

# Actionable Insights with PI Integrators

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Joy Wang, Product Manager

# Agenda



## **Introduction to PI Integrators**

Learn about Integrators and how they add value to your Enterprise PI System.



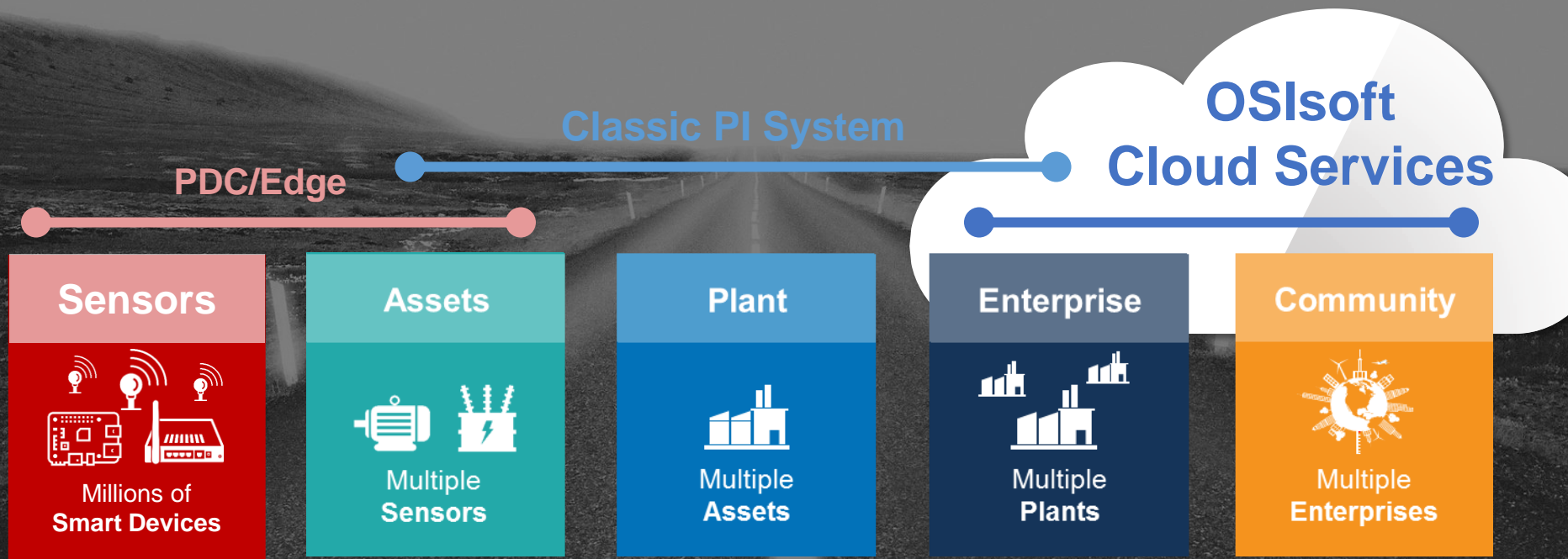
## **Customer Success Stories**

See how users have leveraged PI Integrators to create value for their businesses.

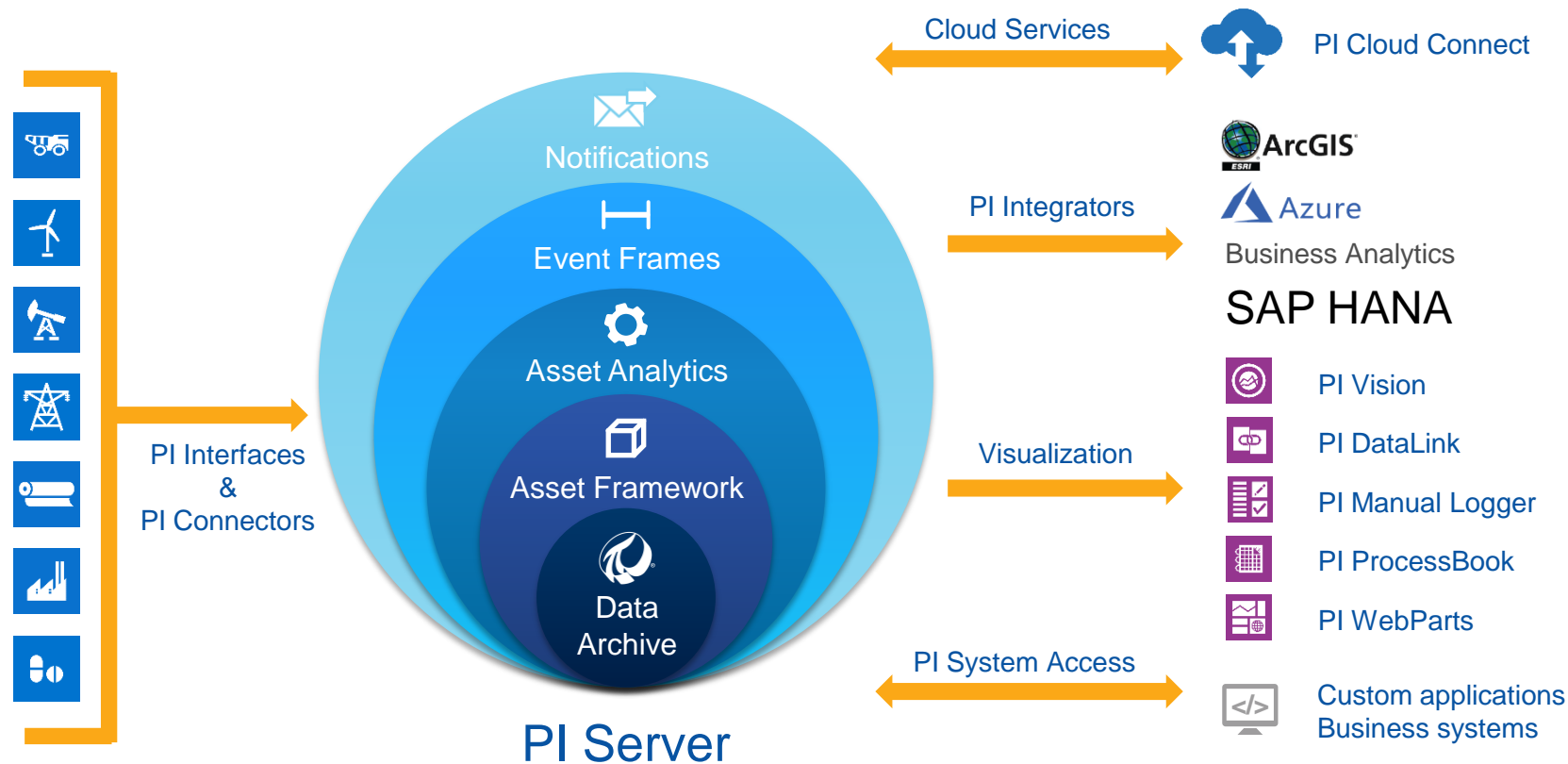


## **What's New + Demonstration**

Discover the newest features and releases.



