DevFest

Kuala Lumpur

End to End Development with Dart using Serverpod

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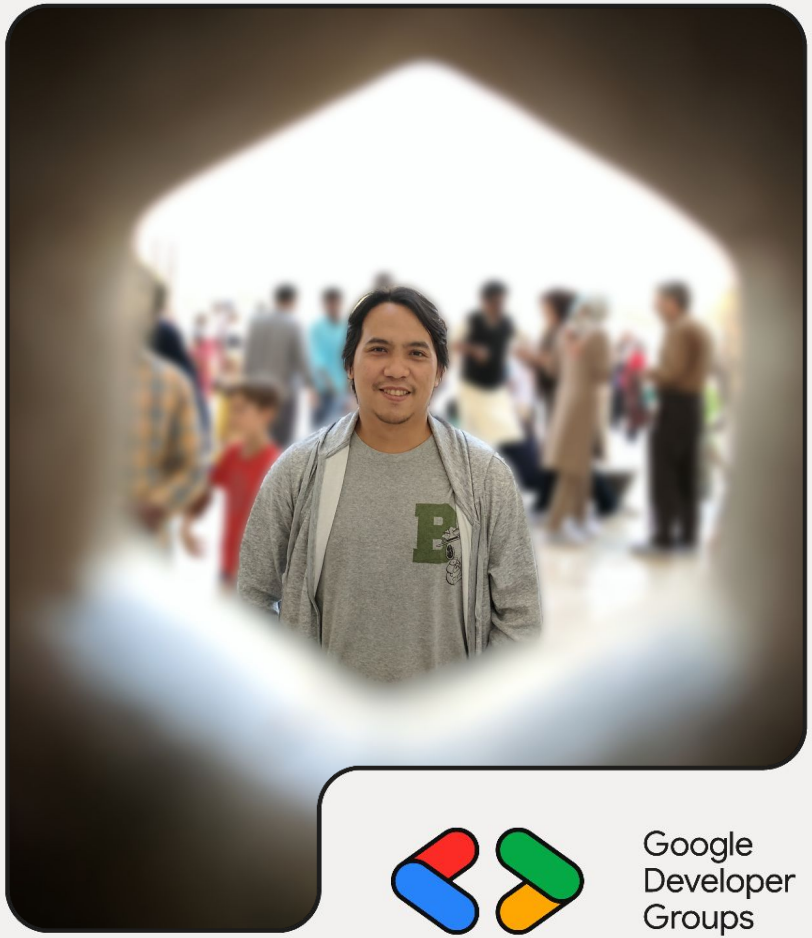

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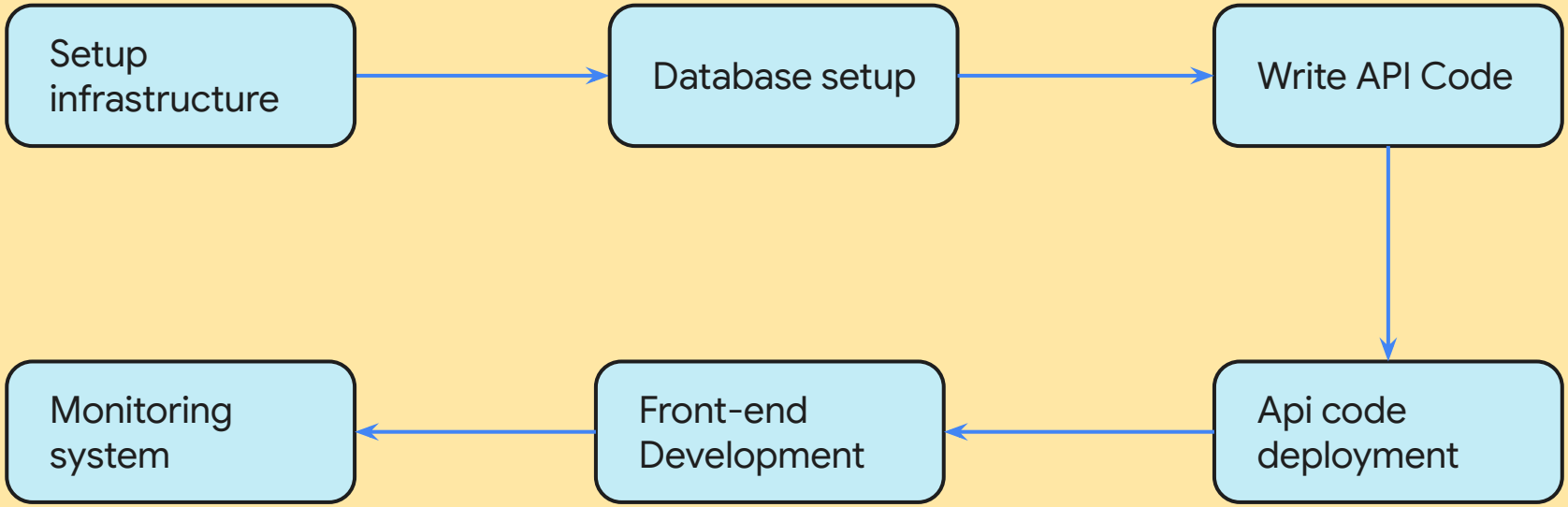
Development Process



