

COLLABORATIVE TECHNOLOGIES FOR EXPLORATION

Authors: Randy Clark, Jerry Hubbard (Energistics)

Presented by: Paul Maton (Energistics and Sillimanite Consultants)

Upstream Standards. Bottom Line Results.



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Introduction to Energistics

- An open standards industry consortium
- Twenty years serving the upstream industry
- With 100 active members...
 - Integrated, independent & national energy companies
 - Oilfield service and professional service companies
 - Software, hardware and integration vendors
 - Regulatory agencies, institutes and media partners

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Energistics is a global consortium that facilitates an inclusive user community for the development, deployment and maintenance of collaborative technologies using open data exchange standards for the upstream oil and natural gas industry.

Current News

11/10/2009
[Microsoft Joins Energistics to Drive Oil and Gas Industry Standardization](#)

4/7/2009
[Energistics Elects Two New Board Members From Aspen Technology and Infosys](#)

4/6/2009
[Energistics Standards Seminar](#)



[View Energistics on The Economic Report with Greg Gumbel](#)

Come visit Energistics at these upcoming industry events:

Petroleum Exhibition & Conference of Mexico, 17-19 Nov, Villahermosa, Tabasco, Mexico
International Petroleum Technology Conference, 7-9 Dec, Doha, Qatar
Oil & Gas India Conference & Exhibition, 20-22 Jan, Mumbai, India

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Current Events

11/17/2009
[Petroleum Exhibition & Conference of Mexico](#)

11/11/2009
[PRODML SIG Working Meetings \(Europe\)](#)

10/25/2009
[SEG International Exposition and 79th Annual Meeting](#)

Hot Topics

10/8/2009
[Vision to reality for an industry standard](#)

9/30/2009
[Energistics Metadata Work Group Holds Open Workshop](#)

9/17/2009
[Metadata Initiative Publishes Position Paper and Schedules an Informational Workshop](#)

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Our Energy Company Members



Our Government Agency Members



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Our Energistics Community

- Global Regions:
 - **Africa** (South Africa, Angola, Equatorial Guinea, Nigeria...)
 - **Asia Pacific** (China, Japan, Korea, Vietnam, Philippines...)
 - **Eastern Europe** (Russia, Kazakhstan and non-EU states)
 - **Latin America** (Mexico, Central and South America)
 - **Middle East** (Saudi Arabia, Kuwait, UAE, Oman, Bahrain...)
 - **North America** (United States and Canada)
 - **South Asia** (India, Australia, Malaysia, Pakistan...)
 - **Western Europe** (European Union and Norway)



The Challenge of Standardization

- Strategic Perspective
 - Strategic Standardization Management
- Standards Collaboration
 - Focus on highest value standards that don't impact competition
- Industry Commitment
 - Internal and external commitment to implementation
- Value Delivery
 - Measuring business value of implementation vs. the cost of not making standardization a strategic goal

Importance of Open Data Exchange Standards

- Optimising highly instrumented assets through technology
- Efficiently using real-time streaming data from multiple sources
- Open data exchange standards should be:
 - **Freely available**
 - **Universally applicable**
 - **Plug-and-play**

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Our Flagship Standards...

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WITSML Summary

Wellsite Information Transfer Standard Markup Language

“The ‘right-time’ seamless flow of well-site data between operators and service companies to speed and enhance decision-making”

