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EAGLE Portal – Developer Guide

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TABLE OF CONTENTS

1	EAGLE PORTAL ARCHITECTURE	3
2	INTERACTION WITH THE AGGREGATOR	5
2.1	QUERY FORMAT	5
2.2	RESPONSE FORMAT.....	6
2.3	EXAMPLES	7
2.3.1	<i>Simple search for all artifacts</i>	<i>7</i>
2.3.2	<i>Advanced search.....</i>	<i>8</i>
2.3.3	<i>Request for details of a returned item.....</i>	<i>10</i>
2.3.4	<i>Faceted search.....</i>	<i>11</i>
3	THE USER PERSONAL SPACE	13
3.1	SAVING A QUERY AND ITS RESULTS	13
3.2	SAVING DETAILED INFORMATION ABOUT AN INSCRIPTION.....	14
4	SUPPORT OF THE FLAGSHIP MOBILE APPLICATION.....	15
4.1	THE IMAGE RECOGNITION SERVICE	15
4.2	THE IMAGE SIMILARITY SEARCH SERVICE	16
4.3	GET METADATA SERVICE.....	17
4.4	LOGIN REGISTERED USER SERVICE	17
4.5	REGISTER USER SERVICE.....	18
4.6	GET SAVED INFO SERVICE	19
5	APPENDIX: FMA CLIENT	20
5.1	JAVA CODE.....	20
5.1.1	<i>ImageRecognitionClient Code Fragment</i>	<i>20</i>
5.1.2	<i>ImageSimilarityClient Code Fragment.....</i>	<i>20</i>
5.1.3	<i>GetMetadataClient Code Fragment.....</i>	<i>21</i>
5.2	TESTING IMAGES.....	21
5.3	XML RESPONSES	21
5.3.1	<i>Image Recognition XML Response</i>	<i>21</i>
5.3.2	<i>XML Response Skeleton</i>	<i>21</i>
5.3.3	<i>XML Response Example</i>	<i>21</i>
5.3.4	<i>Image Similarity Search XML Response.....</i>	<i>26</i>
5.3.5	<i>XML Response Skeleton</i>	<i>26</i>
5.3.6	<i>XML Response Example</i>	<i>26</i>
5.3.7	<i>Get Metadata XML Response.....</i>	<i>27</i>
5.3.8	<i>XML Response Example</i>	<i>27</i>

1 EAGLE PORTAL ARCHITECTURE

The system architecture of the EAGLE Portal consists of two main components: the EAGLE server, which represents the core of the EAGLE Portal, and the FMA server which is dedicated to support the Flagship Mobile Application. Figure 11 shows the two main components of the EAGLE user-service system, along with a view of the different modules and of the interactions between them.

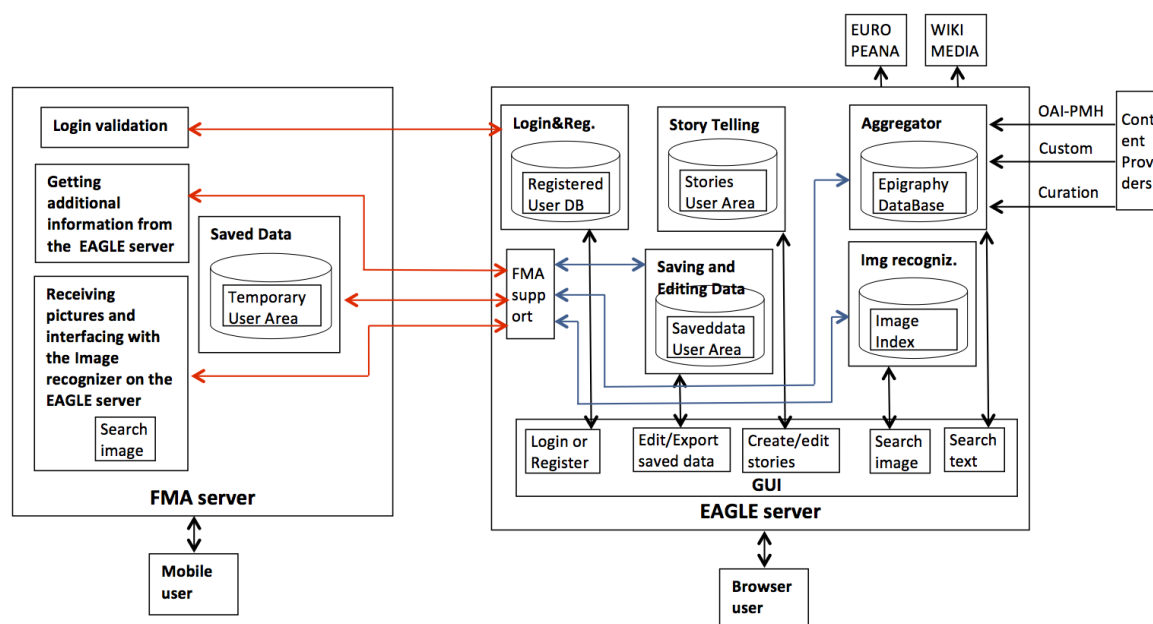


Figure 12. Summary view of the system architecture

The Content Management System that has been selected as the base technology upon which the EAGLE Portal frontend has been implemented is WordPress¹.

WordPress is an open source blog tool and publishing platform licensed under the GNU General Public License (GPL). It is powered by PHP and MySQL and can easily be customised.

WordPress has been selected as the base technology for the implementation of the EAGLE Portal because of its flexibility, its easy and user friendly setup and usage, and its provision of a high level of personalization. This ensemble of qualities makes it the ideal facilitator of a versatile CMS.

WordPress has a web template system that uses a template processor. The processor makes it easy to re-arrange widgets and install and switch between themes. The PHP and HTML code used by the themes can also be edited for more advanced customizations.

Furthermore, WordPress has a rich plugin architecture that allows users and developers to extend its functionality beyond the features that come with the base installation.

In the case of the EAGLE Portal the following plugins have been implemented and integrated in the CMS:

¹ <http://wordpress.org>

- *Eagle Search Inscriptions* is the core plugin which governs the functionality of the EAGLE Inscriptions Search Engine, implementing the GUI which allows users to search the EAGLE database, browse the results and save relevant queries and items. It interfaces with SOLR, the Aggregator indexer and search engine, sending the user query and parsing the results to present them to the user according to the requirements that have been identified. The specific EAGLE plugin includes a dedicated database where to store the data saved by the registered users for future reference, including those imported from the FMA server.
- *Eagle Login Check* implements the interface called by the FMA server to validate user login at the mobile device.

For further details on the interaction between the GUI and the Aggregator, how it is structured the internal database to store the data saved by the and on the interaction between the GUI and the FMA server please see the following Sections. The full integration with the FMA server and the integration with the Storytelling application is in progress and it will be better described in the next WP5 deliverables due by the end of December 2014 (D5.3.1 First release of the flagship mobile application and SDK, D5.4.1 First release of the flagship storytelling application).

