Application Programming Interface

Pertemuan 9
MK Algoritma Pemrograman II

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Outline

- What is an API
- Why we need API
- API types
- Notable API Examples

What is an API?

- Software-to-software interface

- AKA Headless software

- Enables software to communicate with other software, in any programming language and platforms.

- Analogically similar to a Restaurant's server / waiter

Application/Customer   Waiter/API   Kitchen/Server
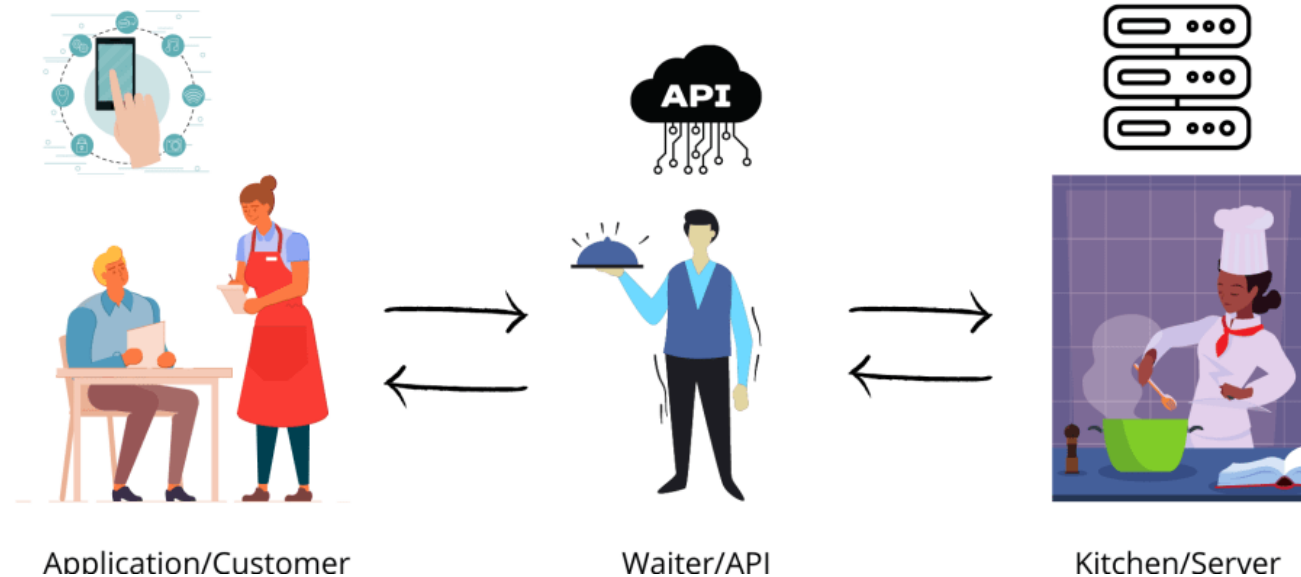
API Workflow
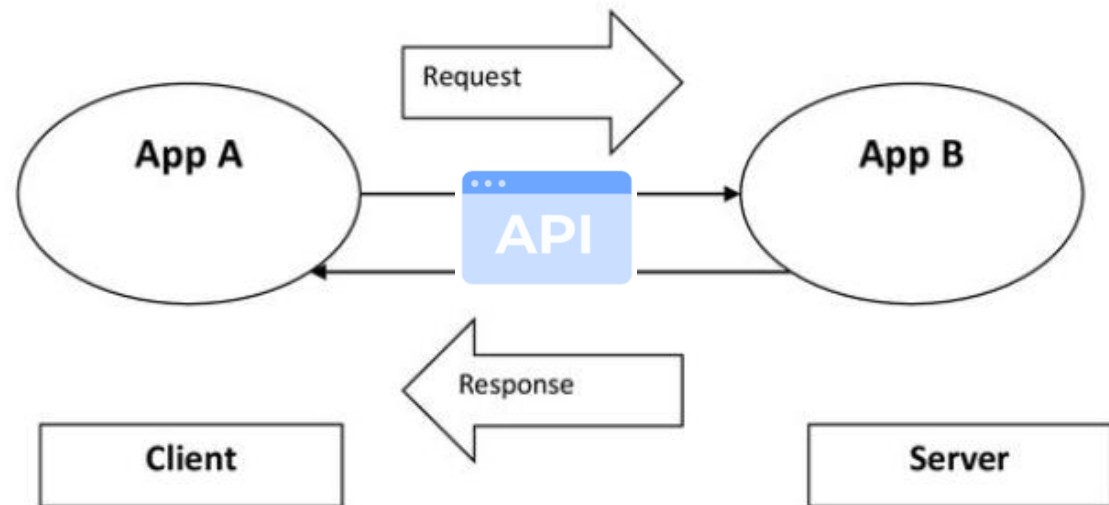
Types of API

- **Local API:** API which was built and stored locally. Usually part of an MVC / n-tiered architecture software.

- **Web API**: a.k.a. web service, a web accessible software/application which handles request through HTTP.

- Known web services types are **SOAP and RESTful API**.

- Web services enables communication between services in any platform and language using universal object (JSON and XML)

RESTful API (REpresentational State Transfer)

- Based on REST Technology, which leverage HTTP Request to communicate (HTTP GET, UPDATE, PUT, DELETE, etc.)

