

## CDX E2E (clinic to clinic): CDA Level 1 with Multiple Attachments

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### Document Versioning

Version	Date	Author	Comment
0.1	2018-01	IH HIE Team	validated test results in CDX E2E
1.0	2018-11	IH HIE Team	Released (Reviewed by Technical Working Group)
1.1	2019-10-01	IH HIE Team	Updates
1.2	2020-05-27	Troy Clark	Added clarification and updated examples to use B64 SHA-1 integrityCheck hash
1.3	2020-06-03	Natalie Schweizer	Updated message total size limit from 3mb to 50mb, per new CDX release. Clarifications around primary document.

### Background

A sending EMR (primary care physician) may have a requirement to send multiple attachments alongside a CDA level 1 document (common example is a Referral request note to a specialist). The attachments might be supplemental documents and images supporting additional patient medical background (eg: lab reports, forms, consents, images, etc.) that the receiving specialist/clinic requires. In CDX, currently only one attachment may be referenced in a CDA level 1 document and this attachment is often one PDF that encapsulates all additional documents and images. If the sending EMR wishes to send separate attachments in one message, the design approach must be clarified.

### Overview

A CDA level 1 document can have a text body (the referral letter as an example) or a reference to one attachment that is found in the transport wrapper of the message. In either case this is considered to be the primary document. When sending multiple attachments using a CDA level 1 document, the sending and receiving EMR must understand that there could be multiple attachment elements placed in the transport wrapper that may not be directly referenced by the unstructured body in the CDA document. In order to facilitate the exchange of multiple attachments, the sending and receiving EMR need to understand their respective responsibilities as defined below.

## Sending EMR – Responsibility

1. In the CDX Transport Wrapper the sending EMR SHALL Base64 encode and place each attachment in an `attachmentText` element. This can occur regardless of the MIME type indicated in the CDA body.
2. In the CDA document, the unstructured body element (`ClinicalDocument/NonXMLBody`) should consist of either narrative text body containing the primary document, or a reference to the primary document attachment. A list of supplemental attachments that are being sent should be included in the primary document’s narrative. Note that there is no coded links to the supplemental attachments in this narrative, only text describing the additional attachments that have been sent.

## Receiving EMR – Responsibility

1. When receiving a CDA level 1 document, check the CDX Transport Wrapper for ALL `attachmentText` elements. If the nonXMLBody contains a reference to an attachment find the primary document and present it as such, or store the text narrative from the nonXMLBody as the primary document. Present any supplementary attachments with the primary document. Although the additional attachments are not directly linked to the narrative text in the body, they are intended to support the original document.

## Attachments in the CDX Wrapper

Attachments are placed in the CDX transmission wrapper in an `<attachmentText/>` element. The wrapper when sending to CDX is the RCMR\_IN000002UV01 document, and when receiving from CDX, it is the RCMR\_IN000032UV01 document. Each attachment is given an `<attachmentText/>` element. There is no limit to how many attachments can be included, although there is a total message size limit of 50 MB. The attachments are placed in the wrapper between the `<acceptAckCode>` element and the `<receiver>` element.

An attachment element should have the following attributes: `mediaType`, and `integrityCheck`. The representation should always be set to “B64” (for Base-64 encoding), the representation `mediaType` should be set to the MIME type of the attachment (usually “application/pdf”), and the `integrityCheck` should be the Base64 encoded string representation of the attachment’s SHA-1 hash. The `attachmentText/integrityCheckAlgorithm` MAY be populated with a value of “SHA-1”, however if left blank, the default value is “SHA-1”. The Base64 encoded attachment goes into this element.

Here is an example of an `attachmentText` element in the wrapper:

```
<attachmentText representation="B64" mediaType="application/pdf"
integrityCheck="DnhPxTIJIZoTFJDZ9uhv2UcNwro=">0b9+HUIWBzoPa6OXZjaBJSSDBYM=">JVBERi0xLjUNCiW1tb
W1DQoxIDAgb...</attachmentText>
```

For multiple attachments, simply repeat this element with the information for each attachment.

## The Attachment Reference in The CDA

If the CDA has a reference to an attachment in the body, the body should be a single reference to the “primary” attachment. This reference should be a SHA-1 hash that matches the integrityCheck attribute of the primary attached document. The hash in the CDA must match the hash of one of the attachments in the wrapper. If there are multiple attachments, the hash will clarify which attachment is considered “primary”.

When the CDA Body Content is to be represented by an attachment: The CDA nonXMLBody/text element should have the following attributes: representation, mediaType, and integrityCheck.

The representation should always be set to “TXT” (for plain text, as the binary is contained in the wrapper).

The mediaType should be set to the MIME type of the attachment (usually “application/pdf”).

The integrityCheck should be the Base64 encoded string representation of the attachment’s SHA-1 hash.

The attachmentText/integrityCheckAlgorithm MAY be populated with a value of “SHA-1”, however if left blank, the default value is “SHA-1”.

In the nonXMLBody element, both the text’s integrityCheck and the reference value contain the hash:

```
<nonXMLBody classCode="DOCBODY">  
  <text mediaType="application/pdf"  
integrityCheck="DnhPxTIJIZoTFJDZ9uhv2UcNwro="0b9+HUIWBzoPa60XZjaBJSSDBYM="  
integrityCheckAlgorithm="SHA-1" representation="TXT">  
  <reference value="hash:DnhPxTIJIZoTFJDZ9uhv2UcNwro="0b9+HUIWBzoPa60XZjaBJSSDBYM=" />  
  </text>  
</nonXMLBody>
```

The reference is the attachment’s hash because there is no other ID for attachments in the CDX system.

## References:

CDX Implementation Guide - Transmission Messaging Wrapper

<https://bccdx.ca/Pages/docs.aspx>

The HL7 v3 transmission wrapper is common to all CDX interactions. The transmission wrapper allows zero to many attachments to be contained in the wrapper “attachmentText” elements. Each attachmentText element will contain one attachment.

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The CDX transmission wrapper MAY have zero or more “attachmentText” elements present representing a file attached to the message payload (for example, a CDA).