



Intelligence Community Technical Specification

XML Data Encoding Specification for Information Resource Metadata

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Chapter 1 - Introduction

1.1 - Purpose

This *XML Data Encoding Specification for Information Resource Metadata* (IRM.XML) defines detailed implementation guidance for using Extensible Markup Language (XML) to encode Information Resource Metadata (IRM) data. This Data Encoding Specification (DES) defines the XML elements and attributes, associated structures and relationships, mandatory and cardinality requirements, and permissible values for representing information resource concepts using XML.

1.2 - Scope

The *Intelligence Community Technical Specification Framework* (IC-SF.XML^[10]) defines the basic conceptual structure and outlines the core philosophy of Intelligence Community (IC) technical specifications. For convenience, a copy of this framework is included in every package.

This specification is applicable to the IC and information produced by, stored, or shared within the IC. This DES may have relevance outside the scope of intelligence; however, prior to applying outside of this defined scope, the DES should be closely scrutinized and differences separately documented and assessed for applicability.

1.3 - Enterprise Need

Information sharing within the national intelligence enterprise will increasingly rely on information resource metadata to allow users and systems to find and access a wide-range of information resources throughout the enterprise. Information resource visibility, accessibility, and understandability are all critical to providing these capabilities. A successful information sharing enterprise depends on the ability of users and systems to locate and access information resources through a consistent and flexible search, or discovery capability. An enterprise-wide discovery capability will be greatly enhanced by the consistent “digital” description of all information resources. A common specification for the description of information resources allows for a comprehensive capability that can locate all resources across the enterprise regardless of format, type, location, or classification.

Both enterprise needs and requirements for this specification can be found in the following policies and implementation guidance:

- 200 Series:
 - Intelligence Community Directive (ICD) 206, *Sourcing Requirements for Disseminated Analytic Products* ^[12]
 - ICD 208, *Write for Maximum Utility* ^[13]
 - ICD 209, *Tearline Production and Dissemination* ^[14]
 - Intelligence Community Policy Memorandum (ICPM) 2007-200-2, *Preparing Intelligence to Meet the Intelligence Community's Responsibility to Provide* ^[18]
- 500 Series:
 - ICD 500, *Director Of National Intelligence Chief Information Officer* ^[15]
 - ICD 501, *Discovery and Dissemination or Retrieval of Information within the IC* ^[16]
 - Intelligence Community Standard (ICS) 500-20, *IC Enterprise Standards Compliance* ^[19]

- ICS 500-21, *Tagging of Intelligence and Intelligence-Related Information* [\[20\]](#)

1.4 - Conventions

Certain technical and presentation conventions are used in the creation of the IC technical specifications to ensure readability and understanding. For details, please see the “Specification Conventions” chapter in the IC-SF.XML [\[10\]](#).

1.4.1 - XML Namespaces

Namespaces referenced in this document and the prefixes used to represent them are listed in the following table. The namespace prefix of any XML Qualified Name used in any example in this document should be interpreted using the information below.

Table 1 - XML Namespaces

Prefix	URI
edh	urn:us:gov:ic:edh
irm	urn:us:gov:ic:irm
ism	urn:us:gov:ic:ism
ntk	urn:us:gov:ic:ntk
xsd	http://www.w3.org/2001/XMLSchema

1.5 - Dependencies

Specifications often rely on other specifications, components or artifacts, either directly or indirectly. For specific definitions of dependency terminology used throughout this section, please see the “Dependency Definitions” chapter in the IC-SF.XML [\[10\]](#).

1.5.1 - Specification Dependencies

This technical specification directly depends on the technical specifications, documentation, and implementations listed in [Table 2](#). The dependencies listed below are directly referenced in this specification (e.g., Schema, Schematron), and are normative or informative as indicated.

The subsequent figure, [Figure 1](#), is an informative graphical representation of all of the Intelligence Community Chief Information Officer (IC CIO) specifications related to this specification. The graphic depicts dependencies. However, the representations may not match an exact schema import tree or dependency diagram that an analysis of the Schema, Schematron or other documents would yield. For example, the graphic only shows a given specification once even though it may actually be imported by many specifications or be a direct dependency. All IC CIO specifications listed in [Table 2](#) will be shown in [Figure 1](#); however not all IC CIO specifications listed in [Figure 1](#) may appear in [Table 2](#). [Figure 1](#) is to aid users in gaining a general understanding of all dependencies whether direct or transitive.

In the related specifications figure, [Figure 1](#), SOME-TDF is not an actual specification but a placeholder in the diagram that represents the fact that this specification depends on some

Trusted Data Format (TDF) specification in its usage as an assertion in a Trusted Data Object (TDO).

Table 2 - Dependencies

Name	Dependency Description
<i>XML Data Encoding Specification for Information Security Marking Metadata</i> (ISM.XML.V2021-NOVr2022-NOV+ [23])	This specification depends on the LATEST technically sound, approved version of ISM.XML ^[23] . The minimum version was based on compliance with the authoritative source, which is ICD-710 ^[17] . Per ICD-710, all security markings MUST be updated within 365 days of a release of the Register and Manual. As of this release, the latest version of ISM.XML is 2021-NOVr2022-NOV which is based on the Register and Manual released in August, 2019.
<i>XML Data Encoding Specification for Trusted Data Format</i> (IC-TDF.XML.V2021-NOV+ [11])	This specification depends on the LATEST technically sound, approved version of IC-TDF.XML ^[11] . The dependence of IRM.XML on IC-TDF.XML is normative. The minimum version is based on a technical dependency, specifically a correction to a rule that can affect IRM: CR-2017-207, TDF Validation Missing RevRecall ISM Consistency Checks.
<i>XML Data Encoding Specification for Intelligence Community Identifier</i> (IC-ID.XML.V1+ [9])	The specification does not depend on a specific version of IC-ID.XML ^[9] ; versions later than version 1 MAY be used. The minimum version was based on the earliest non-retired version; Enterprise Standards Baseline (ESB) 21-2.0 was used for determining the version.
<i>XML Data Encoding Specification for Production Metrics Assertion</i> (PMA.XML.V2019-MARr2019-SEP ^[32])	The specification does not depend on a specific version of PMA.XML ^[32] ; versions later than version 2019-MARr2019-SEP MAY be used. The minimum version was based on a technical dependency; The use of production metrics assertions.
<i>CVE Encoding Specification for US Agency</i> (USAgency.CES.V2017-MARr2018-FEB+ [38])	The specification does not depend on a specific version of USAgency.CES ^[38] ; versions later than version 2017-MARr2018-FEB MAY be used. The minimum version was based on the earliest non-retired version; ESB 21-2.0 was used for determining the version.

Name	Dependency Description
<i>CVE Encoding Specification for Geopolitical Entities, Names, and Codes (IC-GENC.CES.V2019-SEP+^[8])</i>	This specification depends on the LATEST technically sound, approved version of IC-GENC.CES ^[8] . At the time of this release, the latest version of IC-GENC.CES is 2019-SEP and MUST be used unless a later, technically sound, approved version of IC-GENC.CES has been released. The requirement to use the latest technically sound, approved version is based on authoritative source compliance ^[33] .
<i>CVE Encoding Specification for Intelligence Discipline (INTDIS.CES.V2017-JUL+^[21])</i>	The specification does not depend on a specific version of INTDIS.CES ^[21] ; versions later than version 2017-JUL MAY be used. The minimum version was based on the earliest non-retired version; ESB 21-2.0 was used for determining the version.
<i>CVE Encoding Specification for Media Type (MIME.CES.V2020-OCT+^[28])</i>	The specification does not depend on a specific version of MIME.CES ^[28] ; versions later than version 2020-OCT MAY be used. The minimum version was based on the earliest non-retired version; ESB 21-2.0 was used for determining the version.
<i>XML Data Encoding Specification for Virtual Coverage (VIRT.XML.V2020-OCT+^[39])</i>	This specification does not depend on a specific version of VIRT.XML ^[39] ; versions later than version 2020-OCT MAY be used. The minimum version was based on the earliest non-retired version; ESB 21-2.0 was used for determining the version.
<i>Intelligence Community Specification Framework (IC-SF.XML.V2021-NOV+^[10])</i>	This specification does not depend on a specific version of IC-SF.XML ^[10] ; versions later than version 2021-NOV MAY be used, however, the newest version of IC-SF.XML SHOULD be used as IC-SF.XML is expected to always replace its preceding version. The minimum version was based on technical dependencies on IC-SF.XML; IC-SF.XML is the basic structure of and philosophy behind intelligence community technical specifications.
<i>Time Space Position Information (TSPI) 2.0, NGA Standardization Document, Time-Space-Position Information (TSPI) ^[37].</i>	This specification depends on TSPI Version 2.0 for capturing map and geographical information.
<i>International Organization for Standardization (ISO) 19125, ISO 19125-1:2004, Geographic information - Simple feature access - Part 1: Common access ^[26].</i>	This specification depends on ISO 19125 for capturing map and geographical information.

Name	Dependency Description
Schematron ^[36]	<p>Schematron — ISO/International Electrotechnical Commission (IEC) 19757-3:2006 — is a rule-based document schema definition language. In this specification Schematron is a formal language used to express normative business rules, so this reference is normative.</p> <p>The Schematron rules are normative in the sense that they convey criteria that a document MUST adhere to, exactly as English may be used to convey normative criteria. It is not necessary for implementers to use the specific Schematron encoding in this specification. Implementers MAY use any encodings, tools, or languages desired to implement validation schemes for conformance to this specification.</p> <p>Note: The Schematron rules in this specification use Transformations (XSLT) 2.0^[41] query binding.</p>
<p>XSLT 2.0^[41] implementation of Schematron^[36] by Rick Jelliffe (2010-04-14)</p> <p>Note: The only available identifying descriptors for this implementation are the implementer's name and date of release. This implementation may be found at the following Uniform Resource Locator (URL): http://code.google.com/p/schematron/.</p>	<p>The International Organization for Standardization does not create nor endorse reference implementations of its standards. For the purposes of this specification the <i>behavior</i> of the implementation created by Mr. Jelliffe is normative.</p> <p>Implementers MAY use any encodings, tools, or languages desired to implement validation schemes for conformance to this specification. To conform to this specification, a validator MUST find a document valid <i>if and only if</i> the Schematron implementation by Mr. Jelliffe would find the document valid according to the Schematron rules in this specification.</p>

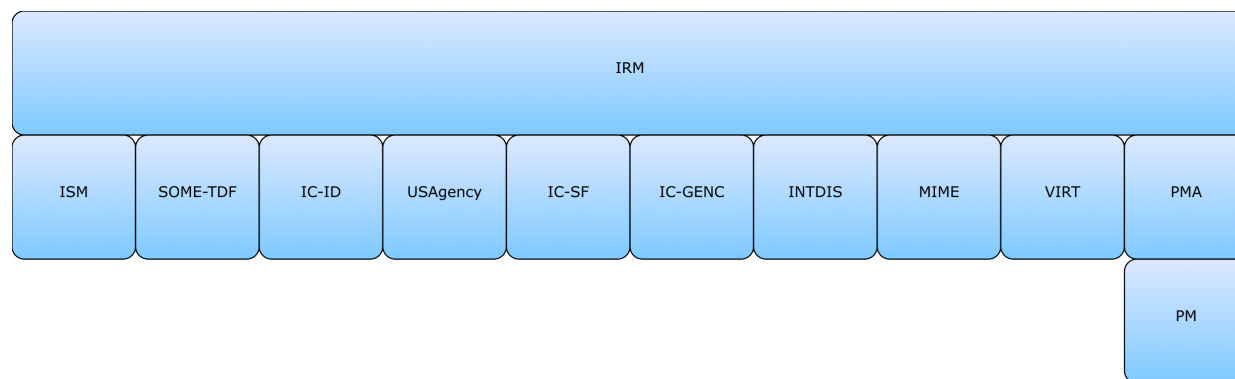


Figure 1 : Related Specifications

1.5.2 - Inverse Dependencies

Generally, it is only necessary to think of the *dependencies* in the dependency tree. However, with the specification versions being decoupled, it is also important to consider the *inverse dependencies*, for compatibility with newer versions of a given specification. The changes introduced to a given specification can sometimes make it incompatible with current versions of its inverse dependencies (specifications that uses the given specification).

