1604C054 – Hybrid Mobile Programming

Database Part 1: Viewing Data

WEEK 08

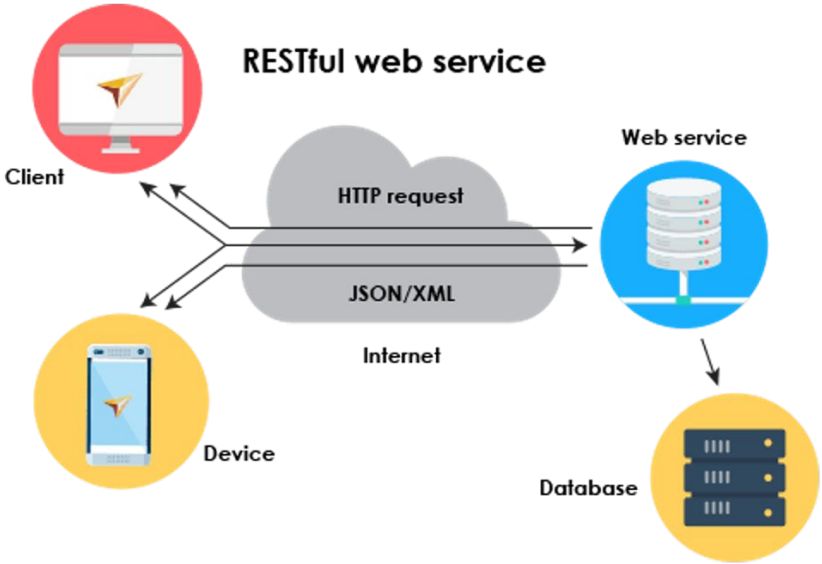
Informatics Engineering
Universitas Surabaya

Outline

1. Web Service
2. Consuming Web Service
3. Nested JSON

Web Service

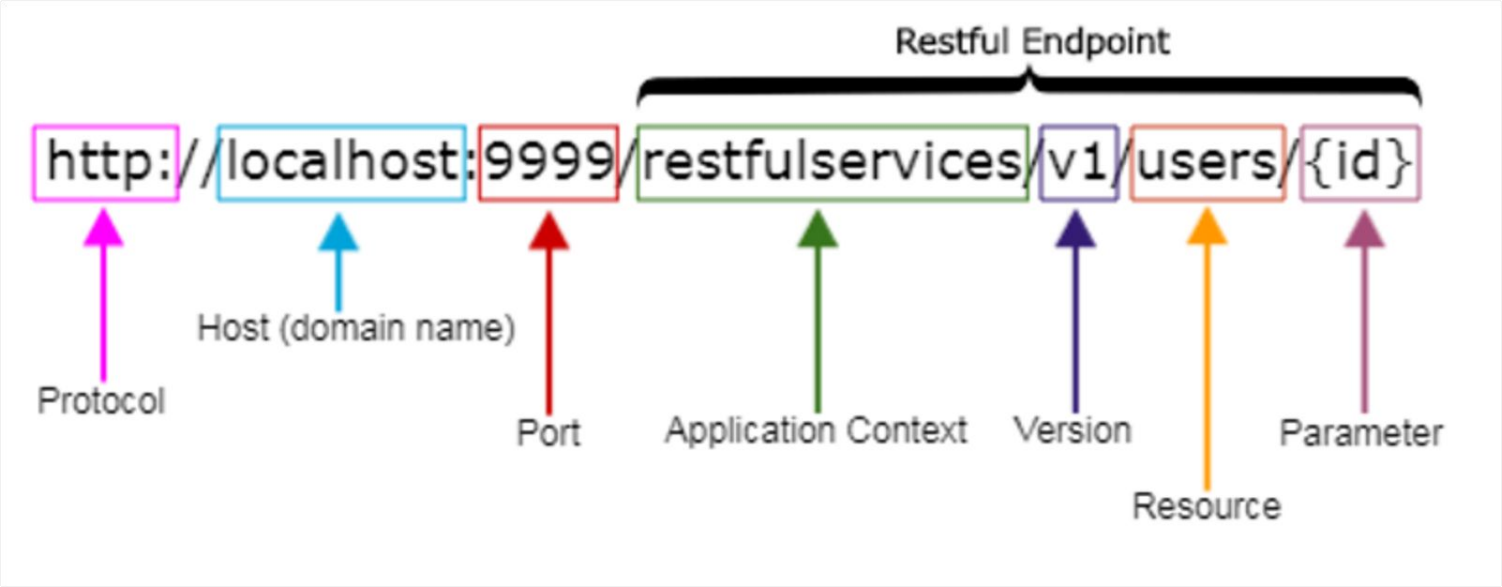
Restful API



What we learn before is creating an app which run on client.

