About Us

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C++ and UI expert with different frameworks.
What is this about?

This talk will guide you through the usage of Flutter as UI framework in Embedded projects, going from the build system integration, development and final result.
What is Flutter?

Flutter is an open source framework by Google for building beautiful, natively compiled, multi-platform applications from a single codebase. It uses Dart as programming language.
Why Flutter?

Flutter is **fast**

Flutter code compiles to ARM or Intel machine code as well as JavaScript, for fast performance on any device. You can expect excellent performance. Flutter is designed to help developers easily achieve a constant 60fps. Flutter apps run using natively compiled code—no interpreters are involved. This means that Flutter apps start quickly.
Why Flutter?

Dart is **optimized for UI**

Mature and complete async-await for user interfaces containing event-driven code, paired with isolate-based concurrency.

A programming language optimized for building user interfaces with features such as sound null safety, the spread operator for expanding collections, and collection if for customizing UI for each platform. A programming language that is easy to learn, with a familiar syntax.

```dart
fetchTemperature() async {
  // This call is non-blocking
  // The UI thread will continue
  // to render with no locks
  final response = await http.get('https://my/weather');
  if (response.statusCode == 200) {
    temp.setText(response.body);
  } else {
    temp.setText('Unknown temp.');
  }
}
```
Why Flutter?

Flutter is **productive**

Make changes to your source code iteratively, using hot reload to instantly see the effect in the running app. Write code using a flexible type system with rich static analysis and powerful, configurable tooling. Do profiling, logging, and debugging with your code editor of choice.
Why Flutter?

Flutter is **flexible**

Control every pixel to create customized, adaptive designs that look and feel great on any screen.

AOT-compile apps to native machine code for instant startup. Target the web with complete, mature, fast compilers for JavaScript. Run backend code supporting your app, written using a single programming language.
IDE Setup
Why Flutter?

Flutter starting from mobile to embedded is become very popular with a big community and interest from companies.

- Active community on different platforms
- Huge list of packages
- Actively developed and updated
- Used by big tech companies:
  - Google
  - BMW
  - Toyota
Flutter vs LVGL

- C vs Dart
- Hot reload and hot restart against rebuild and redeploy
- More platform supported
- More available packages (libs)
- Bigger community
- Easier to build and publish
Flutter vs Qt

- C++/QML vs Dart
- Hot reload and hot restart against rebuild and redeploy
- Free and open source against commercial license
- Rapidly improving
When things get complicated

Getting complex with **FFI**

With foreign function interface (FFI), Dart is capable of calling native C APIs, and to read, write, allocate, and deallocate native memory.
Embedded integration

Flutter package is available both for Yocto and Buildroot.

- Yocto: meta-flutter on GitHub is the official Flutter layer
- Buildroot: Flutter package maintained by my co-worker Adam Duskett
Product example
Q&A