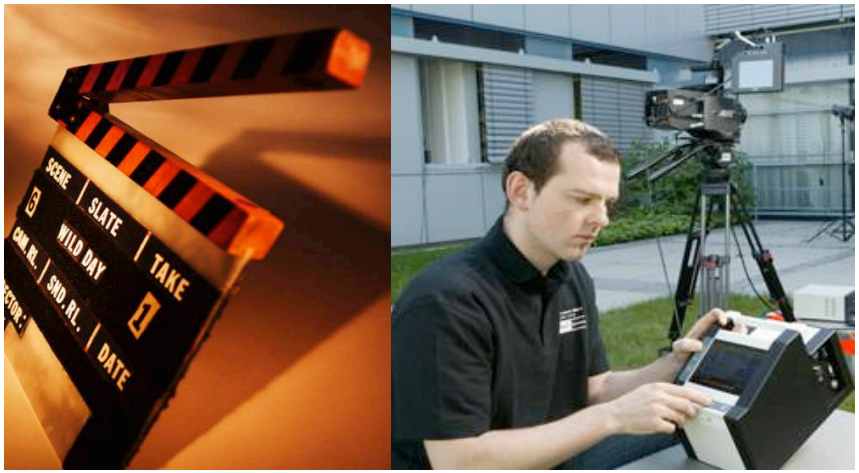
Digital Archiving of Audiovisual Material Pilot Projects in Europe

Fraunhofer Digital Cinema

Arne Nowak



Joint Technical Symposium 2010
Digital Challenges and
Digital Opportunities
in Audiovisual Archiving

Oslo, May 2 – 5, 2010

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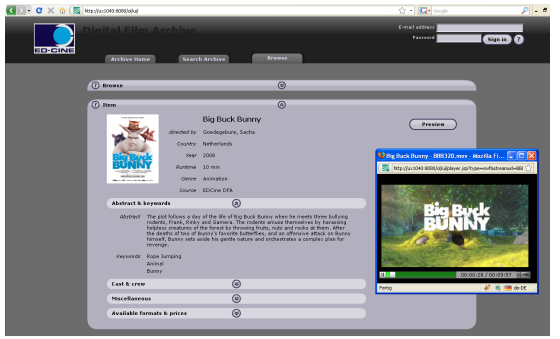
1. Introduction
What happened before?

The EDCINE project

- User requirements, specification
- General process and system concept developed
  - use of open standards: JPEG 2000 and MXF
  - sustainable (as far as possible)
- JPEG 2000 profiles for film archiving standardised in ISO
- Demonstration system developed and tested
- EDCINE ran from August 2006 to July 2009



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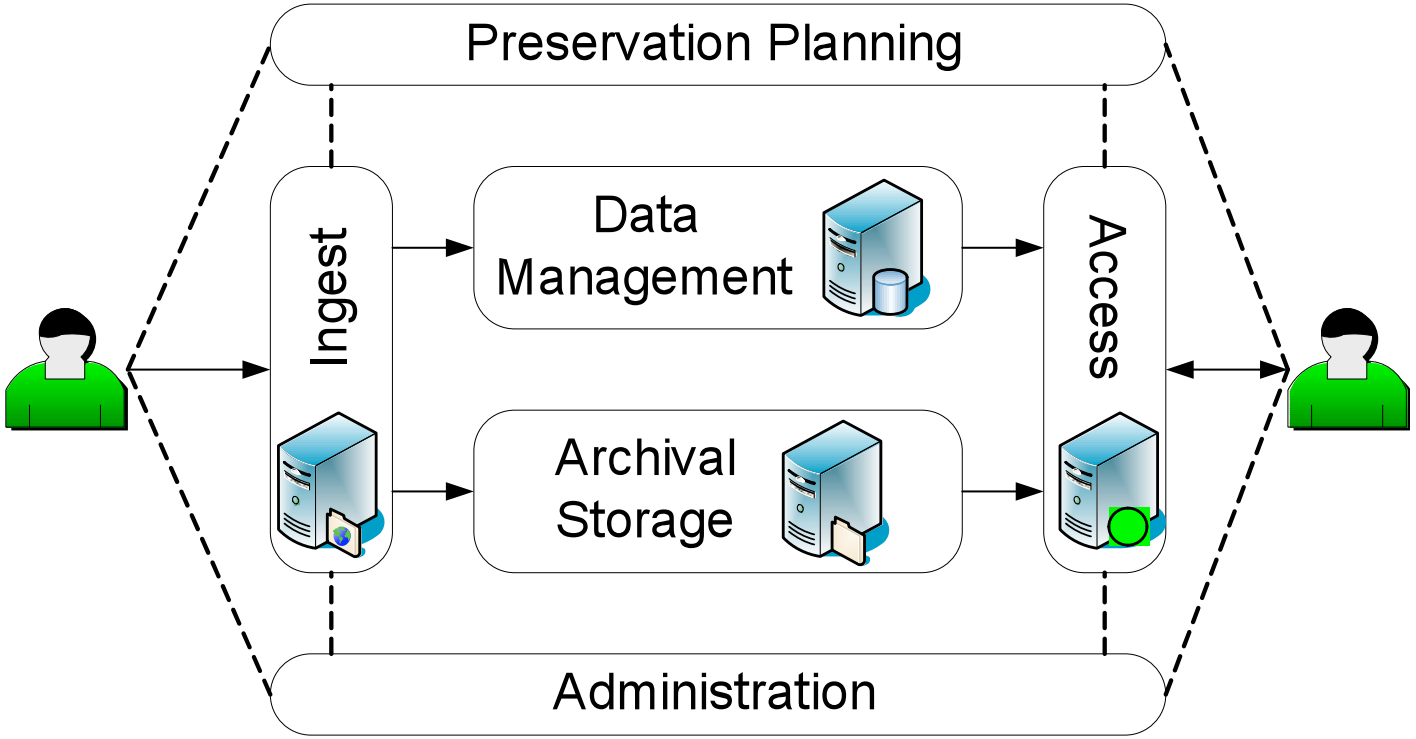
2. EDCINE for Archives – the general concept

Ingest – Preservation – Access



OAIS Reference Model (ISO Standard 14721:2003)

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2. EDCINE for Archives – the general concept
JPEG 2000 – MXF – 2-Tier Storage Approach

How does it work?

