Holistic Data Management Strategy for Large NOC’s

Dale Blue  
Senior Manager – Global Digital Services  
Landmark

Sacha Abinader  
Managing Director – Upstream Digital  
Accenture
Disclaimer

- This presentation is made by Accenture (Co-presenter) and Halliburton**. The contents of this presentation are for informational purposes only. Halliburton** and Co-presenter make no representation or warranty about the accuracy or suitability of the information provided in this presentation and any related materials. Nothing in this presentation constitutes professional advice or consulting services. No contractual relationship with Halliburton or Co-presenter is established by attending or viewing this presentation. No rights to intellectual property of Halliburton or Co-presenter are granted through this presentation. The opinions expressed in this presentation are those of the author and do not necessarily represent the views of Halliburton or Co-presenter. **Halliburton means Halliburton Energy Services, Inc., Landmark Graphics Corporation, and their affiliates.
The Alliance represents ‘combined’ credentialized capability to assist NOC’s and IOC’s in achieving their E&P Data Management journey

**The Accenture – Halliburton – Landmark Alliance**

- **E&P Industry Leader**
  - 98 years of E&P industry experience in over 70 countries

- **Technical Expertise**
  - Access to global network of petro-technical experts

- **Integration leadership**
  - Leader in integration of subsurface data to drive operational decisions

- **Strategic Insight**
  - Extensive experience in addressing the strategic challenges of E&P companies

- **Implementation Expertise**
  - Extensive experience delivering complex transformations, change management & digital transformation

- **Digital Leadership**
  - World’s leading service provider for digital capabilities
Digital Vision & Outcome in the NEW

The NEW can transform the way E&P operates
► Cross discipline efficiency ► Comprehensive asset insight ► Future-proofed workforce

Harnessing the NEW requires
► Focus on business transformation, not technology ► New ways to enable the business
► Petro-technical + NEW IT savvy + business process focus + data-focus
Leveraging Joint Capabilities to deliver value added Data Management Strategy

Digitization Trends

- Benchmarking and Strategy
- End-to-End Digital Integrated Platform
- Enterprise Data Management
- Engineering and Advanced Analytics
- Integrated Asset Model
- Field Instrumentation and IoT

Business Outcomes

- Improved operational performance and cost take out
- End-to-end integrated workflows for optimal field maintenance
- Enhanced data quality and decision making
- Reactive to predictive to prescriptive insights and actions
- Real-time operations visibility and enhanced safety
- Enhanced automation and field cost reduction

Joint Solutions (examples)

- Agile Field Development Planning
- Real-time Drilling Analytics
- Targeted Production Enhancement

Data Management Transformation

Landmark DecisionSpace Platform

Visualize
- Reservoirs
- Drilling Wells
- Production Operations

Model and Optimize
- Integrated model for the overall upstream value chain
- Predictive Maintenance
- Production Optimization
- Advance Analytics

Act

Gather, integrate and align Data

- GnG
- GIS
- ERP
- Maintenance
- Production
- Real-Time
- Other

The Accenture – Halliburton – Landmark alliance
‘Accelerated Commercialization’ & ‘Unit Cost’ Reduction pressures make robust Data Management capabilities a critical imperative for the organization

**The Case for Change**

<table>
<thead>
<tr>
<th>Client’s Success Drivers…</th>
<th>… Require Differentiated Capabilities…</th>
<th>… Underpinned by an Effective DM Capability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accelerated Commercialization</td>
<td>Integrated Reservoir Characterization</td>
<td>Integrated Asset Model</td>
</tr>
<tr>
<td></td>
<td>Agile and interconnected Business &amp; Operations Planning</td>
<td>Geological Analysis</td>
</tr>
<tr>
<td></td>
<td>Integrated Factory Drilling</td>
<td>Reservoir Characterization</td>
</tr>
<tr>
<td></td>
<td>Base Production Management – for steep declining production</td>
<td>Base Production Management – for steep declining production</td>
</tr>
</tbody>
</table>

