National Geospatial Digital Archive

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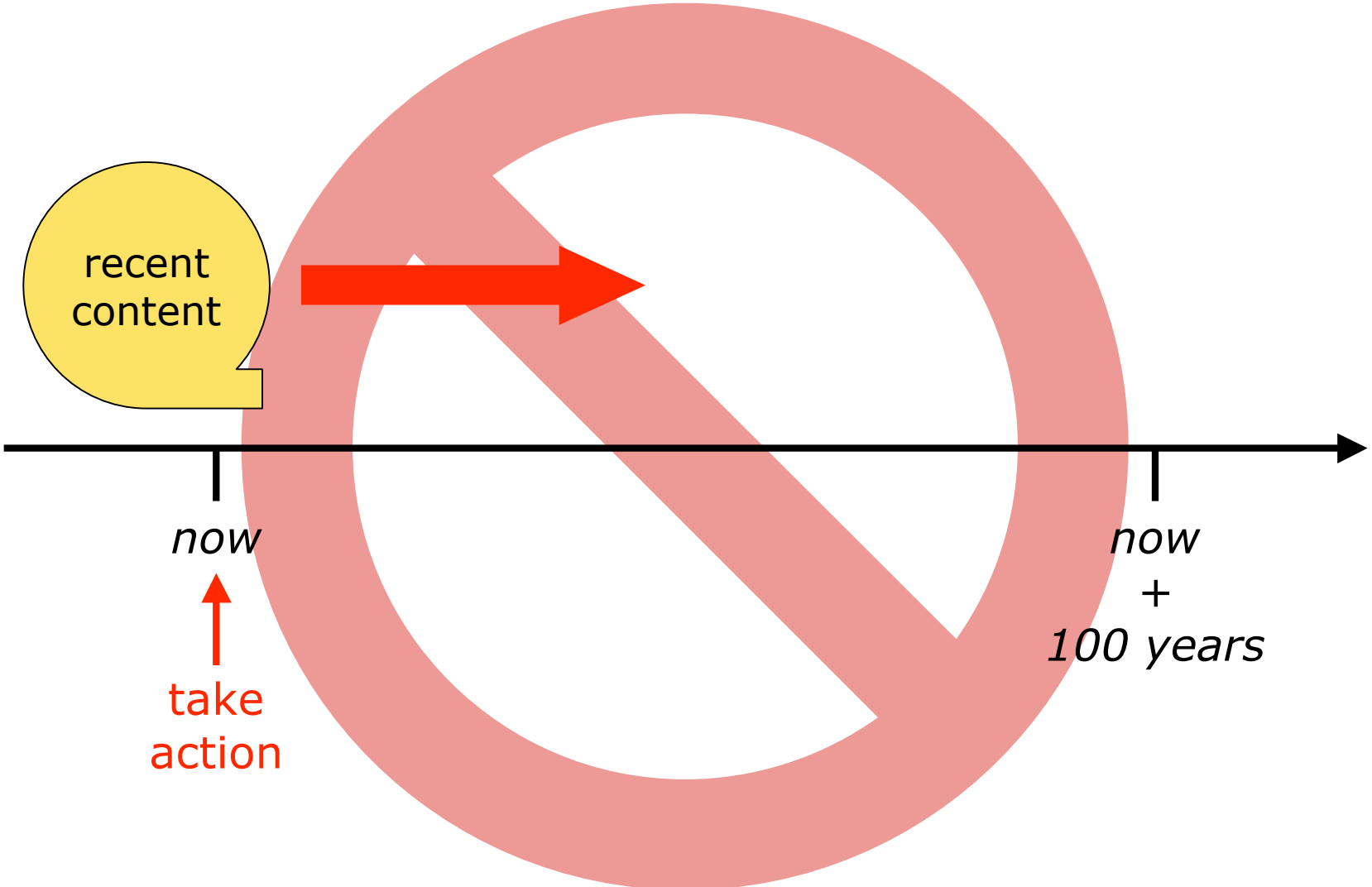
Overview

