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**Intelligence Community and Department of Defense  
Content Discovery & Retrieval Integrated Project Team**

**IC-DoD SOAP Interface Encoding Specification  
for CDR Search**

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# 1 Introduction

## 2 1.1 Service Overview

3 The Search Component, as defined by the Intelligence Community/Department of Defense  
4 (IC/DoD) Content Discovery and Retrieval (CDR) Specification Framework [CDR-SF] serves as  
5 the primary content discovery mechanism to expose content collections for discovery and  
6 accessibility. This component provides a common service interface and behavioral model for IC  
7 and DoD content collections, enabling content consumers to discover relevant content resources  
8 from disparate collections across the IC/DoD enterprise.  
9

10 This specification defines requirements and provides guidance for the realization of the CDR  
11 Search Component as a web service using SOAP<sup>1</sup>, hereafter termed a Search Service in this  
12 document. The content of this specification describes the Search Service's behavior, interface  
13 and other aspects in detail, providing enough information for Search Service providers and  
14 consumers to create and use CDR-conformant Search Services.  
15

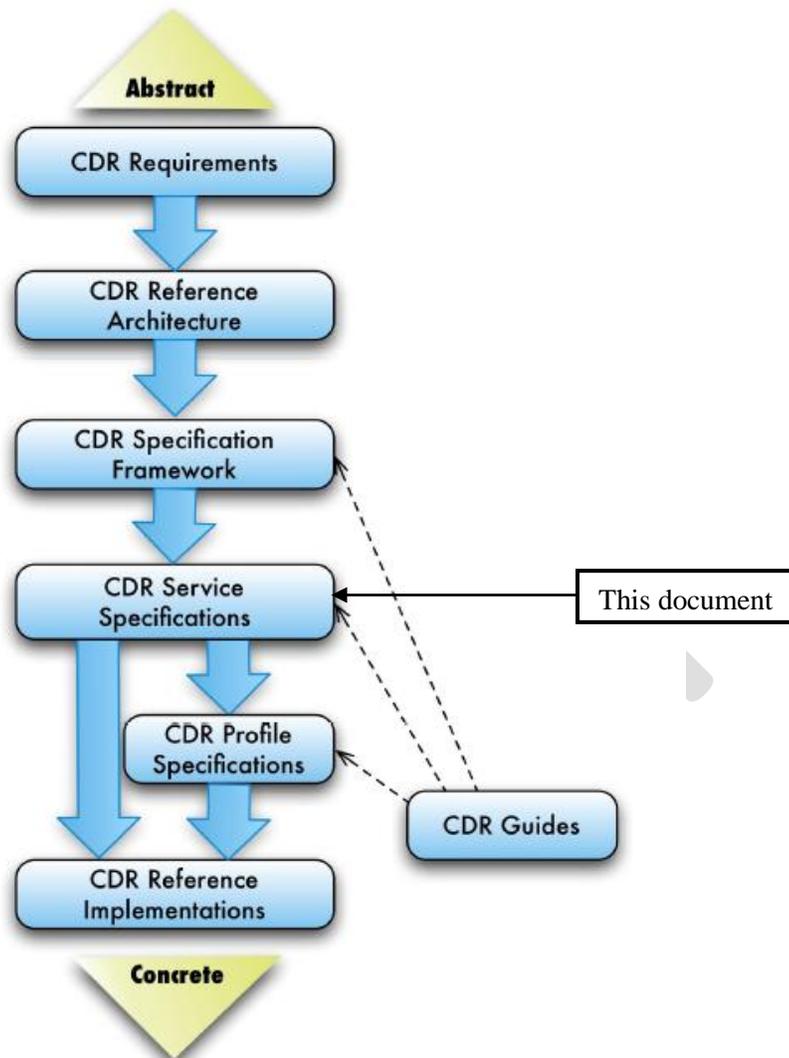
16 The Search Service exposes a single Search operation that is responsible for three activities that  
17 underpin Content Discovery capabilities: Search, Results Presentation, and Results Paging. As  
18 discussed in the CDR Specification Framework, a Search Service's results are generally resource  
19 metadata rather than actual content resources. In the context of Search, resource metadata  
20 generally refers to a subset of a resource's available metadata, not the entire underlying record.  
21 Some of the information contained within each Search result may provide the information  
22 necessary for a consumer to estimate relevance, retrieve or otherwise use the referenced  
23 resource.

