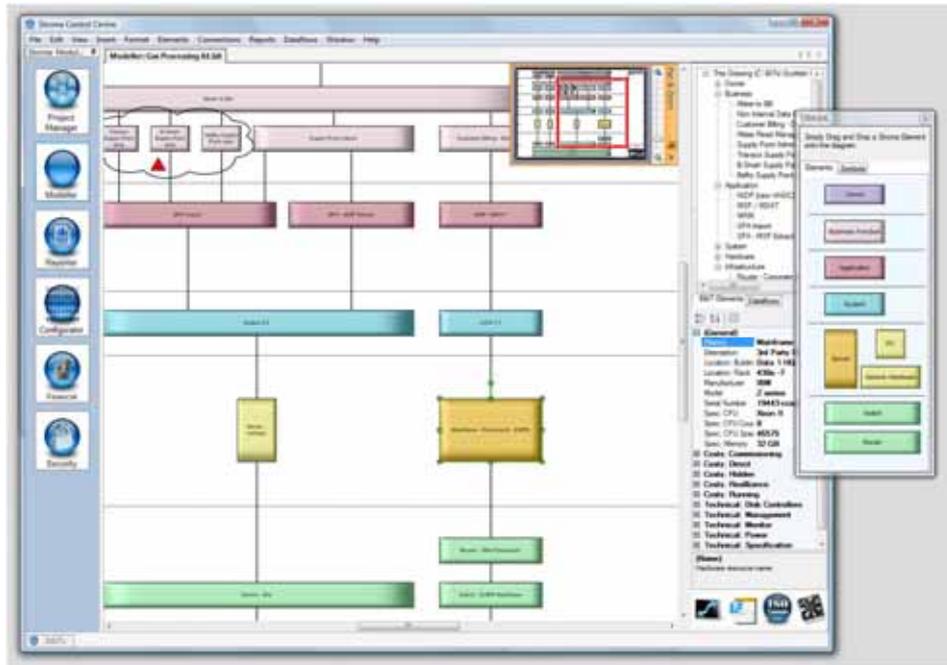


**Petroleum Exploration Society Great Britain  
Data Management Conference, London**



*Stroma Software's Business & IT diagram<sup>1</sup>.*

Around 90 turned out for the 2007 edition of the PESGB's Data Management Special Interest Group's biennial conference. Common Data Access and the British Geological Survey provided updates on the UK's various data initiatives. CDA now offers a turnkey service for well data, with reporting to the UK National Hydrocarbon Data Archive and fulfillment of government reporting requirements. The UK Government body in charge of oil and gas (formerly called the Department of Trade and Industry) is now called the UK department of Business Enterprise and Regulatory Reform (BERR).

A moment of drama arose following the presentation of a new BERR-funded data archival study being performed by Southampton University and Ovation Data. Attendees were, to say the least, curious as to why they were not included in the government tender – and puzzled by the relationship between this project and the other BERR-supported data initiatives. Another significant event was the revealing of a full-blown E&P data warehousing initiative developed by Manchester University and Teradata.

Other presentations looked into the effect of 'Web 2.0' social networking in the enterprise, the extent of GIS deployment in the upstream and a new tool for business and IT 'mapping' for oil and gas.

Finally, another UK university is embarking on an initiative to capture archives from the Anglo-Norwegian Frigg gas field. The project is similar to ongoing Norwegian archival projects and is designed to record business and technical information for posterity.

### Highlights

- [Web 2.0 in oil and gas](#)
- [Survey of GIS usage in E&P](#)
- [Oil and gas data warehouse](#)
- [Long term data archival](#)
- [Business and IT mapping](#)

<sup>1</sup> Image courtesy Stroma Software – [www.stromasoftware.com](http://www.stromasoftware.com).

## Contents

TW0721_1	Common Data Access update – Malcom Fleming, CDA.....	2
TW0721_2	UK national geodata projects – Jeremy Giles, British Geological Survey.....	2
TW0721_3	E&P IM Framework – Simon Cushing, Venture Information Management .....	3
TW0721_4	A new oil and gas archive – Siobhan Convery, Aberdeen University .....	3
TW0721_5	Web 2.0 in oil and gas IM – Paul Duller, Tribal.....	4
TW0721_6	Tagging and E&P data - Wally Jakubowicz, Hampton Data.....	4
TW0721_7	Trends in E&P data management – Andy Thompson, Schlumberger.....	5
TW0721_8	Seismic data format update – Jill Lewis, Troika.....	5
TW0721_9	IGC petrographic standard in sedimentology – Barry Wells, Conwy Valley Systems .....	5
TW0721_10	Legacy data management – Tarun Chandrasekar, Neuralog .....	6
TW0721_11	Survey of GIS usage in E&P – Chris Jepps, Exprodat.....	6
TW0721_12	Workforce planning – Tim Doel, Venture Information Management.....	7
TW0721_13	Teradata for oil and gas – Duncan Irving, Manchester University.....	7
TW0721_14	Avatar-m Project – Charlotte Norlund, University of Southampton IT Innovation Centre .....	8
TW0721_15	Compliant Records Management – Veronica Gordon, Iron Mountain .....	8
TW0721_16	Business and IT mapping for BP – Fergus Cloughley, Stroma Software .....	9
TW0721_17	The Data Room – Technology Watch subscription information.....	10

