

MetaEdits:

Editing and Embedding Audio-Visual Metadata

Presented by:

Chris Lacinak

AudioVisual Preservation Solutions

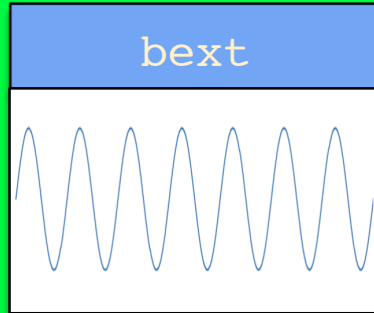
chris@avpreserve.com

American Library Association Annual Conference

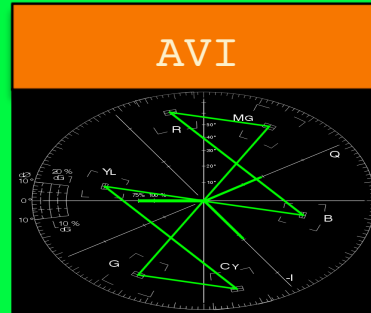
Intellectual Access to Preservation Metadata Interest Group

2012-06-23 | Anaheim, CA

3 PROJECTS



BWF MetaEdit



AVI MetaEdit



reVTMD

EMBEDDED METADATA?

Metadata that is stored inside the same file, or container that also stores the audiovisual essence to which the metadata refers

WHY EMBED?

THE GOVERNMENT
SAYS IT'S GOOD
FOR YOU

Guidelines: Embedded Metadata in Broadcast WAVE Files

Audio-Visual Working Group

Embedded metadata can travel with a digital object during its life cycle and often exists in synergy with metadata in an organization's databases or other information technology systems. Embedded metadata enables people in and outside an organization to work more efficiently, provides valuable data to the systems that preserve digital content, and can assist in disaster recovery. In addition to these guidelines for WAVE files, FADGI offers two embedding guidelines for still images: for minimal [descriptive metadata](#) and for the [TIFF header](#). Meanwhile, regarding WAVE file embedding, the Working Group has developed the [BWF MetaEdit tool](#) to support users.

Specification: Current and Earlier Versions

These guidelines pertain to metadata to be embedded in Broadcast WAVE files. They emphasize the importance of identifying the responsible organization and providing one or more item identifiers, as well as providing other guidance. The guidelines recommend an implementation of the *best chunk standard* defined by the European Broadcast Union (EBU) in *EBU-TECH 3285: Specification of the Broadcast Wave Format Version 2* (2011) and of the *INFO-list* chunk defined in the Microsoft-IBM *RIFF* specification (1991).

[Broadcast WAVE Metadata Embedding Guidelines, Version 2](#) (PDF, 343 KB)

Approved by Working Group - April 23, 2012.

[Broadcast WAVE Metadata Embedding Guidelines, Version 1](#) (PDF, 274 KB)

Approved by Working Group on September 15, 2009, and superseded by version 2 on April 23, 2012.

WHY EMBED?

EVERYONE ELSE IS!

- Recorders and Cameras
- Software Applications
- Editing Systems
- Asset Management Systems
- Distribution Platforms

IS THAT EVEN THE RIGHT QUESTION?

EMBEDDED METADATA

Exists in files, it is integral and useful. To ignore it is to effectively de-catalog

SIGNIFICANCE TO ARCHIVING AND PRESERVATION

Authenticity and Integrity

Management

Identification and
Description

Workflow

Redundancy and Backup

BUT IT'S ALSO SIGNIFICANT TO:

