

ASC PSAAP Alliances Computing at Sandia National Laboratories

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Sandia Computing Resources



Redsky



Clusters at Sandia

<https://computing.sandia.gov/platforms>



Glory
&
Unity



Blackrose
&
Redrose

System	Project	Type	Vendor	Network	Location	Nodes/Cores	Processor	OS	Interconnect	RAM/Node	TFlops	Processor Hrs/Yr	GA Date
Red Mesa	ECIS	Capacity	Sun	ECN	SNL-NM	1,920/ 15,360	2.93 GHz Intel Nehalem QC quad processors	RHEL 5	Infiniband	12 GB	180	134,553,600	May-2010
Ebird	All	Capacity	Dell	ECN	SNL-NM	383/ 766	Dual 3.6 GHz Intel EM64T quad processors	RHEL 5	Infiniband	6 GB	5.5	6,710,160	Feb-2011
Talon	All	Capacity	Dell	SON	SNL-CA	128 /256	3.6 GHz Intel Xeon	RHEL 5	Infiniband	6 GB	1.85	2,242,560	Nov-2010
Red Sky	All	Capacity	Sun	Unclassified	SNL-NM	2,823/22,584	2.93 GHz Intel Nehalem QC quad processors	RHEL 5	Infiniband	12 GB	264	197,835,840	Apr-2010
Glory	NW	Capacity	Appro	Unclassified	SNL-NM	272 / 4352	2.2 GHz AMD Quad Core quad processors	RHEL 5	Infiniband	32 GB	38	38,123,520	Jan-2009
Blackrose	All	Viz	Dell	Unclassified	SNL-NM	128 / 512	2.8 GHz AMD dual core dual processors	RHEL 4	Infiniband	8 GB	2.8	4,485,120	Mar-2007
Goodyear	All	CEE	HP	Unclassified	SNL-NM	8 / 64	2.3 GHz AMD Quad Core	SuSE Linux	Infiniband	16 GB	0.57	560,640	Dec-2008
Tunnison	All	Capacity	HP	Unclassified	SNL-CA	190 / 380	3.4 GHz EM64T Xeon dual core	RHEL 5	Myrinet	2 GB	2.6	3,328,800	Aug-2010
Red Storm	NW	Capability	Cray	Classified	SNL-NM	9,600 / 31,680	6,240 2.2 GHz AMD Quad Core 3,360 2.4 GHz AMD Dual Core	SuSE Linux & Catamount	Cray SeaSTAR	2 GB / core	284	277,516,800	Mar-2007
Red Sky-S	All	Capacity	Sun	Classified	SNL-NM	519 / 4152	2.93 GHz Intel Nehalem QC quad processors	RHEL 5	Infiniband	12 GB	48	36,371,520	Nov -2010
Unity	NW	Capacity	Appro	Classified	SNL-NM	272 / 4352	2.2 GHz AMD Quad Core quad processors	RHEL 5	Infiniband	32 GB	38	38,123,520	Mar-2009
Whitney	NW	Capacity	Appro	Classified	SNL-CA	272 / 4352	2.2 GHz AMD Quad Core quad processors	RHEL 5	Infiniband	32GB	38	38,123,520	Mar-2009
Redrose	All	Viz	Dell	Classified	SNL-NM	264 / 528	3.6GHz Xeon dual core dual processors	RHEL 4	Infiniband	4 GB	3.8	4,625,280	June-2006



Sandia
National
Laboratories

Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000. SAND N0.

SNL Glory Configuration



Standard Tri-lab TLCC cluster from Appro

- 38 TFlops peak
- 272 compute nodes or 4,352 processor cores (16 cores/node)
- CPU: 2.2 GHz AMD quad socket/quad core processors
- Memory: 32 GB DDR2 RAM per node; 8.7 TB RAM total
- Interconnect: Infiniband with OFED stack
- Two login nodes: **glogin1, glogin2**
- Note maximum wallclock time **up to 96 hours**

