Data Management at ARSC

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Presentation Overview

1. ARSC storage
2. Data Management within ARSC
3. Additional Notes on Long Term Storage
4. Moving data to/from ARSC to your desktop system
5. Using the queues to manage data

1. ARSC storage

- **ARSC provides storage in three primary locations. Environment variables are defined for each location.**
  - `$HOME`
  - `$CENTER`
  - `$ARCHIVE` or `$ARCHIVE_HOME`

$HOME

- **Purpose**: location to store configuration files and commonly used executables.
- **Quota**: 8 GB
- **Backed Up**: yes
- **Purged**: no
- **Notes**: Available from computational nodes and login nodes. However, ARSC recommends that you avoid accessing $HOME in parallel jobs.

$CENTER

- **Purpose**: place to run jobs and store temporary files.
- **Quota**: 750 GB (not enforced at this time).
- **Backed Up**: no
- **Purged**: yes (not enforced at this time).
- **Notes**: Available from computational nodes and login nodes.

StorageTek Silo & Sun Fire 5440

$ARCHIVE

- **Purpose**: place to store files long term.
- **Quota**: no quota
- **Backed Up**: yes
- **Purged**: no
- **Notes**: May not be available from all computational nodes. Available from login nodes. Files can be offline. Network Filesystem (NFS) hosted by Sun T5440 system: bigdipper.

2) Data Management within ARSC

Part I

- **Common UNIX commands for local and NFS mounted filesystems.**
  - `mv` move a file or directory
  - `cp` copy a file or directory
  - `rm` remove a file or directory
  - `mkdir` make a directory
  - `rmdir` remove a directory
  - `show_storage` quotas and usage (HPC systems)
  - `quota` quotas and usage (linux workstations)
  - `du` shows disk usage

A few examples

Make a directory in $CENTER

```
f2n1 35% mkdir $CENTER/job1
```

Copy myfile to $CENTER/job1

```
f2n1 37% cp myfile $CENTER/job1
```

Check disk usage (-sk gives summary in kilobytes)

```
f2n1 38% du -sk $CENTER/job1
16      /center/w/usera/job1
```

What’s in $CENTER/job1

```
f2n1 39% ls -la $CENTER/job1
total 64
drwx------   2 usera    staff          8192 Jul 17 10:44 .
drwxr-xr-x  19 usera    staff          8192 Jul 17 10:43 ..
-rw-------   1 usera    staff             0 Jul 17 10:44 myfile
```

Make a directory to store results in $ARCHIVE_HOME (-p makes intermediate directories)

```
f2n1 40% mkdir -p $ARCHIVE/ICEFLYER/job1/
```

A few examples continued

Move myfile from $CENTER to $ARCHIVE

```
f2n1 41% mv $CENTER/job1/myfile $ARCHIVE/ICEFLYER/job1
```

Recursive copy

```
f2n1 43% cp -r $CENTER/job1 $ARCHIVE/ICEFLYER
```

Using special directories (“.” & “..”)

```
f2n1 52% cp -r ../job0 .
```

Remove myfile

```
f2n1 53% rm $CENTER/job1/myfile
```

Recursive remove

```
f2n1 54% rm -r $CENTER/job1
```

Checking quotas (use for linux workstations)

```
klondike 3% quota -v
Disk quotas for usera (uid 2640):
Filesystem    usage   quota   limit    timeleft  files   quota   limit    timeleft
/u1           79896  112400  152640                545       0       0
/u2               0  102400  112640                  0       0       0
/tmp         103896 10485760 11534336              423       0       0
```

More information

- **All of the aforementioned commands have man pages.**
- **For example:** `man cp, man du, etc.`
- **NOTE: Command options may vary with the operating system.**
- **If you have questions don't forget about the ARSC help desk!**
  - Phone: **(907)450-8602** (**x8602** on campus)
  - Email: **consult@arsc.edu**

Moving Data between ARSC Systems

Part II

- **Moving files between systems.**
  - `scp` ssh version of copy
  - `sftp` ssh version of ftp
- **These options are available to users from their local machine (if you are using a UNIX variant).**
- `scp` **supports recursive copies and wildcards (I.e "*","?", etc.)**
- `scp` **requires that you know the path to the files you want.**

A few examples

Using scp (be wary of using environment variables!)

```
f2n1 35% scp -r “iceflyer:/archive/u1/uaf/bahls/ICEFLYER/job1” .
```