2 INTERACTION WITH THE AGGREGATOR

This Section explains the technical details of the interaction between the EAGLE Portal User Interface and the backend constituted by the EAGLE Aggregator (part of the AIM infrastructure), which is powered by the SOLR indexing and search engine (see Deliverables D4.1 AIM Infrastructure Specification and D4.2.1 First Release of AIM Infrastructure).

All the queries received by the Aggregator have to comply with the SOLR syntax, and all the responses returned by the Aggregator will be in the format provided by SOLR. Complete information about the search functionality of SOLR can be found at: http://wiki.apache.org/solr/#Search_and_Indexing

2.1 QUERY FORMAT

The requests to SOLR follow the general SRU (Search/Retrieve via URL) syntax, with the name of the action to be performed (in our case **select**) followed by a question mark (?), followed by any number of (**keyword=value**) pairs, separated by ampersand (&).

select?keyword1=value1&keyword2=value2& <and so on>

To satisfy the EAGLE requirements, two features supported by SOLR are used in EAGLE and are always part of the query.

The first feature (**group**) instructs SOLR to put in a single item of the result list all the items satisfying the query that have the same value in the field specified in the group parameter. In EAGLE, this field is the TM-ID number, so that all the objects (satisfying the query) that have the same TM-ID will be returned as a single item of the result list. Based on the EAGLE specifications, the portal will select among the objects in the item the single one to be displayed.

The second feature (**facet**) provides to SOLR a list of fields and instructs SOLR to provide, at the end of the result list, the number of items satisfying the query for each distinct value in the fields provided in the query. This information will be displayed in the result page, so that the user can perform a “faceted search”.

According to the data model and the functional requirements, the queries will be done against three distinct types of EAGLE objects: artifacts, text, images, that in the query are indicated respectively as **entitytype:artifact**, **entitytype:documental**, **entitytype:visual**.

In the query to SOLR, it is also possible to indicate a list of fields (keyword **fl**) that will be returned for each item in the result list. In EAGLE, this value is always **fl=__result**, as the complete EAGLE object that we want to be returned in the result list has been indexed in the field **__result**.

Another information to be provided in the query is the number of items (keyword **rows**) to be returned in the response and the index (keyword **start**) in the result list where to start counting those **rows** items. In EAGLE it has been decided that **rows** is equal to ten, and the portal, after the first page (**start=0**) will retrieve the subsequent pages with values of **start** that are multiple of 10.

It is possible to specify in the query (keyword **wt**) the format of the response, which can be either XML or JSON, the default being XML. In the rest of this document we assume that this keyword is not specified and all the descriptions will be in XML.

To conclude, the general format of an EAGLE query is the following.

**select?
group=true&
group.field=tmid&
group.limit=50&
facet=true&**

```
facet.field=field 1 here&
facet.field=field 2 here&
.....
facet.field=field N here&
start=index of first result item to be returned&
rows=number of results items to be returned, in EAGLE 10&
fl=__result&
q=entitytype:artifact/documental/visual AND user provided query string
```

2.2 RESPONSE FORMAT

The response provided by SOLR to any query consists in a XML envelope (named **response**) containing, after a short header with a copy of the query, a list of items ranked in relevance order with respect to the query (in search engine parlance, the result list). The exact format of each item in the list clearly depends on the query. In the EAGLE case, each item in the result list is a group of EAGLE objects that have the same TM-ID value (most of the time there is just one item in each group). The EAGLE objects in the result list of course have the **entitytype** specified in the query. Whatever the type, the objects returned in the result list always contains all the data to be included in the result displayed to the user.

The exact format (structure) of each EAGLE object type is defined by the EAGLE Common Metadata Model. The complete XML schema of the three types of EAGLE objects is available at the link below. We recommend to always check the latest version of the XML schema, as it is being “fine-tuned” often, as the EAGLE project proceeds with the implementation and the testing of the portal functionality.

[http://svn-public.driver.research-infrastructures.eu/driver/dnet40/modules/dnet-eagle-workflows/trunk/src/main/resources/eu/dnetlib/msro/eagle/eagle%20schema/EAGLE%20schema%20\(EMF\).xsd](http://svn-public.driver.research-infrastructures.eu/driver/dnet40/modules/dnet-eagle-workflows/trunk/src/main/resources/eu/dnetlib/msro/eagle/eagle%20schema/EAGLE%20schema%20(EMF).xsd)

In summary, a simplified view of the overall structure of the response is depicted below (the detailed structure is in the examples). As it can be seen, SOLR provides in the response generic types of elements, named with a short string suggesting the type of the element or the type of the values contained in the element (list, array, doc, integer, string, etc.).

```
<response>
  <lst name="responseHeader"> ..omissis.. </lst>
  <result name="response"
    numFound="total number of matches" start="index of the first item returned" />
  <lst name="grouped">
    <lst name="tmid">
      <arr name="groups">
        <lst>
          <str name="groupValue">first value of TM-ID</str>
          <result name="doclist" ..omissis..>
            <doc>
              <arr name="__result">
                <str>
                  <result>
                    <header> ..omissis.. </header>
                    <metadata>
                      <EAGLE object here>
                    </metadata>
                  </result>
                </str>
              </arr>
            </doc>
          </doc>
        </lst>
      </arr>
    </lst>
  </lst>
```

```

    <another EAGLE object with the same TM-ID>
    ....
  </doc>
  ....
</result>
</lst>
<lst>
  <another group with another TM-ID>
</lst>
....
</arr>
</lst>
..</lst>
<lst name="facet_counts">
  <lst name="facet_queries"/>
  <lst name="facet_fields">
    <lst name="field1 here">
      <int name="first value of field1"># of items</int>
      <int name="second value of field1"># of items</int>
    ....
  </lst>
  <lst name="field2 here">
    ....
  </lst>
</lst>
</response>
```

2.3 EXAMPLES

2.3.1 Simple search for all artifacts

In this example the user is not requesting any facet values, the “user provided string” will be an asterisk (*), and the **entitytype** will be specified as **artifact**. Usually many of the groups returned in the result list will have only one EAGLE object, as either the TM-ID number is associated with only one EAGLE object, or the object does not (yet) have a TM-ID number. In the latter case the value in the element **<str name="groupValue">** will be in the form **n/a_alphanumericstring**, where the alphanumeric string is different for each object. This has been done within the aggregator, to avoid for all the EAGLE objects that do not have a TM-ID number to be put in the same group.

Query

```
select?
group=true&
group.field=tmid&
group.limit=50&
group.ngroups=true&
start=0&
rows=10&
fl=__result&
q=entitytype:artefact AND *
```

Response

```
<response>
  <lst name="responseHeader">
    <int name="status">0</int>
    <int name="QTime">1467</int>
```

```
<lst name="params">
  // omissis
</lst>
</lst>
<lst name="grouped">
  <lst name="tmid">
    <int name="matches">122703</int> // number of results
    <int name="ngroups">112217</int> // number of groups
    <arr name="groups">
      <lst>
        <str name="groupValue">n/a_UBB::00668eebef4388e943ca4315ad5db3af</str>
        <result name="doclist" numFound="1" start="0"> // number of results per group
          <doc>
            <arr name="__result">
              <str>
                // object
              </str>
            </arr>
          </doc>
        </result>
      </lst>
    </lst>
    // etc...
  </lst>
</arr>
</lst>
</lst>
</response>
```

2.3.2 Advanced search

At the EAGLE Portal is also possible to formulate “advanced queries”, where the user can specify values for a number of fields (some of them with controlled vocabularies) displayed in the advance search page. From the point of view of the SOLR engine, there is really no difference between the simple search and the advanced search. In the simple search no fields are indicated in the query, and the search is performed on ALL the fields indexed. In the advanced search the query indicates the fields on which the search has to be done, and the search will be done only on those fields.

