REST API Fundamentals

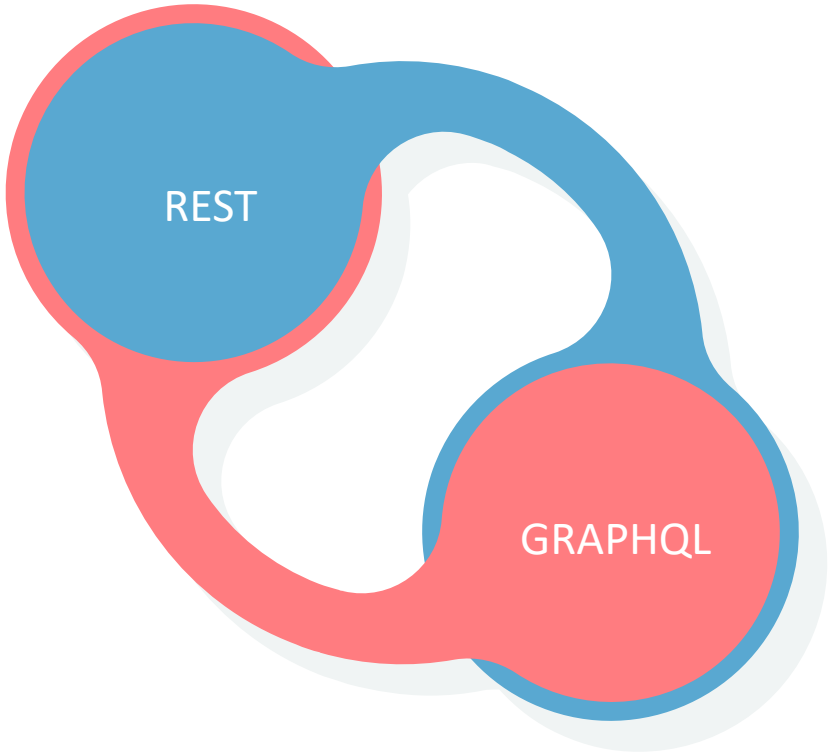
learn more

Testleaf
Always Ahead

2 API Architectures

1 REST

Representational state transfer (**REST**) is a software architectural style



GRAPHQL 2

GraphQL is an open-source data query and manipulation language for APIs

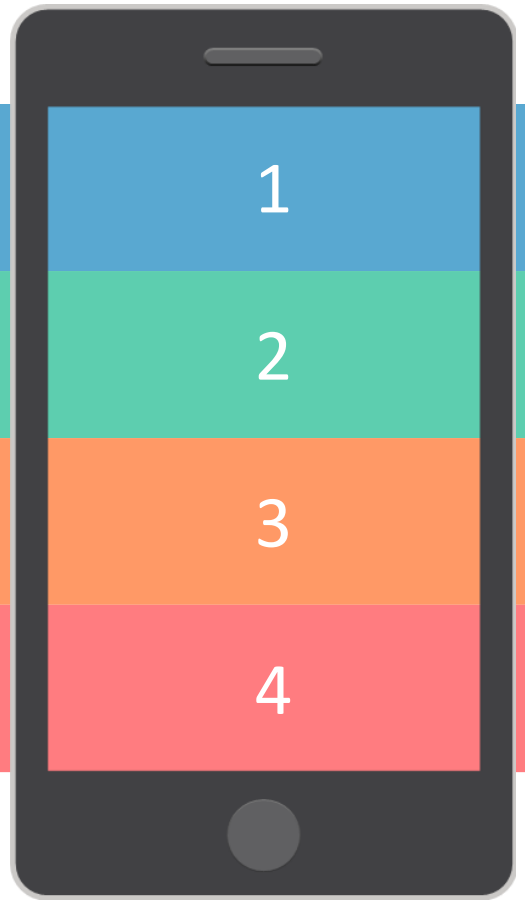
Tools/Libraries that you will be learning

REST

REST

REST

REST



PostMan

a collaboration platform for API development.

RestAssured + WireMock

Java DSL framework for simplifying testing of REST based services

Swagger

Framework backed by a large ecosystem of tools for documentation

Karate

Tool to do API test-automation, mocks

Applications Under Test (AUT)

ServiceNow

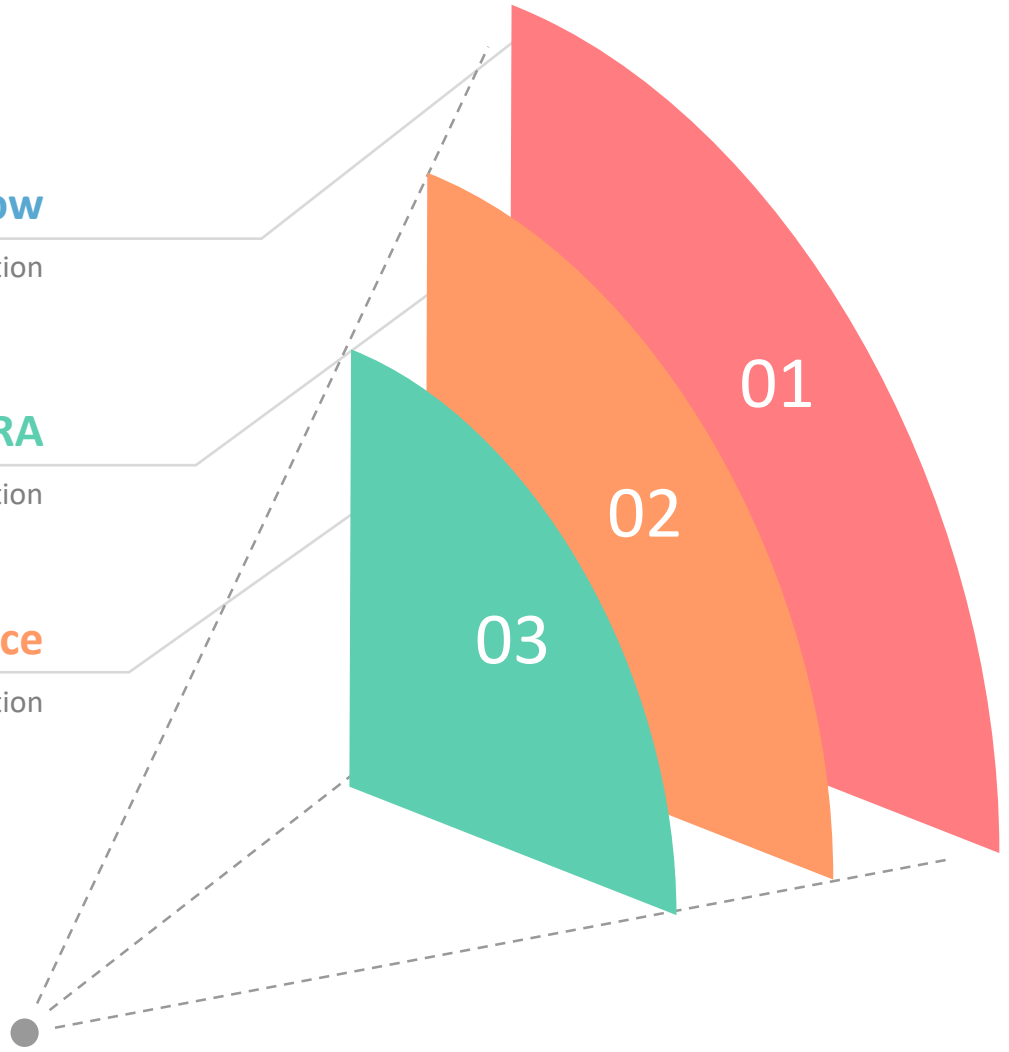
ITSM Application

JIRA

Project Management Application

Salesforce

CRM Application



Testleaf
Always Ahead

Why API Automation is growing in demand?

