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1 Table of Contents

2 Executive Summary

This document constitutes the final version of the VITAL++ market assessment and the VITAL++ exploitation plan. The new trends and developments on the relevant VITAL++ markets are presented as an update to D6.3 *Interim Market Assessment*. A first approach of the VITAL++ exploitation plan has been presented in D6.2 *Impact Creation Plan.* This approach has further been developed to the final VITAL++ exploitation plan provided in this document.

The main outcomes are as follows:

- Standardisation groups are putting effort into the integration of P2P mechanisms with existing SIP and IMS standards.
- The IETF P2P SIP Working Group deals with the principles required for the integration of both worlds.
- The 3GPP TSG SA proposes edge servers to cope with increasing media consumptions. The edge servers are part of a managed overlay network; the concept of super-peers has been introduced, as well.
- The concept of P2P live streaming still has not been taken up by the industry.
- Streaming services more and more replace downloading services.
- Network operators present IMS products, but are still lacking P2P services due to missing products on the market.
- RBB has started collaborating with Volkswagen Group Research – Connected Infotainment, planning to develop a VITAL++ related prototype of the personalised radio.

3 Market Assessment

3.1 Update on VITAL++ related Technologies

The new trends and development for the combination of P2P and SIP technologies are addressed in the P2PSIP working group. Their latest effort is an Internet Standard[1] that defines concepts and terminology for the use of the Session Initiation Protocol in a peer-to-peer environment. In this document, the traditional proxy-registrar and message routing functions are replaced by a distributed mechanism and the registration mechanisms are proposed to be implemented using a distributed hash table or other distributed data mechanism with similar external properties. In the P2P-SIP Internet draft, a high-level view of the functional relationships between the network elements, a conceptual model of operations, and an outline of the related problems addressed are included.

Another effort is carried out by the 3GPP organization. Their effort is currently at release 11 of the technical report 22.906 V11.0.0 (06/2010)[2]. IMS is, of course, specified by the 3GPP and is viewed as a fixed and mobile convergence core network to provide multimedia services. IMS defines an infrastructure for user authentication, registration, service discovery, and multimedia session control and etc. These technical reports present the content distribution services in a Peer-to-Peer manner based on IMS from the TSG-SA1[3] perspective and identify the use cases and potential service requirements.

In the TSG technical reports, P2P based solutions are proposed to noted problems of increasing media consumption. This has resulted in an enormous growth of media servers in order to provide streaming services to the increasing amount of end users. In addition, centralized streaming media servers make considerable demands upon the backbone Internet IP network. So it is required to deploy more and more edge servers close to user entities (UEs) to guarantee service quality for the ever-increasing number of users.

The 3GPP proposes the use of Peer-to-peer technology between edge servers and UEs in order to solve the problem stated above. In this way not only the edge servers handle the requests from their locally served UEs, but also they can handle the requests transferred from the neighbouring edge servers.

[1] https://svn.tools.ietf.org/html/draft-ietf-p2psip-concepts-03

[2] http://ftp.3gpp.org/specs/html-info/22906.htm

[3] 3GPP TSG Service and System Aspects Workgroup

Similarly, if the UE's capabilities permit, the UE can offer spare uplink bandwidth and storage space while obtaining data, and uploads data to other requested destinations. Content is transmitted in a segmented manner, and most of the traffic can be spread across the edge of the network, which helps reduce the storage and bandwidth demands of centralized servers. So the system scalability is improved along with the increasing number of edge servers and UEs.

Considerable effort continues to be invested into improving the efficiency of P2P technology in applications. Management of the overlay network used by P2P applications and networks is essential, as inefficiencies here can, in turn, negatively affect the underlying network topologies. Involving super-peers and service providers is essential for effective modelling of P2P networks. Involving these parties in the application of technology, such as Application-Layer Traffic optimisation (ALTO)[4] and Proactive network Provider Participation for P2P (P4P), is essential[5].

ETSI's Telecommunication and Internet converged Services and Protocols for Advanced Networking Technical Committee (TC TISPAN) continue to adapt and refine Release 3 of the NGN specifications, with particular emphasis placed on areas such as IPTV, QoS in the Customer Premises Network (CPN) to manage resources which reside in the home network, RFID security, NGN security, and regulatory issues[6].

