SMART Company

Geo location based Service finder for User Needs (GSUN)
Software Architecture Document

Version 1.0

Revision History

Date	Version	Description	Author
11/Jan/2012	1.0	Software Architecture Document	Buddhima Wijeweera

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Software Architecture Document

1. Introduction

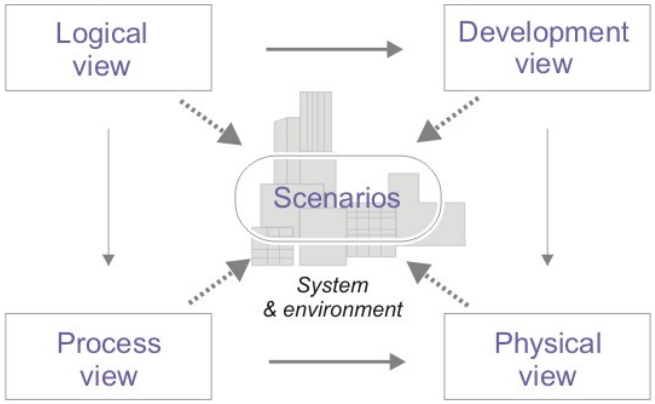
This document describes a high level overview about the Geo location based Service finder for User Needs (GSUN) system which involve in providing best suitable services for user needs. This system depends on the latest features in Android SDK and web applications to provide the optimum solution for the user need.

This document provides a high-level description of the goals of the architecture, use cases and architecture styles support by the GSUN system and selected components that suites best. Through this document a development criteria and standards are provided to the project.

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.
To discuss about the architectural view of this system widely accepted "4+1 model" is used. For that Logical, Process, Deployment and Implementation views are used along with use-case diagrams to describe about Geo location based Service finder for User Needs (GSUN) system. Importance and the description about each view is described in the relevant sections

4+1 Model



1.2 Scope

Scope of this document is to express the architectural design of this system that will guide to the implementation. The diagrams included in this document will show the behavioral and structural characteristics that will be emerge through the system. In each sub section, you can observe that various architectural principles are used. So further details about those designs, how important and the relevance of such a design is described.

1.3 Definitions, Acronyms, and Abbreviations

GSUN - Geo location based Service finder for User Needs

WSDL – Web Service Definition Language

SOAP – Simple Object Access Protocol

RUP – Rational Unified Process

IDE – Integrated Development Environment

SDK – Standard Development Kit

WS-BPEL - Web Services Business Process Execution Language

SOA – Service Oriented Architecture

1.4 References

Project Vision, version 1, 2011

Project Feasibility Document, version 1, 2011

Project Development Case, version 1, 2011

Project Schedule, 2011

Project Requirement Specification, version 1, 2012

Project Quality Assurance Plan, version 1, 2012

1.5 Overview

Through the references I have already explained the functionalities and important of such a system in Sri Lanka. So the rest of this document will explain how the system will get structured and what are the important design decisions have taken. For that purpose "4+1 model" is taken to make it easy to understand.

Architectural Representation describes how the architecture of this system is represented using use-case, logical, process, deployment and implementation views.

Architectural Goals and Constraints focuses on the architectural goals and constrains that have significant impact on architecture.

Use-Case View lists the significant use cases in the final system and the contribution of each to the final system

Logical View explains how sub systems and components interact with each other to accomplish the requirements of the given GSUN system.

Process View explains the processes that the system performs with the interaction with its users in brief.

Deployment View is about the physical network (hardware) configurations on which the software is deployed and run.

Implementation View shows the decomposition of the software into layers and subsystems, and any architecturally significant components.

Size and Performance describes briefly about the major dimensioning characteristics of the GSUN system with contrast to other alternatives.

Quality is all about the qualities (non-functional) that the over-all system will exhibit.

2. Architectural Representation

The architectural view of this GSUN system is explained how the 4+1 model fit to the system and explains necessary model elements it contains.

Logical view is to give abstract level of the sub systems that system contains and how each subsystem interacts with each other to accomplish the functionality of the whole system.

Process view to give the sequence of actions that will take place when a particular process is proceeding and separating steps in to sections.

Implementation view explains the sub systems in the system with the help of layers architecture.

Deployment view shows the hardware that use for the system and the software components that integrated in to those hardware components.

Use case diagram explains the main functional points of the GSUN system with respect to each user that interact with the system.

