

The OSIsoft logo is centered at the top of the page. It features the word "OSI" in a bold, white, sans-serif font, followed by "soft" in a lighter weight of the same font, and a registered trademark symbol (®) to the upper right of the "t".

OSIsoft®

USERS CONFERENCE 2016

April 4-8, 2016 | San Francisco

TRANSFORM
YOUR WORLD



Utilizing PI Cloud Connect to Extend the Value of Process Data for Power Plants

Presented by **Robert Steele**
VP Information Systems & Technology



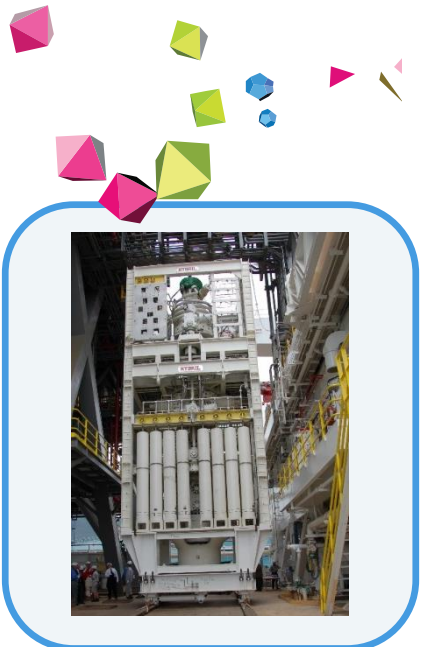
SPS – Data First



Power, Platforms,
Pipelines



Renewables...Wind
& PV



Deep sea Drilling...
BOP

ORAP® - A Global Database

