



MPEG standards for broadcasting



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Contents



- MPEG-4 for object-based content authoring
- MPEG-7 for content description
- MPEG-21 for content management
- 4+7+21 = content in the future





What is MPEG-4?

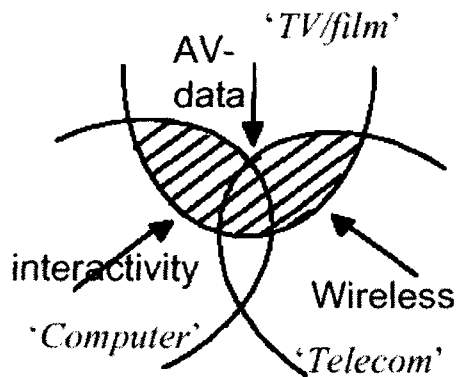


- ISO/IEC 14496
- Coding of audiovisual objects
- First FDIS in November 1998
- Three fields
 - Digital television
 - Interactive graphics applications
 - Interactive multimedia
 - World Wide Web
 - distribution of and access to content

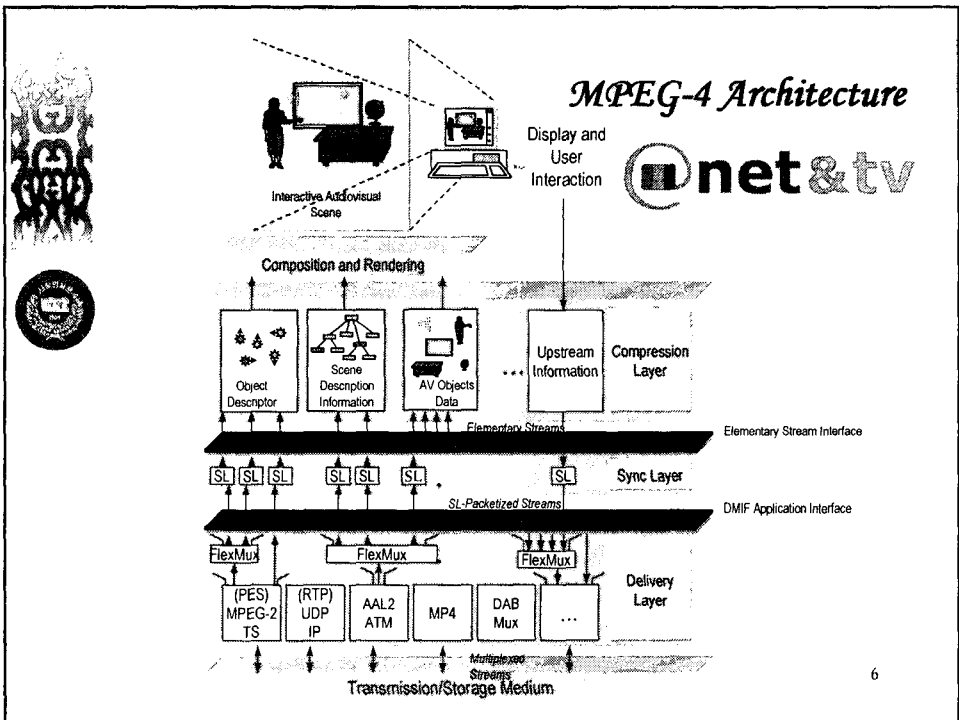
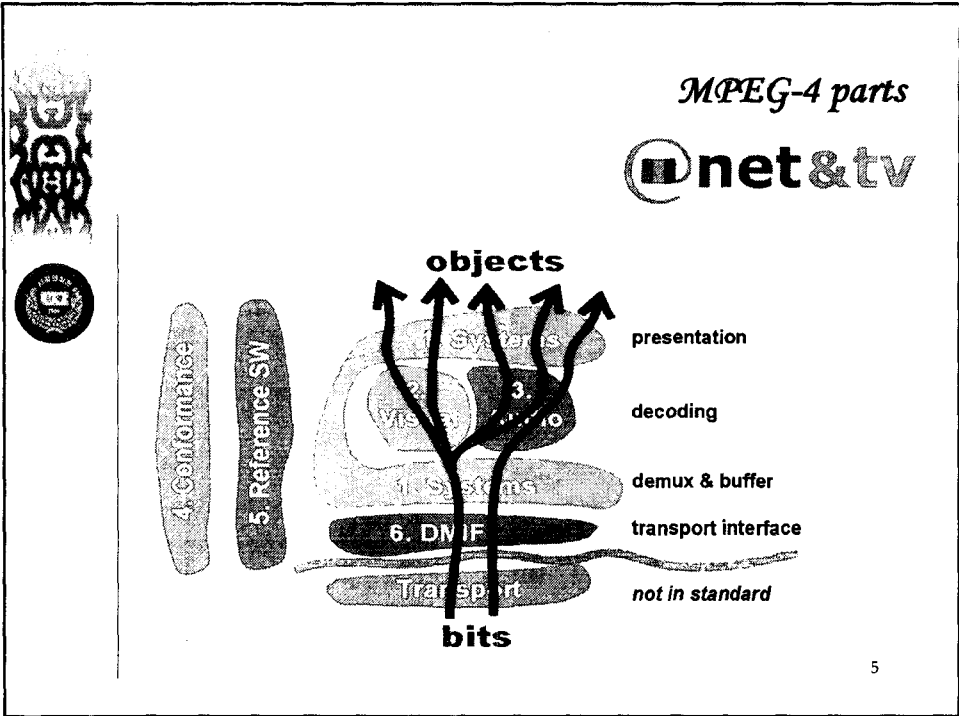
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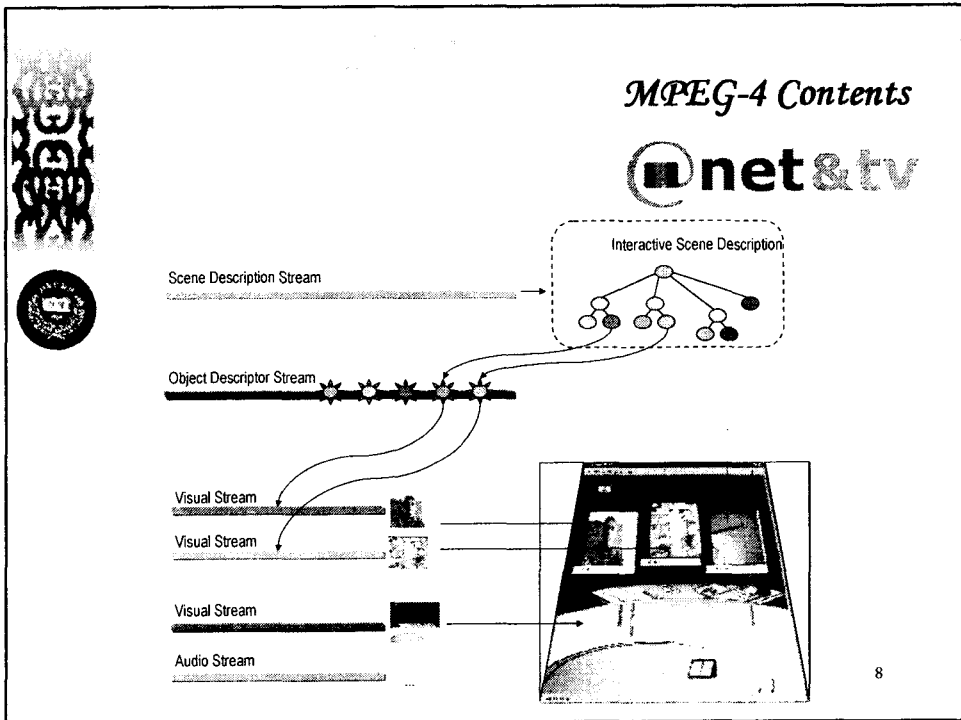
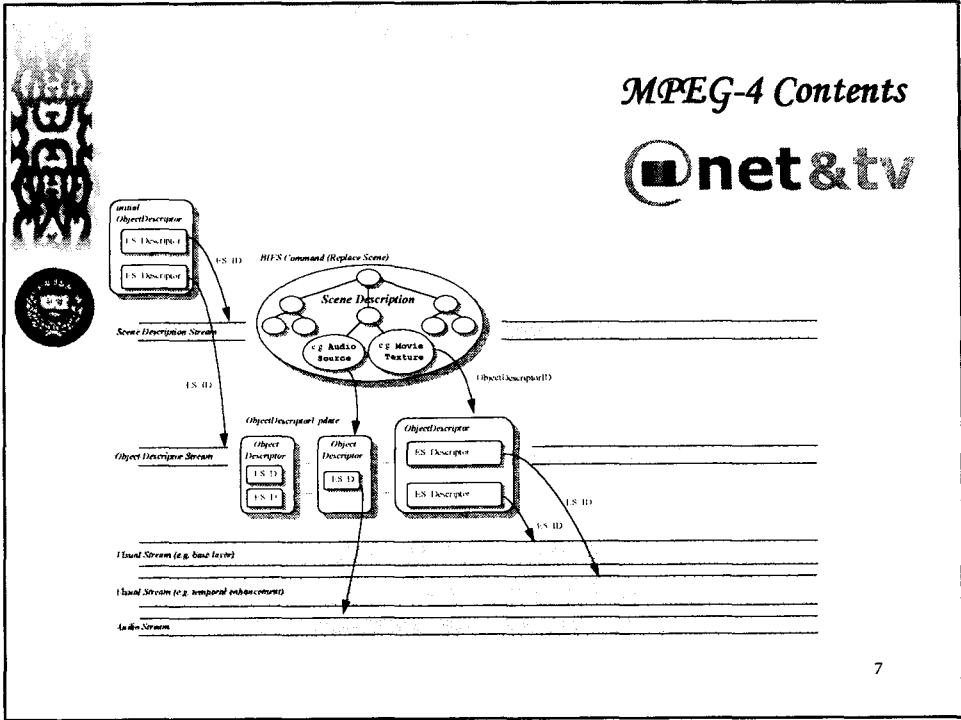


