DEPLOYMENT OF PERFORMANCE IN LARGE SCALE WIRELESS MESH NETWORK

[1]Richa Sharma, [2]Ms.Pency Juneja
[1]Perusing M.Tech (CSE), [2]Assistant Professor
Lovely Professional University, Phagwara
Email:[1]rsricha177@gmail.com, [2]pency16381@lpu.co.in

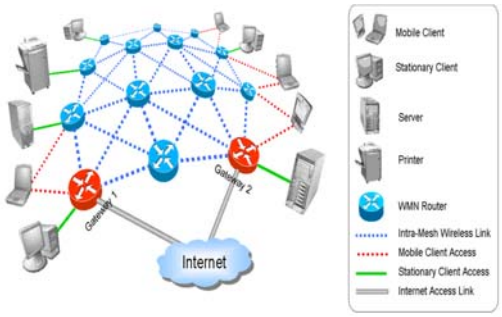
Abstract

In the propose system four parameters are introduced in order to determine the performance of wireless mesh network. The client coverage area, Backhaul tier connectivity, fair mesh connectivity and redundancy factor. In the existing study only three parameters are considered. In the proposed scheme four parameters are considered. Mesh topology indicates that there will be connectivity between every node with every other node. Hence the network is expensive in nature. In order to reduce the cost random topology is discarded from the mesh topology. The traffic will be deviated to the second route in order to reduce the traffic from the network. The utilization of resources will also be a factor determining the overall utilization. If the utilization is low resources will be wasted. In the proposed scheme performance will be estimated using above said factors.

Keywords: Mash Networks, Client server, Backhaul Tire, Mesh Capacity & redundancy

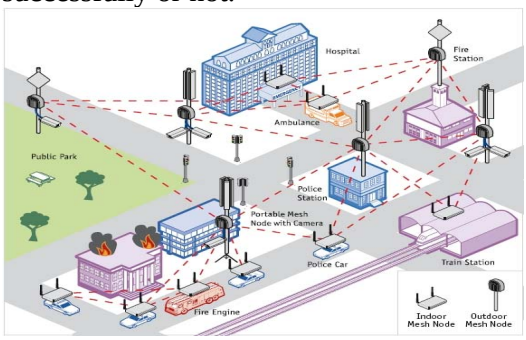
Introduction

The mesh network is used in order to transfer the data from one node to another. When information is transferred from source to destination than cost will be encountered. The cost associated with the transfer will be calculated by using the parameters present within proposed system. Wireless mesh network will provide low infrastructure cost and allow the city wide access to the internet.



The mesh network uses numbers of connecting devices. Also the workload on the individual device over the network is negligible. Hence load balancing is also present.

Our study first of all covers the area of the mesh topology. We find that slight deviation from ideal grid placement do not affect the coverage area. Random deployment will require twice the number of nodes to cover all the area defined by the mesh network. The coverage area will indicates that whether the data to the destination can be delivered successfully or not.



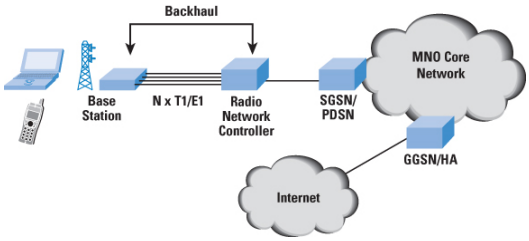
The second parameter which is considered is back haul tier rout. The average mesh node connectivity will be analyzed in this case. The nodes in mesh topology generally have connection with every node on the network. If one connection is broken than the data can be

transferred from other routes. The cost associated with the transfer is also low. When one path goes down than cost will be encountered while diverting the data to the other routes. Random node placement will degrade the performance slightly. However the data will be delivered to the destination for sure.

(Robinson & Knightly, 2007)Third, we calculate the ideal fair mesh capacity, i.e. the aggregate throughput at a wired gateway under per-user fairness constraints. (Robinson & Knightly, 2007)We show that separating the access and backhaul tiers with a second radio is not an efficient use of a second radio, as users in the network experience a fair capacity improvement of less than double. (Robinson & Knightly, 2007)This configuration does not fully take advantage of the second radio in the case where spatial reuse already allows some access links to operate without interfering with the wired gateway nodes. (Robinson & Knightly, 2007)Additionally, we find that a random network provides less than half the fair capacity of a regular grid topology due to increased contention for wireless airtime at wired gateway nodes and poor coverage area. Consequently, random networks are not suitable for a large-scale mesh deployment.