### TW0721\_1 Common Data Access update – Malcom Fleming, CDA.

The Common Data Access **well data** store is now on its third cycle, with Schlumberger performing the IT and data management. CDA members can optionally rely exclusively on CDA for digital well data management – including reporting to the BERR<sup>2</sup> and archival in NHDA<sup>3</sup>. A 2006 analysis determined that CDA needed a better GUI, more comprehensive data scope, an ‘open’ architecture, less paper and ‘self service’ data publishing. CDA selected Schlumberger’s Seabed E&P specific ‘open’ data model. Schlumberger has provided loaders and data management services leveraging DecisionPoint, SharePoint or ‘WSRP<sup>4</sup>’ integration. CDA is also looking to use OpenSpirit and extending WITSML to allow for the exchange of catalog data. CDA has seen a ‘constant growth’ in members. In November 2007, there were 1,500 registered users, some 220 ‘user days’ and circa 150GB of data loaded. CDA is ‘the single biggest repository of its kind in the world,’ housing raw logs and images. The CDA data footprint is being extended to include pressure, DTS, etc.

CDA has been talking about **seismic data** archival since the beginning. Earlier ‘faltering’ attempts were thwarted by a) cost and b) oil price. Today the oil price is right and regulatory changes, especially regarding data release, have made a seismic archive a more attractive proposition. There are two distinct communities of seismic data users – the owners (for whom the archive may be seen as a burden) and users who are pushing for better, cheaper access. CDA is working with the NHDA to get new proprietary surveys and data released under the new guidelines online. To compensate the owner’s burden, CDA assumes the data release obligations – with a one time ‘endowment’ fee for archival and QC. Entitlements offer access to BERR, members and any third parties. CDA has just got the green light for a draft invitation to tender in July/August 2008. DISKOS is the model.

UKOOA,<sup>5</sup> now ‘**Oil & Gas UK**,’ has tasked CDA with the formation of a ‘Data Management Forum,’ one of nine Oil & Gas UK Forums. Fleming invited interested parties to join. The inaugural meeting is scheduled for Q1 2008. A survey is to go out in January to identify scope. CDA is now part of Oil & Gas UK.

### TW0721\_2 UK national geodata projects – Jeremy Giles, British Geological Survey

It is important to manage national geodata for several reasons. Data can be used to back up important decisions for the nation and must be kept for subsequent reuse. For instance, a document in the possession of the British Geological Survey, had it been accessible to the appropriate stakeholders, could have averted the 1973 Lofthouse colliery disaster<sup>6</sup>. Along with the National Hydrocarbon Data Archive<sup>7</sup>, BGS manages the

<sup>2</sup> The UK Department for Business Enterprise and Regulatory Reform – <http://www.berr.gov.uk>, formerly the Department of Trade and Industry.

<sup>3</sup> National Hydrocarbon Data Archive - <http://www.bgs.ac.uk/NHDA/home.html>.

<sup>4</sup> Web Services for Remote Portlets – see [http://oilit.com/2journal/4php/4\\_makemonthly.php?year=2006&month=1#26](http://oilit.com/2journal/4php/4_makemonthly.php?year=2006&month=1#26).

<sup>5</sup> The UK Offshore Operators’ Association.

<sup>6</sup> An inrush of water from a neighboring, abandoned shaft caused six deaths in 1973 – source <http://www.pitwork.net/lofthouse.htm#conclus>.

<sup>7</sup> National Hydrocarbon Data Archive - <http://www.bgs.ac.uk/NHDA/home.html>.

Earth Science Academic Archive, a passive margins database which is ‘under populated at the moment.’ BGS is one of the NERC’s seven designated data centers. Other BGS projects include [DigMapGB](#), the MIDAS geological field mapping project, an [Itronix](#) GoBook Tablet PC for field data acquisition, LithoFrame, a GoCad-based 3D model of UK geology. BGS is active in the field of metadata and discovery, notably with the [Geoscience Spatial Framework](#), a metadata-driven 3D database of UK solid geology [DGSU data portal](#).

#### Q&A

*How populated is/are the databases? Why are there so many front ends? What if there is another disaster?*

There are multiple user-specific front ends to a smaller number of databases? But population is indeed incomplete. There is a 600 man year backlog for data population. We serve a range of uses – and offer metadata-based discovery to expose what is there. This follows the [EU Inspire](#) rules for comprehensive metadata and viewing services. See also [BGS geoindex](#) and [BGS discoverymetadata](#).

#### TW0721\_3 E&P IM Framework – Simon Cushing, Venture Information Management

Venture’s client has a staff of 300 in London and the same in Aberdeen. Venture was called in as end users were ‘frustrated’ with data access. An IM framework was deployed linking corporate information systems (CIS) including document management, digital and physical data stores. A concurrent information management project handled applications and project metadata. Venture embedded processes, standard nomenclature and roles in the IM framework. Databases were linked in with standards and procedures. The project ran 2005-2006. For wells currently drilling, data flows from rig site applications, through to interpretation systems and the CIS. Applications include OpenWorks, SeisWork, NitroView and LiveLink. The CIS holds horizons and faults. Processes monitor drives and trigger actions when new data arrives. The system can evolve with changing business requirements, roles and responsibilities. A 50% reduction in project build time was reported.

