Automating Production of Cross Media Content for Multi-channel Distribution

DE8.2.1.2
Content Selection Guidelines (1st Update)

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Abstract:
This document represents an updated to guidelines for object selection previously provided.

Keyword List:
Content, Selection, Guidelines, Metadata, Formats, Layouts, Templates, Processes

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Table of Content

1 Executive Summary and Report Scope

The annex I of the contract states:

> In parallel to the production of specific content for the validation test cases, a process of content identification is needed. Partners such as ILABS, SEJER, ANSC, have a huge amount of content that they intend to use in the AXMEDIS network supported by the AXEPTool when the project will be in the exploitation phases. In this task, they intend to make a selection of the content in order to identify the most significant content and content components to cope with two fundamental aspects that the content for validation has to satisfy:
>
> - The technical needs. A relevant part of the content selected has to cover a large set of possible technical combinations, giving more evidence to the most used and to the content type that has more commercial value for the market and for the users.
>
> - The promotional needs. A significant part of the content selected has to be attractive for the content producers and for the content distributors to give them the evidence of the innovative functionalities of AXMEDIS solutions. To this end specific collection of content that will be processed for automatic content composition and formatting will be selected.

The present document represents a complement to the already delivered *DE8.2.1 Content Selection Guidelines*. In line with the contract, the purpose of these two documents is to define the criteria by which the partners' content is selected for validation. The focus of this new document is more operative and based on the current state of the available and produced content. For this reason the document has been kept smaller in size and scope. For more details on the background info already provided please refer to the *DE8.2.1 Content Selection Guidelines* already provided, furthermore, as often mentioned, content should be selected for demonstrator development so to ensure the best suitability for high quality assessment of derived infrastructure, application and tools. Partially such an activity can be based on the analysis of *DE2.2.1a* related to test cases, partially on *DE3.1.3* related to content aspect specification.

1.1 Responsibilities

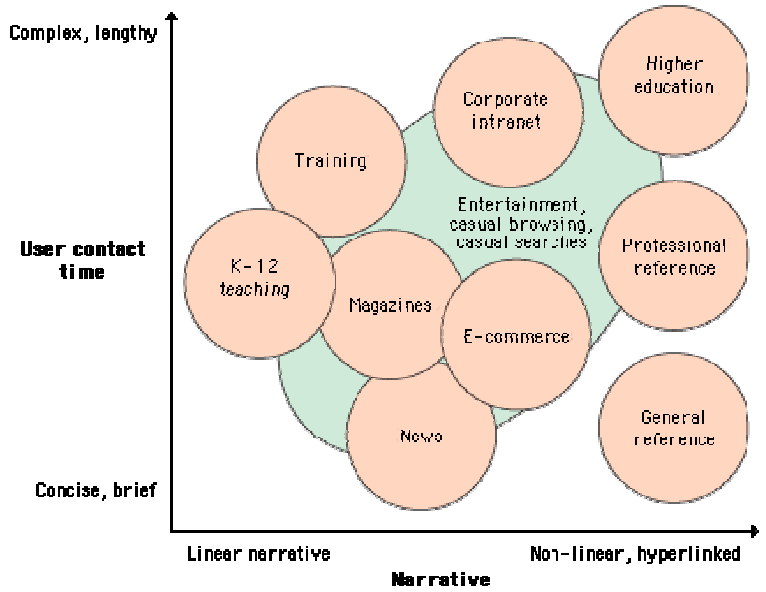
Main responsibility of the document is in charge to ILABS that developed the document with the contribution of XIM and all partners mentioned either in the contributors list.

2 Assumptions

Given the scope of the document and its nature (update of DE8.1.2) it is worth recalling here the assumptions made in order to ensure consistency with previous document while avoiding useless duplications.

2.1 Content Classification

Content classification encompasses many different aspects and it could be also deeply influenced by the target audience and expected usage. This is apparent also from the following graph and independent from the delivery media.



Therefore, we will have to operate a sort of harsh generalisation. Foreseen basic types of content are summarized in the following table, for a more detailed description, please refer to *DE3.1.1 Guidelines and Specification of research enabling technologies* and *DE3.1.3 Content Aspects Specification*. From now on, explanations and suggestions provided will only apply to those kind of basic objects.

Simple objects	Complex objects	Compound objects
Text / Images / Audio	Video / Animations	Multimedia

A compound object accounts for all constraints coming from its components; it is given for granted that it has to be selected evaluating the most restrictive combination so to ensure that all constraints are properly met.

2.2 Content Formats

Content formats will highly depend on the target audience, language, expected usage and delivery media. This is apparent also from the previous graph regardless of delivery media.

Therefore, once again, we will have to operate a sort of harsh generalisation starting from what already said and what reported in *DE8.4.1.2 AXMEDIS Editorial Format Guidelines and Basic Examples*. Foreseen basic types of content formats are summarized in the following table based on content type. From now on, explanations and suggestions provided will only apply to those kind of basic formats.

ID	Format
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)
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)
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)
Audio	Any kind of audio content (file, stream, music, spoken word, sound effects, etc.)
Video	Any kind of video content (file, stream, movie, animation, etc.)
Multimedia	A combination of previous ones

2.3 Main formatting & usability rules

- Content should exhibit proper balance among its components, respecting rules related to areas of interest (AOI),
- Each element of the content must be consistent with the others and as a whole,
- Content should be properly indexed and designed to be highly understandable and accessible,
- Language used should be plain,
- Explanation of technical/specific terms via glossary or notes
- Translation of foreign words should be available either as subtitling or content transcription,
- Any foreseen synchronised content should work correctly
- Media characteristics (format, quality, resolution, compression, colour space…) should be selected according to usage
- Rendering standard should be user-selectable (WAW, MP3, AIFF, PAL, NTSC…) and players needed for fruition should be available for installation along with related supportive info,
- The user should be able to select GUI effects, while interactive content components (buttons, functionality…) must be:
  - easy to use;
  - fully reliable and resilient;
  - compatible with target platforms;
  - compatible with distribution network servers if responses are required.

3 Selection criteria

The criteria for selecting content have been defined (as a core) in the previous version of the document starting from objective, factual *constraints* (such as technical, legal and commercial) and subjective, qualitative issues concerning the *suitability* and attractiveness of content. At this stage is possible to further refine such initial criteria set with further consideration related to usability and feasibility. The whole will have to be complemented with info and suggestions in respect to suitability for the purposes required in AXMEDIS, namely:

- Test case performance analysis;
- Dissemination support - supporting project promotion;
- Demonstrator operation - requiring content to be competitively priced & attractive to target market.

3.1 A recall on Selection Constraints

The following section examines the constraints affecting content selection for AXMEDIS. These constraints are more objective and easier to determine than the more subjective "*suitability criteria*" described later.

3.1.1 Rights and other Legal Constraints

It was mentioned that a crucial constraint for object selection is the rights issue based on the rationale that expected usage, target market and available rights mainly impose strong selection criteria for content. This happens with different modality according to the operational scenario: B2C or B2B. The table below summarises what just stated and should be used as a reference in the selection of content to be used for AXMEDIS testing phase in order to meet constraints.

B2C Distribution	B2B Distribution	P2P Distribution
In general, and also in AXMEDIS, this is a "one-to-many" relation in which content may, potentially, be exposed to high risk of IPR and copyright violation. Therefore main aspects to be taken into account are: • Copyright clearance • IPR recognition • Distribution contract / license in place	In general, and also in AXMEDIS, this is a typical "one-to-one" relation. Usually ruled by strict contracts, in AXMEDIS it is going to be ruled by a combination of contracts and licenses where contracts will cover those aspects that are (at present) not manageable by MPEG21 DRM model. The main aspects to be taken into account are:	In AXMEDIS this is subset of the previous case where instead of a "one-to-one" relation a "one-to-many" applies. In this case it relevant to note that there is a "mutual-trust" relation among partners based on the principles that rule the AXMEDIS P2P infrastructure and what already mentioned in respect of B2B.