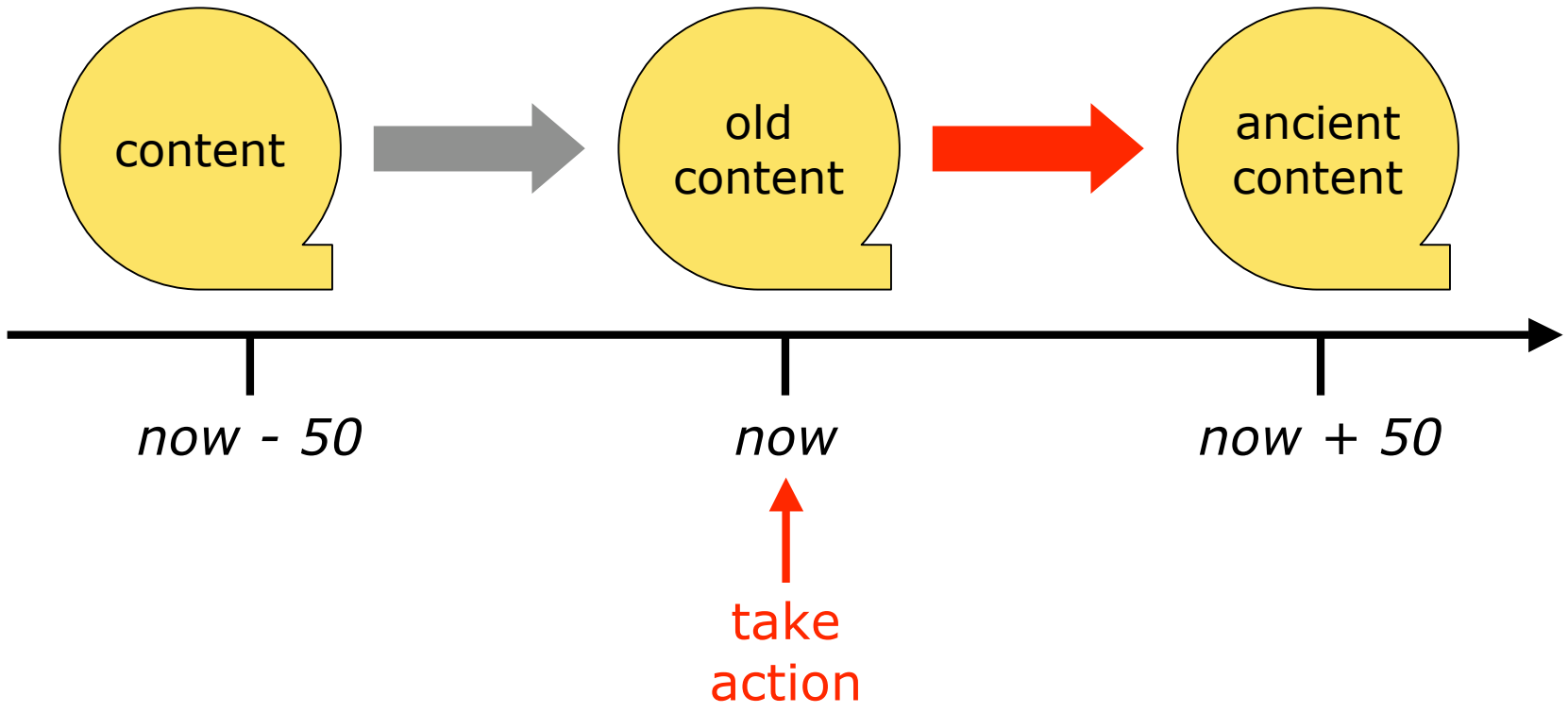
- One of 8 NDIIPP projects funded by Library of Congress
  - joint project with Stanford University
- Goal: long-term, wide-scale preservation of geospatial data
- Preservation architecture & prototype archive
  - single-digit terabytes
  - CaSIL: GIS datasets, remote-sensing imagery, aerial photography
  - Rumsey collection: scanned maps

Common starting hypothesis



NGDA starting hypothesis

"mid-century perspective"



Mid-century perspective

- Repeated migrations across storage media and storage systems
  - past and future
- Repeated migrations across archive management systems
  - each possibly necessitating transformation and reorganization of archived content
- Repeated handoffs between institutions
  - each implementing different policies

Mid-century perspective

- Migrations/handoffs may occur asynchronously
  - different evolution rates, pressures
- Ability to interpret archived data may change and deteriorate
- Information value, resource levels change over time
  - need an ultra-low cost, “fallback” preservation mode

NGDA architecture goals

- Facilitate migration at all levels
  - separate levels to accommodate asynchronicity
- Provide fallback mode
  - for individual objects and entire archives
- Capture semantics
- Cheap & easy
  - or preservation can’t be large-scale

