Data Archive
Infrastructure and Access

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UvA HPC Course : Data Management

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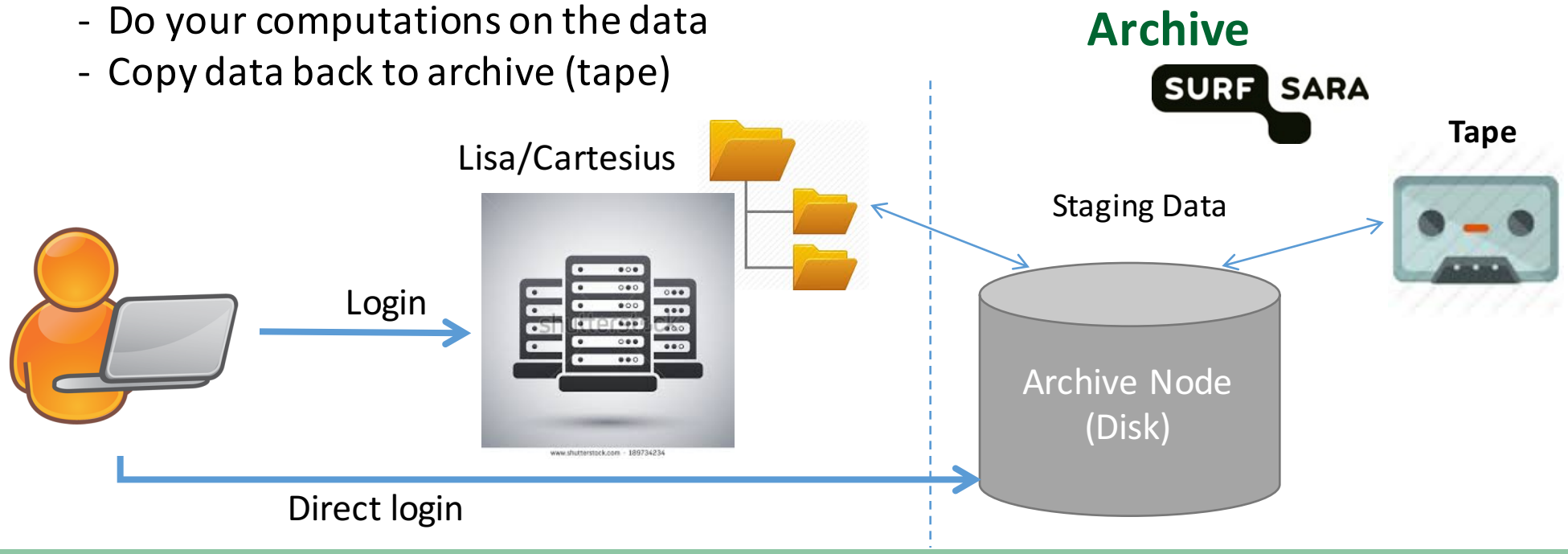
Data Archive - Long-term storage

- Long-term storage of data
- Storage medium: Tape → high latency
- Powerful transfer protocols (gridfTp, rsync, scp)
- Easy access from HPC services lisa and cartesius via NFS mounts → use archive as yet another directory

Data Archive Infrastructure

Data Archive infrastructure
- Direct access to Archive
- Access via HPC (NFS mounts, User sees the archive as another folder)

Workflow employing Archive from compute clusters at SURFsara:
- User logs in to Lisa/Cartesius
- Do your computations on the data
- Copy data back to archive (tape)