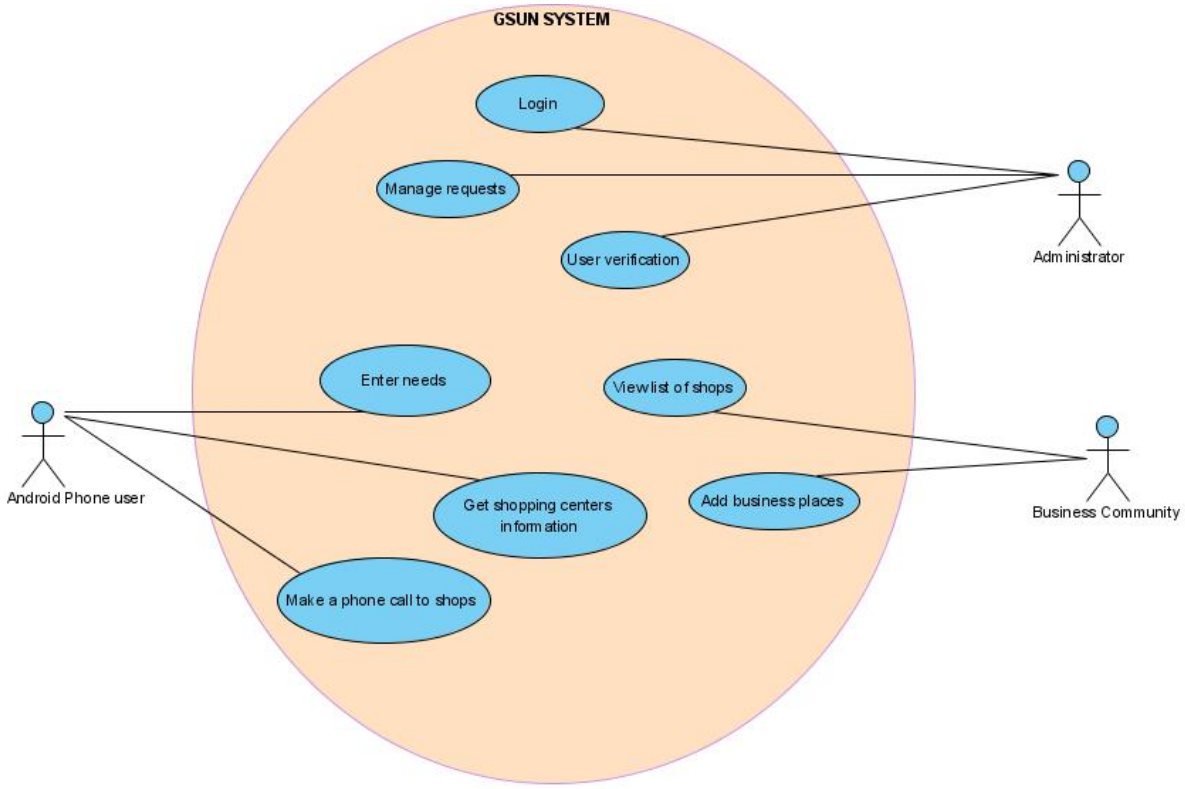
3. Architectural Goals and Constraints

- This system consists of two major components, Android phone and web server which provide web services.
- Architecture design should be accomplished with in the Android API and with the available features.
- Web service for the demonstrations purposes will be hosted in available free hosts, therefore the design components should support for those types of web server also.
- Central database server should be able to handle the required amount of requests with in the given time.
- Central servers should provide reliable service to the web service.

4. Use-Case View

The following are identified as the major use cases in the GSUN system and every use case has one or more role associated. So this section lists use cases or scenarios from the use-case model if they represent some significant, central functionality of the final system, or if they have a large architectural coverage—they exercise many architectural elements or if they stress or illustrate a specific, delicate point of the architecture.

- Login
- Enter needs
- User verification (at the server)
- Make a phone call to shops
- View list of shops
- Add business places
- Manage requests
- Get shopping centers information



4.1 Use-Case Realizations

4.1.1 Login

Brief Description: This use case describes how administrator logs into the system.

4.1.2 Enter needs

Brief Description: This use-case describes how Android phone users enter their needs to the application.

4.1.3 Make a phone call to shops

Brief Description: This use case allows Android phone users to make phone calls to the service points they need.

