



Achieving Operational Excellence

IAPG – Argentina 2016

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PUBLIC

The Challenges You Face

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A tall oil rig stands in a desert landscape under a blue sky with scattered white clouds. In the foreground, there are several large green and black storage tanks and other industrial equipment. The background shows rolling hills and mountains.

Reservoir
RECOVERY

Access to
INFORMATION

Rising Operating
COSTS

Production
TARGETS

Unanticipated
DOWNTIME

THE CONNECTED ENTERPRISE



Integrated Architecture
& Software

Intelligent Motor
Control

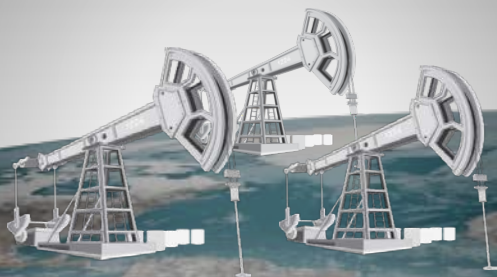
Solutions
& Services

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Automation**

CONNECTED PRODUCTION™

Connect Based Intelligent Assets & Share Information

From the Wellhead



To Point of Custody Transfer



Intelligent
RTUs



Wireless
Transmitters



Wireless
RTUs & Gateways



Secure Network
Infrastructure



Multidiscipline
Control



Mobile & Open
Information Platform



Microsoft® Azure® &
Workflow Manager



What are the main challenges you face?



% Not a Challenge

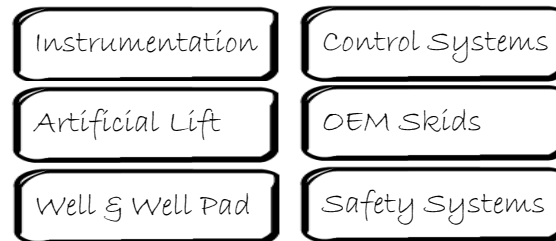
**% Is a Challenge
of which
% is Extremely
Challenging**



Source: Upstream Intelligence, Data Driven Oilfields: Challenges and Opportunities



Production Assets



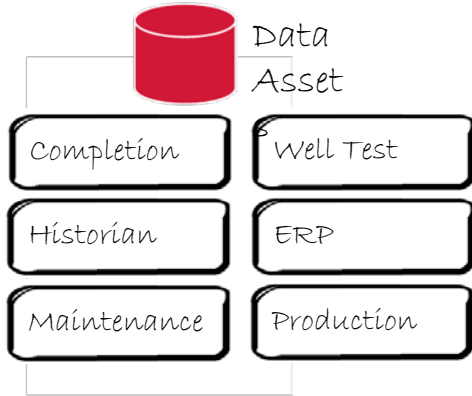
Challenges:

1. Multiple Vendors
2. Multiple Protocols
3. Remote Locations
4. Low Power
5. Disparate Data Sets
6. Multiple configurations Stand alone & well pad

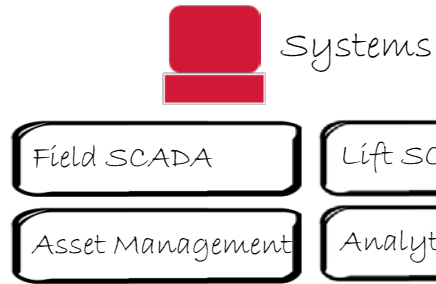


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Data Assets

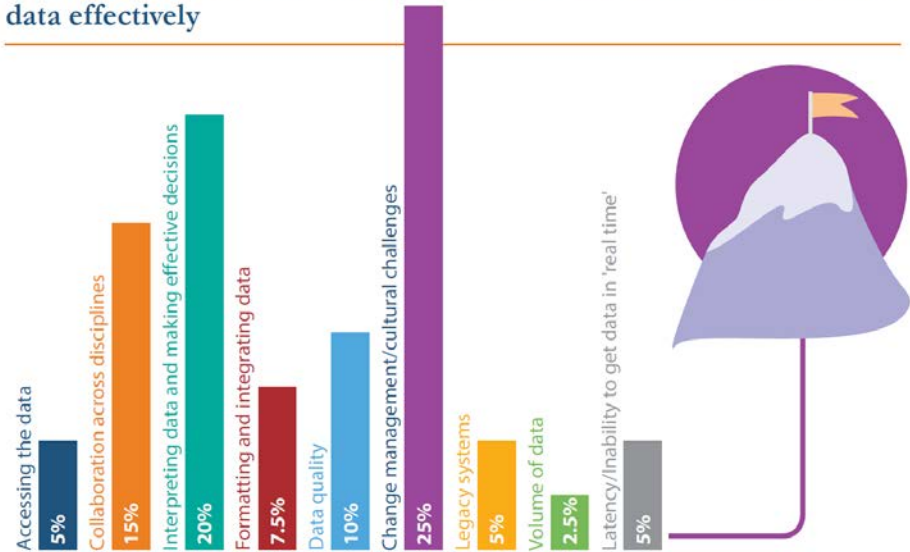


1. Multiple Vendors
2. Disparate schemas
3. Multiple Data Owners
4. Multiple Protocols



1. Multiple vendors
2. Multiple Owners
3. Disparate Data Sets
4. Remote Locations

What is the greatest challenge you face when it comes to leveraging data effectively

