Enabling a Business Transformation Journey at Apache with the PI System as a Strategic OT Infrastructure and Analytics Platform

Kelly Sherrill, IT Advisor

Apache
EXPLORING WHAT'S POSSIBLE

Agenda

- Apache Corp at a Glance
- Our Path the PI System
- PI System Details and Perspectives
- The Apache Data Flow and Ecosystem
- Use Case Examples
  - Drilling
  - Completions
  - Production
- The ROC
- Summary

Apache at a glance

Global Operations

- United States
- United Kingdom (North Sea)
- Egypt

Apache at a Glance – US Operations

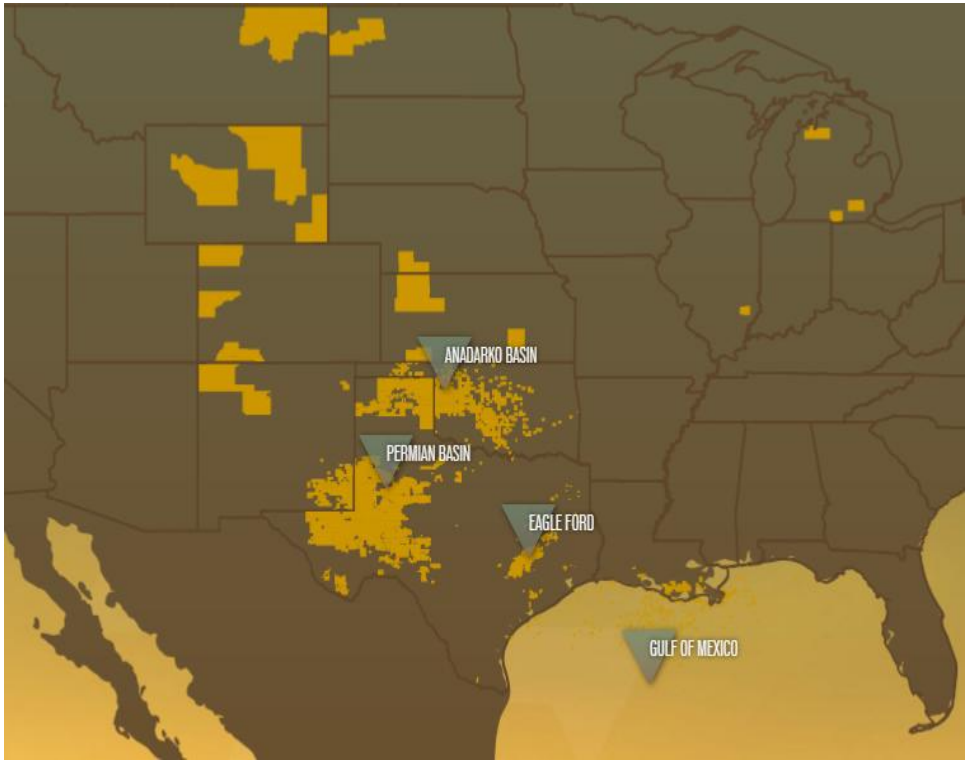
Permian Basin
- Over 3.1 million gross acres
- ~177,000 BOED

Anadarko Basin/Eagle Ford
- 1.8 million gross acres
- Over 3,100 producing wells

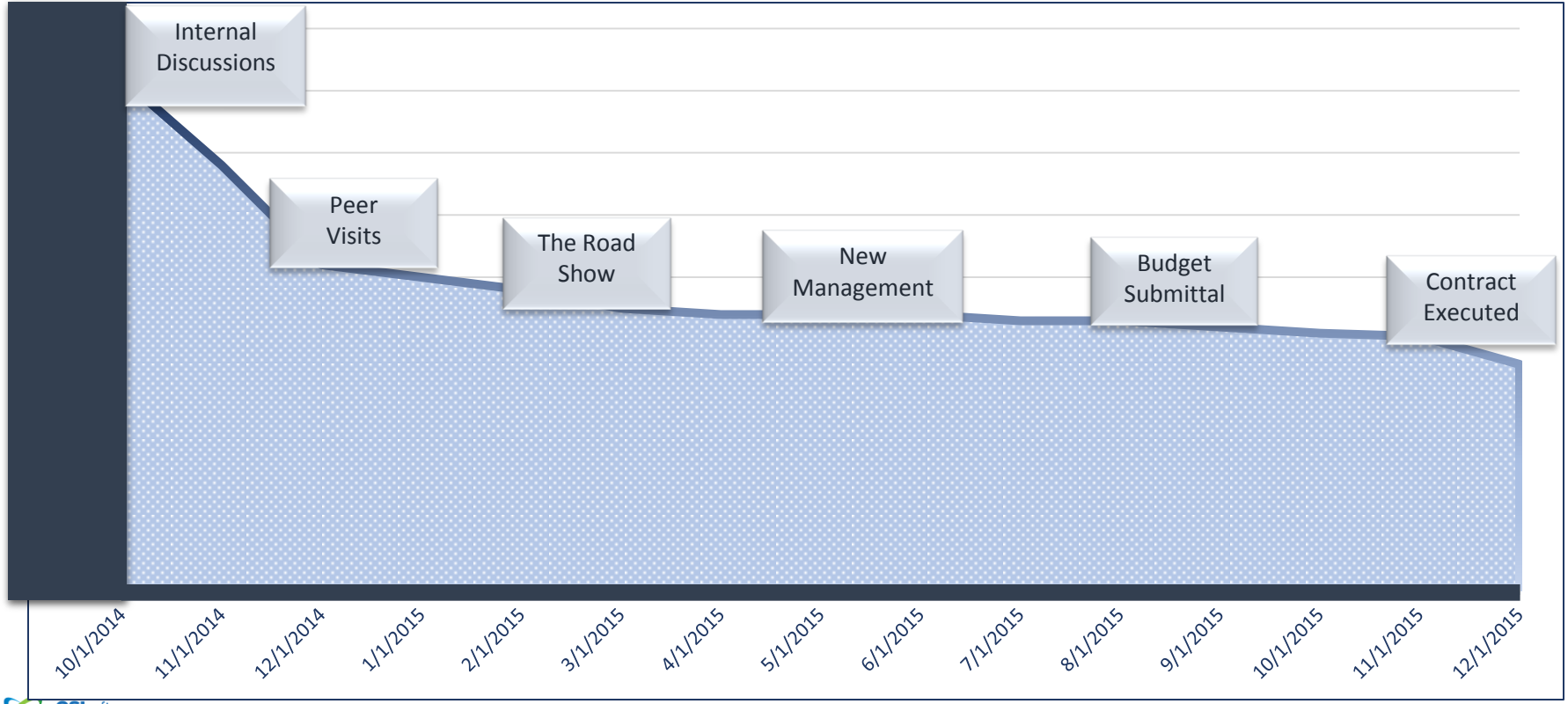
Alpine High
- 352,000 gross acres
- 5,000 identified locations

