



H2B2VS

D4.4.1

Exploitation plan

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EXECUTIVE SUMMARY

General

The H2B2VS project focusses on **hybrid distribution of TV programs and services** over heterogeneous networks:

- Broadcast network (terrestrial, satellite, cable) and
- Broadband network (ADSL, fibre, mobile, ...),

by making use of a **new compression technology: HEVC** (=“High Efficiency Video Coding”), also known as H.265.

H2B2VS is at the heart of the main and trendy topics related to the delivery of new TV experiences. The partners of the consortium are or will be in a position to exploit commercially the work done by the project. They have been analysing and implementing different ways and solutions to exploit the results of the project.

Exploitation Plan foundations

The deliverable D4.4.1 Exploitation Plan is based on the findings and developments achieved during the course of the project spread over 4 main work packages:

- WP1 - Hybrid Broadcast Broadband architectures and use cases definition
- WP2 – Impact of hybrid distribution on future technologies
- WP3 – Demonstrators
- WP4 – Dissemination

The main objective of the Exploitation Plan is to activate the tasks that provide a foundation for the subsequent exploitation of the results obtained by the H2B2VS project and to coordinate the dissemination and standardization activities derived from project results, such as:

- Specifications issued by WP2 to contribute to standardization bodies;
- Components development and the results of live tests;
- Demonstrators built by WP3 for the public demonstrations;
- Developments done in WP2 for their exploitation in future commercial products.

Global Exploitation Plan

As a guideline, the Exploitation Plan contains a detailed description of the identified exploitable services. Those services have been selected based on their feasibility, demonstrative aspect and mid-term exploitation opportunities:

- *Delivering content with high quality based on hybrid delivery;*
- *Customized and added-value services based on hybrid delivery.*

The Exploitation Plan also describes how these services could be exploited on the market. It presents the value chain of a typical TV channel from Content Production, broadcasters and distribution (broadcast and broadband channels) to final users (presentation devices) and provides a list of Business Models clarifying who is paying for offering the service.

Individual Exploitation Plans

Project partners have different backgrounds which makes the richness of the consortium. In their Individual Exploitation Plan, partners describe how they will exploit the results of the project, in three axis: *Exploitation activities*, *Expected main results* and *Activities presentation*. The Conclusions chapter of the Exploitation Plan contains a summary of each partner’s Individual Exploitation Plan.

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2 INTRODUCTION

H2B2VS project will focus on **hybrid distribution of TV programs and services** over heterogeneous networks:

- Broadcast network (terrestrial, satellite, cable) and
- Broadband network (ADSL, fibre, mobile, ...),

by making use of a **new compression technology: HEVC** (=“High Efficiency Video Coding”), also known as H.265.

AVC compression (Advanced Video Coding) (also known as H264) has not been specifically considered as H2B2VS consortium considered that at the end of the project, HEVC will begin to be widely deployed. Anyway, most of the outcomes of the projet are also applicable to AVC compression (e.g. synchronization, CDN optimizations, etc.).

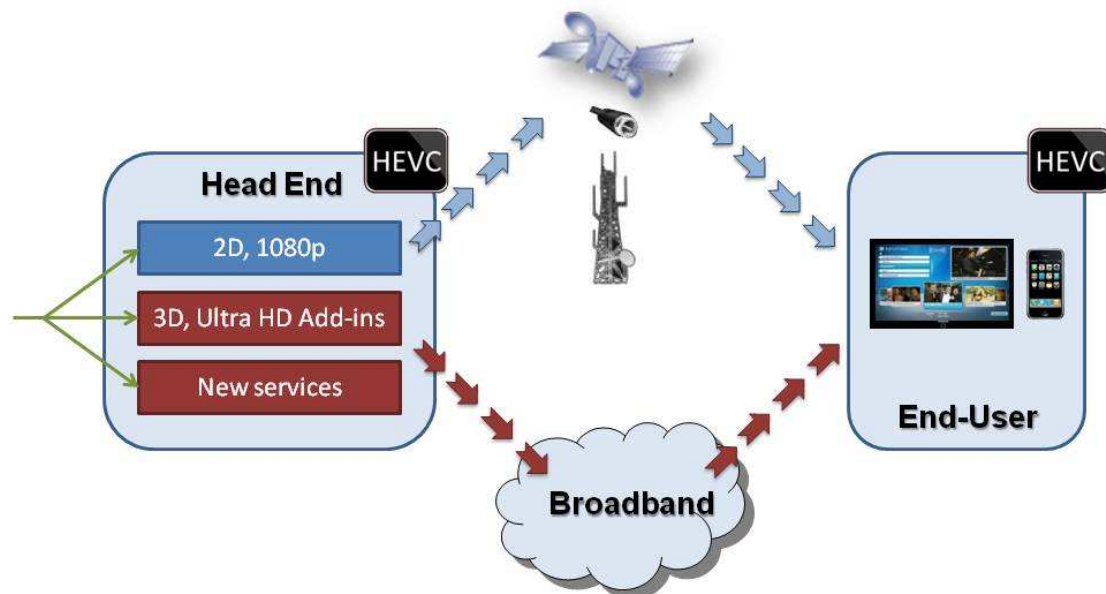


Figure 1 – Main focus of H2B2VS

Other technologies will be considered for this hybrid distribution. Among them, we can highlight:

- At transport level:
 - Protocols: DASH (Dynamic Adaptive Streaming over HTTP), MMT (MPEG Media Transport), DVB (Digital Video Broadcasting) signalling;
 - Infrastructure: use of CDN (Content Delivery network) technology for broadband delivery;
- At security level: Encryption, watermarking;

The project will also address interactions between these technologies and propose operating points to guarantee the **best quality of experience to the end user**.

3 PROJECT DESCRIPTION

3.1 Project Presentation

H2B2VS aims at investigating the hybrid distribution of TV programs and services over heterogeneous networks: Broadcast and Broadband networks, using the future video compression standard: HEVC.

This standard, which first version was issued in January 2013, will have difficulty to be commercially deployed if new video services or new video formats are not deployed simultaneously.

However, Broadcast networks 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 will also be an obstacle to adding new services associated with the broadcast programs. Using the broadband network to carry additional information in these programs is a solution. One can consider the following examples: Broadcasting a program on the terrestrial network and sending its complement to 3D or 4K over the IP network, or using the Broadband network to carry sign language translation of a broadcast programme to help deaf people, or mixing the consumption of broadcast program with customized additional content, etc.

One of the major challenges of the project 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.

Other technologies will also be considered in this hybrid distribution context. For example:

- At transport level:
 - Protocols: DASH (Dynamic Adaptive Streaming over HTTP), MMT (MPEG Media Transport), DVB (Digital Video Broadcasting) signalling;
 - Infrastructure: use of CDN (Content Delivery network) technology for broadband delivery;
- At security level: Encryption, watermarking;

The project will also address the interactions between these technologies and will propose solutions to ensure the best Quality of Experience to the end-user. In particular, one of the main outcomes of the project is about synchronisation mechanisms between broadcast and broadband.