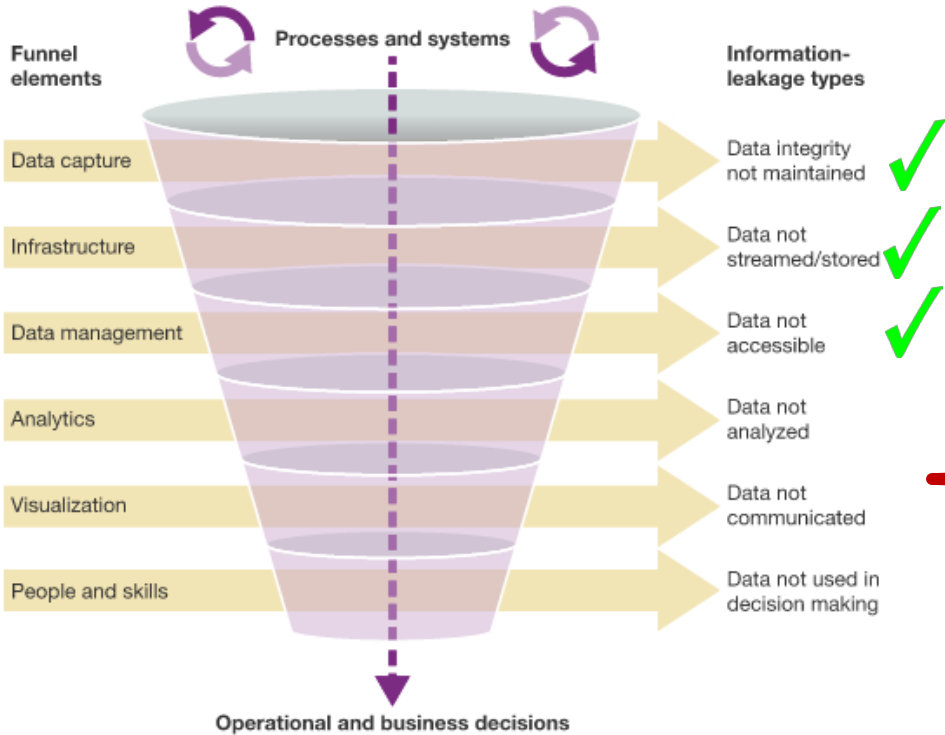


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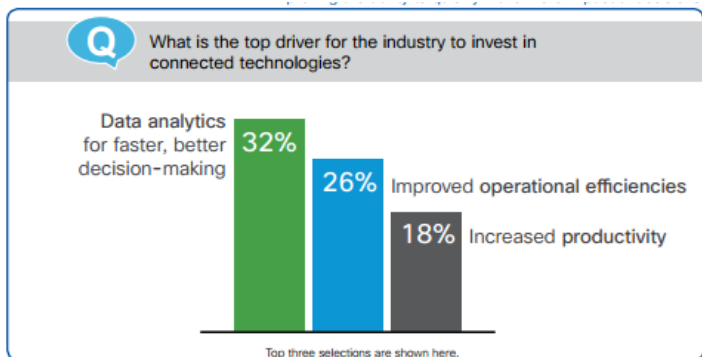
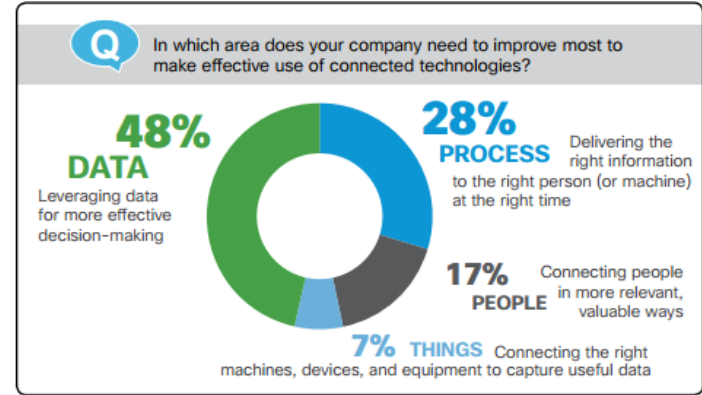


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Data Assets



McKinsey & Company, Digitizing Oil & Gas Production



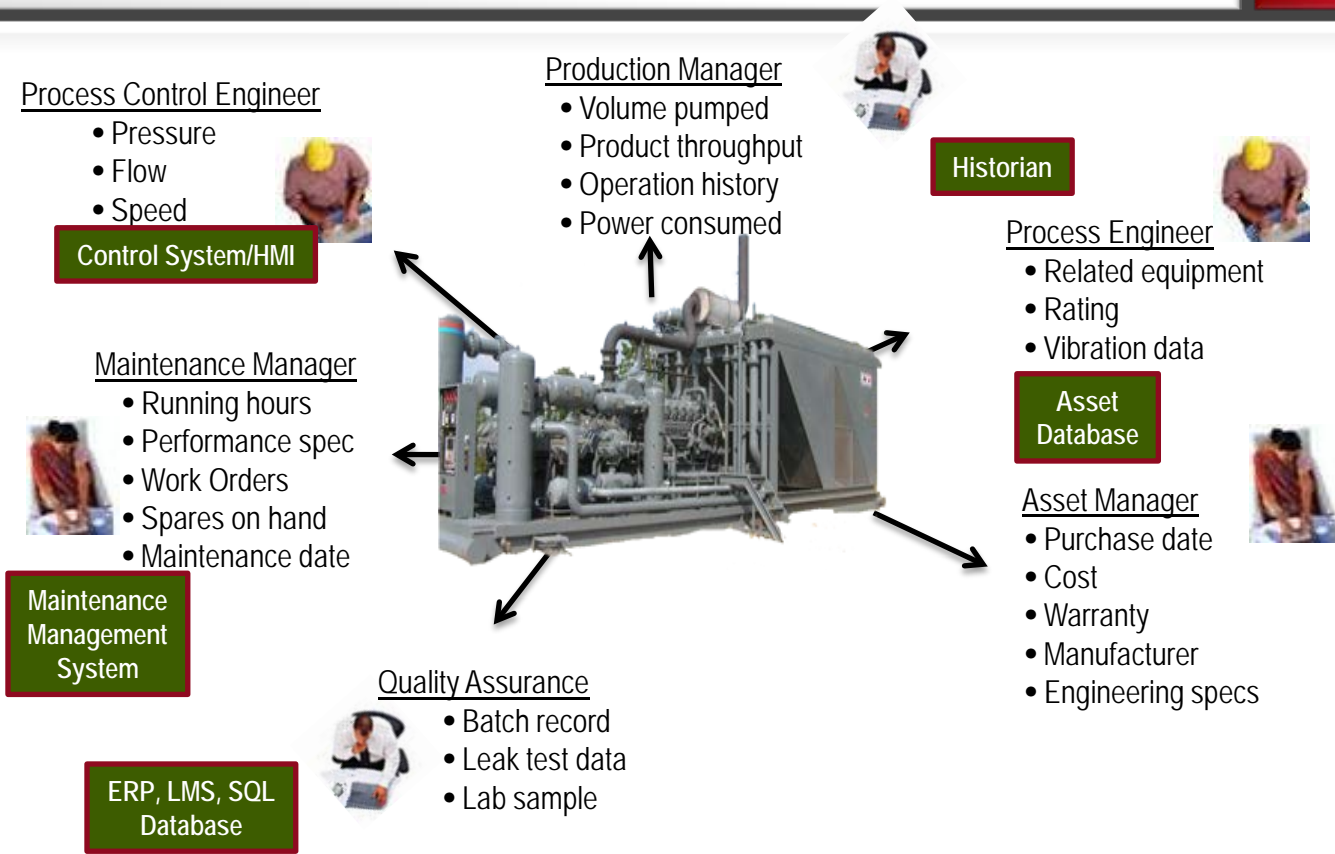
A Quick Recap

- What do we want to do?
 - Address production challenges by enabling data rich intelligent assets information to be analyzed by the correct personnel using a common data interface.
- Why do we want to do it?
 - Because we know that problems exist today with data visualization and accuracy caused by multiple vendors, disparate systems and other manageable challenges.
- How can we do it?
 - We can address production challenges by presenting unified data models and open data connectivity.

