Exascale I/O for Unstructured Grids (EIUG) Workshop

Julian M. Kunkel (DKRZ)
Olaf Ippisch (TU Clausthal)
Sebastian Oeste (TU Dresden)

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About DKRZ

German Climate Computing Center

DKRZ – Partner for Climate Research

High Performance Computing.
Sophisticated Data Management.
Competent Service.

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

Identify strategies for the efficient access of large data sets

- Specifically targeting scientific data along (unstructured) grids

Approach of the workshop:

1. Information exchange between experts, vendors, and users
2. Mostly 35+5 minute slots for direct questions
3. Discussion slots at the end of each day
   - Monday: identify and discuss issues
   - Tuesday: potential solutions (emerging questions)

Support

This workshop is supported by:

And powered by:

esiwace
CENTRE OF EXCELLENCE IN SIMULATION OF WEATHER AND CLIMATE IN EUROPE

EU funded Project: ESiWACE

The Centre of Excellence in Simulation of Weather and Climate in Europe

- Representing the European community for
  - climate modelling and numerical weather simulation
- Goals in respect to HPC environments:
  - Improve efficiency and productivity
  - Supporting the end-to-end workflow of global Earth system modelling
  - Establish demonstrator simulations that run at highest affordable resolution
- Funding via the European Union's Horizon 2020 program (grant #675191)

http://esiwace.eu

esiwace
CENTRE OF EXCELLENCE IN SIMULATION OF WEATHER AND CLIMATE IN EUROPE

Community Activity: The Virtual Institute for I/O

Goals of the Virtual Institute for I/O

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

https://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

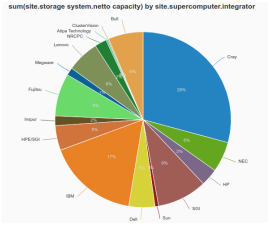
Open Organization

- The organization uses a wiki as central hub
  - Everybody (registered users) can edit the content
  - Major 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)
- Major changes should be discussed on the contribute mailing list
- Members can vote for changes

Everybody is welcome to participate

The Data Center List (DCL)

- Tracks characteristics of data centers over time
- Extends High-Performance Storage List (HPSL)
  - Component model including site, supercomputer, storage
  - Covers costs, energy, etc.
  - Schema is extensible based on feedback
- Provides tools to explore data
- Community maintained (currently 39 sites)



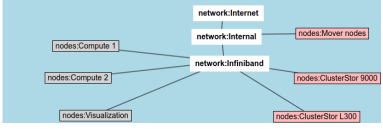
DKRZ

This site describes the systems deployed at the German Climate Computing Centre.

Site characteristics

site **dkrz**	>
institution full name	German Climate Computing Center
webpage	http://www.dkrz.de/
nationality	DEU
energy	>
max power supplied	2 MW
pue	1.04
cost	>
initial costs	35 M$
supercomputer **Mistral**	>
network **Internet**	>
network **Infiniband**	>
network **Internal**	>
storage system **Lustre Phase1**	>
storage system **Lustre Phase2**	>
storage system **HPSS**	>

Network

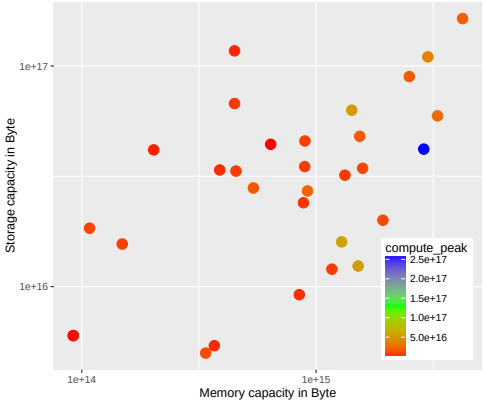


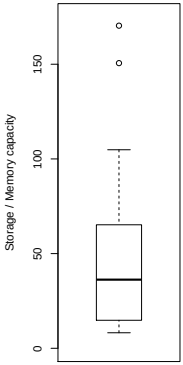
Demo

http://www.vi4io.org

Some More Analysis: Relationship Storage/Memory Capacity

- Correlation storage cap. vs.
  - memory capacity = 0.64
  - compute peak = 0.057
- Mean(storage/mem capacity) = 59





Agenda

Monday

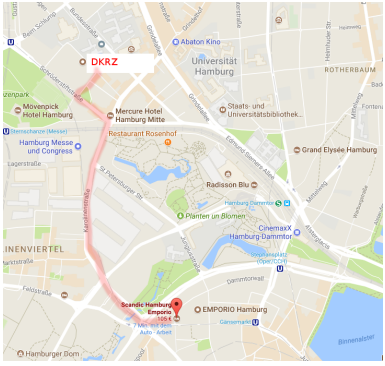
- Talks
- 12:00-13:00 *Lunch (sponsored)*
- Talks
- 15:00-15:30 *Break*
- Talks
- Discussion
- 18:00 *Guided tour*
- 19:00 *Social event*

Tuesday

- Talks
- 10:20-10:50 *Break*
- Talks
- 12:00-13:00 *Lunch*
- Talks
- Discussion
- 16:00 *Farewell*

Social Event

- Location: Scandic Hamburg Emporio, in walking distance
- When: 19:00
- How: We will walk to the location at 18:40 from Mercure Hotel
- Sponsored, excepted for stronger alcoholics (beer is OK)



Discussion

- A moderated discussion slot at the end of each day
- Add questions and relevant issues to our Google Doc
  Follow the discussion link under the agenda on the web page
- Don’t be shy ... add your thoughts!