

A View on The I/O Stack

- Parallel application
 - ▶ Is distributed across many nodes
 - ▶ Has a specific access pattern for I/O
 - ▶ May use several interfaces
 - File (POSIX, ADIOS, HDF5), SQL, NoSQL
- Middleware provides high-level access
- POSIX: ultimately file system access
 - ▶ Provides a hierarchical namespace and “file” interface
- Parallel file system: Lustre, GPFS, PVFS2
 - ▶ Parallel: multiple processes can access data concurrently
- File system: EXT4, XFS, NTFS
- Operating system: (orthogonal aspect)

The layers provide optimization strategies and tunables

Application

Middleware

MPI-IO / POSIX

Parallel File Systems

File Systems

Block device

Example I/O stack