Remote monitoring & optimization for Air Liquide plants using AF/EF

From

Luis Santana - Alizent  Moussa Diakhite - Air Liquide  Irene Lotero - Air Liquide
Conference Theme & Keywords

[Word cloud with keywords such as "Optimization", "Data Analytics", "Smart Decisions", "Airliquide", "AF SIO", "Access", "Deployment"]
Air Liquide Industries
Smart Innovative Operations Initiative
Air Liquide key figures

- ~65,000 Employees
- Present in 80 Countries
- Revenue €20.3 Billion
- Net profit €2.2 Billion
- More than 3 Million Customers & Patients
Large Industries perimeter

- 365 Large Air Separation Units
  - Oxygen, Nitrogen, Argon

- 50 Steam Methane Reformer Units
  - Hydrogen, CO, Syngas

- 18 Cogeneration Units
  - Steam & Power

- Oil & Gas, Petrochemicals & Metals customers

- Best in class performance in safety and availability.
- We improve the efficiency of our customer processes and help them preserve the environment.
Air Liquide Large Industries business challenge

- **Leading Approach**: proactive handling of operational drifts ("detect incidents before they happen")
- **Industrial Sustainability**: make sure what we work on will improve and continue
- **2020**: Zero unplanned shutdowns, Double the efficiency gain
- **Connecting**: Industrial expertise socialization, Fleet and data socialization
- **Digitalization**: digitalization is key to enable all 3 above initiatives
Air Liquide Large Industries business challenge

DRIVE = PREDICT = OPTIM = PERFORM

Evolution of OCC
Automation and infrastructure for high level and safe remote operation

Predictive Analytics Monitoring
Early detection of potential failure

Business Analytics Monitoring
Operation decisions based on real time margin

Best Economical Performance
How to use data to improve economic performance of our assets
SIO.Drive - ROCC

2 ROCCs

24/7 Providing service to customers supplied in industrial gases

22 Production units connected to the remote center

20 Million euros of investment

8+ Countries in Southeast Asia with units to be progressively connected

18+ Production units will be progressively connected to the remote center
a Key Partner
Alizent purpose

Alizent is a fully owned subsidiary of Air Liquide, dedicated to Industrial Internet of Things. We design and operate solutions that connect assets to provide data and enhance performance to:

- deliver Air Liquide Digital Transformation for asset management and production & logistics optimization

- serve non competing 3rd party clients facing similar challenges as AL in their Digital transformation. Ex: LPG Industry - Beer Industry - Aluminum Industry - Health & Wellbeing Industry - Food Industry
Alizent - local presence and global reach

7 Offices to serve clients from

3 Networked Technology Centers
(Paris - Madrid - Montreal)

- 250+ employees
- 20+ years of experience
- ISO 9001
- Digital Studio facilities in Paris
Alizent augments industrial & medical assets with data

Returnable Assets: 22M assets tracked today

Remote Assets: 205k connected assets today:

Production Assets: 200+ plants supervised today

Alizent Value Proposition

Accelerate rotation
Anticipate demand
Inventory & working capital optimization
Avoid losses / detect theft
Attach info to the asset
Enable new distribution & business model

Optimize service costs (refill, maintenance...)
Collect & share information with client / users / patients
Enable new distribution & business model

Improve plant performance
Traceability of production / regulation compliance
Pool operation teams across several assets
Enable new distribution & business model

Production Assets:

Remote Assets:

Returnable Assets:
SIO Program and Alizent

People
- 3 continents
- Data Scientists
- IT Architects
- PI Experts

Processes
- Agile
- Iterative
- Collaborative
- Customer Experience

Phases
- Proof of Concept
- Pilot
- Industrialization
- Operation
Air Liquide Industries France
New Remote Operation Control Center (ROCC)
ALFI before ROCC

19 sites with 22 Production Units

○ Safety
○ Production optimization
○ Maintenance
○ Local customer service
○ Regulatory compliances
○ Billing

Plant manager
Production supervisor
Technicians
Old habits with PI System

Ownership and update
- Creation numerous displays incorrectly shared, updated and/or questioned

Files multiplicity
- For x same equipment x views meaning x files to maintain

Time consuming
- Numerous tags and tag naming across AL not homogeneous
- => spend time searching/asking

1 expression 5 experts 5 results
- For 1 measure on 1 equipment 5 tags
A unique remote operation center connected to production units in France

Based in Saint-Priest, the remote operation and optimization center is gradually being connected to 22 units producing gases for industry and health in France.

