Designing REST Services: HATEOAS

Web Programming and Testing

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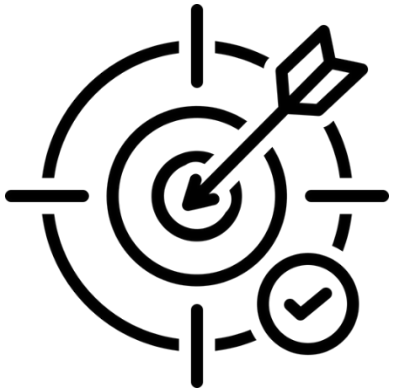
Objectives

- The objective of this session is the following:
  - The students are able to develop REST-based services. On this session, we focus on extending REST to provide more information beyond resource state.

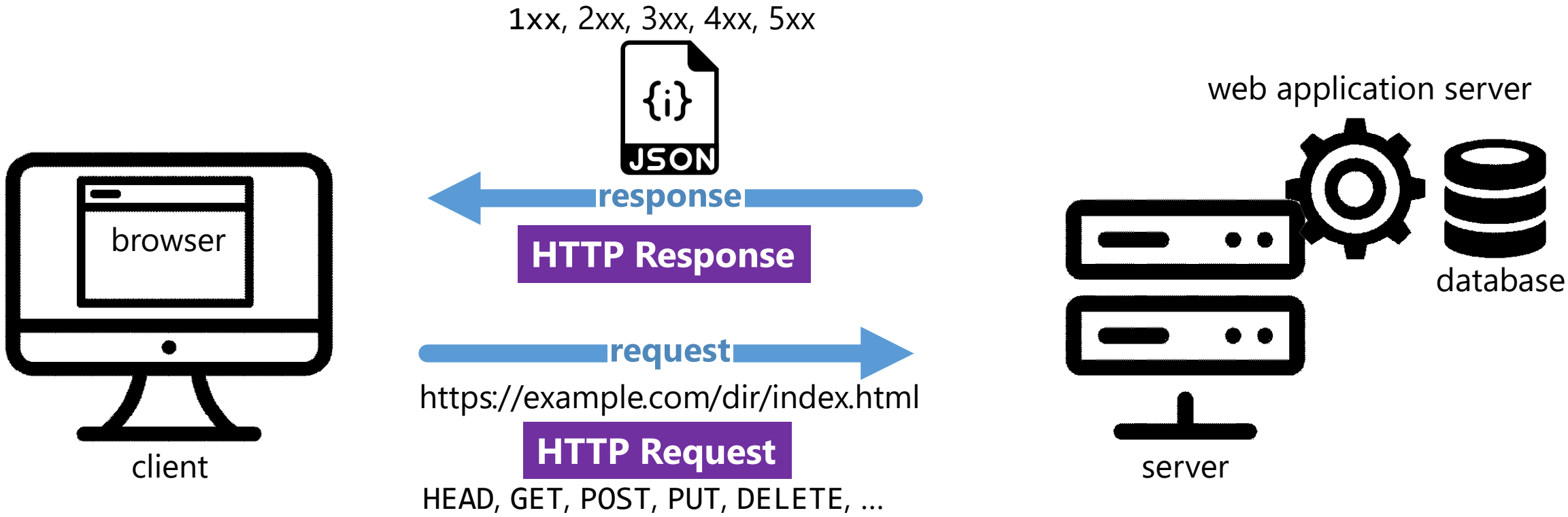


Outlines

1. Request-Response Cycle
2. Application State: HATEOAS

Request-Response Cycle

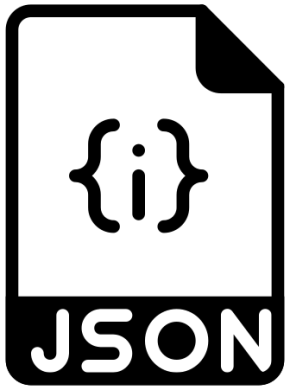
Request-Response Cycle



Application State: HATEOAS

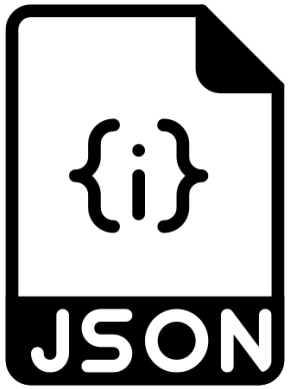
State Representation

- REST is not only about resource state.
  - It also talks about what could the consumers do to the resource.
- A continuous interaction between the parties could be done via REST.
  - Imagine browsing a web application but no fancy graphical aspect.
  - REST → state-oriented.



Application State

- **HATEOAS**: Hypermedia as the engine of application state.
  - REST could be pushed to a higher extend, to represent beyond the resource state, application state.



