

# MPEG-A Part 9: DMB Application Format



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- ❖ DMB Application Formats
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# Development of Multimedia Application Formats



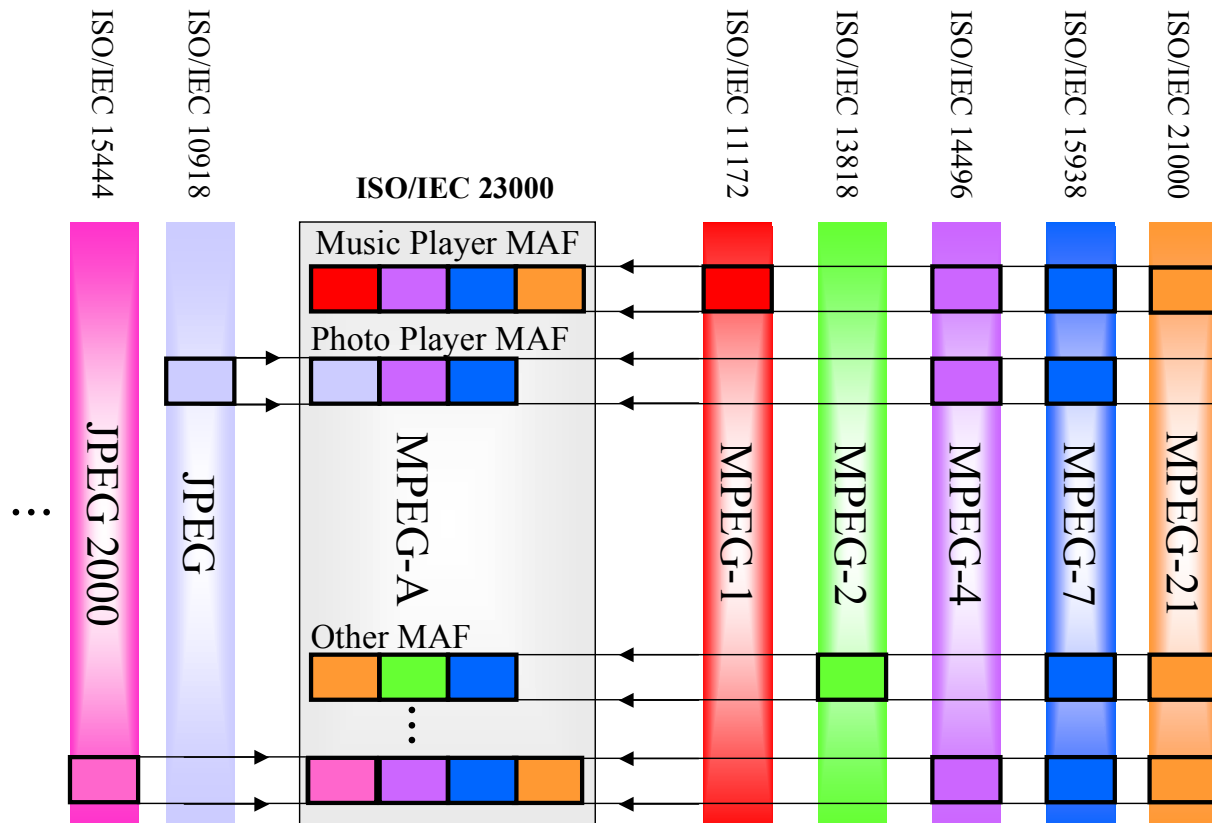
## ❖ MPEG-A (ISO/IEC 23000) – Multimedia Application Formats

- ISO/IEC 23000-1: Purpose of Multimedia Application Formats (TR, 2007-02-01)
- ISO/IEC 23000-2: Music Player Application Format
  - 1<sup>st</sup> Edition – (IS, 2006-08-01) & 2<sup>nd</sup> Edition – (IS, 2008-01-15)
- ISO/IEC 23000-3: Photo Player Application Format (IS, 2007-06-01)
- ISO/IEC 23000-4: Musical Slide Show Application Format
  - 1<sup>st</sup> Edition – (IS, 2008-03-15) & 2<sup>nd</sup> Edition – (FCD, 2008-02-29) → (IS, 2008-07)
  - (AMD1, 2009-01) ← Conformance and Reference Software (PDAM, 2008-01-28)
- ISO/IEC 23000-5: Media Streaming Application Format (FDIS, 2008-01-31) → (IS, 2008-05)
- ISO/IEC 23000-6: Professional Archival Application Format (CD, 2008-04-24) → (IS, 2009-01)
- ISO/IEC 23000-7: Open Access Application Format (FDIS, 2008-01-24) → (IS, 2008-05)
  - (AMD1, 2009-01) ← Conformance and Reference Software (PDAM, 2008-04-24)
- ISO/IEC 23000-8: Portable Video Player Application Format (FCD, 2008-04-06)
- ISO/IEC 23000-9: DMB Application Format (FDIS, 2008-01-28) → (IS, 2008-05)
  - (COR, 2008-04) ← Technical Corrigendum 1 (DCOR, 2008-04-20)
- ISO/IEC 23000-10: Video Surveillance Application Format (FCD, 2008-06-06) → (IS, 2008, 10)
- ISO/IEC 23000-11: Stereoscopic Video Application Format (CD, 2008-04-04) → (IS, 2009-01)

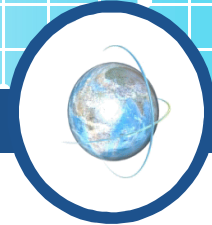
# MPEG-A Standardization



- ❖ ISO/IEC 23000: MAF (Multimedia Application Format)
  - Targeted customization of MPEG standard by packaging MPEG and non-MPEG technologies for industry needs – fast standardization
  - Not generic but target-oriented approach