The table below gives in the left column the fields shown to the user in the advanced search page, and in the right column the corresponding fields to be indicated in the query.

As explained before, for those fields that have a controlled vocabulary, some entries in the vocabulary may have more than one value (i.e. a label) associated with it, each one corresponding to a different language. In order to make the query not dependent on the language, for all the fields with a controlled vocabulary the value indexed in the Aggregator is the URI associated with the “concept” expressed by the vocabulary entry, and therefore the value provided in the query to SOLR is a URI, and not the label selected by the user on the screen. This is accomplished by the portal GUI, by showing a drop-down menu with all the values in the vocabulary (each entry is shown using its “preferred label”) and then inserting in the query the URI corresponding to the selected item.

Fields shown at the portal	Indexed fields to be indicated in the query (OR)
Ancient findspot	ancientfindspot

Modern findspot	modernfindspot
Detailed findspot (village, street, building...)	modernfindspot moderncountry modernregion modernprovince
Location	conservationcountry conservationregion conservationcity museum
Bibliography	bibliography
Text of the inscription	inscriptiontext
Type of inscription	Inscriptiontypevoc
Decoration (controlled vocabulary)	Decorationvoc
Object type (controlled vocabulary)	Objecttypevoc
Material (controlled vocabulary)	Materialvoc
Type of writing (controlled vocabulary)	Writingtypevoc
State of preservation (controlled vocabulary)	stateofpreservationvoc
Social status of the persons mentioned in the text	socialstatus

In this example the user is not requesting any facet values and is searching for all artifacts (query string=**entitytype:artefact AND ***) having specific values for the fields “decoration” and “object type”.

Query:

```
select?
group=true&
group.field=tmid&
group.limit=50&
group.ngroups=true&
start=0&
rows=10&
fl=__result&
q=entitytype:artefact AND * AND
decorationvoc=URI of the item selected in the vocabulary AND
objecttypevoc=URI of the item selected in the vocabulary
```

Response

Same format as in the simple search

2.3.3 Request for details of a returned item

If the user clicks on one of the items in a result list, no new query is needed, as all the information to be displayed in the detailed view (as defined in the present version of the EAGLE functional specifications) can be found in the EAGLE object contained in the **response** envelop, regardless of the **entitytype** of the item being “clicked”.

It has to be noted that the information included in each EAGLE object are just those needed for display, i.e. they are a subset of the complete information that may be contained in the other **entitytypes** of the same EAGLE object.

If the complete information about the entity (partially) described by the EAGLE object at hand has to be retrieved, it is necessary to identify in that object the DNET-IDs of all the other **entitytypes** related to the same object, and to make a new query specifying all the DNET-IDs of the items wanted. In this case no grouping is needed, and the query is as shown below. The format of the response follows the structure of the **response** envelope, but in this case there are no groups.

Query

select?

fl=__result&

q=dnetresourceidentifier:(*DNET-ID1* OR *DNET-ID2* OR ...*DNET-IDN*)

The example below shows the format of the actual DNET-IDs used in the Aggregator, which include alphanumeric strings identifying the entity type, the Content Provider who provided the original entity and the local ID of the original entity (often called CP-ID).

select?

fl=__result&

q=dnetresourceidentifier:"UBB::00668eebef4388e943ca4315ad5db3af::transcription" OR
dnetresourceidentifier:"UBB::00668eebef4388e943ca4315ad5db3af::artifact"

Response

```
<response>
  <lst name="responseHeader">
    <int name="status">0</int>
    <int name="QTime">0</int>
    <lst name="params">
      // omissis
    </lst>
  </lst>
  <result name="response" numFound="2" start="0">
    <doc>
      <arr name="__result">
        <str>
          // object
        </str>
      </arr>
```

```
</doc>
<doc>
  // etc...
</doc>
</result>
</response>
```

2.3.4 Faceted search

As described in Part A, the list of facets (fields) that the EAGLE Portal requests by default, in order to show their counts on the result page, is the following:

- Decoration
- Material
- Object Type
- State of Preservation
- Type of Inscription
- Writing/Execution

The example below is a simple search for all artifacts and the count of the items in each value of the “material” field, which has a controlled vocabulary. It has to be noted that the portal GUI, for the facets requested, will display the “preferred label” of the vocabulary entries, and not the URI returned.

Query

```
select?
group=true&
group.field=tmid&
group.limit=50&
group.ngroups=true&
start=0&
rows=10&
fl=__result&
facet=true&
facet.field=materialvoc
q=entitytype:artefact AND *&
```

Response

```
<response>
  <lst name="responseHeader">
    <int name="status">0</int>
    <int name="QTime">1467</int>
    <lst name="params">
      // omissis
    </lst>
  </lst>
  <lst name="grouped">
    // same as previous example
  </lst>
  <lst name="facet_counts">
    <lst name="facet_queries" />
    <lst name="facet_fields">
      <lst name="materialvoc">
        <int name="http://www.eagle-network.eu/voc/material/lod/48">20664</int>
        <int name="http://www.eagle-network.eu/voc/material/lod/2">5400</int>
```

```
<int name="http://www.eagle-network.eu/voc/material/lod/131">2055</int>
<int name="http://www.eagle-network.eu/voc/material/lod/109">934</int>
<int name="http://www.eagle-network.eu/voc/material/lod/128">809</int>
<int name="http://www.eagle-network.eu/voc/material/lod/75">725</int>
<int name="http://www.eagle-network.eu/voc/material/lod/57">701</int>
// etc...
</lst>
</lst>
<lst name="facet_dates" />
<lst name="facet_ranges" />
</lst>
</response>
```

3 THE USER PERSONAL SPACE

As described in previous Sections, a logged in registered user has the possibility of saving in a “User Personal Space” the result of a query and the detailed information about an object, obtained after “clicking” on one of the results of the query. For a “local user” (i.e. a user logged in at the EAGLE Portal) the saved data is stored internally in a relational data base maintained in the EAGLE server. For a “mobile user” (i.e. a user logged in through the Mobile Application) the saved data is stored (temporarily) in the FMA server, to be retrieved later when the user logs in at the EAGLE Portal and with an “upload function” brings the data saved during the “mobile session” into her Personal Space.

3.1 SAVING A QUERY AND ITS RESULTS

When a user hits the save button when looking at a result page, the EAGLE Portal will save the information described below. In the present release the “query type” of the data saved at the EAGLE Portal will always be “string”. In the next release of the portal it is planned to support also a “query by example” function, where the user can provide a picture as the query and take advantage of the Image Recognition functionality already used by the Mobile Application.

