Intelligence Community and Department of Defense Technical Specification

Atom Data Encoding Specification for Content Discovery and Retrieval Result Sets

Version 2

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Chapter 1 - Introduction

1.1 - Purpose

The Content Discovery and Retrieval (CDR) Search Component specifies the use of result sets in service responses. As various specifications leverage the Atom syndication format,[11] guidelines must be created to ensure consistent usage across those specifications. This document further constrains the Atom base specification to support the specific information requirements of the CDR Search Specifications. The guidance provided in this document focuses on the use of the Atom syndication format.

1.2 - Scope

This specification is applicable to the Intelligence Community (IC) and Department of Defense (DoD) and information produced by, stored, or shared within and between the IC and DoD. This Data Encoding Specification (DES) may have relevance outside the scope of these communities; 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 - Background

The Intelligence Community (IC) and Department of Defense (DoD) support an evolving and dynamic mission and business landscape, so their information systems must enable information sharing and interoperability by default. To achieve this objective, program managers, IT managers, and developers need guidance to plan, manage, model, and build interoperable information systems.

In July 2007, the DoD Chief Information Officer (CIO) and the Director of National Intelligence (DNI) CIO signed a memorandum[14] committing the IC and DoD to a joint vision and shared oversight for realizing a common services-based environment. The key value proposition is to enable greater and more flexible information and capability sharing within and across the IC/DoD Enterprise. Under this vision, the Joint IC/DoD Content Discovery and Retrieval (CDR) Integrated Project Team (IPT) was established to develop and publish a set of architecturally-driven standards and specifications to enable content discovery and retrieval of all IC and DoD data assets.

A DES specifies how to implement the more abstract data structures into a particular physical encoding (e.g., data or file format).

1.4 - Enterprise Need

Enterprise needs and requirements for this specification can be found in the following policies and implementation guidance.

- IC Information Technology Enterprise (IC ITE)
  - Intelligence Community Information Technology Enterprise (IC ITE) Increment 1 Implementation Plan[5]

- 500 Series:
  - Intelligence Community Directive (ICD) 501, Discovery and Dissemination or Retrieval of Information within the IC[6]
  - Joint IC/DoD Memorandum, IC and DoD Commitment to an Interoperable Service-Based Environment (13 Jul 07)[14]

1.5 - Audience and Applicability

DESs are primarily intended to be used by those developing tools and services to create, modify, store, exchange, search, display, or further process the type of data being described.

Within the IC, the conditions of use and applicability of this technical specification are defined outside of this technical specification. IC Standard (ICS) 500-20, Intelligence Community Enterprise Standards Compliance,ICS 500-20 defines the IC Enterprise Standards Baseline (IC ESB) and the applicability of such to an IC element. The IC ESB defines the compliance requirements associated with each version of a technical specification. Each version will be individually registered in the IC ESB. The IC ESB will define, among other things, the location(s) of the relevant artifacts, prescriptive status, and validity period, all of which characterize the version and its utility. Additional applicability and guidance may be defined in separate IC policy guidance.

Within the DoD, the conditions of use and applicability of this technical specifications are defined outside of this technical specification, and can be located within the DoD Information Technology Standards and Profile Registry (DISR).

1.6 - Artifact Overview

This specification is a part of the set of specifications that define the concrete, implementation-specific guidance for the services defined under the auspices of the CDR IPT. The CDR Reference Architecture[1] prescribes an abstract-to-concrete model for the development of architecture elements and guidance for content discovery and retrieval. Each layer or tier of the model is intended to provide key aspects of the overall guidance to achieve the goals and objectives for joint DoD/IC content discovery and retrieval. The following graphic, discussed in detail within the CDR Reference Architecture (RA), illustrates this model.