Backend planning

1. API Design
2. Server Setup
3. Database
4. Security
5. Scalability & Performance

Rest, GraphQL, SOAP, WS, gRPC...

Dedicated Server, Serverless, Cloud/SelfHosting, Deployment script...

In-Memory, Relational, No-SQL, DB Strategy, ...

User Authentication, Data Encryption, Role-Based Control

Caching, Logging, Error Handling, Monitoring Tools, Alert & Reporting

Relational Database

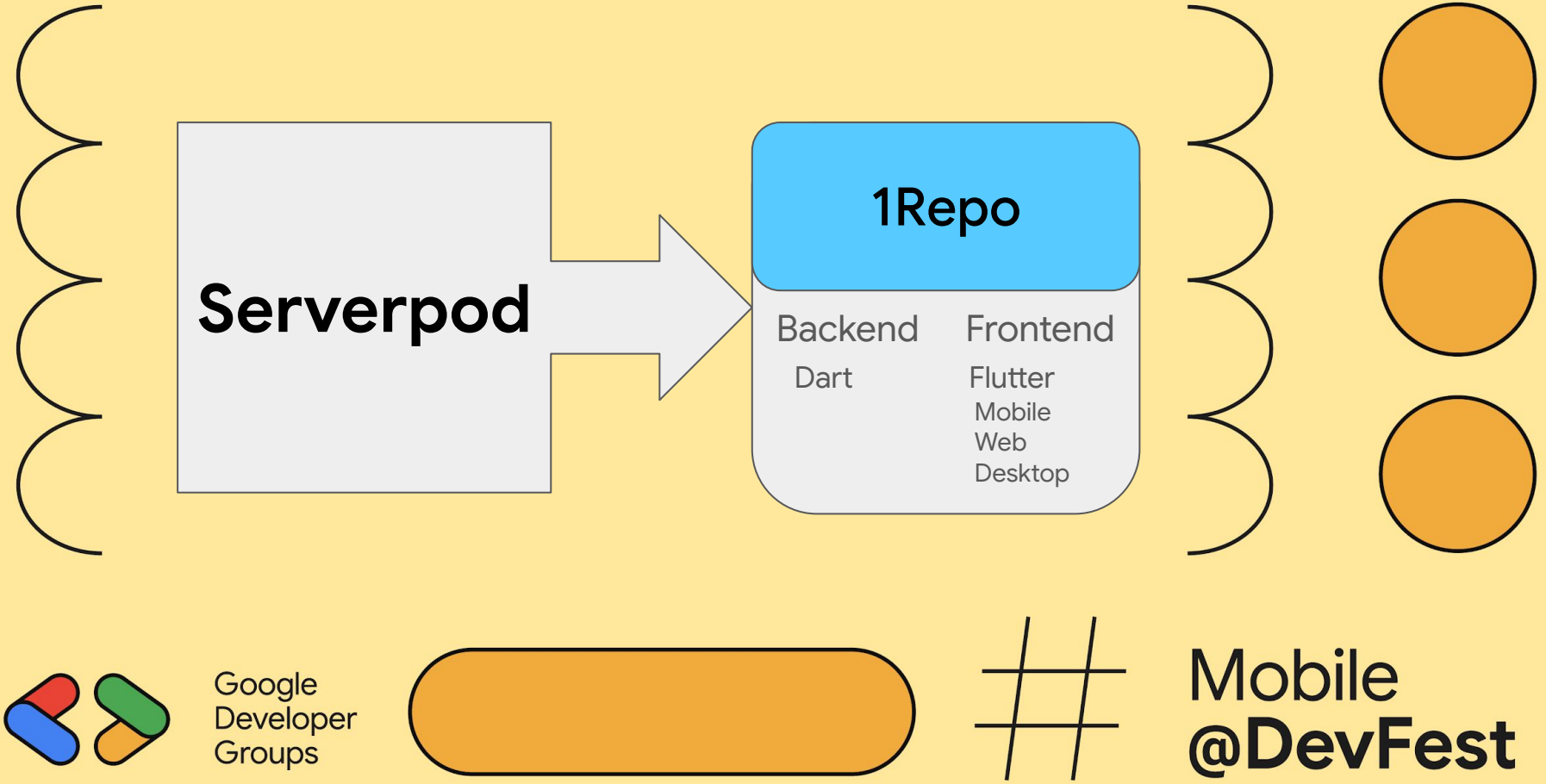
1. Define Tables
2. Table relation, constraint and index
3. Query Optimizer

