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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 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
```

Mount Point	User can unmount/modify	Cluster	Type	Mount/Local	DEE Version	Native Parallel Storage	Mount/Local	Native Parallel Storage	Other
deeph1	no	DEEP-EST	GPFS	deeph1	1.12	no	deeph1	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph2	no	DEEP-EST	GPFS	deeph2	1.12	no	deeph2	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph3	no	DEEP-EST	GPFS	deeph3	1.12	no	deeph3	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph4	no	DEEP-EST	GPFS	deeph4	1.12	no	deeph4	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph5	no	DEEP-EST	GPFS	deeph5	1.12	no	deeph5	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph6	no	DEEP-EST	GPFS	deeph6	1.12	no	deeph6	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph7	no	DEEP-EST	GPFS	deeph7	1.12	no	deeph7	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph8	no	DEEP-EST	GPFS	deeph8	1.12	no	deeph8	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph9	no	DEEP-EST	GPFS	deeph9	1.12	no	deeph9	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph10	no	DEEP-EST	GPFS	deeph10	1.12	no	deeph10	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph11	no	DEEP-EST	GPFS	deeph11	1.12	no	deeph11	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph12	no	DEEP-EST	GPFS	deeph12	1.12	no	deeph12	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph13	no	DEEP-EST	GPFS	deeph13	1.12	no	deeph13	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph14	no	DEEP-EST	GPFS	deeph14	1.12	no	deeph14	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph15	no	DEEP-EST	GPFS	deeph15	1.12	no	deeph15	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph16	no	DEEP-EST	GPFS	deeph16	1.12	no	deeph16	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph17	no	DEEP-EST	GPFS	deeph17	1.12	no	deeph17	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph18	no	DEEP-EST	GPFS	deeph18	1.12	no	deeph18	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph19	no	DEEP-EST	GPFS	deeph19	1.12	no	deeph19	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph20	no	DEEP-EST	GPFS	deeph20	1.12	no	deeph20	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph21	no	DEEP-EST	GPFS	deeph21	1.12	no	deeph21	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph22	no	DEEP-EST	GPFS	deeph22	1.12	no	deeph22	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph23	no	DEEP-EST	GPFS	deeph23	1.12	no	deeph23	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph24	no	DEEP-EST	GPFS	deeph24	1.12	no	deeph24	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph25	no	DEEP-EST	GPFS	deeph25	1.12	no	deeph25	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph26	no	DEEP-EST	GPFS	deeph26	1.12	no	deeph26	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph27	no	DEEP-EST	GPFS	deeph27	1.12	no	deeph27	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph28	no	DEEP-EST	GPFS	deeph28	1.12	no	deeph28	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph29	no	DEEP-EST	GPFS	deeph29	1.12	no	deeph29	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph30	no	DEEP-EST	GPFS	deeph30	1.12	no	deeph30	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph31	no	DEEP-EST	GPFS	deeph31	1.12	no	deeph31	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph32	no	DEEP-EST	GPFS	deeph32	1.12	no	deeph32	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph33	no	DEEP-EST	GPFS	deeph33	1.12	no	deeph33	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph34	no	DEEP-EST	GPFS	deeph34	1.12	no	deeph34	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph35	no	DEEP-EST	GPFS	deeph35	1.12	no	deeph35	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph36	no	DEEP-EST	GPFS	deeph36	1.12	no	deeph36	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph37	no	DEEP-EST	GPFS	deeph37	1.12	no	deeph37	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph38	no	DEEP-EST	GPFS	deeph38	1.12	no	deeph38	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph39	no	DEEP-EST	GPFS	deeph39	1.12	no	deeph39	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph40	no	DEEP-EST	GPFS	deeph40	1.12	no	deeph40	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph41	no	DEEP-EST	GPFS	deeph41	1.12	no	deeph41	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph42	no	DEEP-EST	GPFS	deeph42	1.12	no	deeph42	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph43	no	DEEP-EST	GPFS	deeph43	1.12	no	deeph43	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph44	no	DEEP-EST	GPFS	deeph44	1.12	no	deeph44	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph45	no	DEEP-EST	GPFS	deeph45	1.12	no	deeph45	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph46	no	DEEP-EST	GPFS	deeph46	1.12	no	deeph46	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph47	no	DEEP-EST	GPFS	deeph47	1.12	no	deeph47	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph48	no	DEEP-EST	GPFS	deeph48	1.12	no	deeph48	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph49	no	DEEP-EST	GPFS	deeph49	1.12	no	deeph49	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph50	