

WHAT IS SEISMIC For Data Professionals

Building data competency for
seismic data



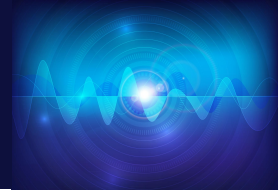


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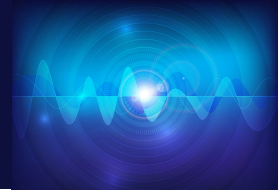
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Why PPDM?

A recognized data professional discipline is created by a governed body of ethics-driven professionals who have an intentional and common purpose to develop, deploy and support a body of knowledge and professional development for the professionalized data practices.

Helping industry use relevant standards and best practices is a critical part of this program. These make industry more efficient through access to consistent and trusted data, and promote the emergence of a portable, skilled and trusted work force of data professionals.

We hope you will support this PPDM Association project, which will add value to all of industry.



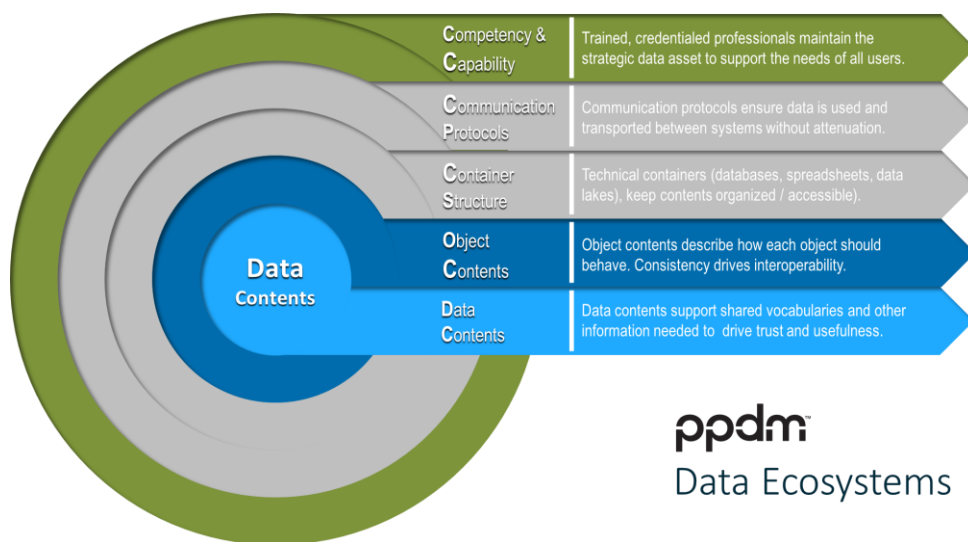
ABOUT THE PPDM ASSOCIATION

The PPDM Association is the global, not for profit society that supports data professionals in the energy and natural resources industry. The PPDM Association works collaboratively with volunteer members to develop vendor neutral International Data Standards and Best Practices (IEDS). These products help industry communicate effectively, prevent data attenuation, and drive data systems to convergence, regardless of what technology platforms you may want to use.

Standards support and enhance competitiveness, operating efficiency, regulatory compliance, safety and return on investment. Collaboratively built industry standards benefit everyone and create a supporting economy of products and services that can be leveraged by all stakeholders.

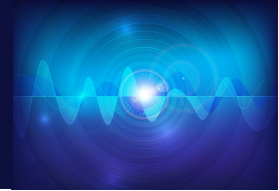
PPDM'S SCOPE OF WORK WITHIN THE DATA ECOSYSTEM

At its most general, the PPDM Data Ecosystem, shown below, contains five core areas. Of these, the PPDM Association focuses on data content and data object-based standards and best practices that help ensure high data integrity, interoperability and sustainability regardless of which container or communication technology is used. PPDM also focusses on the competencies and capabilities that are needed to steward and leverage data as a strategic resource.



DATA CONTENTS: AREA OF FOCUS

Ultimately, data contents are the strategic asset that governance, mastering and management strategies strive to nurture. At their most fundamental, they are text strings, numbers, dates or even unstructured things like documents or illustrations. The real value of data contents can be difficult to realize unless they are placed the context of a data object.



