# Xrootd Demonstrator

Progress Update
WLCG Collaboration Meeting

# The Data Access Problem

- Physicists need a simple and quick mechanism to access data from outside grid sites.

- The operating cost of our data management tools are too high for marginally staffed sites (T3s).

- Jobs should only degrade, not fail, when encountering data access issues.
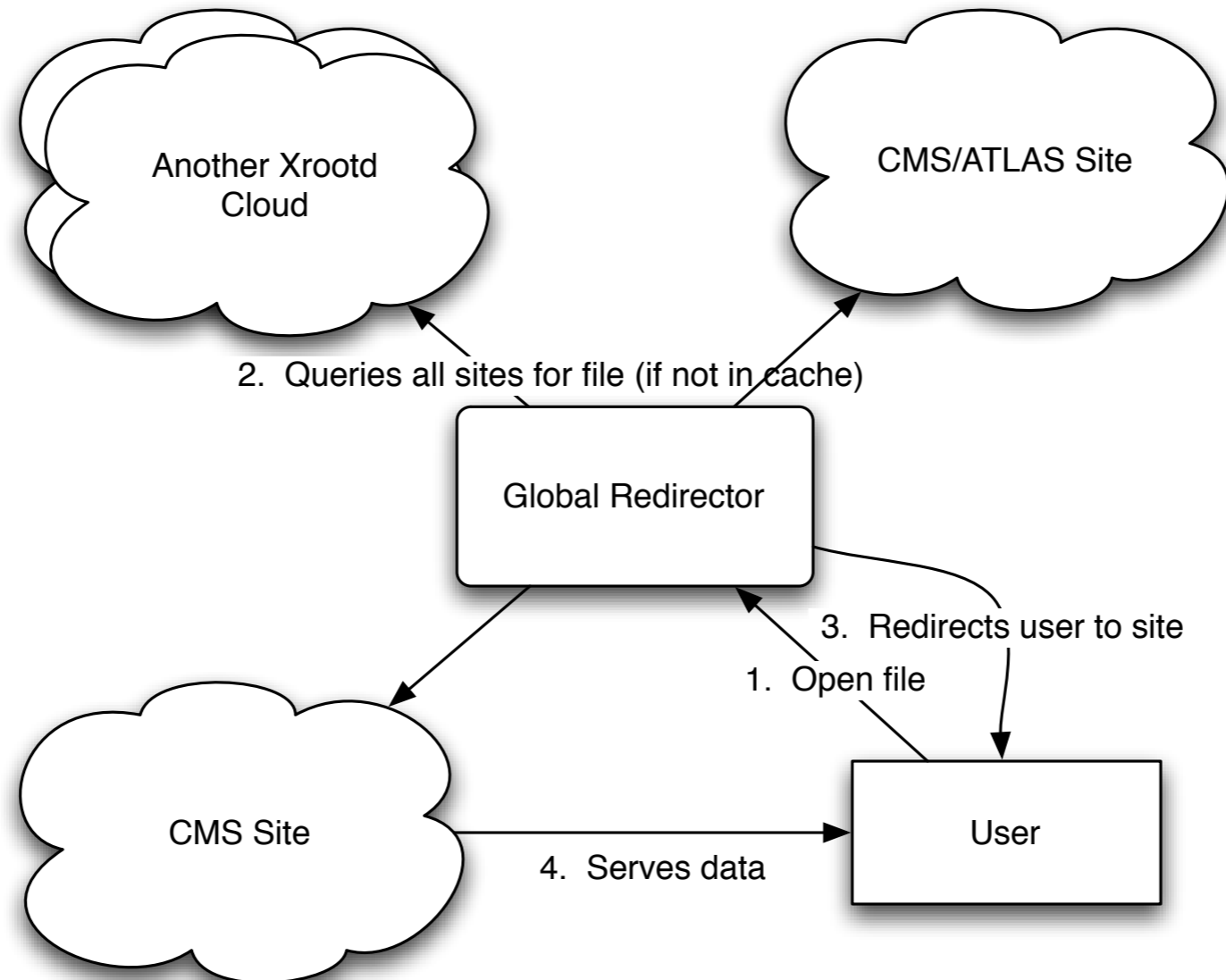
# Goals

- Develop a global data access architecture that is simple, reliable, and transparent.

- Data downloaded on demand, not pre-staged.

- Each file is represented by one URL; discovering sources is done by the system.

- Reliability!

# Xrootd Architecture

- We decided to look at a Xrootd-based global data service, because:

  - Xrootd protocol is ubiquitous in this field

  - Allows for a multi-level caching architecture (and deployed already in the field by ALICE!)

