Data transfers without SRM

To transfer a file without SRM, `globus-url-copy` is commonly used. It is a command line program for file transfers which implements different protocols, among which *gridFTP*, an extension of FTP for file transfers. It supports parallel transfer streams and third-party-copy.

A personal certificate is required in order to use *gridFTP*. Also, the user DN has to be enabled on the *gridFTP* server by the sysadmin. The DN can be obtained from the certificate using the command:

```
openssl x509 -noout -in $HOME/.globus/usercert.pem -subject
```

Then, it should be communicated to the User Support team in order to be enabled.

Before performing the actual file transfer, it is necessary to generate a proxy with the command:

```
grid-proxy-init
```

By default, the proxy lasts 12 hours. In order to extend proxy life time, the following options can be used:

```
-valid HOURS:MINUTES
-hours HOURS
```

For example:

```
-bash-4.2$ grid-proxy-init -hours 48
Your identity: /DC=org/DC=terena/DC=tcs/C=IT/O=Istituto Nazionale di Fisica Nucleare/CN=Andrea Rendina
arendina@infn.it
Enter GRID pass phrase for this identity:
Creating proxy ..................................... Done
Your proxy is valid until: Sun Aug 2 17:47:32 2020
```

After that, we can perform the transfers. This depends on the permissions and the access control list on the filesystem.
To write:

```
globus-url-copy <local_path>/file gsiftp://gridftp-plain-virgo.cr.cnaf.infn.it:2811/<remote_path>/file
```

To read, i.e. to get a local copy:

```
globus-url-copy gsiftp://gridftp-plain-virgo.cr.cnaf.infn.it:2811/<remote_path>/file local_copy
```

The `<remote_path>` (something like: */storage/gpfs_data/experiment*) will be communicated to the user by the User Support team.
Also, the `globus-url-copy` command allows to do a third-party-copy of a file without getting a local copy on your own device.
This works with a simple concatenation of read and write:

```
globus-url-copy gsiftp://gridftp-plain-virgo.cr.cnaf.infn.it:2811/<source_remote_path_>/file gsiftp://gridftp-
plain-virgo.cr.cnaf.infn.it:2811/<destination_remote_path>/new_file
```

The full list of the additional options is available using:

```
man globus-url-copy
```

Some useful options:

- **`-f FILENAME`** : read a list of URL pairs from filename. Each line should contain sourceURL destURL. Enclose URLs with spaces in double qoutes ("). Blank lines and lines beginning with # will be ignored.
- **`-df FILENAME, -dumpfile FILENAME`** : path to a file where untransferred URLs will be saved for later restarting. Resulting file is the same format as the -f input file. If file exists, it will be read and all other URL input will be ignored.
- **`-cd, -create-dest`** : create destination directory if needed.
- **`-r`** : copy files in subdirectories
- **`-v, -verbose :`** display URLs being transferred
- **`-p PARALLELISM, -parallel PARALLELISM :`** specify the number of parallel data connections should be used.
- **`-list URL :`** list the files located at URL.
- **`-sync :`** only transfer files where the destination does not exist or differs from the source. -sync-level controls how to determine if files differ.

- **`-sync-level number :`** criteria for determining if files differ when performing a sync transfer. The default sync level is 2.
  The available levels are:
    - *Level 0*: will only transfer if the destination does not exist.
    - *Level 1*: will transfer if the size of the destination does not match the size of the source.
    - *Level 2*: will transfer if the time stamp of the destination is older than the time stamp of the source.
    - *Level 3*: will perform a checksum of the source and destination and transfer if the checksums do not match.

A user can also use the gfal tools, that are explained in the following paragraphs, for example to list the files of a directory or remove a file, respectively:

```
gfal-ls gsiftp://gridftp-plain-virgo.cr.cnaf.infn.it:2811/<remote_path>/directory
gfal-rm gsiftp://gridftp-plain-virgo.cr.cnaf.infn.it:2811/<remote_path>/file
```