Total wells ~19,000

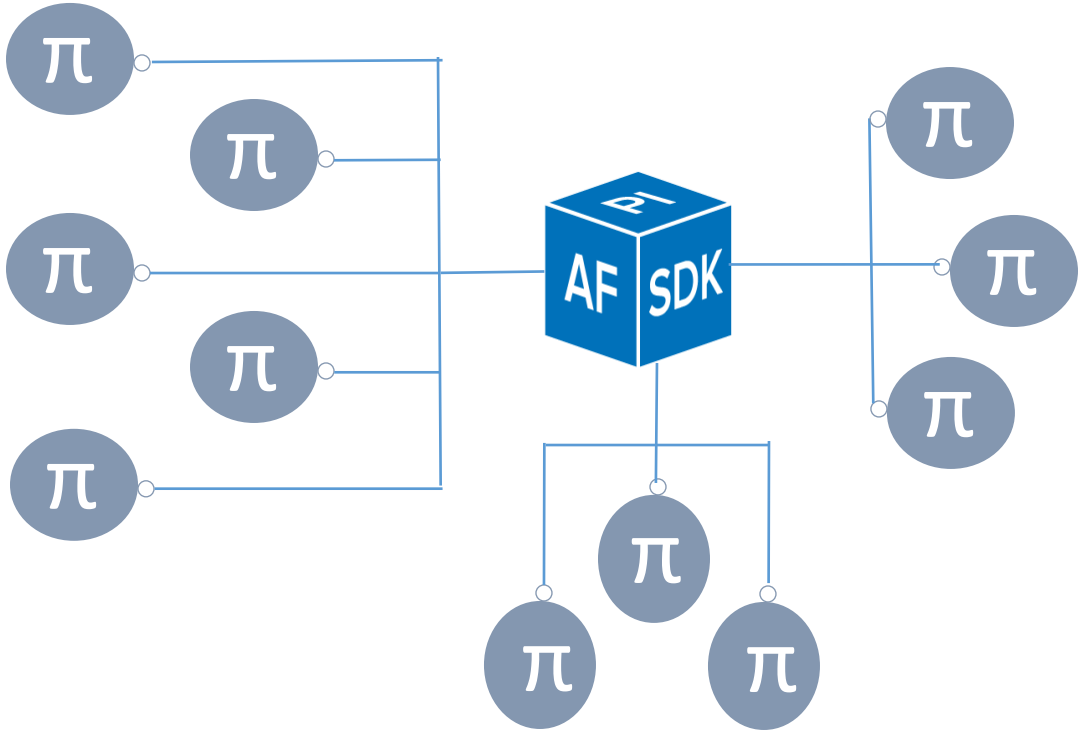
New drills



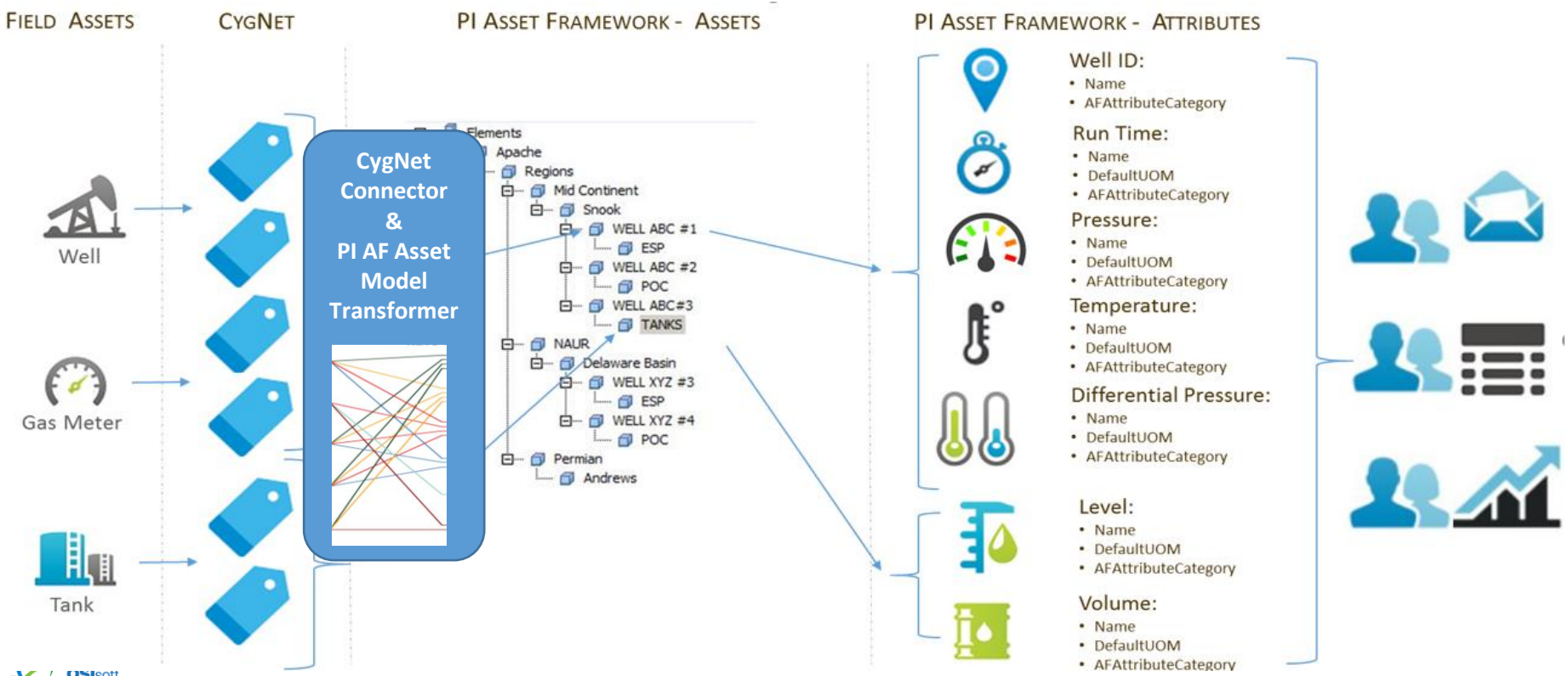
The PI System Path To Approval at Apache



