Oil and Gas Semantic Web: Total position paper

Total core business does not call for direct involvement in semantic web. However at various levels and in several domains (upstream, downstream, new energies, petrochemicals…) initiatives are being conducted to model businesses objects in order to exchange data along the processing chain, both internally and across partners.
This paper focuses mainly on E&P domain but it is clear that the issue has to be extended to others Oil & gas domains

The need:

Metadata is expending in the technical domain:
The more technology progress, the more we discover that data is useless without its qualifiers describing how the data was obtained and how the reading should be used: traceability is carried by metadata. A well is drilled once for all, and the operators are accountable for it over extremely long period of time. Sometimes, due to changes in political or environmental context, the same readings can not be acquired a second time. But to be able to use the raw data information about recording instruments or reference coordinate system associated with the positioning are essential.
On the document side, semantic tools are essential to intelligent search
Several intelligent browsers have appeared (MetaCarta), and the need for adjusting to the specific language of the Oil and Gas is obvious: a pipe in the oil business is not the connector that the IT people mean. The status of a well is an essential verdict to a potential reservoir and described with different qualifiers when exploratory, producing, or from an insurance point of view.

The problem:

The E&P might be traditionally more segmented into separate disciplines and the multi-skilled teams do not consolidate their shared experience into a common standard vocabulary, at least not always. Geologically, settings do differ around the globe, and some refinements in descriptions might be useful in some places and meaningless in others.
There are therefore four reasons for dialects: region, disciplines, companies, and tradition.

The opportunities

Several initiatives have already been conducted, internally and in consortiums, and today the conjunction of empowered web tools and an increased need for improvement of efficiency bring ideal conditions for success.
Indeed, the need for more efficient web technologies is particularly strong in the exploration stage when connection between objects relies more on individual spark of imagination, brain algorithms not yet fully mastered by the most sophisticated IT systems: the walking spotted dog image. Meanwhile, data is becoming everyday more complex to fully understand and more abundant. As time and people are getting scarcer, it is necessary to take a innovative approach to the mining for data, information and knowledge.
Virtual shared repositories are becoming more easily manageable, and knowledge can soon be shared at different levels inside the company or across partners for any given asset for a better

shared vision and better confidence in each other's work and decisions. This understates that various confidentiality levels have to be fully preserved through such web tools.

The path

The semantic task must tackle every discipline and connection between disciplines, to solve the problem of isolated data sources.
But our expectations go beyond the capacity of the semantic Web to provide more relevant and complete results to our researches. We also believe that new tools like semantic browsers (RkbExplorer, Simile) will allow us to discover unexpected relationship between data.

In the field of exploration, for example, one can quote the synthesis of geological basins, stratigraphic information, the mining area, estimate of the reserves, new discoveries… this is just the beginning of a long list of activities that should be supplemented at company scale. The sectors concerned are very broad and an effective semantic Web could improve the productivity in many technical and non technical fields.

Common vocabulary and semantic is an essential stage to being able to use the next generation web tools. It requires accepting the same logical relationships between objects. Next are workflows: we believe that rich recording of the workflows will convey our experts experience across time to move faster in our understanding of the reservoir as more data is acquired. Interpretative process is a scenario. Recording a scenario and replacing one element only allows for instantaneous replay with full control on quality of the outcome.
Last to workflows is modelling and virtualisation. By being able to travel through the life time of a reservoir opens to door to much richer representation and behaviour prediction, with the ability to test multiple hypotheses of development plans.

When will the semantic be efficient for every day business?

The answer to this question depends on progress of the researchers in this field, on the software industry and on the implication of the oil companies in shared initiatives like the one proposed by the W3C. The first point seems to us quite advanced, the second less. The third depends on the capacity of the innovation structures within the companies to convince the operational actors of the challenge and to include them in this loop.
It is clear to us that that several years will pass before operational applications will be available.

Conclusions

In Total we have around semantic subject research and more operational initiatives in several technical domains and a central IT Innovation structure whose role is to promote new IT technologies: We will work on semantic web by looking further into our comprehension of the subject, by taking part in the initiatives of the community and by promoting the progresses obtained toward the potential users.
We believe that it is necessary to have mixed teams involving business specialists and IT people to carry through this project.
In addition it is necessary to coordinate the works that is or will be done in every technical domain concerned in order to share methods, tools and experience.