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Digital transmission of television signals

Digital Program Insertion–Advertising Systems Interfaces: Part 4 – Content Information Service (CIS)

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Recommendation ITU-T J.380.4 (ex J.dpi-asi-4)

Digital Program Insertion–Advertising Systems Interfaces: Part 4 – Content Information Service (CIS)

Summary

ITU-T J.380.4 describes the Digital Program Insertion Advertising Systems Interfaces' Content Information Service (CIS) messaging and data type specification using XML, XML Namespaces, and XML Schema.

Keywords

None

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Digital Program Insertion–Advertising Systems Interfaces: Part 4 – Content Information Service (CIS)

Introduction

A Content Information Service (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.

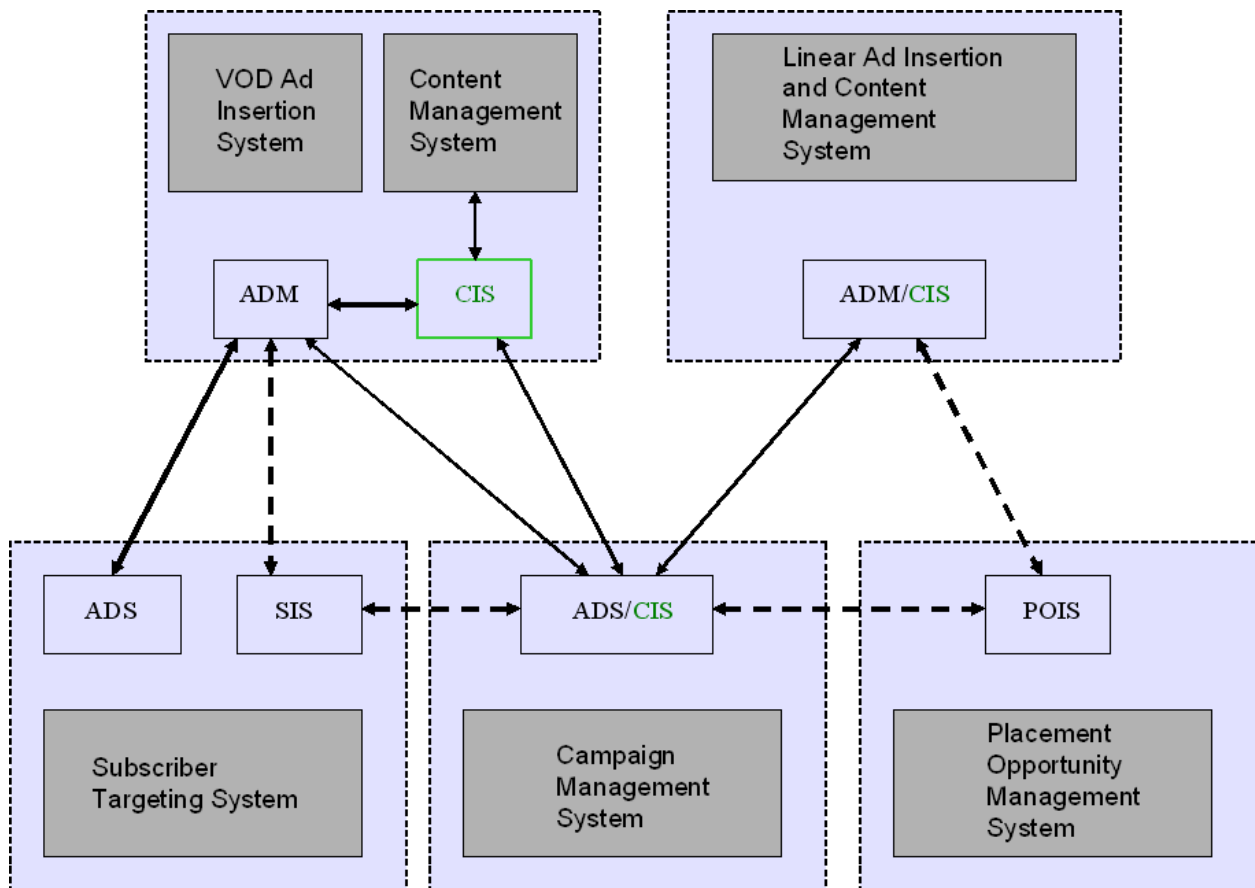


Figure 1 – CIS System Overview

Figure 1 provides examples of several possible CIS implementations with respect to the J.380 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 clauses 7.8 and 7.11 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 clause 7.14 for additional information on advanced query language support and clause 7.1 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 clause 7.4 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.

