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NEXT IN OIL IT JOURNAL, ESRI EU PUG LONDON

Geo-microservices

The next big thing in IT? Microservices! Landmark and DELL/EMC, with backing from majors and service companies, to port monolithic legacy apps to the cloud in OpenEarth Community effort.

Early examples of software migration from on-premises deployment to the cloud simply moved an application along with its operating system off site. The move to the cloud eliminated the need for high-end local hardware but there was no qualitative difference in application functionality. Pre-existing issues, notably interoperability between different applications, were not addressed.

The IT world has been pecking away at this situation for a couple of years now with the concept of microservices. These are small software components, tuned for the web, that *do* interoperate and that benefit from modern deployment technologies such as virtual machines, Docker and that may even run *sans* OS on 'bare metal' hardware (see Nimbix, page 4).

The OpenEarth Community (OEC), a joint industry initiative led by Halliburton-Landmark with support from a number of majors and service companies, is to go live in 2017, with the objective of building an open source stack leveraging a microservices-style architecture and maybe to wean the upstream from its legacy monolithic software.

Dell EMC is collaborating actively on the initiative and already has a 'fully engineered and validated' platform for Landmark's DecisionSpace. Dell is also promoting its Pivotal cloud foundry and 'native hybrid cloud' as key components of the OEC.

Since the OEC was first announced at the Life 2016 event, Landmark has been working on the DevOps and collaboration environment that will support the initiative. OEC founder members include Anadarko, Baker Hughes, CGG, Devon Energy, IHS Markit, Shell, Statoil and Total.

The major oil and gas software houses are racing to embrace the cloud/microservices paradigm - Schlumberger with Mere, GE/ Predix, Siemens/MindSphere, Yokogawa/Industrial Knowledge and Rockwell/Azure IoT Suite. One is tempted to question how such platforms will interoperate with each other. An opening here for the standards folks perhaps?

For the upstream, initial targets for microservices decomposition will be 'embarrassingly parallel' workloads (q.v. Nimbix again) which can be broken into small chunks that run in the cloud.

You may still be wondering how one goes from a monolithic application to microservices. A recent IBM Redbook explains in detail how this can be achieved, with a quaintly named 'strangler' application that captures and intercepts calls to legacy applications, routes them to other handlers, and gradually replaces them altogether.

For more, visit the OEC website and read our exclusive interview with Landmark CTO Mike Jones and Dell/EMC CTO Energy, David Holmes on page 3 of this issue.

Energy management

Yokogawa acquires Soteica Visual Mesa, adding cloud-based energy management to its Industrial Knowledge/KBC Advanced units.

Yokogawa has acquired Houston-headquartered Soteica Visual Mesa, a provider of energy and emissions management, production-yield accounting, supply chain scheduling and blending optimization software. SVM's software will join Yokogawa's cloud-based data-as-a-service Industrial Knowledge (formerly Industrial Evolution) and the KBC Advanced Technologies unit, led by KBC CEO, Andy Howell.

Visual Mesa adds optimization software to KBC's energy consultancy and simulation platform for hydrocarbon processing facilities, PetroSim. Yokogawa executive VP Satoru Kurosu commented, 'The integration of SVM and IK with KBC combines business, process, and operational domain knowledge across the energy and chemicals sectors. The cloud-based, real-time representation of plant, business, and supply chain operations will help identify and implement solutions to sustain and continuously improve performance.'

Howell added, 'These offerings are now delivered through a state-of-the-art, proven cloud service model and bring new possibilities such as continuous model updating, mobile delivery, and seamless hand-off between rigorous simulation and big data analytics.'

Watson and the weather

Neil McNaughton asks if the current big data and analytics hoopla is justified. In some fields, like finance, and probably oil and gas, it can be hard to test AI objectively. In weather forecasting though, there is a vast body of data and also, a rich forward modeling tradition that should allow for a head-to-head comparison of the two approaches. Looks like IBM is on the case already.

Hedge funds, day traders and others seeking get rich quick schemes are looking intensely at what has come to be known as big data and analytics. On the information technology side, the analytics approach is being supported by trendy new technologies – data lakes, machine learning, artificial intelligence and so on. Current media reporting focuses on the promise of such technology, the upside; along with the its' risks to humanity, the downside. What is not so clear is the possibility that the 'big data and analytics' (BDA) movement may be another false dawn for artificial intelligence, the blindside.

It is a good idea to step back from the fray and look at what BDA is trying to do. On the one hand, there is the expectation that, by analyzing a very large amount of data, hidden trends and truths may emerge. The day traders are hoping for some a hitherto unseen correlation that foretells the future value of an investment. BDA promises to beat traditional analyses using charts or fundamentals. Unfortunately, finance does not lend itself to rigorous testing because if a new martingale is discovered, it is unlikely to be widely reported. If it is made public, investors will quickly adapt and lessen its effectiveness.

In science and engineering, BDA is up against a different kind of traditional analysis, generally known as forward modeling. If you are manufacturing an airplane wing or other mechanical part, or if you are studying the flow of chemicals in a reactor, the science behind these activities is well understood. Building detailed models of the part or process in the computer is now used to test proposed modifications to deformations, flow rates and such, that were previously done with real physical models. Should there remain uncertainty in a digital model's validity, other measurements can be added to 'ground truth' and refine the model.

Forward modeling is a very powerful tool and it has been used for decades to model fluid flow in an oil reservoir. But this activity is different from the engineering fields above in that models of oil fields are built on incomplete data. A few sample boreholes, flow rate tests on wells, a relatively short period of oil or gas production do not make for a sufficiently detailed numerical model for unequivocal results. Here, forward modeling becomes an exercise in approximation and interpolation, with results that may vary greatly depending on what assumptions were used.

It is this kind of under-specified problem that is the predilection of the BDA enthusiasts. Instead of using forward modeling using physics, just throw all the information you have into the computer and let the machine figure out what is happening using machine learning/ artificial intelligence. This approach is presented in some circles as a 'no-brainer.' To quote ConocoPhillips' Richard Barclay, a strong advocate of the use of AI in the oilfield, 'If you are still using physics-based models [as opposed to BDA/AI] then you are leaving money on the table.' Strong words indeed, backed up enthusiastically by the IT/consulting community who see a whole new field of opportunities for getting their foot into the door and doing 'disruption.'

Oilfield modeling is, and will likely remain, closer to financial modeling in that it is difficult to know when you have got something right. There are far too many ways of doing the calculations. Again, truth lies in the future, folks will keep on arguing about the outcomes and how much, if any, money is still 'on the table.' Acquiring more data is often prohibitively expensive. In reality, the techniques behind todays' big data approaches have been used for decades in the oil and gas business and in many other verticals without much apparent 'disruption.'

Weather forecasting on the other hand is an area that ought to provide a good test of full physics, forward modeling and BDA/ AI. Currently, weather forecasters use forward modeling of the physics of air motion, a spinning earth, sunlight, water uptake from the oceans and so on to provide quite accurate forecasts of the weather a few days out. Weather forecasters also collect and have been collecting data, lots of it, for decades if not centuries. All of which should make a great litmus test for forward modeling versus analytics.

