Maryland Advanced Research Computing Center: Overview and First Quarter Operation

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About MARCC

The Maryland Advanced Research Computing Center (MARCC) is a shared, high performance computing facility located in the Bayview Campus of Johns Hopkins University. Built with a State of Maryland grant to Johns Hopkins University through IDIES, MARCC is jointly managed by Johns Hopkins University and the University of Maryland College Park while being available to researchers statewide.

The **mission** of center is to enable research, creative undertakings, and learning that involve and rely on the use and development of advanced computing. MARCC manages high performance computing, highly reliable data storage, and provides outstanding collaborative scientific support to empower computational research, scholarship, and innovation.


https://marcc.jhu.edu

Bluecrab (MARCC's first cluster) specifications:

- 648 Compute nodes:
  - 24 cores (Haswell) @ 2.5 GHz
  - 128 GB RAM
- 50 Large Memory nodes:
  - 48 cores (Sandy Bridge) @ 3.0 GHz
  - 1024 GB RAM
- 48 GPU nodes
  - 2 x NVIDIA K80 GPUs
  - 24 cores (Haswell) @ 2.5 GHz
  - 128 GB RAM
- 2 PB High performance Lustre file system
- 14 PB ZFS file system with high data integrity

Usage Statistics

As a shared resource that is free of charge to investigators, many researchers use the facility concurrently and in collaboration:

- Research groups: 127
- Users: 480

Bluecrab Cluster Utilization
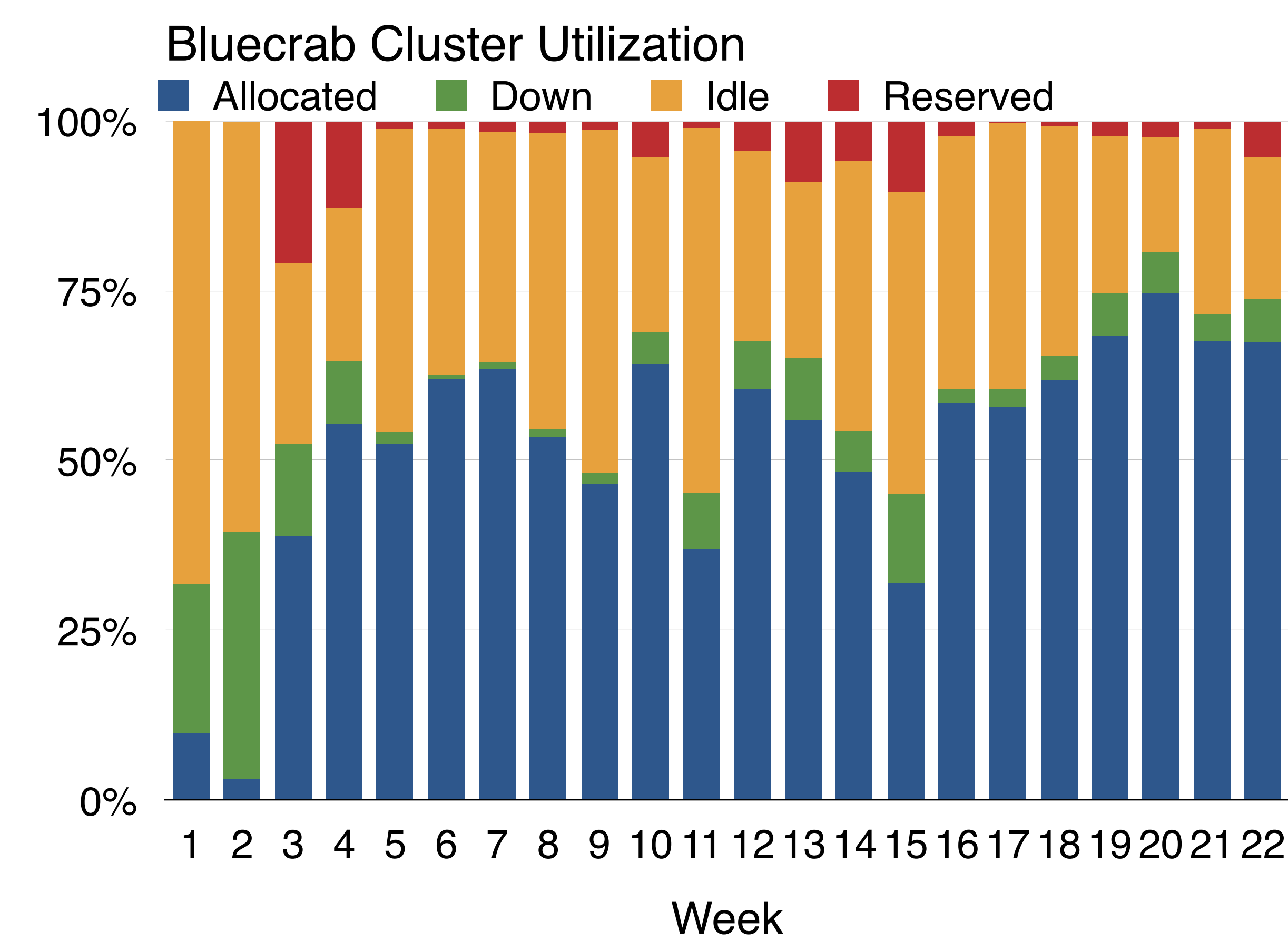
After 2 weeks of beta testing, 4 weeks pre-production, and 16 weeks production:

- Total CPU time: > 4,000 years
- Peak usage rate: 273 years/week
- Peak system utilization: 75%

Most idle nodes are specialty nodes: either large memory or GPU. We encourage our users to take advantage of our services to port, debug, and improve the porformance of their software.

