

Laboratory of advanced programming 2021/2022

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MarketFuture

Idea:

The main objective of this project is providing a distributed web platform used by the users to get informations about stock markets, their trends and possible future trends of a stock via a specific component, moreover it will be used to get news related to companies and finance that will be checked to be non-fake via a machine learning component

What the system should do:

- Fetch news.
- Present news.
- Process news to be sure they are not fake before sending them (ML component).
- Manage authentication of users.
- Present profile page user-dedicated.
- Present stock market trends selected
- Predict possible future stock market trends

Potential Users:

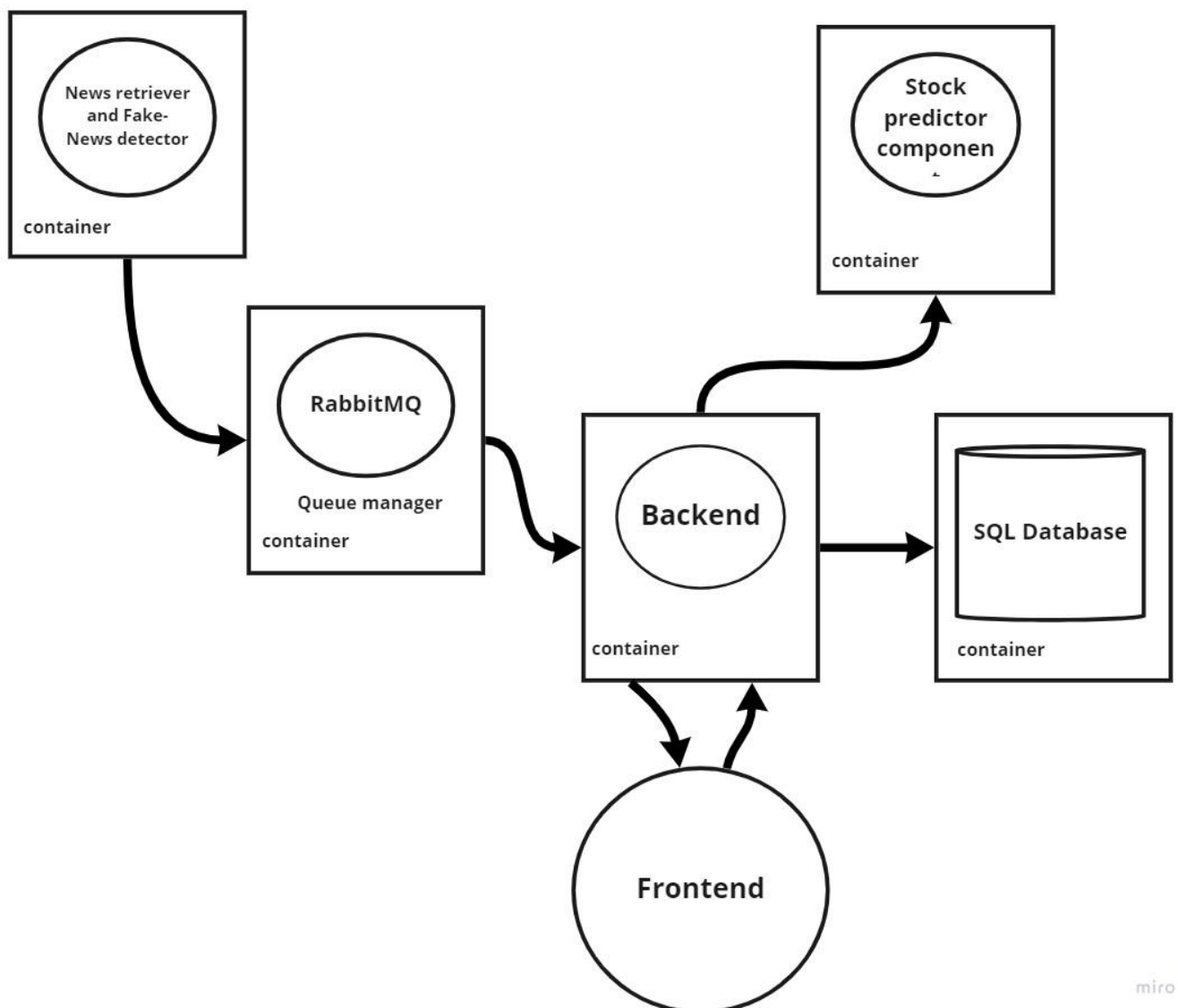
- Young people that are starting learning about stock markets and finance, and want to know it and have an overview of the current financial market situation over time.
- People that are new to the stock markets and investments, and want to be helped to predict the future stock market trends.
- People interested in being up to date with the latest news about stock markets and companies being sure that those are not fake news.

