As seen in the October 2009 issue of E&P

Vision to reality for an industry standard

PRODML provides a data transfer mechanism independent of the software and workflow currently in use and offers a means of sharing a single asset model across all applications.

AUTHORS

***Christopher Fonseca**, Tata Consultancy Services; **Laurence Ormerod**, Weatherford; and **Robin Getty**, PDS*

In today's fast-paced oil and gas business, volatile pricing, tightened regulatory compliance, shrinking budgets, terabytes of data, and limited time for information analysis are among the myriad factors that continually pressure companies to increase the efficiency of their E&P operations. Digital oilfield technology is a tool that many companies have successfully used to realize such gains in efficiency.

A proliferation of digital oilfield technologies is changing the landscape of E&P operations; however, the integration of asset teams, standardization of work processes, and investment in people are critical to maximizing the benefits from such technology. More and more, oil and gas companies are moving to a consolidated platform to manage data, achieve inter-operability, improve data access, and manage and maximize their performance.

One such platform pursued in varying forms by many operators is generically known as the Digital Oil Field of the Future (DOFF). The goal of this program is to align and integrate people, processes, and technologies across the E&P business. Technologies that have the most impact on increasing hydrocarbon recovery from producing reservoirs include remote sensing, visualization, intelligent drilling and completions, automation, and data integration. The PRODuction Markup Language data exchange standard, or PRODML, will allow the DOFF vision to become a reality.

The need for PRODML

Integration in E&P is a powerful tool in support of detailed workflows for faster, safer decisions in oil and gas operations. Unfortunately, integration efforts are often sub-par due to legacy systems that were not designed for that purpose. Data generated from these systems, which were deployed some time ago, are specific to a particular application and not designed for sharing across applications or other systems.

The challenges for integration in oil and gas exploration include:

- A lack of standardization in data;
- An excess of point-to-point links between systems;
- Poor management of reference data; and
- Lack of support for the extended enterprise.

Operational data must conform to basic integrity constraints to allow integration of data within an enterprise. This standardization of data refers to how the data is modeled, its normalization and validation, and to what extent it needs to be "translated" to be available between applications within the enterprise (or between the enterprise and external systems).

Point-to-point links between systems have generally been practical, but this approach is no longer cost-effective because the links are typically dependent on a particular version of the software, and the messages passed over the links are defined for the specific intent of that link. Since each side of the point-to-point link is dependent on the other, upgrades to software on only one side are problematic. In addition, the dependency on the link can constrain organizations in their ability to change or redeploy components, often resulting in increased overhead time and costs to manage the system.

In the production environment, there is no single place to maintain the reference (master) data, and changes in one definition do not cascade to all other def-

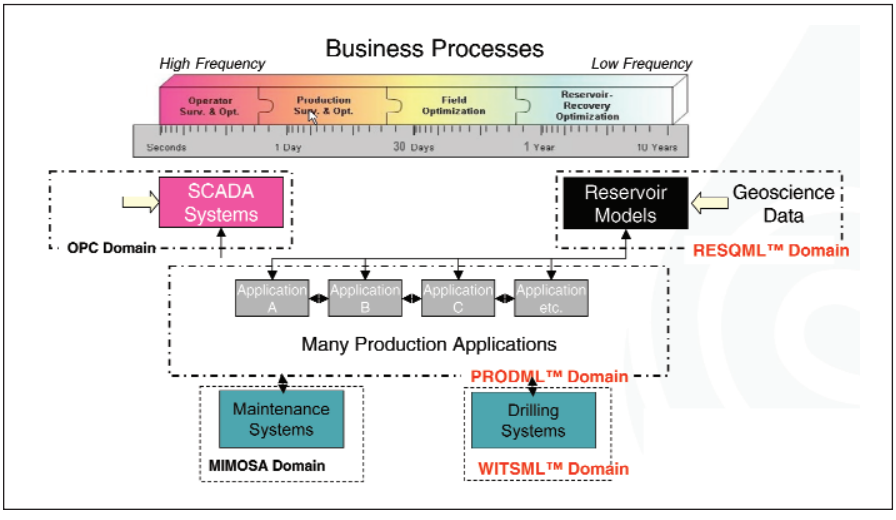

Figure 1. PRODML aids in all aspects of production optimization. (Images courtesy of Energistics)

