

# dCache



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**dCache.org**


**dCache Operations  
Team**

# Overview

- dCache software
- dcache.org: the wider picture
- dCache storage: a service at DESY



# dCache software

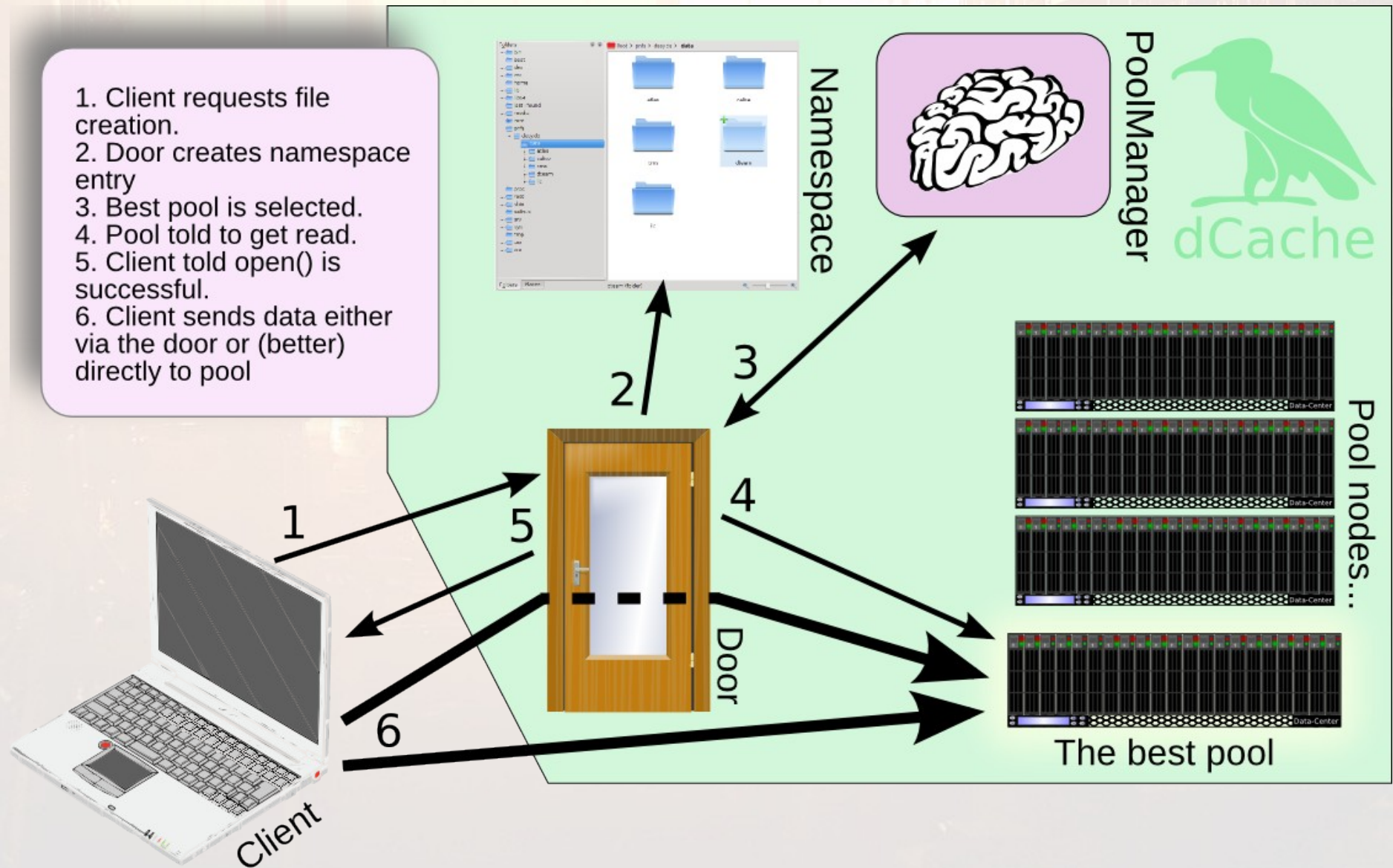
The background image is a photograph of a workshop or laboratory. It features large, multi-paned windows that let in bright, warm orange light, suggesting a sunset or sunrise. The room is filled with shelves and workbenches. On the right, tall metal shelving units are filled with numerous small, dark objects, possibly components or tools. In the center, there are workbenches with various equipment, including what looks like a large circular object on a stand. A ladder is leaning against the right side of the room. The overall atmosphere is one of a busy, well-equipped technical environment.

