Chapter 13
Vehicular Cloud Computing Challenges and Security

Sunilkumar S. Manvi
REVA University, India

Nayana Hegde
Sri Krishna Institute of Technology, India

ABSTRACT

Vehicular Cloud Communication (VCC) is the latest technology in intelligent transport system. Vehicular cloud (VC) facilitates the customers to share resources ranging from storage to computing power to renting it to other users over the Internet. Security of VANET cloud covers various aspects of security, social impact, cost effective communication. Chapter highlights a cost effective, hassle free and secure communication between the cloud and moving vehicles. Communication is established via Network as a Service (Naas). The goal of this chapter is to give a broad overview of Vehicular cloud computing, vehicular cloud applications, mobile computing, and recent literature covering security of vehicular cloud.

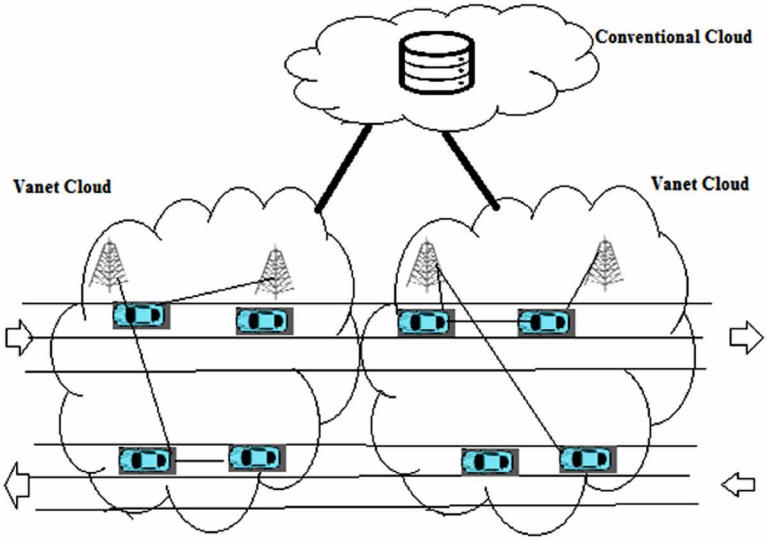
INTRODUCTION

Vehicular cloud computing is a new technological model which combines the advantages of cloud computing with vehicular ad hoc network to serve the drivers at low cost and with pay as you go model. Minimize travel time, reduce traffic congestion, provide good computational power at low cost to drivers, reduce environmental pollution, reduce road accidents and make travel more enjoyable are the few objectives of VCC.

According to Whaiduzzaman (2014), the underutilized computing power, memory, sensing and internet connectivity, of large number of autonomous vehicles on roads, parking lots and streets can be coordinated and allocated to other authorized users. Internet access, computing power and storage capabilities can be rented to drivers and other customers exactly as similar to usual cloud computing service. Vehicular Clouds are technologically feasible and economically viable and will be the next paradigm shift. They will provide many benefits, including societal and technological impacts. Vehicular cloud scenario is shown in Figure 1.

DOI: 10.4018/978-1-5225-1785-6.ch013

Figure 1. Vehicular cloud



In the figure a group of vehicles are forming the cloud. This vehicular cloud can connect to the internet cloud.

Vehicular cloud is union of vehicular network, cloud computing and mobile computing. Figure 2(a) and Figure 2(b) shows cloud computing and mobile cloud computing. These are explained as follows:

Vehicular Network

In recent past, smarter vehicles have provided the travel experience with safer and delightful driving. Now a day's almost all vehicles are provided with cameras, GPS system, on board computers, small-scale collision radars, various sensors and radio transceivers. Different sensors are used to measure vehicle and road safety conditions, to alert drivers. It also takes care of mechanical malfunctions of vehicles. These vehicles when travel on road make ad hoc network by communicating with each other by wireless communication technology.

Cloud Computing

Cloud computing provides users with the computing, storing capability on demand. Advantage here is users need not invest for computation or storage but he/she can take it on rent from internet. The ever increasing demand for computing and storage has given rise to cloud computing. Customers rent processing, storage, networking and other fundamental computing resources for all purposes to authorized users.

Mobile Cloud Computing

Mobile cloud computing is combination of mobile communication and cloud computing. The drivers use their mobile devices (smart phones) and connect to the cloud via internet. Using mobile communication they can send safety related messages to other drivers and share data. But disadvantage of mobile