ATSC 3.0 Video Head-End Workflow

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***Abstract*—the aim of this demonstration is to show a fully functional ATSC 3.0 distribution chain from live source to the TV set.**

Keywords—ATSC 3.0; MPEG-DASH; HEVC; broadcast; broadband

I. INTRODUCTION

Networking standards used in existing deployments belong to two families offering various benefits. Broadcast networks are very efficient in distributing a single content to a large audience. The Quality of Service (QoS) is guaranteed, ensuring a lossless delivery to the consumer. The same content being distributed to all the consumers, per user customization is not possible. Broadband networks work on a point to point basis, provider and consumer are directly connected, allowing the provider to adapt the content to the end user. Contents are transmitted once per consumer. This induces a very high network bandwidth consumption. Quality of Service (QoS), based on the Best Effort principle, is not guaranteed, inducing a limited Quality of Experience (QoE). The ideal network would be a broadband network offering an infinite bandwidth.

Convergence TV [6] project offers to experiment the distribution of UHD video from end to end implementing a full IP transport chain using last generation standards (CMAF, MMT, MPEG-DASH [1]). This will make possible the convergence of broadband and broadcast services distribution. The main benefits are an increased end user QoE and a merge of the distribution chains. This project aims to develop, experiment and sell an audiovisual services distribution solution using both broadcast (terrestrial and satellites networks) and broadband (Internet) networks. This solution will be industrialized to ATSC3.0 [1] markets and will be proposed to DVB ecosystem.

II. TECHNICAL ARCHITECTURES

Broadband and broadcast networks have complementary qualities allowing to offer a high QoE to the consumers. For several years they have been combined to build hybrid audiovisual services. It is not an easy task as the technical basis of this two network types are totally independent.

Broadcast technical architecture has been defined more than twenty years ago. It has evolved along the years to keep up with consumer expectations. But its multiple distribution protocols may increase the fragmentation of the distribution networks.

Broadband technical architecture has been continuously developed for 15 years and is easier to adapt to new services types by adopting new distribution standards (MPEG-DASH being the last).

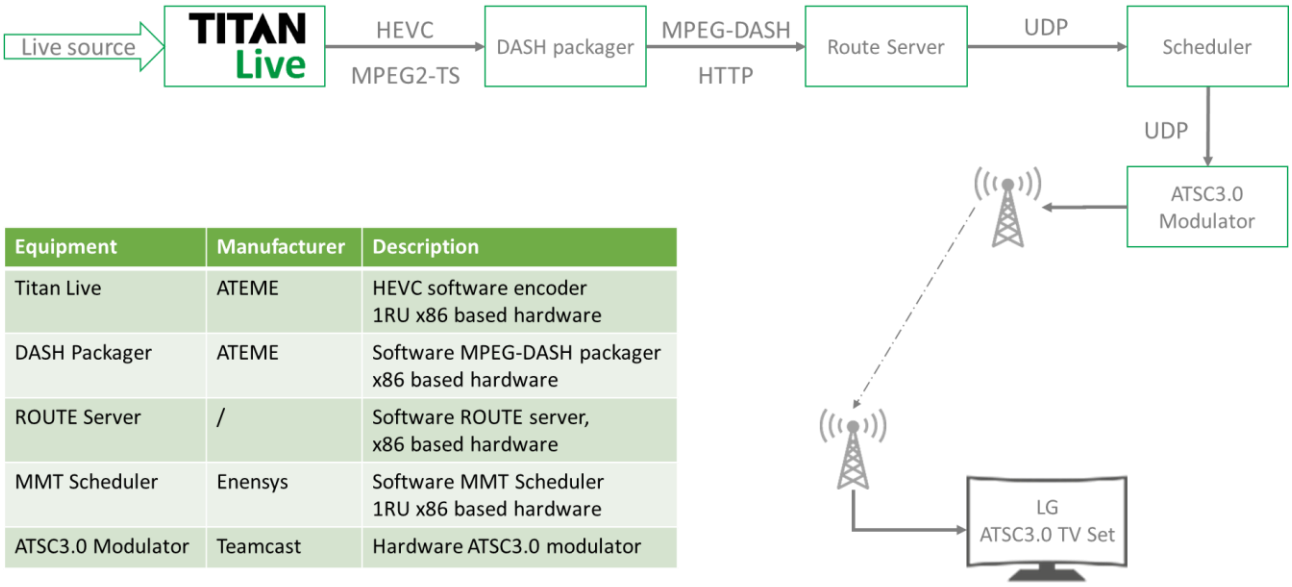
HbbTV [4] standard allows to deploy hybrid services taking advantage of broadcast and broadband networks. However, non-linear audiovisual services using exclusively broadband networks are more and more used.

The diversity of available services leads to the fragmentation of the network architectures. The convergence of both network architecture all along the distribution chain is essential to support the increasing number of hybrid audiovisual services.

III. DEMONSTRATION OVERVIEW

Convergence TV collaborative project started in H2’2017 and is already able to show a full ATSC3.0 distribution chain. The proposed demonstration features all the main components of a real distribution chain, from the live source to the TV set. These components are provided by Convergence TV project partners.

The UHD live source is first encoded using HEVC [3][5] standard to produce a multicast MPEG-2 TS stream streamed on IP network. The stream is then packaged using MPEG-DASH standard to produce video chunks and the associated manifest. This chunks are pushed to a WEBDAV server hosted by the ROUTE server. With this elements the ROUTE server build 2 streams. One containing the video chunks and a carousel of the manifest and another with all the signaling tables. These two streams are ingested by the schedule who is in charge of feeding the ATSC3.0 modulator with data and tables at a given bitrate. The modulator build an ATSC3.0 signal distributed over the air. At the other end of the chain, the TV set features an ATSC3.0 receiver and demodulator as well as an HEVC decoder.



Equipment	Manufacturer	Description
Titan Live	ATEME	HEVC software encoder 1RU x86 based hardware
DASH Packager	ATEME	Software MPEG-DASH packager x86 based hardware
ROUTE Server	/	Software ROUTE server, x86 based hardware
MMT Scheduler	Enensys	Software MMT Scheduler 1RU x86 based hardware
ATSC3.0 Modulator	Teamcast	Hardware ATSC3.0 modulator

Fig 1 Demonstrated ATSC3.0 distribution chain

REFERENCES

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