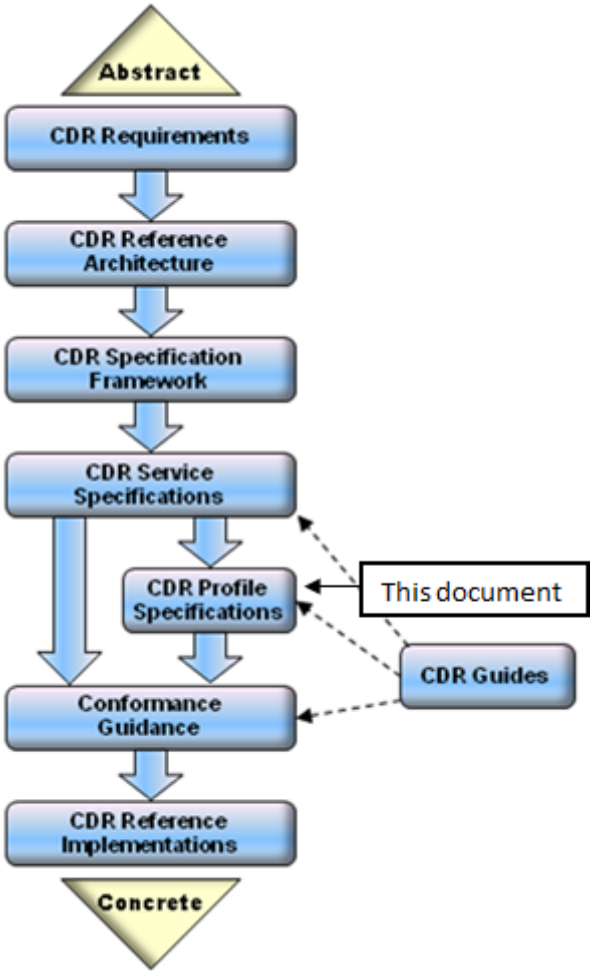

Figure 1 : CDR Architecture Model

As illustrated in Figure 1, the CDR Specification Framework [3] derives from the CDR Reference Architecture[1] and describes behavior in terms of the capabilities, components, and usage patterns defined in the Reference Architecture. Multiple CDR Service Specifications are derived from the CDR-SF, with separate specifications associated with the components of the architecture (e.g., Search) and, for each service, separate specifications to address Representational State Transfer (REST) and Simple Object Access Protocol (SOAP) implementations.

This specification supports the implementation of the IC/DoD Content Discovery & Retrieval Search Services and is intended to be used in conjunction with the CDR Search specifications. [CDR-RS.XML] [CDR-SS.XML]. Additional CDR Guides or Profile Specifications may provide additional guidance on implementing in a particular context.

1.7 - Notational Convention

The keywords "MUST," "MUST NOT," "REQUIRED," "SHALL," "SHALL NOT," "SHOULD," "SHOULD NOT," "RECOMMENDED," "MAY," and "OPTIONAL" in this technical specification are to be interpreted as described in the IETF RFC 2119.[9] When these words are not capitalized, they are meant in their natural-language sense.

The keyword “CONDITIONAL” has been added to indicate conditional requirements. When the “CONDITIONAL” keyword is present, it will be followed with additional text describing the condition.

When describing concrete eXtensible Markup Language (XML) schemas and example XML documents, this specification uses XPath as the notational convention. Each member of an XML schema is described using an XPath notation (e.g., /x:RootElement/x:ChildElement/@Attribute). The use of {any} indicates the presence of an element wildcard (<xs:any/>). The use of @{any} indicates the presence of an attribute wildcard (<xs:anyAttribute/>).

Items contained in curly braces ({item}) are meant to indicate template or notional values to be replaced by actual values (without the use of curly braces) when in actual use.

Examples in this text are distinguished by a blue border. These are meant to be illustrative and only one way that the described syntax can be used.

```
<atom:entry>
     <atom:title>This is an example.</atom:title>
</atom:entry>
```

1.8 - Dependencies

This technical specification depends on the additional technical specifications or additional documentation listed in the following table. The documents listed below are referenced in this Data Encoding Specification, and are normative or informative as indicated in the dependencies table.

Table 1 - Dependencies

Name	Dependency Description
REST and SOAP Interface Encoding Specification for Content Discovery and Retrieval: Search (CDR-RS[2], CDR-SS[4])	CDR Search Specifications specifies the use of result sets as the service response
The Atom Syndication Format[11]	Further constrains the Atom base specification to support the specific information requirements of the CDR Search Specifications

1.9 - 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 (QName) used in any example in this document should be interpreted using the information below.

Table 2 - Referenced XML Namespaces

Prefix	URI	Description
atom	http:/www.w3.org/2005/Atom [http://www.w3.org/2005/Atom]	Atom syndication format
soap	http:/www.w3.org/2003/05/soap-envelope [http://www.w3.org/2003/05/soap-envelope]	SOAP 1.2 Envelope
wsa	http:/www.w3.org/2005/08/addressing [http://www.w3.org/2005/08/addressing]	WS-Addressing
xs	http:/www.w3.org/2001/XMLSchema [http://www.w3.org/2001/XMLSchema]	XML Schema

1.10 - Conformance

This specification defines the output for a CDR Search component Search function to which an implementation and a subsequent deployment MUST conform. For an implementation to conform to this result set specification, it MUST adhere to all REQUIRED aspects of the specification. Since this specification further constrains the Atom syndication format,[11] the implementation MUST also adhere to all REQUIRED aspects of the Atom syndication format.

1.11 - Security

This specification does not directly address security concerns. It will be necessary for any implementation of this specification to address security concerns relevant to the systems with which they interact and the corresponding governance bodies. Several aspects of search, to include returning only the results for which the requesting entity is authorized, should be addressed in the detailed security plan of an implementation, but are out of scope for this document.

1.11.1 - Security Markings

To address the protection of the data of the individual results of the result set or the result set as a whole, security marking metadata may be used. Please reference the XML Data Encoding Specification for Information Security Markings [12] and the XML Data Encoding Specification for Need-To-Know Metadata [15] for specific details.

