International School

CAPSTONE PROJECT 1

CMU-SE-450

Architecture Document

v 1.3

Green Big5 Information System

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Project Title	GreenBig5			
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1.0	All members	20 - Sep - 2021	Finish content of document	x
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1.1.1	Chinh, Chung	16 - Nov - 2021	Add System Context, Container Diagram,	x
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1.2	All members	13 - Dec - 2021	Update System Context, Container Diagram,	x
1.3	Chung	28 - Dec - 2021	Add Allocation Diagram	x

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1. INTRODUCTION

1.1. PURPOSE

The purpose of the Architecture document is to:

- Define the architecture needs and technology in detail.
- Provide solutions for business needs.
- Provide overview about resources, schedule, solution and budget for the project.

The architecture merely introduces the project to the student development teams, and provides the up-front information necessary for the team to develop a specification.

1.2. DEFINITIONS, ACRONYMS AND ABBREVIATIONS

1.2.1. Definitions and Acronyms

Acronyms	Definitions
GB5	Green Big5 Information System
GUI	Graphical User Interface

1.2.2. Diagram Key/Legend

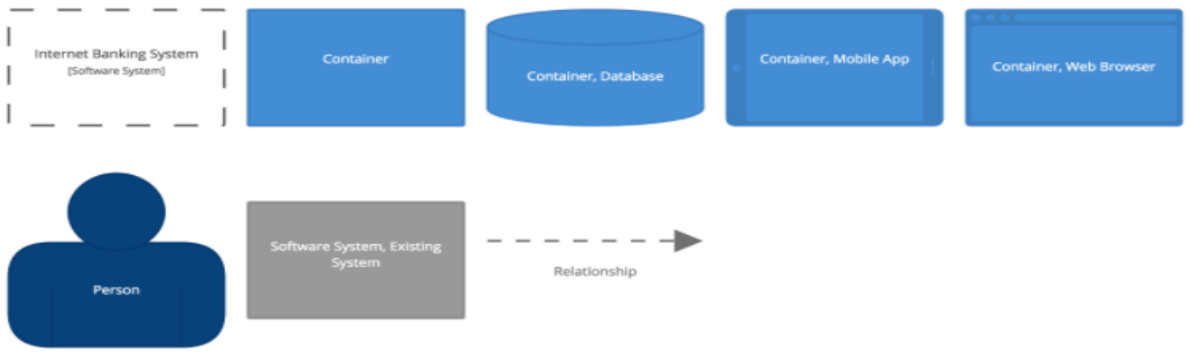

Figure 1.2.2: *Diagram Key/Legend*

1.3. DOCUMENTS REFERENCES

No.	Reference
1	Product Backlog Document for GB5
2	Project Plan Document for GB5

2. PROBLEM STATEMENT

2.1. PROJECT OVERVIEW

As well as the evolution of The Fourth Industrial Revolution (4IR) and the increasing civilization, the environment is becoming harmful by human behavior. Also, at the current rate of urbanization and industrialization, outside of the natural factors, the change of environment is mainly due to human factors. Emissions, population explosion, industrial solid waste, ... are the main causes leading to negative effects on the global environment. To reduce this at a holistic level, predicting human personality and finding the link between it and the environmental impact is the most important task that must be done.

However, predicting human personality and finding the link between it and the environmental impact from many different sources takes a lot of effort and money. To solve this problem, based on our knowledge of big data systems, we have built an intelligent data processing system that can be run on a website-platform with an intuitive and easy-to-use dashboard. This system is a prospective and useful tool for environmental experts and policy makers in Vietnam in particular, and worldwide in general. It can predict user personality and find their effect on the environment and suggest the solution to reduce it.

2.2. BUSINESS DRIVERS

Business problem:

Our environment is always changing. However, at the current rate of urbanization and industrialization, outside of the natural factors, the change of environment is mainly due to human factors. Emissions, population explosion, industrial solid waste, ... are the main causes leading to negative effects on the global environment. To address this at a holistic level, find out the

collaboration between human personality and environmental impact is one of the most important missions.