• Modification / adaptation contract / license in place • Copyrights & IPR protection mechanism in place • DRM mechanism in place • DRM enforcement mechanism in place • Transactional payment mechanism should be in place • CRM may be needed	• Copyright clearance • IPR recognition • Distribution contract / license in place • Modification / adaptation / aggregation contract / license in place • Copyrights & IPR protection mechanism in place • DRM mechanism in place • DRM enforcement mechanism in place • Transactional or conventional payment mechanism should be in place • CRM should be in place	The main aspects to be taken into account are: • Copyright clearance • IPR recognition • Distribution contract / license in place • Modification / adaptation / aggregation contract / license in place • Copyrights & IPR protection mechanism in place • DRM mechanism in place • DRM enforcement mechanism in place • Transactional or conventional payment mechanism should be in place • CRM could be in place

Copyright clearance & IPR recognition issue. One of the major constraint affecting the content selection and acquisition criteria is the hurdles associated with obtaining the rights necessary to bring together text, images, music, video and other content for their aggregation, fruition and distribution. Critical elements of the content acquisition process include evaluating the product carefully and thoroughly to identify and classify all elements of content, deciding systematically which of those elements may require third party licenses or releases, tracking down the persons or entities with authority to grant the rights needed, and, finally, negotiating the necessary licenses and other agreements. Preservation measures must ensure that as many as possible of the following aspects persist over time:

- Fix the object as a discrete whole
- Preserve content
- Preserve the presentation
- Preserve functionality
- Preserve authenticity
- Preserve provenance

Payment system issue. The current inadequacies of the options available have to be highlighted. The whole area of payment and billing systems is highly complex. The lack of ubiquitous e-payment systems remains a significant barrier to the enabling of digital content commerce. The current solutions do not cater adequately for micro-payments necessary for many new business models, in certain consumer sectors and for the interoperability demanded by consumers across platforms.

3.1.2 Media-type constraints

As already mentioned in *DE3.1.1 Guidelines and Specification of research enabling technologies* and *DE3.1.3 Content Aspects Specification* each foreseen type of content (either simple or aggregated) has specific characteristics and may therefore impose limitations in usage especially when combined with other objects. Therefore in the following tables we present the most relevant constraints to be taken into account when selecting objects.

Most widely adopted 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	1600x900	16/9	240x320	3/4
		1280x960	4/3	1920x1080	16/9	300x300	1/1
		1600x1200	4/3	1600x1024	25/16	320x320	1/1
		1920x1440	4/3			320x480	2/3
		2048x1536	4/3			600x600	1/1
						1920x1200	8/5

Most widely supported file formats

Text				Image				Audio			
Formats	**PC**	**PDA**	**Mob**	**Formats**	**PC**	**PDA**	**Mob**	**Formats**	**PC**	**PDA**	**Mob**
DOC	x	x		*JPEG*	x	x	x	*WAV*	x	x	x
ODT	x			*GIF*	x	x	x	*MP3*	x	x	x
TXT	x	x	x	*PNG*	x	x	x	*AIF*	x	x	x
RTF	x			*TIF*	x	x		*PCM*	x	x	
XLS	x	x		*TGA*	x			*RealAudio*	x	x	x
ODS	x			*DIB*	x			*AMR*	x	x	x
WAP	NA	x	x	*PCX*	x			*WMA*	x	x	
HTML	x	x	x	*AI*	x						
XHTML	x			*EPS*	x						
SGML	x			*PSD*	x						
XML	x	x		*SWF*	x						
PDF	x	x		*SVG*	x	x					
				BMP	x	x					

Video				Animation			
Formats	**PC**	**PDA**	**Mob**	**Formats**	**PC**	**PDA**	**Mob**
AVI	x	x		*Flash*	x	x	x
RealVideo	x	x	x	*QuickTime*	x	x	
QuickTime	x	x		*Active Movie*			
MPEG 2/4	x	4	4	*GIF*	x	x	x
Active Movie	x			*QT-VR*	x	x	
Indeo	x			*SVG*	x	x	
DVI	x			*PPT*	x	x	x
Cinepak	x			*ODP*	(x)	(x)	
FLV	x			*SMIL*	x	x	(x)
WMF	x	x					

3.1.3 Channel-type constraints

As already mentioned in *DE8.2.1 Content Selection Guidelines* (previous version of this document) and widely explained in *DE3.1.1 Guidelines and Specification of research enabling technologies* and *DE3.1.3 Content Aspects Specification* each foreseen type of content (either simple or aggregated) has specific characteristics and may therefore impose limitations in usage especially when combined with other objects. Therefore in the following tables we present the most relevant constraints to be taken into account when selecting objects.

B2B Server side – at production facilities

	PC	**iTV/Satellite**	**PDAs/Mobile**	**Kiosk**
Bandwidth	10 Gb	10 Gb	100 Mb - 1 Gb	100 Mb - 1 Gb
QoS	Highly predictable (ISDN, ADSL or similar connections)	Highly predictable (ISDN, ADSL or similar connections)	Highly predictable (ISDN, ADSL or similar connections)	Highly predictable (ISDN, ADSL or similar connections)
HW requirements	Multi-processor ≈ 4 Gb RAM ≈ 500 Gb HD	Single-processor ≈ 2 Gb RAM ≈ 250 Gb HD	Multi-processor ≈ 4 Gb RAM ≈ 500 Gb HD	Single-processor ≈ 1 Gb RAM ≈ 250 Gb HD

	PC	iTV/Satellite	PDAs/Mobile	Kiosk
	DVD/CD(R) WR Keyboard & mouse Regular screen	DVD/CD(R) WR Keyboard & mouse Wide screen	DVD/CD(R) WR Keyboard & mouse Regular screen	DVD/CD(R) WR Keyboard & mouse Regular screen
Obj. Size	< 800 Mb	< 10 Gb	< 100 Mb	< 100 Mb

B2B Client side – at customer's facilities

	PC	iTV/Satellite	PDAs/Mobile	Kiosk
Bandwidth	10 Gb	10 Gb	1 Mb	1 Gb
QoS	Highly predictable (ISDN, ADSL or similar connections)	Highly predictable (ISDN, ADSL or similar connections)	Highly predictable (ISDN, ADSL or similar connections)	Highly predictable (ISDN, ADSL or similar connections)
HW requirements	Multi-processor ≈ 4 Gb RAM ≈ 500 Gb HD DVD/CD(R) WR Keyboard & mouse Regular screen	Single-processor ≈ 2 Gb RAM ≈ 250 Gb HD DVD/CD(R) WR Keyboard & mouse Wide screen	Multi-processor ≈ 4 Gb RAM ≈ 500 Gb HD DVD/CD(R) WR Keyboard & mouse Regular screen	Single-processor ≈ 1 Gb RAM ≈ 250 Gb HD DVD/CD(R) WR Keyboard & mouse Regular screen
Obj. Size	< 600 Mb	< 10 Gb	< 100 Mb	< 100 Mb
Subscription	Optional	Optional	Optional	Optional

B2C Client side – at customer's facilities

	PC	iTV/Satellite	PDAs/Mobile	Kiosk
Bandwidth	56Kb for modem 128Kb for ISDN 384Kb for 3G 128-8Mb/s for DSL, satellite or fibre	380-680Kb	56Kb for GPRS 236.8 for EDGE 384Kb for 3G 1.8 Mb for UMTS and HSDPA	11-56Mb for 802.11b/g wireless 10-100Mb for LAN connection 100Mb-1Gb for LAN or fibre connection
QoS	Highly predictable (ISDN, ADSL or similar connections)	Highly predictable	Often unpredictable	Highly predictable for terminals. Somehow unpredictable for PDA[1]
HW requirements	Single-processor ≈ 1 Gb RAM ≈ 100 Gb HD DVD/CD(R) WR Keyboard & mouse Regular screen	Single-processor ≈ 512 Mb RAM ≈ 40-200 Gb HD Smart Card Reader Ext-remote control Wide screen	Single-processor ≈ 20-80 Mb RAM ≈ 4 Gb SD/MiniSD Reduced keyboard & touch screen Small screen	Single-processor ≈ 512 Mb RAM ≈ 40 Gb HD DVD/CD Keyboard & mouse or touch screen Regular/small screen
Obj. Size	< 300 Mb even if for demo purposes is suggested to keep: audio ≤ 1 Mb video ≤ 8 Mb text ≤ 1 Mb images ≤ 1 Mb animation ≤ 5 Mb	< 1 Gb even if for demo purposes is suggested to keep: audio ≤ 1 Mb video ≤ 8 Mb text ≤ 1 Mb images ≤ 1 Mb animation ≤ 5 Mb	< 10 Mb even if for demo purposes is suggested to keep: audio ≤ 100 Kb video ≤ 1 Mb text ≤ 150 Kb images ≤ 300 Kb animation ≤ 0,5 Mb	< 10 Mb even if for demo purposes is suggested to keep: audio ≤ 100 Kb video ≤ 1 Mb text ≤ 150 Kb images ≤ 300 Kb animation ≤ 0,5 Mb
Subscription	Optional	Needed	Needed	Optional

Channel related compression & bandwidth constraints

[1] It depends on # of connected devices & their activities

Channel	Supported compression format(s)	Max. bit rate	Min. acceptable bit rate
PC	WM9/10, MPEG1/2/3/4	640 KBps	128 KBps
iTV/satellite	MPEG1/2/3/4	340 KBps	128 KBps
Mobile	WM8, MP3/4	1.8 MBps	56 KBps
PDAs/kiosk	WM8/9/10, MPEG1/2/3/4	10 GBps	128 KBps

Cross channel distribution foresees the combination of constraints that apply to all involved channels. Therefore in the selection process it will be necessary to:

- have multiple instances of the same content (one per distribution channel) or
- select the one that would allow adaptation (whenever possible) or else
- select the one that presents the minimum common set of characteristics.

