HEP-CG Workshop
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dCache

A scalable storage element

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dCache in a nutshell

involved people

Responsibility, dCache

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Responsibility, SRM

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Support and Help

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Owen Synge, RAL

dCache in a nutshell

- dCache is a LCG storage element (SE)
  - full Storage Resource Manager (SRM) support
  - variety of data access protocols
    - local area: dCap, (xRootd)
    - wide area: gsiFtp, HTTP(s)
  - information providing: GIP (LCG), JClarens (OSG)
- dCache is an Tertiary Storage-enabling SE
  - supported: OSM, TSM, Enstore, HPSS

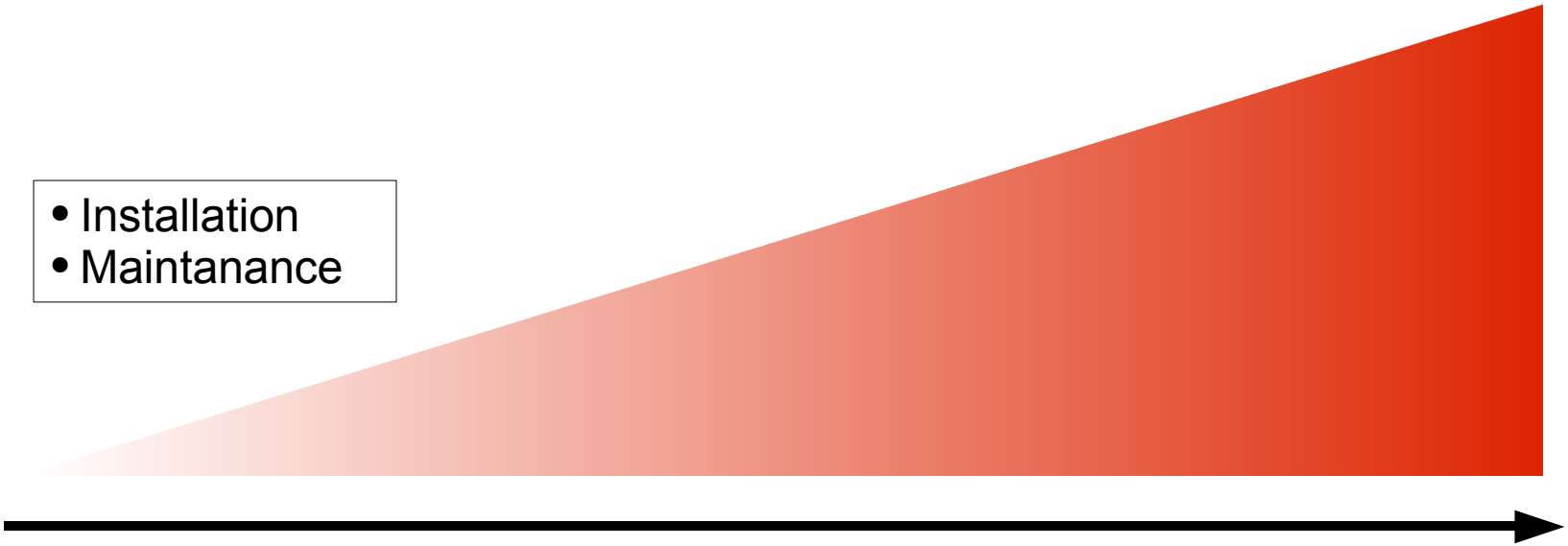
dCache: features

- combines hundreds of commodity disk servers to get a huge data store
- strictly separates between namespace and data repositiories → increased fault tolerance
- allows several copies of a single file for distributed data access
- automatic load-balancing on hotspot detection

