Errata Notice on Schema Locations

(September 30, 2020)

This standard makes use of namespace locations with a form of http://www.scte.org/schemas/xyz/*, where “xyz” is the location of the specific schema being referenced. Due to limitations on the current SCTE•ISBE website, those specific locations are not available.

To find such schemas:

1. Go to the standards download page at https://www.scte.org/download-scteisbe-standards/
2. Search for the standard number (xyz in the above example)
3. Expand the listing by clicking the plus (+) button to the left of the standard number

The expanded list will show the desired schema.

This notice will be removed once the exact namespace values are functional.

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STANDARDS

Digital Video Subcommittee

AMERICAN NATIONAL STANDARD

ANSI/SCTE 130-10 2020

Digital Program Insertion – Advertising Systems Interfaces
Part 10
Stream Restriction Data Model (SRDM)

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1.0 SCOPE

This document in conjunction with the SCTE 130 Part 10 Extensible Markup Language (XML) schema document (i.e. the XSD document) defines the XML data model expressing stream restrictions.

The Stream Restriction Data Model (SRDM) expresses the features, the attributes and the restrictions for a given context. The context *may* refer to a piece of entertainment content, an advertising asset, a VOD session or some other quantity of media. The application of the SRDM to a given context is out of scope for this document.

This revision of the SRDM is used to specify restrictions applied against play scale (i.e. the speed and direction of a particular asset). Any other form of stream restriction is out of scope for this revision of the SRDM.

2.0 REFERENCES

2.1 Normative References

The following standards contain provisions that, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standards indicated below.

[W3C-XSD]	XML Schema Part 1: Structures Second Edition

2.2 Informative References

The following documents *may* provide valuable information to the reader but are not required when complying with this standard.

[SCTE 130-1]	SCTE 130-1: Digital Program Insertion—Advertising Systems Interfaces Part 1—Overview
[SCTE 130-2]	ANSI/SCTE 130-2: Digital Program Insertion—Advertising Systems Interfaces Part 2—Core Data Elements
[SCTE 130-3]	SCTE 130-3: Digital Program Insertion - Advertising Systems Interfaces Part 3 Ad Management Service (ADM) Interface
[SCTE 130-4]	SCTE 130-4: Digital Program Insertion–Advertising Systems Interfaces Part 4 Content Information Service (CIS)
[SCTE 130-5]	SCTE 130-5: Digital Program Insertion-Advertising Systems Interfaces Part 5-Placement Opportunity Information Service

3.0 COMPLIANCE NOTATION

shall	This word or the adjective "***required***" means that the item is an absolute requirement of this document.
shall not	This phrase means that the item is an absolute prohibition of this document.
forbidden	This word means the value specified ***shall*** never be used.
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.
deprecated	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.

4.0 ABBREVIATIONS

ADS – Ad Decision Service

CIS – Content Information Service

MSO – Multi Service Operator

NPT – Normal Play Time

POIS – Placement Opportunity Information Service

SCTE – Society of Cable and Telecommunications Engineers

SRDM – Stream Restriction Data Model

URI – Universal Resource Identifier

VOD – Video On Demand

XML – Extensible Markup Language

XSD – XML Schema Definition

5.0 INTRODUCTION

There are business use cases requiring media being consumed by a viewer to be controlled. A requirement to prevent a viewer from fast forwarding through an advertisement would be an example of such a use case. If such a requirement was made either as an MSO, a content provider or an advertiser business policy, there needs to be a way to describe the restriction such that it *may* be understood by the involved systems. For example, the restriction *may* be expressed as Placement Opportunity metadata from a Placement Opportunity Information Service (POIS/SCTE 130-5) [SCTE 130-5], or as part of PlacementResponse from an Ad Decision Service (ADS/SCTE 130-3) [SCTE 130-3], or as metadata served from a Content Information Service (CIS/SCTE 130-4) [SCTE 130-4]. This document provides the definition of a stream restriction data model. Instances of these stream restrictions are intended to be used as part of an extension to existing schema definitions where the schemata employ an 'Ext' style extension mechanism. (See the Ext element herein for additional information.) This schema definition model allows for this document and associated schema to be revised without having to revise any additional schemas that *may* carry this data model.

