Brochure

Smart Reservoir Modeling

Aspen RMS™

Smart, Interactive Reservoir Modeling Delivers Superior Results in Less Time

Aspen RMS™ 3D modeling software is an industry-leading geoscience and reservoir engineering collaboration platform, offering geophysicists, geologists and reservoir engineers a shared space to compile, visualize and manage a wide range of subsurface data for fields of any size and complexity. The software enables users to integrate information coming from multiple sources, perform interpretations, and build reservoir models for which uncertainties on both data and interpretations can be captured and propagated across the workflow.

Aspen RMS provides an integrated interdisciplinary perspective to properly manage and optimize the reservoir's potential, with the ability to leverage the seismic data and accommodate complex geologies. The result is faster, more robust and more reliable production models, improved decision making, more justifiable investments and enhanced field performance, leading to higher recovery rates in even the most complex reservoirs.

The heart of Aspen RMS is the workflow manager, which automates the workflow and is connected to the uncertainty management module. Workflow automation allows fast update of models and easy generation and analysis of scenarios and sensitivities. RMS workflows can be run on your desktop or in clusters running hundreds of workflows in parallel. The workflow and modeling capabilities of Aspen RMS are cornerstones of the Aspen Big Loop™ offering, along with the Aspen Tempest™ reservoir engineering software suite.
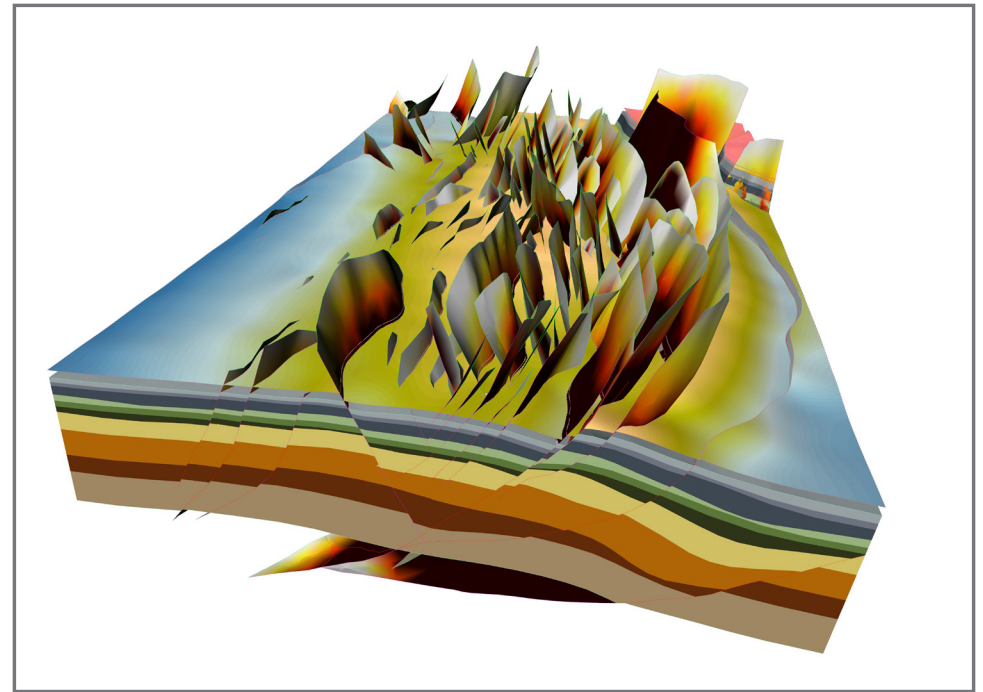
A complex fault model with many faults (Y-type geometry), built using RMS integrated structural modeling.

Data visualization and analysis are an integral part of Aspen RMS, where 3D visualization, 2D map views, cross sections, well sections and a host of charts can work together to give users insight into their data and models.

Aspen RMS can be extended through the use of Python-based API's that are integrated with the workflow manager and uncertainty management. The wide range of Python libraries available makes this a very powerful solution. With Aspen RMS Plugins, users can create interfaces and visualization using JavaScript HTML5.

