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**Association of Moving Image  
Archivists  
December 5, 1996**

*Format Independence*

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# WGBH Holdings

## *Formats include:*

- **Paper Documents**
  - files
  - printed matter
  - posters

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# WGBH Holdings

## *Formats include:*

- **Computer**
  - 3 1/2", 5 1/4", 8" floppies
  - 9 trk.
  - 4mm, 8mm
  - Exabyte
  - CD-ROM

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# WGBH Holdings

## *Formats include:*

- **Audio**
  - 1/4", 1/2", 1", 2" tape
  - audio cassettes, DAT
  - DA88 digital cassettes

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# WGBH Holdings

## *Formats include:*

- **Visual**
  - photos, slides, contact sheets, microfiche & microfilm
  - 8mm, 16mm, 35mm film
  - 1/2” Helical, VHS, 3/4”, Hi-8
  - 2” Quad, 1”, Beta SP, Digital Beta, D3

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# WGBH Holdings

## *Volume Figures include:*

- **Boxes with paper & photo files**  
4,300 boxes (box=1.23 cu. ft.)
- **Boxes with 16mm & 35 mm film materials**  
3,200 boxes / 49,639,600 ft.
- **Master FM audio tape reels**  
32,288 reels

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# WGBH Holdings

*Volume Figures include:*

## Master level materials

2" video 2,654

1" video 6,907

Beta 754

D3 580

2" audio 1,501

35mm audio 448

**12,844 reels/cassettes**

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# WGBH Holdings

## *Volume Figures include:*

### **Non-master materials**

2" video 3,510

1" video 8,999

3/4" cassettes 83,196

Beta 61,050

Misc. Helicals, VHS, audio-cassettes, DAT 652 boxes

**156,755 reels/cassettes**

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- **Technological obsolescence, in particular, has hindered the preservation of video materials by contributing to the enormous expense of accessing stored materials.**

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# The Wonderful Digital Age

- **Digital technology has resulted in a veritable explosion of formats.**
- **Thirteen different digital tape formats are available at present.**
  - **D-1, D-1 SP, D-2, D-3, D-5, D-6, Digital Betacam, Betacam SX, Ampex DCT, Consumer DV, DVCAM, DVCPRO and Digital S**
    - **And several more in development for High Definition Television.**

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# Help!

- **From an archivist perspective this is a nightmare. On one side of the room you store the tapes and on the other side the tape machines and spare parts.**

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# Which format will last?

- **Which one is suitable for preservation?**

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# Preservation Format?

- **There is a significant need for a Universal Preservation Format (UPF)**
  - **Store compound content (not only the media itself but also information about it.)**

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# Oh No!

*You mean all manufactures should agree on a tape format?*

- **No, we don't need a universal acquisition format, we need a Universal Preservation Format!**

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# Where to Start?

- **Along with the surge of digital formats are technologies that are designed to handle digital media of all types.**
  - **Apple Computer’s “Bento Specification”**
  - **Avid Technology’s “Open Media Framework Interchange Specification”**

