

This Memorandum of Understanding (MOU) contains provisions that will guide the working relationship between the University of Iowa researcher referred to here as The Faculty Partner and the HPC Policy Committee concerning the Argon Shared Compute Cluster.

### **Term**

This agreement will be in effect until the Argon Shared Compute Cluster's decommissioning. Decommissioning of the system is expected to occur on or about March 1<sup>st</sup>, 2022, when the five-year hardware warranty on the system has expired. For additional details on decommissioning please see the Retirement Phase section.

### **Service Overview**

The Faculty Partner agrees to purchase access to compute servers/nodes in the Argon Shared Compute Cluster. The following compute node configurations are available:

#### Non-Accelerator Capable Nodes

- Standard Node – \$5399
  - 2 x Xeon E5-2680v4 (28 Cores at 2.4GHz), 128GB
- Mid-Memory Node - \$5930
  - 2 x Xeon E5-2680v4 (28 Cores at 2.4GHz), 256GB

#### Accelerator Capable Nodes

- Standard Node - \$5781
  - 2 x Xeon E5-2680v4 (28 Cores at 2.4GHz), 128GB
- Mid-Memory Node - \$6219
  - 2 x Xeon E5-2680v4 (28 Cores at 2.4GHz), 256GB
- High Memory Node - \$6804
  - 2 x Xeon E5-2680v4 (28 Cores at 2.4GHz), 512GB

#### GPU Accelerators

- Nvidia K40 - \$3232
- Nvidia K80 - \$4529
- Nvidia P100 - ~\$5900 (Final pricing available soon)

Note: Nvidia consumer GPU cards such as the Titan series are not supported in server systems.

All nodes are from Lenovo and are configured with a 1TB SSD, 100Gb Omnipath, and a five-year warranty. Accelerator capable nodes may have up to two accelerator cards in them. At the time of initial purchase only GPU accelerators are available as listed in the pricing above. If more than two accelerator cards are required please contact us to discuss options. Alternate system configurations are not allowed in the system unless the HPC Policy Committee and/or Operations Team grants a special exception.

A Son of Grid Engine 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, access to a low priority queue is available on all nodes when they are idle.

### **Argon Operations Team Responsibilities**

- Provide cluster infrastructure, including racks, power, cooling, and networking.
- Establish and maintain user accounts and job submission queues.
- Maintain cluster system hardware, software, and security.
- Provide systems administration services and technical support in conjunction with local support organizations.
- 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.
- In conjunction with local support organizations 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. Note: Applications requiring root access to install must be installed by a systems administrator on the Argon Operations Team.
- Provide information regarding the system via the HPC website ([hpc.uiowa.edu](http://hpc.uiowa.edu)), the login Message of the Day (MOTD), and email to the system's stakeholders.
- Provide metrics and reports on the utilization of the Argon system.
- Monitor and maintain security in compliance with University of Iowa policies.

### **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. ITS Research Services, in conjunction with local support organizations, will install and maintain the software on the Argon cluster upon receipt of the software, licensing, and vendor contact information that has gone through the Software Acquisition Process (<https://its.uiowa.edu/campus-software-program>). When multiple software packages are requested, The Faculty Partner's research team will advise ITS Research Services or local support 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.
- Help establish general guidelines for the management and use of the Argon cluster.
- Request new user accounts via the HPC website ([hpc.uiowa.edu](http://hpc.uiowa.edu)).
- Provide timely reports of all problems to the Argon Operations Team by contacting ITS Research Services and the local support partners at [hpc-sysadmins@iowa.uiowa.edu](mailto:hpc-sysadmins@iowa.uiowa.edu).
- Routinely check the HPC website, the MOTD, and email for information regarding the system.
- Maintain the security of your account and the system by not sharing accounts and reporting any suspected unauthorized access immediately to [hpc-sysadmins@iowa.uiowa.edu](mailto:hpc-sysadmins@iowa.uiowa.edu).
- Send requests for additional information to [hpc-sysadmins@iowa.uiowa.edu](mailto:hpc-sysadmins@iowa.uiowa.edu).

## **Job Scheduling**

### **Batch System**

The HPC Policy Committee will establish policy for and the Argon Operations Team will provide and operate batch job scheduling and resource management software, Son of Grid Engine. 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 Argon partners.

### **Low Priority Queue**

One of the advantages of the shared cluster program is the ability to share hardware. A shared low priority queue (all.q) exists that will allow all Argon users access to any idle node in the cluster.

