
Yandex

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Basics of async and networking

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Networking examples

bit.ly/networking_examples

Sockets and asynchronous programming

(once again)

Asynchronous programming

- Future API
- Async and await
- Stream

Future API

```
// HttpRequest.getString(url) - returns Future<String>
void getData(String url) {
   HttpRequest.getString(url).then((String result) {
       print(result);  // handle the result
   }).catchError((e) {
      // handle an error
   });
}
```

async и await

```
// HttpRequest.getString(url) - returns Future<String>
void getData(String url) async { // await keyword inside so make function async
   try {
      // execution will freeze inside getData until result will be returned
      String result = await HttpRequest.getString(url)
      print(result); // handle the result
   } catch (e) {
       // handle an error
   }
}
```

Live example

```dart
import 'dart:async';

void main() {
  var counter = 0;
  final timer = Timer.periodic(Duration(seconds: 1), (_) => print(counter++));
  Future.delayed(Duration(seconds: 10)).then((_) {
    print('Finished');
    timer.cancel();
  });
}

void main() async {
  var counter = 0;
  final timer = Timer.periodic(Duration(seconds: 1), (_) => print(counter++));
  await Future.delayed(Duration(seconds: 10));
  print('Finished');
  timer.cancel();
}
```

Streams

- Sequence of async events
- Can subscribe and unsubscribe from a stream
- Can transform and process a stream

Stream types

- Single subscription — subscribe only once. For example, server request.
- Broadcast — many subscribers. For example, UI events or location.

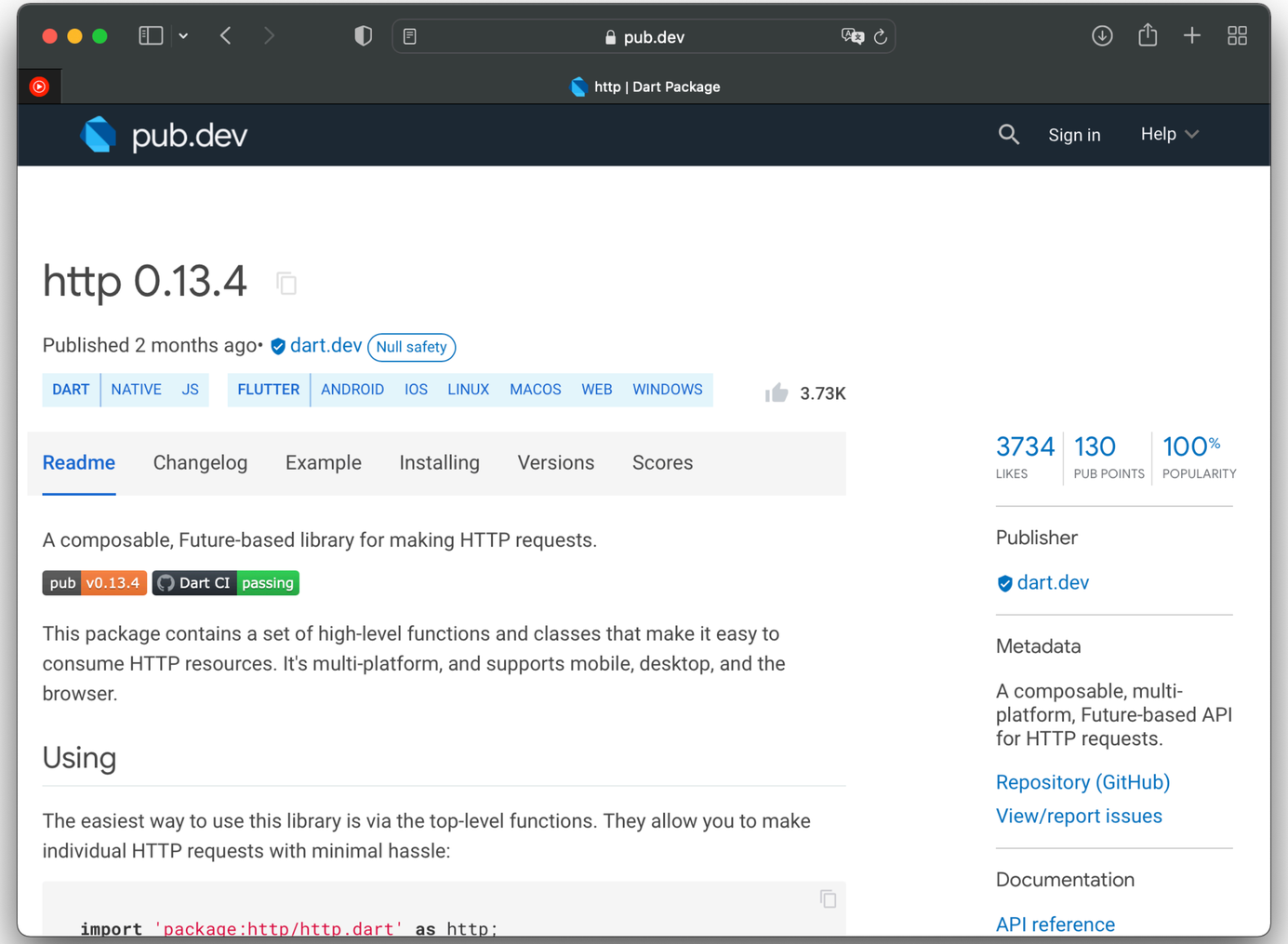
Example

```
final subscription = Stream<int>
    .periodic(const Duration(milliseconds: 100), (int event) ⇒ event)
    .listen(
       (event) {
         print(event);     // handle elements
       },
       onError: (e) {
         print(e);         // handle an error
       },
    );
```

