CernVM-FS for IF?

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Software Distribution

- The problem
  - Need to distribute software releases to many computing centers?
  - Each new release may have libraries that have not changed from previous release. Complete duplication is a waste of resources.
  - Installing the release at each site can be very labor intensive.
- Possible Solution – CernVM-FS

What is CernVM–FS (cvmfs)

- [CernVM–FS is a building block of of CernVM 2.](#)
- http://cernvm.cern.ch
- Tech report
  https://cernvm.cern.ch/project/trac/downloads/cernvm/cvmfstech-0.2.68-1.pdf
- Describes client installation details.
- Pretty easy, obviously needs to be on each client (eg. grid cluster node)
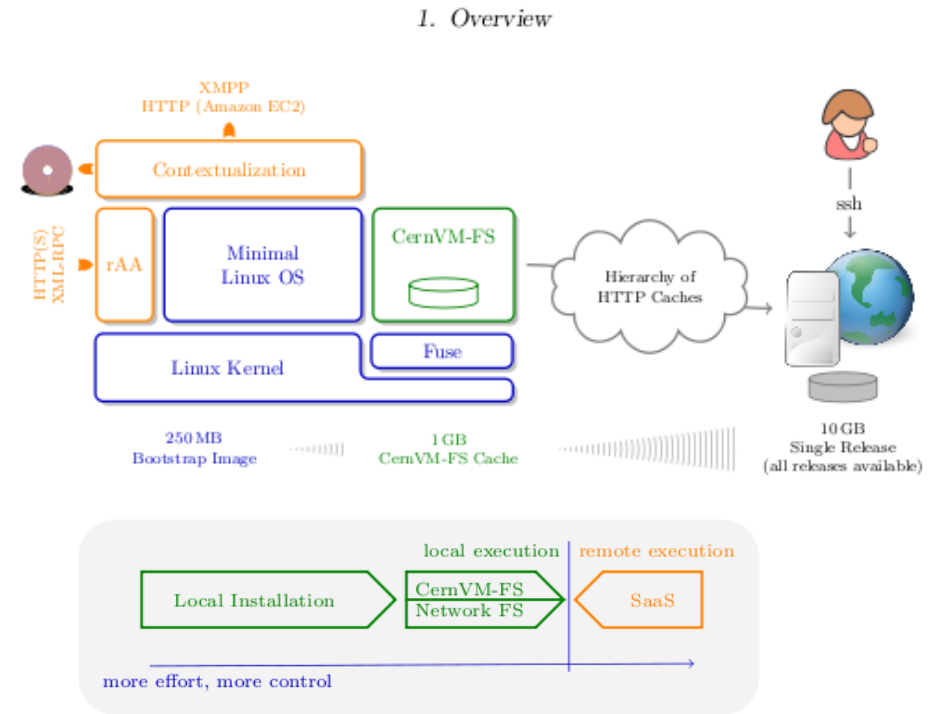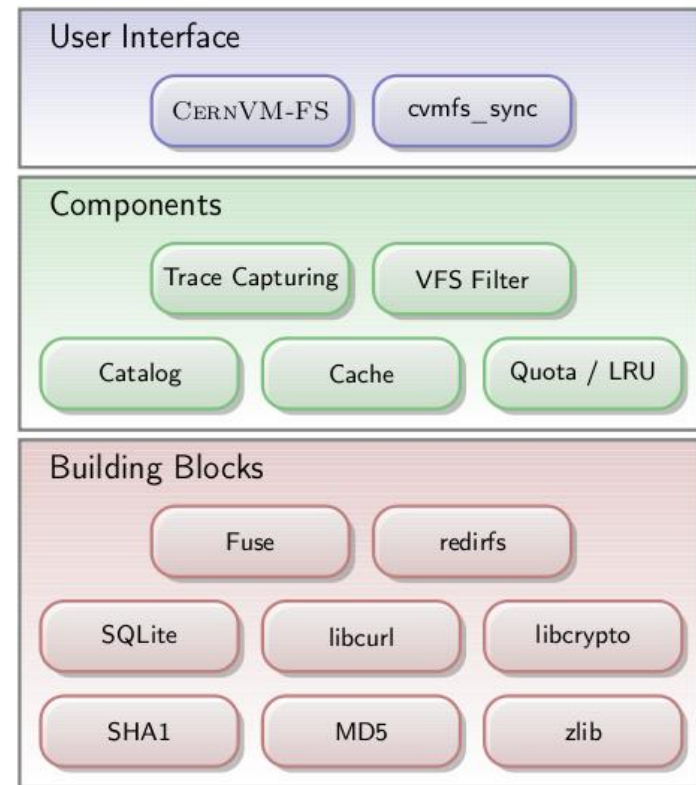