Since this specification is one such specification that is used by other specifications released by the IC CIO, the [Figure 2](#) has been included to assist readers in understanding all of the inverse dependency relationships and how changes in this given specification may impact others specifications. This diagram is representative of direct and transitive inverse dependencies at the time of the release of this specification, but are subject to change over time and is presented in a list format that is different than [Figure 1](#).

For specifications that are used as assertions by some TDF specification, the inverse dependency specification diagram, [Figure 2](#), will only show the TDF specifications that are typically used with this specification and will not show all TDF specifications that can use it.

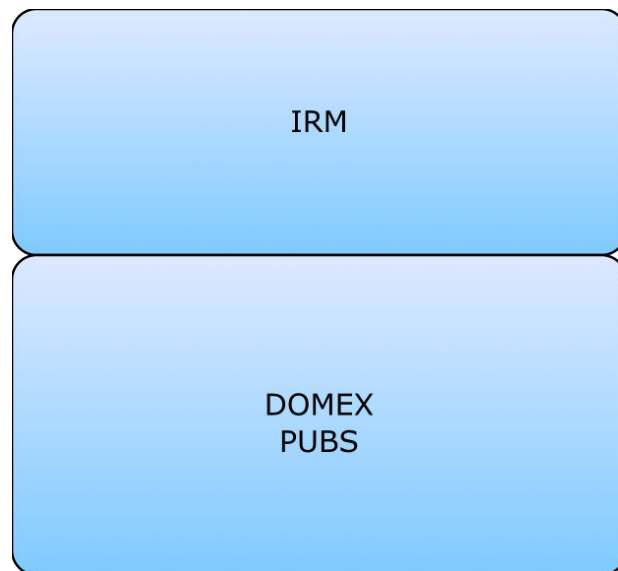


Figure 2 : Inverse Dependency Specifications

Chapter 2 - Development Guidance

For information on the structure and content of the specifications, please see the “Specification Overview” chapter in the IC-SF.XML^[10] framework document. This chapter is intended to expand upon the common information that the framework specifies providing specific development guidance that is specific to the implementation of this specification.

2.1 - Relationship to Abstract Data Definition and other encodings

The relationship of the XML structures defined in this encoding specification to the abstract terms defined in the Abstract Data Definition (ADD) are described using a mapping table in the ADD. The mapping tables generally show the mapping to the encoding specification where a structure is defined, not where it is used. These mappings are provided for reference only. The complete set of encoding specification artifacts, both normative and informative, should be consulted in order to gain a complete understanding of this encoding specification.

The mappings in the ADD provide a starting point for the development of automated transformations between formats defined by the encoding specifications. However, it should be noted that when these transformations are used between formats with different levels of detail there might be some data loss.

2.2 - Additional Guidance

This section provides additional guidance for encoding data in specific situations. The content of this section will evolve over time as additional situations are identified. Implementers of this DES are encouraged to contact the maintainers of this DES for further guidance when necessary.

2.2.1 - Usage Concept

Successful information sharing across the national intelligence enterprise depends on the ability of users and systems to locate and access data assets through a consistent and flexible discovery capability. One facet of such an enterprise-wide discovery capability is the ability to consistently describe data assets. A common specification for the description of data assets allows for a comprehensive capability that can locate all data assets across the enterprise regardless of format, type, location, or classification. A common set of descriptive metadata elements is associated with each data asset and is made visible to the Enterprise Discovery Capability. Metadata is often defined as being “data about data”. Using the metaphor of a described data asset being a book in a library, the metadata is analogous to a card in a card catalog describing that book. Thus, the metadata is often referred to as the metadata card or metacard. Data assets available on the enterprise must be described with metadata, using the information elements defined in this document to permit discovery through the Enterprise Discovery Capability. This specification defines a core set of elements that must be used to describe data assets made visible to the enterprise. Users (human and systems) that search the enterprise will discover data assets that have been tagged and entered into catalogs or repositories that respond to search queries specified in terms of IRM.XML entries. Examples of IRM.XML usage include the following.

- Example 1: IRM.XML metadata elements are compiled based on the attributes of a database, to advertise the existence of the database as a whole. In doing so, users and systems across

the enterprise could discover that the database exists, a description of the database, the owner of the data asset, and possibly, how to access it. The focus of IRM.XML is not geared towards the tagging of individual records or fields within databases. However, IRM.XML and associated policy do not preclude record-level for discovery if it supports a mission need.

- Example 2: IRM.XML metadata elements are associated with an analysis report to advertise the existence of the report as a whole and to give visibility into the author, date created, and information about the content of the report (e.g., subject, keywords). The elements specified in this IRM.XML are designed to be platform, language, and implementation independent. Accordingly, system designers and engineers can decide on how to generate and store the discovery metadata information elements depicted in this document. This approach provides flexibility for system developers to generate and retain discovery metadata using any implementation approach including using Commercial Off-The-Shelf (COTS) products. Data asset authorities should use engineering judgment to determine which data assets will be made available to the Enterprise and the appropriate level of discovery metadata to generate and store applicable to each data asset. IRM.XML is intended to be used as part of a comprehensive approach to metadata specification. Capability implementers are expected to generate and use metadata to define their capabilities, interfaces, and data asset content.

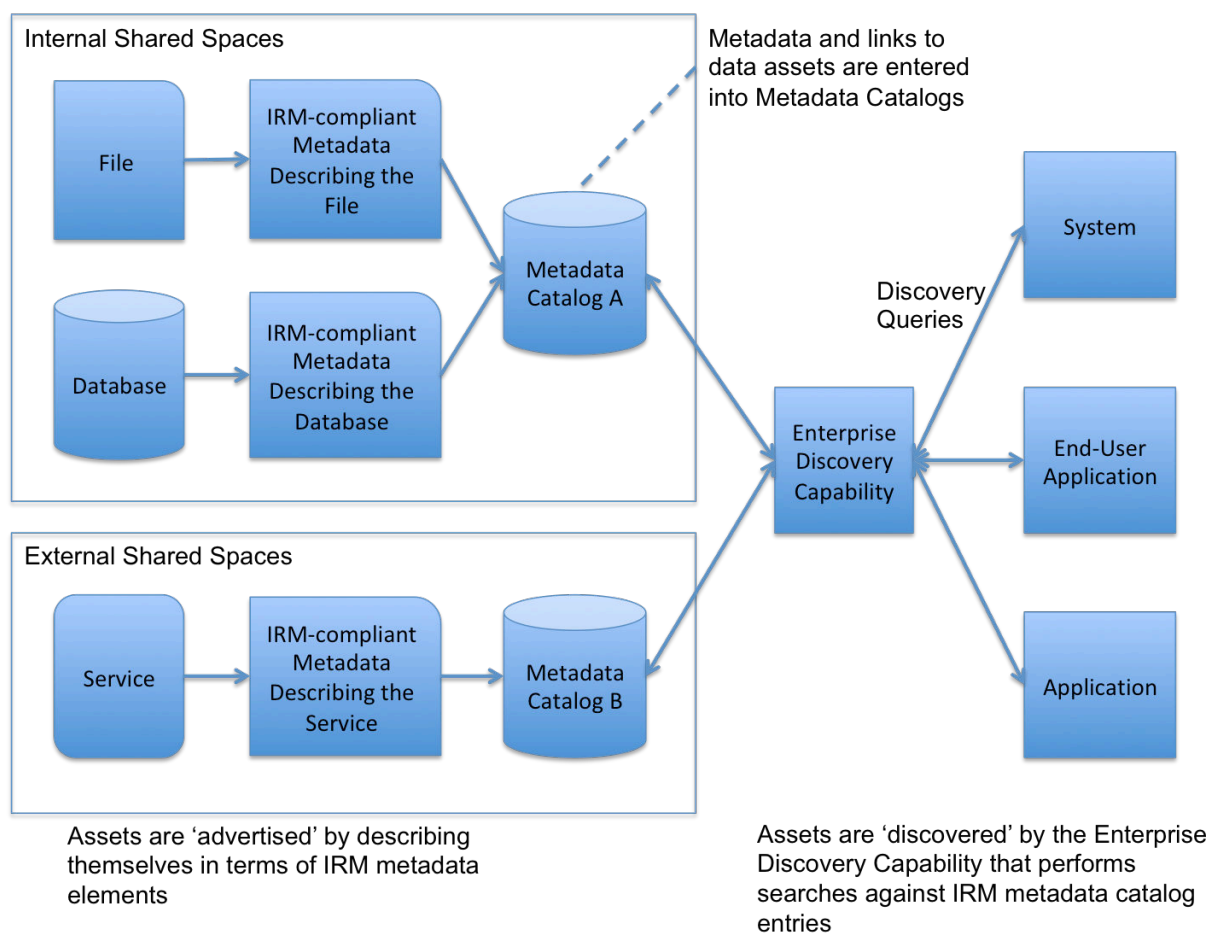


Figure 3 : Usage Concept

2.2.1.1 - Category Sets and Primary Categories

The IRM.XML assertion is composed of elements that can be grouped into four category sets where each category set has a specific functional focus for describing a data asset. Within each category set, there can be one or more primary categories. Each primary category is represented by an element that may itself contain other category elements and their attributes.

- The Metacard Information Category Set describes the IRM.XML assertion itself. This set enables the inclusion of metadata addressing the publication and pedigree of the metadata card and its revision history.
- The Resource Set describes aspects on the maintenance, administration, and pedigree of a data asset.
- The Summary Content Category Set provides the description of concepts and additional contextual aspects of the data asset being tagged with the intent to capture asset-level information that describes the content and/or context. The purpose of the Summary Content Category Set is to aid in precision discovery, offer a level of description above standard indexing and provide a way to capture content metadata.
- The Format Category Set provides the description of physical attributes of the data asset and include information such as file size, bit-rate or frame-rate, and mime type.

Table 3 - Category Sets

Category Sets	Primary Category (ies)
Metacard Information	@irm:metacardInfo
Resource	@irm:contributor @irm:creator @irm:dates @irm:identifier @irm:language @irm:pointOfContact @irm:publisher @irm:resourceManagement @irm:rights @irm:source @irm:title @irm:type

Category Sets	Primary Category (ies)
Summary Content	@irm:description @irm:geospatialCoverage @irm:relatedResource @irm:subjectCoverage @irm:temporalCoverage @irm:virtualCoverage
Format	@irm:format

2.2.1.2 - Obligations

The primary category elements and their fields, elements and attributes, that make up the primary categories have obligations, or provision requirements, assigned to them. There are five types of obligations.

- A “Mandatory” obligation means that the field must be supplied, for a given data asset, in order to comply with IRM.XML.
- A “Mandatory With Exception” obligation means that the field is mandatory if there is no entry in any of the other fields.
- A “Mandatory Unless Not Applicable” obligation means that the field must be supplied if, for example, there is coverage (including geolocation) information related to the data asset.
- A “Conditional” obligation means that the field is required if a particular condition is true.
- An “Optional” obligation means that the field can be supplied, but is not required to be supplied, for a given resource.

The table below shows the obligations of the primary categories which are with respect to the IRM.XML root element for a resource, **ICResourceMetadataPackage**.

Table 4 - Primary Category Obligations

Primary Category	Obligation
@irm:metacardInfo	Mandatory
@irm:contributor	Mandatory With Exception (at least one of creator , publisher , contributor , or pointOfContact is required)
@irm:creator	Mandatory With Exception (at least one of creator , publisher , contributor , or pointOfContact is required)
@irm:dates	Optional

Primary Category	Obligation
@irm:identifier	Mandatory
@irm:language	Optional
@irm:pointOfContact	Mandatory With Exception (at least one of creator , publisher , contributor , or pointOfContact is required)
@irm:publisher	Mandatory With Exception (at least one of creator , publisher , contributor , or pointOfContact is required)
@irm:resourceManagement	Optional
@irm:rights	Optional
@irm:source	Optional
@irm:title	Mandatory
@irm:type	Optional
@irm:description	Optional
@irm:geospatialCoverage	Mandatory Unless Not Applicable
@irm:relatedResource	Optional
@irm:subjectCoverage	Mandatory
@irm:temporalCoverage	Mandatory Unless Not Applicable
@irm:virtualCoverage	Mandatory Unless Not Applicable
@irm:format	Optional

2.2.1.3 - DES enforced obligations

Some obligations, specifically "Mandatory Unless Not Applicable" cannot be enforced by schema or schematron so they are documented here.

