

REST

Theory

REST (Representational state transfer) or REST API is an architecture that describes the standard of which computer systems communicate on the web. A client trying to, for example access information from a system using REST (also known as RESTful systems) can expect the system to follow the constraints described by the REST architecture.

One of the main properties of REST is the separation of client and server, this means that the server and client can be implemented without each other in mind. The reason this is possible is because REST uncouples the two by defining the way information is shared between them.

Another main property is statelessness which means that a client does not need to know the current activity of the server that receives a message, and the server does not need to know the activity or state of a client that sends a message.(1)

REST is resource-oriented which means that a client either requests a resource or submits a resource. (4) Resources are accessed via HTTP requests (GET, POST, DELETE ...) which get processed by the server and returns a response.(5)

When sending a response to a request, REST has a constraint where the data in the response needs to be cacheable or non-cacheable. With that information the client either caches it or not.(6)

REST-based communication use uniform interface, where data is transferred in one certain way, rather than a way adapted to a specific system. The constraints for this are as follows:

- self descriptive messages
- resource manipulation through representations
- hypermedia as engine of application state
- identification of resources

(6)

The identification of resources constraint implies that a unique identifier (URI) is needed for each resource. The self descriptive message constraint implies that each message sent between client and server has to have enough information to complete the task at hand. The Resource manipulation through representations constraint implies that clients can choose with which representation the data is received. Similarly clients can also prefer a representation for the resource when sending it. In this context representations are data formats such as JSON, XML etc.(7)

The hypermedia as engine of application state constraint implies that one can place hyperlinks in a response that enables clients to explore other resources.(8)

REST has yet another constraint for layered systems, where the layers are structured in a hierarchical way. The constraint **only** enables components to know of the layer they are communicating with.(6)

Tools

Json

Json stands for JavaScript Object Notation that transmits data using only text(strings) with a specified format. Json is widely used in client-server communication.(2)

web.py

web.py is a python web framework that simplifies web development. This framework simplifies the processing of HTTP requests such as POST and GET.(3)

Results

Our project group implemented a small Client/Server program that uses POST and GET requests in Python with a specific format of message passing(JSON). This system would be used to store users, with their name and age, in a database(.db file) and show the available users. Every user would then be assigned a unique ID. The data in the database are stored in a specific way. The storage was done with the DataBase class we implemented that helps us read/write from/to the database.

We implemented three functions: `add_users` that added users in the database, `get_user` that returned a user with a specific ID and `get_all_users` that returned all available users in the database.

References

- (1) <https://www.codecademy.com/articles/what-is-rest>
- (2) <https://developer.mozilla.org/en-US/docs/Learn/JavaScript/Objects/JSON>
- (3) <http://webpy.org/>
- (4) https://www.ics.uci.edu/~fielding/pubs/dissertation/rest_arch_style.htm
- (5) <https://www.soapui.org/learn/api/soap-vs-rest-api.html>

- (6) Fielding, Roy T., and Richard N. Taylor. *Architectural styles and the design of network-based software architectures*. Vol. 7. Doctoral dissertation: University of California, Irvine, 2000
- (7) <http://exyus.com/articles/rest-the-short-version/>
- (8) <https://restfulapi.net/hateoas/>