# Using PI Integrators to Improve the Value of Your PI System Data

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# Seeking Value in a Sea of Buzz and Jargon

Machine Learning

Internet of Things

Advanced Analytics

Data Lakes

Predictive Analytics

Big Data

Data Warehouse

Operational Intelligence

Data Science

Business Intelligence

Data Mining

Advanced Visualization


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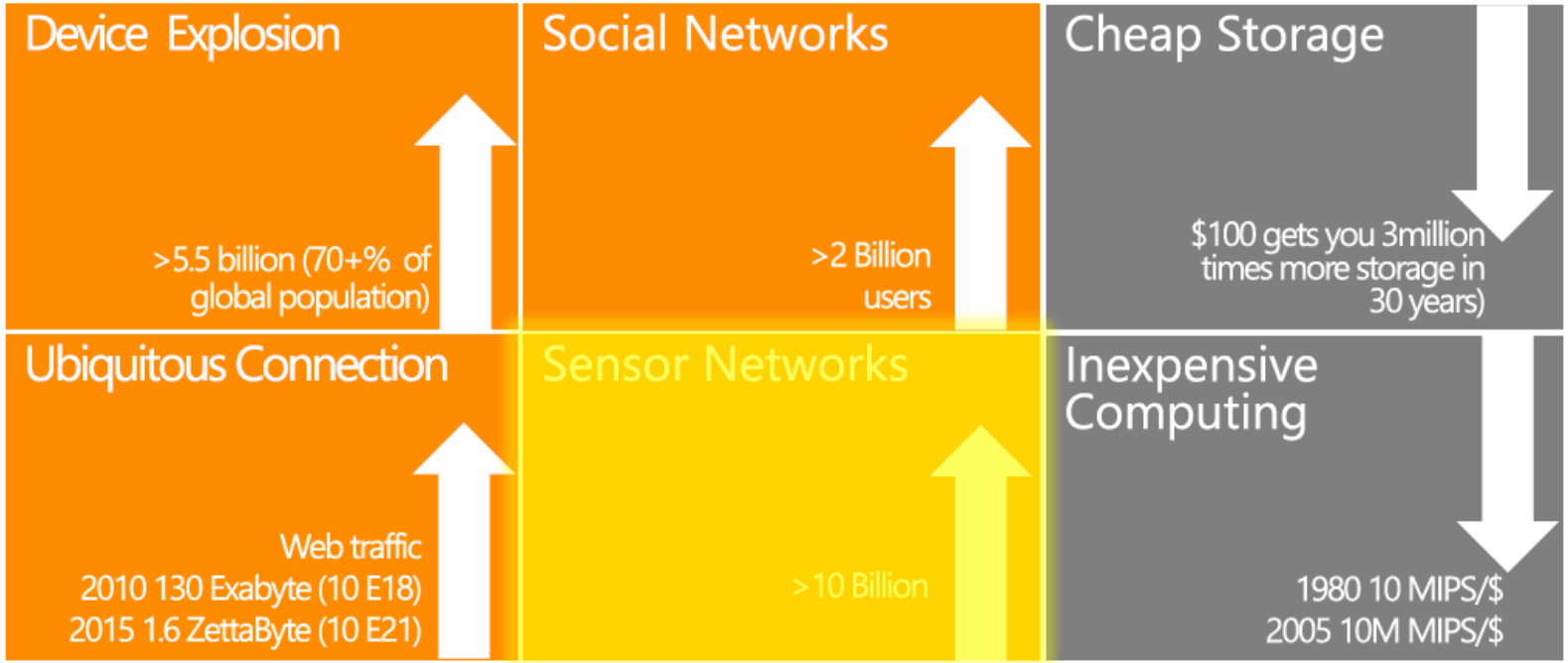
# The Importance of Data (and Sensor Data) is Increasing





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# Sensor Data Occupies a Key Role in (Big) Data Projects

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# Approaches to Getting Value from this (Big) Data

## Data Warehousing

- **Centralizing data** from **different** business systems

## Visual Correlations

- **Visualizing** data sets across **multiple** variables

## Statistical Analytics

- **Identifying patterns** through statistical methods that require **large** and **diverse** datasets


