Brochure

Added Value throughout the Reservoir Life Cycle

Aspen Tempest™

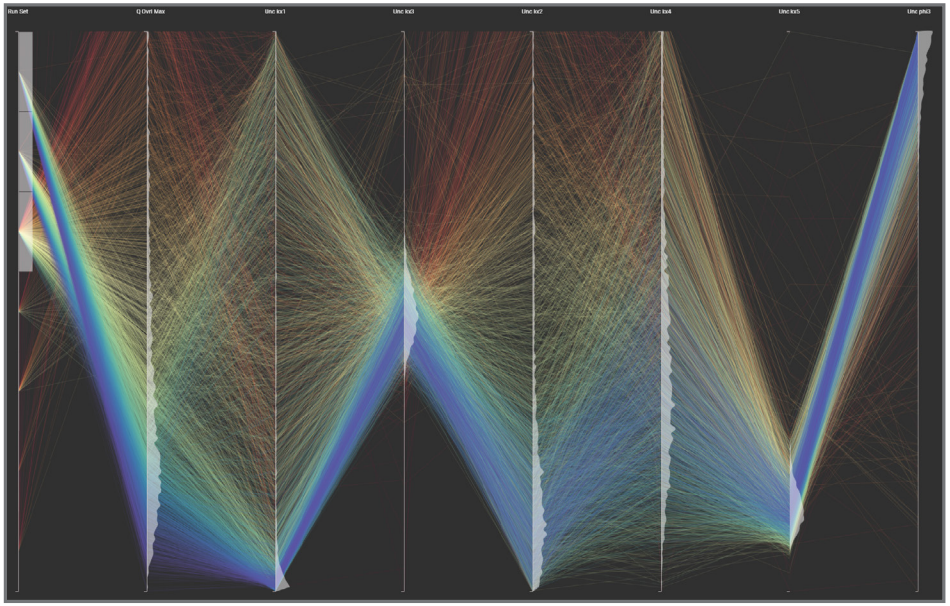
A Full Range of Reservoir Engineering and Simulation Tools

The ability to predict reservoir performance underpins the economics of the drilling decision-making process. Fast and accurate simulation results are a critical requirement for successful reservoir management. Aspen Tempest™, an integrated software suite used in hundreds of installations worldwide, provides a single, consistent interface specifically designed for E&P reservoir engineers. More than just a reservoir simulation tool, Aspen Tempest provides a full range of solutions for preparing and navigating simulation input, submitting and monitoring runs, visualizing and analyzing results, performing assisted history matching, and predicting production uncertainty.

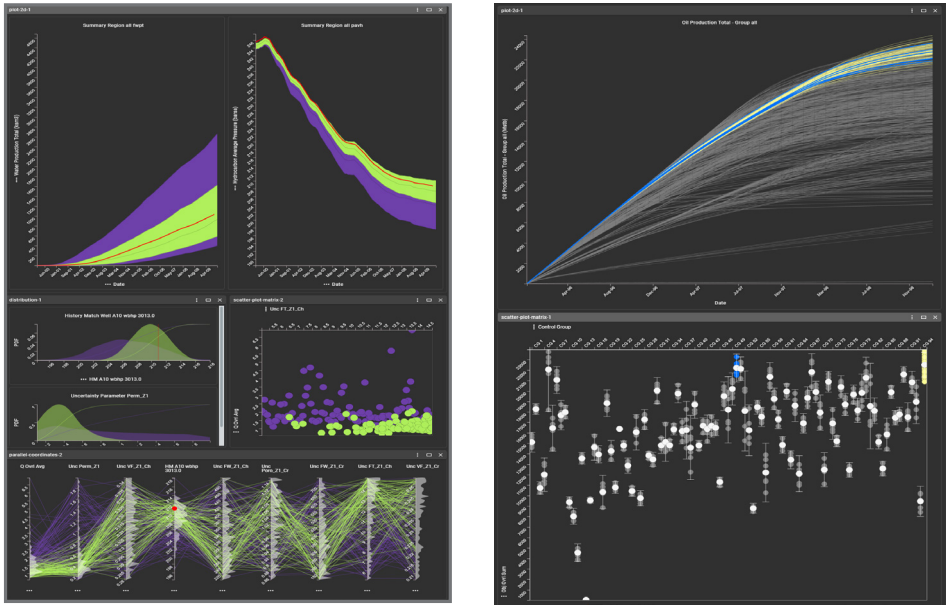
Aspen Tempest runs on Windows and Linux, and on the cloud. In concert with the Aspen RMS™ reservoir characterization and modeling solution, it provides a powerful unified system for cross-domain workflows. All modules can be deployed together or separately within third-party simulation workflows.

