SCTE·ISBE

STANDARDS

Digital Video Subcommittee

SCTE OPERATIONAL PRACTICE

SCTE 263 2020

XML Schema Management Operational Practice

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1. Introduction

1.1. Executive Summary

This document's end goal is to be a concise set of recommendations for how XML artifacts, specifically XML schema, are named, versioned and managed including availability by the SCTE SDO and its staff in the years to come.

Note: This document is an operational practice and is not expected to be referenced in a normative manner. Nevertheless, in order to emphasize procedures and syntax that are more important than other procedures and syntax, the term "*shall*" is used for such items.

1.2. Scope

The topics covered herein include and are not limited to the following:
- XML schema namespace string format and the rules for when to modify this string
- The schema version attribute, its format, usage, and the rules for when to modify this string
- An XML (instance) document version attribute
- An XML schema's filename (i.e., the XSD filename)
- XML schema hosting (i.e., XSD file hosting)
- XML schema importing
- Ways to communicate to SCTE staff what should be the final post ballot changes

1.3. Benefits

Implementation of the procedures stated in this document will provide enhanced and normalized use of the protocols for the naming and use of XML schema.

1.4. Intended Audience

SCTE Standards committees, sub-committees, working groups and staff.

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

- None at this time

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

- No normative references are applicable.

2.2. Standards from Other Organizations

- No normative references are applicable.

2.3. Published Materials

- No normative references are applicable.

3. Informative References

3.1. SCTE References

Reference Identifier	Source and Filename
[DVS790]	Filename is "DVS 790 Report of the DVS Adhoc Group on XML Schema Documentation.pdf"
[SCTENumbering]	Appendix B — "How SCTE Numbers Multiple Releases Per Year"

3.2. Standards from Other Organizations

SMPTE's XML Schema Handling Guidelines	https://kws.smpte.org/higherlogic/ws/public/download/46546/AG-05-2018-XML%20Schema.pdf
ATSC: A/331:2020 "Signaling, Delivery, Synchronization, and Error Protection"	https://www.atsc.org/atsc-30-standard/3312017-signaling-delivery-synchronization-error-protection/

3.3. Published Materials

- No informative references are applicable.

4. 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.

5. Abbreviations

ISBE	International Society of Broadband Experts
SCTE	Society of Cable Telecommunications Engineers
SDO	standards development organization
URL	uniform resource locator
XML	extensible markup language
XSD	XML schema definition

6. The XML Schema Namespace String

The XML schema namespace string format typically used by all SCTE standards in which an XML schema is defined (either normatively or informatively) was original defined in DVS 790 [DVS790]. Section 4.3.2 of DVS 790 proposed the following format, which is captured best in the document's summary section:

> ***http://www.scte.org/schemas/<pubnum>/<revision>/<description>***

> *For example: http://www.scte.org/schemas /456/2007/Splicing.*

6.1. Change Recommendations

Our change recommendations focus on formalizing rules around how the resource path values are formatted/defined, rules for when a namespace is to be changed and by who, and a minor tweak to the resource path itself. These recommendations build on DVS 790 [DVS790].

The scheme ("**http**"), the scheme/host separators ("**://**") and the host ("**www.scte.org**") strings are all fine and *should not* be changed. They *should* be explicitly defined to be all lowercase.

The resource path format (**"/schemas/\<pubnum\>/\<revision\>/\<description\>"**) is recommended to be redefined as:

/schemas/\<pubnum[-partnum]\>/\<basenum\>/\<description\>

where the variable fields, i.e., those surrounded by '<' and '>', and optional field surrounded by '[' and ']', are revised as follows:

- **schemas** *should* be explicitly defined to be all lowercase.
- **\<pubnum[-partnum]\>** — pubnum is clarified to be the SCTE assigned standard number, e.g., 224. In the case of a multipart standard like SCTE 130, the standard number is followed by a hyphen and then the part number, e.g., 130-5.
  When a new standard is being initially drafted, the pubnum value *should* be set to the value 'xxx' until the successful ballot pre-publication point at which time SCTE staff in conjunction with the drafting group, *shall* appropriately update 'xxx' to the final assigned standard number value. This value *shall not* change thereafter.
  The hyphen and part number are optional, and the value *shall* be set by the drafting group prior to the initial ballot and *shall not* change thereafter. The optional hyphen partnum are used for multipart standards like SCTE 130.
- **\<basenum\>** — basenum, which stands for base/basis number, replaces revision and has the format "bn#". Basenum is prefixed 'bn' followed by a numeric value starting at the value one (1) and incrementing by one anytime a non-backward compatible change occurs. Backward compatible schema changes *shall not* alter this value. Thus, for most standards, this value *shall not* ever change as we typically strive to make all changes backward compatible. Editorial changes and backward compatible additions and/or changes *shall not* alter this value. Deletions *shall* never be considered backward compatible and thus, if a deletion does occur, this value *shall* be incremented creating a new, non-backward compatible implementation.
- **\<description\>** — description is a string as explained in DVS 790 [DVS790]. The string *should* be explicitly defined to be all lowercase and avoid any special characters. All standards *should* have a description string including those with only a single schema. A recommended initial value for a single schema standard is 'core'. By having an initial description value, standards may evolve with fewer concerns.

Thus, the new recommended XML schema namespace string format is:

http://www.scte.org/schemas/\<pubnum[-partnum]\>/\<basenum\>/\<description\>

For example: http://www.scte.org/schemas /456/bn1/splicing and
http://www.scte.org/schemas /130-10/bn2/srdm

Following the initial publication, the XML namespace string *shall* be considered immutable. Only a non-backward compatible change to a schema *shall* be the triggering event for when this string is modified to a new value, which *shall* then be considered immutable.

Existing standards *should* continue to use their already implemented namespace string and they *should* only change this string to a new value when a non-backward compatible, breaking change is introduced. In this specific case, the basenum numeric value should be two or later as bn1 is assumed to be the first publication(s).

The XML namespace string *shall* be documented in the standard document and it *shall* use the recommended boilerplate as defined in section 12 of this document. See section 12 for more details.

6.2. Why Certain Recommendations (a.k.a., Why Not Others)?

Most of the above recommendations *should* be self-evident. However, for posterity, a few of our critical choices are being documented here.

<revision> was confusing for a number of reasons including it is an overloaded term just like version. We wanted to avoid any confusion with the SCTE process for numbering documents [SCTENumbering] and its terminology. So, we decided to use the term base/basis number in place of revision or version or any derivative thereof. We use base to indicate the foundation and acknowledge backwards compatible improvements can occur that do not require the XML schema namespace string to change. Only a non-backward compatible change forces an update and we will strive to almost always keep compatibility in order to reduce the development communities' pain.

DVS 790 [DVS790] recommended a year for the <revision> value and many standards utilized this form. The issue became one of confusion for the developers and those unskilled in the art as it was unclear if this year value represented the initial balloted year, the current publication year, or some other year etc. Thus, eliminating year and concretely documenting a value in the standard hopefully reduces the current and future confusion.

We could have used a major.minor format for <basenum> and we decided against it because:
- Any change to either value is a non-backward compatible, breaking change. Thus, changing either the major or the minor value is equivalent.
- We'd then have to define "rules" for when a major number is changed, or a minor number is changed, and what they mean. In reality, any breaking change seems like a major change so what's the value of the minor number? Thus, we choose to use a single value.

SCTE 224 will have to be grandfathered in for the omission of <description> since ANY changes to the schema namespace string causes a breaking change.

It is believed SCTE 35 has been changing the namespace for each new revision. This practice should be stopped, and the namespace string should be "frozen" at its current value.

7. XML Schema Version Attribute

The XML schema version attribute is an optional XML schema attribute and its main use is to specify the version of the schema/XSD being developed. There are no semantics defined for this attribute; so, we must define our own.

The schema version attribute is only available and applicable to a schema. The value does not appear in an XML document and thus, it cannot assist in any enforceable validation or semantic clarification for an implementation and runtime processing of the XML document.

7.1. Change Recommendations

Our recommendation is this attribute and its value *shall* be included in every XML schema file and the value's format *shall* be "YYYYMMDD", where Y, M, and D are all digits ranging from 0 to 9. M and D *shall* be zero prefixed as necessary. The value *shall* be updated every time a schema is modified even if the change is editorial. Thus, this value tracks a schema's development and evolution.

This value format allows tracking through the development cycle though thought must be given to modifications occurring in the same day, etc. (It could be something as simple as post fixing an

underscore number, i.e., "_1, _2" or "r1", "r2", etc., as the drafts change in a single day.) The individual drafting groups *shall* determine their own "collision" rules.

