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1 Executive Summary

This deliverable provides a first set of 3 brochures each presenting a case study resulting from the selected projects supported by COPRAS IST call 1. The preparation of these first case studies has been scheduled early in the process of standardization for each of the selected projects. Specific standardization results are still being pursued. Substantial progress has already been made by each project towards their standardization objectives and these important experiences are documented and shared with other projects and prospective organisations anticipating proposal submission. These 3 case studies will be updated as the project progress and additional case studies will be provided in a second deliverable that will include projects from IST Call 2. The following material used together with the initial information package and the generic material provides a comprehensive promotional package for COPRAS, tailor-made to specific audiences.

The following IST projects collaborated with COPRAS in preparing the case studies. Two of the projects are addressing standardization as part of two separate clusters involving 4 projects, in the Strategic Objectives as indicated in the following table:

IST Project	Instrument	COPRAS Plan	IST Strategic Objective
ENTHRONE	IP	Cluster	Networked audio-visual systems and home platforms
GANDALF	STREP	Individual	Broadband for all
UNFOLD	CA	Cluster	Technology-enhanced learning

The actions described in each of the 3 brochures are the first set of steps towards standardization as described in the tailored ‘Standards Action Plan’, which have been prepared in collaboration with COPRAS and each project to meet their standardization objectives. These Standards Action Plans lay out the relevant information concerning the target standardization bodies, the various assistance COPRAS will provide, and the expected actions of the selected projects. The Standards Action Plan represents the understanding between COPRAS and the selected projects concerning the collaborative steps to be taken to establish the interface with and successful adoption by standards bodies of the project research results and are ongoing.

The COPRAS project anticipates that further experiences gained from collaboration with the selected IST projects in implementing the Standards Action Plans will form additional inputs and identified best practices, which will be reflected in revisions to the Generic Materials and additional brochures later in the project.

Standardisation in Technologies for the Audio-Visual Chain

Introduction

The ENTHRONE project has been working in the area of *Networked Audio-visual Systems and Home Platforms* (NAVSHP) technologies in the European 6th Framework Programme during 2004 and 2005. The project is researching solutions for improving consumer's access to multimedia content by developing an integrated management solution harmonizing the functionality of the individual components in the audio-visual distribution chain.

ENTHRONE was established to develop or improve multimedia technologies for:

- Quality of Service (QoS) management
- Content management & protection
- Definition of metadata

The project deliverables will facilitate managing an end-to-end QoS architecture over heterogeneous networks, thus improving seamless access to a variety of audio-visual services for customers, delivered through a wide range of devices.

Standardization challenges

ENTHRONE was faced with a significant standardization challenge as the desired widespread adoption of the technologies being developed in the

project largely depend on the project being able to use a number of standardization resources and tools. These include compliance testing and labelling, integration of components and standards, and the ability to test interoperability, consistency and reliability between resources.

Moreover, commercial feasibility of the solutions ENTHRONE will provide requires business models that enable various industry actors to collaborate and profit on a mutual basis, and must be based on standards. Consequently, the project has made considerable contributions to improving the current European and international efforts for the establishment of standards in the areas the project is addressing, and to have these adopted as widely as possible.

Standardization environment for the audio-visual content delivery chain

The number of standardization areas and standards organizations ENTHRONE addressed is significant. There are many different aspects of multimedia content management protection and distribution that must be dealt with in ongoing processes across a variety of different standards organizations, which can be seen in the figure below.



Standardisation Path

In order to strengthen its standardization activities, ENTHRONE decided to cooperate in the development of a Standardization Action Plan within a cluster of projects in the NAVSHP area, in parallel to developing its own strategy towards standardization. Within this clustered approach, ENTHRONE would be able to better structure its steps towards standardization deliverables and benefit from additional resources by coordinating actions in dissemination. In the context of the Standardization Action Plan, actions concentrated on the development and implementation of a deployment model for an Integrated Management Supervisor.

Step 1: Descriptive phrase

ENTHRONE provides a proof of concept for the Integrated Management Supervisor concept by presenting a use case scenario with system requirements addressing the complete audio-visual delivery chain, while at the same time presenting the functional architecture for the ENTHRONE system.

Step 2: Descriptive phrase

ENTHRONE implements an MPEG-21 Integrated Management Supervisor deployment model, providing an overview of the use case model containing the use cases that are considered most important from the architectural point of view, thus providing the foundation for the Integrated Management Supervisor model

Step 3: Submission to standardization

ENTHRONE delivers an Integrated Management Supervisor design specification proposal to ISO/IEC JTC1/SC29 WG11 (MPEG), based on the implementations described in Step 2. This will allow demonstration of the levels of compatibility brought by MPEG-21.

