



ITEA

INFORMATION TECHNOLOGY
FOR EUROPEAN ADVANCEMENT

Full Project Proposal Passepartout

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Minor: Content processing

ITEA Roadmap technology categories:

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Minor: Resource Management

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1 Elaborate Project description

The pace in which society has been going digital has continued to accelerate. A key factor in this acceleration is now software technology. This project focuses on the convergence of digital systems and applications in home media-centers in compliance with the ITEA roadmap “The Road towards Convergence” thus matching the vision of industries, institutions, SME and government partners. It is expected that from this project new technologies will emerge that propel the European software industries on to convergence, over terminals and network towards the final goal of ambient intelligence.

The project is aimed at coupling home media-centers to home networks for rendering scalable content from high definition television (HDTV) to lower definitions in a seamless fashion. Integral to the content will be reactive access and interactivity of high-resolution graphics using ISO and W3C standards for object oriented TV. With the project's goal to make a step towards ambient intelligence through mass personalization of reactive content (RAMPEG), implementation shall use the most practical elements of MPEG-4 and MPEG-7 with W3C standards such as SMIL and related content synthesis and syndication in XML. Implications will stretch far beyond infrastructure and basic services but will also affect content, human system interaction and engineering.

Implementation will be based on content access using a PVR media-center as server to new generations of access networks, including Blu-ray optical storage and WIMAX wireless technology. These networks will support the creation of home media-centers that move beyond current STB and PVR-DVD players using MPEG-2 technology, to create true mass-customisation device for family entertainment. With the goals of content packaging and personalization to match the cultural and linguistic needs of the states of the EU and their economies.

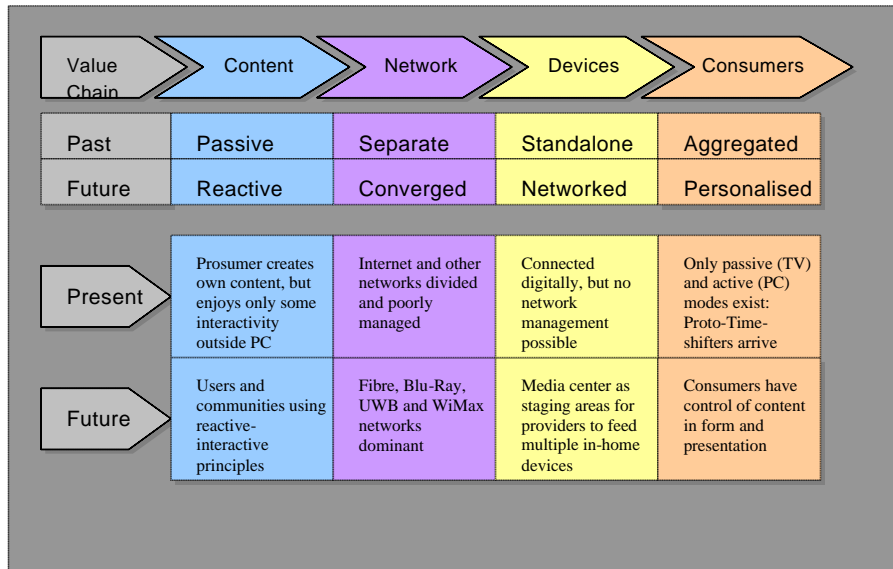


Figure 1 shows the roadmap towards future reactive content that can be accessed with personalised home networks. Consumers will have control over content in form and presentation. (ref: Pricewaterhouse The Broadband Future 2004 : exhibit 2).

The project will integrate with MEDEA+ projects in the area of DRM platform and IC chip-set development for Blu-ray and WiMax to ensure that the European semiconductor and software industries can offer integrated solutions for networks and devices in the next decade. Contributions to emerging linguistic standards for content adaptation and to content packaging will be a priority. European technology will be enhanced with the addition of strategic partners: such as ETRI, the Korean Broadcast Research Centre.

1.1 General goals

A recent ICT study report "Rethinking the European ICT Agenda", Sept. 2004 (Dutch Min. of Eco. Aff.) has identified the issue of adaptable High Definition video content technologies to provide a scalable service for "any content, anytime, any platform, anywhere and anytime" as key to the EU Lisbon goals.

The goals of this project are to take four key technologies:

- HDTV and scalable content
- Blu-ray and Mediacenter (PVR) technologies
- Reactive and interactive content flows
- Wireless Access network

And to show how scalable content can be achieved for a broad class of terminals in a home network. Moreover to provide content that is more closely adapted to the consumers needs and desires, thus matching languages, learning needs, opinions, lifestyles and habits, in a fashion that conventional broadcast TV cannot offer.

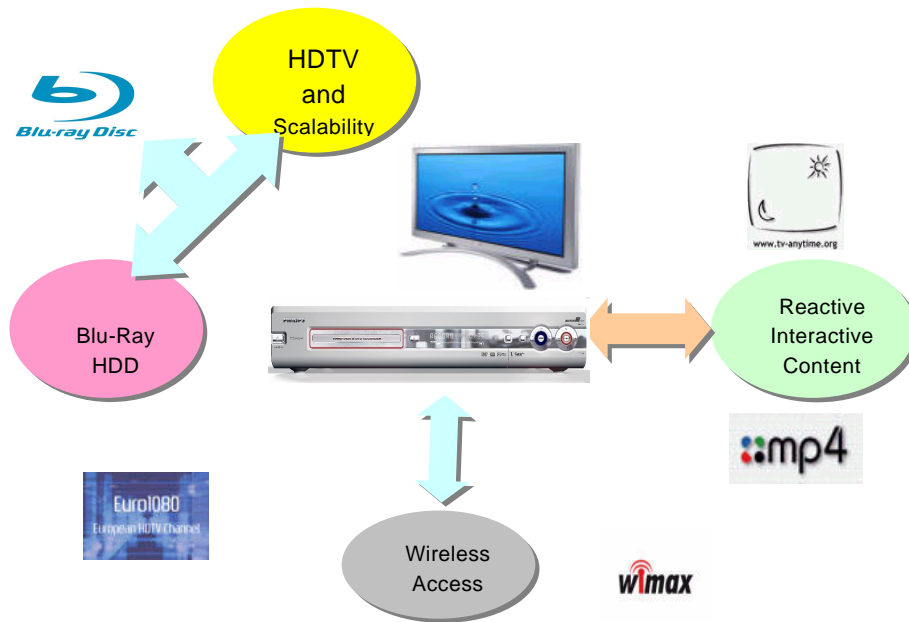


Figure 2: System Concept for Packaged Content PVR and Wireless network. The consortium intends to demonstrate and validate a system concept as shown in this diagram. This includes a number of new system components such as Blu-ray, WIMaX, MPEG-4-AVC, and TV-Anytime, which will be the basis for the project's common-reference platforms

The intent of the consortium is to demonstrate and validate a system concept as shown in Figure 2. This includes a number of new system components such as Blu-ray, WIMaX, MPEG-4-AVC, and TV-Anytime, which will be the basis for the project's common-reference platforms.

Using the example of package driven PVR with Blu-ray capability, the consortium will show how this terminal can be exploited by emerging content networks to provide HD quality content without the need to address the problems of the broadcast networks entrenched position on MPEG-2. The terminal will provide the capability for the Mass-customisation of media objects and thus provide a stepping-stone to the application of Ambient Intelligence in the home network, see figure 3.

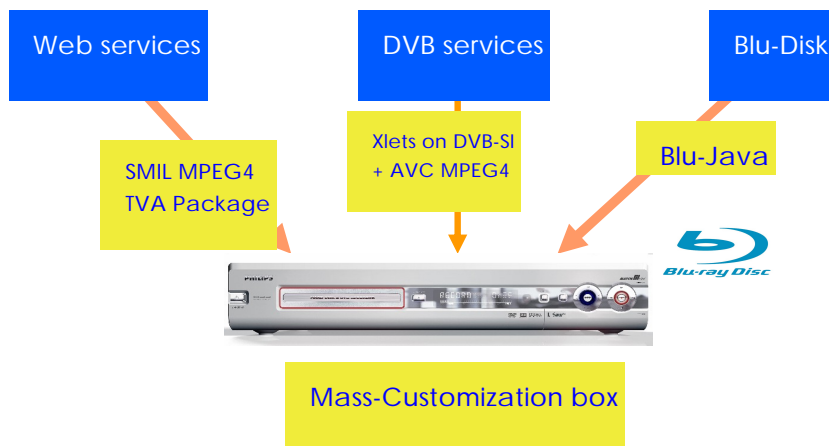


Figure 3: Blu-ray based PVR with HDD for Mass-Customization of AV Content.

1.2 Market relevance

Since consumers needs are the starting points for this project a wide public acceptance of the new technologies is expected. For that reason the new technologies will have to be simple, self-explanatory and easy to use, intelligent, context-aware and adaptive, seamless and interoperable.

From a technical point of view the project is driven by four technologies and the synergy that the consortium can exploit between these.

- HDTV and scalable content
- Blu-Ray and Mediacenter (PVR) technologies
- Reactive and interactive content flows
- Wireless access network

These four technologies will be linked to form an integrated home system as shown in figures 2 and 3. This project's technical innovation is in the coupling of the four emerging technologies of the project into a synergistic whole that can be exploited in a media center in a home network supported by a wireless access network. From an applications point of view there are four fields that will be affected by the new technologies: content, infrastructure and basic services, human system interaction and engineering.

1.2.1 High Definition TV

High definition TV history in Europe is littered with attempts to move the broadcast TV world towards higher and higher standards of quality in image quality. Many of the traditional barriers to HDTV systems have been addressed, while the Western European consumer now has very high expectations for quality from media such as DVD and also in the near future for true HD content from optical disks. The availability of low cost display technology using LCD

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and plasma makes this step to HD possible, but emerging display technologies based on OLED and laser projection technology will drive this trend further forward. Thus it is widely predicted that at least one HD content network will emerge in Europe, and for the majority of European nations this will be Blu-ray, with possible initial competition from HD-DVD. It is assured that HD content from the major US content makers will support optical storage technologies.

However, while HD will open new premium content channels for DVB-S/C and Blu-ray technology with classical MPEG-2 technology, for broadband technology the need for full scalability of content, and optimal integration of graphics demands the move to MPEG-4 technology. Thus for future networks the availability of full scalable HD content and the penetration of MPEG-4 are closely coupled.

Many economically strong and technically able European broadcasters will follow the US trend for HD content creation to support the worldwide market for HD media. And this will drive the leading broadcast nations to support HD content prior to analogue switch-off, prior to 2012. For the lesser nations of Europe, with technically less competent broadcast capabilities there is a need to employ radically more cost efficient technology to create and distribute HD content. This will demand the best possible technology for compression and image improvement, optimally matching the display technologies characteristics. It also opens new markets for the technology advanced nations to create content that is more flexible, i.e. more reactive, to local markets in terms of culture and language. This will in turn lead to a concentration of premium content creation to the technologically highly capable content creators using MPEG-4 technology to serve broad heterogeneous markets. This possibility is seen as one of the key reasons for the Passepartout project to exploit reactive programme in MPEG-4 and MPEG-7. At the same time, community programmes will be increased to feed networks (P2P) as the old State broadcast infrastructure of the European nations is being dismantled with the slow decline of terrestrial TV systems. These P2P networks will be based on broadband networks of PVRs, and will probably follow the model of the BBC Creative Archive using MPEG-4 codec in player technology such as SMIL. These broadband network will be XD, i.e. fully scalable from low-bit rate (QCIF) to full bit-rate HD quality.

1.2.2 Blu-ray and Media-center (PVR)

DVD optical storage technology has been one of the most successful technologies launched in modern history, see figure 4. Except for an initial period of conflict with the original "DivX" format of Circuit City, the technology has never stumbled in its growth to worldwide dominance in a very short period of time. DVD is used in three major home platforms; PC, Game players (PS-2, XBOX) and media-centers (player and recorders). Moreover, it has also given rise to a wide number of new formats such as DVD+RW, and the media-centers are used as a platform for new formats such as SACD.

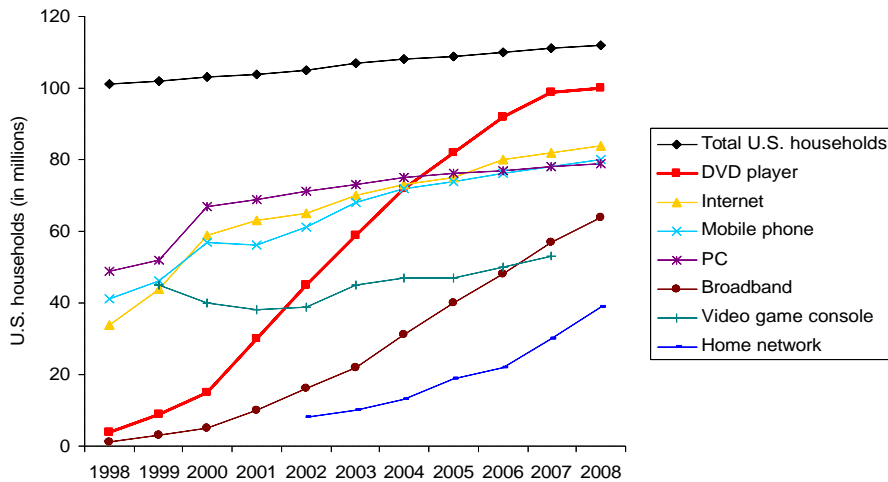


Figure 4: Growth of the DVD Market driven by the 16:9 digital visual quality of MPEG-2-VBR: Blu-ray to be driven by HD and scalability on MPEG-4AVC. (ref: Pricewaterhouse The Broadband Future 2004).

As with all such lucrative technologies the commercial position of the companies are in constant tension; with alliance forming on the basis of markets, technologies, IPR portfolios, etc. Blu-ray is the European technology of choice for advanced optical disk technology, and if it were to falter, the position of the European industries in optical storage would be irreparably damaged. Its success is critically important for the commercial exploitation of the coming generation of optical storage. Specifically because for premium quality HD content for Blu-ray will be the dominant carrier technology for most European markets in this decade. Longer term optical storage products are challenged technologically, i.e. disk layer issues, and by market uncertainties created by the threat of true universal broadband coverage in the later part of the next decade (beyond 2016). Optical storage in the generations after Blu-ray would seem to have to be of radically different technology serving other needs, for generations of users with fundamentally different perceptions of the need for up to tens of terabytes of storage, and the business models to support them. Without effective European participation in this generation of products, East-Asian economic interests in development and production will dominate the following generation of storage platforms.

For Blu-ray to succeed, there is the need to exploit the potential to create new forms of content with a high level of adaptation of the content to the user needs. Premium content DVD has started to exploit the potential for new markets beyond the capabilities of the standards DVD-video. This need has been satisfied by a number of vendors of market players such as InterActual. These companies have made a success of interactivity where the Microsoft standard for DVD interactivity Web-DVD failed.

To bring Blu-ray content close to the ideal of laid-back content, which can be effortlessly customized to the viewers needs, new concepts for the customisation of content are required. With a strong preference to adopt standards for media which are free of the influence of the monopoly USA PC interests who will share this technology with PVRs, game platforms (PS-3), and portable players.

In this context the media-centers used in European homes are expected to fall into four groups:

- Vertical Market STB/PVR (e.g. SKY+)
- Horizontal Market BD/HDD media-centers
- P2P network PVRs (Dreambox and BBC IMP box)
- Mobile PVR (Memory mapped Flash/HDD PVR to V-IPOD)

In this project the terminal will be a hybrid of these first three cases and networked to the fourth case.

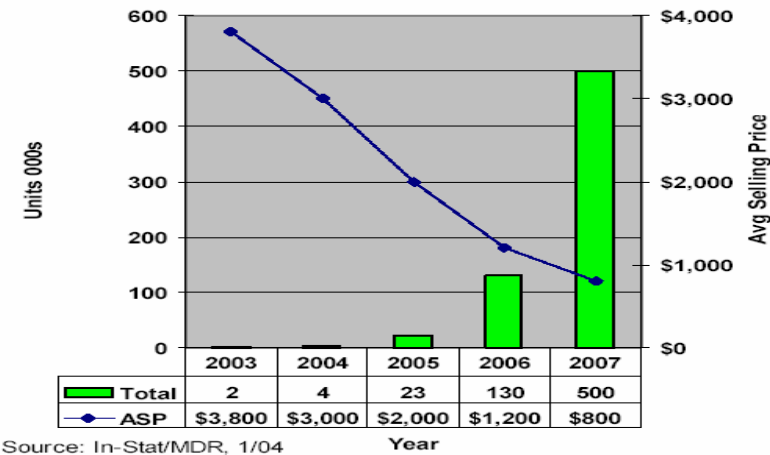


Figure 5: Blu-ray Market growth and Unit price (ref in-Stat/MDR 2004)

Market expectations for the market growth and unit cost of Blu-ray PVRs and players from 2000 to 2008 are shown in Figure 5. This figure does not cover the use of Blu-ray in games terminals i.e. PS-3 nor in MM-PCs. As showing in figure 6, although analogue tuners will be used with such PVRs, digital tuners and network attached PVRs will determine the direction of the system development after 2008.

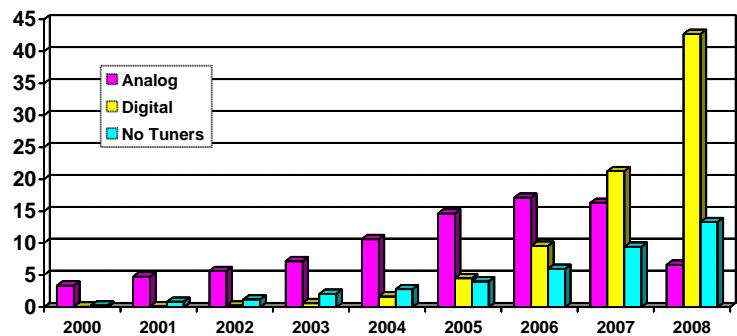


Figure 6: Blu-ray Recorder PVR Type by tuner analogue, digital or network. (ref in-Stat/MDR 2004) (values relative)

Reactive and Interactive Content Creation (RAMPEG)

As an AV codec framework, MPEG-4 has developed in the last 7 years to include many aspects of the DID (Digital Item Declaration) philosophy of MPEG-21, which in this project proposal is covered by the term Object-oriented TV. In the framework much technical progress has been made to make media objects conceptually more adaptable to the needs of the viewers. Nevertheless, the linking together of the components to form a content creation flow that allows the content to be adapted by the client or server has not been practical.