Main Use Cases:

- the user subscribes to the system.
- the user logs in to the system.
- the user explores the landing page for reading the not-fake news presented.
- the user accesses the main page to watch the trend of a selected stock.
- the user triggers the stock trend predicting module to receive the predicted possible future of the stock market.
- the user navigates to its profile page for consulting its personal information.
- the administrator of the system, with higher privileges can manage news, user profiles and stocks.

Architecture:

- Front-end: login + stocks page + user profile page + newspaper
- SQL Based Database.
- RabbitMQ
- Backend : hosting the RESTful Web application.
- News Component: retrieving news and sending those ones that pass a fake-news detector machine learning system. Interacting inter-application using rabbitMQ and queues.
- Stock prediction component: Component used to predict the future stock market trends. Exposed to the other components via REST API's.
- external service accessed via api to get the news
- external service accessed via api to get the stocks data



USER STORY	PRIORITY	VALUE	RISK	Non functional requirements
As a [archetype], I want to be able to [do a thing], so that I can [achieve a goal]	1 High	1 High	1 High	[Any relevant notes]
As an unregistered user i want to be able to login to the application so that i can use the application services	1 High	4 Low	2 Med	Performance
As an unregistered user i want to be able to register to the application so that i can use the application services	1 High	1 High	1 High	Performance
As a registered user i want to be able to logout from the application so that i can login or register again	4 Low	1 High	3 Med	Performance
As a registered user i want to be able to reach the about us description	4 Low	4 Low	4 Low	
As a registered user i want to be able to reach the news in the page so that i can be updated on the latest news about the economy	2 Med	2 Med	4 Low	
As a registered user i want to be able to reach the main page	2 Med	2 Med	4 Low	
As a registered user i want to be able to reach the stock predictor page so that i can analyze the stock prices	3 Med	2 Med	4 Low	
As an admin i want to be able to reach the admin page so that i can control the behavior of the application and monitor it	4 Low	3 Med	4 Low	
As an admin i want to be able to delete a news from the system so that the users can't see it anymore	4 Low	3 Med	4 Low	
As a registered user i want to be able to select a stock to see its trend	2 Med	1 High	4 Low	Availability
As a registered user i want to be able to see the stock prices and the predicted trend in a specific date	2 Med	1 High	4 Low	Availability
As a registered user i want to be able to see the general future trends	2 Med	1 High	4 Low	Availability
As a registered user i want to be able to see the mean stock predicted prices over the weeks	2 Med	1 High	4 Low	Availability
As a registered user i want to be able to see the mean stock predicted prices annually.	2 Med	1 High	4 Low	Availability
As an admin i want to be able to delete a user from its email so that he is banned from the application	4 Low	4 Low	2 Med	Reliability
As an admin i want to be able to add a new stock id so that it can be seen by the users in the predictor page	3 Med	2 Med	4 Low	Reliability
As an admin i want to be able to delete a stock id so that the users can't use it anymore in the stock predictor page	2 Med	4 Low	4 Low	Reliability
As an admin i want to be able to see all the users currently in the system so that i can monitor them	4 Low	4 Low	4 Low	Reliability
As an admin i want to be able to delete a user selecting him so that he is banned from the system	3 Med	3 Med	4 Low	Reliability