Source: Accenture-Landmark analysis
NOC operations contains heterogeneous landscapes with various data silos and end-to-end cross platform integration challenges

HETEROGENEOUS LANDSCAPE

Operational Financial

Analytics & Visualization

Business Planning & Economics Exploration Integrated Well Delivery Facilities Management Gas Operations & Maintenance Production and Revenue Accounting

Core Functions

Finance & HR Supply Chain Management Sales, Marketing & IT

Platform Services

Enterprise Data Federation

Data Sources

Business Planning & Economics

Exploration

Integrated Well Delivery

Facilities Management

Gas Operations & Maintenance

Production and Revenue Accounting

Operational Financial

Analytics & Visualization

Core Functions

Finance & HR Supply Chain Management Sales, Marketing & IT

Platform Services

Enterprise Data Federation

Data Sources

Business Planning & Economics

Exploration

Integrated Well Delivery

Facilities Management

Gas Operations & Maintenance

Production and Revenue Accounting

Operational Financial

Analytics & Visualization

Core Functions

Finance & HR Supply Chain Management Sales, Marketing & IT

Platform Services

Enterprise Data Federation

Data Sources

SAP AFE PRA Corp Master OW EDM Petrel Geolog OSI-PI

Back Office Corporate Petrotechnical

Real-Time

Source: Accenture-Landmark analysis
Copyright © 2018 Accenture-Halliburton. Confidential
The assessment of current Organization’s DM practices & capabilities, defines ‘Desired State’ & necessary steps to achieve it

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why is strengthening the Data Management &amp; Integration function critical to Org success?</td>
<td>?</td>
</tr>
<tr>
<td>What is the vision for Data Management &amp; Integration, in order to effectively support the Org business?</td>
<td>?</td>
</tr>
<tr>
<td>What are the current Data Management &amp; Integration capabilities and pain points?</td>
<td>?</td>
</tr>
<tr>
<td>What actions are required to reach the desired end state in the short, medium, and long term?</td>
<td>?</td>
</tr>
</tbody>
</table>

Source: Accenture-Landmark analysis
Business capabilities will be underpinned by developing a holistic, all encompassing data management framework . . .

**Enterprise Data Management Framework**

<table>
<thead>
<tr>
<th>Data Governance</th>
<th>Data Architecture</th>
<th>Warehousing &amp; BI (Data Analytics)</th>
<th>Data Quality &amp; Meta-data Mgmt.</th>
<th>Data Security &amp; Data Development</th>
<th>Data Operations &amp; Master Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Organization</td>
<td>- Enterprise Data Model</td>
<td>- Data Marts/Data Lakes</td>
<td>- Data Monitoring</td>
<td>- Data Privacy</td>
<td>- Database Operations</td>
</tr>
<tr>
<td>- Roles &amp; Responsibilities</td>
<td>- Technology Architecture</td>
<td>- Data Dashboards</td>
<td>- Data Improvement</td>
<td>- Data Retention</td>
<td>- Structured &amp; Unstructured</td>
</tr>
<tr>
<td>- Policies and Processes</td>
<td>- Integration Architecture</td>
<td>- Descriptive, Predictive &amp; Prescriptive Analytics</td>
<td>- Data Harmonization</td>
<td>- Data Requirements</td>
<td>- “Gold Record” Standards</td>
</tr>
<tr>
<td>- Standards &amp; Metrics</td>
<td>- Taxonomies</td>
<td>- Metadata Definitions</td>
<td>- Metadata Harmonization Across Systems</td>
<td>- Data Modeling</td>
<td>- Database Operations</td>
</tr>
</tbody>
</table>

**Process**

- Understand Requirements
- Build/sustain technology and integration architecture
- Build/sustain Enterprise DM
- Define Taxonomies and Namespaces
- Build/Sustain Architecture
- Integrate and Optimize Data Access
- Monitor & Tune Data Marts
- Define and Implement Analytics Solutions
- Metadatad Definitions
- Data Quality Standards
- Data Quality Reporting and Improvement
- Data Harmonization Across Systems