End-users

Production and Post Production

Creators

Rights Holders

Forensics and Legal System

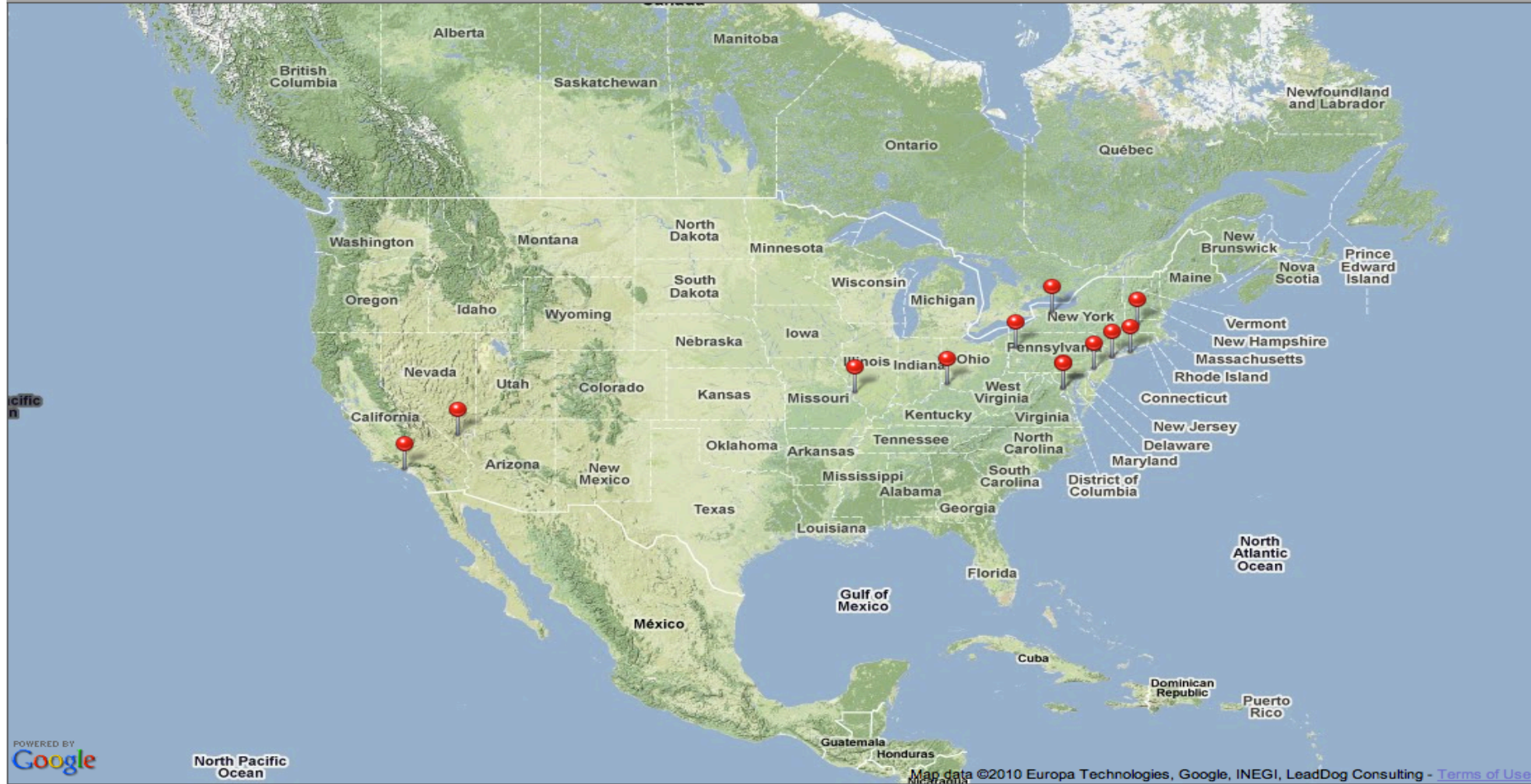
END USERS



Q Search

Name	Artist	Time	Date Added	Album	Genre	Rating	Play Count	Last Played
File 3 copy 3		0:05	5/20/10 11:01 PM					
File 3 copy 4		0:05	5/20/10 11:01 PM					
File 3 copy 5		0:05	5/20/10 11:01 PM					
File 4 copy 3		0:05	5/20/10 11:01 PM					
File 4 copy 4		0:05	5/20/10 11:01 PM					
File 4 copy 5		0:05	5/20/10 11:01 PM					
File 5 copy 3		0:05	5/20/10 11:01 PM					
File 5 copy 4		0:05	5/20/10 11:01 PM					
File 5 copy 5		0:05	5/20/10 11:01 PM					
File 6 copy 3		0:04	5/20/10 11:01 PM					
File 6 copy 4		0:04	5/20/10 11:01 PM					
File 6 copy 5		0:04	5/20/10 11:01 PM					
File 7 copy 3		0:05	5/20/10 11:01 PM					
File 7 copy 4		0:05	5/20/10 11:01 PM					
File 7 copy 5		0:05	5/20/10 11:01 PM					
File 9 copy 3		0:05	5/20/10 11:01 PM					
File 9 copy 4		0:05	5/20/10 11:01 PM					
File 9 copy 5		0:05	5/20/10 11:01 PM					
File1 copy 3		0:05	5/20/10 11:01 PM					
File1 copy 4		0:05	5/20/10 11:01 PM					
File1 copy 5		0:05	5/20/10 11:01 PM					
File2 copy 3		0:05	5/20/10 11:01 PM					
File2 copy 4		0:05	5/20/10 11:01 PM					
File2 copy 5		0:05	5/20/10 11:01 PM					
File 3		0:05	5/20/10 10:59 PM					
File 3 copy		0:05	5/20/10 10:59 PM					
File 3 copy 2		0:05	5/20/10 10:59 PM					
File 4		0:05	5/20/10 10:59 PM					
File 4 copy		0:05	5/20/10 10:59 PM					
File 4 copy 2		0:05	5/20/10 10:59 PM					
File 5		0:05	5/20/10 10:59 PM					
File 5 copy		0:05	5/20/10 10:59 PM					
File 5 copy 2		0:05	5/20/10 10:59 PM					
File 6		0:04	5/20/10 10:59 PM					
File 6 copy		0:04	5/20/10 10:59 PM					

END USERS



END USERS

February 1, 2011

1. BRIEF DESCRIPTION:

The collection of tapes being r
(234) Hi-8 , consisting of 148
(8) Betacam SP, all NTSC
(15) VHS, all NTSC

The content lengths are unk
However, you will note that v

The content on these tapes in
to preserve and make accessib
efforts.

