Analytics and Big Data with the PI System - Visual Analytics

Presented by
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Plant Enterprise Operations
- Small # Assets
- Diverse / Complicated
- Optimization
- Mostly On-premise

Distributed Asset Monitoring
- Medium # Assets
- Similar / Dispersed
- Remote Monitoring
- Enterprise / Cloud

Internet of Things and M2M
- Massive # Assets
- Relatively Simple
- Analytics / Big Data
- Mostly Cloud

Hybrid / Cloud Environment – OSIsoft Focus
Evolving Data Goals

Real-time visibility
- HMI

Real-time and historical view across all assets
- PI Coresight,
- PI DataLink,
- PI ProcessBook

Fleet-wide performance comparison

Prediction and Prevention

Monitoring

Process Optimization

Business Intelligence

Big Data Analytics

Monitoring |
---|
Process Optimization |
Benchmarking |
System Optimization
Big Expectations

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 cost.

Why has this vision been elusive?

What we hear our customers saying
“We’re looking to get the data into tools like Spotfire.”

“We want to mix the data from the PI System and other systems in Hadoop.”

“Accessing the data in a relational database opens up the data to new users.”

“Our company has standardized on Teradata and Tableau for our business intelligence visualization.”

1. Access the data in tools familiar to the end users
What we hear our customers saying

“It took us 40 days to get the data out of the PI System”

“We tried using OLEDB Enterprise but it timed out.”

“Writing code and supporting it is just not an option.”

2. It has to Scale (without code)
What we hear our customers saying

“My job is to provide one version of the truth to the whole organization so I have to be able to trust the data and have a repeatable process.”

“Seeing the data in terms of wells and pumps makes it much easier for my end users.”

“It’s great that I can look at data across similar and different assets together.”

“Zeroing in on just the necessary data by using events for my application keeps things simple.”

3. Flexibility and trust
Modern Information Architecture

Insight

Time Series

Relational

Unstructured
Real-time Data isn’t perfect

The Truth about Real-time Data

- Naturally incomplete (delays, shutdowns)
- Not evenly spaced
- Doesn’t look and behave like SQL (RDBMS)
- Subject to errors in measurement
- Varies in fidelity
- Needs Context (Assets, Events)
- Hard to Collect effectively
Decision-Ready Data

Conditioned, Trustworthy, Targeted

PI Server

PI

AF

Model A

Model B

R&D

Facilities

Central Ops

Data Science

Central IT

Trading

Finance

ERP

Other Data 1

Other Data 2

Other Data 3

Single Source

Raw Data
Integration with Analytics

System of Record

- Guaranteed Delivery & Storage
- Full Fidelity of Sensor
- Optimized for Real-Time
- Backup/Restore
- HA
- Security

Needs

- Cleanse
- Augment
- Shape
- Transmit

Analytics Packages

Visual Analytics

- Excel
- Tableau
- DataWatch
- QlikView
- TIBCO Spotfire
- Cognos

Statistical Analytics

- Hadoop
- MapReduce
- R
- Python
- SAS
- SAP

- Designed to Analyze Large Sets
- Expects that the Data Exists
- Problem Defines Data Shape
- Typically Evenly Spaced in Time
PI Integrators reduce the complexity of analyzing real world industrial data

All PI System data delivered on your terms, in your language, to the tools you use, and to the people that can make a difference.
PI Integrator for Business Intelligence

Visual Analytics – BI Tools
- Excel
- Power BI
- Tibco Spotfire
- Tableau
- Other BI

Data Warehouse
In Memory DB

Augment
Transmit
Cleanse
Shape

PI Integrator

Assets / Events
Asset Analytics

PI System: System of Record / Real-time Analytics

Connect via Internet or PI Interface

Connect via Internet or PI Interface

DATA

Business User

Operational User
New Persona: Information Architect

- Works in an IT or OPs IT role
- Responsible for integrating many data systems to achieve business goals
- Data Lifecycle Management
  - Access Policies & Distribution
  - Logical and Physical Architecture
  - Creation and Receipt (Trust)
  - Maintenance & Disposition
- PI System is just 1 system
- Business Expert / Business Enabler / Not subject matter expert (engineer)
Business Intelligence at Devon Energy

