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Running programs on WestGrid clusters

Chen Lab Bioinformatics Tools Workshop

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WESTGRID

- WestGrid is a consortium involving 14 universities of western Canada British Columbia, Alberta, Saskatchewan, Manitoba.
- WestGrid provides high performance computing resources to researchers.

<http://www.westgrid.ca/>

Creating an Account on Westgrid

- Connect to this website:
 - <https://rsg.nic.ualberta.ca/>
 - Dr. Chen's Project id : 200071
 - Use your SFU email address

WestGrid Clusters

- **Glacier , Robson**

- Small memory serial jobs
- Undemanding parallel jobs

- **Cortex , Nexus**

- Open-MP (Open Multi-Processing) based parallel jobs

- **Bugaboo, Checkers, Orcinus , Matrix**

- MPI(Message Passing Interface)-based parallel jobs requiring high performance interconnect

WestGrid Clusters

- **Glacier**

- 840 computational nodes
 - (each with two 3.06 GHz Intel Xeon 32-bit processors)
 - 2-4 gb of RAM

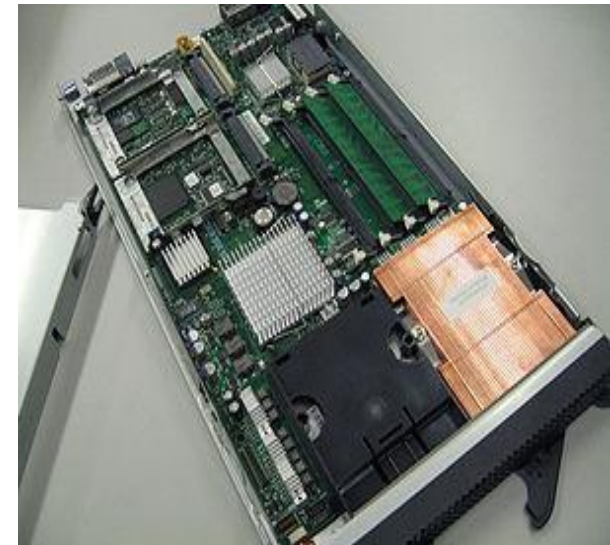
<http://www.westgrid.ca/support/quickstart/glacier>

- **Bugaboo**

- Contains 1280 cores
 - 10 Chassis
 - Each containing 16 blades (each containing 2 Intel Xeon E5430 quad-core processor, running at 2.66 GHz)
 - Each blade has 16 gb of RAM shared among 8 cores



www.chem.ubc.ca/research/westgrid.shtml



http://en.wikipedia.org/wiki/Blade_server

Bugaboo Cluster

File System	Size	Quota(per user)	Backup policy
/home	115 TB	300 GB	Daily backup
/global/scratch	200 TB	1 TB	No backup

/home : User's home directory

/global/scratch/ : Temporary storage directory

<http://www.westgrid.ca/support/quickstart/bugaboo>

PBS & Torque

- PBS: Portable Batch System
 - Job scheduler
 - Allocates computing resources to batch jobs
- Torque (used on WestGrid clusters)
 - Open source distributed resource manager supporting PBS operations
 - Terascale **O**pen-Source **R**esource and **Q**UEue Manager
 - Improvement over OpenPBS
 - Supported and Maintained by [Cluster Resources Inc](#)

Running a single serial job on Westgrid Clusters

- You need to have a pbs file to submit your job to the cluster.
- Pbs file contains all instructions necessary to run your job
- To submit a job to the cluster
 - Type: “qsub example.pbs”

```
#!/bin/bash
#PBS -S /bin/bash
# Script for running serial program, test.pl, on bugaboo
cd /global/home/buyar/scripts
echo "Current working directory is `pwd`"
echo "Starting run at: `date`"
perl test.pl 0 # reference to your executable
echo "Job finished with exit code 0 at: `date`"
```

http://www.westgrid.ca/support/quickstart/new_users

Running multiple serial jobs on multiple nodes

- Create a pbs file for each job
- Submit all pbs files using qsub
- Torque resource manager will assign the jobs to multiple nodes according to the availability of resources

Useful commands

- `qsub job.pbs`
 - Submit a batch job to the cluster
- `qsub -l walltime=hh:mm:ss job.pbs`
 - Declare the time required by the job
- `showq -u username`
 - Display status of your jobs
- `qdel jobid`
 - Delete the job with id 'jobid' from the queue
- `gcp`
 - For efficient transfer of files between westgrid clusters. You need to get a certificate first
 - Type “`myproxy-init -c 0 -s myproxy.westgrid.ca`”
 - Using the westgrid password , you can get a proxy certificate to use this command
- `more /var/spool/mail/username`
 - Display messages sent to you regarding your jobs