API Workshop

Build REST APIs with Spring Boot

O'REILLY®
Software Architecture

AGENDA

- Introduction to Spring & Spring Boot
- Web services, APIs and REST

WHAT IS SPRING?

“Make the right thing easy to do”

Rod Johnson

WHAT IS SPRING?

- Originally a very simple **dependency injection** framework for Java
- **Abstractions** for common patterns
- Now consists of many projects and components for building applications
- **Data Access** - transaction support, JDBC, ORM
- **Integration** with external concerns e.g. messaging and caching
- **Spring MVC** and the newer **WebFlux**
- **Multiple language support** for the JVM

BUILDING SERVICES USING JAVA

IN THE OLD(ISH) DAYS

<XML />

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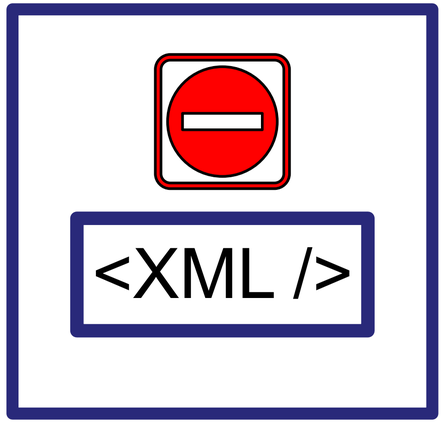
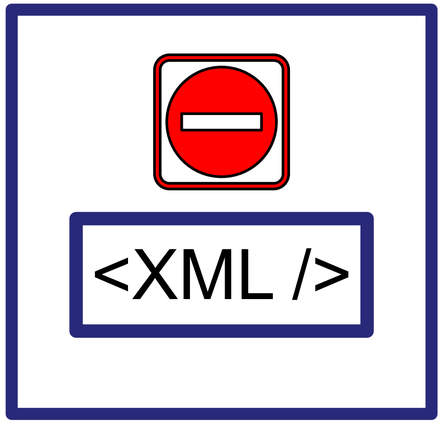
WHAT IS SPRING BOOT?



Stand Alone

AUTO CONFIGURATION

- Including a library dependency will usually also include auto configuration
  - This is facilitated by Spring Boot Starters
- Driven by the **`@EnableAutoConfiguration`** annotation
- The configuration of a **`@Bean`** can be overridden