Statement of Work Sample.docx Properties

General Summary Statistics Contents Custom

Title: Sample Statement of Work

Subject: Outsourcing Digitization

Author: Chris Lacinak

Manager: Chris Lacinak

Company: AVPS

Category:

Keywords: Sample, Statement of Work, Digitization, Video

Comments: Used as a reference for demonstrating an appropriate level of detail to provide to vendors when outsourcing reformatting.

Hyperlink base: www.avpreserve.com

Template: Normal.dotm

☒ Save preview picture with this document

Cancel OK

END USERS

92869753_l.mov	Sep 18
92869753_q.mov	Sep 26
4140461299_160302b871_o.jpeg	May 2
4998910423_04d56f08f7_o	
ARSCMetaTest1.wav	
ARSCMetaTest1alt.wav	
Demo_DV_720x480_CC42.c	
Description Activity.doc	
dvanalyzer_sample...racy_N	

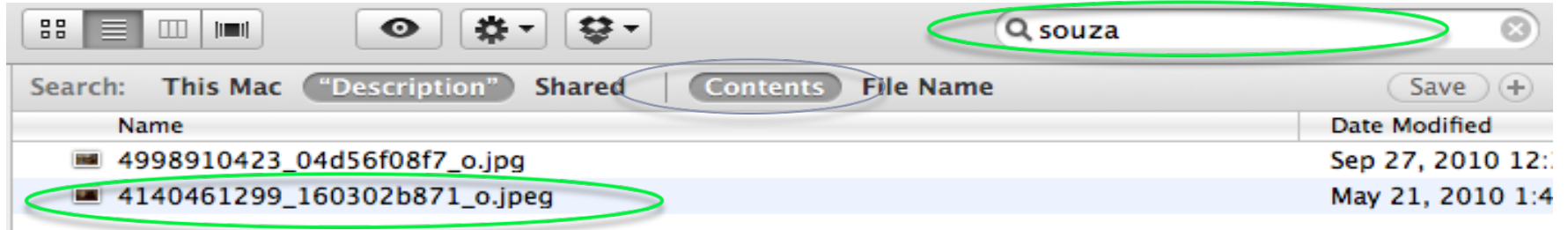


END USERS

File Name : 4140461299_160302b871_o.jpg
Directory : .
File Size : 808 kB
File Modification Date/Time : 2009:12:09 13:09:27-05:00
File Type : JPEG
MIME Type : image/jpeg
JFIF Version : 1.02
Exif Byte Order : Little-endian (Intel, II)
Image Description : Aides brief President Barack Obama aboard Air Force One en route to Tokyo, Japan, Nov. 12, 2009. (Official White House Photo by Pete Souza)...This official White House photograph is being made available only for publication by news organizations and/or for personal use printing by the subject(s) of the photograph. The photograph may not be manipulated in any way and may not be used in commercial or political materials, advertisements, emails, products, promotions that in any way suggests approval or endorsement of the President, the First Family, or the White House.
Make : Canon
Camera Model Name : Canon EOS 5D Mark II
Orientation : Horizontal (normal)
X Resolution : 240
Y Resolution : 240
Resolution Unit : inches
Software : Adobe Photoshop CS4 Macintosh
Modify Date : 2009.11.25 14:11:24
Artist : Pete Souza
Copyright : This official White House photograph is be
subject(s) of the photograph. The photograph may not be manipulated in any w
promotions that in any way suggests approval or endorsement of the President
Exposure Time : 1/125
F Number : 2.8
Exposure Program : Manual
ISO : 640
Exif Version : 0221
Date/Time Original : 2009:11:12 19:55:48
Create Date : 2009:11:12 19:55:48
Shutter Speed Value : 1/125
Aperture Value : 2.8
Exposure Compensation : 0
Max Aperture Value : 1.4
Metering Mode : Partial
Flash : Off, Did not fire
Focal Length : 35.0 mm
Sub Sec Time : 90
Sub Sec Time Original : 90
Sub Sec Time Digitized : 90



END USERS



SCANDAL

Exposure Program : Manual
ISO : 640
Exit Version : 0221
Date/Time Original : 2009:11:12 19:55:48
Create Date : 2009:11:12 19:55:48
Shutter Speed Value : 1/125
Aperture Value : 2.8
Exposure Compensation : 0



SUPREME COURT OF ARIZONA
En Banc

DAVID LAKE,)	Arizona Supreme Court
)	No. CV-09-0036-PR
Plaintiff/Appellant,)	
)	Court of Appeals
v.)	Division One
)	No. 1 CA-CV 07-0415
CITY OF PHOENIX, a political)	
subdivision of the State of)	Maricopa County
Arizona; FRANK FAIRBANKS, in his)	Superior Court
official capacity; MARIO)	No. LC 2006-000835-001 DT
PANIAGUA, in his official)	
capacity; JACK HARRIS, in his)	
official capacity,)	
)	O P I N I O N
Defendants/Appellees.)	

Appeal from the Superior Court in Maricopa County
The Honorable Michael D. Jones, Judge

B A L E S, Justice

¶ 1 Arizona law provides that “[p]ublic records and other matters in the custody of any officer shall be open to inspection by any person at all times during office hours.” Ariz. Rev. Stat. (“A.R.S.”) § 39-121 (2001). The City of Phoenix denied a public records request for metadata in the electronic version of a public record. We today hold that if a public entity maintains a public record in an electronic format, then the electronic version, including any embedded metadata, is subject to disclosure under our public records laws.

