RESQML: Subsurface Knowledge Hierarchy and Examples

**RESQML Hierarchy: A Knowledge Hierarchy for Subsurface Data**

- **Feature = Interpretation = Representation**
- **Hierarchical Workflow**
- **Interpretation as a Representational Component**
- **RESQML Data Model**
- **Examples**

### Workflow Issues

- The exploration and production (E&P) subsurface workflow is lengthy, iterative, and complex. It involves many people from different companies who use legacy data that is stored in and shared by many different software packages for complex analysis, interpretation, modeling, and simulation.
- This multi-disciplinary, multi company, multi-software environment is iterative and requires users to move data back and forth between different software packages. Many of these packages use different data formats—often proprietary and incompatible.
- This inherently complex process and mobility to easily exchange data means E&P companies and their individual users have difficulty defining a priori knowledge, rigid workflows, difficulty characterizing or transferring uncertainty, data loss, and productivity loss.

### Reservoir Model Representations

- **Representations Provide the Topological Support for Geometries, Properties, and Subsurface Knowledge**
- **Representations**
  - Feature
  - Interpretation
  - Representation
- **Examples**
  - Individual Interpretation (Class Diagram)
  - Sub-Representation of a Corner Point Grid with a Fault Interpretation (Instance Diagram)

### RESQML Uses

- NEW: Delivers a “knowledge hierarchy” to organize data and transform it into knowledge
- Increased workflow flexibility with partial model transfers that allow you to update/transfer only data that has changed
- Supports traceability, with universally unique identifiers for each top-level data object and key metadata for data sources, updates, dates of change, etc.
- Supports uncertainty management through increased ability to distinguish between scenarios and realizations and more reliable update models
- Defines a rich set of subsurface data objects and enables transfer of detailed models and a variety of model types
- Public release of Sept 15, 2014 includes business overview, use cases, and technical documentation on design and usage

### References

2. Hierarchical Data Format 5 (HDF5) http://www.hdfgroup.org/
3. Open Packaging Conventions Standard (ECPM) 3.96
   http://www.energistics.org/publications/standards/Ecma-376
4. Open Geospatial Consortium (OGC)

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