2006 SIS Global Forum
Paris, September 2006
Highlights

The Schlumberger Information Solutions (SIS) 2006 Forum was subtitled 'breakthrough team performance' but perhaps a better title would have been 'The Petrel Show'. The plenary session covered ground that is familiar to readers of these reports. Industry is on a roll, but constrained by lack of drilling rigs and other resources. The National Oil Companies are on the up, while the Internationals are constrained by **lack of personnel**. Everyone is planning to hire. Saudi Aramco is planning to double its head count (to 9,000) by 2020 and Petrobras is looking to hire '300-400 people per year'[1]. But where these new hires are to come from is a moot point, the universities are not producing these kinds of numbers. The most plausible solution to the people shortage, rather conveniently for SIS, is IT-led productivity enhancements. Hence the enthusiasm around **Petrel** which has built great momentum as a tool for rapid integration and interpretation of pretty well all geoscience and engineering data. The 'fly' in the Petrel ointment it is integration with other interpretation tools and, in particular, the problems engendered by its 'flat file' approach to data. Petrel files proliferate like Excel spreadsheets – making the data manager's job hard. End users have developed various ways of working around these issues – and SIS has a roadmap out to 2008 which envisages a 'DBX' database for Petrel built on the Seabed data model.

Presentations from Exxon and Shell described how Petrel is being integrated into the E&P workflow – and how their data managers are working around the issues above. Herb Yuan described **Shell**'s long standing R&D relationship with SIS; leveraging the .NET Ocean environment. **Microsoft**'s Charles Johnson acknowledged that those looking for a fully supported 64 bit version of Windows (with debuggers etc.) will have to wait on Vista. Stephen Whitley (SIS) described the 'tough decision' that shifting the SIS desktop to .NET involved for SIS – traditionally a UNIX company. **SIS** president Olivier Le Peuch intimated that Avocet was to do for asset management what Petrel has already done for interpretation.

Two other themes from the conference are 'openness' and web services. **Openness** to Schlumberger means the Ocean API and the Seabed data model. But don't imagine that SIS is going open source. The Ocean API is for the development of plug-ins to Petrel (and in the future Osprey, Merak, and Avocet) and the Seabed data model has been published as a textual description of the database, rather than a DDL. These caveats apart, we have it on good authority that third party developers who are using Ocean are impressed with its functionality. Likewise, the exposure of the Seabed intellectual property has raised some approving eyebrows in the industry. On the web services front, the situation is less clear. SIS' Petrel, Ocean and Seabed flagships do not appear to expose much in the way of web services that could be leveraged by third parties. Indeed there is a natural tension in an SOA which could for instance, move control of the workflow from Schlumberger's infrastructure to a client's script. But, as Joe Perino said in his talk on open technology in the digital oilfield, '*SIS has embarked on a move toward SOA and will offer, for instance, versioning and results management as a service. SIS's solutions embrace openness via Microsoft .NET, J2EE, OpenSpirit, Ocean, SOA, WITSML and ProdML.* <u>*But it is up to operators to push us to use open systems.*</u>'

Highlights

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[1] *This is to be set against the 600,000 jobs that have been 'saved' in the last couple of decades through restructuring.*

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TW0616_1   CEO Panel – challenges, opportunities and trends in oil and gas

Host – Andrew Gould (Schlumberger). Panel: Fahad Al-Moosa (Saudi Aramco), Ali Al-Shammari (KOC), James Hackett (Anadarko), Tony Hayward (BP) and Carlos Morales Gil (Pemex)

Hayward : This is a period of high prices and strong growth (China) and geopolitical uncertainty. 80% of production of all oil is from the Middle East, West Africa and Russia. Government agendas now target security of supply, alternative energy and, a long way down, the cost of energy and the environment. There are 40 year's worth of oil left, and 60 years of gas but infrastructure investment is needed to move both. At the end of the 90s too many people left the industry[2] following cost cutting. IOC[3]s need to continue to deliver oil to the market and invest in new diverse supply sources including alternative energy – we need to reduce dependency on oil and gas.

Gould : NOCs are bigger customers than IOCs. The breadth of oil and gas technology is already huge – and we are moving into an exciting period of even more innovation.

In the ensuing Q&A concerns were expressed regarding the current shortage of drilling rigs and the people shortage.

Al-Shammari : We continue to build our workforce but it is hard to attract and recruit talented personnel. We are working with a Schlumberger consultant to improve our recruitment strategy. We plan to expand our business, going from 4,500 staff to 9,000 by 2020, by offering international company-level salaries and quality of training.

Hackett : The majors were better prepared, while the independents are more aggressive in recruiting. Everyone is now working to bridge the age gap by replacing people near to retirement (35-40% of the workforce) with new people. Companies are offering novel employment solutions – part time, flexible time, working from home and sabbaticals. Today's pension plans may not apply to the under 40s and companies have had to compensate with bonuses.

Gil : We will need to hire 300-400 people a year. The universities can't supply them. We are hiring back retired employees!

Gould : The industry has a problem of reputation. We would need to put a greater effort into improving our reputation – young people do not like fossil fuels! As an industry we are getting better but not yet there – we need to take a position on the environment. How are we to answer the fossil fuels and global warming question? Everyone underestimates the new methods of communication. People about to retire don't know how to use the web and IT. But the people who we hire today can use available knowledge faster than 20 years ago.

Hayward : Now we have a global market for staff, we are increasingly diverse culturally. BP has more employees outside the US and Europe. 7/8ths of the company is comprised of local energy companies. We are fighting a male-dominated industry with recruitment now of 50% of female graduates and there is no penalty for women taking time out for families. BP now has 40% of women employees (20 years ago this was 10%). Women who stay and move into senior management is up from 10% to 20%.