RIFF FILE STRUCTURE

CHUNKS

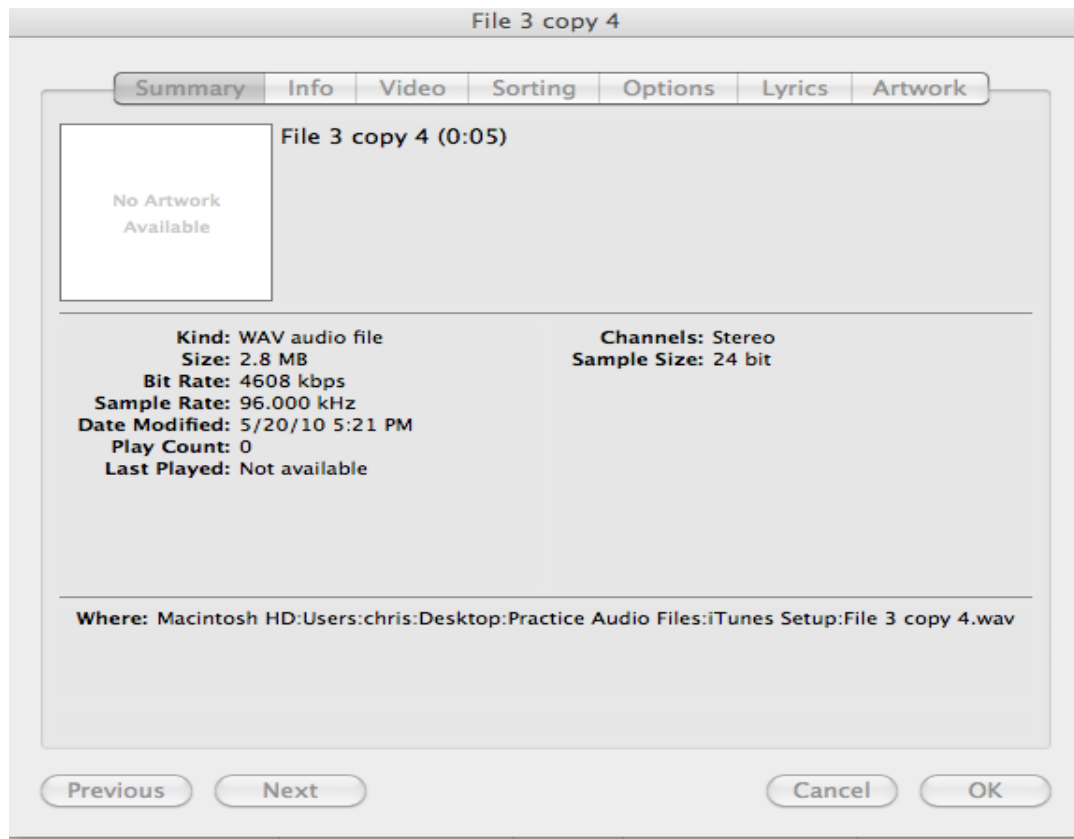
Location	Size	Chunk IDs ----->	
00000000	1112E678	WAVE	
0000000C	00000010	fmt	Format chunk
00000024	00000082	INFO	Tech md
00000030	00000016	INAM	
0000004E	0000000E	IART	
00000064	0000000E	ISFT	
0000007A	00000016	ICRD	
00000098	0000000E	ISRF	
000000AE	000002F4	bext	
000003AA	00002C46	PAD	
00002FF8	1112B680	data	Data chunk Audio data