I say 'should make,' but weather data is not all that easy to access. The national weather authorities have invested heavily in computing resources that generally use the forward modeling approach and may not be all that keen on sharing their data with folks who may use it to compete with them in their commercial forecasting, or perhaps to develop a better, cheaper means of forecasting. There are notable exceptions. The US NOAA has opened its data for public use in its 'Big data project, 'but even here, public access is 'limited to 10% of NOAA's 20 terabytes of daily output'.

Alongside the 'official' met data collected by NOAA, a more grass roots data collection effort is exemplified by WeatherUnderground which links together hundreds of thousands of private individuals' weather stations (on of them which I own!) In 1995 WU started out as a militant 'underground' activity but its potential was spotted early on by The Weather Company (owner of the US TV station The Weather Channel) which acquired WU in 2012. Earlier in 2016, TWC signed with IBM which is now to host its weather data and apply its Jeopardy-winning Watson's 'cognitive' BDA technology to weather forecasting. The question now is, will IBM's Watson beat the traditional forecasters? If it does, will we even know?

🐦 @neilmcn

Oil IT interview, Mike Jones (Landmark)/David Holmes (Dell/Emc)

Oil IT Journal gets the low-down on Landmark's ambitious OpenEarth initiative in this exclusive interview with CTO Mike Jones and David Holmes from partner Dell/EMC. The 'free, global and open' community of scientists, engineers and software developers, with backing from majors and service companies, proposes 'horizontal' interoperability as opposed to Petrel's 'single app' approach.

Mike Jones - The OpenEarth (OE) story started back in 2015 with the squeeze on development spend. At Landmark we launched an internal project to see how other verticals were addressing modern digitalization. We visited advanced verticals, finance, medical and aerospace. What we found was that these industries benefit from community-supported platforms. We then got thinking about how to apply to oil an gas what sort of a model might apply. We drafted a deck to make the case for an oil and gas platform which we showed to 13 of our major clients? We were pleased when 12 of them gave the initiative a warm welcome and a commitment to help. OE was introduced at the 2016 Landmark Life event last summer and we will be launching in Q1 2017.

What is Dell/EMC's role?

David Holmes – We saw synergies with our stuff, notably our Cloud Foundry offering. We also have been looking in some detail at what oils and vendors do on a regular basis. A lot of which I call, 'undifferentiated heavy lifting.' As I think you reported from the EAGE workshop on open source software in geophysics, there were almost as many SEG-Y readers as presentations! An enormous duplication of effort. More generally it's a pain to have to support multiple platforms and either to commit to a proprietary platform or develop code that already exists. Many vendors pretend to be 'open,' as long as you sign up to their platform. Hence the idea of a central common platform and a community-driven roadmap that is not hostage to fortune and a single vendor.

MJ – It is a bit like the difference between the Apple iOS ecosystem and Android. If you develop for the Apple ecosystem you get the technology and access to the platform – but you will not be able to influence the system's future evolution or commercialize your application independently of Apple. It is 'open' but … closed. With Android, you can get under the hood of the technology and monetize your work as you see fit. Android is open and transparent. The OE model is much closer to Android.

DH - OE is a common central platform that can evolve in different directions and that oils and other clients can manage themselves. The idea is to even the playing field.

If we look a few years ahead, what will you get if you do not buy into DecisionSpace – will there be, for instance, an app for reading SEG-Y?

MJ – Our plan is for a secure environment for interoperability. OE is not application-centric. It is designed for vendor-to-vendor and data source-to-data source interactions. To imagine the future, OE certified applications will raise the game with respect to interoperability. Today our main competitor [*read Petrel*] inter-operates around a single application. Our focus is more horizontal. To take your example of, say, a free basic SEG-Y reader, we are working on this. It's a good example of David's heavy lifting. Likewise we might see visualization or basic simulation functionality available at the platform level. For the moment, most of our effort is on the computer science behind the platform.

We have seen Landmark as a long time supporter of platform independence, using Java, and offering Linux and Windows software as opposed to Schlumberger's early move to Windows. Is OE following this way of thinking?

MJ – That's a reasonable conclusion. Schlumberger went to Microsoft early and we remain a Java shop. In fact our DecisionSpace Enterprise Services have been used to seed the OE platform.

Will this involve re-architecting to a cloud-style/microservices type architecture?

MJ – Yes we are migrating to a micro-services platform and to smaller orthogonal components. And we are helping others move in this direction. Our plans include a core IT platform, then support for 4D seismic and real time data where we are partnering with Pivotal.

DH – Today, Landmark's overall offering is client server/Java based. At the SEG we announced a microservices-based cloud offering for on-and/or-off premises deployment. This is under development at Dell with our Pivotal division. We plan for a native Cloud Foundry development that will support a next generation cloud architected scalable solution. A step change in IT.

What other operators and vendors are signed up?

MJ – Several were on stage at our Life event. We have not yet signed but we have strong interest from Dell/EMC (clearly), Pivotal, IHS, BakerHughes and CGG. On the operator side we had similar support from Anadarko, Devon, Shell, Statoil and Total. Since Life, interest has been growing strongly. CIOs are very supportive of a platform that is open to all.

What's the entry fee?

MJ – We are planning something along the lines of an 'open core' model, like Linux, with an offering that is free to developers but that will be commercialized like RedHat as a platform-as-a-service.

How does this relate to iEnergy?

MJ – It is a separate initiative. iEnergy reflects Landmark's work helping clients with their ongoing digitization effort. It is a community effort that is working to help customers deploy our technology.

Anything else on OE?

MJ – Yes, one other thing. OE is not just owned by Landmark. I have been iterating my PowerPoint to reflect the fact that OE is now co-branded Landmark and Shell. We are in talks with other vendors and expect more third parties to be in a position to proselytize the platform.

Visit the OE home page here.

EnergyIQ targets upstream data automation

'Rendezvous' meet up hears from users and from developers on software QA.

Mike Skeffington, VP business development and blogger in chief, has posted highlights from EnergyIQ's annual 'Rendezvous' user meeting held last month in Houston. Skeffington observes that most companies have reduced staff and are unlikely ever to return to the staffing levels of pre-2014. Hence EnergyIQ's focus on data automation. New functionality in the flagship TDM data management system addresses the management of data 'events,' enabling workflow automation and addressing data quality issues.

Four clients presented on their use of TDM, Concho Resources on integrating and well data in TDM, BP on blending DrillingInfo and IHS data sources, Laredo Energy on the use of Spotfire as a front end to TDM and Marathon Oil, which provided an update on its corporate well master database.

Internally, EnergyIQ reports increased use of agile development techniques to assure its software quality. Here, QA professionals participate in 'story development' alongside product managers and developers. The approach is claimed to have improved mutual understanding of product changes and lowered the cost of software defects by catching them as early as possible. An application-wide automated 'smoke test' was developed using Watir's web application test suite with code written in Ruby. Further testing is performed with the RestUI suite and DBfit. Read the blog here.

