Ellipsis Tech Series 2020 Hackathon
Presented by Goldman Sachs

" How can we develop a solution that will empower youths to make **smart** decisions with their finances by **making sense of the labyrinth of financial information** available out there?

Goldman Sachs

Team Blueprint Technologies

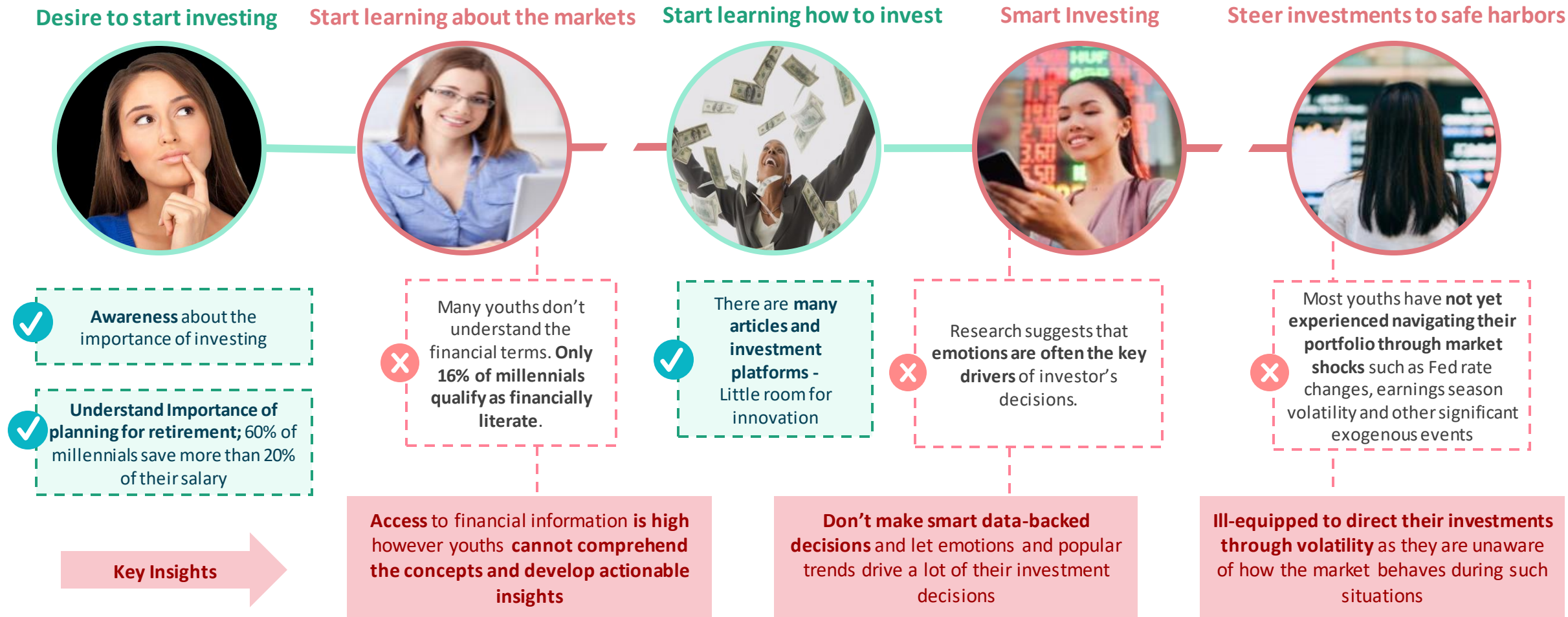Akash Mittal   Ashley Lau Bing Heng   Kin Hou Wong   Madhusudan Murali   Trevor Ng Yu Hong

