Project - Phase 8 Report

Group 14
Tiago Carvalho fc51034
Diogo Lopes fc51058
Miguel Saldanha fc51072
João Roque fc51080
João Afonso fc51111

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1 Motivation

The idea for our project emerged when we were wondering how cool it would be to have an API that could help us decide which shows to watch next based on our personal taste. We figured that such a service could be developed with relative ease if users marked shows as viewed and/or liked.

Because users can watch more than just movies, for example animes, we wanted to use more than one dataset. Both animes and movies can have a lot in common not only with each other but also with books, so we also decided to use a book dataset. Using data from multiple datasets would give us a more realistic experience when it comes to cloud-native applications development, since these applications use data from so many sources.

With three datasets, we aimed to be able to effortlessly search through any of them. We wanted users to be able to mark movies, animes or books as seen or liked, and get suggestions of what to see next. Since the datasets have very similar categories among them, suggesting books mixed with movies and animes would be a possibility that we thought would add value to our application.

Our idea to implement the suggestion mechanism was to base these suggestions on the user's likes and views, which would indicate to us which categories the user prefers, and, therefore, allow us to suggest good movies, animes or books to the user.

We called our API "Seen", since users can see movies, animes and books and then get suggestions based on their profile, on what they have seen.

2 Dataset characterization

2.1 Dataset 1 — IMDB

This dataset provides a lot of information about movies and shows that can be seen in IMDB.

We downloaded the dataset from the Kaggle website, updated one year ago.

From the whole data these are the columns that were important to us:

Columns	Example
id	606e2683b3fff1da8a207ae9
name	The Arrival of a Train
category	[Action,Documentary,Short]
rating	7.4
type	short

Table 1: Movie example in our database

2.2 Dataset 2 — MyAnimeList

The second dataset was obtained from Kaggle, about the MyAnimeList website.

This data not only has a lot of anime content but also user information, but because we want to connect with the other datasets doesn't make sense to use that data. Meaning we used these columns:

Columns	Example
id	606e252aebddc73ebfb15507
name	Shakugan no Shana: Season II
category	[Action,Drama,Fantasy,Romance,School,Supernatural]
rating	7.72
imageUrl	https://myanimelist.cdn-dena.com/images/anime/10/18669.jpg

Table 2: Anime example in our database

2.3 Dataset 3 — GoodReads

At last, this data set represents books from the GoodReads website, also downloaded from Kaggle.

The helpful data from this data set, to be able to use with animes and movies, is its categories and rating:

Columns	Example
id	606e25ad5e927a606f534284
name	Of Mice and Men
description	The compelling story of two outsiders [...]
category	[Classics,Fiction,Academic,School,Literature,Historical]
rating	7.7
imageUrl	https://images.gr-assets.com/books/1511302904l/890.jpg

Table 3: Book example in our database

3 Use cases

We have 3 types of Users: an Admin, which is a logged-in user with special permissions, a Regular user, which is a logged-in user, and a not logged-in user that we call Any.

Services	User	Functionalities
Normal	Any	Sign in See Book, Show and Movie Library
	Regular	User Log in Set Book/Show/Movie as seen Set Book/Show/Movie as liked Ask for suggestions to read and/or watch Count how many views a specific Item has Count how many likes a specific Item has Top 10 Items with more likes
	Admin	Add Book/Show/Movie to Library Remove Book/Show/Movie from Library
Spark	Any	See best Director and his movies with cast See which Actor has the most connections

4 API

User	Path				get	post	put	del	description
Regular	/lib	/{page}			×				Returns a *page* from the database
	/suggest					×			List of suggestions to watch
Admin	/item					×			Creates an item to add to the database
Any	/item	/{type}	/{id}		×			×	Gets/Deletes item with specific *id* and *type*
Regular	/item	/{type}	/{id}	/seen			×		Marks item as seen
	/item	/{type}	/{id}	/like			×		Marks item as liked
Any	/item	/{type}	/{id}	/views	×				Returns Item's number of views
	/item	/{type}	/{id}	/likes	×				Returns Item's number of likes
	/getTopTen	/{type}			×				Returns top ten most liked Items with *type*
	/user					×			Creates User
	/user	/login			×				Logs in
Regular	/user	/logout			×				Logs out
	/user	/search	/{username}		×			×	Searches/Deletes User by username
Any	/{director}				×				Returns list with the best Director's movies and his cast
	/actor				×				Returns the Actor's name with movies with the biggest cast in total

5 Architecture (application and technical)

5.1 Diagram

Figure 1: Project's architecture.

5.2 Application

5.2.1 Client

The Client should be able to access our API on his browser:

`https://recommendations.sytes.net`

The Swagger provides a user interface to use and test our calls by adding "/ui" to the end of the url above.

5.2.2 Server

In total there are 7 different microservices working at the same time. Every single one runs on the Google Cloud, inside the same cluster but different dockers.

Our reasoning was having an entrance microservice, which would redirect the request to the microservice responsible for that type of request, for example when sending a request for a page in our library, the API Gateway receives that request and sends it to the Library Service, where he has the responsibility of ask for Item to the Book, IMDB and Anime Service, and them put them together in just one response, that response then is sent to the API Gateway, to be show to the Client.

This API Gateway service also has the responsibility of transforming the REST requests from the Client to gRPC request that is used internally, between Services.

We also have 5 services which are responsible for the database connection, meaning they are responsible to translate the request they receive to inserts, updates, removes or queries to the database.

5.2.3 Databases

Every database has a service that has the responsibility to access and manage it. While 3 of them are hosted by MongoDB a NoSQL database, the last one is an SQL database hosted by Google Cloud.

For the Items' databases (Books, Movies and Animes) we used a NoSQL database since we might change the format of our documents, meaning if we had an SQL database we would need to always drop the entire database and

repopulate again, and it also helps that the MongoDB provides a very easy and python implementation to work with.

Instead, for the Users' database we used an SQL one, and because we already knew what we wanted from the User, we knew we would use structured data for it.

5.2.4 Spark

For a posterior addition like it was with Spark we created a new microservice, this microservice would be responsible for both the Spark request we provide, this service receives the gRPC requests from the API Gateway and then processes them, creating job to send to the Google Cloud where we have a Cluster with the sole purpose of running these types of jobs.

5.3 Technical

5.3.1 Client

TODO

5.3.2 Server

TODO

5.3.3 Databases

TODO

5.3.4 Spark

TODO