



**NETWORKED
& ELECTRONIC
MEDIA**

NEM Strategic Research Agenda Coverage by FP7-1

**“Networked and Electronic Media”
European Technology Platform**

www.nem-initiative.org

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1 Executive Summary

This document has been prepared to serve as an analysis of the results for FP7-1 in connection with the coverage of NEM Strategic Research Agenda.

The analysis takes into account the current version 4 and the version 5 of the NEM SRA, which is inspired in the NEM vision.

A preliminary analysis of the projects being under negotiation phase as results of the Evaluation of proposals submitted to FP7-1 has been carried out. NEM has the following considerations.

- Much effort has been done in preparation of proposals. More than 94 proposals haven been brought to the attention of NEM
- In objective 1.5 (Networked Media) about 20 projects have been retained for negotiations: 3 integrated projects, 15 STREPs, 1 NoE and 1 SA.
- The coverage of FP7-1 projects to the NEM SRA research topics is unbalanced.

While certain areas are sufficiently covered by a number of research activities proposed by the projects, other areas seem to be not adequately covered by any project proposal. Services and Applications and Content related activities are in general well covered, although there are specific research topics not well addressed. In the area of networking, delivery, terminals and enabling technologies, there is a significant number of research topics which are not well covered or even not covered at all.

The above analysis has been done considering information about projects addressing Objective 1.5 (Networked Media) and Objective 4.2 (Intelligent content and semantics)

Two survey rounds have been made with the project coordinators. During the first round we have collected more or less all project contributions but the analysis showed that these inputs were not always comparable. The NEM group decided to run a second round in order to get harmonised results. Unfortunately we got only answers from 15 projects on the 45. Nevertheless, this partial information has confirmed the first round.

Consequently, NEM proposes to insert research topics related to NEM SRA within the upcoming Call 3 and plan a significant coverage of NEM SRA remaining topics in the Call 4.

In addition, this document proposes new topics that NEM members have identified following a call for proposals which has been done end of 2007.

2 Overall NEM Vision and objectives

Evolution of media and networks

The European Technology Platform on Networked Electronic Media, the NEM Initiative, foresees a future when all will be able to generate, manipulate, use, and enjoy any kind of electronic media content – wherever they are. Electronic media content will include not only the audiovisual services of today such as telephony and television but also a wide range of interactive services across all realms of information, education, and entertainment, offering a wide range of new business opportunities.

This future is elaborated in the NEM Initiative's Vision document, which gives three main aims for the 2015 timeframe:

- **A leading European networked and electronic media industry competitive with other business regions in the world**
- **A regulatory environment favouring the deployment of NEM technologies to improve the quality of life and maximise economic growth and skilled employment in Europe**
- **Open business models across the value network and novel revenue generating models**

The NEM Initiative follows a unique path into the future because it deals with ‘content’ from both the users’ point of view and the technical perspective. Both views are essential if new services, with new commercial opportunities, are to work well and to be attractive to a wide range of users from different backgrounds and with different applications.

To make this vision a reality requires the development of a seamless, pervasive network and easy-to-use tools for generating, searching, accessing, transforming and delivering media content. This Strategic Research Agenda outlines the technical work needed to achieve the vision, concentrating on what needs to be done rather than the form of technology required to achieve it. It aims to inform the workplans of the seventh Framework programme, other international programmes such as Eureka and the programmes of the Joint Technology Initiatives, and the national programmes of the Member States.

State-of-the-art and apparent trends in 2007

The media industry consists of a value chain creating, storing, adapting, aggregating, delivering, and consuming ‘content’ – understandable information made available to a user at any stage of the value chain. This definition of content includes both the ‘essence’ – the data representing text, audiovisual services, games programs etc. that is the object of the value chain – as well as the metadata that describes the essence and allows it to be searched, routed, processed, selected, and consumed. The value ‘chain’ is increasingly becoming a ‘mesh’ as consumers are increasingly becoming originators of content, and stored content is increasingly reused and repurposed.

At present, most content is produced by a craft process, for broadcast services or for recorded retail distribution. Europe is going through a transition from analogue broadcasting standards to new all-digital standards. Broadcast services continue to be available, but using all-digital standards, with additional data services and interactivity. The digital transition gives better spectral efficiency, enabling an expanding range of services.

Increasingly, content is becoming available on demand, both through storage in the home and on request over many different networks from content producers and aggregators as well as from broadcasters. A marked trend is the explosion in social networking internet sites, where content is a form of communication in its own right, reflecting the fundamental human drive to communicate and interact in new ways. These new services will need new internet structures and intelligent universal terminals, together with new object-based methods of representing real or imagined worlds and manipulating those representations.

There is a wide variety of distinct technologies in use, each adapted for a different application. There is little compatibility between devices, making seamless usage impossible: a games console will not receive broadcast TV, for example. This leads to clearly separated usage scenarios: a telephone is a telephone and a radio is a radio – combining them in one handset offers nothing extra in terms of services.

For service delivery, only telephone, broadcast and mobile phone networks are close to ubiquitous. Apart from some well-established technologies like basic telephony and broadcast reception, new technology is far from being easy to use. This reinforces the ‘digital divide’ between those who are technologically literate and those who are excluded from the benefits the technology could bring.

