

# Introduction to **API** **Development** – Part 2

**Jay Gupta**, Computer Science Year 4  
NTUOSS TGIFHacks #132

**February 18, 2022**  
AY2021-22 Semester 2

# Agenda

Introduction

Programming Exercise

CORS (optional)

Web APIs & Protocols

Securing APIs

Remarks

Deployment

OAuth2.0

CI/CD Explained

Programming Exercise

# Questions & Queries

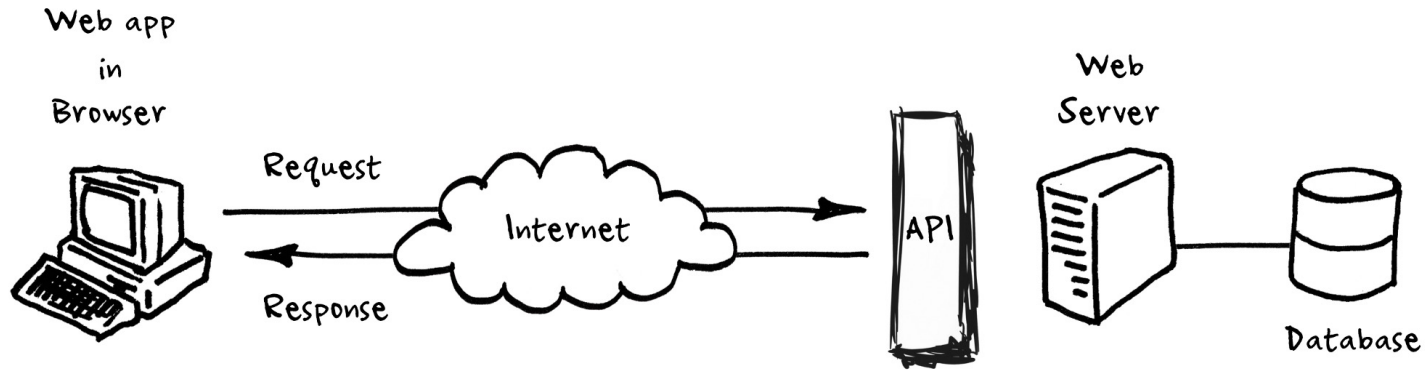


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**NTUOSSAPI**

# Application Programming Interface



# Web APIs & Protocols

Web APIs → RESTful

Interface for the  
Web

**Encoding:** JSON, HTML, Text, etc.  
**Transport:** HTTP

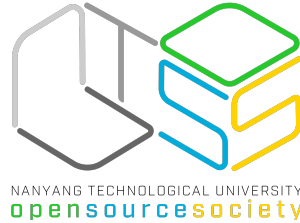


Global Standard

[Example](#)

