

ECHELON

CASE STUDY // AN OPERATOR IN ATLANTIC CANADA

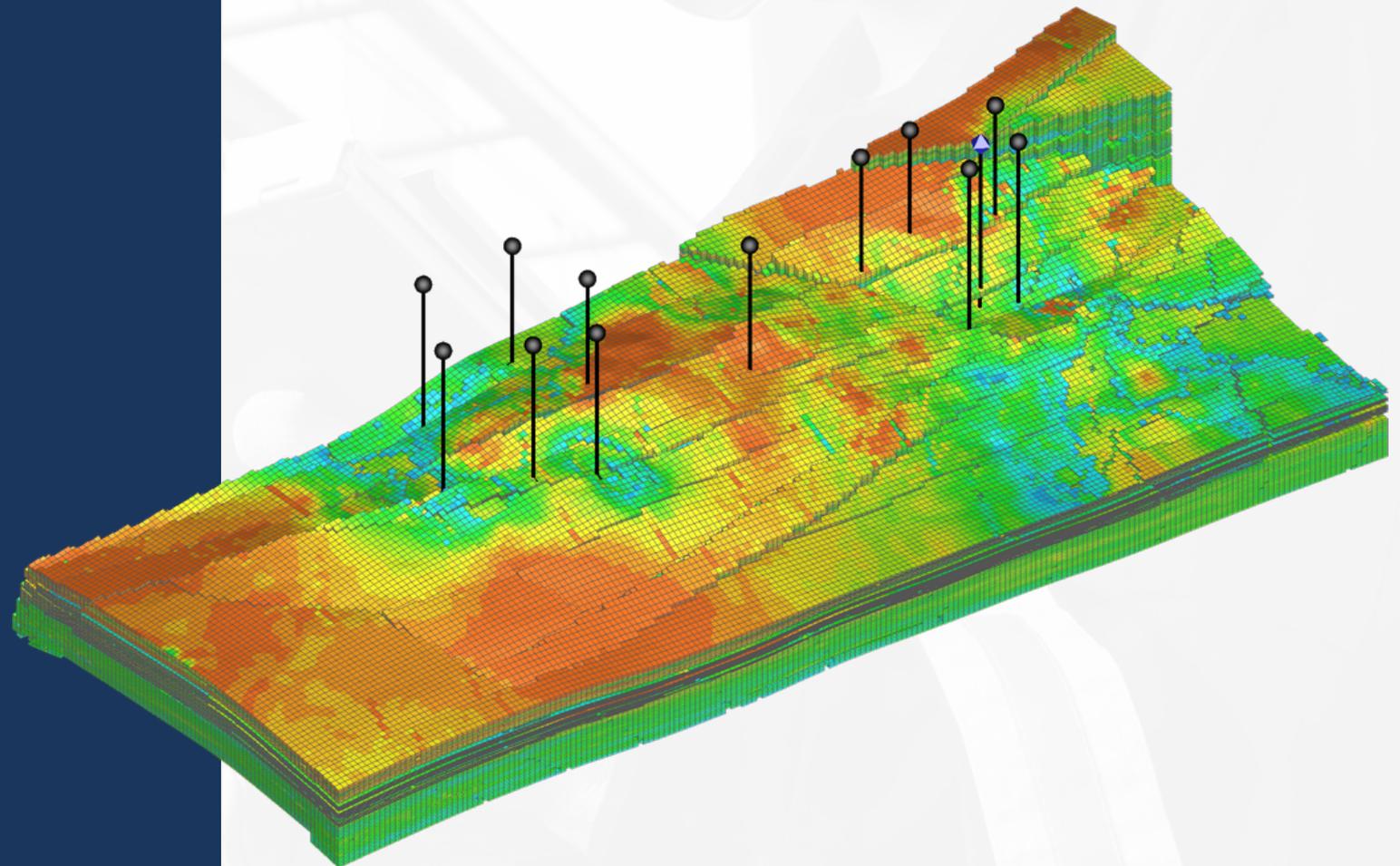
NOVEMBER 11, 2020

AN OPERATOR IN ATLANTIC CANADA REDUCED THEIR SIMULATION RUN TIMES BY UP TO 30X BY USING ECHELON ON A DESKTOP EQUIPPED WITH A LOW COST GRAPHIC CARD.

30x
FASTER

1.24M
CELLS

1
DESKTOP GPU



CHALLENGE

Average simulation run times during history match or production forecasting for models with 1-2 million active cells range from 9 to 11 hours on 4 cores using a CPU-based simulator. These long run times cause delays in achieving a fair history matched model which consequently creates uncertainty in the production forecasting. Although simulation run times could be reduced by increasing the number of cores in both legacy and more modern CPU simulators, this would increase costs and imply moving to a higher-end workstation or a cluster. These challenges motivated the operator to look for newer innovations such as GPU simulators that promise faster run times with a smaller hardware footprint.



SOLUTION

ECHELON is a massively parallel fully implicit reservoir simulator built from the ground up to operate on GPUs, enabling exceptional speed. A comparison between a CPU-based black oil simulator and ECHELON, using a single desktop GTX-1080 GPU, can be seen in the results table below.

RESULTS

ECHELON reduced all CPU runtimes to 22-44 minutes while maintaining the accuracy of the original CPU results; allowing the operator to significantly increase performance with a minimal investment in a new graphic card.

The results in this case study were presented at the SPE Virtual Norway Subsurface Conference on 2 November 2020 and published as SPE 200748 paper.

SIMULATION MODELS	MILLION CELLS	RUN TIME (MINUTES)	
		LEGACY CPU 4 CORES	ECHELON GTX-1080
MODEL A	0.97	642	41
MODEL B	1.95	522	44
MODEL C	1.27	534	42
MODEL D	1.27	672	26
MODEL E	1.24	660	22



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