Nimbix rolls-out 'push to compute' HPC

Novel container technology for HPC workflows offers 'bare metal' OS-less performance.

Speaking at the 2016 SEG, Leo Reiter, (Nimbix CTO) described the problems of processing seismics in the cloud. Seismic imaging is no longer 'embarrassingly parallel' and today's commodity cluster is not up to the task. Reiter describes a 'conflict of architectures' with the cloud's low interconnect bandwidth, loosely coupled architecture and poor GPU support. On the other hand an HPC seismic machine needs high bandwidth interconnect and plenty of GPUs.

Container technology brings the promise of 'bare metal' performance, potentially without the overhead of an operating system. In practice though, Docker-style containers use a virtual machine and lose some of these benefits.

Enter Nimbix Jarvice, a containerized runtime platform for HPC workflows. Jarvice containers run directly on bare metal and offer native performance, access to accelerators and to an InfiniBand-speed interconnect. The 2016 'Push-to-compute' Jarvice edition allow continuous integration of containerized HPC applications with support for Nvidia and Docker images and 'end-to-end, GitHub thro' Docker to Jarvice' deployment. Recently IBM and Nimbix announced availability of Minsky-powered GPU options on the Nimbix cloud.

Roxar announces Python API for reservoir modelers

'Extensibility solution' for upstream workflow development builds cross-discipline apps.

Emerson Automation Solutions' Roxar unit has announced a new application programming interface and 'extensibility solution' for reservoir modelers. The Python-based API allows users to customize their reservoir modeling workflows, adding their own intellectual property 'smarts' and leveraging RMS project data. Roxar VP Kjetil Fagervik said, 'Previously, reservoir modeling has been a fragmented and proprietary-dominated process with a lack of flexibility and interoperability. Vital data was overlooked if it didn't fit into the workflow. The API opens lets users build innovative geoscience, reservoir engineering and oilfield technology applications and add company-specific goals to generic workflows.'

A Python Job functionality allows scripts to be saved and repurposed for use in other workflows. The API can also be used to build customized, standalone 'Roxar apps' that share project data and models with RMS. Apps can be proprietary, commercial or open and shared within the organization or with the wider community of Roxar users and developers. More on the API from Roxar and in our interview with Roxar in next month's Oil IT Journal.

Sindbad seismic imaging consortium year-end meet

OpeSci's symbolic math for finite difference models, wave propagators. Modeling in Juila.

Speaking at the UBC/SLIM/Sinbad year-end meet, Gerard Gorman (Imperial College) introduced OpeSci-FD, an 'open performance portable seismic imaging finite difference Python package. OpeSci uses symbolic mathematics to automatical-ly generate finite difference models from a high-level description of the model equations. The research is a joint Sinbad/Senai-Cimatec effort and has funding from Intel.

Mathias Louboutin (SLIM) demoed high-performance seismic applications of OpeSci. Various wave propagators have been developed and show that performance of this code is on par with industrial software libraries.

Philipp Witte is developing a large-scale time-domain modeling and inversion workflow in Julia. The framework leverages the Devito tool for optimized finite difference computations. Devito generates optimized code from symbolic partial differential equations. Witte's objective is for a framework that supports coding that is 'close to the math' and at the same time provides state of the art wave equation solvers. More from UBC-SLIM.

Software, hardware short takes ...

Roxar RMS 10, Sintef Matlab reservoir simulation toolbox, Tecplot RS, ExproSoft WellMaster, Schneider Electric RefineryWise, Aggreko's genny, CGG GeoSoftware HampsonRussell, GE Field Agent, IFS Business Connector, Seven Lakes Joyn for oil and gas, Kepware KEPServerEX, OpendTect Petrel plugin, PetroVR 2017, PHDWin 2.10, Ikon Science RokDoc/Ji-Fi, Pegasus Vertex CemLife/PlugPro, Quorum Land Canada, Streamsim StudioSL/3DSL. Schlumberger Olga 2016.1.

The new RMS 10 release from Emerson's **Roxar** unit adds support for 'big loop,' seismic to simulation workflows, decision-support tools for reservoir management and increased user productivity.

The 2016b edition of MRST, the Matlab reservoir simulation toolbox is a free download from Norway's **Sintef** R&D establishment. Read the release notes here.

The **Tecplot** RS 2016 R2 release includes a new quick load option and macro debugger. Other new features include the ability to read nearest neighbor connections from Eclipse .init files, and the support by generic ASCII data files for network connections, connection lists, and nodes.

ExproSoft has announced WellMaster, a cloud-based simulator that helps operators predict well interventions, downtime and lifecycle costs. The solution combines RAM Studio from Miriam, which Exprosoft acquired recently, with the WellMaster RMS equipment reliability database.

Schneider Electric has rolled out RefineryWise that provides refiners with greater visibility into 'contextualized, actionable data,' from the process automation layer through the enterprise business system layer and from crude feed planning to final product blending. The solution combines a portfolio of applications and an extensible application integration framework.

Aggreko's oil country electricity generators are controlled in the field only generate power when it is needed, saving 'up to 65%' in fuel costs. A battery control kit synchronizes stop and start with programmable logic controls, tank level switches or thermostat contacts. The system is designed for artificial lift systems, midstream pumping stations and de-watering facilities.

CGG GeoSoftware has released HampsonRussell 10.2 with new features for attribute extraction and prediction along horizontal wells and improved geostatistics. Key features include new data conditioning processes, residual NMO correction and FXY deconvolution for noise attenuation and spectral balancing. A new MapPredict application provides geostatistical mapping of well, seismic and attribute data. CGG has also updated its other interpretation tools with 'significant' updates to InsightEarth 3.1, Jason 9.6, PowerLog 9.6, EarthModel FT 9.6 and VelPro 9.6.

GE has just published a brochure describing its new industrial internet control systems that herald Field Agent/Predix-powered 'user-defined intelligent apps.

IFS has released the IoT Business Connector to 'de-risk and accelerate' IoT initiatives in areas such as predictive maintenance, service management, asset management and manufacturing. The Connector provides plug-and-play connectivity with the Microsoft Azure IoT Suite and provides an open API to connect into other platforms or applications.

Seven Lakes has announced Joyn for oil and gas, a workflow integration platform with out-of-the box solutions for field data gathering, production, financials, reserves and regulatory compliance. Joyn is said harnesses the power of big data, machine learning, cloud computing and mobile technologies.

Kepware has announced V6 of its KEPServerEX industrial connectivity platform with enhancements to the core server, new remote configuration and localization for German and Japanese markets.

OpendTect has just released a new Petrel plugin which provides direct access to Petrel 2016 data. The plugin requires OpendTect Pro V 6.0.4 or higher.

PetroVR 2017, a.k.a. V 13.1 adds interoperability with a range of industry standards including Peep, Palantir, JSON and Excel. The new release also adds international characters and ISO 8601 timestamps. Updates are now secured with a SHA256 hash.

