Encrypted Data Storage in EGEE

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www.eu-egee.org

Motivation

Medical community as the principal user

- large amount of images are produced
- privacy concerns vs. processing needs
- ease of use (image production and application)

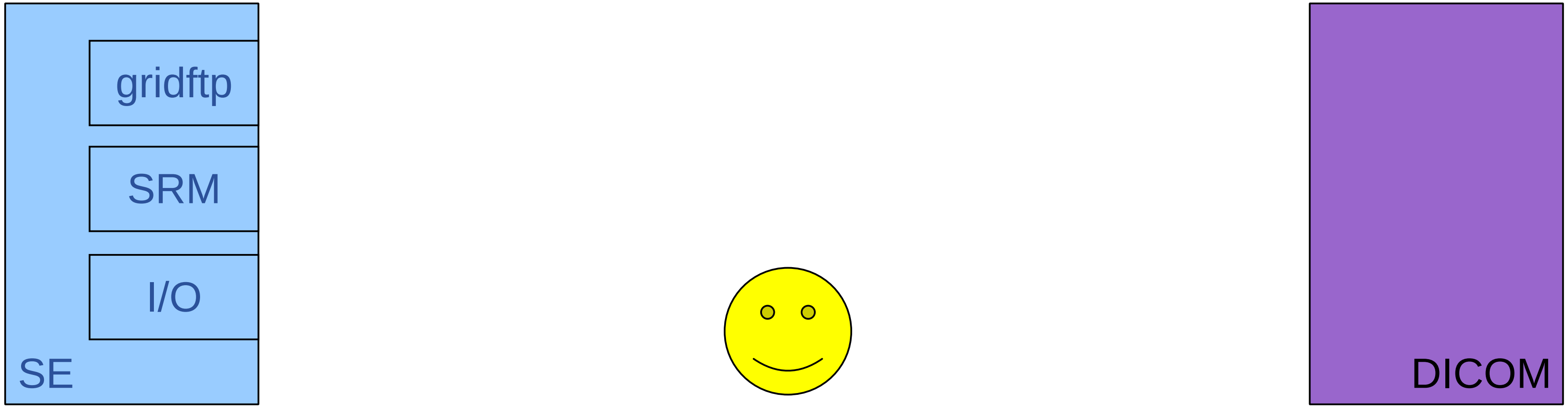
Strong security requirements

- anonymity (patient data is separate)
- fine grained access control (only selected individuals)
- privacy (even storage administrator cannot read)

MDM = Medical Data Management

Building Blocks

- Hospitals: DICOM =
  Digital Image and COmmunication in Medicine
- Grid: SE = SRM + gridftp + I/O
- and a client (application processing an image)
- [data transfer services among storage facilities]



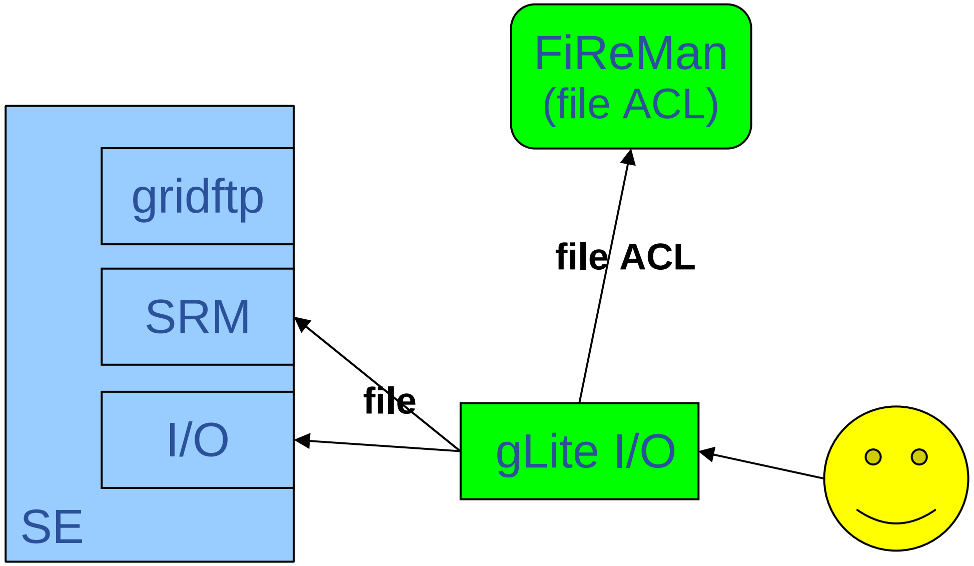
Goal: data access at any location

Access Control

- complex access patterns with many individuals enlisted
- no ACL support in currently used Storage Elements