- Use of standardised formats
- JPEG 2000 for image compression
- Uncompressed multi-channel, multi-language audio
- MXF for
  - Wrapping of images and sound, time code etc.
  - Metadata
- Two storage packages:
    - for long-term preservation: Master Archive Package (MAP)
    - for access: Intermediate Access Package (IAP)

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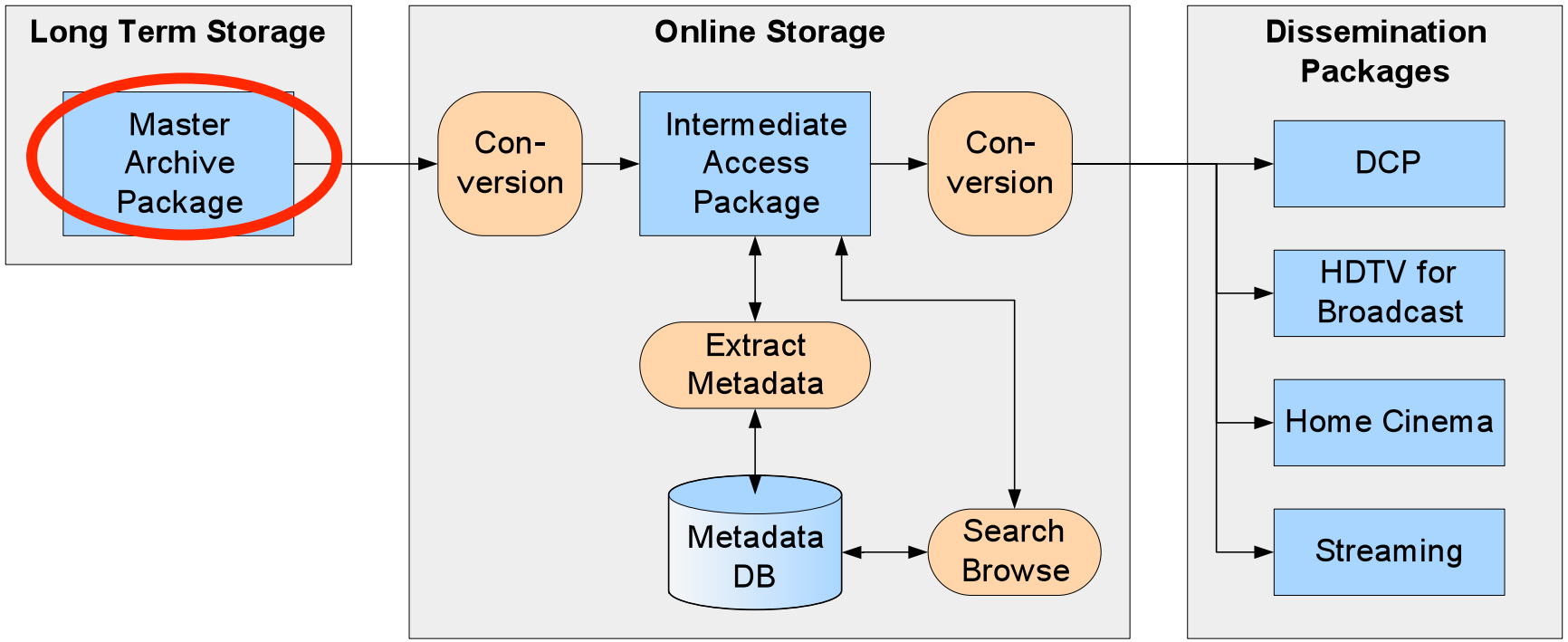
2. EDCINE for Archives – the general concept

Two-tier storage data format, access on demand



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2. EDCINE for Archives – the general concept

JPEG2000 ISO Profiles Relevant for Digital Movies

Profile	2k Distribution Profile	4k Distribution Profile	2k scalable Archive Profile	4k scalable Archive Profile	Master Archive Profile
Profile Indicator	3	4	5	6	7
Max Resol.	2048x1080	4096x2160	2048x1080	4096x2160	16384x8192
Quality Layer	1	1	2	2	<=5
Components	3	3	3	3	<=8
Bitrate	<=250MBit	<=250 MBit/s	<=250MBit/s for Layer0 <=500MBit/s for Layer1	<=250MBit/s for Layer0 <=500MBit/s for Layer1	Lossy and lossless
Purpose	**DCP**	**DCP**	**IAP (compatible with Profile 3)**	**IAP (compatible with Profile 4)**	**MAP**

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3. Digital A/V Archiving Pilot Installations
A joint approach of several European archives

Goal: gain experience with file-based digital A/V archiving

- Bring EDCINE concept to life in different environments
- Collect pratical experience with a small collection first
- Identify problems and opportunities; evaluate processes
- Participating archives:
  - Cinémathèque Royale de Belgique
  - National Audiovisual Archive, Finland
  - Danish Film Institute
  - Imperial War Museum, UK
- Working name: "**F**IAF **A**rchival **T**ranscoding **E**ngine"

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3. Digital A/V Archiving Pilot Installations
The idea

What do we want to do?

- Digitise, scan and convert material into the JPEG 2000 archive formats
- Store, handle and manage the archive packages
  - Online: hard disks
  - Offline: data tapes
  - Migration
  - Quality control
- Search, browse, preview archived material
- Create different end-user formats from archive packages
- Everything in a compact, affordable system that is easy to use

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3. Digital A/V Archiving Pilot Installations
Requirements

What do the participating archives need?

- Support for different source formats: film, video, files etc.
- Support for different output formats: DPX, DCP, H.264, Flash etc.
- Quality control during ingest and in the archive
- Playback of archived material
- Data management
  - Management of files on disks, tapes in robot, tapes on shelf
  - Database with metadata and connection to existing catalogues
- In general: defined processes and workflows for all important tasks
- Guidelines for compression settings, necessary preservation metadata, …
- Definition of “sub-profiles” for different source media types

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3. Digital A/V Archiving Pilot Installations
Requirements – Source Fomats

We start with these formats:

- For scanned film: DPX and TIFF
- Digital Cinema Packages (DCPs)
- Analogue and digital tape-based SD and HD video formats
- Audio: BWAV (multi-channel)
- Samma MXF files and other JPEG 2000 varieties
- Several multimedia file formats: MPEG2, H.264, AVI, Quicktime, JPEG (details yet to be defined)
- XML for metadata, sub-titles etc.