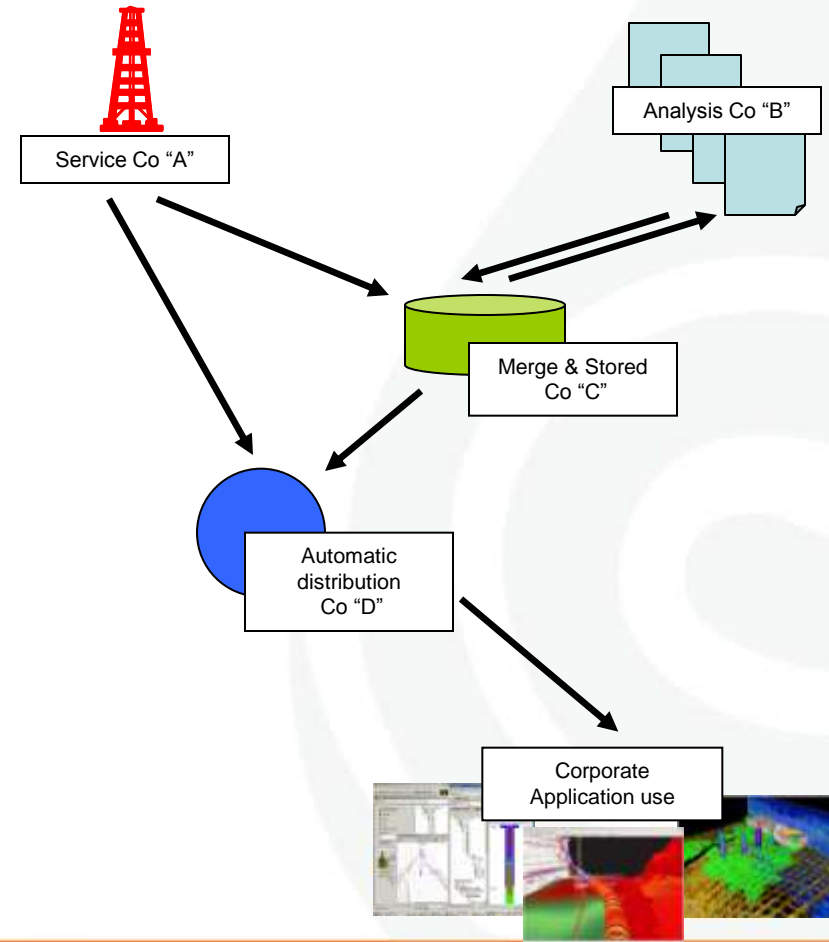
An Open Information Transfer Standard for the Oilfield



WITSML Implementations Update

- Drilling Operations
 - 40+ technology solutions
 - 33 vendors participating
 - Saudi Aramco, StatoilHydro
- Regulatory Agency Use
 - WITSML oriented reporting
 - Daily drilling reports
- Certification Program
 - Self certification now
 - Certification testing in 2008

- Example:



WITSML Data Object Schemas (XML)

General

- Well
- Message
- Operations Report
- Real Time
- Wellbore
- Wellbore Geometry
- Risk

