CS 2001
Department Computing Resources

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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

Hostname	Processors	Memory	Architecture	OS Rev	Kernel
antimony	Dual Dual-Core 3.8GHz Xeons	12GB RAM	32-bit Linux	RHEL 4	2.6
arsenic	Dual Dual-Core 3.8GHz Xeons	12GB RAM	64-bit Linux	RHEL 4	2.6
aluminum	Dual Quad-Core 2.33GHz Xeons	16GB RAM	64-bit Linux	RHEL 4	2.6
selenium	Dual Quad-Core 2.33GHz Xeons	16GB RAM	64-bit Linux	CentOS 4.8	2.6
hydrogen	Dual Dual-Core 3.6GHz Xeons	12GB RAM	64-bit Linux	RHEL 4	2.6
oxygen	Dual Dual-Core 3.6GHz Xeons	12GB RAM	64-bit Linux	RHEL 4	2.6
nitrogen	Dual Dual-Core 3.6GHz Xeons	12GB RAM	32-bit Linux	RHEL 3	2.4
rhenium	Dual Hyper-Threaded Quad-Core 2.93GHz Xeons	96GB RAM	64-bit Linux	CentOS 5.5	2.6
nickel	Dual Hyper-Threaded Six-Core 3.33GHz Xeons	96GB RAM	64-bit Linux	CentOS 5.5	2.6
neodymium	Dual Hyper-Threaded Six-Core 3.33GHz Xeons	96GB RAM	64-bit Linux	CentOS 5.5	2.6
neptunium	Dual Hyper-Threaded Six-Core 3.33GHz Xeons	96GB RAM	64-bit Linux	CentOS 5.5	2.6

Department computing resources

SPARC/Solaris Systems

Hostname	Model	Processors	Memory	OS Rev
blitz	Sun Enterprise 450	Dual 300MHz UltraSPARC IIs	512MB RAM	Solaris 9
hydra	Sun Enterprise 4500	Ten 250MHz UltraSPARC IIs	2.5GB RAM	Solaris 10

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

OpenAFS

- 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

OpenAFS

- 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:

Command	why ?
klog	Identify the user to the system (requests password) and generate a token. Usually integrated with the system login procedure.
tokens	Display currently held tokens and their expiration times
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.

Access Control Rights	Shorthand Notation
r: read	read = rl
l: lookup	write = rlidwk
i: insert	all = rlidwka
a: administer	none = removes entry
d: delete	
w: write	
k: lock	

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 fs –help

fs commands	why ?
fs listacl	List ACL for current working directory
fs listacl *dir*	List ACL for the directory dir
fs setacl *dir <user> all*	Give *user* all rights to dir
fs setacl *dir system:anyuser none*	Revoke all rights to group system:anyuser
fs setacl . john *write* jane *read* or fs setacl . john *rlidwk* jane *rl*	Provide user john with write access and user jane with read access to all files in the current working directory

set recursive permissions

```
find ./your_working_dir -type d -exec fs sa -dir \{\} -acl <user> all \;
```

Managing group access in AFS

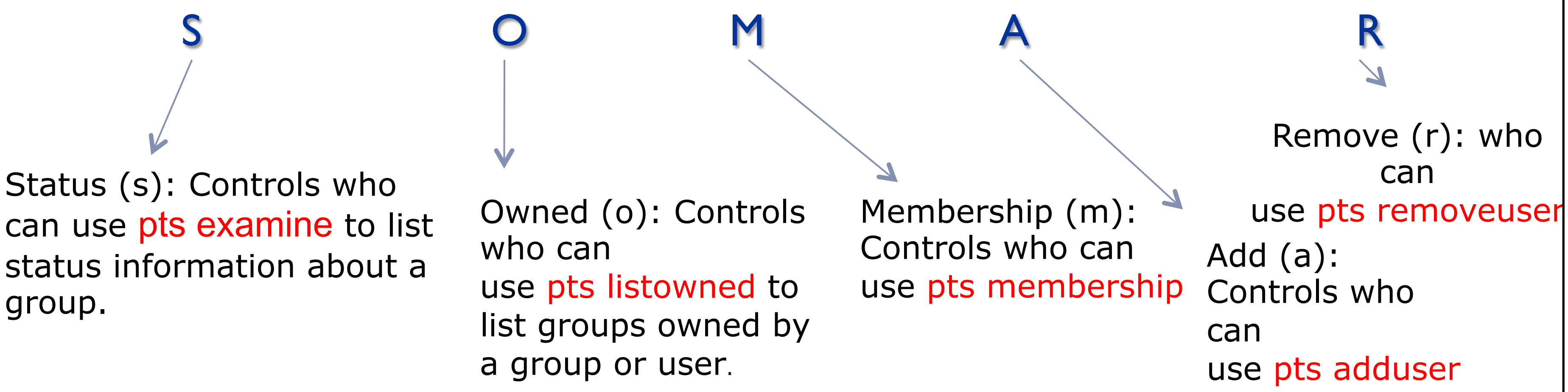
- How to create and manage AFS groups
  Note: typing pts help will list the various pts commands.

