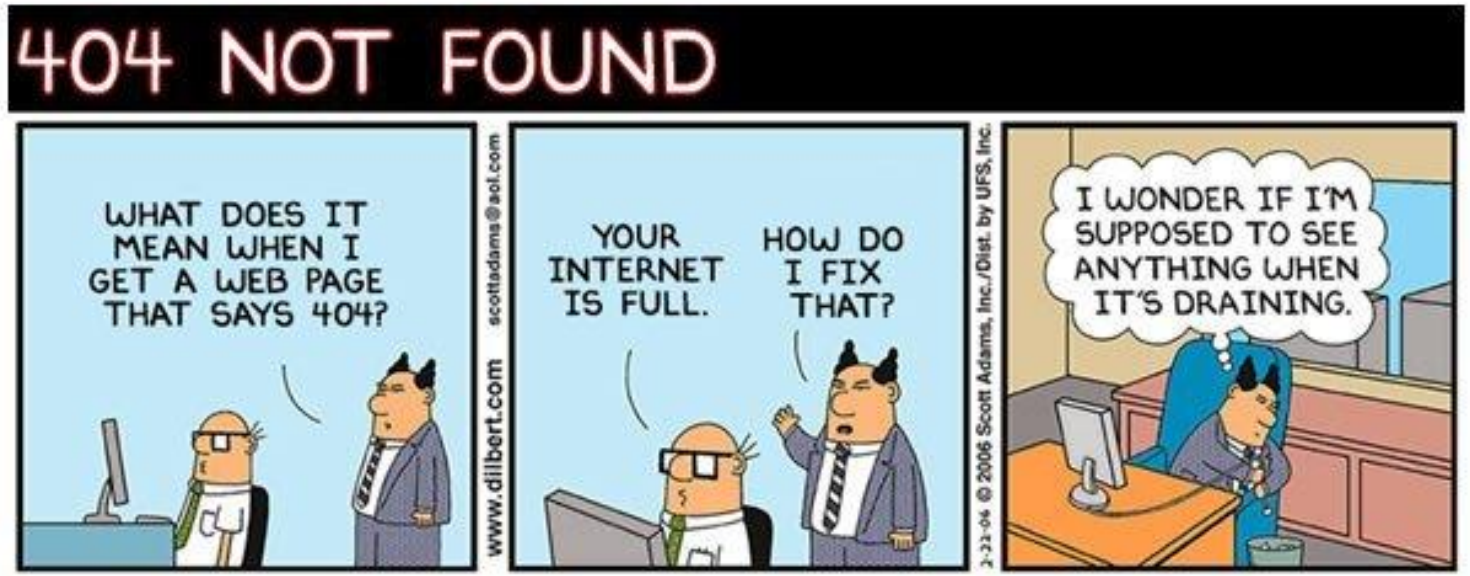
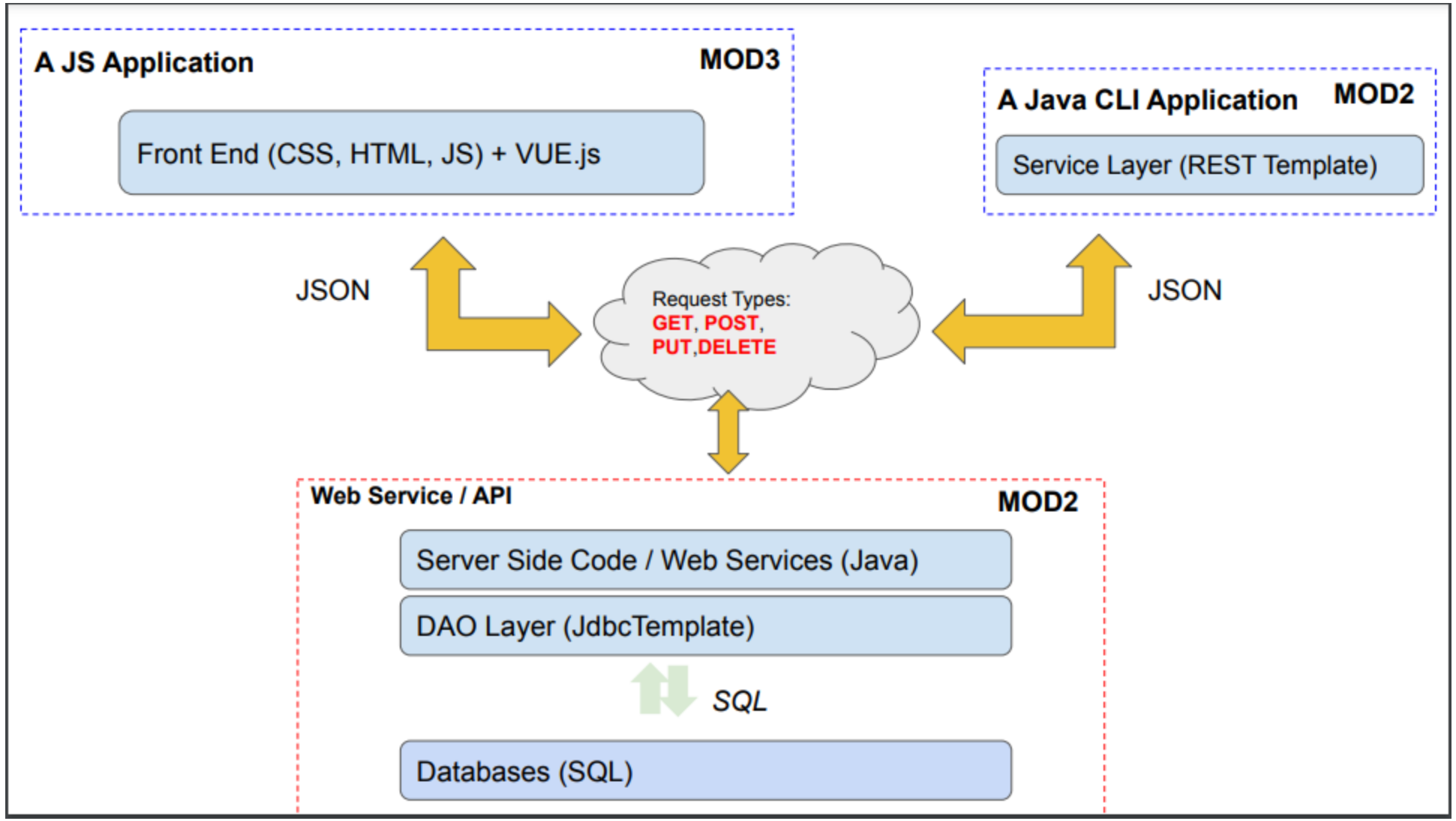

