

# Developing a DVB-I Parser Library in Dart and GUI App in Flutter

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**Abstract**—In this project, we aimed to develop an efficient DVB-I parser library in Dart and a GUI app in Flutter to present TV services on Android devices.

We used the Dart programming language to write the DVB-I parser library and Google’s cross-platform Flutter framework to develop the GUI app.

However, we faced challenges in developing the GUI app in Flutter due to multiple bugs in the libraries we used and sparse documentation. Despite these challenges, we were able to develop a working app to present TV services on Android devices.

Our project demonstrates the feasibility of using Dart to write an efficient DVB-I parser library and Flutter to develop a GUI app that presents TV services on Android devices. However the challenges we faced in developing the GUI app highlight the importance of mature libraries and documentation to support developers in using these technologies. The lack of maturity in the Flutter ecosystem has compelled us to not recommend it for further projects.

**Index Terms**—IP-TV, DVB-I, Flutter, Dart, Cross Platform

## I. INTRODUCTION

In this project, we aimed to develop an efficient DVB-I parser library in Dart and a GUI app in Flutter to present TV services on Android devices. The DVB-I standard is a standards-based solution for delivering television via the internet and offers a discovery mechanism to signal and discover television services, using a set of REST APIs allowing clients to retrieve a list of services in an XML-based format. Our primary objective was to create a parser library that can efficiently handle the DVB-I service list registry and provide all the necessary information required to present the TV service in the client app. Additionally, we aimed to create an Android GUI app using Flutter that uses the DVB-I parser library to present the TV services to the user.

The development of the DVB-I parser library involved reading the DVB-I standard and manually emulating REST requests as specified by the specification. We also familiarized ourselves with the Dart programming language and experimented with simple coding examples to gain proficiency with the language. Once we had a good understanding of the standard and the language, we designed and developed the DVB-I parser library using Dart, implementing the required REST APIs and XML parsing.

The development of the Android GUI app using Flutter involved building an intuitive user interface to present the TV services to the user, as well as incorporating the DVB-I parser

library to retrieve and display the information for each service. We faced challenges while developing the app, including multiple bugs in libraries used and sparse documentation, which affected the app’s functionality and usability.

In this evaluation, we will assess the success of our project in achieving its goals and evaluate the performance and usability of the DVB-I parser library and Android GUI app developed. We will also discuss the challenges encountered during development and recommend future improvements to enhance the overall functionality and usability of the app.

## II. SCIENTIFIC BACKGROUND

In this section we will go over the technologies used and their functionality.

### A. DVB-I Standard

### B. Flutter Framework

## III. ARCHITECTURE OVERVIEW

Flutter is a cross-platform framework for building mobile and desktop applications. Its architecture consists of four main layers: the Dart app layer, the framework layer, the engine layer, and the platform layer. Shown in figure 1.

The Dart app layer is responsible for composing widgets into the desired UI and implementing business logic. It is owned by the app developer.

The framework layer provides a higher-level API for building UI apps, including widgets, hit-testing, gesture detection, accessibility, and text input. It composites the app’s widget tree into a scene.

The engine layer is responsible for rasterizing composited scenes and provides low-level implementation of Flutter’s core APIs, including graphics, text layout, and the Dart runtime. It exposes its functionality to the framework using the `dart:ui` API and integrates with a specific platform using the platform layer.

The platform layer “is the native OS application that hosts all Flutter content and acts as the glue between the host operating system and Flutter” [1]. Flutter includes platform embedders for each of the target platforms, and you can also create a custom platform embedder.

In summary, Flutter’s architecture provides a robust and efficient rendering pipeline, bypassing system UI widget libraries and using its own widget set and Skia 2D library for rendering.

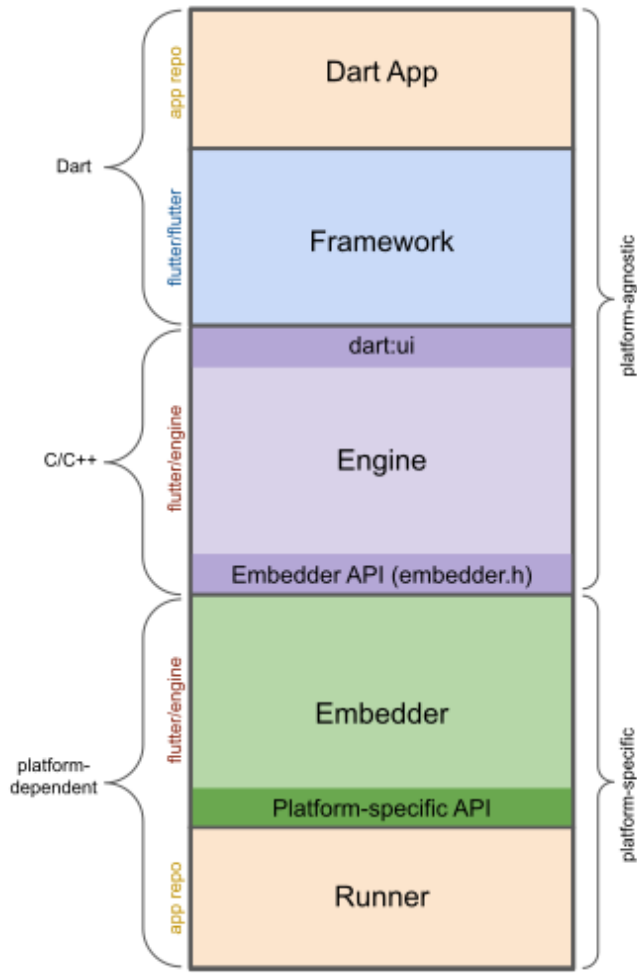


Fig. 1. Flutter architectural overview [1]

