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Digital Program Insertion–Advertising Systems Interfaces

Part 4

Content Information Service (CIS)

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TABLE OF CONTENTS

1.0 SCOPE	1
2.0 REFERENCES.....	1
2.1 NORMATIVE REFERENCES	1
2.1.1 Normative Reference Acquisition	1
2.2 INFORMATIVE REFERENCES	2
2.2.1 Informative Reference Acquisition.....	2
3.0 COMPLIANCE NOTATION	2
4.0 DEFINITIONS AND ACRONYMS	3
5.0 ABBREVIATIONS	3
6.0 CONTENT INFORMATION SERVICE OVERVIEW (INFORMATIVE)	3
7.0 NOTATIONAL CONVENTIONS.....	5
7.1 NORMATIVE XML SCHEMA	5
7.2 DOCUMENT CONVENTIONS	5
8.0 PROCESSING CONVENTIONS.....	5
8.1 UNKNOWN/UNRECOGNIZED/UNSUPPORTED XML ELEMENTS AND ATTRIBUTES	5
9.0 XML NAMESPACES.....	5
10.0 CIS MESSAGES	7
10.1 @VERSION ATTRIBUTE.....	8
10.2 REQUEST BASE MESSAGE	8
10.3 RESPONSE BASE MESSAGE	8
10.4 NOTIFICATION BASE MESSAGE	8
10.5 ACKNOWLEDGEMENT BASE MESSAGE	8
10.6 MESSAGES REQUIRING CONTENT NOTIFICATION REGISTRATION	8
10.7 DEFAULT LOGICAL SERVICE CHANNEL ENDPOINT	8
10.8 CIS MESSAGE EXCHANGE.....	9
10.9 LIST SUPPORTED FEATURES REQUEST AND RESPONSE.....	9
10.9.1 ListSupportedFeaturesRequest Message	10
10.9.2 ListSupportedFeaturesResponse Message.....	11
10.10 LIST CONTENT NOTIFICATION REGISTRATION REQUEST AND RESPONSE	14
10.10.1 ListContentNotificationRegistrationRequest Message.....	14
10.10.2 ListContentNotificationRegistrationResponse Message	16
10.11 CONTENT NOTIFICATION REGISTRATION REQUEST AND RESPONSE	18
10.11.1 ContentNotificationRegistrationRequest Message.....	19
10.11.2 ContentNotificationRegistrationResponse Message	22
10.12 CONTENT NOTIFICATION AND ACKNOWLEDGEMENT	24
10.12.1 ContentNotification Message.....	24
10.12.2 ContentNotificationAcknowledgement Message.....	26
10.13 CREATE CURSOR REQUEST AND RESPONSE.....	28
10.13.1 CreateCursorRequest Message.....	28
10.13.2 CreateCursorResponse Message	30
10.14 CANCEL CURSOR REQUEST AND RESPONSE	32
10.14.1 CancelCursorRequest Message	32

10.14.2	<i>CancelCursorResponse Message</i>	34
10.15	CONTENT QUERY REQUEST AND RESPONSE	36
10.15.1	<i>ContentQueryRequest Message</i>	36
10.15.2	<i>ContentQueryResponse Message</i>	38
10.16	CONTENT NOTIFICATION DEREGISTER REQUEST AND RESPONSE	40
10.16.1	<i>ContentNotificationDeregisterRequest Message</i>	40
10.16.2	<i>ContentNotificationDeregisterResponse Message</i>	42
10.17	DEREGISTRATION NOTIFICATION AND ACKNOWLEDGEMENT	44
10.17.1	<i>DeregistrationNotification Message</i>	44
10.17.2	<i>DeregistrationAcknowledgement Message</i>	46
10.18	SERVICE CHECK SUPPORT	48
10.19	SERVICE STATUS SUPPORT	48
11.0	CIS ELEMENT DETAILS	49
11.1	BASIC AND ADVANCED QUERIES	49
11.2	CONTENTNOTIFICATIONSELECTOR	50
11.3	CONTENTQUERY	51
11.4	CURSOR	52
11.5	CONTENTQUERYRESULT	53
11.6	QUERYFILTER	54
11.7	FILTERELEMENT	55
11.8	BASICQUERYRESULTLIST	56
11.9	ADVANCEDFILTERELEMENT	57
11.10	ADVANCEDQUERYRESULTLIST	58
11.11	ADVANCEDQUERYRESULT	58
11.12	DATAMODELLIST	60
11.13	ADVANCEDQUERYLANGUAGELIST	60
11.14	ADVANCEDQUERYLANGUAGE	61
12.0	SCTE 130 PART 4 CIS ATTRIBUTE TYPES	61
12.1	SEMANTIC DEFINITIONS FOR SCTE 130 PART 4 CIS ATTRIBUTE TYPES	61
12.1.1	<i>queryIdAttrType Attribute Type</i>	61
12.1.2	<i>queryIdRefAttrType Attribute Type</i>	61
12.1.3	<i>cursorIdAttrType Attribute Type</i>	62
12.1.4	<i>cursorIdRefAttrType Attribute Type</i>	62
12.1.5	<i>queryFilterOpTypeEnumeration Attribute Type</i>	62
12.1.6	<i>filterElementNameType Attribute Type</i>	62
12.1.7	<i>filterElementValueType Attribute Type</i>	62
12.1.8	<i>queryLanguageAttrType Attribute Type</i>	63
12.1.9	<i>expandOutputAttrType Attribute Type</i>	63
13.0	BASIC QUERIES AND REGULAR EXPRESSIONS	64
13.1	REGULAR EXPRESSIONS AND WILDCARDS	64
A.	APPENDIX A (NORMATIVE) STATUSCODE ELEMENT @DETAIL ATTRIBUTE VALUES	67
B.	APPENDIX B (INFORMATIVE) COMPLEX QUERIES AND EXPANDED OUTPUT	68
B.1	MULTIPLE FILTER ELEMENTS	68
B.2	EXPANDED OUTPUT	70
C.	APPENDIX C (INFORMATIVE) ADVANCED QUERIES	73
C.1	ADVANCED QUERIES	73
D.	APPENDIX D (INFORMATIVE) CURSORS	74
D.1	CREATING CURSORS	74

D.2	WALKING CURSORS	75
D.3	CANCELING EXISTING CURSORS	76
E.	APPENDIX E (INFORMATIVE) COMPLETE MESSAGE EXAMPLES	78
E.1	LIST SUPPORTED FEATURES REQUEST AND RESPONSE	78
E.2	CONTENT QUERY REQUEST AND RESPONSE	80
E.3	CONTENT NOTIFICATION REGISTRATION REQUEST	81
E.4	CONTENT NOTIFICATION	82
F.	APPENDIX F (NORMATIVE) WSDL	84
F.1	WSDL TARGET NAMESPACE URI FORMAT	84
F.2	WSDL DESCRIPTION	85