Table 5 - DES enforced Obligations

Field	Condition
@irm:geospatialCoverage	If geospatial coverage data exists, then that data must be entered into the @irm:geospatialCoverage.
@irm:temporalCoverage	If temporal coverage data exists, then that data must be entered into the @irm:temporalCoverage.
@irm:virtualCoverage	If virtual coverage data exists, then that data must be entered into the @irm:virtualCoverage.

2.2.2 - ICResourceMetadataPackage Usage

IRM.XML is used in conjunction with *XML Data Encoding Specification for Trusted Data Format* (IC-TDF.XML^[11]) objects as structured assertions. A TDO conforms to the IRM.XML specification when it contains:

- A structured assertion of `scope="PAYL"` and an IRM.XML `ICResourceMetadataPackage` element

where the token "PAYL" means this assertion applies only to the payload within the TDO.

2.2.3 - Document Identifiers

2.2.3.1 - Document IC-ID

All documents within the IC MUST have a single unique identifier. The identifier MUST conform to the *Text and XML Data Encoding Specification for Intelligence Community Identifier* (IC-ID.XML^[9]) specification, and it MUST be encoded using *XML Data Encoding Specification for Enterprise Data Header* (IC-EDH.XML^[7]) and the `edh:Identifier` element. For the purposes of this specification, such an identifier is referred to as the Document IC-ID.XML^[9]. The Document IC-ID.XML^[9] MAY be duplicated in IRM.XML using the "IC-ID" qualifier.



Warning

A Document IC-ID.XML^[9] should be unique across the whole of the IC, however, there is no managing body or registry service for Document IC-ID.XMLs^[9]. Content producers are responsible for ensuring ID uniqueness, including any required coordination amongst content producers.

2.2.3.2 - DocumentID

DocumentID refers to an identifier that is assigned by the agency to carry a document's publication or serial number. **DocumentID** is assigned by the publishing agency to identify a product or publication to the Community at large. **DocumentID** is not guaranteed to be unique across the enterprise, or even the agency assigning it. It SHOULD be unique across a productline for an agency. Unlike the IC-ID.XML^[9], the **DocumentID** may have discernible meaning. **DocumentID** is an optional identifier in IRM.XML, but when provided in IRM.XML, **DocumentID** MUST carry the document's publication or serial number. **DocumentID** is captured in IRM.XML using `@irm:identifier/@irm:qualifier= urn:us:gov:ic:irm:identifier:documentid`.

2.2.3.3 - Other Identifiers

The Document IC-ID.XML^[9] referenced in [Section 2.2.3.1 - Document IC-ID](#) intended to meet USA Government Policy requirements for an unambiguous, IC-wide identifier for a document. However, a document may have many identifiers, which may be necessary for various purposes including processing, retrieval, or tracking. These additional identifiers SHOULD be captured in IRM.XML. Qualifiers for these additional identifiers will have the form `urn:us:gov:ic:irm:identifier:XXX` where XXX is the type of the identifier. Examples of identifier types include **UUID**, and **InternalID**.

2.2.4 - Specification of publishing organization

The element `irm:publisher` is used to identify the entity(ies) primarily responsible for releasing the information to the enterprise. The entity(ies) of interest in this context are foremost the organization responsible for the actual distribution of the data. The organizations and/or individuals

responsible for creating the information are captured within the **@irm:creator** and **@irm:contributor** structures. The publishing organization's approved identifier value is captured in an element called **irm:publisher** whose parent attribute is **@irm:organization** (**irm:publisher/irm:organization**). Further decomposition of the **@irm:organization** is captured in the **irm:subOrganization** element. Depending on the enterprise requirement being addressed, a complete understanding of the Publisher requires evaluating the **irm:organization/@irm:acronym** and **irm:subOrganization** value as well as the values found in the **@irm:affiliation** of the **irm:publisher**, **irm:creator** and **irm:contributor** elements.

The **@irm:publisher** structure provides the ability to identify multiple levels of organizational structure and multiple organizations or individuals responsible for creating the information. The most basic ability to identify is captured with the required element **irm:publisher** using the attribute **irm:organization/@irm:acronym** to represent US or foreign publishing organizations. When identifying US organizations, the values comes from a Controlled Vocabulary Enumeration (CVE) that includes values representing the organizations officially designated as Members of the IC by Director of National Intelligence (DNI) per the DNI website^[22], plus the DNI, plus additional entries intended to recognize non-IC publishers whose information is commonly used in support of the intelligence mission. The use of a country prefix when identifying a US organization is optional (e.g., CIA, USA:CIA). When identifying foreign organizations, the use of a country prefix is required in order to identify the country to which the foreign organization belongs (e.g., GBR:GCHQ).

In many cases, the AgencyAcronym CVE only includes the highest level of the organization structure (e.g., DNI), service or agency (e.g., US Army, Department of Homeland Security (DHS), or U.S. Department of State (DoS)), or non-IC designation (e.g., OtherUSG). In order to identify a Publisher at a level below what the AgencyAcronym CVE allows, use the **irm:subOrganization** element of the **irm:publisher/irm:organization**.

For consistency, populate **@irm:subOrganization** with an approved organization acronym designator for the sub-organization. For multiple levels of sub-organization, list the acronyms in descending order delimited with the "/" character.

In cases where non-IC information (e.g., OtherUSG, SLT) is shared with the intelligence enterprise, the **irm:publisher/irm:organization/@irm:acronym** should reflect the organization, which last prepared the information for consumption (e.g., converted the content into *XML Data Encoding Specification for Intelligence Publications* (PUBS.XML^[34]), applied enhanced information resource metadata tagging, translated, or packaged the information into an official IC product) and shared the product with the enterprise. As that organization is affecting the record status of the product, it must take responsibility for addressing any questions about the information.

If a non-IC producer is providing information that is already compliant with IC enterprise data encoding standards, then the **irm:publisher/irm:organization/@irm:acronym** should reflect the appropriate non-IC organization designator and the non-IC organizations office in the **irm:subOrganization** element. Examples of this scenario might exist in a USG department where there are sub-organizations designated in the IC and sub-organizations not in the IC; Department of Defense (DoD), where some sub-organizations support Defense Intelligence Agency (DIA), some support a service, and some are not in the IC; State, Local, Tribal organizations with information that flows into the intelligence enterprise via DHS, National

Counterterrorism Center (NCTC), or other means; or with our foreign partners. In the case of foreign partners designations in the `irm:subOrganization`, precede the office acronym with the country code trigraph in order to ensure uniqueness.

2.2.4.1 - Examples

For NCTC:

```
<irm:publisher>
  <irm:organization irm:acronym="DNI">
    <irm:name>Director of National Intelligence</irm:name>
    <irm:subOrganization>NCTC</irm:subOrganization>
  </irm:organization>
</irm:publisher>
```

For the XYZ component of NCTC:

```
<irm:publisher>
  <irm:organization irm:acronym="DNI">
    <irm:name>Director of National Intelligence</irm:name>
    <irm:subOrganization>NCTC/XYZ</irm:subOrganization>
  </irm:organization>
</irm:publisher>
```

For the XYZ component of Central Intelligence Agency (CIA):

```
<irm:publisher>
  <irm:organization irm:acronym="CIA">
    <irm:name>Central Intelligence Agency</irm:name>
    <irm:subOrganization>XYZ</irm:subOrganization>
  </irm:organization>
</irm:publisher>
```

For the United States Postal Service:

```
<irm:publisher>
  <irm:organization irm:acronym="USPS">
    <irm:name>United States Postal Service</irm:name>
  </irm:organization>
</irm:publisher>
```

For the JIOC at PACOM:

```
<irm:publisher>
  <irm:organization irm:acronym="DIA">
    <irm:name>Defense Intelligence Agency</irm:name>
    <irm:subOrganization>PACOM/JIOC</irm:subOrganization>
  </irm:organization>
</irm:publisher>
```

For the J4 at PACOM:

```
<irm:publisher>
  <irm:organization irm:acronym="USA:DIA">
```

```
<irm:name>Defense Intelligence Agency</irm:name>
<irm:subOrganization>PACOM/J4</irm:subOrganization>
</irm:organization>
</irm:publisher>
```

For British foreign agency GCHQ:

```
<irm:publisher>
  <irm:organization irm:acronym="GBR:GCHQ">
    <irm:name>Government Communications Headquarters</irm:name>
  </irm:organization>
</irm:publisher>
```

For XYZ component of British foreign agency GCHQ:

```
<irm:publisher>
  <irm:organization irm:acronym="GBR:GCHQ">
    <irm:name>Government Communications Headquarters</irm:name>
    <irm:subOrganization>GBR:XYZ</irm:subOrganization>
  </irm:organization>
</irm:publisher>
```

2.2.5 - MIME Type

The Media Type (MIME) type for an IRM.XML document is application/dni-irm+xml. This is a convention for our community. This type has NOT been registered with the Internet Assigned Numbers Authority (IANA). Should there be a conflict in the future it will be addressed at that time. Systems can use this MIME type to facilitate communications and address business needs within the community.

2.2.6 - irm:type Use in IRM

The element type in IRM.XML is used for many specific uses in IRM.XML. These uses are indicated with a specific set of @irm:qualifier values. There are many ways the IC has to categorize and group data. The irm:type element allows us to keep adding ways without impacting the main schema or most processing systems. A definition for each of the uses is listed below.

2.2.6.1 - @irm:qualifier= 'urn:us:gov:ic:cvenum:intdis:inteldiscipline'

The @irm:value represents an intelligence discipline to which a resource applies. Information Security Markings (ISM) attributes, if present, refer to the classification of the discipline.

2.2.6.2 - @irm:qualifier= 'urn:us:gov:ic:cvenum:intdis:inteldiscipline:component'

The @irm:value represents a refinement of the intelligence discipline to which a resource applies. ISM attributes, if present, refer to the classification of the discipline component.

2.2.6.3 - @irm:qualifier= 'urn:us:gov:ic:cvenum:intdis:inteldiscipline:component:technique'

The **@irm:value** represents a technique used by the intelligence discipline to which a resource applies. Prefix the value with "other:" to specify a value that is not in the enumerated list. ISM attributes, if present, refer to the classification of the discipline component technique or text in **@other:DisciplineComponentTechnique**.

2.2.6.4 - @irm:qualifier= 'urn:us:gov:ic:irm:reportinglevel'

The **@irm:value** represents a designation of the time elapsed between an observation and reporting of the observation.

2.2.6.5 - @irm:qualifier= 'urn:us:gov:ic:irm:productline'

The **@irm:value** represents a description of an agency-specific suite of resources. **ProductLine** may be used to specify that a resource is a member of a given category of resources such as serials. It is up to the producing organizations to ensure that the content of the element is consistent from resource to resource. For example, if "CAR" is the accepted acronym for campaign analysis report, producers should check that the acronym is consistently used in each CAR resource.

2.2.6.6 - @irm:qualifier= 'urn:us:gov:ic:cvenum:irm:activity'

The **@irm:value** indicates that the resource is associated with a particular type of activity; the current list of possible values is: crisis, exercise, operation. The contents of the **irm:type** element are intended for the name or descriptor of the activity.

2.2.6.7 - @irm:qualifier= 'urn:us:gov:ic:cvenum:irm:maliciouscodeindicator'

The **@irm:value** is a value from the "CVENumIRMMaliciousCodeIndicator" that indicates the confidence in the presence or absence of malicious code. This data element is intended to provide a data point, not dictate how a receiving system is to react, which is left to receiving organization policy. Only certain IC systems are certified to process malicious content.

2.2.6.8 - @irm:qualifier= 'urn:us:gov:ic:cvenum:irm:executableindicator'

The **@irm:value** is a value from the "CVENumIRMExecutableIndicator" that indicates the confidence in the presence or absence of executable code. This data element is intended to provide a data point, not dictate how a receiving system is to react, which is left to receiving organization policy. Only certain IC systems are certified to process executable content.

2.2.6.9 - @irm:qualifier= 'urn:us:gov:ic:irm:authorizationreference'

The **@irm:value** represents an indicator of a unique and documented legal basis for all activities surrounding the creation, retention and use of an information resource.

2.2.6.10 - @irm:qualifier= 'urn:us:gov:ic:irm:evaluated'

The **@irm:value** provides an indication of whether a resource contains information pertaining to the objectives of that resource's applicable mission authority.

2.2.6.11 - @irm:qualifier= 'urn:us:gov:ic:irm:minimized'

The **@irm:value** provides an indication of the presence of protected person information in a resource, within the context of that resource's applicable mission authority.