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3. Digital A/V Archiving Pilot Installations
Requirements – Output Fomats

We start with these formats:

- Uncompressed for highest quality: DPX and TIFF
- Audio: BWAV (multi-channel)
- Digital Cinema Packages (DCPs)
- H.264 for preview and high quality home use (Blu-ray Disc)
- MPEG2 for PC and DVD Video
- Professional broadcast file formats (details yet to be decided)
- XML for metadata, sub-titles etc.

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3. Digital A/V Archiving Pilot Installations
Additional general requirements

What other capabilities must the system have?

- Easy to use, even by non-techies
- “Big knob” interface to adjust important parameters
- Possibility to burn-in information in output formats
- Flexibility: each archive has different requirements in detail
  - Formats
  - Processes
  - Processing parameters

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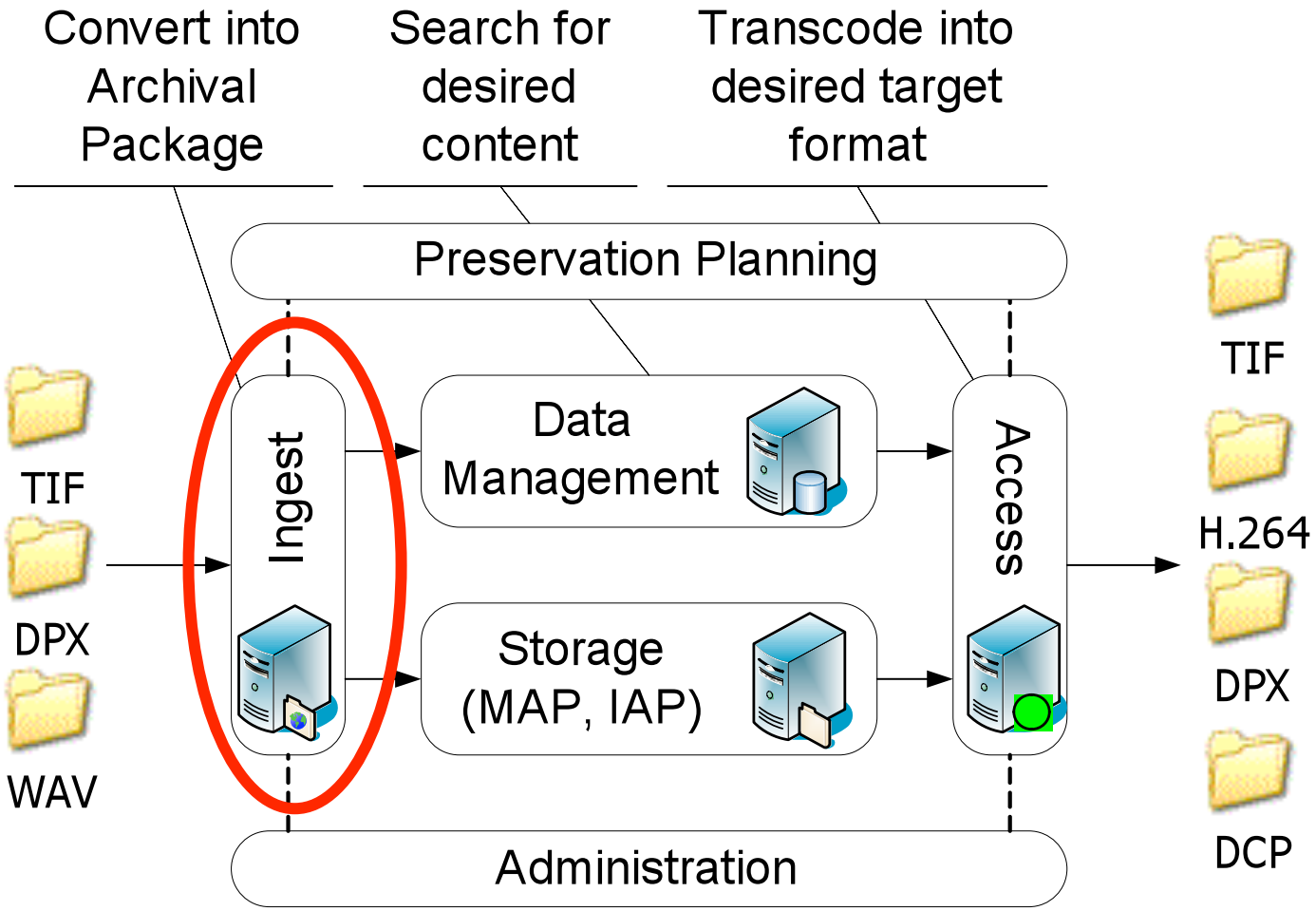
4. Practical Realisation

How do we do it?



