OSIsoft

USERS CONFERENCE 2015

Analytics and Big Data with the PI System - Visual Analytics

Presented by John Baier – Director of Integration Technologies, OSIsoft
Don Morrison – Real Time Data Integration, Devon Energy

© Copyright 2015 OSIsoft, LLC

Plant Enterprise Operations

- Small # Assets
- Diverse / Complicated
- Optimization
- Mostly On-premise

Distributed Asset Monitoring

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

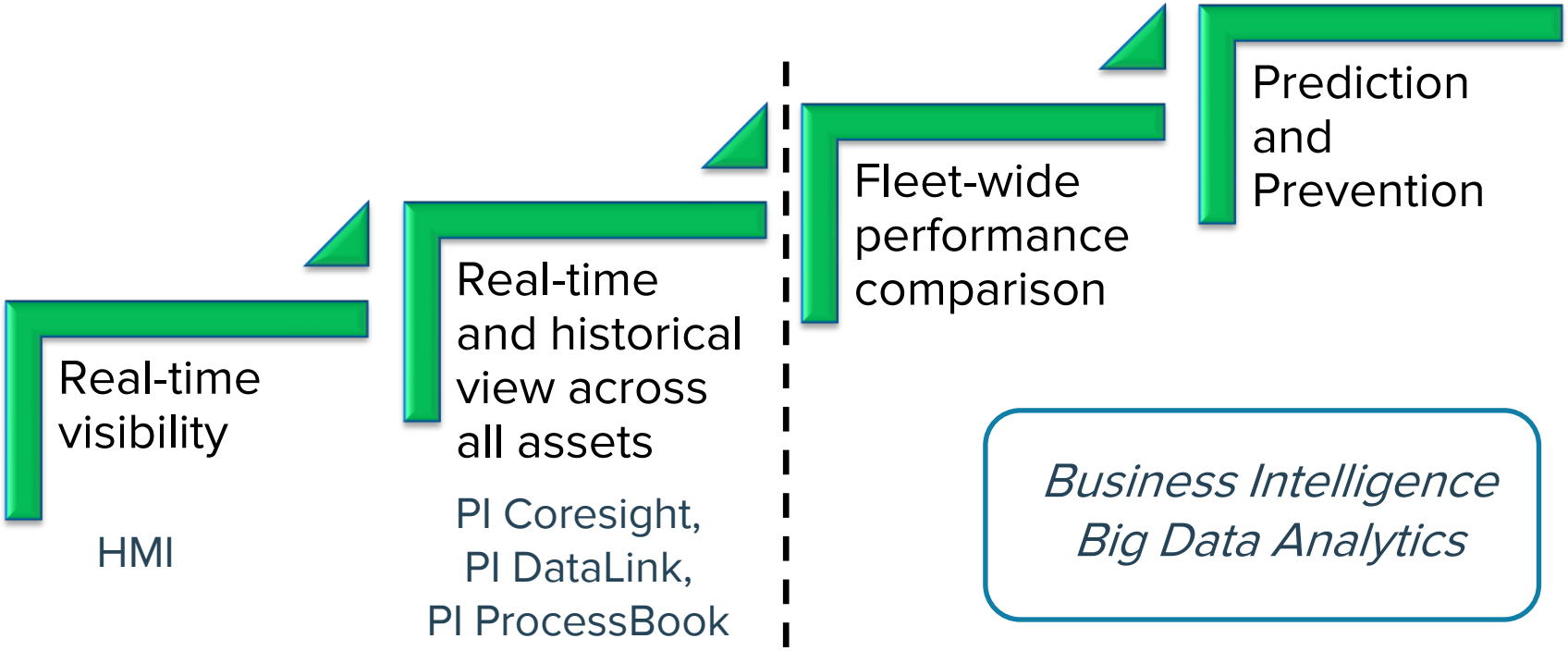
Internet of Things and M2M

- Massive # Assets
- Relatively Simple
- Analytics / Big Data
- Mostly Cloud

Hybrid / Cloud Environment – ***OSIsoft Focus***

© Copyright 2015 OSIsoft, LLC

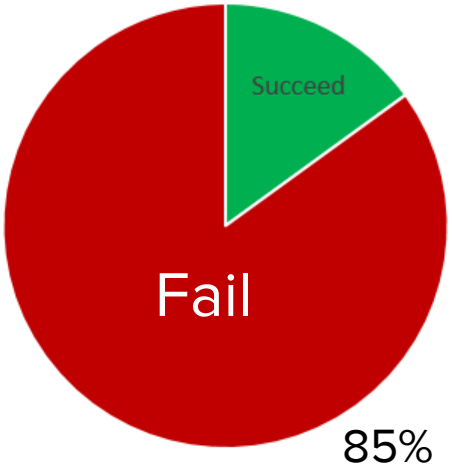
Evolving Data Goals



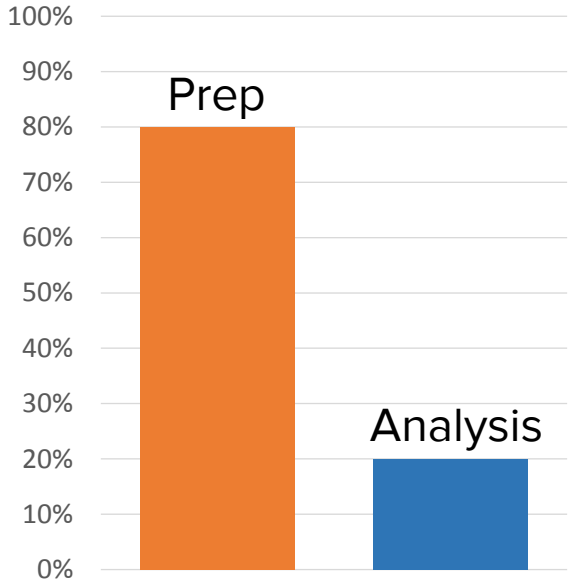
© Copyright 2015 OSIsoft, LLC

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.



https://hbr.org/2014/04/the-sexiest-job-of-the-21st-century-is-tedious-and-that-needs-to-change/

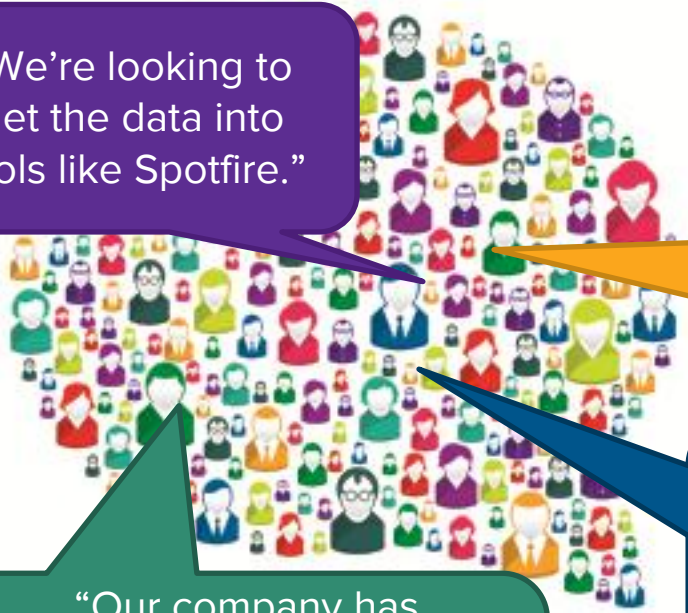
© Copyright 2015 OSIsoft, LLC

Why has this vision been elusive?

What we hear our customers saying

© Copyright 2015 OSIsoft, LLC

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**

© Copyright 2015 OSIsoft, LLC

What we hear our customers saying

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

"Writing code and supporting it is just not an option."

"We tried using OLEDB Enterprise but it timed out."