## 24 1.2 Artifact Overview

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

---

<sup>1</sup> SOAP is a protocol used by web services in the exchange of structured information.



32

33

**Figure 1. CDR Architectural Model**

34 As illustrated in Figure 1, the CDR-SF derives from the CDR-RA and describes behavior in  
 35 terms of the capabilities, components, and usage patterns defined in the RA. Multiple CDR  
 36 Service Specifications are derived from the CDR-SF, with separate specifications associated with  
 37 the components of the architecture (e.g., Search) and, for each service, separate specifications to  
 38 address Representational State Transfer (REST) and SOAP implementations.

39

40 This specification provides guidance for implementing the CDR Search Service as a SOAP Web  
 41 Service. It is intended to parallel the corresponding REST specification, the IC/DoD Content  
 42 Discovery & Retrieval Search Service Specification for OpenSearch Implementations [CDR-  
 43 OS], as closely as possible, to minimize the difficulties in interoperating. Additional CDR  
 44 Guides, Profile Specifications, or Reference Implementations may provide additional guidance  
 45 on implementing this specification in a particular context.

### 46 **1.3 Notational Convention**

47 The key words "MUST," "MUST NOT," "REQUIRED," "SHALL," "SHALL NOT,"  
48 "SHOULD," "SHOULD NOT," "RECOMMENDED," "MAY," and "OPTIONAL" in this  
49 specification are to be interpreted as described in the IETF RFC 2119. When these words are not  
50 capitalized, they are meant in their natural-language sense.

51  
52 When describing concrete eXtensible Markup Language (XML) schemas and example XML  
53 documents, this specification uses XPath as the notational convention. Each member of an XML  
54 schema is described using an XPath notation (e.g.,  
55 /x:RootElement/x:ChildElement/@Attribute). The use of {any} indicates the  
56 presence of an attribute wildcard (<xs:anyAttribute>).

57  
58 Items contained in curly braces ({item}) are meant to indicate template or notional values to  
59 replaced by actual values (without the use of curly braces) when in actual use.

60  
61 Examples in this text are distinguished by a black border. These are meant to be illustrative and  
62 only one way that the described syntax can be used.

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

### 63 **1.4 Conformance**

64 This specification defines an interface to a Search Service to which an implementation and a  
65 subsequent deployment MUST conform. A deployment is an instance of an implementation. For  
66 an implementation to conform to this Search specification, it MUST adhere to all mandatory  
67 aspects of the specification.

### 68 **1.5 Namespaces**

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

72

**Table 1. List of Namespaces**

Prefix	URI	Description
atom	<a href="http://www.w3.org/2005/Atom">http://www.w3.org/2005/Atom</a>	The atom syndication format
cdrs	urn:cdr:search:2.0	The CDR IPT Search binding for SOAP implementations
opensearch	<a href="http://a9.com/-/spec/opensearch/1.1/">http://a9.com/-/spec/opensearch/1.1/</a>	The OpenSearch specification for search web services
relevance	<a href="http://a9.com/-/opensearch/extensions/relevance/1.0/">http://a9.com/-/opensearch/extensions/relevance/1.0/</a>	An OpenSearch extension for relevance.
soap	<a href="http://www.w3.org/2003/05/soap-envelope">http://www.w3.org/2003/05/soap-envelope</a>	SOAP 1.2 Envelope
wsa	<a href="http://www.w3.org/2005/08/addressing">http://www.w3.org/2005/08/addressing</a>	WS-Addressing
xs	<a href="http://www.w3.org/2001/XMLSchema">http://www.w3.org/2001/XMLSchema</a>	XML Schema

### 73 1.6 Query Language URIs

74 The following list provides the URIs for query languages that are currently defined as part of the  
75 CDR specification set. Table 2 references the query languages by name and shows the definition  
76 uniquely identified by the URIs. These are acceptable values for the `queryLanguage`  
77 attribute defined in Table 4. Additional acceptable query language values may be defined in the  
78 future and MUST also be identified by Name and URI. Specification Profiles that describe how  
79 to utilize this specification in the context of the use of one of these query languages, or other  
80 languages defined in the future, may be added to the CDR collection of artifacts.

