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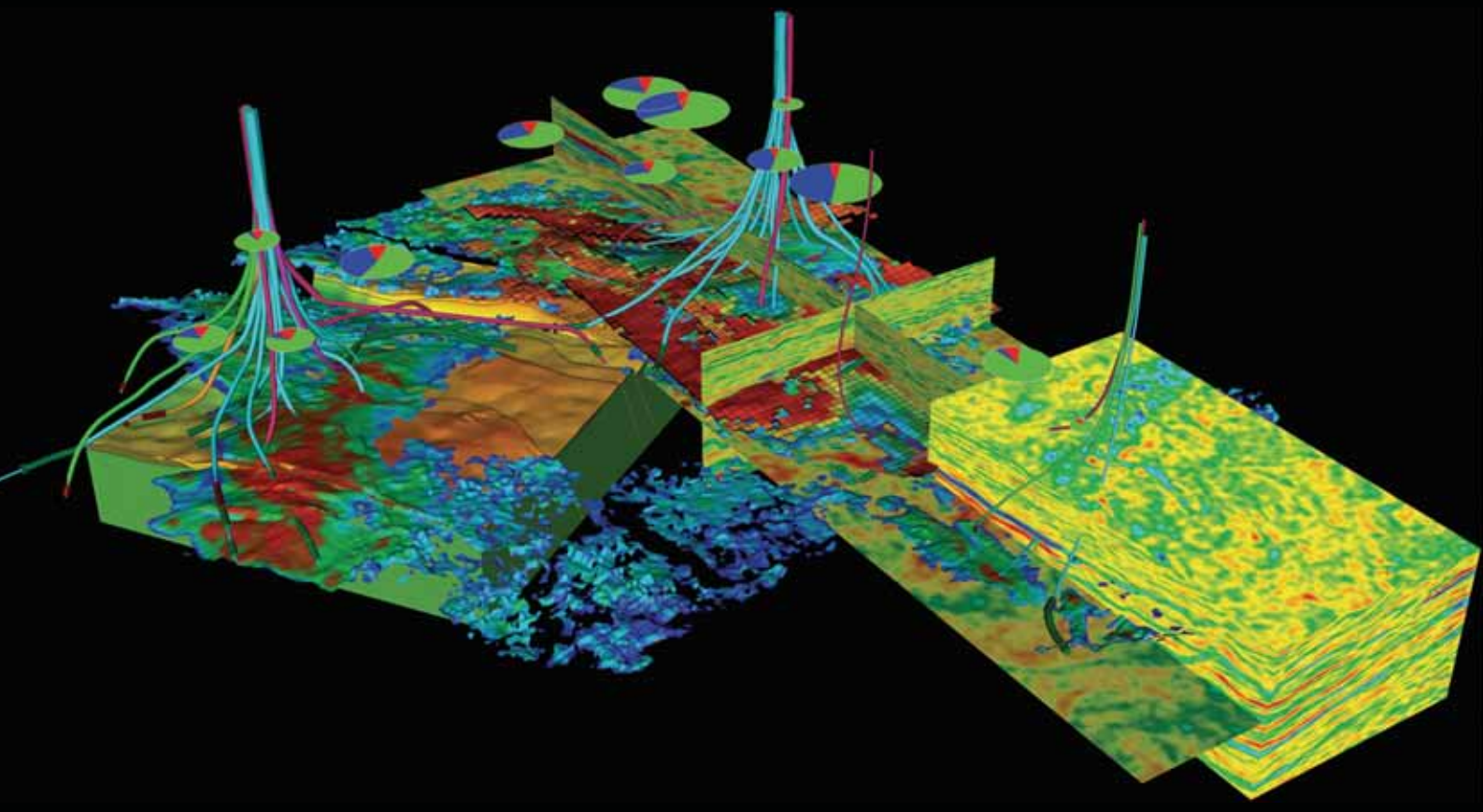
Exploration:
- searching for oil with supercomputers
- a new way to grid the subsurface

Fracturing:
- using tiltmeters and microseismics to monitor your frac



Production:
- when your IT department gets in the way
- wi-fi in North American oilfields

Visualising everything at once

Dynamic Graphics has developed a tool which can visualise multiple datasets from an oil field simultaneously in 3D and 4D – from an overall view of the basin to a view of the individual wells and reservoirs – and you can see how it changed over time as well. It can be used by everyone associated with a project.