RIFF FILE STRUCTURE

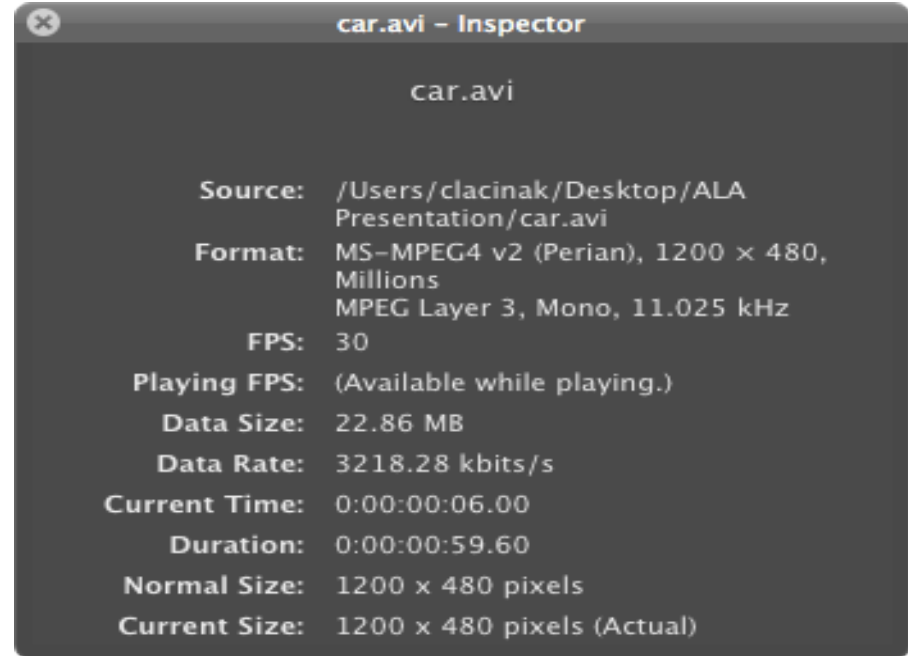
CHUNKS

Location	Chunk IDs ----->	
00000000	AVI	
0000000C	hdrl	
00000018	avih	avih chunk
00000058	strl	Tech md
00000064		
000000A4		strh
000000D4		strf
000010F4	strl	JUNK
00001100		strh
00001140		strf
0000115A		JUNK
0000217A	odml	
00002186		dmlh
00002286	JUNK	
00002800	movi	Movi chunk
00085264	idx1	AV data

FORMAT CHUNK IN USE



AVI CHUNK IN USE



EMBEDDED METADATA STANDARDS

00000000	002CE4AE	WAVE	
0000000C	00000010	fmt	
00000024	00000258	INFO	
00000030	00000022	IARL	
0000005A	00000017	IART	
0000007A	0000001D	ICMS	
000000A0	00000019	ICMT	
000000C2	0000001A	ICOP	
000000E4	0000001E	ICRD	
0000010A	00000019	IENG	
0000012C	00000016	IGNR	
0000014A	00000019	IKEY	
0000016C	00000017	IMED	
0000018C	0000001D	INAM	
000001B2	00000020	IPRD	
000001DA	00000018	ISBJ	
000001FA	00000019	ISFT	
0000021C	00000017	ISRC	
0000023C	0000001C	ISRF	
00000260	0000001B	ITCH	
00000284	0000DC5B	PMX	
0000DEE8	00000268	aXML	
0000E158	0000DD4	iXML	
0000EF34	0000035A	bext	
0000F296	002BF200	data	
002CE49E	00000010	MD5	

LIST-INFO

XMP

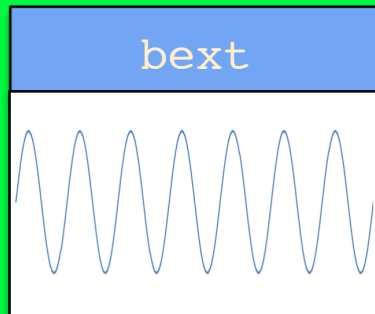
axml

iXML

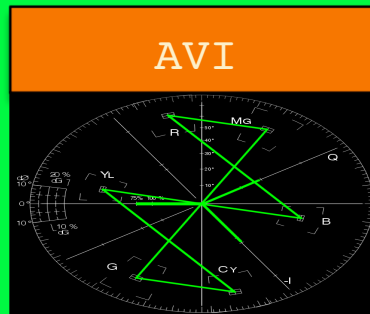
bext

data

3 PROJECTS



BWF MetaEdit



AVI MetaEdit



reVTMD

OVERVIEW OF APPLICATIONS

Free and Open source

Cross-platform (Windows, Mac and Unix)

Command line interface and GUI

Singular and batch processing

Reading, editing and writing of LIST INFO, (bext), axml, XMP and iXML

CSV and XML based importing and exporting

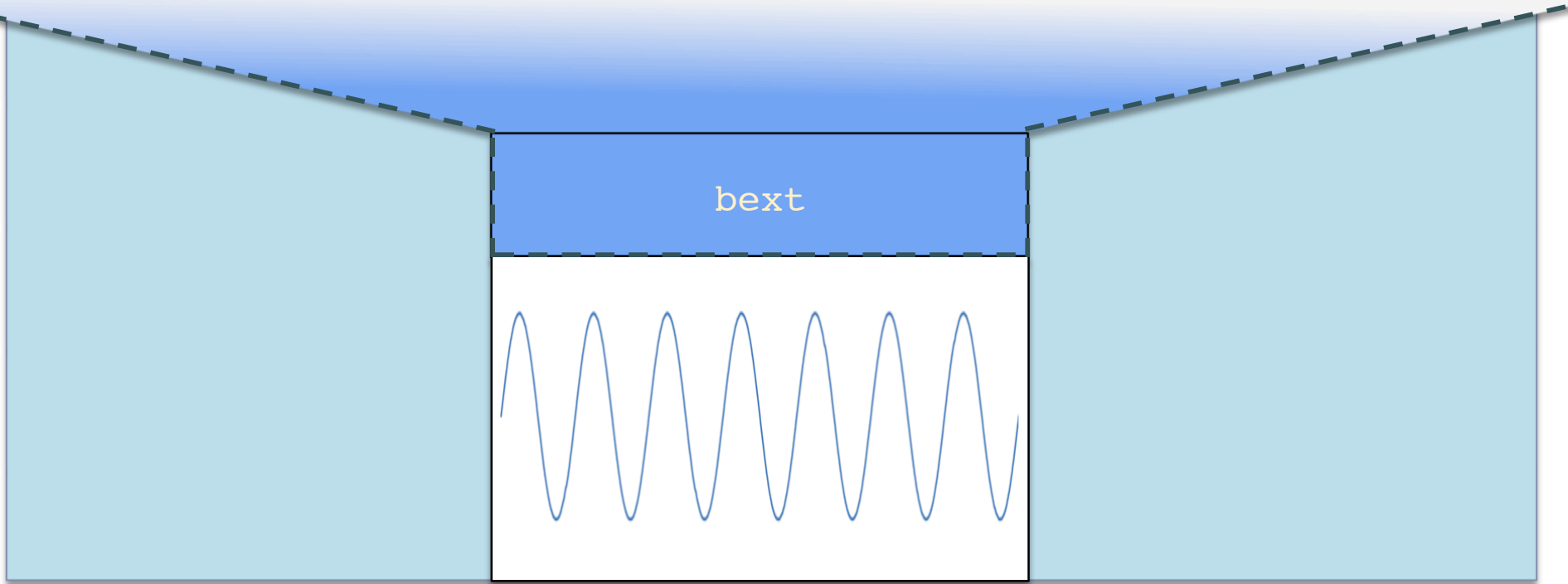
Optional enforcement of standards and guidelines (rule sets)

