



# JUST JUELICH STORAGE CLUSTER

28. MAY 2018 | STEPHAN GRAF (JSC)

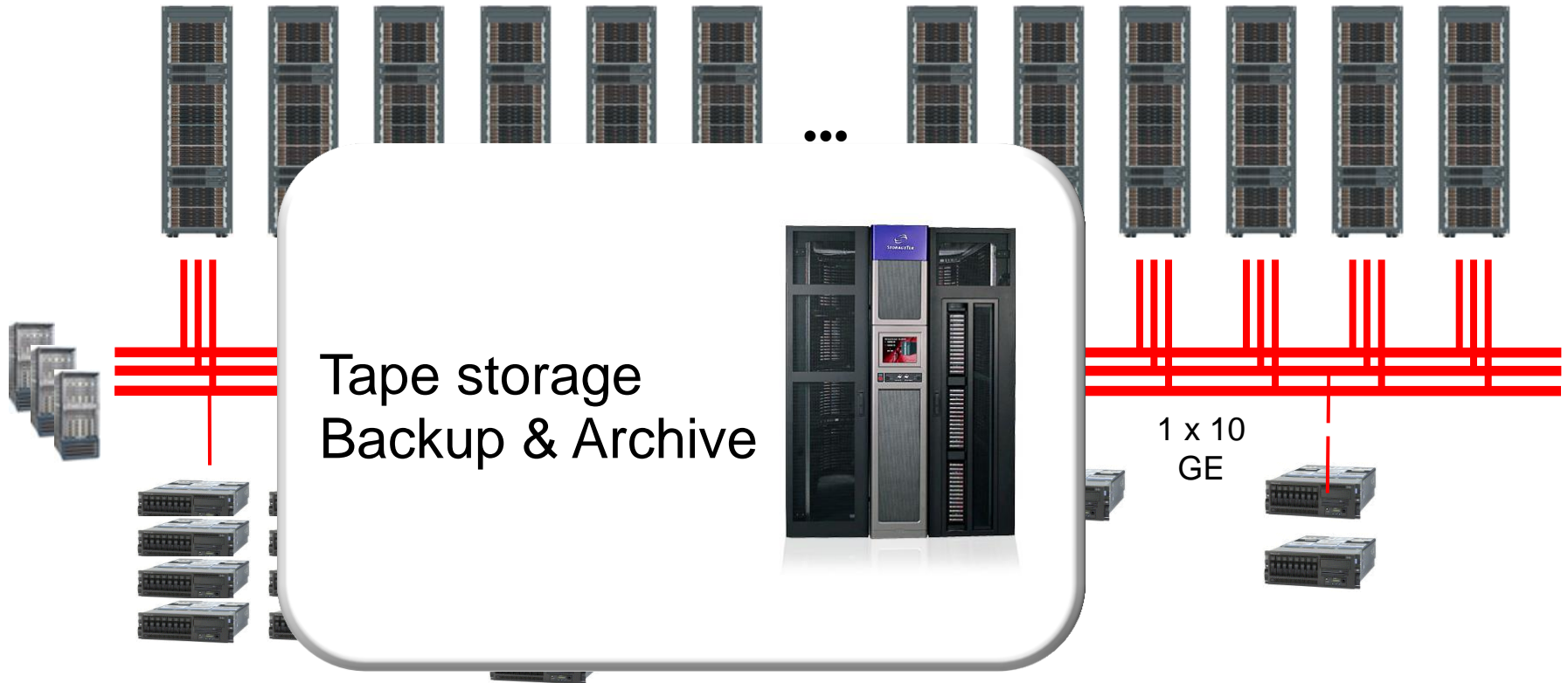
# JUST CLUSTER

## 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



8  
TSM Server  
Power 8

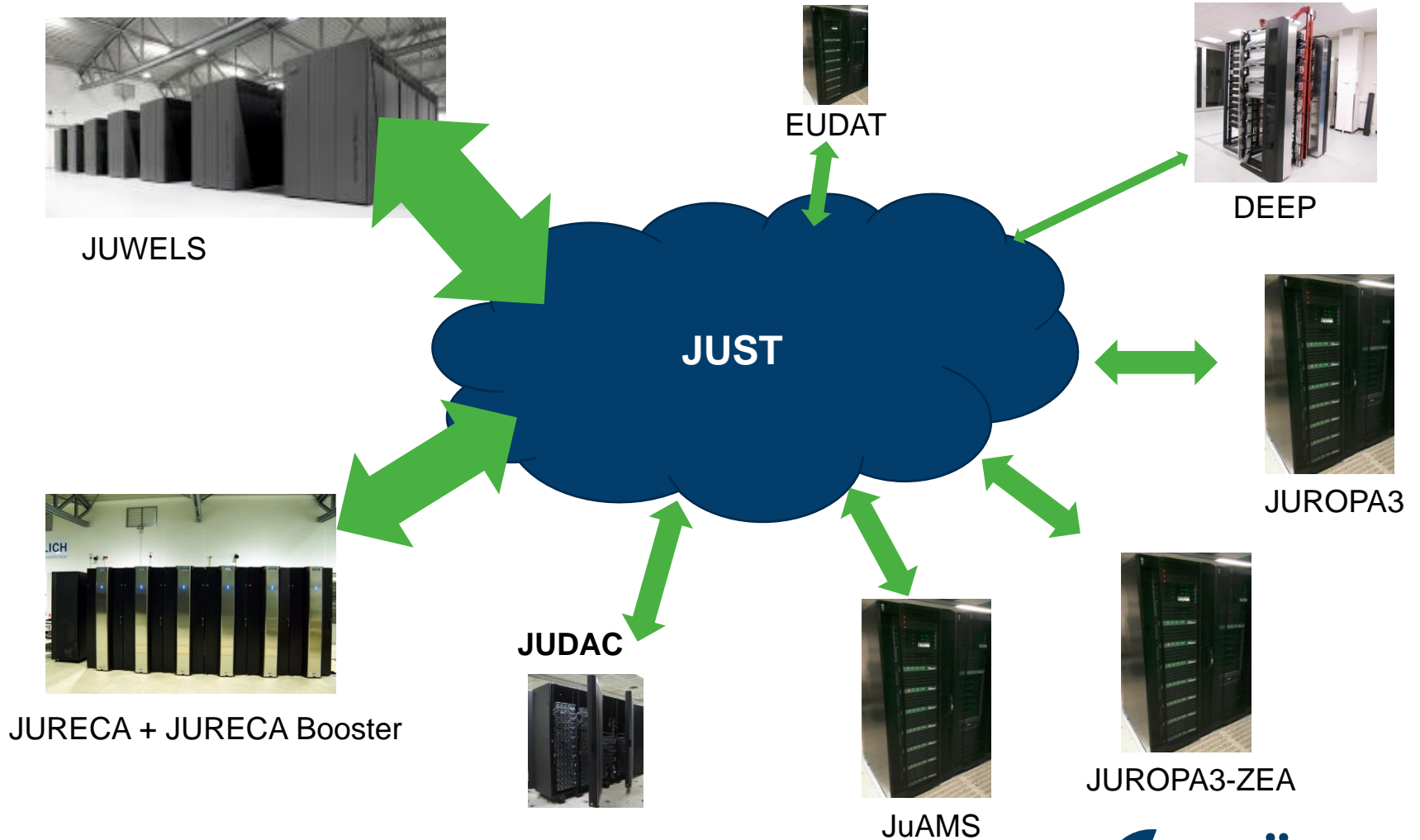
5  
GPFS  
Manager

Cluster Export  
Server (NFS)

Monitoring

2 Cluster  
Management

# CENTRALIZED STORAGE



# 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 -liah
total 320K
 407977 128K drwx----- 2 zdv124 zam 64K May 18 10:01 .
 407555 128K drwxr-xr-x 316 root sys 64K May 24 15:00 ..
18062260 64K -rw-r--r-- 1 zdv124 zam 5 Sep 2 2011 datu.txt
12920848 0 -rw-r--r-- 1 zdv124 zam 12G Jun 3 2015 Vervet_s0050_tiff.tgz
```

- 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>  
**\$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

File System	Description	Characteristics
homea homeb homec	Users HOME File Systems	Group Quota: 10TB/2Mio Files Files in Backup
arch arch2	Users Archive File System	Group Quota: 2Mio Files Files in Backup Migration to Tape
work	Scratch File System	Group Quota: 30TB/4Mio Files No Backup Files deleted after 90 Days (last modification) Empty directories after 3 days
data	Big data based File System For special Projects only Approval by JSC Management	Group Quota: 1GB/300 Files * Files in Backup Quota Info only for approved Project Groups

\* For administrative functions only

# JUDAC – JUELICH DATA ACCESS

## Data access and transfer cluster

- All HPC user can login on judac:  

```
ssh <userid>@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: adsmback [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:  
**[sc@fz-juelich.de](mailto:sc@fz-juelich.de)**
- If you want to optimize your application IO:  
Attend the ***Parallel IO Training*** @ JSC
- HDF5, MPI-IO, SIONLIB, ...

Question?