Tracking your portfolio: Stock manager

Tracking your stock portfolio is now easier than ever before thanks to Stock Manager (*stock_manager@webex.bot*). This Webex bot allows you to:

- View the latest price and daily fluctuations of specific stocks by entering their ticker symbols.
- Seamlessly add stocks to your portfolio.
- Keep track of the overall value of your portfolio.

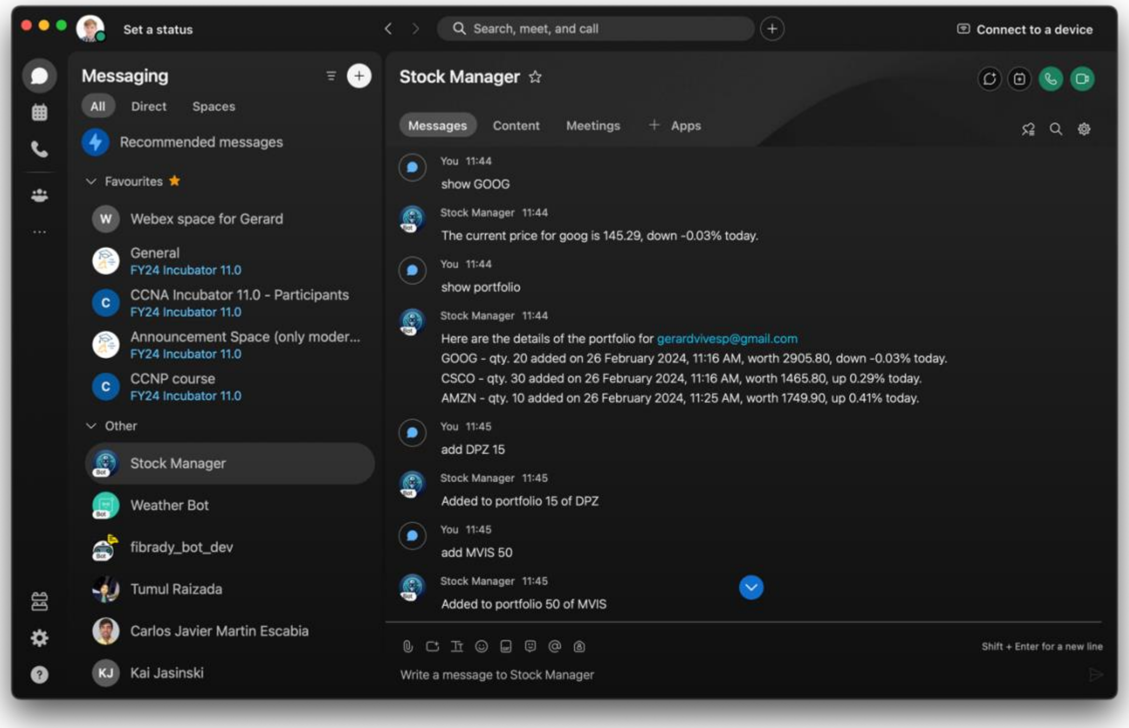
The development of this bot leveraged nGrok technology to establish a reliable connection with Webex servers, facilitating smooth message exchanges. Initially, the goal was to implement the project by using Websockets as can be seen in this repository. However, there appears to be an issue with the device data object which disrupts communication (more on the issue here), thus making it impossible to receive or send messages. After extensive troubleshooting efforts, including collaboration with a Cisco engineer, the decision was made to proceed with nGrok as implemented in this repository.

The core functionality of the bot, particularly in fetching stock prices and daily changes, is powered by the *get_stock_price* function within the *vantage_api.py* file. This function executes an HTTP GET request to a designated API endpoint, passing the stock's ticker symbol and an API key as parameters. The response, in JSON format, provides the requested financial data. This feature utilizes the Alpha Vantage API, renowned for its comprehensive coverage of real-time and historical data across various markets, including stocks, forex, and cryptocurrencies. Access to this API requires a key, which is available upon request and subject to a daily usage limit of 25 queries.

