

Doing more with E+P data

Better ways to integrate drilling with subsurface data

Connected World. Connected Solutions

Courtyard by Marriott Mumbai, Wednesday, February 4, 2015

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Upstream Global Organisations

New developments & Data explosion

Industry trends for better performance & collaboration

Drill the right hole & Drill the hole right

Enterprise view of an organization's data through MDM

Drilling and Subsurface data integration -Bigdata Way



Summary & Conclusions

Upstream global Organisations



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New Industry Developments – Exploration Geophysics



3000

4000

5000

Offset [m]

Lundin

Cable Depth [m]

New Industry Developments – Exploration Contd.



Processing : Reverse time migration Full waveform inversion - Helps bandwidth preservation.



Interpretation :

- Uncertainty modeling error bars to indicate the level of uncertainty present in the model
- Quantitative interpretation to quantify reservoir porperties , lithology, and rock and fluid properties.



Multiphysics

- Seismic data integrated with well logs, gravity and magnetic, and electromagnetic data not new.
- Technologies for joint inversion of the data

Data explosion Challenges

- To ingest, validate, and analyze high volumes (size and/or rate) of data
- Access & Assess mixed data (structured &unstructured) Multiple sources
- Dealing with unpredictable content with no apparent schema or structure
- Enabling real-time or near-real-time collection, analysis, and answers

Need of the hour

- High-velocity capture ,discovery, analysis.
- Shift in computing architecture so as
 - ✓ Data storage requirements
 - ✓ Server processing required to analyze large volumes of data

Confusion – Big Data Storage / Big Data analytics

- Develop analytics processes that were faster and more scalable than traditional data warehousing
- Value extract value from unstructured data produced daily by web users.
- Big Data storage, such as Scale-out-NAS and Object based storage are not new
- IT handles a lot of data for applications that generate huge volumes of unstructured data

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Traditional BI approaches – won't solve the master data problem for operational systems

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Exploration Plan

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Assumptions and calculations underpinning the worst case discharge scenario.

Measures to enhance ability to prevent a blowout.



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Geographical & Reservoir Information

Geological Info

- Structure Maps for producible sand
- top and base
- Maximum drainage area
- Thickness of hydrocarbon sand
- Cross-section of hydrocarbons bearing zones
- Seismic Data used in well site location
- Data sources G&G interpretation Applications



Reservoir Info

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- Reservoir pressure data & drive mechanisms;
- Drainage area , depletion rates & Production history;
- Static and flowing pressures and temperatures;
- Skin damage, Coning and Bridging;
- Pressure-volume-temperature characteristics of the fluid;
- Hydrostatic pressure
- Nodal analysis data



Field Summary

Prospect/Field and Summary of Well Plan

Wellbore :

Well cross section showing with casing program :

Casing/liner sizes (outside and inside diameters) and setting depths.

Various hole sizes as the well progresses

Water depth at proposed location

Plot of surface and bottom hole location

Wellbore completion configurations

Casing and open-hole sizes



Data Sources : Analog Outputs from Corresponding Applications like Landmarks Drilling Suite/ G&G apps

No Drilling Surprises

Data attributes / information to be monitored

- Litho logy Prediction Startigraphic
- Formation Pressure Seismic / Legacy well data
- Discontinuity Seismic
- Well Path EDM/ Openwork's/

Data / information Sources

- Litho logy Prediction Stratigraphic (LWD Gamma Ray etc)
- Formation Pressure Seismic / Legacy well data PWD
- Discontinuity Seismic MWD
- Well Path WITSML drilling

Collaboration / Interactions with:

- G&G teams
- Drilling engineers
- Real time data vendors and operators.







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Enterprise view of an organization's data

Data Governance through proper
master data management
encompasses the people,
processes, and technology
required to create a consistent
data and information set

Data Governance To Look into



MDM Solution Definition – Analysis Approach ahindra



- Be" scenario
- A. Strategy
- B. Standards
- C. Business process
- **D.** Functionality
- E. Needs of integration



Application portfolio inventory

- A. Drilling, rig, production
- B. HR, Legal, Financial

Customize assessment criteria-

A. Distribute assessment attributes / attribute validation rules





Phased approach to MDM



Geographic Area Coverage

• World regions - what's key ? North America, Australia, North Sea?



Reservoir Type Coverage

more about conventional or unconventional reservoirs



Asset Life Cycle Coverage

• Exploration, drilling, facilities? Or Enterprise



Functionality Features

• Tools features like Versioning, reference values, data aggregation?

MDM - Architecture Options



Typical D/IM integration Architecture



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Business Case : Drilling and Subsurface Data integration - Big Data way...



Knowledge Enabled Enterprise





Enterprise integration & Improved collaboration : Structured and unstructured content Synchronisation



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- Process Improvement MDM
- Facilitates convergence of business intelligence and operational apps.,

Key Drivers

Seamlessly integrating technologies creates new dimension in Decision making

- Seamless Information sharing
- Resource Planning
- Key component of what's often Ease in remote monitoring and control of operations
- Contain Costs & Reduce turnaround times



Integration of data from the main streams (Drilling, Wells, Seismic, Facilities) through MDM (People, Process and Technology-Tools/Software)

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"Finance here - we're not sure about this Hadoop thing... Could you just dump it all into Excel for us?"

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Thank You

TimoElliott.com