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What? So What?

The Next-Generation JHOVE2 Architecture for Format-Aware Characterization

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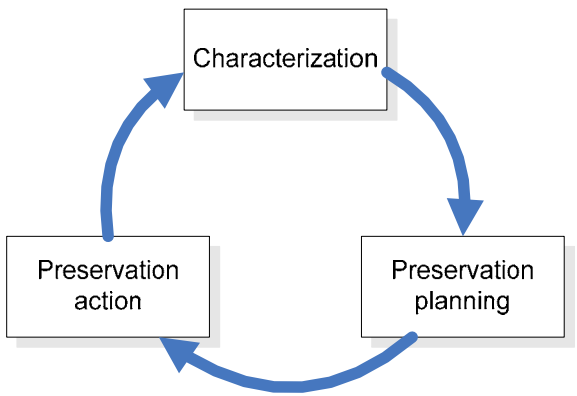
Digital preservation

- Managing the gap between what you were given and what you need
- That gap is only manageable if it is quantifiable
- Characterization tells you what you have, as the starting point for iterative preservation planning and action

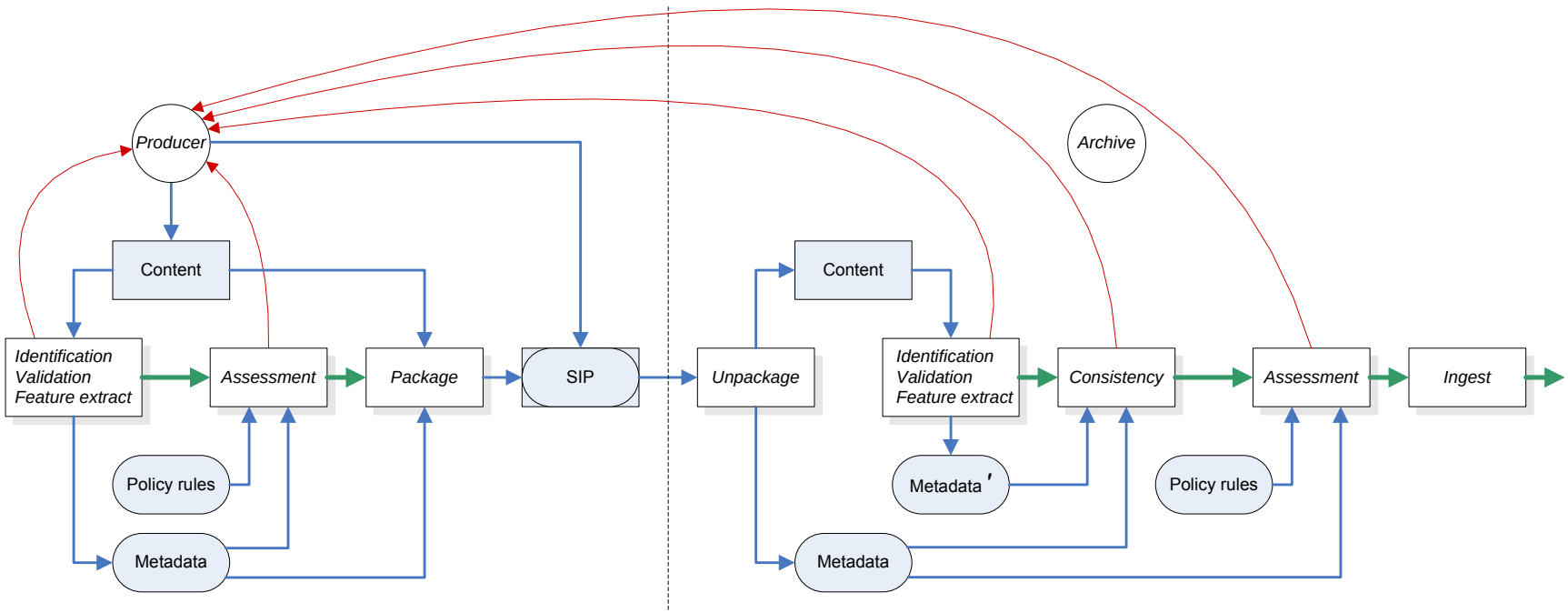


Adopted from A. Brown, “Developing Practical Approaches to Active Preservation,” *IJDC* 2:1 (June 2007): 3-11.