PHDWin 2.10 now ships with a new models maintenance application for enhanced file management. Models can be drag-and-dropped from one file to another and edited in Excel.

The 6.4 release of **Ikon Science**'s RokDoc focuses on stability, usability and performance. A LAS log loader speeds analysis of large well data sets. RokDok Ji-Fi's MPI performance enhancement option optimizes the use of available cluster computing capacity. Usability enhancements to RokDoc 3D and Ji-Fi, include support for non-linear rock physics depth trends and non-contiguous seismic data.

Pegasus Vertex' CemLife analyzes the cement integrity in the context of dynamically changing pressure and temperature conditions. CemLife predicts cement sheath failures caused by compression, traction and micro-annulus. Sensitivity analysis shows the relative impact of different parameters on slurry optimization. Watch the video here! PVI has also released PlugPro, a cement plug placement model that calculates under-displacement volumes and optimizes fluid volumes to balance slurry and spacer levels after pull out of the hole.

Quorum has announced new land management software for the Canadian market. Quorum Land Canada is the result of a joint development effort between Quorum and an Western Canadian upstream operator.

The latest release of **Streamsim**'s StudioSL/3DSL v2016.1212 can now compute remaining fluids in place for surveillance models. 3DSL does this by applying classic material balance to time-varying, streamline-based patterns. More in SPE paper 185713.

The 2016.1 release of Schlumberger's Olga dynamic multiphase flow simulator now includes a risk management and optimization workflow with all Olga licenses. Slugs and rheology simulation is improved and particle transport has been added and connectivity enhanced.

on the spot report

OSIsoft PI System user conference, Berlin

Internet of things? Industrie 4.0? OSIsoft and clients done 'em for decades! Flowserve pump monitored live with AI from SparkCognition. PI marketplace announced. Shell's PI 'super collectives.' Mitsui's PI/SAP cloud. Honeywell on 'ubiquitous but problematic' OPC. OSIsoft's main competition? In-house IT. The PI big data debate. Tullow builds digital oilfield from scratch.

OSIsoft claims to have been doing the industrial internet of things for 35 years already but is quite happy to jump on the current bandwagons of IoT, Industrie 4.0 and 'digitalization.' Christoph Papenfuss, welcoming the record 1,200 attendees to the 2016 EU OSIsoft User Conference in Berlin earlier this year, observed that there is a profusion of buzzwords, new technology and companies trying to grab your attention. But for Osisoft's clients, data underpins all these initiatives. What OSIsoft and its clients have been doing for years is now mainstream. Companies used to give data scientists the wrong tools, spreadsheets. These are 'like bunny rabbits, lovable but they multiply uncontrollably. Lets get rid of them!' At the conference, IoT was more than just a paradigm, with an 'internet of hotel things,' thermal imaging in conference rooms and RFID chips on the attendees' name tags, all feeding into a hosted PI Coresight monitor.

Martin Otterson suggested that the PI System means that clients are now tee'd-up for big data analytics. OSIsoft historically has helped break down the automation vendors' silo walls. But today the major vendors are working towards sensor-to-cloud connectivity and are creating 'whole new silos.' Also, data lakes may not provide adequate context to captured data. A better route to the digital transformation is exemplified by OSIsoft's partnership with Rockwell Automation which has PI technology embedded in its controllers.

A rather compelling use case that the audience appreciated involved a mock-up of a pump from **Flowserve** which was monitored using technology from OSIsoft, National Instruments and PTC. Data flowed into Labview and CompactRIO with analytics in PTC's ThingWorks IoT framework. The system demonstrated cavitation issues, impeller and bearing failure, sending out emails when an upset was detected. For more fancy maintenance applications, an augmented reality/CAD overview of pump parts can be used by field engineers (using technology from Vuforia) on smart phones/tablets or even VR headgear. The multi-vendor theme is to be further developed in 2017 with the

opening of the OSIsoft Marketplace, a 'collection of products, applications, and services from over 200 global partners.' The Marketplace is to launch in 2017 'along the lines of the AppStore.' Of interest to the upstream are the PI Connector for OPC/UA and National Oilwell Varco's Witsml-to-PI interface.

John de Koning showed how **Shell** has deployed PI system 'super collectives' to funnel real time data from worldwide production sites into its central business analytics function, a.k.a. the 'Smart solutions platform.' This leverages OSIsoft tools along with SAP's Hana enterprise data warehouse. The 'smarts' are added with Matlab and R. Shell's proof of concept runs at its Quest carbon capture and storage facility that runs alongside its Alberta tar sands operations. Data from real time laser strain gauges, acoustics and meteorological feeds stream into Matlab/SSP for model based calculations. Power BI provides users with self-service data discovery and HTML5-based visualization.

Japanese *keiretsu* **Mitsui & Co**., which took an equity stake in OSIsoft earlier this year, is now a poster child for ERP-to-operations data integration. Kenji Otake presented the PI/SAP cloud-based integrator proof of concept which is set to become a 'key component of Mitsui's digital transformation.' The IoT integrator for Hana connects the two worlds of equipment and finance and enables collaboration across the supply chain.

Felix Hanish from chemical start-up **Covestro**'s observed that much of Industrie 4.0 is 'buzzword bingo' and someplace 'between gold rush and panic.' Even the novel stuff (machine learning *à la* DeepMind/Go) has been used in the process industries since the 1990s. But the new concepts address real problems in the capital intensive, highly networked chemicals business. Covestro has built its business around the PI System with some 1.6 million PI tags deployed in its StructEese* energy efficiency program. This is lowering CO2 output and energy costs and assures ISO 50001 certification that qualifies Covestro for a 'big tax rebate.' Condition monitoring also ran. On

the downside, the company struggles with the roll-out of apps across its world-wide operations, spending too much time configuring SAP, document management, SmartPlant P&ID and PI. Another issue stems from different innovation cycle rates. These are slow for the DCS/SIS layer but much faster for management information systems. The lower layer is further challenged with the 'slow and incomplete integration' of standards like OPC/UA. There is a need to bypass and tunnel into the DCS to retrofit modern apps and add security.

Honeywell's Elgonda LaGrange described OPC as the workhorse of plant and process connectivity. It is 'ubiquitous but problematic.' OPC/UA improves the situation with multi OS security and is backed by the German IT security organization BSI*. Honeywell's Matrikon unit provides an OPC/UA software development kit, currently with a plant and process focus but also being extended for an oil and gas major to link offshore data sources to an onshore PI system.

Arie van Boven and Arco Stolk from **RWE** described the problems of aligning supply and demand in Germany's diverse energy landscape. An unbalanced electricity grid could disrupt the EU and result in heavy penalties. RWE is reliant on its 24x7 PI infrastructure and is an innovative user of PI Asset Framework, embedded in its in-house developed 'Dataswitch' app. The system is now testing on the Amazon cloud.

