OSIsoft PI System evolutions for the Oil & Gas Industries

Agenda

PI System is helping you transform your world

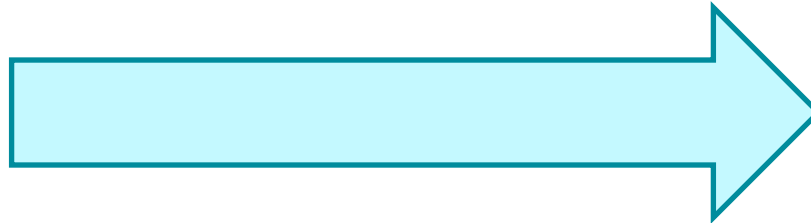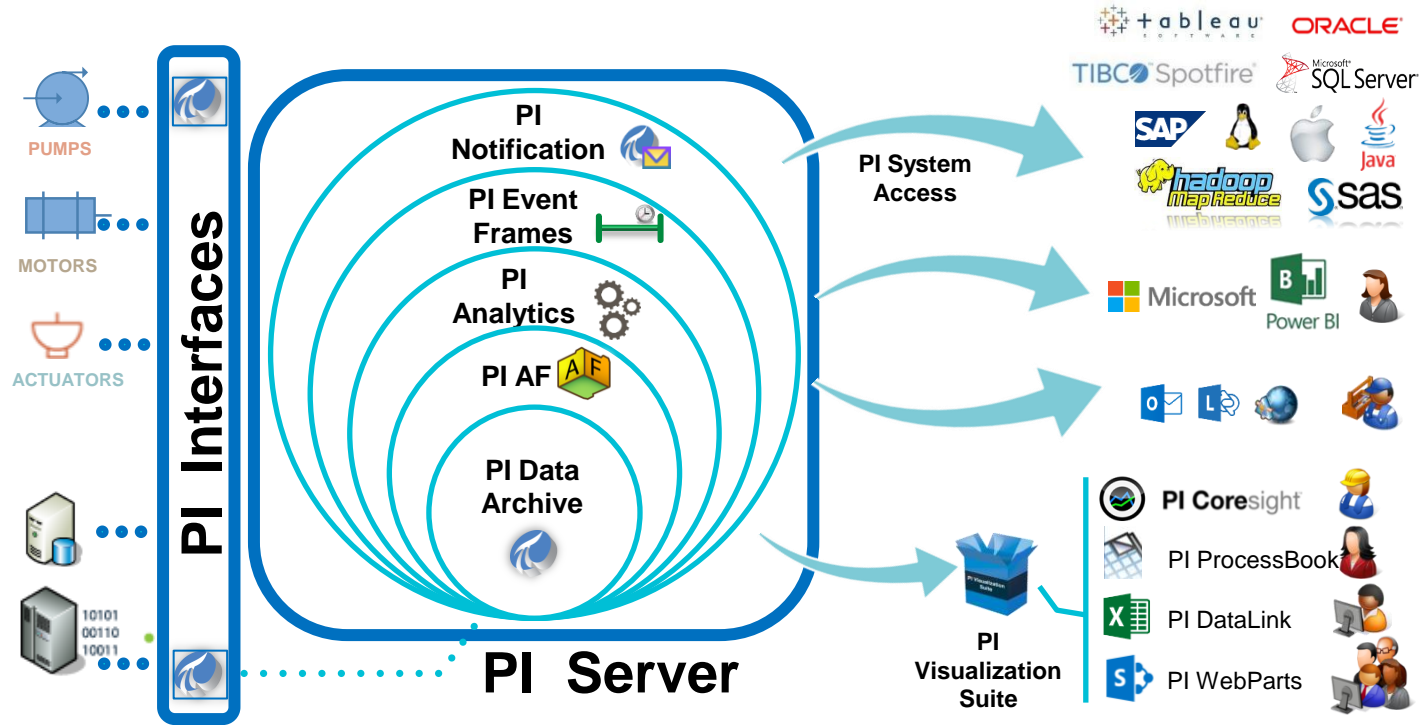|		
Mobility	Geospatial Insights	Actionable Information
Cross Company Collaboration	Forecasting	Enabling Analytics Systems

