Un linguaggio per domarli tutti
Dart full-stack con Serverpod

Dart & Flutter dal client

al server in perfetta armonia

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14.06.2025

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Java Oracle Certified

Flutter Developer

Agenda

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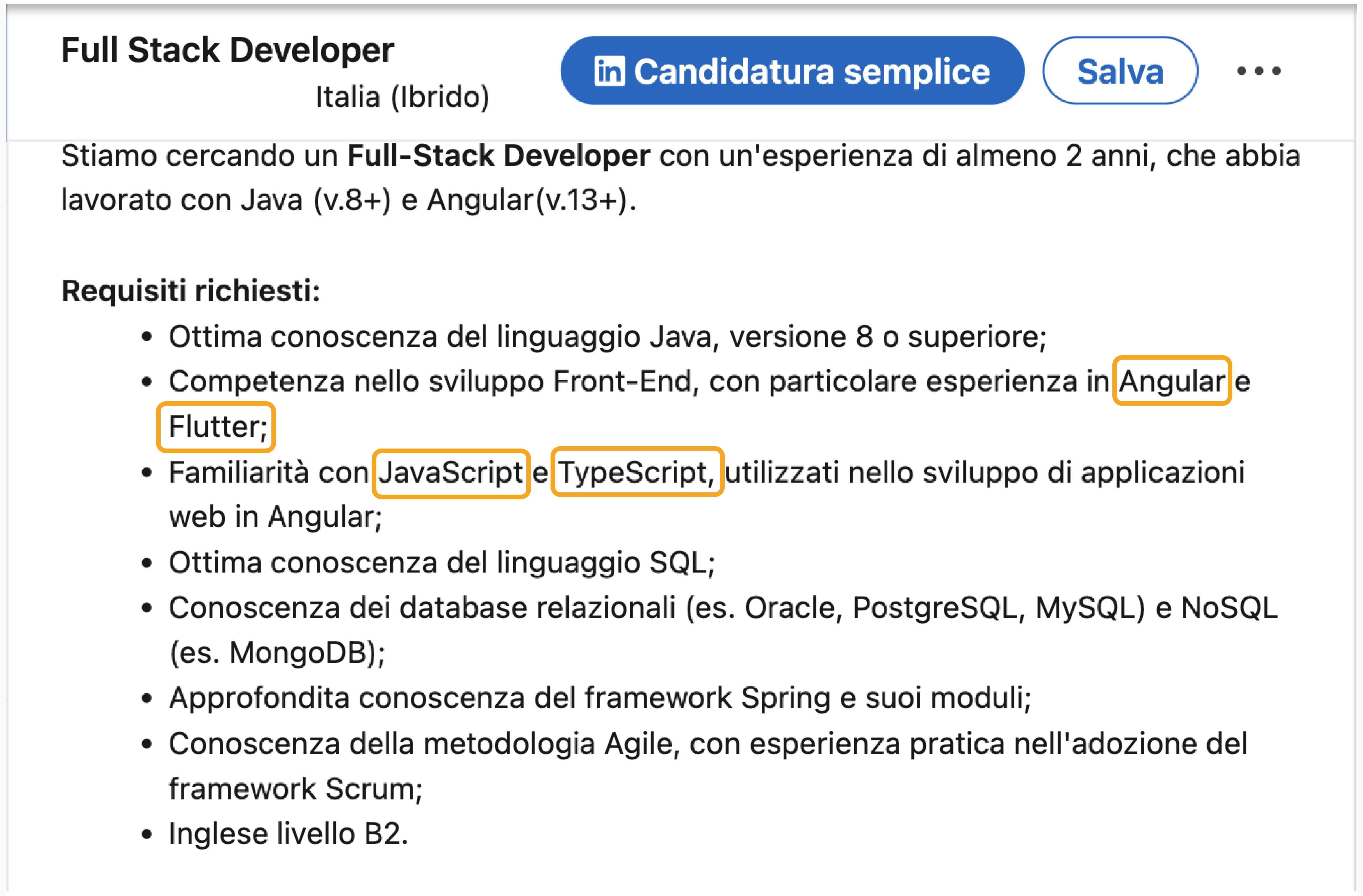
Why Dart full-stack?

Full-stack… with how many stacks?

Frontend

Angular
Flutter
Javascript
Typescript



Full Stack Developer
Italia (Ibrido)

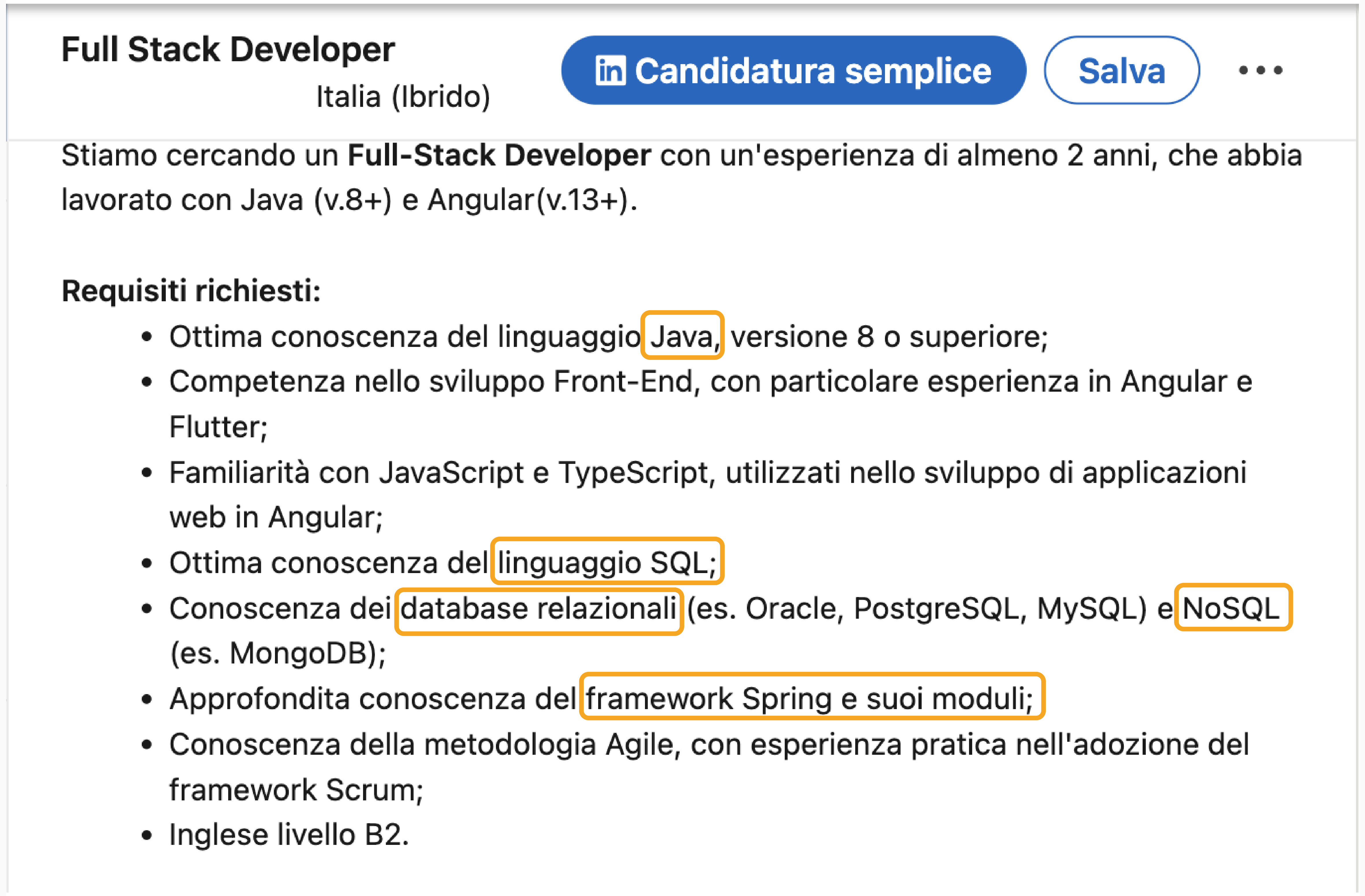
Stiamo cercando un **Full-Stack Developer** con un'esperienza di almeno 2 anni, che abbia lavorato con Java (v.8+) e Angular(v.13+).

Requisiti richiesti:

- Ottima conoscenza del linguaggio Java, versione 8 o superiore;
- Competenza nello sviluppo Front-End, con particolare esperienza in Angular e Flutter;
- Familiarità con JavaScript e TypeScript, utilizzati nello sviluppo di applicazioni web in Angular;
- Ottima conoscenza del linguaggio SQL;
- Conoscenza dei database relazionali (es. Oracle, PostgreSQL, MySQL) e NoSQL (es. MongoDB);
- Approfondita conoscenza del framework Spring e suoi moduli;
- Conoscenza della metodologia Agile, con esperienza pratica nell'adozione del framework Scrum;
- Inglese livello B2.

Backend

Java
Sql
Relational Databases
NoSql database
Spring framework



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Full-stack... in Dart?

WHY DART FULL-STACK?

Frontend in Flutter

Backend requires many technologies

Dart used server side

One codebase, same language, shared models

Introducing Serverpod

Serverpod is an open-source, scalable app server, written in Dart for the Flutter community.

Scalable & progressive

Modular

Scalable & progressive

Modular

Scalable

Scalable & progressive

Modular

Scalable

Flexible

Benefits

Reduced complexity

Benefits

Reduced complexity

Open and free

Benefits

Reduced
complexity

Open
and free

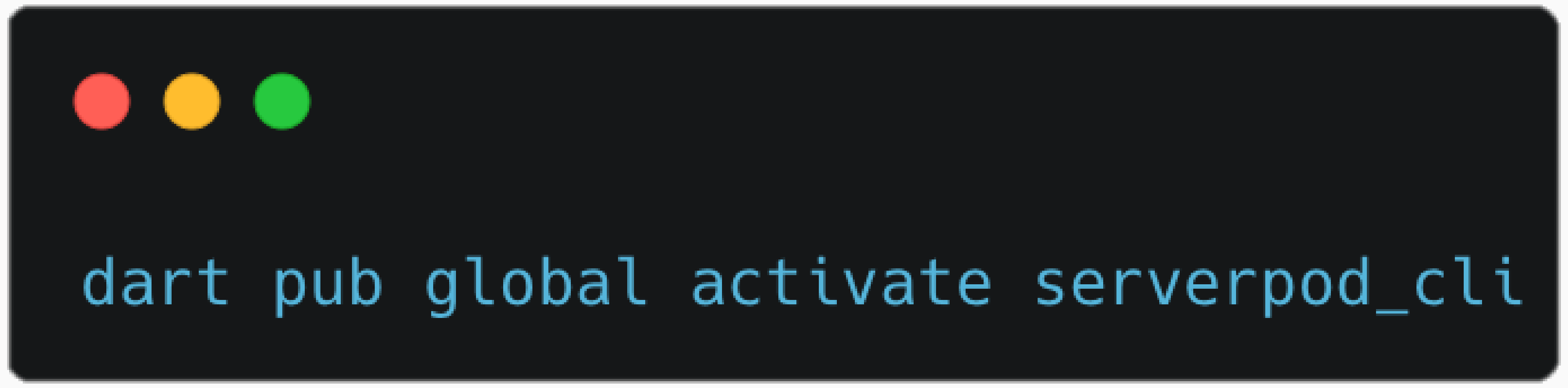
Stable and reliable

Key features

- ORM
- Real-time capabilities
- Straightforward authentication
- All essentials covered
- Cloud ready

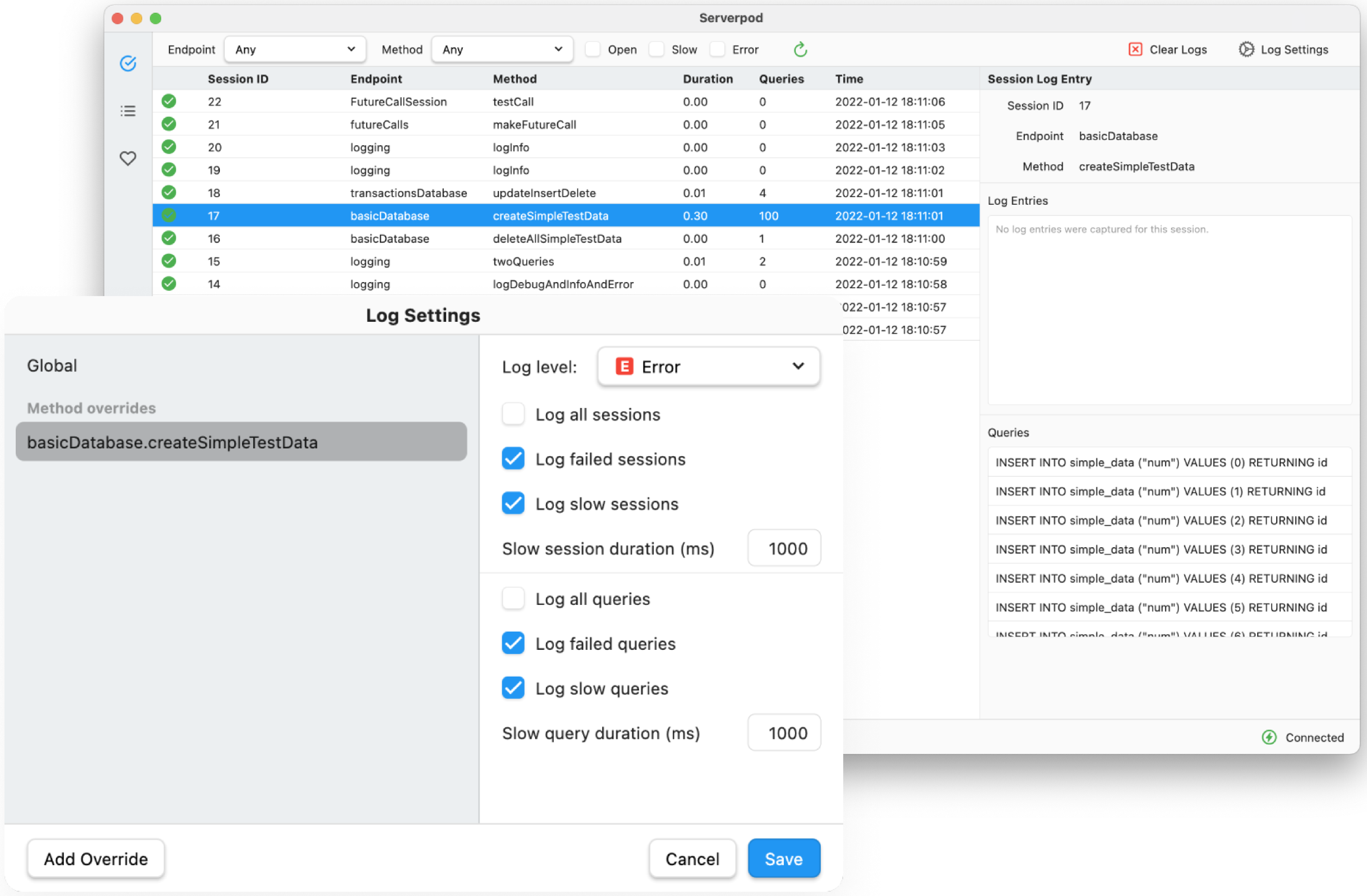
Architecture & Project Setup

Install CLI



```
dart pub global activate serverpod_cli
```

Serverpod Insights



Serverpod

Endpoint Any · Method Any · Open · Slow · Error · Clear Logs · Log Settings

Session ID	Endpoint	Method	Duration	Queries	Time
22	FutureCallSession	testCall	0.00	0	2022-01-12 18:11:06
21	futureCalls	makeFutureCall	0.00	0	2022-01-12 18:11:05
20	logging	logInfo	0.00	0	2022-01-12 18:11:03
19	logging	logInfo	0.00	0	2022-01-12 18:11:02
18	transactionsDatabase	updateInsertDelete	0.01	4	2022-01-12 18:11:01
17	basicDatabase	createSimpleTestData	0.30	100	2022-01-12 18:11:01
16	basicDatabase	deleteAllSimpleTestData	0.00	1	2022-01-12 18:11:00
15	logging	twoQueries	0.01	2	2022-01-12 18:10:59
14	logging	logDebugAndInfoAndError	0.00	0	2022-01-12 18:10:58
					022-01-12 18:10:57
					022-01-12 18:10:57

Session Log Entry

Session ID 17
Endpoint basicDatabase
Method createSimpleTestData

Log Entries

No log entries were captured for this session.

