Industry Collaboration for Open Standards
An Energistics Update

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EuroGeoSource
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Who is Energistics?

- An open standards industry consortium
- Serving the upstream industry since 1990
- Over 110 active corporate members…
  - Integrated, independent & national energy companies
  - Oilfield service and professional service companies
  - Software, hardware and integration vendors
  - Regulatory agencies, institutes and media partners
Our Operating Company Members

- bp
- Chevron
- devon
- ExxonMobil
- MAERSK
- Pioneer Natural Resources
- Saudi Aramco
- Shell
- Statoil
- Total
- Woodside
Our Oilfield Services Company Members

- Baker Hughes
- Halliburton
- Fugro Jason
- National Oilwell Varco
- Kongsberg
- Paradigm
- PetroLink
- Schlumberger
- Weatherford
- Energistics
Our Government/Regulatory Agency Members

- Arizona Geological Survey (AZGS)
- CNSOPB (Canada-Nova Scotia Offshore Petroleum Board)
- Department of Energy & Climate Change
- Default Gas & Hydrocarbons (DGH)
- U.S. Department of the Interior
- Ground Water Protection Council (GWPC)
- CDA (part of Oil & Gas UK)
- Energistics

[Images of the logos for each agency]
Our Global Community

• Regions:
  – Africa (South Africa, Angola, EG, Nigeria…)
  – Asia Pacific (China, Japan, Korea, Vietnam…)
  – Eastern Europe (Russia and non-EU states)
  – Latin America (Mexico, Central, South America)
  – Middle East (Saudi Arabia, Kuwait, UAE, Qatar, Oman…)
  – North America (United States and Canada)
  – South Asia (India, Indonesia, Australia, Malaysia…)
  – Western Europe (European Union and Norway)
Our Flagship Standards...

<WITSML/>™

<PRODML/>™

<RESQML/>™
An Open Information Transfer Standard for the Digital Oilfield

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

General
- Cement
- Frac/Stimulation
- Fluids
- Drilling
- Operations

Contextual
- Well & Wellbore
- CRS
- Rig / Rig Equipment
- Tubular / string
- Wellbore Geometry
- BHA Run
- Survey Program
- Target
- Trajectory & Tool Error

Subsurface
- Log
- Mudlog
- Formation Marker
- Core
- Risk

Reporting
- Message
- Attachment
- Change log
- Object Group

Source: BakerHughes/Paradigm
PRODML…Production Optimisation

- Gas compression optimisation
- Equipment optimisation
- Production optimisation
- Multi-well optimisation
- Single-well optimisation
- Injection optimisation
- Natural lift optimisation
- Gas lift optimisation
- Produced fluids optimisation
PRODML Data Objects

1. Flow Network
2. Product Volume
3. Production Operation
4. Well Test
5. DTS
6. Time series
7. Fluid Sample and Analysis
8. Wireline formation tester
9. Shared Asset Model (SAM)
Completion Data Drilling \(\leftrightarrow\) Production

Drilling & Completions Domain

Production Domain

Optimization using models

Drilled Well

Completed Well

Drilling DB

Completion DB

Workover

Optimization

Well Services

E.g. Gas Lift Change

Surveillance

Reporting

Flowing Intervals, sensor depths

SSSV

DTS

Tubing

Packer

Perm. Gauge

Perforations

Optimization using models
RESQML...representing *models* of the earth
ISO 19115 - Energy Industry Profile
A Metadata Initiative for the Energy Industry

Legend:

- Metadata exchange via EIP standard
- Use cases

External resources
- Externally Harvested (Commercial, Gov’t, & Academic)
- Partner & Subscription Delivered

Metadata Catalog

- Structured resources
- Unstructured resources

Application Managed

1 | Internally Harvested
2 | Partner & Subscription Delivered
3 | Externally Harvested
4 | Structured resources

Legend:

- Metadata exchange via EIP standard
- Use cases

WITSML™ PRODML™
ISO Standard 19115
Geographic Information - Metadata

Profiles Enable Interoperability Between Communities
Regulatory SIG - National Data Repository (NDR)

- Regulatory data delivery and management
  - Formed by the UK, Norway and The Netherlands
  - Last meeting involved 31 countries, 130 delegates

- NDR meetings held about every 18 months
  - NDR8 in Cape Town in February 2008
  - NDR9 in New Delhi in September 2009
  - NDR10 in Rio de Janeiro in March 2011
  - NDR11 to be in Kuala Lumpur in October 2012

- Production Data Work Group
  - Using WITSML & PRODML for Daily Production Reports
Current NDR Locations
Standards Leadership Council

• Founding Members
  – Energistics
  – MIMOSA
  – Open Geospatial Consortium
  – OPC Foundation
  – PIDX
  – PODS
  – POSC Caesar (ISO 15926)
  – PPDM

• Collaboration to reduce duplication of standards efforts
• Collaboration on solutions for mutual challenges
  – Adoption, business value, membership, financial sustainability
The Future... Cross-SIG Collaboration

Standards Interoperability Umbrella

Common Technical Architecture Foundation

WITSML™

PRODML™

RESSQL™
The Challenges of Standardization

- **Strategic Perspective**
  - Strategic Standardization Management

- **Standards Collaboration**
  - Business value without impact on competitive advantage

- **Industry Commitment**
  - Internal and external commitment to implementation

- **Value Delivery**
  - Measuring the business value of implementation
Benefits of Energistics Standards

- **Interoperability Improvements**
  - Eliminates incompatible data formats

- **Data Quality Consistency**
  - Less reconfiguration = less human error

- **Real-Time Decision Management**
  - Multiple vendors delivering standardized data allows for better real-time decision opportunities
How Energistics Benefits the Industry

- **Collaboration**
  - Operators, vendors and regulators working together

- **Neutral Development Environment**
  - US Anti-Trust/EU Anti-Competitive protections

- **Freely-Available**
  - Standards can be used without cost

- **Global Adoption**
  - An agreed common data exchange language

- **Health, Safety and Environmental**
  - Better Operational Efficiencies = Less Personnel at Risk
Benefits of Energistics Membership

• **Provide Leadership to the Industry**
  – A place at the development table with your peers

• **Risk Reduction Through Collaboration**
  – Eliminate costs of ‘One-Off’ solutions

• **Rapid Engagement of New Technologies**
  – Digital oilfield data management improvements

• **Professional Development**
  – Provide growth opportunities for your staff
Standardization is the enabler for our ability to integrate knowledge across the organization. Open standards from Energistics are the key to Integrated Operations being 'the way to operate' in Statoil.

Peter Eilso Nielsen
Chief Geologist Production
Statoil