Society of Cable Telecommunications Engineers

ENGINEERING COMMITTEE
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Digital Program Insertion – Advertising Systems Interfaces

Part 1 – Advertising Systems Overview (Informative)

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2.0 SCOPE

This document offers concepts applicable to all other SCTE 130 parts, leaving the normative details to the individual documents. It provides a high level view of the logical services and general setup procedures (i.e., registration and deregistration) as well as an introduction to the message pairing paradigms used throughout the specification. See Structure Of The Standard (Section 10) for additional information.

3.0 REFERENCES

The following documents may provide valuable information to the reader.

3.1 References

[SCTE 35] ANSI/SCTE 35 2007—Digital Program Insertion Cueing Message for Cable.

4.0 COMPLIANCE NOTATION

"SHALL"	This word or the adjective "REQUIRED" means that the item is an absolute requirement of this specification.
"SHALL NOT"	This phrase means that the item is an absolute prohibition of this specification.
"SHOULD"	This word or the adjective "RECOMMENDED" 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.
"SHOULD NOT"	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.
"MAY"	This word or the adjective "OPTIONAL" 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.

5.0 DEFINITIONS AND ACRONYMS

Throughout this standard the terms below have specific meanings. Because some of the terms are defined in other SCTE documents having very specific technical meanings, the reader is referred to the original source for their definition. For terms used within this document, brief definitions are given below.

Endpoint: An address, a Uniform Resource Identifier (URI), or a specific location where a logical service may be found and consumed.

Logical Service: A well-defined, self-contained set of functions which is the endpoint of a connection. The logical service has some type of underlying computer system that supports message communication.

Message: The unit of communication between two logical services.

Placement: The decision resulting from a placement opportunity which may include a content binding and a set of constraints.

Placement opportunity: A potentially constrained location relative to digital content where ad insertion or content alterations can occur. The alterations may include insertions, replacements, or deletions of content in whole or in part. These locations which contain the opportunity for content insertion have traditionally been referred to as Avails [SCTE35] for linear video content; however, placement opportunity refers to address and time locations where content may be placed, regardless of platform (i.e. Video in VOD, Banner Images on Menus and ITV channels, etc).

Service channel: A message communication path between two logical service endpoints.

This document uses the following abbreviations:

ADS: Ad Decision Service

ADM: Ad Management Service

CIS: Content Information Service

HTTP: Hypertext Transport Protocol

POIS: Placement Opportunity Information Service

SIS: Subscriber Information Service

URI: Uniform Resource Identifier

XML: Extensible Markup Language

6.0 INTRODUCTION

This document provides an informative (i.e., non-normative) overview of SCTE 130, a standardized and extensible message based interface defining a minimal set of cooperating logical services necessary to communicate placement opportunities, placement decisions, and placement related event data necessary for accountability measurements. This document provides an introductory overview of the logical services specified in the

normative standard parts and it briefly describes the logical service's unique value in the overall solution.

Each of the following have been considered in the formulation of this standard and therefore the initial scope of the standard includes, but is not limited to, the following video advertising platforms:

- Video On-Demand
- Traditional Linear Cable
- Advanced Set Top Box Applications
- Digital Video Recorders

SCTE 130 defines an extensible framework of interfaces among a set of advertising system logical services. Within this framework, innovation and variation may occur as needed. The logical service interfaces are easily extended to incorporate new semantics when a new feature's implementation spans two or more logical services. When the efficacy of a new feature is established, the standard may be revised to include its semantics in the affected interfaces. Thus, the SCTE 130 standard encompasses the following:

1. A minimal set of cooperative logical services needed to implement advanced addressable advertising systems
2. The core data types and extensible message framework forming a vocabulary needed to communicate among the defined logical services
3. The interfaces among these logical services using the core data types and messages
4. Mechanisms for extensibility that allow innovation while preserving backward compatibility with already deployed systems - thereby reducing the complexity for incorporating new features within the standard

The normative parts of this standard are intended to facilitate development and implementation in stages where the early steps enable the largest value-added features and later stages build upon the early work to provide necessary advanced features.

The normative parts of this standard define mechanisms for integrating systems implementing features such as:

- VOD based advertising
- Linear based advertising
- Enhanced advertising capabilities such as ad rotation groups

- Subscriber-based addressing
- Extension points for more advanced advertising or addressing features

The normative parts of this standard do not constrain the packaging of logical services in an implementation.

- A logical service may be implemented as one or more physical systems created by the same vendor
- The deployment of a logical service may simultaneously include systems from one or more vendors
- An implementation may incorporate one or more of the defined logical services and interfaces
- Logical service clients are not limited to the suggested models herein

This standard does not describe how to address consumers or how an advertising decision system decides to place ads. Current privacy laws and regulations are out of scope but messages are designed to be compliant as may be required.

