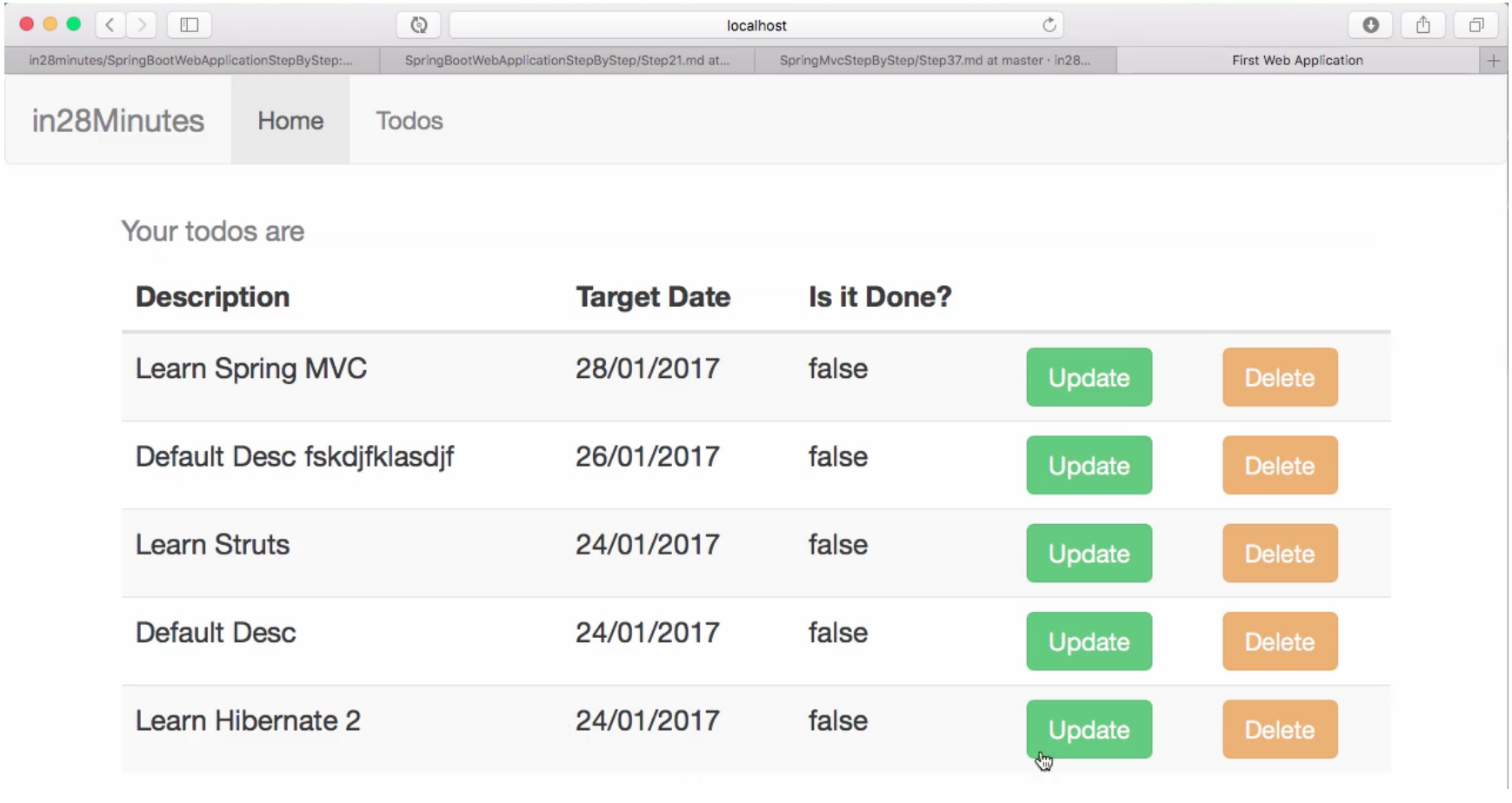
INTRODUCTION TO WEB SERVICES

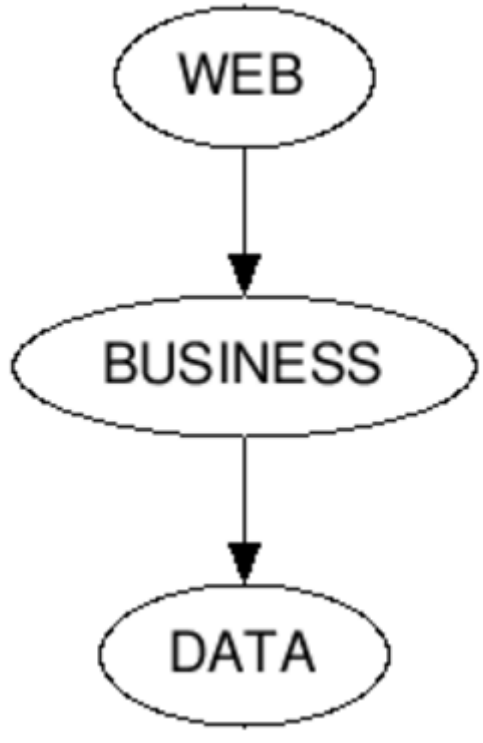
WEB SERVICE

Service delivered over the web?


localhost
in28minutes/SpringBootWebApplicationStepByStep:...
SpringBootWebApplicationStepByStep/Step21.md at...
SpringMvcStepByStep/Step37.md at master · in28...
First Web Application
in28Minutes
Home
Todos
Your todos are
Description
Target Date
Is it Done?
Learn Spring MVC
28/01/2017
false
Update
Delete
Default Desc fskdjfklasdjf
26/01/2017
false
Update
Delete
Learn Struts
24/01/2017
false
Update
Delete
Default Desc
24/01/2017
false
Update
Delete
Learn Hibernate 2
24/01/2017
false
Update
Delete

Is the Todo Management Application a Web Service?