This results in a high-performance, cross-platform framework with minimal abstractions and overhead.

#### IV. INTEGRATING WITH OTHER CODE

##### A. Units

#### V. THEORETICAL BACKGROUND

##### A. DVB-I Standard

The DVB-I (DVB-Internet) standard is a specification developed by the Digital Video Broadcasting (DVB) organization for delivering linear television services over the internet. The standard defines the mechanisms to be used to find sets of linear television services delivered through broadband or broadcast mechanisms as well as methods to retrieve electronic programme data for those services.[ref to document]

The core of the specification is the Service List Registry (SLR) which provides a set of REST APIs allowing clients (TVs, Mobile, Browser) to retrieve a list of services (ServiceList) in an XML-based format including all information required to present the TV service in the client. The DVB-I standard, published by ETSI, expands upon the existing DVB Broadcast-based delivery methods, such as Terrestrial,

Satellite, and Cable, to provide simpler and more accessible options for viewing both Linear and VOD Streaming services on any internet-connected device. With this open standard, users can enjoy a seamless viewing experience across multiple devices without any limitations.

##### B. Flutter

What is Flutter. How does it work? Why we chose it?

Flutter is an open-source mobile app development framework developed by Google that allows developers to create high-performance, cross-platform mobile applications for iOS, Android, and other platforms from a single codebase.

Flutter uses a programming language called Dart, which is also developed by Google, and provides a rich set of pre-built UI widgets and tools that allow developers to create visually appealing and interactive mobile applications. The framework uses a reactive programming model, which means that changes in the app's state are automatically reflected in the UI, making it easy to build dynamic user interfaces.

One of the key benefits of Flutter is its hot-reload feature, which allows developers to quickly see the changes they make to the code in real-time on the app, without having to rebuild the entire application. This significantly speeds up the development process and makes it easier for developers to experiment with different UI designs and functionality.

Flutter is also known for its fast development speed and ease of use, making it an ideal choice for startups and businesses that need to quickly develop and deploy high-quality mobile applications.

In addition to mobile app development, Flutter can also be used for building desktop and web applications, thanks to its platform-independent nature. Overall, Flutter is a powerful and flexible mobile app development framework that is rapidly gaining popularity in the developer community.

#### VI. IMPLEMENTATION

Our implementation is split into four big parts: the development setup VI-A, a general overview of the architecture VI-B, the dvb-i parser library, which contains all the xml parsings and http requests VI-C and finally the user interface which the client interacts with. VI-D. The code for this implementation can be found on *github*<sup>1</sup>.

##### A. Development Setup

Development Setup: Using Nix for a development environment TODO: Setup for Windows describe important libs that were used

##### B. Architecture

1) *General Overview*: General Architecture: walkthrough of how a user interacts with client and how parser requests more info graphic of architecture

<sup>1</sup>[https://github.com/AWT-DVBI/dvbi\\_client](https://github.com/AWT-DVBI/dvbi_client)

### C. Dvb-I Parser

libraries used XML to Dart object mapping Features: Lazy loading. Only request data you need. Request more on obj access Async http request for parallel fetching XML to JSON parsing

### D. Gui Application

libraries used(?) layout of GUI/Screenshots Content Guide Page features: breaks everything Channel Browsing features: subtitles, volume control, next/prev channel, show channel logo and name

## VII. CHALLENGES

Dart Streams, Dart async idea: reduce loading times by asynchr loading channels. State Management in Flutter: Unaccounted for Dart language features in Riverpod Riverpod: Providers + Dart streams = StreamProviders out-of-the-box state management using State widgets

DVB-I Server wrong response data with official endpoints ( use of different staging Endpoints for correct data) start and end time flexibility in standard leads to many edge cases Bugs in libraries: videoplayer, chewie o(n2) performance issue due to the structure of the given xml tree and our used xml lib

## VIII. EVALUATION

scalability include screenshots cross platform framework flutter ....does it work on android and apples ios? only android in combination with exoplayer as mpeg dash is not supported by hls and the current flutter videoplayer libs

## IX. CONCLUSION AND FUTURE WORK

subtitles, channel info button

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<sup>a</sup>Sample of a Table footnote.

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Fig. 2. Example of a figure caption.

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## ACKNOWLEDGMENT

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## REFERENCES

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