Automating Production of Cross Media Content for Multi-channel Distribution

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DE8.4.1.2
Editorial Format Guide and examples
First Update

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Abstract:
This document builds on DE8.4.1.1, providing additional guidelines and examples of editorial formats for use within the AXMEDIS framework in the automated production of content.

Keyword List: Editing, Formats, Layouts, Templates, Channels, Content

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1 Executive Summary and Report Scope (XIM, ILABS)

This document is an update to DE8.4.1 Editorial Format Guidelines and Basic Examples. It provides a more concrete definition of AXMEDIS Editorial Formats, describes Editorial Formats specific to different content categories, gives guidelines on transformations between formats, includes some DRM and licensing aspects and provides updated information on SMIL-based automatic formatting in AXMEDIS.

2 Introduction (XIM, ILABS, FUPF, All)

2.1 Background

This is the second deliverable from WP8.4, Definition of distribution channel editorial formats. The Annex I states:

> *The standard distribution channel is today a single distribution path for each type of content, and often, multiple proprietary systems of representation for the same content. The definition of distribution channel editorial formats would provide one way, unified and rock-solid content format for multipurpose applications. Alternative solutions such as CONTESSA supported the multi-channel distribution by using an XML model of content into the Content management systems of the content provider that also include multiple transcoding engines for transforming the XML model of content in the format suitable for the channel. This approach is not flexible enough since the transcoding of content at the source create strong limitation to the management of Digital Rights. In fact, in models such as CONTESSA the DRM can be applied only to the content in its final version. This creates relevant problems for the content providers since the content distributors are entitled to receive non protected content. This is almost unacceptable in most cases.*
>
> *In AXMEDIS, differently from other solutions such as CONTESSA, the channel distributors may maintain their distribution process. They can continue to use the same format for reaching the final users. In AXMEDIS, the content is distributed on the P2P tool, AXEPTool, by using an evolution of the MPEG-21 format, with the AXMEDIS contribution. This content will be easy contain and deliver MPEG-4, MPEGxx, PDF, HTML, SVG, images, documents, videos, audio file, etc. (in open standard format for continuation, without the use of proprietary technologies – see WP 4.7.1) on demand and for all platforms according to the final format produced by the Distributor. The received content will be formatted by using AXMEDIS tools on the basis of specific editorial formats. Their structure will be defined in WP4. In this WP, a set of editorial formats will be defined and produced to cover a large number of needs, ranging from: i-TV, PDA, PC, mobiles, etc.*
>
> *Work to be done:*
> - *Design basic layout templates for print rendering (no temporal and synchronisation issues).*
> - *Design basic layout templates for screen rendering, which include temporal and synchronisation*
> - *mechanisms, in particular between audio, video, imaging, etc.*
> - *Production of sample editorial formats for i-TV, PDA, PC, mobiles, kiosks.*
> - *Making the editorial format configurable by the user needs for addressing the content formatting on demand.*
> - *Testing editorial formats on the content identified in the other subWPs of WP8.*
> - *Publishing user documentation for the production of the editorial formats.*
> - *Design interaction modules and interfaces to handle and navigate through synchronised temporal documents.*

2.2 Purpose

The purpose of this deliverable is to present an update to the guidelines first published in DE8.4.1.1 and to provide some example Editorial Formats. It is particularly intended for content producers to understand the concept of Editorial Formats in AXMEDIS and to learn about the aspects involved in creating and using them with the AXMEDIS tools within the AXMEDIS Framework.

Examples of actual Editorial Formats are included throughout the document. The actual content and code for these can be downloaded from the AXMEDIS repository as DE8.5.1.1 which is in the form of a ZIP file.

2.3 Key differences to DE8.4.1.1

This document builds on the first guidelines prepared in DE8.4.1.1 in the following aspects:

- It provides an improved definition of AXMEDIS Editorial Formats
- It describes Editorial Formats specific to different content categories
- Guidelines focus on transformations between formats
- It includes some DRM and licensing aspects
- It relates to more practical examples, now that the AXMEDIS tools are well established in prototype form.

3 Definition of an AXMEDIS Editorial Format (XIM, ILABS, DSI)

An AXMEDIS Editorial Format is a kind of “blueprint” for producing a formatted AXMEDIS Object. It enables potentially thousands of consistently formatted AXMEDIS Objects to be automatically generated for delivery via different channels, from raw source content which may or may not already be formatted.

An AXMEDIS Editorial Format comprises:

- the structure of the object, including hierarchy
- graphical elements, including cover graphics, background images, logos, etc....
- style information (fonts, colours, borders, etc.)
- layout information (boxes, columns, placeholders for images/video, etc.)
- interactivity for navigation and/or control, taking into account usability aspects
- designed to suit the relevant category of content (document, presentation, video, etc.)
- designed to match channel constraints (PC, PDA/smart phone, etc.)
- DRM and licensing aspects.

The diagram below illustrates the high-level elements of an Editorial Format.

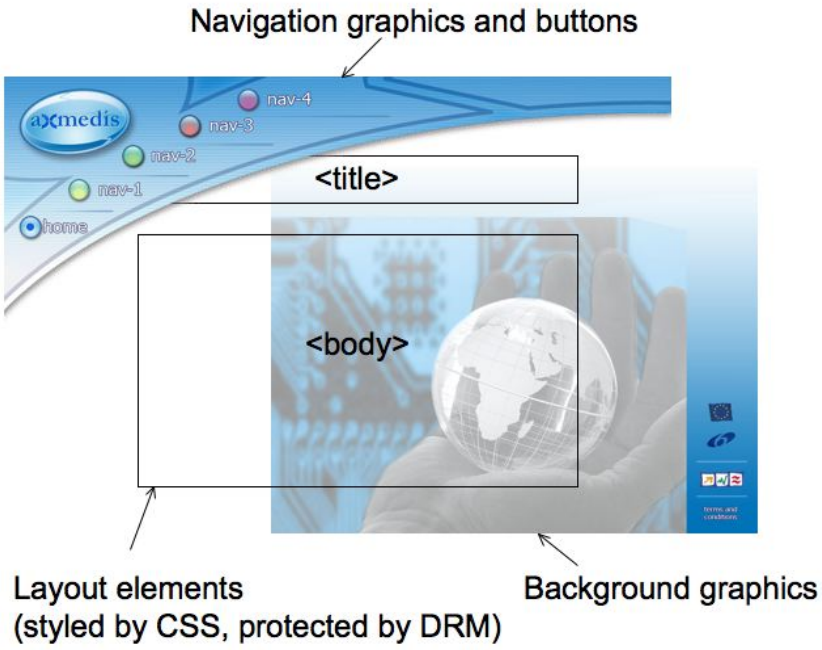


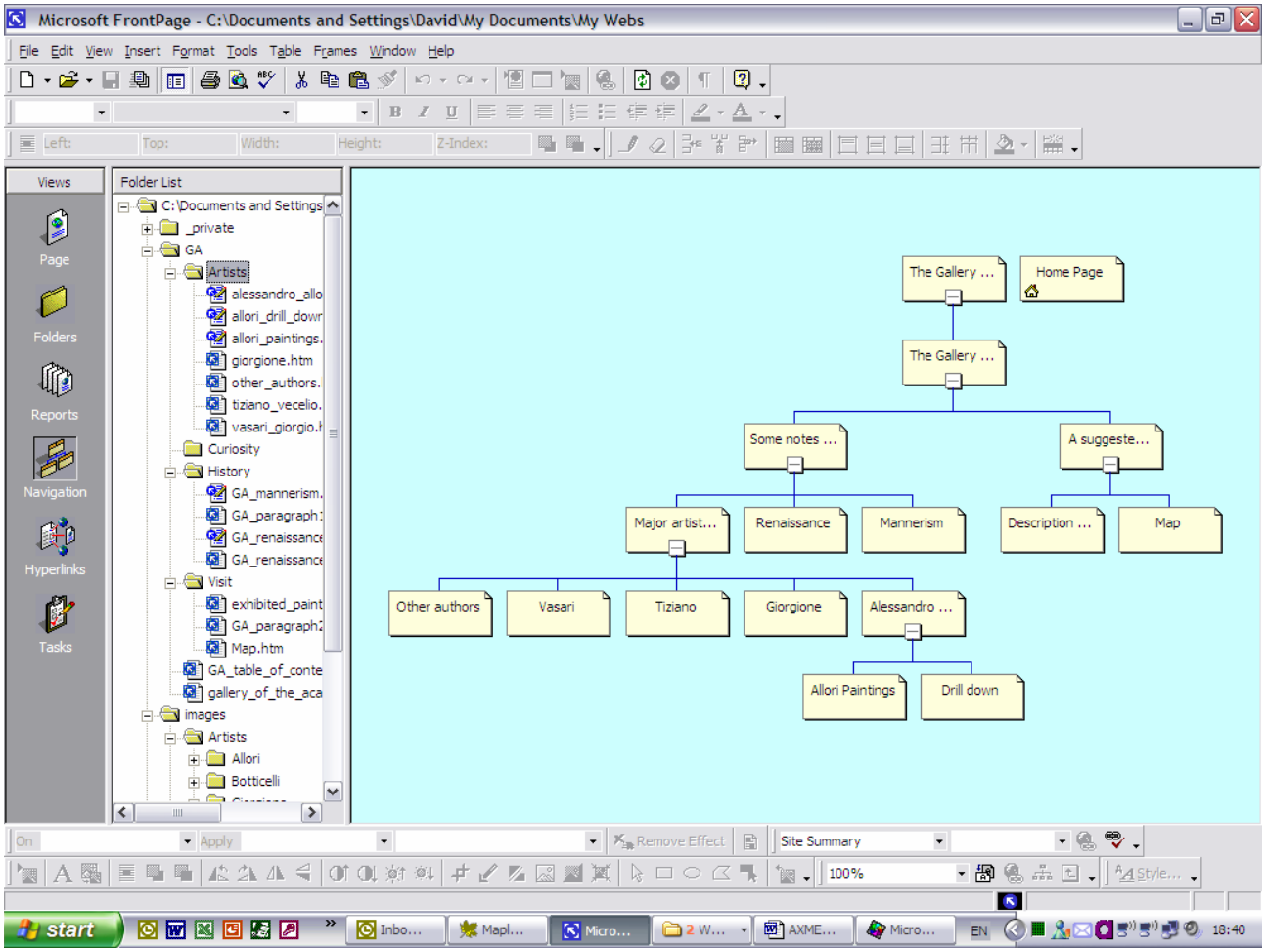
Figure 1 – basic elements of an AXMEDS Editorial Format

4 Elements of an AXMEDIS Editorial Format

4.1 Object structure (XIM, ILABS, DSI)

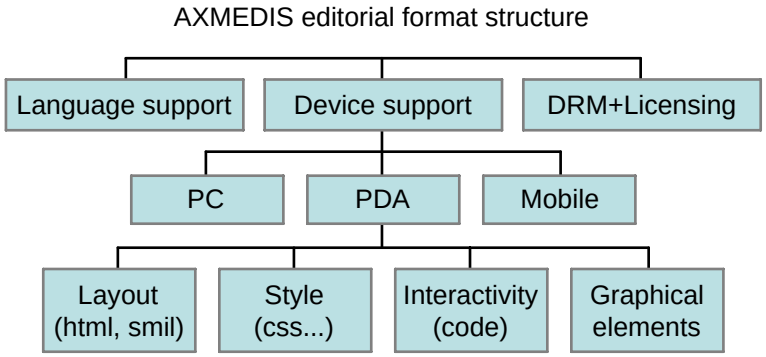
An AXMEDIS object can either be self-contained with embedded assets, or a hierarchical structure with links to nested children objects. The editorial format must be designed to take into account the optimal structure for a given type of content.

The example below shows the structure of a set of AXMEDIS objects, each containing an html page with embedded images, plus hierarchical links to the other objects. This set can be regarded as a single compound object.



4.2 Internal structure of an editorial format

The following diagram shows the structure of an AXMEDIS editorial format. Each of the aspects of the format is described in the subsequent sections below.



4.3 Language support

Any language-based elements must be supported with alternatives to cover the needs of the target distribution markets. Examples within an editorial format are static text on menus/navigation (eg ‘home’) and static text on footers (‘privacy information’ etc.). Clearly any language-sensitive content will be held within the objects to be formatted, so only the format-related text will need to be covered within the editorial format itself.

4.4 Device support

For each device type (PC, Kiosk, PDA/smartphone, mobile, etc.), a tailored set of specific formatting elements is required to define layout, style and interactivity, using specific graphical elements as required.

4.4.1 Layout (XIM, DSI)

DE8.4.1.1 described a set of common layout components that can be used to format the layout of many types of content. In order to format the layout of AXMEDIS objects, it is essential that source CMS metadata related to AXMEDIS objects is mapped into a set of common template elements for design layout. These elements can then be placed and scaled on the output device by the Formatting Rule Engine. Each layout for distribution on a terminal device will require a known set of template page layout elements as described in the table below.