RAM Data for Large-Scale Capital Equipment

Power, Platforms, Pipelines

- 2,600+ Units
- 750+ Thermal Plants

Renewables... Wind

- 660+ Units
- 8 Wind Plants

Deep Sea Drilling... BOP

- 1,040+ Rigs/BOP

Industry Standards

IEEE 762/ISO 3977

IEC 61400

ISO 14224/API-53

**Pedigree
Taxonomy
Operating Data**

**Third-Party
Unbiased**

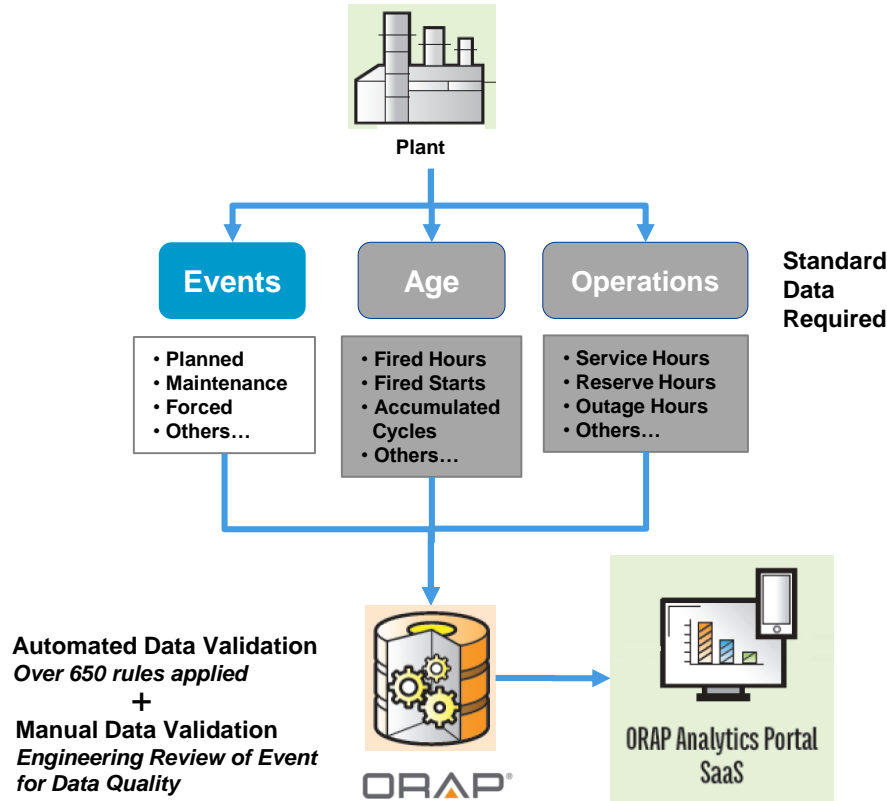
Data Since

1987

A Global Customer Base



ORAP Process



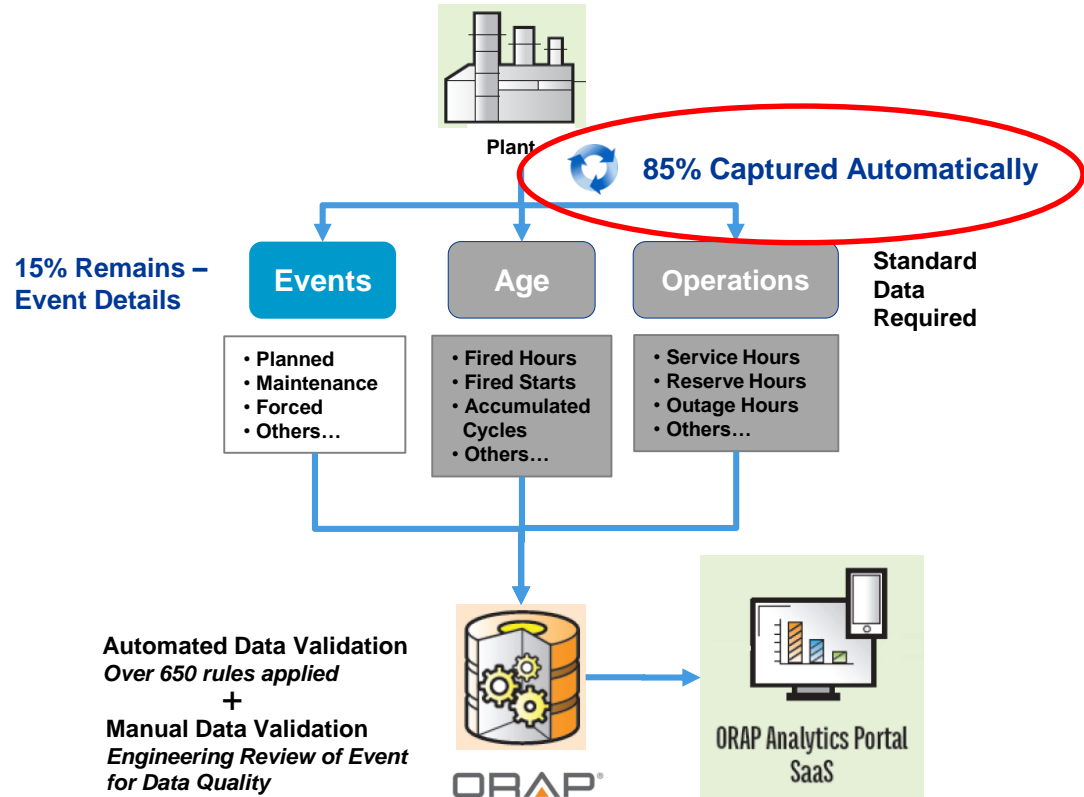
ORAP Benefits

- Standardization across fleets
 - Data Input
 - RAM KPIs
- Benchmarking
 - RAM KPI's
 - Inspections
 - Events
- Summary of Outage Duration and Causes
- Fleet event details
- Communication with OEM