LIST OF FIGURES

Figure 1 – CIS System Overview	4
Figure 2 - CIS Message Exchange	9
Figure 3 - ListSupportedFeaturesRequest–XML Schema	10
Figure 4 - ListSupportedFeaturesResponse–XML Schema	12
Figure 5 - ListContentNotificationRegistrationRequest XML Schema	15
Figure 6 - ListContentNotificationRegistrationResponse XML Schema	17
Figure 7 - ContentNotificationRegistrationRequest–XML Schema	20
Figure 8 - ContentNotificationRegistrationResponse	23
Figure 9 - ContentNotification–XML Schema	25
Figure 10 - ContentNotificationAcknowledgement XML Schema	27
Figure 11 - CreateCursorRequest XML Schema	29
Figure 12 - CreateCursorResponse XML Schema	31
Figure 13 - CancelCursorRequest - XML Schema	33
Figure 14 - CancelCursorResponse - XML Schema	35
Figure 15 - ContentQueryRequest–XML Schema	37
Figure 16 - ContentQueryResponse–XML Schema	39
Figure 17 - ContentNotificationDeregisterRequest	41
Figure 18 - ContentNotificationDeregisterResponse XML Schema	43
Figure 19 - DeregistrationNotification–XML Schema	45
Figure 20 - DeregistrationAcknowledgement–XML Schema	47
Figure 21 - ContentNotificationSelector XML Schema	50
Figure 22 - ContentQuery–XML Schema	51
Figure 23 - Cursor–XML Schema	52
Figure 24 - ContentQueryResult–XML Schema	53
Figure 25 - QueryFilter–XML Schema	54
Figure 26 - FilterElement–XML Schema	56

Figure 27 - BasicQueryResultList–XML Schema	56
Figure 28 - AdvancedFilterElement–XML Schema	57
Figure 29 - AdvancedQueryResultList–XML Schema	58
Figure 30 - AdvancedQueryResult - XML Schema	59
Figure 31 - DataModelList – XML Schema	60
Figure 32 - AdvancedQueryLanguageList – XML Schema	60
Figure 33 - AdvancedQueryLanguage XML Schema	61

LIST OF TABLES

Table 1: XML Namespace Declarations	6
Table 2: CIS Top Level Messages	7
Table 3: ListSupportedFeatures core:Callout @message values	13
Table 4: ContentNotificationRegistrationResponse core:Callout @message values	21
Table 5: ContentNotification@Type values	24
Table 6: CIS Elementary Message Details	49
Table 7: Advanced Query Languages	49
Table 8: BasicQueryResultList Child Elements	57
Table 9: AdvancedQueryResult CDATA contents	59
Table 10: QueryFilterOpTypeEnumeration Values	62
Table 11: CIS Regular Expressions	65
Table 12: Regular Expression Examples	66
Table 13: StatusCode Details	67
Table 14: Part 2 and Part 4 StatusCode Detail Usage	68

Digital Program Insertion—Advertising Systems Interfaces

Part 4—Content Information Service

1.0 SCOPE

This document, SCTE 130 Part 4, describes the Digital Program Insertion Advertising Systems Interfaces' CIS (Content Information Service) messaging and data type specification using XML, XML Namespaces, and XML Schema.

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.

[SCTE130-2]	SCTE 130-2 2008a: Digital Program Insertion—Advertising Systems Interfaces Part 2 - Core Data Elements
[SCTE130-7]	SCTE 130-7 2009: Digital Program Insertion – Advertising Systems Interfaces Part 7 – Message Transport.
[SCTE118-3]	ANSI/SCTE 118-3 2006 – Program-Specific Ad Insertion – Traffic System to Ad Insertion System File Format Specification
[W3C - XPath]	XPath–W3C REC: XML Path Language (XPath) Version 1.0. November 16, 1999
[W3C – Xquery]	XQuery–W3C REF: An XML Query Language (XQuery) Version 1.0. January 23, 2007

All normative references found in [SCTE130-2] are included and apply to this document. See [SCTE130-2] for additional information.

2.1.1 Normative Reference Acquisition

2.1.1.1 SCTE Standards: United States of America

Society of Cable Telecommunications Engineers Inc., 140 Philips Road, Exton, PA 19341; Telephone 800-542-5040; Facsimile: 610-363-5898; E-mail: standards@scte.org; URL: <http://www.scte.org>.

2.1.1.2 W3C Standards

MIT, 32 Vassar Street, Room 32-G515, Cambridge, MA 02139, USA;
Telephone: +1.617.258.5999; <http://www.w3.org>.

2.2 Informative References

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

[SCTE130-1]	SCTE 130-1 2008: Digital Program Insertion—Advertising Systems Interfaces Part 1—Overview
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2.2.1 Informative Reference Acquisition

2.2.1.1 SCTE Standards: United States of America

See Section 2.1.1.1.

3.0 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 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 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.

4.0 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 defined by this standard, brief definitions are given below.

All [SCTE130-2] definitions are included herein. See [SCTE130-2] for additional information

Cursor: A temporary CIS construct containing static data. CIS clients may create and access cursor information using the standard query mechanisms described in this document.

5.0 ABBREVIATIONS

All [SCTE130-2] abbreviations are included herein. See [SCTE130-2] for additional information.

CDATA: (Character DATA) XML data that is not parsed. CDATA carries markup examples that would otherwise be interpreted as XML because of the tags.

6.0 CONTENT INFORMATION SERVICE OVERVIEW (INFORMATIVE)

A CIS provides asset metadata query and notification services, including media availability if known, to service consumers. Using the interfaces defined in this specification, service consumers may retrieve detailed information about assets referenced by a CIS.