81

**Table 2. Query Language URIs**

Name	URI	Description
Keyword	urn:cdr:1.0:soap:query:keyword	A generic definition for keyword queries
XQuery	urn:cdr:1.0:soap:query:xquery-1.0	A limited form of XQuery
OGC Filter	urn:cdr:1.0:soap:query:opengis-filter-1.1	The Open Geospatial Consortium Search filter

### 82 1.7 Security

83 This specification does not directly address security concerns. It will be necessary for any  
84 implementation of this specification to address security concerns relevant to the systems with  
85 which they interact and the governance bodies. Several aspects of search, to include returning  
86 only the results for which the requesting entity is authorized, should be addressed in the detailed  
87 security plan of an implementation, but are out of scope for this document. The Web Services  
88 Security Working Group is addressing these concerns.

## 89 2 Search Service Behavior

### 90 2.1 Search

91 The Search behavior accepts a Search Request<sup>2</sup> from the service consumer, identifies the query  
92 and processes it against the collection of information available to the Search Service to build a

<sup>2</sup> Precise definitions of "Search Request", "Search Results", "Query" and other search related terminology are included in the CDR-SF.

93 set of items, called Search Results, which are the Search Services response to the service  
94 consumer's query.

## 95 **2.2 Paging**

96 Paginating the return of search results can be useful when the number of results is very large or  
97 indeterminate. The Search Service may limit the number of Search Results that are returned for  
98 a single request for performance and convenience reasons. The Search Service may accept  
99 parameters that allow service consumers to request a particular subset of the Search Results.  
100 This capability will allow for the management of search requests that generate a very large  
101 number of results from overloading the server, network, or client.  
102 It is important to note that the paging mechanism supported by Search Services does not  
103 guarantee continuity of search results while switching pages. Consequently, it may not be  
104 possible to guarantee consumers will be able to reconstruct the contents of the entire result set at  
105 a particular time. Data assets may be added, updated, or removed in the period of time between  
106 page requests. Therefore, service consumers SHOULD NOT assume continuity among paged  
107 result sets, unless such continuity is explicitly supported.

## 108 **2.3 Results Presentation**

109 The format, content, and ordering of the Search Results is referred to as Results Presentation.  
110 Support for sorting functionality is OPTIONAL; however, Search Services SHOULD by default  
111 provide results sorted by relevance, if possible. Implementations MAY add sorting parameters  
112 or allow sort order to be expressed in the query expression itself. Support for alternate response  
113 data formats MAY be provided by Search Services<sup>3</sup>. If no alternate representations are requested  
114 by the consumer, the Service MUST respond with the results format associated with the  
115 particular service binding that was invoked.

## 116 **2.4 Relevance**

117 Result relevance is generally a measure of how well a specific result matched the original query.  
118 Providing a result relevance measure allows better matched results to be prioritized relative to  
119 other results. A Search Service implementation MAY provide relevance scores for individual  
120 Search Results with respect to the particular search with which it is identified.

# 121 **3 Search Service Interface**

## 122 **3.1 Search Function**

### 123 **3.1.1 Preconditions**

124 The following preconditions MUST be satisfied if the search function is to correctly process  
125 input and generate results and post-conditions as described.

- 126 1. The requester is authenticated according to applicable policy requirements for  
127 auditing search activity and authorizing access.

---

<sup>3</sup> The availability and access to the information to be presented MAY also be controlled on the basis of the type of data being represented in the items and the authorization of the requestor to that data.

128 2. The authenticated requester is authorized to access the Search Service.

### 129 3.1.2 Input

130 The input to the CDR Search Service MUST be a valid SOAP<sup>4</sup> message that meets criteria  
131 identified in this section. The input should be directed to the SOAP Endpoint address identified  
132 by the implementer.

#### 133 3.1.2.1 Header

134 The header of the SOAP message must contain the action element, as defined in WS-Addressing  
135 [WS-A]. The purpose of this element is to convey to the service which behavior to invoke.  
136 Additional elements, such as other WS-Addressing elements, MAY be added to the SOAP  
137 header.