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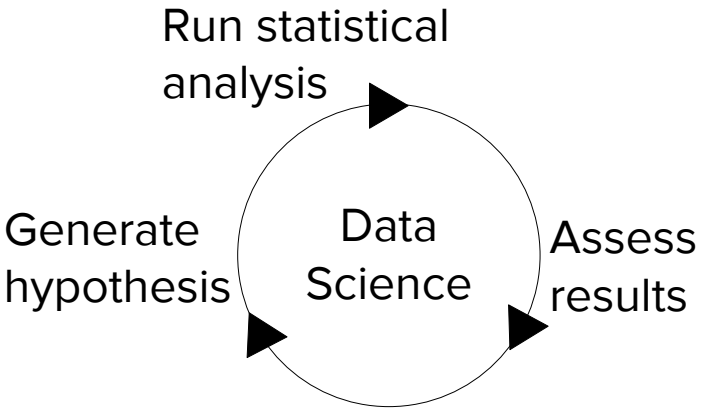
# Approaches to Getting Value from this (Big) Data

**Visual Correlations**

Describe

Diagnose

**Statistical Analytics**





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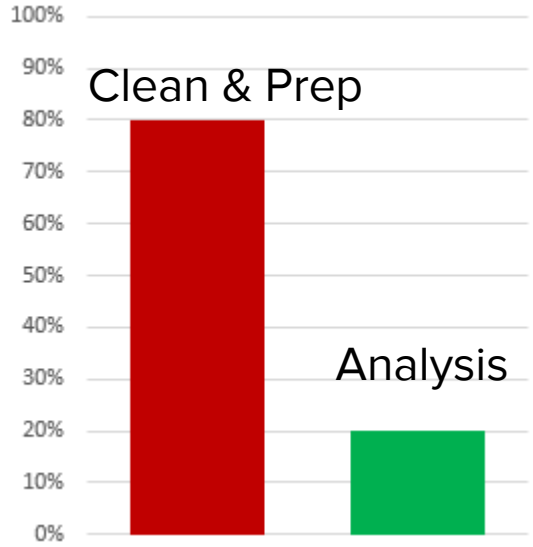
# (Big) Data Projects: Sound Attractive … But There are Challenges

64% of large enterprises plan to implement a big data project.
85% will be unsuccessful.




Data cleansing and preparation tasks can take 50-80% of the development time and funds.

Source: Harvard Business Review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# OSIsoft has Listened to Your Needs

Summary of Needs:

Familiar tools

Scalability without code

Flexibility and trust


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# PI Integrators Let You Clean and Prepare PI System Data

for your business intelligence tools, data warehouses, and data lakes

PI System

Assets
Events

PI Integrator

**Cleanse**
Data quality

**Augment**
Aggregation

**Shape**
Model

**Transmit**
Normalization

TIBCO Spotfire

Power BI

COGNOS

tableau

Microsoft SQL Server Reporting Services

hadoop


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# Let's See This in Action!