#### Q&A

*How many people were required to implement the system?*

8-10 were involved over the 18 months of the project. Current operations involve two people.

*Any standards used?*

Venture advised on standards – mostly naming conventions, metadata and the choice of definitive sources.

*Was data quality a problem?*

Quality was not a focus in this project although it is an issue. Clean up is done on priority data.

*Does the workflow include a ‘final resting place’ for data that fulfils obligations?*

Yes. The CIS was specified to support these requirements in cooperation with CDA.

*What about roles for folks in the business?*

Change management was important – the exploration manager was engaged to support project and change.

#### TW0721\_4 A new oil and gas archive – Siobhan Convery, Aberdeen University

The ‘Capturing the Energy’ (CTE) project follows along the lines of the Norwegian State Archive (Statsarkivet – see Oil IT Journal September 2007<sup>8</sup>) and the results of a data/archival conference held in Aberdeen University in 2006. It had been observed that some coal industry archives had ‘occasionally disappeared’ as pits were abandoned and archives were dumped down the mine shaft! To avoid this happening in the oil and gas industry, Aberdeen University, with support from Total E&P UK and Business Archive Scotland, is to host an industry archive. In Norway, information from the Ekofisk field has already

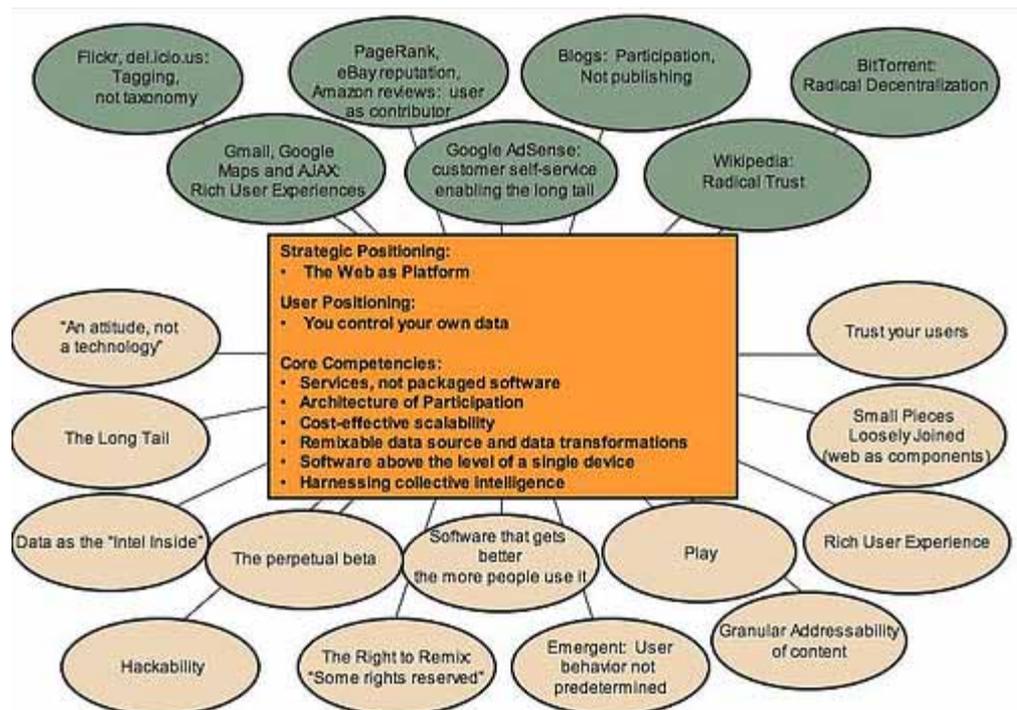
<sup>8</sup> “Torkel Thime from the Norwegian State Archive (Statsarkivet) described a program to capture documents relating to the early days of Norwegian oil and gas exploration. Oil and gas is a crucial business to Norway and it is important to understand how it developed. The Statsarkivet has signed deals with Statoil, ConocoPhillips, Total, Exxon, OLF and others for the archival of documents from the 1970s relating to the discovery and development of Norway’s major oilfields like Ekofisk and Frigg. Documents include scanned memoranda, handwritten notes and video archives. These include ‘behind the scenes,’ internal non public records that ‘contain the real story.’ They show for instance the unpublished negotiations on Ekofisk crude prices and tax discussions between Phillips and the Norwegian government. Management Committee minutes show Bartlesville memoranda on the Ekofisk Bravo blowout. Discussions with trades unions are also captured. According to Thime, ‘There is no truth here, only different views, eyewitness views bring us very close to events.’” Source – Oil IT Journal, September 2007 – [www.oilit.com](http://www.oilit.com).