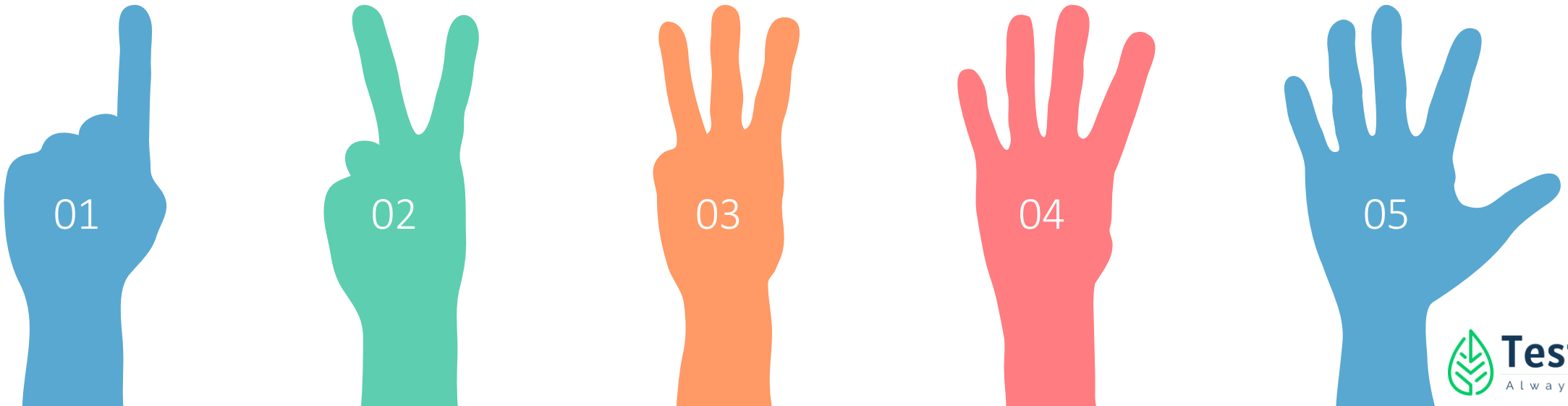
API Based Apps

Faster

Easier & Isolated

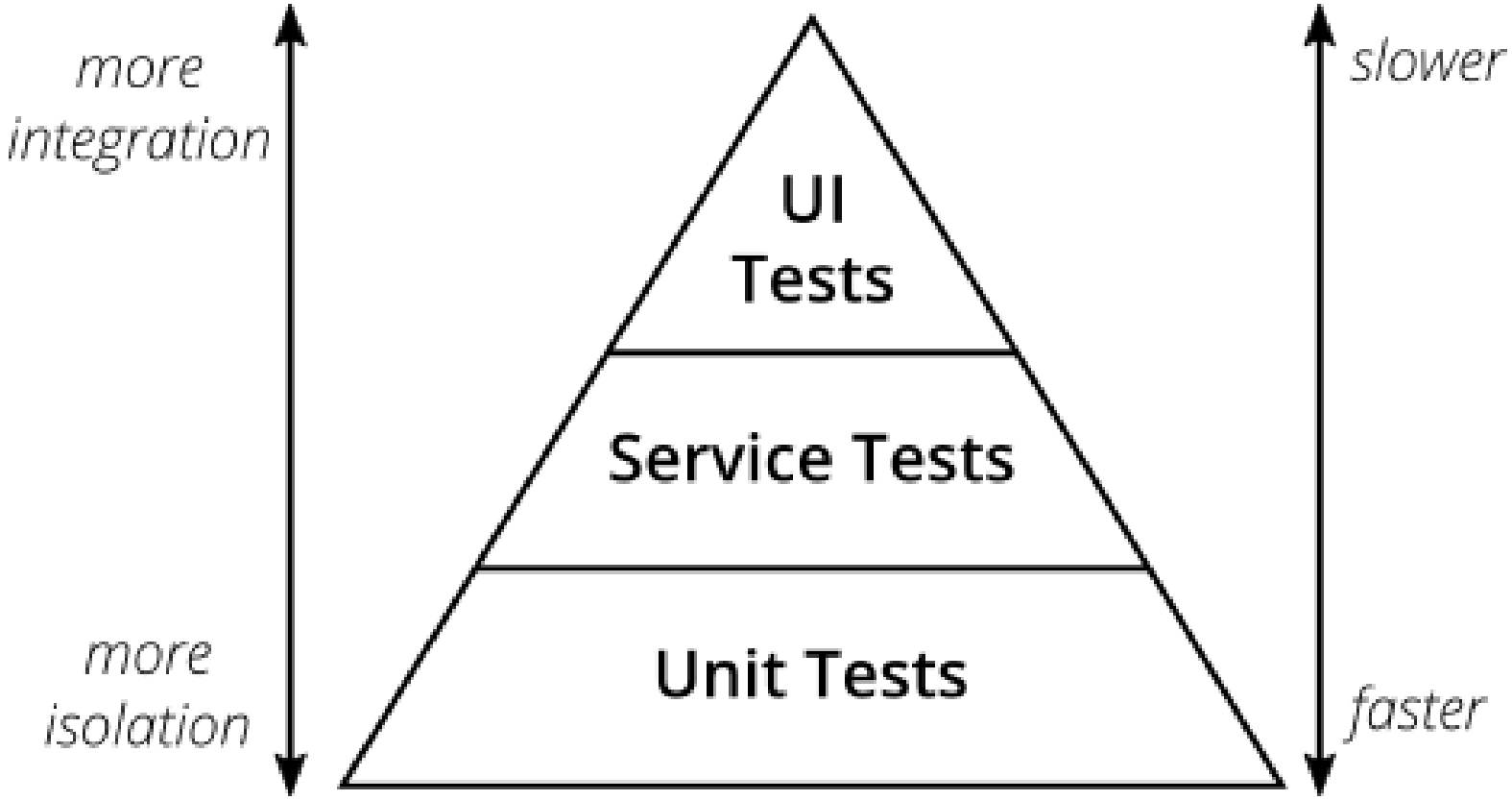
Data Generation

Less Failures



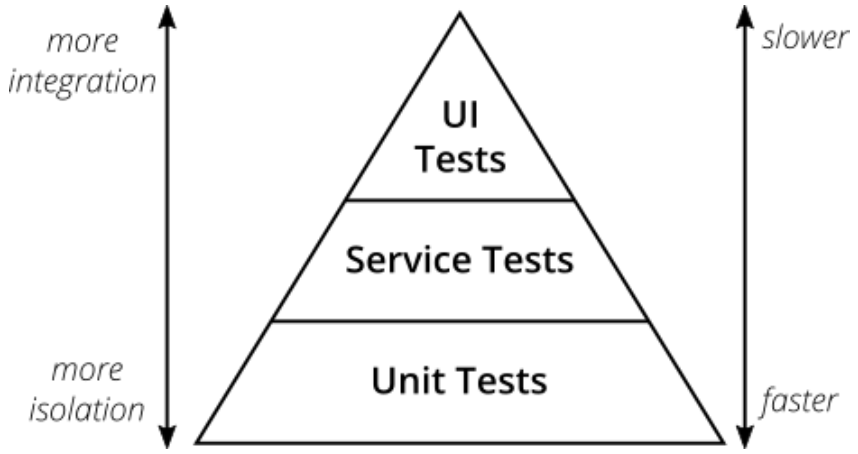
Testleaf
Always Ahead

Mike Cohn' Test Pyramid



Test Pyramid - Take Away

1. Write tests with different granularity (End to End tests in UI)
2. The more high-level you get the fewer tests you should have



SOAP vs REST vs GraphQL vs gRPC

SOAP - Simple Object Access Protocol (1998)

REST - Representational State Transfer (2000)