Sockets

```
abstract class Socket implements Stream<Uint8List>, IOSink {
  // ...
}

// ----

// open connection
final socket = await  Socket.connect('localhost', 4567);

// receive data
socket.listen(...) // Function(Uint8List)? onData

// send data
socket.write(...) // Object? object
```

HTTP


pub.dev
http | Dart Package
pub.dev
Sign in
Help
http 0.13.4
Published 2 months ago• dart.dev Null safety
DART NATIVE JS FLUTTER ANDROID IOS LINUX MACOS WEB WINDOWS
3.73K
Readme Changelog Example Installing Versions Scores
A composable, Future-based library for making HTTP requests.
pub v0.13.4 Dart CI passing
This package contains a set of high-level functions and classes that make it easy to consume HTTP resources. It's multi-platform, and supports mobile, desktop, and the browser.
Using
The easiest way to use this library is via the top-level functions. They allow you to make individual HTTP requests with minimal hassle:
import 'package:http/http.dart' as http;
3734 LIKES
130 PUB POINTS
100% POPULARITY
Publisher
dart.dev
Metadata
A composable, multi-platform, Future-based API for HTTP requests.
Repository (GitHub)
View/report issues
Documentation
API reference

http

HTTP

1. Add dependency name into **pubspec.yaml**

```
dependencies:
   http: 0.13.4
```

2. `flutter pub get`

3.
```
import 'package:http/http.dart' as http;
```

4. Use it!

```
http.get(Uri.parse('https://api.ipify.org'));
```

HTTP

```
Future<Response> get(Uri url,
                     {Map<String, String>? headers})
```

