OVERVIEW

- What are APIs?
- Uses of APIs
- How do APIs work?
- Types of Web Services
- SOAP vs REST
- HTTP Error Codes
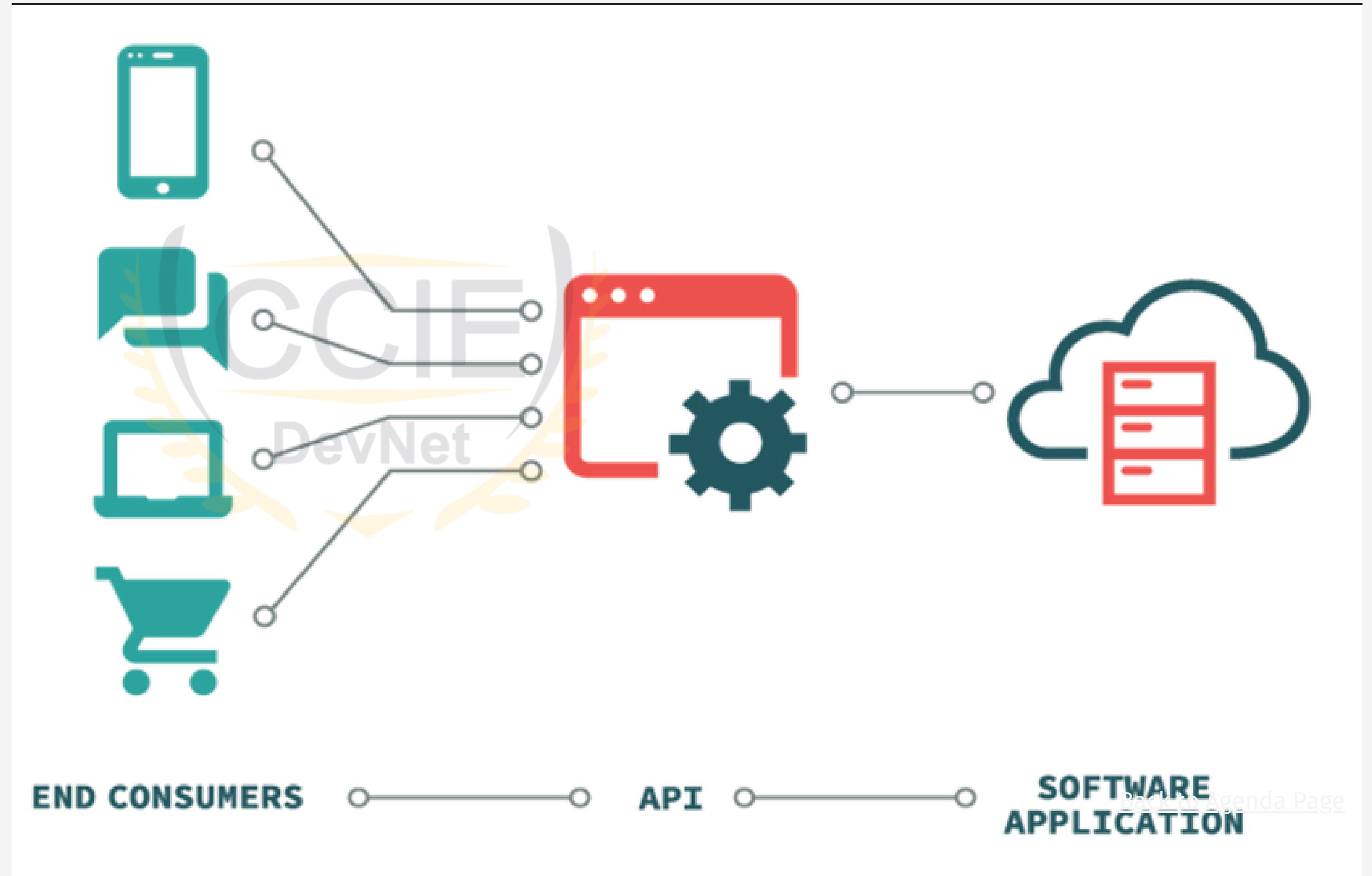- XML and JSON

What are APIs?

- API stands for Application Programming Interface
  1. Allows applications to talk to each other
- Think of the following
  1. Stock tickers
  2. Maps
  3. Currency Conversion
  4. Flight Booking
- Listed above are some of the examples of API uses

Uses of APIs

How do APIs Work?

END CONSUMERS   API   SOFTWARE APPLICATION

Types of Web Services.