Layout element	**Required?**	**Description**
<title>	Mandatory	This will be extracted from the AXMEDIS object's metadata.
<subtitle>	Optional	Like TITLE, this will need to be extracted from the object's metadata.
<body>	Mandatory	This element will contain a set of sub-elements depending upon the number and type(s) of content to be distributed.
Sub-elements of <body> could be:		
<textbox>	Optional	possibly containing in-line images
<imageBox>	Optional	image in separate bordered or spaced box
<mediaBox>	Optional	movie, audio or flash animation
<mediaStatus>	Optional	for time-based media, displays status information ('ready', 'connecting', etc.)
<controlBox>	Optional	this element will need to be present in order to control time-based media (audio, video, animation, interactive, etc.) when a mediabox is present.
<localNavigation>	Optional	Much of the sample content described in DE8.1.1 consists of sets of images/text pages. As AXMEDIS objects will store the granular objects, we will need to automatically generate a navigation element for each page and also navigation pages ('home' etc). This could be a simple set of links to pages belonging to a common container object, or could be enhanced via metadata to allow for hierarchical navigation (eg 'history', 'present day', sections, etc. each with dynamic section homepages).
<sidebar>	Optional	An optional secondary panel of content usually positioned on the right hand side of a screen, normally holding section navigation, promotional information other content related to the main body content.
<footer>	Mandatory	A standard footer element could be generated from the object's general and PAR metadata (author, terms of use, copyright information etc.).

4.4.2 Style (XIM, DSI)

Cascading Style Sheets (CSS) are used to define the fonts, colours borders and basic layout for HTML and SMIL-based content in AXMEDIS. The AXMEDIS formatting tools can apply CSS to content in order to conform the style of formatted text to a consistent look and feel.

As noted in DE8411, these could be at two levels:

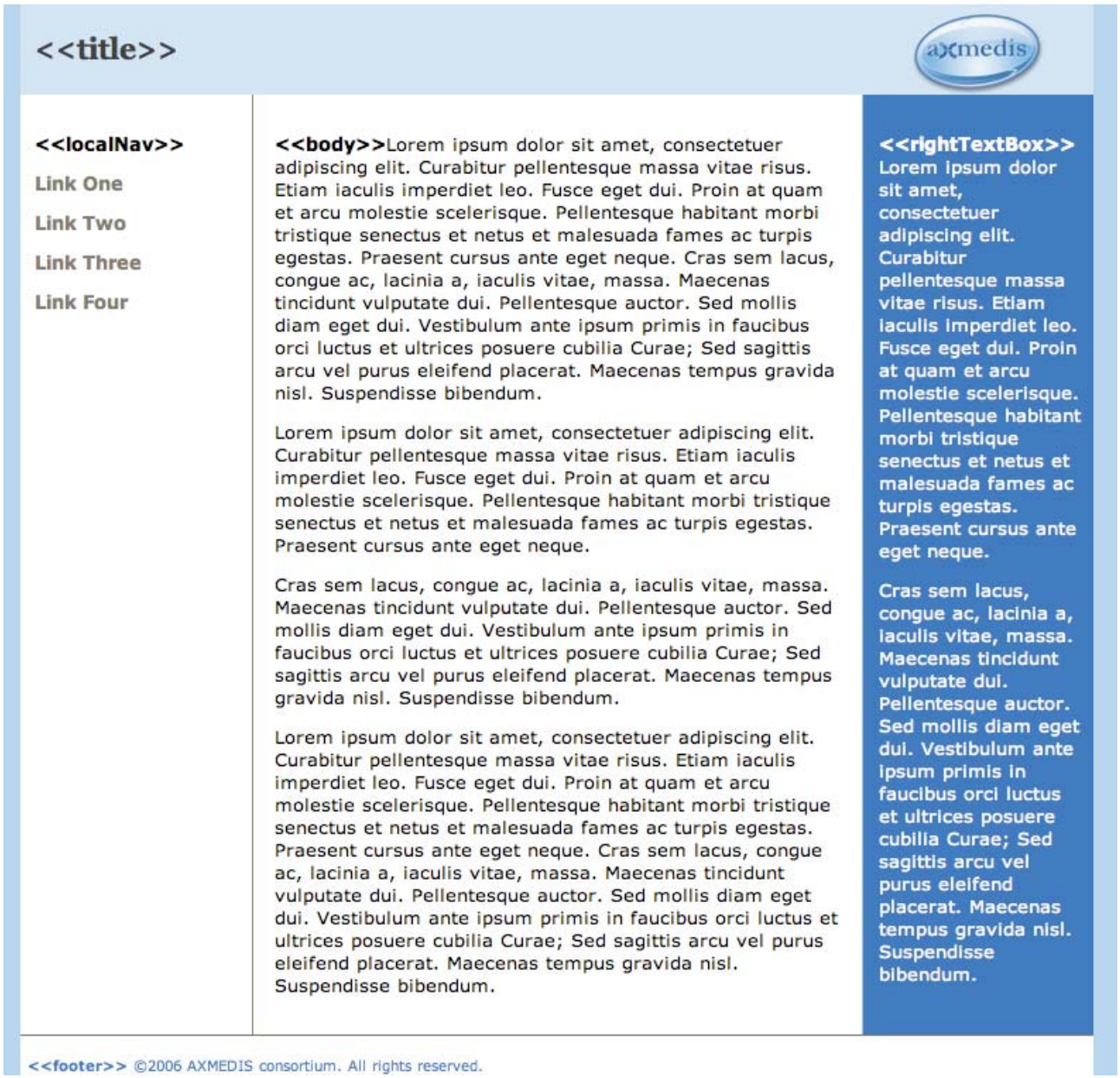
- A preferred stylesheet from the content owner, which provides a blueprint for how the content should ideally be presented

- A channel-owner specific stylesheet provided by the distribution channel, which will take into account legibility and accessibility, as well as possibly specific portal branding or other commercial issues that may override the content owner's preferred styling.

CSS with XSL can therefore be used for:

- Definition of preferred fonts, font sizes, border sizes and colours, background colours and background images, both globally for a screen as well as independently for each layout element
- Ability to override content-owner's preferred formatting, for example, to meet the constraints of a particular device or channel
- Maintaining (inheriting) elements of the original look and feel of source documents where permitted by the formatting rules.

The following example shows an html page which has been formatted by means of a CSS stylesheet. The same html page is shown without CSS formatting below.



The same html file without CSS formatting:

<<title>>

<<localNav>>

Link One

Link Two

Link Three

Link Four

<<rightTextBox>>
Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Curabitur pellentesque massa vitae risus. Etiam iaculis imperdiet leo. Fusce eget dui. Proin at quam et arcu molestie scelerisque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Praesent cursus ante eget neque.

Cras sem lacus, congue ac, lacinia a, iaculis vitae, massa. Maecenas tincidunt vulputate dui. Pellentesque auctor. Sed mollis diam eget dui. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Sed sagittis arcu vel purus eleifend placerat. Maecenas tempus gravida nisl. Suspendisse bibendum.

<<body>>Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Curabitur pellentesque massa vitae risus. Etiam iaculis imperdiet leo. Fusce eget dui. Proin at quam et arcu molestie scelerisque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Praesent cursus ante eget neque. Cras sem lacus, congue ac, lacinia a, iaculis vitae, massa. Maecenas tincidunt vulputate dui. Pellentesque auctor. Sed mollis diam eget dui. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Sed sagittis arcu vel purus eleifend placerat. Maecenas tempus gravida nisl. Suspendisse bibendum.

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Curabitur pellentesque massa vitae risus. Etiam iaculis imperdiet leo. Fusce eget dui. Proin at quam et arcu molestie scelerisque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Praesent cursus ante eget neque.

Cras sem lacus, congue ac, lacinia a, iaculis vitae, massa. Maecenas tincidunt vulputate dui. Pellentesque auctor. Sed mollis diam eget dui. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Sed sagittis arcu vel purus eleifend placerat. Maecenas tempus gravida nisl. Suspendisse bibendum.

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Curabitur pellentesque massa vitae risus. Etiam iaculis imperdiet leo. Fusce eget dui. Proin at quam et arcu molestie scelerisque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Praesent cursus ante eget neque. Cras sem lacus, congue ac, lacinia a, iaculis vitae, massa. Maecenas tincidunt vulputate dui. Pellentesque auctor. Sed mollis diam eget dui. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Sed sagittis arcu vel purus eleifend placerat. Maecenas tempus gravida nisl. Suspendisse bibendum.

<<footer>> ©2006 AXMEDIS consortium. All rights reserved.

4.4.3 Graphical assets (XIM, ILABS)

Although many classes of content are graphical in nature or include graphical assets, an AXMEDIS Editorial Format can include its own graphical assets which are designed as an integral part of the layout, interactivity styling to give a consistent theme or ‘skin’ to the content.

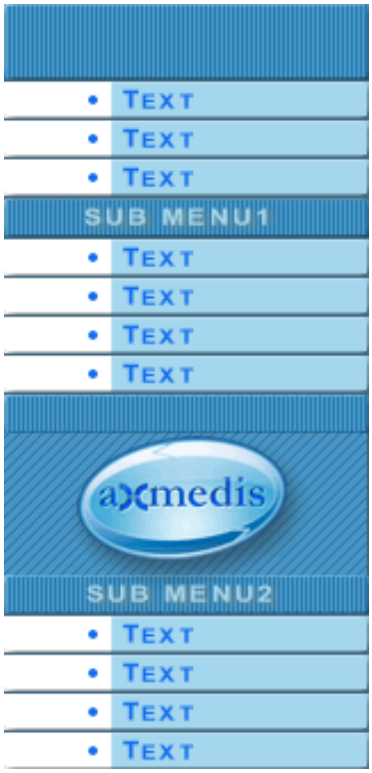
Here is a sample background JPG image:

Here is the complete Editorial Format that uses this image in conjunction with foreground images for menu navigation:

4.4.4 Interactivity (XIM, ILABS, DSI)

Buttons and menus for navigating through content and for controlling time-based content can be defined using standard graphics tools, and then be assigned hyperlinks or functions using HTML or SMIL.

Below is an example navigation menu bar using a combination of HTML, GIF graphics and javascript, which can be used as part of an Editorial Format:



4.4.5 Usability issues

Usability issues apply to the interactive elements of Editorial Formats. Relevant standards and guidelines to refer to can be found in the following references:
[36][37][38][39][40][41][42]

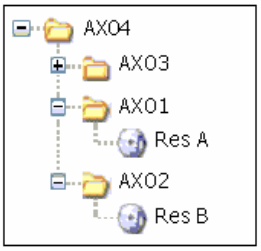
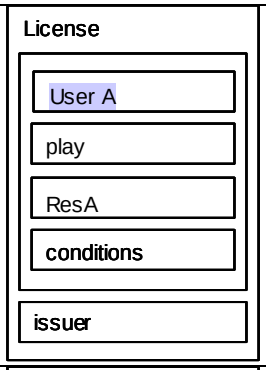
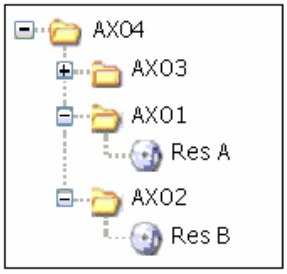
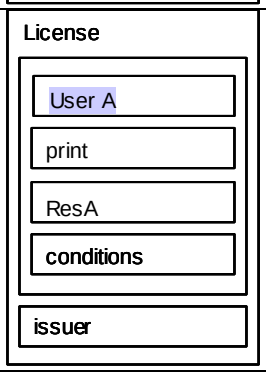
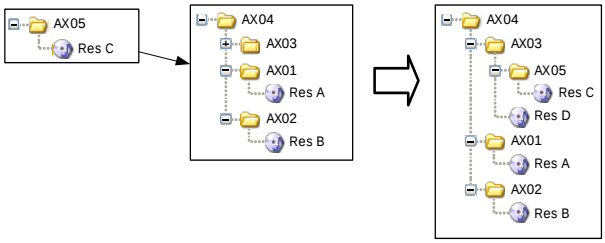
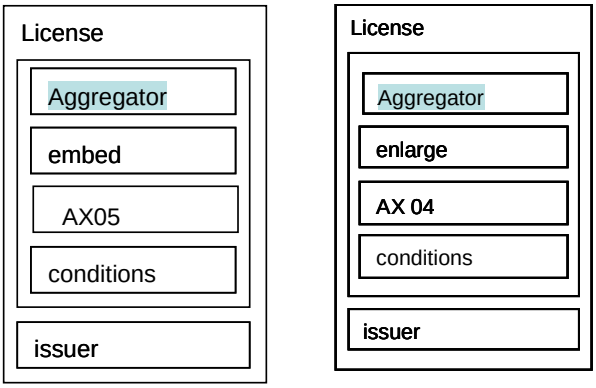
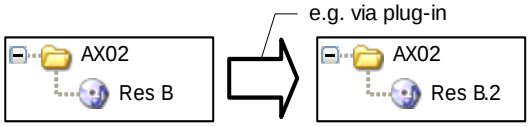
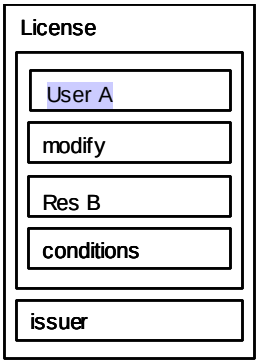
Also the AXMEDIS deliverables concerned with usability are relevant (WP4.9) even though these are principally targeted at the AXMEDIS tools rather than content or formats.