Usage

- ASC resource
- 10% allocation for PSAAP

Accounts and Access

■ Account Requests

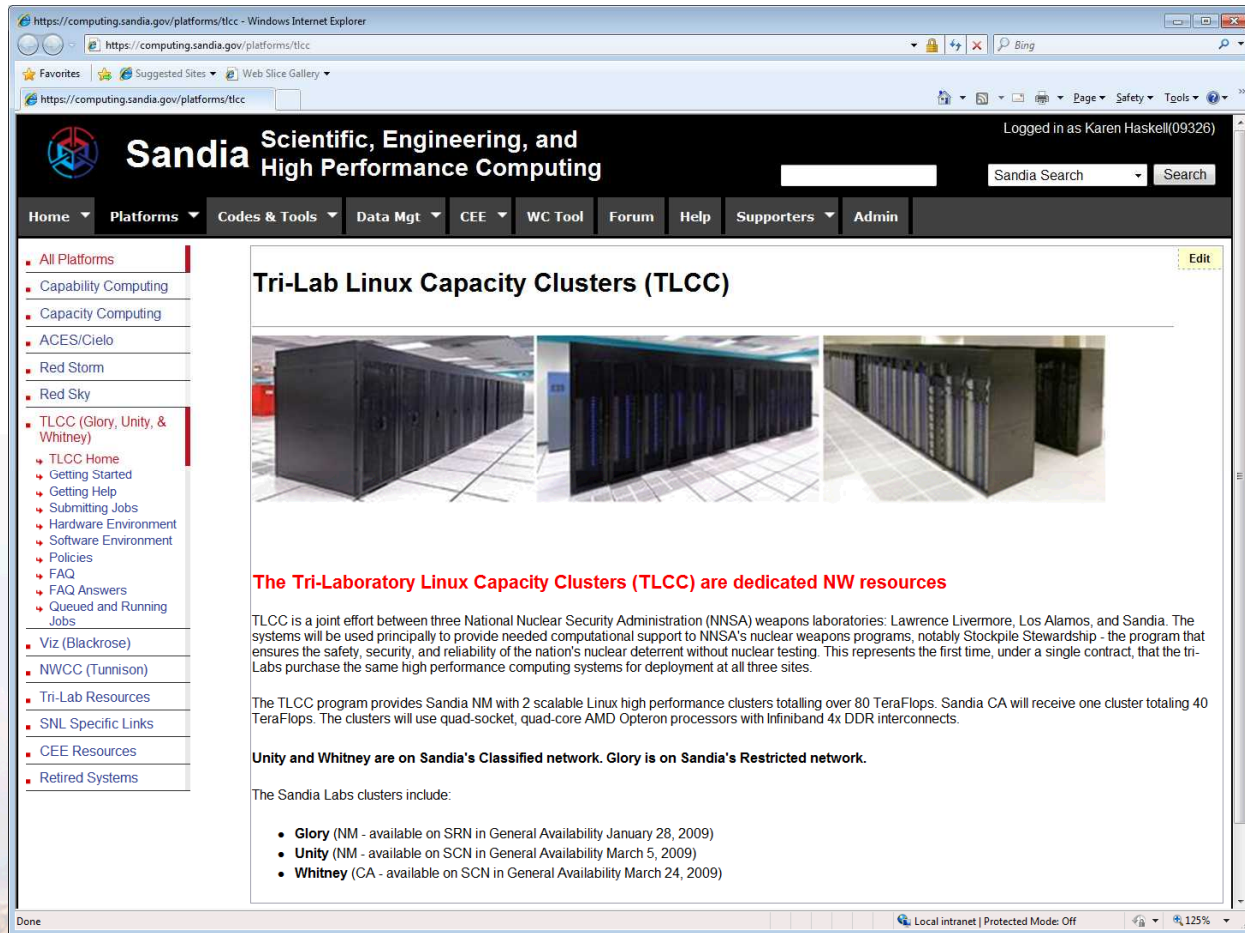
- Through SARAPE at <http://sarape.sandia.gov>
- Request “SRN Capacity Clusters (Glory)”
- You will get a Sandia username and cryptocard

■ Accessing Glory on the SRN at Sandia

- Connect to Sandia Secure Restricted Network (SRN) via gateway:
`ssh <username>@srngate.sandia.gov`
- Read the “WARNING NOTICE TO USERS” message; then enter your cryptocard password
- From Welcome menu, select “3” to Acquire kerberos credentials
- Then enter “2” to establish an `ssh` connection
- Enter Glory login system name: `glogin1` or `glogin2`
- A WC ID is required to run batch jobs; request WC ID from your Sandia CRT, and use it as your “account” for batch jobs

