The Korea Academic Society of Digital Business Administration (KASDBA)
(사)한국디지털경영학회

APCICT-2018
Conference Program

Asia Pacific Conference on Information Communication Technology
(APCICT-2018)
Kyungpook National University
Daegu, Republic of Korea, July 6-7, 2018

■ **Date:** Friday and Saturday, July 6~7, 2018,

09:30 – 17:00

■ **Place:** Building No. 4, College of IT Engineering, Kyungpook National University, Daegu. Republic of Korea

■ **Organizers:**

College of IT Engineering, Kyungpook National University

The Korea Academic Society of Digital Business Administration (KASDBA)

Korea Institute of Digital Convergence (KIDICO)

■ **Sponsor:**

한국중소기업협업진흥협회
Korea Small Medium Business Association

NIA NATIONAL INFORMATION SOCIETY AGENCY

dcvb DAEGU Convention & Visitors Bureau

Conference Program

APCICT-2018 – Conference Schedule

Date – Friday, July 6, 2018

Venue – Building No. 4, College of IT Engineering,

Kyubgpook National University, Daegu, South Korea

<table>
<tr><th>Time</th><th>Program</th><th>Place</th></tr>
<tr><td>09:30 –10:00</td><td>Registration</td><td>Building No.4
College of IT Engineering</td></tr>
<tr><td rowspan="3">10:00 –11:00</td><td>Presentation Session 1-1</td><td>Room No. 101</td></tr>
<tr><td>Presentation Session 1-2</td><td>Room No. 104</td></tr>
<tr><td>Presentation Session 1-3</td><td>Room No. 108</td></tr>
<tr><td rowspan="2">11:15 –12:30</td><td>Opening Ceremony</td><td rowspan="2">Room No. 101
Building No.4
College of IT Engineering</td></tr>
<tr><td>Welcome Message
1. Prof. You-Ze Cho, Dean, College of IT Engineering
2. Changsu Kim, President of KASDBA</td></tr>
</table>

	Digital Grand Award Best Paper Award	
	Invited Talk Dhananjaya Acharya, Annapurna Broadcast Media Pvt. Ltd., Nepal	
12:30–13:30	**Lunch Break**	
13:30 -15:00	Presentation Session 2-1	Room No. 104
	Presentation Session 2-2	Room No. 108
15:00–15:15	**Coffee Break**	
15:15 – 17:00	Presentation Session 3-1	Room No. 101
	Presentation Session 3-2	Room No. 108

Date – Saturday, July 7, 2018

Venue – Daegu City

10:00 – 17:00	**City Tour**	Daegu City

Guidelines for the Presenters

- All participants are requested to participate in the opening ceremony.
- Each speaker will receive 15 minutes of presentation time (10-minute PowerPoint presentation followed by a five-minute question and answer).

There is no specific PowerPoint template. Please bring the PPT in USB.

Presentation Session Details

Presentation Session 1-1, Advanced Technology & Theory Session Chair: Dr. Eunser Lee Place: Room No. 101 Date: Friday, July 6th, 2018 Time: 10:00 – 11:00
An Overview of Selective Forwarding and Wormhole Attacks in Healthcare IoT (Yazdan Ahmad Qadri, Arslan Musaddiq, Dae Wan Kim, Sung Won Kim)
An Overview of Interoperability Issues in Vehicular Cloud Network (Arslan Musaddiq, Yazdan Ahmad Qadri, Dae Wan Kim, Sung Won Kim)
Video Summarization: A Review on Different Approaches (Rafiq Muhammad, Dae Wan Kim, Gyu Sang Choi)
Review of Literature in the Context of the TAM Model (Maqbool Ahmad)
Reviewing the Studies of Unified Theory of Acceptance and Use of Technology (UTAUT) for M-Commerce (Shoaib Imtiaz)
Digital Convergence and its Economic Sentiments (Maqbool Ahmad, Shoaib Imtiaz)