MarketFuture

As a registered user I
want to be able to
login to the
application so that i
can use the
application services

MarketFuture

As an unregistered user i want to be able to register to the application so that i can use the application services

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Go to the stock predictor

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As a registered user i want to be able to reach the about us description

As a registered user
i want to be able to
reach the news in
the page so that i
can be updated on
the latest news
about the economy

As a registered user i want to be able to reach the stock predictor page so that i can analyze the stock prices

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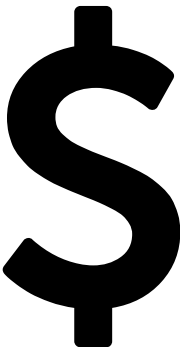
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Go to the stock predictor



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As an admin i want to be able to delete a news from the system so that the users can't see it anymore

As an admin i want to be able to reach the admin page so that i can control the behavior of the application and monitor it

As a registered user i want to be able to select a stock to see its trend

As a registered user i want to be able to see the general future trends

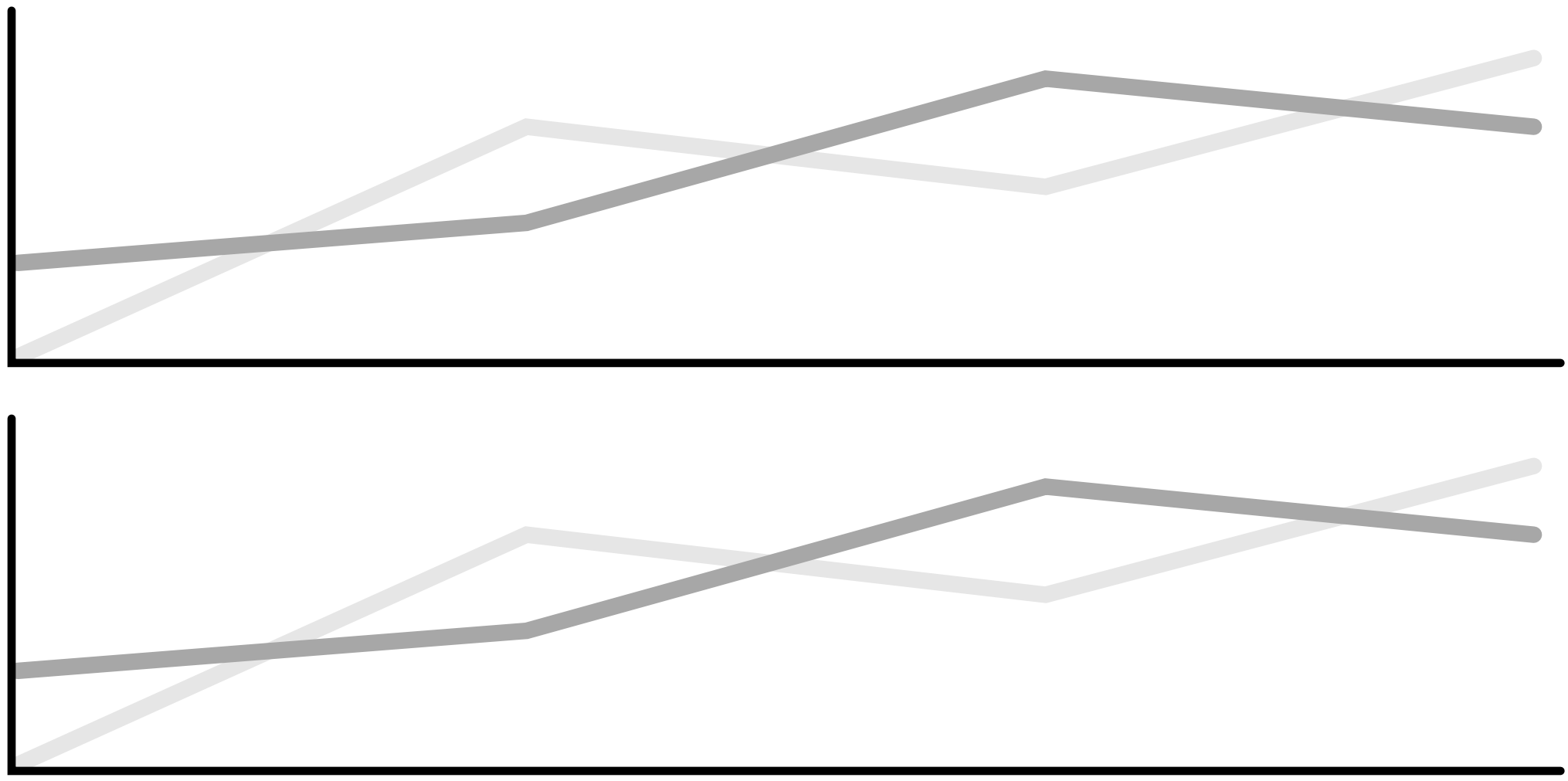
As a registered user i want to be able to see the stock prices and the predicted trend in a specific date

