

Digital Transformation - Turning Data into Intelligence

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OSIsoft's IIOT, Advanced Analytics,
and "Big Data" Forum for the Energy Industries
October 12, 2016



Agenda

- Digital Transformation with OSIsoft & Microsoft
 - IoT and Journey to the Cloud
- PI Integrator for Microsoft Azure
 - Cortana Intelligence and SQL Server 2016
 - Red Carpet Incubation Program
- Customer Showcase
- Next Steps



Digital Transformation

The opportunity for all of us in this room to help our customers enable digital transformation of their businesses has never been greater.

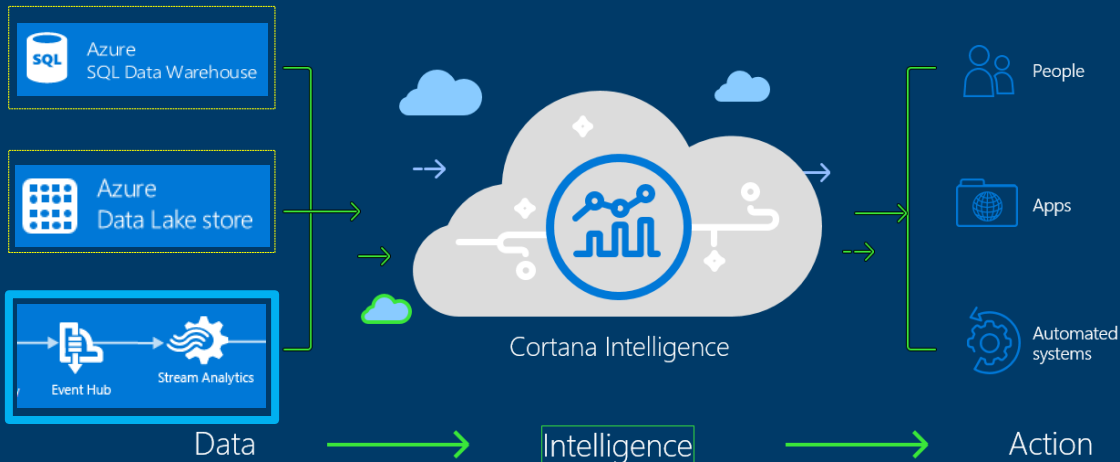
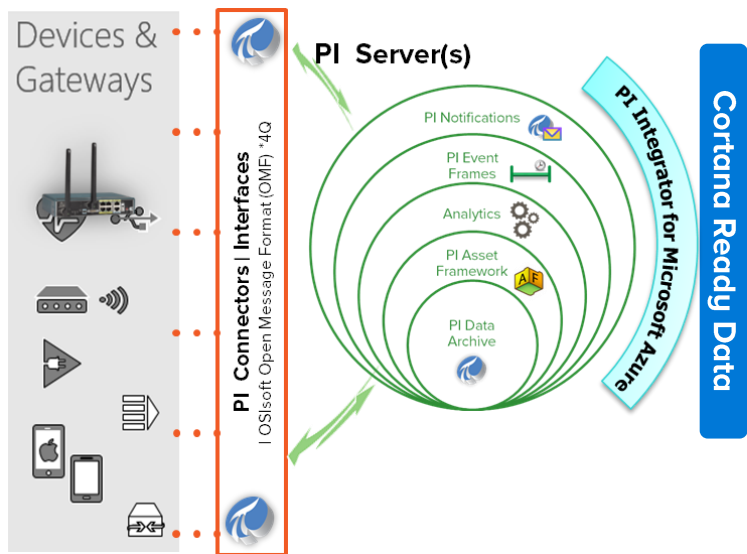


Journey to the cloud

PI Integrator for Microsoft Azure



Cortana Intelligence



OSIsoft.

Empowering Business in Real-Time.

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“A digital transformation is remaking companies and their factories, **bringing the intersection of manufacturing and technology even closer**”*



