Overview of the Texas Advanced Computing Center

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TACC
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TACC Mission & Strategic Approach

To enable discoveries that advance science and society through the application of advanced computing technologies.

- Resources & Services
  • Evaluate, acquire & operate world-class resources
  • Provide expert support via leading technology expertise

- Research & Development
  • Produce new computational technologies and techniques
  • Collaborate with researchers to apply advanced computing technologies in science projects
TACC Technology Focus Areas

• High Performance Computing (HPC)
  – Applications
  – Performance and Architectures
  – Software Tools

• Visualization
  – Scalable Visualization Technologies
  – Visualization Interfaces and Technologies

• Advanced Computing Interfaces
  – Web and Cloud Services
  – Web and Mobile Applications
## Current TACC HPC/DATA Systems

<table>
<thead>
<tr>
<th>System</th>
<th>Ranger</th>
<th>Lonestar</th>
<th>Longhorn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose</td>
<td>HPC</td>
<td>HPC</td>
<td>Data Analysis</td>
</tr>
<tr>
<td>Nodes</td>
<td>3,936</td>
<td>1,888</td>
<td>256</td>
</tr>
<tr>
<td>CPUs/node x cores/CPUs</td>
<td>4 x 4</td>
<td>2 x 6</td>
<td>2 x 4 + 2GPUs</td>
</tr>
<tr>
<td>Total cores</td>
<td>62,976</td>
<td>22,656</td>
<td>2,048</td>
</tr>
<tr>
<td>CPUs</td>
<td>AMD Barcelona 2.3GHz</td>
<td>Intel Westmere 3.3GHz</td>
<td>Intel Nehalem +NVIDIA 2.5 GHz +Quadro Plex S4s</td>
</tr>
<tr>
<td>Memory</td>
<td>2GB/core</td>
<td>2GB/core</td>
<td>6GB/core (240 nodes) 18GB/core (16 nodes)</td>
</tr>
<tr>
<td>Interconnect</td>
<td>SDR IB</td>
<td>QDR IB</td>
<td>QDR IB</td>
</tr>
<tr>
<td>Disk</td>
<td>1.7PB Lustre (IB)</td>
<td>1PB Lustre (IB)</td>
<td>0.2PB Lustre (10GigE)</td>
</tr>
</tbody>
</table>
Stampede

- 2+ PF Linux cluster
  - 6400 Dell DCS nodes
  - 2x 8-core Intel Xeon E5 (Sandy Bridge)
  - 56Gb/s FDR InfiniBand
- 7+ PF Intel Xeon Phi co-processors
- 250+ TB aggregate memory
- 14+ PB disk, 150 GB/s
- Additional Resources
  - 16 1TB shared memory nodes
  - 128 Nvidia Kepler 2 GPUs
# Storage Systems

## High Speed Disk -- *Corral*
- 6 PB Data Direct Disk
- 5 PB, replicated GPFS
- 800TB Lustre File System
- 200TB Data Collections
- InfiniBand interconnect
- **Access:** as `/corral` file system on ranger, lonestar and longhorn; ssh/scp; requires allocation

## Tape Storage -- *Ranch*
- 10PB capacity
- 70 TB cache
- 10Gb Ethernet interconnect
- **Access:** scp/bbcp to ranch.tacc.utexas.edu; or rsh/ssh
TACC Advanced Visualization Systems

• Upgraded ACES Vislab
  – 16x5 Tiled Display Wall, 328 MPixels, Nvidia GPUs
  – SONY 9MPixel Projector, 20ft x 11ft display
  – High-end Dell Workstations
  – Collaboration/conference room
  – Tiled touch display

• Integrated visualization for remote sessions
  – Ranger: 7 GPU-based systems
  – Lonestar: 16 GPU nodes
  – Stampede: 128 GPU nodes + 16 large shared memory nodes with GPUs

• Longhorn
  – 256-node, 512-GPU system for remote vis and HPC on GPUs
TACC Support Services

