

# SCTE • ISBE<sup>®</sup>

## S T A N D A R D S

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**Digital Video Subcommittee**

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**AMERICAN NATIONAL STANDARD**

**ANSI/SCTE 118-1 2019**

**Program-Specific Ad Insertion -  
Data Field Definitions,  
Functional Overview and Application Guidelines**

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## 1. Introduction

### 1.1. Executive Summary

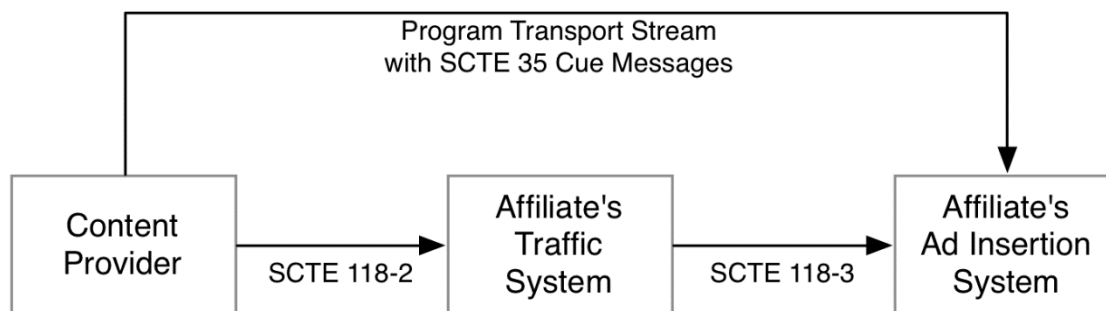
This document defines functionality associated with and the messaging used to control Program-Specific Ad Insertion. Program-Specific Ad Insertion is the scheduling and insertion of a Spot into a digital broadcast Program based on the program identifier passed in the SCTE 35 [1] Cue Message. The usage of specific data fields defined in SCTE 35 are defined in this document.

### 1.2. Scope

Current Traffic Systems allow Affiliates to schedule the insertion of commercial advertising in either a Time-Based or Event-Based “Window” format. Both Time-Based and Event-Based reservations are setup well in advance based on communication from the Networks as described in Section 6 (Informative).

Program-Specific Ad Insertion is the scheduling and insertion of a Spot into a specific broadcast Program in order to avoid misplacement of the Spot as in the cases of sports overruns, delays, alternate programming or other variations from a published schedule.

An overview of the specifications involved in the interaction of an end-to-end system implementing Program Specific Ad Insertion is shown in **Figure 1 - System Context of this Standard**, below. Additionally, Appendix B: SCTE 118 Within DPI End-To-End Representative Architecture (Informative), illustrates these components and message flows within the overall DPI context.



**Figure 1 - System Context of this Standard**

Additionally, this document will highlight other potential areas where Spots *may* air outside of Program Windows and therefore, *may* be of concern during a later stage of this specification.

### **1.3. Benefits**

Program-Specific Ad Insertion will allow for an Avail to be associated with a specific program, as communicated by the Network. The Network assigns an Avail within a specific Program, the T&B system schedules the appropriate Spots within the Avail, and the Ad Insertion system inserts the Spot(s) associated with that Avail and Unique Program Identifier (UPID) when triggered by the appropriate Cue Message. By associating advertising to programming instead of simply to Windows, the Affiliate *should* be able to earn more revenue by guaranteeing the context of the advertisement, and by adapting to occurrences surrounding live events, such as delayed starts, early ends, or overrun. These scenarios, especially when dealing with sports programming, can involve a great deal of high value advertising. When the UPID is not found as expected, the Ad Insertion System will be able to play alternate Window-Based advertising that has been scheduled or other Program-Specific advertising if it has been scheduled.

### **1.4. Intended Audience**

The intended audience is content providers, multi-channel video program distributors, TV Everywhere providers/distributors and vendors/developers who build solutions.

### **1.5. Areas for Further Investigation or to be Added in Future Versions**

An implementer of SCTE 118 *may* wish to give review and attention to SCTE 224 [6], a more recent standard, that provides alternative means of identifying Avails and scheduling appropriate Spots to be inserted therein.

## **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.

### **2.1. SCTE References**

[1] SCTE 35 2017 – Digital Program Insertion Cueing Message for Cable

### **2.2. Standards from Other Organizations**

- No normative references are applicable.

### **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

- [2] SCTE 67 2017 – Recommended Practice for Digital Program Insertion for Cable
- [3] SCTE 118-3 2019 – Program-Specific Ad Insertion – Traffic System to Ad Insertion System File Format Specification
- [4] SCTE 118-2 2019 – Program-Specific Ad Insertion – Content Provider to Traffic Communication Applications Data Model
- [5] SCTE 104 2017 – Automation System to Compression System Communications Applications Program Interface (API)
- [6] SCTE 224 2018 – Event Scheduling and Notification Interface (ESNI)
- [7] SCTE 30 2017 – Digital Program Insertion Splicing API

### 3.2. Standards from Other Organizations

- No informative references are applicable.

### 3.3. Published Materials

- No informative references are applicable.

