Data Transfer in HPC

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Workshop

Stefano Ansaloni

University of Manitoba

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Stefano Ansaloni

Cloud Computing Specialist at University of Manitoba

Software Developer and DevOps Specialist since 2017

Linux User/Admin since 2005



Tools for transferring data

Terminal user interface:

- SCP
- RSync
- Duck

Graphical user interface:

- WinSCP
- Cyberduck

Web user interface:

- Globus

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Secure Copy Protocol – SCP

The command **scp** is part of the OpenSSH suite and it behaves like the **cp** command.

It can copy a local file to a remote host:
`scp local_file remote_user@remote_host:/path/to/remote_file`

It can copy a remote file to the local pc:
`scp remote_user@remote_host:/path/to/remote_file local_file`

It is possible to specify a SSH private key as login credentials for the remote host:
`scp -i ssh_private_key ...`

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Secure Copy Protocol – SCP

Advantages

- Usually pre-installed on Unix systems
- Available for a wide range of operative systems
- Simple to use

Drawbacks

- Transfer resume not supported

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Remote Sync – RSync

The command **rsync** can be used to synchronize single files, or entire directories (either local, or remote).

When synchronizing files between hosts that allow SSH access, *RSync* does support encapsulation of the data stream in an SSH channel.

Example synchronizing a local directory to a remote host (trailing slashes "/" matter):

```
rsync --delete -AXSHax \
      local_dir/ \
      remote_user@remote_host:path/to/remote_dir/
```

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Remote Sync – RSync

Advantages

- Usually pre-installed on Unix systems
- Properly synchronize directories
- Can resume interrupted transfers

Drawbacks

- Slightly more complicated than *SCP*
- Requires extra options for controlling underlying SSH session

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Duck

Duck is the command line version of *Cyberduck*.
It is a server/cloud storage browser with support for multiple protocols (`SFTP`, `S3`, ...).

It can download files or directories from a remote host:

```
duck --download sftp://remote_user@remote_host/path/to/remote_file \
               local_file
```

It can upload files or directories to a remote host:

```
duck --upload sftp://remote_user@remote_host/path/to/remote_file \
             local_file
```

It is possible to specify a SSH private key as login credentials for the remote host:

```
duck -i ssh_private_key ...
```

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Advantages

- Properly synchronize directories
- Can resume interrupted transfers
- Can parallelize connections for a single transfer
- Supports multiple protocols

WinSCP

WinSCP is probably the most common choice for Windows users that want a graphical user interface to move files between their local computer and a remote host.

Its interface can be configured as “2-panes” (similar to Norton Commander), or as “single pane” (similar to Windows File Explorer).

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WinSCP

Advantages

- Look&Feel similar to other Windows applications
- Can resume interrupted transfers (only for some protocols)
- Supports multiple protocols

Drawbacks

- Only available for Windows

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Cyberduck

Cyberduck is probably the most common choice for Mac users that want a graphical user interface to move files between their local computer and a remote host.

It is a server/cloud storage browser with support for multiple protocols and a fairly easy interface.

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Cyberduck

Advantages

- Properly synchronize directories
- Can resume interrupted transfers
- Can parallelize connections for a single transfer
- Supports multiple protocols

Drawbacks

- Only available for Windows and Mac

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Globus

Globus is a service for fast, reliable, secure file transfer.

Designed specifically for researchers, it has an easy-to-use web interface with background monitoring features that automate the management of file transfers.

Globus transfers data between two so-called "Globus Endpoints" or "Data Collections".

Since the data can reside across different organizations, it provides a way to manage and link "identities" between these organizations to facilitate data transfers.

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Advantages

- Web interface (no desktop client needed)
- Automatically tuning transfer settings
- Automatically resume interrupted transfers

Drawbacks

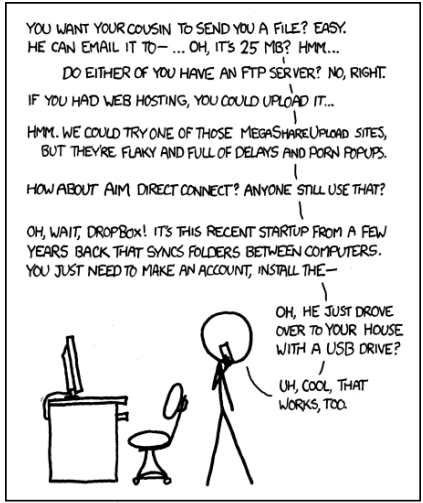
- Transfers only between “Globus Endpoints” (“Data Collections”)

Final thoughts

The tools presented are only few of those available online.

You must comply with any regulations or compliance policies that come with the data you are transferring (i.e. do not transfer data not belonging to you, or that contains information covered by any privacy act).

Avoid blindly downloading/running tools obtained from some obscure internet website.



I LIKE HOW WE'VE HAD THE INTERNET FOR DECADES, YET "SENDING FILES" IS SOMETHING EARLY ADOPTERS ARE STILL FIGURING OUT HOW TO DO.

XKCD [949]

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Questions?

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Thank you

