Featured Company Presentations -Aramco

Leveraging the PI System for a Rotating Equipment Advisory Tool

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Leveraging AVEVA PI Software in Pursuit of Equipment Reliability

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05/18/2022

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Saudi Aramco

- Largest Oil & Gas Producer
- Leading Energy Industry
- Established in 1933
- Based in Dhahran, Saudi Arabia
- More than 68,000 employees

AVEVA at Saudi Aramco

PI System Products

- Largest user in Middle East
- Agreement was singed in 1996
- Total of 40+ PI servers
- Utilizing more than 2 million PI tags
- Utilizing PI Asset FrameWork (AF)
  - PI Notifications.
- 6500+ of PI clients
  - PI Vision
  - PI Process Book
  - PI DataLink

Other AVEVA Products

- AVEVA predictive Analytics (PRiSM)
- AVEVA Process Optimization (RoMeo)
- AVEVA Pro II Steady State Suimulatios
- AVEVA Advanced Process Control (SimSci)
- AVEVA Unified Operations Center (UOC)

Business Case Summary

Equipment underutilization becomes a challenge in the era of maturing fields

Challenge

Different types of Equipment

Expensive equipment

Criticality of business continuity

Incredibly complex

Time consuming

Draining resources

Hindering business agility

Jeopardize to meet production target

Solution

Utilizing AVEVA PI suites to build an Interactive equipment monitoring tool for equipment swapping strategy :

- More responsive
- More adaptive
- More intelligent

Benefits

Increased Plant Availability

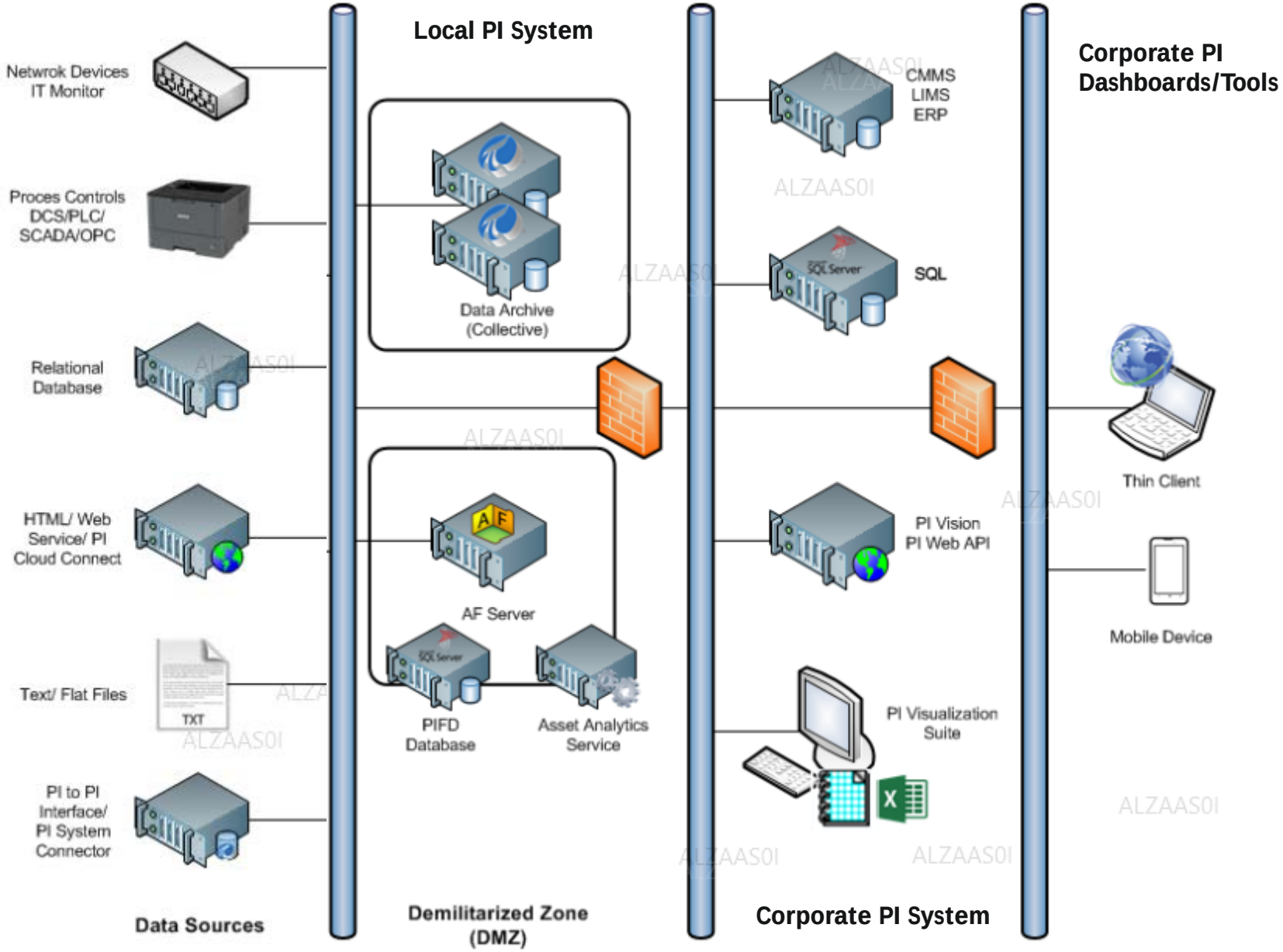
Maintenance KPIs Mean Time Between Failure (MTBF)