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# Bento

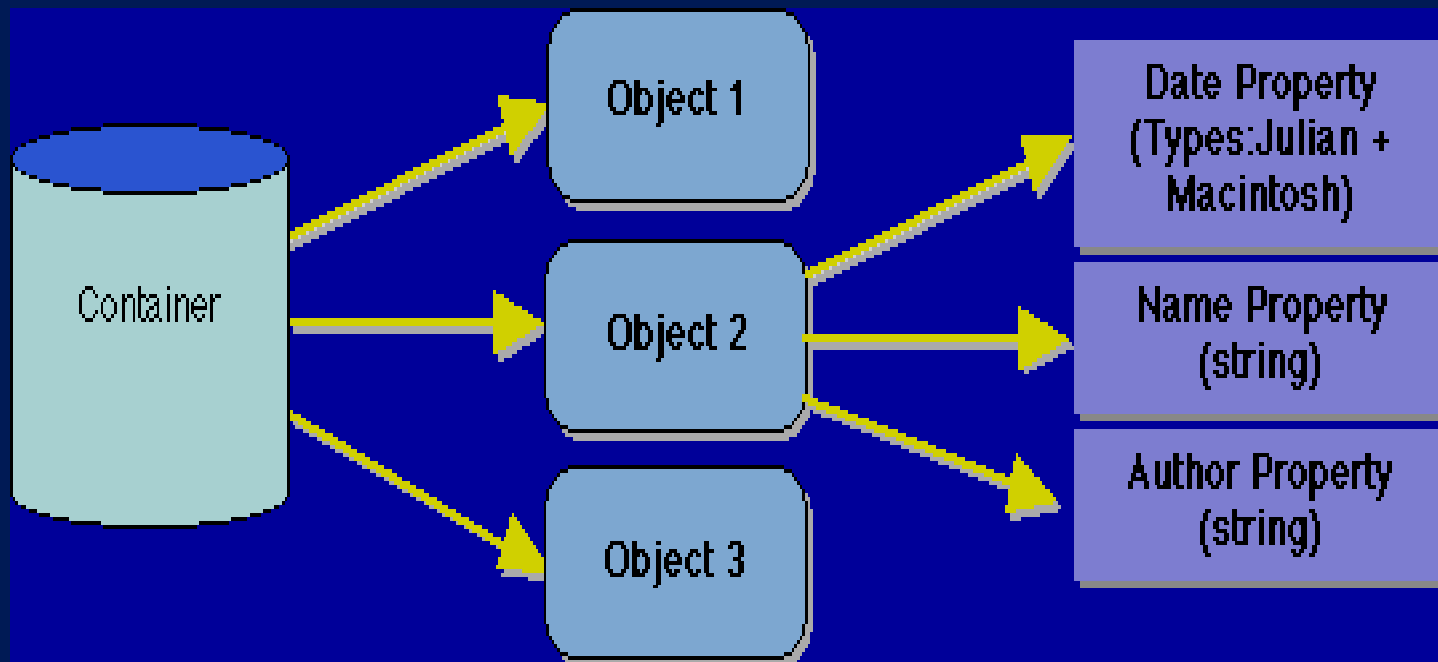
- **A specification for storage and interchange of compound content.**
- **Standard format for storing multiple different types of objects and an application program interface to access these objects.**
- **An object container is just a form of data storage (such as a file.)**

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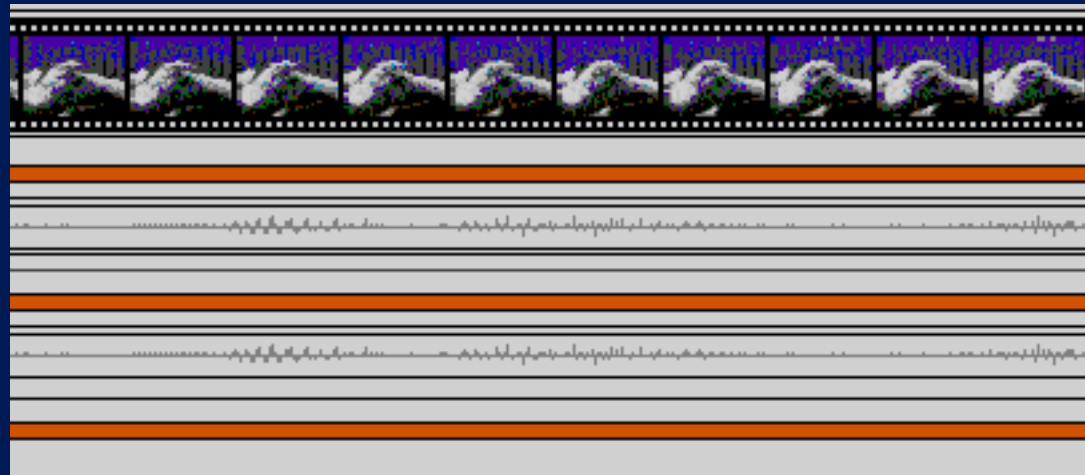
# Bento

- **This storage is used to hold one or more objects (values) and information about the objects (metadata.)**
- **Objects can be simple or complex, small (a few bytes) or large (up to  $2^{64}$  bytes, approximately  $2^{27}$  hours of D-1 video.)**
- **Designed to be platform and content neutral.**

