MPEG-7: Multimedia Content Description interface

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Outline

- Goals and scope of MPEG-7
- MPEG-7 Tools and Architecture
- MPEG-7 and MPEG-21
- Conclusions

Objective of MPEG-7

- Standardize content-based description for various types of audiovisual information
    - allow quick and efficient content localization
    - address a wide range of applications
    - $\Rightarrow$ For some applications: need to go beyond the pure content description, e.g, user preferences

- Types of audiovisual information:
    - Audio, speech
    - Moving video, still pictures, graphics, 3D models
    - Information on how objects are combined in scenes
- Descriptions independent of the media support
- Existing solutions for textual content or description

Example of application areas

- Storage and retrieval of audiovisual databases

- Broadcast media selection (Radio, TV programs)

- Personalized news service on Internet (push media filtering)

- Tele-shopping

- Intelligent multimedia presentations

- Educational applications

- Surveillance and remote sensing

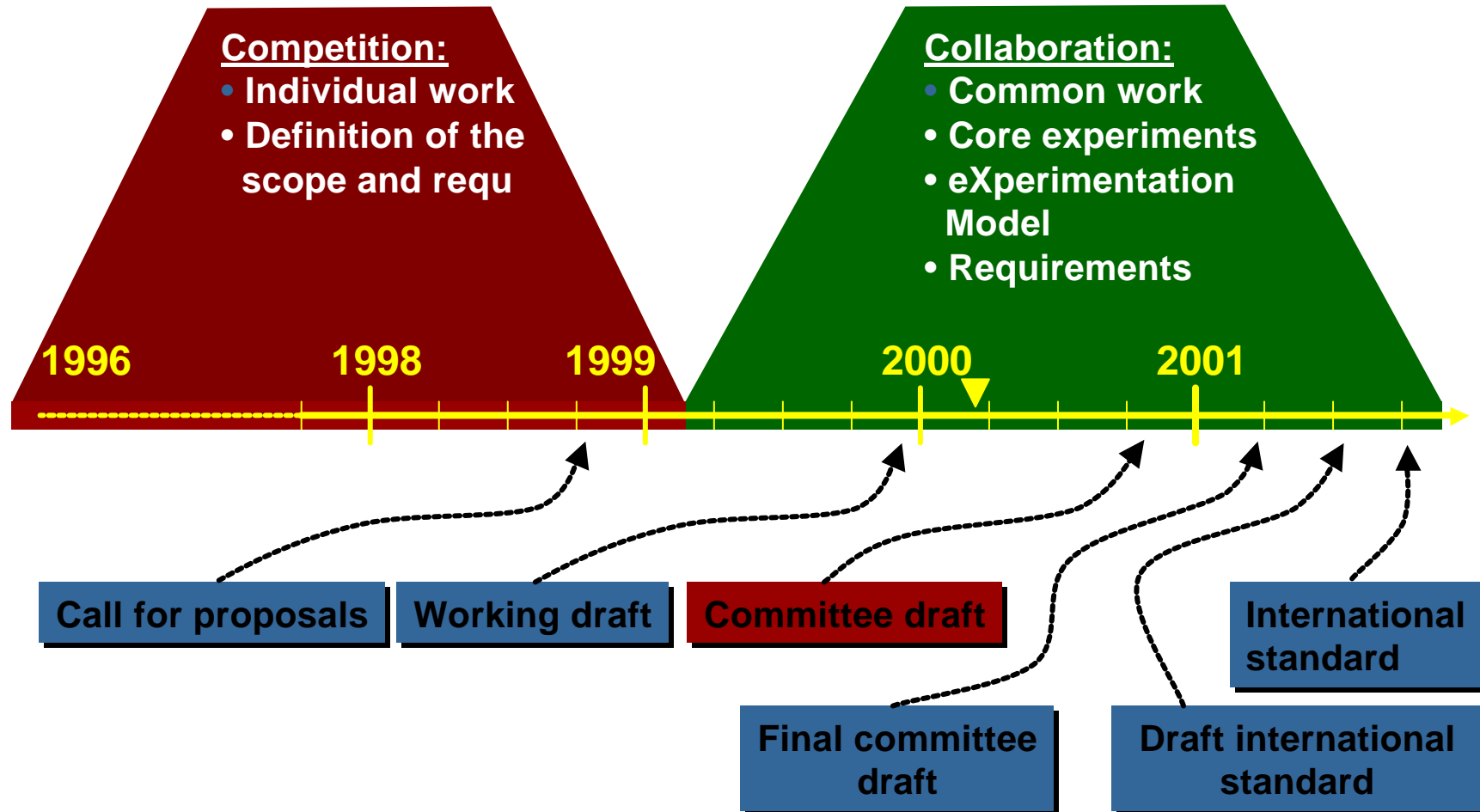- Bio-medical applications

- etc.

Scope of MPEG-7
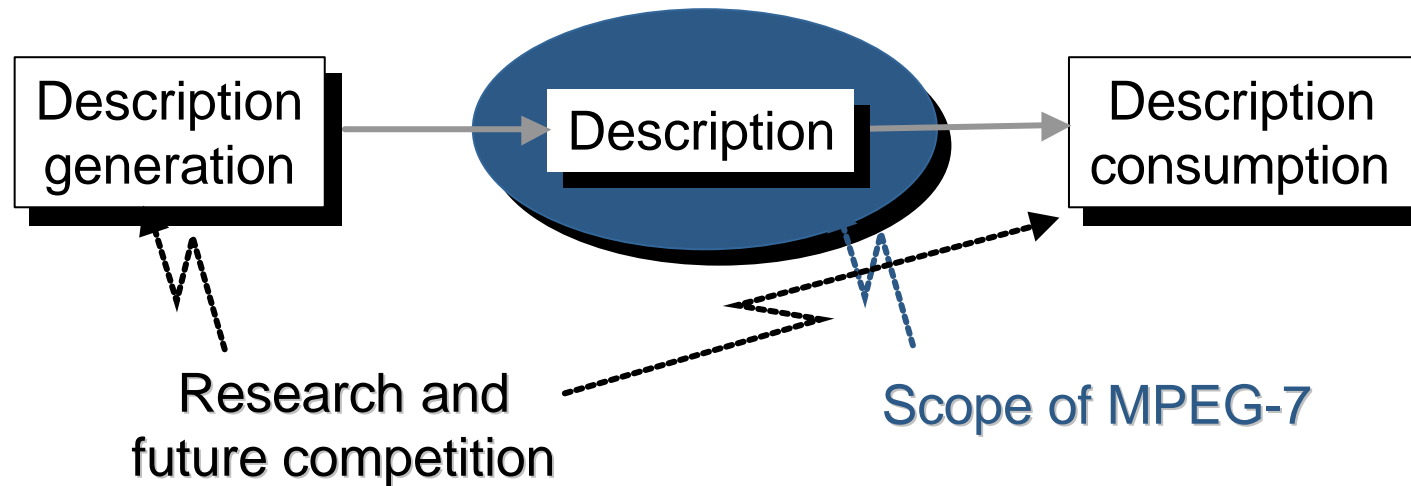
- The description generation (feature extraction, indexing process, etc.) and consumption (search engine, retrieval process, etc.) are not a normative part of MPEG-7

⇒ Just the description is normative

Workplan

Competition:
- **Individual work**
- **Definition of the scope and requ**

Collaboration:
- **Common work**
- **Core experiments**
- **eXperimentation Model**
- **Requirements**

