S3D performance priorities

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S3D: Turbulent combustion simulation

- Three dimensional compressible reactive flow simulation.
- High order finite difference integration of partial differential equations, using a regular Cartesian grid.
- Parallel decomposition using MPI, nearest neighbour communication.

  Good weak scaling on the Jaguar XT5.
- Parallel MPI-IO implemented.
- Detailed chemistry models imply a high ratio of computation to communication, code performance is limited by memory latency.

S3D: Performance objectives

- Prepare code for the anticipated evolution of machine architectures towards deeper memory hierarchies: Possibly a hybrid MPI-openMP programming model.

Specifically:

- Devise a strategy for the restructuring of our Lagrangian particle module to take advantage of shared memory on computational nodes.