# Bento Container



# Media as an Object



**Object**

# Media as data



110011110010101



Object

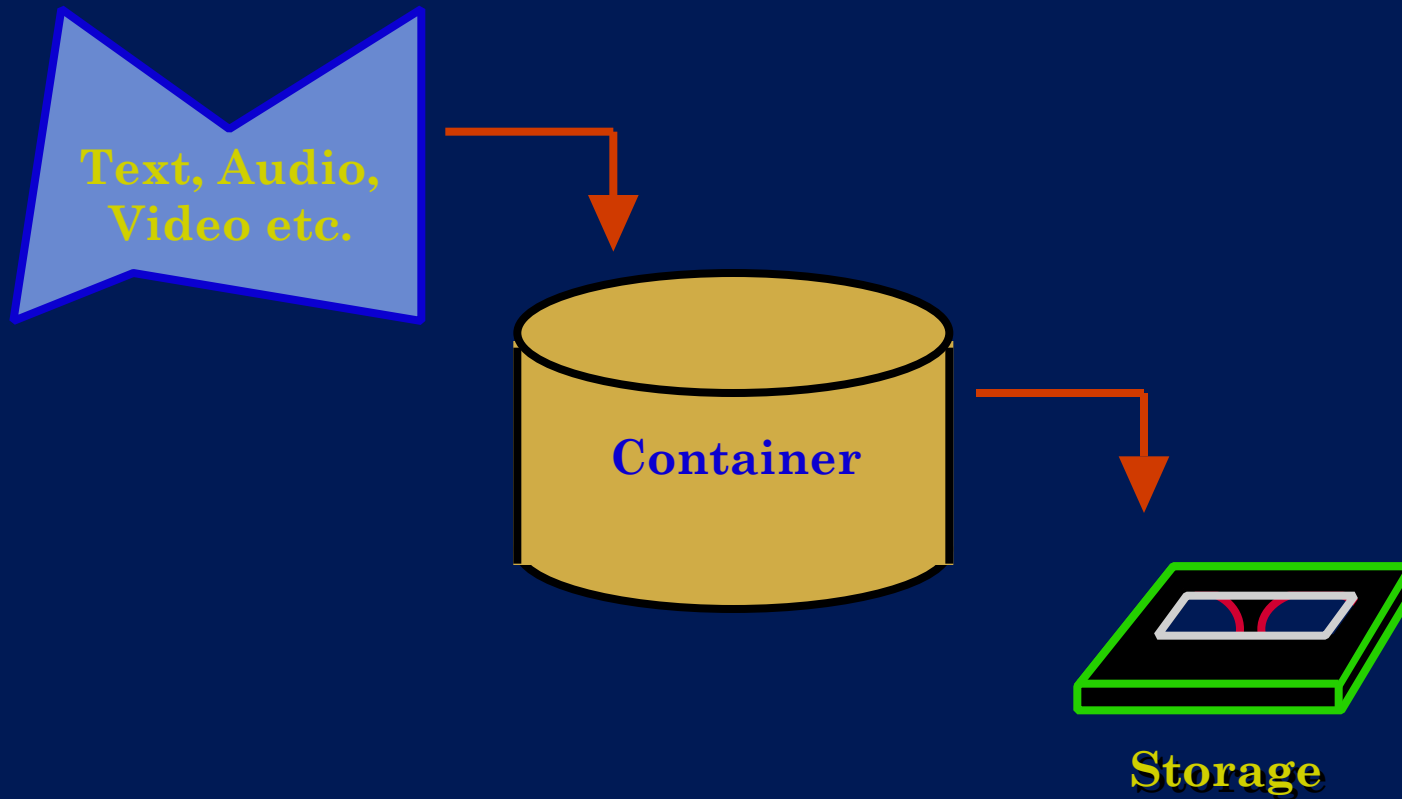


0101011100001



Object

# The Basics



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# Open Media Framework (OMF) Interchange

- **A format for the interchange of digital media data among different platforms**
  - **Uses Bento containers.**
- **Encapsulates all the information required to transport a variety of digital media, as well as the rules for combining and presenting the media.**

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# OMF

- **Provides for a variety of existing digital media types and the ability to easily support new types in the future.**
- **The format includes rules for identifying the original sources of the digital media data.**
  - **Compressed and uncompressed.**

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# OMF

- **All the information required to create, edit, and play media.**
- **Structured to facilitate playback directly from an interchanged file.**

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# Interactive Multimedia Association (IMA)

- **Recommended Practice for Data Exchange.**
  - IMA 950701.1
- **Over 300 member companies.**

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# Bento and OMF as a Preservation Format