SOAP Web Services:

- Use a transport independent message exchange protocol called SOAP.
- Simple Object Access Protocol
- Simply defines the structure of the message exchanged.
- Format used for exchange in this is mostly XML.
- Use WSDL as interface between client and server.
- Web Services Description Language.
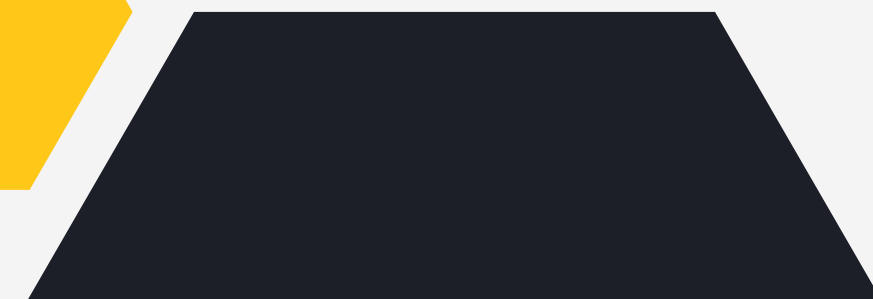
Types of Web Services. (cont.)

- **RESTful Web Services**

1. Use HTTP directly.
2. Use JSON predominantly though they also support XML.
3. Typically called as APIs.
4. Usually come with documentation (e.g. Swagger) which contains all the information needed to use them.
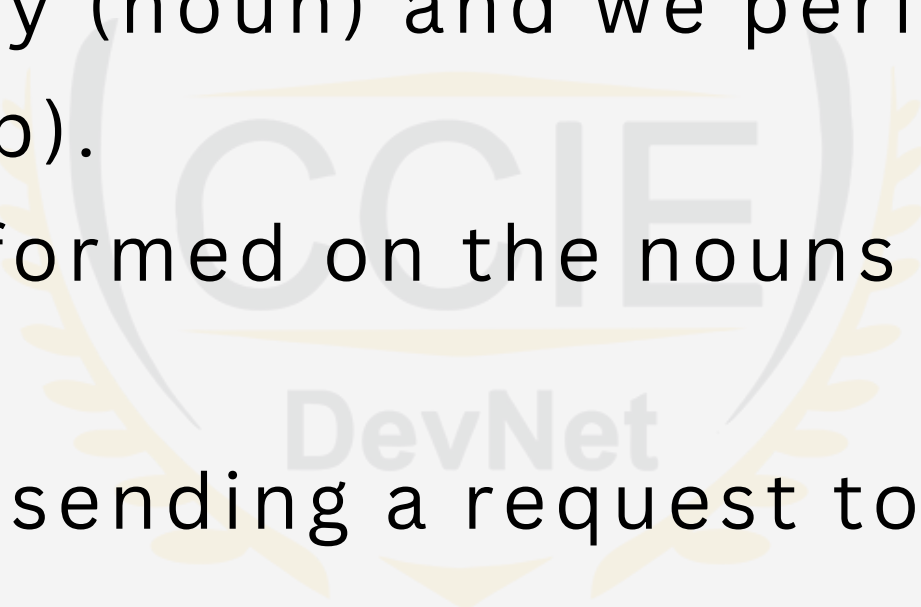
Rest APIs

- REST -- REpresentational State Transfer
- Centered around Web Resources in a textual representation
- These resources can be read and modified via a stateless protocol like HTTP using a set of predefined operations like GET, POST, PUT, DELETE etc.
- What do we mean by Stateless?
- E.g. Phone call vs Email

REST APIs (Cont.)

- Follow Object Oriented programming paradigm of noun-verb.
- There is an object or entity (noun) and we perform some actions on that (verb).
- Verbs are the actions performed on the nouns or resources.
- Actions are performed by sending a request to the server.
- And results of the actions are sent back to the client as response.
- This request and response happens via one of the machine-readable data interchange formats we discussed earlier like XML, YAML, JSON etc.

Rest APIs (cont.)

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Sample API endpoint : **https://petstore.swagger.io/v2/pet/10**

Base URL

Resource
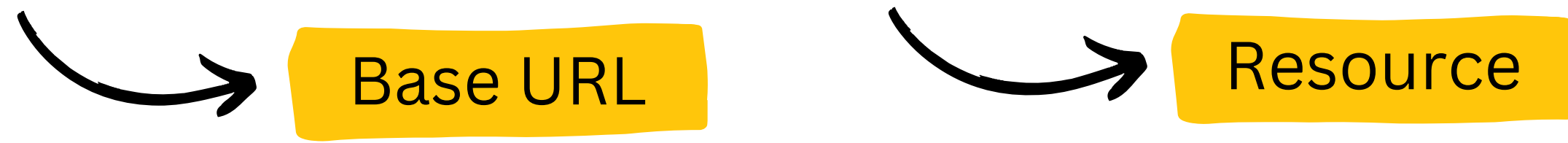
GET	/pet/{petId} Find pet by ID
PUT	/pet Update an existing pet
DELETE	/pet/{petId} Deletes a pet
POST	/pet/{petId}/uploadImage uploads an image

HTTP Error Code Categories.

