



Using MPEG-21 to repurpose, distribute and protect news/NewsML information

Pierfrancesco Bellini, Ivan Bruno, Paolo Nesi

DISIT-DSI, Distributed Systems and Internet Technology Lab

Department of Systems and Informatics, University of Florence

nesi@dsi.unifi.it,

paolo.nesi@unifi.it

<http://www.dsi.unifi.it/~nesi>,

<http://www.disit.dsi.unifi.it>



DMS 2009, San Francisco, USA

- **Motivations**
- **NewsML overview**
- **Problems of NewsML**
- **Mpeg-21/AXMEDIS overview**
- **From NewsML to MPEG-21/AXMEDIS**
- **Model for Intelligent News**
- **Automating the News Management**
- **Conclusions**

- **A large number of cross media content formats: SCORM, MXF, NewsML, MPEG-21, Flash, HTML, etc.**
- **Major Issues for cross media content (DMS 2008):**
 - ◆ Packaging:
 - ➔ Metadata and descriptors, Ids
 - ➔ Digital essences
 - ◆ Distribution: download, streaming, progressive, P2P
 - ◆ Protection: CAS vs DRM
 - ◆ Hierarchical nesting levels: IPR, Metadata, etc.
 - ◆ Players and tools
 - ◆ Automated production, repurposing, etc...
- **Some lacks into the capabilities of the NewsML model and tools to cope with recently stressed aspects:**
 - ◆ IPR, intelligence, interoperability, etc.

- **Largely diffuse**
 - ◆ Archival and interchange format for news
 - ◆ Family: NewsML, NewsML2, SportML, etc.

- **Model based on XML (quite sophisticated)**
 - ◆ Classification metadata
 - ◆ Extension of metadata
 - ◆ Usage of dictionaries (*Topic, TopicSet, Catalog*)
 - ◆ Etc.

- **Packaging with ZIP**
 - ◆ All the files are simply referred from the XML, rarely are encapsulated

