Customer Showcases:

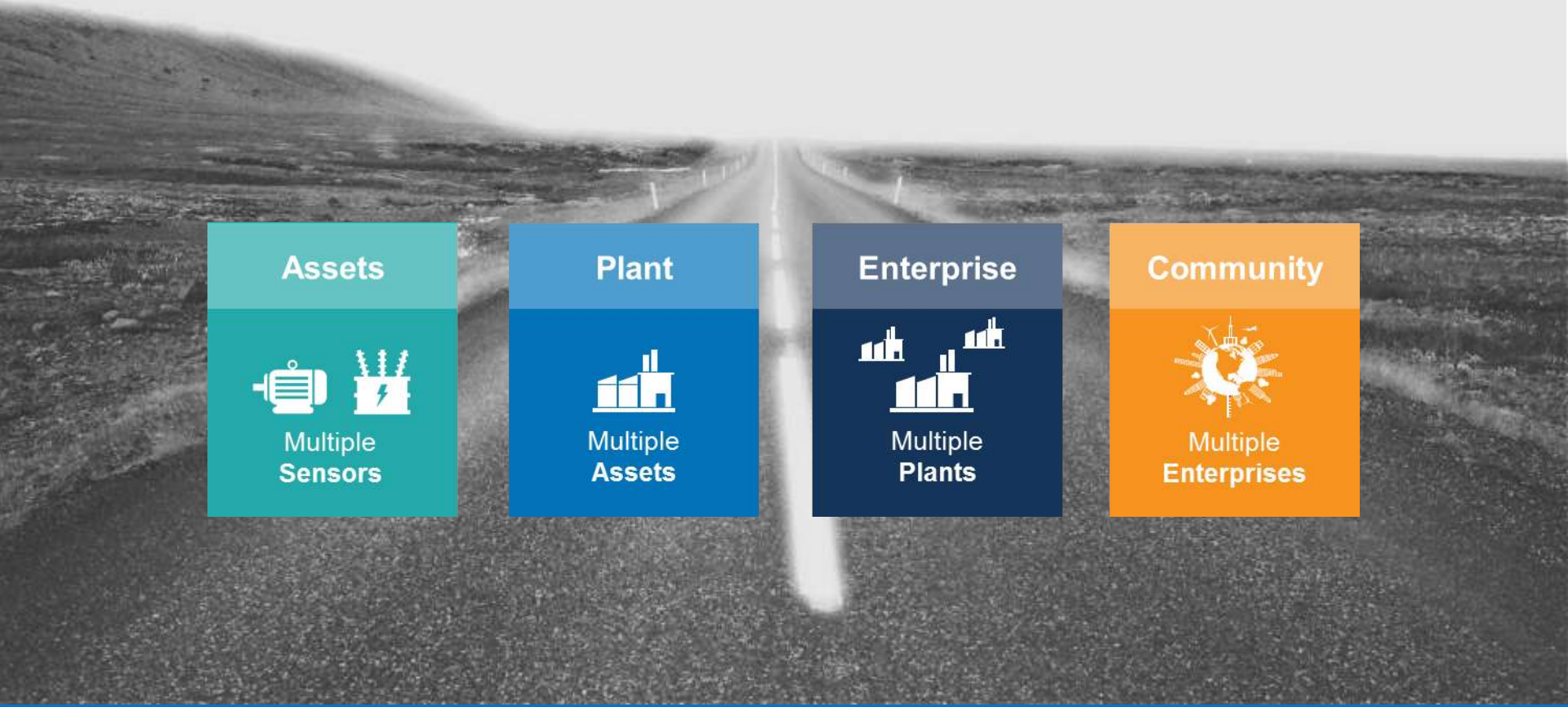
The Latest Products and Upcoming Releases

Presented by

Ray Hall, OSIsoft
Brian Caserta, Southwest Power Pool
Keith Ward, Qualcomm
Brian Faivre, Deschutes Brewery
Tim Alexander, Deschutes Brewery

Exhaustive Company Research

Our Vision: Industrial Digital Transformation



Data Infrastructure for Digital Transformation

Big Data

Analytics

Cloud

OSIsoft.

Data Infrastructure

Sensors

Devices

Assets

PI Integrator for Azure

PI Coresight 2016 R2

PI Notifications 2016 R2

PI System Connector

Customer Showcases

SPP Southwest Power Pool

Brian Caserta
Programmer Analyst

QUALCOMM

Keith Ward
Senior Staff Engineer

devon

Don Morrison
Real Time Data Engineer

DESCHUTES BREWERY

Brian Faivre
Brewmaster, Operations

Tim Alexander
Assistant Brewmaster, Engineering & Technology

Digitizing your Diverse Operations Data

Big Data

Analytics

Cloud

OSIsoft.

Data Infrastructure

PI Integrator for Azure

devon

PI Coresight 2016 R2

QUALCOMM

PI Notifications 2016 R2

Sensors

Devices

Assets

SPP Southwest Power Pool

PI System Connector

Connectivity: Over 450 Interfaces and Connectors

CONNECTOR INNOVATIONS


Time


Flexible


Metadata


Speed


Embedded


Secure

Wonderware by Schneider Electric

SIEMENS
SIMATIC PCS 7

DCSystems

CYGNET
a Weatherford Company

OPC FOUNDATION
OPC UA

PI System

EtherNet/IP

HART-IP

IPMI *UFL* *Ping*

PI System Health

IEC
60870-5-104

WITSML
NOV

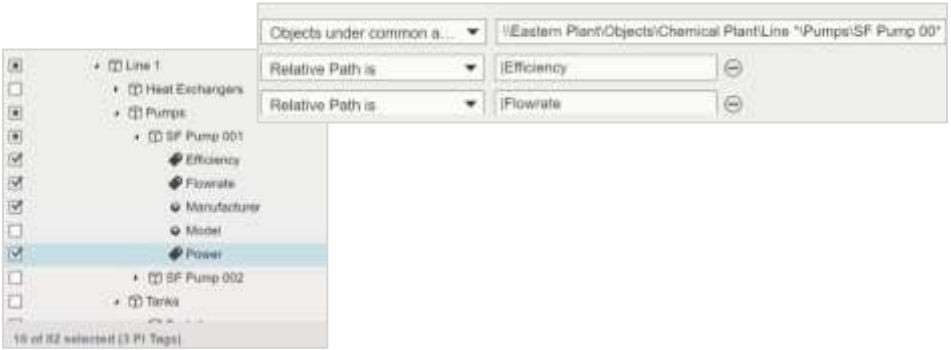
BACnet

PI Connectors: New Infrastructure

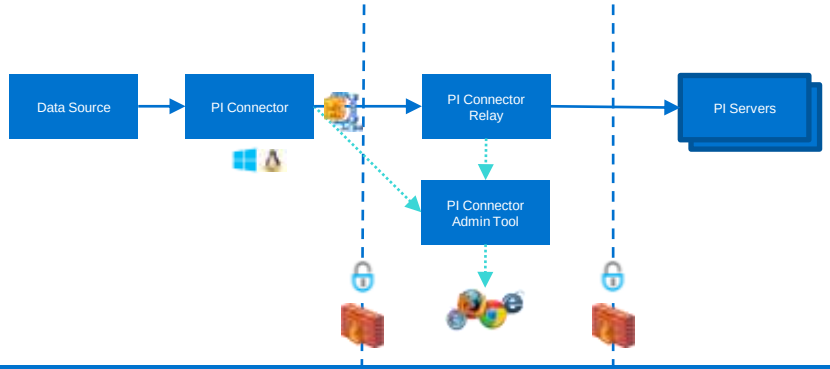
Unified user experience

Automated data discovery

Granular and rule-based data selection



New security architectures



Featuring PI System Connector

SPP Southwest Power Pool

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

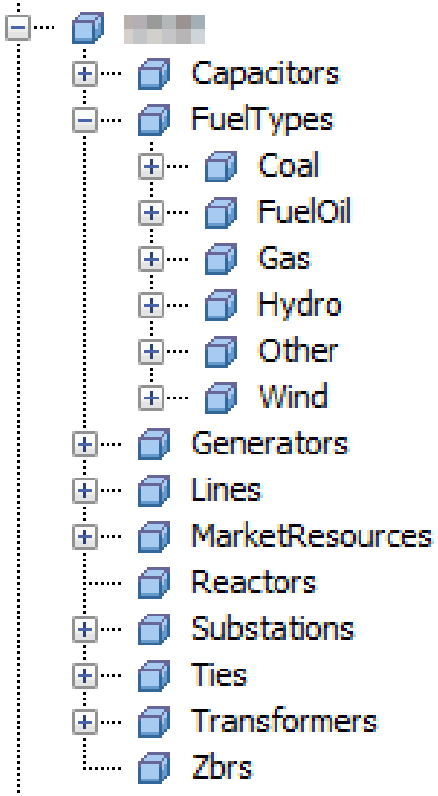
- Located in Little Rock, Arkansas
- Approx. 600 employees
- Reliability Services
- Market Systems Operation
- Transmission Planning