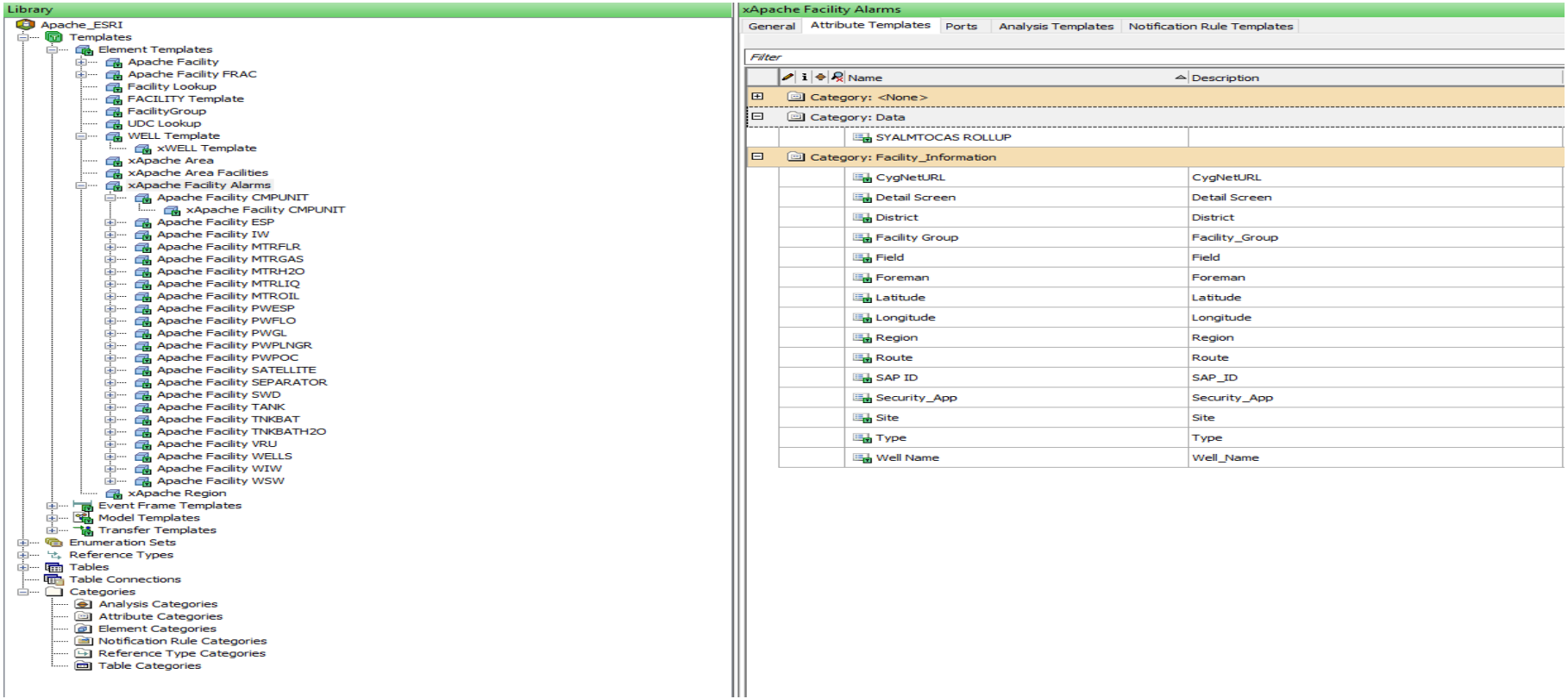
The PI System at Apache



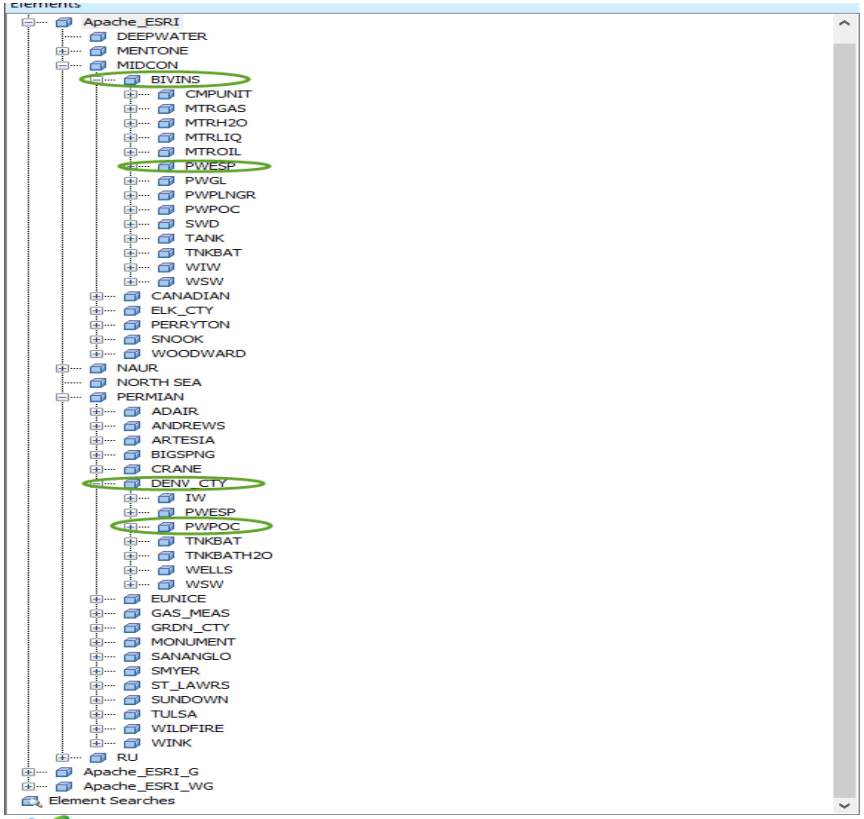
PI AF – “the Language of Apache”