- get
- post
- head
- patch
- put
- delete

HTTP

```
final client = http.Client();

client.send(request);
```

HTTP

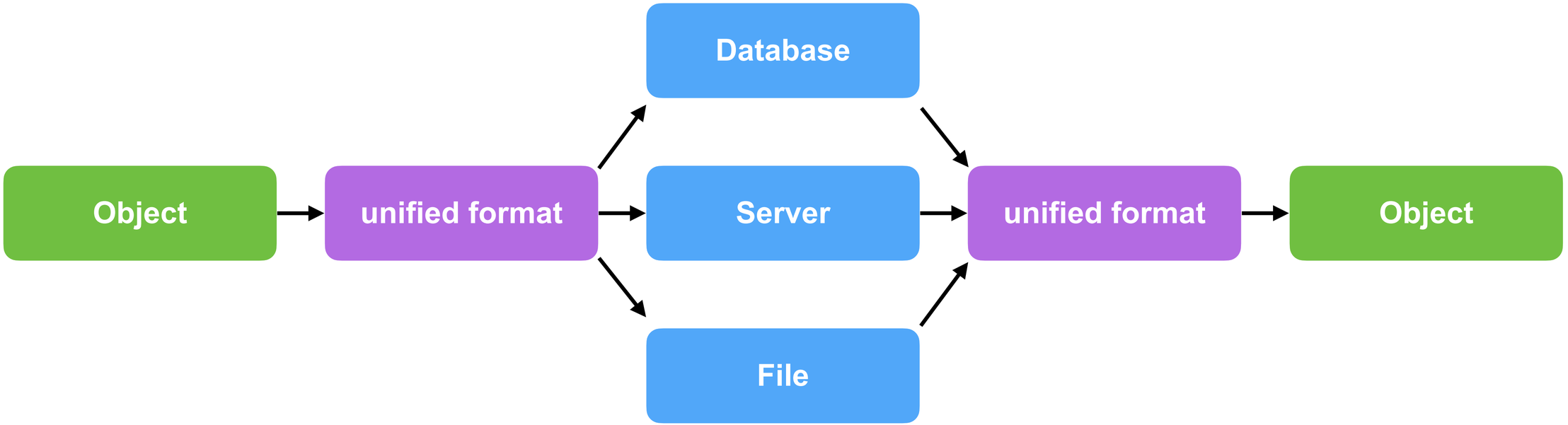
```
MultipartRequest extends BaseRequest
```

```
final multipart =  http.MultipartRequest('POST', uri);
multipart.files.add(MultipartFile(...));

client.send(multipart);
```