Interim results

At an early stage in the project, ENTHRONE presented the definition and description of the Integrated Management Supervisor architecture based on the use cases most relevant for the development of this architecture. It provided an initial design description of the individual Management Supervisor components and demonstrated how these components operate together. Subsequently, in order to verify the architecture that

was developed, ENTHRONE defined several deployment models that may be implemented at a later point in time. In January 2005, ENTHRONE presented a Proof of Concept for the Integrated Management Supervisor, describing a prototype implementation of the Integrated Management Supervisor architecture specified earlier by the project, and illustrating the use of the MPEG-21 framework for ensuring end-to-end QoS. In the description, the workings of the different Integrated Management Supervisor subsystems is explained, showing their interactions and specific usage in view of ENTHRONE's overall objectives.

Representatives from several ENTHRONE consortium partners have been participating in several different standardization process throughout the first two years of the project. Among these has also been a continuous effort towards passing the specifications related to the Integrated Management Supervisor concept through the relevant ISO processes. Tangible results in this area are foreseen for the project's second period of activities in the 2006-2007 timeframe.

Key Learning Points

Insights gained from the experiences of ENTHRONE that might help other projects include the following:

- ENTHRONE allocated a substantial amount of resources to standards related activities, and participated in many different standardization processes. This put the project in a good starting position to pass its essential deliverables through standardization as planned.
- Experience shows that synchronizing a research project's standards related activities with ongoing standardization processes requires permanent attention, specifically because more time and resources than originally expected may be required for communicating the market requirements for the proposed specifications, and for building the constituency required to support it.
- Even within the project itself, interdependencies between deliverables may occur that initially were not anticipated, but appear to be relevant where standardization is concerned. When projects are on a tight schedule, this may eventually lead to abandoning or downgrading standardization goals.

Standardization in Combined Wireless and Wireline Technologies

Introduction

GANDALF has been working in the area of *Broadband for All* in the European 6th Framework Programme and aims at demonstrating the simultaneous provision of Gigabit per second data rates to both wireline and wireless access nodes through research and development of a novel optical feeder. The optical feeder architecture makes it possible to remotely feed heterogeneous (wireline and wireless) access nodes and allows for a significant cost reduction with regard to other approaches while alleviating the bandwidth requirements at the transmitter end and simplifying the electronics at both transmitting and receiving ends. For the access nodes, low-cost optoelectronic technologies are being investigated.

The proposed link configuration is compliant with core network technologies such as DWDM and optical packet switching. The offered bandwidth allows the provision of multi-service and multi-band applications satisfying future requirements of access networks to cope with the expected evolution of user and application requirements.

One of the main targets of GANDALF is to identify ongoing standards that employ modulation formats that are suitable to be deployed at both required frequency bands, or to provide prospects that allow the heterogeneous functionality the project will deliver. As pairs of standards/technologies are identified, their

simultaneous provision of required frequencies and interoperability would be demonstrated both in a laboratory platform and in a small field trial.

Standardization Challenge

The standardization bodies related to the GANDALF project research and technologies were identified as EuroDOCSIS and the AT Digital Working Group of ETSI. The EuroDOCSIS standard is one of the dominant end-user broadband access techniques. Extension of the well-understood and robust technique for future wireless access capabilities was identified as a goal, in order to fulfil new network requirements. In addition, at a later stage the project would also like to contribute to the ETSI TC BRAN specification on dual frequency band scenarios in WiMAX/HIPERACCESS systems. Standardization issues that are considered within the project include the following:

- Redefinition of the DOCSIS modulation formats
- Extension of error-correction and equalization may be required to address Quality of Service
- Extension of the standard description to radio issues (radiated powers, antennas, etc)
- Modifications of the MAC layer due to simultaneous operation in two frequency bands.



Standardization Path

ETSI has been identified as the relevant standardization body for GANDALF, and in particular the work within ETSI technical bodies: AT and BRAN. In order for GANDALF to establish a relationship with the ETSI technical bodies, the Standards Making Process governed by the ETSI Directives needed to be followed, which is defined by:

- ETSI Statutes
- ETSI Rules of Procedure
- ETSI Board Powers and Functions, and Working Procedures
- ETSI Technical Working Procedures

This includes the following principles, which were considered by GANDALF in its actions towards standardization:

- The Chairman of a Technical Body is responsible for the overall management, its working groups and its work programme.
- Representatives of full and associate ETSI members can participate in the work, while representatives of non-members may participate on an "exceptional and temporary" basis, if the Chairman agrees.
- Each Technical Body establishes and maintains a work programme, consisting of work items and a work item is approved by the Technical Body and then formally adopted by the whole membership.
- Most of the technical work is done via electronic means and working groups also arrange physical meetings with a usual frequency of 2 - 6 meetings per year.
- Decisions in a Technical Body are taken either by consensus or by a weighted vote – where a proposition passes if at least 71% of the votes cast are in favour.
- The Technical Body approves the output of work items as an ETSI Deliverable. In the case of ETSI Technical Specifications and ETSI Technical Reports, the Technical Body also adopts the deliverable for publication.

