

Capability

Julian Borrill – Overview

Tanu Malik – Data Management

Jonathan Woodring - Issues for Large-scale Data Analysis and a Primer on ParaView and VTK

Trey Roby - Success Stories in Software Reuse & UI Development

Matt Turk – Astrophysics-Aware Analysis/Viz using yt

Serge Monkewitz - qserv: Prototype of the Baseline LSST Database Architecture

Don Petravik – DESDM Capabilities

David Malon - A Particle Physics Data Perspective

Garth Gibson – Big Data Storage Systems & More



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CAPABILITY

HARDWARE

- MTBF
- File system error
- Accelerators / multicore many

I/O BANDWIDTH
reads vs. writes

COMM BANDWIDTH
Flash/SSD

MIDDLEWARE

Language / DSL
UPC / CHAPL ETC

Programming models
- CUDA / OPENMP / OPENCL
- MAPREDUCE } Acron SS
- THRUST / TBS }
Databases

MPI-IO / HDF5 / CFITSIO
- ADIOS / GLEW
MPI REVISIONS
- multilevel reduce

SOFTWARE

Developer Tools
FRAMEWORKS

APP CONVERGENCE

& RE-USE
& PERSISTENCE

IMPLEMENTATIONS
EG. VO

IN SITU
- data reduction

U.I.'S

WEB GWT | Indexing
FASTBIT
JES

Context

- Four major context areas
 - Cosmos Simulations
 - Computational capability & capacity
 - In situ & post-processing
 - Data serving
 - Scanning Observations
 - Computational capability & capacity
 - Imaging Observations
 - Pipeline processing
 - Data serving
 - Archives
 - Data serving

Hardware Issues & Possibilities

- Mean time between failure
 - Local check-pointing
- File system errors
- Architecture directions – heterogeneity & hierarchy
- Memory per core
- I/O bandwidth & latency (reads vs writes)
 - Flash/SSD (Gordon)
- Communication bandwidth & latency
- Network bandwidth

“Middleware” Issues & Possibilities

- Languages
 - UPC, Chapel et al
 - domain-specific
- Programming models
 - CUDA, OpenCL, Thrust, TBB, ArrayBB
 - Map-reduce
- Databases
 - SciDB
- Communication beyond MPI
- I/O libraries
 - MPI_IO, HDF5; Audios, Glean
- Orchestration layer

“Software” Issues & Possibilities

- Developer tools
- Frameworks
- Application convergence, re-use & persistence
- VO implementation
- User interfaces
- In situ data reduction
- Indexing
 - fastbit