Satya Nadella CEO, Microsoft



**Dr. Pat Kennedy,
CEO, OSIsoft**

**Data Infrastructure for
Digital Transformation**

OSIsoft®. Pioneers of Digital Transformation



35+
years



1.5B
sensors



19,000
sites



127
countries



1300
case studies



65%
of Industrial
Fortune 500



2x
employees in
last 6 years

OSISOFT: ALREADY YOUR DIGITAL TRANSFORMATION PARTNER

Oil & Gas



95%
of top 60
companies

Power & Utilities



1000
of the world's
leading
companies

Chemicals



37/50
of the world's
largest
companies

Life Sciences



9/10
of top
pharma
companies

Metals & Mining



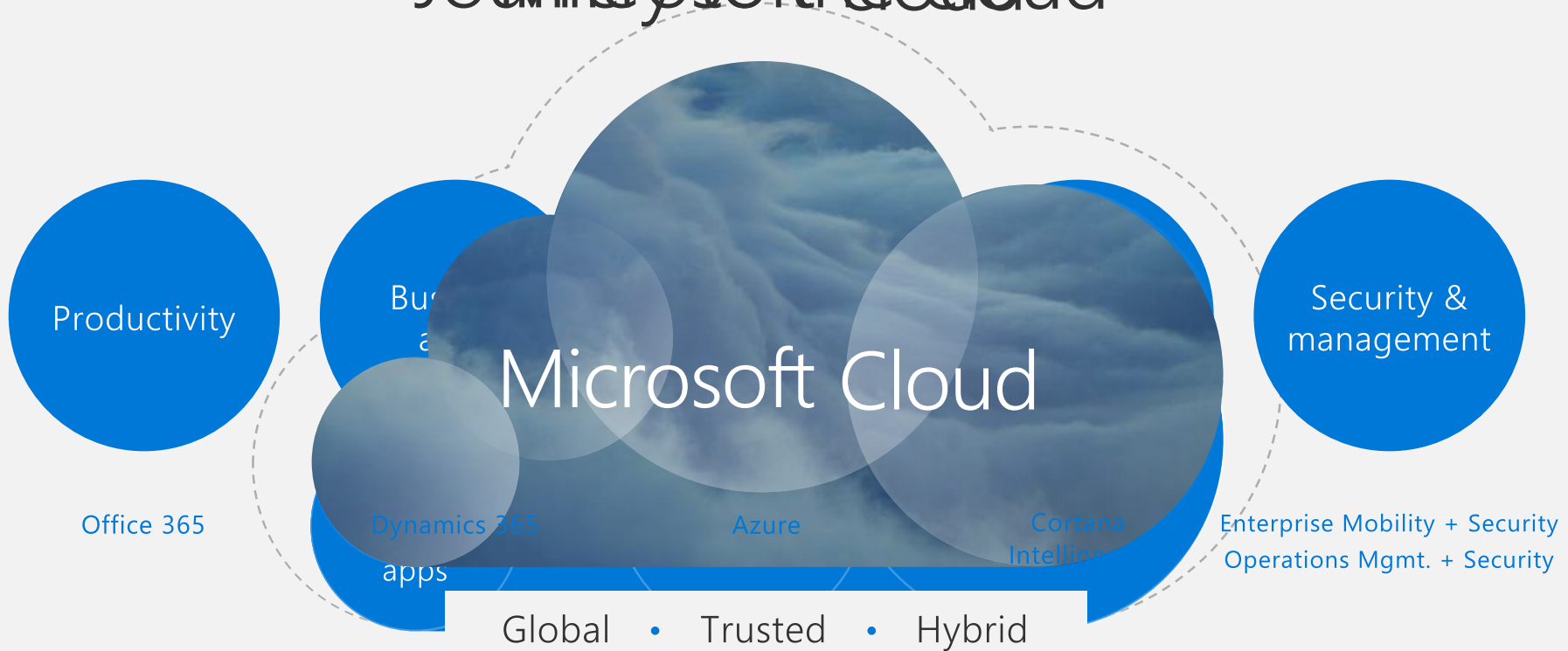
100%
of Fortune 500
companies

Pulp & Paper



400+
sites

Journey to the cloud



