

# How to make software more interactive between the geoscientist in the data centre and the engineer in the field

Paradigm executive vice-president technology, Duane Dopkin, tells *First Break* of the company's plans to broaden the appeal of its software to the mainstream user.



Duane Dopkin expects Paradigm to double in size.

The battle of the E&P software market is hotting up as the amount of seismic data that can be acquired grows and the data itself becomes more sophisticated and of higher resolution. Paradigm is fighting for a bigger slice of this market with the backing of the private equity fund Apex, which last year bought the company.

'In the past five years the industry has done an extremely good job at improving the quality of seismic acquisition,' says Duane Dopkin. 'A lot more data can now be acquired. Changes in seismic and wellbore techniques are also driving changes in computer science. The core technology from Intel, which is the main Central Processing Unit (CPU) provider, and Nvidia, the main Graphics Processing Unit (GPU) provider, continues to advance and things will become faster.'

The main task of Paradigm during this period, he says, will be to broaden its appeal by making its high-performance computing solutions more accessible for wider use. 'The problem is that our customers view Paradigm

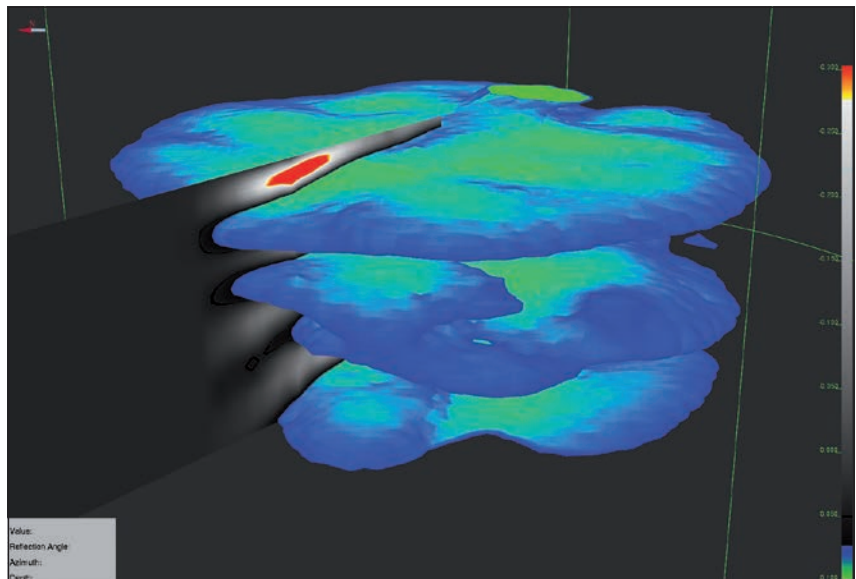
as a solver of advanced and difficult computer science relating to high-performance software. We are aiming to make our software more accessible and we want to create a democracy for users from the geoscience and engineering communities.'

One of the biggest challenges for software providers is to provide platforms for users that are more interactive between the geoscientists processing the data, the engineers in the field and the oil companies.

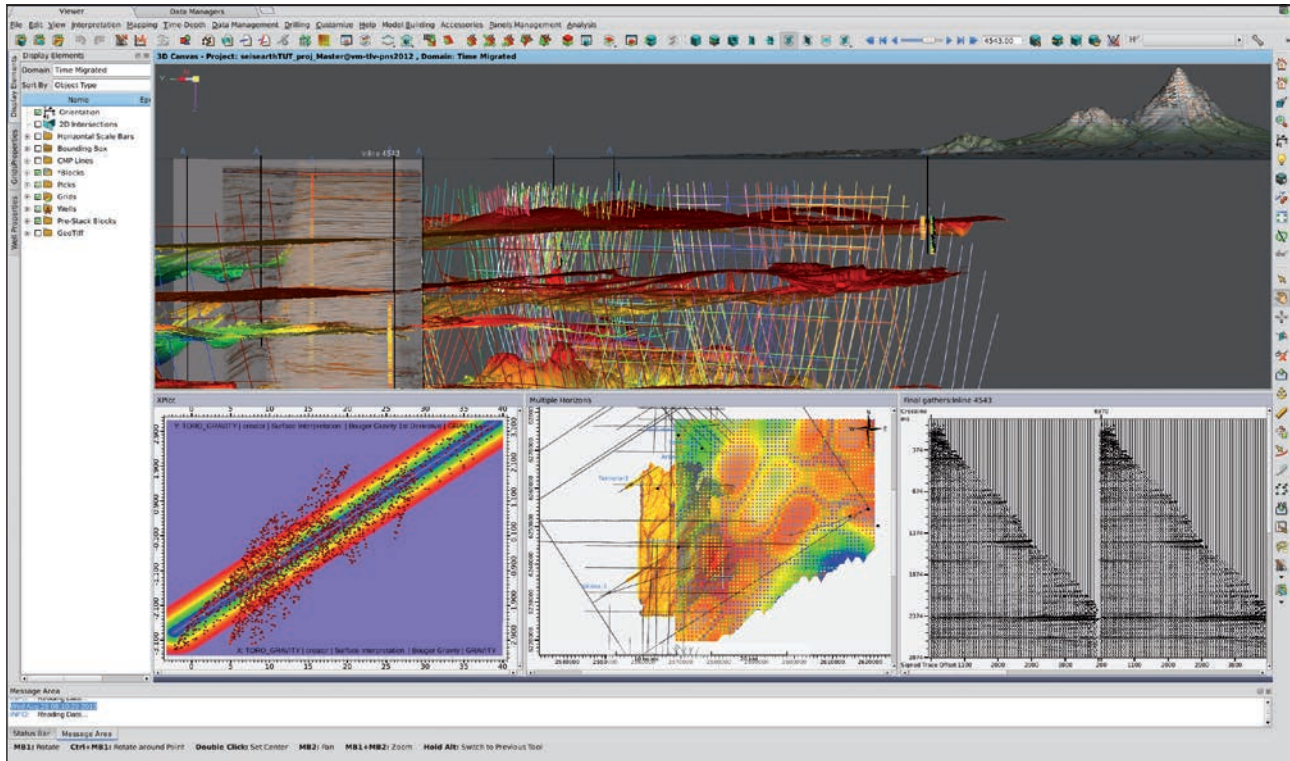
To that end, the company has launched Paradigm Epic, 'an open and integrated platform' on a single integrated console to provide workflows for full azimuth imaging, tomography, formation evaluation, facies analysis and modelling. Paradigm applications are already integrated at the database level through its Epos infrastructure. Epic will add a common user interface to this integration, enabling