# PI System collects, organizes, and enriches data



# Climb the value ladder with PI Integrators

Disparate assets or interacting one-by-one

Interacting with common assets as a fleet

Complexity

## Monitoring

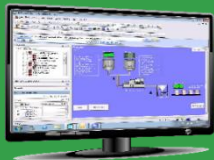
Real-time visibility



- PI Interfaces
- PI ProcessBook

## Process Optimization

Real-time & historical view across any plant asset



- PI ProcessBook
- PI DataLink
- PI Batch
- PI Vision

## Benchmarking

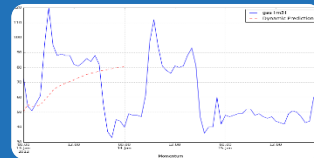
Fleet-wide performance comparison



- PI Asset Framework
- PI Event Frames
- PI Integrator for Business Analytics
- PI Integrator for Esri ArcGIS

## System Optimization

Large scale multi-variate analysis



- PI Integrator for Business Analytics
- PI Integrator for SAP HANA

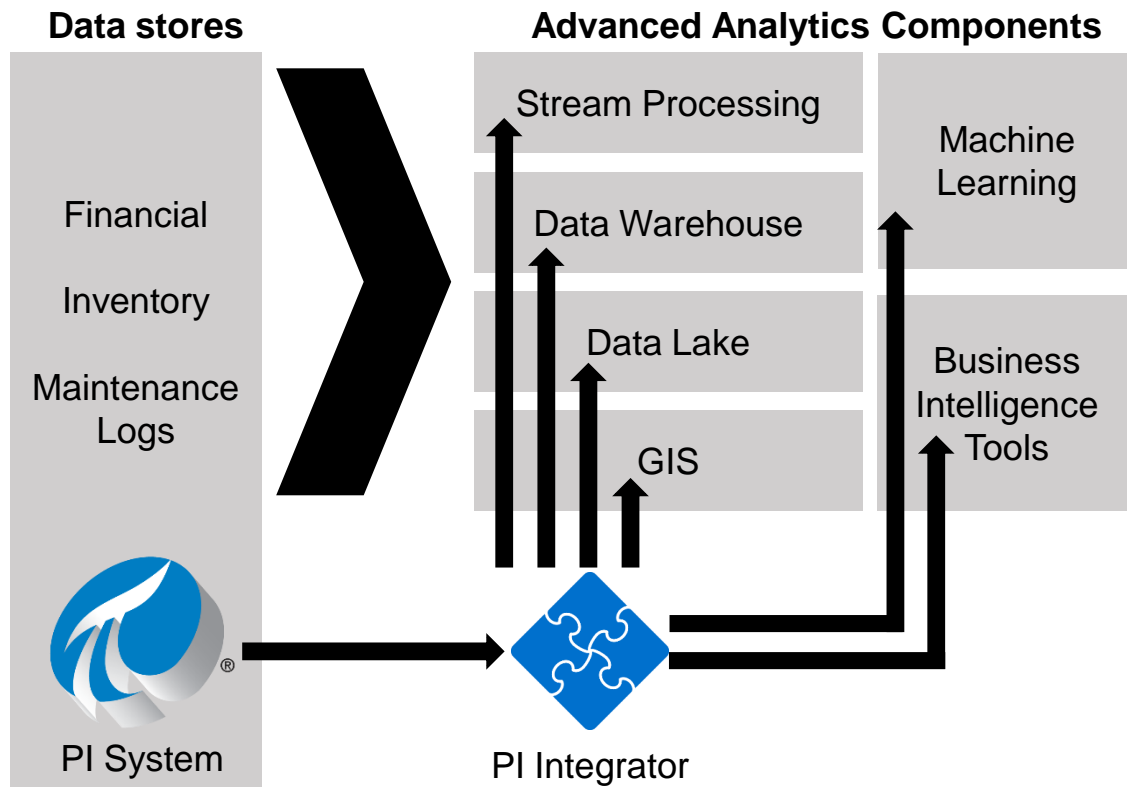
**PI Integrators** *speed the process that brings trustworthy data to many unique analytics tools*



SAP HANA

# PI Integrators bring trustworthy data to advanced analytics

PI System can **integrate** across  
**advanced analytics architectures**  
and  
deliver **authoritative** operational  
data



# What Does Customer Success Look Like?



# Riverside Public Utilities



Riverside  
Public Utilities

Riverside Public Utilities is a consumer-owned water and electric utility established in 1895. Our goal was to create a **digital and connected utility** and turn data into **actionable intelligence**, ultimately *improving reliability and customer experience*.



## CHALLENGE

Disparate systems, people-dependent processes, low visibility into systems and performance.

- It would take staff 8 or more hours per week to compile data and produce reports.
- Forcing management to be reactive and not allowing a proactive culture.

## SOLUTION

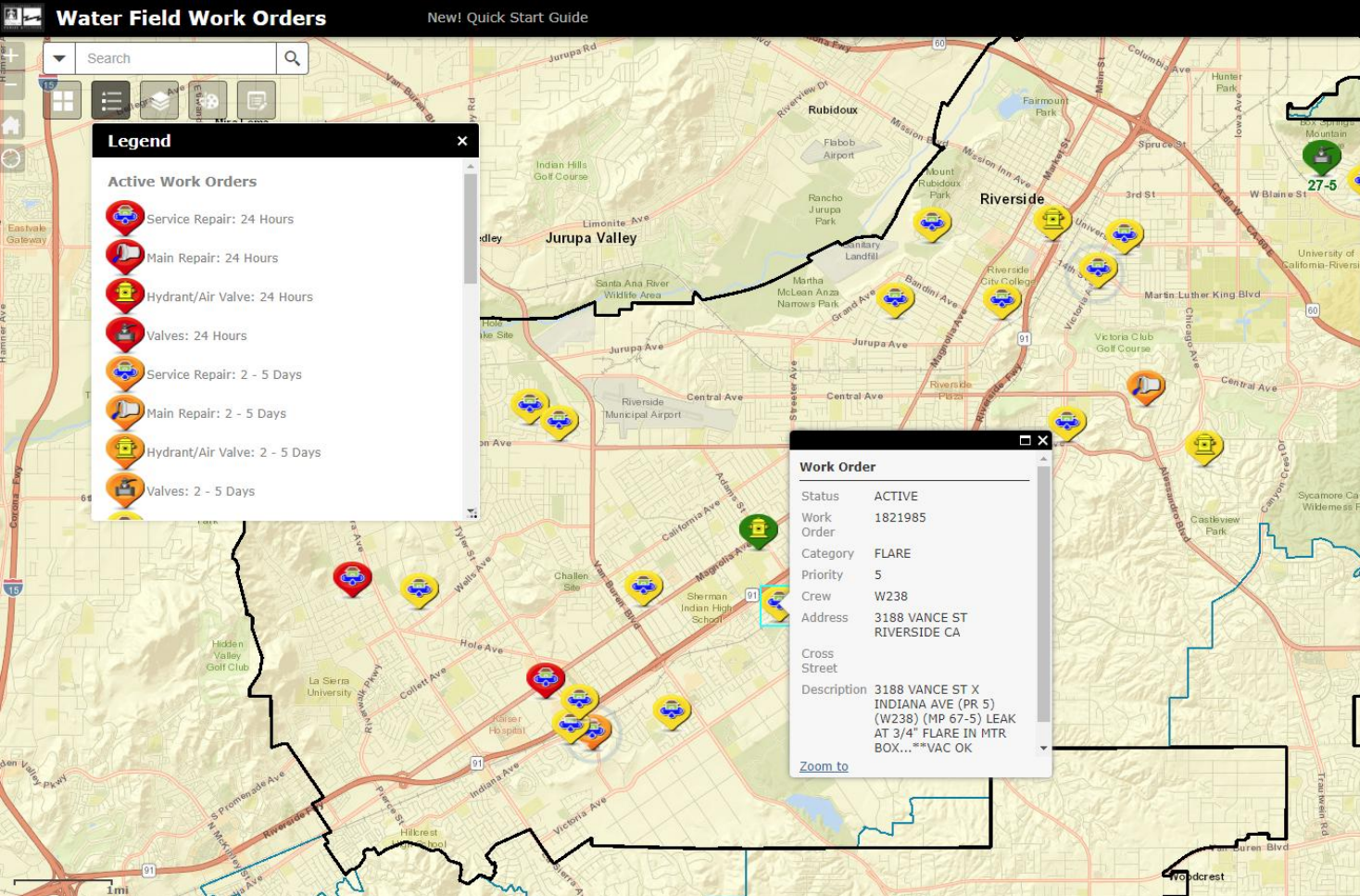
The implementation of PI connected over 10 enterprise systems and applications, automated processes and streamlined reporting.