SPP's Operating Region

- Miles of service territory: 575,000
- Population served: 18M
- Generating Plants: 756
- Lines: 6365
- Substations: 4,940
- Miles of transmission: 60,944
  - 69 kV 13,532
  - 115 kV 14,269
  - 138 kV 9,117
  - 161 kV 5,647
  - 230 kV 7,608
  - 345 kV 10,772
- Regional Transmission Organization
- North American Electric Reliability Corporation

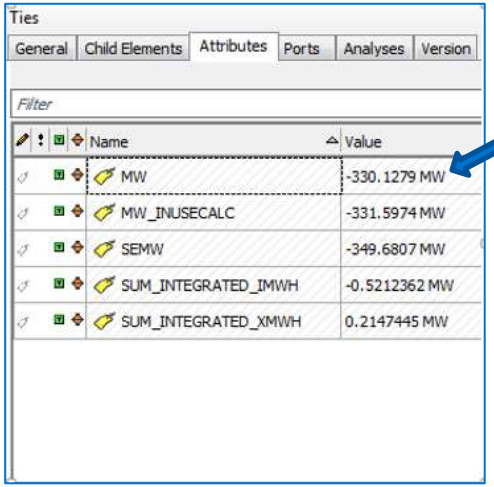
Asset Framework at SPP

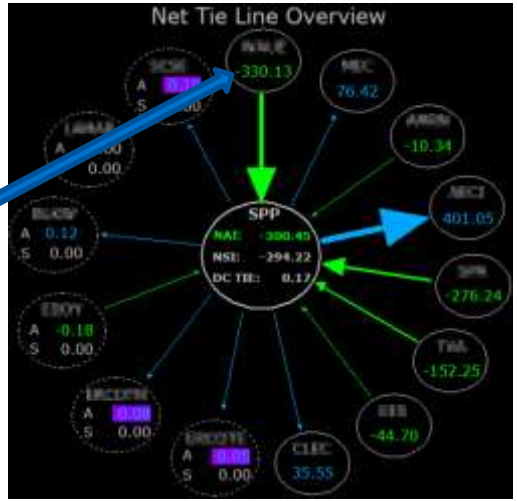
- Tag creation is based on templates
- Monthly process with custom plug-ins
- Limited set of real-time model changes based on changes to network topology