One Azure ecosystem



34

Azure regions today
More than AWS & Google combined



100s of service
providers



1,000s of
enterprises



PI Integrator for Microsoft Azure & Cortana Intelligence

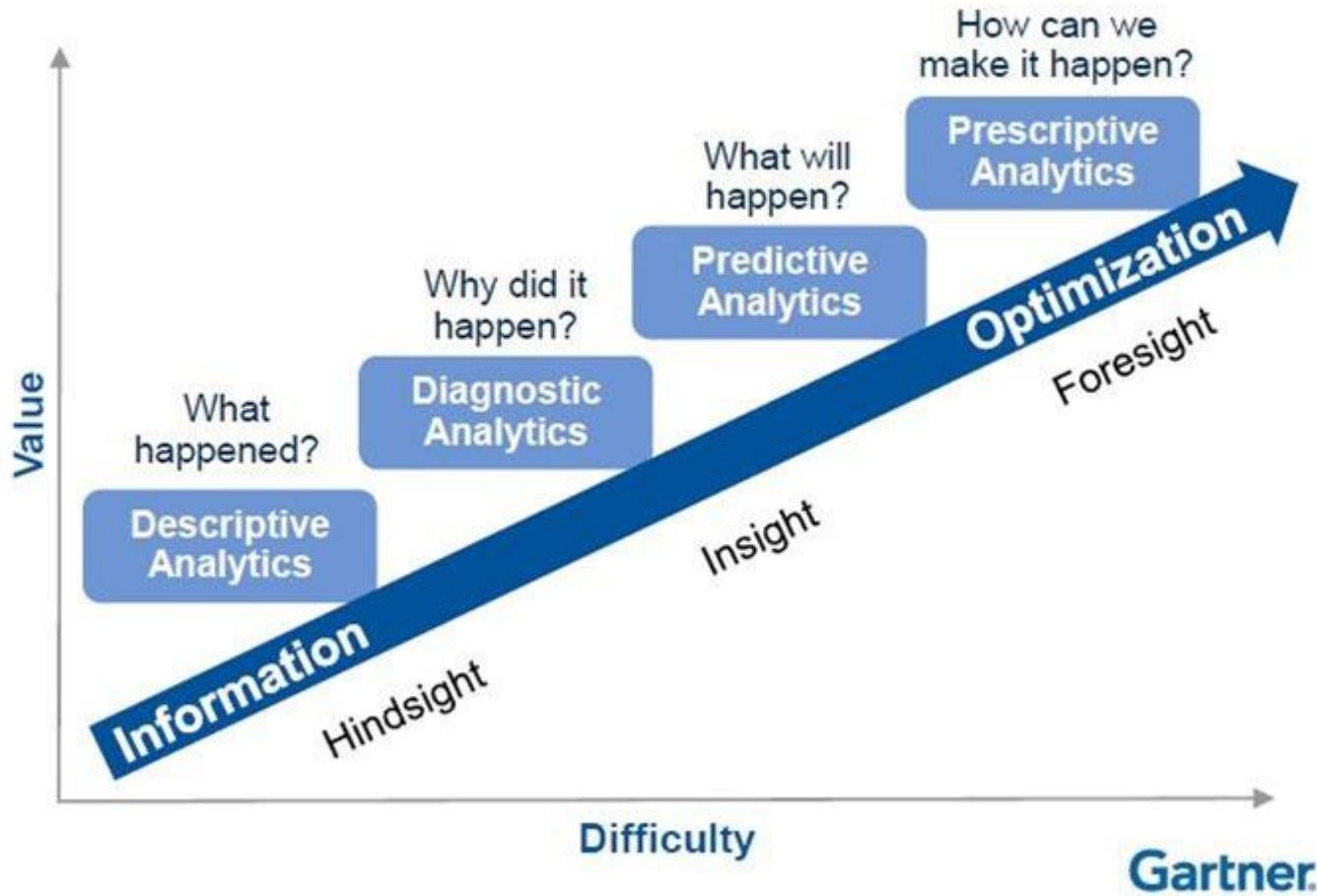
Energy Management,
Predictive Maintenance,
Prescriptive Analytics



OSIsoft®



Microsoft



Cortana Intelligence Suite

Unparalleled
security

**>\$1B annual spend on security
& ecosystem**



Hyper
scalability

**100+ datacenters in over
40 countries**



Most
comprehensive

**Over 16 services to support
advanced analytics**

- Preconfigured Solutions
- Dashboards and Visualizations
- Machine Learning and Analytics
- Big Data Store
- Information Management