ITU-T J.380.4 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] informative reference from [ITU-T J.380.2].

1 Scope

ITU-T J.380.4 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 References

The following ITU-T Recommendations and other references contain provisions, which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[ITU-T J.380.2]	ITU-T J.380.2 (2011), <i>Digital Program Insertion—Advertising Systems Interfaces Part 2 – Core Data Elements</i> .
[ITU-T J.380.7]	ITU-T J.380.7 (2011), <i>Digital Program Insertion – Advertising Systems Interfaces Part 7 – Message Transport</i> .
[SCTE118-3]	ANSI/SCTE 118-3 (2006), <i>Program-Specific Ad Insertion – Traffic System to Ad Insertion System File Format Specification</i> .
[W3C XPath]	W3C Recommendation XPath Version 1.0 (1999), <i>XML Path Language (XPath)</i> .
[W3C Xquery]	W3C Recommendation XQuery Version 1.0 (2007), <i>An XML Query Language (XQuery)</i> .
[SCTE 130-4 Schema]	SCTE 130-4 Schema file.
[SCTE 130-4 CIS WSDL]	SCTE 130-4 Content Information Service (CIS) Web Services Description Language file.

3 Definitions

All J.380.2 definitions are included herein. See [ITU-T J.380.2] 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.

3.1 Terms defined elsewhere

None.

3.2 Terms defined in this Recommendation

None.

4 Abbreviations and acronyms

In addition to all [ITU-T J.380.2] abbreviations, this Recommendation uses the following abbreviations and acronyms:

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

5 Conventions

5.1 Normative XML Schema

See [ITU-T J.380.2] for information.

5.2 Document Conventions

This specification utilizes the same document conventions as J.DP-ASI Part 2. See [ITU-T J.380.2] for conventions and XML schema illustration nomenclature explanations.

5.3 Processing Conventions

Unknown/Unrecognized/Unsupported XML Elements and Attributes. See [ITU-T J.380.2] for information.

5.4 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.

Table 1 - XML Namespace Declarations

Prefix	Namespace	Description
core	http://www.scte.org/schemas/130-2/2008a/core	See [ITU-T J.380.2]
cis	http://www.scte.org/schemas/130-4/2008a/cis	ITU-T J.380.4
xsd	http://www.w3.org/2001/XMLSchema	See [XMLSchemaP1] and [XMLSchemaP2] from [ITU-T J.380.2]

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>.

6 CIS MESSAGES

The following topics are covered by [ITU-T J.380.2] and this specification considers all aspects defined therein to be normative and applicable herein. See [ITU-T J.380.2] for additional information.

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

The CIS message interface shall include the messages defined in [ITU-T J.380.2]. Table 2 identifies additional ITU-T J.380.4 CIS specific messages.

Table 2 - CIS Top Level 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

6.1 @version Attribute

For all ITU-T J.380.4 messages specified in Table 2, the J.380.2 @version attribute shall be set to the value "1.1" for this document's revision.

6.2 Request Base Message

All CIS top level **request** messages are derived from the core:Msg_RequestBaseType abstract base message type. See the [ITU-T J.380.2] document for details on the attributes and elements contained in this base message.

6.3 Response Base Message

All CIS top level **response** messages are derived from the core:Msg_ResponseBaseType abstract base message type. See the [ITU-T J.380.2] document for details on the attributes and elements contained in this base message.

6.4 Notification Base Message

All CIS top level **notification** messages are derived from the core:Msg_NotificationBaseType abstract base message type. See the [ITU-T J.380.2] document for details on the attributes and elements contained in this base message.

6.5 Acknowledgement Base Message

All CIS top level **acknowledgement** messages are derived from the core:Msg_AcknowledgementBaseType abstract base message type. See the [ITU-T J.380.2] document for details on the attributes and elements contained in this base message.

6.6 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.

6.7 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 clause 6.9.2 for additional information on the ListSupportedFeaturesResponse message.

See [ITU-T J.380.2] for a complete description of the terms (message, endpoint and logical service channel).