Q: How to connect it with database ?
A: We use web service or API

Restful API (2)



Restful API have an address to call via GET/POST/PUT/DELETE with or without parameters

Where to put API ?

If we use browser in our computer/laptop while using our app, we can use web service in localhost, we can use existing xampp in our computer. We use address like 127.0.0.1/api or localhost/api.

If we use emulator (with cordova/ capacitor and android studio), we have to change the IP by 10.0.2.2

When we use a device, we have to connect our device and our computer in the same network (for example in the same wifi access) and we have to know the computer IP, and change the address to that IP.

A way to make it more comfortable, is by put the web service on the internet. If the web service address is an internet address, we not need to change our source code while run it in browser, device or in emulator.

Free Hosting !!

We provide a free hosting for Hybrid class and project. Each student have his/her own space and internet address to put API and mysql database to put the application data.

Each student have a space in **ubaya.xyz** domain. Source code can be uploaded using SCP/SSH application for example winscp or filezilla with host ubaya **103.166.157.122**

port **22** and username = hybrid_[NRP] , **ex**=hybrid_160921011 password = ubaya

Your physical directory is : /var/www/html/hybrid/[NRP] **ex**: /var/www/html/hybrid/160921011 If you create, for example, products.php in this directory, you can access it in browser with : https://ubaya.xyz/hybrid/[NRP]/products.php **ex**: https://ubaya.xyz/hybrid/160921011/products.php

For the Database, every student have 1 database with name hybrid_[NRP], ex hybrid_160921011, user **can not** create any new database, just can create tables inside the provided one.

For manage the database you can access: **http://ubaya.xyz/phpmyadmin** username = hybrid_[NRP], ex= hybrid_ 160921011 password = ubaya. Therefore when your php want to connect to your database, it should use this syntax

```
$con = new mysqli("localhost", "hybrid_ 160921011","ubaya","hybrid_ 160921011");
```

Preparing Database

Create table pastas with structure and records like in our previous angular service, or running the sql below.

```
CREATE TABLE `pastas` (
  `id` int NOT NULL,
  `name` varchar(50) NOT NULL,
  `url` varchar(200) NOT NULL,
  `description` varchar(500) NOT NULL,
  `price` int NOT NULL
) ;
INSERT INTO `pastas` (`id`, `name`, `url`, `description`, `price`) VALUES
(1, 'SALMON AGLIO OLIO', 'https://shiokmanrecipes.com/wp-content/uploads/2021/03/Shiokman-Recipes-2-1.png', 'Pasta Spaghetti, Cabai, Paprika Hijau, Bawang Putih dengan Salmon Panggang', 52000),
(2, 'CLASSIC FETTUCCINE', 'https://iambaker.net/wp-content/uploads/2015/04/alfredo-2-800x879.jpg', 'Pasta Fettuccine, Daging Ayam Asap, Saus Creamy dengan Chicken Strip dibalur Cream Cheese Mayo dan Beef Bits', 35000),
(3, 'CHEESE LAVA', 'https://i.pinimg.com/736x/ef/7a/05/ef7a05077502aacd9747d3c971d7bdf9.jpg', 'Pasta Fusilli, Pepperoni Sapi, Saus Keju Cheddar, Beef Bits dengan Saus Cheese Fondue', 38000),
(4, 'CREAMY TRUFFLE', 'https://www.createwithnestle.ph/sites/default/files/srh_recipes/04cac32dfe4fd75e56928b74df71544c.png', 'Pasta Penne, Sosis Beef Chorizo,Bayam, Saus Alfredo, dan Truffle Oil', 42000),
(5, 'SALMON MENTAIKO', 'https://media-cdn.tripadvisor.com/media/photo-s/14/25/1b/0b/salmon-ikura-mentaiko.jpg', 'Pasta Spaghetti, Ikan Salmon Fillet, Saus Mayo Mentai, dan Nori.', 56000);
```