# Managed storage

- User sees single, coherent storage
  - Same data, however it is accessed.
- Same user, whichever protocol is used.
- Security is enforced uniformly (no back doors).
- Ugly details are “behind the curtain”
  - Don't see that storage uses many nodes.
  - Background activities are hidden
    - Storage capacity added, nodes decommissioned, ...



# Quick look behind the scenes



# Advanced features

- Many ways to access data
  - NFS 4.1, WebDAV, (Grid-)FTP, ...
- QoS determined per-directory
  - Should data go to tape?
  - How many copies on disk?
  - Use cheap / expensive disks?
- Data remains as secret as you want
  - ACLs allow fine-grain control of who can do what



# dCache: the wider picture



6 July 2010, Hamburg

Photon Science workshop



# dCache.org collaboration

- Involves DESY (8), FermiLab (2) and NDGF (2).
- DESY
  - Leads the collaboration,
  - Supplies machinery/infrastructure
  - Contributed: namespace, NFS, many basic components, ...
- FermiLab
  - Contributed: SRM, Kerberos support, GridFTPv1
- NDGF
  - Contributed: WebDAV, GridFTPv2, improved xrootd support
- All critically depend on dCache: it has to work for them!



# Others using dCache

- Other sites (in WLCG):
  - Over 50% of storage using dCache
    - Between 10PB and 20PB
  - Tier 1 centres (8 out of 11)
  - ~40 Tier 2 centres
- Non-HEP communities:
  - SNIC, LOFAR, ICECUBE, ...



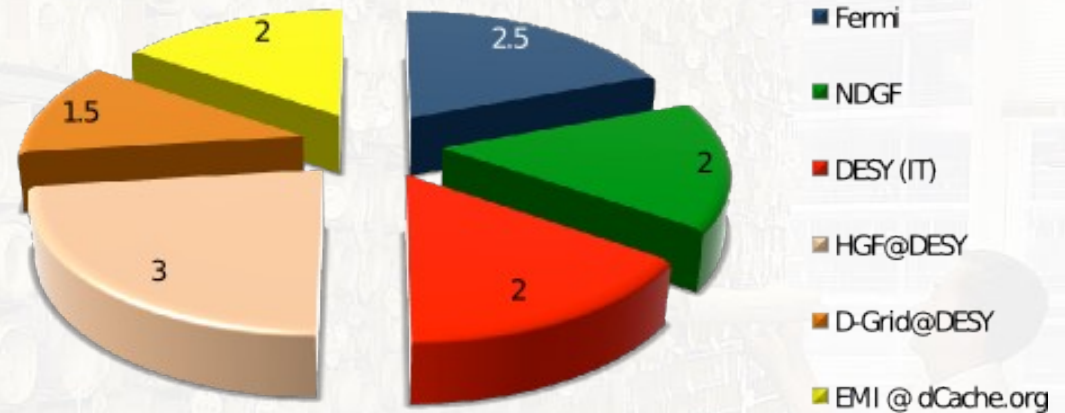
SNIC



IceCube

# Who pays for dCache?

- Labs
  - **DESY**, FermiLab
- Organisations
  - **NDGF**, **European Middleware Initiative (EMI)**, Open Science Grid (OSG) [no direct funding]
- German government
  - **Helmholtz Alliance**, German D-Grid
- **Funding secured for next 3 years.**





# dCache, a service at DESY

# Team dedicated to watching over data, maintaining, updating, ...

- Migrating to new technologies as appropriate,
- Monitoring usage,
- Functional testing,
- Fixing problems when discovered,
- Providing advice and feedback.



# Excellent connection with developers

- Involved with testing new developments,
  - NFS-4.1, WebDAV, Kerberos, ...
- Deploying new developments sooner,
- Located close to developers
  - Literally the “office next door”

# Years of operational experience

- DESY has years of experience as Tier-0.
- Hosts the oldest dCache instance.
- Many years of experience with tape systems:
  - OSM in operation for many, many years



# ~~Conclusions~~ Questions

# Q1:

- dcache.org is a collaboration between DESY, NDGF and ... ?



## Q2:

- For how many years is dCache funding currently secured?

# Q3:

- Of the 11 WLCG Tier-1 centres, how many use dCache?



# Image credits

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