2.2.6.12 - @irm:qualifier= 'urn:us:gov:ic:cvenum:irm:positive:intel'

The **@irm:value** describes the unavailability of finished intelligence information about a given topic, and are provided for applications in which some sort of statement must be made about each node of a taxonomy, even when no substantive analysis is available.

2.2.7 - irm:WKTGeometry Use in IRM

The **@irm:WKTGeometry** is an optional field used to capture the Well-known text (WKT) representation of a vector geometric object on a map related to the resource based on Simple Feature Access, which is both an Open Geospatial Consortium (OGC) standard and ISO standard, ISO 19125, *ISO 19125-1:2004, Geographic information - Simple feature access - Part 1: Common access* ^[26], that specifies a common storage and access model of mostly two-dimensional geometries (point, line, polygon, multi-point, multi-line, etc.) used by geographic information systems. WKT is a text markup language for representing vector geometry objects on a map, spatial reference systems of spatial objects and transformations between spatial reference systems.

2.2.8 - Document Compliance and Exemptions

IRM.XML documents claim compliance with rule sets using the **@irm:compliesWith** attribute on the IRM.XML root node **@irm:ICResourceMetadataPackage**; **@irm:compliesWith** MUST be specified. This is a multi-valued attribute, and the acceptable values are U.S. IC ("USA_IC"), U.S. Department of Defense ("USA_DOD"), and "USA_OtherUSG". These values are used to turn on rule sets for validation. Documents may assert compliance with multiple rule sets, and more rule sets may be added over time (ie. USA_IC_* tokens, non-USA tokens such as GBR_*).

USA_IC	The rule set for documents that comply with United States (US) Intelligence Community policies.
--------	---

USA_DOD	The rule set for documents that comply with US DOD policies.
USA_OtherUS G	The rule set for documents that comply with US policies not covered by "USA_IC" or "USA_DOD".

2.2.9 - Extensions

IRM.XML can be extended by the inclusion of additional TDO-compliant assertions in the metacard that are defined and managed by the community that requires the extension. The TDO structure provides a clear and manageable way to accommodate mission-specific discovery metadata requirements. Communities can author their own discovery metadata assertions in a structure similar to the `@irm:ICResourceMetadataPackage`. This allows the IRM.XML assertion integrity to be maintained and allows communities complete autonomy in specifying their specific discovery metadata needs. This will also support the reuse of discovery metadata across the Enterprise, as all search capabilities should understand the IRM.XML assertion, while community-extended capabilities will additionally understand the associated community-extended assertions. In order to provide visibility into extensions to the IRM.XML, organizations should register their assertions. IRM.XML extensions registered as community-extended assertions may also be integrated into the Enterprise Discovery Capability.

Chapter 3 - Constraints

3.1 - Data Validation Constraint Rules

The IRM.XML schema defines the data elements, attributes, cardinalities and parent-child relationships for which XML instances must comply. Validation of these syntax aspects is an important first step in the validation process. An additional level of validation is needed to ensure that the content complies with the constraints as specified in applicable IC policy guidance and codified in these constraint rules. Traditional schema languages are generally unable to effectively represent these additional constraints. For more information, please see the “Data Validation Constraint Rules” chapter in the IC-SF.XML^[10] framework document.

3.1.1 - Inherited Constraints

In an instance of IRM.XML, the use of attributes and elements from supplementary data encoding specifications must be fully conformant with the constraint rules defined in those specifications. For a full list of supplementary specifications, see [Section 1.5 - Dependencies](#).

3.1.2 - Value Enumeration Constraints

Several elements and attributes of the IRM.XML model use CVEs to define the data allowed in the element or attribute. In some cases the specific CVE is specified via an attribute, which may include a default CVE. Further, in some of the cases where the CVE can be specified, the attribute may restrict the list of CVEs allowed and some may allow for the author to specify their own CVE. For each of these, the value must be in the specified external CVE or the default CVE.

Some CVEs are not available on all networks. A subset CVE will be provided for use on networks not approved for the entire list. If the processing will occur on a network where the entire CVE is not available, the subset CVE may be substituted in the constraint rules since the excluded values would be excluded from use on the lower network.

As noted in the specific rules, a failure of validation against a CVE will generate an Error.

3.1.3 - Additional Constraints

3.1.3.1 - DES Constraints

The DES version is specified through attributes on the root element. The schema constrains the values of these attributes. The **@DESVersion** attribute enables systems processing an instance document to be certain which set of constraint rules, schema, CVEs and business rules are intended by the author to be used.

3.1.4 - Constraint Rules

The detailed constraint rules for the IRM.XML schema can be found in a separate document inside the Documents/IRM directory, in the “IRM_Rules.pdf” file. This document is generated from the individual Schematron files to provide a single searchable document for all of the constraint rules encoded in Schematron. Obsolete rule numbers are listed in the “IRM_Rules.pdf” file.

3.2 - Data Rendering Constraint Rules

3.2.1 - Purpose

Rendering rules define constraints on the rendering and display of IRM.XML documents. The intent is to inform the development of systems capable of rendering or displaying IRM.XML data for use by individuals not familiar with the details of the IRM.XML markup. While expressed in a similar manner to the data validation constraint rules above, there is no expectation that evaluation of these rules can be automated; rather these rules should inform the evaluation of a system's capabilities and functionality.

3.2.2 - Rendering Constraint Rules

The following table contains the information for the IRM.XML data rendering constraint rules.

Table 6 - Constraint Rules

Rule Number	Severity	Description	Human Readable Description
There are no Data Rendering Constraint rules at this time.			

Appendix A Feature Summary

The following table summarizes major features by version for this IRM.XML

Table 7 - Feature Summary Legend

Key	Description
F	Full (able to comply and verified by spec to some degree)
P	Partial (Able to comply but not verifiable)
N	Non-compliance (Can't comply)
N/A	Not Applicable. Feature is no longer required.
Cell Colors represent the same information as the Key value	

A.1. IRM Feature Summary

A.1.1. Features from V2016-SEP to V2021-NOV

Table 8 - IRM Feature comparison V2016-SEP to V2021-NOV

Required date	Feature	V2016-SEP	V2019-MAR	V2019-MARr2020-OCT	V2021-NOV
	Added way to represent well-known text (WKT) geospatial information in IRM geospatialCoverage	N	F	F	F
	Merge DDMS into IRM	N	F	F	F
	Removed Production Metrics from IRM to a new specification PMA.XML ^[32]	N	F	F	F
	Removed vital record indicator as it is covered by ERM	N	F	F	F
	Allow any MIME type value	N	N	F	F
	Removed privacy act indicator as its covered by ERM	N	N	N	F

A.1.2. Features from V12 to V2016-SEP

Table 9 - IRM Feature comparison V12 to V2016-SEP

Required date	Feature	V12	V2014-DEC	V2015-NOV	V2016-SEP
	DNI Negroponte Memorandum for Revision/Recall	F ^a	F	F	F
	PM.CES ^[31] v2015-NOV+, updates to non-state actors.	N	N	F	F
	INTDIS.CES ^[21] v2016-SEP+, updates to intelligence discipline related CVEs and new dependency on INTDIS.CES ^[21] .	N	N	N	F
	MIME.CES ^[28] v2016-SEP+	N	N	N	F
	Use of IC-GENC.CES ^[8] for both countries and subregions	N	N	N	F
	Added support for foreign agency acronyms	N	N	N	F

^aFull support is gained through use of the RevRecall.XML^[35] specification and IRM blocks the use of the revisionRecall elements in DDMS.

A.1.3. Features from V9 to V12

Table 10 - IRM Feature comparison V9 to V12

Required date	Feature	V9	V10	V11	V12
	IC-ID.XML ^[9] V1+	N	F	F	F
	USAgency.CES ^[38] V1+	N	N	F	F
	IC-GENC.CES ^[8] specification (V1+)	N	N	N	F
	DNI Negroponte Memorandum for Revision/Recall	P	P	P	F ^a

^aFull support is gained through use of the RevRecall.XML^[35] specification and IRM blocks the use of the revisionRecall elements in DDMS.

A.1.4. Features from V6 to V9

Table 11 - IRM Feature comparison V6 to V9

Required date	Feature	V6	V7	V8	V9
	Allow more than 3 decimal places on times	N	F	F	F
	MinDiscoverable and MinAccessible modes	N	N	F	F
	Use TDO as container for all IRM.XML components	N	N	N	F
	Version decoupling, allowing import of any version of ISM.XML ^[23] and other dependent specifications at or above ISM.XML ^[23] V9+, NTK.XML ^[29] V7+, IC-TDF.XML ^[11] V1+, ARH.XML ^[2] V1+, and IC-EDH.XML ^[7] V1+	N	N	N	F
	Use of <i>Geopolitical Entities, Names, and Codes</i> (GENC ^[6]) for all country code values	N	N	N	F

A.1.4.1. Features Partial and N/A from V6 to V9

Table 12 - IRM Feature comparison V6 to V9

Required date	Feature	V6	V7	V8	V9
	DNI Negroponte Memorandum for Revision/Recall	P	P	P	P

A.1.5. Features from V3 to V6

Table 13 - IRM Feature comparison V3 to V6

Required date	Feature	V3	V4	V5	V6
	Originator Controlled (ORCON) Memo ^[30] support	P	P	F	F
	XLink 1.1 ^[40]	N	N	F	F
	DNI Negroponte Memorandum for Revision/Recall	N	N	N	P

A.1.5.1. Features Partial and N/A from V3 to V6

Table 14 - IRM Feature comparison V3 to V6

Required date	Feature	V3	V4	V5	V6
	DNI Negroponte Memorandum for Revision/Recall	N	N	N	P

A.1.6. Features from V1 to V3

Table 15 - IRM Feature comparison V1 to V3

Required date	Feature	V1	V2	V3
	MIME.CES ^[28] Types	N	F	F
	Schematron ^[36] Implementation of rules	N	N	F

A.1.6.1. Features Partial and N/A from V1 to V3

Table 16 - IRM Feature comparison V1 to V3

Required date	Feature	V1	V2	V3
	Originator Controlled (ORCON) Memo ^[30] support	P	P	P

Appendix B Change History

The following table summarizes the version identifier history for this DES.

Table 17 - DES Version Identifier History

Version	Date	Purpose
1.0	July 2009	Initial Release
2	September 7, 2010	Routine revision to technical specification. For details of changes, see Section B.17 - V2 Change Summary
3	December 6, 2010	Routine revision to technical specification. For details of changes, see Section B.16 - V3 Change Summary
4	April 11, 2011	Routine revision to technical specification. For details of changes, see Section B.15 - V4 Change Summary
5	September 19, 2011	Routine revision to technical specification. For details of changes, see Section B.14 - V5 Change Summary
6	December 7, 2011	Routine revision to technical specification. For details of changes, see Section B.13 - V6 Change Summary
7	February 27, 2012	Routine revision to technical specification. For details of changes, see Section B.12 - V7 Change Summary
8	July 17, 2012	Routine revision to technical specification. For details of changes, see Section B.11 - V8 Change Summary
9	January 21, 2013	Routine revision to technical specification. For details of changes, see Section B.10 - V9 Change Summary
10	April 5, 2013	Routine revision to technical specification. For details of changes, see Section B.9 - V10 Change Summary
11	August 16, 2013	Routine revision to technical specification. For details of changes, see Section B.8 - V11 Change Summary
12	March 14, 2014	Routine revision to technical specification. For details of changes, see Section B.7 - V12 Change Summary
2014-DEC	December 4, 2014	Routine revision to technical specification. For details of changes, see Section B.6 - V2014-DEC Change Summary

Version	Date	Purpose
2015-NOV	November 16, 2015	Routine revision to technical specification. For details of changes, see Section B.5 - V2015-NOV Change Summary
2016-SEP	September 9, 2016	Routine revision to technical specification. For details of changes, see Section B.4 - V2016-SEP Change Summary
2019-MAR	March 8, 2019	Routine revision to technical specification. For details of changes, see Section B.3 - V2019-MAR Change Summary
2019-MARr2020-OCT	October 1, 2020	Routine revision to technical specification. For details of changes, see Section B.2 - V2019-MARr2020-OCT Change Summary
2021-NOV	December 3, 2021	Routine revision to technical specification. For details of changes, see Section B.1 - V2021-NOV Change Summary

B.1 - V2021-NOV Change Summary

Significant drivers for Version 2021-NOV include:

- Community Change Requests

[Table 18](#) summarizes the changes made to 2019-MARr2020-OCT in developing 2021-NOV.