Preparing Web Service

Create php for read the pasta table and show it in JSON format . example we use pastas.php

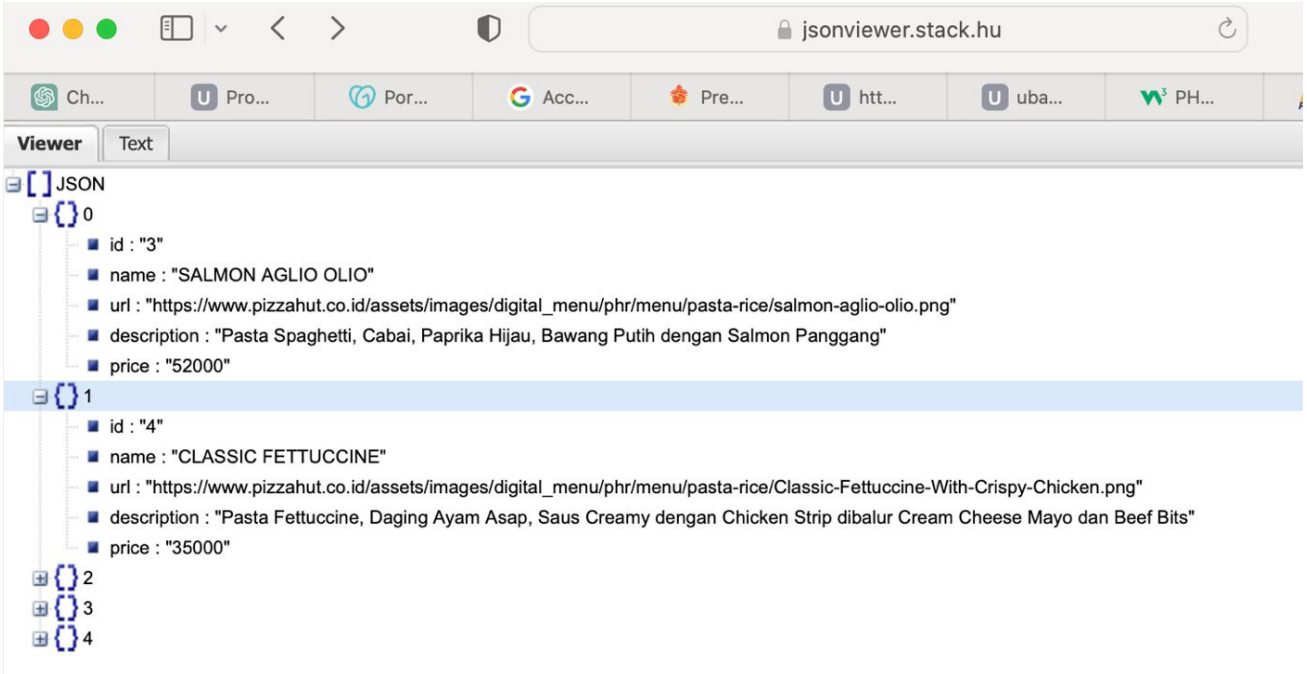
```
<?php
 header("Access-Control-Allow-Origin: *");
header("Access-Control-Allow-Headers: *");
$servername = "localhost";
$username = "hybrid_daniel";
$password = "ubaya";
$dbname = "hybrid_daniel";

$conn = new mysqli($servername, $username, $password, $dbname);
if ($conn->connect_error) {
  die("Connection failed: " . $conn->connect_error);
}
$sql = "SELECT * FROM pastas";
$result = $conn->query($sql);
$data = array();
if ($result->num_rows > 0) {
    while ($row = $result->fetch_assoc()) {
        $data[] = $row;
    }
}
echo json_encode($data);
$conn->close();
?>
```

Checking The Web Service

Open your API URL in browser. It should shows the JSON of pastas.

Some JSON may hard to read. We can use JSON viewer to make it easier to read.



Consuming Web Service

Observables

Observables are a powerful concept for managing and handling asynchronous operations in a more structured and declarative way.