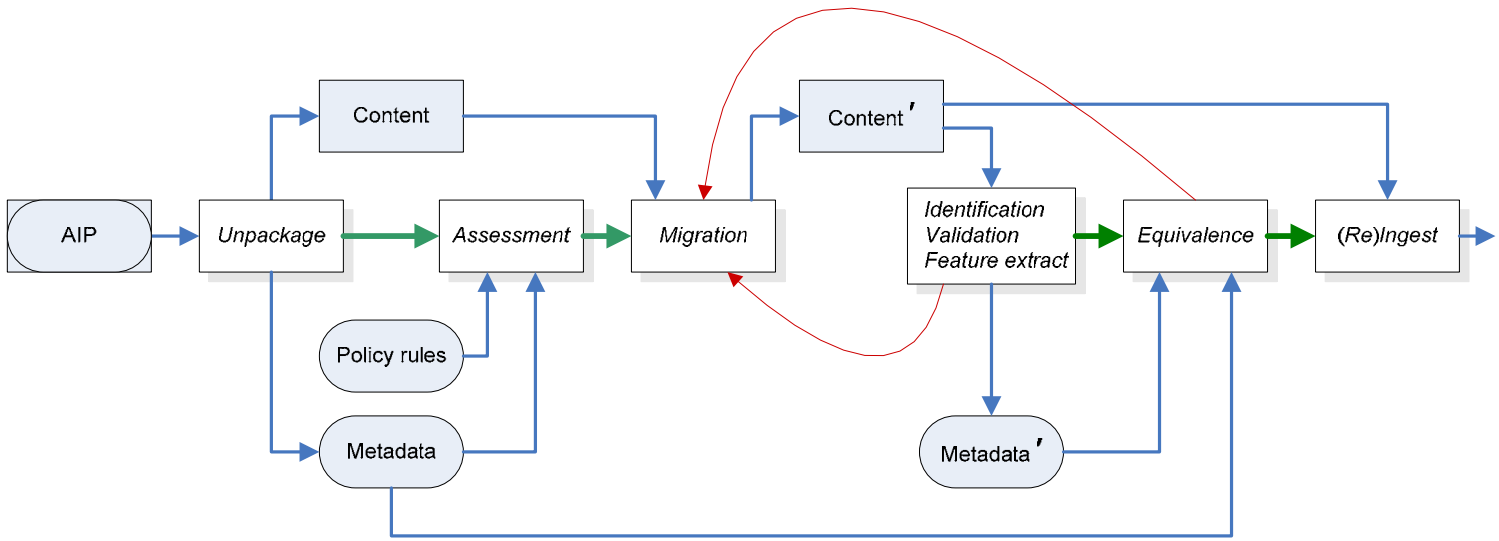
What? So what?

- What is it?
  - *Identification* — Determining presumptive format through signature matching
- What is it, really?
  - *Validation* — Determining conformance to commonly-accepted normative requirements
- What about it?
  - *Feature extraction* — Reporting intrinsic properties significant to preservation planning and action
- What should you do with it?
  - *Assessment* — Determining acceptability for a given purpose on the basis of locally-defined policies

Characterization in ingest workflows



Characterization in migration workflows



JHOVE2 project

- A next-generation architecture for format-aware object characterization
  - Three-fold goals:
    - Re-factor the existing architecture to achieve higher performance, simplify system integration, and encourage third-party enhancement
    - Provide significant new function
    - Implement modules
- Collaborative project of CDL, Portico, and Stanford University
  - Funded by Library of Congress/NDIIPP
  - Open source BSD license

What is a format, anyway?

- A set of syntactic and semantic rules for mapping between abstract information content and bit streams
- If we are interested in preserving *content*, and not merely bit streams, managing format is fundamentally important

```
ffd8ffe000104a46
4946000102010083
00830000ffed0fb0
50686f746f73686f
7020332e30003842
494d03e90a507269
6e7420496e666f00
0000007800000000
0048004800000000
02f40240ffeeffee
030602520347 0...
```

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```
ffd8ffe000104a46          SOI
4946000102010083          APP0 JFIF 1.2
00830000ffed0fb0          APP13 IPTC
50686f746f73686f          APP2  ICC
7020332e30003842          DQT
494d03e90a507269          SOF0  183x512
6e7420496e666f00          DRI
0000007800000000          DHT
0048004800000000          SOS
02f40240ffeeffee          ECS0
030602520347 0...         ...
```

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```

