EMPOWER YOUR ANALYTICS WITH OPERATIONAL DATA
2019 OSISOFT MUMBAI SEMINAR

# OT/IT Integration

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*OSIsoft, LLC.*
*Oct. 2019*

*Regional Seminars*
*Mumbai, INDIA*

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# OT/IT Integration - Takeaways

- Automate/Change existing business process
  - Small amounts of data
  - Trigger a work order in SAP PM…, Initiate a workflow in IBM Maximo
    - What, Why, How… with use cases
  - People, Process, Technology

- Cloud based machine learning, Enterprise data lake …
  - Large amounts of data
  - Microsoft Azure, Amazon AWS, Google Cloud, SAP HANA, R, Python …
    - What, Why, How… with use cases

OT=Operations Technology
IT=Information Technology


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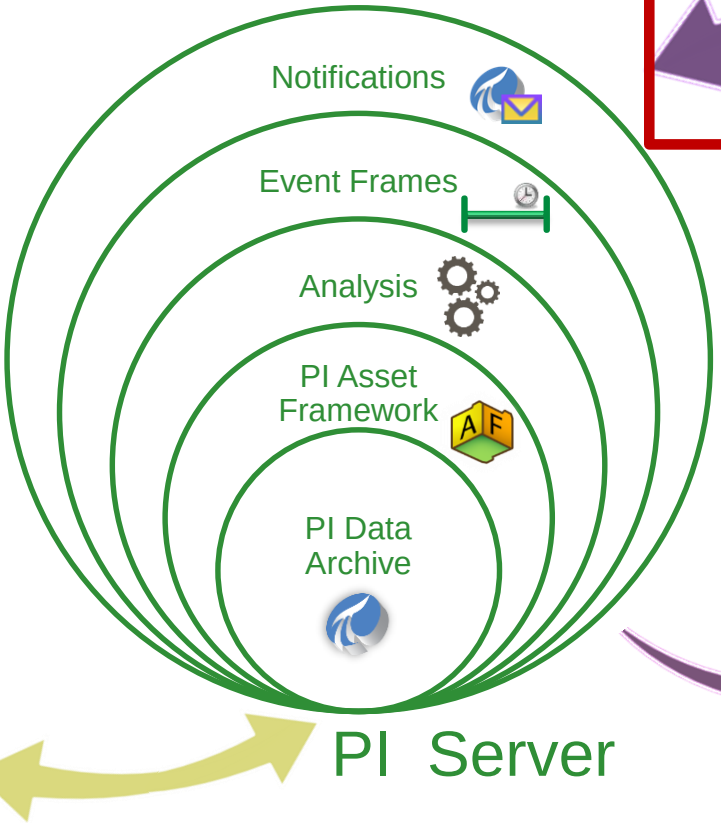
# The Modern PI System




PI Integrators & PI System Access

Microsoft SQL Server · infor · SAS · SAP · IBM · ORACLE · Google Cloud · JDEdwards · aws · Microsoft Azure

1. Connect to relevant sources
2. Collect and archive data
3. Assign context (asset-based)
4. Add Analytics logic
5. Alert and notify
6. Visualize

PI Visualization Suite

- PI Vision
- PI ProcessBook
- PI DataLink

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Compliance Reporting Lab Calibration

Production Maintenance Inventory Quality

ISO

CA.GOV

PI System

SAP

IBM

ORACLE

INFOR

IFS

MINCOM

Ventyx

ERP and Asset Management System


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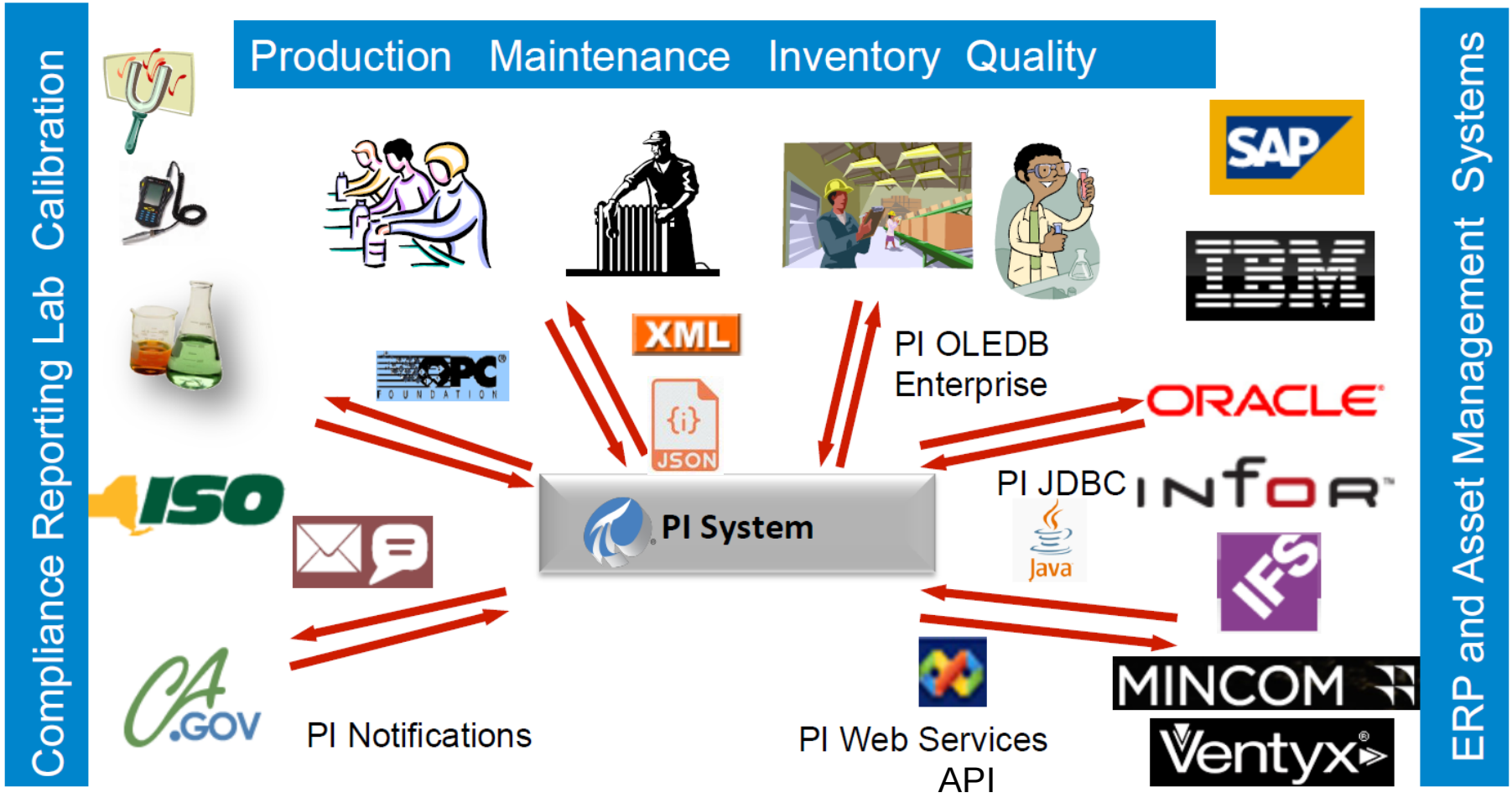



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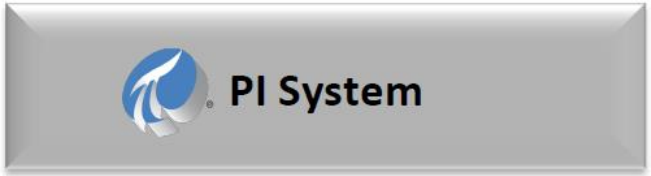
# PI Data Access family of products

## PI System Access (PSA) license





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# Business Integration – What?

- Data/Event integration (transactions)
  - 1000s/day
  - small amounts of data (per transaction)
- Visual integration

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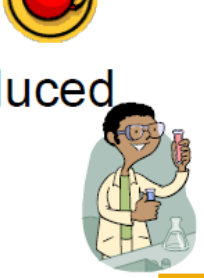
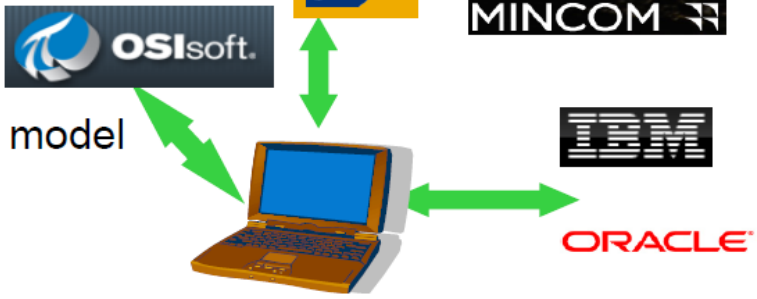
# Business Integration – What (Data, Event, Visual)

- Data - motor run-hours (once a day)
- Event - motor vibration (on alert)
- Event - raw material consumed, goods produced
- Data - lab data (pH, density…) for a batch
- Visual integration
  - shared asset naming convention or data model
  - Loosely coupled URLs







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# Business Integration – Why

Enable business agility (time enough to act)

- Available-to-promise (ATP), better inventory, visibility into capacity

- Condition-based maintenance (CBM) for better asset reliability, reduce maintenance cost

- Quality – compare production runs, close out orders faster
- Visual – visibility into PI System data throughout the enterprise


