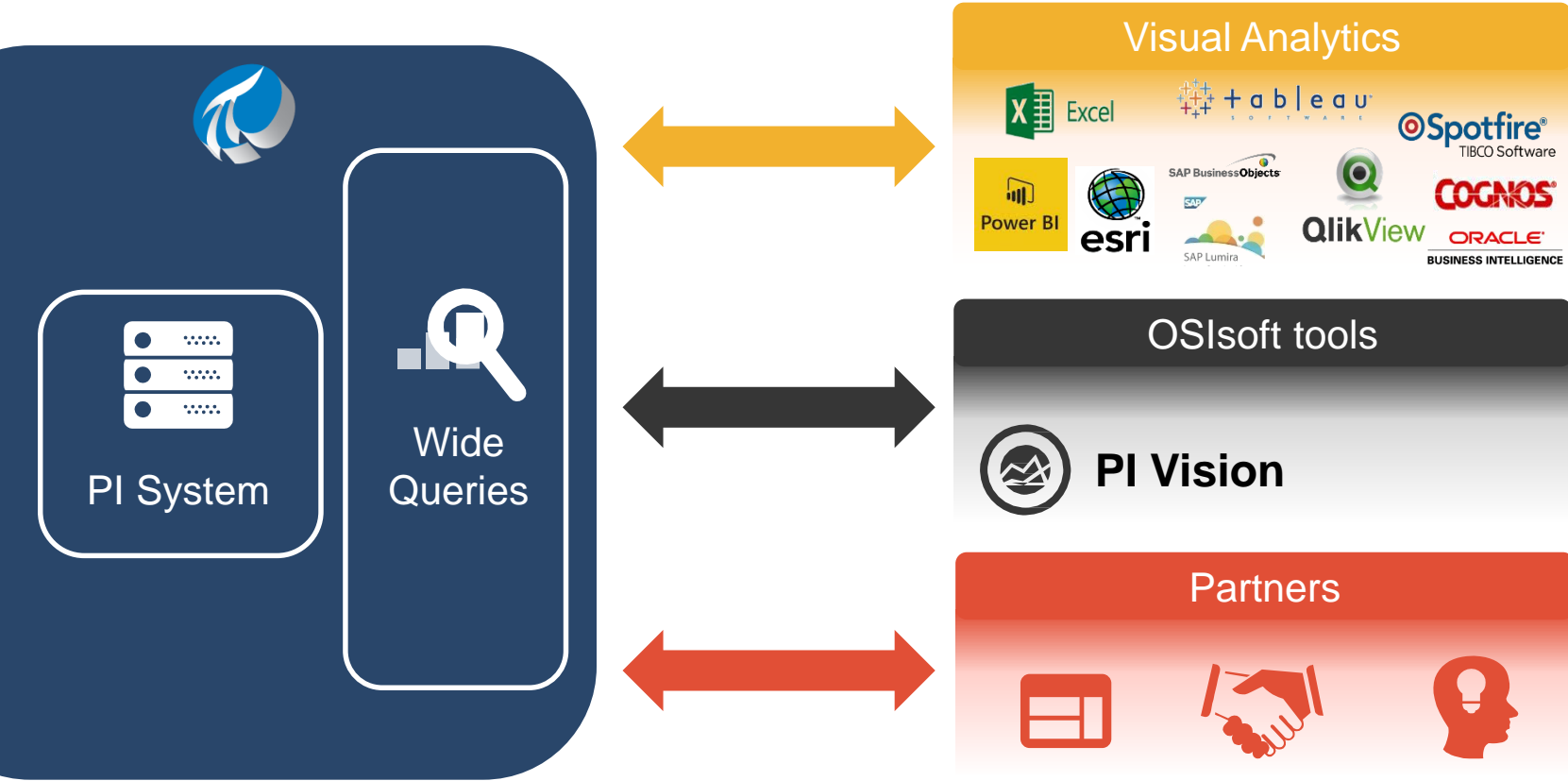


Predict other transitions  
in the brewing process

Apply predictions to *new*  
brands that enter production



# Direct Access from PI Vision, Partner Apps, and BI Tools



# Complimentary Capabilities

## Integrators

---

Blend operational data with business data for complex analyses

## Wide Queries

---

Native query surface for fleet wide questions

## APIs

---

Open APIs for custom built solutions needing to query PI



The background of the slide is an impressionist painting with vibrant, textured brushstrokes in shades of red, orange, yellow, blue, and green. A large white number '5' is positioned on the left side of a yellow horizontal band.