2. It has to Scale (without code)

© Copyright 2015 OSIsoft, LLC

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

© Copyright 2015 OSIsoft, LLC

Modern Information Architecture

© Copyright 2015 OSIsoft, LLC

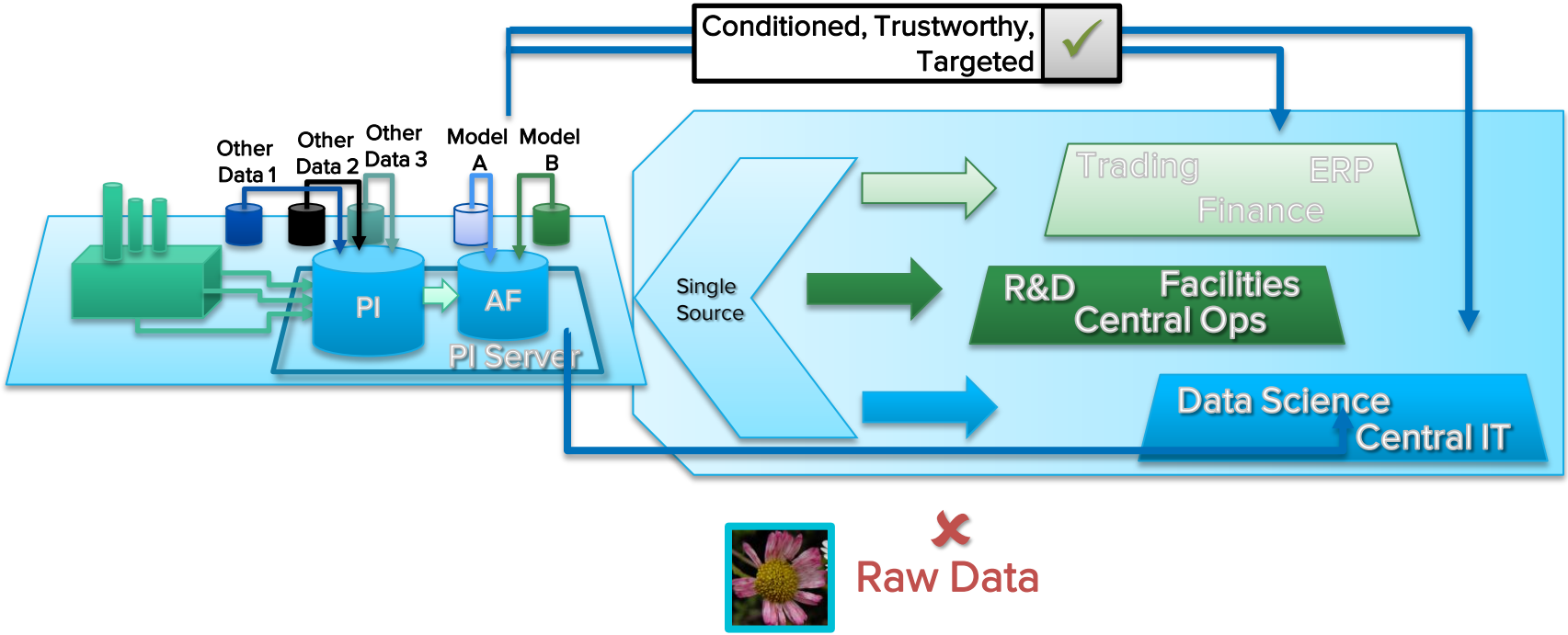
Real-time Data isn't perfect

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

© Copyright 2015 OSIsoft, LLC

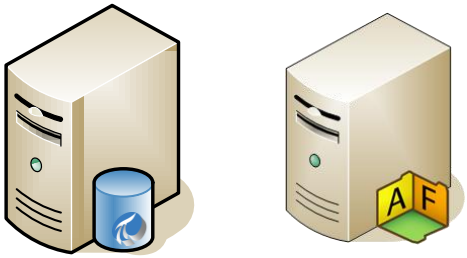
Decision-Ready Data



© Copyright 2015 OSIsoft, LLC

Integration with Analytics

System of Record



OSIsoft.

