

## **OpendTect: driving the open source model into the world of oil and gas**

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### **Introduction**

The open source software movement is slowly gaining a foothold in the oil and gas industry in the form of OpendTect and a limited number of other open source software such as Madagascar, CPSeis, SeaSeis, GMT and more. Regrettably, open source as part of commercial business model, while accepted practice in many other fields such as communications, computer operating systems, and Internet browsers, has yet to truly break through into the oil and gas industry. While most of the open source activity in oil and gas is taking place in academia, at this time, there is only one commercial seismic interpretation company to have embraced the open source concept: dGB Earth Sciences. This is done through a “freemium” business model that employs a triple licensing format, allowing users to use a commercial or academic license, or a GPL license for their OpendTect software. OpendTect is a complete seismic interpretation software package that can be downloaded directly from the Internet ready for immediate use. In addition to OpendTect, there are both open source and closed source plugins available. The closed source plugins require paid licenses, and the code is protected. The open source plugins are downloaded for free from their respective websites, and used through GUIs in OpendTect. The “freemium” business model employed by dGB allows users to benefit from free access to high-end technology, and the source code behind it, and have the option to purchase cutting edge technology plugins in an a la carte manner. The profitability of the company is rooted in income from closed source plugins, training and consultancy. However, independent of the commercial life of the company, the availability of the open source technology is never in danger, the code exists in the public domain.

There were multiple incentives for releasing OpendTect as open source, including growing the user base, enabling a competitive edge for small companies and independents, and stimulating R&D by providing high-end software for free. OpendTect collaborates with multiple companies for building interfaces between existing open source programs, developing additional user friendly functionalities into the open source package, and connecting to closed source plugins. Madagascar, for example, is an independently functioning seismic processing software that has a GUI in OpendTect. The relationship between Madagascar and OpendTect benefits the user community in the manner that they can seamlessly transition from processing to interpreting all in a free, open source process. This workflow is enhanced by another open source software that has a GUI in OpendTect, GMT (Generic Mapping Tool). This open source plugin allows the user to complete their workflow through to producing maps of their results.

### **Community Participation**

An active user and developer community is essential to improving and building upon the existing software. Active group discussions on mailing lists are a good indicator of the relevance of the software. If little feedback is received, or questions have been lagging, it could be an indicator that the software is losing its usefulness, and perhaps needs to be revitalized. While the open source model allows anyone to build upon the software, not

every user has the programming savvy to actually implement their ideas. Implementing the suggestions from users for functionalities that would be widely beneficial can bolster confidence in the software and its custodians. Recently a suggestion was posted on the OpendTect Users' Mailing list, a developer saw the widespread benefit of this idea, and made the decision to incorporate the idea in a future release. There may be many users with great ideas, and there may be many users who have already programmed useful features into OpendTect. However, without the dialogue, there is no progress. Those who have built functionalities that have improved their own workflows, benefiting from the open source code, should also be inclined to share this with the community, but this is rarely the case. Why? This can only be answered by those in the developing community themselves.

Contributions and feedback from commercial companies is quite high, particularly in comparison to that of the individual and academic contributors. Commercial companies commonly sponsor improvements or the addition of functionality, with the explicit intent of making it available to the entire community for free. These sponsorships exhibit the epitome of what the open source cooperation should be. British Gas is sponsoring the development of a list of user friendliness improvements on the thought that it will improve the workflows and efficiency of their employees, and they have opted to allow these improvements to be available to the entire community. Addax has sponsored the addition of a GapDecon attribute, and Tetrel is sponsoring the current development of Voxel Connectivity. By making these functionalities available to everyone in subsequent software releases, they have made the full circle of the open source concept.

### **Stimulating Research & Development**

Solid research and development is built upon peer review. However, when it comes to software code, these advancements are often hidden behind APIs. A key benefit to the open source model, is scientific accountability. Allowing the source code to be viewed freely by the scientific community ensures that the work is in essence being continuously peer reviewed.

In the spirit of open source, dGB has created a website where people can both receive and donate seismic data. Not always do we have access to good seismic data where we can test parameters and see how things should work in a near ideal situation. Having access to data from a similar depositional setting, or wells from a nearby basin, can help in our own interpretations. Research and development can only be done if you have access to the necessary data. The Open Seismic Repository is a place where data that meets the criteria (Creative Commons License) can be made available to everyone. Currently, the repository holds 2D and 3D data sets, including some pre-stack data, selected seismic attribute volumes, interpreted horizons and well databases. The basins range from the North Sea, to offshore Nova Scotia, to the Alaskan North Slope. The repository is always seeking new data to be made available to the public.

### **Conclusions**

The purpose for dGB's releasing an Open Source seismic interpretation software package is to encourage collaborative thinking. Through this effort, we hope to see new technologies reached sooner and have the products be better than they were originally imagined to be. This is possible when you take away limitations on creativity, and let the natural evolution take over.