

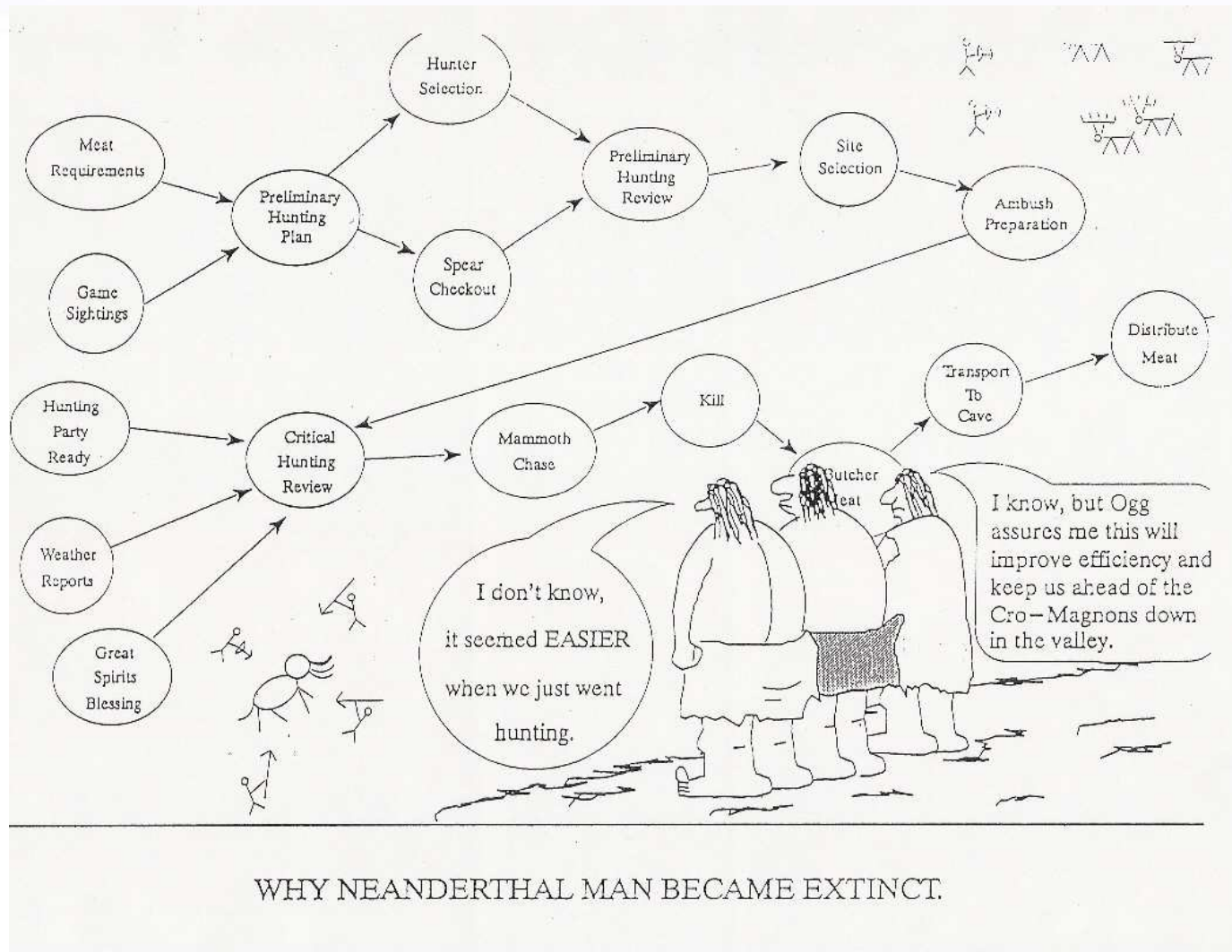
Staying Ahead of the Cro-Magnons: Managing High-Performance Computing Resources

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

May 2008



What?!?



Getting Started...

Sandia High Performance Computing

Logged in as: hrobide

[Home](#)[Governance](#)[HPC / Vis Platforms](#)[Supporting Systems](#)[HERT](#)[Help](#)[RT](#)

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.

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 web space, 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 progressively 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 even 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.

Consolidate
Info

Getting Started


Sandia High Performance Computing

Home Governance **HPC / Vis Platforms** Supporting Systems HERT Help RT

Site Search:


- Red Storm
- NMCAC
- Thunderbird
- Black RoSE
- Rogue
- CEE-Matlab
- Razor
- ICC Shasta
- NWCC Spirit
- NWCC Justice
- NWCC Lassen
- Buzzard
- Vulture

Black RoSE (NM)




Login Node(s) Status:
blackrose1: ■ blackrose2: ■

Rogue (NM)




Login Node(s) Status:
rogue: ■

Renegade (NM)



Login Node(s) Status:
Renegade: ■

Razor (NM)



Login Node(s) Status:
Razor: ■

Change Control Board

- [Make a Platform Priority Request](#)
- [Make a Node-Limit Change](#)

News

4/22/08 through 4/23/08 Glo
Capviz scheduled mainten
Justice, Freedom, Redrose
Razor (/scratch1 only). Log
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Redrose.
Final phase of /home /proje
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ach file systems.

Centralize!



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/PIO) 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 2008	10	512	2.0	10240.0	remove
May 2008	10	512	2.0	10240.0	remove

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

⇒ Workload
Characterization

⇒ Estimates
by month



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) ☐ 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

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

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

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

effect of RedStorm Swing different than current

Report

Get Report in CSV

priorities

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

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

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

Estimate	Total Processor Hours	Time Frame	Work Objective	Work Package	Capability	Milestone	Max Proc Count	Requestor	SPOC Considered?
st Principle mulation of ctromagnetic lse	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
ulsed Power HEDP code development, testing, and employment.	200.0	Dec 2007 - Sep 2008	Inertial Confinement Fusion (ICF) Ignition & High Yield Campaign	ICF Ignition and High Yield	Yes	N/A	100		Demote
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
Presto pervasive failure ASC level 2 milestone	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



Sandia
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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>

