

MPEG-7 definitions

- MPEG-7: a multimedia content description interface; standardizes detailed formatting information and fine-grained descriptions of low-level and high-level features; XML based; ISO 15938 adopted 2001.
- Descriptors: standardized labels or terms for multimedia features (creator, title, date, file format)
- Description schemes: more complex assemblies of descriptors and other description schemes into approved groupings (e.g. CreationInformation)

MPEG-7 overview

- Part 1: Systems architecture
- Part 2: Description definition language
- Part 3: Visual
- Part 4: Audio
- Part 5: Multimedia description schemes (MDS)
- Part 6: Reference software
- Part 7: Conformance testing
- Part 8: Extraction and use of MPEG-7 descriptions

MPEG-7 part 2: Description Definition Language

- Element and attribute declarations
- Type definitions
 - simple (cannot have child elements or attributes)
 - complex (can have child elements or attributes)
 - derived (by extension or restriction of previously defined types)
- MPEG-7 uses XML data types, with extensions
- Jane Hunter, ViDe member, principal writer

MPEG-7 part 3: Visual descriptors

- Color - Color space, Dominant color, Scalable color, Group of frames, Color structure, Color layout
- Texture - Homogeneous texture, Texture browsing, Edge histogram
- Shape - Contour-based, Region-based, 3-D, Multiple-views
- Motion - Motion activity, Camera motion, Motion trajectory, Parametric motion
- Face

MPEG-7 part 5

Multimedia description schemes

- 1. Scope
- 2. Normative references
- 3. Terms, definitions, symbols, Ds and DSs
- 4. Schema tools
- 5. Basic datatypes
- 6. Links to the media and localization
- 7. Basic tools
- 8. Media description tools
- 9. Creation and production description tools

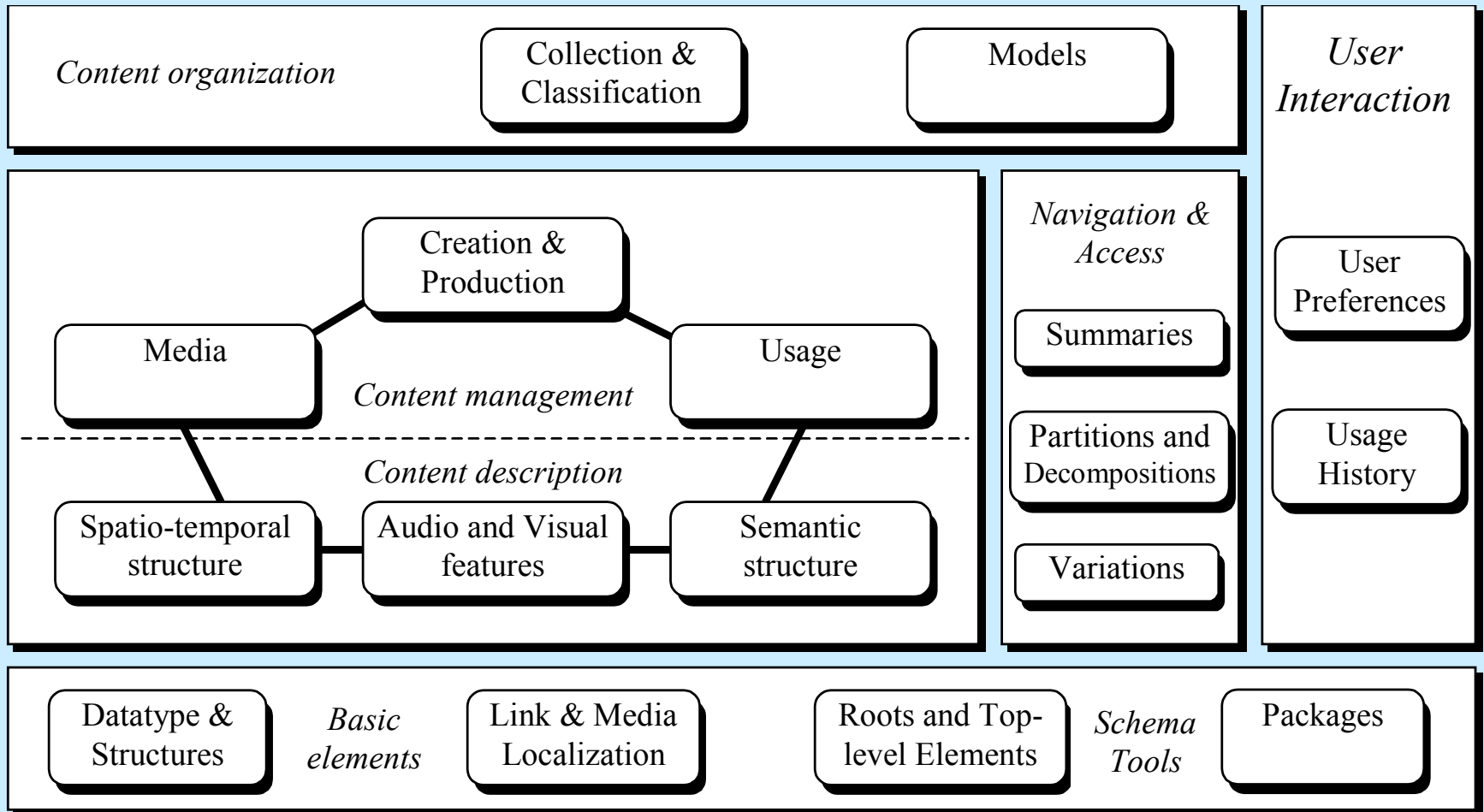
MPEG-7 part 5 (cont.)