As a registered user i want to be able to see the mean stock predicted prices annually.

select stock

▼

Predict the selected stock trend



User email Delete user

Stock id Add stock

Stock id Delete stock

[illegible]

As an admin i want to be able to delete a user from its email so that he is banned from the application

As an admin i want to be able to add a new stock id so that it can be seen by the users in the predictor page

As an admin i want to be able to delete a stock id so that the users can't use it anymore in the stock predictor page

As an admin i want to be able to see all the users currently in the system so that i can monitor them

As an admin i want to be able to delete a user selecting him so that he is banned from the system

ID Sprint	ID User Story [1]	Task Name [2]	Description and details [3]	Check Out [4]	Start date [5]	Due date [6]	Remaining Effort [hr] [7]
1	4	Create a basic description of the team	As a registered user i want to be able to reach the about us description	Andrea	15/03/2022	31/03/2022	0
1	5	Create the fakedetector and show the validated results in the homepage	As a registered user i want to be able to reach the news in the page so that i can be updated on the latest news about the economy	Lorenzo	15/03/2022	31/03/2022	0
1	6	Create a link for the homepage	As a registered user i want to be able to reach the main page	Andrea	15/03/2022	31/03/2022	0
1	7	Use the prediction model to get all the stock trends	As a registered user i want to be able to reach the stock predictor page so that i can analyze the stock prices	Lorenzo	15/03/2022	31/03/2022	0
2	1	Create session validating the data in the database	As an unregistered user i want to be able to login to the application so that i can use the application services	Lorenzo	01/04/2022	15/04/2022	0
2	2	Create session and create the database for the users	As an unregistered user i want to be able to register to the application so that i can use the application services	Andrea	01/04/2022	15/04/2022	0
2	3	Delete a session	As a registered user i want to be able to logout from the application so that i can login or register again	Lorenzo	01/04/2022	15/04/2022	0
3	10	Select a stock to send to the predictor	As a registered user i want to be able to select a stock to see its trend	Andrea	16/04/2022	30/04/2022	0
3	11	Visualize the output of the stock predictor	As a registered user i want to be able to see the stock prices and the predicted trend in a specific date	Lorenzo	16/04/2022	30/04/2022	0
3	12	Use the stock predictor ml model to predict the stock prices	As a registered user i want to be able to see the general future trends	Andrea	16/04/2022	30/04/2022	0
3	13	Get the mean price over the week days	As a registered user i want to be able to see the mean stock predicted prices over the weeks	Lorenzo	16/04/2022	30/04/2022	0
3	14	Get the mean price over the year days	As a registered user i want to be able to see the mean stock predicted prices annually.	Andrea	16/04/2022	30/04/2022	0
4	8	Create a special admin user in the database	As an admin i want to be able to reach the admin page so that i can control the behavior of the application and monitor it	Andrea	01/05/2022	15/05/2022	0
4	9	Delete a news from the database	As an admin i want to be able to delete a news from the system so that the users can't see it anymore	Lorenzo	01/05/2022	15/05/2022	0
4	15	Delete a user from the application	As an admin i want to be able to delete a user from its email so that he is banned from the application	Lorenzo	01/05/2022	15/05/2022	0
4	16	Add a new name for the stock api to get the data	As an admin i want to be able to add a new stock id so that it can be seen by the users in the predictor page	Andrea	01/05/2022	15/05/2022	0
4	17	Delete a stock to not get data from the api	As an admin i want to be able to delete a stock id so that the users can't use it anymore in the stock predictor page	Lorenzo	01/05/2022	15/05/2022	0
4	18	Visualize the users in the db	As an admin i want to be able to see all the users currently in the system so that i can monitor them	Andrea	01/05/2022	15/05/2022	0
4	19	Remove a user from the db from a query	As an admin i want to be able to delete a user selecting him so that he is banned from the system	Lorenzo	01/05/2022	15/05/2022	0