dCache scaling

Issues related to SE scaling

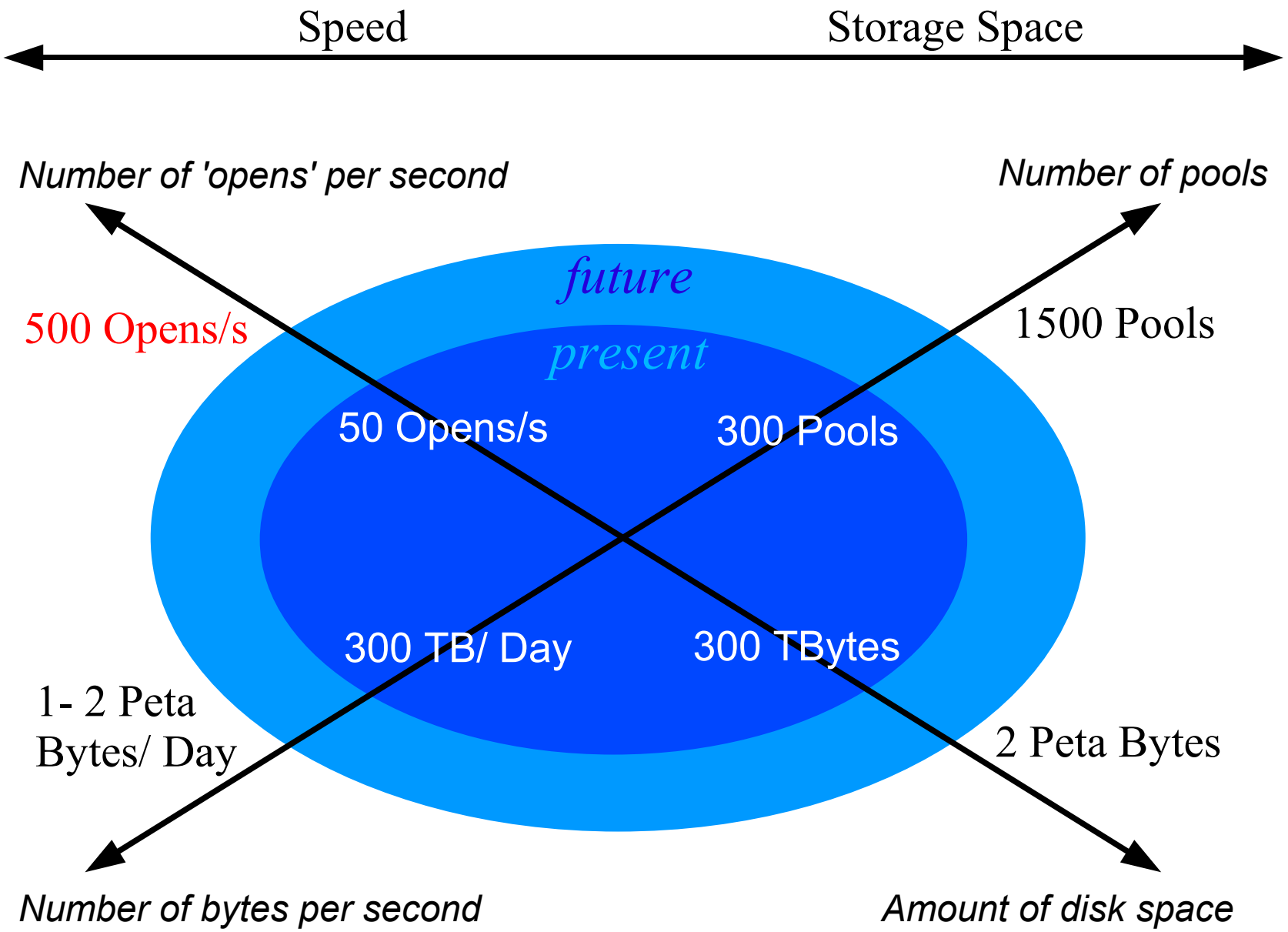
- file-system access frequency
- Tertiary Storage optimization
- SE partitioning
- Addressing hardware issues



