Building Web Applications

WITH SPARK

Introduction to the Spark framework. A practical example: a REST server for tasks management

Goal

- Create REST services
  - in Java
- Learn a simple framework
  - but extensible

Spark

- "*A micro framework for creating web applications in Java 8 with minimal effort*"
- http://sparkjava.com/
- Mainly used for creating REST APIs
- Support
  - session, cookie, redirect, …
- Extensible
  - no HTML templating engine, ORM, etc. included
  - various packages to choose from

Spark Installation

- Use gradle

```
implementation "com.sparkjava:spark-
core:2.8.0"
```

- or Maven

```
<dependency>
    <groupId>com.sparkjava</groupId>
    <artifactId>spark-core</artifactId>
    <version>2.8.0</version>
</dependency>
```

Spark Quick Start

```
import static spark.Spark.*;

public class HelloWorld {
    public static void main(String[] args) {
        get("/hello", (req, res) -> "Hello World");
    }
}
```

- Running the application starts the web server
  - it will run until you kill it

The Web Server

- By default, Spark runs a web server on:
  - http://127.0.0.1:4567
- Port can be customized, before anything else:

```
port(8080); // Spark will run on port 8080
```

- You can replace the embedded web server (Jetty) with other servers
  - by adding a configuration in your web.xml
  - http://sparkjava.com/documentation#embedded-web-server

Web Resources

- Each resource is implemented by a method

```
get("/", (request, response) -> {
    return("Hello World");
});
```

- Must specify
  - the (local) URL at which the resource will be visible
  - the HTTP verb
  - the content of the resource: return statement

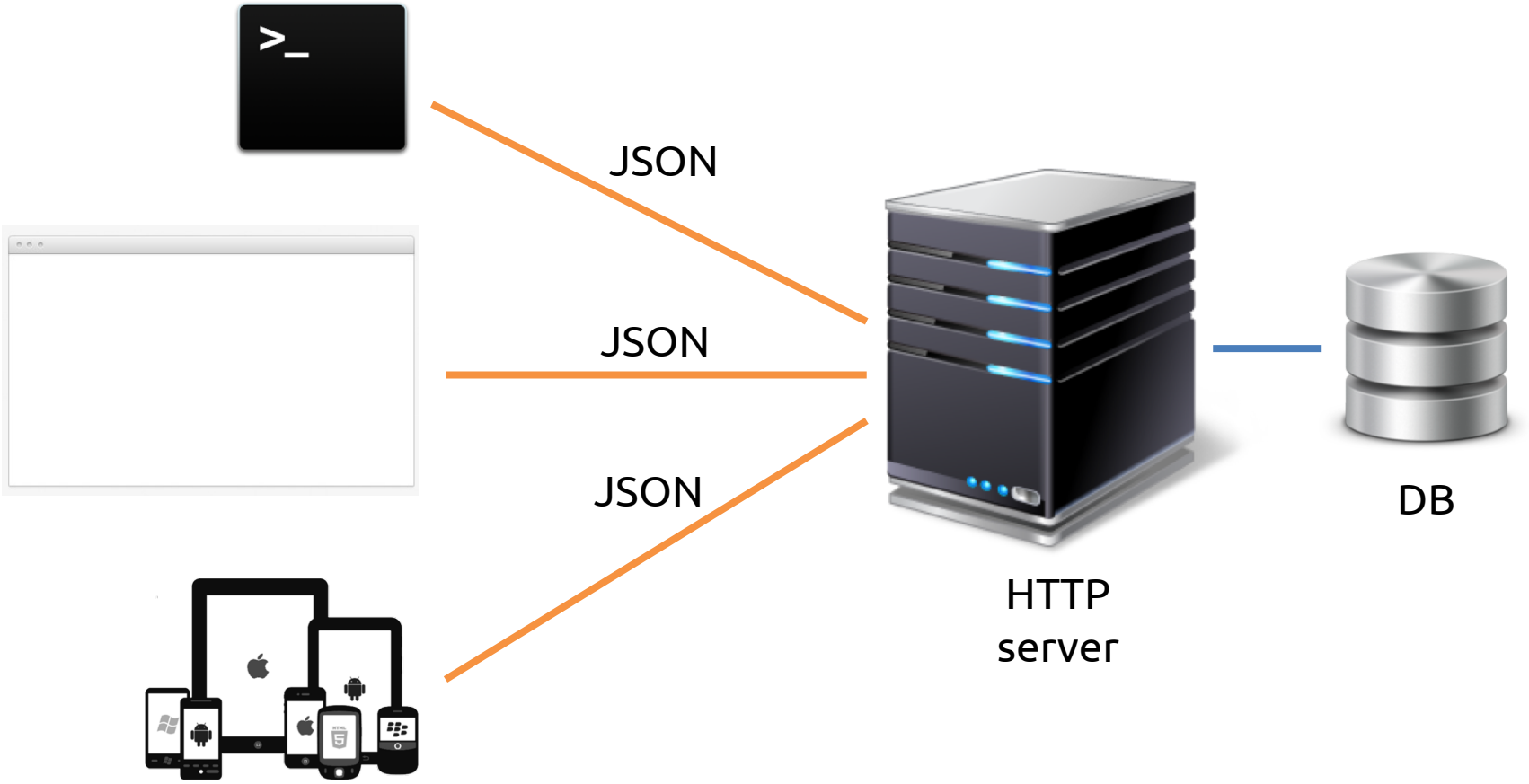
A case study

REST SERVER WITH SPARK

Spark Tasks Server

- A basic server that:
  - Connect to a database that contains a series of tasks
  - For each task, it provides:
    - task description
    - whether the task is "urgent" or not
  - Can show
    - a single task
    - all the existing tasks
  - Can create a new task

Spark Tasks Server



Resources

- Identify the resources to expose
  - Task
    - Represents a single task with its own information
    - Each task is identified by a unique id
  - Tasks
    - The set of tasks available

REST service design

- URLs built on resources
  - `/api/v1.0/tasks` → the collection of tasks
- How to represent a single task
  - They are identified by a unique id
    - `/api/v1.0/tasks/22` →the task with id=22

Tasks

- GET /api/v1.0/tasks
  - return all the tasks in JSON
- GET /api/v1.0/tasks/22
  - return task #22 in JSON
- Example

```
{
    "task": {
        "description": "buy a new mouse",
        "id": 22,
        "urgent": 1
    }
}
```

Tasks

- POST /api/v1.0/tasks
  - create a new task
  - an id is assigned automatically to the newly created tasks
  - task description and priority in JSON
- Example of the HTTP request body

```
{
    "description" : "This is a new task",
    "urgent" : 0
}
```

Result

- Checkout on GitHub
  - https://github.com/reti2vc-2019/spark-rest

References

- Spark
  - http://sparkjava.com/
- Spark Docs
  - http://sparkjava.com/documentation
- Spark Tutorials
  - http://sparkjava.com/tutorials

Questions?

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