- **Asynchronous Data Streams**: Observables are designed to handle asynchronous data streams. An asynchronous data stream is a sequence of data or events that can arrive over time. These events can come from various sources, such as user interactions, HTTP requests, timers, or other asynchronous operations.
- **Event Handling**: Observables allow you to respond to events as they occur, rather than blocking and waiting for them to complete. This is particularly useful in scenarios where you need to deal with events that may not have a predictable arrival time or order.
- **Non-blocking**: Observables are non-blocking, meaning that when you subscribe to an Observable, your code can continue executing other tasks. You don't need to wait for the Observable to complete, as you might with synchronous code or with callbacks.
- **Subscription**: When you subscribe to an Observable, you provide callback functions (often referred to as observers) that specify how to handle the data emitted by the Observable. These callbacks typically include a next callback to handle data emissions, an error callback for handling errors, and a complete callback to signal the end of the data stream.
- **Cancellation**: You can unsubscribe from an Observable when you're no longer interested in its data or when you want to release resources associated with it. This allows you to manage resources and prevent memory leaks.

RxJS and HttpClient

RxJS, which stands for "Reactive Extensions for JavaScript," is a popular library for reactive programming in JavaScript. It's used to work with asynchronous data streams and provides a set of tools and operators for managing and manipulating those data streams. RxJS is widely used in Angular applications, including Ionic-Angular, as well as in other JavaScript applications.

```
import { Observable } from 'rxjs';
```

HttpClient module in Angular is a powerful and convenient tool for making HTTP requests to web services and APIs. It simplifies the process of working with HTTP requests, providing a higher-level, more ergonomic API for handling asynchronous communication

```
import { HttpClient } from '@angular/common/http';
---
constructor(private http: HttpClient) { }
```

In app.module.ts add import **IMPORTANT !!!**

```
import { HttpClientModule } from '@angular/common/http';
```

in imports property in directives @NgModule add:

```
imports: [HttpClientModule,BrowserModule,....],
```

Exercise 1

We will connect to web service and get web service output in our existing service. the foodservice. The goal is to replace pastas array with data from pastas table in our database.

Open foodservice.service.ts , add :

```
import { HttpClient } from '@angular/common/http';
import { Observable } from 'rxjs';
------
constructor(private http: HttpClient) { }

pastaList():Observable<any> {
 return this.http.get("https://ubaya.xyz/hybrid/daniel/pastas.php");
}
```

adjust this section to your respective addresses

Exercise 1 (2)

In pasta.page.ts

```
ngOnInit() {
  //this.pastas=this.foodservice.pastas

   this.foodservice.pastaList().subscribe(
    (data)=> {
        this.pastas=data;
      }
   );
}
```

Pasta page should run normally and shows pasta data from database. Try to edit some value in the database, and check whether your pasta data follows the changed or not.

Nested JSON

Adding Recipe Instruction

Next, we will show pasta detail and its recipe instructions.
There is new table for this recipe instructions.

Run SQL below:

```
CREATE TABLE `pasta_instruction` (
  `pasta_id` int NOT NULL,
  `step` int NOT NULL,
  `instruction` varchar(2000) NOT NULL
)
```

- pasta_id is a foreign key from pastas table
- step is step number of the instruction

