# WOS Storage Quick Start Guide

Overview of the storage infrastructure

Storage is an important part of a cluster. But not all the storage has the same characteristics. HPC cluster storage at KU Leuven consists of 3 different storage Tiers, optimized for different usage

- NAS storage, fully back-up with snapshots for /home and /data
- Scratch storage, fast parallel filesystem
- Archive storage, to store large amounts of data for long time

The picture below gives a quick overview of the different components.
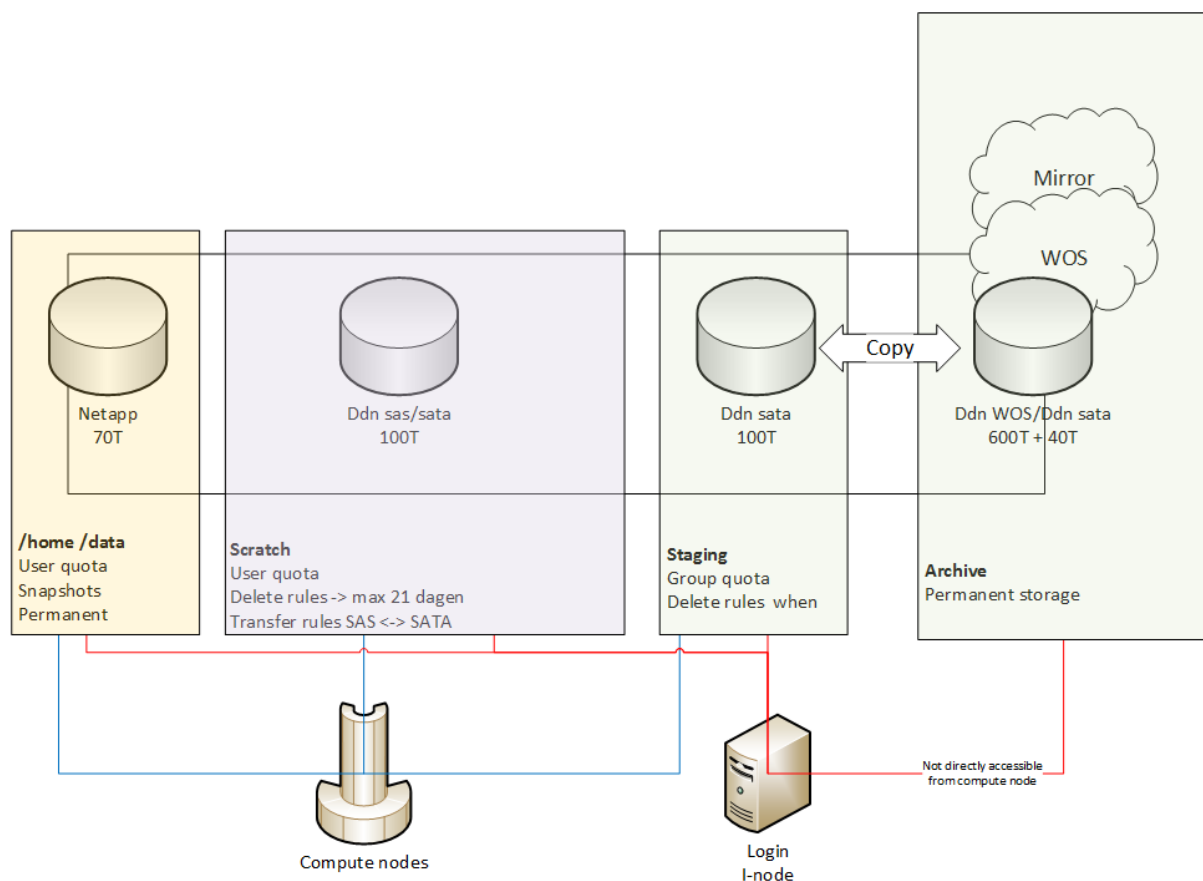
Storage Types

As described on https://www.vscentrum.be/cluster-doc/access-data-transfer/where-store-data different types of data can be stored in different places. There is also an extra storage space for Archive use.