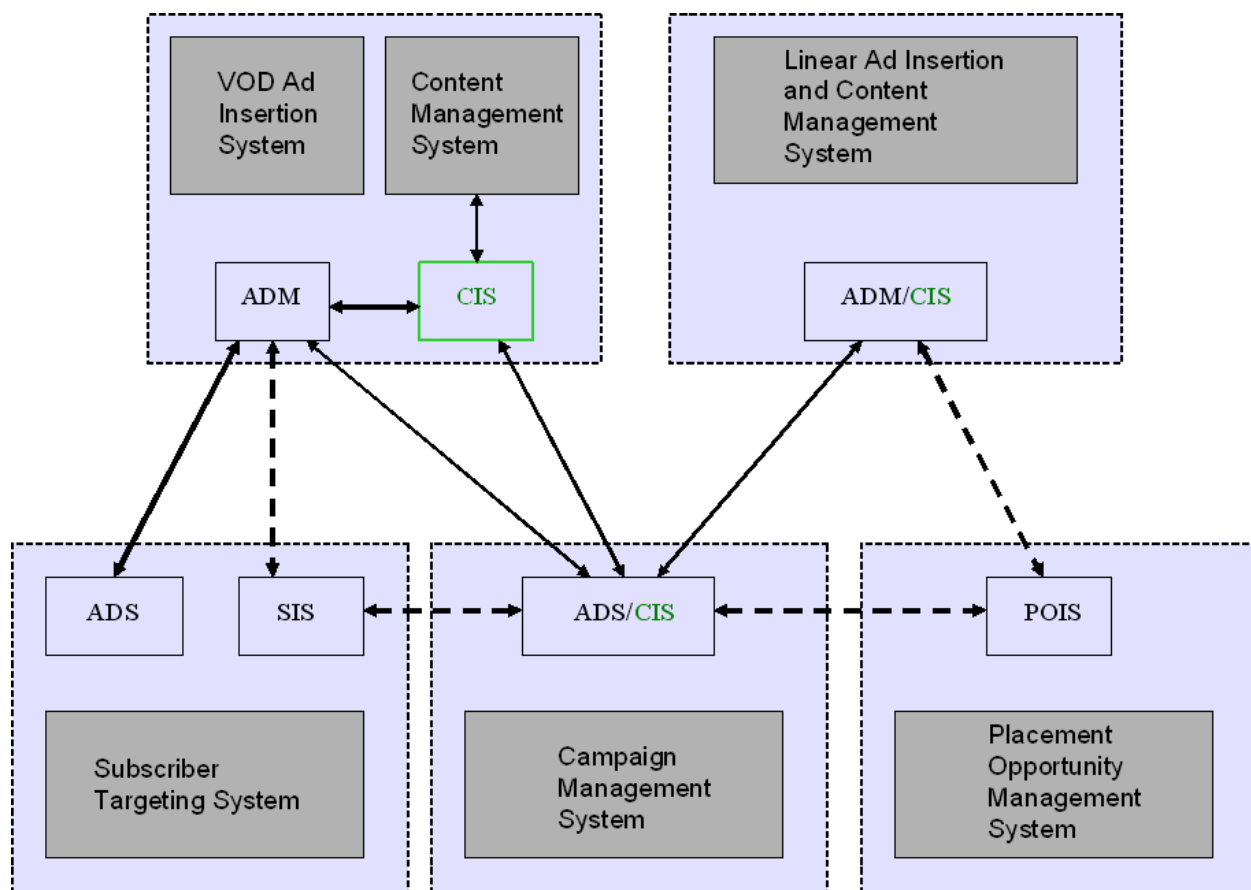


Figure 1 – CIS System Overview

Figure 1 provides examples of several possible CIS implementations with respect to the SCTE 130 logical services. Locations for CIS logical services are not limited to physical content stores, but may also be implemented on top of any physical instances containing asset information.

A CIS answers queries concerning its associated physical content store(s) and issues notification messages when physical content store changes are detected. The interface between the CIS and the physical content store is outside the scope of this specification.

The existence of a CIS implementation, either as a standalone system or as a logical service coexisting with other services or systems, does not imply physical presence of referenced assets. Asset availability may be signaled by the CIS through specific attribute values in the query and content notification response messages. See Sections 11.8 and 11.11 for additional details on asset availability indication.

This specification describes the message sets used to form basic and/or advanced queries against CIS fronted asset metadata. Basic queries leverage a limited key/value regular expression grammar while advanced queries support industry standard XML parsing languages and other user defined query languages. See section 11.14 for additional

information on advanced query language support and section 11.1 for additional information on Basic and Advanced query mechanisms.

This specification also describes cursor based operations for both basic and advanced queries. Consumers may request the creation of temporary static, cursor based information with specified lifetimes, and then iterate over the information until the cursor life cycle completes (i.e., expires). See section 11.4 for additional information on cursors.

This specification includes a notification model for CIS to consumer messaging. The model includes associated notification management functions such as registration, deregistration and active registration listing.

Part 4 also facilitates the expression of CIS supported data models(s). The examples provided herein assume that the CIS supports a data model similar to the CableLabs Asset Distribution Interface Specification (ADI), Version 1.1. See the [CLADI1-1] normative reference from [SCTE130-2].

7.0 NOTATIONAL CONVENTIONS

7.1 Normative XML Schema

See [SCTE130-2] for information.

7.2 Document Conventions

This specification utilizes the same document conventions as SCTE 130 Part 2. See [SCTE130-2] for conventions and XML schema illustration nomenclature explanations.

8.0 PROCESSING CONVENTIONS

8.1 Unknown/Unrecognized/Unsupported XML Elements and Attributes

See [SCTE130-2] for information.

9.0 XML NAMESPACES

This specification uses the ‘cis’ 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.

Prefix	Namespace	Description
core	http://www.scte.org/schemas/130-2/2008a/core	See [SCTE130-2]
cis	http://www.scte.org/schemas/130-4/2008a/cis	SCTE 130 Part 4

xsd	http://www.w3.org/2001/XMLSchema	See [XMLSchemaP1] and [XMLSchemaP2] from [SCTE130-2]
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Table 1: XML Namespace Declarations

Unless otherwise stated, all references to XML elements illustrated in this document are from the ‘cis’ namespace. Elements from other namespaces will be prefixed with the name of the external namespace, e.g. <core:XXXX>.

10.0 CIS MESSAGES

The following topics are covered by [SCTE130-2] and this specification considers all aspects defined therein to be normative and applicable herein. See [SCTE130-2] for additional information.

- Message format
- XML message carriage
- Transport mechanisms
- Message error handling

The CIS message interface shall include the messages defined in [SCTE130-2]. Table 2 identifies additional SCTE 130 Part 4 CIS specific messages.

Message	Description
ListSupportedFeaturesRequest	Request to retrieve a list of CIS supported features
ListSupportedFeaturesResponse	Response to ListSupportedFeaturesRequest
ListContentNotificationRegistrationRequest	Request to list existing registrations
ListContentNotificationRegistrationResponse	Response to ListContentNotificationRegistrationRequest
ContentNotificationRegistrationRequest	Registration request for content notification
ContentNotificationRegistrationResponse	Response to ContentNotificationRegistrationRequest
ContentNotification	Notification message indicating asset status change
ContentNotificationAcknowledgement	Response to ContentNotification
CreateCursorRequest	Request to create a cursor
CreateCursorResponse	Response to CreateCursorRequest
CancelCursorRequest	Request to cancel an existing cursor
CancelCursorResponse	Response to CancelCursorRequest
ContentQueryRequest	Request to acquire records from the CIS
ContentQueryResponse	Response to ContentQueryRequest
ContentNotificationDeregisterRequest	Request to de-register a previously accepted registration
ContentNotificationDeregisterResponse	Response to ContentNotificationDeregisterRequest
DeregistrationNotification	Deregistration notification
DeregistrationAcknowledgement	Deregistration notification acknowledgement

Table 2: CIS Top Level Messages

10.1 @version Attribute

For all SCTE 130 Part 4 messages specified in Table 2, the [SCTE130-2] @version attribute shall be set to the value “1.1” for this document’s revision.

10.2 Request Base Message

All CIS top level **request** messages are derived from the core:Msg_RequestBaseType abstract base message type. See the [SCTE130-2] document for details on the attributes and elements contained in this base message.

10.3 Response Base Message

All CIS top level **response** messages are derived from the core:Msg_ResponseBaseType abstract base message type. See the [SCTE130-2] document for details on the attributes and elements contained in this base message.

