Chapter 2.16

Vehicular System Management Architecture and Application Platform

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ABSTRACT

Notably, not all telematics services can be used in telematics terminals as a result of the varied platform standards. The main issues are that most telematics technologies depend on vertical, proprietary and closed per-OEM Original Equipment Manufacture (OEM) platforms, forming islands of non-interoperable technology and preventing third-party service providers from creating valuable services. In this study, the Open Gateway Service Initiative Vehicle Expert Group (OSGi/VEG) was integrated into an Android platform to generate a vehicular Android/OSGi platform that has the advantages of both original platforms, such as remote management, rich class sharing, proprietary vehicular applications, security policies, easy management of application programming interface (APIs), and an environment with increased openness. Furthermore, this study integrates the cloud computing mechanism into the Android/OSGi platform, which allows service providers to upload their telematics bundles onto storage clouds via the provisioning server.

1 INTRODUCTION

Over the past few years, with the enormous market potentials of telematics industry and the rapid development information technology, automotive telematics has been a booming area and indispensable technology, additionally, it also become a hot R&D area in mobile computing and ITS (Intelligent Transport Systems). Telematics is the convergence of telecommunications and information processing for automation in cars.

So far, quite a number of telematics services have been developed by automakers and third-party service providers, such as monitoring, emergency roadside assistance, navigation, diver aids, remote diagnostics, entertainment, web browsing, and so on. But not all of telematics services can be deployed into telematics terminal as a result of various standards of platforms. Besides, the telematics market is immature now. The main critical issues are most of telematics technologies depend on the vertical, proprietary and closed per-OEM platforms, forming islands of no-interoperable technology and preventing third-party service providers from creating value added services. Consequently, numerous vehicle groups have been some working in establishing and developing open/standard embedded platforms for vehicles, these platforms contain OSGi/VEG, AUTOSAR, AMI-C, CVIS, OSEK/VDX, Android, and so on.

Figure 1 illustrates the open Linux operating system is ported into embedded on-board terminal, which not only provides a variety of device drivers such as CAN\LIN\FlexRay car buses, out-networks connection modules and so on, and also offers resources management. The open/standard telematics platforms in telematics middleware layer mainly standardize telematics API's and graphic/vocal HMI (human-machine interface), so that both service providers and car manufacturers

can quickly deliver solutions on time to potential market and to simplify complexity of development. Besides, if service providers want to remotely deploy telematics services to on-board terminal, or road-side centers need to diagnose the situations of vehicular devices or set-up configurations of telematics applications in terminal, they should use remote management services rely on open/standard telematics platforms.

Telematics applications can be divided into four categories, including VANET embedded system, vehicular multimedia embedded system, intelligent driver aids embedded system, and Urban Nomadic/Pedestrians Telematics embedded system. The first part of VANET system which makes vehicle can communicate with other vehicles or road-side units via DSRC/IEEE 1609, for example if at front of vehicle have accident, it would broadcast emergent message to back vehicles based on VANET embedded system. The second part of multimedia system which makes drivers can be able to watch DVB programs, play on-line games, surveillance home conditions, and so on. The multimedia embedded system should take advantages of high-performance graphic SoC or 3D engines when it performed complicated operations. The three part of driver aids system which ensures security of drivers, economizes the use of power and so on. The final part of Urban

Figure 1. Telematics architecuture
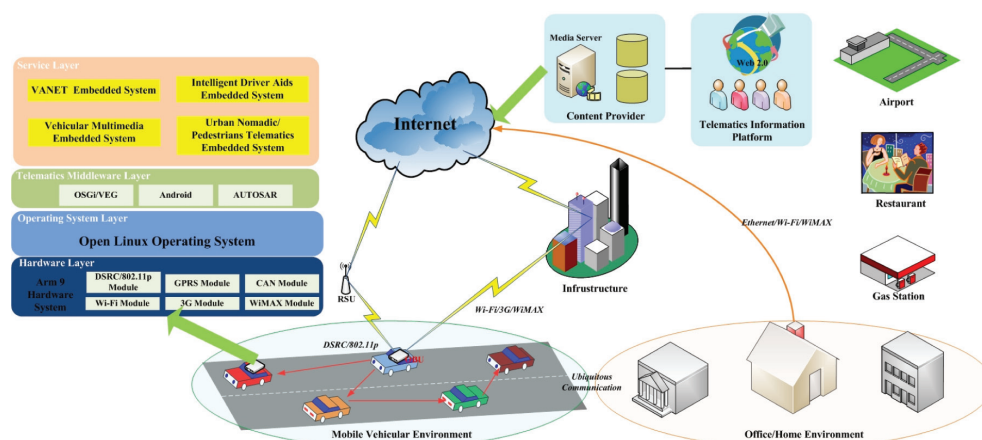
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