

# Using analytics to transform the way we drill and produce Shale wells

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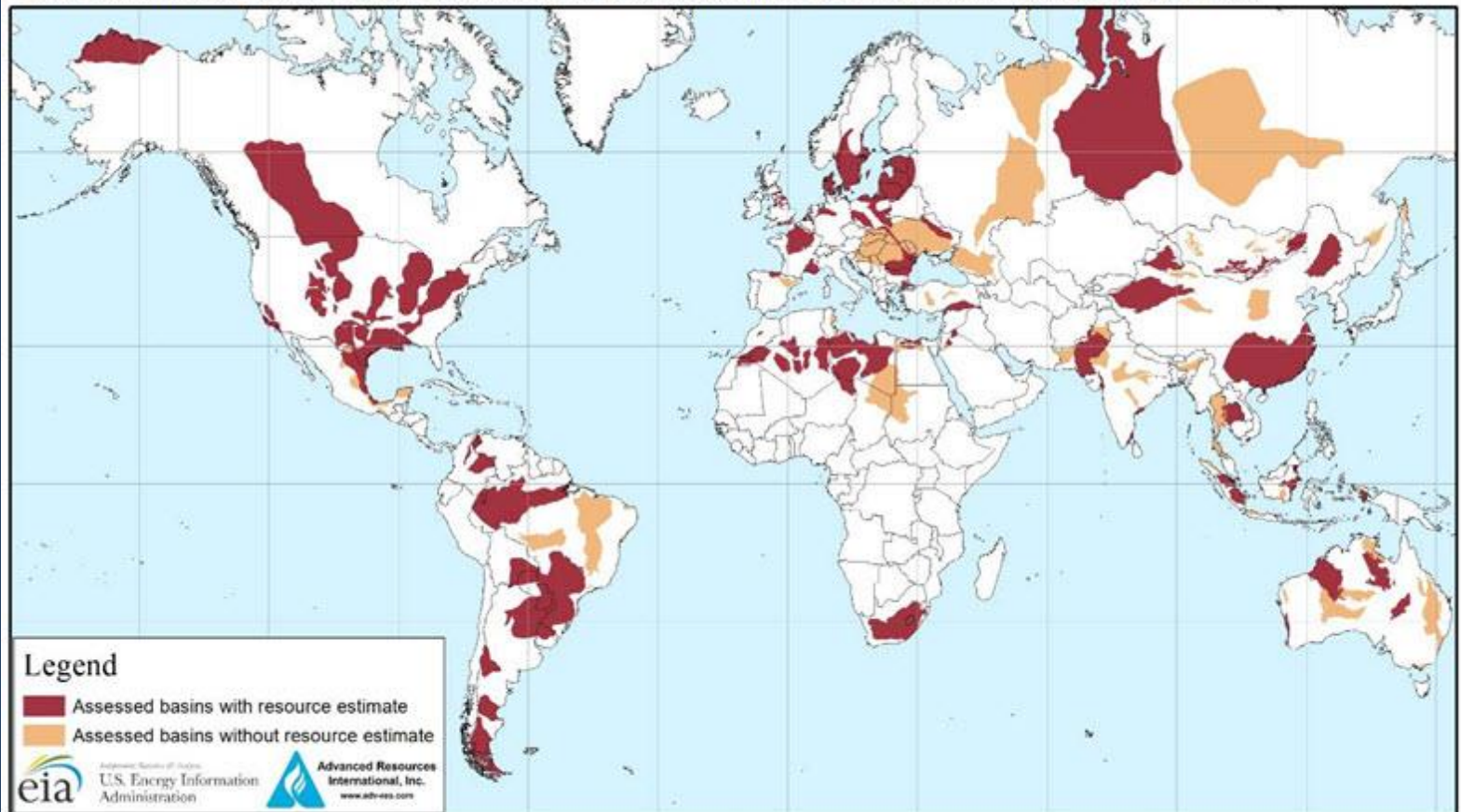
# Agenda



- The Shale
- The New Assembly Line
- The Role of Analytics in the Shale
- Case Study
- Business Transformation

# Shale Plays

Figure 1. Map of basins with assessed shale oil and shale gas formations, as of May 2013



Source: United States basins from U.S. Energy Information Administration and United States Geological Survey; other basins from ARI based on data from various published studies.

# Challenges in the Shale

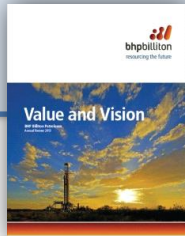
- *The Speed of the Business*
- Logistics
- Integration
- Advanced Analytics