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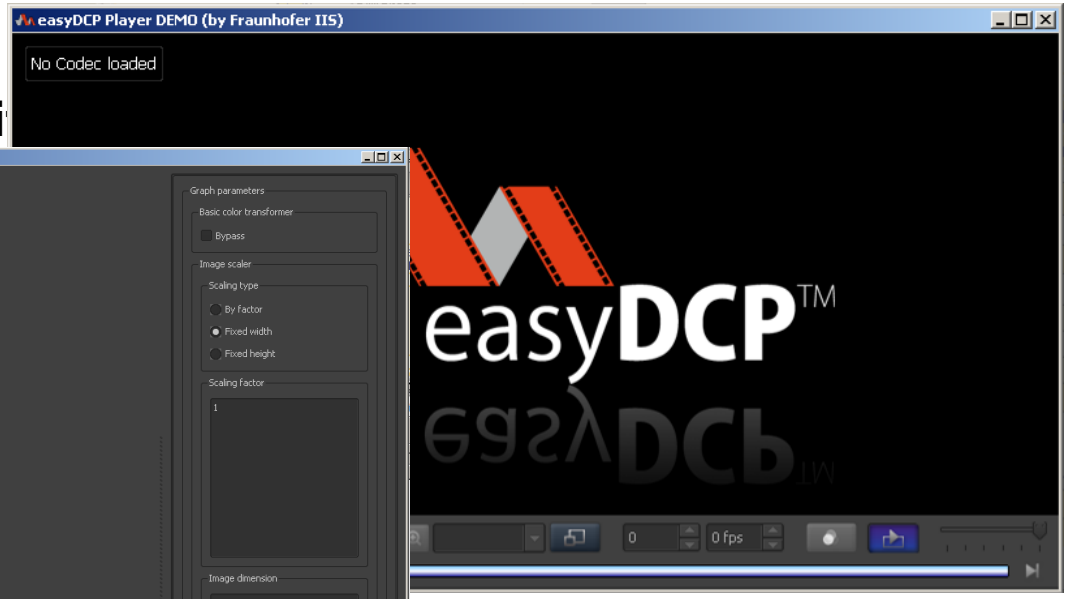
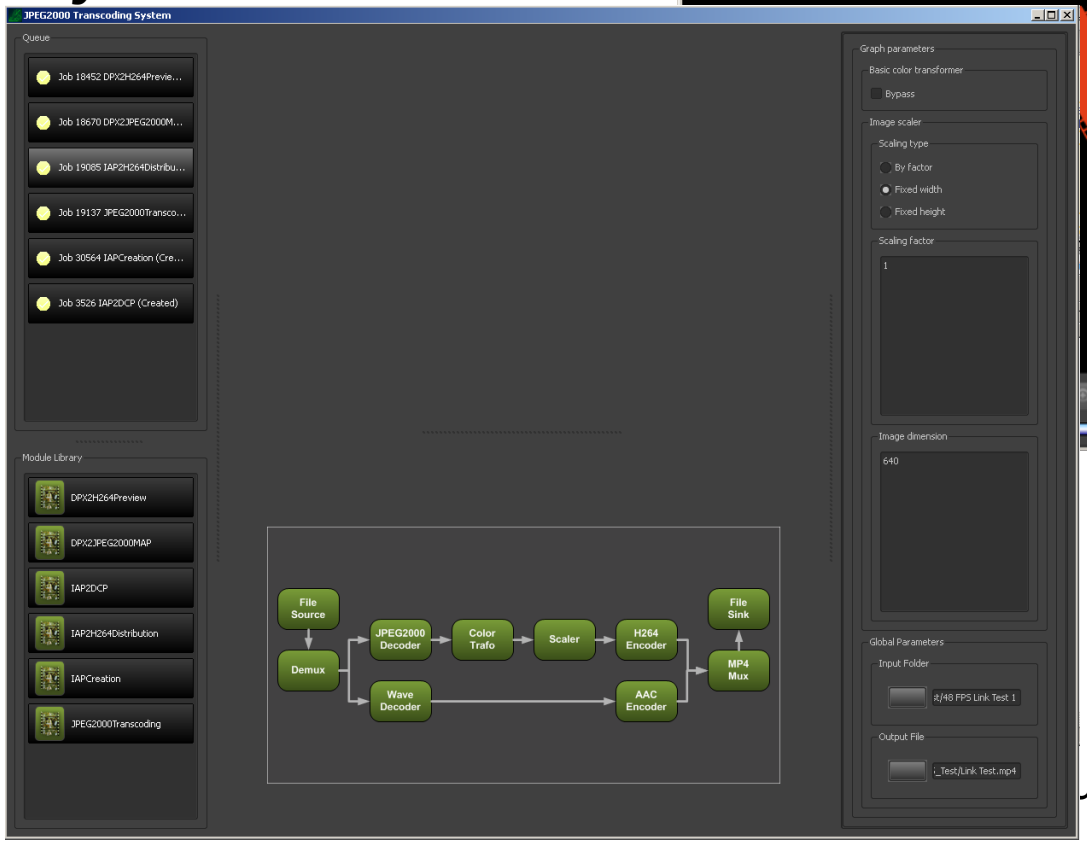
4. Practical Realisation

Main software components

Key feature: modular archi





...ut, Avid, ...)

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5. Conclusion

- We start with a small system
- Modular and flexible: can grow with the archives' needs
- Gain experience: for the developers and the users
- Define "sub-profiles" and documented processes for different types of material to be archived
- Collect information, educate users, archives and ourselves
- Build knowledge base for participating archives

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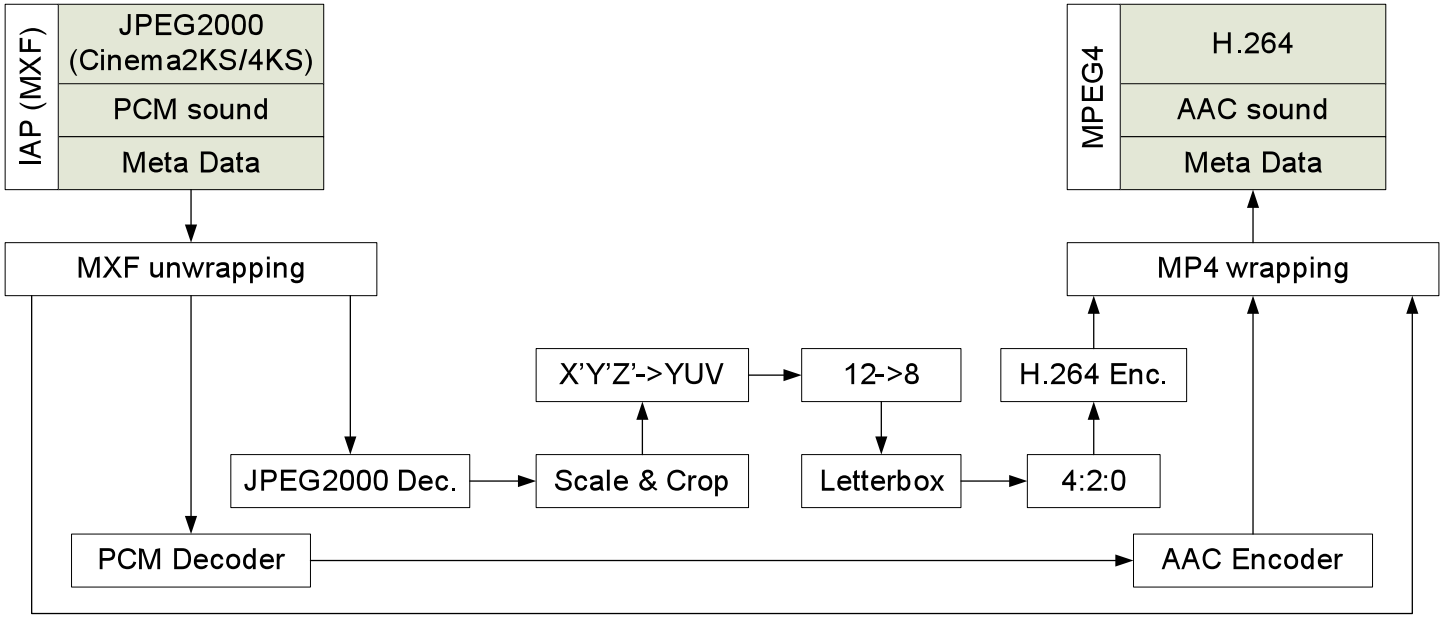
5. Is everything done ... ?
Universal Archival Package