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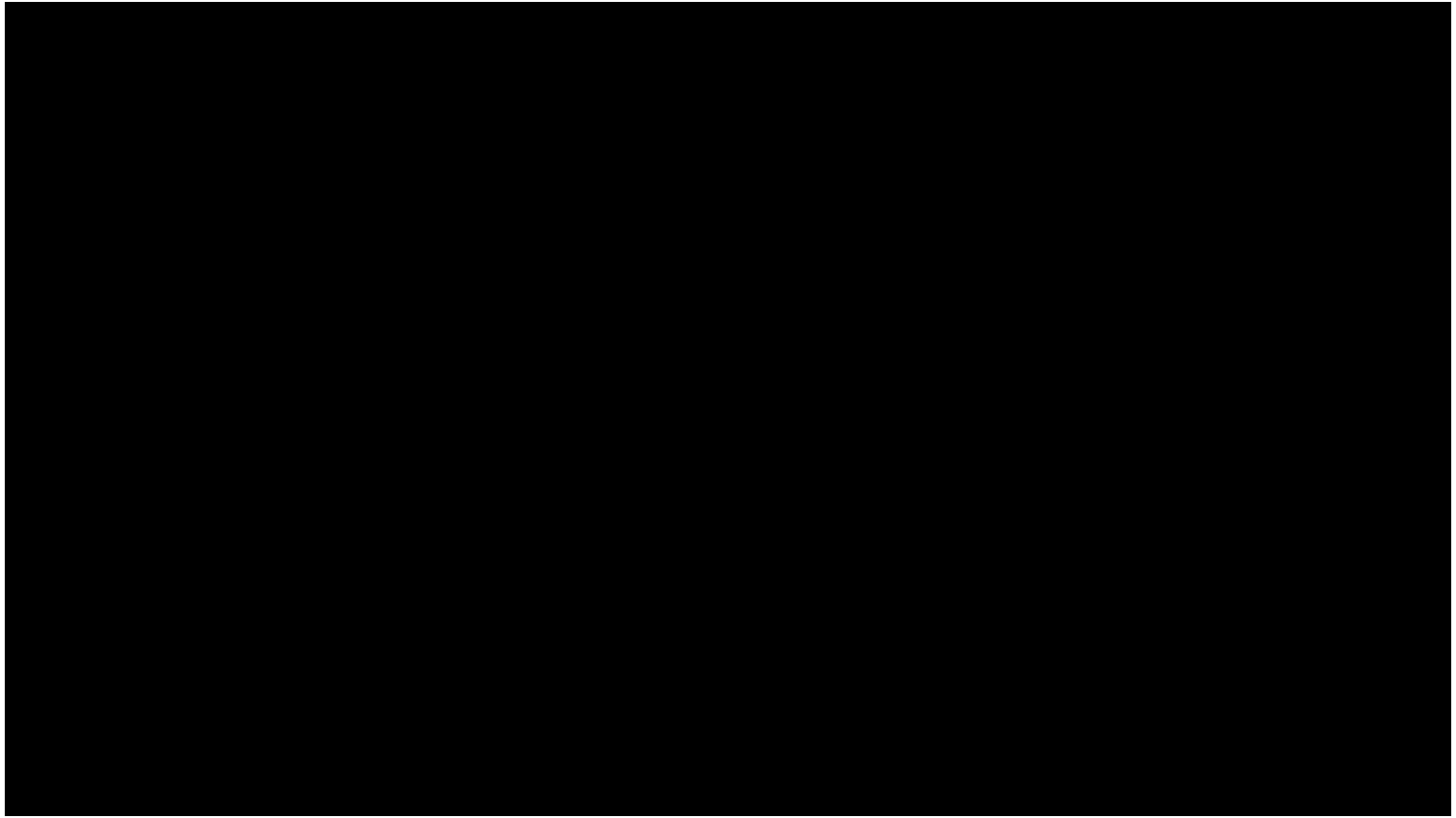
# Maintenance & Reliability - Video

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# Integration with Production Planning/Management System

Customer Product Orders

SAP ERP
Process Orders
Process Recipes

Warehouse Receiving

Material Inventory

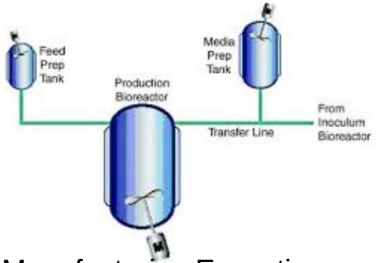
Quality Management Inspection Lots

Materials Movement

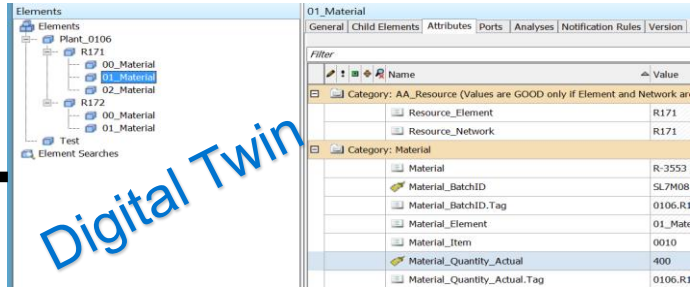
Goods Issue
Goods Receipt

Manufacturing Scheduling (FST)

Plant floor Process Orders




Manufacturing Execution




Manufacturing Operations Data Management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# To Do List – Work Management

- Create a watch list – early warning system
  - Equipment usage – run hours, tons processed, start/stop cycles…
  - Equipment condition alerts – filter clogged, heat-exchanger fouled, motor vibration high…
- Notify the asset owner – with links to details
- Create a report – across asset and production events


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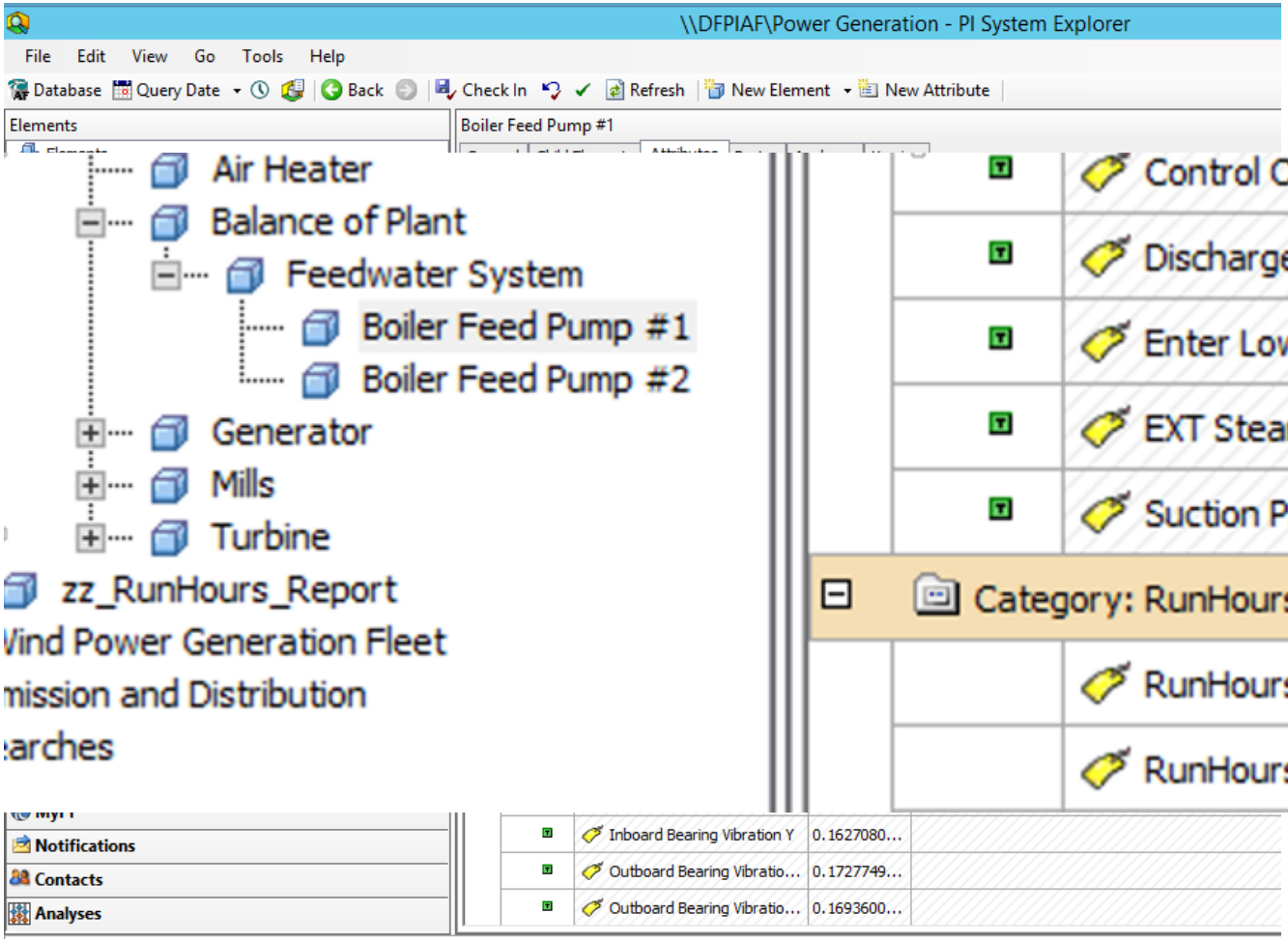



