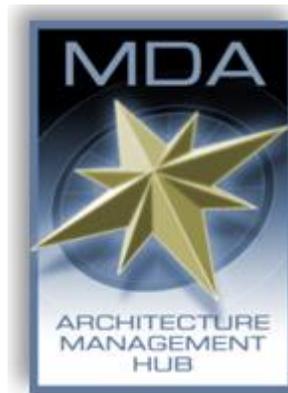


APPENDIX E - SEARCH/RETRIEVE INTERFACE SPECIFICATION



Maritime Information Sharing Environment (MISE)

Search/Retrieve Interface Specification
Version 1.0

25 March 2013

1. Introduction

The Maritime Information Sharing Environment (MISE) is being established to allow secure sharing of unclassified information among partners within the MDA community of interest. The Information Sharing Infrastructure (ISI) is the information and request broker for the MISE.

This document describes the data-consumer facing representational state transfer (REST) architecture providing search and retrieve (SR) functionality for the MISE. By conforming to this interface, the ISI provides data consumers with the ability to find and retrieve the right information at the right time, based on the needs, rights, and authorities of the user and the organizations requesting the information. This document outlines the base level of functionality for the SR interface. The REST interface is divided logically into two parts. The search interface provides query endpoints and an associated set of query arguments, returning a list of results and summaries of each result. The retrieval interface provides the ability to access full records. The two interfaces work together to provide access to all information in the ISI.

All interactions with the SR interface are secured as described by the *MISE Interface Security Specification*. For search and retrieve operations, both the *Trusted System Authentication* and the *User Attribute Conveyance* portions of the interface security specification apply. All records available on the ISI are formatted using NIEM-Maritime, as described in the *National MDA Architecture Information Exchange Package Documents (IEPD)*. For further details on interfacing with the SR interface, see the *MISE Implementation Guide*.

2. General Consumer Search Interface

2.1. URL STRUCTURE AND QUERY RESULTS

For the purposes of this document, the ISI is assumed to be accessible at the global uniform resource identifier (URI) <https://mise.mda.gov/services/MDAService>, provided as an example base URL. SR provides a series of URL endpoints that provide global query functionality and focus-area-specific (or IEPD-specific) queries. The query URLs have the following form:

- [https://mise.mda.gov/services/MDAService/search/⟨iepdname⟩?=-](https://mise.mda.gov/services/MDAService/search/⟨iepdname⟩?=)

The ⟨iepdname⟩ takes the form of one of the message types provided by the ISI. Currently, these are:

1. noa (Notice of Arrival)
2. ian (Indicator and Notification)
3. pos (Position)
4. loa (Levels of Awareness)

Each URI in association with an IEPD name queries a single record type. For example, [https://mise.mda.gov/services/MDAService/search/noa?=-](https://mise.mda.gov/services/MDAService/search/noa?=) provides the notice-of-arrival specific

query endpoint. Using this scheme, further endpoints can be added for specific queries as new record types are defined for new focus areas.