This value *shall* be required to be included in the standard document, so the published standard text is clearly associated with the schema document.

Prior to ballot, it *shall* be the working group's responsibility to set this value to a YYYYMMDD valid value and this same value *shall* be set in the standard document when balloted. "r#" or other collision extension values *shall* not be included in a ballot. Thus, the value typically should not change post ballot except for a few special cases.

The first and largest exception to the above rule is when a brand-new standard is about to be published. Since a brand-new standard requires the SCTE staff and working group to change the <pubnum> value from xxx to the SCTE staff assigned value, then so *shall* this value be updated both in the schema file and in the standard since the schema is being change.

For the majority of cases excluding the above exception, it typically *shall* be the drafting groups responsibility to set this value as schema changes are typically made by the working group and not by the SCTE staff, except for possible editorial/informative changes.

8. XML (Instance) Document Version Attribute

It is our recommendation that all XML (instance) documents have a version attribute, defined by the XML schema, in the root element to allow runtime determination of the XML (instance) document's relationship to a specific standard's semantic version.

8.1. Change Recommendations

Each message, i.e., root XML element, *should* carry a version attribute. This version attribute, not to be confused with the XML schema version attribute, allows the sender to inform the receiver what semantic version of the standard is being used. Each standard defines the version values allowed and what this value means. While the XML schema namespace defines an overall version, and the XML schema version attribute defines a specific version of the XML schema, this per message version attribute allows for refinements where the standard was improved yet the XML syntax was not impacted. Thus, an implementation can adapt as necessary in real time to multiple versions of the standard when they are all syntactically/semantically compatible. The version attribute's format *should* be major.minor. For example, "1.2".

Obviously, runtimes can adapt to XML syntactic additions by testing for them, assuming they are added and defined properly for such a test, and so this XML (instance) document version attribute value may not be so useful in those situations. The value is useful for semantic changes to the standard.

Because this idea is an implementation detail, it will have to be handled on a standard by standard basis. SCTE 35 and SCTE 224 *should* strongly consider this addition in their next update. Other standards need reviews to see if it should be added or if their existing mechanism is sufficient.

9. XML Schema Filename

There should be a consistent schema filename naming format across the schema.

9.1. Change Recommendations

After significant discussion, the recommended XML schema filename format is the following:

SCTE_pubnum[-partnum]_description_YYYYMMDD.xsd

where:
- The filename *shall* start with the string "**SCTE_**"
- Underscores *shall* be used to separate component elements except where a hyphen is used to separate the optional partnum component.
- **pubnum** *shall* be the same value and follows the same rules as the XML schema namespace string's pubnum component previously defined in section 6.1.
- **-partnum** (i.e., hyphen partnum) *shall* be optional and it *shall* be the same value and follows the same rules as the XML schema namespace string's partnum component defined previously in section 7.
- **description** *shall* be the same value and follows the same rules as the XML schema namespace string's description component defined in section x previously.
- **YYYYMMDD** *shall* be the year, month and day the XML schema document was edited. This value *shall* be the same value and follows the same rules as the XML schema version attribute's value defined in section 7.

The XML schema filename *shall* be included in the standard document per the recommendations in section 9. The schema filename's YYYYMMDD component value *shall* be updated every time the XML schema file is modified and thus, the standard document *shall* also be modified with this new value. Additionally, any dependent schemas may need to be modified. It *shall* be the working group's responsibility to work with SCTE staff and other working groups to correctly propagate the change.

We assume the standard document's filename *shall* continue to follow the SCTE document numbering conventions [SCTENumbering].

9.1.1. Why Certain Recommendations (a.k.a., Why Not Others)?

We picked this format because it makes the filename unique and consistent with the previous recommendations herein

10. Schema Location and Retieval

The working group recognizes the majority of this section is outside our control and is the responsibility of SCTE staff and their vendors. We are providing these ideas as wish list items we'd like the SCTE staff to consider as part of a longer-term initiative. We understand and appreciate some of these items could have impact on SCTE business necessities and we don't by any means wish to underestimate the importance of these business needs.