DATA OBJECT CONTENTS: AREA OF FOCUS

A Data Object as defined by the PPDM Association is “a logical collection of documented knowledge, data attributes and data or business behaviors that allow important datasets to be defined, described, governed, and managed independent of any specific technical methodology or language”. By grouping data into logical collections (Data Objects), it is possible to use objective criteria to evaluate the contents of each data object in measurable, defined ways.

CONTAINER STRUCTURES: OUT OF SCOPE

Data containers abound; new containers are developed while legacy containers fall into disrepute or are superseded. Containers consist of technology protocols, often included in software products. The shelf life of most containers varies but is not usually aligned with the shelf life of the data that it contains. Some containers cause content attenuation because the data container design does not accommodate all content, because data types are incompatible with content, or because abstraction results in loss of clarity.

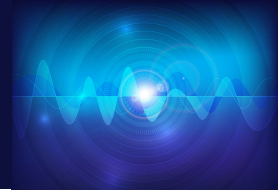
COMMUNICATION PROTOCOLS: OUT OF SCOPE

Data Objects are used by many stakeholders for many purposes – often for several decades. The communication protocols used to transfer data between containers often causes unintended data attenuation, commonly because of abstraction. Unfortunately, the underlying data precepts for data communication, data mapping or transformation are often untaught and undocumented. Physical and contextual attenuation is a common side effect.

COMPETENCY AND CAPABILITY: AREA OF FOCUS

Data, along with whichever containers or communication protocols are in place at a given time, should be fully understood. Strategic planning for data and technology should be treated as having distinct but related objectives.

Data professionals who work in strategic or tactical roles must understand how data behaves, and how differences in user expectations can impact data. This allows robust data governance and data mastering strategies to be developed so they are technology agnostic.



SEISMIC DATA MANAGEMENT CHALLENGES

Seismic data is one of the most malleable data types used in earth sciences. From planning through acquisition, processing, interpretation and brokerage seismic data is organized, reorganized, divided, combined, renamed, recalculated, reprocessed, reinterpreted and distributed countless times. The result is often chaotic data systems rife with duplication, ambiguity and confusion.

Interwoven spatial, business and technical challenges make this datatype difficult to manage or make fully interoperable. The PPDM Association working groups focused on this challenge will consider what can be done to improve legacy data while providing a firm foundation for new seismic data.

Although many technical container and communication systems have been designed by industry, supporting best practices for data content and professional development focused at helping bring this complex data into convergence have been lacking. This PPDM Association project will emphasize technology neutral data behavior and expectations alongside professional development.

PROJECT BACKGROUND AND PURPOSE

The **“What is Seismic”** project will develop (or identify existing materials) a collection of reference lists, data rules, data object definitions, best practice recommendations, semantic disambiguations and learning materials to support seismic data management through its life cycle.

The potential scope of this work is substantial, and the work group(s) will need to follow a plan to ensure that time is used efficiently, and priority given to the most critical needs. Existing PPDM workgroups will collaborate with the Seismic workgroup for development of specific products as appropriate. At this time, we expect the work to be organized roughly by life cycle phase so that the skills of subject matter experts can be leveraged as effectively as possible.

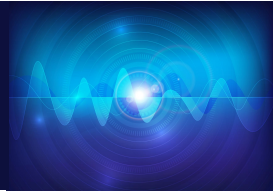
Our purpose is to support:

PRIORITY 1 CONSIDERATIONS

- ✓ Disambiguation vocabularies and taxonomies for “What is Seismic”
- ✓ Identity and Version management best practices
- ✓ Best practices for data rights, entitlements and obligations
- ✓ Professional development materials
- ✓ Materials to support effective data classification
- ✓ Materials focused on standardizing data content (reference lists)
- ✓ Materials focused on evaluating data completeness and appropriateness (data rules)
- ✓ Best practices for seismic data management

PRIORITY 2 CONSIDERATIONS

- ✓ Environmental data pertaining to seismic data

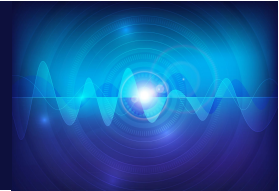


COLLABORATION

Two committees working in the PPDM Association are working to develop reference lists and data rules for seismic data. Three key data container structures are in place today:

- The Society for Exploration Geophysics develops and maintains standards for raw and processed seismic data (SEG D and SEG Y).
- The OSDU Forum™ is developing technologies to store and use data in the cloud.
- The Block Chain for Energy Consortium is developing block chain standards for ledger based seismic entitlements data.