1996 **1998** **1999** **2000** **2001**

Call for proposals **Working draft** **Committee draft** **International standard**
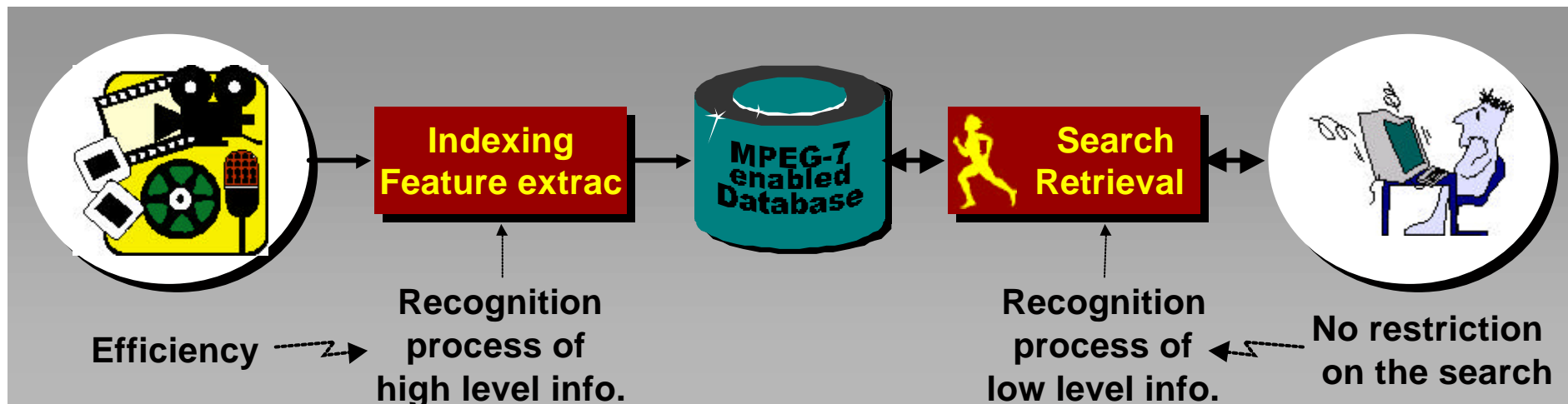
Final committee draft **Draft international standard**

Description

- Information about the content: recording date & conditions, title, author, copyright, coding format, classification, etc.

- Information present in the content: Combination of low level and high level descriptors

  - ◆ High level description:
    - ✦ Efficient and powerful
    - ✦ Lack of flexibility

  - ◆ Low level description
    - ✦ Generic and flexible
    - ✦ Intelligent / efficient search engine

Efficiency ➔ | **Indexing Feature extrac** → **MPEG-7 enabled Database** ↔ **Search Retrieval** ↔

Recognition process of high level info.

Recognition process of low level info.