138 **Table 3. Header Elements for Search Requests**

Element Name Description	Support
<b>/wsa:Action</b> This element (whose content is of type xs:anyURI) conveys the value of the [action] property and indicates to a web service which operation should be invoked.	MUST be supported by Service. MUST be provided by consumer with a value of urn:cdr:SearchService:2.0:request

#### 139 3.1.2.2 Body

140 The body of the SOAP message must contain a single /cdr:SearchRequest element, as  
141 defined in this document. The /cdr:SearchRequest element contains the  
142 /cdr:Expression element, which provides the query expression. Table 4 shows the  
143 attributes of the /cdr:SearchRequest:<sup>5</sup>  
144

145 **Table 4. Attributes of /cdr:SearchRequest Element**

Attribute Name Description	Support
<b>/cdr:SearchRequest/@startIndex</b> The zero-based index into the ordered Search Results of the first Search Result desired by the consumer. Must be expressed as an integer greater than or equal to zero.	MUST be supported by Service. MAY be provided by consumer.
<b>/cdr:SearchRequest/@startPage</b> This is an alternate method of specifying the start index by providing the one-based page number of the Search Results desired by the consumer. The @startPage minus one, multiplied by the count gives the @startIndex. Must be expressed as an integer greater than or equal to one.	MAY be supported by Service. MAY be provided by consumer.
<b>/cdr:SearchRequest/@count</b> The number of results to include in the returned page of a	MUST be supported by Service. MAY be provided by consumer.

<sup>4</sup> Consult the relevant standards registry (such as the ICSR or DISR) to determine the appropriate current version of the SOAP standard to use. Examples in this document use SOAP 1.2.

<sup>5</sup> Please see Appendix C "Changes From Prior Version" for a disposition of the request parameters from the prior version of this specification.

<p>result set. Must be expressed as an integer greater than zero if used. The default value if not specified is 10. Search clients should anticipate that the value of the "count" attribute may not be honored by the search engine, and should rely exclusively on the contents of the "opensearch:itemsPerPage" response element in calculating actual page size.</p>	
<p><b>/cdr:SearchRequest/@queryLanguage</b> The URI for a query language used by the query. This value is supplied to support the case of a Search Service that supports multiple query languages. A Specification Profile should exist for the Query Language referenced for this URI. If not provided, the service SHOULD interpret the query as being expressed in a default query language.</p>	<p>MUST be supported by Service. MAY be provided by Consumer.</p>
<p><b>/cdr:SearchRequest/@responseFormat</b> The response format desired by the client. If provided, the value MUST be a URI that corresponds to a definition of a search response format defined as part of the CDR specifications.</p>	<p>MAY be supported by Service. MAY be provided by Consumer.</p>
<p><b>/cdr:SearchRequest/@timeout</b> The desired timeout period in milliseconds. If the timeout attribute is supported by the Service and provided by the Consumer, when the response time for the service exceeds the timeout value, the Service MUST respond with either partial results or a Timeout Fault, as described in the Fault Conditions, section 3.1.4. If partial results are returned, this status must be indicated in the metadata of the results.</p>	<p>MAY be supported by Service. MAY be provided by Consumer.</p>

146  
147 Additional extension attributes MAY be supported by the Search Service and/or provided by the  
148 consumer to convey additional Query or Search properties. However, any additional attributes  
149 supported by the Search Service MUST be OPTIONAL for the consumer to provide. If the  
150 consumer provides extension attributes that the Search Service does not support, these MUST be  
151 ignored.

152  
153 The /cdr:SearchRequest element has one child element, /Expression, which contains  
154 the Query Expression.

155 **Table 5. Child Elements of /cdr:SearchRequest Element**

<b>Element Name Description</b>	<b>Support</b>
<p><b>/cdr:SearchRequest/Expression</b> The element provides the query expression for which the Search Service must return matching Search Results. The format must be consistent with the query language referenced by the @querylanguage attribute.</p>	<p>MUST be supported by Service. MUST be provided by Consumer.</p>

156

157 The query language used in the `/cdr:SearchRequest/Expression` element **MUST** be in  
 158 a query language supported by the Search Service. The query language may allow the  
 159 expression to contain information relating to result set sorting or ordering. Additional extension  
 160 elements **MAY** be supported by the Search Service and/or provided by the consumer to convey  
 161 additional Query or Search properties. However, any additional elements supported by the  
 162 Search Service **MUST** be **OPTIONAL** for the consumer to provide. If the consumer provides  
 163 additional elements that the Search Service does not support, these **MUST** be ignored.