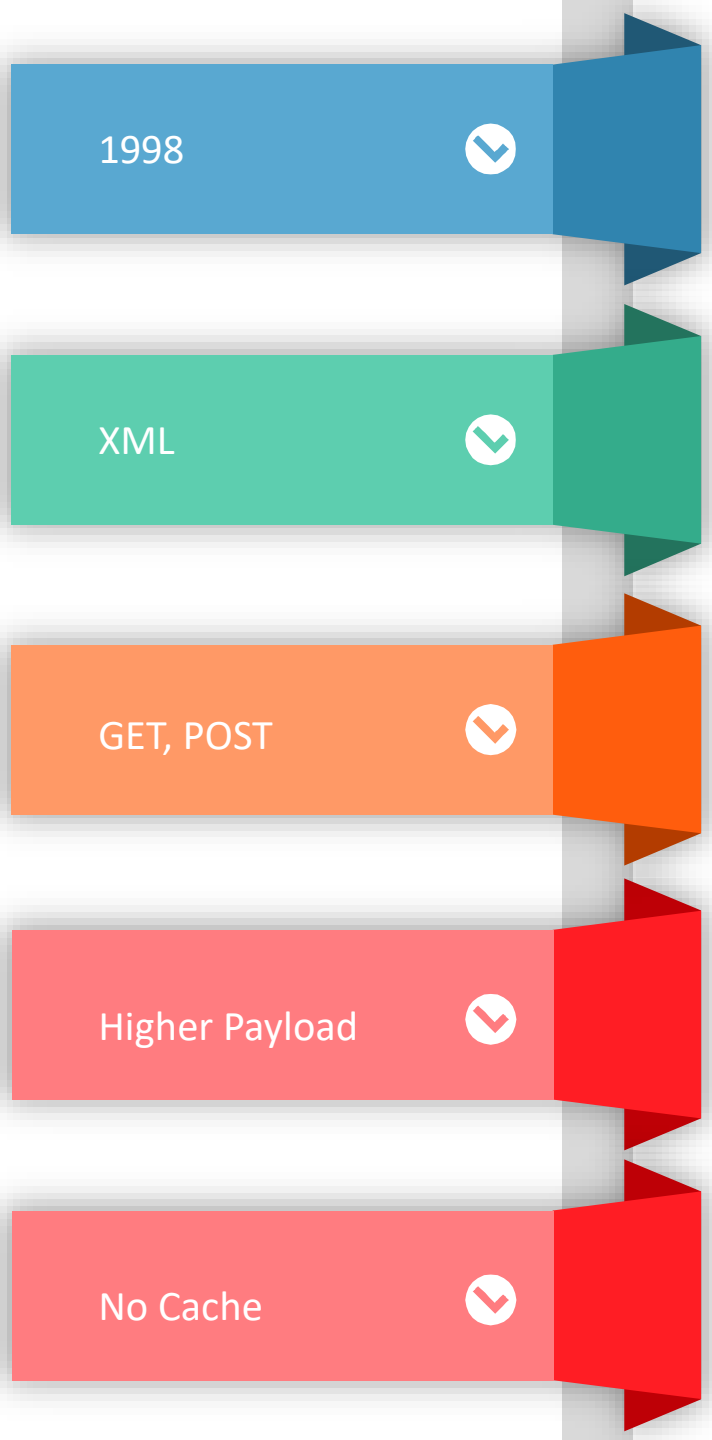
GraphQL – Graphical Query Language (2015)

gRPC – Google Remote Procedural Call (2016)

SOAP

SOAP (Simple Object Access Protocol) is a messaging protocol specification for exchanging structured information in the implementation of Web Services.

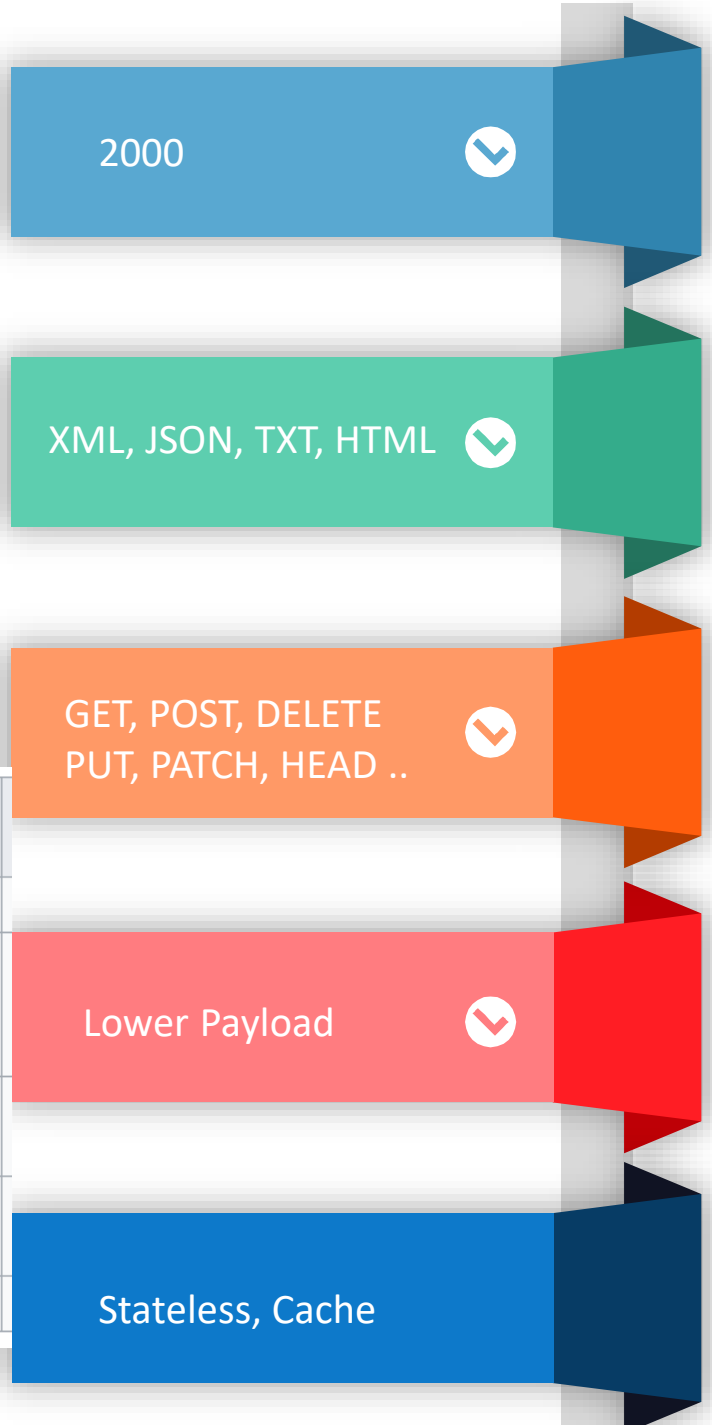
Element	Description	Required
Envelope	Identifies the XML document as a SOAP message.	Yes
Header	Contains header information.	No
Body	Contains call and response information.	Yes
Fault	Provides information about errors that occurred while processing the message.	No



REST

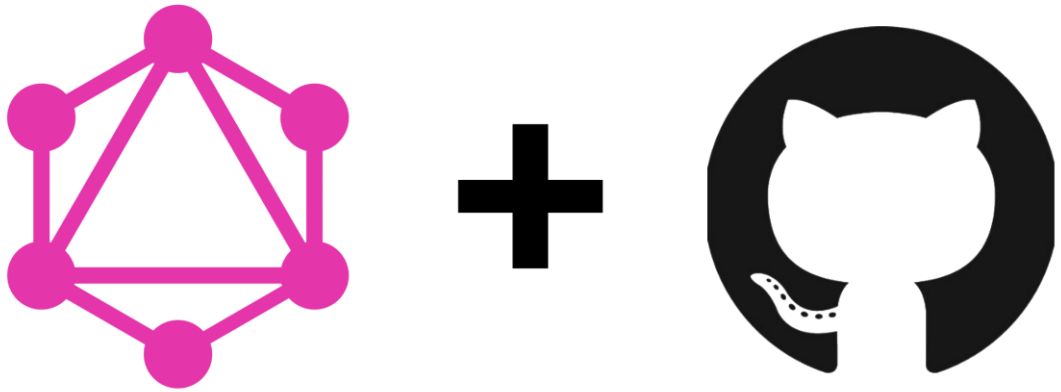
Representational state transfer (REST) is a software architectural style that defines a set of constraints to be used for creating Web Services

HTTP METHODS	Collection resource, such as `https://api.example.com/collection/`
GET	*Retrieve* the URIs of the member resources of the collection resource in the response body.
POST	*Create* a member resource in the collection resource using the instructions in the request body. The URI of the created member resource is *automatically assigned* and returned in the response *Location* header field.
PUT	*Replace* all the representations of the member resources of the collection resource with the representation in the request body, or *create* the collection resource if it does not exist.
PATCH	*Update* all the representations of the member resources of the collection resource using the instructions in the request body, or *may create* the collection resource if it does not exist.
DELETE	*Delete* all the representations of the member resources of the collection resource.



