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KP-LAB

Knowledge Practices Laboratory

Integrated Project

Information Society Technologies

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Contributor(s):	Hadj Batatia (INPT), Benoit Baurens (Silogic), Avi Peled (Radvision)
Editor(s):	Hadj Batatia (INPT), Benoit Baurens (Silogic), Avi Peled (Radvision)
Partner(s):	INPT, SILOGIC, RADVISION
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0.1	22/10/07	Hadj Batatia (INPT), Benoit Baurens (Silogic), Avi Peled (Radvision)	1st version directly issued from INPT's internal note about Multimedia Service + Radvision's state-of-the-art
0.2	12/11/07	Benoit Baurens	Complete re-structuring of chapters and sections. Separation of both annexes, inclusion of Audio streaming related to cases where meeting recording is practised.
0.3	14/12/07	Benoit Baurens	Annex 2 completely revised. Annex 1 shortened and do not include any particular IVP information anymore to stick to main StoA issues. Integrated some comments of Radvision on v0.2. Executive Summary completed. Other main changes issued from comments from internal review are: • Chapter 1 and 2 have been re-written to better present the content and objectives of this document. • Section 3 now includes a short detail of the case into consideration. The needs are expressed only as high-level requirements by now and will be further specified in the different working knots of the project for consideration in next phases of developments. • Sections 5 and 6 have been revised for

			adopting the sequence proposed by the reviewer, which, indeed, shall facilitate the reading. • Section 7 has been shortened and detailed descriptions of IVP features are no more included since presented in Annex 2. • Parts of former 7.5.5 have been incorporated in section 5. • Chapter 8 gives more precision on the work plan currently adopted. • Annex2 has been completely revised and is the main reference document for features descriptions.
1.0	17/12/07	Benoit Baurens and UH team	Final slight presentation editions for making the document ready for delivery.

Executive summary

This document gives an overview of current needs expressed so far in the project for multimedia management and real-time communication services between groups of learners/workers and examine the kind of support that a standard-based technical solution "off-the-shelf" can help in solving main technical issues and in focusing on developments of tools and applications. The document includes in its annexes a state-of-the-art review of related technologies and a detailed examination of the platform that Radvision, as KP-Lab consortium partner, can bring to the project. The document contemplates in details the different needs in various KP-Lab cases and pedagogical scenarios identified so far. It then addresses the question of openness, scalability, customisation and usability of existing tools and platforms. The advantages of the IVP platform and of related Radvision expertise and support within the Consortium are considered as key factors for launching trials with the IVP platform, which is considered as a facilitating solution for the development of our KP-Lab specific tools and services. A short-term work plan is summarized at the end of the document. As planned in the Description of Work M13-M30, the second release of this document (labelled D4.3.2) will detail and reflect on the proof-of-concepts developed so far, give recommendations and guidelines for further developments and tests.

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Foreword

This document entails a large set of telecommunication technology acronyms and concepts, which are more precisely described in the Annex 1 “State-of-The-Art and Standards”.

1 Document Purposes

The purpose of this document is to give a detailed account of the needs concerning the usage of tools in those particular Conferencing and Real-Time cooperation Settings.

The document also reflects on first studies around the possibilities for adopting the IVP platform, an hardware + software solution proposed by Radvision as main support for the realization of those various services.

This documents has 2 annexes:

- Annex 1 reviews the state-of the art and standards in Real-Time communication
- Annex 2 describes in more details the IVP components and their technical functionalities.

2 Introduction

The fourth work package of the KP-Lab project (WP4) aims at integrating the KP-Lab system and creating the required common services, grouped in so-called KP-Lab platform. WP4 notably specifies, designs, and develops APIs and services to implement multimedia capabilities in the KP-Lab system.

As far as the M13-M30 period is concerned, the Semantic Multimedia Annotation Tool and meeting support tools such as Map-It shall take benefit of Multimedia Management Services focusing on the management of video and audio flows respectively. These kinds of applications emphasize synchronous work around shared knowledge items, should they be annotations on videos or enriched-data as part of discussion contributions in a meeting. They often require the organisation of work and activities around real-time sessions in various settings.