# Elements of MPEG Application Format



ISO Media File Format and its derived formats

Audiovisual Data

Content protection  
and Governance  
Metadata

Protocol for Context  
Understanding among  
Entities

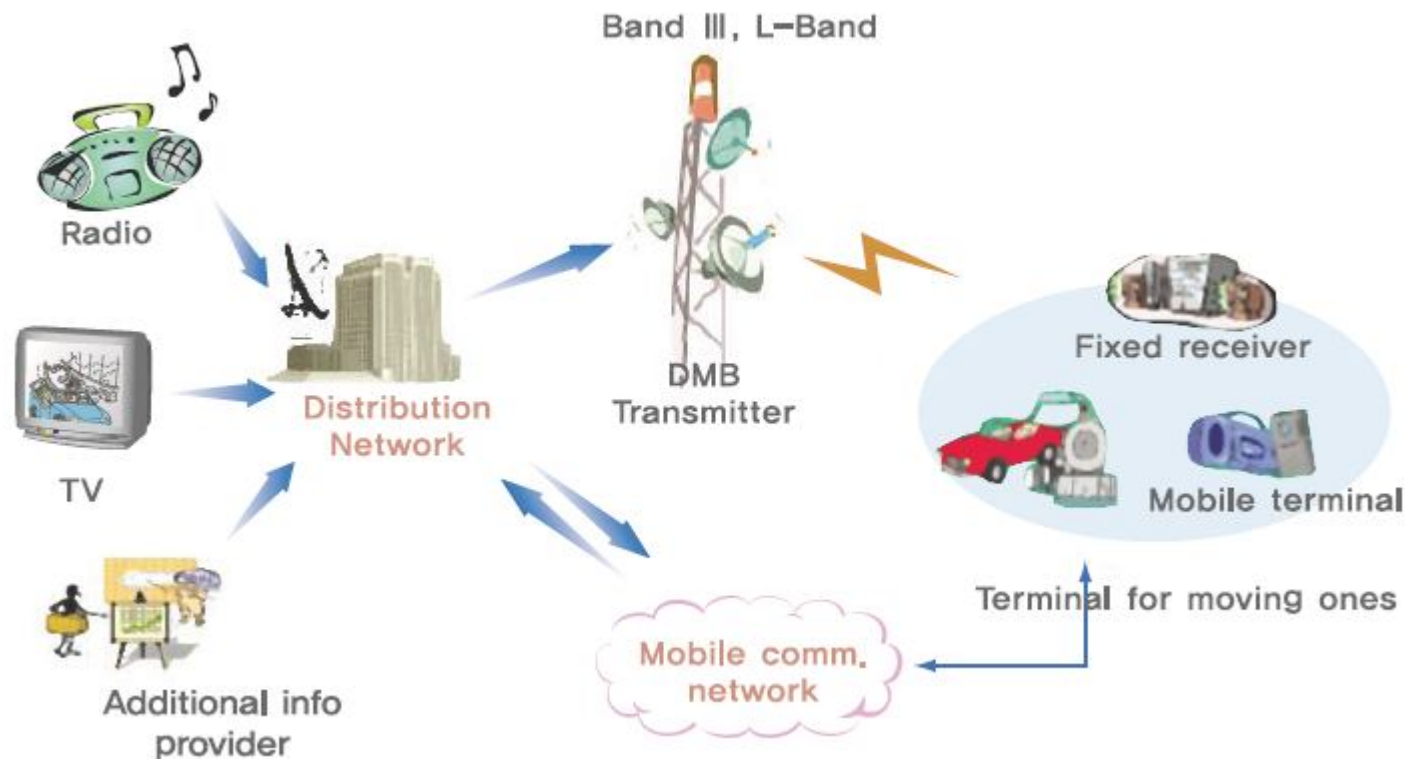
Content Description  
Metadata

Content  
Presentation Data

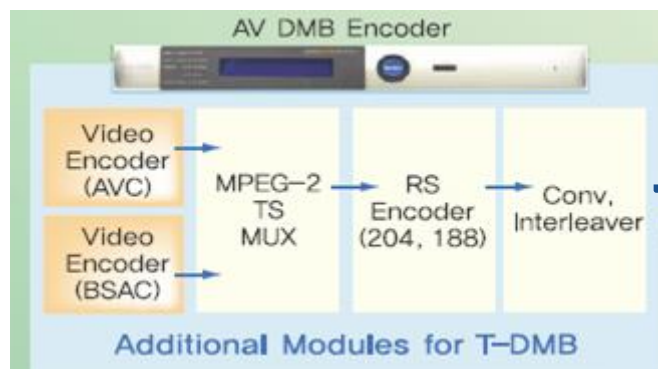
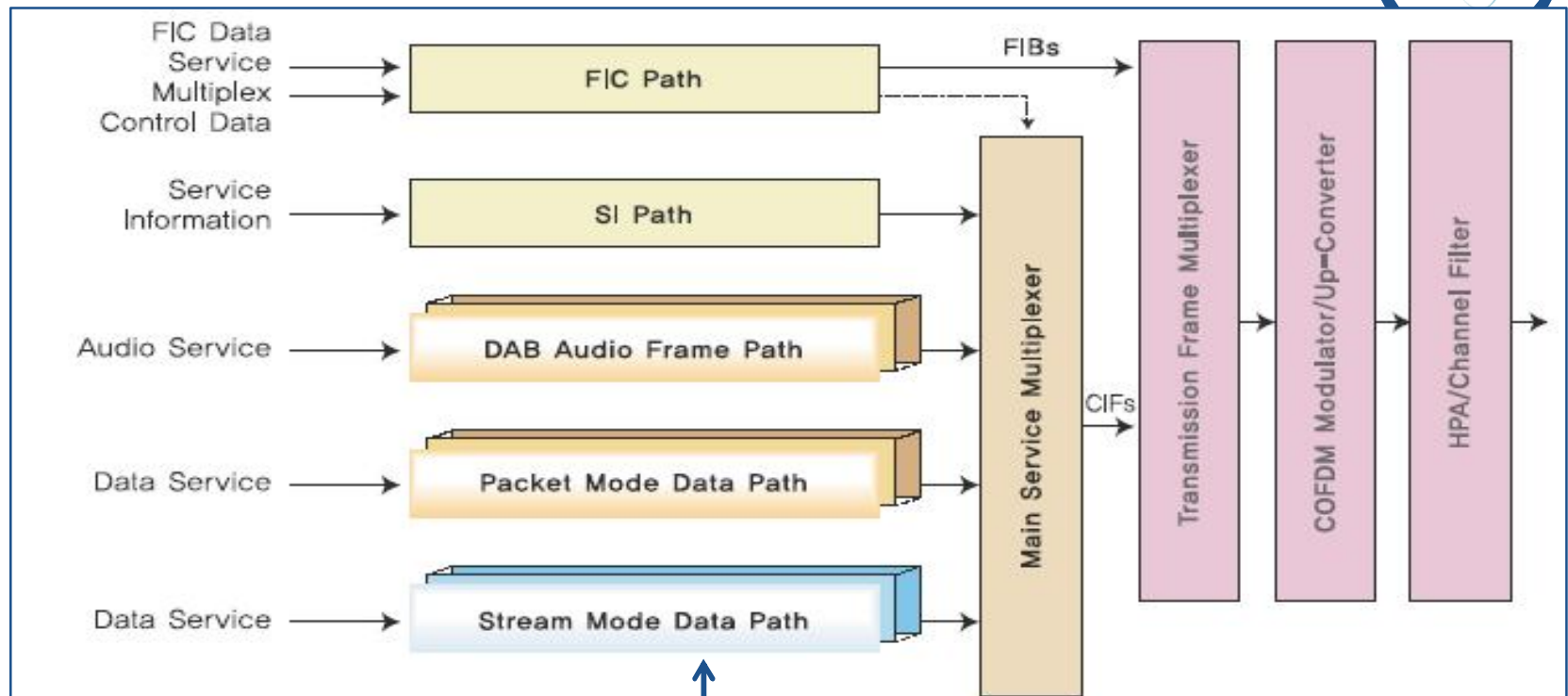
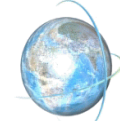
# Digital Multimedia Broadcasting (DMB)



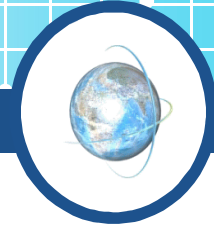
- ❖ DMB: A Type of Mobile Multimedia Broadcasting Service
  - provides **high-quality interactive mobile TV services** on upto 7-inch screens
  - also with **CD-quality audio** and **various data contents** including slideshows, webpages, Java applications, and TTI (traffic and travel information).
  - Currently serviced on **terrestrial** (T-DMB) and **satellite** (S-DMB).



# DAB and DMB

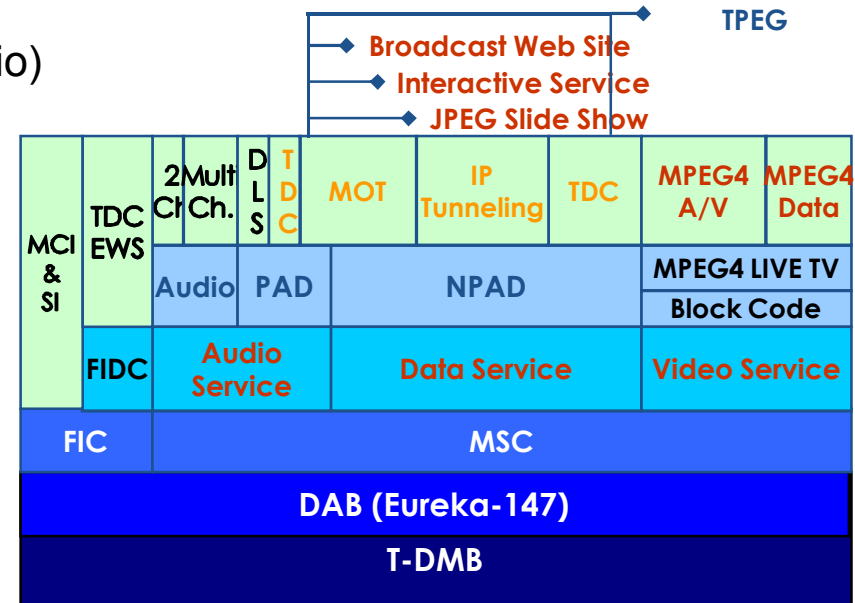


# T-DMB Services and Protocols



## ❖ Three Types of Broadcast Services

- Audio Service
  - MUSICAM (MPEG-1/2 Layer II Audio)
- Data Service
  - BWS (Broadcasting Website)
  - JPEG Slideshow
  - JAVA Midlet
  - TTI (Traffic and Travel Information)
- Video Service
  - AV Program (MPEG-4 AVC & MPEG-4 Audio)
  - Interactive Data (MPEG-4 Systems)