The Challenge

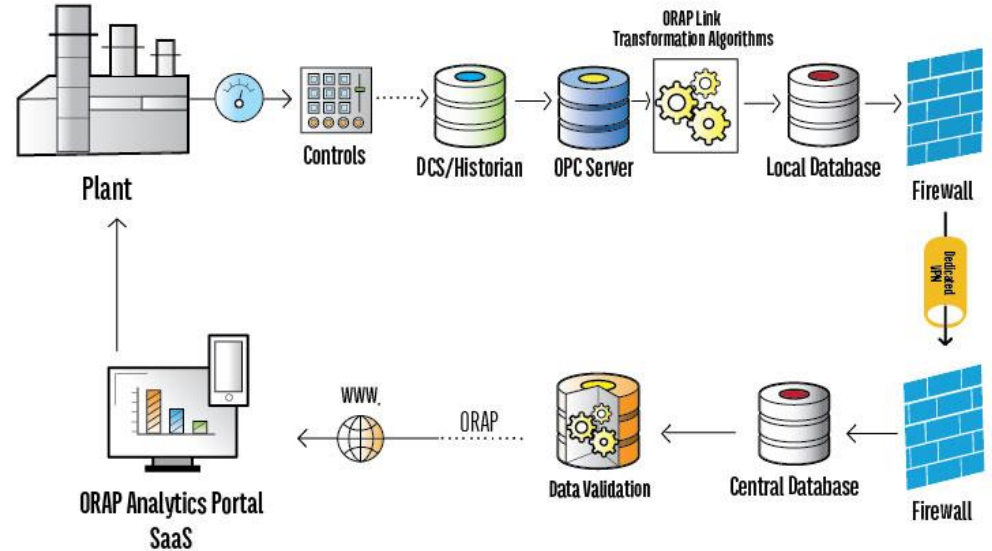
- Reduce Manual Input
- Improve Data Quality
- Improve Timeliness

Optimize Data Collection and Reduce Requirements on Plant Staff



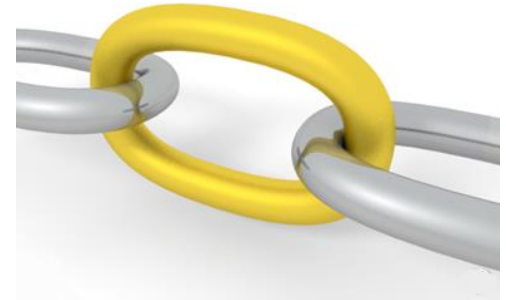
Our Past – Before the PI System

- Initial Install circa 1999
 - Integrated hardware and software
 - OPC communications (and others)
 - VPN connection for data transmission – or later - Custom Web Service
 - Local Data Processing – Transformation Logic
 - Database replication of results only (i.e. not process data)



Our Past - Constraints

- Onsite Installation – Hardware & Software
- OPC Client Required Custom Configuration - DCOM
- Configuration and Maintenance of Local Database
- Hardware Setup and Maintenance
- Software Maintenance with Multiple Remote Applications
- Dedicated VPN Required
- No 'Access' to Unprocessed Data at Data Center



