

# New and Existing Resources Available at SciNet

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SciNet HPC Consortium

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# Systems at SciNet

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Jan 2009

**TCS**

3264 cores

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3264 cores Tightly Coupled System

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**GPC**

30240 cores

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Feb 2013	<b>Sandy</b>	1216 cores	User-contributed Sandybridge cluster

# Types of Processors

- IBM Power:  
**TCS, P7, BGQ**
- Intel x86:  
**GPC, Sandy**
- NVidia cards:  
**ARC, Gravity**

# Types of Operating Systems

- Linux (CentOS)
- AIX
- CNK

# Types of Memory Configurations

- Low memory per core: 1GB/core
- Regular memory per core: 2GB/core
- More memory per core: 4GB/core
- Large memory per core: 8GB/core

# Types of Job Schedulers: Moab/Torque

```
#!/bin/bash
# MOAB/Torque submission script for SciNet GPC
#
#PBS -l nodes=2:ppn=8,walltime=1:00:00
#PBS -N test

# load modules (must match modules used for compilation)
module load intel openmpi

# DIRECTORY TO RUN - PBS_O_WORKDIR is directory job was
cd $PBS_O_WORKDIR

# EXECUTION COMMAND; -np = nodes*ppn
mpirun -np 16 ./a.out
```

# Types of Job Schedulers: LoadLeveller

```
#@ initialdir = SCRATCH/SOMEDIRECTORY
#@ executable = athena
#@ tasks_per_node = 64
#@ node = 3
#@ wall_clock_limit= 12:00:00
#@ notification = complete
#@ job_type = parallel
#@ class = verylong
#@ node_usage = not_shared
#@ rset = rset_mcm_affinity
#@ mcm_affinity_options = mcm_distribute mcm_mem_req mcm
#@ cpus_per_core=2
#@ task_affinity=cpu(1)
#@ environment = COPY_ALL; MEMORY_AFFINITY=MCM; MP_SYNC_
# MP_RFIFO_SIZE=16777216; MP_SHM_ATTACH_T
# ...
#@ queue
```

# TCS

## 3264 cores Tightly Coupled System

mem/core	cores/node	mem/node	nodes
4GB	32	128GB	100
8GB	32	256GB	2

- Power 6 chip at 4.7GHz
- OS: AIX
- Compilers: xlf/xlc
- Endianness: big
- Network: IB (4xDDR)
- Job submission: LoadLeveler



# P7

## 160 cores IBM Power 7 Cluster

mem/core	cores/node	mem/node	nodes
4GB	32	128GB	8

- Power 7 chip at 3.3GHz
- OS: Linux
- Compilers: xlf/xlc (also gcc)
- Endianness: big
- Network: IB (2xDDR)
- Job submission: LoadLeveler





# BGQ

40960 cores SOSCIP BlueGene/Q

mem/core	cores/node	mem/node	nodes
1GB	16	16GB	2560

- A2 chip at 1.6GHz
- OS: CNK
- Compilers: xlf/xlc (also gcc)
- Endianness: big
- Network: Proprietary 5d torus
- Job submission: LoadLeveler



## 30240 cores General Purpose Cluster

mem/core	cores/node	mem/node	nodes
2GB	8	16GB	3756
4GB	8	32GB	84
8GB	16	128GB	2
4GB	16	64GB	76 (Sandy)

- Intel Nehalem at 2.53GHz, Sandybridge at 2.0GHz
- OS: Linux (CentOS)
- Compilers: icc (also gcc)
- Endianness: little
- Network: IB (DDR, QDR)
- Batch Jobs: Moab/Torque



## 7168 cores Accelerator Research Cluster w/GPUs

mem/core	cores/node	mem/node	nodes
6GB	8	48GB	8
13MB	2x448	2x6GB	

- Nvidia M2070
- OS: Linux (CentOS)
- Compilers: nvcc, pgi
- Endianness: little
- Network: IB (DDR)
- Batch Jobs: Torque



# Gravity

50176 cores User-contributed, gravity research, w/GPUs

mem/core	cores/node	mem/node	nodes
$2\frac{2}{3}$ GB	12	32GB	49
12MB	2x512	2x6GB	

- Nvidia M2090
- OS: Linux (CentOS)
- Compilers: nvcc, pgi
- Endianness: little
- Network: IB (DDR)
- Batch Jobs: Torque/Moab



# Access

- GPC: Default
- TCS: Ask and motivate
- P7: Ask and motivate
- ARC/Gravity: Ask
- Sandy: Default
- BGQ: Apply to SOSCIP.

# Quickstarts

GPC: [http://wiki.scinethpc.ca/wiki/index.php/GPC\\_Quickstart](http://wiki.scinethpc.ca/wiki/index.php/GPC_Quickstart)

TCS: [http://wiki.scinethpc.ca/wiki/index.php/TCS\\_Quickstart](http://wiki.scinethpc.ca/wiki/index.php/TCS_Quickstart)

P7: [http://wiki.scinethpc.ca/wiki/index.php/P7\\_Linux\\_Cluster](http://wiki.scinethpc.ca/wiki/index.php/P7_Linux_Cluster)

ARC: [http://wiki.scinethpc.ca/wiki/index.php/GPU\\_Devel\\_Nodes](http://wiki.scinethpc.ca/wiki/index.php/GPU_Devel_Nodes)

Gravity: <http://wiki.scinethpc.ca/wiki/index.php/Gravity>

Sandy: <http://wiki.scinethpc.ca/wiki/index.php/Sandy>

BGQ: <http://wiki.scinethpc.ca/wiki/index.php/BGQ>

# Questions?