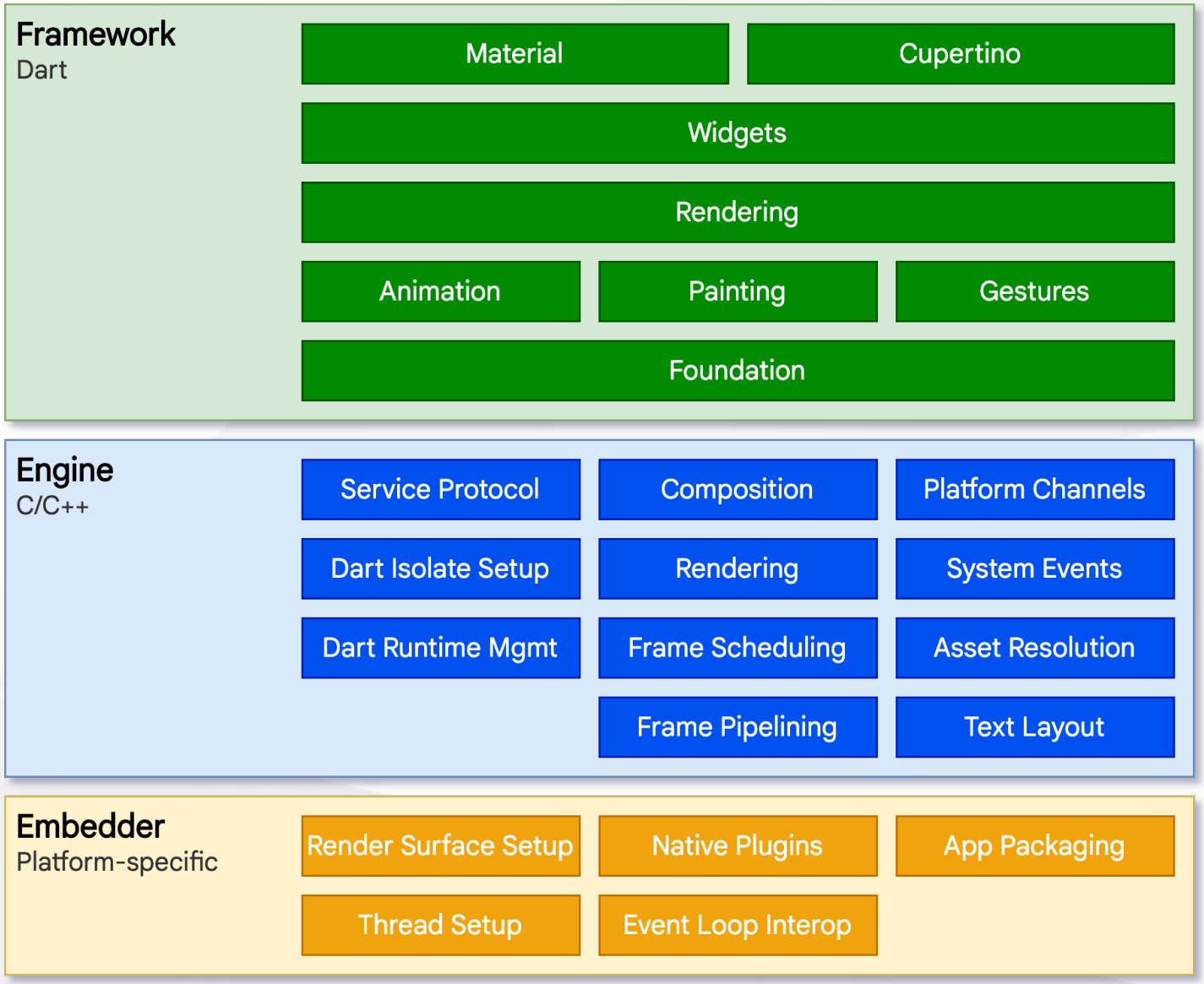
Made by **Google**

1. What is Flutter?

Flutter is `Google's UI toolkit` for building beautiful, natively compiled applications for `mobile`, `web`, `desktop`, and `embedded` devices from a single codebase.

1.1. Architectural layers



https://flutter.dev/docs/resources/architectural-overview

1.2. Get started

Get started now?

https://flutter.dev/docs/get-started/install

Coming from another platform?

Docs:

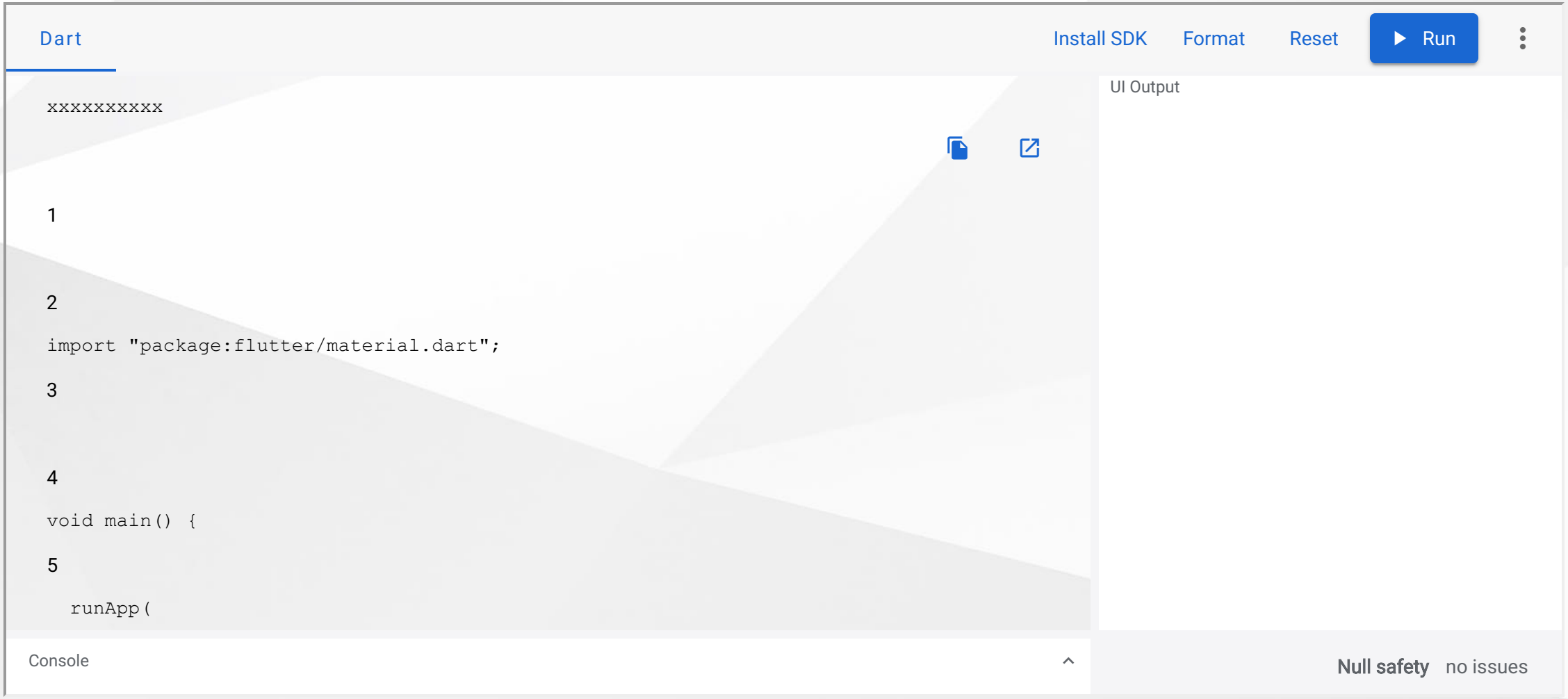
iOS, Android, Web, React Native and Xamarin.

1.3. Try Flutter in your browser

```
import "package:flutter/material.dart";

void main() {
  runApp(
    const Center(
      child: Text(
        "Hello World!!!",
        textDirection: TextDirection.ltr,
      ),
    ),
  );
}
```

1.3. Try Flutter in your browser



https://dartpad.dev/embed-flutter.html?theme=&null_safety=true&id=9677a59dba30af792ba6d129b8a58f63

1.4. Who's using Flutter?

Organizations around the world are building apps with Flutter.

*	*	*
		
		

1.4. Who's using Flutter?

See what's being created:

https://flutter.dev/showcase

2. User Interface

- 2.1. Introduction to widgets
- 2.2. Building layouts
- 2.3. Adding interactivity
- 2.4. Assets & images
- 2.5. Navigation & routing
- 2.6. Animations
- 2.7. Advanced UI
- 2.8. Widget catalog

2.1. Introduction to widgets

- Flutter `Widgets` are inspired by React `Components`
- Rendered by their current configuration (or BuildContext) and state
- When state changes, it rebuilds
- the framework diffs against the previous description in order to determine the minimal changes needed

2.1. Introduction to widgets

- `Everything` is a `Widget`
  - But don’t put everything in one Widget!
- References: https://romain-rastel.medium.com/everything-is-a-widget-but-dont-put-everything-in-a-widget-32f89b5c8bdb

> Everything Should Be Made as Simple as Possible, But Not Simpler

2.1. Introduction to widgets

Basic widgets:

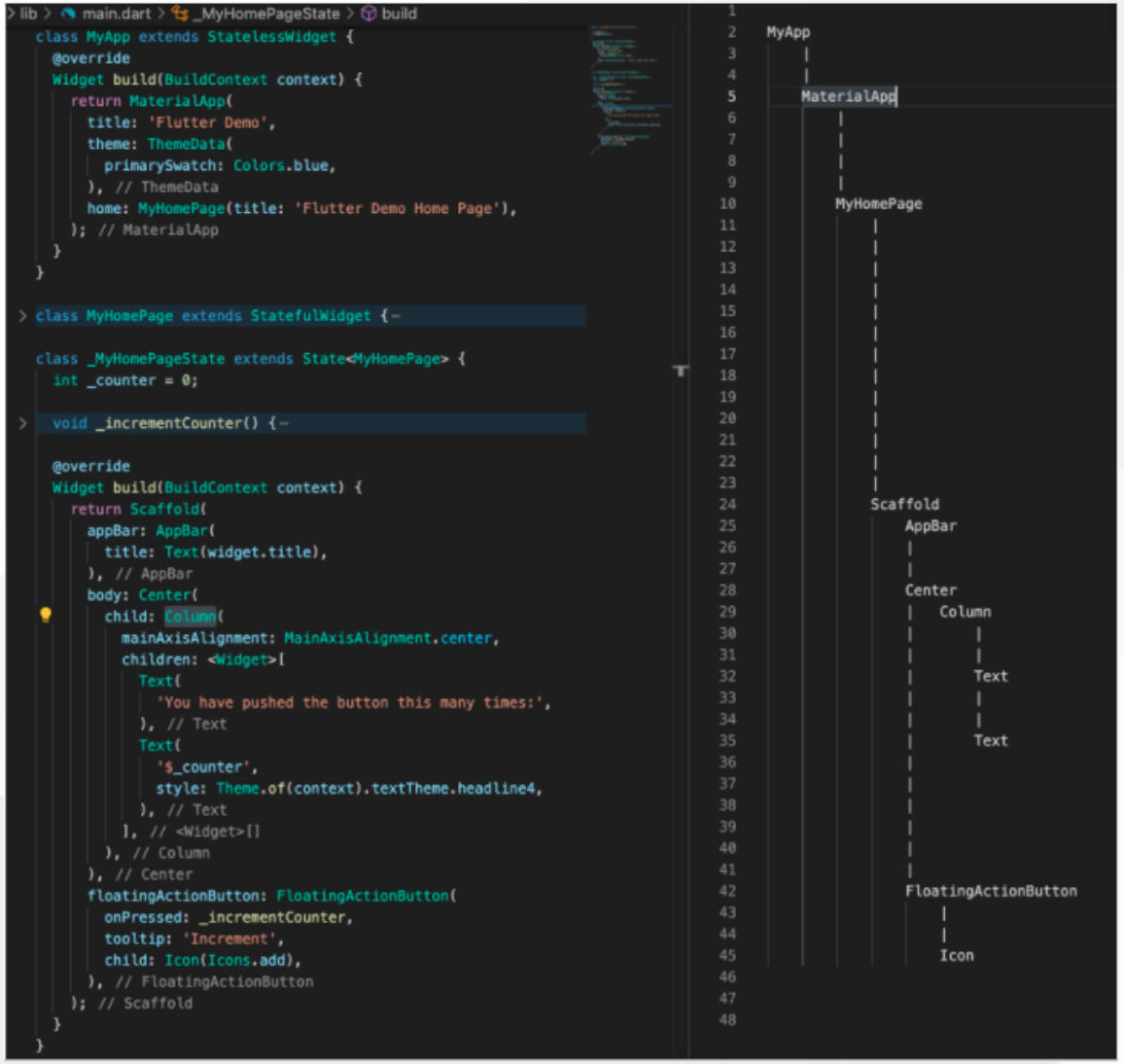
- Text - create a run of styled text within your application.
- Row, Column are flex widgets
- Stack - place widgets on top of each other in paint order.
- Container - create a rectangular visual element, decorated with a background, a border, or a shadow; also have margins, padding, and constraints applied to its size, ...

... more widgets from there: https://api.flutter.dev/flutter/widgets/widgets-library.html

2.1. Introduction to widgets

Notion of Widgets tree

Widgets are organized in tree structure(s).

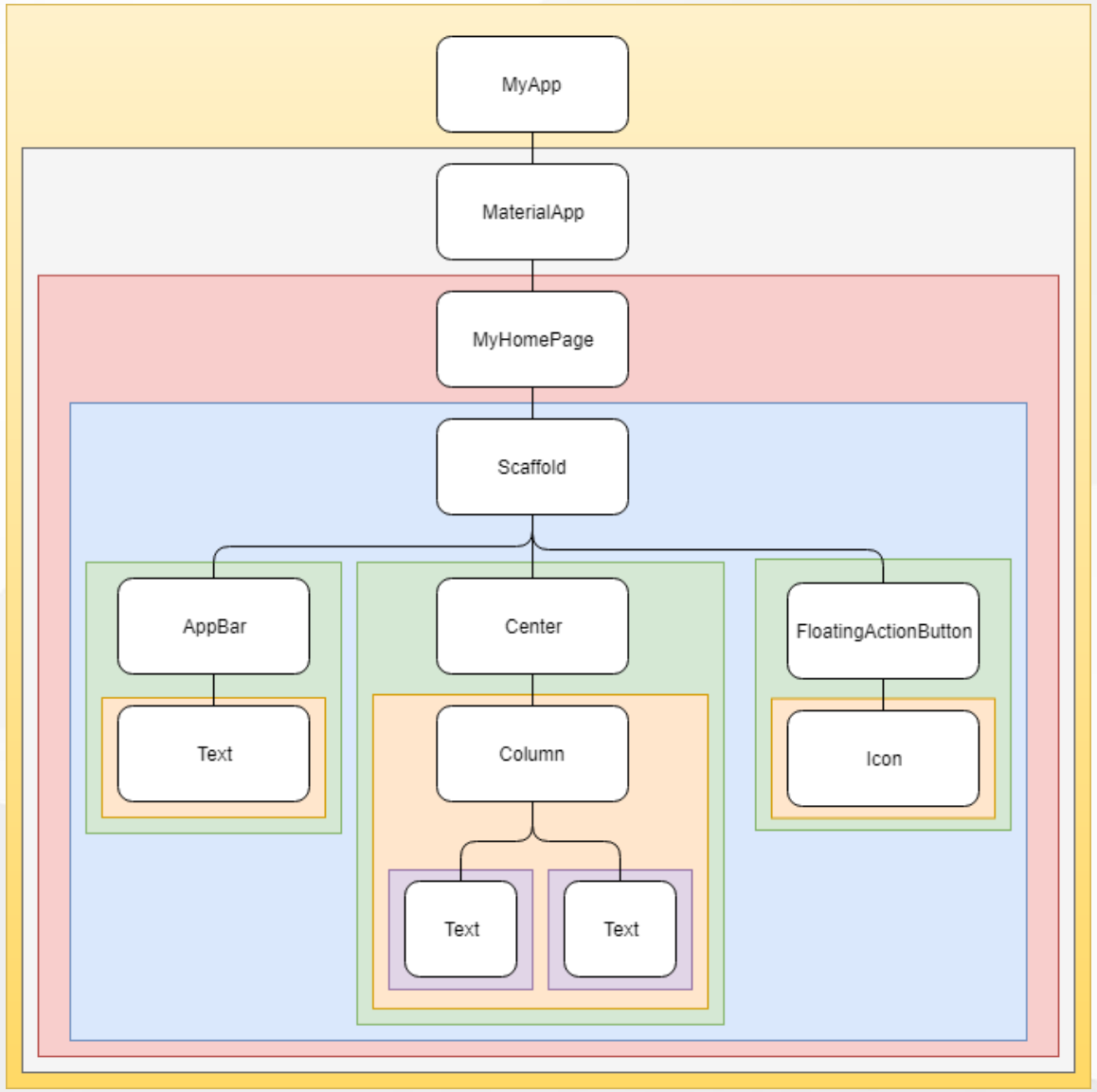


2.1. Introduction to widgets

Notion of Context or BuildContext

Location of a Widget within the tree structure

A context only belongs to one widget.



https://www.didierboelens.com/2018/06/widget-state-context-inheritedwidget/

2.1. Introduction to widgets

Stateful and stateless widgets (1)

StatelessWidget	StatefulWidget
Examples: - Icon - IconButton - Text	Examples: - Checkbox - Radio - Slider - InkWell - Form - TextField
Super-class: StatelessWidget	Super-class: StatefulWidget