Services

- Help desk support
- Software installation and maintenance
- Software development, debugging, profiling, optimization, and modernization
- Training on use of MARCC and HPC tools
- Proposal development for collaborative projects
- Data visualization
- Education and outreach

MARCC Clinic:

- Mondays 10AM-Noon, Bloomberg 235
- Software engineers for in-person support
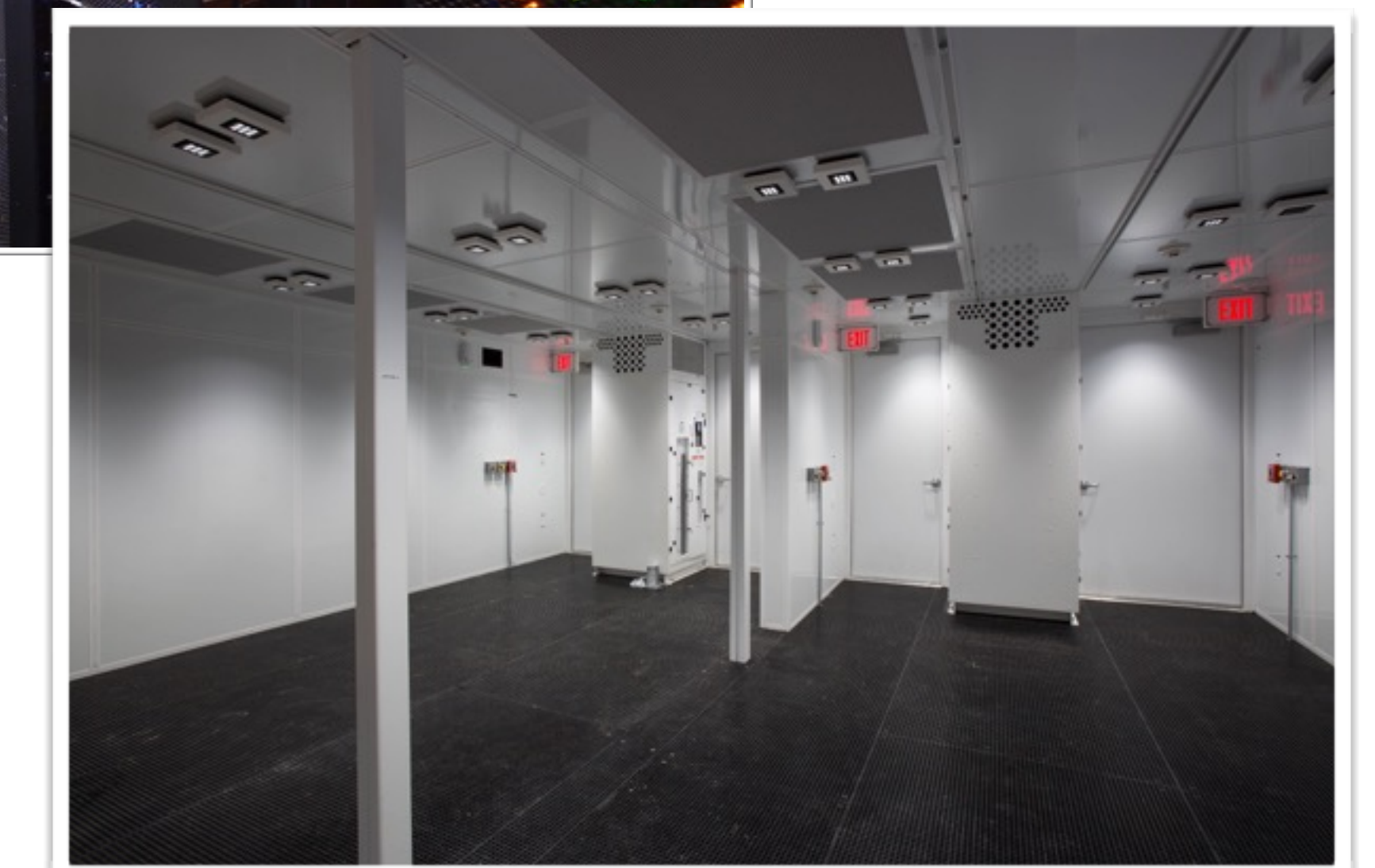
Colocation

Although resources are free to investigators, we encourage colocation through a condo model:
- No recurring costs
- Guaranteed CPU hours across the cluster
- Power and cooling
- Fast and reliable connectivity
- Professional administration
- Reliability and uptime
- Security and data protection
- Scalability