- Personal Digital Assistant – Cortana
- Perceptual Intelligence

Intelligent
by design

**\$12B R&D spend annually
1000+ scientists and engineers
10,000+ peer reviewed publications**



Face APIs



Speech APIs



Computer Vision APIs

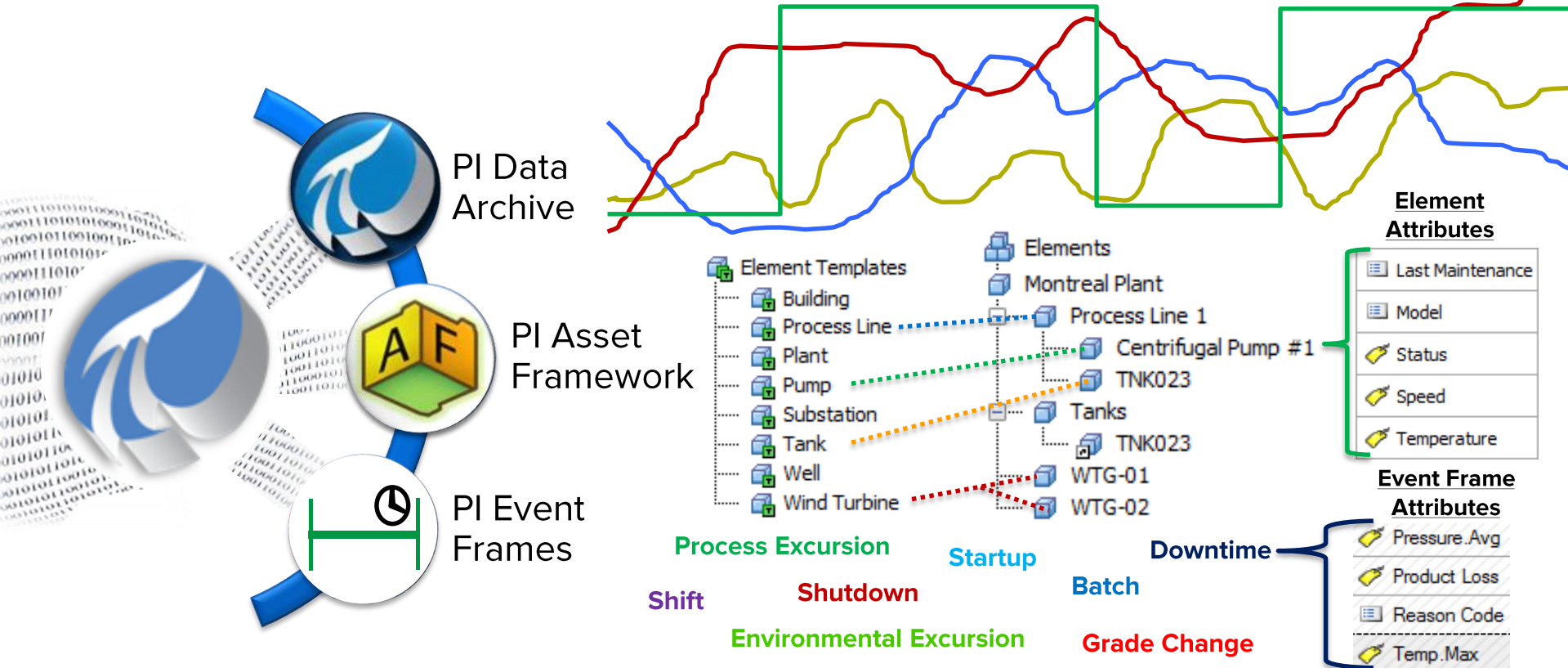


Text Analytics

Transform data into intelligent action in the cloud



PI System Stores and Organizes Data



AFTER...

BEFORE...

Crude Desalter

Operating Pressure: 110 psi
Charge Rate: 14 gph
Mix Valve Pressure: 8 psi
Water Rate: 8%

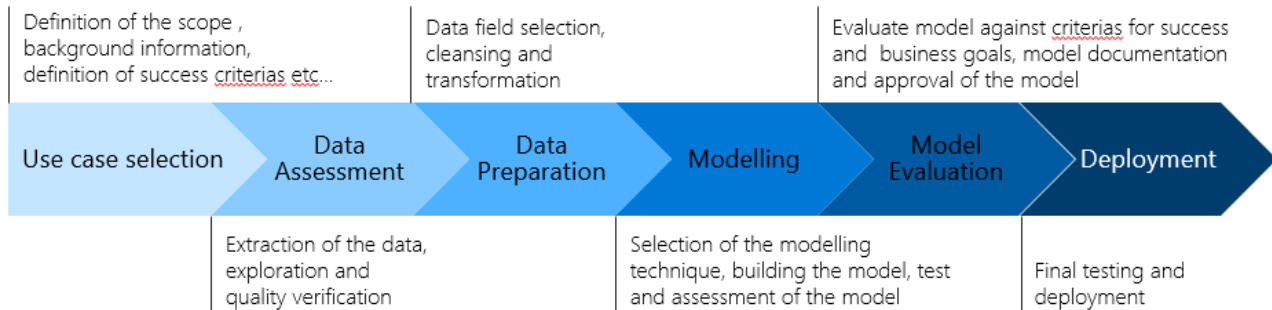
Weather Conditions

Relative Humidity: 34%
Current Temp: 85 F
High: 92
Low: 57 F
Wind: 8 mph/N

Crude Furnace

Draft Pressure: -0.5 WC
Stack Temp: 316 F
Oxygen: 2.5%
Outlet Temp: 840 F
Cold Oil Velocity: 6 ft/sec

Typical Planning for Data Science Experiments



Data Scientist: The Sexiest Job of the 21st Century

Meet the people who can coax treasure out of messy, unstructured data.
by Thomas H. Davenport and D.J. Patil

When Jonathan Goldman arrived for work in June 2006 at LinkedIn, the business networking site, the place still felt like a start-up. The company had just under 8 million accounts, and the number was growing quickly as existing members invited their friends and colleagues to join. But users weren't seeking out connections with the people who were already on the site at the rate executives had expected. Something was apparently missing in the social experience. As one LinkedIn manager put it, "It was like arriving at a conference reception and realizing you don't know anyone. So you just stand in the corner sipping your drink—and you probably leave early."

70 Harvard Business Review October 2009

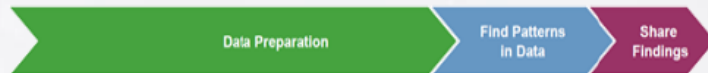
"Data scientists spend up to 80 percent of their time wrestling with the data rather than generating new business insights."

—NEW YORK TIMES

HOTTEST JOBS IN 2016

Data Scientist

80% WASTED TIME



Analysts spend vast majority of time preparing data, not analyzing data.



OSIsoft.

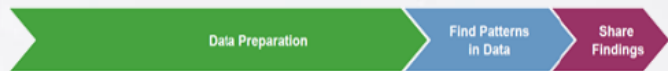
Empowering Business in Real-Time.

