

## **Wikiprint Book**

**Title: File Systems**

**Subject: DEEP - Public/User\_Guide/Filesystems**

**Version: 36**

**Date: 30.04.2024 03:55:54**

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## File Systems

### Available file systems

On the DEEP-EST system, three different groups of file systems are available:

- the [JSC GPFS file systems](#), provided via [?JUST](#) and mounted on all JSC systems;
- the DEEP-EST parallel BeeGFS file systems, available on all the nodes of the DEEP-EST system;
- the file systems local to each node.

The users home folders are placed on the shared GPFS file systems. With the advent of the new user model at JSC ([?JUMO](#)), the shared file systems are structured as follows:

- **\$HOME**: each JSC user has a folder under `/p/home/jusers/`, in which different home folders are available, one per system he/she has access to. These home folders have a low space quota and are reserved for configuration files, ssh keys, etc.
- **\$PROJECT**: In JUMO, data and computational resources are assigned to projects: users can request access to a project and use the resources associated to it. As a consequence, each user can create folders within each of the projects he/she is part of (with either personal or permissions to share with other project members). For the DEEP project, the project folder is located under `/p/project/cdeep/`. Here is where the user should place data, and where the old files generated in the home folder before the JUMO transition can be found.

The DEEP-EST system doesn't mount the **\$SCRATCH** file systems from GPFS, as it is expected to provide similar functionalities with its own parallel and local file systems.

The `deepv` login node exposes the same file systems as the compute nodes, but it lacks a local scratch file system. Since `/tmp` is very limited in size on `deepv` please use **\$SCRATCH** instead (pointing to the project folder) or use e.g. the `/pmem/scratch` on the `dp-dam` partition **\$LOCALSCRATCH** on any other compute node when performing SW installation activities. **A quota has been introduced for `/tmp` on `deepv` to avoid clogging of this filesystem on the login node which will lead to several issues. Additionally, files in `/dev/shm`, `/tmp` and `/var/tmp` older than 7 days will be removed regularly**

The following table summarizes the characteristics of the file systems available in the DEEP-EST and DEEP-ER (SDV) systems. **Please beware that the `$project` (all lowercase) variable used in the table only represents any JuDoor project the user might have access to, and that it is not really exported on the system environment.** For a list of all projects a user belongs to, please refer to the user's [?JuDoor page](#). Alternatively, users can check the projects they are part of with the `jutil` application:

```
$ jutil user projects -o columns
```

System	File System	Mount Point	Access Mode	Quota	Notes
DEEP-EST	GPFS	/p/home/jusers/	rw	Low	Home folders
DEEP-EST	BeeGFS	/p/project/cdeep/	rw	High	Project data
DEEP-EST	Local	/tmp	rw	Low	Temporary files
DEEP-EST	Local	/var/tmp	rw	Low	Temporary files
DEEP-EST	Local	/dev/shm	rw	Low	Shared memory
DEEP-ER (SDV)	GPFS	/p/home/jusers/	rw	Low	Home folders
DEEP-ER (SDV)	BeeGFS	/p/project/cdeep/	rw	High	Project data
DEEP-ER (SDV)	Local	/tmp	rw	Low	Temporary files
DEEP-ER (SDV)	Local	/var/tmp	rw	Low	Temporary files
DEEP-ER (SDV)	Local	/dev/shm	rw	Low	Shared memory

## Stripe Pattern Details

It is possible to query this information from the deep login node, for instance:

```
manzano@deep $ fhgfs-ctl --getentryinfo /work/manzano
Path: /manzano
Mount: /work
EntryID: 1D-53BA4FF8-3BD3
Metadata node: deep-fs02 [ID: 15315]
Stripe pattern details:
+ Type: RAID0
+ Chunksize: 512K
+ Number of storage targets: desired: 4

manzano@deep $ beegfs-ctl --getentryinfo /sdv-work/manzano
Path: /manzano
Mount: /sdv-work
EntryID: 0-565C499C-1
Metadata node: deeper-fs01 [ID: 1]
Stripe pattern details:
+ Type: RAID0
+ Chunksize: 512K
+ Number of storage targets: desired: 4
```

Or like this:

```
manzano@deep $ stat -f /work/manzano
File: "/work/manzano"
ID: 0      Namelen: 255      Type: fhgfs
Block size: 524288      Fundamental block size: 524288
Blocks: Total: 120178676 Free: 65045470 Available: 65045470
Inodes: Total: 0        Free: 0

manzano@deep $ stat -f /sdv-work/manzano
File: "/sdv-work/manzano"
ID: 0      Namelen: 255      Type: fhgfs
Block size: 524288      Fundamental block size: 524288
Blocks: Total: 120154793 Free: 110378947 Available: 110378947
Inodes: Total: 0        Free: 0
```

See <http://www.beegfs.com/wiki/Striping> for more information.

## Additional infos

Detailed information on the **BeeGFS Configuration** can be found [?here](#).

Detailed information on the **BeeOND Configuration** can be found [?here](#).

Detailed information on the **Storage Configuration** can be found [?here](#).

Detailed information on the **Storage Performance** can be found [?here](#).

## Notes

- dd test @dp-dam01 of the DCPMM in appdirect mode:

```
[root@dp-dam01 scratch]# dd if=/dev/zero of=./delme bs=4M count=1024 conv=sync
1024+0 records in
1024+0 records out
4294967296 bytes (4.3 GB) copied, 1.94668 s, 2.2 GB/s
```

- The /work file system which is available in the DEEP-EST prototype, is as well reachable from the nodes in the SDV (including KNLs and ml-gpu nodes) but through a slower connection of 1 Gb/s. The file system is therefore not suitable for benchmarking or I/O task intensive jobs from those nodes
- Performance tests (IOR and mdtest) reports are available in the BSCW under DEEP-ER → Work Packages (WPs) → WP4 → T4.5 - Performance measurement and evaluation of I/O software → Jülich DEEP Cluster → Benchmarking reports:  
[?https://bscw.zam.kfa-juelich.de/bscw/bscw.cgi/1382059](https://bscw.zam.kfa-juelich.de/bscw/bscw.cgi/1382059)
- Test results and parameters used are stored in JUBE:

```
user@deep $ cd /usr/local/deep-er/sdv-benchmarks/synthetic/ior
user@deep $ jube2 result benchmarks

user@deep $ cd /usr/local/deep-er/sdv-benchmarks/synthetic/mdtest
user@deep $ jube2 result benchmarks
```