Although technology can be – and is – used to create barriers, it more often creates new opportunities, new applications, new services that can transform people’s lives and create wealth for all. It is those applications of technology that the NEM Initiative would like to encourage to fulfil its vision for 2015.

The vision for 2015

The NEM Initiative hopes that by 2015 electronic media will appear as a ubiquitous service, easily and simply available to all users for professional and recreational purposes. Of course, the simplicity may

mask many layers of complexity – the point is that the user should not need to care about underlying technologies.

For this to happen, fundamental changes will have to take place in the in the course of the next ten years:

- The distinction between today's basic routing technologies – such as unicast, multicast and broadcast – must become invisible, not only to the user but also the media application itself assuming that the right management is taken into account;
- Media must become networkable, an integral part of any kind of network rather than just something to be transmitted from A to B;
- Media must become ubiquitous; content will come from any user, with highly sophisticated and user-friendly indexing engines to generate the accompanying metadata;
- The infrastructure must become context-aware, recognising users to know their needs, and adapting itself to the environment;
- Intuitive and multi-modal interfaces must offer a more natural way to interact with and within media environments;
- To make networked media communication inclusively available to all, using or consuming any kind of media should be known by its content and not by the technology used ('FM', 'MP3', 'DVB' etc.);
- Media retrieval must become affective, using genre-based playlists representing moods and degrees of user involvement;
- Networked media should allow new groups to form, for social or business purposes, defined by their media interests;
- Video must be represented in a much more human way, by realistically modelling entire media environments on an object-by-object basis, offering exciting new creative possibilities;
- There must be seamless and intuitive service handover between devices and environments, allowing users to access services wherever they are, whatever terminal they are using;
- 'Federated' services – complex services built up from multiple elements from different originators – must be enabled, offering valuable commercial opportunities for service differentiation;
- Service providers must address, in a way that is fair to all, the security and rights issues involved when handling audio-visual material in networked and electronic media.

Market perspectives

Impact

Technology is always a means to create and shape markets and technological developments will influence the business world, offering new opportunities and developing new industries. At the same time, the business world, and the markets it creates, must enable the deployment of new technologies to promote new product concepts. At the core are the users – who are willing to pay only if they see a clear and understandable advantage.

The NEM Initiative's members are mainly from the wide business segment of the content production and distribution industries – network operators, games producers, broadcasters, and equipment manufacturers. Therefore this Strategic Research Agenda is written mainly in terms of those industries' products. However, the NEM Initiative is well aware that the realisation of its vision will have profound effects on other aspects of industry and society, facilitating social interaction without travel, building communities, closing the 'digital divide', revolutionising healthcare, bringing real inclusion to the elderly and handicapped, enabling a wide range of e-government services, and offering European citizens real participation.

Regulation and standards

Because of their large perceived influence and their important role in democracy, the media industries have always been carefully regulated. In order to accommodate technological and market developments, and new customer usages resulting from convergence, modernised and flexible regulation covering all media services is required. The NEM Initiative will continue to discuss how it can best contribute to regulatory matters and, where possible, it will offer views and recommendations for better regulation.

Successful European standards like GSM and DVB show how powerful a single standard can be. The NEM Initiative encourages standardisation, and prefers open standards where possible. However, sometimes the opportunity for standardisation may be lost. If agreement cannot be achieved on a single standard, it may be possible to ensure that different standards can gracefully coexist to ensure seamless delivery of services through interworking: technology can help to deal with the complexity of multiple standards.

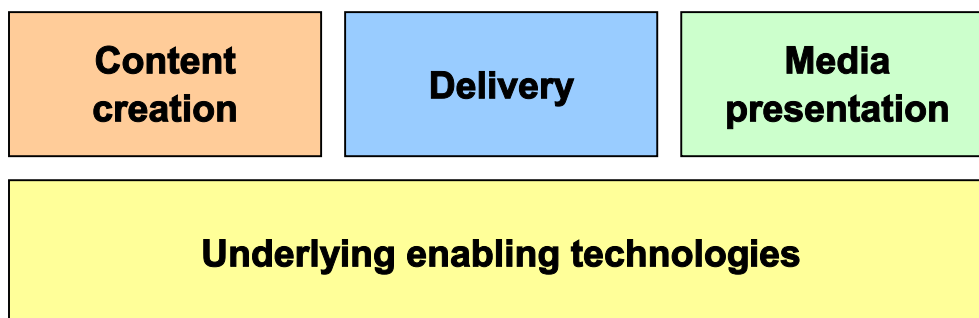
Training

The education and training of researchers in NEM technologies and knowledge gaining is key for the progress of NEM communities to improve the skills of researchers. Cooperation with other academic initiatives, such as the long term research “Networked Media Task Force”, the exchange of knowledge regarding the ongoing research with other areas in the world, and new pan-European qualifications will help the achievement of the NEM Initiative’s main objectives.

Most important research topics

This chapter gives detailed descriptions of the research aspects needed to fulfil the NEM Initiative’s vision for 2015. The topics are addressed according to the following diagram.