Al-Moosa : People are our most important resource. It is important not to let people go if there is a recession. Technology is helping with optimization of manpower. NOCs need long term programs for planning.

Hackett : We owe it to the world to be better statesmen for the environment. Leaders don't need to apologize all the time, but should reward innovative technologies.

Gould : The biggest change in the world energy situation is the issue of access to resources. We now have international NOCs whose own reserves are declining and who are going outside their own countries. Recovery rates are the big challenge. Our number one priority is to be able to supply reliable operations – a challenge as we will see more and more complex projects in the next 5 – 10 years. Regarding people, we are all in competition for the same people, salaries are exploding. We underestimated the power of the communications revolution (for training, etc). Accelerating pace of change is an electric shock for the industry – questioning the service companies' role. SIS is focused on maintaining its values and culture in the face of the current 40% hike in head count

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[2] *Read 'got fired' !*

[3] *International Oil Companies – as opposed to National Oil Companies (NOCs).*

TW0616_2   Other plenary Sessions

0616_2.1   _Oil and gas in financial markets – Didier Cossin, Professor, IMD Lausanne_

While oils are perceived as making 'huge profits', they are not as 'huge' as the banks'! But banks are better at hiding their profits! Despite the perception of profits as something to be ashamed of, profits can be put to good use for instance to support innovation or to 'pick risks' smartly. Cossin asked, 'does it make a difference to have top people?' Citing the case of engineers in oil and gas, Cossin opined that 'better pay will attract top talent'. The job market is subject to supply and demand and there is high value to knowledge. Cossin's message – _hire top talent with higher salaries, innovate and don't be ashamed of your profits._

0616_2.2   _Delivering E&P Business Results – Olivier Le Peuch, SIS_

Industry is bound by constraints and challenges. IT leads to production gains, collaboration and better team performance. The younger generation is more capable of using innovative technology, IT and communications all of which represents 'a step change'. Schlumberger's new 'Open Technology' framework lets customers integrate SIS' offering with their own solutions – the ultimate prize being the integrated operations of the 'field of the future'. Exploration is at an all time high and is bringing challenges such as frontier areas like the Arctic, and ultra deep water. Users have to cope with an explosion of data, seismic surveys operations need to be streamlined – for example, in Alaska, WesternGeco is moving seismic data from vessel to facility over satellite, along with partner BT, leveraging data compression –an example of technological innovation in a tailor-made project.

Exploration : Interpretation used not to be available to all stakeholders and was not integrated. Today, volume interpretation with GigaViz can be run on a server with multiple interpreters. The shared earth model concept brings a step change – for example, Apache's development of the Forties Field, with Petrel. SIS' already significant investment into Petrel is expanding to integrate GigaViz.

Development : National data centers used to be for exploration, but this is changing to embrace development. In this context, the UK's CDA has switched over to SIS technology and the Seabed database. Overstretched compute resources were addressed by a BG asset team where a joint solution (with HP) leveraged a remote server in Paris for fields in overseas units. Real time operations are a challenge and require reliable solutions. Remote drilling operations are now 'mainstream' with Pemex, monitoring six wells at the same time.

Production : SIS wants to 'free people from data' and automate monitoring and surveillance of wells. Historically SCADA or EDS were used – but data flows were complex. Today a new integrated production system 'IPS Ready to Run' built around Avocet, Decide! and PI Historian, supports field automation and control, reduces reporting time and optimizes production. The integrated asset modeling package (IAM) offers reservoir to well to facility modeling. IAM is 'as good as Petrel in interpretation'.

0616_2.3   _Snohvit (Snow White) Integrated Operations Center – Fridtjov Øwre, IFE_

Statoil's Snohvit LNG development in the Barents Sea is an ambitious subsea completion, with all operations located onshore, some 140 km from the field. Fluids are moved in a multiphase flow pipeline, a CO_2 line for reinjection and all controlled via a fiber optic cable linking the onshore Integrated Operation Center (IOC) to the field. Making sure that the IOC handles the needs of subsea, process and LNG loading presents some interesting human-system interaction (HSI) design issues. Statoil has opted for a 16 meter wide screen display of objects that mirror real world operations. The IOC embeds IFE Halden's Information Rich Display concepts – going beyond user friendliness to 'user-enablement'. The interface offers 'information rich' graphic representation of what's going on rather than the numerical representation of the conventional HSI. A VR representation of the slug catcher is coupled with an OLGA model of the pipeline to give users real time insight into the production process. The LSD, with links to the Snohvit training simulator, will be operational late 2007, early 2008. The IRD is already deployed on Ekofisk, Statfjord and Ormen Lange. More from www.ife.no/vr

0616_2.4   _Ocean in Shell, – Herb Yuan, Shell_

Shell's involvement with Petrel dates back to 1999 - before its acquisition by SIS. When the product was acquired by SIS in 2002, Shell initially feared that SIS might be less responsive to Petrel's further development. Such fears proved unfounded as the Petrel/Shell partnership proved 'win win' with the development of the Jason plug in, Open Spirit Petrel collaboration and other enhancements via TAP. All this is in the context driving 'one Shell voice' on applications. In July 03, Shell 'invested' in Petrel and Ocean

via a global software deal notably with the deployment of OpenSpirit data access. Late 04 'footprint issues' caused Shell to jump from Ocean to Petrel Plug-ins for integration of Shell's own tools for locating cells connected to well bores, locate structural spill points etc.. Yuan observed that although Petrel's plug-ins mechanism offers rapid integration of Shell's own .NET-based applets, which can be 'dropped' into the Petrel plug-n sub-directory, the plug in API is limiting and plug-ins are currently poorly supported in Petrel workflows. But the Shell/SIS collaboration is bearing fruit and is allowing Shell to 'mine' software jewels, to wrap them in a protective shell and to drop them in the Ocean – which is 'a fertile environment'. Yuan believes that 'standards' are needed for an open, integrated software environment. Plug-ins increase the pace of Shell's proprietary technology deployment integrated with 3rd party products. Finally Shell anticipates a new way of software deployment with the advent of a 'service-oriented' architecture. More from http://www.slb.com/media/about/events/sis_open_houston_accelerating_technology_delivery.pdf. See also Winand Bemelmans' 'Oceanic experiences' paper at http://www.slb.com/media/about/events/sis_open_houston_oceanic_experiences.pdf.

