

ORACLE®

REST API Overview

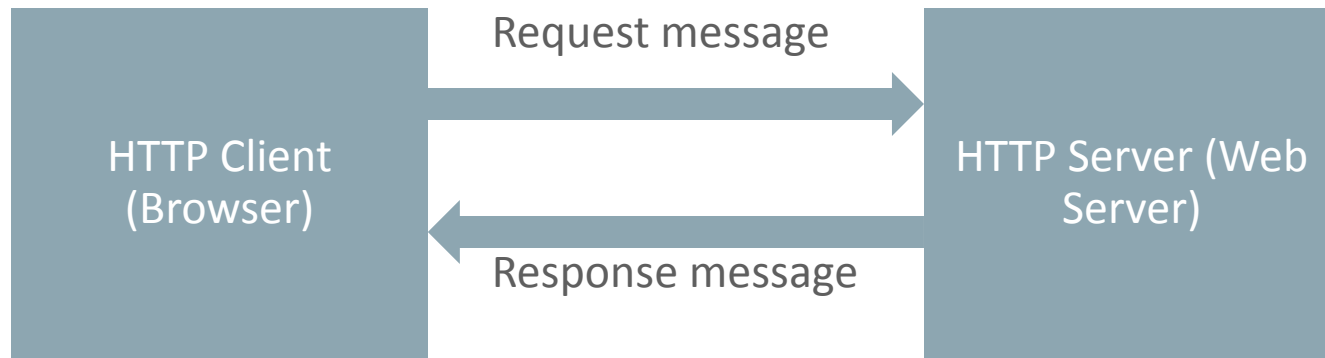
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Agenda

- Before we rest...
- Why should you learn about REST?
- REST overview
- About REST clients
- About HTTP methods
- About HTTP status codes
- Demo:
 - Invoking the REST client
 - Connecting to the REST URL/endpoint
 - Authentication
 - Perform operations – GET, PUT, POST, and DELETE
- Do it yourself!

Before we **rest**, some HTTP basics...

- HTTP client and HTTP server (optional HTTP proxy)
- Standard ports an HTTP server listens on
- Authentication and request interceptors



<Initial line – different for request and response>

Header1: value1
Header2: value2
Header3: value3

<optional message body>

HTTP message format examples

REQUEST initiated by an HTTP Client

GET </path/to/file/index.html>
HTTP/1.1

Header1: value1
Header2: value2
Header3: value3

RESPONSE sent by an HTTP Server

HTTP/1.1 <HTTP status code>

Header1: value1
Header2: value2
Header3: value3

<optional message body>
<Content Type> (text/html, image/gif
etc)
<Content Length>

Why should you learn about REST?

- Proliferation of publicly consumable APIs
- Mobile apps
- Open standards
- Gradual decline of enterprise/SOAP-based applications
- Rapid growth of cloud service providers
- Ease of use and implementation
- Job opportunities for writers with REST/HTTP, XML, and JSON skills

REST overview

- REST stands for Representation State Transfer, an architectural style
- REST ~ HTTP
- Roy Thomas Fielding's PhD dissertation
- Architecture:
 - Client-server
 - Stateless
- Resource is an object with a type, associated data, relationships to other resources, and a set of methods that operate on it
- What, where, and how?

What and where example

- Data in a table is a resource we want to read
- Database server is called *database1*
- Database called *sampledb*
- Table called *employees*

<http://database1/sampledb/employees>

- What type of content you return is up to you – XML and JSON are common

About JSON data model and content types

- JavaScript Object Notation
- 3 data types:
 - Scalar (number, string, boolean, null)
 - Array (ordered list of values of arbitrary type)
 - Object (unordered set of key-value pairs)
- Content types
 - JSON - *application/x-resource+json*
 - XML - *application/x-resource+xml*
 - HTML - *text/html*

```
{  
  "_event": "stc",  
  "name": "REST API session",  
  "presenters": 2,  
  "participants": {  
    "oracle": 5,  
    "abc": 10  
  },  
  "venue": {  
    "SCA": ["room1", "room2"]  
  }  
}
```

HTTP methods

Method	Description
OPTIONS	Return available/supported HTTP methods and other options
GET	Retrieve a single resource, or retrieve all resources in a collection
HEAD	Retrieve a single resource, or retrieve all resources in a collection (headers only)
POST	Create a new resource in a collection
PUT	Update a resource (full update)
PATCH	Update a resource (delta update) – RFC 5789
DELETE	Delete a resource

