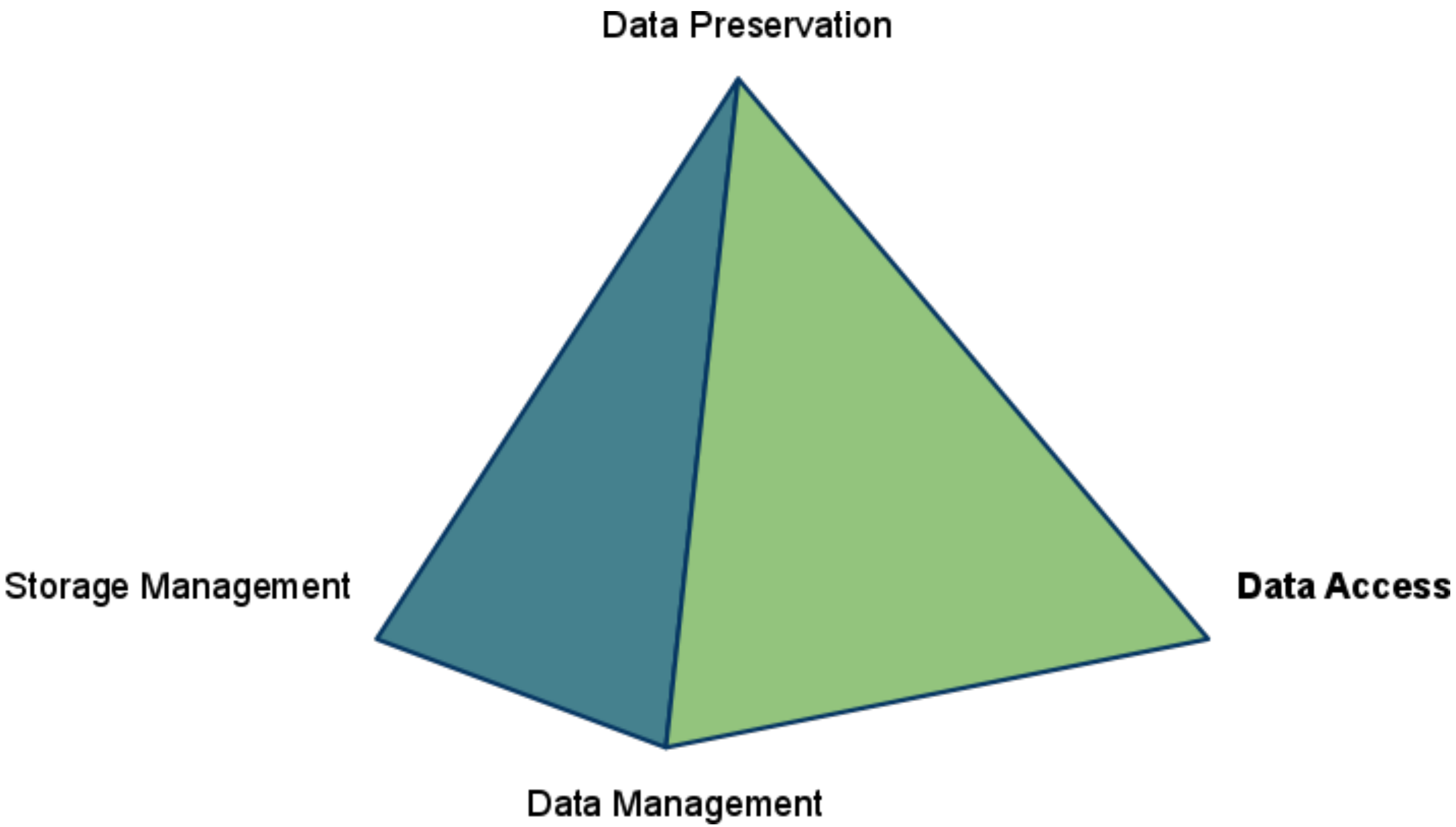
Data Access in HEP

Focus areas for data



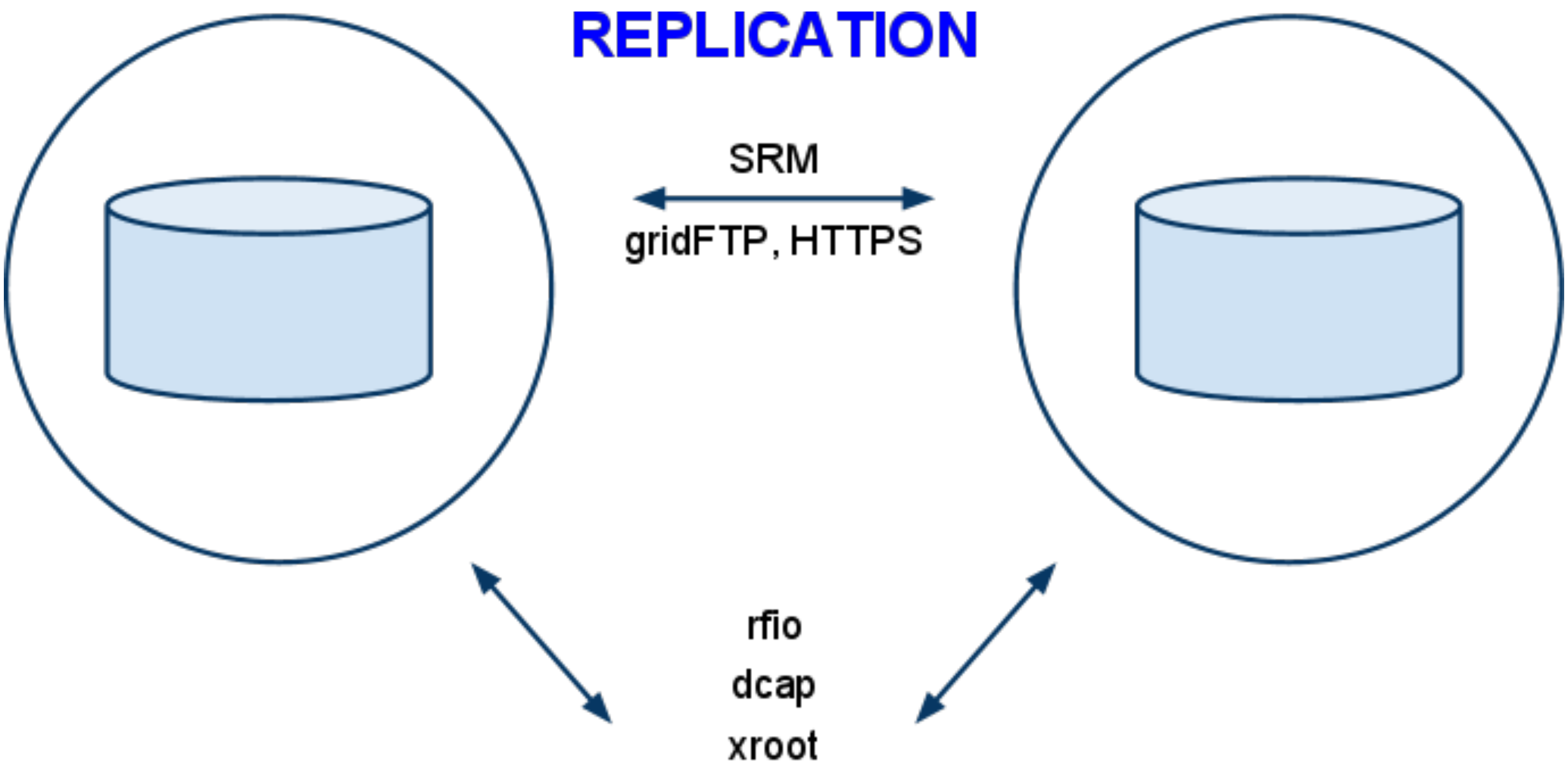
Data Preservation

Storage Management

Data Access

Data Management

Quick Picture (as seen yesterday)



REPLICATION

SRM

gridFTP, HTTPS

rfio

dcap

xroot

ACCESS

POSIX like

What our I/O protocols provide :-)

