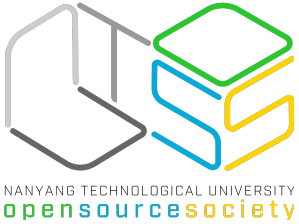
Public Version 1.0



Introduction to **API Development**

Jay Gupta, Computer Science Year 4
NTUOSS TGIFHacks #131

February 11, 2022
AY2021-22 Semester 2

Agenda

- Introduction
- API Examples
- Types
- Web API Protocols
- REST & RESTful
- Programming Exercise
- Request Methods
- Parameters
- Status Codes
- Remarks

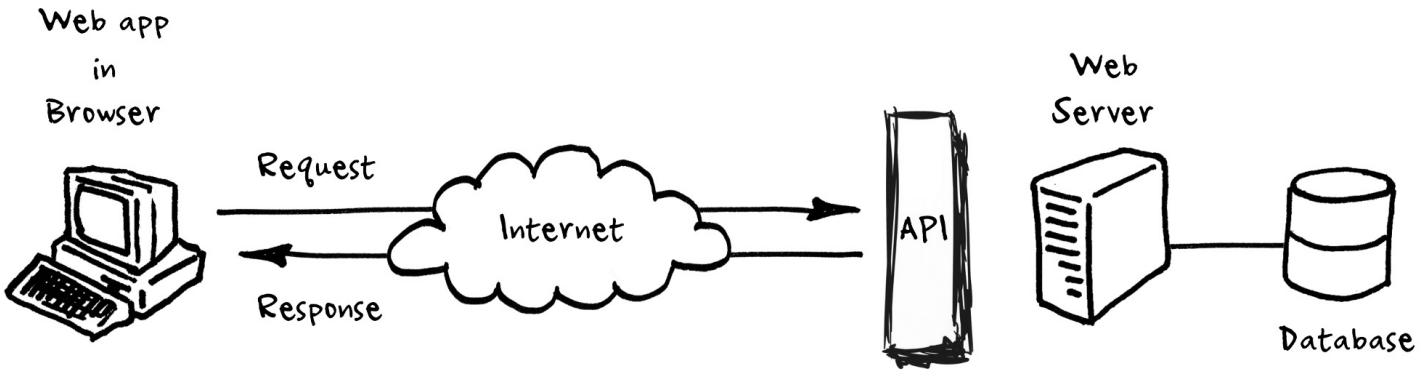
Questions & Queries

Go to
pigeonhole.at

Enter passcode

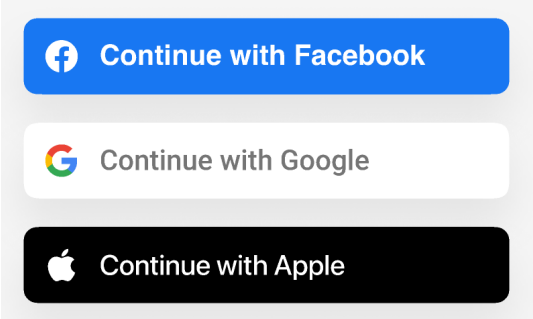
NTUOSSAPI

Application Programming **Interface**

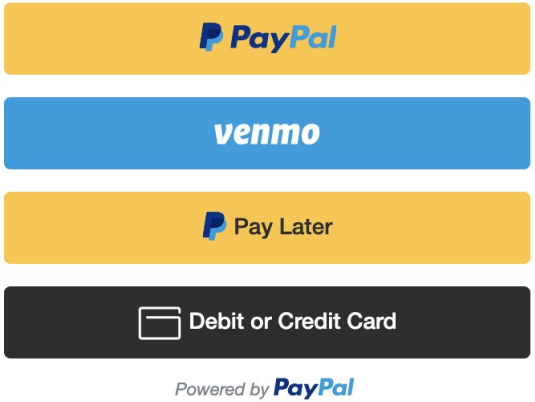


Source: https://www.smashingmagazine.com/2019/01/api-based-platforms-product-managers/

API Examples



Universal Logins



Third-party Payment Processing

Types of APIs

Framework APIs

Interface to a software library

Example

Operating System APIs

Interface between an application and the OS

Example

Remote APIs

Interface between resources through a communication network

Example

Web APIs

Interface for the Web

Example

Web API Protocols

XML-RPC

Protocol built with XML, data transfer through HTTP

SOAP

Protocol built with XML, data transfer through SMTP and HTTP

JSON-RPC

Protocol built with JSON, data transfer through HTTP, sockets, etc.