Queries

```
INSERT INTO simple_data ("num") VALUES (0) RETURNING id
INSERT INTO simple_data ("num") VALUES (1) RETURNING id
INSERT INTO simple_data ("num") VALUES (2) RETURNING id
INSERT INTO simple_data ("num") VALUES (3) RETURNING id
INSERT INTO simple_data ("num") VALUES (4) RETURNING id
INSERT INTO simple_data ("num") VALUES (5) RETURNING id
```

Connected

Log Settings

Global

Method overrides

basicDatabase.createSimpleTestData

Log level: Error

- [ ] Log all sessions
- [x] Log failed sessions
- [x] Log slow sessions

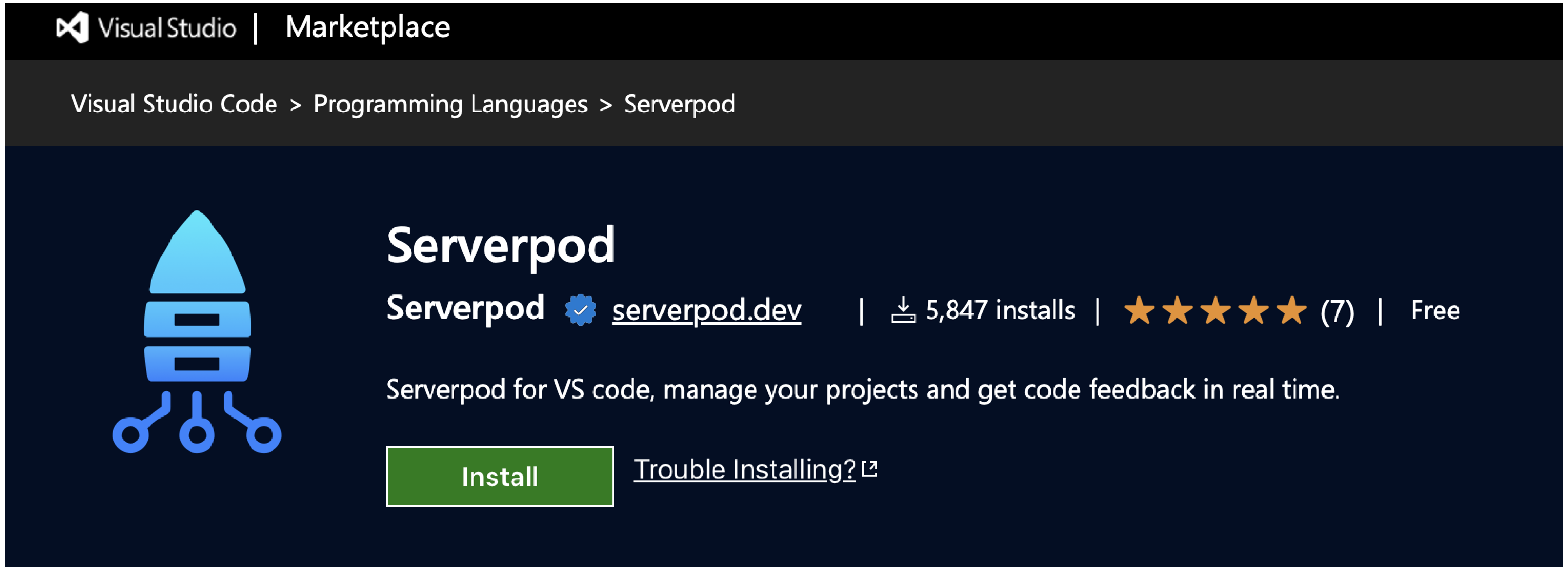
Slow session duration (ms) 1000

- [ ] Log all queries
- [x] Log failed queries
- [x] Log slow queries

Slow query duration (ms) 1000

Add Override · Cancel · Save

VS Code extension


Visual Studio | Marketplace
Visual Studio Code > Programming Languages > Serverpod

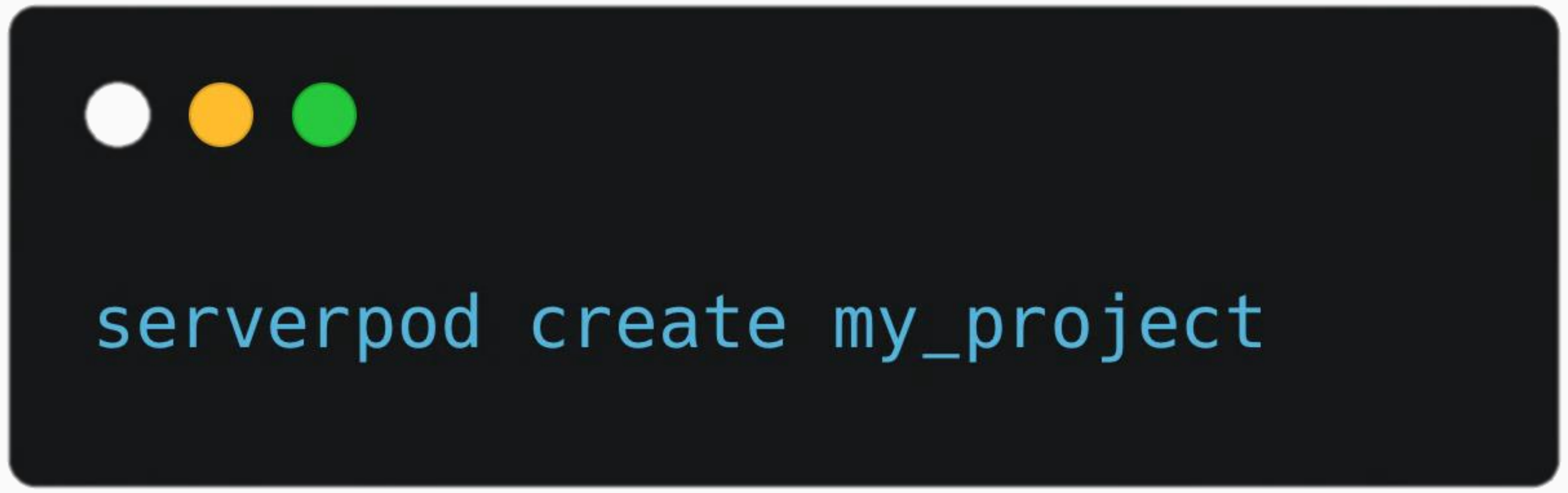
Serverpod

Serverpod serverpod.dev | 5,847 installs | ★★★★★ (7) | Free

Serverpod for VS code, manage your projects and get code feedback in real time.

Install
Trouble Installing?

Create project



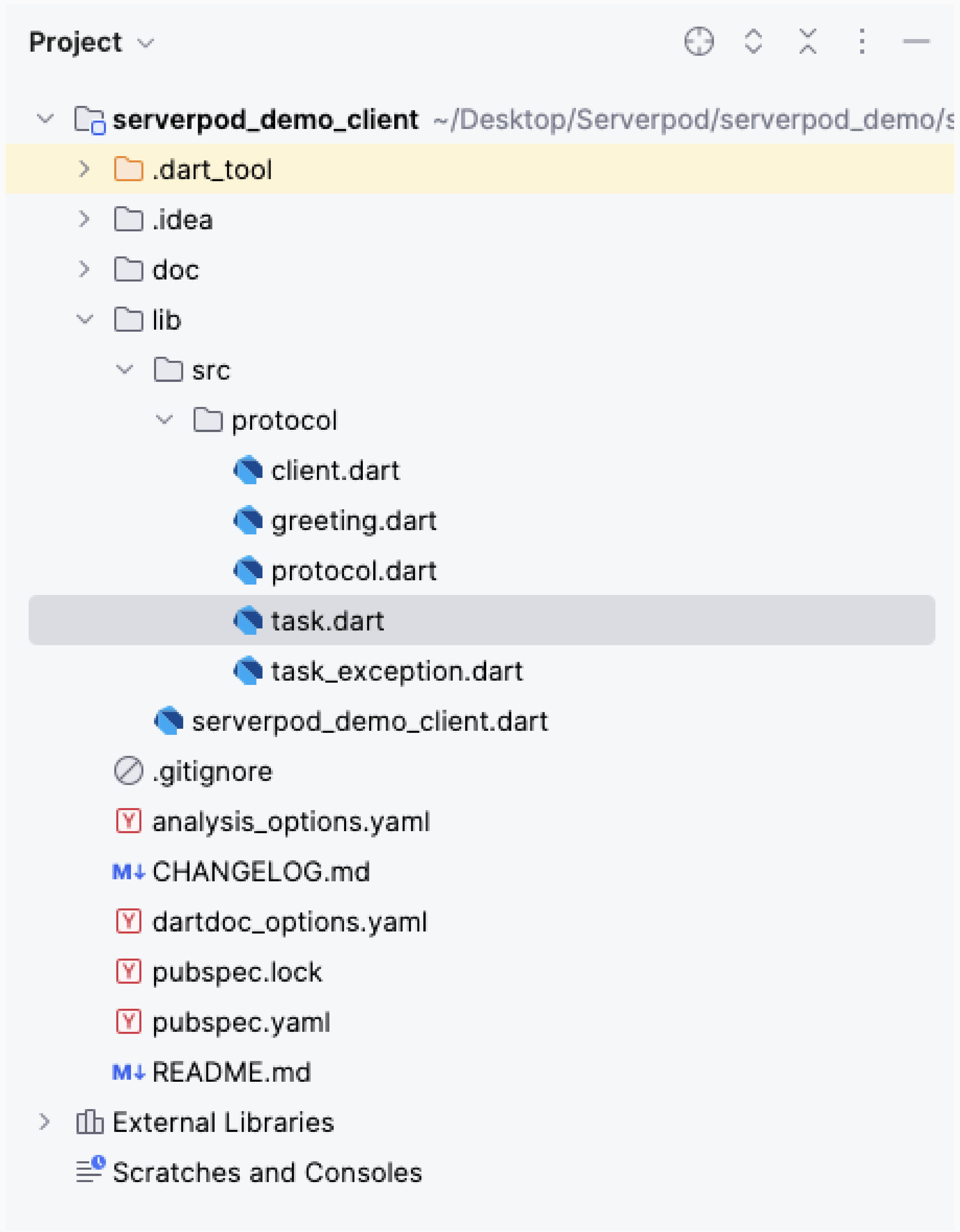
```
serverpod create my_project
```

Serverpod requires a PostgreSQL database

Serverpod pj provides a *docker-compose.yaml*

API client → xxx_client

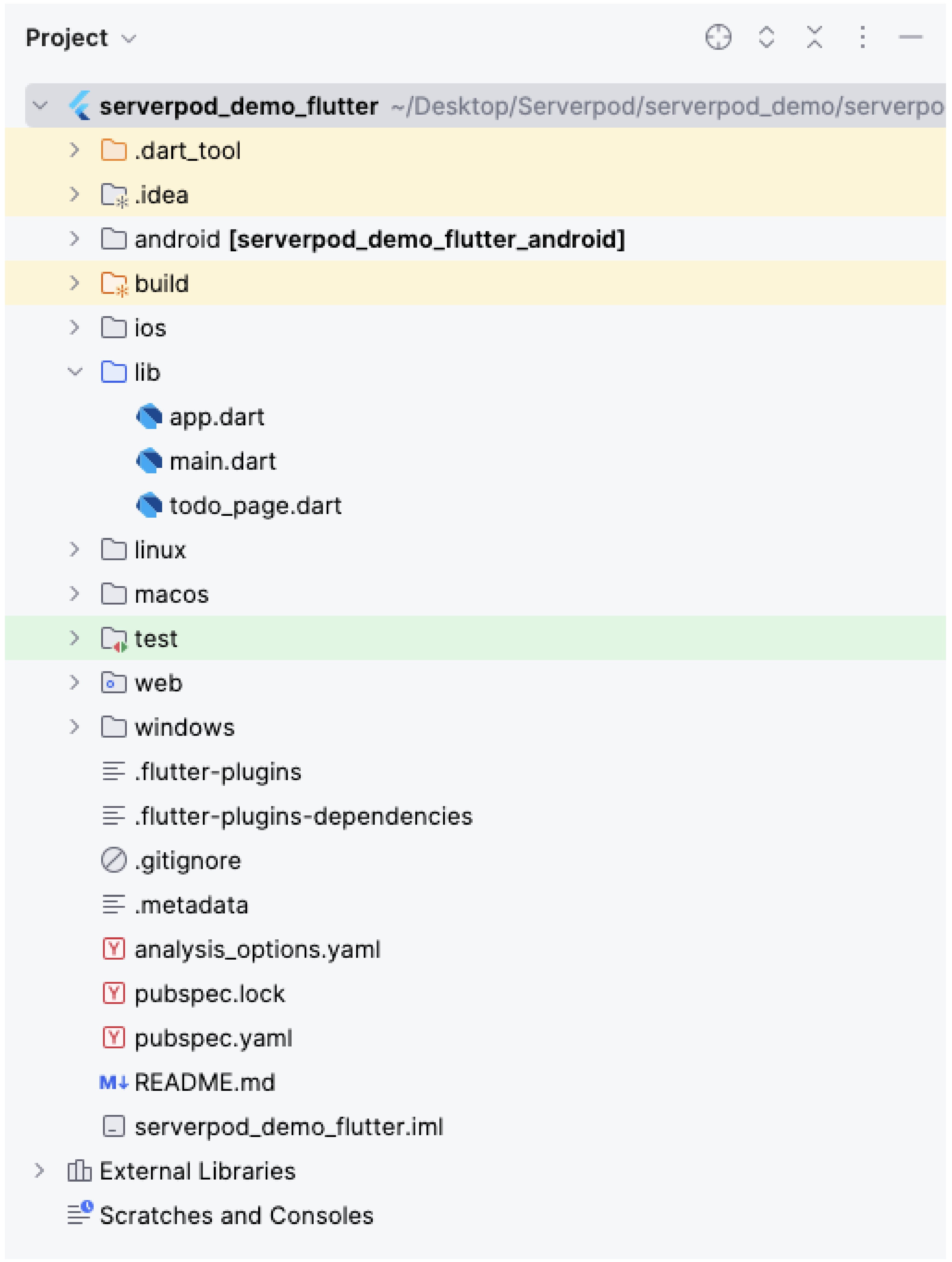
Stores the program code generated from the Server side.
Allows the APP side to access it.
Bridge for communication between the two ends.



```
Project
serverpod_demo_client ~/Desktop/Serverpod/serverpod_demo/s
  .dart_tool
  .idea
  doc
  lib
    src
      protocol
        client.dart
        greeting.dart
        protocol.dart
        task.dart
        task_exception.dart
    serverpod_demo_client.dart
  .gitignore
  analysis_options.yaml
  CHANGELOG.md
  dartdoc_options.yaml
  pubspec.lock
  pubspec.yaml
  README.md
External Libraries
Scratches and Consoles
```