been captured in the Norwegian [Kulturminne project](#) as a ‘public facing’ website. The Frigg Field, which spans the UK and Norwegian boundary, was developed in the 1970s following a landmark legal agreement. Aberdeen University approached the operator, Total, with regards to documenting UK-specific parts of field including the MCP01 gas compression platform. This is to include information on machines, equipment, engineering and the 32” gas pipeline to St. Fergus. The resulting Frigg Archive is the first CTE project (sponsored by Total and Gassled) and includes engineering drawings, photographs and reports. An initial 13,500 items were ‘whittled down’ to 500 considered to be ‘of long term significance’. A related [‘Lives in the Oil Industry’](#) project is to capture oral history (supported by the British Library and Aberdeen University history department.) CTE is now performing a survey to target future archival projects and determine what to gather and to advise on what to keep. The idea is to amend the BERR guidance and extend the existing project with an exhibition and conference in 2008. See [www.abdn.ac.uk/energyarchive](http://www.abdn.ac.uk/energyarchive), [www.capturing-the-energy.org.uk](http://www.capturing-the-energy.org.uk) and [info@capturing-the-energy.org.uk](mailto:info@capturing-the-energy.org.uk).

**TW0721\_5 Web 2.0 in oil and gas IM – Paul Duller, Tribal**

Duller’s presentation on the hardcopy nightmare was subtitled ‘from Gutenberg to an e-mess!’ A 2007 study by Dynamic Markets for Tower Software titled [‘Document Mayhem in the UK and Northern Ireland’](#) found that ‘one employee in six lies to cover up mistakes involving the use of the wrong document to support business decisions.’ How can organizations get people to work together as though they are in the same location. For Duller, the answer lies in ‘Web 2.0’ with its social networking tools. A straw poll revealed that about 20% of those present have a Facebook account and 10% are on LinkedIn. Bulletin boards provide answers to simple questions, social networking can be used to locate skills and blogs to publish material. Wikis have been used in-house for electronic communication policy development. This was achieved in four weeks with no meetings and the resulting document passed on to lawyers for finalization. Tagging has its role as shown by Flickr’s user-generated tags – and the tools than scan tags and create tag clouds or ‘folksonomies.’ Del.Icio.us also ran and Technorati – the ‘blog of blogs.’ [Google Blog Search](#) was recommended as a high quality search engine. [Eli Lilly’s InnoCentive](#) problem solving ‘community’ offers financial rewards of up to \$1 million. One response concerned the Val Deez cleanup. RSS offers automated update – unfortunately, ‘most in oil and gas don’t know about RSS and constantly go back and check websites.’ Enterprise content management also ran and ‘Office 2.0,’ a.k.a. alternatives to Microsoft Office such as Google Documents, Voo2do, Facebook, DocStoc, Sheetster, slideshare etc. All web-based tools that offer ‘zero footprint’ on the user’s PC – no local software or storage. All of which can cause headaches for IT managers. Should they ban Web 2 tools or perhaps study why they are so popular? Microsoft has been a bit slow with Web 2.0 but now offers a more integrated system – a ‘transformed’ Office with SharePoint and Groove, for example for project planning.

**TW0721\_6 Tagging and E&P data - Wally Jakubowicz, Hampton Data**



Jakubowicz followed on from Duller's web 2.0 presentation by outlining more of the new ways of working – publishing and sharing of content using the extensive public APIs. Publisher and pundit Tim O'Reilly's Web 2.0 'meme map' underlines that allowing users to contribute requires trust. How can these techniques be leveraged in the context of the E&P data environment, with stringent security and control of information sharing? A 'top down' approach is not appropriate, while 'bottom up,' like the web itself, tends to 'creative chaos.' The hope is that a small number of expert users will converge on useful semantics. For this to work, we need a 'tag' database with spatial, file, metadata, document and time attributes. This tag database<sup>10</sup> should enhance existing text and structured data stores<sup>11</sup>.

### TW0721\_7 Trends in E&P data management – Andy Thompson, Schlumberger

In the old days, users were, to a point, literate in the technology. As technology evolves – end users are getting more 'literate in a diversity of tools.' 'Behind the scenes' knowledge is less present and maybe unnecessary. How aware are you of what is going on behind the scenes of applications like Google? Not much perhaps because you don't need to be. How sure are we that the data used is right? For instance master data may be correct but not propagated to applications. New tools are available to 'seek out' and correct automatically. The petrotechnical user doesn't need to be aware of this. Tools can report data quality assurance back to business. This lets companies make E&P decisions 'with the confidence of on-line shopping.' These techniques have evolved from the 'costly reformatting' of data transferred to Microsoft Office. A 'MyYahoo' style multi discipline interface includes data management, dashboards and engineers can add their own stuff. Add in real time streaming data, GIS access and so on<sup>12</sup>.

### TW0721\_8 Seismic data format update – Jill Lewis, Troika

Lewis, who is chair of the SEG Tape Standards Committee, noted that most talks today are about metadata rather than data itself and 'it is data that finds the oil.' Lewis advocates copying seismic tapes every 10 years although 'shelves of tapes are a thing of yesteryear.' The SEG should be proud of its SEG-Y standard – the 'most incredibly successful format.' SEG-Y's future is under discussion. It would be desirable to use a markup language of some sort. But XML is inappropriate for seismics' very large data sets. SEG-D 3.0 adds navigation data, disk output etc. and simplifies use without reinventing the wheel (and without requiring 100,000 lines of new code!). To get an idea of where seismic data volumes are heading, Lewis described a Saudi Aramco land seismic survey with 2 million CDPs and sub second sampling. Lewis recommends reading the SEG- Rev 3 paper – a lot of folks don't understand seismics. SEG-D Rev. 3 'makes seismics understandable to regular IT folks.'