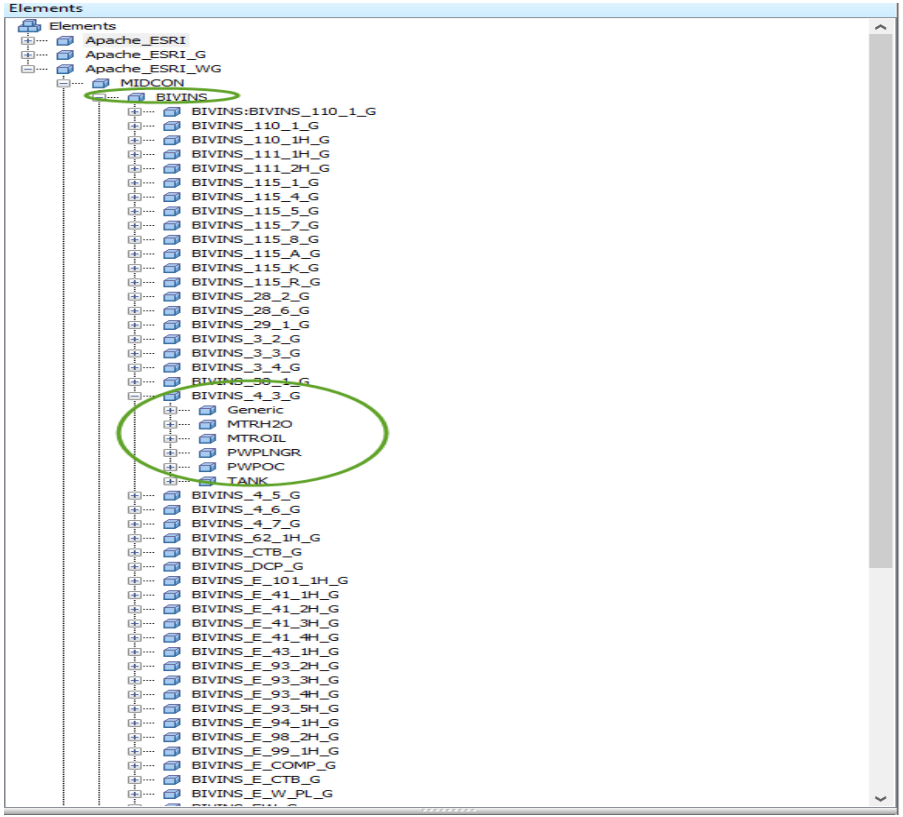


Apache PI AF Template Library



Enabling Contextual Views with PI AF





Additional OSIsoft tools

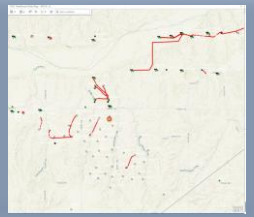
- PI Connector for CygNet
- PI Asset Transformer Tool
- PI Integrator for Esri ArcGIS
- PI Vision 4
- PI Integrator for Business Analytics
- PI DataLink

Perspectives on PI Vision 4.0

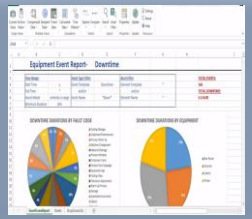
PI System Infrastructure Data Flows

USER COMMUNITY

ANALYTICS | VISUALIZATION | ENGINEERING | ACCOUNTING



PI SYSTEM



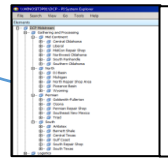
DRILLING | COMPLETIONS | FACILITIES | SCADA | PRODUCTION

Building the PI System Ecosystem

Wonderware by Schneider Electric

Optimization

Remote Operations Center



PI AF Underpins the Apache Ecosystem

DIG

CYGNET a Weatherford Company

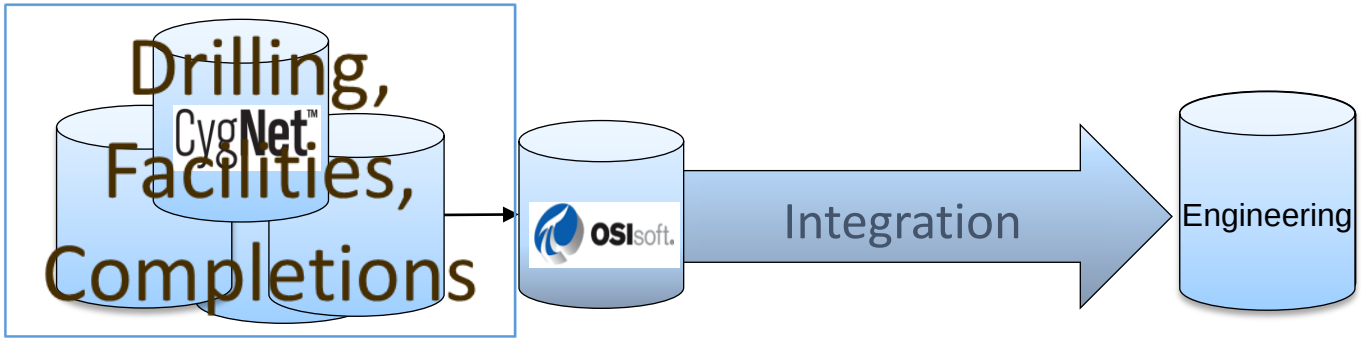
Avocet

Standardized Data Flow

Summary

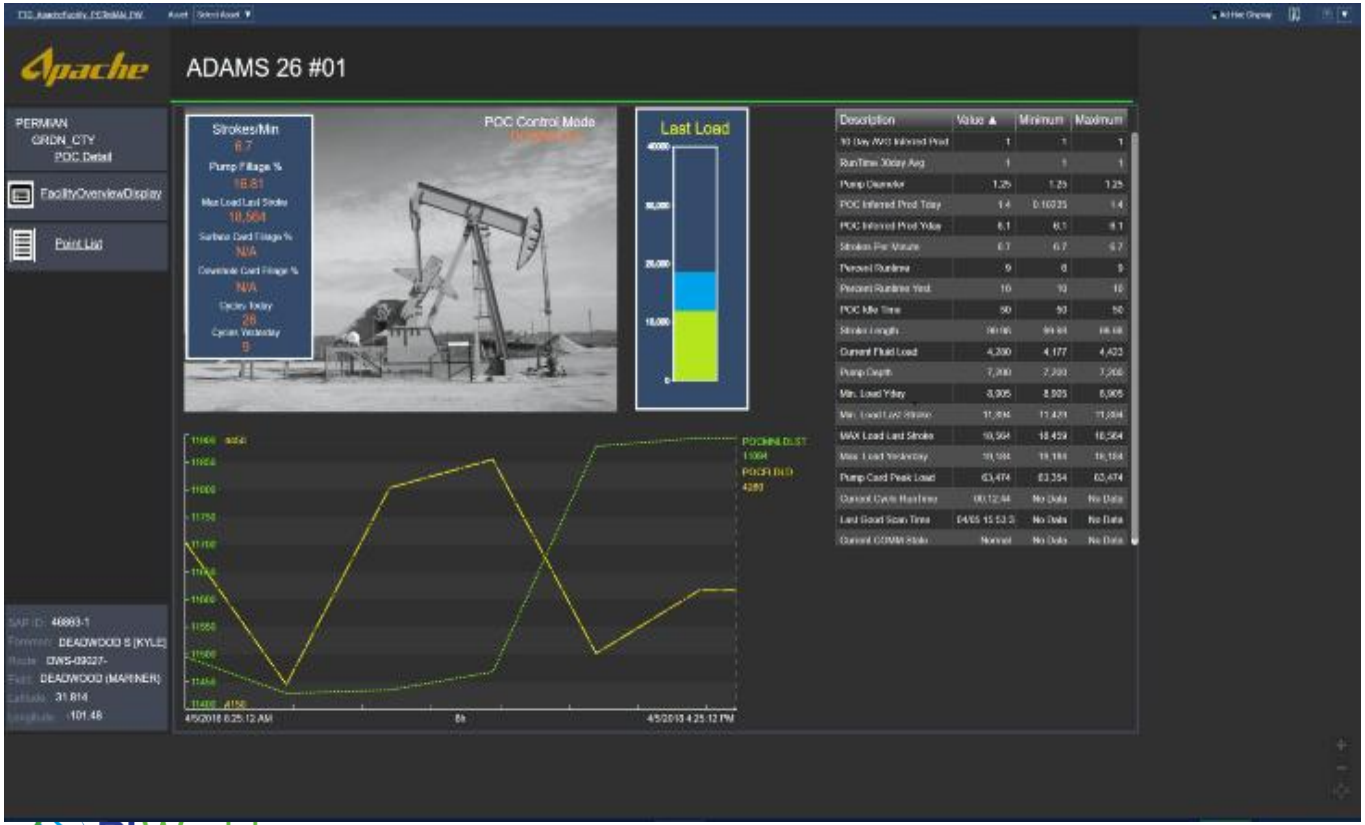
Data is scanned and pushed to the PI System

