



# The Process of Seamless Data Integration for Right Time Decision Making

**Doing more with drilling data**

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- Aggregation of various Data Formats from multiple sources
- Standardisation
- QC
- Data availability
- Time to find the right data
- Multiple systems
- User data administration / User system administration
- Systems Interoperability
- Real-time data Monitoring
- Creating impact based on data availability

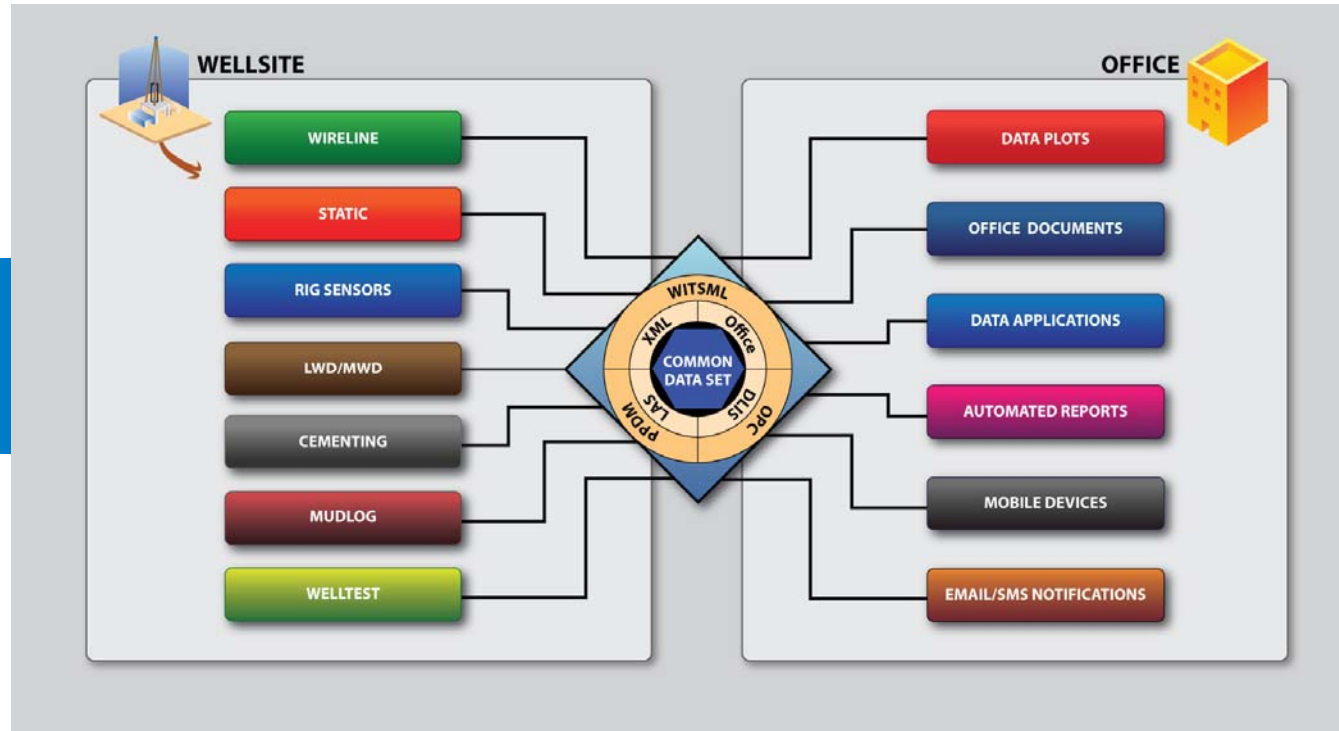


**Collaboration**

**Safety**

**Efficient Data (Asset)  
Management**

## What is Seamless Data Integration?

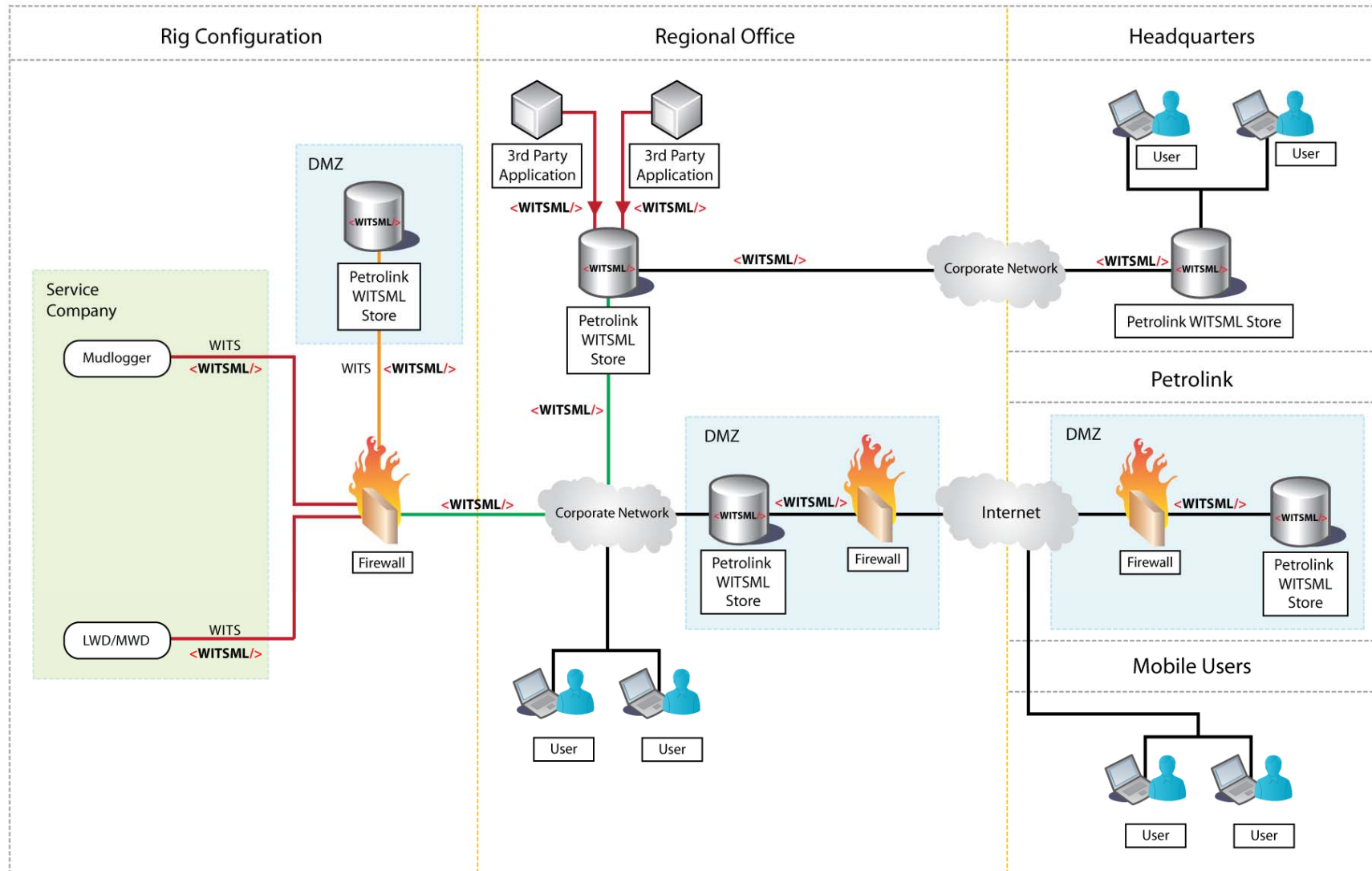


- Elimination of time intensive tasks needed for data transfer
- Minimum time for the data reconciliation/QC cycle
- Earlier information to improve decision-making at the rig-site and the operator's office

- Collect
- Convert to one standard (WITSML)
- Aggregate
- Store (database & store to store synchronisation)
- Transmit
- Visualise
- Monitor
- Calculations for alerts and alarms
- Export data for analyses (third party applications)
- Import analysed data (written back to database)



