Week-1

Backend Engineering Launchpad

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Airtribe

Backend Development
Node JS
Rest API and Express

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Agenda

- What is API and introduction to Rest API
- REST API and HTTP verbs
- Express Framework
- Live coding
- Question and answers

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“An API is a precise specification of the programming instruction and standards to access a web based software or web tool...

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What is an API?

- Acronym for Application program interface
- Acts as a bridge between the programmer and application
- Takes specific requests predefined when created
- Verifies the request and processes the data
- Performs the processing and returns the response to the user

What is REST

- REST stands for representational state transfer
- REST is not a framework but an architectural principle
- REST uses http which is oriented around verbs and resources (GET, POST, PUT, DELETE)

What is REST (continued…)

- Verbs are then applied to resources
- Request consists of headers, body and methods
- Response consists of headers, status code and body
- Data represented via XML/JSON/HTML

Key Principles of REST

- Stateless
- Client Server Architecture
- Uniform Interfaces
- Resource Oriented

API architectural styles

	REST	SOAP	RPC	GraphQL
Organized in terms of	compliance with six architectural constraints	enveloped message structure	local procedure calling	schema & type system
Format	XML, JSON, HTML, plain text,	XML only	JSON, XML, Protobuf, Thrift, FlatBuffers	JSON
Learning curve	Easy	Difficult	Easy	Medium
Community	Large	Small	Large	Growing
Use cases	Public APIs simple resource-driven apps	Payment gateways, identity management CRM solutions financial & telecommunication services, legacy system support	Command and action-oriented APIs; internal high performance communication in massive micro-services systems	Mobile APIs, complex systems, micro-services

Credit: Altexsoft

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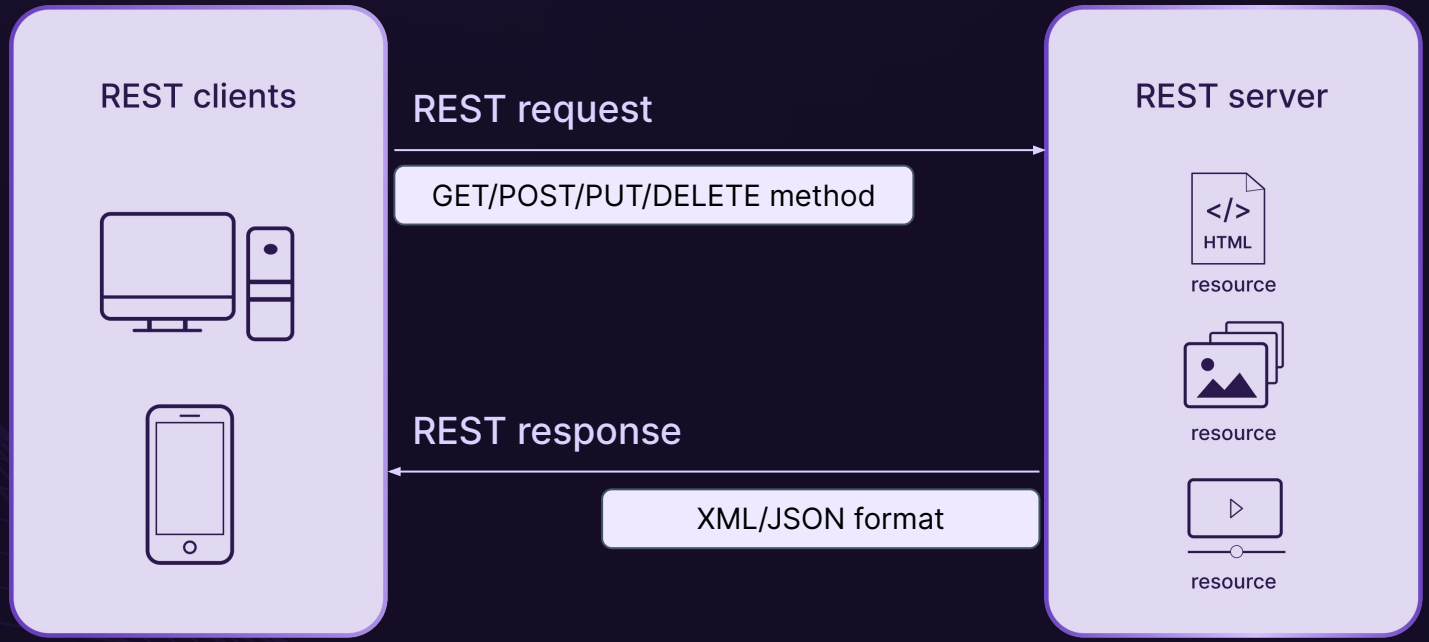
Rest API architecture

REST API IN ACTION



Credit: Altexsoft

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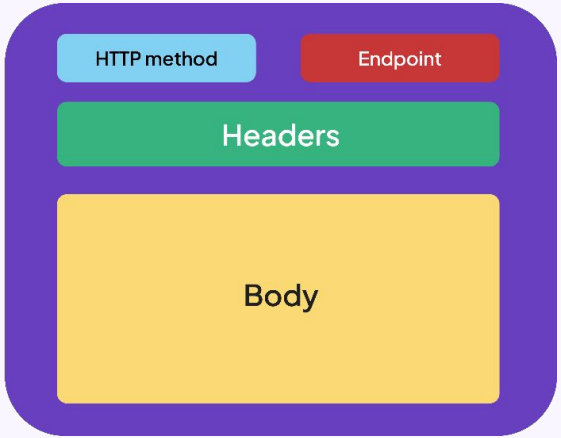
REST API request example

```
POST /api/2.2/sites/9a8b7c6d-54f-3a2b-1c0d-98f7a6b5c4d/users HTTP/1.1
HOST: my-server
X-Tableau-Auth: 12ab34cd56ef78ab90cd12ef34ab56cd
Content-Type: application/json

{
"user": {
 "name": "NewUser1",
 "siteRole": "Publisher"
  }
}
```