- Connected systems, people and processes.
- Turned data into actionable intelligence.

## RESULTS

PI created a cultural shift within the organization – connected systems, people and processes. A digital and connected utility.

- Estimating a ROI of over \$3M in 3-5 years from process automation alone.
- Significant savings in staff time.
- Shifted to a data-driven and transparent utility.



Work crews now  
**view** the work order  
requests on a map and  
**route their**  
work **real-time** in  
the field

Water Work  
Orders from Asset  
Management  
system



PI System



PI Integrator for  
Esri ArcGIS



ArcGIS web  
applications



# Outage Map

Current Temp.

50

Forecasted Low

39

Forecasted High

53

Outages

0

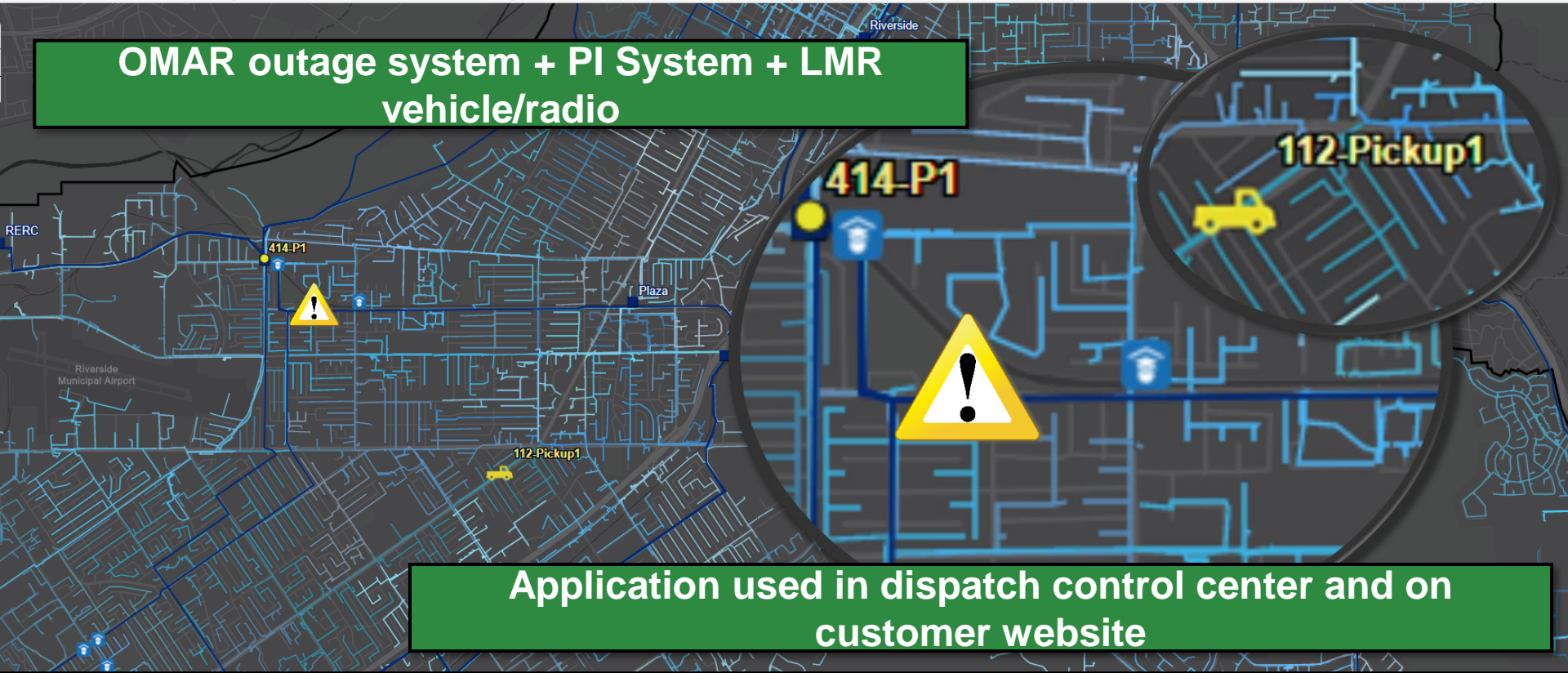
Customers

0

Customer Mins Out

0

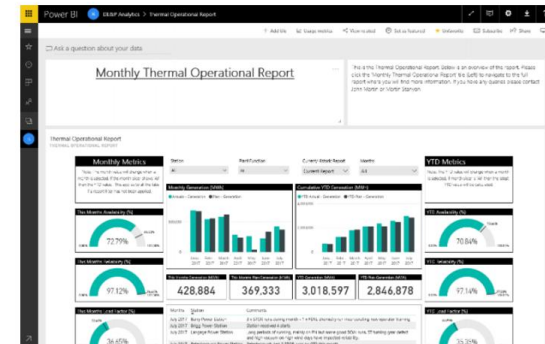
**OMAR outage system + PI System + LMR  
vehicle/radio**



# Centrica



Centrica is an energy and services company and one of our strategic goals is **Cost Efficiency & Simplification**



## CHALLENGE

An aging reporting process with confused ownership of data took too long to produce and quality was questionable

- 11 Excel books with 200,000 rows of unique calculations and 1500+ hard-coded cells within a spreadsheet

## SOLUTION

Give the data context using Asset Framework, find it using Event Frames and prepare using Integrators

- ZERO lines of custom coding
- New assets included and disposed of assets removed automatically