- Generation of dissemination format requires multiple processing steps
- Processing chains are configured by user
- Goal: Automatic, meta data controlled transcoding



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Thank you for your attention!

Questions?

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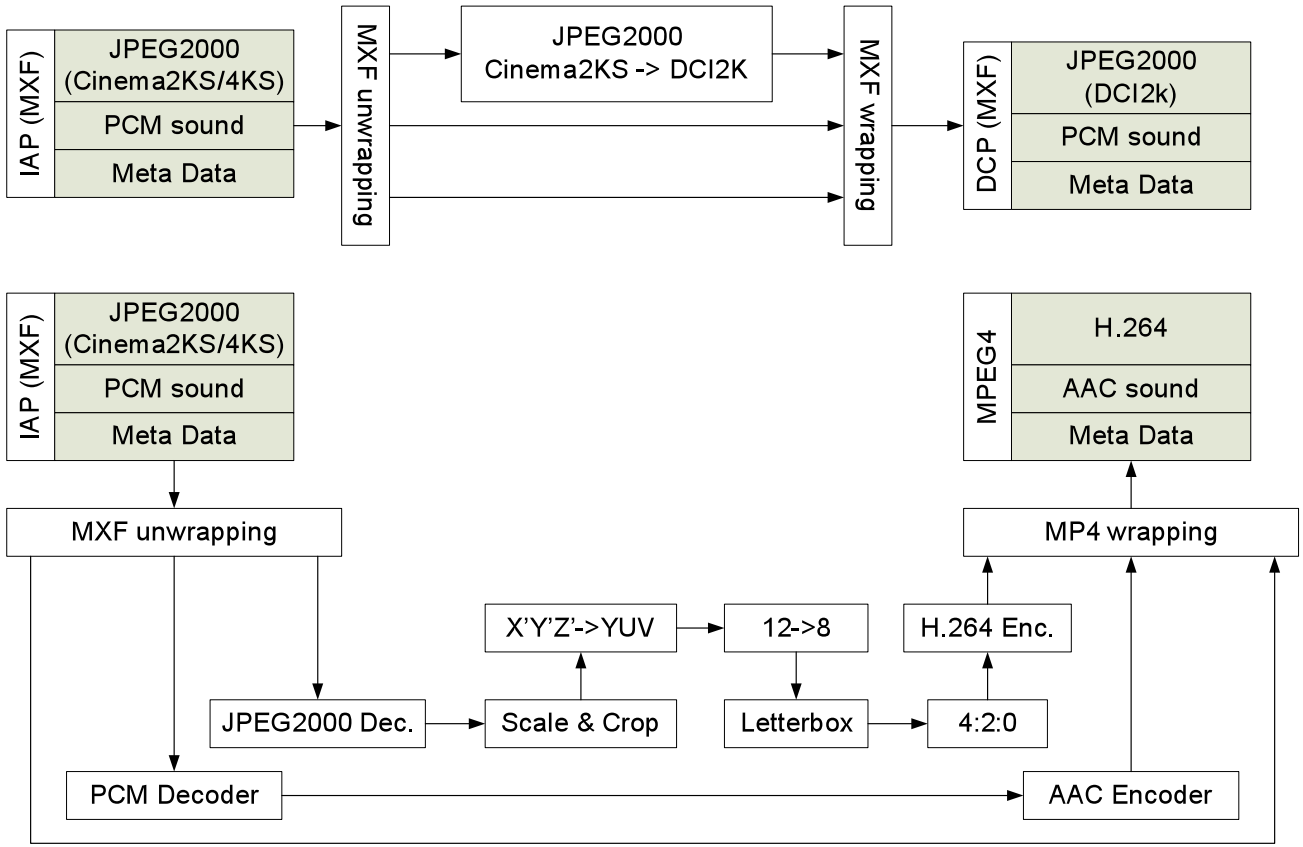
Transcoding System
Distribution processing chain