10.4 Notification Base Message

All CIS top level **notification** messages are derived from the core:Msg_NotificationBaseType abstract base message type. See the [SCTE130-2] document for details on the attributes and elements contained in this base message.

10.5 Acknowledgement Base Message

All CIS top level **acknowledgement** messages are derived from the core:Msg_AcknowledgementBaseType abstract base message type. See the [SCTE130-2] document for details on the attributes and elements contained in this base message.

10.6 Messages Requiring Content Notification Registration

Registration is required for ContentNotification, ContentNotificationDeregisterRequest and DeregistrationNotification message exchanges. All other CIS messages do not require registration and may be sent at any time.

10.7 Default Logical Service Channel Endpoint

At a minimum, the CIS shall support the receipt of the ListSupportedFeaturesRequest message on the default (well known) logical service channel endpoint address for the CIS. Other CIS messages may also be offered on the default (well known) logical service channel endpoint or may be optionally offered on additional logical service channel endpoints. In order to discover all CIS provided logical service channel endpoints, clients must complete a ListSupportedFeatures transaction with the CIS.

See Section 10.9.2 for additional information on the ListSupportedFeaturesResponse message.

See [SCTE130-2] for a complete description of the terms (message, endpoint and logical service channel).

10.8 CIS Message Exchange

The following diagram illustrates a typical message exchange between a CIS client and the CIS.

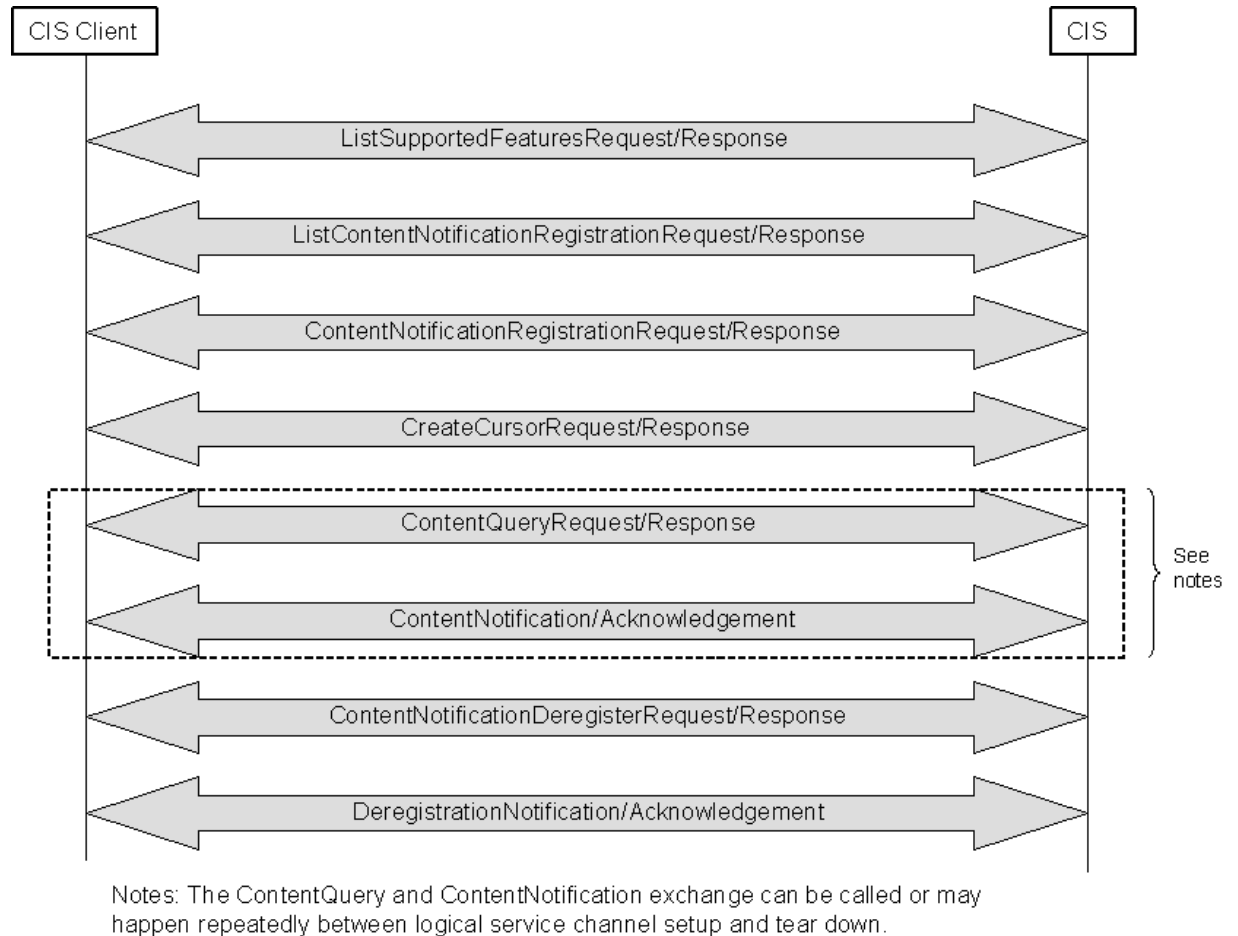


Figure 2 - CIS Message Exchange

Figure 2 illustrates all of the message exchanges that are specific to the CIS. The ServiceCheck and ServiceStatus message exchanges are not depicted in this illustration.

10.9 List Supported Features Request and Response

The ListSupportedFeatures request and response messages allow clients to inquire about CIS supported data models and advanced query languages.

10.9.1 ListSupportedFeaturesRequest Message

The ListSupportedFeatures request message allows a CIS client to inquire about the data models and advanced query languages supported by a CIS. Advanced query language support is optional and thus, the response message may or may not contain information regarding advanced query languages.

The XML schema definition for this message is illustrated in Figure 3 - ListSupportedFeaturesRequest–XML Schema.

