In This Issue

www.OilIT.com

Shell's Hydrogen Digital Platform

Energistics/ECN Summer Digitalization Summit hears from Shell on the repurposing of technology from the Open Subsurface Data Universe across its expanding hydrogen retail business.

Speaking at the 2020 Energistics/Energy Conference Network Summer Digitalization Summit, Richard Zhang, who is software product development lead at Shell Hydrogen explained how Shell is developing a 'digital backbone' for its new hydrogen fueling stations in North America, the UK and parts of the EU. The 'first of a kind' development includes a fully digital hydrogen supply chain to enable remote monitoring and operations and to facilitate root cause analysis of equipment failures that are to be expected in this early stage supply chain. The platform will also allow cross-validation of vendor data and will help mature partners' capabilities and verify performance.

Zhang observed that H2 is 'not yet cool', and Shell needs to bring customers and users into the discussion to identify potential growth areas and inform corporate strategy. The goals of the digital hydrogen supply chain are not new, and they echo much of the challenges that have been solved in oil and gas, aviation and other verticals. In this space, vendors are typically equipment-focused and may need help with IT and data. Vendors may lack test data and proof of reliability in the field. 'Establishing a baseline for analytics is very difficult and labor intensive and ML/AI is not the panacea'. There are also challenges with policy and industrial collaboration where ISO standards may be deficient, as they are created through simulation and limited-scale data gathering. There is also a lack of universal, machine and customer-friendly data exchange and collection methods.

Shell is therefore planning to re-use existing solutions from oil and gas as and to get up and running as soon as possible, making sure that the infrastructure is scalable 'from one to one thousand stations or one to one million customers'.

Shell's Hydrogen Digital Platform (HDP) is to re-use the platform developed for Shell's Open Subsurface Data Universe's infrastructure. 'OSDU has solved internal IT compliance issue and made external data partnership easy'. OSDU is built on an AWS serverless architecture that supports IoT, streaming data, and data analytics. OSDU has seen few performance issues using standard services that were created to solve 80% of common use cases. This has been achieved by offloading as much infrastructure as possible to AWS with tools such as Kinesis over Kafka or Rabbit MQ.

At the H2 Station, an AWS Greengrass edge device data allows for remote operation of station equipment and real time monitoring. Station PLC data streams to the HDP Cloud for analysis and storage in the AWS S3 data lake. Other tools of the trade include AWS IoT and Kinesis, AWS Sagemaker, IoT Warehouse Event and Amplify. An HDP data catalog (built with AWS Glue, Lambda and Scripts) crawls data sources and maintains relationship among data products. A visualization component leverages Tableau, Grafana, FRACAS and MADe to provide self-service analytics, reliability assessment and reporting.

Zhang believes in letting 'software engineers take control of their own fate'. Their efficiency has greatly increased in the last few years enabling rapid experimentation and the freedom to use the best available tool. The agile approach has been a 'learning journey for all the major enterprises'. Today Shell Hydrogen has been able tap into the ecosystem and learn from others.

Specific learnings include the need to check time sync across vendors' system clocks, 'still the most important and impactful thing to do before doing any data analytics'. A unique transaction ID across system boundaries is the best way to simply data analytics and cross-validation. Shell is now working to track baseline changes from field maintenance and integrate with reliability engineering software (FRACAS, RCFA). Shell is also seeking industry consensus on data exchanges for carbon track and trace, carbon trading and policy credits verification where Zhang opined 'blockchain is not a good solution'. More from the Summer Digitization Summit in our next issue and from the conference website.

2020 Huawei Oil and Gas Summit

Huawei Oil & Gas offers a hybrid cloud for oil and gas and co-creation of corporate data centers. OceanStor, converged, 'intelligent' hardware powered by Huawei in-house designed chips and algorithms. HiAI, a branded AI engine and compute service, deployed by Algerian Sonatrach in its 'One Cloud' strategy. 5G IoT deployed at major EU refinery.

Speaking at the 2020 Huawei Oil and Gas Summit, located notionally in Johannesburg, but actually in the ether, someplace between China and the Middle East, Zhang Tiegang (Huawei Oil & Gas) presented on the use of the hybrid cloud in oil and gas. Huawei's hybrid cloud sets out to help companies with the migration of their data centers to the cloud and to satisfy the ever-increasing storage requirements of seismic exploration and reservoir management.

Huawei addresses challenges in cloud data center construction such as the difficulty and cost of migrating services to the cloud, the high network bandwidth needed to run applications, and issues of tenancy with confidential business data restricted by laws and regulations, as well as internal policy. Self-built private cloud projects can represent huge investment and long time frames, all in the face of a general reduction in IT investment.

By 'co-building' a cloud data center companies can benefit from on-demand configuration of computing and storage devices, independent deployment of professional application software, secure backup and 'unified archiving and management of result data'.

With the cloud in place, companies then can build a subsurface cognition system and scientific decision-making systems based on collected data and multi-disciplinary 3D geological models, laying the foundation for intelligent oilfields. **PetroChina**'s own brand GeoEast seismic processing package got a plug in this context as did Schlumberger's flagship Intersect reservoir simulator. The future will see intelligent oil and gas fields with reduced labor intensity thanks to automation and 'full lifecycle management of oil and gas fields'.

Huawei Saudi Arabia's Feras Al-Sarraj presented the OceanStor storage offering for oil and gas. OceanStor is said to be fast, solid, converged and 'intelligent'. The hardware is powered by

Huawei in-house designed chips and algorithms and offers an 'industry's highest performance' of 20 million IOPS and a '7 nines' high availability (99.99999%). A 'Customer X' was cited as a reference for OceanStor's use in seismics and reservoir modeling.

Huawei's Wang Hao described how the company is 'reshaping the oil and gas industry with AI, big data, the cloud and 5G technologies'. Leveraging work done for PetroChina, the company has expanded its HPC/cloud capabilities across an impressive client base of companies outside of North America. On the way it has picked up domain knowledge and now supports software from all the main upstream vendors (Schlumberger also presented its software portfolio at the Huawei event.)

Huawei's offering includes OceanStor storage hardware, CPU/GPU clusters and a 'full stack' artificial intelligence offering from its chip-level Ascend CANN (compute architecture for neural networks) to a 'HiAI' branded AI engine and compute services. These have been leveraged by client **Sonatrach** in its 'One Cloud' strategy. The HiAi toolkit has been used to develop a knowledge graph/neural net for pay zone identification and a tool for pumping unit diagnostics using dynamometer card imagery. Another 'Video Brain' app has been deployed to spot site intrusion, HSE violation and assure safe operations. Huawei's 5G-based IoT network has been deployed at one major EU port and at the 'largest refinery in Europe'. More from the Summit home page.

On digitizing hydrogen and 'agile' software development

Shell plans to leverage a technology stack from OSDU, the Open Subsurface Data Universe to develop a digital backbone for its hydrogen filling stations. Oil IT Journal editor Neil McNaughton tries to figure out why.

In our lead this month you can read how Shell is tooling-up its IT to supply a growing network of hydrogen filling stations in the US and EU. Given that retailing hydrogen would not, on the face of it, be all that different from retailing gasoline, you might have imagined that Shell would have bags of IT ready to roll for the new fuel. This may be the case, but it was not quite how Shell's Richard Zhang presented it at the online 2020 Energistics/Energy Conference Network Summer Digitalization Summit. For hydrogen, Shell is developing a 'first of a kind' digital backbone for its fueling stations.

I guess the new fuel represents a great opportunity for new, state-of-the-art IT. But what is state-of-the art IT today? The current issue of Oil IT Journal contains quite a bit of converging evidence on this which I am going to try and tie together here.

My first witness is Zang himself who provided some clear pointers as to what 'first of a kind' means. Shell's Hydrogen Digital Platform will, 're-use the platform developed for Shell's Open Subsurface Data Universe's infrastructure, OSDU'. I was quite surprised to read this. OSDU, as it says on the can, concerns the subsurface. Moreover, it would appear that, at least in its current manifestation, to be principally a mechanism by which third parties can access Schlumberger's geoscience data environment which has been graciously contributed to the initiative. What does any of that have to do with hydrogen and retail?

To understand why OSDU has achieved such prominence chez Shell's developers, you might like to read another piece in this issue, our review of a recent IBM Redbook titled 'Accelerating Modernization with Agile Integration'. AMAI is a 650-page treatise on current thinking in software development which echoes many of the concepts that lie behind OSDU: Cloud, microservices and open source, inter alia. Further evidence of the linkage between 'agile' and OSDU is evidenced in IBM's 'own-brand' OSDU, ODUA, the Open Data Universe Anywhere – which we also cover in this issue.

In AMAI, IBM warns that 'The [agile] approach is complex. In many cases, existing enterprise solutions can and should continue running with a more traditional architecture … for suitably selected new solutions or for pockets of modernization within existing systems, microservices can provide an order of magnitude increase in benefits that are hard to achieve any other way'.

This raises an interesting issue for the upstream. What 'existing enterprise solutions' should be running on a traditional architecture and what kind of developments are more amenable to an agile approach. To take a specific example, consider Schlumberger's Petrel running on a local workstation with massive local memory and superfast disk space. Could this be 'lifted and shifted' to the cloud? What would the performance be like? Or could it be broken up into myriad microservices? How long would that take? How hard is all this stuff?

It would seem that the commonality between OSDU and hydrogen retailing has nothing to do with either the subsurface or retail. Which leaves us with the pure IT of what is loosely referred to as the digital transformation. All that Kubernetes, Docker, provisioning, microservices and communications stuff and some more. At one juncture, AMAI harks back to earlier SOA initiatives which failed, inter alia because of the 'use of integration specialists with poor knowledge of the applications'. I'm not sure that the injection of the rather thick layer of competencies that the new agile implies is going to help application developers with good domain knowledge very much. I'm not saying that a geophysicist is not capable of writing code in the new vernacular of the cloud. But it does seem likely that the new IT will involve quite a few with less knowledge of the application domain and more knowledge of the arcane world of the cloud.

Speaking of arcane, an AWS blog on natural language processing (see our cheeky summary in this issue) reminded me of my 2017 visit to an AWS day when I came away with more random arcane knowledge than I really needed. The amount of arcana that seems to be required to do even a simple task in the cloud beggars belief. What happened to the old Unix ethos of designing a tool to do one thing and do it well? We have come a long way from a programming environment that puts domain-specific tools in domain specialists' hands. OTOH, if you are a cloud provider looking to assure a degree of customer fidelity (i.e. lock-in), the more arcane the better!

Writing in the Financial Times Richard Waters reported on Nvidia's anticipated rise to data center pre-eminence with a mooted acquisition of ARM. Waters cited the company's founder and CEO Jensen Huang as saying, 'Data centers are the new computing unit. Rather than write programs that run on a single processor or server, coders will write software to run on an entire data center: what happens behind the scenes, as data shifts between machines, and internet services are provided in the most efficient way, will be the concern of a company such as Nvidia, not the programmer'. For an industry that has thrived on complexity that is unlikely to come to pass. But the sentiment is good.

Review: IBM Redbook on Accelerating Modernization with Agile Integration.