In the Jules Verne project the broad concept of RAMO (Reactive Adaptive Media Objects) has been applied to MPEG-4. Specifically the standards framework to adapt the linguistic content of a programme to aid the task of language learning, and the addition of more gaming capabilities to TV content were demonstrated by the partners. In this project the partners will take these initial concepts RAMO as RAMPEG (Reactive Adaptive MPEG), and make a clear attempt to provide content development flows that allow for linguistic adaptation that match the needs of European TV/media economies. These needs are fundamentally different to monolingual TV/media economies such as USA and Japan, or China where ideograms provide effective communication. Using the framework of XMT, and XIFF the flows for this type of reactive content will be defined. Where possible the advanced capabilities of this concept will be prototyped using SMIL based tools and flows. Linguistic adaptation will provide the overall principles for content semantic adaptation in this project.

For gaming content links will be created with the IST OLGA project to ensure approaching the broader issues of reactivity. Gaming type content will be coupled to advanced research in the application of advanced server side technology such as Grids. Advanced server technology such as GRIDs is not a topic in the Passepartout project, and at this time none of the partners are active in this area.

1.2.3 Wireless Access Networks

The European broadband access markets continue to be challenged by the geography and history of its metropolitan and rural regions, i.e. "The last Mile". So in spite of the best efforts by the operators to equip all local exchanges with ADSL capabilities, a significant part of the European population cannot gain access to high bit rate digital connection because it is too far from local exchanges, or poorly ducted. At the same time, many digital cable network provide only adequate Burst-mode bandwidth for application such as Browsers, for true always on Video over IP, cable remains challenged by technology and business model economics.

For broadband-challenged regions economics and practices in **access network solution** can make use of radio technologies based on emerging standards (**IEEE 802.16a and HiperMAN**) viable. This is now widely acknowledged in the industry, and being supported by an increasing number of key market players. To be successful **Wireless-DSL** must be defined with the specific constraints of a system dedicated to the general public. In addition to **low cost subscriber** equipment, this implies also **easiness of installation** by the customer, and consequently good indoor reception (no outdoor unit) for most of the target population without light-of-sight to base-station.

This project will investigate such a **Wireless-DSL system** composed of **base-station and customer equipments**, a system that intends to offer a strong synergy with the existing wireline ADSL architecture in order to simplify its deployment and its exploitation by the operators. A special attention is also paid to inherent quality of the channel and superior Quality of Service, which is a discriminating parameter of the IEEE 802.16a and HiperMAN standards. ADSL is both asymmetric, and highly dynamic in channel capabilities.

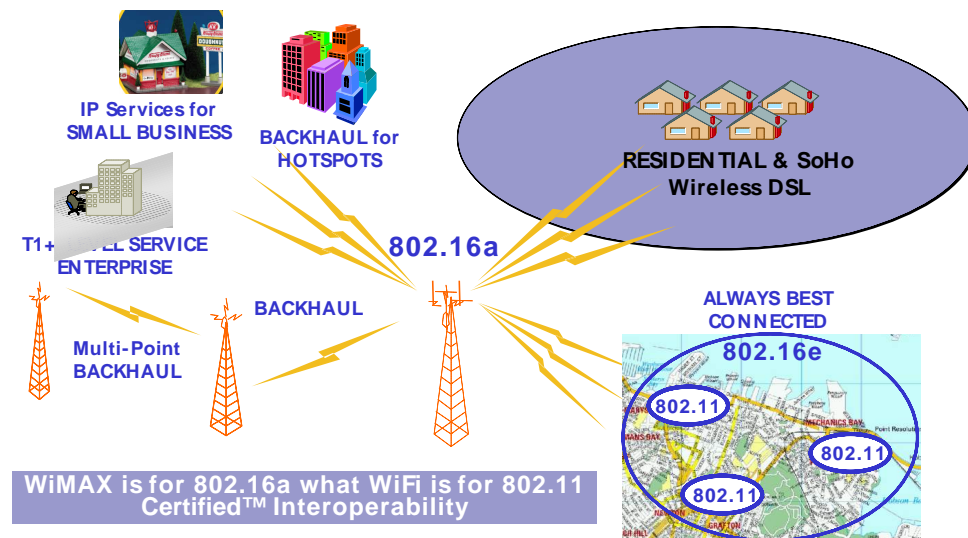


Figure 7: Model of WiMax (802.16x) technologies coupled to current WiFi (802.11x)

WiMax is proposed by manufacturers and operators (e.g. Intel, Thomson, Alcatel, France Telecom) who already have a significant position in the ADSL market. Yet with the intention to complete their offering to customers with a technology that could meet the specific requirement of medium density areas under otherwise marginal economical conditions for alternative technologies for access, and thus increase the market of the access to fast Internet.

WiMax has been identified as providing end-to-end high-speed connection, which is a prerequisite to the development of an Integrated Telecommunications system concept. Because a significant part of the European population, living too far from telephones switches, cannot be reached by wireline ADSL (and that part is rather bigger in the new European and also in emerging countries), there is a danger that such population cannot take part to the tremendous acceleration of the information society. Extending the ADSL coverage to that population is not just a matter of investment, but also requires technologies adapted to the specific configurations of the medium to low-density population areas. In this respect, the WiFi experiments carried out here and there in rural environment illustrates that **radio can be the right solution** to the need of high-speed interconnection in many regions.

As a part of the project, the test of base-station and CPE platforms, in actual conditions will enable to confirm the validity domain of the radio approach for broadband IP access networking, and will then contribute to the emergence, on the basis of recognized standards, of a coherent European solution.

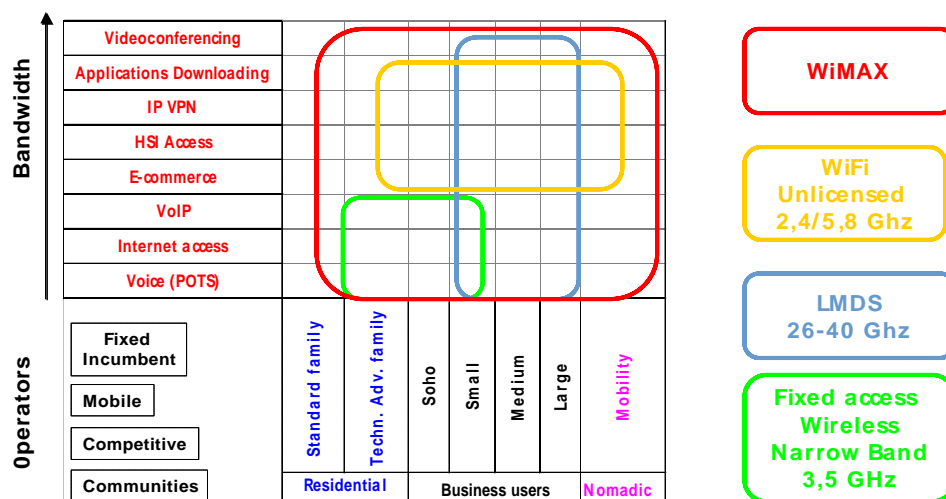


Figure 8: Wireless application areas per technology

1.3 Technical and strategic relevance

This current project proposal builds on the experience of the Jules Verne consortium. The Jules Verne project exploits the potential of MHP and MPEG-4 to show that new content generation techniques can be combined with emerging STB architecture to stimulate the introduction of object-oriented multimedia into the home. Unfortunately, as the discussion at EU level on the mandate for DVB-MHP has shown, the EU Telecommunication Directive that should have created a greater degree of harmony across the members states, has failed. Thus the broadcast driven networks made possible by the DVB standard will not be mandate as the carrier for interactive services as envisaged in the late 1990s. But new emerging technologies such as regional wireless networking, P2P networks, and IP based PVR are likely to supplant DTH DVB broadcast for interactive services. In addition, optical storage technology has been driven by the outstanding success of DVD to exploit the opportunities of HD content distribution in Europe for the emerging flat screen technologies with a new carrier i.e. Blu-ray, that can provide the capacity for HD quality material.

In this context, the consortium has been radically altered, firstly, by rationalization of the major partner contributions, and secondly, by expanding the consortium to include new partners with unique contributions to make in technology and standards of the new networks.

By combining the major partners' refocused efforts with many new partners, the consortium has swung the focus to new aspects of the technology defined as important in the Market Relevance section of this project proposal. Thus the contribution of Philips and Thomson for the exploitation of Blu-ray in PVRs using WiMax and FTTH technology for emerging P2P networks for content distribution has radically changed the major partners' contribution. While the eight new partners broaden the contributions to standards by the consortium into areas of W3C such as SMIL, and new XML (XMT/XIFF) standards for content adaptation and localization.

At the end of the project the partners expect to have a demonstration of a PVR and wireless network using content adaptation and localization technology, which will totally replace the concept of a TV channel as primary delivery mechanism for mass-media. Content will be offered in a form that allow families and individual users far greater influence on the provision of content and allows premium paid-content, advertisement supported and public service content to be merged in a seamless fashion.

The most radical change is perhaps the joining of ETRI, the Korean national telecommunications broadcast research center. By bringing ETRI into the project, the technology partners have been confronted by the vision of one of Southeast Asia's most dynamic ICT economies, and how the broadcast industry will be radically changed by the wide scale use of broadband technology in traditional TV media. In particular how the packaging of content for use in PVRs will result in the disaggregation of content from the traditional broadcast channel towards a more flexible network independent distribution

approach (Figure 1). The TV-Anytime forum in which Philips, Thomson and ETRI are leading players drives this effort.

In addition to the Jules Verne project, the Passepartout project will also exploit the results of the ICECREAM and SAMBITs projects from the IST programme project focused on MPEG-4. The IST STREP titled OLGA or "A Unified Scalable Framework for On-line Gaming" will provide much of the innovation for advanced graphics in the context of MPEG-4 Framework..

This project is complementary to the ITEA HD4U or "HD for you" project consortium. The HD4U consortium is focused on the distribution of HD content in the classical broadcast networks as a direct replacement for SD quality TV. The HD4U project has no relationship to Blu-ray or wireless access networks, and innovations in content adaptation are not included either. In fact the project could be forced by the markets to relinquish interest in MPEG-4, i.e. focus on MPEG-2. In which case the project would virtual have no overlap. HD4U is further seen as a necessary short-term project to maintain the interest in HD broadcasting in Europe prior to the period when Passepartout associated multimedia products can be widely introduced later in this decade. Without HD4U the leap to HD quality in the broadcast networks could be too great and the issues of MPEG-4 introduction in traditional broadcast networks would be left unaddressed.

The Passepartout project fits under ITEA competencies; which during its course are going to be enhanced by the project's achievements.

Content capture, creation and authoring

The project will address the issue of content capture creation and management in the multimedia markets by bringing together SME enterprises in France, Spain, The Netherlands, Finland and other European countries to create an effective value chain. By providing input from the terminal and middleware stack vendors the task of creating attractive, efficient content for the market will be simplified for both the toolmakers and tool users. The tool vendors will address the issue of asset acquisition, digitizing, editing and composition for object oriented TV production processes with a specific focus on the linguistic adaptation issues.

Data & content management

Creating proactive AV content using object oriented streaming technology will be a goal of the project. This will allow open formats of object TV (MPEG-4/-7) lean-back and browser based multimedia (SMIL) to be combined with reactive technology in the terminal to optimize the interactivity to a level compatible with viewers expectation, i.e. advancing browsing onto new connected displays for viewing by groups and by individuals. Thus demonstrating that AV content can mediate interaction between creator and viewers, but not just on a channel level, leading to a better experience of AV exploiting some ambient intelligence concepts. This would include demonstrations of such applications in areas such as education and healthcare.

Network transport and protocols with network management

Streaming technology for advanced IP, DVB network protocols in conjunction with storage technologies will be addressed by the middleware and terminal vendors of the project. This

would include demonstrations with home and service provider based servlets and agents with adaptations to device and user profiles. Adaptation will focus on the use of advanced media such as MPEG-4 and MPEG-21/SVC versus transcoding of formats by media-servers in the home context.

Resource management

Road maps for cost effective terminal and middleware will be addressed in the project in key areas of terminal architecture such as: dynamic resource allocation, real-time software components, graphics capabilities, virtual machine technology, and memory management. The priorities for innovation in resource management will be studied in this project and the results shared with the MEDEA+ projects detailed below.

MEDEA projects

This project will be directly coupled with the Blaze and HADES Medea+ project from the 3rd call of the MEDEA+ programme. These projects will provide the innovation in IC architecture and chipsets necessary to build the terminals and components using the middleware and applications this project will support. Blaze will support the chips-sets necessary to implement PVR technology with Blu-ray capabilities for high quality video object streams from multiple sources. The project will run concurrently with Passepartout and shares two major common partners. Hades is a project focussed on longer-term development of IC architecture that exploits the concept of Network on Chip (NOC). NOC architectures offer the potential to allow middleware integration of major software components within special efforts in the control of the Execution Architecture. At this time there are few techniques for global optimisation of resource allocation (bandwidth and processor) in this class of IC. HADES proposal for QOS at a low level on NOC architecture would allow better optimisation of the use of resources, and more effective power management.

For DRM architecture, the project will rely on that proposed and developed by the partners of the Ankh-Morpork project. This is the major contribution of the MEDEA+ programme to DRM issues at IC level, and participation by both Philips and Thomson in both projects will be important in the alignment of the issues of DRM and user interaction.

- ☐ Short Term: expected technology deployment will start in the Short-Term (2005-07).
- ☒ Med. Term: expected technology deployment will start in the Medium-Term (2008-10).
- ☐ Long Term: expected technology deployment will start in the Long-Term (2011-onwards).

1.3.1 Technological state-of-the-art

At this time the technological state of the art for optical storage technology is based on the red-laser technology combined with MPEG-2 technology for AV content. Some companies such as DivX have introduced MPEG-4 like codec for CE products. However, these products have only employed the compress capability of the codecs, and have not employed the broad set of capabilities that the MPEG-4 framework has to offer to object-oriented TV. Similarly, digital broadcasting has not used the MPEG-4 framework, although discussions on the use of MPEG-4 for HD content are an open topic in the European industry at this time. Thus the transfer of the PC oriented MPEG-4 framework to CE platforms is in a very preliminary stage.

Similarly, the exploitation of TV-Anytime by the industry is very thin. In the USA and UK, propriety systems for control of PVRs (TIVO and SKY+) have been produced. However,

neither system has been widely exploited outside these markets, because they are tied to Pay-TV networks. In the UK the first steps to the introduction of TVA have been made with the introduction of an 8-Day EPG, and this feature will allow horizontal market PVRs and HDD-DVD PVRs to be used effectively for the first time. Nevertheless, this technology is clearly in control of the traditional broadcast business models, and the innovation of content packaging as introduced by ETRI in this project is a substantial innovation in creation of personal TV channels not seen in the USA or Europe.

Further progress in moving PC and P2P technology to consumer products is very limited. The introduction of SMIL to content flows (WP2) offers a unique chance to bridge the gap in Europe between Mobile and CE products. In the Adanets ITEA project this was attempted using the concept of Remote-UI. Using SMIL a common standard for media presentation could be created for Cellphones and PDAs with the PVR.

Combination of MPEG-4/MPEG-7 "Lean-back" visual presentation of content combined with SMIL "Lean-forward" media presentation would seem to be a unique combination of this project in WP2. By adding the innovation of PVR and Blu-ray technology it is believed that the Passepartout consortium is undertaking a unique step in the integration of technologies not found in previous projects in any part of the world or in any programme.

1.3.2 Technological Innovation

This projects technical innovation is in the coupling of the four emerging technologies of the project into a synergistic whole that can be exploited in a media center in a home network supported by a wireless access network.

For the realization of these challenges the project will use and enhance at least the following application of the technologies:

- o MHP-Java heritage evolved to Blu-ray and P2P applications
- o MPEG-4 basis established for object oriented TV content;
- o Implement a Package driven PVR concept;
- o XMT founded as protocol for adaptable content creation;
- o MPEG-4 & MPEG-21/SVC as basis for scalable AV protocol for connected home;
- o Reactive TV content in broadcast and local interactive service;
- o WiMax application for home network access demonstrated;
- o Explore the use of SMIL in content flows
- o Broaden the wider application of Linux in home network environments.

1.4 Major visible expected results

The following three items are expected to result from the project:

- Support the introduction of HD program content and MPEG-4-AVC on Blu-ray and other innovative WiMax media networks in Europe. Contribution and co-ordination of the roadmap between the content industry and terminal industry for Europe to stimulate reactive and interactive media.

- An example of an advanced content creation flow matching the harmonized needs of the content industry, the tools vendors and open APIs of MPEG-4/-7 component vendors and linking SMIL into the content industry. Including extension of MPEG-4 & MPEG-21-SVC to home network application for inherently scaleable protocols
- Broaden the scope of PVR technology in Europe to include a new business model, based on packaging, as replacement for the TV channel. Also the interaction between broadcast PVR technology and community based P2P innovations.

Visibility will be ensured by open project workshops demonstrating the capability of such a roadmap in reactive and proactive applications for entertainment, and education with a strong emphasis on bridging the linguistic and social barriers to advanced content distribution. Standards issues will be address through industrial consortia such as Blu-ray, DVB, ISMA, and IEEE for 802.16X (WiMax), as will as via open standards such as SMIL via W3C, and ISO standards.

1.5 Exploitation and Dissemination of Results

The main industrial objective of the consortium is to create a synergy between the terminal vendors middleware vendors, tool vendors and content providers/creators based on open standards. Using these standards and participating in the standardization bodies the industries will be able to evolve a strong growing market for each party's products. Some of these markets will show strong growth, i.e. the tools and middleware vendors, others should show very high growth because they start from a very low level, i.e. content providers.

Both the middleware vendors and tools vendors are very close to the core of the goals of ITEA to create viable markets for European software technology. The other partners of the consortium represent other aspects of the industry more closely related to the TV content, broadcast, consumer electronics and semiconductor industries.

The project will hold two workshops on a year basis to support the technical transfer of knowledge between the partners. ITEA and IST projects will be invited to these workshops as appropriate. These workshops will support the projects normal technical and management meetings that will be held on a quarterly based using a scheme that rotates the meetings over all the partners' locations.

Publications will be made in major CE and computer conferences with a focus on multimedia technology. Where possible the demonstration of MPEG-4 and other ISO standards will be support by demonstrations of the common platforms with applications. Philips and Thomson are very active in these areas and will ensure that results are applied to supporting standards.

IEEE, ACM, IEE or similar institutional supported conferences will be used for dissemination of technical partners.

1.6 Exploitation plans per Partner

1.6.1 Philips

For Philips as major partner Blu-ray is expected to be the major exploitation vehicle for the projects results. The PVR using Blu-ray is expected to be a key consumer product in the latter years of this decade in European homes. Based on the historical success of DVD based on MPEG-2 and 16:9 formatted TV, the edge provide by MPEG-4-AVC and HD content for Blu-ray is expected to make this technology visual incomparable to other media.