Equipment repair cost avoidance

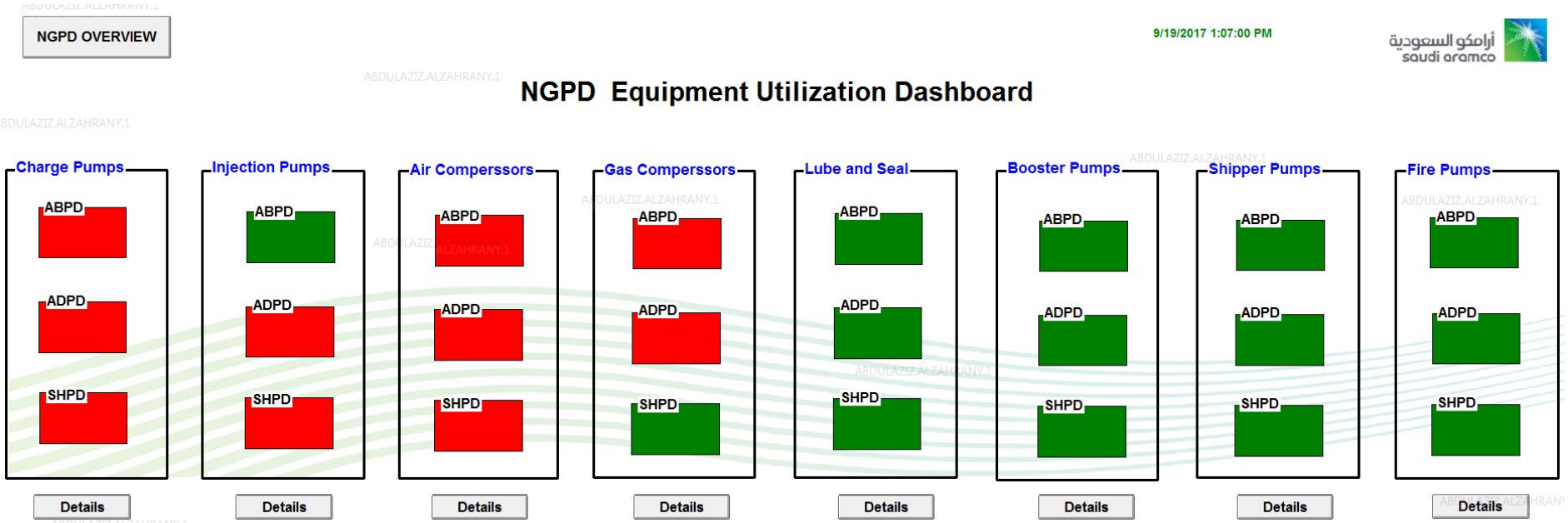
Maximize ROI

Increase Asset health & Uptime

Data Flow



The Solution



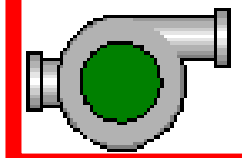
Maximize utilization

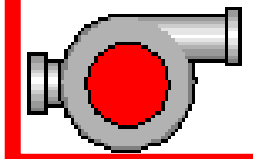
Prevent deterioration

Ensure readiness

Improve responsiveness to rapidly changing business demand

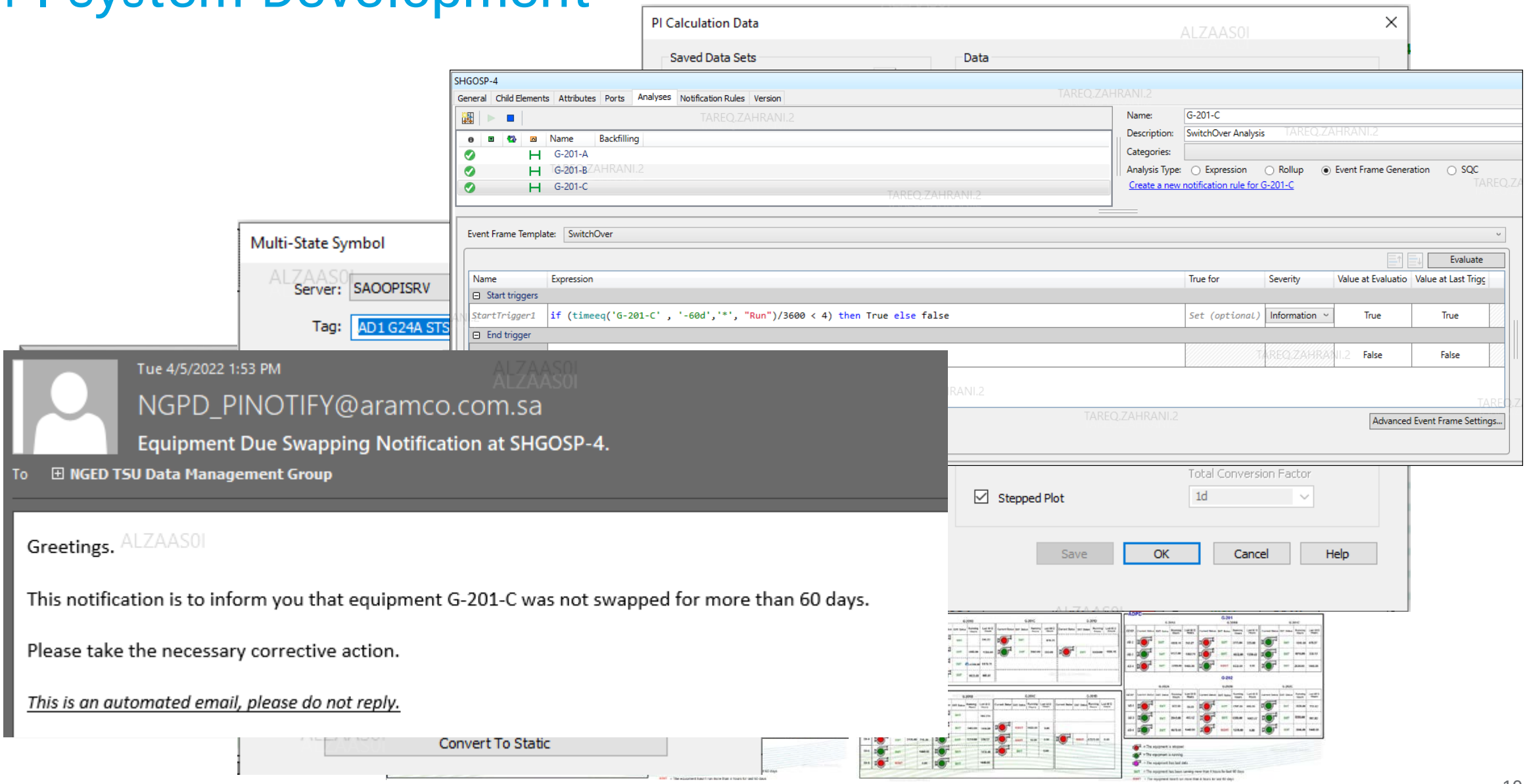
Monitoring Methodology

Current Status	SWT Status	Running Hours	Last 60 D Hours
	SWT	2046.08	1376.81

Current Status	SWT Status	Running Hours	Last 60 D Hours
	SWT	966.15	101.33

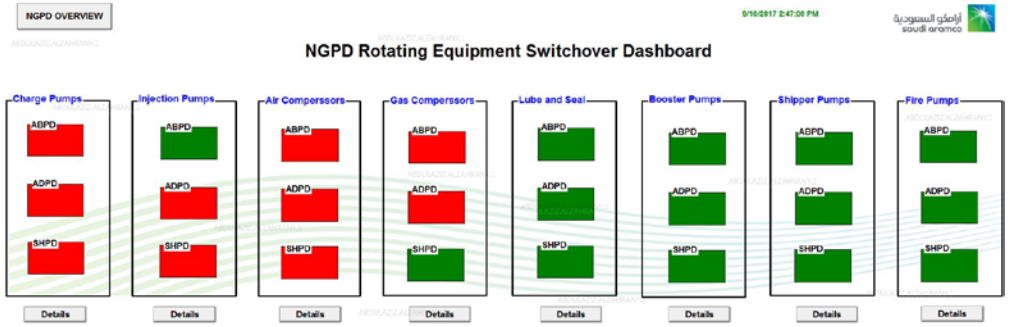
Equipment Status
Hours since last startup/Shutdown
SWT Compliance
NSWT Non-Compliance

PI System Development



Benefits

- Real-time performance monitoring
- Easy access through the PI Process Book
- Automated calculated values
- Optimum utilization of AVEVA applications
- Improve maintenance KPIs such as plant availability
- Ensuring healthiness and readiness of underutilized equipment
- Helps to increase MTBF
- Equipment repairs cost avoidance
- Cost savings from outsourcing developing similar tool
- Maximization of utilization of in-house resources
- Timely alert notifications through email
- Part of digitalization strategy



Large Scale Deployment

- Corporate Maintenance Services (CMS) certification
- Officially announced to all Saudi Aramco Departments
- Corporate application.
- 7+ producing department adopted the tool

Corporate Maintenance Services I June 27, 2019

MaintSnap: Equipment Switchover Dashboard

We are pleased to announce the release of the MaintSnap "Equipment Switchover Dashboard" video. The Dashboard monitors the running hours and condition (operation/standby) of critical equipment, and if it is in operation or stand-by for an excessive period of time.