The PPDM is working with the Open Subsurface Data Universe Forum for development of reference lists. Discussions with the SEG and the Block Chain for Energy Consortium to identify areas where cooperation will provide mutual benefits have been started. By finding opportunities where data centric best practices can be shared, the life cycle of seismic data will become more harmonized, with data becoming more trusted.



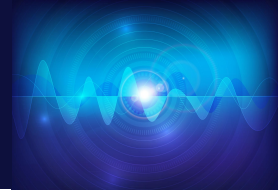
RECOMMENDED STRATEGY

The recommended strategy lays out a guide for consideration by the workgroup that will help align their efforts with the desired outcomes. The order in which these tasks are completed is indicated by the numbers in the chart below. The order may be changed by the workgroup if a different order will improve efficiency or provide more logical workflows. Where significant changes are recommended, the Board of Directors and key sponsors will be consulted to ensure that the primary objectives will be addressed as required.

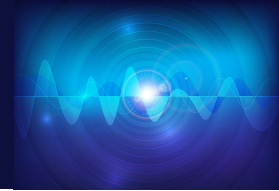
The numbers indicate the order in which work is expected to be completed, with number 1a in phase 1 and 1b supported where possible with funding committed by sponsors.

	Acquisition	Processing	Interpretation
Identify existing standards and variations in industry use. Document the impact of formatting variations. As appropriate, recommend best practices and data requirements.	1a	2	3
Discuss life cycle impact of entitlements and recommend best practices and data requirements.	1a	2	3
Research regulatory impact on operators (licensing, permitting, environmental, submissions). Develop use cases for on and offshore, NOC, IOC. Build materials to support understanding. Evaluate whether recommendations for changes should be made.	1b	2	2
Investigate Carbon Footprint through the seismic life cycle.	1c	1c	1c
Research identity and version management practices, and barriers to understanding. In particular, sub-setting and merging of seismic datasets should be considered. As appropriate, recommend best practices and data requirements.	1a	2	3
Research terminology that causes ambiguity and confusion. Disambiguate these as needed and develop supporting material.	1a	1a	1a
Research and discuss issues with cloud data management, impact of differences in method.	4	4	4

WHAT IS SEISMIC



Research and document CRS and spatial data practices for seismic data. As appropriate, recommend best practices and data requirements.	1a	2	3
Identify seismic attributes that benefit from reference lists and develop these. (underway in RefVal now, so this group would be focused on prioritizing and reviewing)	1a	2	3
Identify key areas that impact seismic data quality, develop and review data rules and (later phase) learning material to support improvement.	1a	2	3
Build a classification taxonomy family that can be used to classify documents and other records. (KDM may donate starting materials).	1b	2	3
Build training materials and other useful resources to expand data professional's understanding of seismic data management and use. (underway now)	1c	2	3
Evaluate practices about data for seismic environmental impact, such as water crossings, protected wetlands or migration and nesting grounds. Identify key data information that should be retained to properly enable environmental accountability.	4	4	4

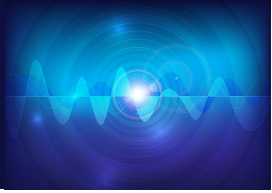


DELIVERABLES

A determination of the final form of deliverables and the order in which they are created is part of the early scope of the Seismic workgroup. Through analysis and discussion, the group may add or alter some recommended key deliverables. When the scope of these changes is substantial the changes will be reviewed with the Board of Directors and key sponsors to ensure that they continue to meet the expectations upon which approval of this Terms of Reference are based.