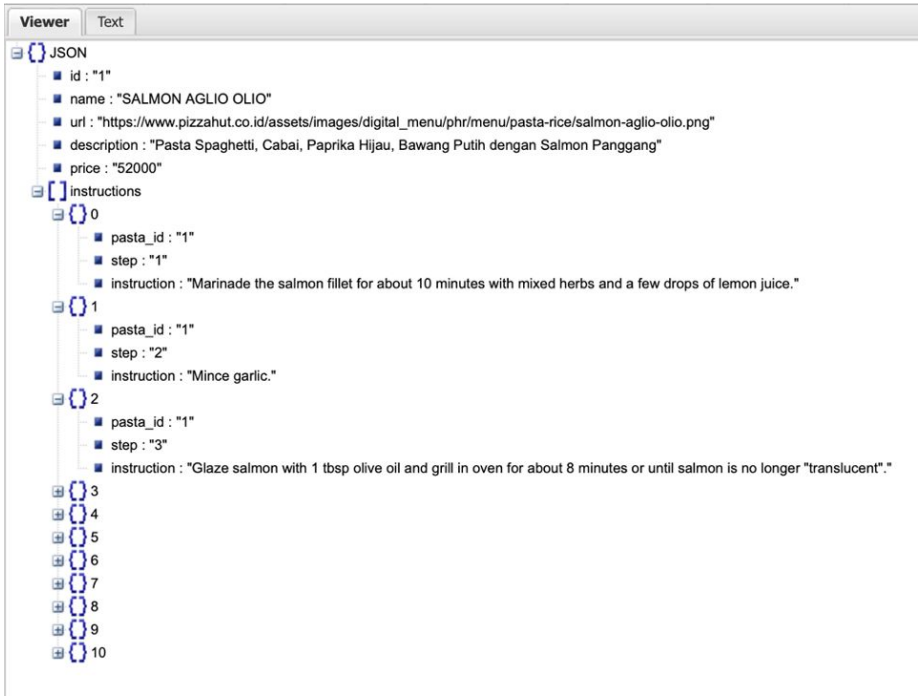
Adding Recipe Instruction (2)

```
INSERT INTO `pasta_instruction` (`pasta_id`, `step`, `instruction`) VALUES
(1, 1, 'Marinade the salmon fillet for about 10 minutes with mixed herbs and a few drops of lemon juice.'),
(1, 2, 'Mince garlic.'),
(1, 3, 'Glaze salmon with 1 tbsp olive oil and grill in oven for about 8 minutes or until salmon is no longer \"translucent\".'),
(1, 4, 'Cook angel hair pasta in a pot of boiling water for about 2 minutes (until al dente).'),
(1, 5, 'While pasta is cooking, heat the rest of the olive oil over a medium flame and add garlic and chilli flakes.'),
(1, 6, 'When garlic becomes fragrant, turn off the fire.'),
(1, 7, 'Drain pasta and mix it into the olive oil mixture.'),
(1, 8, 'Sprinkle salt and mix.'),
(1, 9, 'Pour pasta onto plates and top with grilled salmon.'),
(1, 10, 'Smear butter on top of salmon and let it melt.'),
(1, 11, 'Garnish with whole chillis and serve.'),
(2, 1, 'Cook Noodles in salted water according to package directions, approx 10-15 minutes.'),
(2, 2, 'Drain well and place in a container (chafing dish or skillet) large enough to allow enough room to toss slippery noodles without accident.'),
(2, 3, 'Place over low heat or sterno.'),
(2, 4, 'Add butter in several hunks to the noodles and stir gently until it melts and coats them well.'),
(2, 5, 'Add the cream and stir in a generous amount of black pepper.'),
(2, 6, '(Use a peppermill here if you have one).'),
(2, 7, 'Add the cheese, saving a small amount for later use on top of portions (Cheese is sometimes grated into the dish, but I like to have mine ready).'),
(2, 8, 'Stir as mixture thickens and clings to noodles.'),
(2, 9, 'Serve immediately.'),
(2, 10, 'Pass the remaining cheese.'),
(3, 1, 'Preheat oven to 350 degrees.'),
(3, 2, 'In a pan cook butter, salt, pepper and flour and stir until smooth.'),
(3, 3, 'Remove from heat add milk, return to heat and bring to a boil.'),
(3, 4, 'Boil 1 minute.'),
(3, 5, 'Remove from heat and add cheese, stir until melted.'),
(3, 6, 'Pour over elbows, sprinkle with breadcrumbs and bake at 350 degrees for 30 minutes.'),
(4, 1, 'Preheat the oven to 350°.'),
(4, 2, 'Spread the hazelnuts in a pie plate and bake for about 12 minutes, or until the nuts are fragrant and the skins blister. Let cool, then transfer the nuts to a kitchen towel and rub to remove the skins.'),
(4, 3, 'Transfer the nuts to a food processor and pulse until finely ground. Transfer the nuts to a bowl and wipe out the food processor.'),
(4, 4, 'In the food processor, combine the ricotta, goat cheese, mustard and truffle oil and process until smooth and creamy, scraping down the sides of the bowl.'),
(4, 5, 'Transfer the dip to a serving bowl and stir in the hazelnuts.'),
(4, 6, 'Season with salt and white pepper, add a little more truffle oil, if needed, and serve.'),
(5, 1, 'In a large bowl, mix the tobiko, mayonnaise and cream gently until well combined. Set aside.'),
(5, 2, 'Boil a pot of water and cook the pasta according to the instructions on the packet. Drain and run it under cold water to make sure they don't stick together. Set is aside.'),
(5, 3, 'In a heavy based pan or pot, add the butter and allow it to melt completely before adding the chopped onions and garlic. Fry till fragrant, with caution not to burn it or it will taste bitter.'),
(5, 4, 'Add the salmon marinara and mix it well to make sure it is coated with the buttery onion and garlic mixture. Add the fish stock and allow it simmer for 15 minutes or until the salmon is completely cooked through'),
(5, 5, 'Use a strainer to take the salmon out and place them in the creamy tobiko mixture, reserving the liquid in the pot.  '),
(5, 6, 'To serve, place some pasta and salmon on a plate, and add some mentaiko sauce. Top the pasta with a soft boil egg and sprinkle with some shredded nori. Cut through the egg and allow the egg yolk to flavour and thicken the sauce. ENJOY!');
```

