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REVIEW ARTICLE

Quality of service analysis in wireless network

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Abstract

Wireless Sensor Network (WSN) is used in different research areas such as military, industry, healthcare, agriculture, Internet of Things, transportation, and smart cities. The reason behind this increased usage is the rapid development of smart sensors. There is a challenging need to satisfy the quality of Service requirements in different applications due to the dynamic network condition, heterogeneous traffic flows, and resource-constrained behavior of sensor nodes. WSN are highly innovative networks used for large-scale deployments in adverse environmental conditions. Sensor nodes sense and collect the information from the environment and forward this information to the sink node for further processing. It is a complex and challenging task to build a diverse application of WSN. In this paper describe that IEEE standard defined for all kind of network either it is wired and wireless network. BAN, LAN, WAN, MAN is based on throughput, jitter & delay to find out the result analysis of particular node. This paper presents the wireless network standard 802.11 IEEE like 802.11a, 802.11b, 802.11e. The paper highlights about Network Simulator software which is work on NAM files.

1. Introduction

Quality of Service is the most significant issue in WSN and stimulates great interest towards itself. In a real-world scenario, quality assurance is paramount for the performance, privacy, and security level of the network. This performance depends on the priority of the quality of Service parameter based on the classification as depicted in Fig. 3 [1]. The priority can be based on network-oriented parameters or application-oriented parameters [2, 3]. It is difficult to enhance all parameters of quality of Service simultaneously such as decreasing the latency generates a large amount of energy consumption across the network [4]. Both parameters are core parameters of the designing phase. So, there is a need to maintain a trade-off between both parameters to enhance the performance. The performance of the network can be application-specific such as deadline is an important parameter in hard real-time applications [5, 6]. Several quality of Service provisioning schemes for resource reservation have been proposed in [7-9]. These mechanisms, for resource discovery and admission decisions, send probe packets on preselected routes. Each node predicts the achievable quality of Service based on available resources and admits the quality of Service session if the quality of Service requirement of the end-to-end path delivered by the probe packet is sufficient. Then, these mechanisms using the probe packets have signaling overhead to provide quality of Service assurances. In [10], another alternative is to probe routes end-to-end and use the interval between packet arrivals to calculate the route capacity. Differentiated scheduling and medium access algorithms have been proposed in [11] to provide a prioritized service model to guarantee real-time traffic over best-effort traffic. These

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solutions still face the issue of reducing the overhead for the quality of Service guarantee. It is future generation increase in demand of user nowadays. It is modern technology mobile communication and wireless network to provide a lot of possibilities to be able to share its information, data, files with each other at anytime and anywhere. The next generation of telecom network fifth-generation deployed its support range much faster than current megabits per seconds of 4G. [12] It is including many functional activities like carrier aggregation, multiple-input multiple-output, massive (MIMO) device-to-device communication (D2D), and network function virtualization (NFV). Here is some important wireless network is discussed: BAN, PAN, LAN, MAN, WAN. [13].

1.1 Wireless body area network (WBAN)

Wireless body area network (WBAN), and Wireless body area sensor network (WBASN) basically consists of sensor node attached in and around the human body for monitor the bio signals of human being that bio signals can be used in the variety of application specially in the field of medical. Wireless body area network is short range wireless network of wearable computing devices. [14] It can be used IT parameter which includes measurement of blood pressure and brain signals etc. So this wireless body area network having measure application in the area of medical and health sector. [15].

