

SCTE | **STANDARDS**

Digital Video Subcommittee

AMERICAN NATIONAL STANDARD

ANSI/SCTE 277 2022

Linear Contribution Encoding Specification

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Document Types and Tags

Document Type: Specification

Document Tags:

☐ Test or Measurement

☐ Checklist

☐ Facility

☐ Architecture or Framework

☐ Metric

☒ Access Network

☐ Procedure, Process or Method

☒ Cloud

☐ Customer Premises

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1. Introduction

1.1. Executive Summary

This document specifies the contents and format of contribution linear source media being provided from origination to a recipient for processing into a distribution format. This document defines a standardized ingest specification for linear content to be distributed across either IP/CDN or QAM delivery platforms. The goal in all included scenarios is to deliver the highest quality video available based on the originally produced content type, bit rate, and codec.

1.2. Scope

This specification has the goal of providing a consolidated set of requirements for content essence and related information from a content provider to a processing facility for subsequent delivery to a Content Delivery Network (CDN) or a QAM distribution plant. The formats are defined to obtain the best resultant quality across a number of distribution methods. This specification will initially only define the contribution linear feed.

This document specifies contribution formats. This document covers linear content and related components preparation for ingest. From the ingest point, content in this format can be used in multiple ways which are covered in other specifications. This document does not specify operational processes such as notifications and content delivery. Where notifications are expected in this document, it is expected other process-oriented documents will address this.

1.3. Document Lifecycle

This document is expected to evolve as audio, video, metadata, and associated technologies evolve. Figure 1 shows the potential roadmap for this document based on upcoming technologies.

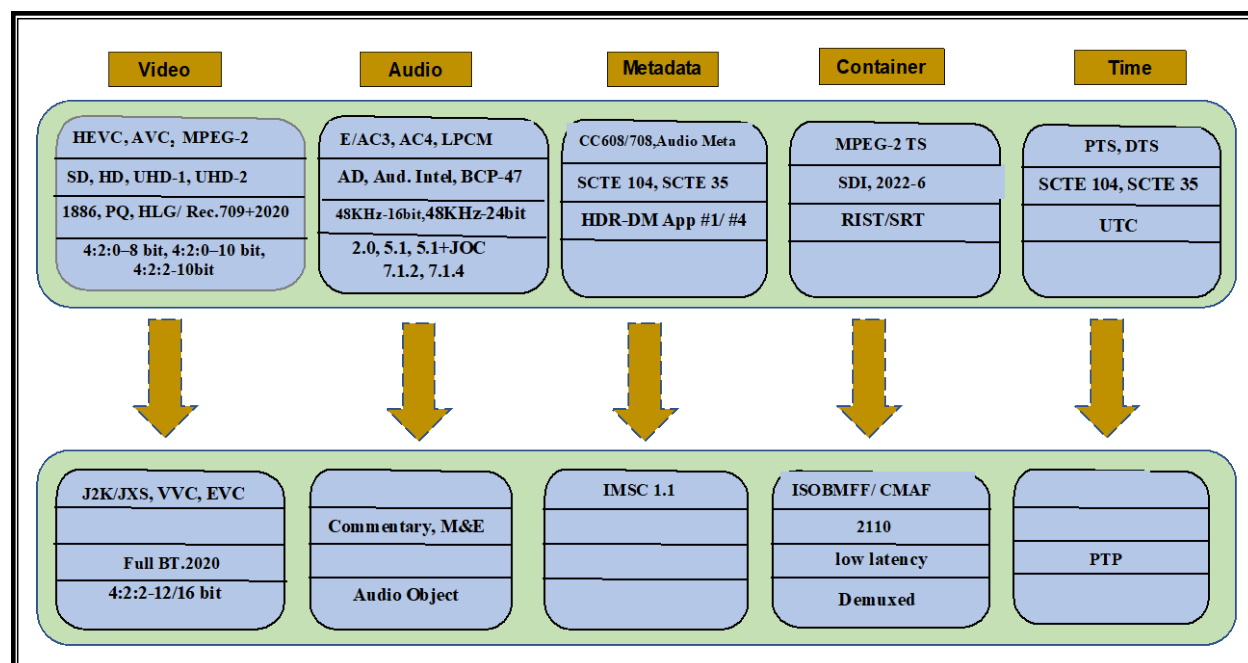


Figure 1 - Document Scope Lifecycle & Future Roadmap

Note: Captioning may also be embedded in the video.

