CableLabs®
SaFI Specifications

Common Data Types Specification

CL-SP-SaFI-COM-I01-090626

ISSUED

Notice

Document Status Sheet

Document Control Number:	CL-SP-SaFI-COM-I01-090626			
Document Title:	Common Data Types Specification			
Revision History:	I01 – Released 6/26/09			
Date:	June 26, 2009			
Status:	~~Work in Progress~~	~~Draft~~	Issued	~~Closed~~
Distribution Restrictions:	~~Author Only~~	~~CL/Member~~	~~CL/ Member/ Vendor~~	Public

Key to Document Status Codes:

Work in Progress	An incomplete document, designed to guide discussion and generate feedback that may include several alternative requirements for consideration.
Draft	A document in specification format considered largely complete, but lacking review by Members and vendors. Drafts are susceptible to substantial change during the review process.
Issued	A stable document, which has undergone rigorous member and vendor review and is suitable for product design and development, cross-vendor interoperability, and for certification testing.
Closed	A static document, reviewed, tested, validated, and closed to further engineering change requests to the specification through CableLabs.

Trademarks:

Contents

Figures

This page left blank intentionally.

1 SCOPE

1.1 Introduction and Purpose

This document provides an overview of CableLabs Stewardship and Fulfillment Interfaces (SaFI) and provides definition of common data types used by SaFI.

1.2 Requirements

Throughout this document, the words that are used to define the significance of particular requirements are capitalized. These words are:

"SHALL"	This word 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 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 weighed 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 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.

2 REFERENCES

2.1 Normative References

In order to claim compliance with this specification, it is necessary to conform to the following standards and other works as indicated, in addition to the other requirements of this specification. Notwithstanding, intellectual property rights may be required to use or implement such normative references.

[SaFI COM XSD] CL-SP-SaFI-COM-I01.xsd, June 26, 2009, Cable Television Laboratories, Inc.

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

2.2 Informative References

This document uses the following informative references.

[IAM] Interactive Application Messaging Specification, CL-SP-SaFI-IAM-I01-090626, June 26, 2009, Cable Television Laboratories, Inc.

[CIP] Campaign Information Package Specification, CL-SP-SaFI-CIP-I01-090626, June 26, 2009, Cable Television Laboratories, Inc.

[COM HTML] CL-SP-SaFI-COM-I01.html, June 26, 2009, Cable Television Laboratories, Inc.

[IAF] Interactive Application Fulfillment Summary Interface Specification, CL-SP-SaFI-IAF-I01-090626, June 26, 2009, Cable Television Laboratories, Inc.

[SMS] Service Measurement Summary Interface Specification, CL-SP-SaFI-SMS-I01-090626, June 26, 2009, Cable Television Laboratories, Inc.

[SCTE 130-2] SCTE 130-2 2008 - Digital Program Insertion–Advertising Systems Interfaces Part 2–Core Data Elements

2.3 Reference Acquisition

- Cable Television Laboratories, Inc., 858 Coal Creek Circle, Louisville, CO 80027;
  Phone +1-303-661-9100; Fax +1-303-661-9199; http://www.cablelabs.com
- SCTE - Society of Cable Telecommunications Engineers Inc., 140 Philips Road, Exton, PA 19341
  Phone: 610-363-6888 / 800-542-5040; Fax: 610-363-5898; http://www.scte.org/

3 TERMS AND DEFINITIONS

This specification uses the following terms:

4 ABBREVIATIONS AND ACRONYMS

This specification uses the following abbreviations:

SaFI Stewardship and Fulfillment Interfaces. A collection of interfaces defined by CableLabs to support advanced services on multiple cable systems

5 OVERVIEW

5.1 General Context

The CableLabs Stewardship and Fulfillment Interfaces are part of a broader set of interfaces and content formats that support the deployment of advanced services across a national MSO footprint. Advanced services include interactive programming and applications, ad insertion, viewer selected content (OnDemand), and addressable advertising.

5.1.1 Reference Architecture

The following diagram illustrates an overview of the advanced services platform and indicates where the SaFI interfaces fit in.