The deployment of a hybrid solution as proposed by H2B2VS cannot be a success without contribution to standards. One of the major outcomes of the project will be contributions of some partners of the project to the relevant standardisation bodies in order to propose solutions in line with the recommendations issued from the project and that can be deployed in the field for a commercial exploitation.

4 GLOBAL EXPLOITATION PLAN

4.1 Overall Context Situation

Hybrid TV today is at the beginning of its life with several "standards" used in different countries:

- FreeView/MHEG5 in the UK
- MHP hybrid TV in Italy
- HbbTV in more and more countries

Some proprietary solutions also exist:

- Smart connected TVs: Samsung, Philips, LG, Sony, etc.
- Set Top Boxes (STBs): Google TV, Apple TV, Google Chromecast, Roku Streaming player, etc.

One standard is luckily dominating in Europe: HbbTV. It was initially a promotional initiative from broadcasters to turn the OTT threat into an opportunity and keep the viewer in the broadcaster's broadband walled garden. The consortium was formally established in 2010 and the 1st version of HbbTV specification (V1.1.1) was issued in June 2010. It was followed by version V1.2.1 in November 2012 with additional support for DASH, DRM and encryption. Work on version V2.0 started in 2013 and this should be issued in the 1st half of 2014. It will include specifications for:

- HTML5 support;
- Companion screen / 2nd Screen;
- Synchronisation between Broadcast and Broadband

Second screen and synchronisation are indeed hot topics for H2B2VS project who is considering them in the Use Cases study and implantation as well as in the standardisation actions.

After a first publication of its standard in January 2013 at MPEG and ITU, HEVC is also emerging significantly with a lot of demonstrations during last international Consumer Electronics Show (CES) in Las Vegas in January 2014 and several announcements from Silicon Valley vendors for HEVC chipsets for STBs (Broadcom, ST Microelectronics) and TV sets (Thomson Video Networks demonstrated with MStar Semiconductor the delivery of HEVC OTT content to connected TVs).

H2B2VS is thus at the heart of the main and trendy topics related to the delivery of new TV experiences. Project partners will be in a position to exploit commercially the work done by the project.

Project partners have different backgrounds which makes the richness of the consortium. They will thus envisage different ways to exploit the results of the project. This is what is described in the section **Error! Reference source not found.** of this document.

4.2 Initial identification of exploitable products and services

4.2.1 Exploitable Services

WP1 has initially defined a large variety of hybrid service use cases. A strict selection has then been carried out between partners taking into account feasibility, demonstrative aspect and mid-term exploitation opportunities. This chapter present the service use cases that will be demonstrated in the project.

4.2.1.1 Use cases focusing on delivering content with high quality based on hybrid delivery

Viewers ask for more quality. Television screen size keeps on increasing. Introduction of UHD television is already in the mind of regulators in different countries such as France. Two use cases concerning UHD have been selected. They will be demonstrated by the French partners.

Both use cases propose a solution to the major problem for UHD launch on DTT network: the scarcity of the RF spectrum.

- Hybrid distribution of 4K HEVC signal :

Generalised broadcasting of UHD services on DTT seems very difficult to achieve. But for DTT operators a solution has to be found. Indeed, there is a fierce competition between the different networks for television deliver. Satellite and cable will not have the same bandwidth constraints. To remain attractive, DTT platform will have to propose this kind of service.

An efficient mean is to use scalable encoding technique for HEVC: SHVC. The base layer corresponding to HD quality will be broadcast whereas the enhancement layer will be accessible through broadband. The Hybrid receiver will combine the 2 streams to get the full resolution.

- Hybrid distribution of High frame rate signals :

HEVC enables a lot of new features. Among them: higher frame rate, wider gamut, higher dynamic range. The launch of UHD will be a success only if there is a significant step in quality of experience with HD TV. But as previously mentioned, DTT RF resource is limited. Once again the best solution is to convey the extra data stream via broadband network.

4.2.1.2 Use cases focusing customized and added-value services based on hybrid delivery

- Trick mode on broadcast event

To keep its attractiveness, broadcast platform has to provide services to meet the viewer's needs. A constraint linked to linear TV nature is that viewer has to remain in front of the TV screen. This use case will allow the viewer to pause a live program and to resume it later. It will also be possible to go backward and forward in the program. This use case should remove one of the main drawbacks of linear TV. It will be implemented in the French demonstrators. An extension of the use case is to offer the possibility to change the video receiver when resuming the program. For instance, a viewer who watched the beginning of a film on a TV will be able watch the end on a tablet. This service could be deployed quickly in France where a restart service is already in operation (watch a live program from the beginning even when we arrive too late).

Hybrid television enables customized TV services thanks to the broadband connection. The two following use cases will be implemented on this topic:

- Advertising personalisation

The number of TV channels is increasing more and more quickly. The advertisement market has difficulty to fund it. A way to solve this problem is to increase the ads value. Targeted advertisement where the ads proposed to the viewer is optimized according to its consumption profile. This is made possible with hybrid television and a use case will illustrate it.

- PIP insertion for sign language

Customization will also be used to adapt broadcast services to particular needs, for instance for disabled people. H2B2VS will show the benefit of connected TV for sign language. Hard hearing people will be able to see an interpreter in a PIP window.

To address disabled people is a more and more frequent request, pushed by associations but also by regulators. This use case will have to manage the broadband/broadcast streams synchronisation. This is a major opportunity on connected TVs, for which H2B2VS has proposed a solution in standardisation (MPEG)

- 2nd Screen HEVC- social TV

Social TV is a major trend for teen-agers and young adults. They represent the audience of tomorrow and new trendy use cases. In some countries such as France, audience measurement takes into account not only the number of viewers but also the number of comments on social networks (e.g. number of tweets). Broadcasters want to develop exchanges in direct relation with their programs: the more viewers react, even to criticise it, the more they get involved. Broadcasters need to learn how to control this phenomenon to get the best benefit of it.

Two use cases have been described on this topic. They are closed one from the other and will be implemented on the Finnish and the Turkish demonstrators: One use case is more focusing on

social exchange on live programs, whereas the other will be on the highlight of broadcast programs.

- Uninterrupted TV services

Hybrid television can also be used to increase the QoS of broadcast TV. A use case describes how broadband TV can be used as a back-up of satellite broadcasting. The quality of the broadband link is permanently monitored by the receiver (e.g. by measuring the bit error rate), and when it reached a minimal threshold, the receiver switches automatically to the broadband delivery. This feature is very important to guarantee the QoS of for example satellite link which are tightly dependent on weather condition. This use case will be tested on the Turkish demonstrator.

4.3 Supply and Value Chain

The H2B2VS project includes the complete value chain of a typical TV channel from Content Production, broadcasters and distribution (broadcast and broadband channels) to final users (presentation devices), so the function, value, and business of every actor are affected by the new features in Hybrid Distribution offered in this project.