Chapter 2 - Atom Result Set Type Definition

2.1 - Identifier

The Atom Result Set type defines its unique Uniform Resource Identifier (URI) as follows:

urn:cdr:resultset:atom:2

While this identifier will not be typically used within a given Atom document resulting from a CDR Search function, it provides a consistent way to indicate the format documented in this specification. Further description on the usage of this identifier to specify the response format of a CDR Search function can be found in the CDR Search specifications.[CDR-RS.XML][CDR-SS.XML]

2.2 - OpenSearch Syntax

OpenSearch defines an existing mechanism for indicating that results of a given query will be returned via Atom within the type attribute of its Descriptor document:

application/atom+xml

The following example illustrates that an Atom Result Set will be returned by a given OpenSearch query:

```
--
<Url type="application/atom+xml"
     xmlns:example="http://example.com/opensearchextensions/2.0/"
     template="http://example.com?q={searchTerms}&amp;c={example:color?}"/>
--
```

For further description of significant elements, please refer to the OpenSearch Specification.[16]

Chapter 3 - Atom Specification Elements

This section describes the REQUIRED, OPTIONAL, and RECOMMENDED use of Atom elements in generated feeds. Note that a Result Set returned as a Search Results [1] is formatted as a single Atom feed and each result in the Result Set is formatted as a constituent Atom entry.

3.1 - <atom:feed> Elements

3.1.1 - atom:id

REQUIRED. Identifies the feed using a permanent universally unique URI.

Recommendation:

- A newly generated atom:feed SHOULD have a unique identifier regardless of how unique the result set is.

Example:

```
<atom:id>urn:uuid:60a76c80-d399-11d9-b93C-0003939e0af6</atom:id>
```

3.1.2 - atom:title

REQUIRED. Contains a human readable title for the feed.

Recommendation:

- When possible, this title SHOULD describe the Service providing the feed in addition to a representation of the query that produced the feed.

Example:

```
<atom:title>Intelink Query Results for CDR Atom Support</atom:title>
```

3.1.3 - atom:updated

REQUIRED. Indicates the last time the feed was modified in a significant way. This date SHOULD be encoded in yyyy-MM-dd'T'hh:mm:ss'Z' format. [2]

Example:

```
<updated>2003-12-13T18:30:02Z</atom:updated>
```

[1] Precise definitions of "Search", "Search Results" and other search related terminology are included in the CDR-SF. [CDR-SF.XML]

[2] Per IETF RFC 4287,[11] IETF RFC 3339[10] (a profile of ISO 8601) [13] formatting is used to ensure consistent treatment of dates across feeds.

3.1.4 - atom:author

CONDITIONAL. Names one author of the feed. A feed MAY have multiple authors. A feed MUST contain at least one author element unless all of the entry elements contain at least one author element. An author describes a person [3] , corporation, or similar entity. It has one required element, name, and two optional elements: “uri,” “email.”

<name> conveys a human-readable name for the person. <uri> contains a home page for the person. <email> contains an email address for the person.

Recommendation:

- If available, the name element SHOULD be populated with information about the name of the organization/program/agency managing the Service.
- If available, the “uri” element SHOULD refer to any webpage that the Service refers to, like a portal.
- If available, the email element SHOULD refer to the POC email for this Service.
- Within the IC and DoD, describing a person/entity/organization is more complex than the three fields defined by the Atom specification (name, email, uri). Depending upon the overall identity solution, this element SHOULD be extended to support the additional elements based on IC/DoD standards (e.g., DDMS, IRM.XML).

Example:

```
<atom:author>
    <atom:name>DNI IC SOA Team</atom:name>
    <atom:uri>http://intelink.gov</atom:uri>
    <atom:email>some.address@dni.gov</atom:email>
</atom:author>
```

3.1.5 - atom:link

RECOMMENDED. Link is patterned after a HyperText Markup Language (HTML) link element. It has one required attribute “href,” and five optional attributes: “rel,” “type,” “hreflang,” “title,” and “length.” The type of relation is defined by the “rel” attribute. A feed is limited to one alternate per type and “hreflang.” A feed should contain a link back to the feed itself.

Recommendation:

- If the Service supports a REST interface to access the feed, it SHOULD provide a<link/> element with an “href” that reflects the corresponding search REST URL.

Example:

[3]A person who in the context of this specification includes both humans and "legal persons", such as corporations, who have the rights and responsibilities similar to that of a human person.

```
<atom:link rel="self" href="http://search.service/?
keywords=iraq&amp;startIndex=1" />
```

...or, if the Search Service implementation internally persists the search request and can reference it with an “id,” as defined in the CDR Specification Framework’s Search Component paging sub-section, then:

```
<atom:link rel="self" href="http://search.service/123" />
```

- If the Service supports a SOAP interface to access the entry, it SHOULD provide a <link/> element with an “href” that reflects a reference to the endpoint, a type of “application/soap +xml”, an @action of “POST” and an endpoint reference. See section 4.1.2 SOAP Service References via Web Service Addressing for more detailed information on the endpoint reference.

Example:

```
<atom:link rel="self" href=
                    http://retrieve.soap.service
                  type=“application/soap+xml” action=”POST” >
    <wsa:EndpointReference>
    …
    </wsa:EndpointReference>
</atom:link>
```

3.1.6 - atom:category

OPTIONAL. Specifies a category to which the feed belongs. A feed may have multiple category elements. <category> has one required attribute, term, and two optional attributes: “scheme” and “label.”

