

Together at Last: Geomechanics, Hydraulic Fracturing and Flow Simulation in a Fully Integrated Model

Simulate Your Multi-Well Unconventional Workflows from Pumping Schedule to Reservoir Depletion in 6X

A unique approach that incorporates both fracture creation and depletion in one model

6X is a fully featured, multi component numerical reservoir simulator. The model incorporates the physics required to capture the hydraulic fracturing and production periods. Engineers can determine how fractures are created, induced and close evaluating their impact on a well's production and the production of neighboring wells.

Capturing the complexity of hydraulic fractures and the dynamic changes within those fractures as fluid and proppant are injected and produced is difficult to do accurately. The legacy approach is to use two applications: (1) design the hydraulically fractured completion, (2) model the production with a flow simulator. To create an accurate representation of the hydraulic fracture and the production flow, the 6X simulator integrates the hydraulic fracturing and fluid flow into one model. This

functionality enables the modeling of the whole lifecycle of a multi-well drilling spacing unit (DSU).

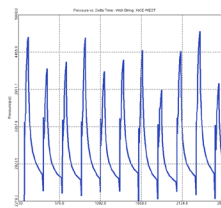
Understand and explore unconventional reservoir development opportunities in 6X

6X enables engineers to more accurately, consistently and rapidly investigate:

- Infill well locations and infill well timing
- Dynamic stress changes from hydraulic fracturing, depletion and infill wells
- Proppant transport and tracking
- Re-fracture completion designs
- Huff-and-puff EOR gas injection process

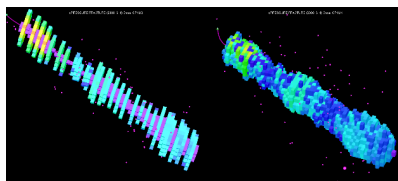
Power, accuracy, and flexibility at your fingertips

6X has an extensible architecture enabling it to run on CPUs, GPUs or on the Cloud to achieve fast turnaround times modeling multi-well scenarios.



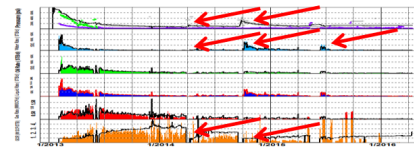
Input pumping schedule

Input the detailed pumping schedule for each stage.



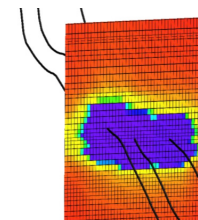
Fracture creation including geomechanics

Create tensile and shear fractures with an implicit stress or geomechanics solution.



Calibrate to observed data

Match simulated results with observed data. See the impact of 'fracture hits' from new wells in older wells.



Consistency in one model

Add infill wells and pumping schedules, create hydraulic fractures and calibrate to observed data. Finally, run forecast sensitivities.

6X: Solving Challenging Problems Fast

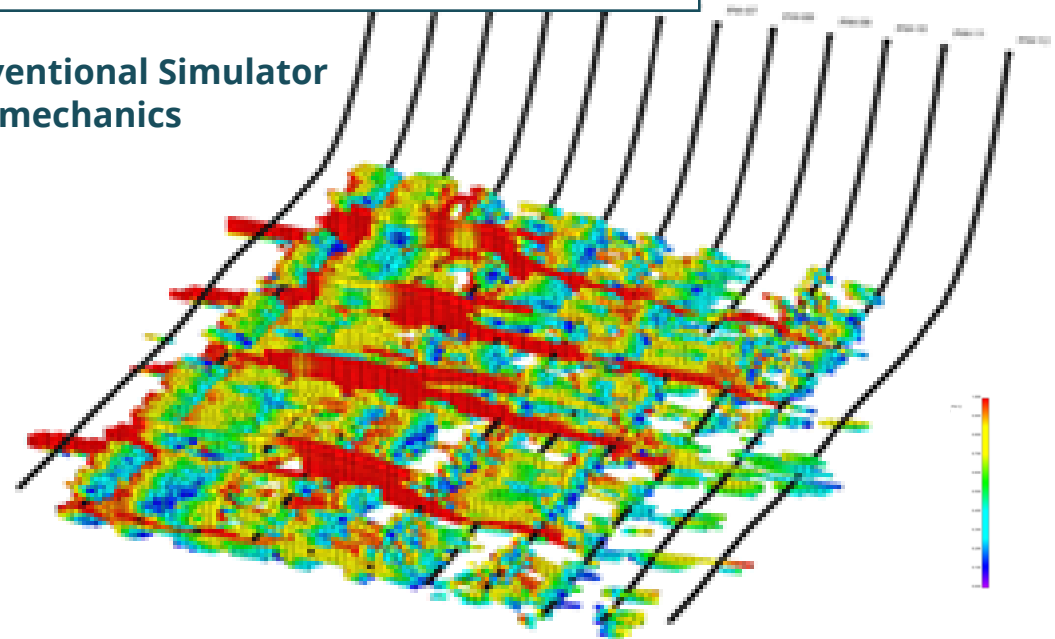
Conventional and Unconventional Simulator with Fully Integrated Geomechanics

Conventional and Unconventional reservoirs, from structurally simple to geologically complex, can be modeled with 6X in Black Oil or Compositional mode.

6X provides unique functionality including:

- Assisted History Matching (AHM) and uncertainty analysis with integrated multiple realizations
- Unconventional reservoir modeling with a multi porosity planar fracture solution for efficiency
- Proppant and fluid pump schedules; proppant transport and tracking
- Hydraulic fracturing and a dynamic geomechanical stress solution
- Development optimization
- Discretized wells
- Scripting
- Massively parallel extensible architecture

For Unconventional reservoirs, 6X models the life cycle of multi-well DSU; from the fracturing of the first well through to the end of production of the last well. The model accounts for fracture generation, closure and well interference. 6X is a single model is used for both the hydraulic fracturing and depletion periods. Incorporating the physics for the dynamic geomechanical stress change, the model captures the impact



of infill wells on parent wells enabling the user to match observed data and evaluate different development scenarios including: Well placement, well spacing, well timing, completion design, proppant and fluid placement, re-fracturing and huff-and-puff EOR gas injection.

The modern design of 6X delivers consistent results across all platforms whether running on multi-CPU, multi-GPU or Cloud systems.