- Technical documentation
  - [http://www.tacc.utexas.edu/](http://www.tacc.utexas.edu/) (user guides!)
- Training
  - [http://www.tacc.utexas.edu/services/training/](http://www.tacc.utexas.edu/services/training/)
  - Taught on-site, sign up at TACC User Portal

- Or – Everything through the TACC Portal (consulting)
  - [http://portal.tacc.utexas.edu/](http://portal.tacc.utexas.edu/)
XSEDE

• eXtreme Digital Resources for Science and Engineering
  – A national federation of NSF-funded advanced computing resource and service providers

• Portal: http://portal.xsede.org
  – Information
  – Allocations
  – Access
  – Help
Using TACC XSEDE Resources

- 11 Centers
- 1.5 Billion core-hrs/yr
- Startup, Research & Instructional Allocations

<table>
<thead>
<tr>
<th>NAME</th>
<th>INSTITUTION</th>
<th>SYSTEM</th>
<th>PEAK TFLOPS</th>
<th>MEMORY TBYTES</th>
<th>STATUS</th>
<th>LOAD</th>
<th>RUNNING JOBS</th>
<th>QUEUED JOBS</th>
<th>OTHER JOBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kraken</td>
<td>NICS</td>
<td>Cray XT5</td>
<td>1174.00</td>
<td>147.00</td>
<td>Up</td>
<td></td>
<td>187</td>
<td>501</td>
<td>306</td>
</tr>
<tr>
<td>Ranger</td>
<td>TACC</td>
<td>Sun Constellation Cluster</td>
<td>579.40</td>
<td>123.00</td>
<td>Up</td>
<td></td>
<td>440</td>
<td>65</td>
<td>100</td>
</tr>
<tr>
<td>Lonestar</td>
<td>TACC</td>
<td>Dell Linux Cluster</td>
<td>302.00</td>
<td>45.00</td>
<td>Up</td>
<td></td>
<td>434</td>
<td>84</td>
<td>139</td>
</tr>
<tr>
<td>Trestles</td>
<td>SDSC</td>
<td>Appro AMD Magny-Cours Cluster</td>
<td>100.00</td>
<td>20.25</td>
<td>Up</td>
<td></td>
<td>1</td>
<td>14</td>
<td>0</td>
</tr>
<tr>
<td>Steele</td>
<td>Purdue</td>
<td>Dell Intel 64 Linux Cluster</td>
<td>60.00</td>
<td>12.40</td>
<td>Up</td>
<td></td>
<td>370</td>
<td>2346</td>
<td>63</td>
</tr>
<tr>
<td>Lincoln</td>
<td>NCSA</td>
<td>Dell/Intel PowerEdge 1950</td>
<td>47.50</td>
<td>3.00</td>
<td>Up</td>
<td></td>
<td>27</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>Blacklight</td>
<td>PSC</td>
<td>SGI UV</td>
<td>37.20</td>
<td>32.00</td>
<td>Up</td>
<td></td>
<td>60</td>
<td>147</td>
<td>1</td>
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<tr>
<td>Dash</td>
<td>SDSC</td>
<td>Appro Intel Nehalem Cluster</td>
<td>4.90</td>
<td>3.00</td>
<td>Up</td>
<td></td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Total: 2305.0 385.65 1520 3182 609

*Indicates failure of one or more status test.
Hover mouse pointer over Resource Name, Resource Status, and headings to see additional information.
XSEDE Allocation Requests
Types of Projects

- **Startup**  
  Development/testing/porting/benchmarking  
  Up to 200,000 core-hrs., for 1yr  
  Submit Abstract, Awarded/2 wks

- **Research**  
  Program (usually funded)  
  Unlimited core-hrs, for 1yr  
  10 page Request, Awarded/quarter

- **Education**  
  Classroom, Training  
  Up to 200,000 core-hrs, for 1 yr  
  Submit Abstract, Awarded/2 wks

https://portal.xsede.org/allocations-overview
More About TACC:

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