Business need:

Green Big 5 Information System have specific uses :

- Collecting user data
- Predicting user personality trait

All the things above are based on the functionality of the Green Big5 Information System. GB5 fully meets these requirements. Therefore, the development of GB5 is very necessary and meaningful.

2.3. PROJECT GOAL

The aim of this project is to build a GreenBig5 information system (GB5), i.e. GB5 App, database and GB5 Dashboard:
GB5 App: User data can be collected and used to predict her/his personality by sending questions and receiving answers.
GB5 Dashboard: Support for creating question packages which used to direct the user follow the environment theme. With each question, users can be distributed by Indicator. Finally, by using a prediction method to predict the user's personality traits.
As a result, government authorities, enterprises, as well as users would have an overview of the environment and have a better solution to change user behaviour and to reduce and prevent it from the bad effect.

3. ARCHITECTURE DRIVERS

3.1. HIGH-LEVEL REQUIREMENTS

(Refer to the Product Backlog document for GB5)

3.2. SYSTEM CONTEXT DIAGRAM

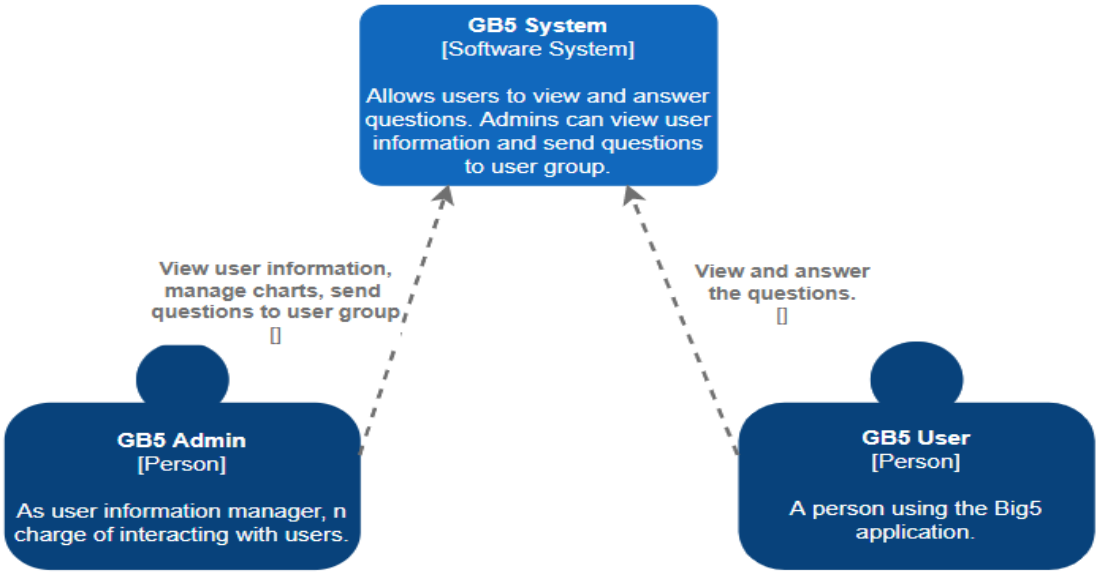

Figure 3.2: Context Diagram of System

3.3. QUALITY ATTRIBUTES

ID	QA01
Quality Attributes	Performance
Stimulus	Submit a question to the user group
Source(s) of stimulus	Admin
Artifacts	System
Environment	Normal mode
System response	The system displays a message that the question has been sent successfully
Response measure(s)	Within 5 seconds

Table 3.3.1: *Performance Quality Attribute*

ID	QA02
Quality Attributes	Performance
Stimulus	Login in to the mobile application
Source(s) of stimulus	User
Artifacts	System
Environment	Normal mode
System response	The system displays the question view page
Response measure(s)	Within 3 seconds

Table 3.3.2: *Performance Quality Attribute*

ID	QA03
Quality Attributes	Availability
Stimulus	Unable to import question into database
Source(s) of stimulus	Admin
Artifacts	System
Environment	Normal mode
System response	System will log the fault immediately
Response measure(s)	Within immediately

