Automated Workflow for the Ingest and Preservation of Electronic Journals

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Portico Background

- Trusted third party archiving solution
- Funding from libraries, publishers, foundations, etc.
- Initial pilot described at Archiving 2004
- Business and access model heavily revised
- Launched to publishers in September 2005
- Launched to libraries in January 2005

- 13 publishers signed; more to follow soon
- ~3500 titles; ~7M articles
- See www.portico.org for latest information

Electronic Journals and Digital Preservation

- Journal publishing models are evolving
  - Publishing practice varies:
    - Print only, E-only, both
    - More / less / same in each edition
  - E-product varies:
    - HTML Header & PDF
    - HTML Full-text with links and supplemental stuff & PDF
    - HTML only
- A “work” with multiple “manifestations”
  - XML or SGML source files
  - Print PDF used to drive printing press
  - Web PDF optimized for online delivery
  - HTML header or full text
    - Often generated from XML or SGML source

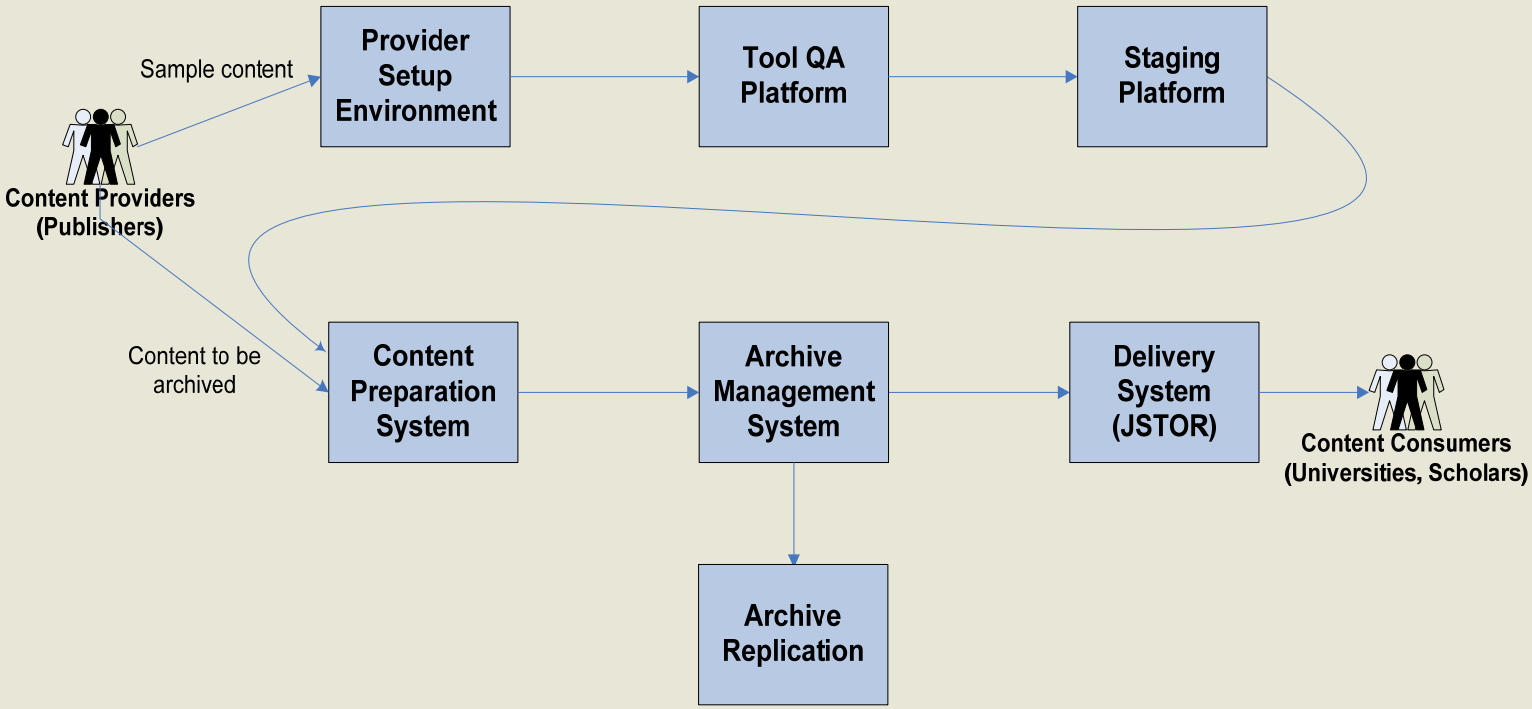
Portico Archival Strategy for E-Journals