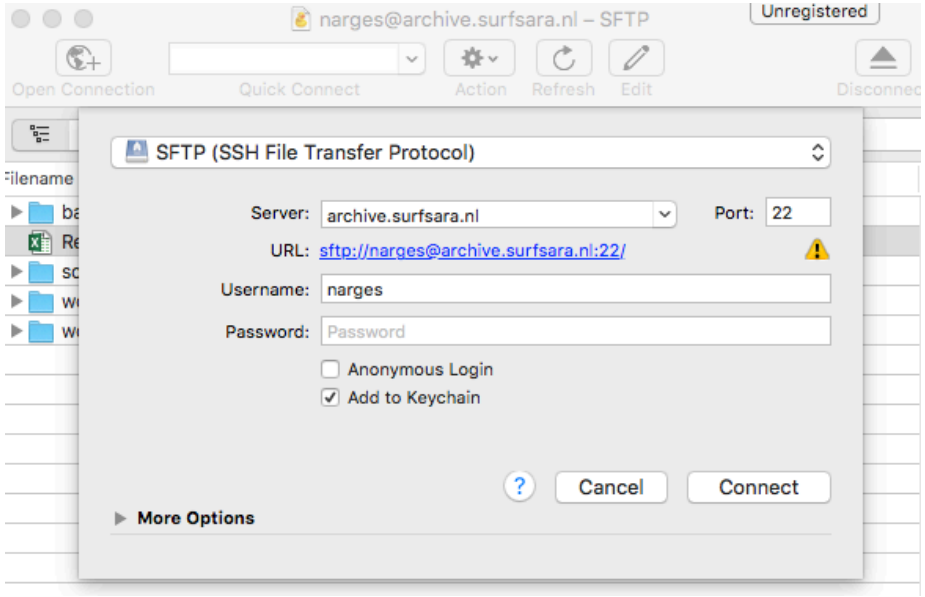


Archive Usage – Best practices

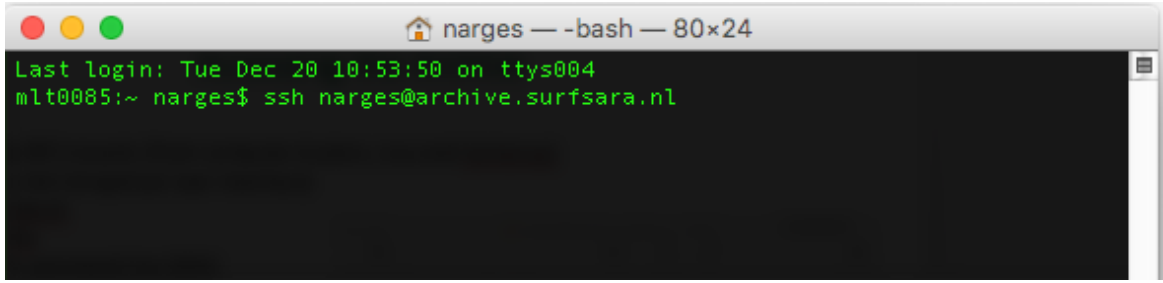
- Try to store files of significant size (> 1 GB) as much as possible. Smaller files will always be accepted, but will lower the performance of restoring your files from tape.
- If you have many small files, make sure to pack them using a file archiving tool like tar or dmftar.
- Try to pack your files before uploading them to the archive.
- Organize your files in such a way that in case the files are needed again only parts of the data set need to be restored from tape.
- Avoid storing unpacked software packages, these usually contain a lot of small files. Instead pack these as well, or refer to a specific software repository.

Data Archive Access

- Access via graphical user interface (GUI)
  - A transfer client that support SSH File Transfer Protocol (SFTP)
    - **Cyberduck** (Mac and Windows)
    - **Filezilla** (Linux)
    - **MobaXterm** (Windows)



- Access via command line interface (CLI)
  - Terminal (preinstalled on Mac and Linux)
  - MobaXterm (Windows)

