This Memorandum of Understanding (MOU) contains basic provisions which will guide the working relationship between the Purdue researcher referred to here as *The Faculty Partner* and *ITaP* concerning the Carter Community Compute Cluster.

Term

This agreement will be in effect until the Carter Community Cluster's decommissioning, which is expected to occur on or about April 30, 2017, when the 5-year hardware warranty on its systems expires.

Service Overview

The Faculty Partner agrees to purchase access to compute servers/nodes in the Carter Community Cluster, which will be in production beginning April 2012. The Carter cluster consists of HP SL230 nodes with two 8-core Intel Sandy Bridge processors (16 cores per node) and 500GB of local disk. The nodes are available in multiple memory configurations (e.g., 32GB, 64GB, etc.). All nodes have FDR Infiniband interconnects, and a 5-year warranty.

A batch job queue will be established for *The Faculty Partner* and his/her research team. No other users will have access to this queue unless a special short-term arrangement is made. However, *ITaP* will run Condor on all nodes in the cluster when the nodes are otherwise idle.

ITaP Responsibilities

- Provide cluster infrastructure, including racks, power, cooling, and networking.
- Establish and maintain user accounts and job submission queues.
- Maintain cluster system hardware and software.
- Provide system administration services and technical support.
- Provide a base suite of software including compilers, operating system software, and some applications and libraries, not to exceed limits provided in our current licensing agreements with vendors.
- Install and provide best-effort support for commercial and public domain packages and libraries beyond the base software suite. Additional applications will be provided by *The Faculty Partner* and installed in accordance with licensing agreements. However, primary responsibility for support of discipline-specific application software will remain with the research team.
- Provide information regarding this system via the RCAC website, the login Message-of-the-Day (MOTD), and email to the system's stakeholders.

Faculty Partner Responsibilities

- Provide funding for access to the equipment as identified.
- Recommend queue characteristics and identify users who are allowed to access *The Faculty Partner's* queue.
- License discipline-specific software as needed. *ITaP* will install and maintain the software on the Carter cluster upon receipt of the software, licensing, and vendor contact information. When

multiple software packages are requested, *The Faculty Partner's* research team will advise ITaP staff on a priority and target installation date for each package to be installed. The research team has responsibility for support of discipline-specific application software.

- Ensure that data that must be protected by Federal security or privacy laws (e.g., HIPAA, ITAR, classified information, etc.) is not stored on this system. This system is not intended to meet the enhanced security required by those laws or regulations.
- Help establish general guidelines for the management and use of the Carter cluster.
- Request new user accounts by emailing rcac-help@purdue.edu.
- Provide timely reports of all problems to *ITaP* at rcac-help@purdue.edu.
- Routinely check the RCAC website, the MOTD, and email from RCAC for information regarding this system.
- Send requests for additional information to rcac-help@purdue.edu.

Job Scheduling

Batch System

ITaP will provide and operate batch job scheduling and resource management software. The system's general characteristics and structure will be established based on input from *The Faculty Partner*. In addition, members of *The Faculty Partner's research group* will be given unrestricted access to a dedicated job queue. Queues that span different types of nodes can be established upon request, but there are limitations based on the scheduling software and the community cluster infrastructure. Occasionally, batch scheduling and queue management may need to be adjusted to better meet the needs of the *Carter* partners.

Standby Queue

One of the advantages of the community cluster program is the ability to share hardware. A shared *standby* queue exists that will allow all Carter users access to any idle node in the cluster.

Standby queue jobs have lower priority than queues associated with the faculty partners. Standby queue jobs run only when a sufficient number of idle nodes are available. Jobs submitted to partners' queues will be started immediately or as soon as any currently running standby jobs finish.

By default, the standby queue will have a time limit of 4 hours per job and a maximum of 1,000 jobs total in queue. Should the Carter community cluster partners desire to alter these limits, *ITaP* can change the limits associated with the standby queue.

Condor

ITaP will run Condor, a distributed computing system, on any idle nodes so long as Condor's presence does not interfere with batch jobs running in the system.

Changes

The queuing parameters can be changed upon request by *The Faculty Partner*. *ITaP* will act as a broker to facilitate short-term scheduling changes as needed – perhaps to help meet a research deadline.

Governance

Meetings related to management of the Carter cluster may be scheduled as necessary. The meetings will focus on reviewing any potential issues or avenues for improvement, highlight key successes, and discuss potential future plans.

Service Availability

Production Phase

In the Production Phase, *ITaP* will maintain the cluster system as a highly available, 24/7 resource. However, there are exceptions to these terms of service:

- Unplanned system outages due to issues with other aspects of the facility such as power, HVAC, network, or emergency maintenance to address computer security incidents may prevent the use of the system in a timely manner.
- Routine software and hardware maintenance of the system. Maintenance windows are typically announced at least 4 weeks in advance.

Retirement Phase

At the end of its 5 year warranty period, all users of the Carter cluster will be required to migrate their work to other computing resources and *ITaP* will decommission the cluster. *ITaP* will trade the equipment in for newer technology and apply credit for the amount recovered via the trade-in to *The Faculty Partner* for use in a subsequent cluster.

Cluster Schedule

- Orders will be accepted beginning March 2012.
- Production starts in April 2012.
- Decommissioning commences in April 2017.

Acceptable Use Policies

The Faculty Partner, his/her research team, and *ITaP* staff agrees to comply with all Purdue University and ITaP/RCAC policies and procedures, including the University's information technology policies located at: *http://www.purdue.edu/securePurdue*. The system is not intended to store data protected by Federal privacy and security laws (e.g., HIPAA, ITAR, classified, etc.). It is the responsibility of the faculty partner to ensure that no protected data is stored on the system. Questions about information security may be directed to the ITaP Help Desk at (765)494-4000.

Facilities

ITaP will house the Carter cluster in the Math Building machine room (G109/G190) or in a suitable facility chosen by *ITaP*.

Support Process

All incident reporting should start with email to *rcac-help@purdue.edu*. *ITaP* will provide a response within

one business day. In general, critical issues will be addressed as soon as possible. Critical issues are defined as disruptions to large portions of the cluster or infrastructure.

Termination

Either party may terminate this agreement by providing written notification to the other party thirty (30) days in advance of termination. In the event of termination, all equipment will remain the property of *ITaP*. *The Faculty Partner* may sell or transfer the remainder of his/her access to Carter to another Purdue researcher. *ITaP* will facilitate the transfer of access to the cluster to the new partner.

Storage

ITaP provides three tiers of storage attached to the Carter cluster. Requests for *ITaP* to support custom storage needs beyond these tiers can be discussed and will be considered on a case-by-case basis.

Home Directories

Home directories are provided for each user of the cluster. These directories are backed up, and files can be recovered when needed.

Scratch Storage

Carter will use a high performance parallel Lustre scratch system that is available for each user of the cluster. Files created more than 90 days previously are subject to being automatically purged. Information on the purging policy can be found at http://www.rcac.purdue.edu/userinfo/policies/scratchpurge.cfm .

The integrity of the scratch storage components will be accomplished via a redundant disk system. No backup, either via remote copy or transfer of data to other media will be performed. No disaster recovery other than the redundant disk systems will be provided.

Archival Storage

Long-term storage is also available via the archival storage system. Information on the archival storage system can be found at http://www.rcac.purdue.edu/userinfo/resources/fortress/.