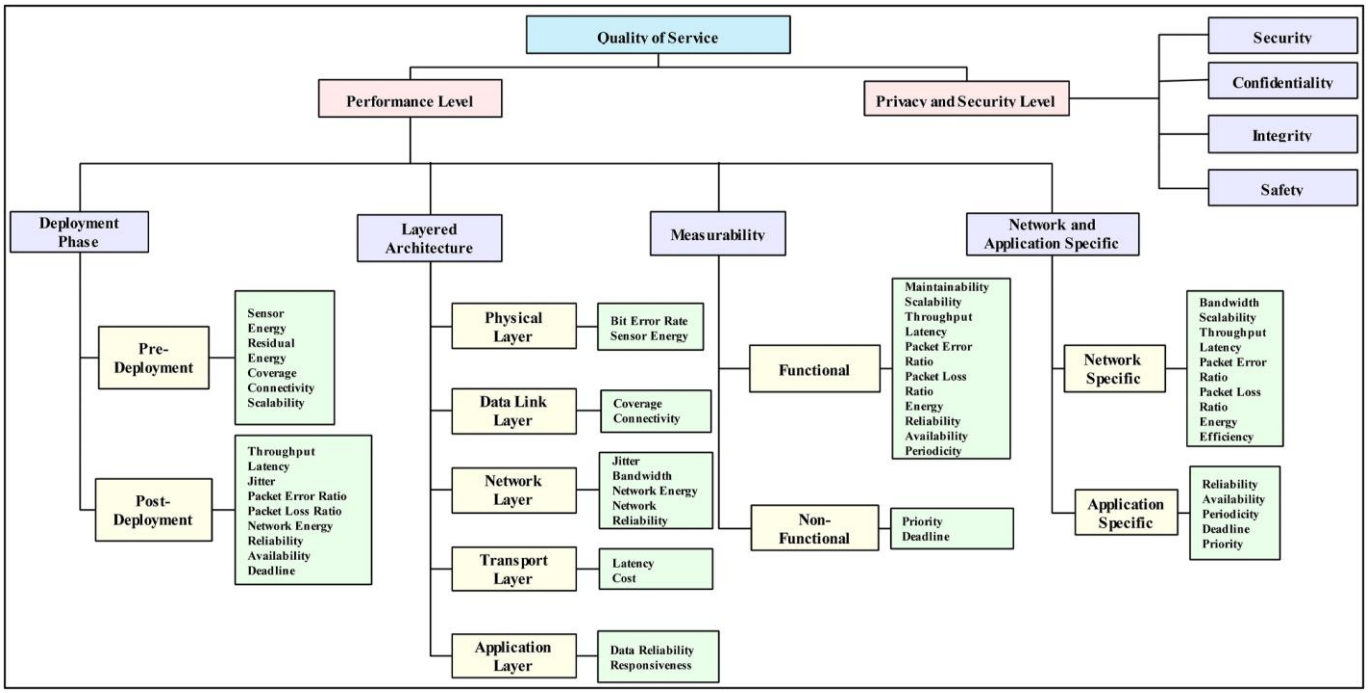

Figure 1: Quality of Service (QoS) Parameters [1].

1.2 Wireless personal area network (WPAN)

Wireless personal area network is used connect the devices for the personal use. It is used to connect the computer devices that can be maintain distance is like 10 meter. This distance is defining the way that they can communicate together and share the information from the one computer to another to the personal use for example it can be used by USB fire wire or wireless such as IRDA or Bluetooth. It is connecting around 2-part wireless PAN and wired PAN.

1.3 Wireless local area network (WLAN)

Wireless local area network is a collection of device that are connected together in one physical location like office, home, school, college and building. Local area network can be large and small connect to one campus area network with one user to an enter price network to connect with more user around the area in an office or school, college. for example, in a college with multiple department like accounting, IT Support and administration. Local area network is highly composed to frequent the reason to the completely available for the users. It is most important part of the wireless network.

1.4 Metropolitan area network (MAN)

Metropolitan area network is lands of connected to large way to convey the required system throughout a city. It is uses local exchange carrier. It is connecting to a single cable to small in size of local area network. It is means to connecting a number of LAN into large network. It is mainly operating by private company or public company. This entire network together could be joined from the metropolitan area network.

1.5 Wide area network (WAN)

Wide area network is collection of local area network (LAN) or the other networks that communication with one another. It is essentially a network of network with internet being the world's largest WAN. [16] Wide area network operate beyond the geographical scope of a land. Basically that the wide area network is used to connect headquarter land to remote land in the branch sites and tele computer sites. Wide area network is owned by a service provider. WAN is a network that uses various link private lines, virtual private network and multiprotocol label switching (MPLS) the internet connected.

2. Wireless networking standard 802.11 IEEE

802.11 is part of 802 set of local area network. It is digital transformation of business and how these employees to work. It is based on frequently-hopping spread spectrum (FHSS) or direct sequence spread spectrum. Wi-Fi specification is based on the IEEE 802.11 standard. [17] These show what needs to be done if it is going to build a system what types of protocol, requirement does it need to satisfy thing like a packet the medium access control the channel and the modulation the data rates all these are included of the IEEE. Wi-Fi standard IEEE 802.11 is the original standard which is released in June 1997.

2.1 802.11a

It is one of the first wireless standards. It was developed in October of 1999. It can use one other frequency for especially but generally 5 gigahertzes of 802.11a network. It has smaller range to available all of the function of 802.11b standard. It is providing the processing of speed or range. It is uses 5 gigahertzes range.it is Varity of solution to be required that available in size to replace the network. It is rather than being absorbed by object to higher range of frequency. it has limited data traffic today network. It has maintained significant important and popularity even till today. It is new emerging broadband high data rate supportive communication technology [18] It is short for OFDM is orthogonal frequency division multiplexing. It is increased the data rate up to 54 megabits per second.

