I/O Traces of HPC Applications

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Introduction

• A better understanding of I/O behaviors of an application can:
  • Help users optimize I/O performance and identify potential I/O bottlenecks.
  • Help file system and I/O library developers make better optimization decisions.

• The first release of the dataset contains I/O traces from 14 HPC applications.
Introduction

• All traces were generated using Recorder\textsuperscript{1}, a multi-level tracing tool.
  • Trace record includes enter/exit timestamp of the function call, function name and all function parameters except the data buffer.
  • Currently includes POSIX, MPI-IO and HDF5.
  • I/O traces with more details take more time to collect. But once generated can be used repeatedly by researchers to perform different analysis tasks.

• Traces are in Recorder-specific binary format.
  • Tools are provided to read, decompress and decode the trace. These tools are written in C with python bindings provided for easy analysis.
  • More information on reading, visualizing and analyzing the traces can be found here: https://github.com/uiuc-hpc/Recorder

I/O Traces of 14 HPC applications

- 14 HPC applications and I/O emulators.
- Applications perform I/O using POSIX, MPI-I/O and high level libraries include HDF5, NetCDF, Silo, and ADIOS.
- 8 nodes x 8 MPI ranks/node @ LLNL Quartz system.
- Traces and visualizations are available at https://doi.org/10.6075/J0Z899X4
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Following files are included for each application run:

• 64 trace files (*.itf) and 64 (*.mt) metadata files, one for each MPI rank.
• recorder-report.html: visualization report generated by Recorder.
• Input files if used.
• Other files like logs written by the application.

Example of FLASH using independent I/O
Thank You

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