For many years, Aspen RMS has been used by its customers to build highly detailed reservoir models that support reliable decision making. These help companies maximize the recovery factor, reduce time to first oil, and stabilize production in even the most complex scenarios.

Geological Interpretation

The close integration of geological interpretation and geological modeling delivers a very strong solution. Managing zones and well picks while creating maps makes the workflow both fast and efficient. Integration between managing well fences in 3D views, map views and cross section and well section views makes visualization easy. Quality control is enhanced through powerful log operations for extracting mistie data, to make all kinds of well average data per well per zone using logs, blocked wells or 3D grid data.
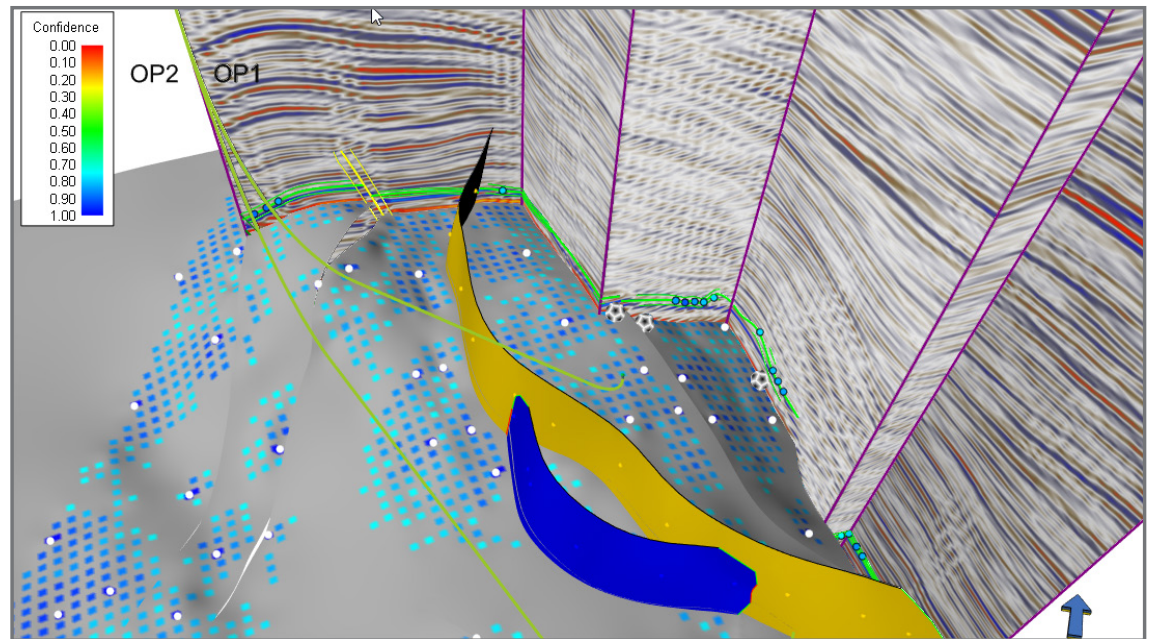
Faults and horizons interpreted on a composite seismic fence. The intersected faults show the fault envelopes as captured uncertainty.

Model-driven Interpretation

Model-driven interpretation (MDI™) combines the strong structural modeling in Aspen RMS with a patented snapping functionality, enabling seismic horizons to be snapped to seismic features. The user adds interpretation points where needed and lets the snapping algorithms follow the seismic features automatically.

Interpreters and modelers can capture interpretation uncertainty in depth or time directly while creating their interpretation. This uncertainty data can be carried through the full structural modeling workflow to aid statistical analysis of reservoir properties.

Seismic Inversion

Aspen RMS seismic inversion allows geoscientists to use seismic data to quickly create a rock property model. Moreover, it provides an accurate result with the implementation of highly efficient geostatistical algorithms: fine scale information from well logs is combined with band-limited information from the seismic data to provide an inversion where the output elastic parameters have realistic behavior.

