

# HUD HMIS XML OVERVIEW

v 4.0 - 2014 HMIS DATA STANDARDS



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## Introduction

The 2014 HMIS Data Standards ([HMIS Data Dictionary](#) and [HMIS Data Standards Manual](#)), were released jointly by the Department of Housing and Urban Development (HUD), the Department of Health and Human Services (HHS), and the Department of Veterans Affairs (VA) on May 1, 2014. The data elements defined by the 2014 Standards must be implemented by HMIS software providers and HMIS administrators by October 1, 2014.

The HUD HMIS eXtensible Markup Language (XML) Schema, version 4.0 is one format for transferring HMIS data collected under the 2014 HMIS Data Standards between systems. The main benefit of XML as a data exchange format is that systems sending and receiving data can independently and automatically validate data against the requirements defined in the XML schema. Another benefit of XML is that the schema can be extended to include additional custom data and validation without losing the ability to check the generated data for accuracy against this core HMIS XML Schema. This XML format can be used for data migrations between systems, or the data types defined within it could be individually referenced in custom (not officially HUD specified) web API methods.

The data elements that make up HMIS XML 4.0 are defined in the HMIS Data Dictionary and HMIS Data Standards Manual; relationships between the data elements defined in the Dictionary and Manual are further specified in the [2014 HMIS Logical Model](#).

HUD resources specifically related to HMIS data exchange are available on the [HMIS Data Exchange Resources](#) page of HUD's Homelessness Data Exchange (HDX) website.

## Audience for this Document

This technical document is intended for developers and project managers implementing software systems that need to transmit HUD HMIS project and client information over a network. Readers new to XML should first familiarize themselves with XML technology in general and the [Technology](#) section of this document before examining the [XML schema](#).

## Scope of the HMIS XML Schema

The scope of HMIS XML 4.0 is generally limited to information needed to facilitate data exchange and data elements defined by and collected in a manner consistent with the 2014 HMIS Data Standards.

In developing HMIS XML 4.0, HUD's priorities for data exchange include transmission of data sets for reporting, periodic bulk data uploads from a partner agency to an HMIS or data warehouse, and HMIS system migration. Consistent with these priorities, this schema requires complete data sets for each grouping of data (groups like Inventory, Project, Client, etc.). For example, the Funder class includes data required by data element 2.6 (Federal Partner Funding Sources). With the exception of *Grant Identifier*, all of the fields in data element 2.6 are required; as a result, HMIS XML 4.0 requires that if a Funder element is present, it must include all required fields.

In previous versions of the HMIS XML Schema (v3.1 and prior), most data elements were optional and the structure was more flexible. While this facilitated the use of the same schema in a wide variety of

use cases, it also resulted in inconsistencies between systems and some misunderstandings about the intent of the HMIS Data Standards, both of which complicated data exchange. HUD recognizes that there are a variety of circumstances in which an alternate data exchange schema or format may be beneficial; technical assistance may be available.

Specific requirements related to the functionality of HMIS applications in general and export and import processes in particular will be established by HUD in the forthcoming HMIS Software and Data Quality Standards and may result in revisions to the HMIS XML 4.0 schema and associated documentation.

### Components of this Document

This document has multiple parts, each is available in two places: the [HUD HDX link](#) above, and a [development website](#), where new versions are discussed and all changes are stored.

- This document includes:
  - A rationale for the schema, including an overview of the process in which it was developed and an explanation of the model.
  - A description of the steps involved beyond creation of a data standard, including development of communication protocols and documentation of responsibilities.
  - A brief discussion of the future path of HMIS XSD development.
- An XML Schema Definition (XSD) document: [HMIS XSD v4.0](#) contains inline documentation which correlates each schema element to an item in the HMIS Data Dictionary and Data Manual. Searching the HMIS XML Schema for the corresponding HMIS Data Dictionary data element numeral provides a cross-walk between technical schema and the HMIS Data Standards.
- A [sample, valid XML instance](#) with fictitious data.
- A [sample extension schema](#) of the HMIS XSD 4.0, illustrating how to add an additional data element.
- A [sample, valid XML instance document](#) for the extended schema.
- Online, browsable, [graphical documentation](#) for version 4.0

### Alternatives

HMIS implementations seeking an alternative format for HMIS client data transmission should see the HUD HMIS Comma-Separated Values (CSV) Format, version 4.0. Both the HMIS XML and HMIS CSV formats are based on the same logical model and are semantically and logically compatible, although the HMIS CSV is somewhat less granular than the HMIS XML, which resulted in some slight differences in field/element names.

## Location of the HMIS XML Schema

The HMIS XML 4.0 and previous major releases are hosted at <http://www.hudhdx.info/VendorResources.aspx>

## Overall Structure

The HMIS XML 4.0 structure is intended to be completely compliant with its parent specification, the HUD HMIS Logical Model, and with its other similarly purposed product, the HUD HMIS CSV 4.0. To keep it simple, the XML has a flat, single file structure. Almost all the data types are one level below the Export data element and key references enforce relationships between types. This allows the system serializing the XML to not be constrained by having to be in the correct context to add elements. Elements can be added in any order within the “Export” element.

