
Repository-RI Documentation

Release develop

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The Repository GE is a core enabler of the FIWARE Business Framework (together with the Store GE and the Marketplace GE). The Repository GE and its reference implementation provide a consistent uniform API to access USDL service descriptions and associated media files for applications of the business framework. A service provider can use the Repository GE to publish the description of various aspects of the service according to a unified description language.

Moreover, the Repository provides a uniform API to perform smart searches over the published descriptions. This API is oriented to service descriptions and media files serialized in RDF formats (e.g a Linked-USDL document) and allows the usage of SPARQL as query language.

This project is part of [FIWARE](#).

User and Programmer Guide

1.1 Introduction

This document describes the basic concepts regarding the Repository GEr and explains the necessary steps to develop applications which makes use of the Repository backend functionality. The Repository API is based on REST principles and generally returns XML or JSON encoded responses. Since REST is independent of a concrete programming language, you just have to know how to make an HTTP request in the programming language of your choice.

Despite the Repository is a Generic Enabler which provides pure backend functionality to other applications (e.g. Generic Enablers or end user facing applications), it is possible to browse between the existing collections and resources using the basic web interface provided.

To give you a feeling of how the Repository works and how you can interact with the system let us take a look at some examples, realized with the command line tool cURL. 'cURL' is a command which can be used to perform any kind of HTTP operation - and therefore is also usable for the Repository. The library libcurl enables the integration in C programs as well. Other easy way to interact with the Repository is using any REST client like some browsers extensions provide to the user. We describe the API REST to show you what operations is able to do, and what responses are given by the Repository.

1.2 User Guide

The Repository allows the client to choose the appropriate data format for retrieving meta information about a resource or a collection. One of this data format is `text/html` which provides a user friendly interface to see the different collection and resources stored in the repository.

1.2.1 Browsing Collections

It is possible to visualize the existing collections registered inside a given collection in the Repository by accessing the URL `http://[SERVER_HOST]/FiwareRepository/v2/collec/{collection}`

Collection: collectionA

Creation Date: Wed May 27 16:05:09 CEST 2015

Collections:

Collection Id	Creation Date
collectionA/collectionB	Wed May 27 16:05:09 CEST 2015
collectionA/collectionC	Thu May 28 15:40:29 CEST 2015
collectionA/collectionD	Thu May 28 15:40:34 CEST 2015

Resources:

Resource Id	Resource Meta Information	Creation Date	Modification Date	Filename	Mime Type
-------------	---------------------------	---------------	-------------------	----------	-----------

It is possible to visualize the existing resources contained in a given collection by accessing the URL `http://[SERVER_HOST]/FiwareRepository/v2/collec/{collectionA}/{collectionB}/`

Collection: collectionA/collectionB

Creation Date: Wed May 27 16:05:09 CEST 2015

Collections:

Collection Id	Creation Date
---------------	---------------

Resources:

Resource Id	Resource Meta Information	Creation Date	Modification Date	Filename	Mime Type
collectionA/collectionB/ResourceExample	Meta Information	Wed May 27 16:05:09 CEST 2015	Wed May 27 16:06:51 CEST 2015	http://whereistheresource.com/ResourceExample	text/plain
collectionA/collectionB/resource1	Meta Information	Thu May 28 15:39:24 CEST 2015	Thu May 28 15:39:24 CEST 2015	resourceFileName	
collectionA/collectionB/resource	Meta Information	Thu May 28 15:39:51 CEST 2015	Thu May 28 15:39:51 CEST 2015	resourceFileName	
collectionA/collectionB/resource2	Meta Information	Thu May 28 15:40:17 CEST 2015	Thu May 28 15:40:17 CEST 2015	resourceFileName	
collectionA/collectionB/resource3	Meta Information	Thu May 28 15:40:21 CEST 2015	Thu May 28 15:40:21 CEST 2015	resourceFileName	

1.2.2 Browsing Resources

It is possible to visualize the meta information of a given resource by accessing the URL `http://[SERVER_HOST]/FiwareRepository/v2/collec/{collectionA}/{collectionB}/{resource}`

Resource:
collectionA/collectionB/ResourceExample

Resource Id	Creation Date	Modification Date	Filename	Mime Type
collectionA/collectionB/ResourceExample	Wed May 27 16:05:09 CEST 2015	Wed May 27 16:06:51 CEST 2015	http://whereistheresource.com/ResourceExample	text/plain

Note: Depending on the configuration of the Repository RI instance, you may be redirected to the FIWARE Lab login page in order to be authenticated.

1.3 Programmer Guide

The Repository offers pure backend functionality; in this way, the current section gives an overview of the operations that can be made with the API in order to integrate the functionality provided by the Repository with an existing solution.

This section contains an overview of the existing REST API. You can find detailed documentation of the API in [Apiary](#) and in [GitHub Pages](#).

1.3.1 Managing Collections

Following you can find the description of the operations that can be performed over collections:

- GET [http://\[SERVER_HOST\]/FiwareRepository/v2/collec/{collection}](http://[SERVER_HOST]/FiwareRepository/v2/collec/{collection}) Get a collection.
- POST [http://\[SERVER_HOST\]/FiwareRepository/v2/collec/](http://[SERVER_HOST]/FiwareRepository/v2/collec/) Create a collection.
- DELETE [http://\[SERVER_HOST\]/FiwareRepository/v2/collec/{collection}](http://[SERVER_HOST]/FiwareRepository/v2/collec/{collection})/ Delete a resource

Note: Every collection name must comply the regular expression "[a-zA-Z0-9_-]+".