For the full chain value the following actors have been identified:

- Content Right Owner
It has the rights on the content.
- Producers, TV Channels
Generate the TV channel that can be sold or provided to one or several Services Providers.
- Service Provider
Usually maintains the contract with the final user and provide a package of channels.
- Broadcast & Broadband operators
Transmit the TV signal over broadcast, broadband or Hybrid environment to reach the final user
- The receiver manufacturer
The user or sometimes the Service Provider purchase the receiver for the service (STB, TV, mobile, etc). It receives value (money) at a single time.
- End User
Receives and uses the content that can be free or paid.
- Sponsor of Commercials
They pay for the insertion of commercials in TV channels and programs. Hybrid transmission enables the use of personalized advertisement for group of users or even specific users
- Others like Public Authorities, Bouquet operators, Conditional Access Providers, etc.

The use cases of the project, described in deliverables M1.2.1 and D1.2.x, show examples of applications that make use of H2B2VS features/mechanisms for Hybrid Distribution. From these use cases the following Business Models have been identified based on who is paying for offering the service:

- Services paid by the end user
In this model the End User pays for watching the TV (in a monthly subscription, for individual events, etc). As the channel is distributed over a common channel (broadcast or broadband), some kind of encryption mechanisms are needed to grant the access to the content only to authorized users.
Figure2 shows the actors involved in this business model and the related value chain.

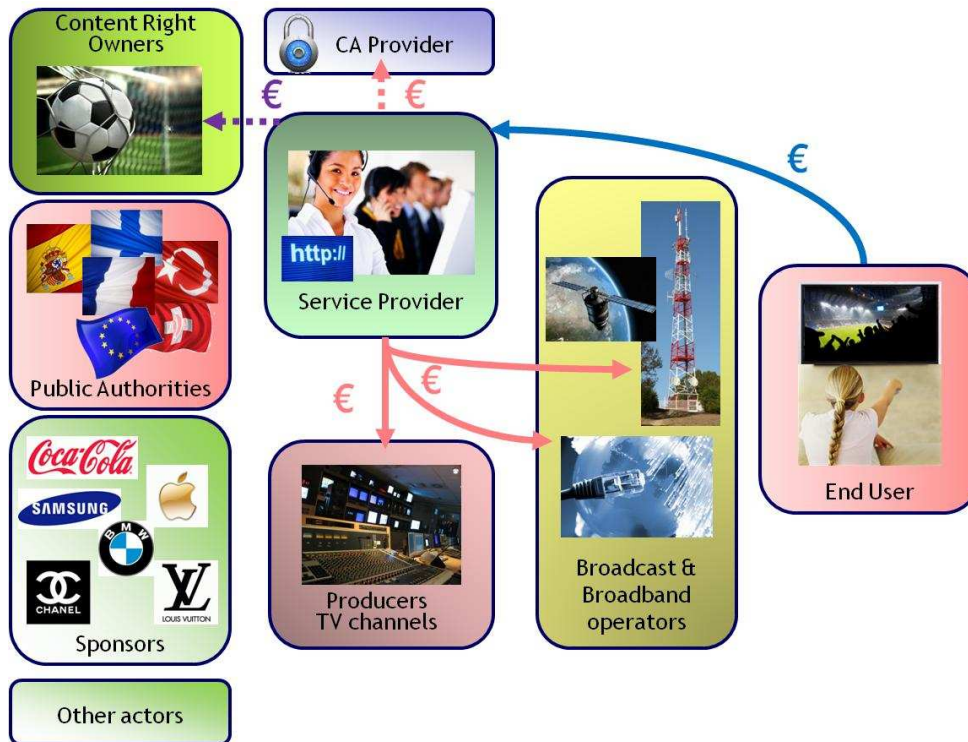


Figure 2 – Pay services chain value

The use cases included in this category are:

- Picture quality improvement
- Additional audio services (quality improvement)
- Trick Modes
- Multi-camera & Program personalization
- Follow-up of another program
- Alternate/additional content
- Uninterrupted TV service by switchover or FEC
- Live betting

- Services paid by the commercials

In this business model the source of money are the sponsors that pay to the Service provider (or to the TV channels) for the insertion of commercials. The other actors (Content Owners, Producers, CA and Operators) receive the money from the Provider.

The uses cases included in this category are:

- Multi-camera & Program personalization
- Uninterrupted TV service by switchover or FEC
- Sign language
- 2nd view social sharing, HEVC social TV
- Educative application for disabled or ill people
- Personalized advertising

- Services paid by Public Authorities

This is a special case in which Public Authorities pay the Service Provider for TV channels of public service, general interest, national channels, etc.

The use cases included in this category are:

- Educative application for disabled or ill people
- Additional audio services (e.g. regional languages)
- Regional variation of a national program
- Sign language

- Services paid by the broadcaster

In this case the source of money is the broadcaster that pays for features that improve the performance of the network.

The uses cases included in this category are:

- Trick Modes
 - Uninterrupted TV service by switchover or FEC
- Services paid by the TV Channel
The Producers / TV_channel pay for services that enhance the functionality or user experience of the TV channel.
The uses cases included in this category are:
 - Trick Modes
 - Alternate/additional content
 - Services paid by the bouquet operator
In this case the bouquet operator pays for services that improve the distribution of the contents over Hybrid networks.
The uses cases included in this category are:
 - Smart Broadcast Network

5 INDIVIDUAL EXPLOITATION PLAN

5.1 Thomson Video Networks (TVN)

5.1.1 Activities presentation

From the very onset of digital TV broadcasting, the Thomson name has been synonymous with supplying expertise, quality, and reliability to the world's leading broadcasters. Thomson Video Networks builds on this great heritage by providing unique and innovative video delivery solutions for a premium viewing experience.

The Thomson Video Networks philosophy, since delivering the world's first large-scale direct-to-home satellite system, has always been the same — to provide the best possible picture quality across any networks, to any devices. As a worldwide leader in compression systems for satellite, terrestrial, cable, IPTV, mobile TV, and Web streaming, Thomson Video Networks is helping its customers to deliver superior quality video to anything from small handheld devices to large 3D high-definition screens, with the lowest bandwidth to ensure a profitable business model.

A trusted supplier with more than 20 percent of the active channels deployed worldwide, a global support presence, and culture of delivering quality at every stage, Thomson Video Networks boasts the experience and range of products to supply every need, from hybrid multi-format compression systems to contribution links for content exchange networks.

In the framework of H2B2VS project, Thomson Video Networks plays a major role in the adaptation of HEVC encoding to the constraints imposed by the use of hybrid networks to deliver new video services. TVN also contributes actively to the studies done on the transport layer, with a special focus on the synchronisation on hybrid networks with contributions to MPEG and DVB on this topic.

5.1.2 Expected main results

The results of the project will be used to strengthen the expertise of Thomson Video Networks in the domain of distribution networks with a special emphasis on hybrid networks. These results will also help TVN to acquire the necessary knowledge about the HEVC emerging standard.

Through the communication done by the project led by TVN, Thomson Video Networks intends to increase its visibility towards its customers and demonstrate that it is a partner everyone can rely on for innovative solutions in the area of hybrid TV.

