RESTful API

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What is a RESTful API?

REST: **RE**presentational **S**tate **T**ransfer [2]

API: **A**pplication **P**rogramming **I**nterface

RESTful API: a conventional architectural style for communicating resource state between two systems (client to server; server to server)

REST Origins

Architectural Styles and the Design of Network-based Software Architectures (2000, UC Irvine)

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REST Principles

Code on demand [1]

- “[S]ervers can temporarily extend or customize client functionality by transferring software programming code to the client.”

REST Principles

Cacheability [1]

- “RESTful web services support caching, which is the process of storing some responses on the client or on an intermediary to improve server response time”

REST Principles

Layered system [1]

- “Client can connect to other authorized intermediaries between client and server, and it will still receive responses from the server”
- “Servers can also pass on requests to other servers”

REST Principles

Statelessness [1]

- Server completes every client request independently of all previous requests
- Clients can request resources in any order
- Server responses are isolated from other requests

REST Principles

Uniform interface [1]

- Servers transfer data in a standard format
- The sent format can be different than the format used for data storage
- Architectural constraints
  - Requests identify resources using a uniform resource identifier (URI).
  - Resource representation contains enough information to modify or delete the resource if the client wants to.
  - The server sends self-descriptive messages that contain metadata about how the client can best use them.
  - Clients receive information about all other related resources they need to complete a task (like hyperlinks)

RESTful API Client Request

- HTTP Headers
  - Content-Type
  - Authorization
- HTTP Method
  - GET, POST, PUT, PATCH, DELETE
- Uniform Resource Identifier
  - Protocol
  - Domain
  - Path
  - Query Parameters
- Body

RESTful API Server Response

- HTTP Headers
- HTTP Status Code
  - 200 OK
  - 302 Found (temporary redirect)
  - 400 Bad Request
  - 404 Not Found
  - 500 Internal Server Error
- Message Body

RESTful CRUD

List: curl -X GET https://mywebsite.com/resources

Get: curl -X GET https://mywebsite.com/resources/{id}

Create: curl -X POST -H “Content-Type: application/json” https://mywebsite.com/resources -d “{ ‘entity’: ‘value’ }”

Update: curl -X PUT -H “Content-Type: application/json” https://mywebsite.com/resources/{id} -d “{ ‘entity’: ‘new value’ }”

Delete: curl -X DELETE https://mywebsite.com/resources/{id}

Sources

[1] “What is RESTful API”, *aws.amazon.com*, [Online]. Available: https://aws.amazon.com/what-is/restful-api/ [Accessed: Sept. 24, 2022]

[2] R.T. Fielding, “Architectural Styles and the Design of Network-based Software Architectures”, *Doctoral dissertation, University of California, Irvine*, 2000. [Online]. Available: https://www.ics.uci.edu/~fielding/pubs/dissertation/top.htm [Accessed: Sept. 24, 2022]