## Publishing Building Energy Consumption for 67 Buildings to SAP HANA


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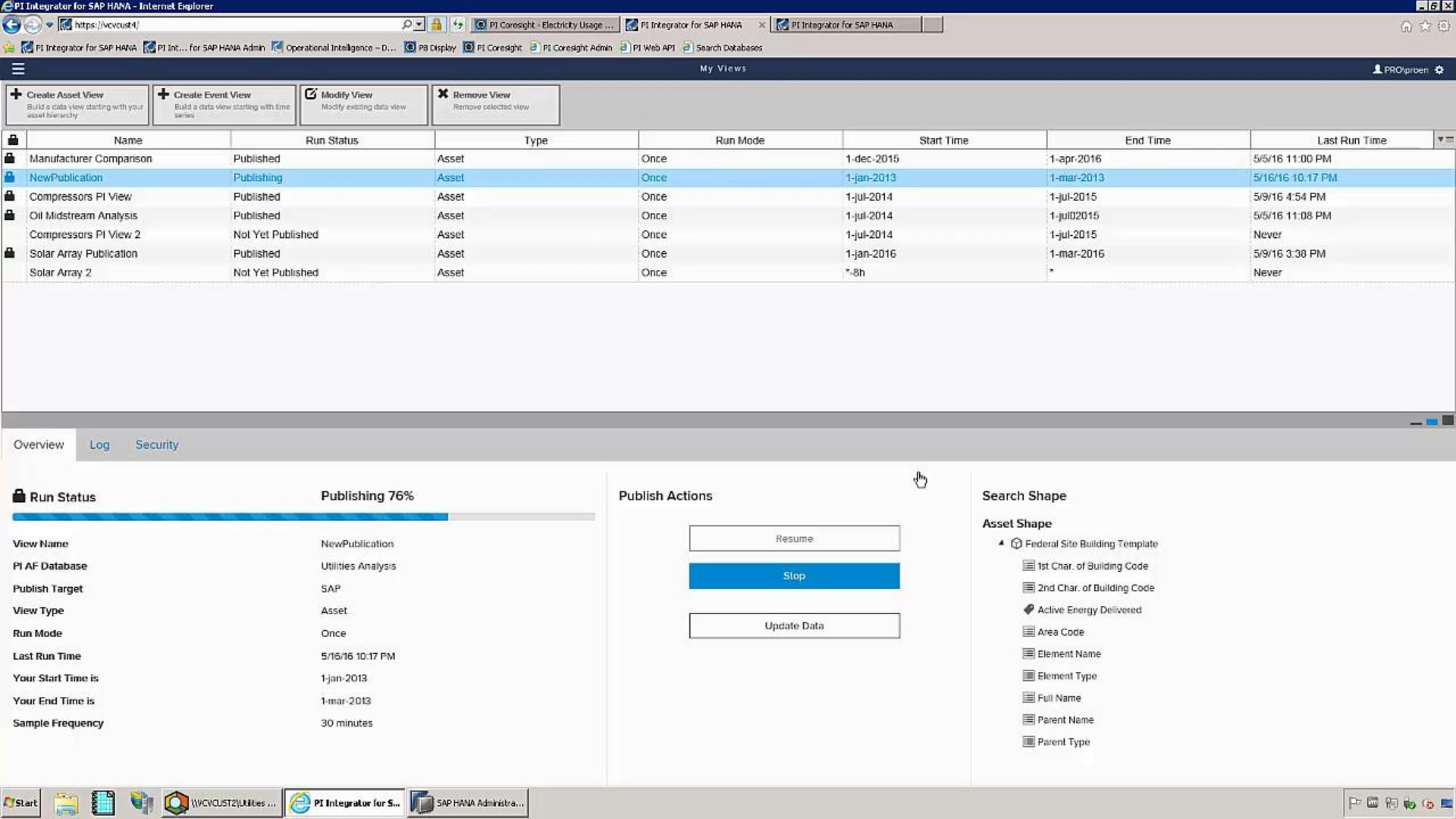
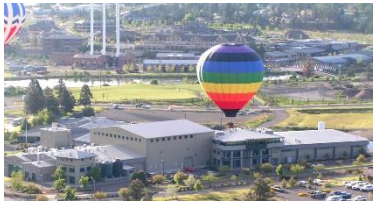

PI Integrator for SAP HANA - Internet Explorer
My Views
Create Asset View
Build a data view starting with your asset hierarchy
Create Event View
Build a data view starting with time series
Modify View
Modify existing data view
Remove View
Remove selected view
Name
Run Status
Type
Run Mode
Start Time
End Time
Last Run Time
Manufacturer Comparison
Published
Asset
Once
1-dec-2015
1-apr-2016
5/5/16 11:00 PM
NewPublication
Publishing
Asset
Once
1-jan-2013
1-mar-2013
5/16/16 10:17 PM
Compressors PI View
Published
Asset
Once
1-jul-2014
1-jul-2015
5/9/16 4:54 PM
Oil Midstream Analysis
Published
Asset
Once
1-jul-2014
1-jul2015
5/5/16 11:08 PM
Compressors PI View 2
Not Yet Published
Asset
Once
1-jul-2014
1-jul-2015
Never
Solar Array Publication
Published
Asset
Once
1-jan-2016
1-mar-2016
5/9/16 3:38 PM
Solar Array 2
Not Yet Published
Asset
Once
*-8h
*
Never
Overview
Log
Security
Run Status
Publishing 76%
View Name
NewPublication
PI AF Database
Utilities Analysis
Publish Target
SAP
View Type
Asset
Run Mode
Once
Last Run Time
5/16/16 10:17 PM
Your Start Time is
1-jan-2013
Your End Time is
1-mar-2013
Sample Frequency
30 minutes
Publish Actions
Resume
Stop
Update Data
Search Shape
Asset Shape
Federal Site Building Template
1st Char. of Building Code
2nd Char. of Building Code
Active Energy Delivered
Area Code
Element Name
Element Type
Full Name
Parent Name
Parent Type