4.1.4 *View list of shops*

Brief Description: This use case allows Android phone users to view a list of shops that provide the service they requested.

4.1.5 *Add business places*

Brief Description: From this use case business community can add their business places to this GSUN system.

4.1.6 *Manage requests*

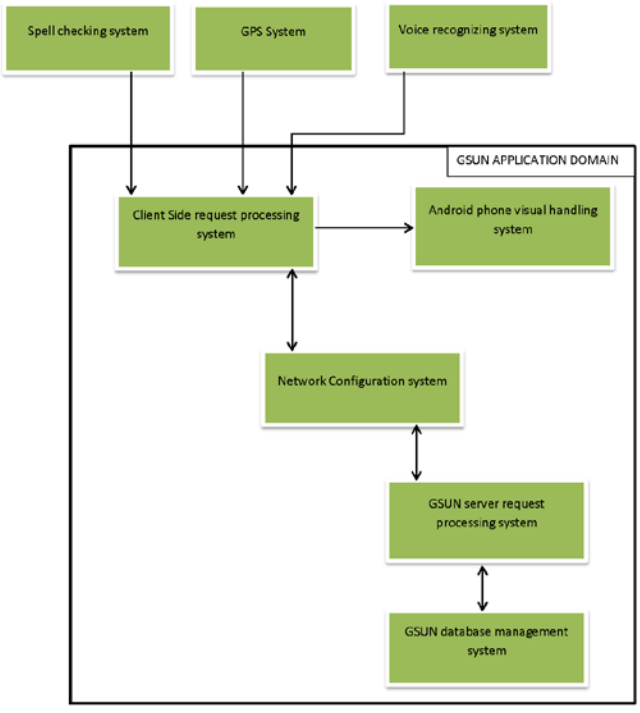
Brief Description: This use case is for the administrator to select or reject business community requests and manage connections in the web application.

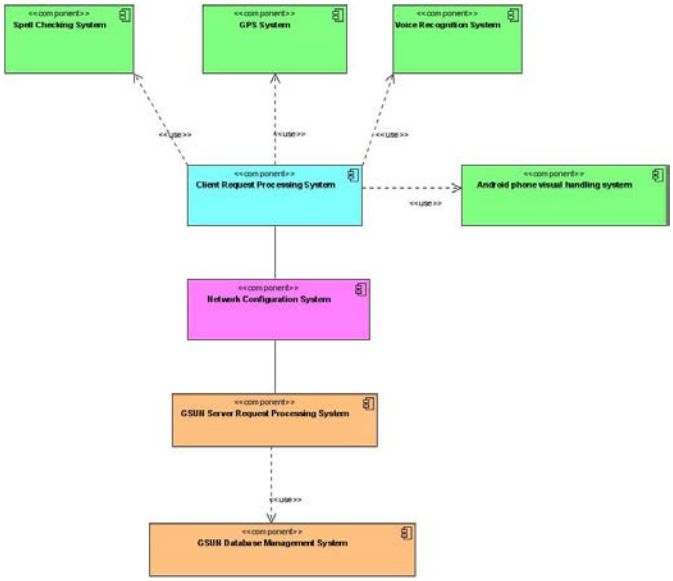
4.1.7 *Get shopping centers information*

Brief Description: This exposes the GSUN web application to authorized external parties.

5. Logical View

Logical view shows the important sub-systems and how they interact with each other systems. In here I used some systems that are already in the Android OS, so reusing is accomplished. Other than those components majority of the sub systems have to be developed.





5.1 Overview

Spell checking system

This system checks the spelling mistakes that could be done by the Android phone user and provide applicable suggestion to those mistakes. So user can provide correct in puts to the system with minimal effort.

GPS system

This system help GSUN system to figure out the geo positions of the Android phone user, so that the system can find the services the user need according to the geo positions. This system is already integrated in the the Android OS. So no need to develop this system again.

Voice recognizing system

Voice recognition system plays an important role in taking user inputs to the GSUN system. This system responsible for recognize user voice and turn it in to text. This facility also available within the Android OS and in this system I will reuse that component.

Client side request processing system

This system responsible for process the user inputs, create messages that will send to server, handle the logic of the system, process the messages receive from server side and provide necessary support to the visual model.

Android phone visual handling system

This system accepts the commands gives by client side processing system and presents that information in the Android interface in proper manner.

Network configuration system

This is a critical system that maintains the network connectivity between Android phone and web server. Therefore this system consists of components from client and server both.

