High Performance Computing Advisory Group
September 6, 2016
Hyalite Expansion

16 new Hyalite Nodes were installed and provisioned in June

- We had an issue with one of the nodes (Compute50) that was resolved by replacing a bad hard drive during the maintenance window last week.

**New Cluster Overview:**

- 60 Nodes (Xeon, 36 Sandy Bridge, 24 Haswell)
- 16 cores per Node for a total of 960 cores (1920 HT)
- 4 GB Ram per core
- 620 TB of Lustre scratch storage
- 10 GbE fabric w/ RDMA
2016-09 Maintenance

- Lustre updated to 2.5.42
- 10GbE Network Drivers Updated
- Migrated IPMI to new network
- RobinHood installed and initialized

- RDMA installed
  - <64byte latency reduced from 8.5 to 1.9 microseconds
  - Similar to QDR infiniband
XDMoD Stats - 2016 UPDATE

• XDMoD Stats
  • Active Users: 35
  • Total Jobs: 85,409
  • Total CPU Hours: 1,687,511
  • Average Job: 19.86 hours
  • Average Wait Time: 20 hours
Who has used the most time?

1. Blakic, Mersad
2. Ogunkoya, Ayodele
3. Hoy, Jerad
4. Niknam, Ghayyar
5. Emmett, Kristan
6. Akbarian, Amir
7. Calle, Leonardo
8. Mazurie, Aurelien
9. Rydquist, Grant
10. Labrador, Anthony
11. Avg of 44 others

**Description:**
- **User:** A person who is on a Pig allocation, hence able run jobs on resources.
- **Wall Hours: Total:** The total time, in hours, Information Technology Services Research CyberInfrastructure jobs took to execute.

Wall time: Wall time is defined as the linear time between start and end time of execution for a particular job.
Who is running long (time) jobs?

- **User**: A person who is on a PI's allocation, hence able to run jobs on resources.
- **Wall Hours: Per Job**: The average time, in hours, a Information Technology Services Research Cyberinfrastructure job takes to execute.
- **Wall Time**: Wall time is defined as the linear time between start and end time of execution for a particular job.
Who is waiting the most?

- **User**: A person who is on a Pil allocation, hence able to run jobs on resources.
- **Wait Hours: Total**: The total time, in hours, Information Technology Services Research Cyberinfrastructure jobs waited before execution on their designated resource.
- **Wait Time**: Wait time is defined as the linear time between submission of a job by a user until it begins to execute.
Who waits the most per job?

Wait Hours: Per Job: by User

1. Niknam, Gheyser
2. Akbarian, Amir
3. Mazurie, Aurelien
4. Hoy, Jerad
5. Peters, John
6. Diakic, Mensur
7. Berry, Eric
8. Muson-Moje, Jacob
9. Owikus, Mark
10. Ogunkoyo, Ayodele
11. Avg of 44 others

- **User**: A person who is on a PIs allocation, hence able to run jobs on resources.
- **Wait Hours: Per Job**: The average time, in hours, a Information Technology Services Research Cyberinfrastructure job waits before execution on the designated resource.
- **Wait Time**: Wait time is defined as the linear time between submission of a job by a user until it begins to execute.
Waiting time (for jobs done in 0.5-30min)

**Jobs by Wall Time/Wait Hours Per Job by User**

**Wait Hours Per Job by User**

*Job Wall Time = 30s - 30min*

- **User**: A person who is on a PIs allocation, hence able to run jobs on resources.
- **Wait Hours Per Job**: The average time, in hours, a job waits before execution on the designated resource.
- **Wait Time**: Wait time is defined as the linear time between submission of a job by a user until it begins to execute.
Example history of cpu-hours

- **Job Size**: A categorization of jobs into discrete groups based on the number of cores used by each job.
- **CPU Hours: Per Job**: The average CPU hours (number of CPU cores x wall time hours) per Information Technology Services Research CyberInfrastructure job.

For each job, CPU usage is aggregated. For example, if a job used 1,000 CPUs for one minute, it would be aggregated as 1,000 CPU minutes or 16.67 CPU hours.
Details on wait time, user example

- **Job Wall Time**: A categorization of jobs into discrete groups based on the total linear time each job took to execute.
- **Wait Hours: Per Job**: The average time, in hours, a user waits for a job to complete on the designated resource. Wait time is defined as the linear time between submission of a job by a user until it begins to execute.

![Graph](image-url)

*User = Niknam, Gheysar*
Waiting time, everyone, August:

- **Job Wall Time**: A categorization of jobs into discrete groups based on the total linear time each job took to execute.

- **Wait Hours: Per Job**: The average time, in hours, a Information Technology Services Research Cyberinfrastructure job waits before execution on the designated resource.

*Wait Time*: Wait time is defined as the linear time between submission of a job by a user until it begins to execute.
Waiting hours vs job length:

- **Job Wall Time**: A categorization of jobs into discrete groups based on the total wall time each job took to execute.
- **Wait Hours: Per Job**: The average time, in hours, a job waits before execution on the designated resource. Wait time is defined as the linear time between submission of a job by a user until it begins to execute.
Why and who wait for brief jobs?
Why and who wait for brief jobs?

**Wait Time:** The average time, in hours, a Job Wall Time Services Research Cyberinfrastructure job waits before execution on the designated resource. **Wait Time** is defined as the linear time between submission of a job by a user until it begins to execute.
Matlab Update

- Matlab Total Academic Headcount License
  - Faculty, Staff, or Student
  - Any machine (Home or On-Campus)
- ITC Help Page about Installation
- Hyalite
  - Working on installation of R2016a
  - Will test Distributed Compute Server (32 worker)
- Matlab HPC Mentors Monthly Meeting
• **Students: cap of 15, currently 4**

• **Usage plan:**
  • Students start with own systems
  • Learn software, shared-user systems
  • Gradually move to cluster
  • By end of semester, submitting very long job

• **Software**
  • TINKER
  • MOPAC
  • DFTP+
  • Gaussian09
  • Tcl shell

• **Estimates (rough Hilmer calculations)**
  • Averaged: 25-50% of a single node’s capacity, 24/7 for a semester
  • Heavily imbalanced: weighted towards end of semester
  • Very long jobs: up to week each