

# 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.

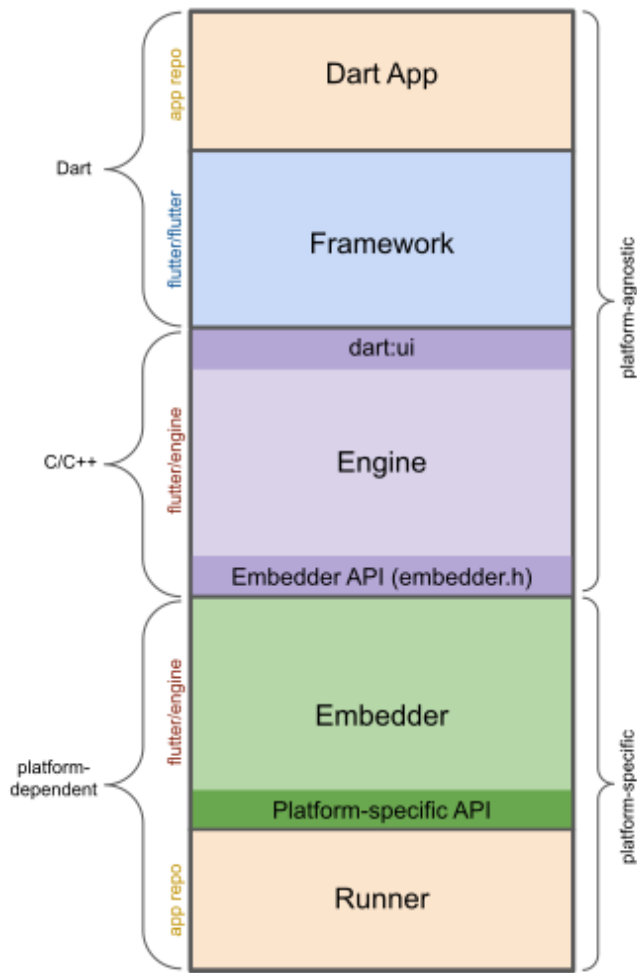


Fig. 1. Flutter architectural overview [1]

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

#### IV. INTEGRATING WITH OTHER CODE

##### A. Units

##### B. $\LaTeX$ -Specific Advice

Please use “soft” (e.g., `\eqref{Eq}`) cross references instead of “hard” references (e.g., (1)). That will make it possible to combine sections, add equations, or change the order of figures or citations without having to go through the file line by line.

Please don’t use the `{eqnarray}` equation environment. Use `{align}` or `{IEEEeqnarray}` instead. The `{eqnarray}` environment leaves unsightly spaces around relation symbols.

Please note that the `{subequations}` environment in  $\LaTeX$  will increment the main equation counter even when there are no equation numbers displayed. If you forget that, you might write an article in which the equation numbers skip from (17) to (20), causing the copy editors to wonder if you’ve discovered a new method of counting.

$\text{BIB}\TeX$  does not work by magic. It doesn’t get the bibliographic data from thin air but from .bib files. If you use  $\text{BIB}\TeX$  to produce a bibliography you must send the .bib files.

$\LaTeX$  can’t read your mind. If you assign the same label to a subsection and a table, you might find that Table I has been cross referenced as Table IV-B3.

$\LaTeX$  does not have precognitive abilities. If you put a `\label` command before the command that updates the counter it’s supposed to be using, the label will pick up the last counter to be cross referenced instead. In particular, a `\label` command should not go before the caption of a figure or a table.

Do not use `\nonumber` inside the `{array}` environment. It will not stop equation numbers inside `{array}` (there won’t be any anyway) and it might stop a wanted equation number in the surrounding equation.