Interim results

ETSI TC AT declared an interest in the GANDALF project results during a first meeting and e-mail discussions between GANDALF and ETSI TC AT

Chairman were arranged. These resulted in an invitation for GANDALF to attend the next ETSI TC AT meeting in November 2005. At the same time the possibility to contribute to the ETSI TC BRAN was also explored by GANDALF. The attendance of the GANDALF project at the next BRAN Plenary meeting was also successfully arranged with the ETSI BRAN Chairman and the ETSI BRAN Technical Officer.

GANDALF attended the ETSI BRAN meeting in October 2005 and submitted the contribution: "Wireline and wireless DOCSIS access networks employing radio-over-fibre fed access nodes". In this contribution a radio-over-fiber access network architecture for simultaneously feeding hybrid access nodes for wireless DOCSIS and wireline DOCSIS access networks was presented.

Key Learning Points

The ETSI BRAN feedback was not very positive regarding the possible participation of GANDALF to standardization activities. The conclusion was that as DOCSIS is already standardised, ETSI does not need to standardise anything further, as whatever GANDALF does provided it complies with the spectrum regulation is up to the GANDALF project itself. However, GANDALF received the recommendation to contact CEPT regarding this issue and received some positive feedback from one ETSI member to participate in a working group dealing with standards coexistence in the same frequency band. The project is now following this new path. The learning point being that some investment in time is often required to identify fruitful paths towards standardization. While specific groupings may not be able to assist, the interactions are still valuable in identifying alternative paths.

GANDALF representatives also attended the ETSI AT meeting November 2005. This time the feedback was positive. The AT chairman suggested that GANDALF produce a Technical Report if the full committee agrees to create a new work item in wireless DOCSIS. Afterwards, if the work item is created, the AT would encourage the project to participate in standardization activities in the subject area, and to contribute periodically. GANDALF is now in discussions with four ETSI members as required to support the new Working Item as according to the ETSI rules and expects to get approval to proceed in 2006. The learning point being that often several paths are required to be followed in order for projects to achieve standardization objectives.

Standardization in Key eLearning Technology for Europe

Introduction

For some years there was a widely held view that the first generation of open eLearning standards, while valuable, had limited eLearning to a relatively simple, single learner, 'deliver-and-test' approach. A significant step forward was marked by the publication in January 2003 of the Learning Design specification from the IMS organisation, which was intended to enable flexible and more sophisticated pedagogical approaches to eLearning.

Government agencies, researchers, and commercial organisations can and do promote standards, and the coordination of these interests is often the determining factor in whether a new specification becomes a widely adopted global standard. It's within this context the UNFOLD project was conceived to promote and coordinate the adoption, implementation and use of IMS Learning Design and related specifications.

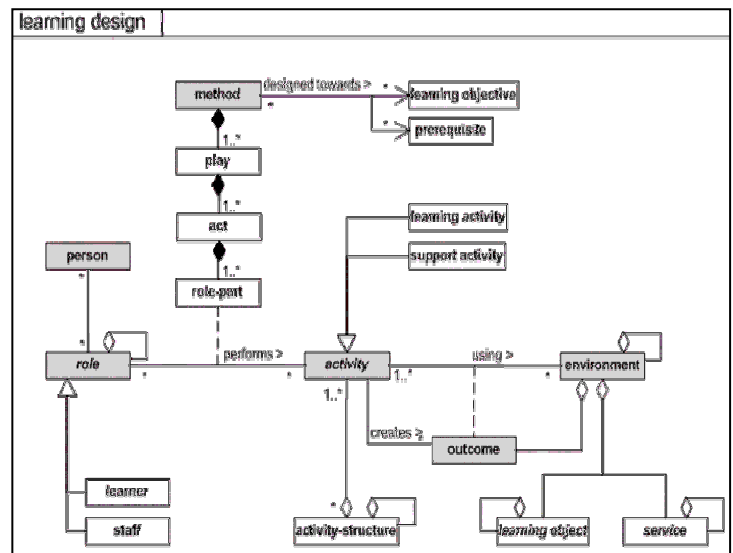
Standardization Challenge

The UNFOLD project has been working in the area of *Technology Enhanced Learning* in the European 6th Framework Programme since early 2004. The standardization challenge faced by the project has been to build a community that was deeply involved with the Learning Design specification from IMS, so that it would be widely adopted and also evolve to meet the needs of Europe. Many different groups needed to be included if the Learning Design specification was to be accepted as a standard, but often these groups were not in contact. Researchers developing specifications do not usually work with authors of learning materials, and tool developers do not usually work with teachers and learners. The UNFOLD project determined that if progress was to be made in this key standard for eLearning in Europe, then information needed to flow between these disparate groups of people.