Prototypes developed and experimented during the course of H2B2VS project will be the basis for the development of new products matching customers' requirements and increasing TVN's revenue.

5.1.3 Exploitation activities

Exploitation activities for Thomson Video Networks are mainly driven by Communication, standardisation and Use Cases studies.

Communication

As leader of Task T4.3 (Project communication and public demonstrations), TVN, from the beginning of the project, is paying a special attention to highlight projects results. It was done through the publication of Press Releases and public demonstrations (a press release and a demonstration were done with Hispasat at the occasion of IBC 2013). This communication work will continue until the end of the project and opportunities for new communications are already identified. As explained in the previous paragraph, here, the objective for Thomson Video Networks is to increase its visibility towards customers.

Standardisation

Contributing to the relevant standardisation bodies (mainly MPEG and DVB) is key for TVN. First, it allows being at the heart of the discussions about the functionalities to be implemented in future products. Participating to the elaboration of these new standards also allows TVN to push ideas in line with its strategy. In the framework of the H2B2VS project, TVN concentrates its effort on synchronisation between Broadband and Broadcast networks because mastering this synchronisation is a real added value for future products and services.

Use Case studies

Thomson Video Networks dedicated a lot of care and time to the definition of the Use Cases studied by the project. Defining the use cases and then experimenting those matching TVN's business is considered as a real added value brought by the project. We have the opportunity to discuss and experiment these use cases with customers (Hispasat, TDF, Turk Telekom, Digiturk, ...) but also with technology partners (NagaVision, Civolution, Vestel, ...). It gives the opportunity to test

before our competitors and within the proper ecosystem new features that we shall be able to monetize in our future products and services.

5.2 TDF (TDF)

5.2.1 Activities presentation

TDF is DTT network operator and interactive television services provider. In H2B2VS, TDF has focused its activity on the 2 following items.

TDF took the responsibility of the WP1 dealing with the architecture of hybrid networks and use cases definition. It will enable TDF to study and propose optimized architecture for Hybrid TV services taking into account DTT networks constraints. TDF is responsible of task 1.2 (use cases) and contributes on the definition of the definition of trick mode on live programs.

As responsible of T2.2 (transport and synchronisation) and member of HbbTV, TDF also participates to the definition of synchronisation mechanism between streams coming from different networks.

TDF will be involved in the French demonstrator as DTT platform integrator and operator. TDF has contributed the first Ultra HD trials in France (Ultra project) , and is in contact with partners for further trials.

5.2.2 Expected main results

As head-end and network operator, TDF wants to increase its expertise to optimize the HEVC encoding and broadcasting over DVB-T2 network.

Thanks to the success of HbbTV, hybrid television is now a reality in France. For the moment, there is only a very loose synchronisation between the services coming from different networks. The global architecture of the platforms is very important if we want to have a tight synchronisation. It has a very big impact on the definition of mechanism to implement. H2B2VS should give some answers on this point.

For the future of DTT, it is important to propose new services that enable the viewer to easily interact with the content. An important work would be to implement trick mode feature to enable pause, rewind backward functions on live program. TDF expects to speed up development and implementation of this service thanks to the project.

5.2.3 Exploitation activities

French DTT is challenged by different network for TV services distribution: satellite, cable and xDSL. The latter is a threat because it can propose enriched and personalized services (IPTV offerings).

TDF wants to show that DTT is innovative and has valuable services by proposing:

- Very high quality TV services thanks to HEVC UHD television. TDF wants to promote this technology for a launch as early as possible on DTT networks. In a report, the French regulatory body proposed end of 2016. Through H2B2VS, TDF wants to promote UHD in France.
- Customized services to the viewer. This can be carried out thanks to hybrid receivers. TDF already develops HbbTV service, want to go further. It will be possible in particular thanks to the synchronisation mechanisms that are studied in H2B2VS and proposed to DVB and HbbTV.

5.3 SmartJog (SJ)

5.3.1 Activities presentation

SmartJog is part of TDF group and has recently been merged with other TDF affiliates under the new brand "Arkena". Arkena is a European media (video/audio) delivery service provider, with end-to-end Over-the-Top (OTT) solutions for Medias, broadcasters and Corporate. One of the main activities is about providing Content Delivery Network (CDN) services, mainly focusing on France and Nordics markets.

In H2B2VS project, SmartJog is providing its CDN solution for the broadband delivery part. It allows demonstrating H2B2VS hybrid broadcast/broadband use cases based on next-gen OTT delivery protocol and high encryption mechanisms (DASH, HEVC).

On studies, Smartjog is contributing mainly about hybrid network synchronisation and CDN adaptation as part of WP2 and WP3. SmartJog has also a large contribution on the french demonstrator, providing the CDN solution for broadband delivery in coordination with other french partners.

5.3.2 Expected main results

As a major European CDN service provider on a very competitive CDN market, SmartJog intends to continue to propose innovating solutions/services to its customers.

SmartJog needs then to support and proposes next-gen solutions, typically an optimal support of DASH/HEVC delivery and a first-class broadband quality through the use of its CDN. Beside a technical evolution such as DASH delivery, there are large interoperability challenges (with Video Head-End/Origin, video device/player) that need to be caught, resulting in specific implementations/optimizations on the CDN.

Another important field of H2B2VS research involving SmartJog is about synchronisation between broadcast and broadband networks, in order to be able to provide advanced video service use cases. Indeed, in addition to its optimal CDN broadband delivery, SmartJog is constantly putting efforts in moving up the value chain and proposing added-value services for its media customers. This becomes particularly true with the new Arkena entity and the building of end-to-end video service solutions.

5.3.3 Exploitation activities

SmartJog CDN will be updated with the features and mechanisms required for DASH and HEVC support and for quality optimization (better synchronisation with broadcast delivery). First integration tests will then be initiated with several existing video customers and also with the other entity of Arkena (formerly named Cognaq-Jay-Image) in charge of head-end services with the goal to provide end-to-end DASH/HEVC solutions to customers.

After having validated the support of DASH/HEVC, SmartJog will be able to communicate on this new service as part of its portfolio and also potentially perform demonstrations/speeches during congress and forums (e.g. IBC).

Even before the official release of DASH on its CDN, SmartJog will initiate interaction with third-parties, mainly as follows:

- Technical teams with DASH/HEVC vendors or service providers (to validate global interoperability) ;
- (Pre)Sales teams with prospects or existing customers, to help them to turn towards new DASH delivery for high quality and optimal multi-screen delivery.

5.4 Civolution (CV)

5.4.1 Activities presentation

In the context of the H2B2VS project, Civolution is extending its Media Protection technology for supporting the next generation of video content (HEVC) in the context of an hybrid distribution that is simultaneously leveraging broadcast and broadband network.

The main use case is to offer enhanced security of premium content (for instance UltraHD or 3D) by inserting a unique watermark identifier in a content delivered by hybrid distribution. This unique watermark will identify the device that has received the content in the first place, thus discouraging potential pirates to illegally re-distribute contents.