Id user story [1]	Story Description [2]	Status [3]
1	As an unregistered user i want to be able to login to the application so that i can use the application services	Done
2	As an unregistered user i want to be able to register to the application so that i can use the application services	Done
3	As a registered user i want to be able to logout from the application so that i can login or register again	Done
4	As a registered user i want to be able to reach the about us description	Done
5	As a registered user i want to be able to reach the news in the page so that i can be updated on the latest news about the economy	Done
6	As a registered user i want to be able to reach the main page	Done
7	As a registered user i want to be able to reach the stock predictor page so that i can analyze the stock prices	Done
8	As an admin i want to be able to reach the admin page so that i can control the behavior of the application and monitor it	Done
9	As an admin i want to be able to delete a news from the system so that the users can't see it anymore	Done
10	As a registered user i want to be able to select a stock to see its trend	Done
11	As a registered user i want to be able to see the stock prices and the predicted trend in a specific date	Done
12	As a registered user i want to be able to see the general future trends	Done
13	As a registered user i want to be able to see the mean stock predicted prices over the weeks	Done
14	As a registered user i want to be able to see the mean stock predicted prices annually.	Done
15	As an admin i want to be able to delete a user from its email so that he is banned from the application	Done
16	As an admin i want to be able to add a new stock id so that it can be seen by the users in the predictor page	Done
17	As an admin i want to be able to delete a stock id so that the users can't use it anymore in the stock predictor page	Done
18	As an admin i want to be able to see all the users currently in the system so that i can monitor them	Done
19	As an admin i want to be able to delete a user selecting him so that he is banned from the system	Done

FUNCTION POINT CALCULATION				Language	English		Adjusted FP		66.05.00		
No.	VAF	Weight: 0 (low) ~ 5 (high)									
1	Data communications	3									
2	Distributed data processing	3									
3	Performance	1									
4	Heavily used configuration	2		FP:	Function Point						
5	Transaction rate	2		VAF:	Value Added Factor						
6	On-Line data entry	3		DET:	Data Element Type						
7	End-user efficiency	3		RET:	Record Element Type						
8	On-Line update	1		FTR:	File Types Referenced						
9	Complex processing	3		ILF:	Internal Logical Files						
10	Reusability	2		EIF:	External Interface Files						
11	Installation ease	3		EI:	External Inputs						
12	Operational ease	4		EO:	External Outputs						
13	Multiple sites	3		EQ:	External Inquiry						
14	Facilitate change	3									
		36									
							Unadjusted FP		65		
No.	Module	Function Name	Description	Type	DET	RET / FTR	Complexity	FP	Adjust %	FP adjusted	Remarks
1	Users	Users	Model stored to represent the users	ILF	3	1	Low	7		7	
2	Stocks	Stocks	Model stored to represent the name of the stocks	ILF	1	1	Low	7		7	
3	Stocks data	Stocks data		EIF	3	1	Low	5		5	
4	News	News	Model used to store the news in the application	EIF	4	1	Low	5		5	
5	Banned news	Banned news	Model stored to represent the banned news	ILF	1	1	Low	7		7	
6	Login	Login	Login to the application	EI	2	1	Low	3		3	
7	Register	Registered	Register to the application	EI	3	1	Low	3		3	
8	Homepage	Show the news	Show the news in the homepage	EQ	4	1	Low	3		3	
9	Homepage admin	Ban a news	Ban a news from the system	EI	1	1	Low	3		3	
10	Stockpredictor	Predict the value of a stock	Select a stock and predict its value	EI	1	1	Low	3		3	
11	Stockpredictor	Calculate the stock trends	Calculate the stock trends from the stocks data	EO	3	1	Low	4		4	
12	Admin panel	Delete a user by email	Delete a user from the app	EI	1	1	Low	3		3	
13	Admin panel	Add stock	Add a stock to the application	EI	1	1	Low	3		3	
14	Admin panel	Delete stock	Delete a stock from the application	EI	1	1	Low	3		3	
15	Admin panel	Delete a user by username	Delete a user from the app	EI	1	1	Low	3		3	
16	Admin panel	Show the users	Show the users of the application	EQ	1	1	Low	3		3	

