PETREL PLUG INS · CONNECT AND LINK

DEEPSOFT

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COVER

Four plug ins for the road from geological model to decision

Static conditioning, layer design, transmissibility correction and well placement, each one a native Petrel plug in, each one solving a step where the workflow usually loses information.

OCEAN STORE | DELFI READY | NATIVE PETREL

PARTNERSHIP

Kelkar & Associates Inc. · Tulsa, USA

LICENSING

Commercial, via SLB Ocean Store

SUPPORT

DeepSoft and Kelkar engineering teams

WHERE THEY ACT

DEEPSOFT

Four steps of the same journey

Each plug in occupies a different point between the geological model and the decision. Three of them work on the way down to the simulation grid. The fourth skips that road entirely.

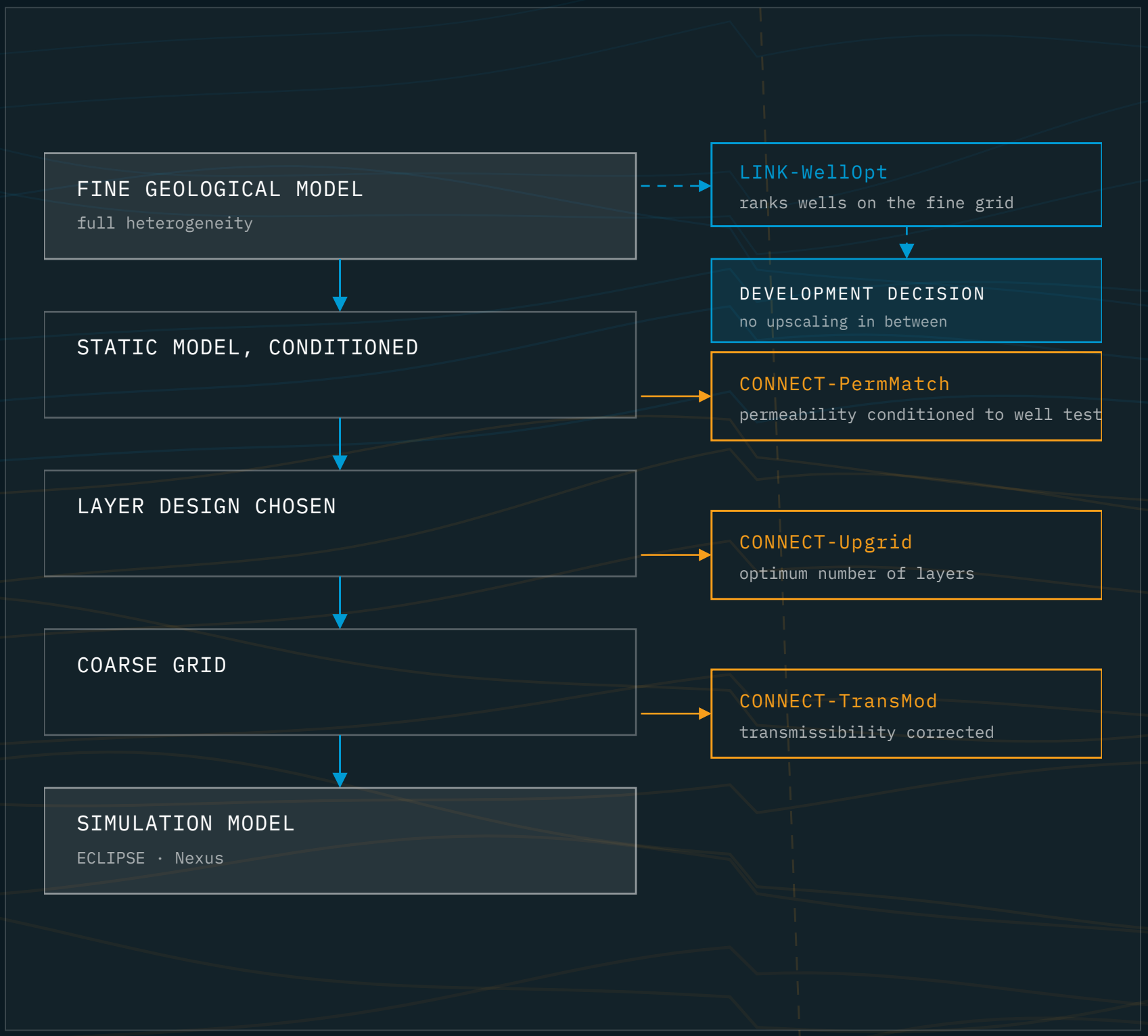


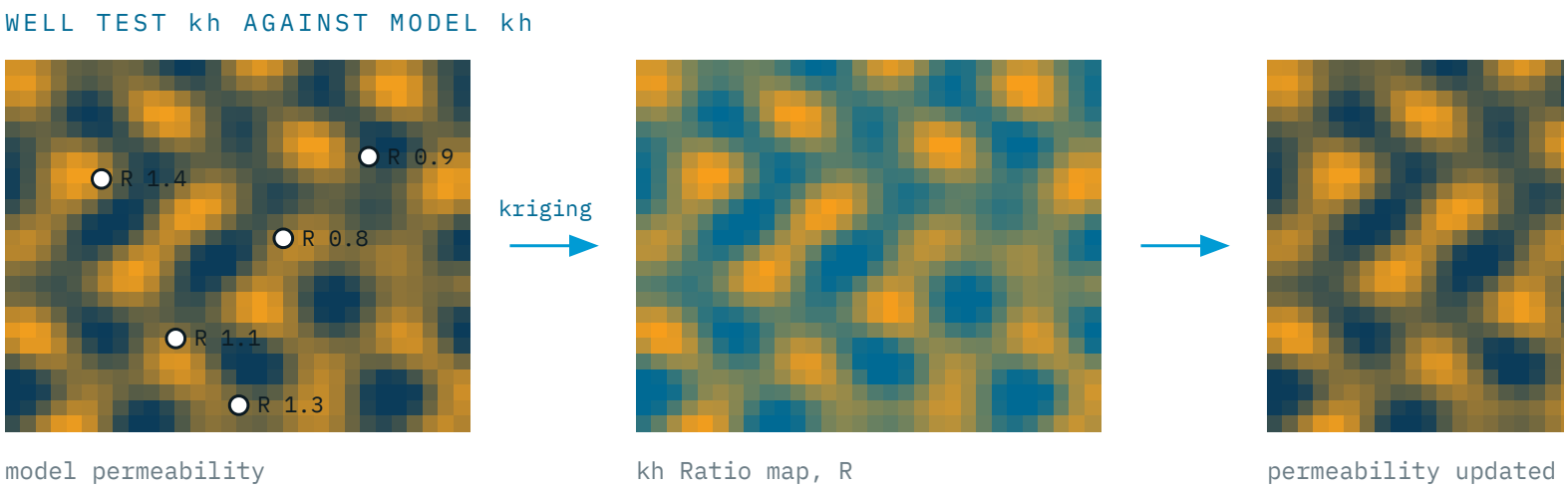
Fig. 01 · Schematic. The workflow, and the point where each plug in enters.

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CONNECT-PermMatch

Reduce history matching work before you even start.

The permeability model is built from logs, cores and correlations, and rarely sees the flow capacity measured in well tests. PermMatch conditions the 3D permeability to the measured kh, and does it without breaking the spatial structure the geologist built.



REALISTIC STATIC MODEL

Permeability reflects the flow capacity actually measured in the field, not only the petrophysical interpretation.

NO ARBITRARY FIXES

Removes the artificial discontinuities that manual permeability corrections introduce during history matching.

CONTINUITY PRESERVED

Texture, anisotropy and heterogeneity of the original distribution survive the correction.

