Date	Version	Description	Author
15/03/2017	1.0	SDS	N.M.S.Nadeeshan

Billboard Advertiser

Billboard Advertiser
Software Architecture Document

Version 1.0

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Software Architecture Document

1. Introduction

1.1 Purpose

This document provides a comprehensive architectural overview of the system, using a number of different architectural views to depict different aspects of the system. It is intended to capture and convey the significant architectural decisions which have been made on the system.

1.2 Scope

The architecture of the Billboard Advertising system in here allows the developer to document the system design that would be based for system implementation. Also this helps to the stakeholders to get an idea of the system.

1.3 Definitions, Acronyms, and Abbreviations

Term	Definition
Advertising Space (advertisement type)	billboard advertising space/ Vehicle surface
Customer	buyers, sellers of the system
Availability type	Some advertisements can be already in a contract and some advertisements can be freely available.
Location	Where the billboard is located
System	The Billboard advertiser system

Table 1 - Definitions

1.4 References

[1] "Software Requirement Specification".

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[2] "Project Proposal".
[3]"Flowchart Maker & Online Diagram Software", Draw.io. [Online]. Available: https://www.draw.io/. [Accessed: 13- Mar- 2017]

1.5 Overview

The rest of the Software architecture document discuss each view in the "4+1" view model. This model contains the Logical View, Physical View, Process View, Implementation View and the Scenario.
The structure of this document is organized as follows

- Architectural Representation
- Architectural Goals and Constraints
- Use-case view
- Logical view
- Process view
- Deployment view
- Implementation view
- Performance
- Quality

2. Architectural Representation

This document takes a detailed look at the architecture of the Billboard Advertiser system using several views.

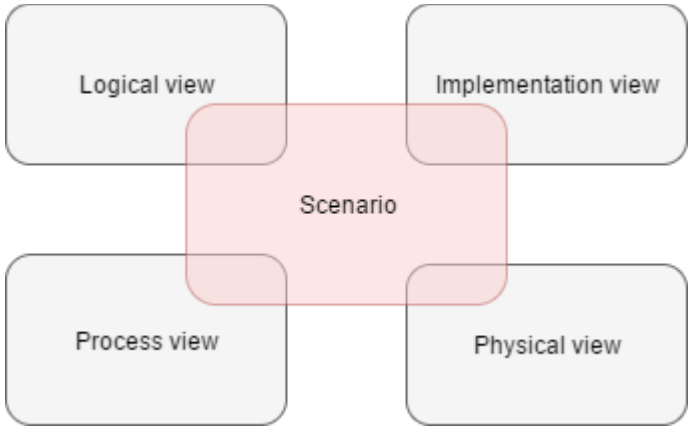

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Figure 1 - 4 +1 view

- Logical View:
  The logical view is concerned with the functionality that the system provides to end-users. UML diagrams used to represent the logical view include activity diagrams, class diagrams, and state diagrams.
  Audience: Designers.

- Process View:
  The physical view depicts the system from a system engineer's point of view. It is concerned with the topology of software components on the physical layer as well as the physical connections between these components.
  Audience: Integrators.

- Implementation View:
  This will show the necessary components to make the system work and how they are bundled together. This will be very useful at the implementation stage of the system.
  Audience: Programmers.

- Physical View:
  The physical view depicts the system from a system engineer's point of view. It is concerned with the topology of software components on the physical layer as well as the physical connections between these components
  Audience: Deployment managers.

- Use-case View:
  This view describes the set of scenarios and/or use cases that represent some significant, central functionality of the system the system.
  Audience: all the stakeholders of the system (including the end-users)

3. Architectural Goals and Constraints

There are some key system constraints that have a significant impact on the system architecture. They are,

- Google API must be accessed in order to get the location detail, traffic of the location. The architecture should facilitate API access.
- Email Gateways should facilitate by the Architecture.
- System must ensure complete protection of data from unauthorized access.
- The system should have at least an availability rate of 98%.

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4. Use-Case View

Use case view is the system requirements that stress or illustrate a specific, delicate point of the architecture or that have a substantial architectural coverage.