### 164 3.1.2.3 Example

165 An example of a SOAP message constituting a Search Service request follows:

```
<soap:Envelope>
  <soap:Header>
    <wsa:Action>urn:cdr:SearchService:2.0:request</wsa:Action>
  </soap:Header>
  <soap:Body>
    <cdr:SearchRequest startIndex="1" count="10"
      queryLanguage="urn:cdr:queryLanguage:keyword"
      responseFormat="http://www.w3.org/2005/Atom">
      <cdr:Expression>watson ibm</cdr:Expression>
    </cdr:SearchRequest>
  </soap:Body>
</soap:Envelope>
```

166 This example shows a search for the keywords “watson” and “ibm”, using the Keyword query  
 167 language, with an Atom response format requested.  
 168

### 169 3.1.3 Output

170 The output of the CDR Search Service is a page of a Result Set, comprised of Results that  
 171 describe resources that matched the query provided in the Search Request. The format of the  
 172 response is determined by the `/cdr:SearchRequest/@responseFormat` attribute. This  
 173 section describes a SOAP message format that can be used to encapsulate a pluggable, separately  
 174 specified response format. It uses the CDR-Atom response format as the basis for the examples  
 175 in this section. For requests that result in an error, a SOAP fault message will be output.

#### 176 3.1.3.1 Header

177 The header of the SOAP message must contain the action element, as defined in WS-Addressing.  
 178 The purpose of this element is to convey to the receiver which behavior was invoked.

179 **Table 6. Required Header Elements for Search Responses**

Element Name Description	Support
<b>/wsa:Action</b> This element (content is of type <code>xs:anyURI</code> ) conveys the value of the [action] property and indicates to a web service which operation should be invoked.	<b>MUST</b> be provided by the Service with a value of <code>urn:cdr:SearchService:2.0:response</code>

180 Additional elements, such as other WS-Addressing elements, **MAY** be added to the SOAP  
 181 header.  
 182

183 **3.1.3.2 Body**

184 The body of the SOAP message **MUST** consist of a single element, representing a page of the  
 185 result set. The name and structure of the element is defined by the response format. Table 7  
 186 shows this in the context of the Atom 1.0 Result Set Specification, where the single element of  
 187 the body of the SOAP message is `/atom:feed`. The attribute definitions this specification  
 188 adds to that element correspond with those defined in the OpenSearch Specification. These are  
 189 specified with the required elements and attributes of the Atom Syndication Format. If a  
 190 different response format is defined and specified by the request, the appropriate information as  
 191 defined by that response format must be returned.

192 **Table 7. Atom Result Set Attributes**

<b>Attribute Name Description</b>	<b>Support</b>
<b>/atom:feed/openSearch:startIndex</b> The index into the ordered Search Results of the first Search Result desired by the Consumer. Must be expressed as an integer greater than or equal to zero.	MAY be provided by Service.
<b>/atom:feed/openSearch:itemsPerPage</b> The number of items returned in a single response.	MAY be provided by Service.
<b>/atom:feed/openSearch:totalResults</b> The total number of results that matched the query.	MAY be provided by Service.

193  
 194 The element containing the result set should contain a series of result elements, each representing  
 195 one resource that matched the query provided in the Search Request. In the case of the Atom  
 196 Syndication Format, the element corresponding to a Result is `/atom:entry`. This Result  
 197 contains the metadata necessary to identify and retrieve the referenced resource. The contents  
 198 below are shown relative to an `/atom:entry`.

199 **Table 8. Atom Result Contents**

<b>Attribute Name Description</b>	<b>Support</b>
<b>/atom:entry/relevance:score</b> The relevance score for an entry.	MAY be provided by Service.
<b>/atom:entry/link</b> Binding information to a CDR Retrieve Service to retrieve the referenced resource. This may be a <code>wsa:EndpointReference</code> .	MUST be provided by Service.