While there is a lot of financial information out there, there are a lot of barriers to entry for investing and the youth often feel lost
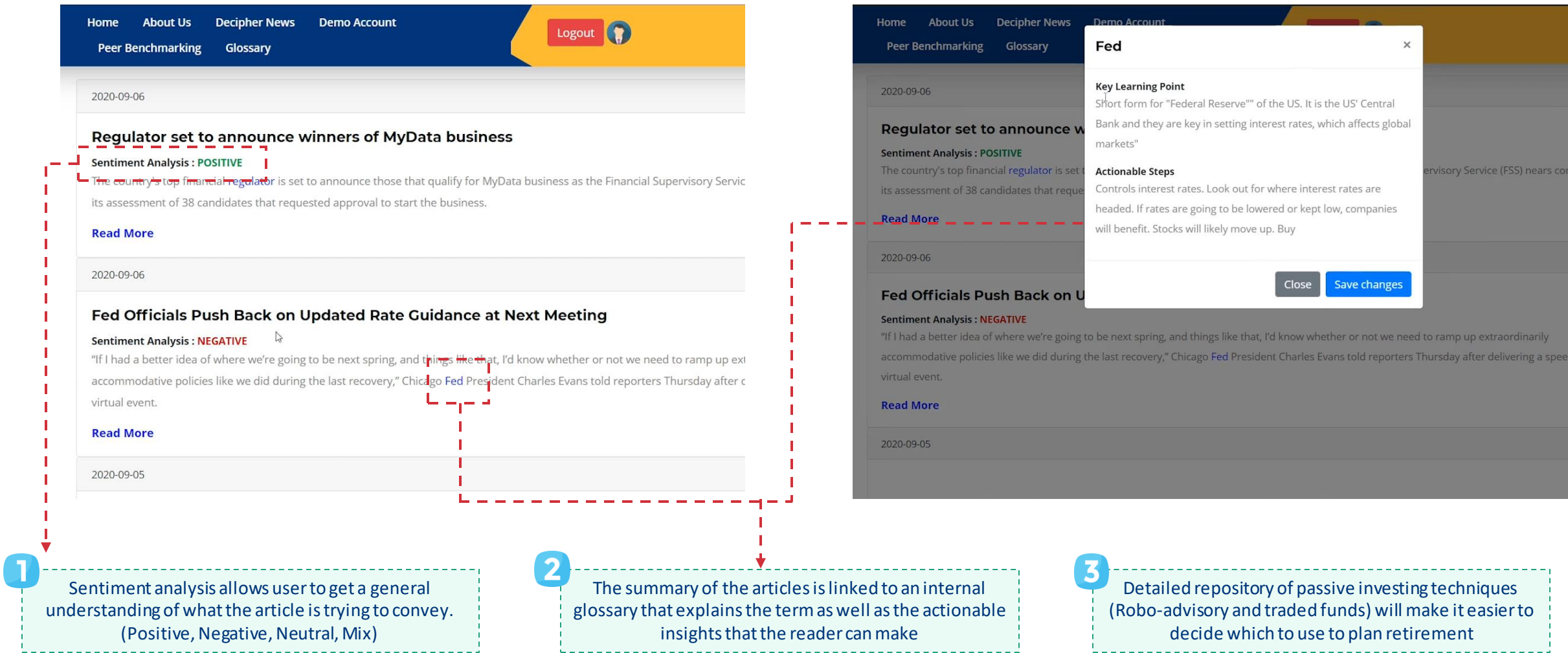
Desire to start investing **Start learning about the markets** **Start learning how to invest** **Smart Investing** **Steer investments to safe harbors**

✓ **Awareness** about the importance of investing

✓ **Understand Importance of planning for retirement;** 60% of millennials save more than 20% of their salary

Key Insights ➡

Many youths don't understand the financial terms. **Only 16% of millennials qualify as financially literate**.

There are **many articles and investment platforms** - Little room for innovation

Research suggests that **emotions are often the key drivers** of investor's decisions.

Most youths have **not yet experienced navigating their portfolio through market shocks** such as Fed rate changes, earnings season volatility and other significant exogenous events

Access to financial information **is high** however youths **cannot comprehend the concepts and develop actionable insights**

Don't make smart data-backed decisions and let emotions and popular trends drive a lot of their investment decisions

Ill-equipped to direct their investments through volatility as they are unaware of how the market behaves during such situations

Sources: Straits Times, Manulife, SG Yahoo Finance, Irish Times, Business Insider

Introduction | Solution 1 | Solution 2 | Solution 3 | Future Plans | Solution Architecture

To help youths make smarter financial decisions, we recommend a 3-pronged approach focusing on the financial education of the younger population

Teaches youth how to decode financial news and make smarter investment decisions

Steer investments to safe harbors

1 Solution 1: Financial News Decoder

2 Solution 2: Smart Suite

3 Solution 3: Future-Proof Navigator

Key Features & Impacts

Feature 1: News Deciphering Algorithm

Algorithm identifies key terms and events in articles which could impact readers' portfolio and suggests ways in which reader could limit their exposure

✓ Youths will be able to **better understand financial articles, the terms used and how such news could affect their portfolio** → They **learn overtime how to make better investments using financial research**