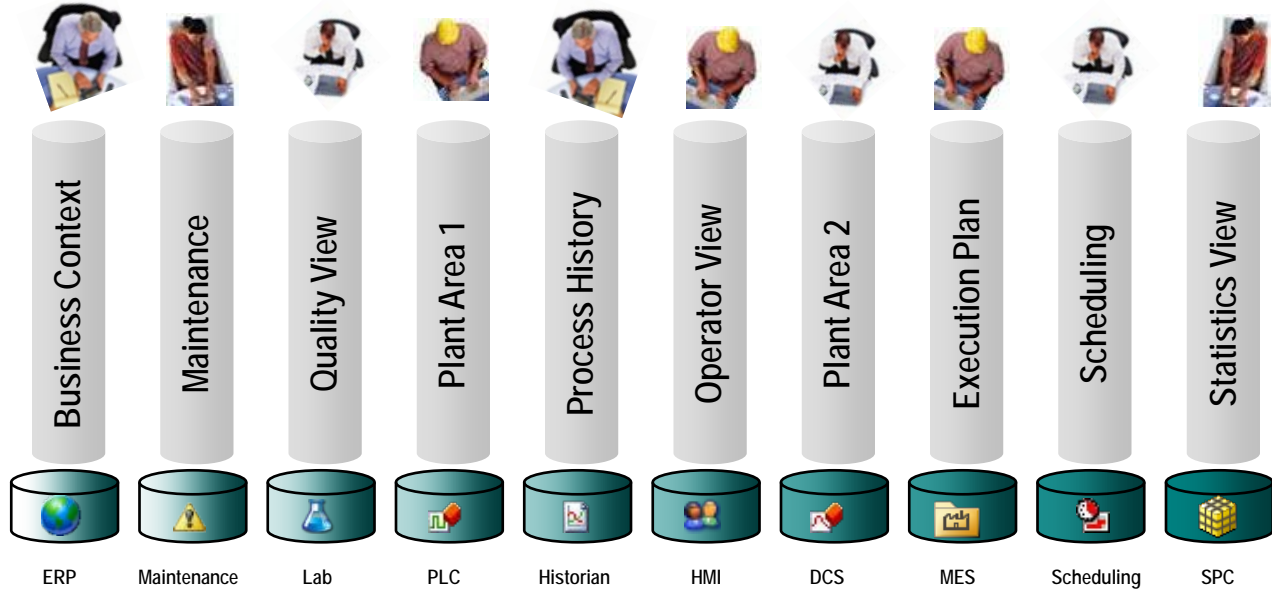
....Let's continue on.



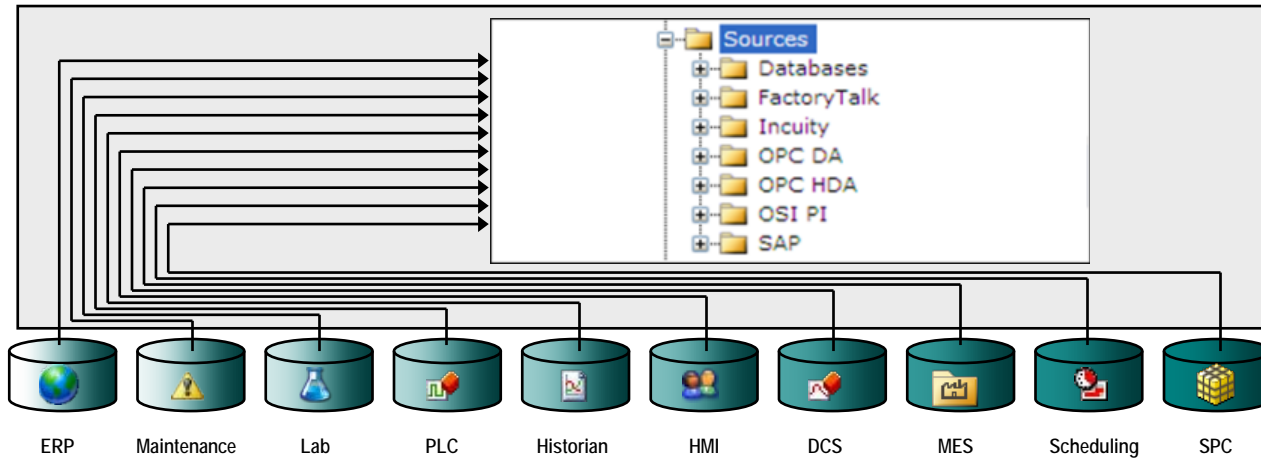
Is a Compressor Just a Compressor?



Silos of Information



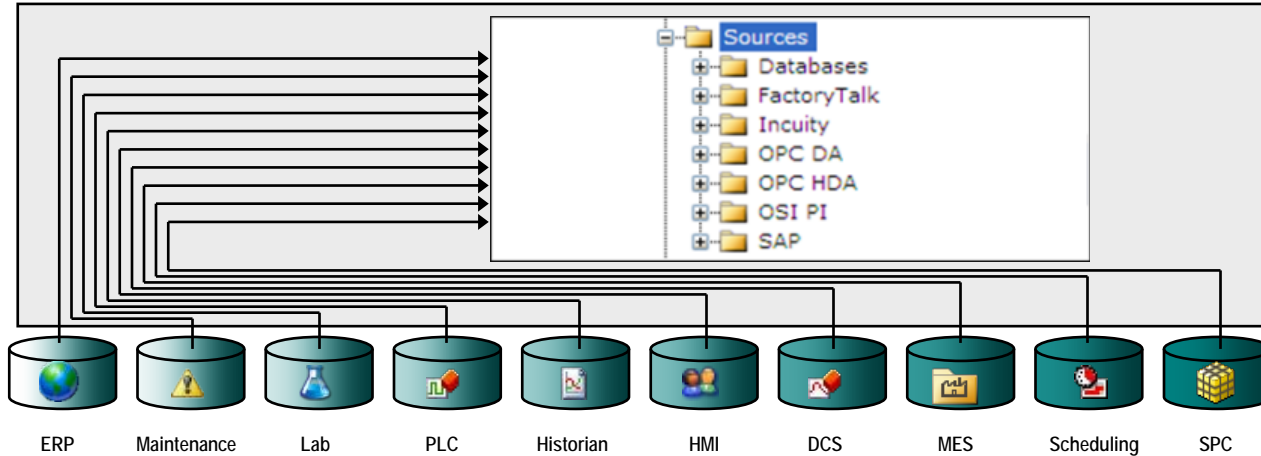
A Federated Model



Leave the data at source, collect it when needed:

- Leverage existing information assets
- A single up to date version of the truth

A Unified Model



One place to access all manufacturing information:

- Easy to access, interpret, correlate and compare
- See the big picture
- One place to secure the data

A Compressor is a compressor...