- POSIX like access
  - Expected by our analysis libraries
- Strong security
  - Currently PKI (X509) & kerberos (popular internally)
- Scalability
  - Thousands of concurrent clients
  - Accessing local systems, but also over the WAN
  - Distributed data access (separate metadata and I/O requests)
- Performance optimizations
  - Block caching, vector reads

No standard protocol offering all of this... until recently

What our I/O protocols impose :-(

- A protocol zoo
    - We have an heterogeneous environment
    - Every vendor proposes his own
    - Some efforts on providing abstraction libraries

- Pain on our users
    - Systems and experts need this knowledge
    - Complexity and load on operators increases significantly

- User Interface Nodes (entry points)
    - Hard to manage
        - version incompatibilities, library conflicts, ...

A standard for POSIX access... pNFS

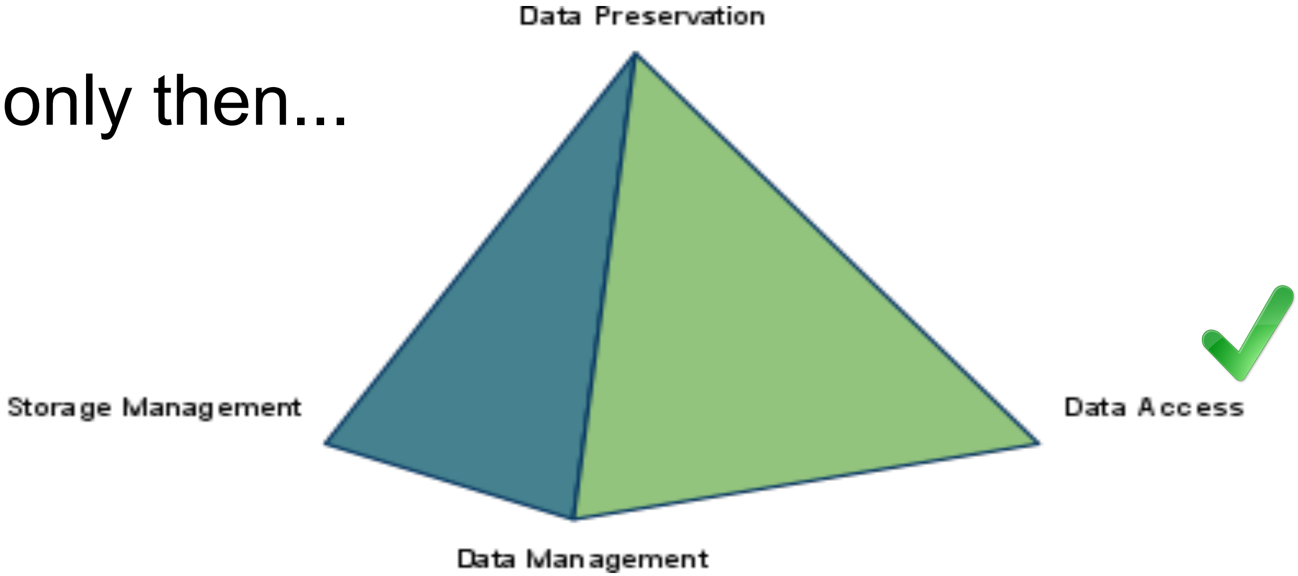
- NFS4 gave us
  - Strong security (via GSSAPI)
  - Bulk requests (performance, also over WAN)
- NFS4.1 (pNFS) gives us
  - Split between metadata and I/O requests
  - Support for multiple access "layouts": file, block, object
  - Scalable access to distributed data
    - Place for optimization, benefit from tiered storage
- And above all they give us
  - An industry standard
  - Built-in clients in different operating systems (Linux, Solaris, Windows, ...)
    - And all the optimizations already there for years
  - End of vendor lock-in (?)

Where we will end up

- A simpler, easier system to use and manage
  - Work in progress in some of our systems

- But that won't been enough
  - Our libraries (analysis and other remote access) need to improve their failure handling
    - Code for failure, as praised earlier today
    - True for every community

- And only then...


Data Preservation
Storage Management
Data Access
✓
Data Management