Mapping

Aspen RMS mapping combines advanced mapping and industry-standard algorithms, to allow users to map geological horizons in depth or time. Time horizons and fault data can be converted from time to depth using a 3D velocity model. The velocity model is built using a variety of user-defined functions. Integration with other Aspen RMS modules makes results easily available throughout the workflow.
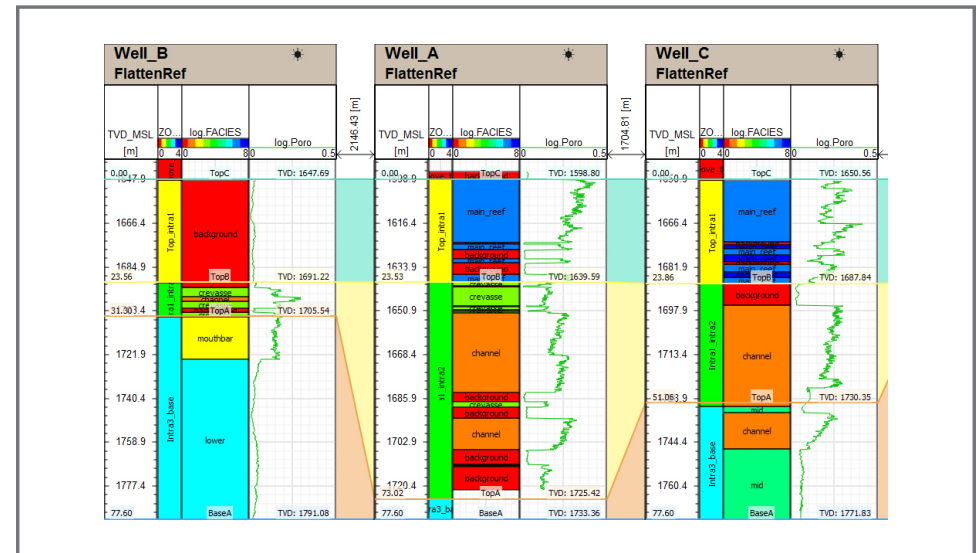
Three horizontal wells with well picks in Aspen RMS correlation view.

Structural Modeling

Aspen RMS structural modeling provides tools and workflows for going from data to grid in a minimum number of steps without compromising the structural integrity of the model. The integrated system helps users achieve maximum reservoir performance and better decisions through quick and accurate characterization of their reservoirs.

Structural Uncertainty Modeling

Aspen RMS structural uncertainty modeling tools are designed to help the decision maker acknowledge and quantify the uncertainties associated with the modeling of a structural framework. Sensitivity studies of key parameters, such as horizon depths and fault locations, are facilitated through a transparent, powerful and fully reproducible way of modeling. Fault and horizon uncertainty tools tightly linked to structure modeling and 3D gridding make it fast and easy to build and update several geological scenarios for investigating the effect of structural uncertainty.
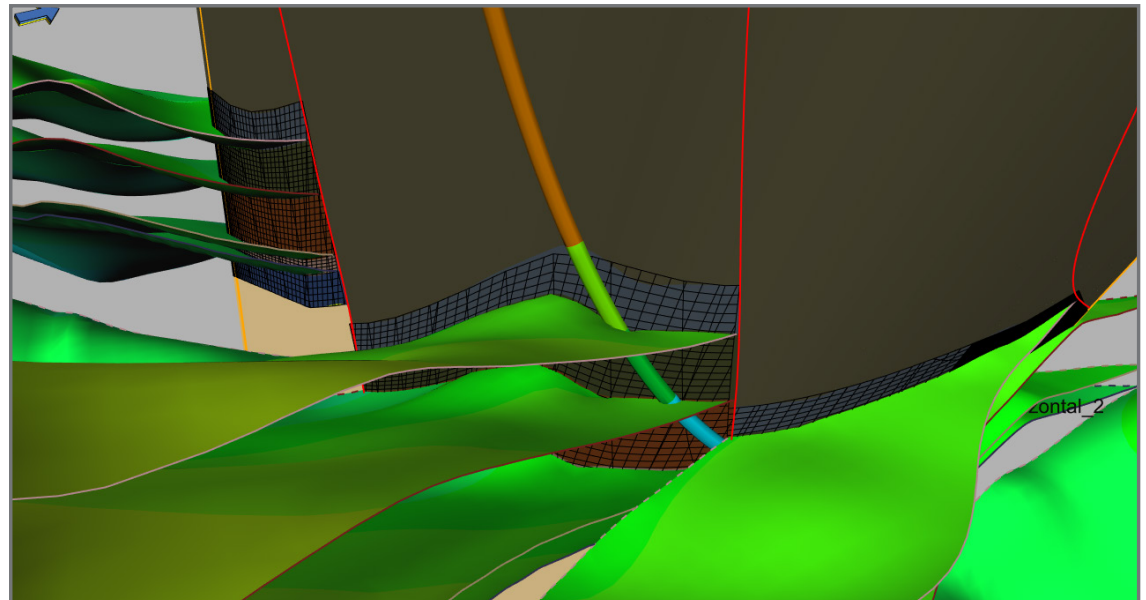
A unique structural uncertainty module greatly improves modeling results, workflow efficiency and the user experience.