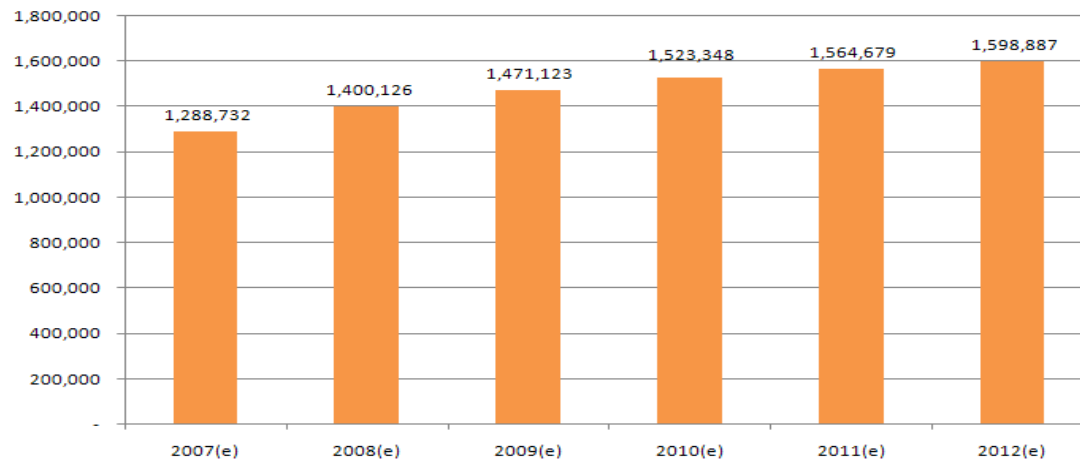




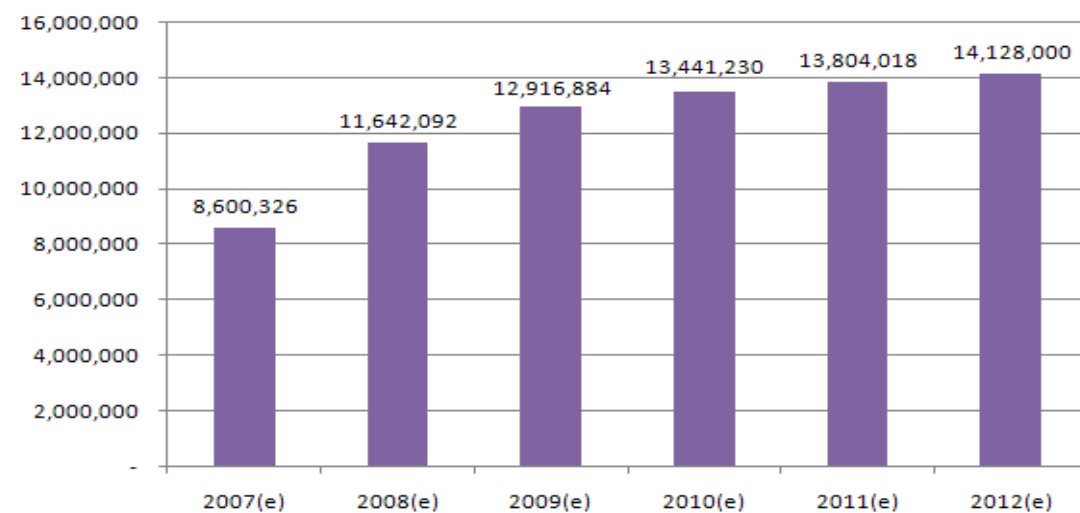
# S-DMB and T-DMB Services



Satellite DMB



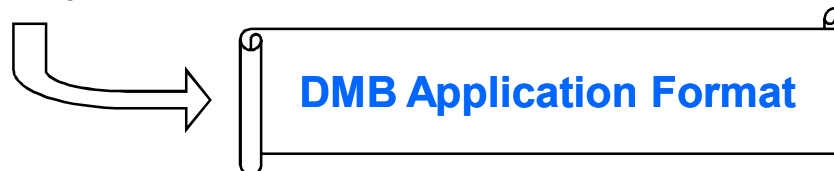
Terrestrial DMB



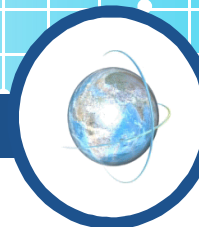
# DMB AF - Motivation



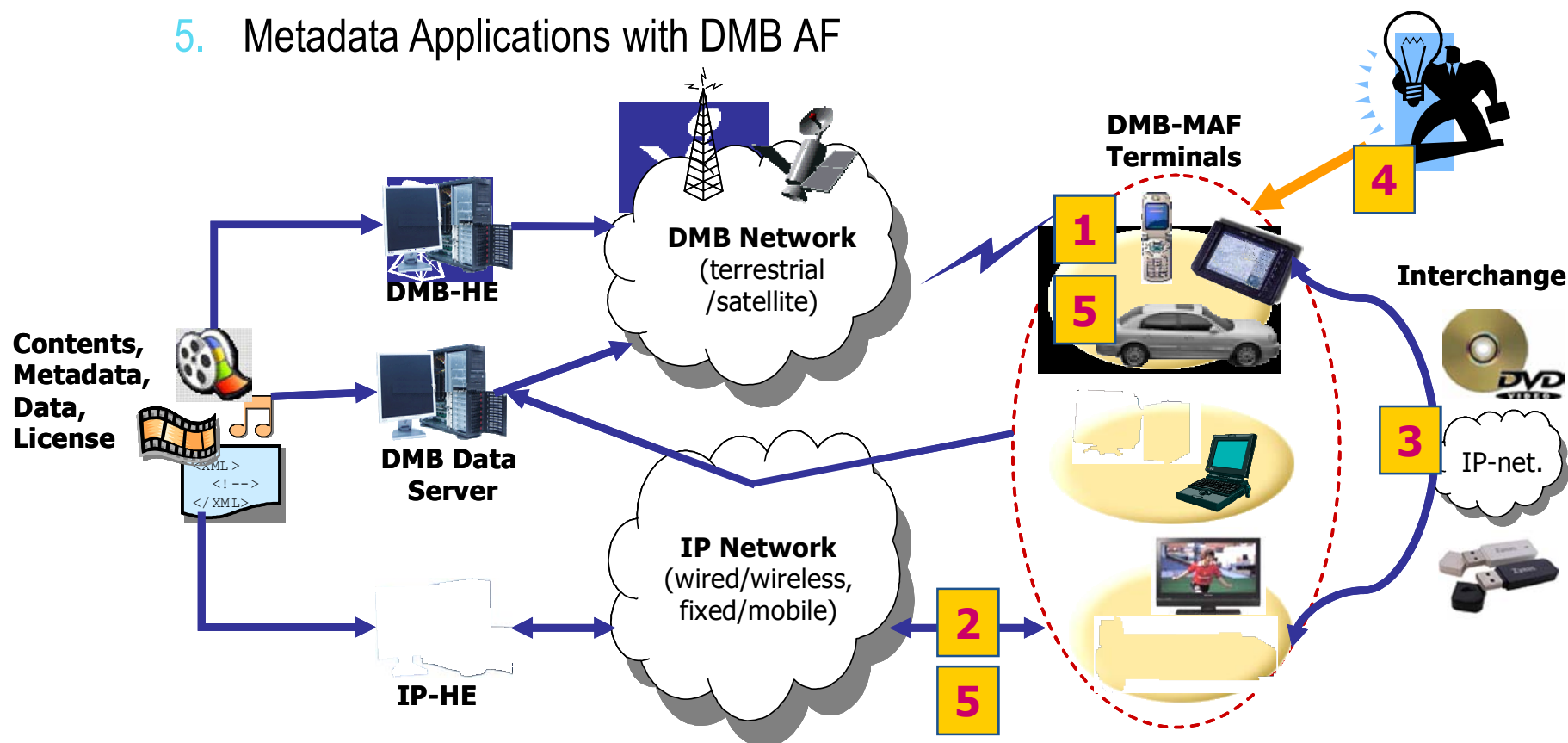
- ❖ Convergence between Broadcasting and Communications
  - More DMB terminals become
    - network-enabled (CDMA, WiBro, HSDPA, 4G, WLAN, etc.)
    - equipped with larger storages and increasing processing capabilities
  - User's behaviors on content consumption are
    - Store and playback the DMB contents anytime.
    - Share the DMB contents via networks and different devices.
- ❖ DMB-specific and interoperable file format are required to support various applications
  - Package of DMB contents and content descriptions in a single format
  - Protection and governance of DMB contents



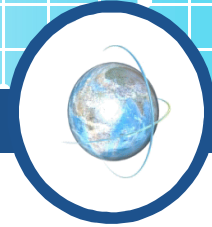
# Application Scenarios of DMB AF



1. Storage of Mobile Broadcasting Contents
2. IP Media Services
3. Interchange of DMB contents between Terminals
4. User-Creative DMB contents
5. Metadata Applications with DMB AF