Flutter App → xxx_flutter

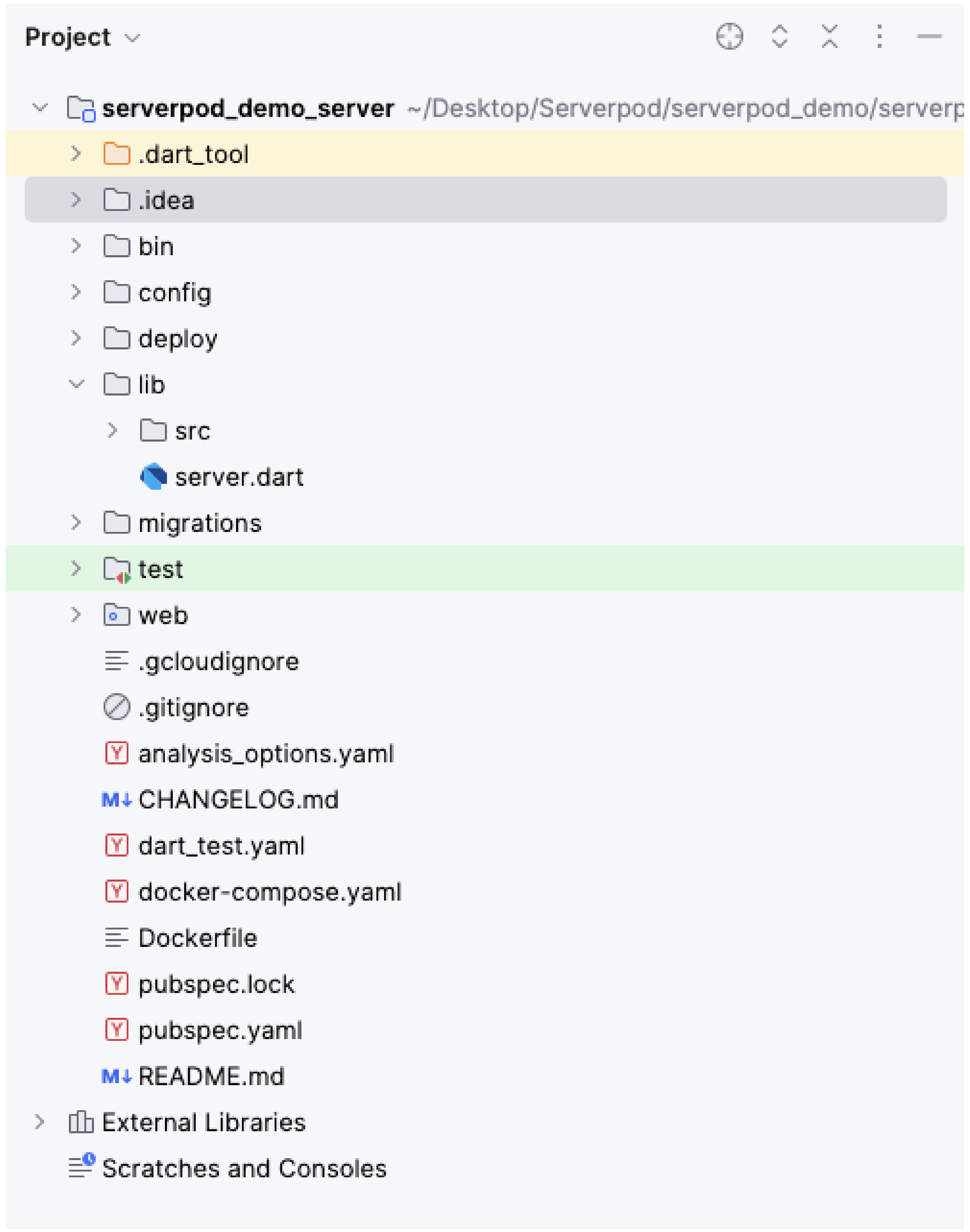
The frontend application (mobile/desktop/web)


Project

```
serverpod_demo_flutter ~/Desktop/Serverpod/serverpod_demo/serverpo
  .dart_tool
  .idea
  android [serverpod_demo_flutter_android]
  build
  ios
  lib
    app.dart
    main.dart
    todo_page.dart
  linux
  macos
  test
  web
  windows
  .flutter-plugins
  .flutter-plugins-dependencies
  .gitignore
  .metadata
  analysis_options.yaml
  pubspec.lock
  pubspec.yaml
  README.md
  serverpod_demo_flutter.iml
External Libraries
Scratches and Consoles
```

Server App → xxx_server

The backend application



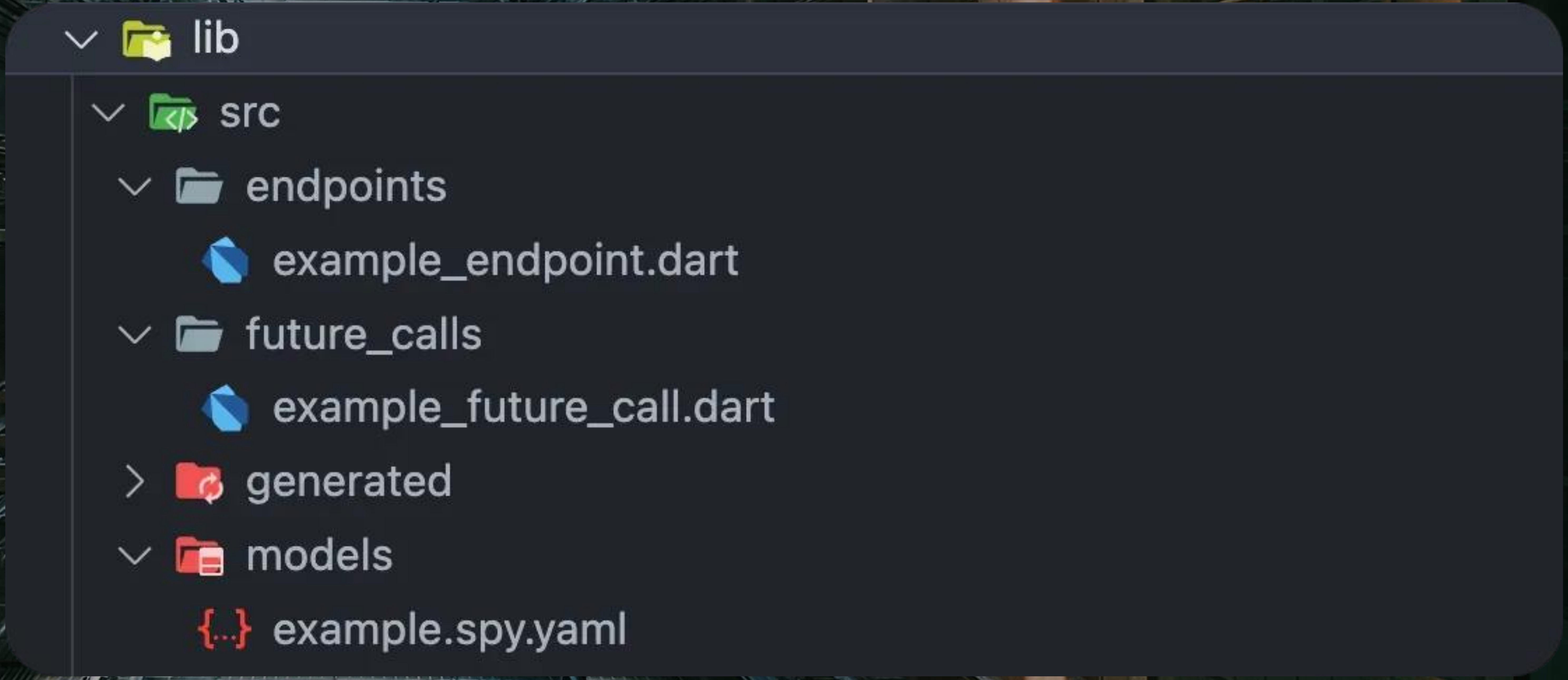
Project

```
v serverpod_demo_server ~/Desktop/Serverpod/serverpod_demo/serverp
  > .dart_tool
  > .idea
  > bin
  > config
  > deploy
  v lib
    > src
      server.dart
  > migrations
  > test
  > web
    .gcloudignore
    .gitignore
    analysis_options.yaml
    CHANGELOG.md
    dart_test.yaml
    docker-compose.yaml
    Dockerfile
    pubspec.lock
    pubspec.yaml
    README.md
> External Libraries
  Scratches and Consoles
```

Server directories

01

endpoints/

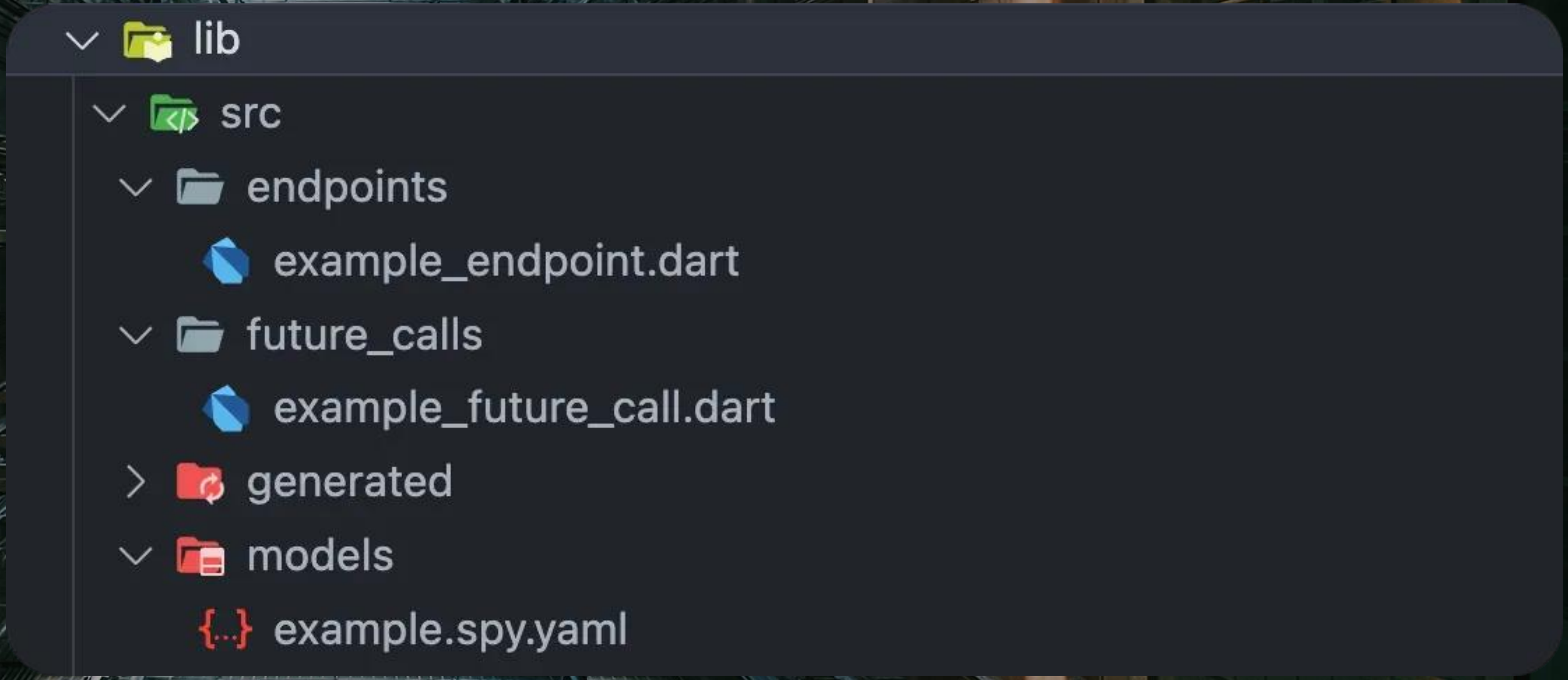


```
lib
  src
    endpoints
      example_endpoint.dart
    future_calls
      example_future_call.dart
    generated
    models
      example.spy.yaml
```

Server directories

02

models/

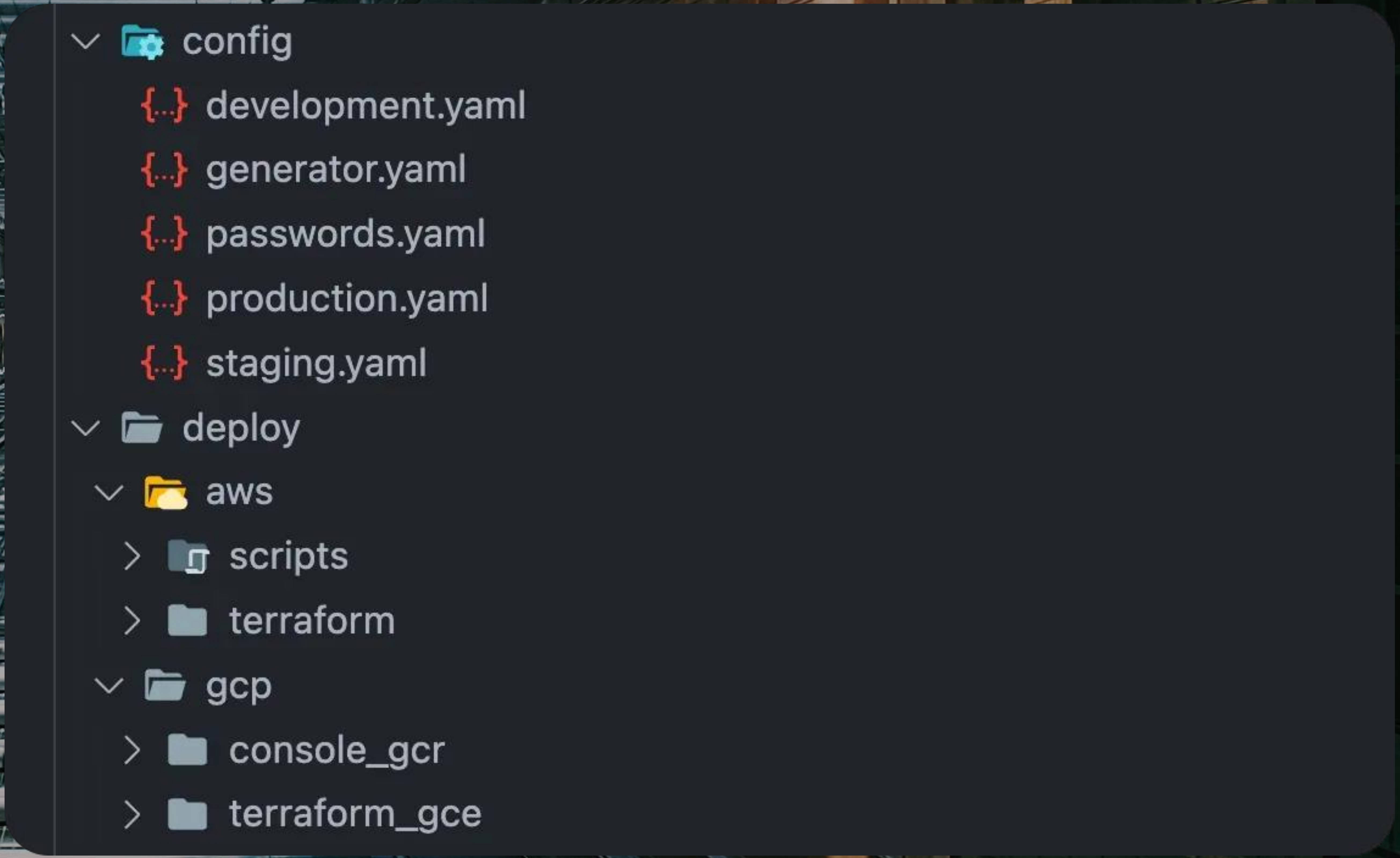


```
lib
  src
    endpoints
      example_endpoint.dart
    future_calls
      example_future_call.dart
    generated
    models
      example.spy.yaml
```

