- Director:
  Prof Ajay Gupta  Director of Computer Resources
  (ajay@cs.odu.edu)  (757) 683-3347

- Full time employees:
  responsible for the entire network, services, accounts, and daily
  operations of the system and department infrastructure

- Student System Administrators:
  experienced student admins, responsible for daily maintenance,
  implementation and upgrades of services and resources

- Student System Consultants:
  student tech support, lab monitors, help desk, and admins in
  training
Systems Group

For more information beyond what is covered in this presentation, please visit...

http://system.cs.odu.edu

-or-

http://cs.odu.edu

Email: root@cs.odu.edu
Wired Infrastructure

- 1 Cisco 6509
- 5 Cisco 4506
- 2 Brocade Turbolron 24x
- 1 Juniper EX4500
- 6 Cisco Catalyst 3750
- 6 Cisco Catalyst 3560G

- Redundant WAN links
- 10Gb Connections:
  - Between Buildings
  - To major servers
- All desktops on 1Gb
Wireless Infrastructure

- 20 AeroHive Hive120 Access Points (APs)
  - 8 APs in Dragas Hall
  - 12 APs in E&CS
- WPA2 Enterprise Security with RADIUS Server
- Active Directory Integration for Authentication
- SSID: WCSNET
- Available 802.11a/b/g/n
Microsoft Windows

- x86_64 hardware
- Hyper-V
- MS Exchange
- Virtual Computing Lab
- Roaming Profiles
- Print Services
- Administrative File Storage
- DHCP
- Default Departmental Windows OS Images
- Remote Desktop Support
- Windows Server Update Services
Virtual Computing Lab

- Vclab.cs.odu.edu
  - Dell R910
  - 4 Intel Xeon X7550 @ 2.0 GHz Quad Core
  - 128 GB of Ram
  - Windows Server 2008 R2 x64
  - Microsoft Terminal Services
- Provides full CS lab experience via Remote Desktop
- Used for CS101 at distance learning sites
Microsoft Hyper-V

- 4 Dell PowerEdge R910 Machines
  - Over 25 virtual servers hosting various services
  - Print Services, DHCP, MS Sharepoint, Office Communicator, MSSQL hosts, MS system wide monitoring applications, Terminal Services and research related virtual machines
Microsoft Exchange

- 2 Dell PowerEdge R610 Machines
  - Front End (load balancing)
  - Desktop Outlook & Mobile device support and configuration using Autodiscover
- 2 Dell PowerEdge R710 Machines
  - Mailbox Storage (over 800 GB of mirrored mail storage)
    - Separate Faculty, Staff, Administration, Student, and Research mailbox storage for increased security
  - Utilizing MS Database Access Groups for redundancy and availability
  - Clustered server configuration for improved performance
- Dell TL4000 Tape Library for backup, archival, and recovery
*nix

- Solaris 10, Ubuntu, RHEL, CentOS
- SPARC and x86_64 hardware
- HPC Clusters
- SMP
- Cloud Computing
- Oracle VM
- Databases
- VMWare ESX
Linux & Solaris Aliases

- **Linux**
  - 2 Dell R910 Machines
  - 4 Intel Xeon X7550 @ 2.00 GHz Quad Core with 128 GB of Ram
  - Ubuntu Server
  - Linux.cs.odu.edu via SSH

- **Solaris**
  - 3 SPARC M4000 machines with 32 Cores @ 2.5 GHz and 32 GB of Ram each
  - Solaris 10
  - Solaris.cs.odu.edu via SSH

---

```
Using keyboard-interactive authentication.
Password:
Last login: Thu Feb 16 01:22:56 2012 from ip:10-160-74-152

Sun Microsystems Inc. SunOS 5.10
Old Dominion University Computer Science Solaris 10 Machine

- Please make sure you recompile all of your old code so that it will work with the new libraries present on this system. Since we did update to a newer version of Solaris 10 some of the base library revisions were updated.

- Ports 10000 to 11000 have been opened for users to run any programs that need to listen for incoming connections. This is only available on our fast alias machines.

- For information on installed software please read /usr/local/etc/solaris_build

If you have any problems you may email us at root@cs.odu.edu or on our Online HelpDesk at http://chat.cs.odu.edu:8080.
```