no	DEEP-EST	GPFS	deeph50	1.12	no	deeph50	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph51	no	DEEP-EST	GPFS	deeph51	1.12	no	deeph51	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph52	no	DEEP-EST	GPFS	deeph52	1.12	no	deeph52	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph53	no	DEEP-EST	GPFS	deeph53	1.12	no	deeph53	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph54	no	DEEP-EST	GPFS	deeph54	1.12	no	deeph54	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph55	no	DEEP-EST	GPFS	deeph55	1.12	no	deeph55	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph56	no	DEEP-EST	GPFS	deeph56	1.12	no	deeph56	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph57	no	DEEP-EST	GPFS	deeph57	1.12	no	deeph57	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph58	no	DEEP-EST	GPFS	deeph58	1.12	no	deeph58	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph59	no	DEEP-EST	GPFS	deeph59	1.12	no	deeph59	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph60	no	DEEP-EST	GPFS	deeph60	1.12	no	deeph60	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph61	no	DEEP-EST	GPFS	deeph61	1.12	no	deeph61	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph62	no	DEEP-EST	GPFS	deeph62	1.12	no	deeph62	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph63	no	DEEP-EST	GPFS	deeph63	1.12	no	deeph63	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph64	no	DEEP-EST	GPFS	deeph64	1.12	no	deeph64	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph65	no	DEEP-EST	GPFS	deeph65	1.12	no	deeph65	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph66	no	DEEP-EST	GPFS	deeph66	1.12	no	deeph66	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph67	no	DEEP-EST	GPFS	deeph67	1.12	no	deeph67	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph68	no	DEEP-EST	GPFS	deeph68	1.12	no	deeph68	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph69	no	DEEP-EST	GPFS	deeph69	1.12	no	deeph69	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph70	no	DEEP-EST	GPFS	deeph70	1.12	no	deeph70	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph71	no	DEEP-EST	GPFS	deeph71	1.12	no	deeph71	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph72	no	DEEP-EST	GPFS	deeph72	1.12	no	deeph72	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph73	no	DEEP-EST	GPFS	deeph73	1.12	no	deeph73	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph74	no	DEEP-EST	GPFS	deeph74	1.12	no	deeph74	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph75	no	DEEP-EST	GPFS	deeph75	1.12	no	deeph75	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph76	no	DEEP-EST	GPFS	deeph76	1.12	no	deeph76	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph77	no	DEEP-EST	GPFS	deeph77	1.12	no	deeph77	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph78	no	DEEP-EST	GPFS	deeph78	1.12	no	deeph78	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph79	no	DEEP-EST	GPFS	deeph79	1.12	no	deeph79	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph80	no	DEEP-EST	GPFS	deeph80	1.12	no	deeph80	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph81	no	DEEP-EST	GPFS	deeph81	1.12	no	deeph81	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph82	no	DEEP-EST	GPFS	deeph82	1.12	no	deeph82	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph83	no	DEEP-EST	GPFS	deeph83	1.12	no	deeph83	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph84	no	DEEP-EST	GPFS	deeph84	1.12	no	deeph84	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph85	no	DEEP-EST	GPFS	deeph85	1.12	no	deeph85	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph86	no	DEEP-EST	GPFS	deeph86	1.12	no	deeph86	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph87	no	DEEP-EST	GPFS	deeph87	1.12	no	deeph87	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph88	no	DEEP-EST	GPFS	deeph88	1.12	no	deeph88	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph89	no	DEEP-EST	GPFS	deeph89	1.12	no	deeph89	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph90	no	DEEP-EST	GPFS	deeph90	1.12	no	deeph90	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph91	no	DEEP-EST	GPFS	deeph91	1.12	no	deeph91	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph92	no	DEEP-EST	GPFS	deeph92	1.12	no	deeph92	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph93	no	DEEP-EST	GPFS	deeph93	1.12	no	deeph93	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph94	no	DEEP-EST	GPFS	deeph94	1.12	no	deeph94	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph95	no	DEEP-EST	GPFS	deeph95	1.12	no	deeph95	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph96	no	DEEP-EST	GPFS	deeph96	1.12	no	deeph96	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph97	no	DEEP-EST	GPFS	deeph97	1.12	no	deeph97	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph98	no	DEEP-EST	GPFS	deeph98	1.12	no	deeph98	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph99	no	DEEP-EST	GPFS	deeph99	1.12	no	deeph99	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.
deeph100	no	DEEP-EST	GPFS	deeph100	1.12	no	deeph100	1.12	GPFS file system, mounted on all nodes of the DEEP-EST system.

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
```