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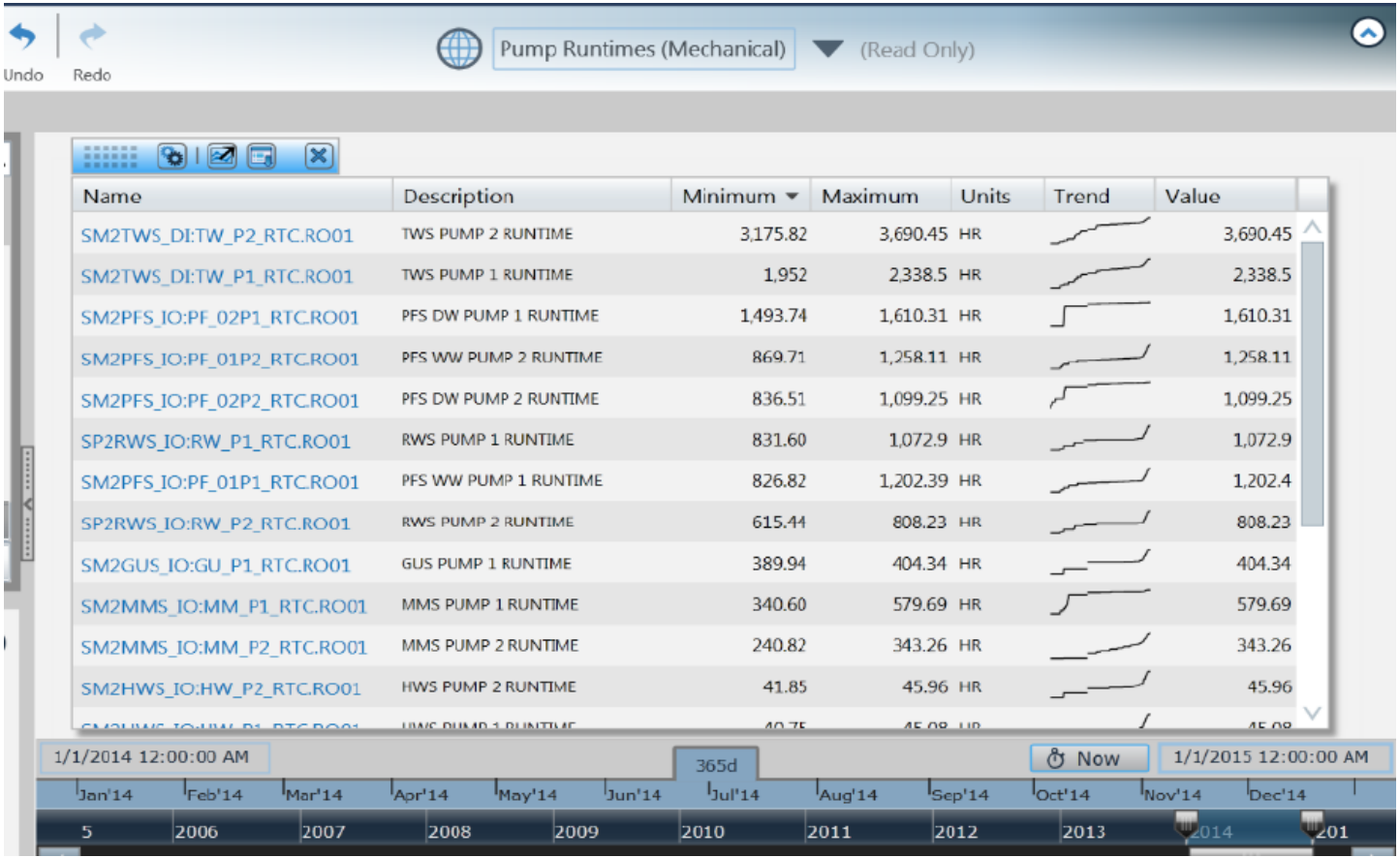
# San Francisco Public Utility Commission – Pump run hours





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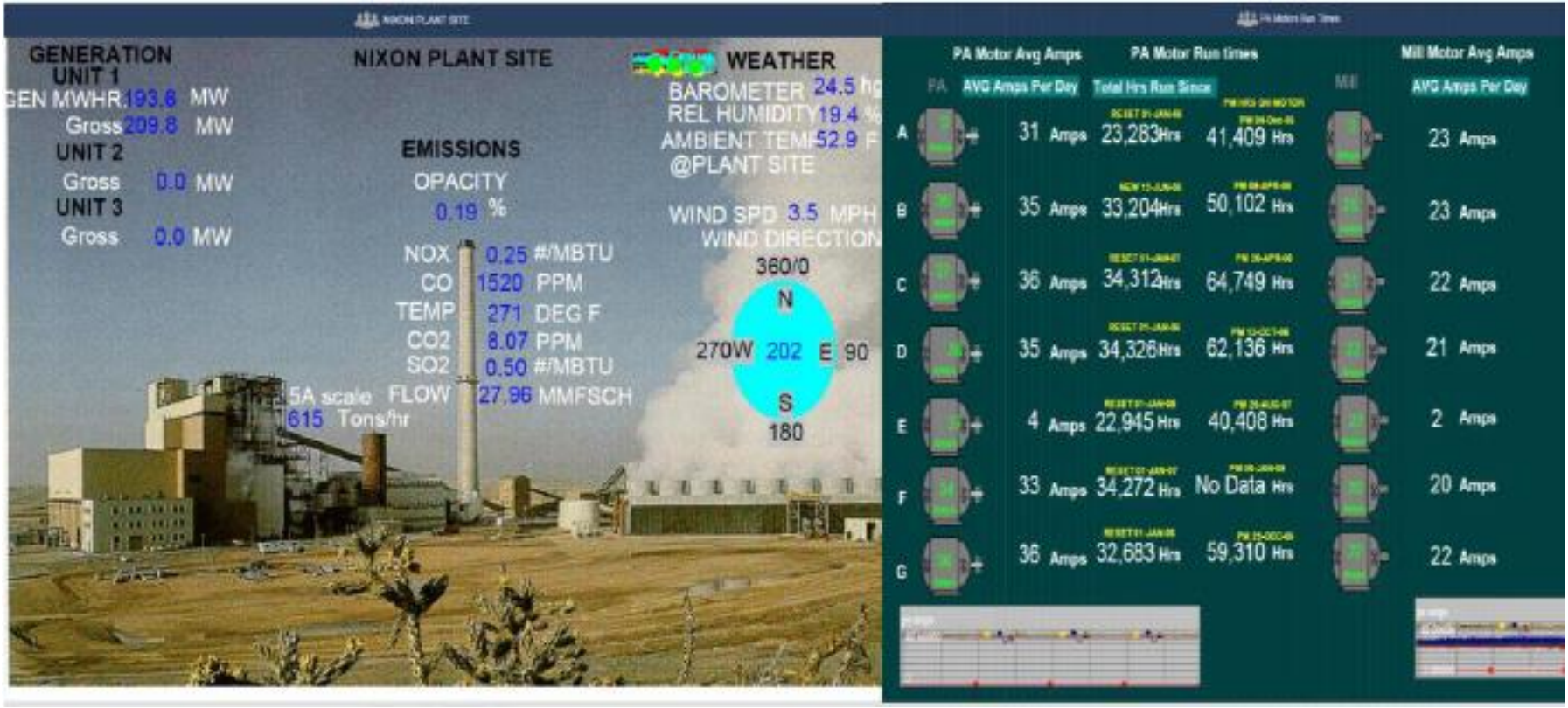
# Colorado Spring Utilities – Motor run hours





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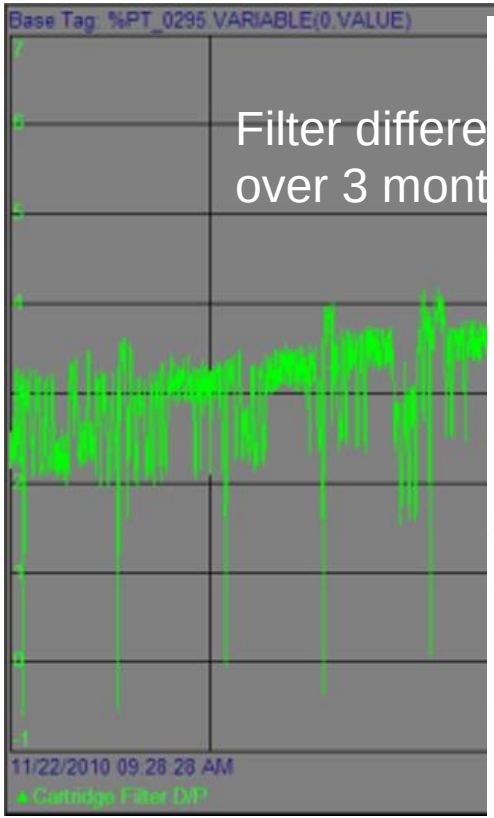
# Filter clogging, Heat exchanger fouling…




