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ANALYSIS AND SPECIFICATION DOCUMENT

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1.0	11/11/2016	First release
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Summary

SECTION 1 - INTRODUCTION

1.1 General System functionalities

The general purpose of this project is the development of an application for the Android platform; it will be then uploaded on the Google Play Store, where the users will be able to download it for free.

The application name is **OpenWifi**, and its users can discover the location of the free Hotspot Wifi in seven italian cities.

1.2 Document Description

This document will be redacted according to the following sections:

Section	Content
2	Glossary: it includes all the technical and specific terms used in this document, in order to facilitate the reading for less experienced users.
3	OpenWiFi application analysis.
4	Appendix: technical aspects covering the hardware platform that we will use, and the database structure supporting the application.

For section **3**, the analysis of the application will follow these guidelines:

1. **General description of the product's functionalities**
   A description of the main purpose of our project and an overview of its potential users.

2. **System Models**
   An analysis of the possible interactions between the users and the system (**use cases**).

   We will use this table:

Code	Number that identifies the use case.
Name	Name of the use case.
Purpose	What the user aims to do.

Actors	Entities involved in the use case.
Pre-conditions	What is taken as true before the use case.
Trigger	Event that activates the use case.
Description	Short description of the actions of the users and the system's response.
Alternatives	Short description of uncommon actions and the relative system management.
Post-conditions	Modifications of the state of the system after the use case.

3. Functional requirements

In this paragraph, we will discuss the system's functionalities alongside the services offered to the user.

We will use this table:

Code	Number that identifies the requirement.
Description	Short description of the requirement.
Reason	Explanation of why we chose the requirement.
Influence	Code(s) of the related functional requirement(s).
Specific	Code of the specific of the functional requirement.
Actor	Service provider.
Priority	It's the priority of the requirement. There are 3 possible values: ● HIGH: the requirement is necessary for the development of the project; if it's not accomplished, the project will be heavily affected. ● MEDIUM: the requirement is important for the development project, although there will be no serious consequences if it's not accomplished. ● LOW: the requirement is not necessary for the development of the application; if it's missing there will be no damages.

4. **Non-Functional Requirements**

   In this section, we will analyze the bonds on the services and on the operations supported by the system.

   As a necessary pre-condition, we will assume that the application is correctly installed in the user's device, and that the user correctly starts it by tapping on its icon.

   The non-functional requirements will be listed according to this table:

Code	Number that identifies the requirement.
Description	Short description of the requirement.
Reason	Explanation of why we chose the requirement.
Influence	Code(s) of the related functional requirement(s).
Category	Category that includes the requirement. There are 3 categories: ● PRODUCT: the requirement describes an app's behaviour; ● PROCESS: the requirement derives from organizational choices: ● EXTERNAL: the requirement depends on external elements.
Priority	It's the priority of the requirement, defined as above.
Metrics	Measure of the requirement according to some metrics.

5. **System Evolution**

   Future revisions of the app: addition of new features, modification of existing ones according to hardware and/or software changes.

6. Requirements' Specifics

In this paragraph, we will offer a detailed description of the functionalities of the applications.

Every specific will be described according to this table:

Code	Number that identifies the specific.
Name	Name of the specific.
Input	It's what the system needs as input.
Output	It's what the system returns as output.
Pre-Conditions	What is true before the functionality is started.
Post-Conditions	The system state when the functionality has ended.
Exceptions	Possible error causes.

SECTION 2 - GLOSSARY

- **Android:** Android is the most used operating system in the world, and the app will be compatible only with it.