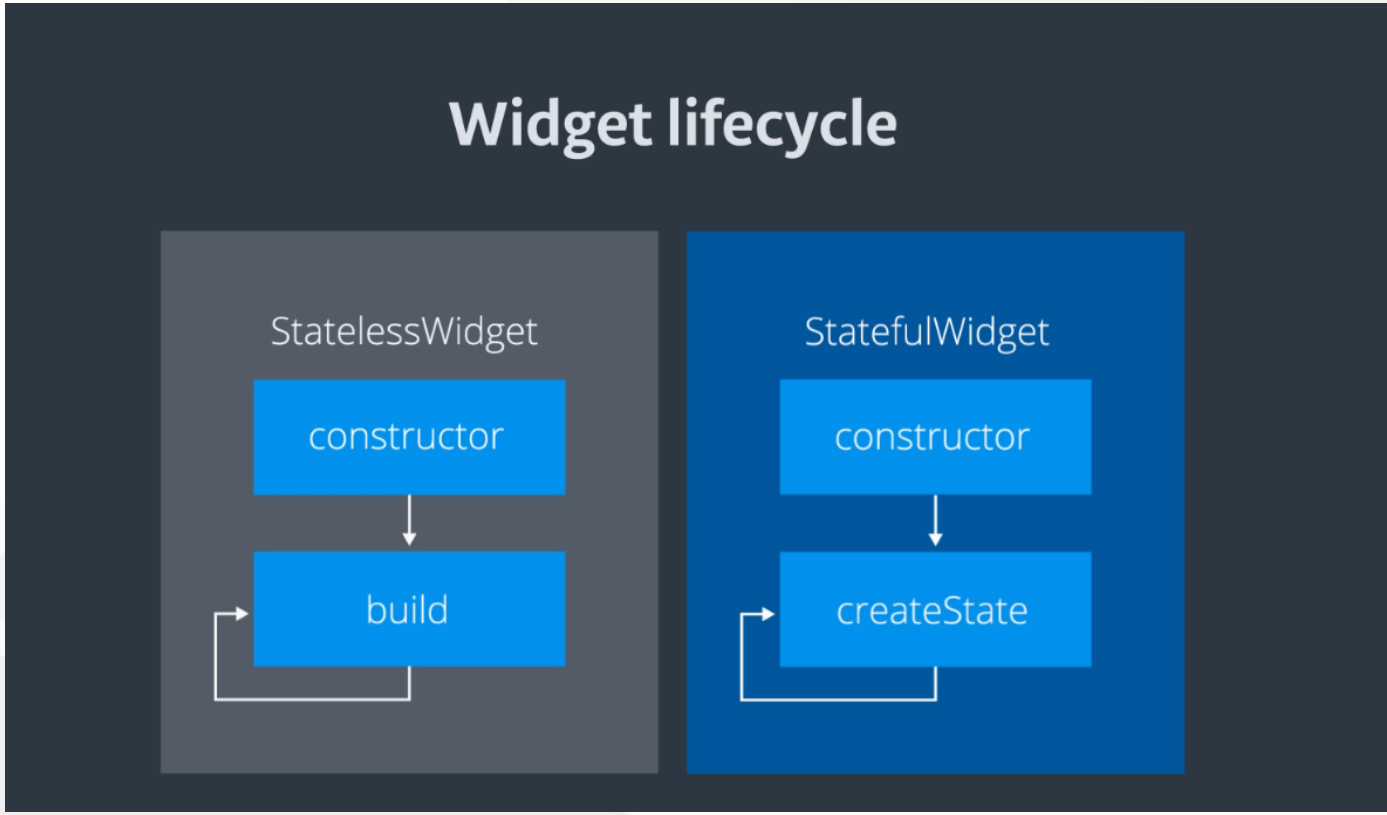
2.1. Introduction to widgets

Stateful and stateless widgets (2)

StatelessWidget	StatefulWidget
Not have to care the state	There are some inner data held and may vary during the lifetime of this widget - called a State

2.1. Introduction to widgets

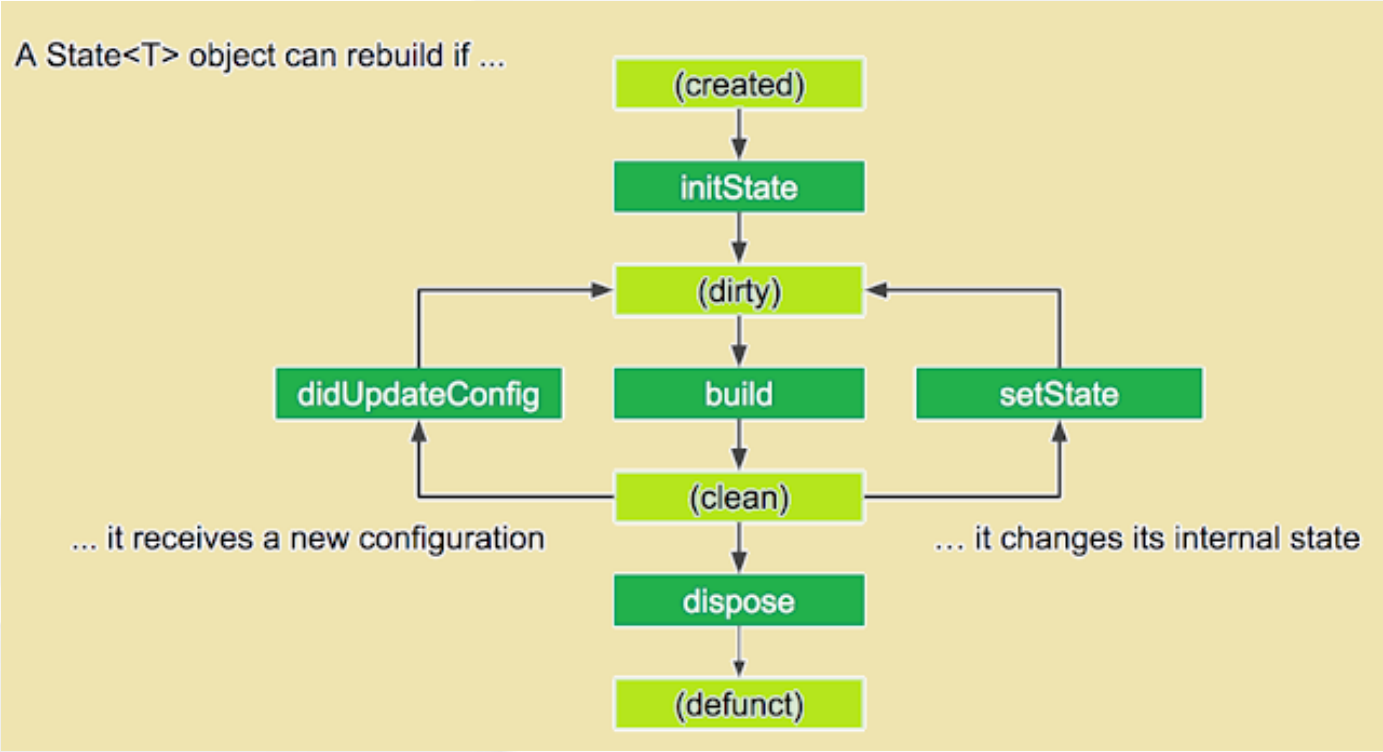
Widget's Lifecycle (1)



2.1. Introduction to widgets

Widget's Lifecycle (2)

The life cycle of the StatefulWidget



https://www.developerlibs.com/2019/12/flutter-lifecycle-widgets.html

2.1. Introduction to widgets

Notion of State

A State defines the `behavioural` part of a StatefulWidget instance.

It holds information aimed at interacting / interferring with the Widget in terms of:

- behaviour
- layout

> Any changes which is applied to a State forces the Widget to rebuild.

2.1. Introduction to widgets

Relation between a State and a Context

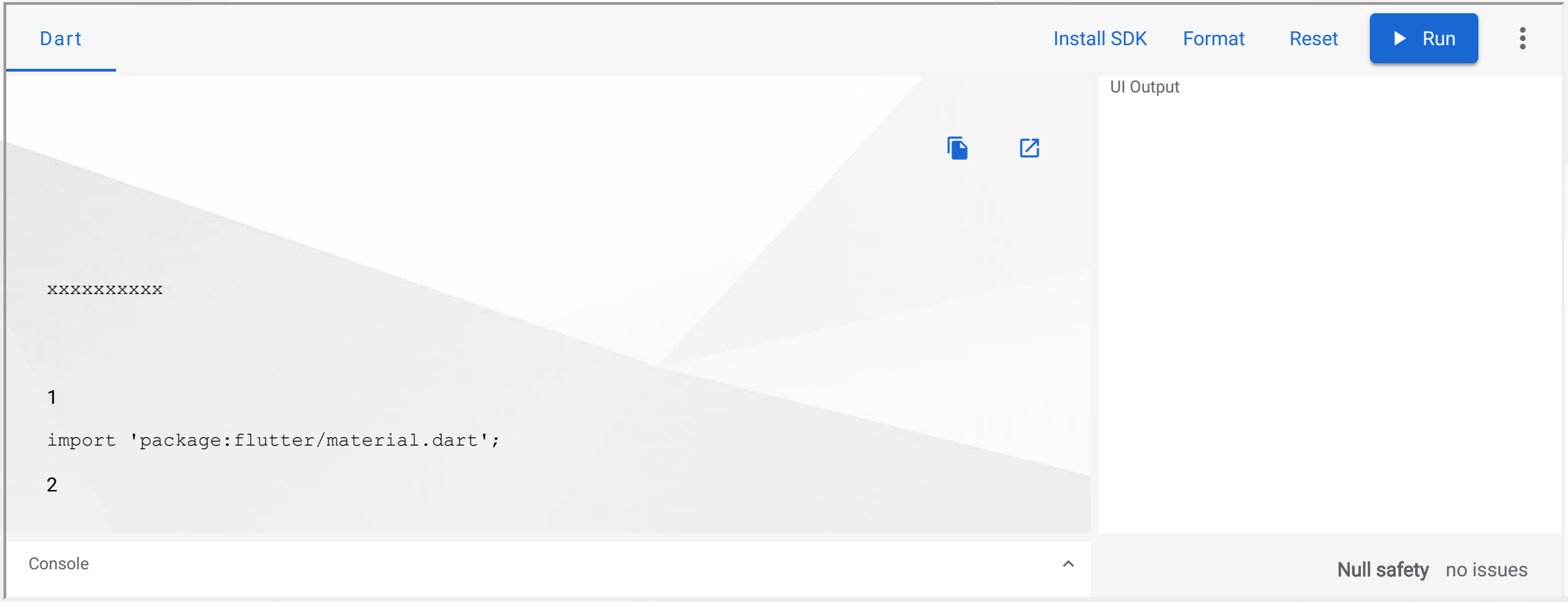
For Stateful widgets, a `State` is associated with a `Context`. This association is permanent and the `State` object will never change its context.

Even if the Widget Context can be moved around the tree structure, the State will remain associated with that context.

When a State is associated with a Context, the State is considered as mounted.