Global Y/N overwrite existing metadata

Undo

AV-only MD5 checksums

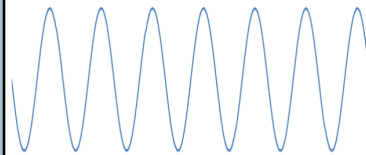
	FileName	Description	Originator	OriginatorReference	OriginationDate	OriginationTime	TimeR
1	full1.wav	Vito Acconci1976	Museum of Modern Art	190.2007	2008-01-08	15:25:54	00:00:1
2	full2.wav	3 Columns for America	Museum of Art	194.2006	2010-09-27	19:55:56	01:00:0
3	full3.wav	Askevold Concert Tone Compressions	Museum of Modern Art	437.2007	1972-01-01	16:12:12	11:00:0
4	full4.wav	Cineprobe: An Evening with Bruce Conner	Museum of Modern Art	234.239	1994-08-10	14:28:00	00:00:2
5	full5.wav	Recorded: 1969-04-22	Museum of Modern Art	69.26	1977-05-03	12:08:41	00:00:0



EMBED

BWF MetaEdit – Audio-Visual Working Group of the Federal Agencies Digitization Guidelines Initiative										
FileName	Description	Originator	OriginatorReference	OriginationDate	OriginationTime	TimeReference (translated)	TimeReference	BextVersion	UMID	Loudness
1 full1.wav						00:00:00.000	0	0		
2 full2.wav						00:00:00.000	0	0		
3 full3.wav						00:00:00.000	0	0		
4 full4.wav						00:00:00.000	0	0		
5 full5.wav						00:00:00.000	0	0		

bext





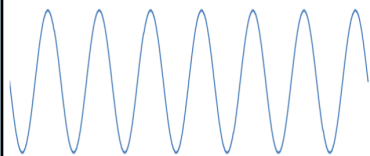
EMBED

BWF MetaEdit – Audio-Visual Working Group of the Federal Agencies Digitization Guidelines Initiative

Save Tech Core

	FileName	Description	Originator	OriginatorReference	OriginationDate	OriginationTime	TimeReference (translated)	TimeReference	BextVersion	UMID	Loudn
1	full1.wav						00:00:00.000	0	0		
2	full2.wav						00:00:00.000	0	0		
3	full3.wav						00:00:00.000	0	0		
4	full4.wav						00:00:00.000	0	0		
5	full5.wav						00:00:00.000	0	0		

bext



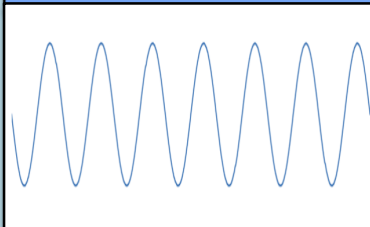


EMBED

BWF MetaEdit - Audio-Visual Working Group of the Federal Agencies Digitization Guidelines Initiative

	FileName	Description	Originator	OriginatorReference	OriginationDate	OriginationTime	TimeReference (translated)	TimeReference	TextVersion	UMID	L
1	full1.wav	Vito Acconci1976	Museum of Modern Art	190.2007	2008-01-08	15:25:54	00:00:10.628	468738	0		
2	full2.wav	3 Columns for America	Museum of Art	194.2006	2010-09-27	19:55:56	01:00:00.000	158760000	0		
3	full3.wav	Askevoid Concert Tone Compressions	Museum of Modern Art	437.2007	1972-01-01	16:12:12	11:00:00.000	1746360000	0		
4	full4.wav	Cineprobe: An Evening with Bruce Conner	Museum of Modern Art	234.239	1994-08-10	14:28:00	00:00:23.520	1037232	0		
5	full5.wav	Recorded: 1969-04-22	Museum of Modern Art	69.26	1977-05-03	12:08:41	00:00:00.000	0	0		

bext



1.