200

201

**202 3.1.3.3 Output Example**

203 The following represents a Sample Output embedding the Atom Syndication Format style result  
204 set into the body of a SOAP message.

```

<soap:envelope>
  <soap:header>
    <wsa:action>urn:cdr:search:2.0:response</wsa:action>
  </soap:header>
  <soap:body>
    <atom:feed>
      <atom:id>urn:uuid:60a76c80-d399-11d9-b93C-0003939e0af6</atom:id>
      <atom:title>Query Results for "watson ibm"</atom:title>
      <atom:updated>2003-12-13T18:30:02Z</atom:updated>
      <atom:author><atom:name>Enterprise Catalog</atom:name></atom:author>
      <opensearch:totalResults>492420</opensearch:totalResults>
      <opensearch:startIndex>1</opensearch:startIndex>
      <opensearch:itemsPerPage>10</opensearch:itemsPerPage>
      <atom:entry>
        <atom:id>urn:uuid:60a76c80-d399-11d9-b93C-0003939e0af7</atom:id>
        <atom:title>IBM - Watson</atom:title>
        <atom:updated>2011-02-21T00:00:00Z</atom:updated>
        <atom:link rel="alternate"
          href="http://www-03.ibm.com/innovation/us/watson/index.html"/>
        <relevance:score>0.97</relevance:score>
      </atom:entry>
      ...
    </atom:feed>
  </soap:body>
</soap:envelope>

```

**205 3.1.4 Post-Conditions**

206 The following conditions **MUST** be met upon successful completion of a search.

- 207 1. The results returned to the requester are relevant to the input query.
- 208 2. The results are in the correct format.
- 209 3. The authenticated requester has been authorized to receive each result in the response.
- 210 4. The Search function has been audited according to applicable policy.<sup>6</sup>

**211 3.1.5 Fault Conditions**

212 An implementation of the Search Service **MAY** provide any of the following faults as a SOAP  
213 Fault to the consumer. The SOAP message **MUST** contain a single SOAP Fault element as the  
214 only child of the SOAP Body element.

215  
216 The SOAP Fault element must contain a mandatory /soap:Fault/Code element and a  
217 mandatory /soap:Fault/Reason element. The /soap:Fault/Code/Value element  
218 should be used to convey the general type of error condition from the enumeration  
219 /soap:faultCodeEnum as described in the SOAP 1.2 specification sections 5.4.1 and 5.4.6.  
220 For each fault a unique /soap:Fault/Code/Subcode/Value is provided to support  
221 automated processing of CDR specific errors. A /soap:Fault/Reason/Text element

---

<sup>6</sup> The Search function may be audited according to applicable policy regardless to the success or failure of the function.

222 should be used to provide a human-readable explanation of the fault as described the SOAP 1.2  
223 specifications section 5.4.2.

224

225 The following table outlines the service specific fault conditions that MAY be generated by CDR  
226 Search Service implementations.

227

DRAFT

228

**Table 9. List of Faults**

/soap:Fault/Reason/Text /soap:Fault/Code/Value /soap:Fault/Code/Subcode/Value	Description
Security soap:Sender cdr:search:soap:fault:security	The Consumer is either not authenticated or not authorized to perform the search query.
Query Property Not Supported soap:Sender cdr:search:soap:fault:property	The Search Component does not support the Query Property, such as queryLanguage, that was specified.
Invalid Query Syntax soap:Sender cdr:search:soap:fault:syntax	The Search Request syntax is not valid in accordance with the specified Query Language.
Query Term Not Supported soap:Sender cdr:search:soap:fault:term	The Search Component cannot understand/support one or more elements of the Search Request.
Query Timeout soap:Receiver cdr:search:soap:fault:timeout	The query cannot be executed in the amount of time specified by the Timeout input parameter.
Query Execution Fault soap:Sender cdr:search:soap:fault:execution	The Search Component encounters an error during query execution.
Query Metadata Fault soap:Sender cdr:search:soap:fault:metadata	The query metadata is not understood or contains an error. In the case of Query Metadata not being understood, a Search Component MAY choose to continue the execution of the query. In this case, some indication SHOULD be provided in the output's Result Metadata Properties.
Invalid Paging Value Fault soap:Sender cdr:search:soap:fault:pagingValue	The Start Index and/or Count values are not valid values (e.g., non-integer, negative).
Out of Range Fault soap:Sender cdr:search:soap:fault:outOfRange	The Start Index and/or Count values are not in a valid range.
Result Format Not Supported soap:Sender cdr:search:soap:fault:resultFormat	The Search Component does not support the result format specified by the response Format input parameter.
Result Sorting Not Supported soap:Sender cdr:search:soap:fault:sorting	The Search Component determined does not support the result sorting mechanism.