2.2 802.11b

Wireless 802.11b standard was released in Sep 1999. It is direct extension of the original standard in the aspect of the modulation technique. It is uses the HR-DSSS or high DSSS. It is short for high rate direct sequence spread spectrum. CCK modulation which is complementary code keying was used. Data rate increased to 11 Mbps compare to as former one or two megabits per second data rates. It is very reliable and secure data network.

2.3 802.11e

This is a protocol that supports EDCA the enhanced distributed channels access. An enhancement to support the DCF the original protocol in which is to enable the quality of services required application. Which is differentiated services is a technology that support priority. If it is more important there must be a way to support a higher level of reliability in supporting quality of service and typical services such as voice, then video then best effort data then just plain background data. 1 and 0 are filliped over compared to the actual priority level. This is very important sensitive application such as voice over IP multimedia when it will include voice and video because these are the two highest categories that are supported with level of priority supported in quality of services.

3. Network Simulator software

3.1 About NS2

NS2 is event-driven simulator designed specifically for research in communication network. It is inception in 1989. It is basically used in industry, academia and government. It is widely known as NS2 is proved useful in studying the dynamic nature of communication network. To investigate network performance researcher can simply use an easy to scripting languages of the network. It is become the most widely used open sources network simulator. It is simulator of the operating system is Linux, free BSD; Macos is used to communicate the network.

3.2 Simulation Results

These figures show the simulation results which we obtained using NS2 software.