No restriction on the search
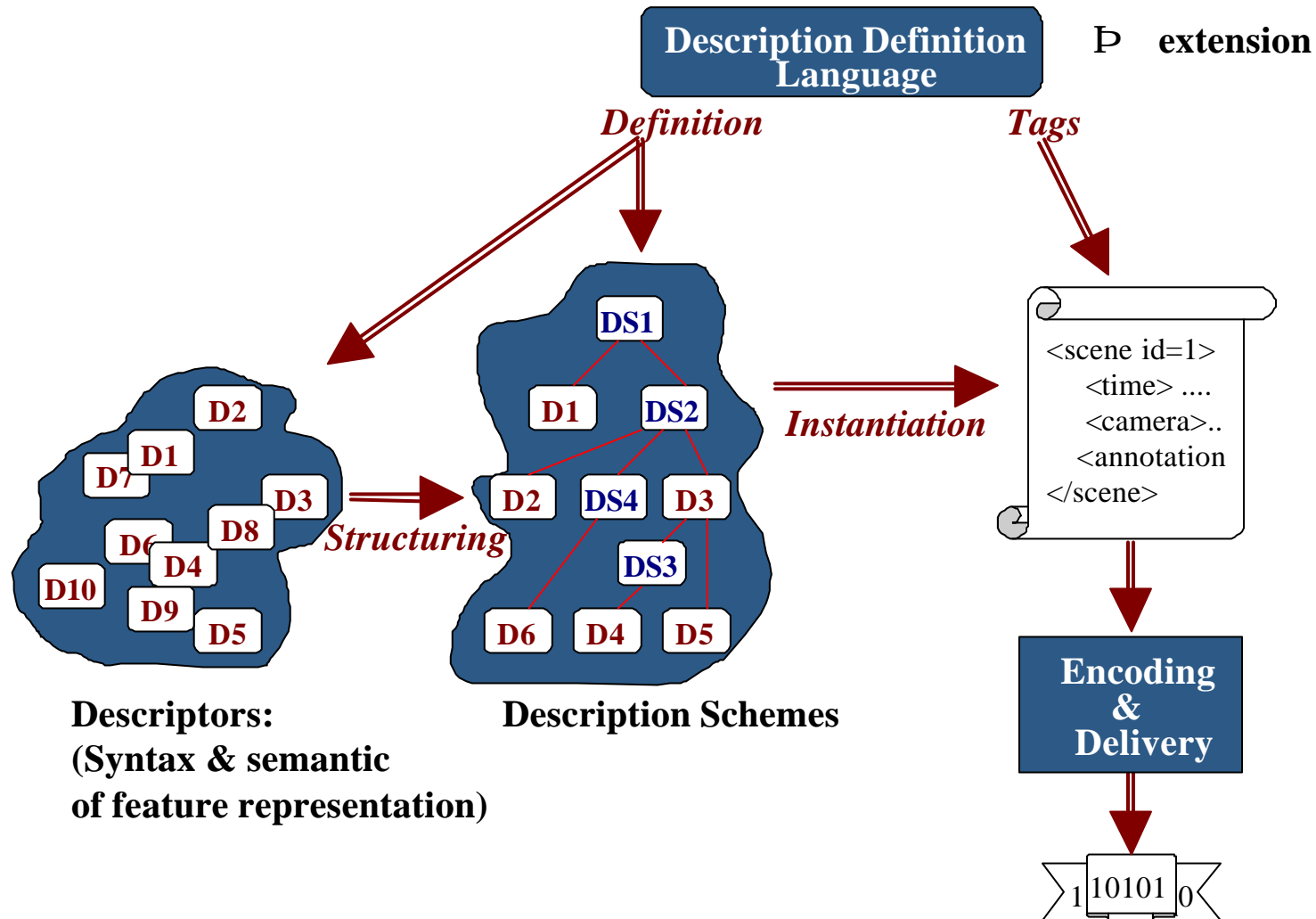
Outline
