

REST and Hypermedia as the Engine of Application State with Standard Java APIs

REST and HATEOAS with Standard Java APIs

About Us

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Agenda

- REST
- JAX-RS
- RESTful JAX-RS
- Generic Javascript Client

REST

REpresentational State Transfer

REST

- Defined by Roy Fieldings dissertation in 2000
- REST is an architectural style
- Defines a set of architectural constraints (Uniform Interface)

The Uniform Interface

- Identification of Resources
- Manipulation of resources through representations
- Self-descriptive messages
- Hypermedia as the engine of application state

Resource

“A resource can be essentially any coherent and meaningful concept that may be addressed.”

Wikipedia

Identification of Resources

- <http://api.example.com/library/books>
- <http://api.example.com/library/books/123>
- <http://api.example.com/library/bestseller>

Manipulation of Resources through representations

GET - idempotent, safe

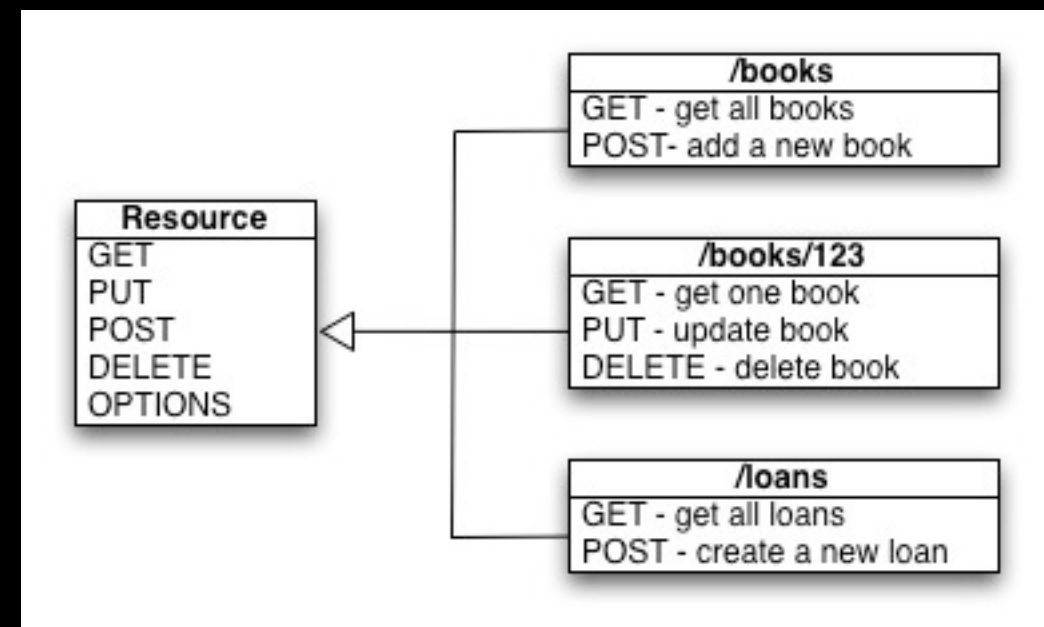
PUT - idempotent

POST -

DELETE - idempotent

OPTION - idempotent, safe

HEAD - idempotent, safe



Manipulation of Resources through representations

POST /books HTTP/1.1

Host: library.org

Content-Type: application/vnd.library.book+xml

...

```
<book xmlns="http://www.library.org/schema">  
  <title>A Game of Thrones</title>  
  <author>George R.R Martin</author>  
</book>
```

Self-Descriptive Messages

- A message should contain all information needed to complete a task
- Stateless

HATEOAS

Hypermedia As The Engine Of Application State

GET /books/123 HTTP/1.1

...

```
<book xmlns="http://www.library.org/schema">
```

```
  <id>123</id>
```

```
  <title>A Game of Thrones</title>
```

```
  <author>George R.R Martin</author>
```

```
  <link rel="self" href="http://library.org/books/123"
        type="application/vnd.library.book+xml">
```

```
  <link rel="loans" href="http://library.org/loans/"
        type="application/vnd.library.loan+xml">
```

```
</book>
```

HATEOAS

Hypermedia As The Engine Of Application State

- Discoverable resource interaction
- Valid state transitions
- Allows resources to evolve over time

JAX-RS

JAX-RS (JSR-311)

- Java API for RESTful Web Services
- Currently in version 1.1
- Expert group for version 2.0
- Formed January 2011
 - Common client API
 - Support for hypermedia
 - And more

JAX-RS (JSR-311)

- Annotation-driven
 - @Path
 - @GET/@POST/@PUT/@DELETE...
 - @Consumes
 - @Produces
 - And more...
- Good integration with other frameworks

Code Example

JAX-RS with HATEOAS

Whats Out There

- RESTeasy Atom link Support
- Jersey Linking
- Purely annotation-based
 - Programmatic approach is more readable
 - Programmatic approach is more versatile
 - DTOs need knowledge of hypermedia

jax-rs-hateoas

- Open Source JAX-RS 1.x extension
- Annotation-driven resource identification
- Programmatic link specification
- Small impact on existing applications
- Configurable HATEOAS verbosity
- Self-documenting

JAX-RS Extensions

- @Linkable annotation
- HateoasApplication
- HateoasResponse
 - Extends javax.ws.rs.core.Response
- HateoasResponseBuilder
 - Extends javax.ws.rs.core.ResponseBuilder
 - Adds support for hypermedia

Configurable Verbosity Levels

- Application Default
- HTTP header

Verbosity Options

- rel
- href
- type
- id
- method
- template
- produces
- consumes
- label
- description

Getting Started

- Extend `HateoasApplication`
- Annotate resource methods with `@Linkable`
- Build responses with `HateoasResponse`
- Add `RequestContextFilter`
- What about DTOs?

Demo

Generic Javascript Client

Browsing a RESTful API

Source Code

- <https://github.com/jayway/>
- <https://github.com/jayway/jax-rs-hateoas/>