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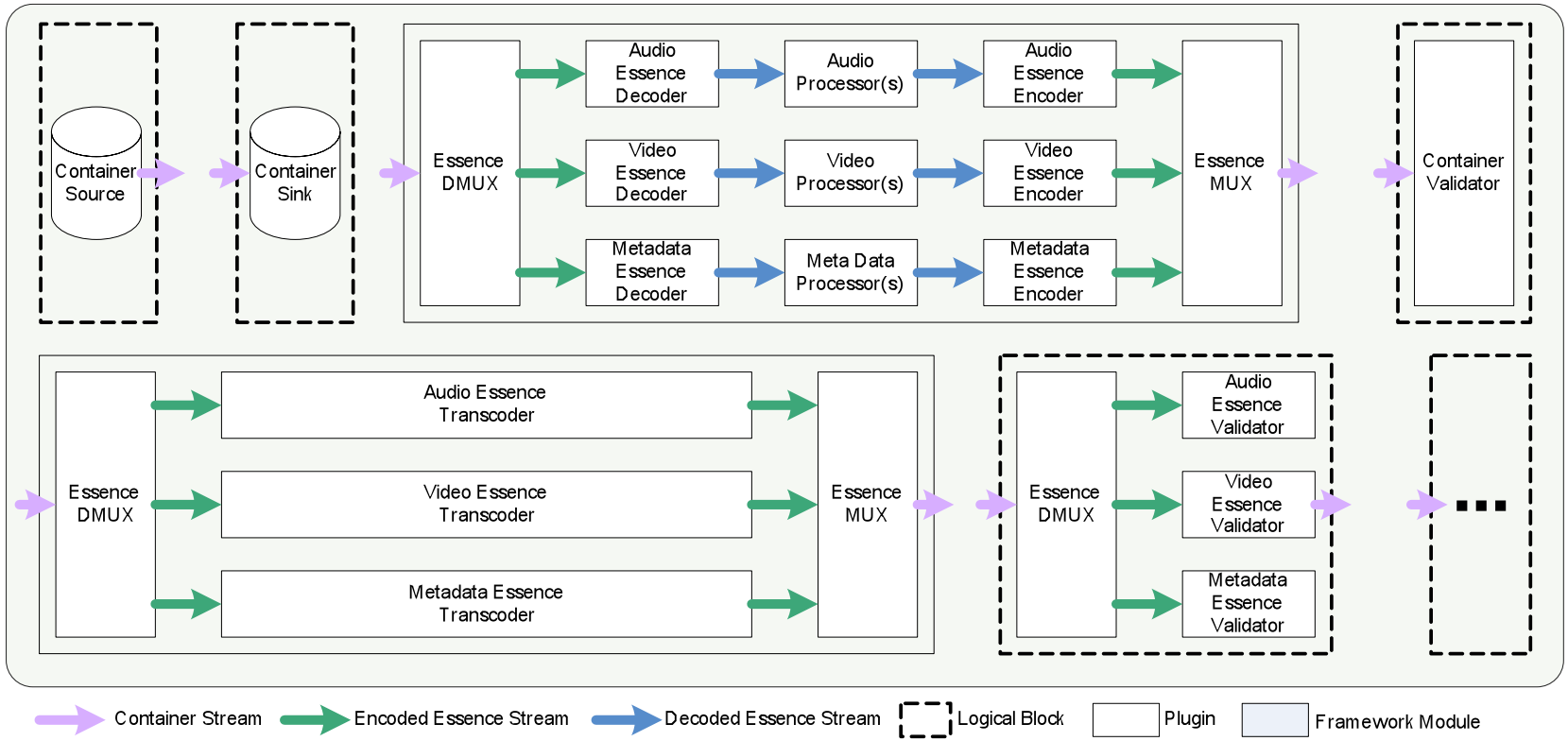
Transcoding System
Modular Approach



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Demonstrator System
The Prototype

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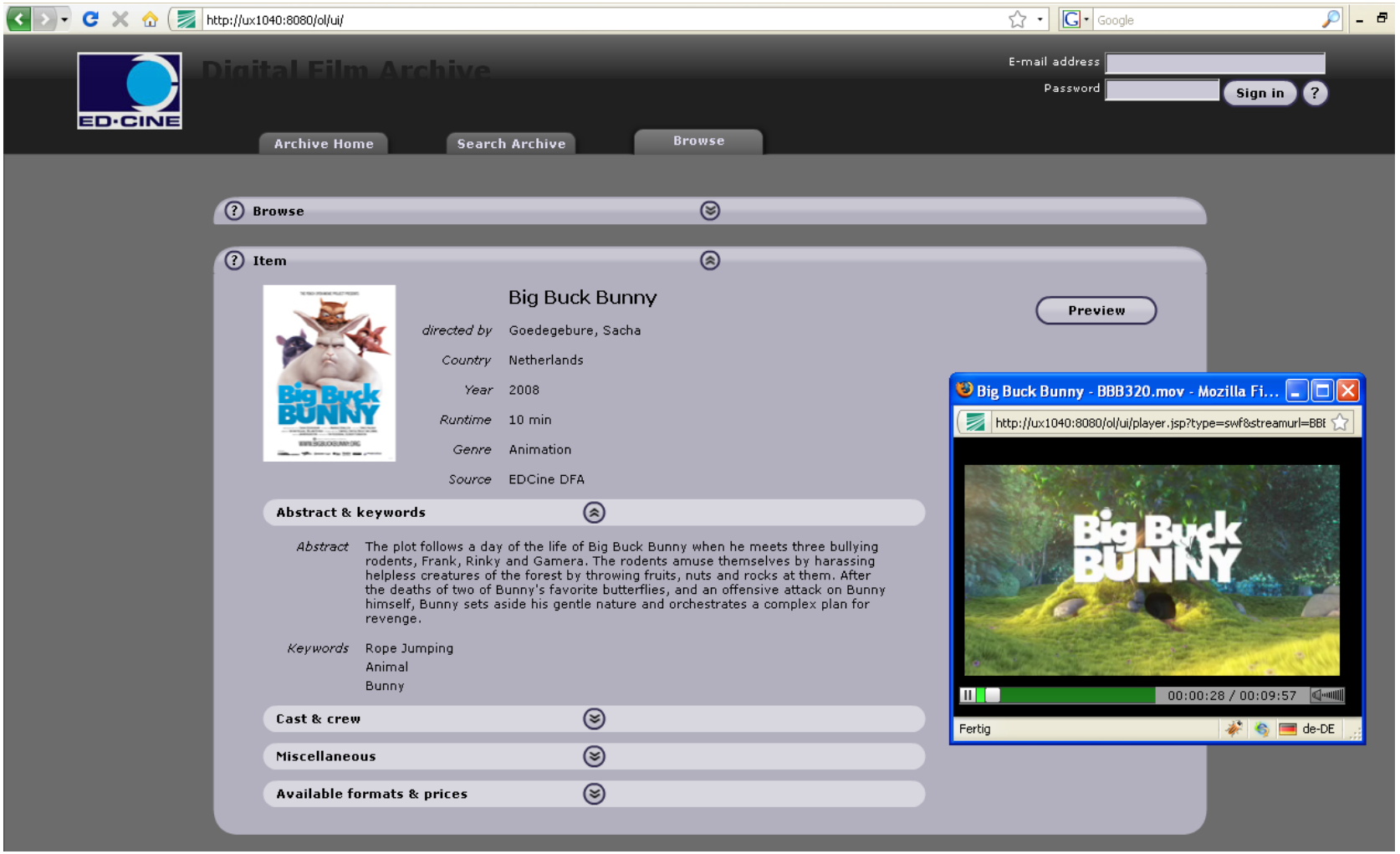
Demonstrator System