Getting collections

- Request

- Verb: GET
- URI: `http://[SERVER_HOST]/FiwareRepository/v2/collec/{collection}`
- Content-type: application/json, application/xml, text/plain

- Responses

HTTP Code	Type	Description
200	OK	Your request has been completed properly.
404	Not Found	The collection with the given path has not been found.
406	Not Acceptable	The collection can not be generated in the given format.
500	Internal Server Error	There was an internal error in the system so your request cannot be completed.

Creating collections

- Request

- Verb: POST
- URI: `http://[SERVER_HOST]/FiwareRepository/v2/collec/[collection]`
- Content-Type: application/json, application/xml
- Body:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<collection xmlns:atom="http://www.w3.org/2005/Atom">
  <creator>CreatornameUpdate</creator>
  <name>TestCollection</name>
  <collections/>
  <resources/>
</collection>
```

- or

```
{
  "type": "collection",
  "creator": "Creator",
  "creationDate": "",
  "modificationDate": "",
  "name": "TestCollection"
}
```

- Responses

HTTP Code	Type	Description
201	OK	The collection has been created. The <i>location</i> header will contain the final URL that users can use to access this collection.
400	Bad Request	The collection is not well formed or collection name is not valid.
409	Conflict	The collection with the path and the name given already exist.
415	Unsupported Media Type	The request entity has a media type which a collection does not support.
500	Internal Server Error	There was an internal error in the system so your request cannot be completed.

Removing collections

- Request
 - Verb: DELETE
 - URI: `http://[SERVER_HOST]FiwareRepository/v2/collec/{collection}`
- Responses

HTTP Code	Type	Description
204	No Content	The collection and all its content has been deleted.
404	Not Found	The collection with the given path has not been found.
500	Internal Server Error	There was an internal error in the system so your request cannot be completed.

1.3.2 Managing Resources

Following you can find the description of the operations that can be performed over resources:

- GET `http://[SERVER_HOST]FiwareRepository/v2/collec/{collection}/{resource}.meta` Get metadata of a resource
- GET `http://[SERVER_HOST]FiwareRepository/v2/collec/{collection}/{resource}` Get content of a resource.
- POST `http://[SERVER_HOST]FiwareRepository/v2/collec/` Create a resource with specified metadata.
- PUT `http://[SERVER_HOST]FiwareRepository/v2/collec/{collection}/{resource}.meta` Replace metadata of a resource.
- PUT `http://[SERVER_HOST]FiwareRepository/v2/collec/{collection}/{resource}` Replace content of a resource.
- DELETE `http://[SERVER_HOST]FiwareRepository/v2/collec/{collection}/{resource}` Delete a resource

Note: Every resource name must comply the regular expression "[a-zA-Z0-9._-]+".

Getting resources metadata

- Request
 - Verb: GET
 - URI: `http://[SERVER_HOST]FiwareRepository/v2/collec/{collection}/{resource}.meta`
 - Accept: application/json, application/xml, text/plain
- Responses

HTTP Code	Type	Description
200	OK	Your request has been completed properly.
404	Not Found	The resource with the given path has not been found.
406	Not Acceptable	The resource can not be generated in the given format.
500	Internal Server Error	There was an internal error in the system so your request cannot be completed.

Getting resources

- Request
 - Verb: GET
 - URI: `http://[SERVER_HOST]/FiwareRepository/v2/collec/{collection}/{resource}`
 - Accept: `application/json`, `application/xml`, `application/rdf+xml`, `text/turtle`, `application/x-turtle`, `text/n3`, `text/rdf+n3`, `text/n-triples`, `text/plain`
- Responses

HTTP Code	Type	Description
200	OK	Your request has been completed properly.
204	No Content	Your request has been processed, but the resource has not got content.
404	Not Found	The resource with the given path has not been found.
406	Not Acceptable	The resource content can not be generated in the given format.
500	Internal Server Error	There was an internal error in the system so your request cannot be completed.

Creating resources

- Request
 - Verb: POST
 - URI: `http://[SERVER_HOST]/FiwareRepository/v2/collec/{collection}`
 - Content-Type: `application/json`, `application/xml`
 - Body:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<resource>
  <creator>Creator</creator>
  <creationDate></creationDate>
  <modificationDate></modificationDate>
  <name>TestResource</name>
  <contentUrl>http://testresourceurl.com/resource</contentUrl>
  <contentFileName>resourceFileName</contentFileName>
</resource>
```

– OR

```
{
  "type": "resource",
  "creator": "Creator",
  "creationDate": "",
  "modificationDate": "",
  "name": "TestResource",
  "contentUrl": "http://testresourceurl.com/resource",
  "contentFileName": "resourceFileName"
}
```

- Responses

HTTP Code	Type	Description
201	Created	The resource has been created. The <i>location</i> header will contain the final URL that users can use to access this collection.
400	Bad Request	The resource is not well formed or collection name is not valid.
409	Conflict	The resource with the path and the name given already exist.
415	Unsoported Media Type	The request entity has a media type which a resource does not support.
500	Internal Server Error	There was an internal error in the system so your request cannot be completed.

Updating resources metadata

- Request

- Verb: PUT
- URI: [http://\[SERVER_HOST\]/FiwareRepository/v2/collec/{collection}/{resource}.meta](http://[SERVER_HOST]/FiwareRepository/v2/collec/{collection}/{resource}.meta)
- Content-Type: application/json, application/xml
- **Body:** :: `<?xml version="1.0" encoding="UTF-8" standalone="yes"?> <resource id="collectionA/collectionB/resource">`
`<creator>Creator</creator> <creationDate></creationDate> <modification-`
`Date></modificationDate> <name>Test resource</name> <contentFile-`
`Name>resourceFileName</contentFileName>`
`</resource>`
- or

```
{
  "type": "resource",
  "creator": "Creator",
  "creationDate": "",
  "modificationDate": "",
  "name": "TestResource",
  "contentUrl": "http://testresourceurl.com/resource",
  "contentFileName": "resourceFileName"
}
```

- Responses

HTTP Code	Type	Description
200	OK	Your request has been completed properly.
400	Bad Request	The request is not well formed or collection name is not valid.
403	Forbidden	The request was a valid request, but the server is refusing to respond to it.
409	Conflict	The resource with the path and the name given already exist.
415	Unsoported Media Type	The request entity has a media type which a resource does not support.
500	Internal Server Error	There was an internal error in the system so your request cannot be completed.