  - Can easily integrate non-Xrootd sites

# Xrootd Architecture

Another Xrootd Cloud

CMS/ATLAS Site

2. Queries all sites for file (if not in cache)

Global Redirector

3. Redirects user to site

1. Open file

CMS Site

User

4. Serves data

- Notes:
  - "Global redirector" can be up to 16 actual hosts (highly available)
  - Sites need to run at least 1 xrootd host, but can keep dCache/Lustre/ HDFS/DPM/etc.
  - Each site exports according to their capacity - no distinction in terms of T0 vs T1 vs T2.
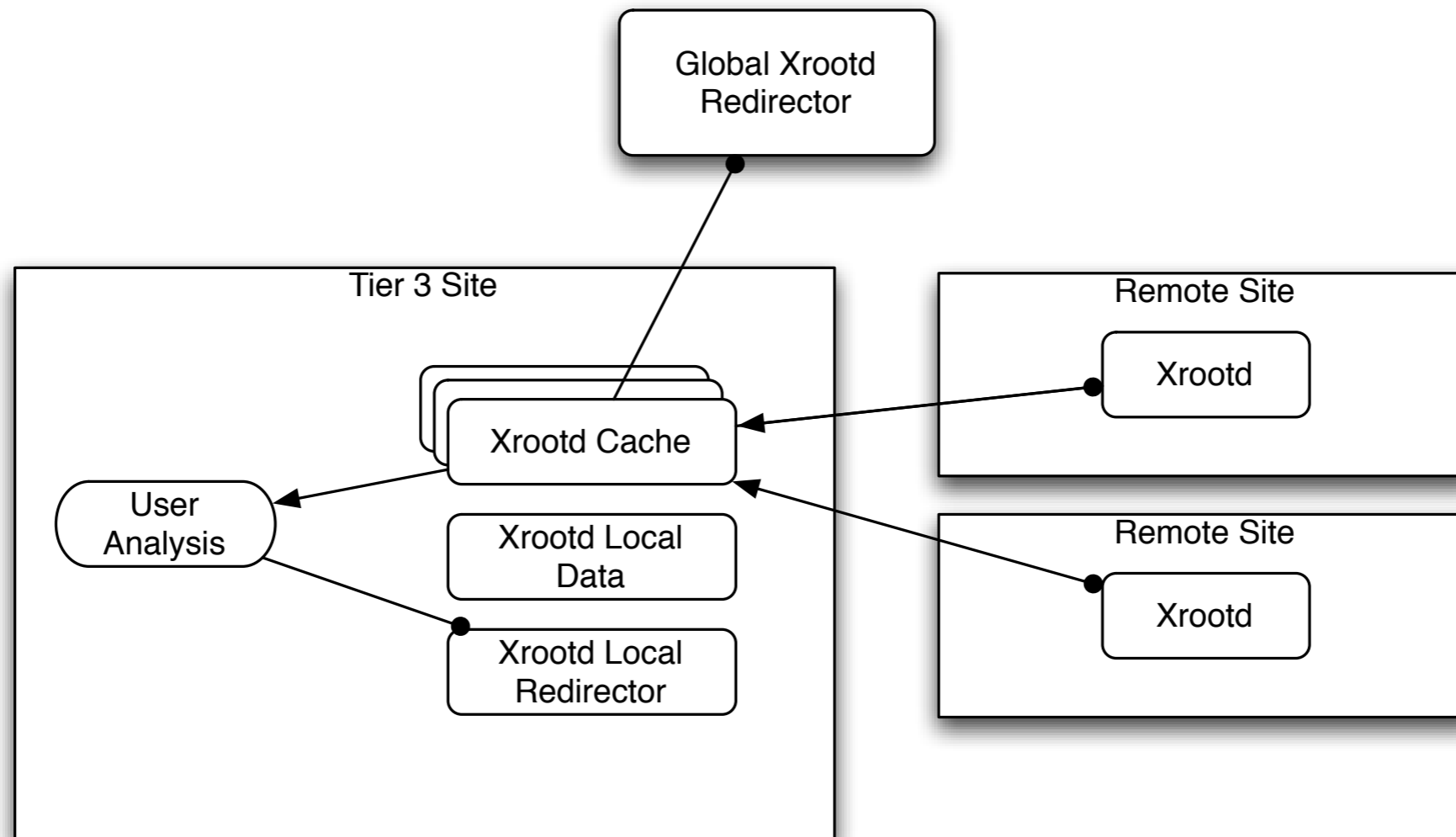  - T3 is a special case; more later.