- More common in usage compared to SOAP, because of its versatility and lightweight (using JSON)

- With increasing usage of cloud computing, RESTful API become common and preferred by every developers.
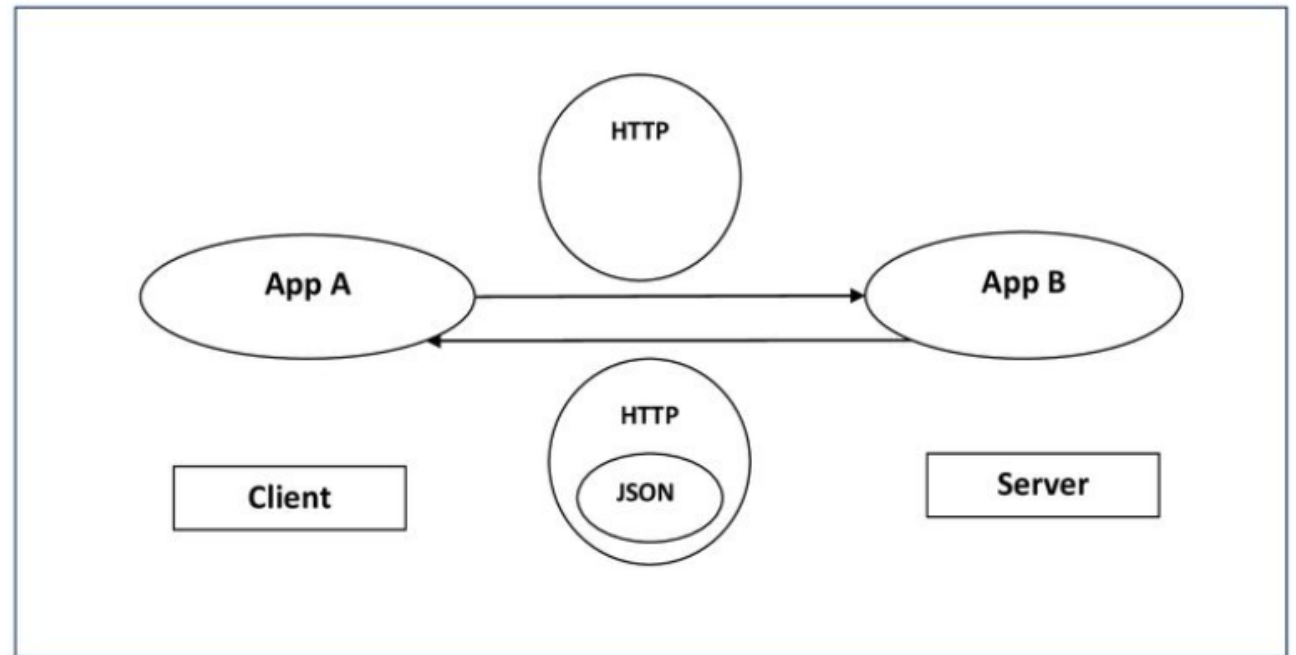
REST API Advantages

- **Simpler to implement** compared to SOAP (less procedural requirement)

- **Easy to integrate** with existing websites and services

- **Useful for integrating restricted-profile devices**, e.g. mobile device which doesn't require xml headers / envelopes / etc.

- **Stateless**

- **Usually written in server-side language** (PHP, Python, C++, JAVA)

RESTful API Concepts

- **Request and Response format**

    Format needed to be explicitly defined. Use content-type application/json and ensures the response to have that in the property to use JSON format. XML can also be chosen (less preferred).

- **HTTP Verbs/Methods**

    Define methods and routes using HTTP Verbs, GET to request data (can also include queries), POST to deliver payload (encrypted) and get response, PUT to update data, and DELETE to delete data. Only define what's needed and exclude everything useless.

RESTful API Concepts

- **HTTP Response Code**

  Leverage HTTP response code to make logical flow based on response, e.g. if HTTP 200 then do something, if 502 then repeat after 5secs.

- **URL Design**

  Place your API in specific place to ensure the url is readable and understandable.
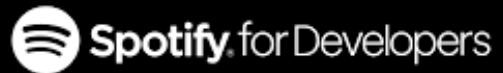
Web Service Requirements

- Needed to be accessible **via internet**

- Has specific routing for specific HTTP Request

- Endpoint security

- Anti-Spam (if applicable)

https://web.whatsapp.com/send?phone=+6285132439093&text ="contohpesantext"

Companies that thrive from APIs

- Google (e.g. Maps API charges extra (per requests) for integration)

- Salesforce

- GoTo (e.g. Gosend API charge Rp.5mil for each integration)

- Lintasarta

- Facebook

- Amazon (AWS Amazon Web Services)

Why APIs?

- Microservice oriented architecture

- Easy to manage

- Allows multi-user and multi-session

- Always accessible (Cloud based APIs)

- Example:
  - University website needs to track each of their lecturers' publication on SINTA.
  - How do universities track the data? Do they have to check it everyday and put in on ms. excel file?
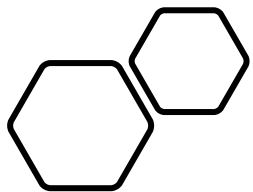
API Examples

- Halodoc x Gosend

- Spotify x Music Publishers (sony, universal, etc.)

- Grammarly

- Playstation Network

- Steam

- ??? (shout out your examples)

API Usage (Short Discussion)

- You created a marketplace, the daily sales amounted to 100,000 invoices with varying amounts of money transferred to the accounts.

- Your marketplace involved 10 Indonesian rupiah banks and accepts other currencies via visa/mastercard.

- Discuss and create a workflow for each transaction using API to simplify the process.

API Usage (Discussion)

- You started a company for booking flights, hotels, and other travel service

- How do you know each schedule of flights from and to all destinations available, book the specific flights, for specific seats, with all specific requirements?

- Discuss and propose a workflow for that use case, and other travel use cases as well. Give us your idea!