Updating resources content

- Request
 - Verb: PUT
 - URI: `http://[SERVER_HOST]/FiwareRepository/v2/collec/{collection}/{resource}`
 - Content-Type: `application/json`, `application/xml`, `application/rdf+xml`, `text/turtle`, `application/x-turtle`, `text/n3`, `text/rdf+n3`, `text/n-triples`, `text/plain`
- Responses

HTTP Code	Type	Description
200	OK	Your request has been completed properly.
400	Bad Request	The resource content is not well formed.
404	Not Found	The resource with the given path has not been found.
415	Unsoported Media Type	The request entity has a media type which the resource content does not support.
500	Internal Server Error	There was an internal error in the system so your request cannot be completed.

Deleting resources

- Request
 - Verb: PUT
 - URI: `http://[SERVER_HOST]/FiwareRepository/v2/collec/{collection}/{resource}`
- Responses

HTTP Code	Type	Description
204	No Content	The resource and all its content has been deleted.
404	Not Found	The resource with the given path has not been found.
500	Internal Server Error	There was an internal error in the system so your request cannot be completed.

1.3.3 Making SPARQL queries

Following you can find the quering operations that can be executed.

- GET `http://[SERVER_HOST]/FiwareRepository/v2/services/query/{contentUrl}`
- GET `http://[SERVER_HOST]/FiwareRepository/v2/services/query?query=[Query]` Execute a query in the triple store.
- POST `http://[SERVER_HOST]/FiwareRepository/v2/services/query` | Execute a long query in the triple store.

Getting a resource by Url Content

- Request
 - Verb: GET
 - URI: `http://[SERVER_HOST]/FiwareRepository/v2/services/query/{contentUrl}`

- Responses

- Verb: GET

- Responses

- Verb: GET

- Accept: application/json, application/xml, application/rdf+xml, text/turtle, application/x-turtle, text/n3, text/rdf+n3, text/n-triples, text/plain

- Body: "SELECT ?s ?p ?o WHERE { ?s ?p ?o }"

Accessing the Repository with cURL

1.3.4 Creating a resource

- Create a message body and save it to a file named `resource.xml`.

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<resource>
  <creator>Creator</creator>
  <creationDate></creationDate>
  <modificationDate></modificationDate>
  <name>resource</name>
  <contentUrl>http://testresourceurl.com/resource</contentUrl>
  <contentFileName>resourceFileName</contentFileName>
</resource>
```

- Send the request to the server.

```
curl -v -H "Content-Type: application/xml" -X POST --data "@resource.xml" http://[SERVER_HOST]/F
```

- Response

```
* Hostname was NOT found in DNS cache
*   Trying 127.0.0.1...
* Connected to localhost (127.0.0.1) port 8080 (#0)
> POST /FiwareRepository/v2/collec HTTP/1.1
> User-Agent: curl/7.35.0
> Host: localhost:8080
> Accept: */*
> Content-Type: application/xml
> Content-Length: 349
>
* upload completely sent off: 349 out of 349 bytes
< HTTP/1.1 201 Created
* Server Apache-Coyote/1.1 is not blacklisted
< Server: Apache-Coyote/1.1
< Content-Location: http://testresourceurl.com/resource
< Content-Length: 0
< Date: Thu, 28 May 2015 12:12:23 GMT
<
* Connection #0 to host localhost left intact
```

1.3.5 Updating the content of a resource

- Create a message body and save it to a file named `resourceContent.xml`.

```
<rdf:RDF
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:app="http://www.app.fake/app#">

  <rdf:Description
    rdf:about="http://www.app.fake/app/App1">
    <app:name>App1</app:name>
    <app:country>USA</app:country>
    <app:company>Company1</app:company>
    <app:price>0.99</app:price>
    <app:year>2010</app:year>
```

```
</rdf:Description>

<rdf:Description
rdf:about="http://www.app.fake/app/App2">
  <app:name>App2</app:name>
  <app:country>Spain</app:country>
  <app:company>Company2</app:company>
  <app:price>0.99</app:price>
  <app:year>2010</app:year>
</rdf:Description>

</rdf:RDF>
```

- Send the request to the server.

```
curl -v -H "Content-Type: application/rdf+xml" -X PUT --data-binary "@resourceContent.xml" http:
```

- Response:

```
* Hostname was NOT found in DNS cache
*   Trying 127.0.0.1...
* Connected to localhost (127.0.0.1) port 8080 (#0)
> PUT /FiwareRepository/v2/collec/collectionA/collectionB/resource HTTP/1.1
> User-Agent: curl/7.35.0
> Host: localhost:8080
> Accept: */*
> Content-Type: application/rdf+xml
> Content-Length: 645
>
* upload completely sent off: 645 out of 645 bytes
< HTTP/1.1 200 OK
* Server Apache-Coyote/1.1 is not blacklisted
< Server: Apache-Coyote/1.1
< Content-Length: 0
< Date: Thu, 28 May 2015 12:41:21 GMT
<
* Connection #0 to host localhost left intact
```

1.3.6 Getting a resource content

- Send the request to the server.