# History and Background

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

- 2 brewhouses
- 50+ vessels
- Bottling and kegging
- 7th largest craft brewer in the U.S.



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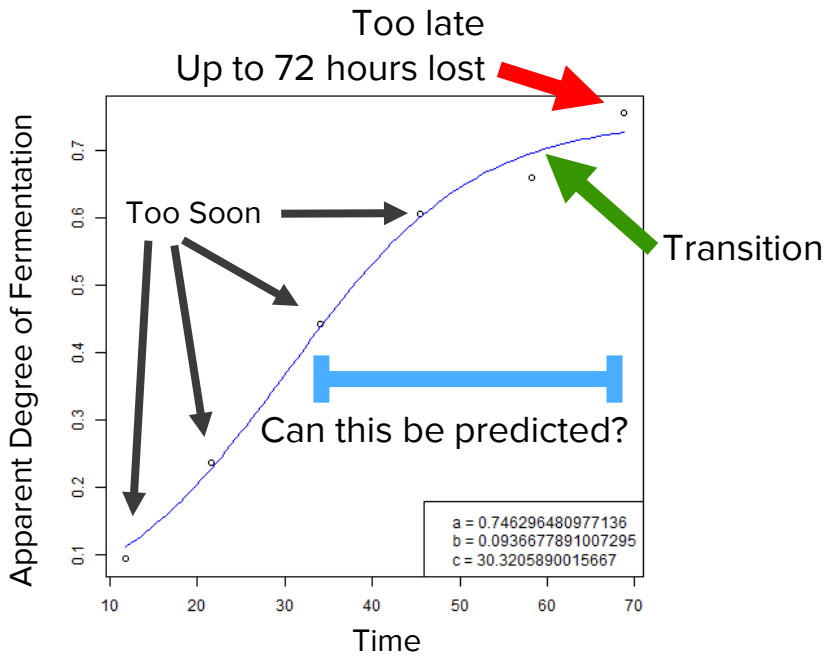
# Production Challenges

Filing ▶ Fermentation ▶ Free Rise ▶ •••




**Options**

- Invest $750k into inline density meters
- Manually predict transition in spreadsheets

**Constraints**

- CAPEX not an option
- Only one manual density measurement per vessel every 8-10 hours

**Challenge**

- Transition occurs between manual density measurements
- Prepare data for each batch prediction
- Automate & operationalize predictions
- Continuously improve accuracy of predictions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# 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 third 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 process

## SOLUTION

Used the PI Integrator for Microsoft Azure to prepare operating, asset, and event data for each batch in the PI System for use by Azure Machine Learning to train a predictive model and inform when a phase transition occurs