COCOMO II - Constructive Cost Model

Software Size

Sizing Method

Function Points

▼

Unadjusted
Function
Points

65

Language

Java

▼

Software Scale Drivers

Precedentedness

High

▼

Architecture / Risk Resolution

Very High

▼

Process Maturity

Nominal

▼

Development Flexibility

High

▼

Team Cohesion

Extra High

▼

Software Cost Drivers

Product

Required Software Reliability

Nominal

▼

Data Base Size

Low

▼

Product Complexity

Low

▼

Developed for Reusability

Low

▼

Documentation Match to Lifecycle Needs

Very Low

▼

Personnel

Analyst Capability

High

▼

Programmer Capability

High

▼

Personnel Continuity

High

▼

Application Experience

High

▼

Platform Experience

High

▼

Language and Toolset Experience

Very High

▼

Platform

Time Constraint

Nominal

▼

Storage Constraint

Nominal

▼

Platform Volatility

Low

▼

Project

Use of Software Tools

Very High

▼

Multisite Development

Nominal

▼

Required Development Schedule

Nominal

▼

Maintenance

Off

▼

Software Labor Rates

Cost per Person-Month (Dollars)

1500

Results

Software Development (Elaboration and Construction)

Staffing Profile

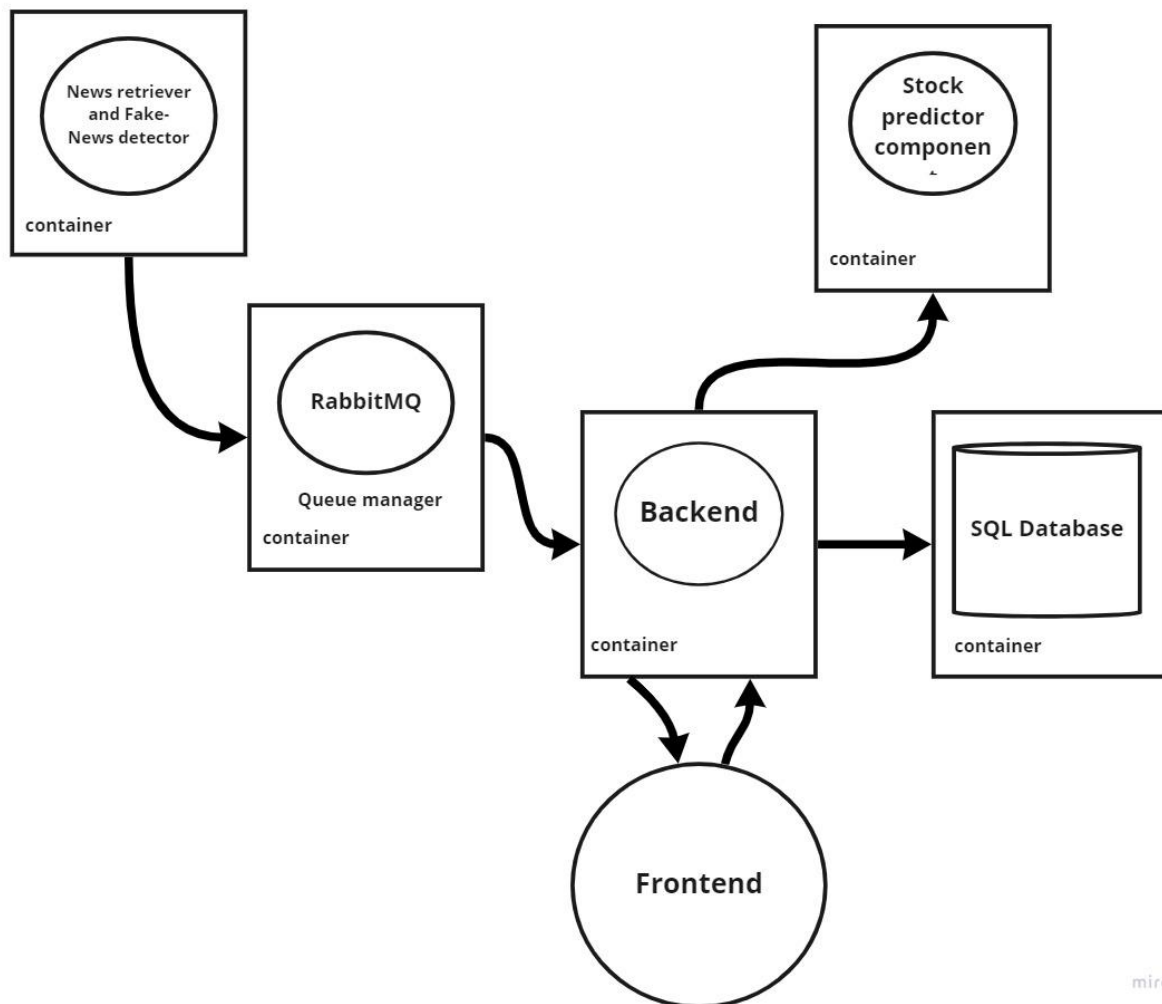
Effort = 2.0 Person-months
Schedule = 4.5 Months
Cost = \$2959

Your project is too small to display a staffing profile due to truncation.

Total Equivalent Size = 3445 SLOC
Effort Adjustment Factor (EAF) = 0.19

Design of the system:

- Front-end: login + stocks page + newspage
- SQL Based Database.
- RabbitMQ
- Backend : hosting the RESTful Web application.
- News Component: retrieving news and sending those ones that pass a fake-news detector machine learning system. Interacting inter-application using rabbitMQ and queues.
- Stock prediction component: Component used to predict the future stock market trends. Exposed to the other components via REST API's.
- external service accessed via api to get the news
- external service accessed via api to get the stocks data



Software architecture:

Database

-mysql database to store news, users and various structures for the application functionalities(banned users ,...).

Backend

-we used node js with some utilities from the express framework for the backend that is linked to the frontend, the database , rabbitmq to connect with the fake-news detector and is also connected with the stock predictor via a rest interface.

Queue

-we used rabbitmq as an amqp that is interconnecting the fake news detector with the backend : the fake news detector pushes every fixed number of seconds news to the queue and the backend uses those pushed objects to obtain informations related to the news preprocessed by the fake news detector.

News fake detector

-it's composed by a retriever of news coming from the mediacom api filtered by some keywords,a machine learning model to distinguish the fake news from the real ones using a naive bayes classifier, a node js server to push those preprocessed news to the rabbitmq component.

Stock predictor

-we used prophet to forecast the trend values of the stocks taken from the yahoo finance api and a flask server to expose the functionalities of the component to the backend.

Front end

-we didn't adopt any frameworks , we sent html css js from the backend ,using the classical libraries for the frontend development (jquery,bootstrap...)

Docker

-we divided the application into 6 containers that were orchestrated via a docker compose file. All the containers were created using a dockerfile and were linked to a docker hub repository from which the docker compose took the images.