```
curl -v -H "Accept: application/rdf+xml" -X GET http://localhost:8080/FiwareRepository/v2/collec
```

- Response:

```
* Hostname was NOT found in DNS cache
*   Trying 127.0.0.1...
* Connected to localhost (127.0.0.1) port 8080 (#0)
> GET /FiwareRepository/v2/collec/collectionA/collectionB/resource HTTP/1.1
> User-Agent: curl/7.35.0
> Host: localhost:8080
> Accept: application/rdf+xml
>
< HTTP/1.1 200 OK
* Server Apache-Coyote/1.1 is not blacklisted
< Server: Apache-Coyote/1.1
< Content-Type: application/rdf+xml
```

```

< Content-Length: 645
< Date: Thu, 28 May 2015 12:43:23 GMT
<
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<rdf:RDF
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:app="http://www.app.fake/app#">

  <rdf:Description
    rdf:about="http://www.app.fake/app/App1">
    <app:name>App1</app:name>
    <app:country>USA</app:country>
    <app:company>Company1</app:company>
    <app:price>0.99</app:price>
    <app:year>2010</app:year>
  </rdf:Description>

  <rdf:Description
    rdf:about="http://www.app.fake/app/App2">
    <app:name>App2</app:name>
    <app:country>Spain</app:country>
    <app:company>Company2</app:company>
    <app:price>0.99</app:price>
    <app:year>2010</app:year>
  </rdf:Description>

</rdf:RDF>
* Connection #0 to host localhost left intact

```

1.3.7 Deleting a resource

- Send the request to the server.

```
curl -v -X DELETE http://localhost:8080/FiwareRepository/v2/collec/collectionA/collectionB/resource
```

- Response:

```

* Hostname was NOT found in DNS cache
*   Trying 127.0.0.1...
* Connected to localhost (127.0.0.1) port 8080 (#0)
> DELETE /FiwareRepository/v2/collec/collectionA/collectionB/resource HTTP/1.1
> User-Agent: curl/7.35.0
> Host: localhost:8080
> Accept: */*
>
< HTTP/1.1 204 No Content
* Server Apache-Coyote/1.1 is not blacklisted
< Server: Apache-Coyote/1.1
< Content-Length: 0
< Date: Thu, 28 May 2015 12:46:33 GMT
<
* Connection #0 to host localhost left intact

```

1.3.8 Executing a Query

- Send the request to the server.

```
curl -v -H "Accept: application/json" -H "Content-Type: text/plain" -X POST --data "SELECT ?s ?p"
```

- **Response:**

```
* Hostname was NOT found in DNS cache
* Trying 127.0.0.1...
* Connected to localhost (127.0.0.1) port 8080 (#0)
> POST /FiwareRepository/v2/services/query HTTP/1.1
> User-Agent: curl/7.35.0
> Host: localhost:8080
> Accept: application/json
> Content-Type: text/plain
> Content-Length: 41
>
* upload completely sent off: 41 out of 41 bytes
< HTTP/1.1 200 OK
* Server Apache-Coyote/1.1 is not blacklisted
< Server: Apache-Coyote/1.1
< Content-Type: application/json
< Transfer-Encoding: chunked
< Date: Thu, 28 May 2015 13:33:32 GMT
<
{
  vars: 3
  columns: [3]
  0: {
    values: [10]
    0: "http://www.w3.org/1999/02/22-rdf-syntax-ns#type"
    1: "http://www.w3.org/1999/02/22-rdf-syntax-ns#type"
    2: "http://www.w3.org/1999/02/22-rdf-syntax-ns#type"
    3: "http://www.w3.org/1999/02/22-rdf-syntax-ns#type"
    4: "http://www.w3.org/1999/02/22-rdf-syntax-ns#type"
    5: "http://www.w3.org/1999/02/22-rdf-syntax-ns#type"
    6: "http://www.w3.org/1999/02/22-rdf-syntax-ns#type"
    7: "http://www.w3.org/1999/02/22-rdf-syntax-ns#type"
    8: "http://www.w3.org/1999/02/22-rdf-syntax-ns#type"
    9: "http://www.w3.org/1999/02/22-rdf-syntax-ns#type"
    -
    name: "p"
  }-
  1: {
    values: [10]
    0: "http://www.openlinksw.com/schemas/virtrdf#QuadMapFormat"
    1: "http://www.openlinksw.com/schemas/virtrdf#QuadMapFormat"
    2: "http://www.openlinksw.com/schemas/virtrdf#QuadMapFormat"
    3: "http://www.openlinksw.com/schemas/virtrdf#QuadMapFormat"
    4: "http://www.openlinksw.com/schemas/virtrdf#QuadMapFormat"
    5: "http://www.openlinksw.com/schemas/virtrdf#QuadMapFormat"
    6: "http://www.openlinksw.com/schemas/virtrdf#QuadMapFormat"
    7: "http://www.openlinksw.com/schemas/virtrdf#QuadMapFormat"
    8: "http://www.openlinksw.com/schemas/virtrdf#QuadMapFormat"
    9: "http://www.openlinksw.com/schemas/virtrdf#QuadMapFormat"
    -
    name: "o"
  }-
  2: {
    values: [10]
    0: "http://www.openlinksw.com/virtrdf-data-formats#default-iid"
```