- 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 (and past) 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

Electronic Journal Data Issues

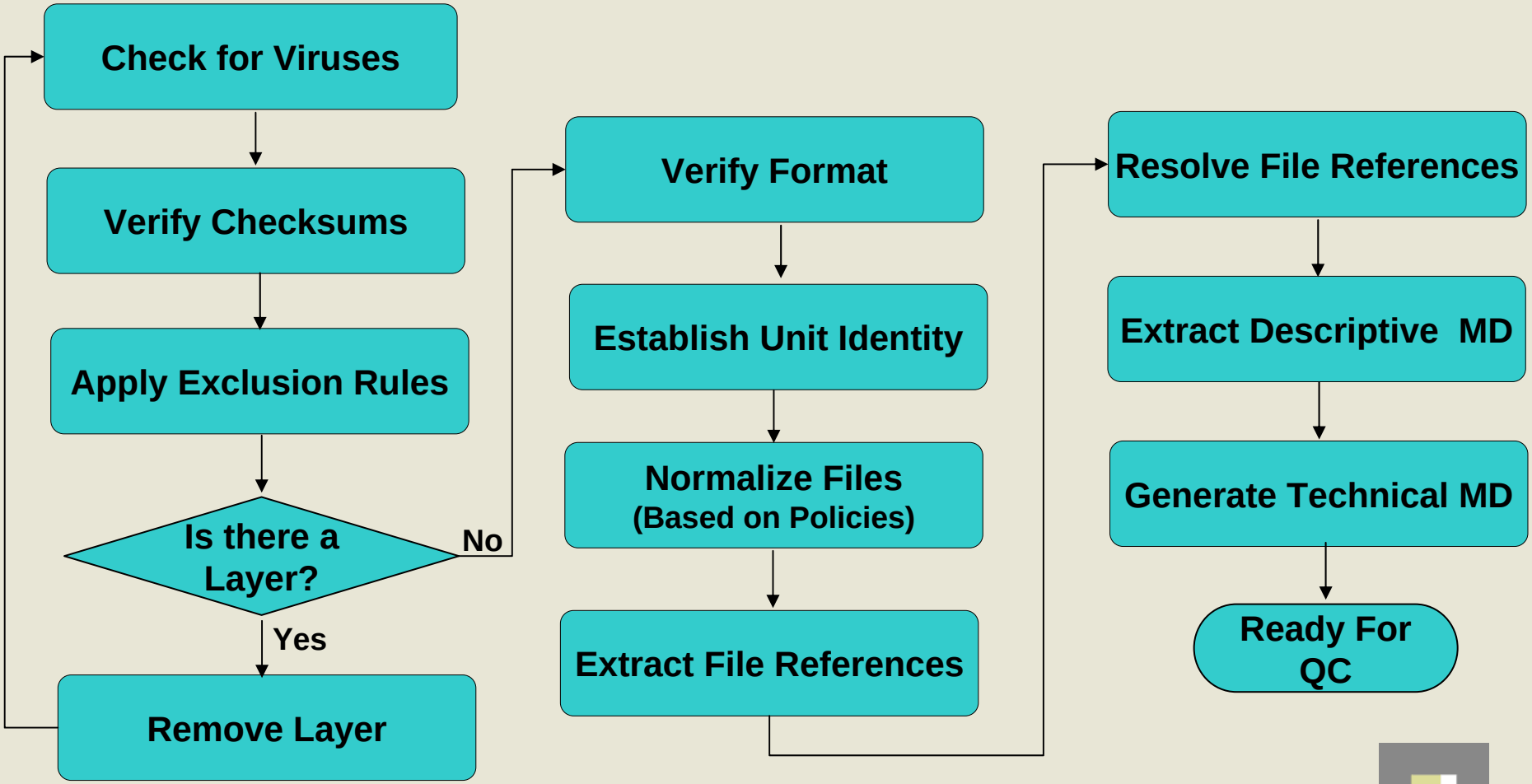
- Inputs
  - Whatever the publisher wants to send us
  - However the publisher wants to send it to us
  - Per article: one text or metadata file, zero or more other files
  - Arbitrary (publisher-specific) collections of data
    - Proprietary file & directory naming conventions
    - Proprietary formats
  - Undocumented business rules hidden in the data
- Output to Archive
  - Normalized content (pre-emptive migration of proprietary formats)
  - Automated metadata capture/generation: technical, descriptive, events
  - Packaged in Portico's variant of METS