All queries to the search interface return an Atom feed that contain summaries of the record or records matching that query. The following listing shows an example feed returned from a search for Position interface. The search that returns this result takes the following form:

```
https://mise.mda.gov/services/MDAService/search/track?start=2012-08-19T11:40:00&end=2013-12-30T11:40:00&ulat=3.75&ulng=-2.0&llat=-2.75&llon=3.0
```

```
<?xml version="1.0" encoding="UTF-8"?>
<feed xmlns="http://www.w3.org/2005/Atom" xmlns:dc="http://purl.org/dc/elements/1.1/">
  <title>Query Response for Entity: https://mise.agencyone.gov/</title>
  <link rel="alternate"
href="https://mise.mda.gov/services/MDAService/search/track?start=2012-08-19T11:40:00&end=2013-12-30T11:40:00&ulat=3.75&ulng=-2.0&llat=-2.75&llon=3.0" />
  <subtitle>Query Response from the Maritime Information Sharing Environment</subtitle>
  <id>TRACK-9991956437ffa1c06327e0d98977989f4f7c6f46b1f3c52e3ac11d04d45273c3</id>
  <entry>
    <title>TRACK</title>
    <![CDATA[<link rel="alternate"
href=https://mise.mda.gov/services/MDAService/retrieve/ian?entityid=https%3A%2F%2Fmise.agencyone.gov%2F&recordid=79869882775656568/>]]>
    <author>
      <name>DCMP</name>
    </author>
    <id>8397109112108101736578</id>
    <updated>2012-12-31T19:28:08Z</updated>
    <summary type="text/xml">
      <posex:Message
xmlns:posex="http://niem.gov/niem/domains/maritime/2.1/position/exchange/3.2"
      mda:securityIndicatorText="LEI" mda:releasableNationsCode="USA"
mda:releasableIndicator="true"
      xmlns:m="http://niem.gov/niem/domains/maritime/2.1"
      xmlns:mda="http://niem.gov/niem/domains/maritime/2.1/mda/3.2"
      xmlns:nc="http://niem.gov/niem/niem-core/2.0"
xmlns:gml="http://www.opengis.net/gml/3.2"
      xmlns:ism="urn:us:gov:ic:ism"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
        <mda:Vessel>
          <m:VesselAugmentation>
            <m:VesselIMONumberText>IMO0000001</m:VesselIMONumberText>
            <m:VesselName>MV Example</m:VesselName>
          </m:VesselAugmentation>
          <m:VesselNationalFlagISO3166Alpha3Code>USA</m:VesselNationalFlagISO3166Alpha3Code>
        </mda:Vessel>
        <mda:Position>
          <m:LocationPoint>
            <gml:Point gml:id="tp1">
              <gml:pos>-1.0 -1.0</gml:pos>
            </gml:Point>
          </m:LocationPoint>
          <mda:PositionSpeedMeasure>
            <nc:MeasureText>12</nc:MeasureText>
            <nc:SpeedUnitCode>kt</nc:SpeedUnitCode>
          </mda:PositionSpeedMeasure>
          <mda:PositionCourseMeasure>
            <nc:MeasureText>180</nc:MeasureText>
          </mda:PositionCourseMeasure>
        </mda:Position>
      </posex:Message>
    </summary>
  </entry>
</feed>
```

```

        <m:AngleUnitText>deg</m:AngleUnitText>
    </mda:PositionCourseMeasure>
    <mda:PositionHeadingMeasure>
        <nc:MeasureText>180</nc:MeasureText>
        <m:AngleUnitText>deg</m:AngleUnitText>
    </mda:PositionHeadingMeasure>
    <mda:PositionNavigationStatus>
        <nc:StatusText>Under way using engines</nc:StatusText>
    </mda:PositionNavigationStatus>
    <mda:PositionDateTime>
        <nc:DateTime>2011-11-30T00:00:00Z</nc:DateTime>
    </mda:PositionDateTime>
</mda:Position>
</posex:Message>
</summary>
<dc:creator>DCMP</dc:creator>
</entry>
</feed>

```

In the Atom feed resulting from the query, four elements should be noted. First, the <link> element at the top level of the feed echoes back the query URL that returned this feed. Each individual record is content in an <entry> element. The <id> element supplies the unique ID of the record on the ISI. The <link> element provides the retrieval URL for the record on the ISI. As long as that record is available on the ISI, the link will provide access to it. The <summary> element contains the summary elements of the record. **Note that the <link> elements have replaced non-XML characters with their entity representations, so that the XML content is valid.**

All the records that match the query are returned, with one <entry> element for each record, up to the result size limit. See Sections 2.6 and 2.7 for more details on the headers and large result-set transfers.

The ISI search interface also provides utility endpoints:

- <https://mise.mda.gov/services/MDAService/search/<iiepdbname>/documentation>: Provides the IEPD for that focus area, allowing new consumers to download the schema and other documentation for a record type representation.
- <https://mise.mda.gov/services/MDAService/search/<iiepdbname>/rendering>: Provides rendering stylesheets to display the NIEM-M XML as HTML or other formats. Internally, the ISI will use this endpoint when a consumer provides an HTTP-Accept header other than the standard NIEM-M XML.
- <https://mise.mda.gov/services/MDAService/specification>: Provides a link to the current version of this document, describing the ISI REST search/retrieve interface.

