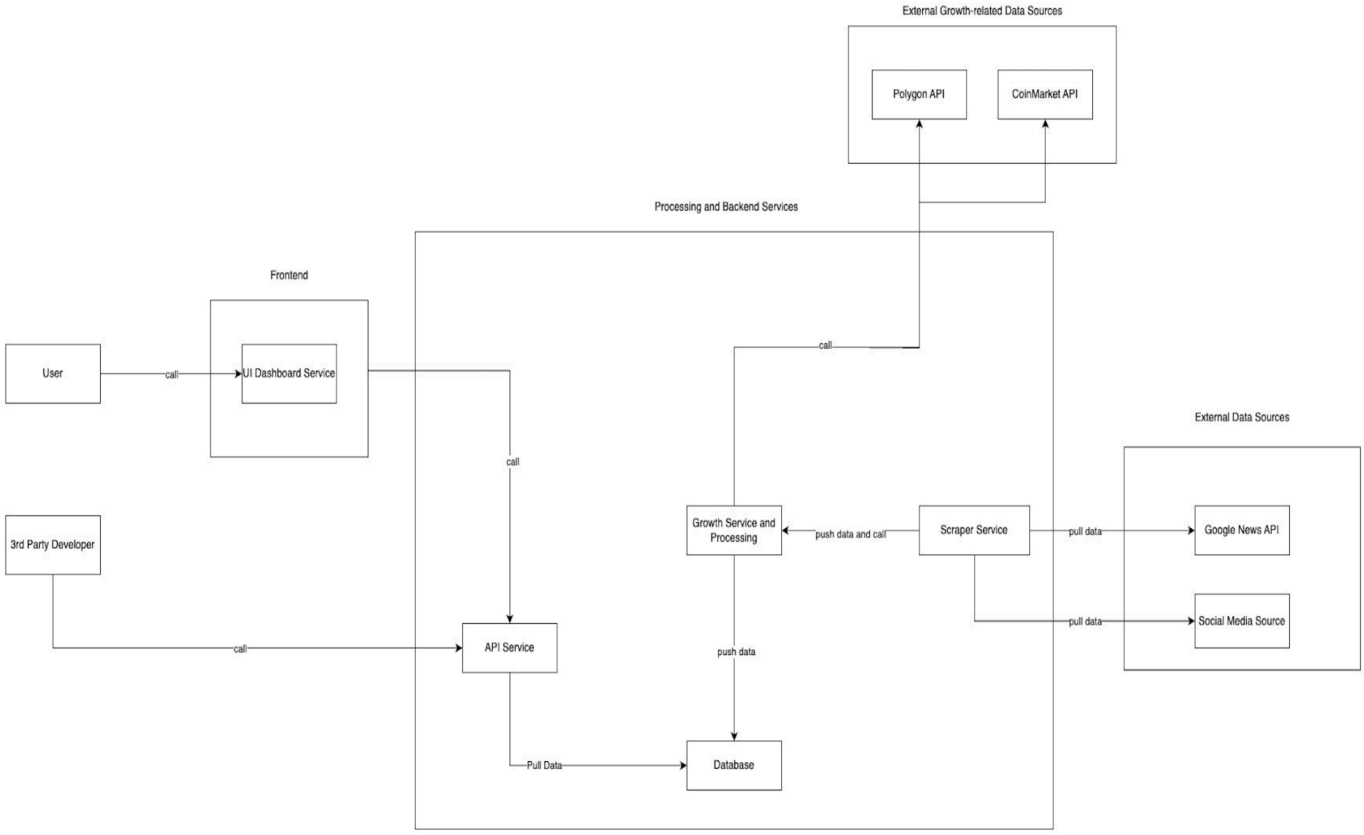
Team 12
Descriptive Architecture for CryptoBoard

Architecture Model

The **Microservices Architecture** has been retained without any modifications or deviations. This approach ensures modularity, scalability, and flexibility, making it well-suited for the system's requirements and objectives.

