Performance Analysis and Visualization

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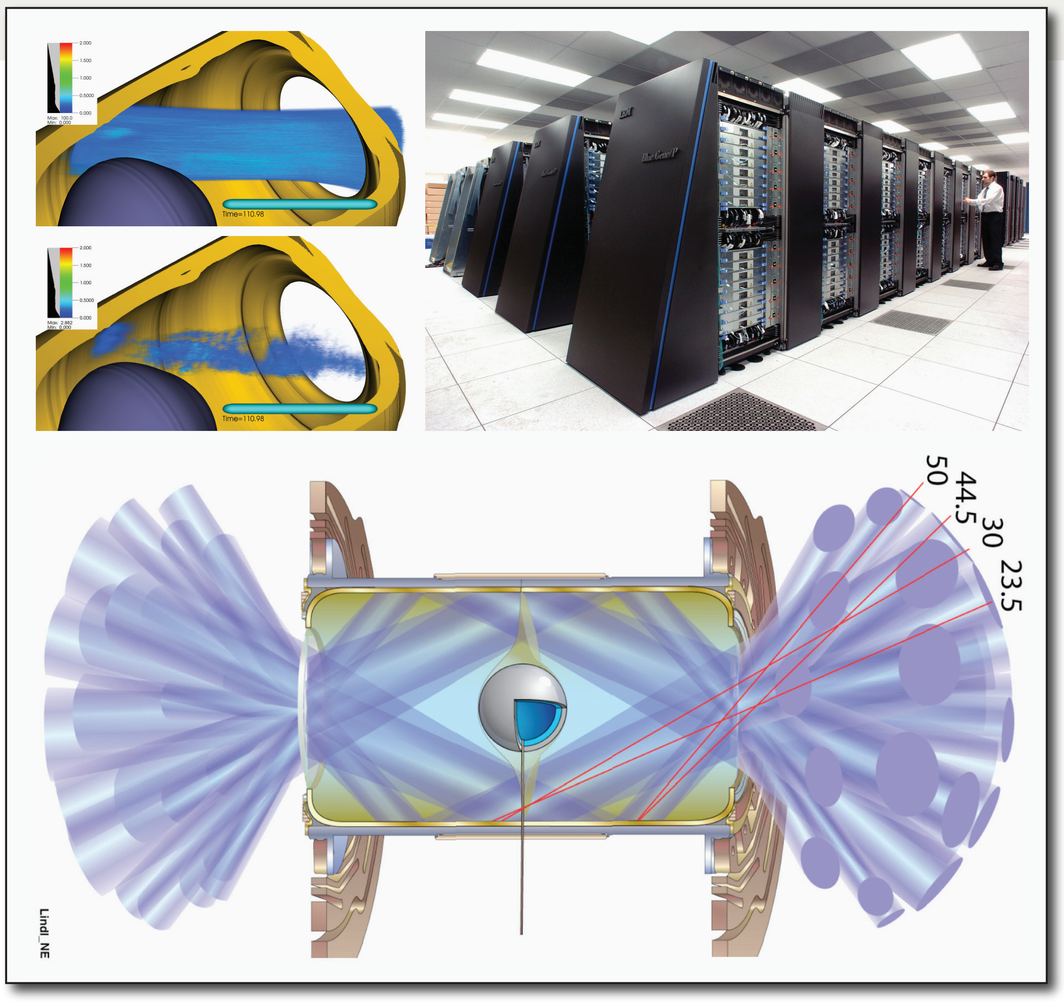
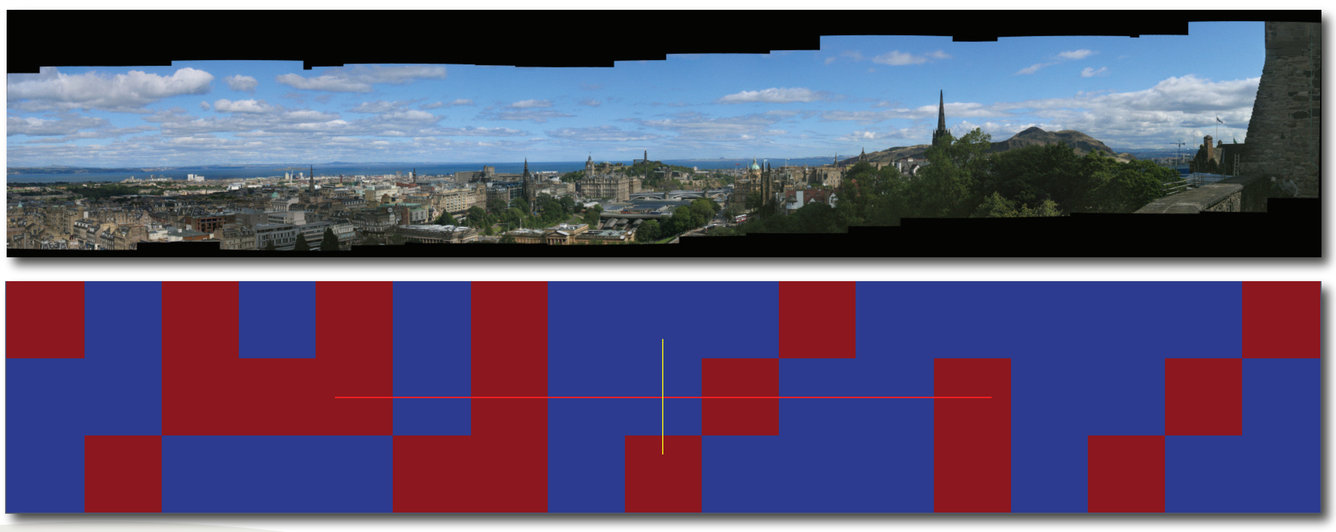
Introduction