0616_2.5   HPC in upstream – Steve Langdon, HP

HPC is a 'horse race' between HP and IBM – the others aren't even there. HPC is also a 'three legged stool' of computing, data management and visualization. HP's HPC solution includes a Linux scalable file share based on the open source Lustre standard. Notwithstanding the dash to high CPU-count clusters, there is still a place for very large memory systems with a few hundred systems, each with up to a TB of main memory (HP has deployed such a system for the French Government[4]). According to the TOP500 LinPack benchmark, single system computers have been entirely displaced by 'industry standard' based clusters. The move from single vendor proprietary solution to cluster involves complexity of making sure it all works – enter HP's 'technology on-ramp' offering. HP recently installed a complex, mixed environment for a large Chinese oil company – including Linux clusters. HP is also working with SIS on pre-configured, certified systems with a single Stock Keeping Unit (SKU – a part number). These systems are delivered ready assembled. This is said to be a 'catalyst' for E&P data center transition. Langdon was particularly enthusiastic about the HP c7000 blade system enclosure.

0616_2.6   Vista, Chevron and HPC – Charles Johnson, Microsoft

Johnson is worldwide MD with Microsoft's manufacturing industry solutions unit. Microsoft is partnering with Schlumberger to offer Excel-based spreadsheet access to data in technical data bases in the same way as does 'Duet' joint venture with SAP. A Microsoft video had Chevron employees enthusing over 'what we expect from Windows Vista!' Chevron is a member of Microsoft's Technology Adoption Program (Vista Tap). Johnson noted Microsoft's arrival in the high performance computing (HPC) marketplace with Windows Compute Cluster Server 2003 (CCS). And a concomitant move to 64 bit computing. Office 2007 will enhance workflow, content management, business intelligence, communication and collaboration. Content management can/will be used to protect intellectual property (IP). Microsoft Vista will offer control on whether documents can be forwarded, saved or copied. A futuristic video showed how touch screens and VR and supply chain collaboration will help design and build new auto components.

Q&A

ExxonMobil is migrating its applications from UNIX to PC and in some cases, from 32 to 64 bits – involving massive amounts of data. Today's Linux clusters increase complexity and Exxon wants to use Windows XP64 directly from the user's desktop. Today, Windows XP64 is limited in terms of support, debuggers etc. We understand that we will have to wait on Vista for true 64 bit – is this true?

Yes. Although this is application-dependent. Some SIS apps work on XP64 OK. But Vista is the real 64 bit game[5].

TW0616_3   CIO Panel – Moderator Bill Pike, Hart's E&P

Don Moore (**Oxy**) - Oxy is focused on big assets and operational efficiency. IT is strictly for business support, there is 'no IT for IT's sake'. Business goals include oilfield automation (Oxy has its own DOFF

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[4] *This would seem to refer to the CEA Tera initiative – for more on Bull's Tera 10 see http://www.bull.com/bulldirect/N7/guest.html.*

[5] *This is quite an admission in view of Microsoft's marketing of HPC to the oil and gas sector.*

initiative) and business process automation through templates. Both of these are considered business differentiators for Oxy. While it is easy to buy storage, true data management is 'a huge challenge for us'.

Cindy Reese (**ExxonMobil** – XOM) XOM uses its own proprietary technology where advantageous and integrates to standardize work processes. In the last decade, ExxonMobil has deployed standard hardware, software and data models. Now the aim is to leverage IT to standardize work processes across the organization, embedding corporate knowledge and best practices. This is 'a daunting task' – addressed in Exxon's EM2010 program[6].

Tom Halbouty (**Pioneer**) – Pioneer has 'democratized' information via web services and portals, exposing workflows to field personnel. Pioneer eschews the 'one size fits all' approach, focusing on innovation that adds value as opposed to 'good but not necessary'. Pioneer's IT falls into two categories – 1) finance, ERP/SAP etc. and 2) innovations that let you digitize and visualize the subsurface. This second category benefits from rapid deployment as it adds the highest value.

Anselmo Tati (**Chevron**) Our challenges are how to make DM/IM 'work'. Chevron has 11 content management systems – users spend 1.5 to 3 workdays per month looking for information. Schlumberger – a long term partner to Chevron is working on federating data. A new 'Everest' initiative is underway to align IT with the business.

Discussion

Pike – what is the biggest prize for IT and hurdles?

Moore – CERA's 2000 predictions were followed by the dot com bust in 2001. But they were basically right, IM will/is changing our business.

Halbouty – It's important to let people make choices around information and to make systems that support this. Building the right architecture and tying things together with web services will enable companies to be more competitive.

Bill Pike (Hart's E&P) – How do you define the digital oilfield?

Reese – Everyone has their own definition. XOM's first RT drilling center dates back to 1984. So this is nothing new for XOM.

SIS – how do you arbitrate between innovation and standardization?

Reese – A standard infrastructure lets people do innovation as opposed to 'mundane work' – and 'standardizes' innovation into the work process.

Halbouty – innovation must be commercially valid.

Tati – We have a team working on innovation – going outside Chevron and building teams with SIS and partners like XOM. This can be hard to add on to a day job!

