

SAPEC develops the functionality for SCTE104 ↔ SCTE35 conversion in LAGUNA solution

Abstract

The regionalization of TV services or insertion of specific ads by areas or users is a very common practice in video broadcasting and distribution systems, since this allows offering different content by region and a more efficient way of monetizing the ads broadcasted on each zone/region. SCTE104 and SCTE35 standards are the ones mainly used to allow this functionality.

This document covers a brief example of how these standards are used for this purpose as well as two typical use cases of this application with LAGUNA MEDIA PROCESSOR.

Introduction

The SCTE104 standard defines the (API) messages between the **Automation Systems** and the **Compression Systems**. SCTE104 messages can be included in the VANC (Vertical Ancillary Data area) of the digital video signal according to the SMPTE2010 standard, being the compression systems responsible for reading these messages and translating them into SCTE35 messages in the compressed output frame (Transport Stream).

The Laguna solution, by incorporating this functionality, allow the use of the Ad-Insertion functionalities and regionalization of services with the fewest number of additional equipment in the distribution headend.

In the same way, by incorporating this feature also in the decoders, it is possible to establish contribution links maintaining this functionality end-to-end.

Solution: Use cases

These are two typical use cases for this functionality:

1.- Distribution Headend

The insertion of advertisements (**Ad Insertion**) differentiated by geographical areas and/or type of end-users together with the **Regionalization** of national programming with temporary disconnections, is a very common practice in current video broadcast systems. This allows Broadcasters to adapt the content when using a final broadcast system based on internet distribution. This means a more efficient marketing and its monetization.

This use case summarizes the architecture of a system supporting this functionality, with the key elements part of this chain.

The following figure shows the complete diagram of a typical use case:

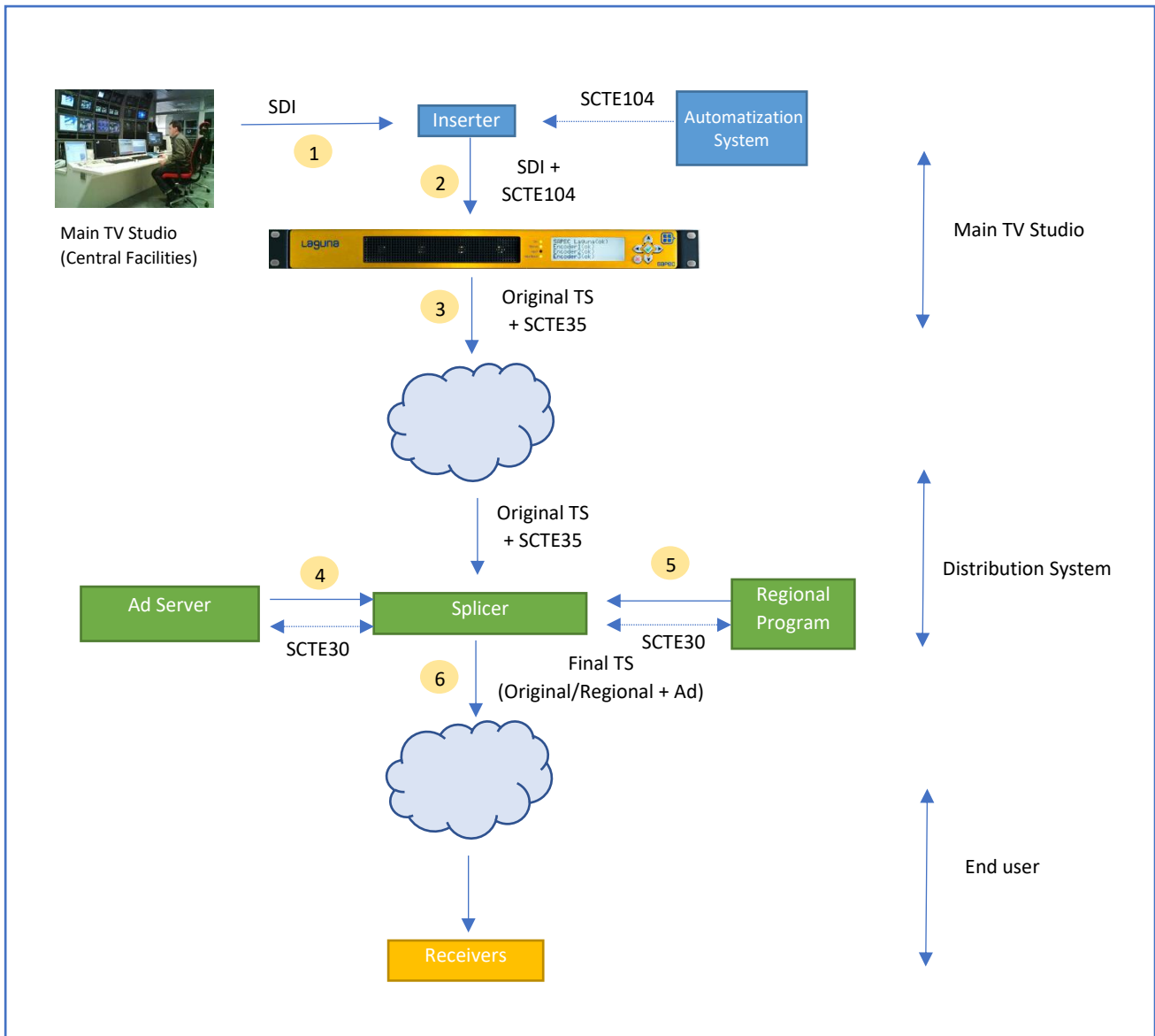


Figure1. Distribution Headend- SCTE104 <-> SCTE35 Application

Main TV Studio

This is where the generic programming is done which serves as the basis for the entire distribution. It starts from an SDI video signal (1) that contains the general program, as well as the commercials/ads that are sent in a general way.

Marks will be inserted in this video signal to define the points where changes in the programming or the advertisements can or should be made. These marks are made in accordance with the signalling standard SCTE104 within the vertical interval (VANC) of the SDI video signal (2) and will be controlled by an Automation System or Content Management System.

The **Laguna Media Processor**, in charge of the video/audio encoding, and auxiliary data services, performs the reading of these marks in the VANC of the video signal and translates them into marks according to the SCTE35 standard within the encoded output stream (Transport Stream) (3). The fundamental commands used for this operation are:

- Immediate switching order. The duration of the commutation can be configured
- Timed switch order. They indicated:
 - Time from when the command is sent until the switch must be made.
 - Total duration of the commutation.

In this phase of the diagram, the General Program is therefore in charge of generating the video signal with the marks where changes to the main program will be allowed in the regional broadcasting centres. This allows the replacement of general ads by others more directed to the specific area or changing the content of the programming for a regional production at certain times.

Distribution System

In regional centres, the general program is received with SCTE35 marks defined already in the Main TV studio. The (main) program is then included in a Splicer, which purpose is to read and interpret these marks and to insert the local ads. These Local ads come from a specific server (Ad Server) (4) or the Regional program (5). The protocol used in this case between the Splicer and the servers of these regional programs is SCTE-30.

The output of this Splicer is a new Transport Stream (6) where the ads or programs have been replaced by the locals at the specific sections. These sections are defined at the Main TV studios (Mani headend). The output is perfectly decodable by any TV or STB.

To avoid ad-removal systems, is the Splicer who normally removes SCTE35.

The output is sent to all receivers in the service area through a terrestrial transmitter, cable headend or IPTV, all displaying the same information.

In some cases, a slightly different distribution model is used; Following the SCTE 138 standard, instead of replacing contents, the new (regional) ones are sent in different video and audio PID, maintaining the signalling of the change points. According to this model, it is the final receiver who decides what content to show to the end user.

2.- Contribution Link

The second use case proposed for this functionality would be a contribution link where this signalling is maintained, and therefore the output is a video signal with the original SCTE104 marks in the vertical interval.

The Laguna Media Processor, by including this feature in both ends (encoder and decoder), allows Broadcasters and Service providers to make a fully transparent end-to-end contribution link. The following figure shows the diagram:

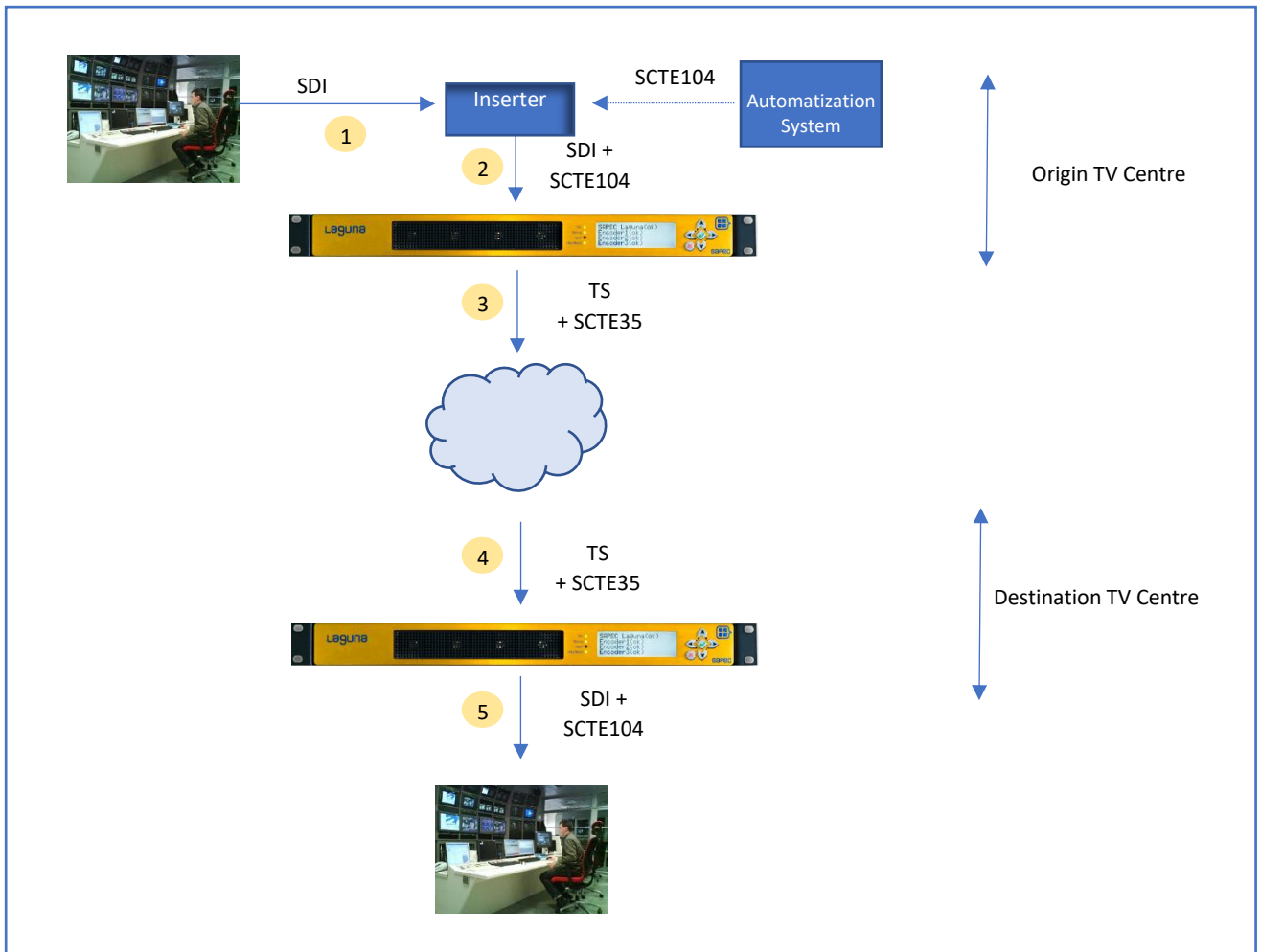


Figure2. Contribution Link- SCTE104 <->SCTE35 Application

As in the previous use case, the Origin TV Centre is where the SDI program signal is produced, where marks will be inserted to define the points where changes in the program or changes of ads can or should be made. These marks are made according to the SCTE104 signalling standard within the vertical interval (VANC) of the SDI video signal (2).

This signal is encoded in this case in very high quality as it is a contribution link (4: 2: 2 profiles, low latency, etc.), including audio channels and vertical interval data (Teletext, Subtitles, etc).

In this case, inside the vertical interval it is possible to include the processing SCTE104 signalling, which is translated into SCTE35 timestamps in the outgoing TS (3).

At destination, the TS (4) is received with all the information exactly as it was transmitted from the origin. Laguna, in addition to decoding the video and audio signals, and processing the vertical interval included in the TS, will read the SCTE35 signalling marks and regenerate the SCTE104 marks in the SDI output video signal. This SCTE timestamps will be identical to the ones included in origin (5).

In this way, the contribution link is transparent both in signalling and in quality, depending logically on the bandwidth assigned to the video encoding.

Conclusion

The support for the SCTE104-> SCTE35 conversion in the encoding site and opposite in the decoding side facilitates new applications for Broadcasters. Today, the main use of this feature is locally inserting/replacing commercial content of the main transmission. This allows Broadcasters to monetize their business resources in a more efficient way.

Laguna Media Processor, includes this functionality in all its different platform models, so no matter if the equipment is encoding decoding 1 channel or 8.

LAGUNA MEDIA PROCESSOR (LMP), is a multi-channel solution for video contribution and distribution in professional Broadcast and Telecom environments. With the launch of the DUAL platform, SAPEC offers its customers three different hardware platforms in terms of density, internal processing capacity and available interfaces (DUAL, QUAD, OCTAL), which will allow the customer to make an efficient choice of the model to be used. best fit your project and budget. In addition, any model, since LMP is a software-defined solution, allows updating the internal architecture (Layout) when the client requires it.

Juan José Anaya
CTO @ SAPEC