Filter differe
over 3 mont

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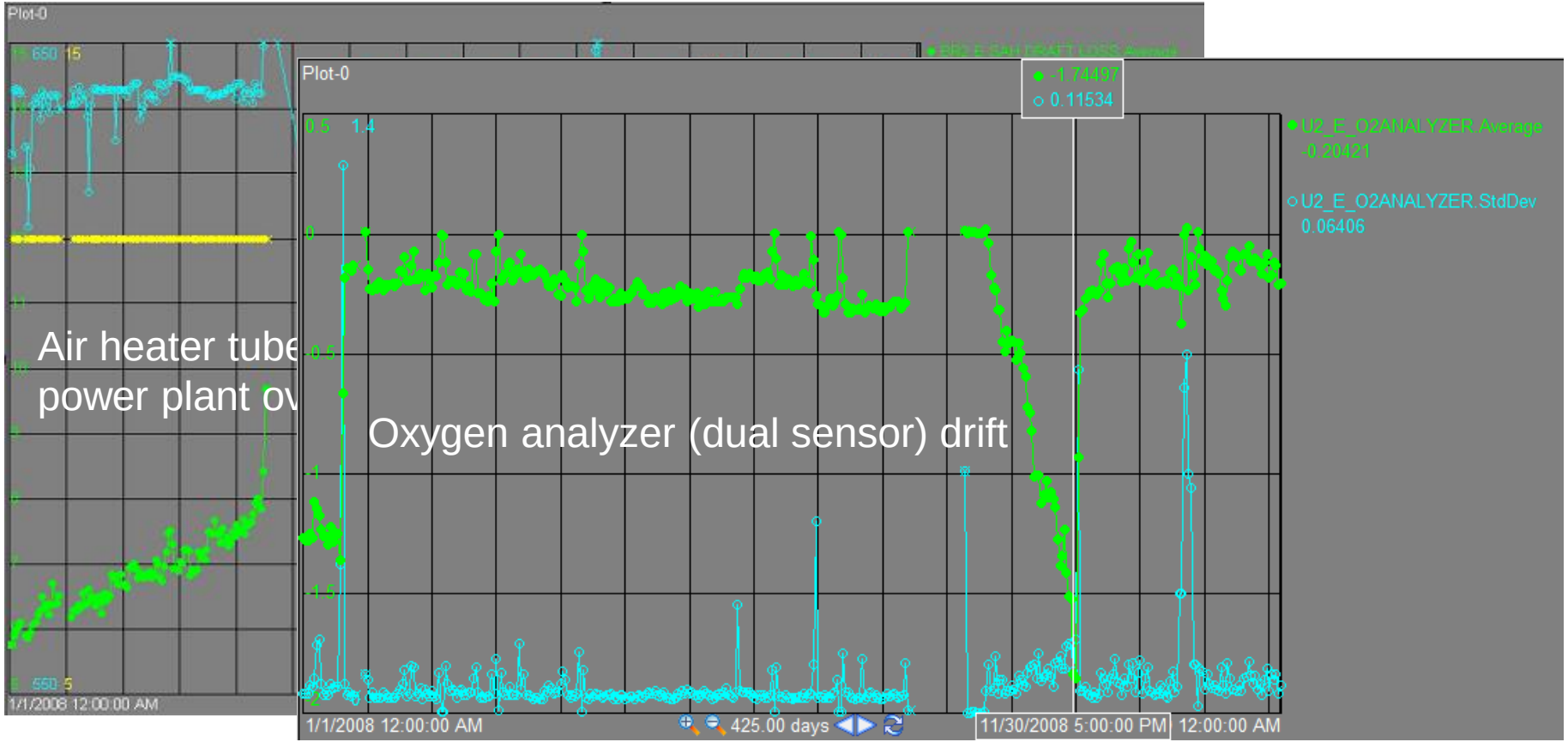
# Air heater tubes plugging, Oxygen analyzer drift…





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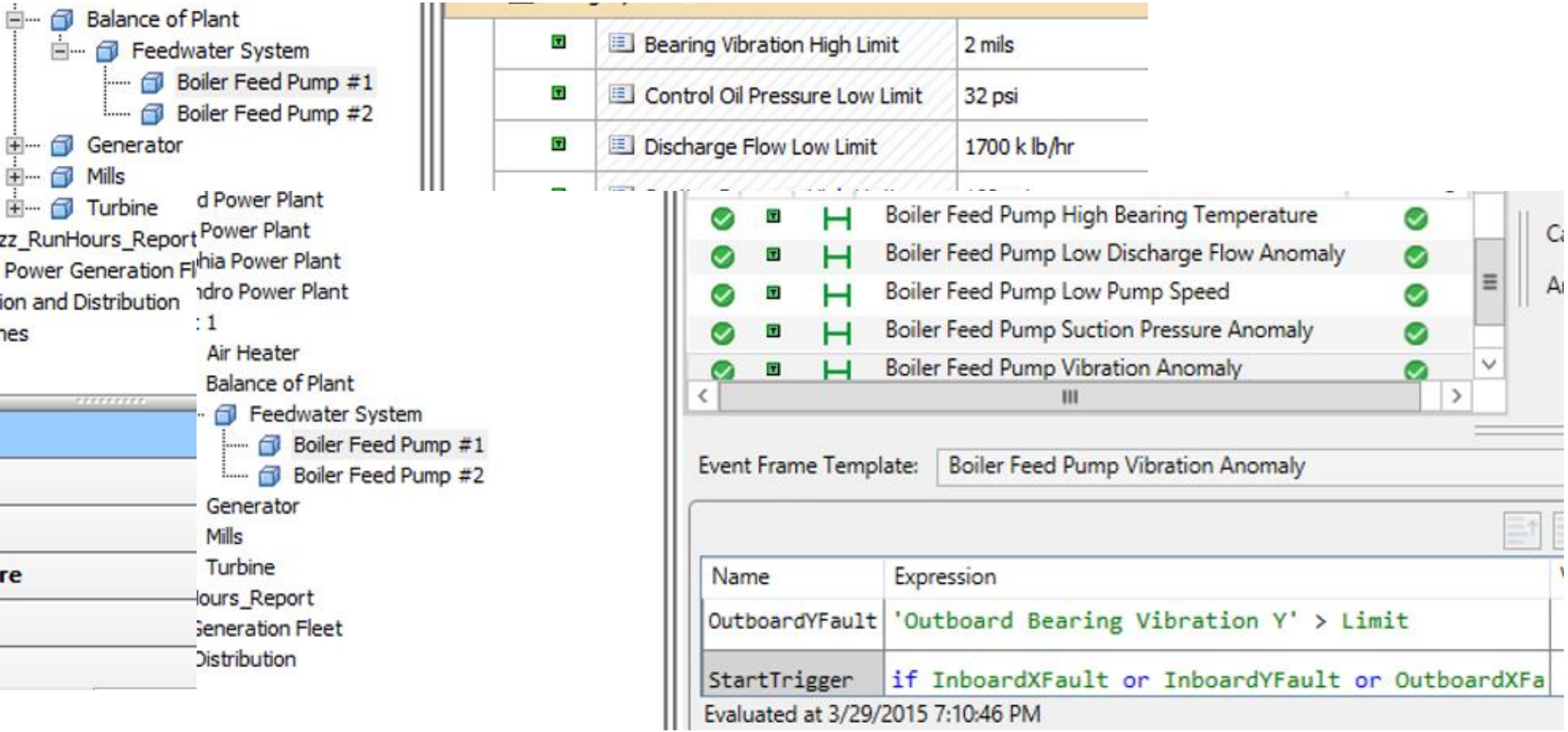
# Motor vibration alert calculations





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# PI System to External Systems

PI System
PI Notifcations

PUSH

EMAIL

Work Order
(PI Alerts - Event Frame)

PUSH

Events

PUSH

Web Service
Delivery Channel

PUSH

SAP
Maximo
Infor
Oracle EAM
…
…
Enablon
(EHS)

RunHours
(Totalizer)

PUSH

PULL

PULL or
PUSH

Script
or
Middleware

PULL or
PUSH

Application Middleware=BizTalk, TIBCO, WebSphere…


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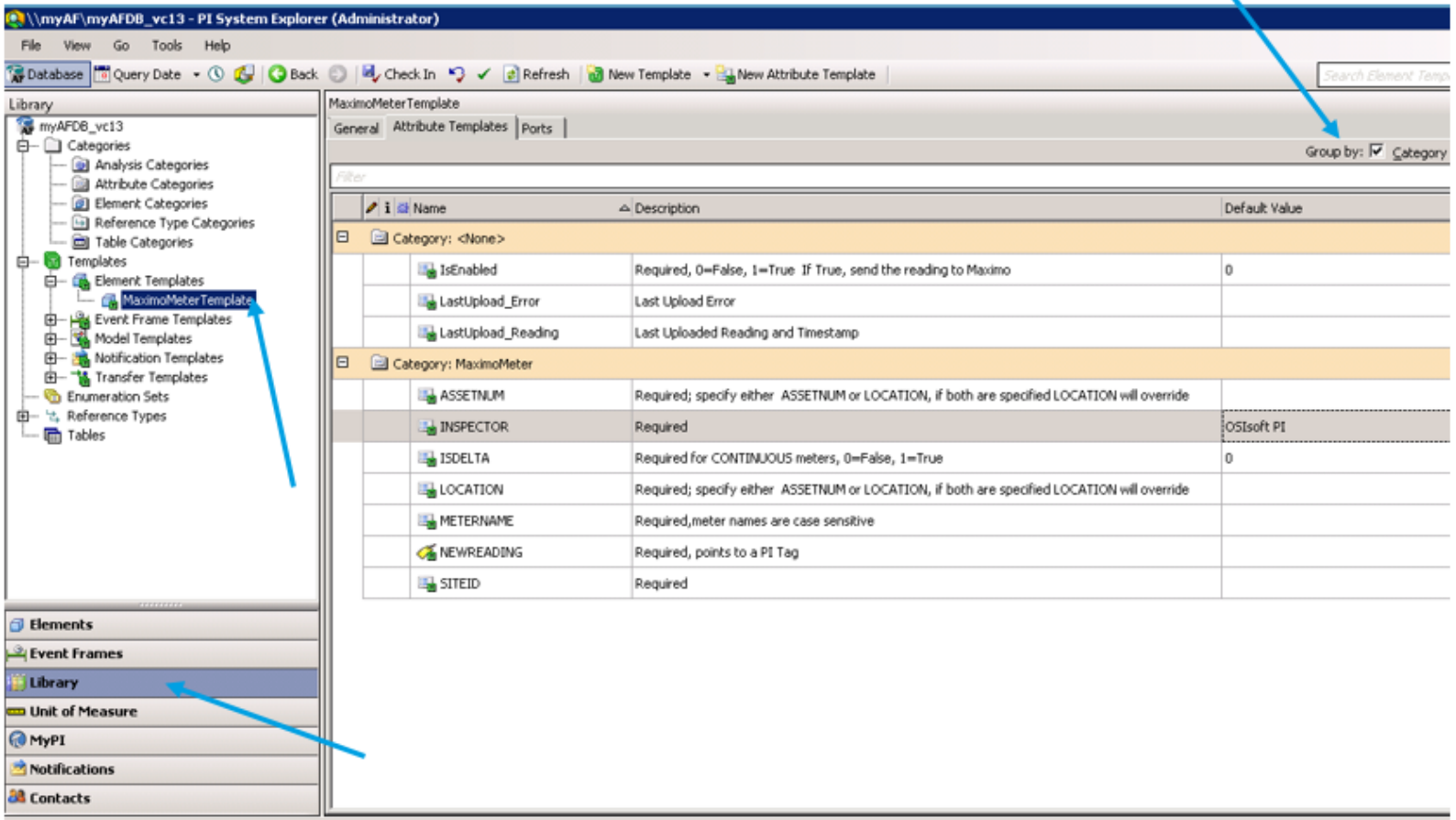