- 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 SOFTWARE, DATAWATCH, QlikView, TIBCO Spotfire, COGNOS

Statistical Analytics

hadoop MapReduce, SAS, R, python, SAP

- Designed to Analyze Large Sets
- Expects that the Data Exists
- Problem Defines Data Shape
- Typically Evenly Spaced in Time

© Copyright 2015 OSIsoft, LLC

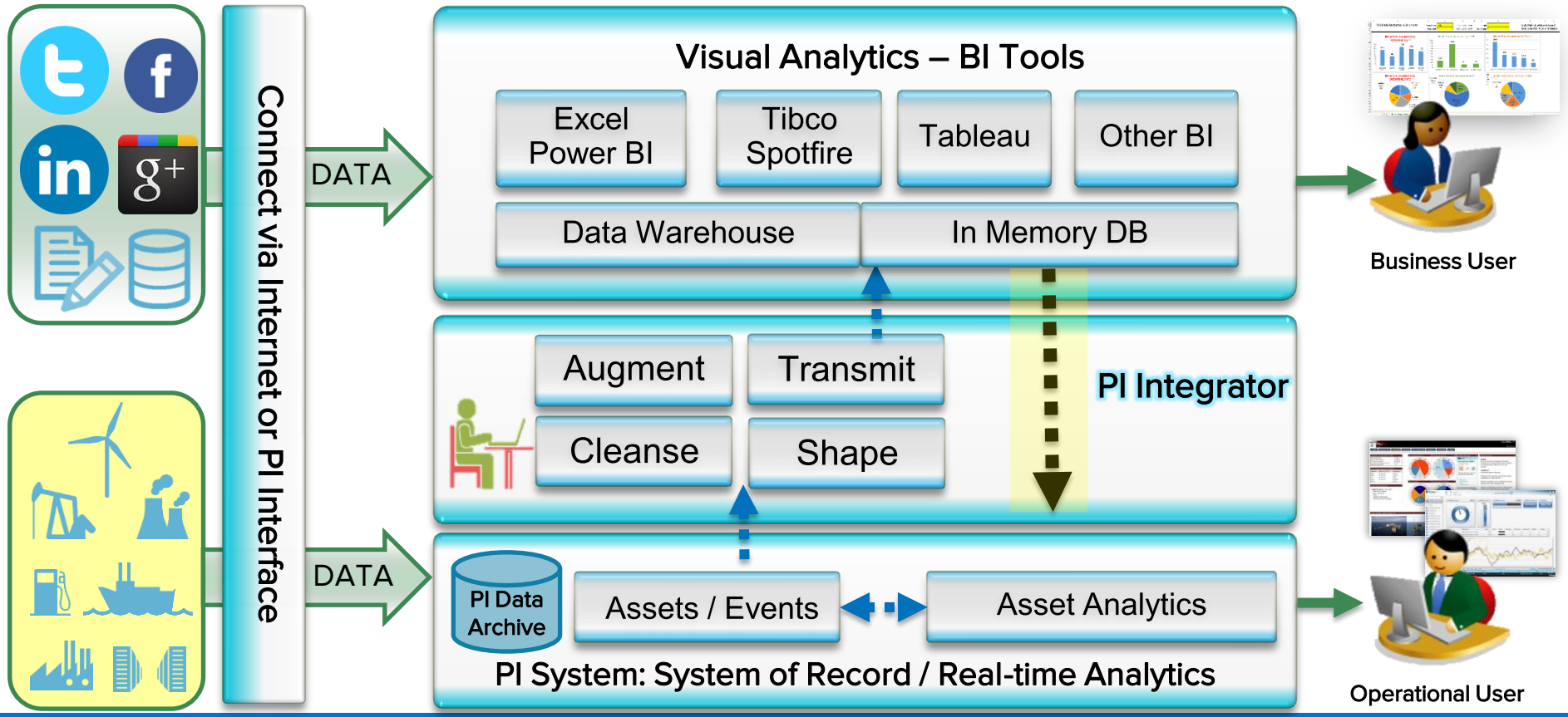
PI Integrators

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.*

© Copyright 2015 OSIsoft, LLC

PI Integrator for Business Intelligence



© Copyright 2015 OSIsoft, LLC

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)