By providing a "Packaged-Content" i.e. not Channel based, PVR technology the expectation is that other content providers will be able to use disaggregated networks to avoid the bottleneck of current MPEG-2 technology broadcast networks to provide similar quality and interactive to Blu-ray via high quality broadband and wireless access network. Most of the SME partners of the project will be part of process of supporting this disaggregating process in the European content industry.

SMEs within the consortium are expected to profit from intimate knowledge of this new package based PVR concept and the Blu-ray standards. The individual business models of the SMEs or the consortium have been justified in the local PA submissions for the project funding. In all cases these submissions have economic goals to justify the subsidy to the partners from the local PA.

Philips will continue to support the development of Blu-ray as a complete system for CE applications including, the chip-sets and mechanical components, middleware (Low and Upper), DRM, applications, user interaction issues, and interfaces to other CE devices in the home.

1.6.2 Telvent

Telvent - Exploitation of results; The broadband era will bring new business opportunities mainly driven by new media technologies and business concepts. Passepartout will contribute to the positioning of Telvent in this new personalised TV based service markets based on home media centers currently moving ahead from STB and PVR-DVD players.

1.6.3 Thomson

IP technology provides a solution for new video services to the consumer home such as TV over DSL, VoD ...However, they will be accepted by the consumers only if it the quality of the service is similar to their existing satellite or broadcast services.

This is even more important for contribution links where THOMSON professional customers will never accept any quality problems if they decide to use Internet links instead of loan ones; the price of the IP technology being the main advantage of this solution.

Considering that THOMSON is a provider of solutions for delivering content from the production to the final customer, it is obvious that Internet networks should be considered (including ADSL and contribution links). All the Passepartout studied technologies – WiMax, MPEG-4 AVC, MPEG-21 SVC, scalability from High-Definition to lower formats and from very high bit rate to mobile connectivity, ...– are of primary interest for THOMSON. This interest is

triple: first in new opportunities in technology and product development, second in the continuity of research lead and third in the strengthening of Intellectual Property.

The results concerning this project will be reused and their development continued in the framework of standardization activities (MPEG, ISMA and DVB-IPI), in collaborative project (IST, ITEA, MEDEA+, e.g. MediaNet) and in cooperation with the THOMSON Strategic Business Unit working on Video. The proposed solutions are also not limited to the new Wireless access network but can be easily extended for the existing common ADSL connections, guarantying the validity of these concepts.

1.6.4 Prowse Oy

Prowse (PRO) will investigate the functionalities and possibilities of the new technologies in related to e-learning and e-support type of applications. PRO will provide ITV application integration model for Learning Management System purposes.

1.6.5 CharToon

The animation technology of CharToon makes it possible to specify and control (i.e. personalize) a multilingual animation. The animation control can be connected both locally and globally to dialogue functions that drive an interaction. The animation player integrates with web technology, has a small footprint and will integrate/support a variety of existing standards, including SMIL, MPEG4, Flash and SVG. The technology thus provides innovative interactive functionality for e.g. ITV applications, web applications and device control interfaces.

For CharToon ITV is expected to be an important exploitation vehicle. Our technology offers content providers the packaging and personalization to match the cultural and linguistic needs of the states of the EU. Animations for applications and device control interfaces can be upgraded or personalized by dealers and consumers just as easy as ring tones of mobile phones can be personalized. This project will serve as a demonstrator for our technology based on which we expect to increase our operation on the market. For animation based content providers, manufacturers and web designers we will provide authoring tools, templates and training. For the consumer market we plan to offer adaptable animations and default repertoire to create/assemble homemade animations.

1.6.6 BCE RTL

As a major free to air broadcast in Europe the organization need to understand the development in CE technology and broadband network evolution are essential to provide "broadcast" type services to a future European market. Also the organization will provide into the process of terminal evolution and content personalization in the context of the PVR technology and standards.

1.6.7 Stoneroos

Stoneroos has identified two exploitation vehicles for the work done in this project.

First, Stoneroos agrees with Philips that the PVR using Blu-Ray will be a key consumer product in the near future. This PVR will use standards and technologies like MPEG7, MHP, SMIL2.0, HTML+TIME, Macromedia Flash and wireless devices. Stoneroos has developed authoring technology for interactive television. In the Passepartout project Stoneroos will participate in further developing this tool for the standards used on the PVR with Blu-Ray. Stoneroos will be able to exploit the authoring tool by promoting and selling it as the solution for providers who wish to bring content to the newly developed platform.

Second, in this project Stoneroos will also develop an application called "iFanzzy". This application will enable the user of the PVR with Blu-Ray and Blu-Is software to create a personal dynamic filter for incoming content. The huge amounts of incoming content via IP, DVB, Blu-Ray or wireless, will be organised into content that the viewer is interested in. Stoneroos will develop iFanzzy and make it available to both B2B and consumer markets. Exploitation can be done in the form of a licensing model for the hardware industry and a software retail models for consumers.

1.6.8 ETRI

ETRI is the Korean broadcast and Telecommunication Research Centre, and is world known for its role in innovation in multimedia technologies.

ETRI is one of the most active organizations in TV-Anytime Forum where it has recently contributed to TV-Anytime Phase-2 Content Packaging and Targeting. ETRI will disseminate the results, mainly related to Package, of the project in TV-Anytime Forum standards.

Publications or tutorials on the personalized broadcasting system will be presented in international conferences.

1.6.9 V2_

V2_ is a specialist in the research and development of early prototypes. With these prototypes V2_ is positioned at the start of the production chain. Partners and third parties take these products onto the market for commercial exploitation. The expectation with these marketed products is that part of the profit flows back into V2_. This will be the case with the results of the Passepartout project as the prototypes resulting from the project are proposed scenarios for the future of i-TV.

1.6.10 Cybercultus

Will exploit the creation of content using reactive media concepts for business applications with a strong cultural and education orientation. The company has an established position in the markets for this technology both with cultural center across the global and broadcasters.

1.7 Dissemination Plans per Partner

1.7.1 Philips

Philips will disseminate its results through the strength of the position of the company in the Blu-ray consortium, and the degree to which broad European-World standards (DVB and

W3C) for interactive content can be integrated into the standard. Of specific interest are historical investment in MHP-Java and DVB-GEM as common platforms for broadcast and optical storage interactivity. Similarly investments in home networking standards, Codecs (MPEG-4-SVC), and DRM systems must be actively defended.

Academic publication will also be supported by Philips and the Dutch consortium, which will use IEEE, IEE CE conferences and related telecommunications conference to disseminate the results to a wider audience. In addition, a tutorial or similar event at IEEE conference in 2006 is planned.

Investment in human capital will also be made using industrial student projects with academic institutes such as TuE Stan Akermans Institute as described in section 2.1.1. "Scenario Validate". This has the specific goal of dissemination to the local economy more knowledge of user interaction in object-oriented content to the emerging content industry.

1.7.2 Thomson

Thomson is one of the most active industrial in MPEG and DVB standardization groups where it proposes new technologies and algorithms. Earlier examples are MPEG-1 (including MP3), MPEG-2, MPEG-4 Part 2 and Part 10 (i.e. AVC, H.264). On-going studies are focused on MPEG-21 SVC where several algorithms are being compared. On this later example, dissemination of results will be done at ISO/MPEG standardization group level and applicable conferences will be considered, regarding the maturity of the technology.

Additionally, a publication or tutorial on video scalability will be presented during a least one international conference or working group (ISO/TC), especially in the domain of video and image (e.g. ICCE, CFP, ICIP).

Internal technology presentations will be made to the project partners to improve knowledge of this new video coding scheme, especially in the context of MPEG-21.

Concerning network aspects, THOMSON is also very active in DVB, especially in the groups concerning DVB-IPI version 2. Realistic context experiments using WiMax will show customers, public authorities and universities many new innovation in these technologies and their convergence.

1.7.3 CharToon

Beside publications aimed at commercial exploitation of our products CharToon will disseminate results by training design studios, application programmers and advanced consumers. CharToon will offer educational licences for selected academic partners. We will approach academic institutes to support student projects. Studies on innovative interface design based on our technology will be encouraged to be presented at appropriate conferences and published in journals to disseminate the results to a wider audience.

1.7.4 ETRI

ETRI as world renown broadcast and telecommunication institute has a leading role in many major standards activities in the world of multimedia including MPEG-21 and TV Anytime Forum.

1.7.5 Pre-wise

Prewise will utilise the project results in the development of a home/mobile version of its Learning Management System with the focus in new types interactive multimedia and broadcast delivery methods. Prewise will and build new media creation components and necessary interfaces from iTV producing software, Cardinal Studio, to the LMS. LMS will be developed to cope with the enhanced home user needs in both static and mobile uses.

In the wider perspective the results will help reaching the common objectives of information society development by enhanced education and training solutions.

1.7.6 Stoneroos

Stoneroos will disseminate its accomplishments in this project through its role as project leader and contact to the Dutch subsidiser (SenterNovem) in the Dutch Passepartout consortium. The academic partners in the Dutch consortium (TU/e and CWI) will spread the results of this project through publications in academic magazines and through presentations at IEEE, IEE CE conferences and related telecommunications conferences. The academic partners will also disseminate some results and accomplishments through Open Source initiatives.

Further, Stoneroos will demonstrate the newly developed products or demonstrators (authoring tool and iFanz) at conferences and trade fairs (like IBC, Milia or NAB).

1.7.7 CRP Henri Tudor

Proven record for publications on the ideas and concepts in multimedia technology, including the RAMO model.

1.7.8 INRIA / Loria

INRIA / Loria will disseminate its results through academic publications in several IEEE conferences and other related digital media and multilingual content handling symposia or conferences. INRIA / Loria will also continue to participate to standardization and normalization activities within ISO (International Organization for Standardization). In particular, ISO committee TC 37 (<http://tc37sc4.org/> - Terminologies and other language resources) and more specifically its sub-committee 3 (Computer applications in terminology) for the management of multilingual terminologies (ISO 16642: Terminological Markup Framework) and sub-committee 4 (language resource management) for the representation of linguistic.

Investment in human capital will also be made using PhD Thesis students projects with academic institutions as the University Henri Poincaré - Nancy 1, the University of Nancy 2 and the National Polytechnic Institute of Lorraine.

1.7.9 INT / Artemis

ARTEMIS actively contributes for five years to the MPEG (MPEG-4 and MPEG-7) (ISO/IEC/JTC1/SC29/WG11) standardisation process and has in charge the official French mandate at the CEN and SC29 level.vision-based natural interfaces and telecommunication services. In a close interaction with the MPEG-7 normalisation process, the *Indexation* project studies metadata.

1.7.10 Technical University Eindhoven

Expected results from the Passepartout project will be in the form of new knowledge and software (tools) & technology. As a university TU/e will share the responsibility for the dissemination and preservation of this knowledge. A main stream for dissemination is by means of papers, articles, dissertations etc. Student projects (short-term and long-term internships) will be assigned within the context of the project. Input for follow-up projects and new PhD positions will be created. Presentations to groups in the Faculty as well as externally interested groups will be given. Presentations at international forums will be also used as dissemination means for the research results.

1.7.11 CWI

CWI has a key role in open standards under W3C for SMIL, and related technical developments in web service based multimedia standards.

1.7.12 Pre-wise

Prewise will develop content oriented solutions and systems for one of the most potential end-uses of the new networked multimedia technology –e-learning. So the Prewise program results will be distributed to the larger audiences by pilot end-user e-learning applications for home and mobile use. This distribution is intended to carry out with the major broadcasters, mainly YLE in Finland. The results are also communicated at industry boards and seminars as well as in white papers.

1.7.13 V2_

V2_, Institute for the Unstable Media undertakes research, organizes presentations and supports artists and organizations. The research takes place in the field of the development of innovative tools, and the development of prototypes and applications in the field of media technology. It focuses on 3 main areas of expertise:

- Interaction
- Interfaces and
- Data organisation.

Within these areas the focus has been on sensors, wearable and mobile user interfaces, biofeedback and enhanced reality technologies. Besides V2_ is an expert in the use of Open Source software

1.7.14 IRUTIC (Gradient)

IRUTIC will perform a prospective investigation on temporal forecasts for substitution phenomena (trends & evolutions). Some scenarios on strategies of roles and key actors (industrials, regulation etc) and evolutions of regulations at EU and national level in accordance with "Video over IP" in European markets will be investigated.

1.7.15 Universidad Politécnica de Madrid

Exploitation at UPM will be mainly performed in terms of dissemination following these activities:

- National and international projects. The PASSEPARTOUT intermediate and final results will be used by the same team in the execution of other projects at the national or European scope; among these projects the following can be cited PROLEARN (NOE-IST), ENEXT (NOE-IST), OSMOSE (ITEA), OSIRIS (ITEA), COSI (ITEA), PAFET4 (PROFIT-SPAIN).

- Postgraduate courses in the Master for Services and Networks Programmes where PASSEPARTOUT results and activities will be presented to students, most of which are professionals in the Spanish IT sector.
- Master Thesis and PhD: at least one PhD thesis and four Master Thesis about PASSEPARTOUT topics will be delivered during the project lifespan.
- Graduate course about Software Engineering in Telecommunications degree will include specific topics dealing with evolution and maintenance of software, where PASSEPARTOUT results will be presented.
- Publications: at least five publications in international workshops, congresses and journals will be tried in the project lifespan.

1.7.16 Universidad de Vigo

Exploitation at UVIGO will be mainly performed in terms of dissemination following these activities:

- National projects. The PASSEPARTOUT intermediate and final results will be used by the same team in the execution of the AVATAR project (Spanish National R+D Plan).
- Postgraduate courses where PASSEPARTOUT results and activities will be presented to students.
- Master Thesis and PhD: at least one PhD thesis and ten Master Thesis about PASSEPARTOUT topics will be delivered during the project lifespan.
- Graduate course about Software Engineering in the Telematics specialization of the graduate course will include specific topics dealing with evolution and maintenance of software where PASSEPARTOUT results will be presented.
- Publications: at least five publications in international workshops, conferences and journals will be tried in the project lifespan.

1.7.17 Other Partners dissemination plans

Other partners will participate in project wide plans for dissemination at workshops, through publications, other events i.e. trade-shows or through related projects in IST, MEDEA+ or ITEA.

1.7.18 Open Source

Open source initiatives will be used to gain access to technology such as MHP and PVR technology for application and middleware, but will also be used to propagate interest in advanced media research in Europe in the open source communities. Specific Linux based platforms will be used for the common reference platforms, and where possible locally driven European open source development such as GPAC for MPEG-4, and Objectweb for OSGi will have preference.

Impact on Europe employment

Paid and advertising-supported media generate over 800,000 jobs spread over EU, i.e. in the creation and distribution of media for DVD, DVB, and IP based networks. These functions are highly portable, and could be transferred around the world to be serviced by IP and Satellite infrastructures. Only by being at the leading edge of media technology in terms of advanced

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AV Codecs, DRM systems and interactivity can these jobs, from high creativity content creation to Video-rental outlets, be guaranteed to remain in the EU.

Manifold Technology Program Involvement

Partners of the consortium are intensively involved in ITEA and will exploit the results from Jules Verne, and Magellan, in this project. Similarly the partners will be exploit the results from IST projects such as Olga, Medianet, Icecream and Sambits in WP1 of the project. There is also a broad coupling to the MEDEA+ programme, in application projects such a Pocket Multimedia, Fust, Blaze, and Planets.

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2 Consortium overview

To address the goals of the project a large consortium has been gathered from various leading Europe countries in digital TV and PC multimedia technology plus an advanced broadcast research centre from Korea. Our intention to maximize the potential of the consortium to implement and demonstrate its technological contribution to roadmap of unified ICT program of ITEA. Within the consortium, partners are present to carry through the technology roadmaps of ITEA and MEDEA+ into standardization and production phases during and after the project. For middleware exploitation the Ecosystem-approach recently widely adopted by large CE and semiconductor companies will be employed which allows open innovations with partners of all types. In the case of this project the transition from the first generation digital media technologies such as MPEG-2, and MHP to the second-generation technologies such as MPEG-4/-7 will be carefully sheperded in verification scenarios that will cover most of the end-to-end issues for an advanced distribution AV network. Open source applications and middleware components will be employed were appropriate by the partners and compatible with IPR interests of the consortium's partners in an open innovation scheme.

Several large industrial partners in the consortium provide the capability to eventually productize the results of the project as consumer products and services for Europe. Particularly strong is the interest of the market driven terminal providers to move beyond classical products to home networks that balance the rights of the copyright owners, and the users. Content creation industry interests are also present as SME companies working in countries with the strongest commitment to advanced digital TV deployment to address the content creation and tooling. These will provide the consortium to these industries which are expected to exhibit enormous growth as the HDTV technology is deployed and the channel broadcast models are replaced by PVRs using object oriented content distribution networks.

After the strong comments from the ITEA reviewers in the PO phase on the consortium proposals, a number of radical measures have been taken to re-structure the project by both including new partners, and by better focus on the original partners. New partners to the project include the addition of four new partners to the project from The Netherlands, the addition of partners to the Finnish, French and Spanish sub-consortia. Philips has focused its contribution to the project to pure middleware and application issues, i.e. removed the semiconductor architecture issues, and will create links to MEDEA+ projects (Blaze and Hades) to provide the coupling to semiconductor architecture issues of future chip-sets for PVR and digital TVs. At the same time, the focus of the project on optical-storage (Blu-ray) strong has been made clear, which is expected to the dominant HD content platform for most European markets in this decade. For Philips; Blaze and Passepartout are thus twin projects addressing the low and high-level issues of this technology.

The new Dutch sub-consortium is strongly represented by SMEs and institutes with a broad interest in open standards (W3C) and the implementation of Ambient Intelligence. CWI bring with it a significant contribution to the development of SMIL 2.0 (Synchronised Multimedia Integration Language). This is a W3C standard used in Real player, Quicktime and Explorer media products. Addition of SMIL will allow the consortium to explore the personalization of

the presentation of multi-source media streams in a fashion that has not been possible to exploited neither by MPEG-4 nor MPEG-7. The other new partners address directly the comments of the reviewers on the whole consortium's weaknesses, and match the French and Luxemburg sub-consortia contributions

Finally, Philips and Thomson have addressed the issue of interest of the broadcast industry in advanced multimedia technology. In Europe it has proven to be difficult to interest the appropriate set of partners to an ITEA project. Much interesting work in the area is performed in large-scale integrated projects under EU funding FP5 and FP6 projects, such as Sambits, Icecream and Medianet. Thus to bring in a significant partner, (outside national broadcasters i.e. BBC, NOS, ZDF or similar) it has been necessary to turn to Korea. The consortium is thus proud to invite ETRI the Korea broadcast and telecommunication research center to the project. ETRI is a unique its contributions to standards in the area of MPEG-4 and MPEG-7, as well as it support the TV-Anytime standard and forum, and specifically for the development of packaging in phase 2, of that forum's activities.