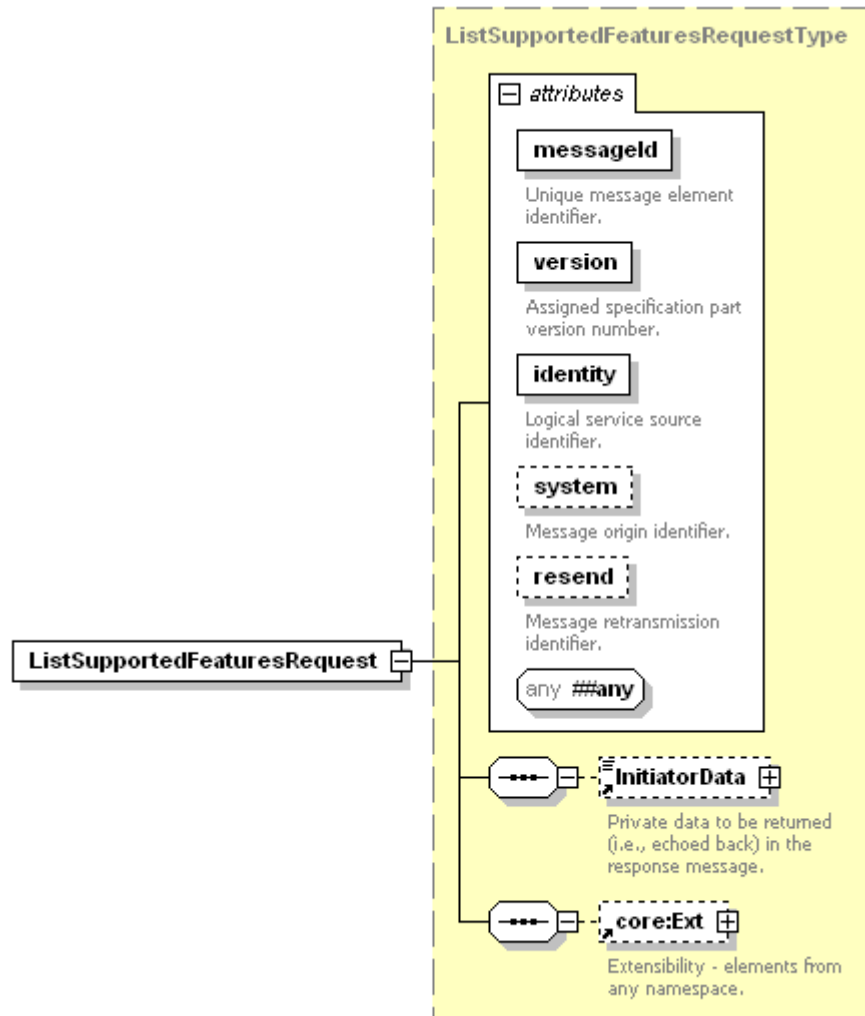


Figure 3 - ListSupportedFeaturesRequest–XML Schema

The ListSupportedFeaturesRequest message defines the following attributes and elements.

@messageId [Required, core:messageIdAttrType] - The message identifier.
See [SCTE130-2] for additional information.

@version [Required, core:versionAttrType] - The message specification version. See [SCTE130-2] for additional information.

@identity [Required, core:identityAttrType] - The origin logical service identifier. See [SCTE130-2] for additional information.

@system [Optional, core:systemAttrType] - The message source identifier. See [SCTE130-2] for additional information.

@resend [Optional, core:resendAttrType] – Message retransmission identifier. See [SCTE130-2] for additional information.

@##any [Optional] - Any additional attributes from any namespace.

core:InitiatorData [Optional] – Private data that shall be returned in the ListSupportedFeaturesResponse message. See [SCTE130-2] for additional details on the core:InitiatorData element.

core:Ext [Optional] – Any additional elements from other namespaces.

10.9.2 ListSupportedFeaturesResponse Message

A successful ListSupportedFeaturesResponse message shall contain, at a minimum, a single core:Callout element containing one or more core:Address element(s). See [SCTE130-2] for additional information on the core:Callout element.

The XML schema definition for this message is illustrated in Figure 4.

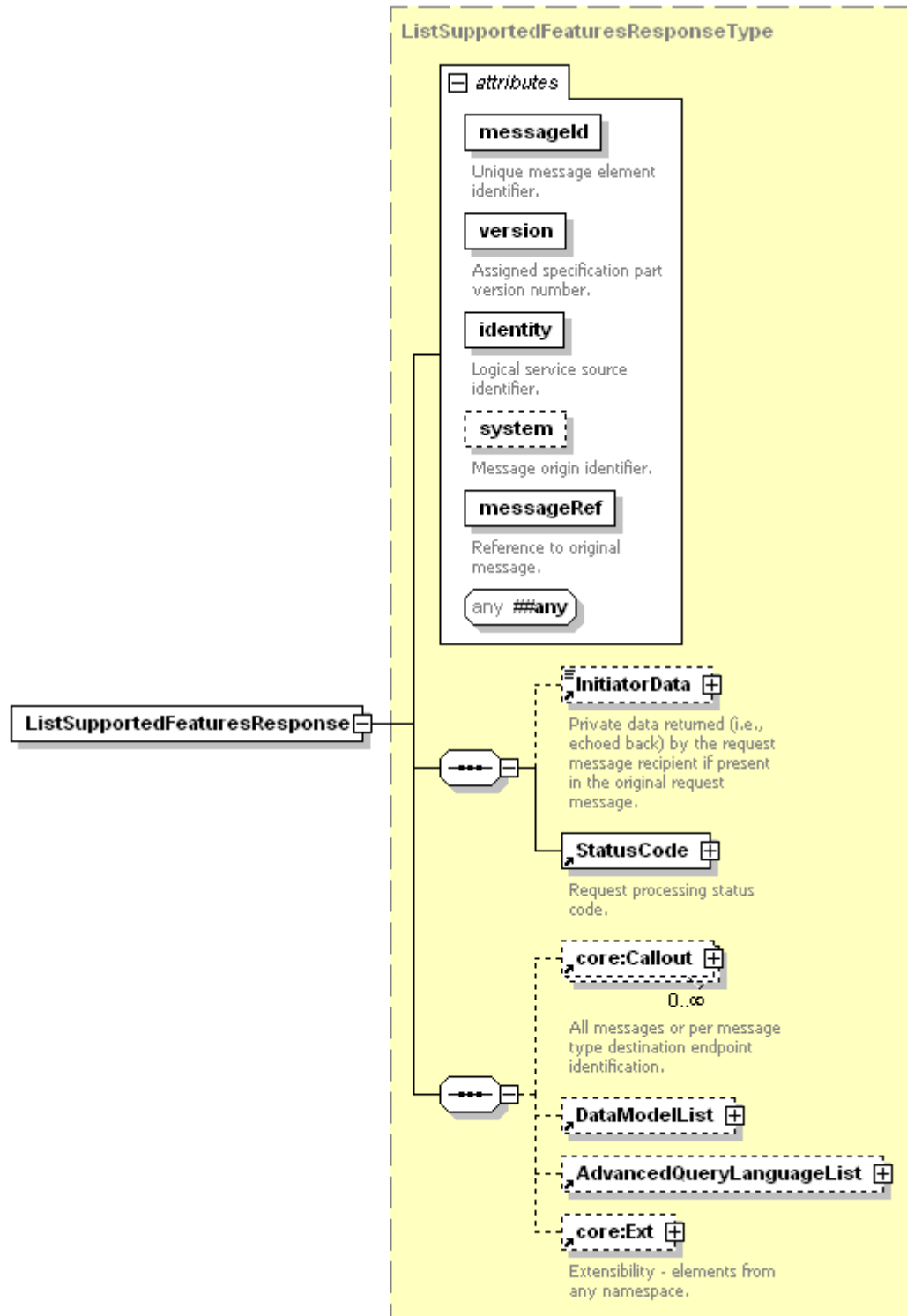


Figure 4 - ListSupportedFeaturesResponse–XML Schema

The ListSupportedFeaturesResponse message is derived from the core namespace base type core:Msg_ResponseBaseType and defines the following attributes and elements.