Dynamic Graphics of Alameda, California has developed a 4D (3D + time) reservoir visualisation software module which enables you to visualise all of your data together for your production operations, and see how it has changed over time.

It gathers all of the data from different departments into a format which everyone in the company can use – without (for example) paying for more expensive licenses for reservoir modelling software, and having to learn how to use it.

This means that, for the first time, the engineering department can work with subsurface data from seismic, which had previously been restricted to people in the geoscience department.

This means that it can function as a communication tool for both technical staff, from different disciplines, and non technical staff.

"Geologists don't have to know how to run Eclipse. Individual disciplines can access the output from other groups together with their own data," says Jane Wheelwright from Dynamic Graphics. "It brings together the different disciplines and the different packages into a common environment."

In one company, engineers used time lapse seismic data with predictive simulation models to figure out that the water injection wasn't working. "They managed to stabilise a field before the pressure caused problems. Most engineers aren't familiar with the seismic from their own fields."

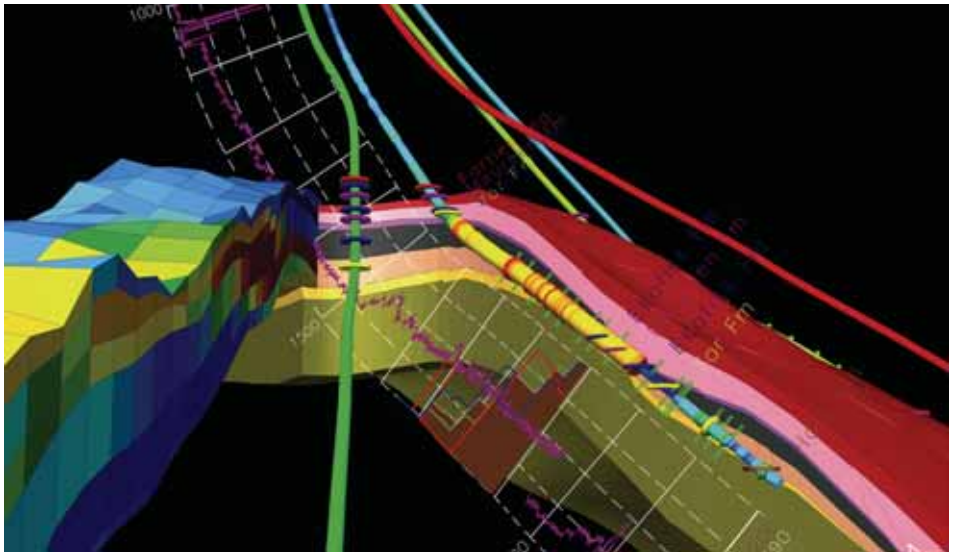
Like Google Earth, you can see entire oceans or countries at once, and then zoom in to see the subsurface of specific wells and fields, with all the data you have.

You can see a 3D view of the information, or see cross sections. You can visualise the flow of oil, gas and water through the subsurface.

It is possible to connect other information to the visualisation – eg if you click on a well, the system can show you a photograph of cores from it. "We have to combine all the data at our disposal," she says.

There is no limit to what can be included in the image – it can include seismic data volumes, well and rig locations, well logs, 3D structural models, information about coastlines, field boundaries, satellite images, digital electronic models of platforms, geologic maps, LiDAR data.

DGI is still developing new ways to incorporate data. "We want to, for example, extend the number of drilling formats," she says.



Above and below: Dynamic Graphics has a software tool which can be used to visualise different data sets from an oilfield simultaneously - including reservoir information, wells, well logs, flowlines and platforms

The tool can show what is happening over time – so you can see both the new wells which have been drilled, and how the reservoir is draining (as worked out from time lapse seismic data). Time sensitive data can include reservoir simulations, time lapse seismic, production data (eg from WITSML feeds) and information about which well was drilled when.

The company has already used the software for carbon capture and storage visualisations, enabling anybody who is interested to see how the carbon dioxide will be pumped underground and what will happen to it after that. "For carbon capture, there will be a real need to communicate with different people, both technical and non technical" she says. "You can show what is happening without resorting to a spreadsheets and lists if figures."

The tool can also be used to make presentations to management, rather than use PowerPoint.