6.8 CIS Message Exchange

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

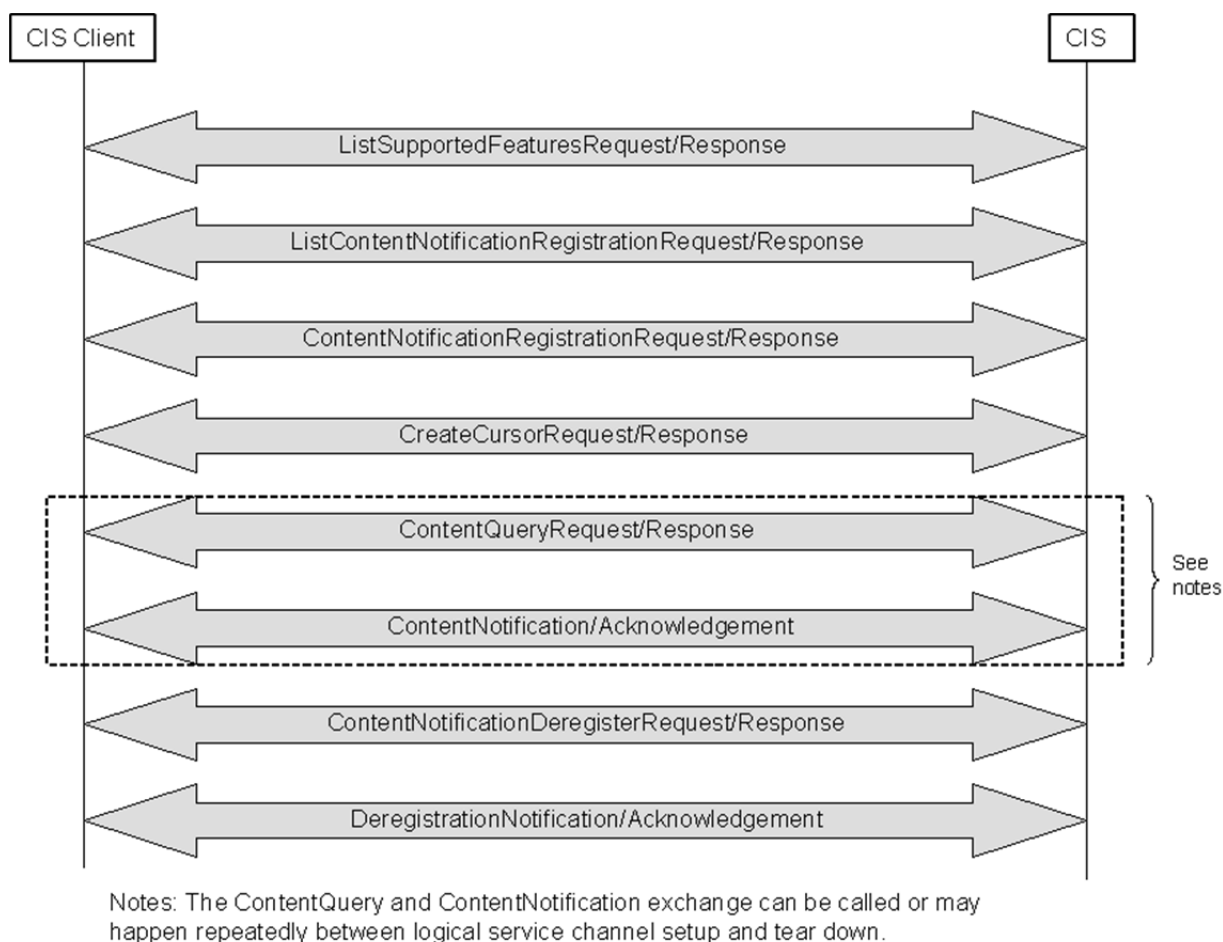


Figure 2 - CIS Message Exchange

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.

6.9 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.

6.9.1 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.