The PI System Infrastructure

Wherever your data starts

to Wherever your data needs to go

The **PI System Infrastructure**

is **everything in between**

PUMPS

MOTORS

ACTUATORS

10101
00110
10011

Real Time Troubleshooting

Keep the network healthy

Report on data quickly

Avoid outages

The PI System Infrastructure

PI Connectors are helping you transform your world
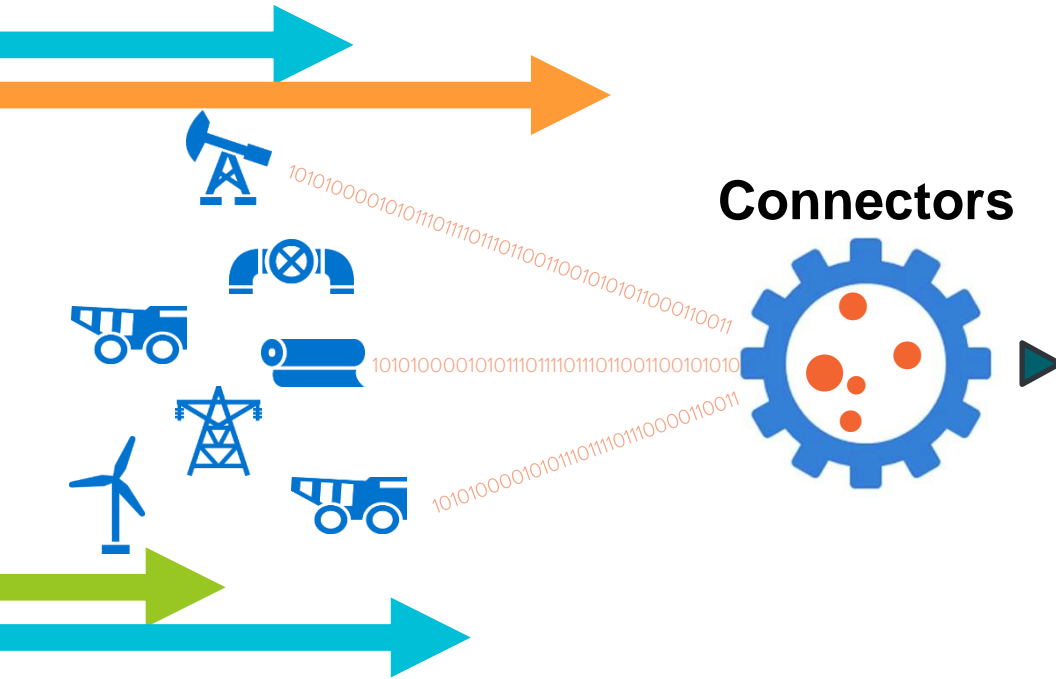
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PI Connectors

Connectors

- Data source is the system of record
- Data collected in terms of assets as defined by the data source
- Assets auto-created in PI Asset Framework
- Tags auto-created in PI Data Server, linked to PI Asset Framework Elements
- Events collected and stored in Event Frames
- Easy to configure

PI Connectors for O&G companies

PI Connector	Market	Status
IPMI	Datacenters	✅
CygNet	Upstream Oil and Gas	✅
EtherNet/IP	High-speed discrete	✅
Kongsberg	Transportation	✅
HART-IP	Many. Wireless sensors	Beta
BACnet	Facilities	Beta
WITSML	Upstream, drilling	Beta
Siemens Simatic PCS 7	Many	Beta

