dCache

The commodity GRID Storage Element

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dCache is a joint effort between the Deutsches
Elektronen Synchrotron (DESY)
and the Fermi National Laboratory (FNAL)

dCache provides (I)

Unlimited data storage, based on your commodity hardware.

Automatic load balancing.

Separation of file name space and data file location.

Data file replication on *hot spot* detection

Posix like access, by shared and preload libraries (linux solaris)

dCache provides (II)

Grid and Kerberos Ftp access.

Storage Resource Manager (SRM) Interface

Easy to apapt interface to Tertiary Storage Systems, providing :

* Prestaging
* *Gather and flush* for writing into the HSM
* Automatic fetch, on cache fault

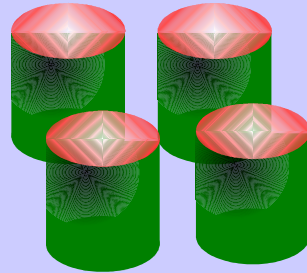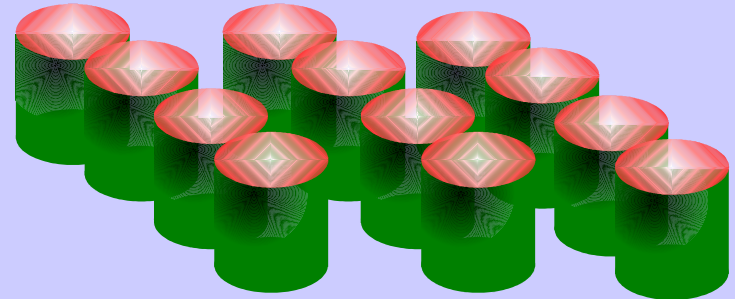# Components

Write Pools

Read Only Pools

SRM

Resilient Manager

File system Engine

Pnfs

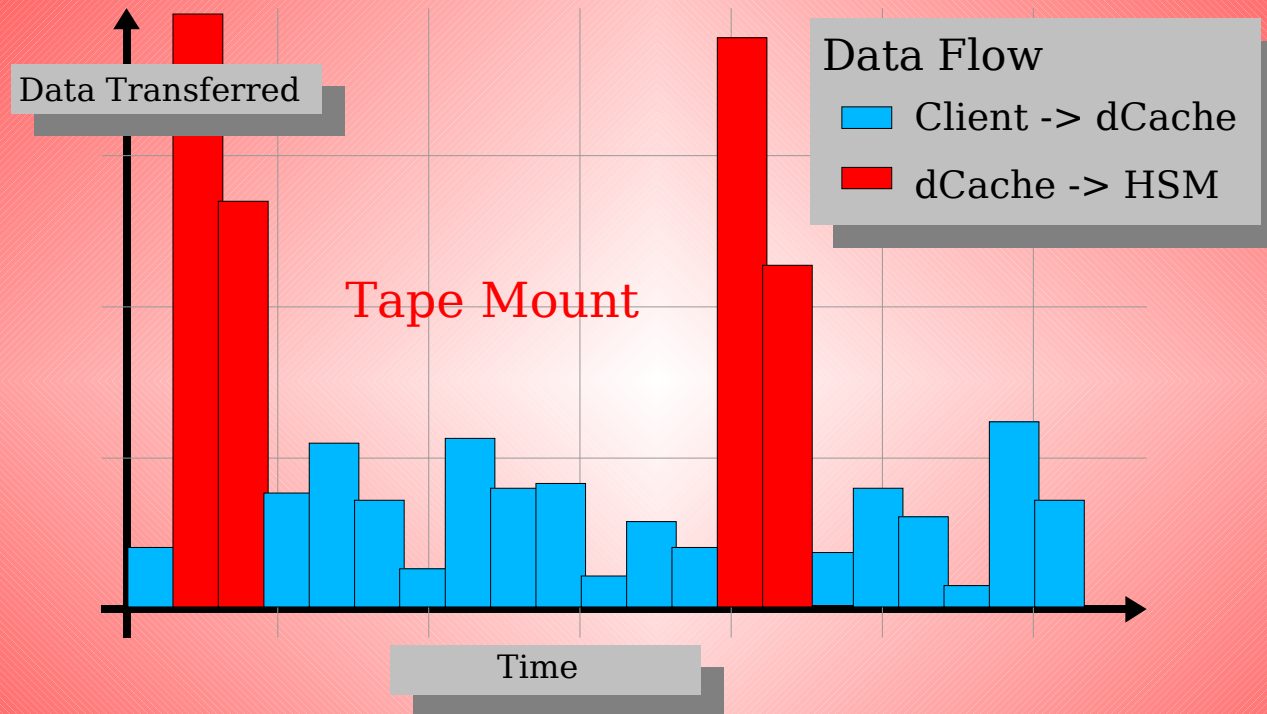**PoolManager**

PM

gsiFtp

http(sg)

gsidCap

other plug-in

Tertiary Storage System Connection

Tape Mount Optimization : deferred write

* Easy to adapt (script based)

* Automatic fetch on cache fault

* Deferred Write to HSM

* Prestaging

Pool Attraction Model I

Pools are chosen, based on

Data transfer direction (read/write/stage)