- Zone by zone kh calculation on the static model
- Spatial interpolation of R by kriging
- Mismatch ratio R per well and per zone
- Quality control with kh histograms and the R map

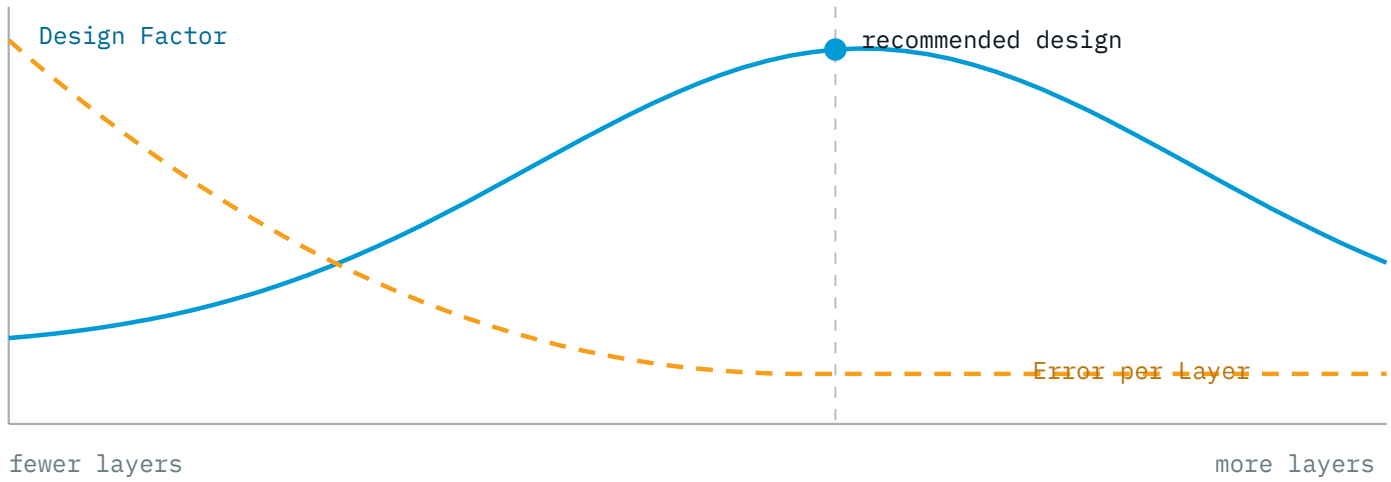
DEEPSOFT

CONNECT-Upgrid

Ninety percent of the dynamic performance with ten percent of the effort.

Choosing the number of layers for the simulation grid is usually a judgement call bounded by machine time. Upgrid replaces it with an analytical criterion: keep the pressure profile of the fine model, and let the layer design follow from that.

DUAL CRITERION FOR THE OPTIMUM NUMBER OF LAYERS



OPTIMUM LAYER DESIGN

Automatic determination of the number of layers and the best grouping, with no empirical guesswork.

DYNAMIC HETEROGENEITY KEPT

The coarse model reproduces the pressure profile of the fine model, which is the behavior that matters.

MUCH SHORTER RUNS

Substantially smaller simulation models, with flow simulations reported up to one hundred times faster.