List of Passepartout partners and the abbreviations as will be used in this project is included:

Companies

Philips Digital System Labs (NL)	PD-E
Telvent (EP)	TEL
Thomson R&D (FR)	TM

SMEs

Cybercultus(Lux)	Cyb
BCE(Lux)	BCE
Prewrite Oy.(Fin)	PRO
Chartoon (NL)	Epi
Stoneroots (NL)	Str

Institute

ETRI (Kor)	ETRI
CRP Henri Tudor (Lux)	CRP-HT
INRIA / Loria (FR)	INRL
INT / Artemis(FR)	Art
Technical University Eindhoven (NL)	TuE
Centrum for WI (NL)	CWI
V2_ (NL)	V2_
IRUTIC (FR)	IRU
Universidad Politécnica de Madrid (EP)	UPM
Universidad de Vigo (EP)	UVIGO

The project partners are classified into five clusters; the clusters are supposed to indicate the general contributions to the project goals:

- Technologies
- Content modelling
- Content authoring
- Services
- Content creation

These are shown in Figure 8 as the interactions that will drive the partners between the WPs based on the force or clusters driving the industry as described in Figure 1.

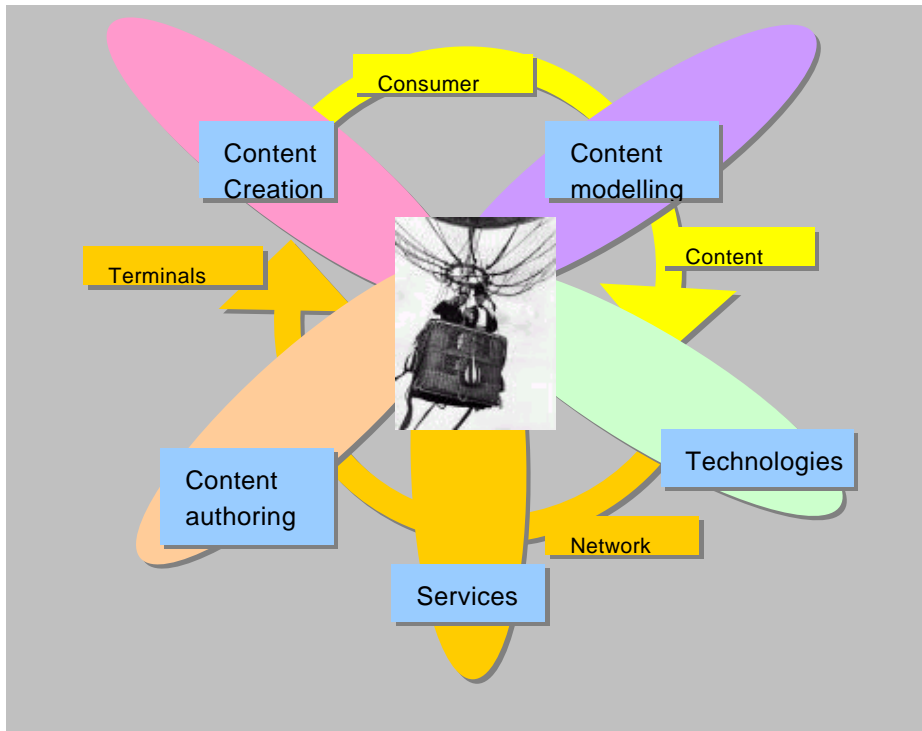


Figure 8: Relationship between Project technology clusters and Market influences of Figure 1

The project will work according to the principles of a classical Waterfall model: with project definition, implementation, and integration phases. All partners must contribute to the definition phase in a set of common deliverables. These deliverables are initially structured by the defined task leaders. During the implementation phase the partners will split into small groups with a tight focus on an agreed technical issue with task leader to monitor the results of the activities and to deal with any contingency issues (partner loss, disagreements, etc). WP leaders (WP2 and WP3) are expected to monitor the progress of tasks during this phase and accommodate for any changes that rise during the course of the tasks. WP 2 and 3 are to be monitored by WP1 leader for consistency to the originally defined goals, and relevance to emerging standards. In the second half of the first year the WP4 leader must start the process

of planning the demonstration activities and evaluation synergy between WP2 and 3 results on the basis of the project scenario. This project scenario is outlined in the FPP of the project. WP4 leader will employ the scenario, and its refinements to steer the results of WP2 and WP3 to form the common demonstrator, which clearly shows the value of broader co-operation between the partners in the project. WP4 leader must also validate the suitability of the reference platforms provided by Thomson and Philips for the networks and terminals. The project leader is expected to co-ordinate the actions of the WP leaders, and to use the scenario to provide a vision to all participants in the project and communicate this vision to ITEA and the reviewers.

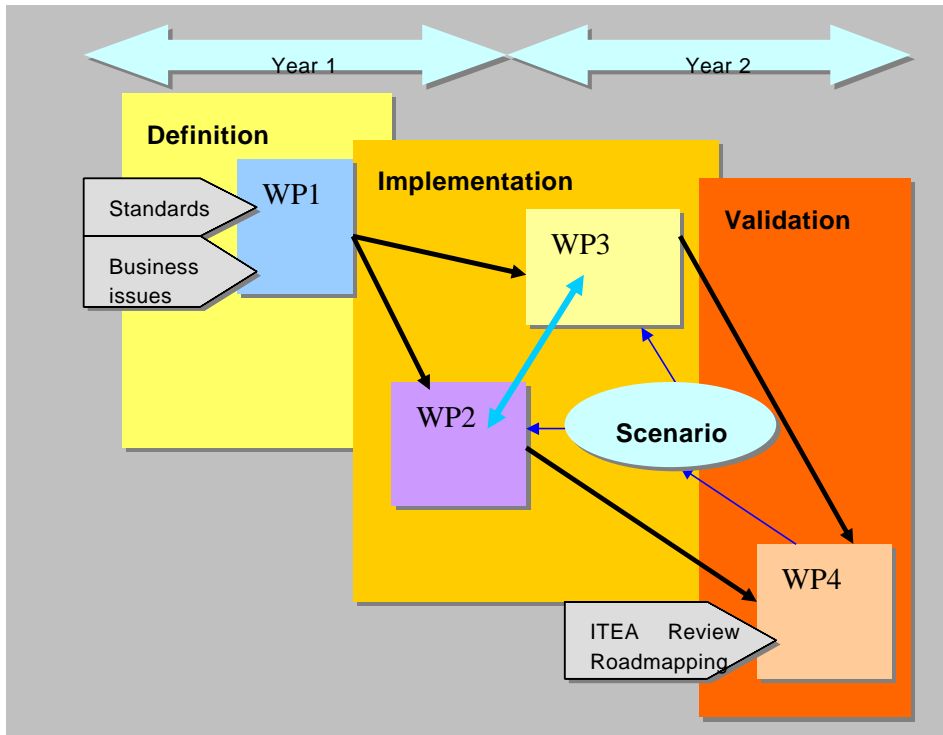


Figure 9: Phasing of WPs in Waterfall model

WP4 is also expected to ensure that the demonstrators are on-time and suited to the purposes of showing the progress of the project to reviewers and to support the ITEA programme and roadmaps as necessary, i.e. ITEA symposium and major technical events such as IBC, IEEE conferences and standards meetings.

A diagram of the interactions between the WP and the scenario is shown in Figure 9.

2.1.1 Scenario: Maxima

Project leader and WP leaders will stimulate a common vision of the issues the project is trying to address using the scenario. Initially it will not be a detailed scenario using use-cases, but the uses cases of the project in the WPs will be derived from the scenario. The scenario will also be used to communicate complex marketing issues to the technical staff, and to show the importance of solving the user interaction problems of personalizing reactive and interactive content.

The scenario itself is as follows:

Context of the scenario

The scenario is set in a family home in the EU in 2010. The family is assumed to be financially well off, but living in a region outside their original parental background. Thus while they wish for the children to integrate with the local community and live and learn from their neighbours, they also value their heritage; linguistic, cultural and religious, to effectively communicate to distant family and friends. The mother is particularly determined that the children (including disabled) should be effectively multi-lingual and multi-cultural, and will invest her time to adapt content where possible to the needs of the children. The mother is thus a teacher as well as a director of the children's multimedia fare. She also maintains strong views on the suitability of content from non-EU sources, understanding both the strengths and weaknesses of these sources. She also understands the need to transfer her skills for control of media objects to her children, and to be proactive in the use of communication tools (P2P networks and Weblogs) to friends and family.

Players in scenario

- Family: Mother and three children of different ages: pre-school, (deaf) school going child, early teenager.
- Local School: Providing content from a national curriculum in TVA packages
- Local religion network: P2P network using locally maintained servers and web sites
- National multimedia P2P network: National FTA broadcaster using P2P and broadcast suited to PVR
- Pan European: Premium Content provider for HDTV using BD and DVB-S

Network of the Scenario

The network scenario assumes the following

- Home network: Hyper-modern home network with terminals using wired and wireless standards
- Access network: WiMax and HD broadcast with Blu-ray disk
- Distribution Network: Classical broadcast and video rental, VOD for NetPVR, P2P (BBC IMP model or similar)

Scenario Validation

To independently judge the issues of user interaction and to stimulate the progress towards Ambient Intelligence, a plan will be made to couple a corps of students from the “Master of Technological Design” course at the TUE in Eindhoven, and similar programmes at other institutes in the EU. This corps of research students will be placed with the partners to be employed in the first and second years of the project to aid create a consistent vision of the scenario, and to validate the implementation as a design concept for user interaction. This concept is based on experience from the Jules Verne and Nomadic Media projects, which have found this approach to validation useful. As partner V2_ is expected to play a key role in the stimulation of innovation in user interaction in a connected home. This role will develop during the course of the project.

2.1.2 Architecture of the project

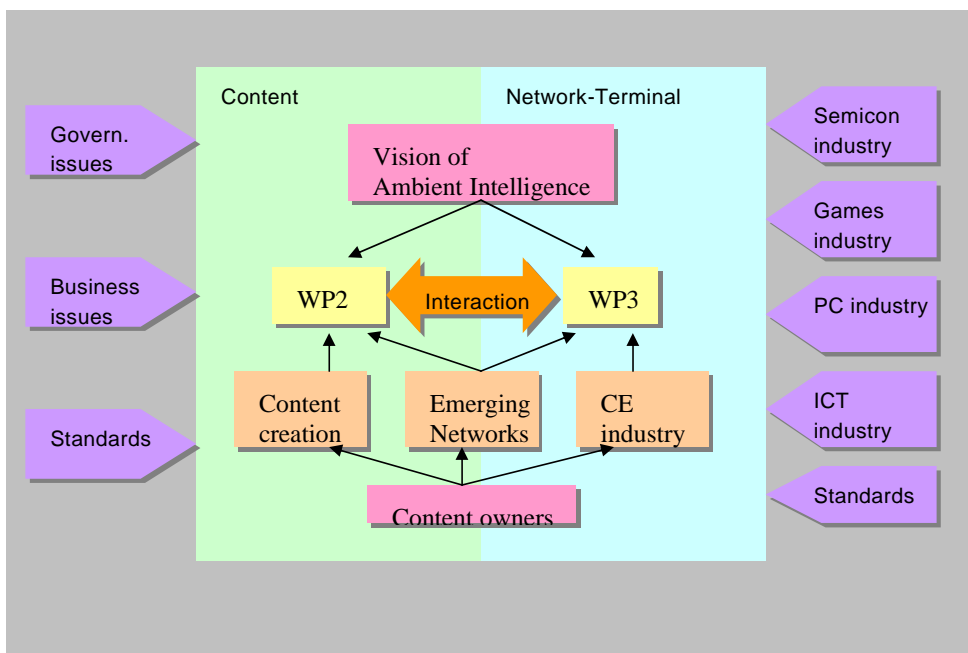


Figure 10: External and Internal Interactions and Influence on WP2 and WP3

As shown in figure 10, there is a clearly defined relationship between the WPs of the project based on the time driven waterfall development model. However, this does not defined the architecture of the technical relationships between the project components of the final products and services for object oriented multimedia production and distributions.

Figure 10 attempts to view the project architecture from the perspective of the technical business and governmental issues driving this project in the industry. As shown in figure 1,

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the entertainment industry is moving from a rigid structure for the creation, adaptation and distribution of content to more flexible forms. These would allow the consumer to have adapted for them many more aspects of channels/content to their personal taste, i.e. ambient intelligence. Ambient intelligence is being promoted in Europe as an essential goal for the ICT, and semiconductor industries. In the scenario we have chosen to make the adaptation of content the responsibility of the Mother, that is to say a new agent for adaptation has been introduced for the viewers, i.e. the children. Obvious allowing all aspects of content to be adapted is not viable, and the project focuses on a subset, these include the scalability (media), accessibility (e.g. deaf child), packaging (channel), and localization (linguistic), and a number of other aspects that fit with the scenario. WP2 is to show what is practical for content makers to devise in terms of adaptable content using object-oriented multi-media standards, and WP3 to demonstrate what networks and terminals can support and generate in terms of media. This is the essential interaction between the two core WPs of the project.

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3 Full description of work

The project has been sub-divided into five work pages:

- WP1: Standards Technologies and Innovations (Thomson R&D) Michel Kerdranvat
- WP2: Content & Tools (Artemis) Prof. F. Preteux
- WP3: Networks and Platforms (Philips) Rop Pulles
- WP4: Integrating the final demonstrator (Telvent) **Jesús González**
- WP5: Project Management (Philips) Keith Baker

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3.1 Project duration (start, end)

Start	01.01.2005
End	31.03.2007

3.2 Work Package 1

Work Package 1: Standards Technologies and Innovation	
WP1 start date: Q1, 1 st January 2005 WP1 end date: Q9, 31 st March 2007	
Description: This work package aims at offering visibility and consistency to the work to be realized during the project as a whole. Visibility includes definition of the work defined as background in order to set up a standard baseline for all partners. This baseline includes <i>State of the Art</i> in technologies but also those innovations necessary to answer problems addressed by the project. This baseline also covers large domains like interactivity, content creation, scalability, architecture or video coding and streaming. Given that the need for consistency is self-evident, this work package is structured to offer a coherent workflow for both its activities but also for the following work packages up to the final demonstrator, as shown in figure 9. Activity 1.1 will form a common understanding of standards technologies for activity 1.3 and will be further refined through the analysis in WP1.2. Clarity will be ensured by usage of appropriate standards, like usage of UML (Unified Modelling Language) diagrams and Object-Oriented representations, when applicable. Activity WP1.1 – Standards Technologies This activity is composed of three sub-activities, which are closely linked together, considering standards technologies and innovation pushed by the project. First deliverable will describe the State of the Art of existing and upcoming technologies for networks, storage, compression and platforms, including capabilities, resources available, etc. Assumptions based on market experience and speculative forecasts will be the base for the definition of a technology roadmap, which will help partners to have visibility and share it with their potential clients. Second deliverable will cover evolution of existing Object-Oriented architectures to scalable features, including networks, and platforms components, such as decoders. Such platforms aim at offering more possibilities to both content creators and home-networks environments, specifically for High-Definition scalable contents over IP networks. Third deliverable will describe all standards contributions done during the project. This will cover MPEG-21 SVC, MPEG-4/-7, multilingual and XML technologies (e.g. SMIL, XMT). Evolution of DVB, Pro-MPEG, TV-Anytime (phase 2), ISMA specifications (e.g. DVB-IP1 v.2 and ISMA v.2) and content storages (e.g. PVR, Blu-ray) will be investigated and communicated. Activity responsible: D1.1a → Mr. Alan Macduff (Philips, Netherlands) D1.1b → Mr. Michel Kerdranvat (THOMSON R&D, France) D1.1c → Mr. Mary-Luc Champel (THOMSON R&D, France) Contributions: ETRI will contribute to the metadata technology based on specification of TV-Anytime Forum, and participate to standardization process of TV-Anytime Forum. (D1.1a, D1.1c) THOMSON R&D will contribute to the definition of the roadmap, technologies SoA and framework, as well as the standardization bodies. THOMSON will also participate actively to DVB, ISO and Pro-MPEG working groups. Philips: The development of authoring software to create disc images and verification software to check for compliance to specifications Creation of a demonstration platform for both advanced movie playback and Java applications, and sample applications for this. Validating and editing the interactive (JAVA) standard and creation of such elements as are compatible with the needs of the product for the European markets INRIA will specify multilingual Concept and terminology in the framework of	

ISO/IEC standardization, and define the multilingual Units: their metadata representation and object placing will follow all proposed specifications.

ARTEMIS contributions will concern the ISO/MPEG specifications. ARTEMIS will actively participate to the ISO/WG11 standardization activities, within the framework of the MPEG-4, MPEG-7 and MPEG-21 standards.

CWI will contribute to a general survey of the use of SMIL in iTV environments and to the applicability of SMIL to cross-platform devices in the wireless home network demonstrator.

BCE will deliver input based on the RTLGroup White Paper Digital Video File Recommendations and by providing feedback from the HD forum.

UPM will contribute with an overview of OSGi and how to use it to provide the execution environment to support interactivity and personalisation (D1.1a and D1.1.b).

Activity WP1.2 – Content Adaptation Techniques

Scalable content is a main subject of the project as adaptation techniques are essential and even mandatory for fully personalized content visualization. Moreover, the appropriate Quality of Service must be offered for complete adoption of the concepts by the end-users. This activity aims at offering the state of the art in content (self-)adaptation for the following domains:

- AV medias,
- Graphics (2D/3D),
- Interactivity
- Languages.

Concepts like scalable coding (MPEG-7/-21/SVC), level-of-details, regions-of-interest or use of metadata will be part of the scope for developing the EOPE (Scalable Edit Once Play Everywhere) concept. An EOPE framework will then be described in this deliverable and algorithms/tools to be developed during the following work packages will be defined. Profiling techniques, enabling content adaptation based on user visual emotions/choices, will be introduced for the purposes of validation.

The results from other projects will be taken into account in order to be able to compare performance and provide requirements for WP2. Similarly the pros and cons of existing solutions in the domain of Quality of service (QoS) for networks, storage and services (e.g. video streaming) will be considered.

The deliverable of this activity will be a report surveying content adaptation techniques, both at the application level and as a semi-transparent component within the infrastructure.

Activity responsible: Mr. Dick Bulterman (CWI, Netherlands)

Contributions: THOMSON R&D will contribute to the scalable contents SoA, specifically in the domain of video compression, as well as in the definition of the EOPE concept and metrics for future measurements of QoS performances.