© Copyright 2015 OSIsoft, LLC

Business Intelligence at Devon Energy

Presented by Don Morrison

© Copyright 2015 OSIsoft, LLC

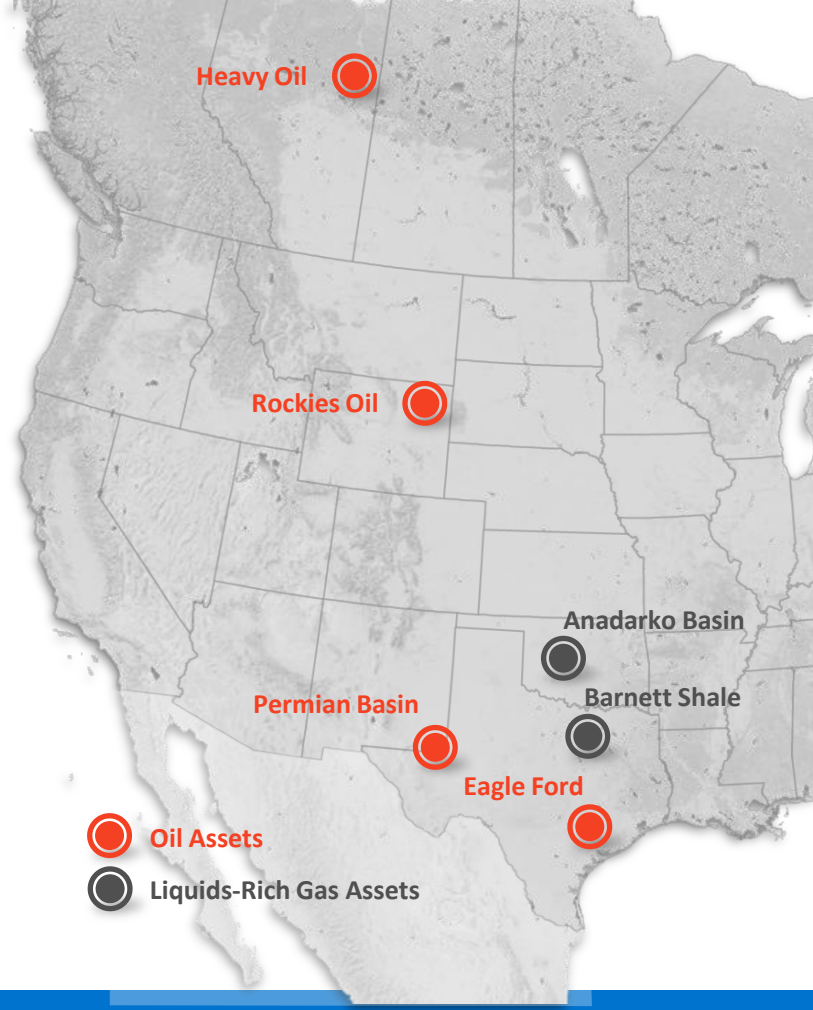
About devon

- 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

© Copyright 2015 OSIsoft, LLC

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**



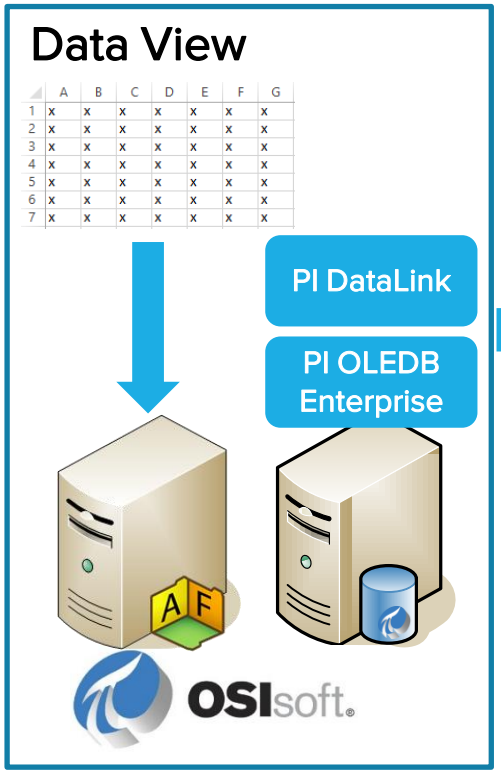
Note: All figures represent Devon's retained asset portfolio.