This latter solution may save storage and troubles in content administration, but at the same time penalises the end user that may end up with content whose quality is greatly limited.

3.2 Suitability

Having recalled that content needs to meet the constraints imposed by content production, distribution channels and device specificity, the selection process next needs to evaluate the suitability of the candidate content for the key uses in AXMEDIS. These have already been described in the previous version of the present document and are reported hereafter for reference.

3.2.1 Common suitability criteria

As already stated general criteria that can be applied to evaluate content suitability are more subjective than the constraints previously described. The initially reported list has been enriched following initial project results evaluation especially in terms of usability. The original format of a list of question has been revised in a tabular format.

Overall user selection criteria

Item	What to check	Tools	For	Notes
Potential audience	Who will use the resource? Will audience be narrow or broad? Will audience use justify purchase?	Market survey Polls Interviews Expert evaluation	B2B	Evaluation is performed combining available info coming from studies, polls… and the feeling of the marketing dep. and management board
Life	How long will the resource last in terms of durability, technology, and interest?	Market forecasts Polls Interviews Expert evaluation	B2B B2C	***B2B*** – technical evaluation is to be taken well distinct from market evaluation (see the Betacam vs VHS case) ***B2C*** – consumer's point of view is strongly influenced by fashion, mood, technology evolution and cost
Price	Is the resource worth the price? How long will it take to recover purchase expense through sale?	Polls Interviews ROI computation	B2B B2C	***B2B*** – given the acquisition cost ROI is a crucial aspect in the evaluation ***B2C*** – cost to value balance is often the leading factor, yet often the fashion or mood effect may be overwhelming
Quality	Is the resource accurate, current, appropriate? Is the resource perceived as a quality one?	Polls Interviews Expert evaluation	B2B B2C	***B2B*** – company may be disrupt and customer fidelity lowered if content quality is not up to the level ***B2C*** – overall perceived quality greatly increases object value and can bias customer's purchase decisions where for equal price is "quality" the winning factor
Balance	Are other materials already available in other formats? Are same materials already	Market survey Polls Interviews	B2B B2C	***B2B*** – different formats or different existing media for a resource may allow acquisition of the most suitable for current aims

Item	What to check	Tools	For	Notes
	available on other media?			***B2C*** – different formats or different existing media for a resource may imply the possibility to find the best suitable one for expected usage
Value	Has the resource received favourable reviews? Is the resource perceived as valuable?	Market survey Polls Interviews Expert evaluation	B2B	Having received favourable reviews or being perceived as valuable are crucial factors for decision making as they give a direct evaluation of possible user acceptance of a product and therefore also an indirect measure of the target audience
Known	Does the public know the resource?	Market survey Polls Interviews	B2B	Advertisement is costly, therefore this factor related to customers' knowledge is very important to set-up both a decision and a proper marketing strategy and will have to be taken into account in the ROI computation
Unique	Does the resource contribute in a unique way?	Market survey Polls Interviews Expert evaluation	B2B	The analysis of this aspect is very important in the decision process. It will greatly influence the final decision once ROI has been computed
Appeal	Is the content stimulating and interesting?	Polls Interviews Expert evaluation	B2B B2C	***B2B*** – is one of the core decision factor in both the production and acquisition process as sale is based on a combination of appeal, quality, vale and price ***B2C*** – as already mentioned several times appeal can be a crucial factor for customers' decision process whenever there is enough purchase capability and both quality and value are perceived as good

Need and Usage selection criteria

Item	What to check	Tools	For	Notes
Interests	Does the resource meet the interests and needs of the audience?	Polls Interviews Expert evaluation	B2B	Coverage of user need is the basic objective that has to be met prior to any other evaluation. It is worth to take into account that according to Maslow needs change in respect to a hierarchy related to personal status, therefore the same object or content may assume a different value and awaken a different interest level in different situations.
Purpose	Will it educate, entertain, or both? Does it address a specific user need?	Polls Interviews Expert evaluation	B2B	In combination with the previous factor will allow sketching proper scenarios for ROI computations
Depth	Is the depth and length appropriate for the intended audience?	Polls Interviews Expert evaluation	B2B	This is a further complementary aspect to be evaluated in chain with the previous two as it may imply adaptation, or editing, or other kind of re-working on the resource prior to proper usage and all such operations will have a direct impact in the ROI computation
Value	Is the resource perceived as	Market survey	B2B	Being perceived as valuable or covering a

Item	What to check	Tools	For	Notes
	valuable? Does it address a specific user need?	Polls Interviews Expert evaluation		specific user need are crucial factors for decision making as they give a direct evaluation of possible user acceptance of a product and therefore also an indirect measure of the target audience

Content Quality selection criteria

Item	What to check	Tools	For	Notes
Format	Is the resource suitable for the format (i.e., audio, video)?	Expert evaluation	B2B	For each expected usage there is need for specific formats for a resource. This may imply pre- and post-processing steps that have to be accounted for in the ROI computation. Moreover if there is no suitable format for a specific resource that has to be used in a specific context it has to be carefully evaluated the cost, impact and feasibility of a custom production / conversion from existing formats
Authority	Is the content creator known and knowledgeable?	Expert evaluation	B2B B2C	***B2B*** – this may increase the appeal and level of interest for the customer in respect to the resource ***B2C*** – this may give a sensation of trust and rise the perceived level of quality
Authenticity	Is the content accurate and correct?	Expert evaluation	B2B	This is not a trivial issue, at least in certain markets. The evaluation is usually performed based on samples and therefore by content domain experts. In this case (and for certain kind of contents) plagiarism detection is of the utmost importance as it may imply legal consequences if not properly avoided/addressed
Timeliness	Is the content current and up-to-date? Is the topic timely?	Polls Interviews Expert evaluation	B2B B2C	***B2B*** – this is usually a winning factor and is often accounted as part of the time-to-market readiness and ability that a company has to show. At the same time, depending on the addressed market the timeliness may also be seen in terms of up-to-date status of the selected resources (think of news, educational, sport...) ***B2C*** – in the customer's perspective this is often represented by the perceived correspondence between the resource and the present fashion/market mood
Relevance	Does the content match the purpose of the work?	Polls Interviews Expert evaluation	B2B	Relevance is another basic factor that has to be examined prior to any other evaluation. Its evaluation will almost always end up with a "go-no-go" decision in respect of resource acquisition. In those case where the relevance is sufficient but cost, user needs or formats do match expectations then the content may be placed on a whish list rather than directly discarded
Efficient	Is the content worth the effort and time in reading,	Polls Interviews	B2B B2C	***B2B*** – evaluation of this aspect depends largely on a clear and precise understand-