Table 3.3.3: *Availability Quality Attribute*

4. CONSTRAINTS

4.1. BUSINESS CONSTRAINTS

- Project will be started on: 12 - Aug - 2021
- Project will be finished on: 15 - Dec – 2021
- Duration: 17 weeks

4.2. TECHNICAL CONSTRAINTS

Main Programming Language: Javascripts, Dart

- **GB5 Application:**
  - Programming Language: Dart, Flutter, JavaScripts, ExpressJs
  - Tool: Android studio.
- **GB5 Database:**
  - Database: MongoDB
  - Tool:MongoDBCompass.
- **GB5 Dashboard:**
  - Programming Language: JavaScripts, ExpressJs
  - Tool: Visual studio code.

5. HIGH-LEVEL ARCHITECTURE

5.1. CONTAINER DIAGRAM

The diagram below shows the overview architecture including containers.

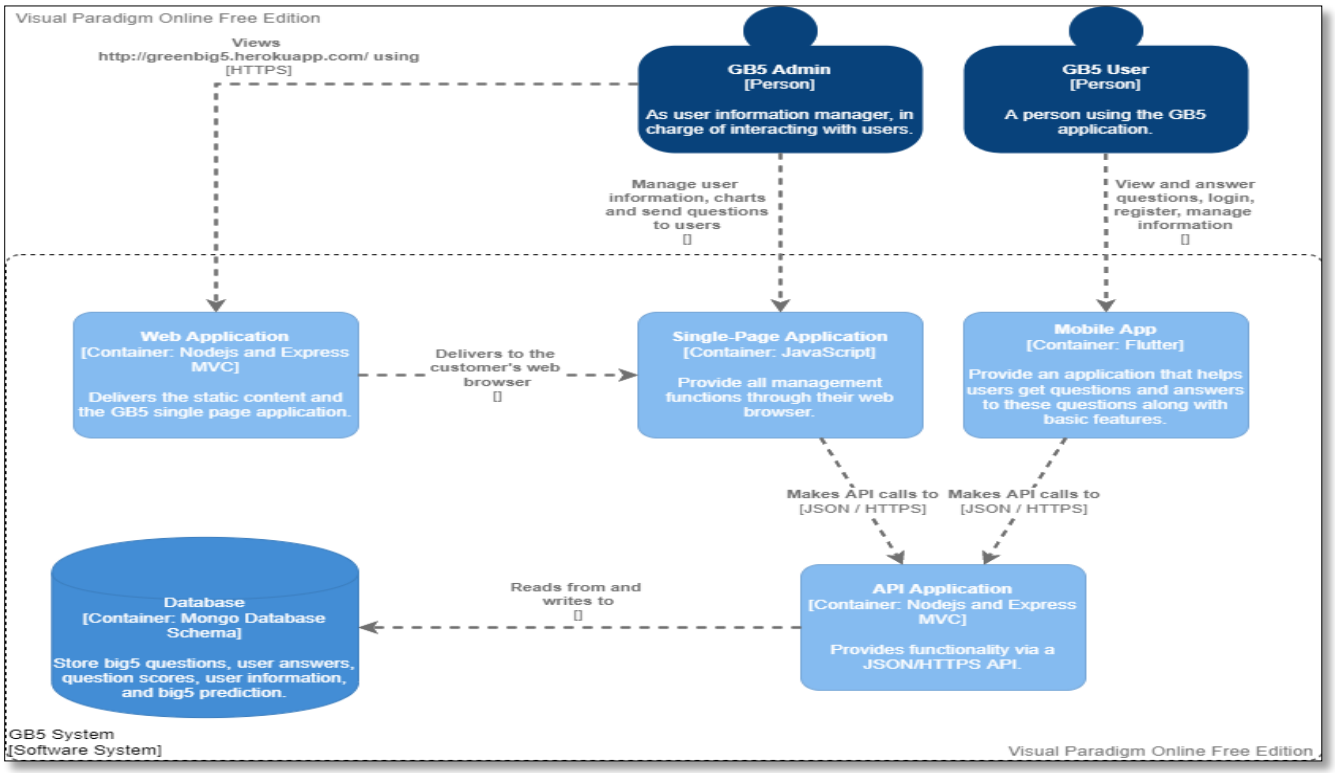

Figure 5.1: *Container Diagram*

5.2. COMPONENT DIAGRAM

5.2.1. Mobile Application

The diagram below shows the overview architecture including components and other related components.