The gist of our recommendation's focus is on our wanting the schema documents, both the current/latest schema and past schemas, to be publicly available and easily machine accessible. We would like the document retrieval to be automatable for getting the latest and previous schema versions. We'd potentially even like the same constructs to be available for our standard document's retrieval, and we believe having all the documents in a single "zipfile"/archive could be very beneficial. We would like the URL scheme and hosting requirements to be reasonably easy for the SCTE staff to support and we want to limit the amount of touching and work post a successful ballot required by the SCTE staff for publication.

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10.1. Change Recommendations

The previously proposed XML namespace string format concatenated with the XML schema file name format naturally facilities a unique retrieval URL. Thus, the following unique URL can easily be formed by concatenation:

http://www.scte.org/schemas/<pubnum[-partnum]>/<basenum>/<description>/ SCTE_pubnum[-partnum]_description_YYYYMMDD.xsd

A simpler alternative that could also be implemented since the XML schema filenames are unique is:

http://www.scte.org/schemas/SCTE_pubnum[- partnum]_description_YYYYMMDD.xsd

There are numerous options that can be discussed and if the SCTE staff is interested we can go into more depth offline.

10.2. Impact Analysis to Current Standards

Omitted since this is really an SCTE staff issue.

11. Schema Importing

How should imported schemas be referenced?

11.1. Change Recommendations

Our recommendation is for "pubnum" associated imported schemas to use an unqualified/local XML schema filename only. Thus, the following example:

<xsd:import namespace=" http://www.scte.org/schemas/<pubnum[- partnum]>/<basenum>/<description>"

" schemaLocation="SCTE_pubnum[-partnum]_description_YYYYMMDD.xsd"/>

For any other imported schemas, it is up to the working group on how to include, though our recommendation is to include using a an unqualified/local XML schema filename only.

11.2. Why Certain Recommendations (a.k.a., Why Not Others)?

The choice was either unqualified/local or fully qualified to the SCTE or alternative SDO website. While using a fully qualified, versioned path and filename would be ideal, there a few issues with this choice. First, schema development and iteration require the file to be local since the document cannot be posted *a priori*, e.g., before publication, to a fully qualified path. Second, given the new SCTE website, unauthenticated URL based retrieval doesn't currently work and it is unclear when and if it will ever be an option based on business reasons, etc. Other SDOs may have the same limitations. Third, and maybe most importantly, we really want to minimize the SCTE staff changes to a

document post ballot. By using the balloted filename only, which is set by the working group, the file typically will not need to be altered except following the initial standard approval as explained previously.

12. Putting Information Where the User Can Find It

We can do better by clearly documenting the namespace, XML schema filename, version, etc., and track the artifact evolution as the standard evolves in parallel. We can improve by making a clear, descriptive linkage between the balloted standard document and the schema documents, and the information should make it easier for the reader to obtain all the associated artifacts.

The implementation burden falls on both the working group and the SCTE staff though we can make it easier be adding/updating our table to be clear with all the information.

12.1. Change Recommendation

This document's recommendations for the connecting the dots are the following:
- Add a table similar to the following to each standard document in the section where the XML schema namespace and other information is included today. In many cases, this action could be simply a retrofit and/or enhance an existing table in the standard already. The following is the example table:

Table 1 – Document and Schema Linkage

Standard	XML Schema Prefix	XML Schema Elements	Value
2019 (latest)	core	Schema namespace	http://www.scte.org/schemas/<pubnum[-partnum]>/<basenum>/description
		Schema version attribute	MMMMYYDD Example: 20190502
		Schema filename	SCTE_pubnum-partnum_description_YYYYMMDD.xsd
		Schema location/retrieval URL	http://www.scte.org/schemas/<pubnum[-partnum]>/<basenum>/description/SCTE_pubnum-partnum_description_YYYYMMDD.xsd
2018 (example previous entry)	core	Schema namespace	http://www.scte.org/schemas/<pubnum[-partnum]>/<basenum>/description
		Schema version attribute	MMMMYYDD Example: 20180718
		Schema filename	SCTE_pubnum-partnum_description_YYYYMMDD.xsd
		Schema location/retrieval URL	http://www.scte.org/schemas/pubnum/basenum/description/ SCTE_pubnum-partnum_description_YYYYMMDD.xsd

- It should be the responsibility of the group to add the new section as appropriate
- We should mark all the fixup locations with a comment of "SCTE staff update".

If the table above grows to long, it can be separated into two tables. One for the current standard and the second in an appendix tracking the history.