Oil IT Journal reviews IBM's 650 page opus, a manifesto for modern cloud-based software and 'agility', in the light of OSDU, the Open Subsurface Data Universe. Agile integration is said to be 'the secret weapon behind the great innovations of today'.

A new IBM Redbook*, 'Accelerating Modernization with Agile Integration' (AMAI) is a 650-page treatise on current thinking in software development. Unlike many Redbooks, AMAI is not closely coupled with an IBM technology. Instead it represents a comprehensive overview of many of the generic trends that are currently touted in the industry. We were particularly interested in AMAI in the context of OSDU, the Open Subsurface Data Universe, that appears to share many of the concepts exposed in the IBM oeuvre.

In the introduction, 'agile integration' is presented as key to digital transformation initiatives, enabled by 'agile connectivity through APIs and architectures that interconnect digital solutions from cloud vendors, system developers, start-ups, and others'. The digital transformation sets out to 'connected customer experiences across a network of applications that use data of all types'. Unfortunately (perhaps surprisingly given the many years of effort in data standardization) 'bringing these processes and information sources together at the correct time and within the correct context has become increasingly complicated'. The introduction has it that new AI capabilities require API access to information sources 'propagated in near real time by event streams' and a 'multitude of other mechanisms'. 'At the heart of the digital economy is the basic need to connect disparate data'. AMAI is said to draw on learnings from hundreds of customer interactions and 'takes note of the dramatic changes that affect the integration landscape'.

What is 'agile integration'? AMAI has a stab at defining agile thus.

> *'The pace of innovation in IT has changed dramatically. Iterations on requirements are in near real-time, prototypes are prepared in weeks or even days, and new mobile apps are made available in months. Application development techniques needed to keep pace by introducing new approaches such as microservices that enable teams to work more independently. Integration is maturing towards a more API-led approach where interfaces that are easy to use enable teams to rapidly share data and functions. However, there is much more subtlety to this change than is apparent. You must think differently about how you align the people and skillsets that relate to integration. You must consider how to ensure that integration components embrace new architectural tenets such as microservices and that they capitalize on the benefits of new infrastructure platforms such as containers'.*

AMAI presents integration as 'the secret weapon behind the great innovations of today'. New ideas 'always require data and functions from other applications within the enterprise and often from other enterprises'. Agility is required to transform ideas into production quickly 'so that new niches can be leveraged'. This requires 'highly empowered and autonomous teams that can

self-provision the integration capabilities that they need and interact efficiently with other teams'.

Agile is further divvied up into three aspects, 'decentralized ownership', a 'delivery-focused architecture' and, you guessed, a 'cloud-native infrastructure'. Decentralization means a shift from yesterday's service-oriented architectures that tended to result in 'heavily centralized integration teams' to 'fine-grained integration deployment, enabling distributed ownership of the creation and maintenance of the integrations.' Delivery-focus implies an 'API-led integration strategy for connectivity between applications', API management refines the SOA paradigm with 'standards around how interfaces are shared between applications and between enterprises in an API economy'. A cloud-native infrastructure allows (encourages?) developers to 'hand-off the burden of many of their previously proprietary mechanisms for cluster management, scaling, and availability to the cloud platform in which they are running'. Software must make the best use of orchestration capabilities such as Kubernetes and other cloud frameworks.

As Oil IT Journal has been reporting on the 'basic need to connect disparate data' for 25 years notably with earlier attempts at data integration such as business objects and the service bus. AMAI discusses the failings in such earlier work. 'SOA turned out to be a more complex than just the implementation of an enterprise service bus (ESB)', resulting in 'heavy centralization […of…] the resulting topology.' AMAI provides other reasons for ESB failure, from funding development across different departments, maintaining different OS versions to support a service, and the use of integration specialists with poor knowledge of the applications, and the now frequently dissed 'waterfall' approach to development.

AMAI cites a major driver for agile as the development of the 'API economy' whereby services from third parties can be called upon over the wire and integrated into an application. APIs are said to 'play a significant role in the disruption of industries'. AMAI devotes a chapter to the subject of API management.

AMAI stresses the use of 'microservices'. These improve agility as they are small enough to be understood in isolation and changed independently. They provide scalability as resource usage can be tied to the business model. They also provide resilience as a change to a suitably decoupled microservice does not affect others at run time'. One might reasonably doubt the veracity of such claims. AIAM acknowledges that microservices are not the solution to every problem. 'The approach is complex. In many cases, existing enterprise solutions can and should continue running with a more traditional architecture'. However, 'for suitably selected new solutions or for pockets of modernization within existing systems, microservices can provide an order of magnitude increase in benefits that are hard to achieve any other way. It will be interesting to see what OSDU comes up with in this arbitration between the 'traditional architecture' and 'microservices' – for more on this see the editorial in this issue.

A chapter on 'capability perspective' covers API management, application integration, messaging and business-to-business B2B exchange and hybrid and multi cloud considerations. AMAI gets into its swing here, discussing topics such as stateless components (Kubernetes), image-based deployments (Docker) and elastic, agnostic infrastructure, and container orchestration platforms. Unfortunately, here AMAI has changed gear from a rather verbose explanation of relatively well-trodden ground to a hasty exposition that is harder to follow.

The B2B section is better developed and should be of interest working in the PIDX e-business data exchange space. Here 'Traditional B2B and EDI patterns were focused around supporting messages for purchasing and supply chains in a batch mode'. APIs better enable real-time data exchanges between applications and business partners.

AMAI includes a short section on hybrid and multi cloud deployment. Users 'want to use the strength and unique offerings from different cloud vendors, but also want to have a consistent operation and runtime environment so that they can achieve portability without cloud platform lock-in'. But here again, coverage is limited to an enumeration of some overriding issues with little on the thorny issue of avoiding lock-in.

Other chapters cover cloud-native concepts and technology, practical agile integration and 'notes from the field' on various topics, one of which, 'field notes on modernizing messaging' focuses on the IBM MQ environment and may be of interest to scada developers.

On the subject of messaging, one topic that intrigued us earlier in AMAI is the event stream. Messaging is seeing 'renewed importance' as enterprises need 'robust, secure, and reliable ways to move data asynchronously'. This may be one of the most appropriate fields for agile development as messages pass from one company system to another, and where scalability is required to handle a sudden increase in traffic. Here Apache Kafka is the 'de facto standard'. The event stream is represented as a pipeline of events from different consumers coming in asynchronously, rather like the clickstream we discussed back in our 2017 editorial 'The Great Misunderstanding. At the time we postulated (rather unadventurously) that big data technology was more aligned with this kind of use case than suited to replacing a monolithic software application.

One of the oft-touted virtues of the cloud (and of agile) is the perceived access that these technologies provide to AI/ML functions. AMAI has little to say on the topic except that agile promises 'quick utilization of artificial intelligence (AI) services'. 'Cloud-based tooling enables enrichment of data in flight and the implementation of digital agents by using pre-built connectors to IBM Watson's cognitive services'. These allow for AI capabilities to be 'trivially embedded into clients' integrations'. Trivial AI, well that's something new!

The Redbook is a free download from IBM.

Red Hat/IBM's Open Data Universe Anywhere

'Fully-supported cloud-independent' Kubernetes/Red Hat OpenShift shrink-wrapped edition of the Open Subsurface Data Universe.

A recent flyer from Red Hat IBM 'Open Data Universe Anywhere' promises cloud-independent deployment of the technology developed by the Open Subsurface Data Universe (OSDU) Forum. OSDU is described as an open, cloud-native subsurface and production data architecture with API's based on industry driven data standards. The data foundation promises 'fast, easy-to-access data across the enterprise'.

Red Hat/IBM's Open Data Universe Anywhere (ODUA) is a cloud-independent edition of OSDU that is claimed to enable secure, seamless enterprise-wide experience from anywhere. ODUA can be deployed on-premise, behind the firewall, on an in-country cloud or 'at the edge'. Cloud independence is said to enable a flexible path to the cloud that avoids vendor lock-in. An optimized infrastructure-as-a-service can be deployed anywhere 'leveraging multi-vendor models to deliver optimized business value'. A deployment closer to the data enables applications to capitalize on an organization's 'data gravity' and provides for 'complete data sovereignty'.

ODUA is available as 'fully managed SaaS on the IBM Cloud with full-stack, full-lifecycle container security built-into the platform at every layer. ODUA is a 'fully supported' Kubernetes container application platform with Red Hat OpenShift and is also presented as an option for markets that are not cloud-ready. Download the flyer here.

OdTML, machine learning for seismic interpretation

MOL Norway-sponsored plug-in adds ML to dGB's OpendTect flagship. dGB shows how ML can perform seismic object detection, generate synthetic test data sets and more. All via an open source Python ecosystem.

Open source seismic interpretation software boutique de Groot-Bril Earth Sciences (dGB) has added an OpendTect machine learning plugin (OdTML) its OpendTect flagship. The plugin was developed with sponsorship from MOL Norway. The plugin extends dGB's existing neural networks plugin with new deep learning algorithms in Python, TensorFlow, Keras and Scikit Learn. Concomitant with the release, dGB held a series of webinars illustrating various use cases for AI in seismic interpretation, showcasing a growing ecosystem of OdTML applications and modules. The plugin moves data from the OpendTect database into an HDF5 data container. Standard python packages numpy and h5py have been complemented by dGB python modules for retrieval of training data in python. A complete machine learning python environment to develop and train new models can be installed with the OpendTect installer.

An example of OdTML is seismic object detection with a supervised neural network. Any visible structure or object in the seismic data can be selected for training with an unsupervised vector quantiser which clusters data into a user-defined number of segments. The resulting UVQ network compares new seismic input data to detect similar objects and provide a confidence measure of the match. UVQ networks can be used for seismic facies analysis or to cluster waveforms along horizons or attributes in 3D volumes.

Another OdT plugin, 'SynthRock' has been used to solve 'a key machine learning problem in seismic applications', how to create representative training and test data sets. The U-Net convolutional neural network has been trained on simulated data for fault prediction with results edited in OpendTect. Convolutional neural nets can be trained to predict any object of interest, for instance dGB's own seismic chimneys. Extreme gradient boosting of random forest models has been applied to pore volume estimation from wireline data. A complete python ecosystem based on Miniconda3 is available with and without support for GPUs. Both are available on Windows and Linux. Watch the dGB AI/ML webinars on Youtube.

2020 Earth Sciences Information Partners

HDF5's popularity in earth and environmental science grows. HDF5 Group working to assure seamless transition to the cloud. STARE, a domain name service for geolocation data. Unidata Thredds wins in cloud access benchmark. New cloud-friendly HDF data format. HDF5 and ZARR data exchange. Digital knowledge commons for the earth and environmental science floated.

Speaking at the 2020 Earth Sciences Information Partners* online summer meeting, Aleksandar Jelenak from the HDF5 Group described HDF5 as 'one of the most widely used file formats for Earth Science data'. The HDF Group is building on this popularity to enable a 'seamless transition' to cloud computing for all applications that use the HDF5 API. An HDF Town Hall covered several use cases of HDF Group's own and third-party solutions on how to access and analyze HDF5 data in cloud object stores.

