dCache Federations

Motivation and Realization
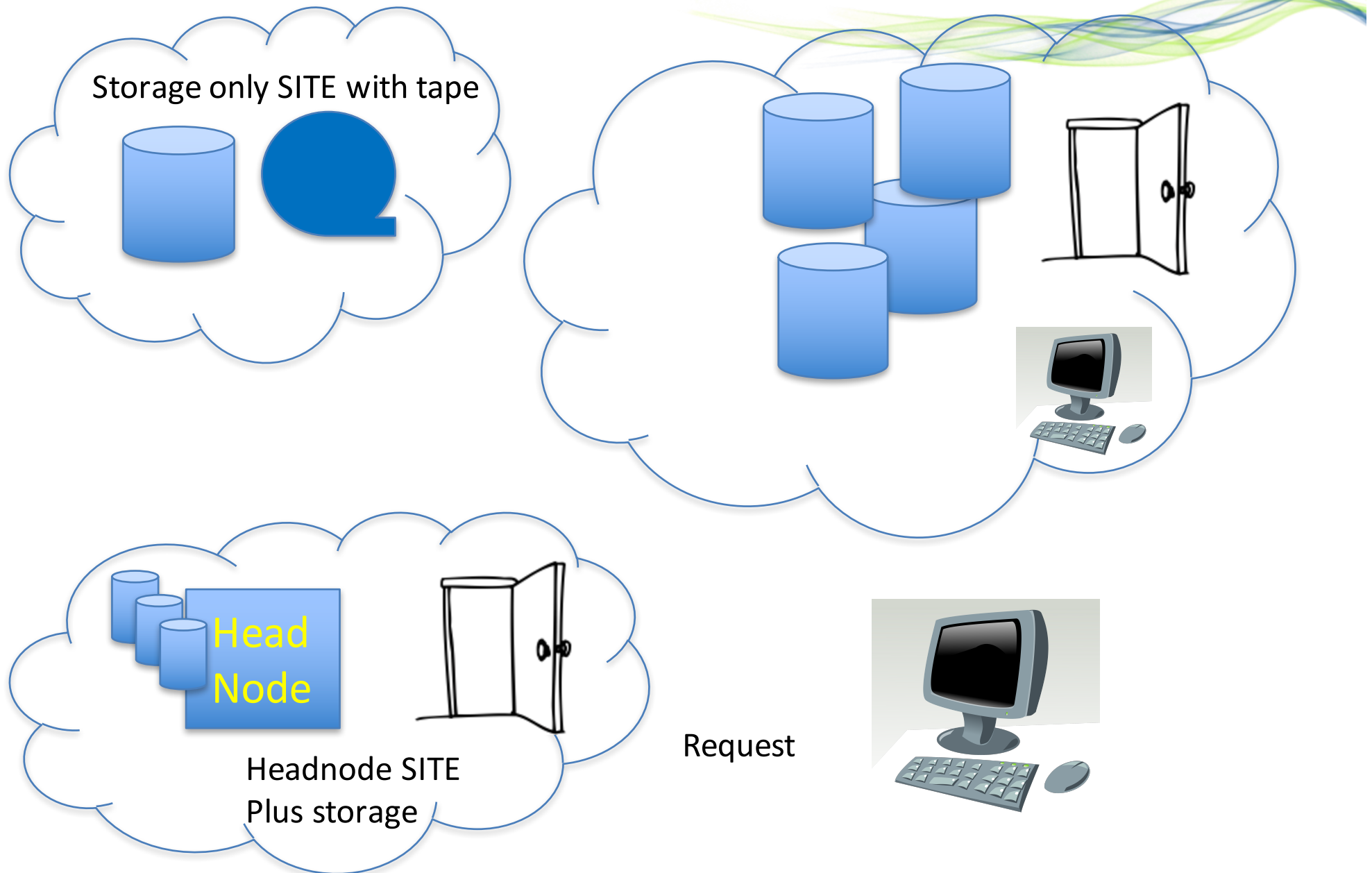
Patrick Fuhrmann, DESY at the
WLCG Workshop in Lisbon, Feb 2016

dCache in federations

- WLCG : needs to reduce the cost of storage maintainance.