Many others protocols in addition

PI Cloud Connect is helping you transform your world

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PI Cloud Connect

Securely Share PI System Data Across
Geographic & Organizational Boundaries

Forecast data is helping you transform your world

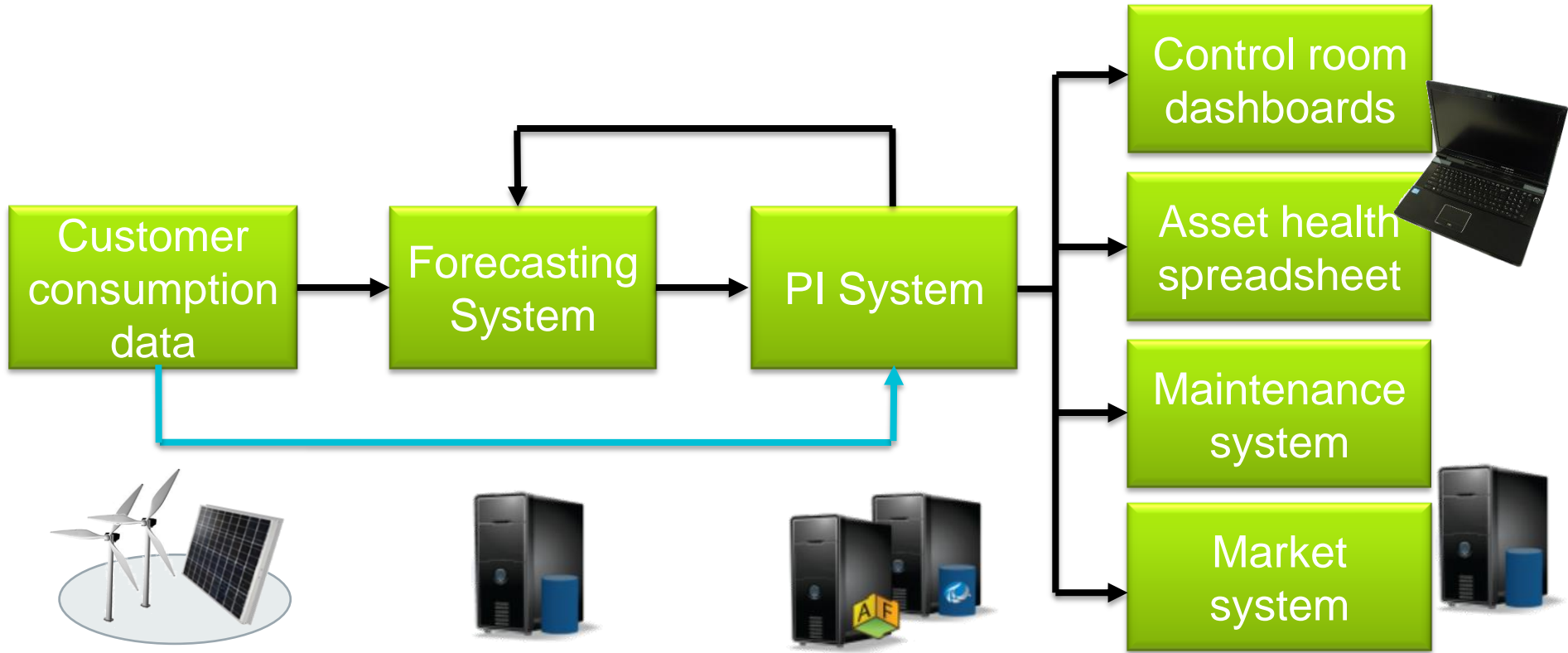|		
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Forecast data in the O&G industry

- Production predictions

- Consumers consumption prediction

- Model failures patterns for prediction

Sample PI System for O&G

Customer consumption data → Forecasting System → PI System →

- Control room dashboards
- Asset health spreadsheet
- Maintenance system
- Market system

PI Asset Framework is helping you transform your world

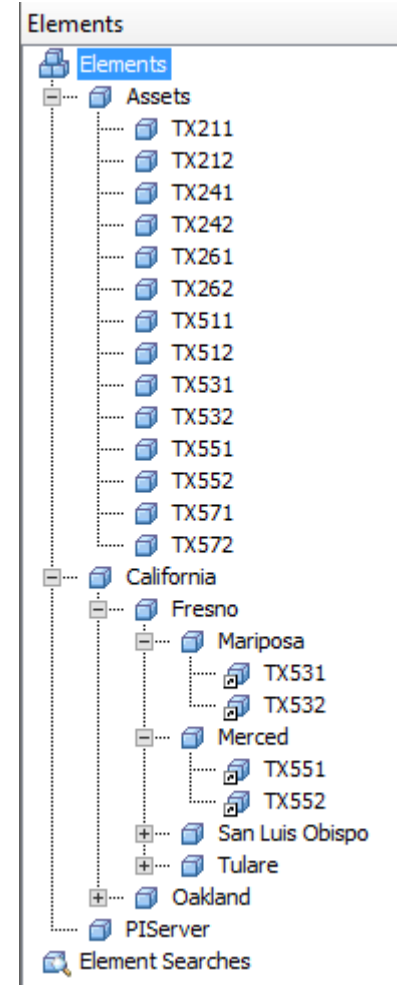|		
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PI Asset Framework

