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Hardware Implementation of Cost Efficient Mapping of Wireless Body Area Networks to H-CSPs in Critical Emergency Situations

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Abstract - *In a post-tragedy condition, the concentration of patients in the area increases the traffic load of the network significantly; it shrinks its performance to mapping costs and network throughput. So, to manage we use a diagnostic health-management system to provide services to increased traffic loads and ubiquitous medical services using Wireless Body Area Networks (WBN) in the presence of many Health Care Service Providers (H-CSP). The Social Network theory Analysis (SNA) incorporates computational complexity and traffic flow to the network in the area, which is different disorder types and WBAN crisis indices. In such a scenario formation of Disease centric Patient Group (DPG) between synchronized WBNs to moderate computational complexity and reasonable traffic load. However, DPG is not the only structure enough to provide Quality of Service (QoS) to every WBAN. So to solve these problems, we set up a price model Expected packet delivery delays to H-CSP from DPC of critical WBNs and efficient mapping to optimize network Throughput. As a result, to identify critical WBANs by DPG, we design the decision parameter based on collection of selection parameters. Performance of efficient Health Care Management (HCM) project is analysed on a different basis Steps such as cost effectiveness, service delays, and throughput. Simulation results show significant improvements in the network performance of existing projects.*

Key Words—*Wireless Body Area Networks, Cloud Computing, Disease-centric Patient Grouping, Heterogeneous Health Cloud Service Provider, Quality of Service, Energy Efficient, Efficient Mapping.*

1. Introduction

Monitoring of affected patients in a post-disaster situation and also providing them with a reliable and universal electronic healthcare services is a major challenge. So in such cases, Cloud-assisted Wireless Body Area Network (WABN) architecture provides cost-effective and real-time services for affected victims. Cloud-assisted WBAN is an infrastructure and system. Integration of traditional WBAN with Cloud. In traditional WBAN architecture, body sensors around human tissue interpret the physical signals of patients, process them and then send sensitive information to the Local Processing Unit (LPU). Medical experts send LPU medical data to servers through local Access Points (Aps) for analysis.

During Cloud-assisted WBNs, local APs send medical data directly to Health Cloud Service Providers (H-CSP). Therefore, patients with WBAN can receive cost-efficient and ubiquitous electronic health services in a critical emergency. Furthermore with cloud support, WABAN offers plenty of services for broad ambulatory and sport applications. Provides adaptive storage and processing infrastructure to analyse data streams created by WBANs for both cloud computing online and offline algorithms, to collect, analyse and process such data. In this domain, Giancarlo et al. Bodyguard proposed a sauce based approach to building a community of WBNs to support Cloud-assisted WBAN applications. WBANs are used to monitor the physical standards of people's community. They produce a large amount of data packets [1].

Cloud-assisted WBNs were deployed and significant issues were addressed to improvement and execution in advanced health services. This is the current system. Overview and revision based on the requirements for creating efficient cloud-assisted WBAN architecture. As a result, Quwaider and others. To deal with these challenges, Al. To support more user mobility, proposes the integration of WBNs with Long Term Evolution infrastructure [2]. The novel cloud-based is proposed for generic data collection in WBANs. In this work, the authors focus on large-scale data-generating WBANs to make the users or service providers reliably accessible. Additionally, Zhang and others. The proposed adaptive map-reduced the framework for measuring cloud resources for real-time applications [3]. He also proposed an efficient plan called Data Networking, named to support rich and adaptive media streaming for low-cost and bandwidth savings with health content size adjustments. Due to the power to restrict the nature of body sensors, large packets packaged by WBNs require strong and secure storage and efficient quest processing mechanism, considering the real time and energy restrictions of WBNs. Diallo and others [4].

New architecture that integrates statistical model technology into cloud-based WBNs, maintains confidentiality for storage infrastructure and is less than real-time user query processing. Due to the large volume of information generated and their long-term processing, the use of substantial energy and energy of data centres greatly increases. Rachkidi and others. The co-op methodology

between WBANs and H-CSP has been proposed for the efficient supply of health services in healthcare to minimize service latency [5]. In the event of disaster, it is important to effectively combine physical sensor data, and channel them to the cloud platform with minimal delay. Abbas et al. personalized health services are provided for the risk of illness using cloud services [6]. Using the auction procedure proposed a suitable resource management plan in cloud infrastructure. Zhou et al. proposed a cloud online environmental blind online schedule to deploy the available severs based on the user's request [7]. Infectious medical emergencies proposed efficient architecture with various traffic. In this work, they proposed to form a relational patient group (RPG) based on various types of disease and symptoms. Also, saint and others. Proposed joint dynamic resource sharing and load balancing scheme for WBANs in poor link-quality presence [8]. Additionally, Ibrahra et al. WBAN proposed joint energy and QOS control for energy fuel [9]. Chen and others. The novel proposes a robotic and cloud-assisted health care system to provide comprehensive health care services, especially for mental illnesses it is helpfully for patient in any emergency [10]. Kulkarn and others. The integrated mobile cloud service architecture is also proposed for real-time health services [11].