Michael Lee Rilee presented **NASA**'s STARE-PODS spatio-temporal data store that leverages the HDF virtual object layer and a STARE location service (SLS), aka a 'domain name service' for geolocated data in the cloud.

Joe Lee (**HDF Group**) compared three cloud access approaches (Apache Drill, Unidata TDS a.k.a. Thredds and HDF5 VFD) for accessing earth observation data in the Amazon S3 cloud. Unidata THREDDS 5.0 came out as a 'clear winner' in the benchmark results.

John Readey (**HDF Group**) presented the new HDF Server features for the cloud. The idea is to keep the existing HDF5 API and data model but migrate to a new cloud friendly storage format. Enter the HSDS, the highly scalable data service.

Aleksandar Jelenak (**HDF Group**) presented on bi-directional exchange between HDF5 and the Zarr format as used by the USGS. Zarr is a Python package that implements chunked, compressed, N-dimensional arrays.

Other ESIP presentations covered a proposal for a 'consistent, operational-grade, digital knowledge commons for the earth and environmental science community' to 'bring together data and information siloed behind disciplinary boundaries'. The digital knowledge commons will leverage semantic technologies and knowledge representation initiatives such as the OBO Foundry merging such with the Semantic Web for Earth and Environmental Terminology (SWEET).

More from the ESIP Summer Meeting website.

* ESIP is a collaboration of partner organizations that promotes the collection, stewardship and use of Earth science data, information and knowledge. Its activities are sponsored by NASA, NOAA and the USGS.

Seismic in the cloud

NAG specialist explains to HPC Society members how to migrate seismic workloads to the cloud. Cloud costing is a tricky business.

Branden Moore from **NAG** (formerly the Numerical Algorithms Group) recently gave a talk to the Society of HPC Professionals on migrating a seismic workload to the cloud. He subsequently started a blog on the approach which we summarize here.

Moore defines a 'cost of solution' (CoS) metric as the overall cloud costs incurred by running the workload, including data transfer and ancillary cloud services required. The analysis considers a NAG-developed reverse time migration (RTM) benchmark, comparing a 'lift and shift' approach, porting the NAG code to an 8 petabyte Amazon FSx for Lustre managed service. Here a 10,000 shots RTM would run for 47 days and cost 'just shy of $4 million'.

An alternative approach using Amazon's 'i3en' virtual machines with large local storage with one instance per shot. Rejigging the code to the VMs lowered the CoS to $1.64 million but increased run time to 52 days.

Finally, Moore figured the costs of using the new AWS Graviton 2 processor which perform HPC tasks well and cost less than other x86 processors. They were combined with the previous i3en instances to arrive at a CoS of only $1.16 million and a much-improved run time of 21 days. Adding extra cloud resources actually reduced the total cost.

More from the new NAG Cloud HPC Migration Service.

Data in motion, data at rest

Kwantis leverages Energistics' Resqml format in major client's central repository of reservoir models.

In 1494 Spain and Portugal carved up the new world at the Treaty of Tordesillas. Centuries later, Energistics and PPDM, carved up the oil and gas data world into 'data at rest' (PPDM) and 'data in motion' (Energistics). At the time it seemed to us* somewhat arbitrary in that once data in motion stops moving, as it inevitably will, it becomes data at rest. Why change the format?

Milan, Italy-based Kwantis appears to agree with us, and has developed (for an unnamed 'major oil and gas client') a central repository of Resqml files and a web-app for save/update/download operations. Files are indexed by company metadata such as 'basin name' or 'business unit'. The working principle is simple, when a new feature is added a study is downloaded from the central repository as a Resqml file, the new feature is added locally in domain software and the study is updated in the central repository, along with an audit trail, a brief description of what has been added/modified and why. Kwantis' software understands

Resqml such that partial upload and download are also possible. The software is said to provide tangible benefits in terms of time saving and the assurance that the most up to date information is being used thanks to the traceability of data modifications.

* See for instance our [2015 interview]() with Energistics CEO Ross Philo.

The Open Group 'Digital First' virtual event

Pedro Vieira (Petrobras) addresses digital challenges for oil and gas. Roadmap to Oil & Gas Industry 4.0 proposed along with 'silo-busting, vendor neutral' formats à la Open Subsurface Data Universe. Vieira proposes merging OSDU with OPA-S to make for a 'TOG in TOG' Forum, a.k.a. The Oil and Gas in The Open Group.

Speaking at The Open Group's Mumbai 'Digital First' event (which moved online due to covid), Pedro Vieira (Petrobras) addressed some of the 'Digital Challenges for the Oil and Gas Industry'. The current situation is complex with a depressed oil price, a covid-induced drop in demand and increasing breakeven prices particularly for unconventionals. Today's physical assets have a relatively low level of digitization – but they will be around for a while, with multi-decade lifetimes. Digitization is further complicated in process plants with legacy and/or proprietary technology which makes instrumentation data hard to access. The silo-oriented industry suffers from poor data exchange across disciplines and poor data integration with supply chain partners.

Vieira cited a Harvard Business Review study that puts oil and gas as a second-class citizen in terms of digital knowledge intensiveness. But its capital-intensive nature means there is potential for further digitization of physical assets. This should lead to improved cross-discipline integration and a lessened dependency on vendor technology. 'Ambidexterity' is another goal, with a bimodal balance between operations and innovation.

Vieira proposed a roadmap to 'Oil and Gas Industry 4.0' that promises better and safer operations and automated diagnostics and prognostics, real-time simulations from 'hybrid twins', condition-based maintenance, zero unplanned downtime and remote operations.

The search is on for 'open and secure systems and data' and 'upgradable, scalable, vendor-independent' systems with intrinsic cybersecurity. Silo-busting, vendor-neutral data formats, data-centric systems/processes and microservices are also keys to a new digital-ready business enterprise architecture.

Vieira observed that The Open Group had two Forums (OPA-S and OSDU) working in the oil and gas digitization space, with similar activity reported from organizations such as the IOGP and [Aupec]()'s Oil & Gas Benchmarking Group* (OGBP). Vieira floated the idea of a 'TOG in TOG', The Oil and Gas in The Open Group blending standards for topsides and process/plant information from OPA-S with subsurface data from OSDU. The concept would merge the two Open Group Forums into one, leveraging other TOG digital workforce recommendations à la Digital Practitioner Body of Knowledge. More from [The Open Group]().

Software, hardware short takes

Lime V2.0 outcrop viewer from Virtual Outcrop Geology Group. 'CorePy' core data viewer from MSRL. RMS 12 from Emerson/Roxar. GlobeClaritas V7.1. V 2020.06 of Isatis.neo Petroleum. Interica OneView. IHS Markit's Data Lake. New RokDoc and iPoint releases from Ikon Science. OAG Analytics' Raster Image Server. Sharp Reflections Pre-Stack Pro 5.8. Aucerna's Enersight 2.14. Kappa Automate distributed microservices platform. Custom forms from Engage Mobilize. Optasense's ODH4+ DAS. Aucerna PetroVR 2020. Rock Flow Dynamics' tNav 20.2. ABB Ability Augmented Field Procedures. Add Energy's AssetVoice. Emerson AR in Plantweb Optics. Gimmal Altitude. IT Vizion's Config Machina. Seeq WITSML and CygNet connectors. Sphera adds P&ID to Control of Work. Brad Adams Walker control room audit service. Implico OpenTAS certified. KBC Maximus 7.1 and Petro-SIM 7.1.

Upstream/G&G

The **Virtual Outcrop Geology Group**, a collaboration between the NORCE Norwegian Research Centre and the University of Aberdeen, has announced Lime V2.0, an update of its geological outcrop viewer. The new release includes a virtual field trips function and coincides with the recent launch of a new website and cloud storage solution, V3Geo with some 120 virtual 3D geoscience models.

MSRL, the mudrock systems research lab, a unit of the US **Bureau of economic geology** has created 'CorePy', a Python tool that uses principal component analysis and K-means clustering to integrate data analytics with graphical visualization. Data from the Eagle Ford Shale, Permian Basin, Vaca Muerta, Haynesville, Barnett and other plays was used to develop the tool.

Emerson has released of RMS 12 with 'fast, fully automated workflows' that improve both structural uncertainty modeling and 'Big Loop' solutions. RMS 12 includes new structural uncertainty technology, developed in a 3-year collaboration project between Equinor, the Norwegian Computing Center and Emerson. The technology offers a new method for capturing and modeling structural uncertainty that can handle complex faulted reservoir structures and large amounts of horizontal and deviated wells. Also new are Big Loop variables for running projects with external workflow orchestrators. The Roxar API has been extended with access to RMS project data and jobs in Python. Emerson/Roxar's Tempest has also been upgraded. V 2020.2 adds a new display for Big Loop ensemble analysis along with more interoperability with third-party products.

GlobeClaritas, now a Petrosys unit, has released V7.1 of its seismic processing package with faster read and sort of HDF5 formatted data. 2D and 3D depth migrations now support VTI anisotropy, improving seismic imaging. An upgraded search function simplifies data file selection via embedded tags. Other enhancements target data munging in Excel, CSV or Ascii-formatted files, allowing spreadsheets supplied by third parties to be used directly in a project. More from GlobeClaritas.

Geovariances has released V 2020.06 of Isatis.neo Petroleum with new pluri-gaussian simulations of facies models, an unfolding tool to flatten geological structures for a more robust variography and a new 2D/3D SEG-Y file import. More in the release notes.

OneView from **Interica**, another Petrosys unit, now provides improved data exchange with Petrosys PRO Map and Project data landscape. Interica OneView delivers a single 'pane of glass' view across the entire petrotechnical application environment and provides out-of-the-box connectivity to 35 petrotechnical applications from companies such as Schlumberger, Halliburton, Petrosys, IHS, CGG, Paradigm, Eliis, and many more. OneView now works in harmony with the Petrosys PRO project crawler, a utility for extracting and collating summary information about large collections of Petrosys PRO files. Interica also recently released V 6.2 of OneView with a new data explorer for rich metadata browsing, automated rule-based actions and several new application connectors. More from Petrosys.

With a rather mixed metaphor, **IHS Markit** has 'launched' a Data Lake, uniting over 1,000 proprietary data assets. A catalogue and standard taxonomy provide 'robust' search across datasets from the financial services, transportation and energy sectors. The unstructured data capabilities will be further enhanced with the onboarding of over 1 million IHS Markit research reports, that will be catalogued and searchable by clients.

Ikon Science has released new versions of RokDoc and iPoint. The new RokDoc release includes tools for modelling 4D geomechanical effects, a multi-well saturation modelling workflow and new tools for rock-type labelling of log data. iPoint now offers improved mapping of attributes into RokDoc while new seismic data handling supports batch load SEGY files and seismic geometry on an ArcGIS map. Spatial search can now be used to download documents from iPointweb. The DLIS loader now supports importing of multi-dimensional array log curves. More from Ikon Science.

OAG Analytics' new Raster Image Server accelerates data science collaboration between geoscientists and data scientists. The hybrid machine learning solutions deliver rapid innovation through extensible tools that deploy as stand-alone applications or integrate with data science workflows. The Image Server will be available on the AWS Marketplace real soon now. More from OAG.

