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TESTING OF WIRELESS SCENARIO FOR DIFFERENT ENVIRONMENT

J. S. Awati,
PhD scholar, VTU, Belgaum, Karnataka, and
Asst. Prof.,Rajarambapu institute of technology,
Sakharale, Maharashtra.

Dr. M. R. Patil,
Principal, Jain AGM Institute of Technology,
Jamkhandi, Karnataka.

Dr. S. A. Patil
Head, ETC Department, D.K.T.E's Engineering and textile institute,
Ichalkaranji, Maharashtra.

Abstract: Wireless sensor Networks are widely used. Before actual deployment of wireless scenario in real time field, testing of the scenario is very important. With the help of Qualnet simulator the different geographical environment can be created which will support to reduce real time problems facing after implementation of wireless sensor networks. This paper deals with the testing of wireless scenario for different geographical environment. Scenario considered with nine nodes with different routing protocols and a variety of environment. The parameters considered are average end to end throughput, average end to end delay, total data received and average jitter.

Keywords: Environment, network, parameters, scenario.

I. INTRODUCTION

Now days wireless sensor networks plays very important role. Wireless sensor networks consist of small nodes with sensing parameters. WSN can be developed with different topologies such as bus, ring star, mesh, circular, grid, pear to pear and tree. Mostly used topology is star topology. As per the applications the suitable topologies are used. The topologies may be followed by single hop or multi-hop techniques. The effectiveness of the topology can be measured by range, coverage, scalability, hopping count and power consumption. Remote data transmission and reception can be done through wireless technology due to its robustness. In wireless sensor networks the communication is done through air. The packets are communicated through air for data transmission and reception. For proper packet transmission and reception suitable routers are used. Routing protocols carry out the traffic management for wireless sensor networks. Most of the routing protocols used are AODV (On-demand distance vector routing), Bellmon ford, DSR (Dynamic source routing), FSR (Fisheye State Routing), LANMAR (Landmark Adhoc Routing Protocol) and Zone Routing Protocol (ZRP). Mostly for remote measurements the wireless sensor networks are used.

II. OBJECTIVES:

- Proper positioning of wireless sensor networks.
- Optimization of wireless sensor networks
- Effective deployment of wireless sensor networks.

III. FACTORS AFFECTING ON THE PERFORMANCE OF WIRELESS SENSOR NETWORKS SCENARIO

Factors affecting on the performance of wireless sensor networks scenario are as following-

i) Terrain: This is the major factor affect on the scenario on WSN. The path loss of the packets changes as per the terrain changes. Highly dense terrain the path loss is more.

ii) Range: The range is one more major factor in WSN. As the range increases the performance of the WSN decreases.

iii) Sensor Node: This is the very important factor in WSN. The sensor node is two types, one is stationary and other is having mobility. The performance of both of these nodes is different. The position of the node also affects on performance of WSN scenario.

iv) Topology: How the WSN nodes are connected is nothing but the topology of the WSN. As the topology of WSN scenario varies the efficiency of the WSN scenario differ. The topologies are star, mesh, ring, pear to pear, circular, tree and grid.

v) Network Density: The number of nodes used in WSN has an effect on the WSN scenario performance; this varies on the efficiency of WSN scenario.

vi) Routing protocol: The rules and regulations for packet transmission and reception. Different routing protocols are available. For different routing protocol the performance of the WSN scenario changes. Most of the routing protocols used are AODV, Bellmon ford, DSR, FSR, LANMAR and ZRP.

vii) Environment: Environment is major factor affecting on the performance WSN scenario. If the environment changes the performance of the node changes and it affects on the loss of the packets.

VI. SCENARIO CREATION

For creating the WSN scenario in the nine steps are followed in Qualnet simulator.

Step 1: General parameters have to be configured,
Step2: Network topology has to be defined,
Step 3: Node place and node mobility have to be defined,
Step 4: Wireless environment have to be configured,
Step 5: Network protocol stack have to be configured,
Step 6: Statistics collection have to be configured,
Step 7: Packet tracing have to be configured,
Step 8: Parallel simulation have to be configured.
Step 9: Run time performance optimization have to be configured.

The scenario considered is nine nodes with different routing protocols and a variety of environment. The parameters considered are average end to end throughput, average end to end delay, total data received and average jitter.

VII. WIRELESS SCENARIO FOR DIFFERENT GEOGRAPHICAL ENVIRONMENT

Number of researchers is working on various wireless scenarios for different geographical areas. Lot of researchers is developing their own wireless scenario suitable for specific applications. The following are the some of the Wireless scenario for different environment. The nodes considered are nine nodes with sea level height are 1500m. The geographical area is different for each scenario.