We sat in on the analyst lunchtime session for an interesting exchange of views between OSIsoft management and the analyst community. PI started out as a tag database but soon matured, adding context to data and becoming 'a kind of PowerPoint for engineers' with much more functionality. Its main 'competition' has always been the in-house IT department which may be tempted by business warehouse or more recently, by cloud-base repositories from third parties, notably GE. In this complex landscape, PI's strength is its focus on collecting time series data from a multiplicity of sources. In other words, getting information from the equipment zoo, 'the hard stuff!' OSIsoft

president Jenny Linton added that the company's privately held status meant that it could devote more resources to customer support than some, its hot line 'always gets answered' and the company can engage on strategic decisions that 'last for a decade'. But while corporate executives may be *au fait* with the latest developments in big data and SAP, their own company's in-house PI system may be under their radar.

We returned to the fray of the mainstream to hear **SAP**'s Ken Pierce on IT/OT convergence, specifically via the SAP/Hana IoT Integrator. This pipes PI data into the Hana in-memory database. SDKs are available for both Hana and PI. In this presentation at least, SAP is at the focal point of enterprise IT with OSIsoft off to the side. Not a picture that is likely to heighten PI's status in the eyes of the execs!

Chris Felts' headed a panel session on innovation in the IoT, with a focus on EU digital manufacturing initiatives under the Industrie 4.0 banner. There are many IoT initiatives around the world with similar objectives, inter alia, to 'lure industry and academia in.' But there are differences to the US and EU IoTs. In the US, IoT means data in the cloud combined with advanced analytics. In Industry 4.0, the EU IoT, it is more about interoperability, equipment and standards. For Greg Herr (**Flowserve**) IoT means doing more than just 'giving data to the customer.' Rob Brannan (**RtTech**) thought IoT was 'just another elevator pitch!' **NI**'s Ian Fountain was more on-message, NI is working with

customers such as Flowserve on 'edge analytics,' e.g. feature extraction, putting the results into PI.

Some expressed concern that the big data movement might mean that process data may bypass PI and go straight to the cloud and even the operators. Elsewhere, established OSIsoft tools may be eclipsed by tools with a more modern look and feel, 'but with only 5% of the functionality.' OSIsoft is addressing this in Coresight 2016 R2 with its 'high fidelity' displays, notifications and ad-hoc analytics available from any device. In any event, the PI Integrator for Business Analytics allows PI to cohabit with BI systems, warehouses, data lakes and such.

Stuart Gillen from **SparkCognition** drilled down further into the Flowserve demonstrator. SparkCognition's SparkPredict adds deep learning to process data along with natural language processing for human to machine and machine to machine communications. Apparently unconnected data streams are processed to generate testable hypotheses of root causes of upsets. Apache Kafka is used to build real-time streaming data pipelines. Apache Spark also ran, although the company denies a direct link between its name and the open source distributed processing engine. 'Spark is not a reference to Apache Spark, although we do use it, there is no connection with the name.'

Tullow's Mark Whitehouse presented on 'designing and building a digital oilfield solution with no previous experience.' The

target was Tullow's deep water Jubilee field, located offshore West Africa. Here, data acquisition and analysis is key to proactive field management. Tullow's digital oilfield solution is branded TAPS, the technology assisted production system. TAPS has the PI System as a central component feeding high frequency raw data from the field to applications that perform integrated asset modelling, hydrocarbon accounting and allocation, production optimization and production reporting. Processed data from these application modules is then fed back into PI for visualization and trending. Whitehouse reports that TAPS has already resolved critical issues, including severe and 'unprecedented' productivity impairment in the wells and hydrate blockage in one of the risers. TAPS is now being deployed on Tullows TEN development.

* *Structured Efficiency System for Energy.*

** *The Bundesamt für Sicherheit in der Informationstechnik.*

Siemens takes-on GE in IoT, with help from Watson

Siemens Innovation event reports progress on Vision 2020 $5bn/year R&D program. Siemens to bundle IBM cognitive analytics with Mindsphere IoT. On 'nurturing' the digital twin.

Siemens has signed with IBM to offer Watson analytics along with IBM Cognos as a component of MindSphere, its cloud-based operating system for the internet of things. The companies plan to offer 'advanced analytics,' data visualization and dashboards and an API for developers and data analysts. The expectation is that Watson's 'cognitive' technology will unearth 'hidden connections' in production data and help with diagnostics and maintenance. Other partners in Mind-Sphere, include ATOS, SAP, Microsoft, Evososft and Accenture.

The announcement was made at the recent Siemens 'Innovation' event in Munich where the company reported progress on its 'Vision 2020' program which kicks off with an ambitious $5 billion of R&D

investment planned for fiscal 2017. Siemens claims some 17,500 software developers and 350 data scientists working on this and other programs in the company.

Siemens is also growing by acquisition and joint ventures, notably with the 2016 acquisition, for $4.5 billion, of Mentor Graphics and a recently announced partnership with Bentley Systems. The future will see further integration of the closed 'life-cycle data-loop' with artificial intelligence built into the 'digital twin.'

The latter is a concept that Siemens shares with GE but Siemens takes the marketing biscuit with the notion that all of the above is going to '*nurture* the digital twin.'

A more concrete parallel exists between Siemen's MindShare platform and GE's Predix showing that, despite the best efforts of Industrie 4.0 and the IoT the two behemoths are in digital battle mode. Hey, what did you expect?

Copy, comments & feeback to info@oilit.com

Folks, facts, orgs ...

Aereon, Asset Guardian, CGG, CH2M, Chevron, DMC Global, Energy Navigator, Exterran, Exxon-Mobil, Freedom CNG, H2scan, KBR, Noble, Petrowest, Shell, Siemens, TrendMiner, Technical Toolboxes, Wellsite, Weatherford, Amphora, Calgary Scientific, Rockwell, Object Management Group.

Kevin Book is VP US upstream sales at **Aereon**. He hails from CSI Compressco.

Mark Steel is business development manager at **Asset Guardian**. He was previously with PMI Software.

CGG's Charlotte Bishop is chair of the Geological Remote Sensing Group.

Patrick O'Keefe now presides the **CH2M** Foundation board, succeeding Elisa Esperanza.

Clay Neff is president of **Chevron** Africa and Latin America E&P following Ali Moshiri's retirement.

Peter Rose now an independent director at **DMC Global**.

Randy Freeborn (**Energy Navigator**) is now an SPE distinguished lecturer.

Exterran has appointed Roger George as Senior VP, global engineering and products. He succeeds retiree Steven Muck.

Darren Woods is to succeed Rex Tillerson as **ExxonMobil** chairman and CEO. Neil Duffin moves up to VP and president of EXOM Production. Liam Mallon becomes president of EXOM Development.

Eddie Murray has been promoted to director of business development at **Freedom CNG**.

Michael Allman is CEO of **H2scan**. He was previously with SoCal Gas.

Mark Sopp is CFO with **KBR**, succeeding retiree Brian Ferraioli. He hails from Leidos (ex-SAIC).

Noble Corp. has appointed Adam Peakes as senior VP and CFO. He was formerly with Tudor, Pickering, Holt.