IP Subnet/ IP Host

HSM Storage class/group

Available Space on pool

File System Subdirectory Tree

Number of transfers on pool

Least Recent Used File Timestamp on pool

Pool Attraction Model II

Pool to Pool transfer initiated on

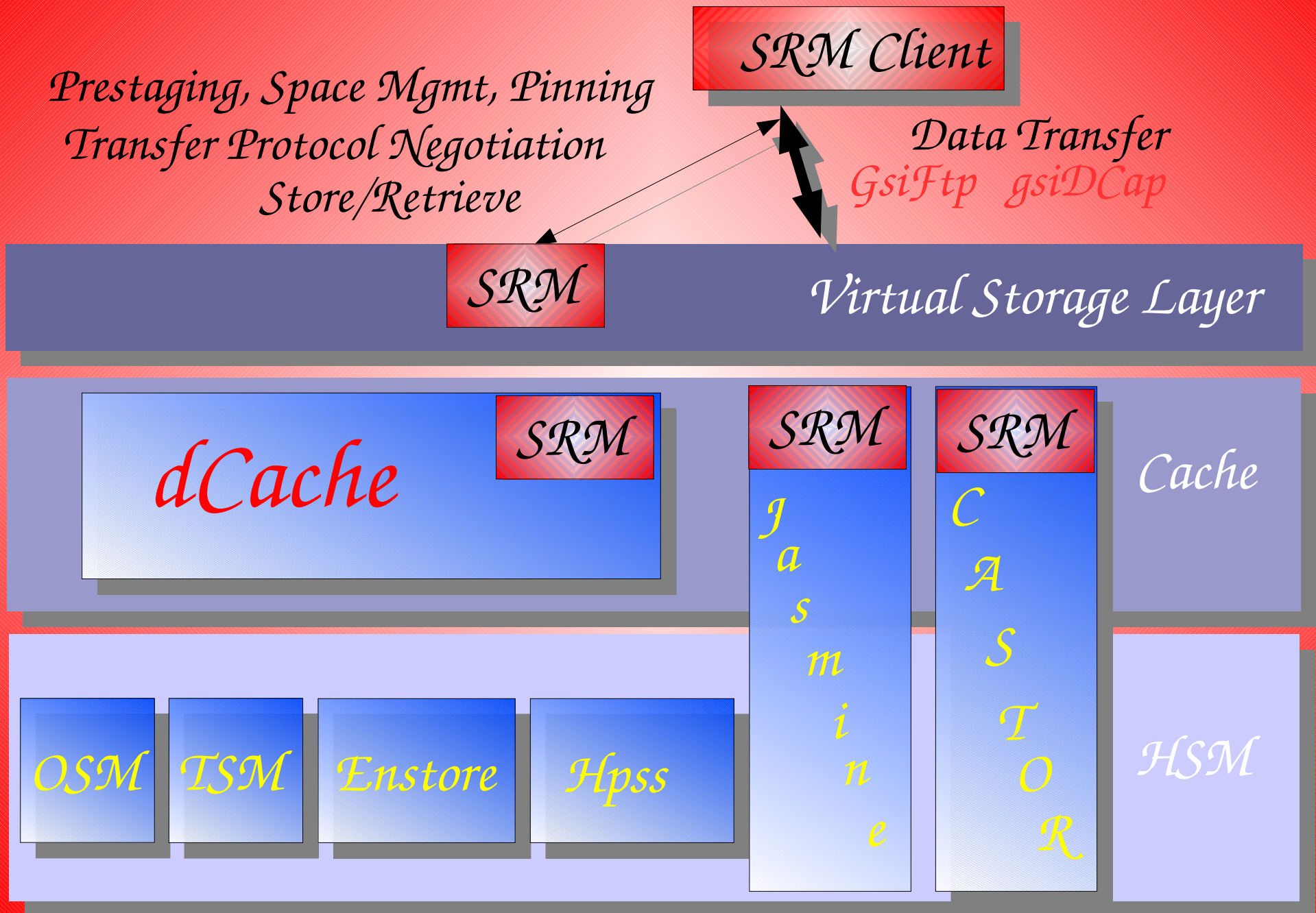Configuration (e.g.: reading disabled on write pools ...)

Load on selected pool too high

Choosing fallback pools on

High load on primary pools

Too many failures on primary pools.

Storage System Abstraction

Prestaging, Space Mgmt, Pinning
Transfer Protocol Negotiation
Store/Retrieve

SRM Client

Data Transfer
GsiFtp   gsiDCap

SRM

Virtual Storage Layer

dCache

SRM

SRM

Jasmine

SRM

CASTOR

Cache

OSM   TSM   Enstore   Hpss

HSM

Installed at (April 2004) :

CMS Tier 0

   CERN, Geneva, CH

CMS Tier I

   Grid Ka (Karlruhe, Germany)

   Fnal (Batavia, US)

CMS Prototype Tier II

   San Diego

   CalTech

   University of Florida

   University of Wisconsin-Madison

Evaluation Sites :

   Brookhaven NL (NY, US) (Evaluation)

   Vanderbilt University, Nashville, TS

   IN2P3, Lyon, France

Large Installations :

   CDF, Fnal, US

      Disk Storage : 150 TBytes
      Delivery/Day : up to 50 TBytes

   DESY, Hamburg, Germany

      Disk Storage : 70 TBytes
      Delivery/Day : up to 20 TBytes