

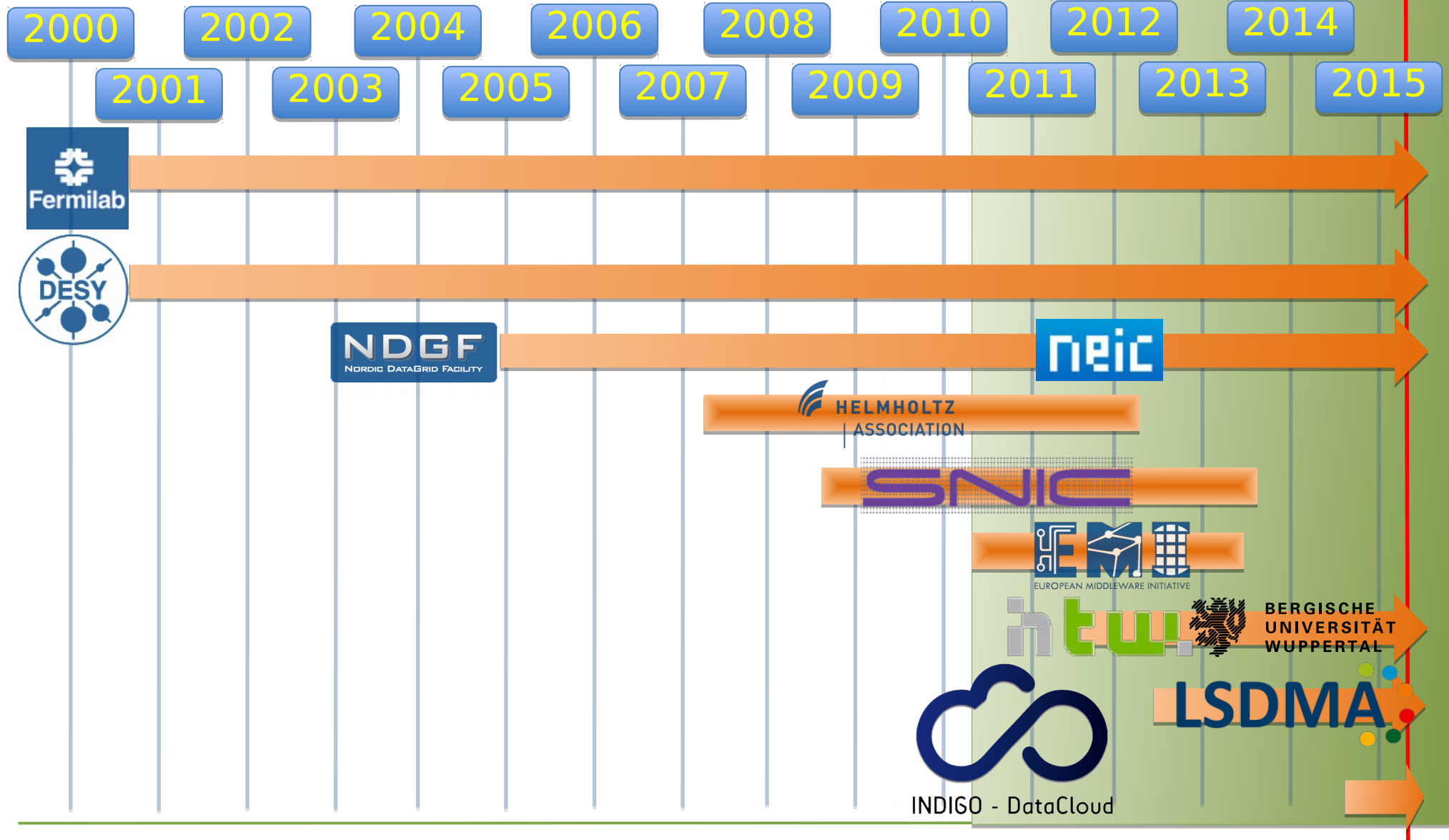
## dCache developments

Paul Millar

Physics at the Terascale (2015-11-18)