7.0 ADVERTISING SYSTEM LOGICAL SERVICES

The SCTE 130 standard defines a set of logical services comprising an advanced advertising system. Each logical service may itself be a complex system. The standard is cast in terms of the key interface definitions implemented by these logical services. The following interfaces are defined in the normative specifications in Parts 3 through 6:

Part 3 Ad Management Service (ADM) / Ad Decision Service (ADS)

Part 4 Content Information Service (CIS)

Part 5 Placement Opportunity Information Service (POIS)

Part 6 Subscriber Information Service (SIS)

The following sections provide a high level overview and introduction to each of the logical services. A compliant implementation is not required to implement all the services. However, a compliant logical service implements the normative interface definitions for that service. Figure 1 (Section 7) provides an illustration of one such possible configuration which may be a useful point of reference while reading the descriptions.

7.1 Ad Management Service (ADM)

The Ad Management Service defines messages in support of ad insertion activities. The primary consumer of these messages is an ADS. The message interfaces exposed

by an ADM allow for both preconfigured ad decisions as well as real-time fulfillment models. Both models are conveyed using the adm:PlacementRequest and adm:PlacementResponse messages defined in SCTE 130 Part 3. An ADM implementation may incorporate some simple ad selection rules (ex. ad rotations) but more complex ad decisions are the responsibility of an ADS.

The defined ADM message interface also supports registration, list registration, and deregistration exchanges. The registration message may include filters which a requesting service like an ADS wants applied by an ADM in selecting an ADS to which it should direct its adm:PlacementRequest.

ADM detection of a placement opportunity is outside the scope of the specification. However, the ADM may be a service consumer of a POIS and/or a CIS in order to obtain such information.

The adm:PlacementRequest message supports extensions to communicate content and client specific metadata. The content metadata may be provided by the CIS and how the CIS obtains this information is outside the scope of the specification. The client metadata may be acquired from the SIS and again, how the SIS obtains this information is outside the scope of the specification.

Using the adm:PlacementResponse, the ADS supplies placements. The ADS may request a change to the current structure within placement opportunities as it deems necessary based on campaign rules and business logic outside the scope of the specification. The specification facilitates a wide range of operations not previously available in earlier advertising systems (e.g., insert, delete, replace, etc.).

Physical topology is outside the scope of this specification as production solutions can be arbitrarily simple or complex potentially ranging from something as simple as an ADS/ADM pair to many systems grouped together to form a single logical service. Each ADS registers with one or more ADM logical services to take responsibility for making ad decisions based on defined criteria. Likewise, each ADM may manage one or more physical delivery models (ex. on demand, linear, etc.). This model illustrates the flexibility the SCTE 130 message model supports.

The ADM interfaces and messages are normatively defined in Part 3 of this standard.

7.2 Ad Decision Service (ADS)

The Ad Decision Service determines how advertising content is combined with non-advertising (i.e. entertainment) content assets. The decisions made by an ADS may be straightforward (i.e. specific ad content placed at a specific time in a specific asset) or arbitrarily complex (based on subscriber data, advertising zone, etc.). The internal operation of an ADS is outside the scope of this standard.

An ADS registers with one or more ADMs to make ad decisions for specific content services and/or ad types or other identified criteria. An ADS may handle different

content types on behalf of many different content owners. It may therefore establish multiple logical service channels to separate the different owners. It may also establish a single logical service channel and register to perform viewer addressing for multiple content owners on multiple programmers' networks. An example is the ADS establishing a service channel to allow it to handle all local placement opportunities on all channels. The same ADS may establish a second service channel to request to handle all network placement opportunities for a particular channel and a different ADS may establish a service channel to allow it to handle all on demand content placement opportunities.

Where multiple ADS systems overlap in areas that they intend to handle, the ADM might limit their scope. However, this decision is implementation specific and outside the scope of the standard.

The ADS interfaces and messages are normatively defined in Part 3 of this standard.

7.3 Content Information Service (CIS)

The Content Information Service manages metadata describing all the assets (both advertising assets and non-advertising assets) available to the other SCTE 130 logical services. The CIS provides query and notification interfaces to the other logical services. The query service is available on an ad-hoc basis and may be called by any other logical service at any time without any prior registration. Queries specify values or patterns to be sought in the query message metadata and the specified matching information (or an error indication) is returned in a response message.

A content notification service is provided through a registration process. Any system may register to receive content notification messages from a CIS whenever a real-time change occurs to the metadata such as the arrival of new matching assets. Similar to queries, the registration request message may include filtering criteria limiting the CIS notification scope.