Facies Modeling

An accurate geological model is the foundation upon which optimal hydrocarbon recovery is built, and Aspen RMS offers industry-leading tools for geological modeling. One of these is the facies modeling module, which offers a range of methods for modeling geological facies, enabling the characterization of all geological environments. Both object-based and pixel-based facies modeling are available, and it is easy to combine the different methods to perform advanced hierarchical geological modeling. These contribute to achieving the best possible result when building an accurate reservoir model.

Property Modeling

Aspen RMS offers a full suite of petrophysical modeling tools, from 2D interpolation to 3D stochastic modeling, conditioned to wells, facies and seismic data. Models can be updated globally or locally as new data is acquired, keeping the models accurate and the decisions focused.

Fault Seal Analysis

Aspen RMS fault seal analysis allows geologists and reservoir engineers to quickly and easily analyze sealing effects occurring in fault regions. Data representing the degree of sealing can be generated and used as a basis for seal analysis or as input to a flow simulator. Uncertainty in fault sealing effects is properly handled and can be integrated into overall workflows. Characterization of sealing effects can significantly improve the quality and speed of a simulation history match.
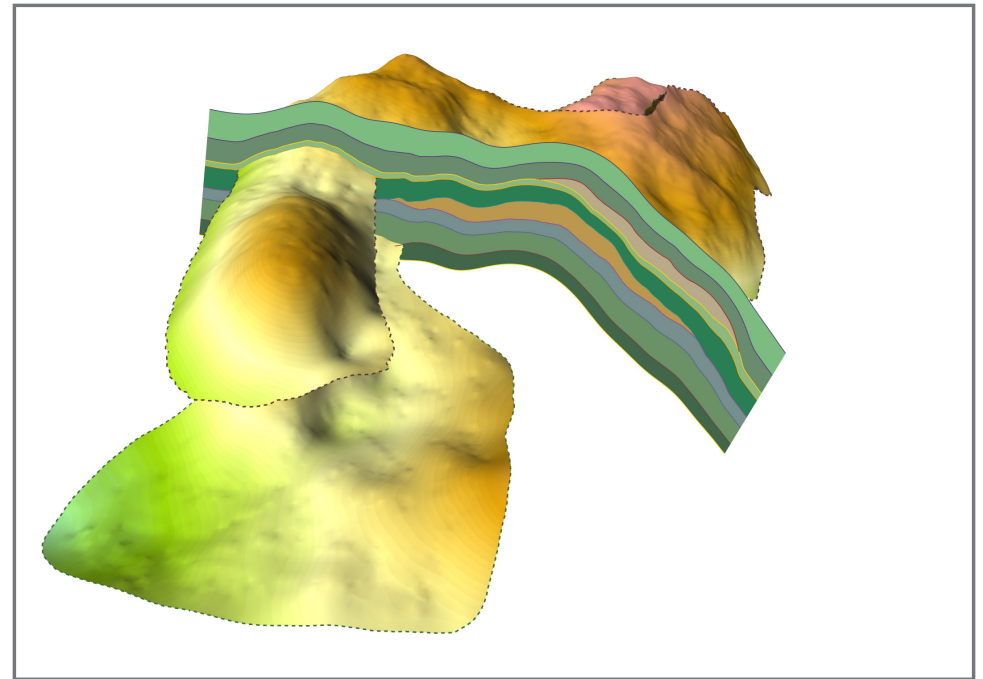
Structural model built with unconformity surfaces in Aspen RMS. Truncated surfaces (of channels) from the horizon model are shown in both 3D and intersected modes.