1.4. Linear Contribution Reference Architecture

Linear sources should be self-contained, or otherwise logically or physically 'bundled' including all video, audio, text, and associated metadata to ensure that all necessary components are available for processing. An example of physical bundling is video, audio, secondary audio, content replacement signaling, and captions. External references *may* permit, for example, third-party metadata to be used with video and audio sources for enrichment and enhancement. These elements will be carried through the content transformation process and provided appropriately for the consuming device.

The diagram in Figure 2 represents the high-level Mezzanine file creation and flow. This specification will address the desired and acceptable Mezzanine file content and format. Content encoding, packaging, and delivery are out of scope of this specification.

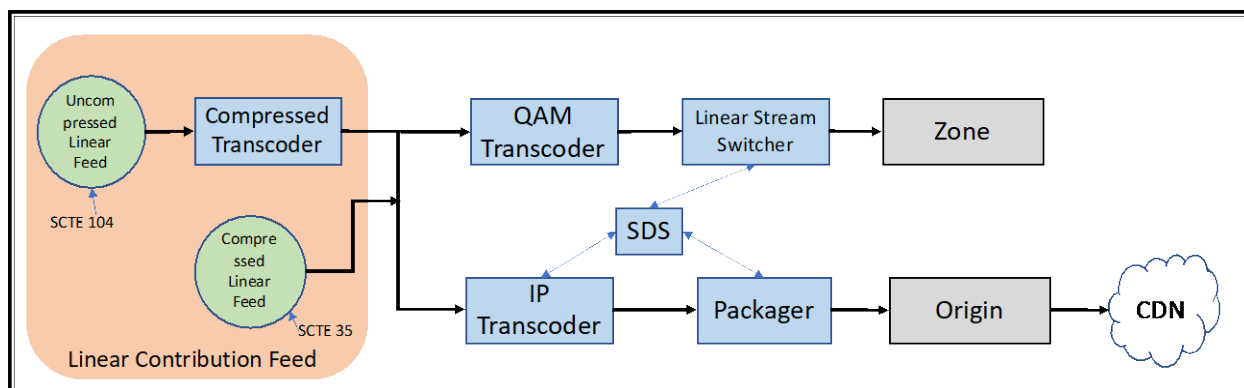


Figure 2 - High Level Architecture

1.5. Benefits

With the use of this document, content providers can reduce the number of mezzanine linear source media versions of their content which can be ingested by multiple recipients while adjusting to each individual recipients' network infrastructure. Without this document, content providers may need to provide many more versions of the contribution linear source media to reach a similar number of recipients.

1.6. Intended Audience

Content providers providing contribution linear media feeds to MVPD recipients intended for processing into a distribution format.

1.7. Areas for Further Investigation or to be Added in Future Versions

This specification will initially only define the contribution linear feed.

This specification will need to accommodate newer technologies that deliver improved media fidelity or experiences or optimize network delivery capacity and robustness.

Additionally, broadcaster feeds will be accommodated in future revisions. A broadcaster's feed differs from a linear contribution feed by being a non-dedicated off-air source at bit rates/ quality suitable for distribution feeds. The feed may also contain separately bundled media components received from different source points and would require time synchronization between these components.

2. Normative References

The following documents contain provisions, which, through reference in this text, constitute provisions of this document. At the time of Subcommittee approval, the editions indicated were valid. All documents are subject to revision; and while parties to any agreement based on this document are encouraged to investigate the possibility of applying the most recent editions of the documents listed below, they are reminded that newer editions of those documents might not be compatible with the referenced version.

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2.3. Published Materials

No normative references are applicable.