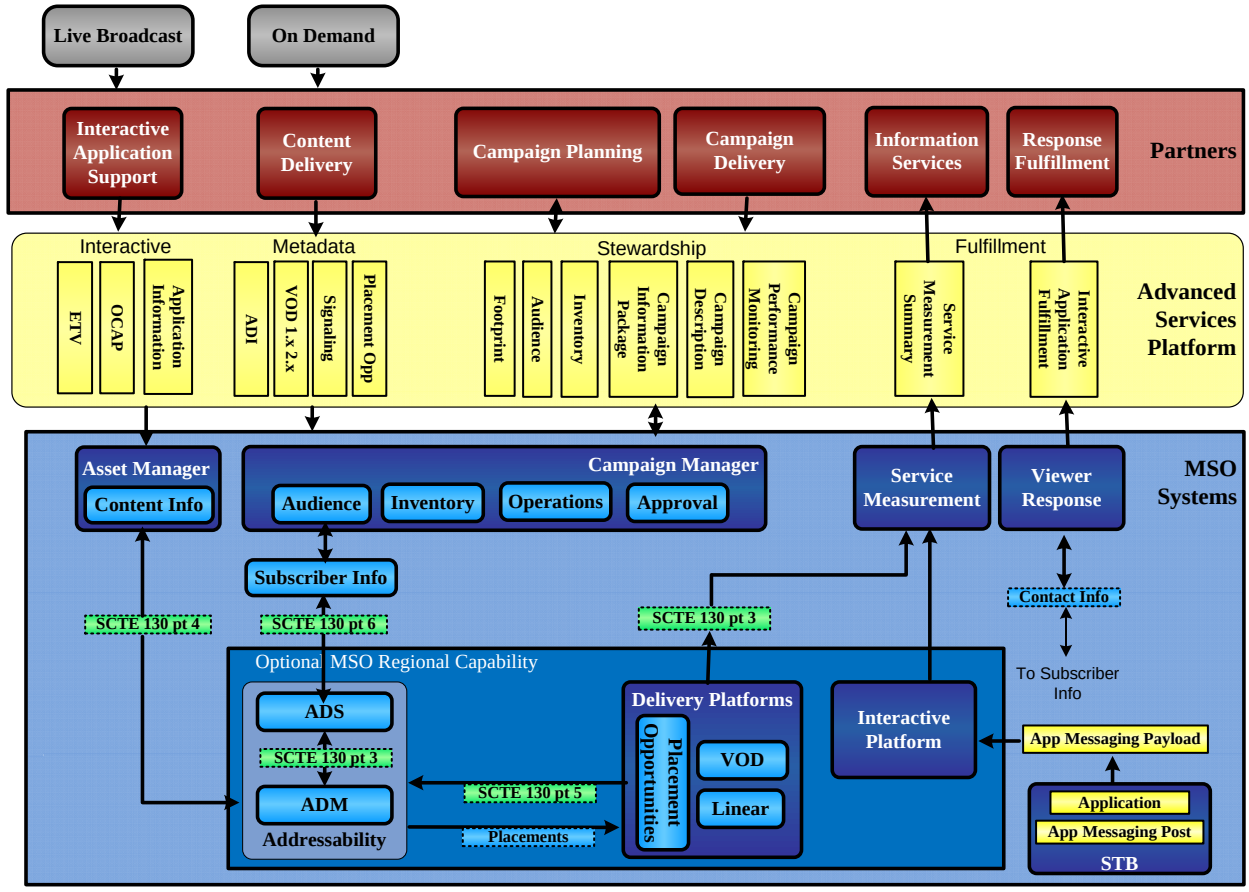

Figure 5–1 – Advanced Services platform

5.1.2 Interface Descriptions

For the purposes of this document, Stewardship and Fulfillment Interfaces are the following elements.

- Campaign Information Package (CIP). This is a web service that defines execution instructions to MSOs for advanced services.
- Service Measurement Summary Interface (SMSI). This is a web service that defines measurement of campaign execution.
- Interactive Application Fulfillment (IAF). This is a web service interface that transfers the results of interactive responses from MSOs to partners.

- Interactive Application Messaging (IAM). This is data model definition for compact messaging from interactive applications to MSO systems.

The CIP, SMSI, and IAF interfaces all include this Common Data Type specification as a normative reference.

Other elements shown in Figure 5–1 are either not yet defined, or are illustrated here purely for informative context.

5.2 Specification Components

This specification consists of the following elements.

- This specification document, which is normative except as otherwise noted.
- The associated XML schema file, CLP-SP-AA-COM-D02-090505.xsd, which is normative.
- The associated Xml Schema document set contained in CLP-SP-AA-COM-D02-090505-html.zip, which is informative.