- 10. Usage description tools
- 11. Structure of the content
- 12. Semantics of the content
- 13. Content navigation and access (e.g. summaries)
- 14. Organization of the content (e.g. collections)
- 15. User interaction
- 16. Bibliography
- 17. Annex A: Classification schemes
- 18. Annex B: XPath datatype definition

MPEG-7 part 5 (cont.)

- 19. MDS schema definition
- 20. Example description

Part 5 camera's eye view



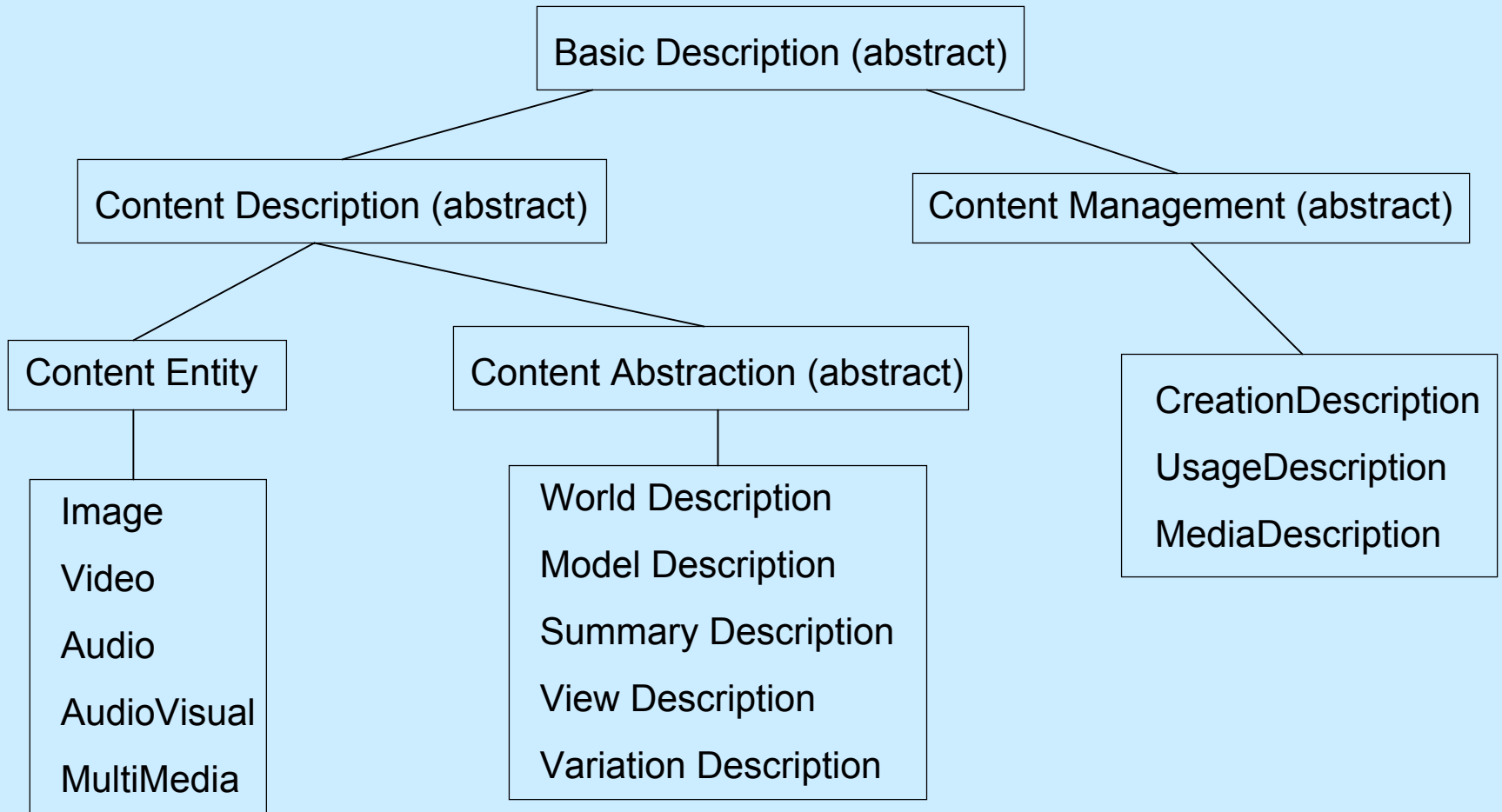
