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Archive Systems

Mass Storage Systems: Lou1 and Lou2

Summary: Users are provided with long-term storage space on one of two NAS mass storage systems. While there are currently no disk quota limits on home filesystems, there *are* limits on the number of files you can store, with associated grace periods.

The NAS environment contains two mass storage systems, Lou1 and Lou2, to provide long-term data storage for users. These systems are SGI Altix computers running the Linux operating system. The combined disk space for the two systems is over 3 PB, split into filesystems ranging from 60-450 TB in size.

Which Lou System I Should Use?

You should be able to log into either of the Lou systems, but will only have storage space on one of them. To determine which system you should store data on:

1. Log in to either Lou1 or Lou2. For example:

   ```
   your_localhost% ssh nas_username@lou2.nas.nasa.gov
   ```
2. Type the command **`mylou`** to find out your mass storage host. For example:

   ```
   lou2% mylou
   Your Mass Storage host is lou2
   Store files there in your home directory, /u/your_nas_username
   ```

   Be aware that Lou1 and Lou2 do not share their home filesystems.
3. Use the home filesystem on your Lou system for your long-term storage. For example:

   ```
   pfe20% scp foo lou2:
   ```

Quota Limits On Lou

On either Lou system, there are no disk quota limits on your home filesystem. However, there *are* limits on the number of files (inodes):

- 250,000 inode soft limit (14-day grace period)
- 300,000 inode hard limit

See also: Quota Policy on Disk Space and Files.

Data (Un)Migration Between Disk and Tapes

In addition to the 3 PB of disk space, Lou1 and 2 have a combined total of 70 LTO-5 tape drives. Each LTO-5 tape holds 1.5 TB of uncompressed data, for a total storage capacity of approximately 115 PB.

Data stored on Lou's home filesystems (disk) is automatically migrated to tape when necessary to make room for more data. Two copies of your data are written to tape media in silos located in separate buildings.

Data migration (from disk to tape) and unmigration (from tape to disk) are managed by the SGI Data Migration Facility (DMF).

If you need to retrieve data that is on tape, make sure to unmigrate the data from tape to your home filesystem on Lou before transferring it to other systems.

TIP: If the Shift client is used for file transfers, it will automatically ensure that files on Lou are online before transfer.
If you are not using Shift (**`shiftc`**), use the following DMF commands:

```
$ dmls -al list_of_files   # show the status of your files.
$ dmget list_of_files&     # retrieve your file from tape.
```

At this point, you can start your transfer and the files will transfer as they come online.

WARNING: Do not store your data on Pleiades or Columbia; as their name suggests, the **`/nobackup`** and **`/nobackupp`** directories are for temporary use only.
For more tips on how to use the Lou storage systems more effectively, see: Portable File Names and Sizes and Dealing with Slow File Retrieval.

The New Lou2 Cluster

The Lou2 mass storage system recently underwent a major transition from an Itanium-based server supporting a stand-alone Data Migration Facility (DMF) storage manager to an x86_64 Sandy Bridge-based cluster supporting a parallel DMF system, which provides increased speed and bandwidth for data transfers between Lou2's disks and tapes.

NOTE: If your mass storage system is assigned to Lou1, you are not affected by this transition. If you aren't sure whether you are assigned to Lou1 or Lou2, log in to either one of them and use the command **`mylou`**.

Key Features of the New Lou2 System

Be aware of the following features and changes on the new Lou2 configuration.

Connections

The new Lou2 is composed of two hosts designated as **`lfe1`** and **`lfe2`**, where "lfe" stands for "Lou front end."

By issuing the command **`ssh lfe`** you will automatically be connected to the Lou2 front end with the lowest load. This is similar to the way the Pleaides front-end and bridge nodes are load balanced when you issue the commands **`ssh pfe`** or **`ssh bridge`**. You can also continue to use the commands **`ssh lou`** or **`ssh lou2`**, both of which have the same effect as **`ssh lfe`**.

Filesystems Accessibility

- The home filesystems of the old Lou2 system will be moved over to become the home filesystems of the new Lou2 system, and are accessible from both **`lfe1`** and **`lfe2`**. All data stored under **`/u/`*`username`*** of the old Lou2 will be available under **`/u/`*`username`*** of the new Lou2 after the transition.
- The Pleiades Lustre filesystems (called /nobackup) are mounted on **`lfe1`** and **`lfe2`**. You can transfer files between Pleiades' /nobackup and Lou's home filesystems by using the local file transfer commands **`cp`**, **`mcp`**, or **`shiftc`**. For example:

```
lfe1% cp /nobackup/your_username/filename /u/your_username
```

To create a tar file that contains the data in one of your Pleiades /nobackup subdirectories (for example, **`/nobackup/`*`your_username/mydir`***) and then store that tar file (for example, ***`mydir`*`.tar`**) under the **`lfe`** home filesystem, follow the example below:

```
lfe1% cd /nobackup/your_username
```

```
lfe1% tar cf /u/your_username/mydir.tar mydir
```

WARNING: The Columbia /nobackup filesystems are not mounted on the new Lou2 system. You can transfer files between Columbia's /nobackup filesystems and Lou2 home filesystems by using the commands **`scp`**, **`bbftp`**, or **`shiftc`**. Note the limitation on bbFTP, below.

Guidelines for Using the New Lou2

- Since the old Lou2 system was Itanium-based and the new Lou2 is x86_64-based, any executable that you compiled on the old system will have to be recompiled for the new Lou2. All Pleiades modules under /nasa are available on **`lfe1`** and **`lfe2`**. Note that there are no default modules on the new Lou2. Be sure to load the appropriate modules with the **`module load`** command prior to compilation.
- No postprocessing is allowed on **`lfe1`** and **`lfe2`**. The system monitoring tool **`query_wms`** will be running on **`lfe1`** and **`lfe2`** to kill any user process that uses more than 1 GB of memory.

- Since the hostnames **`lou, lou2`**, and **`lfe`** are all aliases, bbFTP will not work with them; bbFTP will only accept the hostnames **`lfe1.nas.nasa.gov`** and **`lfe2.nas.nasa.gov`**. Alternatively, the Shift tool may be used with any of the hostnames **`lou, lou2, lfe, lfe1`**, or **`lfe2`**, and it will automatically use **`bbftp`** behind the scenes with the appropriate hostname.