

Chapter 52

Resource Management in Sensor Cloud

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ABSTRACT

Sensor Cloud is one of the attractive trend in present world. Sensor cloud is a combination of wireless sensor network and cloud computing. Due to the lack of battery energy and bandwidth the sensor nodes are incapable to store and process large data. Hence storing raw data is a challenging task. The sensor cloud comes into existence to accomplish multiple tasks that are not possible with existing sensor network. In sensor cloud the sensed data are processed and stored in the clouds and data can be accessed anywhere and anytime. Maintaining the resources and providing the resources to end users is a challenging task in sensor cloud. This chapter will brief the architecture of sensor cloud, application of sensor cloud in various sector, advantages of using sensor cloud compared to existing networks and management of resources in sensor cloud.

INTRODUCTION

Sensor cloud is a new model for cloud computing that uses the physical sensors to gather its data and transmit all sensory data into a cloud computing infrastructure. Sensor cloud is a well-designed sensor data storage, visualization and remote management platform that support powerful cloud computing technologies to provide great data scalability, rapid visualization, and user programmable analysis (Kian Tee Lan, 2010; R. Shea, 2013). In other words, sensor cloud can be defined as, an infrastructure that allows truly pervasive computation using sensors as interface between physical and cyber worlds, the data-compute clusters as the cyber backbone and the internet as the communication medium (Intellisys, 2014; David Irwin, 2010).

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A sensor cloud collects and processes information from several sensor networks enables information sharing on big-scale and collaborate the applications on cloud among users. It integrates several networks with number of sensing applications and cloud computing platform by allowing applications to be cross-disciplinary that may traverse over organizational varieties. Sensor cloud enables users to easily gather, access, processing, visualizing and analyzing, storing, sharing and searching large number of sensor data from several types of applications. These huge quantities of data are stored, processed, analyzed and then visualized by using the computational information technology and storage resources of the cloud (Doukas, 2011).

The main objective for going through the resource management in sensor cloud is to preserve the scarce resources and enhance the network lifetime. Physical sensor node can't give enough storage to store the raw data sensed by the sensor node. Cloud computing has huge storage and very good processing capability at different platforms. Hence combining these two will be beneficial one. Resource Management will provide a good platform to store the data in clouds as well as providing the data to end user at any time.

BACKGROUND

Wireless Sensor Network

Wireless sensor networks are used for monitoring environmental conditions like temperature, pressure, humidity, sound etc. in recent year wireless sensor networks are most widely used in military and many more applications. Wireless sensor network consists of set of sensor nodes and these sensor nodes sense the environmental parameters and updates the user/controller. The lifetime of sensor nodes depends on battery capacity and energy efficiency. Sensor nodes perform several functions hence these nodes are known as multifunctional. Sensor nodes are small in size, low cost and low power. Sensor nodes are capable of communicating wirelessly with each other in small distance. Energy efficiency is a critical issue in wireless sensor network as it depicts the lifetime of the network. Microcontroller, transceiver, external memory, ADC, sensing unit, processing unit and power source are the components of sensor nodes (Heinzelman, 1999) as shown in Figure 1. Microcontroller is used for controlling functionality of other components in the sensor node. Microcontroller is low cost and low power consumption. Transceiver combines the functions of both transmitter and receiver into single device. Sensor nodes use power supply for sensing, communicating and processing data. ADC is used for digitizing analog signal produced by the sensor. The work of sensing unit is to sense the environmental parameters and sensed information will be sent to processing unit for processing of data and storage is used to store the data with time.

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