# An Example Workflow Diagram



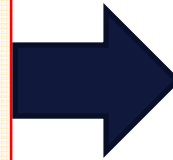
- Data management should start at the point of acquisition
- Real-Time Data
  - Rig drilling sensors (surface)
  - Mudlogging acquisition unit (surface)
  - MWD/LWD (downhole)
  - Cementing unit
  - Well testing (surface and downhole)
- Static (Batch) Data that is unstructured
  - Drilling reports / Geology reports
  - Mudlog plots and corresponding digital data
  - Interpreted lithologs (cuttings)
  - MWD/LWD plots and corresponding digital data (\*.LAS & DLIS)
  - Wireline plots and corresponding digital data (\*.LAS & DLIS)
  - Photographs (bit, cores)
  - Other files (\*.docx, \*.xlsx, \*.pdf, etc.)

- Energistics is an E&P industry supported body
- WITSML is Web based and built on XML technology
- Platform and language independent
- A data standard that is evolving to meet industry requirements
- Supports most types of well data:
  - Mudlogs
  - MWD/LWD
  - Drilling Sensors
  - Directional Drilling
  - Daily Drilling Report

- WITS to WITSML

## A WITS Level 0 Data Stream

```
&&
0801Petrolink
08021
080812635
082180.23
!!
&&
0801Petrolink
08021
080812635.5
082181.48
```