Precisely, the multimedia and conferencing services are expected to provide a set of APIs to allow KP-Lab tools to use and manage multimedia storage, communication, and sharing. In conformance with the co-design process, these APIs will be created in the technical frameworks and services phase. Three tasks in WP4 are directly concerned with these services. Task 4.6 “Gateways for Content Repositories” takes care of managing static media content. Task 4.7 “Cooperative Real-Time communication services” provides possibilities to create and manage multimedia conferences. Task 4.8 “Multimedia Management Services” is responsible for creating software components to store, share and manage multimedia streams.

These services sets are meant to cover all documents management needs within the KP-Lab system, hence their central importance.

3 Multimedia and mobile communication needs

Most KP-Lab cases include investigations of practices that rely on synchronous or asynchronous networked multimedia and/or mobile communication. This section summarizes these needs, as of Q3-2007. For each case, multimedia communication functionalities are listed.

Cases	**Multimedia and mobile Communication needs**
Introduction to Mobile applications Course. This course is targeted to 2nd year Media Engineering students at EVTEK University of Applied Sciences. The main objectives of this course: introduce some of the mobile technologies that are relevant in building mobile applications, and build simple applications using these technologies. Technologies introduced as a part of the course have varied in different years. For example this year course is concentrating on browsing technologies, short messaging and Flash Lite 2. Based on these students will build two different services that they see themselves useful. http://www.kp-lab.org/intranet/design-teams/pedagogical-and-professional-scenarios/pedagogical-and-professional-scenario-in-kp-lab-dt-3/	• Virtual collaboration (project and process management, shared document development, data-analysis of interviews, questionnaires and video data) • Mobile devices are used for taking notes at the client organizations, browsing information in case there is no PC access, and also for ad-hoc video-conferencing with lecturer / Mobile Lab staff. • PC based video-conferencing can be used for scheduled virtual meeting with extended team (incl. lecturer / Mobile Lab staff) and client company.
Education using Pediatric Simulations The main objective is to let the participants take part in realistic cases, some of which are less common and such that practitioners infrequently are exposed by. Another objective is to let participant practice and	• Record a simulation video • Visualize a simulation video • Annotate individually a video record of the team behaviour to flag critical or problematic incidents or otherwise interesting events • Watch in group a video record along with individual annotations

learn about team work. A third is to encourage the participants to reflect on their own practices. One of the pedagogical ideas behind the CEPS exercises is a version of "learning-by-doing": to let participants take part in very realistic and rather complex medical cases in practice: the medical teams provide newborns who arrive from the delivery room with intensive care. http://www.kp-lab.org/intranet/design-teams/pedagogical-and-professional-scenarios/document.2006-04-03.8973418109	• Discuss in group about annotations made to the video record • Allow summative analysis after visualizing the video • Do comparisons between annotations of different people (e.g. Who said what and how often?) • Extract statistics about annotations (e.g. how many of each kind of annotation were done?) • Filter data shows into the view (ontologies, concept, user, date…) • Visualize video without annotation in full screen • Awareness about who is actually connected into an annotation session
Multi-disciplinary course on knowledge practices Rather than starting to lecture, the idea of the courses was to learn, oneself, to practice knowledge work; lectures would be given if necessary but basically it would be the participants' own responsibility to produce knowledge to be discussed and collectively advanced. he "trialogical" object of the course was an evaluation of "home care of elderly people" as it existed in a particular locale, and a developed set of recommendations for improvements. The investigation was to be conducted for a municipality of small but well-off rural area nearby Helsinki. The municipality had privatized home care of elderly people. Rather than having regular visits of social workers, there was a novel ICT supported service centre from which elderly citizen could order groceries and medical supplies by using the Internet. This allowed social workers to visit them only once in three weeks (or when necessary) rather than weekly as before. The course was challenged to assess the status of the system.	• Elderly people interview (audio and videotaped recording) • A mobile device would be used to assess the participants' knowledge practices • A mobile device would be used to contribute notes to the collaborative space, surf the Internet, and collect data during fieldwork. • A mobile device will be used for blogging • a mobile device will be used for awareness • using the mobile device as an audio recorder • write notes about issues thought or discussed with other participants according to topics related to the central object • annotation • reorganized her postings together with Maria's and other students' notes of their team by using drag and drop facilities of the system • created a concept map regarding the problem they were dealing with for each succeeding week