ETSI TISPAN released a technical report into using P2P technologies to deliver IPTV services in the context of NGN. Mentioned in the report is a major P4P trial conducted by several ISPs and universities. Initial results indicated that the use of P4P increased network throughput by as much as 57-85% when compared to a random swarm[7]. ALTO is also specifically mentioned in the report as a concept that can be used to create managed-P2P overlay networks.

3.2 *Update on VITAL++ related Services*

Looking at current developments and scientific publications it becomes apparent that all discussions and publications on the combination of IMS and

[4] IETF, Application Layer Traffic Optimisation – Charter, https://datatracker.ietf.org/wg/alto/charter/

[5] Al-Oqily et. Al, A. Karmouch: Towards automating overlay network management (2009)

[6] Muench, R.: Telecoms & Internet converged Services & Protocols for Advanced Networking

[7] elecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Peer-to-peer for content delivery for IPTV services: analysis of mechanisms and NGN impacts (2009) http://docbox.etsi.org/tispan/Open/NGN_LATEST_DRAFTS/RELEASE3/02075-ngn-r3v009.pdf

P2P date back before 2010. However, there is evolution with respect to P2P based streaming, video streaming.

More specifically, in the area of P2P streaming the only new service since D6.3 seems to be http://streamerp2p.de/, a Shoutcast compatible Streaming client and server. The latest Beta Version was released in February 2010. However, this was also the latest news provided by the developers, but the forum is still very alive and holds current information on new StreamerP2P websites that are being launched in several countries and languages. All in all, StreamerP2P.com seems to be a working P2P streaming solution with small installation effort and low bandwidth requirements, but does not look as if it could have major market impact. Additionally, from the research and academic sector, P2P Next has launched a trial (http://trial.p2p-next.org/) that is based on their SwarmPlugin and their platform for provisioning of live streaming by use of Web browsers.

As far as video and media streaming in general is concerned, streaming solutions seem to be gaining ground in the new era of entertainment with major players in the filed of consumer electronics adopting such techniques in their product portfolios. For example the new "Apple TV" device provides access through the iTunes to a multitude of media offerings. Amazon VoD service is compatible with a plethora STBs and also available in personal computers. ADSL and Internet Providers are offering streaming TV and on-demand movies and shows via STBs. Direct streaming however seems to have replaced P2P techniques due to the fact that P2P was closely related to video downloading in advance of playing.

User provided content remains also a popular concept with respect to either pre-recorded video provided through services like YouTube and DailyMotion and by use of Adobe Flash technology and potentially by use of HTML5 (at least for video viewing) or live content such as Justin.tv for iPhone and LiveU services. News reports indicate related investments in the field of these services.

In general, it seems that media streaming business are continuously evolving although the evolution is not necessarily combined with advances in the technology used. On the other hand, P2P Live streaming, although involving more complex and advanced technology, seems not to find remarkable attention in the industry but rather in academic and open source circles.

3.3 Update on VITAL++ related Products

3.3.1 Telefonica's Products

3.3.1.1 Imagenio

As it was described in greater detail in D6.3 Telefonica, under its trademark Movistar, operates and commercialises Imagenio. Very briefly, this product enables a subscriber to receive a wide variety of Broadcast TV Channels and Video on Demand Services through an IP-ADSL link established over the PTSN, by paying a monthly fee that depends on the amount of channels (or more precisely, sets of channels) he/she had contracted, with an extra charge for each Video On Demand content is consumed.

Although Imagenio and the Internet Access provided by Movistar take advantage of the same ADSL connection, both services have been kept apart till recently, entailing that a user was unable to retrieve and play Imagenio's contents in a PC/Laptop or to navigate the Internet by using his/her TV set. However, since the trend in telecommunications is to allow the access to any services by means of any device available to the user using whichever available connection, Movistar has started to commercialise as an upgrade to Imagenio, a product known as Videoclub Imagenio, based on the Mediabox Device, which will help to mesh those two previous services, ADSL Internet access and Imagenio, to create a new, more complete one.

In short, the Mediabox Device will enable the user to:

Download any Imagenio's multimedia content the user has been granted permissions and play it on any device connected to the ADSL router installed at the user's home, like PCs, laptops, cellular phones, multimedia hard disks, iPhones, DLNA devices, etc, either by directly plugging them to the router or via a Wifi connection.

Play on the TV Set any multimedia content stored in any user's devices accessible via the private IP network managed by the ADSL Router.

Play multimedia contents available in internet sites, like YouTube, Dailymotion et al, not only on the TV Set, but also in any device connected to the user's home network put at his/her disposal by the ADSL router.