Presentation Session 1-2, Web-Based Technology Session Chair: Dr. Won Il Lee Place: Room No. 104 Date: Friday, July 6th, 2018 Time: 10:00 – 11:00
Quality Selection System for Video Types in Deep Learning Based Adaptive Video Streaming (Won Sic Kwon, Dae Gi Kim, Jong Won Bang, Jin Chael Woo, I Seul Kim, Sung Wook Jung, Kyung Shik Lim)
Semantic Separation of Vectorized Homographs with Word2vec (Uk Hwi Kim, Dong Jin Bak, Jae Un Yi, Byeong Je Ryu, Seok Ju Go)
Building Semantic Web Services and Developing Hybrid Contents Trial Services (Tae Young Kim, Sun Jae Park, Chan Jun Lee, Eun Koo Jeon, Eunmi Jeung, Yongju Lee)
An Influence of E-learning Class Redesign on the Degree of Flipped Learning Operation (Youngsang Kim)
Korea's Innovative Clusters and Development Strategies - focusing on the ‘loosely coupled’ cooperation between the Daedeok Innopolis and the Pangyo Technovalley (Won Il Lee)

Presentation Session 1-3, Information Security and New Media Session Chair: Dr. Hyun-Sook Ahn Place: Room No. 108 Date: Friday, July 6th, 2018 Time: 10:00 – 11:00
Big Data Analysis on the Perception of Gifted Education for Information Security (Jong Hyun Lee, Dae Wan Kim)
A Study on the Evaluation of Gifted Education Institution for Information Security (Jong Hyun Lee, Dae Wan Kim)
Study on the Activation of Spatial and Spatial Space based on New Media Art (Eun Ji Yang, Dae Wan Kim)
The Influence of Emotional Intelligence on Individual Creativity (Boung-Ik Kim, Sun-Kyu Lee)
A Study on Agriculture User-Centered Mobile Marketplace UI / UX (Sang Tae Kim)

Presentation Session 2-1, Communication System and Technology

Session Chair: Dr. Gyanendra Prasad Joshi
Place: Room No. 101
Date: Friday, July 6th, 2018
Time: 13:30 – 15:00

Adaptive Video Streaming based on Deep Learning (Kwon Won Sik, Dae Gi Kim, Jongwon Jung, Woo Jin Chul, Kim Sysul, Chung Sung Wook, Hong Sung Jun)
Visual-MIMO for Software-Defined Vehicular Networks (Tae-Ho Kwon, Jai-Eun Kim, Ki-Soo An, Rappy Saha, Ki-Doo Kim)
Energy and Delay Constrained Packet Transmission MAC Protocol for Wireless Sensor Networks (Seong Cheol Kim)
Novel Frame Synchronization Scheme of Electric Vehicle Charging System Based on Power Line Communication (Isaac Sim, Yu Min Hwang, Young Ghyu Sun, Jin Young Kim)
Application Of Machine Learning Techniques To Tweet Polarity Classification With News Topic Analysis (Hoyeon Park, Hyeonjeong Seo, Kyoung-Jae Kim, Gundoo Moon)
Application Of Anfis-Pid Controller For Statcom To Enhance Power Quality In Power System Connected Wind Energy System (Huu Vinh Nguyen, Hung Nguyen, Kim Hung Le)

Performance of Turbo Equalizer for Powerline Communication Systems with Deep Learning
(Yu Min Hwang, Young Ghyu Sun, Issac Sim, Jin Young Kim)

Presentation Session 2-2,Radio Frequency System and Devices Session Chair: Dr. Bhanu Shrestha Place: Room No. 104 Date: Friday, July 6th, 2018 Time: 13:30 – 15:00
Sliding Mode Control for Manipulator Robot with Elastic Link (Mai Nguyen Hoang, Tuan Pham Minh)
An ROI-Based Lidar Sampling Algorithm In The Road Environment (Thai K. Nguyen, Xuan Truong Nguyen, Hyuk-Jae Lee)
Iterative Approach for Performance Improvement of PLC systems (Yu Min Hwang, Young Ghyu Sun, Issac Sim, Jin Young Kim)
Performance of EV Charging System with PLC Systems (Issac Sim, Yu Min Hwang, Young Ghyu Sun, Jin Young Kim)
Interference Analysis of PLC Convergence System (Young Ghyu Sun, Yu Min Hwang, Issac Sim, Jin Young Kim)
Coplanar QCA Adders For Arithmetic Circuits (Nuriddin Safoev, Jun-Cheol Jeon)
Implementation Of Full Adder Using 5-Input Majority Gate (Sarvarbek Erniyazov, Jun-Cheol Jeon)