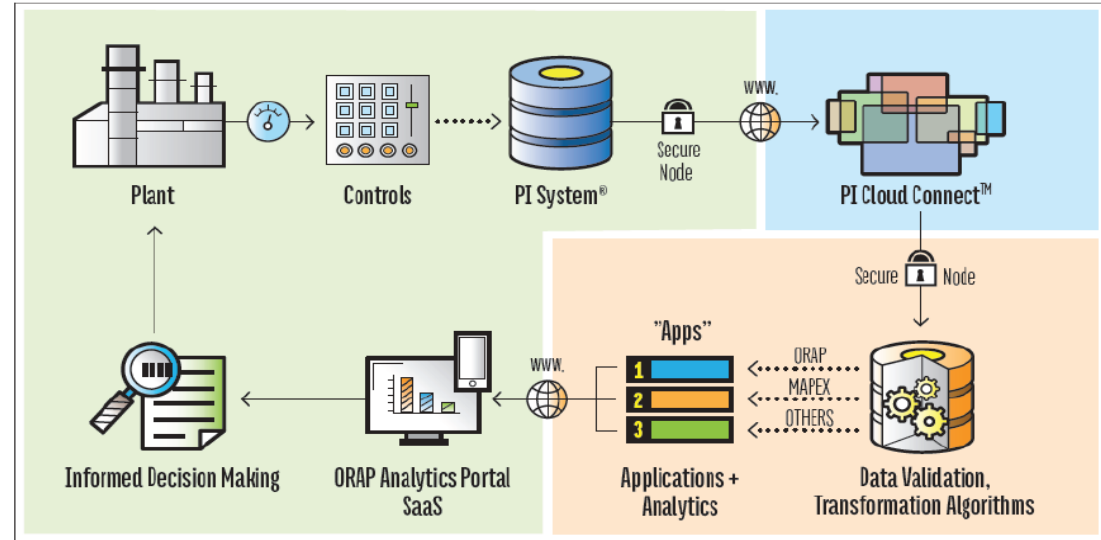
Managing Multiple Remote Installations

Streamlined Process – Partnership with OSIsoft



- Expertise in real-time data capture
- Data flows securely through PI Cloud Connect
- Scalable & maintainable
- Reduced cost and logistical issues
- Leveraged customer's existing PI System infrastructure

ORAP® ASSET INSIGHT™
Data First. Data Fast. Data Fidelity.



How It Works – Site Install

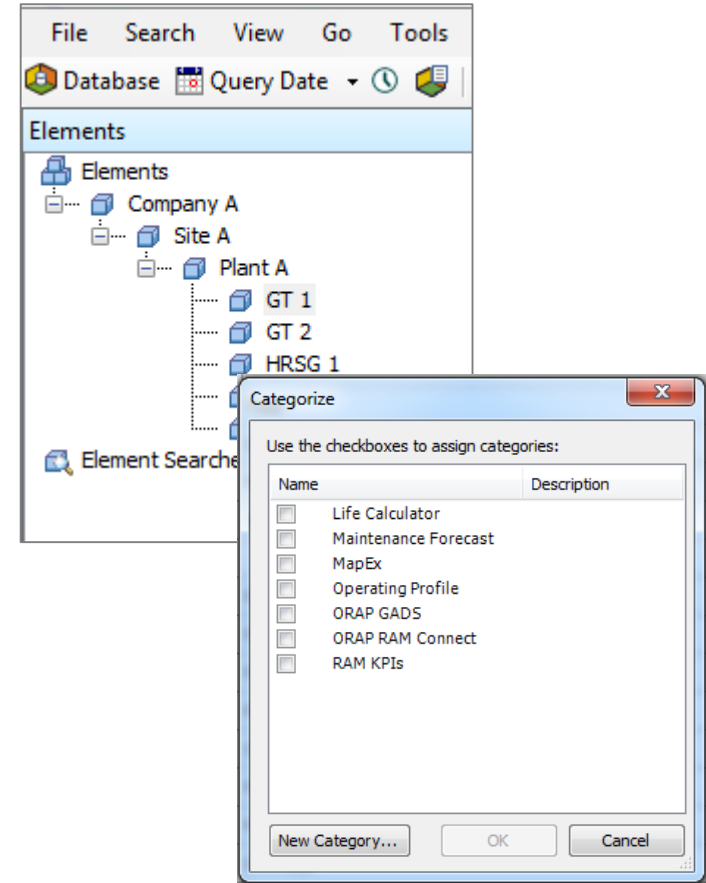
- SPS Provides Customer with Asset Framework (AF) Template
- Customer Maps PI Tags Required for Transformation
- Customer Sets up PI Connect Node
- Customer Publishes AF Template