```

1: "http://www.openlinksw.com/virtrdf-data-formats#default-iid-nullable"
2: "http://www.openlinksw.com/virtrdf-data-formats#default-iid-nonblank"
3: "http://www.openlinksw.com/virtrdf-data-formats#default-iid-nonblank-nullable"
4: "http://www.openlinksw.com/virtrdf-data-formats#default"
5: "http://www.openlinksw.com/virtrdf-data-formats#default-nullable"
6: "http://www.openlinksw.com/virtrdf-data-formats#sql-varchar"
7: "http://www.openlinksw.com/virtrdf-data-formats#sql-varchar-nullable"
8: "http://www.openlinksw.com/virtrdf-data-formats#sql-varchar-dt"
9: "http://www.openlinksw.com/virtrdf-data-formats#sql-varchar-dt-nullable"
-
name: "s"
}-
-
}

```

HTTP content negotiation allows the client to choose the appropriate data format for retrieving meta information about a resource or a collection. Besides XML and JSON the Repository also supports human readable output formats using HTML rendering ('text/html' accept header) including hyperlinked representation and formatted text.

1.3.9 Text Representation

- Request URL: [http://\[REPOSITORY_URL\]/v2/collec/{collection}](http://[REPOSITORY_URL]/v2/collec/{collection})
- Accept Header: text/plain
- Result:

```

Collection: testCollection
Creation Date: Thu Mar 21 10:46:39 CET 2013

```

```
Collections:
```

```

+++++
++  Collection Id          +  Creation Date          ++
+++++
++  testCollection/collectionA  +  Thu Mar 21 10:47:53 CET 2013  ++
++  testCollection/collectionB  +  Thu Mar 21 10:47:53 CET 2013  ++
++  testCollection/           +  Thu Mar 21 10:47:53 CET 2013  ++
+++++

```

```
Resources:
```

```

+++++
++  Resource Id          +  Creation Date          +  Modification Date
+++++
++  testCollection/testResource1  +  Thu Mar 21 10:46:39 CET 2013  +  Thu Mar 21 10:46:39 CE
++  testCollection/testResource2  +  Thu Mar 21 10:47:53 CET 2013  +  Thu Mar 21 10:47:53 CE
++  testCollection/testResource3  +  Thu Mar 21 10:47:53 CET 2013  +  Thu Mar 21 10:47:53 CE
++  testCollection/testResource4  +  Thu Mar 21 10:47:53 CET 2013  +  Thu Mar 21 10:47:53 CE
+++++

```

1.3.10 JSON Representation

- Request URL: [http://\[REPOSITORY_URL\]/v2/collec/{collection}](http://[REPOSITORY_URL]/v2/collec/{collection})
- Accept Header: application/json
- Result:

```
{
  "resources": [
    {
      "type": "resource",
      "name": "testResource1",
      "content": null,
      "collection": null,
      "contentType": "application\\rdf+xml",
      "contentFileName": "filename",
      "contentUrl": "",
      "id": "testCollection\\testResource1",
      "creationDate": 1363859199839,
      "creator": "",
      "modificationDate": 1363859199839
    },
    {
      "type": "resource",
      "name": "testResource2",
      "content": null,
      "collection": null,
      "contentType": "plain\\text",
      "contentFileName": "filename",
      "contentUrl": "",
      "id": "testCollection\\testResource2",
      "creationDate": 1363859273515,
      "creator": "",
      "modificationDate": 1363859273515
    },
    {
      "type": "resource",
      "name": "testResource3",
      "content": null,
      "collection": null,
      "contentType": "text\\turtle",
      "contentFileName": "filename",
      "contentUrl": "",
      "id": "testCollection\\testResource3",
      "creationDate": 1363859273535,
      "creator": "",
      "modificationDate": 1363859273535
    },
    {
      "type": "resource",
      "name": "testResource4",
      "content": null,
      "collection": null,
      "contentType": "application\\rdf+xml",
      "contentFileName": "filename",
      "contentUrl": "",
      "id": "testCollection\\testResource4",
      "creationDate": 1363859273545,
      "creator": "",
      "modificationDate": 1363859273545
    }
  ],
  "collections": [
    {
      "resources": [
```

```

    ],
    "collections": [

    ],
    "type": "collection",
    "id": "testCollection\\collectionA",
    "name": "collectionA",
    "creationDate": 1363859273552,
    "creator": "",
    "modificationDate": null
  },
  {
    "resources": [

    ],
    "collections": [

    ],
    "type": "collection"
    "id": "testCollection\\collectionB",
    "name": "collectionB",
    "creationDate": 1363859273566,
    "creator": "",
    "modificationDate": null
  },
  {
    "resources": [

    ],
    "collections": [

    ],
    "type": "collection"
    "id": "testCollection\\",
    "name": "testCollection",
    "creationDate": 1363859273575,
    "creator": "",
    "modificationDate": null
  }
],
"type": "collection"
"id": "testCollection",
"creationDate": 1363859199837,
"creator": "",
"modificationDate": null
}

```

1.3.11 XML Representation

- Request URL: [http://\[REPOSITORY_URL\]/v2/collec/{collection}](http://[REPOSITORY_URL]/v2/collec/{collection})
- Accept Header: application/json
- Result:

```

<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<collection id="testCollection" xmlns:atom="http://www.w3.org/2005/Atom">

```