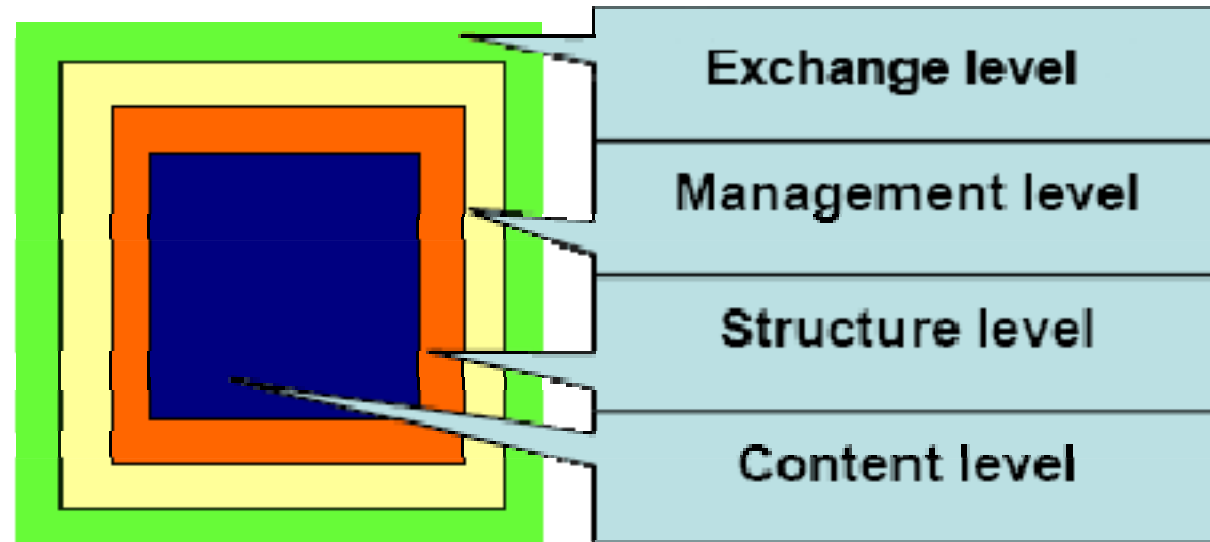
- **Protection: missing**

- **Distribution: only download**

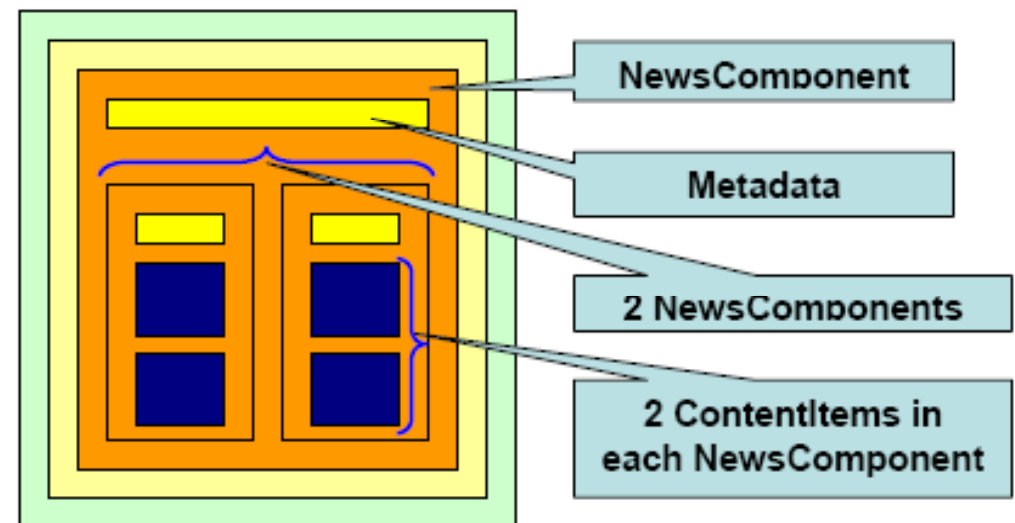
Structure of the NewsML

NewsML : File XML with metadati + resources

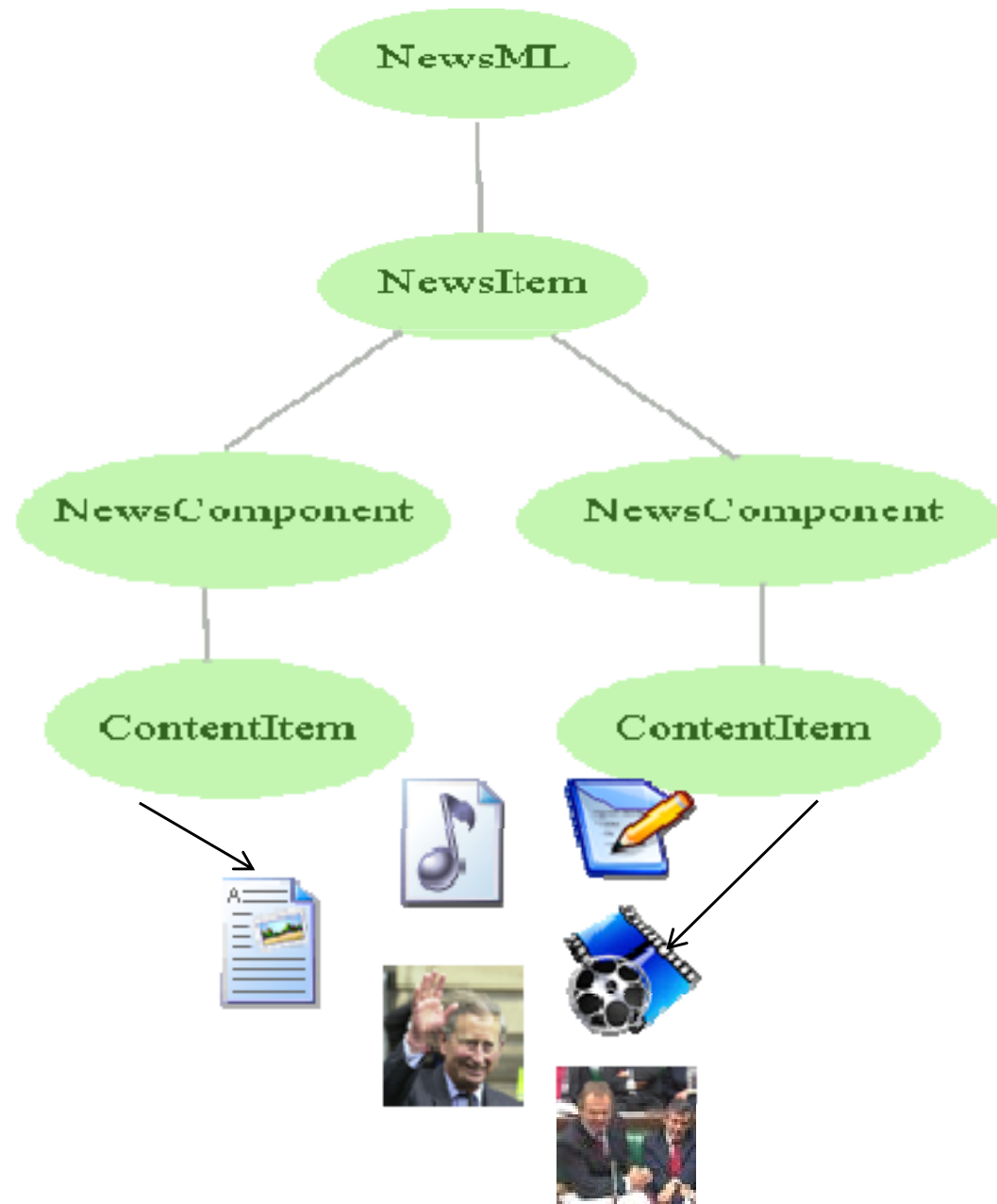
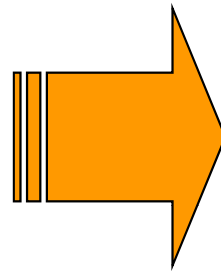
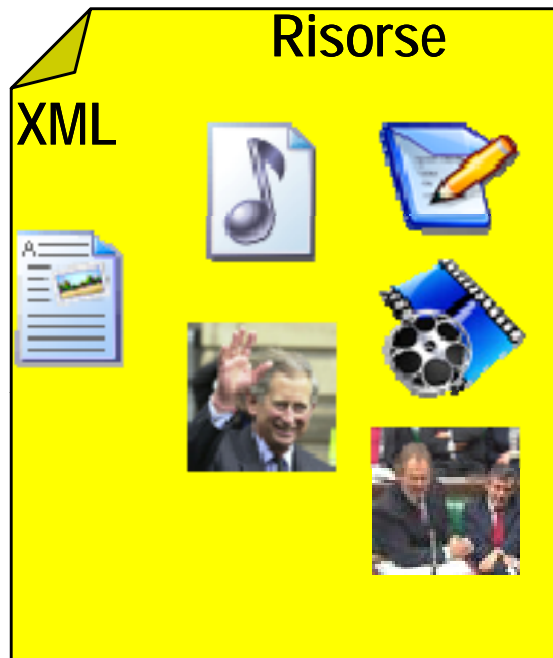
XML structure of a NewsML document



Content Level → **ContentItem**
Structure Level → **NewsComponent**
Management Level → **NewsItem**
Exchange Level → **NewsML**



Example of NewsML

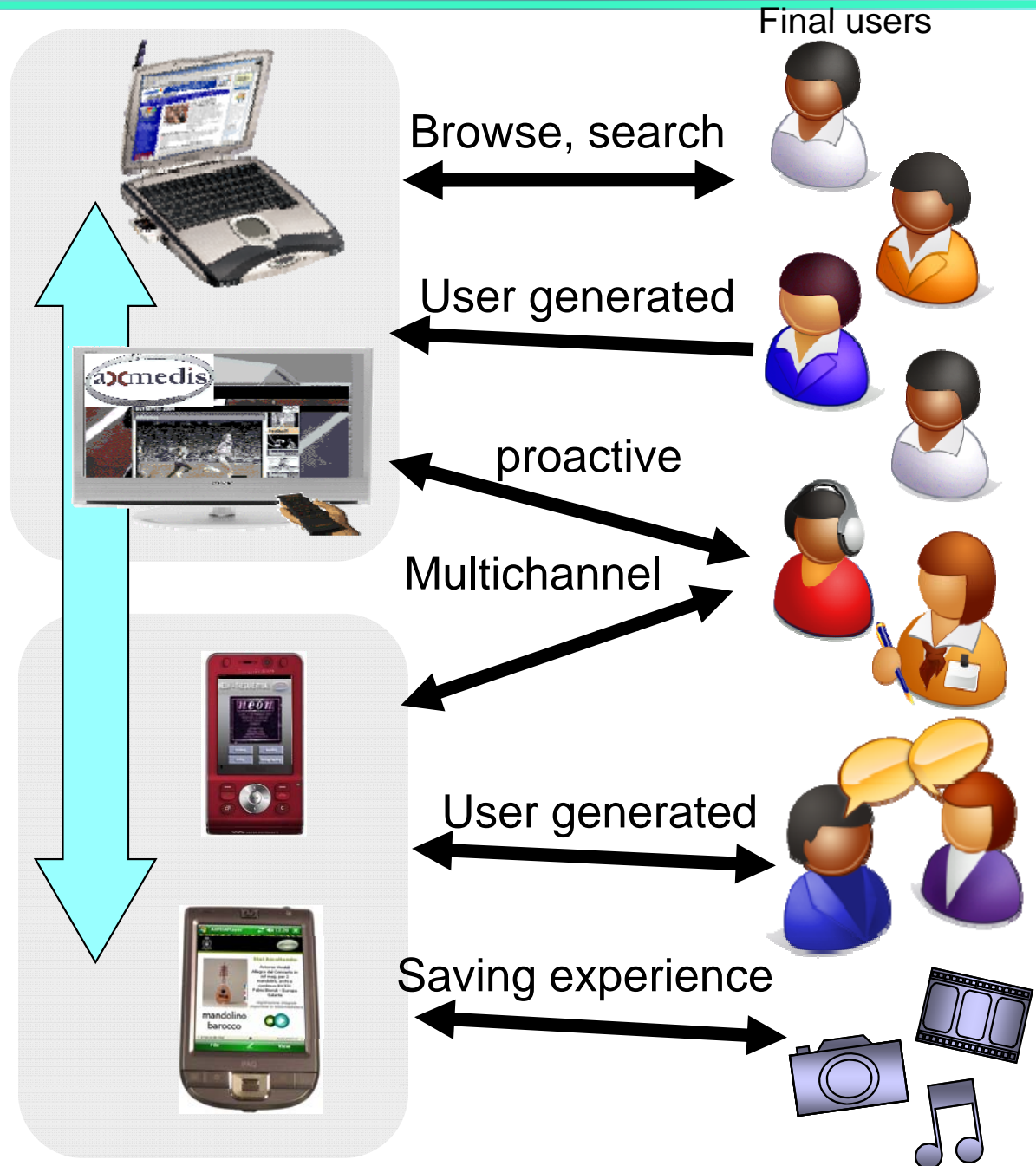


- **Packaging: zip**
 - ◆ All the files are simply referred from the XML, rarely encapsulated
 - ◆ Consistency and Completeness of the PACK is has to verify since the digital essences are only referred with some IDs or file names that may be changed, lost, etc...
- **Protection: simple CAS**
 - ◆ Possibly to use come CAS on ZIP based on password
 - ◆ no IPR formalization of rights, no licensing models and tools
 - ◆ no protection and no enforcement into players/editors/tools
- **Distribution: only download**
 - ◆ Impossible for large file that have to opened to play them,
 - ◆ for example: *to access at a news with a video of 500 Mbyte one has to fully download, unpack and then to play the video.*
- **Intelligence: missing**
 - ◆ No content behavior, no profile/descriptors taken into account, etc.
 - ◆ No proactive with Users
 - ◆ For instance: internal search into the notice, extraction of elements on the basis of rights, etc.