404 NOT FOUND
WHAT DOES IT MEAN WHEN I GET A WEB PAGE THAT SAYS 404?
www.dilbert.com scottadams@aol.com
YOUR INTERNET IS FULL.
HOW DO I FIX THAT?
I WONDER IF I'M SUPPOSED TO SEE ANYTHING WHEN IT'S DRAINING.
© 2006 Scott Adams, Inc./Dist. by UFS, Inc.

HTTP Web services

POST

Objectives

- Implement Java code that can send `POST`, `PUT`, and `DELETE` requests that send data to the server in JSON request body
- Handle an error in network communication properly
- Handle a response containing a 4xx status code
- Use Postman to make a `PUT`, `POST`, or `DELETE` request


A JS Application
MOD3
Front End (CSS, HTML, JS) + VUE.js
A Java CLI Application
MOD2
Service Layer (REST Template)
JSON
Request Types:
GET, POST,
PUT,DELETE
JSON
Web Service / API
MOD2
Server Side Code / Web Services (Java)
DAO Layer (JdbcTemplate)
SQL
Databases (SQL)

Spring Framework

- Powerful, lightweight framework used for application development
- Supports various other frameworks
  - Struts, Hibernate, Tapestry, EJB, JSF, etc.
- Helps solve many technical problems
- Comprehensive tool for supporting applications using Java

Spring Framework

- POJO based
- Modular
- IoC (Inversion of Control)
- Integration with existing frameworks
- Testable
- Web MVC
- Central Exception handling
- Lightweight

More Request Types

- GET: reads the data
- POST: Ideally suited for inserting new data into the data source.
- PUT: Ideally suited for updating an existing record within a data source.
- DELETE: Ideally suited for removing an existing record from the data source.

For the POST & PUT requests we are converting an object to data

GET vs. POST

GET

- Can be cached
- Remain in browser history
- Can be bookmarked
- Should never be used for sensitive data
- Maximum length of 2048 characters
- Used to request data

POST

- Are never cached
- Do not remain in browser history
- Cannot be bookmarked
- Have no restrictions on length

Implementing a POST

Suppose the documentation for the API specifies POST as well :

(POST) *http://localhost:3000/hotels/{id}/reservations*

```
String API_BASE_URL = http://localhost:3000/ ;
RestTemplate restTemplate = new RestTemplate();
HttpHeaders headers = new HttpHeaders();
headers.setContentType(MediaType.APPLICATION_JSON);

// Where reservation is an object of type Reservation.
HttpEntity<Reservation> entity = new HttpEntity<>(reservation, headers);

reservation = restTemplate.postForObject(BASE_URL + "hotels/" + reservation.getHotelID() +
"/reservations", entity, Reservation.class);
```

Note that POST requests have a body and header as well!

