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Wireless Sensor Network Integrated To Cloud Computing To Optimization of Energy Consumption

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ABSTRACT:

Wireless sensor network (WSN) is used mainly for office and industrial controlling applications. Now WSN has become an all pervading entity in human life. It reaches those areas where human cannot, but the limited resources of a limited battery life, limited processing power, are the main challenges for using Wireless sensor network. The "Internet of Things" (IoT), i.e. the capability of connecting every possible device to the World Wide Web, and is Stored in cloud. The very large amount of information that is consequently generated could be profitably handled using "cloud" services Sensing data are stored and processed in distributed manner in cloud. This paper proposes cloud computing for wireless sensor network, which can optimize the energy consumption. Based on this architecture, a cloud acts as a virtual sink with many sink points that collect sensing data from sensors. Each sink point is responsible for collecting data from the sensors within a zone. the proposed architecture improves the performance of WSN, e.g., reduced packet transmission error rate, decreased number of end-to-end hops which results to improve efficiency of energy consumption

I.INTRODUCTION

Wireless sensor networks (WSN), sometimes called wireless sensor and actuator networks (WSAN) ,It is a self-organizing network consisting of a lot of sensor devices that connect to others through wireless communication channel in multi-hop manner. Sensors collect environment parameters like such as temperature, sound, pressure, etc. and transmit sensing data back to a central management node (i.e., a sink node) for further processing. Nowadays, WSN has been applied in many fields, such as environment monitoring, military, surveillance, disaster rescue and healthcare etc., and it is more widely used in the Internet of things (IoT) era. However, sensors are usually low cost devices equipped with limited resources, e.g., processing power, memory, wireless bandwidth, and battery. The design of WSN must take care of these constrains, especially the battery limitation that determines the lifetime of a sensor and a sensor network. In literature, a number of energy efficient techniques have been proposed. All layer protocols used in WSN are optimized to reduce energy consumption, including MAC layer, network layer (routing protocols), transport layer, and cross-layer approaches. Since transmitting operation consumes more energy comparing against sensing and processing operations, some other technologies have been proposed to save energy, e.g., in-network data processing, mobile sink for data collection , and topology reorganization.

Cloud computing is becoming popular day by day in distributed computing environment. Cloud environments are used for storage and processing of data. Cloud computing provides applications, platforms and infrastructure over the internet. Cloud computing is a model for enabling convenient, on demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. The following models are presented by considering the deployment scenario: 1) Private Cloud: This cloud infrastructure is operated within a single organization,

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and managed by the organization or a third party irrespective of its location. 2) Public Cloud: Public clouds are owned and operated by third parties. 3) Community Cloud: This cloud infrastructure is constructed by number of organization jointly by making a common policy for sharing resources. 4) Hybrid Cloud: The combination of public and private cloud is known as hybrid cloud. Wireless Sensor Networks have been seen as one of the most emerging technology, where distributed connected sensor nodes automatically form a network for data communication. A sensor network is a group of specialized transducers with a communications infrastructure intended to monitor and record conditions at diverse locations. Commonly monitored parameters are temperature, humidity, pressure, wind direction and speed, illumination intensity, vibration intensity, sound intensity, power-line voltage, chemical concentrations, pollutant levels and vital body functions.

II. RELATED WORK

Recently, new types of WSN, such as wireless multimedia sensor network (WMSN) and wireless sensor and actor network (WSAN), are emerging. In WMSN, more powerful sensors are employed to capture rich information of monitoring area. In WSAN, the actor, which is usually a robust and can move around, is introduced into WSN. During its movement, it is capable of communicating with scalar sensors and reacts to environment changes. In Agriculture field The main activities of the sensors are to sense and measure the environmental data from the fields and process the data with the help of decision making unit for actuating the process. Sensor nodes that sense the data of the environment and a group of actor nodes Green house monitoring and control based on TINI embedded web server unit which collects the data and routes it from local sensor networks to a base station has been studied and experimented by Stipanicev. Monitoring of greenhouse environment by using a WSN has reported by Ahone. Kang has proposed an automatic greenhouse environment monitoring and control system model. A decision support system called iFARM, useful for precision agriculture is described by Yassine Jiberin . Micro-electro-mechanical systems (MEMS) have gained increasing attention during the recent years, So the WSN are widely used in these fields to capture the required information from the different areas .To store the data and access the data we are moving for the Cloud computing.

