# Energistics – developments with PRODML

Oil and gas standards organisation Energistics is continually improving PRODML, the data exchange standard for production data. CTO Jay Hollingsworth presented the latest developments at our Aberdeen conference in March

*Jay Hollingsworth*

Energistics, a data standards body based in Houston, has a released a new version of its PRODML standard for exchanging many different types of production-related data.

The new version includes a standard for sharing fibre optic distributed temperature sensing (DTS) and distributed acoustic sensing (DAS) data from oil wells.

This standard was requested by a number of PRODML users including Shell, who could see many of the DTS vendors developing their own proprietary communication protocols, and wanted the industry to develop a standard system before the proprietary ones become too embedded.

Energistics is also making the associated documentation easier to work with by software developers, and similar to documentation that software developers usually work with.

There was a common problem that oil companies were asking an IT manager to look at how hard it would be to implement the standard, and the IT manager would just see pages of complex documentation, and pluck a figure out of the air, like $1m and one man year. This would kill the project.

Version 2.0 includes a standard for exchange of Pressure Volume and Temperature (PVT) data for gas, for example between a measurement company and an oil company. This was requested by ExxonMobil and Chevron. Previously, the data would be provided as a pdf, and oil companies would need to re-type it into the system.

Energistics has also developed a simplified version of PRODML. This is suitable for when oil company joint venture partners, and governments, just want a simple monthly production figure.

Energistics has also made it possible to use data from its different standards together – such as well bore data from its WITSML drilling data standard, and reservoir data from its RESQML reservoir data standard together with production volumes from PRODML.

Energistics recently developed a new way to transport data, called Energistics Transport Protocol.

Previously, data was exchanged via constant polling – the receiving computer would ask the sending computer several times a second if there is any new data. Now the data can be streamed.

The transport protocol has been purpose built for the upstream oil and gas industry, and is simpler than many other protocols developed for various 'internet of things' purposes. But it also has functionality which the other ones don't have, which is useful for oil and gas.

## Background to PRODML

PRODML was designed as a standard way to move production data from one application to another, for example, from an offshore meter to a cloud based database, or software tool. It has been around since 2005.

Many oil and gas companies have developed some kind of 'digital oilfield' system. It basically means having real time surveillance of production, taking data from the oil field to the analytics systems. The production engineers can use the data to optimise how the field is operating, and use that to change operation parameters.

Making everything fit together, from the automation systems to the analytical systems, really needs data standards, Mr Hollingsworth said.

He was speaking at the Digital Energy Journal conference in Aberdeen on March 14, "Improving production rates through new approaches to digital technology".

Really high frequency data, such as real time process control, can be handled better using a real time data standard, typically managed by the OPC Foundation. PRODML is more for where data is gathered on a delay, monthly or yearly basis, which happens in applications which production engineers typically use for field optimisation.

Energistics also has two other major standards, WITSML for drilling and RESQML for earth modelling. But PRODML and production data is quite different to these, Mr Hollingsworth said. Drilling data covers a "pretty limited set of information". The earth model has a "lot of stuff in it but it's kind of cohesive."

But the world of production is very different, including everything from operational information (who is at the well, when did the helicopter last come), the results of well tests and lab analysis, "There's lots and lots of data that's fundamentally diverse that all gets lumped together in the world of production," he said.

PRODML can also be used for production reporting to governments. Governments and individual states often develop their own systems for how operators are going to report monthly production volumes and well tests. If everybody used one format, it would make it much easier for oil companies, and also make it more viable to build and sell software to handle it automatically.

There have been a number of pilot projects. One of the first was led by Chevron, in 2006, to post joint venture production data in the cloud.

Another pilot project was with oil company Pioneer Natural Resources, which wanted to do production analytics and visualisation with Spotfire, bringing data in to Spotfire in a standard format, rather than having many different ways to bring the data in.

There was a pilot project for distributed temperature sensing data, where a fibre optic cable is used to record temperatures, linking this data with data from their PI Historian.

BP had a project to try to keep track of the pipeline network flow model, so people could see how the pipe is connected together in a standard way, including showing which valves are closed, or which pipelines are damaged and shut off.

Conoco Phillips wanted a standard for production reporting and updating their network flow model. Statoil wanted a way to optimise their downhole control valves. BP wanted a way to set safety points for gas lift optimisation.

The pilots were also aiming to show if data could be stored in a cloud server, and computing down on the cloud. For example a cloud based system could compute the optimum set points for a gas lift optimisation, which can then be fed back into the control system.