The goal of MPEG-4



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MPEG-4 Visual = Natural + SNHC



- Natural video coding tools
- SNHC (Synthetic and Natural Hybrid Coding) tools
 - Face and body animation
 - 2D dynamic mesh compression
 - 3D mesh compression
 - View dependent scalability
 - etc.

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Augmented Reality



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Telepresence



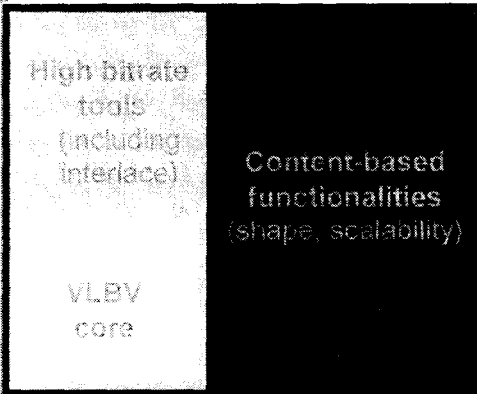
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MPEG-4 Video Standard



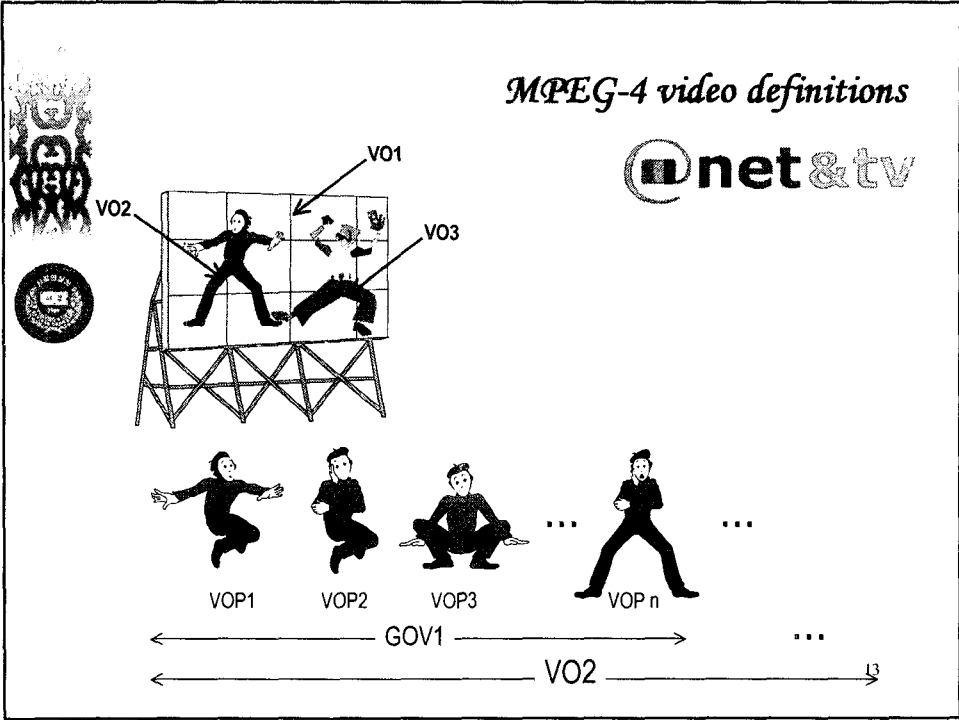
bitrate



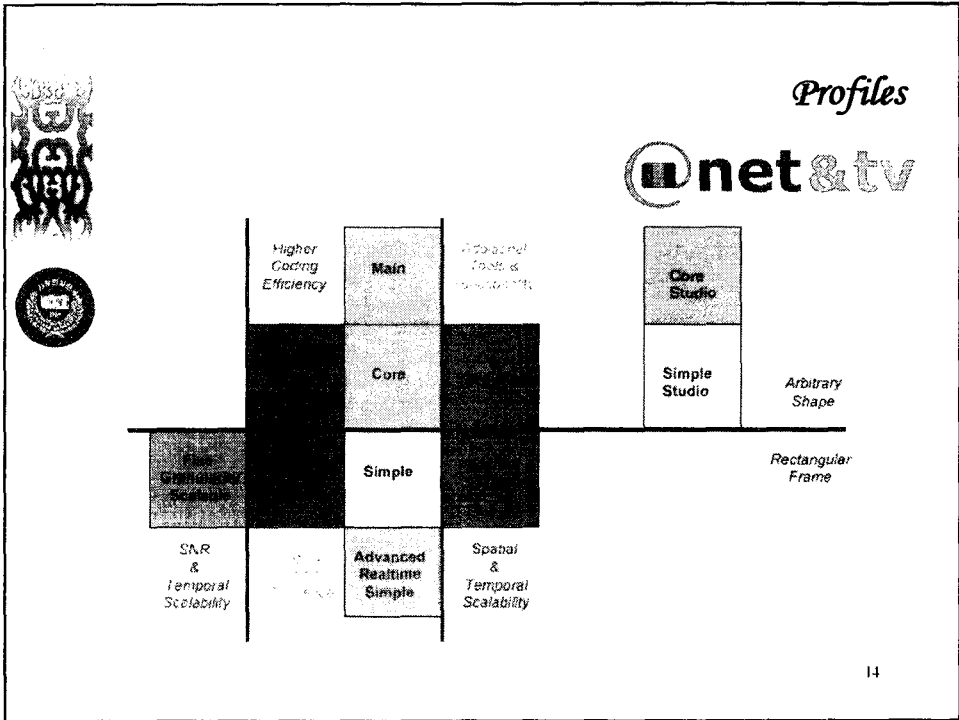
Dimensional

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MPEG-4 video definitions



Profiles





Studio Profiles



- **Simple Studio Profile**
 - To be applied for image acquisition and editing
 - Only Intra coding for independent processing of frames
 - Lossless transcoding from MPEG-2 4:2:2 Profile
 - Support for Arbitrary Shape (binary or grayscale)
- **Core Studio Profile**
 - To be applied for inter-studio transmission and digital cinema distribution
 - Inter (P-VOP) coding for more efficient compression
 - Support for Sprites