5.4.2 Expected main results

Civolution offers solutions for the protection of Premium VoD services. However, the core business of PayTV operators is the live broadcast of exclusive and premium content (for instance sport events). The watermarking of such live content requires a new generation of watermarking, which will integrate seamlessly into live workflows. H2B2VS project will position Civolution into the business of live PayTV. In return, the Civolution products created will allow operators to invest safely in the production of high value content (such as Ultra HD and 3D) as the watermark will protect their return on investment by discouraging piracy.

5.4.3 Exploitation activities

This project will allow Civolution to design and develop solutions to perform live transaction-based watermarking for PayTV operators. The resulting blocks will be leveraged to provide to PayTV operators with a robust and versatile watermarking solution, encompassing both standard broadcast and OTT broadband distribution. Indeed, thanks to H2B2VS, Civolution is expecting to extend its portfolio of products for covering the strategic market segment of content protection of live HEVC content for Premium services.

Through the work done, Civolution may also build strong partnerships with Thomson Video Networks, Nagra, SmartJog and TDF. This would generate increased collaboration resulting in more integrated/compelling demonstrations and products.

H2B2VS will also provide Civolution with the opportunity to develop Civolution watermarking integration expertise in encoder, CDN and receiver.

Finally, the project will help Civolution to develop expertise in HEVC format and hybrid distribution, which are strategic for the future of content delivery.

5.5 Nagra France (NF)

5.5.1 Activities presentation

As a leader of the Task 2.5 on content protection, main activity of Nagra France is to coordinate the effort and contributions from partners towards an innovative protection solution supporting the hybrid transmission of the ever highest quality of contents. Among others, several following issues are identified as the first targeted goals:

- Efficient key distribution through secured individual connection via broadcast, broadband or both;
- Synchronisation between protecting metadata (keys, access criteria, etc.) and scrambled media data (various valuable contents) dispatched in a combined network of broadcast/broadband channels;
- Support of new product-offers allowing independent access to broadcast and broadband streams

5.5.2 Expected main results

The fruitful result of H2B2VS project inspires a new flavour complementing the existing CAS product lines of Nagra France to address the emerging hybrid distribution broadcast broadband model. Furthermore, Nagra France will have a possibility to enrich its expertise on the reactive manner of protection, namely on watermarking and monitoring. Together with conventional encryption, Nagra France will be able to provide a closed chain of protection in an ecosystem of content distribution. Thanks to these prospective, NAGRA France will remain a world leader to provide security solutions to payTV operators.

5.5.3 Exploitation activities

Some prototypes, proof of concept will be realized together with the demonstration of several typical use cases of the project. The prototypes will then be further optimized to the industrial context as well as the practical deployment. Real demands and requirements of clients will be also incorporated and served as inputs for the work done within the project. In the next step, the resulting adaptations will enter in a mass testing phase. At the end, the validated solution will be finally set up in a real operational environment of the ordering clients.

5.6 Alcatel Lucent (ALU)

5.6.1 Activities presentation

Alcatel-Lucent work will focus on:

- Adaptation of Alcatel-Lucent CDN ingestion formats, that currently supports video MPEG2 and AVC, to incorporate the new HEVC standard;
- Adaptation of CDN HTTP Adaptive Streaming, that currently supports HLS and Smooth Streaming, for incorporating the new DASH standard;
- Adaptation of the CDN to support Hybrid transmission

With these 3 main activities in mind, Alcatel-Lucent is participating in all WP in the tasks related to the CDN modifications and the CDN adaptation to support Hybrid Distribution.

Alcatel-Lucent is also the leader of the WP2 dealing with Impact of Hybrid distribution on future technologies.

5.6.2 Expected main results

As result of the H2B2VS project, Alcatel-Lucent will incorporate in its current CDN new functionalities, including support for HEVC video encoding and Adaptive Streaming using DASH format and additionally the CDN will be ready for Hybrid distribution. These 3 new features will allow Alcatel-Lucent to be ready to compete in the HTTP Adaptive Streaming and CDN markets where support for these new standards will soon become mandatory.

With the HEVC format, the transmission of current SD and HD TV channels at lower bitrate and lower cost will be made possible. It will also allow the incorporation of new formats like 3D, HD 1080p@50 or even UltraHD 2160p@25, formats that are currently requesting very high bitrate to be sent over a CDN.

With the support of DASH format, it will be possible to allow the connections of a great variety of devices (from Mobiles, Tablets, Computers, STBs and TV's) in a global market that is currently still fragmented in several proprietary formats like HLS or Smooth Streaming.

The support of Hybrid transmission in the CDN will open the product to new markets that will use broadcast and broadband transmission for offering advanced and interactive services like 3D, Ultra HD, etc.

5.6.3 Exploitation activities

The CDN demonstrator of Alcatel-Lucent will be updated with these new features to be shown to current and potential new customers.

Any assistance to congress, workshops (etc), will allow Alcatel to show these new CDN features.

The new developments made in the project will pass to the Alcatel-Lucent industrialization phase including the validation of the adaptations and the systems test before having an Alcatel-Lucent product ready for selling.

The new CDN features with video HEVC, DASH and Hybrid distribution will be included in CDN product portfolio. From this point the pre-sales and sales procedure will be the normal after the release of a new or an enhanced product.

5.7 VTT Technical Research Centre of Finland (VTT)

5.7.1 Activities presentation

VTT has three main activities in the project:

- Development of OpenHEVC decoder together with IETR: VTT focuses mainly on optimization of decoder to mobile devices such as Android and iOS tablets and mobile phones.
- MPEG-DASH based streaming technologies: VTT develops adaptation algorithms for MPEG-DASH based streaming.
- CDN development: VTT improves its CDN test environment to support HEVC videos and MPEG-DASH streaming protocol.

5.7.2 Expected main results

VTT expects two kinds of results from the project: Experience which can be utilized when VTT sells its services to potential customers, and technology, which can be licensed to potential customers.

In both cases the technological basis is on HEVC video coding and MPEG-DASH techniques.

The optimized HEVC video decoder can be utilized in second screen applications, which VTT develops together with Finnish consortium. Broad mobile device base together with new techniques for video compression and streaming enable rapid deployment of new services. The goal of VTT is to specify and develop basic technology for new services, which can be utilized in fastly developed services for end-customers.

Second result of the project is related to MPEG-DASH technology, which is a new standard for HTTP based adaptive video streaming. MPEG-DASH standard specifies the way how different streams can be delivered, but it does not specify the actual adaptation strategy, i.e. what stream will be chosen, and when the stream switching will happen. The adaptation algorithms developed by VTT will give end-users a smooth video playback experience. This technology can be integrated into client applications, as well as into Content Delivery Network systems.

5.7.3 Exploitation activities

VTT will utilize results achieved in the project to develop new technologies and IPR, to build international partnerships and to take full advantage of international business opportunities. The various research results that will be acquired during the H2B2VS project will contribute to numerous international journal and conference papers. Finally, the participation to the project may support the constitution of spin-off companies, and help technological transfer between academy and companies in the field.

