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JSTOR | PORTICO | ITHAKA S+R

Portico

ConPrep System Overview

17th December 2010

Our Approach to E-Journal Archiving

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- Source file archiving
  - Preserve the components not the rendition
  - Include high-resolution files (PDF and figures) if available
  - All e-only components (data, media, etc.)
  - SGML / XML structured text by preference
    - HTML as last resort
- Preserve intellectual content not "look and feel" of HTML
  - HTML renditions are an artifact of current technology
    - Often dynamically generated
    - Fragile technology, overdue for change
- Preserve only essential features of the user interface
  - Reference linking, other content-based features
  - Not generic navigation or search or e-commerce features
- Why this approach?
  - Based on Mellon-funded study by Harvard University Library
  - Based on practical realities of works with multiple manifestations
  - Based on assessment as to instability of current web technologies

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Our Approach to Long-Term Preservation

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- Format-based migration strategy
  - Driven by Portico Format Registry
- Preservation policies:
  - Fully supported
  - Reasonable effort
  - Byte-preserve only
- Preservation policies based on
  - Format validity
  - File format action plans and archive capabilities
  - Business rules such as publisher preferences
- Archive must also preserve supporting information
  - Required files such as DTDs and entity files
  - Documentation
  - Contracts
  - Archive policy documents
  - Archival actions documents

Key Challenges

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- Diversity of incoming data streams
  - Lack of a packaging standard
- Automating identification, classification, validation of formats
  - Metadata harvesting
- Normalization of proprietary data formats to Archival DTD
  - No industry standard article DTD
- Large number of very small files
- Building a system that can manage non-trivial intervention in the content prior to archiving and preserve the record of the source data, the normalized data, and everything that happened during the normalization
- A big step toward managing future migrations!

Key Architectural Goals

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- Pluggable tools to facilitate new providers and replacement tools
- Configurable workflows to add new business flows and content types Elsevier checksums.
- Clear and clean separation of process view of content model from structural view
- Scalable to very high content volumes

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System Components

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- Workflow
  - Per content type (E-Journals, Business artifacts, Technical artifacts)
  - New and updated content
- Profiles (per provider)
  - Provider-specific rules and policies
  - Packaging rules
  - File name extract rules
- Format registry
  - List of formats known to the archive
  - Links to policy documents, technical documentation, and "required files"
- Tools registry & Tools service
  - What tools for which formats?
  - Where are they located?
  - How are they invoked?

DTD to filter. (local copy?

Joe

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Portico Systems Overview

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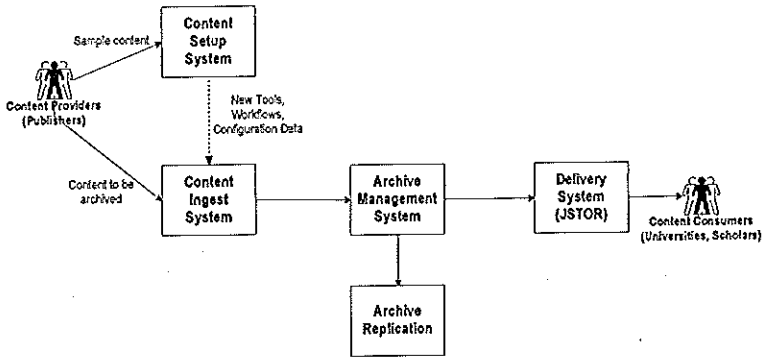