Halbouty – Pioneer advocates 'controlled innovation' which may just be picking a tool and getting to be really good at using it. Pioneer may occasionally pass on a new generation of innovation.

Piette (Open Spirit) – How do you decide what technology to decide to evaluate?

Reese – E&P technology is evaluated differently to IT. On the IT side – we see if a technology fits within our architecture.

In the summing up, Reese suggested it was important to share stories between companies and to explain IT benefits to the board. We should beware of 'runaway' IT costs – especially when the resulting benefits may not accrue to the IT department. Halbouty noted that the industry has 'saved' 600,000 jobs over the last several years through application of technology.

TW0616_4   Schlumberger Presentations

0616_4.1   IM Vision – Smith (SIS)

It is the value of information to decision making that should drive IM. We need to get the right value proposition in place. Since the 1990s, E&P IM has evolved from computer-centric to data-centric. Now we are seeing a further shift towards business process-centric IM. SIS' E&P IM vision is for more openness, consultation with clients, integration with 3rd party applications and delivery and management of solutions.

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[6] *From Oil IT Journal October 2005 - Exxon's 'EM2010 Vision' comprises three components: the Technical Computing Systems for engineers, 'WellWork' data and process management and the RETR interpretation methodology presented at the Calgary AAPG earlier this year (OITJ Vol. 10 N°7/8).*

Openness is to be achieved by Ocean and 'public' APIs. Schlumberger's innovation targets four areas - National Data Centers, Corporate DC, IM for asset (IM4A) and the digital oilfield. Four solution delivery teams have been established to offer managed services, systems integration, tech consulting and technology/products.

0616_4.2   SIS Technology Blueprint – Stephen Whitley, SIS

All projects have a team that includes the developer, a business person and an 'architect'. Schlumberger's Technology Blueprint Vision (TBV) has been in place since 2001. The TBV is one of a petrotechnical desktop focus, as the interoperability partner of choice and of providing IM support for the digital oilfield. SIS wants to support 100 users 'sitting in front of what appears to be a single application'. All products must be open and interoperate. There is also focus on standardization via protocols such as WITSML and ProdML. SIS 'will adhere as close to ProdML as possible'. On the technology front, 64 bit is to become mainstream for high performance graphics and clusters. CPU roadmaps now favor software that exploits multi core processors and 'wide scale XML-based data frameworks'. The desktop shift to Windows .NET was 'a tough decision for SIS, traditionally a Unix company'. The next move is to 64 bit computing for scalability. LiveQuest, SIS' ASP solution leverages Mercury Open Inventor and ThinAnywhere (MIT). SIS is 'moving towards' web services. Results manager actually uses some web services! Enterprise computing is to leverage OpenSpirit and Microsoft BizTalk – and will 'adhere to BEPL2'.

0616_4.3   Avocet – Andy Howell

Schlumberger's Avocet integrated asset manager (IAM) has experienced teething problems since its release. Today, integration leverages AspenTech's open simulation environment (OSE) for connectivity with the process industry. New in 2006 is Avocet Volumes Management (acquired from Quorum), the well and surface modeler and new workflow driven ESP designer. New surveillance workflows have been built on top of Decide! for production surveillance. These are canned workflows for sand management, drawdown analysis etc. The intent is to offer a platform for production management that interoperates with many different vendors – 'by driving and adopting open standards such as PRODML'.

PIPESIM – want big pipe networks to run on Linux clusters. Some Eclipse models are linked to hundreds of pipe models – critical for corrosion monitoring. Decide! data exchange with Eclipse is moving towards automated history matching. Volumes Management (ex Quorum) is 'completely .NET'. SIS is moving towards a common platform for production. Howell showed OFM and Avocet results displayed in Google Earth to visualize oilfield alarms (a Statoil project).

0616_4.4   Jay Hollingsworth – Seabed and openness

We are really serious about opening things up. Seabed is enabling technology, not a product. Seabed covers the a-z of E&P data – but the model is divided into independently deployable data domains. The model is also scalable and is suitable for corporate, project/asset, field data capture etc. Seabed is deployable as an enterprise catalog database, and supports entitlements, audit and events. Multiple deployments can share utilities like loaders, export etc. There are 1,200 tables[7]. Technology includes server-side support for units of measure (UOM) and coordinate reference systems (CRS) management. There is no Seabed application programming interface (API), rather a standard ANSI/SQL interface to all functionality. Seabed is delivered complete with 'open content' in what is described as a move to a standard industry ontology. Seabed builds on industry standards incorporating 'chunks of POSC, bits of PPDM, GeoShare, WITSML, Dublin Core and SIS stuff. Seabed also offers database 'services' – code inside the database that performs a particular function. These may invoke Java inside the Oracle kernel. Users can explore for available services (such as a well log header) with a tool like Toad. The database is 'metadata driven' – even subject matter domains like 'a well' are defined in tables that can be modified. Standard reference tables are from POSC and PPDM but these can be deleted for other languages or business requirements.

Q&A

What is the relationship between Seabed and Ocean?

They are independent.

Why did you make Seabed 'open'?

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[7] *Not 12,000 as wrongly reported in Oil IT Journal!*

Because this is in conformance with SIS' 'architectural principles' and because the MMS[8] required a published data model. And because it is the right thing to do!

So now PPDM can throw in the towel?

No. Some clients are afraid of SIS involvement. PPDM still has a role to play.

Note – you can browse the Seabed data model at the following url -
http://www.slb.com/media/services/software/opensystems/seabed/index.html.

