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# Closed Caption Asset Management

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**Closed captioning products** MacCaption and CaptionMaker allow you to easily author, edit, encode and repurpose video captions for television, web and mobile delivery. Utilizing exclusive e-Captioning™ technology, MacCaption (for Mac) and CaptionMaker (for Windows) simplify the process of complying with FCC regulatory requirements, enabling greater access to broadcast content for television, online and mobile viewers.

## Introduction

Closed Caption (CC) data files are now an integral part of the video asset management workflow at post production facilities. In the past, closed caption data was typically sent out for a one time TV video transmission. Today, file based video content delivery requires a variety of delivery methods that need to include captions for internet and VOD servers.

This poses a challenge to content producers who need to edit and compress video for re-broadcast. Loss of caption data, format compatibility, and frame rate conversion are only a few of the many problems that many broadcasters face when delivering captioned shows to new viewer markets. This is especially true for internet video delivery with captions.

In many cases, broadcasters simply have the videos captioned again from scratch in order to meet regulatory compliance. This costs TV studios both time and money. However, this is not necessary because caption data can be edited and manipulated by software, the same as video can be. Captioning software is now available that can extract, edit, search, and re-purpose the captioning data. This is a new trend, and is what we refer to as Closed Caption Asset Management or CCAM.

We first implemented CCAM in 1997 with our release of caption re-insertion software. It was first implemented with Prime Image's Time Tailor series, allowing the automated reinsertion of closed captions in videos that had frames trimmed for the insertion of additional commercials. Every year since then we have added new CCAM features to help our customers save time and money. In early 2013, we released software to take existing TV caption data and embed to H.264 streams for Wowza and Akamai's Solasphere Streaming Video Closed Captioning.

## Embedding CC data to TV video files

Originally, offline post-production TV closed captions were inserted to tape masters in a linear workflow. Once video servers could capture and play back video with captioning, the tape decks were no longer necessary, but captions were still inserted the same way as they were for tape. A rack mount hardware closed caption encoder could be used to insert closed captions into an SDI signal that was recorded by the server ingest system.

To make things even faster, broadcasters then wanted to do the caption insertion completely file based. To accomplish this, caption software was developed to insert CC data directly to prerecorded TV video files. A variety of video file formats support closed caption data. For example, a popular video file format is XDCAM HD .MXF. The captioning data for this format can be inserted using software according to the SMPTE 436M standard. This HD MXF can be used as a deliverable for a variety of TV video play out servers such as Omneon,

Harris, and Grass Valley. In addition, popular transcoding software such as Telestream Vantage can flip this .MXF to other video file formats without losing caption data.

### Caption data frame rate conversion

Live TV video broadcast uses 1080i60, 480i60 and 720P 59.94 as the standard frame rates, and the same is true for the captioning data. However, some internet video delivery companies require the video frame rate to be the original 23.98 frames per second for certain programming. Since the captioning data is not time stamped to 23.98, the captioning will drift out of sync for long form programming. This is one of the most common problems for studios who are new to CCAM. Therefore, captioning software has been developed to quickly do the frame rate conversion to 23.98 for the caption data.

### Caption data conversion

In baseband TV broadcast feeds, the captioning data is very standardized. Line 21 for SD and Line 9 for HD is used and usually gets converted to MPEG-2 user data for transmission over cable networks.

However, internet delivery is like the wild west of captioning file formats. For example, one captioning file format that works on an iPhone will not work in another video player. Therefore, the TV caption data of CEA-608 and CEA-708 must be reformatted to work in a variety of video players.

### Closed Caption Data Extraction

The extraction of caption data from file formats such as .MXF, .MOV, and MPEG-2 is new. However, the need to do things faster, easier and automatic is something that all video departments have been moving towards for a long time.

Large archives of digital video files will contain captioning that can be re-purposed. Software has been designed to extract this data in batches or with a command-line script. Once the data has been extracted it can be easily formatted for internet delivery.

### MCC file as new standard in CC data archiving

A common caption file format that broadcast professionals come across is the .SCC file. These files were originally designed to work with DVD-Video authoring software. Because of the popularity of DVD-Video, huge archives of the .SCC files are now available. However, SCC was not originally designed with transcoding and conversion of caption data in mind.

For example, TV closed captioning data can contain both CEA-608 and CEA-708 data. .SCC files do not have CEA-708 data since they were intended for NTSC standard definition analog playback. Furthermore, they do not have the ability to properly handle multiple languages and frame rates such as 23.98.

To help overcome these limitations, caption data extraction software is able to map out the actual VANC data of TV broadcast into a .MCC (MacCaption Closed Captioning) file format.

With this format, captioning workflows for transcoding and delivery can eliminate the need to use .SCC, .cap, or any other legacy file format which doesn't actually contain all the data, but in fact was designed to work for only one specific workflow. The .MCC file format was designed with transcoding and editing of caption data as a priority.

### Searchability and indexing for captioning data management

Today, software is available to easily extract caption data from video archives, and entire database searching is possible because of closed captions. Each caption cell in a video file contains both timecode information and key words that can be searched. This information is very valuable to a broadcaster that needs to edit a show and is looking for a specific shot to use.

No matter how you want to re-purpose your closed captioning data, having a proven tool that can archive in the MCC format will prove invaluable in the future as new formats emerge and standards change. The MCC format is available in all versions of CaptionMaker and MacCaption software.

