

Higher Capability, Lower Costs With Cloud Subsurface Data Management

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Lower oil prices, lack of experienced personnel, and uncertainty about long-term global oil and gas demand are driving petroleum companies to seek new ways to improve operational capability and lower costs. Cloud subsurface data management has the potential to allow standardized data acquisition, improve data integration and quality, and catalyze data analytics—all at a lower cost than traditional methodologies.

Many challenges are involved in acquiring, analyzing, and managing subsurface data. Why is subsurface data so different from other domains? Subsurface comprises many complicated data types, including well logs, core analyses, geologic interpretations, and more.

Each data type is complex and requires an experienced subject matter expert (SME) to deal with data acquisition, formatting, and managing. In addition, the subsurface data must be aggregated into a business

context to be useful to the daily operational business. IT and domain SMEs must collaborate to ensure that data are always correct, integrated, and accessible. To be effective, a subsurface data manager must have a strong blend of domain and technical capabilities.

The minimum level of qualification for a position in data management requires a degree in a relevant discipline such as geoscience, engineering, or information technology. Candidates must capably handle multiple operating systems such as Windows and Linux, and should understand company-specific software at a base level.

The technical requirements of subsurface data management are significant. Candidates should know how to script in AWK, sed, Perl, or Python, and additional scripting languages can't hurt. Lastly, candidates must understand management from both a technical perspective—in understanding quality control and juggling multiple databases—and from a people perspective, in possessing excellent communication skills and handling team personalities. With so much required of those in subsurface data management, the result is a complicated landscape that changes from one business unit to another and evolves through time.

With the advent of data analytics, the subsurface data manager's responsibilities have increased. Analytics cannot thrive unless there is good data on which to act. The broadening subsurface workspace, coupled with the large legacy application set and increasing amounts of information, creates a critical problem. Continuing with the same issues and proprietary software is not the answer: A new way of thinking is required.

Why Cloud Platforms Work

Utilizing a cloud platform solution for subsurface data can lower infrastructure and support costs while simultaneously providing a platform for all structured and unstructured data along with a collection of best-in-class applications for managing and acting on the data to create business value.

Any type of data can be stored in the cloud—including supervisory control and data acquisition (SCADA), database, documents, metadata, indexes, and geographic information—and they are integrated more easily by virtue of being in the same space. There is less of a need to know multiple operating systems, and applications in the cloud platform are replaceable as needed. Vendor application lock-in is eliminated, and any application piece can be replaced, including map, search, workflow, quality control, data loading tools, and more. Clients can select the application they deem best and simply plug it into the platform.

These subsurface data management challenges are reduced in scope and complexity on a cloud platform. Cloud platforms offer better service for upstream while minimizing operating costs. And the platform is more malleable. It is much easier to add open source software to or upgrade a cloud system, yet the platform undergoes less cycle-time and downtime. This makes the cloud platform a convincing solution for subsurface data management.

In a cloud platform, a data analytics solution is essential to the system. Having the tools to go against the cloud system where the collective data can support a blend of descriptive, exploratory, and predictive data analytics will deliver new information to decision makers in upstream business processes.

Essentially, cloud data integration gives management a finger on the pulse of the operation. Issues such as real-time drilling predictions, rig scheduling, and maintenance all require a complex blend of data that is traditionally time-consuming and expensive to integrate.

On a cloud system, computation and storage are all scalable, making it possible to perform analyses that were inconceivable 5 years ago.

The New Workforce is Coming

The global petroleum industry has experienced thousands of layoffs in the past 3 years. Workflow software, in conjunction with automated processes in the cloud, can assist the new workforce in filling the experience and skills gap created by this massive shift.

A [recent study](#) found that over 70% of the eliminated personnel had 10–25 years of industry experience, and that most will not return. Having a platform that manages data, is easily accessible, and has workflow, analytics, and artificial intelligence systems will prove to be essential.

Fewer experienced staff members, declining prices and demand, and the need to handle a larger, more varied set of data are pushing the petroleum industry toward the future of work. Data and the information created from it should be viewed as business-critical as companies pursue analytics to assist with oilfield operations. Cloud data lakes, from which artesian wells of insight and springs of wisdom may flow, are the new computing paradigm that drives success in the petroleum industry.



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