## 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.
<i>forbidden</i>	This word means the value specified shall never be used.
<i>should</i>	This word or the adjective “ <i>recommended</i> ” means that there may exist valid reasons in particular circumstances to ignore this item, but the full implications should be understood and the case carefully weighted before choosing a different course.
<i>should not</i>	This phrase means that there may exist valid reasons in particular circumstances when the listed behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.
<i>may</i>	This word or the adjective “ <i>optional</i> ” means that this item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because it enhances the product, for example; another vendor may omit the same item.
<i>deprecated</i>	Use is permissible for legacy purposes only. Deprecated features may be removed from future versions of this document. Implementations should avoid use of deprecated features.

## 5. Abbreviations and Definitions

### 5.1. Abbreviations

	<b>SCTE 118: Part 1; Part 2; Part 3</b>
BXF	Broadcast eXchange Format standard as defined in SMPTE 2021[3]
DPI	digital program insertion
ISAN	International Standard Audio/Visual Number [6], a globally-unique identifier used for referencing a specific version of a completed audio/visual work as well as its finished components.
MVPD	multichannel video programming distributor
SCTE	Society of Cable Telecommunications Engineers
SMPTE	Society of Motion Picture and Television Engineers
UPID	unique_program_id
URI	Uniform Resource Identifier
XML	eXtensible Markup Language

### 5.2 Definitions

Definitions of terms used in this document are provided in this section. Defined terms that have specific meanings are capitalized. When the capitalized term is used in this document, the term has the specific meaning as defined in this section.

	<b>SCTE 118: Part 1; Part 2; Part 3</b>
Ad Insertion System	A hardware and software solution that interprets a Schedule File, streams Spot content when triggered by a Cue Message (based on the Schedule File), logs insertion success/failure results, and returns a Verification File to the Traffic and Billing System.
Advertisement (also called “Ad”)	Non-program material telecast as a solicitation to buy a product or service.
Affiliate	A content distributor (cable operator or MVPD) which has negotiated rights for local or regional Spot insertion into Network-designated Avails.
Avail (Availability)	An Avail is a Network provided opportunity for an Affiliate to insert a Spot(s) into a Program. The start of an Avail is indicated as a splice event in the programming stream. The duration of the Avail <i>may</i> vary from a few seconds to several minutes. (See SCTE 67 [2])
avail_num	avail_num field as defined in the splice_schedule() and splice_insert() commands of SCTE 35 [1].
avails_expected	avails_expected field as defined in the splice_schedule() and splice_insert() commands of SCTE 35.
Break	Avail or an actual insertion in progress. In a sales context, a break is divided into sellable units (Avails). In an insertion context, a break is divisible into individual insertion events (slots).
Broadcast Day	The nominally 24-hour period which is logically thought of as a day for an Affiliate. When it does not align with a Calendar Day, it will typically begin in the early morning and span across midnight.

Calendar Day	The actual Gregorian day/date on which an event takes place. An Affiliate <i>may</i> define its Broadcast Day as representing events that span 2 separate, sequential, Calendar Days.
Cue Message	An SCTE 35 splice_info_section identifying an opportunity to leave or return to the Network Program stream.
Enhanced File	An SCTE 118-2 [4] Network provided XML file which delineates Program and Avail information, through metadata in the optional Service Level field associated with the Avail detailing the Service Level(s) to which it belongs. Service Level variations are expressed in the XML schema as AuthorizedNames and AuthorizationLists.
Event-Based Format	An ad insertion format in which a broad Window of time demarks designated Avails that float within that Window.
Network	A cable, satellite, or digital terrestrial content channel(s) such as CNN, ESPN, etc. offered by a content provider. The term can also apply to an Affiliate’s locally originated programming.
Program	A television show or event, aired by a Network, which <i>may</i> be at a regularly scheduled time and of determinate duration (e.g., SportsCenter, The Andy Griffith Show) or an occasional event at a non-regular time and of a variable duration (e.g., live coverage of a sports event or an awards show).
Schedule File	An XML file that lists all the Spots and times that the Spots are to be spliced in particular Networks and Zones.
Server (also, Ad Server)	This device communicates with the Splicer about the Spot(s) to be spliced and when to splice them into the Network Program.
Service Level Agreement	An agreement between a Network and an Affiliate that specifies the Avails to be provided for local Affiliate Ad insertion. A Network can have different arrangements with specific Affiliates.
Simple File	An SCTE 118-2 XML file provided by the Network which communicates Program and Avail information, but containing no metadata in the optional Service Level field associated with an Avail.
Slot	A Slot is a segment of time within an Avail into which a Spot can be scheduled.
Splicer	A device that splices Spots into Programs, typically based-on Cue Messages. This device also communicates with the Server, typically using SCTE 30 [7], about the time and the Spot to insert.
Spot	A single, schedulable and verifiable, element of non-program material (such as an Advertisement, a public service announcement or a promotional announcement) inserted into an Avail. A Spot usually has a duration under 2 minutes, typically of a standard fixed length of 15, 20, 30, 60, 90, or 120 seconds.
Tier	A measure of system and data support with regards to Program Specific Ad Insertion, as defined herein .
Time-Based Format	An ad insertion format that assigns each Avail a specific time that a Cue Message is expected and provides a buffer of time around it.
Traffic System (also, commonly “traffic and billing system” or “T&B system”)	A system that process client orders, creates schedule files, assigns specific copy, processes Verification Files, and produces invoices.
Unique	Within the scope of this document, the definition of ‘unique’ follows SCTE 67 [2] Section 6 and Section 7 definitions of unique and its usage.