#### Q&A

*What about seismic data on disk?*

There has been a big discussion on the SEG Field list. Problems have been reported with dropped files on software RAID.

*Can you keep data together – observers logs etc.*

SEGD will do this. Western and Sercel will put backup observers logs onto SEG-D trailers.

*Are tape blocks preserved on disk?*

Yes. They must be to retrieve data in an archive format.

*Is this achieved by encapsulation?*

No – a pointer system is used.

### TW0721\_9 International Geological Congress petrographic standard for sedimentology – Barry Wells, Conwy Valley Systems

Artificial intelligence should be part of mainstream computing. Earlier CAIPEP<sup>13</sup> efforts have now stopped as applications entered mainstream – but we still need data management conferences. The [Commission on](#)

<sup>9</sup> [http://static.flickr.com/28/44349798\\_0e487287bc.jpg](http://static.flickr.com/28/44349798_0e487287bc.jpg).

<sup>10</sup> A metadata store?

<sup>11</sup> Our impression is that this is a kind of Web 2.0 'retrofit' to Hampton's GeoScope - <http://www.hamptondata.com/hampton/default.htm>.

<sup>12</sup> We believe that this rather oblique homily to new technology is a soft sell for Decision Space and the newly acquired data quality technology from Innerlogix.

<sup>13</sup> The 1990s Conferences on Artificial Intelligence in Petroleum Exploration and Production – see for instance [http://www.editionstechnip.com/U/braunschweig\\_artificial\\_160\\_001.asp](http://www.editionstechnip.com/U/braunschweig_artificial_160_001.asp).

[Systematics in Petrology](#) (CSP) targets classification and nomenclature (these are not the same). The POSC/Epicentre data model described a ‘hole’ entity – there are many types of holes in rocks. POSC/Epicentre has been mapped to RDF triples. Wells stressed the difference between raw and interpreted data in nomenclature and the ‘chameleon’ nature of terminology. Petrographic nomenclature can change depending on observations and use types. A well must be stored twice – as a centerline and as a 3D caliper record. Here hierarchies are making a come back. LDAP and XML also ran. For example the Universal Protein Database [UNIPROT taxonomy](#) is now available in RDF. OWL also ran. ‘We have some way to go...’

#### TW0721\_10 Legacy data management – Tarun Chandrasekar, Neuralog

In view of the massive amount of well and log data, the status quo is not so bad. Both corporate and project database paradigms have been shown to work. Issues remain with legacy unstructured data such as paper, image, reports and rasters. Physical data management is not enough. Neuralog has been working with Pemex, ‘cleaning gunk off Mylars’ prior to scan. This enables ‘hybrid’ data analysis as available in NeuraSection – allowing for interpretation of calibrated raster logs. The biggest issue is indexing which can be automatic (based on file names), or interactive drag and drop indexing. Log data management can be complex – requiring interoperability with industry and horizontal applications. These include document management systems, SharePoint, WebParts and Informatica. Chandrasekar distinguishes two cultures – ‘enterprise’ data management and ‘Google’ usability. The ideal is a blend of both with added security serving Web 2.0-ish apps. Tools exist to bring in ‘new’ legacy data – scanning in the workflow. Pemex uses a quality – certification process for approved data. SQL Server Express is deployed for remote workers – a ‘mini me’ database that can be disconnected for field work and synched on return.

#### TW0721\_11 Survey of GIS usage in E&P – Chris Jepps, Exprodat

Exprodat conducted a multi client survey of the Role of Geographical Information Systems (GIS) in the E&P industry. What does GIS do? If you Google GIS you get thousands of answers. Jepps groups these into seven categories: organization, visualization, query, edit, spatial analysis, geoprocessing and ‘prediction’ (data mining.) These are positioned along an increasing scale of GIS ‘gradient,’ or value. At the high gradient end lies the promise of competitive analysis – although the data management required to achieve this can be hard to realize. Infrastructure can be hard to build, geoprocessing can be ‘push button,’ or may require training. Jepps suggests a GIS ‘maturity wheel’ – with strategy at center, then data management, applications, and with training and support on the periphery. A six factor ‘maturity matrix’ was used to categorize participants. Most companies are at the early stages of GIS maturity – few gaining all the advantages of GIS.

Although GIS has been around for a while, it is a ‘young’ business in oil and gas. Some 70% of GIS workers have only been in the business since 2000. A migration of GIS was observed – from geotechnical support to IT. 63% reported ‘managed and centralized’ GIS with a support team. Usage has risen significantly in the last three years and GIS usage is expanding across the organization. Most GIS use is in ‘business services’ (data management), new ventures and exploration – less in development. Across the board, 50% are ‘occasional’ users, 25% ‘regular’ and 15% ‘super users’ – the rest do not use GIS at all<sup>14</sup>. 20% provide no GIS training – and little is available in the marketplace.