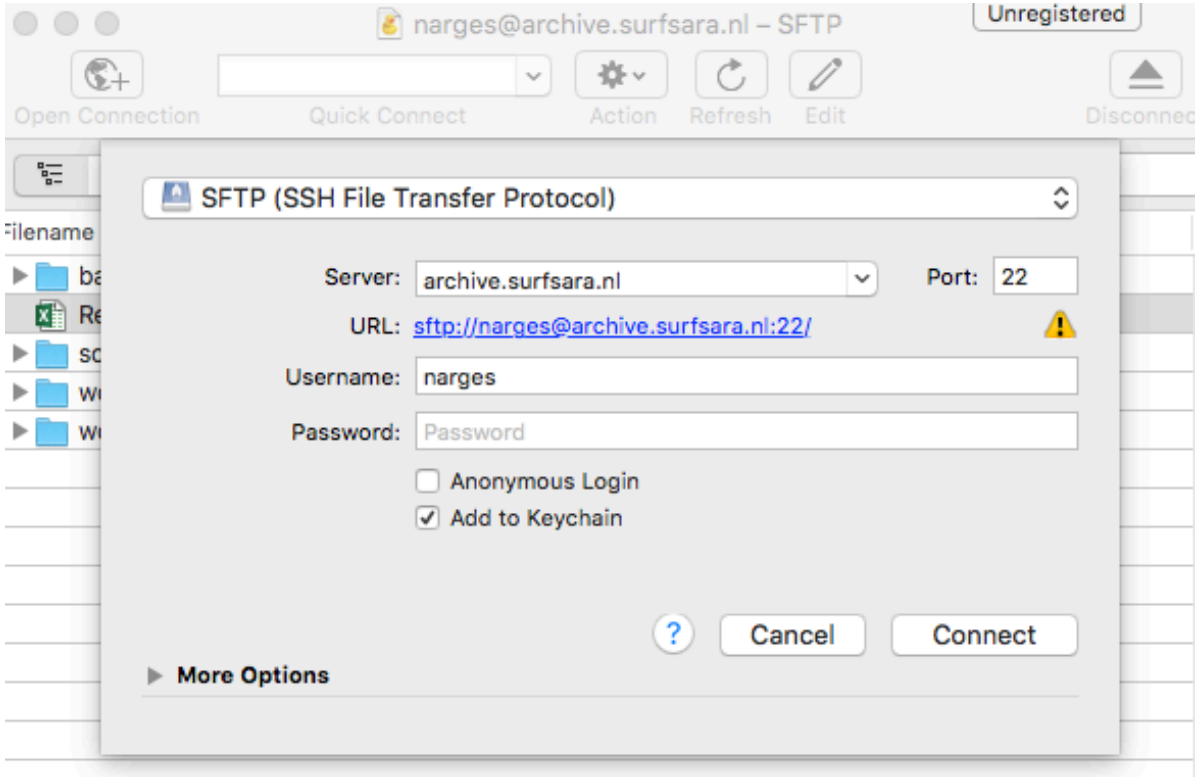


- Access via NFS mounts (Also via command line, only possible from compute clusters, Lisa and Cartesius)

Access Archive via GUI

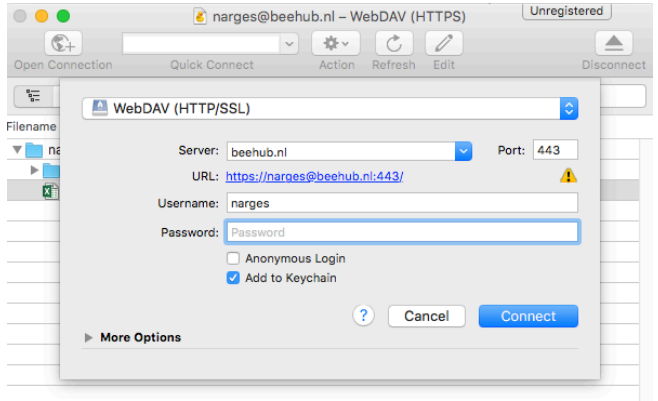
Cyberduck

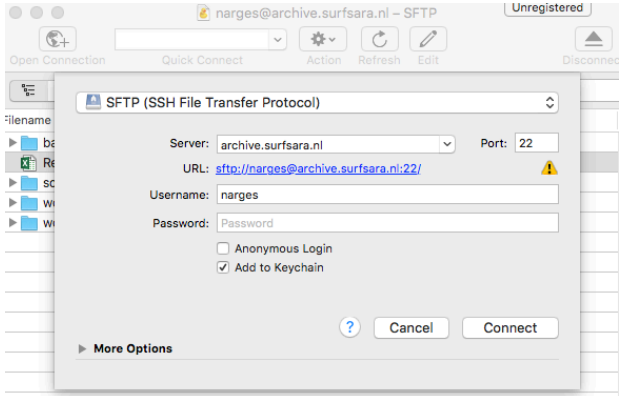
- Cyberduck is a standalone client that runs on Windows and Mac OSX
  - Download and install: http://cyberduck.ch/
- To start an Archive session with Cyberduck:
  - Start Cyberduck
  - Click on 'Open connection'
  - You now see this screen
  - Choose the following options:
    - Connection type: SFTP (SSh File Transfer Protocol)
    - Server: archive.surfsara.nl
    - port: 22
    - Login with your credentials (sdemo<xxx>)