- **Use case:** in software and systems engineering, a use case is a list of actions or event steps, typically defining the interactions between a role (known in the Unified Modeling Language as an *actor*) and a system, to achieve a goal.
- **Database:** a database is an organized collection of data.
- **GPS:** the Global Positioning System (GPS) is a global navigation satellite system (GNSS) that provides geolocation and time information to a GPS receiver in all weather conditions.
- **Google Play Store:** it's the Google digital store, that allows users to browse and download music, books, magazines, movies, television programs, and applications.
- **Hotspot Wi-Fi:** a hotspot is a physical location where people may obtain Internet access, typically using Wi-Fi technology, via a wireless local area network (WLAN) using a router connected to an internet service provider.
- **VeniceConnected:** it's the SSID of the free WiFi Network in the area of Venice and Mestre.
- **Google Maps:** Google Maps is a desktop web mapping service developed by Google. It offers satellite imagery, street maps, 360° panoramic views of streets (Street View), real-time traffic conditions (Google Traffic), and route planning for traveling by foot, car, bicycle, and public transportation.
- **CPU:** a central processing unit (CPU) is the electronic circuitry within a computer that carries out the instructions of a computer program by performing the basic arithmetic, logical, control and input/output (I/O) operations specified by the instructions.
- **RAM:** random-access memory (RAM) is a form of computer data storage.
- **UML:** the Unified Modeling Language (UML) is a general-purpose, developmental, modeling language in the field of software engineering, that is intended to provide a standard way to visualize the design of a system.
- **Touchscreen:** A touchscreen is an important source of input device and output device normally layered on the top of an electronic visual display of an information processing system. It's widely used on smartphones and tablets.
- **Smartphone:** a smartphone is a mobile phone with an advanced mobile operating system, which combines features of a personal computer operating system with other features useful for mobile or handheld use.
- **Operating System:** an operating system (OS) is system software that manages computer hardware and software resources and provides common services for computer programs. All computer programs require an operating system to function.

- **Requirement:** a requirement is a singular documented physical and functional need that a particular design, product or process must be able to perform.
- **Functional requirement:** a functional requirement defines a function of a system or its component. A function is described as a set of inputs, the behavior, and outputs.
- **Non-functional requirement:** a non-functional requirement is a requirement that specifies criteria that can be used to judge the operation of a system, rather than specific behaviors.
- **Product requirements:** they prescribe properties of a system or a product.
- **External requirements:** they are external to the system and its process development, like legislative or ethical requirements.
- **Process requirements:** they prescribe activities to be performed by the developing team. For instance, process requirements could specify the methodologies that must be followed, and constraints that the team must obey.
- **Cellular network:** a cellular network or mobile network is a communication network where the last link is wireless. The network is distributed over land areas called cells, each served by at least one fixed-location transceiver, known as a cell site or base station.
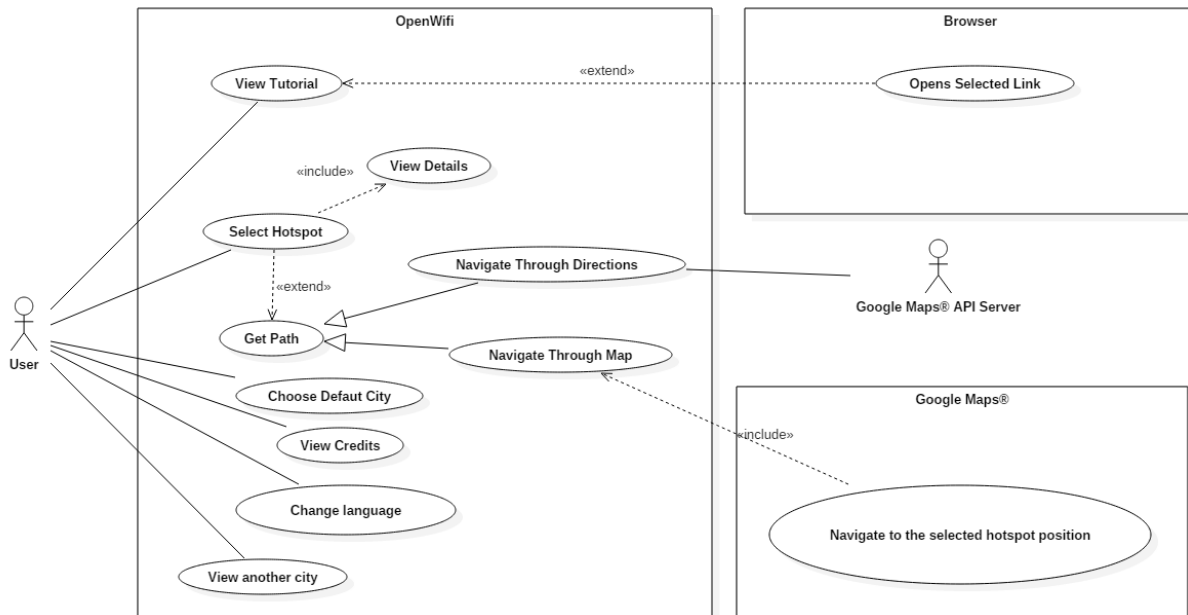
SECTION 3 - OPENWIFI