Design Of Falling-Edge Triggered T Flip-Flop Based On Quantum-Dot Cellular Automata
(Young-Won You, Jun-Cheol Jeon)

Presentation Session 3-1, Advanced Computing Session Chair: Dr. Ajaya Kumar Jha Place: Room No. 101 Date: Friday, July 6th, 2018 Time: 15:15 – 17:00
Implementation of Mobile Smart Key System using the NFC Function of the Smartphone (JuGeon Pak, BoRam Lee, MyungSuk Lee)
A Study on Lightweight Cryptography Algorithm for IoT based Bicycle Sharing System (Larsson Bajracharya, Jongmun Jeong, Mintae Hwang)
CoAP Monitoring System Using Logical Grouping Technique (JeongYun Kang, Nathali Silva, Kijun Han)
Improvement of the KCF Tracking Algorithm through Object Detection (Jae-Wan Park, Sung Joong Kim, Youngjae Lee, Inwhee Joe)
UX Design for the Visually Impaired to Improve Health Information Accessibility (Woo Jin Kim, Min Ji Kim, Il Kon Kim)
Novel Interference Mitigation Scheme for PLC Convergence System Based on Deep Learning (Young Ghyu Sun, Yu Min Hwang, Issac Sim, Jin Young Kim)

Presentation Session 3-2, ICT Convergence Session Chair: Dr. Woong Jo Place: Room No. 108 Date: Saturday, July 6th, 2018 Time: 15:15 – 17:00
Development of Bio-Medical Detection Platform using IoT Technology (Seok-Joo Koh, Jeon Min Jun, Lee Dae Kwan, Kwon Jun Hyeon, Cha Ye Baek, Young-Hee Lee)
Culinary Recipe Recommendation based on Text Analytics (Jiheon Hong, Heejung Lee)
The Effect of External Technology Cooperation and Internal Relation on Innovative Behavior (Won Il Lee)
The Influence Of Celebrity Endorsement On Consumer's Attitude: A Study Case Of Smartphone Brands In Jakarta, Indonesia (Ina Melati, Teddy Indira Budiwan, Haryadi Sarjono)
Dynamic Routing for HTTP Adaptive VBR Video Streaming Based on Software Defined Networking (Thinh Pham Hong, Tan Tran Duc, Thinh Dang Truong, Truong Thu Huong, Nam Pham Ngoc, Alan Marshall)
Supply Chain Design of Potato Commodity in Wonosobo Regency, Central Java - Indonesia (Haryadi Sarjono, Lim Sanny, Ina Melati)

Conference Venue Map

414. College of IT Engineering Bldg.4

Conference Venue: Building No. 4, College of IT Engineering,

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An Overview of Interoperability Issues in Vehicular Cloud Network

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Abstract

Since the past few years, the vehicular network has gained significant attention because of its powerful potential applications such as traffic management, surveillance, and safety. These applications outcomes are achieved by using vehicles onboard computational, communication and storage capabilities with the help of cloud computing. Automobile companies are utilizing cloud services from different cloud providers to support various service level agreements. Thus, cloud interoperability issues arise to support heterogeneous programming interface, programming language, data models and operating systems. In this paper, discussions on vehicular cloud interoperability are provided. The different dimensions of cloud services including, Software as a Service (SaaS), Infrastructure as a Service (IaaS), and Platform as a Service (PaaS) are studied. The objective of this paper is to present the basic insight into areas of vehicular cloud network in which standards would be useful for interoperability at different cloud service levels.