“wrap” the SE into a service which enforces ACLs

- gLite I/O: authorization enforcement
- File and Replica Manager (FiReMan): ACL store

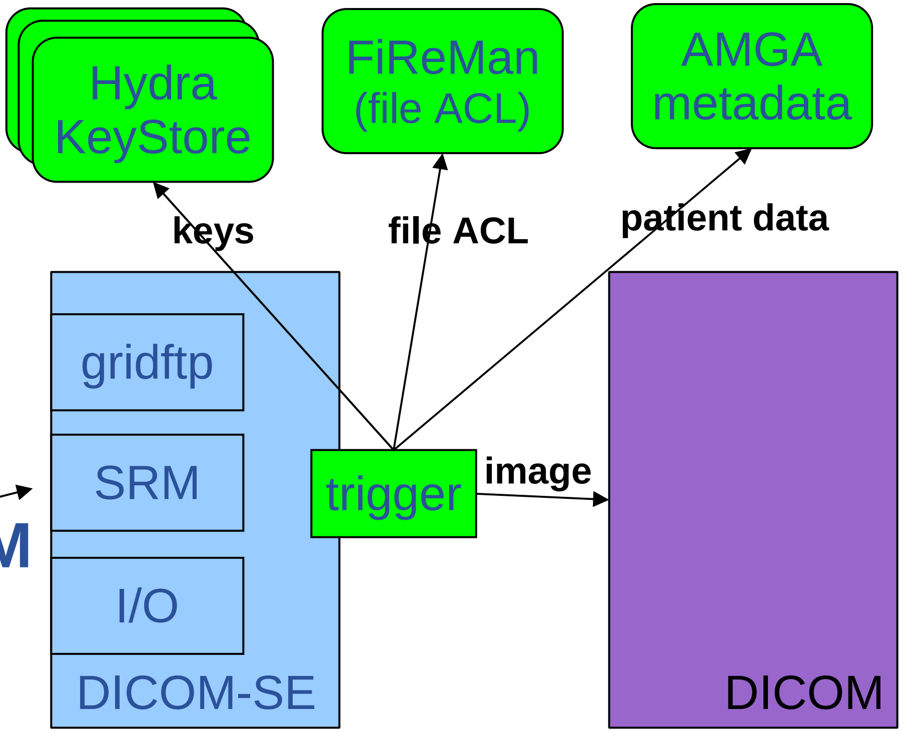


Encryption...

“wrapping” DICOM to satisfy the security requirements:

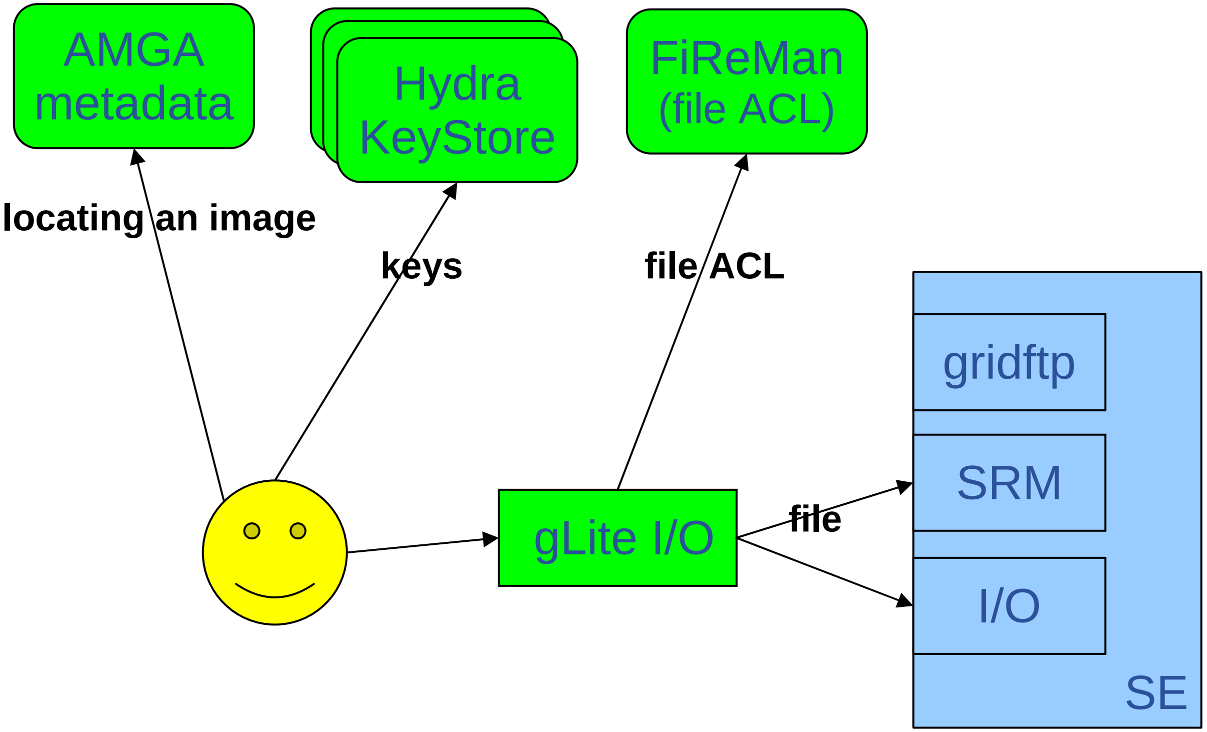
- anonymity: patient data is separated and stored in AMGA
- access control: ACL information on individual files in FiReMan
- privacy: per-file keys are distributed among the Hydra key servers with fine grained access control

Image is retrieved from DICOM and processed to be “exported” to the grid.



... and decryption

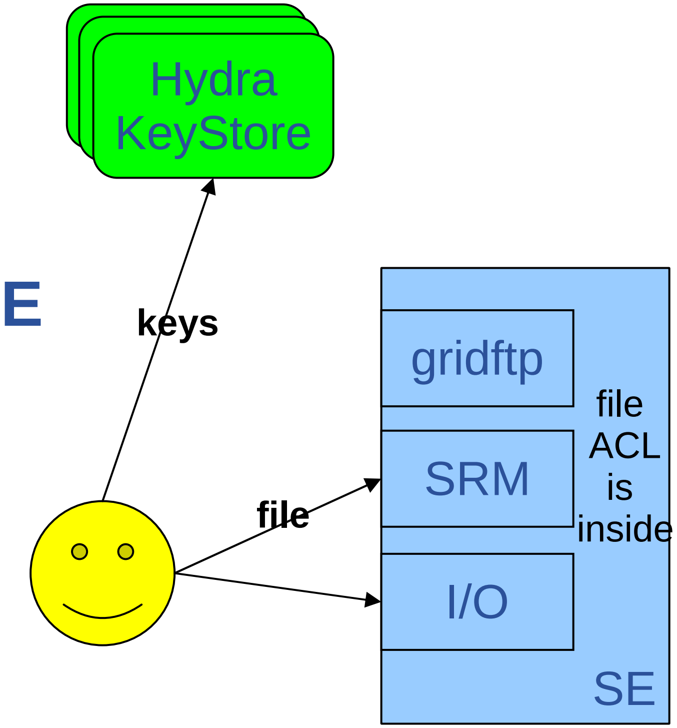
- key is retrieved from the Hydra key servers
- data is decrypted block-by-block in memory only (OpenSSL cyphers)
- encryption also works for output data



Conclusion and Future Work

- components are part of the gLite software stack
- tested with applications – see the MDM demo

- integrating key distribution algorithms (m-of-n key split)
- SRMv2 includes access control
- functions: remove “wrapping” of SE
- ACL sync tool for distributed SEs
- DPM-DICOM as SE
- ease application integration: GFAL (possibly Parrot or FUSE)


Hydra KeyStore
keys
file
gridftp
SRM
I/O
file ACL is inside
SE