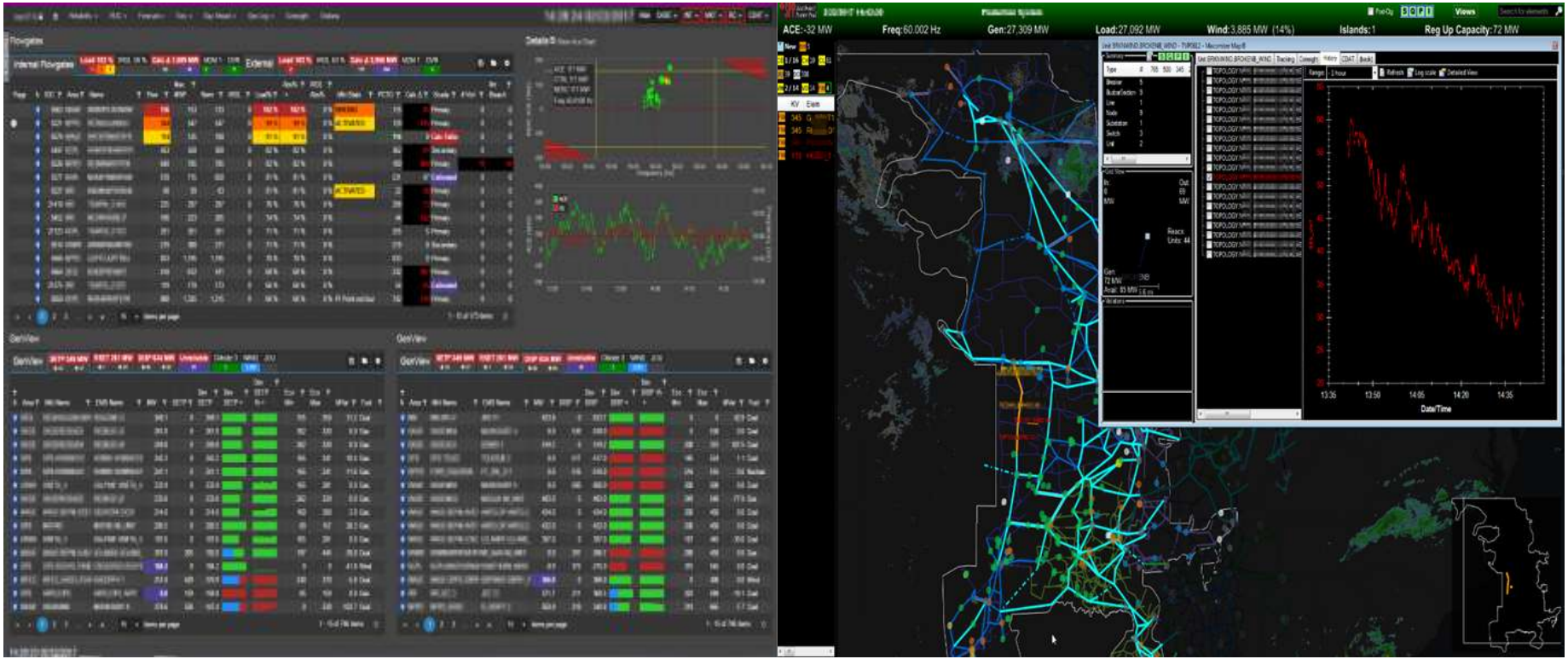
PI Data in Real-time Displays

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

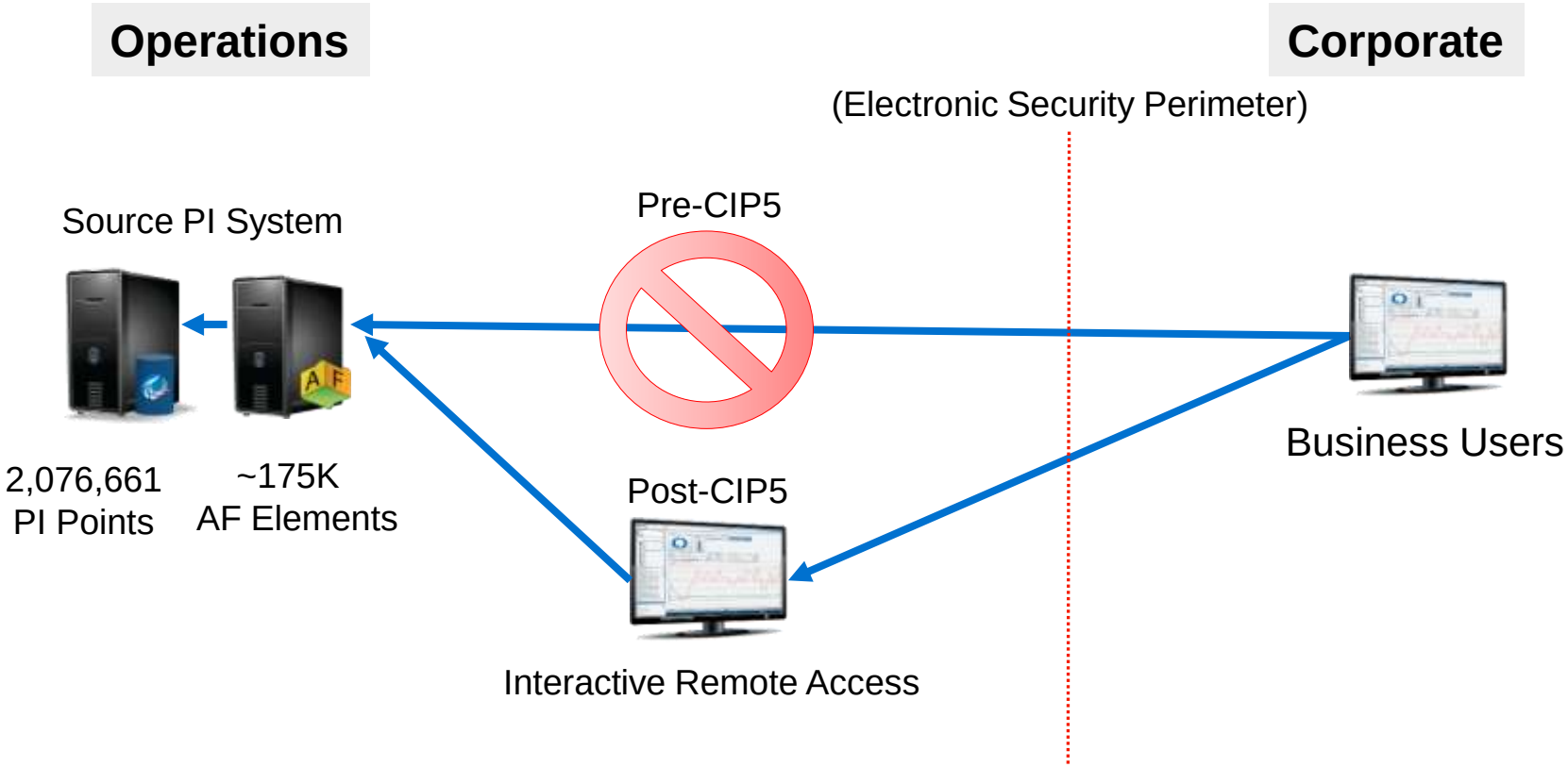




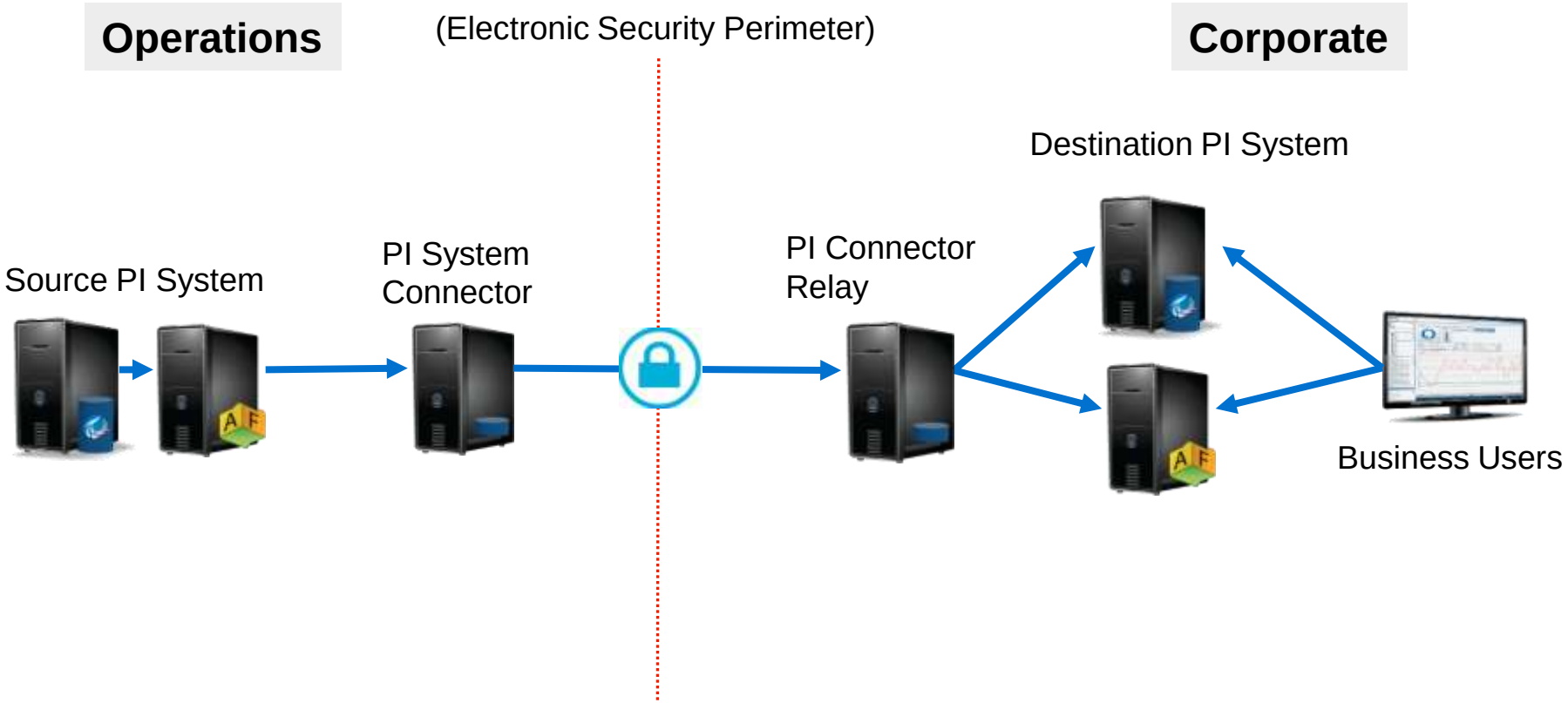
PI Data in Real-time Displays (cont.)



Challenge – Business Users Need the Data
Working with NERC: Critical Infrastructure Protection