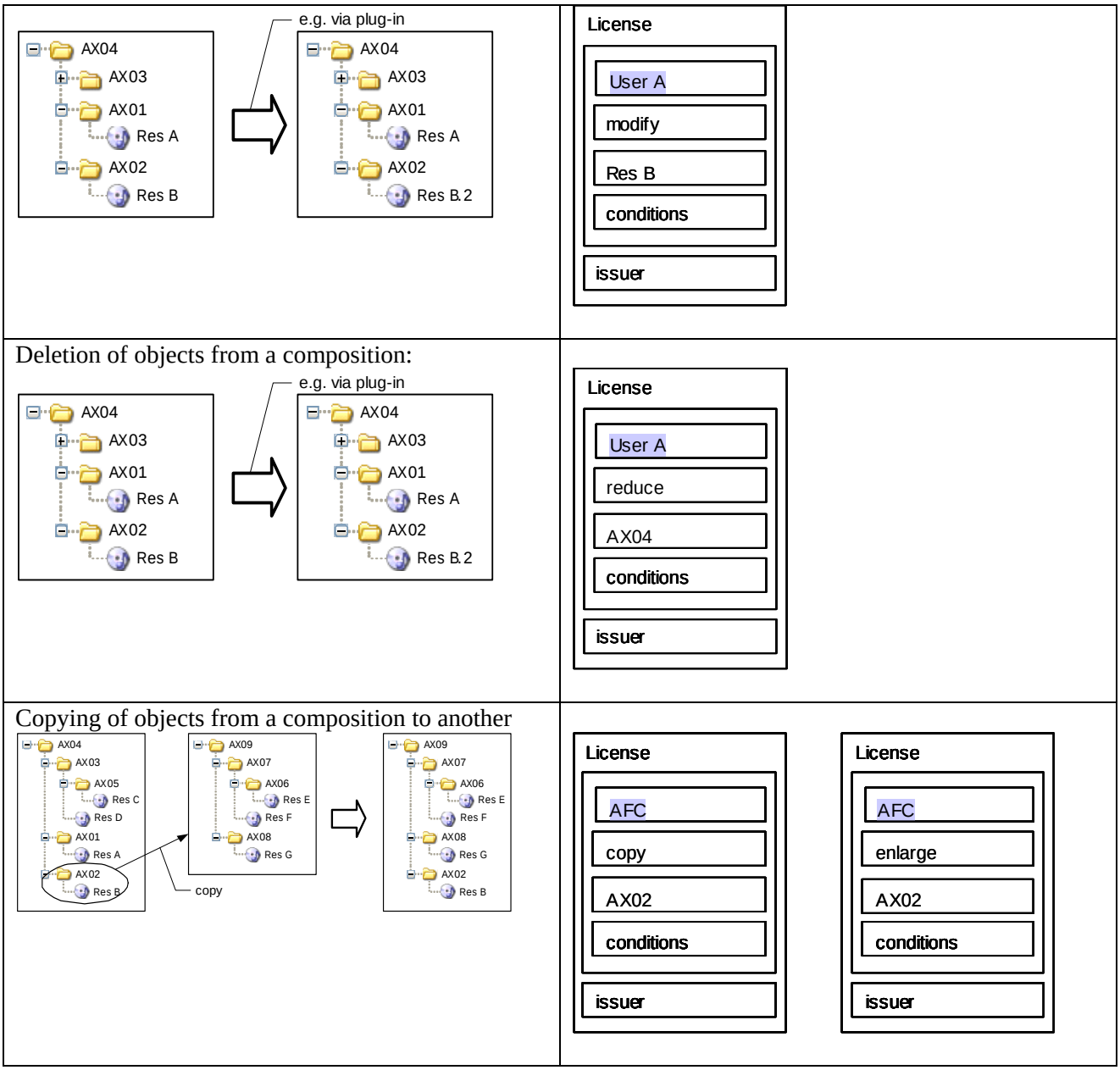
4.5 DRM and licensing (FUPF)

Although DRM and licensing issues are not directly involved in content formatting, it is likely that the design of editorial formats will be made in close conjunction with the definition or review of the rights associated with the target content. Use cases for Editorial Formats will always be dependent upon available rights. For example, adding Editorial Formats to an existing service to add a new channel such as mobile will involve examining the kinds of interaction the mobile end user will make, and the functionality of the Editorial Format will be dependent upon the available rights.

4.5.1 DRM rules for B2C and B2B (FUPF, AFI, ILABS)

The following table outlines typical license rules for enforcing rights for the major uses of content.

Requested rights	**Rule for enforcement**
Play a digital resource 	
Print a digital resource 	
Composition of digital objects: Addition of elements to nested levels of a governed digital object 	
Transformation of basic objects: 	
Transformation of objects in a composition:	

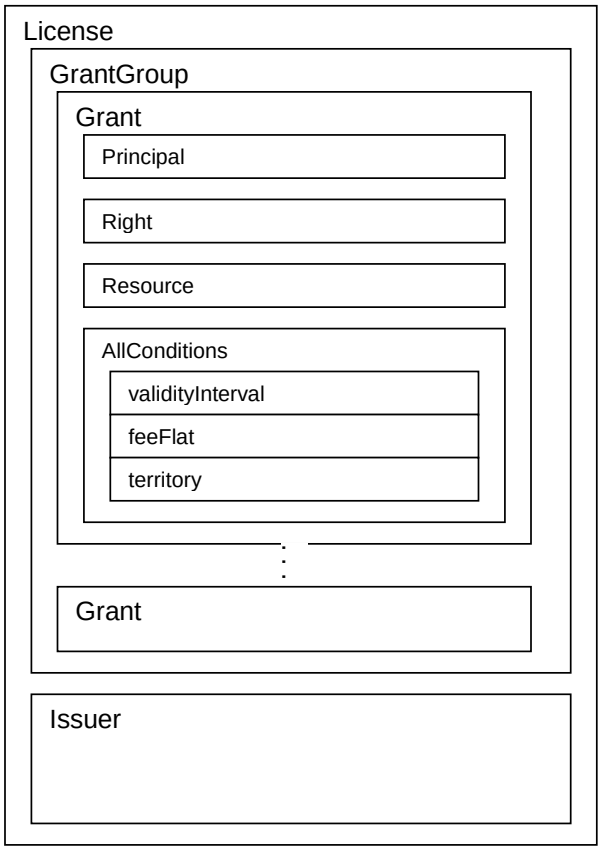


4.5.2 License Model (FUPF)

The license model for AXMEDIS is completely defined in the specification document DE3.1.2.2.9 Specification of AXMEDIS database and query support, first update of part E of DE3.1.2, section 9.

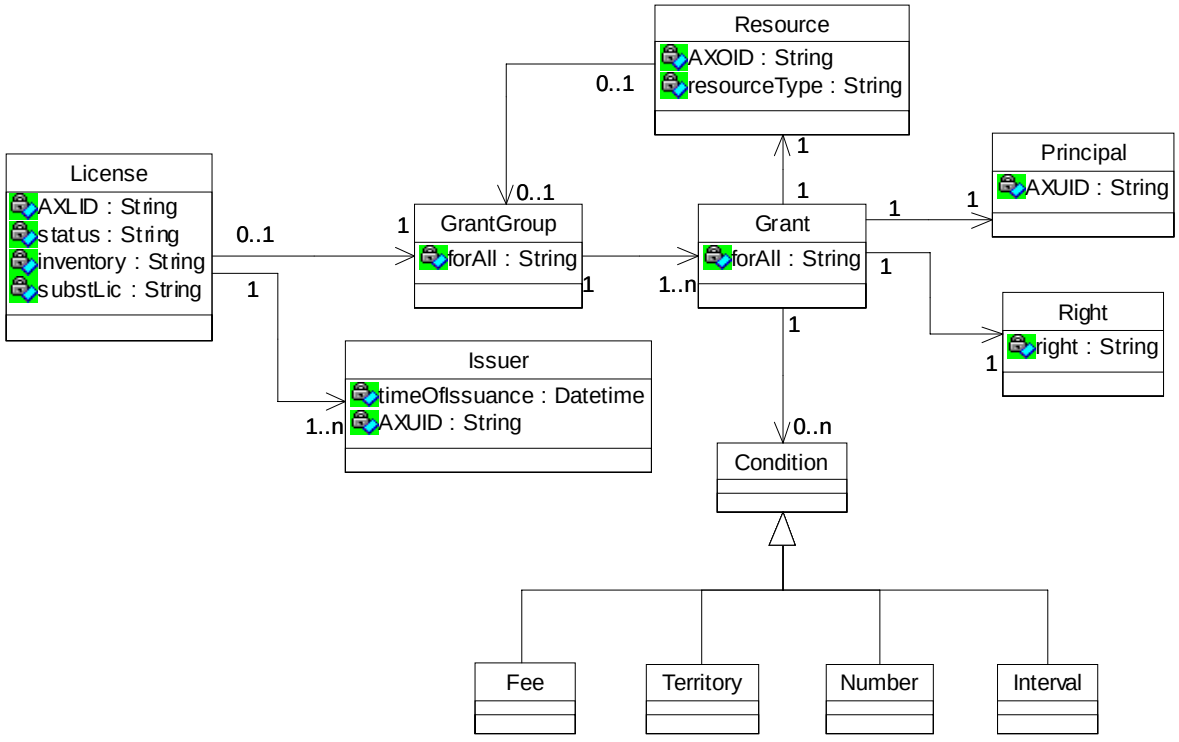
This section is a summary of the corresponding section of DE3.1.2.2.9. Refer to it for more details.

The following figure shows the basic structure of an MPEG-21 REL license. Based on these elements, we have defined two different models to represent licenses: an UML model representing the license from a programmatic point of view and a relational model, used to store the license into a relational database, in order to speed up searches over issued licenses.



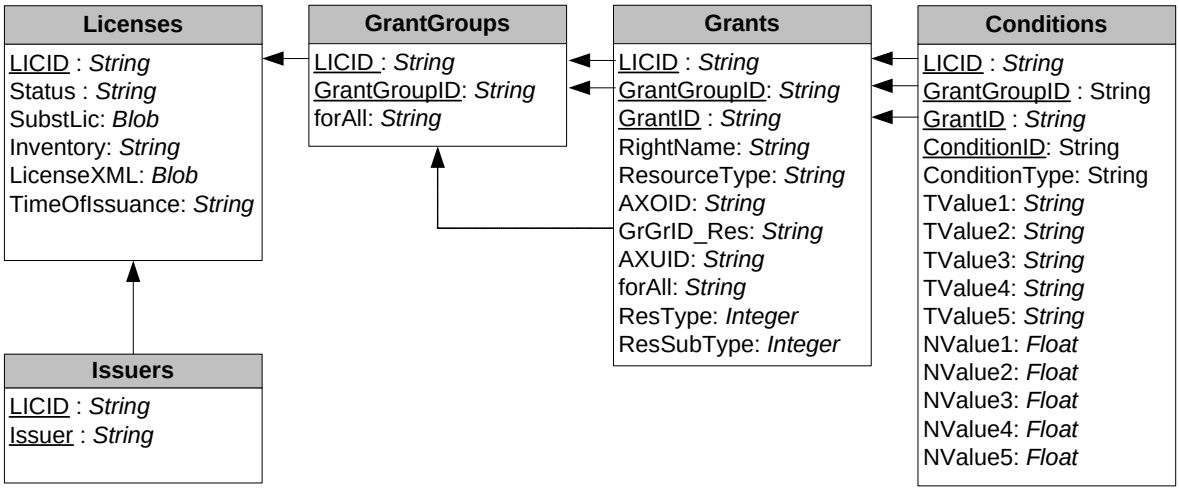
MPEG-21 REL general license structure

The UML model below defines the main elements of an MPEG-21 license as it is used in AXMEDIS.



UML diagram for licenses

The following figure shows how the MPEG-21 license is expressed into a relational model. Apart from the fields extracted from the license to perform searches, the whole license in XML language is stored into the fields LicenseXML of the Licenses table.



Relational model for licenses

5 Content categories (ILABS, DSI, EPFL, XIM)

5.1 Basic categories

Different kinds of AXMEDIS Editorial Format need to be designed for each kind of content. Clearly, an Editorial Format designed for a brochure-style document layout will not work effectively with a video stream, and likewise an Editorial Format designed to support audio content will not be able to format complex text-based content.

We have to assume that in a digital world the kind of content that could be produced and used can be extremely varied, yet there are a set of basic editorial formats that characterise available content and are mainly related to content specific purpose and fruition procedure. If we add to this the fact that the same content may be used on different fruition devices then it is crucial to identify a subset of formats that could meet a "generic usage" scenario constraints set. In this effort what will be crucial is the definition of a set of "format prototypes" that could enable cross-conversion to meet the possibility to generate content in a specific format starting from another.

Following what just stated and what is presently the approach on the market we have devised the following harsh classification of content in terms of formats where the adopted ID is just for quick reference and is in no way intended to represent the only suitable format for accomplishing the work. It is clear that passing from the actual codification used to another (either within or outside the category) a proper formatting and transformation/conversion procedure is needed. This may impose further limitations or constraints to automatic processing or even feasibility.

