

SCTE®

EMMY TALK 3: SCTE 35, SCTE 250, SCTE 224

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SHAPING THE FUTURE OF CONNECTIVITY.

SCTE Suite of Standards

- Originally started out with local cable advertising
- Added content marking and replacement
- Added regional and web blackouts
- Added programmer addressable ads
- Great example of the flexibility and control with the Comcast/NBC Olympics talk on Tuesday morning.

SCTE 35

Digital Program Insertion Cueing Message

- Brief history of cue tones, advertising and other uses
- SCTE 67 Recommended Practice for Digital Program Insertion for Cable
- SCTE 104 Automation System to Compression System Communications API
- Transition to compressed video, Splice_Insert
- More complicated signaling, Time_Signal and descriptors
- Adaptive Bitrate Manifest Markers

Local Ad Sales

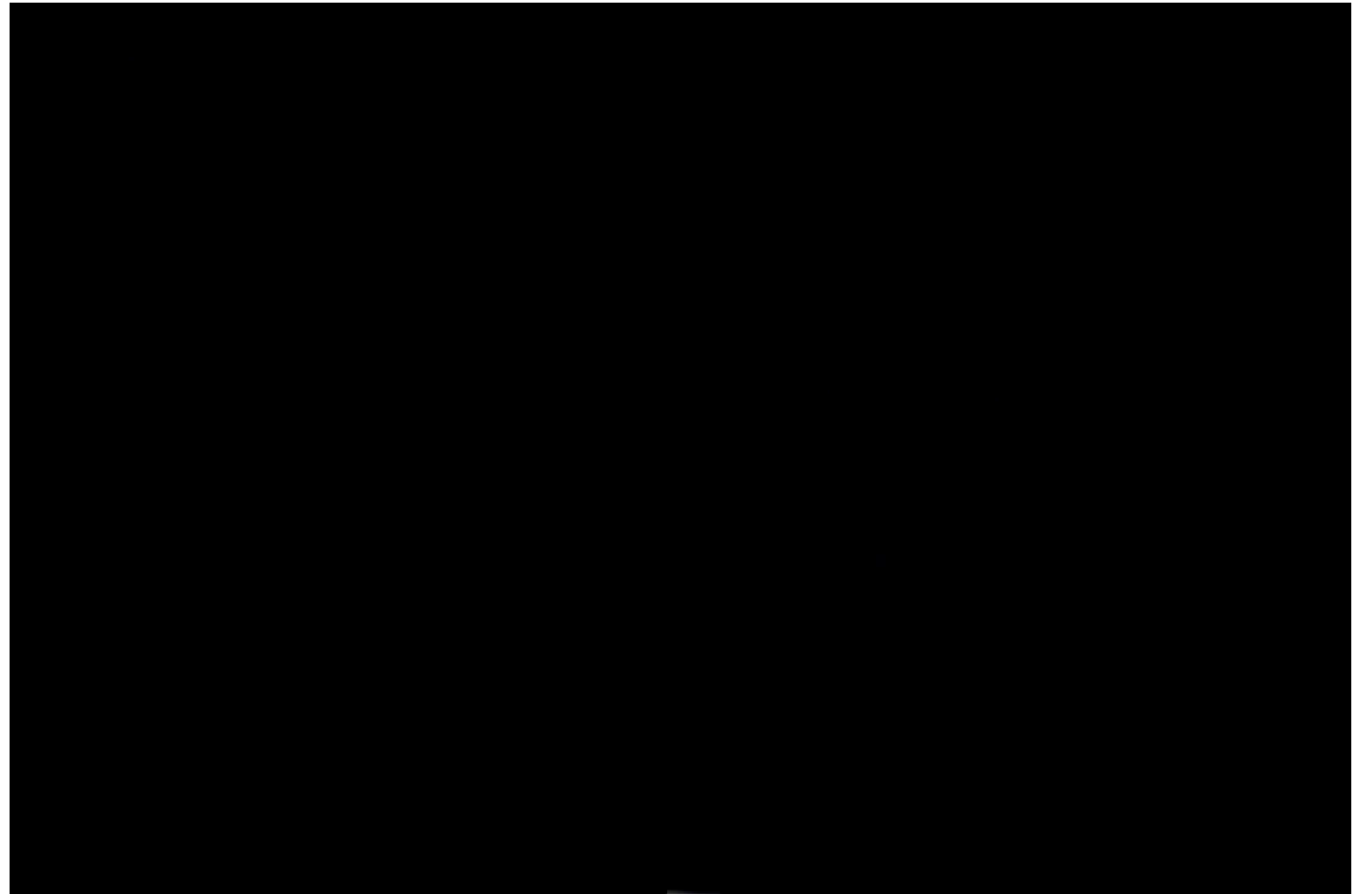
- Where the original horrible audio came from.