No longer actively used

Ethereum Virtual Machine

Web API Protocols

RESTful

Protocol built with JSON, HTML, XLT, Python, PHP, or plain text, data transfer through HTTP

Global Standard

GraphQL

Protocol built with custom query format called Schema Definition Language (SDL) for request, JSON for response, data transfer through HTTP

New & Upcoming

REST & **REST**ful?
Representational **S**tate **T**ransfer

Client-Server Model over HTTP

Stateless Communication

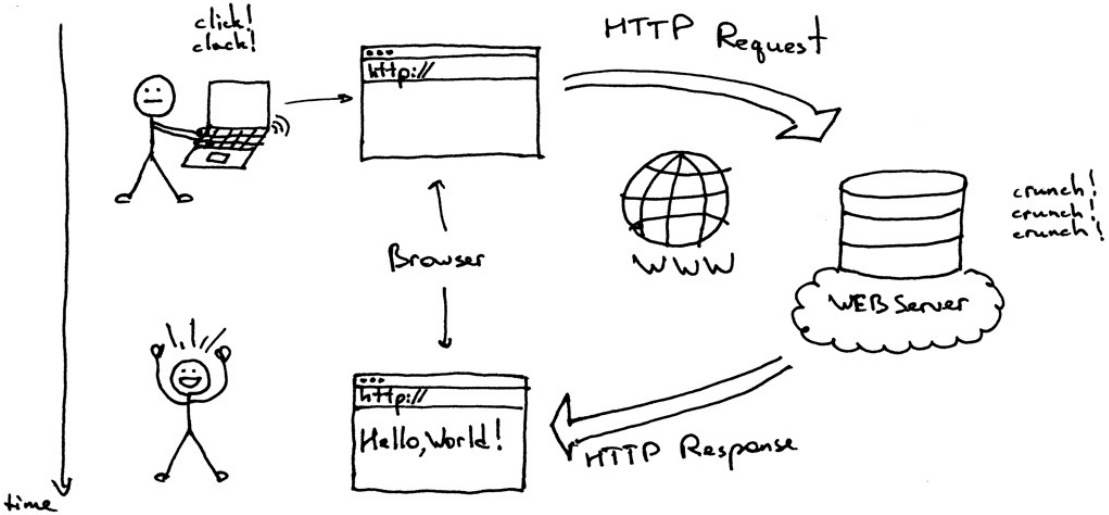
Cacheable Data

Uniform Interface

Layered System

Code-on-Demand (Optional)

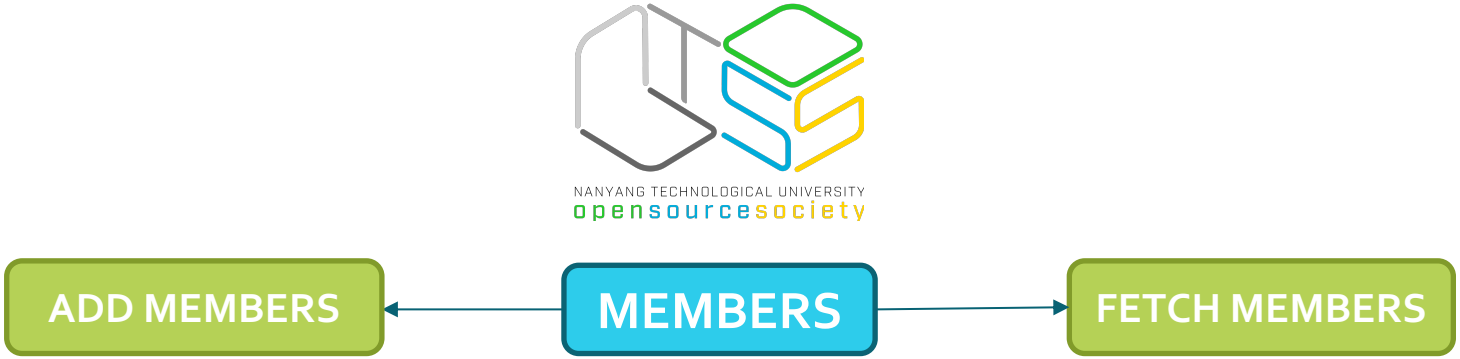
Client – Server Architecture



Source: https://hackernoon.com/http-made-easy-understanding-the-web-client-server-communication-yz783vg3

