Celtic-Plus
Smart Connected World

H2B2VS

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Civolution, France
Digiturk, Turkey
Ecole Polytechnique Fédérale Lausanne, Switzerland
HES-SO Yverdon, Switzerland
HISPASAT, Spain
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Project Website

www.celticplus.eu/Projects/Celtic-Plus-Projects/2012/H2B2VS/h2b2vs-default.asp

HEVC Hybrid Broadcast Broadband Video Services

H2B2VS aims at investigating the hybrid distribution of TV programs and services over Broadcast and Broadband networks. The technology used for the contents compression is the future video compression standard: High Efficient Video Codec (HEVC). The hybrid network and the HEVC standard will allow defining new added value services.

Main focus

Broadcast networks and the current video compression standards have a limited capacity that does not allow considering easily the broadcasting of bandwidth-demanding new video formats such as 3D or Ultra-HD. Their limited capacity is an obstacle to adding new services associated with the broadcast programs. The lack of interactivity on this kind of networks is also an important problem for the development of new services.

Broadband networks have also a limited bandwidth and suffer from difficulties to guarantee the Quality of Service. However, the interaction provided by these networks is necessary for the implementation of added-value services.

H2B2VS proposes a solution to cope with the problem of limited bandwidth on both networks by using the Broadcast network to transmit the main information and the Broadband network to transmit the additional information which can even be interactive. HEVC will also be used to reduce the required bit rate.

One of the major technical challenges the project will have to face will be the difference in the Quality of Service encountered on these two types of networks. On Broadcast networks, all parameters are fully controlled by the operator. In contrast, on Broadband networks based on IP technology, parameters such as delay or jitter are not fully mastered. Synchronization between the two networks will thus be a key issue to be solved by the project.

New services will be implemented using the results obtained in the H2B2VS project. Among them, we can mention broadcasting a program on the terrestrial network and sending its complementary information for Ultra-HD over the IP network, or using the Broadband network to carry the sign language translation of a broadcast program to help deaf people.

Approach

H2B2VS is divided into three technical work packages that will allow practical demonstrations, contributions to standardization bodies and scientific publications.
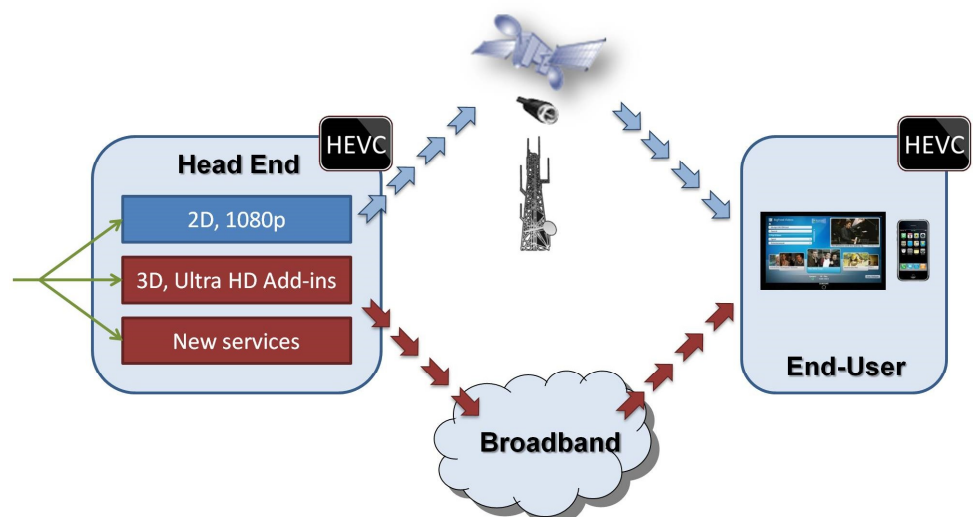
These work packages are:

- Hybrid Broadcast Broadband architecture and use case definition,
- Impact of the hybrid distribution on future technologies,
- Demonstrators.

Close cooperation between all these work packages is key to guarantee an optimized architecture as these topics have many interdependencies and this may enable the joint architecture optimization.

Additionally, another work package is setup to ensure the dissemination and the industrial exploitation of the results of the project.

The two main objectives of the first technical work package are the definition of the system architecture and the identification of the use cases that this architecture can address.

In the second technical work package, the main objective is to implement the main components of the project. These components impact most of the elements of the architecture defined in the previous work package. They are organized in five blocks:

- HEVC video encoding/decoding tools,
- Content transport and synchronization between Broadband and Broadcast networks,

- Improvement of the Content Delivery Network (CDN) to support hybrid delivery networks,
- Adaptation of the terminals to the hybrid architecture,
- End to end content protection on hybrid networks.

The setup of demonstrators in the third technical work package will make use of the components developed in the previous one, following an iterative process and allowing a progressive integration of these components (one step every 6 months).

Main results at Mid Term

The following results have already been achieved by the project:

- Twenty Use Cases on hybrid distribution have been described and six Business Model have been identified and detailed in order to monetize hybrid Broadcast-Broadband delivery.
- Three HEVC video encoders and two decoders are available, some of them working up to 4K.
- CDNs were adapted to hybrid delivery.
- The project proposed to MPEG a mechanism to synchronize Broadcast and Broadband streams; it was accepted and it will be used by DVB and HbbTV.

- Four demonstrators have been built to demonstrate hybrid Use Cases on Terrestrial, Satellite and cable Broadband networks and also security features.
- Six Use Cases are being integrated to allow demonstrations in 2015.

Impact

H2B2VS will explore two key factors that will impact significantly in the near future the multimedia contents delivery in Europe: The reduction of the bitrates in the transmissions and the hybrid distribution which is promising to be very popular. The number of TV sets connected to Internet in 2012 is estimated to more than 210 millions around the world and should grow to more than 500 millions in 2016. The proportion of TV households with a connected set is expected to be more than 40% by 2016 while it was below 15% in 2012. This kind of devices will allow the implementation of hybrid distribution without any additional cost for the users.

The Broadcast/Broadband approach proposed in H2B2VS allows the definition of new attractive added value services for the users without a high investment. The technologies to be developed such as HEVC for video compression or adapted for hybrid delivery such as MPEG-DASH enable cost-efficient storage and delivery with a good Quality of Experience for TV consumers. This gives the partners and other European eco-system stakeholders the possibility to develop their products to be more competitive and appealing.

Additionally, the services developed in H2B2VS can generate new business models based on a "pay-per-quality" concept where the Broadcast networks transports the basic quality and the Broadcast network the additional "improved-quality" which can be monetized.

About Celtic–Plus

Celtic-Plus is an industry-driven European research initiative to define, perform and finance through public and private funding common research projects in the area of telecommunications, new media, future Internet, and applications & services focusing on a new „Smart Connected World" paradigm. Celtic-Plus is a EUREKA ICT cluster and belongs to the inter-governmental EUREKA network. Celtic-Plus is open to any type of company covering the Celtic-Plus research areas, large industry as well as small companies

or universities and research organisations. Even companies outside the EUREKA countries may get some possibilities to joine a Celtic-Plus project under certain conditions.

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