```
SOI
APP0 JFIF 1.2
APP13 IPTC
APP2  ICC
DQT
SOF0  183x512
DRI
DHT
SOS
ECS0
...
```

Objects, not files

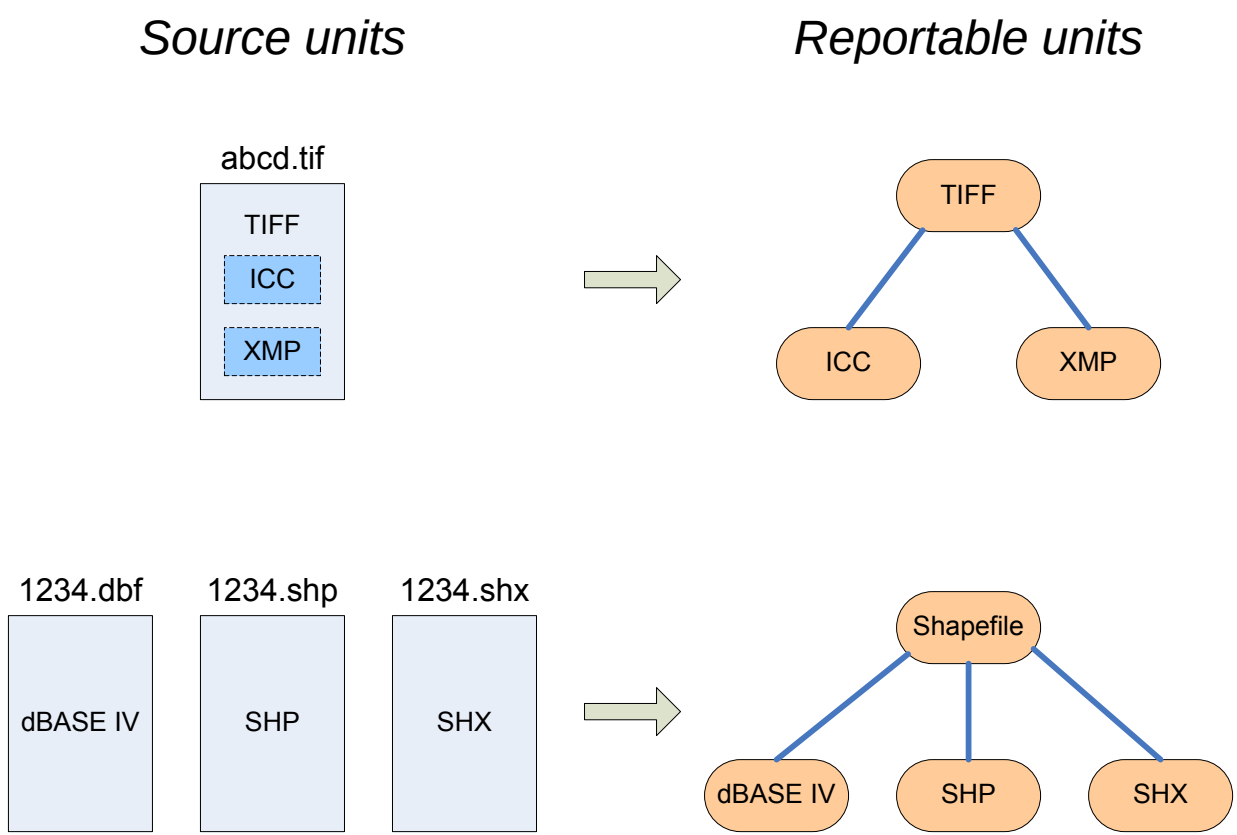
- JHOVE assumed 1 object = 1 file = 1 format
- But what about…
  - TIFF with embedded ICC profile and XMP metadata

    1 object = 1 file = 3 formats
  - JPEG 2000 JPX fragmentation

    1 object = *n* files = 1 format
  - ESRI Shapefile

    1 object = 3 files = 3 formats
- JHOVE2 will support 1 object = *n* files = *m* formats

Objects, not files



Other enhancements

- Generic plug-in interface
- Configurable set of modules iteratively invoked against each object
- Common data structure passed between modules to enable stateful processing
- Identification de-coupled from validation
- Standardized handling of format profiles and error reporting
- Symbolic display of binary formats
- API-level support for editing

Data abstraction

- Based on the “natural” conceptual structures of a format and their component attributes
  - Each such structure maps to a *class* with methods for parsing, validating, reporting, and serializing
  - Each such attribute maps to a *field* with accessor and mutator methods
    - UTF-8 ⇨ Character
    - TIFF ⇨ Image File Header and Image File Directory
    - JPEG 2000 ⇨ Box
    - PDF ⇨ boolean, number, string, name, array, dictionary, and stream

Format support

- Based on project partner requirements and budgetary constraints
  - *Image*: JPEG 2000, TIFF
  - *Audio*: WAVE
  - *Text*: SGML, UTF-8, XML
  - *Document*: PDF
  - *GIS*: Shapefile
  - *Color*: ICC
  - And their well-known variants, e.g. TIFF/IT, TIFF/EP, GeoTIFF, EXIF, DNG, …
- Unfortunately precluding some JHOVE-supported formats
  - AIFF, GIF, HTML, JPEG

Technical components

- Java 1.5
  - java.nio package
- OSGi/Spring frameworks
  - Component versioning and dependency management
  - Fine-grained control of component invocation
  - Inversion of control
- SourceForge
  - Distribution platform
  - Issue tracking

Schedule

- Months 1-6 Outreach, design, and prototyping
- Months 7-9 Core APIs and framework
- Months 10-24 Module implementation

Advisory board

- Deutsche Nationalbibliothek
- Ex Libris
- Fedora Commons
- Florida Center for Library Automation
- Harvard University
- Koninklijke Bibliotheek
- MIT/DSpace
- National Archives (UK)
- National Library of Australia
- National Library of New Zealand
- Planets project

Questions?

Wiki	confluence.ucop.edu/display/JHOVE2Info/Home
Mailing lists	JHOVE2-Announce-L
	JHOVE2-Techtalk-L

(*Subscribe via the wiki*)