EDIT

2.

BWF MetaEdit - Audio-Visual Working Group of the Federal Agencies Digitization Guidelines Initiative

Save Tech Core

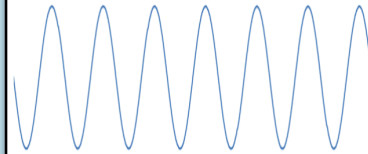
UMID	LoudnessValue	LoudnessRange	MaxTruePeakLevel	MaxMomentaryLoudness	MaxShortTermLoudness	CodingHistory
1						A=PCM,F=96000,W=24,M=stereo,T=originalA=PCM,F=44100,W=16,M=stereo,T=Wavelab 6...
2						A=ANALOGUE,M=stereo,T=Tascam 122 MkIII; SN 7400107972; Audiocassette,A=PCM,F=960...
3						A=ANALOGUE,M=stereo,T=Tascam 122 MkIII; SN 7400107972; Audiocassette,A=PCM,F=960...
4						A=PCM,F=96000,W=24,M=mono,T=preservation masterA=PCM,F=44100,W=16,M=mono,T...
5						A=ANALOGUE,M=mono,T=Studer A807; SN 1353; 1/4 track 2 channel head; 1/4" open reel,A...

MaxMomentaryLoudness

MaxMomentaryLoudness value: 0.00 LUFS

Cancel OK

bext

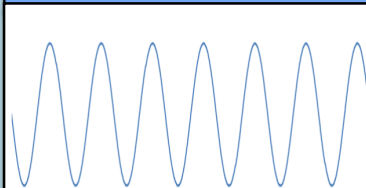


EXTRACT



BWF MetaEdit - Audio-Visual Working Group of the Federal Agencies Digitization Guidelines Initiative											
FileName	Description	Originator	OriginatorReference	OriginationDate	OriginationTime	TimeReference (translated)	TimeReference	TextVersion	UMID		
1 full1.wav	Vito Acconci1976	Museum of Modern Art	190.2007	2008-01-08	15:25:54	00:00:10.628	468738	0			
2 full2.wav	3 Columns for America	Museum of Art	194.2006	2010-09-27	19:55:56	01:00:00.000	158760000	0			
3 full3.wav	Askeveld Concert Tone Compressions	Museum of Modern Art	437.2007	1972-01-01	16:12:12	11:00:00.000	1746360000	0			
4 full4.wav	Cineprobe: An Evening with Bruce Conner	Museum of Modern Art	234.239	1994-08-10	14:28:00	00:00:23.520	1037232	0			
5 full5.wav	Recorded: 1969-04-22	Museum of Modern Art	69.26	1977-05-03	12:08:41	00:00:00.000	0	0			

bext



CODING HISTORY

BWF MetaEdit – Audio-Visual Working Group of the Federal Agencies Digitization Guidelines Initiative

Save Tech Core

MaxTruePeakLevel MaxMomentaryLoudness MaxShortTermLoudness CodingHistory

1 A=ANALOGUE,M=stereo,T=Studer A807A=PCM,F=96000,W=24,M=stereo,T=original

2

3

4

5

Coding History

EBU R98-1999 Free text

	Coding algorithm	Sampling frequency	Bit rate	Word length	Mode	Text, free string
1	ANALOGUE				stereo	Studer A807
2	PCM	96000		24	stereo	original
3	PCM	44100		16	stereo	Wavelab 6.10; UV22HR dither
4						

Load file... Save file... Cancel OK

PROCESS HISTORY

	Role	Description	Manufacturer	Model name	Serial number	Signal	Version	Video encoding
1	source object	U-Matic	Sony	BKT150				
2	playback device	U-Matic Deck	Sony	BVU 950	1298348	Composite		
3	capture device		Black Ma...	Studio ...	3ru24u3	Composite		
4	capture software		CatDV	LiveCap...		Component		V210
5	operating system		Macintosh	OS 10.7.2				
6								

bext	INFO	XMP	aXML	iXML	MD5Stored	MD5Generated	Errors	Information
Version 0	Yes	No	No	No	DD7B63330A04EF906B8E174DA1702E90	DD7B63330A04EF906B8E174DA1702E90		MD5, verified
Version 0	Yes	No	No	No				
Version 0	Yes	No	No	No				
Version 0	Yes	No	No	No				
Version 0	Yes	No	No	No				

BWF MetaEdit preferences

Technical Metadata | Core Metadata | Rules | File management | **MD5** | Default view | Extra

☒ Generate MD5 for audio data

☒ Verify MD5 for audio data

☒ Embed MD5 for audio data

☐ Allow overwriting of embedded MD5 value

AV ONLY MD5



AVI MetaEdit – U.S. National Archives



Save

Tech

Core



2012-06-23 15:46:44 /Users/clacinak/Downloads/samples.multimedia.cx/A-codecs/miss_congeniality_alf2cd.avi: invalid AVI (truncated)

QUALITY CONTROL



BWF MetaEdit – Audio-Visual Working Group of the Federal Agencies Digitization Guidelines Initiative