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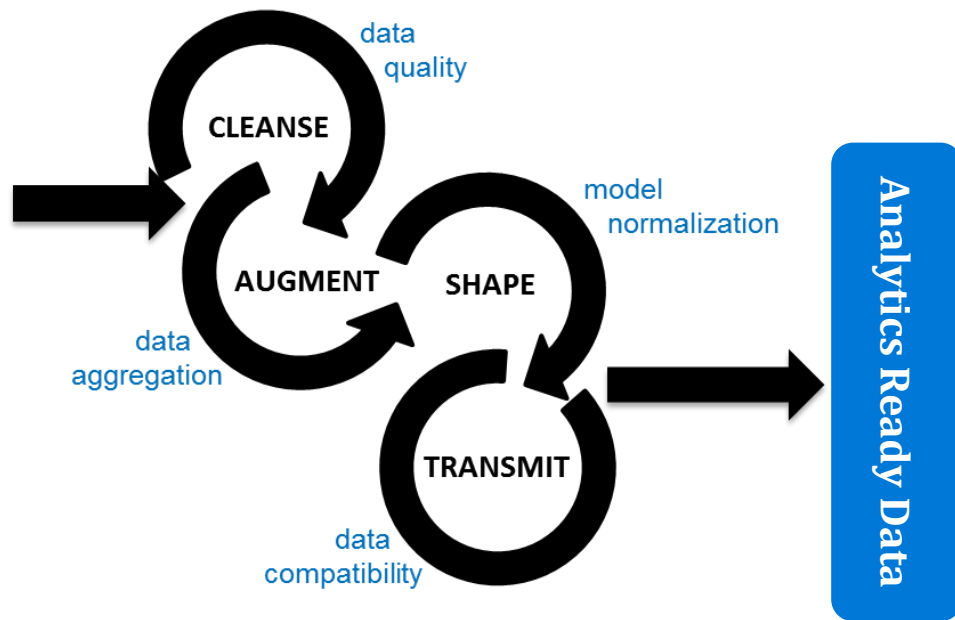
80% WASTED TIME



Analysts spend vast majority of time preparing data, not analyzing data.

Solution: PI Integrator

Analytics-Ready Data | Context | Events via C-A-S-T



Integration: Analytics-ready data for the **Physical** World

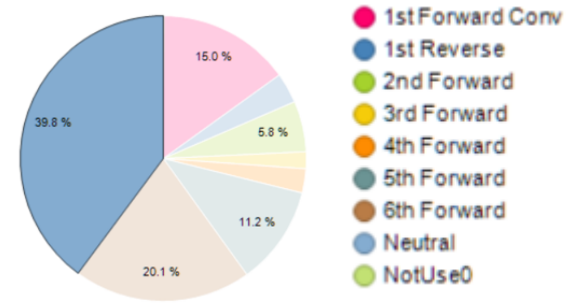


3 Contexts / 3 Perspectives

- Time-series – Time Focus
- Assets – Equipment Focus
- Events – Event Focus

PI
Integrators

Gear Select by Operator



2015-04-23 15:59:50	23.6547420812366	23.2147636153275	28.3663721651326
2015-04-23 16:00:00	23.6547420812366	23.2147636153275	28.3663721651326
2015-04-23 16:00:10	23.6547420812366	23.2147636153275	28.3663721651326
2015-04-23 16:00:20	23.6547420812366	23.2147636153275	28.3663721651326
2015-04-23 16:00:30	23.6547420812366	23.2147636153275	28.3663721651326
2015-04-23 16:00:40	23.6547420812366	23.2147636153275	28.3663721651326
2015-04-23 16:00:50	23.6547420812366	23.2147636153275	28.3663721651326
2015-04-23 16:01:00	23.6547420812366	23.2147636153275	28.3663721651326
2015-04-23 16:01:10	23.6547420812366	23.2147636153275	28.3663721651326

Red Carpet Incubation Program (RCIP)

Devices & Gateways

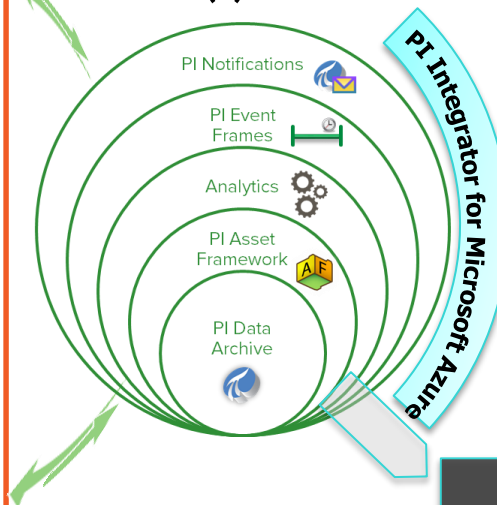


PI Connectors | Interfaces

| OSisoft Open Message Format (OMF) *4Q



PI Server(s)