Recap

# Programming Exercise – NTUOSS API



## Student

Name  
School  
Graduation Year

## NTUOSS Website/Mobile App

Register new users and display the list of members

Recap

# Deploying the API



# Deploying the API



 FastAPI

 python™

Cloud Application Platform

**api.ntuoss.com**



# Deploying the API



Cloud Application Platform

**api.ntuoss.com**

NTUOSS API

 **FastAPI**

 python™

 Google Cloud

**aws**  

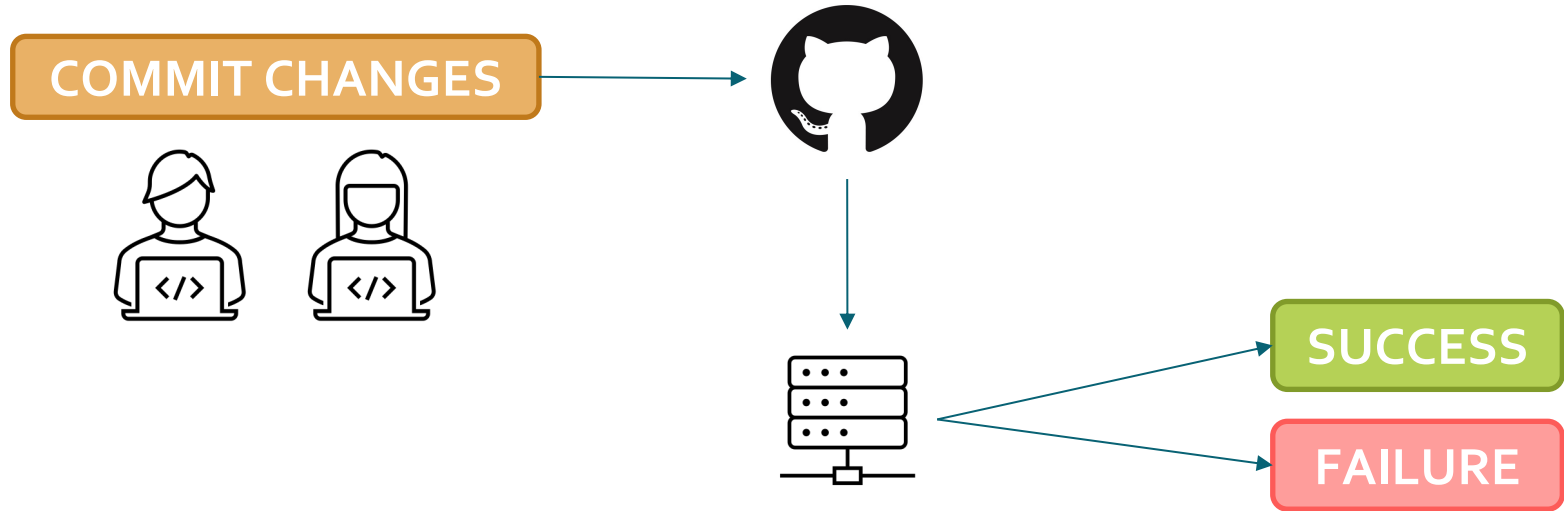

 Azure

 **HEROKU**

...