Semantics

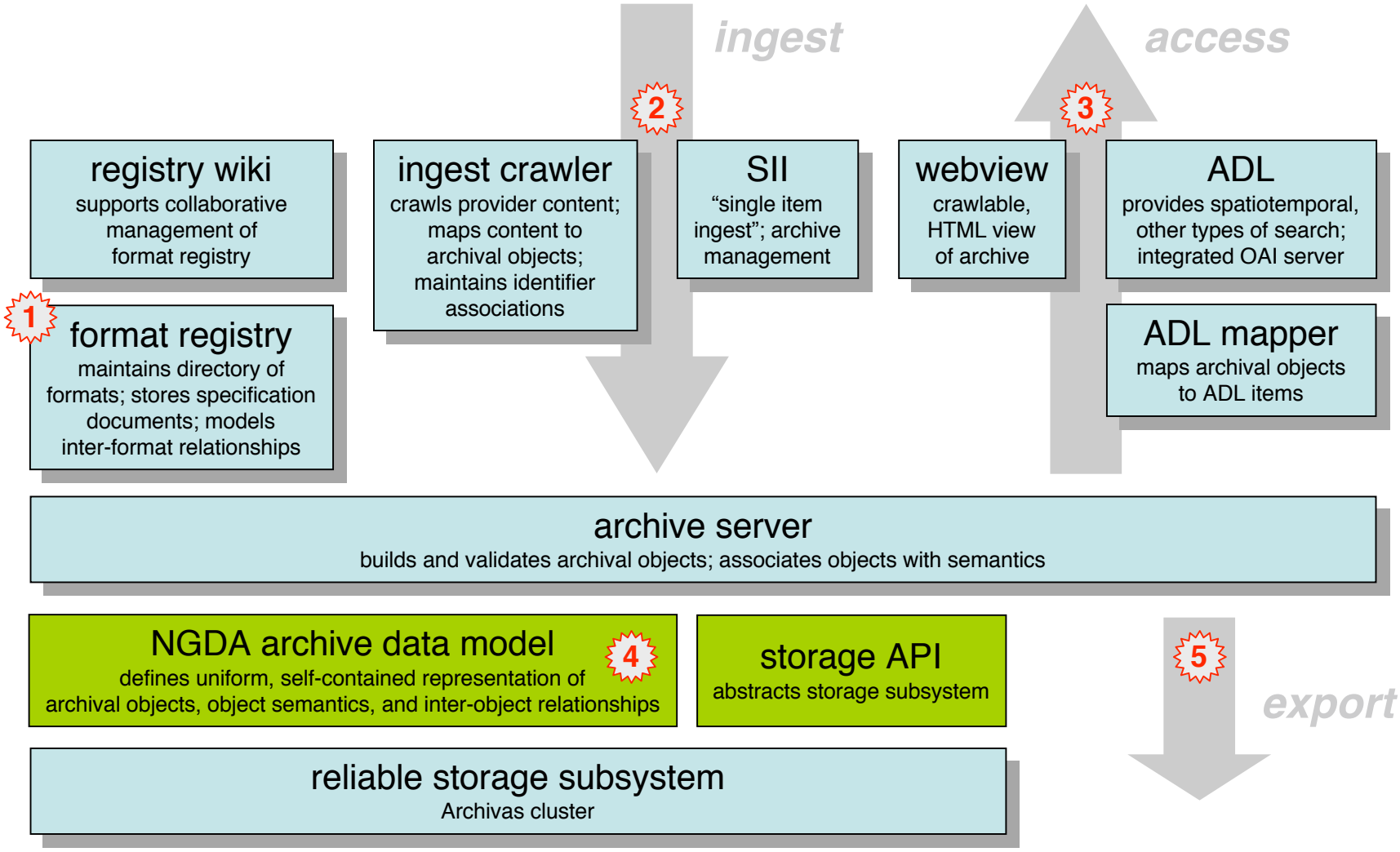
- *Def*: knowledge needed to interpret and use information that is not shared by the target user community
- Simple documents
  - descriptive metadata, format specification sufficient
- Remote sensing imagery
  - need data interpretation, usage, processing, calibration
  - in practice, such semantics are packaged separately
- Climate data records
  - require periodic reprocessing

Ozone reprocessing requirements

- xDRs
- Delivered IPs
- Engineering data (incl. C3S data if not in RDRs)
- Upload files
- Databases
- Software (source code)
- Calibration artifacts
  - data
  - analysis tools
  - tables
  - logs
  - notebooks
  - instrument design
- All project documentation
- All scientific papers
- All reports