Another key point is the storage of the users' portfolios and all their stocks. To resemble a production system, Google Firestore –a flexible, scalable database for mobile, web, and server development from Firebase and Google Cloud- has been used. There are three different collections: *users, portfolios* and *stocks*. Each document in users contains an email address to uniquely identify a user and a reference to its portfolio document. Each portfolio contains an array of references to the associated stock documents. Finally, each stock document contains the ticker, the quantity, and a timestamp to know when it was added.

Once a user starts chatting with the bot and attempts to add a stock to his/her portfolio, the *user* document will be created as well as the *portfolio* document. Each Webex user is uniquely identified by the account's email, which is stored on the email field for the user's document. To add a stock the user must provide the ticker and the quantity, then the *stock* document will be created as well as the reference to it from the portfolio. There is also a command to display all the stats on a user's portfolio, which iterates over all the stocks while querying the Vantage API, by calling *get_stock_price,* to get all the relevant information.

There is not better way to understand how the bot works than showing some examples.



You 11:44
show GOOG

Stock Manager 11:44
The current price for goog is 145.29, down -0.03% today.

You 11:44
show portfolio

Stock Manager 11:44
Here are the details of the portfolio for gerardvivesp@gmail.com
GOOG - qty. 20 added on 26 February 2024, 11:16 AM, worth 2905.80, down -0.03% today.
CSCO - qty. 30 added on 26 February 2024, 11:16 AM, worth 1465.80, up 0.29% today.
AMZN - qty. 10 added on 26 February 2024, 11:25 AM, worth 1749.90, up 0.41% today.