Is a Comp

Process Control Engineer

- Pressure
- Flow
- Speed

Control System/HMI

Maintenance Manager

- Running hours
- Performance spec
- Work Orders
- Spares on hand
- Maintenance date

Maintenance Management System

ERP, LMS, SQL Database

Edit CMP-001

Scope:

Name: CMP-001

Fully Qualified Name: MyEnterprise.ExxonMobil Demo.North America.Sites.Site

Type Name: ExxonMobil.Utility.Compressor

Created On: 10/ 2/2009 7:54:59 PM Min Max

Modified On: 10/ 4/2009 8:42:10 PM Min Max

Description: CMP-001

Icon Index: 78

Manufacturer Name: ACME Manufacturing

Manufacturer Website: www.google.com

Asset Value (\$): System.Sources.Incuity.Tags.CMP_AssetValue

Operator Log: System.Sources.Incuity.Tags.CMP_OperatorLog

Runtime Hours: System.Sources.Simulator.Line 2.Tags.BatchNumber

Starts (Last 30 Days): System.Sources.Simulator.Line 2.Tags.Downtime

Stops (Last 30 Days): System.Sources.Simulator.Line 2.Tags.MachineSpeed

Work Orders Completed (Last 10): MyEnterprise.ExxonMobil Demo.Queries.Work Orders Closed

Work Orders Outstanding: MyEnterprise.ExxonMobil Demo.Queries.Work Orders Open

Alarms and Events (Last 20): MyEnterprise.ExxonMobil Demo.Queries.CMP-001 Alarms and

Asset ID: 1

Location: MyEnterprise.ExxonMobil Demo.North America

Platform: MyEnterprise.ExxonMobil Demo.North America.Sites.Site 1

Start Command: System.Sources.Simulator.Line 2.Tags.MachineRunning

Head Pressure: System.Sources.Simulator.Line 2.Tags.Sine

Actual Flow: System.Sources.Simulator.Line 2.Tags.MachineSpeed

Suction Temperature: System.Sources.Simulator.Line 2.Tags.MachineSpeed

Suction Pressure: System.Sources.Simulator.Line 2.Tags.ProductionCount

Discharge Temperature: System.Sources.Simulator.Line 2.Tags.Ramp

- Asset Database
Manufacturer
- Maintenance Management System
Work Orders Outstanding
- Control System
Actual Flow
- Historian
Discharge Pressure

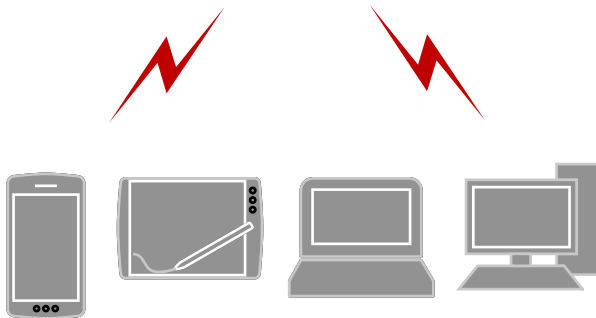
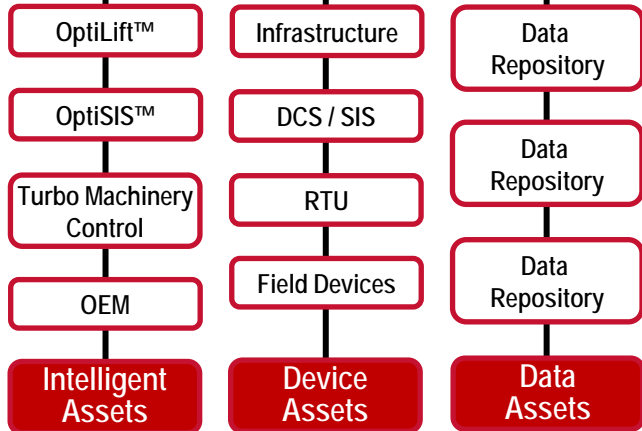
ConnectedProduction™ Solutions

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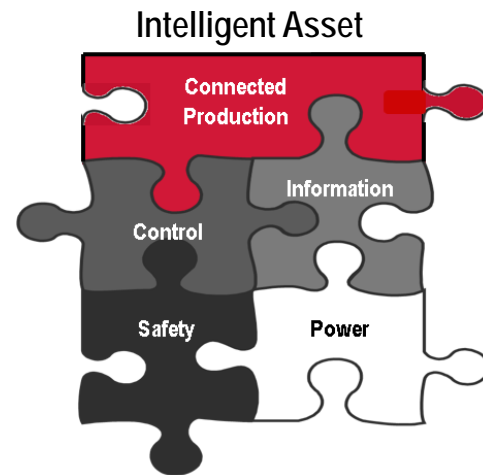
Functional Overview

Deployed "on-premise" or "in the cloud"

Collaboration /Role Based Content		Asset Management	
Data Model	Middle Ware	Visualization	Reasoning
Workflows		Historical Data	Mobile / web
Data Connectors / Gateways		Application Interfaces	