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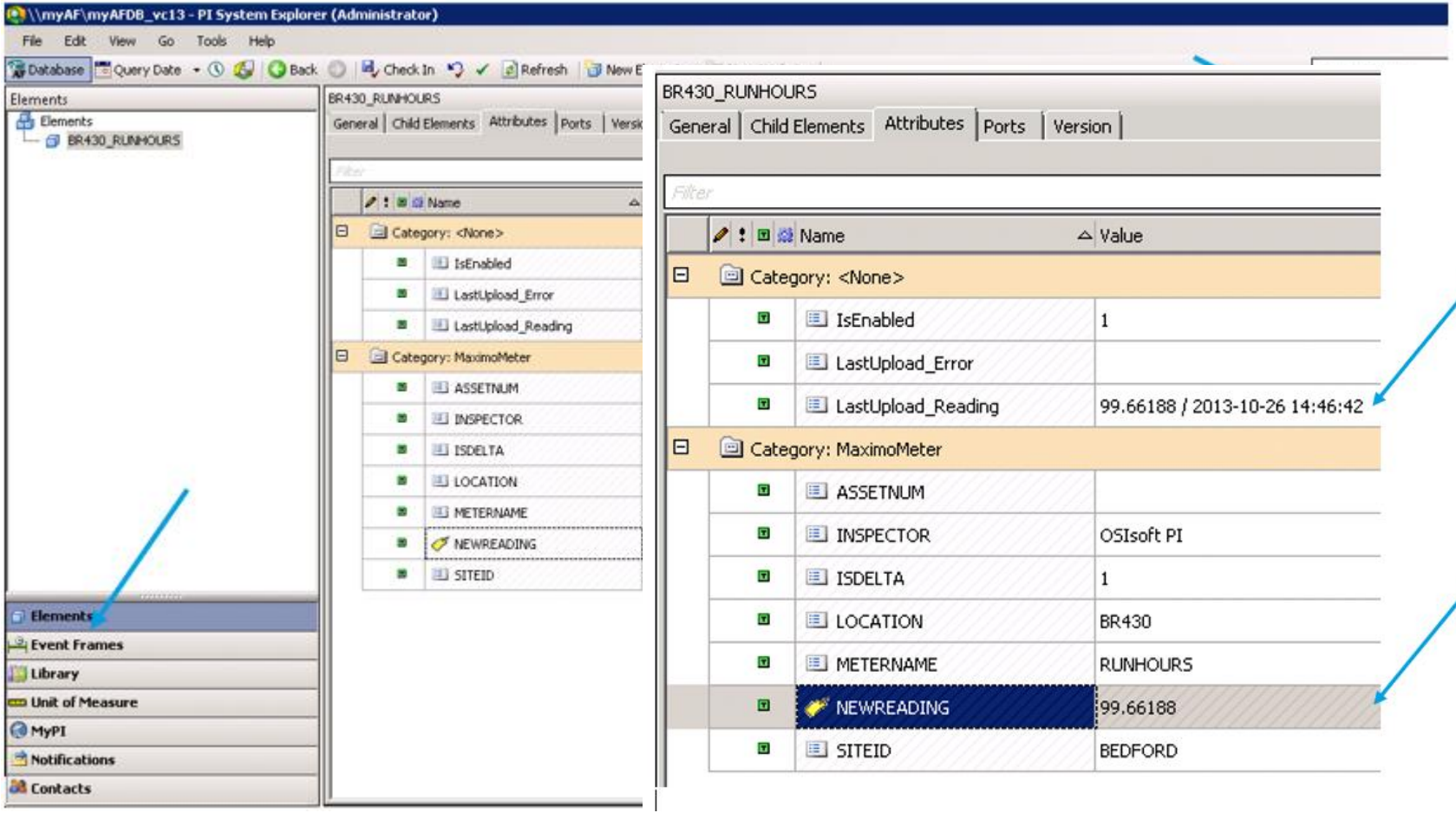



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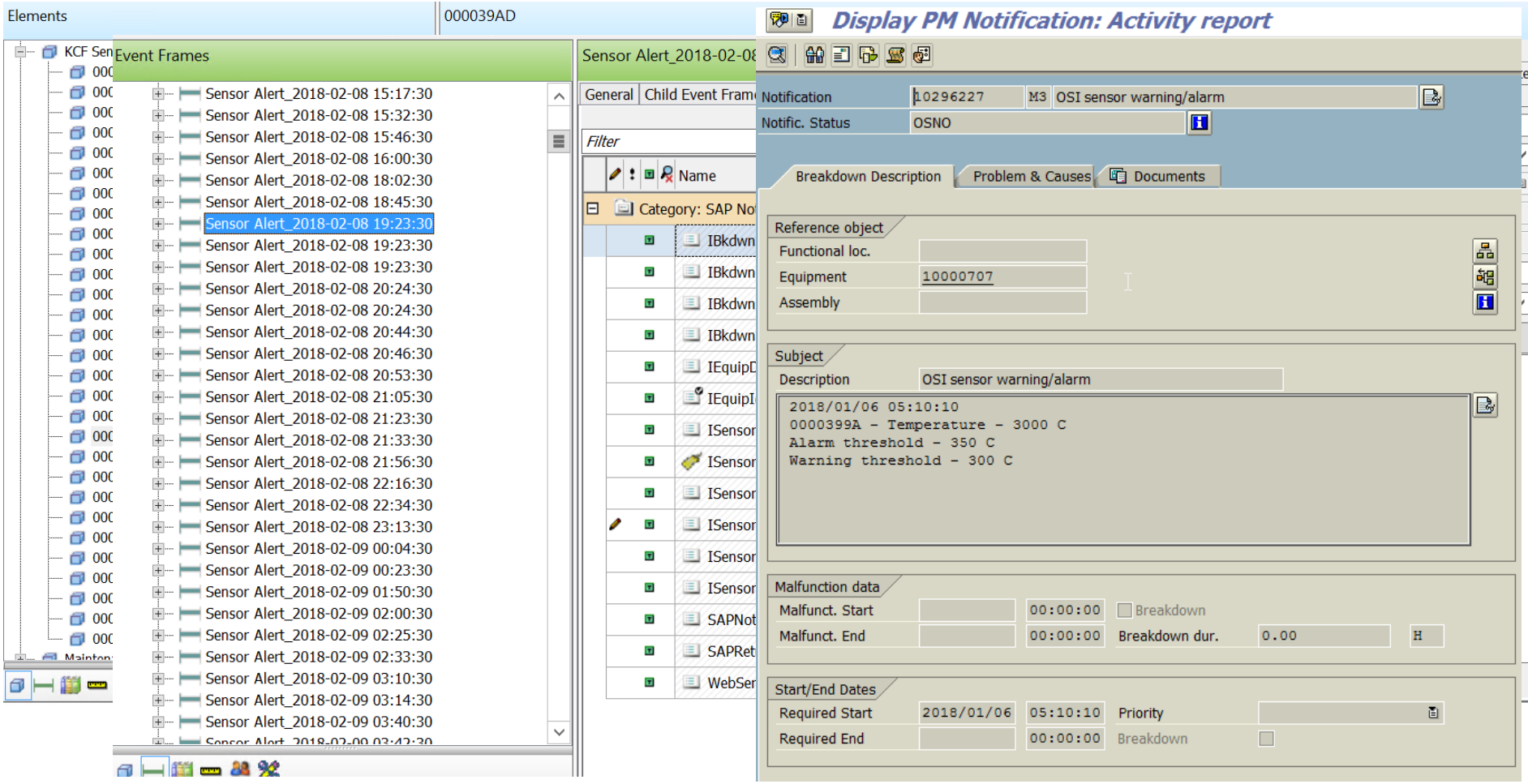



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# Report across asset events

