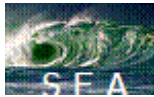












Publishable Summary

Project acronym :	SEA			
Project name :	SEAmless Content Delivery			
Logo				
Project URL :	http://www.ist-sea.eu			
Project LinkID :	http://www.linkedin.com/e/gis/1736267			
Project Type & Reference :	STREP ICT-214063			
Project duration	24 months (01/01/2008 – 31/12/2009)			
Total budget :	3.290.533 € (including own contribution)			
Action lines :	Information & Communications Technologies			
Clusters :	Networked Media			
Project Co-ordinator :	Technical Co-ordinator :			
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SEA Consortium				
Company Name	Logo	Type	Country	Role
ST Microelectronics		Industry	Italy	<ul style="list-style-type: none"> • Project Administration Coordinator • WP6 Leader • Responsible for the testbed & Validation • Responsible for H.264/MPEG4-SVC and MVC video server coding & streaming • P2P streaming technologies optimization
Synelixis		SME	Italy	<ul style="list-style-type: none"> • Project Technical Coordinator • Contribution to the service architecture • Participate in the modelling & adaptation • Responsible for projects Liaison tasks
Thomson Grass Valley		Industry	France	<ul style="list-style-type: none"> • Participate in the system encoder design and implementation • Participate in the modelling & adaptation. • Participation in the in the PQoS enrichment
Philips Consumer Lifestyle		Industry	The Netherlands	<ul style="list-style-type: none"> • WP7 leader • Responsible for the sHMG system • Responsible for development/ porting of the applications user terminals.
Vodafone Panafone		Telecom Operator	Greece	<ul style="list-style-type: none"> • WP2 Leader. • Contribute to the cross layer optimization and network adaptation parameters • Responsible for the 2G+/3G/B3G testbed
Nomor Research		SME	Germany	<ul style="list-style-type: none"> • WP4 Leader • Cross layer control analysis & modelling

				<ul style="list-style-type: none"> • Integration of sNMG with the SAE • Implement the SAE multi-RAT testbed • 3GPP and IETF standardization activities
Fraunhofer /HHI		Research Institute	Germany	<ul style="list-style-type: none"> • WP3 Leader • SVC/MVC encoder/decoder, SVC/MVC storage, signalling and transportation. • Integrated SVC/MVC/MDC video distribution application. • Responsible for the MPEG/JVTG and the IETF standardization activities.
Politecnico di Torino		Research Institute	Italy	<ul style="list-style-type: none"> • MDC extensions to the SVC/MVC encoder/decoder • Responsible for the analytic P2P models • Responsible for validating of the multi-source stream over P2P.
Universidad Politécnica de Madrid		Research Institute	Spain	<ul style="list-style-type: none"> • WP5 leader • Responsible for A/V content distribution • Responsible for content protection
University of California, Los Angeles		Research Institute	USA	<ul style="list-style-type: none"> • Contribution to the P2P modelling and parameters optimization. • Responsible for the PlanetLab P2P testbed. • Validation of the results with respect to the P2P parameters

SEA positioning

SEA consortium is confident that in a few years everyone will be multimedia content producer (by publishing digital pictures, video recordings, remote e-health services, home surveillance, etc.), multimedia content mediator (by storing/forwarding streaming content) and multimedia content consumer (digital television, video on demand, mobile broadcasting and alike). Towards this forthcoming age, SEA (SEAmless Content Delivery) aims to offer a new experience of seamless video delivery, maintaining the integrity and wherever applicable, adapting and enriching the quality of the media across the whole distribution chain.