III. CLOUD COMPUTING BASED ARCHITECTURE

Architecture The architecture is shown in Fig 1. A number of special nodes (sink points) distributed across the WSN area constitute a cloud. We refer this type node as “cloud node”, which is equipped with more resources. Furthermore, a cloud node acts as a sink for sensors nearby. Therefore, the architecture is naturally cluster based. In order to differentiate from the term “cluster” in traditional WSN, we refer a cluster as a “zone” in this paper. These sensors in a zone are organized as independent local WSNs (LWSN), and all LWSN are integrated together by the cloud. The cloud can be viewed as a “virtual sink” for the whole sensor network.

Organizing Sensors in a Zone We present a different way of heterogeneous sensors organization, as shown in the homogeneous sensors form a WSN (a different type sensor could be used as agateway) and send their data to the sink. Each type sensors form a logical independent (and physical overlapped) WSN, and these WSNs access the same sink. Software is deployed in the cloud. After processing data from all sensors, the cloud can designate sensors to perform properly through the accessed sink point.

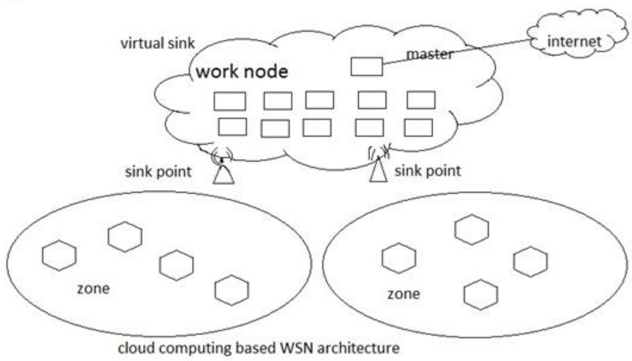

Fig1

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If the size of a zone is reasonable, the scheduling commands from the sink point could reach the destination sensor timely. This way of organization is different from the single-tier clustered architecture of WMSN. First, the independent WSN is built in a zone of which the size is smaller, instead of the whole sensor network. Second, the cloud can control activities of a sensor timely based on data collected from the whole WSN.

Organizing Cloud As considering the organization of nodes to a cloud, the bandwidth is still one of the most important factors, especially when they communicate through wireless channel. In [17], Hadoop is adapted to the infrastructure built on smart phones, which has the similar requirements as here. In fact, Hadoop aims for big data storage and process, and data movement reduction is one of its design goals. One of its design criteria is "moving computation is easier than moving data."

We suggest the cloud is organized in the Hadoop way. Both of Hadoop's storage system (Hadoop Distributed File System, HDFS) and data processing system (Map-Reduce framework) have a master/slave architecture, in which the master is responsible for storing file meta data or scheduling jobs, and slaves are responsible for storing file content or task execution (task is one piece of split job).The two masters could be deployed either in the same physical node or in different physical nodes. In its storage system, when a client accesses a file, it firstly contacts the master to retrieve the file's Meta data (file location, for example), then it directly retrieves the content from the slaves which store a part data of the file. In its data processing system, the code used is submitted to the master, and then the master distributes the code to the slaves which store the processed data, or to those slaves near by the slaves storing the processed data. As a result, the data is processed almost locally and the data movement (thus bandwidth requirement) is reduced. However, data movement cannot be avoided in distributed processing system.