Figure 1.2.: Classification of CERNVM-FS and several alternative options for software installation.
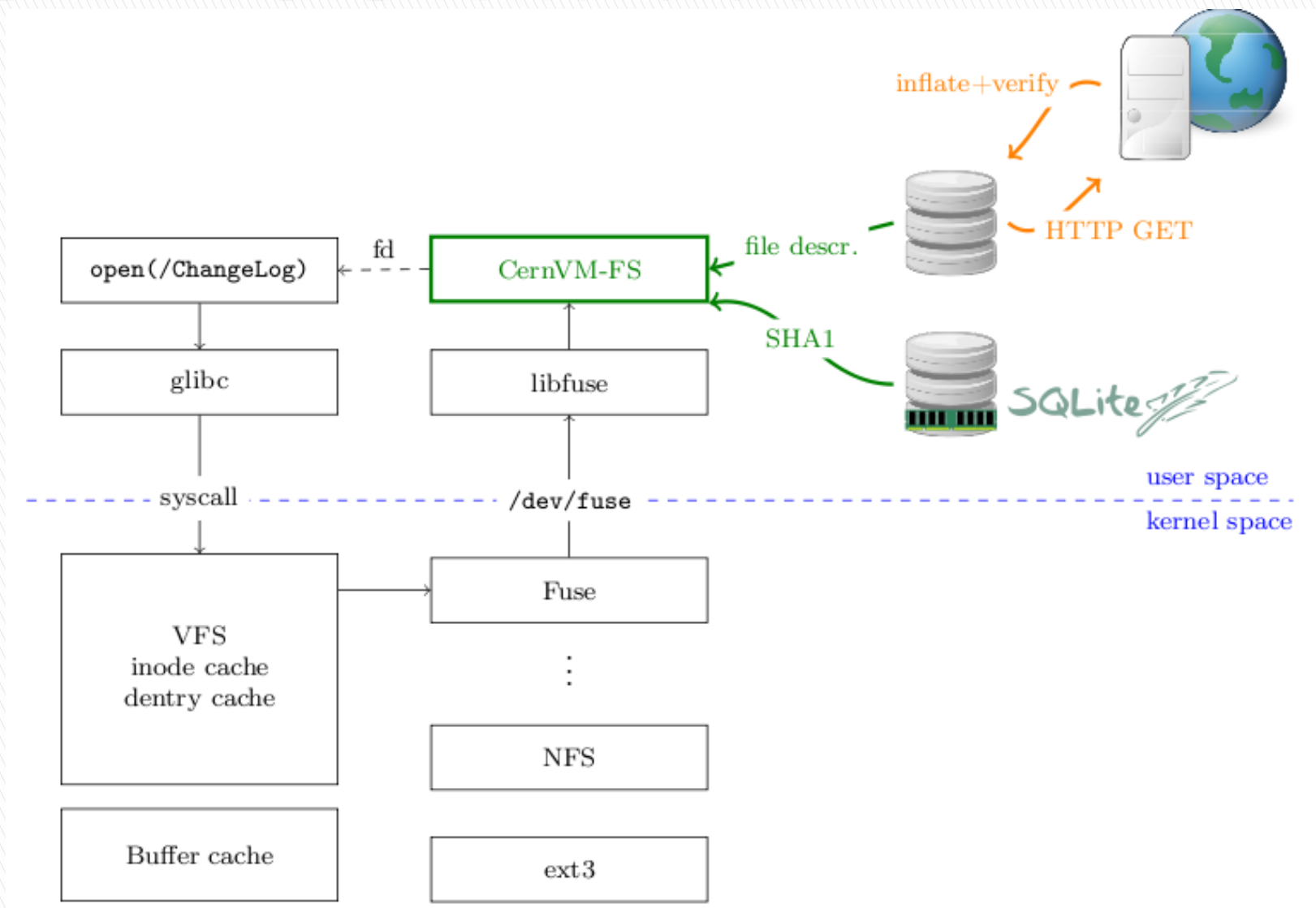
Information	CernVM and CernVM–FS