Interactive and intelligent content



- **integrated media info**
- **proactive with the users**
- **attractive experience**
- **personalized**
- **multichannel**
- **interoperable**
- **device interoperable**



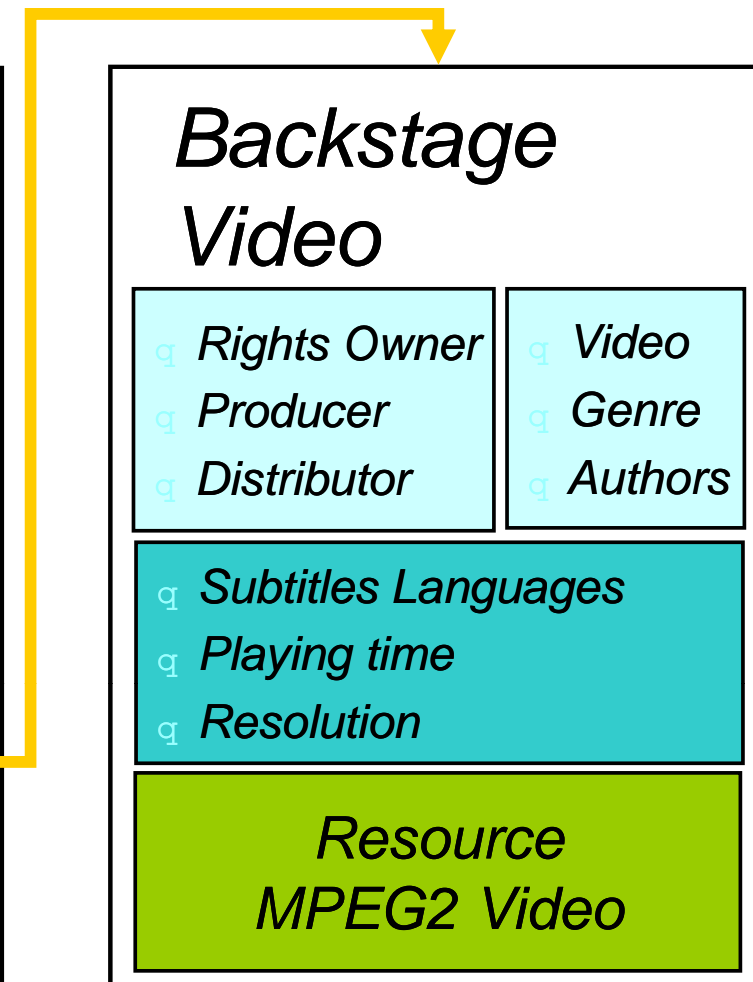
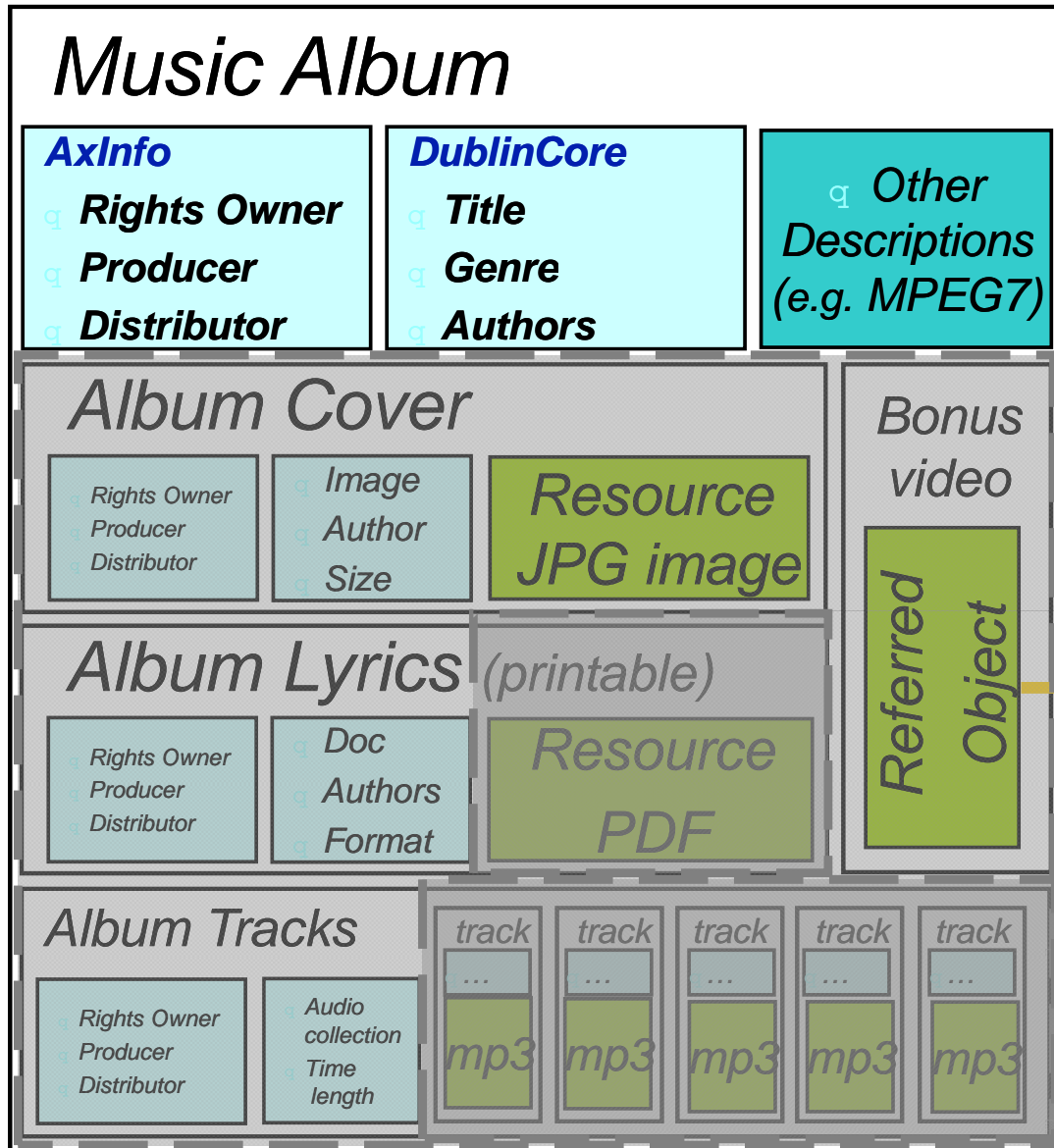
Examples: Intelligent Content