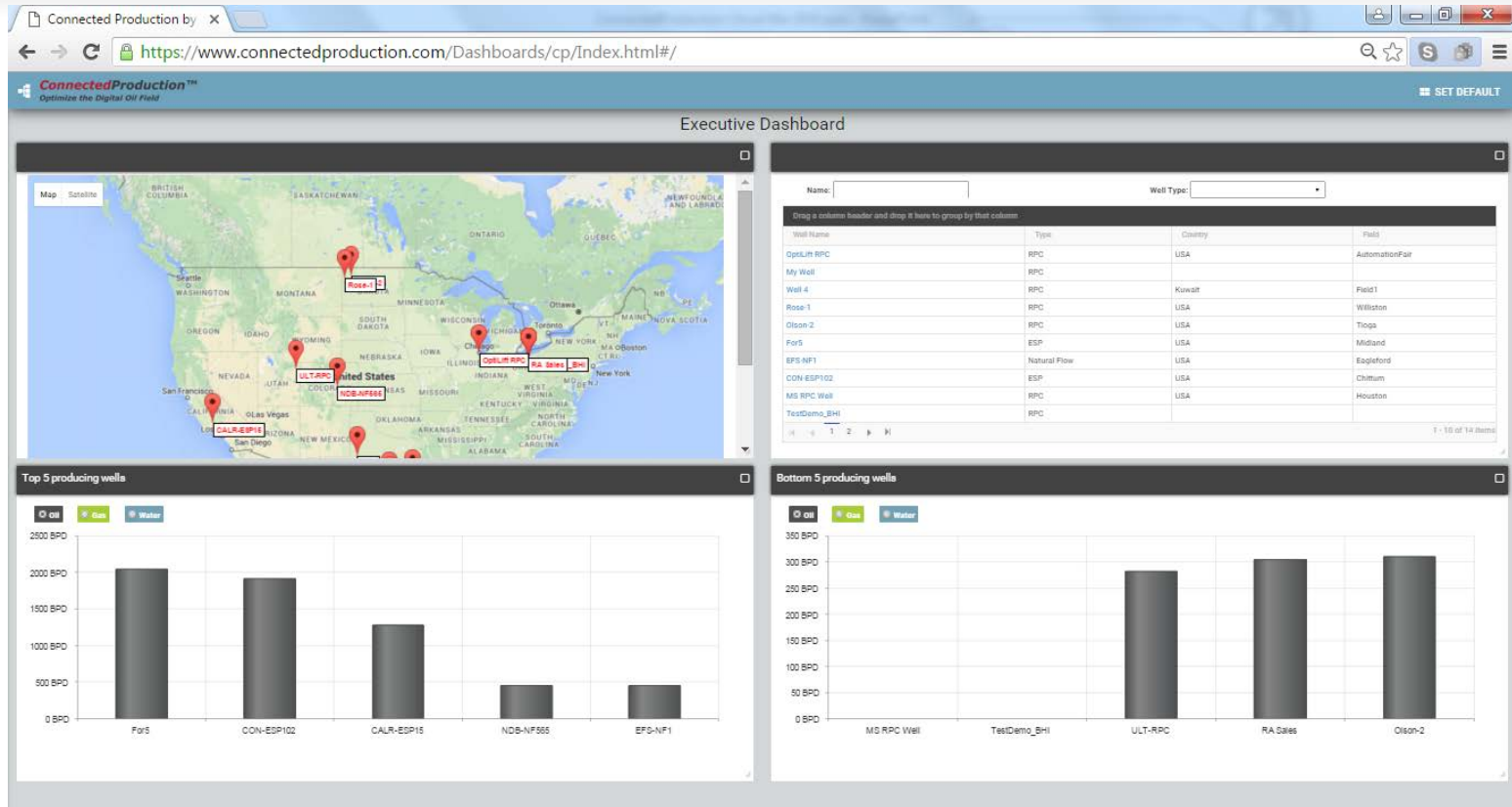


Devices (and third-party systems)