Keywords— VANET, Cloud Computing, Interoperability

I. INTRODUCTION

Due to the new era of the Internet of Things (IoT), the concept of a vehicular network is evolving [1]. With such a large scale and complex heterogeneous vehicular network, various challenges arise. One such challenge is interoperability of systems to exchange the information and use the information that has been exchanged. The automotive industry is focusing on utilizing the IPv6 to connect the vehicles to any cloud platform. Similarly, addressing communication issues among heterogeneous devices is another challenging area. The vehicular cloud consists of stationary and mobile computing data centers or onboard computational devices. Standardization by cloud developers and vehicle manufacturers are required to allow the various heterogeneous operating systems, application-programming interface and radio-based devices to work together. As a result, it could lead to an efficient vehicular network without any additional cost [3].

The U.S. Department of Transportation (USDOT) and the Intelligent Transportation Systems Joint Program Office (ITS JPO) are focusing on interoperability to allow devices vehicles and system work together simultaneously [4]. Interoperability is helpful for transportation safety by ensuring the vehicle make and model communicate without any hurdle. Interoperability for the vehicular network is a broad term, which could mean the interoperability at the communication level, devices level, an operating system level or cloud level. Vehicular cloud objective is to provide several computational challenges by using real-time software services and platforms. In order to provide these services seamlessly, the interoperability is essential to the reliable, efficient and synchronized network [5]. Hence, the importance of vehicular cloud interoperability motivates us to write this paper. In this paper, interoperability challenges among vehicular cloud network have been discussed.

The contributions of this paper are as follow:

- It covers the cloud network aspects of vehicular communication.
- It provides a literature review related to the interoperability issue of the vehicular cloud network.
- It provides an overview of interoperability research challenges at various cloud service models.

The remainder of the paper is organized as follow. Section II discusses the vehicular cloud network. Section III explains the vehicular cloud interoperability and its challenges at different cloud service models. The last section IV concludes the paper.

*Corresponding author
Keywords- VANET, Cloud Computing, Interoperability

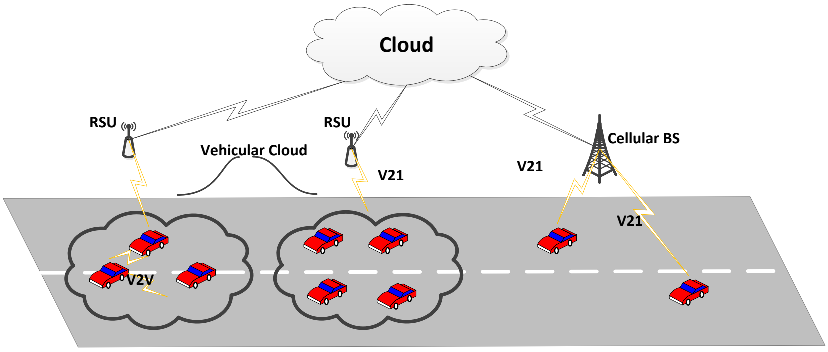

Figure. 1 Overview of Vehicular Cloud Network [5]

II. VEHICULAR CLOUD

VANET is a special case of Mobile Ad Hoc Network (MANET). The only difference is the moving pattern. In case of VANET, the vehicles follow a particular moving pattern or fixed path, unlike MANETs in which nodes move randomly. Establishing an efficient communication between vehicles is the ultimate objective in VANET. The communication could be done either via vehicular to infrastructure (V2I), in which vehicles communicate via roadside units (RSUs) or could be direct communication i.e., Vehicle to Vehicle (V2V) eliminating the need of a third party or RSUs. Lastly, they could also communicate via a cellular network. The vehicular communication requires various services, which include emergency management, roadway maintenance, processing, storage, and computation. In order to acquire these services, the cloud computing could be adopted instead of investing in the infrastructure [5].