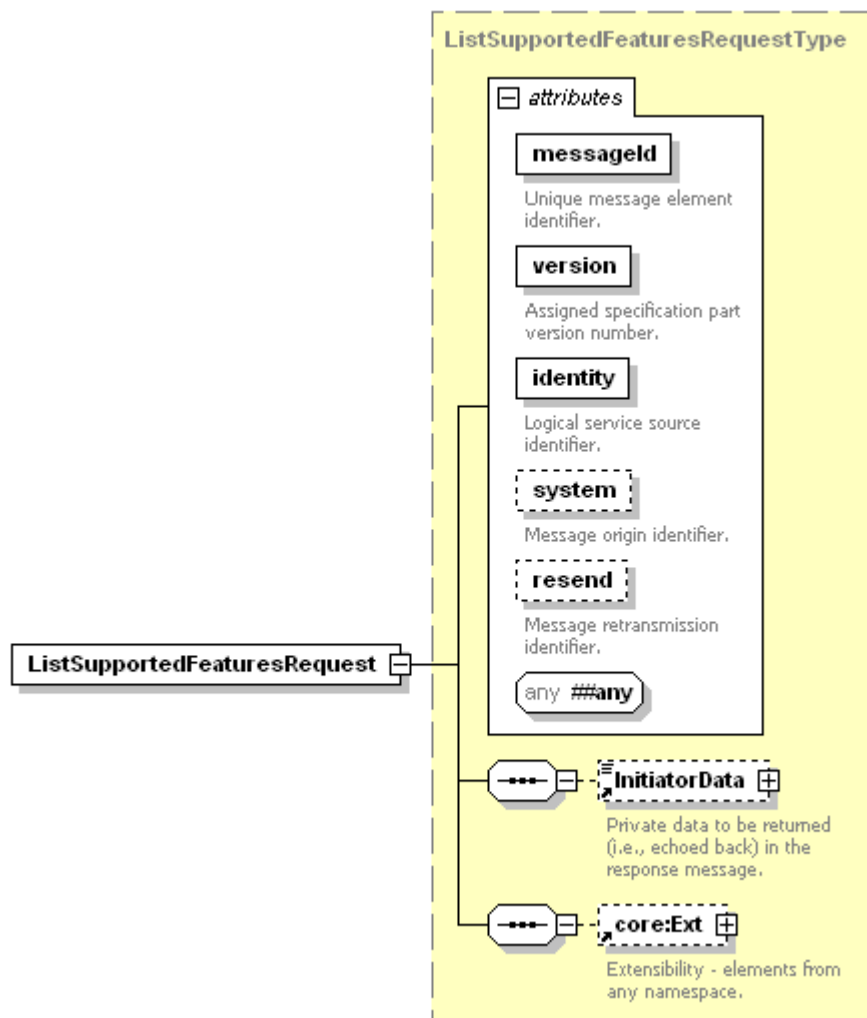


Figure 3 - ListSupportedFeaturesRequest XML Schema

The ListSupportedFeaturesRequest message defines the following attributes and elements.

@messageId [Required, core:messageIdAttrType] - The message identifier. See [ITU-T J.380.2] for additional information.

@version [Required, core:versionAttrType] - The message specification version. See [ITU-T J.380.2] for additional information.

@identity [Required, core:identityAttrType] - The origin logical service identifier. See [ITU-T J.380.2] for additional information.

@system [Optional, core:systemAttrType] - The message source identifier. See [ITU-T J.380.2] for additional information.

@resend [Optional, core:resendAttrType] – Message retransmission identifier. See [ITU-T J.380.2] 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 [ITU-T J.380.2] for additional details on the core:InitiatorData element.

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

6.9.2 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 [ITU-T J.380.2] for additional information on the core:Callout element.