Secure  Node

Customer performs local setup and configuration

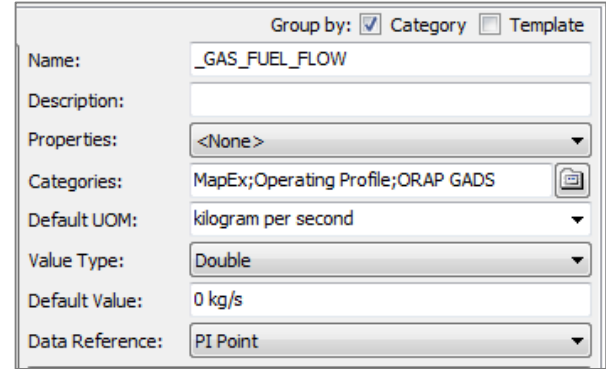
AF Template Details

- Standard AF model built
 - Generic element hierarchy based on the Customer – Site – Plant – Unit – Equipment Hierarchy utilized in ORAP
- Attributes named based upon point names used in existing ORAP Transformation logic
- Attributes for all ORAP Asset Insight Applications or “Apps” contained in template
 - Attributes Categorized based upon the apps that require the data from the attribute
 - All attributes for all Apps included in the template
 - Customer controls attributes chosen in AF




AF Template Details - Continued

- Default units of measure identified for each attribute
- Elements renamed and 'arranged' for specific customer/plant
- AF exported and sent to the customer as an .xml file
- AF Database Specific to ORAP
 - No changes to customers process

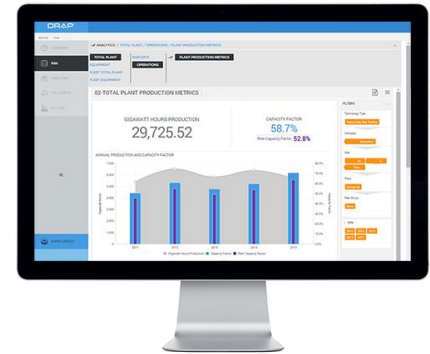


The screenshot shows a configuration window for an attribute. At the top right, there are two checkboxes: 'Group by: Category' and ' Template'. The main form contains the following fields:

Name:	<input type="text" value="_GAS_FUEL_FLOW"/>
Description:	<input type="text"/>
Properties:	<input type="text" value="<None >"/>
Categories:	<input type="text" value="MapEx;Operating Profile;ORAP GADS"/> 
Default UOM:	<input type="text" value="kilogram per second"/>
Value Type:	<input type="text" value="Double"/>
Default Value:	<input type="text" value="0 kg/s"/>
Data Reference:	<input type="text" value="PI Point"/>

How It Works – SPS Data Center

- SPS Subscribes to Customer's Publication
- Using PI SDK SPS Created a Service to Extract Data “as received”
- Process through our existing Transformation Logic
- Transformed Data then sent to ORAP
- Validation
 - Automated – Over 650 engineering rules applied
 - Manual – SPS engineers review all events for data quality
- Visualization
 - ORAP Analytics
 - On-demand Business Intelligence portal



Details of Service using AF and PI SDK

- Created Service to monitor the PI System for Receipt of Data in C#
- Logs last data received/processed and cycles through units (AF Elements) by Plant
- Extracts data and processes for use in existing transformation logic
 - Uses default units from AF
 - Extrapolates for 1/sec Data as Required
- Performs Validation and alerts on 'Bad Data' and Data not received

No Changes to Existing Transformation Logic for Processing Data

Reduced Constraints

- ~~Onsite Installation – Hardware & Software~~
Remote Installation with No Custom Configured Hardware or Software
- ~~OPC Client Required Custom Configuration – DCOM~~
No Custom Communications Required
- ~~Configuration and Maintenance of Local Database~~
Generic AF Template at Site and Central Database



Reduced Constraints - Continued

- ~~Hardware Setup and Maintenance~~
Leverage Existing PI System (add Connect Node)
- ~~Software Maintenance with Multiple Remote Applications~~
No Custom Software installed at remote site
- ~~Dedicated VPN Required~~
Subscribe to Customer's Publication via HTTPS
- ~~No 'Access' to unprocessed data at Data Center~~
All Data Collected stored in Central PI System



The Importance of Data Security

“If I were to share with you the number of attacks that come into the Duke network every day, you would be astounded...”*






-Lynn Good, Duke Energy CEO

- Major Concern for Power Generators
- Must Ensure No Physical Access to System Infrastructure
- Data Confidentiality
- Government Regulations
 - U.S. Power Generators – NERC CIP Compliance
- Corporate IT Hurdles

