Musical METS

An Overview and Case Study

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What is METS?

- Metadata Encoding and Transmission Standard
- The METS schema is a standard for encoding descriptive, administrative, and structural metadata regarding objects within a digital library, expressed using the XML schema language of the World Wide Web Consortium.[1]
- Schema created in 2001
- Digital Library Federation sponsored initial development
- Maintained by Library of Congress
- Governed by METS Editorial Board

[1] http://www.loc.gov/standards/mets/

What is METS? (2)

- Digital Object Packaging

- Content and/or content references and Metadata and/or metadata references

- Supported metadata schemas and allows flagging of unsupported schemas

- Describes the structure of the packaged object(s)

Is XML, Is Good

- eXtensible Markup Language

- Document description (archive/storage context)

- Information exchange (Internet/Business Systems context)

- Generally not tied to presentation concerns

- In a repository context, can be used to create self-describing packages using schemas such as METS and DIDL

- Could aid preservation in some instances

XML Example

```xml
<?xml version="1.1" encoding="UTF-8"?>
 <score-partwise>
   <part-list>
     <score-part id="P1">
       <part-name>Music</part-name>
     </score-part>
   </part-list>
   <part id="P1">
     <measure number="1">
       <attributes>
         <divisions>1</divisions>
         <key>
           <fifths>0</fifths>
         </key>
         <time>
           <beats>4</beats>
           <beat-type>4</beat-type>
         </time>
         <clef>
           <sign>G</sign>
           <line>2</line>
         </clef>
       </attributes>
       <note>
         <pitch>
           <step>C</step>
           <octave>4</octave>
         </pitch>
         <duration>4</duration>
         <type>whole</type>
       </note>
     </measure>
   </part>
 </score-partwise>
```

* taken from http://en.wikipedia.org/wiki/MusicXML

XML Example (2)

- A software package understanding MusicXML can interpret and render this in any way it chooses

- For example, one rendering could be:

- whereas another package may generate:

- and another package may simply play the piece

Major Structures

- METS Element and Header (profile and provenance)
- Administrative Metadata containers (amdSec)
    - techMD
    - rightsMD
    - sourceMD
    - digiprovMD
- Descriptive Metadata containers (dmdSec)
- File references and/or content (fileSec)
- Structural map of packaged object (structMap)
- Relationships between objects (structLink)
- Behaviours associated with objects (behaviourSec)

mets and metsHdr

```
<mets:mets xmlns:mets="http://www.loc.gov/METS/"
        OBJID="hdl:1885/342"
        PROFILE="NLA SIP/DIP 1.0"
        TYPE="Music Object">
  <mets:metsHdr CREATEDATE="2007-07-03T00:00:00">
    <mets:agent ROLE="CREATOR"
                TYPE="ORGANIZATION">
      <mets:name>The Australian National University</mets:name>
      <mets:note>Packaged by METSGenerator</mets:note>
    </mets:agent>
  </mets:metsHdr>
...
...
</mets:mets>
```

amdSec

```
<mets:amdSec ID="AMD1">
   <mets:digiprovMD ID="DP1">
      <mets:mdWrap MDTYPE="OTHER" OTHERMDTYPE="PREMIS">
         <METS:xmlData>
            <premis:premis xmlns:premis="http://www.loc.gov/standards/premis">
               <premis:event>
                  <premis:eventIdentifier>INGEST</premis:eventIdentifier>
                  <premis:eventType>REPOSITORY INGEST</premis:eventType>
                  <premis:eventDateTime>2007-07-03T00:00:04</premis:eventDateTime>
                  <premis:linkingAgentIdentifier>
                     <premis:linkingAgentIdentifierType>Program</premis:linkingAgentIdentifierType>

<premis:linkingAgentIdentifierType>ItemImport</premis:linkingAgentIdentifierType>
                  </premis:linkingAgentIdentifier>
               </premis:event>
            </premis:premis>
         </mets:xmlData>
      </mets:mdWrap>
   </mets:digiprovMD>
</mets:amdSec>
```

dmdSec

```xml
<mets:dmdSec ID="DMD1">
  <mets:mdWrap MDTYPE="DC" LABEL="Dublin Core Metadata">
    <mets:xmlData>
      <oai_dc:dc xmlns:oai_dc="http://www.openarchives.org/OAI/2.0/oai_dc"
                 xmlns:dcterms="http://purl.org/dc/terms/"
                 xmlns:dc="http://purl.org/dc/elements/1.1/" >
        <dcterms:created>1810</dcterms:created>
        <dc:title>Bagatelle in A minor</dc:title>
        <dc:title>Für Elise</dc:title>
        <dc:description>a piece of music for solo piano by Ludwig van
Beethoven.</dc:description>
        <dc:type>Recording</dc:type>
        <dc:type>Image</dc:type>
        <dc:subject>Beethoven</dc:subject>
        <dc:subject>Bagatelle</dc:subject>
      </mets:xmlData>
    </mets:mdWrap>
  </mets:dmdSec>
```