The report found a ‘sweet spot’ of support to staff ratios of 10:1 or less. No companies used a formal system of metrics to measure GIS service quality. The main GIS support issue was poor integration with other systems. This is ironic as GIS is marketed as integrator. 45% had no spatial data management architecture and under 10% had actually achieved this. 90% GIS users have not built basic data management structures – this is ‘surprising.’ Standards used were PPDM (36%), PODS (9%) and APDM<sup>15</sup> (9%) with little other standards use reported. 82% of respondents were ESRI users (one used MapInfo, one had multiple GIS implementations). Little use of ArcGIS server was reported – this was perceived as immature.

Most GIS use is in visualization, query and spatial analysis. Low use of prediction and geoprocessing was reported. GIS awareness is seen to be poor. 48% recognize it as important but lack the understanding or experience to leverage it. Companies are struggling to define the role of GIS. This is often left to specialists – but even so, GIS capabilities are poorly understood and techniques under utilized. Partly due to a lack of competency and the skills needed to ‘raise companies up the GIS value chain.’ In general, E&P companies do not use geospatial IT standards. This means they are missing out on systems and data interoperability and fail to ‘unlock spatial data from isolated GIS applications and leverage IT investment in unforeseen and

<sup>14</sup> These numbers are for the ‘GIS user base’!

<sup>15</sup> Public Petroleum Data Model, [www.ppdm.org](http://www.ppdm.org), Pipeline Open Data Standard [www.pods.org](http://www.pods.org), ArcGIS Pipeline Data Model [www.apdm.net](http://www.apdm.net).

effective ways.’ Eleven companies sponsored the study including Maersk, ExxonMobil, Total, Chevron and Woodside.

#### Q&A

*Any GIS power-user companies in the survey?*

No. Shell and other GIS specialists did not participate.

*What is oil and gas to ESRI?*

About 5% of ESRI’s business.

*Will ESRI make software easier to use?*

This is unlikely to happen.

*Did you see any impact from Google Earth?*

None was seen in the responses.

*What about geospatial data management – handling the sort of problems that occur when data is shared across GIS, OpenWorks and Finder?*

This is an issue. Companies are stuck lower in the maturity matrix because of the difficulty of moving data around.

#### TW0721\_12 Workforce planning – Tim Doel, Venture Information Management

Business critical Excel spreadsheets in a multi-user environment are easily broken. Venture has developed a ‘pragmatic solution’ to this for an oil and gas client to address business issues including HR, skills, aging workforce, local/expatriate mix and so on. Previously these were managed with multiple complex Excel spreadsheets consolidated yearly – using Excel as a database. This meant that inconsistent data was recorded and the arrival of new data meant ‘redoing the whole thing.’ The project presented multiple data management challenges as roles and skills change over time. The project involved some 4,500 roles, 2000 staff/contractors, multiple projects and data managed by 15 dispersed team members. Consolidating to Excel was ‘a nightmare,’ with intermediate output of around 500,000 rows before pivoting on time. The client was at risk from non delivery of its localization program to governments and its recruitment plan. The 18 month planning cycle was too long. Excel was cumbersome, slow and causing data loss. The solution was an Access database with workforce plans exported to Excel for ‘instant analysis.’ Excel is not a database. Contrary to popular belief, Access is good for a network database on a shared drive – and without IT involvement! The result was ‘network-enabled’ spreadsheets. Some issues remain – users can delete the database file! And there is a limit of 10-15 users. It is easy to corrupt data with remote synchronization - especially on wireless networks. Other solutions like web-based applications and an enterprise database may suit different problem sets and environments.

#### Q&A

*What is Access’ multi user performance like?*

There is a limit of 10-15 users – it is not an enterprise database.

*How have you addressed the wireless issues?*

We told users to stop synching over wireless!

*Is Access a solution or a stop-gap?*

I’m not sure – it is currently in use.

#### TW0721\_13 Teradata for oil and gas – Duncan Irving, Manchester University

Irving has leveraged Teradata’s data warehouse engine to attack the complex storage and retrieval issues associated with massive upstream oil and gas data, seismic in particular. The study began with a problem set by Hydro, to automate 3D channel location in a seismic data set. The problem was submitted to the UK’s National Computer Center<sup>16</sup> (NCC) in Manchester. NCC’s experts figured that the problem could be cracked by loading subsets of seismic data to graphics processing units (GPU) for extremely fast image analysis and pattern matching. The problem was that the whole data set had to be ‘parked’ somewhere before it could be accessed by the GPUs. The initial solution involved a Google Earth-like approach with data access across the network to a local storage farm. A university consortium started out down this road but found that infrastructure was a bottleneck – and that commercial storage systems are not designed for query across such large data sets.

<sup>16</sup> Established after the second world war by Alan Turing and others.

Irving was subsequently approached by Teradata with a technology proposal to abandon the storage farm paradigm in favor of a data warehousing approach. Teradata's technology is designed for very large data volume and is used by Wal\*Mart to store and analyze its humongous real-time sales data<sup>17</sup> (OITJ June 2006). The approach proposed by Teradata was to develop an earth-model-based data structure that could become the focal point of the enterprise including technical computing.