GraphQL

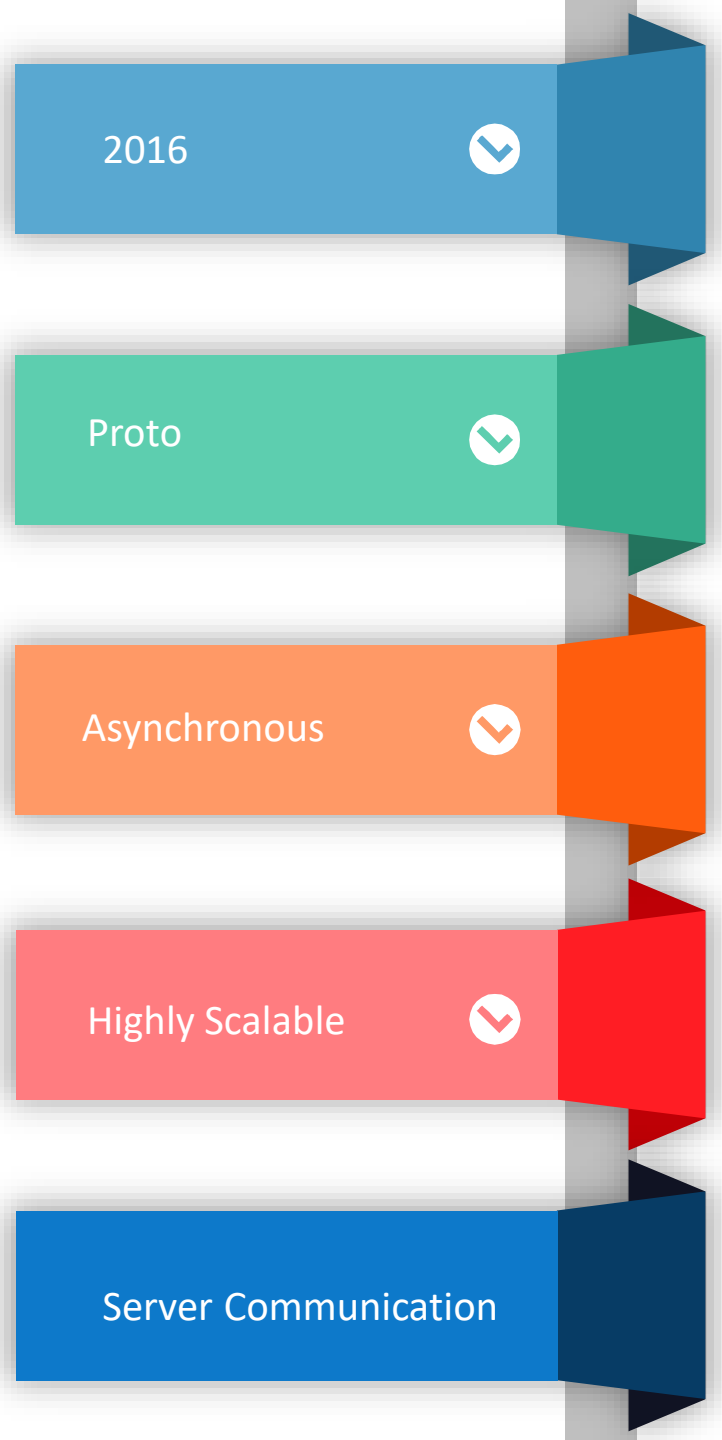
GraphQL is an open-source data query and manipulation language for APIs, and a runtime for fulfilling queries with existing data



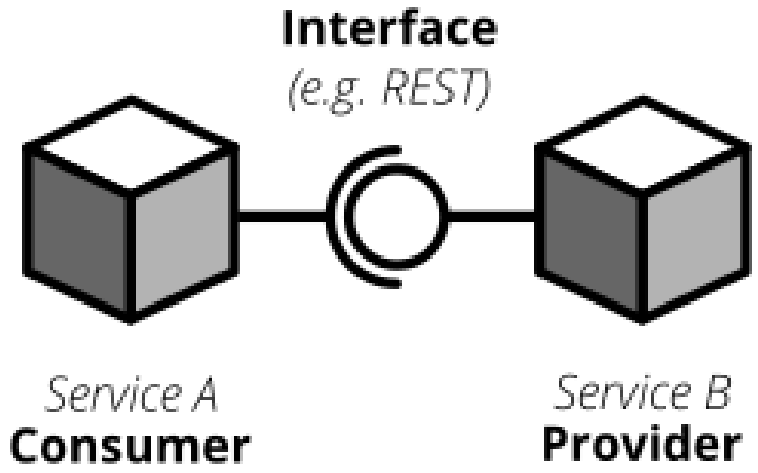
- 2015
- JSON
- Asynchronous
- HTTP, AMQP, MQTT
- Send Only required data

gRPC

A nimble and lightweight system for requesting data. gRPC, on the other hand, is best used when a system requires a set amount of data or processing routinely



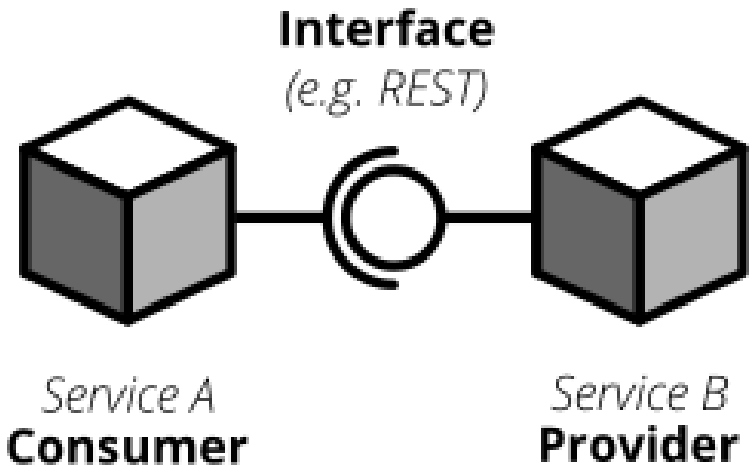
Consumer vs Provider



The **provider** serves data to consumers.
The **consumer** processes data obtained from a provider.

