SAND2011-2712C

DOECGF 2011 Site Report:

Site Name: Sandia National Laboratories

Site Division of Group: Scalable Analysis & Visualization (1461) & Scientific Applications and User Support (9326) and Scientific Computing System (9328)

Site Representative: W. Alan Scott (wascott@sandia.gov)

Site Address: Sandia National Laboratories, MS0822
PO Box 5800
Albuquerque, NM 87185

Group Mission:

Mission:

1461 Mission:
We provide the scientific community with innovative, leading-edge scalable analysis and visualization solutions that enable understanding of complex data. By collaborating directly with customers, we deliver targeted technologies that help them explore, understand, and communicate information.

9326 Mission:
The department provides user and application support in conjunction with Sandia's scientific, high performance computing environment.
The department provides and/or supports certain application-level software and expertise to applications to enable effective use of high performance computing technologies.
It provides user environments that enable the use of scientific computing, and it provides direct support to users of scientific computing.

9328 Mission:
We provide a range of services to support customers who solve large, complex engineering and science problems; visualize and interpret results; and manage and retain information.

Past Years Activities:

ParaView 3.8.1 development and deployment (80 repeat users per month)
ParaView 3.10.0 development and deployment (80 repeat users per month)
ParaView 3.10.1 development and deployment (80 repeat users per month)
EnSight 9.2.1(c) deployment (150 repeat users per month)
Provided direct and indirect visualization support for EnSight and ParaView users
Developed scalable I/O software solutions for VTK/ParaView.
Continued development of Titan framework.

Plans and Priorities:

Continue ParaView development
Continue direct and indirect visualization support
Deploy and support ParaView on Cielo

Group Funding:

Advanced Simulation and Computing (ASC), Data Visualization Science (DVS)
SciDAC-2
LDRD
CSRF
NGIC
ASCR Scientific Data Management and Analysis at Extreme Scale.

Group Resources:

Hardware platforms

Redsky:
Redsky provides interactive visualization, data analysis, and archival storage for unclassified output from compute nodes on Redsky, Glory and other institutional clusters. Redsky's visualization nodes presently consist of a 64 node partition of Redsky. Graphics rendering is done using software Mesa. Redsky consists of 2823 nodes, with each node made up of dual socket/ quad core chips, for a total of 22,584 cores – forming a 264 TFlop cluster. Each core has 1.5 GByte of memory, for a total of 33,876 GBytes of memory. 2PBytes of scratch data storage is attached to Redsky (combined, unclassified and classified systems).

Redsky-s:
Redsky-s provides interactive visualization, data analysis, and archival storage for classified output from compute nodes on Redsky-s, Unity, Whitney and other institutional clusters. Redsky's visualization nodes presently consist of a 16 node partition of Redsky-s. Graphics rendering is done using software Mesa. Redsky-s consists of 519 nodes, with each node made up of dual socket/ quad core chips, for a total of 4,152 cores – forming a 48 TFlop cluster. Each core has 1.5 GByte of memory, for a total of 6,228 GBytes of memory.

Black RoSE:
Black RoSE provides interactive visualization, data analysis, and archival storage for unclassified output from Redsky, Glory, and other institutional clusters. Black RoSE's visualization nodes presently consist of 132 HP XW9400 workstations, each with two nVidia FX3500 graphics cards, for a total of 264 graphics processors for parallel rendering. These workstations have dual-socket, dual-core 2.8 GHz Opteron processors, 8 GB of memory and are interconnected with Voltaire 4X double-data rate InfiniBand. Black RoSE has two Lustre file systems with a total

capability of 0.5 Petabytes and 24 GB/s to enable rapid access to terascale data sets for visualization and analysis.

Cielo:
Cielo Visualization is currently in development. ParaView, EnSight and VisIt will be supported.

MESA WIF VIEWS Corridor:
8-MegaPixels of onscreen real estate (3840x2160 pixels -- 4 times HD)
High-resolution screen driven by either Windows or Linux
Stereo visualization at 8 MP
3-tile ART Table for horizontal display (review of drawings, etc)

Client hardware support:
Linux, PC, and Macintosh desktops

Software:

EnSight 9.2
ParaView 3.10.1

Current Staff:

David Rogers (Mgr 1461)
- Patricia Crossno
- Nathan Fabian
- Ken Moreland
- Thomas Otahal
- Tim Shead
- Andrew Wilson
- Brian Wylie

Dino Pavlakos (Mgr 9326)
- Russ Adams
- Anthony Campisi
- John Greenfield
- Warren Hunt
- Lisa Ice
- David Karelitz
- Alan Scott

John Noe (Mgr 9328)
- Sophia Corwell
- Steve Monk

Growth/Expansion plans for upcoming year

Address scaling issues for interactive ParaView on Cielo
Address latency issues for interactive ParaView on Cielo
Continue to build in-situ visualization capabilities
    Integrate with Sandia simulation codes
    Partner with I/O experts to interface with staging capabilities