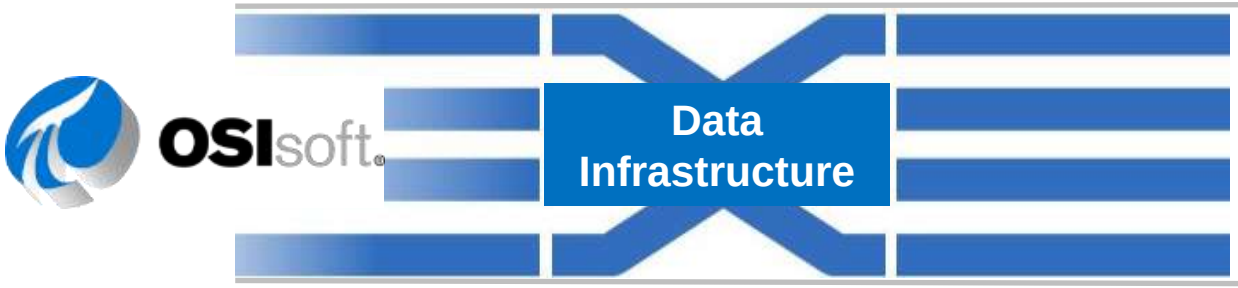


Solution – Replicate PI Servers with PI System Connector



After-the-fact Analysis in the Corporate Environment

Operational System of Record



PI Notifications 2016 R2

Featuring PI Notifications 2016 R2

QUALCOMM

Keith Ward
Senior Staff Engineer

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

Mobile 2G
D-AMPS, GSM/GPRS, cdmaOne

Mobile 3G
CDMA2000/EV-DO WCDMA/HSPA+, TD-SCDMA

Mobile 4G
LTE, LTE Advanced, LTE Advanced Pro

Mobile 5G

Why we win

Scale, reach and technology/IP powerhouse

~119,000
Total worldwide patents^

295+ 3G licensees^

170+ single-mode 4G only licensees^

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

932M
MSM chipsets shipped in FY2015

Technology leadership***

#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

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

** Guidance as of Jan. 27, 2016

***Sources: IHS, Jan. '16 (RF); Strategy Analytics, Dec. '15 (modem, AP)

A Little Background on Our Use of PI

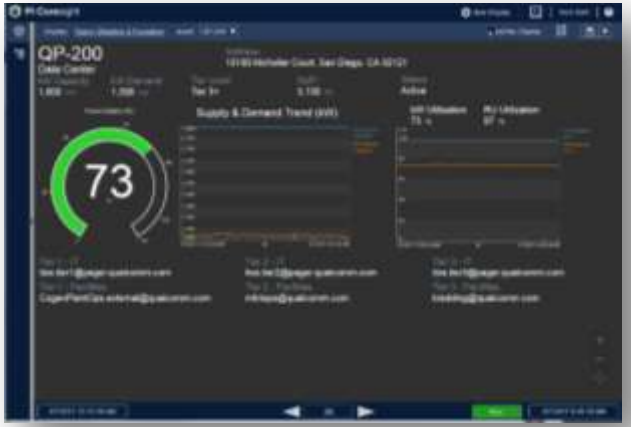
Monitor 80 Datacenters worldwide

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

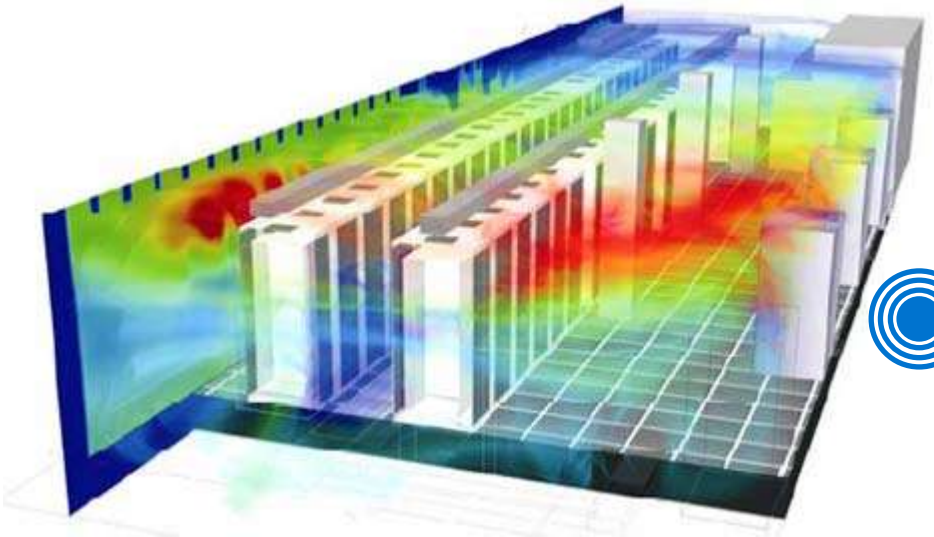
OSIsoft.

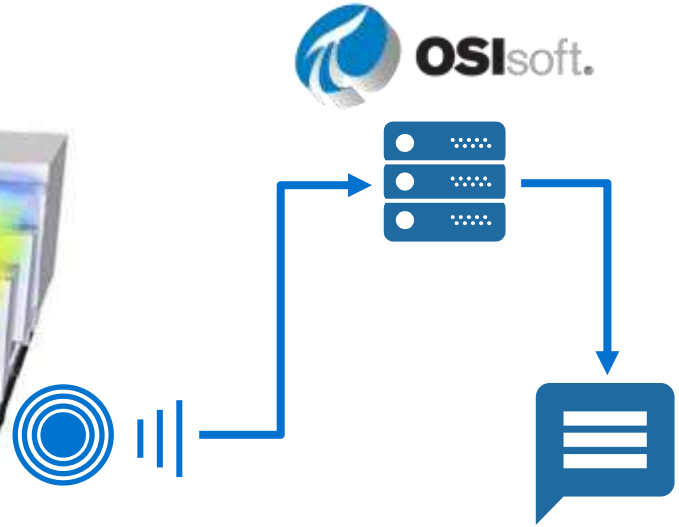
- 80K PI points soon to be 100K
- 10K + elements
- 574 templates
- 13K + notification rules
- 20K analyses

Leverage Coresight for Health of Datacenters



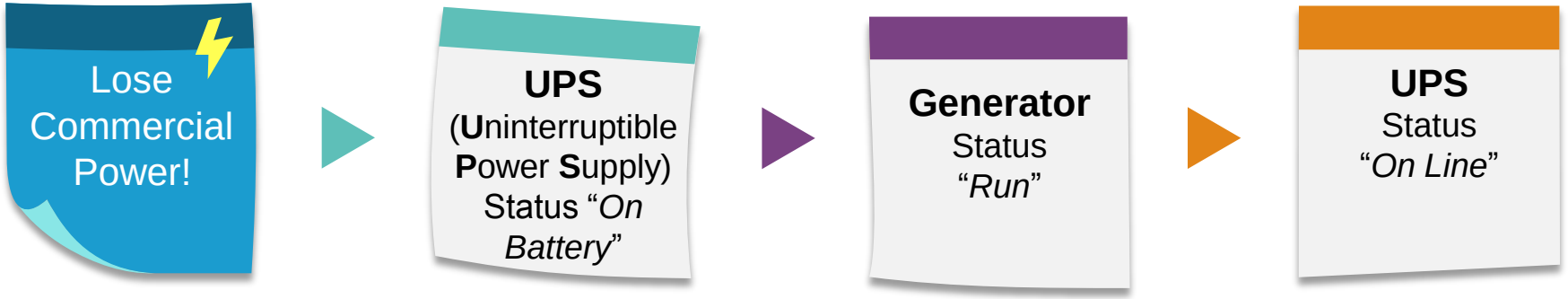
Managing Temperature to Avoid Downtime





- Mechanical Engineer
- IT manager
- Maintenance Engineer

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!

Utilizing Data with Visualization and Analytics

Big Data Analytics Cloud

PI Integrator for Azure

devon

PI Coresight 2016 R2

OSIsoft.