http://www.kp-lab.org/intranet/design-teams/pedagogical-and-professional-scenarios/scenario-multi-disciplinary-course-on-knowledge-practices	
Multi-disciplinary research on knowledge practices A group of educational researchers were engaged in longitudinal investigation regarding transformations of knowledge practices at university education. Participants of the group involved researchers from different departments (located at different buildings) of Faculty of Behavioral Science, University of Helsinki. Consequently, the participants did not see each other daily. Many of the investigators involved were also working with other research projects or book writing projects simultaneously with the present project. This made it difficult to find common meeting times and engage in daily face-to-face coordination activities. Consequently, the participants decided to use KP-Lab environment to mediate their joint research project. They agreed to rely on KP-Lab environment in all of their communicative and trialogical efforts. http://www.kp-lab.org/intranet/design-teams/pedagogical-and-professional-scenarios/scenario-multi-disciplinary-research-on-knowledge-practices	• All knowledge produced by the students are analyzed qualitatively using dedicated tools relying on 3G mobile devices
Educational and Instructional Design course This course is one from a series of instructional design courses offered during the first two bachelor years. By attending this series of courses students gradually build their knowledge and improve their skills in instructional design. The participants in this course are students	• Video-conferencing tool: offers the opportunity to organize the digital lectures • Mobile devices for data-collection (video and/or audio recorders, preferably digital): possibility to record the interview and discussions with SME or other experts and automatically transfer them to a text editing tool

completing their bachelor or pre-master study in Educational Sciences, or students that attend this course as a component of their minor. In a normal set-up the group consists of more than 80 persons. Anyway, this time the course has a distinct target population, which is a group or approximately 20 part-time students in Educational Sciences. http://www.kp-lab.org/intranet/design-teams/pedagogical-and-professional-scenarios/educational-and-instructional-design-uu.doc/view	• Telephonic connection: Skype like • PDA devices: - possibility to make notes while working on the field (mobile information search service, mobile communication service)
Innovative Knowledge Communities at Secondary School (UniC) Research that is conducted at UniC, an innovative secondary school in the Netherlands, is concerned with the investigation of developments in teachers' pedagogical practices as a result of their engagement and participation in a multi-disciplinary team of researchers, teachers, students, school leader, and external experts who collaborate on the co-evolutionary design of a learning module that is based on principles of the knowledge creation metaphor. The main goal this knowledge community attempts to achieve is to develop and to advance a course module in which students, in collaboration with others (i.e., students, teachers, professionals, and/ or customers) create their own knowledge and develop agency during technology-supported authentic projects in which they work in small groups on shared objects. To accomplish this aim, the multi-disciplinary team at UniC is intensively engaged in crossing boundaries practices between the traditional roles represented by the various groups. http://www.kp-lab.org/intranet/work-packages/wp9/cases-for-d9-2-version-2/research-case-uu-weble/	• Interpretation of "Critical Events" that happened during a meeting based on recordings (including notably mapping tools + audio / video recordings).

Music learning & teacher training (UNINE) First level scenario (pupils): 11 year-old pupils are attending a music lesson. They are given basic information on rhythms that can be made with all sorts of objects and with the body. They are then grouped in triads and have to compose a rhythm. When this work is accomplished, each group at a turn performs its rhythm collectively in front of the other pupils. These performances are followed by a session in which the teacher asks the pupils to recall how they have come to this rhythm and how they have managed their social relationships in order to get organized for the correct performance. They are encouraged to invent a notation of the rhythm. The teacher then presents informations to the pupils and considerations on how to improve their skills and performances. They are then given a new task and the scenario is repeated. Second level scenario (the trainer as researcher and teacher): (in this case the teacher is the trainer of music teachers, both acting as a teacher and collecting information for his PhD). The teacher makes the pupils work according to the above described scenario. But before starting he tries to imagine how the activity will develop (according to his past experience) and predict as far as possible what the children will do and what difficulties he expects. He writes all this down (and then puts it aside in order not to refer to it during the teaching). He video-registers the children at work, the performances, the descriptions the pupils make of their work, and the instructions he gives for the next step. http://www.kp-lab.org/intranet/design-teams/pedagogical-and-professional-scenarios/ped-scenario-music-learning-	• audio- and video- recording equipment • beamer and good loudspeakers • store and retrieve audio/video recordings • mapping the music production processes • analysis made by the teachers • notations of the rhythms, etc. • annotate and link audio/video documents (also to bibliographical and textual references, other examples, etc.).

