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Performance Comparison of Different Frequency Ranges of Reconfigurable Systems with non Reconfigurable Systems in Mesh based Networks

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Abstract: The Mesh Networks is the famous topology that extends the one network to another network for communication purposes. This network deployed on the IEEE 802.11 wireless network by using self reconfigurable systems as well as non reconfigurable systems. The self reconfigurable systems are those systems that automatically configured faulty areas/Paths and non reconfigurable systems are those that not configured the path automatically. These non reconfigurable systems has been works on hop basis, if any faulty areas/path in between the network environment. The self reconfigurable systems uses the approach ARS [1] that automatically recovered the faulty areas in the local networks. In this paper we try to comparison between the above said systems with different frequency ranges. The model that has been used in this paper sufficient for computer simulation and adapt the mesh based environment. The different parameters that can be used for calculate the performance of the systems. Simulation test bed and comparison of different frequency ranges are discussed detail in this paper.

Keywords:

1. Introduction

The WMNs stands for wireless mesh networks that provide communication in between different nodes, routers and gateways in different LAN for communication perspective. This Mesh based Networks capable for communication on any networks standard i.e. IEEE 802.11, IEEE 802.15 and IEEE 802.16; also wired media such as IEEE 802.3 Ethernet standard. WMNs can be used to create a low-cost, easily deployable, high performance wireless coverage throughout the home, eliminating radio frequency (RF) dead-spots [5]. A WMN is dynamically self-organized and self-configured, with the nodes in the network automatically establishing and maintaining mesh connectivity among themselves (creating, in effect, an ad hoc network) [3]. This feature brings many advantages to WMNs such as low up-front cost, easy network maintenance, robustness, and reliable service coverage [3].

1.1 Architecture of WMNs [3]

In this section we can describe few techniques of Mesh based networks from these techniques we are applying on the simulation test bed and after that calculates the performance.

A. Infrastructure/Backbone WMNs

In this architecture WMNs [3] are the foremost commonly used sort. For instance, community and neighborhood networks are often designed victimization infrastructure meshing. The mesh routers are placed on the roof of homes in a very neighborhood, which function access points for users within the homes and on the roads. Typically, two types of radios are employed in the routers (shown in figure 1), i.e., for backbone communication and for user communication, respectively. The mesh backbone communication can be established long-range communication techniques as well as directional antennas.

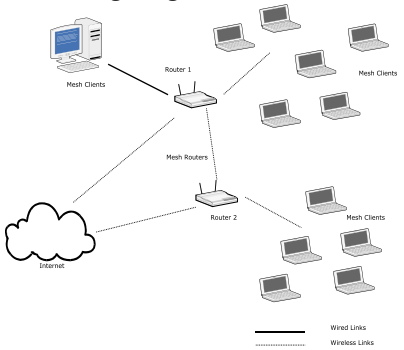

Figure 1: Network Model of Wireless Mesh Networks [11]

2. Literature Review

Ian f. Akyildiz, xudong wang, kiyon (2005) emerged as a key technology for next-generation wireless networking. as a result of their benefits over different wireless networks, WMNs are undergoing fast progress and provoking various applications. The Authors aim to produce an improved understanding of analysis challenges of this rising technology. WMNs are going to be integrated with the net and lots of different wireless networks, and so transport protocols for WMNs ought to be compatible with TCPs.

Timo Vanhatupa, Marko H., Timo D. (2007) worked on two algorithms channel assignment and uses minimizing the amount of mesh Access Points. The WMN channel assignment algorithmic program is genetic algorithmic program designed for static channel assignment. The target is to optimize existing network by choosing radio channels optimally. it's assumed that locations of APs are designed by the network administrator to hide needed areas. every AP contains one or additional wireless interfaces that will care for allowed local area network channels. The second algorithmic program checks the need of every mesh purpose supported the WMN fitness.

Kyu-Han Kim et.al. (2010) presented an autonomous network reconfiguration system (ARS) that allows a multi-radio WMN to autonomously get over native link failures to preserve network performance. The ARS (autonomously reconfigure system) its native network settings channel, radio, and route assignment for period recovery from link failures. The correct link quality info from the watching protocol is employed to spot network changes that satisfy applications' new QOS demands or that avoid propagation of QoS failures to neighboring links.