Figure 1 - Structure of described research fields



Content creation

Work on content creation will help to ensure the availability of innovative new services. Areas of work are:

- Representation of content – file formats for the audio, video and data that are the active constituents of services, plus the metadata that describes them and allows them to be processed; modelling formats for avatars are included, with auralisation formats to represent realistic sound fields; video coding will be based on the objects in the scene; new tools must be developed to classify metadata;
- Tools for content creation and manipulation – including transducers for capturing content (not just audio and video, but other human senses as well); manipulation of audiovisual content must be easier than using today’s word processors, and content once created must be easily and automatically adaptable to the changing circumstances of users on the move; metadata must be automatically captured;

- Automated semantic annotation – to generate metadata automatically from new or existing content using semantic techniques.

Networking and delivery infrastructure

Work on networking and delivery infrastructure will deliver services to users wherever they are. Areas of work are:

- Intelligent delivery – to allow users to access interactive services of all kinds, regardless of the underlying network infrastructure and enabling dynamic handover of services;
- Quality of service – to guarantee quality of service appropriate to the content being carried and expressed in terms users can understand, across heterogeneous networks;
- Networking types – to devise new network architectures appropriate to multi-provisioning of services based on wired and wireless hybrid heterogeneous networks for broadband, broadcast and mobile; they must be scalable to cope with the enormous increases in traffic that are expected; networks for the extended home are included, as well as 'core' networks.

Media presentation and content access

There will be new ways of presenting services to users, and new ways for users to interact with services. Areas of work are:

- Authentic, true-to-original media reproduction – displays to offer video reproduction as realistic and immersive as currently available for audio, including energy-efficient and wearable displays;
- Virtual reality – interactive technology for business applications such as remote action and entertainment applications including games;
- Dynamic federation of distributed interface devices – in this vision, ad hoc federations of devices self-assemble on demand on the basis of essential components distributed in the near environment, for instance interface devices available in a home or office environment, or worn by the user as accessories and clothing; 'mobile augmented reality' is a possible early application;
- User-system interaction – multimodal user interfaces aiming at mimicking the human communication skills that use several modes of communication (voice, handwriting, gesture, gaze...) could offer a natural and transparent way for dealing with the complexities of interaction while hiding them from the user.

Enabling Technologies

A set of horizontal technologies will act as a foundation for the functionality of the entire end-to-end chain. Areas of work are:

- Security and privacy – to provide services and their content securely between all users, guaranteeing the privacy of each participant in a media transaction and securing networks against breakdown and malicious attack;
- Rights management – technology to offer appropriate and fair protection to those who wish to retain a degree of control over content they have created or acquired when it is distributed over heterogeneous networks;
- Federated services – services built up from multiple components from different originators; enabling such services to mobile users with different terminals will require networks and terminals to be aware of users' context, including identity management and personalisation;
- Middleware – to develop an open middleware framework providing a stable standardised architecture and application programming interface (API) dedicated to multimedia for a wide variety of services and applications;
- Human language technologies – to provide language transparency to allow all citizens to become e-included in the information society.

3 FP7-1 Coverage of NEM SRA

A preliminary analysis of the projects being under negotiation phase as results of the Evaluation of proposals submitted to FP7-1 has been carried out. NEM has the following considerations.

- Much effort has been done in preparation of proposals by NEM participants. The list of proposals prepared by NEM participants is as follows.

94 proposals from NEM

- 1 2020 3D Media
- 2 3D4You
- 3 3DPresence
- 4 4NEM
- 5 ActiveAgeing
- 6 Adamantium
- 7 ALADIN
- 8 A-learning
- 9 Amusing
- 10 APRICOT
- 11 Archangel
- 12 Blue-Age
- 13 Box2Box
- 14 CBIZ
- 15 C-CAST
- 16 CD2
- 17 Centics
- 18 COMETS
- 19 COMPACT
- 20 DESIRE
- 21 DICONET
- 22 Digital Beijing
- 23 DiscoverIt
- 24 ECOCLUSTER
- 25 ENTER
- 26 ENUNCIATE
- 27 Euro-NF
- 28 EurOpenTrans
- 29 Everynet
- 30 eWELLNESS
- 31 EXCALIBUR
- 32 [Feel@Home](#)
- 33 FINE
- 34 Folk2Folk
- 35 G-2-G
- 36 Gamepipe
- 37 GEMS
- 38 GRAND
- 39 HiMa
- 40 HVISUAL
- 41 i3D
- 42 IBUS
- 43 IDEA
- 44 intrepid
- 45 IONHome
- 46 IRMOS
- 47 LIGHTNING
- 48 LivingNews

- 49 Mambo
- 50 MARCH
- 51 MATISSE
- 52 MeCIS
- 53 Miconos
- 54 MMOTV
- 55 MobiThin
- 56 MONET
- 57 MOSES
- 58 NETLAB
- 59 NetMediaInterfaces
- 60 OKAPI
- 61 OMEGA
- 62 Opera-Net
- 63 Orchestra
- 64 P2P-Next
- 65 PEPSI
- 66 PetaMedia
- 67 Pi-Health
- 68 PinView
- 69 POCHE
- 70 POLISMEDIA
- 71 PubSub4RT
- 72 QoS EXPRESS
- 73 SALA+
- 74 SAME
- 75 SCALNET
- 76 SEA
- 77 SEAMLESS
- 78 SeenOnTV
- 79 SemaPhoto
- 80 SEMLEARN
- 81 Sentient
- 82 Servery
- 83 SeVaNet2
- 84 SoPCoS
- 85 SPINE
- 86 SUPER-TV
- 87 SWIFT
- 88 TA2
- 89 TV NEXT
- 90 VeLVeT
- 91 VERDI
- 92 VIP
- 93 VT4D
- 94 WeB-NeSt