```
<creationDate>2013-03-21T10:46:39.837+01:00</creationDate>
<creator/>
<collections>
  <collections id="testCollection/collectionA">
    <creationDate>2013-03-21T10:47:53.552+01:00</creationDate>
    <name>collectionA</name>
    <creator/>
    <collections/>
    <resources/>
  </collections>
  <collections id="testCollection/collectionB">
    <creationDate>2013-03-21T10:47:53.566+01:00</creationDate>
    <name>collectionB</name>
    <creator/>
    <collections/>
    <resources/>
  </collections>
  <collections id="testCollection/">
    <creationDate>2013-03-21T10:47:53.575+01:00</creationDate>
    <name>testCollection</name>
    <creator/>
    <collections/>
    <resources/>
  </collections>
</collections>
<resources>
  <resources id="testCollection/testResource1">
    <creationDate>2013-03-21T10:46:39.839+01:00</creationDate>
    <creator/>
    <modificationDate>2013-03-21T10:46:39.839+01:00</modificationDate>
    <contentFileName>filename</contentFileName>
    <contentType>application/rdf+xml</contentType>
    <contentUrl/>
    <name>testResource1</name>
  </resources>
  <resources id="testCollection/testResource2">
    <creationDate>2013-03-21T10:47:53.515+01:00</creationDate>
    <creator/>
    <modificationDate>2013-03-21T10:47:53.515+01:00</modificationDate>
    <contentFileName>filename</contentFileName>
    <contentType>plain/text</contentType>
    <contentUrl/>
    <name>testResource2</name>
  </resources>
  <resources id="testCollection/testResource3">
    <creationDate>2013-03-21T10:47:53.535+01:00</creationDate>
    <creator/>
    <modificationDate>2013-03-21T10:47:53.535+01:00</modificationDate>
    <contentFileName>filename</contentFileName>
    <contentType>text/turtle</contentType>
    <contentUrl/>
    <name>testResource3</name>
  </resources>
  <resources id="testCollection/testResource4">
    <creationDate>2013-03-21T10:47:53.545+01:00</creationDate>
    <creator/>
    <modificationDate>2013-03-21T10:47:53.545+01:00</modificationDate>
    <contentFileName>filename</contentFileName>
```



```

        <contentType>application/rdf+xml</contentType>
        <contentUrl/>
        <name>testResource4</name>
    </resources>
</resources>
</collection>

```

When you insert some resource content in any of the accepted RDF formats, it is also possible to retrieve that content in any of the allowed RDF formats. This section explains how to retrieve resources in the different supported formats.

1.3.12 XML+RDF Representation

- Request URL: [http://\[REPOSITORY_URL\]/v2/collec/{collection}/{resource}](http://[REPOSITORY_URL]/v2/collec/{collection}/{resource})
- Accept Header: application/rdf+xml
- Result:

```

<rdf:RDF
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:app="http://www.app.fake/app#">

  <rdf:Description
    rdf:about="http://www.app.fake/app/App1">
    <app:name>App1</app:name>
    <app:country>USA</app:country>
    <app:company>Company1</app:company>
    <app:price>0.99</app:price>
    <app:year>2010</app:year>
  </rdf:Description>

  <rdf:Description
    rdf:about="http://www.app.fake/app/App2">
    <app:name>App2</app:name>
    <app:country>Spain</app:country>
    <app:company>Company2</app:company>
    <app:price>0.99</app:price>
    <app:year>2010</app:year>
  </rdf:Description>
</rdf:RDF>

```

1.3.13 Turtle Representation

- Request URL: [http://\[REPOSITORY_URL\]/v2/collec/{collection}/{resource}](http://[REPOSITORY_URL]/v2/collec/{collection}/{resource})
- Accept Header: "text/turtle"
- Result:

```

@prefix rdfdf: <http://www.openlinksw.com/virttrdf-data-formats#> .
@prefix owl: <http://www.w3.org/2002/07/owl#> .
@prefix fn: <http://www.w3.org/2005/xpath-functions/#> .
@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
@prefix yago: <http://dbpedia.org/class/yago/> .
@prefix skos: <http://www.w3.org/2004/02/skos/core#> .
@prefix ogc: <http://www.opengis.net/> .
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .

```

```
@prefix ogcgsf: <http://www.opengis.net/def/function/geosparql/> .
@prefix protseq: <http://purl.org/science/protein/bysequence/> .
@prefix xslwd: <http://www.w3.org/TR/WD-xsl> .
@prefix sql: <sql:> .
@prefix geo: <http://www.w3.org/2003/01/geo/wgs84_pos#> .
@prefix sc: <http://purl.org/science/owl/sciencecommons/> .
@prefix sd: <http://www.w3.org/ns/sparql-service-description#> .
@prefix ogcgsf: <http://www.opengis.net/ont/sf#> .
@prefix nci: <http://ncicb.nci.nih.gov/xml/owl/EVS/Thesaurus.owl#> .
@prefix virtrdf: <http://www.openlinksw.com/schemas/virtrdf#> .
@prefix xml: <http://www.w3.org/XML/1998/namespace> .
@prefix ogcgml: <http://www.opengis.net/ont/gml#> .
@prefix ogcgsr: <http://www.opengis.net/def/rule/geosparql/> .
@prefix rdfa: <http://www.w3.org/ns/rdfa#> .
@prefix mf: <http://www.w3.org/2001/sw/DataAccess/tests/test-manifest#> .
@prefix scovo: <http://purl.org/NET/scovo#> .
@prefix virtcxml: <http://www.openlinksw.com/schemas/virtcxml#> .
@prefix dbpprop: <http://dbpedia.org/property/> .
@prefix foaf: <http://xmlns.com/foaf/0.1/> .
@prefix mesh: <http://purl.org/commons/record/mesh/> .
@prefix sioc: <http://rdfs.org/sioc/ns#> .
@prefix xsl10: <http://www.w3.org/XSL/Transform/1.0> .
@prefix product: <http://www.buy.com/rss/module/productV2/> .
@prefix void: <http://rdfs.org/ns/void#> .
@prefix dawgt: <http://www.w3.org/2001/sw/DataAccess/tests/test-dawg#> .
@prefix go: <http://purl.org/obo/owl/GO#> .
@prefix dbpedia: <http://dbpedia.org/resource/> .
@prefix vcard: <http://www.w3.org/2001/vcard-rdf/3.0#> .
@prefix xsl1999: <http://www.w3.org/1999/XSL/Transform> .
@prefix xf: <http://www.w3.org/2004/07/xpath-functions> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix vcard2006: <http://www.w3.org/2006/vcard/ns#> .
@prefix ldp: <http://www.w3.org/ns/ldp#> .
@prefix math: <http://www.w3.org/2000/10/swap/math#> .
@prefix ogcgs: <http://www.opengis.net/ont/geosparql#> .
@prefix obo: <http://www.geneontology.org/formats/oboInOwl#> .
@prefix bif: <bif:> .
@prefix dc: <http://purl.org/dc/elements/1.1/> .