A view is created in the PI System by data type and integrated into the systems



Artificial lift

Rod Lift



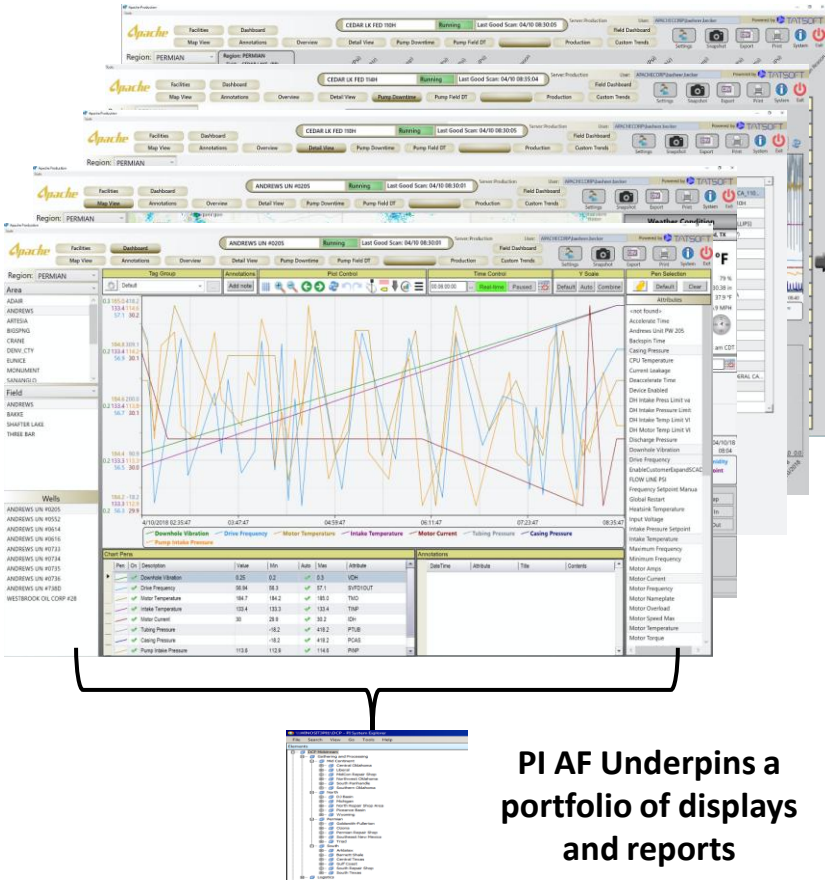
Pump off Control

- PI Vision 4.0 Screens
- Asset data readily available

Artificial Lift

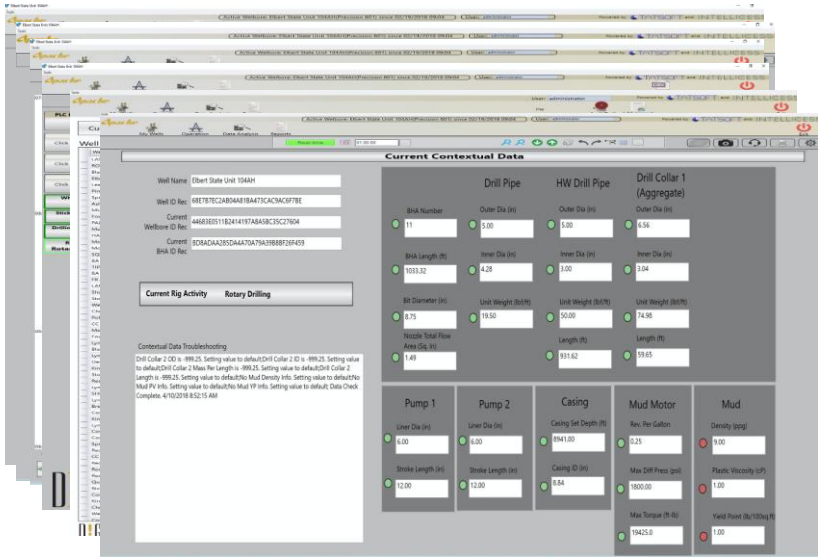
ESP

- Reduced Spend
- Dynamic Analysis
- Pump Info Readily Available



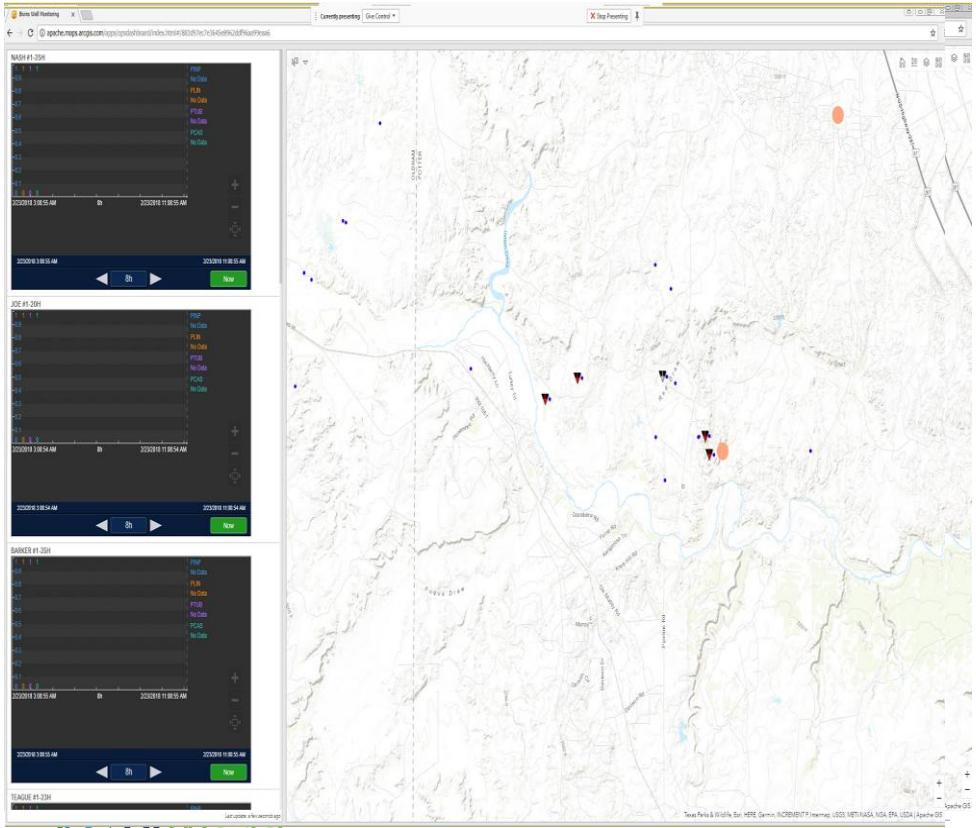
PI AF Underpins a portfolio of displays and reports