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

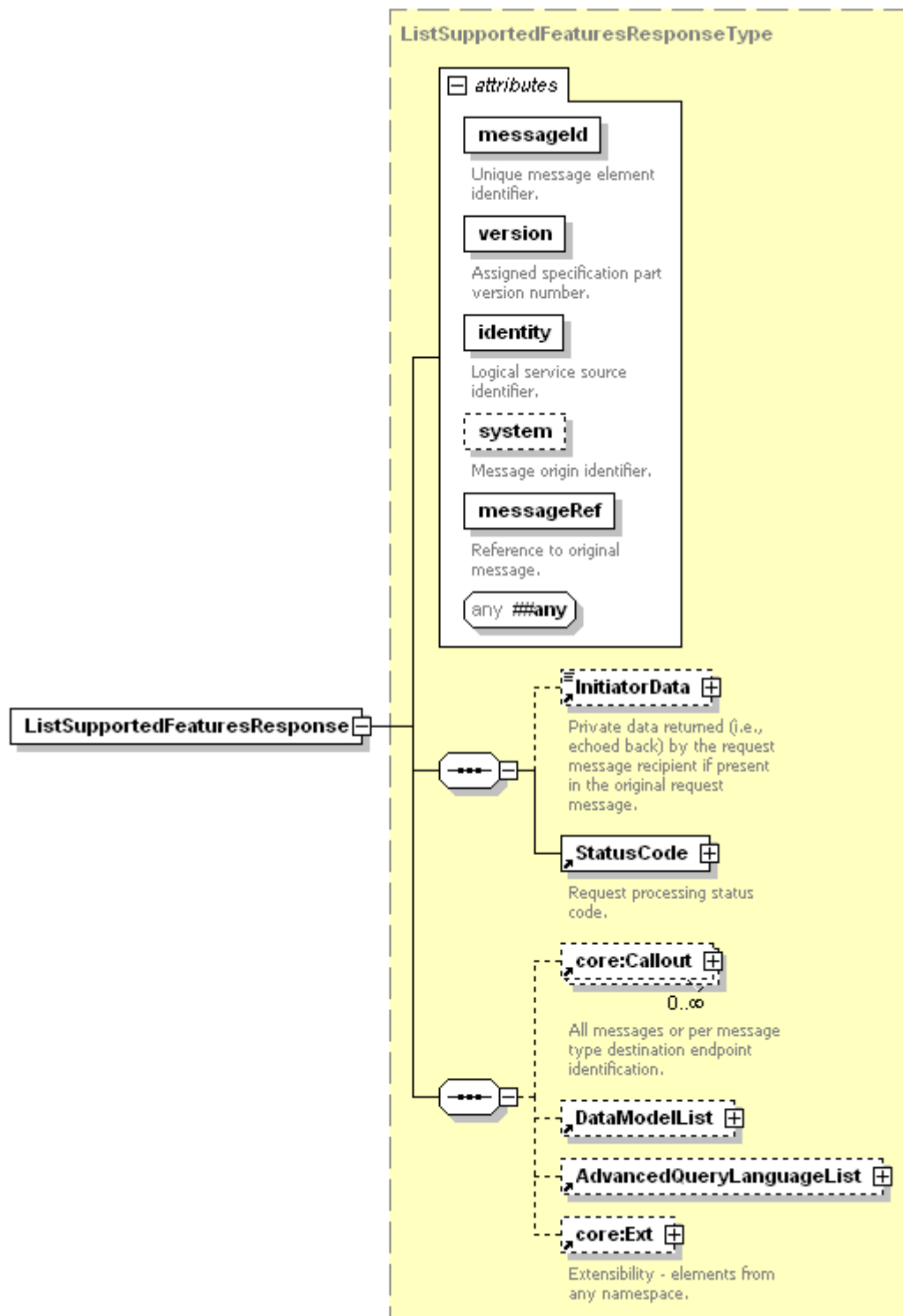


Figure 4 - ListSupportedFeaturesResponse XML Schema

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 [ITU-T J.380.2] for additional information.

@version [Required, core:versionAttrType] - The message specification version. See [ITU-T J.380.2] for additional information.

@identity [Required, core:identityAttrType] - The origin logical service identifier. See [ITU-T J.380.2] for additional information.

@system [Optional, core:systemAttrType] - The message source identifier. See [ITU-T J.380.2] 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 [ITU-T J.380.2] for additional information on the core:messageRefAttrType.

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

core:InitiatorData [Optional] – Private data from the ListSupportedFeaturesRequest message. See [ITU-T J.380.2] for additional details on the core:InitiatorData element.

core:StatusCode [Required] - An core:StatusCode element for communicating status information to the client. See [ITU-T J.380.2] for additional information.

core:Callout [Optional] – Zero or more core:Callout elements specifying the service channel message endpoint(s). See [ITU-T J.380.2] 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.

Table 3 - ListSupportedFeatures core:Callout @message values

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.

DataModelList [Optional] – The DataModelList element contains a sequence of core:ContentDataModel elements indicating the data models supported by this CIS. See the [ITU-T J.380.2] documentation for a list of the supported data models. See clause 7.12 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 clause 7.13 for additional information on the AdvancedQueryLanguageList element.

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

6.10 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.

6.10.1 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.