IRCTC Payment to ICICI / VISA

Event Driven Application – Publisher vs Subscriber

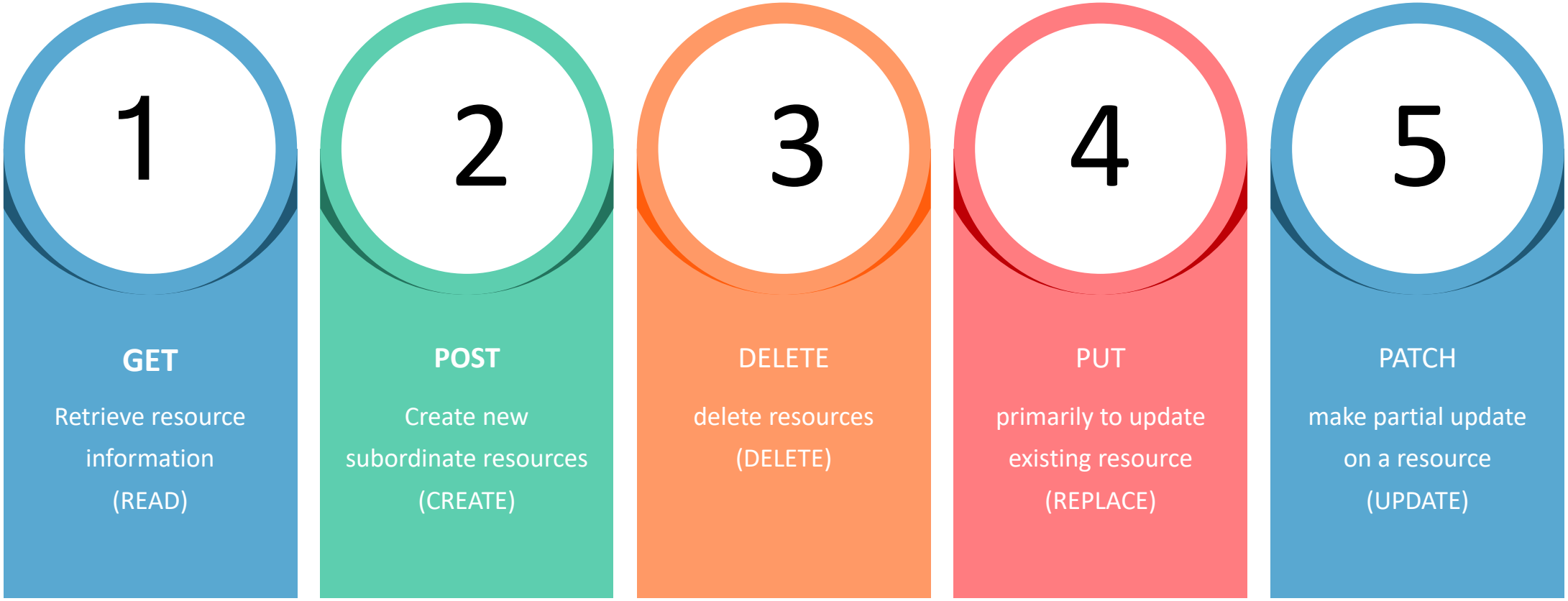


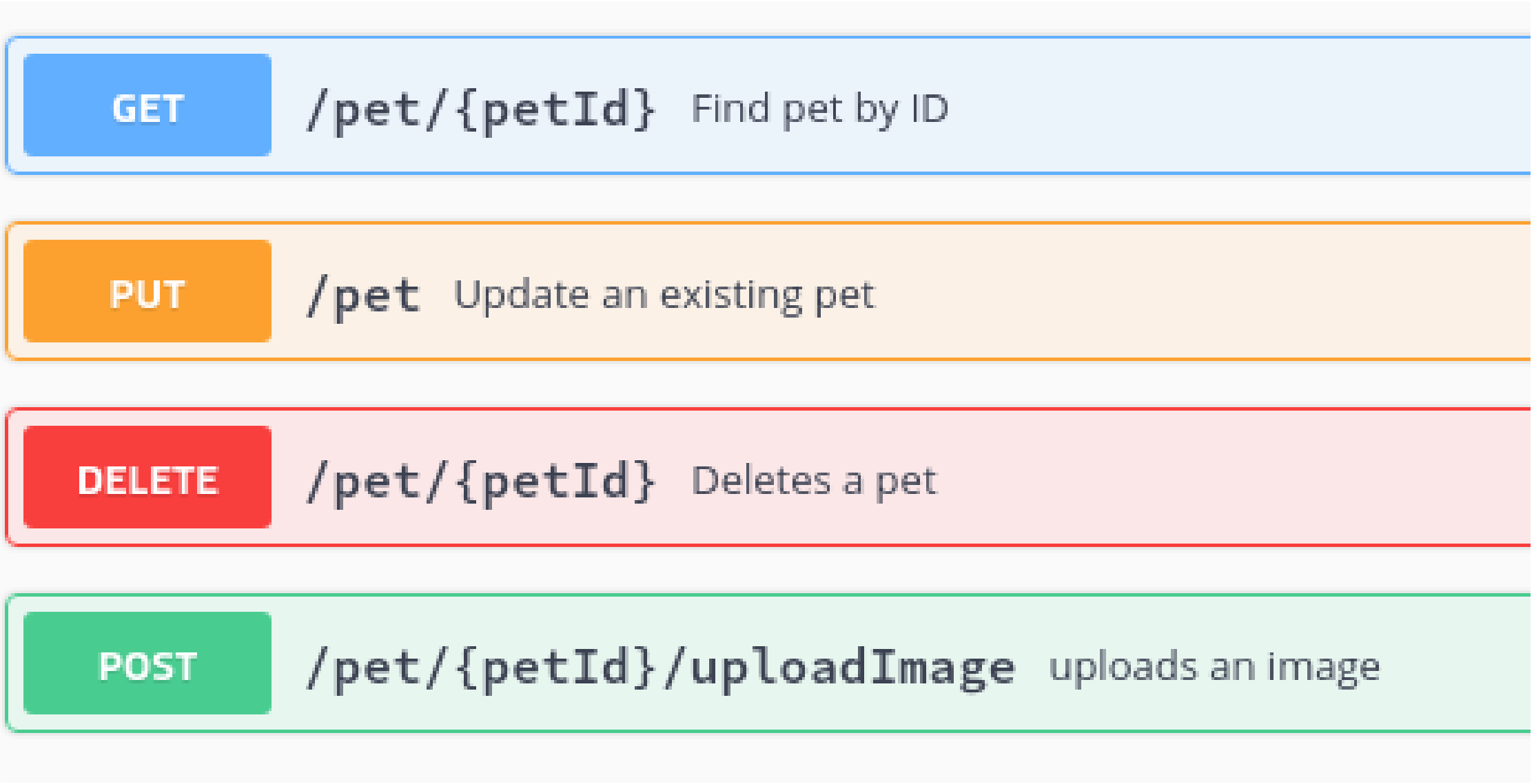
In event-driven application,

- a provider (often rather called **publisher**) publishes data to a queue;
- a consumer (often called **subscriber**) subscribes to these queues and reads and processes data.

Selenium 4.x Grid

HTTP Methods (CRUD)




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

Authentication

No Authentication

Examples: Weather Forecast, Google Map

Basic

Examples: ServiceNow, JIRA

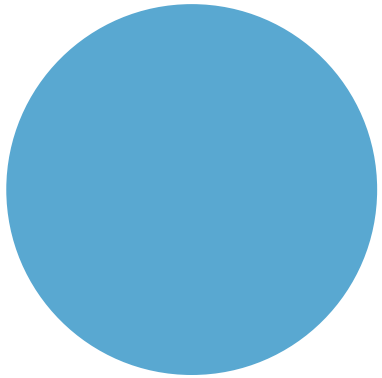
OAuth 2.0

Examples: Payment Gateways, ServiceNow

Token

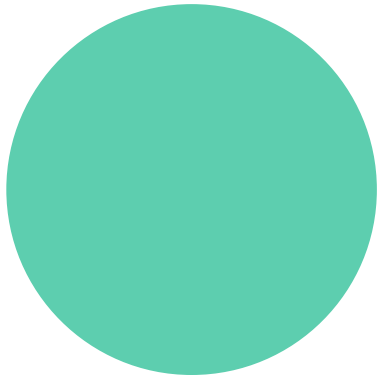
Examples: Oracle WMS, JWT

HTTP Headers



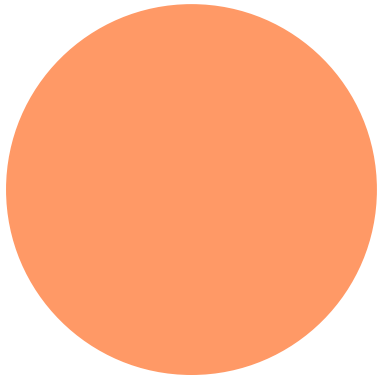
Content-Type

The Content-Type entity-header field indicates the media type of the entity-body sent to the recipient. **(request)**