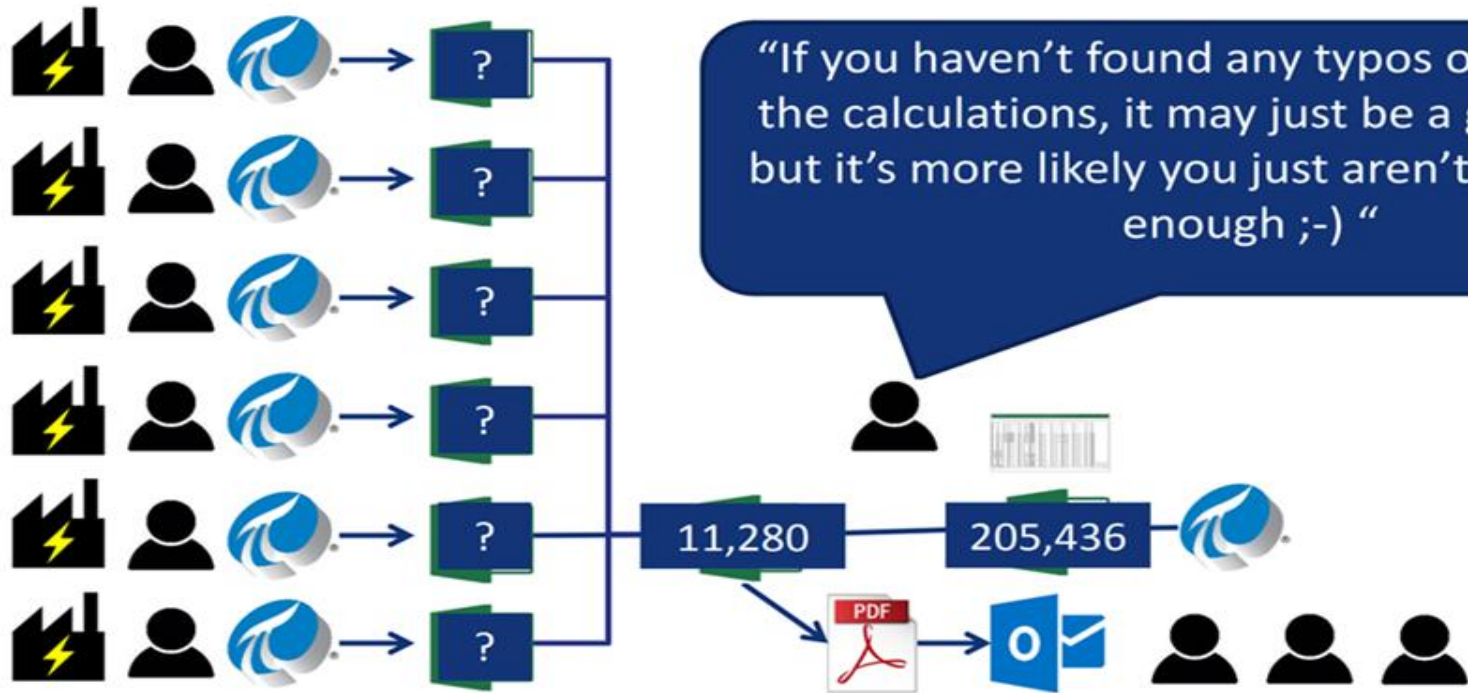
## RESULTS

Vastly reduced time spent on preparing reports from 3-4 days per month to 30 minutes initial setup and automatic refresh, with trusted data

- We now have a simple and efficient process for operational reporting
- Allow the Data & Analytics team to do more analytics and less data preparation

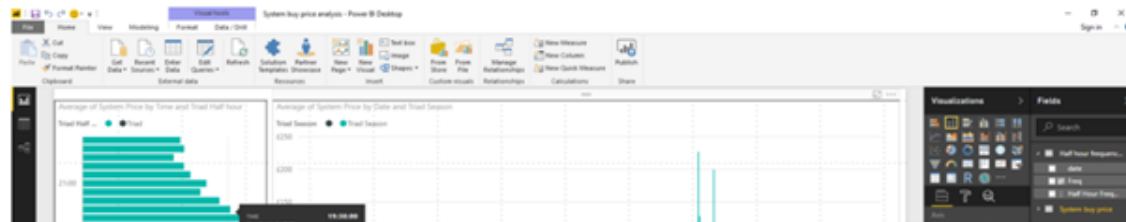
# The Challenge – Monthly Reporting

**centrica**

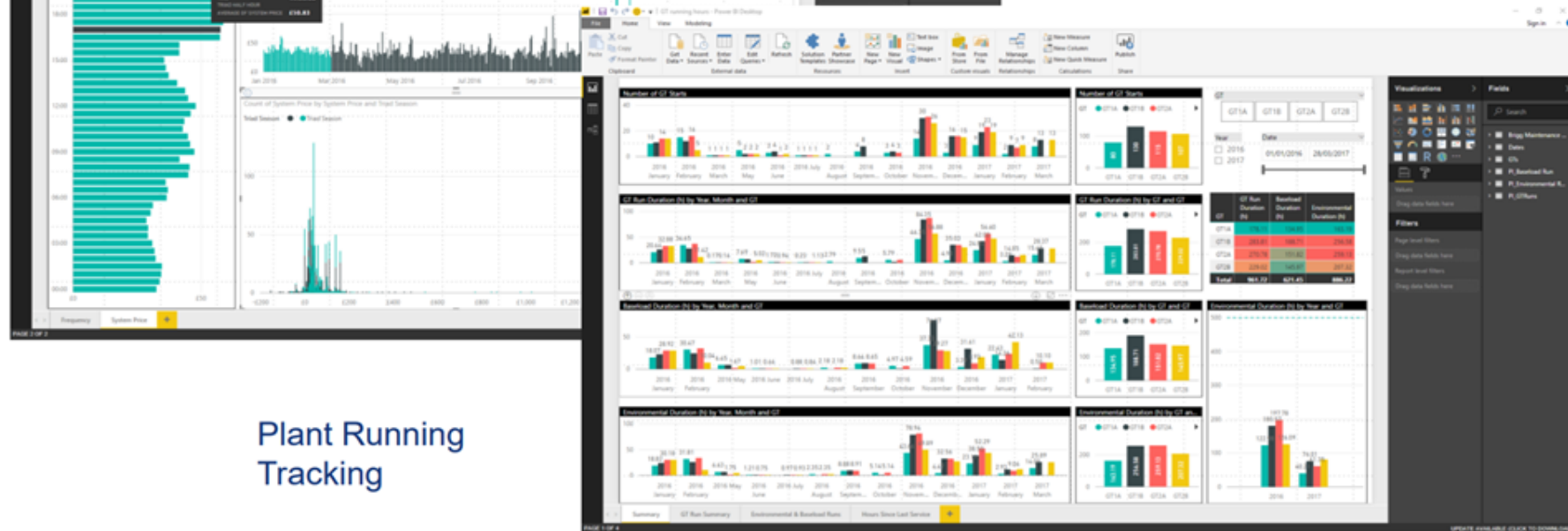


# What's Next?

centrica



## UK Market Analysis

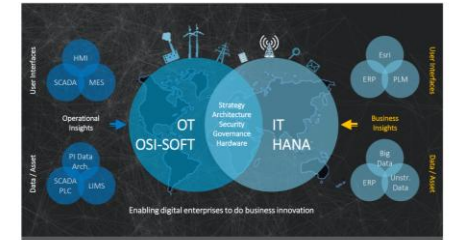


## Plant Running Tracking



# Marathon Oil

## The Convergence of Information and Operational Technology



MarathonOil

### CHALLENGE

MRO had limited means to make decisions based on business logic, and data lived in different technical and business domains

- Productivity lost in chasing data
- Limited access to production data
- Sensor data was not evenly spaced and had quality issues

### SOLUTION

With PI System, SAP HANA IoT Integrator and HANA, MRO centralized data from various sources into HANA for analytics.