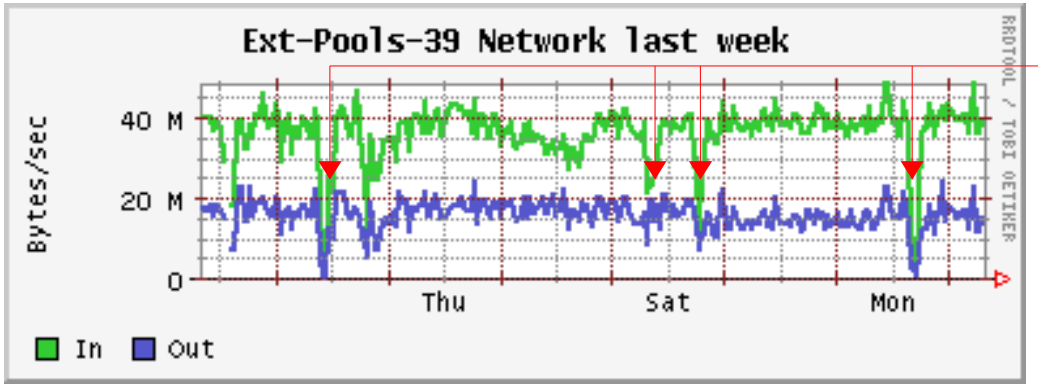
- Installation
- Maintanance

Storage Element Size

SE scaling in the near future

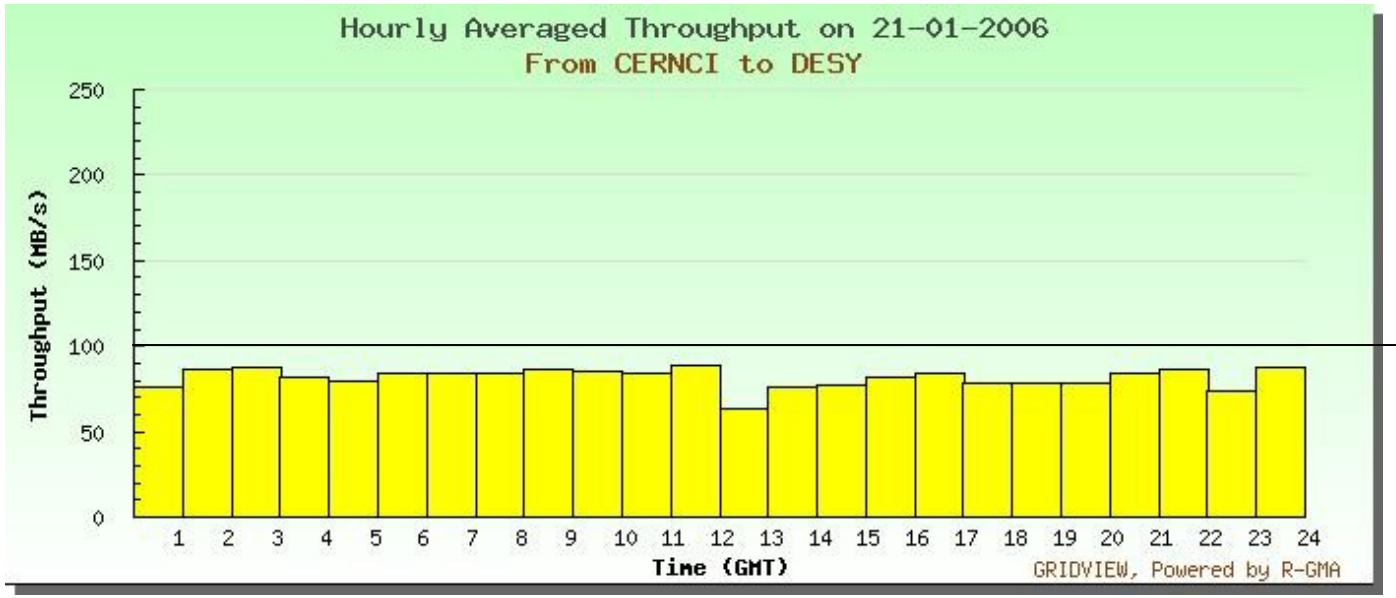


Throughput at DESY



FTS Problems at CERN

Service Challenge 3 (Jan. 06)