Using sftp (a few commands…)

```
ftp> open iceflyer.arsc.edu
Connected to iceflyer.arsc.edu.
220 f2n1 FTP server (Version 5.60) ready.
334 Using authentication type GSSAPI; ADAT must follow
GSSAPI accepted as authentication type
GSSAPI authentication succeeded
Name (iceflyer.arsc.edu:fred): usera
...
ftp> get .cshrc
local: .cshrc remote: .cshrc
229 Entering Extended Passive Mode (|||62653|)
150 Opening BINARY mode data connection for .cshrc (2504 bytes).
226 Transfer complete.
```

A few examples continued

FTP Commands

- `get` get a single file from remote system
- `put` put a single file to remote system
- `mget` get multiple files from remotes system
- `mput` put muliple files to remote system
- `ls` list the contents of a directory on remote system
- `cd` change remote directory
- `lcd` change directory on local host
- `help` shows the ftp help pages

```
ftp> help
Commands may be abbreviated.  Commands are:

!               cr              mdir            sendport        send
$               delete          mget            put             site
account         debug           mkdir           pwd             size
append          dir             mls             quit            status
```

3) Additional Notes on Long

- Long term storage at ARSC is served by Sun Fire 5440 system.
- There are no quotas on the archive filesystem, so there’s no need to micro-manage data.
- Most of the time there is no need to access the servers directly.

When to Log on to Archive?

- **Large transfers (10's of GB+) to your local machine. There are several advantages:**
  - Manually issue stage commands (see next slide) to ensure the files to be transferred are online
  - Better overall transfer rates (avoids an extra network transfer).
- **To determine whether or not a file is offline.**
- **When creating big tar files of data on $ARCHIVE.**

Archive Commands

- `stage` **brings a file or files online.**
- `release` **tells the system to release the on disk copy of the file leaving tape copies only.**
- `sfind` **like** `find` **with flags to determine whether or not a file is online.**
- `sdu` **shows disk usage including offline usage.**
- `sls` **like standard** `ls` **with options to see whether or not a file is online.**
- `batch_stage` **stages a list of files from tape in an orderly manner (ARSC developed).**

Archive Examples

Find all offline files in the current directory.

```
nanook 10% sfind . -name \* -offline
./my.tar.gz
```

Check the status of a file using sls.

```
nanook 11% sls -2 my.tar.gz
-rw-r--r--   1 usera    staff       669944 Jan 27  2005
   my.tar.gz
O--------  guv-- -- --  sg sf
```

Bring an offline file back online

```
nanook 13% stage -w my.tar.gz
nanook 14% sls -2 my.tar.gz
-rw-r--r--   1 usera    staff       669944 Jan 27  2005
   my.tar.gz
```

Archive Examples Cont.

The batch_stage script was developed at ARSC to improve access to offline files. If you have large number of files you need to access, consider using it.

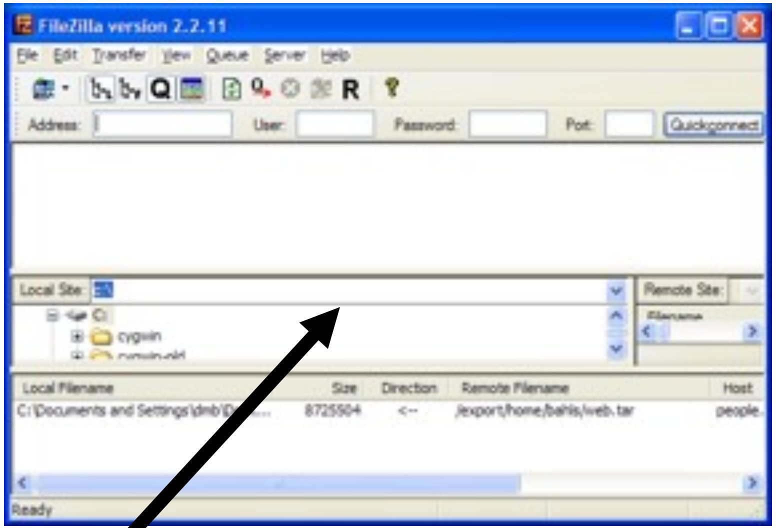
Staging all files in a directory

```
nanook 15% batch_stage $ARCHIVE/ICEFLYER/mydata/*
```