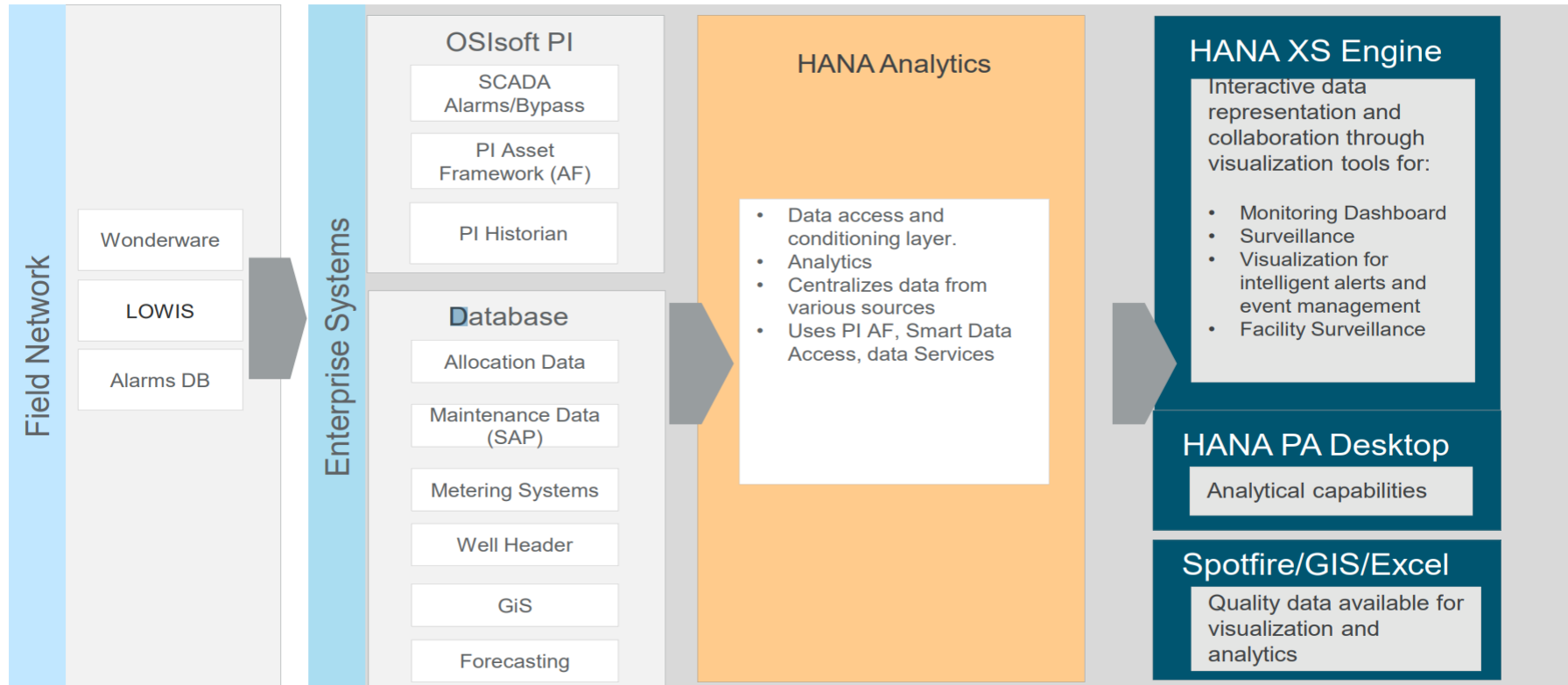
- SCADA
- PI/AF
- Maintenance
- Meters

### RESULTS

Business users now had a single source of truth and could generate mini apps in HANA.

- One analytics project they started is paraffin build-up prediction by extracting 90 attributes of data into SAP Predictive Analytics

# Flow of Information



5

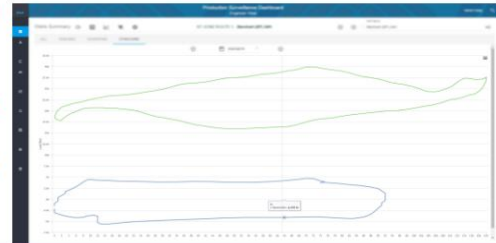
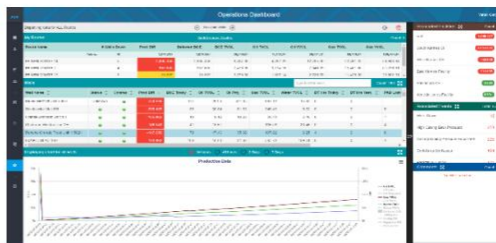
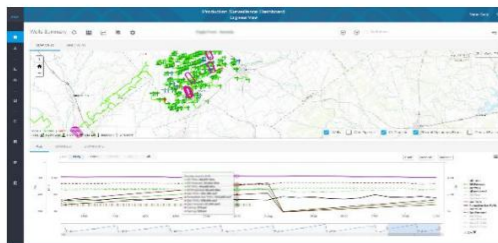
Marathon Oil



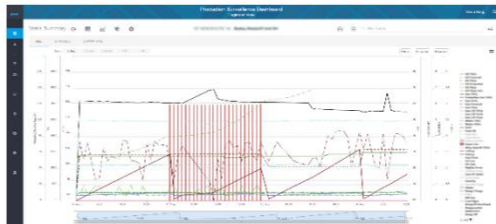
# Example Output



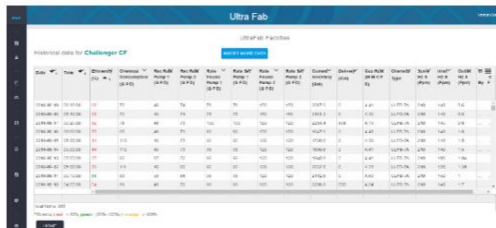
## Monitoring



## Analytics



## Mini Apps



# Technical Details

# Packaged for Simplicity and Flexibility



PI Integrator for Business Analytics:  
Business Intelligence Edition 2016



PI Integrator for Business Analytics:  
Data Warehouse Edition 2016



PI Integrator for Microsoft Azure:  
2016

**Repackaged!**

PI Integrator for  
Business Analytics:  
**Standard Edition**  
2018

**NEW!**



PI Integrator for  
Business Analytics:  
**Advanced Edition**  
2018

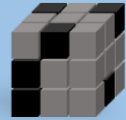
# Various destinations of PI System data

**PI Integrator for  
Business  
Analytics**  
Standard edition



SQL Server  
Oracle RDBMS  
Apache Hive

Azure SQL Data Warehouse  
Azure SQL Database



Hadoop HDFS

Azure Data Lake Store



Flat files  
ODBC connection

**PI Integrator for  
Business  
Analytics**  
Advanced edition



Apache Kafka

Azure IoT Hub  
Azure Event Hubs



# Capabilities enabled by PI Integrators

## Standard edition



Enterprise reporting



Visual business intelligence



Combine operations and business data

Scheduled, bulk data updates

## Advanced edition



Train a new predictive algorithm



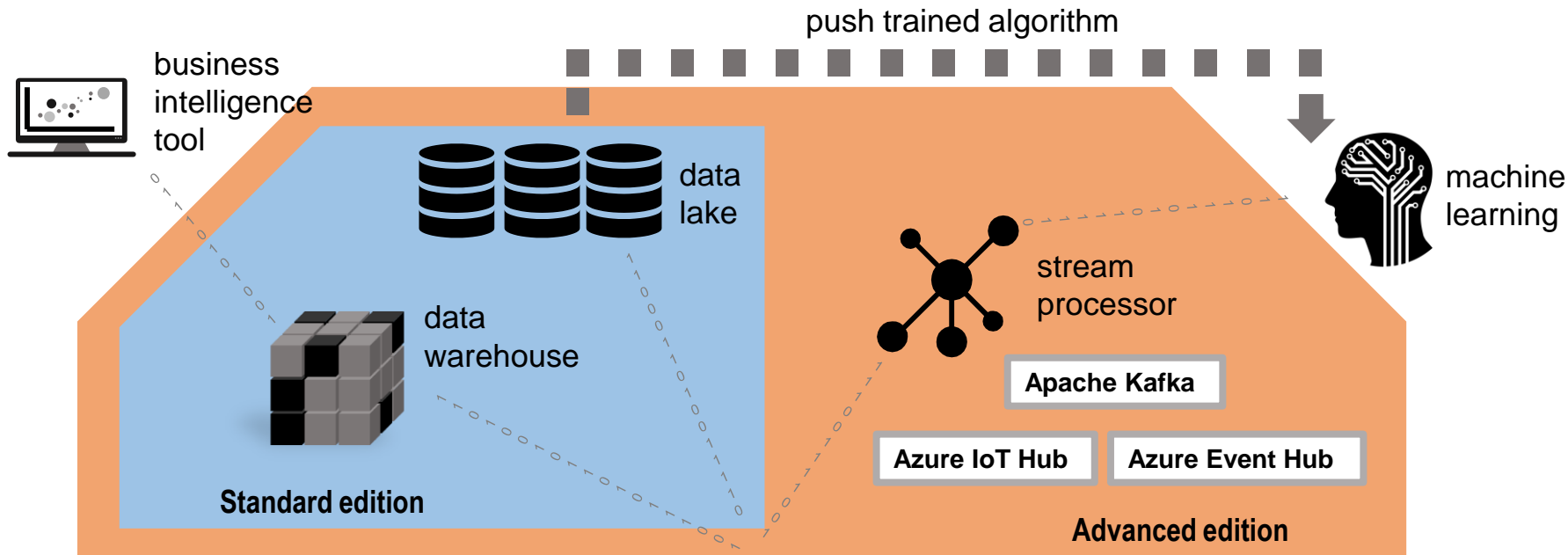
Continuously retrain a predictive algorithm