Saudi Aramco forces all of its drilling vendors to use WITSML, to make it easier, and now it is doing the same with PRODML.

### Norway

In Norway, the government wanted a production report which could be read by both humans and computers.

So they use PRODML for data reporting. Sometimes the complex version of PRODML is needed – if there is a complex system of platforms connected by pipes and oil discharged to tankers in different places.

The Norwegian Petroleum Directorate didn't want to check operator submissions themselves, so it asked the industry to find a way to guarantee that the data is correct before it arrives. So the industry created an organisation called EPIM, which receives the transmissions and runs a series of checks, to see if data is complete and self consistent, before submission to the government.

### About Energistics

Energistics makes data exchange standards. Put simply, it is about locking together people from the oil majors and software companies and saying that they can't leave until they have agreed on how they will exchange information.

"It is pretty much that simple. You get people who are using the data to decide how they are going to exchange it," he said. The standards are developed by members not Energistics staff.

There are a number of groups developing oil and gas standards, and not much overlap between them. There is some space where no-one is making standards. Some standards are primarily for data storage, but Energistics is primarily focused on data exchange.

Some other standards groups include PPDM, developing a standard data model for storing data; SEG making a standard for transfer of seismic data; PIDX for e-business transactions; PODS, Pipeline Open Data Standards; and the MIMOSA standard is used on maintenance information.

### Time looking for data

Jay Hollingsworth noted that the commonly heard phrase, that geoscientists spend 60 per cent of their time looking for data, is probably not true. It would mean they spent 3 days a week for their entire career looking for data which is a bit crazy.

But what is true is they spend 60 per cent of their time trying to reach the point where they have a trusted data set they can use to do analysis with – to start doing their job, basically.

For example, you find that wells are in the wrong place, because the positions were recorded using a different datum system.

"Reaching the point of trusted data is a really important thing," he said. "Geoscientists do spend a large amount of their time trying to get to that point. Petroleum engineers are struggling to get to the point where they have a piece of trusted data."

# Eigen – time for a better system to spreadsheets

**Western business saw enormous improvements in productivity, and share price growth, during the period of about 1980 to 1999, which were also the first two decades of the spreadsheet. But since then, productivity improvement and share price growth have stalled, which may be an indication that it is time to move on, said Eigen's Murray Callander**

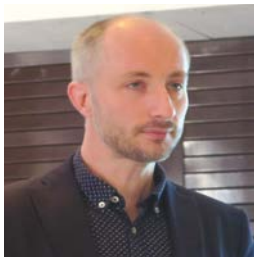
Today, we have much more widespread access to data than in we did a couple of decades ago - but people don't all come to the same conclusion in their analysis of it.

So perhaps we are moving now to a new way of working, geared more to flexibility and autonomous working structures, rather than one where we expected to find all the right answers from looking at a spreadsheet, said Murray Callander, CTO of Eigen.

He was speaking at the Digital Energy Journal conference in Aberdeen on March 14, " Improving production rates through new approaches to digital technology".

This should lead to a different way of working – which is far more iterative and agile, where you can see how something turns out and then change it.

"I think we're on a 30 year journey," Mr Callander said. "I believe spreadsheets are holding us back. We need to change the way we think about stuff."



*Murray Callander*

Work on spreadsheets could be traced to 1969, when Rene Pardo wrote the 'LANPAR' language for programming arrays at random, gaining a patent in 1982. In 1979 Apple's "VisiCalc" was launched. Microsoft Excel was launched in 1985, becoming the market leader in the 1990s due to the growth in Microsoft Windows. And it has been used to run oil and gas operations ever since.

The FTSE share price index rose steadily over this period, from 1981 to 1999, and companies got much better at planning and analysis, perhaps largely with the help of spreadsheets, which could be used to help understand better what has been going on. It was also an era of 'command and control,' where a leader aims to understand a situation (probably with the help of spreadsheets) and make decisions.

However, if you look at the FTSE share price from 2000 to 2016, there is no steady growth, just ups and downs, a totally different picture. "So perhaps this indicates that the value possible from the spreadsheet, and the 'command and control' thinking it led to, was fully realised by about 2000."

### About Eigen

Eigen's background is as a consultancy developing data management services, but it started developing a standard data 'platform' for the oil and gas industry in 2007 when it realised it had met the limits of Excel.

"I had a dream of a data model and a way you could link stuff. We started building that," he said. We have technology platform with a new data model at the core. You can collect all the data together and view it from any angle and