<http://www.app.fake/app/App1>
  <http://www.app.fake/app#company>
    "Company1" ;
  <http://www.app.fake/app#country>
    "USA" ;
  <http://www.app.fake/app#name> "App1" ;
  <http://www.app.fake/app#price>
    "0.99" ;
  <http://www.app.fake/app#year> "2010" .

<http://www.app.fake/app/App2>
  <http://www.app.fake/app#company>
    "Company2" ;
  <http://www.app.fake/app#country>
    "Spain" ;
  <http://www.app.fake/app#name> "App2" ;
  <http://www.app.fake/app#price>
    "0.99" ;
  <http://www.app.fake/app#year> "2010" .
```

1.3.14 N3 Representation

- Request URL: [http://\[REPOSITORY_URL\]/v2/collec/{collection}/{resource}](http://[REPOSITORY_URL]/v2/collec/{collection}/{resource})
- Accept Header: “text/n3”
- Result:

```
@prefix rdfdf: <http://www.openlinksw.com/virtrdf-data-formats#> .
@prefix owl: <http://www.w3.org/2002/07/owl#> .
@prefix fn: <http://www.w3.org/2005/xpath-functions/#> .
@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
@prefix yago: <http://dbpedia.org/class/yago/> .
@prefix skos: <http://www.w3.org/2004/02/skos/core#> .
@prefix ogc: <http://www.opengis.net/> .
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix ogcgsf: <http://www.opengis.net/def/function/geosparql/> .
@prefix protseq: <http://purl.org/science/protein/bysequence/> .
@prefix xslwd: <http://www.w3.org/TR/WD-xsl> .
@prefix sql: <sql:> .
@prefix geo: <http://www.w3.org/2003/01/geo/wgs84_pos#> .
@prefix sc: <http://purl.org/science/owl/sciencecommons/> .
@prefix sd: <http://www.w3.org/ns/sparql-service-description#> .
@prefix ogcsf: <http://www.opengis.net/ont/sf#> .
@prefix nci: <http://ncicb.nci.nih.gov/xml/owl/EVS/Thesaurus.owl#> .
@prefix virtrdf: <http://www.openlinksw.com/schemas/virtrdf#> .
@prefix xml: <http://www.w3.org/XML/1998/namespace> .
@prefix ogcgml: <http://www.opengis.net/ont/gml#> .
@prefix ogcgsr: <http://www.opengis.net/def/rule/geosparql/> .
@prefix rdfa: <http://www.w3.org/ns/rdfa#> .
@prefix mf: <http://www.w3.org/2001/sw/DataAccess/tests/test-manifest#> .
@prefix scovo: <http://purl.org/NET/scovo#> .
@prefix virtcxml: <http://www.openlinksw.com/schemas/virtcxml#> .
@prefix dbpprop: <http://dbpedia.org/property/> .
@prefix foaf: <http://xmlns.com/foaf/0.1/> .
@prefix mesh: <http://purl.org/commons/record/mesh/> .
@prefix sioc: <http://rdfs.org/sioc/ns#> .
@prefix xsl10: <http://www.w3.org/XSL/Transform/1.0> .
@prefix product: <http://www.buy.com/rss/module/productV2/> .
@prefix void: <http://rdfs.org/ns/void#> .
@prefix dawgt: <http://www.w3.org/2001/sw/DataAccess/tests/test-dawg#> .
@prefix go: <http://purl.org/obo/owl/GO#> .
@prefix dbpedia: <http://dbpedia.org/resource/> .
@prefix vcard: <http://www.w3.org/2001/vcard-rdf/3.0#> .
@prefix xsl1999: <http://www.w3.org/1999/XSL/Transform> .
@prefix xf: <http://www.w3.org/2004/07/xpath-functions> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix vcard2006: <http://www.w3.org/2006/vcard/ns#> .
@prefix ldp: <http://www.w3.org/ns/ldp#> .
@prefix math: <http://www.w3.org/2000/10/swap/math#> .
@prefix ogcgs: <http://www.opengis.net/ont/geosparql#> .
@prefix obo: <http://www.geneontology.org/formats/oboInOwl#> .
@prefix bif: <bif:> .
@prefix dc: <http://purl.org/dc/elements/1.1/> .

<http://www.app.fake/app/App1>
  <http://www.app.fake/app#company>
    "Company1" ;
  <http://www.app.fake/app#country>
```

```
        "USA" ;
    <http://www.app.fake/app#name>   "App1" ;
    <http://www.app.fake/app#price>
        "0.99" ;
    <http://www.app.fake/app#year>   "2010" .