2. RELATED WORK

2.1 EXISTING WORK:

The structure of the Disease-centered Patient Group (DPG) are collecting same patient cluster, WBANs also ensures integrated traffic load and reduces computational complexity. However, the DPG only structure is not sufficient to provide a Quality-of-Service (QoS) to every WBAN. Therefore increased traffic load of WBANs is a major challenge, since every WBAN has sensitive medical data. In traditional WBAN architecture, specific medical data of the particular disease is collected on a specific server to effectively handle the data.

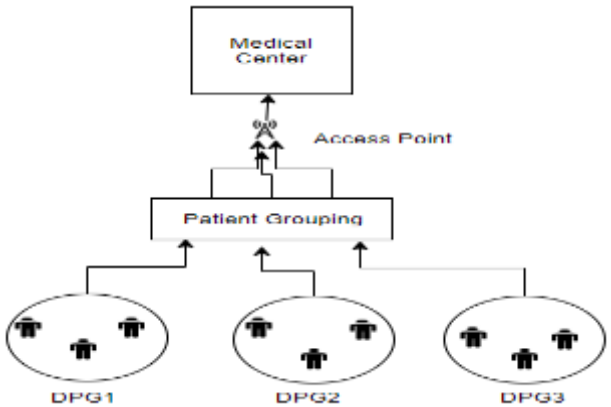

Figure 1: Existing service infrastructure.

Therefore, when specific pathogen patients are not in the area; these servers are ineffective and network maintenance costs will increase. In this case integration to a WBAN platform of cloud services provides cost effective, elastic and real-time health services. In general cases, resource demand from each WBAN may vary; which may increase in emergencies. Since different WBANs of different disease require different types of services, between the various cloud service providers every WBAN must opt for the appropriate H-CSP.

DISADVANTAGES:

- Cost Increases.
- High computational complexity
- High traffic loads.

2.2 PROPOSED WORK

Targeted work tries to identify the problem of traffic load reduction and choose the appropriate H-CSP price policy for extreme WBANs on cloud-enabled platforms. The patient's real-time monitoring can be performed with the help of sensors.

The group of sick-focused patients is treated according to the syndrome associated with these diseases, such as patients pulse rate and temperature. This work focuses on the maximum mapping of critical WBANs specific to specific H-CSP between several different H-CSPs, based on capacity, stability and efficiency based on available resources, service delays and pricing policy of H-CSPs. In order to make use of cloud services, if there are no specific WBNs specific to that area, cloud services may be used by other WBANs. Disease-focused health-care management system with multiple H-CSP using WBANs to maintain increased traffic load and provide ubiquitous medical services. The theory of Social Network Analysis (SNA) incorporates computational complexity and traffic loads on the area network, considering the critical illnesses of different illness types and WBANs.

In such a scenario, participating WBANs reduce the traffic load and warranty complexity that the Disease-centered Patient Group (DPG) structure has. However, the DPG only structure is not enough to provide QoS to every WBAN. Therefore, to address these issues, I set the price model for efficient mapping of critical WBNs from DPG to H-CSP to improve the expected packet delivery delay and network throughput. As a result, I design the decision parameter based on the segmentation of the selected parameters to identify critical WBANs by DPG. Effective Health Care Management (HCM) project is analyzed based on the typical measures such as performance cost, service delays, and throughput.

ADVANTAGES:

- Cost effective
- Provide QOS
- Reduced computational complexity & Traffic loads.

APPLICATIONS

- Health care monitor.
- In emergencies, helps collecting the patient information in a short duration.
- Notification (SMS alerts) to family member.
- Patient could be monitored remotely with secured access.

SYSTEM MODEL

System model is a conceptual design that defines the structure and behavior of the system. The architectural explanation describes a systematic system that supports logical thinking about the structural characteristics of the system. It defines system components or building blocks and provides a plan to store products, and systems are developed to implement the overall system.