6 SAFI COMMON DATA TYPES

This section defines requirements for metrics and the interface between a metrics engine and a cable headend.

6.1 Data Model

An XML schema is defined in [SaFI COM XSD] to describe shared data model components, i.e., those that occur in multiple SaFI interfaces.

XML files conformant to this data model SHALL be generated and properly received by the CAAS and MSO systems.

6.1.1 AcknowledgementMessageType

This defines a standard acknowledgement message for the SaFI web services.

- Attribute TransmissonId [Required, xs:string] is the identifier of the message being acknowledged.
- Element Ack [Required single occurrence, xs:boolean] is the positive (true) or negative (false) status reported for the message.

6.1.2 EpsidType

Enhancement sequence number within a Programmed Element. It is essentially an unsigned short, but formally an xs:int with a domain of zero to 65,535. These sequence numbers are assigned to message-addressable nodes in the campaign description associated with UUIDs and ETypes. The UUID+EPSID can be used to locate the node, and its ETYPE allows further navigation. Limited to two binary bytes.

6.1.3 EventIdType

Enhancement sequence number within a Programmed Element. These sequence numbers are assigned to message-addressable nodes in the campaign description associated with UUIDs and ETypes. The UUID+EPSID can be used to locate the node, and its ETYPE allows further navigation. It is an xs:int with a domain of zero to 99.

6.1.4 ExtType

A standardized extensibility element, which is copy of the [SCTE 130-2] ExtType into the CableLabs namespace. This type SHALL be referenced in an empty element named "Ext".

- Attribute ##any, i.e., from any namespace and using lax processing.
- Element of zero or more children of ##any, i.e., from any namespace and using lax processing.

6.1.5 FaultType

This defines a standard fault model for the SaFI web services.

- Attribute code [Optional, xs:int] is an error code unique to the specific fault.
- Element reason [Required xs:string] is a description of the fault.

6.1.6 GeographicCodeType

GeographicCode is an identifier used to denote the location of the device/unit. It is an xs:choice of zipcode or syscode.

6.1.7 MinSchemaVersionType

A non-negative int representing the lowest compatible schema version number. A document with a minSchemaVersion of 2 is compatible with any processor implementing schema version 2 or greater, but not with a processor implementing schema 1. Might add minor version if there is a clear case for interpreting minor number.

6.1.8 NonEmptyStringType

A derivative of xs:string that is required to have content. Using this in place of xs:string precludes required attribute or element content being left empty. It does not, however, preclude only whitespace content.

6.1.9 NonNegativeIntType

A derivative of xs:int that permits only zero and positive values. Note this differs from xs:nonNegativeInteger in that it derives from xs:int rather than Integer, which has a vastly larger domain.

6.1.10 OptionalRelativeTimeAttributeGroup

An attribute set that defines some instant, and may define an interval starting at that instant.

- Attribute offset [Required, xs:duration] is the specified instant is a positive or negative offset from some predefined event, usually the start of flight.
- Attribute interval [Optional, xs:duration] is optional. The interval is a duration before or after the offset.

6.1.11 PackageIDGroup

PackageIDGroup contain identifiers used to unambiguously identify a stewarded package. Includes the following data objects.

- Element PEID [Required, PeidType] is the Programmed Event ID.
- EPSID [Required, EpsidType] is the Enhanced Package Sequence ID.
- EventID [Optional, EventIdType] is an optional event ID associated with the PEID and EPSID.

6.1.12 ParametersType

Parameters is an optional unconstrained xs:string used to pass other relevant data.

6.1.13 PeidType

Programmed Element ID type, an xs:string limited to 22 characters. This is a GUID represented in RFC 4122 Base64-URL form (so 16 bytes convert to a 22-byte string). This might use a more terse form, but some namespace resolution is needed first.

6.1.14 ProgramType

A type specifying specific programming that is a copy of the [SCTE 130-2] ProgramType in the CableLabs namespace.

- Attribute uniqueProgramID [Optional, xsd:nonNegativeInteger] is an attribute uniquely identifying the program.
- Attribute referenceDateTime [Optional, xsd:dateTime] is an attribute identifying when the attribute uniqueProgramID attribute was established (i.e., contextual reference). This attribute should only be used when the uniqueProgramID attribute is present.
- Attribute ##any [Optional] is any additional attribute from any namespace.

The program element's value is of type xsd:string and may be empty.

