If you are moving large files, use the `shiftc` command instead of `cp` or `scp`. An online NAS service can help diagnose your remote network connection issues, and our network experts can work with your specific file transfer problems.

For fastest file transfer between NAS /nobackup and Lou, log into Lou and use `shiftc`, `cxfscp`, or `mcp`. A simple `cp` or `tar` will also work, but at slower speeds.

Moving large amounts of data efficiently to or from NAS across the network can be challenging. Often, minor system, software, or network configuration changes can increase network performance an order of magnitude or more.

If you are experiencing slow transfer rates, try these quick tips:

- NAS /nobackup are mounted on Lou, enabling disk-to-disk copying, which should give the highest transfer rates. You can use the `shiftc`, `cp`, or `mcp` commands to copy files or even make tar files directly from NAS /nobackup to your Lou home directory.
- If using the `scp` command, make sure you are using OpenSSH version 5 or later. Older versions of SSH have a hard limit on transfer rates and are not designed for WAN transfers. You can check your version of SSH by running the command `ssh -V`.
- For large files that are a gigabyte or larger, we recommend using `shiftc`. This application allows for transferring simultaneous streams of data and, when used without the `--secure` option, doesn't have the overhead associated with encrypting all the data (authentication is still encrypted).
- Another reliable option for large file transfers is through the Shift transfer tool, which includes options specific to the NAS environment, such as checking to see whether files residing on Lou are also on tape.

One-on-One Help

If you would like further assistance, contact the NAS Control Room at support@nas.nasa.gov, and a network expert will work with you or your local administrator one-on-one to identify methods for increasing your transfer rates.

To learn about other network-related support areas see End-to-End Networking Services.

Some users prefer to streamline the storage of files (created during a job run) to Lou, within a PBS job. Because direct access to the Lou storage nodes from the NAS compute nodes has been disabled, all file transfers to Lou within a PBS job must first go through one of the appropriate front-end systems (for example, PFEs for bro_ele, sky_ele, cas_ait, rom_ait).

Here is an example of what you can add to your PBS script to accomplish this:

1. ssh to a PFE (for example, pfe*21*) and create a directory on lou where the files are to be copied.

   ssh -q pfe*21* "ssh -q lou mkdir -p $SAVDIR"

   Here, $SAVDIR is assumed to have been defined earlier in the PBS script. Note the use of -q for quiet-mode, and double quotes so that shell variables are expanded prior to the ssh command being issued.

2. Use scp via a PFE to transfer the files.

   ssh -q pfe*21* "scp -q $RUNDIR/* lou:$SAVDIR"

   Here, $RUNDIR is assumed to have been defined earlier in the PBS script.

The following quick and easy techniques may improve your performance rates when transferring files remotely to or from NAS.

This can increase your transfer rates by 5x, compared to older methods such as 3des.

- Transfer files from the /nobackup filesystem, which is often faster than the locally mounted disks.
- If you are using scp and your data is compressible, try adding the -C option to enable file compression, which can sometimes double your performance rates:

  % scp -C *filename user@remote_host.com*:

- For SCP transfers, use a low-process-overhead cipher such as aes128-gcm@openssh.com or arcfour:

  % scp -c -aes128-gcm@openssh.com *filename user@remote_host.com*:

- If you are transferring files from Lou, make sure they are online, rather than on the tape archive, before you perform the transfer operation.

  Note: If you use the shiftc command to transfer your files, it will automatically bring any files that are on the tape archive online before it transfers them. If you are not using shiftc, use the following DMF commands to determine the location of your files and bring them online if necessary:

  % dmls -al *filename* # show the status of your file.
  % dmget *filename* # retrieve your file from tape prior to transferring.

  For a full list of DMF commands, see DMF commands.

- If you are transferring many small files, try using the tar command to compress them into a single file prior to transfer. Copying one large file is faster than transferring many small files.
- For files larger than a gigabyte, we recommended using the Shift Transfer Tool, which can achieve much faster rates than single-stream applications such as scp or rsync.

To improve your performance by modifying your system, see TCP Performance Tuning for WAN Transfers.

If you continue experiencing slow transfers and want to work with a network engineer to help improve file transfers, please contact the NAS Control Room at support@nas.nasa.gov.