0616_4.5   Role of open technology in digital oilfield solutions – Joe Perino, Schlumberger

Perino described Schlumberger's Business Consulting work on projects including Shell's 'smart fields' Hydrocarbon Development Planning (HDP) and Integrated Reservoir Modeling (IRM) projects. These embed a 'Stage Gate Decision process' that shows where there is room for improvement in the workflow. One persistent 'pain point' is data management – teams spent 40% of their time looking for data (a 'best practice' should be 10%). This means that companies can't evaluate all opportunities. Other issues include 'inconsistency of results capture', 'too many PowerPoints', 'poor integration of analogs and best practices' and the fact that petrotechnical tools are poorly integrated.

In reality, no one vendor has it all – but Perino asks 'In a multi-vendor world, is plug and play interoperability a bridge too far?' SIS's answer is a smart collaboration environment comprising smart workflows, an IM hub and knowledge sharing. The .NET-based Uncertainty Management Tool stores info in Seabed. Flagship client Shell is leveraging SIS' Smart Workflow System in an integrated framework that includes DMS, CDS, resultsDB and Shell IP (see Williams' talk below).

All of the above needs open applications and support for open standards and loose integration through a services-oriented architecture. SIS has embarked on a 'move toward' SOA and a flexible process framework. This will offer, for instance, versioning and results management as a service. SIS's solutions embrace openness via their use of Microsoft .NET and J2EE, OpenSpirit, Ocean, SOA, WITSML, ProdML. Perino asked 'are we team players?' and encouraged operators to 'push us to use open systems.'

0616_4.6   GeoFrame 4.3 – Vogt, SIS

GeoFrame has been relegated from a whole Forum track to a single presentation. GeoFrame is still being developed, with new volume interpretation, 'probe centric' interpretation, data sculpting, 3D paint box, parent/child editing, enhanced ASAP (auto tracking) for BaseMap, IESX and Charisma. SIS has modernized the old Panther software which is now the SEG-Y Editor for GeoFrame. This allows for QC of seismic data from tape or disk. SIS assured the 15-strong audience that 'Geoframe is to stay as the core application set that will integrate the next generation workflows.'

TW0616_5   Client Presentations

0616_5.1   Shell's workflow system – Jevon Williams, Shell.

Shell's goal was to improve its hydrocarbon development planning workflow (HDP). To achieve this it has deployed SIS' LiveQuest along with an in-house tool for uncertainty management. A 'Smart Workflow System' (SWS) keeps an audit trail of decisions made. The solution is 'blue printable' and can be deployed in other contexts. SeisWorks, 123DI, LogicTechnology, Petrel (including Shell's own plug-ins), Xtream, Promise, Reduce++, DS, PEEP all run atop of SIS' DecisionPoint. A demo showed a project being built and linked to Shell's Active Directory to build and notify the team. The tools include prolific tabbed forms and Gantt charts. OpenSpirit is leveraged to build a Petrel project and there are many functions for project review etc. 'No hassle' data management is claimed.

Q&A

Is there a corporate world-wide roll out?

Today, the US. Global roll out is our goal.

Data stores?

LGC, SIS, own stuff etc.

How do you sell this internally?

There is no coercion. We got SIS involved to educate with new techniques.

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[8] *US Minerals Management Service – the first Seabed client.*

0616_5.2   Shell – Guiseppe Carollo, SPEED Project Manager.

Global implementation of SIS PEEP, MPF and associated applications. Shell increasingly has a need for 'evergreen' financial data for reporting and planning. Today, all Shell operating units are on the same system – used for everyday economics. The current project sets out to 'Standardize economic planning with evergreen data (SEED)'. SEED leverages PEEP for economics and Merak Petroleum Financials. All run under Merak Admin Console. Runs on central server farm in EU – users connect into central DB over Citrix – look at most current data for any Shell field. SOX and global security enhanced to work in this environment – software has been improved. Shell is now beginning to realize benefits. GUIs still confuse users – would prefer MS-like consistency.

Q&A

Any use of a financial modeling language (FML)?

No, not yet but we are keen to use industry standards

Is the centrally-deployed database model usable in other domains?

It is still early days for this technology – but yes, this is the way forward if technically possible.

0616_5.3   Integrated surveillance tools for field management – Al Harbi, Saudi Aramco

Saudi Aramco's integrated applications for production engineering connect Schlumberger's OilField Manager (OFM) to data sources including the corporate database, Excel spreadsheets and/or local databases. A map interface provides a summary of data by clicking on a well. Casing leak detection from TCA pressure plots. Formation damage index – spot problem areas – map FD index across field. Also compute a heterogeneity index – compare locals with neighborhood and track production injection compliance with forecast.

0616_5.4   Identity and access management – Anselmo Tati, Chevron Brazil.

Oil and gas companies almost always operate in joint ventures with other companies. This begs the question, how should we share information and data across a JV? Without a data sharing infrastructure in place, there is the risk of delay to first oil. Chevron Brazil needs to collaborate with Petrobras and other partners. Shell looked various solutions. Shared drives can be problematical as employees may leave without telling JV partners. Information could be stolen and there are issues with passwords. Another problem is that today's partners may be tomorrow's competitors. So Chevron looked at federated identity (with Microsoft), ideally with single sign on. Next year Chevron is hosting a workshop with SIS and Exxon in Brazil on federated ID[9].

0616_5.5   Measuring the value of a visualization center – Gavin Goodland, TNK-BP

TNK-BP's Visualization Center was in part specified as a result of BP CEO John Browne's promises to Vladimir Putin to offer high tech visibility of its operations to its Russian co-venturers. TNK-BP CEO Robert Dudley asked Goodland to prepare a business case for a HIVE or visualization and modeling center (VMC). The VMC specified as either a team collaboration room (a better working environment) or as a prestigious 'boardroom' environment. The budget ranged from $1 million in the first case – for a BP 'standard' 7m curved screen, to a $3 million massive CAD wall – the 'best in town' with 16 Barco projectors installed by Schlumberger.