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General Portico Workflow

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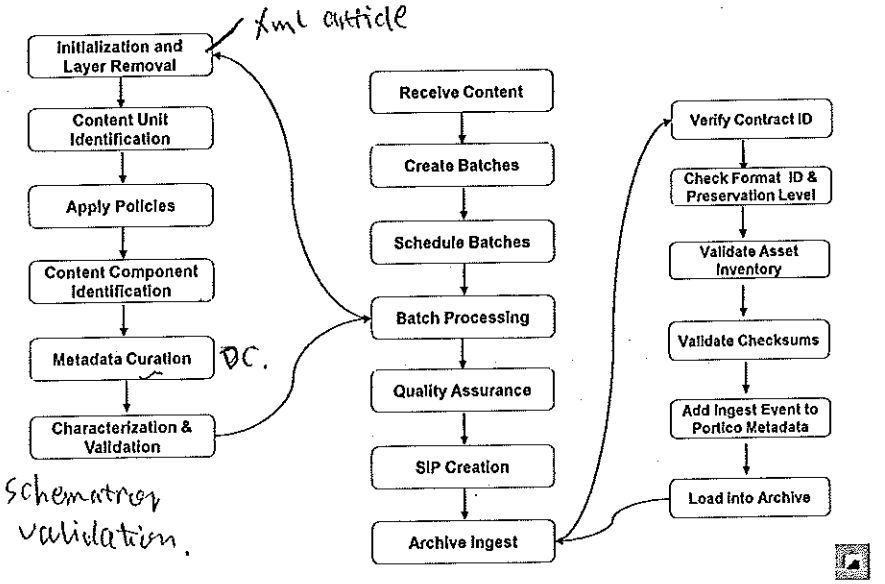

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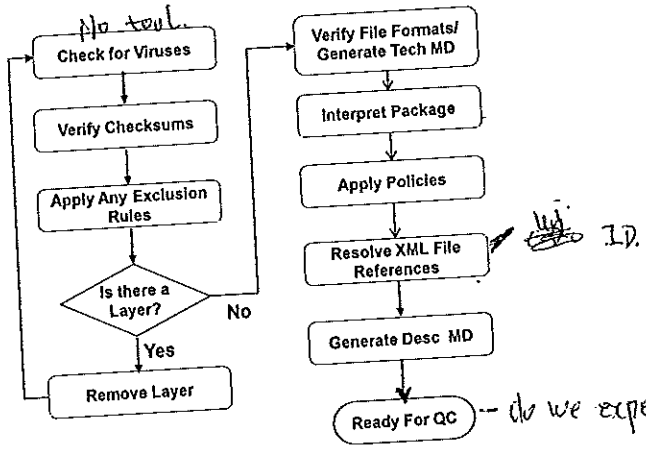
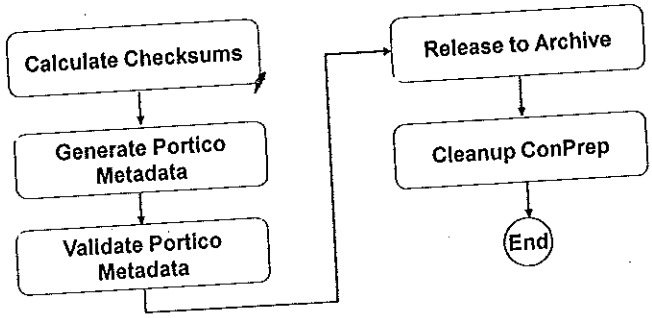
Batch Processing Detail



SIP CreationDetail

reserve Publisher Source data as it is.



Provider Submission Profile

- Captures provider-specific file naming conventions, directory hierarchies, and processing characteristics including rules
- Defines pattern rules based on regular expressions
- Key mechanism to externalize provider-specific behavior from software
- Maintained on a per-provider basis
- Assigned to batches at the time of submission; however can be changed later during QC

Format Registry

- File formats for assets
  - Page Images (e.g., PDF)
  - Graphics
  - SGML & XML
- Each DTD or schema version is a separate format
- File formats for metadata ("metadata is data")
  - XML schemas
- Unique verbose names for all formats recognized by Portico
  - "Recognized" not "supported" or "preserved"
- Current design based on preliminary designs for GDFR
  - By Stephen Abrams of Harvard Library

Format Registry Implementation

- An XML-based registry consulted to identify, validate, characterize, and render various format instances. An instance of the *Portico Format Registry schema*.
- One registry shared by all systems and applications – ConPrep, Archive Management, and Distribution
- Flexible design to "accommodate" future GDFR initiative
- Information on tools/services used to manipulate formats, and policies enforced to preserve formats over time, are in separate registries

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Portico Tools Services

- Format-neutral services:
  - Virus check (ClamAV)
  - Checksum (various)
  - Identification (JHOVE, BSD file; returns a format ID and/or MIME type)
- Format- or MIME type-specific services:
  - Validation (JHOVE)
  - Characterization (JHOVE)
  - Layer removal (e.g., unzip)
  - Transformation (XSLT; per source format and destination format)
- DTD-Specific XML services:
  - Descriptive metadata extraction (XSLT)
  - HTML rendition (XSLT)
  - Descriptive metadata curation (java & XSLT)
  - File reference extraction (XSLT)
  - File reference replacement (XSLT)
  - QC errors & warnings (Schematron)
- And more to come

