What are the Data Transfer Nodes?

• The Data Transfer Nodes (DTN) are servers dedicated to data transfer at NERSC.
  – Nodes – dtn[01-04].nersc.gov

• DTNs have access to most of the NERSC file systems, and are tuned to transfer data efficiently.

• The Data Transfer Nodes are tuned for transferring large volumes of data between NERSC and other major facilities (ORNL, ANL etc.)

• Can also be used to move data between NERSC file systems and HPSS
In short …

• Use the DTNs if you want to move large volumes of data in and out of NERSC (or between NERSC systems)
Login Access

• All NERSC users have login access
• NERSC Users (non-JGI):
  – ssh dtn01.nersc.gov (or dtn02)
• JGI Users:
  – ssh dtn03.nersc.gov (or dtn04)
• Familiar module environment
  – module avail
DTN Filesystems

• All Global Filesystems (but not /scratch on Hopper and Edison)
  • /global/homes
  • /global/scratch2
  • /global/project
  • /global/projectb
  • /global/dna
  • /global/seqfs
  • /global/common
Transfer Tools

- Globus Online – reliably move large data sets in bulk
- scp – Copying individual files and directories
- hsi/htar – For HPSS data transfer
- bbcp – High performance CLI tool with minimal setup
- GridFTP – High performance CLI with grid certificates
Globus

- Managed 3rd party Transfers – http://globus.org
- CLI also available – ssh cli.globus.org
Quick Demo

• [http://globus.org](http://globus.org)
• Select `nersc#dtn` endpoint in the transfer window (autocomplete might take a while)
• Select remote endpoint
• Use point and click interface to submit transfer
• Transfer will happen in the background (including retries on failure).
• You can check back on status later
• Globus Connect allows you to have a private endpoint on your laptop
Other tools

• These are command line tools – use these directly from the DTN nodes or from a remote node
  – scp
  – bbcp
  – GridFTP (globus-url-copy)

• Detailed instructions, syntax etc.
  – http://tinyurl.com/nerscdtn
Secure Copy

- Uses SSH under the covers
- Good for “small” (~100s of MB)
  `scp localfile user@host:remotefile`
- We use high performance modifications (HPN SSH) to get us better throughput
BaBar Copy (bbcp)

- Developed for BaBar experiment at SLAC
- Peer-to-peer model (not client-server)
  - Must be installed on each end
    - Easy to build and/or install
    - Available on all NERSC systems
  - Can do third-party transfers
- Uses ssh authentication
- Many tuning options
- Good for larger files
- Somewhat complicated command-line
  [http://tinyurl.com/nerscbbcp/](http://tinyurl.com/nerscbbcp/)
GridFTP

- **Use Data Transfer nodes for wide-area transfers**
  - dtn01.nersc.gov
  - dtn02.nersc.gov
  - dtn03.nersc.gov
  - dtn04.nersc.gov

- **Use “grid” name for load-balanced hosts**
  - hoppergrid.nersc.gov
  - edisongrid.nersc.gov
  - carvergrid.nersc.gov
  - pdsfgrid.nersc.gov

- **Grid tools available via “module load globus”**
  - globus-url-copy

http://tinyurl.com/nersc-gridftp
External Collaborators

• FTP Upload
  – External collaborators can get temporary FTP accounts to upload data to a “dropbox” like area
  (http://tinyurl.com/nerscftp)
  – User will use `take` command to accept (email instructions will be sent)

• WWW Download
  – Create a www directory in your project space and put your data on the web
  – Available for public access at
    [http://portal.nersc.gov/project/<yourproject>](http://portal.nersc.gov/project/<yourproject>)
• To backup or archive your data use HSI and HTAR
  (http://tinyurl.com/nerschpss)
• Login to DTN node and run hsi/htar
  – Preferred to doing this from login nodes for long running transfers
• Can also to Globus Online transfer
  – nersc#dtn <-> nersc#hpss
Why DTNs?

- No firewall restrictions
- Tuned for WAN transfers
  - Fast network (ESnet), optimized configuration
- You don’t get booted for long running transfers
- Fixed endpoint (in case you need to tune firewalls on the other end)
- Dedicated support for data transfer
General Tips

• Use Globus for large automated or monitored transfers
• scp should be fine for smaller transfers (<100MB)
• Don’t use DTN nodes for non data transfer purposes
• Also: just use cp for transfer within filesystems
Performance Considerations

• Performance is most often limited by the remote endpoint
  – they often are not tuned for WAN transfers
  – often have a 1Gb/sec link.
  – These will lower performance < 100 MB/sec.

• File system contention may be an issue
  – Isn't much you can do except try the transfer at a different time
    or on a different FS.
  – You may need to consider the cost of lost time vs. transferring
    at a lower rate

• Don't use your $HOME directory!
  – Instead use /project, $SCRATCH or $GSCRATCH

• If you don’t think you are getting the performance you
  expect, let us know: consult@nersc.gov
For more information

• General DTN info

• Data transfer info
    (http://tinyurl.com/nerscdtn)

• Feedback / Problems?
  – [consult@nersc.gov](mailto:consult@nersc.gov)

• Globus Support
  – [https://www.globus.org/support/](https://www.globus.org/support/)
Thank you.