METS and MODS / MINERVA
PART 3
METS Profiles for Web Sites

Leslie D. Myrick, NYU
DLF Forum, Spring 2004
Today’s Topics

• Background: challenges of web archiving
• How METS can resolve some of the challenges
• Why METS Profiles are necessary
• Announcement of imminent posting of profiles for web sites by LC and PCWA
• “Superclass” / “subclass” modeling of those profiles vis a vis each other
Political Web Communications Archiving Project

• Under auspices of CRL and Mellon
• Participants: Cornell University, Stanford University, UT Austin, NYU
• Focus: SE Asia, Sub-Saharan Africa, Latin America, Western Europe
• Content: Internet Archive
• Mentoring: LC MINERVA / NDMSO
Web Archiving Challenges: I

• Definition of the object “web site” and its boundaries
  – what to do with external links? near files?
• Complex nature of web site structure
• Complex nature of a web page itself
  – HTML wrapper around embedded files
  – perhaps dynamically generated
Web Archiving Challenges: 2

Version Control-related storage and access issues
• Creator-driven changes: successive harvests and versions
• Repository-driven changes: refreshing, migration, other changes
Web Archiving Challenges 3

- Lack of influence over the production of the content we’re archiving
- Bad metadata from producers of web pages
  - Programmatically extracted metadata as possible source for MODS and MIX bits in METS instances for websites
  - Descriptive MD from <title>, <meta> tags ??
  - Technical MD from embedded file information
Title: Democratic Socialist Movement
Date Captured: 20030417
Abstract: Socialist news, policies and Marxist analysis, socialist campaigns, anti-war campaigns, support for workers' struggles

Links:
Democratic Socialist Movement: TIME FOR REAL CHANGE
Democratic Socialist Movement
Democratic Socialist Movement: TIME FOR REAL CHANGE
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The Case of the Purloined Metadata
The Case of the Purloined Metadata, continued

<snip>
<HTML>
<!-- saved from url=(0041)http://www.sport.de/spart/sk1/ski006.php3 -->
<HEAD>
<TITLE>Bienvenue sur le site de Front Social</TITLE>
<META CONTENT="text/html; charset=windows-1252" HTTP-EQUIV="Content-Type">
<META CONTENT="Sport sports Baseball Basketball Beach-Volleyball Bob Boxen Bundesliga Bundesligavereine Championsleague DEL DFB DFB-Pokal Eishockey Ergebnisse Europameisterschaft Europapokal Fernsehen Football Formel1 Formel3 Fußball Golf Hallenmasters Handball Hockey Inline-Skating Leichtathletik Motorbike Motorrad Motorsport Nationalmannschaft NBA NFL NHL Reiten Rodeln Schwimmen Skifahren Skispringen Snowboard Sportarten Sportnachrichten Surfen Tennis Tischtennis Turniere Uefa-Cup US Open Vereine Volleyball Wassersport WBA WBC WBO Weltmeisterschaft Weltrangliste Wimbledon Fußball Motorsport Radsport Volleyball Sport Eishockey Skisport Boxen Handball Leichtathletik Pferdesport Schwimmen" NAME="keywords">
<META CONTENT="Sport Sportnachrichten Sportvereine Ergebnisse Tabellen Ranglisten Bundesliga DEL Formel 1 Tennis" NAME="description">
<META CONTENT="thu, 30 mar 2000 12:00:00 GMT" HTTP-EQUIV="date">
<SCRIPT language="JavaScript" SRC="sport_fichiers/sidiscript.js">
<SCRIPT language="JavaScript">
<!--
var on = "/ima/pfeil_weiss2.gif";
var off = "/ima/pfeil_weiss.gif";
</snip>
Whence Web Archive Metadata?

• No dearth of metadata provided by crawlers as humble as wget or as sophisticated as Alexa
• Management of it all: a perfect job for METS
• Typical Alexa / IA SIP = .arc and .dat files along with byte offset .ndx files
  – IA .arc = 100 MB gz archive file packed with archived files from web crawl along with server’s http response headers for each file.
Typical IA .arc snippet

<snip>
[crawler’s file header]
http://www.apgawomen.org:80/calender.htm 63.241.136.203 20030417223125
text/html 2570