Petrowest has announced the retirement of its CFO, Lloyd Wiggins. He will be succeeded by Daryl Rudichuk.

Simon Henry is to retire from **Shell** as CFO and will be succeeded by Jessica Uhl.

Lisa Davis has been appointed chair and CEO at **Siemens** following Eric Spiegel's retirement. Judith Marks is CEO at Siemens US.

TrendMiner has named John Miller VP strategic accounts and Edwin van Dijk VP Marketing.

Martin Fingerhut is now President and CEO at **Technical Toolboxes**. He hails from Applus.

Michael Foster is the new regional manager at **Wellsite**'s **Viking Oil Tools** division.

Weatherford has appointed Christoph Bausch as executive VP and CFO. Frederico Justus has been promoted to president, regional operations.

Amphora has added Neil Sanghrajka as head of professional Services EMEA/APAC and Mark Valentine as senior pre-sales consultant to its London office. Neil hails from Allegro and Mark from OpenLink. Celia Dyer and Rachel Lowe have joined Amphora Houston.

Mark Taylor has joined **Calgary Scientific** as CFO and executive VP, operations. He hails from JP Morgan Chase.

Rebecca House is senior VP, general counsel and secretary at **Rockwell Automation** succeeding retiree Douglas Hagerman. She hails from Harley-Davidson.

Sam Mancarella is now Australian sales rep for the **Object Management Group**.

Done deals

NOV/Fjords Processing. Premier Oilfield Labs/MUD Geochemical. Pure Technologies/E-MAC Corrosion. RS Energy/NavPort. Software AG/Zementis. ESIA/JSI Services. BJ Services. Automic/CA Technologies. EPI Group/PDF. Cognizant/Frontica. Rockwell/ACP.

NOV has acquired **Fjords Processing**. Fjords' project design, management and aftermarket support will combine with NOV's global organization.

Premier Oilfield Labs has acquired **MUD Geochemical**. MUD brings a 'progressive big data approach' to subsurface analysis.

Calgary-based **Pure Technologies** is acquiring the business and related assets of **E-MAC Corrosion** for $4.6 million in cash and paper.

RS Energy Group (Calgary) has acquired completion and production data specialist **NavPort**. The acquisition follows a majority investment in RSEG by private equity company **Warburg Pincus**.

Software AG has acquires artificial intelligence boutique **Zementis** whose 'adaptive decision and predictive analytics' become a component of SAG's

internet of things/Industrie 4.0 offering. SAG has made 'multiple' IoT deals of late, including strategic alliances with Bosch, Dell and Cumulocity.

Energy Software Intelligence Analytics has signed an 'exclusive licensing agreement' with **JSI Services**, adding international upstream acquisition and divestment research to its portfolio. This includes Hannon Westwood, Richmond Energy Partners, Novas Consulting, and Douglas Westwood. ESIA 'continues to seek businesses offering intelligence, analytical software solutions and technical insights into the energy industry.'

Baker Hughes, **CSL Capital Management** and Goldman Sachs' **West Street Energy Partners** unit have set up a new hydraulic fracking company under the **BJ Services** brand.

Investment house **EQT VI** is selling

business automation software provider **Automic** to **CA Technologies** in a €600 million deal. Automic's ONE Automation platform automates business processes and IT infrastructure 'regardless of architecture, complexity and location.' Clients include Bosch, eBay, ExxonMobil and GE.

London-based **EPI Group** has acquired oil and gas geoscience consultancy **P.D.F. Ltd**.

Cognizant has acquired the technology and business process services unit of **Frontica** from Akastor in a 1 billion NOK transaction.

Rockwell Automation has acquired **Automation Control Products**.

Going, going … *green!*

PG&E/Acutect. US Energy Department CarbonSafe. ExxonMobil FuelCell Energy. Global CCS Institute. National Academic Press. Oil and gas climate initiative. HyMeAir.

PG&E has piloted a laser methane detection device developed by Acutect. The technology was selected following a methane detector challenge organized by the Environmental defense fund.

The **US Energy Department** is to put some $44 million into 16 CO2 storage projects under its Carbon storage assurance facility enterprise (CarbonSafe) initiative, which seeks to mitigate CO2 emissions from fossil fuels. Cement, iron and steel production, which currently account some 21% of US carbon emissions are to be targeted.

ExxonMobil and **FuelCell Energy** are to deploy a multi-megawatt fuel cell system at Alabama's James M. Barry power plant. The system combines carbon capture with a carbonate fuel cell and clean power generation from natural gas. The pilot is part-funded by the US Department of Energy.

The **Global CCS Institute** has just released a State of the Industry report on carbon capture and storage. The report concludes that 'the pace of carbon capture and storage development must be accelerated if the Paris climate change targets are to be met.' It is however worth noting that recent press comment questions whether the incoming US administration will continue to support CCS.

A new publication from the US **National Academic Press**, 'The changing landscape of hydrocarbon feedstocks' looks at the US shale gas boom and the potential for converting small amounts of stranded or associated gases to 'condensable energy carriers,' and thus to curtail well-head methane flaring and reduce greenhouse gas emissions.

The **Oil and gas climate initiative** has announced a $1 billion investment to accelerate development and deployment of innovative low emissions technologies.

The initial focus of the OGCI is on wide scale carbon capture, use and storage, enhancing the role of natural gas and on energy efficiency in transport and industry. Members are BP, CNPC, Eni, Pemex, Reliance Industries, Repsol, Saudi Aramco, Shell, Statoil and Total

Finally, in the green, but somewhat improbable category we have '**HyMeAir**,' a 'new-age' company whose Nano Towers are to 'get rid of carbon dioxide and extract energy' from the atmosphere. A modest 90% reduction in energy cost is claimed by 'extracting hydrogen and methane from air!'

Battelle Institute on big data in oil and gas

TAMU big data conference paper compares different machine learning approaches.

Speaking at a Texas A&M University conference earlier this year, Srikanta Mishra from the Battelle Institute presented a paper on big data applications in E&P. Big data analytics (BDA) holds the promise of new insights into geoscience, reservoir management, operations and maintenance.

Mishra, citing work done by his colleague, Shuvajit Bhattacharya on machine learning -based lithofacies classification, compared various ML approaches including support vector machine, artificial neural network, self organizing maps and graph-based clustering. SVM proved successful at predicting sweet spots in the Marcellus shale. Another key reference for comparing the different ML approaches is Hastie's seminal 2008 book on The elements of statistical learning. Hastie showed that some approaches are better at forecasting, while other provide more interpretable results. Occam's razor (using the simplest approach you can) is a way of avoiding the 'curse of dimensionality.' Models should ideally be capable of feeding back into a better understanding of the process and of the sensitivity of inputs. Aggregating results over a set of competing models can provide better understanding and prediction. QV Beven's 'equifinality' concept. Mishra wound up with a word of caution. Prediction supposes that the same physical processes will operate in the future. In shale, this will not be the case if the flow regime switches from transient to boundary dominated flow. More from Battelle.

