IOFSL – I/O Forwarding Scalability Layer
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Introduction
Modern massively parallel systems exhibit unique I/O architectures and I/O requirements. For example, compute nodes might not have direct outside access or might be running microkernels incapable of fully supporting all I/O functionality. To handle this, I/O forwarding was introduced. The basic idea?

Instead of performing your own I/O, have it done by some other entity that might be better suited or located.

Data Compression
By using spare CPU time at the clients to compress data sent to the forwarding server (i.e. writes), the effective network bandwidth increases. The forwarding server either decompresses before performing the I/O operation, or (ideally) indicates to the I/O system that the data is already compressed and passes it on unmodified.

Ongoing Work
We’re working on improving IOFSL. Some of our current projects:

- server side compression
  Researching fast compression functions, trading CPU time for a lower compression ratio, in order to enable compression by the forwarding server.
- collaborative caching
  A jointly maintained cache between the forwarders enables new optimizations (such as request merging between forwarders) and improves the efficiency of existing optimizations.
- network protocol improvements
  Packing data and request information in the same message to reduce the number of exchanges between clients and forwarding servers. This is particularly important for applications making many small accesses (such as FUSE).
- Security Infrastructure
  Currently, an IOFSL forwarder executes requests for a single user. Our new security infrastructure will enable a single forwarder to securely serve multiple users.
- I/O Tracing and Visualization
  Integrating IOFSL with end-to-end I/O tracing and visualization tools, such as those developed for the NSF HECURA IOVIS / Jupiter project.

Contributing
We welcome all contributions and collaborations:

- IOFSL Project website: http://www.iofsl.org/
- IOFSL Public Git repository: http://git.mcs.anl.gov/iofsl
Contact us at io-fwd-devel@lists.mcs.anl.gov