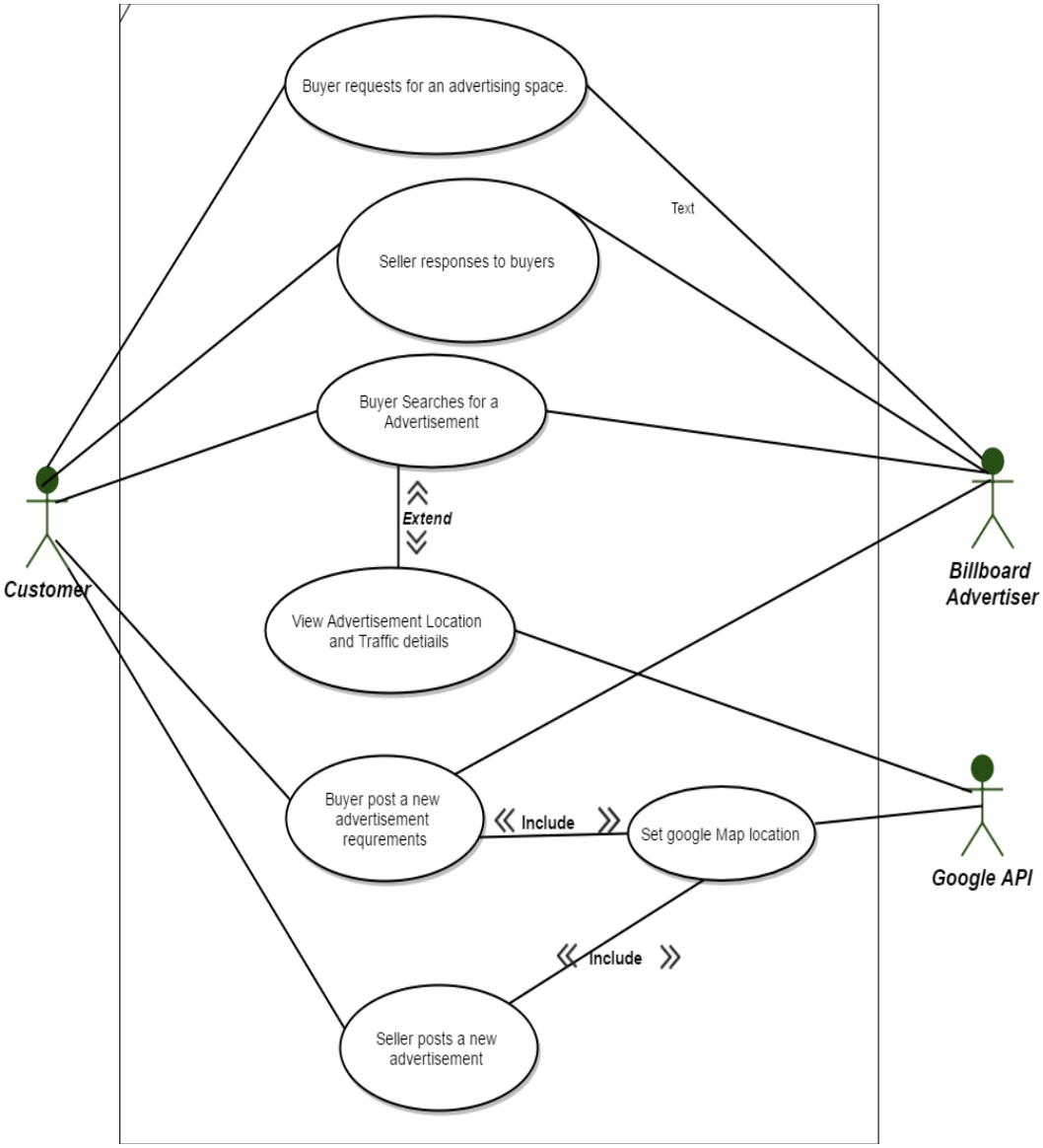

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Figure 2 - use case diagram

4.1 Use-Case Realizations

4.1.1 Seller posts a new advertisement

Use case name	Seller posts a new advertisement
Actor	Customer
Description	Customer post a new advertisement about an advertisement space including the advertising space details
preconditions	The customer should be logged into the system
Main flow	Customer selects create a new advertisement and then he adds the relevant information on the web form. Then he submits the information. The new advertisement will be available on the website.
Successful end/post condition	The new advertisement will be appeared on the website.
Fail end/post condition	The new advertisement will not be appeared on the website.
Extensions	N/A

Table 2

4.1.2 Buyer request for an Advertising space

Use case name	Buyer request for an Advertising space.
Actor	Customer
Description	Buyer(customer) posts a new advertisement request with the details of the advertising space that he hopes to buy

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preconditions	Customer should be logged into the system
Main flow	Buyer includes the details of the advertisement he wants and submit The system will select the best matching sellers depending on the requested location and send the request it to them.
Successful end/post condition	Relevant sellers will receive the buyer's contact number and the information of the required advertise.
Fail end/post condition	No seller will receive the contact number of the buyer
Extensions	N/A

Table - 3

4.1.3 Buyer search for an advertising space.

Use case name	Buyer search for an advertising space.
Actor	Customer
Description	Customer searches for a matching advertising space by giving the required details.
preconditions	Customer should be logged into the system.
Main flow	Customer enters Advertising type, location, advertising space size, price range and search. The system will find the best matching advertising spaces return them
Successful end/post condition	Customer will receive list of matching advertising spaces.
Fail end/post condition	No search results will be return to the customer.
Extensions	N/A

Table - 4

4.1.4 Buyer request for a advertising space which is already in a contract with another

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customer

Use case name	Buyer request for a advertising space which is already in a contract with another customer.
Actor	Customer
Description	Buyer(customer) posts a new advertisement request with the details of the advertising space that he hopes to buy. If the advertisement is already in a contract with someone else and the buyer is willing to accept contract requests before ending the current contract, the buyer will be shown the ending date of the current contract.
preconditions	Customer should be logged into the system Seller should accept the new reservations before the current reservation ends up.
Main flow	Buyer enters the details of the advertisement he wants and submit The system will select the best matching sellers depending on the requested location and send the request it to them.
Successful end/post condition	Ending date of the current contract
Fail end/post condition	No advertisements will be shown to the buyer
Extensions	N/A

Table - 5

4.1.5 Buyer checks the advertising location.

Use case name	Buyer checks the advertising location.
Actor	Customer
Description	The buyer checks the given location of the advertisement using Google map API. The location will be shown in the map or it will

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	be shown as a image view.
preconditions	Customer must be logged into the system. Image location should be added in the advertisement
Main flow	Customer searches for an advertisement and if he finds a matching one. He can select the advertisement and select the location from that.
Successful end/post condition	Buyer will be shown the location of the advertising space.
Fail end/post condition	location will not be shown to the buyer
Extensions	N/A

Table - 6

5. Logical View

This is a description of the logical view of the architecture. This describes the most important classes, their organization in service packages and subsystems, and the organization of these subsystems into layers. Also describes the most important use-case realizations, for example, the dynamic aspects of the architecture. Class diagrams may be included to illustrate the relationships between architecturally significant classes, subsystems, packages and layers.

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5.1 Overview

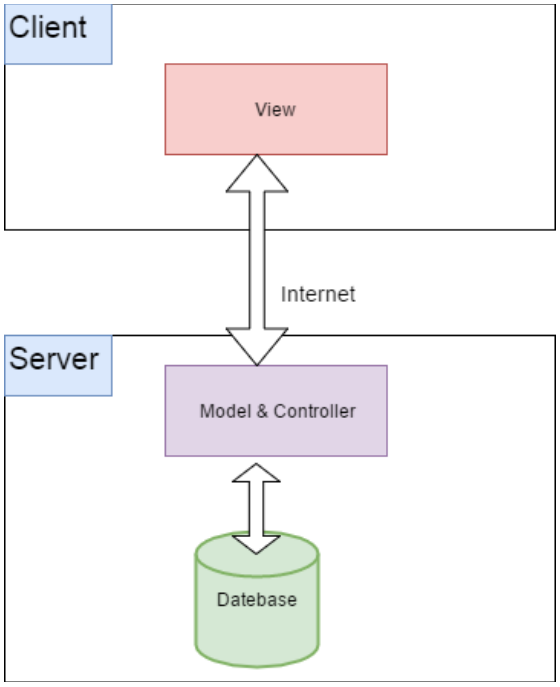

Figure 3 - overview

5.2 Architecturally Significant Design Packages

The structure of the system can also define in terms of classes and their associations and relationships. The class diagram for the Billboard advertising system as follows.