Database Interface



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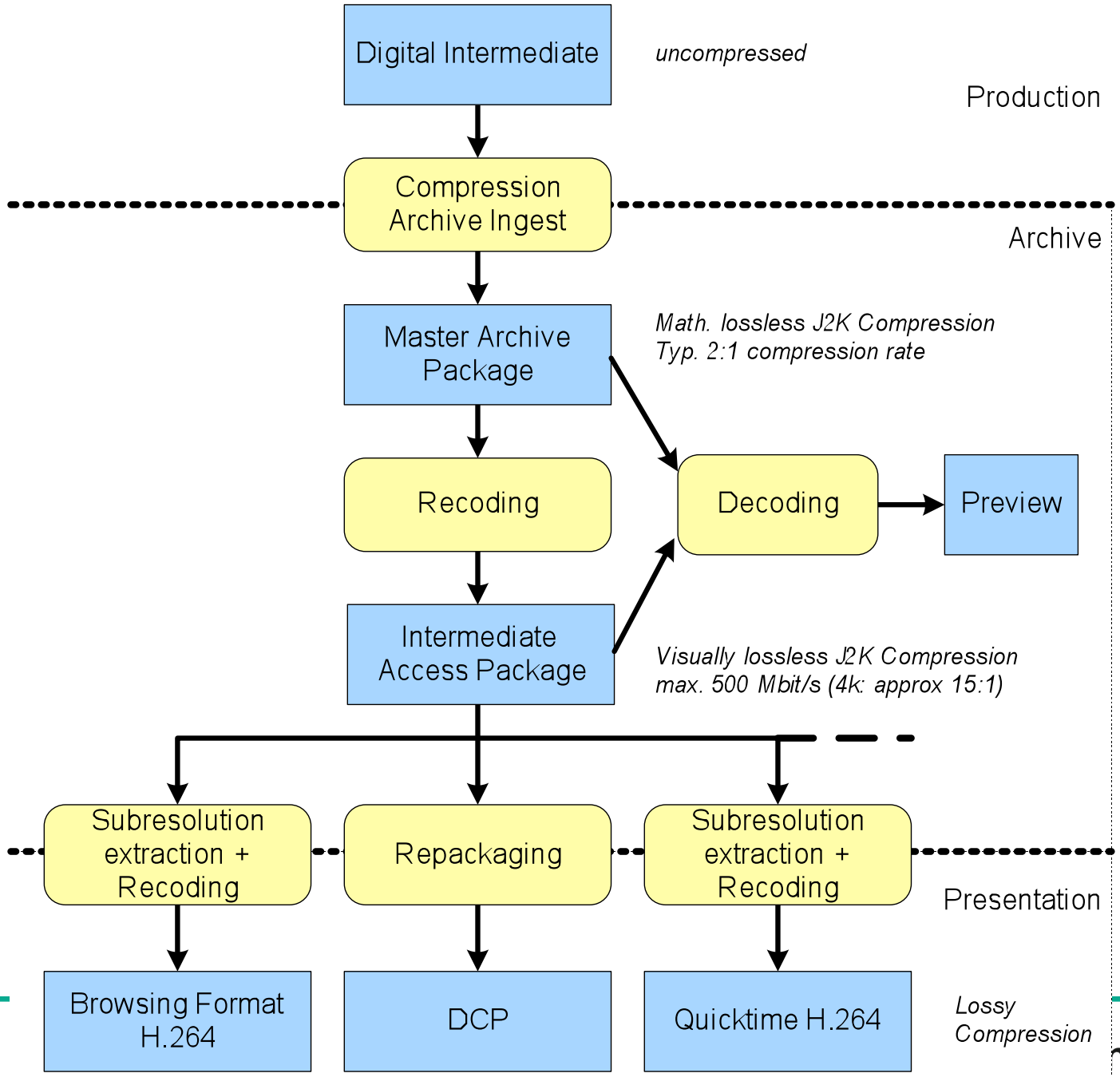

