Core Issues in Digital Preservation: Storage and Maintenance

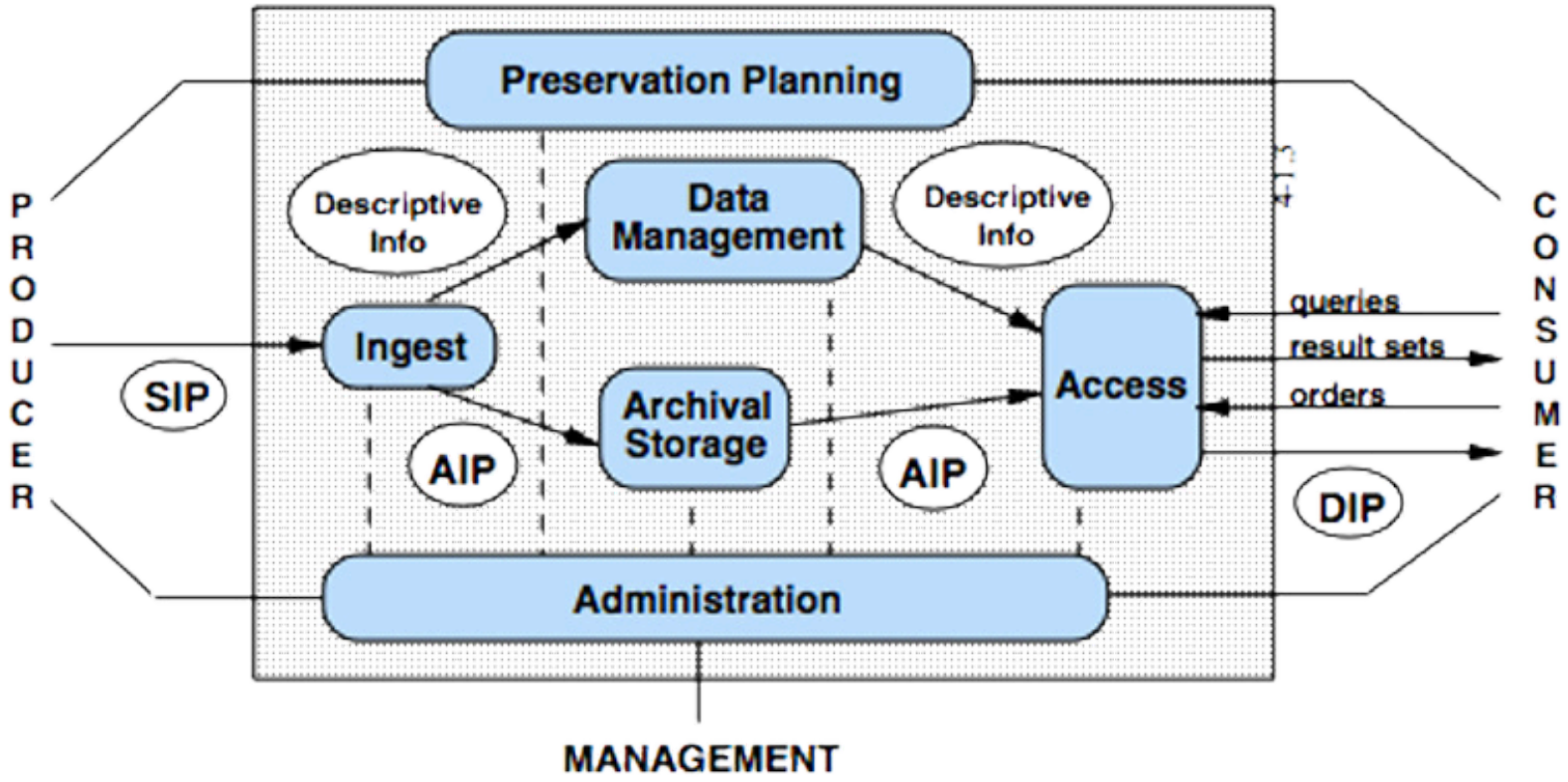
Jacob Nadal, Preservation Officer
UCLA Library


Storage and Maintenance

Digital Repositories

- Ingest: Get things in
- Manage: Take care of them
- Disseminate: Get them to users

OAIS
(Open Archival Information System)