Although the list is very large, the fact that NEM has promoted consistent projects in response to the NEM SRA has provoked a reduction of the oversubscription of proposals, which have contributed to the improvement of the quality of proposals. Nevertheless, the efforts associated to the preparation of so many proposals which are not finally retained represent a tremendous waste of European research energies, which will require some further thoughts (for example, first stage of labelling by NEM on the basis of summarised project work plans and second stage of evaluation by the traditional means of the European Commission, strong involvement of NEM experts in the evaluation phase, etc.).

- The provisional list of projects which are under negotiation, is here indicated. In this list, it can be noted that there are 3 integrated projects, 15 STREPs, 1 NoE and 1 SA.

20-20 3D Media *	IP
3D4YOU *	STREP
3DPHONE	STREP
3DPresence	STREP
4NEM *	SA
ADAMANTIUM *	STREP
iNEM4U	STREP
Mobile3DTV	STREP
My-e-Director 2012 *	STREP
MyMedia	STREP
NAPA-WINE	STREP
OPTIMIX	STREP
P2P-Next *	IP
PetaMedia	NOE
PlayMancer	STREP
SAME *	STREP
SEA *	STREP
TA2 *	IP
UBIMEDIA	STREP
VirtualLife	STREP

The NEM projects are identified with the *

In addition to the projects retained with the objective 1.5 (Networked Media), other projects retained in the context of Challenge 1 are also brought to the attention of NEM as they are covering some research topics of the NEM SRA. These additional projects are: Euro-NF, IRMOS, OMEGA, SWIFT, DICONET, GRAND.

3.1 The coverage of FP7-1 projects to the NEM SRA V4 can be summarized as the following table.



Objective 1.5 & 4.2
NEM SRA V4 Coverage

	NEM projects										Other 1.5 projects										4.2 projects										NEM projects on other objectives										TOTAL	not sufficiently covered (L-3)	sufficiently covered (P-7)	TOTAL Second round										
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40					41	42	43	44	45	46	47	48	49	50
2.1. SERVICES AND APPLICATIONS																																																			101			
2.1.1. Application scenarios																																																			8			
2.1.1.1. e-Applications, e-Services																																																			8			
2.1.1.2. New Entertainment and Content Applications																																																			3			
2.1.1.2.1. Passive gaming																																																			4			
2.1.1.2.2. Digital Cinema																																																			0			
2.1.1.2.3. Advertising																																																			5			
2.1.1.3. Personal communication services																																																			8			
2.1.1.3.1. Enriched personal communications																																																			3			
2.1.1.3.2. Superdistribution and Content Sharing																																																			5			
2.1.1.4. Online communities																																																			7			
2.1.1.4.1. Personalized service creation																																																			9			
2.1.1.4.2. Communication in communities																																																			7			
2.1.1.4.3. Social Networks and Shared Knowledge																																																			9			
2.1.2. Service Technologies																																																			8			
2.1.2.1. Service Discovery and Information Filtering																																																			7			
2.1.2.1.1. Tools for content discovery																																																			7			
2.1.2.1.2. Content Awareness																																																			1			
2.1.2.1.3. Service personalisation																																																			8			
2.1.2.2. Service Platforms																																																			4			
2.1.2.2.1. Intelligent service creation and adaptation																																																			6			
2.1.2.2.2. Multimedia Middleware																																																			0			
2.1.2.2.3. Micropayments																																																			0			
2.1.2.2.4. Mobile Payment Interface for Commercial Applications																																																			9			
2.1.2.3. Service User Interfaces																																																			2			
2.1.2.3.1. Interactivity																																																			1			
2.1.2.3.2. Multimodal interactivity with Media and Communication Services																																																			1			
2.1.2.3.3. Multimodal interactivity with remote environments (telepresence)																																																			1			
2.1.2.3.4. Remote Management																																																			1			
2.2. CONTENT																																																			68			
2.2.1. Private and public content production																																																			14			
2.2.2. Open content format supported by commonly available tools																																																			8			
2.2.3. Content adaptation																																																			9			
2.2.4. Content personalisation, context awareness, ambient intelligence																																																			12			
2.2.5. Convergence between personal communication and content																																																			5			
2.2.6. Content summarising																																																			4			
2.2.7. Innovation in creative formats																																																			6			
2.2.8. Content in the mobile world																																																			6			
2.2.9. Entertainment in the Zipf Tail																																																			2			
2.3. NETWORK INFRASTRUCTURE, DELIVERY NETWORKS																																																			7			
2.3.1. Network Architecture																																																			1			
2.3.2. Home networking																																																			1			
2.3.3. Network based intelligence for end-to-end service control																																																			1			
2.3.4. Seamless service provisioning																																																			2			
2.3.5. Network planning and optimization																																																			0			
2.3.6. Ubiquitous multimedia networking																																																			1			
2.4. TERMINALS, USER DEVICES																																																			29			
2.4.1. Terminals and Devices																																																			1			
2.4.1.1. Residential Gateway – Architecture																																																			1			
2.4.1.2. Residential Gateway – HAN / WAN interaction																																																			0			
2.4.1.3. Advanced Home Gateway																																																			1			
2.4.1.4. Home Multimedia Devices																																																			2			
2.4.1.5. Media Home Terminal																																																			1			
2.4.1.6. Gaming Terminals																																																			3			
2.4.1.7. Broadband Portable Terminal																																																			1			
2.4.1.8. Personal Mobile Terminal																																																			1			
2.4.1.9. Virtual Distributed Devices																																																			6			
2.4.2. Core Building Blocks for Terminals																																																			0			
2.4.2.1. Subjective Assessment of Media Quality																																																			1			
2.4.2.2. Open Middleware Framework																																																			1			
2.4.2.3. Personal Identification Module																																																			1			
2.4.2.4. Distributed User Interfaces																																																			2			
2.4.2.5. Display technologies																																																			2			
2.4.2.6. Transducers (Sensors & Actuators)																																																			2			
2.5. ENABLING TECHNOLOGIES																																																			77			
2.5.1. Privacy and Trust																																																			5			
2.5.2. Interoperable Digital Rights management, content protection (watermarking)																																																			2			
2.5.3. Transition from analogue to digital TV, radio																																																			2			
2.5.4. Flexible compression																																																			1			
2.5.5. Platform-independent porting tools – Adapters																																																			0			
2.5.6. Metadata																																																			9			
2.5.7. Multimedia search engines																																																			7			
2.5.8. Content indexing (audio, video)																																																			10			
2.5.9. Intelligent agents and semantic technologies, Ontologies																																																			14			
2.5.10. Multimedia analysis and computer vision (object recognition and tracking, data fusion)																																																			7			
2.5.11. Mixed reality, Animated computer graphics (2D, 3D)																																																			3			
2.5.12. Acoustics and sound generation (Auralisation)																																																			5			
2.5.13. Human language technologies (translation tools, speech recognition)																																																			1			
2.5.14. Natural and multimodal user interfaces																																																			3			
2.6. Other topics																																																			12			
2.6.1. International cooperation																																																			3			
2.6.2. European cooperation																																																			9			