Data Infrastructure

QUALCOMM

PI Notifications 2016 R2

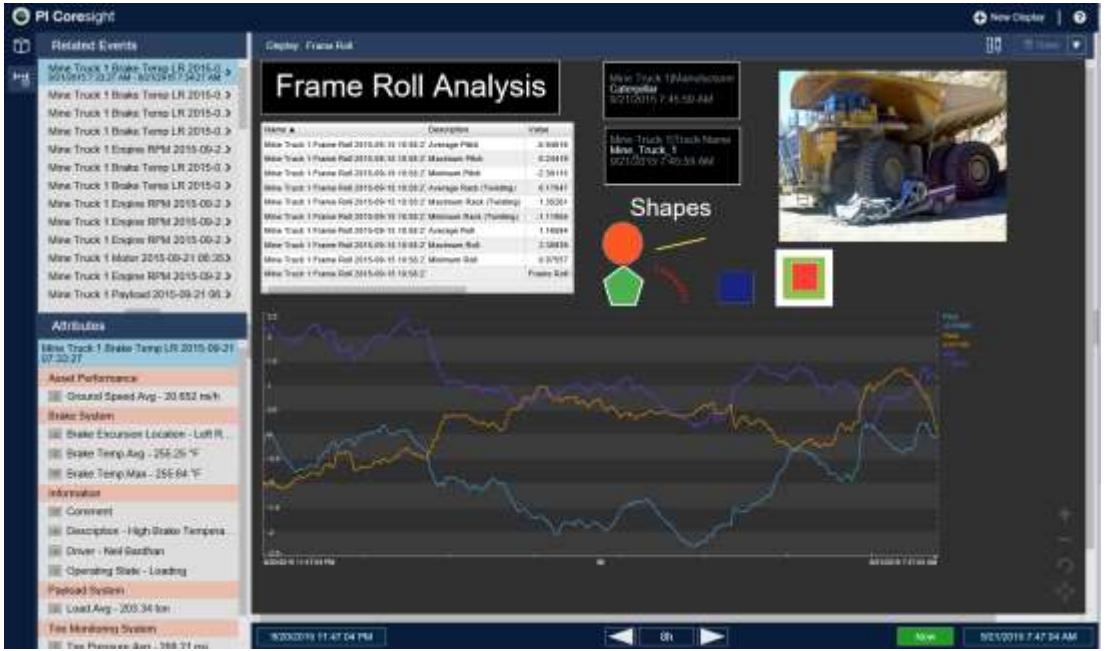
Sensors Devices Assets

SPP Southwest Power Pool

PI System Connector

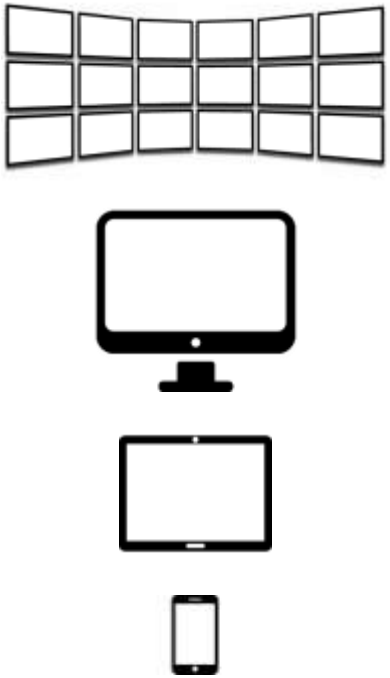
Next Generation Integrated Visualization

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



Time series | Events | Assets | Analytics | Notifications

Anywhere



One Vision:

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

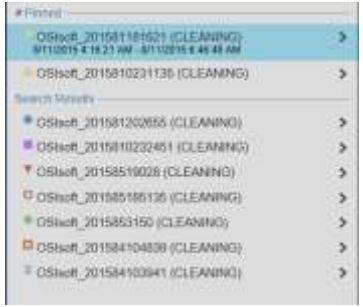
PI Vision 2017

Collections

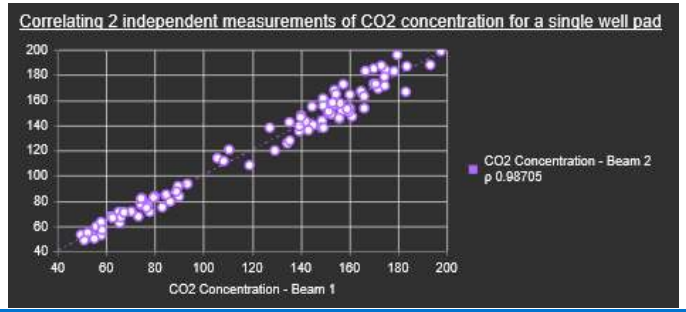
Events Table

Graphic Library

Pinned Events



Scatter Plot



Drill-in Navigation

Advanced Integrations – Supported Systems

Visual Analytics

Excel

Spotfire® TIBCO Software

SAP BusinessObjects

COGNOS

esri

ORACLE BUSINESS INTELLIGENCE

tableau SOFTWARE

Power BI

SAP Lumira

QlikView

Data Warehouse / Data Lake

SQL

Microsoft SQL Server

SQL

ORACLE DATABASE 12c

SAP HANA

Streaming Analytics – 2017

IoT Hub

Machine Learning

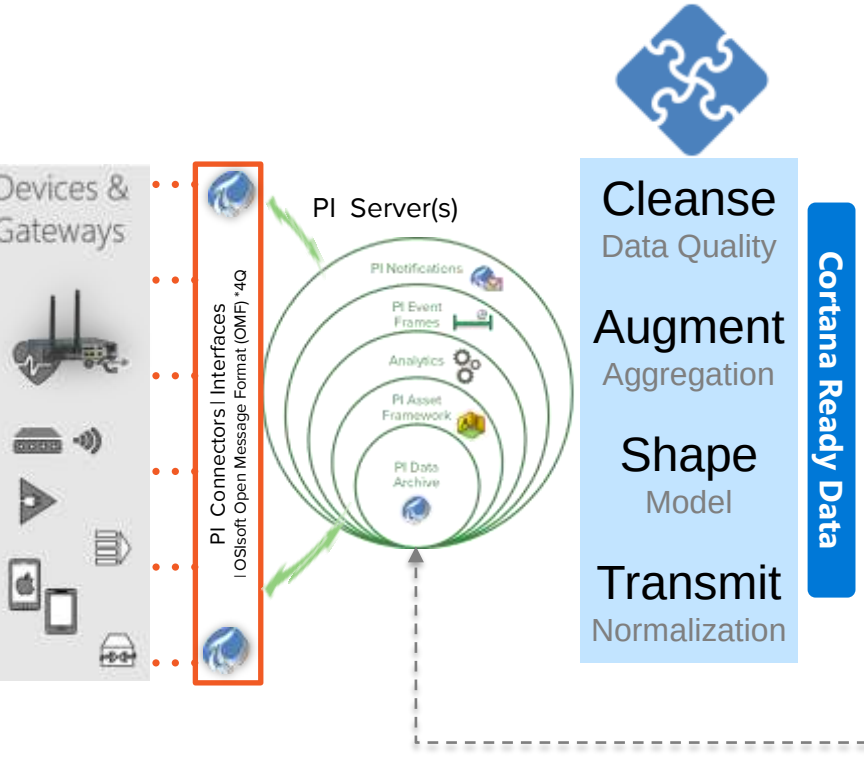
Stream Analytics

Spark

kafka

SAP

PI Integrator for Microsoft Azure



Cortana Intelligence

Insight / Predictions as Future Data (to PI 2015)

Featuring PI Integrator for Microsoft Azure

Brian Caserta
Programmer Analyst

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Don Morrison
Real Time Data Engineer