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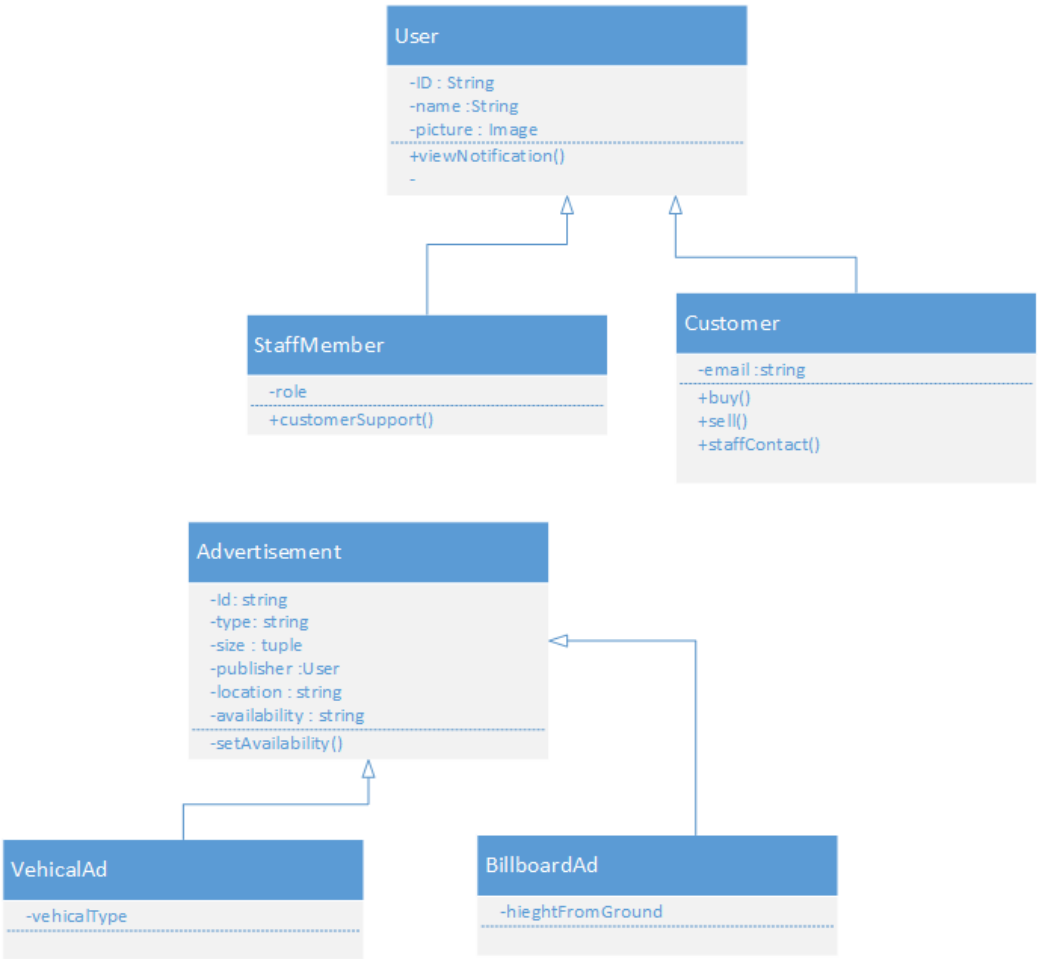