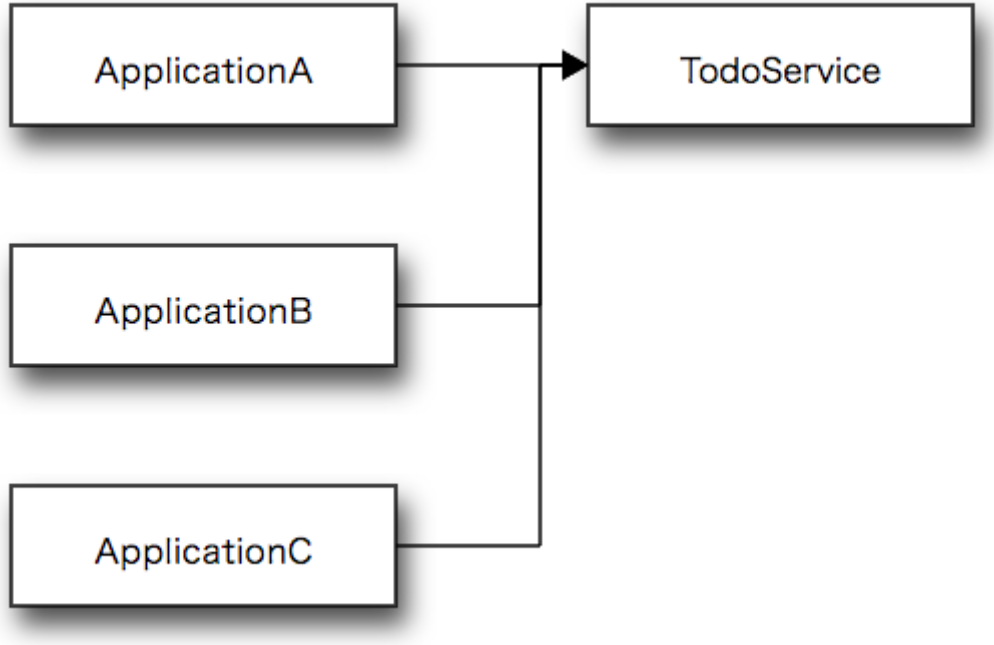
- It delivers HTML output - Not consumable by other applications.


WEB
BUSINESS
DATA

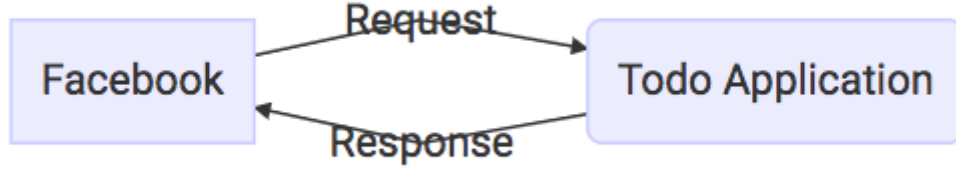
- Can I reuse the Business Layer by creating a JAR?
  - Not Platform independent
  - Communication of Changes
  - Managing Dependencies - like Database

How can I make my Todo application consumable by other applications?

That where we get into the concept of a web service!


ApplicationA
ApplicationB
ApplicationC
TodoService


ApplicationA
TodoService


Facebook
Request
Response
Todo Application

WEB SERVICE - W3C DEFINITION

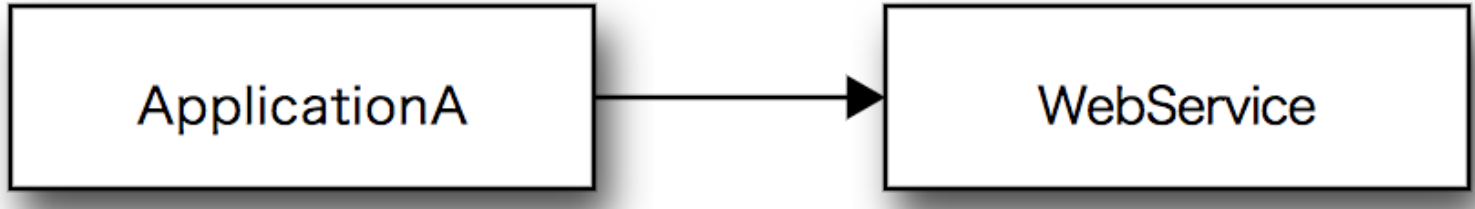
Software system designed to support interoperable machine-to-machine interaction over a network.