---
Oracle VM

- Dell R410 (Head Node)
- 4 Dell R900 (Cluster Nodes)
  - 4 Intel Xeon E7330 @2.4GHz
  - 16 cores
  - 64GB RAM
- 2 Cluster Nodes in E&CS and 2 in Dragas
  - VMs can be hot-migrated manually
  - In event of node failure, VMs are restarted on a different node.
- Currently runs 25 VMs
Cloud Infrastructure

- Dell PowerEdge R510 (head node)
  - 2 Intel Xeon E5620
  - 8 Cores / 16 Threads
  - 16GB Memory
- 3 Dell PowerEdge R410
  - 2 Intel Xeon X5650
  - 12 Cores / 24 Threads
  - 64GB Memory
- openstack – Diablo
VMWare ESXi

- **Isolde**
  - Dell PowerEdge R910
  - 128GB Memory
  - 4 Intel Xeon X7550 @ 2.00GHz
  - 32 Cores / 64 Threads
  - Runs 13 VMs

- **Tristan**
  - Dell PowerEdge R900
  - 4 Intel Xeon E7330 @ 2.40GHz
  - 64GB Memory
  - 16 Cores / 16 Threads
  - Runs 11 VMs
Unix Database Services

- 1 Dell PowerEdge R900
- 4 Intel Xeon 7330 @ 2.40 Ghz
- 64 Gbytes of RAM

- Oracle 11gR2
  - Class DBs.
  - PROJ Research DB.

- Virtual MySQL Server
- 2 Intel Xeon 7330 @ 2.40Ghz
- 2 Gbytes of RAM

- MySQL 5.1.41
  - Contact root@cs.odu.edu to request personal MySQL db access.
SMP (Symmetric Multiprocessing)

Hardware
• 2 Dell PowerEdge R910
• 4 Intel Xeon CPU X7560 @ 2.27 GHz 8 cores CPU and 32 cores per machine
• 512GB of RAM
• 40Gbps QDR Infiniband Interconnect

Software
• vSMP foundation for SMP
• Mpich 1 & 2
• OpenMPI
• OpenMP
• GCC and Intel Compilers
HPCD Cluster

• Deployed December of 2010
• 40 Gbps QDR InfiniBand Interconnect
• SunGrid Engine
• MPICH 1 & 2
• OpenMPI
• GCC and Intel Compilers
• Intel Vtune and Thread Checker

<table>
<thead>
<tr>
<th>Description</th>
<th>Model</th>
<th># of Nodes</th>
<th># of CPU’s</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Processor</th>
<th>Clock Speed</th>
<th>Memory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compute Node</td>
<td>Dell PowerEdge R410</td>
<td>32</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>Intel Xeon E5504</td>
<td>2 GHz</td>
<td>16 GB</td>
</tr>
<tr>
<td>Head/Login Node</td>
<td>Dell PowerEdge R410</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>8</td>
<td>Intel Xeon E5520</td>
<td>2.26 GHz</td>
<td>8 GB</td>
</tr>
<tr>
<td>PVFS2 I/O Node</td>
<td>Dell PowerEdge R410</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>8</td>
<td>Intel Xeon E5530</td>
<td>2.4 GHz</td>
<td>16 GB</td>
</tr>
<tr>
<td>PVFS2 Metadata Node</td>
<td>Dell PowerEdge R410</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>8</td>
<td>Intel Xeon E5520</td>
<td>2.26 GHz</td>
<td>8 GB</td>
</tr>
</tbody>
</table>
### HPCQ Cluster

- Deployed January of 2009
- Dual Gigabit Ethernet Interconnect
- SunGrid Engine
- MPICH 1 & 2
- OpenMPI
- GCC and Intel Compilers
- Intel Vtune and Thread Checker