Sharp Reflections Pre-Stack Pro 5.8 includes an upgraded edition of PCube+ that incorporates the latest developments from the Norsk Regnesentral GIG inversion Consortium.

Drilling/Production

The 2.14 release of **Aucerna**'s Enersight for late-stage asset development and operational planning brings new file-less data sharing with PlanningSpace and a new network solver that reduces non-linear elements of the planning process, brings significant performance improvement and enhances model confidence. Also new is an enhanced water recycling workflow. Aucerna's PetroVR 2020 introduces PlanningSpace integration to provide synergies between asset and corporate planning teams. The new release also adds nested scenarios and memory management improvements and better well intervention and maintenance support.

Kappa Engineering gave a live preview of a new distributed microservice platform 'Automate' featuring next-generation cloud-based tools for data management and automated workflows. Watch the webinar. We will report on Automate in our next edition.

Engage Mobilize has added customizable E-forms to its eponymous cloud-based digital field management, procurement, and electronic ticketing platform for oil and gas. Operators can create digital versions of required documents such as EHS, Regulatory, SOP, Inspection & Evaluation or DOT to be filled out as part of the digital ticketing process. More from Engage.

Optasense's new ODH4+ distributed acoustic sensing interrogator unit is said to deliver superior measurements in multiple applications with the flexibility of using high backscatter fiber cables. ODH4+ works with any fiber from any vendor to delivers higher signal-to-noise ration with variable spatial resolution. More from OptaSense.

The 20.2 release of **Rock Flow Dynamics**' tNav fluid flow simulator improves on the use of GPU resources, with automatic fallback if insufficient GPU memory is available. The Geology Designer adds eight new seismic attributes and improved tools to tie attributes to well data. An early release of Fracture Simulator, a new hydraulic fracture module, is also included. More in the release notes and video.

Operations

ABB's new Ability Augmented Field Procedures sets out to digitize the field operator experience and improve interaction between field and control room operations. Ability AFP uses 'remote-enabled augmented reality technology' to guide operators through an operation, digitally recording each step to ensure operational knowledge is captured and preserved for re-use.

Add Energy's new 'AssetVoice' provides a single source of data for an asset's location, state, and availability. The software and hardware solution tracks and analyzes the stocked, stored and fitted components of an operating asset throughout its lifecycle. The 'smart app' provides an accelerated path toward implementing artificial intelligence in the control room or on the plant floor with real-time anomaly detection presented in a context-aware display. AssetVoice represents £300,000 joint investment by Add Energy and Innovate UK. Watch the video.

Emerson has added an augmented reality functionality to its Plantweb Optics asset performance platform, delivering enhanced access to real-time diagnostics and analytics, as well as live remote assistance, to industrial plant workers. Plantweb Optics brings real-time analytics, equipment health status and technical support documentation into a technician's field of vision. More from Emerson.

Gimmal Altitude lets operators manage and analyze unstructured data across the enterprise by discovering and analyzing content in corporate data sources and improve decision making. Altitude also helps identify redundant, obsolete and trivial information and classifies critical business content to ensure proper information governance. Gimmal has also announced 'Cloud Drop Zones' extending its cloud capability and SharePoint content governance.

IT Vizion has rolled-out a new tool, Config Machina, to simplify process model configuration and analysis. Config Machina provides a searchable configuration reference and can help identifying rogue configurations. Other functions include version control, solution auditing and testing and custom views and a table of contents display.

Manufacturing and industrial internet of things (IIoT) analytics specialist Seeq has expanded its support for oil and gas with WITSML and CygNet enterprise scada connectors. The new

connectors allow oil country data to be processed in Seeq's Workbench analytical engine and Python data lab. Houston-based Seeq partner and system integrator TIGA is available to help-out with deployment.

Risk management software house **Sphera** has added an Interactive piping and instrumentation diagram (P&ID) solution to its Control of Work solution. Interactive P&ID is delivered from the SpheraCloud, a SaaS-based and mobile platform. Users can upload PDF schematics and mark-up electronic document with actions, rules and isolation points. This data is then automatically carried into the integrated isolation planning process. More from Sphera.

Downstream

Control room design specialist **Brad Adams Walker** is proposing a control room audit service to verify compliance with the ISO 11064 standard for ergonomic control rooms design, including layout and dimensions of workstations.

Implico's OpenTAS tank farm management software is now certified to the EU EMCS (Excise Movement and Control System) version 2.4, allowing tank farms to handle loading automatically with simultaneous customs declaration.

KBC (A Yokogawa Company) has released of Maximus 7.1 a new edition of its flow assurance and life of field simulation software. Expanded multi-threading capabilities enable additional parallel scenario simulations. Automated workflows eliminate the need for multiple calculations. KBC has also announced Petro-SIM 7.1, now with the OLI Alliance engine inside. The new 'digital twin' technology is said to minimize process engineering waste.

2020 OSIsoft San Francisco Oil and Gas Track

OSIsoft on stagnating data lakes. Survey finds great interest in AI/ML, but none in the 'DevOps & API' category. Monico's mCore enables Marathon's MQTT scada migration. TC Energy uses Statistical Quality Control, in PI AF to detect pipeline anomalies. Tendeka uses PI to manage voluminous DTS data sets.

Back in 2019, OSIsoft issued a position paper covering its solutions for unconventional oil and gas. OSIsoft's Cindy Crow is quoted as saying, 'As crazy as it may now seem, the warning that neglected data lakes will stagnate into swamps has never been more pertinent. Businesses are getting overwhelmed, and the flood of data needs to be organized, analyzed, and acted upon.' The ability to store and analyze data from expensive equipment provides a huge productivity boost to those assets, but 'you can't get more efficient by simply storing or purging data'. Enter the PI System, 'the ultimate engineer's toolkit, covering everything from data analytics to machine learning'. A survey of PI System users found that 'predictive analytics and insights' was the most popular requirement. However, there is virtually no interest in the 'DevOps & API' category, a finding that marks a significant difference from those in the OSDU camp (see elsewhere in this issue). OSIsoft claims that 'all the pieces needed to solve operational problems, from condition-based maintenance to drilling parameter optimization, can be assisted by the real-time data platform'. OSIsoft captures key drilling events, stick-slip, and associated key attributes such as rate of penetration and key calculations such as drill string volume. PI

System underpins bespoke deployments in companies such as Devon's WellCon decision support system and YPF's 'iUP' Intelligent Upstream web-based interface to its drilling and production systems.

Fast forward to the 2020 OSIsoft San Francisco virtual user meet where Ron Sprengeler (**Marathon Petroleum**) and Doyle Taylor (**Monico Monitoring**) showed how mCore SDR (Monico's secure data router) has been deployed to stream multi-protocol field data from Marathon's compressors into its monitoring environment of Aveva Wonderware SCADA and PI System. Previously, data from Marathon's 850 compressors was 'stranded'. Performance was monitored and optimized with sporadic visits to the field. This was fixed by adding an mCore device to each unit along with a cellular radio network for data backhaul. The solution provides consistent data from all units and is tolerant of data connection outages. As we have seen elsewhere, the MQTT/Sparkplug protocol is used to provide pub/sub data collection. mCore reports that 'a lot of scada systems are going to MQTT'. Sprengeler added that the mCore unit has replaced lots of rugged PCs on site, which made for 'too many moving parts'.

Ionut Buse, from **TC Energy**, a gas pipeline operator explained how he is performing condition monitoring using statistical and machine learning models embedded in PI Asset Framework (PI AF). Anomalies are detected using statistical quality control, a 'highly scalable anomaly detection technique that uses descriptive statistics to compute static thresholds. Given the historical mean and standard deviation for a sensor, anomalies can be flagged when new readings fall outside a certain range. Machine learning can be added to the mix using for example, regression models to predict a sensor reading from one or more monitored variables. Clustering models can reveal subtle relations between many variables. New sensor data that is significantly different from existing clusters can be flagged as abnormal. The base data platform is PI AF. Other tools of the trade include REST Web Services (.NET Technologies, AF SDK, Accord.Net) and a custom front end built with AngularJS. Buse recommends spending time upfront working with subject matter experts to understand the asset fleet, key variations and sensor coverage. 'Use AF template inheritance and keep templates small, avoiding tight coupling'. Simple algorithms deployed at scale are powerful and 'provide tremendous value'.

Andy Nelson from high-end completions specialist **Tendeka** outlined some of the challenges in collecting, managing and manipulating complex data sets in the digital oil field. Tendeka's hardware leverages fiber distributed temperature sensors (DTS) which generate very large amounts of data. This data needs to be moved from the 'process control' domain on the rig into the 'office domain' for analysis with a rules engine, PI system and Tendeka's FloQuest application. DTS does not show the full picture of the well. DTD needs to be augmented with other data sources. In one (typical?) use case, PI System was leveraged to pull pressure data from more than 10 million data points and apply this contextually to a subset of more than 5 billion DTS measurements 'all within seconds'. Storing temperature profiles and interpretation results in PI System has brought 'significant improvement in interpretation and modeling accuracy'. More from the conference home page and from OSIsoft.

Folks, facts, orgs …

African Energy Chamber, AqualisBraemar, ARMA, Bechtel, Bureau of Economic Geology, California Hydrogen Business Council, CAM Integrated Solutions, CEN, CenterPoint Energy, Cold Bore Technology, ConocoPhillips, DistributionNOW, Emerson, Enbridge, EnerCorp, Equinor, ExxonMobil, Flotek Industries, Fluor, Forum Energy Technology, Geotech Computer Systems, Canada Energy Regulator, Grant Thornton, Halliburton, IFPen, Ikon Science, INPEX, Intrepid Financial Partners, iRely, Iron Mountain, Lytt, Marathon Petroleum, Motiva, Neptune Energy, Norwegian Petroleum Directorate, UK Oil and Gas Authority, Oil & Gas Technology Centre, Oil and Gas Sector Skills Unit, OPC Foundation, Okeanus, Pason Systems, Petro.ai, PHMSA, PPDM, Riversand, Texas Rail Road Commission, Ryder Scott, SEI, SeisWare, ServiceNOW, Siemens AG, Tellurian, Teradata, Weatherford, Woodside, Western States Petroleum Association, Halliburton Labs, Ikon Science, International Association for Energy Economics, Enbridge, SPE, ENI.

The **African Energy Chamber** has appointed Nicolas Pompigne-Mognard to its advisory board. Pompigne-Mognard is a communications and technology specialist who is also founder and chairman of APO Group, a pan-African communications and business consultancy.

Marine and offshore consultancy **AqualisBraemar** has named John Harris as MD South East Asia region, an internal promotion. AqualisBraemar has also opened an office in the Port of Tyne, North East of England, with Steven Lee as manager.

ARMA, the American Records Management Association has named Jason Stearns as president.

Engineer **Bechtel** has named Craig Albert as president and COO. Shaun Kenny succeeds him as president of the infrastructure business. Albert succeeds former COO Jack Futcher who is to retire at year-end 2020.

The US **Bureau of Economic Geology** has appointed Kenneth Wisian to associate director of its environmental division. Wisian was previously at the University of Texas at Austin.