- So one solution would be 'national federations'.
  - Remark 1: Would only reduce the cost seen from WLCG. Local site cost would of course still be the same.
  - Remark 2: Local cost might be reduced if SE is only operated in 'cache mode'.
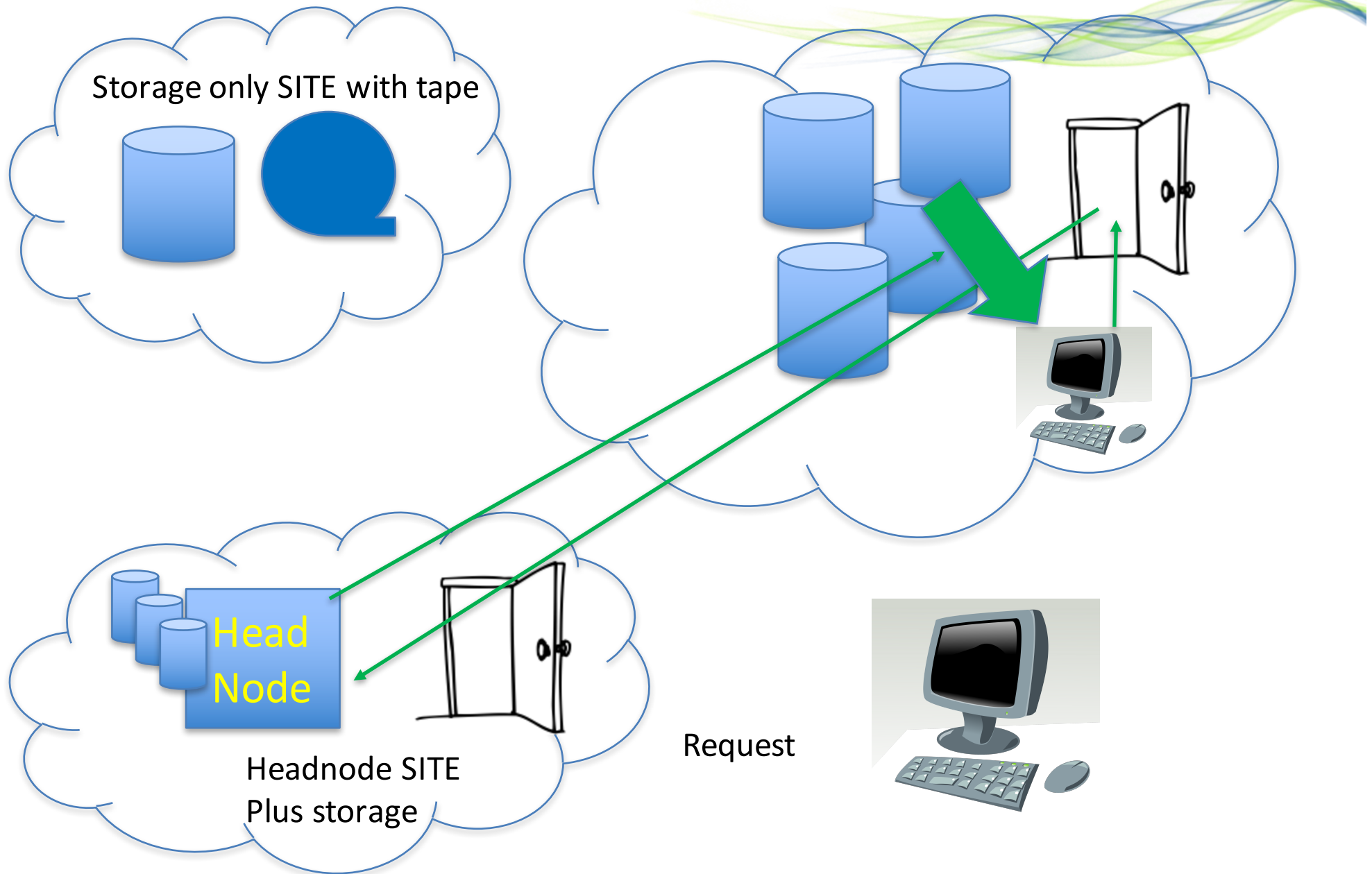
dCache federations

- Russia wants to build federations for
  - WLCG and
  - possibly for XFEL (with DESY).
  - Organized by Alexey Klimenkov.
  - For WLCG : are building a prototype with
    - EOS
    - dCache

dCache federations

- "Jiri Chudoba" from Czech Republic need to federate 3 national Centers.