CernVM-FS components

- Standard building blocks: FUSE, redirfs, etc.
- File catalog in SQLite file.
- Data cache where files are stored.

User Interface
- CERNVM-FS
- cvmfs_sync

Components
- Trace Capturing
- VFS Filter
- Catalog
- Cache
- Quota / LRU

Building Blocks
- Fuse
- redirfs
- SQLite
- libcurl
- libcrypto
- SHA1
- MD5
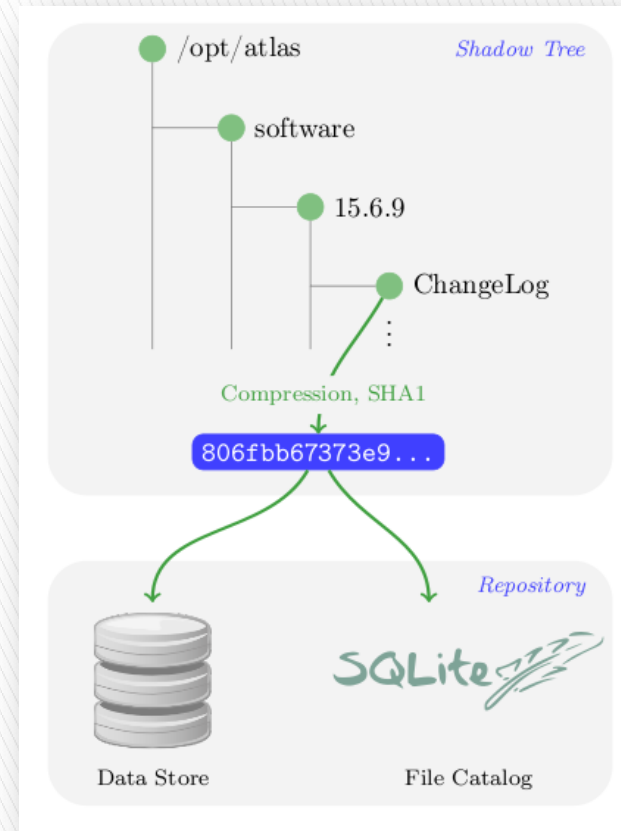- zlib

Details

Block diagram

CVM–FS Client–side

Client-side Catalog and Data Cache

- File catalog
  - SQLite file(s). Can be nested.
  - Signed with .x509 signature.
  - Time-to-live (TTL) parameter directs checking server for new catalog versions.
  - Files in data cache are referenced through MD5 content hash.
- Data cache
  - Where files are stored
  - Only one instance of file (unique MD5 hash) is needed and can be referenced to multiple software versions.
  - Managed with Least Recently Used (LRU) algorithm.

The CVM–FS Repository (server-side)

1. Build release in "shadow" directory and test it.
2. Run *svmfs_sync* and *cvmfs_sign* to load the server-side repository and sign it.
3. Make the web server serve the new version.

/opt/atlas — *Shadow Tree*
software
15.6.9
ChangeLog
Compression, SHA1
806fbb67373e9...
Data Store — *Repository*
SQLite
File Catalog

Loading the repository

Example tree

Status and Plans

- CVM−FS has LHC experiment experience, and support from LCG. Some problems have been noted.
- We (CD/REX) have a test installation we are practicing with to understand the details and interact with the CERN developers.
- In a few weeks, we would like to begin working with one of the IF experiments in a field test.
- We'll proceed from there, as conditions warrant …

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