Preliminary analyses of the research topics are planned to be covered by FP7-1 projects indicate that (those in bold have been confirmed by the 2 survey rounds):

- **Services and Applications** are sufficiently covered by about 101 research activities (research topics and projects)
 - o Particularly, the following activities are well covered by more than 7 research activities :
 - 2.1.1.1. e-Applications, e-Services
 - 2.1.1.3.1. Enriched personal communications
 - 2.1.1.4.2. Communication in communities**
 - 2.1.1.4.3. Social Networks and Shared Knowledge**
 - 2.1.2.1.3. Service personalisation
 - 2.1.2.3.1. Interactivity
 - o The following research topics are not so well covered (only covered by less than 3 research activities):
 - 2.1.2.2.3. Micropayments**
 - 2.1.2.2.4. Mobile Payment Interface for Commercial Applications**
 - 2.1.2.3.2. Multimodal interactivity with Media and Communication Services**
 - 2.1.2.3.3. Multimodal interactivity with remote environments (telepresence)**
 - 2.1.2.3.4. Remote Management**

- **Content** is adequately covered by about 68 research activities
 - o Particularly, the following activities are well covered by more than 7 research activities:
 - 2.2.1. Private and public content production
 - 2.2.2. Open content format supported by commonly available tools
 - 2.2.3. Content adaptation
 - 2.2.4. Content personalisation, context awareness, ambient intelligence**
 - o The following research topics are not so well covered (only covered by less than 3 research activities):
 - 2.2.9. Entertainment in the Zipf Tail**

- **Networked Infrastructure and delivery networks** is covered by about 26 research activities
 - o Particularly, the following activities are well covered by more than 7 research activities:
 - None
 - o The following research topics are not so well covered (only covered by less than 3 research activities):
 - 2.3.2. Home networking**
 - 2.3.3. Network based intelligence for end-to-end service control**
 - 2.3.4. Seamless service provisioning**
 - 2.3.5. Network planning and optimization**

- **Terminals and User devices** are covered by about 29 research activities
 - o Particularly, there is none activity with more than 7 research activities.
 - None
 - o The following research topics are not so well covered (only covered by less than 3 research activities):

- 2.4.1.1. Residential Gateway – Architecture**
- 2.4.1.2. Residential Gateway – HAN / WAN interaction**
- 2.4.1.3. Advanced Home Gateway**
- 2.4.1.4. Home Multimedia Devices**
- 2.4.1.5. Media Home Terminal**
- 2.4.1.7. Broadband Portable Terminal**
- 2.4.1.9. Virtual Distributed Devices**

- **Enabling technologies** are covered by about 77 research activities.
 - o Particularly, the following activities are well covered by more than 7 research activities:
 - 2.5.6. Metadata
 - 2.5.8. Content indexing (audio, video)
 - 2.5.9. Intelligent agents and semantic technologies. Ontologies**
 - o The following research topics are not so well covered (only covered by less than 3 research activities):
 - 2.5.2. Interoperable Digital Rights management, content protection (watermarking)**
 - 2.5.3. Transition from analogue to digital TV, radio**
 - 2.5.4. Flexible compression**
 - 2.5.5. Platform-independent porting tools – Adapters**
 - 2.5.12. Acoustics and sound generation (Auralisation)**
 - 2.5.14. Natural and multimodal user interfaces**

4 New topics identified by the NEM community

A parallel action has been performed by the NEM community in order to identify new research topics which seem now mandatory due the recent evolution of the technology arena. 62 New topics have been proposed, they need a further analysis which will be done by the NEM SRA editor group in order to make the next NEM SRA version (planned to be available end of June).