3.1 General product functionalities description

"OpenWifi" is an application for Android smartphones that helps users in finding the nearest Hotspot Wi-Fi according to their position, in seven italian cities.

3.2 System Model

● UML Diagram of the use cases:

● Use Cases List:

Code	UC-01

Name	View "OpenWifi" tutorial
Purpose	Understand how to create an account for every Hotspot network (it varies from city to city)
Actors	User
Pre-conditions	None
Trigger	First time application launch
Description	User is given some links (one per city) that point to the tutorial for the creation of the free account
Alternatives	None.
Post-conditions	Visitor understands how to create a free account for the Hotspot Network of the city where he is.

Code	UC-02
Name	Select Hotspot
Purpose	Choose one of the Hotspots
Actors	User
Pre-conditions	None
Trigger	Tap on one of the Hotspot icons on the map
Description	User taps on the icon of the chosen Hotspot
Alternatives	None

Post-conditions	None

Code	UC-03
Name	View Details
Purpose	See informations about an Hotspot
Actors	User
Pre-conditions	UC-02
Trigger	Tap on the icon of the chosen Hotspot in the map
Description	User taps on the icon of the Hotspot that he wants to have information about (location, status, ecc)
Alternatives	None
Post-conditions	None

Code	UC-04
Name	Get Path
Purpose	Guide the user to a specific Hotspot
Actors	User
Pre-conditions	Active GPS module; GPS permission; UC-02; UC-03
Trigger	Tap on the icon of the chosen Hotspot in the map, and tap

	on "Directions".
Description	User taps on the icon of the Hotspot that he wants to navigate to, then he taps on the "Directions" button located at the bottom of the informative display
Alternatives	None
Post-conditions	Navigation starts.

Code	UC-05
Name	Navigate Through Directions
Purpose	Navigate using informations
Actors	Google Maps® API Server
Pre-conditions	UC-04
Trigger	Choose 'Directions' option
Description	API returns the best traject between start point and the destination
Alternatives	UC-06
Post-conditions	Navigation triggered

Code	UC-06
Name	Navigate Through MAP
Purpose	Navigate using Google Maps
Actors	User
Pre-conditions	UC-04
Trigger	Choose 'Map' option
Description	Navigation will be processed in Google Maps.
Alternatives	UC-05
Post-conditions	Google Maps App, if available, will open and will be responsible for the navigation

Code	UC-07
Name	Choose Default City
Purpose	Select one of the available cities in the app to change the default city of focus on the app
Actors	User
Pre-conditions	NONE
Trigger	Select 'Choose default City' option
Description	The focus of the map will correspond to the chosen option

Code	UC-08
Name	View Credits
Purpose	Access the basic information about the app
Actors	User
Pre-conditions	None
Trigger	Choose 'View Credits' option
Description	Informations about the app, and the developers associated
Alternatives	None.
Post-conditions	None.

Code	UC-09
Name	Open Selected Links
Purpose	Web browsing the institutional pages of web providers
Actors	User
Pre-conditions	UC-01
Trigger	Tap available links
Description	Redirect the user to browse the official internet provider, guaranteeing the right information to create external mandatory accounts
Alternatives	None.
Post-conditions	Browser.