**People**

- Chief Digital Officer
- Data Architect
- Data Stewards & Owners
- Chief Digital Officer
- Data Architects
- Data Owners
- Data Scientists
- Data Mgmt. Executive
- Data Stewards & Owners
- Data Managers / Analysts
- Security Management Tools
- Data Modeling Tools
- Model Management Tools

**Technology**

- Governance Artifacts Repository
- Metrics Dashboards
- Data Modeling Tools
- Design / CASE Tools
- Enterprise Architecture artifact Repositories
- Database Systems
- Data Integration
- Data Visualization
- Analytics Platform and Applications
- Metadata Repository / Technology
- Data Quality Tools
- Data Integration
- Security Management Tools
- Data Modeling Tools
- Database Systems
- Document and Content Management Systems
- Security Management Tools
- Data Quality Tools
- BPM Tools
- Data Integration
The objective is to drive towards key success factors in order to have a sound Data Management and Integration Strategy.

**KEY SUCCESS FACTORS**

**Adoption for Growth**
- Data Management & Integration approach can be re-used, adapted and scaled for multiple business functions, assets & solutions
- Data Integration approach is extensible to support future solution growth

**Organizational Capability**
- Structured processes, guidelines and competencies to deliver and support data integration
- Stakeholders understand & employ best practices
- Clarity of roles and responsibilities at all levels

**Sustainability & Governance**
- Program is flexible to adapt and support changing business needs (first gas and long-term adaptability)
- Better transparency & traceability of Data Quality from identified System of Records to Functional Solutions
- Clear processes in place to govern competing priorities across organization business functions and assets

**ILLUSTRATIVE**

Source: Accenture-Landmark analysis
The critical areas & gaps for improvement between Data and Business functions, are analyzed and prioritized

**DATA MANAGEMENT MATURITY ASSESSMENT BY FUNCTION**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Exploration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reservoir Eng</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drilling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply Chain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Maturity Gap between As-Is and Org Best-in-Class**
- **Small/Closed**
- **Moderate**
- **Large**

**Source:** Interviews with Client; Accenture-Landmark analysis
Data Management capabilities need to advance in a phased approach; starting with building foundational capabilities.

**Maturity Gap Progression & Potential Org Capabilities Driven by DM**

**‘Building the Foundation’**
- Improved Decision Making
- Well Completions Workflow Optimized
- Data Visibility & Transparency

**‘Establishing Balance’**
- Integrated Reservoir Management
- Predictive Maintenance
- Fully Integrated Planning & Scheduling

**‘Shaping Performance’**
- AI To Support Decision Making
- Digital Twin
- Integrated Field Management

Source: Accenture-Landmark analysis

Maturity Gap between As-Is and Org Best-in-Class (Small/Closed, Moderate, Large)
Collect business requirements and define Use Cases to drive future Analytics across the organization

**IDENTIFY BUSINESS REQUIREMENTS AND USE CASES — SAMPLE DELIVERABLE**

<table>
<thead>
<tr>
<th>Sample Analytics Use Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WELL CONSTRUCTION</strong></td>
</tr>
<tr>
<td><strong>EXAMPLE CASE:</strong></td>
</tr>
<tr>
<td>Field Development Planning</td>
</tr>
<tr>
<td><strong>BROWN FIELD ASSET INTEGRITY</strong></td>
</tr>
<tr>
<td><strong>EXAMPLE CASE:</strong></td>
</tr>
<tr>
<td>Predictive maintenance</td>
</tr>
<tr>
<td><strong>SUPPLY CHAIN</strong></td>
</tr>
<tr>
<td><strong>EXAMPLE CASE:</strong></td>
</tr>
<tr>
<td>Logistics forecasting, intelligent routing</td>
</tr>
</tbody>
</table>

**SAMPLE USE CASES**
1. Develop optimization
2. Surface facility management
3. Supply chain optimization

Source: Accenture-Landmark analysis
Your feedback is very important to us. Please open the LIFE2019 app to answer a few short questions on this presentation.