2.1. Introduction to widgets

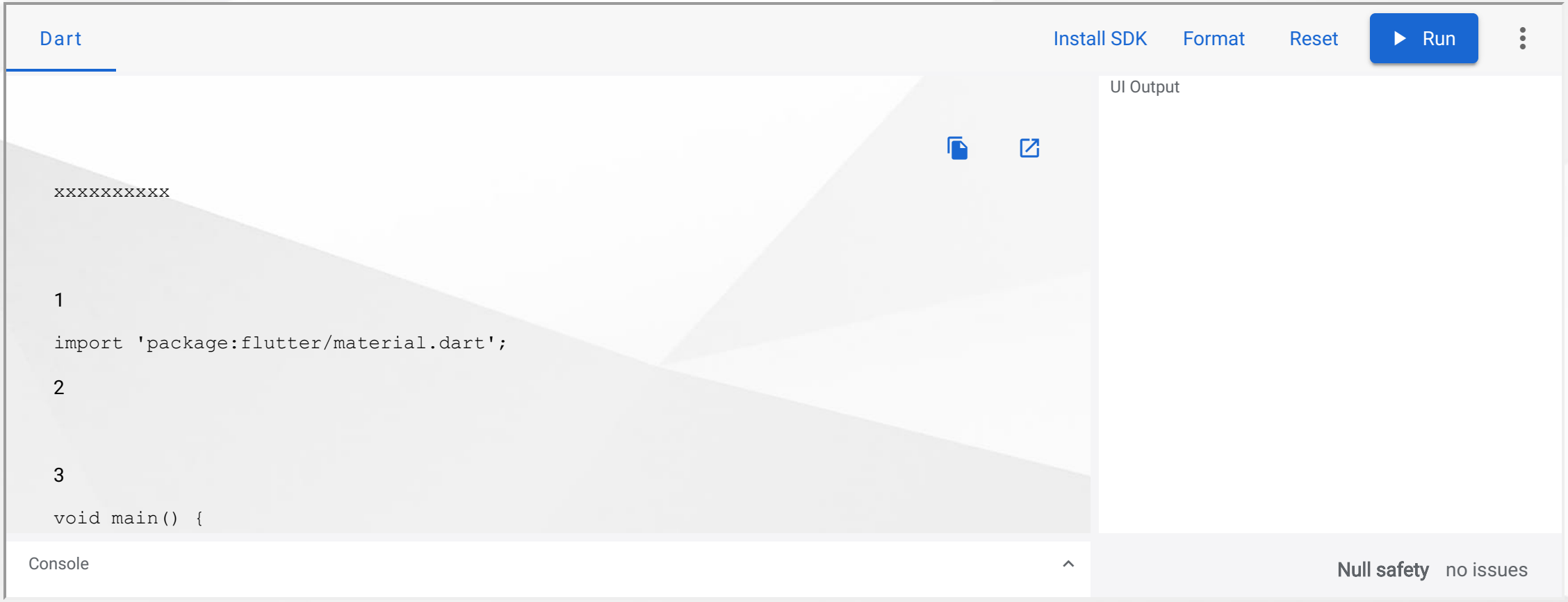
Standard Code of A StatelessWidget



https://dartpad.dev/embed-flutter.html?theme=&null_safety=true&id=e84496279c4f535c42613d827029aad4

2.1. Introduction to widgets

Standard Code of A StatefulWidget



https://dartpad.dev/embed-flutter.html?theme=&null_safety=true&id=48be1c817d6f84f1cb39f06975bccfc5

2.1. Introduction to widgets

Keys

- Use `keys` to control which widgets are `rebuilds`
- For example in builds a list items in ListView:
  - Without `keys` , the item is rebuilt even if it is no longer visible in viewport.
  - By assigning each entry in the list a “semantic” key, only the items visible in the view will be rebuilds.

For more information, see the Key API.

2.1. Introduction to widgets

Global keys

- To uniquely identify child widgets.
- Must be globally unique across the entire widget hierarchy.
- Can be used to retrieve the state associated with a widget.

For more information, see the GlobalKey API.

2.2. Building layouts

- Layouts in Flutter
- Tutorial
- Creating adaptive and responsive apps
- Understanding constraints
- Box constraints

2.2.1 Layouts in Flutter

Example (1)

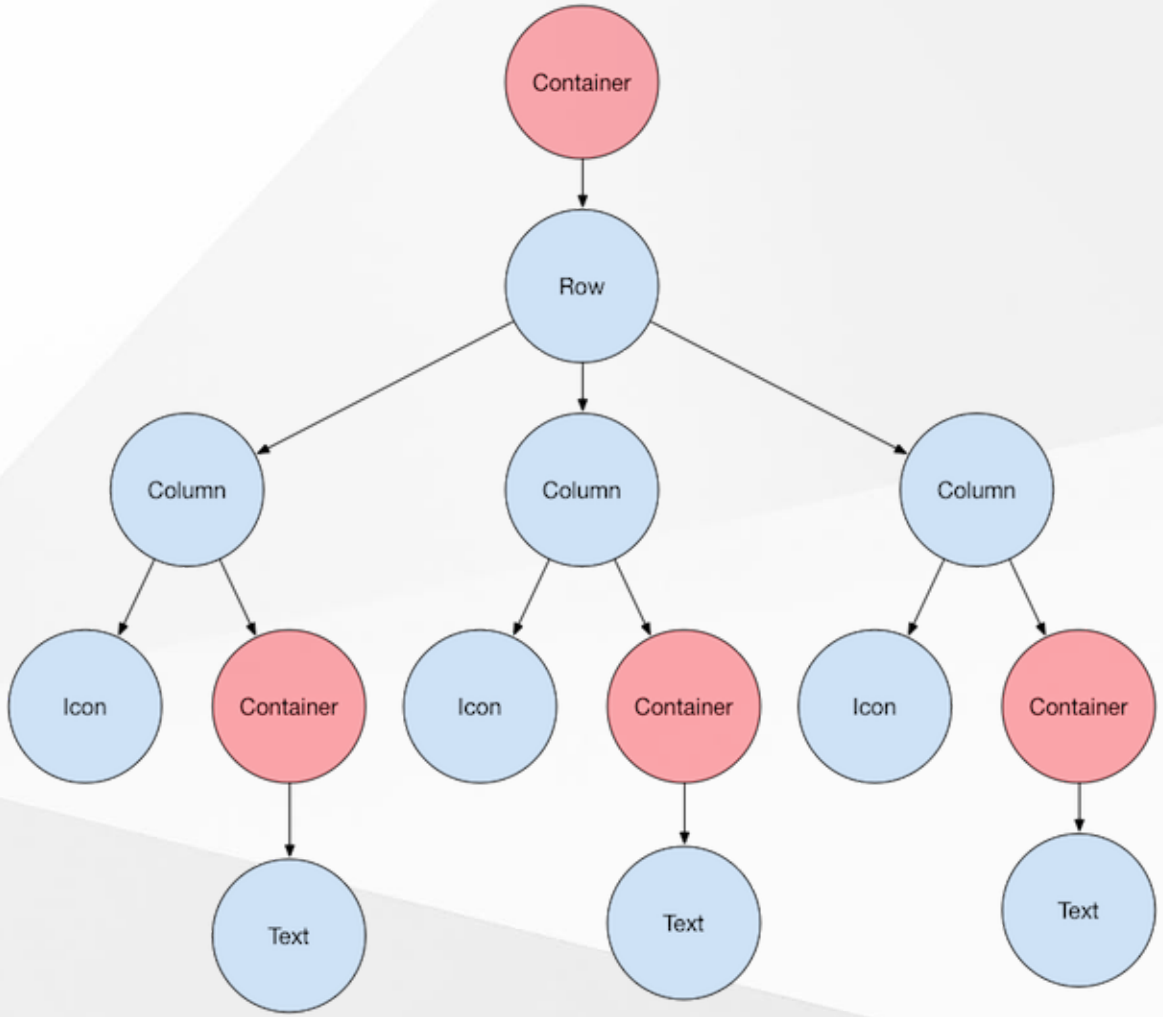
Design	Visual Layout
	

https://flutter.dev/docs/development/ui/layout

2.2.1 Layouts in Flutter

Example (2)

Widgets Tree



https://flutter.dev/docs/development/ui/layout

2.2.1 Layouts in Flutter

Design Languages libaries built-in:

- Material - Google Material Design
- Cupertino - iOS Design Language

2.2.1 Layouts in Flutter

Common layout widgets:

Standard widgets

- Container: Adds padding, margins, borders, background color, or other decorations to a widget.
- GridView: Lays widgets out as a scrollable grid.
- ListView: Lays widgets out as a scrollable list.
- Stack: Overlaps a widget on top of another.

https://flutter.dev/docs/development/ui/layout#common-layout-widgets

2.2.1 Layouts in Flutter

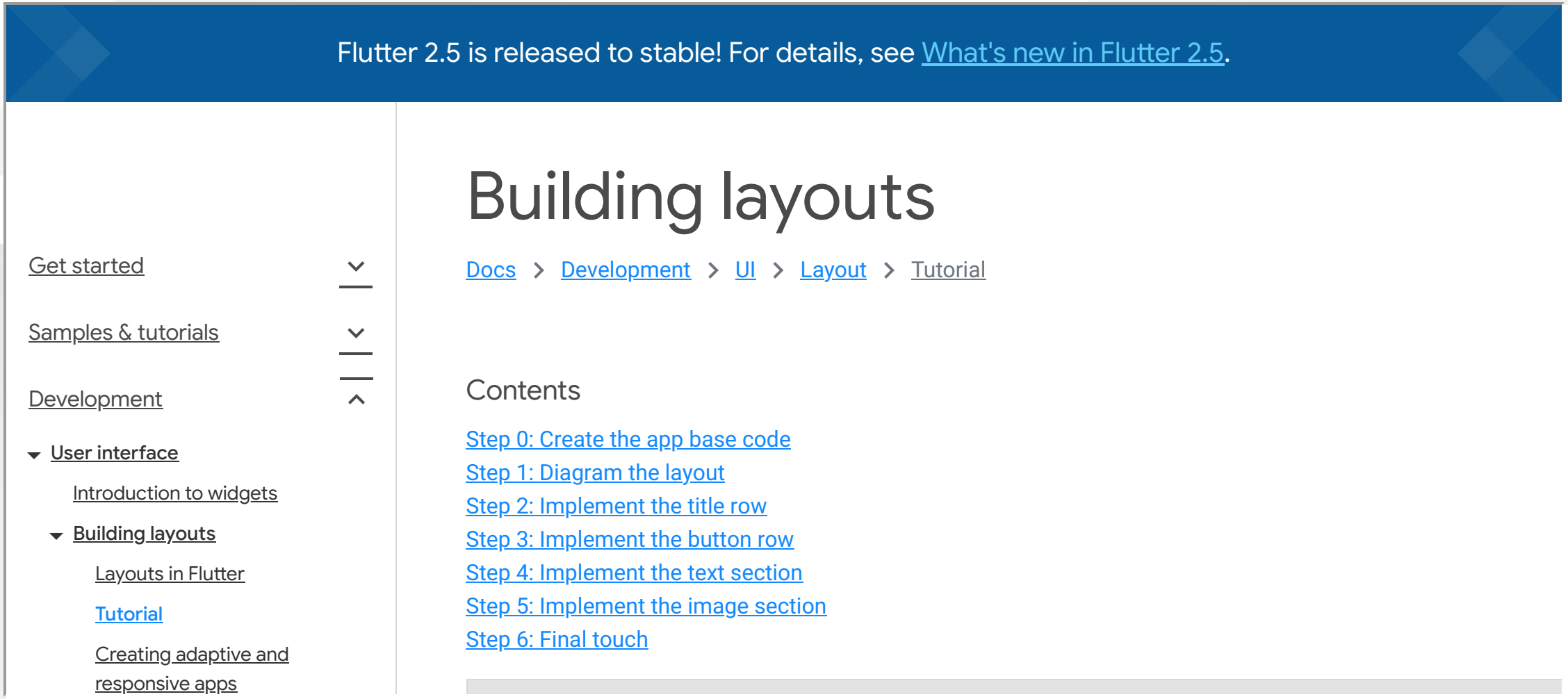
Common layout widgets:

Material widgets

- Card: Organizes related info into a box with rounded corners and a drop shadow.
- ListTile: Organizes up to 3 lines of text, and optional leading and trailing icons, into a row.

https://flutter.dev/docs/development/ui/layout#common-layout-widgets

2.2.2 Tutorial



https://flutter.dev/docs/development/ui/layout/tutorial

2.2.3 Creating adaptive and responsive apps

Difference between Adaptive and Responsive app

- Adaptive and responsive can be viewed as separate dimensions of an app
- Responsive
  - Typically, a responsive app has had its layout tuned for the available screen size...
  - Create a responsive app
- Adaptive
  - Adapting an app to run on different device types, such as mobile and desktop, requires dealing with mouse and keyboard input, ...
  - Building adaptive apps

https://flutter.dev/docs/development/ui/layout/adaptive-responsive

2.2.3 Understanding constraints

Flutter 2.5 is released to stable! For details, see What's new in Flutter 2.5.

Get started

Samples & tutorials

Development

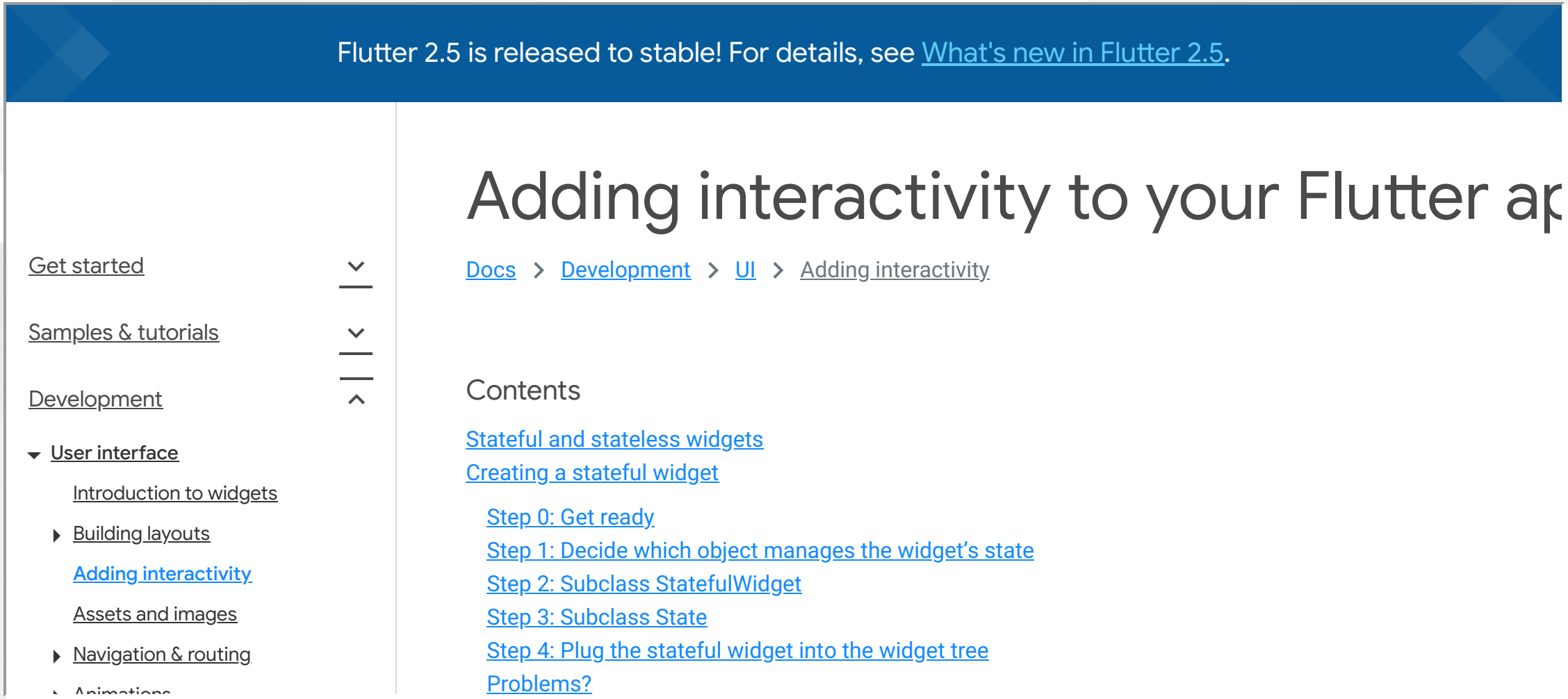
- User interface
  - Introduction to widgets
  - Building layouts
    - Layouts in Flutter
    - Tutorial
    - Creating adaptive and responsive apps

Understanding constraints

Docs > Development > UI > Layout > Understanding constraints

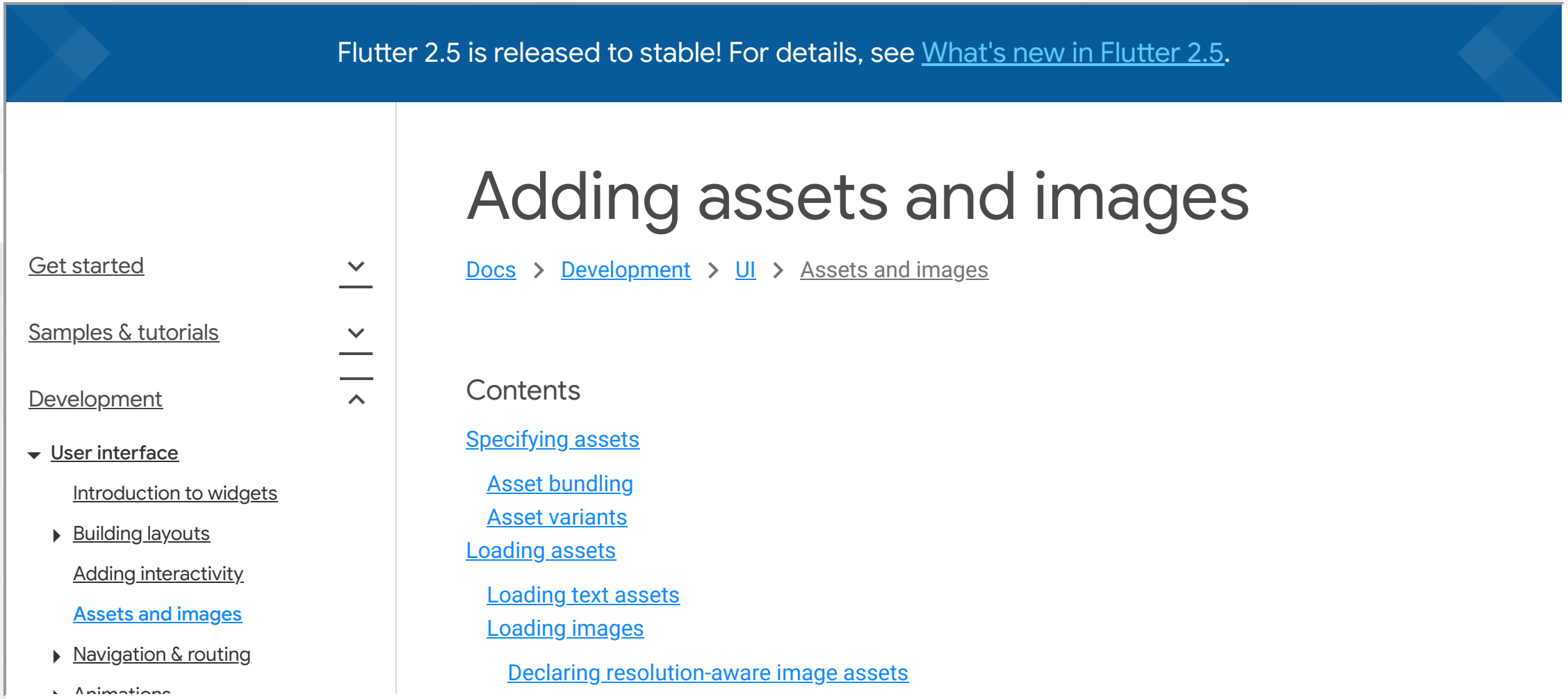
https://flutter.dev/docs/development/ui/layout/constraints

2.3. Adding interactivity



https://flutter.dev/docs/development/ui/interactive

2.4. Adding assets and images



https://flutter.dev/docs/development/ui/assets-and-images

2.5. Navigation and routing (1)

Two approaches:

- Imperative approach, Navigation v1.0
  - see the Navigation recipes
  - Or using Fluro package
- Declarative approach, Navigation v2.0
  - Learning Flutter's new navigation and routing system
  - Alternate packages:
    - vrouter
    - beamer (not stable)

https://flutter.dev/docs/development/ui/layout/adaptive-responsive

2.5. Navigation and routing (2)

Deep linking:

- Examples:
  - `http://flutterbooksample.com/book/1`
  - `customscheme://flutterbooksample.com/book/1`