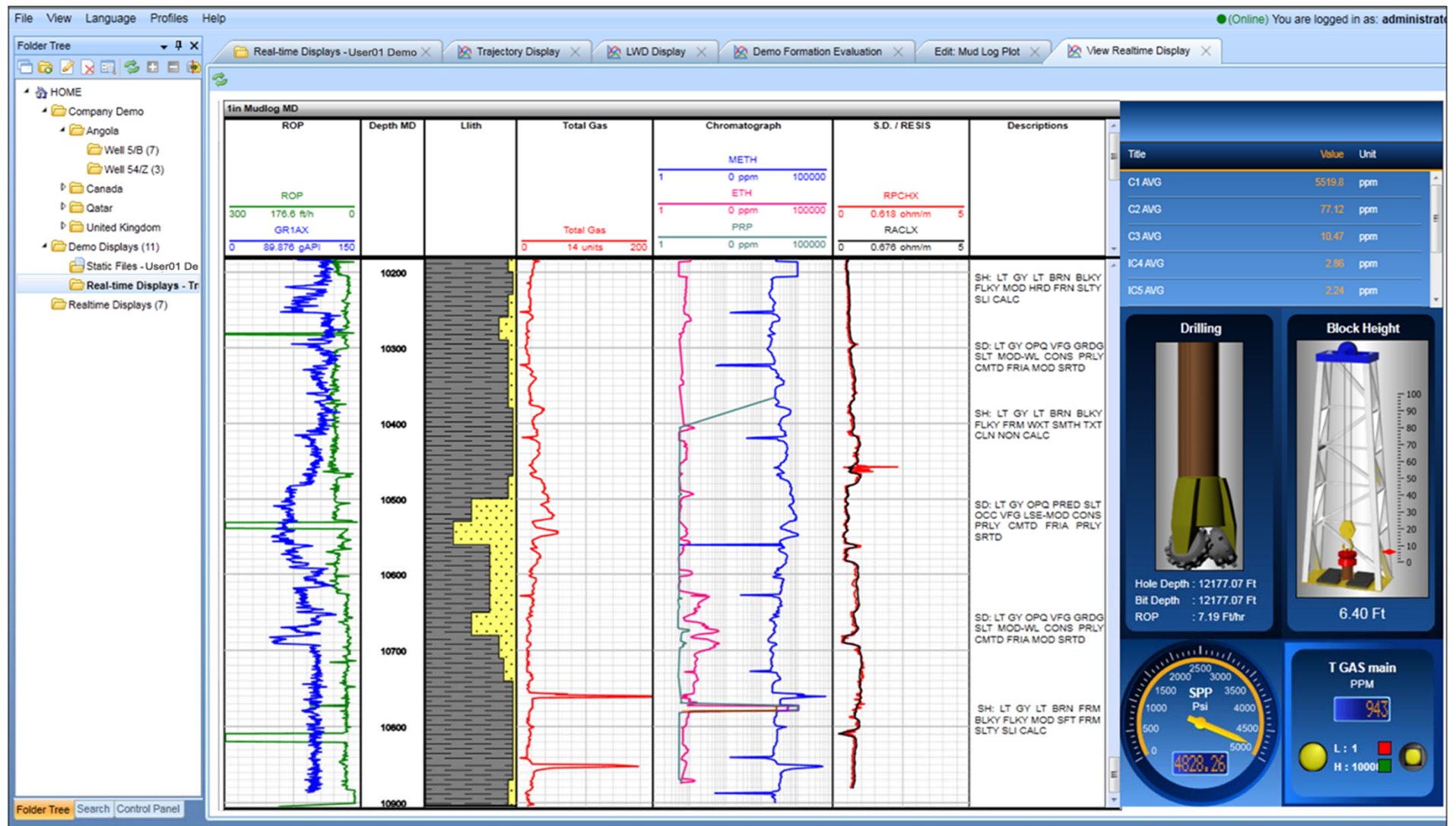


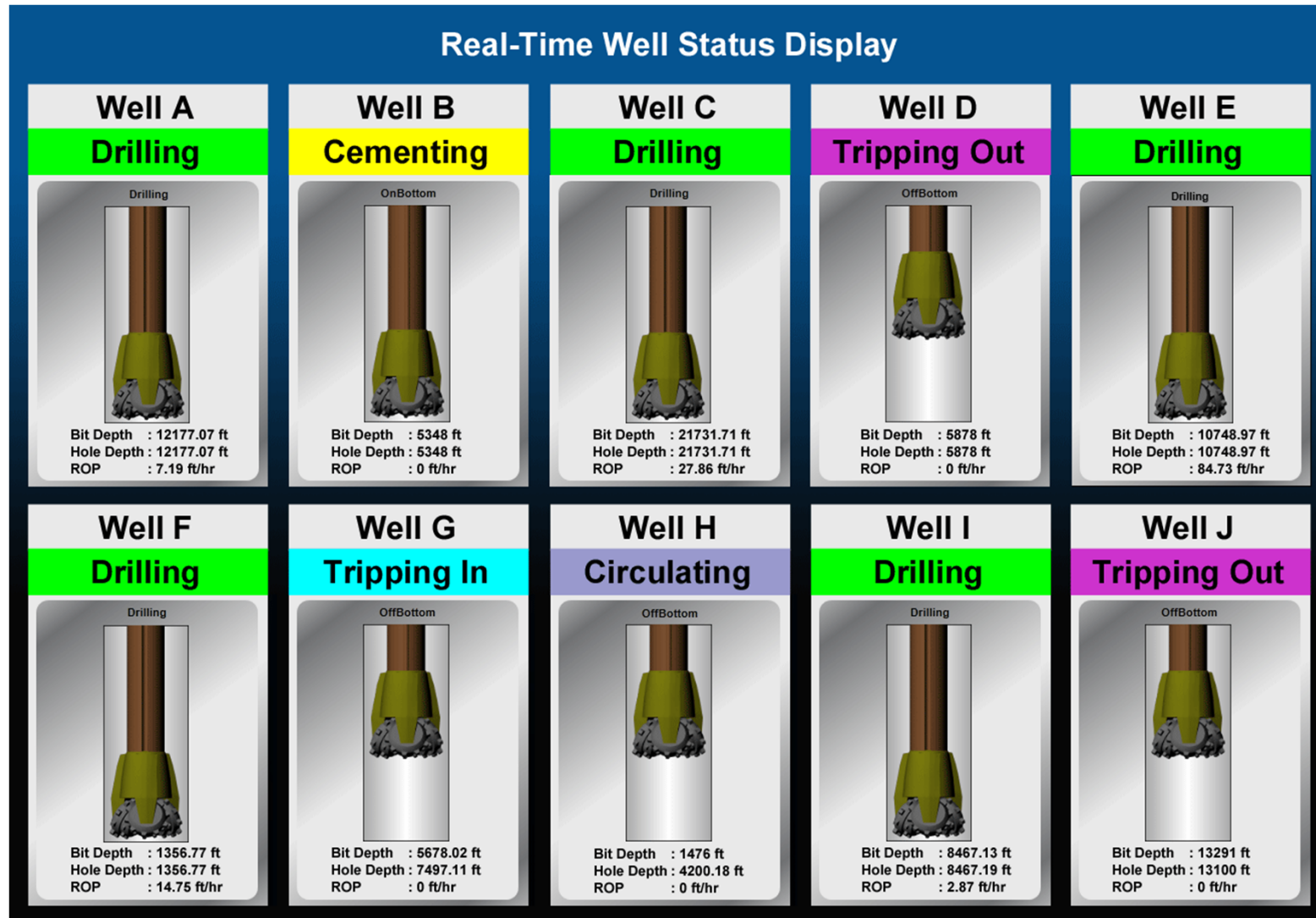
## A WITSML Data Stream

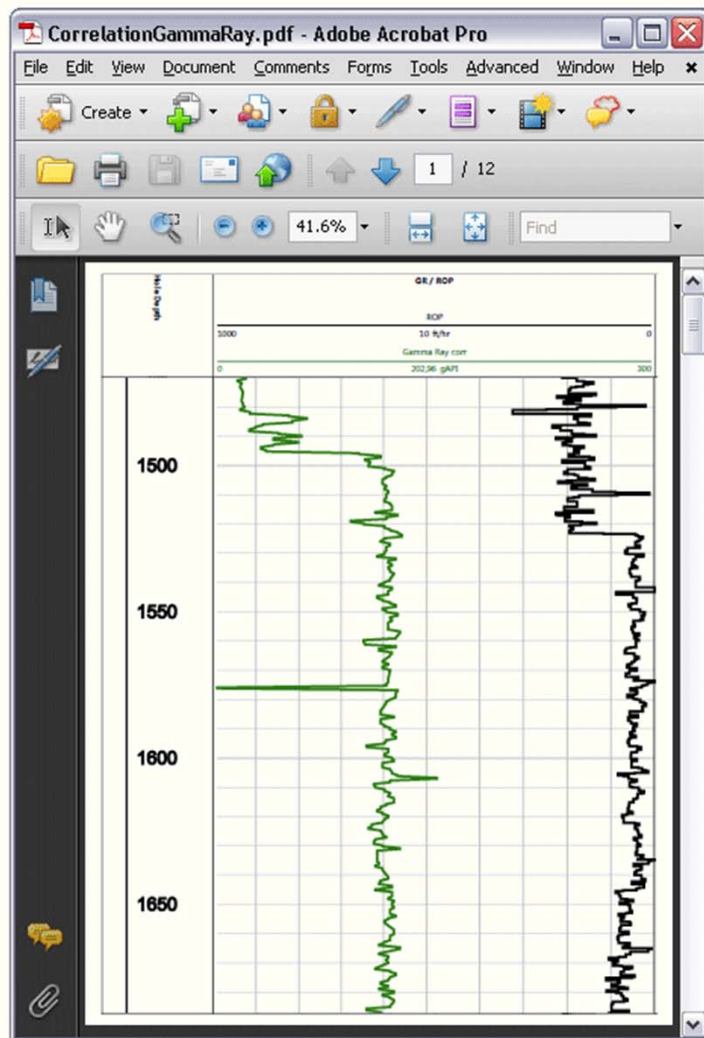
```
<nameWell>Petrolink Test Well</nameWell>
<nameWellbore>Sidetrack1</nameWellbore>
<nameLog>D1</nameLog>
  <logCurveInfo>
    <mnemonic>DEPT</mnemonic>