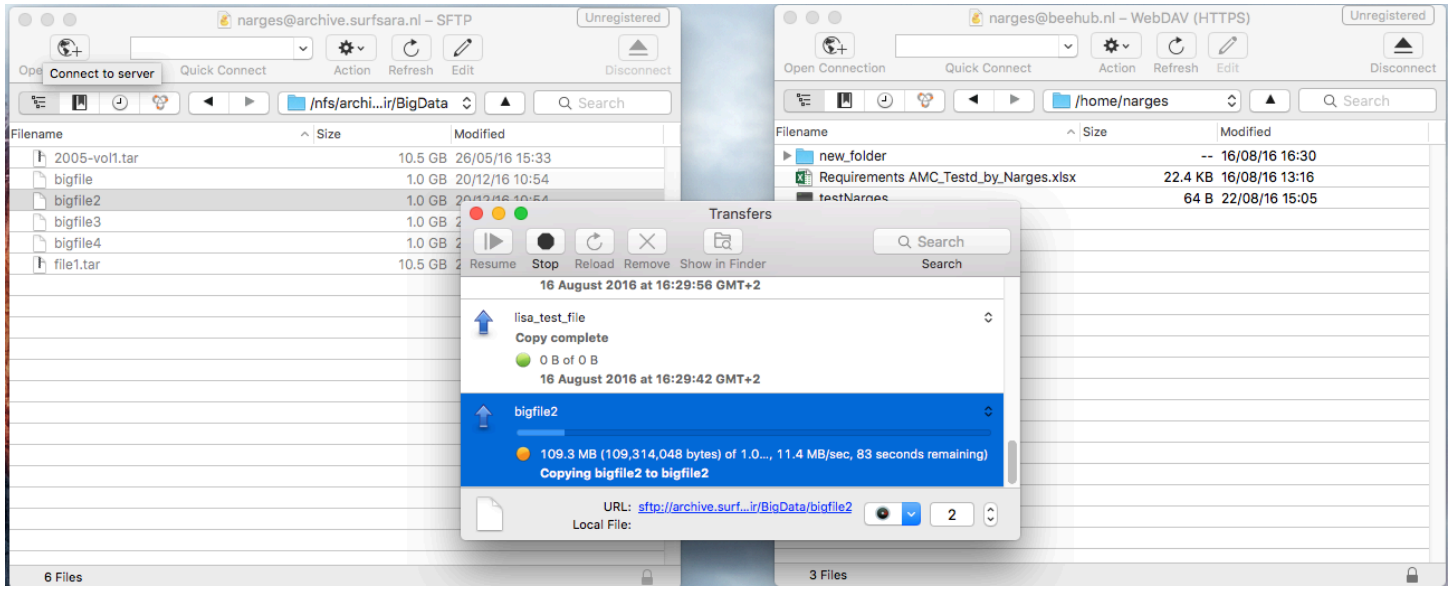


Transfer Data using Cyberduck

- To transfer data between services using Cyberduck:
  - Start Cyberduck
  - Establish a connection to the Archive
  - Establish another connection to BeeHub
  - Simply drag and drop files to transfer data