Figure 4 - class diagram

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6. Process View

6.1 Buyer checks the traffic data around the location

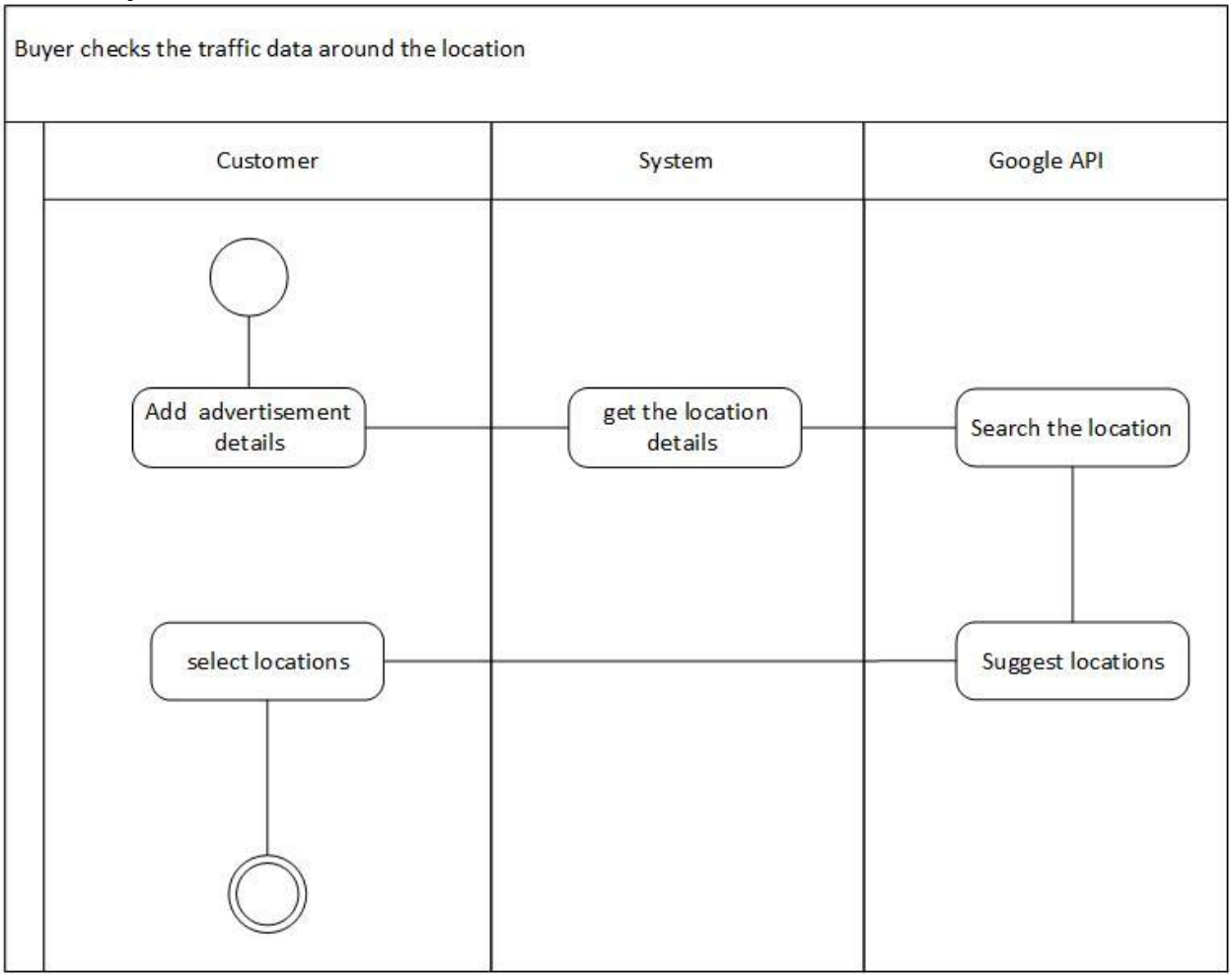

Figure 5

6.2 Buyer checks the location

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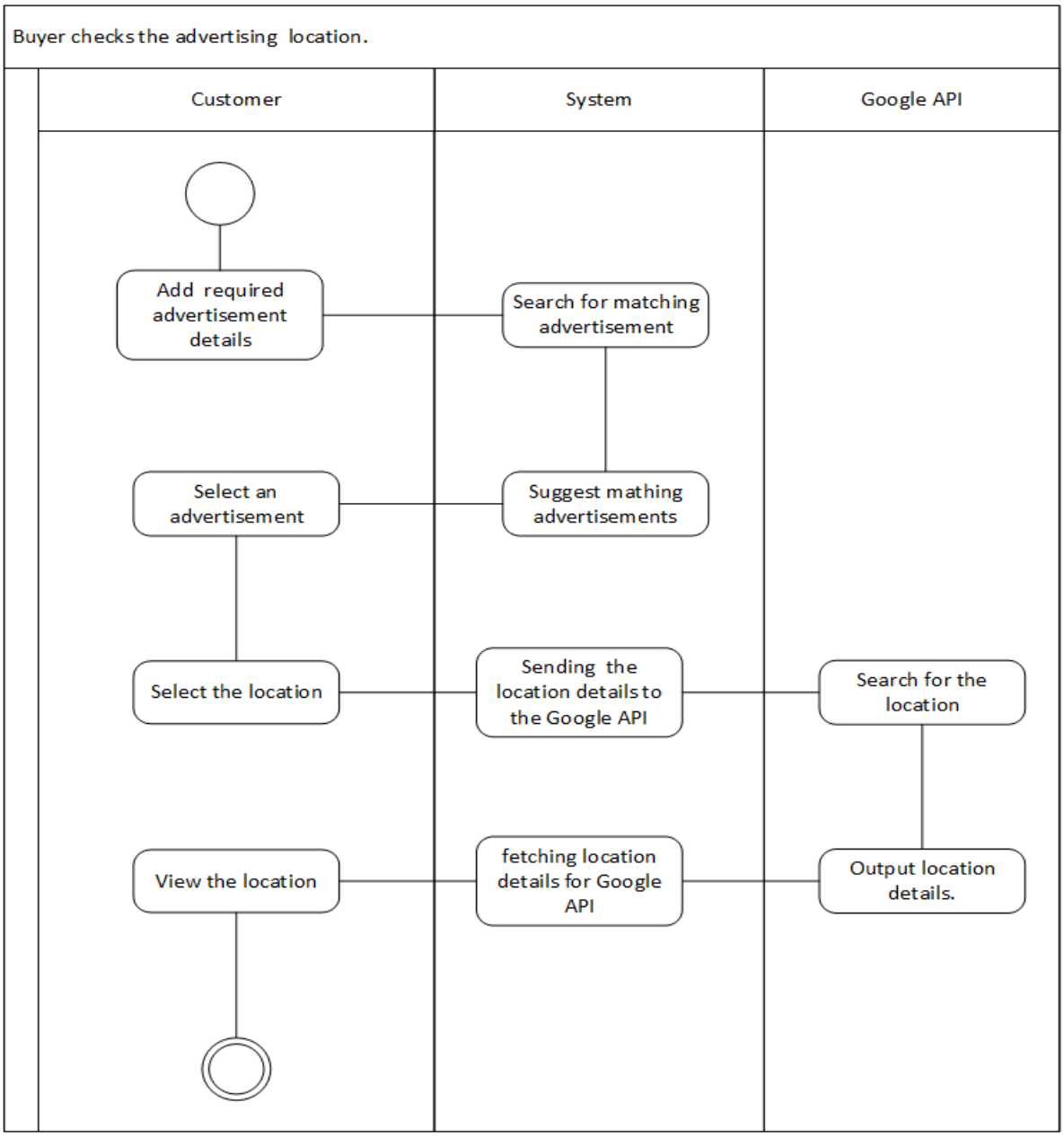

Figure 6

6.3 Buyer request for an adverting space.

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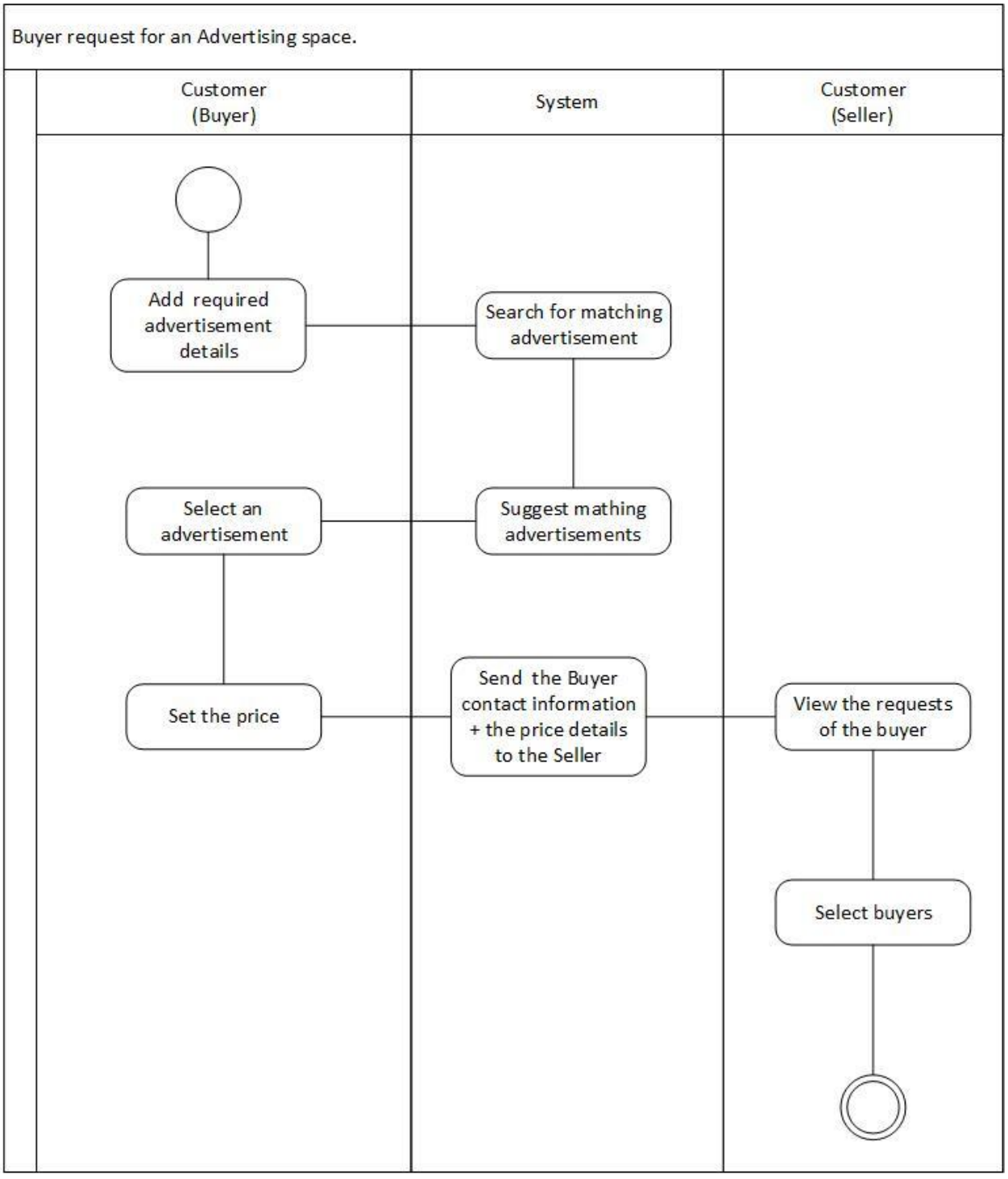