Aspen Tempest comprises the following primary modules:

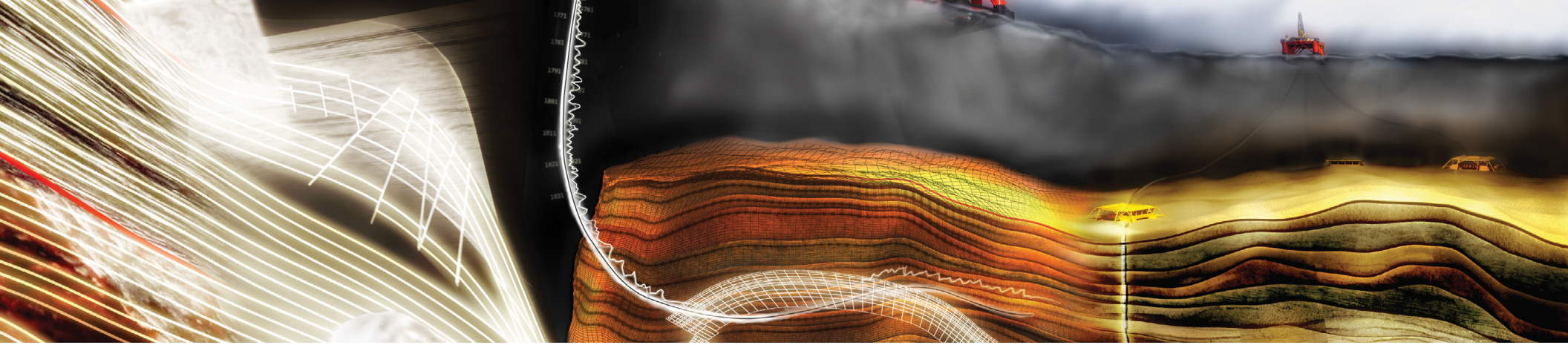
- Powerful simulator post-processing through **Aspen Tempest VIEW**
- Accelerated history matching and optimization through **Aspen Tempest ENABLE**
- Large field flow simulations and EOR support through **Aspen Tempest MORE**



Parallel coordinate plot showing correlation between history match quality and uncertainty parameters for three ensembles



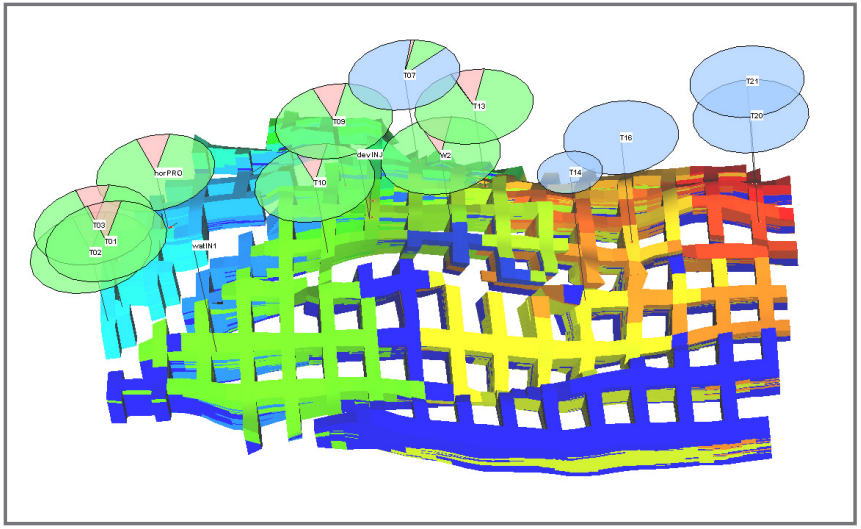
Aspen Big Loop analytics dashboard shows results of a Big Loop optimization project