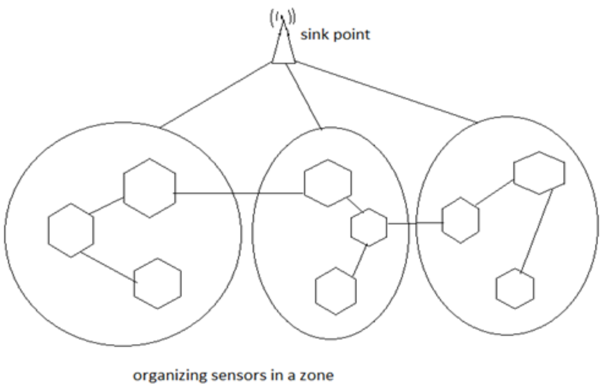

Fig2

Hadoop supports data compression mechanism to reduce bandwidth cost as much as possible. Therefore, a master node should be introduced to build the cloud. The master node usually connects to the Internet and is the access point of the system. It should be clear in mind that Hadoop cannot be adopted directly in the proposed architecture, just as in Hyrax. The configuration parameters, even the code, should be optimized. In summary, in the architecture a cloud node is not only a slave of the Hadoop cloud, but also the sink point of a zone. It receives data sent by sensors in the zone, and then acts as a client to store these data into Hadoop. By optimized the Hadoop code, data movement can be avoided, and the client just creates or updates file Meta data in master. Data processing requirement and code are sent to the master, and the master schedules the job (the requirement) to run on appropriate slaves. Fig 3 shows an example that cloud nodes communicate with others by Ad-hoc manner to form the virtual sink cloud.

IV. CONCLUSIONS

In this paper, we proposed architecture for wireless sensor network based on the cloud computing platform which optimizes the power consumption. In the architecture, a number of specific nodes are carefully distributed across the WSN area, and they form a cloud computing platform by Hadoop. The cloud acts as a virtual sink and has multiple sink points which could collect sensing data from WSN. Therefore, the WSN is naturally divided into a number of zones. The sensors in a zone could be organized in flat or hierarchy way as in traditional WSN. We also propose a new way of sensor organization in a zone: the homogeneous sensors form a WSN, while heterogeneous sensors form logical independent but physically overlapped WSNs. Sensors could be managed by the cloud through sink point accessed. All WSNs in zones are integrated together by the cloud. Sensing data in cloud are stored and processed in distributed manner. Simulations results show that the transmission performance of a WSN built in such architecture is improved greatly. The ratio of packets successfully reaching the sink is increased, the number of end-to-end hops is reduced, and the end-to-end delay is shortened. The average number of sending operations for a packet being sent successfully is reduced as well. This indicates that the efficiency the energy consumption is improved. However, the WSN in this architecture is a structured network in which some nodes (at least the cloud nodes) are needed to be carefully managed.

REFERENCES

[1] S. H. Gajjar, K. S. Dasgupta, S. N. Pradhan, K. V. Shingala, and K. P. Zinzuwadia, "Comparative analysis of medium access control protocols for wireless wensor networks," in 2011 Annual IEEE India Conference (INDICON), 2011, pp. 1-4.

[2] G. H. Raghunandan and B. N. Lakshmi, "A comparative analysis of routing techniques for wireless sensor networks," in 2011 National Conference on Innovations in Emerging Technology (NCOIET), 2011, pp. 17-22.

[3] L. Su, T. Yan, and L. Yonghua, "A survey of transport protocol for wireless sensor networks," in 2012 2nd International Conference on Consumer Electronics, Communications and Networks (CECNet), 2012, pp. 2338-2341.

[4] S. H. Gajjar, S. N. Pradhan, and K. S. Dasgupta, "Cross layer architectural approaches for wireless sensor networks," in 2011 IEEE Recent Advances in Intelligent Computational Systems (RAICS), 2011, pp. 557-562.

[5] A. Sorniotti, L. Gomez, K. Wrona, and L. Odorico, "Secure and trusted in-network data processing in wireless sensor networks: a survey," Journal of Information Assurance and Security, vol. 2, 2007, pp. 189-199.

[6] W. Bin, X. Dongliang, C. Canfeng, M. Jian, and C. Shiduan, "Employing mobile sink in event-driven wireless sensor networks," in 2008 IEEE Vehicular Technology Conference, 2008, pp. 188-192.