URL strategy on the web

- Hash (default)
  For example, `flutterexample.dev/#/path/to/screen`.
- Path
  For example, `flutterexample.dev/path/to/screen`.

https://flutter.dev/docs/development/ui/layout/adaptive-responsive

2.5. Navigation and routing (3)

Fluro

- Simple route navigation
- Function handlers (map to a function instead of a route)
- Wildcard parameter matching
- Querystring parameter parsing
- Common transitions built-in
- Simple custom transition creation
- Follows stable Flutter channel
- Null-safety

https://pub.dev/packages/fluro

2.5. Navigation and routing (4)

VRouter (for reference only)

- Automated web url handling
- Nesting routes
- Transition
- Advanced url naming
- Reacting to route changing
- Customizable pop events
- And much more...

https://pub.dev/packages/vrouter

2.6. Animations

Approaches:

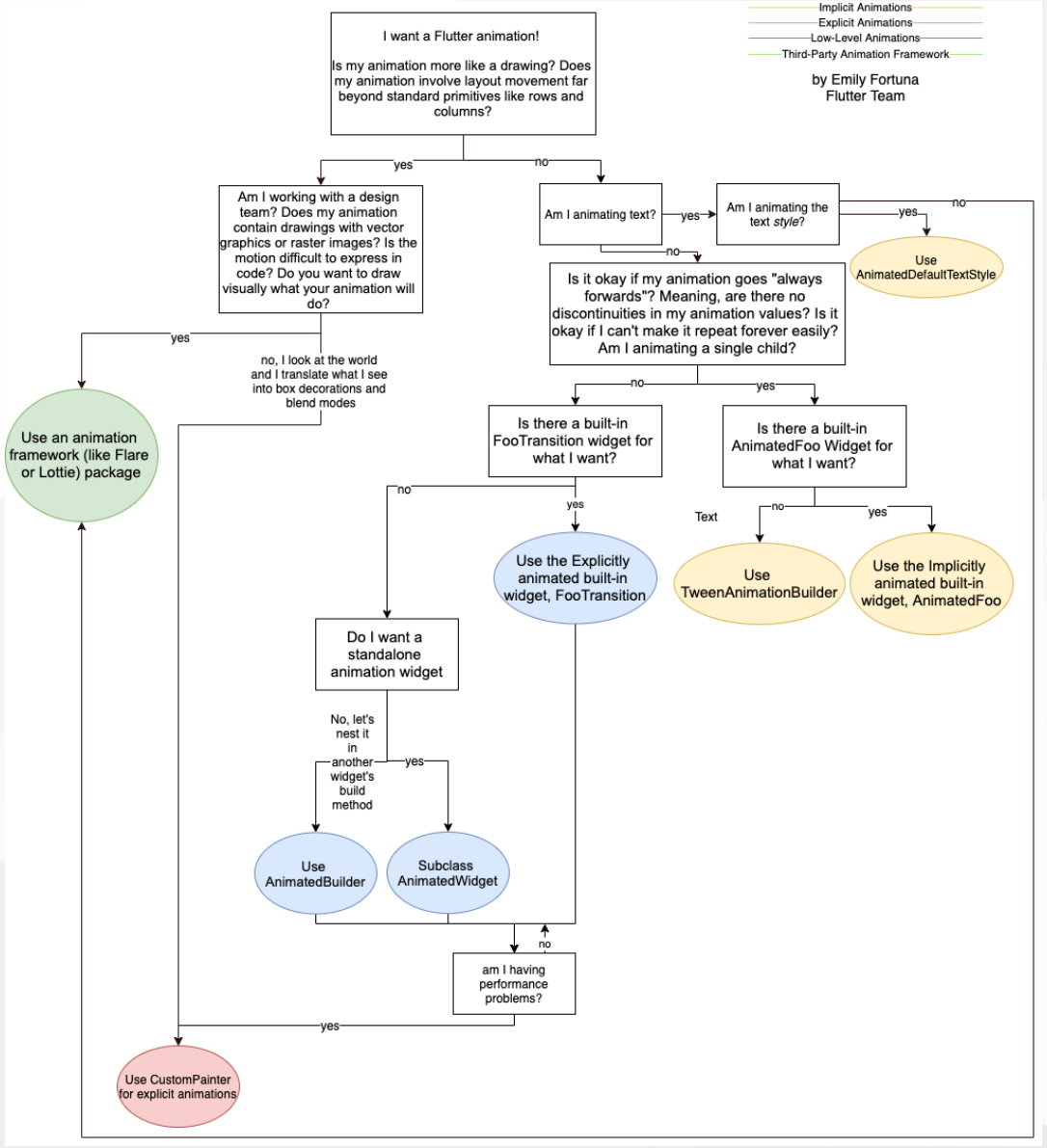
- Implicit Animations
- Explicit Animations
- Low-Level Animation
  - draw it with canvas via CustomPainter
- Third-party animation framework
  - flare_flutter
  - lottie

https://flutter.dev/docs/development/ui/animations#choosing-an-approach

2.6. Animations

Full picture: Click here

Video: How to choose which Flutter Animation Widget is right for you?



https://flutter.dev/docs/development/ui/animations#choosing-an-approach

2.6. Animations

Common animation patterns

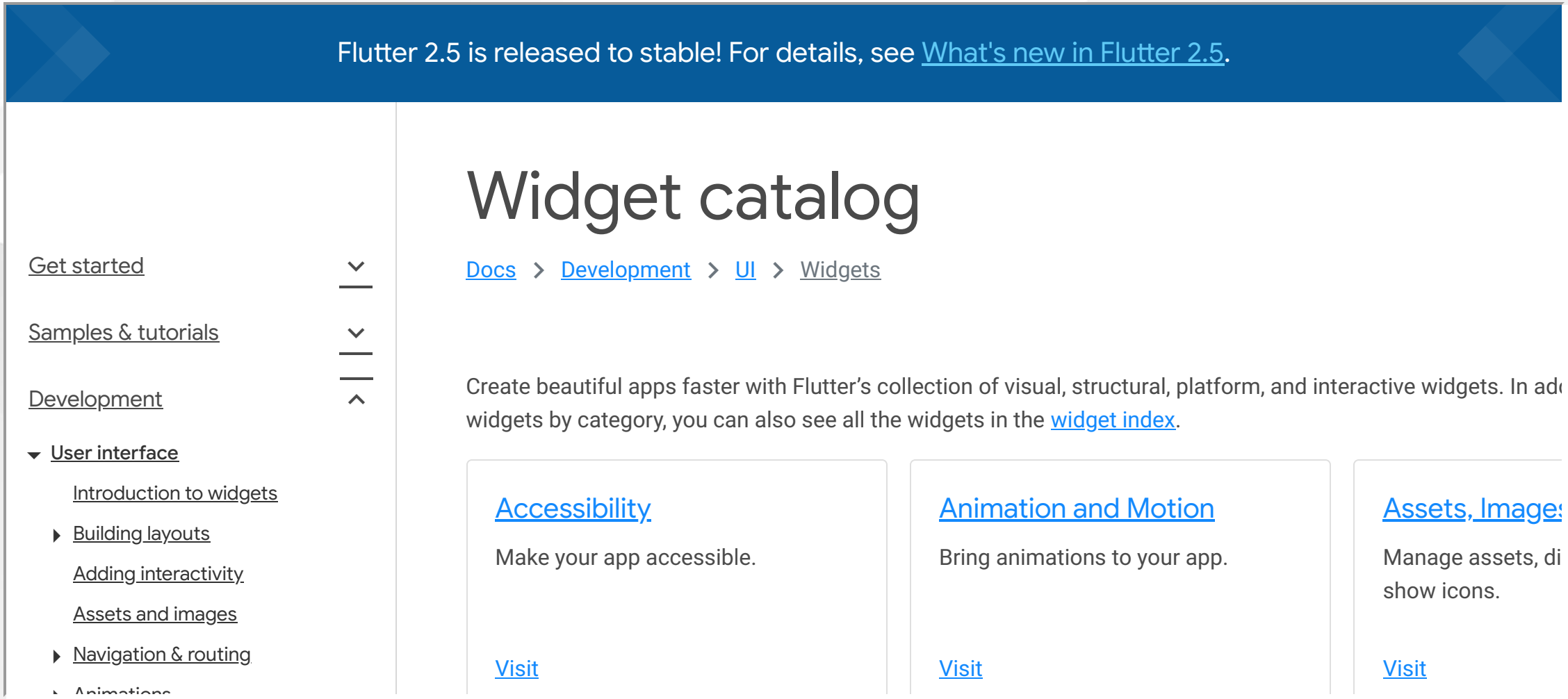
- Animated list or grid
- Shared element transition
  - Shared element transitions between routes (pages)
  - Hero animations
- Staggered animation
  - Animations that are broken into smaller motions, where some of the motion is delayed.
  - The smaller animations might be sequential, or might partially or completely overlap.

https://flutter.dev/docs/development/ui/animations#choosing-an-approach

2.7. Advanced UI

- Using Actions and Shortcuts
- Gestures
- Slivers
- Splash screens

2.8. Widget catalog



https://flutter.dev/docs/development/ui/widgets

3. State management

- 3.1. Introduction
- 3.2. Think declaratively
- 3.3. Ephemeral vs app state
- 3.4. Simple app state management
- 3.5. Options
- 3.6. Riverpod

3.6 Riverpod

> Welcome to Riverpod!

Website: riverpod.dev

Table of Contents:

3.6.1 Introduction

> Riverpod

A Reactive State-Management and Dependency Injection framework.

Packages:

riverpod	
flutter_riverpod	
hooks_riverpod	

3.6.2 Providers

Providers are the most important part of a `Riverpod` application.
A provider is an object that encapsulates a piece of state and allows listening to that state.