Operationalize models using most recent data

Continuously streaming data

# Data destinations to enable advanced analytics

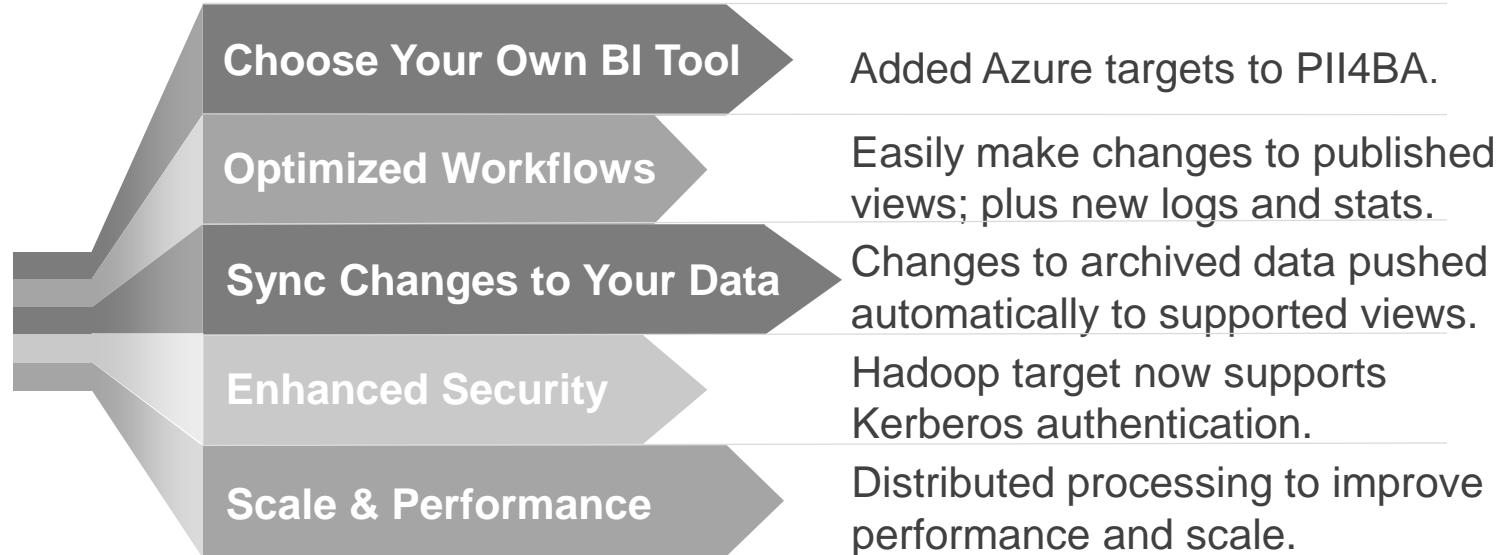


# PI Integrator for Business Analytics



# Latest Releases & Features

# PI Integrator for Business Analytics 2018: Standard Edition





# PI Integrator for Business Analytics 2018: Advanced Edition



## Superset of Standard Edition

All existing targets from 2018 Standard Edition included.

## New Data Pattern

Transmit attribute-value pairs or raw "packages" of data.

## Support for New Platforms

Stream PI data to Apache Kafka, Azure IoT Hub and Event Hubs.

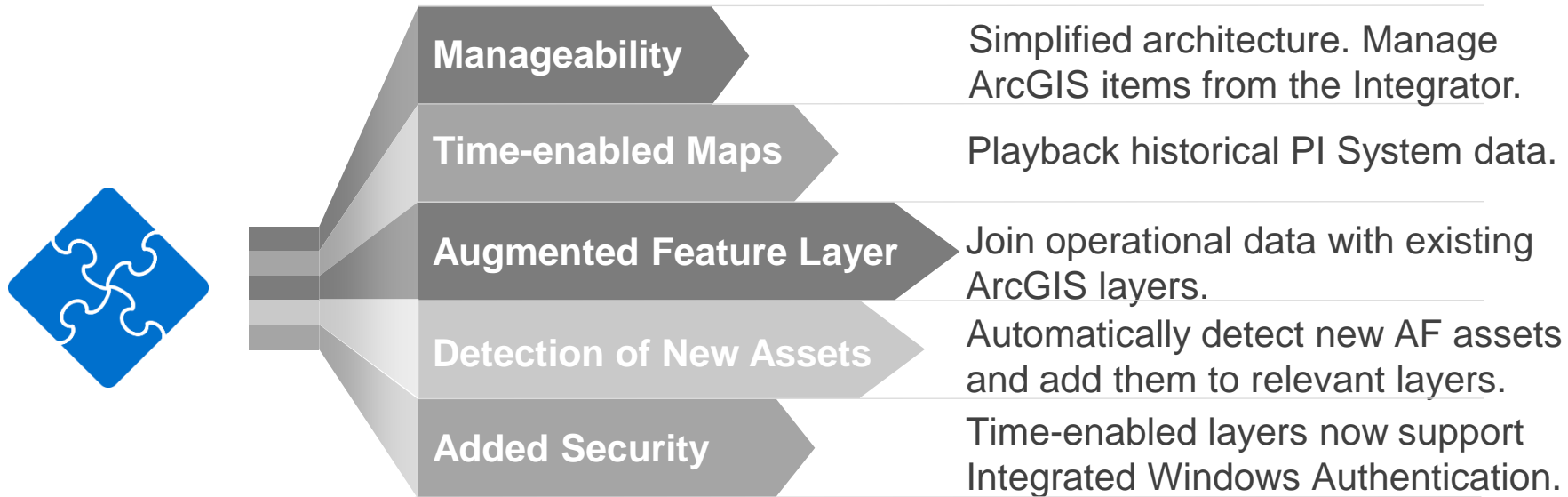
## Data Governance x2

Support for Confluent Avro Schema Registry with Kafka

## Live Updates to Analytics

Stream updated PI data when a new snapshot is received.

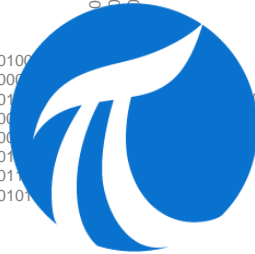
# PI Integrator for Esri ArcGIS 2017 SP1