Api Development

1. Db Connection
2. Data serialization
3. Endpoint and method
4. Logging

Frontend Development

1. Http Client API calls
2. Endpoint and method
3. Parsing & Data serialization
4. Error handling



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Why Dart + Serverpod

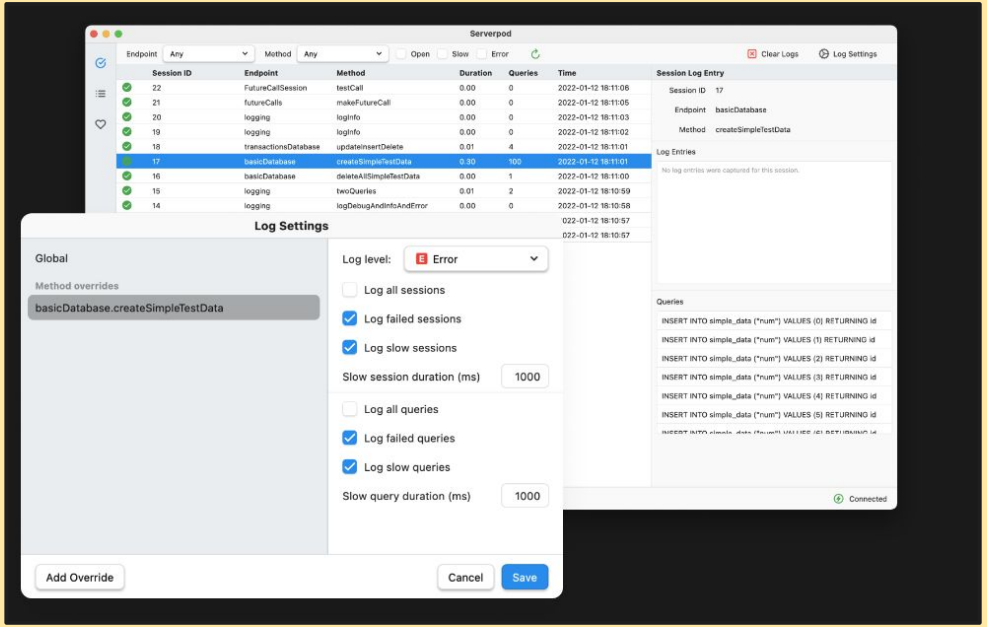
1. You are Flutter developer
2. Free & Open source
3. Accelerate Development time
4. Backend Setup for Dummies
5. Small development team

Serverpod Features

Built-in Caching	ORM	File Upload	Built-in Auth
Scheduling	Bundle Web Server	Data Streaming	Health Check
Logging by default	App Insights	Easy Deployment	Custom Module

Serverpod Insight

1. Check error log
2. Monitoring for slow query
3. Checking Server Health



Project Creation

1. Install Serverpod CLI
2. Creating project
3. Start server
4. Running flutter Apps

```
>>dart pub global activate serverpod_cli
```

```
>>serverpod create mypod
```

```
>>cd mypod/mypod_server
>>docker compose up --build --detach
>>dart bin/main.dart --apply-migrations
```

```
>>cd mypod/mypod_flutter
>>flutter run -d chrome
```

mypod_server

- Api Code
- Auth Module
- Cloud Storage
- Scheduler

mypod_client

- Generated Library for Flutter Project

mypod_flutter

- Flutter Code

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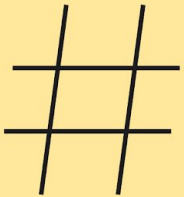

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Endpoint Creation

1. Place endpoint
2. Extend to Endpoint class
3. Return Future
4. Run “serverpod generate”

Servercode

```
import 'package:serverpod/serverpod.dart';

class ExampleEndpoint extends Endpoint {

  Future<String> hello(Session session, String name)
async {
    return 'Hello \$name';
  }
}
```

Flutter code

```
var result = await client.example.hello('World');
```

Data Serialization

1. Models are define in YAML files
2. Place model in models folder
3. Run “serverpod generate”

Data Serialization in YAML

```yaml
class: Company
fields:
  name: String
  foundedDate: DateTime?
  employees: List<Employee>
```