Fracture Modeling

The Aspen RMS fracture modeling technology helps both general and specialist users gain insight into their reservoir behavior. RMS Fracture is both fast and easy enough for fracture model creation and updating to become as routine as updating the facies model. Aspen RMS focuses on efficiently building effective fracture models based on conditioning models to well fracture data, providing geologically reasonable extrapolation trends for well data, and using dynamic information to constrain the model based on interpreted well test permeability.

Simulation Model Building and Flow Modeling

Creating input to dynamic flow simulators is often a complex process. Aspen RMS has workflows that enable the creation of datasets for various dynamic flow simulators. All of the functionality can run in the workflows, automating the process and allowing geological modeling workflows and dynamic simulation to be run back to back. This is a critical component in the Big Loop solution.

Streamline Analysis

Streamline simulations can be used for dynamic analysis of the reservoir, for validation and ranking of reservoir modeling scenarios, and for quality control of property upscaling. Due to its fast algorithms, Aspen RMS streamline simulations work for large models where conventional simulation methods struggle to deal with the large number of grid cells. Dynamic simulations can be performed with both geo models and flow models.
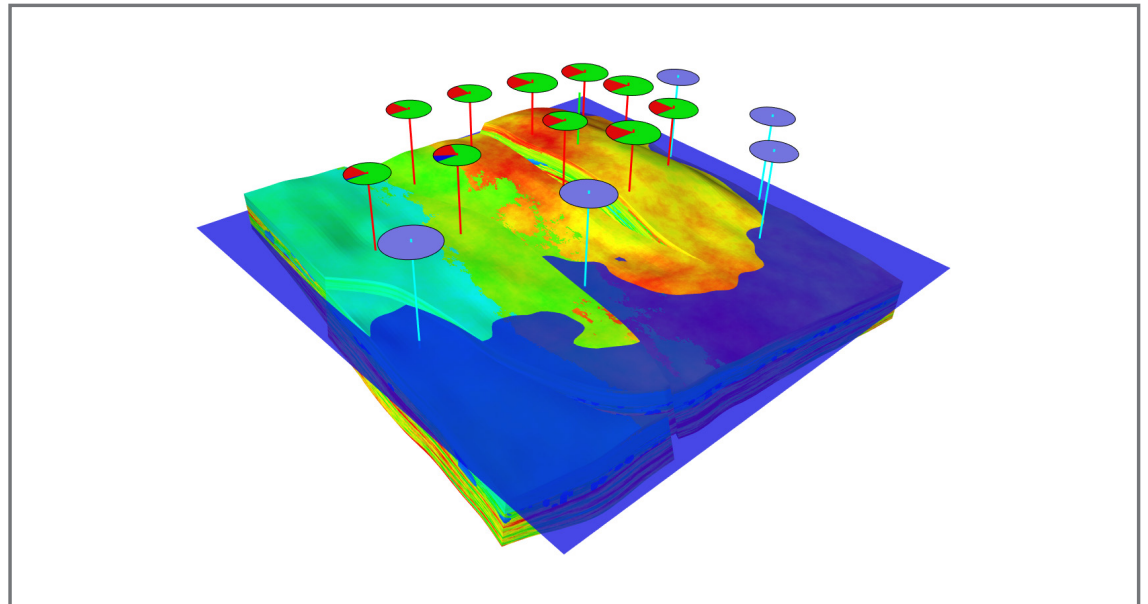
Simulation model displayed with oil water contact and wells with pie charts.