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Figure 7

6.4 Buyer checks the traffic date around the location

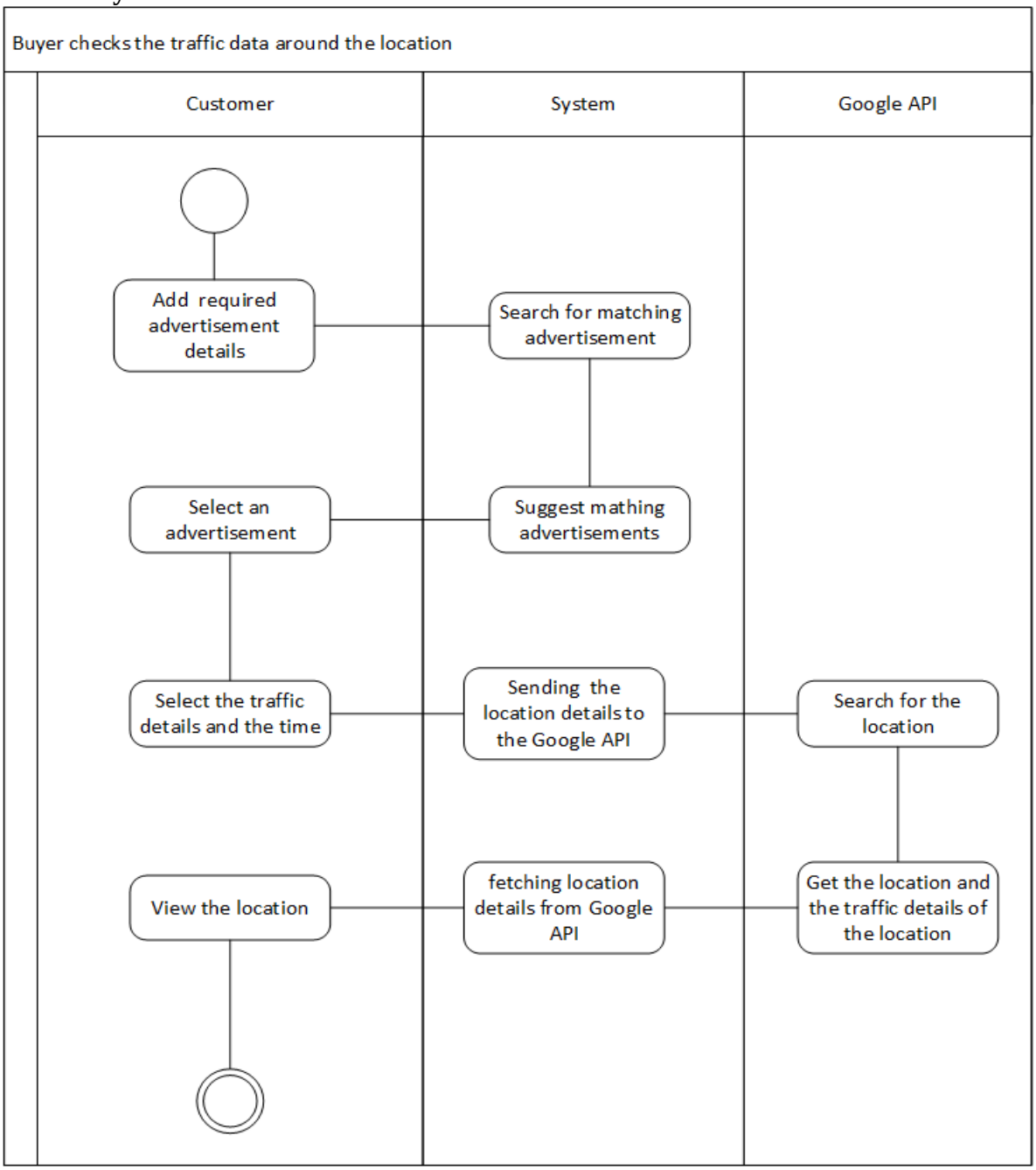

Figure 8

6.5 Customer ask for the support form a staff member

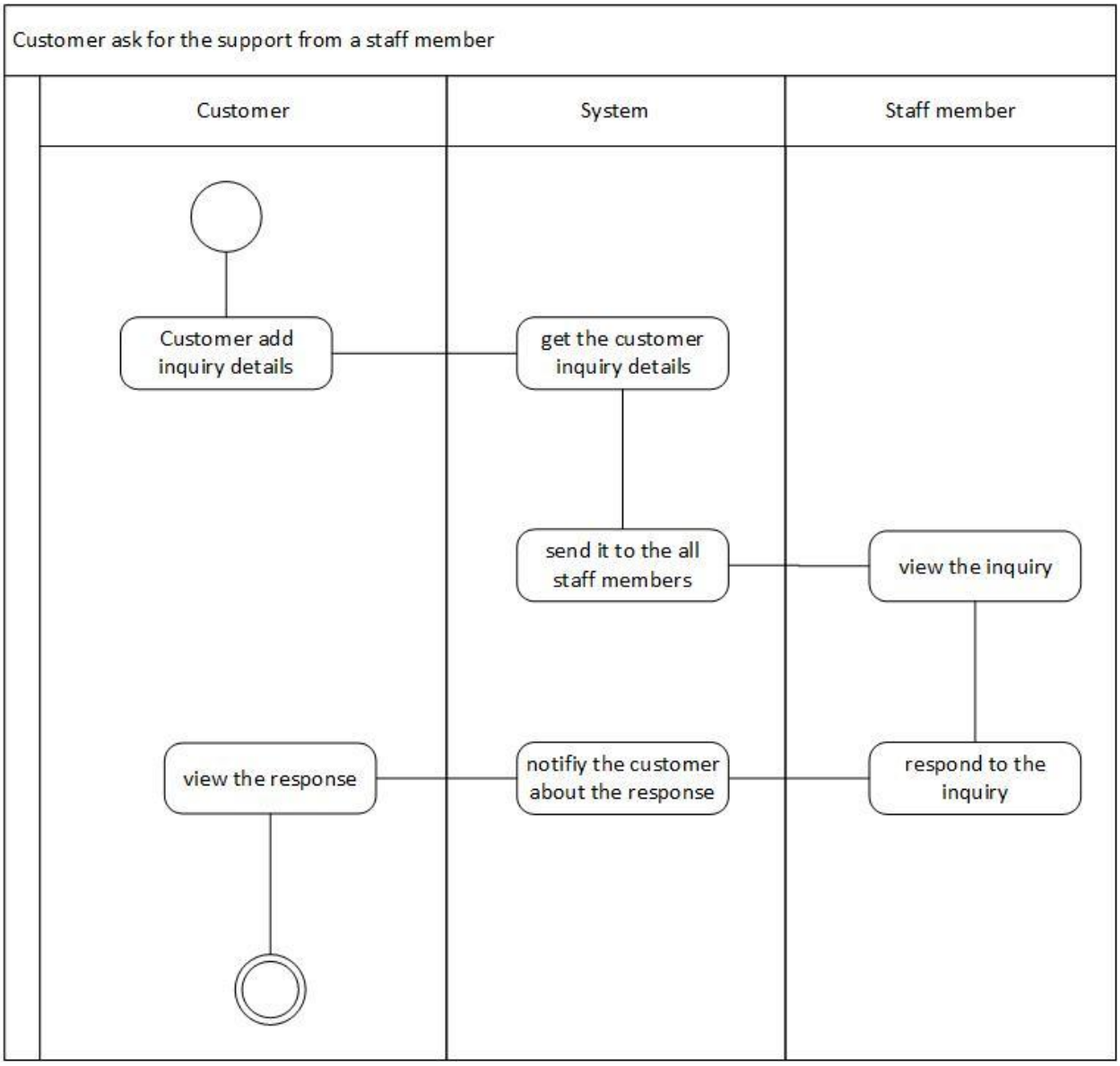

Figure 9

6.6 Sequence diagrams

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6.6.1 Customer ask for the support from a staff member