Let’s Code!

Implementing a PUT

Suppose the API's documentation states that there is a PUT endpoint: (PUT) *http://localhost:3000/reservations/{id}*

Using a REST template we can implement the following:

```
String API_BASE_URL = http://localhost:3000/;
RestTemplate restTemplate = new RestTemplate();
HttpHeaders headers = new HttpHeaders();
headers.setContentType(MediaType.APPLICATION_JSON);

// Where reservation is an object of type Reservation.
HttpEntity<Reservation> entity = new HttpEntity<>(reservation, headers);

restTemplate.put(BASE_URL + "reservations/" + reservation.getId(), entity);
```

Implementing a DELETE

Suppose the API's documentation states that there is a DELETE endpoint: (DELETE) *http://localhost:3000/reservations/{id}*

Using a REST template we can implement the following:

```
String API_BASE_URL = http://localhost:3000/;
RestTemplate restTemplate = new RestTemplate();
// Where id is an int:
restTemplate.delete(BASE_URL + "reservations/" + id);
```

Let’s Create the PUTs & DELETEs requests

Successful status codes

Successful POST, PUT and Delete return successful status codes:

POST – returns 201

PUT – 200 or 204

DELETE – 202 or 204

Exceptions and Error Handling

There are 2 exceptions to be aware of when dealing with APIs:

- RestClientResponseException – for when a status code other than a 2XX is returned.
- ResourceAccessException – for when there was a network issue that prevented a successful call

```
try {
    restTemplate.put(API_URL + "users/remove/23");
}
catch (ResourceAccessException ex) {
    // Handle network I/O errors
    System.out.println(ex.getMessage());
}
catch (RestClientResponseException ex) {
    // Handle response status codes: 1xx, 3xx, 4xx, 5xx
    System.out.println(ex.RawStatusCode());
}
```

We should use try catch blocks to handling these exceptions

```
private Reservation makeReservation(String CSV) {
    String[] parsed = CSV.split(",");

    List<String> list = new ArrayList<>();
    // invalid input
    if (parsed.length < 5 || parsed.length > 6) {
        return null;
    }
    // if we are updating a record and already have the od
    if (parsed.length == 6) {
        list = Arrays.asList(parsed);
    }
    // Add method does not include an id and only has 5 strings
    // we are creating a new record
    else {
        Reservation[] reservations = listReservations();
        int newId = reservations.length + 1; // or we can randomly generate but exercise does it this way

        // place the id into the first position of the data array
        list.add(newId + "");
        list.addAll(Arrays.asList(parsed));

    }
    return new Reservation(
            Integer.parseInt(list.get(0).trim()),
            Integer.parseInt(list.get(1).trim()),
            list.get(2).trim(),
            list.get(3).trim(),
            list.get(4).trim(),
            Integer.parseInt(list.get(5).trim())
    );
}
```

```
private HttpEntity<Reservation> makeEntity(Reservation reservation) {
    HttpHeaders headers = new HttpHeaders();
    headers.setContentType(MediaType.APPLICATION_JSON);
    HttpEntity<Reservation> entity = new HttpEntity<>(reservation, headers);
    return entity;
}
```

Let’s Code!

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reservation.getHotelID() + "/reservations", entity, Reservation.class);
```

```
String API_BASE_URL = http://localhost:3000/;
RestTemplate restTemplate = new RestTemplate();
// Where id is an int:
restTemplate.delete(BASE_URL + "reservations/" +
id);
```

```
String API_BASE_URL = http://localhost:3000/;
RestTemplate restTemplate = new RestTemplate();
HttpHeaders headers = new HttpHeaders();
headers.setContentType(MediaType.APPLICATION_JSON);
// Where reservation is an object of type Reservation.
HttpEntity<Reservation> entity = new HttpEntity<>(reservation, headers);
restTemplate.put(BASE_URL + "reservations/" + reservation.getId(),
entity);
```

Objectives

- Implement Java code that can send `POST`, `PUT`, and `DELETE` requests that send data to the server in JSON request body
- Handle an error in network communication properly

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