However, for the initial launch of the service, those capabilities described above are limited to the play of multimedia contents on the TV Set, either available in the Imagenio platform or stored in user's devices connected at his/her home network. Besides, the internet Video sites the user can access and use are also restricted to a few selected ones.

As the service gets its stride, the remaining capabilities above described will be added in order to make available Imagenio to any device located at the user's home network and also to enable multimedia navigation through Internet from the TV set.

3.3.2 A1 Telekom Austria's Products

3.3.2.1 A1 over IP

A1 over IP[8] is an IMS product of A1 Telekom Austria, which has been launched in February 2007. It has been realised as dedicated IMS application on top of an IMS core platform. The following features are offered:

- VoIP account with public Internet access to IMS platform
- Multiring: For existing mobile subscribers, simultaneous ringing on mobile phone and VoIP client is offered. Both, the VoIP and the mobile account, use the same mobile number.
- Instant Messaging, SMS and Follow Me
- Presence
- Desktop Sharing
- Video calls

With A1 over IP the subscribers are able to make and receive calls with a national mobile subscriber number, also when being abroad. A fixed monthly fee, but no additional call charges are invoiced.

In the context of Vital++, A1 over IP, on the one side, is a pure IMS product already more than three years on the market. On the other hand, no content distribution or any other P2P related functions are provided by A1 over IP.

3.3.2.2 A1 Network Professional

A1 Network Professional[9] is an IMS product of A1 Telekom Austria for the business market, which has been launched in April 2010. It has been realised as dedicated IMS application on top of an IMS core platform. The following features are offered:

- VoIP service for mobile and fixed-line subscribers
- Use of geographic telephone numbers
- Deployment on corporate LAN network
- Fixed network termination. When a phone service with geographic numbers is offered in Austria, a fixed network termination has to be guaranteed by the operator. This functionality is required for emergency calls in order to provide the correct place of the calling party.
- DSL broadband access for QoS-assured fixed-line voice
- DSL broadband access for best effort Internet service
- Hardphones, softphones (PC clients) and mobile devices as terminals

[8] http://www.a1.net/privat/a1overip

[9] http://www.a1.net/business/networkprofessional

- Hosted IP PBX (IP Centrex) with identical feature set across the different devices and extensions
- Fax over IP, Fax2Mail (iFax)
- Self-administration of all users including register and unregister of SIMs
- Telephone reception feature
- Transfer of fixed-line number to IMS platform (number porting)
- Customer Self Care Portal

In the context of Vital++, A1 Network Professional, on the one side, is a pure and converged fixed mobile IMS product launched this year. On the other hand, no content distribution or any other P2P related functions are provided by A1 Network Professional.

3.3.2.3 aonTV

A detailed description of the A1 Telekom Austria IPTV platform called aonTV[10] has already been given in ch. 10.2.2 of D6.3.

Since the time of writing of D6.3, aonTV has been enhanced with the feature "Meine Medien". "Meine Medien" offers the user the opportunity to upload photo, music and video files onto a personal online storage and to view the content on the TV set. The content can also be accessed by a web browser via public Internet or on selected mobile devices. The user generated content can be shared with other aonTV users, as well. Transcoding has been implemented in order to support various mobile devices.

Beside online also local content on a PC can be accessed by aonTV and viewed on the TV set. The "MedienManager", a dedicated aonTV application, has to be installed on the PC. The set-top box is connected with the local PC via the routing function of the DSL modem.

Further content extensions will include Facebook, Twitter and Youtube integration on the set-top box. Web Browsing applications are considered, as well.

In the context of Vital++, aonTV offers significant potential to optimise the streaming schemes within the distribution network and for the exchange of content among users.

[10] http://www.telekom.at/site/produkte/tv/

3.4 Market Analysis

The relevant VITAL++ market areas evolve into different directions. Standardisation is working on the integration of P2P mechanisms with existing SIP and IMS standards.

The IETF P2P SIP Working Group deals with the principles required for the integration of both worlds.

The 3GPP Technical Specification Group for Service and System Aspects (TSG-SA) has introduced P2P enabled edge servers to cope with increasing demands on media consumption. Managed overlay networks and super-peers are used for this purpose.

The VITAL++ related services show a strong trend towards direct streaming instead of downloading services. The market analysis has revealed that industry has still not adopted the concept of P2P live streaming.