Blockchain in oil and gas?

Accenture on 'reinventing' the order-to-cash process.

A blog posting from Accenture's Pierre Mawet and Michael Insogna ruminates on the potential of blockchain in oil and gas supply chains. Blockchain, the technology that underpins the Bitcoin cryptocurrency is presented as a digital disruptor that could make the oil and gas supply chain 'more efficient.' Blockchain, a peer-to-peer transaction ledger, is claimed to minimize the need for oversight and governance. Banks, sensing the competitive threat, are setting up their own blockchain platforms. Utilities are 'trying to reinvent' the energy grid with the technology.

Accenture sees Blockchain as enhancing compliance, process efficiency and providing an audit trail for sensor data from the internet of things. The technology has application in order-to-cash and import/export processes that are currently 'slow, cumbersome and unpredictable.'

Sales, deployments, partnerships …

Rockwell Automation, SAP, GE Digital, Wipro, Bertin Technologies, Onera, Cognizant, Honeywell, DSI, Emerson/Roxar, Ikon Science, Jacobs Engineering, KBR, Petrofac, Ansys, Rollie Systems, Accenture, SolidThinking, Soothsayer Analytics, Technip, DNV GL, Geosoft, Corescan, PTC.

Columbia Pipeline Group has selected **Rockwell**'s PlantPAx process control system to modernize operations.

SAP and **GE Digital** are to integrate GE's Predix and SAP's Hana cloud platforms.

Wipro has secured a three year contract with Woodside to provide IT infrastructure services and digital transformation.

Bertin Technologies has partnered with **Onera** on a three-year research program to create Cubix, a gas detection solution.

Cognizant is now the exclusive provider of digital systems, technology and operations services to multiple Aker Group units.

Delek Refining is to use **Honeywell**'s process reliability advisor to improve performance at Tyler, Texas refinery. Honeywell is also to provide an integrated control and safety system to the Trans-Anatolian Natural Gas Pipeline, Turkey.

Chandra Asri Petrochemical has chosen **DSI**'s digital supply chain platform to automate manufacturing and warehousing.

Emerson has supplied additional licenses of its Roxar RMS reservoir modelling software to Kuwait Oil Company.

GE is to supply Maersk Drilling with SeaStream Insight, a 'Predix-powered' marine asset management solution.

Ikon Science reports recent sales of its RokDoc Ji-Fi software to 'three supermajor clients.'

Shell has awarded **Jacobs Engineering** the front end engineering and design and detailed engineering on its Gulf of Mexico Vito host project.

KBR has secured two three-year global agreements with BP to provide conceptual engineering services and front end engineering design.

Petrofac gets a four and a half-year contract extension for support services on Engie's Cygnus gas field.

Ansys' simulation platform has been combined with **GE**'s Predix to offer 'enhanced monetization of asset health monitoring.'

Rollie Systems is to provide Hart & Iliff with its ultrasonic/wifi-based tank monitoring technology.

Murphy Oil is to undergo a 'full-scale digital transformation,' implementing **Accenture**'s 'upstream direct' on the SAP Hana cloud along with SAP Ariba and SAP SuccessFactors across its global assets.

SolidThinking's Envision BI platform is to be combined with **Soothsayer Analytics**' artificial intelligence capability.

Technip is to provide engineering and project management services to Shell Australia at its Prelude FLNG project.

Aker BP has awarded **DNV GL** a five-year contract for decision support services.

TAG GmbH is to install **GE**'s tuning maintenance software across its pipeline gas turbine fleet.

Geosoft is to offer **Corescan**'s web based virtual core library with its Target geoscience application.

Yokogawa and Gazprom Neft are to establish an International center for advanced process control systems.

PTC and **GE Digital** are to work on the complementary roles of ThingWorx and Predix.

Talk to us …
info@oilit.com

Standards stuff

International Foundation for Information Technology, DNV GL, NAOEMC, Petrotechnical Data Systems, Energistics, PODS, PPDM, CO-LaN.

The **International Foundation for Information Technology** has rolled out a prototype knowledge management body of knowledge website. This site is machine generated using IFIT's 'data driven synthesis technology and Nounz compiler.

DNV GL has kicked off the **North American offshore equipment manufacturers**' committee (Naoemc), to 'establish expectations and align industry for future offshore equipment manufactur-ing.'

Petrotechnical Data Systems has open-sourced its Witsml/ETP solutions. PDS Witsml Server can be used on the rig or in the cloud to gather and store drilling data and enable data exchange. PDS Witsml Studio desktop allows user to query any compliant Witsml 1.4.1 or 1.3.1 server and connect to an ETP 1.1 data producer.

PODS Lite, a subset of the **Pipeline open data association**'s 'next gen' pipeline data model is now available free of charge. The Lite release is provided in Esri geodatabase format and is intended to showcase the complete next gen model scheduled for release in 2018 (and which will be only be available to members).

PPDM reports progress on its regulatory data standards committee which now has support from regulators in Canada (Alberta and Saskatchewan), the US (Bureau of land management and Michigan) and Australia.

Total has withdrawn from the CO-LaN/ CAPE-Open standards body. CTO Philippe Baptiste stated that interest in CAPE-Open has waned over recent years. CO-LaN expressed regrets at the departure.

Safety first

BP on well safety software. CSB 5 year plan. IOGP 2015 record, WEC charter. SPE safety report.

At the SPE Intelligent Energy conference in Aberdeen earlier this year, **BP** presented a paper on risk based management of safety-related well software. BP used the IEC 61508 functional safety standard as a framework and distinguishes 'safety critical' from 'safety related' software. BP has audited its well placing, casing design and well control software for gap analysis. A 'Rapid' analysis helped identify owners and perform a risk 'bowtie' analysis. At the end of the day, software risk is important but less so than the underlying data quality.

The US **Chemical safety board** has just published its 5 year strategy plan looking out to 2021. The organization is to focus its efforts on 'high impact' incidents likely to provide widely implementable recommendations.

The **IOGP** has just published its report on 2015 safety performance indicators. The report enumerates some 33 accidents that resulted in fatalities or near-misses with a brief description of what went wrong and needs to be done to avoid a repeat occurrence. IOGP has also published a report from its Well control incidents

subcommittee. The WEC's updated charter has learning from incidents at its core and focuses on root causes of well control events in a post Macondo world. Sign up here for the IOGP' safety alerts. See also the IOGP's Report 476 on well control training and certification.

The **SPE** has just published a technical report on 'Assessing the processes, tools, and value of sharing and learning from offshore E&P safety related data.'

Hot swapping control systems

CIMA Canada's Tempus appliance supports uninterrupted, live control systems upgrade.

A white paper from Cima Canada offers advice on the live migration of control systems. Authors David Findlay and Ian Verhappen observe that 80% of the world's process control systems are over 20 years old and need replacement. Shutting a system down completely while it is rebuilt is impractical. Instead, Cima proposes a new standard for control system migration, leveraging its Tempus

applicance. Tempus deploys an electrically certified, specialized temporary hardware installation that facilitates all the wiring from one control system to another, without disrupting the signals. Once the new control system is operating the plant, the tool is removed, leaving a new and well-organized control system.

