Agenda

- Computing resources in the department
- OpenAFS
- How to:
  - Get AFS tokens (Windows/Linux)
  - Control access to AFS files
  - Manage group access in AFS
  - Manage Subversions (svn) repositories
- Using the *Condor* cluster
  - How to submit batch jobs
Agenda

• Students’ webpages – why ??
• From where to get licensed software?
## Department computing resources

### The Elements Cluster

<table>
<thead>
<tr>
<th>Hostname</th>
<th>Processors</th>
<th>Memory</th>
<th>Architecture</th>
<th>OS Rev</th>
<th>Kernel</th>
</tr>
</thead>
<tbody>
<tr>
<td>antimony</td>
<td>Dual Dual-Core 3.8GHz Xeons</td>
<td>12GB RAM</td>
<td>32-bit Linux</td>
<td>RHEL 4</td>
<td>2.6</td>
</tr>
<tr>
<td>arsenic</td>
<td>Dual Dual-Core 3.8GHz Xeons</td>
<td>12GB RAM</td>
<td>64-bit Linux</td>
<td>RHEL 4</td>
<td>2.6</td>
</tr>
<tr>
<td>aluminum</td>
<td>Dual Quad-Core 2.33GHz Xeons</td>
<td>16GB RAM</td>
<td>64-bit Linux</td>
<td>RHEL 4</td>
<td>2.6</td>
</tr>
<tr>
<td>selenium</td>
<td>Dual Quad-Core 2.33GHz Xeons</td>
<td>16GB RAM</td>
<td>64-bit Linux</td>
<td>CentOS 4.8</td>
<td>2.6</td>
</tr>
<tr>
<td>hydrogen</td>
<td>Dual Dual-Core 3.6GHz Xeons</td>
<td>12GB RAM</td>
<td>64-bit Linux</td>
<td>RHEL 4</td>
<td>2.6</td>
</tr>
<tr>
<td>oxygen</td>
<td>Dual Dual-Core 3.6GHz Xeons</td>
<td>12GB RAM</td>
<td>64-bit Linux</td>
<td>RHEL 4</td>
<td>2.6</td>
</tr>
<tr>
<td>nitrogen</td>
<td>Dual Dual-Core 3.6GHz Xeons</td>
<td>12GB RAM</td>
<td>32-bit Linux</td>
<td>RHEL 3</td>
<td>2.4</td>
</tr>
<tr>
<td>rhenium</td>
<td>Dual Hyper-Threaded Quad-Core 2.93GHz Xeons</td>
<td>96GB RAM</td>
<td>64-bit Linux</td>
<td>CentOS 5.5</td>
<td>2.6</td>
</tr>
<tr>
<td>nickel</td>
<td>Dual Hyper-Threaded Six-Core 3.33GHz Xeons</td>
<td>96GB RAM</td>
<td>64-bit Linux</td>
<td>CentOS 5.5</td>
<td>2.6</td>
</tr>
<tr>
<td>neodymium</td>
<td>Dual Hyper-Threaded Six-Core 3.33GHz Xeons</td>
<td>96GB RAM</td>
<td>64-bit Linux</td>
<td>CentOS 5.5</td>
<td>2.6</td>
</tr>
<tr>
<td>neptunium</td>
<td>Dual Hyper-Threaded Six-Core 3.33GHz Xeons</td>
<td>96GB RAM</td>
<td>64-bit Linux</td>
<td>CentOS 5.5</td>
<td>2.6</td>
</tr>
</tbody>
</table>
### Department computing resources

**SPARC/Solaris Systems**

<table>
<thead>
<tr>
<th>Hostname</th>
<th>Model</th>
<th>Processors</th>
<th>Memory</th>
<th>OS Rev</th>
</tr>
</thead>
<tbody>
<tr>
<td>blitz</td>
<td>Sun Enterprise 450</td>
<td>Dual 300MHz UltraSPARC IIs</td>
<td>512MB RAM</td>
<td>Solaris 9</td>
</tr>
<tr>
<td>hydra</td>
<td>Sun Enterprise 4500</td>
<td>Ten 250MHz UltraSPARC IIs</td>
<td>2.5GB RAM</td>
<td>Solaris 10</td>
</tr>
</tbody>
</table>
Remotely accessing the machines

**Linux**

1. Open the Linux terminal
2. Use Secure Shell (SSH) to connect to the remote machine
   - If you don’t want to specify a machine just `ssh elements`
     and you will be directed to any available machine in the dept.

   ```
   ssh <username>@elements.cs.pitt.edu
   ```

   - If you want a specific machine

   ```
   ssh <username>@oxygen.cs.pitt.edu
   ```

3. Enter your CS account password

**Windows**

1. Install any ssh application (PuTTY, Secure ssh)
2. Specify the machine (or just elements)
3. Enter username and password
• AFS (originally *Andrew File System*) is a distributed file and authentication service designed to be scalable to many client computers, using secure authentication and with flexible access control.