*Charlotte Business Journal – coverage of the *Triangle Business Journal's* Power Breakfast 1 March 2016

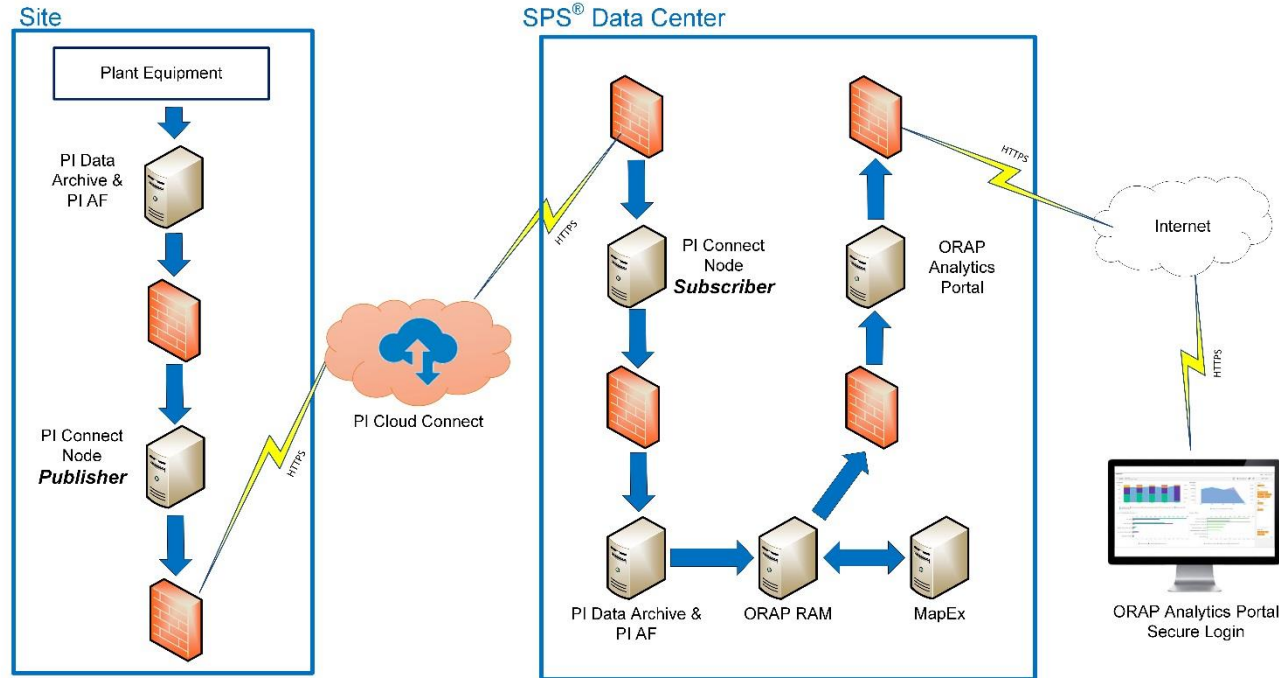
Protecting Data

- Experience
 - Both SPS and OSIssoft
- Data Transmission Controlled by Plant
- NERC CIP Compliance
- Layers of Security
 - PI Cloud Connect
 - Named User Access Profiles in ORAP
- Data Confidentiality

Push Not Pull	NERC CIP Compliant	Layers of Security	Secure Connect Node	Data Confidentiality
				
<ul style="list-style-type: none">▪ Plant establishes data subscription for SPS, names us as restricted user▪ Data transmission controlled by the plant, it can be turned off at any time	<ul style="list-style-type: none">▪ Process has passed CIP compliance audits▪ Data flow is controlled by the plant▪ SPS has no direct access to plant IT systems	<ul style="list-style-type: none">▪ Embedded within PI Cloud Connect data transfer service are Four (4) Layers of Security▪ In ORAP, all data rights are controlled by named user access profiles▪ Sophisticated ORAP security model in place for close to 30 years	<ul style="list-style-type: none">▪ Data flow is secured and encrypted▪ Process uses Secure Socket Layer (SSL) technology for establishing encrypted link between web server and browser	<ul style="list-style-type: none">▪ All data in ORAP is protected under Non-Disclosure Agreements (NDAs)▪ Asset Insight customers sign product specific Subscription Services Agreement▪ All data ownership resides with the submitting owner/ operator