5.8 Tampere University of Technology (TUT)

5.8.1 Activities presentation

The four primary activities of TUT are the following:

- HEVC encoder analysis. The coding parameters of HEVC are being analyzed in order to specify the best operating points in terms of live broadcast quality, available bandwidth,

and coding complexity. The obtained analysis results will be utilized in the encoder development;

- HEVC encoder development. The open-source HEVC encoder called Kvazaar (<https://github.com/ultravideo/kvazaar>) is being developed from the scratch (HM used as a reference) using platform-independent C as programming language. Real-time (30 fps) encoding up to full HD resolution will be obtained by parallelizing Kvazaar to cloud infrastructure;
- HEVC encoder integration. Kvazaar will be made compatible with different transport technologies such as DASH used in DVB-C and CDN networks;
- 4K HEVC test sequence repository creation and maintenance.

5.8.2 Expected main results

TUT will submit the initial results to the recognized international conferences including IEEE International Symposium on Circuits and Systems (ISCAS), International Conference on Acoustics, Speech, and Signal Processing (ICASSP), and IEEE Visual Communications and Image Processing (VCIP). The landmark results will be submitted to the top international journals in the field such as IEEE Transactions on Circuits and Systems for Video technology (TCSVT), IEEE Transactions on Multimedia (TMM), and IEEE Transactions on Consumer Electronic (TCE). All results will also be included in MSc and PhD Theses of the project personnel. So far, TUT has reported the project results in one accepted TCSVT article.

TUT's results will also be demonstrated as a part of the Finnish cable demonstrator during the H2B2VS project. In addition, TUT's intention is to participate in the upcoming conferences and exhibitions where project results will be disseminated through lectures and posters.

5.8.3 Exploitation activities

TUT has opened a video content portal (<http://ultravideo.cs.tut.fi/>) in which raw and HEVC encoded Digiturk's test sequences can be downloaded free of charge. In addition, Kvazaar HEVC encoder is being developed in an open-source project (<https://github.com/ultravideo/kvazaar>). The innovations of this open encoder will be incorporated into forthcoming video applications developed for research, standardisation, and commercial products. TUT will also exploit the results in teaching by updating existing courses and proposing new ones. This way, teaching can be kept up to date with evolving standards, commercial products, and latest research results. The project results are also beneficial for the specification of requirements and constraints for future research projects.

5.9 Neusoft Mobile Solutions (NMS)

5.9.1 Activities presentation

Neusoft Mobile Solutions has strong expertise for researching and developing mobile applications and solutions for various mobile operating systems. Our goal in this project is to study and develop new kind of multiplatform mobile application based on HEVC and second screen concept. In addition, Neusoft believe that this project will help to gain better understanding of the Broadcast/TV domain in order to develop suitable business models to expand our business on this domain more rapidly.

5.9.2 Expected main results

Neusoft will have prototype of personalized mobile multimedia application in our rich communication product portfolio and will expand our mobile project delivery capabilities. Neusoft will also gain technology and business knowledge for second screen concepts for mobile and tablet based on solutions with HEVC coding. Moreover, Neusoft will establish connections with new international partners, and therefore cooperation/collaboration is one of the most important outcomes.

5.9.3 Exploitation activities

Cooperation and prototyping will be done during the project. After the project, Neusoft will evaluate the concepts, prototypes and possible business models, then select the most suitable approach for further developments.

5.10 Teleste Corporation (TL)

5.10.1 Activities presentation

On the H2B2VS project Teleste is focusing on the transmission technology used for delivering the HEVC streams over coax cable. Teleste has a long experience in TV signal transmission and related standards. In this project DVB and DOCSIS standards will be used for the HEVC stream transmission. DVB-C will be used for DVB broadcast transmissions and DOCSIS for IP stream delivery. During this project, Teleste is developing a new product platform which is based on DOCSIS 3.0 standard. On the DVB transmission, existing product platforms will be used with the potential needed modifications.

5.10.2 Expected main results

Teleste expect to gain further knowledge on video compressions technologies, related use cases and requirements on the transmission path. As the transmission path performance is crucial in order to successfully launch and deploy the new services, participation into this project is important to Teleste.

Teleste's results will be demonstrated as a part of the Finnish cable demonstrator during the H2B2VS project. In addition to this, Teleste will demonstrate the solution in various cable TV industry exhibitions and trade shows. Teleste expects to gain more visibility due to the participation in the H2B2VS project.

5.10.3 Exploitation activities

Teleste will utilize the results achieved in the H2B2VS project to develop new innovative product platform and to further strengthen Teleste's brand image in video transmission. The developed product will be extensively demonstrated and promoted to Teleste existing and new possible customer base.

5.11 Turk Telekom (TT)

5.11.1 Activities presentation

Turk Telekom Argela's focus in the project is on broadband content delivery, where its main activities can be listed as:

- Determine the improvements needed for adapting the state-of-the-art CDN technology for the hybrid and adaptive distribution of multimedia content.
- Enhance the state-of-the-art CDN technology for adaptive hybrid delivery.

5.11.2 Expected main results

Turk Telekom Argela expects two main results from the project :

- An enhanced CDN solution tailored for adaptive hybrid delivery of multimedia content.
- Extensive knowledge on HEVC coding and MPEG-DASH adaptive delivery.

5.11.3 Exploitation activities

Turk Telekom Argela is planning to exploit the results of H2B2VS project in multiple ways, including the introduction of new premium services taking advantage of the hybrid distribution technology. The potential integration of the hybrid distribution technology with TT's existing IPTV solutions

would take them to the next level and make it possible to generate new business opportunities by allowing the development of new services based on the results obtained from H2B2VS project.

TT will also exploit the possible improvements in CDN technology within the scope of H2B2VS project to have a more optimized adaptive content delivery infrastructure. In parallel with these, use of HEVC coding will also have big impact on TT's future services with its improved bandwidth usage.

5.12 Basari Mobile (BM)

5.12.1 Activities presentation

BM has two main activities in the project:

- Development of HEVC player using OpenHEVC for mobile devices such as Android tablets and mobile phones;
- Android application development;
- Improvement the solution of the second screen application between STB and android devices.

5.12.2 Expected main results

BM expects two kinds of results from the project: Integration between STB and android clients using second screen user experience. Synchronisation between these devices has one more solution. The best practice have not been implemented yet. BM will develop and try to find best practices on the second screen applications.

Second result of the project is HEVC player on the android phones. Developing the HEVC player using VTT and Finnish partners decoder base for mobile phone.

5.12.3 Exploitation activities

Some prototypes, proof of concept will be realized together with the demonstration of several typical use cases of the project.

The prototypes will be based on second screen user experience and HEVC player.

Real demands and requirements of clients will be planned based on the feedback of the marketing unit.