- Coordinate Ref Sys
- Drill Report
- Attachment

Communication

- Subscription
- Server Capabilities

Rig Instrumentation

- Rig / Rig Equipment
- Cement Job

Surface Logging

- Mud Log

Surveying

- Survey Program
- Target
- Trajectory

Logging While Drilling

- Log → Well Log (includes Wireline)
- Formation Marker

Fluids Systems

- Fluids Report

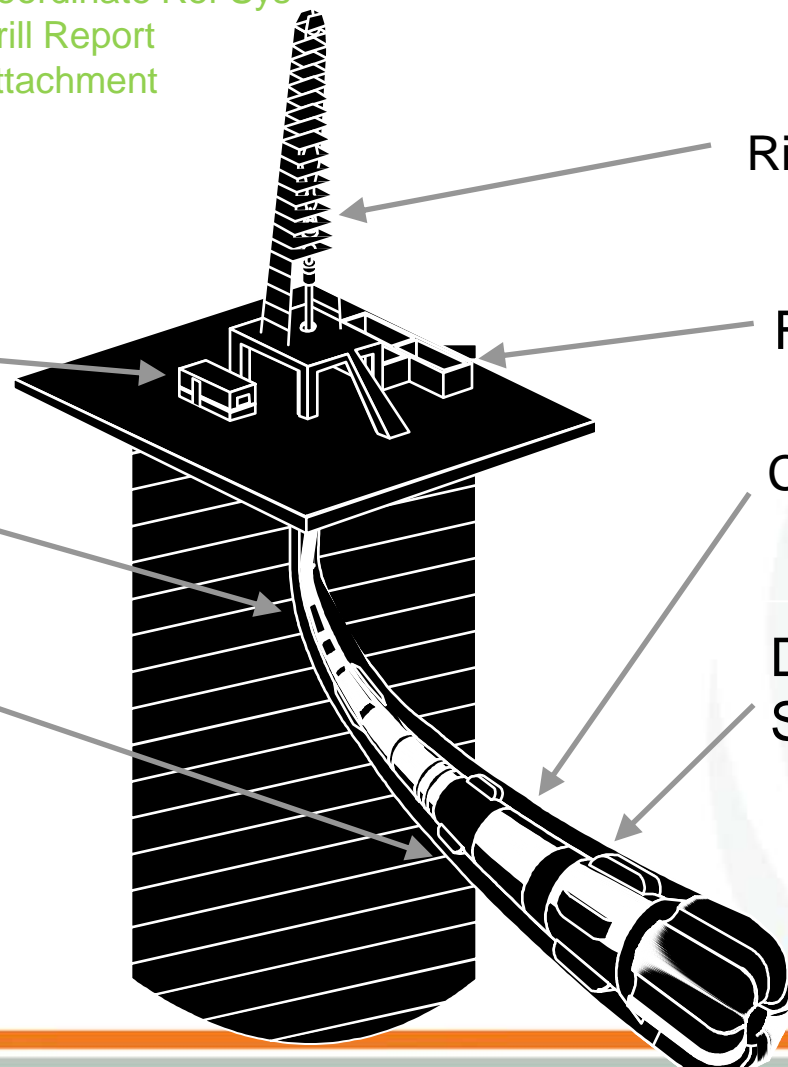
Coring

- Sidewall Core
- Conventional Core

Directional Drilling Systems

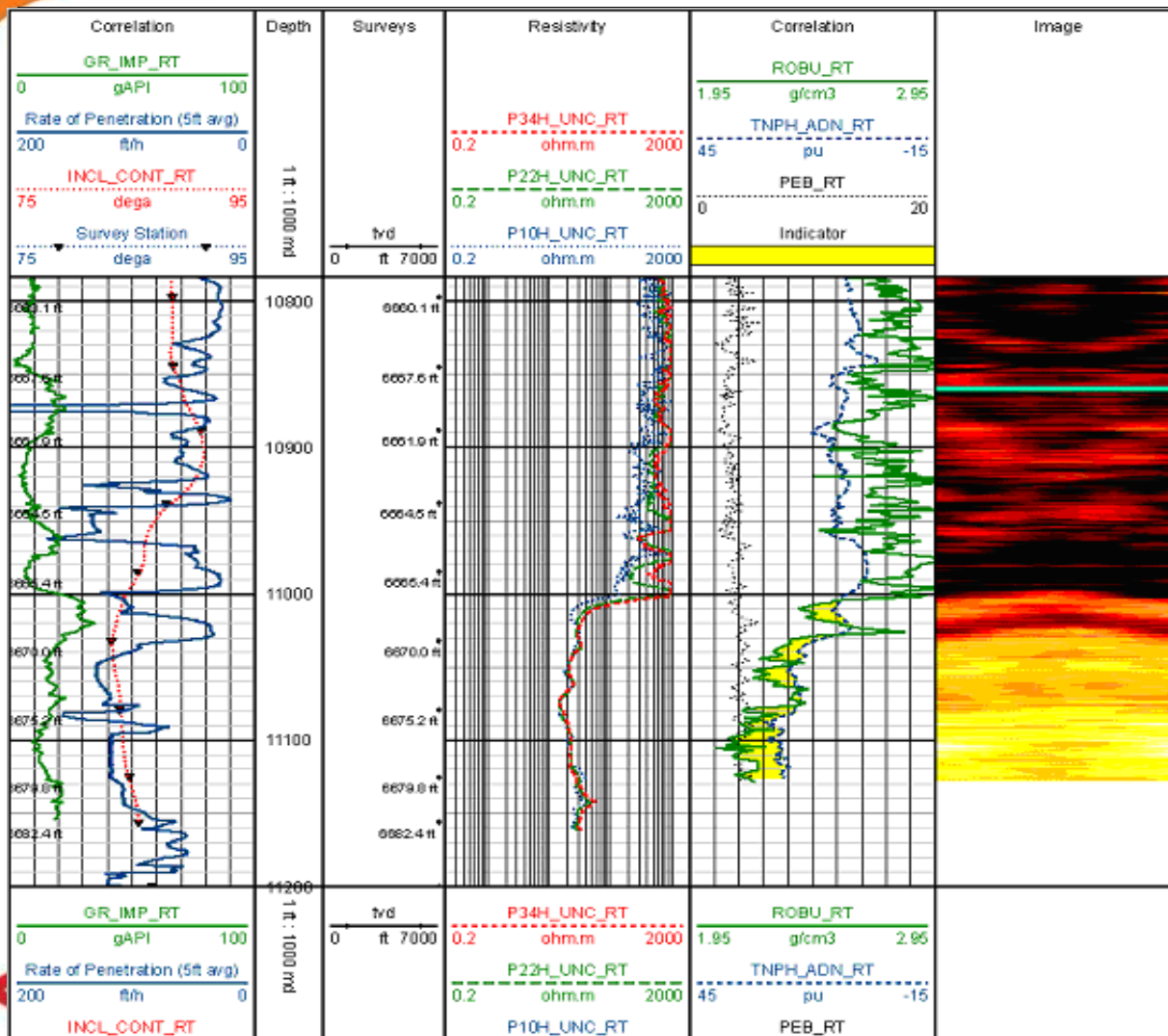
- Tubular /
