JUST
JUELICH STORAGE CLUSTER

28. MAY 2018  I  STEPHAN GRAF (JSC)
JUST CLUSTER

Key Characteristics

- Separate cluster including a lot of disk capacity for our users
- 5th generation
- Filesystem *Spectrum Scale* (GPFS) from IBM
  - Parallel Access
  - POSIX compliant
  - Bandwidth optimized
  - End-to-End data integrity
- 75 PB gross capacity
- No user login
- Cross mounted on HPC systems
JUST – PHYSICAL VIEW

21 x DSS240 + 1 x DSS260 → 44 x NSD Server, 90 x Enclosure → +7,500 10TB disks

Tape storage
Backup & Archive

8
TSM Server
Power 8

5
GPFS
Manager

Cluster Export
Server (NFS)

Monitoring

2 Cluster
Management

1 x 10
GE

Backup & Archive
CENTRALIZED STORAGE

JUWELS

JURECA + JURECA Booster

JUDAC

JuAMS

JUROPA3

JUROPA3-ZEA

EUDAT

DEEP
HOME DIRECTORY

• Login directory
  • Profiles
  • SSH keys
  • …

• Path: /home[abc]/<group>/<userID>
  $HOME = /homeb/zam/zdv124

• Store your project related data

• Quota per group: 10 TB + 3 million files

• Data are in Backup
WORK DIRECTORY

- Bandwidth optimized
  - JUST is capable of >400 GB/s
  - HPC to JUST bandwidth depends on network design
    - JURECA: 150 GB/s
    - JURECA Booster: 100 GB/a
- Path: /work/<group>/<userID>
  - $WORK = /work/zam/zdv124
- Temporary files, checkpointing
- Quota per group: 30 TB + 4 million files
- No Backup
- !!!Data deleted after 90 days without access!!!
- Empty directories are deleted after 3 days
ARCHIVE DIRECTORY

- Filesystem consist of 2 tiers: disks (cache) and tapes (long term)
- Path: /arch[2]/<group>/<userID>

```
[zdv124@judac01:/arch/zam/zdv124> ls -l
ls: cannot access .: No such file or directory
ls: cannot access ..: No such file or directory
ls: cannot access datu.txt: No such file or directory
ls: cannot access Vervet_s0050_tiff.tgz: No such file or directory]
```

- Special rules:
  - Files > 7 days are migration candidate → moved to tape
  - Recall per file is expensive (1 minute mount time + 100 MB/s)
    → use tar balls > 1TB
  - Avoid renaming of directory structures (may trigger huge recalls)
DATA DIRECTORY

- High Capacity disk based filesystem
- Only for specific projects with special requirements (approval by JSC)
- Path: /data/<group>/<userID>
  \>$\text{DATA} = /data/zam/zdv124$
- Quota per group: 1 GB + 200 files
- Files are in Backup
- We are preparing/implementing new options in this area. Our User will get an Announcement.
## FILESYSTEMS - SUMMARY

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<td>Users HOME File Systems</td>
<td>Group Quota: 10TB/2Mio Files Files in Backup</td>
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<td>Group Quota: 30TB/4Mio Files No Backup Files deleted after 90 Days (last modification) Empty directories after 3 days</td>
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<td>Big data based File System For special Projects only</td>
<td>Group Quota: 1GB/300 Files * Files in Backup Quota Info only for approved Project Groups</td>
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<td>Approval by JSC Management</td>
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</table>

* For administrative functions only
JUDAC – JUELICH DATA ACCESS

Data access and transfer cluster

• All HPC user can login on judac:
  
  \[ \text{ssh} \ <\text{userid}>@\text{judac.fz-juelich.de} \]

• Independent from HPC systems (e.g. in maintenance)

• Purpose: data transfer in & out the HPC filesystems
  
  • scp, rsync
  
  • Grid Tools
  
  • UNICORE FTP

• For more information go to → JUDAC Web Page
HINTS & TIPPS

• Restore files from backup: adsmbck [home | data | arch]
  • available on all login nodes
  • Calls IBM TSM Backup/Restore GUI
• Quota usage information: q_dataquota
  • Displays the group usage and quota information
  • Also available in file $HOME/../usage.quota
• SSH/SCP usage
  • Multiple external (scripted) access can be classified as an attack
    → Firewall will block external IP
• Take care of your files
  • Use shared files/directory structure
  • No special characters in the filename (newline, tab, escape, …)
AND FINALLY

• For any problem (accessing files, access rights, restore, quota, data transfer, …) contact JSC application support:
  \texttt{sc@fz-juelich.de}

• If you want to optimize your application IO:
  Attend the \textit{Parallel IO Training @ JSC}

• HDF5, MPI-IO, SIONLIB, …

Question?