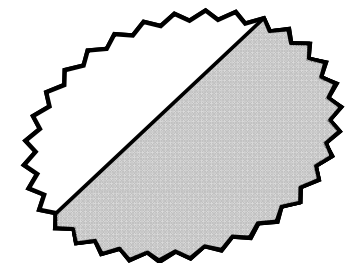
- **Single Files:**
 - ◆ audio, video, documenti, immagini, etc..
- **Interactive Content:**
 - ◆ HTML or SMIL as technology of User interaction
 - ◆ Guids, games, etc.
 - ◆ Valoriz. of Cultural Heritage content
 - ◆ Educational Content
- **Proactive Wizard:**
 - ◆ Video messg. Recording, UGC
 - ◆ Assisted upload
 - ◆ Production of licenses
 - ◆ User profile processing
 - ◆ Taking decision
 - ◆ Local indexing/searching
 - ◆ Local assistant
 - ◆



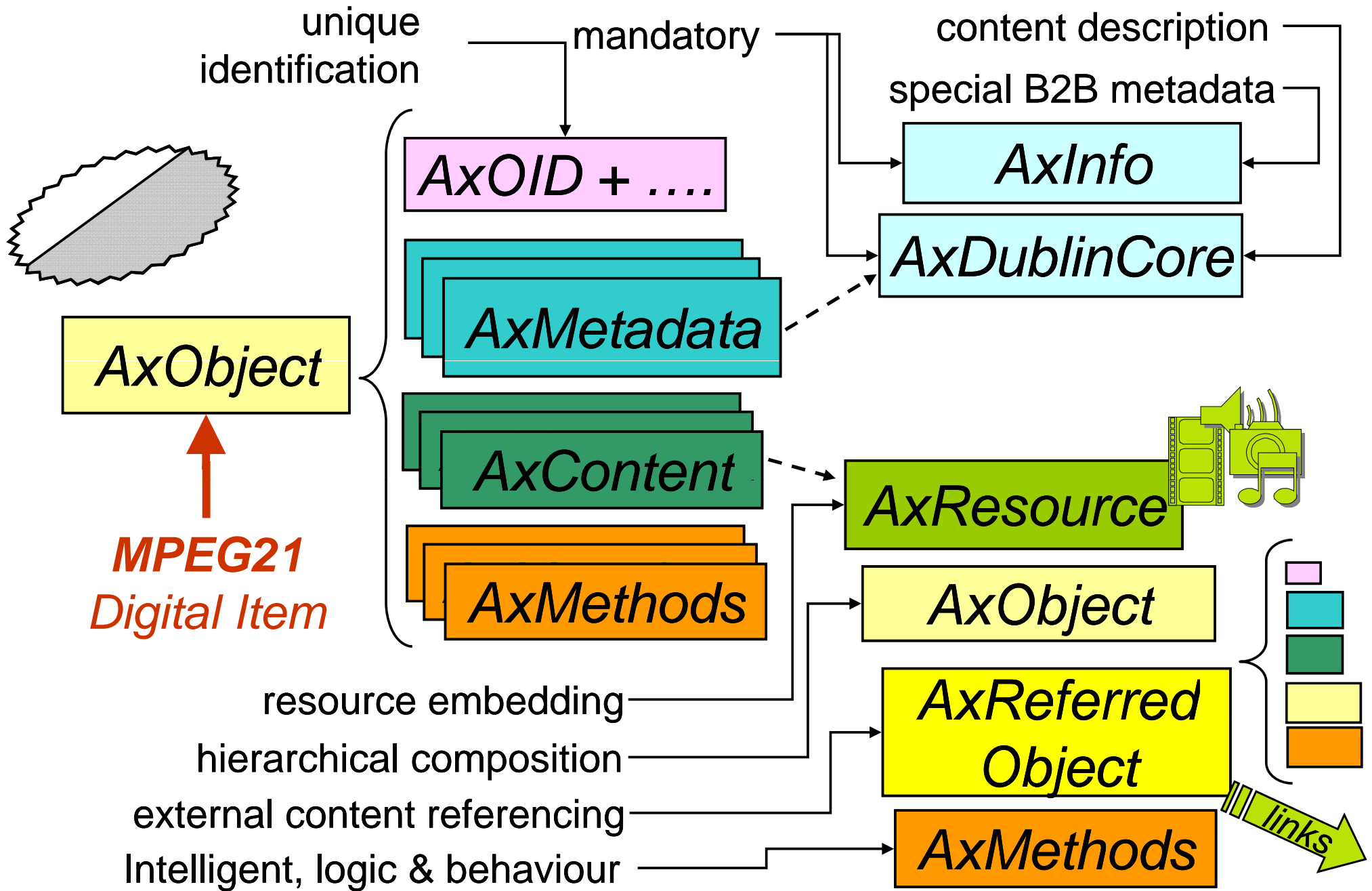
An example of MPEG-21 AXMEDIS



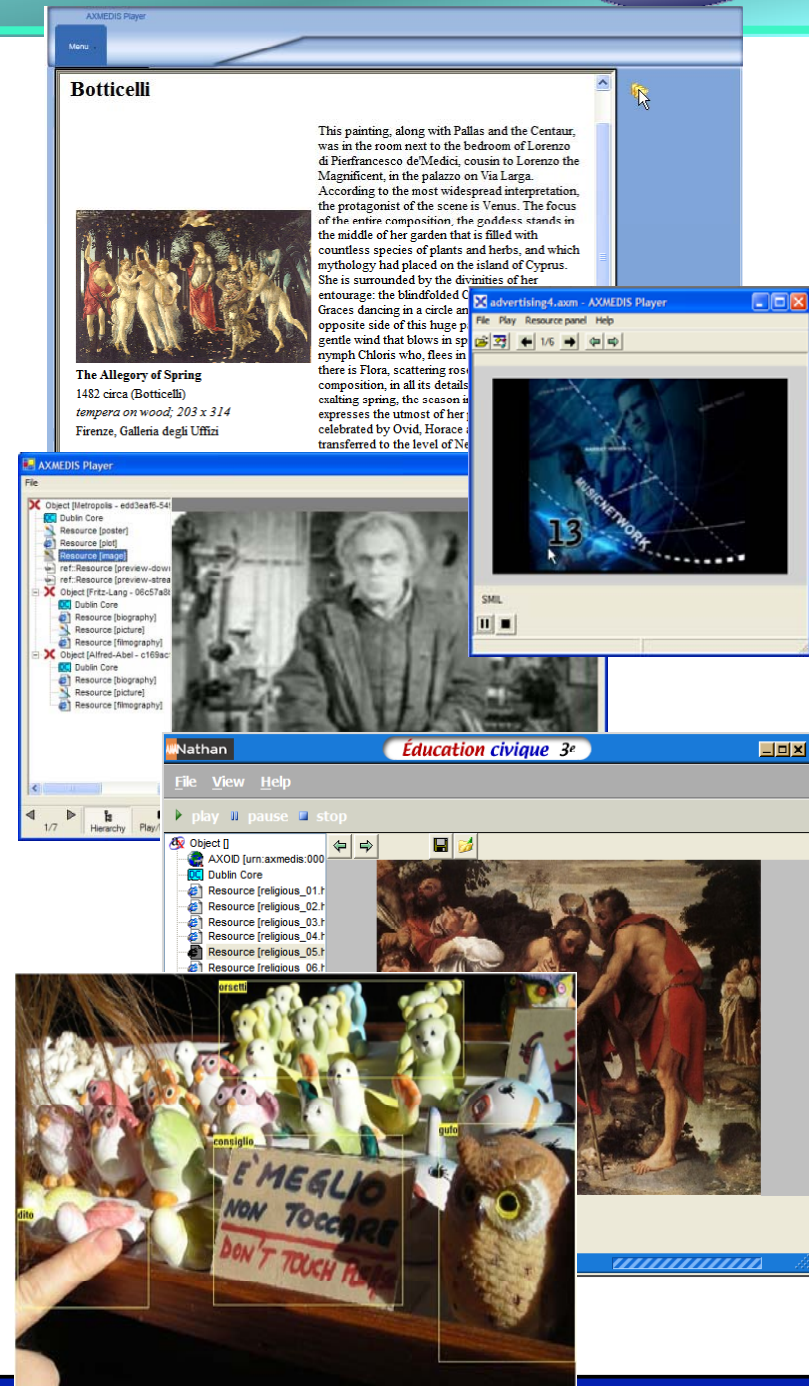
o Metadata will be always accessible for indexing and querying