For providers to work, you must add `ProviderScope` at the root of your Flutter applications:

```
void main() {
  runApp(
    ProviderScope(
      child: const MyApp(),
    )
  );
}
```

https://riverpod.dev/docs/concepts/providers

3.6.2 Providers

Why use providers? (1)

By wrapping a piece of state in a provider, this:

- Allows easily accessing that state in multiple locations.
  - Providers are a complete replacement for patterns like `Singletons`, `Service Locators`, `Dependency Injection` or `InheritedWidgets`.
- Simplifies combining this state with others.
  - Ever struggled to merge multiple objects into one?
    - This scenario is built directly inside providers, with a simple syntax.

https://riverpod.dev/docs/concepts/providers#why-use-providers

3.6.2 Providers

Why use providers? (2)

By wrapping a piece of state in a provider, this:

- Enables performance optimizations.
  - Whether for filtering widget rebuilds or for caching expensive state computations;
    - providers ensure that only what is impacted by a state change is recomputed.
- Increases the testability of your application.
  - With providers, you do not need complex setUp/tearDown steps.
  - Furthermore, any provider can be overridden to behave differently during test, which allows easily testing a very specific behavior.
- Easily integrate with advanced features, such as logging or pull-to-refresh.

https://riverpod.dev/docs/concepts/providers#why-use-providers

3.6.3 Creating a Provider (1)

Providers come in many variants, but they all work the same way.

```
final myProvider = Provider<MyValue>(
  (ref) {
    return MyValue();
  },
  name: 'myProvider', // name used in debug
);
```

we can have two providers expose a state of the same "type":

```
final cityProvider = Provider<String>((ref) => 'London');
final countryProvider = Provider<String>((ref) => 'England');
```

https://riverpod.dev/docs/concepts/providers#creating-a-provider

3.6.3 Creating a Provider (2)

Performing actions before the state destruction

```
final example = StreamProvider.autoDispose((ref) {
  final streamController = StreamController<int>();

  ref.onDispose(() {
    // Closes the StreamController when the state of this provider is destroyed.
    streamController.close();
  });

  return streamController.stream;
});
```

> Note: Depending on the provider used, it may already take care of the clean-up process. For example, `StateNotifierProvider` will call the dispose method of a `StateNotifier`.

https://riverpod.dev/docs/concepts/providers#performing-actions-before-the-state-destruction

3.6.3 Creating a Provider (3)

Creating Provider with Modifiers

```
final myAutoDisposeProvider = StateProvider.autoDispose<String>((ref) => 0);
final myFamilyProvider = Provider.family<String, int>((ref, id) => '$id');

// combine 2 modifiers (autoDispose & family)
final userProvider = FutureProvider.autoDispose.family<User, int>((ref, userId) async {
  return fetchUser(userId);
});
```

At the moment, there are two modifiers available:

- `.autoDispose`, which will make the provider automatically destroy its state when it is no-longer listened.
- `.family`, which allows creating a provider from external parameters.

https://riverpod.dev/docs/concepts/providers#provider-modifiers

3.6.3 Reading a Provider (1)

Obtaining a "ref" object

First and foremost, before reading a provider, we need to obtain a "ref" object.

This object is what allows us to interact with providers, be it from a widget or another provider.

https://riverpod.dev/docs/concepts/reading#obtaining-a-ref-object

3.6.3 Reading a Provider (2)

Obtaining a "ref" from a provider

All providers receive a "ref" as parameter:

```
final provider = Provider((ref) {
  // use ref to obtain other providers
  final repository = ref.watch(repositoryProvider);

  return SomeValue(repository);
})
```

https://riverpod.dev/docs/concepts/reading#obtaining-a-ref-from-a-provider

3.6.3 Reading a Provider (3)

(Obtaining a "ref" from a provider)

This parameter is safe to pass to the value exposed by the provider.

```
final counter = StateNotifierProvider<Counter, int>((ref) {
  return Counter(ref);
});

class Counter extends StateNotifier<int> {
  Counter(this.ref): super(0);

  final ProviderRefBase ref;

  void increment() {
    // Counter can use the "ref" to read other providers
    final repository = ref.read(repositoryProvider);
    repository.post('...');
  }
}
```

https://riverpod.dev/docs/concepts/reading#obtaining-a-ref-from-a-provider

3.6.3 Reading a Provider (4)

Obtaining a "ref" from a widget

> When a widget obtains a "ref", this "ref" should not be passed around. It should be used only by the widget that created this object.

Extending `ConsumerWidget` instead of `StatelessWidget`

```
class HomeView extends ConsumerWidget {
  const HomeView({Key? key}): super(key: key);

  @override
  Widget build(BuildContext context, WidgetRef ref) {
    // use ref to listen to a provider
    final counter = ref.watch(counterProvider);
    return Text('$counter');
  }
}
```

https://riverpod.dev/docs/concepts/reading#obtaining-a-ref-from-a-widget

3.6.3 Reading a Provider (5)

```
class HomeView extends ConsumerStatefulWidget {
  const HomeView({Key? key}): super(key: key);
  @override
  HomeViewState createState() => HomeViewState();
}

class HomeViewState extends ConsumerState<HomeView> {
  @override
  void initState() {
    super.initState();
    // "ref" can be used in all life-cycles of a StatefulWidget.
    ref.read(counterProvider);
  }
  @override
  Widget build(BuildContext context) {
    // We can also use "ref" to listen to a provider inside the build method
    final counter = ref.watch(counterProvider);
    return Text('$counter');
  }
}
```

https://riverpod.dev/docs/concepts/reading#obtaining-a-ref-from-a-widget

3.6.3 Reading a Provider (6)

A final solution for obtaining a "ref" inside widgets is to rely on `Consumer`.

```
Scaffold(
  body: Consumer(
    builder: (context, ref, child) {
      // We can also use the ref parameter to listen to providers.
      final counter = ref.watch(counterProvider);
      return Text('$counter');
    },
  ),
)
```

https://riverpod.dev/docs/concepts/reading#consumer-and-hookconsumer-widgets

3.6.3 Reading a Provider (7)

Three primary usages for "ref":

- ref.watch
- ref.listen
- ref.read

> Whenever possible, prefer using `ref.watch` over `ref.read` or `ref.listen` to implement a feature.
> By changing your implementation to rely on `ref.watch`, it becomes both reactive and declarative, which makes your application more maintainable.

https://riverpod.dev/docs/concepts/reading#using-ref-to-interact-with-providers

3.6.3 Reading a Provider (8)

Using ref.watch to observe a provider

- inside the build method of a widget
- inside the body of a provider to have the widget/provider listen to provider

```
final filterTypeProvider = StateProvider<FilterType>((ref) => FilterType.none);
final todosProvider = StateNotifierProvider<TodoList, List<Todo>>((ref) => TodoList());

final filteredTodoListProvider = Provider((ref) {
  // obtains both the filter and the list of todos
  final FilterType filter = ref.watch(filterTypeProvider).state;
  final List<Todo> todos = ref.watch(todosProvider);
  switch (filter) {
    case FilterType.completed:
      // return the completed list of todos
      return todos.where((todo) => todo.isCompleted).toList();
    ...
  }
});
```

https://riverpod.dev/docs/concepts/reading#using-refwatch-to-observe-a-provider

3.6.3 Reading a Provider (9)

Using ref.listen to react to a provider change

Similarly to `ref.watch`, it is possible to use `ref.listen` to observe a provider.

The main difference between them is that, rather than rebuilding the widget/provider if the listened provider changes, using `ref.listen` will instead call a custom function.

That can be useful to perform actions when a certain change happens, such that to show a snackbar when an error happens.

https://riverpod.dev/docs/concepts/reading#using-refwatch-to-observe-a-provider

3.6.3 Reading a Provider (10)

Using ref.listen to react to a provider change

Used inside body of a provider:

```
final counterProvider = StateNotifierProvider<Counter, int>((ref) => Counter());

final anotherProvider = Provider((ref) {
  ref.listen<int>(counterProvider, (int count) {
    print('The counter changed ${count}');
  });
  ...
});
```

https://riverpod.dev/docs/concepts/reading#using-reflisten-to-react-to-a-provider-change

3.6.3 Reading a Provider (11)

Using ref.listen to react to a provider change

Inside the build method of a widget:

```
final counterProvider = StateNotifierProvider<Counter, int>((ref) => Counter());

class HomeView extends ConsumerWidget {
  const HomeView({Key? key}): super(key: key);

  @override
  Widget build(BuildContext context, WidgetRef ref) {
    ref.listen<int>(counterProvider, (int count) {
      print('The counter changed ${count}');
    });
    ...
  }
}
```

https://riverpod.dev/docs/concepts/reading#using-reflisten-to-react-to-a-provider-change

3.6.3 Reading a Provider (12)

Using ref.read to obtain the state of a provider once

The `ref.read` method is a way to obtain the state of a provider, without any extra effect.

It is commonly used inside functions triggered on user intereactions.

```
final counterProvider = StateNotifierProvider<Counter, int>((ref) => Counter());
class HomeView extends ConsumerWidget {
  ...
  @override
  Widget build(BuildContext context, WidgetRef ref) {
    return Scaffold(
      floatingActionButton: FloatingActionButton(
        onPressed: () {
          // Call `increment()` on the `Counter` class
          ref.read(counterProvider.notifier).increment();
        },
  ...
}
```

https://riverpod.dev/docs/concepts/reading/#using-refread-to-obtain-the-state-of-a-provider-once

3.6.3 Reading a Provider (13)

Notes

- The watch method should not be called asynchronously, like inside `onPressed` or a `ElevatedButton`. Not should it be used inside initState and other State life-cycles.
  In those cases, consider using `ref.read` instead.
- The listen method should not be called asynchronously, like inside `onPressed` or a `ElevatedButton`. Not should it be used inside initState and other State life-cycles.
- Using `ref.read` should be avoided as much as possible.
  It exists as a work-around for cases where using watch or listen would be otherwise too inconvenient to use.
  If you can, it is almost always better to use watch/listen, especially watch.

https://riverpod.dev/docs/concepts/reading/#using-refread-to-obtain-the-state-of-a-provider-once

3.6.3 Reading a Provider (14)

Notes

- DON'T use ref.read inside the build method or provider
- You might be tempted to use ref.read to optimize the performance of a widget by doing:

```
// BAD
final counter = ref.read(counterProvider);

// GOOD
StateController<int> counter = ref.watch(counterProvider.notifier);

return ElevatedButton(
  onPressed: () => counter.state++,
);
```

https://riverpod.dev/docs/concepts/reading/#using-refread-to-obtain-the-state-of-a-provider-once

3.6.3 Reading a Provider (15)

Notes

On the other hand, the second approach supports cases where the counter is reset.
For example, another part of the application could call:

```
ref.refresh(counterProvider);
```

which would recreate the `StateController` object.