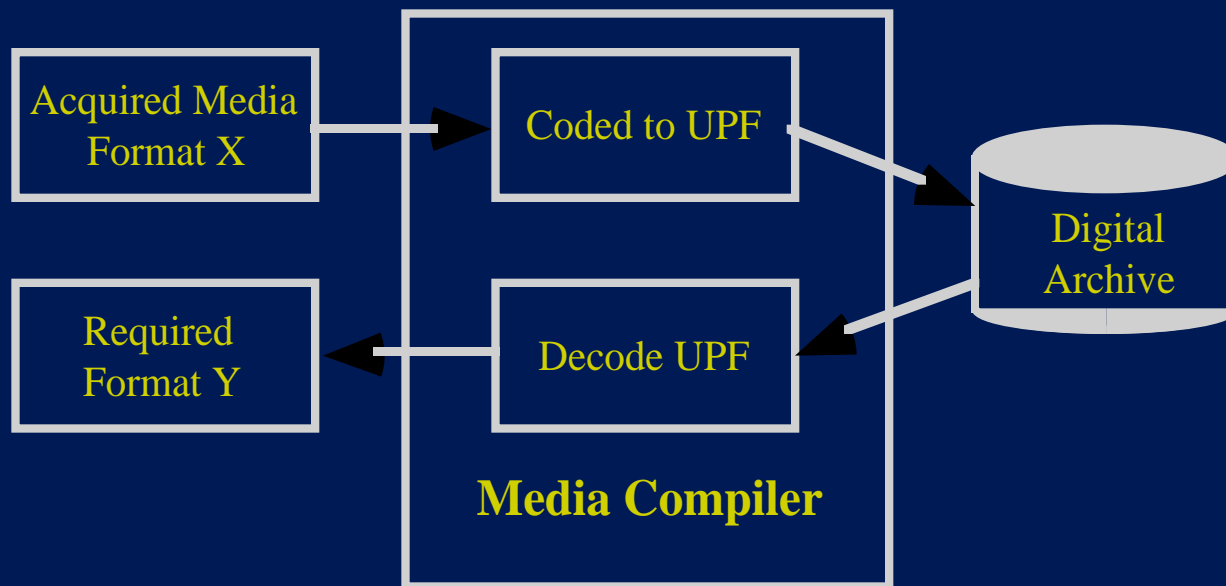
- **Currently only defines a small number of data types (e.g. TIFF, RGBA and AIFF).**
- **Think of current tape formats as having data types (4:2:2, 4fsc., 4:2:0, etc.)**
- **Add additional standard data types (e.g. CCIR 601, 4:2:0, 4:1:1, etc.)**

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# Bento and OMF as a Preservation Format

- **This would break the bond between the recording format and the machine through which the format is accessed.**
- **In addition, can be used for text, still image and other digitizable or data materials.**

**The storage and retrieval of media could be handled by a so called “media compiler.”**



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# Storage Format

*There will always be a format that media has to be stored on and this format will always become obsolete at some time.*

- **The UPF does not solve this problem. But, it does allow for systems that can.**

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# UPF

- **Additional header information that defines the formats stored in the UPF would be included.**
- **In archival terms, it will be necessary to record these definitions to provide decoding of the original material.**

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# Next Steps

- **It is time to bring together technology manufacturers, archivists and standards organizations to advance the creation of a Universal Preservation Format.**
- **The goal of the Universal Preservation Format is to produce a Recommended Practice**

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# Next Steps

- **Advocacy of the Universal Preservation Format has been recently funded by the NHPRC.**
- **Two year grant.**
- **Looking for additional assistance.**

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# Summary

- **Benefit a broad range of users of archival records**
  - Archivists and technology manufacturers, distributors and producers
- **Making it efficient, cost-effective and relatively simple to access media.**

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# Summary

- **Remember that we are talking about an Universal Preservation Format and not a universal acquisition format.**

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# References

- **Bento Specification, Copyright © 1993, Apple Computer, Inc.**
  - <ftp://cil.org/pub/cilabs/tech/bento/>
- **Open Doc underlying technologies**
  - [http://dev.info.apple.com/du/intro\\_to\\_opendoc/iod4\\_underlying\\_technology.html](http://dev.info.apple.com/du/intro_to_opendoc/iod4_underlying_technology.html)
- **Open Media Framework Interchange Specification, Copyright © 1995 Avid Technology, Inc.**
  - <http://www.avid.com/omf/>

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# References

- **IMA Technical Working group, data exchange, IMA 950701.1, p. 2.ii.**
  - <http://www.ima.org/forums/imf/de/>
- **Storage Technology Corporation**
  - <http://www.storitek.com/StorageTek/redwood1.html>

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# UPF Sites

- **Web**
  - <http://info.wgbh.org/upf/>
- **Listserv**
  - [UPF@info.wgbh.org](mailto:UPF@info.wgbh.org)
  - “Subscribe UPF your name” to [listserv@info.wgbh.org](mailto:listserv@info.wgbh.org)

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**The Universal Preservation Format.**