



# Integrated Reservoir & Production System Modelling

## Benefits

- Multi-disciplinary collaborative environment for reservoir, geomechanics and production engineers
- Single integrated software solution with implicit coupling that's faster and more stable than third-party solutions
- Model multi-reservoir with varying degrees of fluid complexity and blending
- Extensible plug-in framework supports proprietary technology deployment

CoFlow, a collaborative modelling environment, allows reservoir and production engineers to make informed decisions on large integrated oil and gas projects.

CoFlow™ is the industry's first, fully implicit, multi-user and multi-disciplinary Integrated Reservoir and Production System Modelling (IPSM) software application. CoFlow will result in superior engineering and economic decisions, reduce the time from concept to field implementation, and assist in the de-bottlenecking and optimization of field operations in high stakes assets.

- Collaborative:** the shared environment facilitates the continuous work by multiple users and disciplines on IPSM projects
- Multi-Fidelity:** easily choose fit-for-purpose fidelity levels for various IPSM workflows
- Usability:** workflow driven, intuitive interface enables all users to easily create simple to complex models, without requiring any specialist skills
- Integrated Uncertainty Assessment:** utilize the end-to-end integrated uncertainty and optimization to support asset planning, forecasting and NPV
- Accurate Data Integration:** CoFlow's collaborative environment removes cross-platform errors, as all data is embedded in one platform delivering accurate data from geomechanics to reservoir to production



The usability of CoFlow supports the multi-user, multi-disciplinary environment.

## What's New

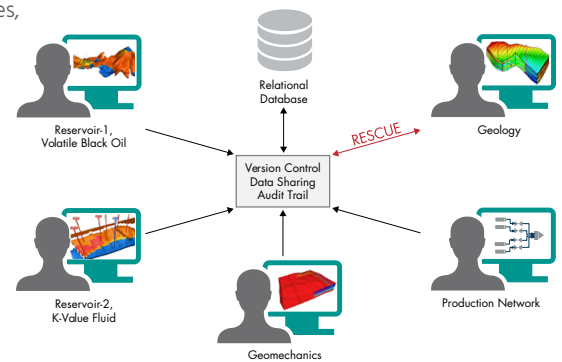
- Use CoFlow as an explicit solution to couple IMEX and GEM along with CMOST for uncertainty analysis and optimization
- Create models for IMEX and GEM datasets using CoFlow directly
- Analyze artificial and gas lift designs and input multi-layer IPR perforations with the new well modelling feature
- Create models faster with pipe catalogs and compressor input tables
- Use the new fluids and option for improved black oil blending

CoFlow results in better performance and accuracy with its fit-for-purpose, collaborative modelling approach. CoFlow delivers a new approach to maximize reservoir asset management.

## Modern IPSM Workflow

The traditional IPSM workflow relies on multiple software packages, possibly from the same vendor or multiple vendors. Due to the complexity and poor integration between software applications, members of the same asset team are limited in how and when data can be shared with others on the team.

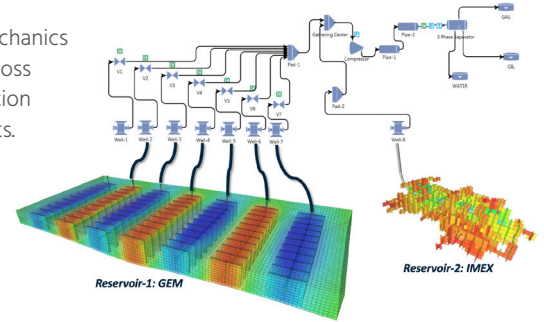
CoFlow has modernized the IPSM workflow by bringing the entire asset team together, on one enterprise solution. By developing CoFlow in collaboration with industry partners (Shell<sup>®</sup> and Petrobras<sup>®</sup>), CMG has delivered the industry's first tool to revolutionize the traditional IPSM workflow. CoFlow increases asset team productivity and multi-disciplinary team communication by maintaining all project data in one database and involving everyone throughout the entire project lifecycle.



The modern IPSM workflow, using CoFlow.

## Collaboration

The collaborative platform enables production, reservoir and geomechanics teams to easily share asset models and data that could be used across disciplines throughout the project. This cross-disciplinary collaboration is key to optimizing the time spent analyzing data and model results. The inherent data consistency means key functionality and results are shared within the integrated platform. Therefore, CoFlow enables a team to determine when to bring in surface facilities during short and medium term forecasting; and to design the optimum surface facility that increases an asset's overall recovery and economic impact.



CoFlow multi-reservoir pad level facility model.

## Multi-Fidelity Approach

CoFlow enables the creation of different fidelity models, tailored specifically to each discipline. Users are able to simplify or make the models and different calculation methods more rigorous as and when required. Apply the multiple fidelity options to achieve different objectives:

- Decline curve model (low fidelity)
- Upscaled discretized reservoir model (medium fidelity)
- Refined discretized reservoir model (high fidelity)
- Implicit Geomechanics
- Lift curves to model wells (low fidelity)
- Coupled surface network with minimal pipe flow calculations (medium fidelity)
- Coupled surface network with advanced pipe flow and thermal calculations (high fidelity)

These multi-fidelity models can be easily combined into a single integrated high-fidelity model using state-of-the-art 3D visualization. The multi-fidelity approach enables users to predict the complete asset performance while also improving team productivity.

## Usability & Extensibility

Traditional IPSM workflows require expert users to set up the integrated production simulation model. Using the modern IPSM workflow, CoFlow is designed to improve usability and productivity across all disciplines, as well as user experience. The single platform allows teams to easily audit and quality control models. The CoFlow interface is easy-to-use and includes a comprehensive set of integrated workflows which enables all skill levels to successfully create and set-up IPSM projects.

The extensible CoFlow architecture allows customers to add proprietary technology or seamlessly interact with other tools in their corporate workflow. The full Application Programming Interface "API" allows users to customize the workflow for reservoir or production engineering "best practices".

## Integrated Uncertainty & Optimization

CoFlow is seamlessly integrated with CMOST-AI™, which leverages artificial intelligence and machine learning algorithms to optimize field development and operational strategies. The CMOST-AI integration is designed around iterative decision-based workflows, therefore key uncertainties are captured at each workflow (from the reservoir to the point of delivery) and brought forward in the integrated modelling workflow. Generate realistic uncertainty estimations by parameterizing anything, at any step, to achieve end-to-end uncertainty assessment and optimization. Extend capabilities and potential to improve business decisions and processes by identifying the best solution for an asset, and by combining advanced statistical analysis, machine learning and non-biased data with the asset team's expertise.



### Contact

For more information please contact [info@cmgl.ca](mailto:info@cmgl.ca)



### R&D Investment

CMG reinvests 20% annual revenue back into R&D, to further innovation and drive technology forward



### Superior Software

CMG delivers easy to use software that provides the most accurate results



### Dedicated Support

Experienced technical sales & support personnel, deliver high-quality, timely and personalized customer support



### Relevant Training

CMG's industry renowned reservoir software training provides the skills to improve productivity and efficiency

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