Maryland Advanced Research Computing Center

HHPC@JHU

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Data Lifecycle

Generation

Storage

Processing

Analysis

Publication

Preservation

Sharing

Reuse

HPC

Repository
Collecting Big Data

High Res. telescopes

Social Networks

Virtual Libraries

Brain Science

Predictive Computational Science

Satellites

Human Genomics

Smart Networks

Financial Markets

Large Scale Experiments
Data-Rich Environment (Effects)

Eco-Informatics

Biomedical Informatics

Digital Humanities

Astro-Informatics

Data Driven Applications
Opportunities

Innovation, Competition and Productivity
What’s being done

- WH 2012 200M R&D for big data
- NSF & NIH (many programs)
- Gordon and Betty Moore Foundation

- Many schools VIDA, DI²,

- States, e.g.: Mass
- Xsede (9/2/14)
What’s Maryland doing?
Data center and data-rich environment

Cyberinfrastructure

Infrastructure

Network

Compute Engine

Storage
Science DMZ @ JHU

HoRNET

40Gb/s

100Gb/s
HPC Resources & Model

- Approx 18,000 cores and 20 Petabytes storage

KSAS: 10.5M Quarter
WSE: 10.5M/Q
SOM: 6.2M/Q
PH: 5.8M/Q
UMCP: 5.8M/Q
## Hardware

<table>
<thead>
<tr>
<th>Count</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>648</td>
<td>Regular compute nodes, 128 GB RAM, Haswell 2.5GHz, 24 cores</td>
</tr>
<tr>
<td>50</td>
<td>Large memory nodes, 1 Tbyte RAM, ivy Bridge 3.0GHz, 48 cores</td>
</tr>
<tr>
<td>24</td>
<td>GPU nodes, 48 Nvidia K40 GPUs, 24 cores per node</td>
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<tr>
<td>2 PB</td>
<td>High Performance File System (CIFS)</td>
</tr>
<tr>
<td>14 PB</td>
<td>zFS File System</td>
</tr>
<tr>
<td></td>
<td>FDR-14 Infiniband Connectivity 2:1 blocking</td>
</tr>
</tbody>
</table>

\[ R_{\text{peak}} = 771 \text{ TFLOPs}, \ R_{\text{Max}} = 617 \text{ TFLOPs}, \ (61^{\text{st}} \text{ place on Top500}) \]
Governance

• Facility Governing Board (3 members JHU, 3 members UMCP)

• Scientific Management Committee (4 faculty members from JHU and UMCP).
  – Policies
  – Allocation models
  – Utilization
Timeline

• Data center: End of November
• Network install “mid December”
• Hardware deployment Dec 1 - Jan 2015
• Production system:

Spring 2015
Co-Location

- Priority
- Early Spring we will have better guidelines and policies
- Cluster/server hosting and management
- Cluster/server hosting
- Virtual servers
Next . . .

• Website
  • FAQs
  • Instruction on how to connect
  • Request accounts
  • Queueing system and queues
• Software & Application support
• Add Condos
• Documentation
Summary

• Create state of the art HPC facility (current and future needs)

• Develop an HPC ecosystem:
  • To foster collaboration and advance research agendas
  • Develop or improve tools for more effective data analysis
  • Resource to attract and retain top researchers
  • Facility to properly house HPC resources with different requirements (Co-location)
  • Researchers concentrate on science not on IT
Information

• combariza@jhu.edu

• Web site (soon) marcc.jhu.edu