# The Speed of the Business

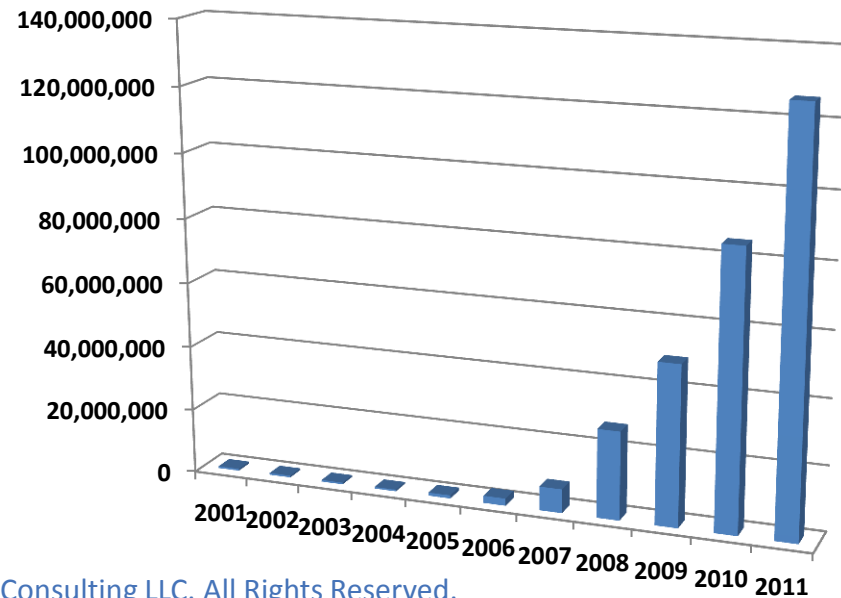
- Business in the Shale is operating at previously unseen speeds
  - Strain on operations
  - Critical need for timely, accurate information
  - Operating efficiency methods
  - **Re-thinking the “conventional way”**

“Going forward, I firmly believe that by applying the same principles of a well-run manufacturing business we can significantly improve the productivity of our shale assets.”

-Tim Cutt

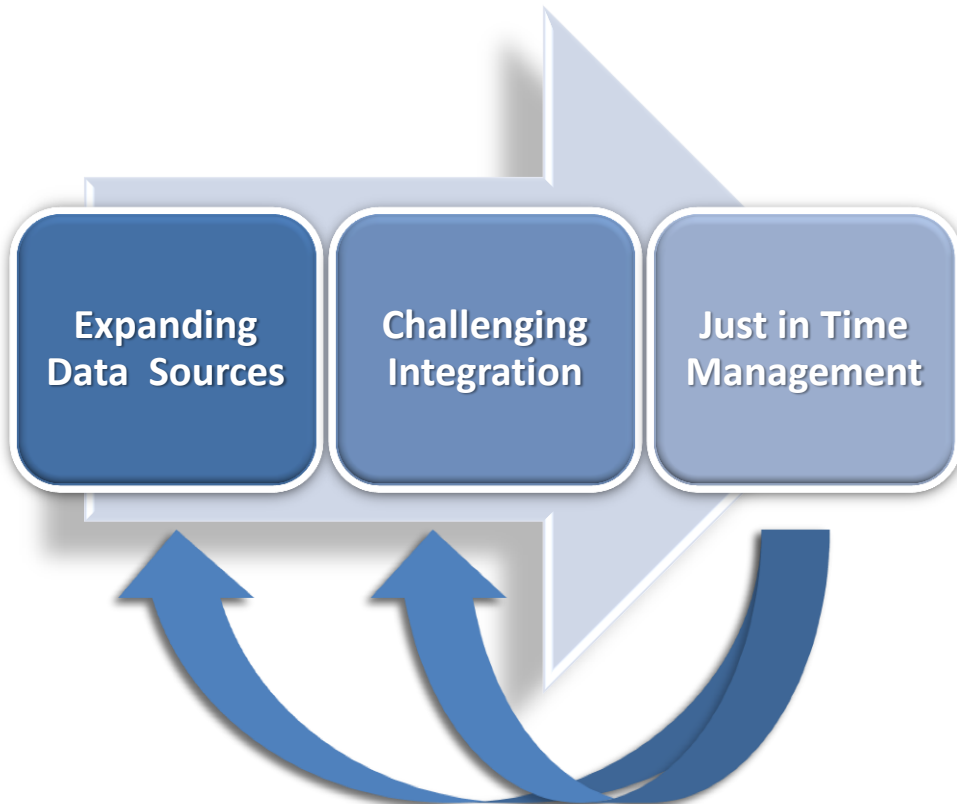


### Annual Bakken Production



# Better Decision Making Capabilities Required

## The New Assembly Line



- Expanded Data Coverage
  - New data sources, e.g. Land, Production
- Challenging Integration
  - Faster, higher volume and real-time
- Just In-Time Management
  - Big Data, Predictive – similar to the manufacturing process

## Continuous Improvement

# Logistics and Integration

With the number of wells, the drilled footage, and production all on the rise, information requirements are changing...

- Access to timely and accurate land holding and expirations
- Supply chain issues for rigs, pipe, tubing, water, sand and other materials
- Product and by-product distribution issues
- Access to real-time drilling and completions data
- Scheduling – requires re-thinking – first come / first serve
- Safety... Safety... Safety

This means that the DATA in the Accounting, Procurement, Drilling, Land, Subsurface and Production systems all need to be integrated

# Understanding the Assembly Line

Some companies drill over 1000 wells per year in shale plays.

- The difference between \$7,500,000/well & \$8,000,000/well over an entire year's operations is half a billion dollars!