The hierarchy

- Group by geography or business units
  - Ex.: Areas deserved by pipelines
- Group by asset types
  - Ex.: Pipelines
- Group by problems you need to solve
- Use references for different "views"

Elements

- Elements
  - Assets
    - TX211
    - TX212
    - TX241
    - TX242
    - TX261
    - TX262
    - TX511
    - TX512
    - TX531
    - TX532
    - TX551
    - TX552
    - TX571
    - TX572
  - California
    - Fresno
      - Mariposa
        - TX531
        - TX532
      - Merced
        - TX551
        - TX552
      - San Luis Obispo
      - Tulare
    - Oakland
  - PIServer
- Element Searches

PI Asset Framework

- Elements
  - Physical object or logical entity
  - Ex.: Compression station
- Attributes
  - Properties of an element
  - Ex.: Flow
- Use templates for standardization and scalability

PI Asset Framework

Templates

- How we define a particular class of objects
- These definitions are used throughout the PI System
- Auto-create PI Points to ensure consistency
- Use template inheritance to define attributes

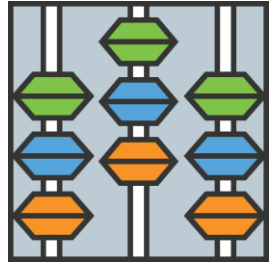| Gas distribution vehicles	
Truck	Cars
Caterpillar	Manitex

PI Asset Framework

Analyses

- 150+ built in functions
- Use variables in expressions for readability
- Scheduled analyses should write outputs to PI Points
- Ensure PI Analysis Service has proper security
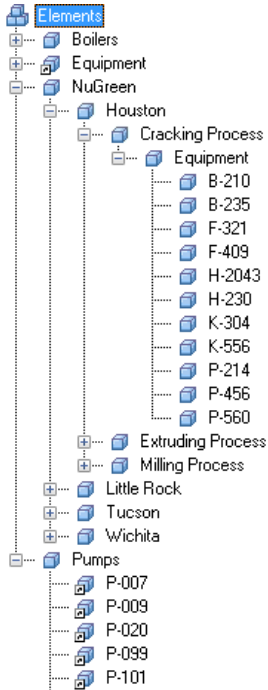- Use analysis templates for standardization and scalability

PI Asset Framework

Event Frames

- Use EF to define important events for assets
  - Days
  - Start-ups and shutdowns
  - Shifts & crew shift reports
  - Tests on operating equipment
  - Downtime, incidents
- Use templates for standardization and scalability

PI Asset Framework

Elements
- Boilers
- Equipment
- NuGreen
  - Houston
    - Cracking Process
      - Equipment
        - B-210
        - B-235
        - F-321
        - F-409
        - H-2043
        - H-230
        - K-304
        - K-556
        - P-214
        - P-456
        - P-560
    - Extruding Process
    - Milling Process
  - Little Rock
  - Tucson
  - Wichita
- Pumps
  - P-007
  - P-009
  - P-020
  - P-099
  - P-101

Analyses
- Efficiency analysis
- Key Performance Indicators (KPI)

Time-series
- In-Flow
- Pressure
- Vibration data

Events
- Downtime
- Startup
- Failure

Asset details
- Name
- Model
- Manufacturer

Notifications
- High speed
- Rotor failure
- Low pressure

External data
- Performance curves
- Last maintenance date
- Design documents
- Best operating procedures