- @term - identifies the category.
- @scheme - identifies the categorization scheme via a URI.
- @label - provides a human-readable label for display.

Recommendation:

- If available, categories SHOULD be used to specify relevant taxonomy or controlled vocabulary values (e.g., Intelink Topics) that the Service supports.

Example:

```
<atom:category term="AF:Aad"
                        4
```

[4] "AF" is a prefix and is associated with the scheme "urn:dni:data:search:itd:0.1".

```
    scheme="urn:dni:data:search:itd:0.1"
    label="Air and Air Defense"/>
```

3.1.7 - atom:subtitle

OPTIONAL. Contains a human-readable description or subtitle for the feed.

Recommendation:

- If possible, the subtitle element SHOULD represent a human-readable version of the data request.

Example:

```
<atom:subtitle>Search on "terrorists in iraq" performed on 2005-11-11</
atom:subtitle>
```

3.1.8 - atom:entry

OPTIONAL. Container for metadata and data associated with a result.

Recommendation:

- If results are available, they MUST be represented by a separate atom:entry.

3.2 - <atom:entry>Elements

3.2.1 - atom:id

REQUIRED. Identifies the entry using a permanent, universally unique URI.

Recommendation:

- A newly generated atom:entry SHOULD have a unique identifier regardless of how unique of the underlying content is.
- A generated atom:entry MAY be stored with the underlying content.

Example:

```
<atom:id>urn:uuid:60a76c80-d399-11d9-b93C-0003939e0af6::1</atom:id>
```

3.2.2 - atom:title

REQUIRED. Contains a human readable title for the entry that describes the underlying data resource.

Recommendation:

- If the underlying data resource is a document, this field SHOULD be title of that document.
- If the underlying data resource is a row in a Relational Database Management System (RDBMS), this field SHOULD describe what that row of data represents, potentially including an identifier of that row.
- If the underlying data resource is an XML document, this field SHOULD describe what information that XML document is trying to convey, potentially including its internal identifier.

Example:

```
<atom:title>GML representing ships in the South Pacific Ocean - id:1</
atom:title>
```

3.2.3 - atom:updated

REQUIRED. Indicates the last time the underlying data resource was modified in a significant way. This date SHOULD be encoded in the “yyyy-MM-dd'T'hh:mm:ss'Z'“ format. [5]

Recommendation:

- If the underlying data resource is a document, this field SHOULD be calculated as the last modified date of document.
- If the underlying data resource is a row in a RDBMS, this field SHOULD be calculated as the date of the last modification on that row.
- If the underlying data resource is an XML document, this field SHOULD be calculated as the last modified date of document.
- If no date can be extracted from the underlying data resource, use the current date at the time of the request.

Example:

```
<atom:updated>2003-12-13T18:30:02Z</atom:updated>
```

3.2.4 - atom:author

CONDITIONAL. Names one author of the entry. An entry MAY have multiple authors. An entry MUST contain at least one author element unless there is an author element in the enclosing feed, or there is an author element in the enclosed source element.

See section 3.1.4 for more detailed information on the author element and recommendations on its use.

[5] Leveraging ISO 8601[13] UTC formatting to ensure consistent treatment of dates across feeds.

3.2.5 - atom:summary

OPTIONAL. Conveys a short summary, abstract, or excerpt of the entry. Summary should be provided if there either is no content provided for the entry, or that content is not inline (i.e., contains an “src” attribute), or if the content is encoded in “base64.”

Recommendation:

- The summary SHOULD include an abstract describing the data resource as much as possible.
- The summary SHOULD use text if possible.

Example:

```
<atom:summary>Abstract:...</atom:summary>
```

3.2.6 - atom:category

OPTIONAL. Specifies a category to which the entry belongs. An entry may have multiple category elements. <category> has one required attribute, term, and two optional attributes, scheme and label.

- @term - identifies the category
- @scheme - identifies the categorization scheme via a URI
- @label - provides a human-readable label for display

Recommendation:

- If available, categories SHOULD be used to specify relevant taxonomy or controlled vocabulary values (e.g., Intelink Topics) that the Service supports.

Example:

```
<atom:category term="AF:Aad">
        scheme="urn:dni:data:search:itd:0.1"
        label="Air and Air Defense"/>
```

3.2.7 - atom:contributor

OPTIONAL. Names one contributor to the entry. An entry may have multiple contributor elements. A contributor describes a person, corporation, or similar entity. It has one required element, name, and two optional elements: “uri,” “email.”

<name> conveys a human-readable name for the contributor. <uri> contains a home page for the contributor. <email> contains an email address for the contributor.

Recommendation:

- If available, the contributor element SHOULD convey information about the important people associated with the data resource, like the program manager.