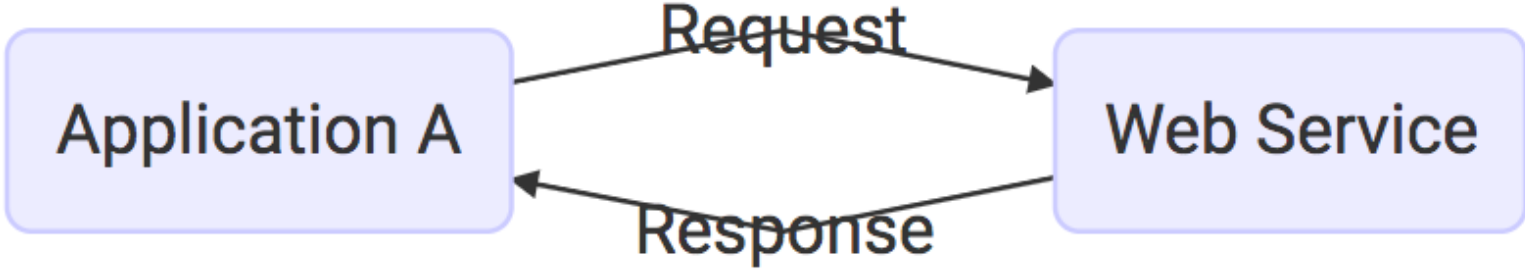
3 KEYS

- Designed for machine-to-machine (or application-to-application) interaction
- Should be interoperable - Not platform dependent
- Should allow communication over a network

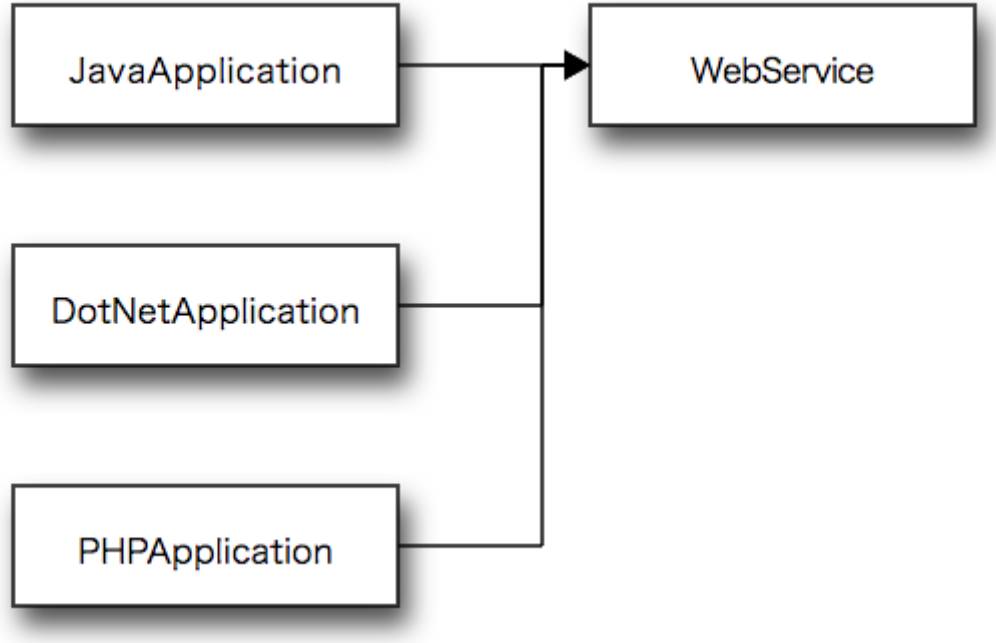
HOW?

How does data exchange between applications take place?


ApplicationA
WebService


Application A
Request
Response
Web Service

How can we make web services platform independent?