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New tools

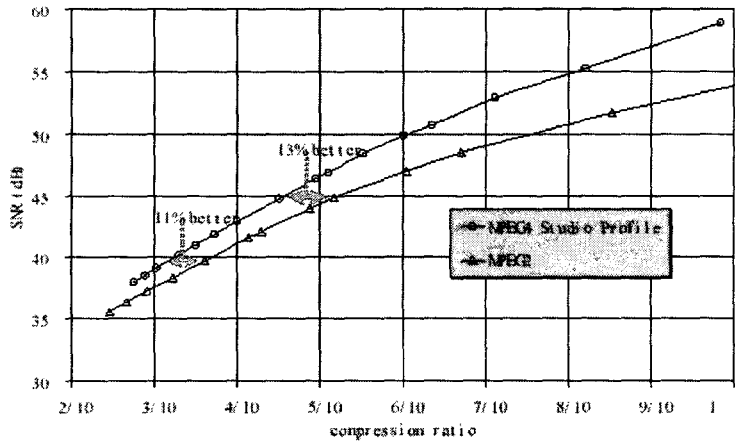


- **High efficiency VLC**
 - Grouping of DCT coefficients based on their values
 - Recursive selection of VLC table for groups of coefficients as function of previously coded group
 - Coded data = group indicator + fixed length code determining the actual value within the group
- Flexible access by special slice structure
- Optional uncompressed mode for lossless coding

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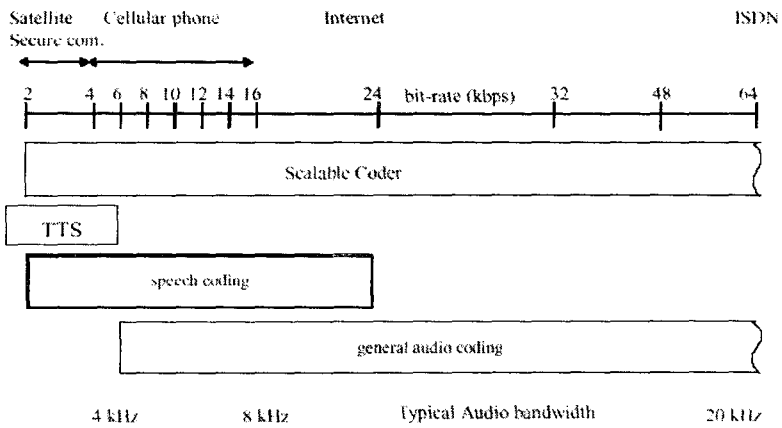
Performance



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Tools in MPEG-4 Audio



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MPEG-4 Audio Quality



Coding tool	Number of channels	Total bit rate	Typical subjective quality
AAC	5	320 kb/s	4.6
1995 Backward Compatible MPEG-2 Layer II	5	640 kb/s	4.6
AAC	2	128 kb/s	4.8
AAC	2	96 kb/s	4.4
MPEG-1 Layer II	2	192 kb/s	4.3
MPEG-1 Layer III	2	128 kb/s	4.1

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What is MPEG-7



- ISO/IEC 15938
- Multimedia Description Interface
- History
 - Call for Proposals October 1998
 - Evaluation February 1999
 - First version of Working Draft (WD) December 1999
 - Committee Draft (CD) October 2000
 - Final Committee Draft (FCD) February 2001
 - Final Draft International Standard (FDIS) July 2001
 - International Standard (IS) September 2001

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MPEG-7 Parts



- MPEG-7 Systems - the binary format and the terminal architecture.
- MPEG-7 Description Definition Language - the language for defining the syntax of the MPEG-7 Description Tools and for defining new Description Schemes.
- MPEG-7 Visual
- MPEG-7 Audio
- MPEG-7 Multimedia Description Schemes - the Description Tools dealing with generic features and multimedia descriptions.
- MPEG-7 Reference Software - a software implementation of relevant parts of the MPEG-7 Standard with normative status.
- MPEG-7 Conformance - guidelines and procedures for testing conformance of MPEG-7 implementations (under development).
- MPEG-7 Extraction and use of descriptions – informative material (in the form of a Technical Report) about the extraction and use of some of the Description Tools (under development).