- The User-ID
- The type of query (string or image query)
- The string entered in the query box OR the image provided as an example (in Release 2)
- The page number the user was looking at when hitting the save button
- Up to 10 pages of results, at present 5 pages before and 5 after the actual page that the user was looking at when hitting the save button
- The number of saved pages
- The provided annotations (“title” and “description”)
- The date when the query was saved

To perform the saving, the GUI software issues (in the background) N calls to the Aggregator to retrieve the N pages of the result of the query that are to be saved, and stores all the information in its internal data structure.

Internally, the data for a saved query are stored in a table of a Relational Data Base. The fields of the table (in MySQL notation) are the following.

- ``query_id` int(11) =====>` an internal unique ID, generated by the system (the table primary key)
- ``user_id` int(11) =====>` the ID of the (logged-in) user requesting the save
- ``query_type` varchar(6) =====>` it can have only three values to indicate the content of the query field
 - o Type1 = the query is the string entered in the query box
 - o Type2 = the query is an image provided as an example
 - o Type3 = the query is a picture taken by the mobile user
- ``query` text =====>` the query made by the user OR the URL to an image
- ``page_number` smallint(5) =====>` the number of the page that the user was looking at when requesting the save of the query

- ``tot_page_saved` tinyint(3) =====>` the total number of pages saved
- ``title` varchar(80) =====>` is the mandatory “human ID” entered by the user
- ``comment` text =====>` the optional description entered by the user
- ``resource` longtext =====>` all the saved pages in Json format, following the XML structure returned by the Aggregator (see Section 5); for Type 3 is empty (no query was sent to the EAGLE server)
- ``data` datetime =====>` the date when the query was saved by the user

3.2 SAVING DETAILED INFORMATION ABOUT AN INSCRIPTION

When the user hits the save button to save one of the items in a result list, the information that is saved is the following:

- The User-ID
- The saved inscription
- Some internal data (position of the saved item in the group of inscriptions associated to the same Trismegistos ID, position of the saved item in the query from which it has been retrieved and saved)
- The provided annotations (“title” and “description”)
- The date when the item was saved

If the inscription has more than one instance (the TM-ID is associated to more than one Content Provider-ID), the saved instance is only the one displayed when the user requests the save.

The saved data consist of the actual values of the data being displayed to the user (i.e. no links to data in the aggregator).

Internally, the data for a saved instance are stored in a table of a Relational Data Base. The fields of the table (in MySQL notation) are the following.

- ``eagle_instance_id` int(11) =====>` an internal unique ID, generated by the system (the table primary key)
- ``user_id` int(11) =====>` the ID of the (logged-in) user requesting the save
- ``col` tinyint(3) =====>` position of the saved item in the group of inscriptions associated to the same Trismegistos ID
- ``row` tinyint(3) =====>` position of the saved item in the results page from which it has been saved
- ``page` int(11) =====>` result page number containing the saved item in the original query
- ``resource` longtext =====>` the saved inscription in Json format, following the XML structure returned by the Aggregator (see Section 5)
- ``comment` text =====>` the optional description entered by the user
- ``title` varchar(80) =====>` the mandatory “human ID” entered by the user
- ``data` datetime =====>` the date when the item was saved by the user

4 SUPPORT OF THE FLAGSHIP MOBILE APPLICATION

The Flagship Mobile Application (FMA) is being developed as an alternative way to access the Eagle platform functionalities. This application, running on a Smartphone, will communicate with its dedicated server (the FMA server, see the architecture), which in turn will need to communicate with the EAGLE server in order to access the information there.

The functions to be supported for the FMA are those described in the Deliverable D5.1, Sect.4.3 (summarised in the Table below).

ID	User	Requirement	Priority
MBE01	Generic	Change default values of basic parameters	High
MBE02	Generic	Search images by “similarity search”	High
MBE03	Generic	Search images by “exact match”	High
MBE04	Generic	Browse history of previous queries	High
MBE05	Generic	Login to the EAGLE system	High
MBE06	Registered	Create and save simple-text notes on records	High
MBE07	Registered	Upload and save pictures of an inscription	High
MBE08	Registered	Browse history of saved images and text	Medium

The FMA server will need four different services from the EAGLE server, namely the “Image Recognition” service, the “Image Similarity Search” service, the “Get Metadata” service and the “Login Registered User” service. In addition, the FMA server will need to support one service needed by the EAGLE Portal, namely the “Get Saved Info” service. All services provided to the FMA server are REST services. They accept HTTP requests and return XML responses.

4.1 THE IMAGE RECOGNITION SERVICE

The image Recognition Service provides a service to recognize epigraphs. It gets a query image and returns the metadata of the recognized epigraph. Internally, this will interact with the Aggregation and Image Retrieval system (AIM) in the EAGLE server (see Deliverable D.4.1) which has two main components: the Image Retrieval System, performing the recognition, and the Metadata Aggregation System, providing the metadata of the recognized epigraph.

Temporary Service Address: <http://virserv101.isti.cnr.it/fma/services/IRServices/recognize>

This service address is temporary, to be used during the testing phase. It will be changed when the services will be in the deployment phase.

HTTP Request Format

HTTP request type: Multipart POST

Supported images formats: JPG, PNG

Image encoding: either binary or Base64 encoding (by Apache Commons Codec library).

Parameters

- `img` inputstream of an image (mandatory).
- `correlationId` optional (for asynchronous calls)
- in the present release any other parameters will be ignored

Response Format

- XML structure containing the complete epigraph metadata (see examples in the Appendix)

HTML Call Example

```
<form method="POST" enctype="multipart/form-data" name="test" action="http://virserv101.isti.cnr.it/fma/services/IRServices/recognize">
```

```
    Query <input name="img" type="file">
```

```
    <input type="submit" value="Search" name="submit">
```

```
</form>
```

HTML Testing Page: <http://virserv101.isti.cnr.it/fma/recognizeTesting.html>

Through this page it is possible to test the recognition service by uploading an image selected from a test set.

4.2 THE IMAGE SIMILARITY SEARCH SERVICE

The Image Similarity Service retrieves the visually similar epigraphs of a query. It gets a query image and returns a sorted list of the most visually similar epigraphs.

Temporary Service Address: <http://virserv101.isti.cnr.it/fma/services/IRServices/searchSimilar>

Please note that this service address is temporary and it will change when the services are deployed on Eagle servers.

HTTP Request Format

HTTP request type: Multipart POST

Supported images formats: JPG, PNG

Image encoding: either binary or Base64 encoding (by Apache Commons Codec library).

Parameters

- `img` inputstream of an image (mandatory)
- `correlationId` optional (for asynchronous calls)
- `nResults` optional, number of results (default: 30)
- in the present release any other parameters will be ignored

Response Format

- XML structure containing the complete epigraph metadata (see examples in the Appendix)

HTML Call Example

```
<form method="POST" enctype="multipart/form-data" name="test" action="http://virserv101.isti.cnr.it/fma/services/IRServices/searchSimilar">
```

```
    Query <input name="img" type="file">
```

```
    Num of Results <input name="nResults" type="text" size="5">
```



```
<input type="submit" value="Search" name="submit">
</form>
```

HTML Testing Page: <http://virserv101.isti.cnr.it/fma/similarityTesting.html>

Through this page is possible to test the similarity service by uploading an epigraph image.