- Supercomputers are used to simulate complex scientific phenomena
- These supercomputers are clusters of individual computers called nodes that are connected to each other
- Programs developed to perform these simulations tend to be very large and complicated
- Analysis and Visualizations of these programs provides insights into the execution behavior and exposes areas of the program that can be targeted for optimizations
- We present a tool that performs such analysis and visualization by providing views and plots



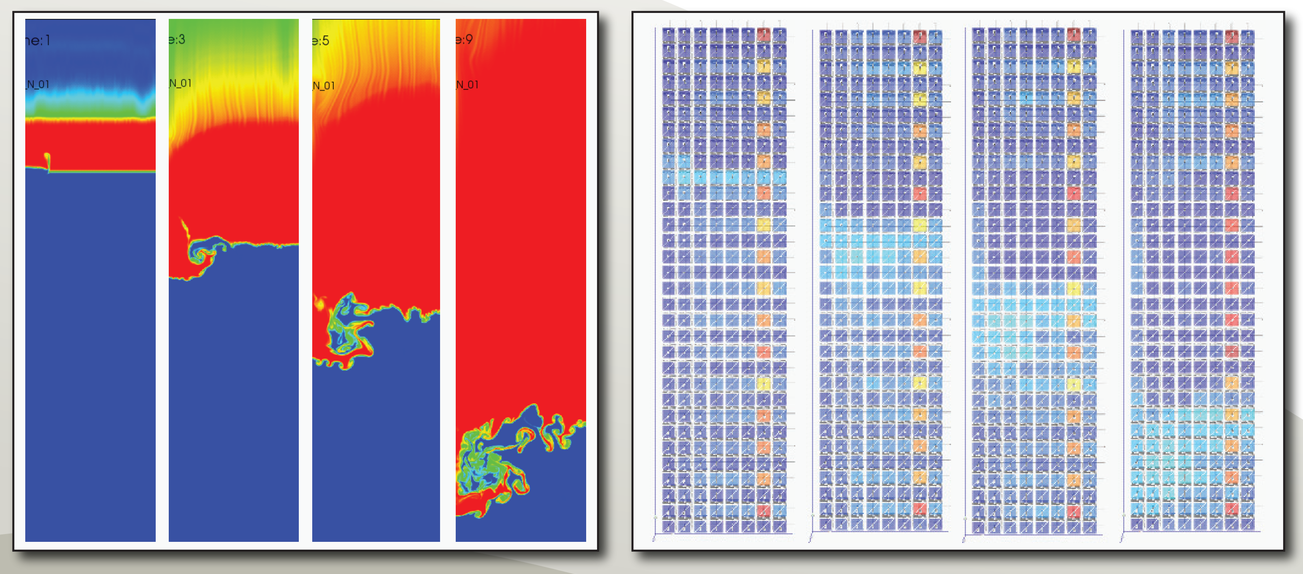
A supercomputer and simulation of traversal of laser beams



