Real-time Drilling Data
Introducing new data management challenges

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Presentation Overview

1. Data Management challenges – Real time data
2. Organizing your team
3. How to ensure quality real-time data deliverables
What is real-time drilling data?

**Measurements While Drilling**
- Gamma Ray (GR)
- Resistivity
- Porosity

**Mudlogging (ML)**
- Hookload (HKLD)
- Rotation per Min (RPM)
- Rate of Penetration
- Stand Pipe Pressure

**Trajectory**
- Depth
- Position (AZI & INCL)
What is Real Time Drilling Data Setup in StatoilHydro

This is the current setup in StatoilHydro!
Data management challenges
Real Time drilling data
### Data Management Challenges

#### The versioning challenge

1. **RAW real time data**
   - The live uncorrected data stream
   - Contains spikes and errors
   - "What was available at any given time"

2. **EDITED real time data**
   - Near real-time edits on real-time datasets
   - Removing spikes, errors, filling in gaps etc…
   - "The best datasets available at any given time"

3. **MEMORY data**
   - Not available in real-time
   - "More accurate, higher sample rate"

RAW/EDITED available in real-time?  
Store all 3 versions?  
Delete when memory data available?
Data Management Challenges
The Volume/performance challenge

1. Volume of data
   - Sensors produce values every 3-5 seconds
   - Time based data ticks in 24/7 for several months

2. Large number of operations
   - Shall all historical data be made available?
   - How far back do you want to go?

Relational databases vs. performance
Proprietary database solutions?
DM Challenges

The data loading challenge – historical data

1. Finding data
   - Data are not available in-house?
   - Files may be stored "somewhere"
   - Service companies?

2. Initial upload
   - Reformatting the data
   - Dealing with dialects and different formats
   - Cleaning the data
DM Challenges
The data streaming challenge – real-time data

**Distributed solution**
- + few interfaces
- - Load on servers
- - External data streaming
- - External Infrastructure

**HUB solution**
- + minimizes external streaming
  + Central QC
- - More interfaces → delay
- - Higher complexity
Data Management Challenges
The WITSML dialect challenge

- Halliburton
- Schlumberger
- Baker
DM CHALLENGES
The storage solution challenge

How the data will be used
Performance requirements
API’s / Interfaces to other systems
External Partner access
Datatype coverage
DM tools
Access control / User administration
Input synchronizers available
QC tools and alarms
Data editing tools
Stability/IT-infrastructure
Organizing your team
Organizing your team

1. Local or central real time services
2. Background / skillset needed
3. Procedures and responsibility
Organizing your team
Local or central data streaming services

Asset A: Real Time loading

Asset B: Real Time loading

Centralized loading to all assets
Organizing your team
Local or central datastreaming services

- Need only one 24/7 team
- Experts on datastreaming
- Simplifies communication with externals
- Synergies across assets
- Powerful corporate voice

Asset A: Real Time loading
Centralized loading to all assets

Asset B: Real Time loading
Organizing your team

Background and skillset needed

**Operational resources**
- + delivering services
  - complex issues
  - assets interaction
  - technical improvements

**Added IT project members**
- + improved technical setup
- + improved procedures
- - limited asset interaction

**Added e&p + IT programmers**
- + good interaction with assets
- + easier to improve services
- + develop new technology / automate

**SH REAL TIME SERVICES**
- A cross discipline department
- 12 people
- Supporting the whole company
### Asset responsibility
- Order real-time data from service company
- Order real-time datastreams to target datastores
- Define wells in target applications
- E&P quality check
- Access management

### “Real Time Centre” responsibility
- Setup/monitor all datastreams (24/7)
- Resolve datastream issues
- Technical QC
- Automate services
- Develop new technology
How to ensure quality real-time deliverables?
REAL TIME DRILLING DATA
Ensure uptime and quality

Decide on interface
Drilling services contracts
Partnership
REAL TIME DRILLING DATA
Ensure uptime and quality

- Decide on interface
- Drilling services contracts
- Partnership
REAL TIME DRILLING DATA
Ensure uptime and quality

Routines & procedures
Software and automation
Dedicated team of experts
REAL TIME DRILLING DATA
Data Management Summary

Main Challenges
- Errors must be fixed in real-time
- Several versions (raw - edited)
- Time-based data and performance
- Distribution to many targets in real-time
- The concept of “historical real-time data”
- Technology / software
QUESTIONS ?
Real-time enable your onshore G&G applications!

• All you need is to fill out a real time order!

• RTS will stream live MWD/LWD and ML drilling data to these applications, enabling new real-time work processes.
STEP 5: IMPLEMENT KPI MEASUREMENT SYSTEM
AGENT SOFTWARE AUTOMATICALLY VERIFYING DELIVERABLES

THE STANDARD ENSURES QUALITY RT-DATA ONSHORE

- QUALITY REQUIREMENTS IN CONTRACT
- QUALITY MONITORING SYSTEM
ML - Surface logging (a.k.a. Mudlogging)

- Sensors located at surface (not downhole sensors)
- Can be displayed both as time and depth based
- Approx 15 – 20 important depth based channels.

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New data will stop when they do not drill new formation

- The depth here may be the same
- Typically 5 second data (frequency)
- New data also when not drilling new formation