In the production units, the teams are able to focus on equipment safety and performance.

1. Alliance Industrielle du Futur
New roles and challenges

- Plant manager
  - Safety
  - Equipment availability
  - Maintenance
  - Regulatory compliances

- Foreman
  - Production optimization
  - Predictive maintenance
  - Customer service
  - Automatic billing

- Technicians
  - Plant manager
  - Foreman
  - Technicians

- Analyst
  - Real time pilot

- Real time pilot
  - Production optimization
  - Predictive maintenance
  - Customer service
  - Automatic billing

#PIWorld
Product impact for real time monitoring and optimization

- **PI ProcessBook**
  - Less file using Element relatives display
  - Information access facilitated

- **PI Vision**
  - Easy share of displays and EF
  - Clear ownership / display update ++
  - Possibility to import ProcessBook display/share easily

- **PI DataLink**
  - Retrieval of data from analytics
  - EF frequency and relevance easy to assess

- **PI System Explorer**
  - User friendly access to database management & testing

- **PI AFBuilder**
  - Quick deployment of data in AF databases
Implementation - Template definition & creation with PI System Explorer

ROCC + Plant + Business expert = X templates
Deployment using PI AFBuilder

PI AFBuilder

ROCC + Plant = Validated tag

Quick deployment

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<th>Inlet Flow</th>
<th>Power</th>
</tr>
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<tbody>
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<tr>
<td>4</td>
<td>FI879</td>
<td>P598</td>
</tr>
</tbody>
</table>
Analytics definition using PI System Explorer

Asset Analytics
Asset Framework
Data Archive

PI System Explorer

Easy management
Testing before deployment

Power Model
(Template analysis)
New database
- Contextualized
- Validated data
- Accessible by all
Visualization using PI Vision

PI Vision

1. Asset Analytics
2. Asset Framework
3. Data Archive
Visualization using PI ProcessBook

- Less files
- Smooth transition to AF
Event Frames deployment and management with PI SE

Quick deployment
Easy management
Event Frames analysis and sharing with PI Vision

Contextualized and custom viz

Weblink for sharing
Event Frames quantitative analysis with PI DataLink

- Event Frames
  - Asset Analytics
  - Asset Framework
  - Data Archive

*PI DataLink*

- Extraction of EF
  - Trigger tuning
  - Specific expression
  - EF killing
Next step - PI Notification implementation

Notifications

Event Frames

Asset Analytics

Asset Framework

Data Archive

Short term notification to Real time pilot for Quick action

Short and mid term notification to Analyst for Sustainable solution

Warning notification to Everyone for Crisis case
What?

- A project launch by the Historian Worldwide Users Committee to create a base template library for Asset Framework for operation.

Why?

- To define templates and architecture to:
  - Reduce time to deployment
  - Facilitate asset management and base KPI deployment
  - Reuse visualization screens and reports

- To define an architecture philosophy consistent with our business and other data project being developed in parallel
Air Liquide

Remote monitoring & optimization for Air Liquide plants using AF/EF

**CHALLENGE**
Change old habits with PI system to remotely monitor and optimize plants using a common and validated database between ROCC & plants

**SOLUTION**
AF implementation and leverage of data using more tools within the PI System

**RESULTS**
- Reactivity
- Optimization
- Customer satisfaction
- Production shortage
- Gas venting
- Liquid Overflow
- Trust ∩ ROCC & plants
- Excellent savings
- Global deployment
Questions?

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