PI Integrators are helping you transform your world

Mobility
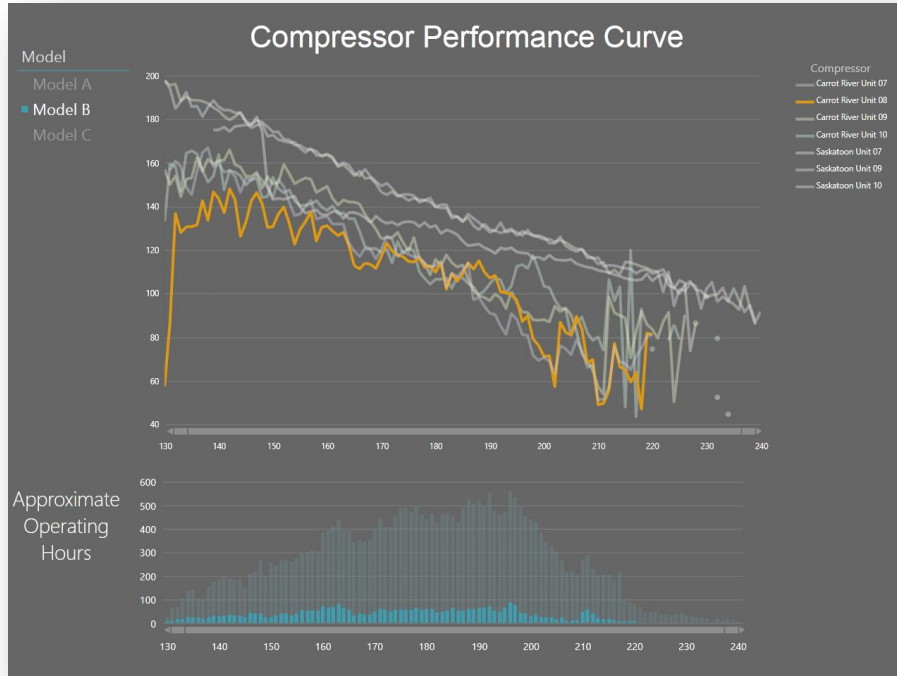
Geospatial Insights

Actionable Information

Cross Company Collaboration

Forecasting
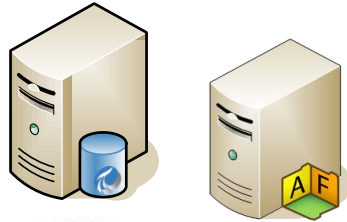
Enabling Analytics Systems

Why do you need a PI Integrator?

Real-time Data isn't perfect

- 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

From Raw Data to Decision Ready Data

Needs:

Cleanse

Augment

Shape

Transmit

Visual Analytics

Excel, tableau software, Spotfire TIBCO Software, COGNOS, QlikView

Statistical Analytics

hadoop Map Reduce, SAS, SAP

System of Record

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

Analytics Packages

- 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**
- PI data delivered to the **tools you use** and to the people that can make a difference

PI Integrator for Esri ArcGIS
Overlay Assets and Real-time Information onto Esri Maps
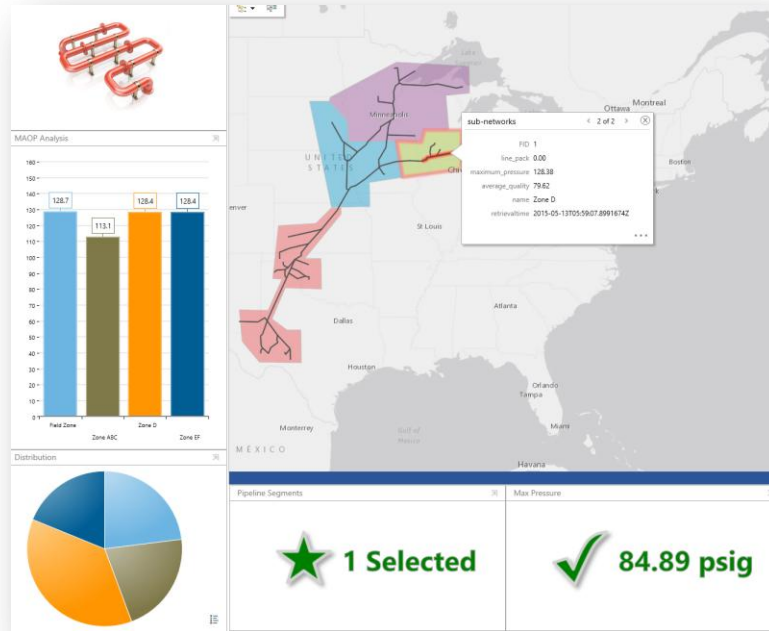
- Overview of your PI System assets using Esri maps

- Esri maps become live with PI System data

- Drill into asset data using PI Coresight

- Import Esri ArcGIS assets into PI Asset Framework

When can you start ?

Mobility PI Coresight 2014 ✓	Geospatial Insights PI Integrator for Esri ✓	Actionable Information PI Server 2014 R2 ✓
Cross Company Collaboration PI Cloud Connect ✓	Forecasting PI System 2015	Enabling Analytics Systems PI Integrator for BI, Hana

THANK YOU

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