GSUN server request processing system

This system handles the requests made from clients and connects to database for get information about service places.

GSUN database management system

This system responsible for add, remove, update underlying database with proper authentication.

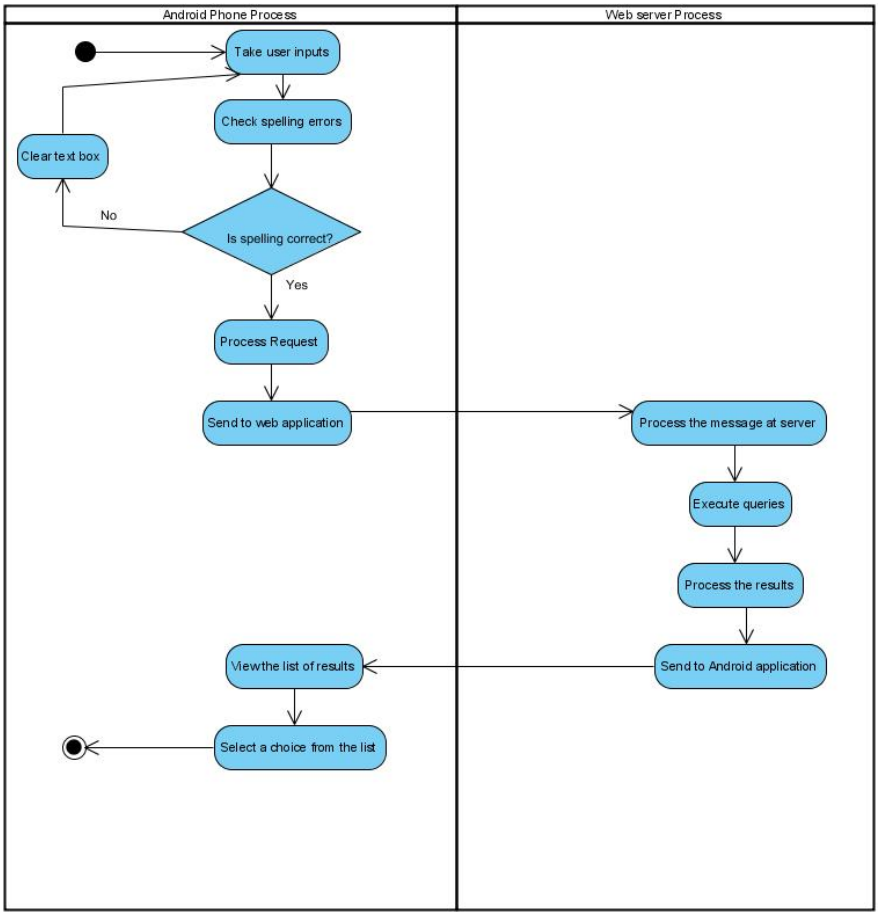
6. Process View

This GSUN system mainly consists of two processes;

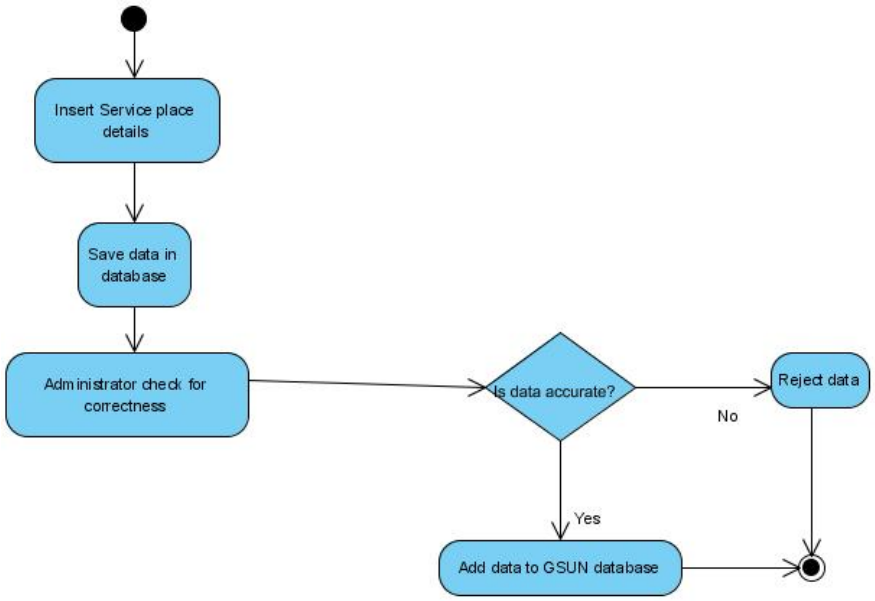
1. User request a list of service places for his need
2. Business community adds a place to GSUN system

Both processes runs through a central server and associated with database manipulation. Because data is stored in central database. And the rest of the components are situated in the Android environment.