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MPEG-7 application

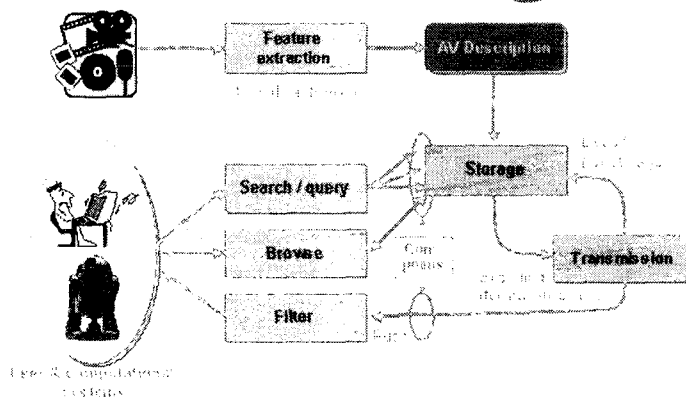
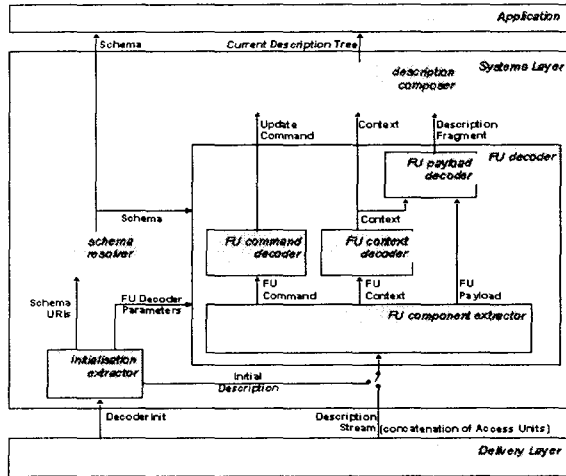


Figure 1. MPEG-7 application process

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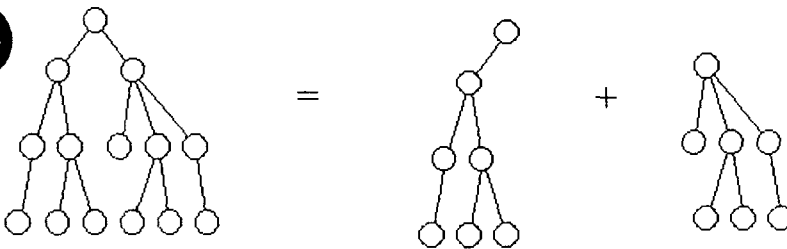
MPEG-7 Architecture



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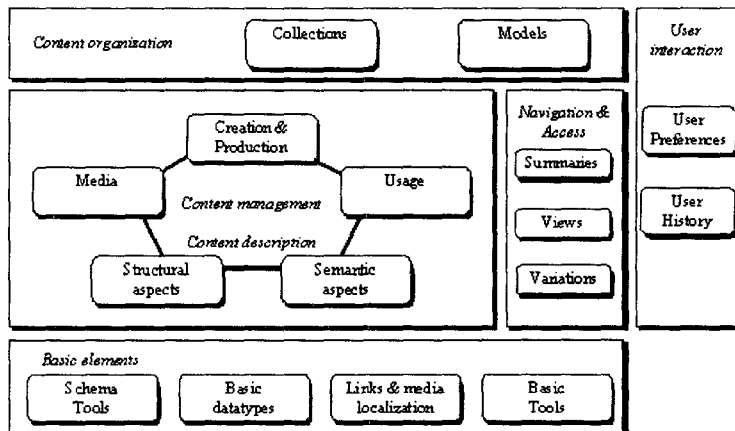
MPEG-7 BiM