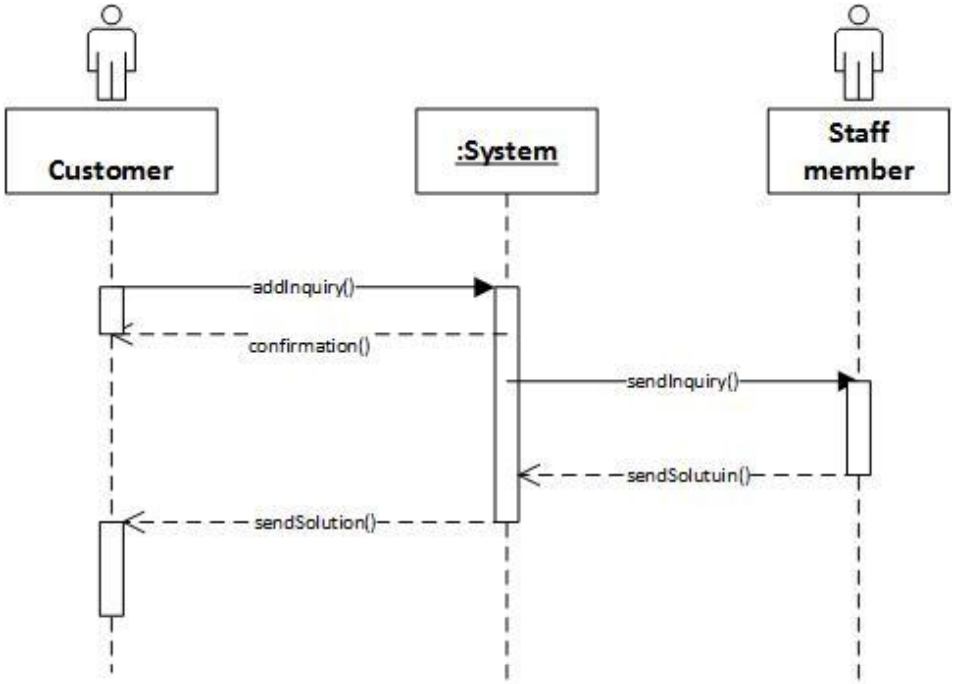

Figure 10

6.6.2 Buyer checks the advertising location

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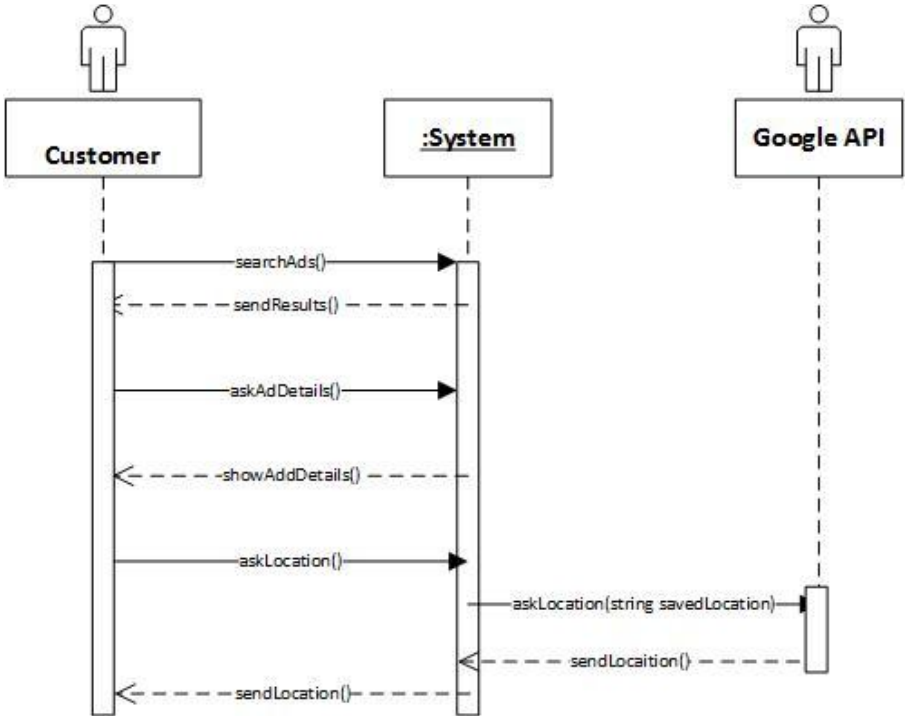