Content category	**Description**	**Transformable to**	**Rationale**
PDF/doc	Any kind of content that should be accessed sequentially, can be printed and has no hyper-linking (it can comprise text, images and even sound)	1) HTML 2) Presentation 3) Multimedia	1) Text can be turned into an hyper-text by adding targeted hyper-links (this can be done partially in automatic manner, but is usually performed manually) 2) Text can be summarised and transformed into a presentation 3) Text could represent the storyboard for a multimedia production (this can be done partially

			in automatic manner, but is usually performed manually)
HTML	Any kind of content that could be accessed sequentially or following a hyper-link based navigation (it can comprise text, images, sound and even video)	1) PDF/doc 2) Presentation 3) Multimedia	1) An hyper-text can be turned into text by removing links (this can be done partially in automatic manner, but is usually performed manually) 2) Hyper-text can be summarised and transformed into a presentation or multimedia depending on nature and aim
Presentation	Any kind of content that has a presentation purpose (therefore usually more concise than the sources used for its production), can be printed and could be accessed sequentially, but may have hyper-linking (it can comprise text, images and even sound)	1) HTML 2) PDF/doc 3) Multimedia	1) A presentation can easily be turned into a text 2) A presentation can be made hyper-textual by adding targeted hyper-links (this can be done partially in automatic manner, but is usually performed manually)
Audio	Audio-based content that requires some form of media player or controls to playback.	Can be listened to via: 1) HTML-embedded player 2) Presentation-embedded player 3) standalone media player	1) An audio file can be chunked into chapters which can either use markers or separate files linked via the controlling player or host object.
Video	Video-based content that requires some form of media player or controls to playback.	Can be presented via: 1) HTML-embedded player 2) Presentation-embedded player 3) media player	1) An video file can be chunked into chapters which can either use markers or separate files linked via the controlling player or host object.
Multimedia	A combination of previous categories	1) HTML 2) Presentation 3) PDF/doc	1) A multimedia can be made hyper-textual by adding targeted hyper-links (this can be done partially in automatic manner, but is usually performed manually) 2) A multimedia can be turned into a presentation by chunking it, inserting text and re-combining the whole in a specific sequence 3) A multimedia can be turned into a text by chunking it, inserting text and re-combining the whole in a specific sequence plus replacing videos with the most significant screenshots and a transcription of the related audio (if any), furthermore any other audio should be replaced by the related transcription

The following subsections describe these categories in more detail along with the implications for designing Editorial Formats for them and the typical content production processes involved with each category.

5.2 Editorial formats for pdf/doc objects (ILABS, XIM)

The starting point for the definition of an editorial format for content in PDF/DOC is the definition of its characteristics. From what previously presented is clear that in this context we refer to any kind of content that should be accessed sequentially, can be printed and has no hyper-linking, it can comprise text, images (and even sound in the case of accessibility issues and digital format of the document itself).

Starting from this definition is clear that it is possible either to perform operations on this content that generate new content while remaining in the same content category or to perform operations to change content category depending on users needs, aims and expectations. This latter point usually applies to B2B users, as B2C users will have a rather limited subset of possibilities in respect of content manipulation

actions. In both cases the kind of operations and steps involved to pass from one stage to another will be better clarified now starting from the intra-category one.

Source sample
Any kind of content that should be accessed sequentially, can be printed and has no hyper-linking. Therefore it comprises text (with one or more type font, styles), still images, colours and shapes. It can be designed to be accessible and therefore readable by screen/text readers.

Format[1]	**Actual coding**
Doc	Plain text & binary code Originally used in the 1980s to identify WordPerfect proprietary format, in the 1990s was used by Microsoft for their "Word" word-processing proprietary format.
Rtf	Plain text The Rich Text Format (often abbreviated to RTF) is a human-readable document file format that has been continually developed by Microsoft since 1987 for cross-platform document interchange
Odt (ODF)	Plain text & binary code The OpenDocument format (ODF), short for the OASIS Open Document Format for Office Applications, is an open document file format developed by the OASIS industry consortium, based upon the XML-based file format originally created by OpenOffice.org, and ODF was approved as an OASIS standard on May 1, 2005. A draft for the ISO ISO/IEC 26300 was approved on May 3, 2006
Pdf	Plain text & binary code Portable Document Format (PDF) is an open standard file format, proprietary to Adobe Systems. Proper subsets of PDF have been, or are being, standardized under ISO for several constituencies: • PDF/X for the printing and graphic arts as ISO 15930 (working in ISO TC130) • PDF/A for archiving in corporate/government/library/etc environments as ISO 19005 (work done in ISO TC171) • PDF/E for exchange of engineering drawings (work done in ISO TC171) PDF/UA for universally accessible PDF files
Ps	Plain text & binary code PostScript (PS) is a page description language and programming language used primarily in the electronic and desktop publishing areas. The most widely diffused standardised version belongs to Adobe and is called Adobe PostScript
Html	Plain text HyperText Markup Language (HTML) designed for the creation of web pages with hypertext and other information to be displayed in a web browser. Originally defined by Tim Berners-Lee and further developed by the IETF, HTML is now an international standard (ISO/IEC 15445:2000). Later HTML specifications are maintained by the World Wide Web Consortium (W3C).

Sources	**Procedure**	**Result/output**	**Example**
Document (.doc, .rtf, .odt, .txt)	**Aggregation** **Possible scenarios** 1) operational step in a distribution chain 2) operational step in a production chain 3) service in outsourcing **Associated rights** B2B 1) needed: Editing, Printing, Storing, Copying (this in the case of production in outsourcing) 2) additional: Distributing B2C rights are going to be a subset of B2B	Document (.doc, .rtf, .odt, .txt)	**Scenario**: two source-files (one in .rtf and one .odt) are acquired, then they are merged into a new document (.doc) styles are harmonized and a homogeneous look and is given to the overall resulting document. **Procedure**: acquire the two original texts, for each acquire the following set of rights: *Editing, Printing, Storing, Copying and Distributing*. It is assumed that the resulting document will be distributed with the following rights: *Printing, Storing and Copying*. Then the content will be processed and assembled into the new content, copyright references and disclaimer will be added. The newly produced content will be packaged, protected and then distributed.

[1] By no way this list is intended to be all-inclusive, what reported is just a subset of the lists of formats already defined and referenced in other deliverables of the AXMEDIS project.

PDF/PS/EPS	**Aggregation** **Possible scenarios** 1) operational step in a distribution chain 2) service in outsourcing **Associated rights** B2B 1) needed: Editing, Printing, Storing, Copying (this in the case of production in outsourcing) 2) additional: Distributing B2C rights are going to be a subset of B2B	PDF/PS/EPS	**Scenario**: two source-files are produced, then they are merged into a new document (.ps). **Procedure**: produce the two original files (cover and text of a brochure are separately produced, one by the graphic dep and one by the business unit); The two files are assembled into the new content by the graphic dep that takes also care or revising (if needed) the text coming form the business unit, copyright references and disclaimer are added as the last step prior to package, protect and distribute the result with the following rights: *Printing, Storing and Copying*..
Document (.doc, .rtf, .odt, .txt)	**Dis-aggregation** **Possible scenarios** 1) operational step in a distribution chain 2) service in outsourcing **Associated rights** B2B 1) needed: Un-protect, Editing, Printing, Storing, Copying (this in the case of production in outsourcing) 2) additional: Publishing and Distributing B2C rights are going to be a subset of B2B	Document (.doc, .rtf, .odt, .txt)	**Scenario**: an original document is acquired and text is extracted to create a new document. The operation leads to a new product. **Procedure**: acquire the original text with the following set of rights: *Un-protect, Editing, Printing, Storing, Copying and Distributing*. It is assumed that the resulting document will be distributed with the following rights: *Printing, Storing and Copying*. Then the content will be analyzed, selected, extracted, re-processed and assembled into the new content, copyright references and disclaimer will be added. The newly produced content will be packaged, protected and then distributed.
PDF/PS/EPS	**Dis-aggregation** **Possible scenarios** 1) operational step in a distribution chain 2) service in outsourcing **Associated rights** B2B 1) needed: Un-protecting, Converting, Editing, Printing, Storing, Copying (this in the case of production in outsourcing) 2) additional: Publishing and Distributing B2C rights are going to be a subset of B2B	PDF/PS/EPS	**Scenario**: an original document is acquired and converted to text. The relevant part is extracted and processed to create a new document. **Procedure**: acquire the original text with the following set of rights: *Un-protect, Converting, Editing, Printing, Storing, Copying and Distributing*. It is assumed that the resulting document will be distributed with the following rights: *Printing, Storing and Copying*. Then the content will be analyzed, selected, extracted, re-processed and assembled into the new content, copyright references and disclaimer will be added. The newly produced content will be re-converted, packaged, protected and then distributed.
PDF/PS/EPS	**Dis-aggregation** **Possible scenarios** 1) operational step in a distribution chain 2) service in outsourcing **Associated rights** B2B 1) needed: Un-protecting, Converting, Editing, Printing, Storing, Copying (this in the case of production in outsourcing) 2) additional: Publishing and Distributing B2C rights are going to be a subset of B2B	Document (.doc, .rtf, .odt, .txt)	**Scenario**: an original document is acquired and converted to text. The relevant part is extracted and processed to create a new document. **Procedure**: acquire the original text with the following set of rights: *Un-protect, Converting, Editing, Printing, Storing, Copying and Distributing*. It is assumed that the resulting document will be distributed with the following rights: *Printing, Storing and Copying*. Then the content will be analyzed, selected, extracted, re-processed and assembled into the new content, copyright references and disclaimer will be added. The newly produced content

			will be packaged, protected and then distributed.
Document (.doc, .rtf, .odt, .txt)	**Conversion** **Possible scenarios** 1) operational step in a distribution chain 2) service in outsourcing **Associated rights** B2B 1) needed: Un/protecting, Converting, Editing, Printing, Storing, Copying (this in the case of production in outsourcing) 2) additional: Publishing and Distributing B2C rights are going to be a subset of B2B	PDF/PS/EPS	**Scenario**: an internally produced original document available in some digital format is processed to be transformed in a lightweight print-ready one. **Procedure**: the original content is checked for print-readiness, and finalized, then protection level is fixed (for example for a pdf file is possible to state that the following permissions apply: print yes, store yes, copy no, modify no…). This last operation has to be performed prior to content transformation as it will have to be reflected in the transformed content. Once this is achieved the newly produced content is ready to be distributed (or returned to committer in case of outsourced operation).
PDF/PS/EPS	**Conversion** **Possible scenarios** 1) operational step in a distribution chain 2) service in outsourcing **Associated rights** B2B 1) needed: Un-protecting, Digitizing, Converting, Editing, Printing, Storing, Copying (this in the case of production in outsourcing) 2) additional: Publishing and Distributing B2C rights are going to be a subset of B2B	Document (.doc, .rtf, .odt, .txt)	**Scenario**: an original document has been acquired via digital scanning of a paper-based version and has to be turned into an editable text for new content production. **Procedure**: the original paper document is acquired via digital scanning (for example a received fax) and stored. Text is extracted (in case the source is an image OCR/ICR should be used) and the new document text composed. Present images are also acquired, if needed retouched, and then inserted wherever appropriate. The whole new document is formatted; copyright and disclaimer notes inserted. Once all is ready the new document is protected and distributed
Document (.doc, .rtf, .odt, .txt)	**Conversion** **Possible scenarios** 1) operational step in a distribution chain 2) service in outsourcing **Associated rights** B2B 1) needed: Un-protecting, Converting, Editing, Printing, Storing, Copying (this in the case of production in outsourcing) 2) additional: Publishing and Distributing B2C rights are going to be a subset of B2B	Document (.doc, .rtf, .odt, .txt)	**Scenario**: an original document has been prepared in a format by the author, but the format is not compatible for the required post processing foreseen for the content (original in word, target in latex), therefore a conversion step is required. **Procedure**: the original document is acquired, if protected is unprotected, then contents are extracted according to hierarchy and style level (titles first, then subtitles, then body, then notes, captions…). Extracted text is inserted in the target document, desired styles applied and pagination adjusted, pictures and other content are then re-inserted (in the appropriate format for expected usage...). Finally indexes and references are completed prior to document closure. Final result is then protected.
PDF/PS/EPS	**Conversion** **Possible scenarios** 1) operational step in a distribution chain 2) service in outsourcing **Associated rights** B2B	PDF/PS/EPS	**Scenario**: an original document has been prepared in a format by the author, but the format is not compatible for the required post processing foreseen for the content (original in pdf, target in ps), therefore a conversion step is required. **Procedure**: the original document is acquired, if protected is unprotected, then

	1) needed: Un-protecting, Converting, Editing, Printing, Storing, Copying (this in the case of production in outsourcing) 2) additional: Publishing and Distributing B2C rights are going to be a subset of B2B		contents are converted according to needs. Specifically desired features (like protection…) are applied to achieved content prior to document closure. Final result is then distributed/delivered to the final destination for usage.

Certainly it is also possible to have combinations of the just mentioned operations that are not reported here but can be easily derived from the basic ones described. Having seen the intra category operation let's now focus on the cross-category transformation.

