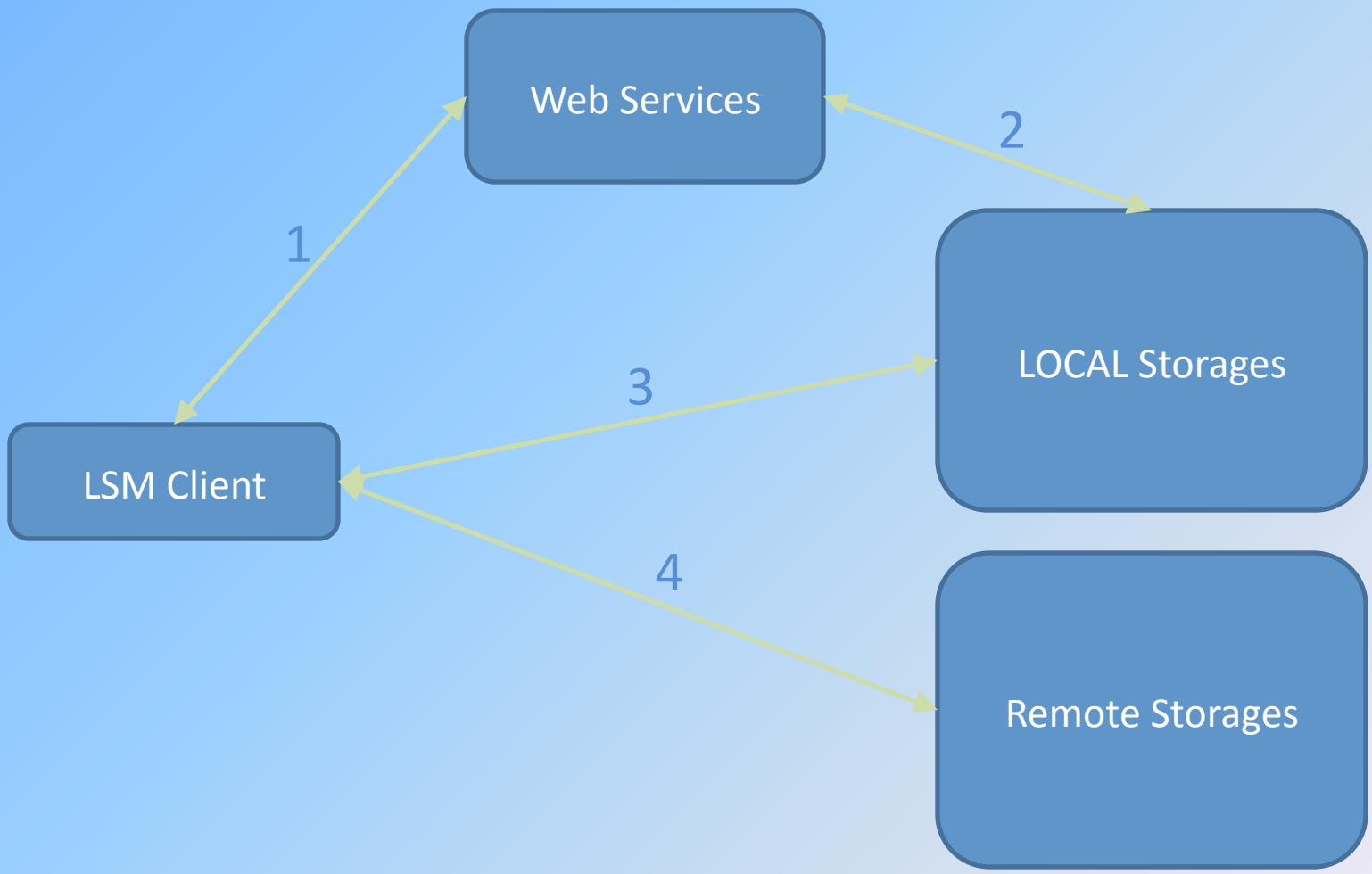