1	eGovernment
2	eHealth
3	eInclusion
4	eBanking
5	eLearning
6	eCommerce
7	Recommendations Systems
8	Advertising
9	Indexation and cataloging of contents
10	Advance video techniques - 3D
11	User Experience Interfaces
12	Mobile Social Networks
13	Localization Services
14	Dynamic Content Delivery and Device Synchronization
15	User Generated Content
16	Gaming
17	New sales model
18	TV Mobile
19	Virtual Worlds
20	Open APIs
21	Social Networks
22	User attention metrics
23	Internet User Experience
24	P2P applied to the multimedia content management
25	Wireless applied to the multimedia world
26	3D audio content creation
27	Sustainable development application. How NEM could help to that great challenge
28	Intelligent search strategies for text, images, bio-data, ... -> search, recommend and access
29	Heterogeneous networks for seamless multimedia service transition accross environements (home, car, office,
30	Audience & customer knowledge including advertising
31	Digital media production technology and intelligent packaging of content from creation to distribution, covering creation of
32	People-, social- and user- centric approach
33	Tools for customer relationship
34	User generated content (in content creation, network and delivery)
35	Identity management - not new, but a universal answer is still needed.
36	Sensor networks - the real applications
37	Future Internet - rich multimedia demands on the network
38	Multipath and multichannel commuication, routing algorithms
39	Dynamic and autonomous network management
40	Universal hybrid services, seamless technology and provider roaming
41	Open software for integration of communications and media applications
42	3D - everything
43	Universal multimedia content and content adaptation
44	Devices' power management and storage
45	Ambient services - where the surroundings deliver the result rather than always your personal device.
46	Delegated Machine Authority - what responsibilities can you give you're devices and who is responsible if they get it
47	High-Performance Computing Research
48	Compilers
49	Long-term training motivation and training control for obese people with interactive training games
50	Middleware standard for game development
51	Procedural contrent creation
52	Networked distribution technologies
53	Media and network convergence that allows the management, personalization and reuse of multimedia contents within the whole value chain of the tourism sector anytime anywhere
54	Adaptation of interactive applications to High Definition Television and new generation of receivers
55	The basis on which any game is based is the graphical engine. In this sense it would be necessary to research in interactive visualization systems Technologies and the adaptation of formative content to games formats
56	To improve performance and QoS supported by the different technologies present in local infrastructures communications networks. The design of an architecture for the integration of all kinds of technologies of local area (wired or wireless), as well as the study of its complementarity with technologies of widespread area
57	Foster the creation of a Platform of 2D and 3D personalized informative graphs in real time for IPTV and DTT
58	Standardize the process of measure of Digital Television receivers (particularly DTT) through virtual labs
59	New Sensory Experiences which improve the well-being
60	Easy access : develop interaction paradigms that fundamentally decrease complexity in the interaction for control and access of content and information
61	Immersive experiences from multimedia data
62	Pervasive Media Interaction

5 Proposed work programme NEM research areas for future FP7 Calls

5.1 Challenge 1 : Networked Media

The following proposed wording for future revisions of the work programme are based on previous work programme applicable for FP7-1 with the views of NEM as per results of FP7-1.

Objective ICT-2007.1.5: Networked Media

Target outcome:

- a) **Interoperable multimedia network and service infrastructures** that
- maintain the integrity and the quality of the media whilst enabling automatic and intuitive enrichment at every step of the media lifecycle;
 - are optimised in particular for unstructured distribution, delivery, sharing, storage and intelligent retrieval of media and applications, and that enable variable media distribution patterns between multiple users.
 - are capable to operate in ubiquitous conditions in a seamless delivery of multimedia services and applications
 - use platform independent porting tools which facilitate the interoperability of different (open software) European standard tools and interfaces for the development of content in general.
- b) **End-to-end systems** and application platforms that enable i) intuitive, intelligent, professional and non-professional creation, manipulation, storage/handling/search, management and rendering of media; ii) the use of multiplicity of terminal devices at home and in everywhere.
- c) **Enabling Networked Media technologies** capable to: i) advance on flexible compression capabilities, ii) develop multimedia search engines; iii) improve acoustic and sound generation; iv) enhance human language technologies (translation tools, speech recognition)
- d) **Roadmapping and conference support**, for co-ordination with related national or regional programmes or initiatives, for international cooperation and interoperability initiatives, including specific targets towards worldwide standardization and harmonization of regulatory framework

Expected Impact:

- o World leadership in a new generation of media technologies providing significantly higher performances in terms of intelligence, scalability, flexibility, speed, capacity, ease of use and cost.
- o New and sustainable market opportunities based on converged business models between content, telecom, broadcast and consumer electronics industries. Reinforced European position vis-à-vis global interoperability and standardisation initiatives.
- o Widespread adoption of new digital media consumption and production patterns. Enhanced quality of life through new usage forms contributing to social, intellectual and leisure well-being. New opportunities for content production and exploitation.