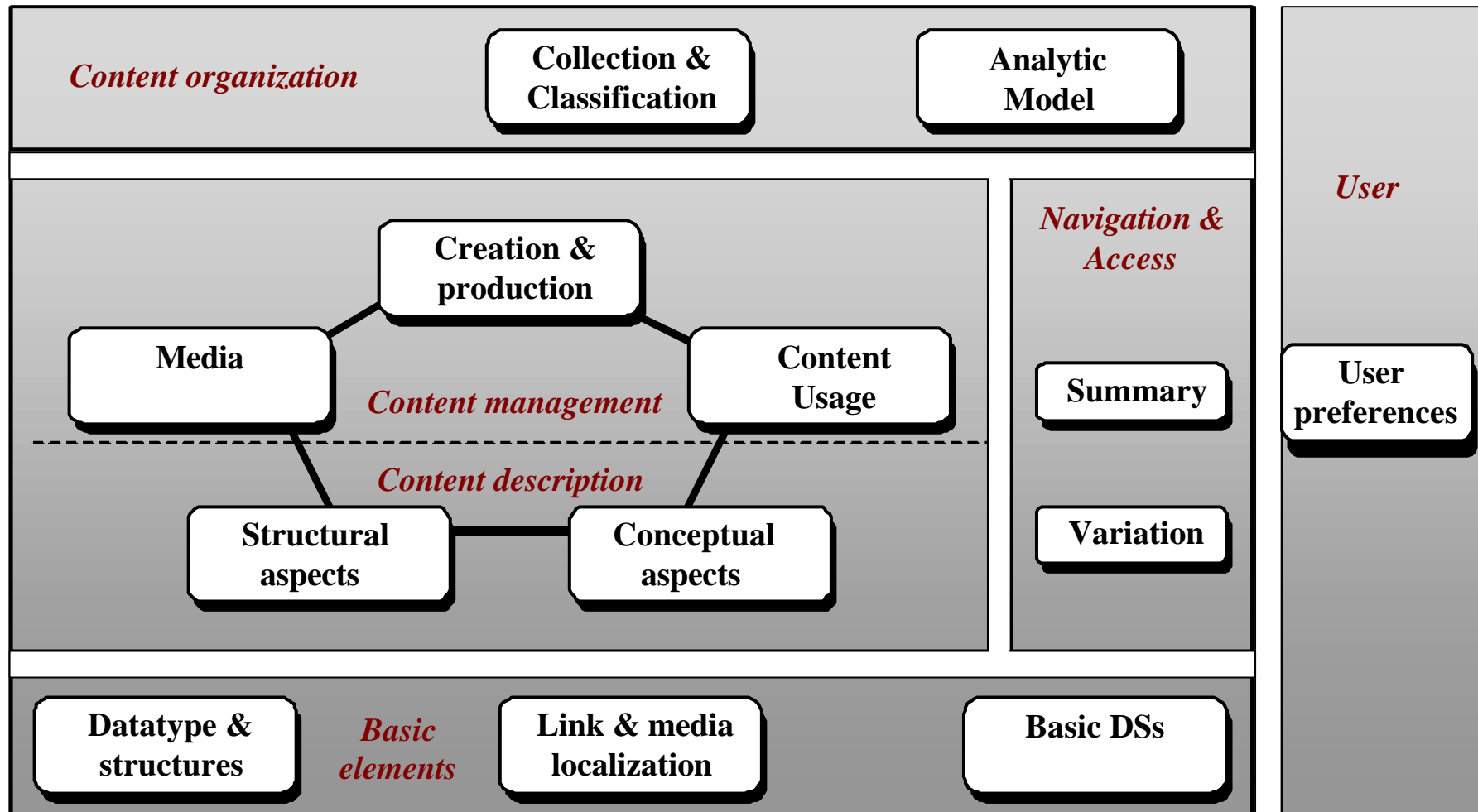
- Goals and scope of MPEG-7