Data Analysis can help to create these efficiencies

- Reduce the number of trips (drill bits, muds, motor reliability)
- Geosteering (staying in the formation while drilling)
- Anti-Collision

Advanced analytics to optimize the **entire** well lifecycle



# Categories of Analytics

## **Analytics is an organizational capability, not a single tool or approach**

- Visual analytics (Visualization) and data discovery - can provide significant pattern identification
- Predictive analytics – using data mining and statistical techniques to find patterns, relationships and anomalies in the data and using them to predict future outcomes
- Right-time and real-time analytics – requires focus on the use case and how to address the time to value (TTV) equation

***Organizations need to build capabilities in several analytic tools & techniques with a set of use cases that apply to each***

# Good Data = Good Insight

## ▪ Technical quality



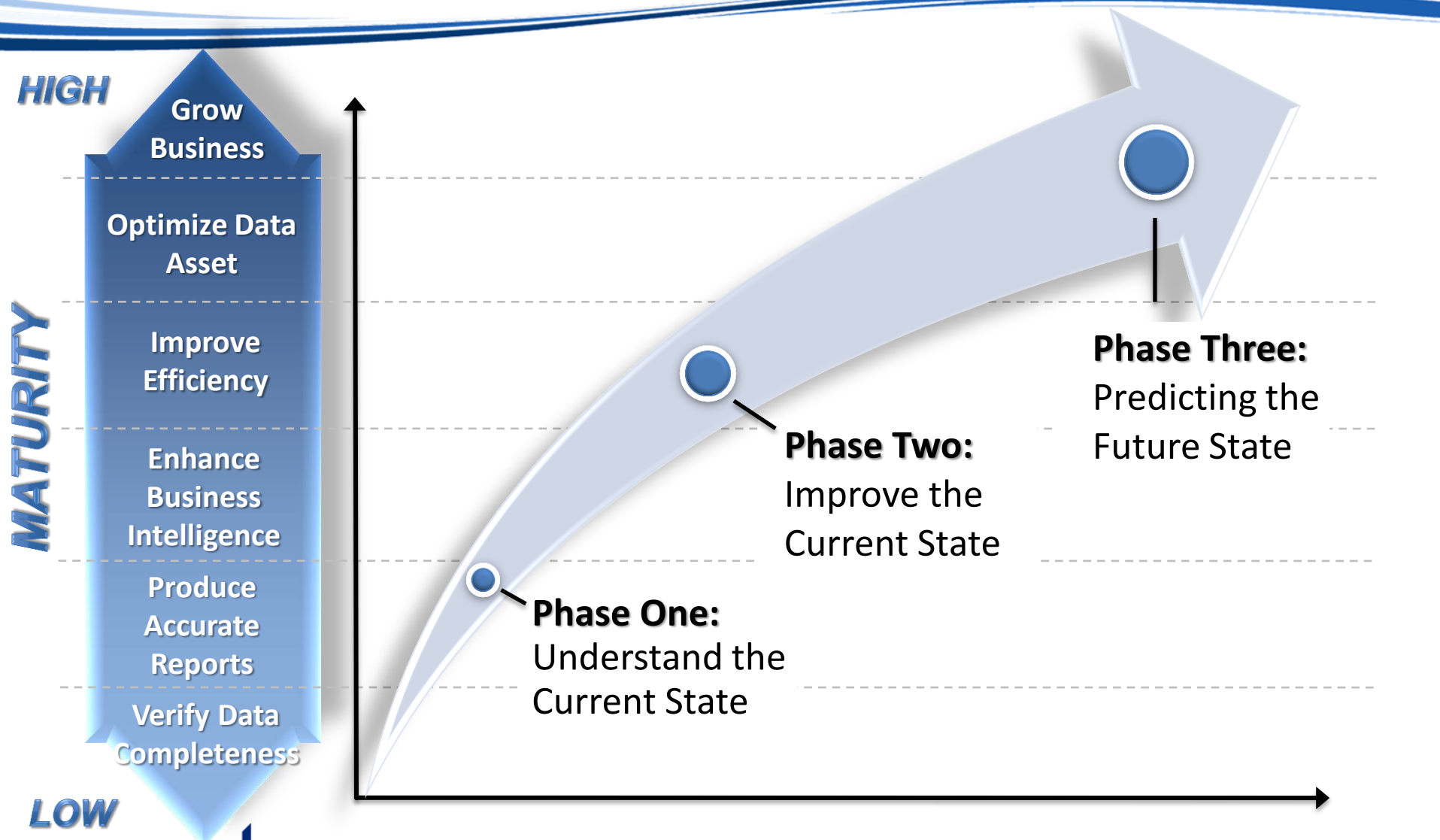
- Is it “wrong”?
  - Information Object
  - Standard format
  - Scale
  - Precision
  - Referential integrity
  - Consistent