Throughout this document the following concepts are used and are useful for the reader to understand. Specific XML elements that embody these concepts are discussed later on in this document.

NPT range: The inclusive minimum and maximum permitted positions within a stream as denoted via normal play time (NPT) values.

Scale range: The inclusive minimum and maximum permitted scale values used for media play out. Scale values can be a discrete value or unbounded.

Stream restriction: An instruction which governs the permissible conditions by which media *may* be presented.

While there are many different ways in which a stream *may* be restricted, this particular version of the data model concerns itself with play scale restriction (the speed and direction of play) as it applies to periods of time within a piece of media. Play scale restrictions are expressed as ranges using an upper and lower bound rather than single scale values because of the difficulties arising when trying to map the values to semantic definitions such as fast forward, slow play, etc. For example, there *may* be a need to express a way to restrict all fast-forward play (any play that is in the forward direction faster than regular play speed). There are an infinite number of values that could be expressed (from 1.0 to infinity). Using an artificially high ceiling has the problem of imposing implementation limitations and using discrete values is not sufficient. If the only cases needing consideration were to restrict fast-forward, rewind, etc., then using enumerations could be one option. However, scenarios whereby a restriction is needed to disallow all fast-forward greater than twice the normal speed would mean creating

additional enumerations. If the example is extrapolated to other restrictions, it becomes apparent that enumerations become inflexible and all parties using such enumerations would need to agree on the semantic definition of each value. Suffice to say, it becomes easier to express a play scale restriction as a range, so the syntax of the restriction *may* express a wide range of restrictions and the semantics don't impose as rigid a definition.

Scale ranges state what scale values are permitted. Each bound that makes up the range has a condition associated with it. The scale value *may* be tested to see if it is greater, or greater or equal to (using the values defined in the schema 'gt' and 'gteq' respectively) the lower bound, and less than, or less than or equal to (using the values defined in the schema 'lt' and 'lteq' respectively) the upper bound. Both bound tests *may* be set to "unbounded" indicating the boundary condition does not exist. The rationale behind this approach is to allow ranges to be specified as precise values rather than approximations.

Example scale ranges *may* include:

Restriction	**Condition**
No fast forward	lowerbound=-INF, lowertest=unbounded, upperbound=1, uppertest=lteq
No rewind	lowerbound=0, lowertest=gteq, upperbound=INF, uppertest=unbounded
No slow play	{lowerbound=-INF, lowertest=unbounded, upperbound=0, uppertest=lt} + {lowerbound=1, lowertest=gteq, upperbound=INF, uppertest=unbounded}
Allow normal play	lowerbound=1, lowertest=gteq, upperbound=1, uppertest=lteq
Allow pause	lowerbound=0, lowertest=gteq, upperbound=0, uppertest=lteq
No fast forward > 2x	lowerbound=-INF, lowertest=unbounded, upperbound=2, uppertest=lteq
No pause	{lowerbound=-INF, lowertest=unbounded, upperbound=0, uppertest=lt} + {lowerbound=0, lowertest=gt, upperbound=INF, uppertest=unbounded}

This document does not specifically define the XML document locations where the Stream Restriction Data Model SRDM is carried. It is expected that SRDM instances *may* be used within various parts of SCTE 130 messages. For example, it *may* be applied to a PlacementOpportunity element in a 130-3 [SCTE 130-3] PlacementRequest message or it *may* be used with a SCTE 130-4 [SCTE 130-4] CIS related messages describing how a particular asset *should* be controlled. A particular instance of the SRDM applies to the context it is defined within.

It is considered that the SRDM *may* be used outside of the scope of SCTE 130 and as such does not derive any XML definitions from other SCTE 130 parts. This does mean there is duplicative definitions with respect to the Ext element defined within SCTE 130 Part 2 [SCTE 130-2] and the ExtType complex type defined within this document, SCTE 130 Part 10. Updates to the SCTE 130 Part 2 Ext element definition ***shall*** warrant consideration for adoption by SCTE 130 Part 10.