4.3 GET METADATA SERVICE

This service gets an ID and returns the full metadata of an epigraph as described in **D3.1**. It queries the **Metadata Aggregation System** to retrieve the epigraph metadata.

It performs the following query to the Metadata Aggregation System:

[http://search.eagle.research-infrastructures.eu/solr/EMF-index-cleaned/select?q=__all:"id"](http://search.eagle.research-infrastructures.eu/solr/EMF-index-cleaned/select?q=__all:)

where **id** is the epigraph ID.

Service Address: <http://virserv101.isti.cnr.it/fma/services/IRServices/getMetadata>

Please note that this service address is temporary and it will change when the services are deployed on Eagle servers.

HTTP Request Format

HTTP request type: GET

Parameters

- **id** ID of the epigraph to retrieve

Response Format

- XML structure containing the complete metadata of the object (see examples in the Appendix)

HTML Call Example

```
<form method="GET" name="UITestForm" action="
http://virserv101.isti.cnr.it/fma/services/IRServices/getMetadata">
  ID <input name="id" type="text" size="30">
  <input type="submit" value="Search" name="submit">
</form>
```

HTML Testing Page: <http://virserv101.isti.cnr.it/fma/getMetadataTesting.html>

Through this page is possible to test the get metadata service by sending an epigraph id.

4.4 LOGIN REGISTERED USER SERVICE

The “Login Registered User” interface is called by the FMA server to validate user login at the mobile device. The request/response interaction is on a secure channel (https).

Service Address (SSL): <https://www.eagle-network.eu/wp-admin/admin-ajax.php>

HTTP request type: GET

Parameters

- **action** “elc_process_login_request” (hidden parameter)

- username the username of the user requesting to login
- password the password of the user requesting to login

Response Format

- A Boolean value:
 - o 0 user not authenticated
 - o 1 user successfully authenticated

HTML Call Example

```
<form method="GET" name="LoginTestForm" action=" https://www.eagle-network.eu/wp-admin/admin-ajax.php">  
  <input type="hidden" value=" elc_process_login_request " name="action">  
  Username <input name="username" type="text" size="20"><br/>  
  Password <input name="password" type="password" size="20"><br/>  
  <input type="submit" value="Login" name="submit">  
</form>
```

4.5 REGISTER USER SERVICE

The “Register User” interface is called by the FMA server to create a new user account from the mobile device. The request/response interaction is on a secure channel (https).

Service Address (SSL): <https://www.eagle-network.eu/wp-admin/admin-ajax.php>

HTTP request type: GET

Parameters

- action “elc_process_register_request” (hidden parameter)
- username the username of the new user
- password the password of the new user
- email the email address of the new user

Response Format

- The user ID of the new user in case of success, one of the following error codes in case of failure:
 - o empty_user_login cannot create a user with an empty login name
 - o existing_user_login this username is already registered
 - o existing_user_email this email address is already registered

HTML Call Example

```
<form method="GET" name="RegistrationTestForm" action=" https://www.eagle-network.eu/wp-admin/admin-ajax.php">  
  <input type="hidden" value=" elc_process_register_request " name="action">  
  Username <input name="username" type="text" size="20"><br/>  
  Password <input name="password" type="password" size="20"><br/>  
  Email <input name="email" type="email" size="20"><br/>
```

```
<input type="submit" value="Register" name="submit">
</form>
```

4.6 GET SAVED INFO SERVICE

The “Get Saved Info” Interface is called by the EAGLE server to upload data saved in the “user temporary area” in the FMA server. This interface is invoked when the user, logged in at the EAGLE Portal, requests the uploading to his Personal Space of the data saved by the FMA server during a “mobile session”.

When the user activates the “Get Saved Info” interface, all his data are uploaded to the Eagle Portal. This data are sent as a JSON file, representing all the items that have been saved by the user since his last upload. For images, the response will contain just their URLs (in the FMA server), and the uploader will retrieve them with a subsequent GET.

In input only the user ID is needed, as all the saved information will be transferred to the EAGLE server in one block. If convenient, the data transferred to the EAGLE server may be deleted from the FMA server after the transfer. The exact format of the block being uploaded follows as closely as possible the format of similar information that a user can save on the EAGLE server during a “local session”.

The data that will be stored in the FMA server will be organised into the following categories:

1. saved queries and their results;
2. saved epigraphs (visualized after hitting one item in the result of a query);
3. pictures (of anything) taken by the “mobile user”.

For each saved item the user will be requested to provide a text string that will become the “human readable” ID of the saved item and an optional description (again as a text field).

Service Address: to be defined

Parameters

- **UserId** ID of the user requesting the upload
- **CorrelationId** Unique identifier of the request

Response Format

- **ResponseCode** Code describing the outcome of the operation. Possible values:
 - o **OK** Data found
 - o **NO MATCH FOUND** User not recognised
 - o **NO SAVED DATA** No data available for this user
- **CorrelationId** Unique identifier of the request
- **SavedData** All the data saved by the user since the last upload request. It contains the results of a query to the data base tables which store the data saved by the user, as specified in Sections 6.1 and 6.2:
 - o saved queries and results, where the fields that are not applicable (‘page_number’, ‘tot_page_saved’) are set to “0”
 - o saved epigraphs, where the fields that are not applicable (‘col’, ‘row’, ‘page’) are set to “0”
 - o pictures taken by the “mobile user”, as special case of saved queries and results, where the query is the picture and the result list is empty

5 APPENDIX: FMA CLIENT

5.1 JAVA CODE

Eclipse project: **FMAClient**

This project contains some Java code and images to test the FMA services.
The code should work also on Android platforms.

- **ResponseCodes** contains the following response codes:
 - `RESPONSE_OK` = 200
 - `RESPONSE_NO_MATCH_FOUND` = 300
 - `RESPONSE_SERVER_ERROR` = 400
- **RecognizerExample** is a simple image recognition example.
- **SimilaritySearchExample** is a simple image similarity search example.
- **GetMetadataExample** is a simple example to retrieve epigraph metadata.
- **ImageRecognitionClient**, **ImageSimilarityClient** and **GetMetadataClient** are just a simple classes to show how to call the Image Recognition Service by Apache **HttpClient** library (v4.0.3).