2.2. PROTOCOL, SESSIONS, AND SECURITY

All interactions with the ISI are done over Secure Socket Layer/Transport Layer Security (SSL/TLS) connections. SSL/TLS are enforced to protect information in transit and session cookies. Each client querying against the SR interface is authenticated by the ISI and is provided with a limited-duration session cookie, which must be supplied in the header of following requests. The method for authentication is discussed the *MISE Interface Security Specification*.

2.3. SEARCH OPERATION

URI	https://mise.mda.gov/services/MDAService/search/<iepdname>?=-	Example: https://mise.mda.gov/services/MDAService/search/ noa?VesselName-Enterprise
Method	GET	
Request Headers	Authorization	As described in the MISE Interface Security Specification.
Request Content Type	Empty	
Status Codes	200 (Success)	Returns the Atom feed with the results of the search.
	400 (Bad Request)	Request was not formatted correctly.
	401 (Unauthorized)	No Authorization header.
	403 (Forbidden)	Authenticated information provider is not configured at ISI for search of this IEPD.
Response Headers	Empty	
Response Content Type	Atom feed with search results.	

Table 1 – Search Operation Detail

2.4. QUERY PARAMETERS

All IEPD search endpoints support a common set of query parameters, shown in Table 2.

Parameter Name	Value Type	Comment
VesselName	String	
VesselSCONUMText	String	
VesselMMSIText	String	
VesselIMONumberText	String	
VesselNationalFlag	String	
VesselClassText	String	
VesselCallSignText	String	
VesselHullNumberText	String	
VesselOwnerName	String	
VesselCategoryText	String	

InterestCategoryCode	String	
InterestLevel	String	
PortNameText	String	
InterestType	String	
InterestCategory	String	
InterestLevel	String	
InterestStart	ISO8601 DateTime	GMT
InterestEnd	ISO8601 DateTime	GMT
ArrivalPort	String	
ExpectedArrivalTime	ISO8601 DateTime	GMT
start	ISO8601 DateTime	GMT
end	ISO8601 DateTime	GMT
ulat	WGS84 upper left latitude of a bounding box	
ulng	WGS84 upper left longitude of a bounding box	
llat	WGS84 lower right latitude of a bounding box	
llng	WGS84 lower right longitude of a bounding box	
eid	String	The eid parameter allows a consumer to specify a specific data provider. This field must contain the entity ID of a provider system from the Trust Fabric document. This is only used in addition to other parameters, to narrow the returned results.

Table 2 – Common Query Arguments

These parameters can be combined to query for any of the record types.

- <https://mise.mda.gov/services/MDAService/search/noa?VesselName=Atlantic%20Light&PortNameText=Miami>

For **start**, **end**, and other dates, the representation is a GMT ISO8601 datetime indicating a time period within which to return new or updated records. When either **start** or **end** date is specified, the time period is unbounded, but still a valid query. For instance, if only **start** is specified, there is no **end** time on the query:

- <https://mise.mda.gov/services/MDAService/search/pos?VesselName=Atlantic%20Light&start=2012-02-29T00:00:00Z>

Refer to the *MISE Implementation Guide* for examples, queries, and use cases.

2.5. SCOPE

For specific events and situations, the ISI provides an additional set of query parameters that can be used to query for messages within a specific scope. When applied by an information publisher, the scope parameters modify the entitlements for a record for the duration of the scope.

Parameter Name	Value Type	Comment
Scope	String	

For example, consider a Search query for all notice of arrival messages inbound to the Port of Miami during Hurricane Katrina:

- <https://mise.mda.gov/services/MDAService/search/noa?PortNameText=Miami&scope=HurricaneKatrina>

Valid scope values can be found on the National MDA Architecture website.

2.6. HEADER INFORMATION

The ISI SR interface uses the following HTTP headers for specific purposes. All other HTTP headers should be interpreted according to the HTTP 1.1 standard.