Save

Tech

Core



	FileName	Description	Originator	OriginatorReference	OriginationDate	OriginationTime	TimeReference (translated)	T
1	full1.wav	Vito Acconci1976	Museum of Modern Art	190.2007	2008-01-08	15:25:54	00:00:10.628	4
2	full3.wav	David AskevoldConcert Tone Compressions	Museum of Modern Art	437.2007	1972-01-01	16:12:12	00:00:00.000	0
3	full2.wav	Vito Acconci1976	Museum of Art	malformed input, Originator 2nd character must be between 'A' and 'Z' (FADGI recommendations))				
4	full4.wav	Cineprobe: An Evening with Bruce ConnerRecorded 1969-04-22	Museum of Modern Art	69.26	2008-07-24	14:28:00	00:00:23.520	1

```
<reVTMD xmlns="http://www.archives.gov/preservation/products/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.archives.gov/preservation/products/ http://www.archives.gov/preservation/products/reVTMD.xsd">
<objects>
  <object>
    <filename></filename>
    <identifier></identifier>
    <access>
      <type></type>
      <contact_reference></contact_reference>
      <statement></statement>
      <comment></comment>
      <expiration_date></expiration_date>
      <documentation_date></documentation_date>
    </access>
    <organization>
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        <role></role>
        <role_note></role_note>
      </organization_main>
      <organization_division>
        <name></name>
        <role></role>
        <role_note></role_note>
      </organization_division>
    </organization>
  </object>
</objects>
</reVTMD>
```

reVTMD

PRIOR

WORK

Highlights

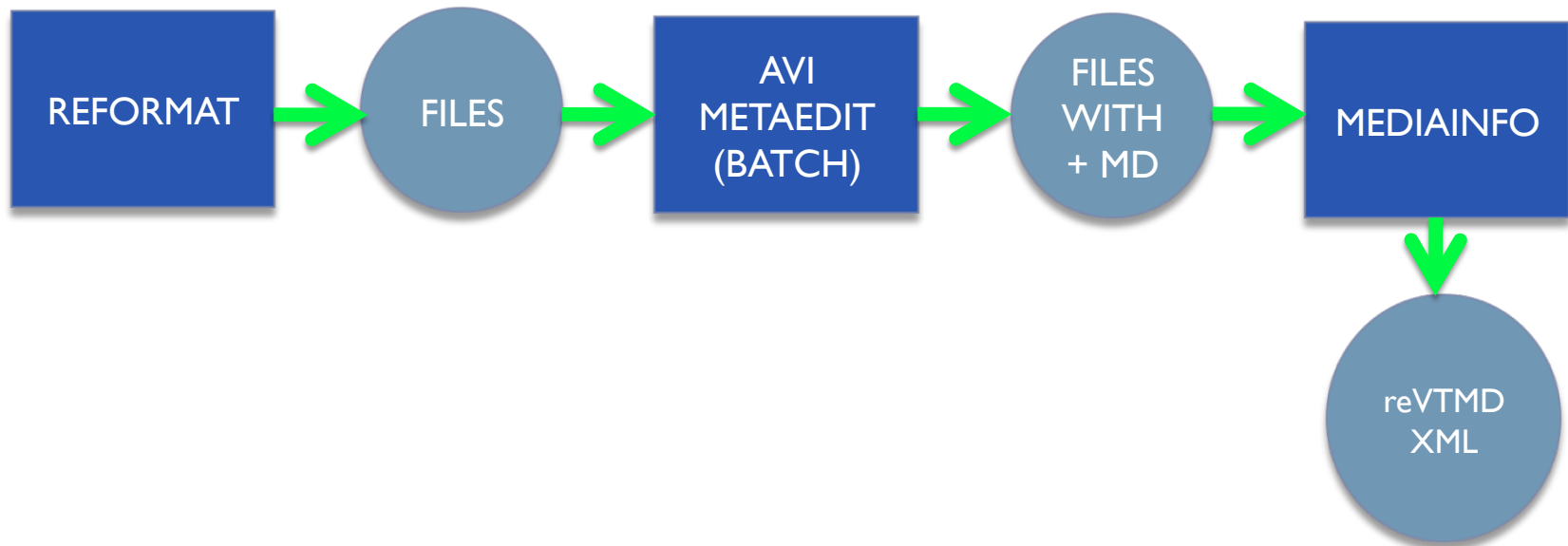
All file-based. Not just AVI. Not physical objects.

Process history particularly well suited for reformatted video digital objects but can be used for born digital as well.

Generates valid instance documents in automated fashion.

Incorporated into the MediaINFO NARA
GitHub version as an output (Windows Only)

BASIC AVI METAEDIT & reVTMD WORKFLOW



LINKS

BWF METAEDIT

<http://www.digitizationguidelines.gov>

<http://sourceforge.net/projects/bwfmataedit/>

AVI METAEDIT AND reVTMD

<https://github.com/usnationalarchives>

<http://www.archives.gov/preservation/products/reVTMD.xsd>

[http://www.archives.gov/preservation/products/reformatting/
video.html](http://www.archives.gov/preservation/products/reformatting/video.html)

THANK YOU!

QUESTIONS?

Chris Lacinak
AudioVisual Preservation Solutions
chris@avpreserve.com