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MDS



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Visual Descriptors

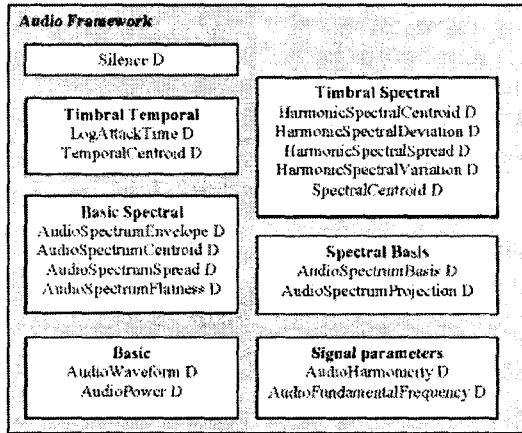


- Basic structures
- Color descriptors
- Texture descriptors
- Shape descriptors
- Motion descriptors
- Localization
- Face recognition

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Audio Descriptors



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MPEG-21

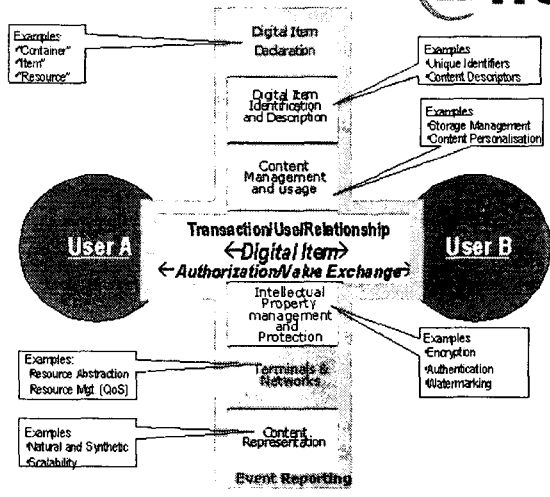


- ISO/IEC 21000
- Multimedia Framework
 - to enable transparent and augmented use of multimedia resources across a wide range of networks and devices
- Work in progress

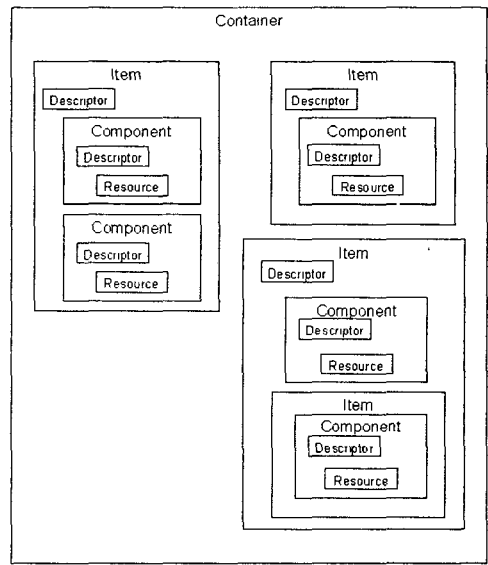
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MPEG-21 Key Concepts



MPEG-21 Digital Item





MPEG-21 content protection

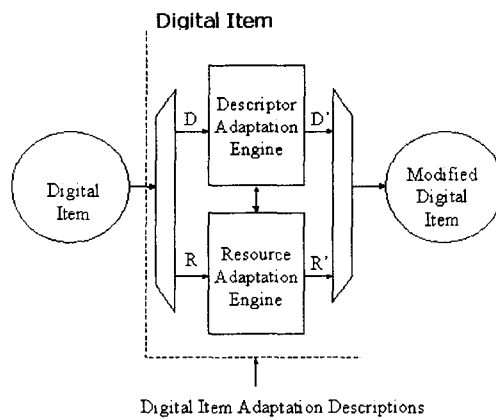


- MPEG-21 IPMP
- MPEG-21 REL
- MPEG-21 RDD

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Digital Item Adaptation



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