Low priority queue jobs have lower priority than queues associated with Faculty Partners and jobs running in this queue will be immediately evicted (killed) if a request is received to use the resources of a Faculty Partner's queue. Please be aware of this policy and write you job so that it can be check pointed/interrupted if possible. If your job is sensitive to such interruptions, we do not recommend use of all.q.

## **Changes**

The Faculty Partner can change the queuing parameters upon request. ITS Research Services will act as a broker to facilitate short-term scheduling changes as needed, such as to meet a research deadline.

## **Governance**

Meetings related to the management of the Argon and other campus HPC clusters will be scheduled approximately twice per year. 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**

The Argon cluster is expected to enter production in February 2017. In the Production Phase, the Argon Policy Committee and ITS Research Services will make a best effort to maintain the cluster system as a 24/7 resource. However there are exceptions to this term of service:

Staff members are only available Monday – Friday, 8:00AM – 5:00PM.

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 scheduled quarterly for 24 hours and are typically announced at least three weeks in advance.

Whole system runs that exploit the entire system for purposes of benchmarks or other demonstrations of system capability will be scheduled infrequently. ITS Research Services will work with the Argon partners and make a best-effort attempt to accommodate users' needs with respect to the timing of these runs.

### **Retirement Phase**

At the end of its warranty period, all users of the Argon cluster will be required to migrate their work to other computing resources and the cluster will be decommissioned. The Argon Policy Committee will attempt to trade the equipment in for newer technology and apply any credit for the amount recovered via the trade-in to The Faculty Partner for use in a subsequent cluster.

### **Acceptable Use Policies**

The Faculty Partner, his/her research team, ITS Research Services staff, and local support staff agree to comply with all University of Iowa and ITS Research Services policies and procedures, including the University's information technology policies located at <https://opsmanual.uiowa.edu/community-policies/acceptable-use-information-technology-resources>. Questions about information security may be directed to the ITS Security Group at [it-security@uiowa.edu](mailto:it-security@uiowa.edu).

### **Facilities**

ITS Research Services will house the Argon cluster in the Lindquist Center data center or in a suitable facility chosen by ITS Research Services. Tours of the system are available with advance notice by contacting us at [hpc-sysadmins@iowa.uiowa.edu](mailto:hpc-sysadmins@iowa.uiowa.edu).

### **Support Process**

All incident reporting should start with an email to [hpc-sysadmins@iowa.uiowa.edu](mailto:hpc-sysadmins@iowa.uiowa.edu) or by contacting your local support representative. ITS Research Services and the collaborating local support groups will make a best effort to 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, The Faculty Partner has the right to remove their compute nodes from the cluster but is not entitled to any supporting infrastructure. Alternatively, The Faculty Partner may sell or transfer the remainder of his/her access to the Argon cluster to another University of Iowa researcher. Nodes in Argon use blade enclosures so an investor withdrawing less than twelve compute nodes will be required to purchase a blade enclosure to use their systems outside the cluster.

## Storage

Three types of storage are provided on the Argon cluster. Requests to support custom storage needs can be discussed and will be considered on a case-by-case basis. Researchers are responsible for the backup of their data in compliance with University of Iowa backup requirements (<http://cio.uiowa.edu/policy/policy-backup-recovery.shtml>)

### Home Directories

Home directories are provided for each user. These directories are not backed up but do have locally available snapshots. The home directory quota for each user is 1TB.

### Group Storage

Group directories are provided upon request at a cost of \$40/TB/Year/Copy of Data (\$80/TB/Year including backups). Options to purchase a dedicated storage system to collocate with the Argon system are also available upon request for those with large storage requirements (typically greater than 100TB).

### Scratch Storage

Argon provides an NFS based scratch storage system. Files that are more than 60 days old will be automatically purged. Please plan accordingly. A high speed distributed scratch file system may be installed on Argon later in 2017.

There are currently no default limits on the amount of storage for users of the scratch system. This may be revised in the future should space become constrained. In the event that the system approaches capacity users of large amounts of storage may be asked to purge some of their data. The system is expandable and users of large amounts of storage may be asked to help fund expansion of the storage if required.

The integrity of the scratch storage components is accomplished via a redundant disk system and no backup whatsoever is provided.

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Faculty Partner

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Director of Research Services, ITS  
Representing Argon Policy  
Committee

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Date