teacher-training-unine-v.2/	
Speech therapists (UNINE) In order to get their master degree, students have to receive positive evaluations for their two internships, succeed a major written examination in speech therapy and an important oral examination on the psychology of relationship. In order to prepare for this last examination – and, hopefully, also, in order to help them in these difficult internships - students are offered a 2,5 years training (consisting of: seminars, questionnaires, reading, role-playing, etc.) http://www.kp-lab.org/intranet/design-teams/pedagogical-and-professional-scenarios/unine_speech-therapist-3.doc/view	• Record videos of a role playing. • Annotate video of a role playing, and comment it in a seminar. • Build hypertexts with the course materials, the videos, the cases and the students' comments and questions by creating links. Each student could have personalized hypertexts. • Structure long video in several clips and segments. • Search, play, modify, delete clips and segments in a video • Go to a particular image into a video (by image number or time from the video beginning) • Assign an annotation session to a group of users • Export annotations to XML file • Get access rights to videos, annotations and ontologies
Field training in Educational Psychology The field-training is an activity which takes place in the last year of studies. During the long-term field-training, the students are guided by a university lecturer, a lecturer of didactics, and a classroom teacher in the school where their training takes place. http://www.kp-lab.org/intranet/design-teams/pedagogical-and-professional-scenarios/ped-scenario-field-training-in-educational-psychology-uh	• Record a video of small group interaction • Record a database discussion of small group • Record a collaborative Blogging • Record an email discussions • Link a video with database discussion and collaborative blogs • Annotate a video record of small group interaction • Watch in group a video record along with individual annotations • Keep a mobile log of own learning experiences by making notes, audio recordings, photographing or videotaping situations • Reflect on own learning, the critical incidences that they think have influenced their work and participation • Be able to view the experiences

	of the other students
Change Laboratory Telephone Corporation (TC) is a large provider of telecommunications services in Finland. They decided to use the CL method to establish a knowledge management tool for the grassroots work communities to enhance their capacity to produce innovations and new knowledge. During the CL process, consisting of five consecutive weekly two-hour meetings and a follow-up meeting two months later, the team evaluated its present activity system and process of work, created new solution and a vision of the proximal development for the team's activity and a number of new ways of enhancing the team's learning. The team also made a concrete plan with a time schedule to carry out the intended changes in its activity. http://www.kp-lab.org/intranet/design-teams/pedagogical-and-professional-scenarios/cl-scenario-1.doc/view	• Record a video of group activities • Record an audio of group communication or a specific interview • Make notes about observed group activities • Breakdown a video to select critical events in the raw material • Associate a video fragment with an audio fragment • Annotate a video record • Watch in group a video record with annotations
Argumentation in Science Education The whole pedagogical design of the course[1] (called "argumentation and learning", given in the University context with students who are future teachers or having teaching experiences yet) is meant as allowing students to be initiated to the design of argumentation activities in teaching science, and to analyse their potential benefits. In this scenario participants are invited to learn by doing. It is designed in order to articulate times where students are exposed to concepts and methodological tools on argumentation in a "monological" way (ex cathedra lessons), times where they resolve problems, plan	• Replay of discussions using graphical discussion representations and audio recordings. At the moment only used in co-location scenarios but desired to be extended to remote participation.

[1] Two scenarios have been tested at University of Neuchâtel by N. Muller Mirza around this topic, with some changes: the first one (2006) was more focused on how to develop an argumentative design in science with reflections about scientific reasoning and science development, and the other one (2007) on how to implement an argumentative design in a classroom. Both had been conducted during one semester with about 25 students in 2nd and 3rd year in psychology and education.

activities, work on texts, etc. in collaborative groups (in a “dialogical” way), and times where they are invited to collaborate in and for transforming practices and knowledge (knowledge creation) also with the help of ICT tools, like Digalo. Through this design, students experiment different social and professional positions, the ones of learner, teacher, and researcher. http://www.kp-lab.org/intranet/work-packages/wp9/cases-for-d9-2-version-2/D8.2_UniNE_Argumentation.doc/view	

4 Summary of Technical Requirements

Cooperation is a fundamental activity in the KP-Lab approach to knowledge creation and management. Allowing users to communicate naturally around and using multiple media has therefore great added-value potentials. One of the general requirements of the KP-Lab system is to allow for creating, sharing, analysing, reflecting on, annotating, and performing any individual or cooperative action on multimedia documents, such as text, image, audio, and video. Cooperation might be synchronous or asynchronous. Synchronous cooperation requires real time streaming of live or recorder bit-streams, simultaneously, towards multiple and heterogeneous terminals, with satisfactory Quality of Service (QoS). Terminals include desktop computers, mobile phones, PDAs, and specialized conferencing equipments. This requires real time adaptive coding of media streams to cope with terminal and access network limitations. Due to the large variety and heterogeneity of hardware and software, the KP-Lab system needs to adopt communication standards and protocols such as SIP, H324, MPEG-4...