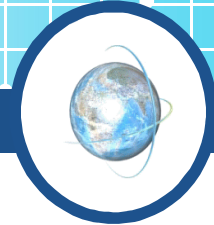


# DMB AF - Service Examples

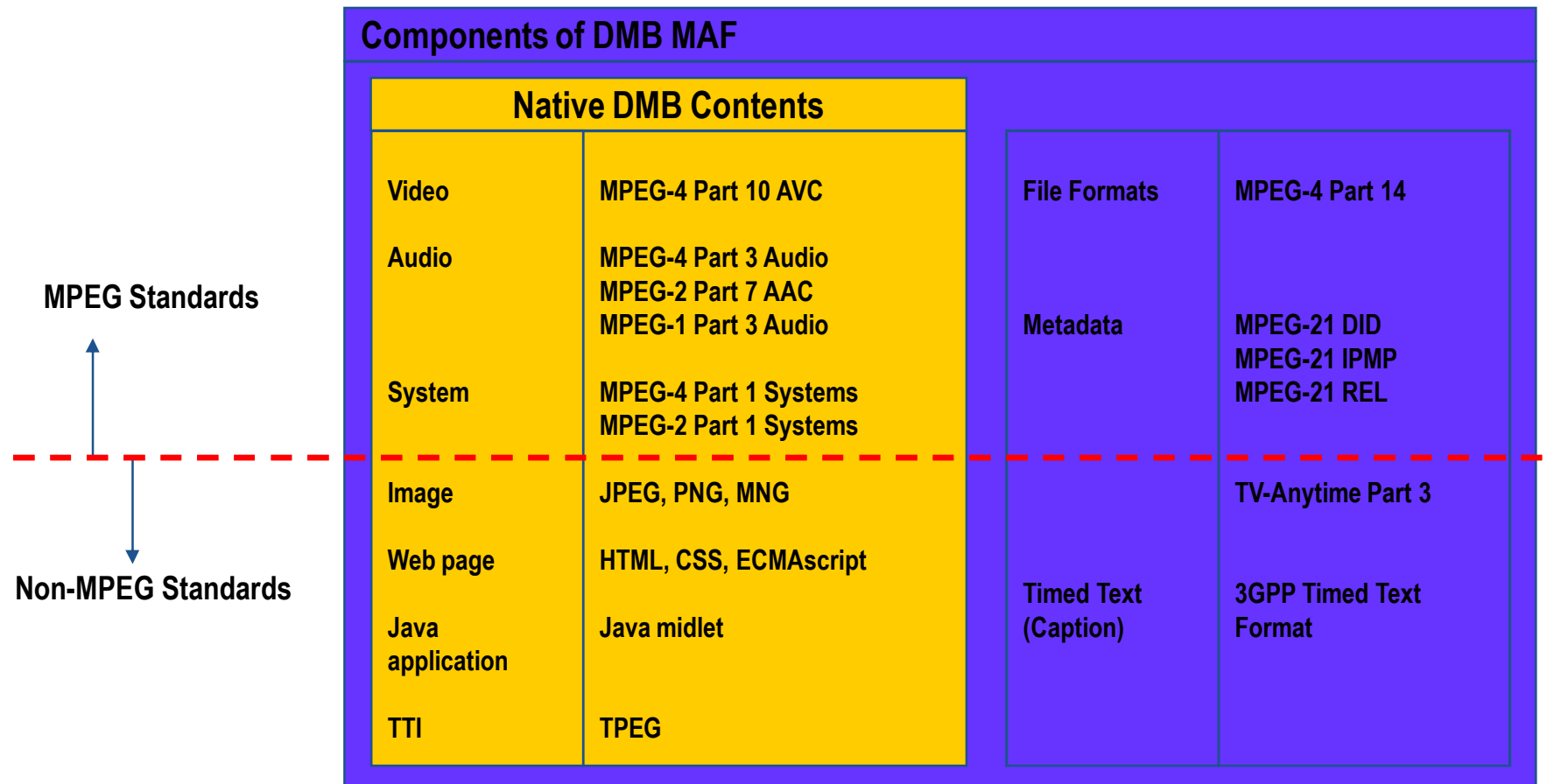


- ❖ Packaged Storage Services
  - Personalized Storage of Broadcast Contents
  - Packaged Storage and Management of Various DMB Contents
- ❖ File Casting Services
  - File Casting during low data traffic time (night) with Personalized Storage
- ❖ IP Media Services
  - Download and Streaming from DMB Portal
  - Packaged Media Delivery with Interoperable DRM
- ❖ Interchange Between Terminals
  - Sharing and Interchange between DMB Terminals
- ❖ Enhanced & Rich Consumption Experience
  - Segment based Video Browsing
  - Rich Content Descriptions

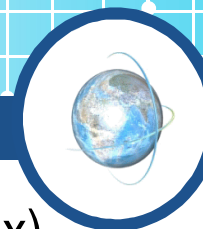
# Components of DMB AF



- ❖ DMB AF covers all the native DMB contents
  - As defined in ETSI/TTA standards



# Components of DMB AF – Brand names



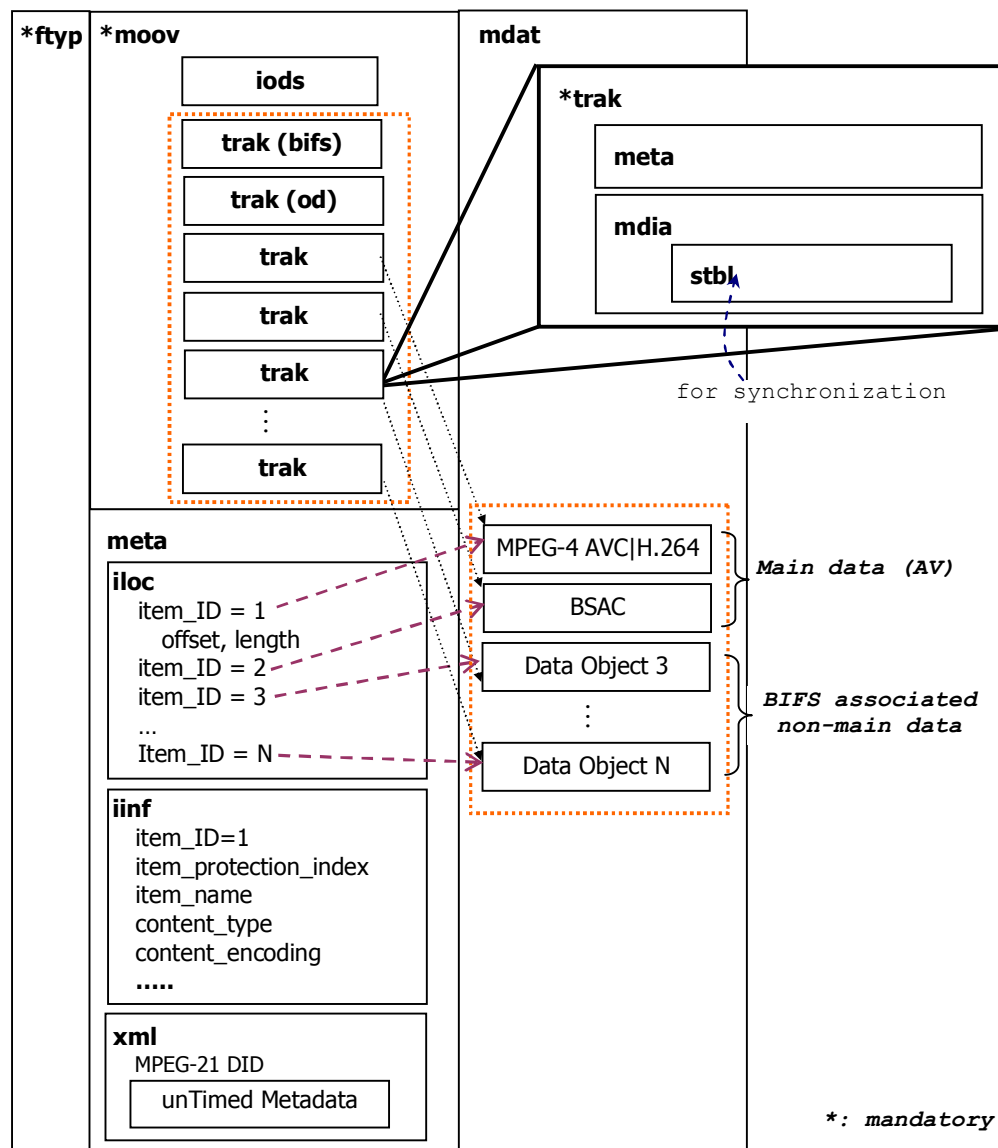
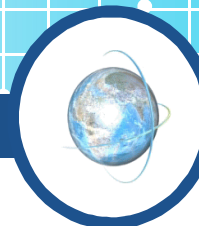
- ❖ DMB AF contents can be distinguished by its brand names (in ftyp box)