6.0 NOTATIONAL CONVENTIONS

6.1 Normative XML Schema

See [SCTE 130-2] for information.

6.2 Document Conventions

This specification utilizes the same document conventions as SCTE 130 Part 2. See [SCTE 130-2] for conventions and XML schema illustration nomenclature explanations. This specification utilizes XML substitution groups for additional extensibility. XML substitution groups designate elements as substitutes for other element declarations without changing the original schema documents. Within this document, substitutable elements are graphically identified using the following illustrative technique.

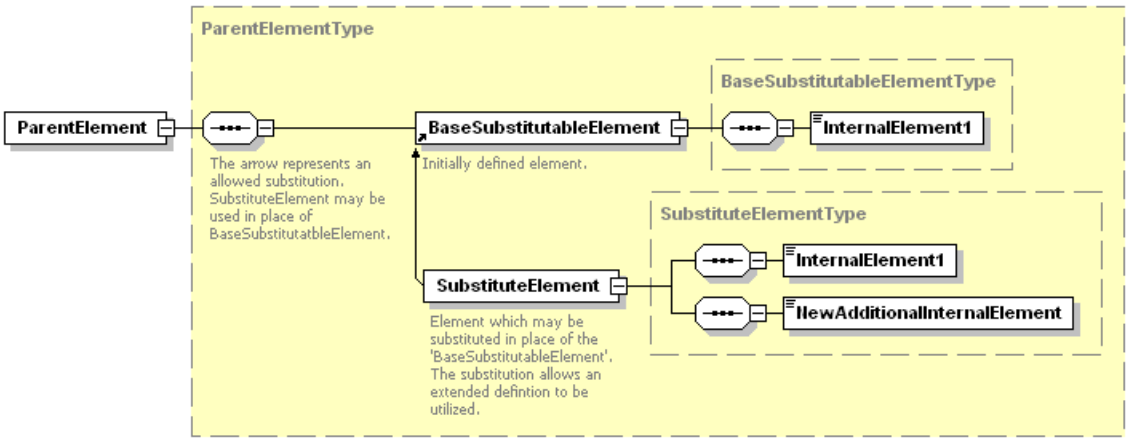

Figure 1. Substitution Group Schema Convention

In Figure 1, the element referred to as “SubstituteElement” *may* be used in place of the element named “BaseSubstitutableElement” provided the XML namespace declarations are included in the document as per [W3C-XSD]. The diagram’s illustrative arrow signals the reader of the possible element substitution.

7.0 PROCESSING CONVENTIONS

7.1 Unknown/Unrecognized/Unsupported XML Elements and Attributes

See [SCTE 130-2] for information.

8.0 XML NAMESPACES

This specification uses the 'srdm' prefix, as described in Table 1, for the interface associated with the specific XML namespace URI that ***shall*** be used by all implementations. Table 1 lists the prefix, the corresponding namespace, and a description of the defining specification used herein.

Standard	XML Schema Prefix	XML Schema Elements	Value
2020 (latest) SCTE 130 Part 10 (i.e., this document)	srdm	Schema namespace	http://www.scte.org/schemas/130-10/bn2/srdm[1]
		Schema version attribute	20200322
		Schema filename	SCTE_130-10_srdm_20200322.xsd

Table 1. XML Namespaces

9.0 XML NAMESPACE DECLARATIONS

Unless otherwise stated, all references to XML elements illustrated in this document are from the 'srdm' namespace. Elements from other namespaces are prefixed with the name of the external namespace, e.g. <xsd:XXXX>.

[1] In the 2020 specification revision, the XML namespace was corrected in both the standard and the XML schema to be consistent with the SCTE 130 specification family's usage and the latest SCTE XML recommendations.

10.0 MESSAGES CONTAINING THE STREAM RESTRICTION DATA MODEL

Any SCTE 130 message interface *may* utilize the SRDM. The message interfaces utilizing the SRDM are outside the scope of this specification. Refer to the individual messaging specifications for additional information.

10.1 @version Attribute

This SRDM ***shall not*** have a @version attribute associated with this specification. The data model revision ***shall*** be reflected by the SRDM XML namespace specified in Section 8.0.