Serialization

Serialization

Deserialization



Serialization

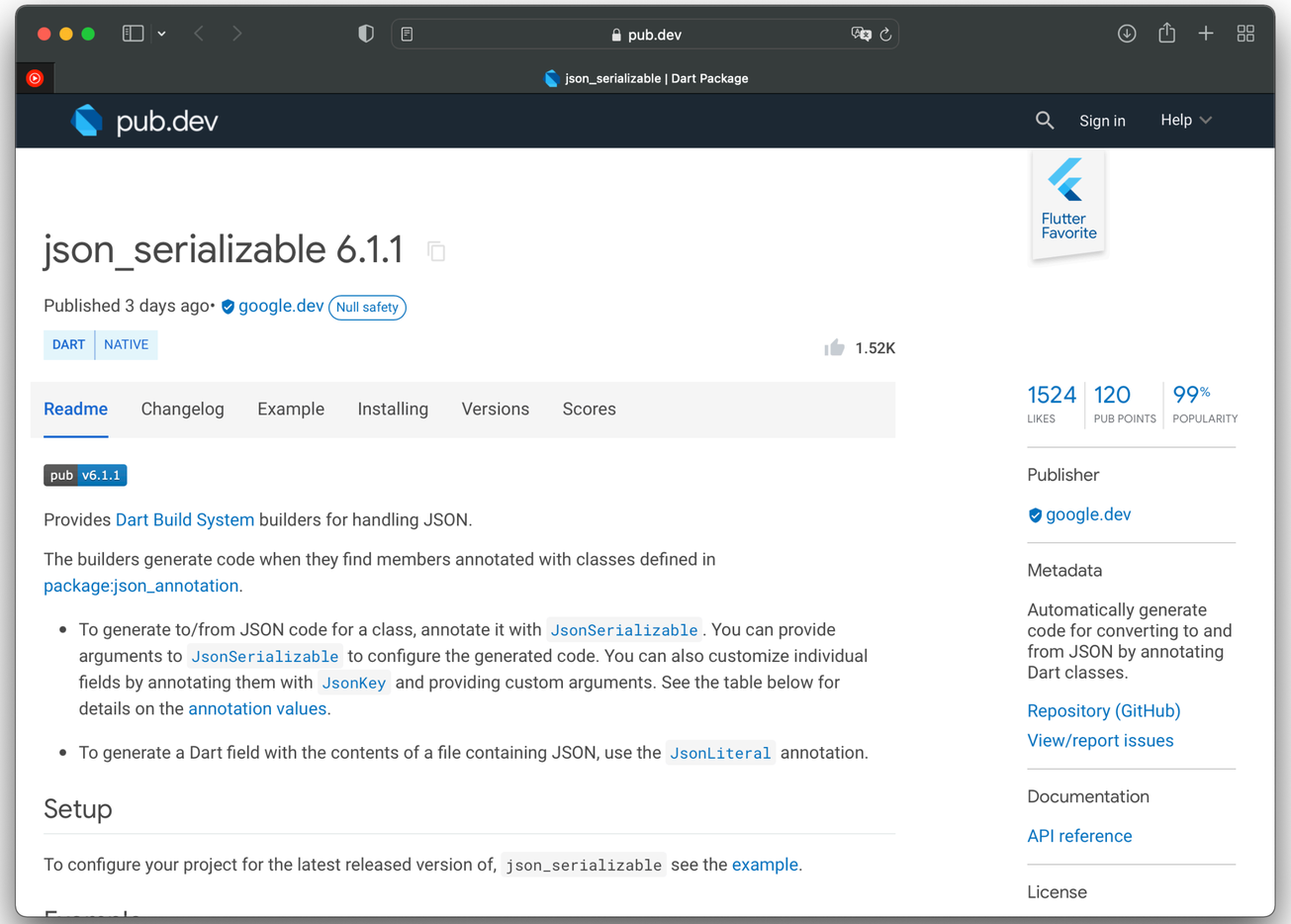
1. `import 'dart:convert';`

2. Serialization

```
jsonEncode(Map<String, dynamic>()) // returns String
```

3. Deserialization

```
jsonDecode('{"key": "value"}') // returns dynamic
```



json_serializable

Serialization

1. Add dependency name into **pubspec.yaml**

```
dependencies:
   json_annotation: 4.4.0

dev_dependencies:
   json_serializable: 6.1.4
   build_runner: 2.1.7
```

2. `flutter pub get`

Serialization

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

part 'user.g.dart';

@JsonSerializable()
class User {
  final String name;
  final String email;

  User(this.name, this.email);

  factory User.fromJson(Map<String, dynamic> json) => _$UserFromJson(json);
  Map<String, dynamic> toJson() => _$UserToJson(this);
}
```

Serialization

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part 'user.g.dart';

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Serialization

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  factory User.fromJson(Map<String, dynamic> json) => _$UserFromJson(json);
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}
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Serialization

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part 'user.g.dart';

@JsonSerializable()
class User {
  final String name;
  final String email;

  User(this.name, this.email);

  factory User.fromJson(Map<String, dynamic> json) => _$UserFromJson(json);
  Map<String, dynamic> toJson() => _$UserToJson(this);
}
```