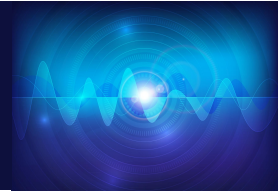
All PPDM workgroups are founded and conducted in accordance with the Board Policy “the PPDM Way”. This means that all work is done in conjunction with volunteers and with sufficient funding to complete the work and maintain it for at least two years.

KEY DELIVERABLES	SPECIFIC RECOMMENDATIONS
Documentation and other materials to support understanding and use of seismic standards and best practices for data.	<ul style="list-style-type: none"> - Standards that are difficult to find should be brought forward. - Materials that may be difficult to understand may benefit from additional clarity. We will work with the owners wherever possible, and PPDM expects to develop additional materials.
Disambiguation vocabularies and taxonomies.	<ul style="list-style-type: none"> - Clarified semantics for core seismic terminology, particularly for seismic collections (projects, surveys, programs...)
Best practices for seismic data management.	<ul style="list-style-type: none"> - Seismic identification best practices - Identity and Version management for data systems - Meta data management - Spatial behavior
Best practices for data rights, entitlements and obligations.	<ul style="list-style-type: none"> - Data lineage, provenance, vintage - Data protection - Data obligations, rights and entitlements
Materials focused on standardizing and validating data content.	<ul style="list-style-type: none"> - Standard reference lists - Data quality and completeness rules
Materials to support effective data classification, data spatialization and analysis.	<ul style="list-style-type: none"> - Faceted taxonomy for classification of stored materials. - Best practices and reference documentation.
Professional development materials.	<ul style="list-style-type: none"> - Training classes - Reference guides - Documentation and clarification with all deliverables.
Environmental data requirements for data	<ul style="list-style-type: none"> - Carbon footprint - Greenhouse gas emissions



retention, reporting and regulatory compliance.

- Water body access and remediation
- Environmental damage and habitat protection
- Subsurface damage (flowing holes)



ASSUMPTIONS

1. **Sufficient Funding:** This project requires industry funding to support the research, development and publication of materials. The final scope and duration of the project will be contingent on industry funding or access to dedicated resources. The following costs (USD) are based on a 12-month project duration focused on Phase 1 deliverables.

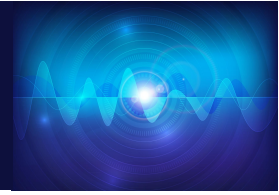
Project management	\$25,000
Research and survey	\$30,000
Business analysis	\$75,000
Materials development	\$40,000
Training class development (MVP)	\$50,000
Publication Preparation, graphics	\$8,000
Legal (IP protection)	\$2,000
Total	\$230,000

Funds Committed as of October 2023: \$50,000

2. **Committed, paid resources position projects for success:** PPDM staff will support logistical and organizational requirements, will ensure that the committee is well formed and adheres to appropriate Policies (including Code of Ethics and applicable Anti-trust law)
3. **Industry participation is essential for success:** Work will be done by a combination of paid and volunteer resources, coordinated by the PPDM Association. Volunteer participants will be available to serve a one or two-year term, renewable if mutually desired.
4. **IP contribution rights protect industry:** The necessary IP contribution rights will be supported, as it is recognized that contributors may require a separate grant of rights for this project. This may be partly addressed through appropriate licensing arrangements (such as the Public GNU).
 - o Grant of right given by contributors
 - o Grant of right to use given to users of materials produced.
5. **Industry support will build through early success:** Identifying and developing appropriate avenues to support the ongoing development and maintenance of these materials is critical to long term success.

RISKS & CONSTRAINTS

1. **Vendor Neutrality Policy:** Neutral optics are essential to success and is a PPDM requirement.
2. **Delays may impact delivery:** Economic conditions may result in some program delivery delays, due to funding and resource gaps .



3. **Long-term planning is essential:** We recognize that making the information complete and filling content gaps will take time and require trust building to encourage participation. Adoption will require industry buy-in and socialization along with suitable materials to support adopters.