## OUTCOME

Ability to eliminate production time losses and increase production capacity

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


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# Machine Learning Model

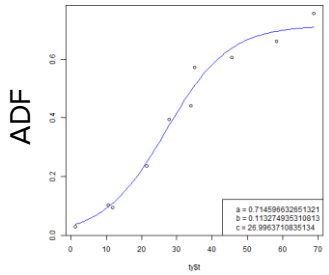
## Proposal

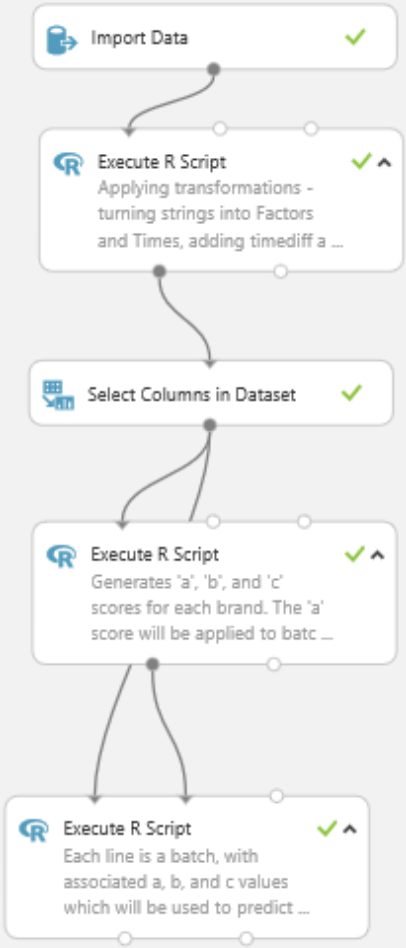
Early Density Readings → Transition Time

## Hypothesis

Transition Time influenced by

- Brand of beer
- Fermentation dynamics (temperatures, pressures, etc)
- Vessel's dimensions & volume





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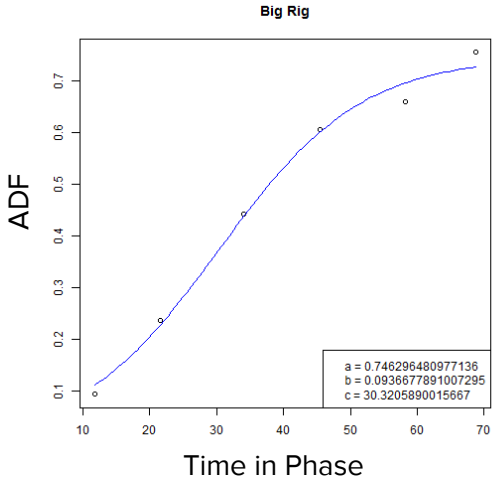
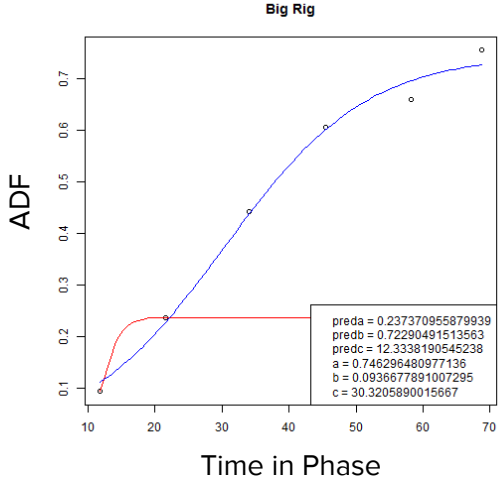
# Azure ML Predicts Accurate Transition Time

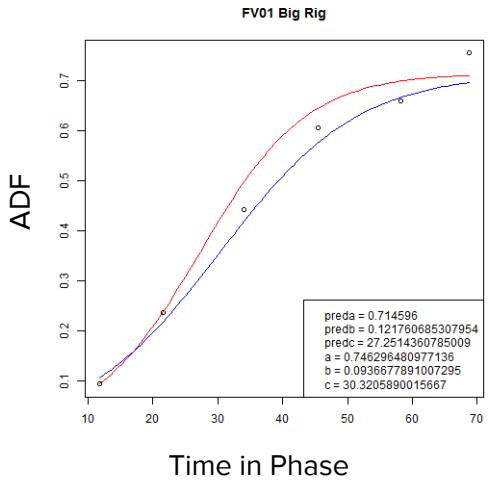
**Benchmark**: Measure accuracy against a standard (based on historical data)