Sources	**Procedure**	**Result/output**	**Example**
Document	Conversion - Text is analysed and hyper-links added depending on aim. The simplest form is to turn the table of content into a set of links to the chapters, paragraph and other structural part of the document plus adding additional links aimed at taking the user back to the table of content. A further navigation step if so add links that allow to browse the document in relation to its content (like for cross indexes)	HTML	**Scenario**: an interesting article that has been acquired form an external author (and that references other papers previously produced in the same company) has to be put in direct relation/ connection to referenced content and placed on a intranet web for reference. **Procedure**: the original document is acquired, if protected is unprotected, then reported references are turned into actual links. Navigation features are applied (if needed), result is properly protected and final result is then distributed/delivered.
Document	Conversion - Text is summarised and transformed into a presentation assigning titles to pages, inserting summarized text in bulleted form, adding images/animations where needed, putting achieved pages in the proper sequence	Presentation	**Scenario**: an interesting article that has been published on a company best case has to be turned into a presentation and placed on a intranet web for reference and dissemination. **Procedure**: the original document is acquired, if protected is unprotected, then content is summarized, text turned into bulleted points, reported references are turned into actual links. Navigation features are applied (if needed), result is properly protected and final result is then distributed/delivered.
Document	Conversion - Depending on text nature it could be either the storyboard for a multimedia production (that well be manually produced based on the storyboard) or a content holding multimedia components (like images and parts that can be transformed into audio) and that once transformed as to achieve a presentation is then completed with the multimedia components (audio…)	Multimedia	**Scenario**: an interesting article that has been published on a company best case has to be turned into a multimedia presentation and distributed for marketing/promotional purposes. **Procedure**: the original document is acquired, if protected is unprotected, then content is post processed to be transformed into an an actual multimedia product. Navigation features are applied (if needed), result is properly protected and final result is then distributed/delivered.

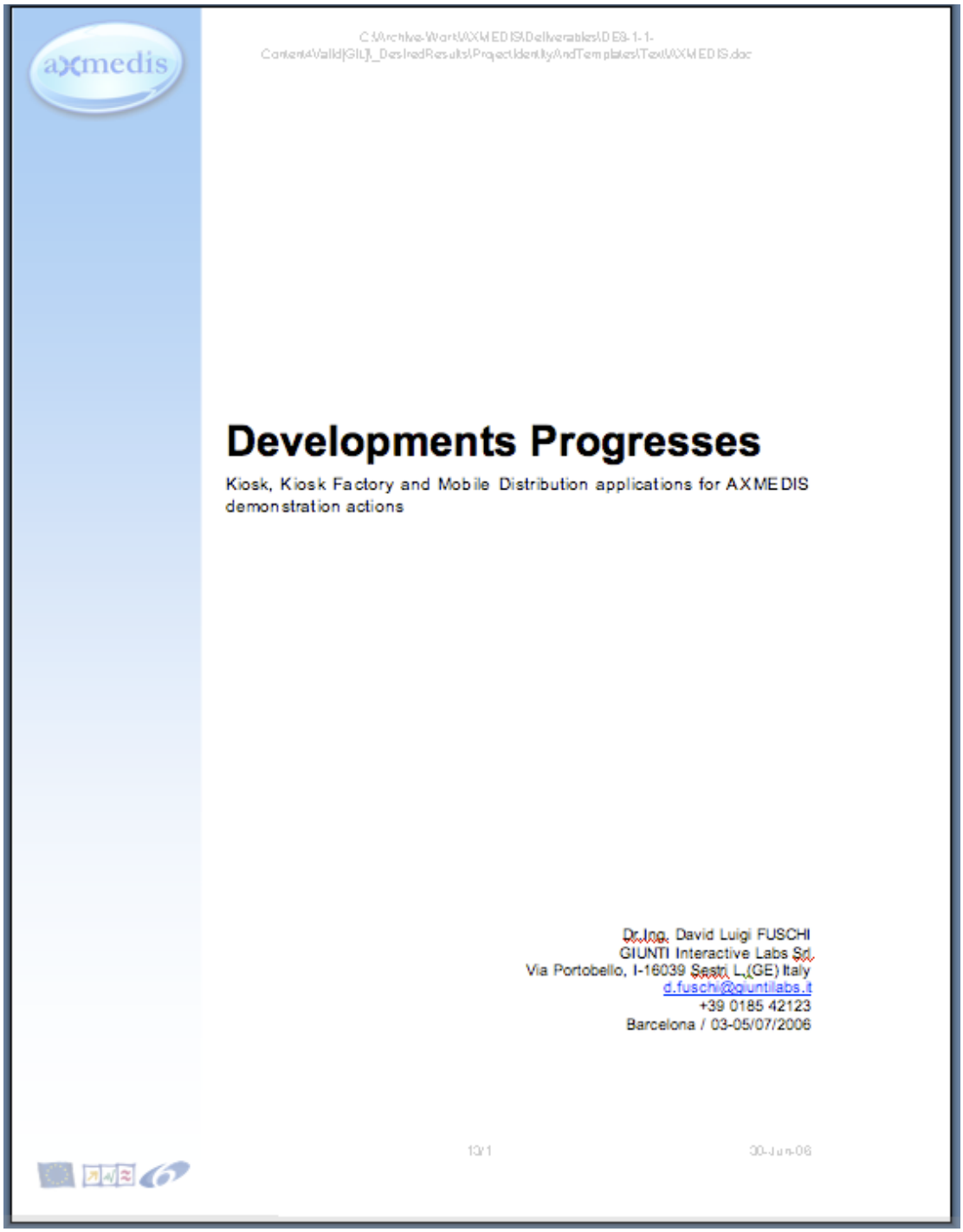
Valuable reference for this kind of contents can be found in: [1] [2] [6] [7] [8] [9] [10] [11] [12] [13] [15] [18] [19] [20] [26] [30] [31] [32] [34] [35] [36] [37] [38] [43]

5.3 Example Editorial Formats for pdf/doc

The following screenshots show two sample editorial formats for formatting objects as documents. These have been designed to be used for demonstration purposes within the AXMEDIS project and also to provide a basis for the development of further editorial formats for AXMEDIS document objects.

5.3.1 Basic document style

This format is designed to be clean, professional and simple, suitable for formatting a wide range of business document types (reports, papers, etc.). Its layout for content consists only of a header, footer and main body (the left margin would remain static)



5.3.2 Brochure or flyer style

This second sample editorial format is designed to still be professional but bolder and more marketing-oriented, to be used for brochures and other short documents that are designed to attract attention. The layout includes a title plus 2 columns which can hold text and in-line images, plus a grid of 4 image boxes fixed across the centre.

Axmedis Update

Axmedis breaks new ground in multi-channel distribution again in 2006

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"Automating Production of Cross Media Content for Multi-channel Distribution"

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5.4 Editorial Formats for hypertext objects (ILABS, XIM)

The starting point for the definition of an editorial format for content in hypertext is the definition of its characteristics. From what previously presented is clear that in this context we refer to any kind of content that could be accessed sequentially or following a hyper-link based navigation (it can comprise text, images, sound and even video). It is worth taking into account that inside this category we would place hypertexts rather than considering them as part of the previous category. Even though this could be a quite harsh simplification, is worth adopting it as most hypertexts could be saved in HTML/XHTML/XML format.

Starting from this definition is clear that it is possible either to perform operations on this content that generate new content while remaining in the same content category or to perform operations to change content category depending on users needs, aims and expectations. This latter point usually applies to B2B users, as B2C users will have a rather limited subset of possibilities in respect of content manipulation actions. In both cases the kind of operations and steps involved to pass from one stage to another will be better clarified now starting from the intra-category one.

Source sample
Any kind of content that could be accessed sequentially or following a hyper-link based navigation. Therefore it comprises text (with one or more type font, styles), still/moving images, colors, shapes, audio/visual and links. It can be designed to be accessible and therefore readable by screen/text readers

Format[2]	**Actual coding**
HTML	Plain text HyperText Markup Language (HTML) is a markup language originally defined by Tim Berners-Lee and further developed by the IETF, HTML is now an international standard (ISO/IEC 15445:2000). Later HTML specifications are maintained by the World Wide Web Consortium (W3C)
XHTML	Plain text Extensible HyperText Markup Language (XHTML) is a markup language that has the same expressive possibilities as HTML, but a stricter syntax. XHTML 1.0 became a World Wide Web Consortium (W3C) Recommendation on January 26, 2000.
XML	Plain text Extensible Markup Language (XML) is a W3C-recommended general-purpose markup language for creating special-purpose markup languages, capable of describing many different kinds of data. XML 1.0 became a W3C Recommendation on February 10, 1998. Concurrently to the publishing of XML 1.0 Third Edition was published also XML 1.1. Both XML 1.0 Third Edition and XML 1.1 are considered current versions of XML.
VRML	Plain text Virtual Reality Modeling Language (VRML) is a standard file format for representing 3-dimensional (3D) interactive vector graphics. The first version of VRML was specified in November 1994. The current and functionally complete version is VRML97 (ISO/IEC 14772-1:1997). VRML has now been superseded by X3D (ISO/IEC 19775-1)
X3D	Plain text X3D is the ISO standard for real-time 3D computer graphics (ISO/IEC 19775-1), the successor to Virtual Reality Modeling Language (VRML).
SGML	Plain text The Standard Generalized Markup Language (SGML) is a descendant of IBM's Generalized Markup Language (GML), developed in the 1960s by Charles Goldfarb, Edward Mosher and Raymond Lorie. SGML is an ISO standard: "ISO 8879:1986 Information processing - Text and office systems - Standard Generalized Markup Language (SGML)".

Sources	**Procedure**	**Result/output**	**Example**
HTML/XHTML/XML/VRML/X3D/SGML	**Aggregation** **Possible scenarios** 1) operational step in a distribution chain 2) service in outsourcing **Associated rights**	HTML/XHTML/XML/VRML/X3D/SGML	**Scenario**: two web-sites (originally independent from one another) are to be merged into a single site **Procedure**: the rights related to the two original sites are checked, (both in respect to content and to branding) and in case re-

[2] By no way this list is intended to be all-inclusive, what reported is just a subset of the lists of formats already defined and referenced in other deliverables of the AXMEDIS project.

	B2B 1) needed: Editing, Printing, Storing, Copying (this in the case of production in outsourcing) 2) additional: Distributing B2C rights are going to be a subset of B2B		acquired/cleared/revised. Content is fetched (usually by automatic retrieval using specifically devised tools) and then stored for further processing. The new web-site structure is designed taking into account constraints coming form original content. Previously stored content is post-processed (in case this is somehow needed) and then stored in the new final location. Achieved results are tested and links/navigation consistency is checked. Depending on site content, aim and target audience additional checks are performed (like usability and accessibility ones) and security related issues are fixed. A final test is performed to ensure proper result and then the attained result is made "publicly" available to expected audience.
HTML/XHTML/XML/VRML/X3D/SGML	**Dis-aggregation** **Possible scenarios** 1) operational step in a distribution chain 2) service in outsourcing **Associated rights** B2B 1) needed: Un-protect, Editing, Printing, Storing, Copying (this in the case of production in outsourcing) 2) additional: Publishing and Distributing B2C rights are going to be a subset of B2B	HTML/XHTML/XML/VRML/X3D/SGML	**Scenario**: content coming from specific web sites is acquired for usage into another (this could apply either to a part or to the whole site – in this later case a "mirroring" operation may be occurring. **Procedure**: the rights related to the original content are checked, (both in respect to content and to branding) and re-acquired/cleared/revised (if needed). Content is fetched (usually by automatic retrieval using specifically devised tools) and then stored for further processing. The target web-site structure is designed taking into account constraints coming form original content. Previously stored content is post-processed (in case this is somehow needed) and then stored in the new final location. Achieved results are tested and links/navigation consistency is checked. Depending on site content, aim and target audience additional checks are performed (like usability and accessibility ones) and security related issues are fixed. A final test is performed to ensure proper result and then the attained result is made "publicly" available to expected audience.
HTML/XHTML/XML/VRML/X3D/SGML	**Conversion** **Possible scenarios** 1) operational step in a distribution chain 2) service in outsourcing **Associated rights** B2B 1) needed: Un/protecting, Converting, Editing, Printing, Storing, Copying (this in the case of production in outsourcing) 2) additional: Publishing and Distributing B2C rights are going to be a subset of B2B	HTML/XHTML/XML/VRML/X3D/SGML	**Scenario**: a web site is transformed into a virtual world. **Procedure**: the rights related to the original content are checked, (both in respect to content and to branding) and re-acquired/cleared/revised (if needed). Content is fetched (usually by automatic retrieval using specifically devised tools) and then stored for further processing. The target web-site structure is designed taking into account constraints coming form original content. Previously stored content is post-processed (passing from 2D to 3D whenever needed) and then stored in the new final location. Achieved results are tested and links/navigation consistency is checked. Depending on site content, aim and target audience additional checks are performed (like usability and accessibility ones) and

			security related issues are fixed. A final test is performed to ensure proper result and then the attained result is made "publicly" available to expected audience.

Certainly it is also possible to have combinations of the just mentioned operations that are not reported here but can be easily derived from the basic ones described. Having seen the intra category operation let's now focus on the cross-category transformation.