Main needs can be partitioned as:

- initiating and managing a conferencing session from KP-Lab tools
- allowing any terminal (desktop, mobile, specialized equipment), depending on particular case settings, to join a conference
- recording, possibly remotely, video or audio streams and storing them in standard format ready for streaming
- sharing, synchronously, video or audio streams in multicast sessions and allow their cooperative control by multiple users
- providing possibility of sharing rich media augmented with graphical annotations

In order to respond to these needs, the KP-Lab technical multimedia services should overcome a number of technical problems. The most important are listed below in the “Challenges” section.

5 Networked multimedia: KP-Lab Application Domains, Challenges and Tools,

5.1 Trends

Recent technological developments show a clear orientation of networked multimedia towards the convergence of networks and services. The legacy telecommunication networks used for voice and videoconferencing are progressively abandoned for computer networks. The circuit-switched network technologies are now cohabiting with less costly, more reliable and manageable networks based on Internet protocols. Phone, TV, videoconferencing, web, and data services are more and more delivered

via the same networks. This convergence opens up a large potential for new applications such as interactive multimedia applications. Gateways to 3G mobiles allow easy and unconstrained access to such applications.

5.2 KP-Lab Application domains and objectives

Application domains include research, health and education where videoconferencing and data-collaboration are used to create communities of practices. Research networks, telemedicine, and distance learning are examples of promising applications in these domains. Multi-location businesses have also continuously evolving needs for interactive environments for teleworking to increase productivity and reduce costs. To respond to these needs, a new economical niche area has developed around voice and video providing. New actors provide computer-based communication and information services.

In KP-Lab, the objective is to create an integrated and innovative solution for collaborative work in educational and professional settings. The KP-Lab system allows communication, management and sharing of artifacts and processes for creating knowledge. A large part of the knowledge targeted by KP-Lab is embedded in user practices and group interactions. By interactions, we mean any exchange or cooperation via documents, tasks, processes, synchronous or asynchronous communication (audio, video, chat, blog, discussion graphical maps…), or any other artifacts. Monitoring these interactions is necessary to capture knowledge, allow its reuse, and discover knowledge practices. In order to achieve this objective, KP-Lab aims at integrating networked multimedia facilities within the KP-Lab system. Users can manage and run audio, video or text communication from within their cooperation space. This allows observing, recording, and structuring the communication and providing possibilities for reflection. Such possibilities would not be possible with non-integrated third party tools.

Integrating a networked multimedia platform with the KP-Lab system is therefore a legitimate solution given the evolution of the technology and the needs.

5.3 Main Technical Issues to be considered in Deployment

The Design, implementation and deployment of large and powerful communication services are always sensible and difficult tasks: they imply to take into account the large set of used protocols, the intensive use of devices and network resources and the often opposition of technical requirements with organization security policies.
Very often, software solutions are not sufficient and high-level expertise for customisation and parameterisation of tools and equipments is needed as part of true integration and deployment projects.

Main issues to be contemplated include:

- **LAN connectivity**

QoS in real time multimedia communication requires adapting the streams at different levels (servers, terminals, networks). Negotiating and adjusting the format, the signalling, and the bandwidth are basic functionalities that should support any networked multimedia application. Overcoming asymmetric network connections is required to allow two direction streams.

- **LAN security**

Most network connections are governed (and constrained) by security rules and their orchestrating equipments, such as firewalls. KP-Lab networked multimedia services must allow seamless communication beyond these obstacles. Easy configuration is required to allow users to communicate and share multimedia behind firewalls.

- **Standard protocols**

Real time conferencing uses standard protocols such as H323 and SIP. These real time technologies need dedicated hardware equipment. Developing such solutions from scratch is an unrealistic option in KP-Lab.

- **3G technology**

Allowing users to communicate with peers without constraint requires ubiquitous connections to networked multimedia applications. This implies allowing 3G mobiles to be used as terminals for recording, sharing, and annotating video and audio streams. Adopting 3G gateways to Internet is therefore needed.