Updated Component Diagram



1. UI Dashboard Access

- The React-based **UI Dashboard** retrieves all required data through the **API Service**, which queries the database

2. API Service:

- Acts as the backend to:
    - Provide data to the dashboard
    - Serve a public API for third-party developers

3. Scraper Service:

- Fetches data from:
    - **Two News Sources**: A custom scraper was initially developed to collect news articles from sources such as the LA Times and the New York Times. However, after 24 hours of continuous scraping, very few keyword matches were identified, significantly limiting the relevance and volume of the collected data. To overcome this limitation, the system was adapted to use the **Google News API**, which aggregates articles from multiple news platforms. This change not only resolved the data volume issue but also exceeded the original requirement of two specific sources by providing access to a broader and more relevant dataset
    - **One Social Media Source**: Data is collected from Reddit API

4. Growth and processing Service:

- Based on the scraped data, does analytics to calculate popularity percentage on how each crypto is popular compared to the other crypto's based on news and social media data.
    - While scraping we are calculating the number of times a crypto was mentioned, we are keeping a count of these occurrences.
    - Once we have individual counts for each crypto we are calculating the popularity percentage which is count of a that crypto divided by the sum of all counts.
- Fetches historical price data and price percentage changes from:
    - **Polygon API - is being used to get historical time series data of price and volume to make the chart in the UI.**
    - **CoinMarketCap API -** is being used to get the percentage change of pisces for the last 24hours, 7days, upto last 30days. This data is being used to predict the future price of the crypto.

5. Frontend (UI Dashboard Service):

- Integrated into the React-based frontend, allowing users to view cryptocurrency insights by communicating with the backend via the API Service

6. Database:

- **MongoDb** has been used as the database. All historical data and analytics based on scraping is stored in the Db as a JSON.

6. External Users:

- **End Users (Clients):** Access the dashboard for cryptocurrency insights.
- **Third-Party Developers:** Use the public API to integrate CryptoBoard's data into their own applications

Workflow:

1. Scraper(on cron job every 24hrs) → calls Growth and Processing with scraped data using a REST call.
2. Growth rate and prediction - pull Historical Data from Polygon and price_change, price_percent_change from CoinMarketCap and do analytics
    a. Growth service job pulls data from coinmarketcap and Polygon makes analytical processing based on scraped data
    b. Growth service and processing → (dumps data to) DB.
3. User opens Frontend Dashboard → REST call to API server → API server fetches data from MongoDB → The data from MongoDB is sent to frontend as the response.

Departures

1. Plug and Play Decoupling

Reason for Departure:

- Cryptocurrency-specific sources were minimal, leading to reliance on the Google News API and Reddit API
- Plug-and-play functionality would require interfaces for adding/removing sources, which was deprioritized due to the low availability of other sources

Future Implementation:

- Plug-and-play decoupling can be added using an interface-based design, requiring approximately 0.5 days of Dev effort

2. Search Functionality

Reason for Departure:

- Search functionality was deprioritized as the primary focus was on fetching and processing data for the dashboard

Future Implementation:

- A search feature can be integrated into the front-end and API by adding a search query endpoint and utilizing indexed data in MongoDB