Select a DAY: 2015_01_13

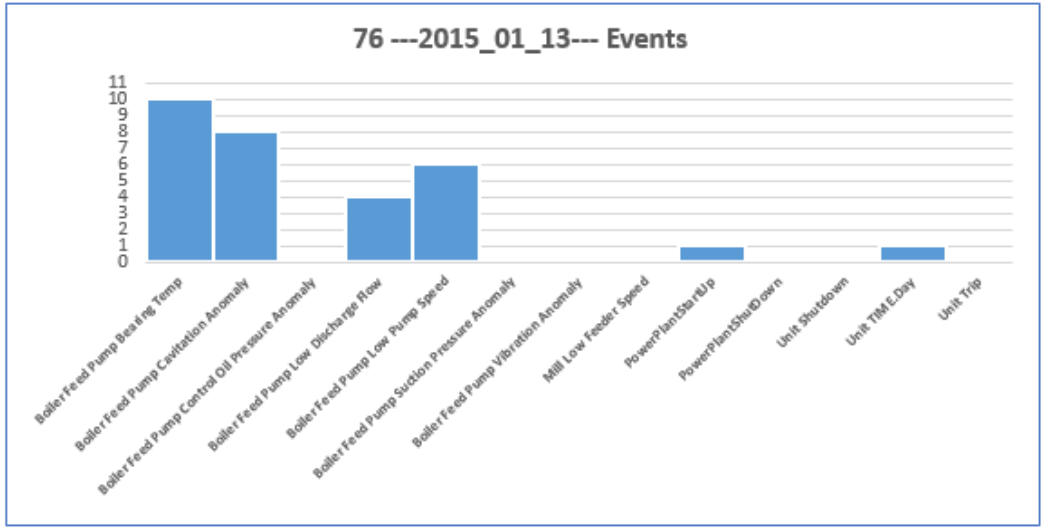
Search Start: 1/10/2015 (10-Jan-)
Search End: * (24-Mar-)

| GENERAL INFORMATION | |
|---|---|
| DAY NAME | 2015_01_13 |
| Site | San Leandro Power Plant |
| Unit | Unit 1 |
| Start Time | 13-Jan-15 00:00:00 |
| End Time | 14-Jan-15 00:00:00 |
| Duration | 1 0:00:00 |
| Duration (min) | 1440.0 |
| Day of Week | TUESDAY |
| Day Type | WEEKDAY |
| Element Path | \\DFPIAF\Power Generation\Generation\OSISoft Power\San Leandro Power Plant\Unit 1 |

| AMBIENT TEMPERATURE | |
|---|---|
| Ambient Temperature.Min | 36.23 |
| Ambient Temperature.Avg | 38.02 |
| Ambient Temperature.Max | 40.44 |

| TURBINE OVERVIEW | |
|---|---|
| HP Overall Efficiency.Avg | 0.00 |
| IP Overall Efficiency.Avg | 0.00 |

(76) Events during DAY ---2015_01_13--- on <<Unit 1>>




EF Name

Boiler Feed Pump Relative | Production Summary Report | Hourly Report | Daily Anomaly Investigation | GLOBAL | DAY Data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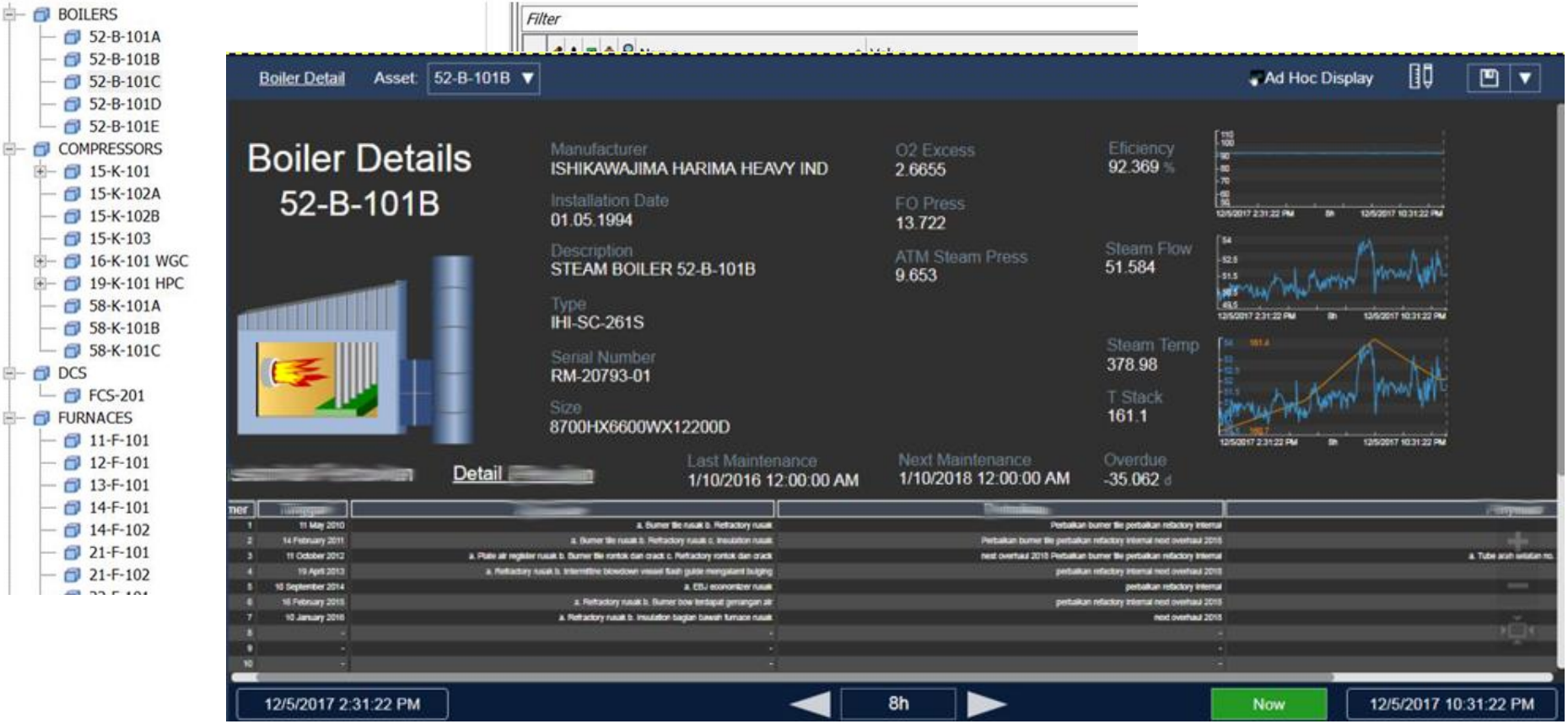
# Equipment display & SAP WorkOrder info in PI Vision





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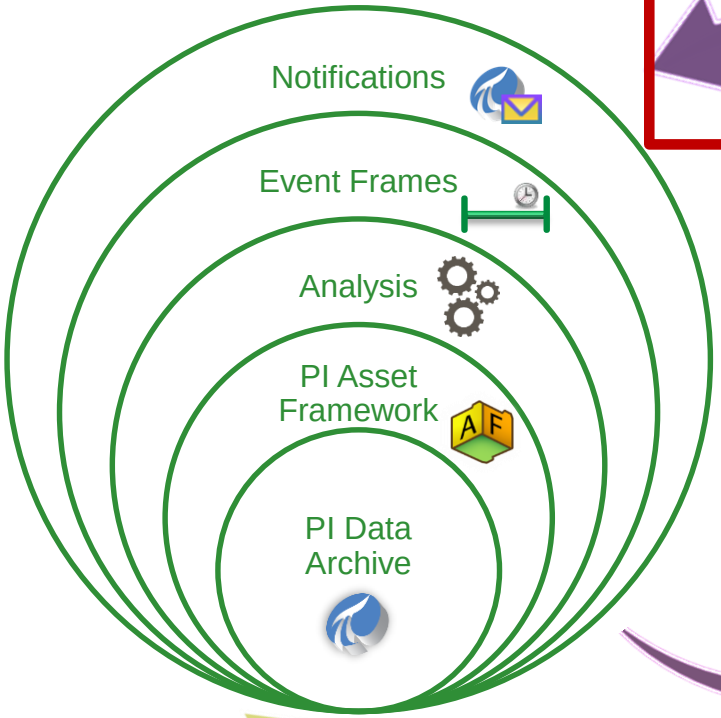


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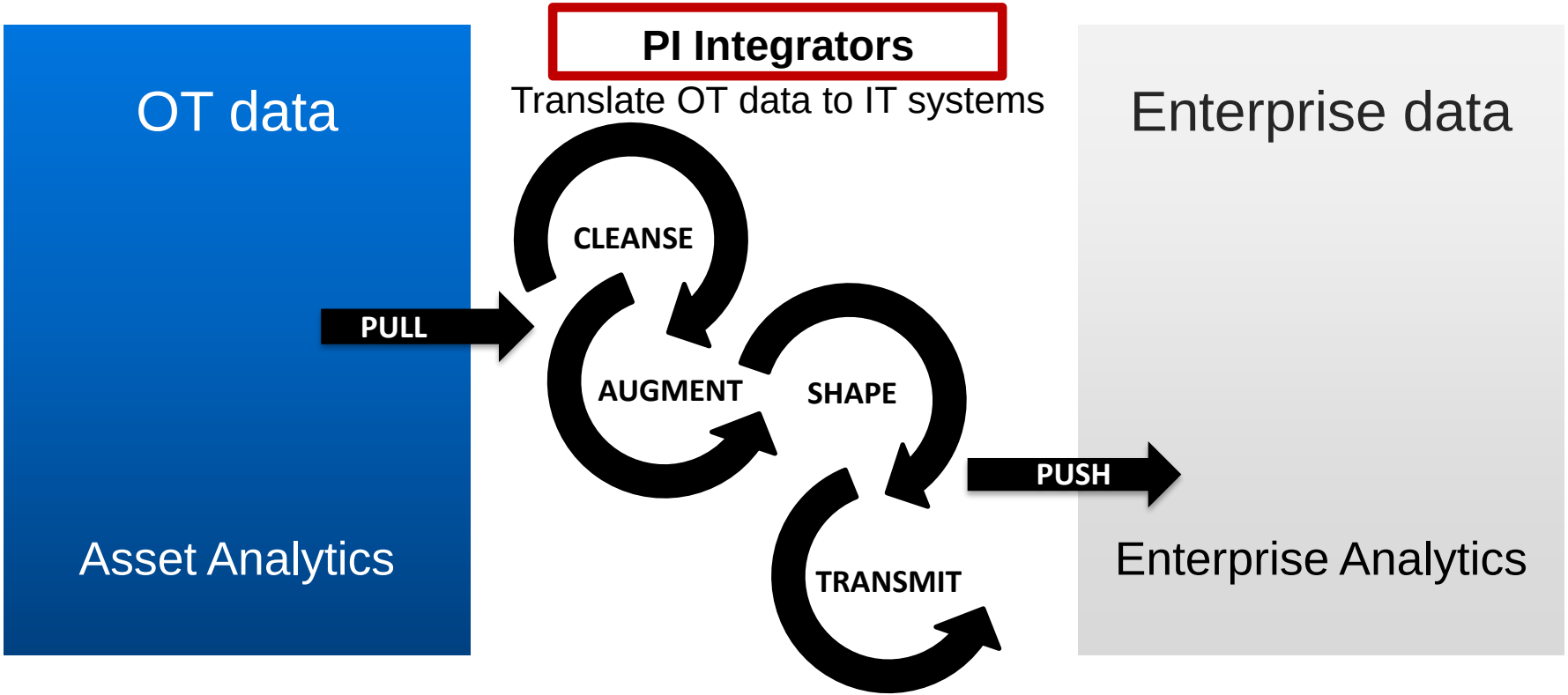
# Integrate OT & IT Data with Data Management