The **California Hydrogen Business Council** has named Bill Zobel as executive director. Zobel hails from Trillium.

CAM Integrated Solutions, a provider of EPCM services to the onshore oil and gas industry, has appointed Brian McPherson chief accounting officer.

Stefano Calzolari has been elected president of **CEN**, the EU Committee for Standardization.

CenterPoint Energy has appointed David Lesar as president and CEO. Lesar was previously CEO at Halliburton.

Completion optimization specialist **Cold Bore Technology** co-founder and president Brett Chell is now also CEO.

ConocoPhillips EVP and CFO Don Wallette is to retire. Bill Bullock takes over both roles.

National Oilwell Varco spin-out **DistributionNOW** has appointed Dave Cherechinsky as CEO.

Emerson is to invest $100 million in an innovation center and expanded manufacturing operations in Boulder, Colorado.

The **Enbridge** board of directors has appointed Stephen Poloz as a director. He was previously Governor of the Bank of Canada.

Justin Morin, founder and executive chairman of the **EnerCorp** board of directors, has retired from active duties. EnerCorp continues with current president and CEO James Pung.

Tove Andersen has been elected to the **Equinor** board of directors. She hails from Yara International ASA.

Steve Greenlee is to retire as president, **ExxonMobil** Upstream Business Development Company. Linda DuCharme is named Corporate VP and President of the UBDC unit and has been named VP of Exxon Mobil Corporation. She also retains her position as president of ExxonMobil Upstream Integrated Solutions Company.

Flotek Industries has appointed Michael Borton as CFO. Earlier in his career Borton held financial roles at Schlumberger and Halliburton-Landmark. Flotek also announced that TengBeng Koid is to join the company as president, global business. Koid hails from Emerson Automation Solutions.

In an internal promotion, **Fluor** has named Joe Brennan as CFO.

As part of an ongoing cost reduction plan, **Forum Energy Technology**'s corporate executive team is being reduced and reorganized. Lyle Williams is now executive VP and CFO. Neal Lux is executive VP operations. Both report to CEO Cris Gaut. Senior VP and CFO Pablo Mercado is leaving to pursue other opportunities.

Steve LaZar has joined **Geotech Computer Systems** as VP business development. He hails from Atmosfir Optics.

The Government of Canada has named Gitane De Silva as CEO of the **Canada Energy Regulator**, a five year term of appointment.

Grant Thornton has named Lisa Walkush as its national managing principal of its Industry program. She also serves on the firm's National Leadership Team.

Executive Director Scott Gale is to head-up **Halliburton**'s new clean energy development innovation unit, Halliburton Labs, located at the Houston HQ.

Pierre-Franck Chevet has been appointed president of the board of **IFPen**, formerly the French Petroleum Institute. Chevet hails from the French Ministry of Industry.

In an internal promotion, the **Ikon Science** board has named Denis Saussus as CEO and member of the board.

INPEX has named Shigeru Togase VP of the Logistics & IMT Division, Nozomi Fujita general manager of the Abu Dhabi Projects Division and Hisato Akiyama general manager of Logistics and IMT. Kiyoshi Niikawa is now director of the Teiseki Pipeline Company and Toshihiro Tanaka is general manager at the Naoetsu LNG Terminal/Domestic Energy Supply and Marketing Division.

Intrepid Financial Partners has hired Tim Carlson as MD of its advisory business in Houston. Carlson hails from Evercore Partners.

iRely, a provider of enterprise software for petroleum distributors and C-stores, announces the appointment of Ed Kane as director of sales, east and Keith Haag director of sales, west.

Iron Mountain has appointed Kimberly Anstett Executive VP and CTO. Ansett joined Iron Mountain in May 2019 as CIO.

Lytt has named Paul Vickery as interim chief executive. Lilia Noble has joined the company as operations engineer, well integrity. She was previously with Schlumberger.

Marathon Petroleum has hired Ehren Powell as Senior VP, Chief Digital Officer. He was previously with GE Healthcare.

Georganne Hodges will succeeds retiree Todd Fredin as Executive VP Supply, Trading and Logistics with **Motiva**.

Mehdi Bouguetaia has joined **Neptune Energy** as MD Algeria based in Algiers. He was previously with Shell's Rashpetco Egyptian joint venture.

Erik Garshol has been hired as director of organization and IT at the **Norwegian Petroleum Directorate**. May Karin Mannes is director of NCS analysis and data management. Torgeir Stordal is director of geoscience, technology and 'co-existence'.

The **UK Oil and Gas Authority** (OGA) has appointed two new non-executive directors, Iain Lanaghan and Sarah Deasley.

Tendeka VP for Europe, Russia, CIS & Africa, Gillian King, has joined the Board of The Oil & Gas Technology Centre.

The first meeting of the **Oil and Gas Sector Skills Unit** (SSU) Governing Board meeting was held at the headquarters of the Oman Society for Petroleum Services.

The **OPC Foundation** has appointed Michael Clark as director of the OPC Foundation, North America.

Julie Knott has been hired as sales engineer at **Okeanus Science & Technology** in Houston.

Pason Systems is to implement a long-term succession plan, to take effect on October 1, 2020. James Hill will be retiring as Chair of the Board of Directors. Current President and CEO Marcel Kessler is also to retire and will succeed Hill as Non-Executive Chair of the Board. Jon Faber will succeed Kessler as President and CEO. David Elliott assumes the role of interim CFO until a permanent successor is appointed.

Nathan Meehan has joined **Petro.ai** as senior advisor for reserves and emissions. Meehan is president of CMG Petroleum Consulting and was the 2016 President of the Society of Petroleum Engineers.

PHMSA, the US Pipeline and Hazardous Materials Safety Administration has awarded $10 million to fund a new pipeline research, development and testing center in Pueblo, Colorado. More from [Transportation Technology Center](#).

PPDM has named Matt Becker as the new Chair of the PPDM Education Advisory Committee. Becker is MD of Sullexis' Enterprise Data Management practice. PPDM has also named Phil Cremer as chair of the PPDM Reference Values Project. PPDM's Professional Development Committee has developed six 'baseline job descriptions', which can be used to develop or augment existing job descriptions. The 'widely-recognized' roles are Data Analyst, Data Manager, Chief Data Manager, Data Steward, Petrotechnical Business Analyst, and Petrotechnical Data Scientist.

Tarun Chandrasekhar has been hired as senior VP Product at **Riversand**. He was previously with BP.

Mia Hutchens has joined the **Texas Railroad Commission** as Director of Public Affairs.

Ryder Scott has promoted Brett Gray to senior VP, Gilly Rosen to VP, Anton Siyatskiy to VP and Andrew Wright to 'economist'.

The **SEI** has named Anita Carleton the director of its Software Solutions Division.

Krista Saunders has been promoted to the role of COO at **SeisWare**.

Lara Caimi has been named Chief Customer and Partner Officer with **ServiceNOW**.

Judith Wiese has been appointed Managing Board member and Labor Director of **Siemens AG**.

Charif Souki has been promoted from non-executive to executive chairman at **Tellurian**

Steve McMillan has been appointed president and CEO of **Teradata**. He was previously with F5 Networks.

Karl Blanchard, Executive VP and COO at **Weatherford** is to assume the role of interim CEO until a permanent President and CEO has been appointed.

Woodside has named Fiona Hick Senior VP Operations. Tom Ridsdill-Smith has taken up a new role as senior VP Climate.

The California-based **Western States Petroleum Association** (WSPA) has appointed Tiffany Roberts as VP, Regulatory Affairs. Margo Parks has been promoted to Director, California and Southwest Policy. Zach Leary has been taken-on as Manager, California Policy.

We're hiring

Starting September 2020, Halliburton Labs will begin accepting applications from individuals and startups interested in a collaborative environment 'where entrepreneurs, academics, investors and industrial labs join to advance cleaner, affordable energy'.

[*Not exactly 'hiring' but ...*] **Ikon Science** has restarted its 'Geos Between Jobs' program, offering free e-learning RokDoc Rock Physics training to unemployed geophysics professionals.

Deaths

The **International Association for Energy Economics** has announced the death of Stephen Brown, a 'mainstay' of the organization and writer on topics such as macroeconomic and regional impacts of energy price shocks, the relationship between oil and natural gas pricing, and energy security.

Enbridge announces that Charles Fischer, a long-standing member of its board of directors died on Wednesday, June 17, 2020.

The Journal of Petroleum Technology reports the death of Giovanni Paccaloni, former **SPE** President and VP R&D with **ENI**. More from the JPT.

Done deals

Bentley Systems launches The Cohesive Companies. BP buys into Satelytics. Sercel takes stake in AMBPR. Chevron Technology Ventures launches Future Energy Fund. Core Scientific has acquired Atrio. EnerCorp combines with Pro Oil & Gas Services. EQT acquires IFS. Flotek Industries regains NYSE compliance. HSB Solomon has acquired the assets of EnSys Energy. ICIS bags Chemical Data. Ideon Technologies gets funding from University of British Columbia. Kværner and Aker Solutions are to merge. mIQroTech Incorporated is joining the Chevron Technology Ventures Catalyst program. Petrolearn gets grant from DoE. Prometheus Group has acquired WorkTech. Siemens is spinning off its energy business into Siemens Energy AG. Mark Whiteley & Associates have merged with S. Oliver & Associates to form Whiteley Oliver. How XBRL financial reports can be used as the basis of 'explainable AI' for bankruptcy prediction.

Following its acquisition of Atlanta-based Cohesive Solutions, an IBM Maximo reseller, **Bentley Systems**' Acceleration Fund has launched **The Cohesive Companies**, a wholly owned subsidiary. TCC will include the services team from Bentley's AssetWise business and the offerings of Bentley, Cohesive, and IBM's Maximo to support owner-operators' digital transformation.

BP has invested $5 million in geospatial analytics company **Satelytics**. The company applies machine learning and spectral imagery to data from satellites, drones and planes to, inter alia, detect fugitive methane from new and existing facilities.

CGG's **Sercel** manufacturing unit has acquired a 34% shareholding in **AMBPR,** a start-up company that designs and markets autonomous robots for repairing (sanding and painting) large metallic structures, used in the maritime and energy industries. Sercel identified AMBPR in its 'Axandus' program that helps start-ups scale up. Sercel is to manufacture AMBPR robots at its Saint-Gaudens site in France. The terms of this agreement also provide for Sercel increasing its stake in AMBPR to 51% in 2021.

Chevron Technology Ventures has launched a **Future Energy Fund** with an initial commitment of $100 million. FEF is to invest in 'breakthrough technologies' that will enable a transition to a greater diversity of energy sources.

Core Scientific has acquired **Atrio,** 'strengthening its AI capabilities'. The companies share the vision that 'AI and blockchain will change the way information is processed in an increasingly decentralized yet connected world'.

EnerCorp Engineered Solutions has combined with **Pro Oil & Gas Services**, a provider of well flow management and well construction products and services in the Permian Basin and Haynesville.