STANDALONE

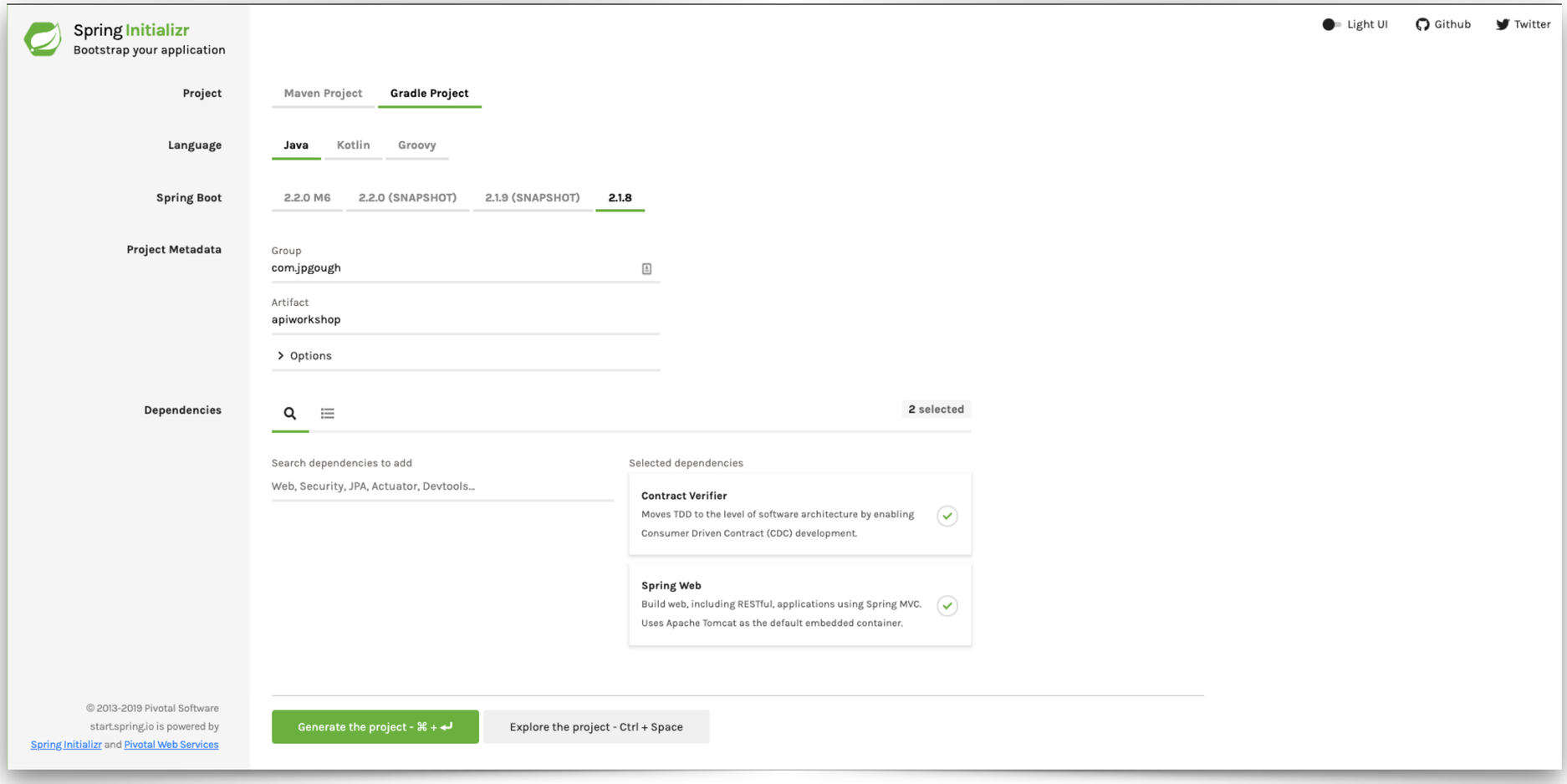
- Previously with Java applications we had to
  - **Package** the application up into a WAR file or similar
  - **Download** the package onto a webserver
  - **Configure** that webserver to run the application
  - **Deploy and start** the webserver
- Spring Boot is simply **package** and **run**

Stand Alone

OPINIONATED

- Closely tied to AutoConfiguration
- Spring will make opinions about how to configure your application
- Convention over configuration
- Using Spring's opinion means you can be up and running in minutes
- **WARNING: hidden complexity!**

http://start.spring.io



WEB SERVICES, APIS & REST

- SpringBoot makes it relatively easy to build and deploy HTTP based web services
- Web services (or micro services) can be designed to expose business data or capabilities via APIs
- REST can be used over HTTP to provide structure to those APIs

WHAT IS REST?

- **Re**presentational **S**tate **T**ransfer
- An architectural style, or design pattern, for APIs.
- Resources
- Operations
  - Create, Read, Update, Delete

REST OVER HTTP

- HTTP as the transport layer
- URLs identify resources
  - http://www.api-workshop.com/todos
  - http://www.api-workshop.com/todos/1

REST OVER HTTP

- HTTP verbs for operations
  - POST, GET, PUT, DELETE
- HTTP status codes represent the result of a request
  - HTTP 2xx - Success
  - HTTP 3xx - Redirection
  - HTTP 4xx - Client errors
  - HTTP 5xx - Server errors

EXAMPLE: GET ALL TODOS

Request: **GET http://www.api-workshop.com/todos**

HTTP Headers:
- **Accept**: application/json

Response: **200 OK**

```
{
  "todos": [
    {
      "id": 1,
      "description": "Attend API workshop",
      "done": false
    }
  ]
}
```

EXAMPLE: GET WITH QUERY PARAMETERS

Request: **GET http://www.api-workshop.com/todos?done=false**

HTTP Headers:
- **Accept**: application/json

Response: **200 OK**

```
{
  "todos": [
    {
      "id": 2,
      "description": "Learn about SpringBoot",
      "done": true
    }
  ]
}
```

EXAMPLE: CREATE A TODO

Request: **POST** **http://www.api-workshop.com/todos**

HTTP Headers:
- **Content-Type**: application/json

```
{
  "description": "Learn about REST APIs"
}
```

Response: **201 CREATED**

```
{
  "id": 3,
  "description": "Learn about REST APIs",
  "done": false
}
```