Limit of DESY's WAN link

dCache Storage Element improvement

Information Service

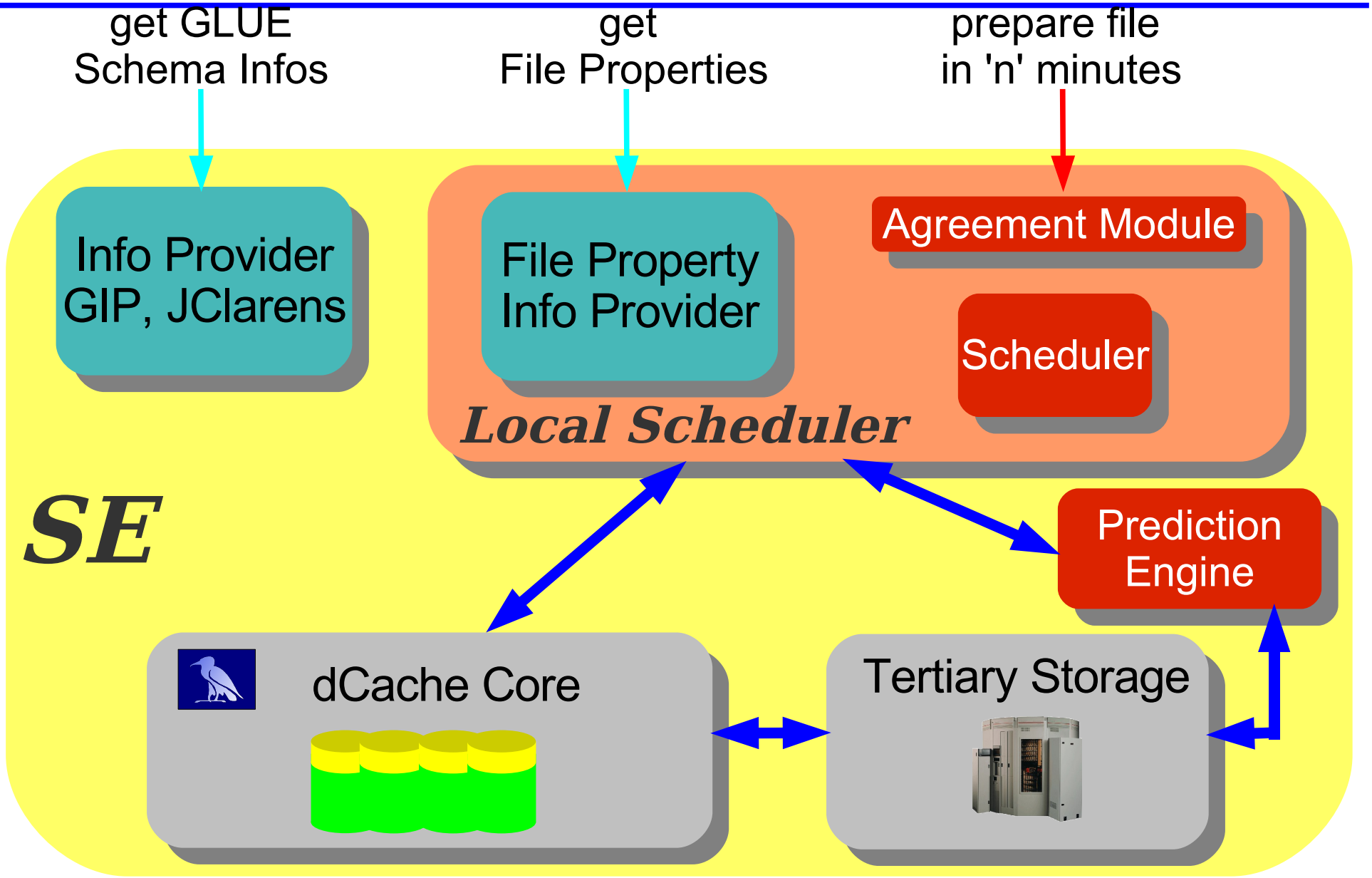
- Information Provider (SE-specific)
  - dCache gets grid-enabled by publishing its status according to the GLUE schema
  - already deployed in LCG and OSG installations
- File Property Infoprovider (file-specific)
  - Extendend Information Service, WS-based
  - file is cached/ on tape
  - time to get file ready for transfer

  → important requirement for co-scheduling

Co-scheduling of jobs and data

- More precise information provided by SE's will help the Resource Broker to do better matchmaking
  - RB is querying SE for specific file metadata using File Property Infoprovider
- more details in „HEP-CG Scheduling Architecure“, held by Lars Schely, Uni Dortmund

Extended SE overview



dCache SE deployment

dCache Packaging

- approved shell-based build system
  - requires lots of manual interaction
  - not very handy for developers
- new build system based on Apache Ant
  - will power next major release
  - XML scripts perform CVS checkout, source compilation and rpm creation
  - provides faster and more automated builds
  - automatic installation in preparation
- RPMs delivered for SL 3/4

SE Deployment

- last major version 1.6.6. (released Nov. 05) has shown stable and is in production on many LCG sites
- active support via different channels
  - Request Tracker support@dcache.org
  - User Forum user-forum@dcache.org
  - „dCache, the Book“ www.dcache.org/manuals/Book
  - direct phone support
- next major release expected in June

Sites using dCache 1.6.6

- Germany
  - LCG: gridKa (Tier 1), Aachen, DESY, Freiburg, Dortmund
  - d-Grid: Juelich (ZAM), Berlin (ZIB), Darmstadt (GSI)
- UK
  - 8 LCG Sites: Manchester, Edinburgh, Liverpool
- France
  - Lyon: IN2P3 (Tier 1)
- US
  - FERMI (Tier 1), BNL (Tier 1) CMS: 7 sites, ATLAS: 7 sites in preparation

.. and much more

D-Grid Integration Project (DGI)

- collaboration with DGI
  - providing dCache-Software as well as installation support
- mid-size dCache-installation at Research Centre Jülich
  - tape backend in use: Tivoli Storage Manager
  - becoming resource of the Core-D-Grid