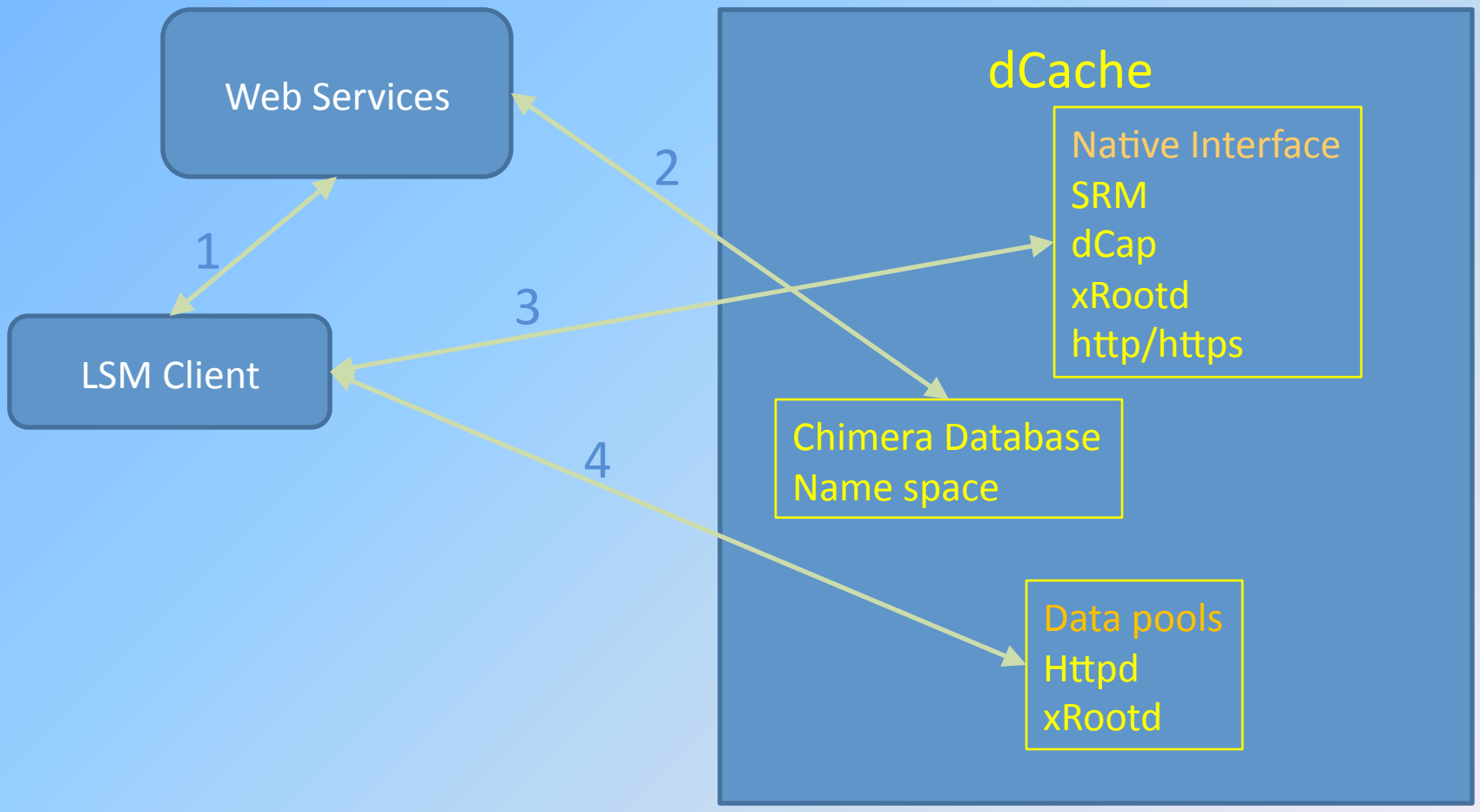
New LSM

