A Standard Data Model for the Energy Industry

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Summary
The Public Petroleum Data Model Association is an independent, not-for-profit association formed in 1990 that represents over 100 oil and gas companies, vendors, and regulatory agencies worldwide. PPDM delivers a vendor-independent standard petroleum data model that serves as the industry foundation for managing information as an essential asset in the global resource business.

Petroleum data, software applications, and other services based on the PPDM model have already reduced user and supplier costs, and improved the effectiveness of petroleum information technology. The PPDM Association continues to expand the standards that are available to encompass other key exploration and production business processes.

Introduction
In 1996, the PPDM Association enhanced the data model through the addition of an integrated seismic and information management data module designed to manage conventional two-dimensional seismic acquisition, processing and interpretation data. Member companies around the world have adopted PPDM into their software applications and data repositories.

Standards built by the PPDM Association are developed using an open methodology that benefits from the expertise of and is based on the requirements of Industry participants. International participation and feedback in this work group process ensures that the products of each project are targeted to real business needs in a practical and implementable way.

An international seismic work group is presently enhancing the functionality provided in the model. Three key areas of focus have been defined. First, the relational data model itself must be enhanced to support additional requirements; mainly these address mechanisms for handling 3D and marine data. Second, capability to exchange data between repositories and applications or other agencies and organizations are needed to support daily work activities. In many cases, these standards can be built to support and encourage the use of industry-defined standards such as SEG P1 or SEGY. Finally, standardization of reference value content will improve the ability of member companies to exchange data with clarity.

Data Model Enhancement
Corporate data repositories contain the information and data that comprises part of their knowledge asset; thus they need to be developed to support key business activities of an organization and improve the efficiency with which they are carried out. Ideally, they consist of an integrated set of databases, document libraries and (possibly) technical applications. The objective of the PPDM work group is to develop a data model that will:

- Manage all types of seismic data, including conventional data, 3-D data, multiple component recording, well related seismic and additional recording methods at all stages of the life cycle.
- Enable good data management strategies, to ameliorate the costs of reworking data that has been lost or corrupted.
- Permit interaction with other critical types of information, such as wells, land, contracts, stratigraphy, production, projects and more.
- Support integrated handling of the components (lines, swaths, segments) of any seismic survey, either (2D, 2_D or 3D), and/or (Marine, Land or Transition zone).

Presently the work group has defined or revised modules in the following areas:

- Seismic acquisition. The revised module supports 2D, 3D, marine and well related acquisition, both planned and actual.
- Processing. Detailed processing flows, both planned and actual, are captured in the data model together with all input parameters and output products.
- Interpretation. Key information relating to an interpretation project can be stored in the corporate repository, allowing users to integrate results from various applications (and their versions) and to combine results for high level analysis.
- Records management. Archived products, either in digital or hardcopy media, can be catalogued or managed in this module. These products are fully integrated with the relevant sets of seismic data
- Funding summary. While PPDM is not an accounting database, it contains planned and actual cost summaries and allows you to reference work done to accounting cost centers.
- Entitlements. Common to brokered seismic transactions or third party data management organizations, this module allows user to track the level of authorization they have to data.
- Projects. Details about the objectives of a project, its participants and their roles, the steps completed and the results of the project can be managed in this module.
- Work orders. Representing a key component of the service industry business, this module allows a service provider to associate their work activities with the business data.
- Well related seismic. Integration with well-related seismic data is provided in the seismic module.

Data Exchange
Data Exchange Standards have been available to the oil and gas industry for decades; they are widely used for storing and sharing data among companies or partners, applications and data stores and submissions to regulatory agencies. The SEG P1 and SEGY formats are defacto standards for storing and distributing seismic location and trace data. Regulatory agencies routinely define an ASCII standard format in which electronic data submissions are to be made. In this way, ASCII standards have proliferated in the Oil and Gas Industry.

From their earliest days, ASCII standard formats have seen their share of successes and failures. Technically, these data files are compact, well defined and efficient for storage and transmission of data. On the other hand, errors or inconsistencies in using the defined format can result in catastrophic data errors on load or transmission. Every ASCII format in use today has fallen prey to these problems.

Self-defining formats (data files that contain both structural definitions and data content) create a new opportunity for sharing and transmitting data in a semantically accurate and consistent way. Extensible Markup Language (XML), an Internet based language based on existing standards, is such a format.

Industry interest in XML technology is substantial simply because the potential benefits for improving data exchanges are profound. Providing an XML based data exchange structure for PPDM will enable users of the data model to move one step closer to interoperability.

The PPDM Association has, in conjunction with its members, initiated a work group to define data exchange formats that support effective exchanges between PPDM databases, or PPDM databases and industry standard ASCII formats (such as SEG P1). The products of this work group will include:

- Data exchange schemas (XML) to support the types of data exchange required by industry.
- Mechanisms to load and unload the schema from a PPDM database or a recognized industry standard format.
- Mechanisms that use XML to support integration of ASCII data standards (such as SEG P1) and databases.
- Mechanisms to conduct an actual data exchange.

Standardizing data content
Creating and adopting industry standards for storing your data and moving it around only solve part of the data management issue that is faced today. Non-conformant data content can cause endless confusion and cost tremendous amounts to resolve. Industry standards bodies such as the CSEG are addressing many of these problems today. For example, the CSEG has been defining standards for naming seismic lines.

Imagine how much time and effort could be saved if each oil and gas company, each vendor and each regulatory agency in the world was using a common set of values for things like:

- Energy source types
- Ownership types
- Seismic recording format type
- Country names
- Media type

The PPDM Association is establishing, in cooperation with various industry standards organizations world wide, a project that will develop, distribute and maintain these lists for the industry.

References
www.ppdm.org