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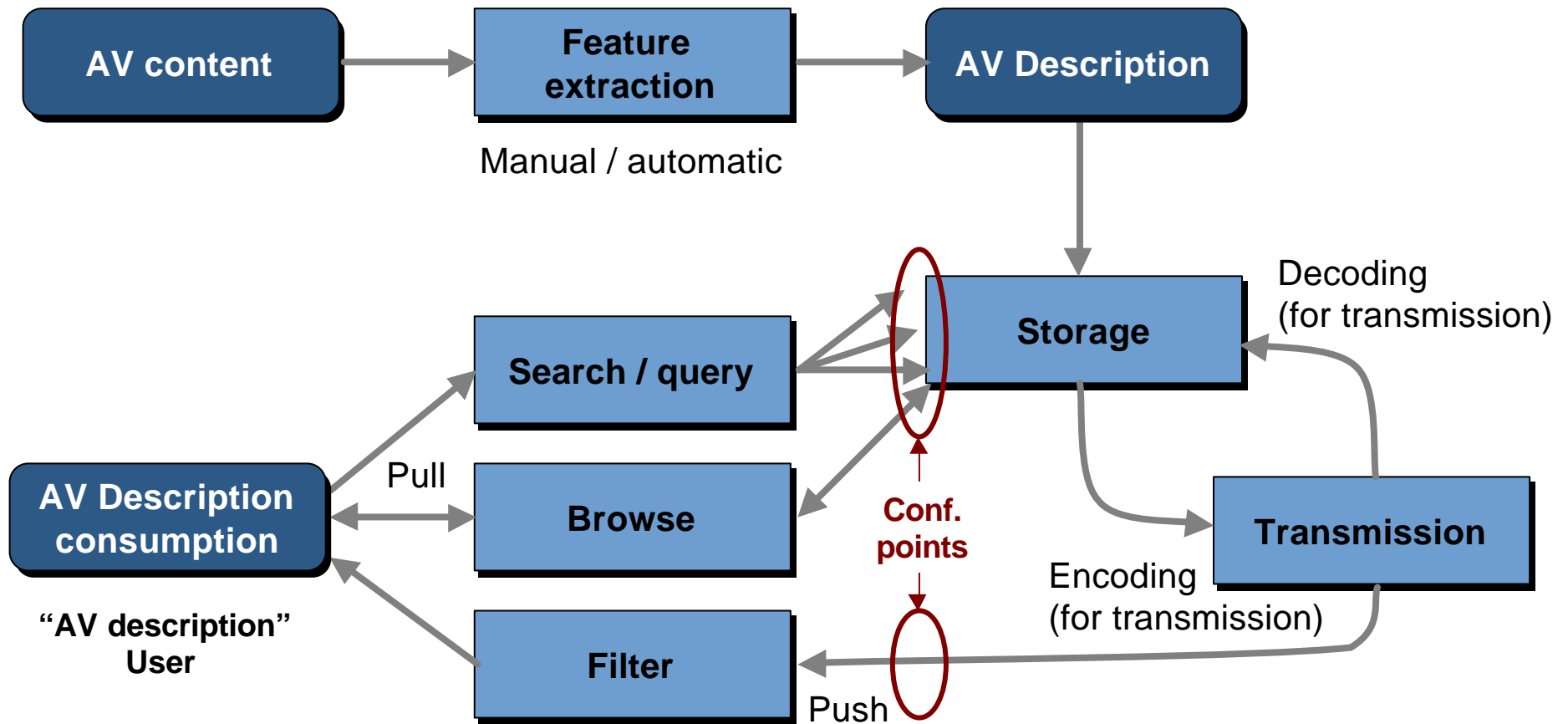- Conclusions