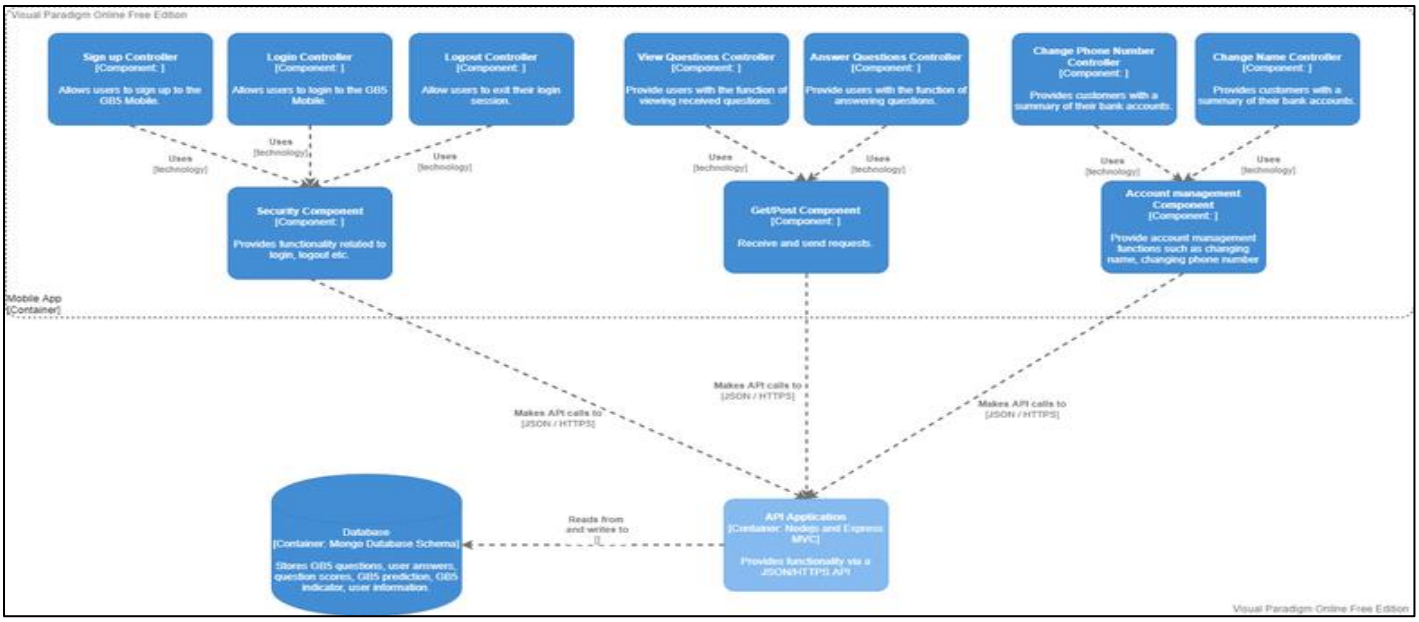

Figure 5.1: *Component diagram of Mobile Application*

5.2.2. Single-Page Application

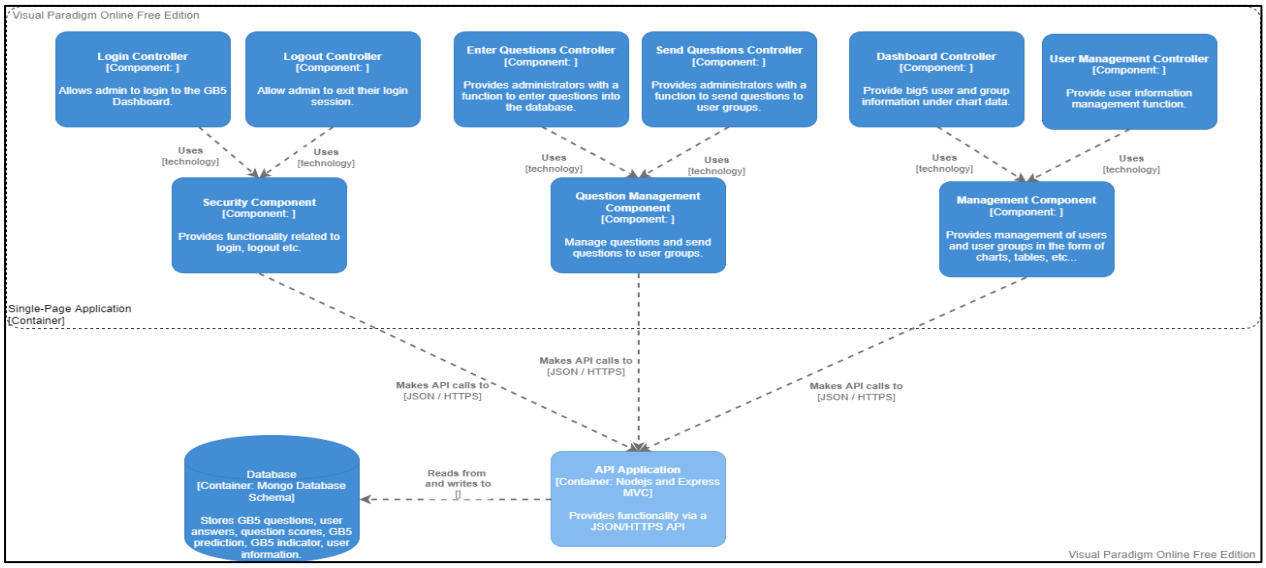

Figure 5.2: *Component diagram of Single-Page Application*

5.3. CLASS DIAGRAM

The diagram below shows the overview architecture including the class diagram of the question management component.

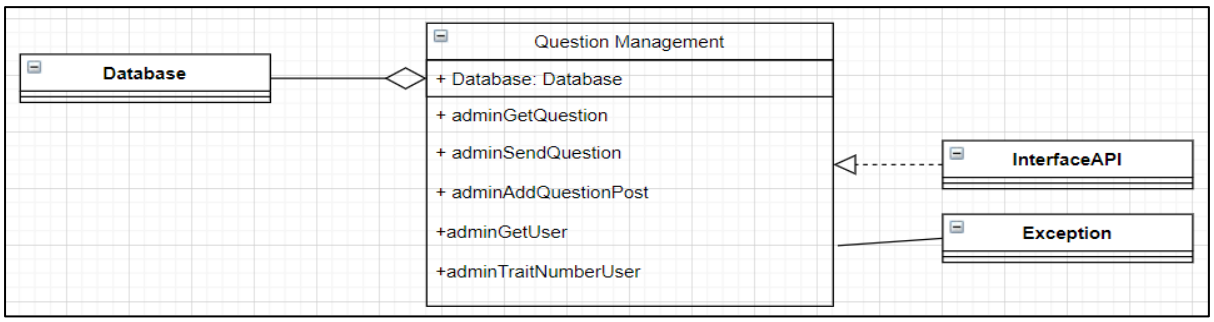

Figure 5.3: *Class Diagram*

Role & Responsibility	Description
adminGetQuestion	Display questions from the database on the board
adminSendQuestion	Submit a question to the user group
adminAddQuestionPost	Enter the question into the database
adminGetUser	Select the User group to submit the question
adminTraitNumberUser	Save indicator information for group classification

