About DKRZ

German Climate Computing Center

DKRZ – Partner for Climate Research
Group Wissenschaftliches Rechnen (Scientific Computing)

Composed of DKRZ research division and Universität Hamburg research group

Research

- Analysis of parallel I/O
- I/O & energy tracing tools
- Middleware optimization
- Alternative I/O interfaces
- Data reduction techniques
- Cost & energy efficiency
Goal of the Workshop

Support development of tools to identify (in-)efficient usage of I/O resources

- From the perspective of users and data centers

Approach of the workshop:

1. Understanding future storage architectures and implications on workflows
2. Introduce monitoring tools to enable optimization of system/applications
   - Identify and quantify I/O inefficiencies of observed workloads
3. Benchmarking provides (optimal) baselines to understand storage better
   - Also enables comparison between storage systems and sites
   - Mandatory tool for procurements and steering of vendor effort
Support

This workshop is supported by:

And powered by:
Introduction: VI4IO

Goals of the Virtual Institute for I/O

- Provide a platform for I/O researchers for exchanging information
- Foster training and international collaboration
- Track and encourage the deployment of large storage systems by hosting information about high-performance storage systems

Web page: http://www.vi4io.org
Introduction

Philosophical cornerstones of the institute

- To allow participation of everybody without a membership fee
- To treat every member and participant equally
- To be an independent organization
  - Independent of vendors and research facilities
Open Organization

- The organization uses a wiki as central hub
  - Everybody (registered users) can edit the content
  - Mayor changes should be discussed (see below)
  - The wiki uses tag clouds to link between similar entities

- Supported by mailing lists
  - Call-for-papers
  - Announce list for relevant information
  - Contribute list to discuss and steer organizational issues
  - IO-500 (development of a benchmark for the IO-500 list)

- Mayor changes should be discussed on the contribute mailing list
- Members can vote for changes

*Everybody is welcome to participate*
The High-Performance Storage List (HPSL)

- Aims to track storage characteristics over time
- Uses a component model that covers: site, supercomputers and storage
- Provides means to explore data
- Is community maintained

<table>
<thead>
<tr>
<th>#</th>
<th>Site</th>
<th>Supercomputer</th>
<th>Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Name</td>
<td></td>
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<tr>
<td>1</td>
<td>LANL</td>
<td>Trinity</td>
<td>Lustre</td>
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<tr>
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<td>Mineral</td>
<td>Lustre</td>
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<td>K.Computer</td>
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<td>Coral Phase 1</td>
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</tr>
<tr>
<td>10</td>
<td>JAMSTEC</td>
<td>Earth Simulator</td>
<td>Lustre</td>
</tr>
</tbody>
</table>

...
On 30 systems that are currently in the list
- Corr. storage capacity &
  - memory capacity = 0.63
  - compute peak = 0.13
- Mean(storage/mem capacity) = 45.6
Agenda

Wednesday

- Architectures
- Discussion: Architectures
- *Social Event*

Thursday

- Monitoring
- Discussion: Monitoring
- *Lunch*
- Benchmarking
- Discussion: Benchmarking
- *Farewell*
Social Event

- **Location**: Rickmer Rickmers at the Harbor (see webpage for the location)
- **When**:
  - 19:00 reception with finger food
  - 19:30 buffet
  - Museum attendance covered (opens until 22:00)
  - You can attend the museum even at 18:30
- **How**: We will depart at 18:30 from DKRZ main entry using U3 (Schlump)
  - Towards Landungsbrücken
- **Tickets**: You have to pay for yourself...
  - Single short trip ticket: 1.60 Euro
  - Group daily ticket (5 people): 11.60 Euro
  - We will wait at Schlump until you have bought your tickets
A discussion slot follows every topic block
- The appointed moderator leads the discussion

Add questions and relevant issues to our Google Doc
https://docs.google.com/document/d/1fPMzSRepwwSgNBh7SGcmUTaN1mYR0oPVhd-mRKjY81U/edit

Do not be shy ... simply add stuff!
Results of the Workshop

A PDF with the results will be published on the web page

- Summarizing the presentations
- Summarizing the discussions
- We will use a simple Google Doc
  - Everyone is welcome to summarize the own talk / add something
  - I will later convert it to LaTeX and put it on the web page
  - Yes, it is embedded at the end of the discussion document!
- Feel free to edit the document during the workshop
  - I will make notes in the document during the workshop
Further Advertisement

Upcoming events

■ 2017-06-22 HPC I/O in the Data Center Workshop
   https://wr.informatik.uni-hamburg.de/events/2017/iodc
   During the ISC-HPC workshop day in Frankfurt!
   **Submission deadline:** 2017-03-28 (extension possible)

■ BoF: The Virtual Institute of I/O and the I/O 500
   During ISC-HPC, Frankfurt, 2017-06-18

■ 2017-09-25/26 Workshop: Exascale I/O for Unstructured Grids (EIUG)
   https://wr.informatik.uni-hamburg.de/events/2017/eiug
   Will take place at DKRZ