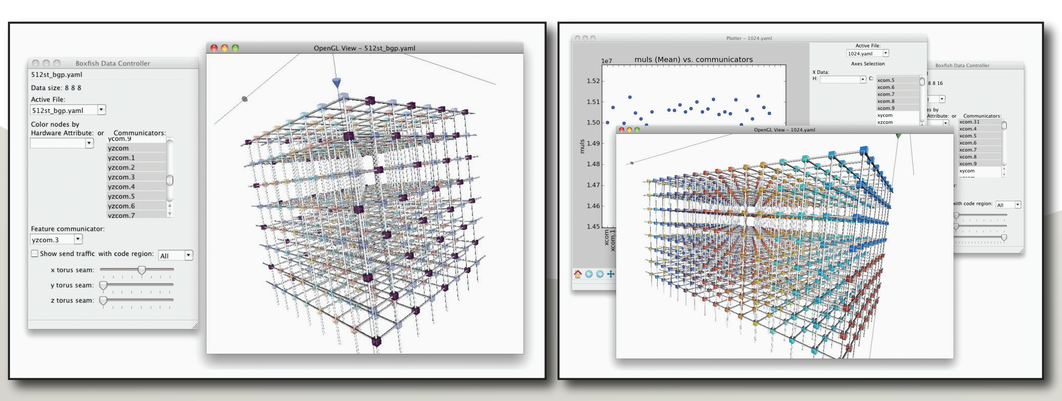
Visualization of the various parts of the high resolution image that were processed on CPU(blue) and GPU(red)