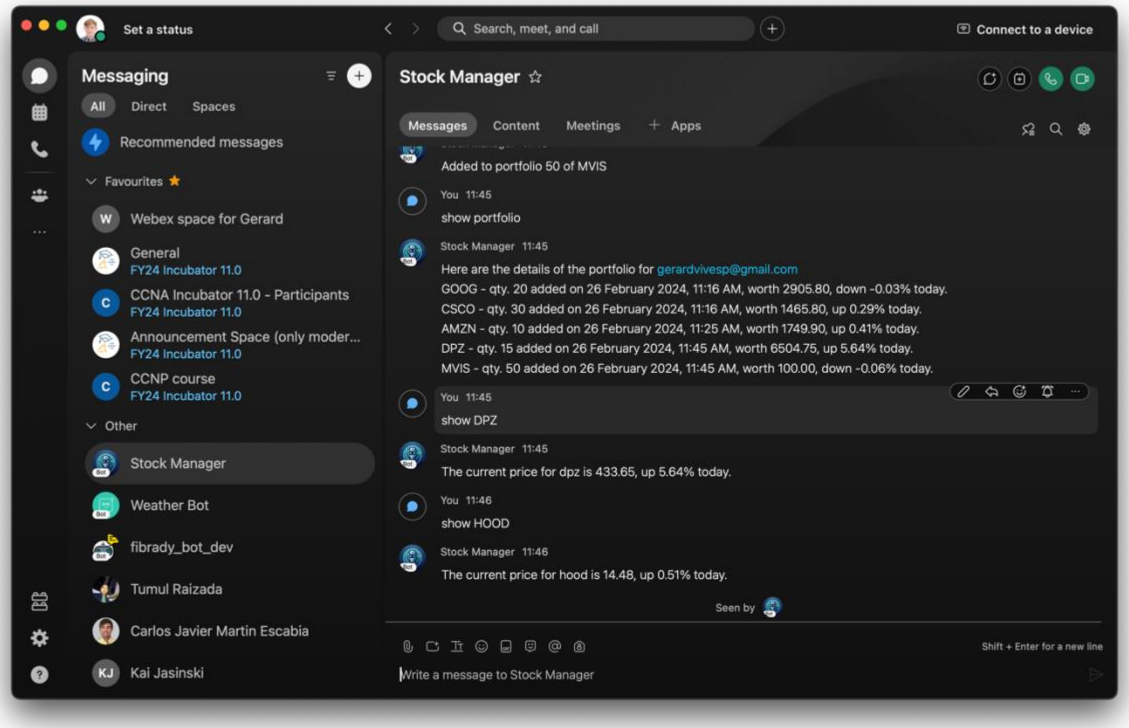
You 11:45
add DPZ 15

Stock Manager 11:45
Added to portfolio 15 of DPZ

You 11:45
add MVIS 50

Stock Manager 11:45
Added to portfolio 50 of MVIS

The command in the top (*show <STOCK-TICKER>*) displays the price and the daily change for a particular stock, Google in this case. To check the portfolio stats, *show portfolio* is used. At that moment, there were 3 stocks in the portfolio added on different times. The total worth based on the quantity purchased is displayed, as well as the daily change. Right after, two stocks were added: 15 x DPZ and 50 x MVIS by using *add <STOCK-TICKER> <QTY>*. As it can be seen on the screenshot below, the two new stocks are displayed in the portfolio.



Added to portfolio 50 of MVIS

You 11:45
show portfolio

Stock Manager 11:45
Here are the details of the portfolio for gerardvivesp@gmail.com
GOOG - qty. 20 added on 26 February 2024, 11:16 AM, worth 2905.80, down -0.03% today.
CSCO - qty. 30 added on 26 February 2024, 11:16 AM, worth 1465.80, up 0.29% today.
AMZN - qty. 10 added on 26 February 2024, 11:25 AM, worth 1749.90, up 0.41% today.
DPZ - qty. 15 added on 26 February 2024, 11:45 AM, worth 6504.75, up 5.64% today.
MVIS - qty. 50 added on 26 February 2024, 11:45 AM, worth 100.00, down -0.06% today.

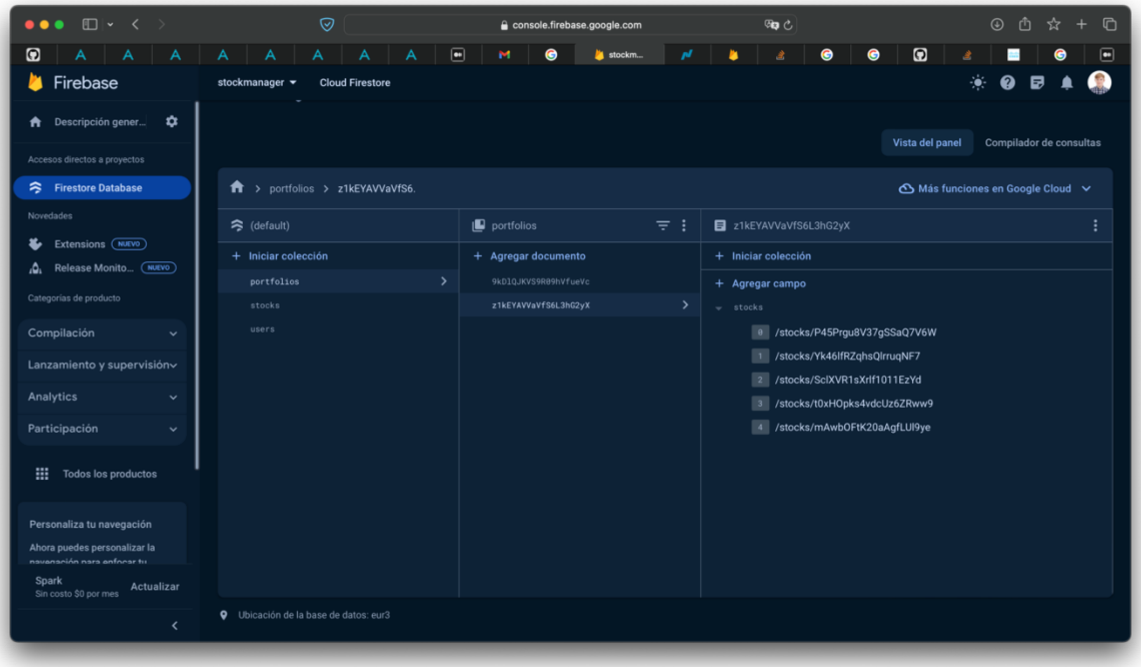
You 11:45
show DPZ

Stock Manager 11:45
The current price for dpz is 433.65, up 5.64% today.