HTTP statuses

Status Code	Description
1xx	Informational - request received, continuing process
2xx	Success - action requested by the client was received, understood, accepted and processed successfully
3xx	Client must take additional action to complete the request. Many of these status codes are used in URL redirection
4xx	Client errors
5xx	Server errors

Intro to the demo

- We will use Oracle Storage Cloud Service, an object storage solution from Oracle built on top of open stack swift API
- Trial service
 - REST end point/URL
 - User name and password
- Get an authentication token (GET)
- Create a storage *Container* (PUT)
- Set container metadata (POST):
 - Quota
 - Number of objects in a container
- Delete the container (DELETE)

Demo

Useful links

- XML and JSON examples: <http://json.org/example>
- REST client download (Windows): <http://www.softpedia.com/get/Network-Tools/Misc-Networking-Tools/WizTools-org-RESTClient.shtml>
- REST Easy plugin for Firefox: <https://addons.mozilla.org/en-us/firefox/addon/rest-easy/>
- CuRL download: <http://curl.haxx.se/dlwiz/>
- HTTP spec: <http://www.w3.org/Protocols/rfc2616/rfc2616.html>
- A story of how a web developer explained REST to his wife: <http://www.looah.com/source/view/2284>
- HTTP status codes: <http://httpstatus.es/>
- Oracle Storage Cloud Service Trial: <http://cloud.oracle.com/storage>
- Oracle Storage Cloud Service documentation:
http://docs.oracle.com/cloud/latest/storagecs_common/CSSTO/GUID-5778ADBB-A0E8-4451-B886-362A3B7237DB.htm#CSSTO3177

Demo screenshots

Authentication Error

WizTools.org RESTClient 3.4.2

File Edit History Tools Help

HTTP Request

URL: **type the REST API endpoint/URL here**

Method Header Cookie Body Auth SSL Etc. Test

HTTP Method

- GET
- POST
- PUT
- PATCH
- DELETE
- HEAD
- OPTIONS**
- TRACE

HTTP Response

Status: **HTTP/1.1 401 Unauthorized**

Headers Body Test Result

HTTP Header	Value
Date	Mon, 16 Mar 2015 18:14:52 GMT
Content-Type	text/html; charset=UTF-8
Www-Authenticate	Token
Content-Length	278
X-Trans-Id	txd34a0c9f57184106a3398-0055071d9c
Cache-Control	no-cache
Pragma	no-cache
Keep-Alive	timeout=5, max=100
Connection	Keep-Alive
Content-Language	en

GET – Authentication Token

WizTools.org RESTClient 3.4.2

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HTTP Request

URL: **type the REST API endpoint/URL here**

Method Header Cookie Body Auth SSL Etc. Test

HTTP Method

- GET
- POST
- PUT
- PATCH
- DELETE
- HEAD
- OPTIONS
- TRACE

HTTP Response

Status: HTTP/1.1 200 OK

Headers Body Test Result

HTTP Header	Value
Date	Mon, 16 Mar 2015 18:18:56 GMT
X-Storage-Url	https://storage.us2.oraclecloud.com/v1/storagetrial2594-usoracletrial04143
X-Storage-Token	AUTH_tk43a08859080316db25a55ca0af09fddf
X-Auth-Token	AUTH_tk43a08859080316db25a55ca0af09fddf
X-Trans-Id	trac62ab70ed5411cc00516-003307-res0
Content-Length	0
Cache-Control	no-cache
Pragma	no-cache
Keep-Alive	timeout=5, max=100
Connection	Keep-Alive
Content-Type	text/plain
Content-Language	en

OPTIONS – View the methods allowed

WizTools.org RESTClient 3.4.2

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HTTP Request

URL: **type the REST API endpoint/URL here**

Method Header Cookie Body Auth SSL Etc. Test

HTTP Method

- GET
- POST
- PUT
- PATCH
- DELETE
- HEAD
- OPTIONS**
- TRACE

HTTP Response

Status: HTTP/1.1 200 OK

Headers Body Test Result

HTTP Header	Value
Date	Mon, 16 Mar 2015 18:21:26 GMT
Content-Type	text/html; charset=UTF-8
Allow	HEAD, GET, PUT, POST, OPTIONS, DELETE
X-Trans-id	tx3cac3c3f774f4522a1d7e-005507-1120
Content-Length	0
Cache-Control	no-cache
Pragma	no-cache
Keep-Alive	timeout=5, max=100
Connection	Keep-Alive
Content-Language	en

PUT – Create a container

The screenshot shows the WizTools.org RESTClient 3.4.2 interface. The URL field is set to `/Guru_Cont4` and is circled in red. The HTTP Method dropdown is set to **PUT**, also circled in red. The status bar shows **Status: HTTP/1.1 201 Created**, circled in red. The response headers are displayed in a table below.