Table 18 - Data Encoding Specification V2021-NOV Change Summary

#	Change	Artifacts Changed	Compatibility Notes
1	Support changes to USAgency to use country.agency vs the old country:agency (CR-2019-173, CR-2019-003)	Schematron IRM-ID-00101 modified IRM-ID-00102 modified IRM-ID-00104 modified IRM-ID-00052 deleted	Systems need to be updated to accommodate the new delimiter for countries.
2	Removed privacy act indicator. (CR-2019-071)	Schema	Systems using privacy act indicator must now look in the ERM Assertion.
3	Fixed misspellings and other grammatical errors in the Schema Guide documentation. (CR-2020-048)	Schema	No impact to systems.

#	Change	Artifacts Changed	Compatibility Notes
4	Add support for Codes for World Waterbody Names. (CR-2021-025)	CVEnumIRMWaterBody added Schema Schematron IRM-ID-00113 added IRM-ID-00114 added	No impact to systems.
5	Remove specific TDF specification environment check since assertion specifications can choose from multiple TDF specifications. (CR-2021-008)	Documentation Schematron IRM-ID-00097 deleted	Data generation and ingestion systems need to be updated.

B.2 - V2019-MARr2020-OCT Change Summary

Significant drivers for Version 2019-MARr2020-OCT include:

- Community Change Requests

The following table summarizes the changes made to 2019-MAR in developing 2019-MARr2020-OCT.

Table 19 - Data Encoding Specification V2019-MARr2020-OCT Change Summary

#	Change	Artifacts Changed	Compatibility Notes
	Update Dependency table to point to the appropriate law or policy for ISM and IC-GENC. (CR-2019-152)	Documentation	No impact to systems.
	Support change to MIME specification to allow additional values through media type regex. (CR-2019-053)	Schematron IRM-ID-00033 modified IRM-ID-00112 added	Systems need to be updated to accommodate this change.
	Updated libraries to render the rule number when triggered. (CR-2019-084)	Schematron ValidateValidationEnvSchema modified ValidateValidationEnvCVE modified	Systems need to be updated to accommodate this change.

#	Change	Artifacts Changed	Compatibility Notes
	Enforce content in virtualCoverage (CR-2020-006)	Schematron IRM-ID-00111 added	Systems need to be updated to accommodate this change.

B.3 - V2019-MAR Change Summary

The following table summarizes the changes made to 2016-SEP in developing 2019-MAR.

Table 20 - Data Encoding Specification V2019-MAR Change Summary

#	Change	Artifacts changed	Compatibility Notes
1	Updated flag attribute from 'error' to 'warning' to be consistent with intent and existing message of the schematron rule. (CR-2018-034)	Schematron IRM-ID-00019 updated IRM-ID-00021 updated	Data generation and ingestion systems need to be updated to enforce the modified rule.
2	Added way to represent well-known text (WKT) geospatial information in IRM geospatialCoverage (CR-2018-104)	Schema	Data generation and ingestion systems need to be updated to enforce the modified rule.
3	Allow version attributes for IRM dependencies and updated schematron rules for minimum version enforcement to test the validation environment. Updated DESVersion enforcement rule to be warning. (CR-2017-140, CR-2017-083)	Schema Schematron IRM-ID-00079 modified IRM-ID-00080 modified IRM-ID-00086 modified IRM-ID-00088 modified IRM-ID-00096 modified IRM-ID-00097 modified IRM-ID-00099 modified IRM-ID-00106 added IRM-ID-00107 added	Data generation and ingestion systems need to be updated to enforce the modified rule.

#	Change	Artifacts changed	Compatibility Notes
4	Updated Schematron rules dealing with CombinedDateType to account for time zones. (CR-2018-119)	Schematron IRM_XML.sch modified DateListYearRangeRule modified DateYearRangeRule modified	Data generation and ingestion systems need to be updated to enforce the modified rule.

#	Change	Artifacts changed	Compatibility Notes
5	Update IRM rules to no longer reference DDMS. (CR-2018-096)	Schema Schematron IRM-ID-00002 modified IRM-ID-00005 modified IRM-ID-00006 modified IRM-ID-00007 modified IRM-ID-00010 modified IRM-ID-00015 modified IRM-ID-00016 modified IRM-ID-00017 modified IRM-ID-00019 modified IRM-ID-00020 modified IRM-ID-00021 modified IRM-ID-00022 modified IRM-ID-00023 modified IRM-ID-00024 modified IRM-ID-00025 modified IRM-ID-00029 modified IRM-ID-00030 modified IRM-ID-00033 modified IRM-ID-00034 modified IRM-ID-00036 modified IRM-ID-00041 modified IRM-ID-00042 modified IRM-ID-00043 modified IRM-ID-00044 modified	Data generation and ingestion systems need to be updated to enforce the modified rule.

#	Change	Artifacts changed	Compatibility Notes
		IRM-ID-00045 modified	
		IRM-ID-00046 modified	
		IRM-ID-00047 modified	
		IRM-ID-00048 modified	
		IRM-ID-00050 removed	
		IRM-ID-00051 removed	
		IRM-ID-00052 modified	
		IRM-ID-00053 modified	
		IRM-ID-00054 modified	
		IRM-ID-00055 modified	
		IRM-ID-00059 removed	
		IRM-ID-00062 modified	
		IRM-ID-00063 modified	
		IRM-ID-00064 modified	
		IRM-ID-00065 modified	
		IRM-ID-00068 modified	
		IRM-ID-00070 modified	
		IRM-ID-00071 modified	
		IRM-ID-00072 modified	
		IRM-ID-00073 modified	
		IRM-ID-00074 modified	
		IRM-ID-00075 removed	
		IRM-ID-00076 modified	
		IRM-ID-00077 modified	
		IRM-ID-00078 modified	
		IRM-ID-00081 modified	

#	Change	Artifacts changed	Compatibility Notes
		IRM-ID-00082 removed IRM-ID-00083 removed IRM-ID-00087 modified IRM-ID-00089 modified IRM-ID-00090 modified IRM-ID-00091 modified IRM-ID-00092 modified IRM-ID-00093 modified IRM-ID-00094 modified IRM-ID-00095 modified IRM-ID-00098 modified IRM-ID-00100 modified IRM-ID-00101 modified IRM-ID-00102 modified IRM-ID-00103 modified IRM-ID-00104 modified IRM-ID-00105 modified	
6	Added @id and @role to all sch:rule elements, in support of commercial tools warnings and errors and to support open source unit testing frameworks. (CR-2017-223)	All non-abstract Schematron rules modified	No impact to existing systems. Additional capabilities.
7	Added ISM attributes to Schematron files to mark up the documentation. (CR-2017-304)	Schematron	No impact to systems.
8	Removed Production Metrics from IRM.XML to a new specification PMA.XML ^[32] (CR-2016-034)	Schema Schematron IRM-ID-00084 removed IRM-ID-00085 removed	Systems using production metrics must now look in the PMA Assertion.

#	Change	Artifacts changed	Compatibility Notes
9	Removed vital record indicator as it is covered by ERM (CR-2016-054)	Schema and Schematron	Systems using vital record must not look in the ERM Assertion.
10	Create RelaxNG CVE Fragments for IRM.XML. (CR-2017-175)	CVEs	No impact to systems.
11	Create JSON version of CVEs in IRM.XML (CR-2017-056)	CVEs	No impact to systems.
12	Create CSV version of CVEs in IRM.XML (CR-2017-034)	CVEs	No impact to systems.
13	Added inverse dependency section and definitions for Dependencies and Inverse Dependencies. (CR-2017-114)	Documentation	No impact to systems.
14	Added schema PDF. (CR-2018-017)	Documentation	No impact to systems.
15	Changed "Multipurpose Internet Mail Extensions" to "Media - Type". Removed CVEnum-IRMMimeType. (CR-2018-056)	Documentation CVEnumIRMMimeType-removed	No impact to systems.
16	Updated DESVersion attribute to generic regex in the schema and created schematron rule to check current DESVersion (CR-2017-083)	Schema Schematron IRM-ID-00108 added	Data generation and ingestion systems need to be updated to accommodate the changes.
17	Change "we" out of schematron rules for IRM.XML. (CR-2017-211)	Schematron	No impact to systems.
18	Updated CSV generation to include a column for deprecation date information. (CR-2018-083)	CSV	Systems using CSVs no longer have to look to the XML or JSON for the deprecation date information.

#	Change	Artifacts changed	Compatibility Notes
19	Update IRM.XML documentation, schema, schematron with regards to @irm:compliesWith and schematron to limit firing based on @irm:compliesWith (CR-2017-321)	<p>CVE</p> <p>CVEnum-IRMCompliesWithUSA added</p> <p>Schema</p> <p>Schematron</p> <p>IRM-ID-00015 modified</p> <p>IRM-ID-00016 modified</p> <p>IRM-ID-00017 modified</p> <p>IRM-ID-00019 modified</p> <p>IRM-ID-00020 modified</p> <p>IRM-ID-00021 modified</p> <p>IRM-ID-00033 modified</p> <p>IRM-ID-00034 modified</p> <p>IRM-ID-00045 modified</p> <p>IRM-ID-00052 modified</p> <p>IRM-ID-00054 modified</p> <p>IRM-ID-00055 modified</p> <p>IRM-ID-00063 modified</p> <p>IRM-ID-00064 modified</p> <p>IRM-ID-00081 modified</p> <p>IRM-ID-00101 modified</p> <p>IRM-ID-00102 modified</p> <p>IRM-ID-00103 modified</p> <p>IRM-ID-00104 modified</p> <p>IRM-ID-00105 modified</p> <p>IRM-ID-00109 added</p>	Data generation and ingestion systems need to be updated to accommodate the changes.

#	Change	Artifacts changed	Compatibility Notes
		IRM-ID-00110 added	
20	Remove dependency section from SECRET Annex (CR-2017-135)	Documentation	No impact to systems.
21	Updated documentation to use the specification framework. (CR-2018-126, CR-2017-247)	Documentation	No impact to systems.
22	Update Schematron Rules relating to Min version to check infrastructure (CR-2018-133)	Schematron ValidateValidationEnvCVE added ValidateValidationEnvSchema added IRM-ID-00079 modified IRM-ID-00080 modified IRM-ID-00086 modified IRM-ID-00088 modified IRM-ID-00096 modified IRM-ID-00097 modified IRM-ID-00099 modified IRM-ID-00106 modified IRM-ID-00107 modified	Data validation systems need to be updated to accommodate the changes to the rules.
23	Fix validity of JSON-LD CVEs. (CR-2018-144)	CVE	Data generation and ingestion systems using JSON need to be updated to accommodate the changes.
24	Removed the Dependency Over Time table. (CR-2018-152)	Documentation	No impact to systems.

B.3.1 - V2019-MAR Change Errata

The following table summarizes the changes to row 9' Compatibility Notes of the Change Log from the original publication of V2019-MAR (i.e., "not" was changed to "now").

Table 21 - Data Encoding Specification V6 Change Errata

#	Change	Artifacts changed	Compatibility Notes
1	Removed vital record indicator as it is covered by ERM (CR-2016-054)	Schema and Schematron	Systems using vital record must now look in the ERM Assertion.

B.4 - V2016-SEP Change Summary

The following table summarizes the changes made to 2015-NOV in developing 2016-SEP.

Table 22 - Data Encoding Specification V2016-SEP Change Summary

#	Change	Artifacts changed	Compatibility Notes
1	Updated IRM.XML to use INTDIS.CES ^[21] CVEs instead of IRM.XML CVEs for intelligence discipline related CVEs. (CR-2015-098)	Schematron IRM_XML.sch updated IRM-ID-00041 updated IRM-ID-00042 updated IRM-ID-00043 updated IRM-ID-00046 updated IRM-ID-00047 updated IRM-ID-00048 updated IRM-ID-00081 updated	Data generation and ingestion systems need to be updated to enforce the modified rule.
2	Removed IRM.XML intelligence discipline related CVEs. (CR-2015-098)	CVE CVerenum-IRMIntelDisciplines.xml removed CVerenumIRMIntelSubdisciplines.xml removed CVerenumIRMIntelSubdisciplineTechniques.xml removed	Data generation and ingestion systems need to be updated to enforce the modified rule.