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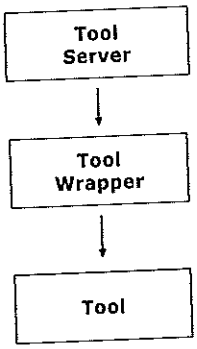
Tool Registry & Services Implementation

- Registry provides information about tools utilized to process content
- Registry does not know whereabouts of tools or itself offer services
- Loose coupling of tool and format registries to facilitate independent evolution



- Dispatcher that listens for requests; upon arrival, spawns a worker thread to process
- Adapter that hides tool-specific behavior and converts tool-specific interface to tool-neutral interface
  - e.g., maps specific return values to standard values
- A COTS product, open-source, or custom software that provides a specific service
  - e.g., JHOVE, ClamAV, gzip

A Major Issue: Varying Degrees of Badness

- What format is a defective file?
  - The purported format? The actual format?
  - Format "Re-identified" (a business concern as well as technical)
- Can a file be damaged but still usable?
  - XML: No, we have to have valid XML file to extract metadata!
  - PDF: Yes, Acrobat reader can read some WFNV or NWF PDF?
- On what do you base the preservation policy for a bad file?
  - The actual format?
  - Best-effort on purported format?
  - What about well-formed but not valid?
- Some use cases:
  - Defective file (varying degrees)
  - Purported format is in error (e.g. wrong extension)
  - Both of the above

Verification / Identification Sequence

To distinguish between bad files and mislabeled files:

- Verify purported format (MIME type)
- If verification succeeds
  - Record format
  - Capture technical metadata
- If verification fails, do identification
- If identified format is same as purported format
  - File is bad
- If identified format is not same as purported format
  - Might be mislabeled
- Verify identified format
  - If fails again, file is bad

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Portico Content Model

- Based loosely on MPEG-21 Concepts
  - Not MPEG-21
  - Not METS
  - Developed as "Ithaka Configurable Repository" R&D project
- Key requirements
  - Support for complex objects such as E-Journal articles
  - Flexible enough for future content
  - Treat metadata as first class asset
    - "Metadata is data"
  - Classify assets by function as well as format
    - To support function-based migration strategies
    - To support complex objects

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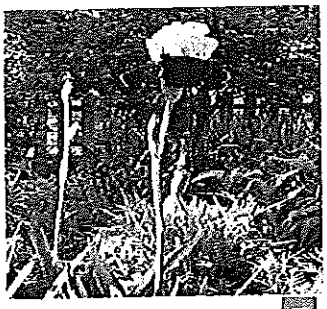
Portico Content Model Key Concepts

- Content Type
  - Broad division into business lines or genres
- Content Set
  - Divisions within a Content Type
- Content Unit
  - Single intellectual unit of archived content
- Functional Unit
  - One or more files with same intellectual identity and functional type:
    - Renditions: Page, Web
    - Text: Full, Header
    - Components: Graphics, Media, Other
    - Metadata Records (Portico Metadata)
- Storage Unit
  - The preserved file

Content Model Example: Imaginary Photo Album Archive

- Content Type: Digital Photo Albums
- Content Set: Evan's Chicago Garden Album
- Content Unit: Iris Germanica (variety unknown)
- Functional Unit: Image
  - Storage Unit: Pic1.jpg
  - Storage Unit: Pic1.tiff
  - Storage Unit: Pic1.gif
- Functional Unit: Metadata Record
  - Storage Unit: Pic1.pmets



Content Model Example: E-Journals

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- Content Unit: One E-Journal article
- Functional Unit: Full Text
  - Storage Unit: SGML file (normalized & inactive)
  - Storage Unit: XML
- Functional Unit: Print Rendition
  - Storage Unit: PDF file
- Functional Unit: Component: Image
  - Storage Unit: Figure1.jpg
  - Storage Unit: Figure1.gif
- Functional Unit: Metadata record
  - Storage Unit: Portico Metadata file