Interworking Between Fixed Terminal and Mobile Terminal In Distributed Environment

Gourav Gupta, Harsh Vardhan Singh

Abstract - In real life, the vehicle has to be driven to the entrance of parking lot. The driver then draws the vehicle to search an available parking space for parking. The VPMS has to be designed to be smart and easily managed. This paper describes the design and implementation of a distributed system built using Java that supports interworking between fixed terminal and mobile terminal in a distributed environment using RMI and World Wide Web respectively. We identify the requirements of software that supports distributed computing, and we propose a design that meets those requirements. Our primary concern is the identification and implementation of software components that can be composed to develop correct distributed application and to provide services to those components. The application domain for implementation is Vehicle Parking Management System in which fixed terminal are installed at parking site and mobile terminal connects through World Wide Web and both of them are at remote locations.

Keywords- Distributed Objects, Distributed System, Fixed Terminal, Mobile Terminal, Remote Method Invocation, Vehicle Parking Management System.

1 INTRODUCTION

The present day metropolitan areas have seen a burgeoning growth in human population as well as vehicles. This directly results in the requirement of number of parking lots. The advent of multi-level vehicle parks has made the management of parking slot and statistical information the topmost priority. The VPMS solution caters to this requirement in an efficient way within in Distributed environment which was not efficiently supported by a single system to meet user's requirement. The VPMS is based on the knowledge sharing in which data is collected on multiple servers, thereby decreasing the traffic load and increases performance, and a coordinator lets the different autonomous computing nodes to communicate with each other. The computing nodes, which are fixed terminal are located at parking site communicate with the server through RMI and the mobile terminal located globally communicate with the server through World Wide Web.

Distributed System, Coulouris defines a distributed system as "a system in which hardware or software components located at networked computers communicate and coordinate their actions only by message passing"[1].

A common misconception among people when discussing distributed systems is that it is just another name for a network of computers. However, this overlooks an important distinction. A distributed system is built on top of a network and tries to hide the existence of multiple autonomous computers. It appears as a single entity providing the user with whatever services are required. A network is a medium for interconnecting entities (such as computers and devices) enabling the exchange of

messages based on well-known protocols between these entities, which are explicitly addressable using an IP address.

The main feature of distributed system includes functional separation, inherent distribution, reliability, scalability and economy.

As a consequence of these features, the various entities in a distributed system can operate concurrently and possibly autonomously. Tasks are carried out independently and actions are co-ordinate at well-defined stages by exchanging messages. Also, entities are heterogeneous, and failures are independent. Generally, there is no single process, or entity, that has the knowledge of the entire state of the system.

2 PROBLEM STATEMENT

In tradition Vehicle Parking Management System which were automated using central point of control the biggest flaw of using one single central point of control is if the single component of central system/server crashes the whole system fails there are further more problem associated with this as the amount of data increases the system gets slow to overcome this problem high-end server machines are required which are quite costlier furthermore if number of simultaneous user increases it would be quite difficult for a single system to serve all the system efficiently at the same time system may also crash or sometime may go into the state of deadlock and if there

is a single point of control there is higher chances of bottleneck.

3 SOLUTION

While developing a distributed system, the prime focus is to accomplish different feature, different application focuses on solving different problem associated with distributed system. VPMS caters to solve issues like heterogeneity, transparency, reliability, scalability, concurrency and load balancing.

3.1 System Architecture

The VPMS consist of fixed Terminal, Mobile Terminal and distributed server located at different geographical locations. The Fixed Terminal and Distributed servers are connected using RMI over Internet whereas Mobile terminal communicates with distributed servers using Internet. Each server will consist of replicated database.