unique_program_id	unique_program_id field as defined in the splice_schedule() and splice_insert() commands of SCTE 35.
Unique Program Identifier	A binary value defined in this file format that is equivalent to the unique_program_id field in SCTE 35.
Verification File	An XML file generated by the Ad Insertion System that lists all of the Spots that successfully played or failed to play, for a particular Network and Zone.
Window	A time range defined by a Schedule File, during which a Cue Message is expected.
Valid Window	For the purposes of determining whether a Spot is active, if the time of the insertion falls within the Window defined by the Scheduled Window Date, Scheduled Window Time and Scheduled Window Duration of SCTE 118-3 [3].
Window-Based	A type of Avail whereby a Spot insertion is triggered by a Cue Message received within a specified time range and not by a Program ID. Window-Based Avails can be scheduled as Time-Based or Event-Based formats.
Zone	A geographic region within an MVPD's distribution plant separable from other regions for the purpose of geographically targeted Spot insertion.

## 6. System Overview (Informative)

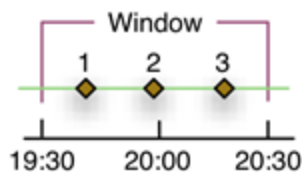
This document describes the systems encompassing Program-Specific Ad Insertion and their interaction. Without Program-Specific Ads Insertion, there are two in typical and general types of advertising insertion into Network programming. These Window-Based Avails are either Time-Based or Event-Based advertising insertion as described in the two following scenarios.

A Time-Based Format assigns each break an exact time that a Cue Message is expected and then allows for a buffer around it. Figure 2 shows that the break “red dot” is set for 3:40 and the Window is set for a 5-minute buffer around it for a 10-minute total Window. If the Cue Message is not received within that 10-minute Window, the Avail will be lost. Time-Based Formats are used on Networks with reliable Cue Message delivery patterns, e.g. Discovery, MTV or Food Networks.



**Figure 2 – Time-based Diagram**

Event-Based Formats are defined by setting up a Window time and assigning multiple Avails that float within that Window. Figure 3 shows a one-hour Window from 7:30 PM to 8:30 PM with 3 Avails assigned to it. The cues for these Avails *may* be received at any time within the one-hour Window. If only two cues are received within the Window, the 3rd Avail will be lost. Because Event-Based Formats allow breaks to air sequentially at any time within a Window, they are most often used when cue times are unpredictable, e.g. live sporting events.



**Figure 3 – Event-based Diagram**

### 6.1. Scenarios Addressed by Program-Specific Ad Insertion

The following is a non-comprehensive list of scenarios that *may* be better addressed by Program-Specific Ad Insertion than by traditional, Window-Based insertion. Many of these cases deal with high-value advertising Avails. The ability to better utilize inventory and sell these high-value Avails gives the possibility of additional revenue to the Affiliate.

- Sporting Event Over runs
  - NFL, MLB, etc. games running long – with no additional breaks
  - NFL, MLB, etc. games going into overtime, with additional breaks being offered for local use
- Specials / Live non-sports events running long
  - MTV Music Awards running 4 hours rather than expected 3
- Sporting Event Short-runs
  - NFL, MLB, etc. games ending sooner than expected – with no loss of breaks
- Breaking news events interrupting scheduled programming
  - Programming/breaks ceased due to weather alert / war coverage / national news story
- Sporting Event Rain-outs and Blackouts
  - Sporting Event does not air at all, due to “rain-out situation”
  - Sporting event begins late, due to rain delay
  - Sporting event ends early, due to rain-out
  - Sporting event airs for a portion of time – then becomes “delayed” – only to later resume

### 6.2. Implementation of Program-Specific Ad Insertion

Implementation of Program-Specific Ad Insertion requires the synchronization and communication of program identifiers from a Network through the Affiliate’s Traffic System to the Affiliate’s Ad Insertion System.

Today, there currently exist a number of communication paths between Networks and Affiliates. There also exist numerous formats for communicating schedules from Traffic Systems to Ad Insertion Systems. In order for Program-Specific and Traditional Ad Insertion to work, there needs to be a standardization of communication between the parties involved in this process. These communications means are described in the documents listed in Section 3.1 and outlined briefly, below.

The first of these standards (SCTE 118-2[4]) defines the communication of a Network’s broadcast schedule, with the appropriate Unique Program Identifiers to the Affiliate. This communication *should* simply contain this UPID in addition to the data that is already being supplied from the Broadcaster to the Traffic System.

The second standard (SCTE 118-3[3]) defines the communication of a schedule to an Ad Insertion System from an Affiliate's Traffic System and the verifications from the Ad Insertion System to the Affiliate's Traffic System. This is historically done through a flat-file schedule file that defines play Windows and what Spot is supposed to play, and a flat-file Verification File reporting what played or failed based on the original schedule file. In order to accommodate Program-Specific Ad Insertion, the Traffic System will need to be able to schedule and verify both Window-Based and Program-based schedules. Many Traffic and Ad Insertion systems already have a common format for communicating the Window-Based insertions. The Program-based insertions will be communicated in compliance with SCTE 118-3 or SCTE 118-2 to include the additional data for Program-Specific Ad Insertion.