Presented by Don Morrison
• One of North America’s leading independent producers of natural gas and oil
• Engaged in exploration and production
• Corporate headquarters in Oklahoma City
• More than 5,500 employees
• Member of the S&P 500
• On Fortune magazine’s 100 Best Companies to Work For list each year since 2008
• New to PI in 2013 and Enjoying the Benefits of EA
A Leading North American E&P

- **Focused and balanced asset portfolio**
  - Proved reserves: 2.8 billion BOE
  - Net production: 664 MBOED
  - Upstream revenue: 60% oil

- **Deep inventory of opportunities**
  - Prolific Eagle Ford assets
  - High-quality Permian Basin position
  - World-class heavy oil projects
  - Top-tier liquids-rich gas plays

- **Positioned to deliver visible, low-risk production growth**

*Note: All figures represent Devon’s retained asset portfolio.*
What we hear our business saying

“I want the data in Spotfire.”

“We use Datameer to report out of Hadoop.”

“That query you wrote keeps timing out” (PIOLEDB Enterprise)

“Can I just get the data in MS Access or MS Excel”
How we deliver data to the business

Data View

- Excellent for “small” datasets
  - Hours, days, 1-2 months

- Does not scale to “large” datasets
  - 6 months, 3 yrs...

PI DataLink
PI OLEDB Enterprise

Analytics\Visualization

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PI Integrator for Business Intelligence
What do we gain?

• BI tools become more responsive (Spotfire)
• Users can build queries ad hoc (SQL)
• Scheduled and ad-hoc reporting (SSRS)
• Historical data available to existing BI tools
• Real-time data in Hadoop
• Align data for BI within a common time scheme
• Enable unique uses for real-time data
Use Case: Management Summary

- Automated Daily Reports
- Management Overview
- KPI / Metrics
- Rollup to Bus. Unit
Use Case: Daily Reports

- Automated Daily Reports
- Technical Overview
- KPI / Metrics
- Well by Well
Use Case: SharePoint / Pivot Tables

Automated, Scheduled, and Daily Update
Use Case: Reservoir Analysis

Faster and Better Decisions
The Power of the Shape

- Find nested elements
- Find “buried” attributes
- Require specific structure
- Filter on Categories
- Filter on Event Frames
- Translate to new relations

“Google for AF”
We’re leveraging more data

“Our managers and engineers are able to get a better idea of how the asset is performing.”

“...spending less time copying and pasting and more time analyzing the data.”

“Enables us to make faster and better decisions regarding asset performance, which should lead to better production and lower costs!”
PI Integrator for Business Intelligence

• Beta Q2 2015, Release Q3 2015
  – Data Designer UI
  – Data Extraction, Shaping, Cleansing
  – PI Views stored in AF
  – Pull Data from PI System using ODBC
  – Compatible with most off the shelf BI Tools
    • Microsoft PowerBI and Excel, Tibco Spotfire, Tableau, Datawatch, SAP BusinessObjects, Cognos
Tangible Benefits

• Easy to deploy, easy to explore, easy to iterate

• Explore PI System Data in tools that business users are already comfortable using

• Identify correlations across fleets of assets

• Tap into the most valuable data set in the world
Call to Action

• Stay for the Next Talk
  – Demo of Data Designer
  – Integration with Hadoop and Statistical Analytics
• Come see us at Product/Partner Expo
  – PI Integrator for SAP HANA
• Friday 10am – Big Data and Business Intelligence
• Sign up for Interest in Beta – Q2
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Questions

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

State your
**name & company**
THANK YOU