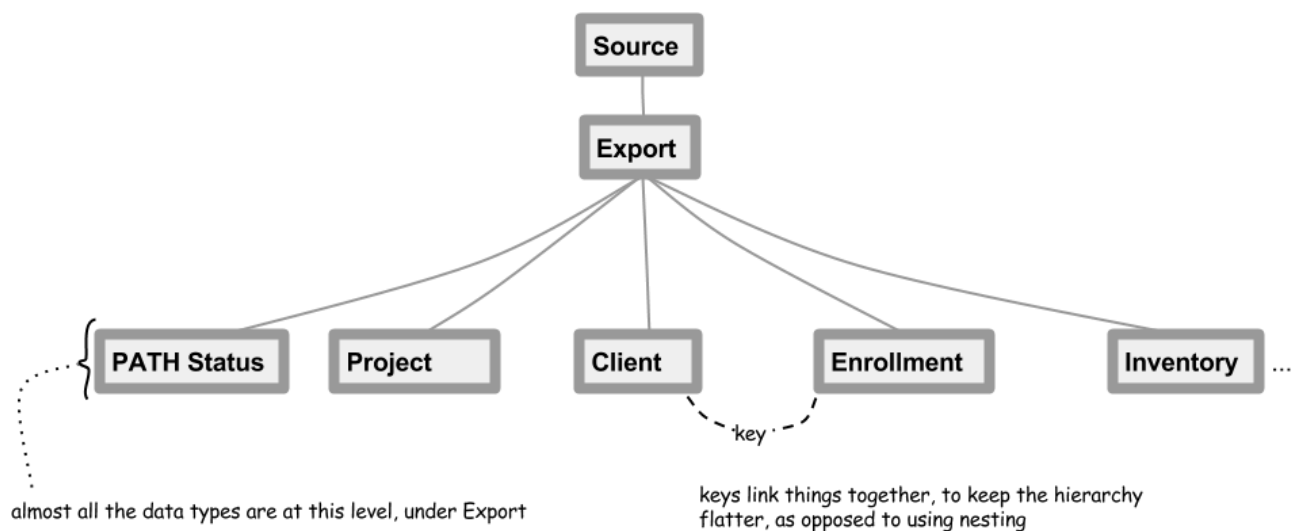
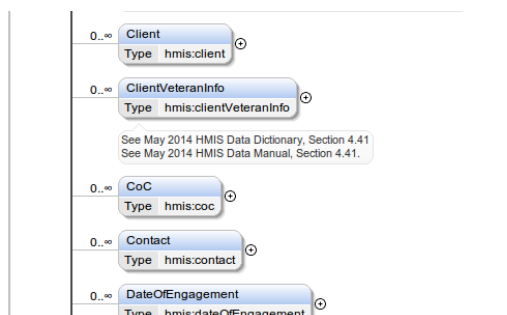


Figure 1: HMIS XML 4.0 Basic Structure

## Inline Documentation

The HMIS Data Dictionary and Data Manual data element reference is listed within each HMIS XML data element, whenever available. Some data elements, such as Export, do not reference a data element in the Dictionary/Manual, since they only serve a functional purpose for data transfer.



## Browsable Graphical Documentation

A browsable list of all the data element in the HMIS XML Schema is [available](#). The definitions for each data element are available in the browsable documentation as well.

## Relationship to Logical Model

The HMIS XML Schema version 4.0 complies with [Logical Model](#). The various relationship lines within the Logical Model are enforced by requiring matching IDs/Keys (see the section on [Keys](#)) between the two data types (like ProjectCoC to Inventory, or Exit to Enrollment) joined by a line in the Logical Model.

## Cardinality Enforcement

The Logical Model is also very specific about cardinalities (like “many-to-many” and “zero to one”) between the related data types. HMIS XML Schema strictly enforces cardinality by means of XPath 2.0 assertions<sup>1</sup>; a new feature of XML Schema 1.1. If the Logical Model requires “zero to one” of something (like Date of Engagements per Enrollment), the HMIS XML 4.0 will likewise require valid XML documents to declare the required zero or one occurrence.

## Changes from Previous Version

- All data elements are updated from the 2010 to the 2014 HUD HMIS Data Standard elements
- AIRS namespace elements are dropped, so that the schema is purely defined by the scope of the 2014 HMIS Data Standards Manual and HMIS Data Dictionary
- Line-by-line comparison of version 3.1 to version 4.0.0-rc.1: <https://github.com/hmis-interop/xml/compare/v3.1...v4.0.0-rc.1>

## Technology

### XML Schema 1.1

[XML Schema version 1.1](#) is used by the HMIS XML 4.0. XML Schema 1.1 is a superset of XML Schema 1.0, which was used in previous versions of the HMIS XML format. XML Schema 1.1 is forward-compatible with 1.0; it includes all features of 1.0 and adds additional features. Two of the additional features in version 1.1 are used by HMIS XML 4.0 and are discussed in detail below. All major XML parsers have been updated to support version Schema 1.1, which was released in 2007, resulting in XML Schema 1.1 now being a mature technology.