13. Helping SCTE Staff Update Successfully Balloted Standards

How do we communicate to the SCTE staff what should change prior to publication when a successfully balloted standard is being prepped for publication?

One idea is we build a form that should accompany every ballot and such a form is proposed in Appendix A. However, given the above changes and usage of the comment directly embedded in the document as recommended, it is likely we don't need this form.

14. Appendix A

The following is an example proposed staff change sheet, which is an artifact included with the ballot and it is where the proposing group states what changes the SCTE staff should make following a successful ballot.

SCTE Staff Approved Standard Pre-Publishing Document Modifications

What Standard is to be modified pre-publishing? _____

Schema/XSD Document Changes

Should the SCTE staff change the xsd:schema element's namespace (yes/no)? _____

Should the SCTE staff change the xsd:schema element's version attribute (yes/no)? _____

Should the SCTE staff change the xsi:schemaLocation statements (yes/no)? _____

If yes, which ones and how should they be changed?

_____

_____

Should the SCTE staff change the xsd:import statements (yes/no)? _____

If yes, which ones and how should they be changed?

_____

_____

Are there other standards impacted by these changes (yes/no)? _____

If yes, which ones and how should they be changed?

_____

_____

Standard Document Changes

Should the SCTE staff change/update the namespace table (yes/no)? _____

If yes, which ones and how should they be changed?

_____

_____

15.   Appendix B – How SCTE Numbers Multiple Releases Per Year

dpi@standards.scte.org on behalf of Dean Stoneback <dstoneback@scte.org> Tue 12/17/2019 10:45 AM dpi@standards.scte.org☐

DPI,

Per today's call, here's our internal procedure on how we name multiple releases within the same year.

Regards,

Dean

1.1.   Updates to Published Documents

1.1.1.   Normative and/or Balloted Changes in the Same Calendar Year

If a document is updated in the same calendar year with normative and/or balloted changes, an "a" should be added to the end of the year. If a second update is made in the same calendar year, a "b" should be used instead of an "a" after the year. Subsequent releases in the same year should continue to use an incremented letter.

The a, b, c, etc. should be in the filename and in the document number on the title page.

A fictional example is shown below:

Original release: ANSI/SCTE 224 2018

New version in 2018: ANSI/SCTE 224 2018a

1.1.2.   Editorial Updates to Published Documents

When editorial changes are made to published documents, an "a" should NOT be added to the filename, as that nomenclature is reserved for a document is approved twice in the same year.

To identify editorial changes to a document, an r1, r2, r3, etc. should be added after the year.

Thus, a, b, c, etc. indicates new balloted documents in the same year and r1, r2, r3, etc. indicates editorial changes to a balloted document.

The a, b, c, etc. and/or r1, r2, r3, etc. should be in the filename and in the document number on the title page.

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A fictional example is shown below:

Original release: ANSI/SCTE 224 2018

Editorial update: ANSI/SCTE 224 2018r1

New version in 2018: ANSI/SCTE 224 2018a

New version with editorial update: ANSI/SCTE 224 2018ar1

A second editorial update two years later in 2020: ANSI/SCTE 224 2018ar2 (note that the approval date is still shown as 2018)

16.   Appendix C – Sample Table for tracking Documents

In the previous sections (Sections 6-11), changes in existing documents may need to be made and they are best analyzed and managed by using a table structure that lists the standards under consideration. The table provides a concise list of standard documents to be tracked, the impact the change will have on the document and notes to be considered in making the document edits. Table 20 provides an example of how this was structured in reviewing DVS/WG5 standards for the Section 7 review of the "XML: Schema Version Attribute".

Table 2 – Example: Impacts: XML Schema Version Attribute

Standard	Impact	Notes
SCTE 35	Low	Needs to be added to every schema per the recommendations.
SCTE 118-3	Low	Needs to be added to every schema per the recommendations.
SCTE 130 (2-8,10)	Low	Needs to be added to every schema per the recommendations.
SCTE 224	None	No change required as it follows this convention already.
SCTE 236	Low	Needs to be added to every schema per the recommendations.
SCTE 250	Low	Needs to be added to every schema per the recommendations.

The following blank table can be copied and used in the analysis of standards documents by other subcommittees and working groups.

Table 3 – Example: Blank Table

Standard	Impact	Notes