With oil companies relying on their software providers more than ever to offer integrated solutions, Paradigm has released Rock & Fluid Canvas 2009 Epos 4.0, a synchronized release of seismic processing, imaging, interpretation, and modeling; reservoir characterization; and drilling engineering solutions that operate on an open, distributed, and relational data management system. This system acts as the framework to link together best-in-class applications to produce revolutionary new work flows. The system enables users to perform data transformations, visualization, analysis, interpretation, modeling, and uncertainty measurements, all on a common platform.

“This is an important milestone,” said Duane Dopkin, senior vice president of technology at Paradigm, who led project management for the launch. “It is the largest synchronized release of products Paradigm has ever had.

Higher-order work flows
The system allows asset teams to clarify the way they visualize the subsurface and model the reservoir, transform the way they work, and even advance the way they think. It expands the science and practices of hydrocarbon detection and recovery by enabling geoscientists and engineers to optimize their work processes across the entire exploration and production value chain.

Paradigm calls this bridge across disciplines the Higher-Order Workflow (HOW), describing it as a collective, knowledge-building process that reduces data loss and simplification. By leveraging data across the E&P application continuum, HOW lets users visualize a more accurate representation of the subsurface, which reduces exploration risk (See Table 1 for HOW examples).

“We have taken point solutions and transformed them into higher-order work flows with higher-order objectives,” said Dopkin. “Today, much higher levels of complexity are now considered routine, and geoscientists need a system that supports that without compromising deadlines or data validity. Interplay between geology and geophysics, between geophysics and petrophysics, and between petrophysics and geology becomes a lot more convenient and accurate.”

Table 1. Examples of Higher-Order Work Flows
- Performing multi-well geologic correlations and wavelet extractions
- Integrating geologic modeling and seismic inversion for improved reservoir property prediction
- Generating a seamless regional interpretation with distributed multi-survey data
- Imaging, interpretation, and modeling of complex salt structures
- Validating interpretation data and interpretation integrity with paleo-seismic flattening and modeling
- Incorporating facies from seismic and well log data into a reservoir model
- Using the SKUA model as a constraint to seismic inversion
- Planning well trajectories at seismic, well log, and reservoir scales with drilling engineering constraints
- Geosteering horizontal wells using models of petrophysical properties
Foundation enables integration

Scalable infrastructure is vital to data access and sharing among multiple users at geographically dispersed locations with a high degree of stability and reliability.

Historically, single-vendor data models, data repositories, and data management solutions have constrained application purchasing decisions, thus hindering E&P companies from using best-in-class solutions. This platform offers an open and distributed data model that provides oil and gas companies the freedom to work with multiple vendors’ applications and data stores without imposing application restrictions that compromise desired higher-order work flows.

The interoperability framework takes advantage of SQLite, a “light” relational database management system rather than a traditional large and monolithic database. This indicates it is more flexible and configurable. Also, as a relational database, the infrastructure supports indexing, cataloging, and GIS-driven queries. Data security and access can be customized and controlled for each project or user role. Laid atop the relational database are data management controls and client-server data services that distribute data across the enterprise so that hundreds of users can work on the same project simultaneously.

To speed data access, there are separate services for each major data type, such as interpretation data, well data, and survey data. Users have no need to worry about different units of measure or GIS projection systems.
Many industry data interoperability standards have also been incorporated, including OpenSpirit and WITSML.

A key component is the Web Asset Manager, a Web-enabled GIS data management tool used to query and view all registered project data from disparate, federated data stores, including those from GeoFrame and OpenWorks.

Changes in the platform enable the higher-order work flows, enhance regional-to-prospect scale interpretations, and connect GOCAD and SKUA modeling workflows with interpretation, well, and seismic data.

Applications
The system comprises a multidisciplinary suite of more than 25 upstream applications that span the E&P continuum from seismic processing and imaging to well planning and drilling engineering. In addition to new applications, products that have been used in the industry for more than 30 years, such as Geolog and Echos (formally Focus), have been updated for this synchronized release.

“A large amount of effort was dedicated to the infrastructure and to geoscience advancements in every application,” said Dopkin. “This is the fourth synchronized release since 1997 of our application suite under a common infrastructure, and each release gets richer in terms of the types of work flows it can accommodate.”

A large portion of the product line has been unified under a standard user interface using Qt Version 4.0 graphics libraries for consistent toolbars and layouts, resulting in a familiar look and feel among the applications.

“The consistent contouring and overlays designed with Qt facilitates training,” Dopkin said. “Now SeisEarth, VoxelGeo, and Stratimagic all share the same infrastructure and interfaces. This unification greatly facilitates carrying out the higher-order work flows.”

For example, the Geosteer application can receive position data and logging-while-drilling data in real time using WITSML, which can be used to update the geomodel in near-real time.

“This release reflects necessary changes as advanced by our customers over the last five years,” Dopkin said. “Users should be able to do things a lot better in less time because it’s more multidisciplinary, more accessible. Companies are adopting it rapidly by necessity, simply because the fields they are working on are more complex and require more complex work flows for interpretation and modeling.”

Figure 2. Epos repositories.