Further development

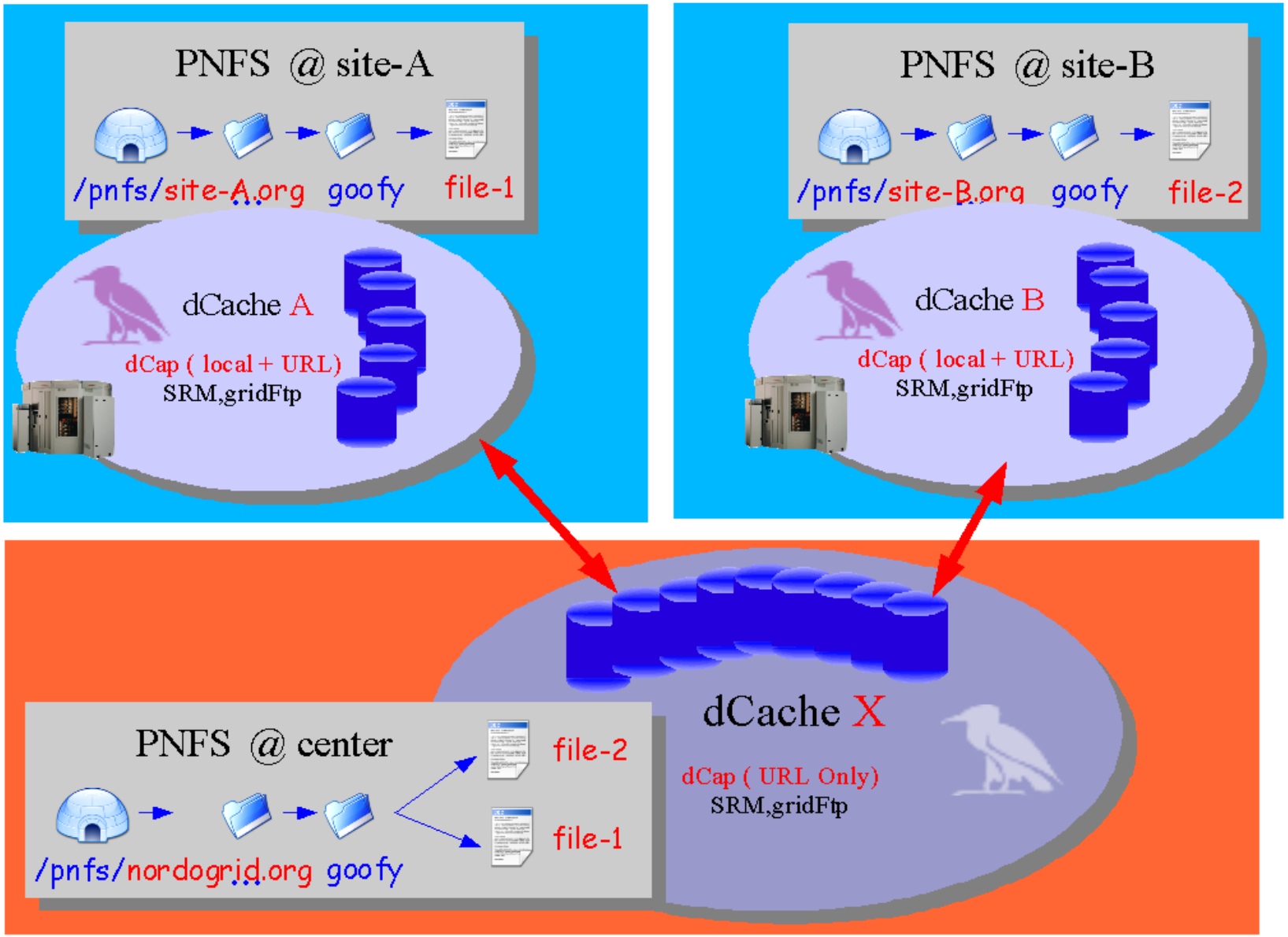
SE improvements

- Local scheduler of the dCache SE
  - Implementation of Prediction Engine (already in progress), Scheduler and Agreement Module
- File Property Infoprovider
  - Extended file metadata
    - Availability
    - Media Quality (Disk/Tape, Raid-Level,..)
    - Persistence (permanent, volatile)

SE improvements (II)

- xrootd
  - allowing ROOT-users to access dCache-files transparently
  - basic read/write mode already implemented
  - work to be done: authentication, async file transfer

Complex scenarios: Nordo-Grid



Complex scenarios: Partitioning

- dCache allows definition of partitions (groups of diskservers)
- Extended properties for partitions
  - Allowed data transfer protocols
  - Behavior on Hotspot Detection
  - Pool-2-Pool-Copy behavior
  - Tertiary Storage Connectivity
  - Impact on cost module

Contact

dCache, the Book

www.dCache.org

need specific help for your installation or help in designing your dCache instance.

support@dCache.org

dCache user forum

user-forum@dCache.org