Commercial IMS products are already offered on the market by network operators, but P2P related products can hardly be found. The simple reason is the lack of ready-to-use P2P products on the market.

4 Exploitation Plan

4.1 Teléfonica I+D

For Telefonica, the most appropriate niche for the deployment of a project like Vital++ is the Imagenio Platform.

As it has been previously commented in D6.3 and also in this deliverable, Imagenio aims at distributing TV Channels and Video On Demand contents to the subscriber's home, by taking advantage of an IP-ASDL link established over the PSTN access. However, Imagenio is only focused in the mere playing of multimedia contents on the TV set, controlled by means of the remote, and does not take advantage of the Internet navigation capabilities of the IP-ADSL link, nor allow the playing of multimedia contents stored in devices connected to the home network built around the ADSL router, either by direct plugging to this device or via a Wifi connection. Besides, Imagenio's subscribers are not aware of other users' existence nor can interact with them, for instance to share their likes and dislikes.

By using Vital++, Imagenio can put its huge library of multimedia contents at the disposal of any Imagenio's subscriber navigating the Internet, regardless of those contents being currently broadcasted by a TV channel belonging to the platform or available in the Video on Demand services, and play it in any device, like a PC, laptop, iPhone, mobile phone, multimedia hard disk, etc, connected to the user's home network, instead of being constrained to watch it on the user's TV set. Besides, the AAA capabilities of Vital++, provided by its subarchitectures, make quite easy to ensure that only Imagenio's subscribers are allowed to access those contents, to grant the appropriate rights and licences according to his/her subscription level and to charge the consumption of those multimedia contents to the Imagenio's subscription owned by the user.

Thanks to its huge subscriber's population, a GUI similar to the one developed by RBB will help to create a social network consisting of Imagenio's users, where they can not only check which contents are being watching by other subscribers, and consequently receiving most of the buzz, but also upload private contents to be shared with friends or be notified of contents matching their likes and dislikes, according to their preferences.

To conclude, since IMS is an integral part of Vital++, subscribers joining this social network can also share their impressions on the offered contents with other users, either by using instant messaging or by launching a peer to peer conference, whose quality will depend on each other terminal's multimedia capabilities.

4.2 *Rundfunk Berlin-Brandenburg*

RBB has started collaboration with Volkswagen Group Research – Connected Infotainment, planning to develop a prototype of the personalised radio together with a special focus on specific requirements in car entertainment. These specific requirements concern both, particular personalisation strategies as well as content streaming technologies. The envisaged prototype is planned to be available in December 2010 with an option to discuss its further development if it proves feasible and convincing.

Beyond that the concept of an Internet-based personalised Radio Service won many supporters within RBB and its closely connected partners so that further exploitation is very probable as the service matures.

4.3 BlueChip Technologies S.A.

Bluechip SA is a vendor of smart cards for mobile devices having a sales portfolio comprised of the largest telecom operators and service provides in the region of Balkans. Being deeply involved in selling, programming and customizing smart cards, Bluechip is highly interested in investigating how to exploit VITAL++ P2P algorithms on smart card applications (USIMs) so that they can be directly exploitable by the advanced user applications of mobile terminals for media streaming, exchanging and peering.

4.4 A1 Telekom Austria AG

A1 Telekom Austria will exploit the Vital++ results on the existing IPTV platform described in chapter 3.3.2.3.

Telekom Austria is going to enhance the IPTV service by offering additional P2P channels and by implementing VITAL++ concepts for QoS assurance and measurement. In this way, Telekom Austria will have an added value for the IPTV service to be sold to premium customers as add-on package. Telekom Austria intends to optimize the distribution mechanisms for the IPTV channels in order to improve the scalability of, e.g. HDTV channels based on MPEG4. In this way, CAPEX for switching components and for link capacities can be saved.

4.5 Voiceglobe Belgium Sprl

Voiceglobe is a third party provider of communication services and applications. Voiceglobe service portfolio today comprises voice and simple data exchange services implemented over the SIP protocol. Voiceglobe services are offered on various software clients (such as x-lite), while service coverage includes users of residential and mobile networks.

Through VITAL++, Voiceglobe aims at enhancing its portfolio of services with the addition of capabilities for multimedia streaming. As bandwidth conservation is of paramount importance VITAL++ P2P algorithms would be exploited on Voiceglobe software clients as a means of keeping bandwidth utilization as minimum as possible, while retaining acceptable communication performance.