    <unit>FT</unit>
    <mnemAlias>DEPTH</mnemAlias>
    <nullValue>-999.25</nullValue>
    <startIndex>12635</startIndex>
    <endIndex>14386</endIndex>
    <columnIndex>1</columnIndex>
```



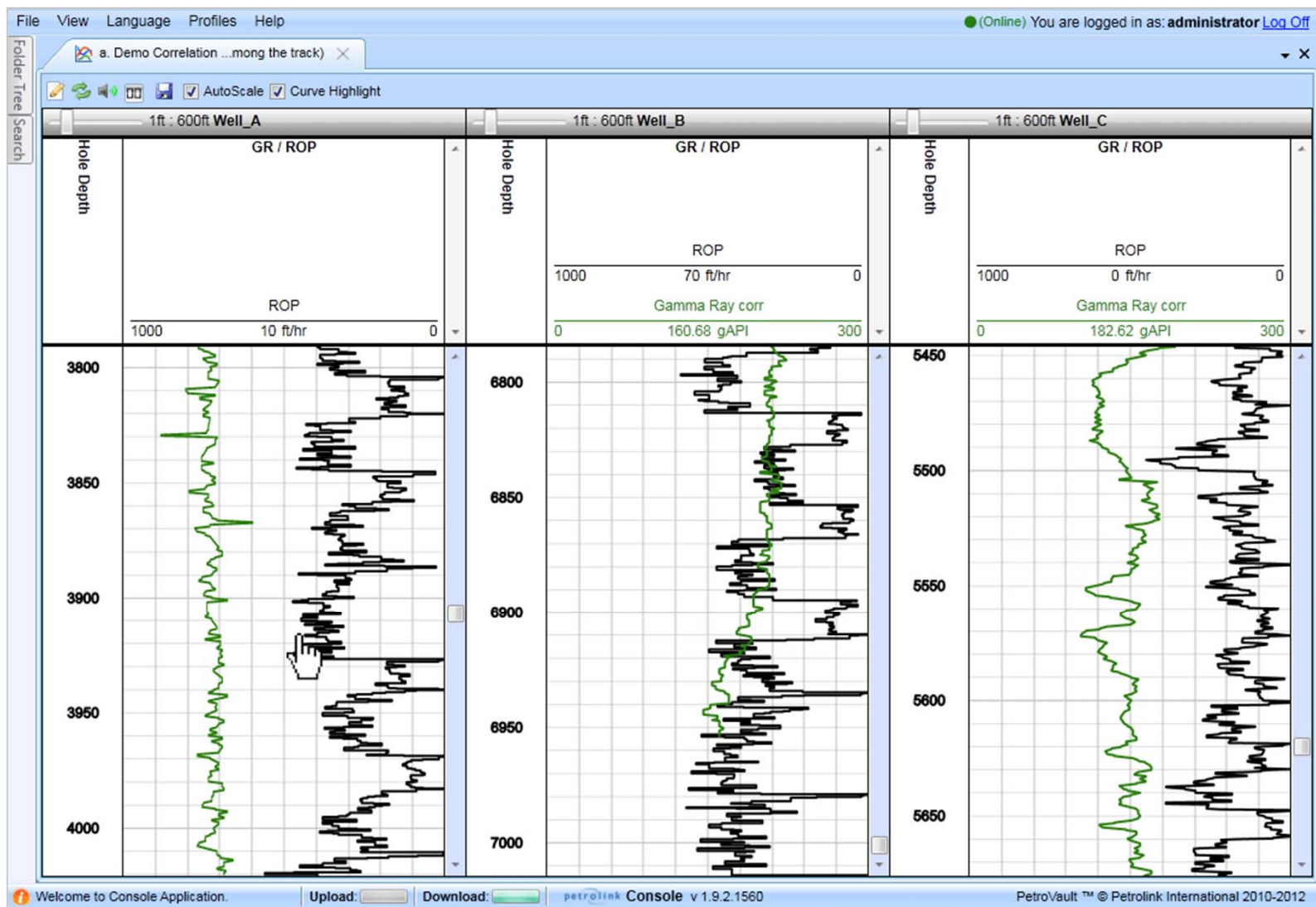
Wellsite Information Transfer Standard Markup Language