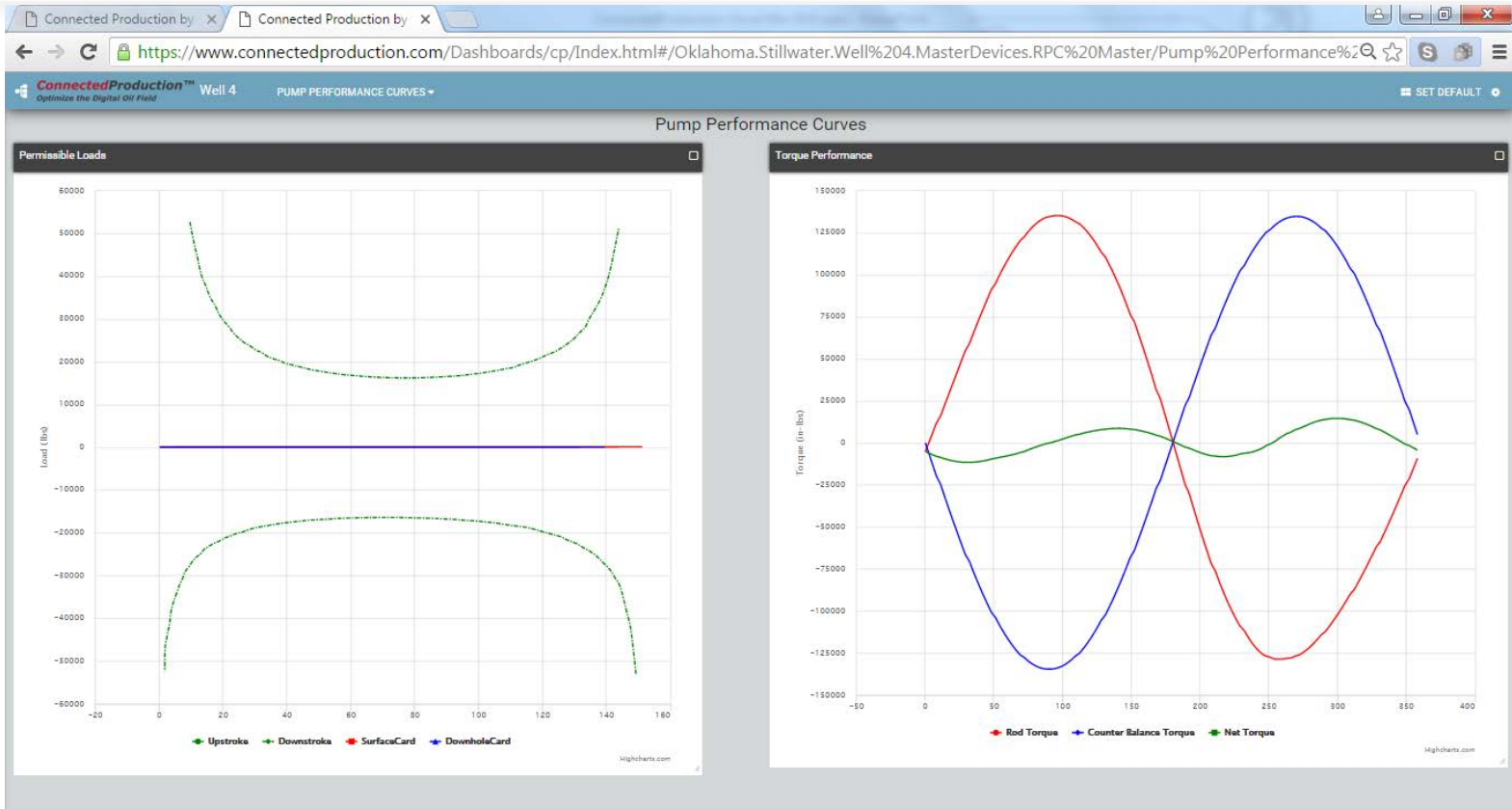
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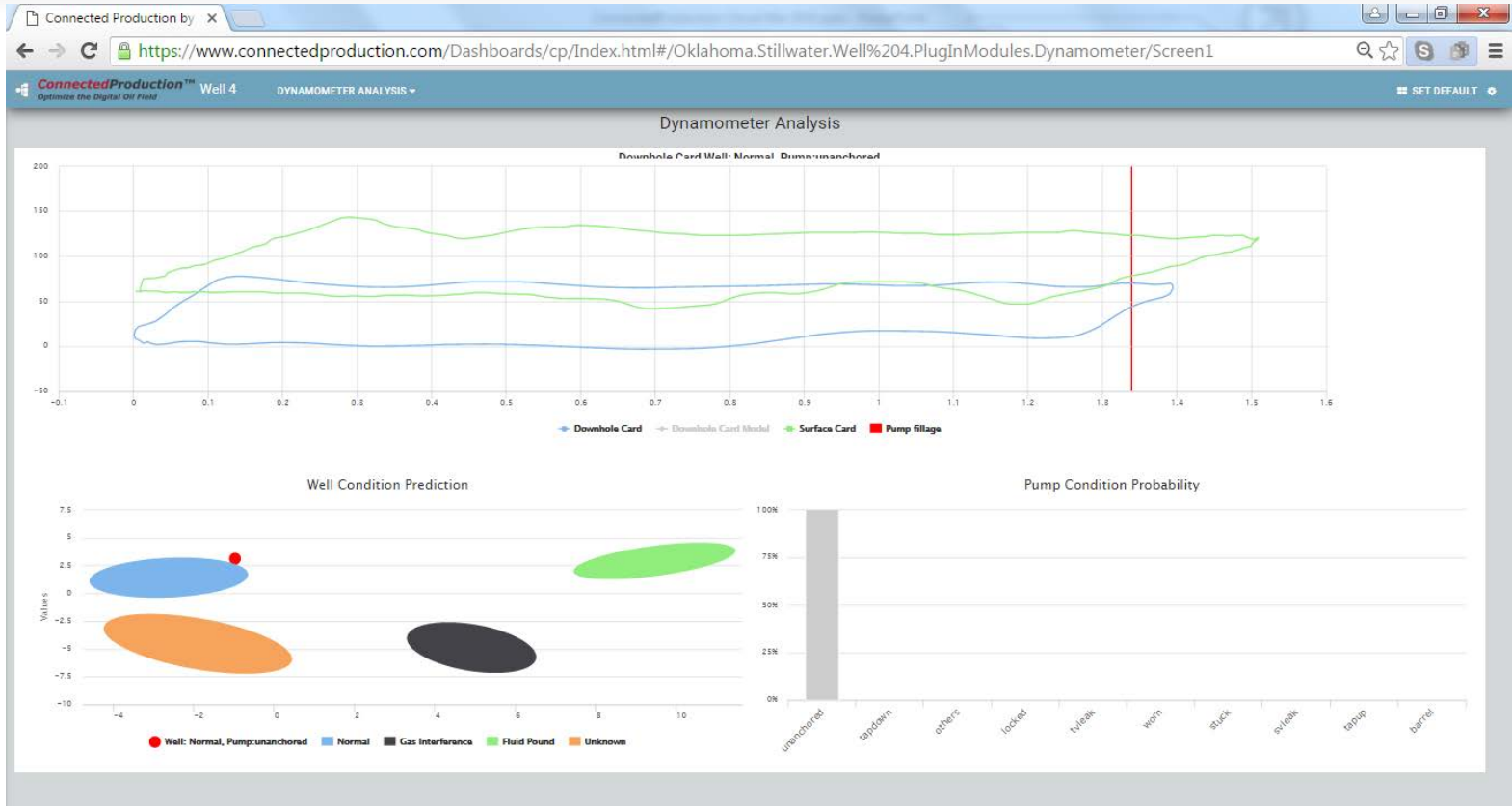
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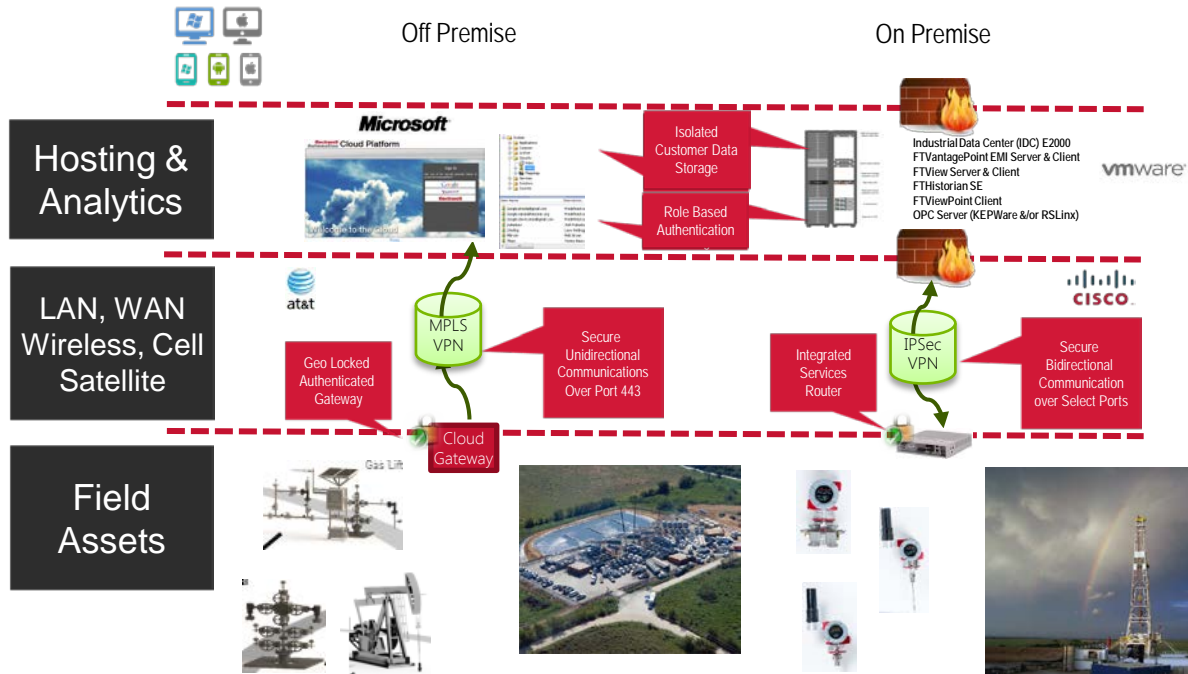
ConnectedProduction™ Solutions

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Automation



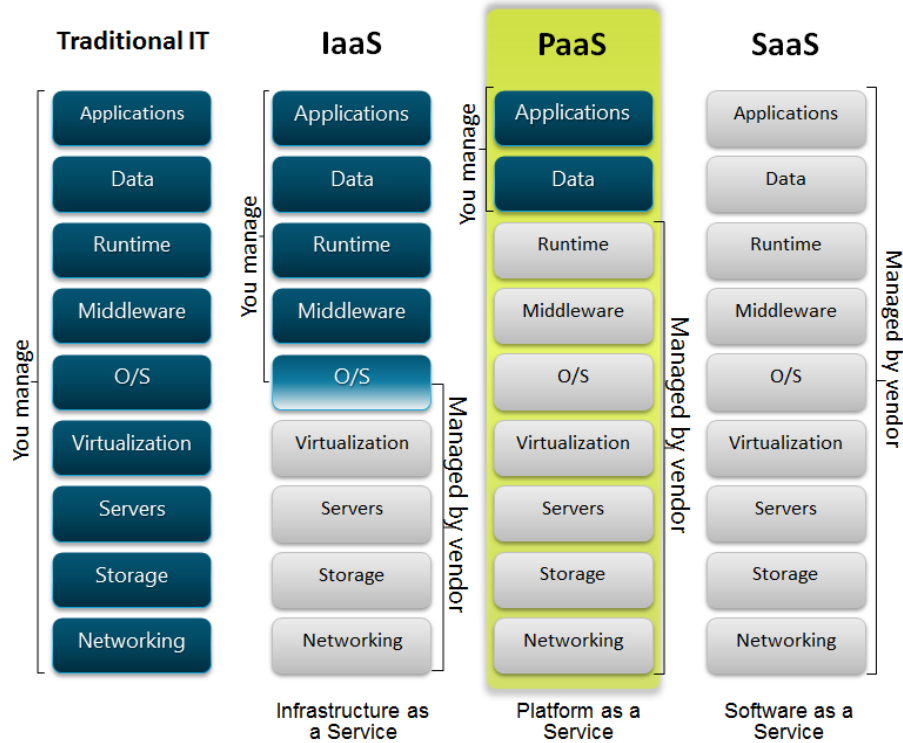
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Flexible Connectivity