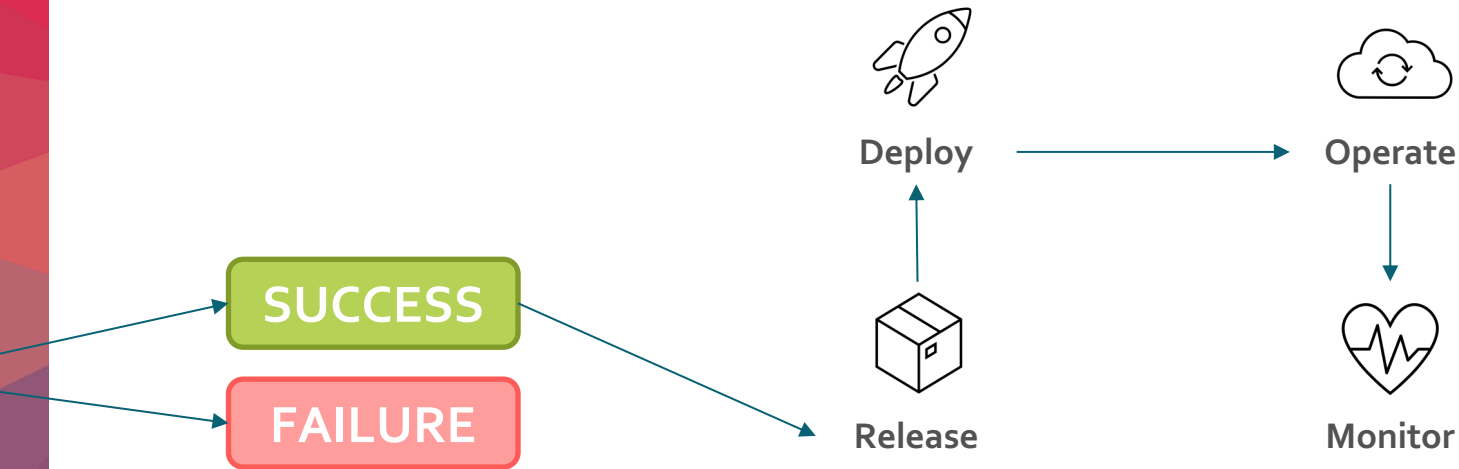
# CI/CD

## Continuous Integration / Continuous Deployment



# CI/CD

## Continuous Integration / Continuous Deployment



# CI/CD Tools



**Jenkins**



GitHub Actions

**TC TeamCity**

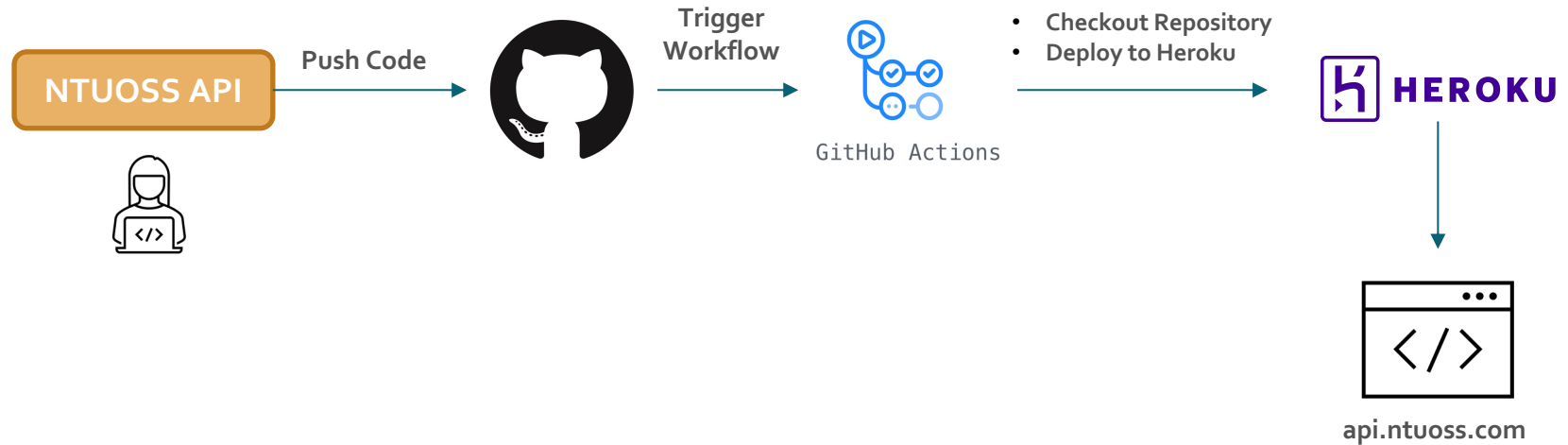
 **circleci**



**CI/CD**

...