Learning Design Specification

The IMS Learning Design specification is used to describe learning scenarios. It allows these scenarios to be presented to learners online, and enables them to

be interoperable so they can be shared between systems. It can describe a wide variety of pedagogical models, or approaches to learning, including group work and collaborative learning. It describes how people perform activities using resources, including materials (e.g. books, articles, software programmes, pictures) and services (e.g. forums, chats, wiki's), and how these are coordinated into a learning flow.



Standardization Path

UNFOLD decided that the path towards greater adoption and evolution of the Learning Design specification needed to be based on a very collaborative approach. The path chosen was to work closely with other projects within the *Technology Enhanced Learning* programme, and to build a broader community of interested organisations that would share experiences in utilising the specification, and become an important constituency in its adoption and evolution. A set of action steps was identified for the project.

Step 1: Establishing communities

To accelerate the adoption and to shape the evolution of the specification, communities of practice were established involving researchers, tool developers, learning designers and teachers to use and evaluate the Learning Design specification.

Step 2: Identify and aggregate needs

Each of the communities of practice came together both in workshops and online forums to share their experiences, and address common issues regarding the Learning Design specification and supporting tools. The project facilitated the exchange of information and collected and addressed specific needs.

Step 3: Influence the evolution of the specification

The needs and issues identified within the communities of practice were documented and presented within IMS. Some of these needs have been proposed as extensions to the Learning Design specification, others as complimentary specifications for IMS to develop to support further interoperability of eLearning systems.

Collaboration in Research Clusters

UNFOLD was one of several eLearning projects funded and launched by the European Commission in 2004. Several of the other projects also utilise the Learning Design specification in their research. The ELeGI project addressing eLearning across GRID based architectures, and the iClass project addressing innovative eLearning pedagogies for K-12 students, collaborated with UNFOLD in addressing the Learning Design specification. The PROCLEAR Network of Excellence also played an important role in broadening the reach of UNFOLD in building communities of practice and addressing technology areas. The TELCERT project has worked on application profiles and conformance tests for Learning Design based systems, which will be delivered in 2006. Verification of conformance is expected to increase interoperability and accelerate the global adoption of the Learning Design specification and future extensions.

Interim results

The work within UNFOLD has led to the number of 'Units of Learning' produced with the Learning Design specification going from near zero in 2004, to the low hundreds by the end of 2005. This increase in use of the specification is encouraging, and reflects the success of UNFOLD in providing a platform for coordinating development of tools, demonstrating them, and providing leadership in the evolution of the specification. Over the course of the project UNFOLD has organised a large number of events, including:

- 6 Community of Practice meetings and 10 workshops across Europe

- 3 seminars in collaboration with other organisations

During these events people presented their work to each other, were trained to use the newly developed tools, tested the interoperability of tools, and informed each other about new plans and extensions to the Learning Design specification.

Key Learning Points

Insights gained from the experiences of UNFOLD that might help other projects include the following:

- The time required to build a constituency in support of a standard was underestimated. A key element that accelerated the work to establish the communities was the availability about mid-way through the project of tools that utilised the specification. It was at this milestone when true collaboration became possible as the communities of developers and learners could evaluate first-hand the specification.
- The fact that the first tools that utilised the specification were open source avoided many issues for the project. Fragmentation of the standard through proprietary interpretations has been avoided and the open source approach has encouraged further research and recommendations by organisations in Europe who can readily access current state-of-the-art.
- Constituency building was successful because people outside of the project were willing to invest their own resources to participate. The Learning Design specification addressed a real and identifiable need for those involved in eLearning. This motivated involvement, which increased the resources for evaluating and deploying the Learning Design specification by orders of magnitude beyond those within UNFOLD.
- Having partners in UNFOLD that were involved in the development of the Learning Design specification was a key factor in the project success. The UNFOLD project provided a European forum where other European projects and researchers could discuss and address issues and clarifications concerning the Learning Design specification. This deep involvement of UNFOLD partners in IMS gave confidence to European organisations that their interests were being represented in the IMS standards process.