Accept

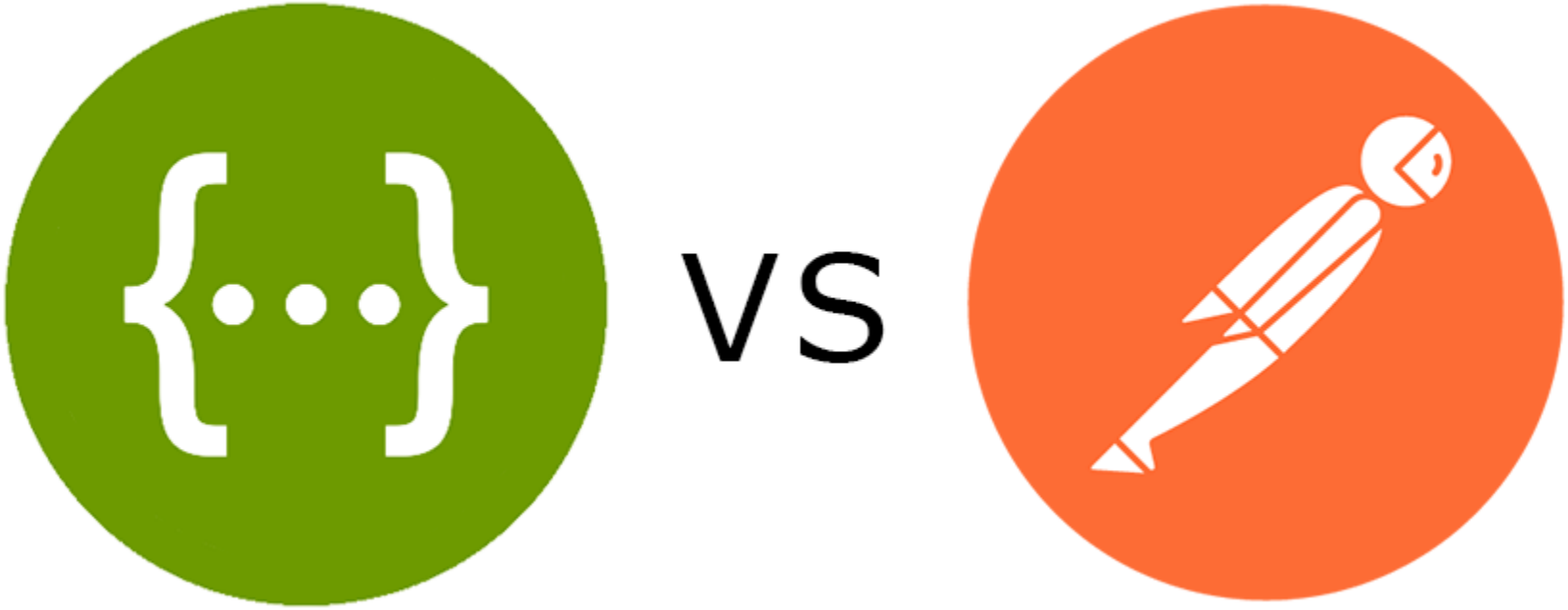
The Accept request-header field can be used to specify certain media types which are acceptable for the **response**.



Cookie

The Cookie request-header field value contains a name/value pair of information stored for that URL

Documentation Tool



https://covid-19-apis.postman.com/

Request Parameters

Header

Request header, usually related to authorization.

Query

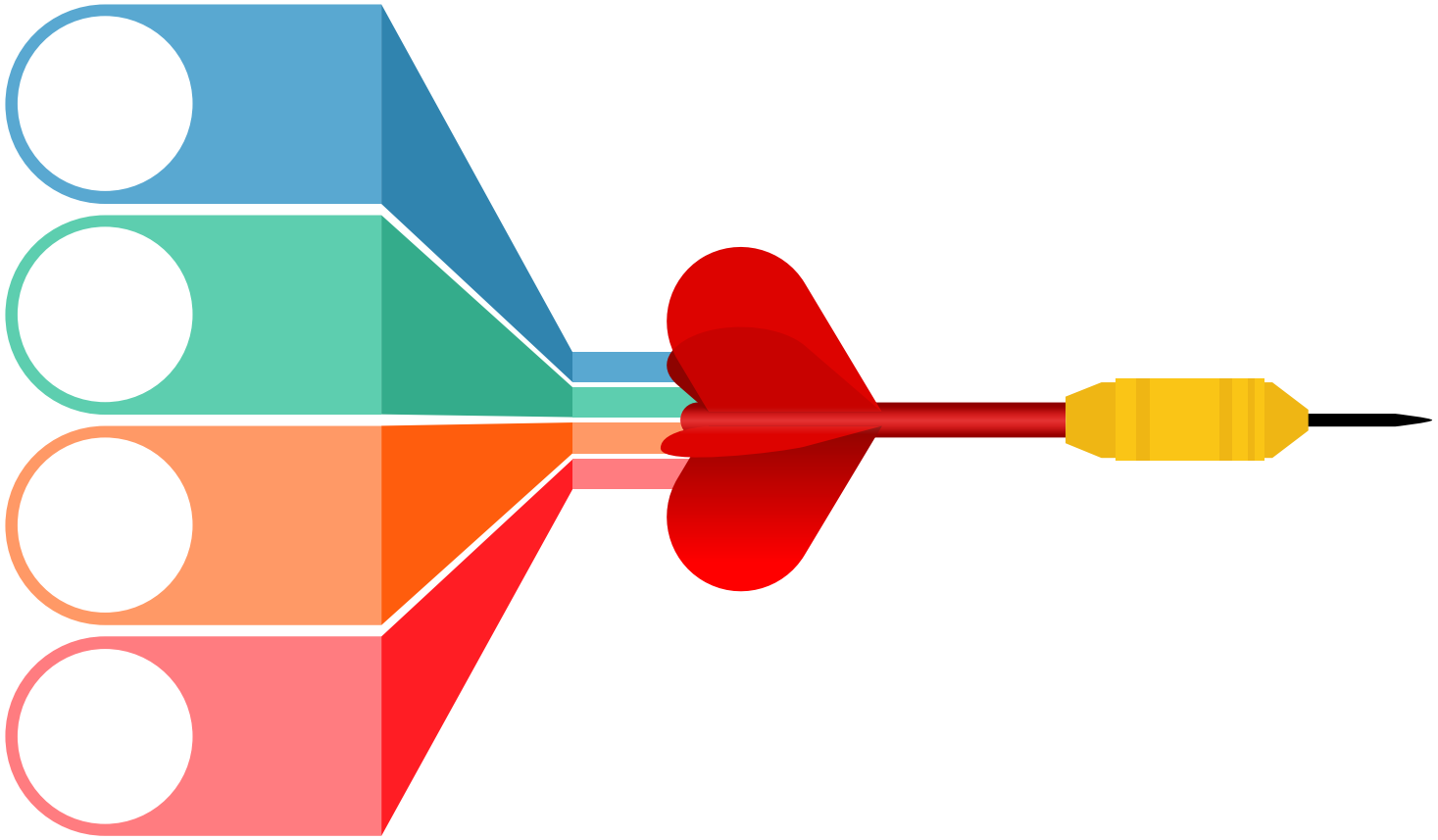
Parameters in the query string of the endpoint, after the ?.

Form

Parameters included in the request body. Usually submitted as JSON.

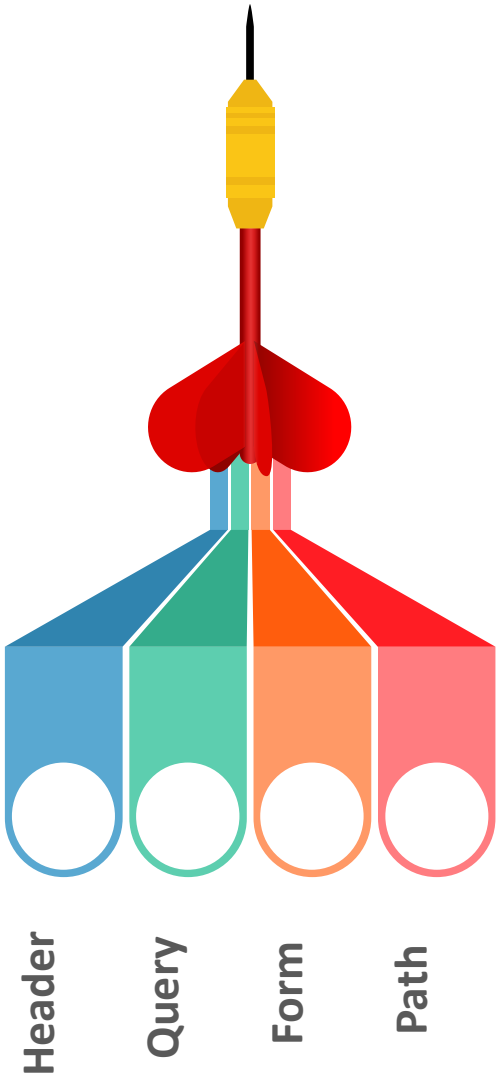
Path

Parameters within the path of the endpoint, before the query string (?). These are usually set off within curly braces.