** Courtesy of Mike Linda, NASA GSFC; from 2006 NOAA CLASS workshop*

NGDA architecture



Federation interaction points

1. Format registry…
   - provides a central place for data providers to describe file semantics, and for archives and end users to reference those semantics.
2. Ingest services and tools…
   - allow data providers to transfer content into an archive.
3. Access services…
   - allow end users to search for and use content across the entire federation, and allow third parties to provide value-added access services.
4. Archive data model…
   - defines a uniform representation of archive content; archives that implement or map to the data model can employ NGDA tools to provide access and export services.
5. Export function…
   - transfers archive content in bulk to other archives for replication and migration purposes; ancillary object semantics are automatically included.

Storage system requirements

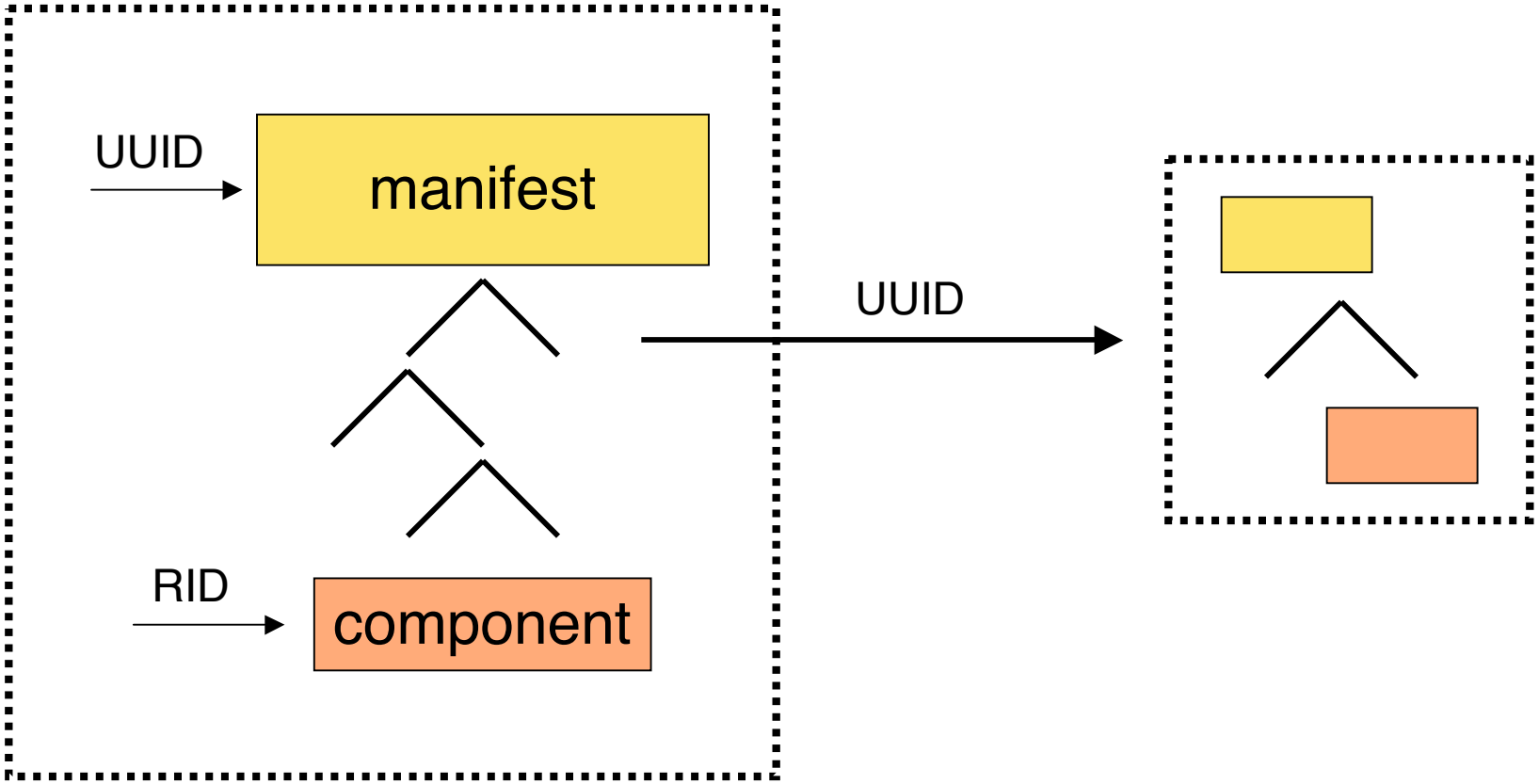
- Req's:
  - associate UUIDs/RIDs with bitstreams
  - retrieve global/local bitstream by UUID/RID
  - determine (parent) UUID of any bitstream
  - list all UUIDs