One option to solve these problems and provide professional interactive multimedia communication is to adopt an existing platform and develop configuration and integration interfaces. The IVP platform, developed by Radvision (member of KP-Lab), can be an ideal solution to this issue. The next section describes briefly the different types of tools under consideration. The next chapter will more specifically contemplate how pertinent features of the IVP platform can fulfil our needs.

5.4 Tools

5.4.1 Various solutions in the market for various usages

Various multimedia communication services (e.g. PC videoconferencing) such as Skype, Microsoft MSN exist already. They are valuable, mainly with regards of their popularity, simplicity of use for basic communication needs. They appear not sufficient for more advanced KP-Lab scenarios requirements.

- the lack of reliability (no guarantee of service is provided)
- closed client applications although some limited APIs are opened
- the absence of data security (data crosses public and providers domains) – servers/services hosted by other (private) institutions
- the impossibility of monitoring or recording communication and interaction

- the difficulty of connecting and coupling mobile equipment applications
- exchanges of identified knowledge artefacts and collaboration around them.

Larger platforms including more services are required in the work place and in numerous education settings for enabling larger-scale communication and collaboration of groups of workers. Examples of these are Marratech, WebEx, and Radvision SCOPIA's solutions. However, these platforms are independent of the actual information system of the organization. Usually, adopting them for day-to-day usage requires booking conferencing rooms via service providers.

Using third party platforms (such as Marratech, Webex,) without integration in KP-Lab does not solve the security, recording, openness and monitoring issues. They simply do not allow in an integrated way, shared activities around KP-Lab objects of knowledge. Context specific scaffold mechanisms and devices to promote, support, and facilitate knowledge construction and/or practice of skills, are needed and must be built in integrative functionalities.

On the particular field of Rich Internet Applications (RIAs) and of the Flex technology used by most tools in KP-Lab, very promising announces have been recently made by Adobe during their developers symposium in Barcelona (17-18th October 2007). They are preparing two hosted (!) services that will allow developers to add real-time collaboration capabilities, including voice over IP, to their RIAs. The company demonstrated the services -- code-named Pacifica and CoCoMo.
Pacifica is a service that will allow developers to integrate voice, messaging and user presence information into applications built using Flex, Adobe Integrated Runtime (AIR) or Flash technologies. AIR, which is currently available in beta-test form, allows developers to take those Flex-based Web applications and move them to the desktop.
CoCoMo will be the next-generation framework for the Adobe Connect Web conferencing service, which will enable developers to take certain parts of Connect's functionality and integrate them into other applications. Basically, the company is turning Connect into components for its Flex development environment so developers can build and host collaborative applications on Connect.
These developments remain hosted by Adobe directly, there are not open-source and are therefore very questionable in terms of adaptability for innovative management of knowledge artifacts and are still in very early stages of availability. These elements lead us to consider that this is not yet appropriate for our developments, in short- to mid-term perspectives at least.

6 IVP Platform as a Solution in KP-Lab?

The Interactive Video Platform is a scalable platform for mobile and fixed operators, and for service providers. The latter constitutes the expected role the platform could play in the overall KP-Lab platform.

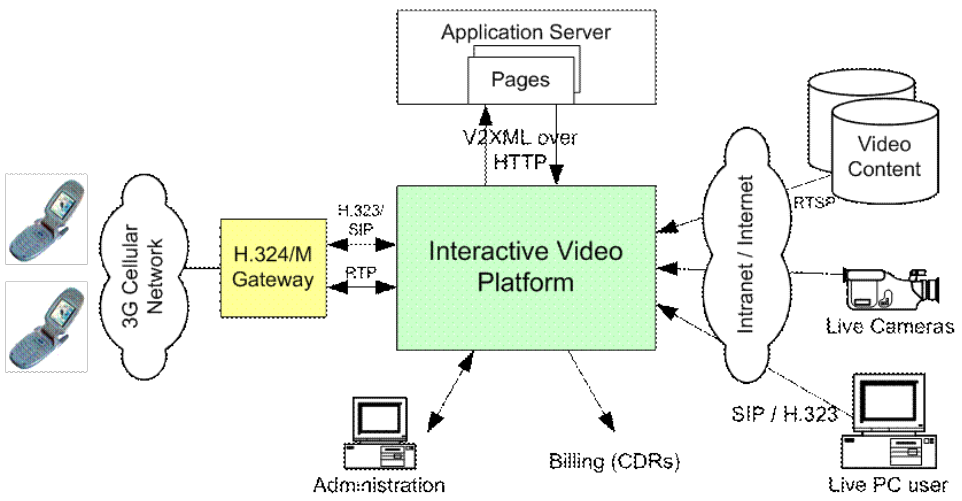
The IVP enables convenient creation of video and voice services based on rich underlying video and voice processing capabilities. Services that can be implemented on top of the IVP platform range from applications interacting with a single user (such as a video portal or a video surveillance application), contact centres which connect users to agents, through to multi-party applications such as video chat rooms, video blogs, video conferencing, and more.
The IVP can also be used as a Media Resource Function (MRF) in an IMS network, in which case it is controlled by a SIP (Session Initialisation Protocol) Application Server and performs all media-related functionality.