Uncertainty Management

Aspen RMS supports reliable decision making through the consistent treatment of uncertainties throughout the workflow, not just geological modeling. The range of parameter uncertainties includes seismic interpretation, structure, velocity model, facies, net to gross, porosity/permeability, water saturation, fluid contacts and development scenarios. Uncertainties can be handled in two ways: using the Uncertainty Manager or through an external orchestrator, e.g. Tempest ENABLE and Big Loop Variables.

The Uncertainty Manager is easy to use, with a clean, clear graphic interface supported by tremendous power. Big Loop Variables offers a user-friendly way to import variables from external orchestrators and map them to parameters in Aspen RMS. Linked to other AspenTech SSE solutions, it provides the most comprehensive and sophisticated workflow in the industry – Aspen Big Loop.

Well Planning and Geosteering

Planning wells and testing different well concepts, running sensitivities and optimizing wells are an essential part of reservoir management. With Aspen RMS well planning, it's easy to digitize new well targets and trajectories and constrain trajectory geometries using real drilling constraints.

Geosteering and landing horizontal wells optimally in the reservoir can be challenging. The integrated real-time data reader and geosteering capability in Aspen RMS provide techniques to visualize and calculate how far into the stratigraphy the bit is; this information, together with knowledge about the target location, provides essential information to directional drillers about how to land and steer the well optimally.
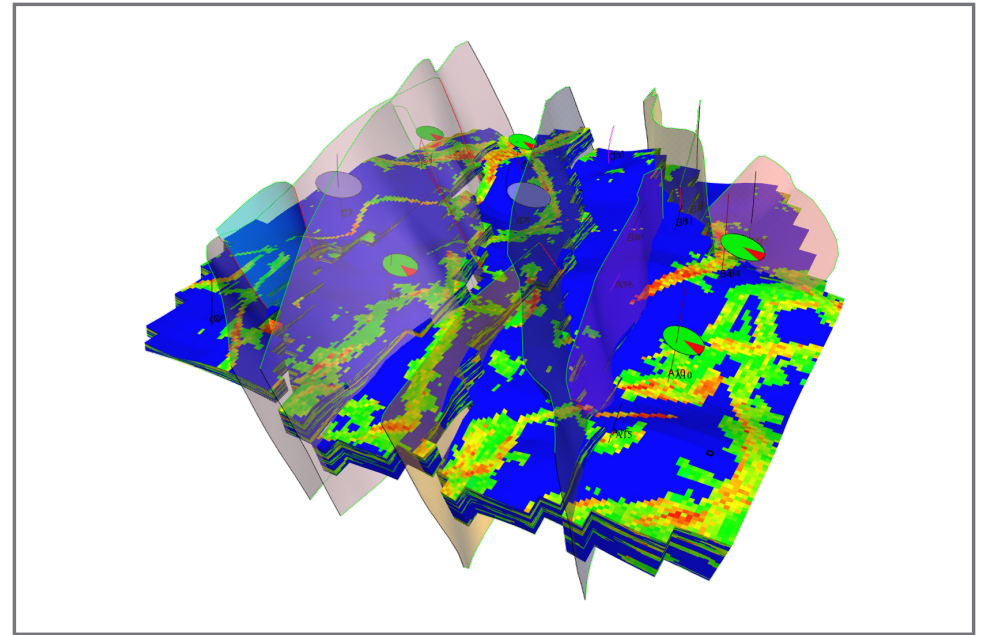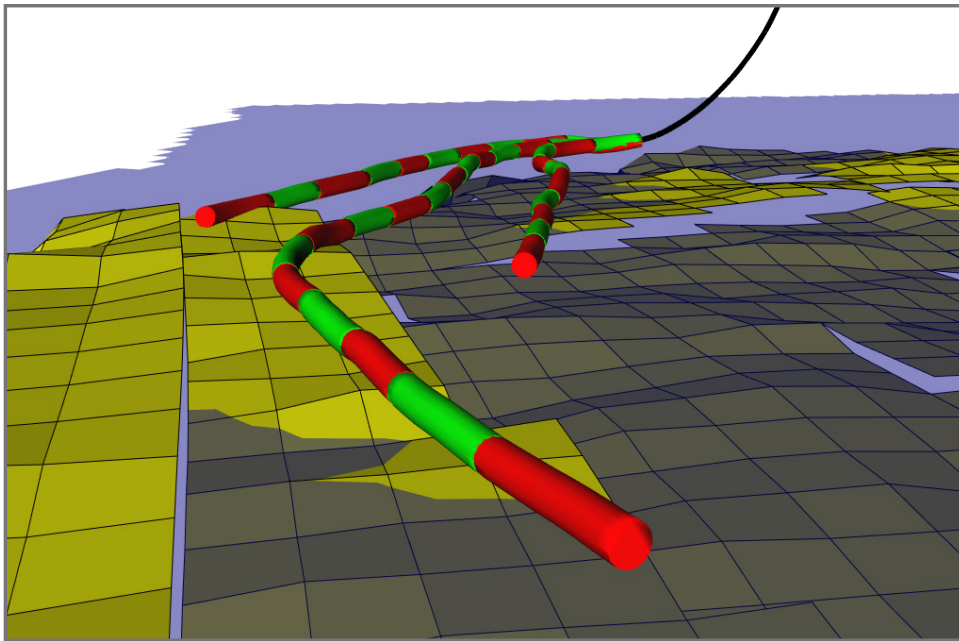