CWI will contribute to the survey of architectural solutions for mapping content across multiple devices.

Philips will contribute to the application level, network and terminal level issues of content adaptation in the concept of PVR and smart TV systems.

INRIA will contribute to the State of the Art in content adaptation for

Multilingual contents and Terminology and describe work in progress in the different standardization groups.

TU/e contributes to the content adaptation, in particular in the field of content modelling, specification techniques for content adaptation and the associated navigation adaptation.

CRP Henri Tudor will contribute to content metadata description in relation to the RAMO model, [within the context of interactive and adaptive multimedia applications](#).

Cybercultus will provide the concepts for a visual user profiling technique, focused on content adaptation applied to ECG (Electronic Content Guide).

CharToon will contribute to adaptation techniques for multilingual animations. The focus is on personification of content by providing parameterization of XML based animations to adapt both visual and behavioural aspects.

ARTEMIS contributions will concern scalability for AV, 2D/3D graphical and interactive content, based on the MPEG-4 AFX (Animation Framework eXtension) and MPEG-21 specifications.

Activity WP1.3 – Scenarios and Creation Tools

This activity is separated in two sub-activities, which are linked due to their relation with content modelling and creation.

First deliverable will focus on definition of High Definition content in the project scenario. Sub-scenarios will introduce multilingual aspects as defined in the specifications. Those sub-scenarios will also show full potential of scalable interactive AV content, in terms of personalized display and interactivity. Business Models investigation and market analysis, such as analysis of the video market, its tendencies, usages and consumption modes, will be achieved in order to validate those scenarios. The analysis will provide a particular emphasis on successful business experiences with iTV services in order to better understand the underlying “winning factors” for consumer acceptance.

Second deliverable will focus on the definition of content creation tools capable of securing the conception and production of scalable / adaptable / personalised content, of content intelligence processing structures, and of multilingual metadata representations. A particular emphasis will be on the means to support and integrate standards content technologies such as “XMT/XSLT (MPEG-4), SMIL/XML based (MPEG-7), SVC (MPEG-21)” following the appropriate recommendations from WP1.1.

Enabling EOPE concept and intelligent / multilingual user personalisation taking into account both device characteristics and the presentation environment will be the main purpose of the activity. A [cross-platform adaptation layer](#) will be specified in order to validate the EOPE and personalisation concept.

Activity responsible: D1.3a → Mr. Patrick Blandin (CRP-HT, Luxembourg)
D1.3b → Mr. Patrick Blandin (CRP-HT, Luxembourg)

Contributions: ETRI will contribute to the definition of scenarios for generating content that can be consumed in personalized way, based on package concept in TV-Anytime Forum and the requirements and specifications for authoring tool of metadata and package.

IRUTIC will analyse the actual video market, its tendencies, the usages and consumption modes and investigate the clauses for (complete or partial) substitution of this market in the advantage of “Video over IP”.

THOMSON R&D will contribute to the definition of scalable interactive scenarios, including the professional areas, as well as to the requirements

and specifications for scalable video content creation tools.

Philips will contribute to the definition of the PVR in the scenario for adaptive concept using MPEG4 and TV Anytime forum technology based on the Blu-ray technologies applicable to European media business models

Saint Thomas Prod. will participate by giving original ideas of iTV scenarios. Interactive TV content creation will be based upon generic scripts such as games, vote and sport betting.

INRIA will define HD content scenarios, introducing Multilingual aspects, showing potential of AV possibilities in terms of display and interactivity. It will also define requirements and specifications of creation tools.

TU/e contributes to the definition of the scenarios, specifically in the domain of the personalization of the display and the interactivity (e.g. the navigation), and to the identification of requirements and specification for the content modelling in the creation tools.

Telvent and UPM will contribute to the definition of scenarios for generating highly personalized content that could integrate IP content (e.g. MPEG4), locally stored content (e.g. PVR), locally generated (e.g. SMIL), advanced XML-based (e.g. XUL, WHAT) information and interactive content and applications (e.g. MHP). This will include the definition of the demonstrator architecture and scenario.

UVIGO will contribute to the specification of scenarios involving t-learning activities, with strong emphasis on the differences with the traditional e-learning based on Internet connected computers. In addition, UVIGO will also participate in the definition of scenarios for exploring automated content recommendation techniques and user profiling. In addition, UVIGO will investigate a new structure and dynamics for t-learning courses, more adequate to the specifics of the broadcast environment, including the specification of different mechanisms to synchronize the multiple contents involved in the learning experience. This will include the specification of a tool to support designers in the task of designing and creating T-learning courses. This tool will free the course designer from most of the routine tasks, automating the creation of the active entities.

CRP Henri Tudor will define a scenario illustrating content personalization in the context of interactive and adaptive multimedia applications, targeting more particularly ECG (Electronic Content Guide). It will also introduce personalization principles and technologies for the creation of personalized RAMO-based multimedia applications exploiting semantic profiles, thus providing input for advanced authoring tools exploiting RAMO and Semantic Web technologies.

BCE will deliver input based on the RTLGroup White Paper Digital Video File Recommendations, targeting particularly the realization of the scenario proposed by CRP Henri Tudor. Additionally, BCE will contribute in the area of specification for digital video file exchange in order to streamline processes and giving input for the development of web-tools which should simplify planning, researching, logging and editing for production staff.

Cybercultus will define a scenario for visual user profiling in adaptive ECG. This scenario will complement and integrate the scenario defined by Centre Henri Tudor.

CharToon will contribute to the definition of scenarios for interactive animations that can be presented in a personalized way and on authoring

tools for modelling and creation of these adaptive multilingual animations.

ARTEMIS will contribute to the specification of scenarios for personalized video consumption, based on MPEG-7 and MPEG-21 terminal/user adaptation and profiling tools. ARTEMIS will also contribute to the definition of interactive scenarios making use of synthetic data (2D/3D graphics objects), as well as to the SoA report, requirements and specifications for scalable graphics content creation tools.

CWI will contribute to the definition of scalable interactive scenarios, concentrating on the integration of automatically generated and hand-authored content augmentation tools.

Targets:	Date	Type of deliverable	Description
	Q2	Report	Deliverable D1.1a: Technology Roadmap
	Q2	Report	Deliverable D1.1b: HD/IP Technology Framework
	Q8	Report	Deliverable D1.1c: Standards Contributions
	Q3	Report	Deliverable D1.2: Content Adaptation Techniques
	Q3	Report	Deliverable D1.3a: Scenarios
	Q3	Report	Deliverable D1.3b: Creation Tools
WP1 Leader: Michel Kerdranvat,, THOMSON R&D			

WP1 partners	Country
Philips Digital System Labs	Netherlands
Telvent	Spain
Thomson R&D	France
Prewrite Oy	Finland
BCE (RTL group)	Luxembourg
Cybercultus	Luxembourg
CharToon	Netherlands
Stoneroos	Netherlands
ETRI	Korea
CRP Henri Tudor	Luxembourg
INRIA / Loria	France
INT / ARTEMIS	France
Technical University Eindhoven	Netherlands
CWI	Netherlands
V2_	Netherlands
IRUTIC	France
UPM	Spain
UVIGO	Spain

3.3 Work Package 2

Work Package 2: Content & Tools
WP2 start date: Q3, 1 st July 2005 WP2 end date: Q8, 31 th December 2007
Description: <p>As shown in figures 8, 9 and 10 WP2 will have a clear content applicative focus. The aim is to conceive and develop concrete content libraries and authoring tools, for scalable media with advanced TV interaction capabilities. In order to respond to the EOPM (<i>Edit Once Publish Many</i>) paradigm, a central role within WP2 will concern the elaboration of appropriate content adaptation capabilities for dis-aggregated content distribution, i.e. TV-Anytime. Thus making it possible to achieve interoperable transparent access to advanced, distributed and interactive multimedia content by shielding users from network and terminal installation, management and implementation issues, while fully assuring the agreed/contracted quality, reliability and flexibility.</p> <p>More specifically, the concept of content adaptation will be advanced through three major areas, related to:</p> <ul style="list-style-type: none">- <i>Content scalability</i>, involving the elaboration of scalable video coding tools, integrating within the same stream and in a flexible/reusable manner multiple levels of detail of the same content, which might correspond to several network, terminal and user profiles,- <i>Network and terminal adaptation</i>, requiring the specification and integration of appropriate terminal and network-related descriptors and descriptions schemes related to encoding/decoding capabilities, device and display properties, power and storage characteristics, quality of service...- <i>User profile specification</i>, with the elaboration and development of both user and content-related description schemes. Such tools will consider several criteria such as user's age, rights, preferences, level of comprehension, program/presentation preferences, or length, complexity and characteristic of the program (multilingual aspects, language preferences... oriented to disabilities / restricted accessibility). <p>The results of WP2 developments will be used in WP4 for demonstrating the content adaptability feature within the framework of a real-life application as defined in the scenario on a home network using Blu-ray and WiMax access networks</p>

Activity WP2.1 –Adaptation engine

Activity leader: INT-ARTEMIS

WP2.1 will develop core technologies for content adaptation. Firstly as adaptive content packages, which will be, represented appropriately using efficient high compression distribution standards i.e. MPEG-4 scheme to a media-center. Secondly, (*i.e.* when using SMIL), specific adaptation scheme will be developed and smoothly integrated within the Passepartout framework for network based adaptation.

The activity will be organised following the media type: scalable representation and compression tools will be developed for video, audio, 2D and 3D graphics. An integrated approach will allow addressing common adaptation requirements such as user/terminal/network profiles.

Scalable compression schemas will be developed for elementary media. The video representation will accommodate for the ongoing SVC (Scalable Video Coding) standardization process within the MPEG-4 standard. The graphics exploits elements defined by MPEG-4 Part 16 (Animation Framework eXtension) or SVG recommendations provided by W3C.

Creating complex content requires combining elementary streams and attaching attributes and temporal behaviour. MPEG-4 content will be created either by conversion from existent multimedia (e.g. Flash content by Macromedia, Scalable Vector Graphics - SVG by W3C) or directly authoring MPEG-4 content. The first approach will be covered by the development of conversion tools. While the second will refer to a complete framework of MPEG-4 Authoring Tools (AT) together with a higher level ATs based on the RAMO¹ concept introduced and implemented within the Jules Verne Project. All these new developments will be integrated within the platform⁽²⁾ provided as a reusable result of the Jules Verne project for RAMPEG linguistic adaptation.

In addition, advancing beyond the initial concepts defined within the Jules Verne project, partners will make a clear attempt to provide content development flows that allow for linguistic adaptation that match the needs of European TV/media economies. Using the framework of XMT, and XIFF the flows for this type of reactivity will be defined. Where possible, the advanced capabilities of this multilingual concept will be prototyped using SMIL 2 based tools and flows. Linguistic adaptation will provide the overall principles for content semantic adaptation in this project vision and scenario for future family usage.

An integrated MPEG-4 player (able to decode scenes, elementary streams and to interpret java code) will be developed in order to visualize and browse MPEG-4 complex content.

The player will be integrated and used within the WP4 demonstrator for visualizing complex MPEG-4 contents.

Contributors:

THOMSON R&D will develop a Scalable Video Coding (MPEG-4 SVC) encoder and a MPEG-4 AVC (H.264) adaptive codec. Additionally, THOMSON will contribute actively to JVT (Joint Video Team) for standardization of MPEG-4 SVC, including the definition and refinement of their profiles.

ARTEMIS will develop and integrate MPEG-4 scalable compression schema for elementary content: video and 2D/3D graphics as well as the MPEG-4 AT and the MPEG-4 player.

CRP Henri Tudor will focus on the definition and development of adaptation and presentation techniques for RAMO-based multimedia applications targeting more particularly the needs for the scenarios proposed in WP1.3.

Adaptation of objects composting the dynamic RAMO scenes and applications, in relation to user and content semantic profiles will be addressed.

Cybercultus will define and develop tools related to visual user profiling for an ECG application domain: visual representation of content choices based on relevant algorithms, user selections capture and processing, profiles generation.

BCE will deliver input on what metadata are required in order to classify content, based on what is used at BCE. Content security aspects will also be investigated.

TU/e and CWI will provide specific techniques for (1) achieving adaptive behaviors of assistant and recommenders programs, with support of interactive/rapid user modeling based on semantic Web functionality, and (2) adapting the distribution of the content to the available devices based on user preferences. CWI will also contribute to the development of an authoring tool for content augmentation.

LORIA / INRIA Lorraine will focus on the definition, specification and use of a high-level generic mechanism for representing and dealing with multilingual content within authoring tools.

The Stoneroos OpenTV authoring tool currently is used by Dutch TV producers to adapt new content in a broadcast environment. It proved to be a very easy tool, based on the "What You See is What You Get" principle. Stoneroos will elaborate further on this authoring tool to facilitate it within the Maxima scenario in order to allow the Mass customization box owners to add various information to the broadcast content and to share it also within their own peer group(s).

Activity WP2.2 – Content Production, Augmentation and Sharing

Activity leader: CWI

This activity will investigate models and methods for manipulating content, both inside and outside of the physical media center as server. The central focus will be on integrating the needs of the project scenario definition in WP-1.3a and developing implementation prototypes that demonstrate how users can restrict or augment content provided over broadcast and interactive streams.

The technologies surveyed in WP-1.3b and the content adaptation techniques surveyed in WP-1.2 will be used (and extended in WP2.1, if necessary) to develop two demonstrators sets. The first demonstrator set will show how multiple viewers of a common broadcast program can use personal devices to individually request restructured presentations related to the program and share them with each other. The second demonstrator will show how individual users can take (protected) broadcast content and either extend it locally by associating new content containing text, audio or stroke animations, or restrict content by imposing (virtual) edit changes.

The activity will focus on the sharing of content on multiple classes of devices and multiple types of interaction tools, such as intelligent and 'dumb' portable devices that can be used while viewing to augment content and conventional desktop devices that could be use in on-line and off-line adaptation and sharing scenarios.

The deliverables of this activity will be two demonstrators sets implemented on top of a prototype home network environment.

Activity responsible: D2.2a Mr. Franck Nack (CWI)
D2.2b Mr. Dick Bulterman (CWI)

Contributions:

CWI will investigate the development of automated content authoring for selecting portions of broadcast content based on user preferences stored in a PVR and sensor-based interaction. CWI will also investigate the development of content augmentation authoring tools for manual editing of content extensions of broadcast and interactive content.

THOMSON will provide the wireless infrastructure in order to enable the management of scalable video in the Media Center.. Therefore enhanced contents can be streamed over IP in a wireless "TV over DSL"-like context, offering more than simple broadcast functionality.

CharToon will provide the animation technology integration to create, adapt and present scalable XML-based (SMIL and SVG) multilingual animation.

INT/ARTEMIS will support the integration of the adaptation engine from WP2.1 when heterogeneous terminals are involved.

LORIA/INRIA Lorraine will investigate, within the framework of content augmentation tools, how to deal with multilingual content.

Stoneroos will develop a viewer tool that displays the personalized content. A presentation form of such a viewer is a TV Jukebox channel allowing combination of video, audio and textual data according to user profiles and preferences, with access to local HDD, Internet or DVB broadcast.

Prewrite (PRO) will investigate the functionalities and possibilities of the new technologies in related to e-learning and e-support type of applications. PRO will provide iTV application integration model for Learning Management System purposes.

Activity WP2.3. Technology integration issues

Activity leader: Stoneroos

MPEG-4 technology offers the basis for object-oriented TV in terms of the distribution technology. It also offers a more efficient compress technology, which makes it very attractive for the distribution networks. However, serious problems of integration need to be addressed to exploit the potential of the technology in two areas:

Content Adaptation to terminal and dynamic / interactive user profiles for PVR using TV Anytime (TVA), MPEG-7 and Semantic Web technologies, with dis-aggregation and community syndication (RSS).

Localization of content using local server technology e.g. linguistics and other content semantics.

The intention of the partners is to further refine the concept of content adaptation (for example, using the RAMPEG model described in the introduction to the project) to raise this to the level of elements important to the business models of content distribution industry, *i.e.* channel oriented content, as well as program oriented content reactivity and interaction.

With respect to localization of content, experience in modularized service oriented-architectures will be applied, where different system components are all equipped with facilities to communicate with the (other) components in terms of service invocations. Bridges are used to specify mappings between the different model services within such architectures.

This activity also concerns the reactive aspects of the multimedia object (for example, defined by the RAMO model or RAMPEG). The core technology will be based on profiling approaches related to content description (MPEG-7, TVA, EPG,...) user preferences, multilingual content (TMF, MLIF), terminal performances and network characteristics.

Contributions:

ETRI contribution concerns the metadata generation based on TVA (Phase 2), which defines XML schema for package and targeting. A package, which is a collection of content components (e.g. video, graphic, text, game, web-link, application tool) that, in some combination (either all or a subset), provides various consumer experiences and are intended to be used together, and targeting enables content components to be consumed according to usage environment (e.g. user preferences, usage history, terminal type, network characteristics, location, time).

ARTEMIS will provide the content description framework according to MPEG-7 descriptors and description schemes.

CWI and TU/e will focus on techniques for the content adaptation to terminal and user profiles for PVR using TVA and MPEG-7. This involves activities such as rapid / interactive user modeling and maintaining dynamic user profiles for achieving adaptive behaviors of user programs, as well as semantic-oriented content and application tasks modeling for achieving intelligent retrieval and presentation.

STONEROOS will develop an application of the recommended technology by producing an enriched Personalized Program Guide (PPG) offering services such as questions/answers, personal screen separation, web services, filtering and search.

CRP-HT will focus on the integration of user and content profiles (based mainly on MPEG description languages and Semantic Web technologies) in RAMO-based multimedia applications to enable content personalization and more particularly focusing on scenarios proposed in WP1.3.

Philips provide input for the definition of the relationship between the middleware implementation for a PVR, and the two model for content distribution; Push and Pull under the TV Anytime Standard.

Cybercultus will focus on the integration needs of the tools related to visual user profiling developed in the context of wp2.1. The profiles generated by the tools from the user visual choices are particularly concerned.

BCE will help to integrate content security aspects as defined in WP1.2 for an integration phase.

LORIA / INRIA Lorraine will focus on the definition of a flexible specification platform for elementary multilingual units that may be either embedded in several types of multimedia content (e.g. as an extension to existing

standards) or used autonomously to localize existing content. Such a specification platform should be (1) coupled to a reference set of descriptors that should be used to parameterize specific applications comprising multilingual content and (2) able to deal in a uniform way with both monolingual or multilingual embedded content with various levels of granularity.

THOMSON R&D will study the integration of MPEG-4 SVC codec in existing MPEG-4 Systems Player or DVB-IPi infrastructures especially and regarding evolution of standardization in the context of "Video over IP".

