Suggested title:

A User-Friendly Approach for Tuning Parallel File Operations

Suggested body:

This report describes on-going work studying the factors affecting the performance of parallel file operations on Lustre-based systems; developing a model that describes the performance for collective write operations; and producing a user-friendly library that facilitates tuning parameters to optimize performance. The library, which is named T3PIO, sets stripe count, stripe size, and aggregators (writers) within applications using MPI-IO or libraries based on MPI-IO (e.g. HDF5, netCDF4, and PnetCDF). T3PIO users are able to make a single function call to exercise full control over the tuning process or allow the library to automatically set near optimal parameters for collective write operations. The large-scale computing community is quickly outgrowing traditional approaches to file operations. We deem the library and the underlying model as important initiatives in helping the research community make the necessary but sometimes difficult transition from traditional file operations to efficient, effective parallel techniques.