## ▪ Business quality

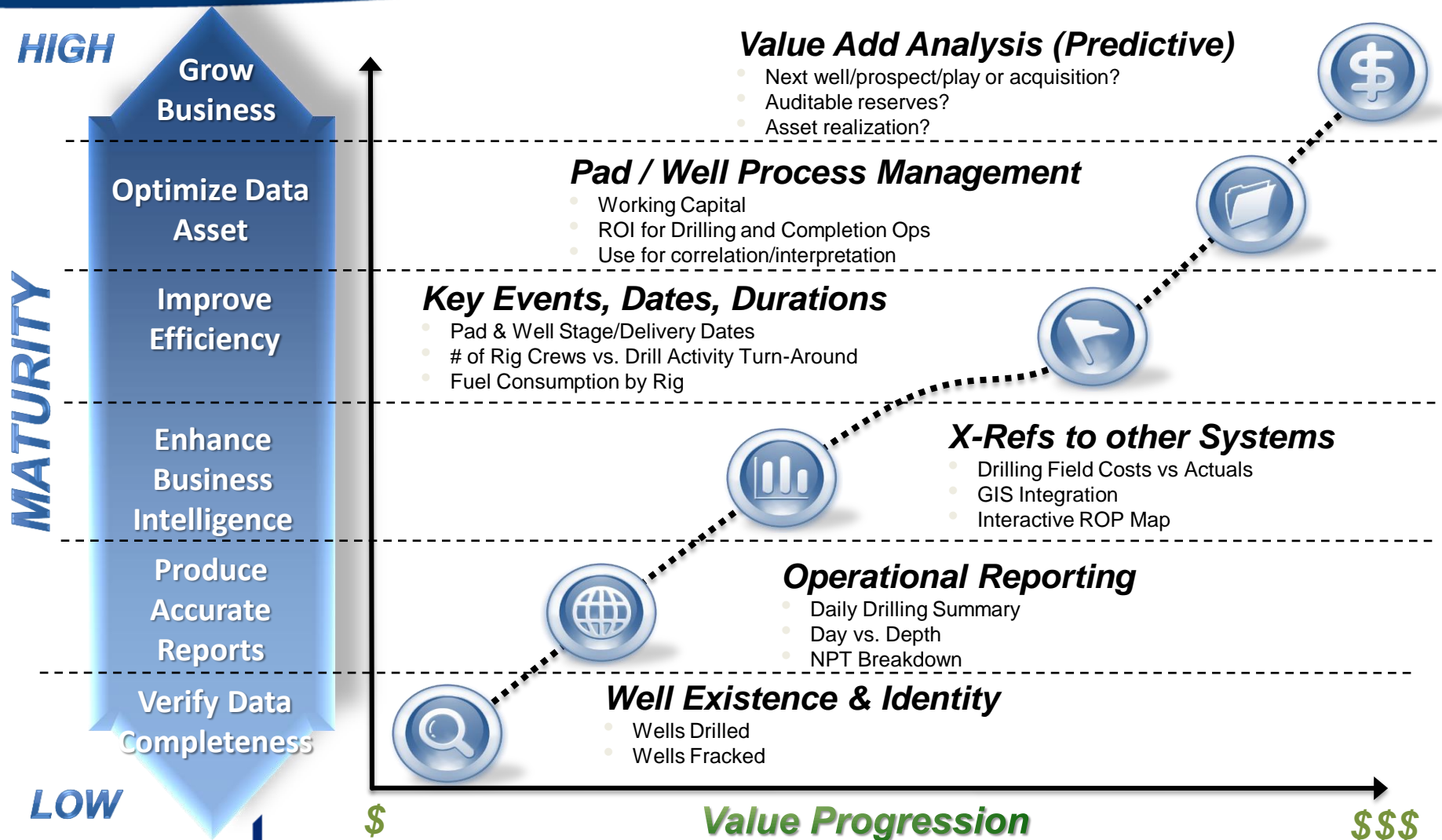


- Is it “right”?
  - Data suitable for a particular purpose, at a particular point in time
  - Context sensitive relative to where it is being measured in the data lifecycle
  - Measured in relation to business process

# A Progressive Journey



# Noah's D&C BI Maturity Model



# Case Study: The Problem Statement

Following an acquisition, the onshore U.S. division of a multinational Upstream company launched a strategic improvement initiative focused on Drilling and Completion Performance Management

Information Management was asked to provide a set of business performance visualizations with data sourced from the Drilling, Production, and Accounting systems as well as the existing data marts

These visualizations focus on providing performance metrics and reporting capabilities for the Drilling and Completion teams