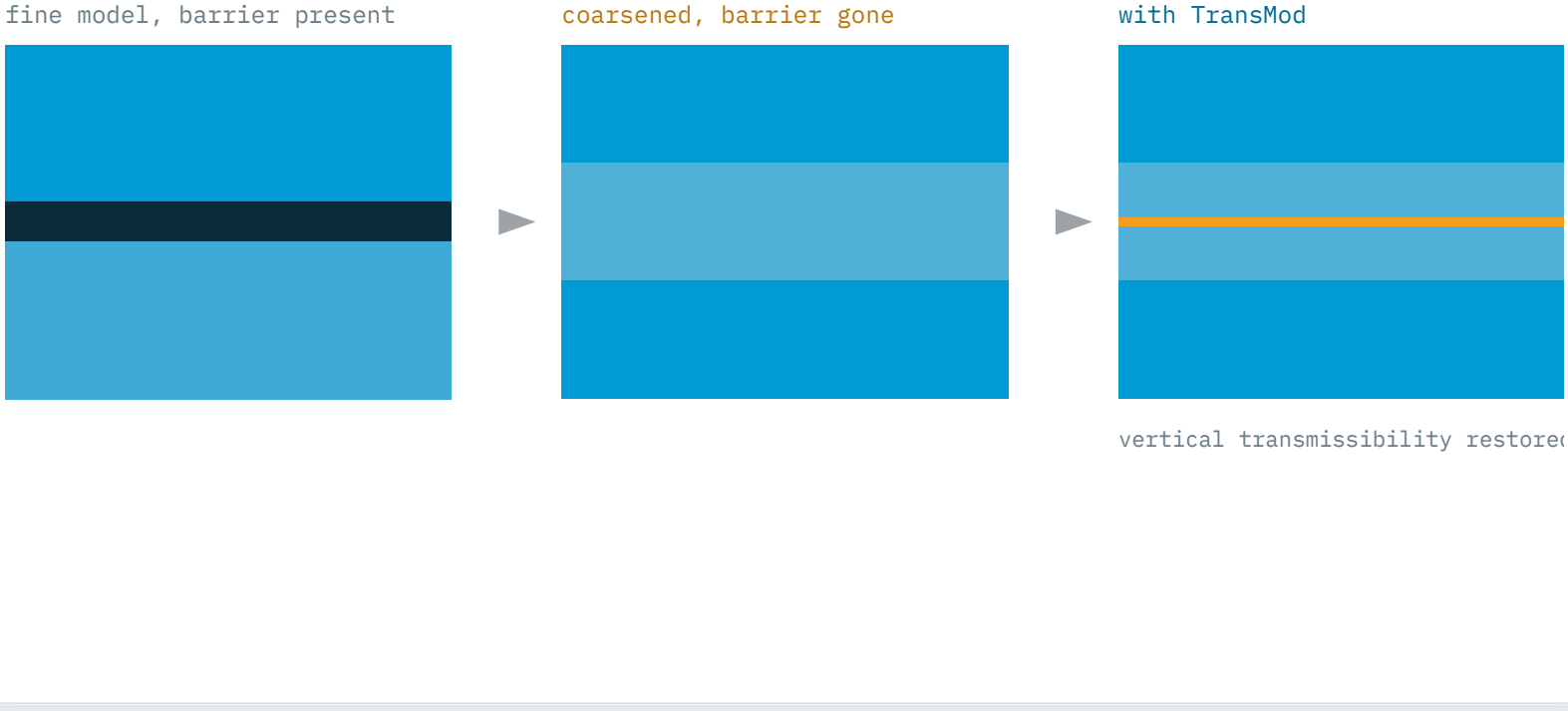
- Analytical grouping from an error function derived from Darcy
- Preserved heterogeneity curve per number of layers
- Design Factor and Error per Layer as a dual criterion
- Automatic pillar grid generation, no fine scale simulation needed

DEEPSOFT

CONNECT-TransMod

Restore the connectivity that property upscaling destroyed.

Averaging reservoir and non reservoir cells into one coarse cell erases the connectivity structure of the geological model. TransMod reads the fine scale connectivity and computes the transmissibility corrections that give it back to the simulator.



GEOLOGY HONORED

Barriers, flow paths and vertical discontinuities of the fine model survive into the coarse grid.

NO FALSE OPTIMISM

Removes spurious communication between isolated regions, and the loss of vertical flow that upscaling can cause.

SIMULATOR READY

Output in ECLIPSE format and Nexus native arrays, inside the Petrel export workflow.

- Fine scale connectivity analysis
- Reservoir and non reservoir handling by facies or cut off
- RatioX, RatioY and direct TransmissibilityZ
- Pinch out models and use inside automated Petrel workflows