#	Change	Artifacts changed	Compatibility Notes
3	Added optional INTDIS.CES ^[21] CESVersion attribute to Information Resource Metadata (IRM) attribute group. (CR-2015-098)	Schema IC-IRM.xsd updated Schematron IRM-ID-00086 added IRM-ID-00087 added	Data generation and ingestion systems need to be updated to enforce the modified rule.
4	Updated IRM.XML to use MIME.CES ^[28] CVE instead of IRM.XML CVE for mime types. (CR-2015-048)	Schematron IRM_XML updated IRM-ID-00033 updated	Data generation and ingestion systems need to be updated to enforce the modified rule.
5	Added optional MIME.CES ^[28] CESVersion attribute to IRM attribute group. (CR-2015-048)	Schema IC-IRM.xsd updated Schematron IRM-ID-00088 added IRM-ID-00089 added	Data generation and ingestion systems need to be updated to enforce the modified rule.
6	Added description for identifying additional document identifier values. (CR-2015-048)	DES	Data generation and ingestion systems need to be updated to handle the new potential values.
7	Added rule to give warning for use of deprecated MIME types. (CR-2015-048)	Schematron IRM-ID-00091 added	Data generation and ingestion systems need to be updated to utilize the new rule.
8	Removed 3 values and added one to CVE and updated rules based on changes. (CR-2016-009)	CVEnum CVEnum-IRMCompoundLanguageQualifierType Schematron IRM-ID-00008 removed IRM-ID-00009 removed IRM-ID-00010 updated for new value	Data generation and ingestion systems need to be updated to utilize the new rule.

#	Change	Artifacts changed	Compatibility Notes
9	Updated rules to include checking for the use of Department of Defense Discovery Metadata Specification (DDMS) language in PUBS.XML ^[34] . (CR-2014-056)	Schematron IRM-ID-00005 updated IRM-ID-00006 updated IRM-ID-00007 updated IRM-ID-00010 updated	Data generation and ingestion systems need to be updated to utilize the new rule.
10	Updating to use IC-GENC.CES ^[8] for both countries and subregions. (CR-2015-089)	CVEnumIRMCoverage-ISO-3166-2SubCountry.xml removed Schema Schematron IRM-ID-00031 removed IRM-ID-00049 removed IRM-ID-00090 added IRM-ID-00093 added IRM-ID-00094 added IRM-ID-00095 added IRM-ID-00098 added	Data generation and ingestion systems need to be updated to utilize the new rules.
11	Updated schematron rules to enforce minimum versions defined in specification dependency table 1.7	Schematron IRM-ID-00080 updated IRM-ID-00096 added IRM-ID-00097 added IRM_ID-00099 added	Systems need to be updated to accommodate this change.
12	Updated IRM.XML CVEs with latest ISO 639 updates.	CVE CVEnum-IRMISO639-2Trigraph updated CVEnum-IRMISO639-3Trigraph updated	Systems need to be updated to accommodate this change.

#	Change	Artifacts changed	Compatibility Notes
13	Added a schematron rule to enforce that tdf:StatementMetadata is present in a tdf:Assertion if ddms:resource is present within tdf:StructuredStatement to ensure proper classification. Previously, it was possible for the ddms:resource to have no classification, which could impact use and tear-lining. (CR-2016-043)	Schematron IRM-ID-00100 added	Systems need to be updated to accommodate this change.
14	Consistent qualifiers for UUIDs, DocumentIDs, and InternalIDs (CR-2014-015) Added standard way of including a document identifier that is required to be the publication/serial number if used. The optional DocumentID MUST conform to the standard format that everyone and every system knows as the publication/serial number. (CR-2014-015)	Documentation	Systems need to be update to accommodate this change.
15	Correct rule to properly handle nested elements. (CR-2015-003)	Schematron IRM-ID-00075 updated	Systems need to be updated to accommodate this fix.
16	Added requirement for ddms:NonStateActor values to be from the NonStateActor CVE in PM.CES ^[31] . (CR-2015-101)	Schematron IRM-ID-00092 added	Systems need to be updated to accommodate this new restriction.
17	The schema change logs will no longer be maintained as of the 2016-SEP release. The existing change logs will only serve as legacy information. For changes to schema as of and after 2016-SEP, reference the change history in the DES.	Schema	No impact to systems.

#	Change	Artifacts changed	Compatibility Notes
18	Updated Schematron rules for IRM.XML to account for @ddms:acronym that contains country code. (CR-2016-028)	Schematron IRM_XML.sch updated TypeConstraintPatterns.sch added IRM-ID-00052 updated IRM-ID-00101 added IRM-ID-00102 added IRM-ID-00103 added IRM-ID-00104 added	Systems need to be updated to accommodate this new restriction.
19	Update applicability section to reflect a requirement to comply with Law/Policy (CR-2016-063)	Documentation	Implementers must verify that they are complying with applicable laws and policies.

B.5 - V2015-NOV Change Summary

The following table summarizes the changes made to 2014-DEC in developing 2015-NOV.

Table 23 - Data Encoding Specification V2015-NOV Change Summary

#	Change	Artifacts changed	Compatibility Notes
1	Updated IRM.XML CVE imports for PMSubject and PMCoverage to use PM.CES ^[31] CVEs instead of IRM.XML CVEs.	Schematron IRM_XML updated IRM_ID_00050 updated IRM_ID_00051 updated	Data generation and ingestion systems need to be updated to enforce the modified rule.
2	Removed IRM Coverage and Subject CVEs.	CVE CVENumIRMProduction-MetricsCoverage.xml removed CVENumIRMProduction-MetricsSubject.xml removed	Data generation and ingestion systems need to be updated to enforce the modified rule.

#	Change	Artifacts changed	Compatibility Notes
3	Added optional PM.CES ^[31] CESVersion attribute to IRM attribute group.	Schema IC-IRM.xsd updated. Schematron IRM_ID_00084 added. IRM_ID_00085 added.	Data generation and ingestion systems need to be updated to enforce the modified rule.

B.6 - V2014-DEC Change Summary

The following table summarizes the changes made to V12 in developing 2014-DEC.

Table 24 - Data Encoding Specification V2014-DEC Change Summary

#	Change	Artifacts changed	Compatibility Notes
1	Corrected rule text replacing the mention of attribute @ddms:type with @ddms:value, since ddms:type doesn't have an attribute named @ddms:type, and the rule assertion is actually looking for @ddms:value.	Schematron IRM-ID-00046 revised IRM-ID-00053 revised IRM-ID-00070 revised IRM-ID-00071 revised	No change to actual code, only changes to the rule text that is rendered.
2	Made changes to IRM Production Metrics Coverage to match it to high-side version of country names that apply to Production Metrics values. Full details of changes available.	CVEnumProduction-MetricsCoverage.xml changed	Data generation and ingestion systems need to be updated to enforce the modified rule.
3	Made changes to IRM Production Metrics Subject to update ECFS to Economic Stability and Threat Finance and resorted list to match ordering in USG list.	CVEnumProduction-MetricsSubject.xml changed	Data generation and ingestion systems need to be updated to enforce the new rules.
4	Wrapped DateListYearRangeRule and DateYearRangeRule abstract Schematron rules in patterns to better conform with Schematron requirements.	DateListYearRangeRule and DateYearRangeRule changed	Data generation and ingestion systems need to be updated to incorporate the rule changes.

#	Change	Artifacts changed	Compatibility Notes
5	Revised rule IRM_ID_00049 to correct use of attributes on ddms:subDivisionCode rule (using codespace and code instead of qualifier and value).	Schematron IRM-ID-00049 changed	Data generation and ingestion systems need to be updated to enforce the modified rule.
6	Changed DESVersion to represent the year and month of release. Also allowed for extension of specification by adding a '-' followed by a string to denote a custom implementation.	DES Schema Schematron IRM-ID-00079 changed IRM-ID-00080 changed	Data generation and ingestion systems need to be updated to enforce the modified rules.
7	Corrected qualifiers listed in section 2.2.5 of the DES bringing them into consistent alignment with CVE namespaces and their use in Schematron. Also, corrected a bad qualifier usage in IRM-ID-00041. Corrected typo in URN of CVEnum-IRMPostitiveIntel.	DES CVEnum-IRMPositiveIntel.xml Schematron IRM-ID-00041 changed	Data generation and ingestion systems need to be evaluated the effect of these changes on their system and updated as necessary.
8	Added rule IRM-ID-00083 requiring a DDMS assertion if an IRM Trusted Data Object structured statement exists.	Schematron IRM-ID-00083 added	Data generation and ingestion systems need to be updated to enforce the new rule.

B.7 - V12 Change Summary

Significant drivers for Version 12 include:

- Use of *Geopolitical Entities, Names, and Codes* ^[6] for country codes
- Full implementation of DNI Negroponte Revision/Recall Memorandum

The following table summarizes the changes made to V11 in developing V12.

Table 25 - Data Encoding Specification V12 Change Summary

#	Change	Artifacts changed	Compatibility Notes
1	Updated the IRM.XML Schematron to import the IC-GENC.CES ^[8] specification and use the IC-GENC abstract rule to enforce allowable values for country codes.	Schematron IC-IRM-ID-00031 Changed	Data generation and ingestion systems need to be updated to enforce the modified rule.
2	Added a schematron rule to prevent use of the ddms:revisionRecall element which is now replaced by the new RevRecall.XML ^[35] specification.	Schematron IC-IRM-ID-00082 Added	Data generation and ingestion systems need to be updated to enforce the new rules.

B.7.1 - V12 Change Errata

The following table summarizes the changes that were discovered to have been omitted from the original publication of V12.

Table 26 - Data Encoding Specification V12 Change Errata

#	Change	Artifacts changed	Compatibility Notes
1	Change "FD&D" to "FDND".	IRM.XML DES	Data generation and Ingestion systems need to be updated to properly enforce the change.

B.8 - V11 Change Summary

Significant drivers for Version 11 include:

- Creation of the USAgency.CES^[38] specification

The following table summarizes the changes made to V10 in developing V11.

Table 27 - Data Encoding Specification V11 Change Summary

#	Change	Artifacts changed	Compatibility Notes
1	Updated the IRM.XML schema to import the USAgency.CES ^[38] specification and use the US Agency abstract rule to enforce allowable values for the agency acronym attribute for the organization element. Added the US Agency Controlled Vocabulary Enumeration Encoding Specification (CES) Version attribute to the Enterprise Data Header (EDH) top level element.	Schema Schematron IC-IRM-ID-00052 Changed	Data generation and ingestion systems need to be updated to use the latest version of the schema and enforce the modified rule.
2	Added a schematron rule to ensure that the versions of the US Agency imported spec meets the minimum allowed version.	Schematron IC-IRM-ID-00080 Added	Data generation and ingestion systems need to be updated enforce the new rules.

B.9 - V10 Change Summary

Significant drivers for Version 10 include:

- Creation of the IC-ID.XML^[9] specification

The following table summarizes the changes made to V9 in developing V10.

Table 28 - Data Encoding Specification V10 Change Summary

#	Change	Artifacts changed	Compatibility Notes
1	Updated the IRM.XML schematron rule that verified the format of the GUIDE ID to use the abstract rule defined in IC-ID.XML ^[9] .	Schematron IRM-ID-00062	Data generation and ingestion systems need to be updated to enforce the updated rule.
2	Updated the IRM.XML schema to import the IC-ID.XML ^[9] specification and added the IC-ID.XML ^[9] DES Version attribute to the IRM assertion.	Schema	Data generation and ingestion systems need to be updated to use the latest version of the schema.

B.10 - V9 Change Summary

Significant drivers for Version 9 include:

- See ISM.XML^[23] V10 drivers
- DDMS^[4]

The following table summarizes the changes made to V8 in developing V9.

Table 29 - Data Encoding Specification V9 Change Summary

#	Change	Artifacts changed	Compatibility Notes
1	Updated a rule checking for child nodes on the @ddms:TemporalCoverage element to ignore @ddms:name .	Schematron IRM-ID-00075 Changed	Data generation and ingestion systems need to be updated to enforce the modified rule.
2	Moved several rules from PUBS.XML ^[34] to IRM.XML as they should be run whenever DDMS is present, not just if the XML Instance is a PUBS.XML ^[34] document.	Schematron IRM-ID-00074 Added (originally PUBS-ID-00109) IRM-ID-00075 Added (originally PUBS-ID-00088) IRM-ID-00076 Added (originally PUBS-ID-00107) IRM-ID-00077 Added (originally PUBS-ID-00105) IRM-ID-00078 Added (originally PUBS-ID-00090)	Data generation and ingestion systems need to be updated to no longer enforce the removed rules, and instead upgraded to enforce the IRM.XML versions.
3	Added a new CVE to define an enumeration for Positive Intel values. Created schematron rules to enforce that if an element of @ddms:type is qualified as a Positive Intel value, the attribute @ddms:value is defined within the CVE.	CVEnumIRMPositiveIntel Schematron IRM-ID-00073 Added	Data generation and ingestion systems will have to recognize the qualifier for Positive Intel and enforce the schematron rule that confirms the values are valid.