Servercode

```
var myCompany = Company(
  name: 'Serverpod',
  employees: [
    Employee(
      name: 'Viktor',
    ),
  ],
);
```

Flutter code

```
var myCompany = await client.example.getMyCompany();
print(myCompany.name);
```

Database Creation

1. Models are define in YAML files
2. Place model in models folder
3. Define model as table
4. Run “serverpod create-migration”
5. Run “dart run bin/main.dart --apply-migrations”

Data Serialization in YAML

```yaml
# company.yaml
class: Company
table: company
fields:
  name: String
  employees: List<Employee>?, relation

# employee.yaml
class: Employee
table: employee
fields:
  name: String
  address: Address?, relation

# address.yaml
class: Address
table: address
fields:
  addressId: int
  street: String
indexes:
  user_address_unique_idx:
    fields: addressId
    unique: true
```

Db Basic

1. Persisting data
2. Extend to Endpoint class
3. Return Future
4. Run
“serverpod generate”

Servercode

```
class ExampleEndpoint extends Endpoint {
 Future<void>addCompany(Session s,String name)async {
    var myCompany = Company(
      name: name,
    );
    var insertedCompany = await
      Company.db.insertRow(session, myCompany);
  }

 Future<Company?>findMyCompany(Session s,String name)async {
   var myCompany = await Company.db.findFirstRow(
      s,
     where: (t) => t.name.equals(name),
   );
   return myCompany;
}}
```

Flutter code

```
await client.example.addCompany(‘Serverpod');
```

```
var result = await
client.example.findMyCompany(‘Serverpod');
```

Caching

1. Define cache key
2. Retrieve object from cache
3. If null get data from The source
4. Put data in cache and Set the lifetime

Servercode

```
class ExampleEndpoint extends Endpoint {

Future<UserData> getUserData(Session s,int userId) async {
  var cacheKey = 'UserData-$userId';

  var userData = await
      session.caches.local.get<UserData>(cacheKey);

  if (userData == null) {
    userData = UserData.db.findById(session, userId);

    await session.caches.local.put(cacheKey, userData!,
     lifetime: Duration(minutes: 5)
    );
  }
  return userData;
}
}
```

Scheduling

1. Extend to FutureCall class
2. Define future call name
3. Register Future call name in server main run method
4. Call function anywhere with pass the future call name

Servercode

```
import 'package:serverpod/serverpod.dart';

class ExampleFutureCall extends FutureCall<MyModel> {
  @override
  Future<void> invoke(Session session, MyModel? object) async {
     //Do Something
  }
}

#server.dart
void run(List<String> args) async {
  final pod = Serverpod(
    args,
    Protocol(),
    Endpoints(),
  );

  ...

  pod.registerFutureCall(ExampleFutureCall(),'exampleFutureCall');

}

#Invoke
await session.serverpod.futureCallAtTime(
   'exampleFutureCall',
   data,
   DateTime(2025, 1, 1),
);
```

Log & Exception

1. Define exception in yaml

Data Serialization in YAML

```
#my_enum_spy.yaml
enum: MyErrorType
Values:
 - BadRequest
 - Unauthorize
 - InternalServerError
```

```
#exception_spy.yaml
exception: MyException
 fields:
   message: String
   errorType: MyErrorType
```

Servercode

```
Future<Company?>findMyCompany(Session s,String name)async {
  ...some processing…
  if (failure) {
      final e = MyException(message: 'Failed to do thingy',
        errorType: MyEnum.thingyError,);
      session.log('Some Message', exception: e);
     throw e;
  }
}
```

Flutter code

```
try {
  client.example.doThingy();
} on MyException catch(e) {
  print(e.message);
} catch(e) {
  print('Something else went wrong.');
}
```

Google Cloud Deployment

1. Deployment tools

2. Setups and Deployment

3. What is deployed

Terraform, Paid Google Cloud Platform, Registered custom domain with Terraform, Project on Github

Create New GCP Project
Create service Account
Enabling APIs
Setup and verify domain
Create Docker Artifact Registry
Deploy Docker Container
Configure Terraform on GCP
Configure Serverpod config
Deploy infrastructure using Terraform

api.examplepod.com: API server entry point
app.examplepod.com: Web server
insights.examplepod.com: Serverpod Insights access
database.examplepod.com: External database access
storage.examplepod.com: Public storage access

Thank You

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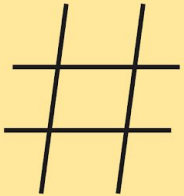

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