The second main application domain covered by the platform is video-conferencing through two main components: a MCU (Multipoint Communication Unit) and a 3G Gateway ensuring communication between 3rd Generation mobile network and IP networks such as the Internet.

6.1 IVP APIs

The IVP exposes an application-programming interface (API) to applications. The API is based on HTTP and supports an XML language called V2XML (Voice & Video XML). V2XML is a simple yet powerful language that enables the implementation of diverse video services. IVP keeps the task of development straightforward and relieves the developer from concern with underlying complexities. IVP allows deployment of an application on any application server available on the market, making application development as convenient as posting a page to a Web server.
that the platform shall allow Application Developers, System Integrators and Service Providers' R&D to easily develop interactive video value added services.

6.2 Principles of operation summarized



- Applications" (or "Services") are identified by the called number ➔ The same platform can host multiple applications
- An incoming call is matched against the set of applications, and if a match is found call is routed to one of the MCUs
- Every call creates a "session" on the Controller, and a separate conference on the MCU
- The Controller reads V2XML pages, interprets them and executes them
- Presenting a movie, for example, involves calling the MSP on another leg from within the MCU session

6.3 Capacity of minimal configuration

For 1 MCU and 1 MVP (Media Video Processing board), the IPV can handle up to ninety six (96) 3G **ports**[2] (QCIF resolution, low bit-rate) or up to 48 ports for CIF and high bit-rate (from PC).
Please note that if the application is also presenting clips, a clip is also counted as a port, meaning a user viewing a clip is using two MCU ports during the play period.

6.4 IVP appropriateness

6.4.1 General Considerations

It sounds quite logical to consider the needs of enhancing the KP-Lab platform with conferencing services and interactive multimedia communications in order to facilitate at least synchronous distributed activities around shared objects, using heterogeneous end-devices. This addition will allow for a better multimedia exploitation and communication between the parties involved in collaborative activities that are powered by KP-Lab solutions (see sample cases in chapter 3 above), while guaranteeing scalability, maintainability and technical compatibility with IP communications standards.

The proposed platform - Interactive Video Platform (IVP), provides solutions and capabilities to a broad range of functions of voice and video conferencing capabilities and of multimedia material services.

The IVP is the latest state of the art platform developed by Radvision, based on previous products and is enhanced to the latest market needs. Many years of developments were invested in the IVP and the relevant supporting services. The platform is already operational, used by real customers, so there are low development risks involved on the platform parts themselves. Since the platform is developed, manufactured and supported by Radvision, we believe that the use of the IVP will allow Radvision to provide added-value to the project, allowing the work to focus on actual innovative developments above the platform. Traditional cumbersome and

[2] one has to note that depending on the application, the application may need to use, for each user multiple MCU ports during his/her session..

costly work on developing real-time session, signalling, provisioning, and reliability functions are already covered by the proposed solution. This notably helps in responding recent reviewers' comments on the flexibility to create various "conferencing" applications, using standards of the field, according to the project needs by saving development resources.

6.4.2 Readiness for Mobile Applications

Special attention is toward the recent wide trend of mobile application needs. The current 3G mobiles voice and video capabilities allow the IVP to emulate the mobile phone as an IVP user "end point", thus allowing using the IVP developed features with the mobile. During the development phase special attention was given to use any 3G standard mobile in the market, without the need to install mobile client. So the use of the system with 3G mobile is straight forward, initiated by simple dialing.