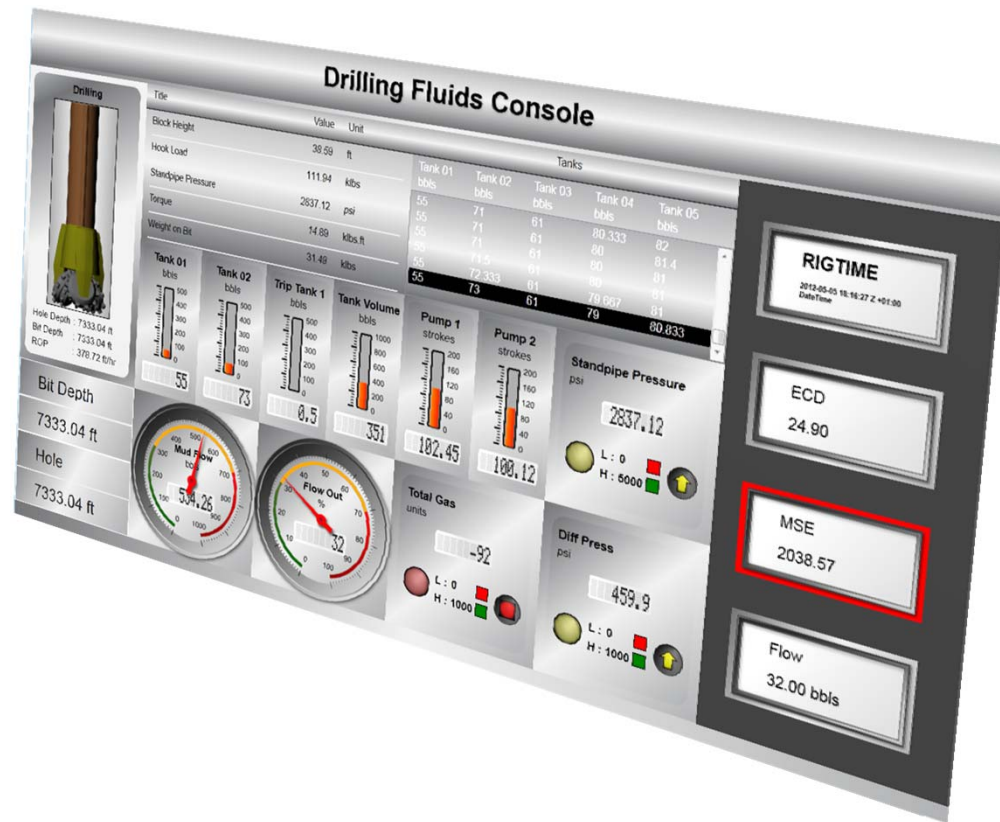




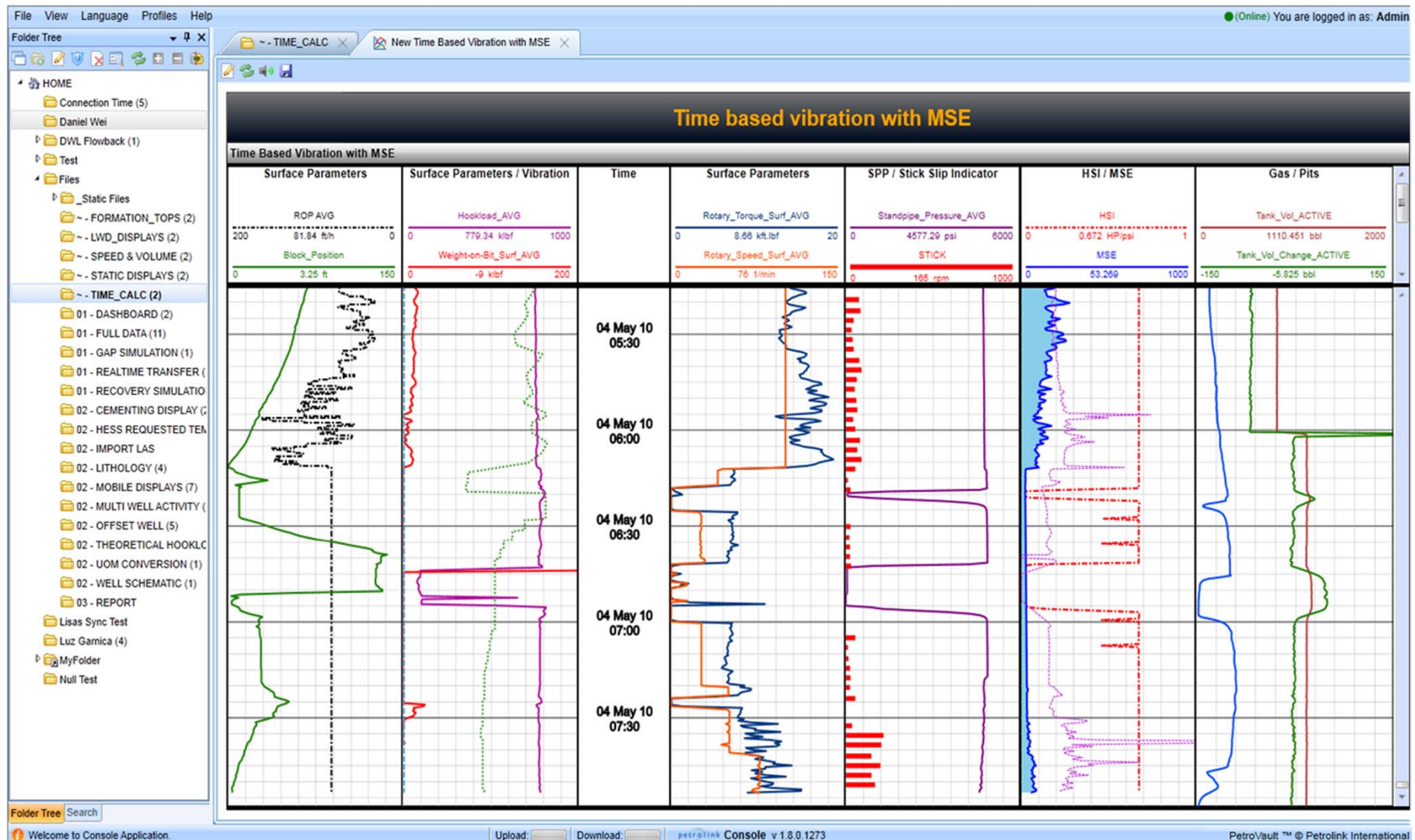
# Curve Ghosting between Tracks