Process Overview



Automated Processing for E-Journal Content

(high-level summary)



Incoming File System

```
PublisherA
  └──0008543X
      └──2006
          └──106
              └──8
                  └──CNCR21779
                      │   21779_ftp.pdf
                      │   21779_ftp.sgm
                      ├─equation
                      │   aueq001.tif
                      │   aueq002.tif
                      │   nueq001.gif
                      │   nueq002.gif
                      ├─image_m
                      │   mfig001.jpg
                      ├─image_n
                      │   nfig001.jpg
                      └─image_t
                          tfig001.gif
```

Resulting Content Model

```
──Content Unit (Article)
   ├─── Text: Marked Up Text
   │      21779_ftp.sgm
   ├─── Rendition: Page Images
   │      21779_ftp.pdf
   ├─── Component: Formula Graphic
   │      aueq001.tif
   │      nueq001.gif
   ├─── Component: Formula Graphic
   │      aueq002.tif
   │      nueq002.gif
   └─── Component: Figure Graphic
          mfig001.jpg
          nfig001.jpg
          tfig001.gif
```

EXCERPTS FROM SGML TEXT:

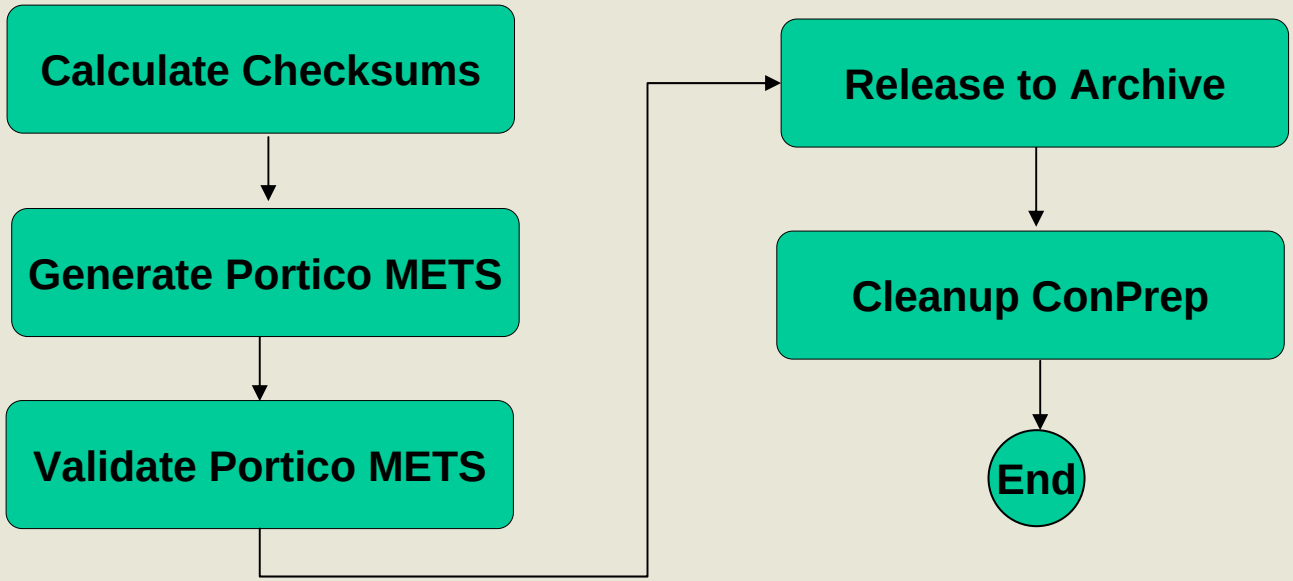
```
the following statistical model was fitted to
the data: <UEQN NAME="ueq002" LOC="FIXED"></
UEQN> in which <I>T</I> &equals; 1 if Grade 3
or 4 neutropenia was present

The overall survival for all patients is
illustrated in Figure <FIGR HREF="fig1">1</
FIGR>.

<FIG ID="fig1" LOC="FLOAT"><GRAPHIC
NAME="fig001"></GRAPHIC><NUMBER>1</NUMBER>
<CAPTION><P>Overall survival for 160 eligible
and evaluable patients with recurrent solid
tumors who were enrolled on Children&apos;s
Cancer Group Study 0962.</P></CAPTION></FIG>
```