Cloud computing is a paradigm, which provides virtualized computing resources as a service via the Internet. The concept of cloud computing is used for webmail, storage, and web hosting services which require minimum management effort and service provider interaction. In term of the vehicular network, the onboard computing resource of vehicles is integrated with the cloud. Vehicular cloud is different from the traditional cloud in term of its characteristics, mobility, and agility. There are two types of vehicular cloud, 1) Infrastructure Based Vehicular Cloud (IVC) and 2) Autonomous Vehicular Cloud (AVC). IVC is similar to a traditional cloud platform in which vehicles access the services from roadside infrastructure via a network communication, e.g., GPS or google maps. On the other hand, IVC slightly differs in term of the way the services are provided. The vehicles itself can be organized to form an autonomous vehicular cloud in case of emergencies where roadside infrastructure is damaged due to earthquake or hurricane. The vehicular cloud is formed by interconnecting vehicles and RSU resources as shown in Figure 1. The aim is to produce advanced vehicular services and resources which individual vehicle cannot make. The services in the vehicular cloud are slightly different from the ones in the conventional cloud. These services include Storage as a Service (STaaS), Network as a Service (NaaS) and Cooperation as a Service (CaaS). Compare to the traditional cloud, the VC has several distinguishing features such as mobility, autonomy, heterogeneity, and agility. The services that vehicular cloud offers are non-trivial and complement to the traditional cloud network [6].

III. VEHICULAR CLOUD INTEROPERABILITY

Interoperability issue in cloud computing arises when different cloud services provider exchanges data and application between each other. The problem could be either the programming languages are not compatible or virtualization implementation are different or the application-programming interface (API) is incompatible (Figure 2). In the cloud-computing scenario, the application components in SaaS, IaaS or PaaS are required standardized protocols and services. Each level requires managing the features and interfaces so that different cloud systems work seamlessly. There must be a capability to retrieve vehicle data from the source cloud to the target cloud service [7].

The vehicles must also have the capability to transfer application components from one cloud service to another cloud. Similarly, the programming interface of different cloud services are not standardized and different cloud platform uses

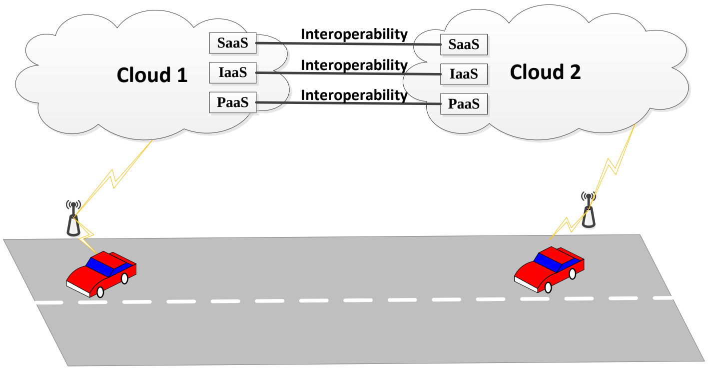

Figure. 2 Interoperability Scenario of Vehicular Cloud Network.

different API. The API describes how to connect, configure and interact with the vehicular cloud. It also includes how to save and retrieve date from the cloud. Moving from one cloud service to another typical involve a change in the interface which in turn brings a great interoperability challenge. The user interface might not be identical for two different cloud services. However, they may offer similar functionality to reduce the overall cost. The vehicles applications produce a large amount of sensor data collected from the environment or from neighboring vehicles. Thus, vehicle cloud system is largely providing a wide variety of services. Thereby, managing this diverse system and components to ensure they work together successfully is of paramount importance.