5.13 Nagravisio (NV)

5.13.1 Activities presentation

Nagravisio as scientific entity will work on studying the global security aspects of the project. It will then work on the development of a system security product line for hybrid distribution systems based on the evolution of its CAS product line and the integration of adapted watermarking technologies (technology choice, dedicated researches in this field) accordingly to the project constraints. Nagravisio will more specifically focus on the overall system architecture security, the project demonstrator, and also the system and service necessary to retrieve pirated content over the internet (Control Word Sharing or Content Sharing), and analyse them in order to recover the information they potentially contain (watermark, fingerprint), and set-up appropriate countermeasures.

The important objectives for Nagravisio are both scientific and operational and intend to answer to the following questions:

- How to adapt actual security features to the hybrid distribution?
- How to integrate adapted watermark solutions, matching constraints of the hybrid distribution and HEVC codec?
- How to manage content illegal redistribution, especially on Internet, in a very short time, allowing recognition of fraud, pirate's ID and immediate countermeasures.

5.13.2 Expected main results

Anticipated deliverables are:

- Hybrid distribution system security architecture, with adapted keys management;
- Watermark technology integration and technology suggestion and choice;
- Content delivery network real-time monitoring, with architecture set-up and demonstrator, to access to internet data flows in real-time.

5.13.3 Exploitation activities

As Content Sharing is a growing reality, the results of the project will be immediately usable to offer piracy knowledge and actions capacity to our clients. It will also help in designing appropriate solutions for User's ID integration in the content for illegal redistributor's recognition.

Moreover, today's security requirements set by cinema studios (represented by Movielabs) for 4K content distribution highlights the need of watermarking solution and end-to-end protection. Thus, the project clearly targets the main aspects required by the studios (4K content, protection, Watermarking)

5.14 École Polytechnique Fédérale de Lausanne (EPFL)

5.14.1 Activities presentation

As WP4 leader, EPFL will coordinate all partners activities related to dissemination. This includes contributions to international standards (e.g. MPEG, DVB), publications to relevant journals and international conference and any other communication activity such as participations to workshop and events and the maintenance of the public web site.

Additionally, given the specifics of EPFL, the main exploitation activities at EPFL will be oriented towards teaching and research activities. These activities will be performed by the SCI-STI-MM Group (<http://gramm.epfl.ch/>) within the STI Faculty of the EPFL.

5.14.2 Expected main results

The main expected results for EPFL will be along 3 axes:

- validation of a high-level dataflow approach for the efficient implementation of MPEG-HEVC compliant codecs on parallel architectures
- software implementation and integration of a hybrid video streaming system relying on MPEG-DASH and MPEG-HEVC
- publication and dissemination activities in the form of papers submissions to relevant journals and conferences and participation to the standardisation work of the MPEG ISO/IEC working group

5.14.3 Exploitation activities

Academic Activities

Semester projects

Target audience: university students in the area of digital signal processing, computer science and electronics.

Duration: 3 to 6 months.

Subjects:

- Development and optimization of parts of a HEVC encoder using a dataflow representation based on the RVC-CAL formalism.
- Development and integration of an hybrid (broadcast-broadband) streaming scenario based on scalable HEVC using both publicly available and EPFL proprietary tools.

Master courses (including public material developed during H2B2VS)

Within a Master course titled "Systems, architectures and methodologies for information and signal processing", some of the outcomes of the project will be used as real-life scenario of multimedia processing architecture issues and resolutions. Possible themes:

- Hybrid multimedia streaming over heterogeneous networks;
- Scalability impact over perceived video quality

Planned: 2-4 hours live lectures per course series.

Participation to future research projects

The experience and know-how gained in the H2B2VS project will significantly increase the EPFL team's research skills in advanced multimedia streaming technologies. In particular, the MPEG-HEVC and DASH standards and the relevant modules developed or integrated in the project will serve as a reference framework for research in media streaming technologies. The MPEG-DASH framework will also allow demonstrating further key technologies developed in the SCI-STI-MM group, such as the new advanced video coding architectures such as Scalable High-Efficiency Video Coding (SHVC).

Thanks to the results achieved in hybrid video streaming implementation within H2B2VS, the SCI-STI-MM group was already able to submit new proposals for research projects at a national and international level. This enabled the establishing of new partnerships with the academic and industrial world.

Specific topics:

- Given the recent trends in multimedia streaming technologies, there is strong motivation to follow up new research proposals in the direction of MPEG-DASH for IP based high quality video streaming applications
- The EPFL team will further develop and validate the approach of combining broadcast and broadband approaches for multimedia streaming, and, being actively involved in MPEG standardisation, will propose to MPEG new solutions for a correct handling of the relevant problems.

Ph.D students activities

Ph.D students at SCI-STI-MM will take benefit of H2B2VS scientific material and the MPEG-HEVC infrastructure developed in the project in preparation of their Ph.D work and for advanced studies.

Continuous dissemination

EPFL partner will exploit the results obtained in the H2B2VS project in order to elaborate further research directions and publish papers on journals and video coding/media streaming oriented conferences.

5.15 HES-SO (HES)

5.15.1 Activities presentation

HES-SO is active in the domain of content protection (Task 2.5) and it works with NagraVision and Nagra France towards delivering a new Conditional Access System that is able to leverage on hybrid network types (broadcast + broadband). This includes the study of the threat model, security requirements definition, design and analysis of new hybrid cryptographic schemes, definition and implementation of software prototypes and their integration into H2B2VS demonstrators, including the integration of innovative software protection mechanisms.

5.15.2 Expected main results

Expected results are two-fold:

- New cryptographic schemes adapted to dual broadcast-broadband communication links ;
- New software protection techniques adapted to high-performance software such as an HEVC decoder.

5.15.3 Exploitation activities

H2B2VS confidential

The exploitation activities of HES-SO will be deployed in different axes. The new hybrid cryptographic scheme(s) will probably allow to define new IPR, as well as writing scientific publications dedicated to the scientific cryptography community.

Furthermore, HES-SO will embed the insights gained about integrating software protection techniques in high-performance software (such as a HEVC decoder) in long-term open-source project, the Obfuscator-LLVM toolkit.

In summary, this project will help HES-SO to continue to develop and advertise its expertise and leadership in the domains of industrial and applied cryptography, and software protection.

5.16 HISPASAT (HS)

5.16.1 Activities presentation

Hispasat's work is centered in the following activities:

- New architecture definition: identifying how satellite networks best fit into the Hybrid architectures and how they can be integrated or complement CDNs so as to define a more efficient architecture for new video services. This architecture has implications in terms of synchronization and content protection which are very relevant for future commercial services.
- Use case definition: identifying realistic use cases that could potentially drive the need for this kind of networks.
- Demonstrations: Hispasat leads T3.3 dealing with use cases tests and which are considered within Hispasat the key activity, since their results will define the possibility of developing new products and services.

5.16.2 Expected main results

One of the first expected results from the project is the application of HEVC encoding for broadcasting over satellite. The results from the tests will provide insight on what can be expected from this new coding technique and how it can help in the distribution of current and new video services.

The next expected result is how satellite broadcast networks and CDNs can be integrated (in terms mainly of implications in equipment and more specifically on synchronization).

Finally, the most important outcome of the project will be the use cases test results, especially in terms of QoE and QoS.