Server directories

03

config/

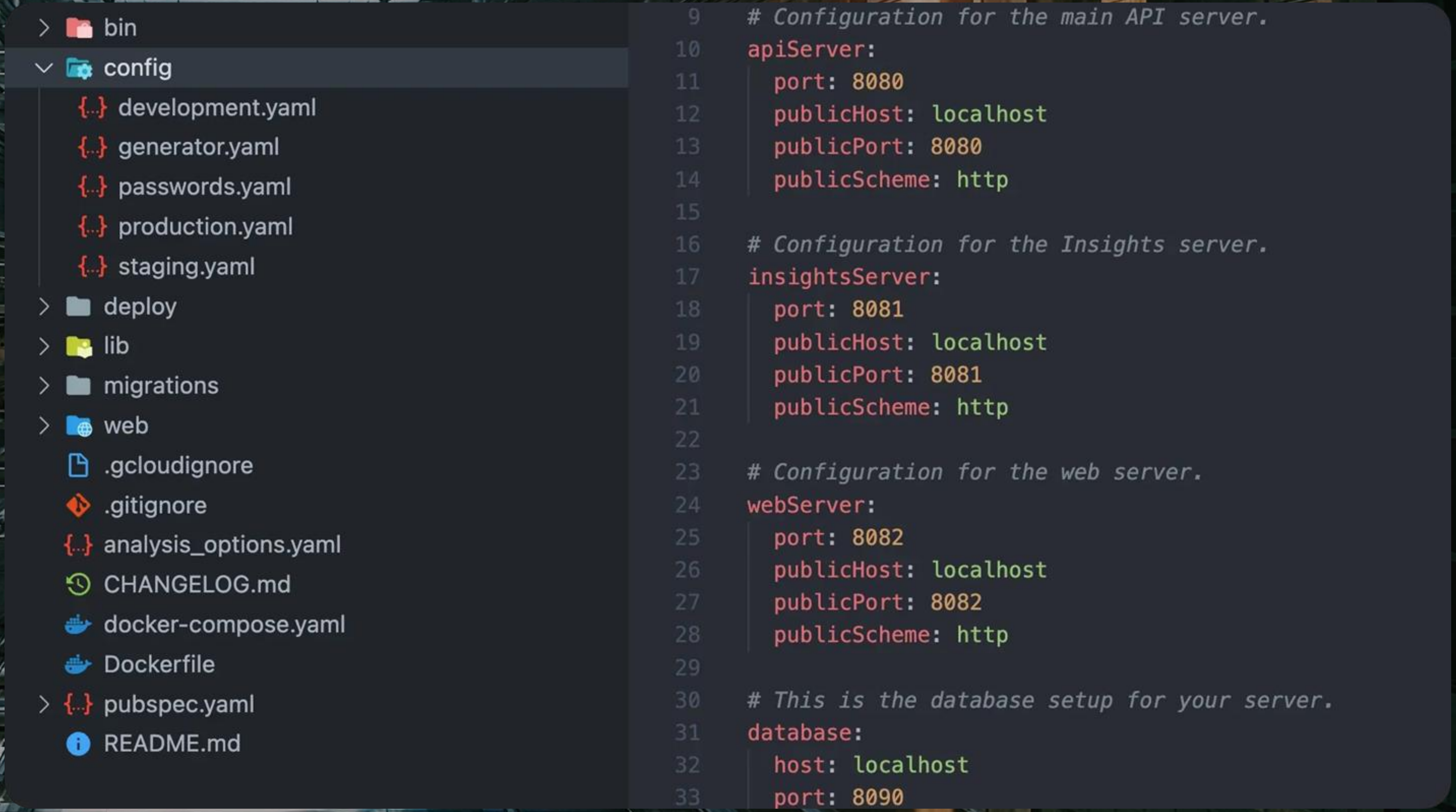


```
⌄ config
    development.yaml
    generator.yaml
    passwords.yaml
    production.yaml
    staging.yaml
⌄ deploy
  ⌄ aws
    › scripts
    › terraform
  ⌄ gcp
    › console_gcr
    › terraform_gce
```

Server directories

03

config/



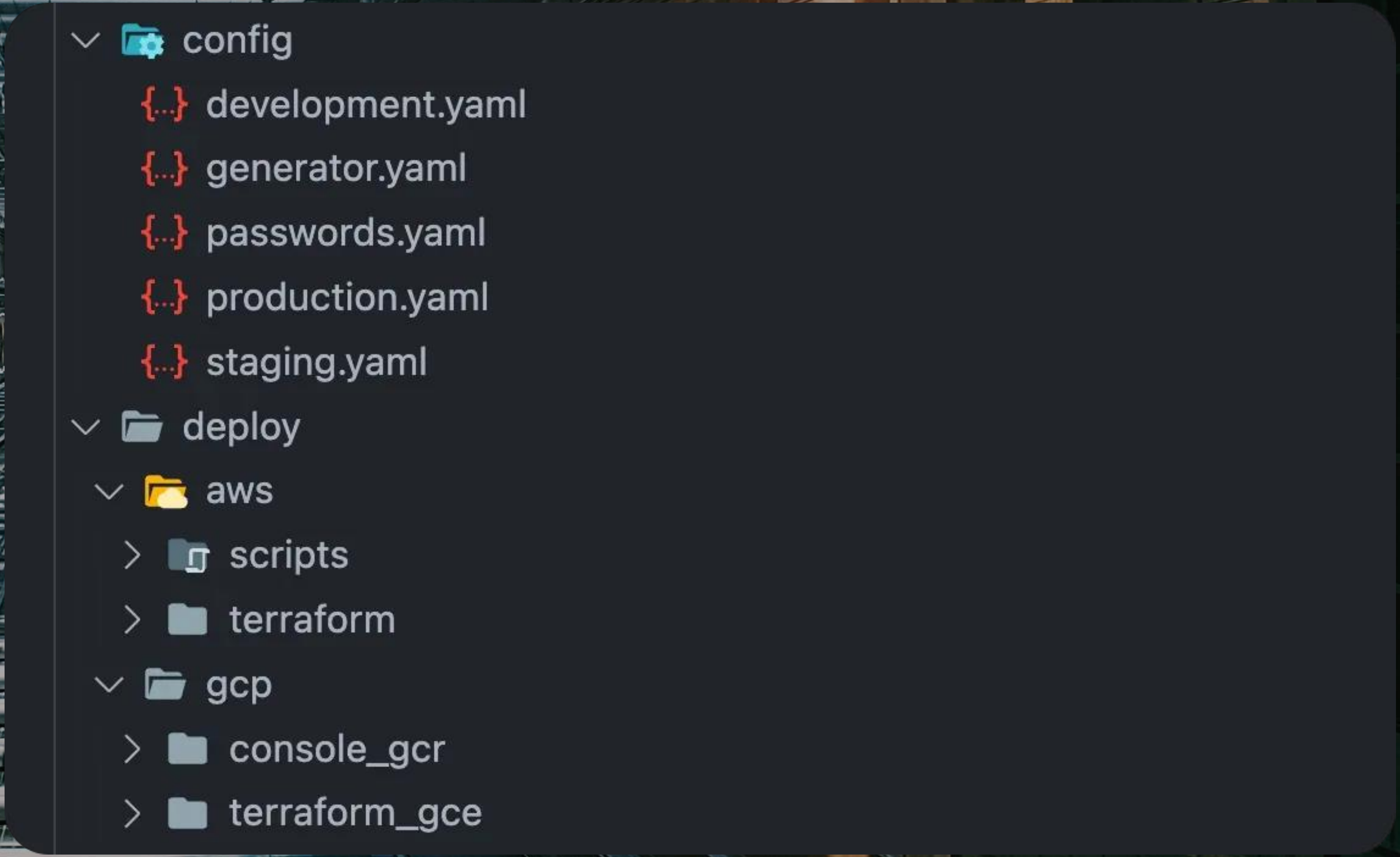
```
> bin
v config
    development.yaml
    generator.yaml
    passwords.yaml
    production.yaml
    staging.yaml
> deploy
> lib
> migrations
> web
  .gcloudignore
  .gitignore
  analysis_options.yaml
  CHANGELOG.md
  docker-compose.yaml
  Dockerfile
> pubspec.yaml
  README.md
```

```yaml
# Configuration for the main API server.
apiServer:
  port: 8080
  publicHost: localhost
  publicPort: 8080
  publicScheme: http

# Configuration for the Insights server.
insightsServer:
  port: 8081
  publicHost: localhost
  publicPort: 8081
  publicScheme: http

# Configuration for the web server.
webServer:
  port: 8082
  publicHost: localhost
  publicPort: 8082
  publicScheme: http

# This is the database setup for your server.
database:
  host: localhost
  port: 8090
```

Server directories

04

deploy/

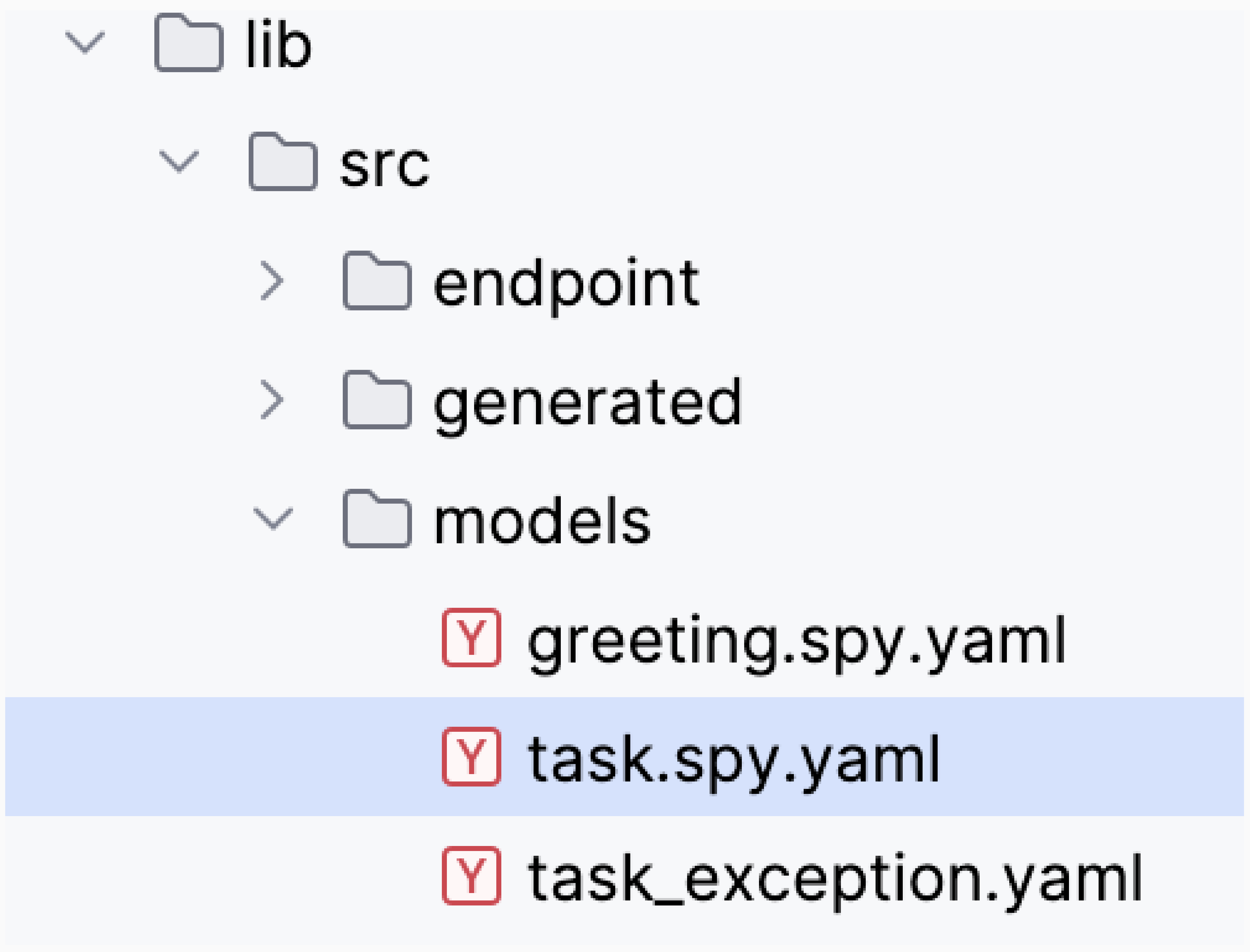


```
config
  development.yaml
  generator.yaml
  passwords.yaml
  production.yaml
  staging.yaml
deploy
  aws
    scripts
    terraform
  gcp
    console_gcr
    terraform_gce
```

Models, Endpoints & Client Calls

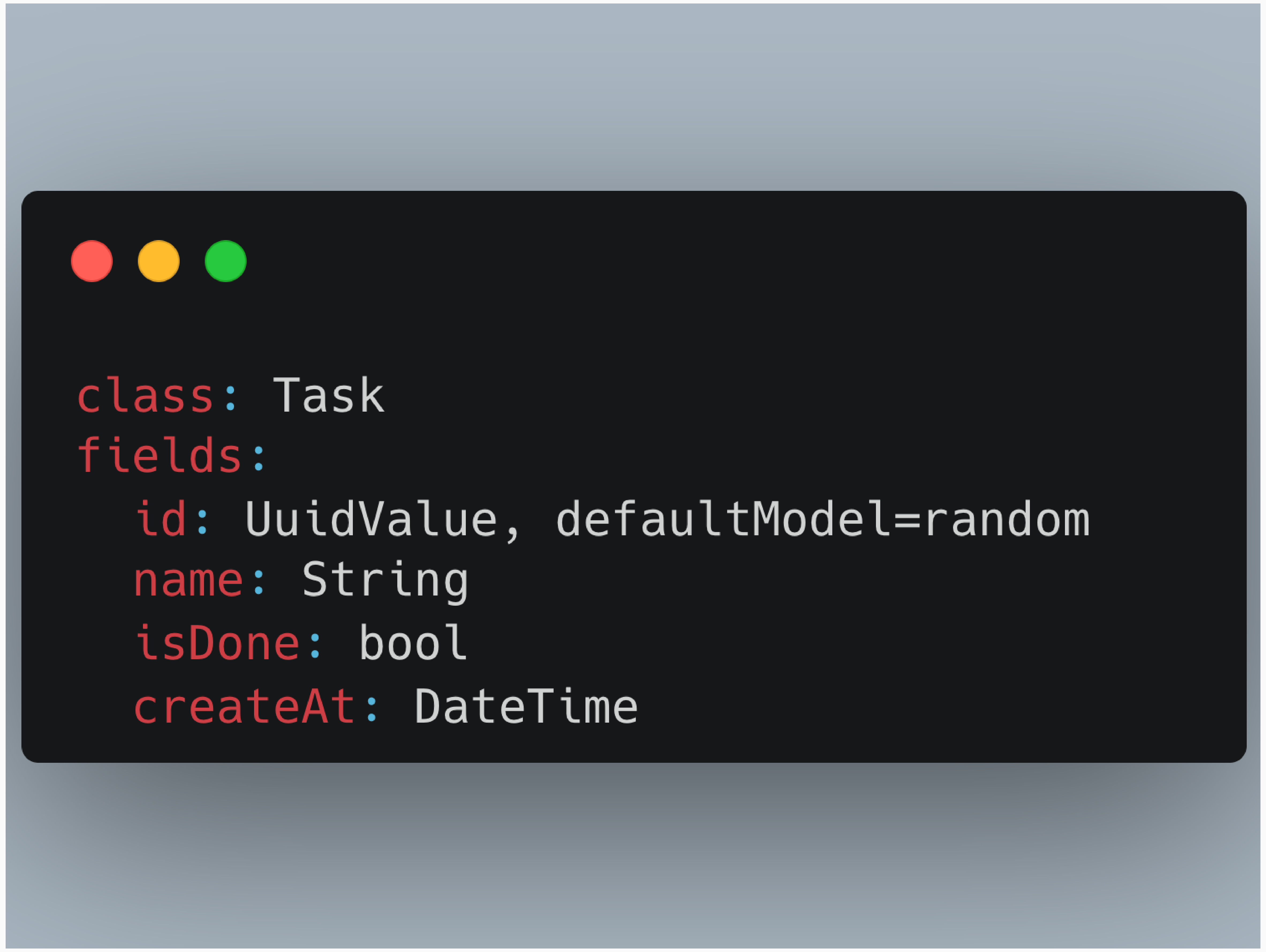
Create Model

Create file task.spy.yaml


```
lib
  src
    endpoint
    generated
    models
      greeting.spy.yaml
      task.spy.yaml
      task_exception.yaml
```