11.0 SRDM ELEMENT DETAILS

The SRDM introduces new elements in defining the data model composition. The new SRDM elements are listed in Table 2. SRDM Elements and are detailed in subsequent document sections.

Element	**Description**
StreamRestrictionList	The element used to capture the list of stream restrictions for a given context.
StreamRestriction	Used to describe an instance of a specific set of stream restrictions for a given NPT range.
NPTRange	Used to describe a single NPT range.
ScaleRange	Used to describe a single scale range.

Table 2. SRDM Elements

11.1 StreamRestrictionList

This element is a container for all the stream restrictions that are to be applied for a given context. It is intended that only one StreamRestrictionList instance need be instantiated for a given context. At least one StreamRestriction instance must be specified.

The XML schema diagram for this element is as follows:

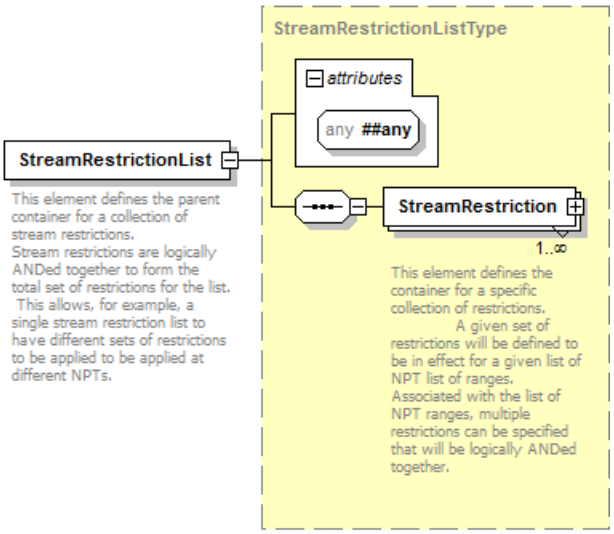

Figure 2. StreamRestrictionList Element Schema

The StreamRestrictionList element semantics are as follows:

StreamRestriction [Required] – A specific instance of a set of stream restrictions for an optional set of NPT ranges.

11.2 StreamRestriction

This element defines the container for a specific collection of restrictions that are applied to a given set of NPT ranges. Associated with the list of NPT ranges, multiple restrictions *may* be specified that are logically ANDed together. NPTRange is optional and if omitted, the stream restrictions ***shall*** be applied to the entire context.

The behavior of overlapping NPT ranges is not defined by this document.

The XML schema diagram for this element is as follows:

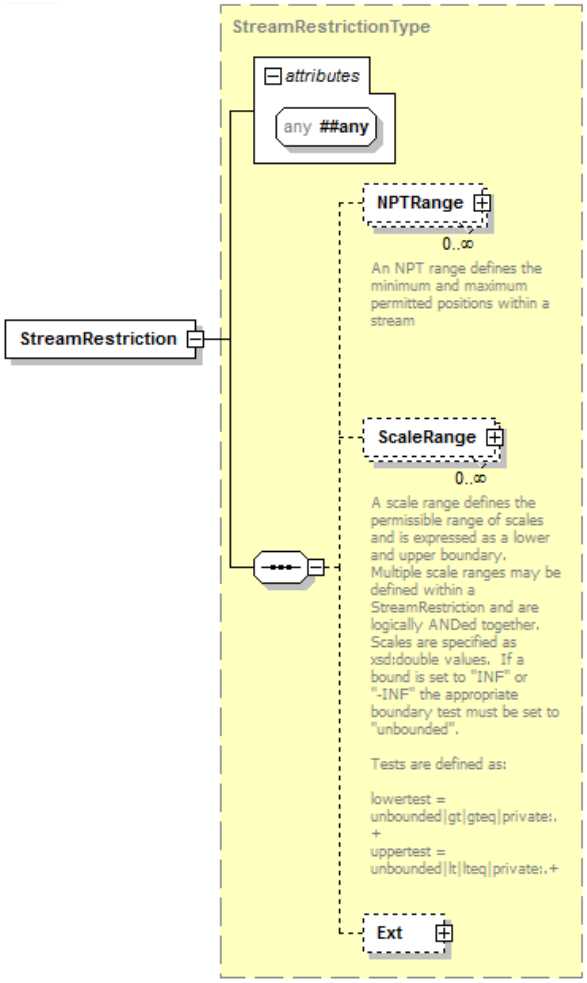

Figure 3. StreamRestriction Element Schema

The StreamRestrictionType element semantics are as follows:

NPTRange [Optional] – Zero or more NPT ranges.