Item	What to check	Tools	For	Notes
	viewing, or listening?	Expert evaluation		ing of both user's need and user's psychology and has to be carefully taken into account in combination with cost taking into account that from the customer's point of view it is strongly involved in the cost to value balance evaluation ***B2C*** – from the customer's point of view this is part of the perceived value of the resource and is strongly involved in the cost to value balance evaluation
Appeal	Is the content stimulating and interesting?	Polls Interviews Expert evaluation	B2B B2C	***B2B*** – is one of the core decision factor in both the production and acquisition process as sale is based on a combination of appeal, quality, vale and price ***B2C*** – as already mentioned several times appeal can be a crucial factor for customers' decision process whenever there is enough purchase capability and both quality and value are perceived as good
Originality	Is the content interesting and imaginative (i.e., style, creativity, originality)?	Polls Interviews Expert evaluation	B2B B2C	***B2B*** – being originality a part of the product appeal it is part of one of the core decision factors, at the same time it can also represent a risk at least as far as acceptance is concerned as too innovative products may also be refused ***B2C*** – being part of the resource appeal can be a crucial factor for customers' decision process (either in a positive or negative way depending on users' psychology and society evolution stage)
Vocabulary	Is the vocabulary appropriate for the intended audience?	Polls Interviews Expert evaluation	B2B	Evaluation of this aspect depends largely on a clear and precise understanding of target audience and has to be taken into account carefully as it may hamper exploitation possibilities
Aims	Is the resource appropriate for the subject (i.e., animation, documentary)?	Polls Interviews Expert evaluation	B2B	Evaluation of this aspect depends largely on a clear understanding of target product and audience combination. It has to be carefully taken into account as it may hamper exploitation possibilities
Organization	Is the content well organized, easily followed, presented in effective manner?	Polls Interviews Expert evaluation	B2B B2C	***B2B*** – this is a crucial part of product design and requires a mix of knowledge encompassing domain specific, presentation and user's psychology; from its proper achievement depends a good part of user's evaluation of content quality. ***B2C*** – in the user's perspective this is one of the main factors to be taken into account for product value assessment (at least in certain market segments)
Editing	Is the content well edited?	Polls Interviews Expert evaluation	B2B B2C	***B2B*** – this is a crucial part of product design and requires a mix of knowledge encompassing presentation and user's psychology; from its proper achievement depends a good part of user's evaluation of

Item	What to check	Tools	For	Notes
				content quality and value. ***B2C*** – this factor plays a relevant part in the product appeal set-up and is perceived as a strong quality factor even though often the user basis his judgement more on feelings than on specific knowledge
Features	Are special features effective (i.e., background information, supplemental materials)?	Polls Interviews Expert evaluation	B2B B2C	***B2B*** – this is a crucial part of product design and requires specific knowledge of both user's psychology and product expected usage; from its proper achievement depends a good part of user's evaluation of content quality and value. ***B2C*** – in the user's perspective this is one of the main factors to be taken into account for product value assessment
Special Needs	Are options provided for special needs (i.e., captioning, language choices)?	Expert evaluation	B2B B2C	***B2B*** – whenever a product is designed taking into account usability and accessibility, even if costs may be a bit higher, it is proved that its market penetration is higher than a concurrent one that has not been designed in the same way (unless if the cost difference is not too high) ***B2C*** – usability and accessibility aspects have a high impact on product value determination and (when cost difference is marginal) may represent a success factor for product acquisition

Technical Quality selection criteria

Item	What to check	Tools	For	Notes
Visual Elements	Are the visual elements effective (i.e., viewpoint, composition, focus, exposure, colour, clarity, special effects)?	Polls Interviews Expert evaluation	B2B B2C	***B2B*** – original visual aspect of a resource may have huge impacts in the production chain especially in case of need for adaptation to a specific company image (branding…). Therefore this is usually one of the most relevant factors in the technical quality selection of resources and requires a thorough examination as if it always possible to reduce quality when needed it is generally not possible to do the vice-versa. ***B2C*** – from the user point of view this is part of the product appeal and strongly contributes to product value assessment
Sound Elements	Are the sound elements effective (i.e., sound quality, voice and music quality, clarity)?	Polls Interviews Expert evaluation	B2B B2C	***B2B*** – while is more difficult to define a branding effect for sound based elements of a resource, yet this is also a very important aspect to be taken into account. Furthermore the needed sound quality is much dependent on the addressed market and audience therefore requires a thorough examination as if it always possible to reduce quality when needed it is generally not possible to do the vice-versa. ***B2C*** – from the user point of view this is

Item	What to check	Tools	For	Notes
				part of the product appeal and strongly contributes to product value assessment
Textual Elements	Are the text elements effective (i.e., text appeal, readability…)?	Polls Interviews Expert evaluation	B2B B2C	***B2B*** – even though it is more and more the case that people are attracted by audio/visual content rather than from textual one the textual aspect of resources has to carefully checked in respect to suitability for the target audience both in terms of "language" and message conveyed ***B2C*** – from the user point of view this is part of the product appeal and strongly contributes to product value assessment even if much less than the previous two factors
Editing	Is the editing effective (i.e., smooth, rhythm, continuity, pacing)? Is the resource embeddable in a product? Is the resource easily adaptable (if & when needed)?	Polls Interviews Expert evaluation	B2B B2C	***B2B*** – this is a crucial part of product design and requires a mix of knowledge encompassing technical skills, presentation and user's psychology; from its proper achievement depends a good part of user's evaluation of content quality and value. ***B2C*** – this factor plays a relevant part in the product appeal set-up and is perceived as a strong quality factor even though often the user basis his judgement more on feelings than on specific knowledge
Technology	Does the technology work effectively (i.e., skipping, missing elements, poor navigation)?	Polls Interviews Expert evaluation Case studies	B2B B2C	***B2B*** – usability (and even accessibility) considerations should lead this aspect of the technical quality evaluation. As it may have a direct and relevant impact both in the production and fruition (including the distribution) phases has to be carefully taken into account even if a good balance with time-to-market and cost factors has to be achieved ***B2C*** – from the user's perspective proper functioning of the technology plays a relevant role in the product value and functional evaluation
Dimension	Is the resource dimensionally fit for the target use (size, download time…)?	Polls Interviews Expert evaluation	B2B B2C	***B2B*** – this factor may imply adaptation or re-work on the resource to adapt for a specific use, in any case usually it is worth selecting the dimension that implies the best quality/resolution/format for the resource as this will by far simplify the production/adaptation process even if it will be reflected also in the price of the resource ***B2C*** – a user may decide to renounce acquiring a resource if its dimension is unsuitable with own expectations, needs, capabilities…
Protection	Is it possible to protect it? Is it easy to protect? Are possible protections resilient & effective?	Expert evaluation	B2B	From a business perspective there are no resources that are not worth being protected, usually is just a matter of costs and trade-offs that brings to the decision of not

Item	What to check	Tools	For	Notes
	Is it costly to protect?			protect a specific resource. Furthermore taking into account that whenever something has been protected, there will always be someone trying to un-protect it the cost and effort of protecting a resource will have to be evaluated and inserted into the ROI computation, then other factors may determine if the resource will or will not be protected

In addition to these general suitability criteria, which apply to all uses, each of the uses of content within AXMEDIS have specific requirements for content which need to be matched with candidate content objects.

3.2.2 Test case performance analysis

It was already stated that technical testing within the project will need a wide mix of content types and formats in order to test the extremes of format, file size, bit rate… yet this point has to be clarified as a proper trade-off between what would be nice to achieve and what can be achieved has to be reached.
It has been stated that for each item of test content, it will be necessary to define the expected results (e.g. expected processing time for a large file or complex format, etc.). This issue has already been partially addressed in the test cases definition (*DE2.2.1a* and *DE2.2.1.2*) and some generic suggestions provided in the deliverable *DE8.1.1* accompanying documentation. In more detail in *DE8.1.1* for each test case was suggested a set of possible candidate sets of content or objects coming from the presently available collections.
In the following tables are provided some additional suggestions on how to select samples from the available content collection to best much test case performance analysis. Data have been grouped according to operation kind to keep table size limited and related content readable. Also info about content kinds, purpose and context has been reduced to the very minimum in order to retain relevance while allowing readability. It is therefore intended that what presented hereafter can be extended. Nevertheless we have tried to keep in evidence the most relevant cases.