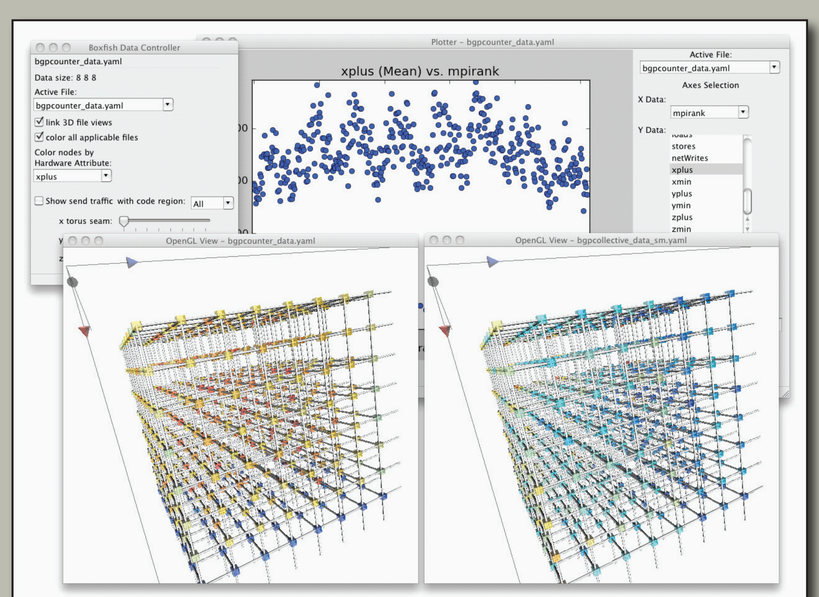
PAVE Tool

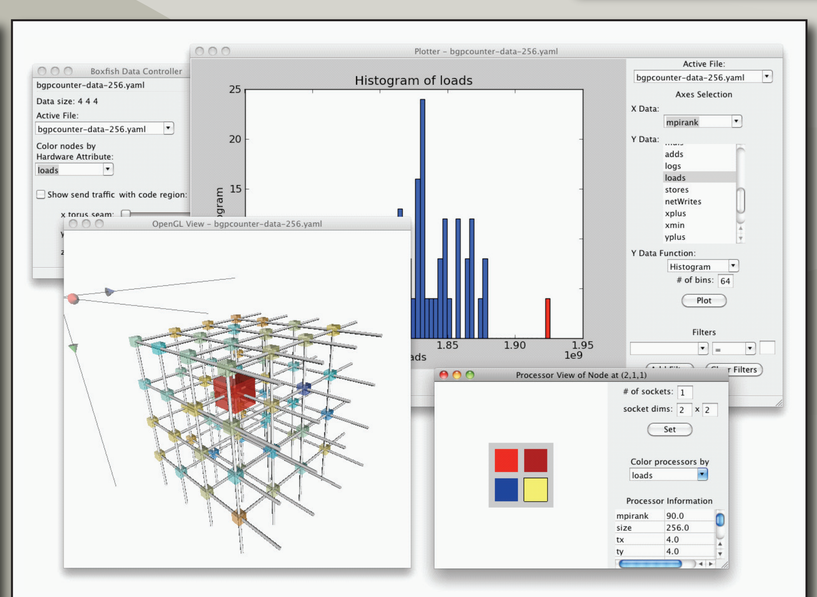
- This tool represents the supercomputer as a grid of nodes
- Combined analysis of the 2D and 3D views gives better insight into working of the program
- User can map the output of the simulations to the various nodes of the supercomputer
- Performance metrics can be viewed at various granularities like cluster level and node level.

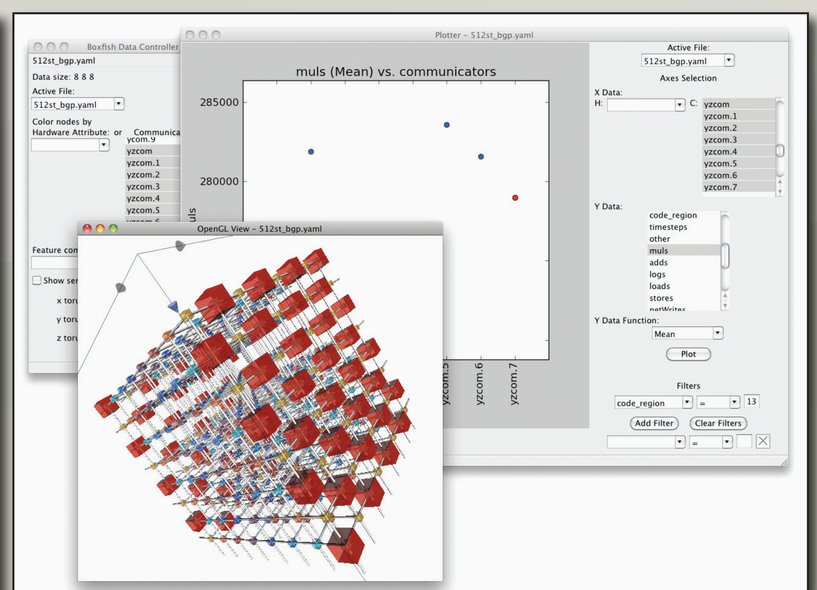


Right: Simulation output viewed at various time steps Left: Behavior of the L1 cache misses of the various nodes used for the simulation during the same time steps. Notice the wave front in the image.









References

S. H. Langer, B. Still, P-T. Bremer, D. Hinkel, B. Langdon, J. A. Levine, E. Williams. Cielo Full-System Simulations of Multi-Beam Laser-Plasma Interaction in NIF Experiments – Cray User Group Confernce 2011
M. Schulz, J. A. Levine, P-T Bremer, T. Gamblin, and V. Pascucci Interpreting performance data across intuitive domains – ICPP'11
S. Philip, B. Summa, P-T. Bremer, V. Pascucci. Parallel Gradient Domain Processing of Massive Image s - Eurographics Symposium on Parallel Graphics and Visualization, (April 2011)

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