Drilling



- Unique Requirements
- Factory Studio
- Asset data readily available

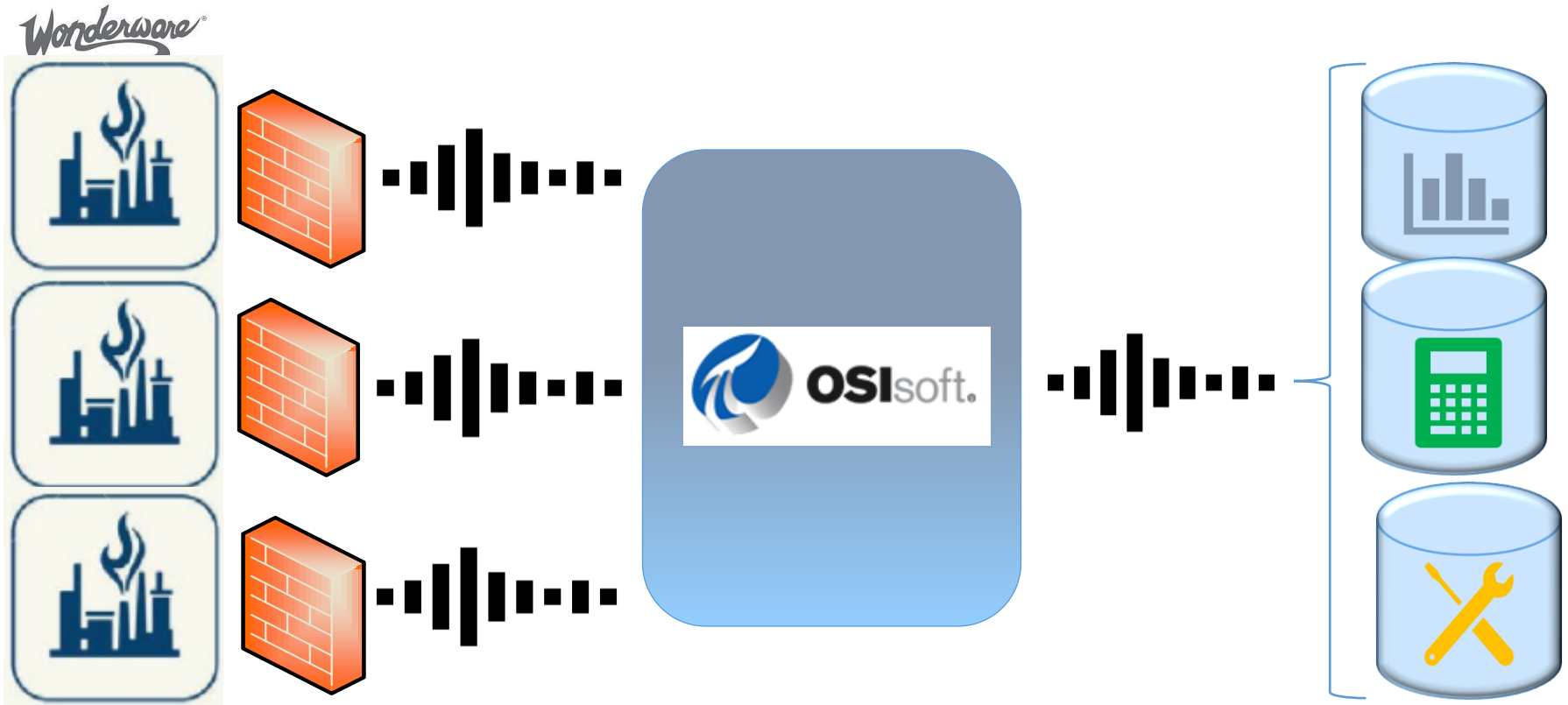
Completions



1 Tool, 3 Types of Analysis

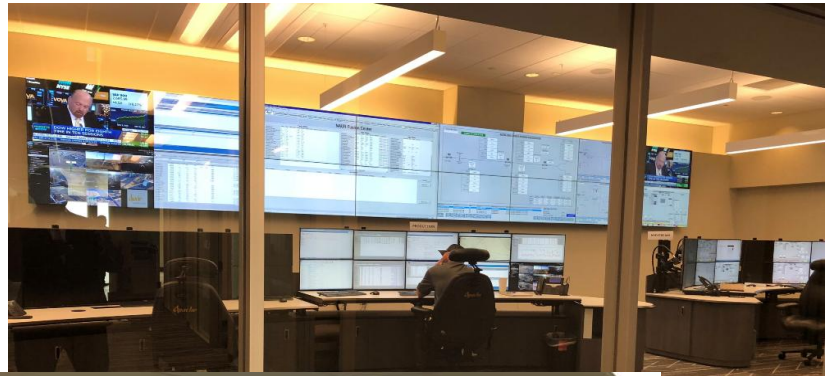
- FRAC Offset Well Monitoring
- FRAC analysis
- Calculated Information
- Imports
  - Over 10 million rows of data imported into the PI system

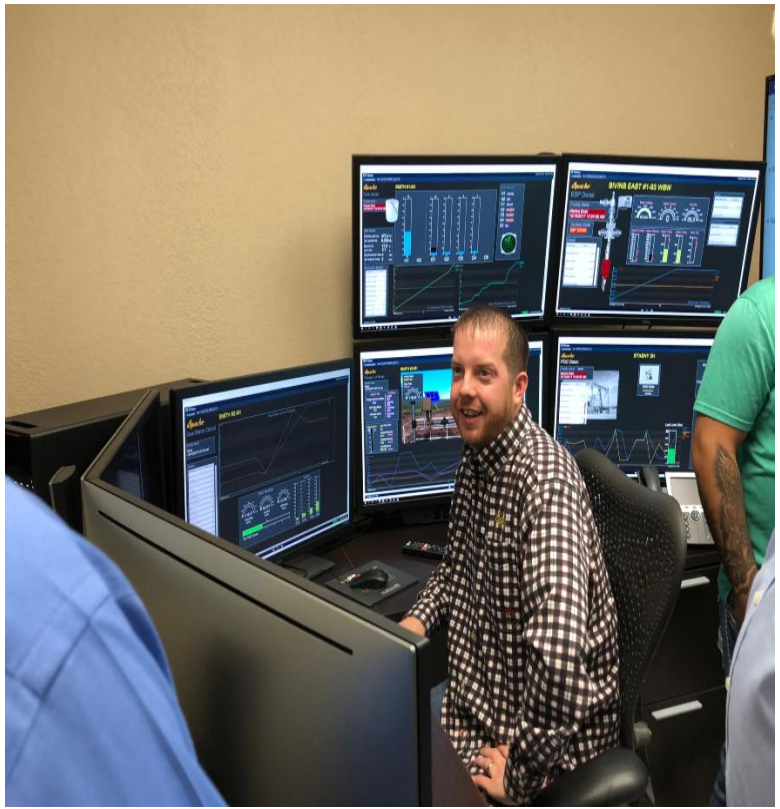
Facilities



Remote Operations Center….”the ROC”