**Predict**: Use 2 early densities to estimate transition time

**Refine**: Base predictions on brand for greater accuracy





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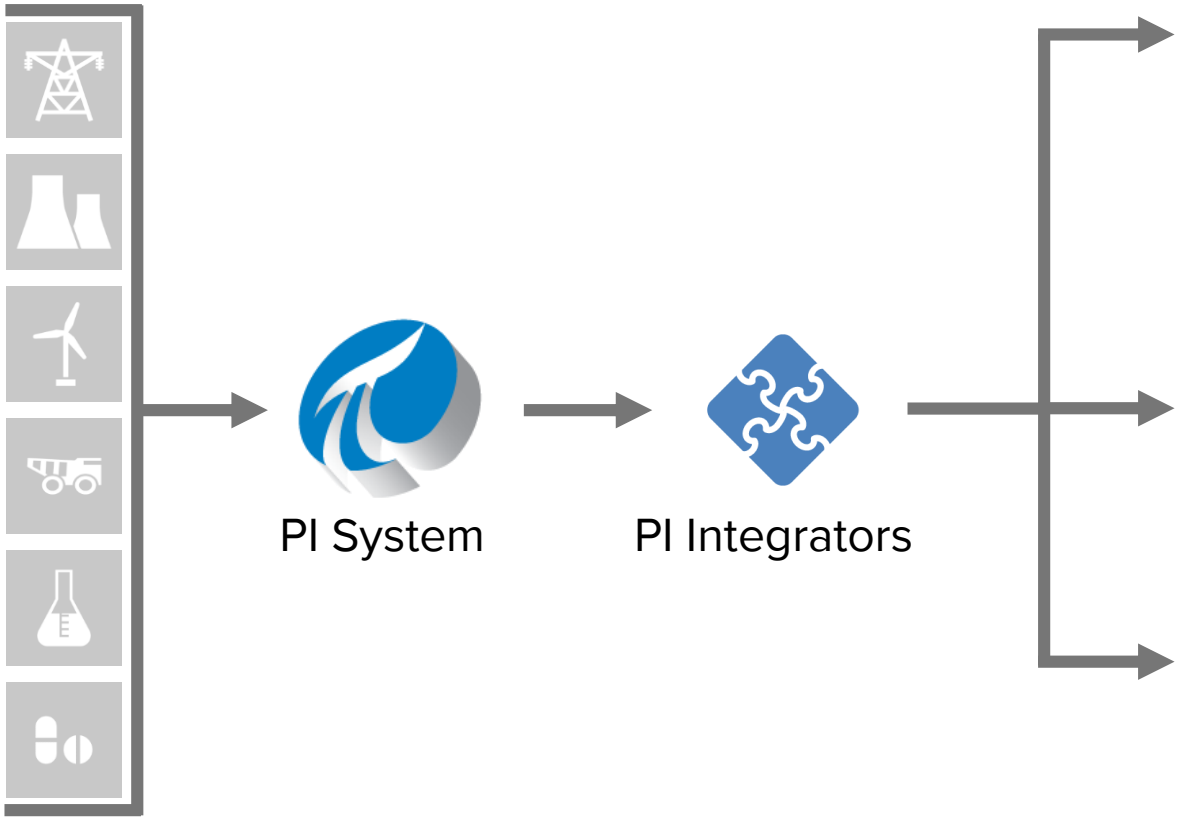
# PI Integrators




PI Integrator for Business Analytics
- SQL Server
- File
- ODBC client
- Hadoop (*new*)
- Oracle RDBMS (*new*)

PI Integrator for SAP HANA
- SAP HANA
- Smart Data Integration (SDI)