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OSIsoft has a multi-cloud strategy for ***repeatable patterns*** with major cloud vendors

Google Cloud Platform


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# Repeatable Patterns for Extending into Cloud

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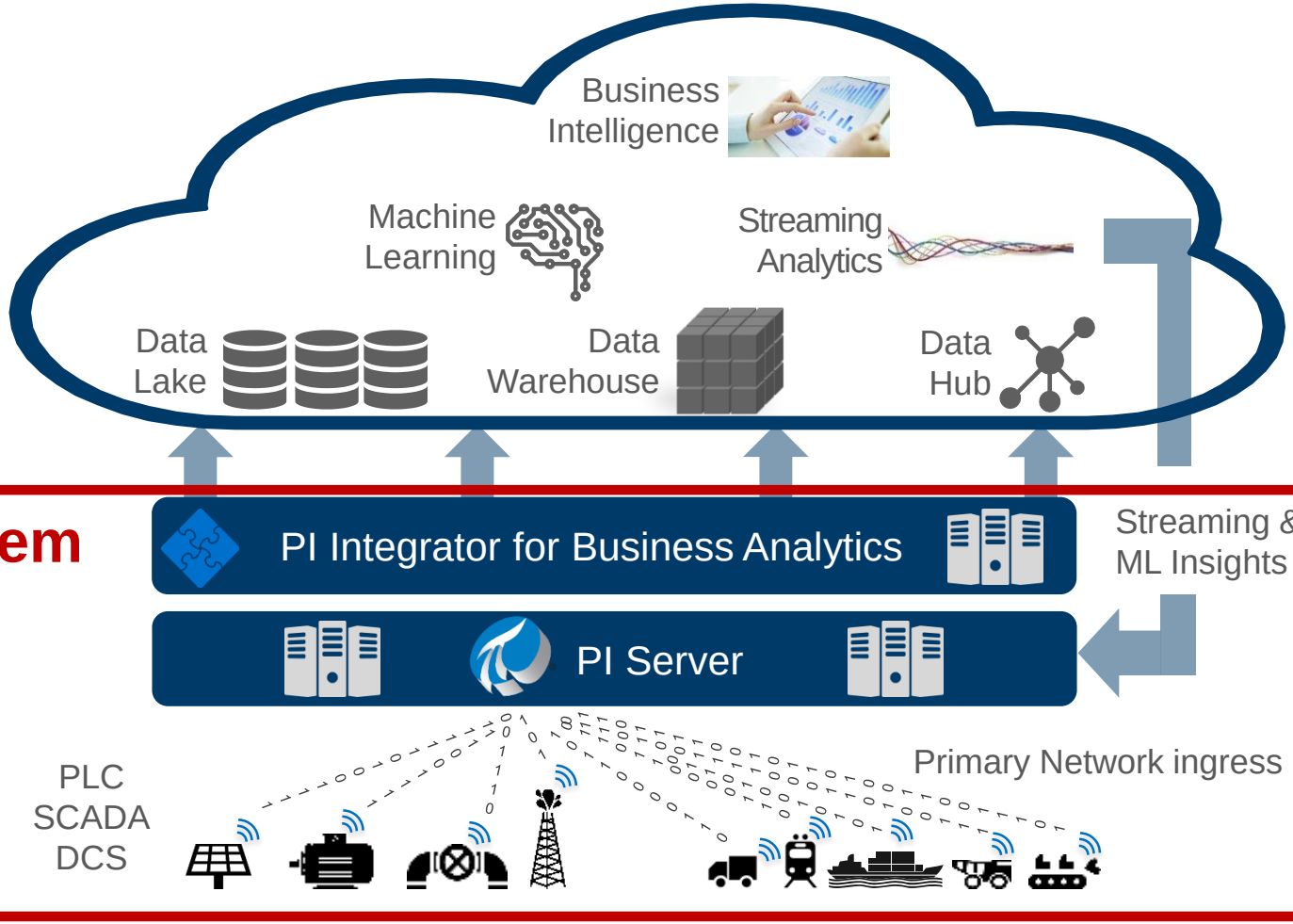
# Data Science





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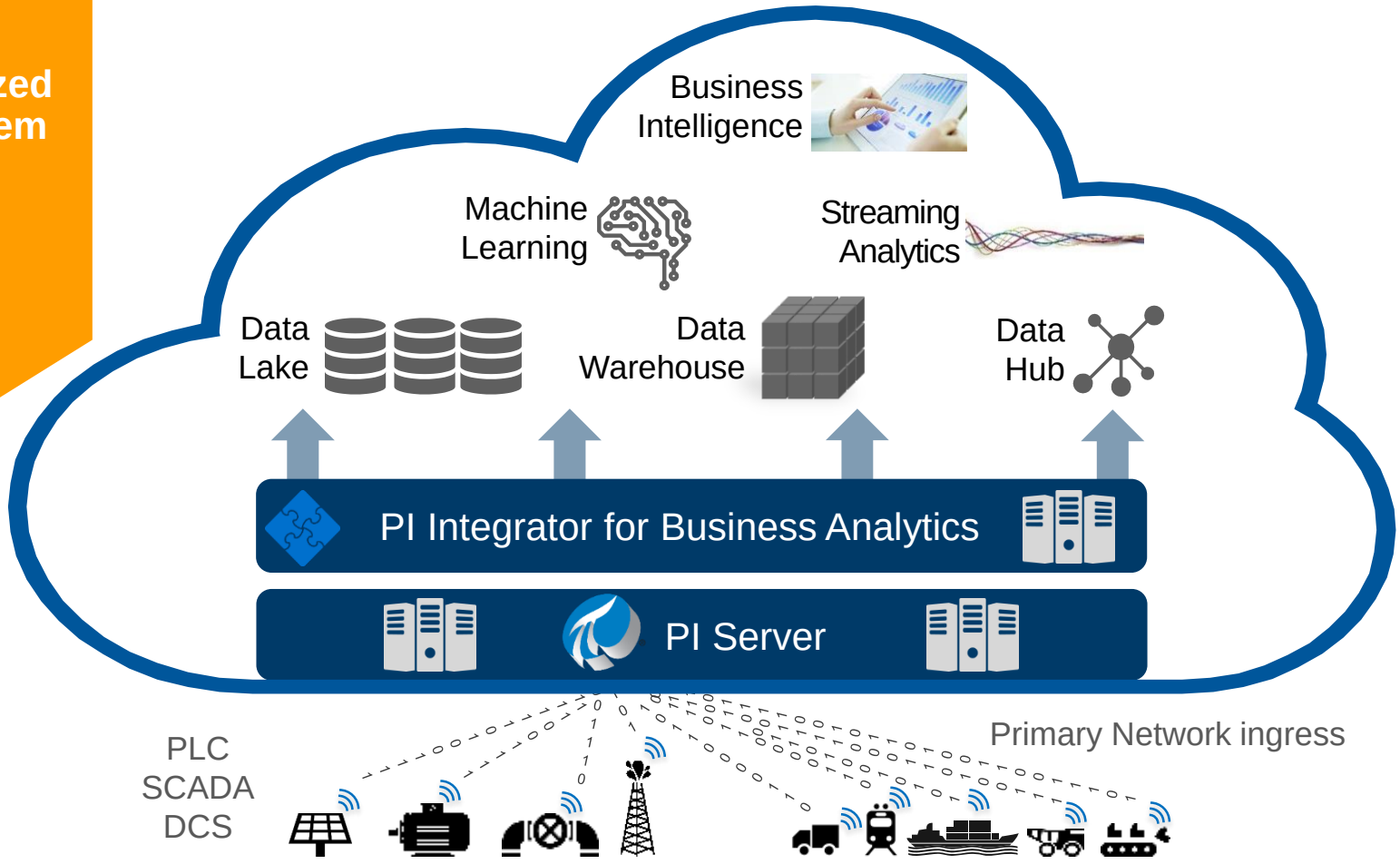
# Virtualized PI System