The MaintSnap series encourages the sharing and exchanging of maintenance and reliability best practices using video recordings. The videos are intended to be short, concise, and deliver messages with impact.

Way Forward

- Migration to PI Vision
  - Web based visualization
  - Reporting Tool
- Integration with other BI.
- Monitoring Enhance
  - Add more analysis
  - More notifications
- Expansion to other types of equipment and facilities.

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Fourth Industrial Revolution Center (4IRC)

PI System-based solutions and applications

By Reham Faqehi

05/18/2022

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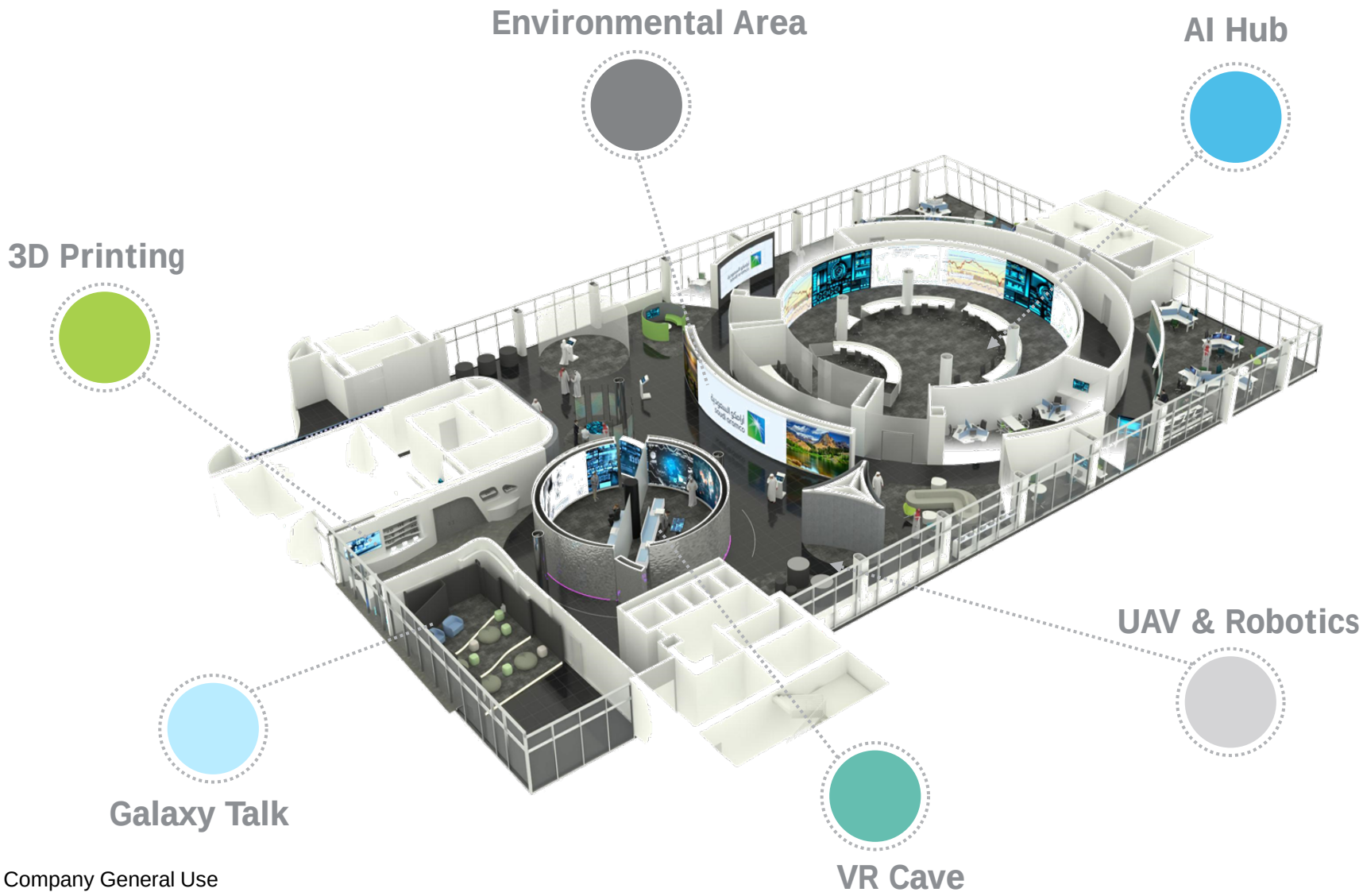
Outline