Responses are grouped in five classes:

- Informational responses (100 – 199)
- Successful responses (200 – 299)
- Redirects (300 – 399)
- Client errors (400 – 499)
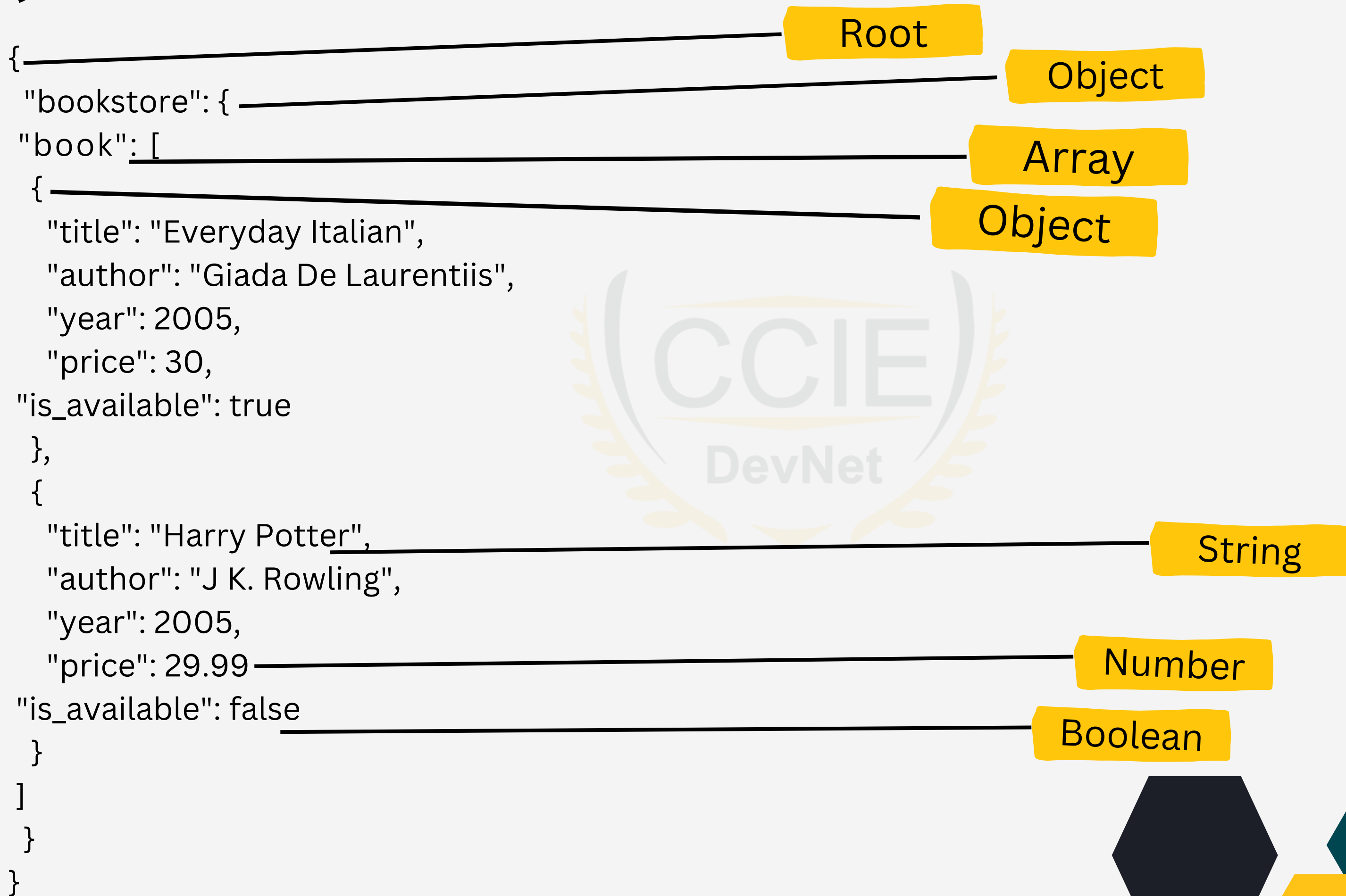- Server errors (500 – 599)

XML, JSON

- What is the main component which is exchanged between client and server?
- Data
- This Data has to be represented in a standard way
- That is where XML or JSON come into picture
- XML - Extended Markup Language

  -A distant cousin of HTML (Hyper Text Markup Language)
- JSON - Javascript Object Notation

XML:

```
<bookstore>
<book>
<title>Everyday Italian</title>
<author>Giada De
Laurentiis</author>
<year>2005</year>
<price>30.00</price>
</book>
<book>
<title>Harry Potter</title>
<author>J K.
Rowling</author>
<year>2005</year>
<price>29.99</price>
</book>
</bookstore>
```

JSON:

```
{                                    Root
  "bookstore": {                     Object
"book": [                            Array
  {                                  Object
    "title": "Everyday Italian",
    "author": "Giada De Laurentiis",
    "year": 2005,
    "price": 30,
"is_available": true
  },
  {
    "title": "Harry Potter",         String
    "author": "J K. Rowling",
    "year": 2005,
    "price": 29.99                   Number
"is_available": false               Boolean
  }
]
  }
}
```

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REST APIs

DEMO.