Beginnings

Local Cable Ad insertion

- Late 1980's you may have heard DTMF cue tones on many networks.
- 3 digit DTMF cue with a * to start and a # to end. (CNN was 024*)
- The start was typically an 8 second pre-roll to let the tape machines spool up.
- The end was an immediate switch back to network.
- Most ad insertion systems ignored the end cue.
- Later moved to an alternate audio, subcarrier or subcarrier with a contact closure.
- After tape decks Video servers played out the ad content, but the analog switches and DTMF remained.



Entering the Digital Age (ATSC and Digital Cable)

MPEG 2 Compressed network feeds being delivered to the set top



- SMPTE 312M - Signaling and Splicing MPEG streams
 - Splicing constraints are essentially what ABR segments are today
- Problem - Constant bit rate ads spliced in to variable bitrate stat-max
 - Solution real time transcoders (iMedia Cherrypicker)
 - Progressive refresh GI/Motorola encoders HITS
- Two remaining issues
 - Signaling in the compressed digital domain
 - Communication between Splicers and Servers (SCTE 30, not part of this talk)

SCTE 35

Initial Standard ages ago SCTE Digital Video Subcommittee DPI AHG

- Used SMPTE 312M signaling as a base, but extended to meet the needs of local cable ad Insertion. Left Splice_Null and Splice_Insert started at 5
- Used Presentation Time Stamp (PTS) to define splice point so MPEG2 Transport Streams
- Left open constraints on the ad or program stream
 - Let the best splicer win
- Splice_Insert Command
 - Tried to fix some issues in then current local ad-insertion
 - Unique program ID and ad # of total ads

Then Came MystroTV

- Needed more cue types than just local ads (programs, programmer ads)
- New cue types required different data
- Some of the fields in Splice_Insert were too small to be useful
- In order to manage studio rights, needed accurate content segmentation and updated rights as to what could be stored and what could not.
- Created Time_Signal that stripped out the timing information from the Splice_Insert command.
- Added segmentation_descriptor for new info.
- Lives on as StartOver(TM)

Then Came Adaptive Bitrate

- HLS with MPEG2 Transport Stream (SCTE 35 chapter 12.2)
 - Could leave SCTE 35 messages in stream, timing still worked
 - Or Extract and put in Manifest Markers EXT-X-SCTE
 - And EXT-X-CUE-OUT and EXT-OATCLS-SCTE35 and
- HLS with CMAF
 - Extract SCTE 35 and insert Manifest Markers
 - Use either EXT-X-SCTE or EXT-X-DATERANGE
- DASH (SCTE 214-1)
 - Section 12.3 Carriage of SCTE 35 in a query parameter