3. User Management

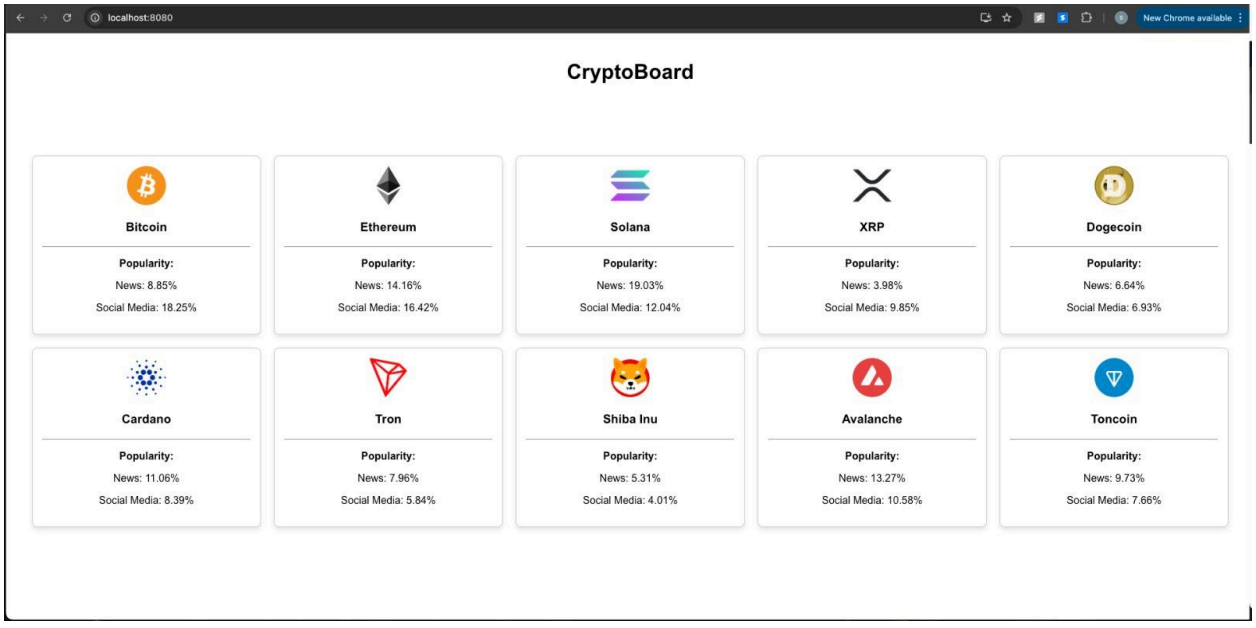
Reason for Departure:

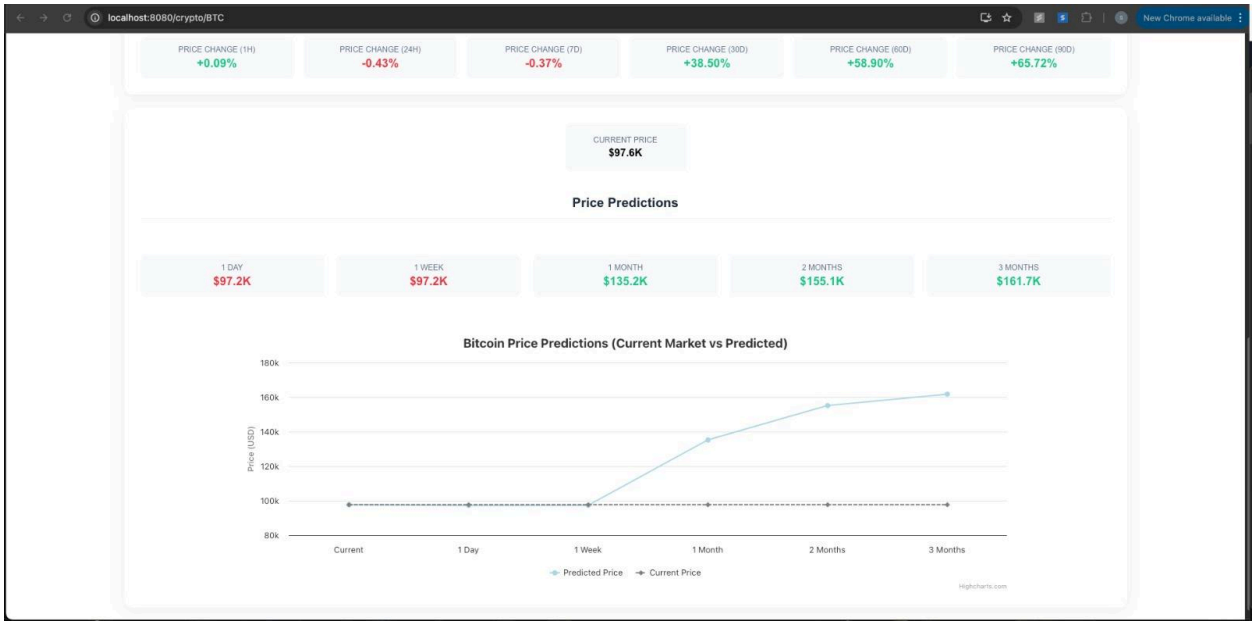
- User management and authentication were deprioritized as the initial target audience did not require personalization