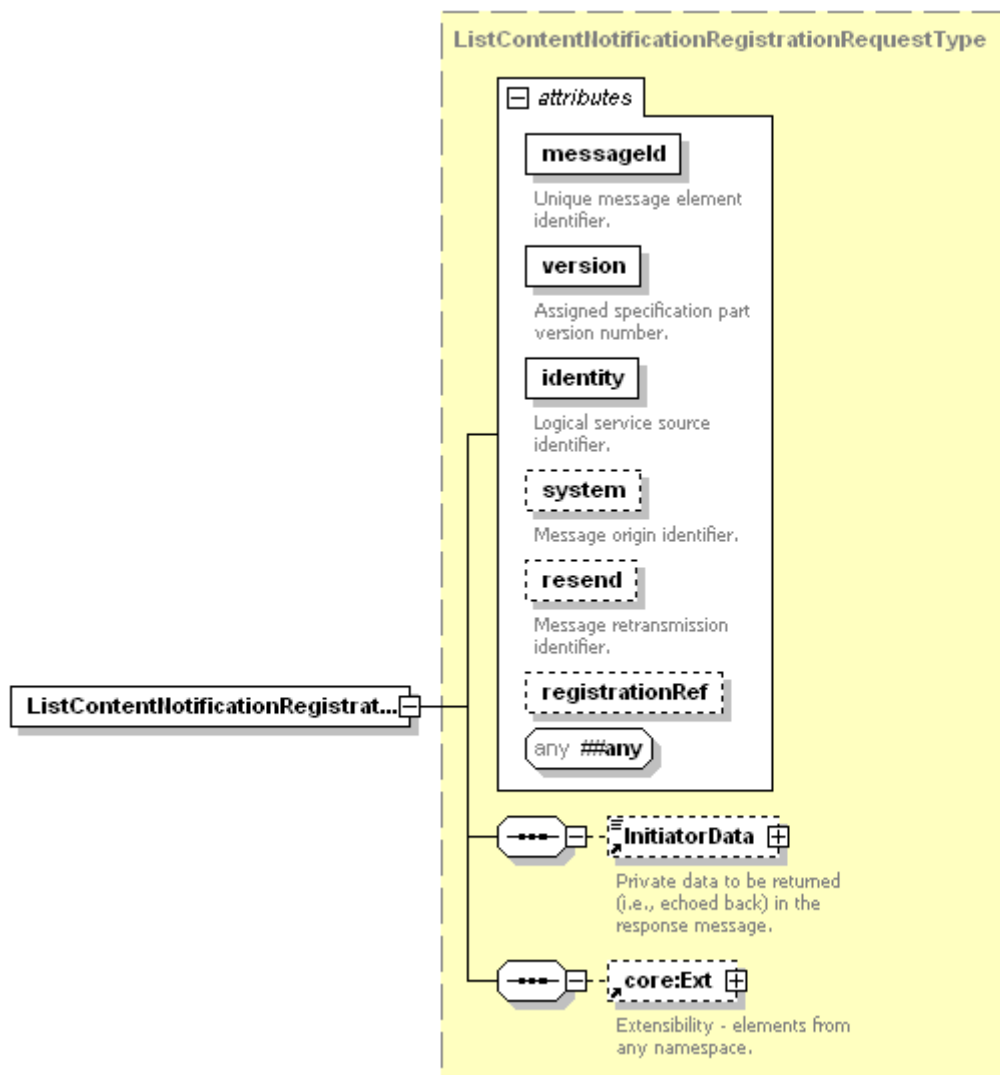


Figure 5 - ListContentNotificationRegistrationRequest XML Schema

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 [ITU-T J.380.2] for additional information.

@version [Required, core:versionAttrType] - The message specification version. See [ITU-T J.380.2] for additional information.

@identity [Required, core:identityAttrType] - The origin logical service identifier. See [ITU-T J.380.2] for additional information.

@system [Optional, core:systemAttrType] - The message source identifier. See [ITU-T J.380.2] for additional information.

@resend [Optional, core:resendAttrType] – Message retransmission identifier. See [ITU-T J.380.2] 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 [ITU-T J.380.2] for additional details on the core:InitiatorData element.

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

6.10.2 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.