# Integrating CI/CD



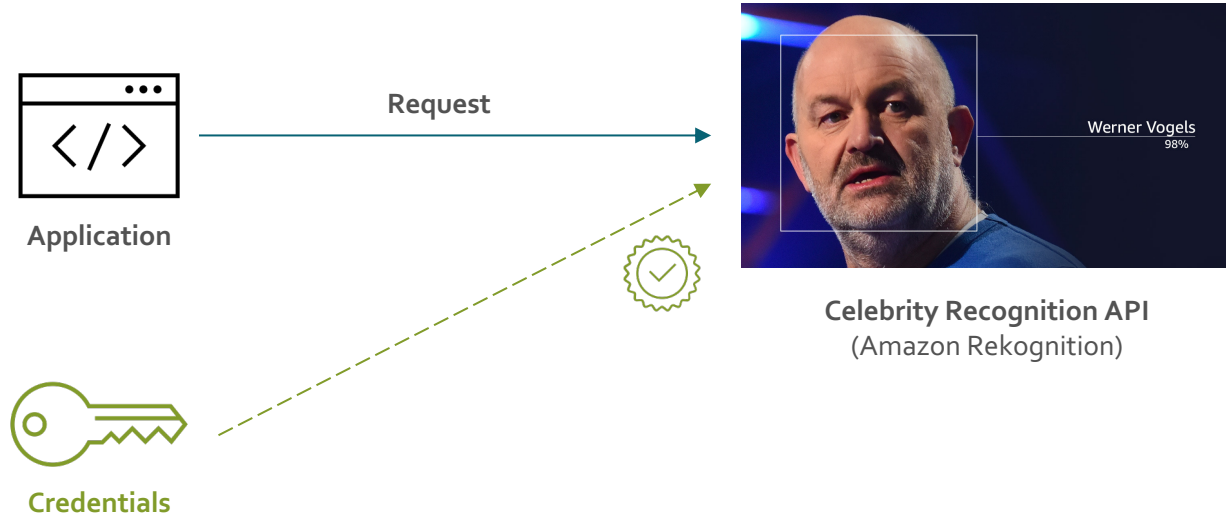
# Programming Exercise

# API Deployment

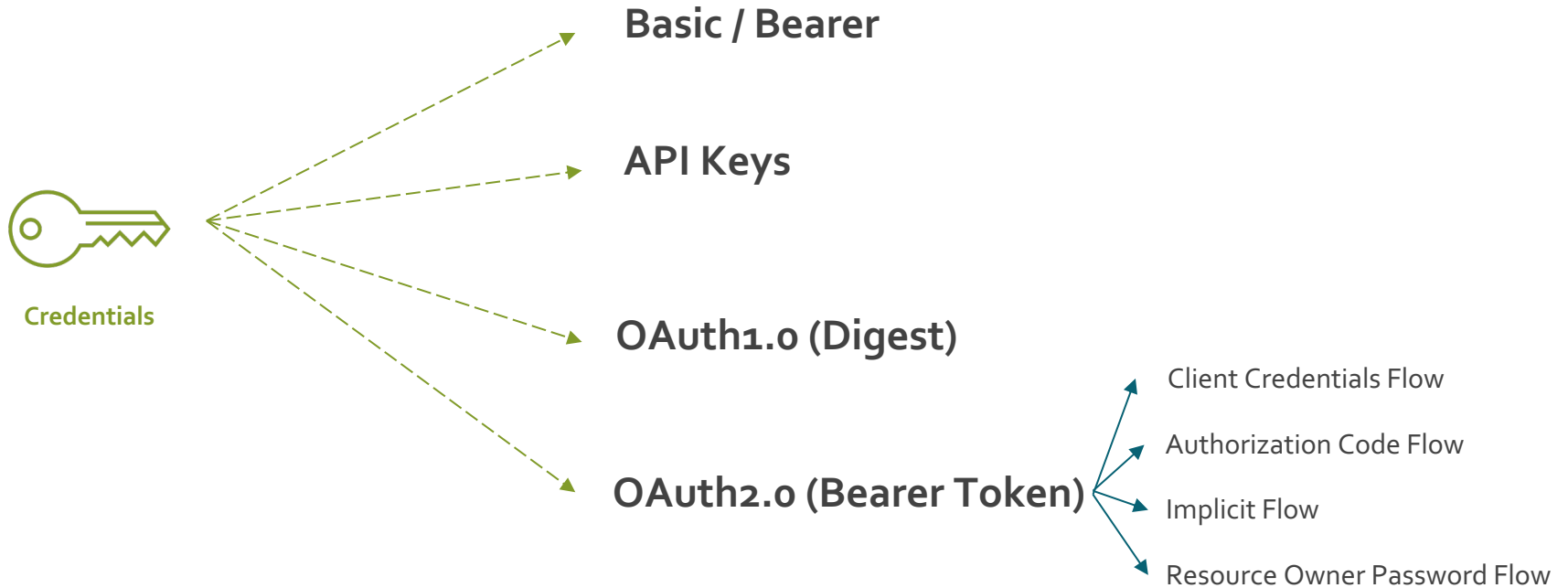
[github.com/guptajay/NTUOSS-API-Development-Workshop](https://github.com/guptajay/NTUOSS-API-Development-Workshop)