# Association and funding



# INDIGO-DataCloud: cheat sheet



INDIGO - DataCloud

- A Horizon-2020 project

**Approved:** January 2015; **Started:** April 2015; **Ends:** September 2017

- 26 partners (inc. DESY and KIT) from 11 European countries,
  - **Budget:** over €11 million
  - **Objective:** develop an Open-Source platform for computing and data, deployable on public and private cloud infrastructures.
  - Requirements from 11 INDIGO communities.
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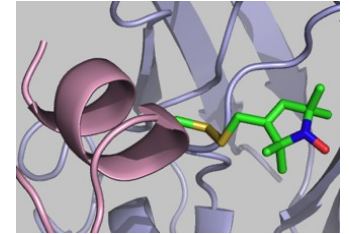
# What is INDIGO-DataCloud



INDIGO - DataCloud

- **Biological and medical science,**

Biological, molecular and medical imaging, life science research applied to medicine, agriculture, bio-industries and social, structural biology.



- **Social science, arts and humanities,**

Georeferencing (e.g., of current and historical maps), cultural heritage, smart sensors.



- **Environment and earth science,**

Biodiversity and ecosystem research, interactions between geosphere, biosphere and hydrosphere, earth system modelling.



- **Physical science,**



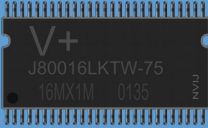
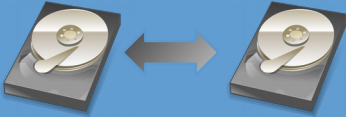
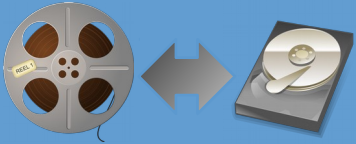
Astrophysics, theoretical and experimental research in physics.