fileSec

```
<mets:fileSec>
    <mets:fileGrp USE="AUDIO">
      <mets:file ID="F1" DMDID="DMD1" MIMETYPE="audio/x-wav">
        <mets:FLocat LOCTYPE="URL"
                        xlink:ref="http://myarchive.com/beet/recs/felise.wav"/>
      </mets:file>
    </mets:fileGrp>
    <mets:fileGrp USE="IMAGE">
      <mets:file ID="F2" DMDID="DMD1" MIMETYPE="image/tiff">
        <mets:FLocat LOCTYPE="URL"
                        xlink:ref="http://myarchive.com/beet/scores/felise.tif"/>
      </mets:file>
      <mets:file ID="F3" DMDID="DMD1" MIMETYPE="image/tiff">
        <mets:FLocat LOCTYPE="URL"
                        xlink:ref="http://myarchive.com/beet/pics/comp.tif"/>
      </mets:file>
    </mets:fileGrp>
  </mets:fileSec>
```

structMap

```
<mets:structMap>
   <mets:div TYPE="music object">
      <mets:div TYPE="recording" DMDID="DMD1"
               xlink:LABEL="1">
         <mets:fptr FILEID="F1"/>
      </mets:div>
      <mets:div TYPE="score" DMDID="DMD1"
               xlink:LABEL="DIV2">
         <mets:fptr FILEID="F2/>
      </mets:div>
      <mets:div TYPE="composer" DMDID="DMD1"
               xlink:LABEL="DIV3">
         <mets:fptr FILEID="F3/>
      </mets:div>
   </mets:div>
</mets:structmap>
```

structLink

```
<mets:structLink>
   <mets:smLink xlink:from="DIV2" xlink:to="DIV1"/>
</mets:structLink>
```

behaviourSec

```
<mets:behaviorSec>
   <mets:behavior STRUCTID="DIV1" BTYPE="access">
      <mets:interfaceDef LOCTYPE="URL"
                         xlink:href="http://streaming.org/wav/play"/>
   </mets:behaviour>
</mets:beahviourSec>
```

METS Profiles

- METS Profiles are intended to describe a class of METS documents in sufficient detail to provide both document authors and programmers the guidance they require to create and process METS documents conforming with a particular profile[2]

- As an analogy think of a profile as being the same as a musical form

- Set of rules/guidelines for packaging particular content types

[2] http://www.loc.gov/standards/mets/mets-profiles.html

APSR Context

- APSR is contributing funds to develop a set of METS profiles for various content types
- One of the content profiles is for music collections
- Core profile being developed by NLA
- Content profiles being developed by APSR partners in conjunction with NLA
- Scope is for submission and exchange of materials in a repository context

Example METS document and repository access

Music Repository

The Anthology of Australian Music

A selection of twentieth century Australian piano music (CSM:40)

The Anthology of Australian Music

1 - 3	Sonata (Holland, Dulcie)		
	Brooding - rather slow - allegretto		7:59
	Andante - molto mosso		7:42
	Vivo		7:43
4	Andante tranquillo from Concerto no. 2 in C# minor (Hyde, Miriam)		6:31
5 - 7	Three Aboriginal dances (Hill, Mirrie)		
	Brolga (the dancer)		2:54
	The Kinkarunkara women		1:46
	Nalda of the echo		2:59
8	The lake (Holland, Dulcie)		5:38
9	Theme and variations - Passacaglia (Eagles, Moneta)		7:53
10 - 15	Six profiles (Sutherland, Margaret)		
	With animation		1:15
	Expressively		2:29
	Cool and detached		2:46
	A little fussily		2:32
	Quietly flowing		1:04
	Rhythmically		4:14
16 - 18	Fantasia no. 11 'E', in three movements (Sitsky, Larry)		
	1		6:12
	2		3:31
	3		4:02

Done

Why Use METS?

- Open Standards
- Supported and Maintained by an International Community
- Mailing lists for technical support
- Useful for packaging compound digital objects
- Supported by repository software (longer term)

Links

- APSR web site: http://www.apsr.edu.au/

- METS web site: http://www.loc.gov/standards/mets/

- METS structure diagram:
http://sunsite.berkeley.edu/mets/diagram/

- METS Primer (draft):
http://www.loc.gov/standards/mets/METS%20Documentation
%20draft%20070310p.pdf