JavaApplication
WebService
DotNetApplication
PHPApplication

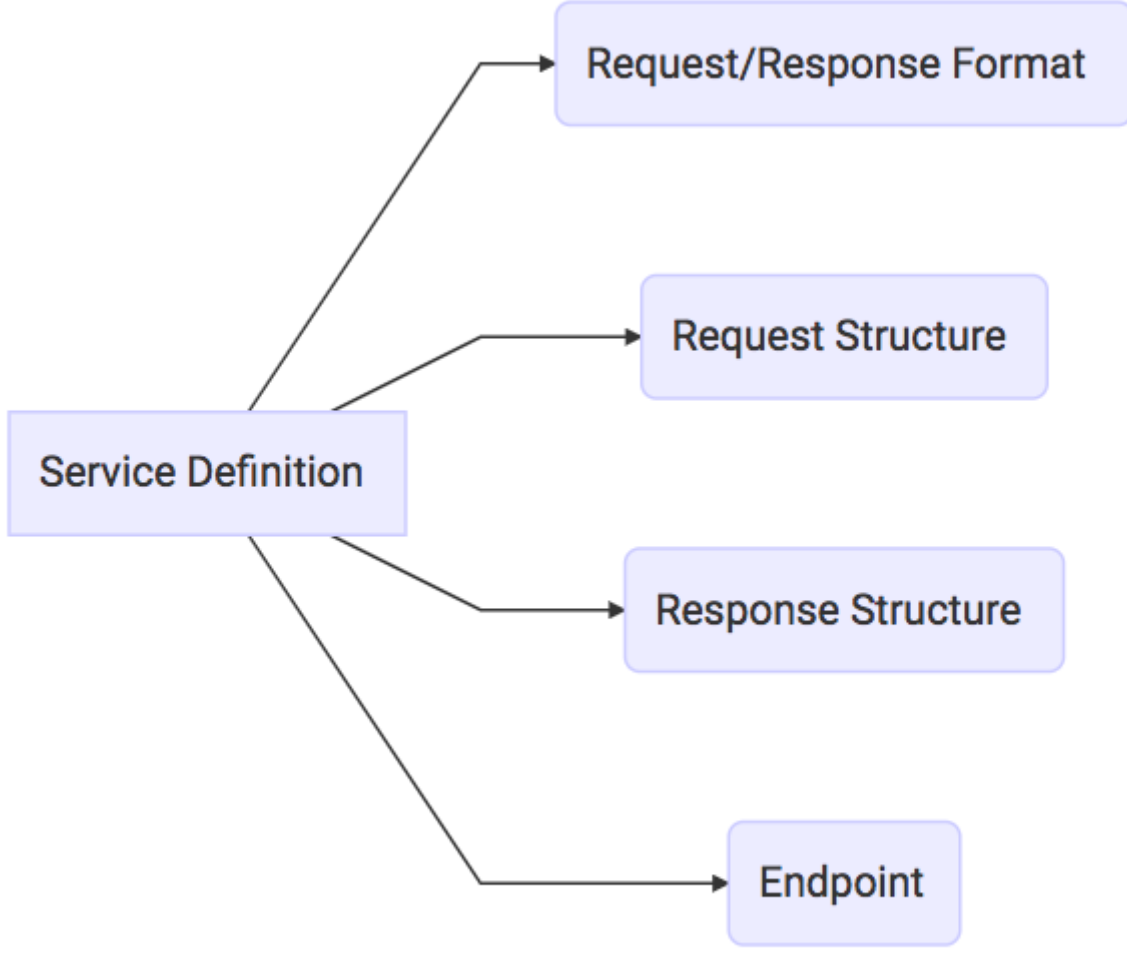
XML

```
<getCourseDetailsRequest>
    <id>Course1</id>
</getCourseDetailsRequest>
```

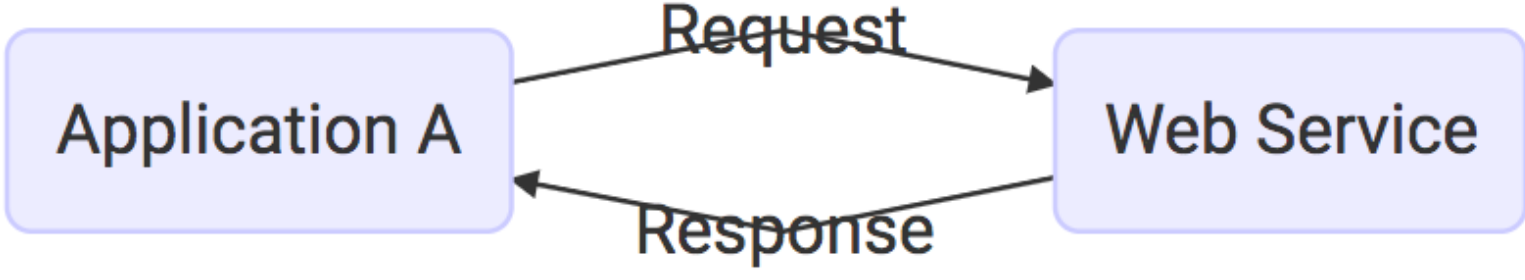
JSON


```
[
  {
    "id": 1,
    "name": "Even",
    "birthDate": "2017-07-10T07:52:48.270+0000"
  },
  {
    "id": 2,
    "name": "Abe",
    "birthDate": "2017-07-10T07:52:48.270+0000"
  }
]
```

How does the Application A know the format of Request and Response?


Request/Response Format
Request Structure
Service Definition
Response Structure
Endpoint

How does Application A and Web Service convert its internal data to (XML or JSON)?


Application A
Request
Response
Web Service

KEY TERMINOLOGY

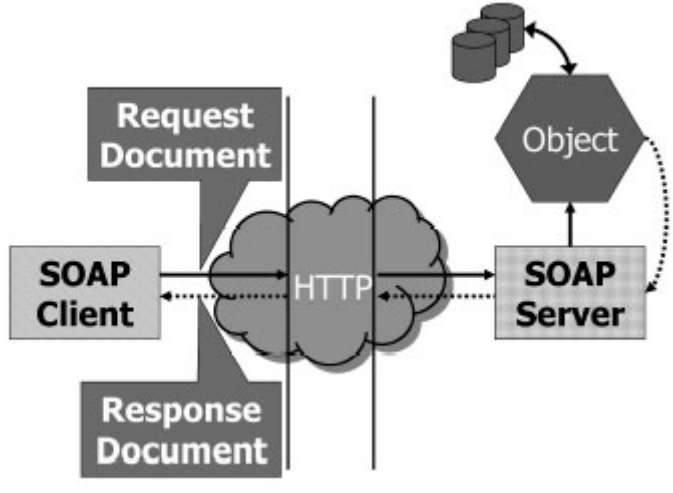
- Request and Response
- Message Exchange Format
  - XML and JSON