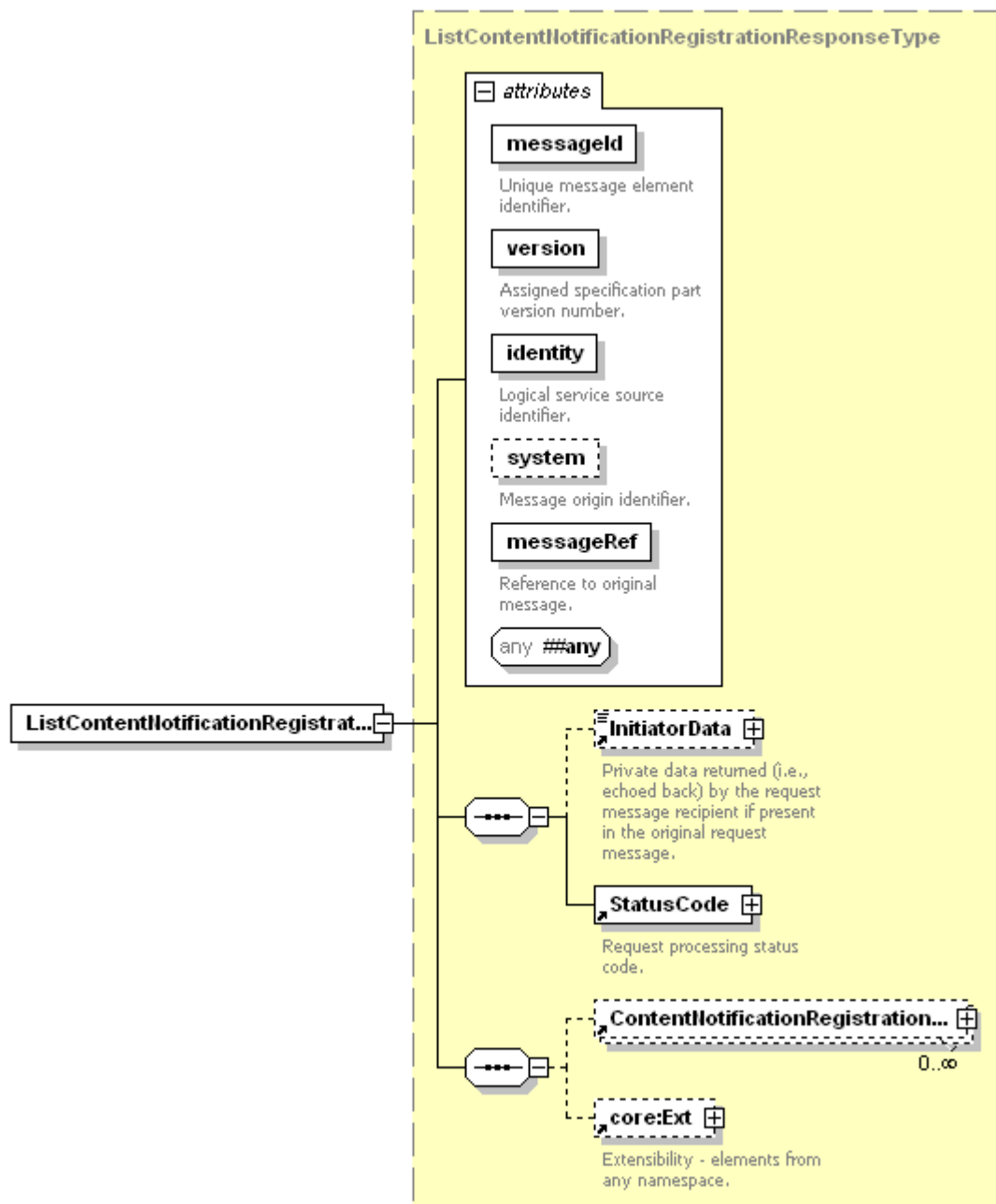


Figure 6 - ListContentNotificationRegistrationResponse XML Schema

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 [ITU-T J.380.2] for additional information.

@version [Required, core:versionAttrType] - The message specification version. See [ITU-T J.380.2] for additional information.

@identity [Required, core:identityAttrType] - The origin logical service identifier. See [ITU-T J.380.2] for additional information.

@system [Optional, core:systemAttrType] - The message source identifier. See [ITU-T J.380.2] 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 [ITU-T J.380.2] 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 [ITU-T J.380.2] for additional details on the core:InitiatorData element.

core:StatusCode [Required] – An core:StatusCode element for communicating status information to the client. See [ITU-T J.380.2] 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 clause 6.11.1 for additional information on the ContentNotificationRegistrationRequest message.

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

6.11 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.

6.11.1 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.