A complex fault model with many faults (Y-type geometry) built using Aspen RMS integrated structural modeling.
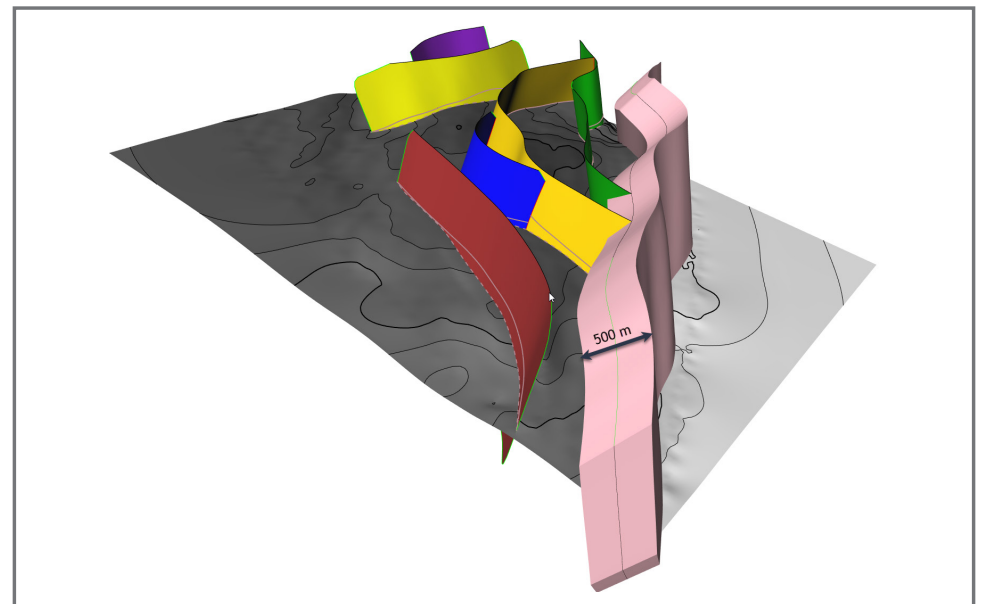
Example of an uncertainty envelope representing the positional uncertainty of a fault.
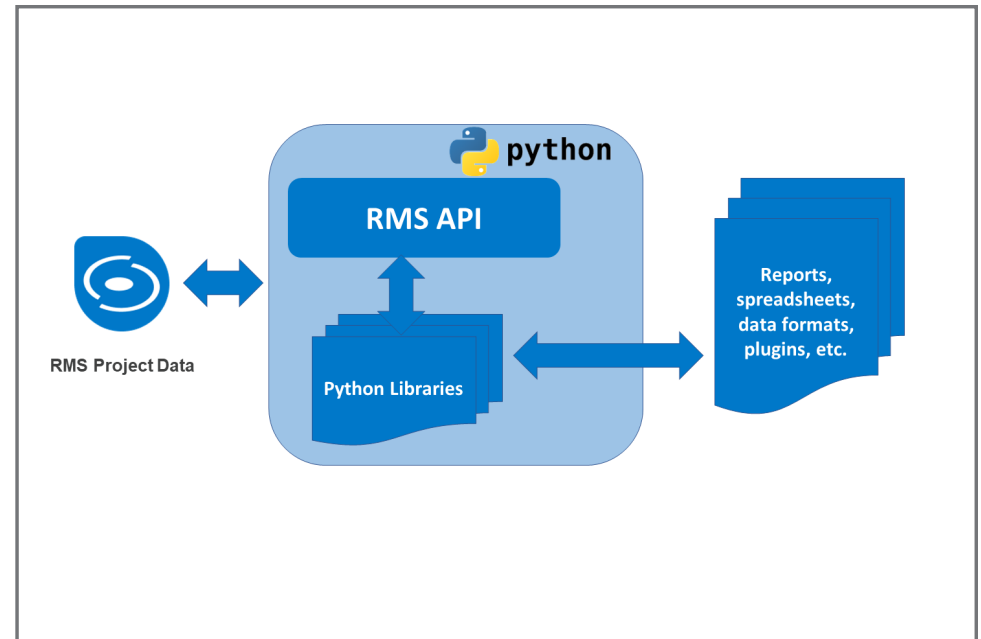
RMS API