Create Model

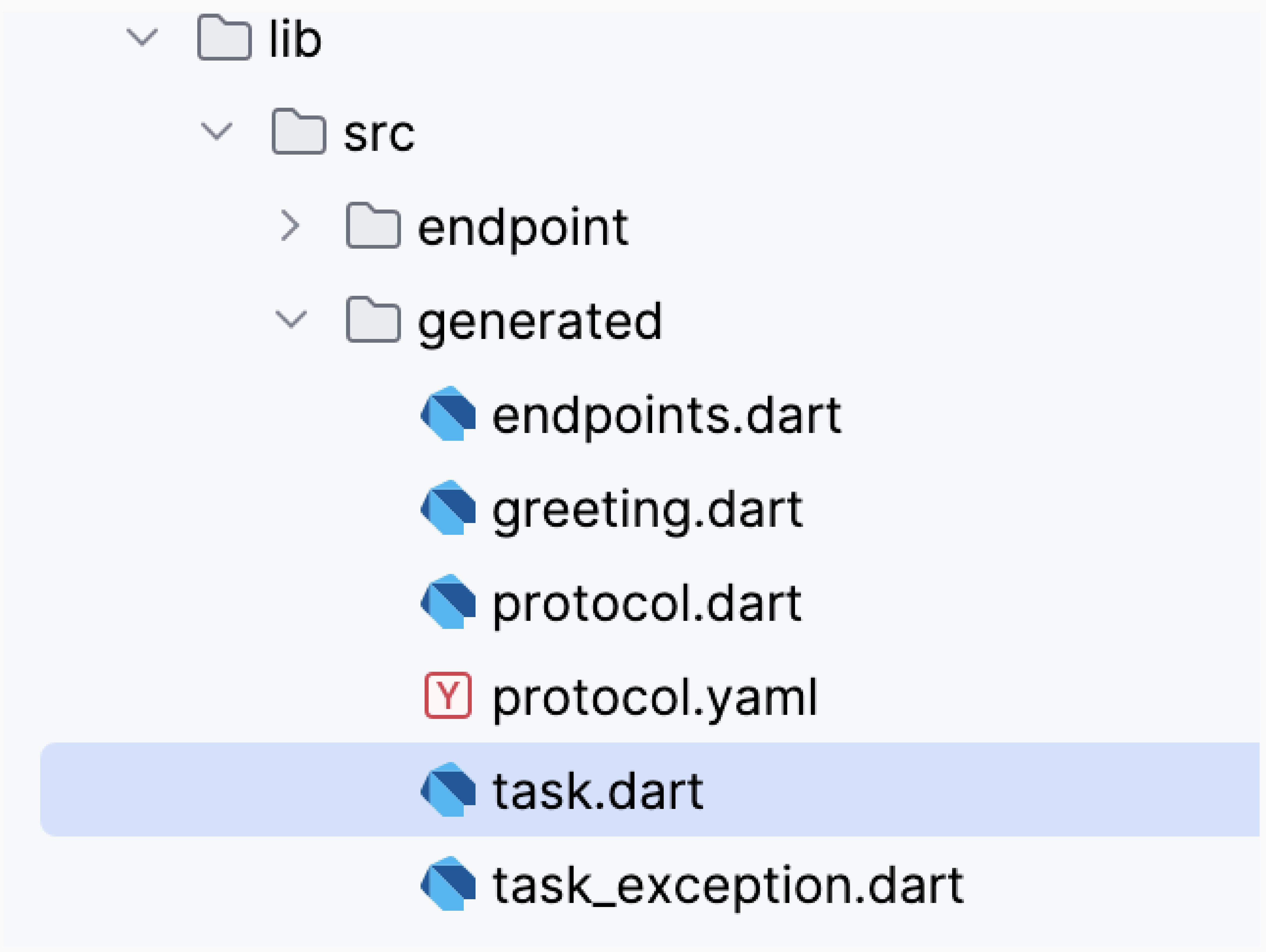
Define the model



```
class: Task
fields:
  id: UuidValue, defaultModel=random
  name: String
  isDone: bool
  createAt: DateTime
```

Create Model

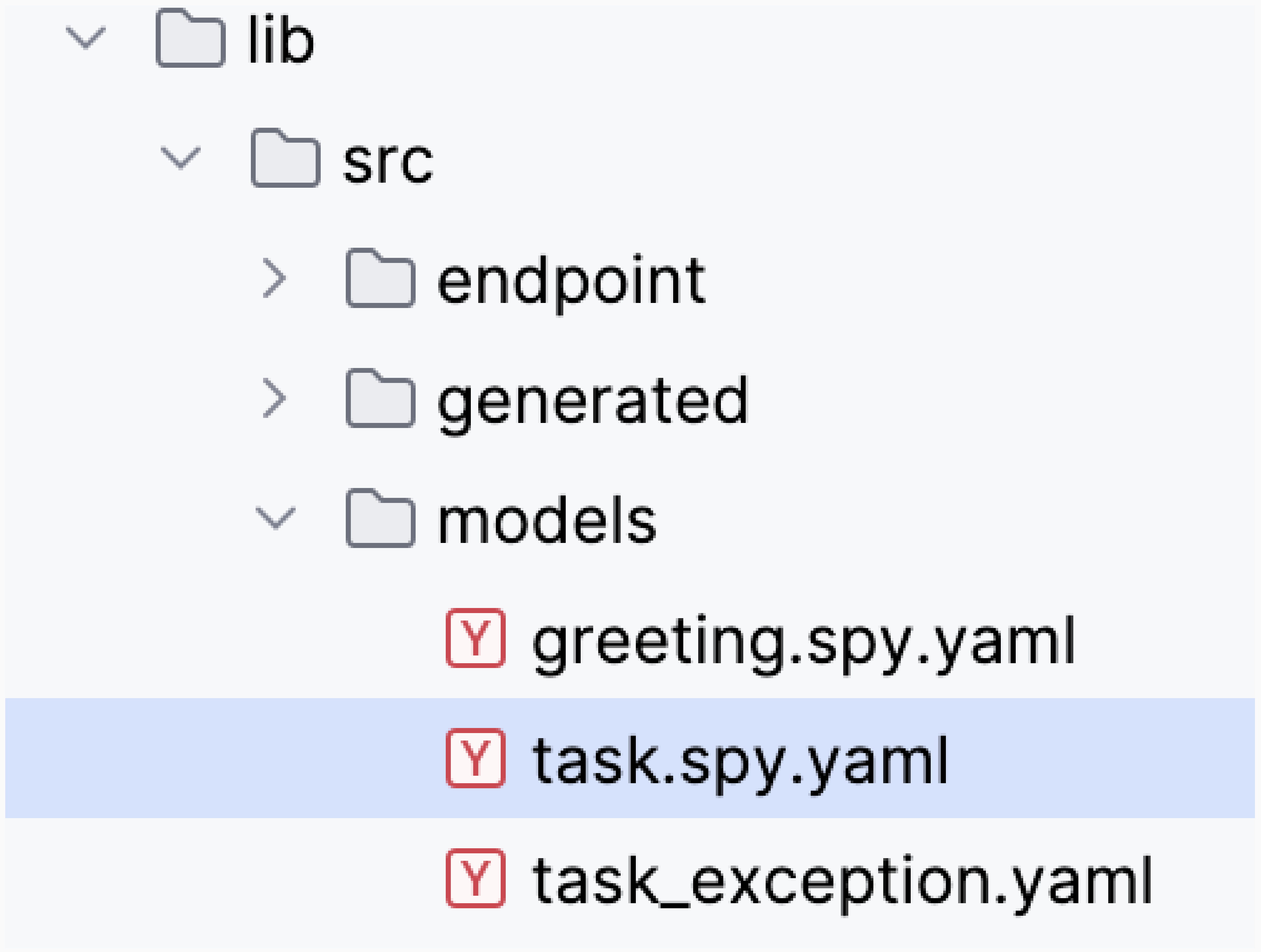
Generate the model: *serverpod generate*



```
lib
  src
    endpoint
    generated
      endpoints.dart
      greeting.dart
      protocol.dart
      protocol.yaml
      task.dart
      task_exception.dart
```

Create Table

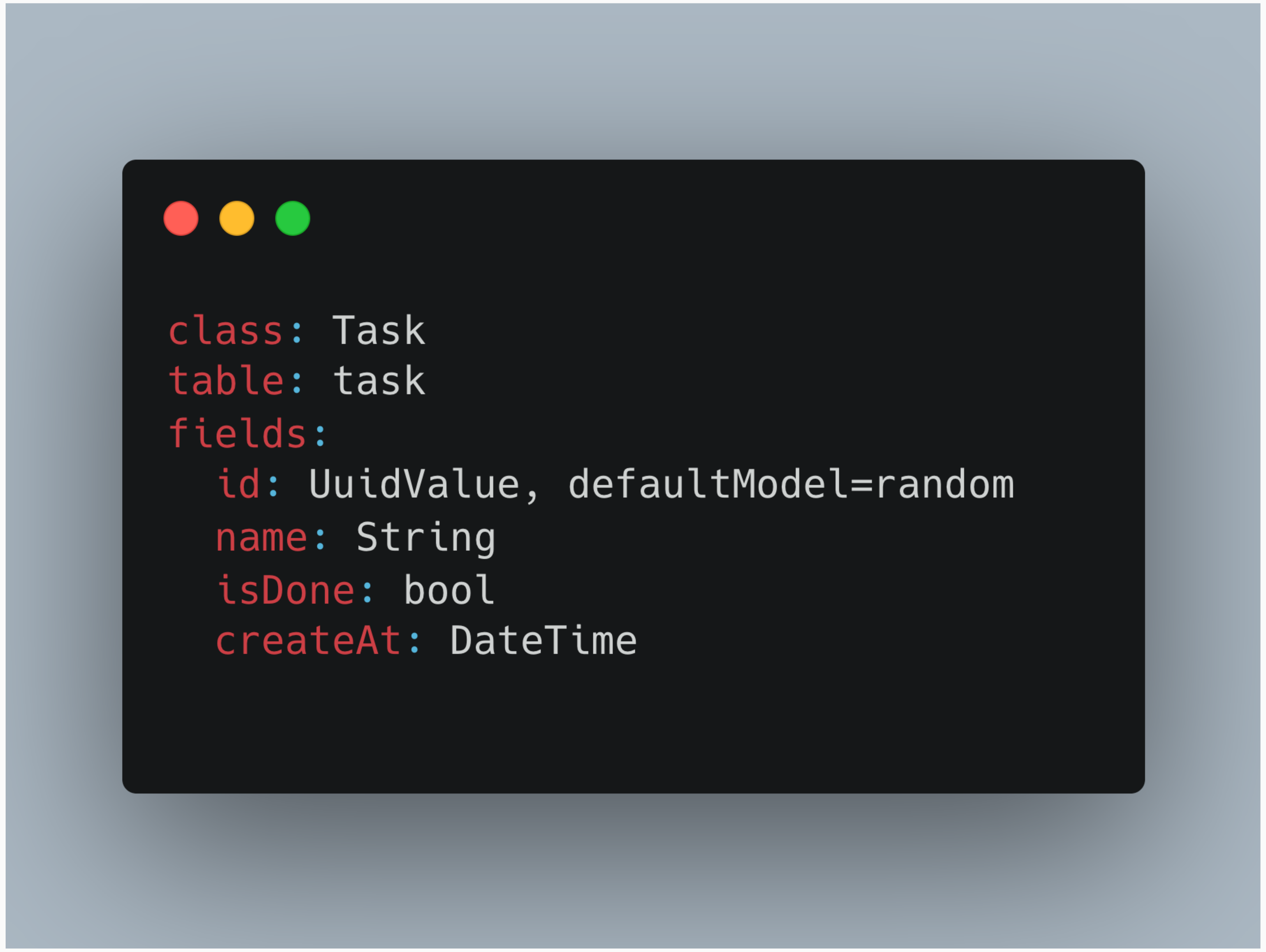
Create file task.spy.yaml (or use the same used for model)



```
lib
  src
    endpoint
    generated
    models
      greeting.spy.yaml
      task.spy.yaml
      task_exception.yaml
```

Create Table

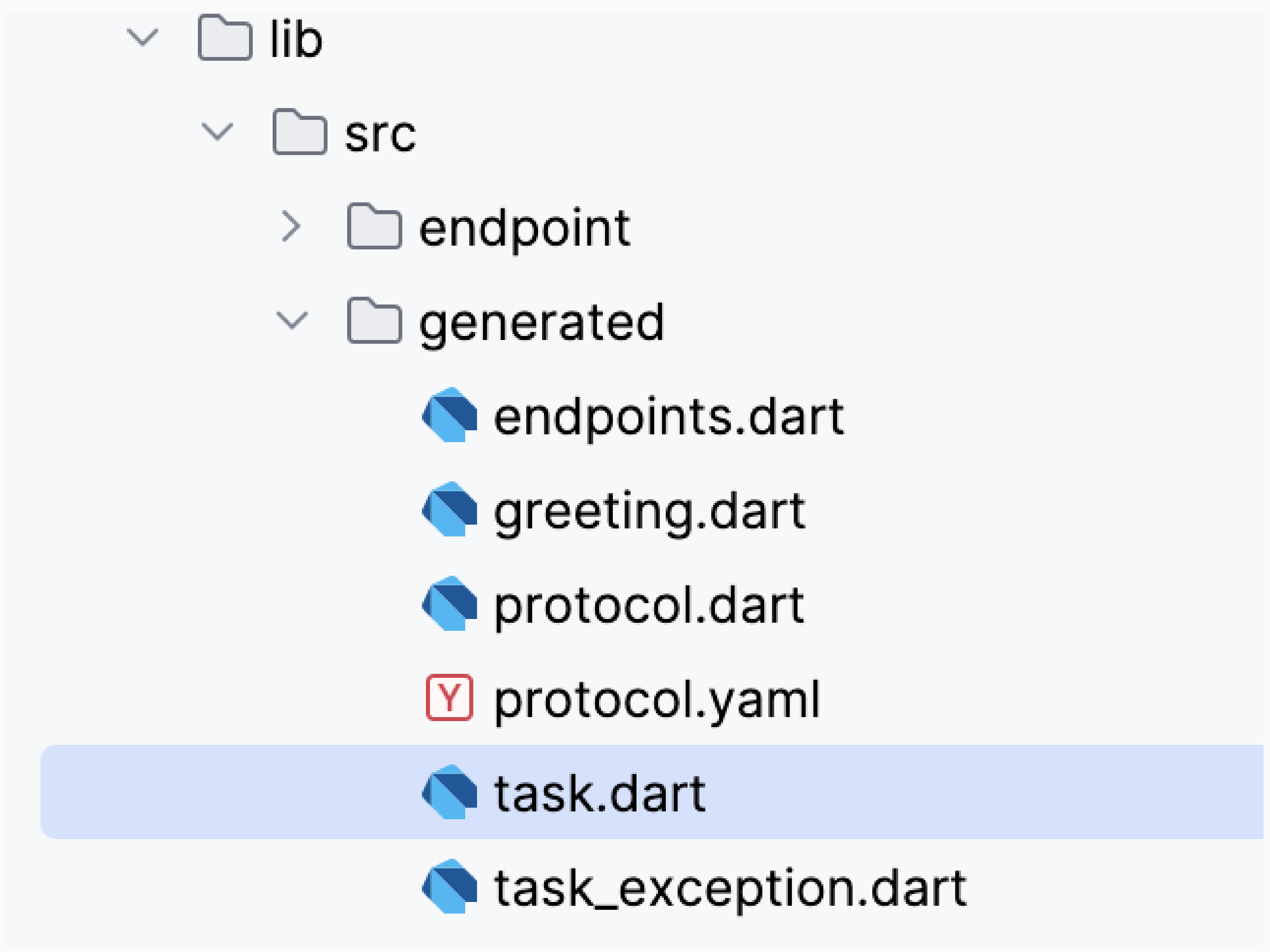
Define the **table** attribute



```
class: Task
table: task
fields:
  id: UuidValue, defaultModel=random
  name: String
  isDone: bool
  createAt: DateTime
```