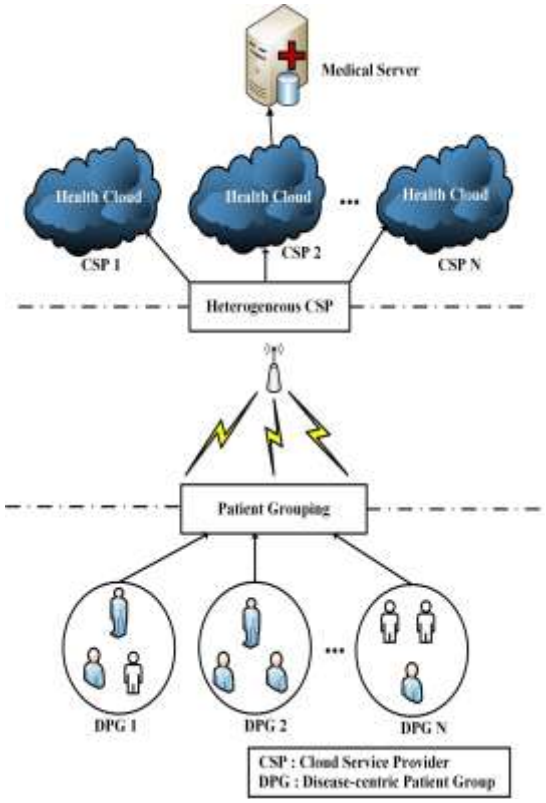

Figure 2: Simulation On DPG-based Cloud-assisted WBAN Architecture

2.3 HARDWARE WORKING

- We are using Arduino for connecting a sensor
- Arduino: Used for connecting the microcontroller and the different sensors.
- Heart beat and Temperature sensor are used.
- SMS gateway for the alerts
- SMS gateway: is collects and shares the patient's data from Arduino to other devices (ex: cloud).

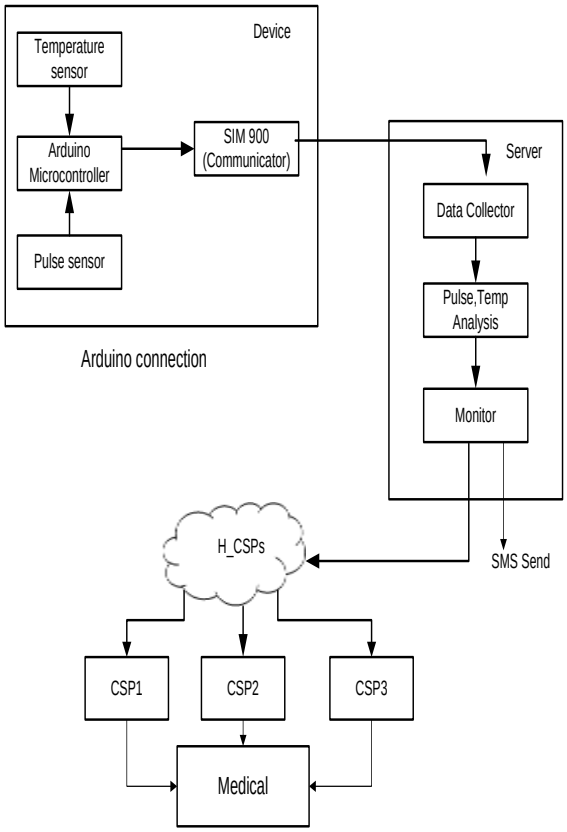

Figure 3: Hardware Implementation Cloud Architecture

RESULTS:

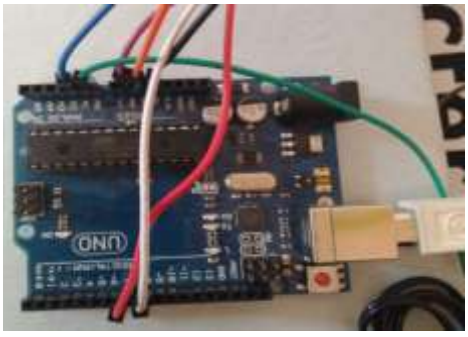

Figure 4: Arduino board

Figure 5: SMS Gateway

Figure 6: Temperature collection sensor

Figure 7: pulse rate collection sensor

CONCLUSION

Increased traffic load reduces performance in the area network for mapping costs and average network throughput. So, to reduce traffic loads, we have proposed an approximate method of disease-centric relation estimation methodology to enhance the computational difficulty of the cluster creation. After assessing the relationship between WBANs, we have proposed an algorithm for forming DPG considers the diseases such as cardiac arrest, malaria. DPG is not enough to provide QoS services WBANs. So, we have proposed another algorithm for efficient mapping of WBANs corresponding to a DPG with most advantageous H-CSP. We conduct complex analysis and stability of the target algorithm.

FUTURE WORK

The analysis of dynamic behaviour of WBANs in a critical situations are considered for future scope, also propose dynamic cache optimization algorithm for handling such emergency condition.

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