[http headers]
HTTP/1.1 200 OK
Date: Thu, 17 Apr 2003 21:35:43 GMT
Server: Apache/1.3.27 (Unix) FrontPage/5.0.2.2510
Last-Modified: Sun, 26 Jan 2003 04:05:37 GMT
ETag: "3b01d2-8fb-3e335e91"
Accept-Ranges: bytes
Content-Length: 2299
Connection: close
Content-Type: text/html

[file itself]
<html>
<head>
<title>calender</title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
</head>
<body bgcolor="#FFFFFF">
</snip>
Technical Metadata Sources

• Crawler frontier application
• Host Server (HTTP response headers)
• Captured Files
  – Some info from accompanying HTTP headers
  – Some from post-processing with ImageMagick and its ilk for other multimedia
Technical Metadata Desiderata

- Host Server
  - IP Address, operating system, webserver configuration
- Capture Transaction
  - Timestamp, software, HTTP response headers, errors
- All Captured Files
  - File format, file name, file size, last modified date, creating software, creating hardware, generated checksum
- HTML Pages
  - Charset, language, encoding, links broken down by type, embedded scripting, <meta> tags.
Image Files

(After post-processing with ImageMagick)

- format
- bit depth
- compression
- resolution
- imageWidth and imageLength
- file size
- identifier
Image Magick dump for Mao1925.jpg

Image: Mao1925.jpg
Format: JPEG (Joint Photographic Experts Group JFIF format)
Geometry: 142x185
Class: DirectClass
Type: true color
Depth: 8 bits-per-pixel component
Colors: 11423
Resolution: 300x300 pixels
Filesize: 8115b
Interlace: Plane
Background Color: grey100
Border Color: #DFDFDF
Matte Color: grey74
Iterations: 0
Compression: JPEG
signature: 8c173bd33c3e5667d27e51aee539afcd58ccbc8d4a11ab76b127408905f598fd
Tainted: False
<mix:mix>
  <mix:BasicImageParameters>
    <mix:Format>
      <mix:MIMEType>image/jpeg</mix:MIMEType>
      <mix:ByteOrder>little-endian</mix:ByteOrder>
      <mix:Compression>
        <mix:CompressionScheme>1</mix:CompressionScheme>
        <mix:CompressionLevel>0</mix:CompressionLevel>
      </mix:Compression>
      <mix:PhotometricInterpretation>
        <mix:ColorSpace/>
      </mix:PhotometricInterpretation>
    </mix:Format>
    <mix:File>
      <mix:ImageIdentifier>www.aniagolu.org/images/people_dallas.jpg</mix:ImageIdentifier>
      <mix:FileSize>189010</mix:FileSize>
    </mix:File>
  </mix:BasicImageParameters>
  <mix:ImagingPerformanceAssessment>
    <mix:SpatialMetrics>
      <mix:ImageWidth>1020</mix:ImageWidth>
      <mix:ImageLength>767</mix:ImageLength>
    </mix:SpatialMetrics>
    <mix:Energetics>
      <mix:BitsPerSample>8,8,8</mix:BitsPerSample>
    </mix:Energetics>
  </mix:ImagingPerformanceAssessment>
  <mix:ChangeHistory/>
</mix:mix>
METS Website Viewer
Why METS Profiles?

- As a transfer, archiving or functional syntax METS is a paradigm of flexibility.
- But METS’ very flexibility is at once its strength and its onus.
- How can we constrain METS instance production to facilitate interoperability?
- Enter METS Profiles
Profiles as Blueprints for Classes of Objects

- METS XML Schema and Profile Schema expressly written in WXS to take advantage of O-O modeling
- Profiles, by specifying constraints beyond those of the METS schema proper, create classes of objects whose properties are predictable
XML Schema Constraints

• Structural validation of the document and its elements’ content model
  – does it have a structMap?

• Referential and identity integrity
  – Do the IDs and IDREFs match up? Are IDs unique?

• Data type validity
  – Is the string value kb or b not appended to your mix:fileSize?
Profile Constraints Go Further

- May specify particular extension schema, rules of description, or controlled vocabularies.
- May specify arrangement and use of METS elements and attributes.
- May specify technical characteristics of data files within a METS object.
- May prescribe particular tools or applications to be used with a METS object.
Modeling Web Site Object(s) in a continuous archive

One possibility for PWCA:

• Root level node (web site in the abstract) with <mptr>s to
• Intermediary node (web site harvested on April 17, 2003) with <mptr>s to
• Leaf node (single web page in web site harvested on April 17, 2003)
LC Profile / Model

- Describing Internet Libraries e.g. MINERVA with different configurations of aggregation of content
- Profile and model to serve as “superclass” for other web site profiles e.g. PCWA
Aggregator and Single Captures Model

• Profile for top level aggregation that uses `<mptr>`s to point to either another intermediary aggregator or to more than one captured version of a web site.