    <http://www.app.fake/app/App2>
    <http://www.app.fake/app#company>
        "Company2" ;
    <http://www.app.fake/app#country>
        "Spain" ;
    <http://www.app.fake/app#name>   "App2" ;
    <http://www.app.fake/app#price>
        "0.99" ;
    <http://www.app.fake/app#year>   "2010" .
```

1.3.15 N-Triples Representation

- Request URL: [http://\[REPOSITORY_URL\]/v2/collec/{collection}/{resource}](http://[REPOSITORY_URL]/v2/collec/{collection}/{resource})
- Accept Header: “text/n-triples”
- Result:

```
<http://www.app.fake/app/App1> <http://www.app.fake/app#company> "Company1" .
<http://www.app.fake/app/App2> <http://www.app.fake/app#company> "Company2" .
<http://www.app.fake/app/App1> <http://www.app.fake/app#country> "USA" .
<http://www.app.fake/app/App2> <http://www.app.fake/app#country> "Spain" .
<http://www.app.fake/app/App1> <http://www.app.fake/app#name> "App1" .
<http://www.app.fake/app/App2> <http://www.app.fake/app#name> "App2" .
<http://www.app.fake/app/App1> <http://www.app.fake/app#price> "0.99" .
<http://www.app.fake/app/App2> <http://www.app.fake/app#price> "0.99" .
<http://www.app.fake/app/App1> <http://www.app.fake/app#year> "2010" .
<http://www.app.fake/app/App2> <http://www.app.fake/app#year> "2010" .
```

When you execute a SPARQL query in the Repository, it generates different responses depending on the type of query. If you execute a SELECT query, it returns a json object composed by n columns being n number of variables. If you execute a CONSTRUCT or a DESCRIBE query, you can specify the RDF format as described in the previous section.

1.3.16 Executing SELECT query

- Request URL: [http://\[REPOSITORY_URL\]/v2/collec/{collection}/{resource}](http://[REPOSITORY_URL]/v2/collec/{collection}/{resource})
- Accept Header: “application/json”
- Body: SELECT ?s ?p ?o WHERE { ?s ?p ?o }
- Result:

```
{
  vars: 3
  columns: [3]
  0: {
    values: [15]
    0: "http://www.w3.org/1999/02/22-rdf-syntax-ns#type"
    1: "http://www.w3.org/1999/02/22-rdf-syntax-ns#type"
    2: "http://www.w3.org/1999/02/22-rdf-syntax-ns#type"
```

```

3: "http://www.w3.org/1999/02/22-rdf-syntax-ns#type"
4: "http://www.w3.org/1999/02/22-rdf-syntax-ns#type"
5: "http://www.w3.org/1999/02/22-rdf-syntax-ns#type"
6: "http://www.w3.org/1999/02/22-rdf-syntax-ns#type"
7: "http://www.w3.org/1999/02/22-rdf-syntax-ns#type"
8: "http://www.w3.org/1999/02/22-rdf-syntax-ns#type"
9: "http://www.w3.org/1999/02/22-rdf-syntax-ns#type"
10: "http://www.w3.org/1999/02/22-rdf-syntax-ns#type"
11: "http://www.w3.org/1999/02/22-rdf-syntax-ns#type"
12: "http://www.w3.org/1999/02/22-rdf-syntax-ns#type"
13: "http://www.w3.org/1999/02/22-rdf-syntax-ns#type"
14: "http://www.w3.org/1999/02/22-rdf-syntax-ns#type"
-
name: "p"
}-
1: {
  values: [15]
0: "http://www.openlinksw.com/schemas/virtrdf#QuadMapFormat"
1: "http://www.openlinksw.com/schemas/virtrdf#QuadMapFormat"
2: "http://www.openlinksw.com/schemas/virtrdf#QuadMapFormat"
3: "http://www.openlinksw.com/schemas/virtrdf#QuadMapFormat"
4: "http://www.openlinksw.com/schemas/virtrdf#QuadMapFormat"
5: "http://www.openlinksw.com/schemas/virtrdf#QuadMapFormat"
6: "http://www.openlinksw.com/schemas/virtrdf#QuadMapFormat"
7: "http://www.openlinksw.com/schemas/virtrdf#QuadMapFormat"
8: "http://www.openlinksw.com/schemas/virtrdf#QuadMapFormat"
9: "http://www.openlinksw.com/schemas/virtrdf#QuadMapFormat"
10: "http://www.openlinksw.com/schemas/virtrdf#QuadMapFormat"
11: "http://www.openlinksw.com/schemas/virtrdf#QuadMapFormat"
12: "http://www.openlinksw.com/schemas/virtrdf#QuadMapFormat"
13: "http://www.openlinksw.com/schemas/virtrdf#QuadMapFormat"
14: "http://www.openlinksw.com/schemas/virtrdf#QuadMapFormat"
  name: "o"
}-
2: {
  values: [15]
0: "http://www.openlinksw.com/virtrdf-data-formats#default-iid"
1: "http://www.openlinksw.com/virtrdf-data-formats#default-iid-nullable"
2: "http://www.openlinksw.com/virtrdf-data-formats#default-iid-nonblank"
3: "http://www.openlinksw.com/virtrdf-data-formats#default-iid-nonblank-nullable"
4: "http://www.openlinksw.com/virtrdf-data-formats#default"
5: "http://www.openlinksw.com/virtrdf-data-formats#default-nullable"
6: "http://www.openlinksw.com/virtrdf-data-formats#sql-varchar"
7: "http://www.openlinksw.com/virtrdf-data-formats#sql-varchar-nullable"
8: "http://www.openlinksw.com/virtrdf-data-formats#sql-varchar-dt"
9: "http://www.openlinksw.com/virtrdf-data-formats#sql-varchar-dt-nullable"
10: "http://www.openlinksw.com/virtrdf-data-formats#sql-varchar-lang"
11: "http://www.openlinksw.com/virtrdf-data-formats#sql-varchar-lang-nullable"
12: "http://www.openlinksw.com/virtrdf-data-formats#sql-varchar-fixedlang-x-any"
13: "http://www.openlinksw.com/virtrdf-data-formats#sql-varchar-fixedlang-x-any-nullable"
14: "http://www.openlinksw.com/virtrdf-data-formats#sql-varchar-uri"
  -
  name: "s"
}-
-
}

```