- **Accept:** By default, if no Accept is specified, the summary feed will be returned in the Atom format as specified above. However, the following Accept headers may be supplied, resulting in translated feeds:
 - `application/kml` – returns the Atom feed translated into a KML overlay.
- **Transfer-Encoding:** For large requests, the server may respond using HTTP 1.1 chunked transfer. When this happens, the Transfer-Encoding HTTP response header is set in place of the Content-Length header, which the protocol would otherwise require. Because the Content-Length header is not used, the ISI does not need to know the length of the content before it starts transmitting a response to the client. The ISI can begin transmitting responses with dynamically generated content before knowing the total size of that content. The size of each chunk is sent right before the chunk itself so that a client can tell when it has finished receiving data for that chunk. The data transfer is terminated by a final chunk of length zero.

2.7. ERROR CODES

The ISI SR interface uses the following HTTP response codes for specific purposes. All other response codes should be interpreted according to the HTTP 1.1 standard.

- 413: If the resulting record set matching a query is too large for efficient transfer, even via HTTP chunked transfer, the ISI returns the 413 error code, indicating that the response set is too large. In this situation, the client should retry the query with a more restrictive set of parameters.

3. Focus-Area Specific REST Parameters

This section describes the more specific parameters to query information from each focus area. The URIs below follow the same format as the general query interface, with additional parameters described below to provide specific information.

3.1. NOTICE OF ARRIVAL

Parameter Name	Value Type	Comment
NoticeType	String	
NoticeTransactionType	String	
CDCCargoDeclared	Boolean	T or F

3.2. VESSEL POSITION

Parameter Name	Value Type	Comment
num	Integer	The num parameter is applied to queries for Position information. It specifies how many previous positions should be returned in reverse date order. The default number is 5.

3.3. INDICATORS AND NOTIFICATIONS

Parameter Name	Value Type	Comment
ActivityName	String	
ActivityStart	ISO8601 DateTime	GMT
ActivityEnd	ISO8601 DateTime	GMT

3.4. LEVELS OF AWARENESS

Parameter Name	Value Type	Comment
LevelOfAwarenessCode	Integer	This parameter is applied to queries specifically for the Levels of Awareness IEPD type. This specifies the LOA level, 1-4 that should be returned. If not specified, all matching LOA messages will be returned.

4. Retrieve Interface

In each Atom feed returned, the <link> element for each entry points to the canonical URI that represents that record. As long as the ISI can reference that record, the ID-specific URI will point to the same record. If the record is no longer accessible, the ISI returns an HTTP 404 status code, indicating that that record is no longer available. Each record URI takes the form <https://mise.mda.gov/services/MDAService/retrieve/<type>?entityid=<eid>&recordid=<id>>. The ID is the same as the <id> element in the <entry>. The <eid> references the data provider system. This value is the Entity ID from the Trust Fabric document. The <type> variable is the focus area, such as *pos* for position reports. Note that the <eid> parameter value URL-encoded. For example, the entity ID <http://agencyone.gov> would be represented in the URL as `https%3A%2F%2Fmise.agencyone.gov`.

4.1. RETRIEVE OPERATION

URI	<code>https://mise.mda.gov/services/MDASer vice/retrieve/<type>?entityid=<eid>&reco rdid=<id></code>	Example: <code>https://mise.mda.gov/services/MDAService/retrieve /track?entityid= agencyone.gov&recordid=8397109112108101736578</code>
Method	GET	
Request Headers	Authorization	As described in the <i>MISE Interface Security Specification</i> .
Request Content Type	Empty	
Status Codes	200 (Success)	Returns the NIEM-M formatted record.
	400 (Bad Request)	Request was not formatted correctly.
	401 (Unauthorized)	No Authorization header.
	403 (Forbidden)	Authenticated information provider is not configured at ISI for search of this IEPD.

Response Content Type	NIEM-M Record
-----------------------	---------------

Table 3 – Retrieve Operations Detail

4.2. SCOPE

For specific events and situations, the ISI provides an additional set of query parameters that can be used to query for messages within a specific scope. When applied by an information publisher, the scope parameters modify the entitlements for a record for the duration of the scope.

Parameter Name	Value Type	Comment
Scope	String	

Scope must be applied to the retrieve query, similar to the search query:

- <https://mise.mda.gov/services/MDAService/retrieve/track?entityid=agencyone.gov&recordid=8397109112108&scope=HurricaneKatrina>

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