Serialization

Run code generation:

```
flutter pub run build_runner build
```

Serialization

```
const JsonKey({
  this.defaultValue,
  this.disallowNullValue,
  this.fromJson,
  this.ignore,
  this.includeIfNull,
  this.name,
  this.required,
  this.toJson,
  this.unknownEnumValue,
});
```

```
// ...
class User {
  @JsonSerializable(name: 'name')
  final String name;
  @JsonSerializable(name: 'email')
  final String email;

  User(this.name, this.email);

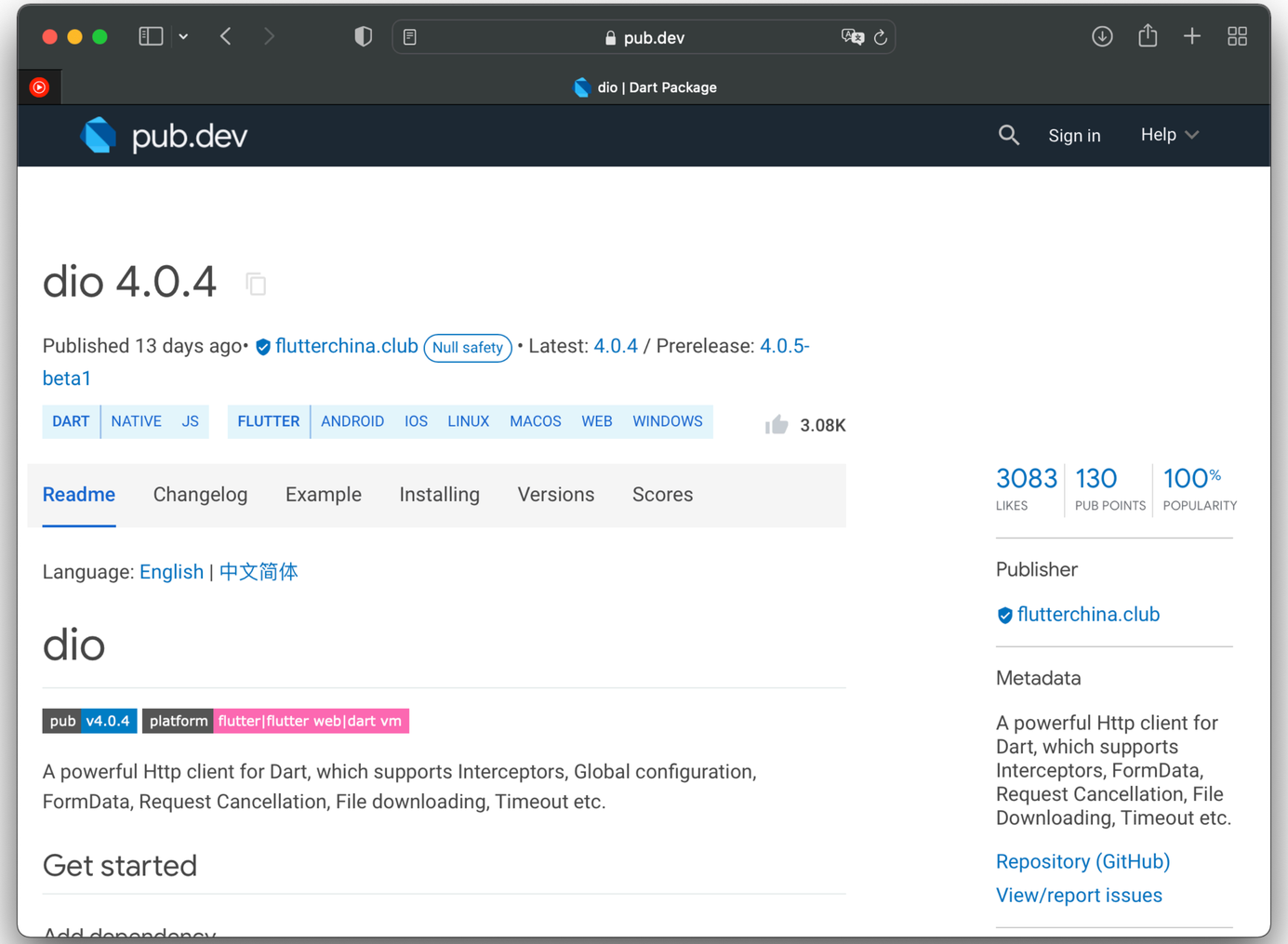
  // ...
}
```

Serialization

Other solutions for serialization

- freezed
- built_value

Dio


pub.dev
dio | Dart Package
pub.dev
Sign in
Help
dio 4.0.4
Published 13 days ago• flutterchina.club Null safety • Latest: 4.0.4 / Prerelease: 4.0.5-beta1
DART NATIVE JS
FLUTTER ANDROID IOS LINUX MACOS WEB WINDOWS
3.08K
Readme Changelog Example Installing Versions Scores
Language: English | 中文简体
dio
pub v4.0.4 platform flutter|flutter web|dart vm
A powerful Http client for Dart, which supports Interceptors, Global configuration, FormData, Request Cancellation, File downloading, Timeout etc.
Get started
Add dependency
3083 LIKES
130 PUB POINTS
100% POPULARITY
Publisher
flutterchina.club
Metadata
A powerful Http client for Dart, which supports Interceptors, FormData, Request Cancellation, File Downloading, Timeout etc.
Repository (GitHub)
View/report issues