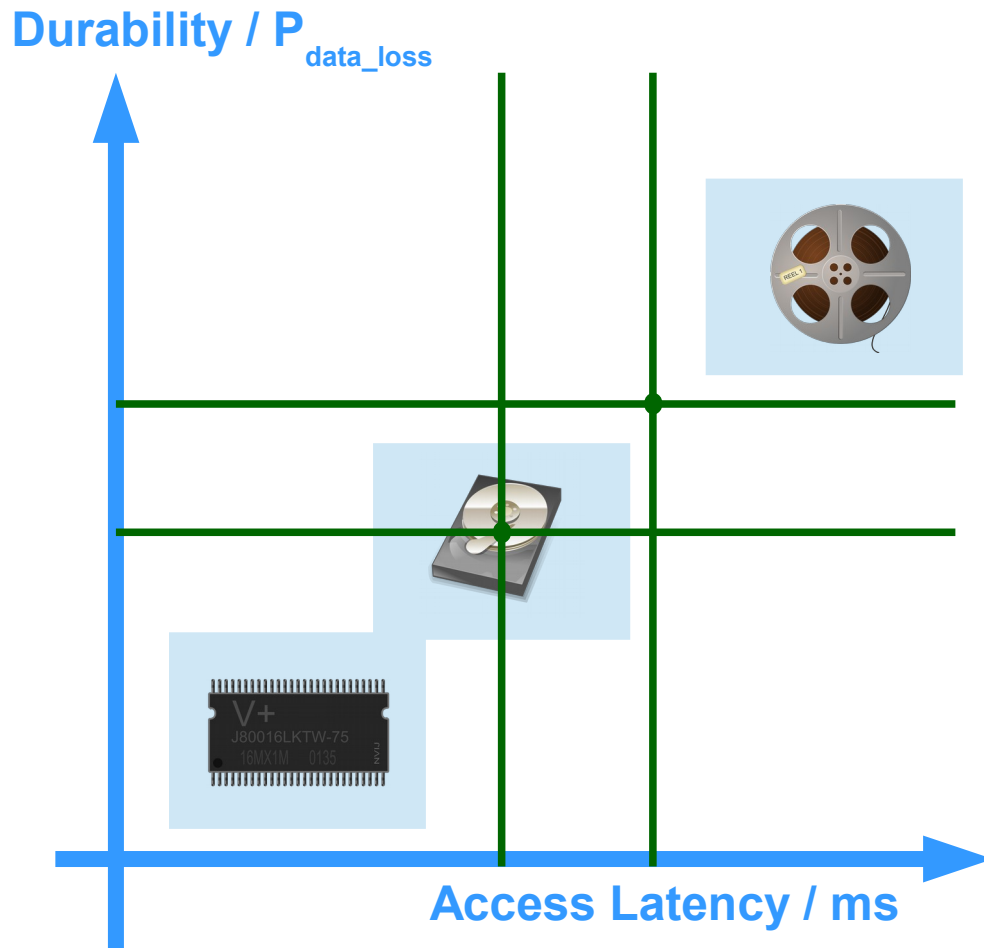
# The dCache core team

- The **permanent** effort:
    - 1 FTEs at NeIC,
    - 3 FTEs at DESY,
    - 1.5 FTEs at Fermilab.
  - The **project money** effort:
    - 2 FTE LSDMA → 1 FTE in 2016,
    - 4 FTE INDIGO-DataCloud.
- Total:** 11.5 FTE (10.5 from 2016).
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# Future: improved media handling

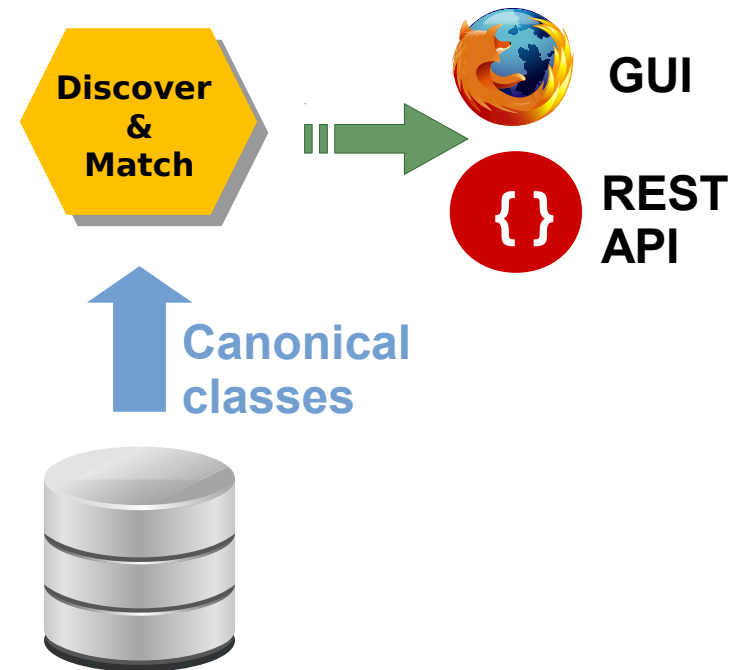
Media Quality					
Access Latency	<b>HIGH</b>	<b>MEDIUM</b>	<b>LOW</b>	<b>MEDIUM</b>	<b>MEDIUM</b>
Durability	<b>OK</b>	<b>MEDIUM</b>	<b>Not so clear</b>	<b>Quite OK</b>	<b>OK</b>
Data rate	<b>OK</b>	<b>OK</b>	<b>MEDIUM</b>	<b>OK</b>	<b>OK</b>
Cost	<b>Very low</b>	<b>Reasonable</b>	<b>Very high</b>	<b>MEDIUM</b>	<b>MEDIUM</b>