Prewise (PRO) will develop a home/mobile version of LMS with the focus in interactive multimedia and build necessary interfaces from Cardinal Studio to LMS. LMS will be developed to cope with the enhanced home user needs in both static and mobile uses.

GRADIENT will perform a prospective exercise on temporal forecasts for substitution phenomena (heavy tendencies & evolutions). Some scenarios on strategies of actors (industrials, etc) and evolutions of regulations in accordance with "Video over IP" will be investigated.

Targets:	Date	Type of deliverable	Description
	Q4 / Q6	Software	Deliverable D2.1a: Elementary media scalable SVC and SG codecs
	Q5 / Q7	Software	Deliverable D2.1b: Advanced authoring tools
	Q6	Software	Deliverable D2.1c: MPEG-4 player with Java support
	Q7	Software	Deliverable D2.1d: Adaptive behavior / recommender agents
	Q5 / Q7	Prototype	Deliverable D2.2a: Content sharing demonstrator
	Q5 / Q7	Prototype	Deliverable D2.2b: User specific content augmentation
	Q5 / Q7	Specification, software	Deliverable D2.3: Content adaptation architecture, demonstrator and tools

WP2 Leader: Prof. F. Prêteux, INT / ARTEMIS

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WP2 partners	Country
Philips Digital System Labs	Netherlands
Thomson R&D	France
Cardinal	Finland
CharToon	Netherlands
Stoneroos	Netherlands
ETRI	Korea
CRP Henri Tudor	Luxembourg
INRIA / Loria	France
INT / Artemis	France
Technical University Eindhoven	Netherlands
CWI	Netherlands
GRADIENT	France
Prewrite	Finland
Cybercultus	Luxembourg
BCE	Luxembourg

3.4 Work Package 3

Work Package 3: Networks and Platforms
WP3 start date: Q2, April 1 st 2005 WP3 end date: Q8, December 31 th 2006
Description: <p>To create the synergy between the terminal vendors, middleware or platform vendors, tool vendors and content creators/providers, it is very important to have a reference hardware and software implementation for a terminal that is able to validate and demonstrate the correct working of the content, generated by the developed content creation tools. Dedicated (IP) servers and networks are required to provide the terminals with the correct content and to establish the basis for interactive and proactive services.</p> <p>In this work package, the hardware platforms used to validate and demonstrate the implemented technologies will be chosen. Also, the different types of middleware/platform software will be implemented/modified to fit the specified new functionality.</p> <p>The goal of Work package 3 is to develop networks and platforms (for client and server) that are capable of validating and demonstrating the scenarios and applications that are developed in Work package 4. The input for Work package 3 will come from Activities 1. The results of WP3 will provide valuable feedback to Activity 1. (Standards technologies) of WP1.</p> <p>The main WP3 activities are:</p> <ul style="list-style-type: none">• Choosing Basic Hardware & Middleware Implementations• Implementation of new media center middleware• Implementation of media center and access ports• Creation of Validation & Demonstration Platforms <p>In the following sections, the activities are described in more detail.</p> <p style="text-align: center;">Activity 3.1 - Defining used hard & middleware</p> <p>During this activity the used networks and platforms as well as the used components will be defined. Potential hardware and middleware platforms have to be defined, and the adaptations that need to be made to these platforms need to be determined. The main hardware platform will be a home media-center. This platform must enable the project members to show most of the topics handled in WP2, such as there are:</p> <ul style="list-style-type: none">• Blu-ray storage interaction architecture• Video IP streaming (for example via WiMax)• Personalization on a TV-Anytime packaging system <p>The main hardware platform needs to be combined with several different sized terminals to show the possibilities of the self-adaptive ness of the content and the different ways to access or interact with the content. The content generated with the tools created in WP2 must be able to adapt to issues as:</p> <ul style="list-style-type: none">• Network gateways and server• Scalability of video content (SVC)• User-profiles (multilingual, display)• Multi-user multi-modal interaction <p><u>Activity responsible:</u> Siuli Ko-Pullan (V2_, The Netherlands)</p>

Deliverable: D3.1: Definition of the hard and middleware

Contribution:

Thomson R&D (France) will define the requirements for the HW and SW of the wireless link. Additional requirements will be specified for the devices involved in the demonstrator of scalable video for content adaptation techniques.

Philips PDSL (Netherlands) will define the requirements of storage techniques and other hard-, and middleware. Besides the main hardware platform (media-center) also the requirement of the necessary peripherals will be defined.

Telvent and UPM will contribute to the definition, selection and adaptation of the middleware components required for the scenarios.

UVIGO will contribute to the specification of the middleware components necessary for supporting the content recommendation and the T-learning capabilities. In this task, advanced content recommenders will be specified making use of semantic web techniques to achieve intelligent reasoning about content attributes. This will include the specification of ontologies to classify TV contents and user profiling techniques.

V2_ (Netherlands) will define wearable human-computer interfacing hardware which will aid physical content selection. Furthermore V2_ will introduce an accompanying hardware platform for the HCI

Stoneroos (Netherlands) will contribute the definition of an Electronic Program Guide

Activity 3.2 – Implementation of the media-center middleware

Today, personalization in media-centers is concentrated around television programs as a whole and as an isolated entity. This precludes a lot of interesting personalization use cases. The objectives of this activity are to investigate future personal media storage solutions, to define an advanced storage API and middleware, and to demonstrate these technologies.

MPEG-4 AVC video coding technology will be the foundation of the personal media storage solutions. Mass-customization of content is done at the media-center and this content is then scaled and rendered at the final display. The topics include, but are not limited to:

- *Segmentation of content.* Instead of treating, for example, a television program as a whole, it might be divided in different temporal segments or objects. Personalization and storage is then targeted at these segments or objects. This results in a more fine-grained personalization mechanism.
- *Composition of content (Packaging).* By combining and composing contents, each of which is, for example, initially intended for sole consumption, an increased user experience might be created.
- *Content targeting.* Targeting the content on the user usage environment (for example, package based selection, content adaptation, content customization), which encompasses: user preferences, user history, terminal type, network capacity, location, etc.
- *Extensibility of personalized content.* Content, when enjoyed by the user, might afterwards be extended with additional related content.
- *Content on removable media.* Future removable media, e.g., Blu-Ray discs, will store an impressive amount of data. This might overwhelm user. Personalization might help to make this content more accessible.
- *IP connected content.* Interactive content that is linked to the Internet. Bulk of the content is delivered via broadband channels like Blu-Ray and DVB, and the personalized content is delivered via the IP link.

Content delivery to mobile/wireless terminals. The middleware must work with networking protocols and mechanisms in order to be able to provide adequate service for different end user

network/terminal combinations.

Activity responsible: Peter Hulsen (Philips, Netherlands)

Deliverables:

D3.2.1: Report about Advanced Storage-API

D3.2.2: Personalized Storage Demonstrator

Contribution: ETRI (South Korea) is an expert in PVR based as packaging, so in close cooperation with Philips PDSL (Netherlands) they will be involved in the development of the PVR middleware able to be executed on the defined hardware that will be build by Philips PDSL. ETRI will be the main contributor to this activity.

Telvent and UPM (Spain) will contribute by developing middleware components For personalized and interactive content that could include combination of technologies such as OSGI AA services, SAML and personalization agents. Research areas will consider a context in which the personalization could be achieved with the combination of broadcast content, external/associated providers or the audience itself (e.g. individuals or audience communities).

Uvigo will contribute to the development of the middleware components necessary for supporting the content recommendation and the T-learning capabilities.

TU/e (The Netherlands) will contribute in the field of content targeting and selection to provide a both personalized and accessible content delivery. To achieve this we will develop strategies and structures to contain and maintain the user profile, context and history. Research areas will consider different user modeling strategies and structures to provide an as flexible as possible interface providing input to personalization and recommender components.

Activity 3.3 – Implementation of the media-center and its access port.

Implementation of the components as determined and defined in activity 3.1, this includes the Innovative wired and wireless solutions for the access ports to the home media-center, the media-center itself, its peripherals and the middleware to run on these devices. The most suitable hardware platform needs to be selected and configured; the network must able to handle the High Definition content (bandwidth, storage). Necessary decoders need to be developed to support the new standards. Middleware components as MPEG-4 (AVC), PVR or HDTV have to be created or adapted to fit the API definitions as defined in the Blaze project, these API's need to be focused on the interactive codecs.

One of these new concepts is Video IP streaming WiMax and ISMA/DVB-IP version 2. The project will try to demonstrate HD streaming over several IP networks towards different devices (different sizes from HD to QCIF for mobile). Other concepts are items like: scalability (SVC), user-profiles, multilingualism and packaging.

Activity responsible: Mr. Michel Kerdranvat (Thomson, France)

Deliverable: D3.3: Implementation of a (wireless) Access port for feeding the media-center

Contribution: Thomson R&D (France) will work on 802.16 IP connection (specifically for ISMA/DVB-IP streaming), MPEG-4 and MPEG-21 components for scalable video contents. Specific tests will be performed to assess the performances and architectures of networks to support HD scalability

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Philips PDSL (Netherlands) contribution will be the development/configuration of the hardware and middleware of the media-center. The hardware must be able to connect with the peripherals as well as the media ports, and for the PVR functionality also the storage functionalities need to be available

Telvent and UPM (Spain) will contribute in the Identification and adaptation of the middleware components dealing with the wireless network access.

Activity 3.4 Integration of all components

Integration of the all components. During this activity, the network being able to transport Video content and IP will be the access port for the Home media-center. The media-center is connected to other hardware components in the home environment. The new middleware components have to be integrated on the media-center and the additional connected hardware. Automatically generated metadata included in the content will be used for personalization purposes (PVR). The home network running the self-adapting content will provide a complete home media solution. The combination of middleware implementations and hardware has to provide (a) platform(s) on which the demonstrators developed within WP4, can be executed.

Activity responsible: Rop Pulles (Philips PDSL, Netherlands)

Deliverable D3.4: Working HW/SW platform(s) that form the basis for the Demonstrator(s).

Contribution: Philips PDSL (Netherlands) will add the developed middleware to the Media-Center created in WP3.3 according to the definition of WP3.1.

Thomson R&D (France) will contribute most in the access port in this activity. The access port for the media-center will provide access towards the provider via an IP network or within the home (private network).

ETRI's (South-Korea) contribution is the integration of the developed middleware to the selected media-center.

Telvent and UPM will contribute in the Integration of the above and potential external components.

TUE (Netherlands) in this activity will be an intermediate between WP2 and WP3 to ensure that the knowledge of personalization is present in the integrated demonstrator.

Targets:	Date	Type of deliverable	Description
	Q3	Document	Deliverable D3.1: Definition of the hard and middleware
	Q4	Document	Deliverable D3.2.1: Report about Advanced Storage-API
	Q6	Software	Deliverable D3.2.2: Personalized Storage Demonstrator
	Q6	Hardware/Software	Deliverable D3.3: Implementation of a (wireless) Access port for feeding the media-center
	Q8	Hardware/Software	Deliverable D3.4: Working HW/SW platform(s)

WP3 Leader: Rop Pulles, Philips

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WP3 partners	Country
Philips Digital System Labs	Netherlands
Thomson R&D	France
ETRI	Korea
V2_	Netherlands
Telvent	Spain
UPM	Spain
UVIGO	Spain
IRUTIC	France

Full manpower and financial data contained in a separate sheet

3.5 Work Package 4

<p>Work Package 4: Integrating the final demonstrator</p> <p>WP4 start date: Q4, October 1st 2005 WP4 end date: Q9, March 31st 2007</p> <p>Description: The objective of this work package is both to implement validation tests that will exhibit and validate elements of the Passepartout architecture concept, and develop the final layer of controlling applications in order to create the appropriate test environment.</p> <p>During this work-package, hardware/middleware with specific new functions and applications, resulting from the development activities in WP1 and the integration activities in WP3, will be validated. The plurality of technologies will be taken into account and integrated into the validation set of requirements. There will be several devices connected to the media-centre platform. They will be based on partner's equipment and connected to the platform via experimental wired or wireless networks.</p> <p>Demonstrators should enable the project partners:</p> <ul style="list-style-type: none"> • Learn building together integrated applications and content, • Demonstrate the industry what are the best contributions from content tools makers, digital content producers, as well as middleware and software developers, • Validate and adapt the targeted Passepartout platform • Test content produced in WP2 • Test several end-users criteria ranging from the services' accessibility to the user-friendliness of users interfaces. • Assess the potentiality for product development, industrialization and commercialisation. <div data-bbox="263 1008 1117 1299"> </div> <p>Figure 11 visualizes the hardware configuration of the system. The media-center is connected via an access gate like WiMax for connecting via an IP protocol to a provider. The provider will be able to provide several services. On the right site in the picture the media-center is visualized, via a home network several rendering devices are connected. The use of multiple rendering devices and multiple users will prove the AVC and personalization aspects.</p> <p>The main activities of WP4 are: defining the controlling application, defining the validators and integrating as necessary hard,- and middleware from WP3 into a single combined demonstrator.</p> <p>Activity WP4.1 – Demonstrator Specification</p> <p>The goal of this activity is to define common validators based on realistic application scenarios identified in WP2, the framework architecture defined in WP1 and its implementation in WP3. The validation test, object criteria and metrics will be defined. Applications will be specified to control the components in order to run the validators.</p>
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Consortium partners will evaluate the system with respect of their initial requirements and will propose modifications and extensions that are necessary for a real-world operational system. Meanwhile, trial preparation and user test phases will have to be planned.

For SVC the transport over a network is much different then for AVC. While SVC was meant to bring content from a server to a terminal without any changes, SVC will adapt during all router changes to arrive adjusted to the receiving terminal.

Deliverable: D4.1 Demonstrator specification

Activity responsible: Michel Kerdranvat (Thomson R&D, France)

- Contribution: All partners below will contribute in specifying the demonstrators and in defining the validators for this demonstrator:
- PREwise
 - BCE
 - Philips PDSL (Netherlands),
 - CRP Henri Tudor (Luxembourg)
 - V2_ (Netherlands)
 - Telvent (Spain)
 - Stoneroos (Netherlands),
 - Thomson R&D (France).
 - UPM (Spain)
 - Univ. Vigo (Spain)

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**Activity WP4.2 – Conception and development of controlling applications
WP3 components**

Development of controlling applications above WP3 components, in order to create the appropriate environment. It will be utilized as the final user interface and will control and operate the overall scenario. Besides the development of the controlling application also the validation of the different parts of the system will be performed in this activity. The validations will focus on main topics like Quality of service (WiMax), scalability and resolution of the bandwidth.

Deliverable: D4.2 controlling applications

Activity responsible: Jesus Gonzalez (Telvent, Spain)

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- Contribution:
- Philips PDSL (Netherlands) will develop the controlling application for the media-center; this application needs to provide an user interface to control the middleware on the media-center.
- Thomson R&D (France) will develop necessary controlling application for running the scalable video scenarios over wireless IP network. Such application will include Graphical User Interfaces and will interact with components developed during WP3.
- Telvent and UPM (Spain) Controlling and management application for the components developed in WP3.
- UVIGO will specify and develop the necessary control applications to implement the demonstrator's functions related to the t-learning and content recommender capabilities, providing appropriate user interfaces. This will include the development of the tool specified in Activity 1.3.b and one course to demonstrate the results, as well as a database of metadata describing contents for testing the content recommenders.

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ETRI (South-Korea) will develop the application that controls the package concept in the media-center.

Cybercultus contribution:

General contribution, to demonstrators specification and definition of validators.

BCE contribution

BCE will offer its expertise in DVB-T, DVB-H (2006), HD-TV and WiMaX during the final integration and test phase. We can propose Luxembourg as an ideal possible test-market/area for the integration, since it offers a compact telecom and broadcast infrastructure in the areas mentioned, plus the expertise of BCE/RTLGroup for content creation, delivery and broadcast.

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Activity WP4.3 – Integrate Demonstrators

In this activity we will combine as many demonstrators as possible into 1 working system to prove as many concepts as possible according to the specifications created in activity WP2. The separate demonstrators are specified and build in WP3 and the selection and investigation of combining them is already done in WP 4.1.

This activity will integrate and test a common demonstrator based on realistic application scenarios identified in WP2, the framework architecture defined in WP1 and its implementation in WP3. The integrated demonstrator phase could run from Q5-Q9, with official presentation to be organized in Q9 (deliverable 4.3) This phase will consist of selective experimentation on different system configurations that the current activity will have to define.

During this activity all components from WP3 need to be integrated. The network being able to transport Video content and IP needs will become the access port for the Home media centre. The media-center is connected to the other hardware components, and the new middleware components have to be integrated on/to the media-center and the other hardware components. Automatically generated metadata included in the content via TVA provided by the appropriate partners will be used for personalization purposes (PVR). The home network running the self-adapting content will provide a complete home media solution. The combination of middleware implementations and hardware has to provide (a) platform(s) on which the demonstrators developed within WP3, can be executed.

Deliverable: D4.3 Exhibiting of second validator

Activity responsible: Rop Pulles (Philips, Netherlands)

Contribution: All partners concerned with demonstrator work package deliverables

Activity WP4.4 – Integrate Demonstrators

This document is a Living Story based in input from the industrial and commercial partners providing in a series of Snap-shots the status of the view on the development of the global media industries and their interaction with the European ICT and semiconductors industries and technologies.

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Deliverable: D4.4 Business Model Story Book

Activity responsible: Frederic Huet (IRUTIC/GRADIENT)

Contribution: All partners industrial and commercial partners to provide contribution GRADIENT will provide general market information and will define the methodology for their business / market analysis in Wp 1.3 and will finally produce the results in WP 4.4. So at the end of the project in order to have enough time left for a meaningful study during the (rest) of the projet lifetime (as mentionned during WP 1.3 session in Amsterdam).