Protecting Data – High Level Architecture

ORAP® Analytics: PI Cloud Connect High Level Architecture

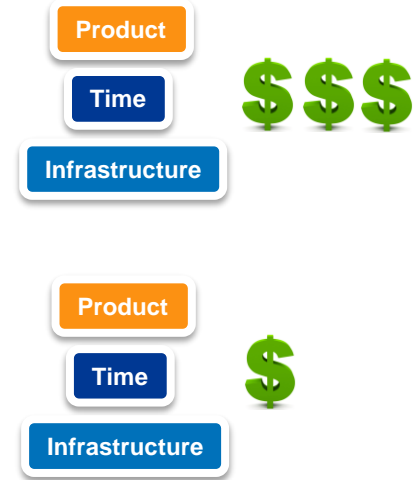


NOTE: Configuration for Illustration Purposes - Configuration is Site & Company Specific. See FAQ for port details

NOTE: Firewall & Server Configuration for Illustration Purposes Only

Product Flexibility and Time Savings

- Before OSIssoft
 - Bundled product offering
 - 2-3 days onsite with the customer
 - Ongoing hardware, software and infrastructure maintenance
- With OSIssoft
 - Cost effectively unbundle “apps”
 - 2-3 hours over the phone with customer
 - Reduced hardware, software and infrastructure maintenance



- **Extending the value of data collected through the PI System**
- **Focus on adding business value through data transformation**

Helping Power Plant Owner/Operators Make Data-Driven Decisions



- “Run Your Plants – Not Reports”
 - PI Cloud Connect reduces data collection requirements
 - Owner/Operators can focus on running the plant
 - Satisfies Corporate and Regulatory reporting requirements
 - On-demand reliability & availability benchmarks
 - NERC GADS reporting
 - Aging parameters
 - Thermal performance metrics

Moving Forward with Our Partnership

- Developing Additional Applications Based on Customer Feedback and Needs
- Product Solution Expanded to Global Customer Base
- Transition into Vertical Markets
 - Oil & Gas
 - Renewables



Process Optimization Using PI Cloud Connect

COMPANY and GOAL

SPS gathers data from power plants all over the world then provides reliability benchmarking statistics to help them make business decisions. **Optimizing data collection** and **reducing requirements** on plant staff is the main goal.



Strategic Power Systems, Inc.



CHALLENGE

Legacy process required onsite installation, VPN set up and manual map & tag of addresses.

- Set up would take multiple days at customer site to complete
- Management of multiple remote installations
- Product offering was a full bundled solution

SOLUTION

Data flow from the plant through PI Cloud Connect to SPS allows for scalable, effective and maintainable infrastructure.

- Customers are able to view their reliability analytics on-demand with minimal effort required of their plant staff
- SPS can rely on PI Cloud Connect process and proven data capture expertise

RESULTS

Scalable, data-driven solution that allows SPS to provide detailed reliability analytics to our customers

- Setup time required onsite with customers is reduced from 2-3 days to hours
- Product solution can be cost effectively unbundled, allowing customers the flexibility to choose what apps work for them

Contact Information

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Strategic Power Systems, Inc.



Questions

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

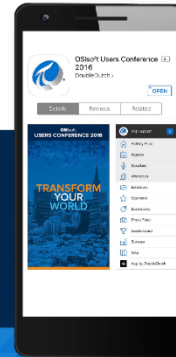


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HTML

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<http://ddut.ch/osisoft>

감사합니다

谢谢

Danke

Merci

Gracias

Thank You

ありがとう

Спасибо

Obrigado

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