# Case Study: Objectives

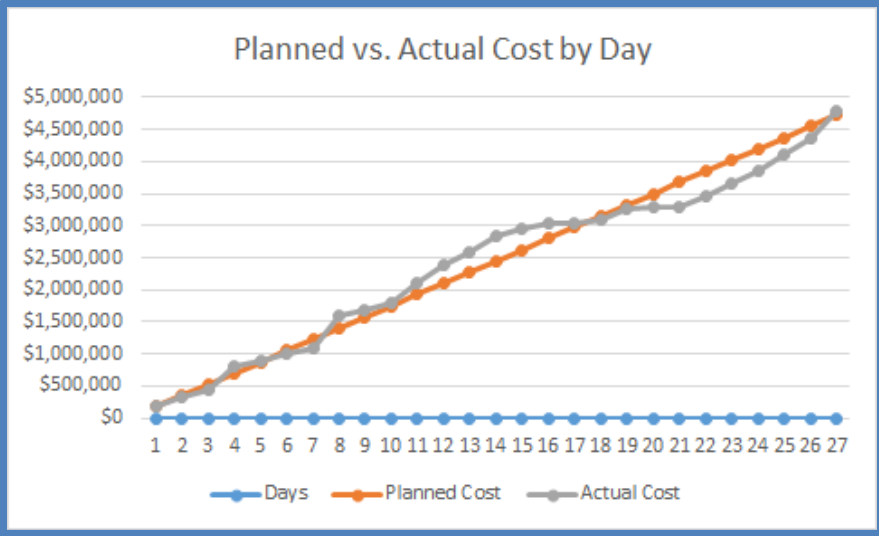
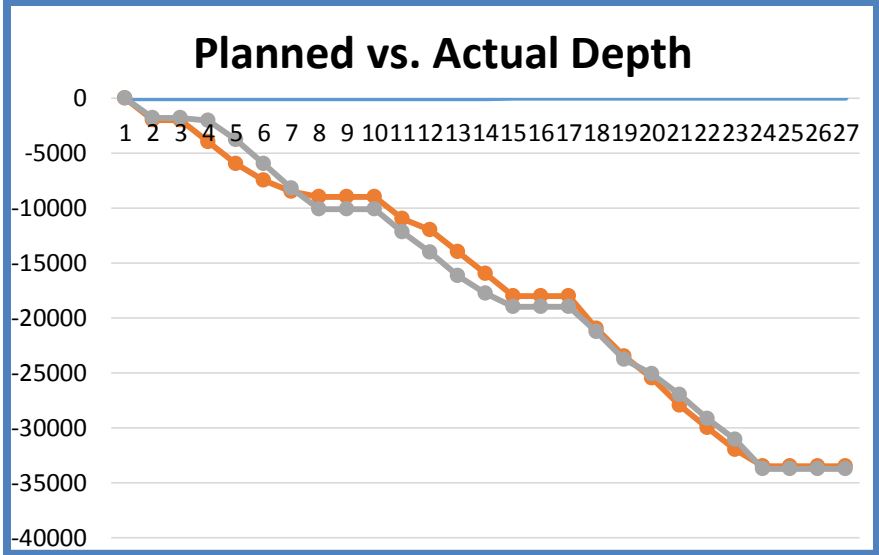
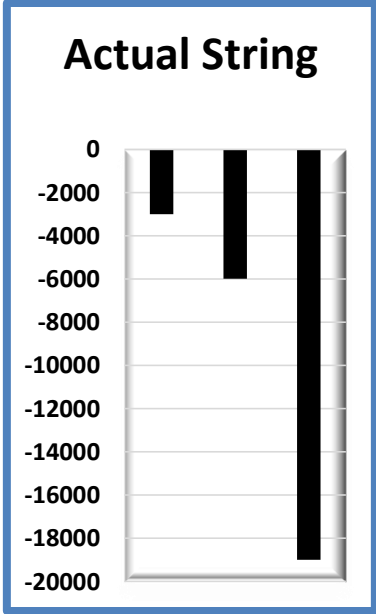
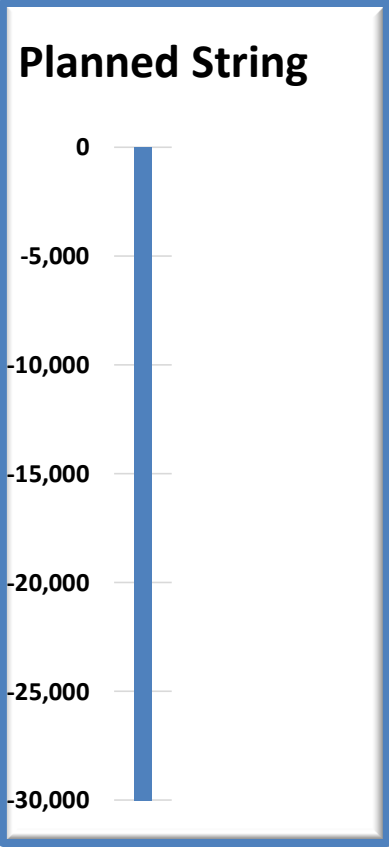
## What:

- Reduce the cycle time for bringing a well into production