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This document is a Living Story based in input from the industrial and commercial partners providing in a series of Snap-shots the status of the view on the development of the global media industries and their interaction with the European ICT and semiconductors industries and technologies.¶

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Targets:	Date	Type of deliverable	Description
	Q5	Document	Deliverable D4.1: Demonstrator specification
	Q6	Document	Deliverable D4.2: Controlling applications
	Q9	Software, Hardware	Deliverable D4.3: Integrated Demonstrator
	Q4/Q9	Document	Living document of Snap-shots of business model issues.
WP4 Leader: <u>Jesús González (Telvent, Spain)</u>			

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WP4 partners	Country
Philips Digital System Labs	Netherlands
Telvent	Spain
Thomson R&D	France
Prewise Oy	Finland
BCE	Luxembourg
Prewise	Finland
Chartoon	Netherlands
Stoneroos	Netherlands
ETRI	Korea
CRP Henri Tudor	Luxembourg
INRIA / Loria	France
INT / ARTEMIS	France
Cybercultus	Luxembourg
Technical University Eindhoven	Netherlands
Centrum for CWI	Netherlands
V2_	Netherlands
IRUTIC	France
UPM	Spain
<u>UVIGO</u>	<u>Spain</u>

Full manpower and financial data contained in a separate sheet

3.6 Work Package 5

Work Package 5: Project Co-ordination			
WP5 start date: Q1, January 1 st , 2005			
WP5 end date: Q9, March 31 st 2007			
Description: The main objective of this work package is to support the technical and content production work packages on administrative, financial and managerial issues. Project reporting and monitoring will strictly follow all ITEA guidelines and requirements.			
<p align="center">Activity 5.1: Reporting</p> <p>The Passepartout consortium will prepare, under the responsibility of its project co-ordinator and its PCC (Project Co-ordination Committee), a "Project report" consisting of an abstract (1/2 pages A4), A summary and an Appendix that is the core of the reporting. The summary will emphasise both the strategic business aspects and the scientific achievements of the Passepartout project in the reporting period. The appendix will report on the progress per Work packages and identify the partners achieving it in the reporting period.</p> <p align="center">Activity 5.2: Monitoring</p> <p>It is the responsibility of both the project co-ordinator and the project PCC (Project Co-ordination Committee). Monitoring comprises technical progress including the checking and verification of milestones and deliverables, the co-operation between project partners, as well as the utilisation of human resources.</p> <p>Roles of main partners: Philips: coordination and liaison with ITEA organisation All partners will nominate one representative to the PCC (Project Co-ordination Committee)</p>			
Deliverables: Six monthly report			
Targets:	Date	Type of deliverable	Description
	Q2	report	Deliverable: D5.1
	Q4	report	Deliverable: D5.2
	Q6	report	Deliverable: D5.3
	Q8	report	Deliverable: D5.4
	Q10	report	Deliverable: D5.5
WP5 Leader: Keith Baker, Philips Digital System Labs			

WP5 partners	Country
Philips	NL
Thomsons	France
INT / ARTEMIS	France
Stoneroos	NL
Telvent	Spain

Full manpower and financial data contained in a separate sheet

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3.7 Major milestones/deliverables

Quarter	Year	Deliverable
Q4	2005	D3.2.1: Report about Advanced Storage-API
Q7	2006	D2.2a: Content sharing demonstrator
Q7	2006	D2.3 :Content Adaptation Architecture, demonstrators and tools
Q7	2006	D3.4: Working media-center with Wireless access port that form the basis for the Demonstrator.
Q9	2006	D1.1c: Standards Contributions
Q9	2006	D4.3: Exhibiting of second validator

A detailed plan for the activities and deliverables has been created.

4 Rationale for funding

The Passepartout consortium consists of large, and smaller companies together with research institutes and other non-commercial organizations from different European countries (France, Finland, Netherlands and Spain) with a common goal to innovate in the area of consumer multimedia technologies based new concepts in networks, platforms and content. In addition the consortium includes a Korean partner, ETRI, the National Telecommunication Research Institute, who have been invite to join the project to spread the basis for the technology (Packaging) to advanced broadcast technology for PVR such as TV Anytime.

The background of the partners is unique in Europe, and the major partners Philips and Thomson form the backbone of the consumer industries of the EU. The participating countries are geographically spread but are all leading in making contribution to the ICT industry of the EU. By working together they will understand more clearly the needs of the consumer to use advanced multimedia terminals using the latest technology for high definition scalable content (HD AVC-MPEG-4) on broadband (FTTH and WiMax) and optical storage technologies (Blu-ray) The research institutes and Universities each offer unique contributions to the formulation of open standards in the area of multimedia standards and adaptation of content for local and personal needs. The project also includes companies with a deep understand of the opportunities and challenges that the new technologies give the content creation industries. A key partner also represents the needs of network operators to create new services based on the potential of P2P networks to broaden the basis for content creation.

Therefore Pan-European and European-Korea co-operation combined with ITEA risk funding is a necessary prerequisite for the completion of this project, and must facilitate:

- introduction of Blu-ray technology to European homes and the content industry
- broaden the understand of the new access network technologies such as WiMax
- assist European level discussion on the necessary moves to exploit new technologies under the European Telecommunication Directive articles, such as those dedicated originally to interactive TV (MHP), but must now evolve to an IP connected-home.
- create a basis for PVR technology which support all content makers without the need to retain the concept of channel for adverting revenue, and allow premium quality content to be distributed in a fair and legal manner
- support the use of open standards for high definition and scalable multimedia to allow the media objects to be localized and personalized in the network and in the terminal.
- encourage innovation in the creation of reactive and interactive content using multimedia objects applying ISO and W3C standards
- demonstrate the value of this technology for the family as an aid to learning and enhancement of knowledge in a rapid expanding universe of information.

5 Organisational information

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2	Francoise Preteux	ARTEMIS Institut National des Telecommunications
3	Rop Pulles	Philips
4	Jesús González	Telvent
5	Keith Baker	Philips

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6 Contacts with Public Authorities

	Did you contact your national Public Authority prior to submitting this proposal?	Did you check your national funding rules prior to submitting this proposal?	Result of PA contacts:
Philips (NL)	Yes	Yes	Accepted
Telvent	Yes	Yes	Accepted
Thomson	Yes	Yes	Accepted
Jutel Oy			Rejected
Prewrite	Yes	Yes	Accepted
St. Thomas Productions	Yes	Yes	Rejected
Cardinal	Yes	Yes	Rejected
CharToon	Yes	Yes	Accepted
Stoneroos			Accepted
ETRI	Yes	Yes	Accepted
CRP Henri Tudor	Yes	Yes	Accepted
INRIA / Loria	Yes	Yes	Accepted
INT / Artemis	Yes	Yes	Accepted
VTT	Yes	Yes	Rejected
TU/e	Yes	Yes	Accepted
CWI	Yes	Yes	Accepted
V2_	Yes	Yes	Accepted
IRUTIC	Yes	Yes	Accepted
UPM	Yes	Yes	Accepted
UVIGO	Yes	Yes	Accepted
Cybercultus		No	New addition
BCE		No	New addition

7 Appendices

7.1 Consortium description

7.1.1 Philips

Royal Philips Electronics of the Netherlands is one of the world's biggest electronics companies and Europe's largest, with sales of EUR 29 billion in 2003. With activities in the three interlocking domains of healthcare, lifestyle and technology and 165,600 employees in more than 60 countries we have market leadership positions in medical diagnostic imaging and patient monitoring, color television sets, electric shavers, lighting and silicon system solutions.

Philips is tenth on Fortune's list of global top electronics corporations. We are active in about 60 businesses, varying from consumer electronics to domestic appliances, and from security systems to semiconductors.

We are a world leader in digital technologies for television and displays, wireless communications, speech recognition, video compression, storage and optical products as well as the underlying semiconductor technology that makes these breakthroughs possible.

We have world class solutions in lighting, medical systems (particularly scanning and other diagnostic systems) and personal and domestic appliances where our investments in design and new materials are critical to success. Translated into figures, we produce over 2.4 billion incandescent lamps every year, and some 30 million picture tubes. Around 2.5 million heart procedures (scans and interventional procedures) on X-ray equipment are carried out each year using our technology. One in seven television sets worldwide contains a Philips picture tube, and 60 percent of all telephones contain Philips products. Thirty percent of offices around the world are lit by Philips Lighting, which also lights 65 percent of the world's top airports, 55 percent of major soccer stadia, and 30 per cent of hospitals. The strength of Philips' global operations is reflected in its (value-based) leadership position in many of the markets in which it is active:

Philips Consumer Electronics (PCE) is the largest Product Division within Philips Electronics and has a long history in the field of developing, manufacturing and selling products with embedded software for both the consumer and business market. Part of the product portfolio today containing embedded software are TVs and audio systems, LCD TVs, TV set top boxes, WebTV boxes, TiVo Personal Video Recorders, VCRs, DVD players/recorders and mobile, corded and cordless phones. More upstream the media value chain, DRM, RFID, smartcards, Java web services provides solutions for broadcasters and content production companies including studio and compression equipment, content storage equipment, and distribution systems.

Philips Digital System Labs [PDSL] serves the consumer electronics market, as a corporate development lab of Philips. In this context it closely works together with Philips Research, Philips Consumer Electronics and Philips Semiconductors. For a good customer relationship, PDSL has knowledge of its application domains. Currently PDSL-E (Eindhoven) is mainly

active in the Home Audio and Video (Display, Storage and Connectivity), Personal Healthcare and In-car infotainment domains. One single application domain can have several technology domains like: Audio Video streaming, Digital Rights Management, Human System Interaction, Optical Disc Standards, etc.

Besides these domains several disciplines like: Project Management, Configuration Management, Hardware, Software and System Engineering have to be maintained on a high level. For software technology PDSL-E is using the SEI's Capability Maturity Model (CMM) as a reference for continuous improvement. With the above-mentioned organization PDSL-E is able to create many first of a kind products, which the company develops and licenses as high-performance middleware platforms, applications and supporting development tools.

7.1.2 Telvent

Telvent, Abengoa's Information Technology subsidiary, specializes in IT solutions with high technological added value for specific industrial sectors such as Energy, Environment, Traffic, Transport, Telecom and Public Administration. Telvent is a leading supplier to these industries in Spain, North America, Latin America and Asia.

With over 40 years experience in industrial supervisory control and business process management systems, Telvent executes projects and provides technical services in the field of mission-critical, real-time, control and information management. With the most comprehensive portfolio of outsourcing and consulting services, and employing a technology-neutral philosophy, Telvent manages IT and telecommunications infrastructure for many international clients.

At the source of Telvent's success and growth are its people, who are constantly encouraged to develop innovative technical solutions for integrating corporate information architecture. Telvent's systems facilitate organization-wide integration of vital operational, business process and commercial information. Technically advanced, seamless infrastructure yields unsurpassed efficiency, economy and productivity for both clients and management.

Over 2,100 professionals, located in Excellence Centers of product development and Competence Centers for the creation of vertical solutions, ensure that Telvent maintains leadership in the areas of Information Technology applicable to its chosen sectors.

7.1.3 Thomson

With sales of 10.5 billion Euros (U.S. \$ 9.3 billion) in 2001 and 73,000 employees in more than 30 countries, Thomson multimedia (Paris Euroclear: 18453) (NYSE: TMS), provides a wide range of video (and enabling) technologies, systems, finished products and services to consumers and professionals in the entertainment and media industries. To advance and enable the digital media transition, Thomson multimedia has five principal activities: Digital Media Solutions, Displays and Components, Consumer Products, Patents and Licensing, and New Media Services. The company distributes its products under the THOMSON, RCA and TECHNICOLOR brand names. For more information: www.thomson-multimedia.com

About Thomson multimedia R&D France

A culture of innovation and research

Research and Development within Thomson multimedia involves 2,400 employees spread over three continents.

Thomson multimedia R&D France, established in Rennes in 1973, is one of the six research centers of the company. The center masters the technologies of the whole image chain in multimedia systems and networks: from the data processing, the transmission, to the reception and use within the home network. Consumer multimedia products are also developed: digital decoders, high bit rate modems, modules for interactive television.

Thomson multimedia R&D has built partnerships with universities, public institutes, industrial partners and is involved in French and European research programs such as RNRT, RNTL, RIAM, MEDEA, ITEA, IST...

At the heart of the digital revolution

With the universal language of digital technology, the expansion of transmission channels and the development of interactivity, the world of entertainment and information is undergoing a massive change. To create a link between consumers and the content and service producers, we design and develop in Rennes, the future generations of digital consumer electronics products and services.

Research and Development themes

Data processing and compression
Networks and communication
Interactive applications and software technologies
Integrated circuits and hardware architecture
Security and conditional access
Storage and access to multimedia content
Interactive delivery of multimedia content
Display technologies

Key figures

400 people of which 80 % are graduates
36 years average age

7.1.4 Prewrite Oy

Prewrite is a company that operates in the field of turn-key e-learning and information marketing solutions. The mission statement describes the group's commitment to the real and long-lasting customer benefits and is stated as follows:

Our mission states that we are providing our customers **information marketing solutions** that increases their company value by creating knowledge capital.

Information marketing is a new way of understanding the data-information-knowledge metaphor. The term combines the (person's) inside driven learning processes as well as the

community-driven social and marketing processes. It focuses the action changes and results generated from the view of the corporation in which the individuals belong to.

Innovative information marketing solutions combine in a unique way the strategy, content, process and technology elements in order to create a turnkey solution for the customer.

Our operation consists of content & technology units in Finland, Lithuania and Project teams in United Arab Emirates. The main operation and development centre is in Finland with some software development in Vilnius, Lithuania.

Our staff in April 2004 is 18 full time and 30 part time employees (content producers, freelancers) and the estimated revenue in 2004 about 1,4 m€.

7.1.5 CharToon

Statement: quality of life is computer business

Today but certainly in the near future the computer will help us to enhance the quality of life in a way that we accept and even appreciate.

Vision

We at Epictoid believe that the computer will become part of our daily routine everywhere. Information, assistance and communication will be available when we need it. Although the computer itself will not be manifest, a physical means to communicate will be. The user interface is the most important part of the communication means. It must develop into a reliable virtual partner which can be simply understood and intuitively addressed correctly. We have the knowledge to create such conversational interfaces. Our strength is to provide these interfaces with (facial) expression and behaviour in real time computer animations or humanoids.

Profile

Epictoid BV is a sales driven organization, located in the Netherlands. We develop, implement and sell venerable interface technology between man and computer. We deliver computer animation software (tools and applications) for consumers and business to business services. In the b-t-b field we deliver virtual agent technology that provide applications with a friendly and natural look and feel interface. In the R&D area we are involved in international R&D projects that focus on humanoid technology. We are part of strategic alliances with universities and industrial companies. Our goal is to provide for humanoids using our new interface technique.

7.1.6 Stoneroos

Stoneroos Interactieve Televisie is a leading developer of interactive TV concepts and applications in the Netherlands. The company offers a wide range of iTV solutions in the areas of project management, consultancy, design, concept development and technology. Founded in June 2001, Stoneroos is located in Hilversum, the centre of Dutch media.

In 2003, Stoneroos won two prestigious awards; a Milia iTV Award and a Golden SpinAward, both for the interactive TV concept of Stand.nl developed and broadcast by Dutch public broadcaster NCRV.

Recently in march 2004, Stoneroos has been nominated for 2 SpinAwards for Willem Wever Interactive (Best iTV and iMedia Concept and Innovation Award). In the same month Stoneroos was also nominated for 2 International iTV Awards at Milia 2004 in Cannes (Best Enhanced Program and Best Developer).

Stoneroos combines the skills of concept development, project management, design and programming in one company. Like this it is able to offer clients a completely interactive and innovative TV solution. Stoneroos is THE full solution provider for interactive television in The Netherlands.

Stoneroos focuses on interactivity in combination with the television set: interactive television. By interactive television we do not mean watching video over the internet or watching the internet on your television! Interactive television is a medium that uses the power of television combined with interactivity, more choice, more control and individual choice.

Stoneroos offers the following services:

- making existing TV programmes interactive
- developing new interactive TV concepts at the request of a client
- iTV consultancy and strategic advice
- developing applications that can be played out on set-top box and TV
- developing new concepts without an available client

The strengths of Stoneroos are:

- combining knowledge of television, internet, marketing and design
- being able to watch iTV like the viewers at home
- being a full service provider
- being innovative
- thinking up cross media concepts

having the biggest portfolio of all Dutch iTV companies

7.1.7 Electronics and Telecommunications Research Institute - ETRI

ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INSTITUTE (ETRI) is a non-profit government-funded research organization that has been at the forefront of technological excellence for more than 25 years and a recognized leader in the information and telecommunication research institute in Korea. In Digital Broadcasting Research Division, ETRI, we have been developing a variety of broadcasting technologies including advanced broadcasting-network transmission technology, intelligent broadcasting core technology, and realistic broadcasting fundamental technology. Those technologies provide SmarTV (Superintelligent Multimedia Anytime-anywhere Realistic TV) services. The SmarTV services allow end-users to utilize realistic and customized broadcasting programs and multimedia information services according to their taste and need through advanced broadcasting networks or integrated networks of broadcasting and communications. In addition, personalized broadcasting technology based on TV-Anytime, MPEG-7, and MPEG-21 have been developing as broadcasting and communication has been converged. Our major

research area of the Broadcasting Media Research Group is research and development of AV signal processing, compression technology for high quality video, audio and data services. ETRI also researches and develops broadcasting application services, multimedia data broadcasting, standardization, Internet broadcasting, and next generation broadcasting technology.

The following is our current major research fields:

- Intelligent broadcasting content technology: MPEG-7/TV-Anytime metadata processing technology; object-based AV authoring technology; 3D image/video authoring technology;
- Intelligent enhanced broadcasting technology: enhanced broadcasting server technology; return channel server technology; ATSC-ACAP based middleware technology;
- Intelligent broadcasting terminal (set-top box) technology: realistic broadcasting fundamental technology; 3D audio acquisition; processing and reproduction technology;
- MPEG-21 based multimedia framework technology;
- Digital content protection and management technology;
- Universal Multimedia Access (UMA) technology for broadcasting and telecommunications convergence networks.

ETRI has been very active in TV-Anytime Forum activities and MPEG standardisation activities, and contributed to TV-Anytime specification and MPEG-4, MPEG-7 and MPEG-21 standards. In particular, we have recently contributed to TV-Anytime Phase-2 Package and Targeting. With our proposed technologies in Package and Targeting, content can be consumed in a personalized way.

In future R&D work, we have a plan to finish development of digital terrestrial, satellite and cable broadcasting technology as soon as possible for Korean digital broadcasting services. Particularly, the Broadcasting Media Research Group will focus on the interactive multimedia broadcasting technology, personalized broadcasting technology, integrated media broadcasting technology, object-based AV authoring/production technology, and watermarking technology in broadcasting-communication convergent environments for Korean broadcasting future. Also, we are assisting technology transfer to companies for Korean broadcasting industry.

7.1.8 CRP Henri Tudor

Located in the Grand Duchy of Luxembourg, the Centre Henri Tudor is a Public institution where 220 engineers work on several main domains of expertise:

Environment, Industrial and Information Technologies, Medical Computing and Clinical Engineering, Technological Watch.

Management & IT Technologies, Industrial Management & Technologies, Environmental Technologies.

Within the Centre Henri Tudor, the CITI - Centre for Information Technologies Innovation (70 persons) includes the following disciplines, under the umbrella of "Management & IT Technologies":

Knowledge Management; Semantic Web; Conceptual Modelling; Innovation Network; Workflow; Software Quality Improvement; Security; e-business; System Modelling; Knowledge-Based Economy.