ScaleRange [Optional] – Zero or more scale ranges.

core:Ext [Optional] – An optional extension point for implementation details not covered by this specification.

Stream restrictions *may* be created with one or more scale ranges but do not have any associated NTP range. The absence of an NPT range ***shall*** mean that the stream restriction applies to the entire media from beginning to end.

Stream restrictions *may* be created with one or more NPT ranges but do not have any associated scale ranges. The absence of scale range ***shall*** be permitted to allow extensions to the SRDM to be bounded by NPT ranges. Such use of the SRDM is out of the scope of this document.

Stream restrictions *may* be created with zero NPT ranges and zero scale ranges. The absence of both NPT ranges and scale ranges ***shall*** be permitted to allow extensions to the SRDM. Such use of the SRDM is out of the scope of this document.

11.3 NPTRange

This element is used to hold a single NPT range. Multiple NPTRanges *may* be specified within a single StreamRestriction element. When multiple NPTRanges are specified within a single StreamRestriction element the applicable range ***shall*** be the union of NPTRange elements. For any NPT not covered by an NPTRange instance, no stream restrictions ***shall*** apply.

The NPTRange startnpt and endnpt attributes utilize the xsd:dateTime format. The behavior of NPTRange instances based on the presence or absence of the startnpt and endnpt attributes is described in the table below:

startnpt	**endnpt**	**Behavior**
Present	Absent	The range starts from the value of the startnpt attribute and extends to infinity. An endnpt *may* be implicit by practical limitations of a system (e.g. session duration). The definition of the practical end of a range without an endnpt attribute is outside of the scope of this document.
Present	Present	The range starts from the value of the startnpt attribute and extends up to but not inclusive of the value of the endnpt attribute.
Absent	Present	The range starts from an infinite point the past and extends to the value of the endnpt attribute. A startnpt *may* be implicit by practical limitations of a system (e.g. start of session). The definition of the practical start of a range without a startnpt attribute is outside of the scope of this document.
Absent	Absent	When both startnpt and endnpt values are not defined this ***shall*** mean the stream restriction applies to the entire context.

Table 3. Interpretation of NPTRange attributes

The XML schema diagram for this element is as follows:

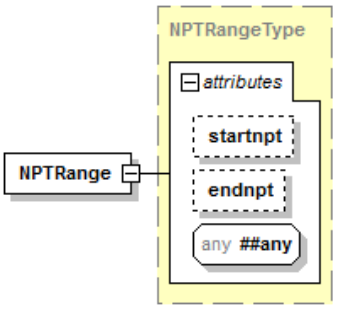

Figure 4. NPTRange Element Schema

11.4 ScaleRange

This element holds a single scale range. The scale range expresses the permissible scale ranges as defined by a lower and upper bound. Each bound ***shall*** be expressed as an xsd:double value and ***shall*** have an associated boundary test.

If a bound is set to –INF/INF (meaning unbounded), the corresponding bound test must be set to "unbounded". Otherwise, the lowertest attribute *should* be either "gt" or "gteq" and the uppertest attribute *should* either be "lt" or "lteq". The upperbound must be greater than the lowerbound, and both the upperbound and lowerbound along with uppertest and lowertest attributes must be specified.

Bound value	**Test value**
upperbound = INF	uppertest = unbounded
lowerbound = -INF	lowertest = unbounded
upperbound != INF	uppertest = lt | lteq
lowerbound != -INF	lowertest = gt | gteq

Table 4. Possible bound/test values for scale ranges

Scale ranges state what scale values are permitted.

