

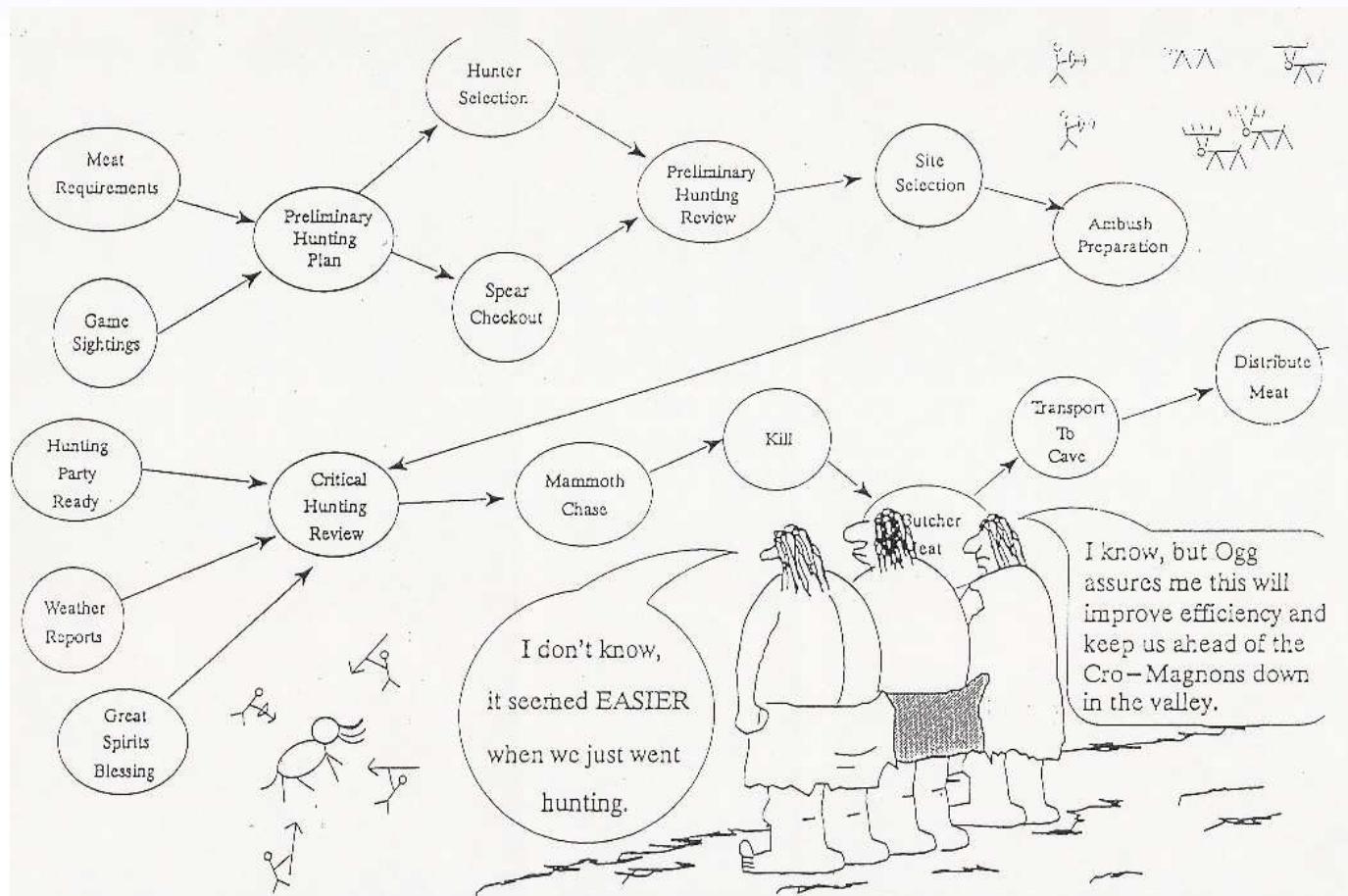
Staying Ahead of the Cro-Magnons: Managing High-Performance Computing Resources

Presented to participants of
NLIT Summit 2008 by
Heather Robideau, Sandia National Laboratories

May 2008



What?!?