@messageId [Required, core:messageIdAttrType] - The message identifier. See [SCTE130-2] for additional information.

@version [Required, core:versionAttrType] - The message specification version. See [SCTE130-2] for additional information.

@identity [Required, core:identityAttrType] - The origin logical service identifier. See [SCTE130-2] for additional information.

@system [Optional, core:systemAttrType] - The message source identifier. See [SCTE130-2] for additional information.

@messageRef [Required, core:messageRefAttrType] - A reference to the ListSupportedFeaturesRequest message element initiating this message exchange. The value shall be the ListSupportedFeaturesRequest message's @messageId attribute value. See [SCTE130-2] for additional information on the core:messageRefAttrType.

@##any [Optional] – Any additional attributes.

core:InitiatorData [Optional] – Private data from the ListSupportedFeaturesRequest message. See [SCTE130-2] for additional details on the core:InitiatorData element.

core:StatusCode [Required] - An core:StatusCode element for communicating status information to the client. See [SCTE130-2] for additional information.

core:Callout [Optional] – Zero or more core:Callout elements specifying the service channel message endpoint(s). See [SCTE130-2] for additional information on core:Callout. Table 3 contains the values for the @message attribute of the core:Callout element. Values for the @message attribute should be used exactly as defined in this table.)

Value	Description
ContentNotificationRegistrationRequest	Destination endpoint for message.
ContentNotificationDeregisterRequest	Destination endpoint for message.
ListContentNotificationRegistrationRequest	Destination endpoint for message.
CreateCursorRequest	Destination endpoint for message.
CancelCursorRequest	Destination endpoint for message.
ContentQueryRequest	Destination endpoint for message.
ServiceStatusNotification	Destination endpoint for message.

Table 3: ListSupportedFeatures core:Callout @message values

DataModelList [Optional] – The DataModelList element contains a sequence of core:ContentDataModel elements indicating the data models supported by

this CIS. See the [SCTE130-2] documentation for a list of the supported data models. See Section 11.12 for additional information on the DataModelList element.

AdvancedQueryLanguageList [Optional] –The AdvancedQueryLanguageList element contains a list of the advanced query languages supported by the CIS. See Table 7 for a list of advanced query processing languages for CIS implementations that support advanced query language capabilities. See Section 11.13 for additional information on the AdvancedQueryLanguageList element.

core:Ext [Optional] –Any additional elements from other namespaces.

10.10 List Content Notification Registration Request and Response

A CIS client may inquire about current registrations by using the ListContentNotificationRegistrationRequest message. The CIS shall respond to the ListContentNotificationRegistrationRequest message with a ListContentNotificationRegistrationResponse message. This allows a CIS client to discover the active notification queries that were previously installed by one or more ContentNotificationRegistrationRequest messages.

10.10.1 ListContentNotificationRegistrationRequest Message

The ListContentNotificationRegistrationRequest message may be issued to a CIS to retrieve information about active ContentNotificationRegistrationRequest messages.

The XML schema definition for this message is illustrated in Figure 5.

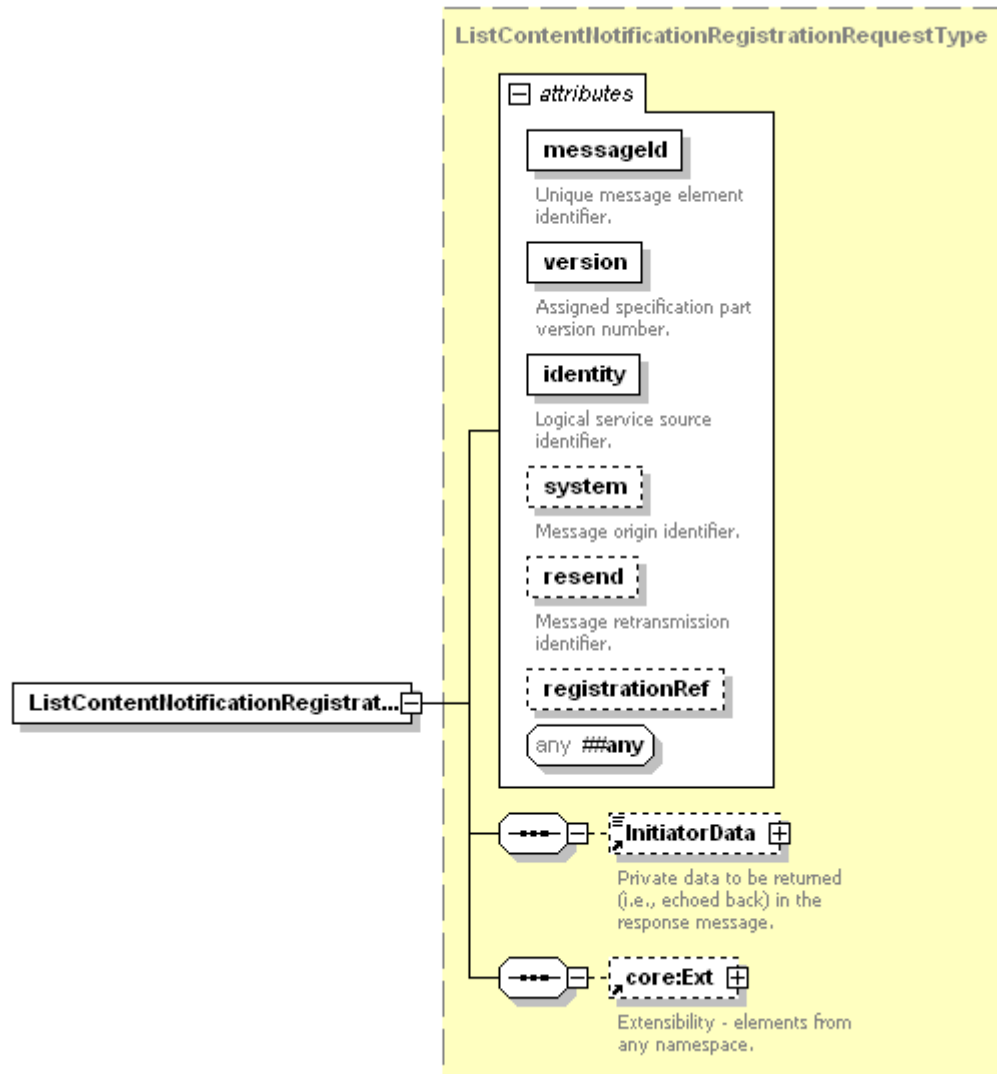


Figure 5 - ListContentNotificationRegistrationRequest XML Schema

The ListContentNotificationRegistrationRequest message is derived from the core namespace base type core:Msg_RequestBaseType and defines the following attributes and elements.

@messageId [Required, core:messageIdAttrType] - The message identifier. See [SCTE130-2] for additional information.

@version [Required, core:versionAttrType] - The message specification version. See [SCTE130-2] for additional information.