Example:

```
<atom:contributor>
    <atom:name>John Doe Program Manager)</atom:name>
    <atom:uri>http://intelink.gov</atom:uri>
    <atom:email>john.doe@dni.gov</atom:email>
</contributor>
```

3.2.8 - atom:published

OPTIONAL. Contains the time of the initial creation or first availability of the underlying data resource behind the entry. This date SHOULD be encoded in the “yyyy-MM-dd'T'hh:mm:ss'Z' format.” [6]

Recommendation:

- If the underlying data source is a RDMS, the published date could be calculated as the date creation.
- If the underlying data source is a document store, the published date could be date of the latest revision.
- If no date can be extracted from the underlying data source, do not include this element.

Example:

```
<atom:published>2003-12-13T18:30:02Z</atom:published>
```

3.2.9 - atom:source

OPTIONAL. If an entry is copied from one feed into another feed, then the source feed's metadata (all child elements of feed other than the entry elements) should be preserved if the source feed contains any of the child elements “author,” “contributor,” “rights,” or “category” and those child elements are not present in the source entry.

Example:

```
<source>
    <id>http://example.org/</id>
    <title>Forty-Two</title>
    <updated>2003-12-13T18:30:02Z</updated>
    <rights>© 2005 Example, Inc.</rights>
</source>
```

[6] Leveraging ISO 8601[13] UTC formatting to ensure consistent treatment of dates across feeds.

3.2.10 - atom:link

CONDITIONAL. Link is patterned after HTML's link element. It has one required attribute, “href,” and five optional attributes: “rel,” “type,” “hreflang,” “title,” and “ length.” The type of relation is defined by the “rel” attribute. An entry must contain an alternate link if there is no content element.

Recommendation:

- If the Service supports a RESTful interface to access the entry, it SHOULD provide a <link/> element that reflects the URL of the resource corresponding to the search result item.

Example:

```
<atom:link rel="alternate" href="http://retrieve.service/1234" />
```

- If the Service supports a SOAP interface to access the entry, it SHOULD provide a <link/> element with an “href” that reflects a reference to the endpoint, a type of “application/soap +xml”, an @action of “POST” and an endpoint reference. See section 4.1.2 SOAP Service References via Web Service Addressing for more detailed information on the endpoint reference.

Example:

```
<atom:link
       rel="alternate"
       href=http://retrieve.soap.service
       type=“application/soap+xml”
      action=”POST” >
    <wsa:EndpointReference>
      …
    </wsa:EndpointReference>
</atom:link>
```

3.2.11 - atom:content

CONDITIONAL. Contains or links to the complete content of the entry. Content MUST be provided if there is no alternate link, and should be provided if there is no summary.

Recommendation:

- In most cases, a Search Result SHOULD contain meta information of the content resource and not the actual content resource itself. In this case, the entry MUST contain the <link/> element as described in 3.2.10 atom:link. There will be times, however, when the content resource is small and it will make sense for the provider and their customers to provide the content resource in its entirety. In this case, the entry MUST contain the <content/> element.

Example:

```
<atom:content>complete story here</atom:content>
```

Chapter 4 - Atom Extensions

This section describes the REQUIRED, OPTIONAL, and RECOMMENDED use of extension elements within an Atom feed.

4.1 - Optional Extensions

4.1.1 - Use of OpenSearch 1.1 Constructs for Paging

CONDITIONAL. If an implementation is supporting paging, the use OpenSearch 1.1[16] response elements with Atom are REQUIRED. Service specifications leveraging this specification MUST clearly indicate the support that is required for this extension.

```
<atom:feed>
    <atom:id>urn:uuid:60a76c80-d399-11d9-b93C-0003939e0af6</atom:id>
    <atom:title>DIA Search Service</atom:title>
    <atom:updated>2003-12-13T18:30:02Z</atom:updated>
    <atom:author>
        <atom:name>DIA</atom:name>
    </atom:author>
    <!-- Open Search 1.1 Extensions -->
    <opensearch:totalResults>12</opensearch:totalResults>
    <opensearch:startIndex>11</opensearch:startIndex>
    <opensearch:itemsPerPage>10</opensearch:itemsPerPage>
    ...
</atom:feed>
```

4.1.2 - SOAP Service References via Web Service Addressing

CONDITIONAL. The CDR RA has explicitly decoupled the services it defines (Search, Retrieve, etc) at design-time, but advocates their integration together during runtime execution. One of the challenges of this situation is adopting a strategy to provide enough information to the service consumers about which services reference each other and how those services should be invoked. Although Atom inherently provides this capability in the “link” element, it is limited in providing to an existing resource using only those parameters that can be placed in the URI reference. Additional information must be provided to the link element in order to provide the client enough information to invoke a SOAP web service.

Any Atom link element that references a SOAP Service MUST do the following:

- The @href should reference the SOAP Web Service endpoint
- The @type attribute should be set to “application/soap+xml”
- The @action attribute should be set to”POST”
- The link element must be modified to include a “wsa:EndpointReference” including any metadata necessary to access the service.