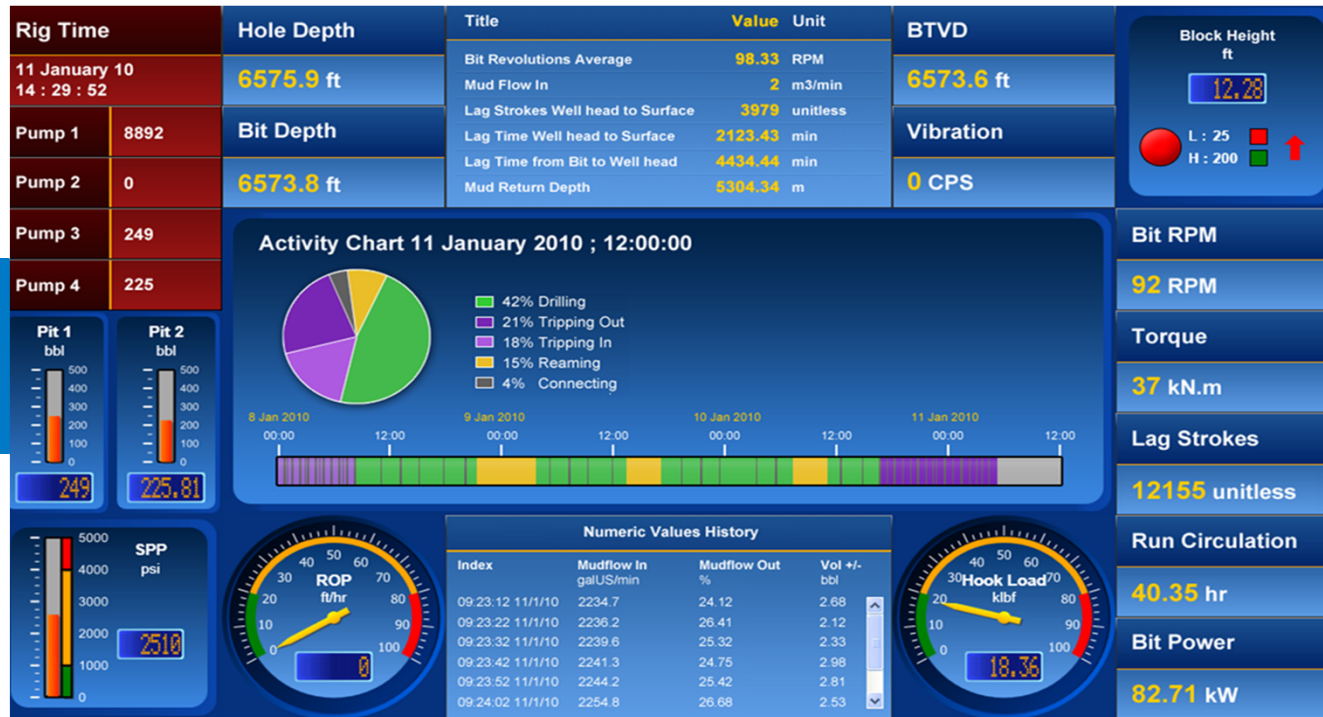
- MSE calculation
- Ability to set alert thresholds
- Display alarm