Part 5 clause 4: Schema tools

- 4.1 Base types
 - 4.1.1 VisualDType, AudioDType, VisualDSType, AudioDSType
- 4.2 Mpeg7 root element, DescriptionMetadata
- 4.3 Top-level types (serve as wrappers of tools)
 - 4.3.2 ContentDescription (abstract)
 - ContentEntity (abstract)
 - MultimediaContent (image, video, audio, etc.)
 - ContentAbstraction (abstract)
 - Summaries, real world semantics, models, etc.

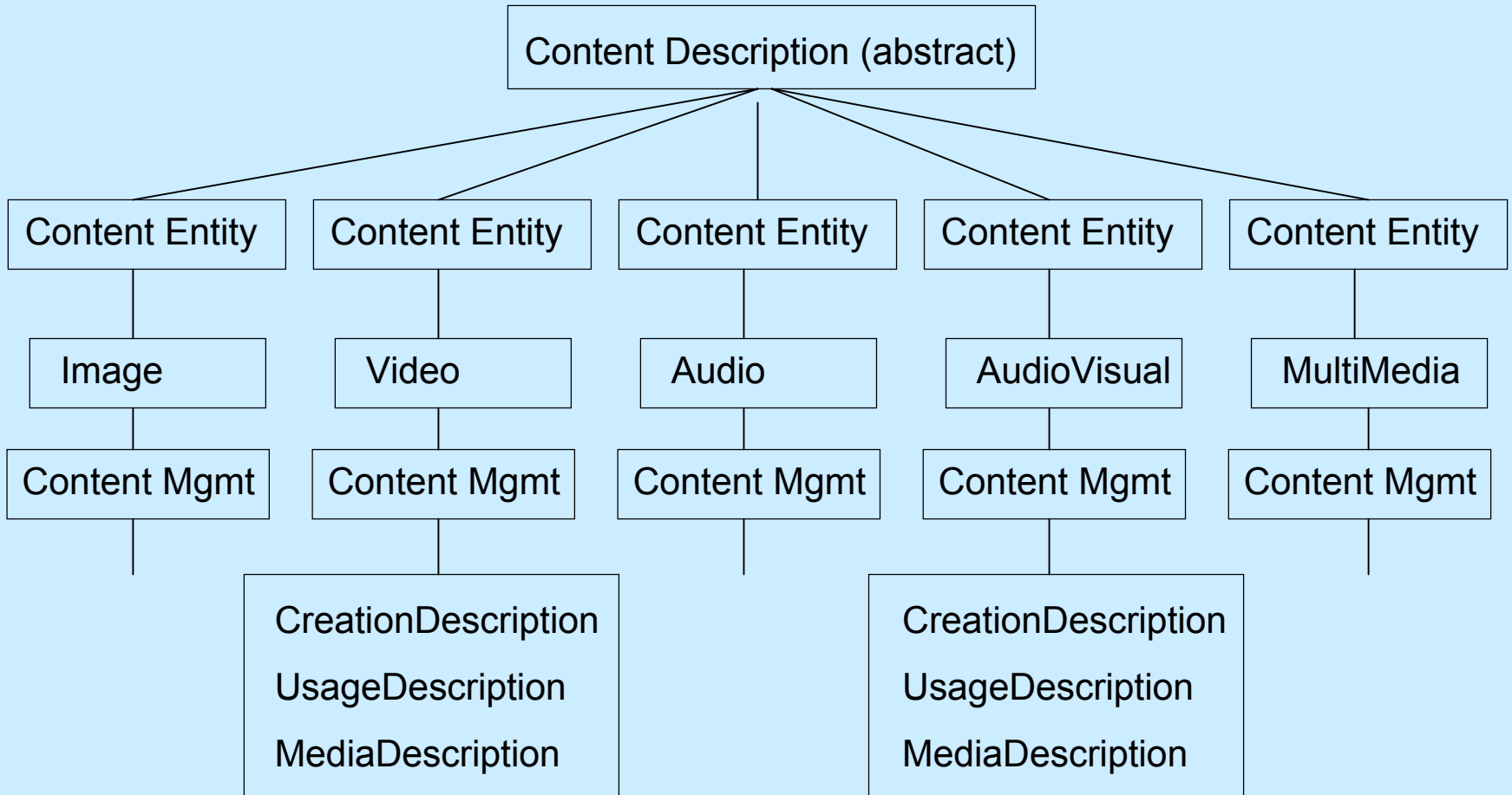
Part 5 clause 4: Schema tools (cont.)