3. Simulation Testbeds [11]

The same parameters used that work on our previous work [11]. The 20 wireless nodes, placed randomly in 800x500 flat spaces for 60 s of simulation time. In the first set of simulations, all the nodes were moveable. Background traffic was established through the use of a low network load with four routers connected to the two gateways, until a medium network load level with four Routers, of FTP/TCP type; the destination nodes were placed in the clustered manner where ten nodes working on one cluster and other ten belong to another cluster (in figure 3). Each data packet had 1000 bytes of size.

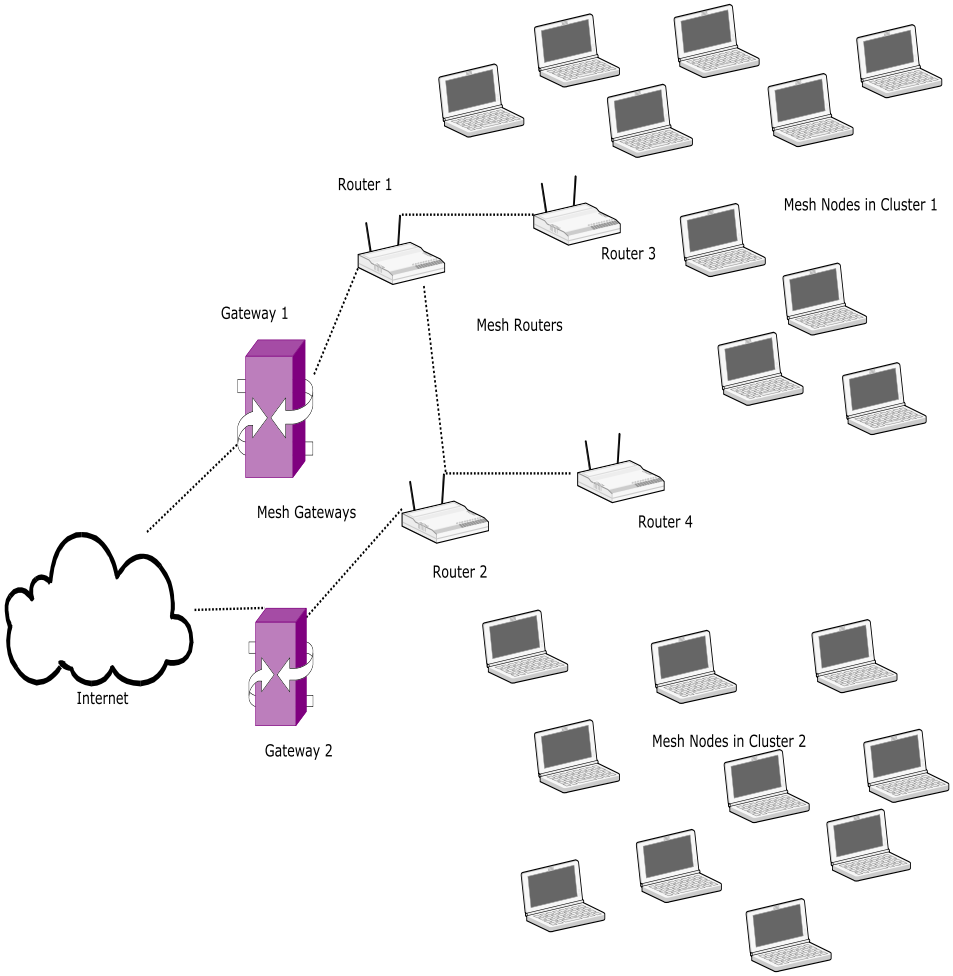

Figure 2: Simulation scenario using ARS[11]

The figure 2 and figure 3 shows the scenarios that were used in this paper.