• Developed by CMU, commercialized by Transarc, bought by IBM, branched into DFS/DCE, made open source
  www.openafs.org

• Students are highly encouraged to use AFS to store their important files and projects since it is highly reliable, and secure. *Don’t* rely solely on your local storage devices to store your important stuff ..
OpenAFS

- Where does your account reside?
  /afs/cs.pitt.edu/usr0/username/

- How to access your AFS directory using Windows
  1- Download the appropriate openAFS client distribution from www.openafs.org and install
  2- From your computer explorer window, select -> Map Network drive, select a drive letter, then enter your afs paths as follows: //afs/cs.pitt.edu/usr0/username
  3- Using the AFS client authentication, obtain your token to be able to access your directories
How to access your AFS directory using Linux

1- You need to find the exact steps for your Linux distribution online, the process diverges from one Linux distribution to the other ... just Google this!!

2- Once you have configured your afs client. From the Linux terminal you can make use of the following utilities:

<table>
<thead>
<tr>
<th>Command</th>
<th>why?</th>
</tr>
</thead>
<tbody>
<tr>
<td>klog</td>
<td>Identify the user to the system (requests password) and generate a token. Usually integrated with the system login procedure.</td>
</tr>
<tr>
<td>tokens</td>
<td>Display currently held tokens and their expiration times</td>
</tr>
</tbody>
</table>
| fs      | System file queries  
  • fs quota  
  • fs listacl  
  • fs examine |
| unlog   | explicitly discards one or more tokens. It is usually performed automatically when logging out |
Control access to AFS files (ACLs)

• ACLs are maintained for each directory in your volume and are under your control.

<table>
<thead>
<tr>
<th>Access Control Rights</th>
<th>Shorthand Notation</th>
</tr>
</thead>
<tbody>
<tr>
<td>r: read</td>
<td>read = rl</td>
</tr>
<tr>
<td>l: lookup</td>
<td>write = rlidwk</td>
</tr>
<tr>
<td>i: insert</td>
<td>all = rlidwka</td>
</tr>
<tr>
<td>a: administer</td>
<td>none = removes entry</td>
</tr>
<tr>
<td>d: delete</td>
<td></td>
</tr>
<tr>
<td>w: write</td>
<td></td>
</tr>
<tr>
<td>k: lock</td>
<td></td>
</tr>
</tbody>
</table>
Control access to AFS files (ACLs)

- The AFS command used to set and modify ACLs is the "fs" command. To know more about fs use \texttt{fs \textendash help}

<table>
<thead>
<tr>
<th>fs commands</th>
<th>why?</th>
</tr>
</thead>
<tbody>
<tr>
<td>\texttt{fs listacl}</td>
<td>List ACL for current working directory</td>
</tr>
<tr>
<td>\texttt{fs listacl \textit{dir}}</td>
<td>List ACL for the directory \textit{dir}</td>
</tr>
<tr>
<td>\texttt{fs setacl \textit{dir} &lt;user&gt; all}</td>
<td>Give \textit{user} all rights to \textit{dir}</td>
</tr>
<tr>
<td>\texttt{fs setacl \textit{dir} system:anyuser none}</td>
<td>Revoke all rights to group system:anyuser</td>
</tr>
<tr>
<td>\texttt{fs setacl . john \textit{write} jane \textit{read}} or \texttt{fs setacl . john \textit{rlidwk} jane \textit{rl}}</td>
<td>Provide user john with write access and user jane with read access to all files in the current working directory</td>
</tr>
</tbody>
</table>

\texttt{find ./your\_working\_dir \textendash type d \textendash exec fs sa \textendash dir \{}\{\}\textendash acl \textit{<user>} all \};
Managing group access in AFS

• How to create and manage AFS groups
Note: typing **pts help** will list the various pts commands.

**Create:** pts creategroup *username:*<identifier>
**Add user:** pts adduser jsmith *username:*<identifier>
**Remove user:** pts removeuser jsmith *username:*<identifier>
**Listing group members:** pts membership *username:*<identifier>

**Examine** group membership and change flags
pts examine *username:*<identifier>
Managing group access in AFS

• **Flags**

  - **S** (Status): Controls who can use `pts examine` to list status information about a group.
  - **O** (Owned): Controls who can use `pts listowned` to list groups owned by a group or user.
  - **M** (Membership): Controls who can use `pts membership`
  - **A** (Add): Controls who can use `pts adduser`
  - **R** (Remove): who can use `pts removeuser`

Each one of the flags, somar, has three possible values:

- A hyphen, "-", gives rights only to the group's owner
- A lowercase version of the flag (eg a lowercase "s") gives rights to members of the group, in addition to those who have "hyphen" rights.
- An uppercase version of the flag gives rights to anyone.
How to make an AFS directory private?
To make an AFS directory so that only you can read & administer the contents, you should remove all entries ACLs except one for you. A quick way to do this is with the command:

```
fs setacl <directory> your-username all -clear
```

For example:

```
fs setacl /afs/cs.pitt.edu/user0/marianky/private marianky all -clear
```
CollabNet, Inc, developed Subversion starting in 2000 as part of a collaboration software suite.