The latter was chosen by management. Initially users, especially geologists, were under-whelmed by the 3D facility, but the executives liked the 'wow' factor. Usage increased significantly when Dudley reminded users of Browne's promise to Putin, intimating that if they didn't use the center their future with the company might be compromised. The following day, the VMC's booking system crashed!

The VMC also allows accountants to show huge Excel spreadsheets – in fact most 'excitement' comes from placing video, Excel and models together on the huge screen. Valuing the VMC presents a paradox as management wanted the high end screen but also required an a posteriori 'business case' to justify the decision. In reality, most VMC use was at 'low value-add levels', with a few high value meetings with government. So TNK-BP decided that booking a meeting would require an estimate of the 'value' of the meeting. A value 'ready reckoner' was provided and meeting room conflicts resolved by choosing the highest value meeting. It is TNK-BP's belief that this will produce 'true solid value tracking' over time. To

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[9] *See SPE Digital Security in oil and gas for Mike Reddy's presentation on same subject (TW 05_28).*

date the VMC has recorded $ 1 million of 'validated value'. 'If you avoid a refinery accident, the value is huge[10].'

Q&A

Did Schlumberger install the whole system?

TNK-BP tendered at a high level and SIS was chosen as the integrator.

How are the 'value' figures arrived at, do you compare the VMC use against conducting the meeting in a different way?

Yes, users do this.

But they are under duress to use the VMC and to come up with a high 'value' – the whole thing is ridiculous!

We feel that in the long term the methodology will be validated.

Is the ready reckoner deployed in head office?

No.

TW0616_6   The Petrel Papers

0616_6.1   *Petrel integral to PDO's subsurface asset management – Talib Al-Ajmi (PDO)*

Petroleum Development Oman (PDO – a Shell/Omani Government joint venture) operates 100 fields. Some fields have over 400 wells and PDO is embarking on a major EOR (steam injection) project. Petrel has been used in PDO for 5 years and there are now 100 active models and 125 licenses (for 200 users). PDO now offers in-house Petrel support from experienced/super users. Current use spans petroleum engineering, reservoir engineering and petrophysics (seismic interpretation is under development). Petrel offers good data integration – of fracture data, mud loss data, PLT (production logs) data, pressure, seismic well etc. This lets PDO highlight areas where efficiencies are possible. PDO leverages stereo display to see pressure through time, to model and visualize depletion and to identify areas for future completions. Integration helps search for attic oil (structure higher than original well plans accounted for). The full field models (FFM) let PDO keep facility maps up to date by including satellite photos, pipeline data etc. Subsurface target optimization is important when individual wells have up to 10 laterals that track the reservoir roof. Injectors are drilled back to back with producers – so 3D integration of data 'really handles wells in a controllable manner and helps geosteering'. This is also key to channel/thin layer targeting with 5 to 15 m wide targets. Here, PDO integrates real time gamma ray data and azimuthal MWD to track faults and channels (GR spikes show when in shale). Volumetrics, structural modeling, stratigraphy also ran, helping link stratigraphy and reservoir modeling in complex aeolian reservoirs. Seismically controlled property data is studied with a 'QI' porosity cube. Al-Ajmi concluded that Petrel is working for PDO, helping discover new uses for geoscience and other disciplines. Petrel provides an ideal collaborative environment for data and interpretation QA/QC and managing uncertainty.

Q&A

What support model do you have for your 200 users?

We have 15 PDO geoscientists as super users plus one SIS person. We also offer lots of training courses.

These are impressive results – how do you see Petrel's development?

To handle more uncertainty – control risks.

Any weaknesses compared to earlier individual applications?

Not really, the integration is really superb, letting you combine logs, reservoir and time variant data.

Is Petrel used for reservoir surveillance?

No it is used for studies and drilling operations – surveillance is different.

0616_6.2   *Data management roadmap for Petrel – Arun Narayanan, SIS*

Petrel's data management is not going to follow the GeoFrame/OpenWorks data paradigm. These were designed around an 'always connected' model, with changes propagated immediately. Petrel data

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[10] *While this is certainly true, estimating the cost of such an event is usually out of the 'bean counter's' scope.*

management will be improved, leveraging the flexibility of flat files and the features of a database. Schlumberger wants to ensure that Petrel will work off its flat files – for performance and so that 'you can take it on the plane' and reconnect and sync when back online.

The Petrel data management roadmap is as follows.

2005 Secondary projects. Users can create Petrel projects from other Petrel projects or from GeoFrame/OpenWorks. But this requires attention and cooperation between users so that wells don't get edited during a project.

2006 ProSource aggregates Petrel projects. A Petrel index held in a Seabed database is visible to ProSource, although project capture is very coarse – the whole project is indexed.

2007 reference project workflows. Remedies above issues by creating the illusion that the entire asset team is working on the reference project. Concurrent use is enabled through a quick lock and auto release mechanism. In 2007 the ProSource index will include bulk data and results capture. OpenSpirit will provide integration with ArcGIS.

2008 Petrel DBX (Seabed database). A new Petrel 'DBX' database is planned for 2008 that will interface with the Seabed database. Reference projects are instantiated within a database in a 'lossless' data transfer between Seabed and Petrel. Petrel will still work off '.pet' flat files – you 'wont need Oracle on the plane'. Everything in Petrel will be in the DBX although while some data will be databased and can be queried, bulk data will be stored in blobs[11]. With time (out to 2010) more and more data types will migrate from blobs to the model apart from purely Petrel-related information. The Petrel DBX will be an option – but through Seabed, the PDX will bring full units, coordinate reference system support, etc. The DBX can be configured to sync with Petrel, to notify of new data etc. It will also be possible to create a workspace project out of the DBX, lock, pack and go, work in workspace, return and then update the DBX. This development is driven as part of the Project and User Management for Petrel (PUMP) project. 2009 will see reservoir engineering support added to the Petrel DBX.