Code	UC-10
Name	Navigate to the selected hotspot
Purpose	Navigate with Google Maps
Actors	User
Pre-conditions	UC-06

Trigger	Start navigation through Map
Description	Google Maps will start a process of navigation.
Alternatives	None.
Post-conditions	Browser.

Code	UC-11
Name	Change Language
Purpose	Provide multiple languages to the user
Actors	User
Pre-conditions	None
Trigger	Tap option 'Change Language'
Description	User owns the possibility to change the Language of the app, depending on the preferences of each user
Alternatives	None.
Post-conditions	None.

Code	UC-12
Name	View another city
Purpose	Provide multiple cities to the user to see the available

	hotspots in different cities in simultaneous
Actors	User
Pre-conditions	None
Trigger	Tap option 'View another city'
Description	Is possible to load simultaneous cities's hotspots to the map.
Alternatives	None.
Post-conditions	None.

3.3 Functional Requirements Definition

Code	FR-01
Description	Navigation session start
Reason	User wants to start a navigation session to an Hotspot
Influence	None
Specific	RS-01
Actor	User
Priority	HIGH

Code	FR-02
Description	Navigation session end

Reason	User reached the destination, or user interrupts voluntarily the navigation
Influence	FR-01
Specific	RS-02
Actor	User
Priority	HIGH

3.4 Non-Functional Requirements Definition

Code	NFR-01
Description	Application usability
Reason	Usability is necessary to allow the user to easily understand how the application works
Influence	None
Category	PRODUCT
Priority	HIGH
Metrics	No more than a couple of minutes.

Code	NFR-02
Description	Application efficiency.

Reason	Efficiency is necessary for the optimization of the application.
Influence	None
Category	PRODUCT
Priority	HIGH
Metrics	Application must respond in seconds.

Code	NFR-03
Description	GPS activation.
Reason	GPS in necessary for the navigation tool.
Influence	None
Category	PROCESS
Priority	HIGH
Metrics	None

Code	NFR-04
Description	Internet connection activation.
Reason	An internet connection is necessary to download the application from the store and the download of the map.
Influence	None
Category	PROCESS
Priority	HIGH
Metrics	Less than one minute, as the app is not heavy.

Code	NFR-05
Description	User License acceptance.
Reason	User must accept the license in order to download the application from

	the store.
Influence	None
Category	EXTERNAL
Priority	HIGH
Metrics	None

3.5 System Evolution

The application could be designed to show the POI (Point Of Interests) near the user's location, and to offer the navigation system to reach those places.

3.6 Requirements' Specific

Code	RS-01
Name	Navigation session start
Input	Tap on "Directions" button, located at the bottom of the informative display of the Hotspot.
Output	Screen with turn-by-turn navigation, starting from the user's position and leading to the Hotspot.
Pre-Conditions	User is on the informative display of the Hotspot he wants to reach.
Post-Conditions	User has reached the desired Hotspot.
Exceptions	None.

Code	RS-02
Name	Navigation session end
Input	User reached the desired Hotspot, or he interrupted voluntarily the turn-by-turn navigation by tapping on the "Cancel" button.
Output	Default map visualization
Pre-Conditions	User must have started a navigation session
Post-Conditions	None
Exceptions	None

3.7 Dependencies between Requirements

	FR-01	FR-02	NFR-01	NFR-02	NFR-03	NFR-04	NFR-05
FR-01		X					
FR-02	X						
NFR-01							
NFR-02							
NFR-03							
NFR-04							
NFR-05							

SECTION 4 - APPENDIX

4.1 Hardware platform description

The application is compatible only with Android smartphones, with OS version 4.0 or superior. Basing on Google guidelines, we are able to identify the fundamental and non-fundamental requirements that these smartphones have to accomplish.

Fundamental requirements:
- Three physical buttons
- Capacitive screen
- Minimum resolution of 800x480 pixel
- 256 MB of RAM
- 0.5GB of internal memory
- Network Connectivity
- GPS
- Compass

Non-Fundamental requirements
- Camera
- Gyroscope
- Accelerometer