- They talked to us during the WLCG workshop in Lisbon and asked for a possible collaboration.
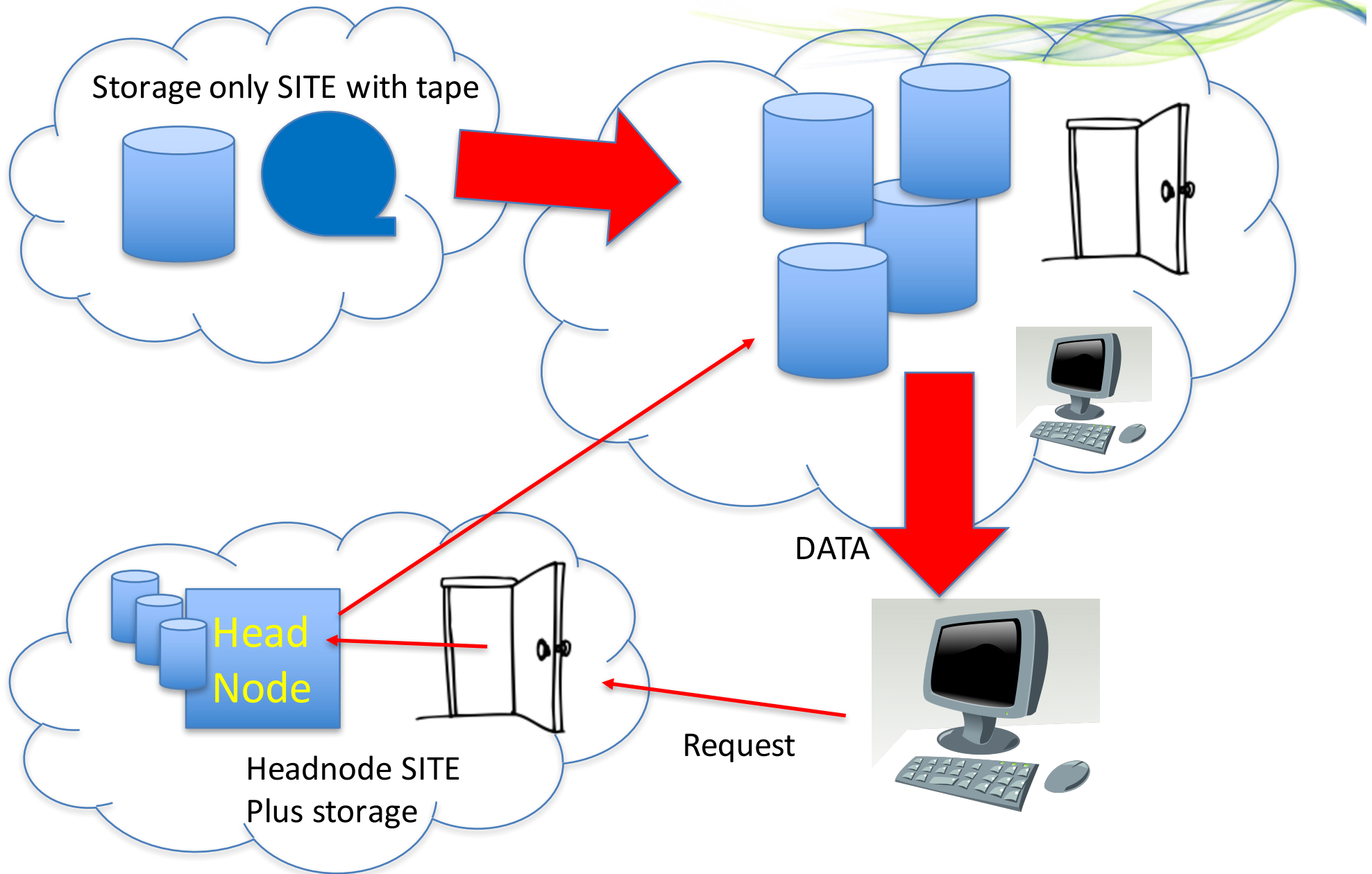
dCache federation design