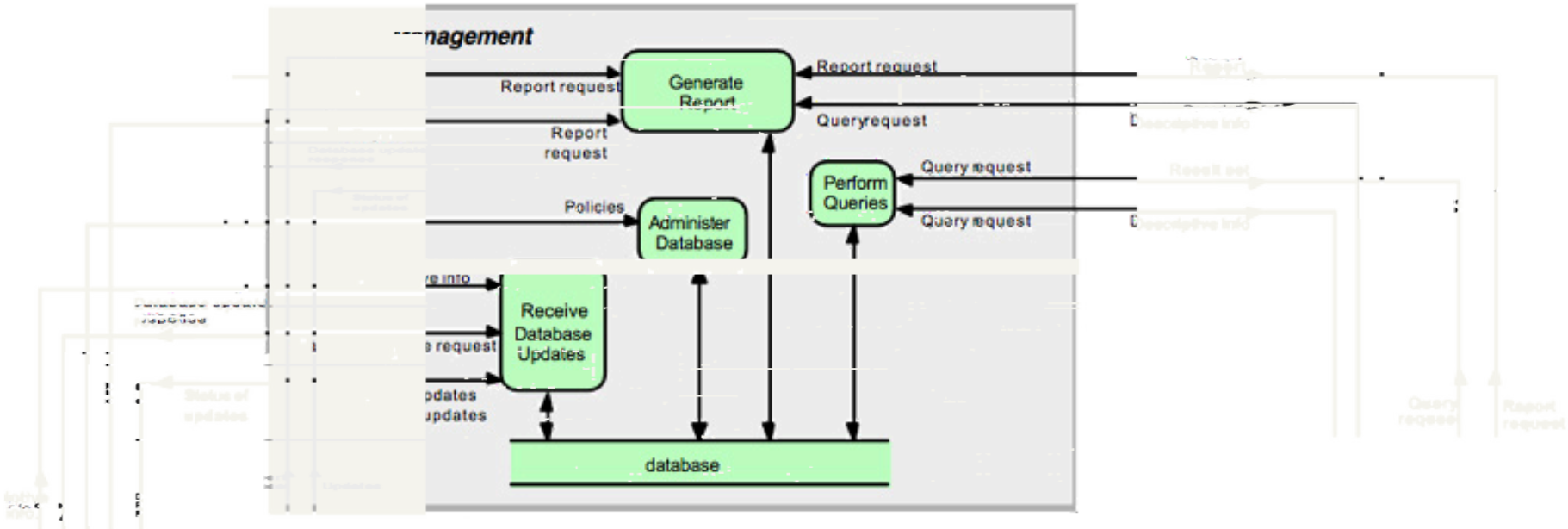
Start here: http://en.wikipedia.org/wiki/Open_Archival_Information_System