Figure 11

6.6.3 **Buyer request for an available advertising space.**

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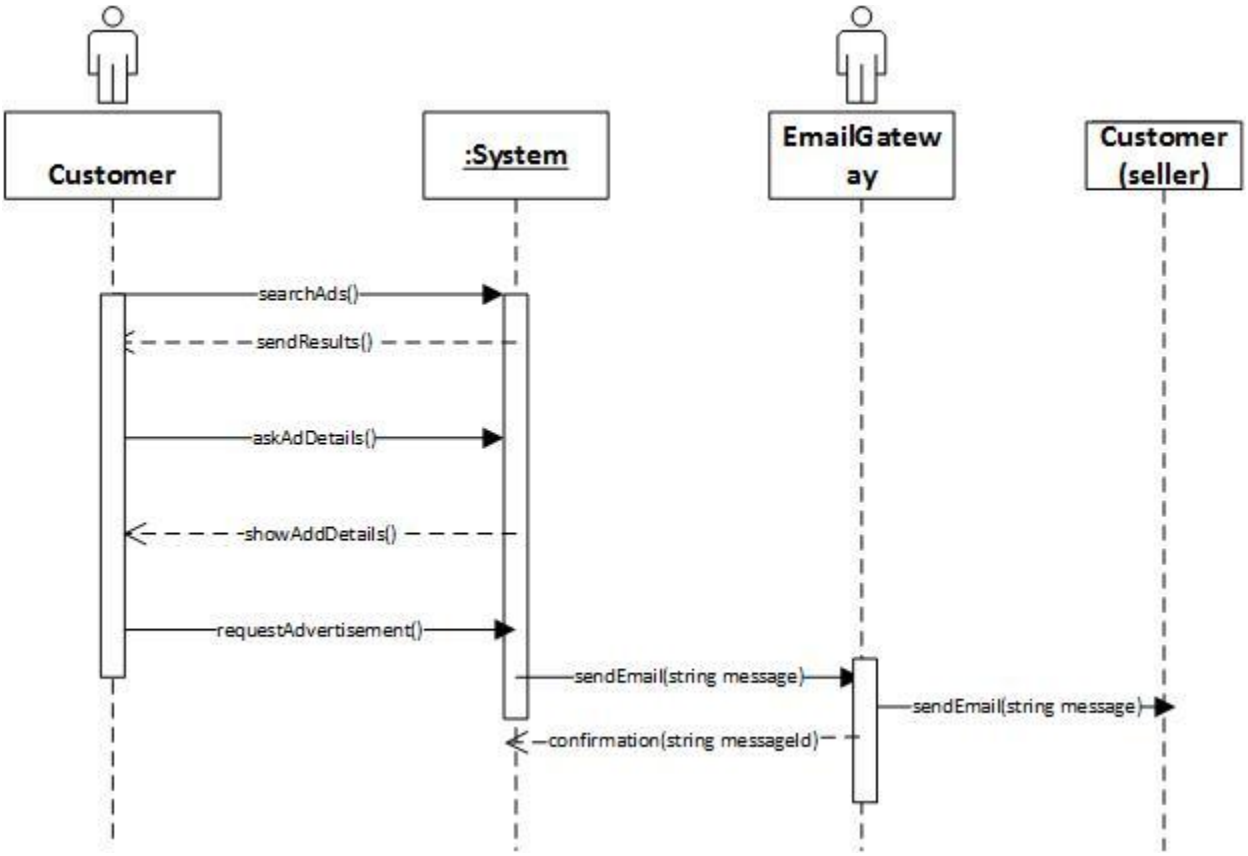

Figure 12

6.6.4 Buyer checks the traffic data around the location

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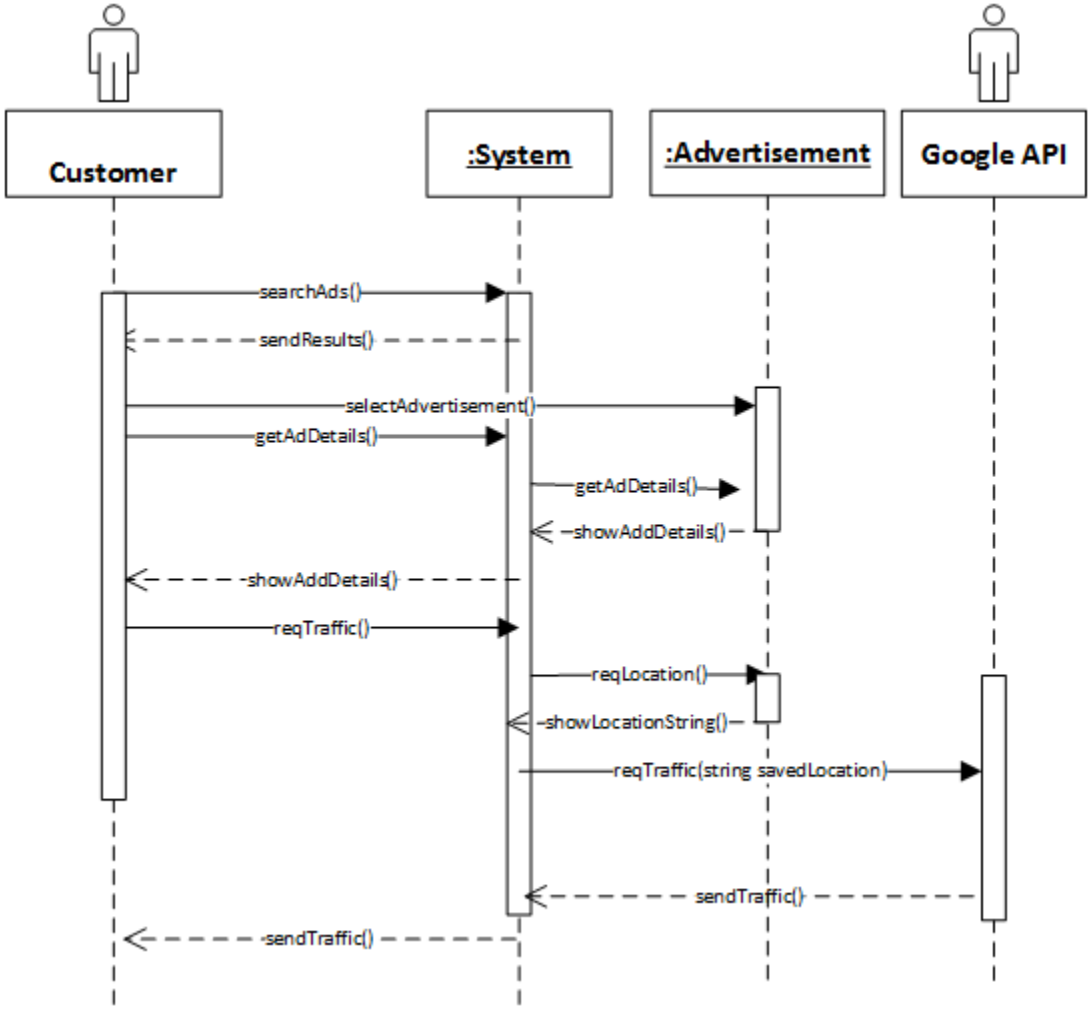