Release 1





Project Objectives

Enhance decision making by operations staff

- Data visualization
- Monitoring

Increase uptime and productivity levels

- Data systems and technologies integration
- Operational data visualization

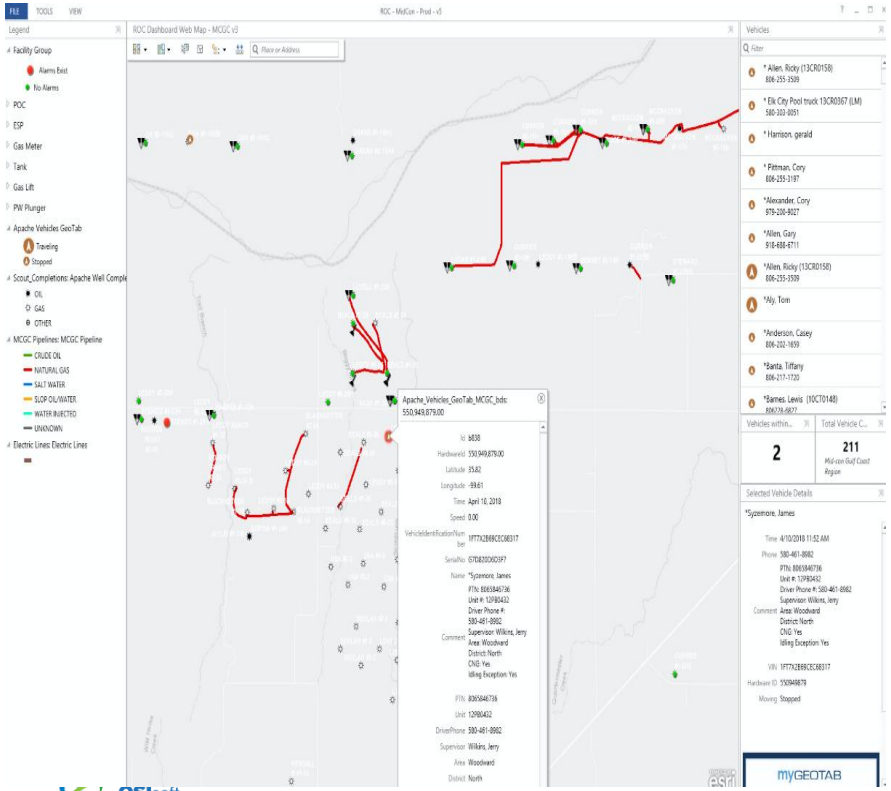
Increase response time to operational issues

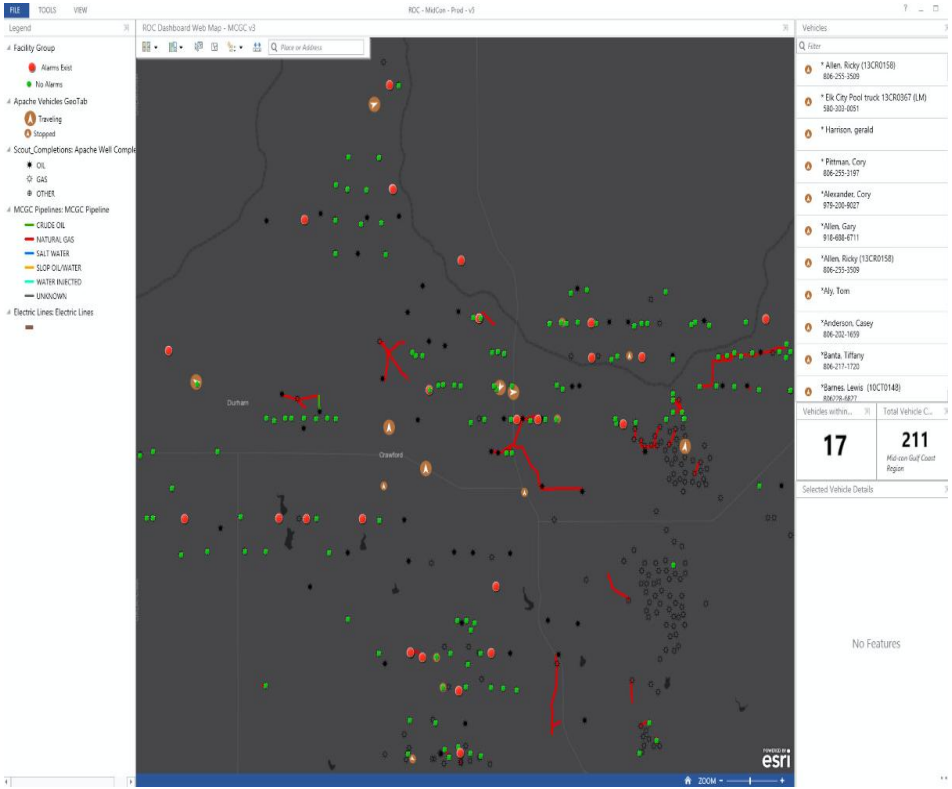
- Engineering analytics
- Proactive vs reactive

Improve safety

- Redundancy
- Built-in fail over support

ROC Overview



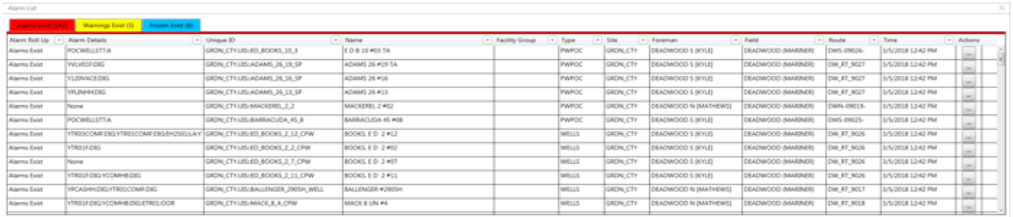


ROC Overview

- Visualize

  - View live Facility data, Vehicle locations, and other assets
- Analyze
  - Analyze details of facilities
    - pressure, rate, volumes, temp, status
  - Query facility history

- Respond
  - Acknowledge Facility Notifications and alert field personnel to respond