> Q&A
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> *It can take up to 20 minutes to open a project because of the number of files involved. Will the file count reduce?*
>
> Not sure – better ask engineering.

0616_6.3   Evaluation of Petrel 2004 in seismic interpretation – Peter Diebold (Shell)

Datasets over 10GB are common in Shell, often with a mix of 2D and 3D data. With the increasing power of the PC (dual core, 64 bit XP, clusters) it should be feasible to perform seismic interpretation on the latest machines. The context of this investigation is of pure 'spatial' (not voxel) seismic interpretation. This involves an evolutionary paradigm shift from what Diebold describes as the old-fashioned 'paper on screen' (PoS) technology. Today, people and time constraints mean that such a 'meticulous' approach is no longer possible. Diebold is waging a war against PoS interpretation in Shell where recently, a team leader recommended PoS interpretation – showing a 'criminal' lack of judgment for Diebold.

Diebold advocates a modern 'sparse' 3D interpretation approach and it was in this context that Shell set out to evaluate Petrel's seismic interpretation capability in 2005. Petrel is already established as a key reservoir management tool in Shell – so there is significant potential to leverage synergy with seismic interpretation. The 2005 study investigated what seismic functionality existed in Petrel, checking that everything was there and that it integrates with Shell's information management and geomatics. Shell also wanted to be able to embed in-house R&D with the Petrel toolset.

The evaluation was performed in part by Shell's existing Petrel petroleum geology community – especially the early adopters, the 'tinkerers'. The evaluation was performed across a big matrix of 8 'themes'. Petrel was tested globally with evaluations all over world on different live projects. The results showed that Petrel was great for 'quick look' seismic interpretation and integration with non seismic disciplines. Users commented that they had 'never seen volume interpretation come so naturally'. Petrel's workflow management, multiple realizations and its use in interpretation quality assurance were positive points. On the downside, Petrel's lacunae in data management were deemed 'a huge issue'. The integration of legacy data (GeoFrame and OpenWorks) was problematical. In this context, OpenSpirit – SIS' preferred solution

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[11] *Binary large objects.*

proved 'slow and unpredictable'. Geomatics is 'poor' and rock seismic interpretation issues, limited volume size and lack of multi user support were also reported.

Following the evaluation, Shell has recommended limited deployment of Petrel Seismic Interpretation, for example in the New Business Ventures group. Petrel SI requires training and a mindset change – to help folks get away from PoS interpretation – Diebold remarked that middle management is often part of the PoS 'gang'.

0616_6.4   Petrel data management in ExxonMobil – JoAnne Sblendorio-Levy

ExxonMobil's (XOM) environment prior to the adoption of Petrel involved the automated replication of data between databases and its major geoscience applications. Then Petrel came along with its file-based data management –Petrel does not have a database – and the need to duplicate data. This is generally considered a bad data management practice. The data managers effectively lost control over project creation and could not assure defaults for project names or metadata standards. Petrel is also geodetically 'unaware' which is also potentially dangerous. The result is that a lot of manual intervention is required for Petrel data management. XOM considers that Petrel's limited and complex data loading is a 'big issue'.

Today, XOM's data management strategy involves a major data preparation and reconciliation of whatever is used in a Petrel project. Auto sync is turned on to maintain consistency. XOM uses the Petrel master project paradigm with a seismic master and a well master. Users drag and drop data into their working projects. Data management controls setup and load of Petrel projects in so far as this is possible and is training support staff in best practices. Loading is performed by trained staff using naming conventions and a standard directory structure. Data is auto synched from the Corporate data store (CDS) to GeoFrame and then via OpenSpirit (a key component of XOM's system) to load the Petrel master. It is from the Petrel master to Petrel projects that 'things get complicated'.

Sblendorio-Levy suggested a few ways of making it better. XOM wants to create projects programmatically – with direct data load into Petrel projects. Other suggestions include automated Petrel project maintenance, automated capture of project milestones. XOM would also like to be able to build a Petrel project according to business rules – for example to refresh a project from the corporate database when new well data arrives and to synchronize Petrel projects back to the CDS or across to other Petrel projects.

In summary, Petrel data management is a challenge. Today, XOM has a 'tactical solution' but wants full database integration, project level data access, full metadata access and a really robust API e.g. for project clean-up. XOM also wants to save workflows outside of Petrel, ideally in XML.

Q&A

How do you compare Petrel and GeoFrame data management in terms of staff levels and training requirements?

Today Petrel data management is fairly resource intensive. We hope that long term, resources will be less.

The issues with trying to control project generation are reminiscent of proliferating Excel spreadsheets!

That's it – you grab a license and off you go. We are trying to avoid anarchy through training, support staff and templates.

Do you use OpenSpirit for data synchronization?

We did evaluate this earlier this year but decided against it. Hopefully it will work soon.

TW0616_7   Interview with Brice Bouffard and Lester Bayne

What's important to SIS today?

Bouffard – See our Infosys announcement. This emphasizes the evolution of IM and indicates where we'll be 5 years hence, with smoother data flows and developing our skills and services.

Is the Infosys deal another attempt at what you tried to achieve with SEMA?

Bouffard – No! Infosys is a global IT services provider which is helping us achieve what we can't do ourselves. As an example, today's IT systems are built within silos. In the petrotechnical space we have Finder and other structured databases. While these may be federated through a portal, they remain silos. And there are other silos across the enterprise – SAP, legal HSE etc. All of which run on different systems that are not going to converge. So when a drilling engineer wants to query all wells in the vicinity of a location

for cost, HSE information etc. this is not doable today. Or if it is, it is cumbersome. This is the kind of problem that integration would solve.