© Copyright 2015 OSIsoft, LLC

What we hear our business saying

© Copyright 2015 OSIsoft, LLC

How we deliver data to the business



PULL

Analytics\Visualization

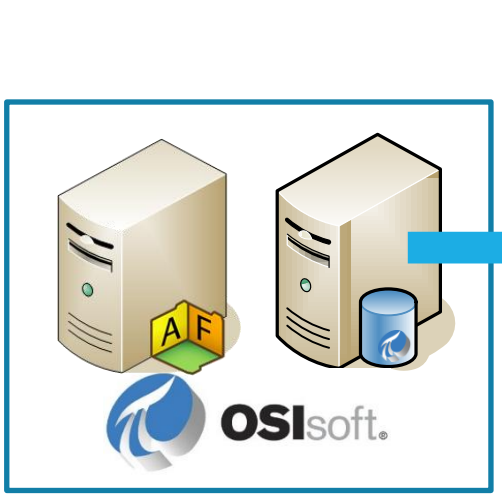
Excel TIBCO Spotfire

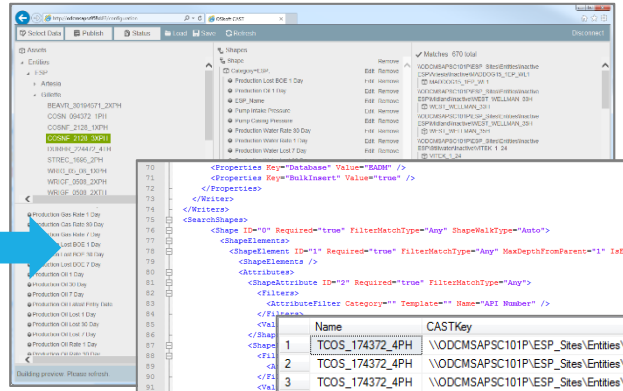
Excellent for “small” datasets
- Hours, days, 1-2 months

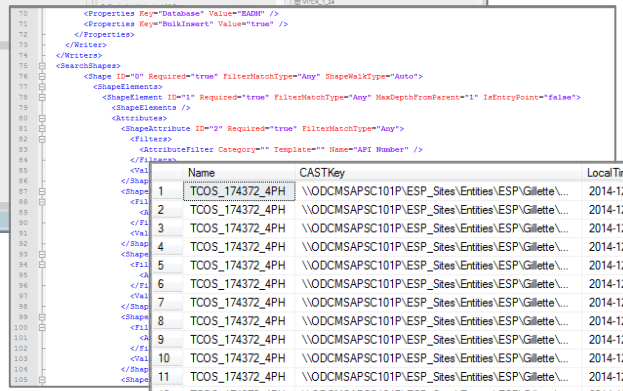
Does not scale to “large” datasets
- 6 months, 3 yrs…

© Copyright 2015 OSIsoft, LLC

PI Integrator for Business Intelligence







	Name	CASTKey	LocalTime	GMTTi
1	TCOS_174372_4PH	\\ODCMSAPSC101P\ESP_Sites\Entities\ESP\Gillette\...	2014-12-07 08:30:00.000	2014-1
2	TCOS_174372_4PH	\\ODCMSAPSC101P\ESP_Sites\Entities\ESP\Gillette\...	2014-12-07 08:45:00.000	2014-1
3	TCOS_174372_4PH	\\ODCMSAPSC101P\ESP_Sites\Entities\ESP\Gillette\...	2014-12-07 09:00:00.000	2014-1
4	TCOS_174372_4PH	\\ODCMSAPSC101P\ESP_Sites\Entities\ESP\Gillette\...	2014-12-07 09:15:00.000	2014-1
5	TCOS_174372_4PH	\\ODCMSAPSC101P\ESP_Sites\Entities\ESP\Gillette\...	2014-12-07 09:30:00.000	2014-1
6	TCOS_174372_4PH	\\ODCMSAPSC101P\ESP_Sites\Entities\ESP\Gillette\...	2014-12-07 09:45:00.000	2014-1
7	TCOS_174372_4PH	\\ODCMSAPSC101P\ESP_Sites\Entities\ESP\Gillette\...	2014-12-07	
8	TCOS_174372_4PH	\\ODCMSAPSC101P\ESP_Sites\Entities\ESP\Gillette\...		
9	TCOS_174372_4PH	\\ODCMSAPSC101P\ESP_Sites\Entities\ESP\Gillette\...	2014-12-07 10:30:00.000	2014-1
10	TCOS_174372_4PH	\\ODCMSAPSC101P\ESP_Sites\Entities\ESP\Gillette\...	2014-12-07 10:45:00.000	2014-1
11	TCOS_174372_4PH	\\ODCMSAPSC101P\ESP_Sites\Entities\ESP\Gillette\...	2014-12-07 11:00:00.000	2014-1
12	TCOS_174372_4PH	\\ODCMSAPSC101P\ESP_Sites\Entities\ESP\Gillette\...	2014-12-07 11:15:00.000	2014-1
13	TCOS_174372_4PH	\\ODCMSAPSC101P\ESP_Sites\Entities\ESP\Gillette\...	2014-12-07 11:30:00.000	2014-1
14	TCOS_174372_4PH	\\ODCMSAPSC101P\ESP_Sites\Entities\ESP\Gillette\...	2014-12-07 11:45:00.000	2014-1
15	TCOS_174372_4PH	\\ODCMSAPSC101P\ESP_Sites\Entities\ESP\Gillette\...	2014-12-07 12:00:00.000	2014-1
16	TCOS_174372_4PH	\\ODCMSAPSC101P\ESP_Sites\Entities\ESP\Gillette\...	2014-12-07 12:15:00.000	2014-1
17	TCOS_174372_4PH	\\ODCMSAPSC101P\ESP_Sites\Entities\ESP\Gillette\...	2014-12-07 12:30:00.000	2014-1
18	TCOS_174372_4PH	\\ODCMSAPSC101P\ESP_Sites\Entities\ESP\Gillette\...	2014-12-07 12:45:00.000	2014-1