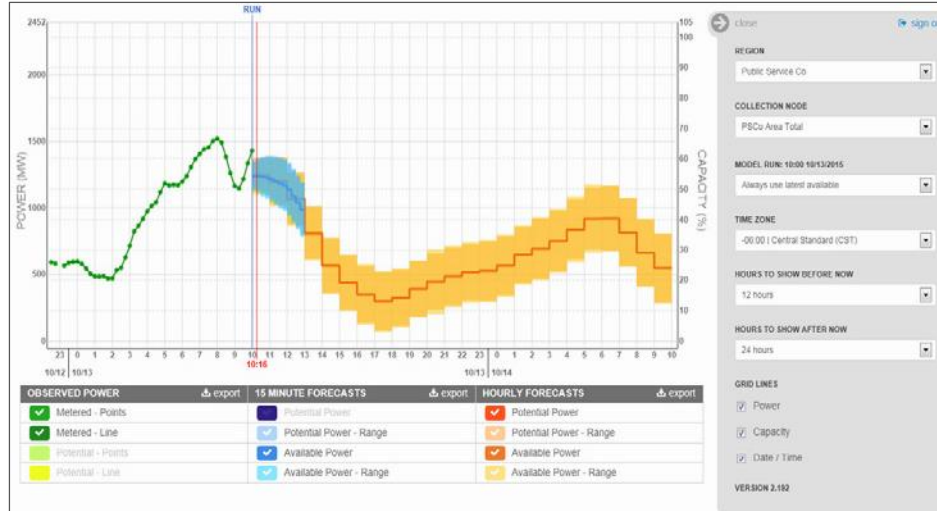
5

# Complementary Cloud Services



# Example Community: Knowledge Exchange

To improve wind forecasting, Xcel Energy “went to the experts, the National Center for Atmospheric Research



“Savings/ Efficiencies are roughly estimated Over the last six years at \$46 million.”