If we used `ref.read` here, our button would still use the previous `StateController` instance, which was disposed and should no-longer be used.
Whereas using `ref.watch` correctly rebuilt the button to use the new `StateController`.

https://riverpod.dev/docs/concepts/reading/#using-refread-to-obtain-the-state-of-a-provider-once

3.6.3 Reading a Provider (16)

Deciding what to read

As example, consider the following StreamProvider:

```
final userProvider = StreamProvider<User>(...);
```

When reading this userProvider, you can:

- synchronously read the current state by listening to userProvider itself
- obtain the associated Stream, by listening to userProvider.stream
- obtain a Future that resolves with the latest value emitted, by listening to userProvider.last

https://riverpod.dev/docs/concepts/reading/#deciding-what-to-read

3.6.3 Reading a Provider (17)

Using "select" to filter rebuilds

By default, listening to a provider listens to the entire object. But in some cases, a widget/provider may only case about some properties instead of the whole object.

For example, a provider may expose a User:

```
abstract class User {
  String get name;
  int get age;
}
```

But a widget may only use the user name:

```
  User name = ref.watch(userProvider).user; // NOT GOOD
  String name = ref.watch(userProvider.select((user) => user.name)); // GOOD
```

https://riverpod.dev/docs/concepts/reading#using-select-to-filter-rebuilds

3.6.3 Reading a Provider (18)

Using "select" to filter rebuilds

It is possible to use select with ref.listen too:

```
ref.listen<String>(
  userProvider.select((user) => user.name),
  (String name) {
    print('The user name changed $name');
  ...
```

Doing so will call the listener only when the name changes.

You don't have to return a property of the object. Any value that overrides == will work. For example you could do:

```
final label = ref.watch(userProvider.select((user) => 'Mr ${user.name}'));
```

https://riverpod.dev/docs/concepts/reading#using-select-to-filter-rebuilds

3.6.4. Combining providers

As an example, consider the following provider:

```
final cityProvider = Provider((ref) => 'London');
```

We can now create another provider that will consume our cityProvider:

```
final weatherProvider = FutureProvider((ref) async {
  // We use `ref.watch` to listen to another provider, and we pass it the provider
  // that we want to consume. Here: cityProvider
  final city = ref.watch(cityProvider);

  // We can then use the result to do something based on the value of `cityProvider`.
  return fetchWeather(city: city);
});
```

That's it. We've created a provider that depends on another provider.

https://riverpod.dev/docs/concepts/combining_providers#combining-providers

3.6.4. Combining providers

FAQ:

- What if the value listened changes over time?
- Can I read a provider without listening to it?
- How to test an object that receives read as parameter of its constructor?
- My provider updates too often, what can I do?

https://riverpod.dev/docs/concepts/combining_providers#combining-providers

3.6.5. ProviderObserver

Listens to the changes of a ProviderContainer.
Has four methods:

- didAddProvider
- didDisposeProvider
- didUpdateProvider
- mayHaveChanged (`Deprecated` , will be removed)

Usage:

- Use to log the info of a provider and its state.

https://riverpod.dev/docs/concepts/provider_observer

3.6.6. Modifiers (1)

At the moment, there are two modifiers available:

- `.autoDispose`, which will make the provider automatically destroy its state when it is no-longer listened.
- `.family`, which allows creating a provider from external parameters.

Example:

```
final myAutoDisposeProvider = StateProvider.autoDispose<String>((ref) => 0);
final myFamilyProvider = Provider.family<String, int>((ref, id) => '$id');

// combine 2 modifiers (autoDispose & family)
final userProvider = FutureProvider.autoDispose.family<User, int>((ref, userId) async {
  return fetchUser(userId);
});
```

https://riverpod.dev/docs/concepts/providers#provider-modifiers

3.6.6. Modifiers (2)

`.family`

The `.family` modifier has one purpose:

> Creating a provider from external values.

Some common use-cases for family would be:

- Combining FutureProvider with .family to fetch a Message from its ID
- Passing the current Locale to a provider, so that we can handle translations:
- Connecting a provider with another provider without having access to its variable.

https://riverpod.dev/docs/concepts/modifiers/family

3.6.6. Modifiers (3)

`.family`

Example:

```
final messagesFamily = FutureProvider.family<Message, String>((ref, id) async {
  return dio.get('http://my_api.dev/messages/$id');
});

...

Widget build(BuildContext context, WidgetRef ref) {
  final response = ref.watch(messagesFamily('id1'));
  // final response2 = ref.watch(messagesFamily('id2'));
}
```

https://riverpod.dev/docs/concepts/modifiers/family#usage

3.6.6. Modifiers (4)

`.family`

Parameter restrictions:

> For families to work correctly, it is critical for the parameter passed to a provider to have a consistent hashCode and ==.

Parameter should be:

- A primitive (bool/int/double/String), a constant (providers), or an immutable object that overrides == and hashCode.
- No support for multiple values/parameters

https://riverpod.dev/docs/concepts/modifiers/family#usage

3.6.6. Modifiers (5)

`.autoDispose`

A common use-case when using providers is to want to destroy the state of a provider when it is no-longer used.

There are multiple reasons for doing such, such as:

- When using Firebase, to close the connection and avoid unnecessary cost
- To reset the state when the user leaves a screen and re-enters it.

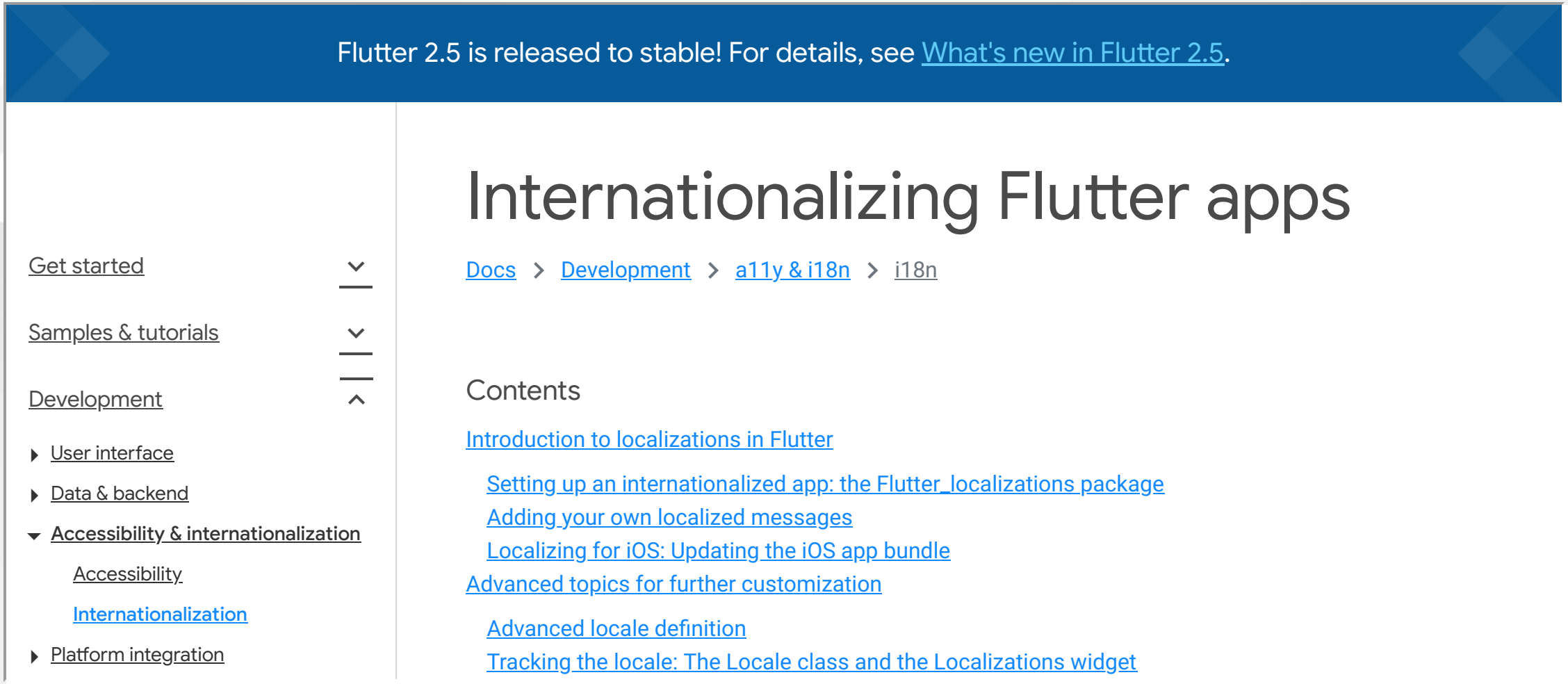
Providers comes with a built-in support for such use-case, through the `.autoDispose` modifier.

https://riverpod.dev/docs/concepts/modifiers/auto_dispose

4. Data & Networking

- 3.1. Cross-platform http networking
- 3.2. Networking cookbook
- 3.3. JSON and serialization
- 3.4. OpenAPI and generate Data Provider
- 3.5. Firebase

5. Internationalization



https://flutter.dev/docs/development/accessibility-and-localization/internationalization

Other References and ebooks (1)

- Flutter Complete Reference
  - Offical website: https://fluttercompletereference.com/
  - Full version
  - Preview version
- Performance & optimization
  - App Size
  - Deferred components
- Platform-specific behaviors and adaptations

Other References and ebooks (2)

- Widget index
- API reference
- flutter CLI reference
- Package site
- FAQ

Thank you