Chapter 63
Vehicle to Cloud:
Big Data for Environmental Sustainability, Energy, and Traffic Management

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ABSTRACT

The population of humanity has become more than seven billion. Daily used devices, machines, and equipment, are also increasing quicker than the human population. The number of mobile devices in use like phones, tablets and IoT devices already passed the two billion barrier and even more than one billion as vehicles are also on the roads. Combining these two will make the one of the biggest Big Data Environment about the daily life of human beings after the use of internet and social applications. For the newly manufactured vehicles, internet operated entertainment and information Systems are becoming a standard equipment delivering such an information to the manufacturers but most of the current vehicles do not have a system like that. This chapter explains the combined version of IoT and vehicles to create a V2C vehicle to cloud system that will create the big data for environmental sustainability, energy and traffic management by different technical and political views and aspects.

INTRODUCTION

Starting from the early days of civilization to nowadays, one of the irrefutable facts about the humanity is the endless technology development and research beyond the imagination of his ancestors. Behavioral issues for most of the civilizations took place in early days behavioral can be explained by Maslow's hierarchy of needs, which focuses on describing the stages of growth in humans starting from bottom including the physiological needs, safety needs, love and belonging needs, esteem as well as self-actualization and self-transcendence (Maslow, 1943). However, the world gets more and more sophisticated, complex and complicated; therefore, majority of the earlier assumptions and theories themselves should continuously

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evolve to change or reshape in light of the technological improvements and innovations. Contemporary modern daily life enforces people to use digital devices such as computers, personal digital assistants, cell phones as well as online services and infotainment systems which heavily rely on Internet. In this regard, hierarchy of needs could easily be extended in such a way that digital products and services are also included. It is critical to keep in mind that both number and capabilities of these digital products and services increase dramatically in the last two decades in parallel to the escalating demands. In order to meet the requirements, Microsoft, AMD, Intel and IBM has already passed the five billion barrier in the microprocessor transistor counts in the device and making a huge scatter from the Moore's Law of the doubling of transistors per square inch on integrated circuits. (Schaller, 1997; Moore, 1998). This implies that the future of the humanity will also reshape and adapt itself to the contemporary conditions while more devices and sensors becoming online. In parallel with these, one should bear in mind that more computational power will be available for artificial intelligence and self-aware systems. It is obvious that these next generation systems should be tuned to optimize for sustainable a future.

Sustainability is based on a simple way of thinking about the idea of everything that humanity needs for survival and well-being depends, either directly or indirectly, on the natural surrounding conditions. The ability to keep something around for this aim creates and maintains the conditions under which humans and nature can exist in productive harmony allowing a continuous satisfaction of the items. Main concern areas of sustainability starts with the E3 concept of energy, economy, environment and as well as enriching with commercial, social, financial, agricultural, educational, health related issues of present and future.

Among all these issues, energy is the key controllable crucial one that controls, limits and connects most of them. A clean, free and unlimited energy may result in environmental and economical sustainability and the rest will also improve and adapt accordingly. However, in reality of nowadays harsh conditions, energy is mostly produced from limited fossil fuels which also generate high emissions and leads to global warming and climate change. There are many regulating bodies and institutions around the globe concerning these problems. International Energy Agency (IEA) is one of them which aims to promote energy security to physical disruptions in oil supply and looking for ensure reliable, affordable and clean energy for the world. IEA periodically publish several general annual reports as well as key subjects with detailed focus reports on energy policies and perspectives and future projections. Those reports provide a common and detailed information to the energy related issues. According to IEA reports since the first Conference of the Parties (COP) in 1995, greenhouse-gas (GHG) emissions have risen by more than one-quarter and the atmospheric concentration of these gases has increased steadily to 435 parts per million carbon-dioxide equivalent (ppm CO_2-equivalent) in 2012. According to the International Panel on Climate Change (IPCC), humanity and all the countries have to take fully committed and urgent action otherwise climate change will have severe and irreversible impacts across the world. The international commitment to keep the increase in long-term average temperatures to below two degrees Celsius (2 °C), relative to pre-industrial levels, will require substantial and sustained reductions in global emissions. In order to reach this level and attain the goals, energy sector, operating rules, conditions, policies and procedures of operating need to be changed since two-thirds of all made by people and greenhouse-gas formed by energy production. The World Data Center for Greenhouse Gases (WDCGG) provides data for The Carbon Dioxide Information Analysis Center (CDIA) in USA which works on climate-change data and is a very good source for finding statistical and deep information about the subject. In order to collect information for measuring greenhouse (GHG) and ozone depleting gases and aerosols in clean air environments special air pollution stations are required where air is unaf-