PI Integrator for Microsoft Azure (Q4)
- SQL Data Warehouse (Q4)
- Azure SQL (Q4)
- Azure Data Lake (beta)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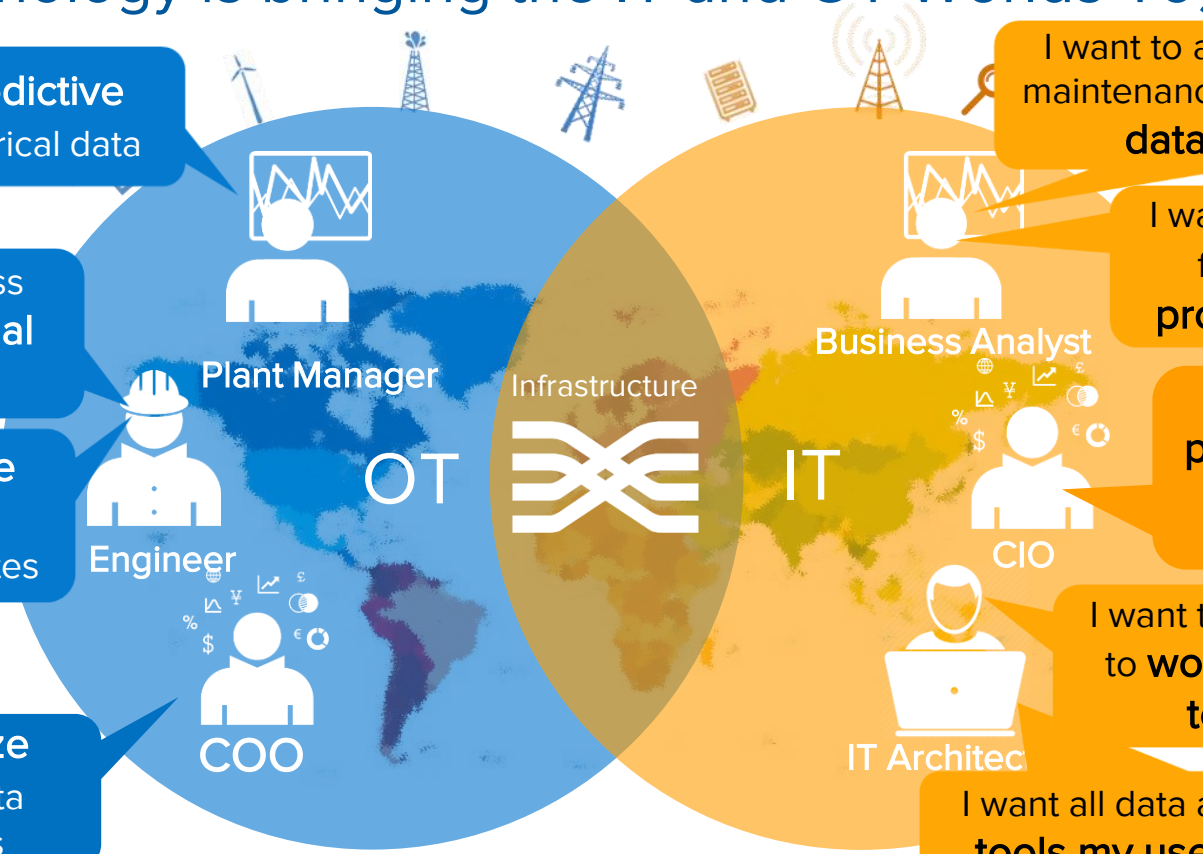
# New Technology is bringing the IT and OT Worlds Together

I want to build **predictive models** from historical data

I want to spend less time on **operational reports**

I want to **compare my equipment** against our other sites

I want to **minimize risks** through data driven decisions




I want to analyze production, maintenance logs, and financial **data all together**

I want operational data for the **Big Data project** we're starting

I want **trusted production data**, to be confident in our decisions

I want the operational data to **work with our other technologies**

I want all data accessible by the BI **tools my users already know**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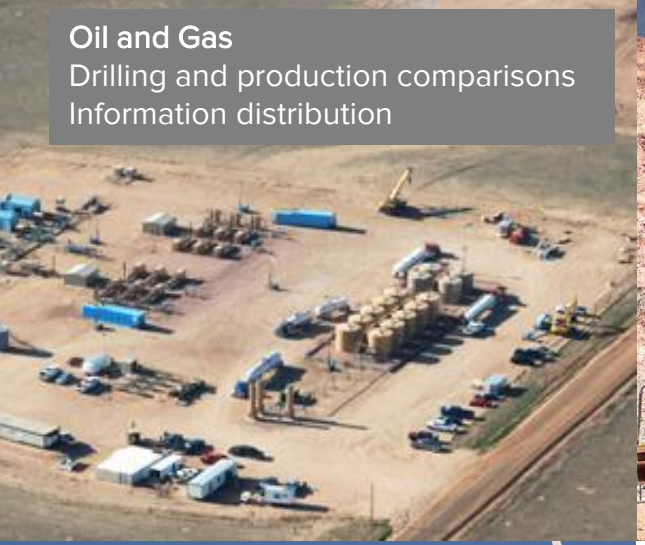