What does Infosys bring to the table?

Bouffard – They can offer for example Finder to Documentum integration – or HSE to SAP. They can help us capture and refine best practices and then deploy them globally.

Bayne – We are also re-emphasizing our technical consulting offering in the form of site audits, analysis and data management. Clients often underestimate the complexity of their own IT infrastructure. We can offer a quick survey that identifies potential problems, giving clients a holistic view that they may not have internally.

Bouffard – Technical computing is a major area of investment for our clients.

Given a large, integrated oil and gas company which wants to completely renew its IT/IM - a green field site - what do you propose?

Bayne – Avoid unnecessary complexity! From a technology perspective, we are enabling this in three ways 1) minimizing integration complexity via Seabed as a common logical data model across multiple domains and DB instances (project / master); 2) minimizing complexity with respect to tool usage and learning curves, via common DM applications across domains and data-stores (eg. ProSource) and 3) minimizing complexity regarding the demands placed on end-users by enabling workflows as opposed to adding applications, so that users can perform their duties (including their contributions to IM) without added complexity in terms of infrastructure, integration, or learning/usage (e.g. our Petrel IM plug-ins that deploy IM workflows natively in the application). And all of this can be done without a single Unix box if preferred!

Bouffard – End users are looking to new ways of working – these may not be completely defined. But we do have some technology directions to offer. Streaming RT data is becoming part of daily life. Access to production data – WITSML, PRODML – this is not likely to change. We see convergence of structured and unstructured data.

Bayne – Although you will always need structured databases – there is huge growth in emails, BLOBS – here we revert to Infosys for help in managing this. Text search is now embedded in IM – through ProSource, and DecisionPoint will have text search RSN. IM is like a seatbelt. The threat posed by strong search does not exist. There is more and more interest from customers.

Bouffard – IM may not always be apparent. For instance HDP[12] process from Shell – all interpretation goes through steps including Portal access to interpretation applications and data. This methodology may be commercialized as a toolkit. The future will see interpreters doing more and more in less and less time – and data management will have to be done in the background.

Bayne – This will leverage pre-populated forms on the web, and cookies on a user's machine to store preferences and workflow bookmarks.

Why do we even bother building projects? Why can't you offer interpreters windows onto their data à la MapQuest[13]?

Bayne – Our Seabed paradigm is a step in this direction.

Bouffard – GF/OW were built to be close to the user – providing limited views onto corporate data.

Bayne – OFM too offers views onto a corporate dataset.

Bouffard – But I agree that today's technology is not up to this. We expect to be able to offer such facility through web services and data replication.

We wrote up a piece on Petrel data management following the EAGE (see below). Did we get it right - especially are the OpenSpirit and Seabed data models to merge? When?

Bouffard – The article is right in the essentials (steps to integration) but we do not plan to merge the OS and Seabed data models in the near term – although with time, all data models will converge towards Seabed. What is significant is OS' ability to build a Seabed server – we anticipate that this will be significant for new application development. We are having ongoing discussions internally and with OS about these issues.

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[12] *Hydrocarbon Development Planning, aka Field Development Planning see above.*

[13] *An idea we developed in our September 2006 editorial.*

We hear a lot about web services (WS). Where is SIS in WS, with self describing data, tagging, data validation?

Bayne – ProSource and Petrel DM leverage web services today. Our integration engine as deployed in ProSource Results leverages a services-oriented architecture.

Can workflows be captured in XML, edited programmatically and re-run?

Petrel does not support the ability to export the workflows to xml currently. SIS is experimenting with Microsoft Windows Workflow Foundation to enable this kind of functionality[14].

What's the 'next big thing'?

Bouffard – Streaming real time data and applications – developing the technology stack as above.

Talking of 'openness' in the context of Petrel is something of a paradox. Petrel is a facet of SIS' 'wall to wall Microsoft' approach to technology. A far remove from what is generally understood as the Open Source movement!

Bouffard – That's not quite how we see it. At one level, the Ocean API provides openness. But users won't get access to all of our IP as you would expect from an Open Source environment. But Ocean does allow you to add your own functionality to applications like Petrel. We are completely genuine on this openness issue. Publishing Seabed has been a major event for us. This data model represents tens of man-years for our data modelers. Offering this up to the market is a bold statement and we hope that the industry as a whole will gain from this initiative.

We had a look at the Seabed model – it is a text-document, are you planning to release an implementable DDL version of the data model like PPDM does?

Bouffard – PPDM only releases its DLL to members. SIS 'only' publishes the Seabed data model but to everyone. And indeed, we perceive the physical implementation of the data model is a differentiator. Please take some time to check http://www.slb.com/content/services/software/opensystems/index.asp and click on Seabed Data Model.

Any headline oil and gas corporate users of Seabed and or Ocean?

Bouffard – We are not yet ready to make that statement. But to return to your first question about what's key. We are seeing a fantastic growth in our DecisionPoint business today. This is perceived as a step in the direction of automated access to everything.

TW0616_8   Oil IT Journal article on Petrel data management (July 2006)

Russ Sagert presented Schlumberger Information Solutions' (SIS) four approaches to Petrel workflow integration and data management. These start with 'simple deployment' of OpenSpirit (OS) whose data footprint now embraces more of Petrel's data types. Level 2, the Petrel Reference Project, will give co-workers notification of changes such as a re-picked fault path. More sophistication is available at Level 3 with the ProSource GUI and Results extension manager that allows snapshots of projects to be exposed, captured and managed in a Seabed database. Level 4 (nirvana?) will be available in 2008 when users can expect a 'full footprint' Seabed data store for Petrel project data.

TW0616_9   Technology Watch subscription information

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[14] *This answer was supplied off line.*