##### C. Some Common Mistakes

- The word “data” is plural, not singular.
- The subscript for the permeability of vacuum  $\mu_0$ , and other common scientific constants, is zero with subscript formatting, not a lowercase letter “o”.
- In American English, commas, semicolons, periods, question and exclamation marks are located within quotation marks only when a complete thought or name is cited, such as a title or full quotation. When quotation marks are used, instead of a bold or italic typeface, to highlight a word or phrase, punctuation should appear outside of the quotation marks. A parenthetical phrase or statement at the end of a sentence is punctuated outside of the closing parenthesis (like this). (A parenthetical sentence is punctuated within the parentheses.)
- A graph within a graph is an “inset”, not an “insert”. The word alternatively is preferred to the word “alternately” (unless you really mean something that alternates).
- Do not use the word “essentially” to mean “approximately” or “effectively”.
- In your paper title, if the words “that uses” can accurately replace the word “using”, capitalize the “u”; if not, keep using lower-cased.
- Be aware of the different meanings of the homophones “affect” and “effect”, “complement” and “compliment”, “discreet” and “discrete”, “principal” and “principle”.
- Do not confuse “imply” and “infer”.
- The prefix “non” is not a word; it should be joined to the word it modifies, usually without a hyphen.
- There is no period after the “et” in the Latin abbreviation “et al.”.
- The abbreviation “i.e.” means “that is”, and the abbreviation “e.g.” means “for example”.

An excellent style manual for science writers is [8].

##### D. Authors and Affiliations

**The class file is designed for, but not limited to, six authors.** A minimum of one author is required for all conference articles. Author names should be listed starting from left

to right and then moving down to the next line. This is the author sequence that will be used in future citations and by indexing services. Names should not be listed in columns nor group by affiliation. Please keep your affiliations as succinct as possible (for example, do not differentiate among departments of the same organization).

#### E. Identify the Headings

Headings, or heads, are organizational devices that guide the reader through your paper. There are two types: component heads and text heads.

Component heads identify the different components of your paper and are not topically subordinate to each other. Examples include Acknowledgments and References and, for these, the correct style to use is “Heading 5”. Use “figure caption” for your Figure captions, and “table head” for your table title. Run-in heads, such as “Abstract”, will require you to apply a style (in this case, italic) in addition to the style provided by the drop down menu to differentiate the head from the text.

Text heads organize the topics on a relational, hierarchical basis. For example, the paper title is the primary text head because all subsequent material relates and elaborates on this one topic. If there are two or more sub-topics, the next level head (uppercase Roman numerals) should be used and, conversely, if there are not at least two sub-topics, then no subheads should be introduced.

#### F. Figures and Tables

a) *Positioning Figures and Tables:* Place figures and tables at the top and bottom of columns. Avoid placing them in the middle of columns. Large figures and tables may span across both columns. Figure captions should be below the figures; table heads should appear above the tables. Insert figures and tables after they are cited in the text. Use the abbreviation “Fig. 2”, even at the beginning of a sentence.

TABLE I  
TABLE TYPE STYLES

Table Head	Table Column Head		
copy	Table column subhead	Subhead	Subhead

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



Fig. 2. Example of a figure caption.

Figure Labels: Use 8 point Times New Roman for Figure labels. Use words rather than symbols or abbreviations when writing Figure axis labels to avoid confusing the reader. As an

example, write the quantity “Magnetization”, or “Magnetization, M”, not just “M”. If including units in the label, present them within parentheses. Do not label axes only with units. In the example, write “Magnetization (A/m)” or “Magnetization {A[m(1)]}”, not just “A/m”. Do not label axes with a ratio of quantities and units. For example, write “Temperature (K)”, not “Temperature/K”.

#### ACKNOWLEDGMENT

The preferred spelling of the word “acknowledgment” in America is without an “e” after the “g”. Avoid the stilted expression “one of us (R. B. G.) thanks ...”. Instead, try “R. B. G. thanks...”. Put sponsor acknowledgments in the unnumbered footnote on the first page.

#### REFERENCES

Please number citations consecutively within brackets [2]. The sentence punctuation follows the bracket [3]. Refer simply to the reference number, as in [4]—do not use “Ref. [4]” or “reference [4]” except at the beginning of a sentence: “Reference [4] was the first ...”

Number footnotes separately in superscripts. Place the actual footnote at the bottom of the column in which it was cited. Do not put footnotes in the abstract or reference list. Use letters for table footnotes.

Unless there are six authors or more give all authors’ names; do not use “et al.”. Papers that have not been published, even if they have been submitted for publication, should be cited as “unpublished” [5]. Papers that have been accepted for publication should be cited as “in press” [6]. Capitalize only the first word in a paper title, except for proper nouns and element symbols.

For papers published in translation journals, please give the English citation first, followed by the original foreign-language citation [7].

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