Sources	Procedure	Result/output	Example
HTML	Conversion An hyper-text can be turned into text by removing links (this can be done partially in automatic manner, but is usually performed manually)	PDF/doc	**Scenario**: an interesting hypertext has been acquired for reference publication and has to be transformed into a printable-only document. **Procedure**: the original document is acquired, if protected is unprotected, then reported links are turned into references. Navigation features are reflected in content table of content and actual document structure, result is properly protected and final result is then distributed/delivered.
HTML	Conversion - Hyper-text is summarised and transformed assigning titles to pages, inserting summarized text in bulleted form, re-placing images/animations where needed, putting achieved pages in the proper sequence	Presentation	**Scenario**: an interesting hypertext has been acquired for reference publication and has to be transformed into a printable-only presentation. **Procedure**: the original document is acquired, if protected is unprotected, then text is summarized and transformed into bullet points, reported links are turned into references, navigation features are reflected in content table of content and actual document structure, result is properly protected and final result is then distributed/delivered.
HTML	Conversion - Hyper-text is transformed dropping some part of the content/navigation interface and rearranging content (this procedure could be semi-automatic if the original content is already structured in a way that suits the aim in any case is also much depending on nature and aim of the original content)	Multimedia	**See previous cases**

Valuable reference for this kind of contents can be found in: [3] [4] [5] [9] [10] [11] [12] [15] [16] [17] [18] [19] [20] [21] [26] [34] [35] [36] [37] [38] [40] [41] [42]

5.5 Editorial Formats for presentation objects (ILABS, XIM)

The starting point for the definition of an editorial format of content in form of presentation is the definition of its characteristics. From what previously presented is clear that in this context we refer to any kind of content that has a presentation purpose (therefore usually more concise than the sources used for its production), can be printed and could be accessed sequentially, but may have hyper-linking (it can comprise text, images and even sound).

Starting from this definition is clear that it is possible either to perform operations on this content that generate new content while remaining in the same content category or to perform operations to change content category depending on users needs, aims and expectations. This latter point usually applies to B2B users, as B2C users will have a rather limited subset of possibilities in respect of content manipulation

actions. In both cases the kind of operations and steps involved to pass from one stage to another will be better clarified now starting from the intra-category one.

Source sample
Any kind of content that has a presentation purpose (therefore usually more concise than the sources used for its production), can be printed and could be accessed sequentially, but may have hyper-linking. Therefore it comprises text (with one or more type font, styles), still/moving images, colors, shapes, audio/visual and links. It can be designed to be accessible and therefore readable by screen/text readers

Format[3]	**Actual coding**
Ppt	Plain text & binary code Proprietary presentation format originated as an idea of Bob Gaskins, in 1984, was then developed at Forethought by Dennis Austin and Tom Rudkin. Bob Gaskins later suggested the new name "PowerPoint" which finally became the product name. PowerPoint 1.0 was released in 1987 for the Apple Macintosh.
Odp (ODF)	Plain text & binary code The OpenDocument format (ODF), short for the OASIS Open Document Format for Office Applications, is an open document file format developed by the OASIS industry consortium, based upon the XML-based file format originally created by OpenOffice.org, and ODF was approved as an OASIS standard on May 1, 2005. A draft for the ISO ISO/IEC 26300 was approved on May 3, 2006
Smil	Plain text Synchronized Multimedia Integration Language (SMIL) is a W3C Recommendation for describing multimedia presentations using XML (Extensible Markup Language). It defines timing markup, layout markup, animations, visual transitions, and media embedding, among other things. SMIL 1.0 became an official recommendation in June 1998. SMIL 2.0 became an official recommendation in August 2001. SMIL 2.1 became an official recommendation in December 2005. SMIL 2.1 includes a small number of extensions based on practical experience gathered using SMIL in the Multimedia Messaging System on mobile phones.
Flash	Plain text & binary code interpreted by a specific player Macromedia Flash, or simply Flash, refers to a Macromedia proprietary standard for authoring. It features support for vector and raster graphics, a scripting language called ActionScript and bidirectional streaming of audio and video.

Sources	**Procedure**	**Result/output**	**Example**
Ppt / Odp / Smil /Flash	**Aggregation** **Possible scenarios** 1) operational step in a distribution chain 2) service in outsourcing **Associated rights** B2B 1) needed: Editing, Printing, Storing, Copying (this in the case of production in outsourcing) 2) additional: Distributing B2C rights are going to be a subset of B2B	Ppt / Odp / Smil /Flash	**Scenario**: A management and a technical presentation of a product have to be combined into a marketing one. **Procedure**: the original presentations are acquired; needed rights (related to brands, trademarks and logos) are cleared. A common style is selected and a specific template sketched (background image/color). Original presentations are un-protected and content is extracted. Text is re-organized and inserted, images, diagrams… are re-arranged and inserted. Animations and effects are added, then achieved result is packed, secured and delivered
Ppt / Odp / Smil /Flash	**Dis-aggregation** **Possible scenarios** 1) operational step in a distribution chain 2) service in outsourcing **Associated rights** B2B 1) needed: Un-protect, Editing, Printing, Storing, Copying (this in the case of production in outsourcing)	Ppt / Odp / Smil /Flash	**Scenario**: Part of a technical presentation of a product has to be extracted to be used into a marketing one. **Procedure**: the original presentation is acquired; needed rights (related to brands, trademarks and logos) are cleared. A specific template is selected. Original presentation is un-protected and content is extracted. Text is re-organized and inserted in the new format. Images, diagrams… are re-arranged and inserted. Animations and

[3] By no way this list is intended to be all-inclusive, what reported is just a subset of the lists of formats already defined and referenced in other deliverables of the AXMEDIS project.

	2) additional: Publishing and Distributing B2C rights are going to be a subset of B2B		effects are added, then achieved result is packed, secured and delivered
Ppt / Odp	**Conversion** **Possible scenarios** 1) operational step in a distribution chain 2) service in outsourcing **Associated rights** B2B 1) needed: Un/protecting, Converting, Editing, Printing, Storing, Copying (this in the case of production in outsourcing) 2) additional: Publishing and Distributing B2C rights are going to be a subset of B2B	Smil /Flash	**Scenario**: A marketing oriented presentation has to be turned into a MMS[4] for mass promotion. **Procedure**: the original presentation is acquired; needed rights (related to brands, trademarks and logos) are acquired/cleared. A specific template is designed. Original presentation is un-protected and content is extracted. Text is re-organized and inserted in the new format. Images, diagrams… are post-processed, adapted, re-arranged and inserted. Animations and effects are added, then achieved result is packed, secured and delivered

Certainly it is also possible to have combinations of the just mentioned operations that are not reported here but can be easily derived from the basic ones described. Having seen the intra category operation let's now focus on the cross-category transformation.

Sources	Procedure	Result/output	Example
Presentation	Conversion - A presentation can easily be turned into a text by removing the animations and taking into account that content that will be hidden in the printed form (because only visible in a specified sequence of superimposed screens) have to be turned into separate pages of the document sequence (this latter operation usually brings to a higher number of pages than the original and cannot be done in an automatic way)	PDF/doc	**Scenario**: an interesting presentation on a case study has been held in a marketing meeting and the management wants it to be turned into a brochure for reference and dissemination. **Procedure**: the original document is acquired, if protected is unprotected, then a specific template is selected; content is extracted from the original source, re-structured (text re-organized, reported references and links placed in evidence). Images and other visual content selected, post-processed, adapted and inserted (if needed), result is properly protected and final result is then published.
Presentation	Conversion - A presentation can be made hyper-textual by adding targeted hyper-links (this can be done partially in automatic manner, but is usually performed manually)	HTML	**Scenario**: the technical department has developed an interesting presentation on a product and the management wants to turn it into an hypertext to be used for reference. **Procedure**: the original document is acquired, if protected is unprotected, then reported references are turned into actual links. Navigation features are applied (if needed), result is properly protected and final result is then distributed/delivered.
Presentation	Conversion - A presentation is usually transformed into a multimedia dropping some part of the navigation interface and rearranging content (this procedure could be semi-automatic if the original content is already structured in a way that suits the aim in any case is also much depending on nature and aim of the original content)	Multimedia	**See previous cases**

4 MMS is based on SMIL

Valuable reference for this kind of contents can be found in: [9] [12] [14] [15] [16] [18] [20] [22] [26] [33] [34] [35] [36] [37] [38]

5.6 Example Editorial Formats for presentations

The following screenshots show two sample editorial formats for formatting objects for presentations. These have been designed to be used for demonstration purposes within the AXMEDIS project and also to provide a basis for the development of further editorial formats for AXMEDIS presentation objects.

5.6.1 Marketing-style presentation format

This editorial format uses bold colours and subtle shading and effects to give a professional ‘marketing’ style appearance to content. It consists of just title and body content areas for simple text content.

5.6.2 Simple presentation format

This editorial format uses a limited colour range and white to give a professional industrial or academic style appearance to content. It consists of title, body and footer content areas for text content.

5.7 Editorial Formats for audio, visual and multimedia objects (ILABS, XIM)

These would normally be embedded within the above classes of object. With this we mean that a generic multimedia object will comprise text, images, audio/visual content along with navigation info. Therefore the generic multimedia content we will take into account will be a combination of previously described objects and in most cases encapsulated in a XML/HTML based container.

Starting from this definition is clear that it is possible either to perform operations on this content that generate new content while remaining in the same content category or to perform operations to change content category depending on users needs, aims and expectations. This latter point usually applies to B2B users, as B2C users will have a rather limited subset of possibilities in respect of content manipulation actions. In both cases the kind of operations and steps involved to pass from one stage to another will be better clarified now starting from the intra-category one.

Source sample
Any audio, video or mixed-media content, including any combination of previous ones.

Format[5]	Actual coding
Flash	Plain text & binary code interpreted by a specific player Macromedia Flash, or simply Flash, refers to a Macromedia proprietary standard for authoring. It features support for vector and raster graphics, a scripting language called ActionScript and bidirectional streaming of audio and video.
Director	Plain text & binary code interpreted by a specific player Director is another proprietary format started out as MacroMind "VideoWorks". Its name was changed to "Director" in 1987, with the addition of new capabilities and the Lingo scripting language in 1988. A Windows version was available in the early 1990s. By the mid-1990s, over 70% of CD-ROM multimedia titles were authored using Director. Macromedia Director is now part of Adobe Systems. It allows users to build applications built on a movie metaphor, with the user as the "director" of the movie. Its scripting language Lingo motivated some to use this application. It can incorporate many different formats (e.g. AVI, BMP, QuickTime, PNG, JPEG, RealVideo) thus making it possible to integrate without re-encoding files. It also supports vector graphics and 3D interactivity, Version MX and its successors are also easily linked with Flash animation. Director's functionality can be extended through plug-in applications called Xtras. These can be created by users or purchased from third party vendors. They are created using Macromedia's XDK (Xtra Development Kit), a C++ SDK.
VRML	Plain text Virtual Reality Modeling Language (VRML) is a standard file format for representing 3-dimensional (3D) interactive vector graphics. The first version of VRML was specified in November 1994. The current and functionally complete version is VRML97 (ISO/IEC 14772-1:1997). VRML has now been superseded by X3D (ISO/IEC 19775-1)
X3D	Plain text X3D is the ISO standard for real-time 3D computer graphics (ISO/IEC 19775-1), the successor to Virtual Reality Modeling Language (VRML).
Smil	Plain text Synchronized Multimedia Integration Language (SMIL) is a W3C Recommendation for describing multimedia presentations using XML (Extensible Markup Language). It defines timing markup, layout markup, animations, visual transitions, and media embedding, among other things. SMIL 1.0 became an official recommendation in June 1998. SMIL 2.0 became an official recommendation in August 2001. SMIL 2.1 became an official recommendation in December 2005. SMIL 2.1 includes a small number of extensions based on practical experience gathered using SMIL in the Multimedia Messaging System on mobile phones.
SGML	Plain text The Standard Generalized Markup Language (SGML) is a descendant of IBM's Generalized Markup Language (GML), developed in the 1960s by Charles Goldfarb, Edward Mosher and Raymond Lorie. SGML is an ISO standard: "ISO 8879:1986 Information processing - Text and office systems - Standard Generalized Markup Language (SGML)".

Sources	Procedure	Result/output	Example
Flash / Director / VRML / X3D / Smil / SGML	**Aggregation** **Possible scenarios** 1) operational step in a distribution chain 2) service in outsourcing **Associated rights** B2B 1) needed: Editing, Printing, Storing, Copying (this in the case of production in outsourcing) 2) additional: Distributing B2C rights are going to be a subset of B2B	Director	**Scenario**: A set of management and technical presentations of a product have to be combined into a CD for marketing usage. **Procedure**: the original presentations are acquired; needed rights (related to brands, trademarks and logos) are cleared. A specific content organization structure and user interface for accessing to content are designed and implemented. A common style is selected and a specific template sketched (background image/color). Original presentations are un-protected and content is adapted to the new “look and feel”. Modified contents are re-arranged and inserted in the devised structure. Both devised structure and user interface are checked for consistency and tested, then achieved result is packed, secured and delivered.
Director /	**Dis-aggregation** **Possible scenarios** 1) operational step in a distribution chain 2) service in outsourcing **Associated rights**	Flash / VRML / X3D / Smil / SGML	**Scenario**: A previously produced CD for marketing usage holds a set of valuable management and technical presentations that should be saved individually for reference purposes. **Procedure**: the original CD is un-protected

[5] By no way this list is intended to be all-inclusive, what reported is just a subset of the lists of formats already defined and referenced in other deliverables of the AXMEDIS project.