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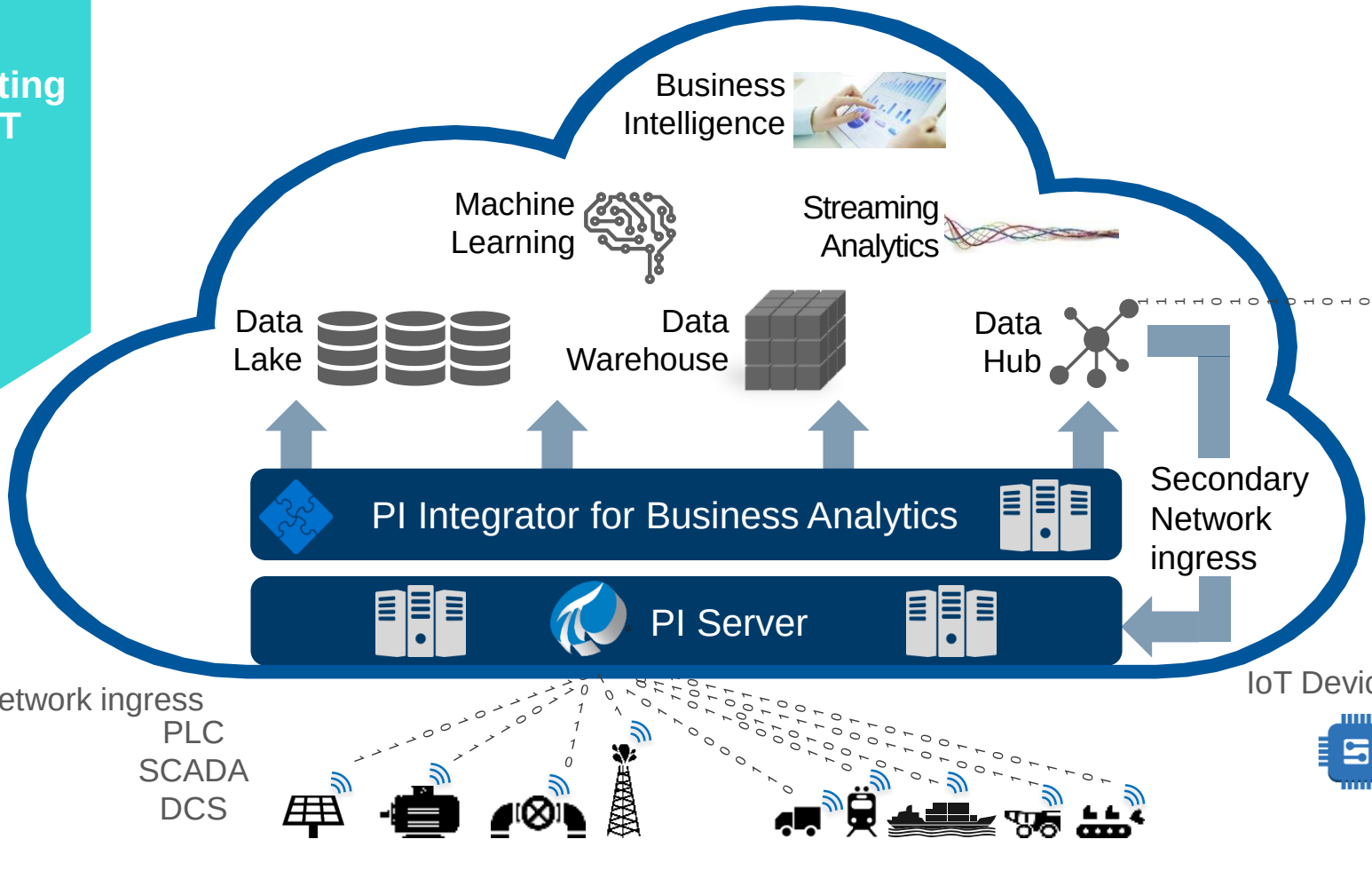
# Architecting for IoT





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# Customer Success Stories with Microsoft Azure ML (Machine Learning)

## Deschutes Brewery

Deschutes used machine learning to improve their brewery processes

- Saving up to 72 hours per batch
- Deferring an $8 million upgrade

## Lonza Specialty Ingredients

Expanded production capacity limits

- Used machine learning to identify major drivers for reaction times
- 6 weeks – total time to value

- ✓ **Process optimization**
- ✓ **Improved maintenance**
- ✓ **Energy management**
- ✓ **Predictive operations**
- ✓ **And more…**

https://www.osisoft.com/presentations/brewing-beer-the-smart-way/

https://www.osisoft.com/presentations/rcip--data-analytics-and-manufacturing-process-optimization/


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# Customer Success Stories in AWS

| TransCanada | Georgia Pacific | TEPCO |
| --- | --- | --- |
| Gas demand forecasting | Self-service analytics and data lakes | Running PI System workloads in AWS |

https://www.osisoft.com/presentations/transcanada-s-journey-to-advanced-analytics---integrating-transcanada-s-pi-af-with-aws-machine-learning/


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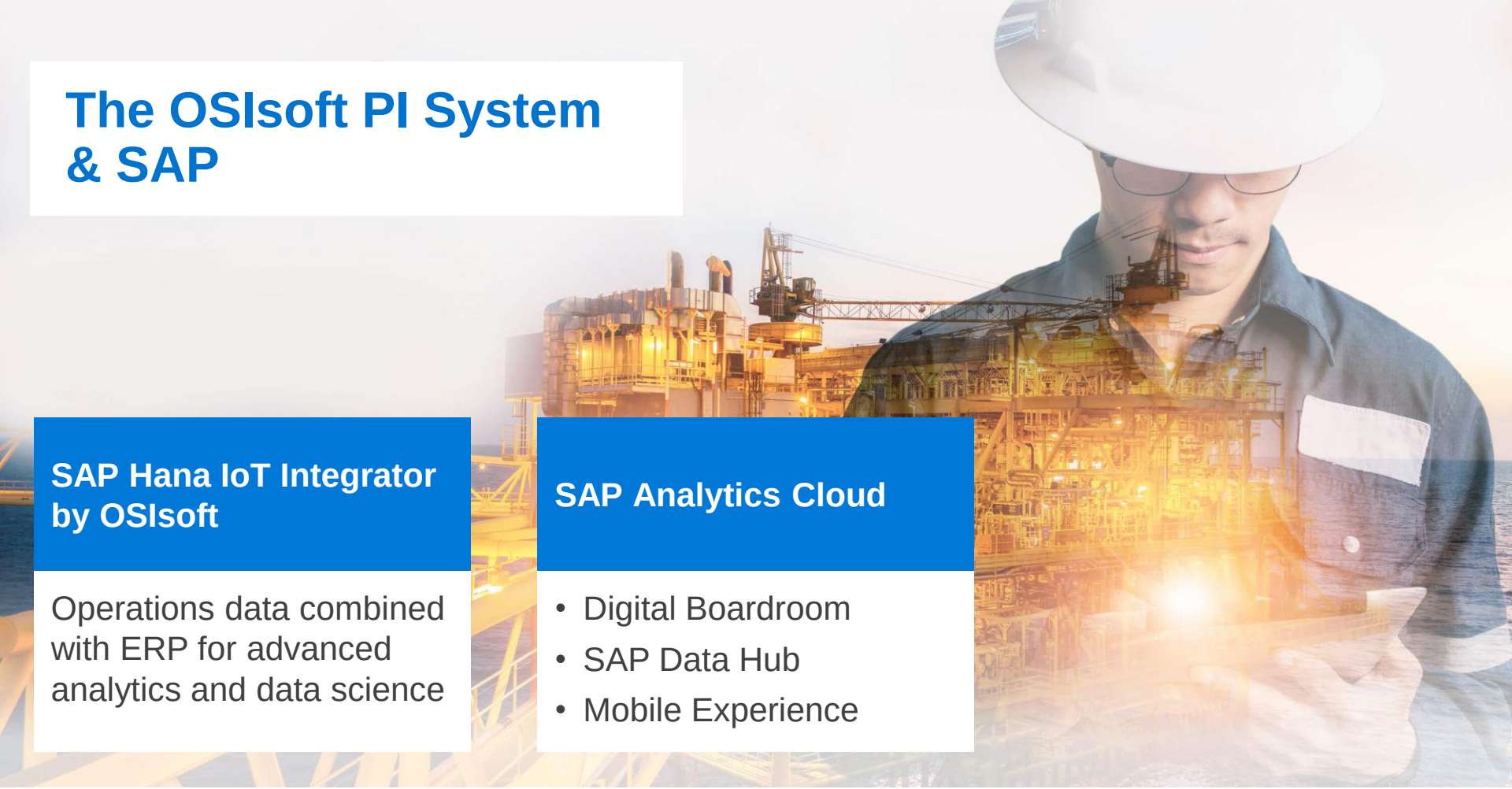
# The OSIsoft PI System & SAP



## SAP Hana IoT Integrator by OSIsoft

Operations data combined with ERP for advanced analytics and data science

## SAP Analytics Cloud

- Digital Boardroom
- SAP Data Hub
- Mobile Experience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# Customer Success Story

## Marathon Oil

### System of Record for Operational Data

The PI System collects 700,000 data points with 1400 updates per second

### OT Data, Enterprise Analytics

Over 100,000 PI System data points are fed every five minutes into SAP Hana

### Simplified Processes

- Automated data prep
- Agile application development
- Optimized E&P processes

https://www.osisoft.com/presentations/the-pi-system-and-sap-hana--operating-at-the-speed-of-business/


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# Other Cloud Integrations

**Development in Progress - Preview**

Google Cloud Platform


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# Thank You

Next Steps:

>Your OT/IT integration use cases

>PI Workshop

>https://learning.osisoft.com/

>https://pisquare.osisoft.com/ (Community & Developer)

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