**Oil and Gas**
Drilling and production comparisons
Information distribution

**Mining**
Route optimization
Energy reduction (across fleets of haul trucks)

**Life Sciences**
Reactor comparisons
Process scale-ups
(1L, 3L, 10L, 1kL, 10kL)

**Renewables**
Energy production reports
Wind farm comparisons
Outlier analyses

**PI Integrator for Business Analytics is in use today!**

- ✓ IT/ OT integration
- ✓ Business intelligence and reporting
- ✓ Data warehouse integration
- ✓ Support for cross-platform projects

**Food and Beverage**
Utility usages
Process analytics


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# Move the Needle with PI Integrators

- Start the conversation!
  - Could a colleague make a **better decision** with **data you see daily**?
  - What **business intelligence tools** could you leverage further?
- Visit **YouTube** or [osisoft.com](osisoft.com) to see which PI Integrator works for you

PI Integrator for Business Analytics
PI Integrator for SAP HANA
PI Integrator for Microsoft Azure


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# Contact Information

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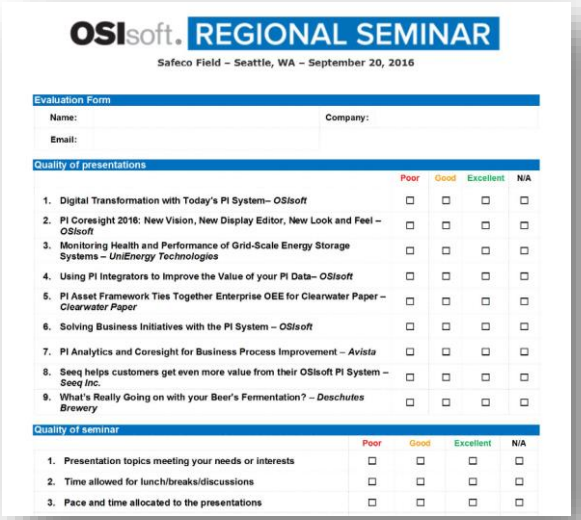
# Questions

Please wait for the **microphone** before asking your questions

State your
**name & company**

# Please remember to…

Complete the Survey
for this session



OSIsoft. REGIONAL SEMINAR

Safeco Field – Seattle, WA – September 20, 2016

**Evaluation Form**

Name: Company:

Email:

**Quality of presentations**

| | Poor | Good | Excellent | N/A |
|---|---|---|---|---|
| 1. Digital Transformation with Today's PI System– *OSIsoft* | ☐ | ☐ | ☐ | ☐ |
| 2. PI Coresight 2016: New Vision, New Display Editor, New Look and Feel – *OSIsoft* | ☐ | ☐ | ☐ | ☐ |
| 3. Monitoring Health and Performance of Grid-Scale Energy Storage Systems – *UniEnergy Technologies* | ☐ | ☐ | ☐ | ☐ |
| 4. Using PI Integrators to Improve the Value of your PI Data– *OSIsoft* | ☐ | ☐ | ☐ | ☐ |
| 5. PI Asset Framework Ties Together Enterprise OEE for Clearwater Paper – *Clearwater Paper* | ☐ | ☐ | ☐ | ☐ |
| 6. Solving Business Initiatives with the PI System – *OSIsoft* | ☐ | ☐ | ☐ | ☐ |
| 7. PI Analytics and Coresight for Business Process Improvement – *Avista* | ☐ | ☐ | ☐ | ☐ |
| 8. Seeq helps customers get even more value from their OSIsoft PI System – *Seeq Inc.* | ☐ | ☐ | ☐ | ☐ |
| 9. What's Really Going on with your Beer's Fermentation? – *Deschutes Brewery* | ☐ | ☐ | ☐ | ☐ |

**Quality of seminar**

| | Poor | Good | Excellent | N/A |
|---|---|---|---|---|
| 1. Presentation topics meeting your needs or interests | ☐ | ☐ | ☐ | ☐ |
| 2. Time allowed for lunch/breaks/discussions | ☐ | ☐ | ☐ | ☐ |
| 3. Pace and time allocated to the presentations | ☐ | ☐ | ☐ | ☐ |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# Thank You