- Bit Record
- BHA Run

Original
Updated
Added



WITSML Case Study – Saudi Aramco

AramcoLink – A single plot for all service companies



Refreshing... MR (1-41541) OK [10:04:16, 0.03/0.06]

Gamma Ray (gAPI)

18.45



L: 5
H: 30



Neutron (pu)

21.84



L: 10
H: 20



Data: trajectory data

Trajectory: [80] T-38866-1

Depth: md [0 - 7631] ft

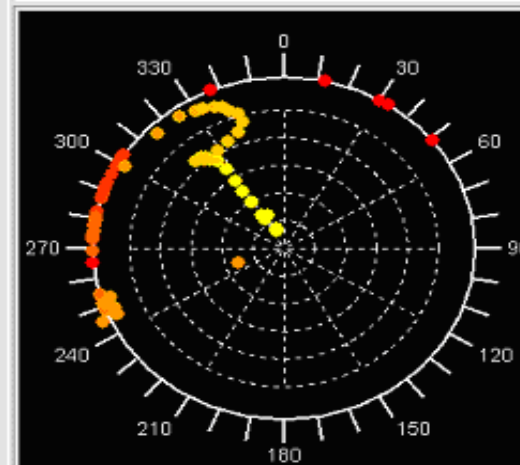
Azimuth: azi [0 - 343.52] dega

Curve: tvdDelta [10.561 - 202.755] ft

Scale: linear min: 0 max: 100

Points: 100 data have 80 points.