# Securing APIs: Example



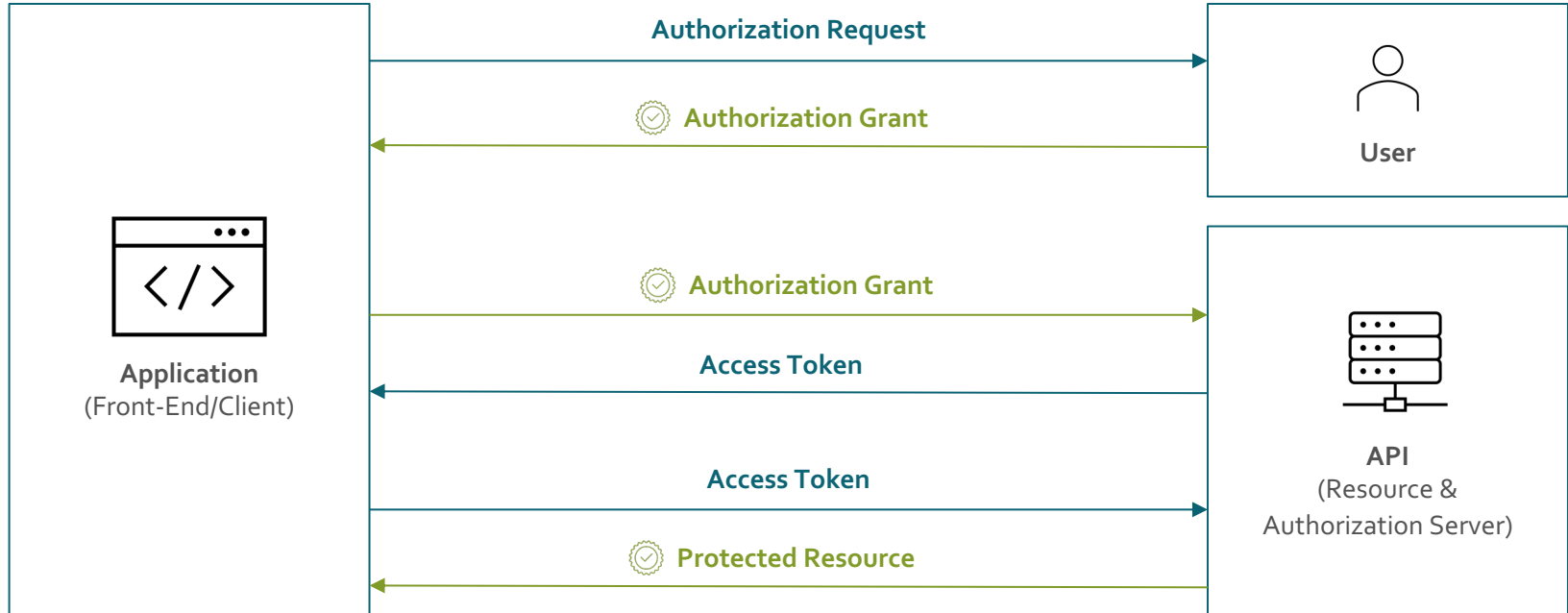
# Securing APIs: Methods\*



\* This is not an exhaustive list.