SVN tracks changes to files and also directories and directory hierarchies.

Uses a client-server model.
- local access to Subversion Repository
- svn:// protocol for client-server operation (can be SSH tunneled)
- http(s):// protocol, layered on top of WebDAV (uses Apache modules)

All data are stored in a server database repository.
Subversion

- The essential **Subversion lifecycle** is the following:

1. checkout your working version
2. create or edit files
3. update changes
4. when ready commit your changes
Subversion

• **Creating** svn repository (in your directory):

```
svnadmin create <svn_identifier>
```

• **NOTE**: Subversion uses this directory to store information about your projects, like file revisions.

• You won't need to directly deal with this directory, so I suggest keeping it in a *safe place* and not messing with its contents unless you know what you're doing 😊
Subversion

• **Checkout** your working copy

```bash
svn checkout
file:///afs/cs.pitt.edu/usr0/<username>/<svn_identifier>
```

• **Create** a directory for your project in your repository to import your project files to later

```bash
svn mkdir
file:///afs/cs.pitt.edu/usr0/<username>/<svn_identifier>/mynproj
```

• **Importing**

```bash
cd <your_project_dir>
svn import
file:///afs/cs.pitt.edu/usr0/<username>/<svn_identifier>/mynproj
```
Subversion

• **Committing** your changes

  while in your working directory:

  `svn commit -m "some_message"`

• **Working with revisions**

  Check status:

  `svn status <file_name>`

  - **U:** File was updated.
  - **A:** File was added.
  - **D:** File was deleted.
  - **R:** File was replaced.
  - **G:** File was merged.
  - **?:** Resource is not under version control.
  - **!:** Resource is missing or incomplete (removed by another tool than Subversion).
Subversion

• **Adding file**
  
  while in your working directory:
  
  ```
  svn add <file/dir_name>
  ```
  
  Then you need to commit the added file/dir

• **Finding differences**
  
  ```
  svn diff
  ```
  
  ```
  svn diff <file/dir_name>
  ```

• **Comparing revisions**
  
  ```
  svn compare -r R1:R2 <filename>
  ```

• **Revert local edits**
  
  ```
  svn revert <filename>
  ```

• **Revert to Previous Revisions**
  
  ```
  svn update -r R
  ```
The **Maté** Cluster

- The department operates a cluster of 16 SunFire X2100 compute servers, each with dual 2.4GHz 64-bit AMD Opteron processors and 4GB RAM.

- This cluster runs the **Condor** distributed processing manager on Red Hat Enterprise Linux 4.

- The control machine for this cluster is **s1.mate.cs.pitt.edu**

1- To use the cluster, you need to give the condor cluster read/write access rights to your working directory (recursively).

```bash
find ./your_working_directory -type d -exec fs sa -dir {} -acl condor rlidwk \;
```

2- Create your jobs file *(filename.sub)*

3- Connect to *s1.mate.cs.pitt.edu*

4- **Submit** jobs

```bash
condor_submit <filename.sub>
```
The Maté Cluster

5- **Check** jobs status

   `condor_status`

6- **Monitor** your job(s)

   `condor_q`

7- **Kill** your job(s)

   `condor_rm xxx`
   where xxx is your job ID that will be displayed to you when you issue the command in (6)
Software licenses

- Go to http://software.pitt.edu/
  
  Log in with your pitt account, and you will find a selection of licensed software titles at no cost 😊

- Free student software licenses and low cost software can be obtained from the university (windows, office, Matlab, ...). Visit http://technology.pitt.edu/software.html
  
  For more details on the available software and where to get them from.
Your homepage

- Why?
  - It is your front image in the department and worldwide
  - You need to show your academic progress and publications .. right?
  - If your teaching, then this is a good place to put recitations/lab material for your students to download

- Where to put your files?
  - All your html pages, scripts .. etc should go under your afs space in public/html directory.
  - Make sure if you add downloadable material to put it in the public/html to be accessible from your homepage.
Thank you

For any technical questions or to report any equipment issues in the department
Email tech@cs.pitt.edu or file a ticket at https://ticket.cs.pitt.edu/