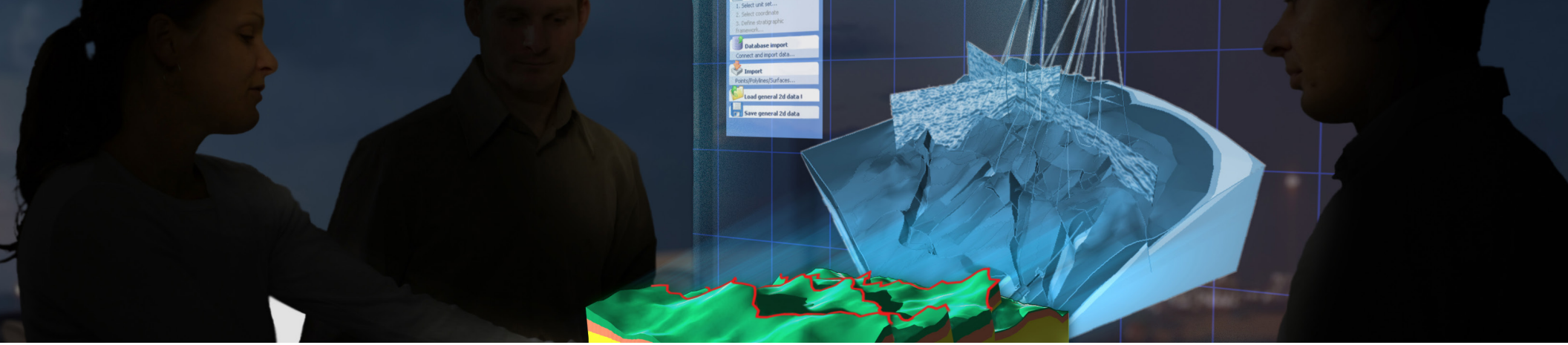
Aspen Tempest VIEW - Pre- & Post Processing

Aspen Tempest VIEW offers an intuitive and user-friendly interface that has been developed specifically for reservoir engineers. The postprocessing functionality in Tempest VIEW is exceptionally powerful and is used by many customers in conjunction with their chosen simulator. It is a fast and memory-efficient system, capable of quickly processing results from multiple simulations consisting of millions of cells and thousands of wells. Interactive displays, on-demand loading and tailored plotting make this a highly flexible solution.

Connectivity: Aspen Tempest VIEW can be used as a front end to the following simulators: Aspen Tempest MORE, ECLIPSE 100/300, INTERSECT, Nexus, IMEX/GEM/STARS, OPM, ECHELON, tNavigator and other proprietary simulators.



Aspen Tempest provides reservoir simulation, data analysis, risk mitigation, decision support and workflow integration, from geoscience to production.



Aspen Tempest ENABLE – Assisted History Matching & Uncertainty Analysis

Aspen Tempest ENABLE provides state-of-the-art history matching and uncertainty analysis tools to help with field development decisions. By taking into account all engineering data and tolerances concurrently, Tempest ENABLE intelligently drives the simulator through hundreds of realizations, rather than the few that manual simulation allows. Tempest ENABLE can be employed at any stage of a field's life, with or without historical data. Ensemble Smoother-based history matching allows the use of 3D observed data, such as attributes from 4D seismic, to more accurately estimate uncertainty.

Aspen Tempest ENABLE comes with a set of pre-defined forward model components, including components for simulators such as MORE, ECLIPSE, CMG and NEXUS, as well as components for geological modeling packages like RMS, SKUA™ and Petrel*, to allow Big Loop™ studies. Custom applications, such as Python scripts, can be easily integrated into the forward model. Geological modeling packages often use stochastic algorithms; Tempest ENABLE can incorporate the stochastic nature of geological inputs when estimating uncertainty and performing history matching.

Aspen Tempest ENABLE comes with superior ensemble data analytics which reservoir engineers can use to better assess alternative scenarios and understand the impact of uncertainty on their field development plans.