Feature 2: Sentimental Analysis by ML

AWS Comprehend API analyses individual news articles based on language and tone and provides a sentiment rating on each article

✓ Youths can use the sentiment of the article to **learn to decipher how experts feel about the matter**

Feature 1: Competitive KPI Benchmarking

Users will be able to compare their chosen stock to its listed peers based on KPIs, and see how their stock ranks amongst its peers

✓ Youths will be able to take **a data-driven, unbiased approach** to see which stocks are the most value for money and invest accordingly

Feature 2: Key Events Calendar

Will help users get a comprehensive overview of certain key events that could impact their portfolio – IPO calendar, earnings calendar, Fed rate change etc.

✓ Youths will **not miss out on key events that could impact their portfolio**, and hence make trades to optimise their holdings

Feature 1: Economic Events Simulation

Allows users to simulate significant historic events like a pandemic, Fed rate change, etc. and its effects on chosen stocks

✓ Youths can observe how these events could affect their portfolio stocks if a similar event occurred in the future. They can **pre-emptively adjust their holdings and steer their portfolio to "safe harbours"**

Feature 2: Key Industry Drivers Explained

Will help users understand the revenue driver/cost drivers of key industries to be able to link economic events to how it could affect their investments

✓ Youths will be able to **understand the nuances of the different sectors** and understand the knock-on effects of news on their particular holdings → **make faster decisions to mitigate/take advantage of crucial news**
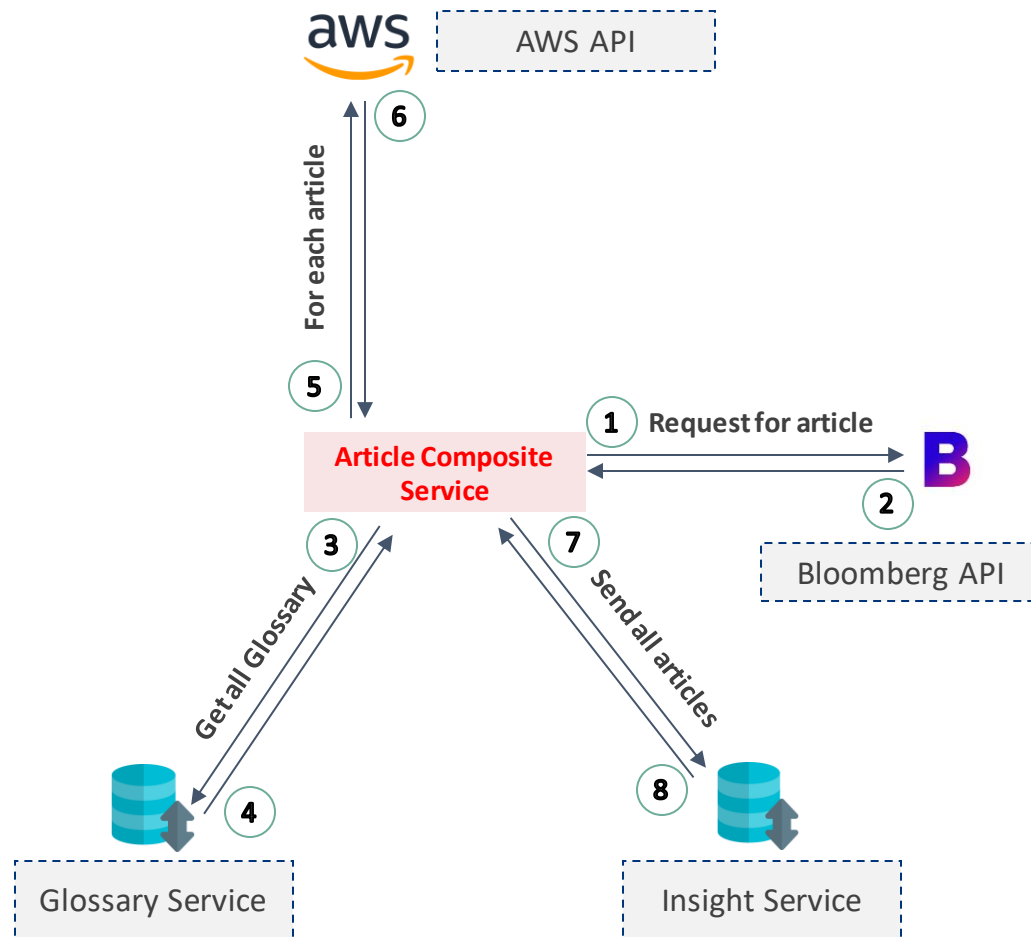
There are a lot of financial articles out there, youths are not able to decipher this information and make the best judgement call for their investing needs

