

A Key to the Successful Conduct of E&P Activity is Managing Data

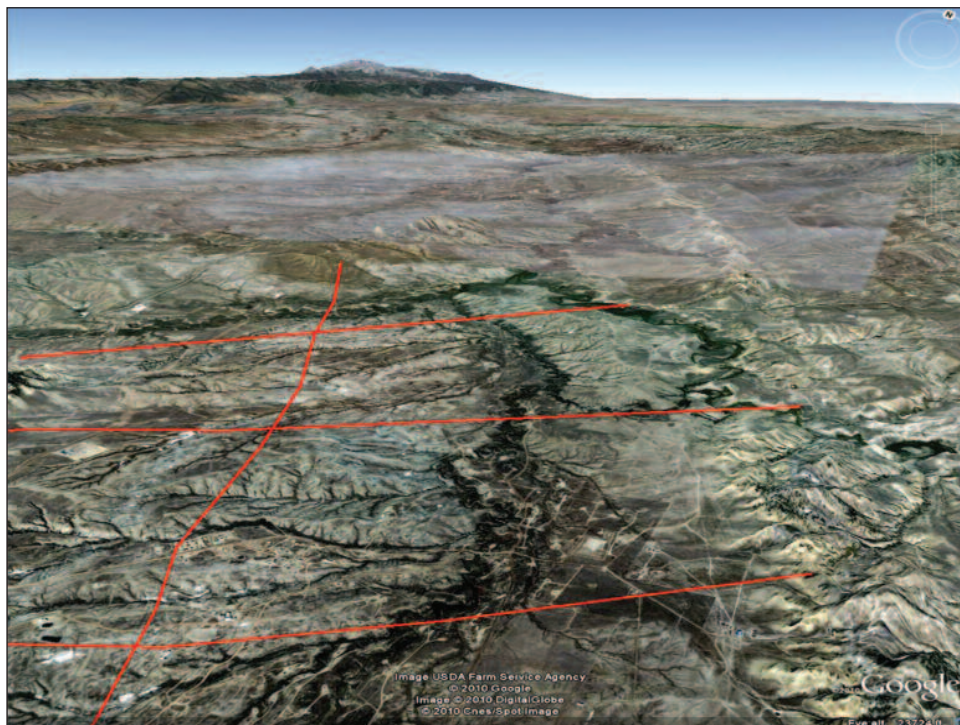
Data management must be a facilitator, not a bottleneck.

By Philip Neri, Paradigm

One of the main defining characteristics of today's oil and gas E&P industry is the massive amounts of data that need to be collected, processed, analyzed, and stored. This takes place in a context of frequent changes in priorities, revised project scope or staffing, asset divestments, and other disruptive events. As such, data management has been identified as an area where new ideas are sorely needed. Energy companies require a data management and administration environment that can adapt to changing circumstances with little or no downtime while offering complete control to IT professionals throughout the process.

Single-instance relational databases have been the standard for E&P data over the past 15 years. There is an increasing realization, however, that this architecture is ill-suited to the business requirements of today's energy companies. For data to be shared by a community of users, the single-instance database architecture requires that data be stored in one excessively large database. If data is segregated into asset databases, it cannot be shared and requires duplication. With hundreds of terabytes or petabytes of data associated with single assets, it is clear that data replication no longer is the answer as the expenditure on storage resources alone would be overwhelming and valuable time would be lost while waiting for data to be copied.

For these reasons, the monolithic data storage structure of yesterday is losing its leadership position to the distributed database, which removes the constraints and data duplication requirements that plague legacy systems. A distributed architecture allows the creation of dedicated relational or hierarchical data repositories that can be located anywhere on the local area network. The use of dedicated data repositories for each data type (seismic, wells, culture data, etc.) ensures that each data type is stored and accessed in the most appropriate and efficient way. This also makes it possible to balance the load of both network storage appliances and network bandwidth to ensure maximum return on investment. Yet the system remains transparent to users, who simply can connect their project to any number of repositories with no need for data duplication. A highly configurable set of access, authorization, and locking mechanisms control shared usage.



Paradigm's Web Asset Manager is shown with a GIS image background from Google Earth. (Image courtesy of Paradigm)

Scalability, collaboration are key

This agile distributed data architecture is geared to scalability as the database can be adapted easily to changing performance requirements and storage locations as datasets continue to grow. It supports the needs of customers of all sizes, from individual laptop users to small groups to very large, geographically distributed enterprises.

With the onset of distributed databases, the vision of an enterprise based on data sharing and collaborative work among geoscientists and engineers from multiple disciplines becomes a reality. With the appropriate permissions, one or more asset teams working across the room or across the world can share data, collaborate on problem solving, and interact in a common visualization environment.

High-level tools are available to manage both access to specific

datasets and the levels of permission granted to groups of employees or other personnel on site. Disaster recovery, another strong concern, is addressed by new backup and restore capabilities that allow operators to place high-priority projects in an alternate location should a facility become unavailable.

The industry is seeking applications that access data directly in industry-standard formats from company archives, further reducing or eliminating the need for data duplication and making it easy for users to move from one vendor's infrastructure to another, if desired. Vendor-neutral, platform-independent middleware such as OpenSpirit allows both application integra-

tion and data exchange.

Recent developments enable users and administrators to use the capabilities of the Internet for the purposes of viewing and cataloging data. Web-based visualization provides a global view of data at a given site, a capability that usually is supported only by centralized data stores. The web-based user interface is valuable particularly for users who are unfamiliar with proprietary applications, such as managers who need to follow the progress of a business unit or professionals in charge of managing the data.

The advent of next-generation, agile distributed data infrastructure is the key to a significant reduction in the resources allocated to data administration and system security oversight while supporting enhanced cross-disciplinary collaboration, greater operational flexibility, and faster project turnaround. ■