Editing operations

Test	Purpose	Rationale	Content suggestions
Effectiveness	Check tools effectiveness	Verify that requested operations are performed successfully in terms of result quality	Use dimension limited, well defined & structured data sets to be edited following a well-specified protocol with clear & simple steps each to be mapped on a specific rule. The ideal cases are: o text/web based content to be changed in style (look & feel) o images to be resized, rotated or watermarked o audio to be clipped to a specific duration o video to be clipped to a specific duration
Efficiency	Check tools effectiveness	Verify that requested operations are performed successfully in terms of responsiveness	As in previous case
Robustness	Check tools robustness to user errors, data corruptions or system faults	Verify that requested operations are performed successfully in terms of error/fault tolerance	As in previous case in terms of data sets, in terms of operation either non supported formats in input/output or non existing object/rules should be used to check system robustness
Performance Volume Stress	Check tools response in terms of performance, time	Verify that requested operations are performed successfully in terms of	For ***performance*** it will be possible to use the same data sets used for effectiveness testing monitoring execution time and resources con-

	response, operation volumes and scalability	performances	sumption For ***volume testing*** use a relatively large set of the same data sets used for effectiveness, focus should be on the % of successful completion. For ***stress testing*** use a relatively large set of the same data sets used for effectiveness processed in parallel, focus should be on the % of successful completion within a pre-assigned timeframe
Compatibility Regression	Check that changes in tools or data structure do not affect usage	Verify that requested operations are performed successfully	Use the same set of content used previously to test effectiveness and efficiency and save results in a different object then compare result of previous executions to assess results

Aggregation operations

Test	Purpose	Rationale	Content suggestions
Effectiveness	Check tools effectiveness	Verify that requested operations are performed successfully in terms of result quality	Use dimension limited, well defined & structured data sets to be combined following a well-specified protocol with clear & simple steps each to be mapped on a specific rule. The ideal cases are: o pdf based content to be aggregated in a single file o images to be aggregated in a slide-show o audio to be aggregated in a compilation o video to be aggregated in a compilation
Efficiency	Check tools effectiveness	Verify that requested operations are performed successfully in terms of responsiveness	As in previous case
Robustness	Check tools robustness to user errors, data corruptions or system faults	Verify that requested operations are performed successfully in terms of error/fault tolerance	As in previous case in terms of data sets, in terms of operation either non supported formats in input/output or non existing object/rules should be used to check system robustness
Performance Volume Stress	Check tools response in terms of performance, time response, operation volumes and scalability	Verify that requested operations are performed successfully in terms of performances	For ***performance*** it will be possible to use the same data sets used for effectiveness testing monitoring execution time and resources consumption For ***volume testing*** use a relatively large set of the same data sets used for effectiveness, focus should be on the % of successful completion. For ***stress testing*** use a relatively large set of the same data sets used for effectiveness processed in parallel, focus should be on the % of successful completion within a pre-assigned timeframe
Compatibility Regression	Check that changes in tools or data structure do not affect usage	Verify that requested operations are performed successfully	Use the same set of content used previously to test effectiveness and efficiency and save results in a different object then compare result of previous executions to assess results

Adaptation operations

Test	Purpose	Rationale	Content suggestions
Effectiveness	Check tools effectiveness	Verify that requested operations are performed successfully in terms of result quality	Use dimension limited, well defined & structured data sets to be adapted following a well-specified operational protocol with clear & simple steps each to be mapped on a specific rule.

Test	Purpose	Rationale	Content suggestions
			The ideal cases are: o text to web conversion (doc -> html) o images format conversion (tiff - > jpg) o audio format conversion (aiff - > mp3) o video format conversion (wmf - > mp2)
Efficiency	Check tools effectiveness	Verify that requested operations are performed successfully in terms of responsiveness	As in previous case
Robustness	Check tools robustness to user errors, data corruptions or system faults	Verify that requested operations are performed successfully in terms of error/fault tolerance	As in previous case in terms of data sets, in terms of operation either non supported formats in input/output or non existing object/rules should be used to check system robustness
Performance Volume Stress	Check tools response in terms of performance, time response, operation volumes and scalability	Verify that requested operations are performed successfully in terms of performances	For ***performance*** it will be possible to use the same data sets used for effectiveness testing monitoring execution time and resources consumption For ***volume testing*** use a relatively large set of the same data sets used for effectiveness, focus should be on the % of successful completion. For ***stress testing*** use a relatively large set of the same data sets used for effectiveness processed in parallel, focus should be on the % of successful completion within a pre-assigned timeframe
Compatibility Regression	Check that changes in tools or data structure do not affect usage	Verify that requested operations are performed successfully	Use the same set of content used previously to test effectiveness and efficiency and save results in a different object then compare result of previous executions to assess results

Validation operations

Test	Purpose	Rationale	Content suggestions
Effectiveness	Check tools effectiveness	Verify that requested operations are performed successfully in terms of result quality	Use dimension limited, well defined & structured data set to be processes following a well-specified operational protocol with clear & simple steps each to be mapped on a specific rule. The ideal cases are: o text/web based content to be changed in style (look & feel) o images to be resized, rotated or watermarked o audio to be clipped to a specific duration o video to be clipped to a specific duration o text to web conversion (doc -> html) o images format conversion (tiff - > jpg) o audio format conversion (aiff - > mp3) o video format conversion (wmf - > mp2) o pdf based content to be aggregated in a single file o images to be aggregated in a slide-show o audio to be aggregated in a compilation o video to be aggregated in a compilation
Efficiency	Check tools effectiveness	Verify that requested operations are performed	As in previous case

Test	Purpose	Rationale	Content suggestions
		successfully in terms of responsiveness	
Robustness	Check tools robustness to user errors, data corruptions or system faults	Verify that requested operations are performed successfully in terms of error/fault tolerance	As in previous case in terms of data sets, in terms of operation either non supported formats in input/output or non existing object/rules should be used to check system robustness
Performance Volume Stress	Check tools response in terms of performance, time response, operation volumes and scalability	Verify that requested operations are performed successfully in terms of performances	For ***performance*** it will be possible to use the same data sets used for effectiveness testing monitoring execution time and resources consumption For ***volume testing*** use a relatively large set of the same data sets used for effectiveness, focus should be on the % of successful completion. For ***stress testing*** use a relatively large set of the same data sets used for effectiveness processed in parallel, focus should be on the % of successful completion within a pre-assigned timeframe
Compatibility Regression	Check that changes in tools or data structure do not affect usage	Verify that requested operations are performed successfully	Use the same set of content used previously to test effectiveness and efficiency and save results in a different object then compare result of previous executions to assess results

3.2.3 Dissemination support

This set of criteria cover the suitability of content to properly support AXMEDIS promotion. Some content will promote the project either by directly covering project related issues or indirectly by being used live in demos at exhibitions and conferences. Content specifically created for the dissemination such as flyers and poster, clips/promotional videos, training material and user manuals can also be used as Content in this context. In any case it is important to note that to this purpose some very specific constraints have to be met, namely:

Criteria	Description	Rational
Appeal	Provided content/tools should be appealing	Appealing content help much in promoting, but it is not enough, also provided tools should be appealing in terms of GUI as this makes acceptance easier, furthermore a familiar look and feel helps too
Intuitiveness	Provided content/tools should be intuitive to use	Also this is a component of the overall appeal of content or tools. As already mentioned it helps much lowering acceptance barriers and speeds up the learning process. Furthermore it helps reinforcing/building user self-confidence
Familiarity	Provided content/tools should giving a familiar look and feel	Also this is a component of the overall appeal of content or tools. As already mentioned it helps much lowering acceptance barriers and speeds up the learning process
Usability	Provided content/tools should be easily usable	Unless proven usability is provided, it is very unlikely that promotional material can provide good feedback. Even though still in an experimental phase it is mandatory that whatsoever provided can be really usable
Accessibility	Provided content/tools should be easily accessible	Even though less severe than lack of usability, lack of accessibility is not the best way to promote content and tools, especially in our target environment (content owner, producer, aggregator and distributors) where there is a constant growing demand for accessibility often even supported by enforcing regulations (508 section in the US and similar in UK and EU)
Effectiveness	Provided content/tools should be effective	Talking of content usage for promotional activities it is a must to take into account that communication effectiveness has to be met. This implies on a side to have appealing content, and on another side to carefully plan the design and production of the promotional content (no matter whether it is a print or a video material). It would be advisable to have a small but effective set of samples, even if this would require to have them specifically designed by