Current MPEG-7 working areas

Description Definition Language

Ⴆ extension

Definition   *Tags*

DS1

D1   DS2

D2   DS4   D3

DS3

D6   D4   D5

Instantiation

Structuring

D2
D1
D7   D3
D8
D   D4
D10   D9
D5

```
<scene id=1>
  <time> ....
  <camera>..
  <annotation
</scene>
```

Encoding & Delivery

1 | 10101 | 0

Descriptors:
(Syntax & semantic
of feature representation)

Description Schemes

Library of description tools

Content organization

Collection & Classification
Analytic Model

Content management

Creation & production

Media

Content Usage

Content description

Structural aspects

Conceptual aspects

Navigation & Access

Summary

Variation

User

User preferences

Basic elements

Datatype & structures

Link & media localization

Basic DSs

Use of description tools

- The description tools are presented on the basis of the functionality they provide.

- In practice, they are combined into meaningful sets of description units.

- Furthermore, each application will have to select a sub-set of descriptors and DSs.

- Library of tools!

- DDL can be used to handle specific needs of the application.

An example of architecture

- The content and its description may also be multiplexed

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Key-areas of the Multimedia framework

From a user viewpoint (N3162):

- Network and delivery
- Quality and flexibility of service   **MPEG-7**
- Quality of content (rendering)
- Quality of content (artistic)
- Ease of use of services and devices
- Interoperability of physical media formats
- Payment / subscription model
- Multi-platform decoding and rendering
- Search, filter, locate, retrieve and store the content   **MPEG-7**
- Consumer content publishing   **MPEG-7**
- Usage rights of consumers
- Consumer privacy

Content representation / description

- Generally seen as two different entities
    - Two different functionalities:
    - Different set of requirements
    - Different tools, etc.