#	Change	Artifacts changed	Compatibility Notes
4	The refactoring of the DDMS card to be a TDO with a DDMS assertion removed the need for the <code>@ddms:publisher</code> , <code>@ddms:language</code> , <code>@ddms:productionMetric</code> , <code>@ddms:title</code> , <code>@ddms:creator</code> , <code>@ddms:contributor</code> , and <code>@ddms:pointOfContact</code> to be defined within the DDMS structure. These values are now stored in the Payload scoped Handling Assertion's EDH and are required by the schema. The business rules previously enforcing that these values be defined if <code>MIN_DISCOVERABLE_OR_GREATER</code> have been removed.	Schematron IRM-ID-00035 Removed IRM-ID-00038 Removed IRM-ID-00039 Removed IRM-ID-00056 Removed IRM-ID-00061 Removed	Data generation and ingestion systems will have to be updated to no longer enforce that rule.
5	The refactoring of the DDMS card to be a TDO with a DDMS assertion allows that TDO to contain an inline payload. The rules previously enforcing that a DDMS card had ism markings for external references has been removed.	Schematron IRM-ID-00066 Removed IRM-ID-00067 Removed	Data generation and ingestion systems will have to be updated to no longer enforce those rules.

#	Change	Artifacts changed	Compatibility Notes
6	<p>The refactoring of the DDMS card to be a TDO with a DDMS assertion removed the need for IC-ID.XML^[9] for the resource and the DDMS card to be defined within the DDMS structure. The IC-ID.XML^[9] for the complete DDMS card, originally in <code>ddms:metacardInfo/ddms:identifier</code>, is now defined in the Identifier element in the TDO scoped Handling Assertion's EDH for the TDO. The IC-ID.XML^[9] for the resource, originally in <code>ddms:resource/ddms:identifier</code>, is now defined in the Identifier element in the Payload scoped Handling Assertion's EDH. The business rules previously enforcing the existence of those IC-IDs have been removed.</p>	<p>Schematron</p> <p>IRM-ID-00012 Removed</p> <p>IRM-ID-00014 Removed</p>	<p>Data generation and ingestion systems will have to be updated to no longer enforce those rules.</p>
7	<p>The regular expression to check the GUIDE id was updated to ensure that there are no additional characters before or after the id.</p>	<p>Schematron</p> <p>IRM-ID-00062 Changed</p> <p>Examples</p>	<p>Data generation and ingestion systems complying with the GUIDE id rules do not need to be updated.</p> <p>Systems that were allowing invalid GUIDE ids will need to be updated to comply with the constraint rule.</p>
8	<p>IRM.XML is now designed to live inside of a TrustedDataObject resulting in DDMS being removed from the Schema.</p> <p>As part of this change, all schematron rules were updated with xpaths for the new format.</p>	<p>Schema</p> <p>Schematron</p>	<p>Data generation and ingestion systems will have to be updated to handle the new TDO formatted IRM instances.</p>
9	<p>DDMS now resides in a peer assertion within the a TrustedDataObject.</p>	<p>Schematron</p>	<p>Data generation and ingestion systems will have to be updated to handle the new TDO formatted IRM instances.</p>

#	Change	Artifacts changed	Compatibility Notes
10	Added check to require <code>@ddms:start dateTime</code> be less than <code>@ddms:end dateTime</code> for <code>@ddms:searchableDate</code> .	IRM-ID-00072 Added	Data generation and ingestion systems need to be updated to use the additional rule.
11	Fixed bug in IRM-ID-00010 to not error in the edge case where attribute <code>@ddms:value</code> contains the empty string.	IRM-ID-00010 Changed	Data validation systems should update to include the syntax improvement.
12	Updated MIME Types to current IANA list + DNI types +application/x-autocad.	CVEnumIRMMimeType	Data generation and ingestion systems will have to be updated to handle the new mime values.
13	Version decoupling, allowing import of any version of ISM.XML ^[23] and other dependent specifications at or above ISM.XML ^[23] v9+, NTK.XML ^[29] V7+, ARH.XML ^[2] V1+, IC-TDF.XML ^[11] V1+, and IC-EDH.XML ^[7] V1+.	DES	Data ingestion systems need to be aware of this change and ensure they check appropriate dependent spec versions for validation.
14	Updated Schema to ISM.XML ^[23] V10.	Schema	Updated the Schema itself to use <code>ism:DESVersion</code> to 10 to mark the <code>xsd</code> schema instance with classification markings.
15	Adopt <i>Geopolitical Entities, Names, and Codes</i> ^[6] as the only Country code list for IRM.XML.	IRM-ID-00001 Removed CVEnumIRMCoverage-FIPSDigraph Removed CVEnumIRMCoverage-ISO3166Trigraph Changed CVEnumIRMCoverage-ISO3166Trigraph Changed	Data generation and ingestion systems will have to be updated to support the current CVE values.
16	Remove ORCON POC related rules as ISM.XML ^[23] .V10 removed ORCON POC.	Schematron IRM-ID-00037 Removed	Data generation and ingestion systems need to be updated to no longer use rule
17	Updated Schema to ISM.XML ^[23] V10.	Schema	Updated the Schema itself to use <code>ism:DESVersion</code> to 10 to mark the <code>xsd</code> schema instance with classification markings.

#	Change	Artifacts changed	Compatibility Notes
18	Update to use VIRT.XML ^[39] instead of IC Common for virtual coverage concepts.	Schematron Removed IRM-ID-00069	Data generation and ingestion systems need to be updated to no longer use this rule
19	Update rule to enforce that attribute @ism:excludeFromRollup must not be specified for any element in the namespace [urn:us:mil:ces:metadata:ddms:5] in a TDF IRM assertion.	Schematron Removed IRM-ID-00025	Data generation and ingestion systems need to be aware of this rule
20	Add Cabinet Offices to CVEEnum-IRMAgencyAcronym.	CVE	Data generation and ingestion systems need to be updated to use the correct CVE definitions and values.

B.10.1 - V9 Change Errata

The following table summarizes the changes that were discovered to have been omitted from the original publication of V9.

Table 30 - Data Encoding Specification V9 Change Errata

#	Change	Artifacts changed	Compatibility Notes
1	Removed Schematron rules	Schematron Removed IRM-ID-00003	Data generation and ingestion systems need to be updated to properly enforce the new constraint rules.

B.11 - V8 Change Summary

Significant drivers for Version 8 include:

- See ISM.XML^[23] V9 drivers
- DDMS^[4]
- IC Cloud

The following table summarizes the changes made to V7 in developing V8.

Table 31 - Data Encoding Specification V8 Change Summary

#	Change	Artifacts changed	Compatibility Notes
1	Update ISM.XML ^[23] to V9 and NTK.XML ^[29] to V7.	Schema Constraint Rules	Data generation and ingestion systems need to be updated to comply with all constraint rules in these sub-specifications.
2	Update mapping to IC-ADD.XML ^[1]	DES	Should not impact data.
3	Add Mapping for AUTH-ID as a <code>@ddms:type</code> [artf12285].	DES Schema	Data generation and ingestion systems need to be updated to use new structure.
4	Updated IRM-ID-00039 to verify that at least one <code>productionMetric</code> exists in one of the <code>subjectCoverage</code> elements.	Schematron	Data generation and ingestion systems need to be updated to use the new values and comply with all constraint rules.
5	Added support for alphanumeric <code>@DESVersion</code> identifiers [artf12167].	Schema	Should not impact data but ingestion systems may need to account for it.
6	Added support for malicious code, executable, authorizationreference, evaluated, and minimized as <code>@ddms:types</code> [artf12285].	DES	Data generation and ingestion systems need to be updated to use the new values and comply with all constraint rules.

#	Change	Artifacts changed	Compatibility Notes
7	Added attribute @compliesWith to allow IRM instance documents to comply with subsets of rules, including rules for minimum access (cloud ingestion) and minimum discoverability.	Schema Schematron IRM-ID-00035 Changed IRM-ID-00038 Changed IRM-ID-00039 Changed IRM-ID-00055 Changed IRM-ID-00056 Added IRM-ID-00059 Added IRM-ID-00061 Added IRM-ID-00063 Added IRM-ID-00064 Added IRM-ID-00065 Added CEnum-IRMCompliesWith.xml Added	Data generation and ingestion systems need to be updated to use the new and modified rules and support the modified schema.
8	Updated rule IRM-ID-00037 to only apply to specific DDMS element creator , publisher , contributor , and pointOfContact to prevent rules from firing on element @irm:NoticeText .	IRM-ID-00037 Changed	Should not impact existing data but ingestion systems need to account for modified rule.
9	Removed rule IRM-ID-00011 because it is covered by rule IRM-ID-00012.	IRM-ID-00011 Removed	Data generation and ingestion systems need to be updated to use the correct constraint rules.
10	Removed rule IRM-ID-00013 because it is covered by rule IRM-ID-00014.	IRM-ID-00013 Removed	Data generation and ingestion systems need to be updated to use the correct constraint rules.
11	Added rule to require notices within @ddms:security to be marked as externalNotice="true" since they refer to the referenced resource.	IRM-ID-00066 Added	Data generation and ingestion systems need to be updated to use the new rule.

#	Change	Artifacts changed	Compatibility Notes
12	Added rule to require <code>@ntk:Access</code> within <code>@ddms:security</code> to be marked as <code>externalReference="true"</code> since it refers to the referenced resource.	IRM-ID-00067 Added	Data generation and ingestion systems need to be updated to use the new rule.
13	Added rule to enforce format of IC-ID.XML ^[9] identifiers.	IRM-ID-00062 Added	Data generation and ingestion systems need to be updated to use the new rule.
14	Added rules to enforce <code>network</code> attribute and <code>xlink</code> attribute constraints on <code>@ddms:taskID</code> .	IRM-ID-00068 Added IRM-ID-00069 Added	Data generation and ingestion systems need to be updated to use the new rules.
15	Added rules to enforce CVE values for <code>ExecutableIndicator</code> and <code>MaliciousCodeIndicator</code> [artf12660].	IRM-ID-00070 Added IRM-ID-00071 Added CVENum-IRMMaliciousCodeIndicator Added CVENum-IRMExecutableIndicator Added	Data generation and ingestion systems need to be updated to use the new rules.

B.12 - V7 Change Summary

Significant drivers for Version 7 include:

- See ISM.XML^[23] V8 drivers

The following table summarizes the changes made to V6 in developing V7.

Table 32 - Data Encoding Specification V7 Change Summary

#	Change	Artifacts changed	Compatibility Notes
1	Update ISM.XML ^[23] to V8 and NTK.XML ^[29] to V6.	Schema Constraint Rules	Data generation and ingestion systems need to be updated to comply with all constraint rules in these sub-specifications.
2	Removed IRM-ID-00018 so times are no longer constrained to 3 decimal places.	Schematron IRM-ID-00018 Removed	Data generation and ingestion systems need to be updated to properly handle the greater precision now possible.

B.13 - V6 Change Summary

Significant drivers for Version 6 include:

- DDMS [\[4\]](#) / IRM Harmonization

The following table summarizes the changes made to V5 in developing V6.

Table 33 - Data Encoding Specification V6 Change Summary

#	Change	Artifacts changed	Compatibility Notes
1	IRM and DDMS Harmonization: IRM is now an <code>@irm:IC-ResourceMetadataPackage</code> wrapper around a DDMS 4.0 ^[4] <code>@ddms:resource</code> element.	Schema Documentation IRM-ID-00002 Changed IRM-ID-00005 Changed IRM-ID-00007 Changed IRM-ID-00008 Changed IRM-ID-00009 Changed IRM-ID-00010 Changed IRM-ID-00011 Changed IRM-ID-00012 Changed IRM-ID-00013 Changed IRM-ID-00014 Changed IRM-ID-00016 Changed IRM-ID-00018 Changed IRM-ID-00019 Changed IRM-ID-00020 Changed IRM-ID-00021 Changed IRM-ID-00022 Changed IRM-ID-00024 Changed IRM-ID-00025 Changed IRM-ID-00027 Removed IRM-ID-00028 Removed IRM-ID-00029 Changed IRM-ID-00030 Changed IRM-ID-00031 Changed	Data generation and ingestion systems need to be updated to comply with all constraint rules in these sub-specifications as well as schema changes.