• Profile for single standalone captured site, whether part of successive harvests or a one-off capture.
Aggregator Profile

• Contains single MODS description describing the aggregation as an intellectual object
  – e.g. Election 2004; JohnKerry.com (Nov 1-10)
• Contains no amdSec, fileSec or structLink.
• Contains a root <div> for the aggregation nesting <div>s with <mptr>s to each subsidiary aggregation or captured version.
Single Capture Profile

- Top-level MODS description describes the website as it existed when it was captured.
- MODS record for each HTML page.
- amdSec uses textMD, MIX, A/V prototype
- fileSec
- structMap
- structLink
Modeling web site structure(s)

- Flattened logical tree hierarchy in structMap
  - entry page as root `<div>` nesting all other pages (LC)
  - optionally further nesting pages’ hyperlinked pages (PWCA)
- is cross-referenced to hyperlink structure in structLink `<smLink>` element
  - either from page to page (LC) or
  - from link to page (PWCA)
CRL Political Web Archiving Project METS Viewer

http://dlibdev.nyu.edu/webarchive/mettest/www.apgawomen.org/

APGA women
not just num

WWW.APGAWOMEN.ORG
LC structure

< Mets:div DMDID="DM01" TYPE="wc:website" ID="page18"
LABEL="http://dlibdev.nyu.edu/webarchive/metstest/www.apgawomen.org/">
  < Mets:fptr>
    < Mets:par>
      < Mets:area FILEID="FID18"/>
      < Mets:area FILEID="FID1036"/>
      < Mets:area FILEID="FID1043"/>
      < Mets:area FILEID="FID1075"/>
    </METS:par>
  </METS:fptr>

  <METS:structLink>
    <METS:smLink from="page18" to="page1059"/>
    ...
    <METS:smLink from="page1059" to="page154"/>
  </METS:structLink>
</METS:div>
<METS:structMap>
  <METS:div DMDID="DM01" TYPE="web site" ID="page18"
    LABEL="http://dlibdev.nyu.edu/webarchive/metstest/www.apgawomen.org/
    ORDER="01">
    <METS:fptr>
      <METS:par>
        <METS:area FILEID="FID18"/>
        <METS:area FILEID="FID1036"/>
        <METS:area FILEID="FID1043"/>
        <METS:area FILEID="FID1075"/>
      </METS:par>
    </METS:fptr>
  </METS:div>
  <METS:div ID="LINK1" LABEL="home" ORDER="2">
    <METS:fptr>
      <METS:area BEGIN="000" BETYPE="BYTE" END="111" FILEID="FID18"/>
    </METS:fptr>
  </METS:div>
</METS:structMap>

<METS:structLink>
  <METS:smLink from="LINK1" to="page1059"/>
  ...
  <METS:smLink from="LINK2" to="page113"/>
  <METS:smLink from="LINK3" to="page120"/>
**Sample Archive Record**

**Title:** Web Site of APGA Women

Supports the All Progressive Grand Alliance political party (APGA). Information on the APGA presidential candidate, Chief Chukwuemeka Odumegwu-Ojukwu. Includes calendar, officers, membership information, projects page, news archive. Based in Kennesaw, Georgia.

**Capture Date Range:** 20030417-20040202

**Subjects:** Political Parties

**Language:** eng

**Genre:** Web site

**Access Condition:** [Policy Statement Goes Here]

**Active URL:** http://www.apgawomen.org

**Archive:** CRL Political Web Archiving Project

**Go to METS Viewer for Archived Versions of This Site:**

- April 17, 2003
- December 12, 2003
- February 2, 2004
CRL Political Web Archiving Project METS Viewer

http://dlbdev.nyu.edu/webarchive/mettest/www.apgawomen.org/

Title: APGA Women
Date Captured: 20030417
Abstract: Supports the All Progressive Grand Alliance political party (APGA). Information on the APGA presidential candidate, Chief Chukwuemeka Odumegwu-Ojukwu. Based in Kennesaw, Georgia.

Links
[ Back to Homepage ]
home