AV Content

Description

AV **Desc** **AV** **Desc**
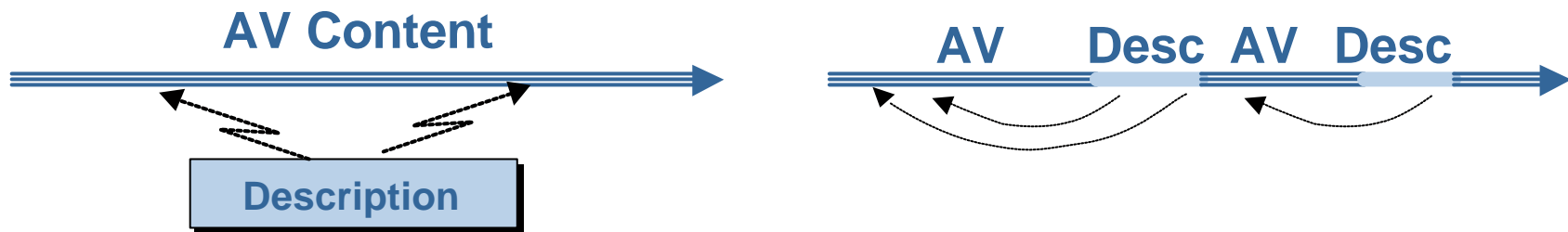
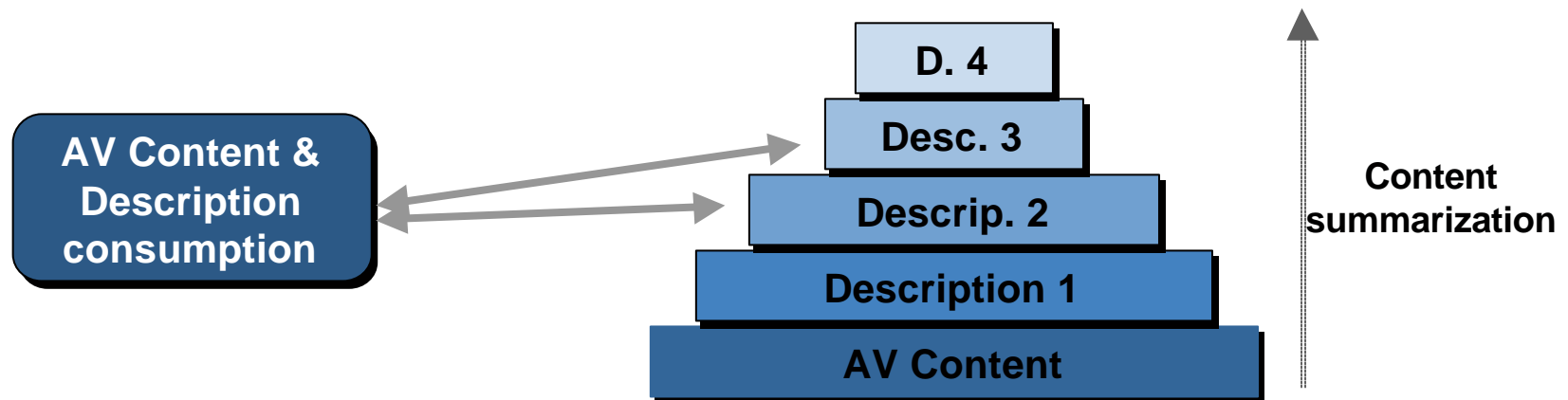# Content representation / description

- For future multimedia services, content representation and description may have to be addressed jointly:

  - ◆ Many services dealing with content representation will have to deal first with content description
    "a non-described content may be useless"

  - ◆ Access only to the content description:
    - ✦ New original services (e.g. optimizing personal time)
    - ✦ Adaptation to networks and terminal capabilites

Content representation / description

- Is consumption of the content the ultimate goal ?