Compo- nents Brands	Audio				Associated Data					Associated Metadata			
	MP2	ER-BSAC	HE-AAC2	AAC+SB R	BIFS	MOT- SLIDE	DLS	JPG/PNG /MNG	3GPP-TT	DID	TVA	REL	IPMP
'da0a'	R	-	-	-	-	O	O	O	-	-	-	-	-
'da0b'	R	-	-	-	-	O	O	O	O	O	O	O	O
'da1a'	-	R	-	-	-	-	-	O	-	-	-	-	-
'da1b'	-	R	-	-	-	-	-	O	O	O	O	O	O
'da2a'	-	-	R	-	-	O	O	O	-	-	-	-	-
'da2b'	-	-	R	-	-	O	O	O	O	O	O	O	O
'da3a'	-	-	-	R	-	-	-	O	-	-	-	-	-
'da3b'	-	-	-	R	O	-	-	O	O	O	O	O	O

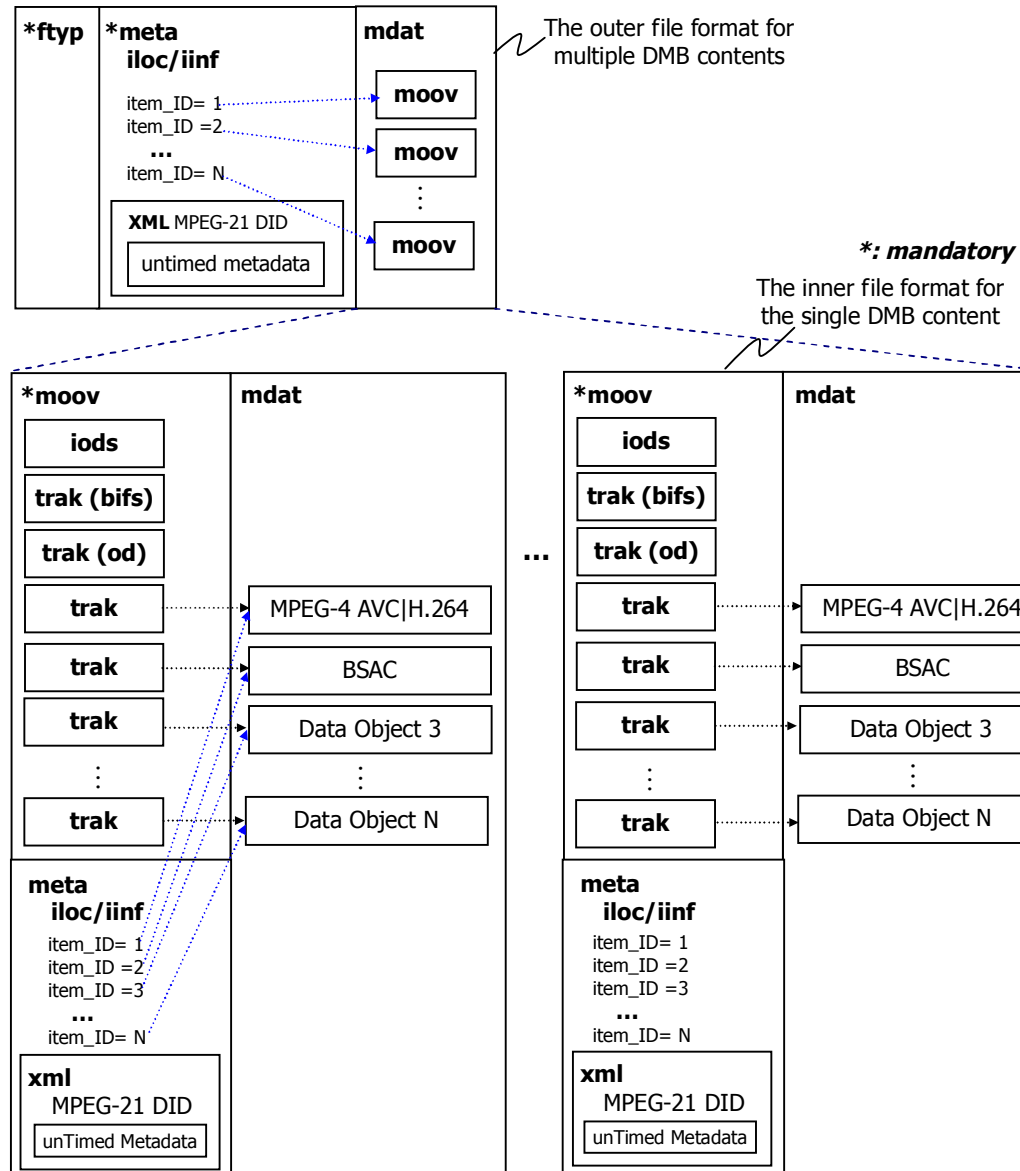
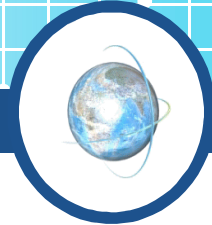
Compo- nents Brands	Visual	Associated Audio			Associated Data			TS	Associated Metadata			
	AVC	ER-BSAC	HE-AAC2	AAC+SBR	BIFS	JPG/PNG /MNG	3GPP- TT	MP4on MP2	DID	TVA	REL	IPMP
'dv1a'	R	R	-	-	O	O	-	O*	-	-	-	-
'dv1b'	R	R	-	-	O	O	O	O*	O	O	O	O
'dv2a'	R	-	R	-	O	O	-	O*	-	-	-	-
'dv2b'	R	-	R	-	O	O	O	O*	O	O	O	O
'dv3a'	R	-	-	R	O	O	-	O*	-	-	-	-
'dv3b'	R	-	-	R	O	O	O	O*	O	O	O	O

Brands	Components
'dmb1'	This brand support all the components listed in Table 1 except Transport stream components. For the Transport stream components, the same rule described in the 'Remark' of Table 6 applies. <b>R: required O: optional</b>

# DMB AF - Single Type



# DMB AF - Multiple Type



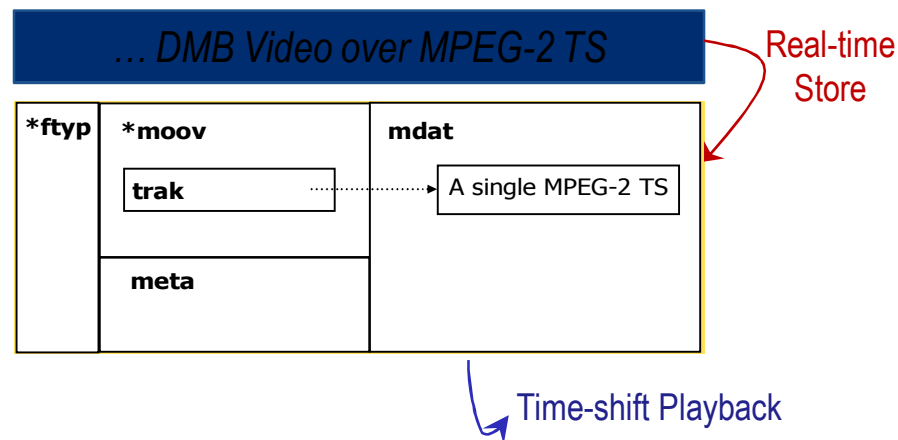


# MPEG-2 TS Storage & Playback



## ❖ Motivation

- Some DMB terminals stores the DMB contents “as is” in MPEG-2 TS (Transport Stream) format.
- DMB AF supports to playback the stored DMB contents in MPEG-2 TS.
- It requires partitioning program-related information in MPEG-2 TS and producing it as metadata for playback.