The wsa:EndpointReference[17] is intended to provide flexible and dynamic exchange of endpoint information in tightly coupled environments where communicating parties share a set

of common assumptions about specific policies or protocols that are used during the interaction. An example of a wsa:EndpointReference that points to a specific Retrieve Service implementation is as follows:

```
<atom:entry>
    ...
    <!—Retrieve Service Endpoint -- >
    <link rel=”alternate” href=”http://example.com/
retrieve“ type=”application/soap+xml” action=”POST”>
        <wsa:EndpointReference
            xmlns:rts=" urn:cdr:Retrieve:2.0"
            xmlns:rsri="urn:example:services:RetrieveService:2.0:ri">
            <wsa:Address>http://example.com/retrieve</wsa:Address>
            <wsa:Metadata>
                <wsaw:InterfaceName>rsri:RetrieveService_PortType</
wsaw:InterfaceName>
                <wsaw:ServiceName>
                    rts:RetrieveService
                </wsaw:ServiceName>
            </wsa:Metadata>
        </wsa:EndpointReference>
    </link>
    ...
</atom:entry>
```

Description of significant elements:

wsa:EndpointReference/wsa:Address

This REQUIRED element captures the actual URI of the service implementation being described.

wsa:EndpointReference/wsa:Metadata/

This element indicates that the following information represents metadata about the endpoint that this EPR describes.

wsa:EndpointReference/wsa:Metadata/wsaw:InterfaceName

The wsaw:InterfaceName element includes a QName identifying a description of the sequences of messages that a service sends and/or receives. This interface corresponds to a WSDL 2.0 interface or, for backwards compatibility, a WSDL 1.1 port type. When this element is included in the wsa:EndpointReference/wsa:Metadata field of an EPR, the EPR is considered to be specific to the interface or port type it identifies.

wsa:EndpointReference/wsa:Metadata/wsaw:ServiceName

The wsaw:ServiceName element includes a QName that identifies the set of endpoints at which a particular Web service is deployed. The set of endpoints is represented by a service in WSDL 2.0 or, for backwards compatibility, a WSDL 1.1 service.

A description of how to map from a wsa:EndpointReference to a SOAP message is clearly articulated in the W3C Web Service Addressing 1.0 - SOAP Binding recommendation (http://

www.w3.org/TR/2006/REC-ws-addr-soap-20060509/). It is assumed that service consumers will implicitly understand what is required to invoke specific services as that information is readily available in their respective specifications. Services are NOT REQUIRED to support wsa:EndpointReferences. However, services supporting wsa:EndpointReferences MUST clearly define the expected usage and format of any EPRs. Furthermore, a Service specification MAY choose to extend the wsa:EndpointReference construct for its specific purposes. Those extensions MUST be clearly defined and their intended behavior described in the respective specification.

4.1.3 - Use of Domain Specific Information

RECOMMENDED. When domain specific information is to be attached to an <atom:entry> or <atom:content>, it should include enough context to describe what it is. Therefore, the root node of the domain specific information MUST include a namespace prefix and valid corresponding namespace value and MAY include a schema location as shown in the following example.

```
<atom:feed>
    ...
    <atom:entry>
        <atom:title>Example Intelligence Data Resource Title</atom:title>
        <atom:id>urn:uuid:1225c695-cfb8-4ebb-aaaa-80da344efa6a</atom:id>
        <atom:updated>2006-02-17T18:30:02Z</atom:updated>
        <atom:summary>Some descriptive text</atom:summary>
        <atom:link href="#" rel="alternate"/>
            <ddms:Resource
                xmlns:ddms="http://metadata.dod.mil/mdr/ns/DDMS/1.3/"
                xmlns:ICISM="urn:us:gov:ic:ism:v2"
                xsi:schemaLocation=” http://metadata.dod.mil/mdr/ns/DDMS/
1.3/”>
                <ddms:identifier
                    ddms:qualifier="http://metadata.dod.mil/mdr/ns/MDR/0.1/
MDR.owl#URI"
                    ddms:value="urn:example:intelligence:data:resource1"/>
                <ddms:title ICISM:ownerProducer="USA"
ICISM:classification="U">
                    Example Intelligence Data Resource Title
                </ddms:title>
                <ddms:dates  ddms:created="2009-02-17"/>
                <ddms:security ICISM:ownerProducer="USA"
ICISM:classification="U"/>
            </ddms:Resource>
    </atom:entry>
    ...
</atom:feed>
```

Services are NOT REQUIRED to support any particular type of domain specific information.