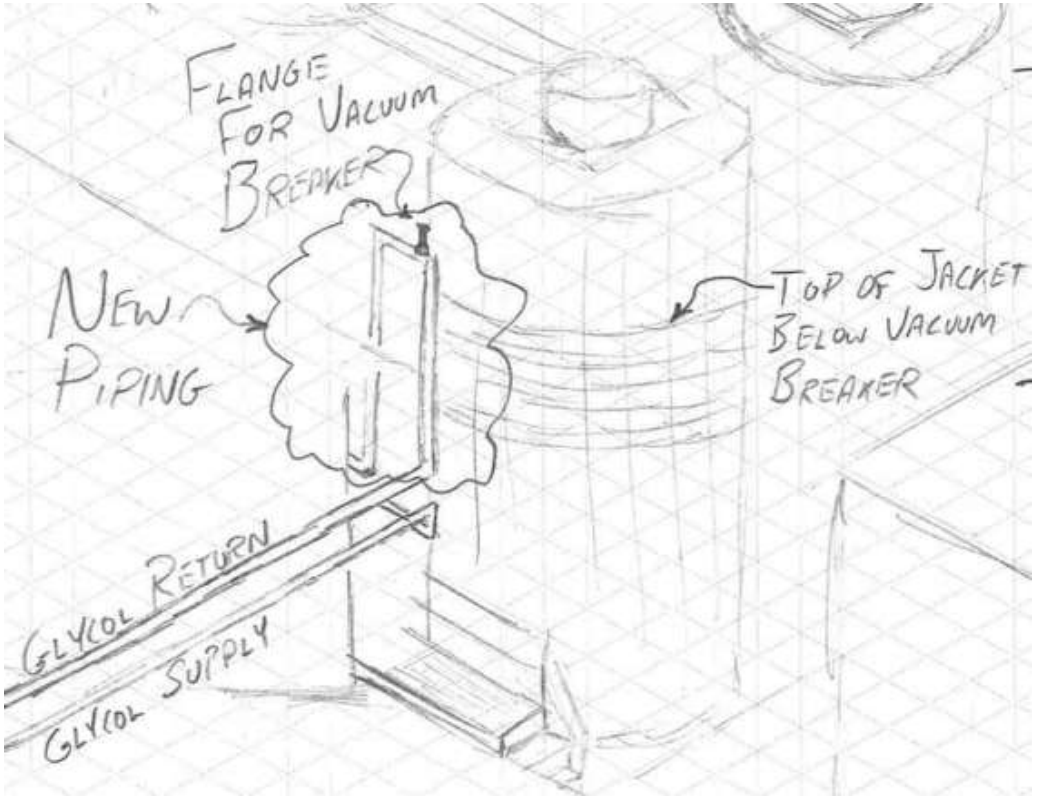
Brian Faivre
Brewmaster, Operations

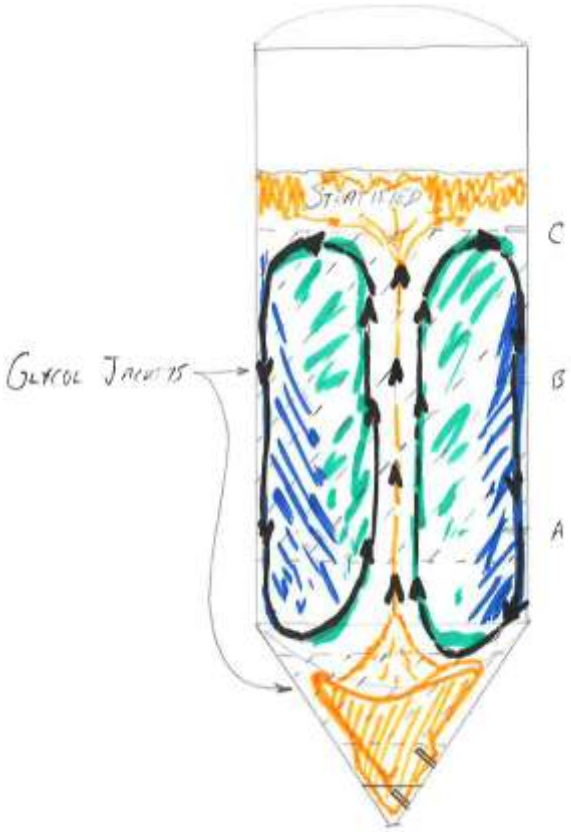
Tim Alexander
Assistant Brewmaster, Engineering & Technology

- Located in Bend, OR
- Founded in 1988
- Pub opened in Portland, OR in 2007

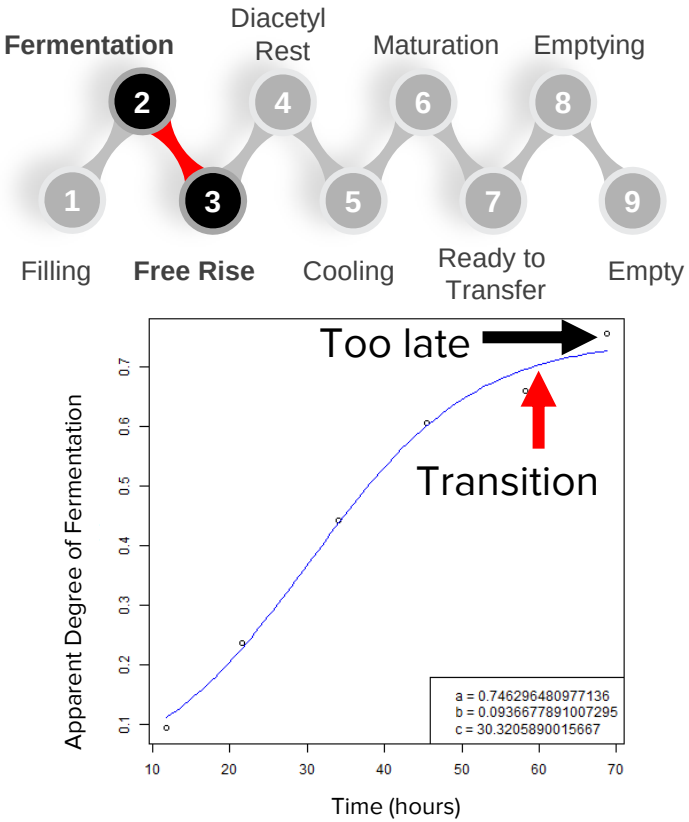
- 2 brewhouses
- 50+ vessels
- Bottling and kegging
- 7th largest US craft brewer

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

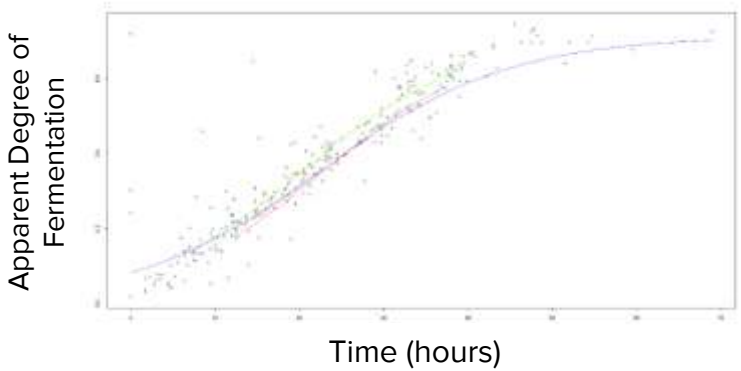
Challenges
- Transition occurs between measurements

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

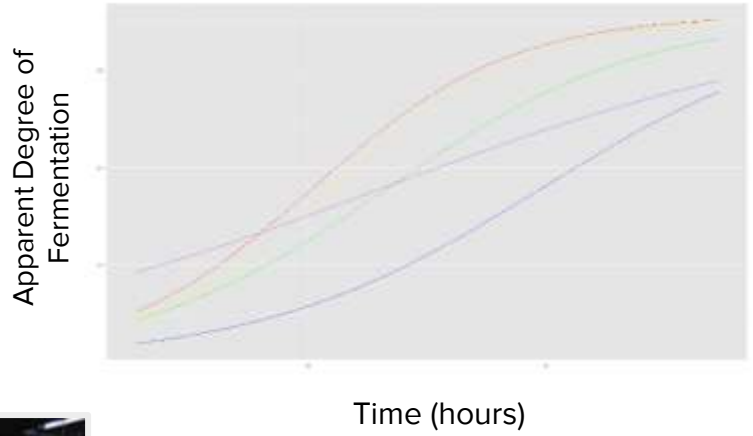
Constraints
- 8-10 hours between measurements
- No large capital expenditure
- No fully-dedicated data scientists in-house