1 Sentiment analysis allows user to get a general understanding of what the article is trying to convey. (Positive, Negative, Neutral, Mix)

2 The summary of the articles is linked to an internal glossary that explains the term as well as the actionable insights that the reader can make

3 Detailed repository of passive investing techniques (Robo-advisory and traded funds) will make it easier to decide which to use to plan retirement

Sources: SG Yahoo Finance,

Bringing you through a glimpse of our proposed solution (1) …

1 Every hour, Scheduler starts the function to get articles. The service first makes a request for news from Bloomberg's API

2 Bloomberg API replies JSON containing news articles

3 Function calls Glossary Service to get all Glossary terms in the database

4 Glossary service replies with all glossary terms

5 Service loops through articles and extracts the title, summary and autogenerated summary. String sent to Amazon Comprehend for sentiment analysis

6 Amazon Comprehend replies with sentiment analysis

7 Once all articles are processed, service sends processed articles to Insight service to be stored in the database

8 Insight service replies with success or failure of storing articles

Sources:

Many youths simply make decisions and not 'SMART' decisions, providing them with benchmarks for potential investments will allow them to better optimise their portfolio

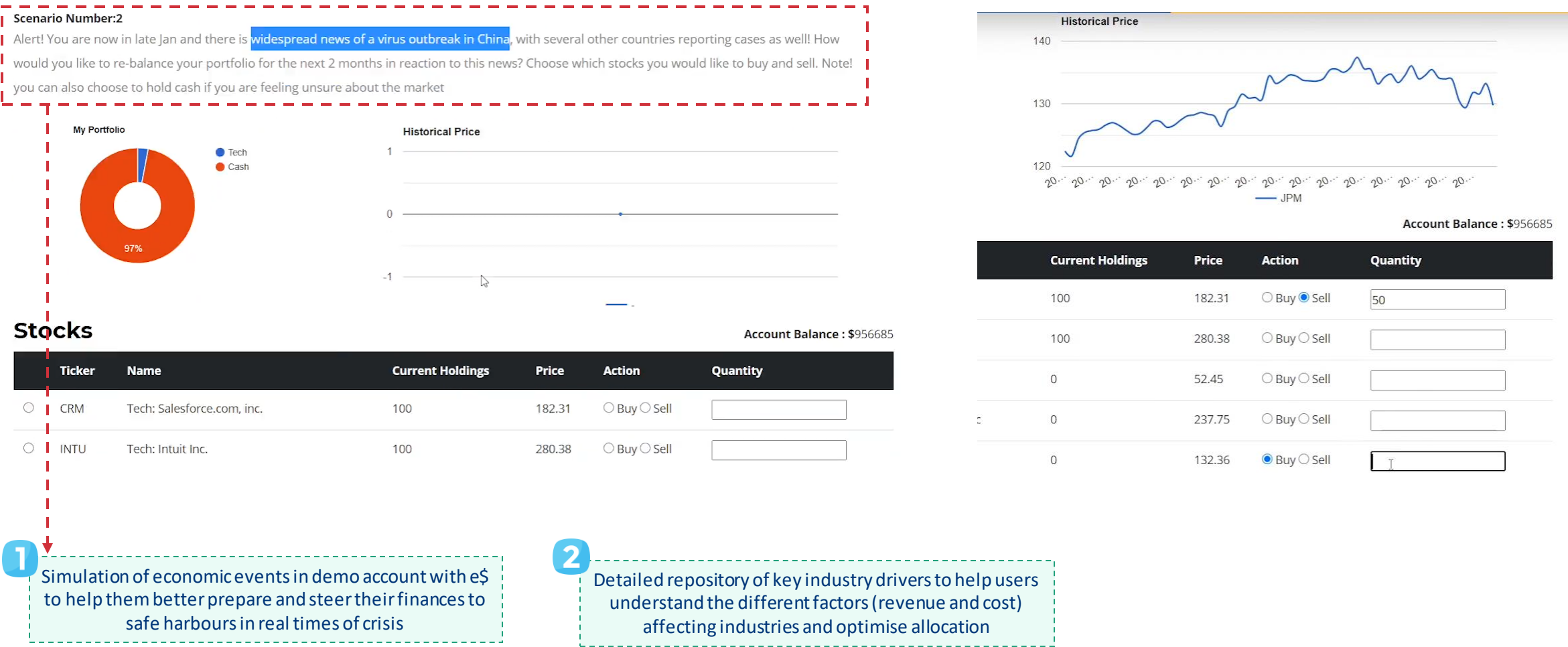| Metric	Value	Min	Max	Lagging Peer	Leading Peer
EBITDA	29.3	-15.5	36.2	Workday Inc	Oracle Corporation
PE Ratio	55	18	97	Oracle Corporation	Workday Inc
Price To Sales Ratio	20	4.7	20	Oracle Corporation	Adobe Inc
Enterprise Value Over EBITDA	52	-23	40	Workday Inc	Intuit Inc.