AXMEDIS Object/Package Model



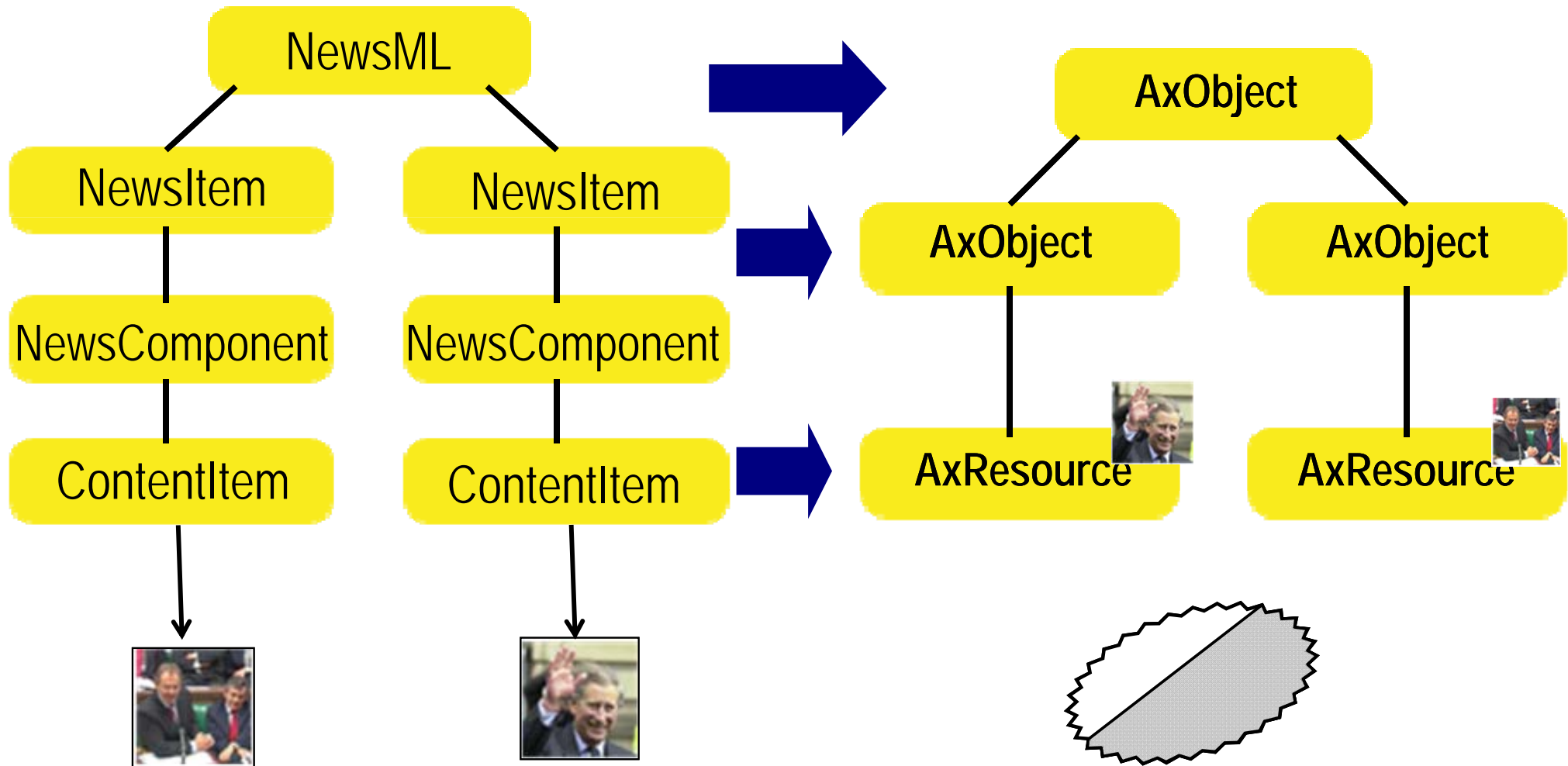
- Any content inside a package:
 - ◆ Mix of: HTML, SMIL, MPEG-4, video, audio, text, Documents, images, actions, games, animations, etc.
 - ◆ Additional content and interactivity for the end users
 - ◆ compliant and extending MPEG-21
- AXMEDIS Intelligent content allow user/producers to
 - ◆ create content for other devices: ringtones, mobiles, ...
 - ◆ support social activity
 - ➔ annotations
 - ➔ user generated content
 - ➔ personal collections
 - ◆ internal query
 - ◆ customized for culture and language