Prepare The Web Service

Create pasta_detail.php

```
....
$id=$_GET['id'];
$sql = "SELECT * FROM pastas where id=$id";
$result = $conn->query($sql);
$data = $result->fetch_assoc();
$sql = "SELECT * FROM pasta_instruction where
pasta_id=$id";
$result = $conn->query($sql);
$instructions = array();
if ($result->num_rows > 0) {
    while ($row = $result->fetch_assoc()) {
        $instructions[] = $row;
    }
}
$data['instructions']=$instructions;
echo json_encode($data);
$conn->close();
?>
```



Update Link

Update link which previously using index, now using pasta.id

```
<ion-item routerLink="/pastadetail/{{pasta.id}}">
```

Update and Use Service

Add new function in service.ts

```
pastaDetail(id:number):Observable<any> {
  return this.http.get("https://ubaya.xyz/hybrid/daniel/pasta_detail.php?id="+id);
}
```

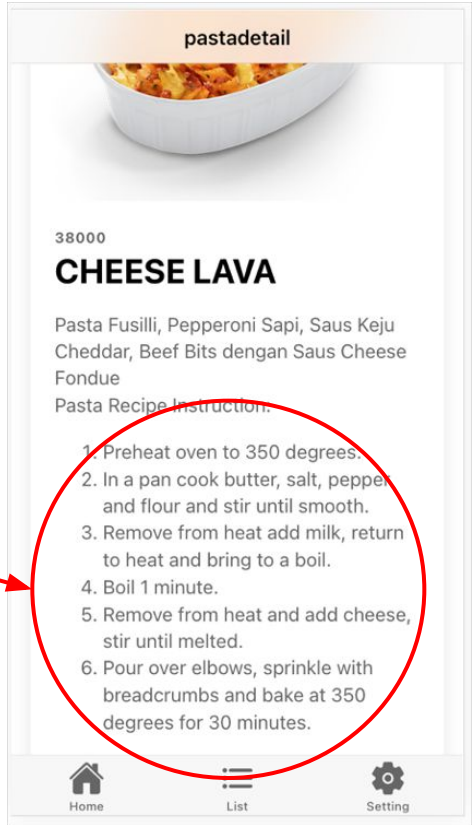
Use in pastadetail page. In .ts :

```
pasta:any = {}
ngOnInit() {
  this.route.params.subscribe(params => {
     //this.index = params['index'];
     this.foodservice.pastaDetail(params['index']).subscribe(
      (data)=> {
       this.pasta=data;
      }
     );
   });
}
```

Update and Use Service

Update .html

```
<ion-label>Pasta Recipe Instruction:</ion-label>
<ol >
  <li *ngFor="let ins of pasta.instructions">
    {{ins.instruction}}
  </li>
</ol>
```



Exercise 3

Can you add searchbox in pasta page? When users input text into it, the list of pastas displayed should only include those whose names contain the entered word.

For example if user type 'salmon' , the pasta list just displaying salmon aglio olio and salmon mentaiko.

Thanks.

Any Question ?