Documentation and Help

- For documentation: <https://computing.sandia.gov/platforms/tlcc>



The screenshot shows a web browser window displaying the Sandia Scientific, Engineering, and High Performance Computing website. The page is titled "Tri-Lab Linux Capacity Clusters (TLCC)". The left sidebar contains a navigation menu with links to "All Platforms", "Capability Computing", "Capacity Computing", "ACES/Cielo", "Red Storm", "Red Sky", "TLCC (Glory, Unity, & Whitney)", "Viz (Blackrose)", "NWCC (Tunnison)", "Tri-Lab Resources", "SNL Specific Links", "CEE Resources", and "Retired Systems". The main content area features three images of server racks and a detailed description of the TLCC program, including its purpose, the participating laboratories (Lawrence Livermore, Los Alamos, and Sandia), and the specific clusters (Glory, Unity, and Whitney) available for use.

Tri-Lab Linux Capacity Clusters (TLCC)

The Tri-Laboratory Linux Capacity Clusters (TLCC) are dedicated NW resources

TLCC is a joint effort between three National Nuclear Security Administration (NNSA) weapons laboratories: Lawrence Livermore, Los Alamos, and Sandia. The systems will be used principally to provide needed computational support to NNSA's nuclear weapons programs, notably Stockpile Stewardship - the program that ensures the safety, security, and reliability of the nation's nuclear deterrent without nuclear testing. This represents the first time, under a single contract, that the tri-Labs purchase the same high performance computing systems for deployment at all three sites.

The TLCC program provides Sandia NM with 2 scalable Linux high performance clusters totalling over 80 TeraFlops. Sandia CA will receive one cluster totaling 40 TeraFlops. The clusters will use quad-socket, quad-core AMD Opteron processors with Infiniband 4x DDR interconnects.

Unity and Whitney are on Sandia's Classified network. Glory is on Sandia's Restricted network.

The Sandia Labs clusters include:

- **Glory** (NM - available on SRN in General Availability January 28, 2009)
- **Unity** (NM - available on SCN in General Availability March 5, 2009)
- **Whitney** (CA - available on SCN in General Availability March 24, 2009)

Software Environment

■ Standard TOSS software stack based on Red Hat Linux

- PGI, Intel, and gnu compilers
- OpenMPI and MVAPICH

■ Modules

- Basic software environment and optional software are controlled using modulefiles
- A default environment is loaded for the user: PGI compilers and OpenMPI
- To see what is currently loaded: `module list`
- To see what is available: `module avail`
- To add to the environment: `module load <modulefile>`
- To change the environment: `module swap <module1> <module2>`

■ SLURM and Moab Batch Submission

- Example submission scripts can be found in `/home/samples/tlcc` directories

File Systems

File System	Description	Backup?	Purge?
/home directories	NFS mounted; 5 GB quota	Yes	No
Parallel filesystem /gscratch2	Lustre; no quotas	No	Yes
/storz	Sun hardware/software solution	No	No

Archive storage

- Users can archive files to Sandia Mass Storage System (SMSS)
- Sign up for SMSS via sarape.sandia.gov, and choose “Restricted Sandia Mass Storage System (RSMSS)”
- Documentation at

https://computing.sandia.gov/data_management/smss



ECN Ebird



- **Ebird is a portion of the old Tbird cluster, re-deployed on the Sandia External Collaborative Network (ECN)**
- **Hardware configuration**
 - 5.5 TFLOPS
 - 383 nodes (766 total cores)
 - Dual 3.6 GHz Intel EM64T processors
 - 6 GB RAM per node (3 GB per core)
 - InfiniBand high-speed interconnect
- **Resource available to approved foreign nationals**
- **If you are interested in getting an account, please contact me (khaskel@sandia.gov)**



Support



- **Sandia HPC OneStop Portal at <https://computing.sandia.gov>**
 - Notices and Alerts
 - FAQs
 - Software and Hardware documentation

- **Contact HPC OneStop Service Desk**
 - By phone: (505)845-2243 Option 8, or (505)844-9328
 - By email: HPC-Help@sandia.gov
 - Webform: at <https://computing.sandia.gov/help>