Create Table

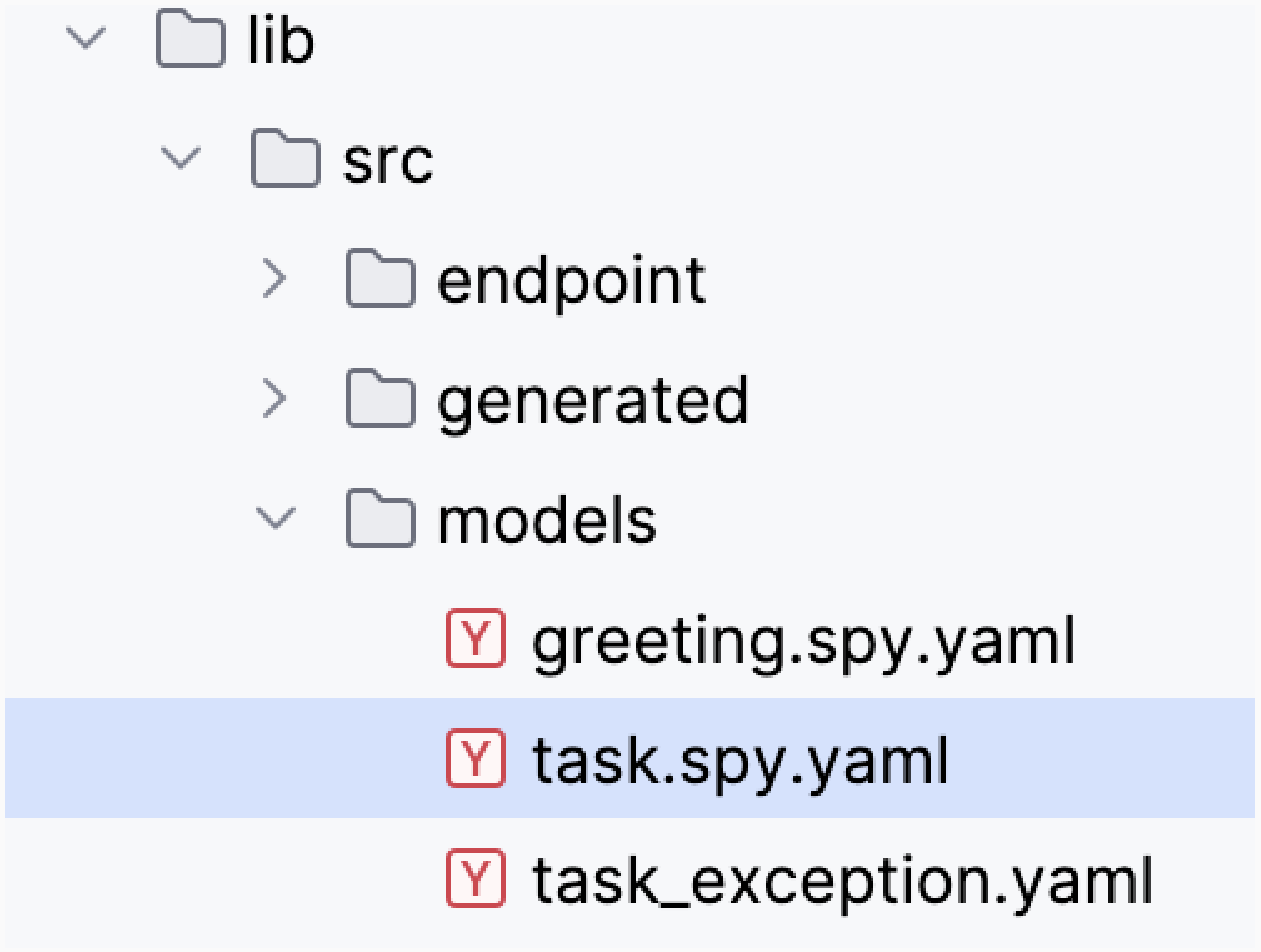
Generate the table class: *serverpod generate*
Create migration: *serverpod create-migrations*



```
lib
  src
    endpoint
    generated
      endpoints.dart
      greeting.dart
      protocol.dart
      protocol.yaml
      task.dart
      task_exception.dart
```

Create Exception

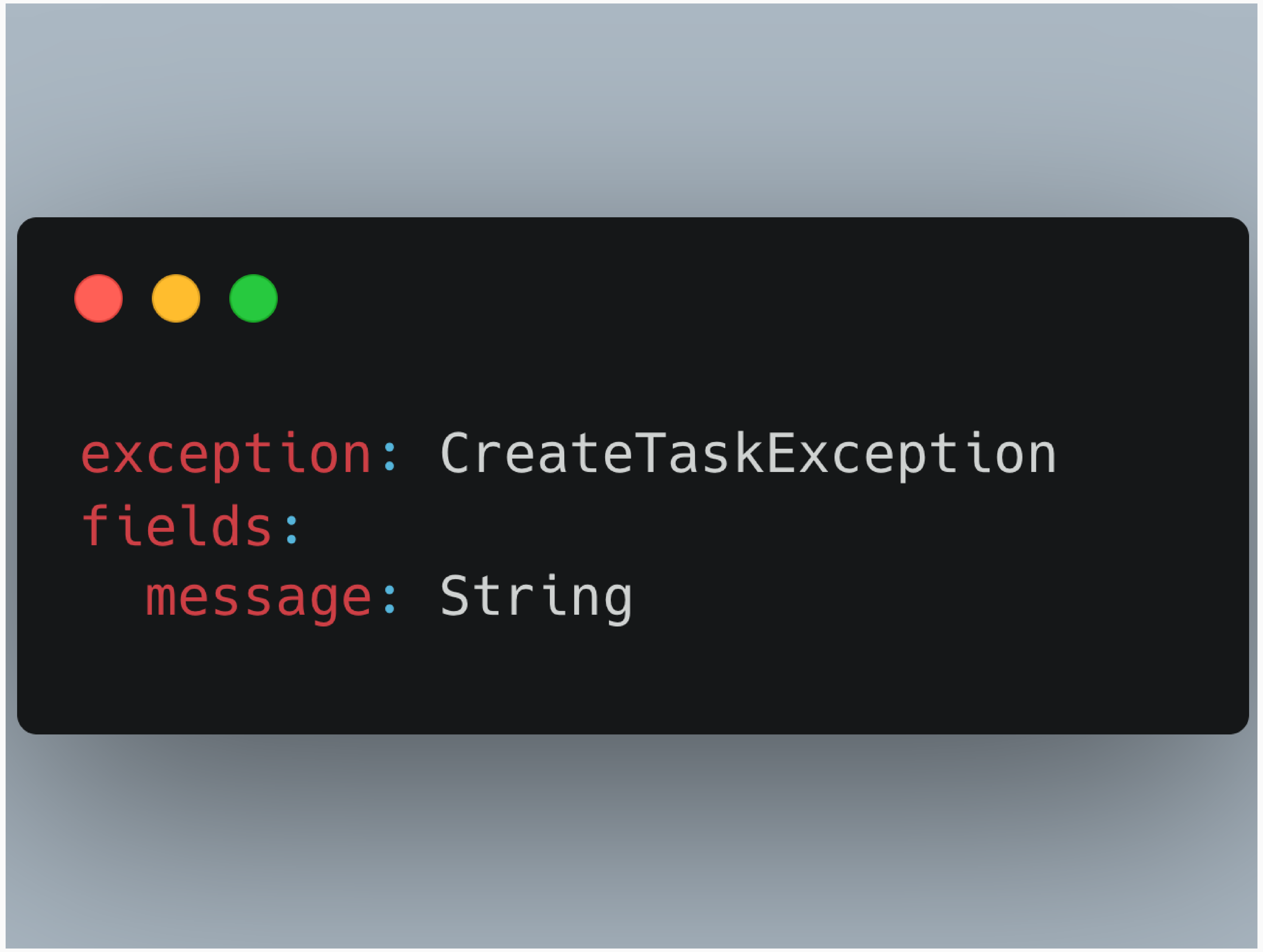
Create file task_exception.yaml



```
lib
  src
    endpoint
    generated
    models
      greeting.spy.yaml
      task.spy.yaml
      task_exception.yaml
```

Create Exception

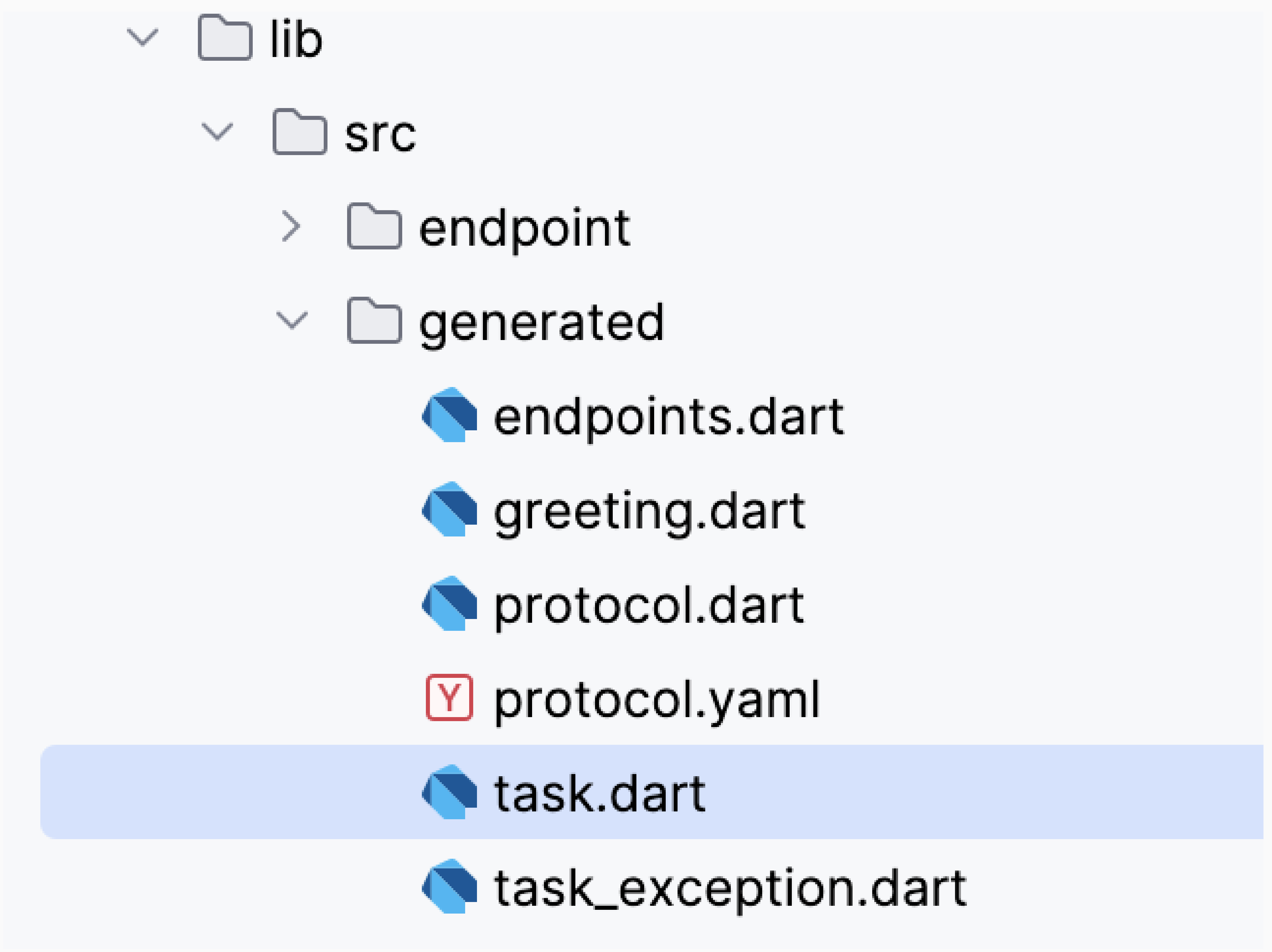
Define the **exception** attribute



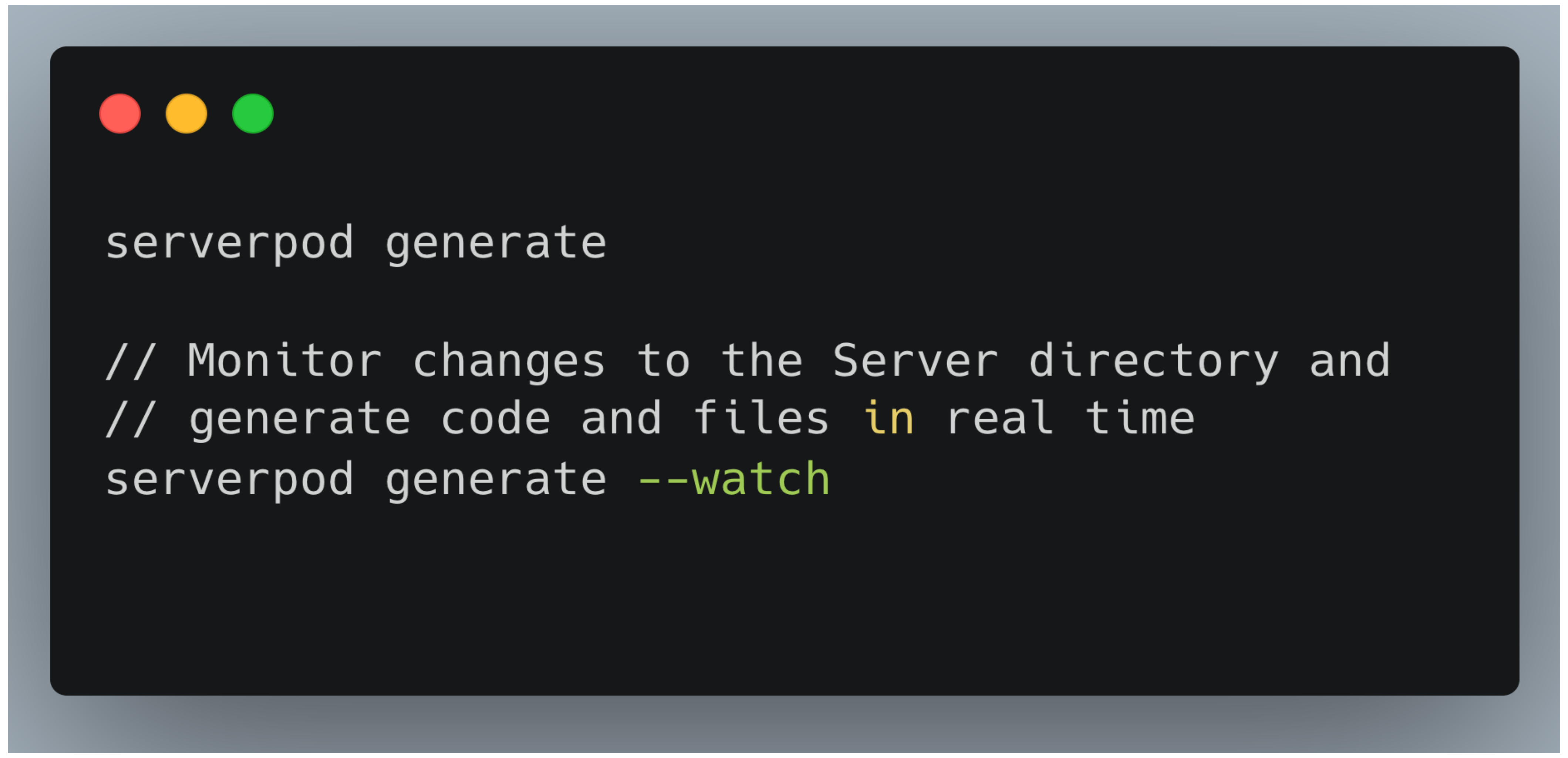
```
exception: CreateTaskException
fields:
  message: String
```