Scenario 1: simple wireless sensor network

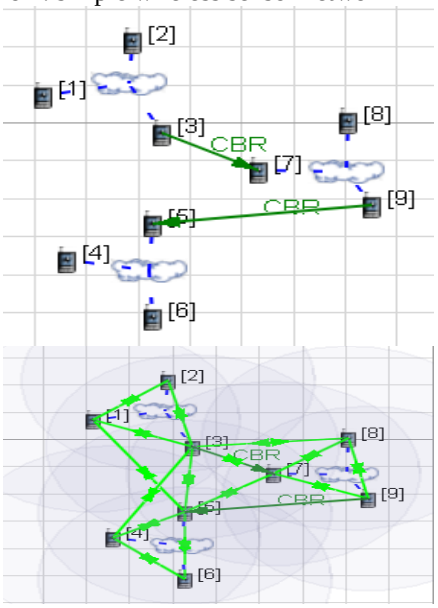

Fig. No. 1

Scenario 2: wireless sensor network on grass

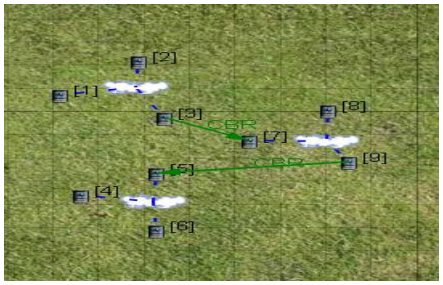

Fig. No. 2

Scenario 3: wireless sensor network in clouds

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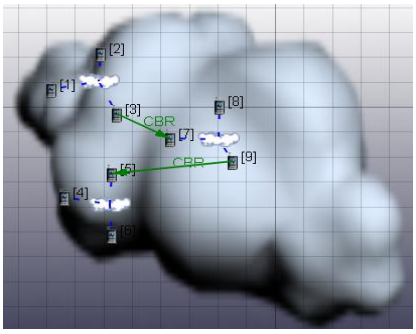


Fig. No. 3

Scenario 4: wireless sensor network in buildings

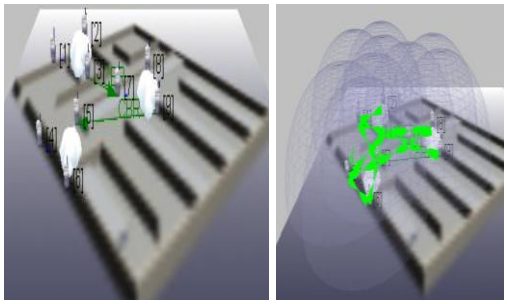


Fig. No. 4

Scenario 5: wireless sensor network on hills and valleys

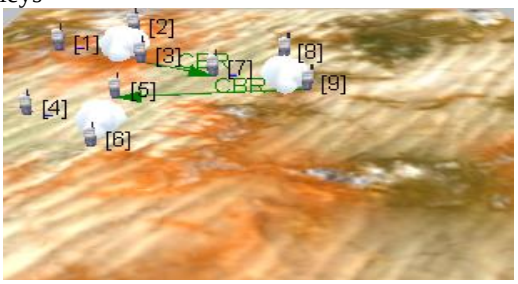


Fig. No. 5

Scenario 6: wireless sensor network on bridge

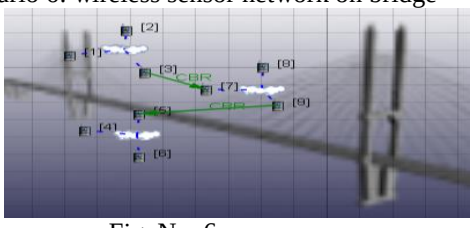
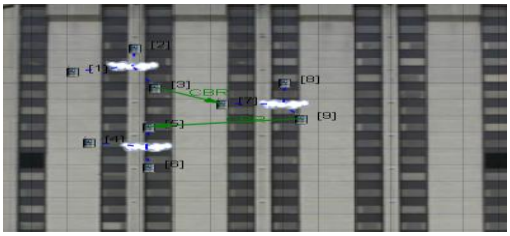


Fig. No. 6

Scenario 7: wireless sensor network on urban area



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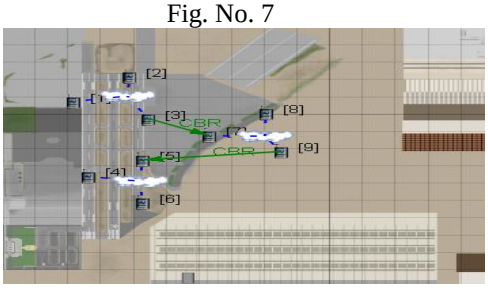

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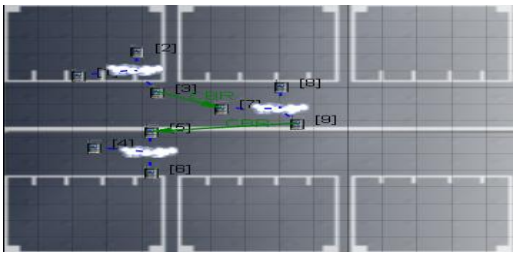
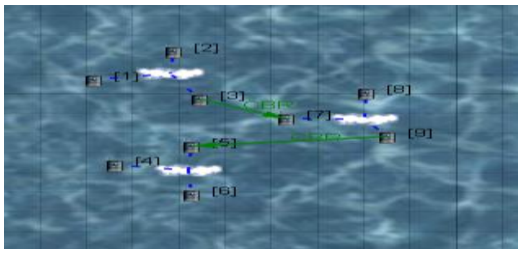


Fig. No. 9

Scenario 8: wireless sensor network in sea



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V. RESULTS:

The network is tested for different environment. Some of the parameters are considered for differentiating the Wireless scenario for different geographical environment.