Color: 100.0

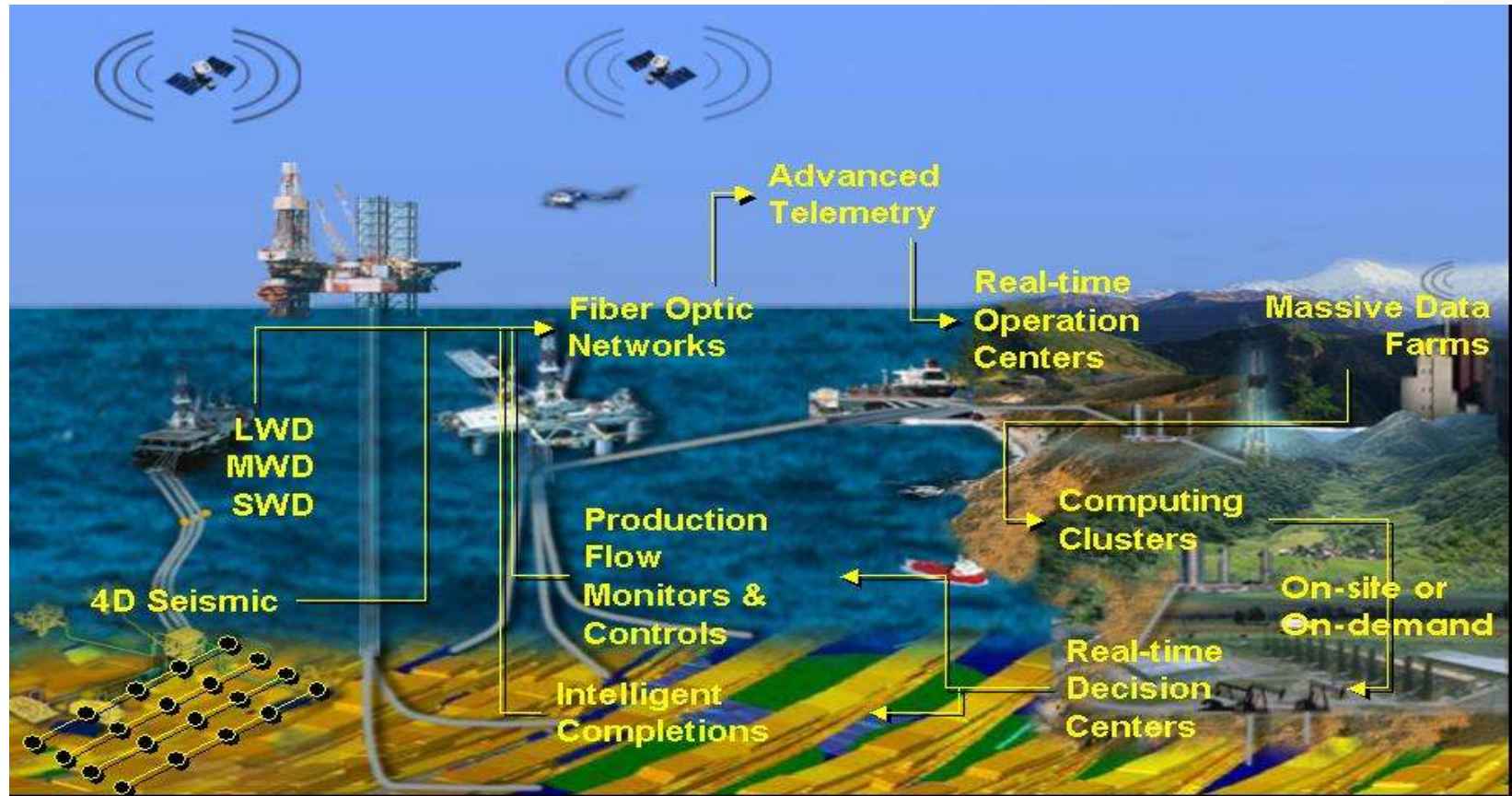


WITSML Status

- 2009 – year of reflection and evaluation for our most mature standard
- Created Executive Team of elected representatives to guide operations and development on behalf of Steering Committee
- Release 1.4.1 under development and planned for release by Q3 2010 – may include:
 - Fracturing (StimJob) reporting object
 - Address issues identified in version 1.4.0 (development)
 - Improved documentation for implementation
 - Potential BHA Object revision
 - Address trajectoryStation ISCWSA and target object definitions



Looking for production optimization?



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PRODML: A Collaborative Technology

- The PRODML initiative, hosted by Energistics, is being driven by energy companies and vendors who believe the industry needs:
 - A freely available, universally applicable set of industry standards
 - To enable low-risk and low-cost use of proven optimization solutions including interchangeability
 - To accelerate and encourage innovation in the design, configuration, and deployment of optimization solutions

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PRODML: A Collaborative Effort

- The founders in 2005 were BP, Chevron, ExxonMobil, Shell, and StatoilHydro
- They were joined in 2006 by Halliburton, Invensys, Kongsberg Intellifield, OSIsoft, Petroleum Experts, Schlumberger, TietoEnator, and Weatherford
- In 2007, by energy companies ConocoPhillips, Pioneer Natural Resources and ONGC.
- Also in 2007 by solution providers AspenTech, Euriware, Honeywell, IBM, Infosys, Intelligent Agent, Matrikon, P2 Energy Solutions, Petris, Roxar, Satyam, SensorTran and TIBCO.

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Piloted PRODML Use Cases

- Gas lift well optimization
- Distributed Temperature Survey (DTS)
- Allocated volumes for smart wells
- Free-flowing well optimization
- Field wide optimization
- Down-hole measurements
- Integrated flow network model
- Production volume reporting
- Injection Water Handling