SCTE 67 and 104

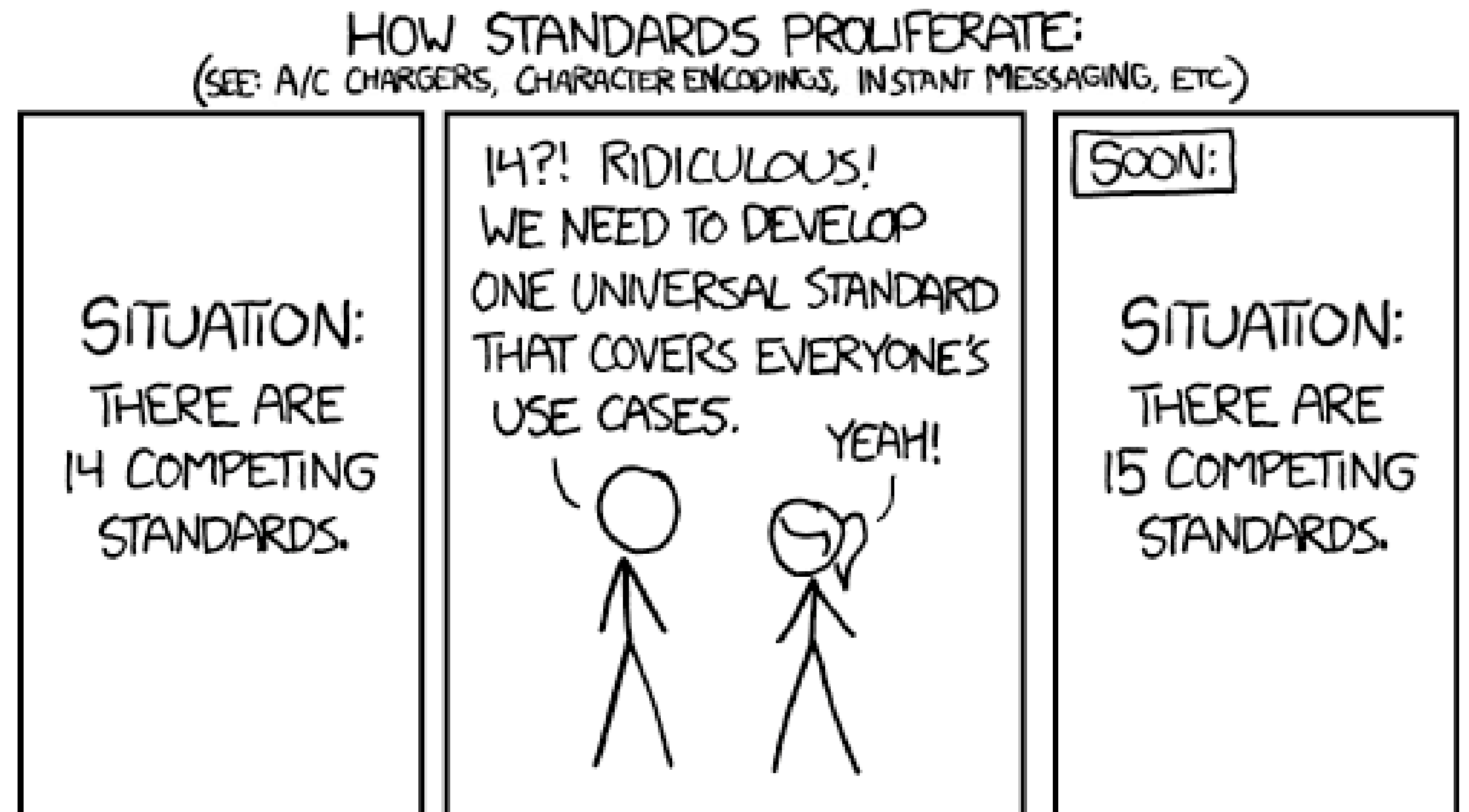
- SCTE 67 Recommended Practice for Digital Program Insertion for Cable
 - Wanted to keep SCTE 35 simple
 - But splicing is complicated, managing multiple audio, video, encryption
 - SCTE 67 meant to be example of how to use SCTE 35 for local ad insertion
- SCTE 104
 - Basically SCTE 35 for uncompressed video (originally SDI, now SMPTE 2110)
 - Allows Broadcast Automation systems control SCTE 35 message insertion

Why is every programmers SCTE 35 different

- Some programmers wanted to implement features by overloading existing parameters.
 - You can ask SCTE questions on implementations
 - Join the standards group and get the new features implemented
- SCTE 35 does allow private descriptors and use a registered identifier

Cue obligatory XKCD

- Or generate a new Standard to be able to process and modify different cues
- Cue SCTE 250 ESAM...



SCTE 250

Event Signaling And Management (ESAM) - History

- ESAM started as a OpenCable Specification with version I01 in 2012
- It had some quick revisions before the much adopted I03 was released in October 2013
- SCTE picked up ESAM in 2018, released current SCTE 250 Standard in 2019
- All of them named “Real-time Event Signaling and Management (ESAM)”