1 Peer to peer benchmarking for stocks will allow users to make well—informed decisions about their investments across industries

2 By understanding the different KPIs used in benchmarking companies, youths will also be able to sift the gold from the dirt in terms of information

3 By anticipating key events, users will be able to get a comprehensive overview of certain key events that could potentially impact their portfolio

Stock microservice

FMP Financial Modeling Prep

1 Request for stocks statistics from Stock Microservice

2 Retrieve data from API

3 API returns statistics

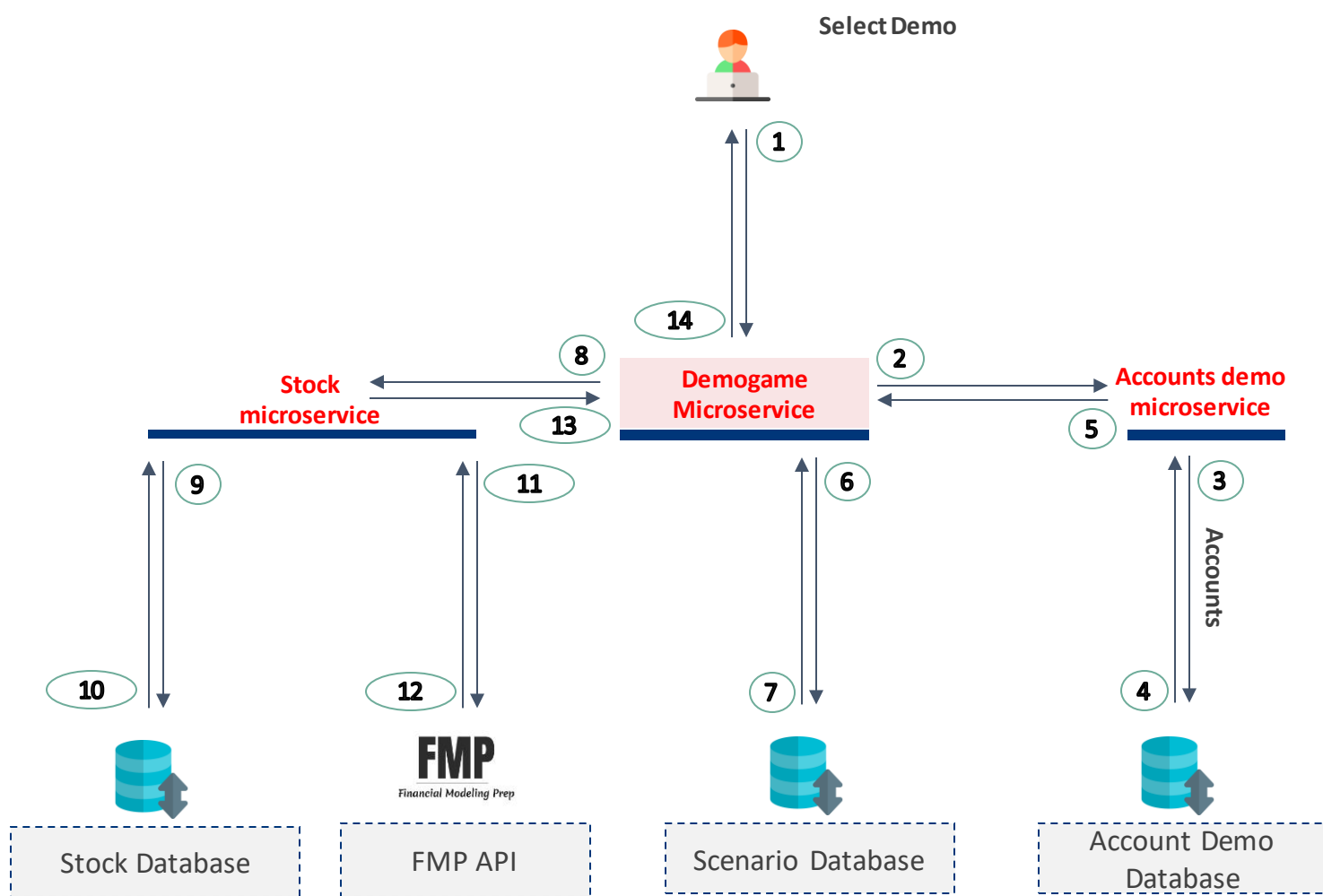4 Stock Microservice forwards received data to user