3. Informative References

The following documents might provide valuable information to the reader but are not required when complying with this document.

3.1. SCTE References

No informative references are applicable.

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4. Compliance Notation

<i>shall</i>	This word or the adjective “ <i>required</i> ” means that the item is an absolute requirement of this document.
<i>shall not</i>	This phrase means that the item is an absolute prohibition of this document.
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5. Abbreviations and Definitions

5.1. Abbreviations

3D-LUT	three dimensional look up table
AAC	advanced audio coding
AD	audio description (also known as description video service)
AFD	active format description
API	Application Programming Interface
ATSC	Advanced Television System Committee
AVC	advanced video coding

CABAC	Context-Adaptive Binary Arithmetic Coding
CALM	Commercial Advertisement Loudness Mitigation
CBR	constant bit rate
CC	closed captioning
CDN	content delivery network
CEP	content encoding profiles
CLL	content light level
D	dialogue
DASH	dynamic adaptive streaming over HTTP
DM	dynamic metadata
DPI	Digital Program Insertion
DTS	decoding time stamp
DVS	descriptive video service
EBP	encoder boundary point
EIDR	Entertainment Identifier Registry Association
ESAM	Event Signaling and Management
ESNI	Event Scheduling and Notification Interface
ETV	enhanced television
FCC	Federal Communications Commission
FPS	frames per second
GBPS	Gigabits per a second
GOP	Group of Pictures
HD	high definition
HDR	high dynamic range
HDTV	high definition television
HEVC	High Efficiency Video Coding
HLG	hybrid log gamma
HLS	HTTP live streaming
HP	high profile
HT	high throughput
HTTP	Hypertext Transfer Protocol
IDR	Instantaneous Decoding Refresh
IEC	International Electrotechnical Commission
IP	Internet Protocol
IRE	Institute of Radio Engineers
ISO	International Organization for Standards
ITU-R	International Telecommunications Union – Radiocommunication
JOC	joint object coding
JPEG	Joint Photographic Experts Group
LFE	low frequency effects
LPCM	linear pulse-code modulation
LUT	look up table
MBAFF	Macroblock-Level Adaptive Frame/Field
MBPS	Megabits per a second
MDCV	master display color volume
MP	main profile
MPD	manifest presentation description
MPEG	Moving Pictures Experts Group
MVPD	Multichannel Video Programming Distributor

M&E	music and effects
NCG	narrow color gamut
NGA	Next Generation Audio
NPT	normal playback time
OOB	out of band
PAFF	Picture Adaptive Frame Field
PAT	Program Association Table
PCM	Pulse-Code Modulation
PCR	program clock reference
PES	Packetized Elementary Stream
PID	Program Identifier or Packet Identifier per [13818-1]
PMT	Program Map Table
PQ	perceptual quantizer
PSI	Program System Information
PTS	presentation time stamp
RIST	Reliable Internet Stream Transport
RTP	Real Time Protocol
SAP	stream access point
SCC	scenarist closed caption
SCTE	Society of Cable Telecommunication Engineers
SD	standard definition
SDI	Serial Digital Interface
SDR	standard dynamic range
SDS	Signal Decision Systems
SDTV	Standard Definition Television
SEI	Supplemental Enhancement Information
SMPTE	Society of Motion Picture and Television Engineers
SPTS	Single Program Transport Stream
SRT	Secure Reliable Transport
TBD	to be determined
TS	transport stream
T-STD	Transport Stream System Target Decoder
UHD	ultra high definition
UHDTV	ultra high definition television
UTC	Universal Time Code
VANC	vertical Ancillary data space
VBI	vertical blanking interval
VBR	variable bit rate
VoD	video on demand
XDS	extended data service
XML	eXtensible Markup Language

5.2. Definitions

AC-3	Dolby Digital Audio Codec.
Adaptive Content	Adaptive Content is an alternative approach for information delivery with the purpose of providing access of content to many types of devices and network conditions.
Advanced Audio Coding	Advanced Audio Coding (AAC) is a lossy compression and encoding scheme for digital audio.