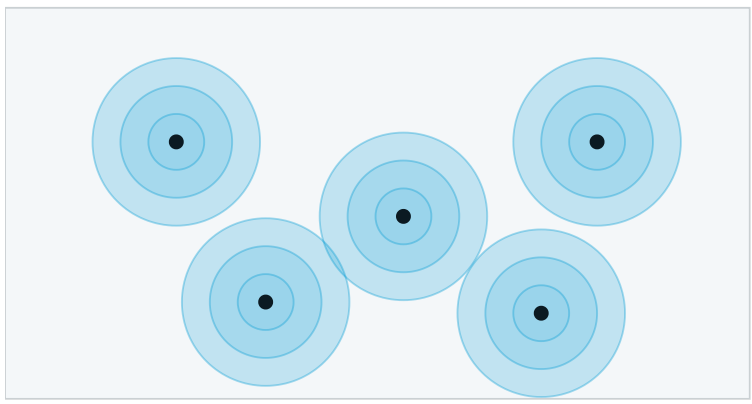
DEEPSOFT

LINK-WellOpt

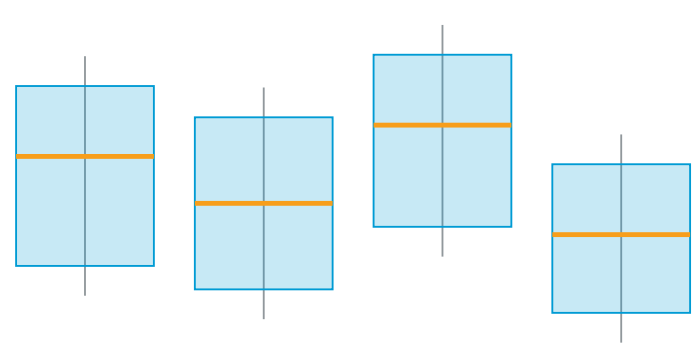
Rank development scenarios in a fraction of the time a simulation would take.

Deciding where to drill under geological uncertainty usually means exhaustive numerical simulation. WellOpt ranks well and model combinations from drainage volumes computed analytically, directly on the fine grid, with no upscaling.

drainage volumes from Diffusive Time of Flight



relative recovery per scenario



P10 · P50 · P90 across geological models

FASTER DECISIONS

Hundreds of well and model combinations ranked at a timescale that makes the analysis viable at all.

UNCERTAINTY QUANTIFIED

Multiple geological models at once, with P10, P50 and P90 statistics on relative recovery.

NO UPSCALING

Runs on the high resolution model, and execution time grows linearly with grid size, not quadratically.

- Diffusive Time of Flight by the Fast Marching Method
- Faulted corner point geometry and arbitrary well architectures
- Rate and recovery from a semi analytical approximation
- Box and whisker plots, cross plots and productivity index per well

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They are useful alone and better in sequence

Upgrid with TransMod

One decides how few layers the model can afford, the other gives back the connectivity that coarsening costs. Applied together they cut model size while the dynamic behavior stays put.

PermMatch before simulation

Conditioning permeability to well test data early means the history matching stage starts from a model that already knows what the field measured.

WellOpt before committing

Ranking well placements on the fine model shows the dynamic impact of the static model before anyone pays for a simulation campaign.

One environment

All four are native Petrel plug ins, so inputs and outputs stay in the project and every step keeps its trace back to the geological model.

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TOGETHER

Consolidated tools in the E&P market, used by operators worldwide in reservoir characterization, modeling and simulation projects.

AVAILABILITY

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How to get them

Ocean Store

All four plug ins are published on the SLB Ocean Store, under commercial licensing, installed like any other Petrel extension.

DELFI ready

Prepared for the DELFI environment, so teams running hybrid local and cloud workflows keep the same tools on both sides.

Native Petrel

Inputs come from the project and outputs go back to it as properties, grids and plots, with no intermediate files to manage.

Support from the engineers

Technical support comes directly from the engineering teams at DeepSoft and at Kelkar & Associates, not from a ticket queue.

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AVAILABILITY

OCEAN STORE | DELFI READY | PETREL NATIVE | ECLIPSE AND NEXUS OUTPUT

PARTNERSHIP

Built with Kelkar & Associates, engineered for Petrel.

DeepSoft and Kelkar & Associates Inc., of Tulsa, are partners on the CONNECT and LINK plug ins. Engineering and technical support come from both teams.

Bring us a model and a question. We will show you which of the four answers it, and what it costs you in machine time.

LICENSING

SLB Ocean Store

CONTACT

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LINKEDIN

/company/deepsoft

DEEPSOFT

CONNECT-PermMatch · CONNECT-Upgrid · CONNECT-TransMod · LINK-WellOpt