229

230

231 **3.1.5.1 Fault Message Example**

232 The following shows a fault message of type “Invalid Query Syntax”.

```

<soap:Envelope>
  <soap:Body>
    <soap:Fault>
      <soap:Code>
        <soap:Value>soap:Sender</soap:Value>
        <soap:Subcode>
          <soap:Value>cdr:search:soap:fault:syntax</soap:Value>
        </soap:Subcode>
      </soap:Code>
      <soap:Reason>
        <soap:Text xml:lang="en">Invalid Query Syntax</soap:Text>
      </soap:Reason>
    </soap:Fault>
  </soap:Body>
</soap:Envelope>

```

233 **4 References**

- 234 1. CDR-Atom. "IC/DoD CDR IPT Atom 1.0 Result Set Specification." 2010.
- 235 2. CDR-OS. "IC/DoD Content Discovery & Retrieval Search Service Specification for  
236 OpenSearch Implementations 1.2." 2011.
- 237 3. CDR-RA. "CDR IPT Reference Architecture 1.1." 2011.
- 238 4. CDR-S 1.0 "IC/DoD CDR Search Specification for SOAP Implementations 1.0". 2010.
- 239 5. CDR-SF. "IC/DoD Content Discovery & Retrieval Specification Framework 1.0." 2011.
- 240 6. WS-A. "WS-Addressing" <http://www.w3.org/TR/ws-addr-soap/> . 2008.

241

242 **Appendix A. Mapping to Specification Framework**

243 This section explicitly ties the items in this specification to the requirements of the CDR-SF.  
244 The CDR-SF identifies the requirements for creating specifications, while the implementation  
245 details are outlined here.

246 **A.1. Search Request**

247 The CDR Search Request definition in this specification defines a variety of properties that fall  
248 under the definition of Query Properties from the CDR-SF.

249 **Table 10. Search Request Mapping to Specification Framework**

Specification Framework Variable	SOAP Search Specification
Query	/cdr:SearchRequest/Expression
Query Properties	/cdr:SearchRequest/@queryLanguage
Search Properties	/cdr:SearchRequest/@startIndex /cdr:SearchRequest/@count /cdr:SearchRequest/@responseFormat

## 250 **A.2. Search Response**

251 Details of the search response are contained in the Atom 1.0 Result Set Specification [CDR-  
252 Atom] and are not duplicated here. Additional search response formats may be defined and  
253 added to the defined set in the future.

254 **Table 11. Search Response Mapping to Specification Framework**

Specification Framework Variable	SOAP Search Specification
Result Set	/cdr:SearchResponse/atom:feed

## 255 **Appendix B. SOAP-REST Interoperability**

256 To date, there are two specifications for the Search Service defined by the CDR Specification  
257 Framework version 1.0. The OpenSearch Specification version 1.2 details the RESTful binding.  
258 This specification details the SOAP binding. This appendix will address the interoperability of  
259 services created with the REST binding with services created with the SOAP binding.

260  
261 The full scope of interoperability between SOAP and REST web services is outside the scope of  
262 this specification. However, by providing a mapping between the URL parameters and returned  
263 XML data utilized in the OpenSearch specification and the contents of the SOAP messages  
264 provided in this specification, the semantic translation between these two web services can be  
265 identified.

### 266 **B.1. SOAP-REST Parameter Mapping**

267 This section provides a mapping between elements and attributes identified in this specification  
268 and the corresponding parameters identified in the OpenSearch Specification version 1.2. The  
269 use of this mapping demonstrates the interoperability of the two approaches.