- 4.3.3 ContentManagement
 - UserDescription (User, UserPreferences, UsageHistory)
 - CreationDescription (CreationInformation)
 - UsageDescription (UsageInformation)
- 4.4.1 MultiMediaContentDS (ImageType, VideoType, AudioType, AudioVisualType, MultimediaType, MultimediaCollectionType, MultimediaProgramType, SignalType, ElectronicInkType, VideoEditingType)

Part 5 top level hierarchy



Part 5 top level hierarchy a cataloger's view



Part 5 clause 6: Links to the media & localization

- 6.2 UniqueID
- 6.3.1 Time datatype
- 6.3.2 TimePoint
- 6.3.3 Duration
- 6.3.4 IncrDuration
- 6.3.5 RelTimePoint
- 6.3.6 RelIncTimePoint
- 6.3.7 TimeHeader (timeBase, timeUnit)

Part 5 clause 6: Links to the media & localization (cont.)

- 6.3.9 MediaTime
- 6.3.10 MediaTimePoint
- 6.3.11 MediaDuration
- 6.3.12 MediaIncDuration
- 6.3.13 MediaRelTimePoint
- 6.3.14 MediaRelIncTimePoint
- 6.3.15 MediaTimeHeader (timeBase, timeUnit)

Part 5 clause 6: Links to the media & localization (cont.)

- 6.4.1 MediaLocator datatype (MediaURI for external, InLineMedia, StreamID)
- 6.4.2 InlineMedia (embeds binary AV data in a textual description)
- 6.4.3 TemporalSegmentLocator (specifies a MediaTime element or BytePosition)
- 6.4.4 ImageLocator (specifies a MediaTime element or BytePosition)
- 6.4.5 AudioVisualSegmentLocator (specifies a URI or MediaTime element)

Part 5 clause 7: Basic tools

- 7.1.1 xml:lang attribute
- 7.2.2 TextAnnotation (FreeTextAnnotation, etc.)
- 7.3 Classification schemes and terms (controlled term use, etc.)
- 7.4.1 Agent DS
- 7.4.2 Person DS (Name, Organization, Address, ElectronicAddress, etc.)
- 7.4.3 PersonGroup DS (Name, Address, etc.)
- 7.4.4 Organization DS (Name, Address, etc.)

Part 5 clause 7: Basic tools (cont.)