Full Standard: http://public.ccsds.org/publications/archive/650x0b1.PDF

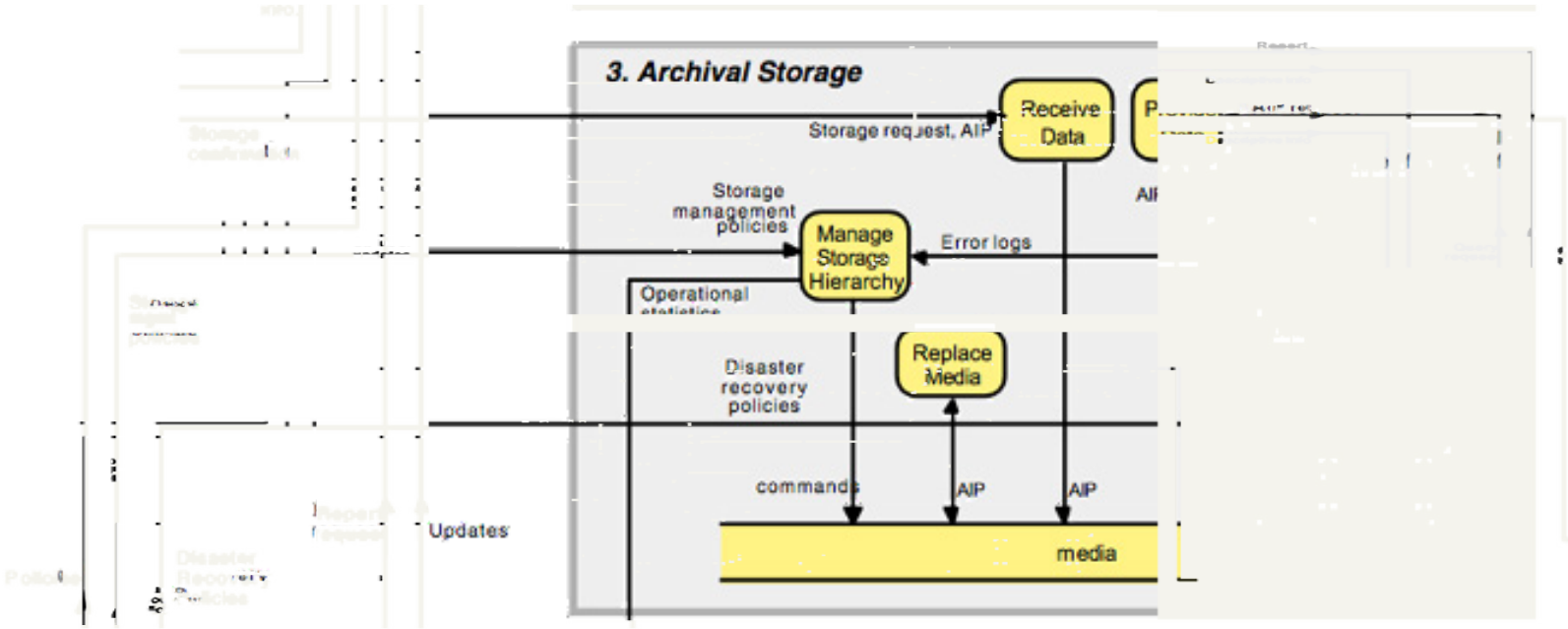
OAIS v Core IT

- OAIS contains elements that are common in managed IT environments
  - Database administration
  - System Backup
  - Media replacement
- OAIS has concepts that are more specifically archival
  - Preservation Planning and Metadata take a longer view than routine updates and digital asset management
    - "Designated Community" of users determines if archive is usable
  - "Information Packages" as distinct, granular objects
    - In the loosest form of backup, objects may not be handled with the level of independence OAIS expects

OAIS Entities:
Data Management



OAIS Entities: Archival Storage



Trusted Digital Repositories

1. OAIS compliance
2. Administrative responsibility
3. Organizational viability
4. Financial sustainability
5. Technological and procedural suitability
6. System security
7. Procedural accountability

Bare bones, or, not ***not*** digital preservation?

- A 1TB hard drive: $199
- Another 1TB hard drive: $199
- Yet another 1TB hard drive: $199
  - That's $600 for 1TB, very safe, for a year
- Software
  - Text Editor: Pref. w/XML support
  - PDF: Output PDF/A
  - Image: Output TIFF, JPEG 2000; ICC profiles
  - Audio: Output .WAV (Uncompressed PCM)
  - Video: Wait if possible; uncompressed .AVI

	Drive 1 / Workstation	Drive 2	Drive 3	Drive 4
January	Onsite backup	--	--	--
February	Onsite backup	Jan Backup	--	Jan Backup
March	Onsite backup	Offsite	Jan-Feb Backup	Offsite
April	Onsite backup	Offsite	Offsite	Jan-Mar Backup
May	Onsite backup	Jan-Apr Backup	Offsite	Offsite
June	Onsite backup	Offsite	Jan-June Backup	Offsite
July	Onsite backup	Offsite	Offsite	Jan-June Backup
August	Onsite backup	Jan-July Backup	Offsite	Offsite
September	Onsite backup	Offsite	Jan-Aug Backup	Offsite
October	Onsite backup	Offsite	Offsite	Jan-Sept Backup
November	Onsite backup	Jan-Oct Backup	Offsite	Offsite
December	Onsite backup	Offsite	Jan-Nov Backup	Offsite

	Drive 1 / Workstation	Drive 2	Drive 3	Drive 4
January	Onsite backup	--	--	--
February	Onsite backup	Jan Backup	--	Jan Backup
March	Onsite backup	Offsite	Jan-Feb Backup	Offsite
April	Onsite backup	Offsite	Offsite	Jan-Mar Backup
May	Onsite backup	Jan-Apr Backup	Offsite	Offsite
June	Onsite backup	Offsite	Jan-June Backup	Offsite
July	Onsite backup	Offsite	Offsite	Jan-June Backup
August	Onsite backup	Jan-July Backup	Offsite	Offsite
September	Onsite backup	Offsite	Jan-Aug Backup	Offsite
October	Onsite backup	Offsite	Offsite	Jan-Sept Backup
November	Onsite backup	Jan-Oct Backup	Offsite	Offsite
December	Onsite backup	Offsite	Jan-Nov Backup	Offsite

1. This is not digital preservation, but it is a viable way of getting digitized content through the year.
2. Don't avoid digitization because you don't have a digital repository set up.
3. Don't just keep digitizing or promising long-term preservation without developing (or contracting with) a repository

