MARCC: Cutting Edge Technology for Data-Intensive Computing

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2015 IDIES Annual Symposium

Last year (2014)

Site Work/October 2014

Module Buil/test/Oct 2014

Loading Modules/Oct 2014

Air handlers/Nov 2014

Chillers/Nov 2014

Assembling/Dec 2014

February/March 2015

MARCC/Feb-2015

IT Stack/2/19/15

IT Stack/2/19/15

Hard Drives 2/19/15

Hard Drive Installation

Row of racks /3/2015

Cabling nodes/3/2015

Final checking

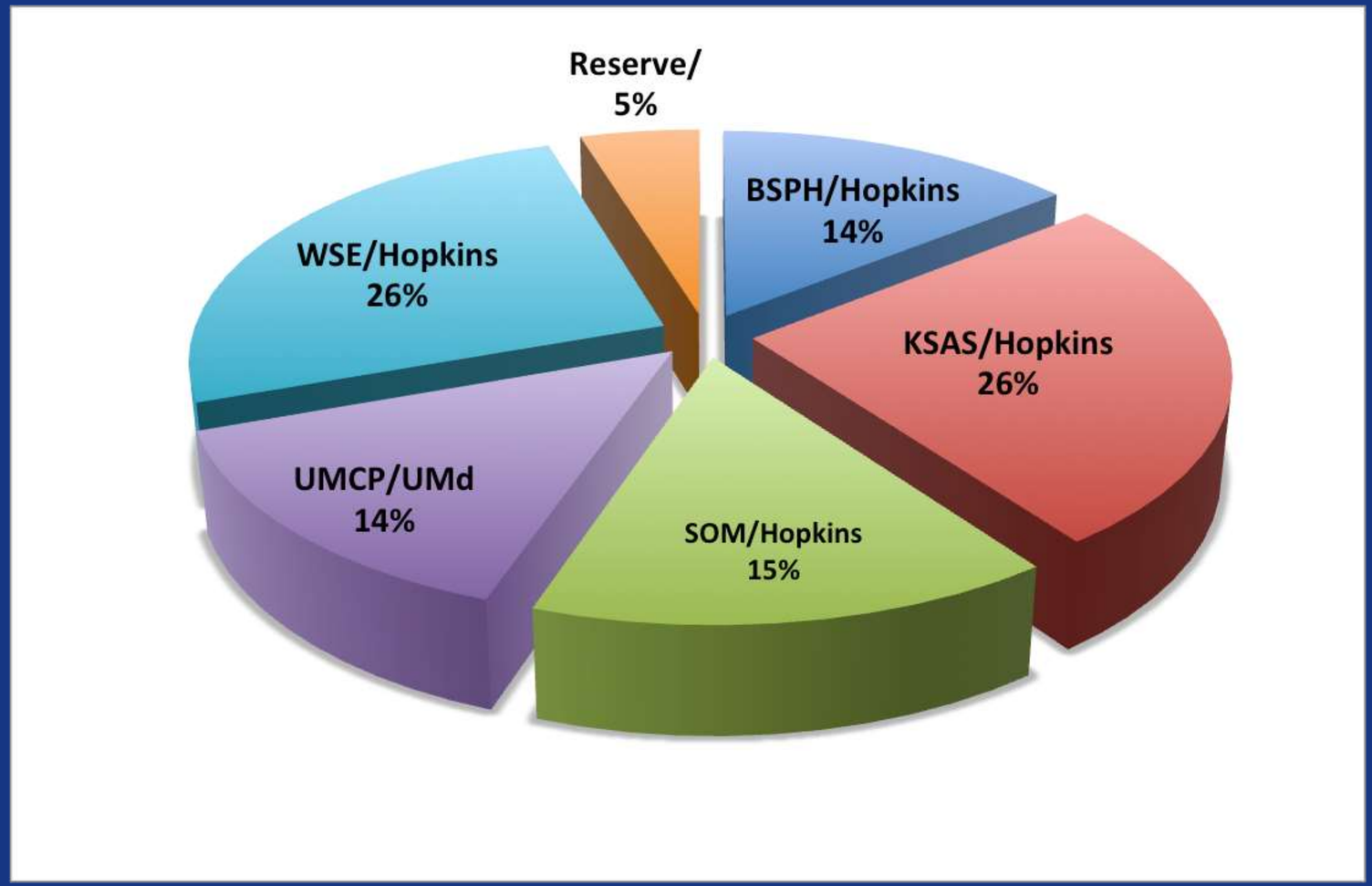
April/May 2015

Final Configuration

Count	Description
648	Compute nodes, 128GB RAM, 24 cores, 2.5GHz Haswell processors
50	Large memory nodes, 1024 GB RAM, 48 cores
48	GPU nodes, 2 Nvidia K80 GPUs/node, 24 CPU cores
2 PBytes	High Performance File System (Lustre)
15 Pbytes	ZFS File System
RPeak ~900 TFLOPs, RMax=475 TFLOPs (top 10 US universities)	

Allocation Model/School

- Approx 19,000 cores and 20 Petabytes



KSAS:10 M Quarter

WSE: 10M/Q

SOM: 6 M/Q

PH: 6 M/Q

UMCP: 6 M/Q

Reserve: 1.8 M/Q

Allocation Process

- Ask Faculty (form, proposal)
- 1 node, 24 cores, about 50,000 Hours
- Period, 3 months (quarterly)
- Evaluate requests and time available
- Allocations for first quarter (experiment)
- Schools allowed to over allocate 20%
- Stress: Resources are limited