Staging all files in a directory tree

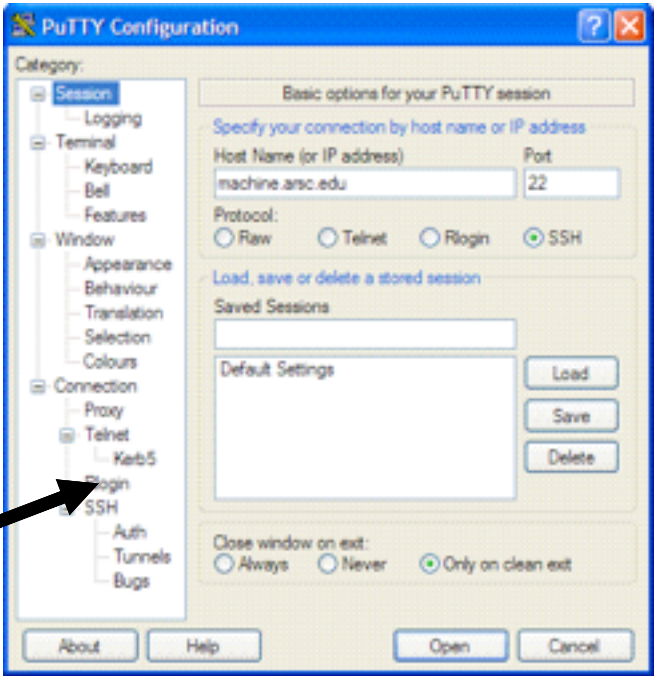
4) Moving data to/from ARSC to your desktop system

- **Unix-like OS: things are pretty much the same as transferring between machines within ARSC.**
- **Windows Systems**
  - Putty ssh client.
  - Filezilla ftp/sftp client.
  - Others exists as well (e.g. cygwin)


FileZilla version 2.2.11
File Edit Transfer View Queue Server Help
Address: User: Password: Port: Quickconnect
Local Site: C:\
C:
cygwin
cygwin-old
Remote Site:
Filename
Ready

Local Filename	Size	Direction	Remote Filename	Host
C:\Documents and Settings\dmb\D...	8725504	<--	/export/home/bahls/web.tar	people...

Filezilla



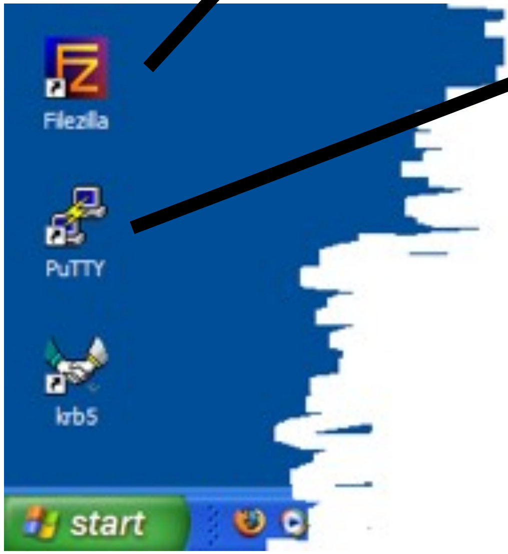
Host Name (or IP address): machine.arsc.edu
Port: 22

Protocol: ○ Raw ○ Telnet ○ Rlogin ● SSH

Saved Sessions:
Default Settings

Close window on exit: ○ Always ○ Never ● Only on clean exit

PuTTY



Using pscp

1) Open a Windows 'Command Prompt'.

2) Change directory to the directory where your files are located.

(e.g. `cd “C:\Documents and Settings\default\My Documents”` **)**

3) Run pscp.exe

```
“C:\Program Files\HPCMP\Putty\pscp.exe” -r mydir
    “username@iceberg.arsc.edu:/u1/uaf/username”
```

Using the queues to manage

- As mentioned before $ARCHIVE may not be mounted on computational nodes and is generally not a good place to run your jobs.

Moving data from a job to

- Job chaining (one job submits the next) PBS
- Job dependencies (jobs are dependant on the exit status of previous jobs) PBS

Some References

- **Creating Sequences of Batch Jobs in PBS**
  - http://www.arsc.edu/support/news/HPCnews/HPCnews319.shtml
  - http://www.arsc.edu/support/news/HPCnews/HPCnews320.shtml
- **Scripted Chaining of Batch Jobs and File Checks**
  - http://www.arsc.edu/support/news/HPCnews/HPCnews297.shtml
- **Recursive Copies**
  - http://www.arsc.edu/support/news/HPCnews/HPCnews343.shtml#qt
- **Unrelated but maybe useful: X11 on Windows**
  - http://www.arsc.edu/support/howtos/usingcygwin.html

Need more information?

- Check out man pages
- Call or email the ARSC Help Desk:
  - PHONE: 907 450-8602 (x8602 on campus)
  - EMAIL: consult@arsc.edu
- ARSC website & HPC Users' Newsletter
  1. http://www.arsc.edu/support
  2. http://www.arsc.edu/support/news/HPCnews.shtml