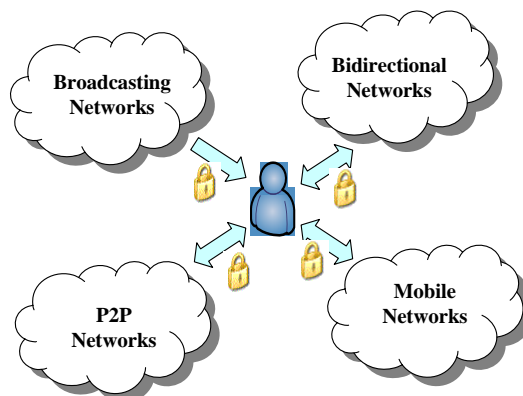


Figure 1: The SEA Concept

As shown in Figure 1, SEA places the user acting as **content consumer, content mediator** and **content producer**. The figure demonstrates the heterogeneous physical and logical architecture, over which SEA aims to enable personalised, scalable, seamless and trusted multimedia content delivery, while protecting content from unauthorized access. Moreover, aims to keep bandwidth requirements low and increase the Perceived Quality of Service (PQoS).

In more details, SEA aims to introduce novel services and new business models by innovating over three key-content delivery pillars:

- A) Multi-layered/Multi-viewed content coding.** SEA considers the evolving H.264/MPEG4-SVC and MVC as the major content delivery technologies over heterogeneous networks, terminals and large audiences. SVC will offer layered temporal/spatial/quality content scalability, while MVC will allow the user to select among the different views embedded in a single video stream. Future truly free-view point applications will become available by adding depth information to MVC coded sequences.
- B) Multi-source/multi-network streaming & adaptation.** SEA will offer on-the fly content adaptation, inherited resiliency and enriched PQoS by dynamically combining different content *layers*, *views* and *representations* transmitted from multiple sources (different servers or peers) and/or received over multiple diverse paths or networks. Reconstruction of the content segments may take place either within the network (for low-end terminals) or at the end-user terminal in case multi-network connectivity.
- C) Content Protection and lightweight asset management.** New business models for large scale content distribution will be facilitated side-by-side to a proper content protection and asset management mechanism. Within SEA, personalised content protection will be offered, covering not only the legacy content creation chain, but also the private multimedia content. The work will advance in the adaptation of the content protection solution for new media in P2P networks.

SEA will test and validate the developed technologies over real testbeds and real-time emulators of various networks (3G/4G, WiMAX, ADSL and WLAN IEEE 802.11b/g/a) along with a large state-of-the art P2P testbed and a real 3G/4G network. Over this heterogeneous architecture, an innovative P2P IPTV-like application will efficiently combine and utilise all SEA networking and multimedia technological advances, validate the SEA concept and optimise the SEA platform behaviour.