PRODML Status

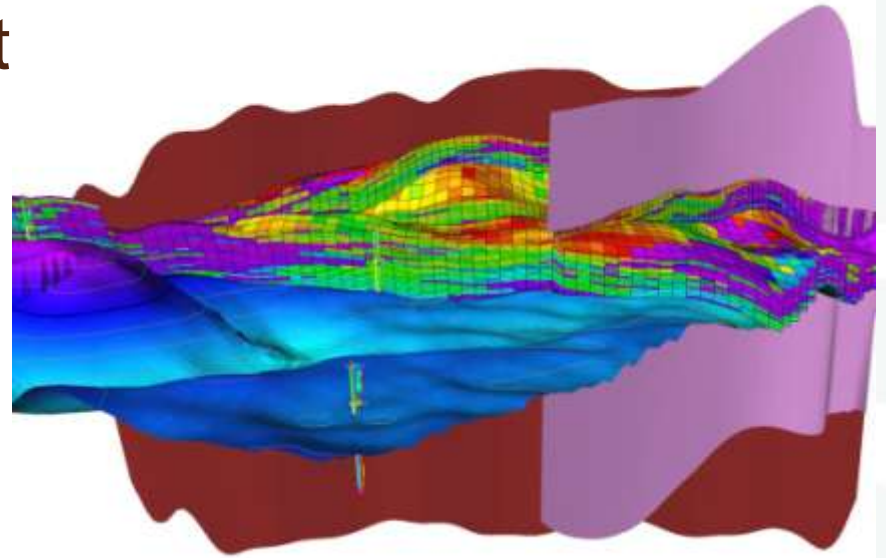
- “Adoption Advisory Group” formed
 - Digital Oilfield/Field of the Future leaders
 - strategic high-level recommendations for direction of the PRODML Standards.
 - SIG members preparing a response which will address development, testing, deployment, and adoption support activities for the next two years.
- Incremental releases of the PRODML Standards were published for both the data exchange specifications area (Ver. 1.2) and the web services specifications area (Ver 2.0).
- PRODML-based demonstration for a Distributed Temperature Sensor use case was developed by several SIG member companies and presented at the Microsoft Global Energy Forum (February). This demo and another PRODML-based demonstration for an advanced Well Test Validation use case were presented at the SPE ATCE (October).



RESQML: 3D/4D Reservoir Characterization

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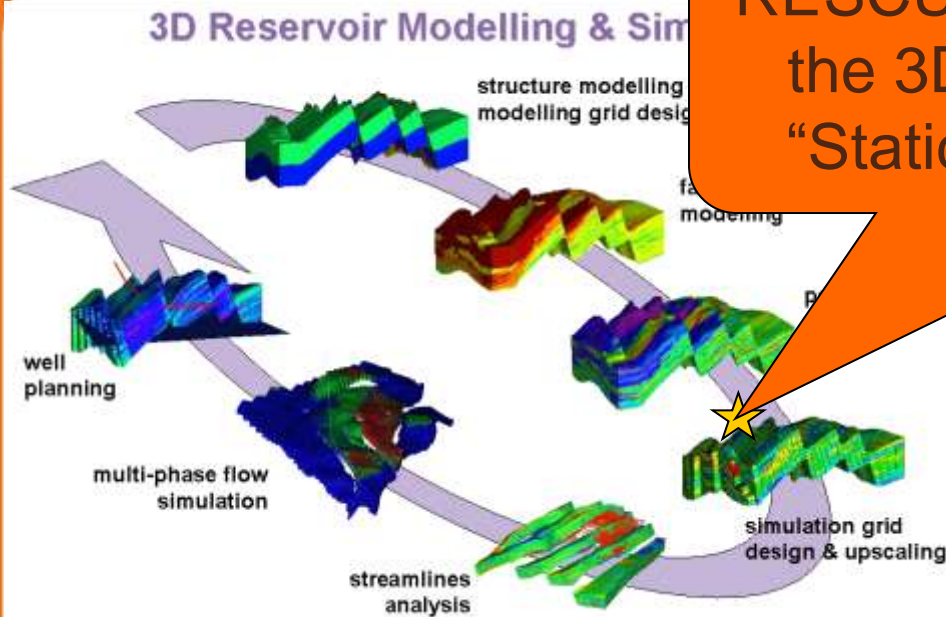
is the exchange format for transferring earth model data between applications in a vendor neutral open and simple format.



RESCUE in the Workflow

Initial Scope: Static to Dynamic

RESCUE provides for the transfer of the 3D Reservoir Model from the “Static” to the “Dynamic” Domain

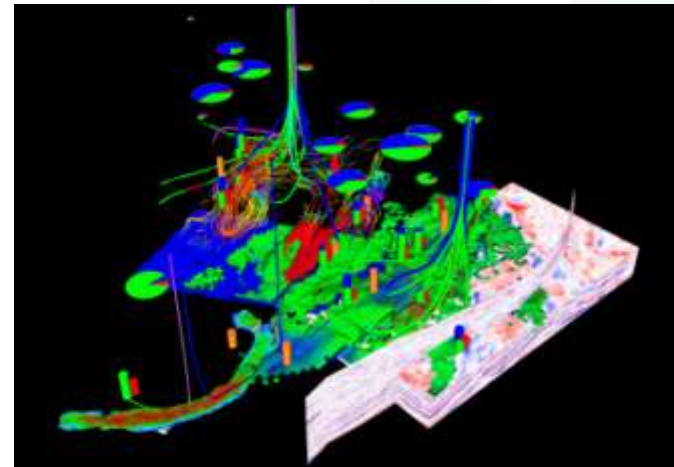


3D Reservoir Modelling Workflow
(After Roxar RMS)