This document and the other two standards do not intend to break the way in which current systems create and process schedules. They are meant to enhance the capabilities of Traffic and Ad Insertion Systems, to provide for additional revenue for Affiliates through the better targeting of advertisements.

Program-Specific Ad Insertion will always occur based on a SCTE 35[1] Cue Message that contains a non-zero UPID. When scheduling a Program-Specific Avail, the whole Avail must have the same attributes, and must be entirely Program-Specific.

### **6.3. A Multi-Tiered Approach to Program-Specific Ad Insertion**

To allow for a phased approach to the implementation of Program-Specific Ad Insertion through the various components, the definition of multiple tiers of support is defined in this Standard. In this manner, various devices can produce and support data supporting Tier 0, Tier 1 or Tier 2 Programs or events. When a Network, Traffic System or Ad Insertion System supports a particular Tier, all Programs or events scheduled or announced do not need to be of that Tier (although a Program must maintain a consistent tier for all of its Avails). A schedule file *may* contain events that are a mixture of Tiers, and a Network need only support Tier 2 or Tier 1 data for a subset of their Cue Messages.

The following rules are meant to override the defined behavior in Sections 8.1.3 and 8.2, which describe the behavior of a Tier 2 system (full implementation).

If all devices in a particular installation do not support a Tier of service, then that system cannot be compliant. That is, if there is a system producing Tier 2 messages in the content, a system that is producing Tier 2 schedule files at the affiliate, but only a Tier 1 Ad Insertion System, then the overall system is essentially a Tier 1 system.

In addition to complying with requirements for a Tier from the system standpoint, the data must also be compliant that same Tier. If a Traffic System receives only Tier 0 or Tier 1 schedule data from a Network (i.e., it only receives a list of Programs with the number of breaks, or a list of Programs with unique\_program\_ids and number of breaks), it cannot, without additional data, produce a Tier 2 schedule file (one that specifically states what avail\_num and avails\_expected values will be contained within each Cue Message).

### **6.4. Additional Notes about using Program-Specific Insertion**

SCTE 35[1] allows for a Unique Program Identifier of 16 bits to be conveyed in the splice\_schedule() and splice\_insert() commands as defined in SCTE 35. The value of zero is reserved to signal an un-specified Unique Program Identifier by the Network.

When using a primary Program-Specific and alternate schedule the Avails in each schedule are tracked differently. For example, if the last Program ID avail\_num was greater than 1 and no other Spots have played in the alternate schedule Window then the first Avail in the alternate schedule Window will play.

In the circumstances where there are multiple feeds for a given Network (for example, USA Network's East Coast vs. West Coast), each feed will have its own Unique broadcast day, and be scheduled as if they were independent, Unique Networks. The fact that they are simply time-shifted versions of each other has no bearing on implementing this standard.

## 6.5. Not described in this document are:

- The communication of the Unique Program Identifier from a Broadcaster to an Affiliate's Traffic System. (Refer to SCTE 118-2[4])
- The communication of the Unique Program Identifier from an Affiliate's Traffic System to an Ad Insertion System. (Refer to SCTE 118-3[3])

This document does not intend to:

- Change the method of communication between Traffic System and Ad Insertion System
- Create real-time communications between the Traffic System and Ad Insertion System
- Address any issues of backhaul communication between the Ad Insertion System and the Traffic System other than through the currently existing verification process
- Require the use of the splice\_schedule() message.

## 7. Program-Specific Data Fields

### 7.1. Lifespan of a Unique Program Identifier

A Unique Program Identifier *shall* be valid and reserved for the 24-hour period (Program Window) defined with the Scheduled Program Date and Time (see SCTE 118-2[4]) in the middle of the valid Unique Program Identifier Window. As a result, a Unique Program Identifier cannot be used (or reserved) for a different event (even a duplicate instance of the same Program) for 12 hours, 00 minutes, and 00 seconds before the scheduled beginning of the Program, and cannot be repeated for 11 hours, 59 minutes, and 59 seconds after the end of the Program, as shown in Figure 4. Note: this allows for the actual airing of the Program to occur early (by up to 12 hours) or late (up to 11 hours, 59 minutes, and 59 seconds minus the Program duration).

Two Programs can be scheduled on subsequent days at the same time using the same Unique Program Identifier, as the Schedule Program Date and Time plus the Program Window of the first Program do not overlap with the Schedule Program Date and Time minus the Program Window of the subsequent day's Program (except during daylight savings situations, when either an unscheduled hour of programming occurs, or when the second day's schedule overwrites the first day's for the overlapping hour). This 24-hour separation *shall* be the effective minimum separation of Unique Program Identifier reuse.