Version 1.0

Programming Exercise – NTUOSS API



Student

Name
School
Graduation Year

NTUOSS Website/Mobile App

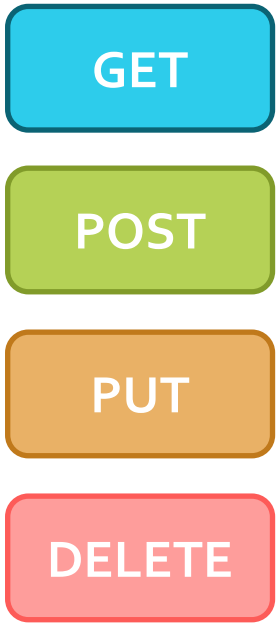
Register new users and display the list of members

Version 1.0

Programming Exercise

github.com/guptajay/NTUOSS-API-Development-Workshop

HTTP **Request** Methods



Request for a Resource

Submit a Resource

Edit a Resource

Delete a Resource

HEAD

TRACE

PATCH

CONNECT

OPTIONS

More Detail: https://developer.mozilla.org/en-US/docs/Web/HTTP/Methods

Path vs Query Parameters

GET

api.ntuoss.com

/members/{id}

Identify a Resource

Path vs Query Parameters

GET

api.ntuoss.com

/members?school=scse

Filter/Sort Resources

Version 1.0

HTTP **Response** Status Codes

200
OK

400
Bad Request

401
Unauthorized

403
Forbidden

404
Not Found

500
Server Error

502
Bad Gateway

More Detail: https://developer.mozilla.org/en-US/docs/Web/HTTP/Status

Remarks

- APIs form the backbone of most applications since they are useful in decoupling the front-end and back-end components and serve as a connection between them.
- They are essentially messengers that take requests from one entity, process it, and return the response for the request.
- The requester does not need to know any details about how the request is processed and returned.
- If you are keen to know more about APIs, I highly recommend learning **Spring Boot** (JAVA/Kotlin) for enterprise software development, or **Flask/FastAPI** (Python) for ML-based application use-cases.

Part 2 of this Workshop

Security (Authentication/Encryption)

API Specifications & Standards (e.g., OData)

CORS

Deployment

CI/CD Pipelines & Testing

. . .

Next Friday

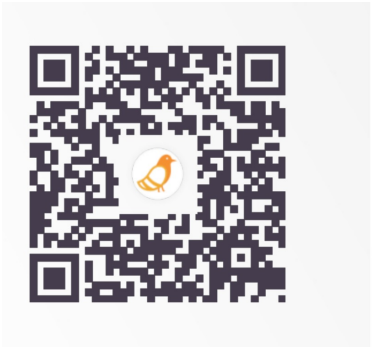
18 Feb.

1830 – 2030 hrs

Beyond this Workshop

- RESTful API Fundamentals & Usage
- RESTful API Development –
  - Kotlin – Spring Boot
  - JAVA – Spring Boot
  - Python – FastAPI
  - Python – Flask
- GraphQL API Development

Thank you. **Questions?**



Go to
pigeonhole.at

Enter passcode

NTUOSSAPI

References*

- https://realpython.com/fastapi-python-web-apis/
- https://codingnomads.co/blog/python-fastapi-tutorial
- https://github.com/craigsdennis/intro-to-apis-course/blob/master/course-notes.md
- https://en.wikipedia.org/wiki/API
- https://developer.mozilla.org/en-US/docs/Web
- https://www.redhat.com/en/topics/api/what-is-a-rest-api
- https://graphql.org/
- https://www.ibm.com/cloud/learn/api

* This is not an exhaustive list of references used for this workshop.