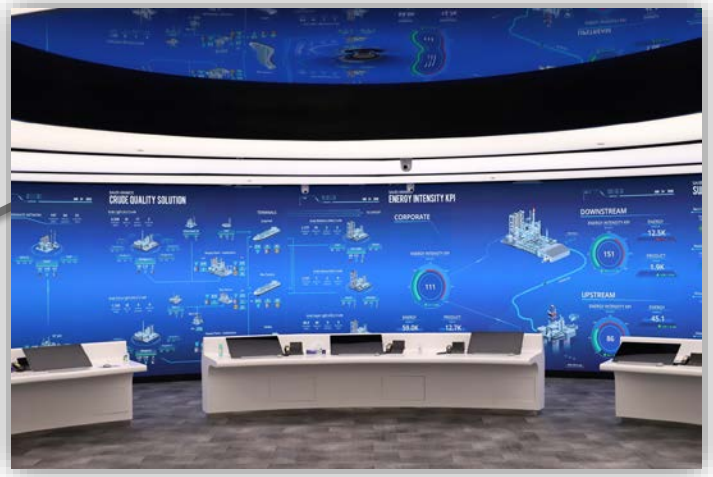
- Saudi Aramco 4IRC
- Data Quality Assurance
- 4IRC Solutions using the PI Platform
- 4IRC AVEVA Video Wall Project
- Asset Predictive Analytics (APA)

Fourth Industrial Revolution Center (4IRC)



Business Case Summary: AI Hub

Focusing on developing Advanced Analytics and Machine Learning solutions in the areas of sustainability, energy efficiency, product quality and Asset Health & Integrity



Fourth Industrial Revolution Center (4IRC)

Challenge

- Billions of data points received everyday generated by operations activities.
- Data analytics and integrations complexity.

Solution

Forth Industrial Revolution Center(4IRC) PI System Platform tools:

- Asset framework
- PI Analysis and Notifications
- PI Vision
- AVEVA IN-touch

Benefits

4IRC Solutions:

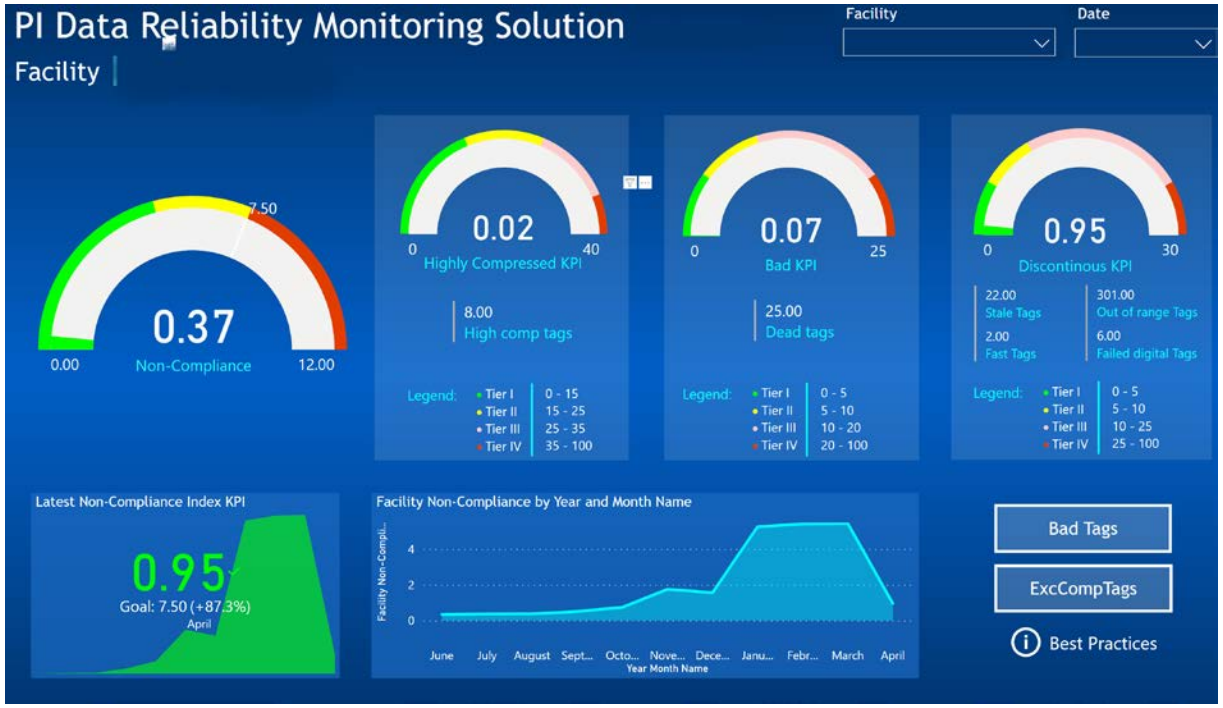
- Sustainability
- Energy Efficiency
- Product Quality
- Assets Health & Integrity

Data Quality Assurance (DQA)

- **Data Quality Analyzer (DQA)** is an in-house developed tool to collect and analyze plant data. DQA uses defined data quality detection methods to identify the root-causes and provide recommendations to correct these data conditions