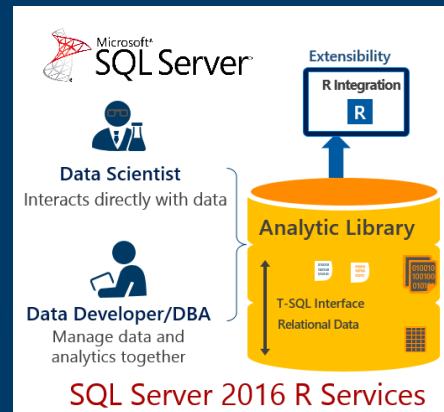


Analytics Ready Data

PI Integrator for Microsoft Azure



PI Integrator for Business Analytics:
Data Warehouse

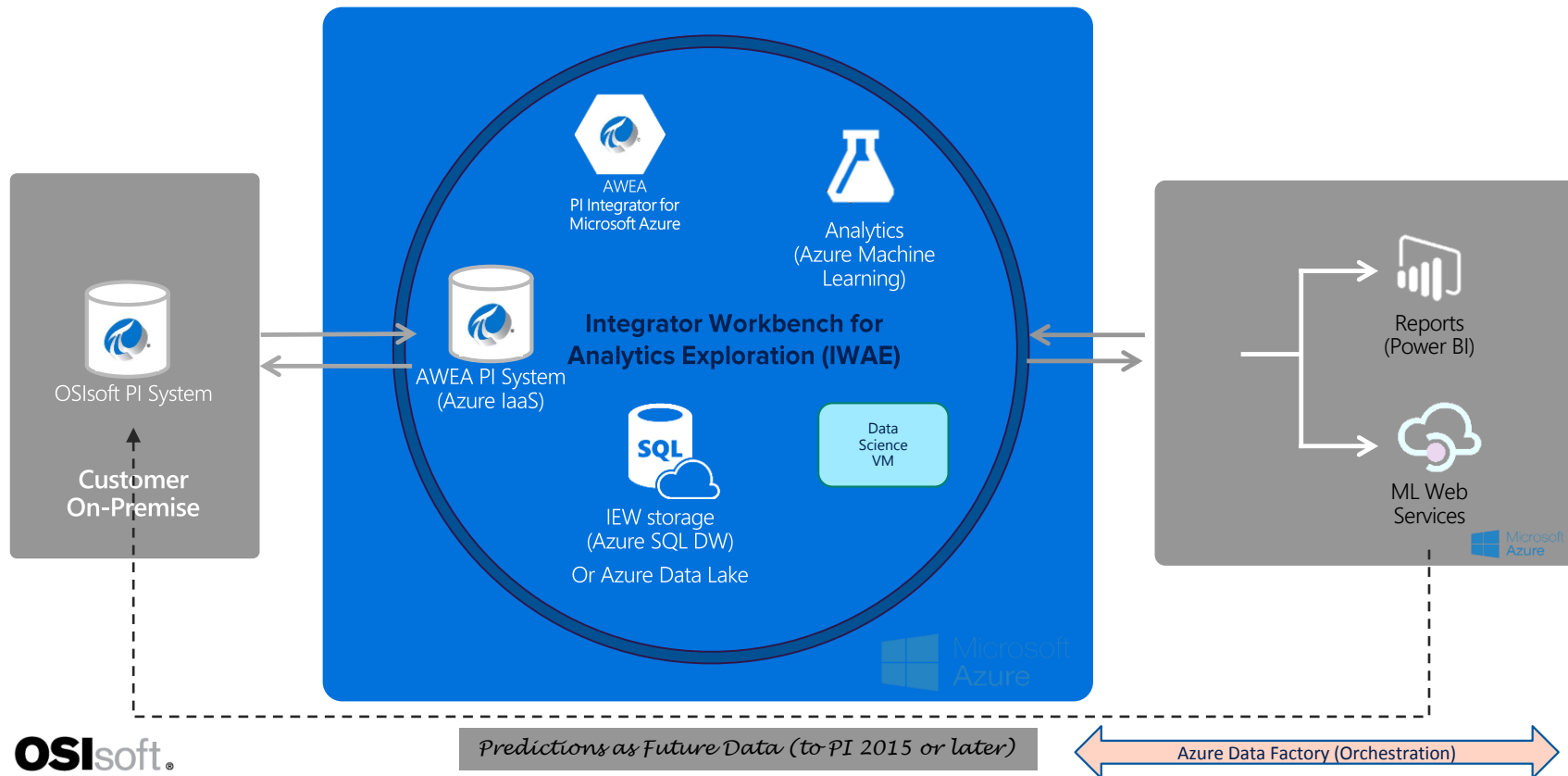


Red Carpet Incubation Program for Select Customers