Tempus avoids disruption to control signals and assures that there is no loss of signal to either the old or new systems during migration. Full live commissioning of the new program/logic eliminates the requirement for plant shutdowns. The non vendor-specific solution works with 'any platform, from any supplier.'

The Castrol Brain, BP's chatbot

Pioneering artificial intelligence app for BP's mariners taste of things to come.

An article in BP Magazine describes the use of artificial intelligence in BP. AI is real and is 'taking over the agenda in many industries' according to Dan Walker, who leads BP's emerging technology team. 'In the near future, there will be sensors with connectivity everywhere, recording data as often as you want and constantly creating new datasets.'

'Using AI we'll be able to combine data on flow rates, pressure and equipment vibration with data from the natural environment to transform the way we operate.' Much oil and gas activity involves computer science problems that are amenable to AI. BP's Castrol Brain is a 'pioneering' AI tool that is initially trained to answer marine customers' technical questions. The Brain learns and improves

its answers the more it is used. AI could also optimize well design, improve equipment reliability and maintenance.

Paul Stone, IT principal consultant added 'We are currently in the early stages of exploring the area of advanced AI and cognitive computing, looking at where they will have the most immediate impact. We are considering trials to demonstrate the value.'

Emerson standardizes Plantweb on Azure IoT

Digital ecosystem and connected services move to the Windows 10 cloud.

Emerson is to standardize its revamped Plantweb and connected services digital ecosystem on Microsoft's Azure internet of things suite. The announcement was made at the recent Emerson global users exchange. Emerson is also to 'broadly adopt' Windows 10 IoT technology in its DeltaV and Ovation control systems and in data gateways into the Azure cloud. Azure IoT provides a 'scalable and secure cloud environment' for Plantweb.

Peter Zornio, chief strategy officer with Emerson automation solutions said, 'Emerson and Microsoft have a long-standing relationship to deliver sensor-driven applications that run plant processes safely and reliably. The Azure IoT Suite and smart device-driven Windows 10 IoT devices will expand Plantweb to the cloud.'

Zornio added that Plantweb users can

participate in Emerson's recently launched 'operational certainty' program, which provides a 'clear, scalable business case' for investing in the IoT. The program targets the current '$1 trillion annual losses' incurred by the oil and gas, chemical and manufacturing industries. More from Emerson.

Forecasts and fantasies ...

Oil and gas analytics. Cognitive computing. 3D printing. Drilling data management systems.

Global Market Insights puts a $21 billion price tag on the worldwide oil and gas analytics market citing, rather curiously, Cobalt's Zalophus 1 well, offshore Angola. 'Such exploration activities will need advanced service platform including hardware and software support.' In the US, the oil and gas analytics market for hosted deployment is put at $800 million in 2015 and is to grow at 19%/year through 2024. More from GMI.

Daniela Murgu, social media manager with **IBM**, citing an **IDC Energy Insights** study, observes that 80% of the data collected by oil companies 'sits idle and unexploited.' To leverage this 'dark' data,

IBM's ecosystem of Watson-related service providers are available to apply 'cognitive computing' to the oil and gas vertical. IDC Energy Insights 'believes that cognitive computing is the way of the future and that 2001: A Space Odyssey is actually becoming a reality.' More such 'research' from IDC.

You may not have noticed but, according to **Lux Research**, the oil and gas industry is 'turning towards 3D printing' to cut costs and raise efficiency. Lux cites Halliburton, Schlumberger and Shell as 'beginning to use the technology' while GE is already a 3D printing user. Use cases including printing chemical injection

stick tools and nozzles for downhole cleanout tools, sand control screens and pipeline pigs. Lux recommends that would-be 3D printers contact metal printing specialists such as EnergyX, Arevo, Nanosteel and QuesTek. More from Lux.

A report from **Technavio** forecasts that the global drilling data management systems market will grow at 12%/year from 2016-2020. Growth will be driven by the need for asset optimization, improved well control and by the 'end of easy oil.' Data capture and analysis are set to contribute here 'in a significant way.' More from Technavio.

EPCs, operators moot capital projects 'operating system'

San Antonio ECC conference hears call to fix 'management, technology and mindset' problems.

A group of engineers and operators at the 48th annual ECC* Conference in San Antonio floated a proposal for a 'next generation capital operating system' for major engineering projects. Seemingly, US construction has seen declining productivity since 1968! A McKinsey survey attributed the decline to design, contract issues, poor management and execution, increasing project size and complexity and

to some extent, under-investment in 'digital and innovation.'

The consultants advocate a revamped construction industry 'operating system' to address the three pain points of management, technology and 'mindset.' For the technology tier, performance needs to be approached 'like you treat safety, everyone should understand the project operating

system.' Cross-contractor control tower 'war-rooms' will be used for problem solving, visual management and dialogue. 'Gold standard' project controls and a project production management system such as the Lean Construction Institute's Last Planner.

The Engineering and construction contracting association.

Synopsis SimpleWare for Repsol

ScanIP-based tool underpins digital petrophysics workflows.

In a recent webinar, Repsol's Carlos Santos showed how its digital petrophysics workflow is producing 'meaningful inputs' for rock typing and reservoir characterization. The webinar was hosted by Simpleware, developer of ScanIP, a tool for processing and visualizing 3D scanned images from MRI, computer tomography and more. Digital rock characterization is

'breakthrough technology' for Repsol allowing high resolution scans to be turned into realistic rock images in 'a fraction of the cost and time' of traditional methods. The approach also works on samples that would not be considered suitable for lab testing.

The workflow spans acquisition with X-ray micro-tomography, image enhance-

ment, solid and pore phase separation and meshed pore space representation, morphometric interpretation and absolute permeability numerical simulation with finite element analysis. ScanIP offers video recording features and options to export segmented models to CAD systems and to 3D printers. More from Synopsis.

API squeals as its own standard gets adopted!

American Standards Institute complains as Phmsa applies RP 1170/71 standards 'too soon!'

The conflicted nature of the American Petroleum Institute, which acts as both standards-setter and (rather shrill) lobbyist, was made clear recently. The API's midstream group director Robin Rorick has, on the one hand, welcomed the adoption by the US Pipeline and hazardous materials safety administration of API recommended practices 1170 and 1171. The 2015 standards cover underground

hydrocarbon storage construction methods, materials and maintenance practices for ensuring safe operations. These are written into Phmsa's new underground natural gas storage rule.

But the API is not so pleased with the speed at which Phmsa wants the rules applied. Rorick opined, 'While we are encouraged that the new rule adopts API's rigorous safety management practices, we

fear that the new rule's unrealistic compliance timeline will prevent operators from effectively implementing the requirements of the rule and could potentially undermine the very safety efforts the rule is trying to promote.'

Can you believe it? Industry gets together on a safety standard and then the blooming 'guvmint' goes and actually applies it! What's the world coming to?