Figure 4 - Valid Program ID Window

## 7.2. Lifespan and Sequence of Avails

During the lifespan of a Unique Program Identifier, Ad Insertion Systems and Splicers *should* be tolerant of Cue Messages that are missed or are received out of sequence. Although a Network is generally expected to increment the avail\_num field for subsequent breaks within a given Program, an Ad Insertion System *should* handle the case if Avails arrive in non-sequential order (i.e., if the Avail with an avail\_num value of 1 plays, then the Avail with the avail\_num value of 3 plays, then the Avail with an avail\_num value of 2 *may* still play when the appropriate Cue Message is received within the appropriate Program Window).

Reuse of non-zero Avail numbers within a Program is not recommended, as it would not unambiguously identify two Avails with the same attributes within the same Program.

Duplicate Cue Messages *shall* be ignored, and the Cue Message details will be recorded in the Verification File as a missed Avail.

Avails will continue to live until their Windows expire (as described in this document and SCTE 118-3[3]), and an Ad Insertion System *should* insert the appropriate Spots if it sees a ‘skipped’ avail\_num at a later time. Program-Specific Avails that have not been played do not expire when a subsequent Avail is announced. Program-Specific Avails only expire when played or at the close of the Avail’s scheduled Window.

All occurrences of a Unique Program Identifier do not need to be sequential and uninterrupted.

For example, if a Program contains four Avails, the Cue Messages for the first two Avails could be received, and then a Cue Message containing a completely different (or unspecified) Unique Program Identifier could be received. Finally, the third and fourth Avails for the original Program could be received. This situation *may* be encountered in a baseball rain delay, or if a Network and affiliate wished to announce a half-time show as a different event than the game in which it resides.

As another example, an Ad Insertion System *should* be able to determine that Cue Message with avail\_num value of 2 has been received and not the expected avail\_num value of 1 and *should* play the appropriately scheduled Spot. At a later point in time (during the Avail’s valid Window), avail\_num value of 1 is encountered, and the appropriately scheduled Spot is played. The Ad Insertion system will play avail\_num value of 1 for the appropriate Unique Program Identifier even if Cue Messages for other Programs have occurred in between.

## 8. Tiers Of Data And System Operation

To allow for a phased approach to the implementation of Program-Specific Ad Insertion through the various components, multiple Tiers of operation are defined. When a Network, Traffic System or Ad Insertion System supports a particular Tier, all Programs or events scheduled or announced do not need to be compliant with that Tier (although a Program must maintain a consistent Tier for all of its Avails). A

schedule file *may* contain events that are a mixture of Tiers, and a Network need only support Tier 2 or Tier 1 data for a subset of their Cue Messages.

Note: the use of the SCTE 35[1] splice\_schedule() command is not required to implement Tiers or any other specification of this document.

For a system or party (Network, affiliate, etc.) to provide a service Tier, the system or party *shall* support ingesting or producing that defined level of data and must produce the appropriate responses.

A Network *shall* produce Tier ‘x’ schedules and corresponding Tier ‘x’ Cue Messages for an affiliate in order to provide Tier ‘x’ service to that affiliate for an event. A Network *may* produce a schedule that contains events of different Tiers to a single affiliate. A Network *may* provide different service Tiers to different affiliates by providing schedule files with differing data to various affiliates.

An Ad Insertion System supporting a particular Tier *shall* accept schedule files that *may* contain a mix of events that are of the supported Tier or below. That is, if it supports Tier 1 insertion, it must be able to accept schedule files that contain both Tier 0 and Tier 1 scheduled items. It *shall* produce a Verification File with the appropriate information for each event of the schedule file (Tier 2 verifications for Tier 2 events, Tier 1 verifications for Tier 1 events, etc.).

A Traffic System *shall* be able to ingest Tier ‘x’ schedule data for a Network from a Content Provider and Tier ‘x’ Verification Files from an Ad Insertion system and *shall* be able to generate Tier ‘x’ schedules to an Ad Insertion system in order to provide Tier ‘x’ service.

## 8.1. Definition of Tiers

### 8.1.1. Tier 0

Tier 0 *shall* describe the functionality of a system that implements SCTE 35[1] Cue Messages without utilizing (or placing) data in the unique\_program\_id, avail\_num and avails\_expected field. This describes how all systems behave prior to the implementation of this Standard and related technologies. Tier 0 also describes the default behavior that will occur if no match can be made when utilizing Tier 1 or Tier 2 data and instructions.

### 8.1.2. Tier 1

Tier 1 *shall* describe the functionality of a system where only unique\_program\_id must match.

Note: This behavior enables the scheduling of Avails within a specified Program but does not enable knowledge of which Avail has been announced.

- For a system creating SCTE 35[1] Cue Messages, Tier 1 support *should* create a message with a valid unique\_program\_id, and both the avail\_num and avails\_expected fields *should* be set to zero (but either or both *may* be non-zero).
- A Traffic System supporting Tier 1 *shall* create schedule files with a valid unique\_program\_id, and both the avail\_num and avails\_expected fields *shall* be set to zero.
- An Ad Insertion System supporting Tier 1 *shall* match an Avail on a valid Window and unique\_program\_id. If the avail\_num field or avails\_expected field are populated in either the Cue Message or the schedule file, they *shall* be ignored.