	B2B 1) needed: Un-protecting, Converting, Editing, Printing, Storing, Copying (this in the case of production in outsourcing) 2) additional: Publishing and Distributing B2C rights are going to be a subset of B2B		and component presentations are extracted; needed rights (related to brands, trademarks and logos) are cleared. A specific content organization structure for reference and archival purposes is designed and implemented (if needed) otherwise the available one will have to be used. Original presentations are secured, stored and related metadata filled in.
Flash / VRML / X3D / Smil / SGML	**Dis-aggregation** **Possible scenarios** 1) operational step in a distribution chain 2) service in outsourcing **Associated rights** B2B 1) needed: Un-protecting, Converting, Editing, Printing, Storing, Copying (this in the case of production in outsourcing) 2) additional: Publishing and Distributing B2C rights are going to be a subset of B2B	Flash / VRML / X3D / Smil / SGML	**Scenario**: A previously produced presentation for marketing usage holds a set of valuable management and technical content that should be saved individually for reference purposes. **Procedure**: the original presentation is un-protected and components are extracted; needed rights (related to brands, trademarks and logos) are cleared. Original contents are post-processed (if needed), secured, stored and related metadata filled in.
Flash	**Conversion** **Possible scenarios** 1) operational step in a distribution chain 2) service in outsourcing **Associated rights** B2B 1) needed: Un/protecting, Converting, Editing, Printing, Storing, Copying (this in the case of production in outsourcing) 2) additional: Publishing and Distributing B2C rights are going to be a subset of B2B	Smil / SGML	**Scenario**: A previously produced presentation for marketing usage holds a set of valuable content that could be used individually for marketing purposes using MMS. **Procedure**: the original presentation is un-protected and components are extracted; needed rights (related to brands, trademarks and logos) are cleared. Original contents are post-processed (if needed), re-packaged into MMS format, secured, stored, related metadata filled in and finally published on the distribution service for delivery.

Certainly it is also possible to have combinations of the just mentioned operations that are not reported here but can be easily derived from the basic ones described. Having seen the intra category operation let's now focus on the cross-category transformation.

Sources	**Procedure**	**Result/output**	**Example**
Multimedia	Conversion - A multimedia can be made hyper-textual by adding targeted hyper-links (this can be done partially in automatic manner, but is usually performed manually)	HTML	**Scenario**: A product presentation originally prepared as "proof of concept" for a web-site development has to be turned in the real site **Procedure**: the original "proof of concept" is used as schema and storyboard for the development of the site structure. Its content will have to be un-protected, decomposed and re-used as the staring point of the development process. Presentation content (texts, captions, buttons, navigation controls…) will be extracted; referenced content will be collected, acquired (in terms of rights) and then processed. The initial result will be the skeleton of the target web-site (including navigation structure, features and tools) having therefore transformed the original (only visual demo) into the equivalent hyper-textual equivalent.

Multimedia	Conversion - A multimedia can be turned into a presentation by chunking it, inserting text and re-combining the whole in a specific sequence	Presentation	**Scenario**: A product presentation originally prepared as "multimedia gadget" for a "miniCD-based distribution" has to be turned into a formal presentation. **Procedure**: the original "miniCD" is used as schema and storyboard for the development of the formal presentation. Its content will have to be un-protected, decomposed and re-used as the staring point of the development process.
Multimedia	Conversion - A multimedia can be turned into a text by chunking it, inserting text and re-combining the whole in a specific sequence plus replacing videos with the most significant screenshots and a transcription of the related audio (if any), furthermore any other audio should be replaced by the related transcription	PDF/doc	**Scenario**: A product presentation originally prepared as "multimedia gadget" for a "miniCD-based distribution" has to be turned into a document for paper-based publication. **Procedure**: the original "miniCD" is used as schema and storyboard for the development of the paper-based publication. Its content will have to be un-protected, decomposed and re-used as the staring point of the development process.

Valuable reference for this kind of contents can be found in: [9] [12] [14] [15] [16] [18] [20] [23] [24] [25] [26] [27] [28] [29] [34] [35] [36] [37] [38]

5.8 Example Editorial Formats for audio, visual and multimedia playback

The following screenshot shows a sample format for formatting and playback of video and/or multimedia objects. This has been designed for use in demonstrations, and takes the form of a media player with standard controls.

Test versions of this Format are being prototyped using SMIL in order to play video content in the main window, using start and stop controls (eventually volume control and other functionality).

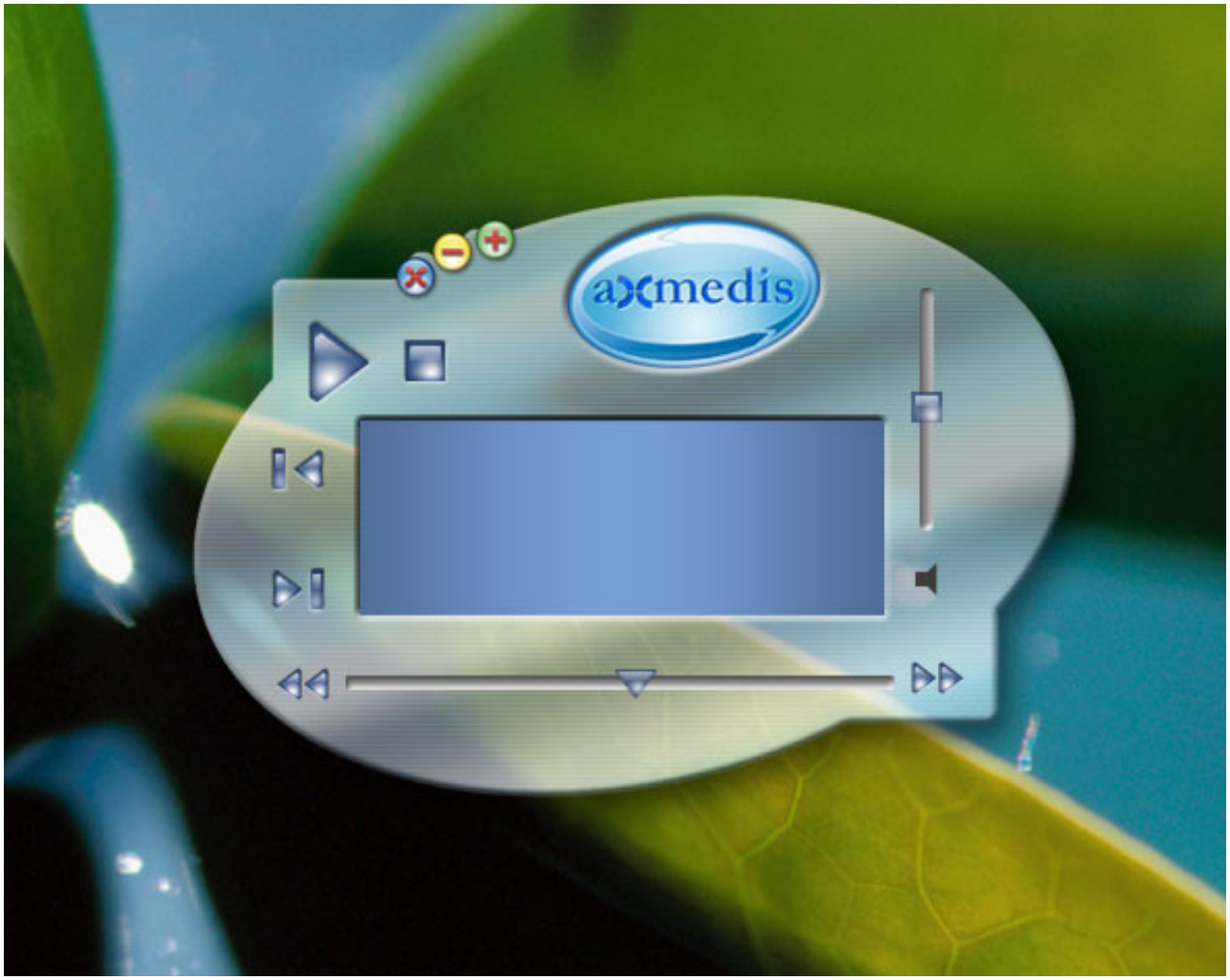
5.8.1 Subtitles

Subtitles must be supported by any AXMEDIS formats for video. However, three key issues exist:

- **Synchronisation** – it is planned to use SMIL to encode the frame timing of subtitle appearance to synchronise with the content. However, this is not an issue for editorial formats but will impact the structure of AXMEDIS objects which contain subtitles.
- **Positioning** – in order to make optimal use of limited screen space (especially on mobile/PDA platforms) it is necessary to design formats suited to different permutations of content and display aspect ratios. In essence, a letterbox video viewed on a 4:3 ratio display can have the subtitles positioned beneath the video, while letterbox video on widescreen displays will best suit an overlayed subtitle.
- **Multi-lingual support** – for Western languages, formatting should be the same, however, for languages that run top-bottom or right-left, it may be necessary to design alternative subtitle layouts within the format.

5.8.2 Audio player

The screenshot below shows a audio-player concept format derived from the media player above. The display can be used for synchronised messages or for general information related to the audio content.

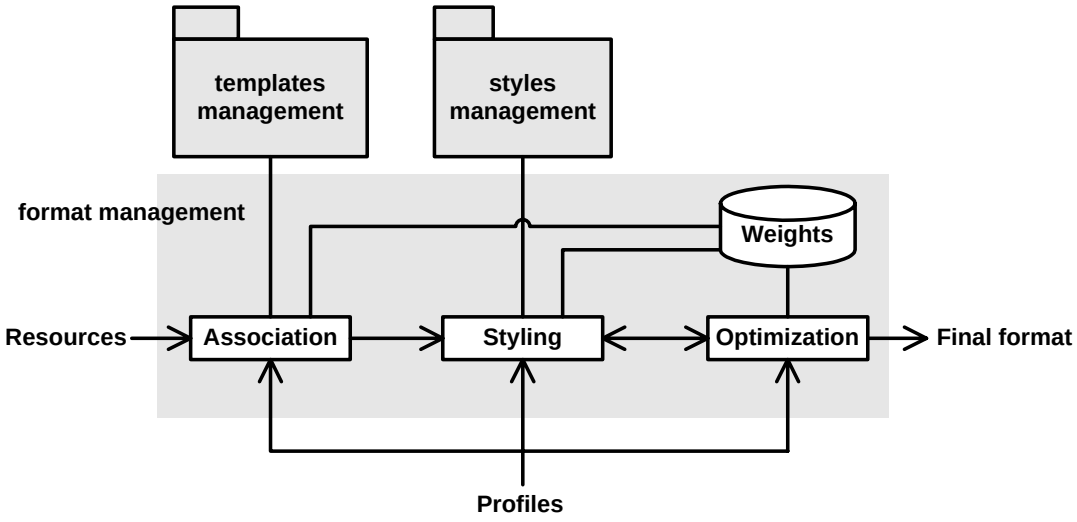


6 AXMEDIS Formatting model and SMIL guidelines (DSI Vaccari, EPFL Beilu)

The model adopted for format description, used by the AXMEDIS Format Engine for automatic formatting and optimization, is based on the W3C's SMIL language. Editorial Formats for AXMEDIS need to include SMIL code to describe layout. This section describes the current status of the SMIL-based formatting model and provides guidelines for using SMIL in Editorial Formats.

6.1 AXMEDIS Formatting model for adaptation and rendering (DSI Vaccari, EPFL Beilu)

The format management system aims to select and adapt almost automatically the presentations contained in the system library, to reuse them for formatting a new set of digital resources. New presentations can be created either from scratch or by modifying existing ones, enriching increasingly the library.
To achieve its goal, the system uses a format description based on templates and style-sheets. It is logically divided into three blocks:



The main blocks of the format management system

- the **association** block receives as input the digital resources, user and device. It performs a mapping of resources, profiles and other compositional properties, and chooses most suitable templates, according to a set of weights. To detect the "type" of the presentation and choose a template that matches it, it is very relevant for this block to have a precise context definition. Therefore, the user who requests the formatting should specify:

    - the platform for which the presentation is needed, i.e.: PC, PDA, SmartMobile, Mobile, iTV, etc.;
    - the desired output format, i.e.: MPEG4, AXMEDIS/MPEG21, SMIL, HTML, etc.;
    - a general category for the content, i.e.: slide show, electronic book, kiosk, interactive music, interactive video, training tutorial, etc.

    The system will perform a mapping of context and selected media, and it will choose the template nearest to these criteria. The output of this block is the indication of a template, which describes the basic structure of the presentation;

- the **styling and optimization** blocks select a style-sheet for the given template and adjust their parameters to cope with the profiles, managing the adaptation and the transcoding of the involved media. They perform a mapping of resources, profiles and other compositional properties, and choose most suitable style-sheets and optimization values, according to a set of weights. The output of this block is the final format description.
  The optimization process is a very critical and complex phase, that may involve many aspects. Media encoding is part of the optimization: to fit the optimized layout, media may necessitate transcoding, resampling or moreover, media have to be transformed (scaled, rotated, etc.) to fit the adapted layout.