EXCERPTS FROM NORMALIZED XML TEXT:

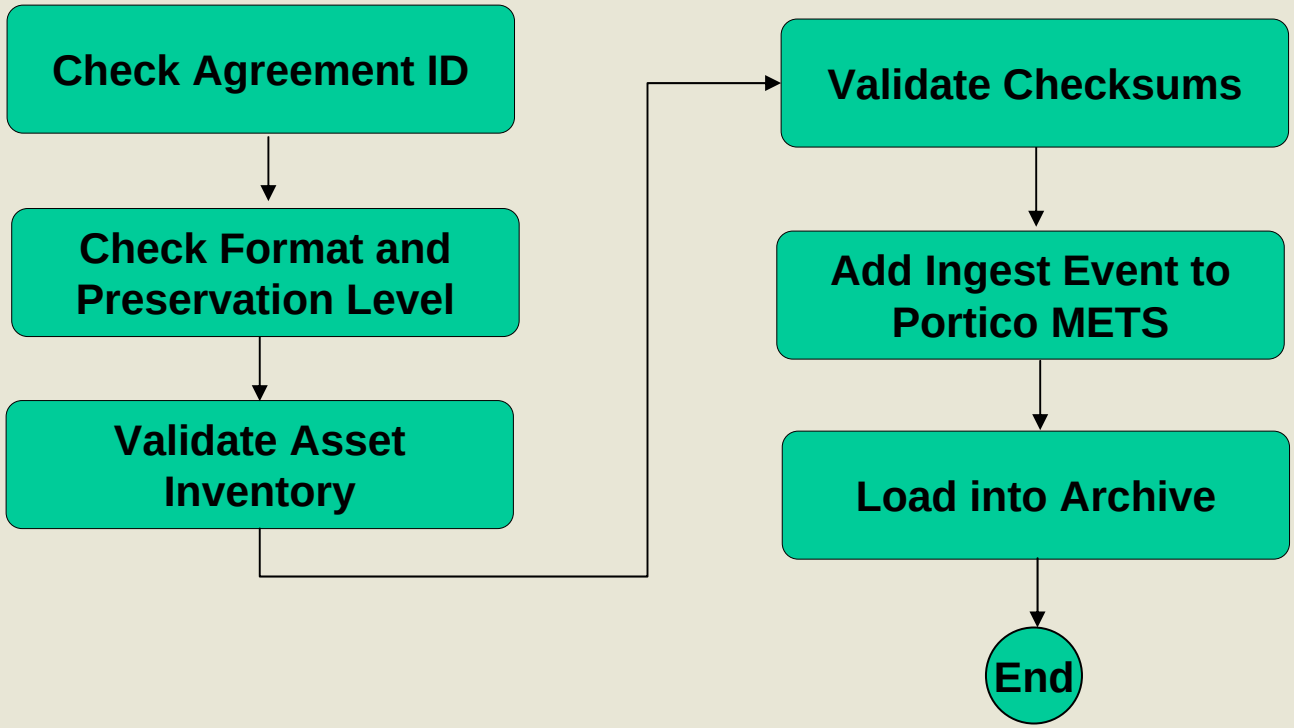
```
the following statistical model was fitted to the data: <disp-
formula><graphic xlink:href="ark:/27927/pc01mtb5t"
position="anchor"/></disp-formula>in which <italic>T</italic> = 1
if Grade 3 or 4 neutropenia was present

The overall survival for all patients is illustrated in Figure
<xref rid="FIG1" ref-type="fig">1</xref>.</p>

<fig fig-type="figure" id="FIG1" position="float"><label>
<x x-type="archive">Figure</x>1<label><caption><p>Overall survival
for 160 eligible and evaluable patients with recurrent solid tumors
who were enrolled on Children's Cancer Group Study 0962.</p></
caption><graphic position="anchor"
xlink:href="ark:/27927/pc01mtbqj"></graphic></fig>
```