Criteria	Description	Rational
		communication & marketing experts rather that have at had a handful of ineffective contents.
Efficiency	Provided content/tools should be efficient	Unless proven efficiency is provided, it is very unlikely that promotional material can provide good feedback. Even though still in an experimental phase it is mandatory that whatsoever provided can be used efficiently
Robustness	Capability to face and overcome erroneous user operations or other kind of faults	Unless proven robustness is provided, it is very unlikely that effective promotional material (including sample objects and viewers) can be accepted providing good feedback. Even though still in an experimental phase it is mandatory that whatsoever provided can be used safely and with no major risk of severe fault
Dimension	File size has to be rather small to minimise waiting time due to content processing / transferring / fruition	The purpose is to show the working of the or the overall framework; content should be relatively small, but at the same time sufficient to demonstrate framework capabilities and functionalities, therefore in general: o Text / Audio / Image ≤ 1 MB o Video / Animation ≤ 5-8 MB

Additionally it would be preferable if content used or produced for dissemination purposes meets the following characteristics:

- Content with reference to AXMEDIS should be preferred, e.g. flyer with logo, etc
- Content metadata should be correct and completed, i.e.:
  - AXINFO Metadata is to be completed appropriately
  - Dublin Core Metadata description field states "*Subject to the terms and conditions of the license, this sample video/audio/etc. was created for AXMEDIS demonstration and training*"
- The following materials are proposed since they could be used as content as well as serving to enhance dissemination activities:
  - Project flyers – in image and document formats
  - Project posters – in image and document formats
  - Demo video produced – in video sequences
  - Promotional videos produced – in video sequences
  - AXMEDIS training manuals – in text or other doc format
  - AXMEDIS user manuals – in text or other doc format
  - AXMEDIS installation guides – in text or other doc format.

3.2.4 Demonstrator Business Model Support

This section provides a quick reference to a further set of criteria covering the attractiveness and suitability to the target markets, both B2B and B2C, of the AXMEDIS demonstrators. Given the variety of business models that could be implemented (even for a single channel) here we report only basic criteria and we make no explicit reference to any specific business model, nevertheless provided info should support and lead the process of both business model and content selection.

Criteria	Description	Rational
Market	Who are the target markets for the content? Is the content attractive to the target market? Does the content address their needs?	This should kept in mind among selection criteria and, ideally, tested *"a posteriori"* with samples from the target market. Preliminary checks in terms of acceptance can be carried out by consulting target market samples of users, either by survey, focus groups or other methodology
Target Cost	What is the target market's preferred price? Can the content have the required price point for the target market?	This depends on original cost of the content, expected market size, share, offer positioning… and many other factors that change according to addressed market segment and distribution channel(s). If during content selection is possible to reply to such questions in a positive manner, then the content being examined is worth of more

Criteria	Description	Rational
	Can the content be delivered, satisfying all licensing costs within chosen price?	attention and represents a possible asset. If the reply is negative, the content should be discarded unless it represents part of the promotional activities or is a "*best-of-breed*" test case for the developed technology.
Quality-price balance	Will the content meet the required quality-price relationship in order to offer value for money?	Quality is clearly a vital criterion, but must be measured in context with the target price. For example, a game could cost anywhere from €10k up to €10m to produce, so the important issue is to match the quality of the content to the target market.
Channels	Which are the preferred channels? Will the content be suitable for the preferred channel(s) to the target market? Can the content be delivered through them with sufficient quality and usability?	Each content may best fit to a specific channel, nevertheless it can be adapted to other distribution channels, yet the cost of this "adaptation" process may be far from marginal and therefore (just like for the previous "balance" case) it will be necessary to perform a proper ROI computation for each addressed scenario and based on all involved aspects and steps of the process that will lead from content selection to actual distribution.

4 Caveat and other important remarks

The present section aims to point out other relevant aspects to be taken into account during the selection process either to be avoided or to be considered.

Criteria	Description	Rational
Usability	Can the content be used to support dissemination?	***Expectations*** o All contributed content should bear reference to allowed usage o Ideally all content collected should be usable for public demonstration and training purposes ***Caveats*** o Usage for dissemination of content that is marked for internal testing only must be avoided o Avoid contributing content without reference to allowed usage ***Remarks*** Reference to AXMEDIS within the actual content or the metadata such as the AXMEDIS logo and reference in the appropriate metadata fields are encouraged.
Appropriateness	Does the content reflect the desired image?	***Expectations*** Content providers for demonstration and tutorial are expected to provide digital content up to the level expected for demonstration purposes ***Caveats*** o Use or produce content that gives an impression of poor quality level o Use or produce content that is not providing references to the project o Use or produce content that is lacking in the metadata sections o Use or produce content that uses styles or formats in clear contrast with the ones adopted by the project o Use or produce content that may be considered affected by plagiarism of any sort (from visual aspect to content) ***Remarks*** o Usage of promotional material can guarantee that the content reflects the professionalism and innovation of AXMEDIS. o All content submitted for demonstration and tutorials will be monitored to ensure that appropriate quality level is reached not only by demonstrators and tools but also by digital content being used.
Suitability	Is the content suitable for the distribution channels to be demonstrated?	***Expectations*** Provided and produced content are suitable for demonstration and fruition on all supported channels ***Caveats*** Use of un-adapted content on a demonstrator should be avoided unless aimed to show adaptation process feasibility/characteristics ***Remarks***

Criteria	Description	Rational
		In any case demo content should be adapted and ready for distribution on all supported channels. This is to make sure that it is possible to provide demonstration at all time, with or without running all the necessary modules.

5 Selection process

It is warmly recommended that the consortium use the above mentioned criteria within the actual selection process. It is also suggested to adopt a clear timescale and to assign actual responsibilities. All what just mentioned is outlined in the table below:

Responsible	Other partners involved	Selection stage	Goal	Timing
ILABS	XIM, SEJER, AFI, ANSC, etc.	Content quality	To select content of sufficient quality for testing and validation	by M30
DSI	UNILEEDS, EXITECH, FUPF, IRC, etc	Technical compliance	To select content that meets test case and other technical requirements	by M36
TISCALI	DSI, AFI, XIM, ILABS UNILEEDS, etc.	Exploitation suitability	To select content that meets market desirability criteria for demonstration purposes	by M36

5.1 Process

Within each stage, the candidate content will be made available to the partners involved and also listed in a spreadsheet which will be circulated. A ranking will be made for each candidate content against the relevant criteria from the previous tables in this deliverable. The responsible partner will assess the input from the involved partners and have final veto over the ranking.

6 References, Standards & Bibliography

In this sections are reported the more relevant reference and standards that have to be taken into account when selecting content either for re-editing/publishing or distribution purposes. The content reported hereafter is intended to complement the equivalent section of *DE3.1.3* and other specification deliverables.

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7 Terminology

Term	Explanation (including source if available)
Active Movie	A multimedia streaming technology developed by Microsoft. ActiveMovie is already built into the Internet Explorer browser will be part of future versions of the Windows operating system. Supporting most multimedia formats, including MPEG, ActiveMovie enables users to view multimedia content distributed over the Internet, an intranet, or CD-ROM. ActiveMovie's main competition is the QuickTime standard developed by Apple Computer
AI	Adobe Illustrator format. Used for vector graphics.
AIF	Short for Audio Interchange File Format, a common format for storing and transmitting sampled sound. The format was developed by Apple Computer and is the standard audio format for Macintosh computers. It is also used by Silicon Graphics Incorporated (SGI). The AIFF format does not support data compression so AIFF files tend to be large. However, there is another format called AIFF-Compressed (AIFF-C or AIFC) that supports compression ratios as high as 6:1. AIFF files generally end with a .AIF or .IEF extension.
ASCII	American Standard Code for Information Interchange, ASCII, is a code for representing English characters as numbers, with each letter assigned a number from 0 to 127. Most computers use ASCII codes to represent text, which makes it possible to transfer data from one computer to another. Text files stored in ASCII format are sometimes called ASCII files. Text editors and word processors are usually capable of storing data in ASCII format, although ASCII format is not always the default storage format. Most data files, particularly if they contain numeric data, are not stored in ASCII format. Executable programs are never stored in ASCII format. The standard ASCII character set uses just 7 bits for each character. There are several larger character sets that use 8 bits, which gives them 128 additional characters. The extra characters are used to represent non-English characters, graphics symbols, and mathematical symbols. Several companies and organizations have proposed extensions for these 128 characters. The DOS operating system uses a superset of ASCII called extended ASCII or high ASCII. A more universal standard is the ISO Latin 1 set of characters, which is used by many operating systems, as well as Web browsers. Another set of codes that is used on large IBM computers is EBCDIC.
AVI	Short for Audio Video Interleave, the file format for Microsoft's Video for Windows standard. A format developed by Microsoft Corporation for storing video and audio information. Files in this format have a .AVI extension. AVI files are limited to 320 x 240 resolution, and 30 frames per second, neither of which is adequate for full-screen, full-motion video. However, Video for Windows does not require any special hardware, making it the lowest common denominator for multimedia applications. Many multimedia producers use this format because it allows them to sell their products to the largest base of users. Video for Windows supports several data compression techniques, including RLE, Indeo, and Cinepak. A competing software -only video format is QuickTime.
BMP	The standard bit-mapped graphics format used in the Windows environment. By convention, graphics files in the BMP format end with a .BMP extension. BMP files store graphics in a format called device-independent bitmap (DIB).
Cinepak	A popular codec (compression/decompression technology) for computer video developed by SuperMac Inc.
Colour space	Effectively, the dynamic range of colour and contrast. A wide colourspace includes brighter whites, darker blacks and richer colours.
CRM	Customer Relationship Management (CRM) includes the methodologies, technology and capabilities that help an enterprise manage customer relationships. The general purpose of CRM is to enable organizations to better manage their customers through the introduction of reliable systems, processes and procedures
DIB	Short for device-independent bitmap, the bit-mapped graphics format used by Windows.