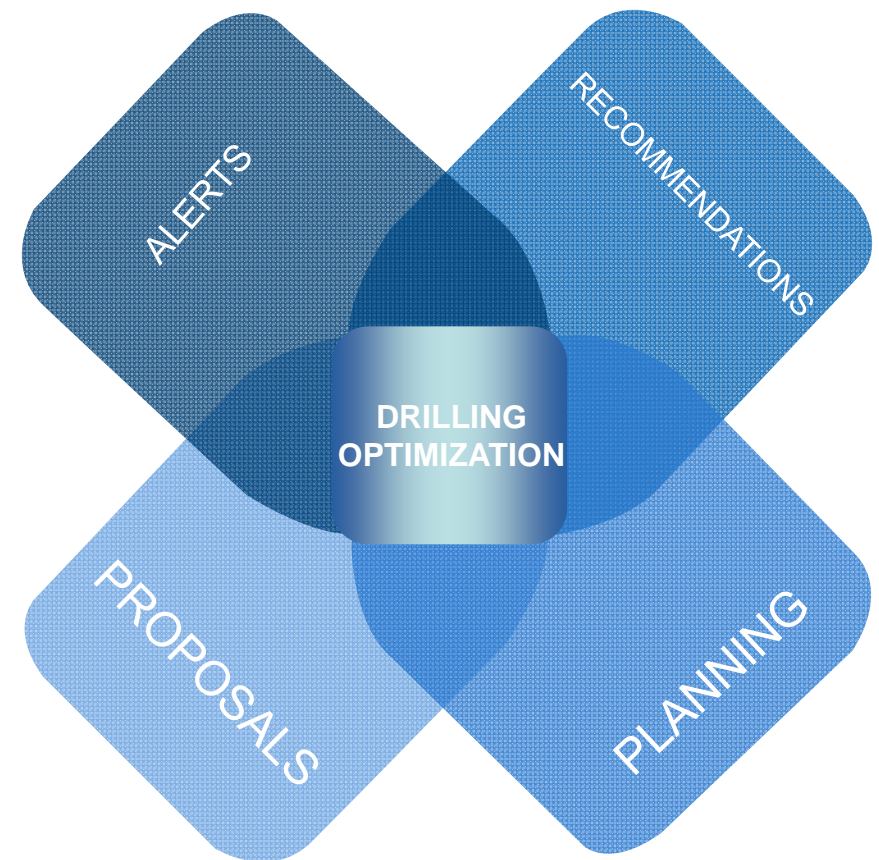
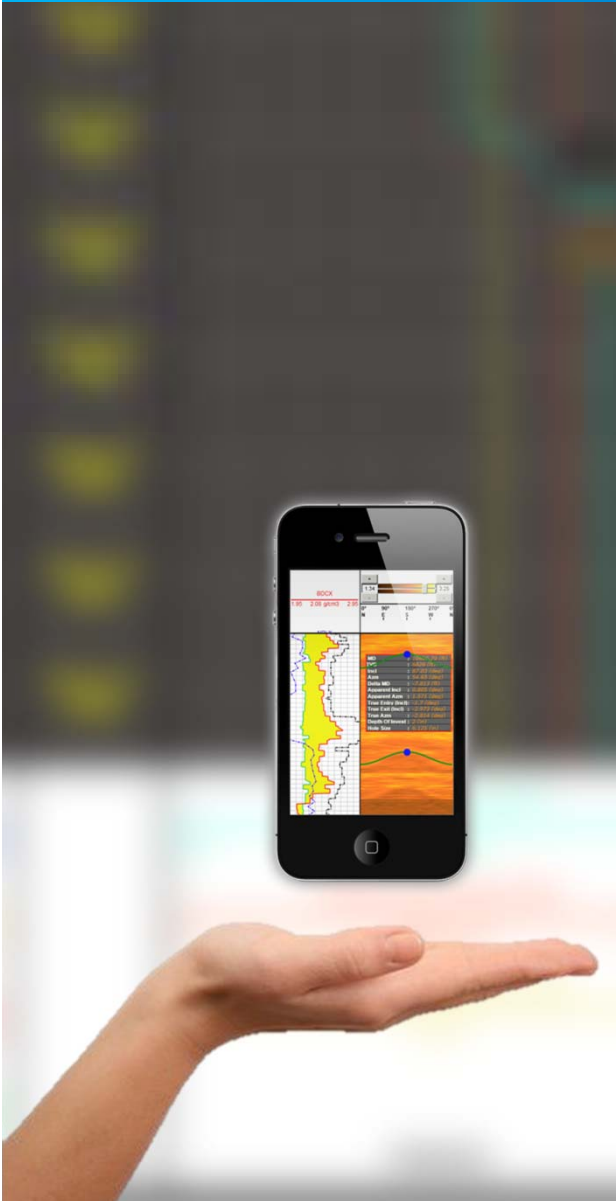
# Activity Code Calculation



Data is recorded every 15 seconds, and stored 3 minutes for Analysis. The Trend is analysed:

- Drilling: Hole Depth = Bit Depth
- Circulating: Pipe not moving (Bit) and Standpipe Pressure (SPP) is above some threshold (currently 100 psi)
- Reaming: Pipe moving and SPP above threshold
- Trip IN / OUT: Bit depth trend depth increasing / decreasing without circulation (as defined above) and bit depth < hole depth more than one stand (120')
- Pipe Connection: Off bottom, pipe moving and bit depth < hole depth for LESS than one stand and not circulating, and IN SLIPS (hook load < threshold)