Brand Portfolio & Facility Size Complicates Predictability

Batch Variety

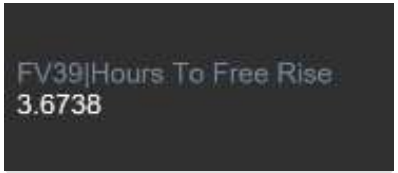


Brand Diversity

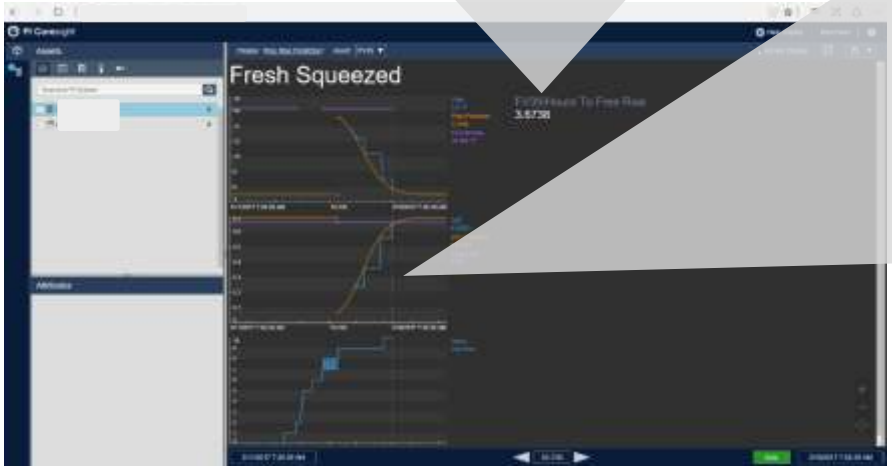


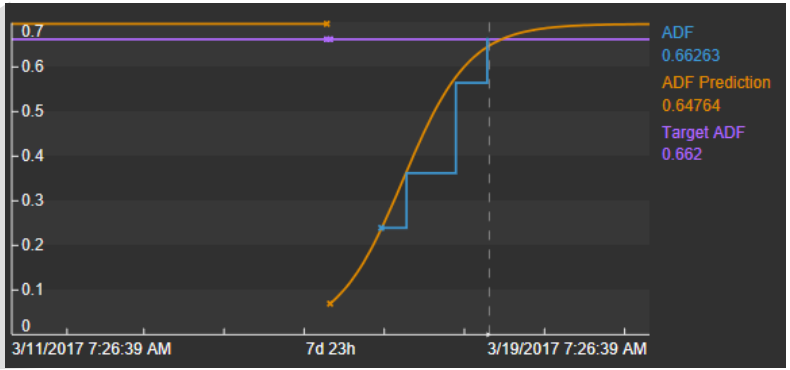
50+ Vessels

Predicting the Transition is a Low-cost, Accurate Option



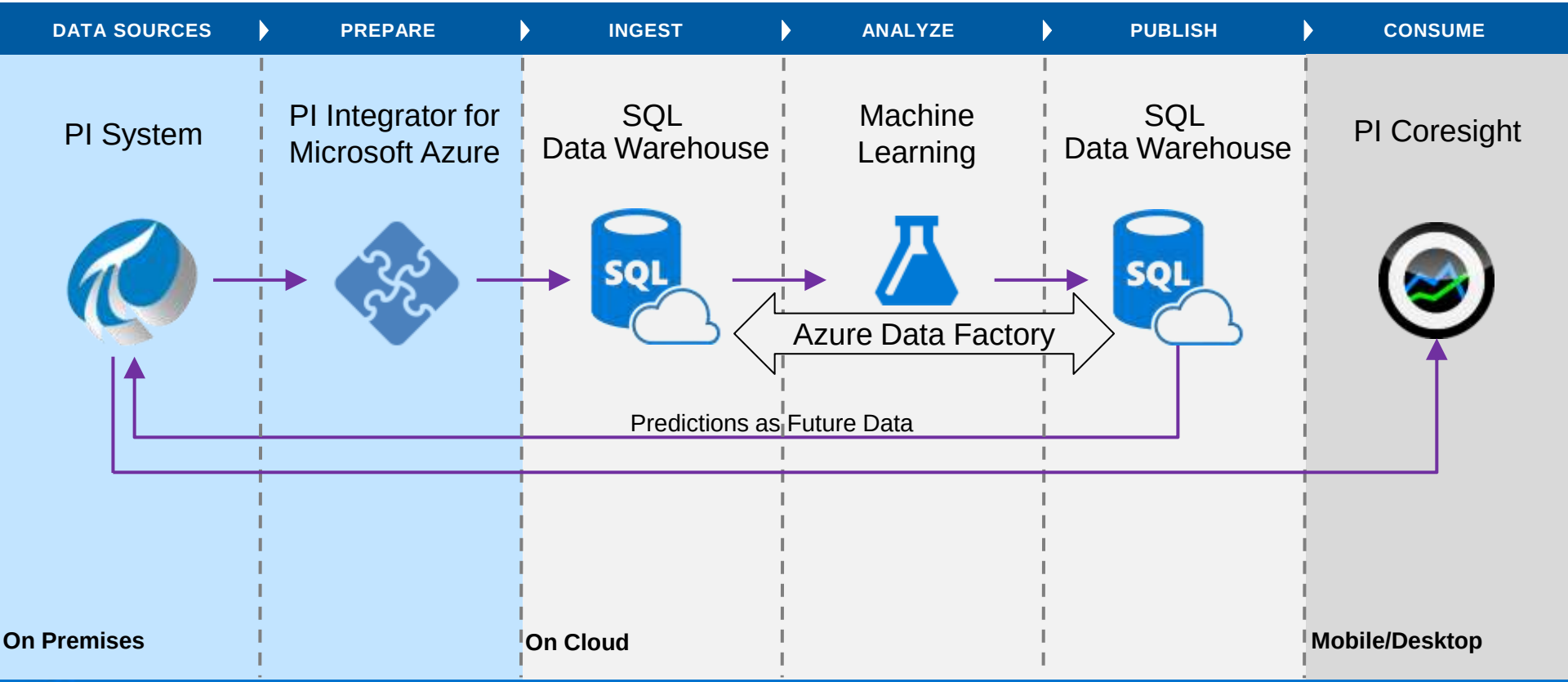
Indicate when transition happens





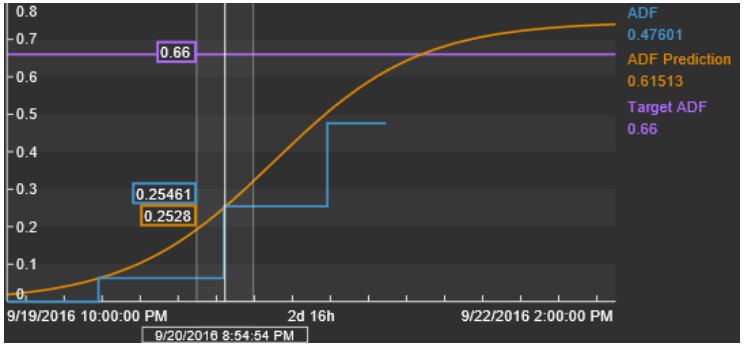
Use experience & predictions to ensure high quality beer