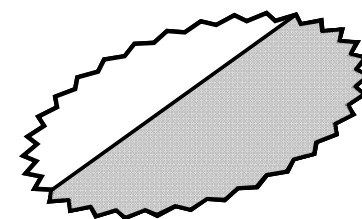
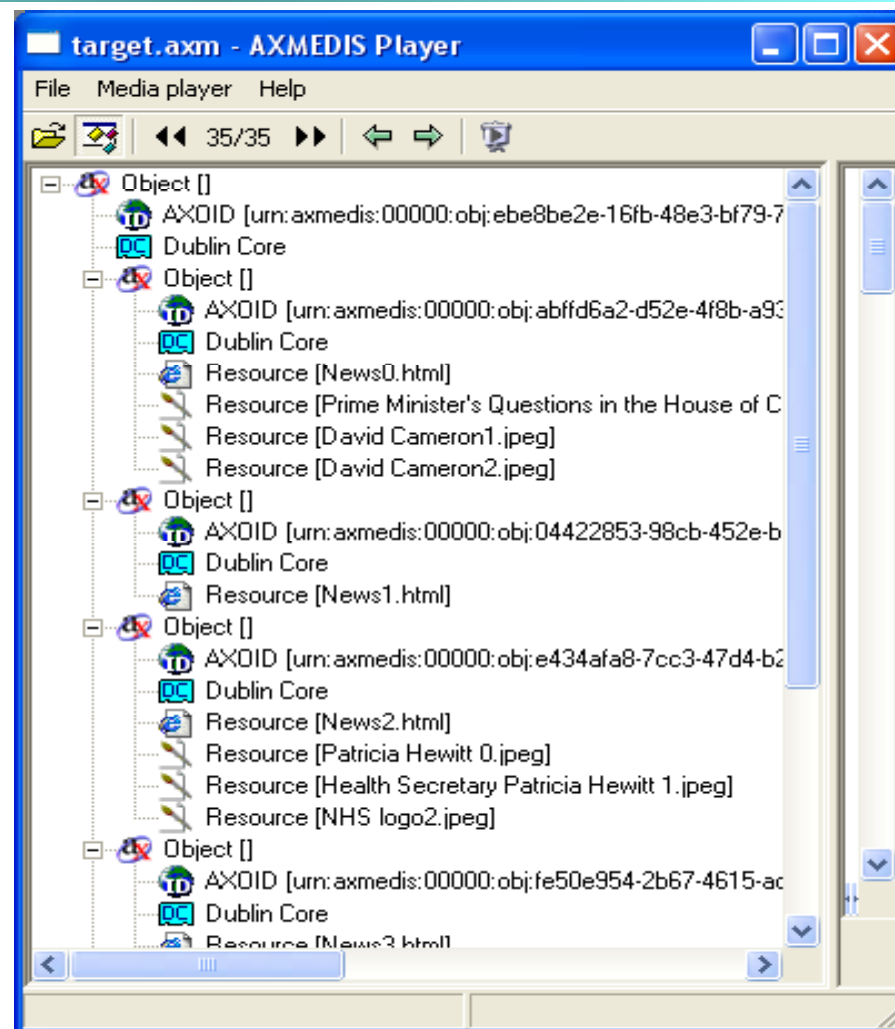
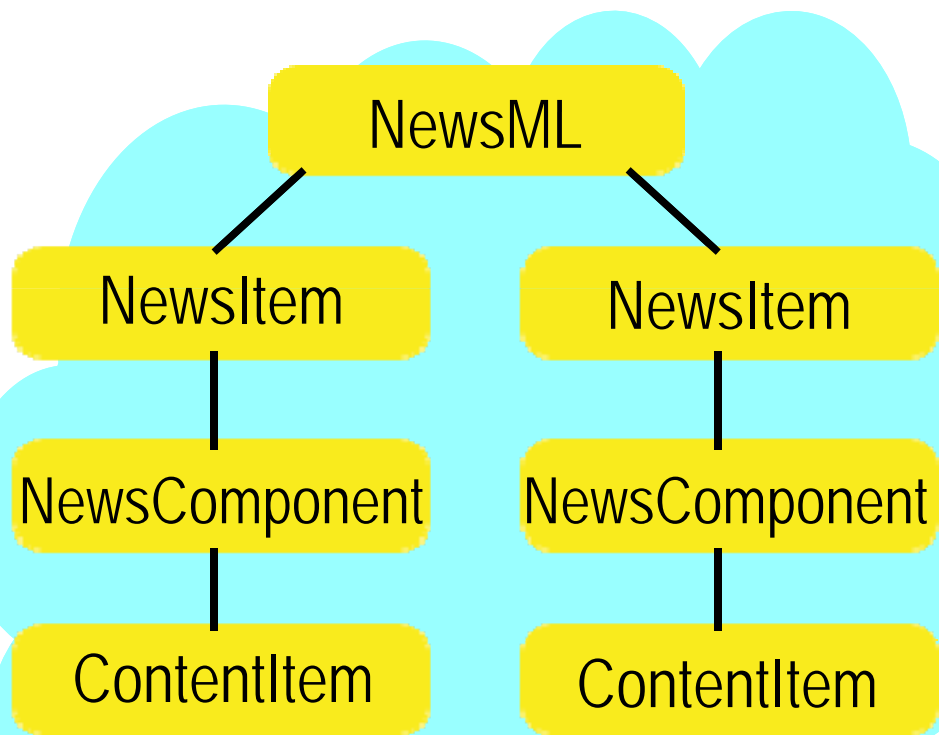


Business Models	Larger number of Business Models
B2C DRM	B2B, B2C, B2B2C DRM solution
Proprietary / Standard DRM and model	Standard DRM: MPEG-21, OMA, etc.
Non interoperable DRM	Allowed Interoperable DRM: MPEG-21, OMA, etc.
Fixed/Flexible Protection Model	Any Protection Model, key, algorithms, etc.
Separation among Content and license	Separation among Content and license
Signed Content Header	Signed Content AXINFO, any Metadata
Channel distribution	Multichannel with the same license
Players and Devices	Players and Devices: PC MS-Windows, PDA Windows Mobile, STB, Linux OS, Apple MAC (in progress), Java Mobiles
License Proprietary: number of rights, domainss	Licenses MPEG-21 REL: Expandable dictionary, any type of rights, licenses OMA, domains
Authentication of Player	Authentication of device, user, domain, etc.
Revocation per Player	Revocation per device, user, etc,
Revocation per license	Revocation per license
Source code non accessible	Source Code Accessible
Limited Metadata	Any metadata, custom metdata, any ID, any Descriptor
Media content, simple content, not intelligent	Any digital format, of any type: audio, video, image, games, doc, and Cross media: SMIL, HTML, MPEG-4,... INTELLIGENT content
Customizable Tools	Customizable Tools: servers and player clients

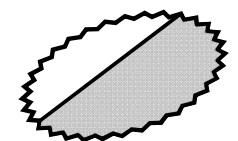
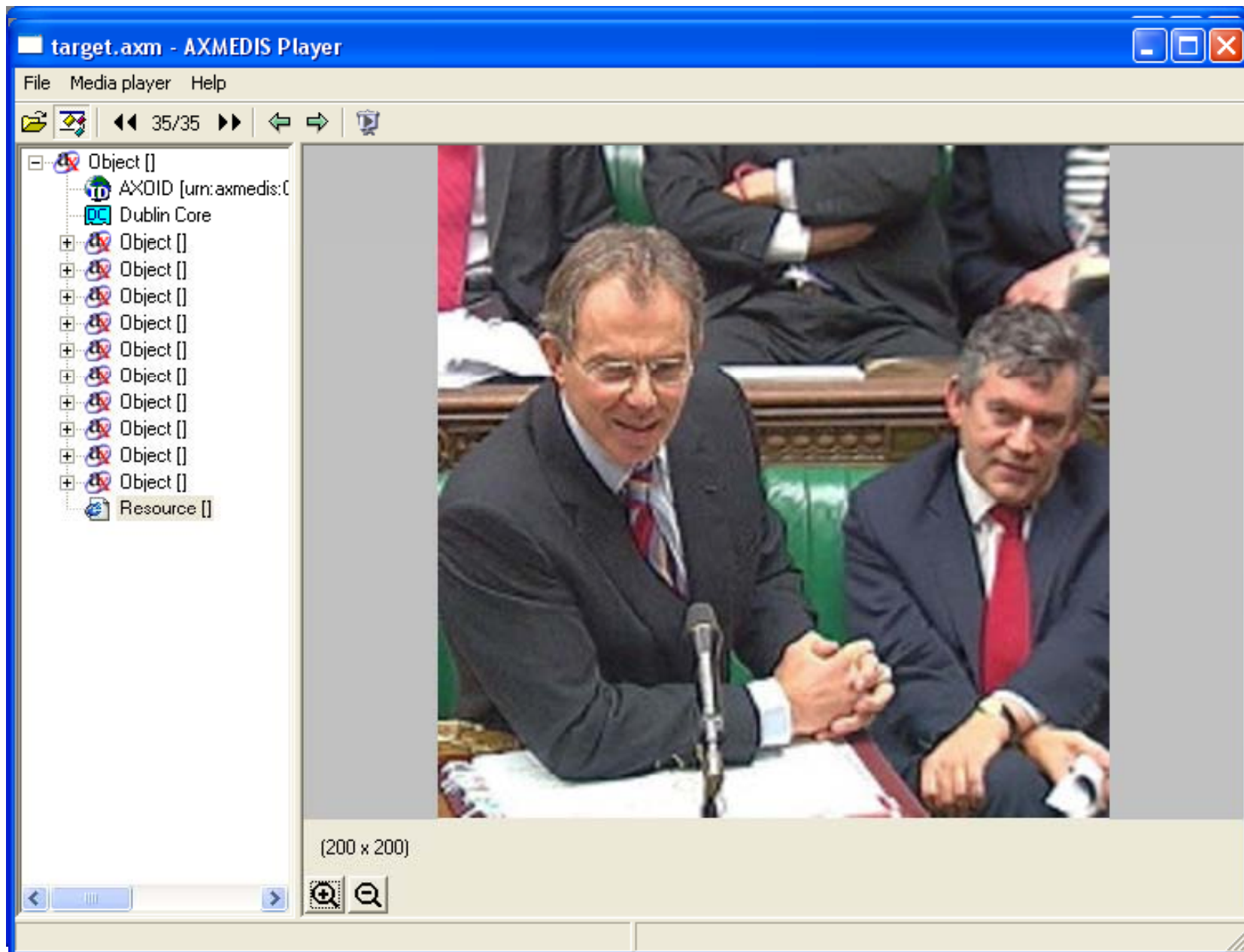
From NewsML to AXMEDIS



