

Video Distribution Over MPLS networks supporting heterogeneous format environments

VIDIOS has optimised the quality of video services transmitted via a state-of-the-art Internet infrastructure to a DSL broadband access network. VIDIOS aimed to integrate bandwidth on demand and video service error protection into video distribution, contribution and conferencing services.

Main focus

As a first step, VIDIOS designed and deployed a video streaming architecture suitable for state-of-the-art DSL broadband accesses. Most European Internet backbone networks are based on Multi Protocol Label Switching (MPLS) technology and offer QoS according to the IETF (Internet Engineering Task Force) DiffServ architecture. To adjust for potential network shortcomings, VIDIOS optimised the video distribution architecture, video coding, Internet and Ethernet / ATM

broadband access QoS features. Charging will be based on content access and hence decoupled from the communication service. Digital Rights Management features have been investigated to ensure respect for copyrights and access control.

In a second step, VIDIOS added bandwidth on demand (BoD) services and QoS for video streaming services for guaranteeing high levels of user satisfaction. Developing advanced video services at the lowest possible cost is the fundamental paradigm of VIDIOS. VIDIOS limits new interfaces and QoS signalling to local networks and backbone edge routers. Efforts required to produce a value-added service access justify extra charges. Settling of bills and protection against service misuse will require authentication and ciphering. Finally, signalling, access and admission control features were an integral part of on-demand end-to-end QoS in VIDIOS.



VIDIOS

Project ID: CP2-029

Start Date: 1 January 2005

Completion date: 1 January 2007

Partners

Servicios Avanzados de Tecnologías S.A. (SATEC), Spain

Scopus, Israel

Telefónica I+D, Spain

University of Murcia, Spain

Co-ordinator

Antonio F. Gomez Skarmeta
University of Murcia, Spain
E-mail: Skarmeta@dif.um.es

Project web site

www.celtic-initiative.org/projects/vidios

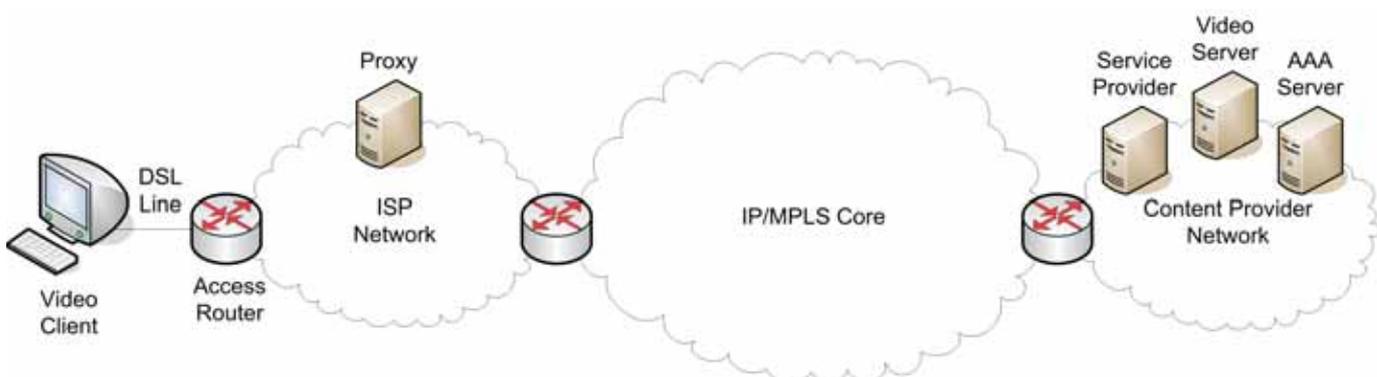


Figure 1: VIDIOS architecture

Approach

The VIDIOS project was organized in six work packages and the tasks dissemination and project management. The work packages were:

1. Video Distribution Architecture

The video distribution architecture optimizes an IP/MPLS network for video distribution supported by statically assigned network quality of service. A general design aim is to minimize additional investment into existing networking platforms.

2. Codec Adaptation

Architecture design of video distribution over IP/MPLS networks - optimization of video service components by error concealment and error protection adjusted for transmission over IP/MPLS networks.