Figure 13

6.6.5 Seller posts a new advertisement.

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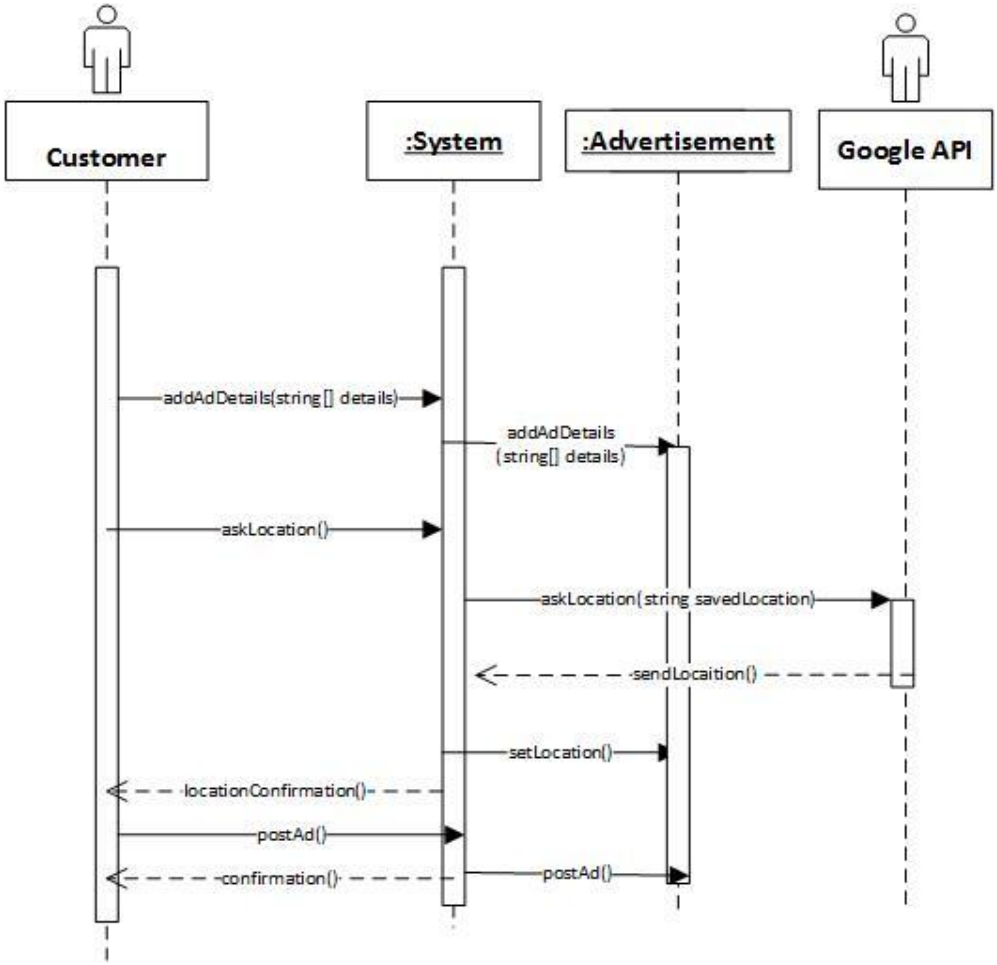

Figure 14

7. Deployment View

The physical nodes of the Billboard advertiser system consists of three components as follows.

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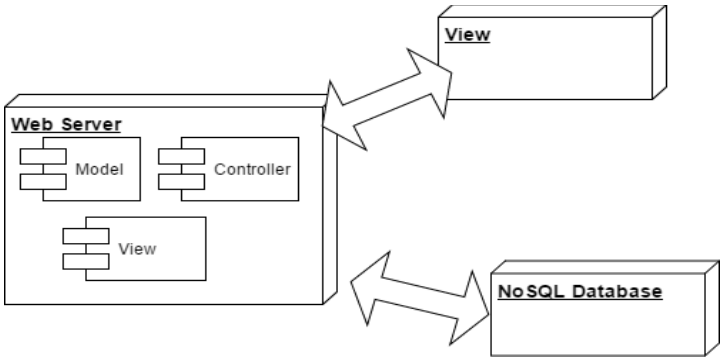

Figure 15

8. Implementation View

8.1 Overview

The layers applied to the implementation view are the model layer, control layer and the view layer of MVC architecture.

8.1.1 Package Diagram

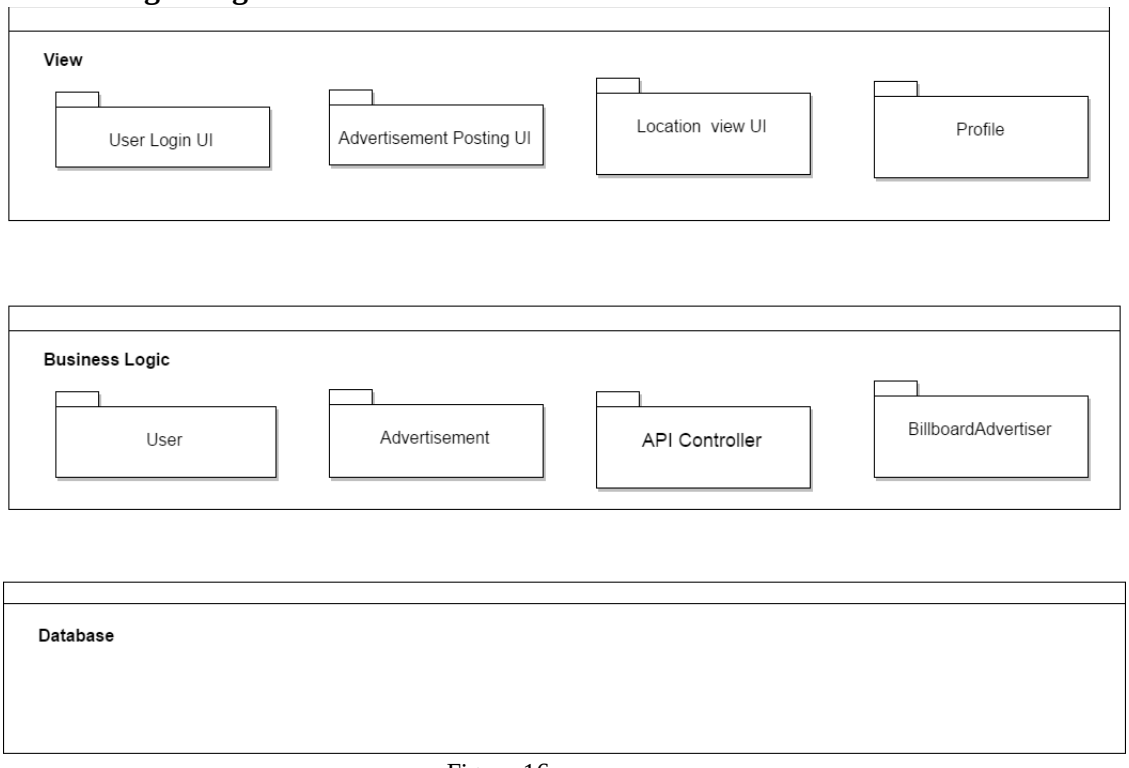

Figure 16

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8.2 Layers

8.2.1 View Layer

This layer has all the user interfaces of the system. This layer is responsible for accessing the system from various types of devices.

8.2.2 Business and logical Layer

This layer handles the core functionality of the system. This layer can be further divided into sub components. This layer will receive input from the view layer and process the inputs and send it back to the view layer or send down to the data layer.

8.2.3 Data access layer

This layer is responsible for managing the database activities of the Billboard advertising system.

9. Data View (optional)

The database is very essential part of the system as the details of users, advertisement and transactions has to be saved in the system. The data model should handle data storing very efficiently. A NOSQL data base will be used for the Billboard advertiser system.

10. Size and Performance

- Responsiveness
  The user interface must be responsive in order to increase the performance.
- Accuracy
  details on the site should be accurate
- consistency
  One a change happen in an object it should be there until another change happens.

11. Quality

Reliability-

The reliability of the system should be higher in order to attract customers

Extensibility-

The application developed must be easily extendable and easily adaptable to add new functions and features.

Learn ability-

The user interfaces must be designed in a way that all types of users can easily

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learn the system.