RMS API is a platform for customization and knowledge sharing. It builds bridges between different applications and extends the capability of internal products by providing an easy-to-use approach to script creation, plugins and standalone applications using the Python language.

RMS API enhances efficiency and reduces costs through the automation of repeatable workflows. It helps solve data management challenges by preserving vital information across internal and third-party formats and provides innovative ways to explore new methodologies for visualization and analysis.

Multilateral well displayed with segment model data.

RMS API enables users to access RMS project data using the Python language, in order to customize workflows and manipulate data as needed.

Features

- Strong technical capabilities for all kinds of plays, including complex structural geometries

- Unique structural uncertainty workflow for improved 3D models and uncertainty handling

- Super model handling capacity (high-performance gridder)

- Multi-platform (Linux and Windows)

- Flexible workflow manager, focused on automated, updatable and reproducible processes

- Best-in-class modeling technology

- Cost-efficient development and integration of customized solutions using RMS API

- RESQML data transfer tool

- With Aspen RMS plugins, create interfaces and visualization using JavaScript HTML5

Interoperability

- Data exchange in RESQML™ using the Energistics Transfer Protocol (ETP 1.2)

- OpenWorks® R5000.8.1 or higher

- Petrel* 2021, 2020 & 2019

    (*is a mark of Schlumberger)

The Aspen RMS Advantage

- Aspen RMS supports geophysicists, geologists and reservoir engineers, enhancing data integration and cross-domain collaboration.

- A seamless, automated and easily repeatable workflow, from seismic to flow simulation, enables users to efficiently maintain evergreen 3D models.

- Propagates knowledge to decision-makers in a single, integrated application.

- Delivers reliable and accurate reservoir models that increase return on investment in the reservoir.

- Accelerates field development through better collaboration and a deeper analysis of the model.

- Quantifies geological risk across the entire value chain, for faster, better decision-making.

- Optimizes the asset team's experience and knowledge.

- Aspen RMS is a core component of the Aspen Big Loop offering.

System Specifications

- 64-bit Red Hat® Enterprise Linux® 7 (RHEL7)

- 64-bit Microsoft® Windows® 10

About AspenTech

Aspen Technology, Inc. (NASDAQ: AZPN) is a global software leader helping industries at the forefront of the world's dual challenge meet the increasing demand for resources from a rapidly growing population in a profitable and sustainable manner. AspenTech solutions address complex environments where it is critical to optimize the asset design, operation and maintenance lifecycle. Through our unique combination of deep domain expertise and innovation, customers in capital-intensive industries can run their assets safer, greener, longer and faster to improve their operational excellence.

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