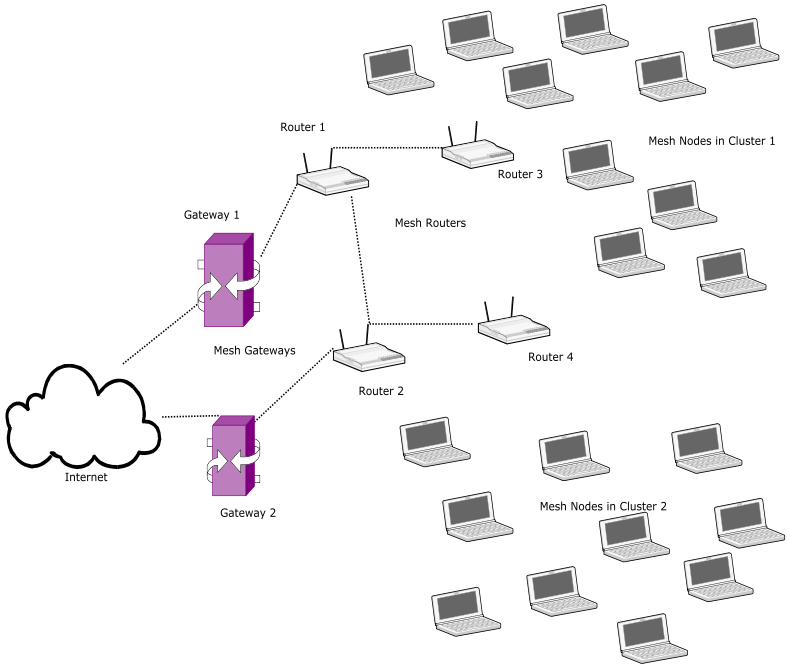

Figure 3: Simulation scenario Without ARS[11]

We compare the extensive performance evaluations to determine the effectiveness of the proposed route quality metric [5] and the same parameters used in both figures (figure 3 and figure 4) listed in Table1.

Table 1: Simulation Parameters [11]

Parameter Used	**Value**
Node Queue Length	50
Protocol used	AODV
Data Packet Size	1000 bytes
Traffic generation	Exponential
Transmitter Antenna Gain	0 dB
Transmit Power	20 dB
Propagation Model	Two way ground
Receiver Antenna Gain	0 dB

The mesh routers dynamically form multi-hop routes between the mobile users (mesh clients) and the gateways. Mesh routers have two interfaces, one for communicating with the mesh clients and another for communicating with other mesh routers. We focus on routing within the mesh routers only, i.e. the mesh clients do not participate in multi-hop routing. Only single channel operation is assumed, i.e. all mesh nodes operate on the same channel for transmitting mesh traffic. Although the use of multiple radios per node operating on multiple orthogonal channels would reduce interference effects, we focus on the quality of single channel networks in this work. It is assumed that the gateway is aware of the locations of the mesh routers, and keeps track of all active nodes and neighborhood information [5].

The simulated scenario run with using NS2 Simulator and observed value shown in Table2.

Table 2: Analysis the statistics from the Simulated Scenario (in fig.5) [11]

Node	**Route Changes**	**Link Changes**
0	178	103
1	164	102
2	318	85
3	190	76

4	200	82
5	238	127
6	250	119
7	220	110
8	210	70
9	198	90
10	190	120
11	178	101
12	190	100
13	200	130
14	201	120
15	220	98
16	221	70
17	223	78
18	224	89
19	225	67
20	221	57

4. RESULTS AND DISCUSSIONS

Number of used paths represents the total number of routes that are used to transmit traffic between each pair of source-destination nodes.

4.1 Throughput of WMN

The maximum throughput depends upon the quantity of links that may move at the same time. every node related to one another in an exceedingly random manner because the associative operate in between every of the node. The nodes were sending causation and receiving information from the neighboring information and every of the routing record stores by individual node. From this paper, is to calculate the turnout of every node and that we see that the most accomplishable throughput of WMN 14 Mbps and is a lot of as compared to the opposite analysis paper [1].