SCTE 250

Components

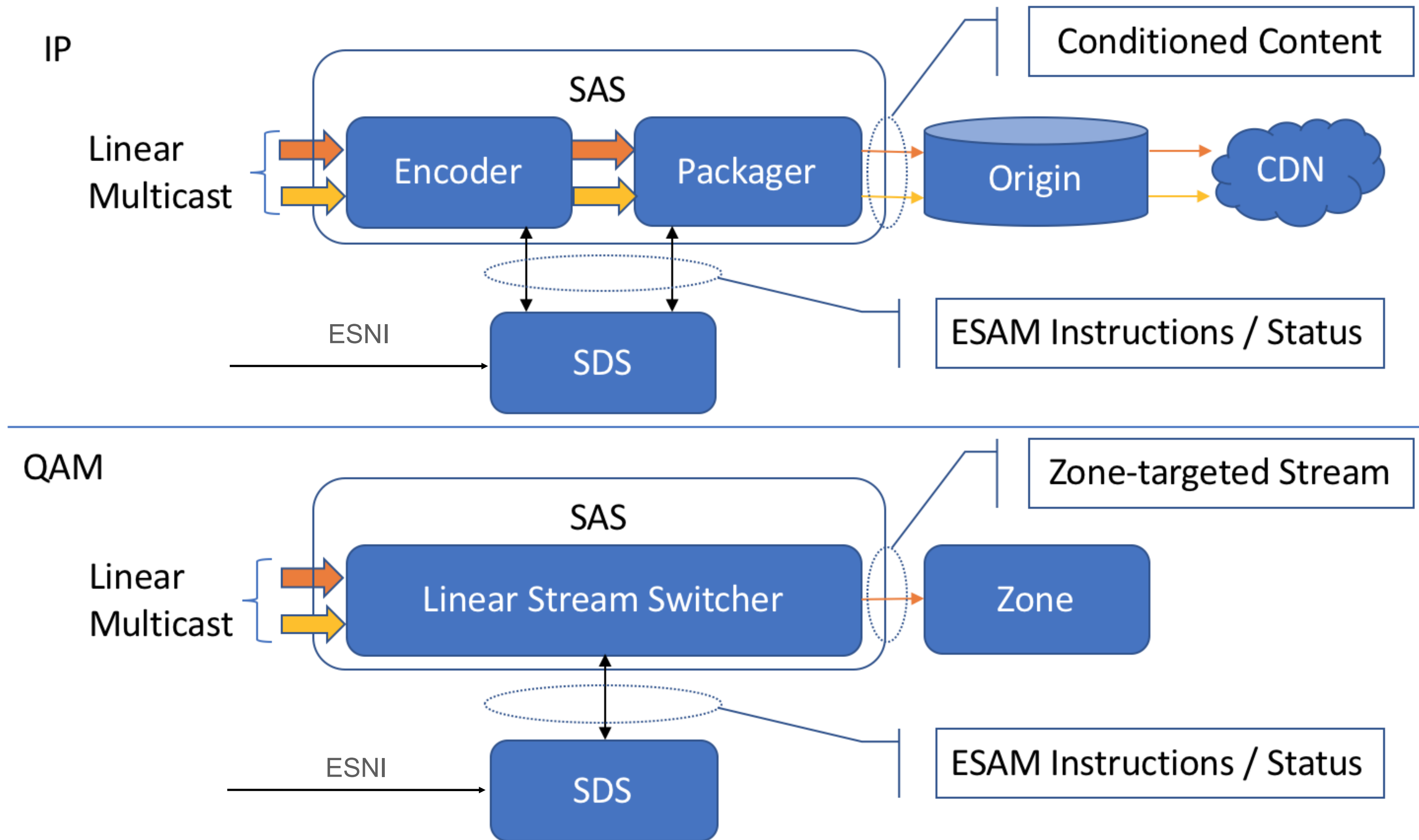
- The Real-time Event Signaling and Management API defines a standardized mechanism for a Signal Acquisition System(s) (SAS) to communicate with with Signal Decisioning System(s) (SDS)
- SAS can be multitude of devices (i.e., encoder, transcoder, packager, stream switcher, etc.)
- SDS is typically a Placement Opportunity Information System (POIS) or a SCTE 224 Decision Engine
- Signaling is the SCTE 35 in-band signaling seen by the SAS in the video stream

SCTE 250

Scenarios

- SAS sees an in-band SCTE 35 signal and needs to send that to a POIS or SDS to get instructions on what to do
 - SAS uses the Media message to convey pertinent information
 - source, zoneIdentity, binary signal, utcPoint
- SDS needs to send instructions to SAS in response or unsolicited
 - SDS uses the Media/MediaPoint/ReferenceSignal/Instructions