Table 5.3: *Role Description*

5.4 Allocation Diagram

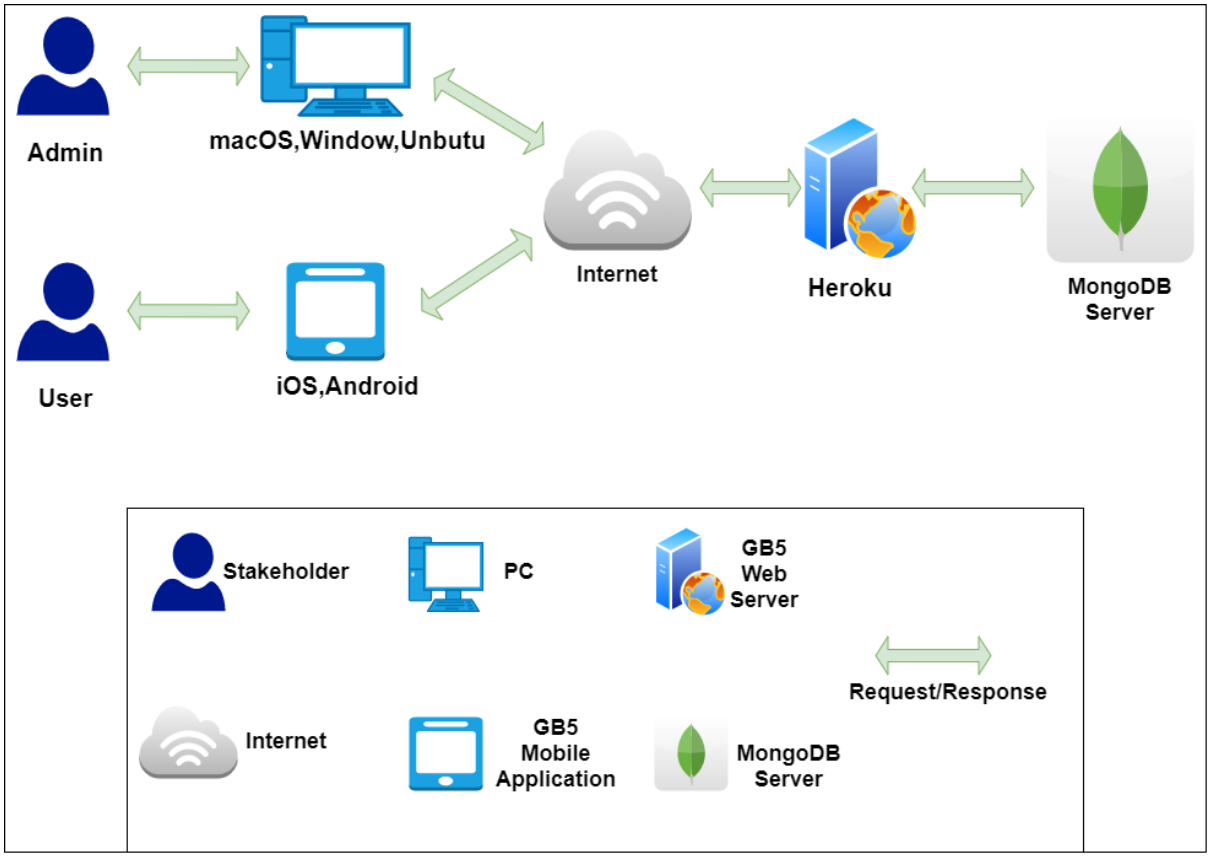

Figure 5.4: *Allocation Diagram*

Role & Responsibility	Description
Admin	Admin that interact with Dashboard Application.
User	User that interact with Mobile Application.
PC	Devices providing web browsers.

Mobile Application	Our application.
Internet	A global computer network providing a variety of information and communication facilities, consisting of interconnected networks using standardized communication protocols.
GB5 Web Server	This is where the API is hosted and provides hosting...
MongoDB Server	Database server to store data.
Request/Response	Get request data from client and response the data to client.

Table 5.4: *Role Description*

6. REFERENCES

- The C4 model for visualising software architecture
- https://online.visual-paradigm.com/
- diagrams.net