3. VoD Application and Trial

As a first key application, VIDIOS designed and deployed a Video on Demand environment over MPLS with users having state-of-the-art DSL broadband accesses. The VIDIOS VoD service demonstrates the extension of IP network capabilities to "triple play".

4. Bandwidth on Demand (BoD) Architecture

WP4 specifies a Bandwidth on Demand service based on end system- and measurement-based admission control in the core network combined with signaled QoS resource administration on the access line.

5. Video Contribution over (G)MPLS
The MPLS and GMPLS based video contribution architecture models consist of QoS models, Fast Rerouting models, QoS-Monitoring and a user service management including the definition of a Network to User Interface (UNI).

6. Bandwidth on Demand (BoD) applications and trial

WP6 validated the infrastructure, technologies, services, and applications analyzed, designed and/or deployed within the project by a trial network.

Achieved results

The VIDIOS consortium delivered an "Integrated Communication System Solution". VIDIOS united the most important players of video communication and distribution within a single project, which designed trials and validated all elements of the "media chain" of a video service produced over an IP/MPLS network. Adding more value to broadband access technology by enabling advanced video services, VIDIOS increased the attractiveness of broadband accesses and ensured convergence by supporting DSL broadband access types, secure service access and content management, application of open standards and interfaces. The full system and services were developed, integrated and tested in a network environment. VIDIOS results will definitely help to keep the European ICT sector at the forefront of global development.

The main achievement of VIDIOS was the design and development of one of the first fully usable solutions for the deployment of VoD services over the already installed network infrastructures that are mainly based on IP/MPLS cores and DSL broadband Internet access for final users. The proposed architecture in VIDIOS provides QoS and BoD, secure delivery of contents, DRM via an access control system, and advanced FEC mechanism to deal with errors in the IP networks. Moreover, several VIDIOS achieved some crucial results. Telefonica I+D has found ways to alleviate the overload of its IMAGENIO network thanks to the research on Multicast over MPLS and access control methods designed in the project. SATEC has been able to determine the real differences between the hardware offered by industry leaders in order to fulfil the high requirements of a VoD architecture with such a dimension. Scopus has developed an advanced Forward Error Mechanism and has successfully transferred that technology to real equipment, as shown in the demos of the project. Finally, the University of Murcia has shown, by publishing a number of papers, how the state of the art technologies for AAA (Authentication, Authorization, Accounting), ciphering, IP traffic control, and streaming over IP can be merged to obtain a VoD architecture able to compete with proprietary solutions.

About CELTIC

Celtic is a European research and development programme, established as Eureka cluster, to strengthen Europe's competitiveness in telecommunications through short and medium term collaborative R&D projects. Celtic is currently the only European R&D programme fully dedicated to end-to-end telecommunication solutions. Launched in November 2003, Celtic (Cooperation for a sustained European Leadership in Telecommunications) was founded and has been supported by major European telecommunication players, both vendors and operators. Celtic fills the gap between public R&D programmes not specifically focused on telecoms and short-term R&D efforts by the telecoms industry

Timeframe: 8 years, from 2004 to 2011

Total budget: in the range of 1 billion euro, shared between governments and private participants

Participants: companies from the telecommunications industry (small, medium and large), universities, research institutes, and local authorities from all 35 Eureka countries may participate in Celtic projects.

CELTIC Office

c/o Eurescom,
Wieblinger Weg 19/4
69123 Heidelberg, Germany
Phone: +49 6221 989 405,
e-mail: office@celtic-initiative.org
www.celtic-initiative.org



Impact

Internet Service Providers, IP backbone carriers and Multimedia vendors have recognized the impact and chances resulting from Media Content Creation, Transport and Distribution over Internet backbones and broadband access networks. VIDIOS developed, integrated and tested all parts of the "media chain" over DSL broadband Internet access networks and Multi Protocol Label Switching (MPLS) backbones. By applying application-oriented state-of-the-art technology, VIDIOS innovations have created opportunities for maximizing the investment returns of the telecommunication industry. Widespread access to reliable video services is an important precondition for ensuring economic success of multimedia production and distribution across Internet backbones. The architecture designed by VIDIOS applies open interfaces and standards supporting the required inter-workings and interoperation wherever these are available.