Outline for Tutorial M4

The tutorial will follow the following outline. The bullets represent major topics that will be explained in all cases with examples containing actual code, and in many cases, performance results.

- Introduction (1/2 hr)
  - What's New in MPI-2
- Parallel I/O (1 1/2 hr)
  - Using MPI for Simple I/O
  - Noncontiguous Accesses and Collective I/O
  - Accessing Arrays Stored in Files
  - Nonblocking I/O and Split Collective I/O
  - Consistency Semantics
  - Achieving High I/O Performance with MPI
- Dynamic Process Management (1 hr)
  - Creating New MPI Processes
  - Intercommunicators
  - Connecting MPI Processes
  - Understanding Fault Tolerance and MPI
  - Name Publishing
- LUNCH
- One-Sided Communication (RMA) (1 hr)
  - Contrast with Message Passing
  - Understanding Synchronization
  - Memory Windows
  - Puts and Gets
  - Completing Data Transfers
  - Lock and Unlock
  - Allocating Memory for MPI Windows
  - Contrast with Shared Memory
  - Performance Tuning
- Using MPI with OpenMP (1/2 hr)
  - OpenMP and Thread Basics and Issues
  - MPI and Threads
  - Mixed-Model Programming: MPI with OpenMP for SMP Clusters
- Hands-on Exercises (1 hr)
  - Installing MPICH2 on users' laptops
  - Running MPI-2 examples
  - Editing and compiling examples
  - If possible, run on the cluster of users' laptops
- Conclusions (1/2 hr)
  - MPI-2 Implementation Status
  - Where Does MPI Go from Here?