You 11:46
show HOOD

Stock Manager 11:46
The current price for hood is 14.48, up 0.51% today.

Finally, to better understand how the Firestore database is structed there are three screenshots for each of the collections and one of its documents, respectively.



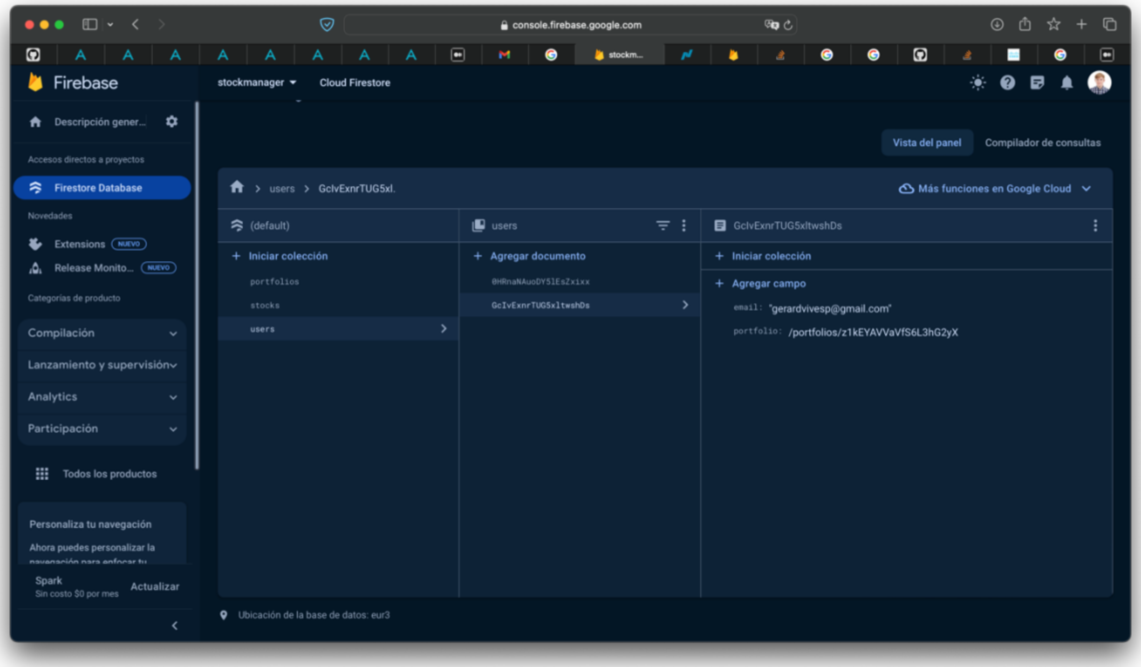
portfolios > z1kEYAVVaVfS6.

(default)
portfolios
stocks
users

portfolios
9kDlQJKVS9R09hVfueVc
z1kEYAVVaVfS6L3hG2yX

z1kEYAVVaVfS6L3hG2yX

stocks
- 0 /stocks/P45Prgu8V37gSSaQ7V6W
- 1 /stocks/Yk46lfRZqhsQlrruqNF7
- 2 /stocks/SclXVR1sXrlf1011EzYd
- 3 /stocks/t0xHOpks4vdcUz6ZRww9
- 4 /stocks/mAwbOFtK20aAgfLUl9ye