information to be shared in real time. General users will now be able to work with advanced workflow that previously required specialized expertise. Developers will be able to integrate their applications into Epic royalty-free, using either an application-level plug-in or through the underlying Epos database. Developers connecting into the platform will be free to build similar plug-ins for any other vendor. 'This is the first time that users will be able to select specific applications from Paradigm to connect into their existing primary platform,' says Dopkin.

This is where the industry is going in its software development and the main challenge is to facilitate greater interactivity, and make further innovations such as utilizing cloud computing for storage of big data, while at the same time maintaining security of the information for the oil company that is ultimately paying for it.



Paradigm wants data such as this angle gather from the Barnett Shale to be more interactive.



Structural data, pre-stack and post-stack, crossplot, maps and GeoTIFFs visualized on the open and integrated Epic platform.

‘The problem is that the data is not static; we are always changing it. If you relate this to a drilling decision, the oil company wants to know how the data is being edited and who is contributing to those edits? We model that data in different scenarios. The same dataset needs to be accessed by the petrophysicist, geologist and engineer towards making a drilling decision and they need to access each other’s data.’

‘Software is becoming more interactive for recording data in the field,’ says Dopkin. ‘Cloud computing will play a role in the future. It seems like a natural fit, but we have to solve the problem of how to make the data secure for the oil companies that own the data. We can deploy a data management system with security control that is locked out to some people, but those mechanisms are not yet in place for the cloud. We are looking at developing a private cloud that we could make available to the oil companies for when they take over the data.’

Dopkin predicts that the next few years will see even faster change and innovation in seismic acquisition soft-

ware as the influence of the younger generation of geoscientists that have emerged in the past 15 years continues to grow.

‘This generation has grown up with access to mobile devices and the internet and working with real-time access to data on the desktop and the industry has had to adapt. We are changing to make our devices as responsive in real time as possible in large amounts of data. Training in collaboration with other geoscience industries has become a trend and I see that evolving quite a bit.’

Last year Paradigm was bought by Apex, a private equity fund with more than \$30 billion of assets. ‘We have more than \$200 million in revenues from sales and software licensing. We are extremely profitable and there is quite a lot of room for us to grow. Apex bought us because its research placed us in the top tier of software companies in any industry.’

Early signs for Apex have been encouraging. Repsol Sinopec has adopted the Paradigm interpretation software suite SeisEarth, for its major exploration projects in the Campos Basin offshore

Brazil – one of the top five discoveries in the world in 2012, with an estimated recoverable volume of at least 1.2 billion barrels of oil and gas.

Meanwhile, Paradigm will still focus on its core strength of developing high-performance computing solutions, such as the newly launched Earth Study 360. The tool can model 360 degrees in the sub-surface, says Dopkin. It converts surface-recorded data into a very detailed sub-surface image showing the properties of the sub-surface varying with azimuth. ‘We use anisotropy to decompose the seismic in a way that we can understand the sub-surface. I would compare it with opening the pages of a book – you can open page 60 to find the geolayer, as opposed to drilling through the pages with a well bore.’

With Apex’s backing, mergers and acquisitions by Paradigm are likely, and, going on Apex’s usual model, there is likely to be an IPO within five years. ‘We could probably go public today if we wanted to,’ says Dopkin. ‘We are 700 people and operate in 100 countries and I would not be surprised to see the company double in size.’