- Kasen Huwa,  
Senior Business Manager  
XcelEnergy



Power/ T&D

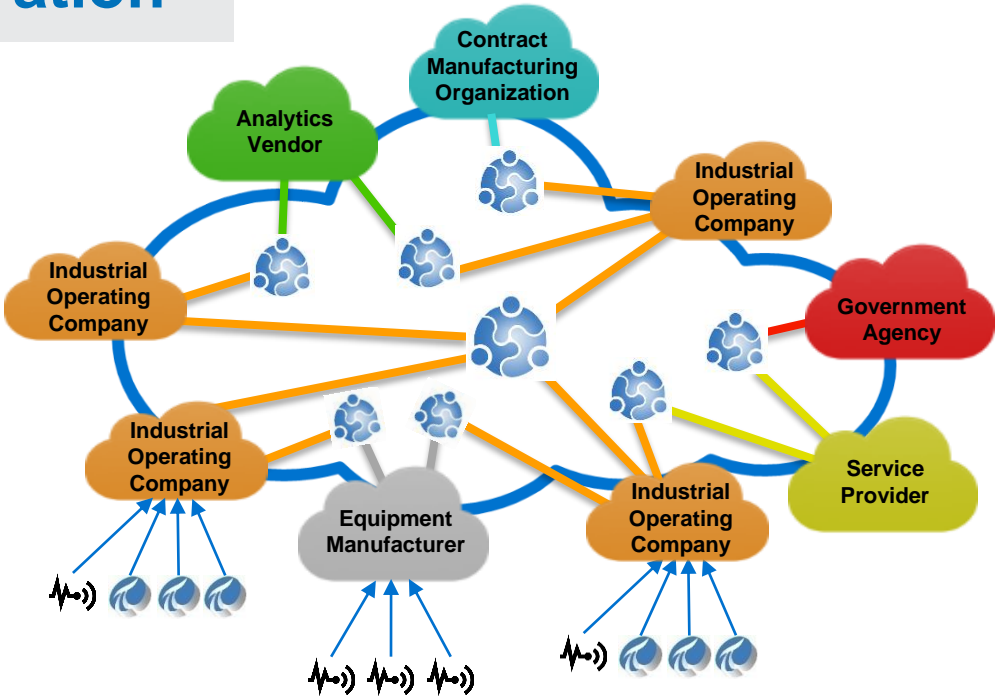
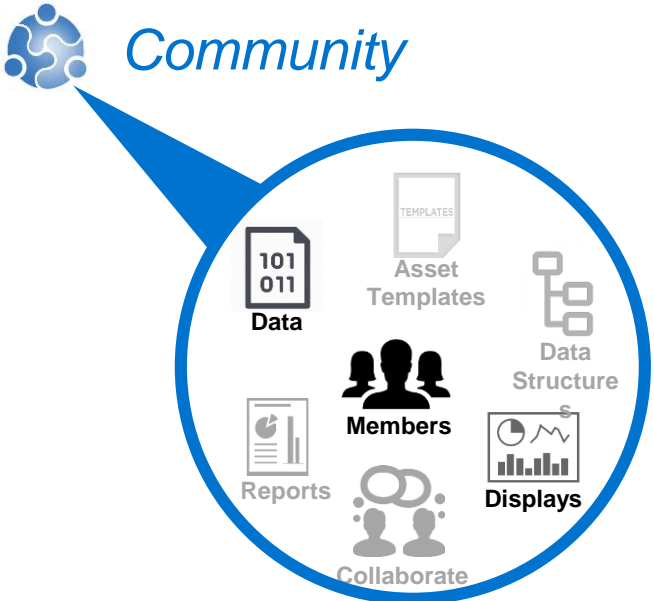
Generation