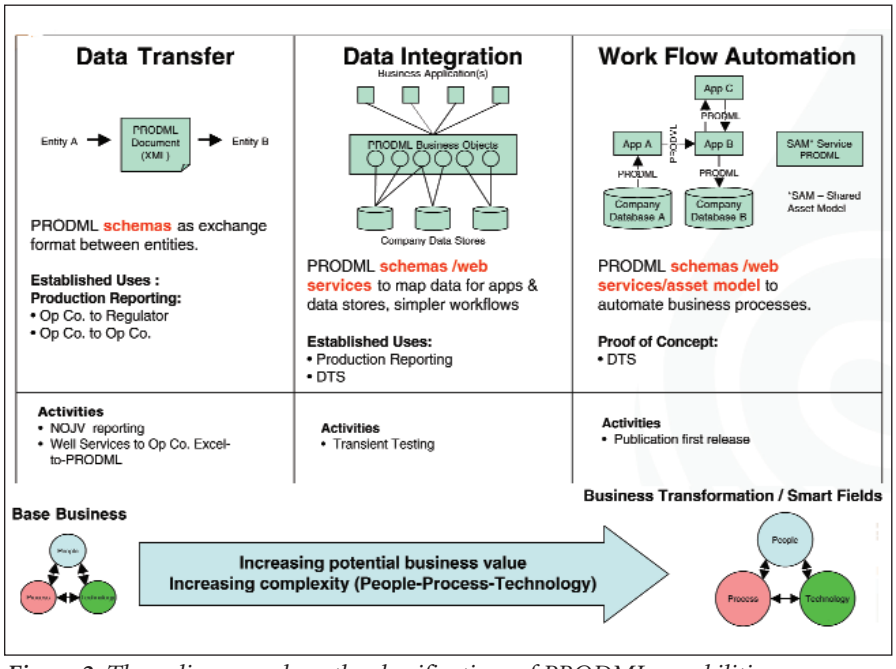

Figure 2. These diagrams show the classifications of PRODML capabilities.

initions. Individual applications generally have their own private definitions of the asset that must be maintained. The definition that each application maintains can express different views of the asset can also be mutually inconsistent.

PRODML provides a data transfer mechanism independent of the software and workflow currently in use. It also provides a means of sharing a single asset model across all applications.

Scope

The scope of PRODML has grown to enable production operations, optimization, and reporting and data management for the E&P domain. The current inventory of PRODML standards not only includes production optimization, but adds production reporting, production fiber-optic distributed survey use, and the production lab results/fluid properties use. The PRODML community is working on a multiyear roadmap that includes use cases of increasing scope and complexity. Among the use cases under consideration are:

- Longer-term asset planning, including reservoir performance management;
- Support for electrical submersible pump (ESP) and mechanically pumped fields; and
- optimization.

If PRODML usage grows according to plan, it will demonstrate support for a wide range of optimization cases covering well, field, and reservoir management, as well as artificial lift/enhanced recovery, and reporting to management, partners, regulators, and others.

Benefits

PRODML builds on the earlier success of WITSML to improve data and work process efficiencies in production optimization. Previously, oil companies and service providers dedicated an inordinate amount of time, money, and effort to converting common data for in-house custom-built systems. PRODML allows the transfer of production data more easily, saving money across the industry, and allowing companies to concentrate on the real business of making wells and production facilities work more efficiently. The PRODML standards have the following potential benefits to software providers and E&P companies:

Improved operational efficiencies. Production optimization systems are more reliable and accurate with a lower total cost of ownership because information is used more efficiently and effectively.

Safer operations. Opportunities for remote monitoring, collaboration, and timely intervention to solve problems can result in reduced exposure for personnel and a safer working environment.

Improved data trustworthiness and compliance. Improved quality facilitates the management of information to monitor, optimize, and report asset performance. Operators can more easily exchange data and collaborate with partners, host governments, and service providers, ensuring adherence to contractual, corporate, and regulatory obligations.

Accelerated adoption of recommended production optimization practices. Standard processes, as well as innovative variations, can be applied more consistently and efficiently.

Broader awareness of opportunities for production optimization. With access to more timely information, operators can better support field systems and contribute to integrated operations and production optimization.

PRODML is an industry initiative to provide open non-proprietary standard interfaces between software tools that are used to monitor, manage, and optimize hydrocarbon production. Applications currently used to support production workflows are available from multiple vendors, but without PRODML they cannot be easily integrated due to a proprietary data structure and non-compatible architectures. The most recent version comprises a set of XML schemas and Web Services that support data exchange, integration, and queries for optimizing free-flowing wells based on real-time measurements and network models, production well tests, distributed temperature sensing, and production reporting. There have been PRODML success stories in data transfer and reporting in XML files, data integration using Web Services and XML, and workflow automation using the Generic Data Access and Shared Asset Model. Energistics has custody and manages this standard for the oil and gas industry. A roadmap has been developed for the PRODML standards to support production workflows from the reservoir-wellbore boundary to the custody transfer point. EXP

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