Testleaf
Always Ahead

Request Parameters – Data Types



These data types are the most common with REST APIs:

- **string**: An alphanumeric sequence of letters and/or numbers
- **integer**: A whole number – can be positive or negative
- **boolean**: true or false value
- **object**: Key-value pairs in JSON format
- **array**: A list of values

Request Body (Data Formats)

Form Data

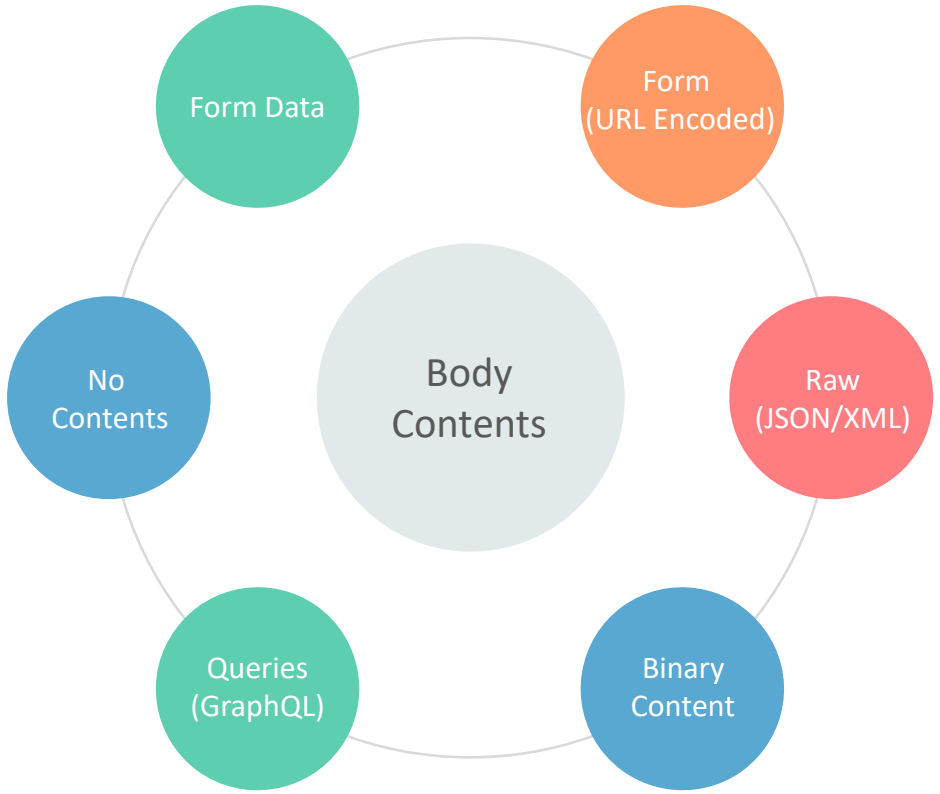
In Key-value format (Text / File) including multi-part

None

No data passed in body

Queries & Variables

This is specially for the GraphQL Scenarios



Form (URL Encoded)

Data is encoded in key-value format

Raw Data

This can be JSON/ XML or TXT

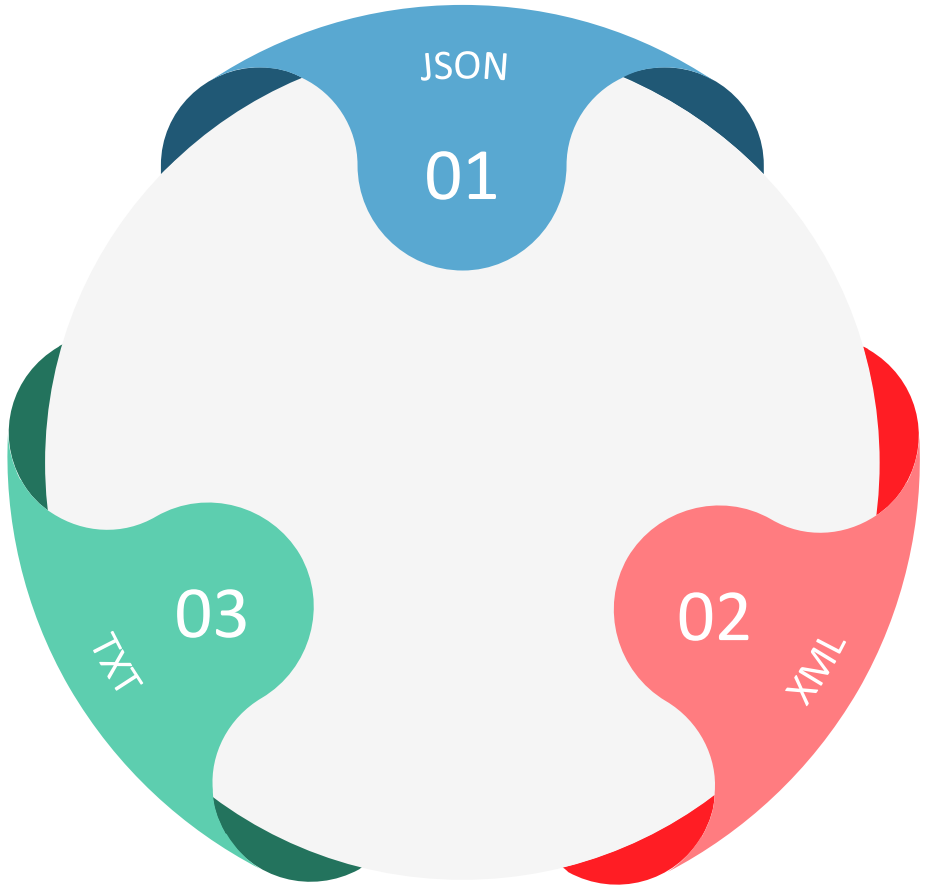
Binary

The files or executables that can be attached

Body (Contents)

The body can have different formats like below:

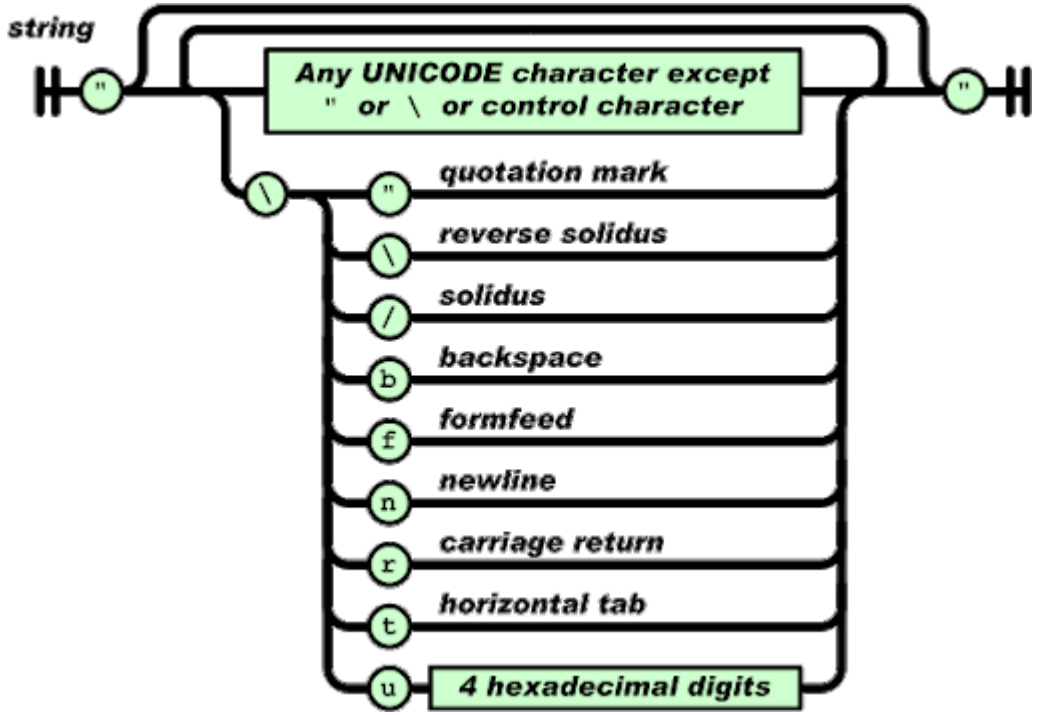
- JSON - JavaScript Object Notation
- XML - Extensible Markup Language
- TXT – Plain text format