- Any data exchanged from the provider is enriched with options from which the consumer could choose to do on the next interaction related to the resource.

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indahmanik Update p03_db.sql (#399)

00-html-only	Rename menu_utama.html to home.ht	
01-html-css	Create team-style.html (#88)	
02-html-php	Adding profile page d and m (#293)	
03-php-laravel	Update web.php (#397)	
sql	Update p03_db.sql (#399)	
README.md	Initial commit	3 months ago

Clone

HTTPS SSH GitHub CLI

https://github.com/itdel-ppw/20-03-sim

Use Git or checkout with SVN using the web URL.

Open with GitHub Desktop

Download ZIP

README.md

About

Repository ini digunakan untuk menyimpan artefak proyek mata kuliah

This repository has a state and the information is retrieve-able via REST API.

Readme

From this page, what can you do next?

No releases published

Create a new release

Packages

calls > repo simta.txt

```
curl \
-H "Accept: application/vnd.github.v3+json" \
-H "Authorization: token 05cadb1ff3143817d8a358f4f2c13a4cb12xxxxx" \
https://api.github.com/repos/itdel-ppw/20-03-simta
```

Consumers are given some options available to do on the follow-up interaction.


```
{
  "id": 293484205,
  "node_id": "MDEwOlJlcG9zaXRvcnkyOTM0ODQyMDU=",
  "name": "20-03-simta",
  "full_name": "itdel-ppw/20-03-simta",
  "private": true,
  "owner": {
    "login": "itdel-ppw",
    "id": 55906585,
    "node_id": "MDEyOk9yZ2FuaXphdGlvbjU1OTA2NTg1",
    "avatar_url": "https://avatars1.githubusercontent.com/u/55906585?v=4",
    "gravatar_id": "",
    "url": "https://api.github.com/users/itdel-ppw",
    "html_url": "https://github.com/itdel-ppw",
    "followers_url": "https://api.github.com/users/itdel-ppw/followers",
    "following_url": "https://api.github.com/users/itdel-ppw/following{/other_user}",
    "gists_url": "https://api.github.com/users/itdel-ppw/gists{/gist_id}",
    "received_events_url": "https://api.github.com/users/itdel-ppw/received_events",
    "type": "Organization",
    "site_admin": false
  },
  "html_url": "https://github.com/itdel-ppw/20-03-simta",
  "description": "Repository ini digunakan untuk menyimpan artefak proyek mata kuliah 12S3101 Pemrograman dan Pengujian Api
Web di Institut Teknologi Del.  Topik: Sistem Informasi Manajemen Tugas Akhir",
  "fork": false,
  "url": "https://api.github.com/repos/itdel-ppw/20-03-simta",
  "forks_url": "https://api.github.com/repos/itdel-ppw/20-03-simta/forks",
  "keys_url": "https://api.github.com/repos/itdel-ppw/20-03-simta/keys{/key_id}",
  "collaborators_url": "https://api.github.com/repos/itdel-ppw/20-03-simta/collaborators{/collaborator}",
  "teams_url": "https://api.github.com/repos/itdel-ppw/20-03-simta/teams",
  "hooks_url": "https://api.github.com/repos/itdel-ppw/20-03-simta/hooks",
```

HATEOAS in Action

```
{
  "title": "book title",
  "isbn10": "xxxxxxxxxx",
  "isbn13": "xxxxxxxxxxxxx",
  "author": "author name",
  "description": "book description",
  "published_year": "xxxx"
}
```

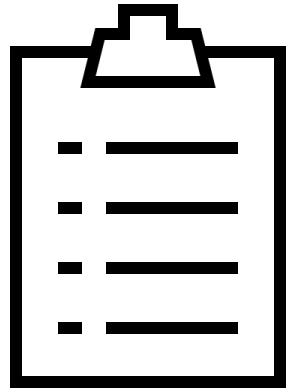
Some extra follow-up options for the consumers

```
{
  "title": "book title",
  "isbn10": "xxxxxxxxxx",
  "isbn13": "xxxxxxxxxxxxx",
  "author": "author name",
  "author_url": "/authors/{12345}",
  "description": "book description",
  "published_year": "xxxx“,
  "links": {
    "borrow": "/books/{isbn-13}/borrow",
    "rate": "/books/{isbn-13}/rate",
    "book_list": "/books"
  }
}
```

Just the resource state, no follow-up option

To-dos

1. Next time we will discuss about implementation, testing methods and API testing.
2. Incorporate the HATEOAS into yout API design.



References

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Erl T. (2016). Service-Oriented Architecture: Analysis and Design for Services and Microservices. Pearson

Massé, M. (2012). REST API Design Rulebook. O'Reilly

Thank you