### 8.1.3. Tier 2

Tier 2 *shall* describe the functionality of a system where `unique_program_id`, `avail_num` and `avails_expected` all must all match.

Note: If a system encounters data that does not contain all of the required Tier 2 information (e.g., an Ad Insertion System receives a Cue Message with a valid `unique_program_id` but an `avail_num` or `avails_expected` of 0, or a schedule file with a valid `unique_program_id` but an `avail_num` or `avail_expected` of 0), it will switch to implementing Tier 1 behavior. If all of the fields (`unique_program_id`, `avail_num` and `avails_expected`) are populated with valid (non-zero) values, but no match is made, then it will switch to implementing Tier 0 behavior for the Spot in question.

## 8.2. Behavior of an Ad Insertion System Implementing Program-Specific Ad Insertion

Ad Insertion Systems *shall* have standard behavior when supporting Program-Specific Ad Insertion at Tier 2. This behavior is defined by the following rules (processed sequentially):

1. An Ad Insertion System, upon receiving a SCTE 35[1] Cue Message containing a non-zero `unique_program_id`, `avail_num` and `avails_expected` within a valid Window, will insert the matching Avail's Spot(s). In order to match, the values of all three fields must match (unless the Ad Insertion System is using a Tier 1 schedule for the `unique_program_id`, then it will ignore the `avail_num` and `avails_expected` fields) and must be within a valid Window. If no match is found, then no Program-Specific Ad Insertion will occur.
2. If no Program-Specific Ad Insertion occurs due to a zero `unique_program_id` or due to no match in rule 1, the Ad Insertion System will play a Window-Based insertion if the Cue Message falls within a valid, scheduled Window.
3. If an Ad Insertion System has no match (either Program Specific as in rule 1 or Window-Based as in rule 2), no insertion will occur, and the Cue Message details (time, length, `unique_program_id`, `avail_num`, `avails_expected`) *should* be recorded to the Verification File as a missed Avail.

The Ad Insertion System *shall* also generate Verification Files that log which Spots ran or failed, at what time, and against what UPID. Note: The Traffic System then interprets the Verification File for billing, future scheduling, makegoods, etc.

If multiple schedule files are being merged to produce the final schedule file for an Ad Insertion System, both schedule files pre-merge must have Program-Specific scheduling information for a particular break if both are going to contribute Spots to the break. If neither system provides Program-Specific scheduling information, a Program-Specific schedule cannot be generated for the Avail.

## Appendix A: Usage Example (Informative)

The following is a real-life scenario that happened or could have happened on 5/22/2004.

Please refer to Figure 5 (“Overtime with Extra Break - Today”)

The first drawing titled Today’s Window-Based Example is a baseline drawing that graphically depicts the way ESPN would currently be scheduled on the night of May 22, 2004.

The first section (‘Scheduled’) shows how users actually scheduled ESPN with implementations prior to the adoption of this Standard. A user would have combined the basketball game and Sports Center (SC) to create one 4 hour Window with 9 Avails. The remainder of that night’s schedule had three 1 hour Windows with the appropriate number of Avails for each expected Program.

The second (‘Actual’) shows how the Avails fell and a timeline version of the “as-ran” log. The user caught the O/T Avail but only aired a normal SC dollar Spot and not a higher dollar one specifically meant for the basketball game.

Please refer to Figure 6 (“Overtime with Extra Break”)

In the second drawing illustrates the same evening but demonstrates how a Program-Specific event might work if the user were to expect “live programming”, Tier 2, queue messages from the Network for the basketball game and the Sports Center Program.

The primary schedule (‘Scheduled - Primary’) shows 5 Avails in the 2 ½ hour game and 4 Avails in the 90-minute SC Program. The user added 2 contingent (back-up O/T breaks) Avails to the schedule and assigned them to the game’s UPID (07224). The Affiliate decided that the remainder of the night (after 9PM) would not be defined as sellable by Program title so the rest of that night’s schedule has three 1-hour Windows with the appropriate number of Avails for each expected Program.

To account for the unforeseen event that the queue messages might be missing an exact match UPID or contained no UPID at all, a “safety net” alternate schedule is also produced (‘Scheduled – Alternate’). In this example the alternate schedule is Window-Based and could be another live programming schedule.

The combination of the primary schedule and the alternate schedule will yield a new hybrid combined (merged) schedule. This combined schedule will conform to the SCTE 118-3[3] format, which is backward compatible with existing formats (i.e. all the fields in the existing format are required in SCTE 118-3). The reader *should* notice that the primary schedule only has two sellable Programs defined. These two Programs serve as the dominant schedule while the overlapping secondary schedule acts as a fall back schedule within the combined schedule during the same time frame.

The ‘Actual’ timeline shows how the user expected the playback to happen if the user were to receive the Program-Specific Cue Messages as expected. The user maximized revenue by taking advantage of the extra Basketball O/T Avail, airing the higher value Spots in the Program based back-up break and sacrificing a lesser Avail(s) later in the evening.