5.16.3 Exploitation activities

The results of H2B2VS will provide Hispasat very valuable knowledge on HEVC and hybrid networks. These results will set the basis for the definition of new products to Hispasat's portfolio, improve existing ones and may help define strategic alliances for the development of new hybrid services.

In a first iteration Hispasat has already launched a permanent 4K channel both in Europe and North and Central America using HEVC encoding provided by Thomson Video Networks. Though this channel is still a demo, it is a good proof of concept for future commercial services.

In terms of communication, Hispasat's participation in the project and the dissemination activities done within the project will help re-enforce Hispasat's image within the industry.

6 CONCLUSIONS

This deliverable describes how all partners intend to deeply exploit the results of H2B2VS project and make them able to embrace innovation and usage evolutions on video. Hereafter, a summary of partner's individual exploitation plans:

- The results of the project are used to strengthen the expertise of Thomson Video Networks in the domain of distribution networks with a special emphasis on hybrid networks. TVN has also acquired further knowledge of the HEVC emerging standard. Prototypes developed in the framework of H2B2VS project are the basis for the development of new products matching customers' requirements. The results of the project will be promoted to customers and partners visiting Thomson Video Networks.
- TDF group plans to deploy on Hybrid DTT networks some of H2B2vS services as soon as they are mature. Concerning future video formats using HEVC, the use-cases and solutions of H2B2VS project allow TDF to promote DVB-T2 kick off based on Hybrid networks using HEVC and new services like HD 1080p/50 and Ultra-HD or scalability to Ultra-HD. The results of H2B2VS project are also an important contribution to the next World Radio Conference 2015.
- SmartJog (recently turned to Arkena) will add DASH/HEVC delivery to its CDN portfolio by implementing all the required features on its CDN. SmartJog will also evaluate the opportunity to create a product line linked to hybrid delivery technologies and all innovations implemented for the H2B2VS project. These new services could be made available across all European territories where SmartJog operates its CDN .
- Civolution designs and develops solutions to perform live transaction-based watermarking for PayTV operators. The resulting building blocks will be leveraged to provide to PayTV operators with a robust and versatile watermarking solution, encompassing both standard broadcast and OTT. Through the work done, Civolution may also create partnerships with other partners (e.g. Thomson Video Networks, Nagra, SmartJog and TDF). The increased collaboration is resulting in more integrated/compelling products. H2B2VS also provides Civolution with the opportunity to develop Civolution watermarking integration expertise in encoder, CDN and receiver. Finally, the project will help Civolution to gain expertise in HEVC format, which is strategic for the future of content delivery.
- To complement the existing product lines for broadcast and broadband networks, NAGRA France is designing a new flavour of its CAS product to address the emerging hybrid distribution model. Thanks to this project, NAGRA France remains a world leader to provide security solutions to payTV operators. The results of the project provide a new competitive solution and technology for the next Generation of the Content Video Delivery Network. The project will generate some new patents that will be applicable to the new generated generation of products that will be deployed in the core networks of the Future IP Networks, where video delivery will be the main challenge in an ubiquitous environments. The new generation of Network Routers with video content ingestion and processing capabilities will provide a new level of functionality to the current IP Networks. This new technology will be finally incorporated to the IP Division line of products.
- UPM who is collaborating with ALU in this project, is generating two theses in the framework of the QoE and the implementation of HEVC decoders. The experience acquired in the project allow the professors of the UPM to include these new technologies in their Master Lectures and publish papers in international journals. Finally the results of the project will be presented in a workshop organized in the framework of an International Conference.
- The results of project improve VTT's technological expertise in the field of hybrid networks, and HEVC video coding. Especially technologies for adaptive HTTP streaming and CDN, and their suitability for hybrid distribution will be explored. The knowledge, and developed technology are improving VTT's capability in offering services to broadcasters, content owners, operators and device manufacturers. Final goal is to sell and license technology to customers, so that their products and services can benefit from the results of the project.
- TUT utilizes the results in teaching by updating existing and proposing new courses to keep teaching up to date with evolving standards, commercial products and latest research

achievements. TUT utilizes public results on open reference video encoder implementations and video based applications for open research, standardization and commercial exploitation. The results will be used in scientific publications and Theses, as well as specification of requirements and constraints for future research projects.

- Neusoft has gained technology and business know how for mobile and tablet based solutions in a hybrid distribution environment. Also as a result of the H2B2VS project, Neusoft has so far acquired good knowledge of HEVC standard and its usage in the mobile devices.
- Teleste is using the results in development of new products for OTT and HbbTV distribution in cable networks. The knowledge gained in the project strengthens Teleste's systems integration capabilities and improve its competitiveness. The developed prototypes have now been used for a demo system in Finland.
- Türk Telekom, which is one of the leading infrastructure providers with around 160k kilometers fibre, has been investigating the possibilities to use the results of H2B2VS project in the existing IPTV services and focus on the possible market occasions for 3D services. Since TT also provides network infrastructure to content providers, TT is planning to integrate the network adaptation solutions of the project in its infrastructure to meet the needs of their future services.
- Basari Mobile has gained expertise in the domain of distribution networks with a special emphasis on hybrid networks with HEVC emerging standard. Mobile adaptation prototypes based on the framework of H2B2VS project are being further development for new mobile products especially TV and home entertainment scope in Turkey. The results of the project will also be promoted to potential customers and partners in national and international area.
- To complement the existing product lines for broadcast and broadband networks, NAGRAVISION is designing a new flavour of its CAS product to address the emerging hybrid distribution model. Thanks to this project, NAGRAVISION will remain a world leader to provide security solutions to payTV operators.
- The goal of an academic institution such as EPFL in the project covers different aspects. The first one is to validate the innovative results of applied research for both new video compression technology at the level of codecs and of transport layer, main contribution of EPFL. Studies and results obtained only on academic examples and not embedded into real communication networks and systems results to have a lower scientific and didactical values. The second interest is to gain knowledge and experience on "beyond state of the art" communication systems and on the new interesting technological problems associated to them that so far are not solved or satisfactorily faced by industry. The third is the possibility of PhD students and post doc to improve their competence, acquire wider experience and be formed for their future careers in industry and research.
- The experience acquired during this project allows the HES-SO professors to include these new insights and technologies into their master-level lectures and publish papers in internationally recognized journals. Additionally, the results will be presented in international conferences and allow scientific assistants to broaden their skills, which is a clear advantage with respect to their future careers in the industrial world.
- The results of H2B2VS provide Hispasat with very valuable knowledge on HEVC and hybrid networks. These results set the basis for the definition of new products to Hispasat's portfolio, improve existing ones and help define strategic alliances for the development of new hybrid services.
In a first iteration Hispasat has already launched a permanent 4K channel both in Europe and North and Central America using HEVC encoding provided by Thomson Video Networks. Though this channel is still a demo, it is a good proof of concept for future commercial services.
In terms of communication, Hispasat's participation in the project and the dissemination activities done within the project will help re-enforce Hispasat's image within the industry.