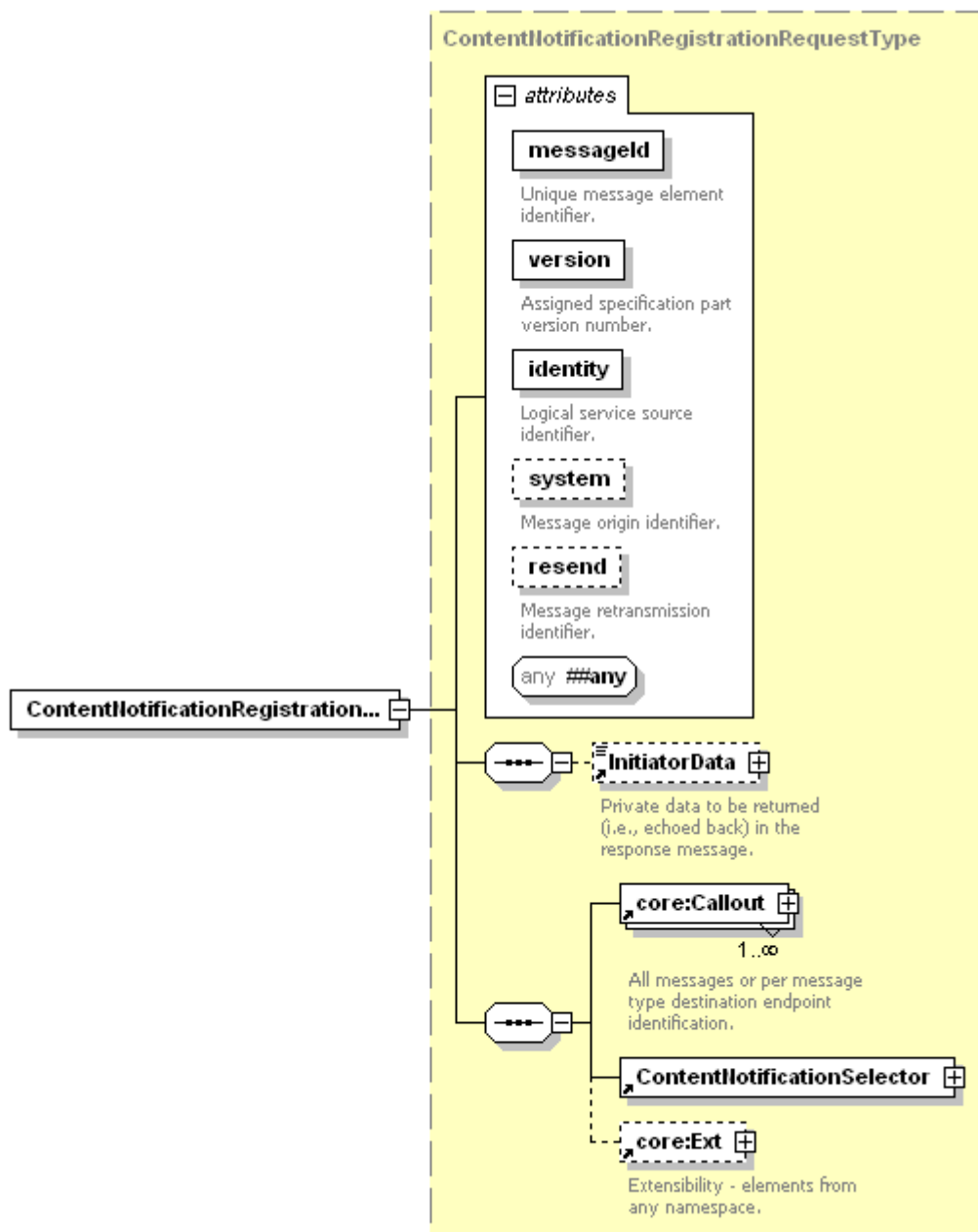


Figure 7 - ContentNotificationRegistrationRequest XML Schema

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 [ITU-T J.380.2] for additional information.

@version [Required, core:versionAttrType] - The message specification version. See [ITU-T J.380.2] for additional information.

@identity [Required, core:identityAttrType] - The origin logical service identifier. See [ITU-T J.380.2] for additional information.

@system [Optional, core:systemAttrType] - The message source identifier. See [ITU-T J.380.2] for additional information.

@resend [Optional, core:resendAttrType] – Message retransmission identifier. See [ITU-T J.380.2] for additional information.

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