5.1.1 ImageRecognitionClient Code Fragment

The following is just a Java code fragment to show how to call the Image Recognition Service through Apache **HttpClient** library

```
String sr="http://virserv101.isti.cnr.it/fma/services/IRServices/recognize";
InputStream img=an epigraph image;
InputStreamBody isb = new InputStreamBody(img, "img");
MultipartEntity me = new MultipartEntity(HttpMultipartMode.BROWSER_COMPATIBLE);
me.addPart("img", isb);
HttpClient httpClient = new DefaultHttpClient();
HttpPost postRequest = new HttpPost(sr);
postRequest.setEntity(me);
HttpResponse res = httpClient.execute(postRequest);
String response = EntityUtils.toString(res.getEntity());
```

5.1.2 ImageSimilarityClient Code Fragment

The following is just a Java code fragment to show how to call the Image Similarity Service through Apache **HttpClient** library

```
String sr="http://virserv101.isti.cnr.it/fma/services/IRServices/searchSimilar";
InputStream img=an epigraph image;
int numResults = 10;
InputStreamBody isb = new InputStreamBody(img, "img");
MultipartEntity me = new MultipartEntity(HttpMultipartMode.BROWSER_COMPATIBLE);
me.addPart("img", isb);
me.addPart("nResults", new StringBody(Integer.toString(numResults)));
HttpClient httpClient = new DefaultHttpClient();
HttpPost postRequest = new HttpPost(sr);
postRequest.setEntity(me);
HttpResponse res = httpClient.execute(postRequest);
String response = EntityUtils.toString(res.getEntity());
```

5.1.3 GetMetadataClient Code Fragment

The following is just a Java code fragment to show how to call the Get metadata Service through Apache **HttpClient** library

```
String sr="http://virserv101.isti.cnr.it/fma/services/IRServices/getMetadata";
String id = "epigraph ID";
HttpClient httpClient = new DefaultHttpClient();
HttpGet getRequest = new HttpGet(sr + "?id=" + id);
HttpResponse res = httpClient.execute(getRequest);
String response = EntityUtils.toString(res.getEntity());
```

5.2 TESTING IMAGES

The EDR_Images folder contains a collection of 16 images from EDR archives for testing purpose.

5.3 XML RESPONSES

5.3.1 Image Recognition XML Response

The XML response complies with the requirements in *EAGLE_Adv_Architecture*. It returns also the full epigraph metadata got from the Metadata Aggregation System as described in **D3.1**.

5.3.2 XML Response Skeleton

The following is the structure of the XML response returned from the Image Recognition Service

```
?xml version="1.0" encoding="UTF-8"?>
<imageRecognition responseCode="Response Code" correlationId="Correlation ID">
  <result score="Recognition Score">
    <id>Epigraph ID</id>
    <metadata>
      <!--EAGLE Epigraph Metadata-->
    </metadata>
  </result>
</ imageRecognition>
```

Relevant fields:

- **responseCode:** returns the recognition outcome code. Possible response codes:
 - o 200: *Ok*
 - o 300: *No match found*
 - o 400: *Server error*
- **score:** image recognition score
- **Id:** ID of the recognized epigraph
- **metadata:** contains the full epigraph metadata (if available), as described in **D3.1**

5.3.3 XML Response Example

The following is an example of a response received from the Image Recognition Service. All the content inside the **metadata** tag come from the **Metadata Aggregation System**.

```
<?xml version="1.0" encoding="UTF-8"?>
<imageRecognition responseCode="200" correlationId="null">
  <result score="0.749">
    <id>EDR000023</id>
    <metadata>
      <response>
```

```
<lst      name="responseHeader"><int      name="status">0</int><int      name="QTime">1</int><lst      name="params"><str
name="q">_all:"EDR000023"</str></lst></lst><result name="response" numFound="3" start="0"><doc><arr name="__dsversion"><date>2014-
10-08T11:59:49Z</date></arr><arr      name="__result"><str>&lt;result      xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:dri="http://www.driver-repository.eu/namespace/dri"      xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:dnet="eu.dnetlib.miscutils.functional.xml.DnetXsltFunctions"
repository.eu/namespace/dr"&lt;&lt;header&lt;&lt;dri:objIdentifier&lt;378b3c99-21d3-47a5-ade8-
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edr.it/edr_programmi/res_complex_comune.php?do=book&amp;id_nr=EDR000023"&lt;http://www.edr-
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&lt;editingInfo&lt;
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&lt;thumbnail&lt;http://www.edr-edr.it/foto_epigrafi/immagini_uso/1/000023.jpg&lt;/thumbnail&lt;
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&lt;/hasTmId&lt;
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&lt;conservationRegion uri=""&lt;
&lt;conservationCity uri=""&lt;
&lt;museum uri=""&lt;Roma, Museo Nazionale Romano, inv. 61725&lt;/museum&lt;
&lt;position&lt;
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&lt;/conservationPlace&lt;
&lt;/hasArtifact&lt;
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edr.it/edr_programmi/res_complex_comune.php?do=book&amp;id_nr=EDR000023"&lt;http://www.edr-
edr.it/edr_programmi/res_complex_comune.php?do=book&amp;id_nr=EDR000023&lt;/recordSourceInfo&lt;
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CXXV.&lt;/text&lt;
&lt;textHtml lang="la"&lt;
&lt;div class="textpart"&lt;
```

```

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</textHtml>
</bibliography>

    Not. Sc., 1926, p. 297, nr. 4 (R. Paribeni) (1)
</bibliography>

    L. Quilici, Collatia, Roma 1974, p. 494 con foto - AE 1974 (2)
</bibliography>

    AE 1974, 0178 (3)
</bibliography>

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name="__result"><str></arr><arr name="__result"><str></arr><arr name="__result"><str></arr>
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08T11:56:52+02:00</dri:dateOfCollection></header></metadata></eagleObject>
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    </metadataEditor>MARGHERITA FOGLIA</metadataEditor>
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    </description lang="la">
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    </depth>0.00</depth>
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    </ancientFindSpot uri="www.trismegistos.org/place/NaN">Roma</ancientFindSpot>
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    </modernCountry uri="">
    </modernRegion uri="">
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    </conservationPlace>
    </conservationCountry uri="">
    </conservationRegion uri="">
    </conservationCity uri="">
    </museum uri="">Roma, Museo Nazionale Romano, inv. 61725</museum>
    </position>
    </inventoryNumber>
    </conservationPlace>

```



```

<!--hasVisualRepresentation-->

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<!--inscription-->
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<!--height-->
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<!--/paleographicCharacteristics-->

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<!--/letterSize-->
<!--honorand socialStatus="unknown" unknown honorand-->
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<!--dnetResourceIdentifier-->EDR::94a9c565725d917437609127430bbe18::transcription<!--/dnetResourceIdentifier-->
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<!--text lang="la" [A(ulus) ] Novius A(uli) l(ibertus) / â,çPhilargurusâ,ç. / Opetreia P(ubli) l(iberta) Secunda. / parte CXXV.<!--/text-->
<!--textHtml lang="la"-->
<!--div class="textpart"-->
<!--a id="a1" --O--><!--/a--> [A(ulus) ] Novius A(uli) l(ibertus) <!--br id="a2"/>â,çPhilargurusâ,ç.<!--br id="a3"/>Opetreia P(ubli) l(iberta) Secunda.<!--br id="a4"/>parte CXXV. <!--/div-->
<!--/textHtml-->
<!--bibliography-->

Not. Sc., 1926, p. 297, nr. 4 (R. Paribeni) (1)
<!--/bibliography-->

<!--bibliography-->

L. Quilici, Collatia, Roma 1974, p. 494 con foto - AE 1974 (2)
<!--/bibliography-->

<!--bibliography-->

AE 1974, 0178 (3)
<!--/bibliography-->

<!--hasTranscription-->
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<!--/artifact-->
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xmlns:dc="http://purl.org/dc/elements/1.1/" xmlns:dnet="eu.dnetlib.miscutils.functional.xml.DnetXsltFunctions" xmlns:dr="http://www.driver-repository.eu/namespace/dri" <!--/header--><!--dri:objIdentifier-->378b3c99-21d3-47a5-ade8-bb423e2aa39f_UmVwb3NpdG9yeVNlcnZpY2VSZXNvdXJjZXMvUmVwb3NpdG9yeVNlcnZpY2VSZXNvdXJjZVR5cGU=:94a9c565725d917437609127430bbe18_transcription<!--/dri:objIdentifier--><!--dri:repositoryId-->378b3c99-21d3-47a5-ade8-bb423e2aa39f_UmVwb3NpdG9yeVNlcnZpY2VSZXNvdXJjZXMvUmVwb3NpdG9yeVNlcnZpY2VSZXNvdXJjZVR5cGU=
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<!--dnetResourceIdentifier-->EDR::94a9c565725d917437609127430bbe18::transcription<!--/dnetResourceIdentifier-->