- Drive down costs associated with Drilling and Completion activities
- Use analytics to determine the optimal order of well workovers
- Anticipate downhole problems with data from previous wells

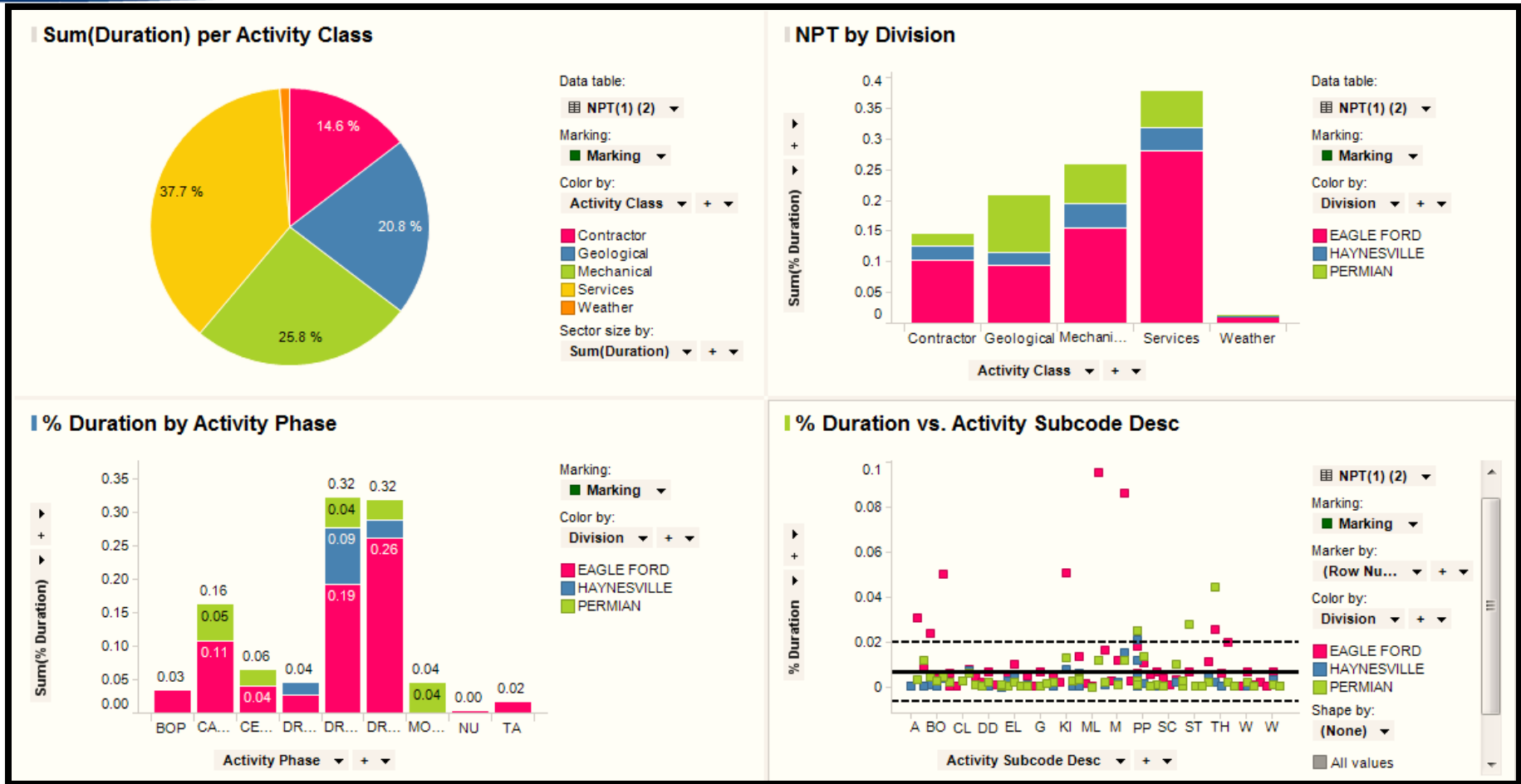
## How:

- Provide reporting and analytical capability for Drilling and Completions across the Shale assets
- Provide data quality management through the identification of data issues through the use of visualizations
- Ensure scalability for future enhancements with new visualizations, reporting layouts and data sources

# Case Study: Well Drilling Detail



# Case Study: Sample NPT Visualizations



- Analysis of non-productive time inception-to-date
- Part of periodic vendor review
- Enable better go-forward plan





# Case Study: Data Quality Counts by Rig

Count of Fields Populated By Rig

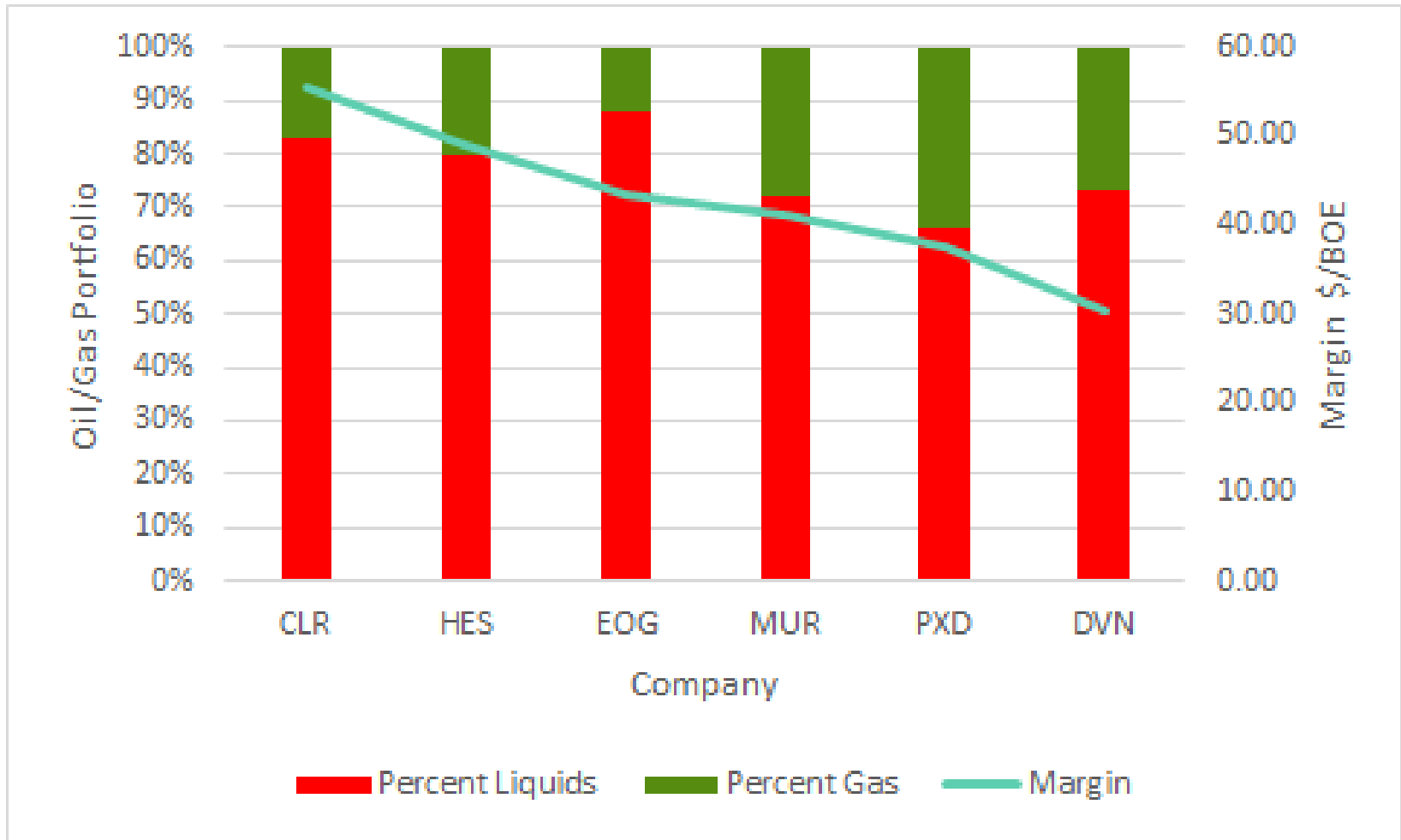


- **Data quality measures**
  - Change behavior
  - Increase accountability
  - Enhance data veracity

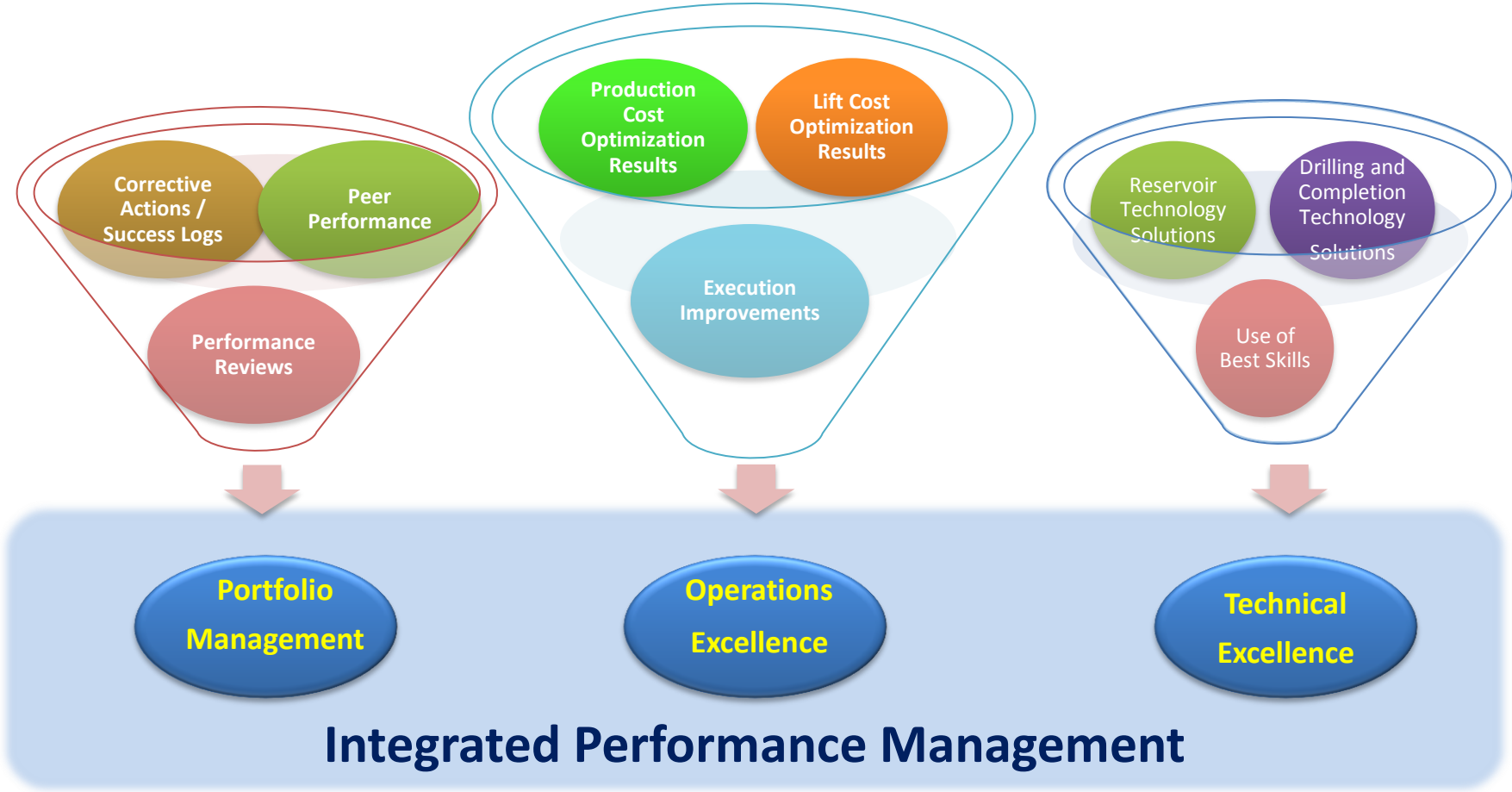
# Business Transformation

- Improving margins is essential
  - Margins are driven by cost per unit of production
  - Most companies focus on the costs
  - Successful companies focus on both
- Portfolio transformation will attain significant benefits
- Performance transformation will create competitive differentiation
- ***Advanced analytic capabilities will support both!***