Archive Storage

What

The archive tier is built with DDN WOS storage. It is intended to store data for longer term. The storage is optimized for capacity, not for speed. The storage by default is mirrored.

No deletion rules are executed on this storage. The data will be kept until the user deletes it.

Use for

Store data that will not be used for a longer period and which should be kept. Compute nodes have no direct access to that storage area and therefore it should not be used for jobs I/O operations.

How to request

Please send a request from the storage request webpage: https://admin.kuleuven.be/icts/onderzoek/hpc/hpc-storage.

How much does it cost

For all the prices please refer to our service catalog: https://icts.kuleuven.be/sc/english/HPC.

Working with archive storage

The archive storage should not be used to perform I/O in a compute job. Data should first be copied to the faster scratch filesystem. To accommodate user groups that have a large archive space, a staging area is foreseen. The staging area is a part of the same hardware platform as the fast scratch filesystem, but other rules apply. Data is not deleted automatically after 21 days. When the staging area is full it will be the user's responsibility to make sure that enough space is available. Data created on scratch or in the staging location which needs to be kept for longer time should be copied to the archive.

Location of Archive/Staging

The name of user's archive directory is in the format: /archive/leuven/arc_XXXXX, where XXXXX is a number and this will be given to the user by HPC admin once your archive requested is handled.

The name of your staging directory is in this format: /staging/leuven/stg_XXXXX, where XXXXX is the same number as for the archive directory.

Use case: Data is in archive, how can I use it in a compute job?

In this use case you want to start to compute on older data in your archive.

If you want to compute with data in your archive stored in 'archive_folder'. You can copy this data to your scratch using the following command.

```
rsync -a <PATH_to_archive/archive_folder> <PATH_to_scratch>
```

Afterwards you may want to archive the new produced results back to archive therefore you should follow the steps in the following use case.

Use case: Data produced on cluster, stored for longer time?

This procedure applies to the case when you have jobs producing output results on the scratch area and you want to archive those results in your archive area.

In that case you have a folder on scratch called 'archive_folder' in which you are working. And the same folder already exists in your archive space. Now you want to update your archive space with the new results produced on scratch.

You could run the command:

```
rsync -i -u -r --dry-run <PATH_to_scratch/archive_folder>
<PATH_to_archive/archive_folder>
```

This command will not perform the copy yet but it will give an overview of all data changed since last copy from archive. Therefore not all data needs to be copied back. If you agree with this overview you can run this command without the --dry-run' option. If you are synching a large amount files, please contact HPC support for follow-up.

Use case : How to get local data on archive?

Data that is stored at the user's local facilities can be copied to the archive through scp/bbcp/sftp methods. For this please refer to the appropriate VSC documentation here:
https://www.vscentrum.be/client/linux/data-openssh (for linux)
https://www.vscentrum.be/client/windows/filezilla and
https://www.vscentrum.be/client/windows/winscp (for windows)
https://www.vscentrum.be/client/macosx/data-cyberduck (for OS X)

Use case : How to check the disk usage?

To check the occupied disk space additional option is necessary with du command:

```
du --apparent-size folder-name
```

How to stage in or stage out using torque?

Torque gives also the possibility to specify data staging as a job requirement. This way Torque will copy your data to scratch while your job is in the queue and will not start the job before all data is copied. The same mechanism is possible for stageout requirements. In the example below Torque will copy back your data from scratch when your job is finished to the archive storage tier:

```
qsub -W
stagein=/scratch/leuven/3XX/vsc3XXXX@login1:/archive/leuven/arc_000X
X/foldertostagein -W
stageout=/scratch/leuven/3XX/vsc3XXXX/foldertostageout@login1:/archi
ve/leuven/arc_000XX/
```

Hostname is always one of the login nodes because these are the only nodes where 'archive' is available on the cluster.

For **stagein** the copy goes from /archive/leuven/arc_000XX/foldertostagein to
/scratch/leuven/3XX/vsc3XXXX
For **stageout** the copy goes from /scratch/leuven/3XX/vsc3XXXX/foldertostageout to
/archive/leuven/arc_000XX/