The solution leverages 'open interfaces,' GIS and geodata standards. A geospatial data structure, a global earth model, was built using the OpenGIS 'Geography' data type. Data is stored as attributes by volume cell (voxel) and referenced by hashing at various spatial scales for speed of retrieval (à la Google Earth). The database, which can roll-in weather and production data, underpins reservoir and financial models.

Teradata supports processing within the database, using a 'parallelized' database architecture. The building block is the Access Module Processor – described as 'a little cluster.' These are linked with a custom BYNET backplane to provide massively parallel processing. Seismic data is stored as a 10byte header and a binary large object (BLOB). Spatial data management lets a seismic trace be located in 3D space and more data (velocity) and methods can be attached to a trace such that complex math operations can be performed on the BLOB. Gravity data can be overlaid on the seismics. Rendering and compression middleware can run on a Microsoft Xbox<sup>18</sup>! Irving is currently working on geospatial query and is looking for tie-ins with other vendors.

Irving concluded by noting that data warehousing has been around for a couple of decades – but the oil and gas vertical has yet to get to grips with it. There are many spin-off benefits from enterprise-class data warehousing. Strict version control means that nothing is ever overwritten – good for SOX compliance and workflow management. Data warehouses are amenable to fuzzy logic and neural net processing. The Manchester/Teradata solution even supports high performance computing for flow modeling and real time monitoring of production measurements. The database schema has been tested with MRO inter alia.

#### TW0721\_14 Avatar-m Project – Charlotte Norlund, University of Southampton IT Innovation Centre

The UK Government funded Avatar-m project is investigating ways of storing digital audio/visual and seismic data. The project sets out to address some of the 'interesting challenges' that archivists will face in the next 10-20 years: growing data sizes, disruptive technologies, storage obsolescence, economic and ecological issues. The project has support from the BBC and UK DTI. The BBC has an estimated 27 petabytes of digital data and the UKCS another petabyte or so. Seismics and video share common issues such as obsolete media, lost assets and compliance (data must be kept for perpetuity). A market analysis identified market sectors of data acquisition, processing users, owners, storage providers and governments. In past data was managed internally. There is now a trend towards regular data migration. Data management for field and stack data is generally satisfactory but intermediate stage processing data capture (management of processing parameters) 'could be improved.' Processing knowledge is not 'actively managed.' Looking to the future, 'market forces are driving seismic data on line.' Governments are pushing for centralized archiving of seismic. The future is a services-oriented architecture, and a 'workflow engine.' This is already the subject of an 'active R&D program for audio visual – when will this happen in oil and gas? Avatar-m envisages archives as online services leveraging SOA and 'GIS based data processing.' More from [Avatar-m@it-innovation.soton.ac.uk](mailto:Avatar-m@it-innovation.soton.ac.uk).

#### Q&A

*How does the £3 million grant fit in with the DTI/BERR tender we are expecting next year for the NHDA?*

This is a separate project. The £3 million has already been awarded.

*[A straw poll established that no one present had been asked to tender.]*

*Are all stakeholders aware of this project? The BGS is already providing an archive solution for this...*

*There seems to be a serious disconnect here. I suggest that you are not properly engaged with the industry.*