# Displays on Mobile Devices

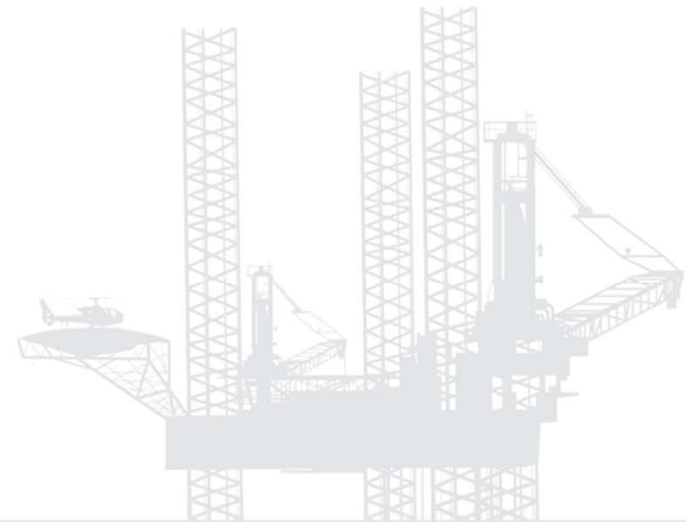


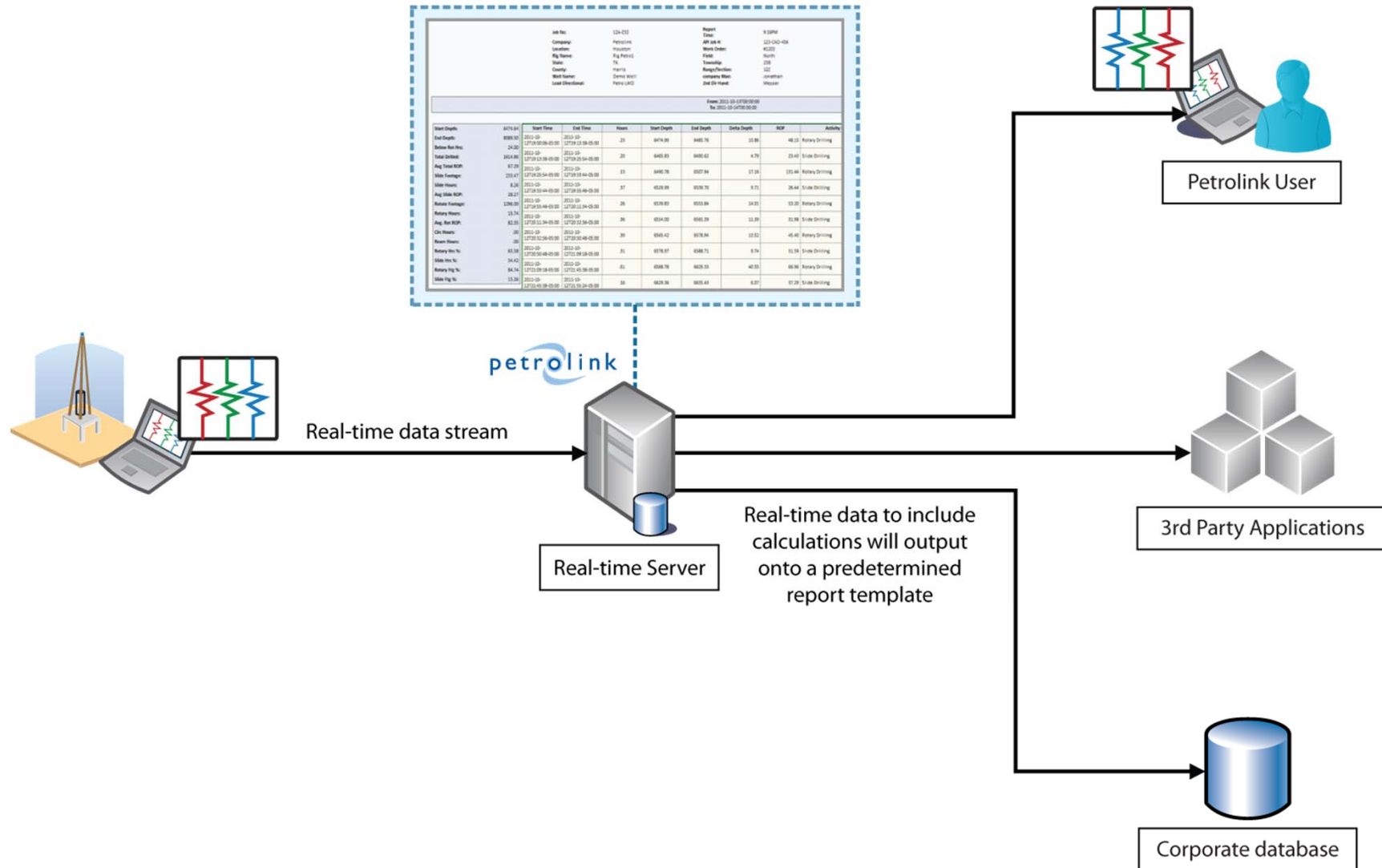


Note: Map of data users in an organisation

- Flexibility = **Better Time Management**
- Quicker Respond = **Faster Decision Making**

- Openworks
- Seabed
- Petrel
- Techlog
- Interactive Petrophysics
- DSP-One
- EDM / Decision Space
- DrillEdge by Verdande
- DrillScene by Sekal
- GEO by SDC Geologix
- Gravitas by HRH
- MS Excel





- Seamless data integration is NOT 'plug and play'
- Lower costs by improving decision making
- Safer operations through collaborative decision making
- Total well information capture, aggregation, delivery and visualization by integrating well-site data
- WITSML enables interoperability and collaboration
- A collaboration environment that improves multi-disciplinary communication between rig personnel, service company personnel, office based operational and technical professionals
- More efficient integrated decision making
- Independence from service companies allows the operator to control the data
- Highly scalable platform that supports multiple rigs worldwide

**Thank you!**

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