EQT is to acquire field service management software provider **IFS** in a € 3 billion plus deal. **TA Associates** has been cut in on the deal with a 'significant minority' stake in IFS

Flotek Industries has received notice from the **New York Stock Exchange** that it has regained compliance with the continued listing standards. The Company is no longer considered below the $1.00 per share continued listing criterion and the below compliance '.BC' indicator has been removed from the Company's common shares.

HSB Solomon Associates has acquired the assets of **EnSys Energy** including the World Oil Refining Logistics and Demand model and databases. Solomon also acquired EnSys' North American Logistics Review and Crude Flows Services and will continue to offer these solutions to clients.

ICIS, part of RELX, has acquired **Chemical Data**, a Houston-based provider of US petrochemical price benchmarks, market analysis and predictive analytics.

Ideon Technologies has raised $1.3M CAD in seed funding from a diverse group of investors and the **University of British Columbia**'s Seed Fund. Ideon's cosmic-ray muon tomography provides x-ray-like imaging to explore beneath the earth's surface. The monies will be used to develop a new bore-hole detector, slated for release in 2021. Muon tomography primarily addresses the mining sector, but additional applications include oil and gas, notably SAG-D operations.

Kværner ASA and **Aker Solutions ASA** are to join forces and create a new supplier company to enable 'sustainable, low-carbon oil and gas production' and accelerate growth in renewables. Kjetel Digre will be the CEO of the consolidated company.

mIQroTech Incorporated is joining the **Chevron Technology Ventures** Catalyst program. mIQroTech applies artificial intelligence and internet of things technology to predict pipeline leaks.

Petrolearn has been awarded a $1.2 million grant from the United States **Department of Energy** to further develop and commercialize its state-of-the-art machine learning based technology for real-time acquisition, compression, transmission, and processing of large subsurface datasets. Petrolern's low cost technology, originally developed for subsurface CO2 plume monitoring, has further application in oil and gas and geothermal energy.

Prometheus Group has acquired enterprise workforce management provider **WorkTech**, a provider of contractor management and productivity solutions software. WorkTech's technology will integrate the Prometheus platform and will improve planning and execution of shutdowns and turnarounds with real-time snapshots of planned vs. actual activity and spend.

Siemens shareholders have approved the spin-off of the company's energy business to **Siemens Energy AG**. This move leaves Siemens AG with Digital Industries, Smart Infrastructure and Mobility.

Beaumont, Texas-based surveyors **Mark Whiteley & Associates** have joined forces with **S. Oliver & Associates** to form **Whiteley Oliver**. Jason Whiteley is CEO and Stan Oliver is president.

A presentation at the Eurofiling Innovation Day by Maria Mora and Alicia Rodriguez (**Fujitsu Labs**) and Revathy Ramanan (**XBRL International**) showed how XBRL financial reports can be used as the basis of 'explainable AI' for bankruptcy prediction. The study used a decade of XBRL annual and audit reports filed with the Spanish Securities Market Commission to build a machine learning model for predicting company distress. The presentation highlighted how the xBRL-JSON and xBRL-CSV formats can be ingested into effective machine learning models. More from Eurofiling.

Safety first …

Blackline Safety/NevadaNano wearable gas sensors. US Chemical Safety Board on plant safety in the hurricane season. CSB update on fatal Aghorn Operating H2S release. New offshore kick lesson shared by IOGP. Weatherford introduces Velox Wellhead System for enhanced safety. Creative Supply's guide to 'Returning to Work Safely. Chevron CEO on oil and gas' role in 'combatting the virus' and on how covid has 'accelerated digital transformation' and on working from home. More covid-related announcements from the Energy Institute, the United Nations ('counter covid with code!') and D-Wave Systems 'quantum-classical computer simulations'!!

Blackline Safety has added NevadaNano's MPS flammable gas sensors to its range of cloud connected G7 wearables. The new molecular property spectrometer is said to provide an 'unparalleled' lower explosive limit accuracy for combustible gasses in any environment. More from Blackline.

The US **Chemical Safety and Hazard Investigation Board** (CSB) has issued a video safety message and alert entitled '2020 Hurricane Season: Guidance for Chemical Plants During Extreme Weather Events'. The video highlights recent work by the Center for Chemical Process Safety (CCPS) to help operators prepare for extreme weather events including flooding.

Facilities are urged to follow established startup procedures and checklists, and to recognize that 'human performance may be compromised due to crisis conditions'.

The **CSB** has also released a 'factual update' on the events surrounding an October 26, 2019, hydrogen sulfide release at Aghorn Operating's water flood station in Odessa, Texas. The release resulted in two fatalities, an Aghorn employee and his wife who was overcome when she drove to the waterflood station in her personal vehicle to check on her husband. Testing of the site's H2S alarm suggests that it may not have been performing as expected.

The Well Control Incident Subcommittee of the **IOGP** has produced a new Lesson Sharing report (N° 20-5) covering an offshore kick that led to increased personnel risk exposure at the wellsite. The incident exposed a 'confirmation bias' in the well site operations and office team's decision to interpret the first kick indication as 'ballooning'. The IOGP believes that this detailed incident description contains important lessons to be shared with the industry. More from the IOGP Safety Zone.

Weatherford has introduced the Velox Wellhead System with quick-connect components that lock-in pressure integrity to reduce potential leak paths and enhance safety. Velox is said to provide 'unmatched isolation' between casing strings with quick-connect components that maintain pressure control, reduce potential leak paths, and minimize non-productive time during installation in many applications, including high-pressure, high-temperature, and sour-gas wells. Velox expedites installation by enabling the packoff to be run in a single trip from the rig floor, removing personnel from the cellar. More from Weatherford.

Covid corner

Creative Safety Supply has produced a 14-page guide; 'Returning to Work Safely' covering the main recommendations from OSHA and the CDC for preventing the spread of Covid in the workplace. The guide covers the application of OSHA standards (29 CFR 1910.132, Personal Protective Equipment, 29 CFR 1910.134, Respiratory Protection and 29 CFR 1910.141, Sanitation) in the context of the current epidemic. The guide explains how to classify worker exposure to COVID-19, how to conduct a job hazard analysis and how to implement workplace controls, basic hygiene, disinfection and assure social distancing. Creative provides a range of labels and other safety related products.

Chevron Chairman and CEO Mike Wirth, speaking to Dan Yergin at the 2020 virtual Cera Week opined that the oil and gas is 'essential to combatting the virus' and that petroleum-based and petrochemical products are 'on the front lines against the virus'. Moreover, COVID-19 'has accelerated the ongoing digital and operational transformations in the industry' with Chevron 'embarking upon a digital journey to begin to take decades of legacy technology platforms and take advantage of the cloud, of mobility, of artificial intelligence and some of the things you can do with big data now'. Wirth also stated that, 'I don't think everybody will always work from home. But I also think that the traditional model where everybody always comes to the same place, where people get on planes to go to meetings – they might be able to do using other technologies. I think there will be changes that every company in every industry will have to sort through'.

We have been inundated with releases covering the covid epidemic. Many are simply a reminder that a vendor is still around and doing business, even if remotely. Some are of possible interest, such as the **Energy Institute**'s explanation of how a 'bow tie' can help fight

covid-19. A few are curious like the **UN**'s 'Code the Curve' attempt to 'counter COVID-19 online'. Others, like **D-Wave Systems** offer of 'hybrid workflows from quantum-classical computer simulations' seem somewhat 'forward looking'. A marketing pandemic possibly?

2020 PIDX Virtual Spring Conference

PIDX adoption forums and NOC 'empanelment'. Chevron/Microsoft moot PIDX Energy Transition project. Cloud to 'democratize data exchange'. Sphera on ISO 22745 and supply chain risk management. Enverus/Peloton on OpenTicket field ticketing. Chevron and ChaiOne on digital field service management. Payload, 'a wealth of opportunity lies dormant in application databases'.

Houston

Speaking at the 2020 PIDX* virtual spring conference Amit Sethi (**PIDX** board and **Baker Hughes**) presented on the need for PIDX adoption forums. These are to help members with their journey from standards to adoption and outcomes. Target areas include business process standardization, master data harmonization and technology modernization. Currently there has been limited adoption of a few standards. PIDX can help by scaling existing solutions to create value for both partners. Another problem area is represented by country-specific adoption challenges such as culture and local legislation. Sethi advocates promoting PIDX standards to Middle East NOCs and proposes 'empanelment' of NOCs into PIDX to share case studies and highlight the benefits of regional and global adoption.

Sebastian Gass, Stephanie Waters and Franz Helin (**Chevron**) pitched the PIDX Energy Transition Project (to be led by Chevron and Microsoft) as a component of the PIDX Strategic Initiatives Work Group. Chevron is building on earlier work on environmental performance, leveraging data science and artificial intelligence. Chevron's environmental 'beachhead' projects include emissions data collection and integration at its El Segundo refinery and offshore Western Australia Gorgon complex. A target architecture is proposed to automate enterprise GHG (greenhouse gas) emissions data collection and curation, including trusted external data, to feed the Sphera GHG emission reporting and analysis application (see below). A PIDX ET/NDX (energy transition normalized data and exchange standards) framework will establish clear data standards and exchange needs in the energy industry amongst suppliers and operators. The plan is for transparency of reporting with APIs for technical integrations and a 'minimum viable product' to roll out later in 2020. More in the proposal.

Kadri Umay (**Microsoft**) presented on 'democratizing data exchange with a cloud-native architecture'. Umay described today's upstream data landscape as a 'Winchester House' of data silos. What is needed is a networked 'open data model with rich semantics' spanning subsurface, trading, production and reaching across to suppliers and joint venture partners. In which context, OSDU, The Open Group's open subsurface data universe got a shout-out, as indeed did PIDX, as a relevant standards body. 'Cloud-born' technology, object storage, NoSQL databases and the internet of things are in the mix as are 'blockchain tokens'. The whole caboodle is augmented with various Microsoft tools (Office365, the Azure Synapse, Dynamics365) and sits atop Azure Data Lake storage. Poster child for Microsoft's industrial data nirvana is Swedish utility Vattenfall. Umay concluded with a mention of Microsoft's

Project Silica that stores seriously large amounts of data in inalterable quartz glass using 'femtosecond lasers'.

Peter Hardy, Neal Rosen and Matt Ludbrook (Sphera) presented on supplier price book onboarding, catalogue automation and the role of master data management in operational risk management. Issues with supplier contracts include managing material master data, handling a constant stream of price book deltas, aligning materials requirements with availability, and superseding obsolete items. The route to success passes through structured master data on part number and pricing with a single, unique record for each stock keeping unit (SKU). The authors cited the ISO 8000-110 and ISO 22745 standards as key to quality data. In particular, the three 'stages' of ISO 22745, the technical dictionary (part 10), identification guide (part 30) and master data (part 40). Somewhat enigmatically, the semantic web was cited as 'the future for material identification'. Sphera's software is used by BP, Shell, Siemens, Yokogawa and many others.