```



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edr.it/edr_programmi/res_complex_comune.php?do=book&id_nr=EDR000023</recordSourceInfo>
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<dateEdited>1970-01-01</dateEdited>
<metadataEditor>MARGHERITA FOGLIA</metadataEditor>
</editingInfo>
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<description lang="la">
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<ancientFindSpot uri="www.trismegistos.org/place/NaN">Roma</ancientFindSpot>
<modernFindSpot uri="">Roma, via Labicana (oggi via Casilina), km 3, colombario</modernFindSpot>
<modernCountry uri="">
<modernRegion uri="">
<modernProvince uri="">
</findingSpot>
<inscriptionType uri="http://www.eagle-network.eu/voc/typeins/lod/92">sepulcralis</inscriptionType>
<objectType uri="http://www.eagle-network.eu/voc/objtyp/lod/257">tabula</objectType>
<material uri="http://www.eagle-network.eu/voc/material/lod/48">marmor</material>
<conservationPlace>
<conservationCountry uri="">
<conservationRegion uri="">
<conservationCity uri="">
<museum uri="">Roma, Museo Nazionale Romano, inv. 61725</museum>
<position>
<inventoryNumber>
</conservationPlace>
</hasArtifact>
<hasVisualRepresentation>

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entifier>
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edr.it/edr_programmi/res_complex_comune.php?do=book&id_nr=EDR000023</recordSourceInfo>
<thumbnail>http://www.edr-edr.it/foto_epigrafi/immagini_uso/1/000023.jpg</thumbnail>
<hasVisualRepresentation>
<transcription>
<text lang="la">[A(ulus) ] Novius A(uli) l(ibertus) / â,çPhilargurusâ,£. / Opetreia P(ubli) l(iberta) Secunda. / parte
CXXV.</text>
<textHtml lang="la">
<div class="textpart">
<a id="al1">[A(ulus) ] Novius A(uli) l(ibertus) <br id="al2">â,çPhilargurusâ,£.<br
id="al3">Opetreia P(ubli) l(iberta) Secunda.<br id="al4">parte CXXV. </div>
</textHtml>
<criticalApparatus>

Textus secundum (1) contulit ad imaginem archivii photographici Instituti
Epigraphiae Latinae (Roma) Foglia a. 2002.
</criticalApparatus>

<bibliography>

Not. Sc., 1926, p. 297, nr. 4 (R. Paribeni) (1)
<bibliography>

L. Quilici, Collatia, Roma 1974, p. 494 con foto - AE 1974 (2)
<bibliography>

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<lt;bibliography>
    AE 1974, 0178 (3)
    <lt;/bibliography>

    <lt;commentary>
    <lt;/transcription>
    <lt;/documentalManifestation>
    <lt;/eagleObject><lt;/metadata><lt;/result></str></arr><arr
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430bbe18_transcription</str><long name="__version_">1481388868632576000</long><arr name="__fulltext"><str></arr></doc></result>
</response>
</metadata>
</result>
</imageRecognition>
```

5.3.4 Image Similarity Search XML Response

The XML response complies with the requirements in *EAGLE_Adv_Architecture*.
The image similarity response returns a list of the most visually similar epigraphs.

5.3.5 XML Response Skeleton

The following is the structure of the XML response returned from the Image Similarity Service

```
<imageSimilarity responseCode="Response Code" correlationId="Correlation ID">
  <results>
    <result score="Result Score">
      <id>Epigraph ID</id>
      <thumbnail>Epigraph Thumbnail URL</thumbnail>
      <title>Epigraph Title</title>
    </result>
    <result score="Result Score">
      <id>Epigraph ID</id>
      <thumbnail>Epigraph Thumbnail URL</thumbnail>
      <title>Epigraph Title</title>
    </result>
    ...
  </results>
</imageSimilarity>
```

Each result is contained in a result tag.

Relevant fields:

- **responseCode:** returns the image similarity response code. Possible response codes:
 - o 200: *Ok*
 - o 300: *No match found*
 - o 400: *Server error*
- **score:** image simialrity score
- **Id:** ID of the similar epigraph
- **thumbnail:** URL of the epigraph thumbnail
- **title:** thumbnail title (if available)

5.3.6 XML Response Example

The following is an example of a response received from the Image Similarity Service. The title content come from the **Metadata Aggregation System**.

```
<?xml version="1.0" encoding="UTF-8"?>
<imageSimilarity responseCode="200" correlationId="null">
```

```
<results>
  <result score="5.3410625">
    <id>EDR000023</id>
    <thumbnail>http://virserv101.isti.cnr.it/eagle-images/000023.jpg</thumbnail>
    <title>EDR000023</title>
  </result>
  <result score="0.22245051">
    <id>EDR005073</id>
    <thumbnail>http://virserv101.isti.cnr.it/eagle-images/005073.jpg</thumbnail>
    <title>EDR005073</title>
  </result>
  <result score="0.16435404">
    <id>EDR110628</id>
    <thumbnail>http://virserv101.isti.cnr.it/eagle-images/110628.jpg</thumbnail>
    <title/>
  </result>
  <result score="0.14074884">
    <id>EDR005014</id>
    <thumbnail>http://virserv101.isti.cnr.it/eagle-images/005014.jpg</thumbnail>
    <title>EDR005014</title>
  </result>
  <result score="0.12546638">
    <id>EDR005114</id>
    <thumbnail>http://virserv101.isti.cnr.it/eagle-images/005114.jpg</thumbnail>
    <title>EDR005114</title>
  </result>
</results>
</imageSimilarity>
```

5.3.7 Get Metadata XML Response

The XML response complies with the requirements in *EAGLE_Adv_Architecture*.

This service returns the full metadata associated to an epigraph as described in **D3.1**. To retrieve the epigraph metadata, the service queries the Metadata Aggregation System.

The following is the SOLR query performed by this service to the Metadata Aggregation System:

[http://search.eagle.research-infrastructures.eu/solr/EMF-index-cleaned/select?q=__all:"id"](http://search.eagle.research-infrastructures.eu/solr/EMF-index-cleaned/select?q=__all:)

where **id** is the epigraph ID.

5.3.8 XML Response Example

The following is an example of a response received from the Get Metadata Similarity Service. The full content come from the **Metadata Aggregation System**.