WHY NEANDERTHAL MAN BECAME EXTINCT.



Getting Started . . .

Sandia High Performance Computing

Home Governance HPC / Vis Platforms Supporting Systems HERT Help RT

Logged in as: hrobide

Site Search:

WallClock Accuracy for hrobide

[View Actual Usage](#)

WallClock Accuracy for org: 09326

[View Actual Usage](#)

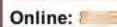
Jobs for hrobide

Here we display up to the minute information about running and queued jobs. You currently have no running or queued jobs on our monitored platforms.

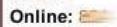
Consolidate
Info

Welcome to Sandia HPC!

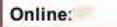
Thunderbird

Online:  Avail: 

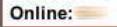
Rogue

Online:  Avail: 

Shasta

Online:  Avail: 

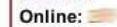
CEE-Matlab

Online:  Avail: 

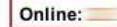
Spirit

Online:  Avail: 

Buzzard

Online:  Avail: 

BlackRose

Online:  Avail: 

Focused on the User

The teams who manage Sandia's computing resources are focused on and committed to creating a stellar user experience. To do so, we have come together in a united webspace, leveraging expertise and technology to create an organized, viable information and help resource. Using process methods outlined in [Operational Excellence](#), we will grow this web tool into a one-stop-shop for everything a user may require from any computing resource at Sandia National Laboratories.

Our inspiration for Sandia HPC came as Sandia's capacity and capability computing environment grew impressively over the past three years with the addition of ICC, NWCC, Thunderbird, and RedStorm. While we provided web sites for each of these clusters, the multiple URLs quickly became an undue burden to our user community whenever they wanted assistance or information. In reviewing our work processes, we found many users were unsure how to procure support, where to get useful information, or how to get accounts and start working on the clusters. It became clear that our users would benefit from a single web space that united all HPC and Visualization platform environments.

This site will provide valuable information on every HPC and visualization platform at Sandia National Laboratories, including how to get started using the resources, how to get help for questions or support issues, informational documentation about any given system, real-time status, and more. Everything will be uniformly formatted and organized, providing consistency and the

News

4/22/08 through 4/23/08 **Global**
SCN Capviz scheduled maintenance for Justice, Freedom, Redrose and Razor (/scratch1 only). Logins will be disabled on Justice, Freedom and Redrose.

Final phase of /home /projects upgrade for Justice, Freedom and Redrose. Update lustre software (affects /scratch1). Add 10 compute nodes to Justice

4/23/08 - **Decommission SRN ICC Capviz cluster Liberty.**

Liberty will be shut down due to end of life.

4/30/08 - **Decommission SCN ICC Capviz cluster Freedom.**

Freedom will be shut down due to end of life.

4/28/2008 - **SRN and SCN Capviz purge.**

Scheduled purge for the Capviz scratch file systems.



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Getting Started

Sandia High Performance Computing

Site Search:

Home Governance HPC / VII Platforms Supporting Systems HERT Help RT

Change Control Board

[Make a Platform Priority Request](#)

[Make a Node-limit Change](#)

News

4/22/08 through 4/23/08 [Global Capviz scheduled maintenance on Justice, Freedom, Redrose, and Razor \(/scratch1 only\). Log disabled on Justice, Freedom, and Redrose.](#)

Final phase of /home /project upgrade to Lustre, /home, Freedom, and Lustre software. Add 10 compute nodes.

[View All News](#)

Centralize!

Red Storm

Red Storm

NMCAC

NMCAC

Thunderbird

Thunderbird

Black RoSE

Black RoSE

Rogue

Rogue

CEE-Matlab

CEE-Matlab

Renegade

Renegade

Razor

Razor

ICC Shasta

ICC Shasta

NWCC Spirit

NWCC Spirit

NWCC Justice

NWCC Justice

NWCC Lassen

NWCC Lassen

Buzzard

Buzzard

Vulture

Vulture

Black RoSE (NM)

Black RoSE (NM)

Rogue (NM)

Rogue (NM)

Renegade (NM)

Renegade (NM)

Razor (NM)

Razor (NM)

Log in Node(s) Status:

alogin1: alogin2:

blogin1: blogin2:

clogin1: clogin2:

dlogin1: dlogin2:

Log in Node(s) Status:

blackrose1: blackrose2:

Log in Node(s) Status:

rogue:

Log in Node(s) Status:

Renegade:

Log in Node(s) Status:

Razor:

Centralize!

