Oil and gas (O&G) companies are realizing the importance of information management. Many have recognized the need to build out master data management (MDM) solutions within their organizations because of the need for clean, trusted data. Typically, a well header master is the first MDM domain that is tackled due to the fact that well information is core to the business and spans so many other data domains.

Embarking on the journey to build an MDM solution can provide both direct benefits, such as resource or process efficiencies, and indirect benefits, such as risk mitigation or improved decision making. Noah Consulting recently helped a super-major O&G client with a business case study to justify the need for a well header master and identified two key benefits. An identified direct benefit of the business case was the need to provide a trusted and clean system of record for well data because the time land techs spent on gathering, reconciling, and analyzing data was taking away from their day-to-day responsibilities. An indirect benefit that was identified in the business case was the need to minimize latitude/longitude collisions during drilling. The lack of a trusted and clean system of record for well data, specifically latitude/longitude, was putting them at risk of drilling into competitor wells or into wells that were identified as non-viable.

In the typical MDM solution, data is sourced by many systems and then conformed based on standard filters, business/data rules, and reference data lists, resulting in a single version of the truth for a particular piece of data. Along with the mastered record that is constructed from a master data repository, metadata, such as lineage, and content management, such as taxonomy, is created during the process. The master/meta data is then available for GIS applications, reports, and analytics.

When setting up an MDM solution, there are three options: a custom-built solution, oil and gas (O&G) specific MDM products, and general enterprise MDM tools. A custom-built solution provides the most flexibility because you are not inhibited by a solution domain, a data model, tool or technology. If an organization wants to be PPDM compliant and use tools and technologies that are already part of their enterprise architecture, a custom-build solution becomes the preferred method. The existing O&G-specific MDM products are well established in the O&G domain and handle some of the very technical data domains, such as seismic and well logs. These tools may or may not be PPDM compliant and typically have connectors to the tools and technologies specific to O&G (i.e. Open Spirit). The general enterprise MDM tools are well established tools in the retail and finance domains with a rich set of MDM capabilities; however, they are not optimized for O&G data types at this point.

As stated above, the general enterprise MDM tools are not new to the market and possess the key capabilities needed to build a robust enterprise MDM solution. While the general enterprise tools have robust capabilities, they still lack some of the key capabilities needed to support O&G data domains. We will discuss both the pros and cons of these tools below.

Pros:
- Large data volumes – Because these tools were born from the retail and finance sectors, they have been optimized to handle large sets of data that are inherent with these sectors.
• Custom data models – The tools are open enough to be able to handle O&G industry standard models such as PPDM and PODS.
• Match, merge, blending/besting – This is the key strength of these tools and the key component to a solution. This capability provides a systematic way to determine the best version of the truth when combining disparate data.
• Data lineage and metadata management – This capability provides the users of the solution to ‘trust’ in the bested record because it shows where the attributes came from and understand how the record was created.
• Hierarchy management – This capability is key in supporting the O&G domain due to the need to build a well level that is supported by the PPDM “What is a Well?” concept.
• Reference data management – Source reference data needs to be mapped and translated to a standard list of reference values within the solution.
• Data quality and data integration tools – Several of the tools have complimentary data quality and integration tools that plug into the solution seamlessly. This provides the ability to cleanse and load data via the same platform.
• Data governance process and workflows – Data governance is the foundation for a successful MDM solution and, with the ability to setup data steward processes and workflows, the data can be kept clean over its lifetime.

Cons
• Product driven data model – While some of the tools are open to custom data models, there are some tools that are inhibited by a specific data model (i.e. ERP).
• Complex O&G data types unsupported – There are some data types that cannot be handled in these tools.
• Cross vendor tool challenges – Different vendor tools are not compatible for data integration or data quality.

With all of these tools, how do you select the one that is right for you? There are three things that are key to making this decision: identification of the value proposition, participate in a tool assessment, and lastly, selecting a tool.

Value proposition – What are the current pain points within the organization around the data type? Build a cost benefit analysis and a business case understanding that not all of the items identified can be solved in a single iteration. Building out an enterprise MDM solution is not a one-time project; it is a long-term investment for the organization.

Conduct an assessment – Identify the data domain you will tackle first and any subsequent complementary domains. After you know these entities/attributes, you should build out the necessary use cases to meet your functional and non-functional requirements. Identify what tools you already have in your environment that can complement the solution you are assessing.

Select the appropriate tool – Look at what the market is saying about the tools (Gartner, etc.), short list the tools that match to your functional/non-functional requirements, and then do a side-by-side comparison of the tools on the short list using the use cases that you have identified. Once a tool has been selected, undertake a proof of concept or pilot.
About the authors:

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Prasanna Balakrishnan is currently working at Noah Consulting as a Principal Subject Matter Expert/Architect in the Upstream Oil & Gas Information Management space. He has over 11 years of IT experience primarily in the Oil Exploration and Production domain. He has extensive experience in building software solutions in the areas of Information Management, Reservoir Modeling & Engineering, Seismic Interpretation and Data Acquisition/Logging. He has played roles of Solution Architect, Project manager, Trainer, Business Analyst and Technical Lead during this time and has developed a unique blend of Domain, Technical and Program Management expertise. Prior to joining Noah, Prasanna was working at Infosys Technologies Ltd as a Lead Consultant in the Energy Center of Excellence group. During his tenure at Infosys, he managed and architected several end to end master data management solutions for large Oil & Gas operator and service companies. He has been an active participant in PPDM user group meetings and has previously presented a paper on the implementation of a PPDM based Well Master for an Oil & Gas service company. Prasanna has a Master’s degree in Computer Applications from the Indian Institute of Technology (IIT) Roorkee.

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Kelly Guillory is a Principal Technical Architect in the upstream oil & gas Information management space with over 16 years of IT experience spanning multiple industries from trading, upstream oil & gas, financial services, healthcare, and public sector. She has extensive knowledge in architecting and building data integration, data quality, and data warehousing solutions. Over the past four years, she has built several master data management solutions around the well domain using the foundation of PPDM. Prior to joining Noah Consulting, Kelly was working as an independent consultant as a Lead ETL architect for several clients. Kelly has a bachelor’s degree in accounting and accounting information systems from Virginia Polytechnic Institute & State University.