6.4.3 Documented and evolving APIs

In order for the different KP-Lab tools to be able to use the services of the conferencing platform a standard API is proposed. This API will allow for any application to utilize the services of the platform by simply hosting a web server with V2XML (see below) scripts that will be executed by the communications platform (see section 6.1 above). It is planned that future releases of the IVP firmware will also support VXML and CCXML, two emerging W3C standards for the management of high-level voice –based integration of tools/applications[3].

6.4.4 Openness for future applications

- **LAN connectivity**

IVP Platform is an opportunity to permit KP-Lab users to use professional real time communication capabilities. With this platform, KP-Lab will be able to broadcast real time video in a conference. Users in a conference room can view multiple videos. The IVP platform monitors communication and adapt bandwidth, format and codecs.

- **LAN security**

IVP provides various solutions to overcome firewall problems. A simple software solution allows users to communicate behind firewalls.

- **Standard protocols**

IVP is based on standard protocols especially SIP, H323 for signalling and MPEG-4 and H264 for media coding. KP-Lab tools need only to implement SIP and H264 clients.

- **3G technology**

[3] CCXML: Call Control XML: www.w3.org/TR/**ccxml**/
VXML: VoiceXML: www.w3.org/TR/voicexml20/

IVP supports 3G Gateways allowing 3G mobile terminals to interact with any networked multimedia application.

6.4.5 Training, Maintenance and Support

Radvision, as partner of our Consortium, can dedicate parts of its resources for an exclusive execution of training, maintenance and support services during the remaining of the project with very good acquaintance of needs and constraints. Precise agreements are to be settled for defining what directly concern the IVP hardware/firmware.

Additionally, for the post-project period, ownership, conditions of use, maintenance and support contracts would then be subject of particular negotiations and agreements.

6.4.6 Main Decision

As documented through the preceding chapters, we identify the IVP platform as a very good opportunity for facilitating development, test and operation of multimedia management and conferencing services in the different tools to be developed and evaluated in various trials. A work plan for qualification and testing is being elaborated (see next chapter).

7 Workplan

Since most development are planned at INPT and also to some extend at Silogic (both organisations being located in the same city, Toulouse-France), we plan to install the platform at INPT premises.

INPT also benefits from privileged connections to most National academic&research network infrastructures such as Renater/Geant, ensuring best IP connections to the Internet world in terms of capacity, quality of service and reliability.

The rough work plan decided so far includes the following major milestones:

- Radvision provides the IVP (hardware and software) platform and helps installing it at INPT premises (at the moment, planned for M24)
- Radvision provides a training session to KP-Lab developers involved in multimedia services (at the moment, planned for M24)
- INPT develops a prototype application allowing sharing video/audio streams (M27).
  Release 2 of this document will reflect on these experimentations. This will be D4.3.2 – due originally M26 in the M13-M30 Description of Work but likely shifted to M28 in the forthcoming M25-M42 DoW for taking into account current delays in the deployment of the solution. The document will detail the proof-of-concepts developed so far, give recommendations and guidelines for further developments and tests.

- INPT and other partners (likely Silogic as main co-developer) further specify and develops multimedia and conferencing services to suit the needs of KP-Lab community (M28 until end of project)

Radvision provides technical support to IVP developers and administrators throughout the project life.

INPT ensures access of all KP-Lab users to conferencing and multimedia services by providing necessary network and computing facilities, throughout the project period.

8 ANNEX 1 State-of-The-Art and Standards

This annex describes the main network and communication technologies real-time communication applications are built on. The Real-time communication and conferencing domains are rich of technologies both at software and hardware levels. A first part will give a comprehensive glossary giving a reference for the terms and acronyms used.

In a second part, the state-of-the-art is addressed; the evolution from classical telephony technologies towards IP-based communication is reminded and the tremendous rise of IP standards in tools are described. Technical providers also often have to offer cross-boundary solutions for bridging exploding mobile telephony demands for services with traditional networks ones.

In a third part, the annex presents more extensively than in this main document, main issues encountered when such solutions are deployed. Organisations security policies often are a limitation factor in wider adoption of these technologies. These chapters present traditional technical and political solutions that can be implemented, based on Radvision experience also with demanding customers.

9 ANNEX 2 Technical Presentation of the IVP Platform

This Annex presents in more details the different components of the Scopia's IVP platform that can be provided by Radvision.

****** End of the Document ******