Data standards enhance the digital oil field

The concept of the digital oil field (DOF) has advanced tremendously over the last decade, yet significant challenges remain. DOFs gather, exchange and ultimately deliver information in real-time in order to support E&P business decisions. In this regard, a DOF is only as effective as the information management approach used to connect people with business intelligence, writes Gordon Cope.

Two significant barriers to realising the digital oil field’s (DOF) full potential value remain – incompatiable data formats and poor quality data. The various vendors, service companies and operators on any given project invariably have technologies and systems with different, often proprietary, data formats. As a result, the need to reformat data as it moves along the value chain or between stakeholders is often inefficient, error-prone and costly.

Within the upstream oil and gas industry, two standards organisations – Energistics and the Professional Data Management Association (PPDM) – are working together to address these issues. ‘The strongest synergy that Energistics and PPDM have is introducing clarity into what data is and how it is handled,’ says Trudy Curtis, Chief Executive Officer, PPDM.

Energistics, formerly known as POSC, facilitates a global non-competitive, vendor-neutral infrastructure for upstream industry professionals to collaborate on the development and adoption of open data exchange standards. The organisation has over 100 members, including oil, service and technology companies. ‘Open data exchange standards define data types, naming conventions, formatting rules and various other meta-data for the management and processing of the information within various technologies and software applications,’ explains Jerry Hubbard, Chief Operating Officer, Energistics.

Energistics’ flagship standards cover drilling, production and reservoir management. WITSML is a standard for exchange of drilling, completions and fracturing data. PRODML is a standard for exchange of production data. RESQML, the exchange standard for subsurface data (reservoirs and earth models), eliminates data corruption when transferring geological and geophysical information (such as well trajectories, tops and seismic information), from one system to another. PPDM is a not-for-profit society based in Calgary. Founded in 1991, it provides data management solutions for the E&P industry. Over 150 petroleum companies, government agencies, software application providers, data vendors and service companies form the membership. The core of PPDM’s work has revolved around an open framework for database management (currently in Version 3.8), a comprehensive data model that benefits business functions that use well information, including production and reserves data, equipment and facilities management, well activities, seismic information and surface and mineral rights management.

PPDM recently launched its ‘What is a well?’ project (WIAW). The project takes the traditional American Petroleum Institute (API) standard definition of well components and updates it to include major drilling innovations that have arisen over the last few decades, including horizontal wells, multiple completions and wells that cycle between steam injection and heavy oil production. The organisation is also working on ‘Well ID’, a major well identification project designed to update the API’s well identification standard. The modernisation of the system will honour existing standards, but allow for solutions to identifying and cataloguing new well technologies in a consistent, universal manner.

Universal standards

Global, industry-wide, vendor-neutral data models and open data exchange standards have many benefits – they give exploration companies the ability to solve data incompatibility problems, facilitate more efficient and seamless integration of this information, and improve implementation and operation of technology. ‘By utilising good quality data and a common set of data exchange standards, resources can be focused where value is best created – by addressing business and operational issues – instead of wasting valuable time and incurring costs to reformat and interpret data again and again,’ says Hubbard.

‘The oil and gas sector wants operators, regulators, vendors and everyone else to be managing their information assets consistently, so that they don’t have to train people to do the same task 100 different ways,’ continues Curtis. ‘Energistics and PPDM are working towards having a universal core set of knowledge that can be applied across our industry by establishing standards in how data is defined, managed and transferred. Creating and adopting standards means that we can train employees, consultants and service providers with a common core set of skills. It means that we can get our software tools to talk to each other without confusion, and it means we can share information with others more readily.’

Introducing data standards has many challenges. Existing systems are entrenched, so changes are costly and time consuming. Some professionals are also resistant to change; if it’s not broken, why fix it? ‘Change is difficult, but once the upstream industry embraces standards, the industry will benefit from a common shared language across the industry – the standard of best practices,’ notes Hubbard. ‘This is also vital in regions impacted by the coming crew change, where new geoscientists are replacing retiring veterans and important institutional knowledge is being lost. By improving out ability to encapsulate best practices gained by generations past through the effort of establishing standards, the industry will be able to preserve much of the knowledge gained over the course of many years.’

More and more companies are adopting DOF technologies, primarily in complex offshore environments where even incremental improvements result in significant benefits. ‘When the DOF truly embraces and employs common standards-based technologies, the results will be revolutionary and the benefits transformational,’ concludes Curtis.

For more information regarding data standards, visit www.ppdm.org and www.energistics.org