ConnectedProduction™

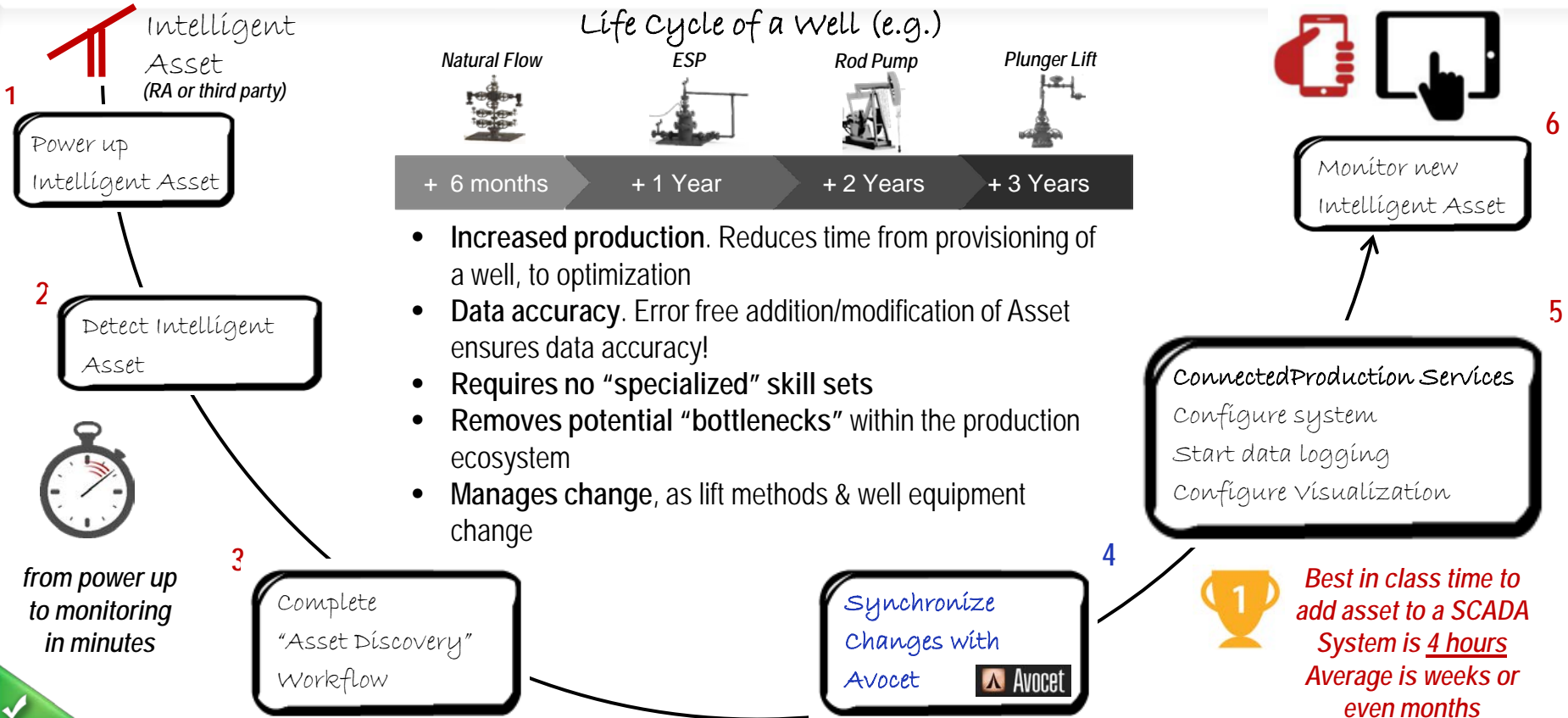
Benefits of Cloud technology



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Adding and Maintaining Intelligent Assets (ConnectedProduction Services)

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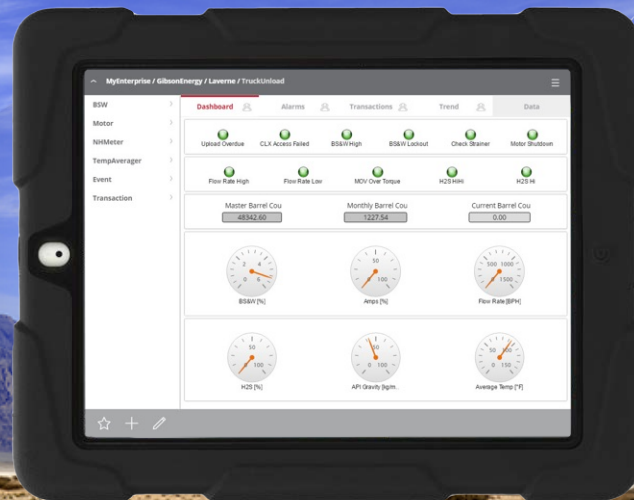


Hydro-Carbon Custody Transfer via Cloud

IMPROVED GAUGING AND AUTOMATIC E-TICKETING

Hands-Off Operation
Reduces Risk of Human Error

Real-Time Visibility
Reduces Average Billing Cycle



Advanced Analytics and Reasoning

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Flow Measurement, Virtual Flow Metering



Configuration



- Base Assay Coefficients
- Water Cut
- Initial Well Test Data
- Base PVT Data
- Well characteristics
- Reservoir Data