Appendix A Examples

Table 3 - Example Search Result Set

```
<atom:feed>
    <atom:id>urn:uuid:60a76c80-d399-11d9-b93C-0003939e0af6</atom:id>
    <atom:title>Intelink Query Results for CDR Atom Support</atom:title>
    <atom:subtitle>Search on "terrorists in iraq" performed on 11/11/05</
atom:subtitle>
    <atom:updated>2003-12-13T18:30:02Z</atom:updated>
    <atom:author>
    <atom:name>DNI IC SOA Team</atom:name>
    <atom:uri>http://intelink.gov</atom:uri>
    <atom:email>some.address@dni.gov</atom:email>
    </atom:author>
    <atom:link rel="self" href="http://search.service/?
keywords=iraq&startIndex=1" />
 <atom:entry>
        <atom:title>Example Intelligence Data Resource Title</atom:title>
        <atom:id>urn:uuid:1225c695-cfb8-4ebb-aaaa-80da344efa6a</atom:id>
        <atom:updated>2006-02-17T18:30:02Z</atom:updated>
        <atom:summary>Some descriptive text</atom:summary>
        <atom:link href="#" rel="alternate"/>
        <ddms:Resource
            xmlns:ddms="http://metadata.dod.mil/mdr/ns/DDMS/1.3/"
            xmlns:ICISM="urn:us:gov:ic:ism:v2"
            xsi:schemaLocation=" http://metadata.dod.mil/mdr/ns/DDMS/1.3/">
            <ddms:identifier
                ddms:qualifier="http://metadata.dod.mil/mdr/ns/MDR/0.1/
MDR.owl#URI"
                ddms:value="urn:example:intelligence:data:resource1"/>
            <ddms:title ICISM:ownerProducer="USA" ICISM:classification="U">
                Example Intelligence Data Resource Title
            </ddms:title>
            <ddms:dates  ddms:created="2009-02-17"/>
            <ddms:security ICISM:ownerProducer="USA"
ICISM:classification="U"/>
      </ddms:Resource>
    </atom:entry>
</atom:feed>
```

Appendix B Change History

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

Table 4 - DES Version Identifier History

Version	Date	Purpose
0.1	24 November 2009	Initial draft release for internal review.
0.2	18 December 2009	Conversion to a Result Set Specification.
0.4.1	1 January 2010	Draft release for internal review. Revision number changed to reflect RA and Framework versions.
0.4.4	15 January 2010	Draft release for internal review.
0.9.0	22 January 2010	Draft release for internal review.
0.9.1	28 January 2010	Draft release for internal review.
0.9.2	4 February 2010	Draft for Subgroup review.
0.9.3	16 February 2010	Minor changes.
0.9.4	18 February 2010	No changes.
0.9.5	26 February 2010	Formatting, join SOAP and RESTful guidance.
1.0-Milestone 1	9 March 2010	Minor changes.
1.0-Milestone 1	29 March 2010	Tech edits.
2	9 November 2012	Updated spec with new format.

B.1 - V2 Change Summary

Significant drivers for Version 2 include:

- Docbook conversion

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

Table 5 - Data Encoding Specification V2 Change Summary

Change	Artifacts changed	Compatibility Notes
Updated specification with new format.	ATOM	

Appendix C Acronyms

This appendix lists all the acronyms referenced in this DES and lists other acronyms that may have been used in other DES. This appendix is a shared resource across multiple documents so in any given DES there are likely acronyms that are not referenced in that particular DES.

Table 6 - Acronyms

Name	Definition
A&A	Authorization and Accreditation
ABAC	Attribute Based Access Control
ABNF	Augmented Backus-Naur Form
ADD	Abstract Data Definition
API	Applications Programming Interface
ARH	Access Rights and Handling
AS	Attribute Service
ATO	Authority To Operate
BBOX	Bounding Box
BNF	Backus-Naur Form
CAPCO	Controlled Access Program Coordination Office
CAT	Catalog Services Interface Standard
CDR	Content Discovery and Retrieval
CF-NetCDF	Climate and Forecast - Network Common Data Format
CMS	Cryptographic Message Syntax
COMET	Completely Open Mapping Environment
CONOPS	Concept of Operations
CORBA	Common Object Request Broker Architecture
CQL	Common Catalog Query Language (CQL)
CRL	Certificate Revocation List
CSW	Catalog Service for Web
CVE	Controlled Vocabulary Enumeration
D & R	Discovery and Retrieval
DAA	Designated Approval Agent
DCMI	Dublin Core Metadata Initiative
DC MES	Dublin Core Metadata Element Set
DDMS	Department of Defense Discovery Metadata Specification
DES	Data Encoding Specification
DIA	Defense Intelligence Agency

Name	Definition
DISR	DoD Information Technology Standards and Profile Registry
DNS	Domain Name System
DOI	Digital Object Identifier
DN	Distinguished Name
DNI	Director of National Intelligence
EBNF	Extended Backus-Naur Form
EDH	Enterprise Data Header
E.O.	Executive Order
ES&IS	Enterprise Search & Integration Services
EPR	Endpoint Reference
FOUO	For Official Use Only
FTP	File Transfer Protocol
GENC	Geopolitical Entities, Names, and Codes
GeoRSS	Geographic Really Simple Syndication
GeoTIFF	Geographic Tagged Image File Format
GIF	Graphics Interchange Format
GIS	Geospatial Information System
GML	Geography Markup Language
GNS	Geographic Names Server
GUIDE	Globally Unique Identifiers for Everything
GVS	GEOINT Visualization Services
HDF-EOS	Hierarchical Data Format - Earth Observing System
HTML	HyperText Markup Language
HTTP	Hypertext Transfer Protocol
I2	Information Integration
IC	Intelligence Community
IC.ADD	Intelligence Community Abstract Data Definition
IC CIO	Intelligence Community Chief Information Officer
IC EA	IC Enterprise Architecture
IC ESB	Intelligence Community Enterprise Standards Baseline
IC ITE	IC Information Technology Enterprise
ICD	Intelligence Community Directive
ICEA	Intelligence Community Enterprise Architecture
ICPG	Intelligence Community Program Guidance
ICS	Intelligence Community Standard