Credit: Altexsoft

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REST API response example

```
HTTP/1.1 200 OK (285ms)
Date: Fri, 21 Apr 2017 10:27:20 GMT
Server: Apache/2.4.6 (CentOS) OpenSSL/1.0.1e-fips PHP/7.0.16
X-Powered-By: PHP/7.0.16
Content-Length: 109
Keep-Alive: timeout=5, max=100
Connection: Keep-Alive
Content-Type: application/json; charset=UTF-8
```

{"status":"success","message":"City List","data":[{"city_name":"Visakhapatnam"},{"city_name":"Vijayawada"}]}

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HTTP response example

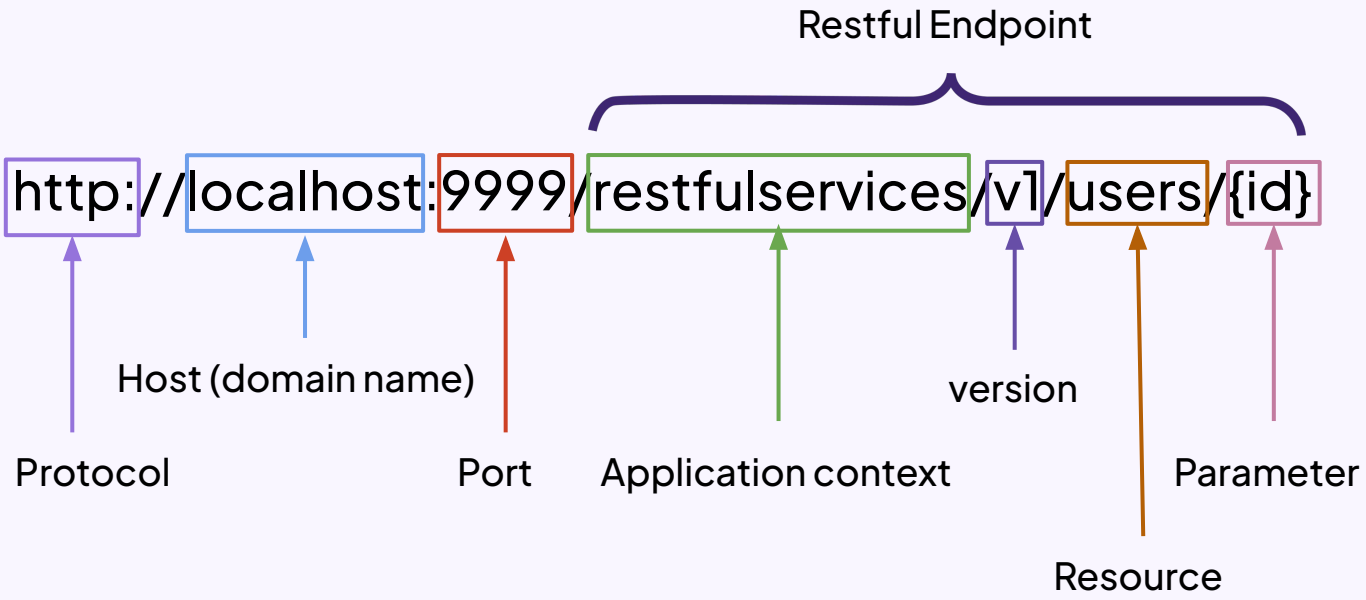
HTTP Status Codes

Level 200 (Success)
OK
Created
203 : Non-Authoritative Information
204 : No Content

Level 400
400: Bad Request
401: Unauthorized
403: Forbidden
404: Not Found
409: Conflict

Level 500
500: Internal Servor Error
503: Service Unavailable
501: Not Implemented
504: Gateway Timeout
599: Network timeout
502: Bad Gateway

Restful endpoint structure



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What is express js

- Express JS is a framework for creating a web server with rest API endpoints
- Lets understand node + express using Live code examples ?

Lets create a course rating application

Authentication, Authorization and Security

Build a REST API express web server named airtribe course rating app, which would be responsible for taking in a rating from a student for a given course and when asked about the rating for a given launchpad, aggregates the ratings given by the previous students and shows it to the airtribe student. This application would help students, how the other students felt about the course they are taking.

Lets create a course rating application

You need to create a web server using express and it should be able to support the following functions

- GET - /courses → gets the list of the courses and their details
- GET - /courses/1234 → gets the details of the course named 1234
- GET - /courses/1234/avg-ratings → gets the average ratings of all the students for the course 1234
- POST - /courses → Creates the launchpad with the provided details
- POST - /courses/1234/ratings → Adds the rating to the provided course 1234
- PUT - /courses/1234 → Modifies the information of the course with the provided details

Use postman and terminal to hit the following localhost endpoints, and get information about the airtribe launchpads !

Lets create a course rating application

Make the following assumptions while building the airtribe launchpad rating application

- Assume that information being passed only gets retained in the memory until the server is running. Once the web server is killed all of the data vanishes.
- Assume that once the server starts, all the students hit the localhost url to provide the rating running on your machine.
- Assume the initial list of course when the server starts to be *Node Js*
- All of the information can be retrieved and queried until the web server is running, once the server is killed airtribe launchpad starts again from the start with no student rating.

Lets create a course rating application

Outcomes:

- Understanding express web server
- Understanding versioning of third party packages (express js) in this case
- Understanding rest API and the http verbs (get, post, put)
- Understanding basic routing in node js

Thank you

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