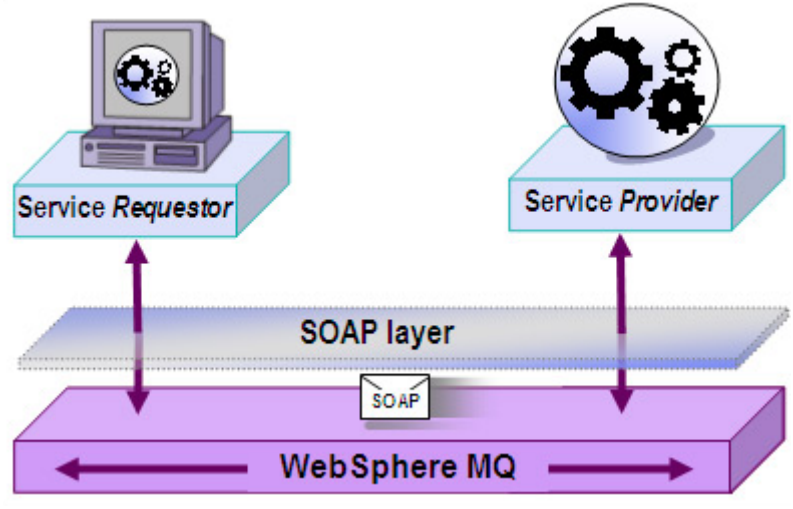
KEY TERMINOLOGY

- Service Provider or Server
- Service Consumer or Client
- Service Definition

KEY TERMINOLOGY

- Transport
  - HTTP and MQ


Request
Document
Object
SOAP
Client
HTTP
SOAP
Server
Response
Document

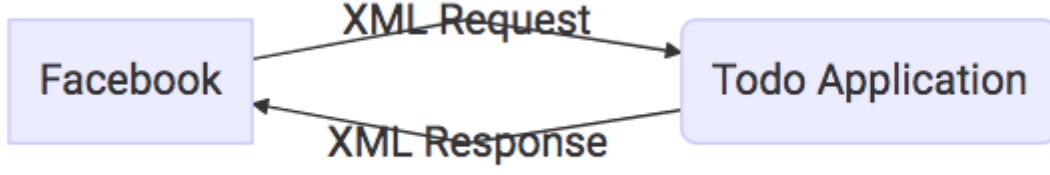

Service Requestor
Service Provider
SOAP layer
SOAP
WebSphere MQ

WEB SERVICE GROUPS

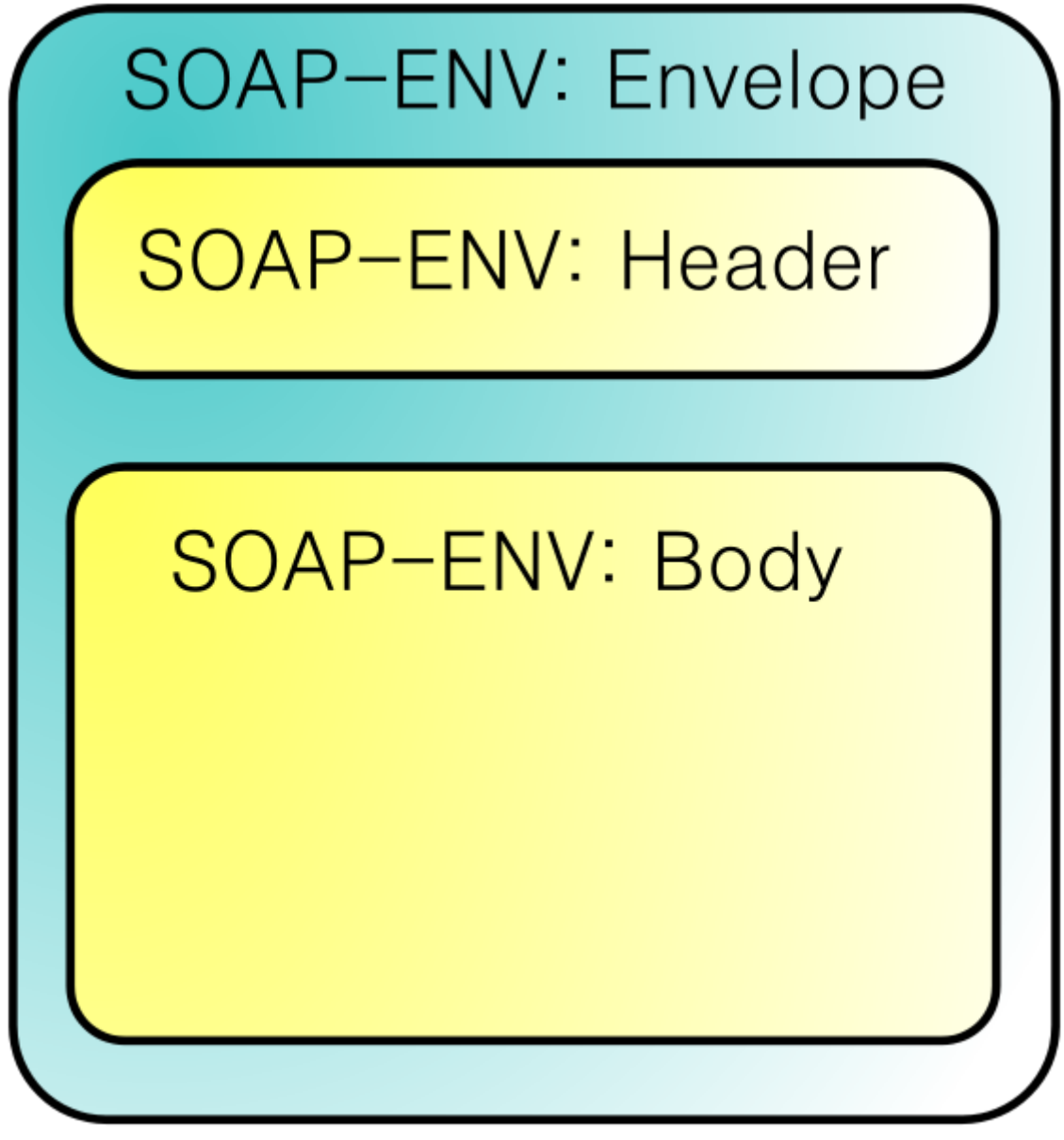
- SOAP-based
- REST-styled

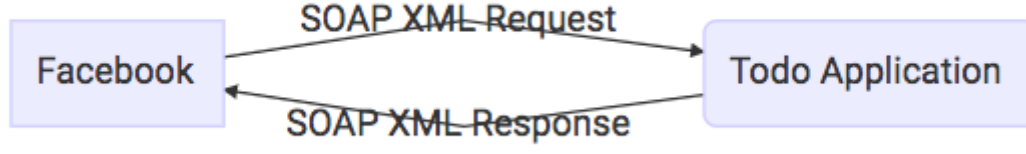
SOAP and REST are not really comparable.

SOAP?




```
<getCourseDetailsRequest>
    <id>Course1</id>
</getCourseDetailsRequest>
```