- 7.4.5 PersonName (GivenName, FamilyName, dateFrom, dateTo, etc.)
- 7.4.6 ElectronicAddress (Telephone, Fax, Email, URL)
- 7.5.1 Place DS
- 7.5.1.4 GeographicPointType DS (longitude, etc.)
- 7.6.1 Graph DS
- 7.8.1 Affective DS (audience mood)

Part 5 clause 8: Media description tools

- 8.1.1 MediaInformation DS (MediaIdentification, MediaProfile)
- 8.1.2 MediaIdentification (EntityIdentifier)
- 8.1.3 MediaProfileDS (MediaFormat, MediaInstance, etc.)
- 8.1.4 MediaFormat
 - Content (image, audio, visual, audiovisual)
 - Medium (physical storage medium)
 - FileFormat (MPEG7FileFormatCS or MIME)
 - FileSize

Part 5 clause 8: Media description tools (cont.)

- 8.1.4 MediaFormat (cont.)
 - System (MPEG7SystemCS)
 - Bandwidth (Hz)
 - BitRate (attributes: minimum, average, maximum)
 - VisualCoding
 - Format (MPEG7VisualCodingCS, attribute: colorDomain)
 - Pixel (resolution, aspectRatio, bitPer (accuracy))
 - Frame (height, width, aspectRatio, rate)

Part 5 clause 8: Media description tools (cont.)

- 8.1.4 MediaFormat (cont.)
 - AudioCoding
 - Format (MPEG7AudioCodingCS)
 - AudioChannels
 - Sample (attributes: rate, bitPer)
- 8.1.5 MediaTranscodingHints
- 8.1.6 MediaQuality
- 8.1.7 MediaInstance DS (InstanceIdentifier, MediaLocator, LocationDescription)

Part 5 clause 9: Creation and production description tools

- 9.1.1 CreationInformation DS (Creation, Classification, RelatedMaterial)
- 9.1.2 Creation DS
 - Title (main (default), alternative, seriesTitle, etc.)
 - TitleMedia (TitleImage (a thumbnail), TitleVideo (a videoclip), TitleAudio (a jingle))
 - Abstract
 - Creator (Role and Agent (name and type))
 - CreationCoordinates (CreationLocation, CreationDate)

Part 5 clause 9: Creation and production description tools (cont.)

- 9.1.3 Classification DS
 - Form (recommend LC's migfg)
 - Genre (recommend LC's migfg)
 - Subject (recommend LCSH or other)
 - Language (also SubtitleLanguage, ClosedCaptionLanguage, etc.)
 - Release (Country and Date)
 - Target (Market, Age (for example, audience, such as higher education))

Part 5 clause 9: Creation and production description tools (cont.)

- 9.1.4 RelatedMaterial DS
 - PublicationType (MPEG7PublicationTypeCS)
 - MaterialType (Ruth Bogan list of MaterialTypes)
 - MediaLocator
 - MediaInformation
 - CreationInformation
 - UsageInformation

Part 5 clause 10: Usage description tools

- 10.1.1 UsageInformation DS (Rights, Availability, UsageRecord, etc.)
- 10.1.2 Rights (RightsID)
- 10.1.4 Availability DS
 - PublicationType (MPEG7PublicationTypeCS)
 - OriginPlace
 - Distributor
 - Financial
 - Rights
 - AvailabilityPeriod

Part 5 clause 11: Structure of the content

- 11.1.1 Segment DS (an abstract, parent DS from which elements can be inherited)
 - MediaInformation
 - MediaLocator
 - StructuralUnit
 - CreationInformation
 - UsageInformation
 - TextAnnotation
 - Relation (to other segments, objects, etc., spatially, temporally)

Part 5 clause 11: Structure of the content (cont.)

- 11.1.2 StillRegion DS (SpatialLocator, MediaTimePoint, SpatialDecomposition)
- 11.1.3 ImageText DS (text, language, superimposed, scene, fontSize, fontType)
- 11.1.4 Mosaic DS (mosaic or panoramic view of a video segment)
- 11.1.5 StillRegion3D DS (MultipleView, SpatialDecomposition, etc.)
- 11.1.6 VideoSegment DS (MediaTime, Mosaic, various decompositions)

Part 5 clause 11: Structure of the content (cont.)