dio

Dio

1. Add dependency name into **pubspec.yaml**

```
dependencies:
    dio: 4.0.4
```

2. `flutter pub get`

3. `import 'package:dio/dio.dart';`

Dio

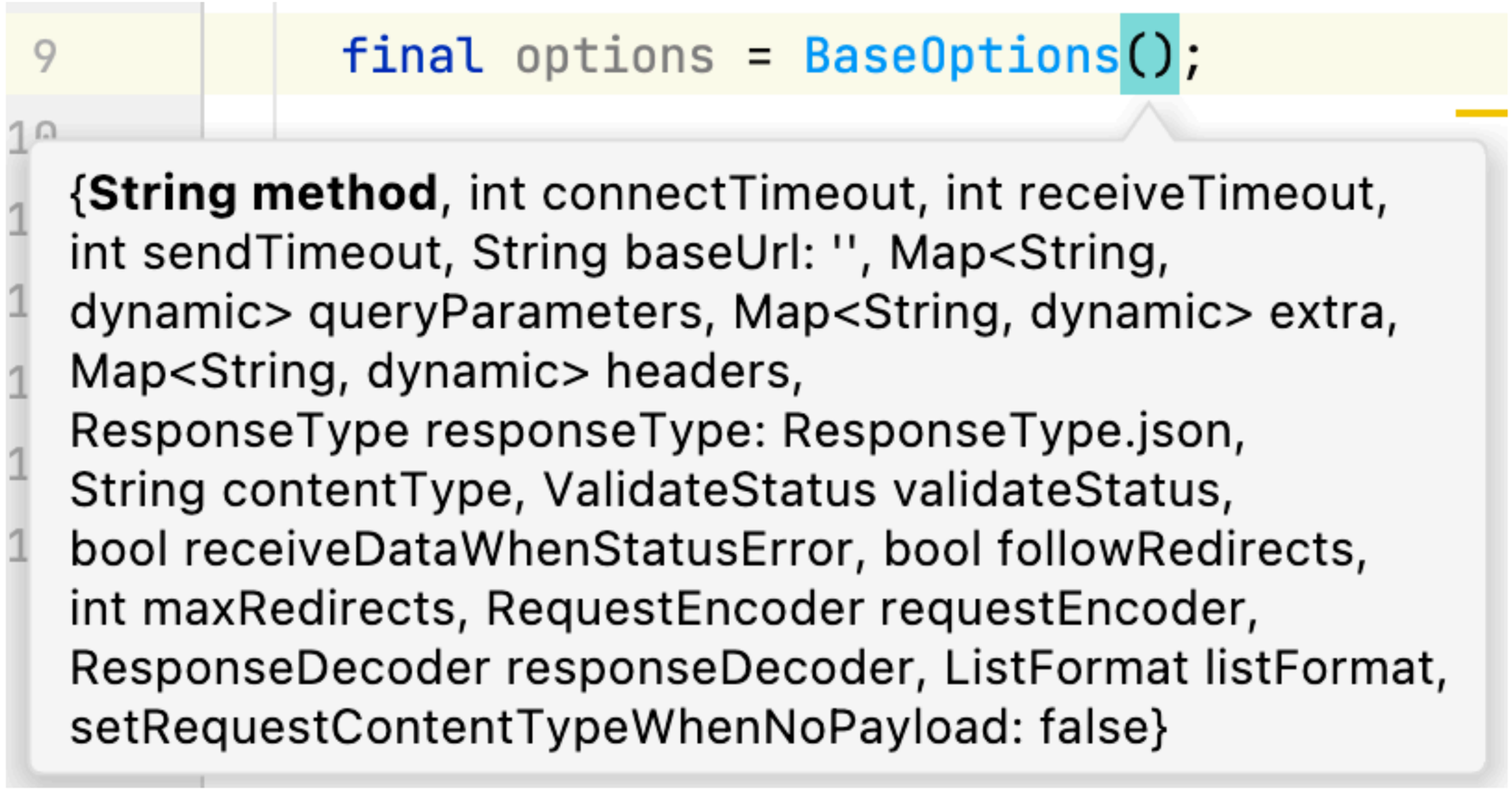
4. Create client

```dart
final Dio _dio = Dio();
```