Architecture



SCTE 250

Instructions

- Remove original in-band signal
- Insert new in-band signal
- Receive status information for a signal
- Receive endpoint for reporting
- Condition stream for splice (in or out)
- Switch Content
- Customize ABR manifest
- Perform instructions on a repeating/ongong basis

SCTE 250

Summary

- ESAM is a performant protocol that:
 - Provides the mechanism to send signal information out of the SAS
 - Provides the mechanism for the SDS to send instructions back to the SAS
 - Provides the mechanism for the SDS to send unsolicited instructions to the SAS
- Example sources of SDS metadata can be
 - SCTE 130 Placement Opportunity Information System (POIS)
 - SCTE 224 Event Scheduling and Notification Interface (ESNI) engine

SCTE 224

Event Signaling and Notification Interface (ESNI)

- Background
- Structure
 - <Media>
 - <MediaPoint>
- <Metadata> can be applied at multiple points
- Use cases

Background

- June 2009 TimeWarner and Comcast announce TV Everywhere... But
 - Regional and web blackouts, slate or alternate content (Sat Affiliate handled this manually at this time)
 - Program rights depended on linear and IP channels same
 - Some contracts required programmer branding to be dominant
 - Programmer and affiliate advertising
 - Studio Contracts on content rights
 - Live to On Demand

Solutions

Cablelabs, OATC to SCTE

- Cablelabs worked on an Alternate Content specification mainly handling sports/regional blackouts.
- OATC was working on a follow on to the On Demand Metadata for TVE with a Live Content Metadata specification. Combine guide, blackouts and ads.
- Both specifications were submitted to SCTE to create ESNI
- Two main concepts to deliver the required information
 - <Media> and <MediaPoint>
 - Audience, Action, ViewingPolicy, Policy

<Media>

- Live Network
- Live Program
- On Demand Asset
- <Metadata>
 - Could be SCTE 236 (Cablelabs ADI / Content)
 - Other guide data format

<MediaPoint>

- Place in the <Media> where something needs to happen, maybe...
- <MatchSignal> Can be marked by time or a signal (or both)
 - Originally an SCTE 35 message
 - Watermark
- <Metadata>
- Apply Policy
 - Addressable ad Allocation
 - Blackout

<Audience>

Can be related to the viewer, device or distributor

- Can be made up of multiple attributes, some examples
 - Device
 - OS
 - Zip
 - DMA (Designated Marketing Area)
 - Vird (Virtual IRD to simulate prior satellite based delivery)
 - Distributor
 - Public/Private network (In house cable modem vs driving around)

<ViewingPolicy>

Assembles an <Audience> with an Action

- What to do when the <Audience> is watching
 - Signal conditioning - adding or deleting cue information
 - Content (to describe alternate content to use)
 - FastForward
 - KidVid - FCC coppa rules apply
 - DRM - Some Studios/programmers have different DRM rules for different content. State of the union address may not require DRM, New movie does
 - Capture (Start Window, Stop Window, Reap ...) used for Live-> On Demand

<Policy>

- Assembles one or more <ViewingPolicy>
- Example
 - If outside the US, put up a slate
 - If in a certain ZIP, use alternate content (Slate or alternate programming)
 - Default to no fast forward, but pause allowed

SCTE 268

Operational Practice on the use of SCTE 224 for Advertising Information

- Some vendors had proposed using addressable metadata
- Some other wanted something that fits in the audience/action schema
- Took some of the addressable metadata and stuck it in audience and action, everyones happy
- Created an Allocation action with slots and exclusions to define the addressable ad opportunity
- Needed for insertion in to linear programming with existing network ads.
 - Programmers ad system had to manage either the ads that could play in a spot, or categories to exclude from a spot.

SCTE 268

- Different distributors have different capabilities
- Same feed may go to Distributors and their ADS vendors who may handle multiple affiliates. Same ad may be replaced
 - Addressable replacement by Cable Affiliate on QAM and IP
 - Addressable replacement by a satellite affiliate with set top
 - Addressable replacement on a TV using watermarks or ACR
- No room in band to describe all of this

Questions?

A graphic consisting of several concentric circles in shades of red and black. The text "That's all Folks!" is written in a white, cursive script across the center of the circles.

That's all Folks!

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Thank You!

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