Create Exception

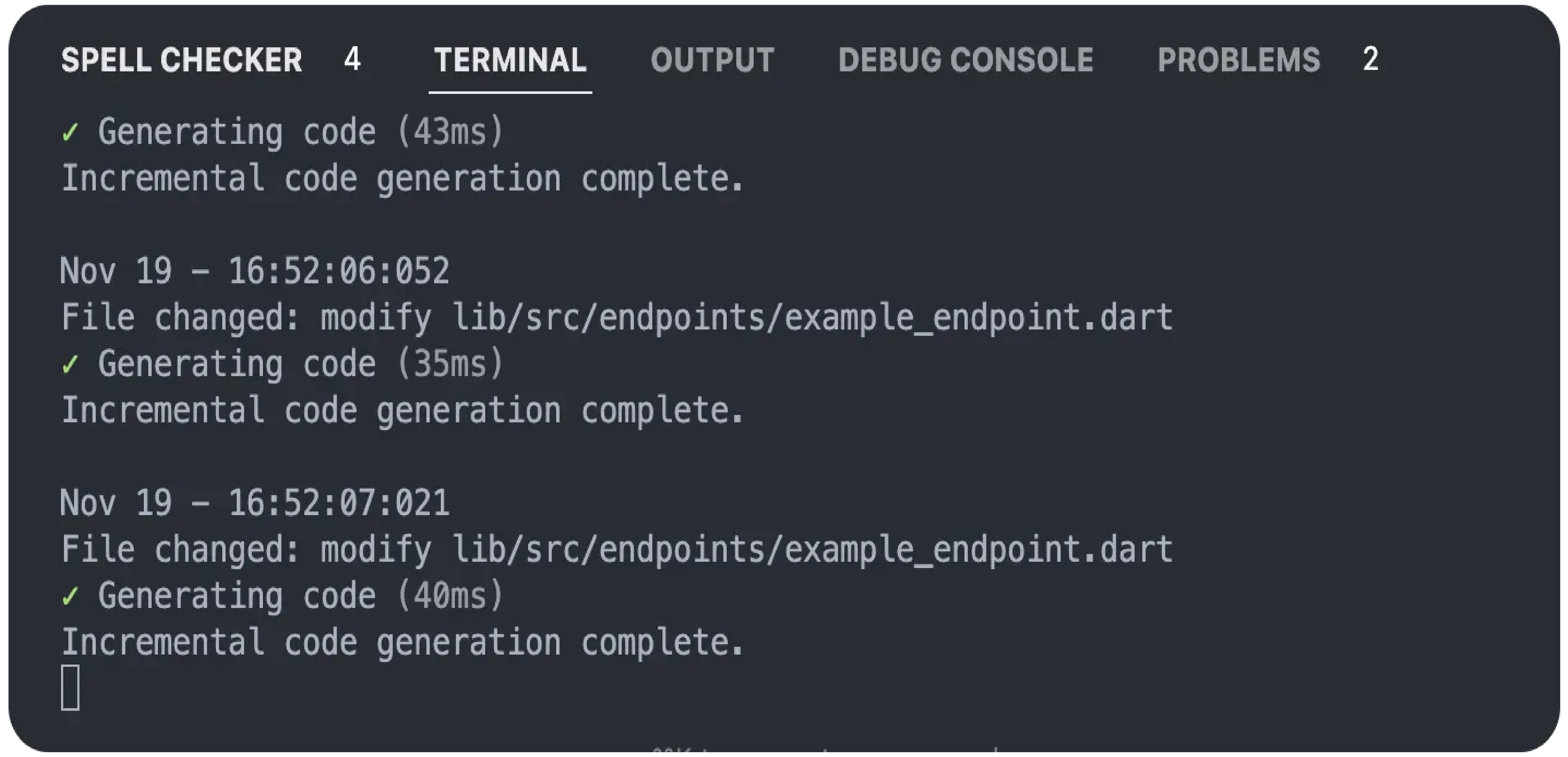
Generate the exception: *serverpod generate*


```
lib
  src
    endpoint
    generated
      endpoints.dart
      greeting.dart
      protocol.dart
      protocol.yaml
      task.dart
      task_exception.dart
```

Code generation



```
serverpod generate

// Monitor changes to the Server directory and
// generate code and files in real time
serverpod generate --watch
```

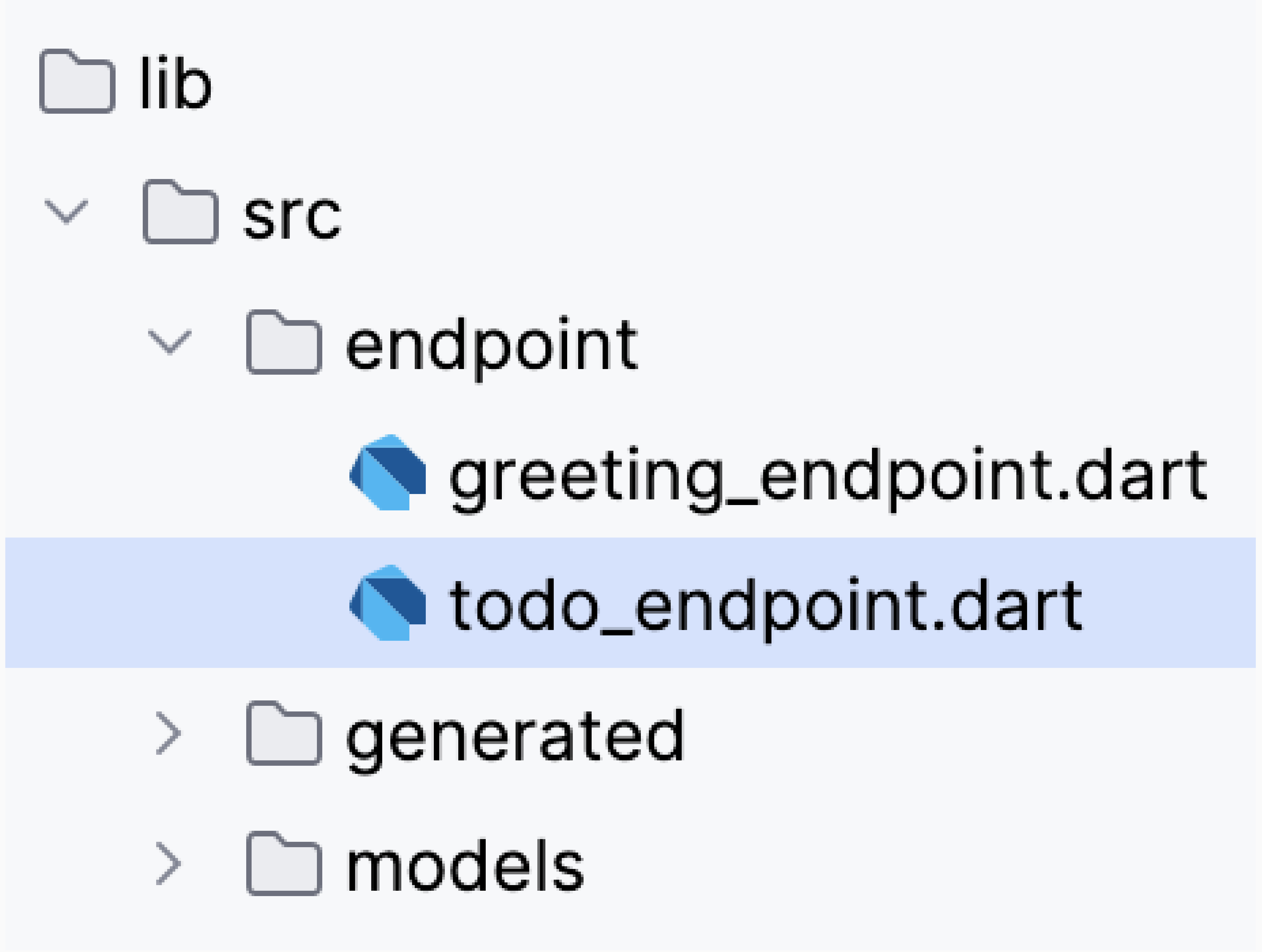


```
✓ Generating code (43ms)
Incremental code generation complete.

Nov 19 - 16:52:06:052
File changed: modify lib/src/endpoints/example_endpoint.dart
✓ Generating code (35ms)
Incremental code generation complete.

Nov 19 - 16:52:07:021
File changed: modify lib/src/endpoints/example_endpoint.dart
✓ Generating code (40ms)
Incremental code generation complete.
```

Ctrl/Cmd + S → Serverpod supports Hot Reload

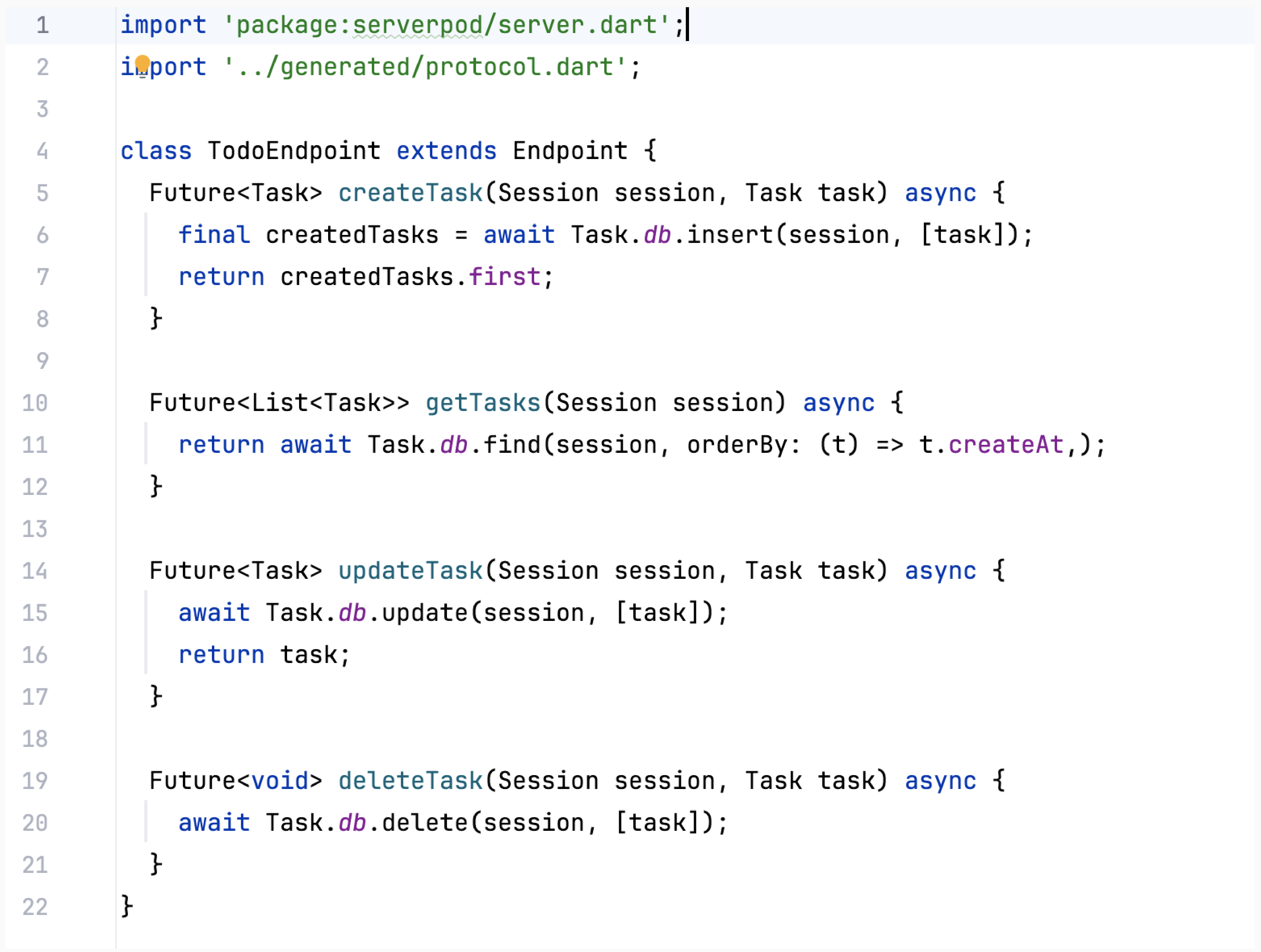
Create Endpoint

Create file todo_endpoint.dart



Create Endpoint

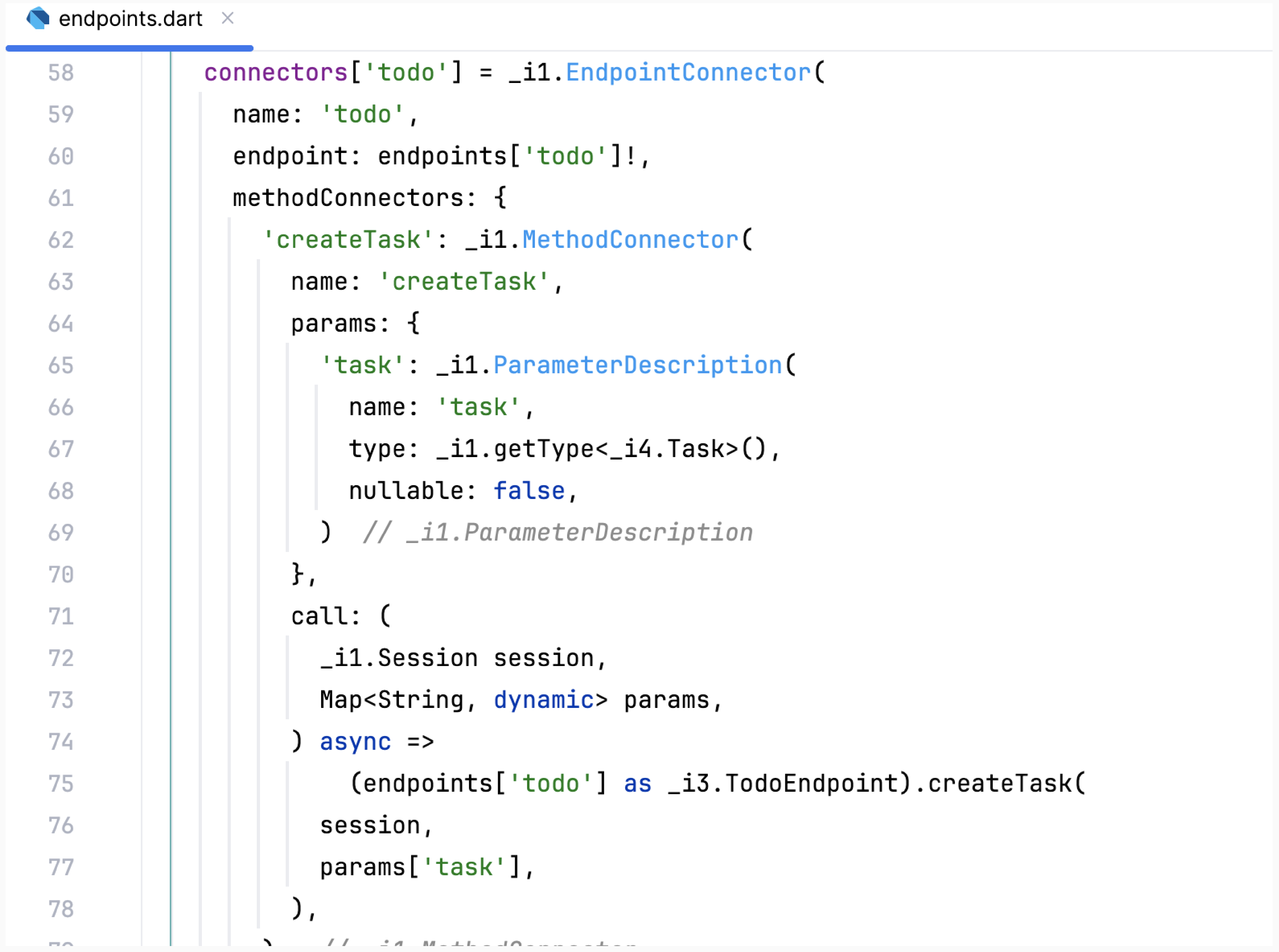
Write the endpoint class (**must extends Endpoint**)



```dart
import 'package:serverpod/server.dart';
import '../generated/protocol.dart';

class TodoEndpoint extends Endpoint {
  Future<Task> createTask(Session session, Task task) async {
    final createdTasks = await Task.db.insert(session, [task]);
    return createdTasks.first;
  }

  Future<List<Task>> getTasks(Session session) async {
    return await Task.db.find(session, orderBy: (t) => t.createAt,);
  }

  Future<Task> updateTask(Session session, Task task) async {
    await Task.db.update(session, [task]);
    return task;
  }

  Future<void> deleteTask(Session session, Task task) async {
    await Task.db.delete(session, [task]);
  }
}
```