Vehicles manufacturer require cloud services to manage connected vehicles network infrastructure. Several cloud service providers manage data centers and infrastructure to maintain and host the cloud services, e.g., Amazon Web Service (AWS) connected vehicles [8], Microsoft connected vehicles platform [9], Google cloud platform [10], IBM Watson [11], Salesforce, SAP and Oracle cloud. Ford Motor Company announced to provide their customers with a Transportation Mobility Cloud. The system would comprise cellular vehicle-to-everything technology as the backbone for this platform, allowing the vehicle to communicate with other vehicles or infrastructure. Ford is using Microsoft Azure cloud service to update the car's infotainment system, e.g., Ford Service Delivery network is a cloud-based system to update vehicles navigation and infotainment system. Similar to Ford, Toyota Motor Corporations' and Mercedes-Benz is also utilizing Microsoft Azure to manage the applications and services for connected vehicles. The Honda Motor Company and BMW are leveraging IBM cloud to provide connected car platform. In case of Volkswagen group opts to use an open-source cloud computing platform named OpenStack to manage the connected vehicular cloud. The Hyundai Motor Company, on the other hand, is working with Cisco to develop interconnected car services. Numerous companies are offering cloud services and organizations; thus, the interoperability and portability challenges are likely to grow in the complex interconnected environment.

a. The SaaS interoperability framework challenges:

AT the SaaS level, the interoperability issues arise among applications inside a single cloud or across different SaaS environment when applications exchange information. The problem could also arise during migration of one cloud application to another system. Similarly, connecting multiple cloud environments using a software program to integrate data and application in a unified manner also cause interoperability challenges [12].

The major vehicular companies working towards smart cars and as a result, cloud computing is growing exponentially. SaaS may include applications accessible over a network such as voice and video communications and gaming. The different service provider offers different interfaces to access their services. Therefore, the cloud vehicles would need to employ a middleware or common standard to integrate different APIs.

The IBM SmartCloud and Microsoft Connected Vehicles platform are the significant examples of SaaS model. The SaaS platform for vehicles aims to provide advanced navigation, predictive maintenance, improved in-car productivity and autonomous driving capabilities. Ford Motor Company, Toyota Motor Corporations' and Mercedes-Benz are utilizing Microsoft Azure. The Microsoft Cortana is one of the SaaS services. Due to a number of SaaS provider for vehicles, there is a number of APIs, e.g., Microsoft Azure and IBM SmartCloud provide different APIs.

b. The IaaS interoperability framework challenges:

IaaS cloud service mainly provides storage, networking infrastructure (including firewalls and security) and data centers. Similarly, with the IaaS, vehicles are able to run an operating system and various software's. Within IaaS, interoperability is required in different services areas, e.g., cloud service providers need to allocate the different services to the vehicles with different requirements. Defining how a service in the cloud is access by the vehicles is necessary for cloud management framework, e.g., Microsoft Azure Active Directory Access Control Service (ACS). Similarly, the features and functionality provided by a considerable number of other cloud management frameworks must be able to move to different cloud platforms.

In case of storage, each cloud platform provides different management and organization of the storage facility. The functional interface specified by the different cloud platform to create, delete, update and retrieve must be interoperable. Similar to this the application level communication and remotely accessing these applications across the vehicular cloud must have a standardized mechanism.

c. The PaaS interoperability framework challenges:

PaaS as a service model provides the computing platforms, e.g., operating system, programming language execution environment, database or web server. At the PaaS level, the service provider must certify that the application environment e.g., database server supported by the cloud service provider is compatible with the vehicle on-premises application environment. The application environment is based on open technologies to increase the number of viable alternative cloud service providers, which can facilitate migration if a change in provider is warranted. PaaS mostly depends on the development frameworks. Thus, the respective development community can better support the interoperability among different PaaS clouds.

IV. Conclusion

In this paper, the fundamental concept of vehicular network has been discussed followed by an idea of cloud computing and how it could increase the transportation system capabilities. Due to the complex and heterogeneous nature of the vehicular network, a fundamental challenge of interoperability arises. Since the vehicles are connected to the cloud platform, interoperability issue in cloud layer is a fundamental challenge. Thus, the cloud interoperability issue is explained along with the fundamental challenges of various cloud service models. In order for the vehicular cloud to interoperate seamlessly, cloud service providers, automotive industry as well as local and federal governing bodies must agree on rules, regulations, and standardizations. The cloud reference model following standardized protocols and architecture is also required for the vehicular network to address the interoperability problem.

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