Testleaf
Always Ahead

JSON – A quick run through

- JavaScript Object Notation
- Lightweight
- Easy to understand
- Not specific to languages



JSON Structure

Simple JSON format

```
{
  “name”: "Babu",
  “age”: 45,
  “city”: "Chennai"
}
```

Simple JSON Array

```
{
  “name”: "Babu",
  “age”: 45,
  “companies”: ["Syntel", "HCL", "HP", "TL"]
}
```

JSON Nested Arrays

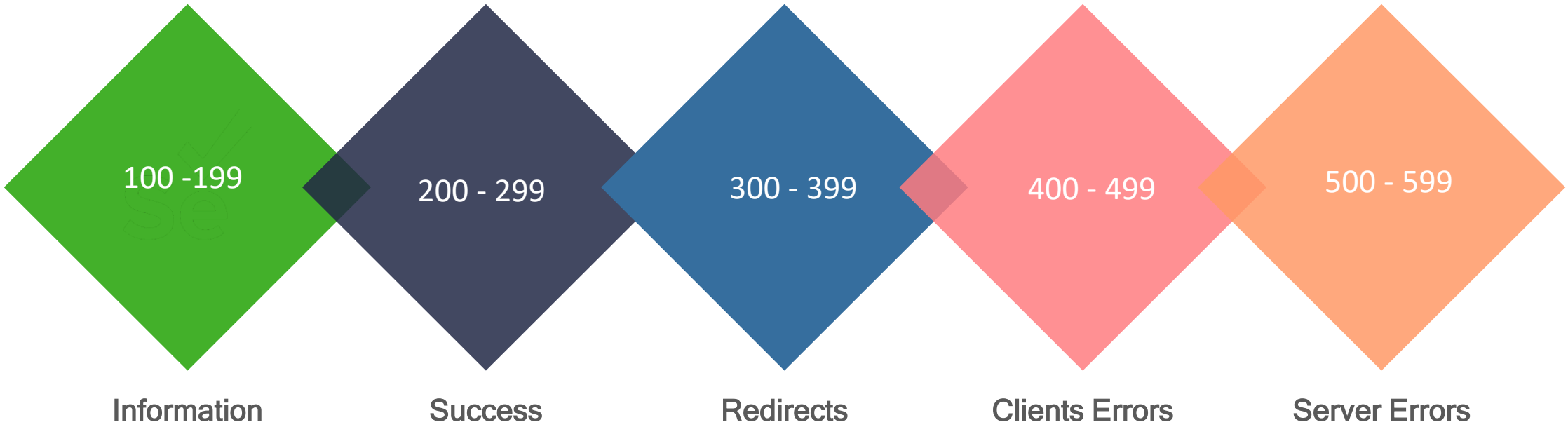
```
{
  "name":"Babu",
  "age":45,
  "companies":[
    {"name" : "syntel", "years" : "3.1", "customers" : 4, "country" : ["india", "usa"]},
    {"name" : "hcl", "years" : "1", "customers" : 1, "country" : ["india"]},
    {"name" : "hp", "years" : "13.2", "customers" : 18, "country" : ["india",
"usa","uk","sg"]},
    {"name" : "tl", "years" : "4.3", "customers" : 8, "country" : ["india", "usa"]}
   ]
}
```

XML Structure

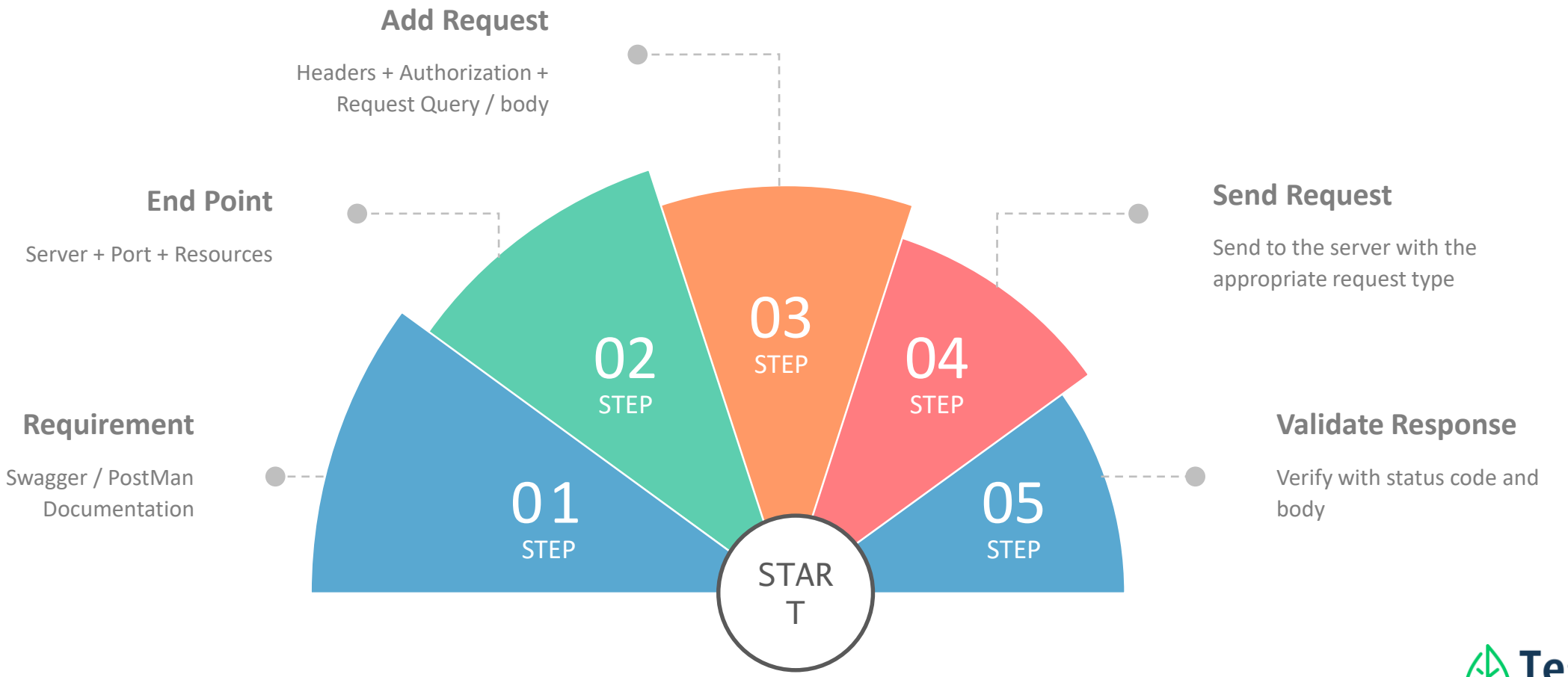
Simple XML

```
<?xml version="1.0" encoding="UTF-8"?>
<details>
    <person>
        <name>Babu</name>
        <age>45</age>
        <city>chennai</city>
     </person>
</details>
```

Status Codes



5 Step Process



Testleaf
Always Ahead

Thank You!