The CIS specification interfaces and messages are normatively defined in Part 4 of this standard.

7.4 Placement Opportunity Information Service (POIS)

The Placement Opportunity Information Service (POIS) holds, maintains, or retains descriptions of placement opportunities. The POIS may also contain attributes and constraints for each placement opportunity, platform compliance, rights, and policies of the content in which the placement opportunity exists. These placement opportunities are content specific, therefore attributes and constraints may vary by network, geographic region, or other content distribution dimension.

7.5 Subscriber Information Service (SIS)

The Subscriber Information Service manages the per-subscriber information relevant to ad placement decisions. The SIS provides mechanisms surrounding privacy issues.

8.0 LOGICAL SERVICE CONFIGURATIONS

Many possible configurations of the logical services described by this standard are possible. Figure 1 illustrates a simple configuration with a number of variations of deployment among the services. In one case an ADM is shown as a standalone service while in another an ADM and CIS are combined into a single physical server. Many other combinations beyond the illustration in Figure 1 are possible. All communication lines shown in Figure 1 are message sequences defined by the various parts of this standard. Services shown with dotted communication indicate that the standards are still to be defined.

In Figure 1, the systems shown as dark gray boxes are hypothetical and out of the scope of this standard. They are the systems that implement the functions such as detecting placement opportunities (sometimes referred to as cue messages or placement opportunity triggers), inserting ads into a linear stream or processing orders from advertisers for certain type of programming, for example. These systems are implemented by a multitude of vendors and vary widely in the features that they provide. The logical systems of this document (shown in the white boxes) provide a standard set of public interfaces to expose the relevant functions of their associated private systems. In this way, the details of how and where content is stored, for example, are kept within a vendor’s content storage system and the associated CIS makes the metadata regarding this content available to other logical services.

Figure 1 also illustrates the potential many-to-many relationships among these services. In the example, the ADM associated with the hypothetical VOD system is communicating with a single ADS while the ADS is communicating with two ADMs. Figure 1 is just one example of the many possible configurations.

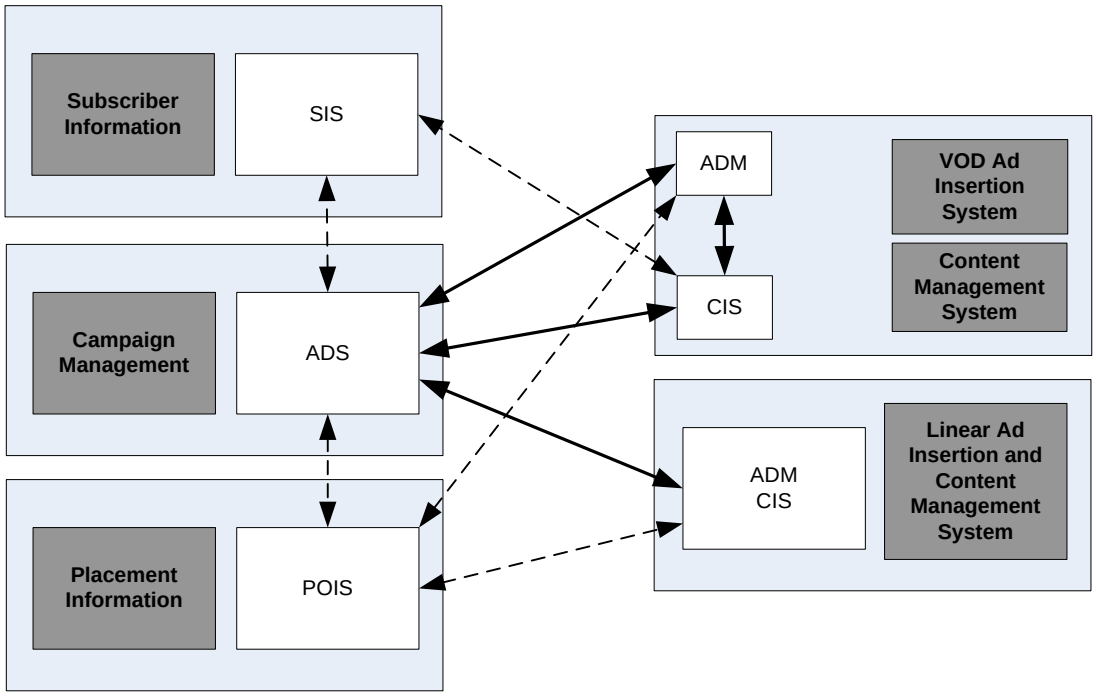

Figure 1 – Example Advertising System Services Configuration

9.0 XML MESSAGE DATA

9.1 XML Layering

A key assumption underlying the definition of the SCTE 130 standard is the definition of a common set of data types and message structure used to communicate among the logical services. These data types and message structure do not depend on any domain type (VOD, Linear Cable, Switched Digital Video, etc.) or on specific advanced advertising functions (session based advertising, subscriber addressing, etc.)