TIBCO Spotfire®

IHS HARMONY

Microsoft® SQL Server® Reporting Services

hadoop

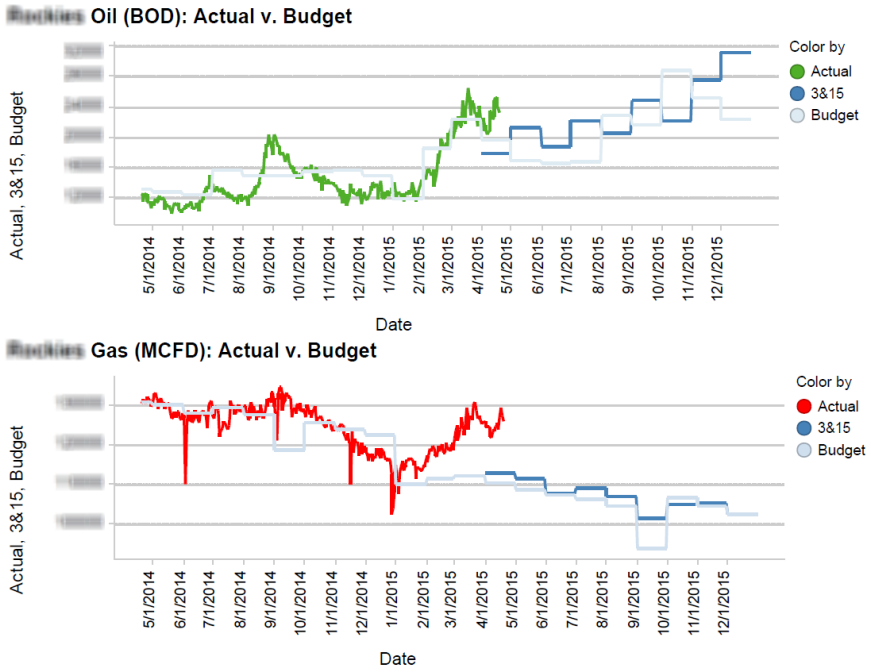
© Copyright 2015 OSIsoft, LLC

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

© Copyright 2015 OSIsoft, LLC

Use Case: Management Summary

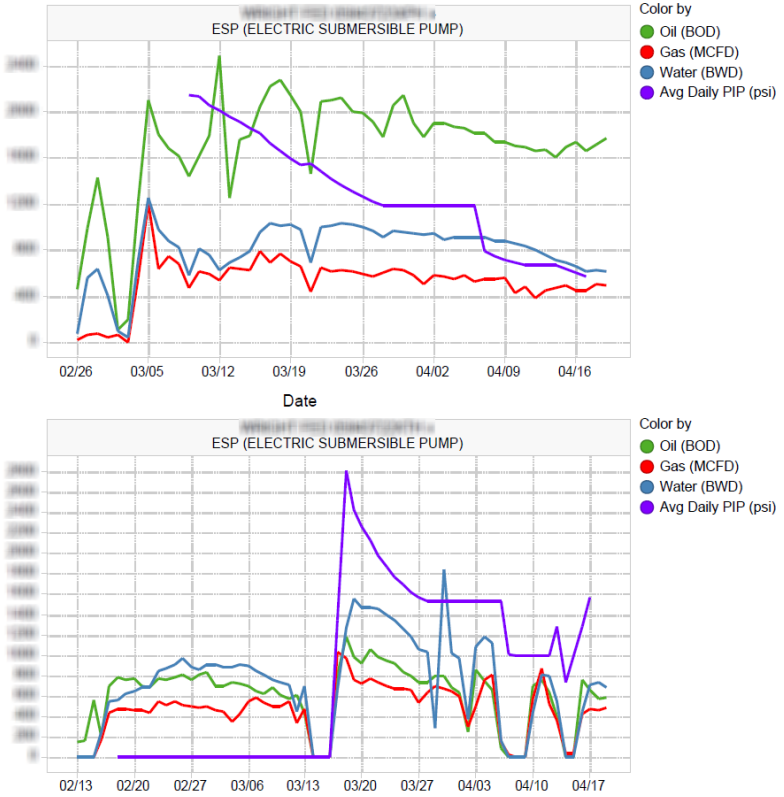


- Automated Daily Reports
- Management Overview
- KPI / Metrics
- Rollup to Bus. Unit