### XML Schema 1.1 Feature: Extensibility

Flexible vendor extensions are much more easily accomplished with XML Schema 1.1, as opposed to the previous XML Schema 1.0. To extend the HMIS XML Schema 4.0 using this new feature, please read the [documentation](#) on *defaultOpenContent mode="interleave"* at the World Wide Web Consortium (W3C) website. This new feature permits is implemented in HMIS XML, allowing the addition of new data elements anywhere in the HMIS XML Schema, and the original parts still can be found and validated. The newly added extensions which a software provider might add should be validated by a second XML Schema. The second XML Schema can be defined elsewhere, and both the HMIS Schema and the new extension schema can function in concert to validate the extended XML documents. The extended schema will still validate against the official HUD HMIS XML 4.0, but it will not invalidate the custom elements added.

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<sup>1</sup> <http://www.w3.org/TR/xmlschema11-1/#cAssertions>

Currently, HUD is not publishing any official extensions, but parties engaged in data integration may negotiate the use of a schema to extend the HMIS XML Schema for the addition of new data types, attributes, and elements.

Previous versions of the HMIS XML included the ability to transmit and identify hashed values; because hashing is an implementation-dependent feature, it is not included in HMIS XML 4.0. One potential extension to HMIS XML4.0 might include the addition of a "hashValue" attribute for schema elements that include personally identifying information. The "hashValue" attribute would contain the hash value, and the element it applies to could have an overridden, fictitious value that still validates (see [sample XML extension instance](#)). The sample extension enforces the requirement that DateOfBirth must be a date (albeit a fictitious one), and also transmits the hashing in the "hashValue" attribute. This model also makes it simple to extend the hashValue attribute to other elements to which it did not previously apply (e.g., address data).<sup>2</sup> The [sample extension schema](#) implements this hashing model on a Client record.

#### XML Schema 1.1 Feature: Keys

The HMIS XML schema uses keys and references to those keys ("keyrefs") to create the relationships defined in the HMIS Logical Model. The keys are enforced, so that if an enrollment in the XML references a project ID which isn't defined somewhere else in the XML, it will raise a validation error, which enforces complete, self-referential data sets. Keys also enable the flattened structure of the schema. One significant advantage of a flattened schema is that data elements are not repeated within deeply nested structures. Keys also makes programming simpler, since there are not so many nested logic structures to handle. The flattened structure is also more flexible, since not every related data element has to be mentioned within the same tree branch of the XML.

## Examples

### Sample XML Instance

A fairly exhaustive sample HMIS XML 4.0 instance is available for download on the [HMIS Data Exchange Resources](#) page of the HDX. The intent of the sample instance is to provide examples of valid XML for a broad range of elements included in HMIS XML 4.0. As a result, while all data are valid under the HMIS XML 4.0 Schema, they are not necessarily consistent with expected data collection for a real project. For example, the two projects included are both defined as HOPWA-funded permanent housing projects, but the sample instance includes data specific to other funding sources and project types.

### Sample Extension Schema and Instance

Links to a sample extension to the HMIS XML 4.0 Schema and a sample instance of the extension are available for download on the [HMIS Data Exchange Resources](#) page of the HDX.

## Change Process and Technical Support

To request changes to the HUD HMIS XML Schema, there are multiple ways to register requests.

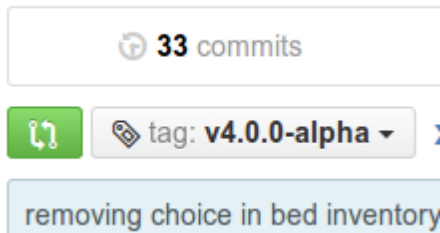
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<sup>2</sup> <https://github.com/hmis-interop/xml/issues/27>

- A software issue tracker is available at: <https://github.com/hmis-interop/xml/issues>
- A HUD sponsored [HMIS Software Provider forum](#) regularly hosts a revision process to maintain the HMIS XML Schema
- Email [hmisd@gmail.com](mailto:hmisd@gmail.com) to discuss the request with a HUD Technical Assistance representative

## HMIS XML Schema Hosting

HMIS XML schema development archives and issues list is unofficially (not an official HUD Website) hosted at: <https://github.com/hmis-interop/xml>. The tags on that site contain the various versions available, from which the differences between versions can be listed in detail.



## Further Information

Please submit questions about HMIS XML 4.0 via the [Ask A Question](#) interface on the HUD Exchange website.