The standard defines these "Core" data types then adds to them as needed to address the needs of specific platforms and advanced advertising functions. Figure 2 shows the XML stack factored into separate layers and blocks that model the parts of the SCTE 130 standard.

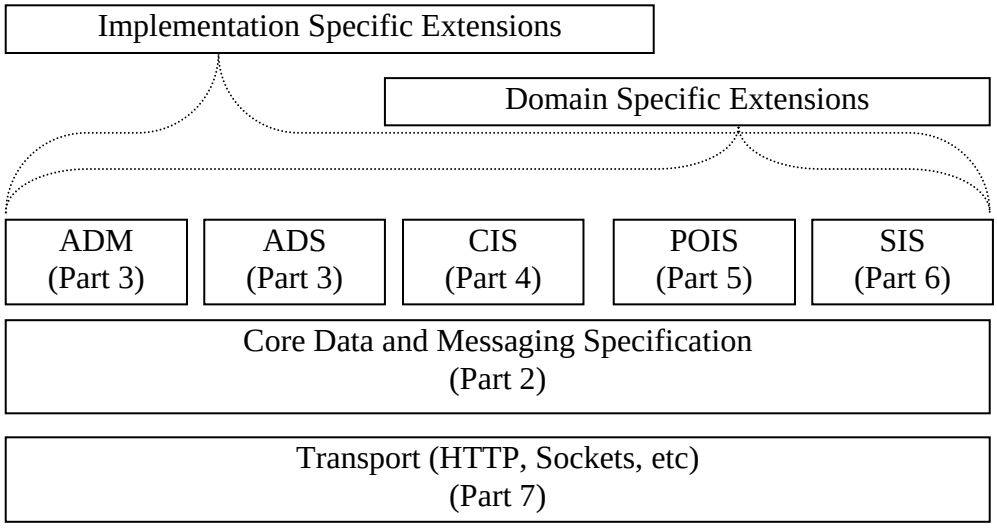

Figure 2 – XML Layering

Note: In Figure 2 the term "Domain Specific Extensions" is used to refer to specific delivery platforms - such as VOD, Linear Cable, Switched Digital, and Advanced Set-top Applications.

9.2 XML Namespace

The current XML standard set includes the XML Namespaces standard which provides mechanisms for partitioning different XML vocabularies into distinct, unambiguous domains. Each namespace is outlined in the respective normative sections of this specification.

Namespace versioning is supported and detailed in SCTE 130 Part 2.

10.0 TRANSPORT MECHANISMS

SCTE 130 Part 7 defines the specific mechanism or protocols for transporting the messages. The SCTE 130 standard does not expressly require or prohibit that specific message exchanges occur directly between two logical services. Messages may be passed and routed through intermediaries as long as such activity does not compromise the messaging specification defined within any SCTE 130 specification part. It is the responsibility of the message sending system and the selected transport (see SCTE 130 Part 7) to send them in such a manner as to facilitate processing in an appropriate order.

10.1 Paired Messages

All messages within the SCTE 130 standard are defined as pairs – every message initiated by some logical system has a defined response. There are two general categories of message pairing defined: request / response and notification / acknowledgement.

Figure 3 illustrates a typical sequence of such message pairs. In the example, an ADS initiates the communication by requesting to be registered to receive content notifications from a CIS. The CIS sends a response message to the ADS accepting (or rejecting) the request. The CIS then spontaneously sends notifications to the ADS as changes to the specified content occur over time. The ADS acknowledges each of these notifications but neither system is required to maintain synchronous threading of messages on the transport. Prerequisite registration requirements for specific messages are reflected in the respective logical interface definitions and therefore not expanded upon here.