5. Use it!

```dart
_dio.get('/path');
```

Dio: client configuration




```dart
final Dio _dio = Dio(options);
```

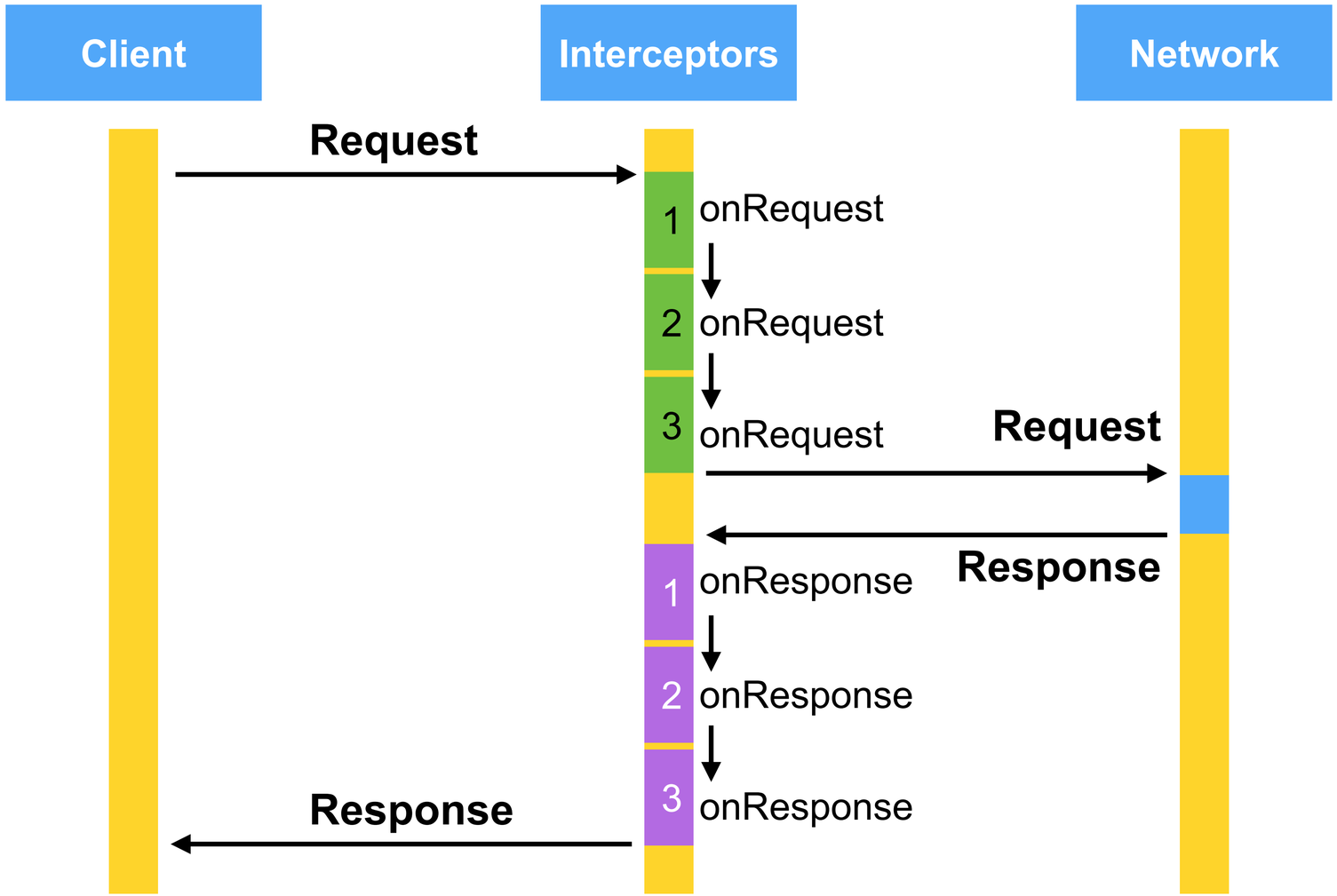
Decerialization

```
_dio.get<Map<String,dynamic>>('/path');
```

Serialization

```
_dio.post(‘/path', data: {
  'field': 'string'
});
```

Dio: interceptors



Dio: interceptors

```
class AuthInterceptor extends Interceptor {

  @override
  void onRequest(RequestOptions options, RequestInterceptorHandler handler) {
    final newOptions = options.copyWith(
      headers: {
        ...options.headers,
        ‘Authorization': token
      }
    );
    handler.next(newOptions);
  }

}
```

Dio: errors

```
try {
  // make request
} on DioError catch (e) {
  // handle error
}
```

Yandex

Thank you for attention

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