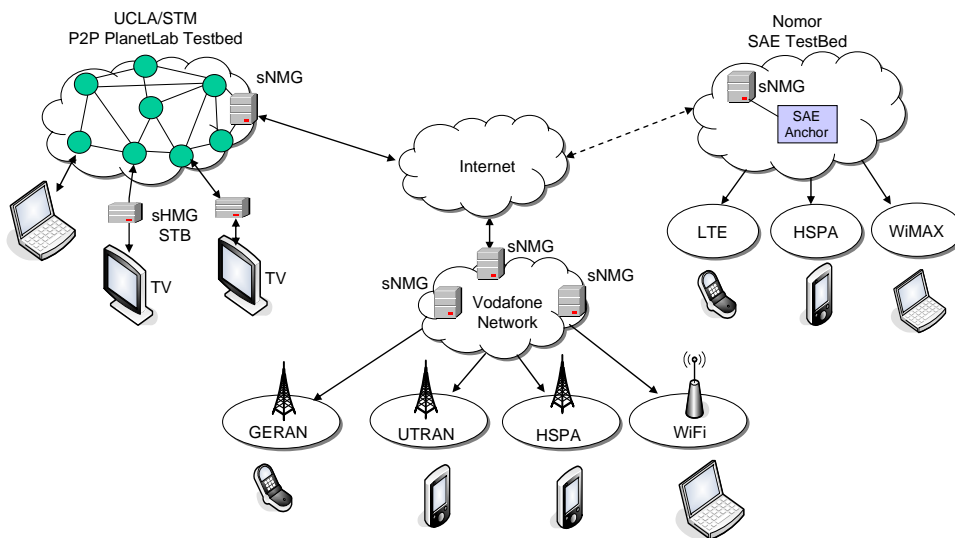


Figure 2: SEA testbed architecture

SEA will eventually provide the means to distribute A/V user-centric services (infotainment, healthcare, e-learning, home surveillance), with superior quality and striking, flexibility, seamlessly in a trusted and personalized way, improving citizens quality of life, entertainment and safety.

The project duration is 24 months (1/1/2008 – 31/12/2009). More info may be found at the project web site: www.ist-sea.eu

Achievements in this period

Within the period 1/1/2008-31/12/2008, a number of objectives have been achieved. In more details:

- 1) **Technical Achievements.** SEA has successfully met all major technical milestones. In more details:
 - **H.264/MPEG4-SVC and MVC encoders/servers and decoders/receivers** have been implemented for point-to-multipoint and point-to-point topologies.
 - Mechanisms for video streaming **transport of H.264/MPEG4-SVC and MVC** have been specified and implemented.
 - A **highly flexible SVC/MVC file format** has been developed which meets all requirements for the storage of MVC content and appropriate describing metadata.
 - Provide efficient **mechanisms for allowing adaptation of integrity-checked media**. Adaptation will furthermore depend on the used underlying access network (multi-homed terminal) and their characteristics, which have to be considered to the adaptation instance.
 - **Fast and efficient discovery and location of compatible and complementary content segments** (i.e. layers, descriptions, formats) in alternative providers/peers, without flooding the network.
 - Definition and implementation of a **novel MDC scheme compatible with SVC/MVC base layer**, allowing easy and efficient tuning of the redundancy according to the underline network conditions following multi descriptive nature on video bitstream level.
 - Implement a **CLC methodology** able to face the end-to-end network and terminal heterogeneity and get benefit of the advanced encoding/protection A/V schemes and the P2P topologies.
 - Implement **content protection and rights management solutions for new media in P2P networks**, based on the adaptation of standard solutions such as MPEG-21-IPMP.
 - Implementation of a **P2P streaming protocol** (SEACAST), based on ISMACryp Extensions has been provided and integrated into a multiple-tree architecture and on the VidTorrent open source protocol.
 - Integration of the **MDC scheme with SEACAST**, so that each tree of the overlay network carries a given description.
 - Set up of **P2P evaluation test bed** on local machines and set up of PlanetLab test bed
 - For the server side, an **encrypting proxy based on ISMACryp Extensions** has been implemented. A library for the decoding of SVC and MVC encoded streams
 - Define and implement the **SEA content management solution** for content exchanging and delivery in P2P mesh networks for privacy and respect property rights. This definition includes the specification of the license server functionalities and architecture and the key management system. We have leant towards a general implementation in order to make it interoperable with other digital content protection standards.
- 2) **Knowledge Dissemination.** Apart from the Web site, where a number of public documents can be downloaded, SEA has published a number of papers in refereed conferences/workshops and made a number of poster presentations. More papers have been submitted and they are still under review.

SEA has actively participated in the Fall 2007, Spring and Fall Networked media Concertation meetings in 2008, and is leading the Media Delivery Cluster of projects.
- 3) **Contributions to standards.** SEA has been quite active participating and contributing in a number of relevant standardization forums. SEA delegates have participated and/or contributed to IETF and MPEG standardization activities.
- 4) **Project Liaison.** SEA has liaison and interoperated with the projects Adamantium, Optimix and P2P Next. Moreover, SEA have started liaison activities and provided use cases to the FIRE.
- 5) **Future Internet Activities.** SEA has played a very active role in the Future Internet Activities, leads the Future Content Networks session and has contributed to the various other sessions.