Aspen Tempest can transparently and dynamically provision cluster computers in cloud environments and remove them when no longer needed. This reduces the need for cloud-based IT knowledge while coping with peaks in compute demand.

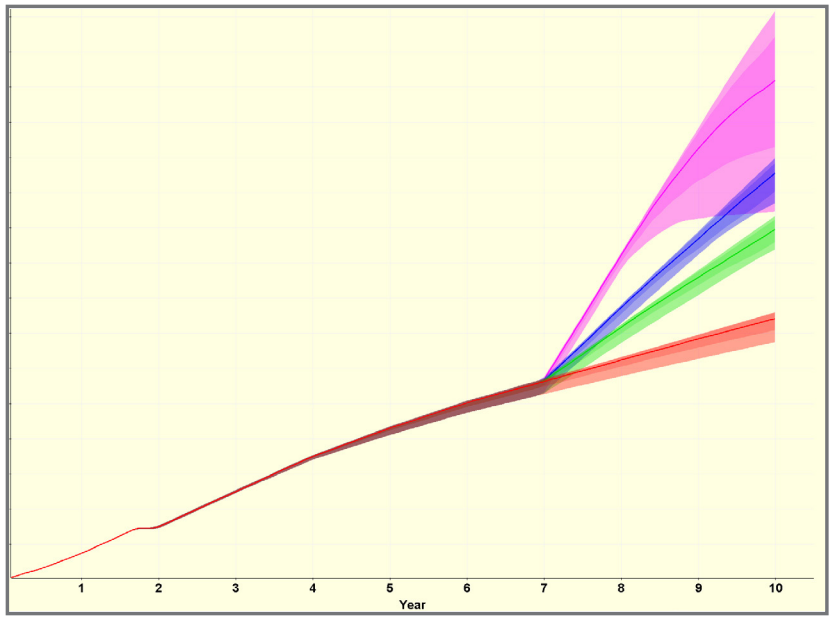
Connectivity: ENABLE works with Tempest MORE, ECLIPSE 100/300/MR, INTERSECT, Nexus, IMEX/GEM/STARS, OPM, ECHELON, tNavigator and proprietary reservoir simulators.

*(*is a mark of Schlumberger)*

Aspen Tempest MORE - Reservoir Simulation

Aspen Tempest MORE is a modern, full field, full physics, black oil and compositional reservoir simulator. Optimized for running large models in parallel, engineers benefit from fast and robust simulations, including a wide range of engineering features to solve complex simulation challenges, such as situations where near well effects, fracturing and CO_2 injection are important. Tempest MORE is also easy to use, providing a supportive graphical interface for entering simulation events and performing data QA.

Connectivity: MORE accepts data in standard GRDECL (RMS, Petrel) files and can produce output in ECLIPSE format. Native result formats are open and documented. MORE can also link to network simulators and geomechanical software via a built-in proprietary API.



Oil production total - no further action vs. infills

Features

Aspen Tempest VIEW

- Simulation input creation, editing and run submission
- Integrated results plotting and 3D visualization
- Pre-defined graphics reports
- Summary and property calculators for custom analysis
- Tools for history match and reservoir flow analysis

Aspen Tempest ENABLE

- Assisted history matching
- Field appraisal and brown field development
- Reservoir optimization
- Statistically robust ensemble-based workflows
- Ensemble Smoother algorithms for geologically realistic history matching
- Links to geological modeling and production networks

Aspen Tempest MORE

- Full featured compositional and black oil modes
- EOR techniques such as CO2/polymer/steam/WAG injection
- Dual porosity/permeability
- Hydraulic well fracturing modeling
- Accurate near well bore physics
- Extensible logic using Python
- Open API links to network simulation and geomechanical modeling

The Aspen Tempest Advantage

- A field-proven simulation and analysis system that can handle multiple models and large datasets
- A consistent simulation interface for black oil and compositional studies
- A statistically robust tool for analyzing risk consistently across both engineering and geology domains, ensuring confidence in decisions at all stages of the production workflow
- Excellent compatibility with third-party simulators

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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