#### 270 **B.1.1 Input**

271 In general, the single element of the body of the SOAP Search Request, the /cdr:SearchRequest  
272 element, contains the information which is in the OpenSearch query string template.  
273

274

**Table 12. REST to SOAP Mapping**

<b>REST Parameter</b>	<b>SOAP Element or Attribute</b>
opensearch:searchTerms	/cdr:SearchRequest/Expression
opensearch:count	/cdr:SearchRequest/@count
opensearch:startIndex	/cdr:SearchRequest/@startIndex
opensearch:startPage	/cdr:SearchRequest/@startIndex
<i>Not explicitly defined</i>	/cdr:SearchRequest/@queryLanguage
<i>Not explicitly defined</i>	/cdr:SearchRequest/@responseFormat

**275 B.1.2 Output**

276 The output of both the REST service and the SOAP service is delegated to the result set  
277 specifications provided by the CDR IPT. To date, there is only one recognized Search Results  
278 specification, the CDR Atom 1.0 Search Results Specification.

**279 Appendix C. Changes from Prior Version**

280 This section outlines the significant changes that were made from the prior version of the  
281 IC/DoD CDR Search Service Specification for SOAP Implementations, Version 1.0-20100309.  
282 These changes were made to accommodate changes in the CDR-RA and CDR-SF, to harmonize  
283 the content of this specification with that contained in the other specifications produced by this  
284 group, and to incorporate feedback on the specification from pilot implementations.

**285 C.1. Search Request****286 C.1.1 Change queryTypeURI to queryLanguage**

287 The prior version of this specification contained the input variable “query type” to provide a  
288 mechanism to specify information to describe and assist in processing the Query Expression.  
289 The Specification Framework [ref] example in the definition of query type was “(e.g., keyword,  
290 XQuery, etc.)”, indicating a diverse set of possible values and little guidance for what use or  
291 behavior the input would support. In addition, CDR-OS did not address query types because  
292 there is an implicit assumption that the OpenSearch searchTerms parameter provided keyword  
293 targets. The Specification Framework deprecated query type and replaced it with Query  
294 Metadata to specifically “enable determination of whether a search capability can process the  
295 query”. Query language is given in the Specification Framework definition as an example of  
296 Query Properties.

297  
298 In this version of the SOAP Search Specification, in line with the CDR-SF, query language is  
299 recognized as one of the Query Properties that can be provided along with a query. Search  
300 Services can indicate via their service descriptions which query languages they support. The  
301 flexible Query Properties mechanism can be used to provide information on other aspects of a  
302 query, such as the metadata format used in the query expression.

**303 C.1.2 Change resultsPerPage to count**

304 The prior version of this specification used the resultsPerPage parameter to indicate the desired  
305 number of results to be returned. This was the incorrect variable name to use, as the correct

306 corresponding OpenSearch variable is count. This version of the specification and the current  
307 version of CDR-OS now use the name “count”.

### 308 **C.1.3 Use of Query Identifier**

309 The prior version of this specification used the element QueryId in some requests to the server to  
310 utilize a temporary identifier for a query expression for purposes of accessing of result set cache  
311 in paging operations. The specification for this behavior did not fully describe caching behavior,  
312 as it described the behavior when both an expression and a query identifier were provided as  
313 indeterminate, but demanded a fault be sent as well. It did not specify a period for which the  
314 query identifier would be valid. In addition, it was not supported by the schema file as an option  
315 to be used in place of the expression. This specification follows the CDR-OS specification in  
316 using the Expression, in conjunction with any security related information, such as the identity of  
317 the requestor, used to produce the result set, to serve the purpose of the query identifier.

## 318 **C.2. Search Response**

319 The current specifications identify a search response binding only for Atom Syndication Format.  
320 This specification outlines using the Atom Syndication Format as the body of a SOAP message.  
321 This is an extensible mechanism which allows additional search response types to be defined.  
322 Version 1.0 of the specification did not specifically address response formats, because none were  
323 defined.

324  
325 Version 1.0 discussed a “Results Metadata Format” as an implicit property of a Search Service.  
326 This version of the specification explicitly defines a response metadata format attribute that can  
327 be used to select an appropriate format for the response.

328  
329 The timestamp discussed in the previous version is handled by the  
330 `/atom:feed/atom:updated` element in CDR-Atom, and should be handled by any other  
331 result types which are defined.

## 332 **C.3. Guide for Usage**

333 The guide for usage section, Section 4 of Version 1.0 of this specification, was removed from  
334 this document. With the simpler approach to what was called query type, the process of using  
335 this specification was simplified. This section did not appear in other documents and may end  
336 up in a more general guide document that was not contemplated when Version 1.0 of this  
337 specification was created.