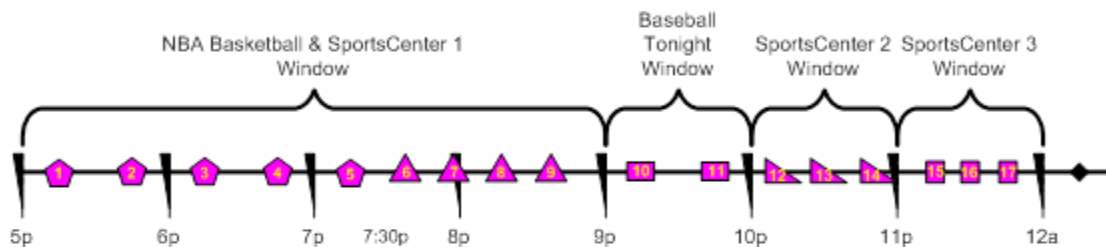
### Overtime With Extra Break -Today

- Game ends late - extra cue message
- SportsCenter 1 starts late
- Baseball Tonight starts late
- SportsCenter 2 starts late
- SportsCenter 3 starts late, ends after midnight

Today's  
Window Based  
Example

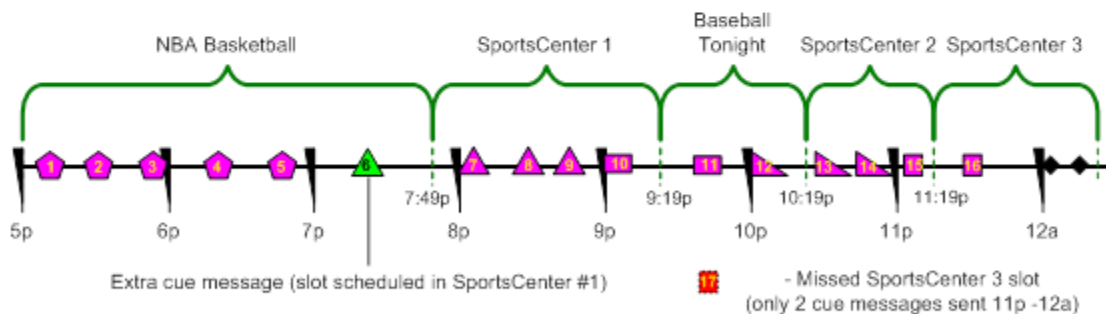
### SCHEDULED

#### Window-based Avails Only



### ACTUAL

#### Window-based Avails Only



LEGEND			
Window-based Avails			
NBA		SC 2	
SC 1		SC 3	
Bball Tonight			

Figure 5 – Overtime with Extra Break - Today

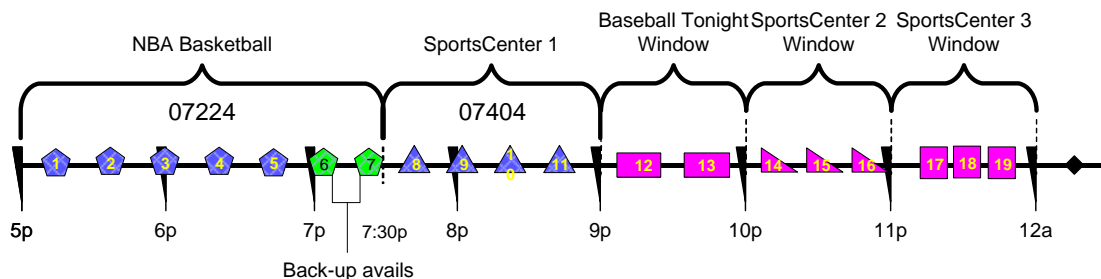
### Overtime With Extra Break

- Game ends late - extra cue message with PID sent
- SportsCenter 1 starts late
- Baseball Tonight starts late
- SportsCenter 2 starts late
- SportsCenter 3 starts late, ends after midnight

