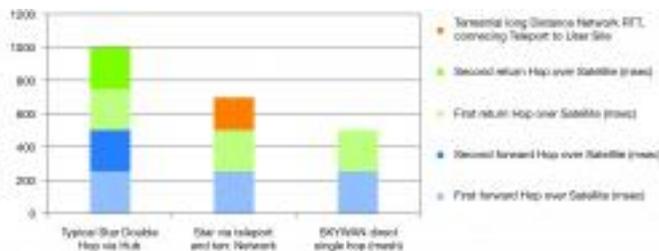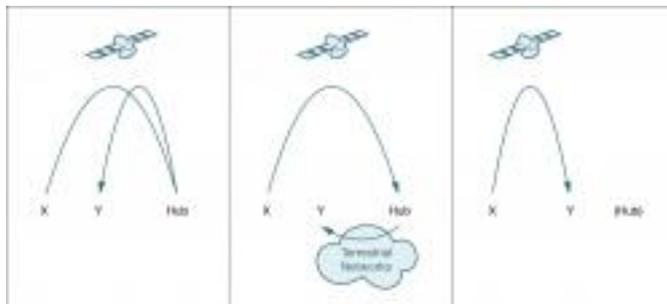# Field telecoms and cloud computing

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Posted By Paul Boughton

SKYWAN 5G is the satellite communications platform that hedges a highly secure and reliable, over time modularly extendable network design

Volker Jarsch looks at the communication options available to oil and gas companies as they move to the 'digital field'.

The oil and gas industry is moving to the 'digital field'. Offshore and onshore both increasingly rely on collaborative work processes involving data storage and processing capacity at multiple sites. A complete system relies on efficient and available telecommunications.

Oil and gas companies and their communications service providers have a variety of technologies at their hands that can be applied for their respective scenarios. In this sense 'cloud computing' is the best concept not only for the outsourcing of storage and processing capacity, but also for the distributed storage and processing capacity within a company's sites and the access to these resources from other company sites. This needs fast and reliable connectivity between the sites.

The preferred solution for high-speed communications is fibre optics or line-of-sight. Wherever fibre optics is available at a site, and not only at one site but at all sites that need to communicate, it gives the best performance of all technologies. But what if not all sites are connected to high-speed fibre? Or, what happens when the connection to a site is interrupted? Fibre cables are available at major cities or sea cable connection points but not necessarily at the headquarters, data centres, computing centres of an oil company, and certainly not at an out-of-area field. For all other access technologies the reachable user data rate is rather limited, in particular in the return link out of a remote site, as well as the connections between company sites.

Evolving services for oil and gas companies need:

* Company-internal connectivity to support collaboration, access to storage and processing resources;

* Real-time connections for the control of mechanical and electrical equipment, from a company-internal control facility to the company sites in the fields;

* Broadband real-time sensor and video data transmission to labs and control sites;

* Broadband reception for social traffic, and increasingly a transmit capacity for social traffic.

Interactive applications are response-time critical. Nothing makes a user more nervous than sitting at a PC and waiting, or being slowed down in his flow of activity by a slow response time.

Remote control of mechanical and electrical equipment needs real-time communications. Transmission latency must be kept at a minimum and - equally important - it must be constant.

When fibre optics or line-of-sight is not available at all company sites, satcom can be the medium of choice. In reality, satcom is a collection of different technologies that distinguish themselves in the usability for the demanding new applications. Let us consider the round-trip-time between two sites that shall support an interactive application, for instance the CAD database at one site X and a user accessing this database from a site Y:

* Star network with a central hub at a service provider and X and Y as remote sites. This means that all traffic goes first from site X (via satellite) to the hub and from the hub to site Y. The response returns via the same way.

* Star network with a central hub at a service provider, X connected via satellite to the hub and Y connected to the hub via terrestrial networks. This means that all traffic goes first from site X (via satellite) to the hub and from the hub (via terrestrial networks) to site Y. The response returns via the same way.

* SKYWAN network with dynamic full mesh connectivity, directly connecting all sites, also X and Y by one satellite hop. No detour via a central hub and no detour via a terrestrial network.

In addition to the latency of the end-to-end connection, the achievable throughput is relevant. Following the above consideration of the connectivity for cloud applications, the sites to be connected directly are oil fields and labs, exploration and drilling sites and labs, at the same time all of them with a company headquarters and its ERP system, the CAD system, the logistics and finance administration.

Of course, it would be possible to connect any two of these sites with a direct point-to-point link in single hop via the satellite. This requires each site to select the right path to the respective other site(s). As soon as we talk about more than three sites this connectivity becomes expensive. Its capacity is constrained - and wasted when not fully used, because no other connection can use it.

All those issues are avoided when using SKYWAN 5G. The 5G terminal provides an integrated router and transmits all data or voice directly to the destination. The time to arrive at the other site is never more than 250msec, and the throughput can be up to 20Mbit/s user data rate in all directions. The satellite capacity is not dedicated to just one connection between each two points, but it is shared between all sites. Overall, the end-to-end efficiency in time, capacity use, Bit/Hz, and overall cost is unbeatable. At the same time, each site can have higher peak data rates and blocking-free reachability of all sites it needs to communicate to, at all times in parallel.

Integrated user terminals, onshore, offshore, mobile, transportable, or on-the-move, can reach all relevant company sites in single hop.

SKYWAN 5G fulfils all the requirements mentioned above - and that at a very low investment and low operational costs. SKYWAN 5G ensures connectivity, performance, quality of service and a degree of reliability that was never reached before. All a user needs is one type of hardware and they are prepared for all challenges ahead.

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