<table>
<thead>
<tr>
<th>Description</th>
<th>Model</th>
<th># of Nodes</th>
<th># of CPU’s</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Processor</th>
<th>Clock Speed</th>
<th>Memory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compute Node</td>
<td>Dell PowerEdge 14355C</td>
<td>16</td>
<td>2</td>
<td>4</td>
<td>N/A</td>
<td>AMD Opteron 2382</td>
<td>2.6 GHz</td>
<td>16 GB</td>
</tr>
<tr>
<td>Head/Login Node</td>
<td>Dell PowerEdge 2850</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>N/A</td>
<td>AMD Opteron 2382</td>
<td>2.6 GHz</td>
<td>16 GB</td>
</tr>
</tbody>
</table>
## HPCU Cluster

- Deployed August of 2004
- Gigabit Ethernet Interconnect
- 10 Gbps QDR Infiniband Interconnect
- SunGrid Engine
- MPICH 1 & 2
- OpenMPI
- GCC and Intel Compilers
- Intel Vtune and Thread Checker

<table>
<thead>
<tr>
<th>Description</th>
<th>Model</th>
<th># of Nodes</th>
<th># of CPU's</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Processor</th>
<th>Clock Speed</th>
<th>Memory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compute Node</td>
<td>SunFire v20z</td>
<td>32</td>
<td>2</td>
<td>1</td>
<td>N/A</td>
<td>AMD Opteron 242</td>
<td>1.6 GHz</td>
<td>2 GB</td>
</tr>
<tr>
<td>Head/Login Node</td>
<td>SunFire v20z</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>N/A</td>
<td>AMD Opteron 242</td>
<td>1.6 GHz</td>
<td>2 GB</td>
</tr>
</tbody>
</table>
HPCR Cluster

- Deployed December of 2010
- Gigabit Ethernet Interconnect
- Professor Yaohang’s research cluster

- 3 Compute Nodes
- 32 Cores
- 64 GB Ram
- 68 GFLOPS Peak

<table>
<thead>
<tr>
<th>Description</th>
<th>Model</th>
<th># of Nodes</th>
<th># of CPU’s</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Processor</th>
<th>Clock Speed</th>
<th>Memory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compute Node</td>
<td>Dell PowerEdge R410</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>Intel Xeon E5506</td>
<td>2.13 GHz</td>
<td>16 GB</td>
</tr>
<tr>
<td>Head/Login Node</td>
<td>Dell PowerEdge R410</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>Intel Xeon E5504</td>
<td>2.0 GHz</td>
<td>16 GB</td>
</tr>
</tbody>
</table>
CUDA Workstations

- Cuda.cs.odu.edu
- Tesla.cs.odu.edu
- Stream.cs.odu.edu
  - Tesla C870 with 128 Cores and 1.5 GB of Ram
- Gpu.cs.odu.edu
  - Tesla C1060 with 240 Cores and 4 GB of Ram
- Nvidia.cs.odu.edu
  - Tesla S1070 with 960 Cores and 16 GB of Ram
- Aquila.cs.odu.edu
  - Professor Yaohang’s Research Cuda Workstation
    - 4 Tesla C2070 with a total of 1760 Cores
- NVIDIA GPU Computing SDK v4.1
- NVIDIA CUDA Toolkit 4.1
Problem Solving Lab (Dragas RM 1103G)

- 30 Single Monitor Stations
- 6 Dual Monitor Stations
- Dell Optiplex 760
- Intel Core 2 Quad Q9550 @ 2.8GHz
- 4 GB of Ram

- 2 iMacs
- Power Stations for Laptops
- Scanning station
- Live User Support During Business Hours
- Group Study Tables
- Lounge
Open Research Lab (E&CS RM 3104)

- 23 Dell Optiplex 780
- Intel Core 2 Quad CPU @ 3.00 GHz
- 8 GB of Ram

Dual Monitor Stations
- 2 Dell Optiplex 990
- Intel Core i7 CPU @ 3.40 GHz
- 8 GB of Ram

