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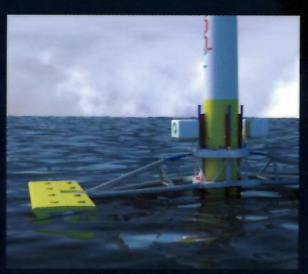

In the previous issue of *Energy Profile* we presented the importance of using advanced transmission protocols (WITSML) in the E&P business, and the capability of surface logging companies like Geolog to utilise them for oil companies' benefit.

Here we will present the approach we followed in engineering a data transmission service – Geolog's Wellcoms system – correctly sized to the needed scale.

THE GEOLOG WELLCOMS EXPERIENCE

WHY SURFACE LOGGING FOR WELL DATA TRANSMISSION?

Written by **Gionata Ferroni**, technical manager, Geolog

In recent months many things have dramatically changed the general framework in which we operate, although our job remains the same, at 140 or at 40 US$/bbl, even in financial turmoil: providing timely information from rig to remote clients, enabling them to take the right decision at the right time.

Decisions on what? Primarily, Geolog assists oil companies in two crucial fields: formation evaluation and optimisation of drilling practices, which ultimately means cost control, important in normal times, crucial during an economic crisis.

Geolog has engineered Wellcoms as its Web solution for real-time data transmission from the rig site to the client office. Here's how...

The main starting point in developing the Wellcoms tool was to keep it simple to use and maintain: we chose to develop a Web-based instrument because we wanted it to be as light as possible on our clients' systems and we did not require the involvement of their IT people in getting through their firewalls.

In fact, the most difficult part of engineering a transmission system is to be very clear in what is the scope of the transmission. The risk, if this point is not addressed correctly, is to make a mistake in one of two directions.

You can over-engineer a system, loading it with items and functions that are not crucial and yet require resources to develop. The result often takes you into somebody else's technical territory, with a system not designed to compete at that level.

Or you can under-engineer: the intrinsic problem in this case is that you end up with an instrument that is inherently limited, or rigid, and cannot be developed as needed.

We believe we have avoided both risks thanks to the knowledge of the needs of our end users, which are primarily operations geologists and drilling engineers.

These users' requirements were clear to us. They needed crucial well data in real time. Not all the data tomorrow. The right data, right now.

They needed information displayed in a clear way, with a set-up that can be modified as quickly as needed, and is easy to extract. And without the need of a dedicated trainer.

Starting with a Web-based system running on Internet Explorer™ meant we avoided any software compatibility issues, and were immediately able to run tests and demos receiving both internal and client feedback. This has dramatically shortened the development and testing phase of Wellcoms.

The structure of the Internet-based transmission was equally designed to be simple, and it introduced an extra fail/safe item: *homo sapiens*. We discovered that it is much more effective to run a system requiring simple tasks from an operator rather than trying to make it entirely automatic or unsupervised: the minimum level of supervision required is hard to replace with an automatic system because it involves simple acts and complex logic, which are easily handled by a human, but can be very hard for a machine.

Removing entirely the human touch from the system would have required a significant extra effort, with uncertain results. We chose not to.

As for the transmission specifications, the Wellcoms system has been designed for all sorts of environments, therefore it was necessary to have it lightweight in terms of bandwidth, and flexible in terms of approach.

The system requires a TCP/IP network connection between the mud logging unit and the data hosting server, which can be third party; in fact the rig infrastructure can be utilised for the physical data transmission. If a dedicated transmission infrastructure is missing, Geolog can provide it.

We kept the required bandwidth as low as possible: while the initial cloning of database takes 16kbps (2,048Bytes/s), the regular replication is as low as 1kbps (128Bytes/s).

And as for the data hosting, the flexibility exisits in the possibility of choosing to use Geolog's data centre or a client's own. In the first case we guarantee data security and complete 24/7 support coverage on both software and hardware.

The rig communication system security is not an issue since only the TCP ports (49542, 49543 and 49544) should be open (on outgoing only) on the rig's LAN gateway (router/firewall).