Term	Explanation (including source if available)
	Graphics stored in DIB format generally end with a .bmp extension. It's called device-independent because colours are represented in a format independent of the final output device. When a DIB image is output (to a monitor or printer), the device driver translates the DIB colours into actual colours that the output device can display.
Director	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.
DOC	Text format - Originally used in the 1980s to identify WordPerfect proprietary format, in the 1990s was used by Microsoft for their “Word” word-processing proprietary format.
DVI	Short for Digital Video Interactive, a now-defunct technology developed by General Electric that enables a computer to store and display moving video images like those on television. The most difficult aspect of displaying TV-like images on a computer is overcoming the fact that each frame requires an immense amount of storage. A single frame can require up to 2MB (megabytes) of storage. Televisions display 30 frames per second, which can quickly exhaust a computer's mass storage resources. It is also difficult to transfer so much data to a display screen at a rate of 30 frames per second. DVI overcomes these problems by using specialized processors to compress and decompress the data. DVI is a hardware -only codec (compression/decompression) technology. A competing hardware codec, which has become much more popular, is MPEG. Intel has developed a software version of the DVI algorithms, which it markets under the name Indeo.
EPS	Encapsulated Postscript. Designed as a portable image file format that can include text layout, fonts, images, vector graphics, etc. Well supported as an import/export format by graphics and image editing tools.
Flash	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. A bandwidth friendly and browser independent vector-graphic animation technology. As long as different browsers are equipped with the necessary plug-ins, Flash animations will look the same. With Flash, users can draw their own animations or import other vector-based or bitmap images, video, and audio files. Flash has includes comprehensive support for JavaScript scripting internally, which enables advanced front-end client software to be developed within a single SWF file. Flash was known as FutureSplash until 1997, when Macromedia Inc. bought the company that developed it.
FLV	Flash for Video (FLV) file format. FLV files contain encoded audio and video data that is highly optimized (through the use of Sorenson's Spark codec) for delivery through the Flash Player.
GIF	Short for Graphics Interchange Format, another of the graphics formats supported by the Web. Unlike JPG, the GIF format is a lossless compression technique and it supports only 256 colours. The compression algorithm used in the GIF format is owned by Unisys, and companies that use the algorithm are supposed to license the use from Unisys (Unisys announced in 1995 that it would require people to pay licensing fees in order to use GIF. This does not mean that anyone who creates or uses a GIF image has to pay for it. Authors writing programs that output

Term	Explanation (including source if available)
	GIF images are subject to licensing fees.). Although often overlooked, the GIF file format can be used to perform efficient animations based on a sequence of repeating frames.
HTML	Short for HyperText Mark-up Language, the authoring language used to create documents on the World Wide Web. HTML is similar to SGML, although it is not a strict subset. HTML defines the structure and layout of a Web document by using a variety of tags and attributes. The correct structure for an HTML document starts with <HTML><HEAD>(enter here what document is about)<BODY> and ends with </BODY></HTML>. All the information you'd like to include in your Web page fits in between the <BODY> and </BODY> tags. There are hundreds of other tags used to format and layout the information in a Web page. Tags are also used to specify hypertext links. These allow Web developers to direct users to other Web pages with only a click of the mouse on either an image or word(s). 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).
Indeo	A codec (compression/decompression technology) for computer video developed by Intel Corporation. Although it is a software -only codec, Indeo is based on the DVI, which is a hardware -only codec. Competing video standards include Cinepak and MPEG.
JPEG	Short for Joint Photographic Experts Group, the original name of the committee that wrote the standard. JPG is one of the image file formats supported on the Web. JPG is a lossy compression technique that is designed to compress colour and greyscale continuous-tone images. Although it can reduce files sizes to about 5% of their normal size, some detail is lost in the compression. The information that is discarded in the compression is information that the human eye cannot detect. JPG images support 16 million colours and are best suited for photographs and complex graphics. The user typically has to compromise on either the quality of the image or the size of the file.
MP3	The name of the file extension and also the name of the type of file for MPEG, audio layer 3. Layer 3 is one of three coding schemes (layer 1, layer 2 and layer 3) for the compression of audio signals. Layer 3 uses perceptual audio coding and psychoacoustic compression to remove all superfluous information (more specifically, the redundant and irrelevant parts of a sound signal. The stuff the human ear doesn't hear anyway). It also adds a MDCT (Modified Discrete Cosine Transform) that implements a filter bank, increasing the frequency resolution 18 times higher than that of layer 2. The result in real terms is layer 3 shrinks the original sound data from a CD (with a bit rate of 1411.2 kilobits per one second of stereo music) by a factor of 12 (down to 112-128kbps) without sacrificing sound quality. Because MP3 files are small, they can easily be transferred across the Internet.
MPEG	Short for Moving Picture Experts Group, and pronounced m-peg, a working group of ISO. The term also refers to the family of digital video compression standards and file formats developed by the group. MPEG generally produces better-quality video than competing formats, such as Video for Windows, Indeo and QuickTime. MPEG files can be decoded by special hardware or by software. MPEG achieves high compression rate by storing only the changes from one frame to another, instead of each entire frame. The video information is then encoded using a technique called DCT. MPEG uses a type of lossy compression, since some data is removed. But the diminishment of data is generally imperceptible to the human eye. There are three major MPEG standards: MPEG-1, MPEG-2 and MPEG-4. The most common implementations of the MPEG-1 standard provide a video resolution of 352-by-240 at 30 frames per second (fps). This produces video quality slightly below the quality of conventional VCR videos. MPEG-2 offers resolutions of 720x480 and 1280x720 at 60 fps, with full CD-quality audio. This is sufficient for all the major TV standards, including NTSC, and even HDTV. MPEG-2 is used by DVD-ROMs. MPEG-2 can compress a 2 hour video into a few gigabytes.