#### TW0721\_15 Compliant Records Management – Veronica Gordon, Iron Mountain

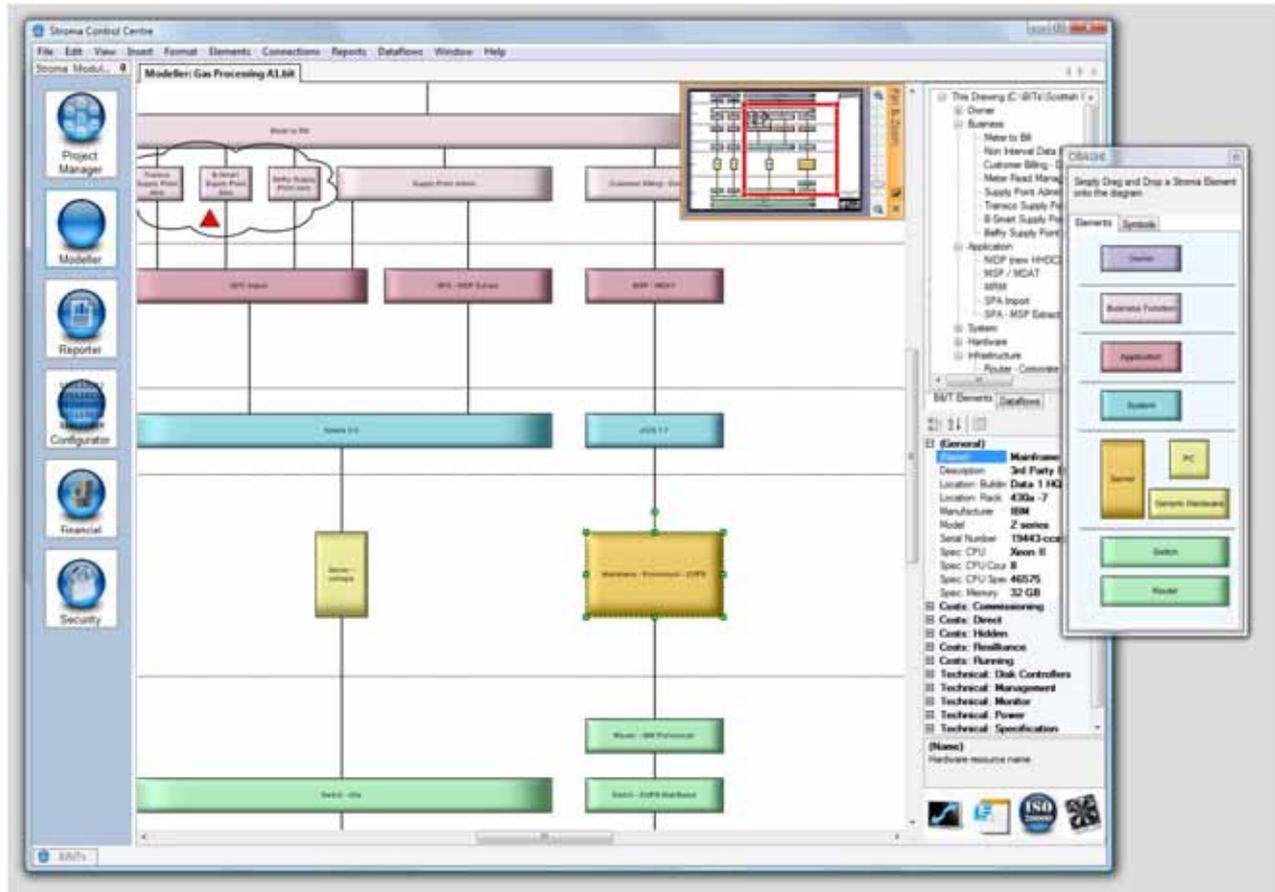
In US legislations you must comply with records management, 'or you will go to jail.' The recent extradition of the Natwest three demonstrates the long arm of the US law. Sarbanes-Oxley is driving record keeping even though many organizations are still 'in denial.' Some use 'arbitrary' destruction programs – for instance, everything over five years old is trashed. The information management playing field is particularly uneven when it comes to digital records. These are 'C-level' issues. Recent record management cases include HM Revenue & Customs (whose chairman resigned last month), a laptop stolen from the

<sup>17</sup> Oil IT Journal – June 2006 ([http://oilit.com/2journal/4php/4\\_makemonthly.php?year=2006&month=6#3](http://oilit.com/2journal/4php/4_makemonthly.php?year=2006&month=6#3)).

<sup>18</sup> The relationship between the X-Box and Teradata's own 'in-situ' processing capability was unclear.

Nationwide Building Society and so on. The American Records Management Association's (ARMA) list server has an ongoing debate on topics like 'what is a record?' 'What is a vital record?' No firm conclusions have been reached to date although a good working definition might be 'A vital record is one whose loss would impact continuity of operations.' But there is a financial carrot to good records management – one Iron Mountain client implemented an RM policy including destruction and reported a 43% ROI over a 3 year period.

## TW0721\_16 Business and IT mapping for BP – Fergus Cloughley, Stroma Software



Stroma's Business and IT mapping tool<sup>19</sup>.

Stroma's modeling tool creates 'Business and IT' (B&IT) diagrams that serve as a 'common language' for engineers and IT. Stroma was developed for BP's Grangemouth refinery. During the Y2K period, BP discovered a communications gap between IT and business. There was no 'big picture' of business information flows. BP asked Stroma to build a link between information models and CAD, LIMS, PI, optimization and simulation. This was in the context of BP's Common Operating Environment (COE) and the new 'digital business' strategy. The result is a common dynamic view of process and IT support. Stroma's B&IT displays CAD/P&ID diagrams that show the relationship between pumps and the IT systems that look after the plant. Scope is defined by another acronym – 'OBASHI' – meaning 'owner, business process, application, system, hardware and infrastructure.' B&IT shows data flows from tank through various business processes and owners into a spreadsheet in the accounts dept. Recent developments include 'swim lane' diagrams (beyond Excel and Visio) that are inventing 'new ways to relate to information.' More from [www.stromasoftware.com](http://www.stromasoftware.com).

<sup>19</sup> Image courtesy Stroma Software – [www.stromasoftware.com](http://www.stromasoftware.com).

[TW0721\\_17 The Data Room – Technology Watch subscription information](#)

*This report has been produced as part of The Data Room's Technology Watch reporting service. For more on this subscription-based service please visit the [Technology Watch home page](#) or email [tw@oilit.com](mailto:tw@oilit.com).*



© January 2008

*The Data Room  
7 rue des Verrieres  
F-92310 Sevres France*

Tel (USA) 281 968 0752

Tel (UK) 020 7193 1489

Tel (France) +33 1 4623 9596

Fax +33 1 4623 0652

[Technology Watch Home Page](#)

[info@oilit.com](mailto:info@oilit.com)