- RESCUE
 - 3D Grid is the primary data
 - Faults / Horizons / Wells associated with the grid
- Provides a link from Geologic to Simulation Vendors
- Workflow has been extended to support better multi-vendor reservoir characterization

RESQML™ Requirements

- What Have We Learned from RESCUE?
 - Work processes, not a single “Static to Dynamic” Workflow
 - Also “Static to Static” and “Dynamic to Static” transfers
 - Support for partial model transfer and updates
- What we want from RESQML:
 - Enhanced integration with 3D/4D Seismic data
 - Commercial / Life of Field data integrity
 - Managing Risk & Uncertainty
 - Geomechanical Support
 - Giga-Cell Models
 - Unstructured Grids



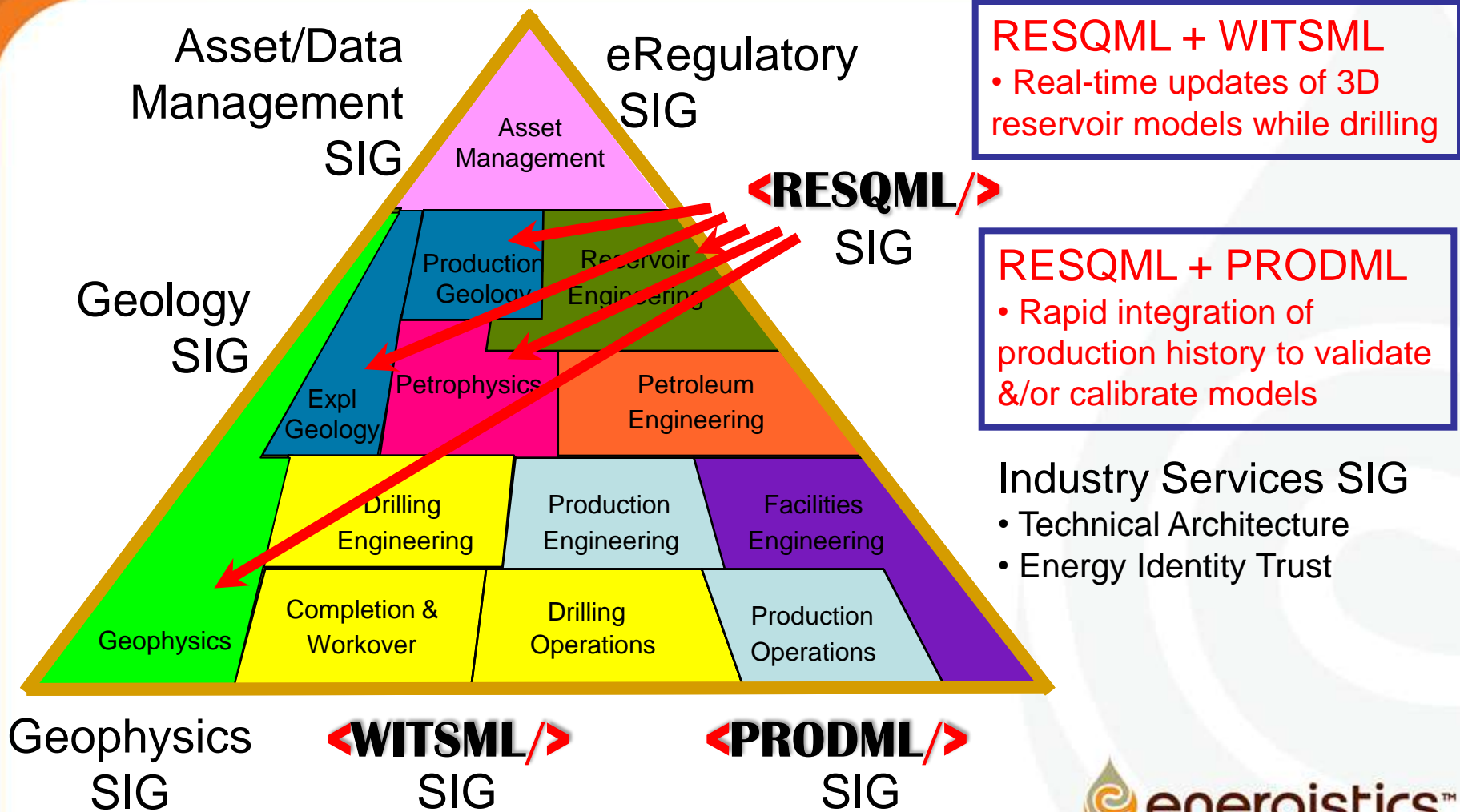
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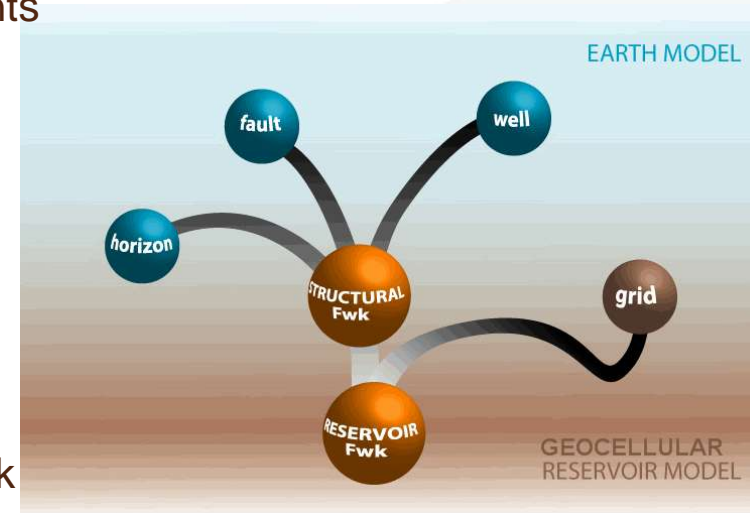
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Interaction with Other Standards & Domains