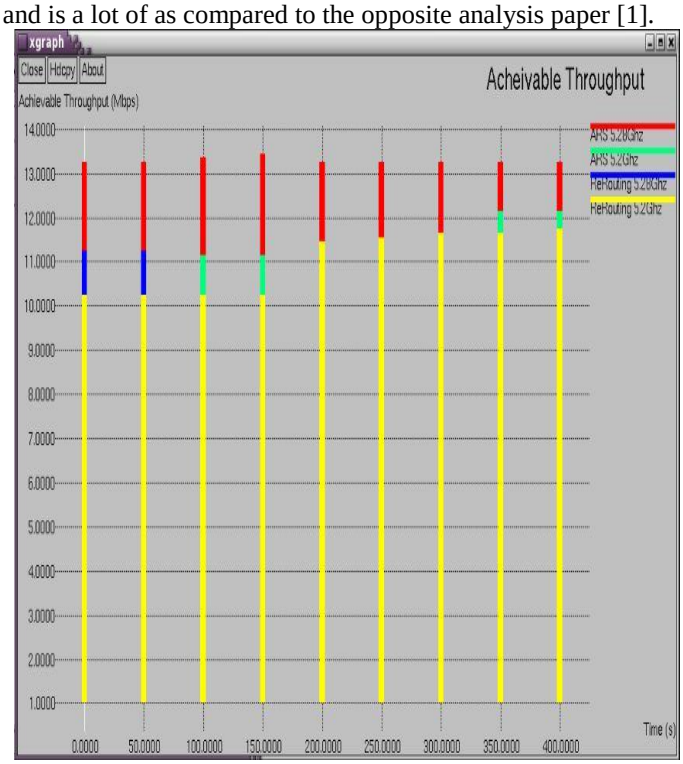

Figure 4: Throughput of WMN

4.2 E2E Delay *of WMN*

The End to end delay (abbreviated as E2E delay) means that the time taken to transmit the packet from Sender to destination machine. Here within the figure 5.2, see that every packet transmit from Sender to destination with effectively and solely 4WD probabilities of have an effect on the performance of the general networks however the losses of the packets are

retransmitted once more. There was some delay in between the nodes 15 to 45 however overall 96 of the packets effectively transmitted to every of the node and that's why the performance of outturn improved well.

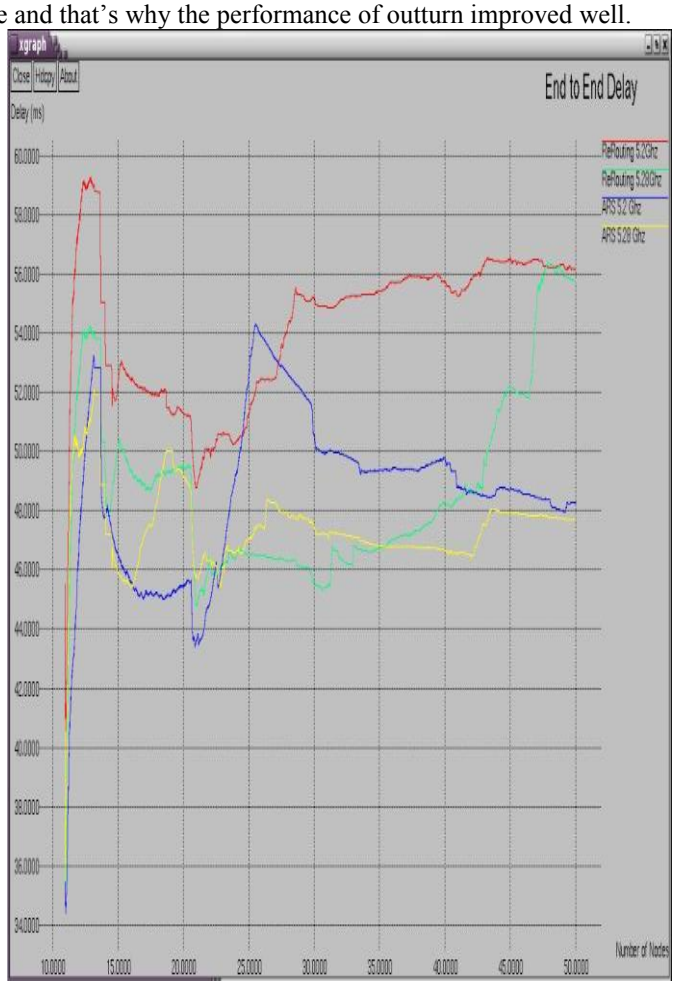

Figure 5: E2E delay of WMN

5. Conclusion

This paper uses an algorithmic approach of ARS that automatically reconfigured the native system once using 2 situations i.e. static routing and ARS. The results on cooperative communication, ranging from the only sort of cooperation, i.e., relay channels, and moving towards the lot of useful and fairer scheme of mutual cooperation. During this work bestowed the framework in NS2 simulator for wireless Mesh sort networks and compare with ARS and while not ARS primarily based networks. Our MAC protocol employed in the implementation reduces E2E delay and increase the throughput of the networks. This makes MAC level packet forwarding operations less a lot of at risk of losses. There's no any broadcast mechanism in-built the MAC Layer and also the variety of retransmissions within the network was less.

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