# Securing APIs: OAuth2 (simplified)



# Securing APIs: Tokens

**Token:** **Bearer** <my\_token\_value>

**JWT Token:** **Bearer** eyJhbGciOiJIUzI1Ni...

(Signed with a validity period)

# Programming Exercise

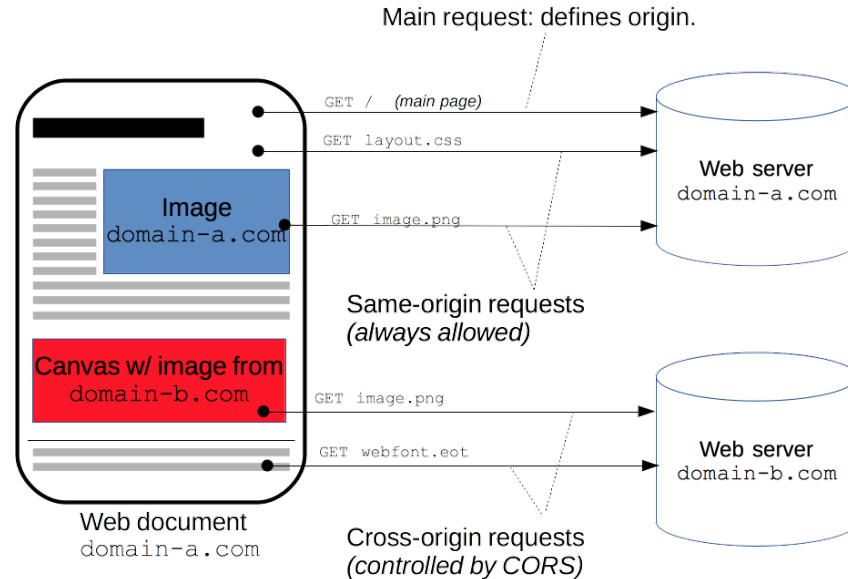
# Securing the API

[github.com/guptajay/NTUOSS-API-Development-Workshop](https://github.com/guptajay/NTUOSS-API-Development-Workshop)



# CORS

## Cross-Origin Resource Sharing



# 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.
- Development and consumption of APIs consist of a vast and mature eco-system in software engineering.
- Along with development of core functionalities: authentication, authorization, deployment, and maintaining specifications are crucial parts of building an API.
- 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.

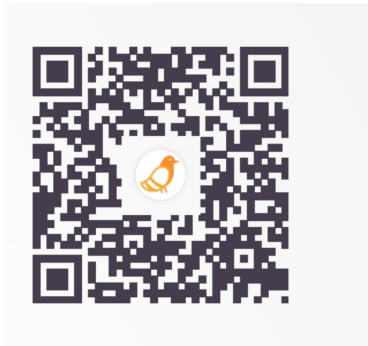
# Beyond this Workshop

- [RESTful API Fundamentals & Usage](#)
- RESTful API Development –
  - [Kotlin – Spring Boot](#)
  - [JAVA – Spring Boot](#)
  - [Python – FastAPI](#)
  - [Python – Flask](#)
- [GraphQL API Development](#)

# Beyond this Workshop

- [CI/CD](#)
- [OAuth2.0 & OpenID Connect](#)
- [Understanding JWT](#)
- [OData – Open Data Protocol](#)
- [OpenAPI](#)
- [Cross Origin Resource Sharing](#)

# Thank you. Questions?



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# References\*

- <https://fastapi.tiangolo.com/tutorial/security/>
- <https://jarmos.netlify.app/posts/using-github-actions-to-deploy-a-fastapi-project-to-heroku/>
- <https://youtu.be/scEDHsr3APg>
- <https://dzone.com/articles/four-most-used-rest-api-authentication-methods>
- <https://www.digitalocean.com/community/tutorials/an-introduction-to-oauth-2>
- <https://developer.mozilla.org/en-US/docs/Web/HTTP/CORS>
- <https://developer.okta.com/blog/2019/10/21/illustrated-guide-to-oauth-and-oidc>
- <https://en.wikipedia.org/wiki/API>
- <https://developer.mozilla.org/en-US/docs/Web>
- <https://www.ibm.com/cloud/learn/api>

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