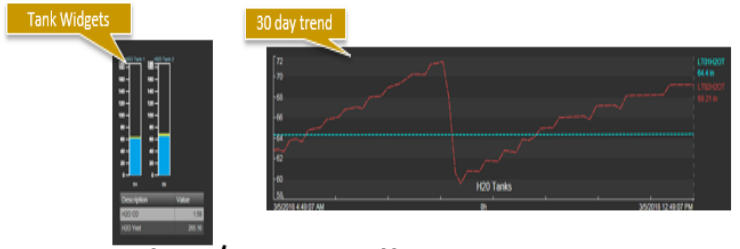


Visualize & Analyze

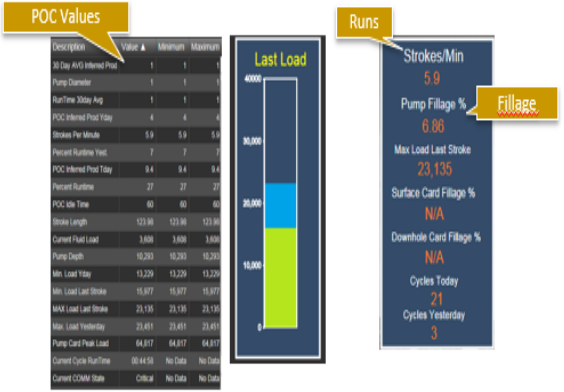
Visualize Facility Group Alarm State

Visualize Facility Types and Alarm State

Analyze Tank Production Trends



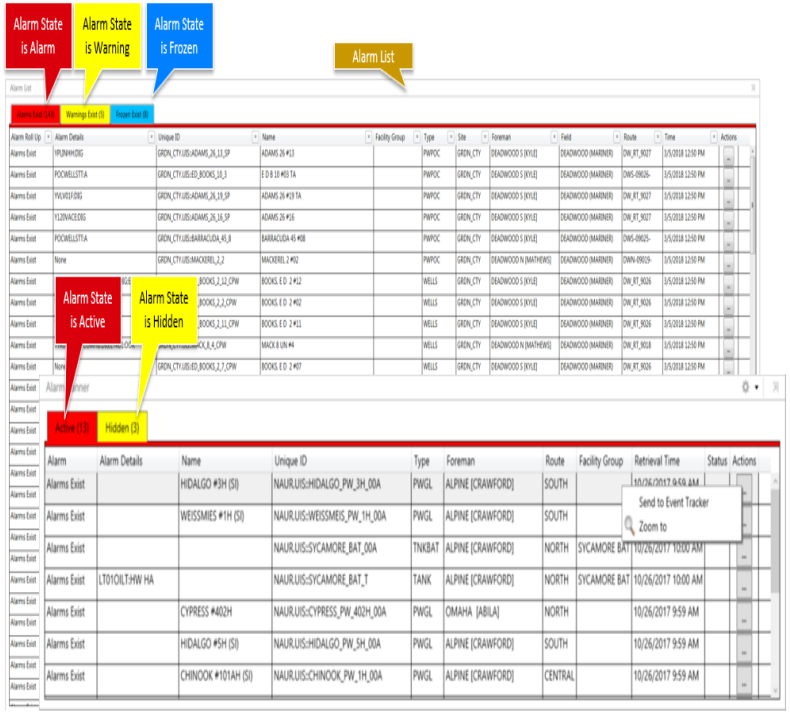
Analyze POC Strokes/Pump Fillage



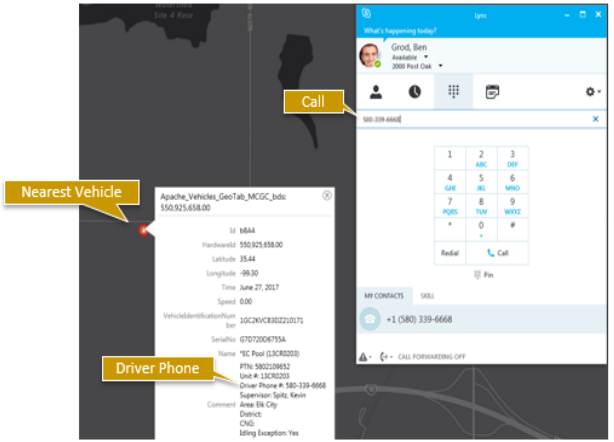
.....and Respond

Alarms / Dispatch

- Acknowledge Alarms



- Evaluate Nearest Field Personnel and Contact



- Dispatch Emergency Personnel

The PI System by the Numbers

What it takes to get there.

30,000

Total Number of unique facilities types monitored for alarms

600,000

Total number of PI Tags used

Total Number of PI Vision screens created

238

15,180

Number of PI elements

3

Active Regions

Total Unique ROC Operators **8**

Esri by the numbers

What it takes to get there.

128,506,640

Total Number of Cumulative Polls by PI Integrator to date

46

Total number Dashboard maps

Total Number of PI Integrator layers

38

124

Number of ESRI Layers

16

GeoEvent services

Total Unique training and demos **15**

Key Items of Interest

PI Vision Screen Linking

- Hyperlinking
- Vision graphics outside of “normal” PI

Rovisys Partnership

- Dynamic hyperlinking table

Looking to the Future

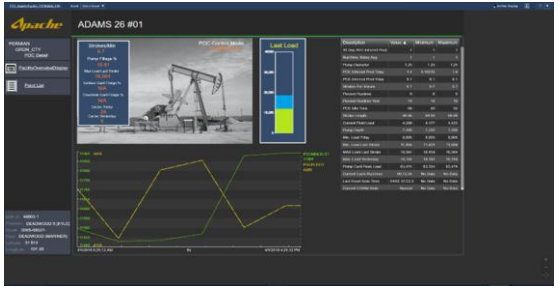
- Seismic Activity
- Mobile SCADA
  - PI Vision
- Additional data analysis
  - Rollups
  - Event frames
  - Well potential

Summary

- Challenges
  - Let me see “PI”
  - It’s an infrastructure . . . What’s that?
  - Buy-In
- Solutions
  - Business driven
  - Rapid configuration
  - Standardized process

Transforming for the 21st Century - Going Digital in E&P

Our focus is on **harnessing the value of operational data in drilling, completions, & production** to lower the costs of production & time to first oil, increase EBITDA & continue leadership in EH&S.



CHALLENGE

OT data and associated application and solutions ecosystem could not support focus on operational excellence

- Many new wells each year
- Diverse tag and asset naming
- Many apps and solutions

SOLUTION

Started the journey of installing an enterprise PI System to augment our CygNet and WW SCADA environment as the foundation to our “going digital”

- Evolving a PI AF templates
- Used PI Vision 4.0 to address key visualization requirements
- Migrating to a Remote Operations Center (ROC) to enhance decision making by operations staff

RESULTS

Standardized OT infrastructure and improved performance in drilling, completions, and production

- Reduced downtime
- Reduction in drive time

Questions

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

State your **name & company**

Please remember to…

Complete the Online Survey for this session

Speaker Information

Kelly Sherrill

Kelly.Sherrill@apachecorp.com

IT Advisor

Apache Corporation

Merci

谢谢

Danke

Спасибо

Gracias

Thank You

감사합니다

ありがとう

Grazie

Obrigado

Optional: Click to add a takeaway you wish the audience to leave with.