RESQML™ Team Structure

- **Steering Committee**
(Scope, Direction, Marketing)
 - Use Case Team
 - Workflows, Processes, and Requirements
- **Technical Team**
(Development)
 - Infrastructure
 - Binary, ASCII to Binary, Shared Utilities
 - Wells
 - WITSML with RESQML extensions
 - Structural “Earth Model”
 - Faults, Horizons & Structural Framework
 - GRID “Reservoir Model”
 - 3D Grids, Properties & Cell Connections
 - Discretized: Faults, Horizons & Well Perforations



A Collaborative Effort

- Operators, Service Companies and Software Developers actively engaged in development.



RESQML Status

- Q1 2010 – Development version available – to include:
 - Faults and horizons
 - 2D grids/rotated grids
 - Triangulated surfaces
 - Additional capabilities under discussion
- Q3 2010 – Commercial release published
- 2010 – Refine roadmap for subsequent releases with enhanced capabilities has been drafted to guide future development.

Geophysics SIG Update

- Assessment goal was to demonstrate the viability of improving geophysics work practices
 - Funded by ONGC
 - Energistics working with SEG and the industry
- Assessment identified strong opportunities for improvement in:
 - Post-Processing and Interpretation Formats, Usage, Data Exchange and Data Quality
- Assessment recommended:
 - Publish best practices, promote adoption, form Work Group
 - SEG handles standards for Acquisition and Processing
 - New Work Group will develop geophysics data exchange standards for post-processing and interpretation datasets

Additional Collaborative Technology Projects

- Global Unique Well Identifier
 - Jointly with IHS Energy
- National Data Repositories
 - Re-energizing the eRegulatory Special Interest Group
- Web Services Interoperability Work Group
 - Recently released Version 1.0



Production Optimization is the Prize

- Improved data quality and timely delivery
- Improved technical integrity and safety
- Increased production/lower operating expenses

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Final thoughts on Open Industry Standards

- Standards developed in a proprietary fashion :
 - *Have little business value*
- Standards developed collaboratively but not widely adopted:
 - *Have only potential business value*
- Standards developed in collaboration, widely adopted and deeply deployed:
 - *Have tangible business value*

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Thank you

Jerry Hubbard
Executive Vice President
+1 (713) 294-4993
jerry.hubbard@energistics.org