HTTP Header	Value
Date	Mon, 16 Mar 2015 18:23:19 GMT
Content-Length	0
Content-Type	text/html; charset=UTF-8
X-Trans-Id	tx444dd7ff0e794bd7ace07-0055071f97
Cache-Control	no-cache
Pragma	no-cache
Keep-Alive	timeout=5, max=100
Connection	Keep-Alive
Content-Language	en

GET– View the newly created container

The screenshot displays the WizTools.org RESTClient 3.4.2 interface. The top menu bar includes File, Edit, History, Tools, and Help. The main window is divided into two sections: HTTP Request and HTTP Response.

HTTP Request Section:

- URL: type the REST API endpoint/URL here
- Method: GET (selected and circled in red)
- Other methods: POST, PUT, PATCH, DELETE, HEAD, OPTIONS, TRACE

HTTP Response Section:

- Status: HTTP/1.1 200 OK
- Body: (selected and circled in red)
- Response content:
Guru_Cont1
Guru_Cont2
Guru_Cont4 (circled in red and highlighted with a yellow background)
Guru_test1
Guru_test2

POST– set container metadata (quota and number of objects)

WizTools.org RESTClient 3.4.2
File Edit History Tools Help

URL: **type the REST API endpoint/URL here** `14-usoracletrial04143Guru_Cont4`

Method **Header** Cookie Body Auth SSL Etc. Test

Key: Value:

Header	Value
X-Auth-Token	AUTH_1k43a00033000016db25a55ca0af09fdf
X-Container-Meta-Quota-Count	200
X-Container-Meta-Quota-Bytes	10737418240
X-Storage-Pass	
X-Storage-User	

HTTP Response

Status: HTTP/1.1 204 No Content

Headers Body Test Result

HTTP Header	Value
Date	Mon, 16 Mar 2015 18:27:03 GMT
Content-Length	0
Content-Type	text/html; charset=UTF-8
X-Trans-Id	tx0489e17037834c2ea2a5d-0055072077
Cache-Control	no-cache
Pragma	no-cache
Keep-Alive	timeout=5, max=100
Connection	Keep-Alive
Content-Language	en

POST– status

The screenshot displays the WizTools.org RESTClient 3.4.2 interface. The URL field is set to `/Guru-Cont4`. The HTTP Method is set to `POST`. The response status is `HTTP/1.1 204 No Content`. The response headers are listed in the table below.

HTTP Header	Value
Date	Mon, 16 Mar 2015 18:27:03 GMT
Content-Length	0
Content-Type	text/html; charset=UTF-8
X-Trans-Id	tx0489e17037834c2ea2a5d-0055072077
Cache-Control	no-cache
Pragma	no-cache
Keep-Alive	timeout=5, max=100
Connection	Keep-Alive
Content-Language	en

DELETE– delete the container

The screenshot shows the WizTools.org RESTClient 3.4.2 interface. The URL is set to `type the REST API endpoint/URL here` with `Guru_Cont4` appended. The HTTP Method is set to `DELETE`. The HTTP Response status is `HTTP/1.1 204 No Content`. The response headers are listed in a table below.

HTTP Request

URL: `type the REST API endpoint/URL here`Guru_Cont4

Method: `DELETE`

HTTP Response

Status: `HTTP/1.1 204 No Content`

HTTP Header	Value
Date	Mon, 16 Mar 2015 18:30:50 GMT
Content-Length	0
Content-Type	text/html; charset=UTF-8
X-Trans-Id	tx8d5451bd7eba45059646d-0055072159
Cache-Control	no-cache
Pragma	no-cache
Keep-Alive	timeout=5, max=100
Connection	Keep-Alive
Content-Language	en

GET– view the list of containers to verify the deletion of Guru_Cont4

The screenshot displays the WizTools.org RESTClient 3.4.2 interface. The top menu bar includes File, Edit, History, Tools, and Help. The main window is divided into two sections: HTTP Request and HTTP Response.

HTTP Request Section:

- URL:** type the REST API endpoint/URL here
- Method:** GET (selected and circled in red), POST, PUT, PATCH, DELETE, HEAD, OPTIONS, TRACE.

HTTP Response Section:

- Status:** HTTP/1.1 200 OK
- Body:** (selected and circled in red) contains the following text:
Guru_Cont1
Guru_Cont2
Guru_test1
Guru_test2