@identity [Required, core:identityAttrType] - The origin logical service identifier. See [SCTE130-2] for additional information.

@system [Optional, core:systemAttrType] - The message source identifier. See [SCTE130-2] for additional information.

@resend [Optional, core:resendAttrType] – Message retransmission identifier. See [SCTE130-2] for additional information.

@registrationRef [Optional, core:registrationRefAttrType] – A reference to an original ContentNotificationRegistrationRequest message. This attribute instructs the CIS to only list the ContentNotificationRegistrationRequest message identified by this reference. The value shall always be the ContentNotificationRegistrationRequest message's @messageId attribute value, which in a retransmitted registration message, shall be the @resend attribute's value.

@##any [Optional] – Any additional attributes from any namespace.

core:InitiatorData [Optional] – Private data that shall be returned in the ListContentNotificationRegistrationResponse message. See [SCTE130-2] for additional details on the core:InitiatorData element.

core:Ext [Optional] – Any additional elements from other namespaces.

10.10.2 ListContentNotificationRegistrationResponse Message

The ListContentNotificationRegistrationResponse message is the response pair to the previously defined ListContentNotificationRegistrationRequest message.

The XML schema definition for this message is illustrated in Figure 6.

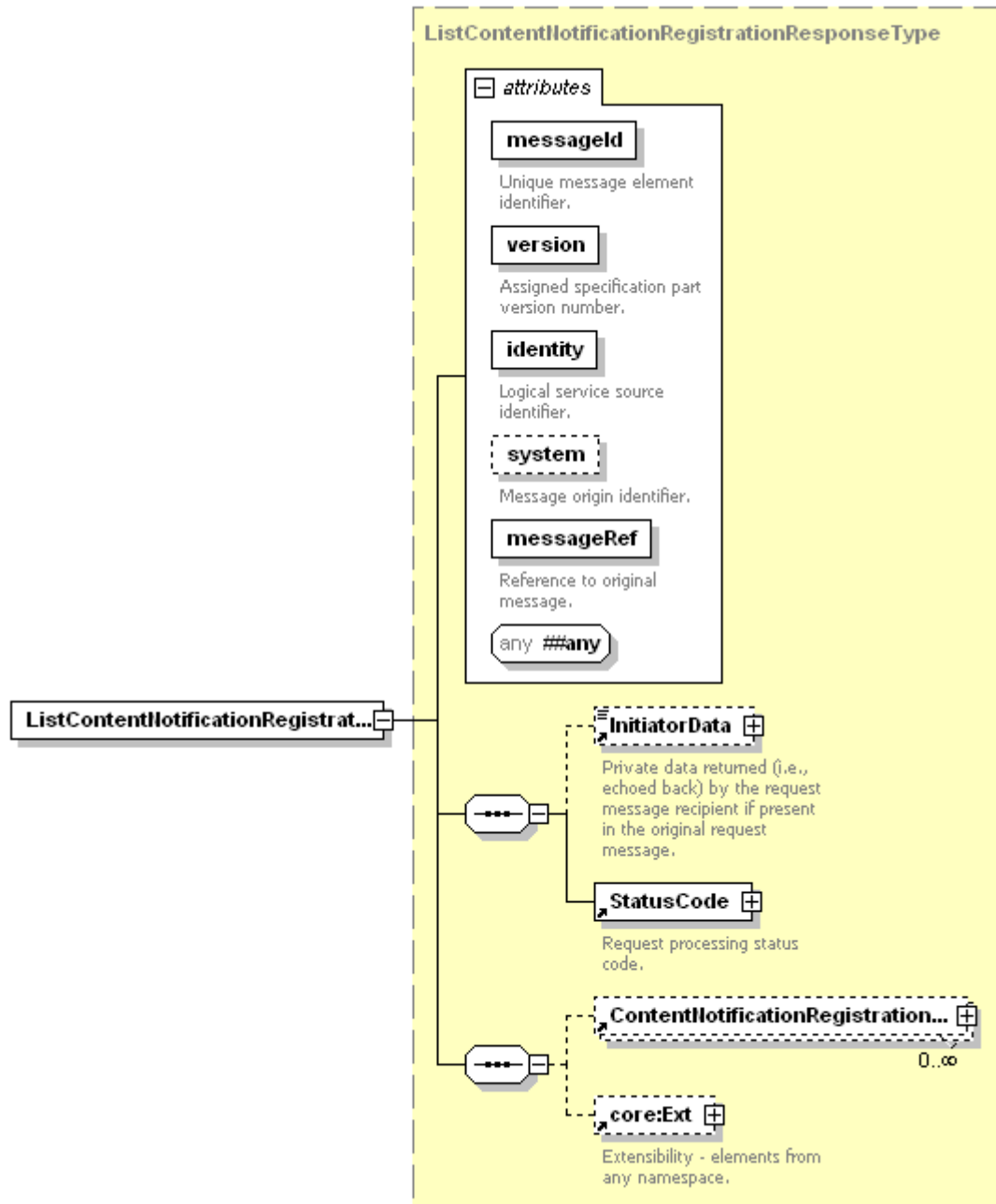


Figure 6 - ListContentNotificationRegistrationResponse XML Schema

The ListContentNotificationRegistrationResponse message is derived from the core namespace base type core:Msg_ResponseBaseType and defines the following attributes and elements.

@messageId [Required, core:messageIdAttrType] - The message identifier. See [SCTE130-2] for additional information.

@version [Required, core:versionAttrType] - The message specification version. See [SCTE130-2] for additional information.

@identity [Required, core:identityAttrType] - The origin logical service identifier. See [SCTE130-2] for additional information.

@system [Optional, core:systemAttrType] - The message source identifier. See [SCTE130-2] for additional information.

@messageRef [Required, core:messageRefAttrType] - A reference to the ListContentNotificationRegistrationRequest message element initiating this message exchange. The value shall be the ListContentNotificationRegistrationRequest message's @messageId attribute value. See [SCTE130-2] for additional information on the core:messageRefAttrType.

@##any [Optional] – Any additional attributes from any namespace.

core:InitiatorData [Optional] – Private data from the ListContentNotificationRegistrationRequest message. See [SCTE130-2] for additional details on the core:InitiatorData element.

core:StatusCode [Required] – An core:StatusCode element for communicating status information to the client. See [SCTE130-2] for additional information.

ContentNotificationRegistrationRequest [Optional] – Zero or more ContentNotificationRegistrationRequest message elements. The ContentNotificationRegistrationRequest element shall be a recorded copy of the accepted registration message. The message element order does not convey any information (e.g., element order does not reflect registration order). See Section 10.11.1 for additional information on the ContentNotificationRegistrationRequest message.

core:Ext [Optional] –Any additional elements from other namespaces.

10.11 Content Notification Registration Request and Response

A CIS shall support registration for ContentNotification message delivery. The ContentNotificationRegistrationRequest message enables a client to specify notification interests relative to a selectively defined asset set. On receipt of an asset update, addition or deletion event from the underlying content store, the CIS shall send a ContentNotification message to each matching registered client.