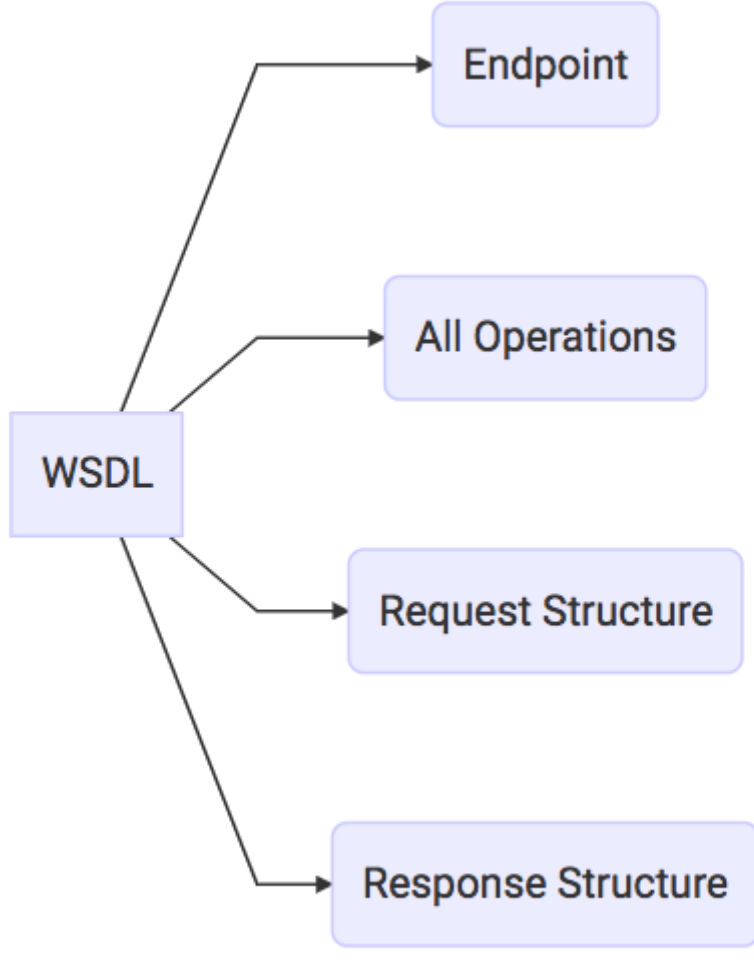

SOAP-ENV: Envelope
SOAP-ENV: Header
SOAP-ENV: Body

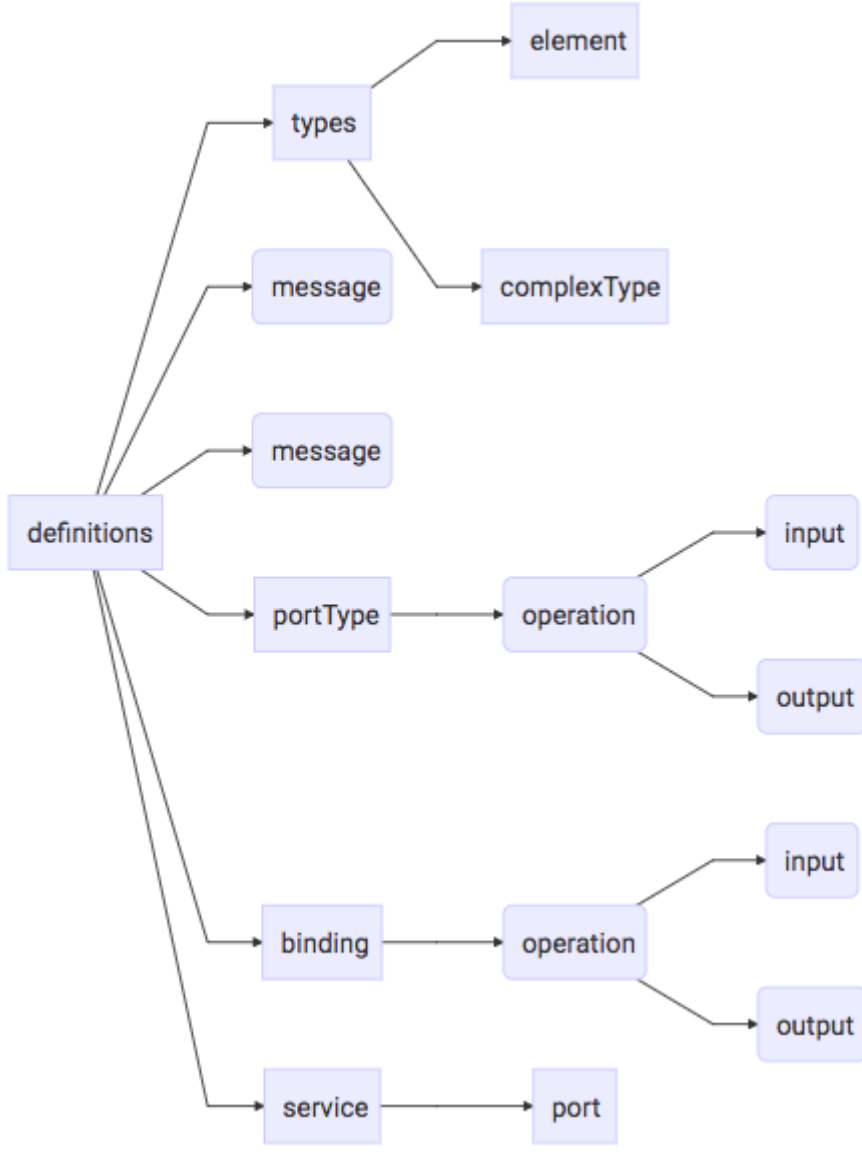

Facebook
SOAP XML Request
Todo Application
SOAP XML Response

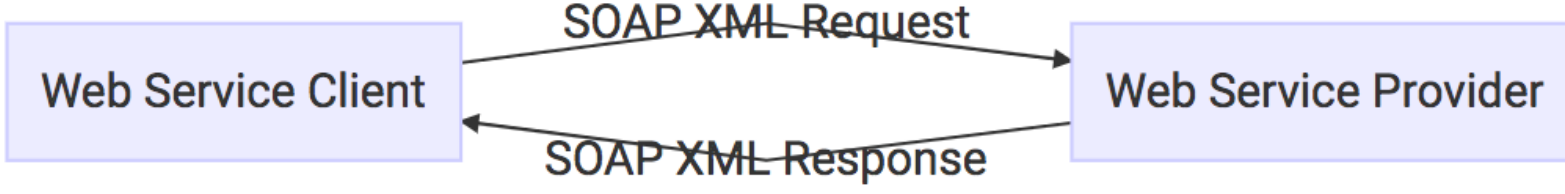
```
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/
    <SOAP-ENV:Header/>
    <SOAP-ENV:Body>
        <ns2:getCourseDetailsResponse xmlns:ns2="http://in28mi
            <ns2:course>
                <ns2:id>Course1</ns2:id>
                <ns2:name>Spring</ns2:name>
                <ns2:description>10 Steps</ns2:description>
            </ns2:course>
        </ns2:getCourseDetailsResponse>
    </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

SOAP

- Format
  - SOAP XML Request
  - SOAP XML Response
- Transport
  - SOAP over MQ
  - SOAP over HTTP
- Service Definition
  - WSDL


Endpoint
All Operations
WSDL
Request Structure
Response Structure


element
types
message
complexType
message
definitions
input
portType
operation
output
input
binding
operation
output
service
port