A joint presentation from **Enverus** and Peloton, given by Dave Savelle (Enverus) discussed the Enverus/Oildex OpenTicket digital ticketing solution. The cloud-based collaborative platform allows operators and service providers to generate, review and approve field tickets. Field ticketing progressed from manual paper transactions to digital invoicing (with a degree of manual reconciliation) by around 2010. Today a fully digital transaction chain with digital invoicing, reconciliation and approval, 'pay on ticket' is possible. But there remain issues as suppliers prefer to review field tickets internally, before using them as the basis for an invoice, to validate pricing and discounts and ensure that the scope aligns with the work done. Additional technical solutions like geofencing and GPS tracking show promise but may not work on a well pad with many objects in a relatively small space. It can be hard to support multiple 'fit for purpose' ticket types and to align with customers' business rules. Today, OpenTicket transacts over 2 million tickets per year (2019), a $6 billion spend by over 4,000 suppliers. By spend, 85% of transactions go straight through the portal. An additional 5% come as PIDX-compliant tickets.

Peloton's WellView tracks AFE, field estimates and final invoiced costs for morning reporting. WellView provides KPIs including daily cost total, AFE vs field estimate and cost per depth. Digital ticketing can support contract price matching providing more accurate cost estimates along with complex AFE/CC and GL splits, breaking out costs accurately between entities. Integration between the digital field ticket and morning reporting solutions reduces the data entry burden and improves accuracy. Support for real time digital ticketing in drilling and completions is slowly being adopted. Current digital ticketing processes support lease operating expenditure analysis well and can speed business process. The need today is to link morning reporting and field ticketing systems, making the morning report the source of digital field ticket approvals. Here there is an opportunity for PIDX to lead in enhancing standards for data and transport layers for field ticket information.

Calgary

Dan Carlson (**Chevron**, retired) and Stephen Johnson (ChaiOne), speaking at another PIDX 2020 event in Calgary, presented a PIDX success story on how software design thinking has been used to help and enable Chevron's field workers. ChaiOne's flagship is digital field service management (DFSM), a mobile application that enables timely confirmation of 3rd party work when completed in the field and produces an accurate estimate of the value of work done. DFSM exposes an API that uses the PIDX industry data standard to securely connect

Chevron with external partners. DFSM development was informed by Chevron's 'voice of the supplier' and 'voice of the field worker' initiatives. The tool was launched in August 2019. Today site managers digitally approve field tickets on a daily basis. A Microsoft Azure back end lets developers integrate via PIDX. Suppliers call the 'CreateTicket' PIDX endpoint. App users can display and approve or reject a ticket and register devices for push notifications.

Chris Lambert **(Payload)** believes that there is a 'wealth of opportunity' lying dormant in many application databases and company data warehouses, all data that could be leveraged to reduce costs, improve productivity and automate process. The answer may be 'self-arranging intelligent systems' that leverage AI/ML to adapt automatically to a particular problem. Data collected on a daily basis may have additional value through aggregation, or as part of a larger data ecosystem. For instance, route coordinates from daily operations will be of value to first responders in an emergency. Lambert envisages a 'journey' from unstructured data in disparate applications and disconnected data sources to fully structured data that is 'consumable'. Here standards like PIDX will be critical to success. 'PIDX represents an opportunity for your organization to better align standardized and structured data'.

More from PIDX.

* The Petroleum Industry Data Exchange standards body.

Sales, partnerships, deployments …

BP deploys Lytt's DAS fiber. ABB Ability System 800xA for Petrobras' Anna Nery FPSO. GAIL to use Amphora CTRM for LNG trading. Applied Petroleum Technology supplies geochemical studies to Chrysaor. US DoE awards Bureau of Economic Geology grant for downhole CO2 microsensors. Black & Veatch teams with Hexagon. INT integrates Bluware VDS into IVAAP. BP to implement Bluware InteractivAI. CGG GeoSoftware runs in Alibaba Cloud. Wintershall DEA to deploy Cognite Data Fusion. Hibernia Resources to use Cold Bore Technology's SmartPAD. Canadian Well Logging Society migrate RW map to Esri ArcGIS. Doris Group, AVEVA and Schneider Electric team announce Digital Twin Alliance. eDrilling partners with WellSpec. Jaguar E&P selects Emerson/Paradigm's geoscience software. ExxonMobil renews collaboration with Princeton University's Andlinger Center for Energy and the Environment. Genasys and Esri. Gimmal and Box Governance. Graves & Co. Signa Engineering. Norwegian oil and gas industry bodies GTO and EPIM combine. Halliburton and TechnipFMC announce 'Odassea' DAS for subsea wells. Petronas extends DecisionSpace 365 contract with Halliburton. Halliburton, Microsoft and Accenture team on Azure data lake. EPC Hargrove Controls partners with AspenTech on digital twin. Cairn Oil & Gas deploys Honeywell Forge. Iron Mountain's InSight in Google Cloud Marketplace. Yokogawa KBC teams with OLI Systems.

BP has used **Lytt**'s DAS fiber acquisition technology and cloud-based AI to enhance real time visualization and logging of downhole inflow profiling. More from the Lytt blog.

ABB is to provide ABB Ability System 800xA control system to the Yinson-built FPSO for Petrobras' Anna Nery FPSO to be anchored on the Marlim 2 oil field in Brazil's Campos Basin. ABB is also to combine the vessels' production modules into an integrated safety and control system.

Indian natural gas company GAIL, a Maharatna unit, is to deploy **Amphora**'s CTRM software at its LNG trading operations to monitor and control its LNG landscape and test trading scenarios prior to execution.

Applied Petroleum Technology is to provide UK operator Chrysaor with geochemical and petroleum systems analyses around its Armada hub and Greater Lomond areas.

The US Department of Energy has awarded the **Bureau of Economic Geology** a $3.7 million grant for the development of a wireless autonomous distributed sensor networks of casing annulus-deployed microsensors to monitor CO2 injection and subsurface movement.

Black & Veatch is working with **Hexagon** to integrate Intergraph Smart suite of design tools to with its oil and gas engineering design business.

Interactive Network Technologies has integrated **Bluware**'s seismic Volume Data Store into its HTML5-based 'IVAAP' upstream data visualization platform. In a sperate announcement, INT reports that the latest IVAAP now runs on OSDU Release 2 and OpenVDS (the open source edition of VDS).

BP is to implement **Bluware**'s 'InteractivAI' deep learning technology in its subsurface interpretation workflows. InteractivAI runs on top of Bluware's Volume Data Store cloud-native seismic data environment. Geoscientists can now 'train and correct deep learning results interactively, significantly improving structural interpretation workflows'.

CGG GeoSoftware has collaborated with China's **Alibaba** to deploy its geoscience software in the Alibaba Cloud, the 'third largest' cloud service in the world with a N° 1 market position in Asia Pacific, according to Gartner.

Wintershall DEA is to leverage **Cognite**'s Data Fusion solution at its Mittelplate oilfield, Germany. CDF's data contextualization and AI-enablement will improve maintenance and boost production.

Hibernia Resources is to deploy **Cold Bore Technology**'s 'SmartPAD' completions operating system. SmartPAD provides sensor-driven tracking and ultra-high-resolution analytics of fracking operations.

The **Canadian Well Logging Society** has migrated it RW water salinity application to a **new Esri** ArcGIS-based platform. Visit the CWLS 2020 RW Mapping App here.

Doris Group, **AVEVA** and **Schneider Electric** have announced the Digital Twin Alliance. The DTA is to 'address complex digital transformational challenges in upstream oil and gas'. The DTA partners promise delivery of a 'fully-formed digital twin' to serve as a backbone for performance improvement.

eDrilling has partnered with **WellSpec**, a drilling and well engineering advisory company, to adapt its Drill Own Well simulator services to HPHT and MPD scenarios.

Mexico-based Jaguar E&P has selected **Emerson/Paradigm**'s exploration and production software and services for seismic and well data analysis, multi-survey seismic and geologic interpretation, petrophysical analysis and subsurface modeling. Jaguar was the biggest winner of Mexico's six and seventh auctions with the award of 11 of the 24 blocks offered.

ExxonMobil has renewed its collaboration with **Princeton University**'s Andlinger Center for Energy and the Environment. The 'E-filliates' R&D partnership targets lower-emission technologies and energy solutions. The research is 'taking a comprehensive look at potential pathways to achieve net-zero emissions in the United States by 2050'.

Genasys, provider of critical communications systems and solutions, is now an official **Esri** partner. The deal means that Genasys' emergency situational awareness tools can now leverage accurate geofencing when notifying people in, or entering into, crisis-affected areas, benefitting from Esri's public library of map layers.

Houston-based **Gimmal**, a provider of information governance and compliance software, has integrated its records management offering with **Box Governance**'s cloud-based content management solution. The combination adds features such as 'record immutability' to achieve 'complete control and compliance throughout the organization'.

Graves & Co. Consulting and **Signa Engineering** have signed a strategic agreement that combines Graves's reservoir engineering and geological consulting firm with Signa's drilling and production engineering and analytics. The deal extends Graves' evaluation capacity to include assets such as production facilities, gathering systems, pipelines, and drilling, fracking and completion equipment.

Norwegian oil and gas industry bodies **GTO** and **EPIM** are to become one joint organization. The combination means that sharing data and information between member companies will be easier with a renewed focus on digital collaboration.

Halliburton and **TechnipFMC** have announced 'Odassea', a distributed acoustic sensing solution for subsea wells. The platform provides for 'intervention-less' seismic imaging and reservoir diagnostics.

Petronas has awarded **Halliburton** a scope expansion covering the DecisionSpace 365 E&P cloud software.

Halliburton has also signed a five-year strategic agreement **with Microsoft** and **Accenture** for the 'advancement' of Halliburton's data lake and other digital capabilities in Microsoft Azure.

Mobile, Atlanta-based EPC **Hargrove Controls** has partnered with **Aspen Technology** to deliver engineering services for a 'digital twin' that supports the operations and maintenance phase of a plant's lifecycle. Hargrove will provide digital twin services that will rely on key technology and domain expertise from AspenTech. The twin comprises the AspenONE asset performance management (APM), Engineering and Manufacturing and Supply Chain software suites.

India's Cairn Oil & Gas, Vedanta has deployed **Honeywell** Forge enterprise performance management software to improve decision-making and enable workers to remotely operate their facilities. Honeywell Forge Inspection Rounds digitizes runs on mobile devices and enables field technicians to capture data through pre-defined workflows. Honeywell Forge Operations Management adds a single, auditable repository for all logged plant-related operational activity.

Iron Mountain's InSight artificial intelligence and machine learning content services platform is now available on the **Google Cloud** Marketplace. InSight classifies and extracts key metadata from a wide array of structured and unstructured assets, from documents and spreadsheets to videos and images.

Yokogawa's **KBC** unit has teams with **OLI Systems** to deliver a predictive software solution to mitigate corrosion and scaling problems in the oil and gas industry. The deal combines KBC's Petro-SIM with the OLI Alliance Engine.

Standards stuff …

IOGP Geomatics Guidance Note 3. Google Cloud joins OPC Foundation. OPC teams with CESMII and Open Industry 4.0 Alliance. Oil Companies International Marine Forum publishes 'Dynamic positioning failure mode' guide. Open Geospatial Consortium approves HDF5. Industrial Internet Consortium white paper on distributed ledgers in the IIoT. New ISO standards for the IoT. Linux Foundation's EdgeX Foundry 'Geneva' release. NIST on a Chip. PPDM V3 of Well Status & Classification taxonomy. PPDM Board explains relationship with OSDU. Alliance for the Internet of Things and the Semantic Interoperability Expert Group of the World Wide Web Consortium (WC3) to compile ontology landscape for the IoT.