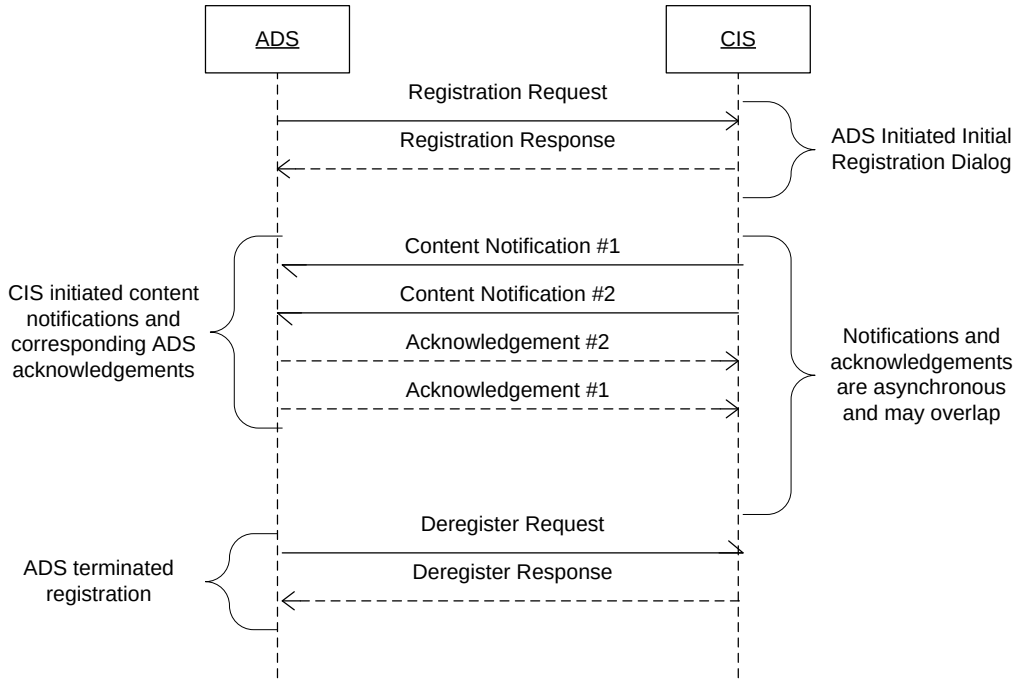

Figure 3 – Typical Message Sequence Diagram

10.2 Registration Messaging

Part of this standard provides semantics for services to offer the ability of one logical service to register as a consumer of events from another service. This service producer, service consumer model offers a great deal of flexibility for communication between logical services. A logical service registers with some other service in order to establish ongoing consumption of the service provided. The example in Figure 3 above illustrated an ADS registering to receive content notifications from a CIS.

Deregistration allows one service to remove itself as a consumer. List registration offers the chance for any service to list the registrations currently stored on the producing service.

10.3 Query Messaging

Query request messages ask for information from a logical service. Any logical service may issue a query to any other logical service at any time without previously registering to do so. The requested information (or an error status) is returned in a query response message.

10.4 Service Status and Service Check Messaging

Service Status and Service Check messages are used to communicate information between logical interfaces. Service Status messages are sent from a logical service to

some other logical service with which it has previously registered in the event of a change in ability to perform the registered service. Service Check messages may be sent to any logical service on an ad hoc basis to poll the service in order to determine its availability and other status.

11.0 STRUCTURE OF THE STANDARD

The following table summarizes the parts of this standard and describes the content of each.

Document	Description
SCTE 130-Part 1 (this document)	Advertising Systems Overview, an informative overview of the standard
SCTE 130-Part 2	Core Data Elements, a normative definition of the core data types and messaging needed within a digital advertising system
SCTE 130-Part 3	Ad Management Service (ADM) Interface, a normative definition of the logical service interfaces needed to describe ad insertion opportunities and to receive ad placement decisions. Typically, the primary client of this interface is the Ad Decision System (ADS)
SCTE 130-Part 4	Content Information Service (CIS), a normative definition of the logical service interface needed to implement the content query and content notification functions.
SCTE 130-Part 5	Placement Opportunity Information Service (POIS) Interface, a normative definition of the logical service interface needed to implement the placement opportunity query and notification functions.
SCTE 130-Part 6	Subscriber Information Service (SIS) Interface, a normative definition of the logical service interface needed to implement the subscriber information query and notification functions.
SCTE 130-Part 7	Message Transport Compliance, a normative definition of the physical and logical protocols needed to transport Parts 2-6
SCTE 130-Part 8	General Information Service (GIS), describes the syntax and semantics of common interface components that provide functions that are common to more than one advertising service. The GIS may be implemented by advertising system services that provide data to other advertising system services. It describes the messaging that may be used by a client to retrieve data by querying an advertising service's data model.

Table 1 – Structure of this Standard

Part 2 provides the normative definitions of the core data elements and messages that are used by Parts 3 through 6 to define their various application specific data and messages. Part 7 defines normative transport details necessary to exchange the XML message structures using different transport mechanisms. The reader is encouraged to proceed from here to Part 2 for a detailed foundation of those common structures.