# Margins



# Focus Areas



# Sample KPIs

## Well Lifecycle Stages

Planning



Drilling



Completing



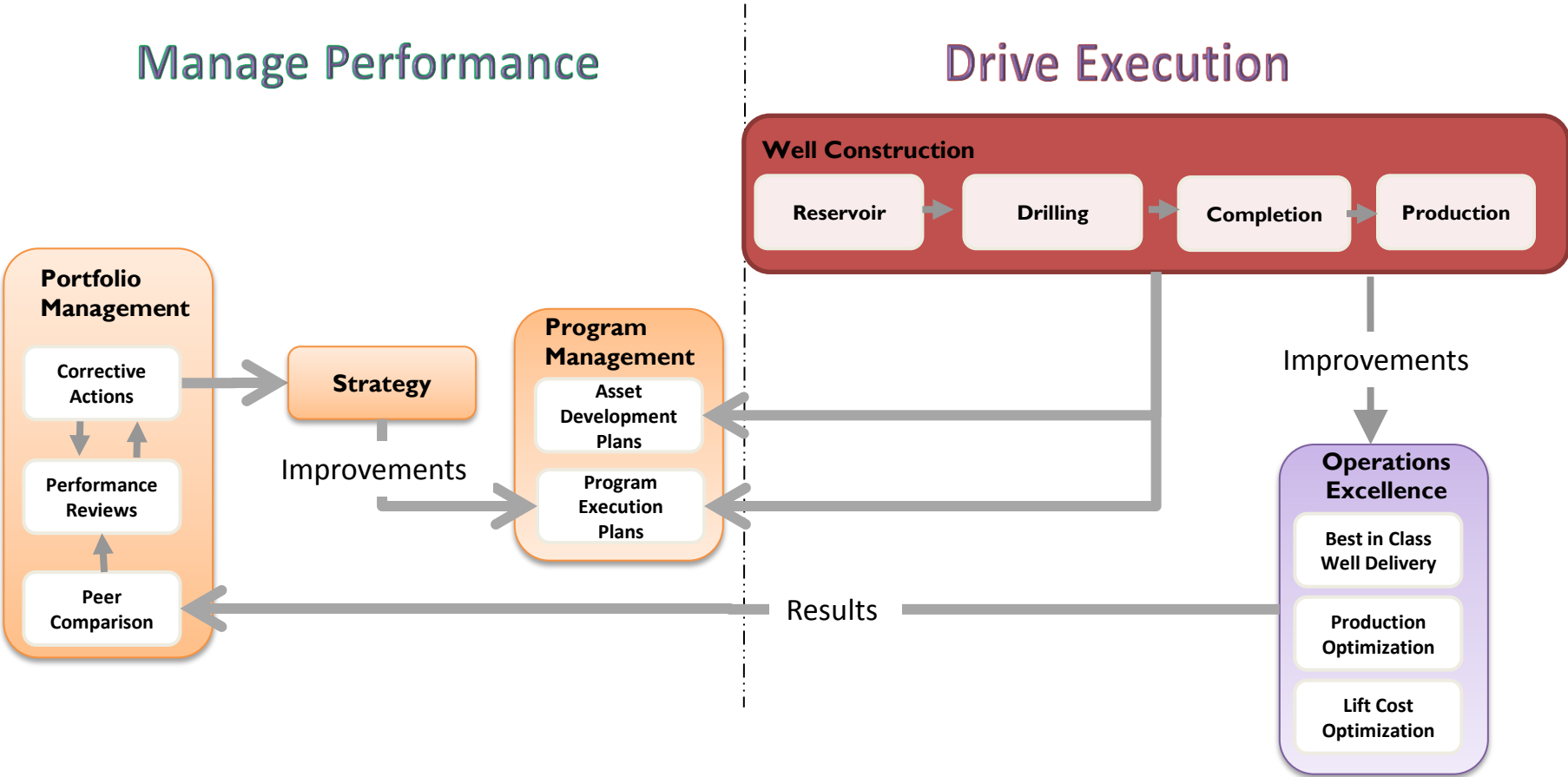
Producing



## Sample Metrics

- Time → Staking request to spud (avg. cycle time)
- Cost → Pre-Spud actual versus AFE
- Quality → Drillable well inventory (RTB)
- Time → Spud to rig release (avg. cycle time)
- Cost → Total drilling costs versus AFE (sum)/Avg. cost/ft.
- Quality → Percent of lateral in zone; Unplanned Sidetrack Rate
- Time → Rig release to completion (avg. cycle time)
- Cost → Total completion costs versus AFE (sum)/Avg. Cost/Stage (or Cost/GPI)
- Quality → Percentage of incomplete frac stages; Sand/Fluid Volume per stage
- Time → Completion to IP (avg. cycle time)
- Cost → Facilities cost versus AFE (sum)
- Quality → WOPLs; gas flared

# Linking Focus Areas – A Sample



# Noah Consulting – About Us

- Founded by information services professionals
- Extensive experience providing solutions to the largest and most complex energy companies in the world
- Focused exclusively on the data / information domain
- Industry and Data Management Professionals averaging 18+ years experience
  - Combine significant information and industry subject matter expertise
  - Providing a full spectrum of business solutions Information strategy, information architecture, solution delivery
  - Local and offshore solution delivery options
- **Consulting magazine – Small Jewel award recipient - 2012**
- **Houston Business Journal – Best Places to Work – 2012, 2013, 2014**
- **Houston Business Journal –Fast 100 - 2013 & 2014**
- **Inc.5000 – 2013 & 2014**
- **ComputerWorld - Best Places to Work – 2013 & 2014**
- **WorldOil magazine – 2012 Best Data Management finalist**
- **Informatica Innovation Award Partner - 2014**