Operationalizing Predictions with PI System and Azure

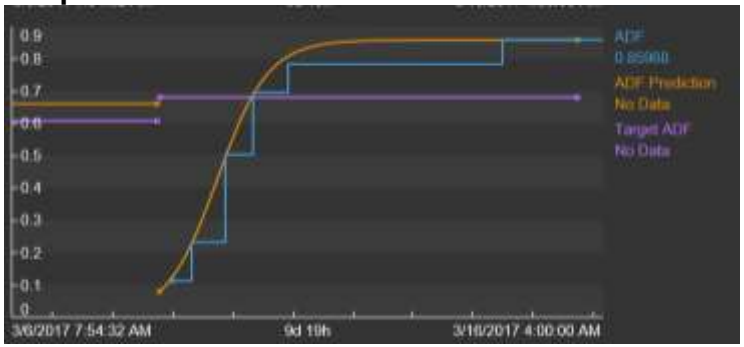


Predicting Transitions for All Brands and All Vessels

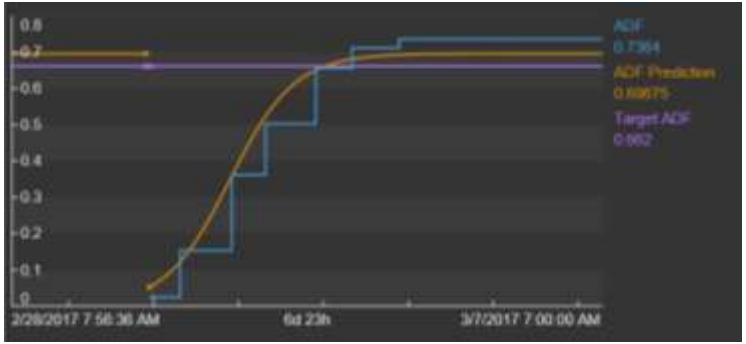
Mirror Pond Pale Ale – Vessel 16



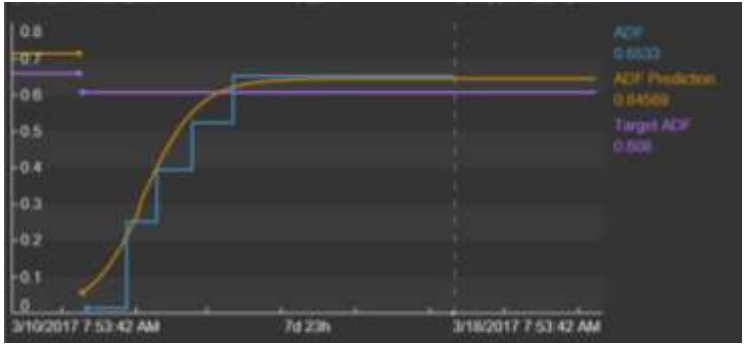
Hop Slice Summer Ale – Vessel 27



Fresh Squeezed IPA – Vessel 39

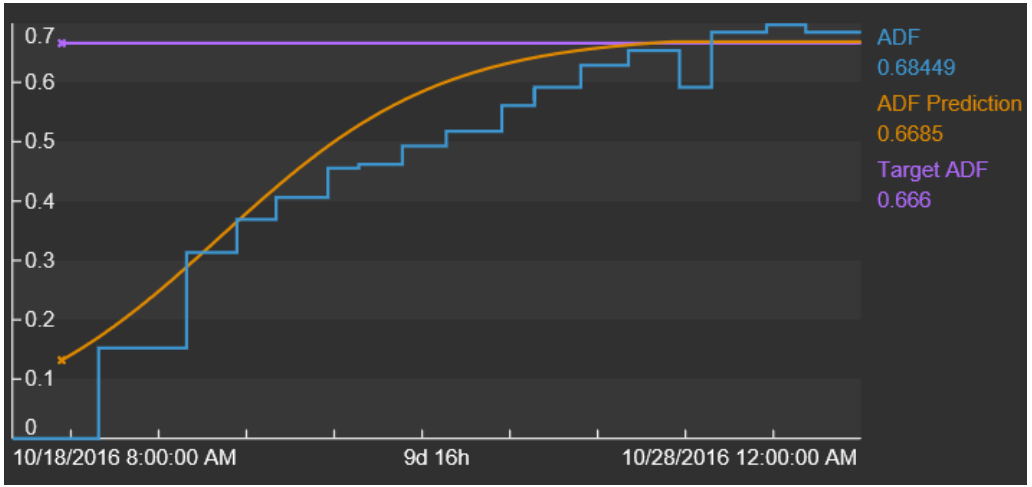


Black Butte Porter – Vessel 45



Detecting Early Deviations and Taking Corrective Action

Obsidian Stout – Vessel 23



Indications:

- Uncharacteristic fermentation

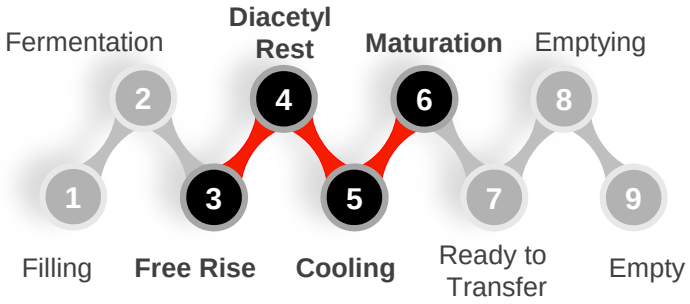
Actions taken:

- 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

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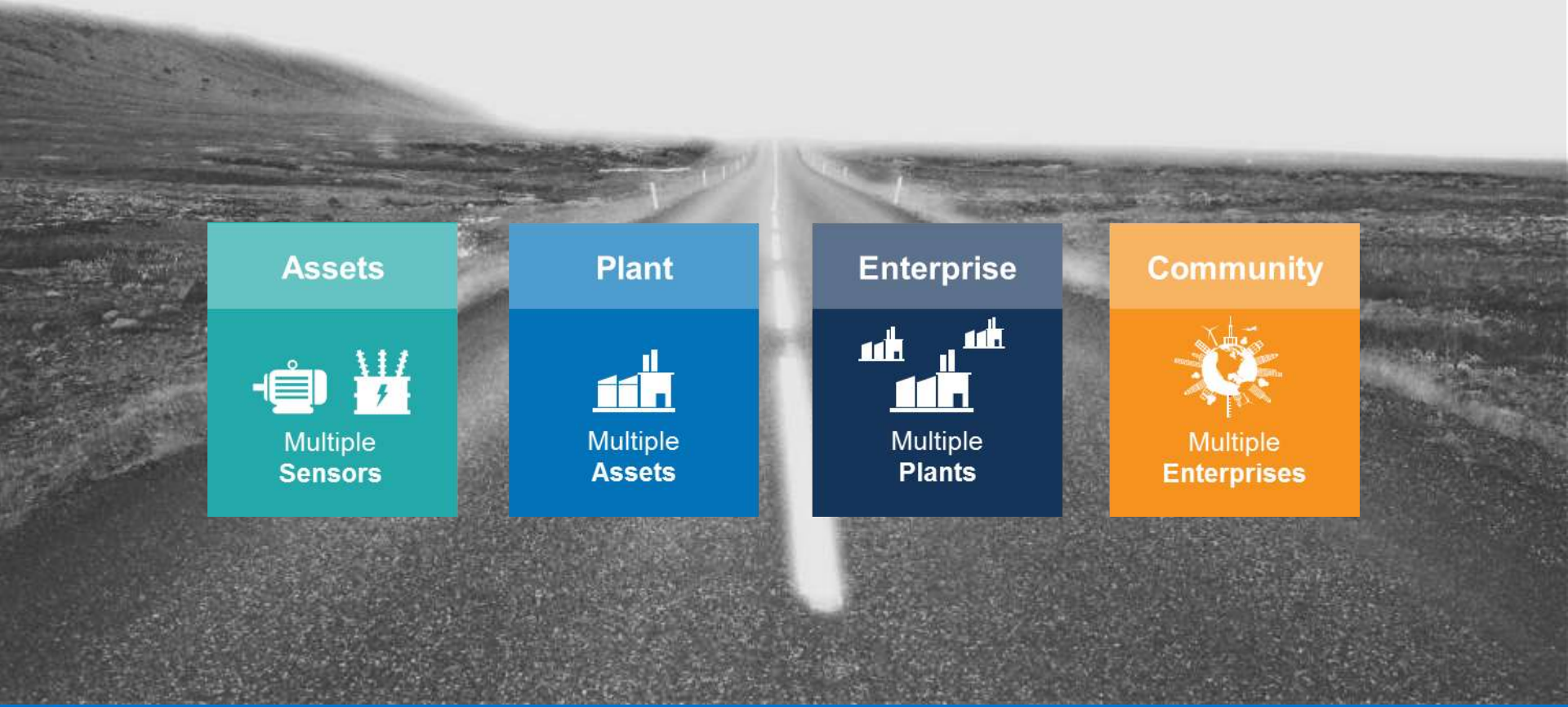
Our Vision: Industrial Digital Transformation



감사합니다

谢谢

Danke

Gracias

Merci

Thank You

ありがとう

Спасибо

Obrigado

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- OSIsoft, LLC