Chapter 5
An Infrastructure for Wireless Sensor–Cloud Architecture via Virtualization

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ABSTRACT

A typical WSN contains spatially distributed sensors that can cooperatively monitor the environment conditions, like second, temperature, pressure, motion, vibration, pollution and so forth. WSN applications have been used in several important areas, such as health care, military, critical infrastructure monitoring, environment monitoring, and manufacturing. At the same time. WSN Have some issues like memory, energy, computation, communication, and scalability, efficient management. So, there is a need for a powerful and scalable high-performance computing and massive storage infrastructure for real-time processing and storing the WSN data as well as analysis (online and offline) of the processed information to extract events of interest. In this scenario, cloud computing is becoming a promising technology to provide a flexible stack of massive computing, storage, and software services in ascalable and virtualized manner at low cost. Therefore, sensor-cloud (i.e. an integrated version of WSN & cloud computing) infrastructure is becoming popular nowadays that can provide an open flexible, and reconfigurable platform for several monitoring and controlling applications.

DOI: 10.4018/978-1-4666-8687-8.ch005

INTRODUCTION

Motivation

A typical sensor network may consists of a number of sensor nodes acting upon together to monitor a region and fetch data about the surroundings. A typical WSN contains self-regulated sensors that can cooperatively monitor the environmental conditions, like sound, temperature, pressure, motion, vibration, pollution, fire like, and other application dependent events. Each node in a sensor is loaded with a raio transceiver or some other wireless communication device, a small microcontroller, and an energy source most often cells/battery. WSNs have some of the limitations, like in terms of memory, energy, computation, communication and scalability, efficient management of the large number of WSNs data.

Cloud computing allows the systems and users to use Platform as a Service (PaaS), for example, Operating System (Oss), Infrastructure as aService (IaaS), for example, storages and servers and Software as a Service(SaaS), for example, application level programs, and so forth at a very low cost which are being provided by several cloud providers (e.g., Amazon, Google, and Microsoft) on the basis of pay per use services (Atif Alanri, 2013). Cloud Computing platform dynamically available, configures, and updates the servers as and when needed by end uses. The limitations of WSNs are the pluspoints in the Cloud Computing.

This is the reason why the integrations of cloud computing & WSNs will lead to greater benefits & efficiency.

What Is Sensor-Cloud Infrastructure?

Sensor-Clod infrastructure i.e. integrated version of Wireless Sensor networks and Cloud Computing is powerful and scalable high-performance computing and massive storage infrastructure for real-time processing and storing of the WSN data (online as well as previously collected ofline) as well as analysis of the processed information to extract events of interest.

Some of the Definitions of Sensor Cloud Architecture

AN Infrastructure that allows truly pervasive computation using sensors as an interface between physical and cyber worlds, the data-compute clusters as the cyber backbone and the internet as the communication medium (Sajjad Hussain Shah, 2013).

It is a unique sensor data storage, visualization and remote management platform that leverage [sic] powerful cloud computing technologies to provide excellent data scalability, rapid visualization, and user programmable analysis. It is origi-