 ArcelorMittal Integrated Steel & Mining	 Kraft Brewery	 devon Independent Oil and Natural Gas	 Henkel Multinational Consumer	 TOYOTA Automotive OEM	
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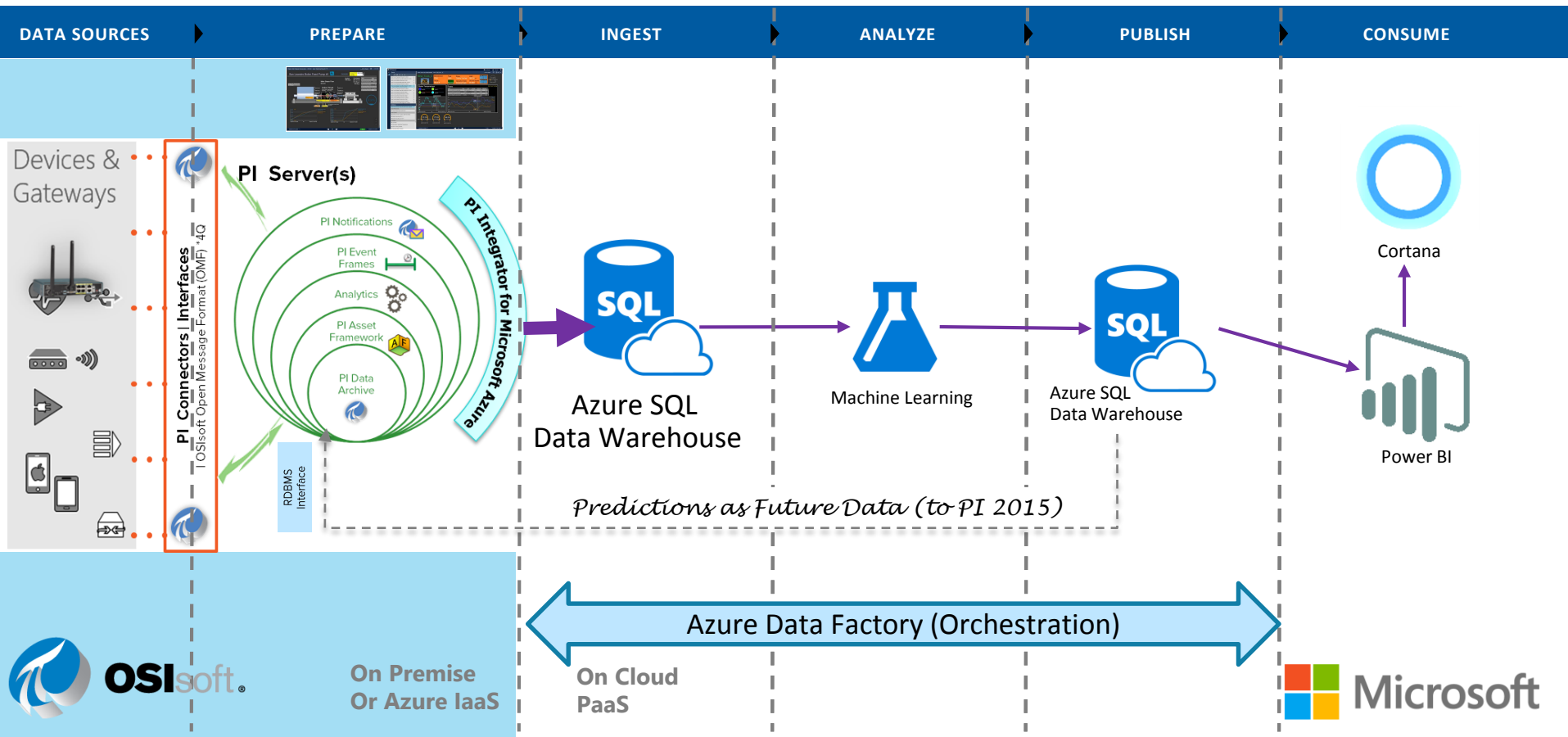
Integrator Workbench for Analytics Exploration (IWAE) Microsoft