10.11.1 ContentNotificationRegistrationRequest Message

The ContentNotificationRegistrationRequest message allows a client to specify a set of asset related notification interests. These registered interests shall be examined by the CIS relative to content store changes. If a change to the content store results in a match, a notification containing the result of the matching query shall be sent to the client in the form of a ContentNotification message.

The XML schema representation of the ContentNotificationRegistrationRequest message is illustrated in Figure 7 - ContentNotificationRegistrationRequest–XML Schema.

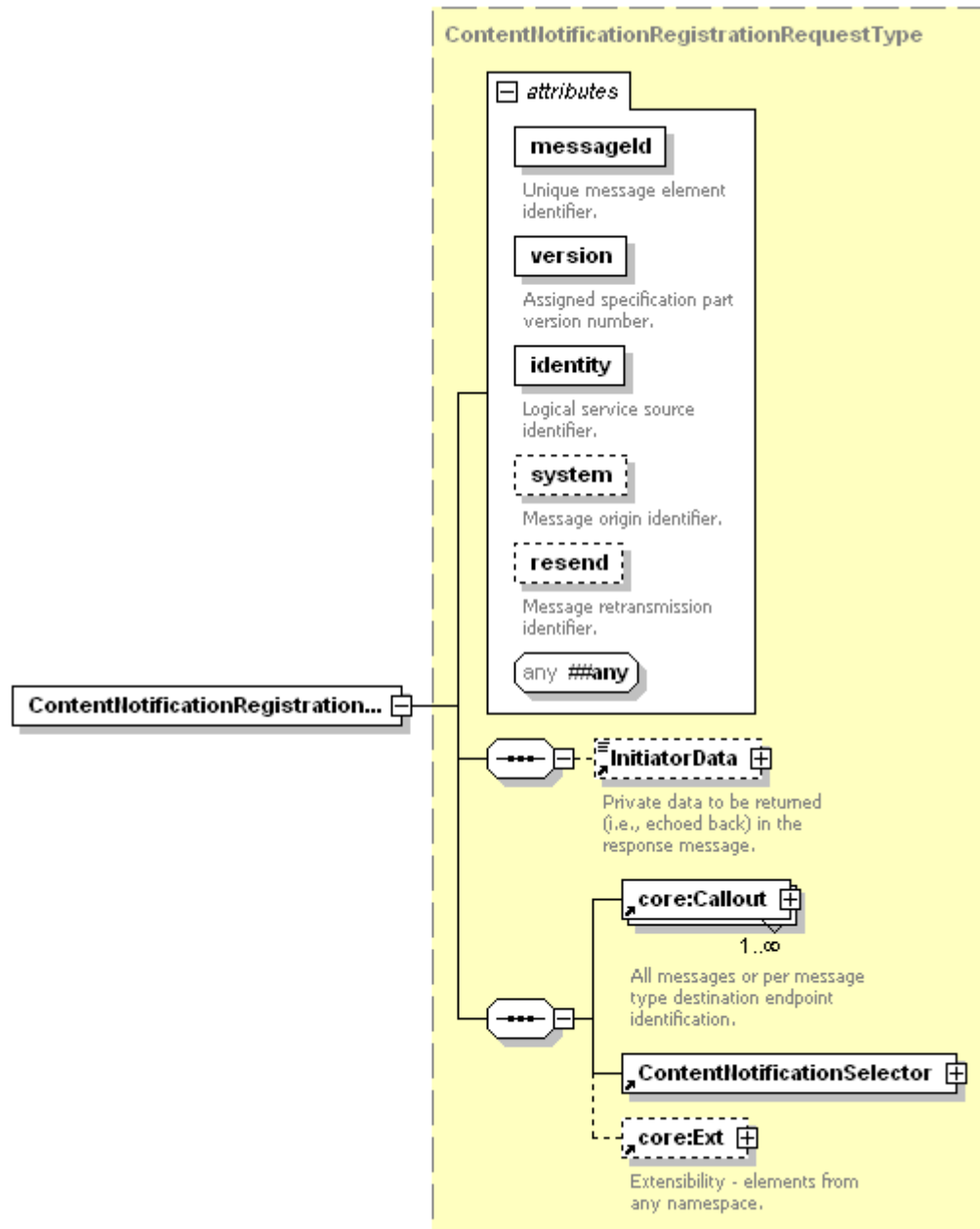


Figure 7 - ContentNotificationRegistrationRequest-XML Schema

The ContentNotificationRegistrationRequest message is derived from the core namespace base type core:Msg_RequestBaseType and defines the following attributes and elements.

@messageId [Required, core:messageIdAttrType] - The message identifier. See [SCTE130-2] for additional information.

@version [Required, core:versionAttrType] - The message specification version. See [SCTE130-2] for additional information.

@identity [Required, core:identityAttrType] - The origin logical service identifier. See [SCTE130-2] for additional information.

@system [Optional, core:systemAttrType] - The message source identifier. See [SCTE130-2] for additional information.

@resend [Optional, core:resendAttrType] – Message retransmission identifier. See [SCTE130-2] for additional information.

@##any [Optional] – Any additional attributes from any namespace.

core:InitiatorData [Optional] – Private data that shall be returned in the ContentNotificationRegistrationResponse message. See [SCTE130-2] for additional details on the core:InitiatorData element.

core:Callout [Required] – The core:Callout element provides callback message and address information to the CIS. See [SCTE130-2] for a complete description of the Callout element.

Before generating a ContentNotificationRegistrationResponse, the CIS may send a core:ServiceCheckRequest message to a core:Address, in order to verify the validity of the callback endpoint. The CIS shall not fail the registration for a core:ServiceCheck message failure provided at least one Address of each Callout is reachable.

A CIS implementation shall recognize the values listed in Table 4 as values for the core:Callout @message attribute.

@message value	Description
ContentNotification	Value associated with the address endpoint where ContentNotification messages shall be sent.
ServiceStatusNotification	Value associated with the address endpoint where ServiceStatusNotification messages shall be sent.
DeregistrationNotification	Value associated with the address endpoint where DeregistrationNotification messages shall be sent.
...	User defined address endpoint outside of the scope of this specification. The string shall be prefixed with the text “private:”.

Table 4: ContentNotificationRegistrationResponse core:Callout @message values

If the @message attribute of the core:Callout element is blank, a CIS implementation shall send all unsolicited messages to the default endpoint supplied in the ContentNotificationRegistrationRequest from the client.

ContentNotificationSelector [Required] – The ContentNotificationSelector element contains all of the necessary elements required to specify a collection of asset interests for notification purposes. See Section 11.2 for additional details on the ContentNotificationSelector element.

core:Ext [Optional] – Any additional elements from other namespaces.

10.11.2 ContentNotificationRegistrationResponse Message

Upon completion of processing a ContentNotificationRegistrationRequest message, the CIS shall respond with a ContentNotificationRegistrationResponse message.

The XML schema diagram for the ContentNotificationRegistrationResponse message is as follows in Figure 8 - ContentNotificationRegistrationResponse

.