Transmission

Distribution



# An Ecosystem of Communities Enabling Sharing & Collaboration

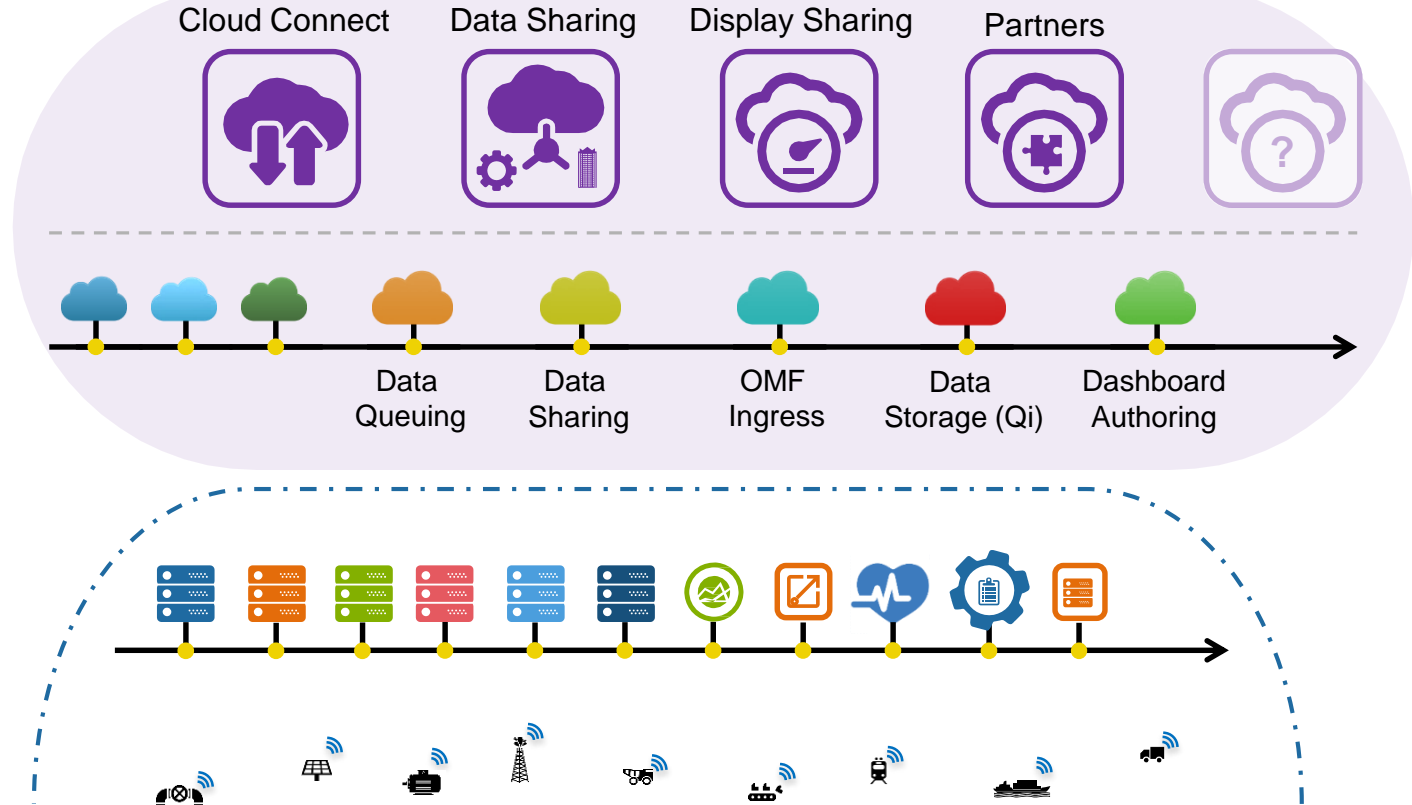


# Building complimentary capabilities

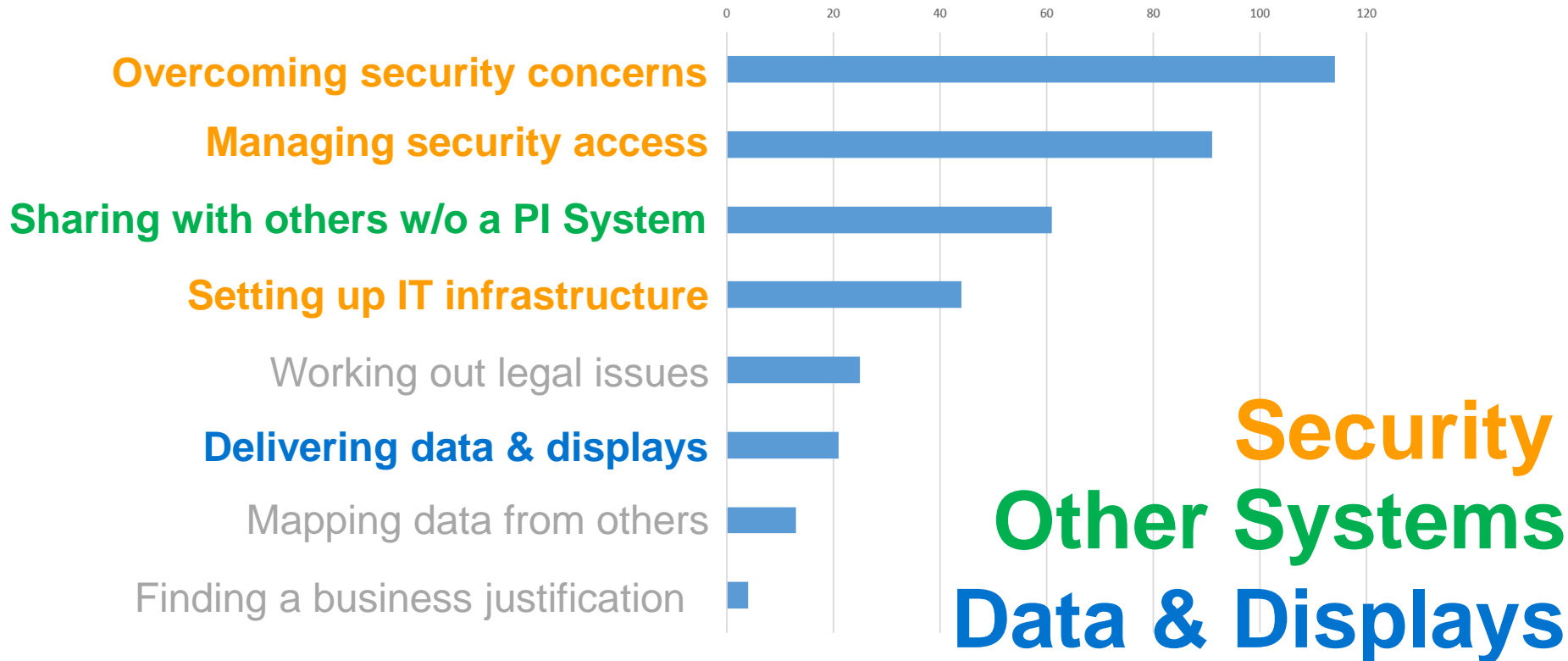
Commercial  
Cloud Services  
Offerings

Cloud Services  
Platform

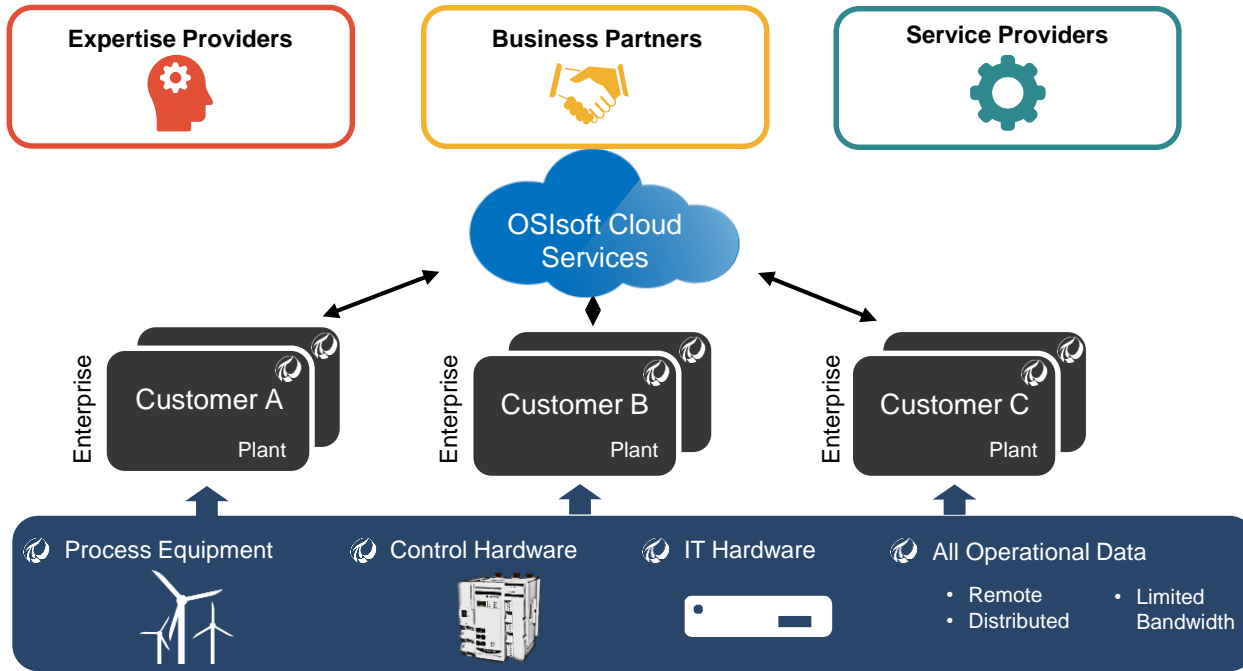
On-premises  
capabilities



# Challenges of Sharing Information with External Parties



# An Evolving Ecosystem



## Focus Areas

Display and Data Sharing

Fleet-Wide Operations Questions

PI Vision

Evolution of the PI System

Accessing all Operations Data

# Our Vision: Industrial Digital Transformation

**Assets**



**Multiple  
Sensors**

**Sites**



**Multiple  
Assets**

**Enterprise**



**Multiple  
Plants**

**Community**



**Multiple  
Enterprises**



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# Thank You