© Copyright 2015 OSIsoft, LLC

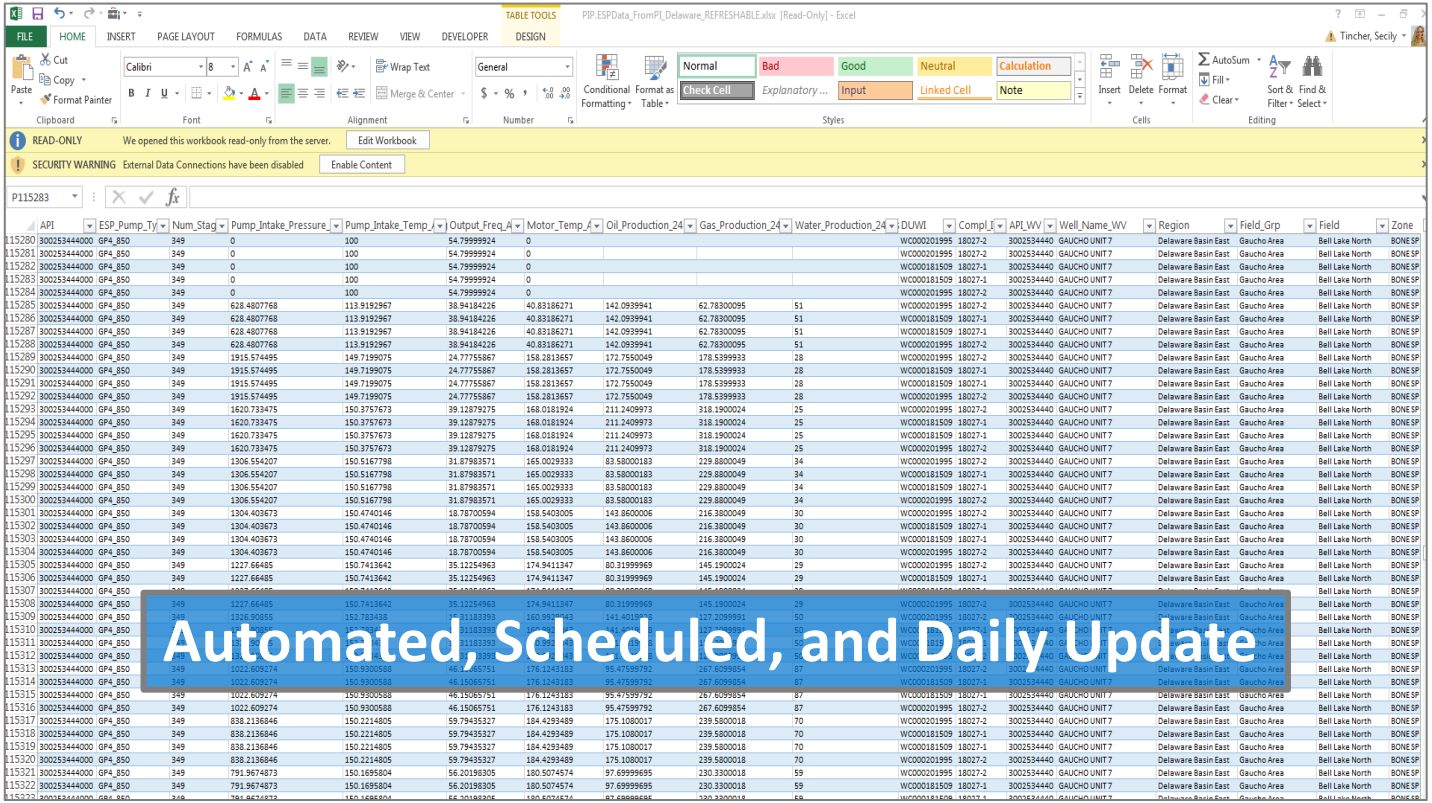
Use Case: Daily Reports

- Automated Daily Reports
- Technical Overview
- KPI / Metrics
- Well by Well



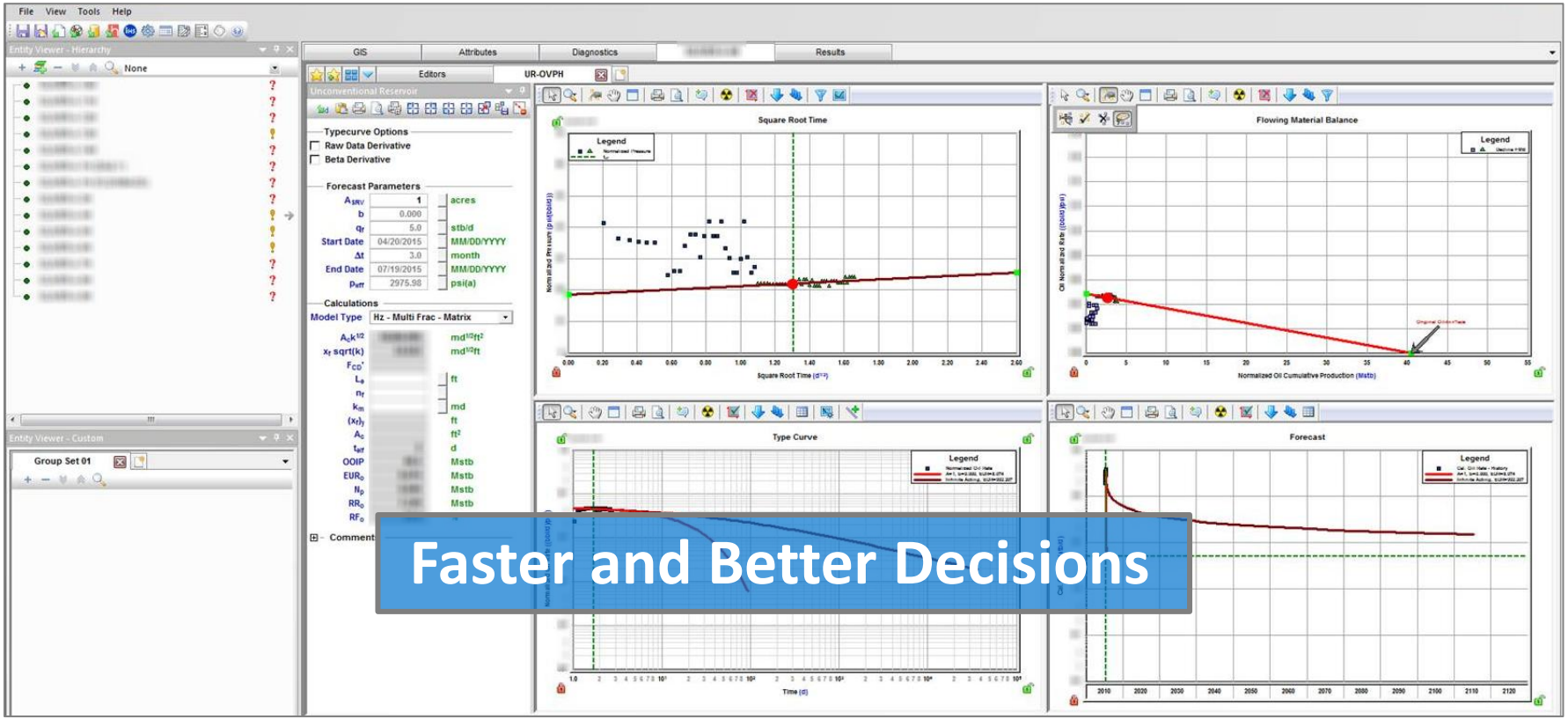
© Copyright 2015 OSIsoft, LLC

Use Case: SharePoint / Pivot Tables



© Copyright 2015 OSIsoft, LLC

Use Case: Reservoir Analysis



© Copyright 2015 OSIsoft, LLC

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

```
        <Properties Key="Database" Value="EADM" />
        <Properties Key="BulkInsert" Value="true" />
      </Properties>
    </Writer>
  </Writers>
  <SearchShapes>
      <Shape ID="0" Required="true" FilterMatchType="Any" ShapeWalkType="Auto">
        <ShapeElements>
          <ShapeElement ID="1" Required="true" FilterMatchType="Any" MaxDepthFromParent="1" IsEntryPoint="false">
            <ShapeElements />
            <Attributes>
              <ShapeAttribute ID="2" Required="true" FilterMatchType="Any">
                <Filters>
                  <AttributeFilter Category="" Template="" Name="API Number" />
                </Filters>
                <ValueFilters />
              </ShapeAttribute>
              <ShapeAttribute ID="4" Required="true" FilterMatchType="Any">
                <Filters>
                  <AttributeFilter Category="" Template="" Name="Completion Name" />
                </Filters>
                <ValueFilters />
              </ShapeAttribute>
              <ShapeAttribute ID="5" Required="true" FilterMatchType="Any">
                <Filters>