Funding schemes

a-b): CP, NoE; c): CSA

Indicative budget distribution

115 M€:

- CP 45 M€ of which a minimum of 30 to IP and a minimum of 25 M€ to STREP;

- NoE 7 M€;

- CSA 6 M€

FP7-ICT-2007-4

URGENT ACTION FOR FP7-ICT-3:

Target outcome:

a) **Interoperable multimedia network and service infrastructures** that

- Allowing different service provisioning including mechanisms for micropayment;
- are optimised in particular for unstructured distribution, delivery, sharing, storage and intelligent retrieval of media and applications, and that enable variable media distribution patterns between multiple users.

a) **Enabling Networked Media technologies** capable to: i) develop multimedia search engines; ii) enhance human language technologies (translation tools, speech recognition); iii) develop core building blocks for terminals (subjective assessment of media quality, personal identification modules, distributed user interfaces).

d) **Road-mapping and conference support**, for co-ordination with related national or regional programmes or initiatives, for international cooperation and interoperability initiatives, including specific targets towards worldwide standardization and harmonization of regulatory framework

Expected Impact:

- o World leadership in a new generation of media technologies providing significantly higher performances in terms of intelligence, scalability, flexibility, speed, capacity, ease of use and cost.
- o New and sustainable market opportunities based on converged business models between content, telecom, broadcast and consumer electronics industries. Reinforced European position vis-à-vis global interoperability and standardisation initiatives.
- o Widespread adoption of new digital media consumption and production patterns. Enhanced quality of life through new usage forms contributing to social, intellectual and leisure well-being. New opportunities for content production and exploitation.

Funding schemes

a-b): CP, NoE; c): CSA

Indicative budget distribution

25 M€:

- CP 10 M€ of which a minimum of 30 to IP and a minimum of 5 M€ to STREP;
- CSA 1,5 M€

FP7-ICT-2007-3, FP7-ICT-2007-4,

5.2 Challenge 4: Digital Libraries and Content

In today's society individuals and organisations are confronted with an ever growing load and diversity of information and content, and with increasing demands for knowledge and skills. Coping with these demands requires progress in three closely related domains. First, content should be made available through digital libraries and its long-term preservation, accessibility and usability must be ensured. Second, we need more effective technologies for intelligent content creation and management, and for supporting the capture of knowledge and its sharing and reuse. Third, individuals and organisations have to find new ways to acquire, contribute and exploit knowledge, and thereby learn.

The challenge, therefore, is to harness the synergies made possible by linking content, knowledge and learning; to make content and knowledge abundant, accessible, interactive and usable over time by humans and machines alike. This should take into account current trends in content production and consumption and particularly the move from few-to-many to many-to-many models. Europe, with its unique cultural heritage and creative potential, is well placed to take advantage of this paradigm shift and to be a key actor in the knowledge economy.

The research is expected to firmly establish digital libraries services as a key component of digital content infrastructures, allowing content and knowledge to be produced, stored, managed,

personalised, transmitted, preserved and used reliably, efficiently, at low cost and according to widely accepted standards.

The support of more personalised and collaborative services, particularly within selforganising communities, will lead to more creative approaches to content and knowledge production. Improvements are also expected in terms of the usability, accessibility, scalability and cost-effectiveness of the resulting methods, technologies and applications with respect to large amounts of data and concurrent users.

The work will strengthen the link between content, knowledge and permanent learning processes. It will improve our ability to master and exploit content and knowledge and to learn in increasingly dynamic working environments. The work carried out under this challenge will contribute to the implementation of the "i2010:

Digital Libraries" initiative.

Objective ICT-2007.4.1 (ICT-2007.4.3): Digital libraries and technology-enhanced learning

Target outcome

For digital libraries

Medium term:

a) **Large-scale European-wide digital libraries** with innovative access services that support communities of practice in the creation, interpretation and use of cultural and scientific content, including multi-format and multi-source digital objects. They should be combined with robust and scalable environments which include semantic-based search capabilities and essential digital preservation features. Particular attention is given to cost effective digitisation processes and to the use of digital resources in multilingual and multidisciplinary contexts.

Longer term:

b) **Radically new approaches to digital preservation**, such as those inspired by human capacity to deal with information and knowledge, exploring the potential of advanced ICT to automatically act on high volumes and dynamic and volatile digital content, guaranteeing its preservation, keeping track of its evolving semantics and usage context and safeguarding its integrity, authenticity and long term accessibility over time.

There is a specific focus on the creation of a network of centres of competence for digitisation and preservation, building upon, pooling and upgrading existing resources in the Member or Associated States.

For technology-enhanced learning

Medium term:

c) **Responsive environments for technology-enhanced learning** that motivate, engage and inspire learners, and which can be embedded in the business processes and human resources management systems of organisations. They support the transformation of learning outcomes into permanent and valuable knowledge assets. Focus is on the massindividualisation of learning experiences with ICT (contextualized and adaptable to age, situations, culture, and learning abilities), through pedagogically-inspired solutions for competency, skills and performance enhancement. Activities integrate pedagogical and organisational approaches and exploit, where relevant, interactivity, collaboration and context-awareness. Interdisciplinary research should deliver a convincing and theoretically sound body of evidence as to which approaches are effective and under which circumstances.