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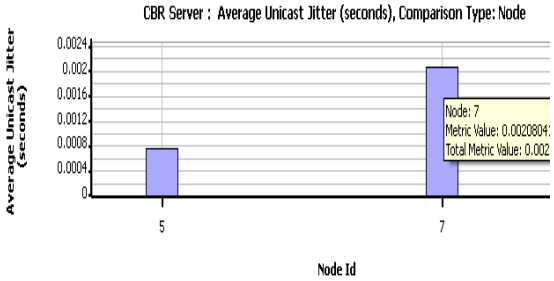

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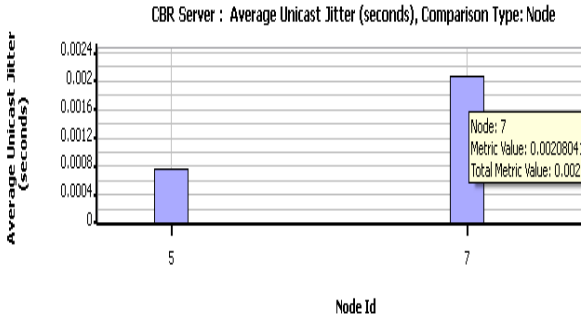

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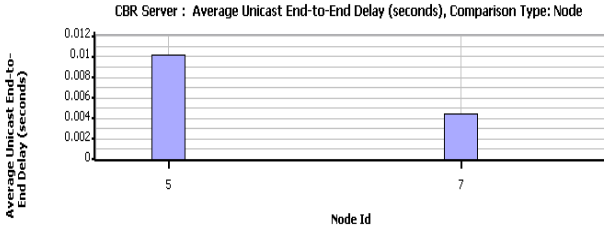

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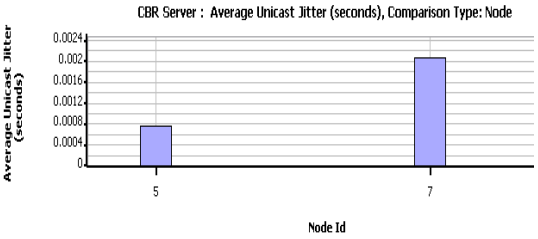

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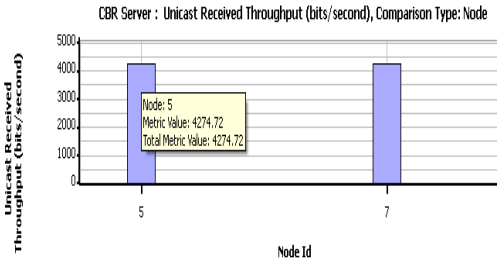

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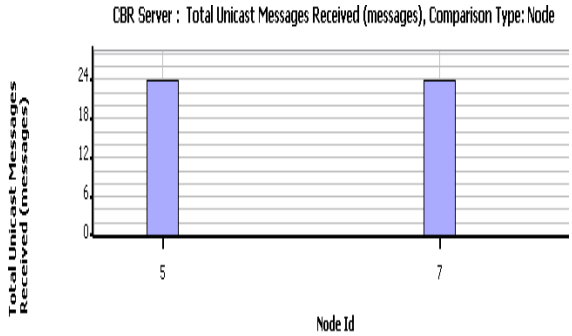

Fig. No. 16

VI. DIFFERENCE BETWEEN THE WIRELESS SCENARIOS FOR DIFFERENT GEOGRAPHICAL ENVIRONMENT

Total nine nodes with CBR traffic and sea level height is kept same for the entire geographical environment.

Table 1. Difference between Wireless Scenarios for Different terrain

Routing Protocols	Terrain 100m x 100m	Terrain 500m x 500m	Terrain 1000m x 1000m	Terrain 1500m x 1500m	Terrain 2000m x 2000m	Terrain 1500m x 1500m with rain
Average end to end delay received	0.00487101	0.00516041 seconds	0.00503043 seconds	0.0070265 seconds	0.0080375 seconds	0.0073265 seconds
Total data received	12288	12288	12288	12288	12288	12288
Total unicast messages received	24	24	24	24	24	24

Throughput received	4273.46	4274.03 seconds	4275.07 seconds	4277.09 seconds	4284.41 seconds	4279.09 seconds
Average jitter	0.00122552	0.001108563 seconds	0.000908169 seconds	0.000918169 seconds	0.000939697 seconds	0.000926179 seconds

VII: CONCLUSION

In wireless sensor networks the different geographical environment implemented for different testing. This paper showed the difference between scenarios of different terrain for different geographical area. The simulation results showed the difference between different parameters. This paper helps to understand the different geographical scenarios for testing before implementation.