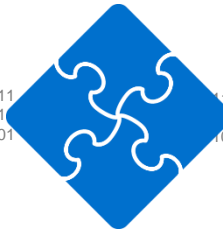
# PI to HANA: The Basics



Process  
Engineer



PI Server



SAP HANA IoT  
Integrator by OSIsoft



HANA

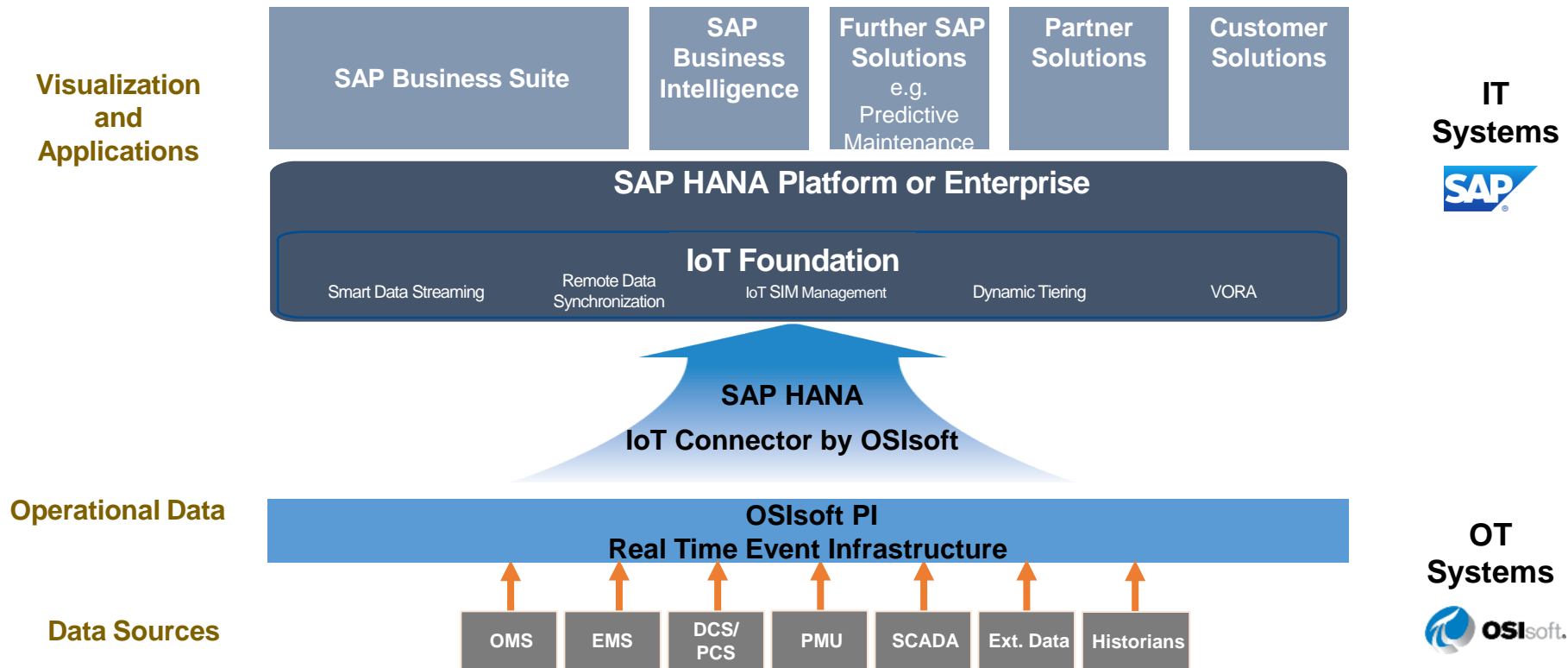


Data  
Scientist



PI Connectors  
PI Interfaces

# SAP HANA IoT Integrator by OSIsoft 2017

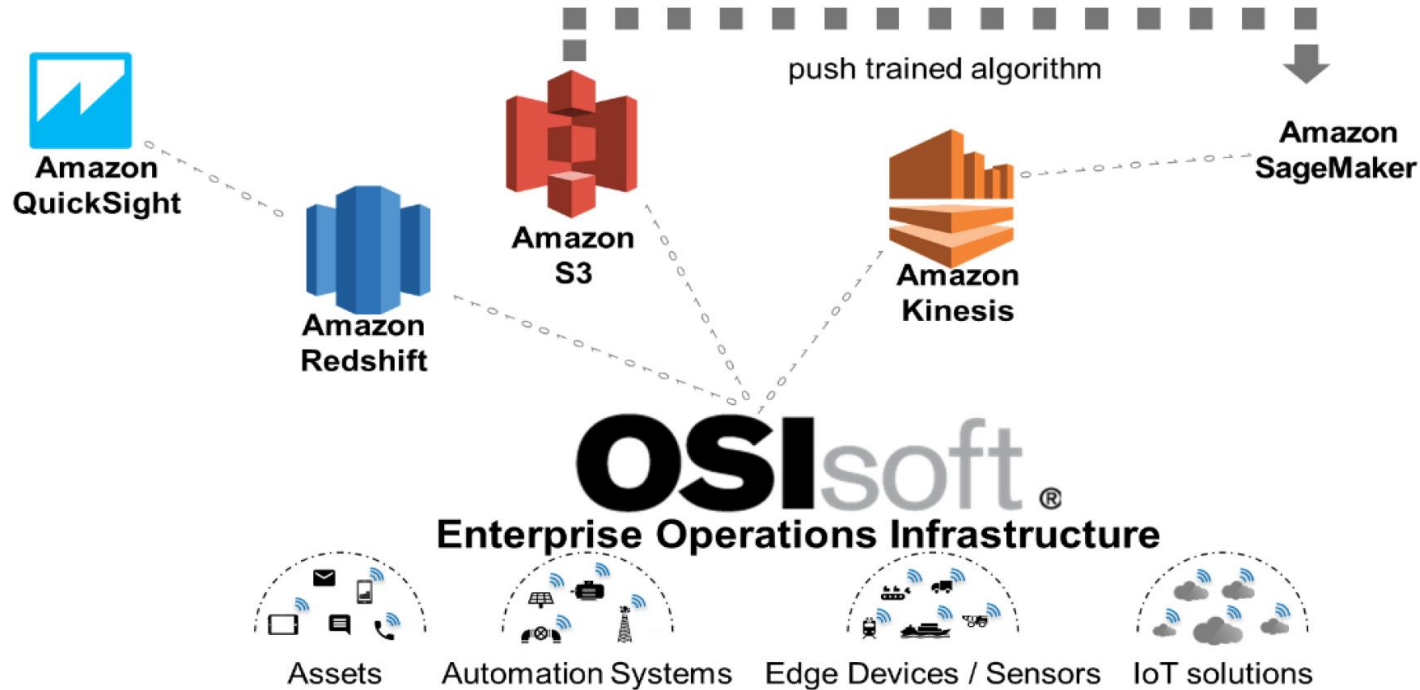


# Multiple Architectures Available

- Supports SAP HANA (on-premises and cloud)
- Multiple ways of data transfer
  1. HANA ODBC (direct write into HANA Database)
  2. HANA SDS (Smart Data Streaming)
  3. HANA SDI (Smart Data Integration)
    - Virtual Table (PI View table is shown as table in HANA)
    - Table replication (data from PI View gets replicated into HANA table)

# Upcoming Release

# PII4BA 2018 R2 – Amazon Web Services



# PII4BA 2018 R2 – Fixes & Enhancements

**Source Events**

Server:

Database:

Enter Event name or string match pattern

Event Frames **Assets**

- ▶ Node1\_9/18/2018 6:27:33 PM
- ▶ Node1Child1\_9/18/2018 6:27:33 PM0
- ▶ Node1Child1\_9/18/2018 6:27:33 PM1
- ▶ Node1Child1\_9/18/2018 6:27:33 PM10
- ▶ Node1Child1\_9/18/2018 6:27:33 PM100

[Show More](#)

**Message Designer**

**Schema Options**  
Syncing mode (flattened)

**Message Trigger**  
Trigger a new message every 1 minutes

**Backfill Data**  
Do not backfill data

**Message Filters**  
0 filters

{

"% cooling": "% % cooling (Value) ",

"% heating": "% % heating (Value) ",

"% need more air signal (cooling)":  
"% need more air signal (cooling) (Value) ",

"% need more air signal (heating)":  
"% need more air signal (heating) (Value) ",

"AC Application Mode Duration": "% AC Application Mode Duration (Value) ",

"AC Unit": "% AC Unit (Value) ",

"AC Unit Path": "% AC Unit Path (Value) ",

"Actual Airflow": "% Actual Airflow (Value) ",

"After Hours Timer": "% After Hours Timer (Value) ",

"After Hours Timer Limit": "% After Hours Timer Limit (Value) ",

"Afterhour Status": "% Afterhour Status (Value) ",

"CO2 DCV Reset Minimum": "% CO2 DCV Reset Minimum (Value) ",

"Color Index": "% Color Index (Value) ",

"Cooldown": "% Cooldown (Value) ",

"Cooling Damper Time (seconds)": "% Cooling Damper Time (seconds) (Value) ",

[Add Property to Schema](#)



# DEMO

Name	Description	Category	Type	Template
BACnet C...			None	
Devices			None	Devices
Economics	areding		None	
SLTC			None	
Vien Glass	Device 300 in ...		None	



## How do you get to actionable insights?

### **Leverage trustworthy operations data.**

Utilize data prepared by PI Integrators to support your business intelligence, machine learning, and GIS projects.

