Scalable and Reliable Integrated Solution for Real-Time Drilling Operations

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ABSTRACT

Geosteering workflows play a key role in maximizing reservoir contact, thereby increasing economical profit of drilling operations. Computing infrastructure forms the backbone of any geosteering solution. Considering the high cost of drilling, avoiding systems outages is crucial. This paper discusses the technical details of a scalable, reliable and integrated end-to-end geosteering solution in one of the world's largest oil and gas producing corporations. The key enablers of this solution are multi-layer services, monitoring tools, and knowledge sharing best practices. We rely on highly redundant and scalable services: network, servers, workstations, data repositories, and software applications. These applications include a combination of industry leading geological interpretation packages tailored to fit the nature of the agile environment and an in-house built real-time drilling data loader. The services are loosely coupled in such a way that an application and its data can be served from different physical centers while remaining integrated with the other components. The solution serves multiple physical centers (primary and backups) with high performance and availability. The flexibility in this setup makes the service location transparent to users. As evidence, a new disaster recovery center is being established by simply creating new instances of the solution components and connecting those together through a standard configuration. This loosely coupled solution architecture has also allowed us to rapidly deliver support for new operation centers required for new business activities, such as drilling intensive operations for unconventional resource exploration. To further maintain the reliability of this heterogeneous setup, proactive monitoring processes are applied around the clock on key service components to alert support staff of any system outage before users become aware of the problem. The flexible, distributed, service-oriented solution architecture facilitates the rapid system changes required to support continually changing business requirements. This solution is also scalable to accommodate a growing user community and flexible enough to support new workflows and customizations. The robustness of the solution has also been proven by executing scheduled fail-over drills where individual component or the entire system is halted to verify the built-in redundancy and efficient operational transfer to a remote backup operations facility.