# Making QoS choices meaningful

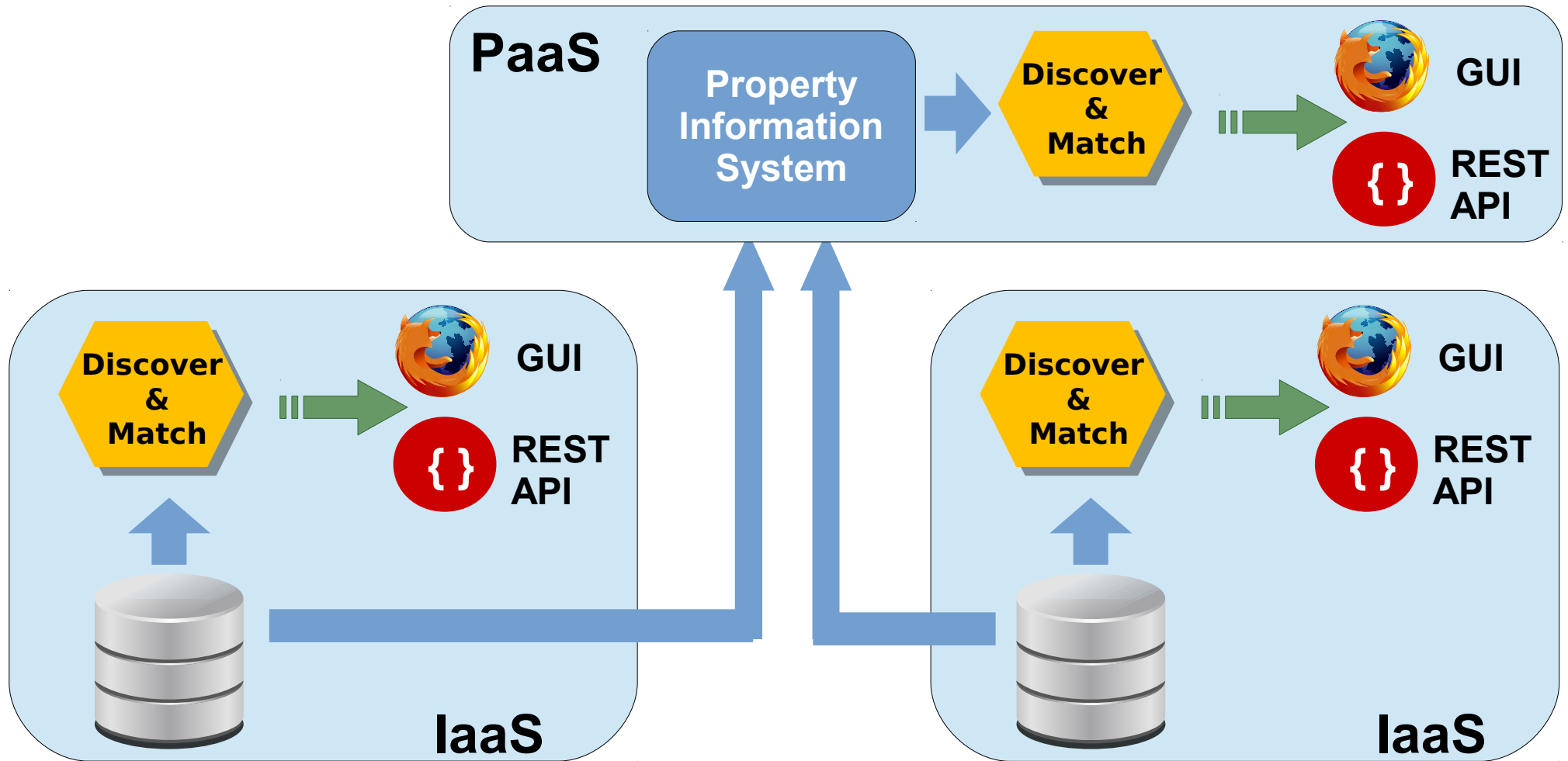


- Low latency & lowest price → Class #1
- High throughput & super durable → Class #2
- Large volume & cheap & archive → Class #3