Not so bare bones

- Fedora Digital repositories
- LOCKSS networks
- DIY Repositories

Not so bare bones

- Fedora digital repositories software:
  - Identifies digital objects
  - Asserts relationships among digital objects
  - Links "behaviors" (i.e., services) to digital objects.
- Open source software: Free to use and develop on your own (http://fedora-commons.org/)
- Also available through a fee-based service called DuraCloud (http://www.duracloud.org)
- Fedora (repository) + D-Space (interface)
  - $4,500-$7,000 / year for .5 TB – 1 TB
  - $1,000/TB per year for extra storage

Fedora

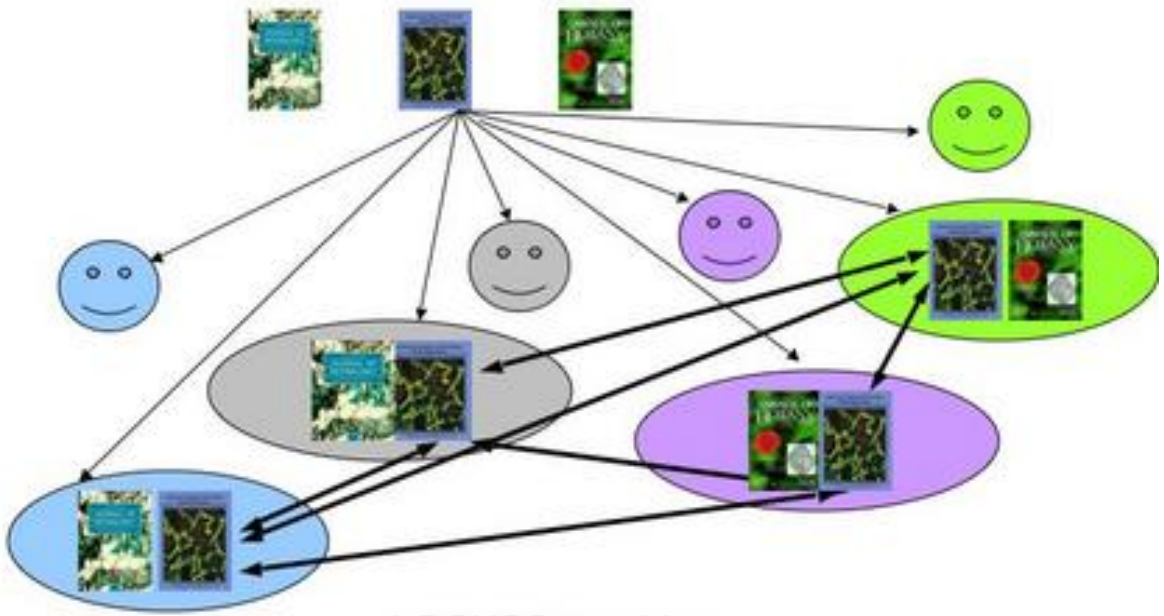
- Kahn and Wilensky Framework
  - www.cnri.reston.va.us/k-w.html
- Supports RDF – "semantic triples"
  - [1]Object [2] described by [3] metadata
  - [1] Page image [2] is part of [3] eBook
- Triples relate well-defined, persistently identified bitsreams or "digital objects"

Distributed Storage

"...let us save what remains: not by vaults and locks which fence them from the public eye and use in consigning them to the waste of time, but by such a multiplication of copies, as shall place them beyond the reach of accident."

--Thomas Jefferson to Ebenezer Hazard, Philadelphia, February 18, 1791.

LOCKSS



Costs:
•Commodity, desktop PC grade, hardware: $100s - $1,000s
•LOCKSS Alliance Fee (or negotiated price for Private LOCKSS):
•$1,080 (Assoc. Colleges), $2,160 (BA Colleges) up to $10,800 (Tier 1 Research Universities)

Private LOCKSS

- Institutions form a mutual-aid system to maintain each other's content
- MetaArchive (www.metaarchive.org/)
- Alabama Digital Preservation Network (www.adpn.org/)
- Other private networks: (www.lockss.org/lockss/Private_LOCKSS_Networks)

Third-party services

- OCLC Digital Archive
  - ContentDM
  - http://www.oclc.org/digitalarchive/
- Cloud Services
  - Currently $500 - $1,000 / TB per year
  - Some level of on-your-own software development
  - Example: http://aws.amazon.com/s3/
  - Example: http://www.sdsc.edu/services/StorageBackup.html
- Commercial Data Centers

Pros & Cons of Outsourcing

- Pay for what you need, when you need it ("scalable storage")
- Pay for overhead and common denominator services
- Reduces the need for some kinds in-house expertise, and people are expensive
- You need to make a connection between the repository and your access system

Cornell/ICPSR
Digital Preservation Management Framework

http://www.jacobnadal.com/247

STORAGE AND MAINTENANCE Q&A