The **IOGP** has published Geomatics Guidance Note 3 covering coordinate and area descriptions for contract and unitization definitions. The Note, Version 6 of a publication that first came out in 1995, targets licensing authorities and regulators, operators and joint venture partners with advice on the correct characterization of contract areas, license block boundaries and unitization agreements which, in the past 'have often have been inadequately described'.

Google Cloud has joined the **OPC Foundation** and is to 'offer' OPC UA in a 'commitment to openness and industry collaboration'. Google Cloud will use OPC UA to incorporate machine data into its analytics and AI solutions. More on Google Cloud's Industry 4.0 efforts in the video.

The **OPC** has teamed with **CESMII**, the Clean Energy and Smart Manufacturing Innovation Institute and OI4, the Open Industry 4.0 Alliance to develop an internet-hosted database of OPC UA information models, publicly accessible through a RESTful interface. The library targets scada system developers looking to leverage industrial assets containing non-standardized information models. OPC has also extended its OPC UA compliance test tool (UACTT) which now validates PA-DIM (Process Automation Device Integration Model), PLCopen and MDIS companion specs. More from OPC.

OCIMF, the Oil Companies International Marine Forum has published a [90 page guide](#) titled 'Dynamic positioning failure mode effects analysis assurance framework risk-based guidance'. The guide was authored following safety concerns arising from several North Sea incidents involving dynamically positioned vessels.

The **Open Geospatial Consortium** (OGC) membership has approved the Hierarchical Data Format Version 5 (HDF5) Core as an official OGC Standard. HDF5 is a data model, programming interface and storage model for managing an 'unlimited variety' of data types. HDF5 is said to be suited to scientific and engineering geospatial applications that employ complex multidimensional datasets to describe phenomena that change over time and/or space. More from [OGC](#).

The **Industrial Internet Consortium** has published a white paper on '[Distributed Ledgers in the IIoT](#)'. The publication covers blockchain and other distributed ledgers and their potential use in the industrial internet. DLs are said to be 'relevant to industrial IoT … providing a safe, immutable distributed ledger that stores sensor data and allows information to be verified without relying on a third-party authority'. However, the report warns that blockchains suffer from the 'scalability trilemma' in that they can generally have only two of the following three properties: decentralization, security and scalability. The report concludes that 'Permissioned DLs appear to currently be the most successfully deployed solution today, particularly with the supply chain use case'. The report does not appear to address the impossibility of connecting the digital and real worlds. In which context we suggest a read of our 2018 '[blockchain is bullshit](#)' editorial.

ISO has released three standards for the IoT. ISO/IEC 21823-2 specifies a transport framework for interoperability. ISO/IEC TR 30164 describes concepts, terminologies and use cases. ISO/IEC TR 30166 adds technical and functional elements of the IIoT. To learn more, [visit ISO](#) and prepare your Swiss Francs to satisfy ISO's unfriendly pay-to-view policy.

The new 'Geneva' release of the **Linux Foundation**'s EdgeX Foundry promises simplified deployment, optimized analytics, secure connectivity for multiple devices and more robust security. The Foundation reports that since its launch in 2017 there have been 5 million container downloads of [EdgeX](#).

The US **National Institute of Standards and Technology** (NIST) has launched [NIST on a Chip](#), a program to bring cutting-edge measurement-science technology and expertise to users in industry, defense, medicine and academia. NOAC will develop accurate quantum-based standards and sensors that are traceable to the International System of Units, making ultra-reliable measurement technology available anywhere and anytime.

The **PPDM Association** has published V3 of its Well Status & Classification taxonomy offering 'well-defined reference value lists which convey information with precision and clarity'. The taxonomy was developed with help from Chevron. The free publication is available from [PPDM](#) (sign in required).

The **PPDM** Board has [written](#) to its membership to explain its relationship with OSDU, the open subsurface data universe. PPDM is in discussion with the OSDU leadership on a possible new OSDU training and certification role.

AIOTI, the Alliance for the Internet of Things and the Semantic Interoperability Expert Group of the **World Wide Web Consortium** (WC3) are looking for help in compiling an ontology landscape for the IoT. The group has drafted a template which, while useful, is 'difficult for industrial practitioners to understand'. More too from AIOTI.

2020 PCRI Research Exchange Meeting

Pipeline Research Council International meet hears from Rosen on an ML-based digital alternative to in-line inspection. Integral Engineering and SoCalGas on using machine learning to enhance pipeline reliability assessment. Pacific Northwest National Laboratory's hybrid physics-based/data-driven model fed with PHMSA incident data.

Speaking at the 2020 Research Exchange Meeting of the (PCRI), Christopher De Leon and Michael Smith (**ROSEN Group**) offered a digital alternative to in-line inspection, aka a predictive analytics solution for monitoring the condition of uninspected pipelines. Using inline inspection data (ILI) from 5,000 pipelines, a trained Bayesian network was used to predict internal corrosion growth rate in an uninspected line, using ILI data from similar inspected pipelines. The approach led to a 'significant reduction in unnecessary digs compared to traditional modeling'. Potential applications of the technique include input to direct assessment (dig prioritization), decision support for pipeline modifications (piggability) and ILI validation to API 1163 Level 1.

SoCalGas has used machine learning to enhance pipeline reliability assessment as Daryl Bandstra (**Integral Engineering**) and co-author Mari Shironishi (SoCalGas) explained. The approach addresses the risk of excavation damage, a leading cause of pipeline failure, leveraging earlier PRCI-sponsored research* into fault tree/structural reliability models of mechanical interference from excavation equipment. A machine learning regression model was fed with data on land use and 'one call' notifications of upcoming excavations. The model makes location-specific predictions of the rate of excavation notifications along a gas transmission pipeline network. The project showed how ML models can enhance existing risk assessment approaches and how the use of public data sources can improve risk estimates. The authors noted however that 'an increase in accuracy comes at the cost of decreased interpretability, for many machine learning models'.

* Chen, Q. and Nessim, M. 1999. 'Reliability-based Prevention of Mechanical Damage to Pipelines'. Submitted to Pipeline Research Council International. Catalog PR-244-9729.

Kayte Denslow and other co-authors from the **Pacific Northwest National Laboratory** reported on DOE/Office of Fossil Energy-supported research into natural gas transmission prognostics with machine learning. The work investigates the use of novel signatures from deployed transmission infrastructure and sensors. Despite advances in inspection technologies, significant incidents continue to occur that undermine the safety and reliability of natural gas transmission pipelines. Insights from past lifecycle data and novel signatures from in-line inspection data can improve the prediction (and enable better avoidance) of incidents. The research sets out a) to develop a 'health index' for pipelines, derived from sensor measurements and historical operating data and b) to predict system condition and expected remaining useful

life. A hybrid physics-based/data-driven (HBDD) model has been developed and is being fed with PHMSA incident data. So far, the machine learning model has correctly 'predicted' the incident year 86% of the time. Looking forward, the researchers plan to deliver 'PHD', a commercial-grade pipeline health diagnostic software tool that can integrate an operator's scada system and provide pipeline health status (situational awareness) along with predictions of when and where pipeline repair/replacement is needed. Download the full (1,100 page) RCRI REX Proceedings.

Amazon Comprehend

Natural language processing locates key information in public domain US drilling reports.

A blog post co-authored by Amazon's Carlos Castro and Kevin Wang explains how well drilling reports can be analyzed with natural language processing (NLP). Amazon Comprehend, its own brand NLP service, was used in an automated pipeline to extract insights from unstructured data in well activity reports.

US operators report well activity to the Bureau of Safety and Environmental Enforcement (BSEE) using Form 133 which includes a free text field where unusual events can be recorded. NLP was used to search for key words in the text area that might indicate, for instance, a well control problem. Other key entities can then be captured in an engineering database.

The apparently straightforward task involved a pipeline built with AWS Step functions to coordinate multiple services into 'serverless workflows', create a training dataset and train the system. A 'state machine' leverages AWS Lambda functions containing application logic. A 'Split SNWAR' function, Elasticsearch, Amazon DynamoDB and Kibana also ran (and we have skipped quite a bit of the pipeline). If you are tempted to try Amazon's labyrinthine NLP offering, read Castro and Wang's blog. On the other hand, you could try grep.

Letters to the Editor

Energistics on counting OSDU members. Bluware responds to 'Is Seg-Y Useless'.

From Ross Philo, CEO Energistics

Neil

I thought you might find the following clarification re OSDU member numbers useful. Contrary to what you mentioned (and were clearly surprised by) in the latest Oil IT Journal, the number of active members of the OSDU Forum is not 750 but is actually around 150 (and increasing each month). Sometimes that number gets inflated to 190 when one includes companies that are Gold/Platinum members of The Open Group, who are allowed to participate

across multiple forums, but they may or may not actually be active in OSDU, so the lower figure of 150+ is more accurate.

I suspect that the number you quoted of 750 members of OSDU is more likely the total number of members of The Open Group*.

Yours, Ross Philo

Editor – indeed it was, apologies. At the last count (July 2020) OSDU membership had just topped 200.

From Andy James, Chief Product Officer, Bluware

Dear Editor,

I am following up on your article published in Volume 25, Number 3 of Oil IT Journal "Is SEG-Y useless?". It explores an interesting topic, particularly as many companies are poised to move sub-surface data to the cloud and wondering if moving SEG-Y is the best approach. The article presents Bluware in the light of 'dissing' SEG-Y, which is not the case. The SEG-Y format is important for exchanging seismic data between systems. It has been fulfilling this function for years and given both the amount of data in SEG-Y format and the number of tools and applications that know how to speak SEG-Y, it will be relevant for many years to come.

Seismic surveys and the sensor technologies acquiring them result in massive data files with 10-fold survey size increases in recent years. The strategy of moving data between applications is becoming prohibitive because of the sheer size of the data and the amount of replication that is needed to support end-to-end workflows. A company starting with a 500GB post-stack survey could end the workflow with a 10TB data management challenge when you count (multiple stacks) x (multiple subsets) x (application specific formats) – and none of this data works well in the ubiquitous cloud storage type: object storage. One of clients rightly pointed out "There is no point in moving to the cloud if we don't improve the workflow". This means exploiting the strengths of the cloud too.

This is where we believe streaming data and providing fast API and random access to data stored in low cost storage tiers is the future for seismic data. We see some groups are pursuing strategies to cast SEG-Y across cloud object stores which is propped up by cloud specific code such as Lambda; while these solutions show real innovation and provide API-based access to data in place for things like data science, they still don't get over the fact that the SEG-Y format was not designed for the cloud. This is where we feel Bluware VDS and the open source implementation, OpenVDS have the edge.

I hope this clarifies our position regarding SEG-Y, or more generally the future of seismic data in the cloud.

Cheers! Andy James.

www.OilIT.com