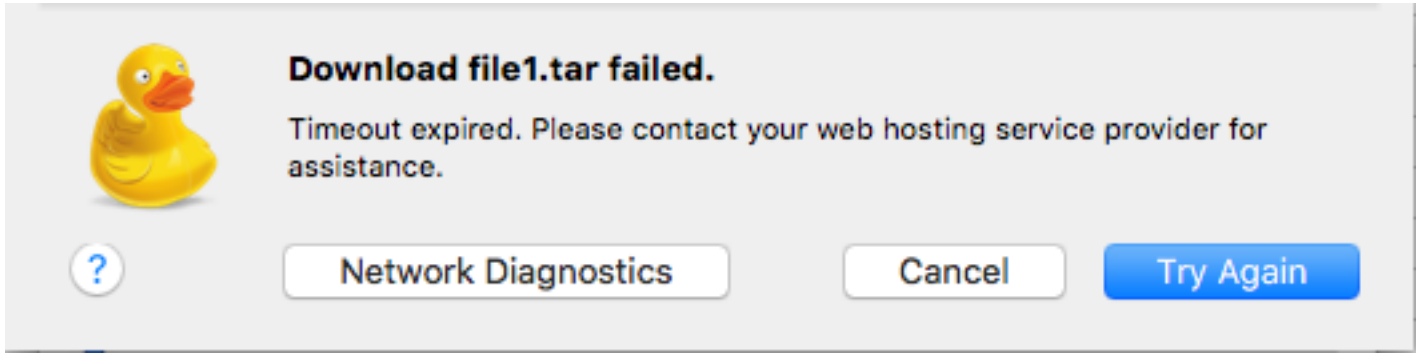




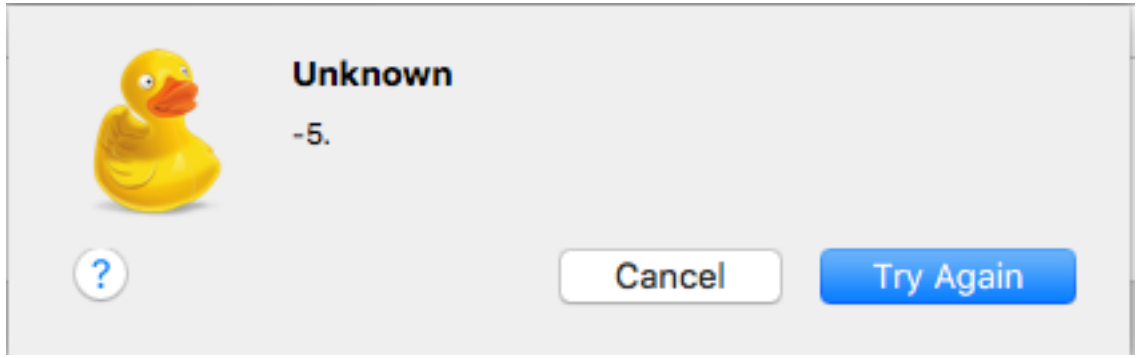


Transfer Data using Cyberduck

- Error: If the file is on tape, and not on disk. The files needs to be stages first.

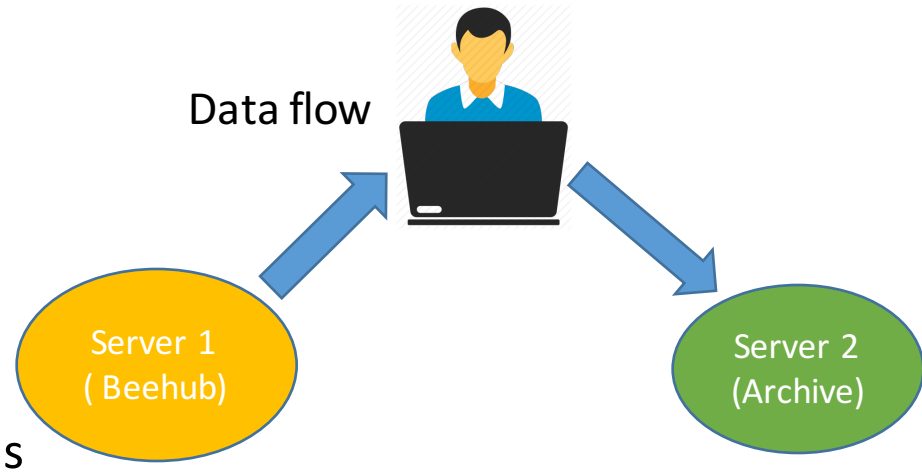


- Error: If the internet connection is lost.