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 O M A R

Status (s): Controls who can use pts examine to list status information about a group.

Owned (o): Controls who can use pts listowned to list groups owned by a group or user.

Membership (m): Controls who can use pts membership

Add (a): Controls who can use pts adduser

Remove (r): 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.

Private Directories and DropBox

- **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
    ```

Subversion

- CollabNet, Inc, developed Subversion starting in 2000 as part of a collaboration software suite.

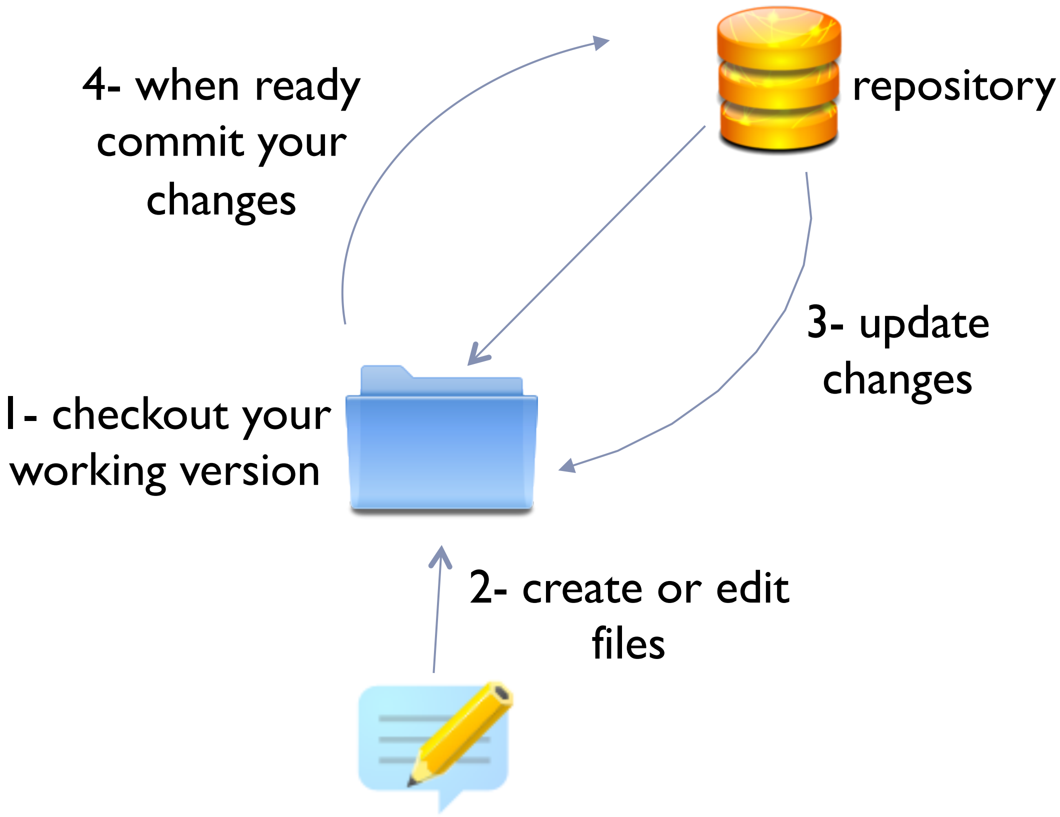
- SVN tracks changes to files and also directories and directory hierarchies.

- 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:



4- when ready commit your changes

repository

3- update changes

1- checkout your working version

2- create or edit files

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

```
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

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

- **Importing**

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

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

- For a complete reference guide visit
  http://www.cs.wisc.edu/condor/manual/v7.4/

The *Maté* Cluster

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

```
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

```
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/