The knowledge & experience in term of Software Engineering of the Centre:
From programming Languages towards abstraction by the use of specification languages,
Specification via the object* (static) and via the agent* (dynamic and interacting with others)
Data Modelling => Process Modelling => Knowledge Modelling (Modelling of objects)
*Object & Agent oriented specification languages

The Centre Henri Tudor will especially contribute to the PASSEPARTOUT project in conceiving a comprehensive Object Oriented content environment integrating the RAMO model (Reactive and Adaptive Multimedia Object), result of the Jules Verne project, and in establishing an integrated Object Oriented Intelligence Processing concept with a focus on High Definition Advanced TV Interactivity capabilities.

7.1.9 INRIA / Loria

INRIA (National Institute for Research in Computer Science and Control) is a French public-sector scientific and technological institute operating under the dual authority of the Ministry in charge of Research and the Ministry in charge of Industry. General Headquarters are situated at Rocquencourt near Versailles in France, INRIA has five research units at: Grenoble, Nancy, Rennes, Rocquencourt, and Sophia-Antipolis (near Nice). INRIA's missions are "to undertake basic and applied research, to design experimental systems, to ensure technology and knowledge transfer, to organize international scientific exchanges, to carry out scientific assessments, and to contribute to standardization".

The research carried out at INRIA brings together experts from the fields of computer science and applied mathematics covering the following areas: networks and systems; software engineering and symbolic computing; man-machine interaction; image processing, data management, knowledge systems; simulation and optimization of complex systems.

INRIA gathers in its premises around 2 100 persons including 1 300 scientists, many of which belong to partner organizations (CNRS, industrial labs, universities) and are assigned to work in common research teams called "projects". On INRIA's budget, around 500 full-time equivalent R&D positions can be accounted for. A large number of INRIA senior researchers are involved in teaching and their PhD students (about 550) prepare their thesis within the different INRIA research projects (currently 83).

Its budget is roughly 90 MEuro, 25% of which comes from research and development contracts, royalties and sales.

Technology transfer is addressed at INRIA via industrial contracts (400 running), European Projects (already 300 executed), Framework agreements with specific industrial companies, and finally the creation of Technology companies (40 created since 1984). In 1998, INRIA has launched a subsidiary to promote high-tech start-up companies: INRIA-TRANSFERT deals

with early accompaniment of the future companies and is the instigator of the I-Source Gestion company, in charge of setting up start up funds in the field of Information Technology.

Together with MIT for America and the University of Keio for Asia, INRIA leads the European branch of the World Wide Web Consortium (W3C). The W3C is in charge of developing common protocols for the evolution of the World Wide Web. The European W3C research team is hosted at the INRIA premises in Sophia-Antipolis.

7.1.10 Institut National des Télécommunications - ARTEMIS Project Unit ²

The *Institut National des Télécommunications* (INT) is one of the components of the French *Groupe des Ecoles de Télécommunications* (GET), a state-operated structure taking into account the training needs within the broad spectrum of the telecommunications domain. Its missions consist in:

- providing graduate programs in engineering and management, tailored to deliver the highest level of scientific, technical, economic and general education;
- running research training programs, leading to doctoral and postdoctoral studies;
- conducting all the research activities requested by the evolution of the telecommunications area, in close collaboration with the best laboratories and R&D centers throughout the world, contributing to the development of the economic tissue, through industrial cooperation actions.

Research provides close ties between the Institute, the business community and national/international research organizations. On a national basis, INT maintains solid research collaborations with the major French industrial and academic research centers, including INRIA, CNET, CNES, CTA, CNRS and INSERM, and actively contributes to the newly-created *Réseau National de la Recherche en Télécommunications* (RNRT) (National Network for Research in Telecommunications). On an international basis, INT is expanding its research activities in association with other European academic and industrial partners through its participation to European Projects within the FP4 and FP5 EC programs, including ACTS, Telematics, Esprit/TIDE, Tempus, Copernicus, SOCRATES and IST.

The ARTEMIS (Advanced Research and TEchniques for Multidimensional Imaging Systems) Project Unit is a research-oriented structure within the *Institut National des Télécommunications*. Its vocation is to conduct methodological and technological research in the field of multidimensional imaging. ARTEMIS jointly aims at developing a high-level expertise through exploratory projects on advanced topics, and at transferring this competence into operational applications via pre-competitive projects. Research training is active, as illustrated by twelve defended Ph.D. theses during the 1996-2001 period, and seven Ph.D. works currently under continuation

ARTEMIS activities cover the broad spectrum of visual information processing, including image acquisition, processing, archiving, transmission, analysis, manipulation and secured intelligent access. They are structured in projects, organised around three themes: Multidimensional Vision, Medical Imaging and Telecommunications & Multimedia. The last

² WWW : <http://www-sim.int-evry.fr/Artemis>

theme, divided into three projects, aims at developing enabling technologies for new generation telecommunication services. The *Advanced compression methods* project is concerned with mathematical modeling for lossy/nearly-lossy compression of multispectral data, video object-based selective coding and 2D/3D mesh scalable coding. Emphasis is set on wavelet theory, mathematical morphology and nonlinear information theory. The *Smart shapes* project deals with 3D model-based analysis/ synthesis of video sequences. The interest is focused on facial and gestural analysis for MPEG-4 compliant description languages, generic description schemes and robust descriptors for content-based retrieval in video and 3D object databases.

ARTEMIS actively contributes for five years to the MPEG (MPEG-4 and MPEG-7) (ISO/IEC/JTC1/SC29/WG11) standardisation process and has in charge the official French mandate at the CEN and SC29 level. vision-based natural interfaces and telecommunication services. In a close interaction with the MPEG-7 normalisation process, the *Indexation* project studies metadata

7.1.11 Technische Universiteit Eindhoven

The Technische Universiteit Eindhoven is one of the leading technological universities in the world (often ranked in the top 10). It offers masters and engineering degrees and educates around 5.000 students.

The Adaptive Web-Based Information Systems research group is part of the Computer Science Department. It is headed by prof. dr. Paul M.E. De Bra. The group is leading in the field of adaptive hypermedia, and core member of the ProLearn Network of Excellence. The group published the AHAM reference model for adaptive hypermedia applications and the general-purpose adaptive hypermedia engine AHA!, used in research projects and adaptive courses in several institutes in different countries. The group also hosts the Adaptive Hypertext and Hypermedia Homepage (<http://www.wis.win.tue.nl/ah/>) and the Adaptive Hypermedia Mailing List (ah@listserver.tue.nl). In 2004 the TU/e is also hosting the Third International Conference on Adaptive Hypermedia and Adaptive Web-Based Systems. Together with Philips Research and other faculties of the TU/e the group is involved in the TU/e research focus of ambient intelligence.

7.1.12 CWI

CWI, founded in 1946, is the National Research Institute for Mathematics and Computer Science in the Netherlands. CWI performs frontier research in mathematics and computer science and transfers new knowledge in these fields to society in general and trade and industry in particular.

The cluster Information Systems (INS) pursues research in areas that bridge the gap between theoretical and experimental computer science. The cluster has a longstanding international reputation in the design of algorithms for distributed systems, and in descriptive complexity theory and its applications, cryptography, and parallel database technology. More recently, machine learning, multi-media systems, and data mining have become a focal point of activity and increased international attention.

An important output of the work is the development of prototypes for demonstrating and experimenting with solutions. Many of these prototypes are used by affiliated research groups or find their way through partners in (inter)national consortium. The cluster policy regarding their construction is to develop them up to the point that real applications can be built and exercised. Further exploitation, if warranted, should be done outside the institute. Therefore, the cluster fosters transfer of research to its business liaisons. In particular, its [spin-off companies](#) and through the many externally funded industrial projects.

CWI's spin-off companies

CWI created a number of spin-off companies. These companies are founded by CWI employees, with support from CWI. Generation of spin-off companies is an important method for institutes like CWI to convert fundamental knowledge to applications in society and to create high-level employment at the same time.

Close links with the mother institute during the initial years form a crucial success factor. CWI researchers successfully managed to establish spin-off companies in recent years; some of these now have dozens of employees - and even more. Spin-off companies sometimes receive considerable capital injections from investors, in order to grow into a size considered as necessary for a successful operation at a global scale.

7.1.13 V2_

V2_, Institute for the Unstable Media undertakes research, organizes presentations and supports artists and organizations. The research takes place in the field of the development of innovative tools, and the development of prototypes and applications in the field of media technology. It focuses on 3 main areas of expertise:

- Interaction
- Interfaces and
- Data organization.
-

Within these areas the focus has been on sensors, wearable and mobile user interfaces, biofeedback and enhanced reality technologies. Besides V2_ is an expert in the use of Open Source software

7.1.14 IRUTIC Research Program

IRUTIC - « *Innovation, Représentations et Usages des Technologies d'Information et de Communication* » (Innovation, Representation and Usages of Information and Communication Technologies) - research program is one of the eleven research programs of the LARES. It is a interdisciplinary program focusing on society and social sciences applied to ICT. Its purpose is to study usages and stakes of innovation within telecommunication areas, communication network industries, computer sciences, remote-access computing and Internet, radio and television medias and their multimedia « convergence ».

Research axis

Seven main research axis are structuring this collective work program:

1. Socioeconomic related to innovation
2. ICT usages

3. Information services and remote activities
4. ICT representations and imagination
5. Actors strategies and regulation
6. Local and regional medias
7. Internationalization of the communication

Team

IRUTIC is formed by teacher-cum-researchers among which three research managers, post-doctorate and Ph.D. for information, communication and social sciences. It is managed by Pierre Musso, PR in information and communication sciences, at Rennes II University.

The research team supports the Research master « Technologies de l'Information et de Communication, Innovation, Réseaux et Usages » (TICIRU) in Rennes II University.

Research environment

In Rennes 2 University, IRUTIC team (*Innovation, Représentations et Usages des TIC*) is member of the reception team (EA 2241) of the Anthropology and Sociology Laboratory (LAS/LARES) bound to the Doctorate School "Humanities and Social Sciences"

IRUTIC participates in the Scientific Interest Group MARSOUIN (« Môle Armoricaïn de Recherche sur la Société de l'Information et les Usages d'Internet ») and to the LUTIN platform (*UMS CNRS, Laboratoire des Usages en Technologies d'Information Numériques*) in the "Cité des Sciences de la Villette" in Paris.

It works closely with France Télécom R&D (studio Créatif) in Rennes and Issy-les-Moulineaux, FT R&D Lannion and Thomson R&D France.

7.1.15 Universidad de Vigo

The Telecommunication School (<http://www.teleco.uvigo.es>) at the University of Vigo (<http://www.uvigo.es>) was created in 1985. Nowadays it has three graduate courses: two of them are 3-year and one 5-year. This one offers to the students, since the founding of the School, three possible specializations: Communications, Telematics and Electronics.

The Department of Telematic Engineering (DET) is in charge of teaching information technologies, especially networking, transmission and telematics (electrical engineering and computer science) at graduate (it teaches almost the whole specialization of telematics in the graduate 5-years course), post-graduate, master and doctorate levels.

The DET (<http://www.det.uvigo.es>) is the main department at the University of Vigo dealing with information and communication technologies. Nowadays, it has over 40 members (20 PhD) and organises two doctorate programs (one of them based on e-learning techniques).

The research group participating in this project, integrated in the Network and Software Engineering Research Group (<http://www-gris.det.uvigo.es>), has at present 11 members (6 PhD). Since its foundation in 1995, our main research area was the development of design methodologies for distributed communication systems. In this field, the group has produced several PhDs and published many papers in international conferences and magazines. This research area has been funded by several national and international R+D projects. In <http://www-gris.det.uvigo.es> (section Research Lines -> Software Engineering -> Publications) our main publications in this area are available.

In the last years, our group has been applying its know-how in distributed system design and development to a new research line devoted to the study of digital TV issues, mainly related to the new MHP standard for interoperable Set-Top Boxes and the design and development of telematic applications for this new field. our main projects and achievements have been the following:

1. The development of the middleware for an MHP receiver which includes a web browser for a digital TV environment based on DVB-HTML.
2. A development tool to create distance learning contents for TV (t-learning).
3. Currently, we are developing a recommender application for digital TV contents and telematic applications. This application, running on the SetTop box or on the content provider machines, is aimed at identifying the most appropriate programs/services for each user based on the user profile, TV content characteristics and past history of watching/buying programs.

In this area, we have published several articles in journals and conferences, available at <http://www-gris.det.uvigo.es> (section Research Lines -> Interactive TV development -> Publications).

Dr. José J. Pazos-Arias has been an associate professor in the Telecommunication School at the University of Vigo since 1996. He has participated in several projects, funded by the Xunta de Galicia, European Union (ESPRIT project) and National R+D Plan, on software engineering, requirements engineering and development of telematic applications for the digital TV. In these areas, he has written over 60 papers on international journals, conferences and workshops. He has been the adviser of four PhD and more than 25 Master thesis. He was head of the DET since its foundation to July 2004.

7.1.16 Universidad Politécnica de Madrid

Universidad Politécnica de Madrid (UPM) is the main university in Spain devoted to technical studies in several branches of engineering. Among them, "Escuela Técnica Superior de Ingenieros de Telecomunicación" (ETSIT) is a founder member of the UPM, in charge of teaching information technologies, especially networking, transmission and telematics (electrical engineering and computer science), at graduate, post-graduate, master and doctorate levels. It is one of the centres most requested by young students (so the admittance grades are at the highest in Spain) with approximately 300 teachers and 4000 students. The Department of Telematics Systems Engineering (DIT) is one of the largest and most significant departments dealing with Information and Communication Technologies in Spanish University. DIT also organises a postgraduate programme for industry, with one Master program for Networks and Systems, and other for Mobile Networks, as well as several Specialisation programmes (IT Management, Mobile Internet Engineering, Internet/Intranet Engineering, etc.).

The technical focus of research activities range from the infrastructure layers in communications (broadband network, IPv6, networks integration), to the management of networks and services (services trading and brokering, integrated management of networks, systems and services -TMN, SNMP-, cryptography and network security), and including the

software engineering of services on networks (distributed platforms, real-time critical systems, CORBA, software architectures and UML), specific platforms and techniques for Internet based services (Web, Web-services engineering, Java services, EJB, MDA, RDF, Multimedia Internet), and applications such as
Tele-education, Tele-training, multimedia interfaces, Tele-presence, CSCW, distributed databases and data models, complex systems and office theory.

DIT introduced electronic mail in Spain (1986), the first Spanish Internet connection (1988), and Internet provider (1990-1994), and one of the first Web sites in Spain, the first satellite-based remote education programme ETSIT (1994-1996); DIT is an active member of IPv6 Forum, W3C and OMG, and holds the Telefónica chair in UPM for Next Generation Internet (2001-2004).

The group performing research on software engineering for distributed and real-time systems in DIT/UPM is composed by six professors, and more than twenty doctorate and master students. This group has followed a successful research line in the study of design techniques for complex software systems. IPTES and IDERS were two projects studying prototyping techniques for real-time systems in the III and IV ESPRIT programmes. ARES was devoted to the study of architectural reasoning techniques and was performed during the IV IST programme framework. ESAPS, CAFÉ and FAMILIES were three EUREKA/ITEA projects with UPM participation. Currently, DIT/UPM is involved in several IST and ITEA projects (OSMOSE, E-NEXT, PROLEARN between them). As a result of this, DIT/UPM holds many contacts with European and Spanish companies and universities.

Dr. Juan C. Dueñas is an associate professor at Universidad Politecnica de Madrid, in the Telecommunications School, where he was awarded with the prize to the best PhD thesis in software engineering. Since then, he has participated in several European IST and ESPRIT (IPTES, IDERS, ARES, ESAPS, CARTS, CAFE, FAMILIES, OSMOSE, E-NEXT, PROLEARN) consortia, in the roles of technical development, technical management and principal UPM researcher, on real-time, software engineering, software architecture engineering, software evolution and service oriented architecture projects. He has written more than 40 papers on international congresses and workshops in the field of software engineering for complex systems. He has co-authored three books on Information Technologies in Spanish. He has been part of the organising committee of the 1st, 2nd and 3rd International Workshops on Software Architectures for System families. He has participated as external expert in the first and second versions of the "ITEA Roadmap". He is a member of IEEE.
He is a member of the Master program committee in ETSIT.

7.1.17 BCE

Production & Distribution of TV and Radio Content

Turnover : 35 m€
Staff : 200 people
Mother company : 100% RTL Group
Activity : Technical services for media
Foundation: January 2000 as a result of the merger of different technical entities of RTL Group

BCE's aim is to offer high quality technical services and advice to all its clients in the fields of media content creation and distribution.

These are the key values that guide BCE's policy:

Quality

We believe in regular quality improvements streaming from talks with clients, internal exchange of experiences and constructive analysis with external partners.

Communication

To our staff and to our clients as well, we strive to deliver a clear message to which we commit. Internal communication is favoured to enable a seamless cooperation at each level. External communication focuses on informing clients properly and exchanging views with market players to understand their needs correctly.

Creativity

Every BCE member is expected to be creative in its way to find customer-oriented solutions.

Efficiency

We are permanently reviewing our workflows and upgrading our work tools so as to make our services more efficient and consequently more attractive to our clients in terms of price and quality.

Technology

BCE is proud to be and remain at the edge of the technological progress in the field of digital production and distribution. New technological applications are opportunities to offer new solutions to our clients and improve the quality of existing services.

7.1.18 Cybercultus

Cybercultus is a company founded on two pillars, the "Art Industry" and "Information Technology". Cybercultus innovative solutions aim at promoting human creativity in a constantly changing technological context.

Cybercultus has developed immersion technologies based on two concepts:

- Reactive and adaptive multimedia objects
- Personalised perception of 3D spaces.

These two immersion concepts are found in the eBSA (e-Business Solutions for the Art Industry) products and services developed by Cybercultus, such as the eBSA Expo Suite and the eBSA edutaining applications.

The eBSA Expo Suite allows the creation of interactive / 3D expo spaces, where thematic exhibitions are generated in real-time and where the visitors interact in a personalised way with the assets exposed and with other visitors. Such an environment is designed to run on multi-platform environments (WEB, DVD, ITV).

The eBSA edutaining applications allow users to express their individual artistic creativity, to interact with adaptive educational content, and to share their creative experiences with other users in real-time. Such applications are also designed to run on multi-platform environments (WEB, ITV).

By combining virtual reality with individualised navigation, Cybercultus offers its customers very intuitive, user-friendly and value-added applications.

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In order to secure high quality digital creations with high artistic values, Cybercultus develops smart art objects in a digital form and collaborates with a network of museums and media actors, as a source of imagination and cultural assets for its customers.

The fields of application of the Cybercultus solutions cover cultural communication, edutaining applications, interactive web, and interactive television.

7.2 Project effort and financial information