Automated Processing after QC

(for all content types)



Archive Ingest Processing



Some Critical Issues

- Content isn't perfect
  - Must have policies and workflow for invalid data
  - There are degrees of "badness"
  - Strict format validity does not equate to usefulness or usability
    - E.g., Well-formed but not valid PDF
    - E.g., Valid PDF with bad embedded font
    - E.g., Invalid JPEG
- Content creation practices change over time
  - Publishers (content providers) aren't consistent
  - Or don't warn you that they are changing something
  - Defensive programming required
- Software isn't perfect
  - Assume that there will be internal failures
  - Reversibility and audit trail are essential
    - Portico Tool Registry and events metadata

A Sample Tool Event

```
<EventTransformedFile Timestamp="2006-05-22T11:39:46.830-04:00">
  <Tool>
    <ToolInfo>
      <RunDate>2006-05-22T11:39:46.150-04:00</RunDate>
      <ToolWrapper>
        <RegisteredName>BepressTransformTool:1.0:2006-04-21</RegisteredName>
        <RuntimeEnv>Java:Sun Microsystems
Inc.:1.5.0_04:SunOS:sparc:5.9</RuntimeEnv>
        <DependentLibSet>
          <DependentLib>bepress.xsl</DependentLib>
          <DependentLib>insert-titles.xsl</DependentLib>
          <DependentLib>insert-portico-doctype.xsl</DependentLib>
          <DependentLib>nlmpub2_1_to_ptc2_0.xsl</DependentLib>
          <DependentLib>porticoCommon_1_1.xsl</DependentLib>
          <DependentLib>gentext.xsl</DependentLib>
        </DependentLibSet>
      </ToolWrapper>
      <VendorTool>
        <VendorToolName>com.icl.saxon.TransformerFactoryImpl</VendorToolName>
        <RuntimeEnv>Java:Sun Microsystems
Inc.:1.5.0_04:SunOS:sparc:5.9</RuntimeEnv>
      </VendorTool>
    </ToolInfo>
  </Tool>
</EventTransformedFile>
```

Envoi

- Digital preservation as “interoperability with the future”
  - Let’s test now while we can still recover
  - If we can’t move content from party to party today,
  - Why do we think we will be able to in the future?
- Data exchange is valuable
  - To both parties
  - There is knowledge transfer as well as data transfer
  - Standards are only standard when practiced, in use
- Robust electronic content production and content management systems will help to make preservation easier and cheaper
  - We have to get ahead of the problem, not just clean up the mess afterwards