- Satisfied by:
  - any filesystem
  - any kind of UUIDs
    - tag:library.ucsb.edu,2005:*identifier*

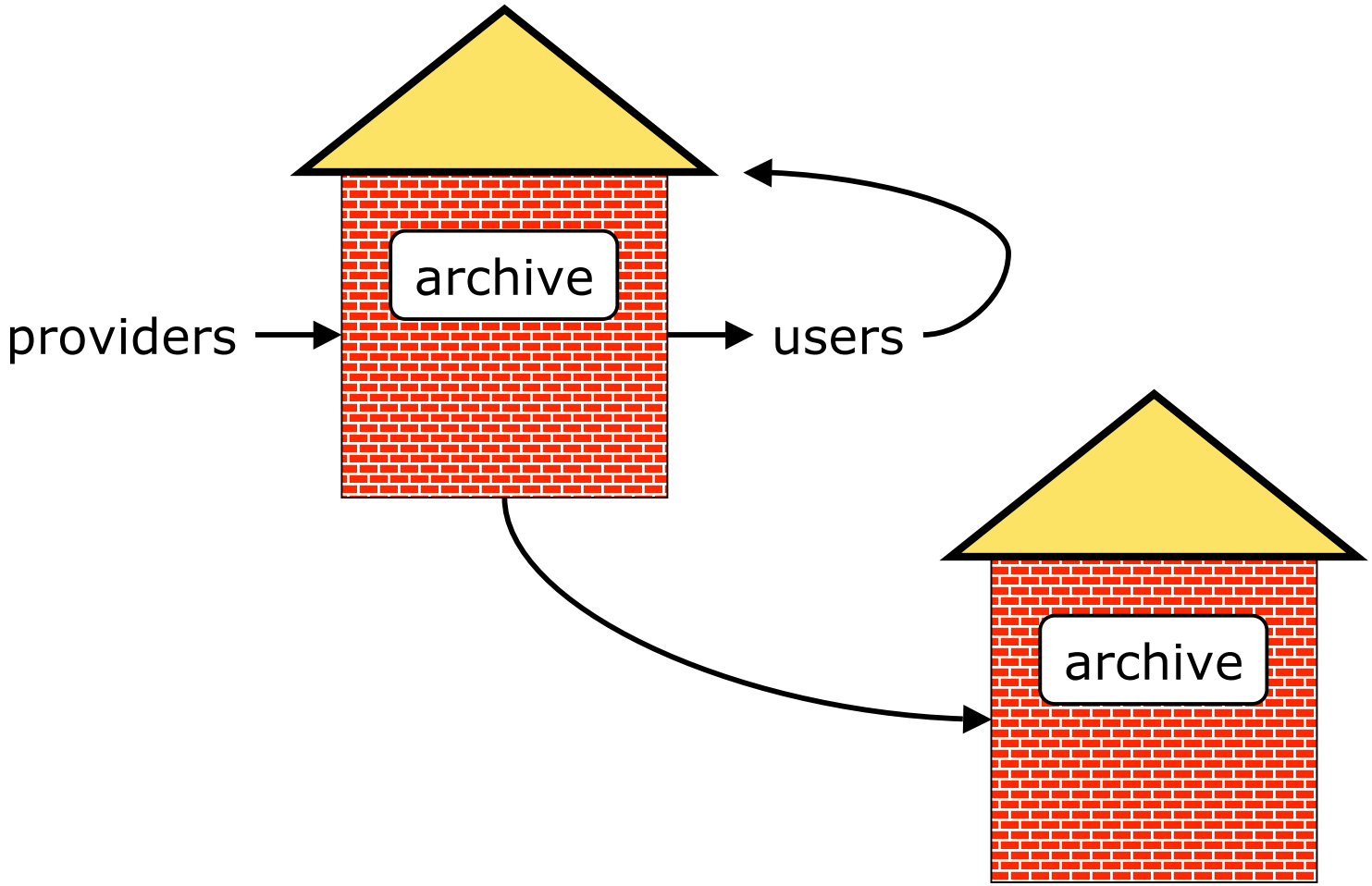
Data model

- Physical implementation of OAIS logical model
  - filesystem
  - files and directories identified by UUIDs
  - XML manifests
- Organizing principle: archival object
  - one individually reusable unit of information
  - groups metadata, data, derivatives, etc.
- Inter-object relationships
  - semantic definitions
  - lineage
  - collections and other aggregations