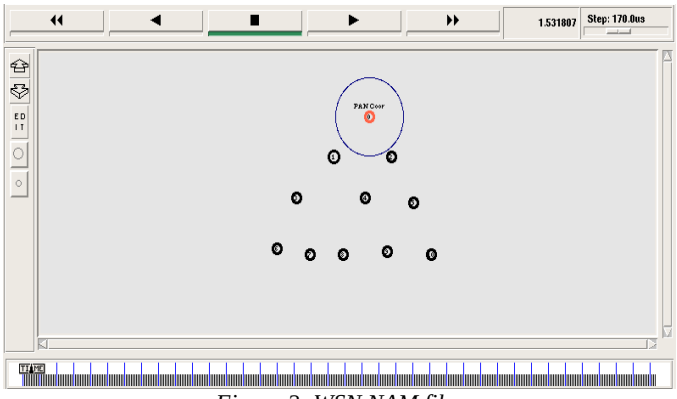

Figure 2: WSN NAM file

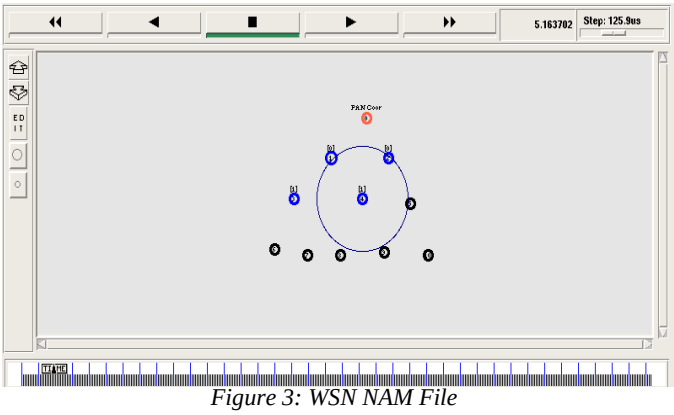

Figure 3: WSN NAM File

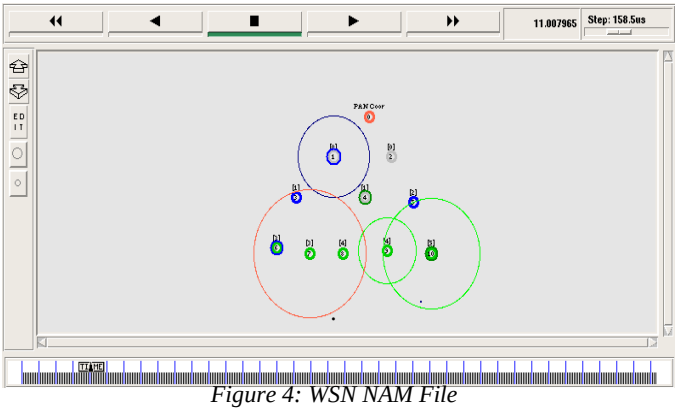

Figure 4: WSN NAM File

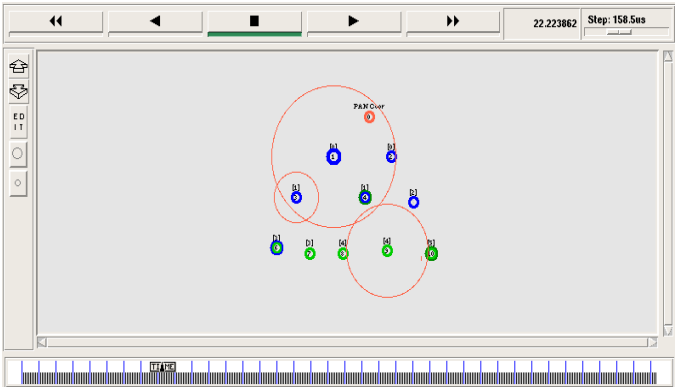

Figure 5: WSN NAM File

4. Results and discussion

Result analysis based on packet size w.r.t to no of nodes:
In this section results are obtained on the basis of packet size due to the increase in the number of nodes. The responses are throughput response, delay response and jitter response. The nodes are labeled as 11, 9, 7, and 5 are represented by blue, red, green, purple lines in the graph.
It is increase the time interval jitter response decreases with respect to number of nodes, represented by blue, red, green, purple lines in the graph.

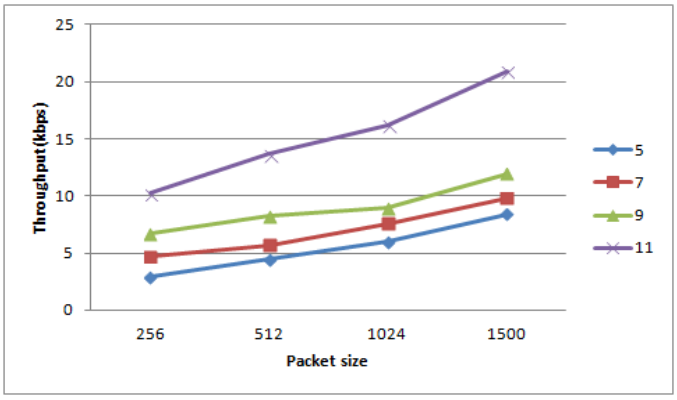

Figure 6: Throughput Vs packet size w.r.t number of nodes.

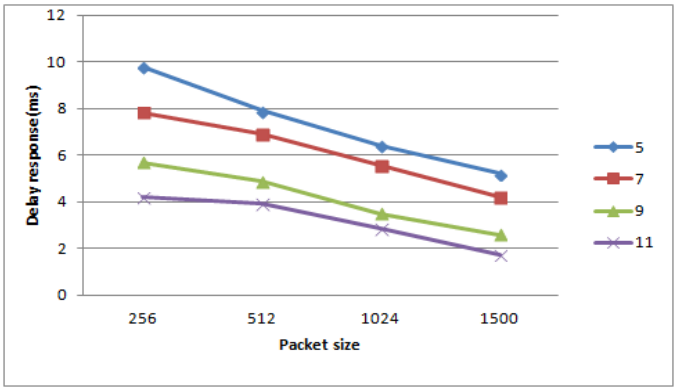

Figure 7: Delay Vs Packet size w.r.t numbers of node

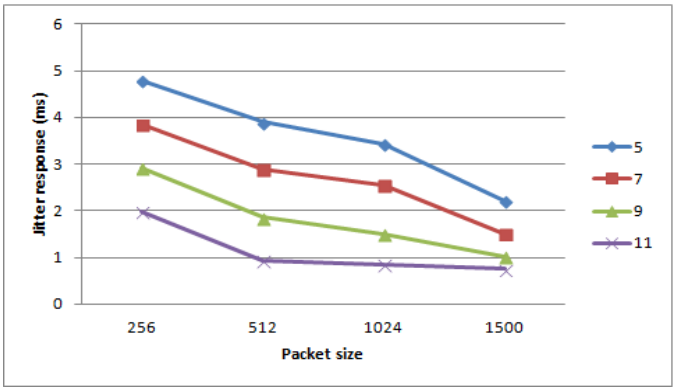

Figure 8: Jitter Vs Packet size w.r.t numbers of nodes

5. Conclusions

It is providing the low power consumption and self- healing. All types of area network provide safety and security for the any kind of devices. Ad-hoc network using dynamic topologies to be define the particular network to the protocol. 802.11 WLAN traditional to base on the way to organize the process to hard handover strategies introduces long hand over latency. It is providing the high performance to complete the high priority traffic both with throughput access delay.

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