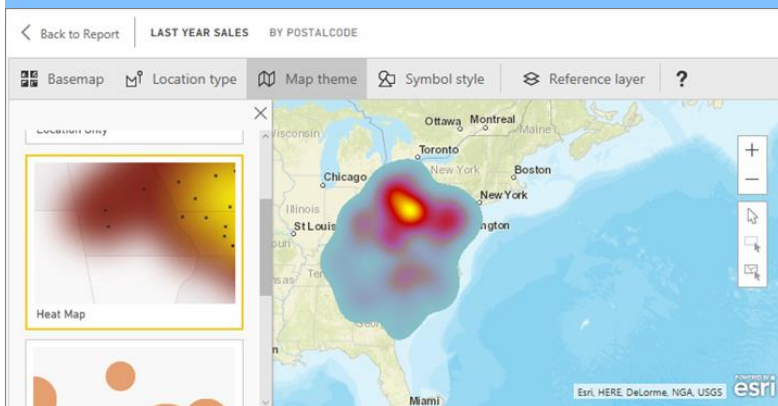
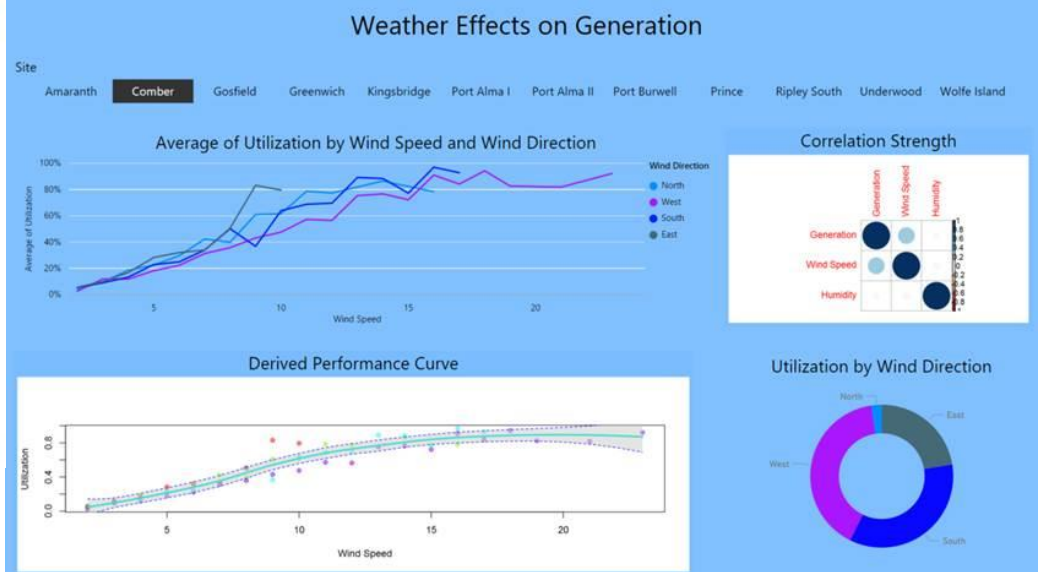
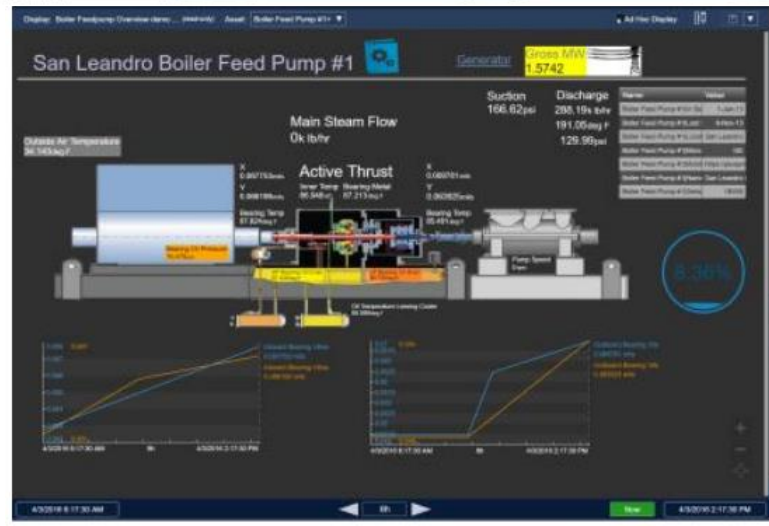
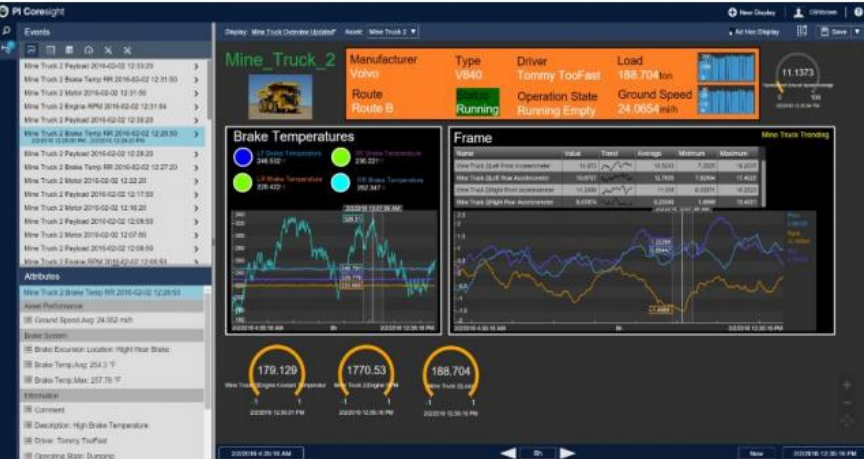
Red Carpet Incubation Program (RCIP)
for PI Integrator for Microsoft Azure and Cortana Intelligence



Advanced Analytics Operationalized Pipeline

PI Integrator for Microsoft Azure and Cortana Intelligence





Leveraging the PI System and Cortana Intelligence to Increase Process Efficiency



COMPANY and GOAL

Deschutes Brewery is the 7th largest craft brewery in US, and wanted to maximize production with its existing infrastructure to fund construction of a 2nd brewery in Roanoke, VA

CHALLENGE

Batch's phase transition happens between manual density measurements occurring every 8-10 hours

- Impact: Losing up to 72 hours in production time

SOLUTION

Use data science to achieve accurate predictive analytics for determining a batch's density measurements

- PI System
- PI Integrator for Microsoft Azure
- SQL Data Warehouse
- Azure Machine Learning
- Azure Data Factory

RESULTS

Ability to eliminate production time losses and increase production capacity

- Accurate predictions of when a batch's phase transitions from fermentation to free rise