- Motives
  - Jobs should not fail for missing input files.
    - Reason for not being able to access input files.
      - dCache service on particular storage pool is down
        - » Local problem.
      - Racing condition between the PANDA brokerage and the central deletion services removes required input files.
        - » Non local problem
  - Would like to shutdown dCache services without shutting down a site or failing jobs
  - Current LSM not 100% functional after PNFS to Chimera upgrade
- Methods
  - Access data using the various APIs in the local storage
    - dCap, xRootd, http
  - Search and access data at all ATLAS storages.

General LSM Scheme



LSM Local Storage Scheme



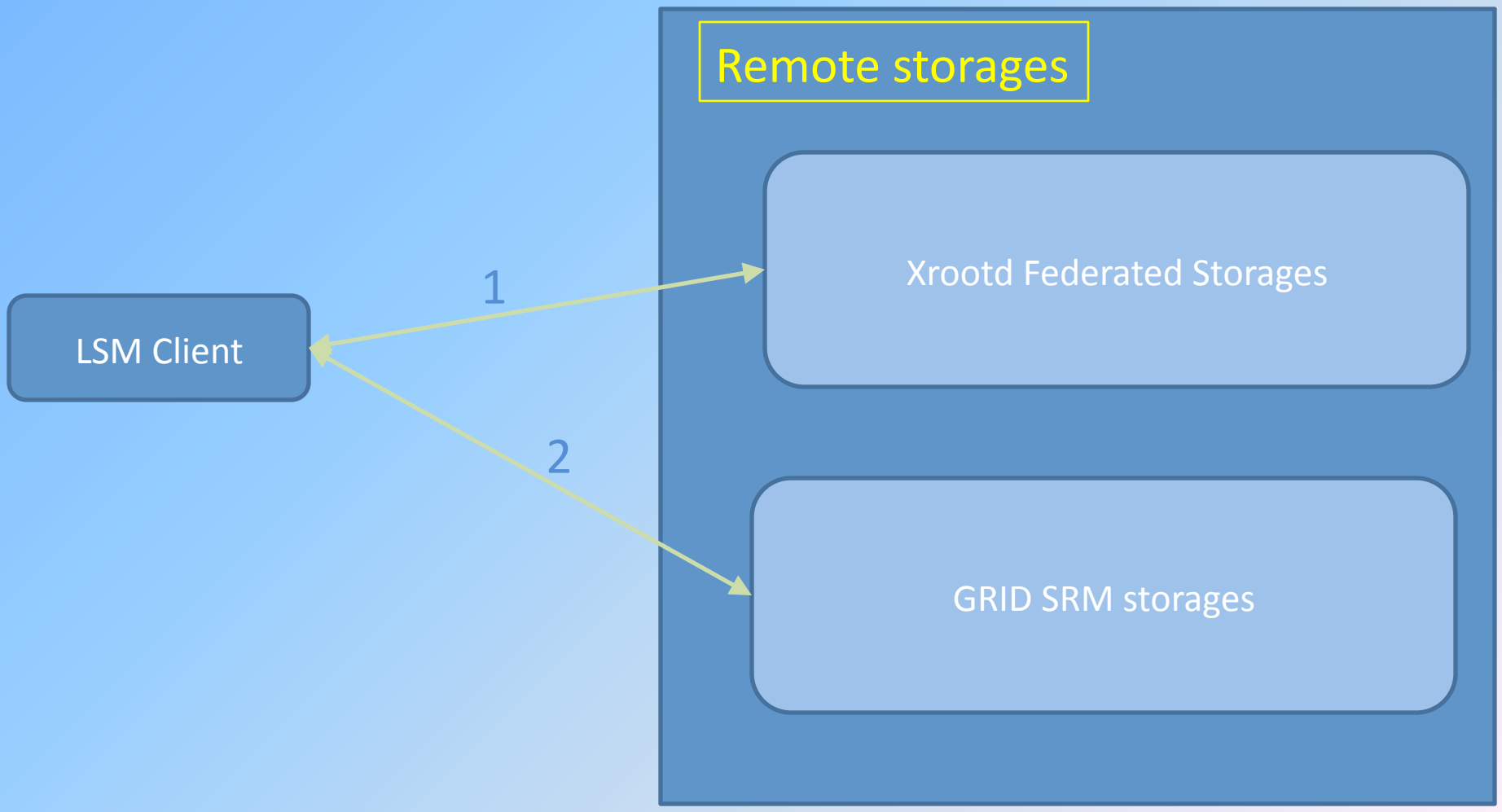
Web Services

- Access to dCache Namespace PostgreSQL database (chimera)
  - With given SURL, it provides all information regarding a file in local storages.
    - Name of file in the storage. In dCache, the name of file in physical storage is different from SURL. It is ID name of the file in name space.
      - If a file is in /pnfs/usatlas.bnl.gov/mytest.txt with ID of "0123ABC" at storage host XYZ, then, the corresponding physical filename in storage host XYZ is "0123ABC" .
    - Name of actual storage hosts.
    - The codes can be alter to accommodate non-dCache storage
      - It just needs to return some additional information to facilitate alternate access methods available at a site.
- LSM will work even if the web service fails.

LSM Local Storage Access

- Access methods
  - dCache Native Data Access Interfaces
    - Dcap (via ID or Path)
      - ID provides the fast access and requires no pnfs mount
    - Xrootd
    - Httpd/https/webdav
  - Non-dcache Data Access
    - xRootd
      - Xrootd server on every data server
      - It runs independent of other servies.
        - » Does not require dCache at all
    - Http
      - Httpd server on every data server
      - It runs independent of other services.
        - » Does not require dCache at all

LSM Remote Storage Scheme



LSM Remote Storage Access

- Access Methods
  - xRootd Federated Storages
    - All US T1/T2s are part of the federation.
    - Does not require lookup various LFCs since LFC look up is done by federation.
    - Transfer via xrdcp
  - Grid SRM
    - All ATLAS files can be found if exist
    - Needs to access various LFCs at T0/T1s.
      - Client access LFCs (not the web services)
    - Transfer via lcg-cp through srm (But, it could be other supported format.)
    - Needs protections from possible abuse.

Priority Hierarchies

1. Dccp/dcap via ID
2. dccp/dcap via path
   - When the webservice is down or failed to find ID
   - ID is for wrong file.
3. xRootd/httpd via path through dCache Native Interfaces
4. xRootd via ID
   - dCache is down (No 1, 2 and 3 failed or being disabled.)
     - Dcap is down, name space is down, NFS mount is broken, dcache pool service is down, etc…
5. Httpd via ID
   - dCache and xrood are disabled/down.
6. xrdcp via Federated storage via global name.
7. Lcp-cp via GRID storages

Future Capabilities

- LSM should dynamically decides if the physical download is suited over the direct access method.
  - Currently, it is set as a PANDA site configuration. The dynamic adjustment is not possible.
  - Decision can be made based on the input file size, the number of input files, etc…
- If direct methods, it should again provides best available direct method from among the arrays of interfaces.
  - dCache's dCap/xRootd
  - xRootd on storage pools
  - NFS 4.1?