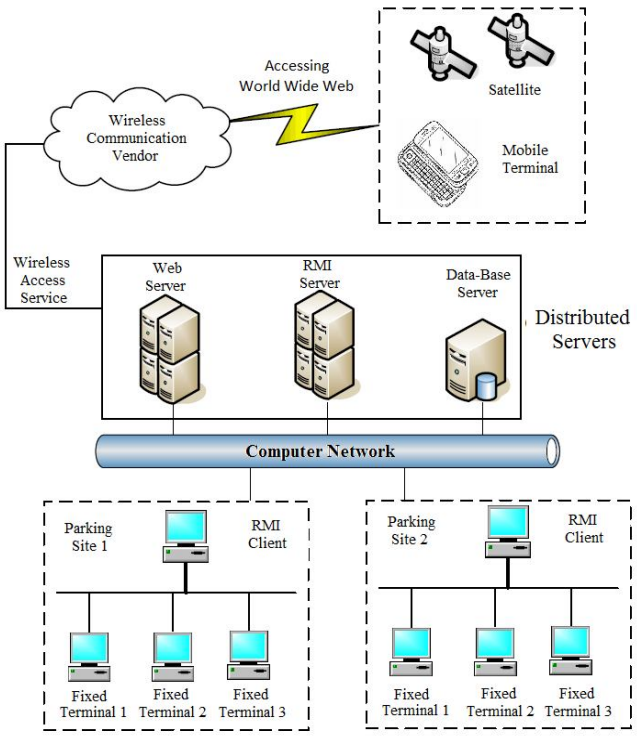

Figure 3.1 System Architecture

3.2 Working

In VPMS two client interfaces are available, one for fixed terminal and other for mobile terminal, dedicated to customer over Internet. Every Mobile terminal includes customer interface through which customer can access the website where he can find the parking site available nearby to his desired location, after selecting the desired parking site, upon successful login he can book the parking slot in the selected parking site and a slot will be assigned to him. On reaching the parking site he had to cross-verify the booking and after successful verification he can park the vehicle at the already assigned parking slot. When the customer exits the parking site an entry will be made by the parking manager and the parking slot which he was using will be marked free and will be made available to be booked by next customer or parking manager.

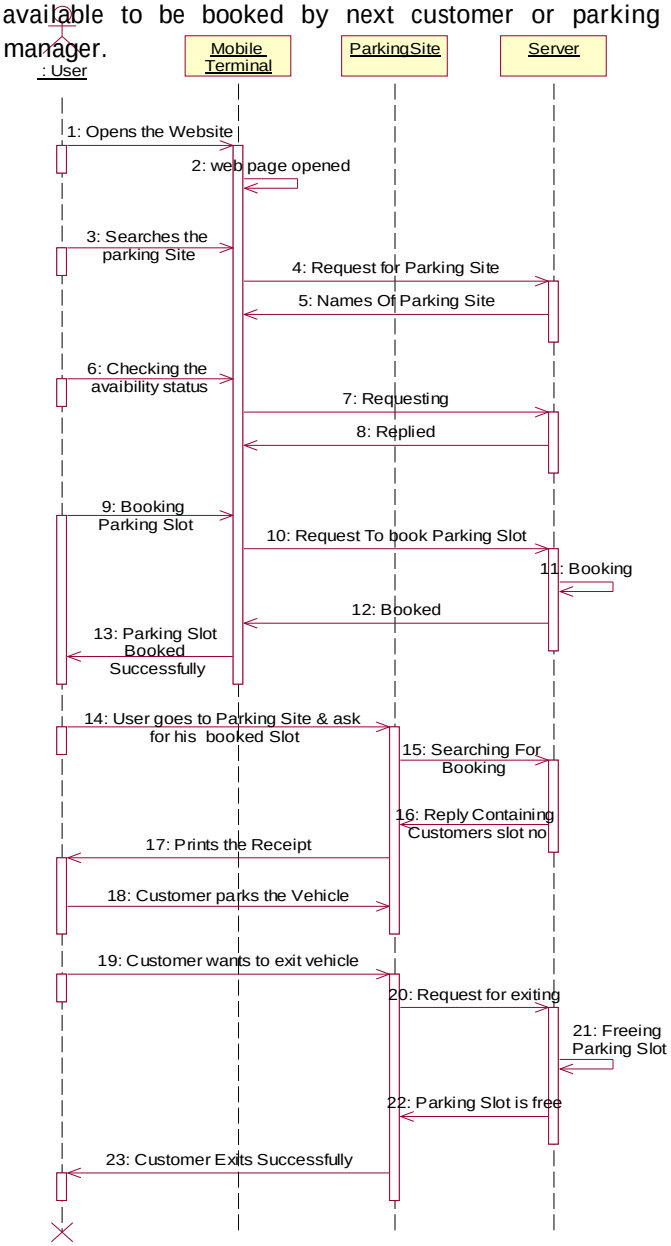

Figure 3.2 Use Case: VPMS

Every Fixed terminal include interface for parking manager and administrator. Upon successful login, parking manager can assign parking slot to vehicle coming into the slot for parking and the slot will be assigned with vehicle information and will be marked as busy, upon exit of vehicle the slot will be marked as free by the parking manager whereas administrator is responsible to perform managerial tasks.

4 CONCLUSIONS

This paper has discussed the structure, functions, main technical features and their implementation principles of a vehicle parking system in distributed environment and given examples of the use of RMI under Java in the implementation of a particular application. It emphasized the peculiarity and key design of the communication software, at the same time, offered the corresponding methods and working process of the client and the server in distributed environment. The research in the paper gives scientific and referenced bases for interworking between a fixed terminal and mobile terminal in distributed environment. Experiences show that application under distributed environment are concurrent, heterogeneous and are more reliable. Developing applications with object-oriented is easy, fast and powerful.

5 REFRENCES

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