#	Change	Artifacts changed	Compatibility Notes
		IRM-ID-00032 Removed	
		IRM-ID-00033 Changed	
		IRM-ID-00034 Changed	
		IRM-ID-00035 Changed	
		IRM-ID-00037 Changed	
		IRM-ID-00038 Added	
		IRM-ID-00039 Added	
		IRM-ID-00040 Added	
		IRM-ID-00041 Added	
		IRM-ID-00042 Added	
		IRM-ID-00043 Added	
		IRM-ID-00044 Added	
		IRM-ID-00045 Added	
		IRM-ID-00046 Added	
		IRM-ID-00047 Added	
		IRM-ID-00048 Added	
		IRM-ID-00049 Added	
		IRM-ID-00050 Added	
		IRM-ID-00051 Added	
		IRM-ID-00052 Added	
		IRM-ID-00053 Added	
		IRM-ID-00054 Added	
		IRM-ID-00055 Added	

B.14 - V5 Change Summary

Significant drivers for Version 5 include:

- See ISM.XML^[23] V7 drivers

- National Human Intelligence (HUMINT) Director for several new markups
- Joint Chiefs of Staff Pub 2.0: Appendix B - Intelligence Disciplines^[27]

The following table summarizes the changes made to V4 in developing V5.

Table 34 - Data Encoding Specification V5 Change Summary

#	Change	Artifacts changed	Compatibility Notes
1	Update ISM.XML ^[23] to V7 and NTK.XML ^[29] to V5.	Schema Constraint Rules	Data generation and ingestion systems need to be updated to comply with all constraint rules in these sub-specifications.
2	Removed IRM NoticeList , Notice , and NoticeText elements, and updated references to @irm:NoticeList to @ism:NoticeList .	Schema IRM-ID-00002 Changed	Data generation and ingestion systems need to be updated to use the new values.
3	Replaced IC-DDMS with clean version of DDMS 3.0 ^[4] and enforce specific IC constraints with new Schematron ^[36] rules.	IRM-ID-00031 Added IRM-ID-00032 Added IRM-ID-00033 Added IRM-ID-00034 Added IRM-ID-00035 Added	Data generation and ingestion systems need to be updated to use the new constraint rules.
4	Updated XLink ^[40] to version 1.1, which further restricts the types of certain attributes.	Schema IRM-ID-00036 Added	Data generation and ingestion systems need to be updated to use the new values. Note: Data generated under previous releases may not be valid under this release.
5	Added support for ORCON ^[30] memos and points-of-contact by extending DDMS ^[4] elements creator , publisher , contributor and pointOfContact to include the @ism:POCAttributesGroup .	Schema IRM-ID-00037 Added	Data generation and ingestion systems need to be updated to use the new values and comply with all constraint rules. Note: Data generated under previous releases may not be valid under this release.

#	Change	Artifacts changed	Compatibility Notes
6	Added <code>irm:Dates/@dateReceived</code> attribute to track when a product is received from an external source.	Schema IRM-ID-00016 Changed IRM-ID-00018 Changed IRM-ID-00024 Changed	Data generation and ingestion systems need to be updated to use the new values and comply with all constraint rules.
7	Added ProcessingInfoList and ProcessingInfo elements, with the required <code>@dateProcessed</code> attribute, to track when a product has been transformed in some way post-production.	Schema IRM-ID-00016 Changed IRM-ID-00018 Changed IRM-ID-00024 Changed	Data generation and ingestion systems need to be updated to use the new values and comply with all constraint rules.
8	Replaced "\d" in regular expressions to the more specific "[0-9]."	Schema Constraint Rules	Should not impact data since intent of the new expressions is the same.
9	Fixed type errors generated when using a schema-aware processor.	Constraint Rules	Should not affect data.
10	Updated Intelligence Discipline and Subdiscipline CVE values in accordance with JP 2-0: Joint Intelligence ^[27] .	CVEnum-IRMIntelDisciplines.xml, CVEnumIRMIntelSubdisciplines.xml	Data generation and ingestion systems need to be updated to use the updated CVE values.
11	Added country code for South Sudan to the ISO 3166-1 ^[25] CVEs.	CVEnumISMFGIOpen Changed CVEnum-ISMFGIProtected Changed CVEnum-ISMOwnerProducer Changed CVEnumISMRelTo Changed	Data generation and Ingestion systems need to be updated to properly use the new values.

B.15 - V4 Change Summary

Significant drivers for Version 4 include:

- See ISM.XML^[23] V6 drivers
- National HUMINT Director for several new markups

The following table summarizes the changes made to V3 in developing V4.

Table 35 - Data Encoding Specification V4 Change Summary

#	Change	Artifacts changed	Compatibility Notes
1	Changed encoding of constraint rules from text to Schematron ^[36] .	Documentation, Constraint Rules	Other than rules whose changes are noted below, this should only result in more clarity of definition for the rules.
2	Removed support for ISO 3166-1 ^[25] Digraph codes.	Documentation, Schema, CValueEnumIRMCoverage-ISO3166Digraph, IRM-ID-00002 (Value Enumeration Constraints) Removed	Data generation and Ingestion systems need to be updated to not use these values anymore and to properly enforce only the remaining constraint rules. Note: Rule identifier IRM-ID-00002 was previously used for two rules, one under Value Enumeration Constraints and the other under Global Constraints. Now, only the Global Constraints rule remains.
3	Removed support for ISO 3166-1 Numeric codes ^[25] .	Documentation, Schema, CValueEnumIRMCoverage-ISO3166Numeric, IRM-ID-00004 Removed	Data generation and Ingestion systems need to be updated to not use these values anymore and to properly enforce only the remaining constraint rules.
4	Corrected incorrect reference to ISO 639 ^[24] CVE file.	IRM-ID-00010 Changed	Data generation and Ingestion systems need to be checked to ensure the correct values are being used.
5	Changed wording of rules to distinguish between attributes and elements using similar constructs.	IRM-ID-00018 Changed IRM-ID-00024 Changed	As the intent of the rules remains unchanged, this should not impact data.
6	Added <code>@irm:CountryCodeCoverageList</code> and <code>@irm:CountryCode</code> element.	Schema IRM-ID-00027 Added IRM-ID-00028 Added IRM-ID-00029 Added	Data generation and Ingestion systems need to be updated to properly support new elements.

#	Change	Artifacts changed	Compatibility Notes
7	Added irm:SubCountryCodeCoverageList and irm:SubCountryCode elements.	Schema	Data generation and Ingestion systems need to be updated to properly support new elements.
8	Added @irm:order attribute to specify a user-defined ordering of elements, including irm:NonStateActor , irm:CountryCode and irm:SubCountryCode .	Schema IRM-ID-00030 Added	Data generation and Ingestion systems need to be updated to properly support new attribute.
9	Removed rules for @ism:compliesWith ICD 710 ^[17] .	IRM-ID-00026 Removed	Data generation and Ingestion systems need to be updated to no longer enforce this constraint.

B.16 - V3 Change Summary

Significant drivers for Version 3 include:

- See ISM.XML^[23] V5 drivers
- Executive Order 13526^[5]
- National HUMINT Director for several new markups

The following table summarizes the changes made to V2 in developing V3.

Table 36 - Data Encoding Specification V3 Change Summary

#	Change	Artifacts changed	Compatibility Notes
1	Uses ISM.XML ^[23] V5.	Schema	Data generation and Ingestion systems need to be updated to properly enforce the new constraint rule.
2	Added IRM.XML MIME type.	DES, Schema	IRM.XML MIME type has been declared in order to facilitate communications and address business needs within the community.
3	Removed Appendix H Reading the Schematics.	Documentation	Knowledge of how to interpret these schema images is common making this appendix unnecessary.

#	Change	Artifacts changed	Compatibility Notes
4	Added support for expressing coverage of NonState Actors.	Documentation Schema	Data generation and Ingestion systems need to be updated to properly support new elements.

B.17 - V2 Change Summary

Significant drivers for Version 2 include:

- See ISM.XML^[23] V4 drivers
- Executive Order 13526^[5]
- CAPCO Register and Manual^[3]

The following table summarizes the changes made to V1 in developing V2.

Table 37 - Data Encoding Specification V2 Change Summary

#	Change	Artifacts changed	Compatibility Notes
1	Added all constructs other than <code>@ddms:resource</code>	All	Prior data will need to have the constructs other than <code>@ddms:resource</code> and will have to map <code>@ddms:resource</code> to <code>@irm:ICResource-MetadataPackage</code> .

Appendix C List of Abbreviations

This appendix lists all the acronyms and abbreviations referenced in this encoding specification.

ADD	Abstract Data Definition
CES	Controlled Vocabulary Enumeration Encoding Specification
CIA	Central Intelligence Agency
CVE	Controlled Vocabulary Enumeration
DDMS	Department of Defense Discovery Metadata Specification
DES	Data Encoding Specification
DHS	Department of Homeland Security
DIA	Defense Intelligence Agency
DNI	Director of National Intelligence
DOD	Department of Defense
DOS	U.S. Department of State
EDH	Enterprise Data Header
ESB	Enterprise Standards Baseline
HUMINT	Human Intelligence
IANA	Internet Assigned Numbers Authority
IC	Intelligence Community
IC CIO	Intelligence Community Chief Information Officer
ICD	Intelligence Community Directive
IC ESB	Intelligence Community Enterprise Standards Baseline
ICPM	Intelligence Community Policy Memorandum
ICS	Intelligence Community Standard
IEC	International Electrotechnical Commission
IRM	Information Resource Metadata
ISM	Information Security Markings
ISO	International Organization for Standardization

MIME	Media Type
NCTC	National Counterterrorism Center
OGC	Open Geospatial Consortium
ORCON	Originator Controlled
TDF	Trusted Data Format
TDO	Trusted Data Object
TSPI	Time Space Position Information
URL	Uniform Resource Locator
US	United States
XML	Extensible Markup Language
XSL	Extensible Stylesheet Language
XSLT	XSL Transformations

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Available online at: <http://www.w3.org/TR/xslt20/>

Appendix E Points of Contact

The Intelligence Community Chief Information Officer (IC CIO) facilitates one or more collaboration and coordination forums charged with the adoption, modification, development, and governance of IC technical specifications of common concern. This technical specification was produced by the IC CIO and coordinated with these forums, approved by the IC CIO or a designated representative, and made available at the following DNI-sponsored web sites.

Public Website: <https://w3id.org/ic/standards/public>

Intelshare: <https://w3id.org/ic/standards/data-specs>

Direct all inquiries about this IC technical specification, IC technical specification collaboration and coordination forums, or IC element representatives involved in those forums, to the IC CIO.

E-mail: ic-standards-support@odni.gov.

Appendix F IC CIO Approval Memo

An IC CIO Approval Memo should accompany this enterprise technical data specification bearing the signature of the IC CIO or an IC CIO-designated official(s). If an IC CIO Approval Memo is not accompanying this specification's version release package, then refer back to the authoritative web location(s) for this specification to see if a more complete package or a specification update is available.

Specification artifacts display a date representing the last time a version's artifacts as a whole were modified. This date most often represents the conclusion of the IC Element collaboration and coordination process. Once the IC Element coordination process is complete, the specification goes through an internal IC CIO staffing and coordination process leading to signature of the IC CIO Approval Memo. The signature date of the IC CIO Approval Memo will be later than the last modified date shown on the specification artifacts by an indeterminable time period.

Upon signature of the IC CIO Approval Memo, IC Elements may begin to use this specification version in order to address mission and business objectives. However, it is critical for IC Elements, prior to disseminating information encoded with this new specification version, to ensure that key enterprise services and consumers are prepared to accept this information. IC Elements should work with enterprise service providers and consumers to orchestrate an orderly implementation transition to this specification version in concert with mandatory and retirement usage decisions captured in the Intelligence Community Enterprise Standards Baseline (IC ESB) as defined in ICS 500-20^[19].