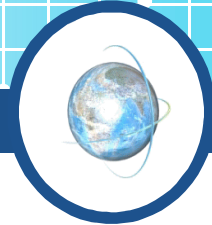
# DMB AF - Content Description



## ❖ Based on TV-Anytime Metadata Standards

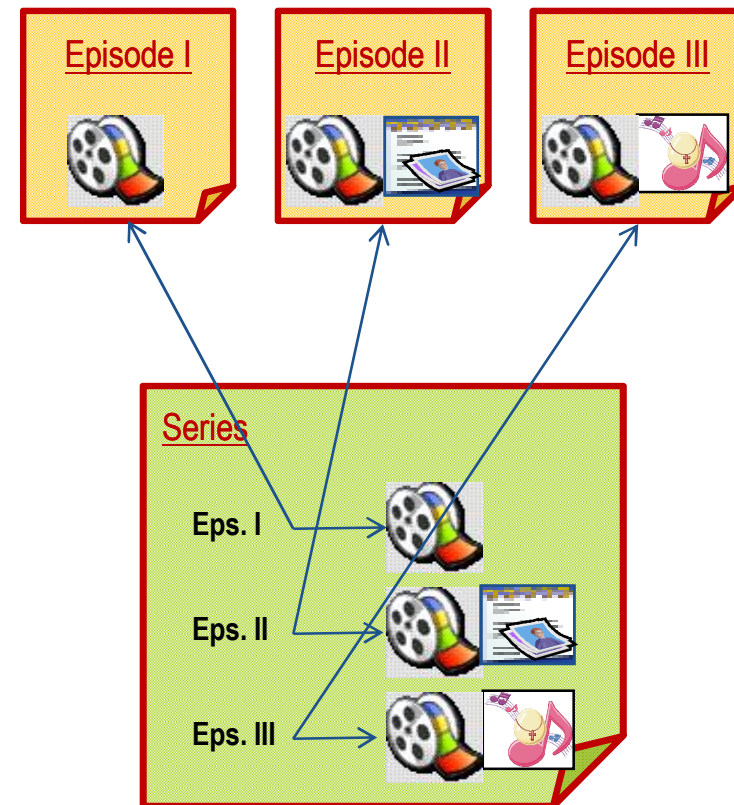
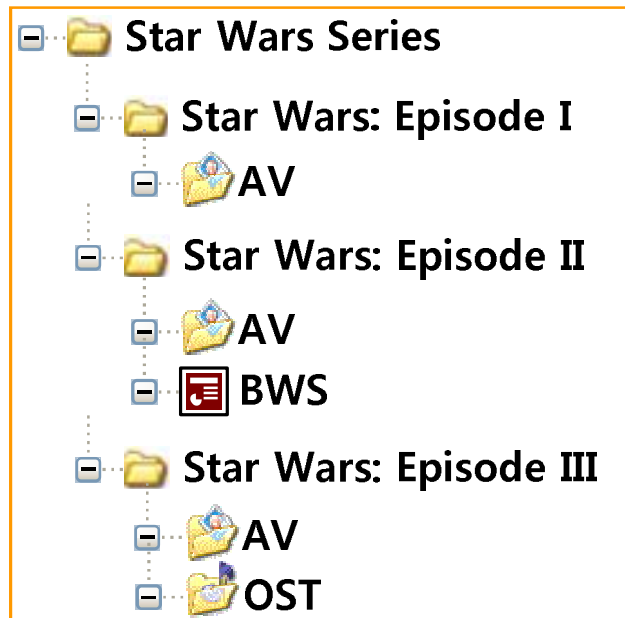
- Description of audio and video contents
  - Content description such as Title, Grade, Genre, Recorded time, Station, Broadcast schedule, URL, synopsis, etc.
  - Segment information for enhanced browsing of AV programs, for example ToC (Table of Content)-based, highlight-based, event-based, or user-added bookmarks-based browsing of AV programs
- Description of data service contents
  - MOT (multimedia object transfer) Slide show, BWS (broadcast website)
  - TTI (traffic and travel information), Interactive contents with BIFS, Java midlet
- Description of contents groups
  - Description on a program group as a whole
  - Description on a package of contents as a whole
- Description of usage history and user preference
  - Usage history such as acquired (recorded) or not and consumed (played) or not in program basis or program parts basis
  - User preference value on contents
- Description of consumption condition and targeting information

# DMB AF - Content Packing



## ❖ Simple but Flexible Packaging of Multimedia Contents

- Single Type
- Multiple Type

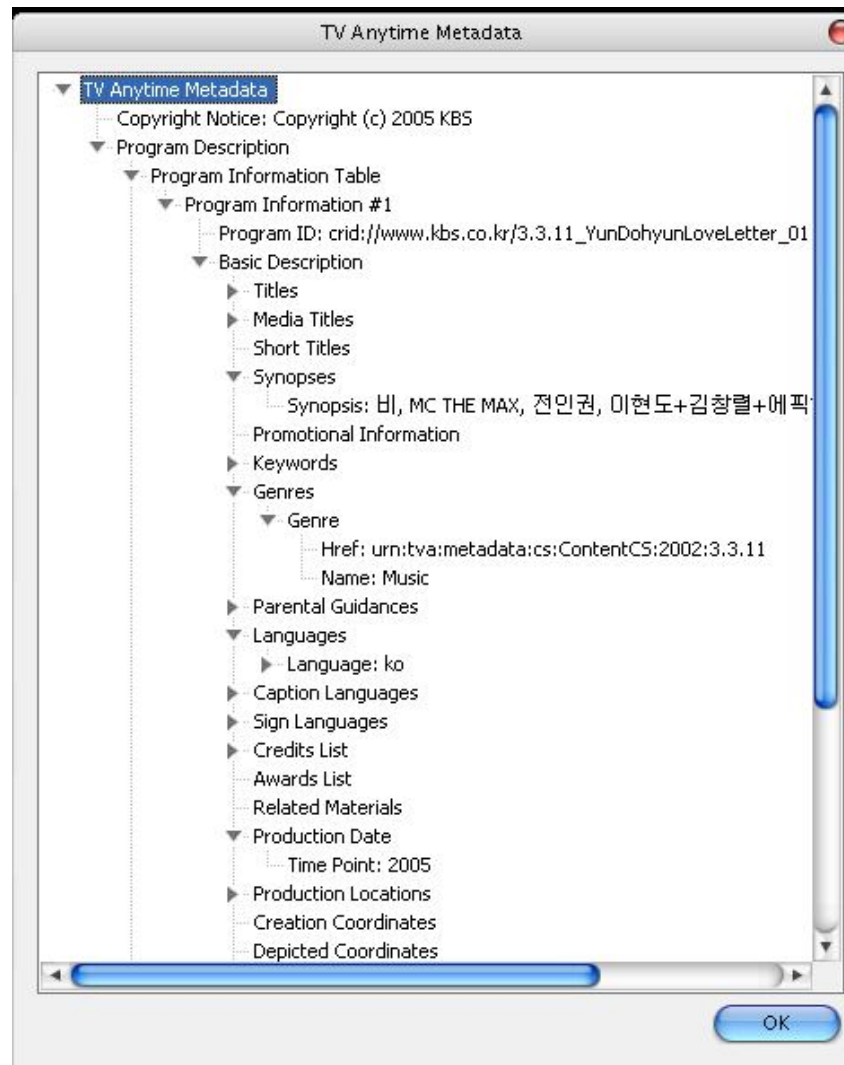


# DMB AF - Content Description

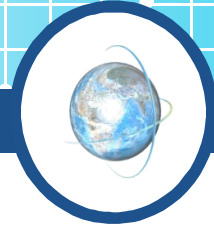


## ❖ Example

### ■ Program Description



# DMB AF - Content Description



## ❖ Segment Metadata Example

- Bookmark for easy access and navigation
- Video highlights, a collection of favorite video clips.

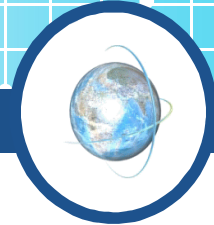


## User's virtual program on Tennis



User  
Preference  
TENNIS

# DMB AF - Content Protection & Governance



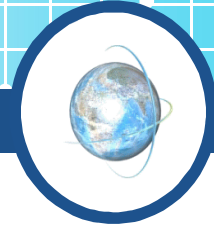
## ❖ Requirements on Protection & Governance for DMB AF

- Protection of DMB AF resources (audio, video and metadata)
- Usage control on protected resources
- License management in DMB AF
- IPMP access and management for DMB AF files

## ❖ Components of Protection and Management for DMB AF

- MPEG-21 IPMP
  - Description of information about content protection
- MPEG-21 REL DAC Profile
  - Usage Rule for DMB AF contents