Centralize! for the Centralized scratch file systems.

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Inclusion of Usage Estimation Tool

Sandia High Performance Computing

[Home](#)[Governance](#)[HPC / Vis Platforms](#)[Supporting Systems](#)[HERT](#)[Help](#)[RT](#)[HERT](#)[Current Usage Estimates](#)[Completed Usage Estimates](#)[Codes](#)[Work Objectives](#)[Reports](#)[Docs](#)[Home](#) » [HERT](#)

HERT

What is HERT?

- It is the HPC (High Performance Computing) Estimations & Requirements Tool
- It captures estimates of future HPC system usage from users
- It allows users to specify urgency and importance
- It organizes and reports this data
- It is tied directly to HPC system queues and job schedulers

Getting Started

Create a HPC Usage Estimate - [New Usage Estimate](#)

Getting Help

Any questions, needs, or concerns regarding HERT should be emailed directly to: hert-dev@sandia.gov.

More Information

Please visit our Documentation page: [HERT Documentation](#).



Enter "New Usage Estimate"

Home » HERT » Usage Estimates » New

New Usage Estimate

(* denotes required field)

Title *

I/O Library Conversion

Description *

Replace the parallel I/O libraries developed by Sandia (PDS/FIO) with parallel HDF5 and/or MPI-IO.

Classification *

Unclassified:

Classified:

External(NMCAC):

Class *

Capability:

Capacity:

Project/Task *

103725/20.01.01

This section is work related, not funding related, please select the following as best you can.

If you need assistance with your selection please contact us at hert-admin@sandia.gov.

SMU *

Nuclear Weapons

Work Objective *

ASC Facility Operations & User Support-Platforms and Environment

Work Package *

User Support Services

Code(s) *

IOR

[Add another code](#)

Monthly Runs: *

Note: Only enter estimates for this Fiscal Year. All others will be deleted.

Month	Runs	Processors	Hours	Processor Hours
April	1008	10	512	2.0
May	2008	10	512	2.0

[Add another set of runs or additional month\(s\)](#)



Workload
Characterization

Estimates
by month



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View Usage Estimate

Used data to defer milestones

07 data led directly to 08 HPC procurements

[Home](#) » [HERT](#) » [Usage Estimates](#) » [I/O Library Conversion](#)

I/O Library Conversion

HERT Estimate Identifier 2190

SPOC Considered?	No
Title	I/O Library Conversion
Description	Replace the parallel I/O libraries developed by Sandia (PDS/PIO) with parallel HDF5 and/or MPI-IO.
Classification	Unclassified
SMU	Nuclear Weapons
Work Objective	ASC Facility Operations & User Support-Platforms and Environment
Work Package	User Support Services
Project/Task	103725/20.01.01
P/T SMU	NW
P/T Description	USER SUPPORT SERVICES
Code(s)	<input type="checkbox"/> IOR

Processor Hours

Month	Runs	Processors	Hours	Processor Hours
4/2008	10.0	512.0	2.0	10,240.0
5/2008	10.0	512.0	2.0	10,240.0
Total				20,480.0

Class Capacity

Machine N/A

Additional Users N/A

High Importance Request N/A

Comment N/A

Milestone N/A

Created By Heather Robideau

Created Date April 30, 2008 14:21



Management Involvement

Home » HERT » Reports » SPOC Considered Estimates

SPOC Considerations

Classification: Classified Unclassified All

Class: Capacity Capability All

Completed: Yes No All

Valid For Range:

Start: Month: 4 Year: 2008

End: Month: 4 Year: 2008

[Generate Report](#) [Get Report in CSV](#)

[Update Priorities](#)

Note: Max Proc Count represents the maximum number of processors an estimate will use on the platform.