Resources are typically included into an AXMEDIS object; when composing the object, the author should also specify a category, that is the way he intends to use the resource. For instance: a text may be used as document title, as page body, as figure caption, as button label; an image may be used as page header, as background, as figure; and so on. Such information is needed to correctly insert resources into the structure of the presentation.

The system is supposed to work in two modalities:

- an interactive modality, which allows the author to choose or create templates and style-sheets and control the results of the adaptation. This modality also relies on the AXMEDIS SMIL Editor and Player;
- an automatic modality, that manages the whole process following a set of JavaScript rules.

Please refer to DE4.3.1 and DE3.1.2.2.6 for a full description of the AXMEDIS Content Formatting Engine.

6.2 Using SMIL for Editorial Formats (DSI Vaccari, EPFL Beilu)

The format produced with the AXMEDIS tools is included in the AXObject delivered to the final user. Although the model is based on SMIL, the output could be either in SMIL, HTML, MPEG4 or another publishing format.

The formatting process is divided in three steps:
1. template definition;
2. style definition;
3. optimization.

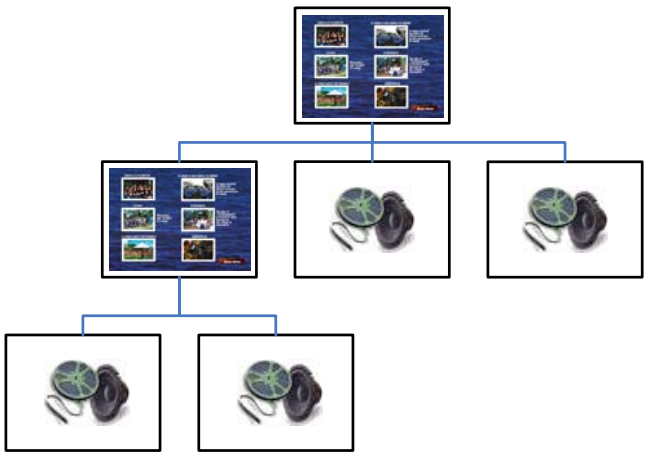
Templates define the document behaviour:
- screen regions: number and nesting;
- digital resources: assignment to regions, timing and synchronization;
- hyper-linking: relationships among resources and with other documents.

Style-sheets determine the document appearance: they define positions, dimensions and other visual properties (colours, etc.) of the regions. Moreover, the style-sheet declares some attribute as parameters: their value are produced by an optimizer based on meta-heuristic algorithms.

The task of creating templates and style-sheet should be simple and almost transparent to the user, since it is embedded in the creation of a normal SMIL document through the AXMEDIS SMIL Editor. Only a few additional items of information are required from the user: this information is used to assign templates and digital resources to some general categories in order to make the automatic formatting process more effective.

Although the whole SMIL language (as specified in the "W3C Recommendation SMIL 2.1") can be used for format description, to get best results with the AXMEDIS Format Engine a special approach is needed.

- SMIL allows creation of a presentation composed by independent sections, which are logically active in parallel, but only one is physically active (i.e. displayed) at any one time. To simplify the task of guessing the association between resources and placeholders defined in the template, authors are encouraged to split up the presentation in several independent scenes (concatenated with hyperlinks), rather than include all the sections in the same SMIL document.
- This way, we can describe a complex multimedia format such as a DVD-style menu, with independent sections. Each section may contain either a sub-menu, or only some audiovisual media; both kinds of page contain media assets. This pattern may be nested and repeated, creating a multi-level hierarchy, as depicted in the figure below.
- A similar hierarchy can be reproduced nesting the AXMEDIS objects that include resources belonging to different scenes.
- For sake of simplicity and effectiveness, the structure of the presentation should only implement vertical hyperlinks (that is, from menu to sub-menu, and vice versa), while horizontal hyperlinks (that is, between section located at the same level of the hierarchy) should be avoided.
- A big advantage of this approach is the potential reusability of templates: the probability of "recycling" an existing template is higher if the template is simple and it accomplishes a standard task. In contrast, templates with very complex and specific behaviours can hardly be reused in different situations.



The typical DVD-style structure

7 Formats for mobile and PDA (XIM, ILABS)

The mobile and PDA distribution channels impose specific restraints on the Editorial Format. Therefore a matrix of Editorial Formats is required to format each kind of content for each required channel, as illustrated in the table below.

Content type/ Channel	Document	Presentation	Hypertext	Audio	Video	Multimedia
PC	Full-size, printable	Full-size, printable	Full-size, flexible navigation	Juke-box style player option	Juke-box style player option	Juke-box style player option
Kiosk	Simple to access and read on-screen	Simple to access and read on-screen	Clear structured navigation	Clear menu giving links to required audio files	Clear menu giving links to required video files	Clear menu giving links to required multimedia files

Content type/ Channel	Document	Presentation	Hypertext	Audio	Video	Multimedia
PDA	Chunked, reduced font and graphic size, simple navigation	Chunked, reduced font and graphic size, simple navigation	Reduced scale pages, simplified navigation	Simple player, some options available	Simple player, some options available	Simple player, some options available
Mobile	Provide abstract plus link to download	Provide abstract plus link to download	Simple, chunked views, simple navigation	Simple player	Simple player	Simple player

The specific details of the channels in AXMEDIS are well described in previous deliverables. In particular, please refer to the update User Requirements (DE2.1.1.2.1).

7.1 Practical problems for PDA and mobile formats

The key formatting constraints for mobile and PDA devices are:

- limited display resolution, physical size and colour range
- limited user interface capability, with small keypads and sometimes present pointing devices (such as stylus, toggle, etc.)
- poor performance due to processor speed and operational memory limitations, which may impact streamed media and/or large or complex objects to be rendered by a browser.
- limited browser media-type support, which can prevent simple reuse of media formats supported by PC browsers.
- limited network bandwidth, constraining bitrates when streaming.

Further relevant information can be found in User Requirements (DE2.1.1.2.1).

7.1.1 Display constraints

At present, in order to support the main mobile and PDA devices on the market in addition to PCs, it is necessary to design Editorial Formats to suit the following screen resolutions:

Small		Regular		Wide		Special	
Resolution	**Ratio**	**Resolution**	**Ratio**	**Resolution**	**Ratio**	**Resolution**	**Ratio**
160x120	4/3	640x480	4/3	1280x768	5/3	160x160	1/1
320x240	4/3	1024x768	4/3	1280x1024	5/4	200x200	1/1
		1152x864	4/3			240x320	3/4
		1280x960	4/3			300x300	1/1
						320x320	1/1
						320x480	2/3
						600x600	1/1

The physical screen size is also important factor, especially as resolutions increase. A letterbox-style movie presented on a 2inch screen will be very hard to see detail, and any small navigation elements would be difficult to interact with.

Other display-related issues concern the variability of mobile device displays. Displays can be monochrome or have only limited colour range, they may exhibit poor visibility in bright sunlight conditions, and they may have non-standard resolutions and aspect ratios. As it is potentially possible to end up with a very large number of permutations, the editorial formatting approach to supporting these devices will need to be planned and designed in line with the quality and performance goals of the distribution channel owner and the content owners.

7.1.2 User interface considerations

Mobile devices may have limited user interface capability, which might limit the use of scrolling, complex navigation and interactivity within formats. Some devices have small keyboards, others may offer stylus interaction, etc.

7.1.3 Performance and device memory constraints

Although recent phones include memory capacities exceeding 32Mb, this is flash memory and not necessarily available for application support such as a browser or media player. CPU performance is also a constraint on current generation models, although this can also be expected to improve substantially with future hardware.

7.1.4 Browser/viewer compatibility issues

Mobile devices with proprietary operating systems often utilize proprietary browsers and may have limited support for media types that are readily viewable on PC platforms. For example, viewing and rendering some video formats and flash may have limited support. Also support for certain html elements such as frames and css may not be strictly standards-compliant, leading to potential layout and styling errors.

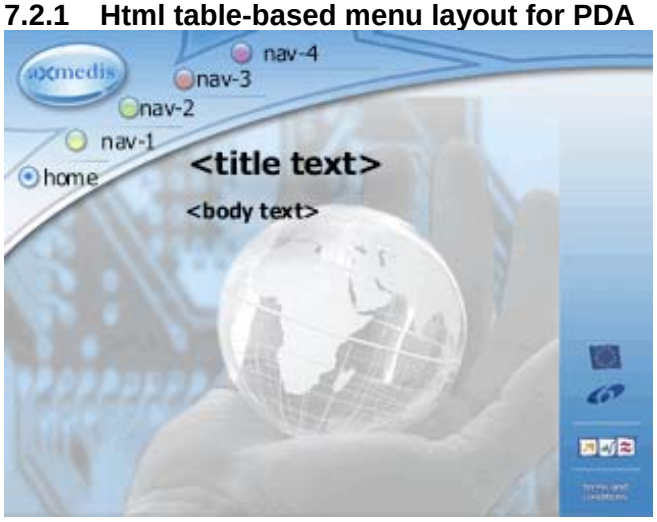
7.1.5 Network bandwidth issues

It is possible that a mobile network will have limited network bandwidth, especially for users in areas with poor network coverage. This can impact maximum bitrates when streaming video and or audio, and can slow down effective responsiveness for hyperlinked, image-heavy content.

7.2 Editorial format declined for PDA and smartphone

Taking into account the constraints described above, the following examples show editorial formats declined for PDA. These formats also apply to the latest generation mobile phones with screen resolutions approaching 320x240, and which include media players and enhanced browser capability.

7.2.1 Html table-based menu layout for PDA



This table-based layout preserves the shape of the design from the full-size version, but in doing so leaves only limited space for content. It is therefore more suited to simple, short pages of content.

7.2.2 Html frames-based menu layout for PDA

Such a frames-based format is highly suitable for PDA/smartphone as the centre window can utilise its own vertical scroll bar when body content exceeds the screen height. This leaves the header with menu navigation visible, along with the footer which can contain relevant copyright information, etc.

7.2.3 Presentation player (SMIL) for PDA

This format functions as a slide viewer with simple navigation between consecutive slides/content pages.

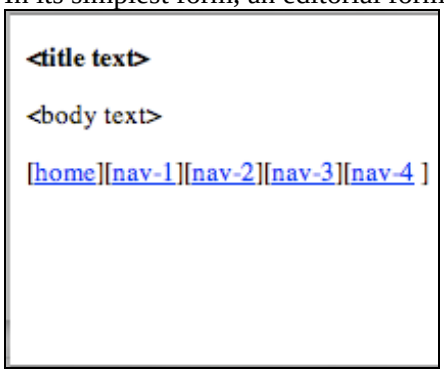
7.2.4 Media player for PDA

With this format, an option for full screen viewing with simple controls would also improve screen utilisation.

7.3 Editorial format declined for non-smartphone mobile phone

For many recent mobile phones using the symbian OS[45], the formats described for PDA would also be suitable as these 'smartphones' are capable of PDA-like display and media-type support. However, many phones still remain in use on networks which are only capable of limited text and image rendering, usually limited to WML support. It should be possible to reformat some AXMEDIS objects down to such a basic level, although this would be limited to text-heavy content.

In its simplest form, an editorial format for a hypertext page could be as follows:



This still preserves the page title, body and navigation menu. As the <body text> grows, dynamic "next" and "previous" links would be necessary to allow the body text to be 'chunked' into screens. This page could be rendered in either wml or html depending the target device. However, the limited resolution, small graphics and chunking of content would make this a difficult interface for the end user. It is therefore recommended that the AXMEDIS editorial formats focus on the 'smartphone'/symbian level of interface and above.

8 Conclusions and next steps (XIM, ILABS)

The content partners in AXMEDIS (ILABS, XIM, SEJER, AFI, ANSC, HP) have been identifying and aggregating content for use in the project (see DE8.1.1). WP8.4 runs to month 24 and so the development of editorial formats is scheduled to continue with further refinements being reported in later deliverables.
In parallel, the production work in WP8.5 of content for multichannel is ongoing through to month 42 of the project, so the editorial formats and rules presented in this deliverable are being applied to the selection and creation of AXMEDIS formatting templates for multichannel test objects and DRM rules in that subWP, ensuring that the objects created will be relevant to the needs of the market and realistic for content producers.

9 Bibliography (mandatory)

In this sections are reported the more relevant reference and standards that have to be taken into account, they can in any case be further complemented by the ones reported in the equivalent section of *DE3.1.3* and other specification deliverables.

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10 Glossary (mandatory)

DRM – Digital Rights Management
REL – Rights Expression Language
SMIL – Synchronized Multimedia Language
XSL – Extensible Stylesheet Language
PDF – Portable Document Format
PS – PostScript
RTF – Rich Text Format
ODF – OASIS Open Document Format for Office Applications,
XML – Extensible Markup Language
HXTML – Extensible HyperText Markup Language
HTML – HyperText Markup Language
SGML – The Standard Generalized Markup Language
VRML – Virtual Reality Modeling Language