Name	Definition
ICSR	Intelligence Community Standards Registry
IdAM	Identity and Access Management
IDM	Interface Data Model
IDMView	Interface Data Model View
IETF	Internet Engineering Task Force
IOC	Initial Operating Capability
IP	Internet Protocol
IPT	Integrated Project Team
IRM	Information Resource Metadata
ISBN	International Standard Book Number
ISM	Information Security Marking
ISO	International Organization for Standardization
ISOO	Information Security Oversight Office
JPEG	Joint Photographic Experts Group
JPIP	JPEG 2000 Interactive Protocol
JSON	JavaScript Object Notation
JWE	JSON Web Encryption
JWICS	Joint Worldwide Intelligence Communications System
JWT	JSON Web Token
KA	Knowledge Assertion
KML	Keyhole Markup Language
KOS	Knowledge Organization System
KVP	Key Value Pair
LIMDIS	Limited Distribution
LNI	Library of National Intelligence
MAC	Multi Audience Collection
MCG&GIL	Mapping, Charting, and Geodesy Information Library
MCGView	Mapping, Charting, and Geodesy View
MIME	Multipurpose Internet Mail Extensions
MTOM	Message Transmission Optimization Mechanism
NARA	National Archives and Records Administration
NCES	Net-Centric Enterprise Services
NGA	National Geospatial Intelligence Agency
NGDS	Net-Centric GEOINT Discovery Services
NGT	Next Generation Trident

Name	Definition
NIPR	Non-Classified Internet Protocol Router Network
NITF	National Imagery Transmission Format
NPE	Non-Person Entity
NRO	National Reconnaisance Office
NSG	National System for Geospatial Intelligence
NSI	National Security Information
NTK	Need-To-Know Metadata
OCIO	Office of the Intelligence Community Chief Information Officer
OCSP	Online Certificate Status Protocol
ODNI	Office of the Director of National Intelligence
OGC	Open Geospatial Consortium
OGCA	Open Geospatial Consortium Australia
OGCE	Open Geospatial Consortium Europe
OWS	OGC Web Services
PAP	Policy Administration Point
PAYL	Payload
PDP	Policy Decision Point
PEP	Policy Enforcement Point
PK	Private Key
PKI	Public Key Infrastructure
PNG	Portable Network Graphics
PUBS	Intelligence Publications
PURL	Persistent Uniform Resource Locator
RA	Reference Architecture
RDBMS	Relational Database Management System
REST	REpresentational State Transfer
RFC	Request for Comments
RR-ID	REST Security Encoding Specification for End-to-End Identity Propagation
SAML	Security Assertion Markup Language
SIPR	Secret Internet Protocol Router Network
SOAP	Simple Object Access Protocol
SQL	Structured Query Language
SSD	Special Security Directorate
SSL	Secure Sockets Layer
STIL	Saint Louis Information Library

Name	Definition
TCP/IP	Transmission Control Protocol/Internet Protocol
TDC	Trusted Data Collection
TDF	Trusted Data Format
TDO	Trusted Data Object
TGN	Thesaurus of Geographic Names
TIFF	Tagged Image File Format
TIN	Triangulated Irregular Network
TLS	Transport Layer Security
UDDI	Universal Description, Discovery and Integration
UML	Unified Modeling Language
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
URN	Uniform Resource Name
UUID	Universal Unique Identifier
VIRT	Virtual Coverage
W3CDTF	World Wide Web Consortium Date Time Format
WARP	Web Based Access and Retrieval Portal
WCS	Web Coverage Service
WFS	Web Feature Service
WMS	Web Map Service
WSDL	Web Service Definition Language
XACML	eXtensible Access Control Markup Language
XML	Extensible Markup Language
XPath	XML Path Language
XPointer	XML Pointer Language
Xquery	XML Query
XSLT	XML Stylesheet Language for Transformations

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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 DNI-sponsored web sites. Direct all inquiries about this IC technical specification to the IC CIO, an IC technical specification collaboration and coordination forum, or IC element representatives involved in those forums.

Public Website: http://purl.org/ic/standards/public

E-mail: <datastandardssupport@ugov.gov> or <ic-standards-support@intelink.gov> .

Appendix F IC CIO Approval Memo

An Office of the Intelligence Community Chief Information Officer (OCIO) Approval Memo should accompany this enterprise technical data specification bearing the signature of the Intelligence Community Chief Information Officer (IC CIO) or an IC CIO-designated official(s). If an OCIO 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 OCIO staffing and coordination process leading to signature of the OCIO Approval Memo. The signature date of the OCIO Approval Memo will be later than the last modified date shown on the specification artifacts by an indeterminable time period.

Upon signature of the OCIO 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 IC Enterprise Standards Baseline as defined in Intelligence Community Standard (ICS) 500-20.[8]