# DMB AF - Content Protection & Governance



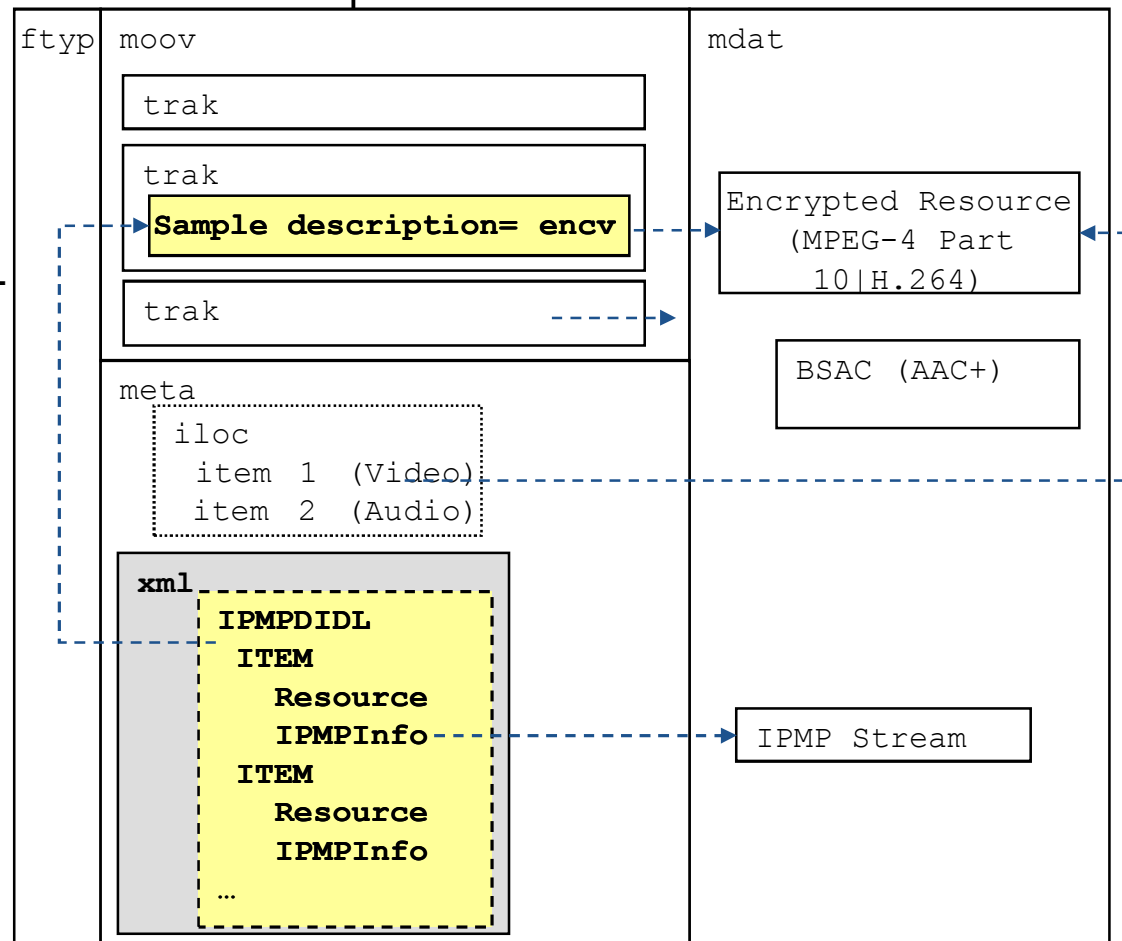
## ❖ Protection Signaling

- Mechanism to signal whether IPMP tools is provided in the DMB AF file or not.

## ■ IPMP Signaling

- sample description in trak box
- Resource in IPMP DIDL

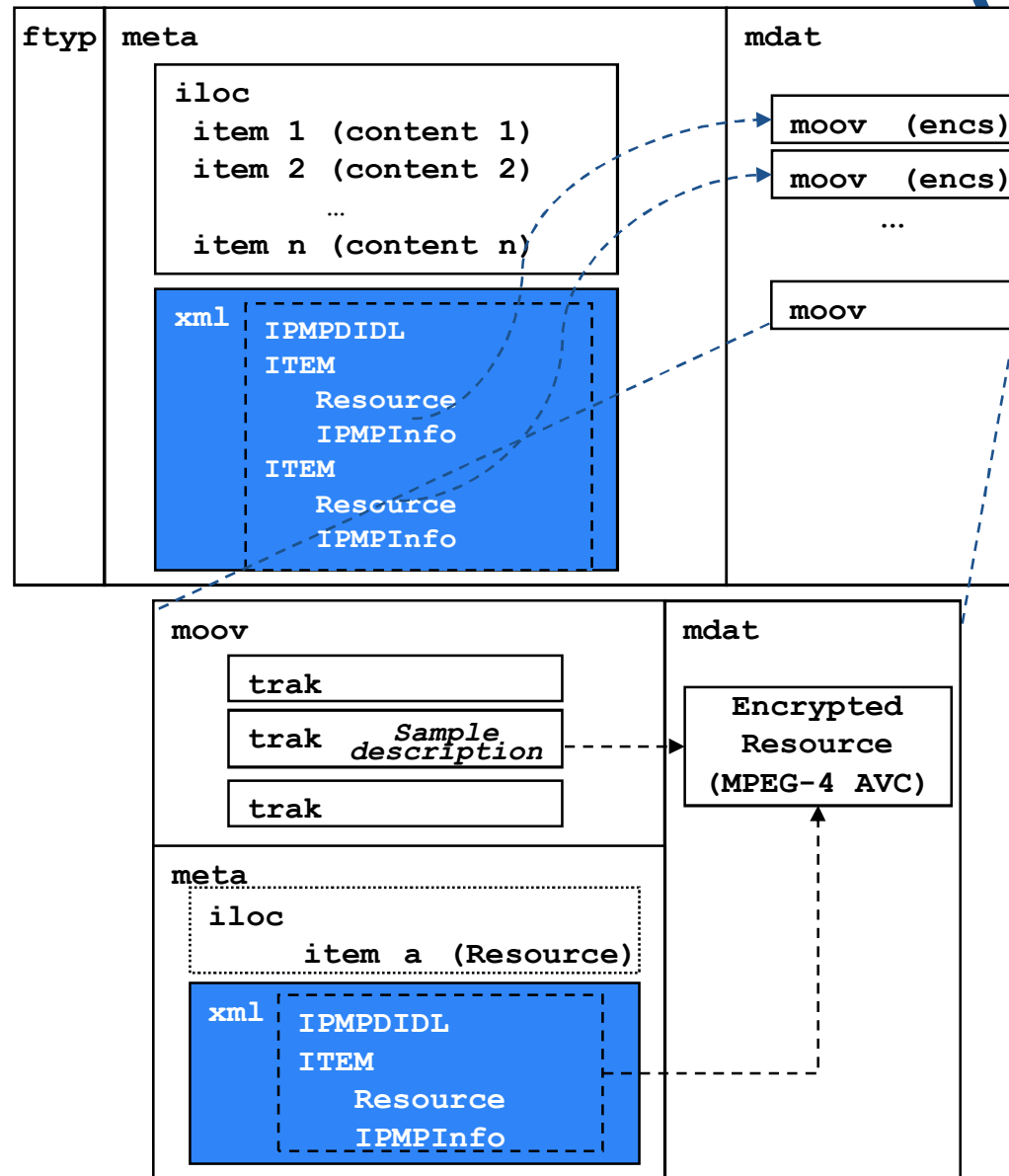
## ❖ Protection for DMB AF with an AV single content