Priority	Title	Total Processor Hours	Time Frame	Work Objective	Work Package	Capability	Milestone	Max Proc Count	Requestor	SPOC Consideration
35	SGT crash simulations	3,000,000.0	Nov 2007 - Jun 2008	ASC Computational Systems & Software Environment	L2 Milestone (FY08) Deliver post-processing tools that enable verification & validation of FY08 simulations	Yes	N/A	2500		Demote
36	3D ALEGRA radiation magnetohydrodynamics simulations of wire array z-pinch implosions for ICF applications	576,000.0	Apr 2008	Inertial Confinement Fusion (ICF) Ignition & High Yield Campaign	ICF Ignition and High Yield	Yes	N/A	600		Demote
1	Testing Aleph: plasma sheath simulations and arc modeling	480,000.0	Nov 2007 - Dec 2008	ASC Physics and Engineering Models	P&EM Other	No	N/A	100		Demote
22	First Principle Simulation of Electromagnetic Pulse	432,000.0	Jan 2008 - Sep 2008	ASC Computational Systems & Software Environment	L2 Milestone (FY08) Deliver post-processing tools that enable verification & validation of FY08 simulations	Yes	N/A	1500		Demote

Legend

Classified	Denoted by pink background and bold text
Capability	Runs on ASC Red Storm
Small Black/Red	Fits estimates above the solid green line
Large Black/Red	Fits estimates above the solid blue line
Jumbo Black/Red	Fits estimates above the solid red line
Capacity	Runs on any other machine
Capacity Line of Demarcation:	Fits estimates above the solid green line

Sandia
Platform
Oversight
Committee



Reports

Home » HERT » Reports » SPOC Considered Estimates

SPOC Considerations

Classification: Classified Unclassified All

Class: Capacity Capability All

Completed: Yes No All

Valid For Range:

Month: 4 Year: 2008

Month: 4 Year: 2008

Requests above the
green line can be
met; those below
cannot be met

Legend

Classified	Denoted by pink background and bold text
Capability	Runs on ASC Red Storm
Small Black/Red	Fits estimates above the solid green line
Large Black/Red	Fits estimates above the solid blue line
Jumbo Black/Red	Fits estimates above the solid red line
Capacity	Runs on any other machine
Capacity Line of Demarcation:	Fits estimates above the solid green line

Report Get Report in CSV

Priorities

Proc Count represents the maximum number of processors an estimate will use on the platform.

Request ID	Total Processor Hours	Time Frame	Work Objective	Work Package	Capability	Milestone	Max Proc Count	Requestor	SPOC Considered?
1	432,000.0	Jan 2008 - Sep 2008	ASC Computational Systems & Software Environment	L2 Milestone (FY08) Deliver post-processing tools that enable verification & validation of FY08 simulations	Yes	N/A	1500		Demote
2	200.0	Dec 2007 - Sep 2008	Inertial Confinement Fusion (ICF) Ignition & High Yield Campaign	ICF Ignition and High Yield	Yes	N/A	100		Demote
35	3,000,000.0	Nov 2007 - Jun 2008	ASC Computational Systems & Software Environment	L2 Milestone (FY08) Deliver post-processing tools that enable verification & validation of FY08 simulations	Yes	N/A	2500		Demote
39	360,000.0	Sep 2007, Dec 2007 - Aug 2008	ASC Integrated Codes-Code Development and Applications	L2 Milestone (FY08) Predictive failure capabilities in SIERRA mechanics	Yes	N/A	3000		Demote



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It HERTs so Good . . .

- Most important points:
 - This software is helping users, system administrators, & managers to organize, prioritize, and submit jobs to all high-performance computing systems
 - We, SNL, are using HERT as a prototype to tie compute requirements directly to management of machine resources via interfaces provided by the Moab Cluster Software suite
 - HERT reports are being used as prototype of job accounting summaries from job usage databases (Gold, AIRS)
 - Management is able to identify work that is getting done, as well as work that is NOT getting done!





Questions?

- For more information:
 - Heather Robideau
 - hrobide@sandia.gov
 - 505-845-8145
 - (1-800-41-SANDIA X8458145)
 - <http://www.sandia.gov>