VS



# Federating QoS Choices

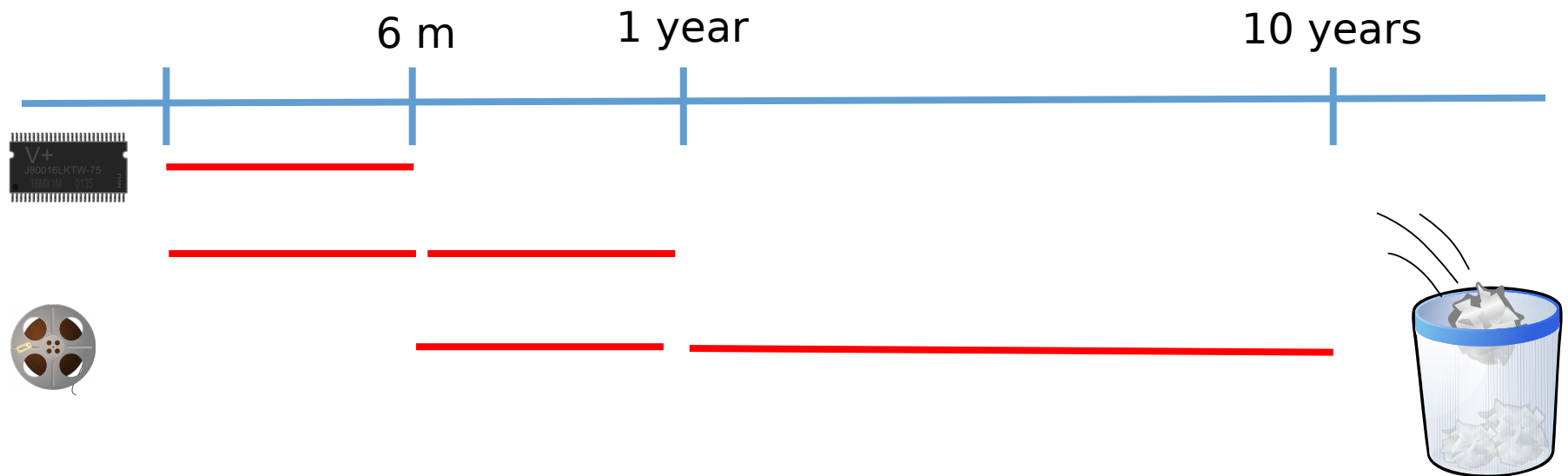




# Improved media handling: Data-LC

Data Lifecycle is just time dependent changes of

- Storage Quality of Service
- Ownership and Access Control: PI Owned, limited access → Site Owned, Public access
- Payment model: pay-as-you-go → pay-in-advance for rest of lifetime
- Maybe other things



# {Replica → Resilience} Manager

- Complete redesign
  - New features include:
    - Better handling of **temporary offline pools**,
    - Useful **diagnostic information**,
    - Supports **multiple replication strategy**:
      - per storage-class, configurable replication & partitioning,
    - Integrated **alarm support**,
    - **Reduced load** on dCache:
      - Information from PoolManager & namespace, not directly querying pools,
    - Fairness in choosing between **foreground or background replication**,
    - **Configurable policy** on internal replication failures.
-

# dCache on Ceph

- The start of support for **cluster filesystems**: GPFS, Ceph, ... – Ceph is our initial focus.
  - Two approaches:
    - **Single pool** per cluster (easier, but less useful),
    - **Multiple pool** per cluster (allows load-balancing, harder to achieve)
  - Benefits to dCache:
    - **Data distribution**: delegated to underlying cluster storage,
    - **Integration**: (re-)use existing site storage infrastructure.
  - Benefits to cluster storage:
    - **dCache features**: protocols, authentication, tape integration, ...
    - **Future proof**: migrate from storage technology without down-time.
  - Plan to demo prototype at ISGC 2016 (March next year)
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# Summary

- dCache team is **strong** after recently expanding,  
New project money means **more features**,
  - **Resilience manager** as replacement for replica manager,
  - **QoS and Data-Lifecycle** places more control in users hands,
  - dCache on **Ceph** coming soon.
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# Backup slides