# User Use Cases

- Application running outside grid

- Incomplete dataset at a site
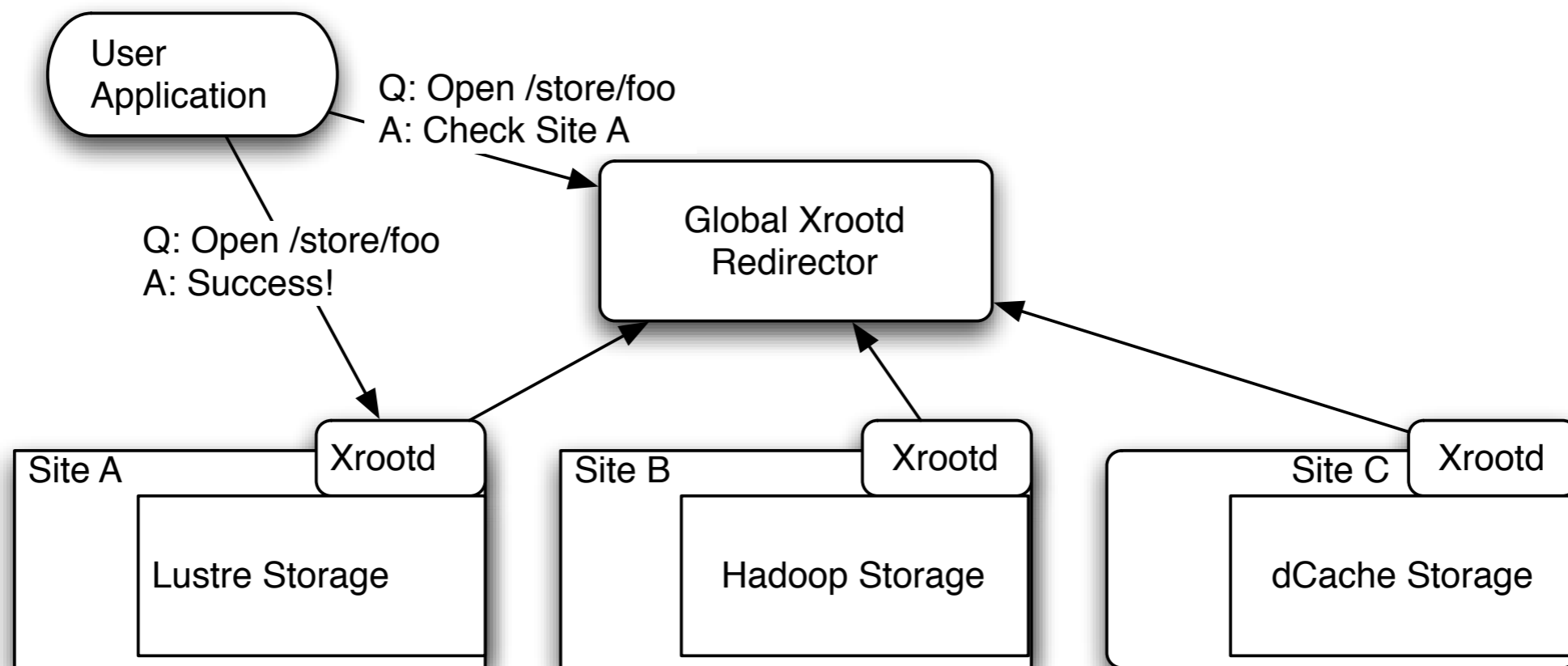
# Use Case

T3 Site - look!  No data management responsibilities



The cache servers act as a client to the global system. Downloads from all possible sources as in bittorrent.

# Demonstrator Project

- A single global redirector, xrootd.unl.edu.

- Each site exports the same namespace (only need the LFN, no PFN/GUID stuff)

- GSI security (VOMS work being done by CERN).

- Have as many sites participating as possible.

- Show we can link it to experimental frameworks.

- "Flesh out" the operational issues and identify weaknesses.

  - Both globally and at the site level.

# Status

- Participating sites: Nebraska, Caltech, UCSD, Bari, FNAL.

- Upcoming sites: CERN, KIT

- Upcoming T3s: UCR, Omaha

- Demonstrated usage with CMSSW, ROOT, CMS event display.

  - Up to 80% CPU efficiency on trans-atlantic link on experimental CMSSW versions!

- Submitted several rounds of CRAB-based analysis jobs demonstrating remote access.

# Metrics for Success

- *Not* in GB/s (we already can do that!)

- Being able to demonstrate promised capabilities to experiments.

- Understanding WAN impact of caching.

- Reduce costs of running a T3 site.

# Next Steps

- Need help!

  - Looking for volunteer T1/T2/T3 sites.

    - Especially DPM sites (not yet represented!)

  - Need users to abuse the system.

  - Need feedback and concerns from sysadmins.