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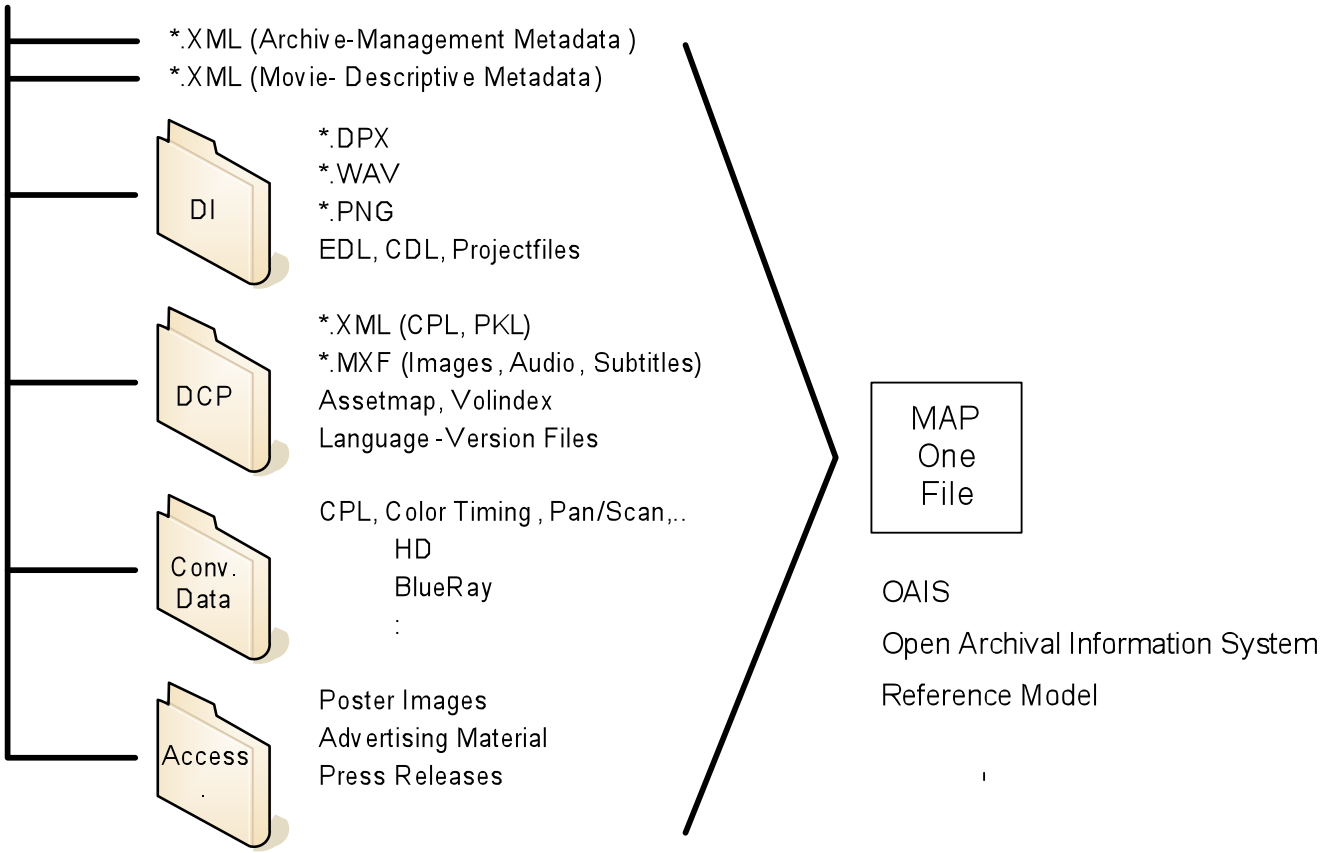
Archive Package Usage Scenarios

Master Archive Package



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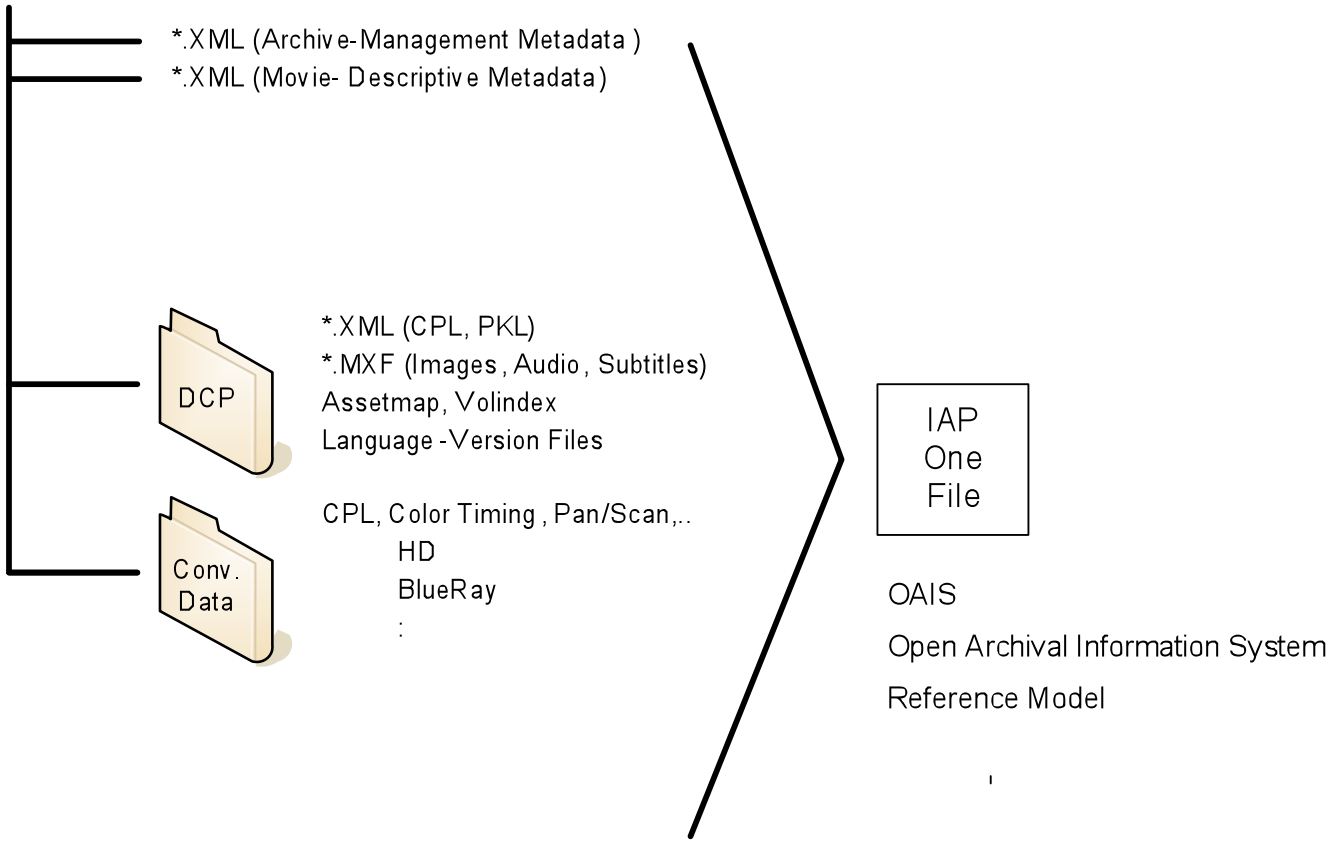
Archive Package Usage Scenarios

Intermediate Access Package



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