6.1.15 RelativeTimeAttributeGroup

An attribute set that may define some instant, or interval starting at that instant, but may also be empty.

- Attribute offset [Optional, xs:duration]. The specified instant is a positive or negative offset from some predefined event, usually the start of flight.
- Attribute interval [Optional, xs:duration] is optional. The interval is a duration before or after the offset.

6.1.16 Scte35SegmentationUpidType

The Scte35SegmentationUpidType describes a data model to facilitate in-band content asset identification. It is copied from [SCTE 130-2] into the CableLabs namespace.

- Attribute type [Required, xsd:unsignedByte] is any valid value from [SCTE 35] Table 8-6 Type column where the attribute maps to the SCTE 35 segmentation_upid_type bit field. See [SCTE 35] for additional information.

- Attribute length [Optional, xsd:unsignedByte] is any valid value from [SCTE 35] Table 8-6 Length Bytes column and the length attribute's value is the binary data length. The length value is dependent upon the type value and maps to the SCTE 35 segmentation_upid_length bit field. See [SCTE 35] for additional information.
- Attribute eventID [Optional, xsd:unsignedInteger] is the [SCTE 35] segmentation_event_id bit field. See [SCTE 35] for additional information.
- Attribute typeID [Optional, xsd:unsignedByte] is any valid value from [SCTE 35] Table 8-7 that maps to the segmentation_type_id bit field. See [SCTE 35] for additional information.
- Attribute segmentNum [Optional, xsd:unsignedByte] is an attribute conformant to the [SCTE 35] segment_num bit field description. See [SCTE 35] for additional information.
- Attribute segmentsExpected [Optional, xsd:unsignedByte] is an attribute conformant to the [SCTE 35] segments_expected bit field description. See [SCTE 35] for additional information.
- Attribute referenceDateTime [Optional, xsd:dateTime] is the date and time providing contextual reference.
- Attribute ##any [Optional] is any additional attribute from any namespace.

The SegmentationUpid element's value is of type xsd:hexBinary and contains the [SCTE 35] segmentation_upid bit field. The value SHOULD NOT be empty. The value is specific to the @type attribute and SHALL meet the requirements as specified in SCTE 35. See [SCTE 35] for additional information.

6.1.17 SyscodeType

A syscode is a unique human-readable identifier that is an xs:string of length 4. The identifier tends to represent a network insertion point (e.g., a Splicer). These system level syscodes are at the MSO level within a given market. Larger network areas are represented by a syscode that is itself composed of syscodes.

6.1.18 TimeRangeType

TimeRangeType defines an absolute time range. Includes the following data objects.

- Attribute Starttime [Required, xs:dateTime] is the point in time marking the beginning of the range.
- Attribute Endtime [Required, xs:dateTime] is the point in time marking the end of the range.

6.1.19 TimestampType

TimestampType indicates a point in time and an interval around that time. It includes the following data objects.

- RelativeTimeAttributeGroup. See definition above.
- Element StartTime [Required xs:dateTime] identifying a point in time.

6.1.20 TrackingType

The Tracking element is copied from [SCTE 130-2] into the CableLabs namespace. It provides carriage for privately defined attributes and data that shall be returned in normatively specified container elements. The returned Tracking element SHALL be an exact copy of the received original (i.e., the element is echoed back). The element's usage and return requirements are defined explicitly by the including specification. (For example, see SCTE 130-3.) The internal element information is opaque to all other logical services, as the data is implementation-specific. Typically, the value is assigned by an ADS to track a specific ad asset instance.

- Attribute ##any [Optional] is any additional attribute from any namespace.

The Tracking element's value is of type xsd:string and SHOULD NOT be empty (but may be if all the data is provided as attributes).

6.1.21 UserInputType

UserInput is a an xs:string of length one used to store a user's selection to a poll, RFI, etc. This element is optional, as it will not be included in messages representing Service Metric updates.

6.1.22 UuidUrlType

UUID is a 16-byte integer, encoded using RFC 4122 Base64-URL form, so encodes to ceiling((bytes)/3)*4 = 24 Base64 bytes less padding, making this type an xs:string of length 22. In contrast, it would be about 43 decimal, or 32 hex digits.

6.1.23 ZipcodeType

Zipcode is an xs:string of five decimal digits, or five digits followed by "-" and four additional digits. The contents are a US postal zip code.

Annex A SaFI Common Data Types Model Schema (Normative)

The formal data definition is found in [SaFI COM XSD].