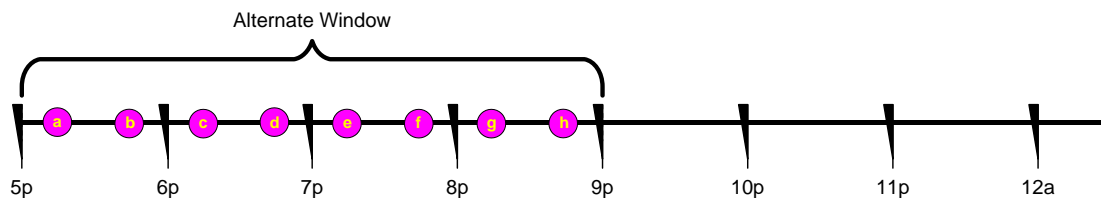
Scenario 3

## SCHEDULED

### Primary Program- & Window-based Avails



### Alternate Window-based Avails



## ACTUAL

### Combined Primary & Alternate Avails

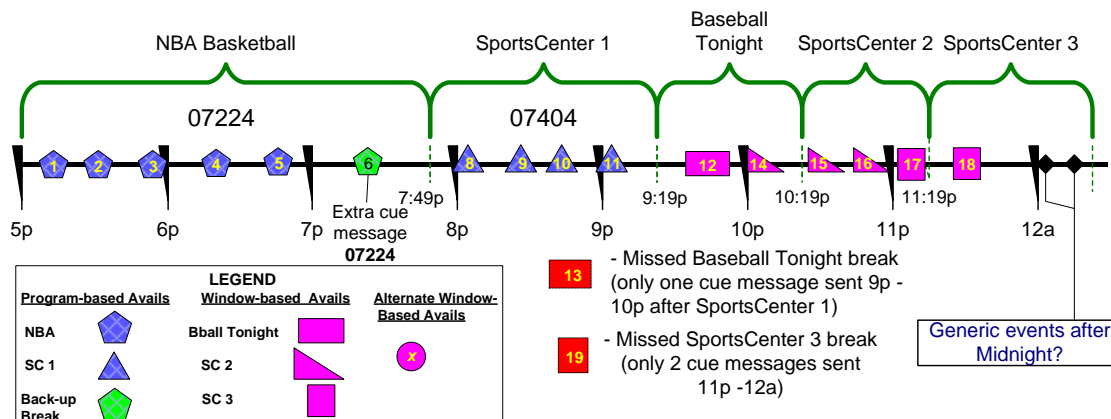
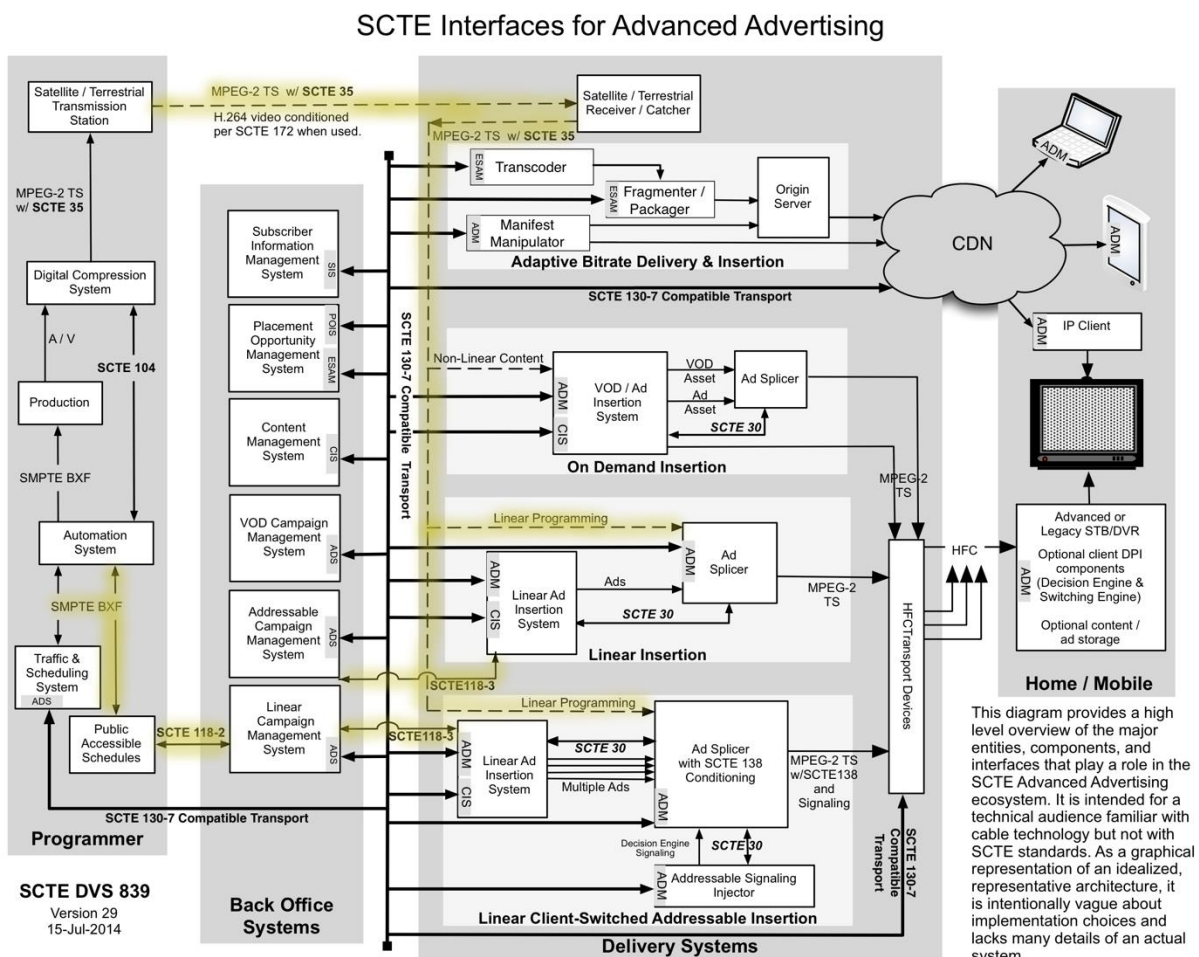


Figure 6 – Overtime with Extra Break

# Appendix B: SCTE 118 Within DPI End-To-End Representative Architecture (Informative)



This diagram provides a high level overview of the major entities, components, and interfaces that play a role in the SCTE Advanced Advertising ecosystem. It is intended for a technical audience familiar with cable technology but not with SCTE standards. As a graphical representation of an idealized, representative architecture, it is intentionally vague about implementation choices and lacks many details of an actual system.