User request a list of service places for his need

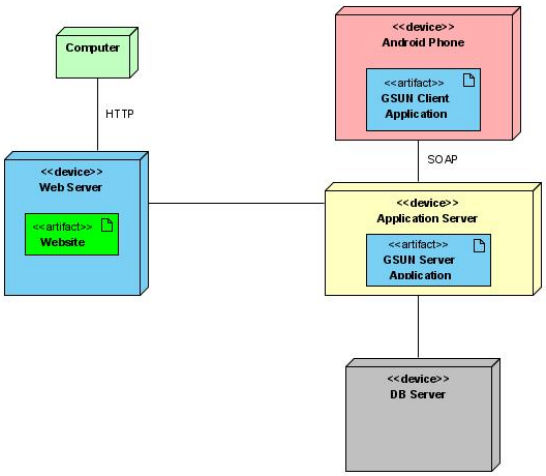


Business community adds a place to GSUN system



7. Deployment View

Deployment view shows the physical devices associated with this GSUN system and the way each device interact. This system consists of web server and Android phone. These two devices exchange data using HTTP or SOAP messages.

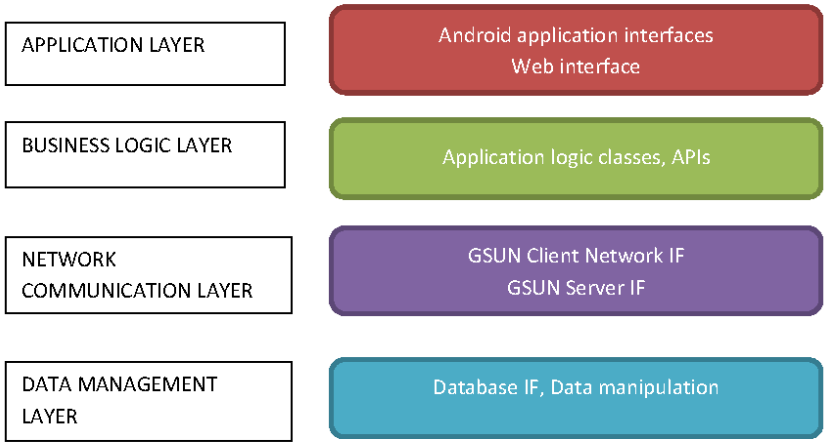


8. Implementation View

8.1 Overview

This GSUN system consists of 4 layers and designed such that the coupling between layers is minimal. Each layer is dedicated to a special task in the system.

- Application Layer – User interface Android phone, Web browser user interface
- Business Logic Layer – Request management classes
- Network Communication Layer - Network connectivity component
- Data Management Layer – Manage the data comes in and goes out from database



8.2 Layers

Application Layer

This layer contains all the screens and web interfaces that users attract. Therefore this layer separate clients from middle tear.

Business Logic Layer

Business Logic Layer consists of classes which will contain the logic of the application and the network connectivity to the server. Application specific API's and interfaces will be used in this layer.

Network Communication Layer

This layer is responsible for establishing, maintaining, and terminating network connectivity between Android phone and web service.

Data Management Layer

This will handle the all the aspects that the system requires from its databases. So this layer will separate databases access from upper layers and provide common, safe interface to business logic layer.

9. Size and Performance

- Server should handle at least 100 simultaneous users at a time.
- Server should support a database that contains all the details required to the system.
- System should have maximum response time of 10 seconds and average response time of 5 seconds.
- Server should be available throughout the whole day.
- System should be up to date

10. Quality

- The information provided by the system should be reliable.
- GSUN web service should be extensible to use as a web service for other applications (by 3rd parties)
- Communication between Android phone and server should be secure from other external parties
- Database should be protected from other parties
- The system should depend on the standard structure of SOA
- Message exchanging should follow a standard SOAP format.