Create Endpoint

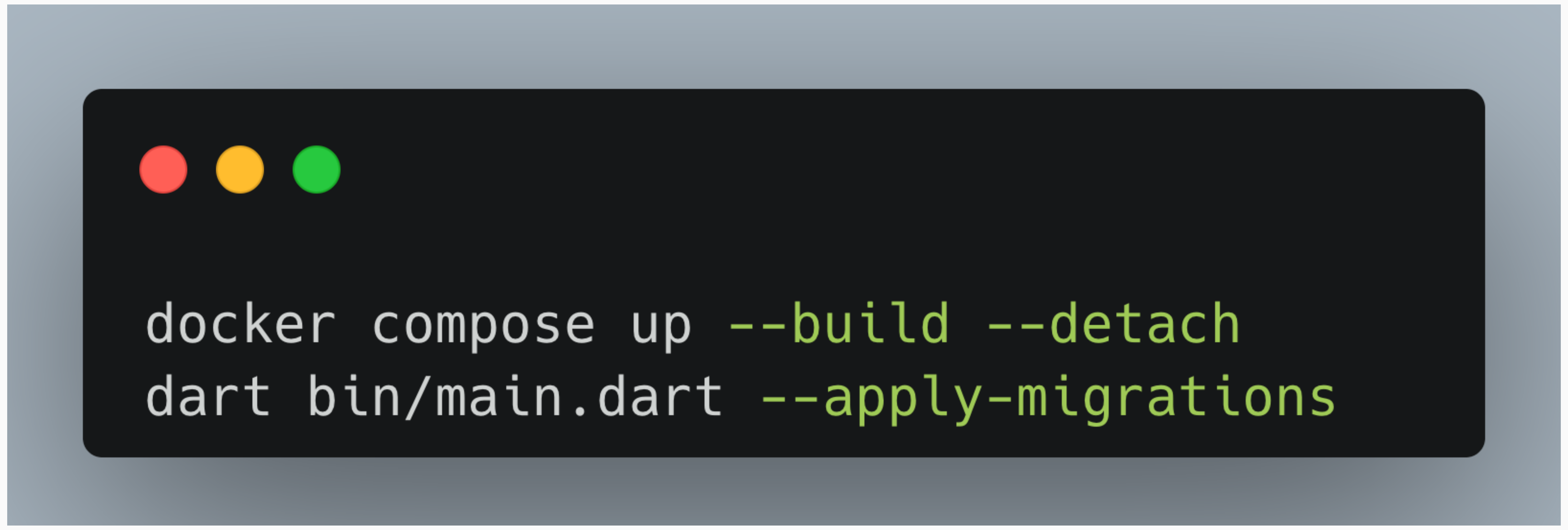
Generate Server and Client code:*serverpod generate*



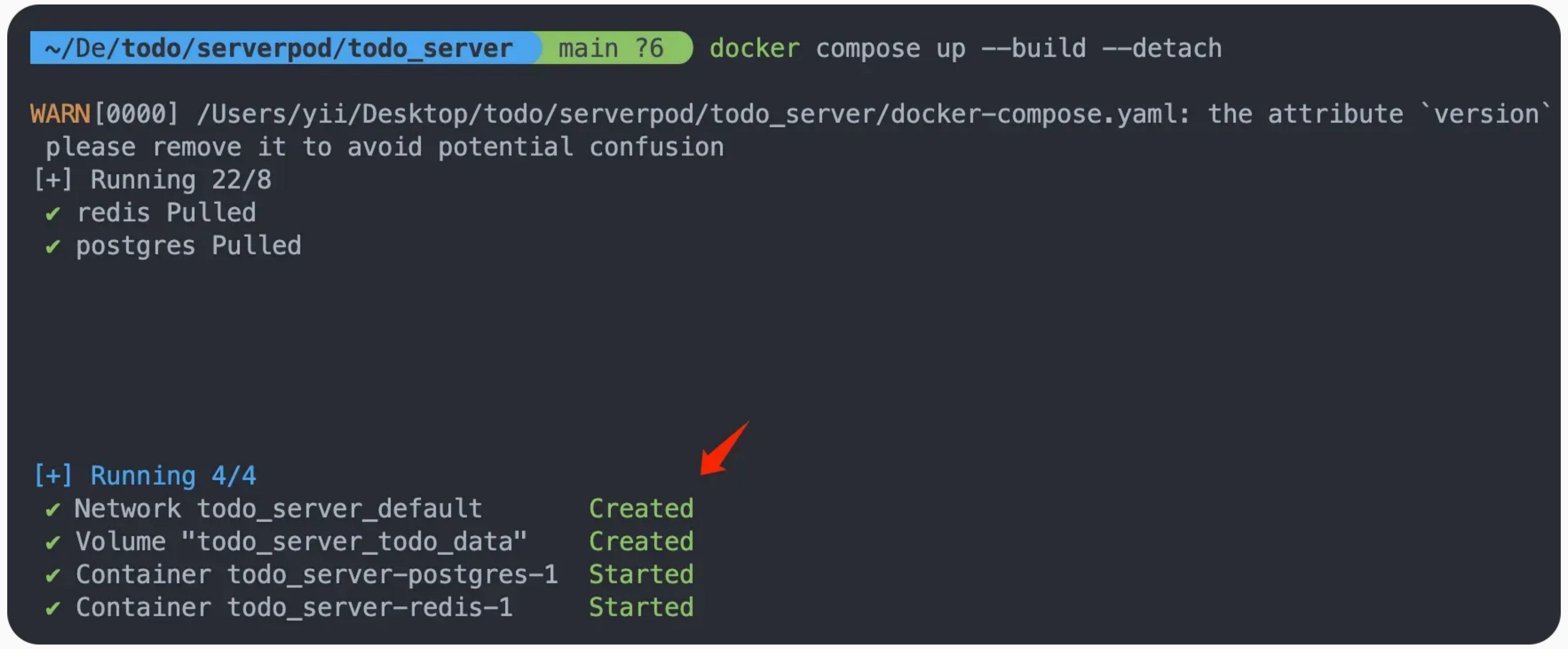
endpoints.dart

```dart
connectors['todo'] = _i1.EndpointConnector(
  name: 'todo',
  endpoint: endpoints['todo']!,
  methodConnectors: {
    'createTask': _i1.MethodConnector(
      name: 'createTask',
      params: {
        'task': _i1.ParameterDescription(
          name: 'task',
          type: _i1.getType<_i4.Task>(),
          nullable: false,
        )  // _i1.ParameterDescription
      },
      call: (
        _i1.Session session,
        Map<String, dynamic> params,
      ) async =>
          (endpoints['todo'] as _i3.TodoEndpoint).createTask(
        session,
        params['task'],
      ),
    ), // _i1.MethodConnector
```

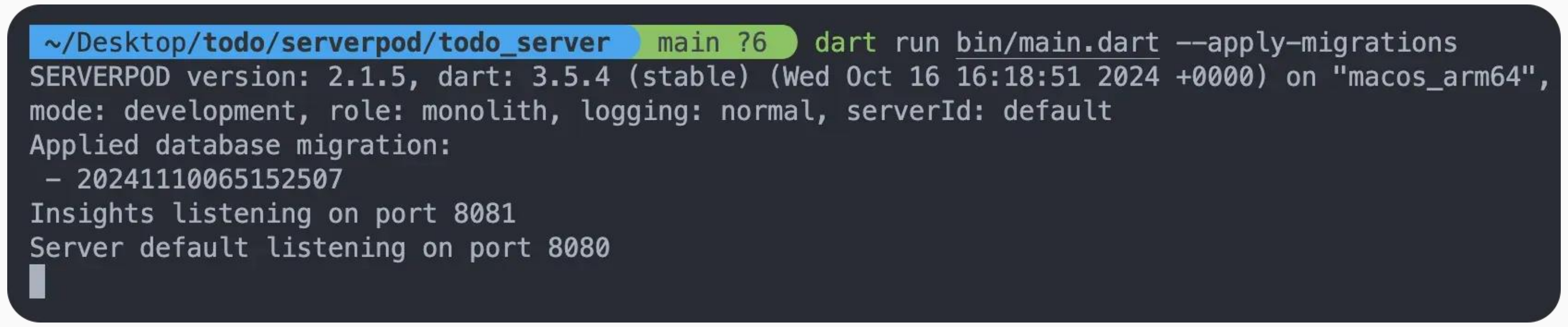
Server running



```
docker compose up --build --detach
dart bin/main.dart --apply-migrations
```



```
~/De/todo/serverpod/todo_server  main ?6  docker compose up --build --detach

WARN[0000] /Users/yii/Desktop/todo/serverpod/todo_server/docker-compose.yaml: the attribute `version`
 please remove it to avoid potential confusion
[+] Running 22/8
 ✔ redis Pulled
 ✔ postgres Pulled




[+] Running 4/4
 ✔ Network todo_server_default       Created
 ✔ Volume "todo_server_todo_data"    Created
 ✔ Container todo_server-postgres-1  Started
 ✔ Container todo_server-redis-1     Started
```



```
~/Desktop/todo/serverpod/todo_server  main ?6  dart run bin/main.dart --apply-migrations
SERVERPOD version: 2.1.5, dart: 3.5.4 (stable) (Wed Oct 16 16:18:51 2024 +0000) on "macos_arm64",
mode: development, role: monolith, logging: normal, serverId: default
Applied database migration:
 - 20241110065152507
Insights listening on port 8081
Server default listening on port 8080
```

Client

```
final client = Client('<http://$localhost:8080/>')
  ..connectivityMonitor = FlutterConnectivityMonitor();
```

● ○ ○ ○ ○ ○

Client

```
void getTasks() async {
  final result = await client.todo.getTasks();

  setState(() {
    tasks.addAll(result);
  });
}
```

Client

```
void createTask() async {
  final taskName = _textEditingController.text;
  final task = Task(
    name: taskName,
    isDone: false,
    createAt: DateTime.now(),
  );  // Task

  try {
    final createdTask = await client.todo.createTask(task);
```

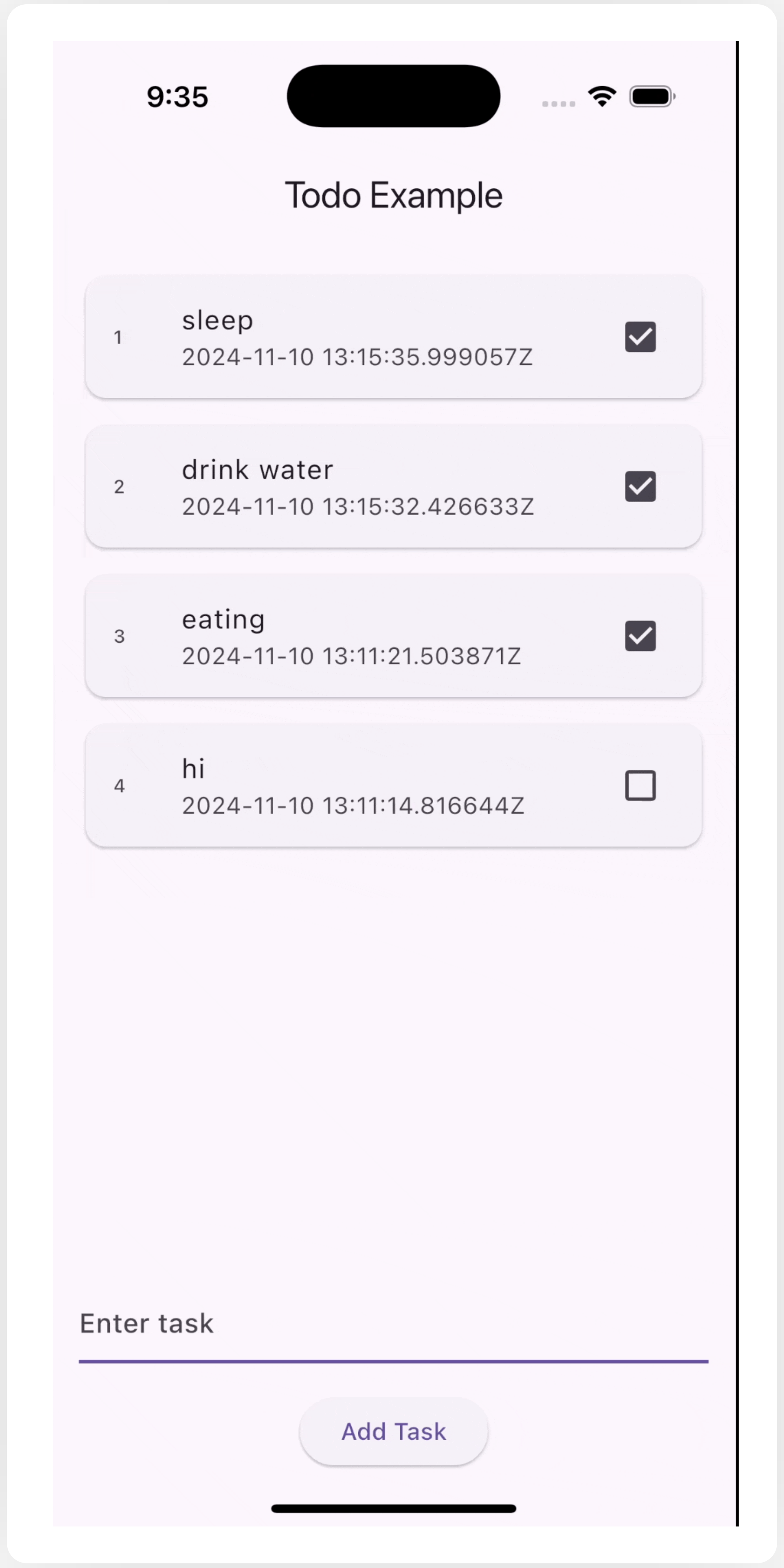
Client

```
Future<void> updateTask(int index) async {
  final task = tasks.elementAt(index);
  final newTask = task.copyWith(isDone: !task.isDone);

  try {
    setState(() {
      tasks[index] = newTask;
    });

    await client.todo.updateTask(newTask);
```

Client

```
void deleteTask(int index) async {
  final task = tasks.elementAt(index);

  try {
    setState(() {
      tasks.remove(task);
    });

    await client.todo.deleteTask(task);
```

Client demo


9:35

Todo Example

1	sleep 2024-11-10 13:15:35.999057Z	✓
2	drink water 2024-11-10 13:15:32.426633Z	✓
3	eating 2024-11-10 13:11:21.503871Z	✓
4	hi 2024-11-10 13:11:14.816644Z	☐

Pros, Cons & Conclusion

PROS, CONS & CONCLUSION

	Serverpod	Others (e.g., Node.js, Firebase)
Language	Dart only	JS, TS, Go, Python, etc.
Typing	Strong, end-to-end	Often weak or needs extra libraries
Flutter Integration	**Native**	Manual REST/GraphQL
Tooling	**Built-in CLI & UI**	Varies by framework
Learning Curve	**Low for Flutter devs**	May need full-stack knowledge
Scalability & Flexibility	Good, less modular	Highly flexible
Adoption	**Still limited**	Widely used in production

When adopt it?

DO

- Team Flutter-centric
- Fast and consistent MVPs
- Avoid context switching

DON' T

- Very complex or legacy backend
- Highly scalable microservices

Where to go now

1 Caching

2 Logging

3 Modules

4 Authentication

5 Uploading files

6 Scheduling

7 Streams

8 Serverpod mini

Conclusions

Dart full-stack is a reality with Serverpod

Simplified client-server communication

Consistent experience with powerful tooling

ME AS A
DART DEVELOPER
FLUTTER
FRONTEND
SERVERPOD
FULL-STACK POWER

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