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Review Article

IT obstacles using cloud computer facility that serves European users referring to access shared computing resources using cloud computing using shared computing resources

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Abstract

Cloud computing is the result of the evolution and adoption of existing technologies and paradigms. The goal of cloud computing is to allow users to take benefit from all of these technologies, without the need for deep knowledge about or expertise with each one of them. The cloud aims to cut costs, and helps the users focus on their core business instead of being impeded by IT obstacles it is a new era of referring to access shared computing resources. On the other hand, wireless sensor networks have been seen as one of the most essential technologies for the 21st century where distributed spatially connected sensor node automatically forms a network for data transmission and receive among them is popularly known as Sensor Network. For security and easy access of data, cloud computing is widely used in distributed/mobile computing environment. This is possible due to miniaturization of communication technology. Many researchers have cited different types of technology in this context.

Keywords: IT obstracles, cloud aims

1. Introduction

Cloud computing, or in simpler shorthand just "the cloud", also focuses on maximizing the effectiveness of the shared resources. Cloud resources are usually not only shared by multiple users but are also dynamically reallocated per demand. This can work for allocating resources to users. For example, a cloud computer facility that serves European users during European business hours with a specific application (e.g., email) may reallocate the same resources to serve North American users during North America's business hours with a different application (e.g., a web server). Fig.1 consists of WSNs (i.e. WSN1, WSN2, and WSN3), cloud infrastructure and the clients. Clients seek services from the system. WSN consists of physical wireless sensor nodes to sense different applications like Transport Monitoring, Weather Forecasting, and Military Application etc. Each sensor node is programmed with the required application. Sensor node also consists of operating system components and network management components. On each sensor node, application program senses the application and sends back to gateway in the cloud directly through base station or in multi-hop through other nodes. Routing protocol plays a vital role in managing the network topology and to accommodate the network dynamics.

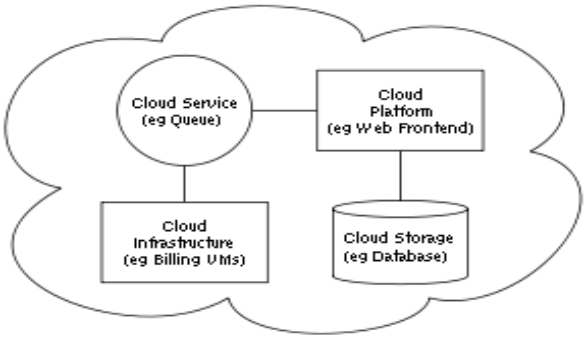

Figure 1: WSN- Cloud Computing Platform

A wireless sensor network (WSN) consists of spatially distributed autonomous sensors to cooperatively monitor physical or environmental conditions, such as temperature, sound, vibration, pressure, motion or pollutants. The development of wireless sensor networks was motivated by military applications such as battlefield surveillance. They are now used in many industrial and civilian application areas, including industrial process monitoring and

control, machine health monitoring, environment and habitat monitoring, healthcare applications, home automation, and traffic control. Each node in a sensor network is typically equipped with a radio transceiver or other wireless communications device, a small microcontroller, and an energy source, usually a battery. The size of sensor node may vary from shoebox down to a grain of dust. The cost of sensor nodes is also varies from hundreds of dollars to a few pennies, depending on the size of the sensor network and the complexity required of individual sensor nodes. Size and cost constraints on sensor nodes result in corresponding constraints on resources such as energy, memory, computational speed and bandwidth.

Following are the important terms which are used widely in sensor network:

1) Sensor: A transducer that converts a physical phenomenon such as heat, light, sound or motion into electrical or other signal that may be further manipulated by other apparatus.

2) Sensor node: A basic unit in a sensor network, with processor, memory, wireless modem and power supply.

3) Network Topology: A connectivity graph where nodes are sensor nodes and edges are communication links.

4) Routing: The process of determining a network path from a source node to its destination.

5) Resource: Resource includes sensors, communication links, processors and memory and node energy.

6) Data Storage: The run-time system support for sensor network application. Storage may be local to the node where the data is generated, load balanced across a network, or anchored at a few points.

In hierarchical-based or cluster based routing, nodes will play different roles in the network. In a hierarchical architecture, higher energy nodes can be used to process and send the information while low energy nodes can be used to perform the sensing in the proximity of the target. This means that creation of clusters and assigning special tasks to cluster heads can greatly contribute to overall system scalability, lifetime, and energy efficiency. Hierarchical routing is an efficient way to lower energy consumption within a cluster and by performing data aggregation and fusion in order to decrease the number of transmitted messages to the BS. Hierarchical routing is mainly two-layer routing where one layer is used to select cluster heads and the other layer is used for routing. The examples of hierarchical-based routing protocols are – LEACH, PEGASIS, TEEN, APTEEN, MECN, SMECN, SOP, Sensor Aggregate routing, VGA, HPAR, TTDD etc.

In location-based routing, sensor nodes' positions are exploited to route data in the network. In this kind of routing, sensor nodes are addressed by means of their locations.

Combining WSNs with cloud makes it easy to share and analyze real time sensor data on-the-fly. It also gives an advantage of providing sensor data or sensor event as a service over the internet. The terms *Sensing as a Service* (SaaS) and *Sensor Event as a Service* (SEaaS) are coined to describe the process of making the sensor data and event of interests available to the clients respectively over the cloud infrastructure. Merging of two technologies makes sense for large number of application. Some applications of sensor network using cloud computing are explained below:

2. Weather Forecasting

Weather forecasting is the application to predict the state of the atmosphere for a future time and a given location. Weather monitoring and forecasting system typically includes- Data collection, Data assimilation, Numerical weather prediction and Forecast presentation.

Each weather station is equipped with sensors to sense the following parameters-wind speed/direction, relative humidity, temperature (air, water and soil), barometric pressure, precipitation, soil moisture, ambient light (visibility), sky cover and solar radiation. The data collected from these sensors is huge in size and is difficult to maintain using the traditional database approaches. After collecting the data, assimilation process is done. The complicated equations that govern how the state of the atmosphere changes (weather forecast) with time require supercomputers to solve them.

Cloud engineering is the application of engineering disciplines to cloud computing. It brings a systematic approach to the high-level concerns of commercialization, standardization, and governance in conceiving, developing, operating and maintaining cloud computing systems. It is a multidisciplinary method encompassing contributions from diverse areas such as systems, software, web, performance, information, security, platform, risk and quality engineering.

3. Health Care

Sensor networks are also widely used in health care area. In some modern hospital sensor networks are constructed to monitor patient physiological data, to control the drug administration track and monitor patients and doctors and inside a hospital.

In the above scenario, the data collected from the patients are very sensitive and should be maintained properly as collected data are required by the doctors for their future diagnosis. In traditional approach the patient's history database is maintained in the local nursing home. So reputed doctors who are specially invited from abroad to handle critical cases cannot analyze the patient's disease frequently. They will only make diagnosis when they will visit the particular nursing home. This problem may be solved by forming a cloud where the critical data of the patients can be maintained and authorized doctors sitting in abroad can analyze the data and give proper treatment.

4. Conclusion

Physical control of the computer equipment (private cloud) is more secure than having the equipment off site and under someone else's control (public cloud). This delivers great incentive to public cloud computing service providers to prioritize building and maintaining strong management of secure services. Some small businesses that don't have expertise in IT security could find that it's more secure for them to use a public cloud

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