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Software Engineering and Architecture

Coding the HTTP in Java

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The Good News

- Web is big! Lots of high quality frameworks for building both clients and servers on top of HTTP and REST!
  - Google a bit around to find some…
- Major qualities in teaching are
  - *Learnability* (tutorial quality, simple API)
  - *Code compactness* (expressiveness, code size)
- UniRest

```
Unirest.post("http://httpbin.org/post")
  .queryString("name", "Mark")
  .field("last", "Polo")
  .asJson()
```

Spark-Java

```
import static spark.Spark.*;

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

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Clients

UniRest

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Minimal Demo

- (Find it as a zip file on the weekplan)

```
public class ShowUniRest {
  public static void main(String args[]) throws UnirestException {
    HttpResponse<String> reply =
            Unirest.get("http://www.baerbak.com/contact.html").asString();
    System.out.println("Reply status code: "+reply.getStatus() + " " + reply.getStatusText());
    System.out.println("Content-type: "+reply.getHeaders().getFirst( key: "Content-type") );
    System.out.println("Body (200 chars):\n"+reply.getBody().substring(0, 200));
  }
}
```

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Actually a Bloch Builder

- Unirest.(verb)
  - Creates a verb object, but does not execute it
- .queryString, .field, .header, .body
  - ‘setter’ methods on the verb object
- asJson(), asString()
  - Builds and executes the verb
    - i.e. transmits the POST on the given URL with the set parameters

```
HttpResponse<JsonNode> jsonResponse = null;

String path = Constants.BLOODPRESSURE_PATH;
try {
  jsonResponse = Unirest.post( url: baseURL + path).
      header( name: "Accept", MimeMediaType.APPLICATION_JSON).
      header( name: "Content-Type", MimeMediaType.APPLICATION_JSON).
      body(payload).asJson();
} catch (UnirestException e) {
  throw new IPCException("POST failed for 'processAndStore'", e);
}
```

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Servers

Spark-Java

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Minimal Demo

- (No source code here, but similar ones will follow…)

emacs@csdev

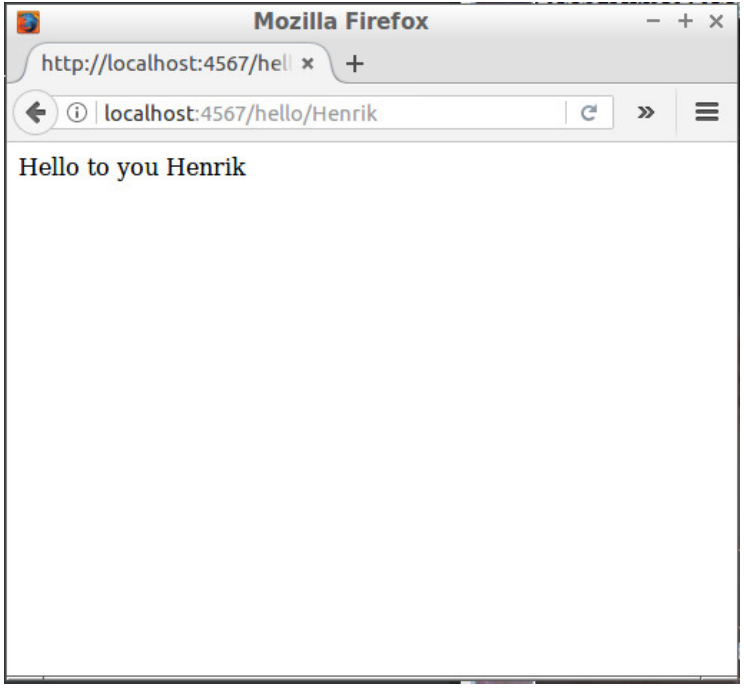
File Edit Options Buffers Tools Java Help

```
// Spark Framework for Java, see sparkjava.com

package example;

import static spark.Spark.*;

public class Hello {
    public static void main(String[] args) {
        get("/hello/:name",
            (req, res) -> "Hello to you "+req.params(":name"));
    }
}
```



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Lambda's

```
// POST = processAndStore
String storeRoute = "/" + Constants.BLOODPRESSURE_PATH;
post(storeRoute, (req,res) -> {
  lastVerb = req.requestMethod();

  // Demarshall the body into the teleobservation posted
  String body = req.body();
  TeleObservation teleObs = gson.fromJson(body, TeleObservation.class);

  // Upcall to servant
  String id = teleMed.processAndStore(teleObs);

  // Set the CREATED status code
  int statusCode = HttpServletResponse.SC_CREATED;
  res.status(statusCode);
  res.type(MimeMediaType.APPLICATION_JSON);

  // Location = URL of created resource
  res.header( header: "Location",  value: req.host() + "/" + Constants.BLOODPRESSURE_PATH + id);

  lastStatusCode = statusCode;
  // Return the tele observation as confirmation
  return gson.toJson(teleObs);
});
```

req = request object
res = response object

Summary

- Rule #1 in software engineering:
  - *Someone has probably solved this problem before*

- So – go look for candidates
  - **Timebox** the learning curve and quality assessment
    - I have found Open Source libraries that were
      - Extremely hard to understand and use
      - Often also full of defects and inconsistencies
  - Pick the best candidate
    - And prepare for ***do over***