Test Period

- End of May, 2015
  - Early adopters
  - Everybody
- Modules to maintain software
- SLURM (testing and adjusting)
- Storage allocations (testing)
- Fix many small issues

Batch Queues

Partition	Time Limit	Max cores	Features
Shared	7 days	24	shared nodes
Parallel	7 days	unlimited	Dedicated nodes
Unlimited	No limit	24	shared nodes
GPU	Shared	no limit	dedicated
lrgmem	7 days	48 cores	shared nodes
Debug	5 hours		
scavenger	12 hours	unlimited	pre-emptable

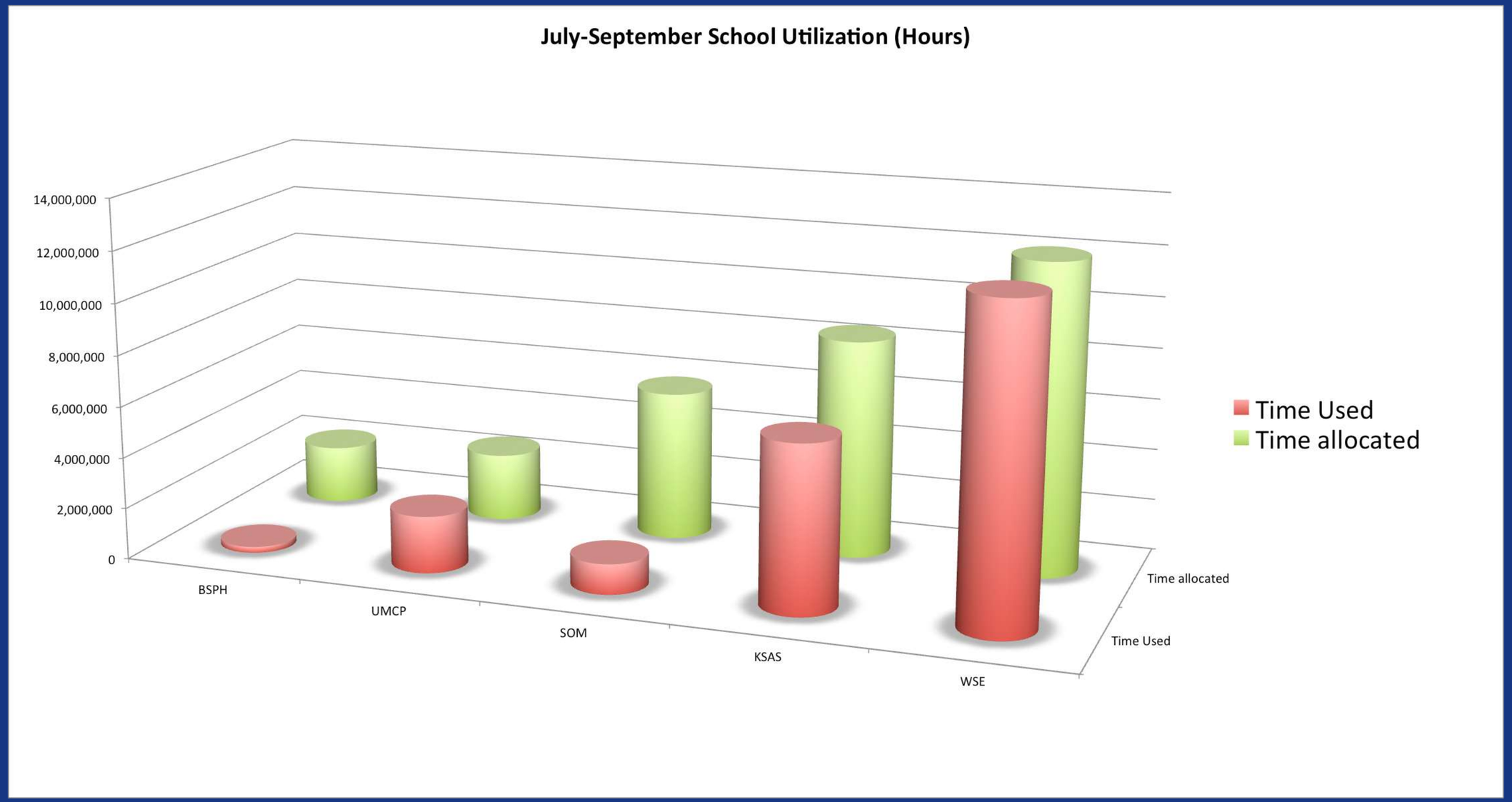
Production

- July 1, 2015
- Training sessions
  - Basic Linux and Introduction to MARCC
  - Introduction to MARCC (250 participants)
  - Code optimization tips
  - Basic Matlab
  - MARCC Clinics (walk-in)
  - MARCC day (early Winter)

Metrics/Success Factors

Research Groups PIs	134
User Accounts	478
Training	250+ users
Scientific Applications	174 (Unique)
Wall-Time used July-Sept	23,907,240
Downtime	14 days
Number of Jobs	over 1.8M

July - September 2015 (75%)



Challenges

- Lustre -> Intel IEEL
- 1 Week (testing) interruption Dell Tuneup
- 2 full Shutdowns
  - Requested by Baselayer
  - Power WIP installation
  - Lost some data
- 1 power outage

Colocation

- Work in place
  - Racks
  - Cable trays
  - Power WIPS
  - PDUs (end of October)
- Early November start
- Cost recovery fee
- MOU

Condos

- First condo added, October 2015
  - 26 nodes MEDE
  - 1 node for Geography
  - 1 node for MSE

Thanks

- marcc-help@marcc.jhu.edu
- http://marcc.jhu.edu