The XML schema diagram for this element is as follows:

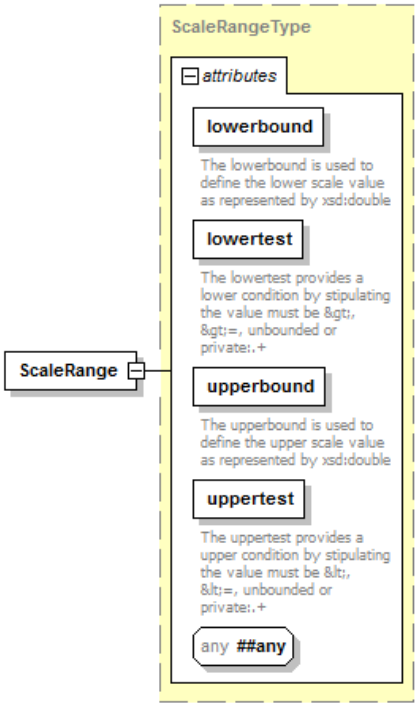

Figure 5. ScaleRange Element Schema

APPENDIX 1. SRDM EXAMPLES (INFORMATIVE)

Disallow fast forward example

An example of an instance of the Stream Restriction Data Model that would disallow fast forward for the entire NPT range of the context.

```
<StreamRestrictionList>
	<StreamRestriction>
		<NPTRange startnpt="00:00:00.000"/>
		<ScaleRange lowerbound="-INF" upperbound="1" lowertest="unbounded"
uppertest="lteq"/>
	</StreamRestriction>
</StreamRestrictionList>
```

Example 1. Disallow Fast Forward Entire NPT Range

Disallow fast forward example with no NPT range example

An example of an instance of the Stream Restriction Data Model that would disallow fast forward for the entire NPT range of the context by virtue of specifying no NPT range.

```
<StreamRestrictionList>
	<StreamRestriction>
		<ScaleRange lowerbound="-INF" upperbound="1" lowertest="unbounded"
uppertest="lteq"/>
	</StreamRestriction>
</StreamRestrictionList>
```

Example 2. Disallow Fast Forward no NPT Range

Multiple NPT range example

An example of an instance of the Stream Restriction Data Model that restricts play for two NPT ranges (e.g. for two static breaks within a piece of entertainment content), to any reverse play, pause, slow forward play and normal (1x) forward play.

```
<StreamRestrictionList>
	<StreamRestriction>
		<NPTRange startnpt="00:10:00.000" endnpt="00:12:59.999"/>
		<NPTRange startnpt="00:20:00.000" endnpt="00:22:59.999"/>
		<ScaleRange lowerbound="-INF" upperbound="1" lowertest="unbounded"
uppertest="lteq"/>
	</StreamRestriction>

</StreamRestrictionList>
```

Example 3. Multiple NPT Range Example

Multiple stream restriction example

An instance of the Stream Restriction Data Model showing no slow play between three time periods (e.g. during entertainment content) and no fast forward during two periods (e.g. during baked in ad content).

```
<StreamRestrictionList>
       <StreamRestriction>
              <NPTRange startnpt="00:10:00.000" endnpt="00:12:59.999"/>
              <NPTRange startnpt="00:20:00.000" endnpt="00:22:59.999"/>
              <ScaleRange lowerbound="INF" lowertest="unbounded" upperbound="1"
uppertest="lteq"/>
       </StreamRestriction>
       <StreamRestriction>
              <NPTRange endnpt="00:09:59.999"/>
              <NPTRange startnpt="00:13:00.000" endnpt="00:19:59.999"/>
              <NPTRange startnpt="00:23:00.00"/>
              <ScaleRange lowerbound="-INF" lowertest="unbounded" upperbound="1"
uppertest="lteq"/>
              <ScaleRange lowerbound="0" lowertest="gteq" upperbound="0"
uppertest="lteq"/>
              <ScaleRange lowerbound="1" lowertest="gteq" upperbound="INF"
uppertest="unbounded"/>
       </StreamRestriction>
</StreamRestrictionList>
```

Example 4. Multiple Stream Restriction

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