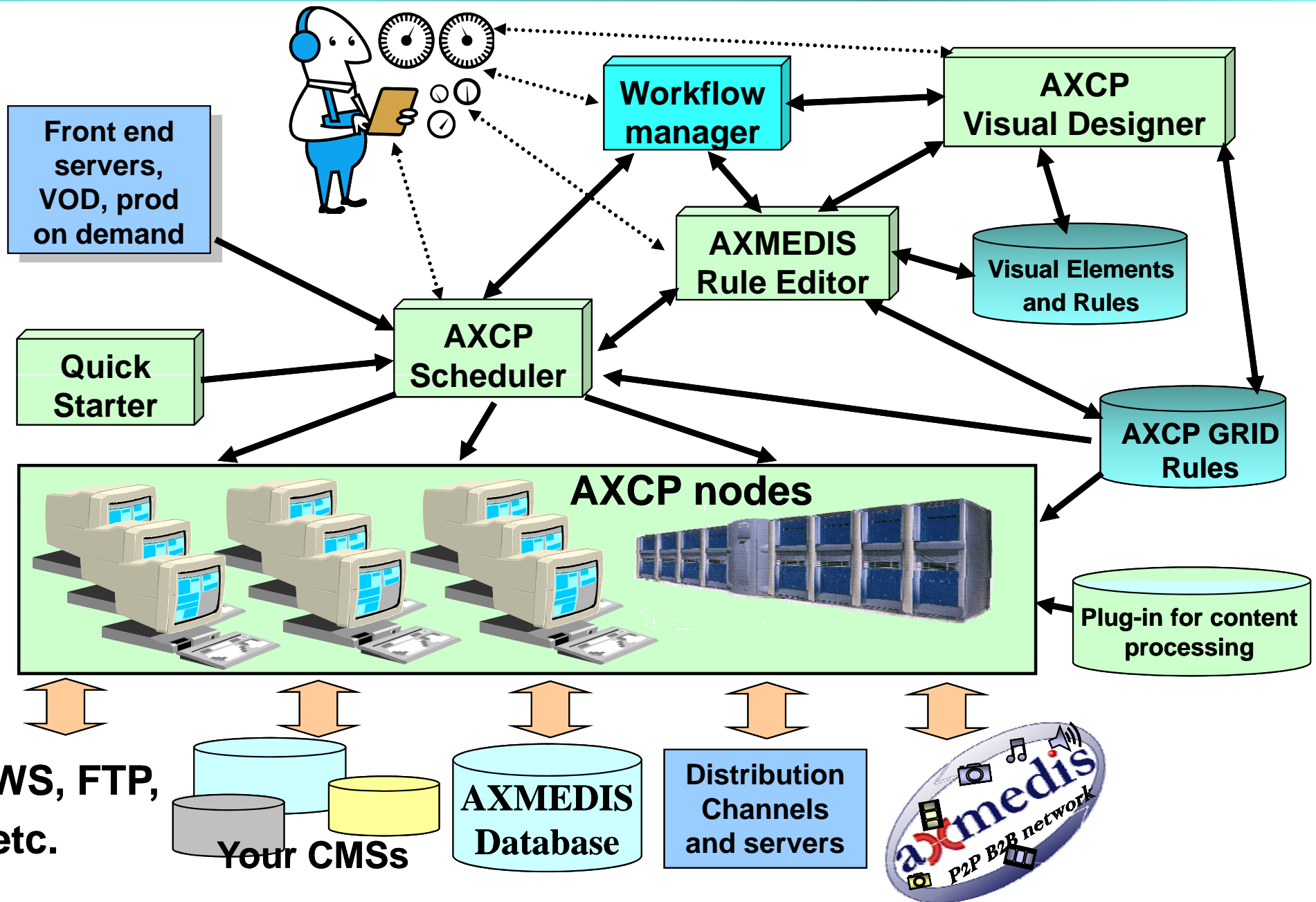
From NewsML to AXMEDIS

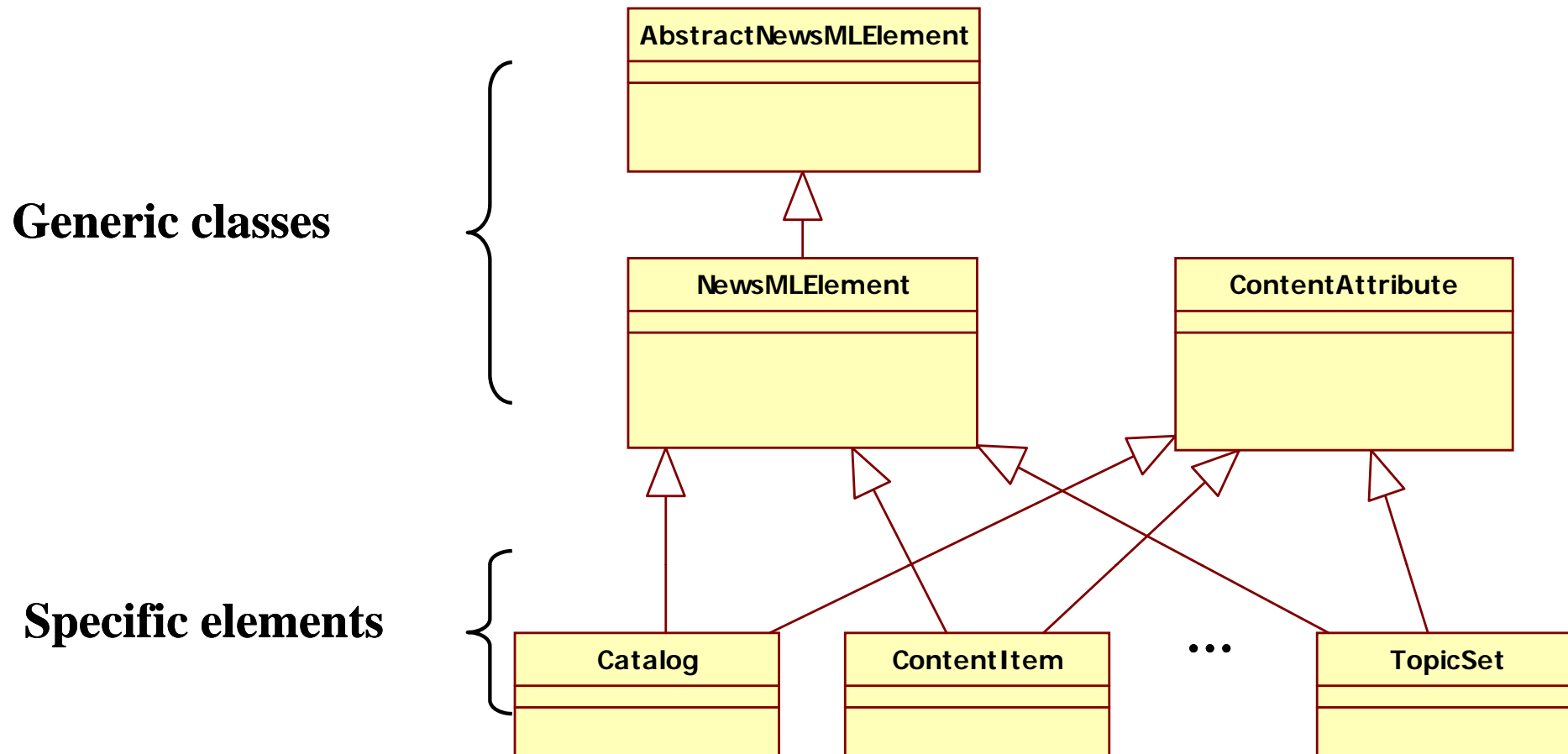


AXMEDIS Player, AXMEDIS Editor



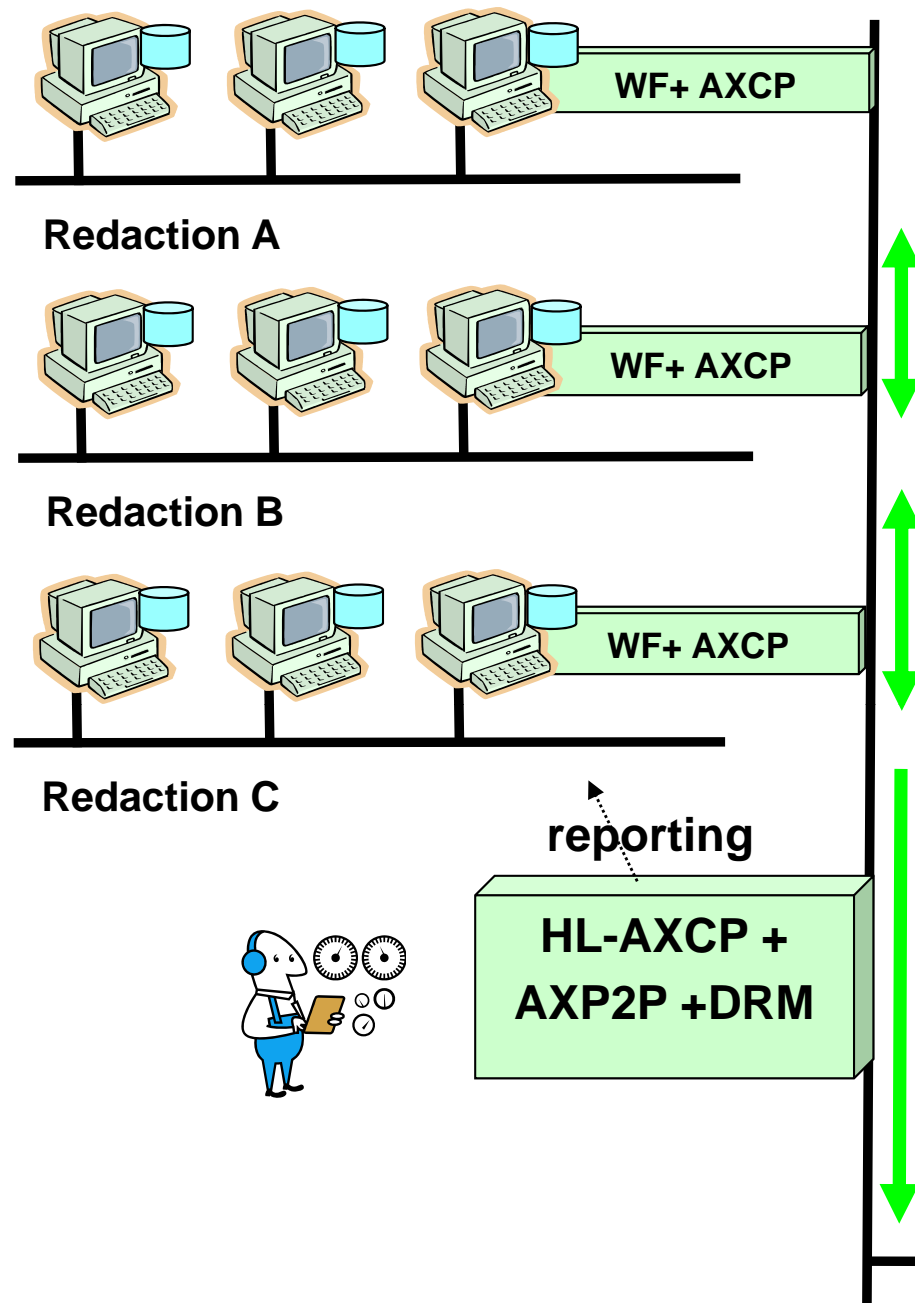
Automated Management of News



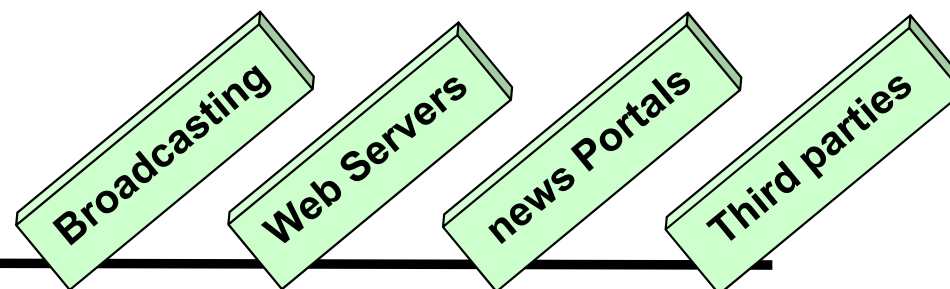


*AbstractNewsMLElement, NewsMLElement and ContentAttribute
Implements the major functionalities
Then: NewsML, NewsItem, NewsComponent, ContentItem,
Topic, TopicSet, Catalog*

Multifactory news production and sharing



- **AXCP based News redaction**
 - ◆ content management and publication
 - ◆ content gathering
 - ◆ automated production, transcoding
 - ◆ automated metadata enrichment, labeling, completion
 - ◆ content protection and DRM, B2B content sharing with DRM rules
- **WFMs**
 - ◆ Workflow harmonization and control
 - ◆ Control points and check points
- **HL-AXCP + AXP2P**
 - ◆ content sharing among Factories according to DRM
- **AXDRM**
 - ◆ Control of content access and usage
- **Scalable and integrated**



- **The solution proposed save the NewsML structure in a new package much more powerful than the former one**
- **MPEG-21 AXMEDIS Tools can be used for:**
 - ◆ Ingesting and repurposing NewsML
 - ◆ Producing and editing news
 - ◆ Packing and delivering news
- **Strong advantages:**
 - ◆ Distribution as progressive download and stream
 - ◆ Protection enforcement and DRM (B2B and B2C)
 - ◆ Interoperability of Players (PC, PDA, Mobile) and authoring tools
 - ◆ Model for Intelligent News (active and proactive)
- **All the back office activities can be automatically managed**