### **Take advantage of flexibility.**

PI Integrators enable best of breed analytics platforms, allowing you to start projects with low risk and existing IT investments.

### **Save time, save costs.**

Without any custom code, reduce the time and effort for data scientists to prepare data and generate results, for field crews to perform work, and for projects to deliver business value.

# PI Integrators 2018 Roadmap

## PI Integrator for Esri ArcGIS 2017 SP1

April 2018

May 2018

Q4 2018

## PI Integrator for Business Analytics 2018 R2

- Support for Amazon Web Services platform
- Fixes & Enhancements

## PI Integrator for Business Analytics 2018

- Repackaging with support for Azure platform
- Streaming PI System data in real time
- Improved iterative approach to preparing data

## Emerging Technologies

- Under OSIsoft Cloud Services

2019-2020

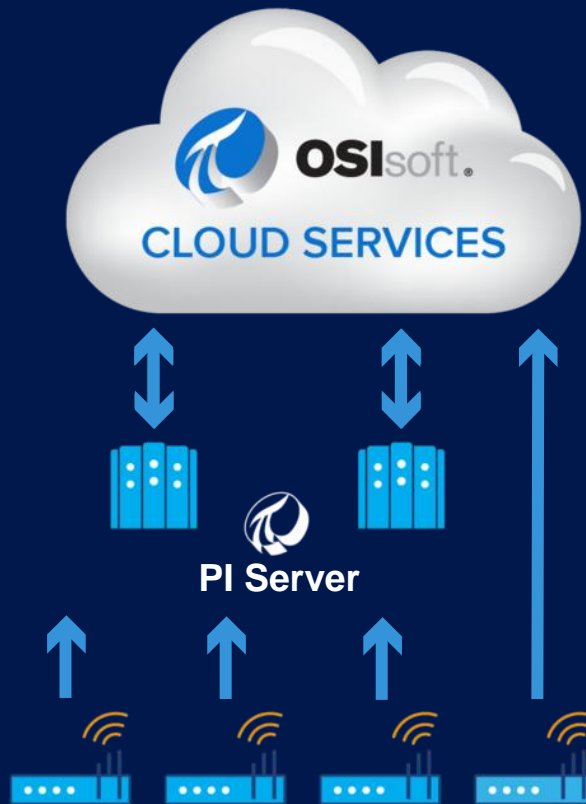
Enterprise Data



Site Data

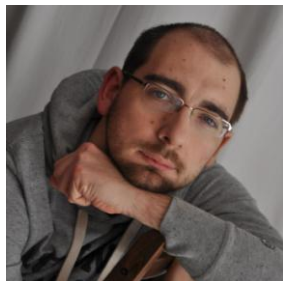


Edge Data



Enabling  
Data Science &  
Advanced Analytics

*In the cloud*  
*On-premises*  
*At the edge*



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OSIsoft USA

# PI Integrators – Related PI World sessions

<b>EDPR Energias de Portugal - Renovaveis</b>	<i>Success Story in Performance Evaluation using AF Analytics &amp; PII4BA with High Number of Calculations</i>
<b>Ørsted</b>	<i>Ørsted Wind Farm Site Operation with OSIsoft AF</i>
<b>Henkel AG &amp; Co.</b>	<i>Prediction of In-Process Quality</i>
<b>TransCanada</b>	<i>Extending TransCanada's PI System Infrastructure with the AWS Cloud</i>
<b>OSIsoft</b>	<i>Introduction to Data Science for PI Data for PI Professionals</i>
<b>OSIsoft</b>	<i>Hands-on Lab: Apply Predictive Machine Learning Models to Operations</i>

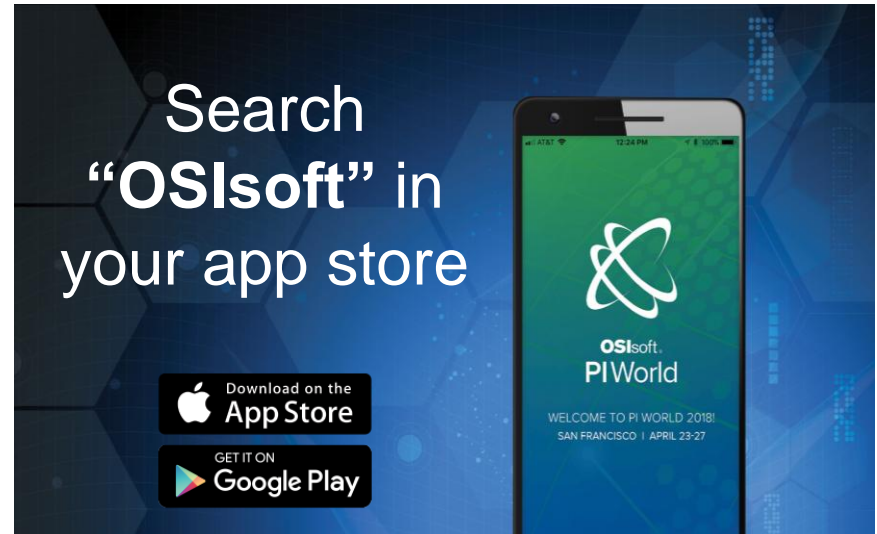
# Questions?

Please wait for  
the **microphone**

State your  
**name & company**



# Please rate this session in the mobile app!





謝謝 KEA LEBONA  
TARADH LEIBH 고맙습니다  
BAЯPЛAЛAА MISAOTRA ANAO  
DZIĘKUJĘ CI NGIYABONGA TEŞEKKÜR EDERIM GRACIES  
OBRIGADO شكرا SALAMAT  
DANKON TANK TAPADH LEAT  
DANKIE TERIMA KASIH  
KÖSZÖNÖM  
СПАСИБО  
PAKMET CIZGE  
GO RAIBH MAITH AGAT  
БЛАГОДАРЯ GRACIAS  
ТИ БЛАГОДАРАМ  
MAHADSANID  
TAK DANKE  
RAHMAT  
HATUR NUHUN  
CẢM ƠN BẠN  
WAZVIITA  
DANK JE  
AČIŮ SALAMAT MAHALO IĀ 'OE TAKK SKALDU HA  
GRAZZI PAKKA PĒR PAXMAT CAĞA  
FÄLEMINDERIT  
EΥΧΑΡΙΣΤΩ GRATIAS TIBI  
DI OU MÈSI  
ĐAKUJEM  
MATUR NUWUN  
UA TSAUG RAU KOJ  
ТИ БЛАГОДАРАМ  
СИПОС  
MULTUMESC  
FAAFETAİ  
ESKERRIK ASKO  
HVALA ХВАЛА ВАМ  
TEŞEKKÜR EDERIM  
HVALA  
DZЯKYI  
GRAZIE



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THANK YOU



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BARCELONA 2018

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