Archival objects



Towards a more layered architecture



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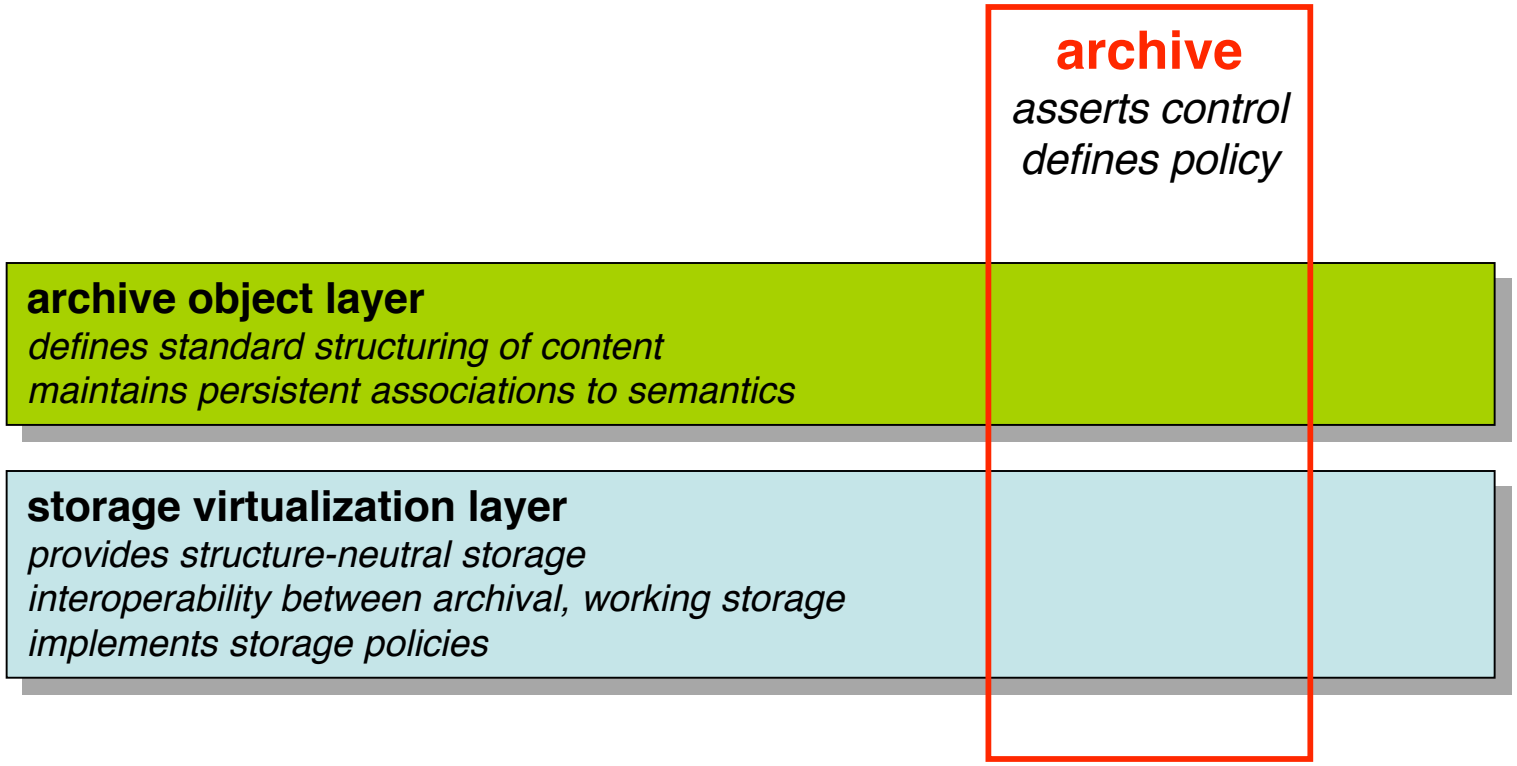

Questions?