These solutions have enabled us to interface with environments where multiple exchanges of data amongst services were constantly active, in which our transmission service became an integral part of a third party real-time centre system.

It integrated easily because we could provide information not otherwise available from the real-time centre:

- the operational comments, entered by our

FIGURE 1 The access page to the system. Entering the password is the only step of the process

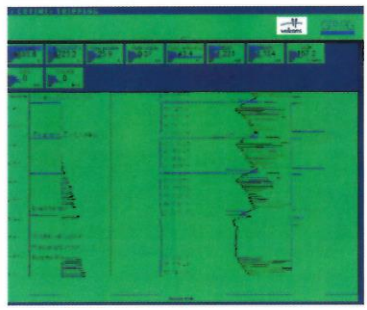

FIGURE 2 A 'talkative' chart provides context to the lines on the screen: data becomes information

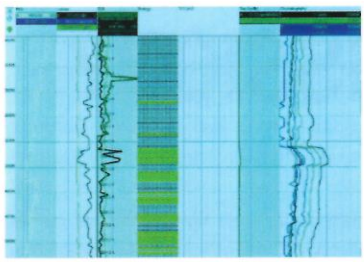

FIGURE 3 A simple configurable display means clear information to the end user

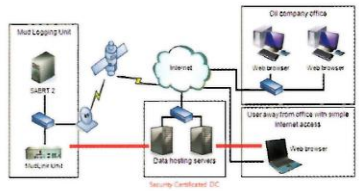

FIGURE 4 The transmission system of Wellcoms requires supervision mostly at rig level, where Geolog is deploying personnel operating 24/7

team onboard, giving guidance to the remote users;

- the lithology descriptions;
- the lithology itself, ultimately the main point of drilling an exploration well, finding out what rock is there.

The way we have approached the technical problem has been key to the success of the system: Wellcoms has for more than a year routinely transmitted mud logging, logging while drilling (LWD) and any other WITS datastreams gathered by Geolog on the rig, in several parts of the world.

But, ultimately, why should an oil company require its surface logging contractor to have well data in real time? We are not the only ones capable of doing it. Of course, there are specialised data gathering and management companies which have packages dedicated to the data transmission. And then, of course, there are the LWD guys, who these days are offering the transmission of their data and occasionally the mud logging data too.

However, although lacking the marketing resources of LWD companies, Geolog has two significant advantages over these various competitors in the race for real-time transmission.

The first is the constant presence of the surface logging service during the drilling and completion of a well.

No other service is continuously operating on the rig in all the well phases: day in day out, our guys work alongside the rig crew, monitoring drilling data and providing geological analysis. They follow drilling phases, trips, cement jobs, wireline runs, and all the various drilling problems (and solutions) that make the history of a well. The constant presence is the key to knowledge and understanding. If you want to know what has happened on a rig in the last two months, you will go to the mud logging cabin, to get most of the information. This presence is also a physical presence, and that's one of the main keys that link data transmission with mud logging: a transmission system involves servers, routers, cables, switches, plugs, and physical settings that cannot be virtualised. It takes somebody to do it. And unlike the LWD guys, who come and go on the rig, or the data management companies, who are not there at all, our personnel are there to look after and maintain the transmission from the rig 24/7. A capillary coverage no-one else can grant due to the intrinsic nature of the job.

Second, watching and monitoring: more than any other service involved in drilling an oil and gas well, surface logging is specialised in monitoring real-time data. Make no mistake, the term monitoring in this case is more complex than it sounds...

It involves the entire process of thinking out a system to measure parameters, then acquiring it into a database, preparing a software package that enables to treat the data, calculate parameters and display them, and finally choosing in an intelligent way the most effective system to transmit and communicate this information, to enable a decision maker to use it.

It means transforming simple data into sound information, in real time. Or, if we want, transforming rocks into numbers, and numbers into words of advice. ep