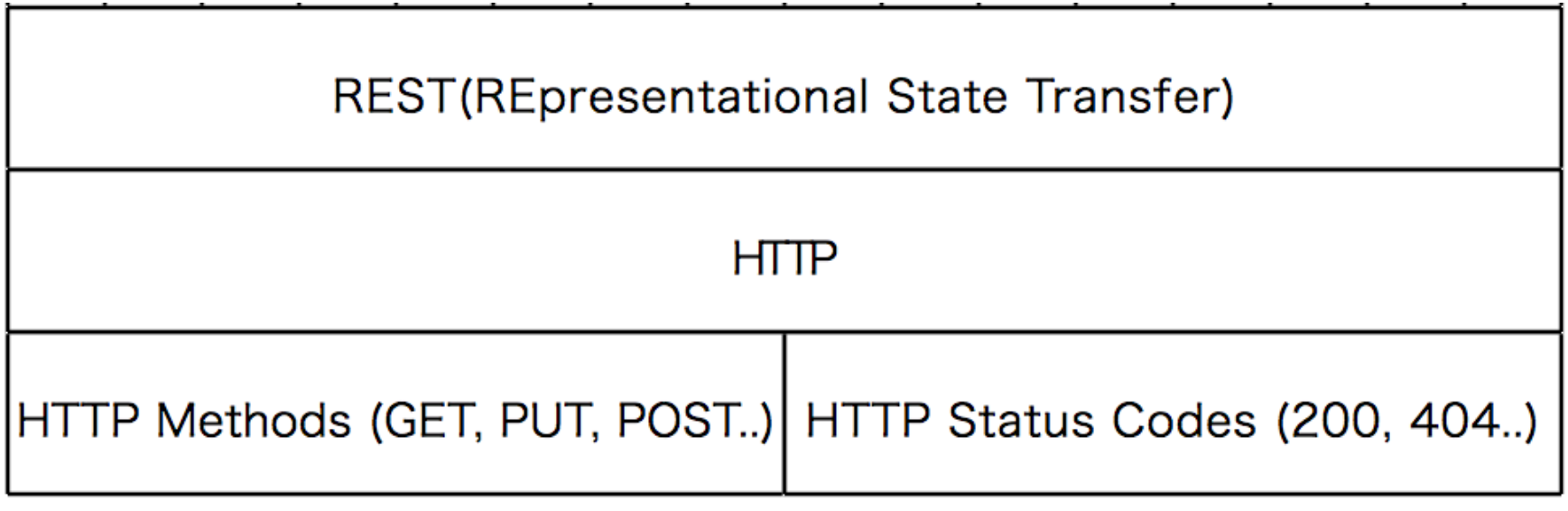

Web Service Client
SOAP XML Request
SOAP XML Response
Web Service Provider

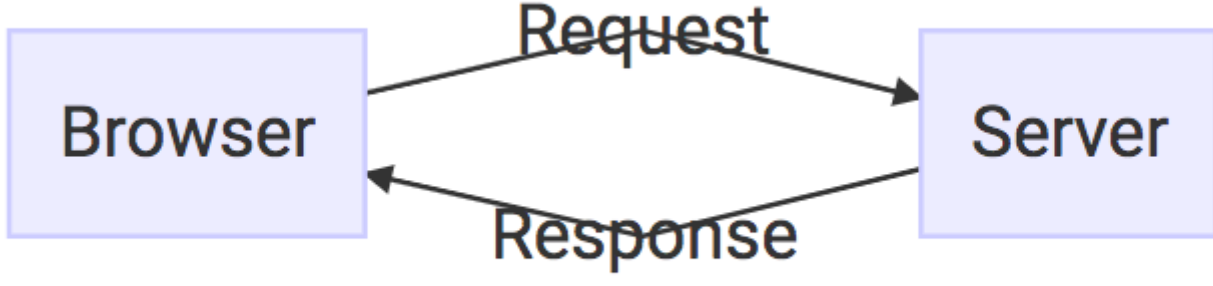
REST

REpresentational State Transfer

REST is a style of software architecture for distributed hypermedia systems

MAKE BEST USE OF HTTP




Request
Browser
Server
Response

KEY ABSTRACTION - RESOURCE

- A resource has an URI (Uniform Resource Identifier)
  - /users/Ranga/todos/1
  - /users/Ranga/todos
  - /users/Ranga
- A resource can have different representations
  - XML
  - HTML
  - JSON

EXAMPLE

- Create a User - POST /users
- Delete a User - DELETE /users/1
- Get all Users - GET /users
- Get one Users - GET /users/1

REST

- Data Exchange Format
  - No Restriction. JSON is popular
- Transport
  - Only HTTP
- Service Definition
  - No Standard. WADL/Swagger/...

REST VS SOAP

- Restrictions vs Architectural Approach
- Data Exchange Format
- Service Definition
- Transport
- Ease of implementation

```
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/
    <SOAP-ENV:Header/>
    <SOAP-ENV:Body>
        <ns2:GetCourseDetailsRequest xmlns:ns2="http://in28min
                <ns2:id>Course1</ns2:id>
        </ns2:GetCourseDetailsRequest>
    </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

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            <ns2:CourseDetails>
                <ns2:id>Course1</ns2:id>
                <ns2:name>Spring</ns2:name>
                <ns2:description>10 Steps</ns2:description>
            </ns2:CourseDetails>
        </ns2:GetCourseDetailsResponse>
    </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

REQUEST METHODS

- GET
- POST
- PUT
- DELETE

RESPONSE STATUS

- 200 - SUCCESS
- 404 - RESOURCE NOT FOUND
- 400 - BAD REQUEST
- 201 - CREATED
- 401 - UNAUTHORIZED
- 500 - SERVER ERROR

USE PLURALS

- Prefer /users to /user
- Prefer /users/1 to /user/1

USE NOUNS FOR RESOURCES

FOR EXCEPTIONS

DEFINE A CONSISTENT APPROACH

- /search
- PUT /gists/{id}/star
- DELETE /gists/{id}/star

DEFINE ORGANIZATIONAL STANDARDS

- YARAS - https://github.com/darrin/yaras