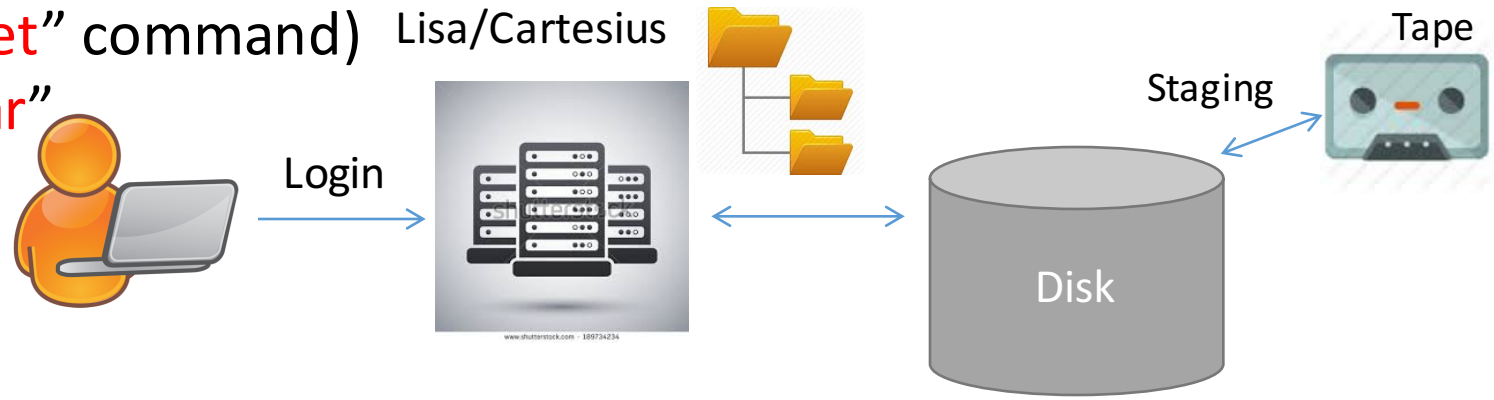
Advantages & Limitations of GUI access

- Advantages:
  - Easy data transfer (to the archive)
  - Good for dumping data to the archive, and not fetching data
  - Transfer data between services (Only possible for small data)
  - Can be accessed from Windows, Mac and Linux machines
- Limitations
  - The data flows via the user laptop. Therefore the transfer depends on your local storage and connectivity (If the connection is lost, the transfer is lost).
  - Only for small data files
  - Does not always work for fetching data (data needs to be staged first)
  - You can't see the status of the data (i.e. weather the data is on disk or on tape).



Archiving Workflow

- In all cases:
  - User logs in to Lisa / Cartesius
  - User's archive home folder is mounted as folder `/archive/<username>`
- Storing data:
  - Pack your data using tar or "dmftar" locally
  - Copy to archive
- Retrieving data:
  - Stage archived data ("dmget" command)
  - Unpack using tar or "dmftar"
- Direct archive access:
  - archive.surfsara.nl (CLI)



Optimal archiving using dmftar

dmftar is …

- Wrapper for GNU tar, developed in-house by SURFsara.
- Creates archive files of any size (default 10 GB).
- Can transfer data automatically to and from the archive file system.
- Available on Data Archive, Lisa cluster or Cartesius supercomputer.
- Contains the same information as tarballs, plus more:
  - Checksum of each tarball (default checksum algorithm is md5, but others are supported as well, i.e sha1, sha224,…)
  - File index: list of files and directory structure
- Understands underlying storage infrastructure: ‘tape-aware’
  - Automatically stages your archived files

Archiving tools: comparison

- tar:
  - Available everywhere!
  - All Linux distributions and OS X by default
  - Windows requires installation: Tar for Windows
- dmftar:
  - Only available on Lisa / Cartesius / archive
  - Automates extra tasks concerning data archiving
  - Ideal for archiving data on the Data Archive!

Archiving tools: dmftar

- tar syntax:

```
tar [OPTIONS] <tarball> <input-files..>
```

- dmftar syntax:

```
dmftar [TASK] [OPTIONS] -f <dmftar-archive> <input-files>
```

- Note: always use the right extension (‘tar’ and ‘dmftar’) for your archives!

Archiving tools: dmget & dmput

- Staging data from tape on the archive:

```
dmget –a [file]
```

- Pushing data to tape on the archive:

```
dmput [–r] [file]
```

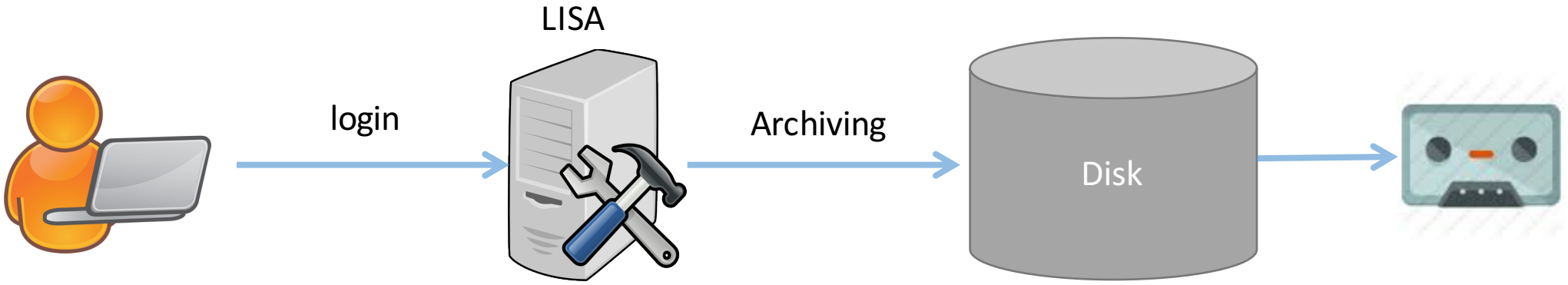
- Wildcards are accepted!

Thank you!

Thanks to:
Hans van Piggelen
Arthur Newton
Christine Staiger
Jeroen Engelberts

Hands-on: Archiving Data

- Archiving data using dmftar
  - Login to LISA
  - Explore the environment
    - Connection to archive
    - DMF commands
  - Start an archiving workflow



Link to the hands on material: https://goo.gl/3GLudN