Term	Explanation (including source if available)
	While decompressing an MPEG-2 data stream requires only modest computing power, encoding video in MPEG-2 format requires significantly more processing power. MPEG-4 is a graphics and video compression algorithm standard that is based on MPEG-1 and MPEG-2 and Apple QuickTime technology. Wavelet-based MPEG-4 files are smaller than JPEG or QuickTime files, so they are designed to transmit video and images over a narrower bandwidth and can mix video with text, graphics and 2-D and 3-D animation layers. MPEG-4 was standardized in October 1998 in the ISO/IEC document 14496.
MPEG 2/4	
ODT/ODP/ODS	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
PCM	Short for pulse code modulation, a sampling technique for digitizing analogue signals, especially audio signals. PCM samples the signal thousands of times a second; each sample is represented by 8, 16 or 24 bits. There are two standards for coding the sample level. The Mu-Law standard is used in North America and Japan while the A-Law standard is use in most other countries. PCM is used with T-1 and T-3 carrier systems. These carrier systems combine the PCM signals from many lines and transmit them over a single cable or other medium. PCM is also the modulation technique used for CD audio and WAV and AIF files. It is popular as a format because it does not compress the signal, so the only distortion arises from the digitizing process (A-D and D-A conversion). Any loss of quality is a function of the sample rate and word length, therefore the greater these two parameters are, the more information about the analogue signal is captured.
PCX	Originally developed by ZSOFT for its PC Paintbrush program, PCX is a graphics file format for graphics programs running on PCs. It is supported by most optical scanners, fax programs, and desktop publishing systems. Files in the PCX format end with a ".pcx" (pronounced dot-p-c-x) extension. Two other common bit map formats are BMP and TIFF.
PDF	Short for Portable Document Format, a file format developed by Adobe Systems. PDF captures formatting information from a variety of desktop publishing applications, making it possible to send formatted documents and have them appear on the recipient's monitor or printer as they were intended. To view a file in PDF format, you need Adobe Reader, a free application distributed by Adobe Systems. 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
PNG	Short for Portable Network Graphics, the third graphics standard supported by the Web (though not supported by all browsers). PNG was developed as a patent-free answer to the GIF format but is also an improvement on the GIF technique. An image in a lossless PNG file can be 5%-25% more compressed than a GIF file of the same image. PNG builds on the idea of transparency in GIF images and allows the control of the degree of transparency, known as opacity. Saving, restoring and re-saving a PNG image will not degrade its quality. PNG does not support animation like GIF does.
PPT	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

Term	Explanation (including source if available)
	name "PowerPoint" which finally became the product name. PowerPoint 1.0 was released in 1987 for the Apple Macintosh.
PS	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
PSD	Photoshop format. Proprietary image editing file format native to the cross-platform image editing tool of the same name. Widely used across the graphics industry for print, web and television design, so has become an important image exchange format between designers.
QoS	Quality of Service – relates to telecommunications and the reliability and predictability of services. For example, a private line telephone link can have a guaranteed QoS whereas a voice-over-IP telephone connection relying on the internet will have no guaranteed QoS.
QT-VR	The virtual reality extensio of Quick Time. Was one of the first solutions used to produce 3D like browsable environments on the web and is based on a special way to combine pictures taken with a digital camera.
Quick-Time	A video and animation system developed by Apple Computer. QuickTime is built into the Macintosh operating system and is used by most Mac applications that include video or animation. PCs can also run files in QuickTime format, but they require a special QuickTime driver. QuickTime supports most encoding formats, including Cinepak, JPEG, and MPEG. QuickTime is competing with a number of other standards, including AVI and ActiveMovie. In February 1998, the ISO standards body gave QuickTime a boost by deciding to use it as the basis for the new MPEG-4 standard.
Real-Audio	RealAudio provides high audio quality at a broad range of the bit rate spectrum, with its ability to scale from 12 - 800 Kbps. For low to mid bit rate files (< 128 Kbps), RealAudio deploys advanced audio compression techniques dividing original data from the audio spectrum into distinct frequency bands, bands which are imperceptible by the human ear are discarded, resulting in a decreased file size with virtually no degradation. At higher bit rates (> 128 Kbps - typically suited for download or high bandwidth networks), RealAudio incorporates the MPEG-4 AAC codec. RealAudio Multichannel enables more than two discrete channels, including the commonly configured 5 or 6 channel (5.1 channel audio). Delivers full surround sound experience: left, right, left-surround, right-surround, front-center, and low frequency sub-woofer
RealVideo	Used for download or streaming, RealVideo delivers from dialup to HDTV. According to producer it provides compression and reduces bandwidth costs while enabling high-quality, rich media experiences. Visual quality has been improved by reducing distracting visual distortions (artefacts) wile all previous encoding modes are supported (Constant Bitrate, Variable Bitrate, and Quality-Based Encoding). The new version employs rigorous analysis to decompose & compress video content exploiting sophisticated image segmentation and motion analysis highly accurate mode decisions to improve bit efficiency and improved pixel prediction. HDTV quality video at <5 Mbps Supports all HD formats and resolutions including 720p and 1080i In terms of interlaced support RealVideo 10 bitstream can carry 60 fields / second interlaced content
RTF	Rich Text Format. A standard formalized by Microsoft Corporation for specifying formatting of documents. RTF files are actually ASCII files with special commands to indicate formatting information, such as fonts and margins. Other document formatting languages include the Hypertext Mark-up Language (HTML), which is used to define documents on the World Wide Web, and the Standard Generalized Mark-up Language (SGML), which is a more robust version of HTML.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
SGML	Short for Standard Generalized Mark-up Language, a system for organizing and tagging elements of a document. SGML was developed and standardized by the International Organiza-

Term	Explanation (including source if available)
	tion for Standards (ISO) in 1986. SGML itself does not specify any particular formatting; rather, it specifies the rules for tagging elements. These tags can then be interpreted to format elements in different ways. SGML is used widely to manage large documents that are subject to frequent revisions and need to be printed in different formats. Because it is a large and complex system, it is not yet widely used on personal computers. However, the growth of Internet, and especially the World Wide Web, is creating renewed interest in SGML because the World Wide Web uses HTML, which is one way of defining and interpreting tags according to SGML rules. 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)".
SMIL	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.
SVG	Scaleable Vector Graphics. An open format developed by Adobe, but not frequently deployed on the web.
SWF	Macromedia Flash format. Although primarily used for animation and interaction, SWF files can be used for highly optimised still images based on vectors. They also have the advantage of being resizable (scaleable) without degrading image quality.
TGA	A photorealistic graphics file format designed for systems with a Truevision display adapter. Targa format developed by Truevision; usually 15 or 24 bit full colour images, compressed or uncompressed; maximum colours = 16.7 millions. The real name for this format is just plain "TGA" or "Truevision File Format", but a lot of people call it "Targa", after the Truevision video card that first used it. There's a lot of this name confusion in image file formats. It supports 1 to 32 bit images and professional features like an alpha (mask) channel, gamma settings and a built-in thumbnail image. TARGA image file format; this commonly has a .tga or .TGA ending. FrontPage can import TGA files.
TIF	Acronym for tagged image file format, one of the most widely supported file formats for storing bit-mapped images on personal computers (both PCs and Macintosh computers). Other popular formats are BMP and PCX. TIFF graphics can be any resolution, and they can be black and white, grey-scaled, or colour. Files in TIFF format often end with a .tif extension. TIF files allow for additional channels beyond RGB, sometimes called alpha channels, to support transparency.
TXT	Standard textual format of document produced with several word processors (actually the extension .txt is typical of MS-Textpad)
UNI-CODE	A standard for representing characters as integers. Unlike ASCII, which uses 7 bits for each character, Unicode uses 16 bits, which means that it can represent more than 65,000 unique characters. This is a bit of overkill for English and Western-European languages, but it is necessary for some other languages, such as Greek, Chinese and Japanese. Many analysts believe that as the software industry becomes increasingly global, Unicode will eventually supplant ASCII as the standard character coding format.
VRML	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)
WAV	The format for storing sound in files developed jointly by Microsoft and IBM. Support for

Term	Explanation (including source if available)
	WAV files was built into Windows 95 making it the de facto standard for sound on PCs. WAV sound files end with a .wav extension and can be played by nearly all Windows applications that support sound.
X3D	X3D is the ISO standard for real-time 3D computer graphics (ISO/IEC 19775-1), the successor to Virtual Reality Modeling Language (VRML).
XHTML	Short for Extensible Hypertext Mark-up Language, a hybrid between HTML and XML specifically designed for Net device displays. XHTML is a Mark-up language written in XML; therefore, it is an XML application. XHTML uses three XML namespaces (used to qualify element and attributes names by associating them with namespaces identified by URI references. Namespaces prevent identically custom-named tags that may be used in different XML documents from being read the same way), which correspond to three HTML 4.0 DTDs: Strict, Transitional, and Frameset. XHTML Mark-up must conform to the Mark-up standards defined in a HTML DTD. When applied to Net devices, XHTML must go through a modularization process. This enables XHTML pages to be read by many different platforms. A device designer, using standard building blocks, will specify which elements are supported. Content creators will then target these building blocks--or modules. Because these modules conform to certain standards, XHTML's extensibility ensures that layout and presentation stay true-to-form over any platform. 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	Short for Extensible Mark-up Language, a specification developed by the W3C. XML is a pared-down version of SGML, designed especially for Web documents. It allows designers to create their own customized tags, enabling the definition, transmission, validation, and interpretation of data between applications and between organizations. 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.