- 11.1.7 MovingRegion DS (SpatioTemporalLocator, various decompositions)
- 11.1.8 VideoText DS (text, language, superimposed, scene, fontSize, fontType)
- 11.1.9 InkSegment DS (InkMediaInfo, MediaTime, various masks, decompositions)
- 11.1.10 AudioSegment DS (MediaTime, Temporal, and MediaSource decompositions)
- 11.1.11 AudioVisualSegment DS (MediaTime, masks, decompositions)

Part 5 clause 11: Structure of the content (cont.)

- 11.1.12 AudioVisualRegion DS
(VisualSpatioTemporalLocator, decompositions)
- 11.1.13 MultiMediaSegment DS
(MediaSourceDecomposition)
- 11.1.14 EditedVideoSegment DS (Analytic,
AnalyticClip, Shot, Transition, etc.)
- 11.2 Various masks, matching hints, points of view
- 11.3 Various decomposition tools
- 11.4 Segment relation tools (before, after, starts,
finishes, keyFor, etc.)

Part 5 clause 11: VideoSegmentDS

- 11.1.6 VideoSegmentDS
 - MediaTime
 - VisualDescriptor (from part 3)
 - VisualDescriptionScheme (from part 3)
 - TimeSeriesDescriptors (from part 3)
 - SpatialDecomposition
 - TemporalDecomposition
 - SpatioTemporalDecomposition
 - MediaSourceDecomposition

Part 5 clause 11: AudioSegmentDS

- 11.1.10 AudioSegmentDS
 - MediaTime
 - AudioDescriptor (from part 4)
 - AudioDescriptionScheme (from part 4)
 - TemporalDecomposition
 - MediaSourceDecomposition

Part 5 clause 11: AudioVisualSegmentDS

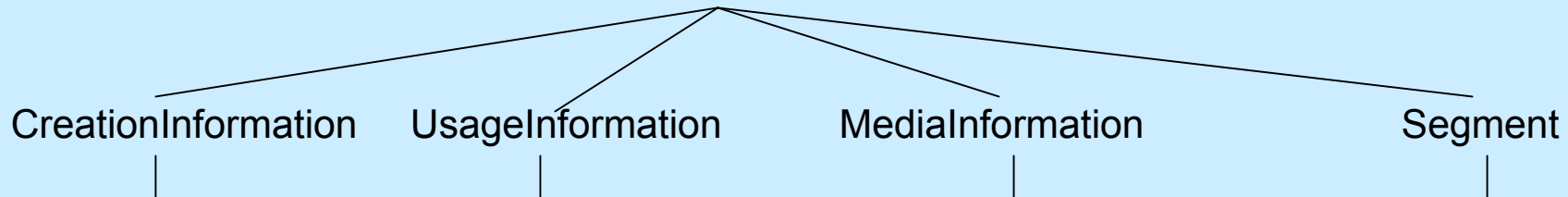
- 11.1.10 AudioSegmentDS
 - MediaTime
 - SpatialDecomposition
 - TemporalDecomposition
 - SpatioTemporalDecomposition
 - MediaSourceDecomposition

Part 5 clause 17: Classification schemes

- 17.1.2.1.1 MPEG7FileFormatCS
- 17.1.2.1.2 IPTCMimeTypeCS
- 17.1.2.2.1 MPEG7MediumCS
- 17.1.2.3.1 MPEG7SystemCS
- 17.1.2.4.1 MPEG7VisualCodingFormatCS
- 17.1.2.5.1 MPEG7AudioPresentationCS
- 17.1.2.6.1 MPEG7AudioCodingFormatCS
- 17.2.3.1.1 MPEG7PublicationTypeCS

Part 5 - a cataloging view

Image, Video, Audio, Audiovisual, MultiMedia, etc.



Creation
Title, Creator, etc.

Classification
Form, Genre, etc.

RelatedMaterial
MaterialType,
MediaLocator,
etc

Availability
Rights
PubType
etc.

MediaIdentification
MediaProfile
MediaFormat
Content
FileFormat
FileSize,
etc
MediaInstance

MediaTime
MediaTimePoint
MediaDuration
VisualDescriptor (pt.3)
AudioDescriptor (pt.4)
Decompositions