Allowing youth to simulate events through a demo platform will allow them to put their learnings to better use and steer their finances to safe harbours in real times of crisis

Scenario Number:2

Alert! You are now in late Jan and there is widespread news of a virus outbreak in China, with several other countries reporting cases as well! How would you like to re-balance your portfolio for the next 2 months in reaction to this news? Choose which stocks you would like to buy and sell. Note! you can also choose to hold cash if you are feeling unsure about the market

My Portfolio

- Tech
- Cash

97%

Historical Price

Account Balance : $956685

Stocks

	Ticker	Name	Current Holdings	Price	Action	Quantity
○	CRM	Tech: Salesforce.com, inc.	100	182.31	○ Buy ○ Sell	
○	INTU	Tech: Intuit Inc.	100	280.38	○ Buy ○ Sell	

Historical Price

140

130

120

— JPM

Account Balance : $956685

Current Holdings	Price	Action	Quantity
100	182.31	○ Buy ● Sell	50
100	280.38	○ Buy ○ Sell	
0	52.45	○ Buy ○ Sell	
0	237.75	○ Buy ○ Sell	
0	132.36	● Buy ○ Sell	

1 Simulation of economic events in demo account with e$ to help them better prepare and steer their finances to safe harbours in real times of crisis

2 Detailed repository of key industry drivers to help users understand the different factors (revenue and cost) affecting industries and optimise allocation

Sources:

Bringing you through a glimpse of our proposed solution (3) …

Select Demo

Stock microservice

Demogame Microservice

Accounts demo microservice

Accounts

Stock Database

FMP
Financial Modeling Prep

FMP API

Scenario Database

Account Demo Database

1	Send Request for the Demo
2	Request for User's Demo Information
3	Gather data from Account Demo Database
4	Send back User's Demo data
5	Pass data over to Microservice
6	Obtain Scenario from database based on User's progress
7	Send back Scenario information
8	Request for Scenario Stock Information from Microservice
9	Microservice queries database for Stock Data
10	Send back Stock Information
11	Request for Stock historical data from FMP API
12	Send back requested information
13	Microservice compile data and send to Demogame
14	Sends all the compiled data back to user

Our future plans for implementation will be guided by three main factors: ease of implementation, cost of implementation, and its alignment with the solution's vision

	Ease of Implementation	Cost of Implementation	Alignment with Vision
Financial News Decoder			
Social Analytics for Social Media	Medium	Medium	High
Implement Educational Certifications	Hard	High	High
Smart Suite			
Add industry specific KPIs to benchmark against	Easy	Low	Medium
Add notifications for important upcoming events	Easy	Low	Low
Future Proof Navigator			
Add greater variety of scenarios	Easy	Low	High
Add portfolio risk analysis to simulation	Easy	Low	Medium

Our solution architecture and frameworks to help you understand the development of our solution...

AWS Cloud

EC2

Ubuntu
- DOCKER IMAGE — Insights Microservice
- DOCKER IMAGE — Glossary Microservice

EC2
- HTML/CSS/JS

ECS Cluster (Web Functions)

ECR
- DOCKER IMAGE — Accounts Microservice
- DOCKER IMAGE — AccountDemo Microservice
- DOCKER IMAGE — DemoGame Microservice
- DOCKER IMAGE — Stocks Microservice

AWS Comprehend

Bloomberg

AWS RDS

FMP Financial Modeling Prep

Technology used:
- HTML/CSS
- Flask
- Django
- Bloomberg API
- FMP API
- AWS RDS
- AWS EC2
- AWS Comprehend
- AWS Elastic Cloud Registry
- AWS Elastic Cloud Services