Periodic oscillation in any one, two, or three control parameters:
- WOB
- ROP
- delta P

Most common cause: one or more of the parameters reaches a control limit or setpoint and oscillations begin
Drillytics is an application that ingests rig data, processes it, and provides alerts and prescriptions back to the rig in real-time with an average latency of less than 5 seconds.

Drillytics acquires data through industry protocols (WITSML) and formats the data by ensuring parameters are consistently named and units of measurements are standardized so the data can be readily compared. Once this is complete, the real-time analysis occurs using a complex events processing engine. The output produced is sent to the driller’s console (via WITS0) as well as to displays and databases in the client’s real-time operations center, allowing multiple end-users to view the data in industry standard log viewing applications.
Drillmetrics is an application that stores and visualizes all of the data being ingested, processed, and produced by Drillytics across all of the client’s wells allowing for cross-well comparisons and analysis as well as tracking of key performance indicators and metrics over time.

Drillmetrics stores data in Azure SQL or Cassandra. For visualization, Drillmetrics utilizes a custom built HTML5 dashboard. Drillmetrics can also connect with other visualization platforms such as Microsoft’s Power BI.
Results from Initial Customer - Hess

Sample Size:
~100 Wells

Prescription Accuracy:
~90 percent

Savings:
Average $25k USD / well

400 percent ROI
Note - Placeholder Slide: Go to Browser for Well Examples
DataCloud Architecture

User Interface Layer
- Third Party Data Store & Visualization
- Drillytics Admin UI

API Layer
- Drillytics I/O API
- Drillytics Admin API

Analytics Layer
- Drillytics Real-Time Analytics
- Apache Spark
- Drillmetrics API (REST+JSON)
- Datasax Enterprise Cassandra

Storage Layer
- Data Lake Store

Bus Layer
- EventHubs

Cloud Layer
- Web Apps, PaaS
- Azure
- Open Source
- Proprietary
- Managed Services

Power BI
- Streaming Analytics
DataCloud has built robust architecture that seamlessly provides E&P clients the following three invaluable capabilities:

• The ability to access streaming rig data in real-time, without having to implement any new IT systems or protocols

• The ability to subject drilling data to advanced machine learning pattern recognition techniques and computer-based cognitive abilities via artificial intelligence

• The ability to deliver near instantaneous alerts and prescriptive recommendations to the rig and client points of contact
## Size of the Opportunity – Two Market Views

<table>
<thead>
<tr>
<th>Available Market for NPT Reduction</th>
<th>Available Market for Oil and Gas Data Analytics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Annual Worldwide</strong></td>
<td><strong>Annual Total Oil and Gas Analytics Market</strong></td>
</tr>
<tr>
<td>2016 (Trough)</td>
<td>2016: $8B</td>
</tr>
<tr>
<td>1,500 Rigs $6B / year</td>
<td>2019: $19.6B</td>
</tr>
<tr>
<td>2014 (Peak)</td>
<td>CAGR: 36%</td>
</tr>
<tr>
<td>3,700 Rigs $54B / year</td>
<td>(Source: Markets and Markets)</td>
</tr>
<tr>
<td><strong>Annual United States</strong></td>
<td></td>
</tr>
<tr>
<td>2016 (Trough)</td>
<td></td>
</tr>
<tr>
<td>410 Rigs $2B / year</td>
<td></td>
</tr>
<tr>
<td>2014 (Peak)</td>
<td></td>
</tr>
<tr>
<td>1,900 Rigs $26B / year</td>
<td></td>
</tr>
</tbody>
</table>

(Market Size: Rigs x Spread Rate x NPT Rate)
Scaling with Microsoft

Credibility: Microsoft capabilities within client organizations

Scale: Azure technology and Microsoft account teams

Reliability: Enterprise grade

Analytics Capabilities: Cortana Intelligence Suite and access to world class product teams

Growth: Reliance on high level managed services such as Stream Analytics, Machine Learning, Power BI, and Event Hubs allows our E&P clients to focus on core business operations
Discussion

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