- 1 Dell Optiplex 380 Projector Station
- 1 Help Kiosk

Peter
- HP LaserJet 9040dn Printer
Teaching Lab (Dragas RM 1115)

- 47 Dell Optiplex 755
- Intel Core 2 Quad Q9550 @ 2.80 GHz
- 4 GB of Ram

- Dell 1510X Projector

ODU-Printer
- HP LaserJet 9040dn Printer
CS101 Lab (Dragas RM 1105)

- 43 Dell Optiplex 380
- Intel Core 2 Duo E7500 @ 2.90 GHz
- 2 GB of Ram
- Dell 1510X Projector

Herbert
- HP LaserJet 8150n Printer
Access Grid

- Technology Classroom
- Virtual Classroom
- Live PHD Dissertation Broadcasts
- Live Masters Presentation Broadcasts
- Live Colloquium Broadcasts

Display

- 4 Projectors
- Sharp Notevision GX-C55X
- 3000 Lumens
- 1080i HD Compatible
E&CS Conference Room 3316

- 4 19” Dell 1901 FP Flat Panels
- 2 Dell 4610X Projectors
- 1 Dell Optiplex 760
- 1 Bose AV38 Surround Sound System
- 2 Sharp 60” LED LCD HDTV’s
- Avaya Polycom 4690 IP Phone
Proxy Card Locks

• 51 Locks Total
  • 16 Offline Locks
  • 35 Online Locks

• E&CS
  • 18 Online Locks
  • 8 Offline Locks

• Dragas
  • 14 Online Locks
  • 8 Offline Locks
Avaya VoIP

- G700 Gateway with S8300 Media Server
- H.323 Call Signaling
- G.711MU Audio Codec
- 100+ Avaya 4602, 4610, 4620, 1608, 1616 IP Stations
Storage

- EMC Celerra NS40 in E&CS
  - 30TB Storage
  - Networked via 4 1Gb Connections
- EMC Celerra NS480 in Dragas
  - 34TB Storage
  - Networked via 4 1Gb Connections
- iSCSI targets, SMB/CIFS shares, NFS exports
- Asynchronous replication between the two devices for home directories
- 10Gb upgrade is in the works.
Snapshots

- EMC Snapshots
  - 0-6 hours ago
  - 6-12 hours ago
  - 12-18 hours ago
  - 24 hours ago
  - 2 days ago
  - 3 days ago
  - 4 days ago
  - 5 days ago
  - 6 days ago
  - 7 days ago
  - 2 weeks ago
  - 4 weeks ago
  - 6 weeks ago

- To access snapshots in *nix:
  - cd to ~/.backup

- To access snapshots in Windows:
  - Context menu ->
  - “Properties” ->
  - “Previous Versions” tab

- See [http://system.cs.odu.edu](http://system.cs.odu.edu) for more details
Tape Backups

- Tape backups are done every night between midnight and 6AM
- Most days are incremental backups
- One day per month is a full backup
- Incremental backups are kept for six months
- Full Backups are kept for two years
- The oldest data we can restore is data that was present two years ago

- Contact root@cs.odu.edu to recover data from tape backups
Account Creation

- Confirm email address
- Wait up to 24 hours (usually <15 minutes)
- Receive username and password in 2nd email

Password Resets

- Confirm email address
- Wait up to 24 hours (usually <15 minutes)
- Receive new password in 2nd email
Account Archiving

• At the start of every semester around the last add/drop date, the archiving process starts.
• Students that have registered for a class for the current semester or the previous semester will be subject to account archiving.
  1. Emails are sent to CS addresses notifying of impending archiving.
  2. One week later accounts are locked/frozen.
  3. Another week later accounts are archived.
• What happens when an account is archived?
  • Exchange mailbox deleted
  • Home directory compressed and moved to archiving filesystem
  • Account completely removed from system so the username/UID can be reused
• Exceptions are made for students not formally registered but working with faculty. Contact root@cs.odu.edu to request an exception.