Measured Values

- Casing Pressure
- Casing Temperature
- Tubing Pressure
- Tubing Temperature

Black Oil
Model

Well

GOSP

Production

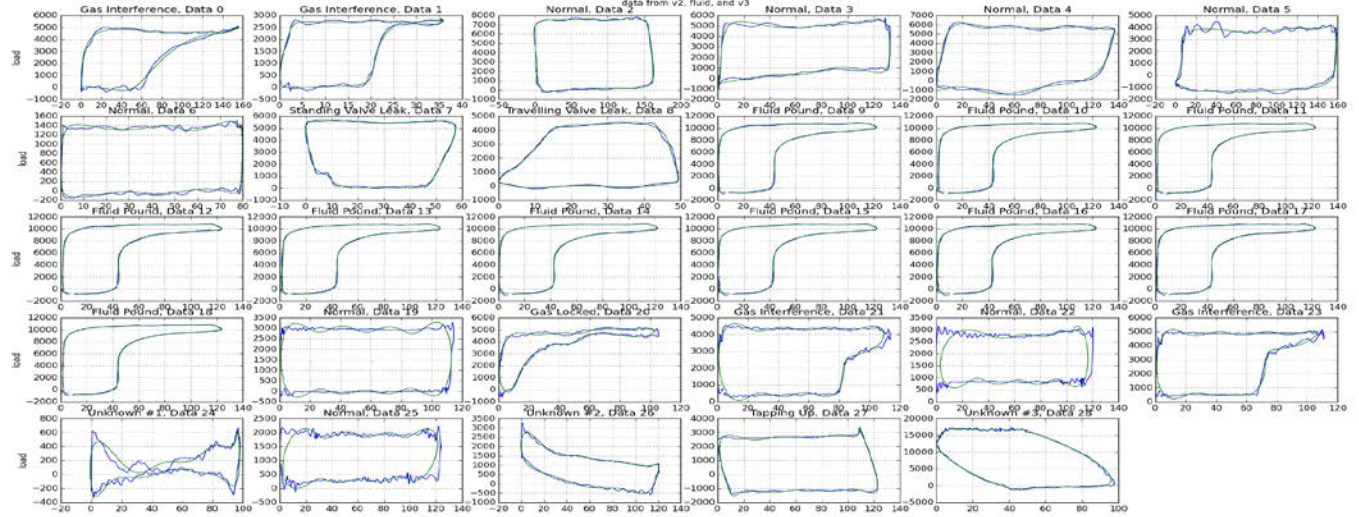
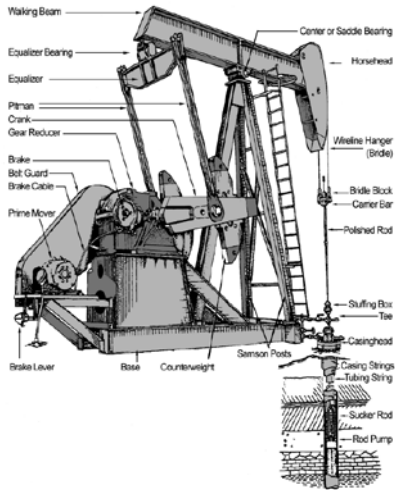
Reservoir
To Terminus

- Computes three-phase flow (oil, gas and water) based on well configuration, and measured pressures and temperatures
- Produces / generates:
 - Well profile – P, T, flow regimes
 - Well frictional and elevation pressure drops / pressure profile
 - Well temperature profile
 - Well performance curves / parametric
 - Well operating envelope (next phase)
- Provides well performance analysis:
 - Forecasting aid, what-if analysis, and performance improvement
 - Parameter impacts: for example, water-cut, reservoir pressure, and PI
- Enables well test cross-check / validation
- Infers values between well tests, improving production accuracy and providing early problem detection
- Enables “test by exception”, streamlining well test scheduling
- Does not require a three-phase meter
- Works on a broader range of conditions vs. three-phase meter

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Performance Monitoring & Diagnostics for OptiLift-RPC Rod Pump Controller

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• Customer Value:

- Predict failures, minimize unplanned downtime
- Maximize production per unit of consumed energy

• **Input Data:** Load vs. position measurements for the rod pump at the bottom of the well

• **Analytics Output:** Operation state of the pump, Prediction of future state of the pump

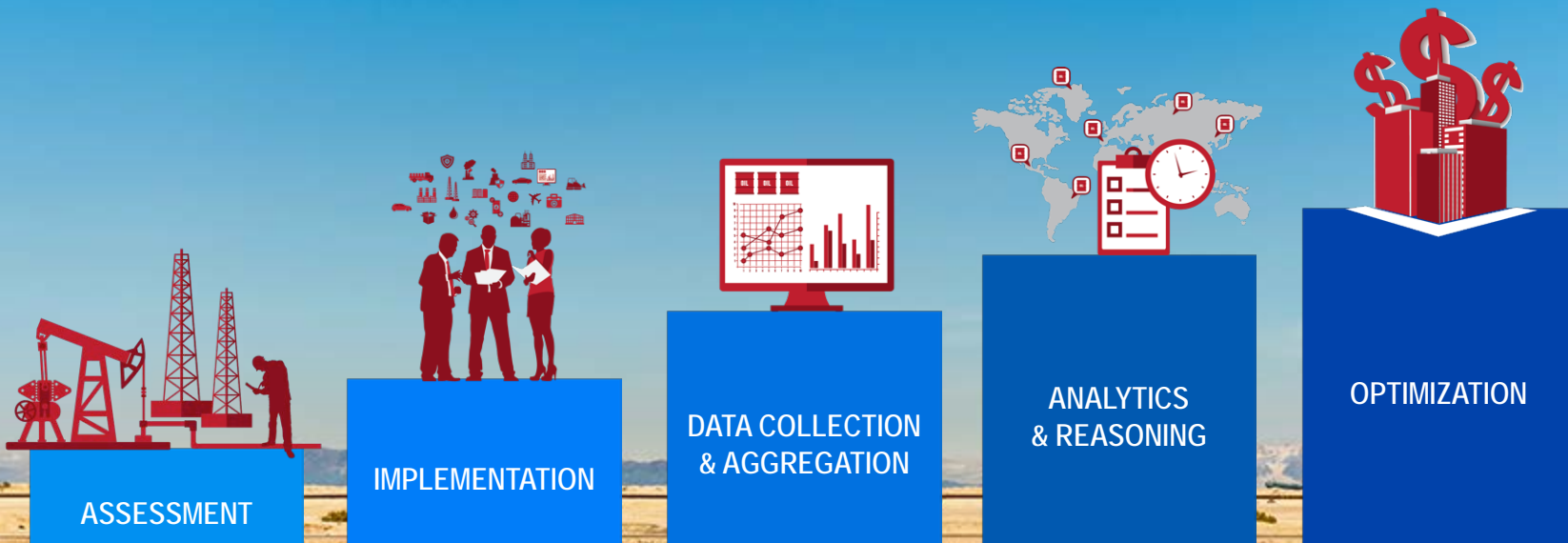
CONNECTED PRODUCTION™

MAXIMIZE
Well Recovery

IMPROVE
Operational Efficiency

ENHANCE
Production Agility

REDUCE
Downtime



SECURE PATHWAY FROM PRODUCTION DATA TO ACTIONABLE INTELLIGENCE



Thank You



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