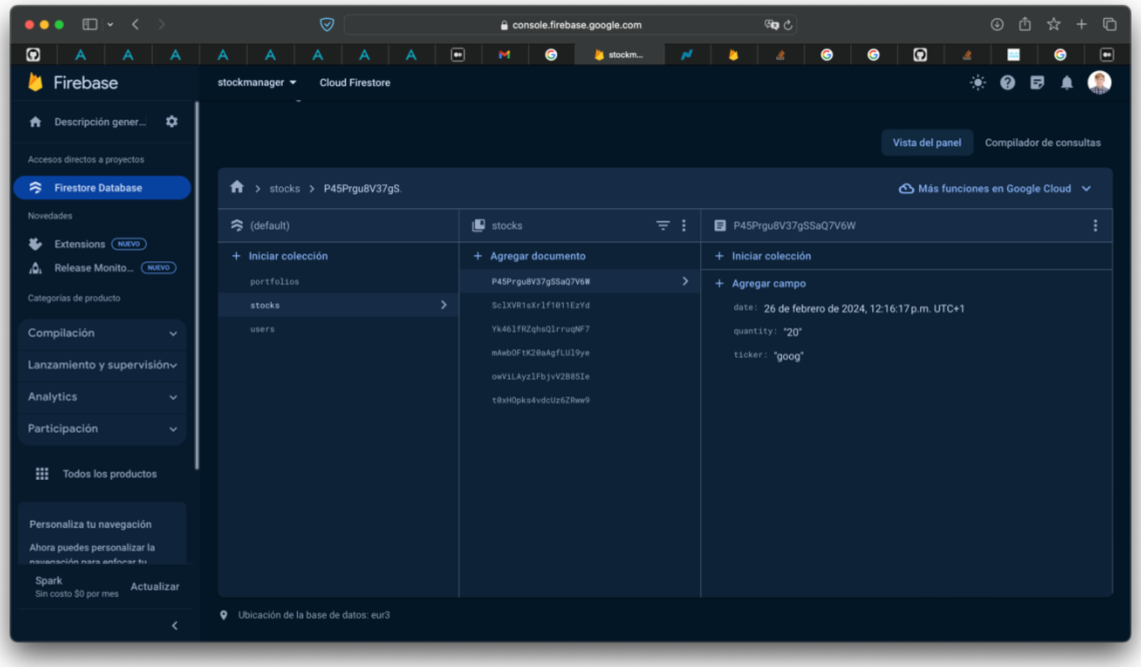
users > GcIvExnrTUG5xl.

(default)
portfolios
stocks
users

users
0HRnaNAuoDY5lEsZxixx
GcIvExnrTUG5xltwshDs

GcIvExnrTUG5xltwshDs

email: "gerardvivesp@gmail.com"
portfolio: /portfolios/z1kEYAVVaVfS6L3hG2yX



stocks > P45Prgu8V37gS.

(default)

- portfolios
- stocks
- users

stocks

- P45Prgu8V37gSSaQ7V6W
- SclXVR1sXrlf1011EzYd
- Yk461fRZqhsQlrruqNF7
- mAwbOFtK20aAgfLUl9ye
- owViLAyzlFbjvV2B85Ie
- t0xHOpks4vdcUz6ZRww9

P45Prgu8V37gSSaQ7V6W

date: 26 de febrero de 2024, 12:16:17 p.m. UTC+1
quantity: "20"
ticker: "goog"

The Stock Manager Webex bot project was a great hands-on experience for understanding ChatOps and how APIs operate. It shed light on new concepts such as Websockets and nGrok, demonstrating the importance of adaptability in tech. Although initially faced with challenges, especially with the Websockets, switching to nGrok proved to be a successful workaround. This project also allowed me to apply knowledge from my degree, particularly in working with databases, by utilizing Google Firestore for managing user data and stock information.

However, there is room for improvement. Handling exceptions, like issues with the Vantage API, could be refined for a better user experience. Moreover, adding features like removing stocks from a portfolio could enhance functionality. Overall, this project was not only a valuable learning experience but also an opportunity to apply academic concepts to real-world applications.