Longer term:

d) **Adaptive and intuitive learning systems**, able to learn and configure themselves according to their understanding and experience of learners' behaviour. Cross-disciplinary research on the synergies between learning and cognition in humans and machines should lead to systems able to identify learner's requirements, intelligently monitoring progress, capable of exploiting learners' abilities in order to let them learn better, and able to give purposeful and meaningful advice to both learners and teachers either for self-learning or for learning in a collaborative environment.

Research on both themes of this objective is to be carried out by cross-disciplinary teams and it should include empirical evaluation studies assessing the broader socio-economic context in which technology is to be embedded.

Expected impact

- Unlocking people's and organisations' abilities to access content, master it, transfer it to the desired contexts and preserve it over time. Widespread use of these resources in the collaborative creation of cultural experiences.

- EU-wide migration of content to digital form involving memory institutions (libraries, archives and museums), leveraging national initiatives, and resulting in a significant increase of content available through digital libraries.
- Faster and more effective acquisition of knowledge, competences and skills, increased knowledge worker productivity, and more efficient organisational learning processes.

Funding schemes

CP, NoE, CSA

Indicative budget distribution¹²

ICT Call 3 - 50 M€:

- CP 42.5 M€ of which a minimum of 20 M€ to IP and a minimum of 10 M€ to STREP;
- NoE 5 M€;
- CSA 2.5 M€

Calls

FP7-ICT-2007-3

Objective ICT-2007.4.2 (ICT-2007.4.4): Intelligent Content and Semantics

Target outcome

Medium term:

a) Advanced **authoring** environments for the creation of **novel forms** of interactive and expressive content enabling multimodal experimentation and non-linear story-telling. These environments will ease content sharing and remixing, also by non-expert users, by automatically tagging content with semantic metadata and by using open standards to store it in networked repositories supporting symbolic and similarity-based indexing and search capabilities, for all content types.

b) Collaborative automated **workflow** environments to manage the **lifecycle** of novel and legacy media and enterprise content assets, from the acquisition of reference materials to the versioning, packaging and repurposing of complex products, including their linguistic and cultural adaptation to target markets and user groups. Empirical results from the psychology of human perception and attention will be used to identify salient multimedia segments and apply summarisation and encoding schemes that will improve content storage and transmission without affecting its perceptual properties.

c) Architectures and technologies for **personalised distribution, presentation and consumption** of self-aware, adaptive content. Detecting and exploiting emergent ambient intelligence they will use features embedded in content objects and rendering equipment to enable dynamic device adaptation, immersive multimodal experiences and contextual support of user goals and linguistic preferences. Privacy preserving learning algorithms will analyse user interactions with devices and other users so as to update and effectively serve those goals and preferences.

d) Actions geared towards **community building**, intended to stimulate cross-disciplinary approaches and a more effective user/supplier dialogue, and other measures, including field validation and standards, aimed at a faster **uptake** of research results. Usability and technology assessment studies, economic analyses and roadmaps to chart the democratisation of personal and community based multimedia production and management tools.

Longer term:

e) **Semantic foundations**: probabilistic, temporal and modal modelling and approximate reasoning through objective-driven research moving **beyond current formalisms**. Theoretical results will be matched by robust and scalable reference implementations. Usability and performance will be tested through large scale ontology mediated **Web integration** of heterogeneous, evolving and noisy or inconsistent data sources ranging from distributed multimedia repositories to data streams originating from ambient devices and sensors, supporting real time resolution of massive numbers of queries and the induction of scientific hypotheses or other forms of learning.

f) **Advanced knowledge management systems** for information-bound organisations and communities, capable of extracting **actionable meaning** from structured and unstructured information and social interaction patterns, and of making it available for activities ranging from information search through conceptual mapping to decision making. Such systems will exploit semantics embedded in multimedia objects, data streams and ICTbased processes, and rely on formal policies to manage user access as well as audit trails in support of dynamic virtual organisations. Research advances will be embedded within end-to-end systems using **computer-tractable knowledge** in support of dynamic data and application integration, automation and interoperation of business processes, automated diagnosis and problem-solving in a variety of domains. Robustness, scalability and flexibility will be tested in real-life settings, together with interworking with legacy systems.

Expected impact

These activities will make digital resources that embody creativity and semantics easier and more cost-effective to produce, organize, search, personalise, distribute and (re)use, across the value chain.

- Creators will be able to design more participative and communicative forms of content.
- Publishers in creative industries, enterprises and professional sectors will increase their productivity with innovative content of greater complexity and ease of repurposing.
- Organisations will be able to automate the collection and distribution of digital content and machine-tractable knowledge and share them with partner organisations in trusted collaborative environments.
- Scientists will operate more efficiently by automating the link between data analysis, theory and experimental validation.

Funding schemes

CP, NoE, CSA

Indicative budget distribution¹²

ICT Call 3 - 50 M€:

- CP 45 M€ of which a minimum of 19 M€ to IP and a minimum of 13 M€ to STREP;
- NoE 3.5 M€;
- CSA 1.5 M€

Calls

FP7-ICT-2007-3