```
<?xml version="1.0" encoding="UTF-8"?>
<response>
  <lst name="responseHeader"><int name="status">0</int><int name="QTime">1</int><lst name="params"><str name="q">__all:"EDR000112"</str></lst></lst><result name="response" numFound="3" start="0"><doc><arr name="__dsversion"><date>2014-10-08T11:59:49Z</date></arr><arr name="__result"><str>&lt;result
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:dri="http://www.driver-repository.eu/namespace/dri"
    xmlns:dc="http://purl.org/dc/elements/1.1/"
    xmlns:dnet="eu.dnetlib.miscutils.functional.xml.DnetXsltFunctions"
    repository.eu/namespace/dr"&lt;&lt;header&lt;&lt;378b3c99-21d3-47a5-ade8-bb423e2aa39f_UmVwb3NpdG9yeVNlcnZpY2VSZXNvdXJjZXMvUmVwb3NpdG9yeVNlcnZpY2VSZXNvdXJjZVR5cGU=:0b4b1c3b5051f3a0f4eea2be136d7b34_transcription&lt;&lt;dri:objIdentifier&lt;&lt;dri:repositoryId&lt;
      378b3c99-21d3-47a5-ade8-
      bb423e2aa39f_UmVwb3NpdG9yeVNlcnZpY2VSZXNvdXJjZXMvUmVwb3NpdG9yeVNlcnZpY2VSZXNvdXJjZVR5cGU=
      &lt;&lt;dri:repositoryId&lt;&lt;dri:dateOfCollection&lt;2014-10-
      08T11:52:51+02:00&lt;&lt;dri:dateOfCollection&lt;&lt;header&lt;&lt;metadata&lt;&lt;eagleObject&lt;
      &lt;&lt;dnetResourceIdentifier&lt;EDR::0b4b1c3b5051f3a0f4eea2be136d7b34::transcription&lt;&lt;dnetResourceIdentifier&lt;
```

```
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edr.it/edr_programmi/res_complex_comune.php?do=book&amp;id_nr=EDR000112">http://www.edr-
edr.it/edr_programmi/res_complex_comune.php?do=book&amp;id_nr=EDR000112</recordSourceInfo>
<editingInfo>
<dateEdited>1970-01-01</dateEdited>
<metadataEditor>STEFANIA VALENTINI</metadataEditor>
</editingInfo>
<metadataPr uri="http://www.europeana.eu/rights/rr-f/">Reserved Rights - Free access via EDR</metadataPr>
<title lang="la">EDR000112</title>
<description lang="la">
<entityType>documental</entityType>
<documentalManifestation>
<documentType>transcription</documentType>
<hasArtifact>
<dnetResourceIdentifier>EDR::0b4b1c3b5051f3a0f4eea2be136d7b34::artifact</dnetResourceIdentifier>
<recordSourceInfo providerName="Archivio epigrafico di Roma" providerAcronym="EDR" landingPage="http://www.edr-
edr.it/edr_programmi/res_complex_comune.php?do=book&amp;id_nr=EDR000112">http://www.edr-
edr.it/edr_programmi/res_complex_comune.php?do=book&amp;id_nr=EDR000112</recordSourceInfo>
<hasTmId>
<tmdId>n/a_EDR::0b4b1c3b5051f3a0f4eea2be136d7b34</tmdId>
</hasTmId>
<artifactTitle lang="la">EDR000112</artifactTitle>
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period="">1 AD - 1 AD</originDating>
<findingSpot>
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<ancientFindSpot uri="www.trismegistos.org/place/031683">Albingaunum</ancientFindSpot>
<modernFindSpot uri="">Albenga (Savona), regione Doria</modernFindSpot>
<modernCountry uri="">
<modernRegion uri="">
<modernProvince uri="">
</findingSpot>
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<material uri="http://www.eagle-network.eu/voc/material/lod/48">marmor</material>
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<conservationCountry uri="">
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<position>
<inventoryNumber>
</conservationPlace>
</hasArtifact>
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tifier>
<recordSourceInfo providerName="Archivio epigrafico di Roma" providerAcronym="EDR" landingPage="http://www.edr-
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edr.it/edr_programmi/res_complex_comune.php?do=book&amp;id_nr=EDR000112</recordSourceInfo>
<thumbnail>http://www.edr-edr.it/foto_epigrafi/immagini_uso/1/000112.jpg</thumbnail>
<hasVisualRepresentation>
<transcription>
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f(ilio) Po[b(lilia)] / â, Çquattuorviroâ, Æ aedil(icia) [t(estate) ], / â, Çquattuorviroâ, Æ iur(e) [c(undo) ] / [- - - -]</text>
<textHtml lang="la">
<div class="textpart">
<a id="a1"></a> [T(itus) Virius [.] f(ilius) Pob(lilia)]</a> [B]arbar[us v(ivus) f(ecit) sibi]</a> et Lucretiae [.]. f(iliae)]</a> et C(aio) Virio T(iti)
Po[b(lilia)]</a> [t(estate) ],</a> Çquattuorviroâ, Æ aedil(icia) [t(estate) ],</a> Çquattuorviroâ, Æ iur(e) [c(undo) ],</a> [- - - -]</div>
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<criticalApparatus>
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</criticalApparatus>
</bibliography>
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</bibliography>
</bibliography>
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</bibliography>

Page 29 of 31

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edr.it/edr_programmi/res_complex_comune.php?do=book&amp;id_nr=EDR000112</recordSourceInfo>
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f(ilio) Po[b(lilia)] / â,Çquattuorviroâ,£ aedil(icia) [t(estate) ], / â,Çquattuorviroâ,£ iur(e) [c(undo) ] / [ - - - - ]</text>
<textHtml lang="la">
<div class="textpart">
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id="al3">et Lucretiae [.] f(iliae)]&lt;br id="al4">et C(aio) Virio T(iti) f(ilio) Po[b(lilia)] &lt;br id="al5">
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iur(e) [c(undo) ]&lt;br id="al0">[ - - - - ]&lt;/div>
</textHtml>
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AE 1990, 0371 (2)
</bibliography>
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</visualRepresentation>
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47a5-ade8-
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36d7b34_0f0ca746e5bd2dc34b6c48c59068a68a_visual</str><long name="__version_">1481388751676506112</long><arr
name="__fulltext"></arr></doc><doc><arr name="__dsversion">date>2014-10-08T11:59:49Z</date></arr><arr
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repository.eu/namespace/dri" xmlns:dc="http://purl.org/dc/elements/1.1/" xmlns:dnet="eu.dnetlib.miscutils.functional.xml.DnetXsltFunctions"
xmlns:dr="http://www.driver-repository.eu/namespace/dr">&lt;header>&lt;dri:objIdentifier>378b3c99-21d3-47a5-ade8-
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```



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<lt;inventoryNumber/>
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