# DMB AF - Content Protection & Governance



- ❖ Content protection for DMB AF with multiple AV contents





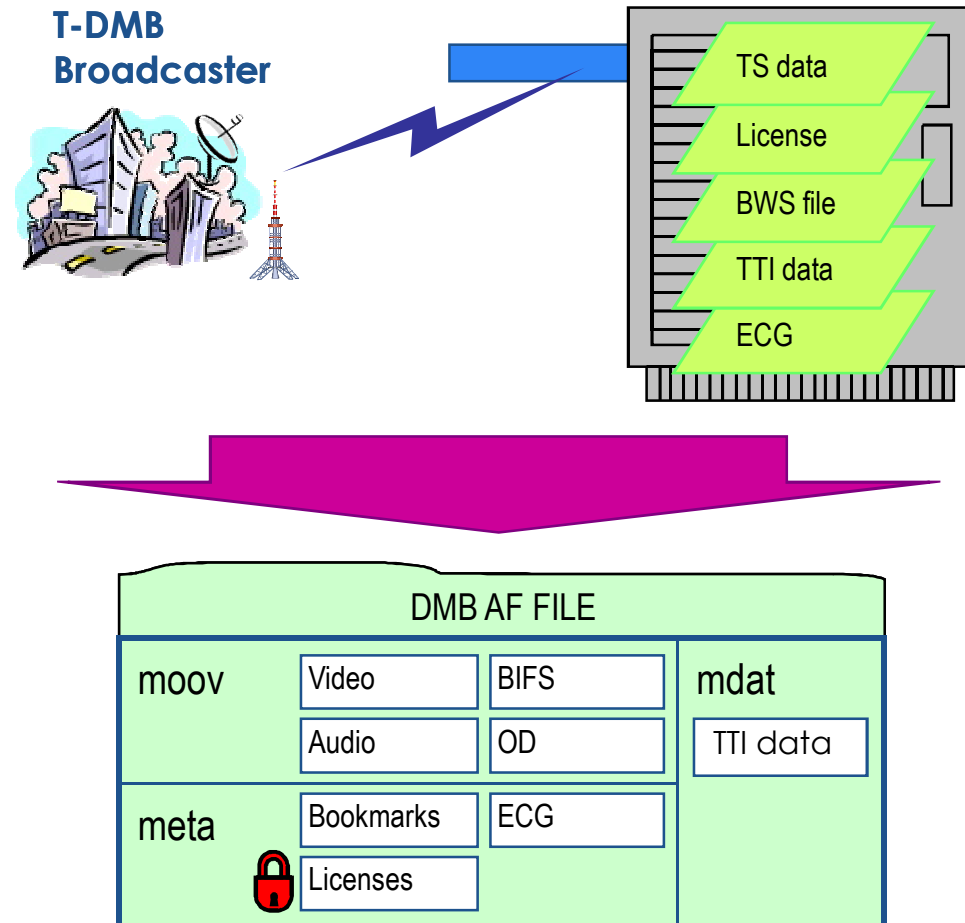
# DMB AF – Usage Examples



## Recording Broadcast Contents



DMB AF Player

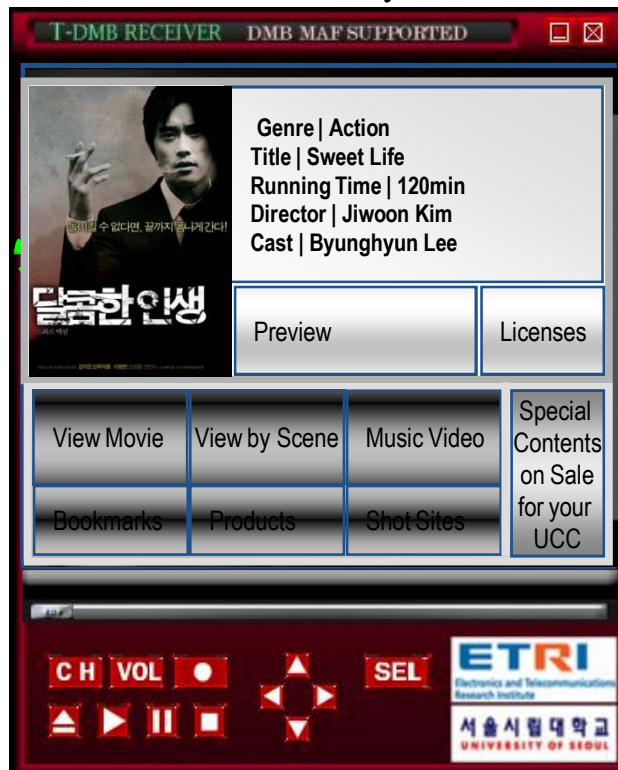


# DMB AF – Usage Examples



## IP Media Service

### DMB AF Player



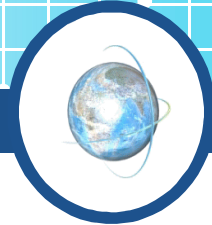
Wired/Wireless  
Networks



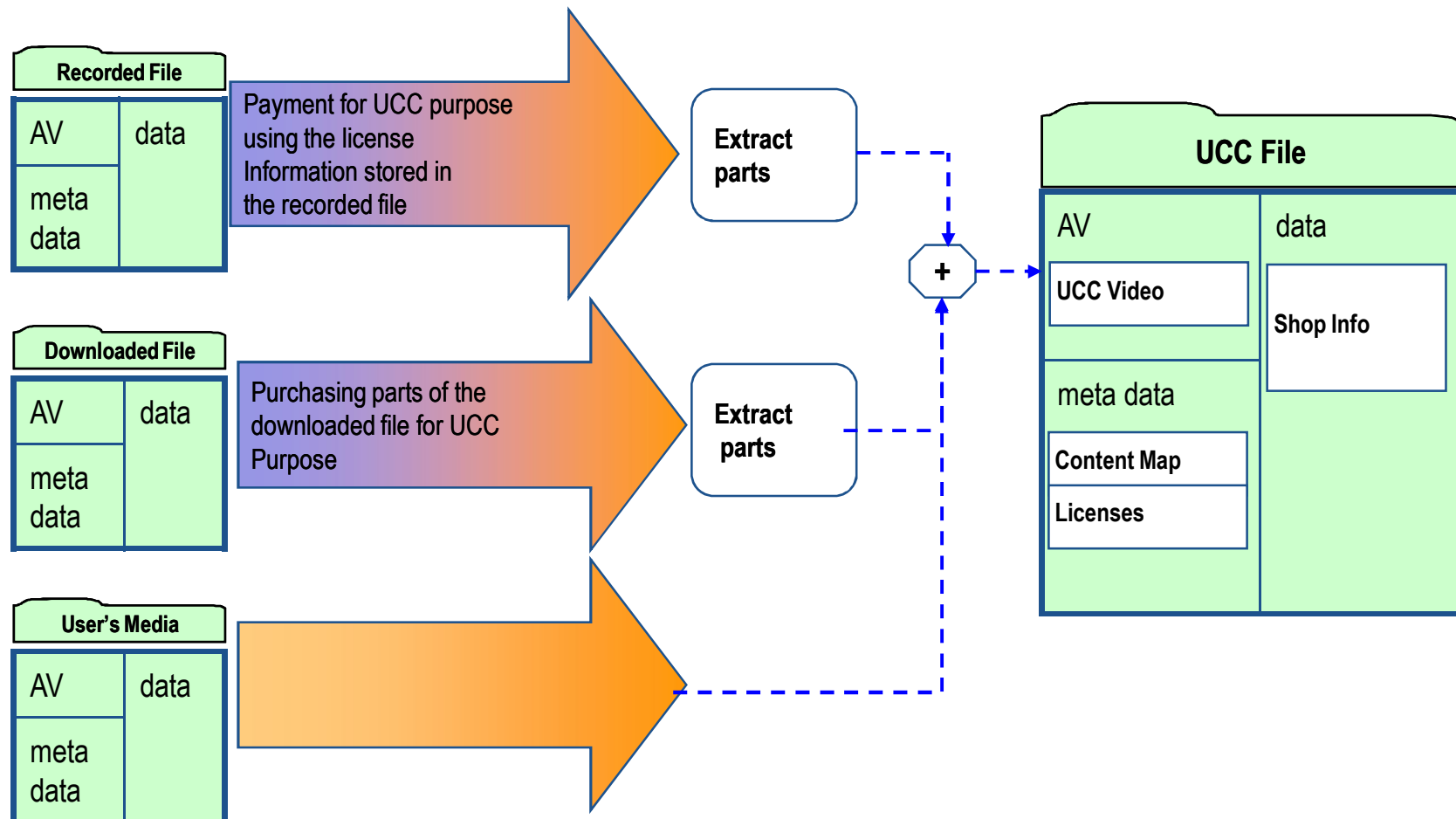
### DMB Portal Server



# DMB AF – Usage Examples



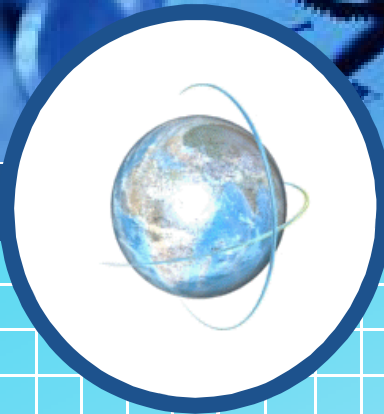
## User-Creative Contents



# Conclusions



- ❖ DMB AF is an application format for DMB content services.
  - Integration of DMB contents with appropriate additional information to facilitate interchange, management, editing, and presentation of the contents in protected, governed, and interoperable ways.
- ❖ Applications of DMB AF
  - scheduled storage and time-shifted playback of broadcast content,
  - IP media service such as DMB content portal,
  - rightful interchange of content between terminals,
  - user editing or creation from DMB contents.
- ❖ DMB AF has a potential to open a new market
  - for service providers and terminal vendors
  - by providing more rich and convenient user experiences
  - with minimal effort to implement the technology.
- ❖ DMB AF looks forward to see potential usage in mobile IPTV services



**Thank You !**

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