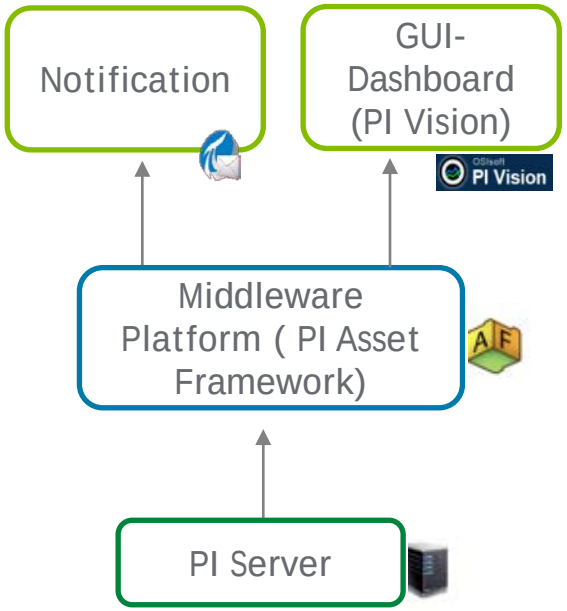
- Monitoring improper tag settings, such as:
  - Noise
  - Compression filtering
  - Data collection rates
  - Minimum and maximum ranges

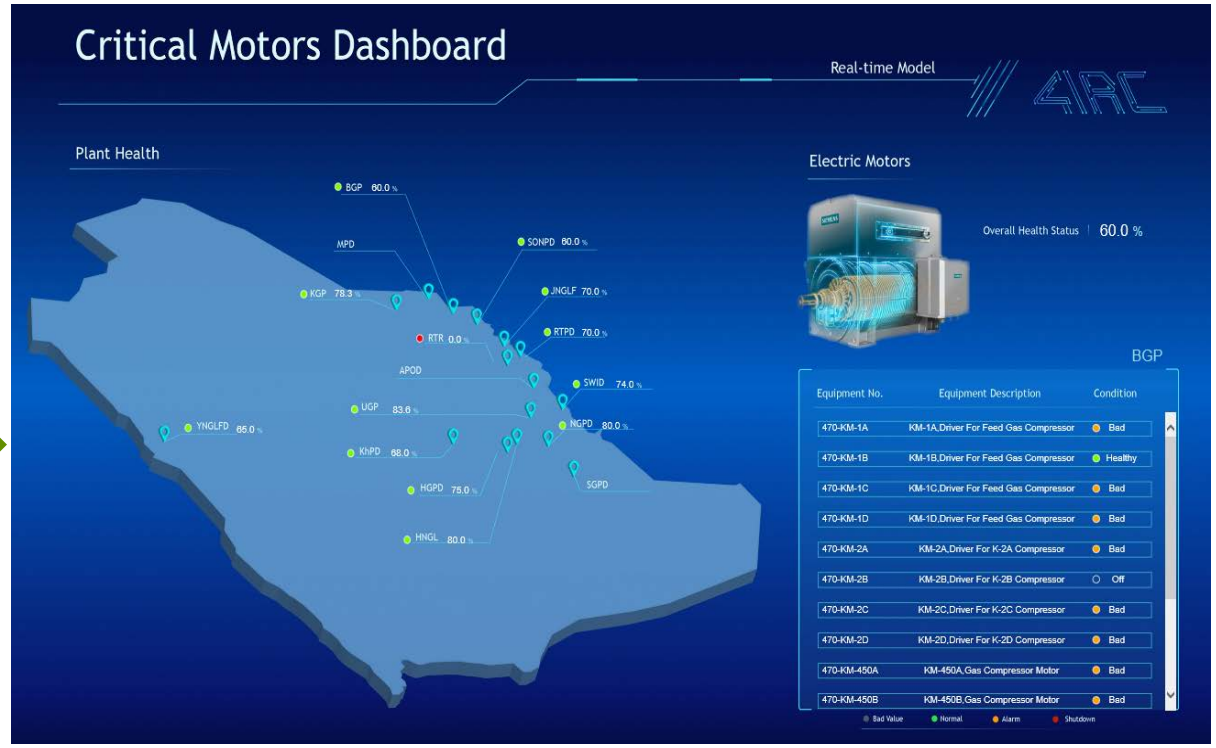
- Benefits:
  - Maintaining high quality of information
  - Improve reliability of PI System solutions



4IRC PI Solutions

Electric Motors Solution





Added Value:

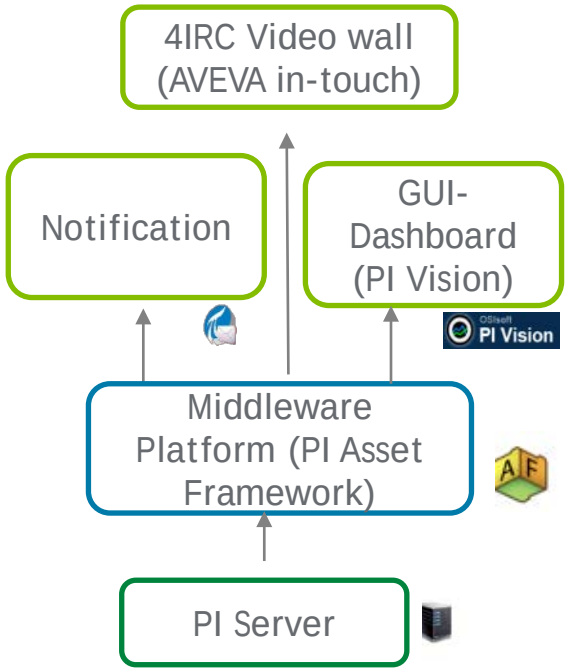
- Improves reliability and reduces future failures

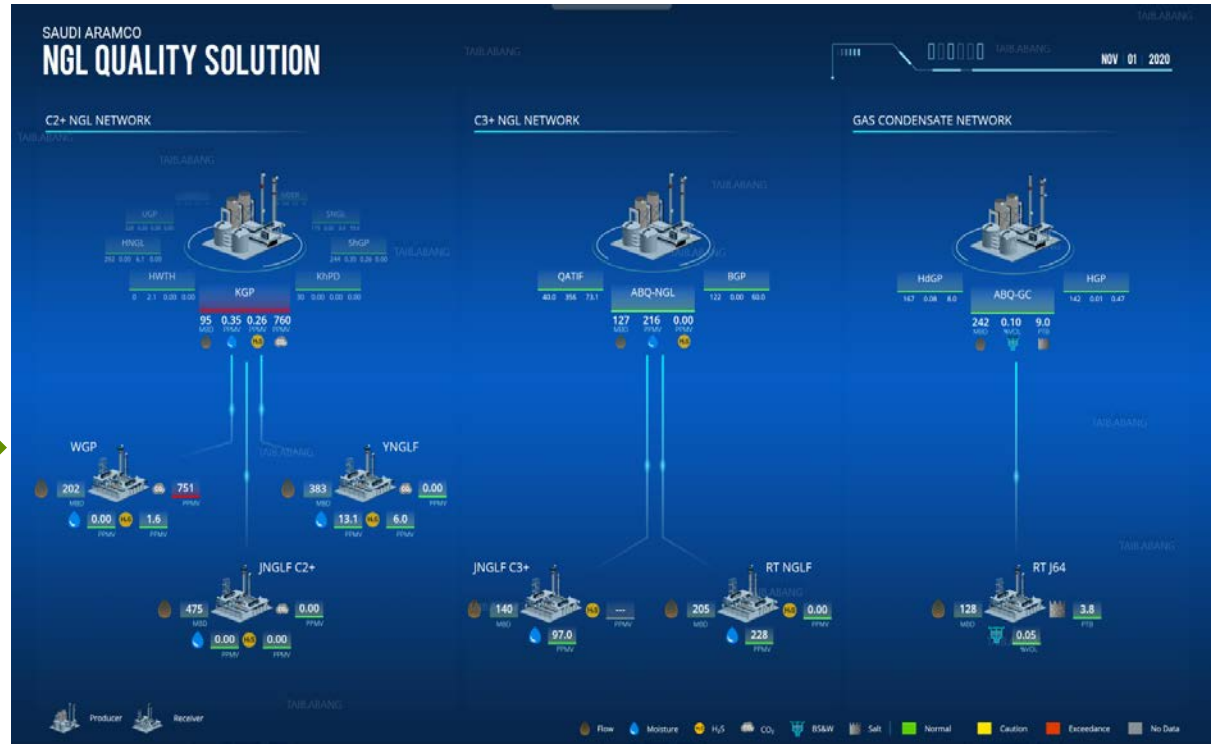
Added Features:

- Smart Advisory tool
- Notification mechanism

4IRC PI Solutions

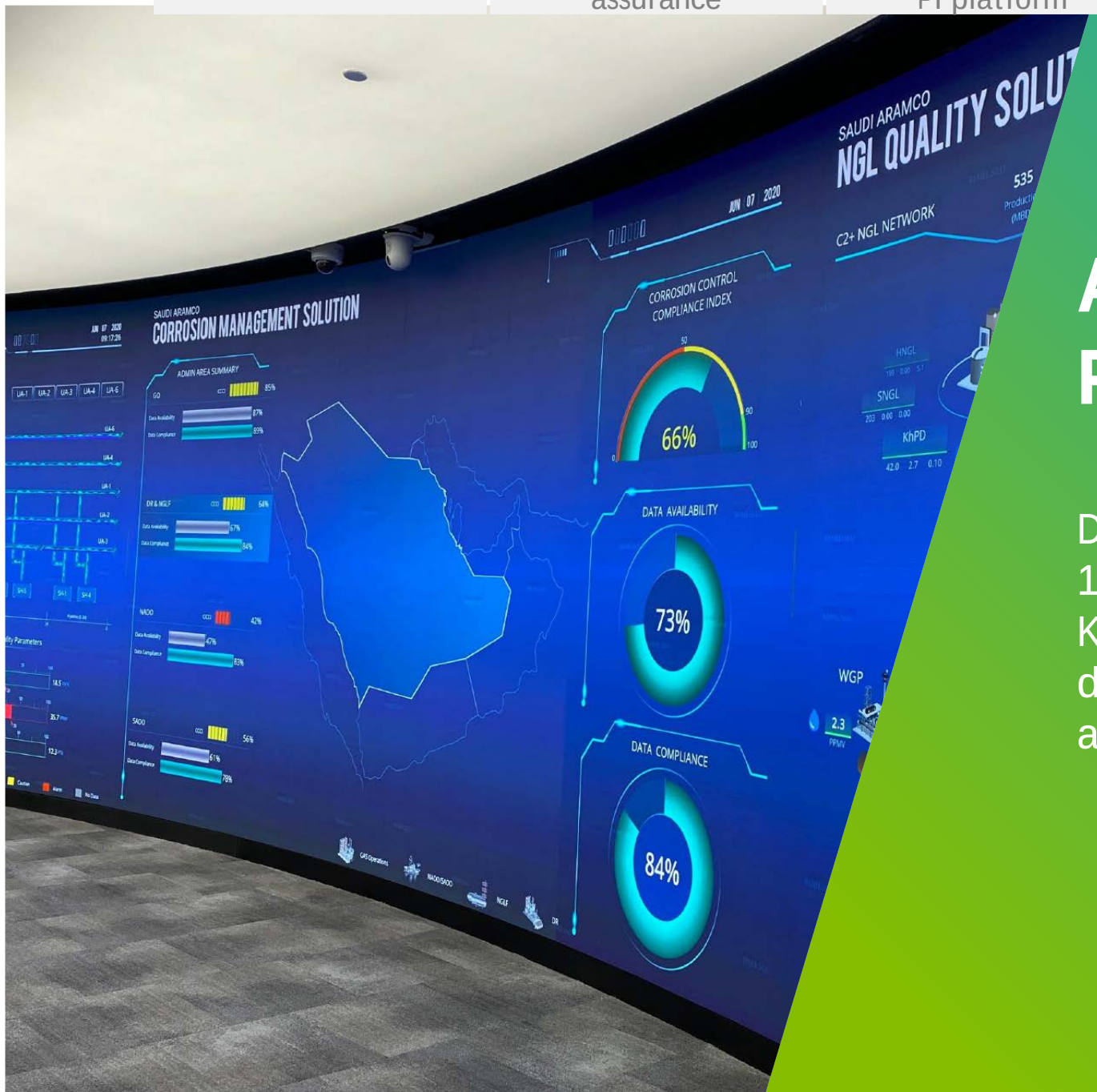
NGL Quality Solution





Added Value:

- Provide affective monitoring tools for producing and receiving facilities
- Ensure that NGL and condensate quality is maintained



AVEVA video wall Project

Design 40 Dashboards covering 16 Solutions to display Corporate KPIs and Engineering KPIs (In drill downs) with a unified look and feel

Asset Predictive Analytics (APA)

Description

- APA refers to the technologies that apply advanced analytics modeling algorithms and rules on top of asset data.
- APA combines rule-based and data-driven modelling techniques with predefined/configured fault models to be able to detect asset initial failure proactively.

Addressed Problems:

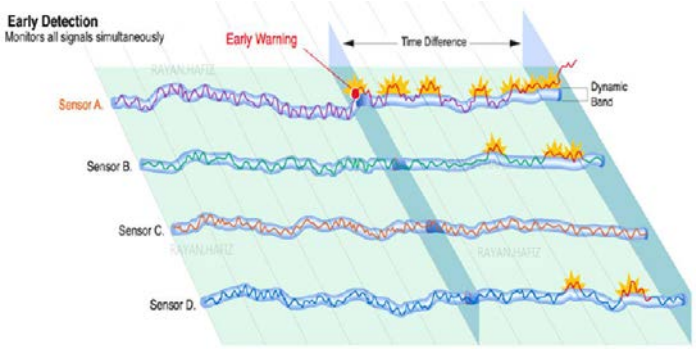
- Detection of asset performance degradation
- Recognition of initial drifting of asset parameters
- Notifying users of any potential problems

Problems addressed

- Increased and high maintenance costs due to run to fail or run until next T&I
- Increased energy costs due to lower asset efficiencies

Technologies

- AVEVA Aventis Prism



- The system uses asset historical data to develop prediction models and uses real-time data of process parameters to enable a trusted assessment of the assets condition

Impact

- Improves maintenance scheduling and reduces overall maintenance costs client
- Reduces energy costs
- Reduces production losses due to unplanned shutdowns and associated high costs
- Prevents equipment failures
- Increasing asset utilization
- Extending equipment life, and identify underperforming assets

Spread

- Being deployed on the corporate level on operating facilities and for critical and high impact assets

Thank You