                  <AttributeFilter Category="" Template="" Name="Cost Center" />
                </Filters>
                <ValueFilters />
              </ShapeAttribute>
              <ShapeAttribute ID="6" Required="true" FilterMatchType="Any">
                <Filters>
                  <AttributeFilter Category="" Template="" Name="Pump Intake Pressure" />
                </Filters>
                <ValueFilters />
              </ShapeAttribute>
              <ShapeAttribute ID="26" Required="true" FilterMatchType="Any">
```

“Google for AF”

© Copyright 2015 OSIsoft, LLC

We're leveraging more data

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

"Enables us to make faster and better decisions regarding asset performance, which should lead to better production and lower costs!"

"...spending less time copying and pasting and more time analyzing the data."

© Copyright 2015 OSIsoft, LLC

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

© Copyright 2015 OSIsoft, LLC

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

© Copyright 2015 OSIsoft, LLC

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
  - PIIntegrators@osisoft.com

© Copyright 2015 OSIsoft, LLC

John Baier

jbaier@osisoft.com

Director of Integration Technologies

OSIsoft, LLC

Don Morrison

Don.Morrison@dvn.com

Real-time Data Engineer

Devon Energy

© Copyright 2015 OSIsoft, LLC

Questions

Please wait for the microphone before asking your questions

State your
name & company

© Copyright 2015 OSIsoft, LLC

THANK YOU

© Copyright 2015 OSIsoft, LLC

OSIsoft

USERS CONFERENCE 2015