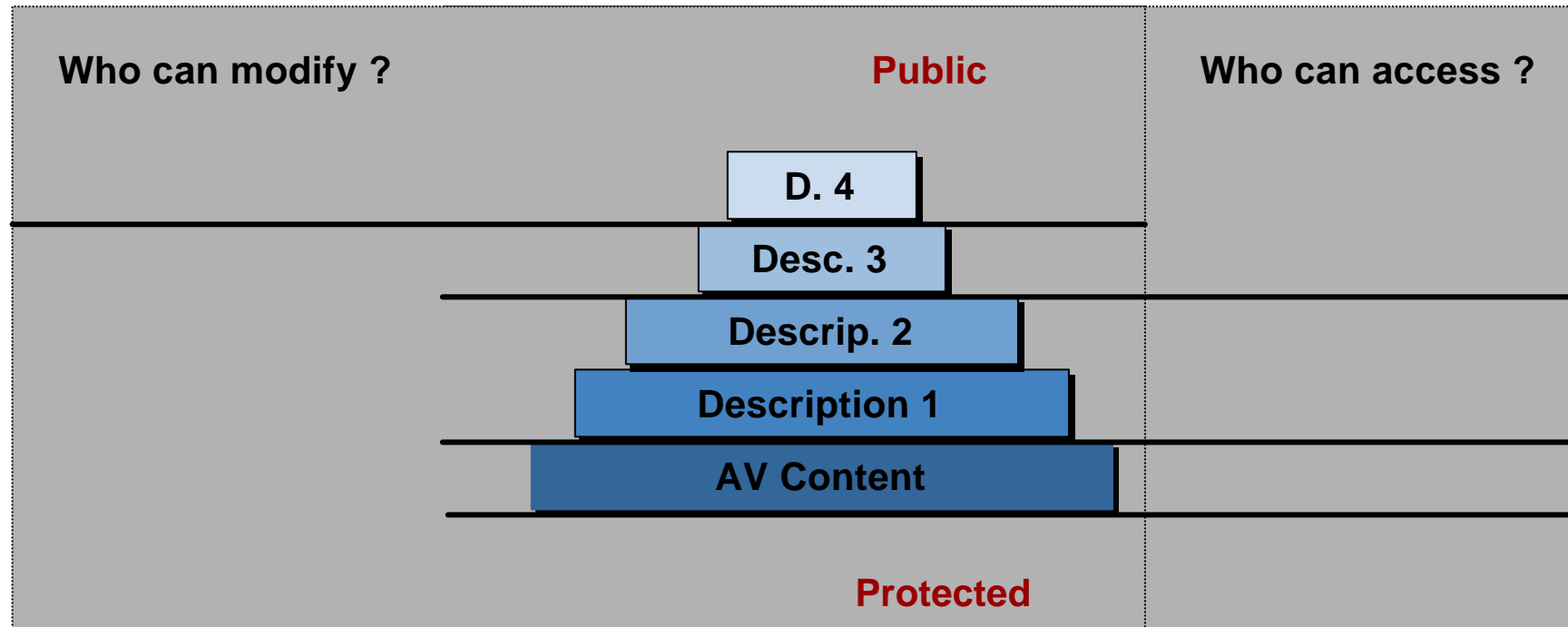# Integration of content representation / description

- Full integration of content representation and its description:
    - Are there new requirements?
    - What is the appropriate architecture for this integration?

- Analysis of the integration between content representation and its description: a work item for MPEG-21?

Key-areas of the Multimedia framework

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Information Protection

Who can modify ?	Public	Who can access ?
	D. 4	
	Desc. 3	
	Descrip. 2	
	Description 1	
	AV Content	
	Protected	

- The definition of the frontier between public/protected information will create / allow different business models.

Conclusions

- **Overview of MPEG-7**
  - Scope and goals, Tools, Architecture
- **Relation: content representation and content description**
  - No clear separation for future services
  - Integration of content representation and description may be studied by MPEG-21
- **Relation: content description and protection**
  - The definition of what is protected will enable different business models
  - The value of the description is going to increase