dCache.org

Storage only SITE with tape

Head Node

Headnode SITE
Plus storage

Request

dCache federation design

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Storage only SITE with tape

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DATA

Head Node
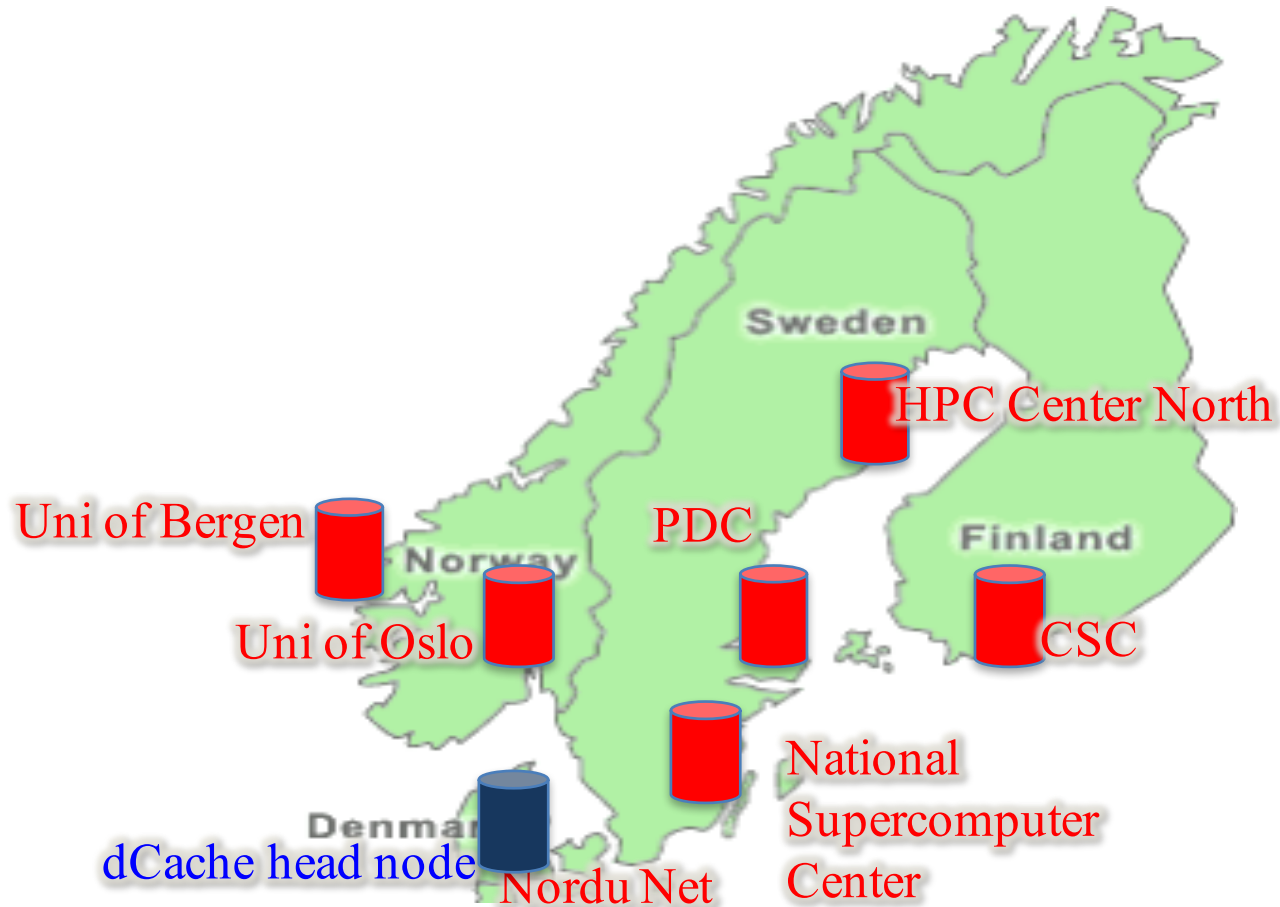
Headnode SITE Plus storage

Request

Features available

- Federation works for essentially all protocols
  - http/WebDAV
  - gridFTP
  - NFS4.1 / pNFS
  - dCap/xrootd
- Preferred write location depending on IP (location) or directory path (if requested)
- Preferred 'local' read access if data is available
- Replication
  - Automatic replication on write (to remote site)
  - Automatic lazy replication with 'n' copies.
  - Permanent replication based on data type.
  - Manual 'scheduled' data transferred for improved data location or hardware component decommissioning

Considerations

- Secure component communication between sites.
- Component upgrade compatibility within a major release.
- Trying the same between major releases but not always possible.
- Hot standby of headnodes possible.
- Upgrading headnode means 'deadtime' for the entirre system.
- "Short downtime" mechanisms are possible but never tried out.

dCache.org

4 Countries

One dCache

HPC Center North

Uni of Bergen

PDC

Uni of Oslo

CSC

National Supercomputer Center

dCache head node

Nordu Net

Slide stolen from Mattias Wadenstein, NDGF