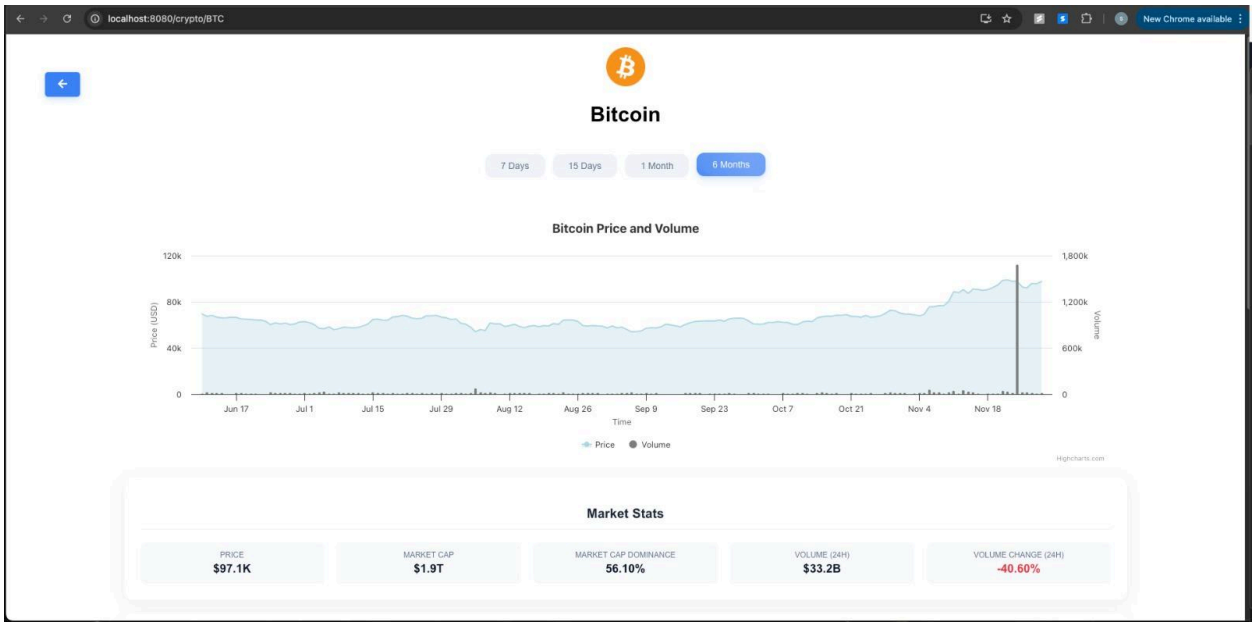
Future Implementation:

- Adding user management will involve integrating authentication middleware and a user database, requiring moderate effort

UI Screenshots:




localhost:8080/crypto/BTC
New Chrome available
PRICE CHANGE (1H)
+0.09%
PRICE CHANGE (24H)
-0.43%
PRICE CHANGE (7D)
-0.37%
PRICE CHANGE (30D)
+38.50%
PRICE CHANGE (60D)
+58.90%
PRICE CHANGE (90D)
+65.72%
CURRENT PRICE
$97.6K
Price Predictions
1 DAY
$97.2K
1 WEEK
$97.2K
1 MONTH
$135.2K
2 MONTHS
$155.1K
3 MONTHS
$161.7K
Bitcoin Price Predictions (Current Market vs Predicted)
180k
160k
140k
120k
100k
80k
Price (USD)
Current
1 Day
1 Week
1 Month
2 Months
3 Months
Predicted Price
Current Price
Highcharts.com


localhost:8080/crypto/BTC
New Chrome available
Bitcoin
7 Days
15 Days
1 Month
6 Months
Bitcoin Price and Volume
120k
80k
40k
0
Price (USD)
1,800k
1,200k
600k
0
Volume
Jun 17
Jul 1
Jul 15
Jul 29
Aug 12
Aug 26
Sep 9
Sep 23
Oct 7
Oct 21
Nov 4
Nov 18
Time
Price
Volume
Highcharts.com
Market Stats
PRICE
$97.1K
MARKET CAP
$1.9T
MARKET CAP DOMINANCE
56.10%
VOLUME (24H)
$33.2B
VOLUME CHANGE (24H)
-40.60%