The forth parameter which we have introduced is redundancy factor. In this factor we calculate the packet redundancy by analyzing the packet number. If the same packet is already transferred than redundancy is present within the data transfer which will cause the bandwidth utilization. The overhead in terms of the channel utilization and cost will be introduced. So we will prevent the redundant packet to be transferred over the network.

A two tier back haul connectivity will be used which ensured that connection between client and server will be successfully established. In this case backhaul tier will be used for interconnection between infrastructure mesh nodes and wired connection to the internet.



There are number of factors which must be considered in the interconnection between source and destination. The factors are as listed below

A. Topology Factors

The topology will indicate the physical factors which are used in order to connect the source with the destination. The medium which is used will go to decide whether the coverage area is wide or not. The coverage area if high then only data is transferred to the desired destination. Best, Average and Worst cases will be considered in this case.

B. Grid Topology Perturbation

(Robinson & Knightly, 2007)In most mesh network deployment scenarios, the mesh operator does not have complete control over the placement of mesh nodes. (Robinson & Knightly, 2007)We next examine the impact of this realistic deployment scenario by introducing random perturbations to mesh node topologies.

RELATED WORK

In order to prove the worth of the study we have analyzed large number of papers. Some of the papers which are meaningful in the situation will be describes in this section

(Louis, Kedieng, & Nlong, 2015) Wireless Mesh Network is presented as an appealing solution for bridging the digital divide between developed and under-developed regions. (Louis et al., 2015)But the planning and deployment of these networks are not just a technical matter, since the success depends on many other factors tied to the related region. (Louis et al., 2015)Although we observe some deployments, to ensure usefulness and sustainability, there is still a need of concrete design process model and proper network planning approach for rural regions, especially in Sub-Saharan Africa. (Louis et al., 2015)This paper presents a design methodology to provide network connectivity from a landline node in a rural region at very low cost. (Louis et al., 2015)We propose a methodology composed of ten

steps, starting by a deep analysis of the region in order to identify relevant constraints and useful applications to sustain local activities and communication. (Louis et al., 2015)Approach for planning the physical architecture of the network is based on an indoor-outdoor deployment for reducing the overall cost of the network.

(Bondorf & Schmitt, 2010) the response time is considered as important factor in determining the performance of the mesh network. (Bondorf & Schmitt, 2010)The performance will be considered in terms of transfer process. The statistical time bounds (Bondorf & Schmitt, 2010)are determined in this case. t. With Monte Carlo method we derive estimates for quintiles of the maximum response time distribution under uncertainty about the topology. (Bondorf & Schmitt, 2010)In numerical experiments we show that the long but light tail of this distribution causes considerably lower bounds compared to the deterministic one even under small violation probabilities and, yet, on the other hand compare favorably with the median of the distribution.

(Brito, Stewart, & Hassan, n.d.) The WLAN is considered in this case. With the help of WLAN the wide area is covered and connectivity is also provided. A two tier mesh network is considered. A two tier network has relatively lower cost as compared to WAP (Wireless Access Point). Better coverage is presented in this case. (Si & Selvakennedy, 2008) For the emerging wireless mesh networks with multiple radios and directional antennas, this paper first proposes a position-based deployment and routing strategy, and then gives a concrete approach under this strategy.(Si & Selvakennedy, 2008) The main idea of this strategy is to deploy the mesh network in certain kind of geometric graph and then design a position-based routing protocol accordingly, so as to achieve efficiency and scalability.(Si & Selvakennedy, 2008) The proposed approach comprises two parts: (1) a topology generation algorithm based on Delaunay triangulations and (2) a routing protocol based on the greedy forwarding algorithm. (Si & Selvakennedy, 2008) Both parts have appealing properties for deployment or routing, with formal proofs provided when applicable. Our simulation results validate the proposed approach. (Knightly, n.d.) in this case four parameters are considered in order to measure the performance of the system. The four parameters which are considered involve Client Coverage Area, Protocol Dependent Throughput and Per User Fair Rates. (Akyildiz, Wang, & Wang, 2005) the performance of Ad-hoc network is presented in this case. The performance will increase when the performance metrics are followed successfully. The performance metrics which are considered are viable in nature. The redundancy is not considered in this case. (Fang, Administration, State, & Marcos, n.d.) the wireless mesh technology is considered in this case. It is cost effective way in order to transfer the data from source to the destination.

From the review we have conducted it is clear that most of the work which is does not considered redundancy as a factor in order to analyze the performance of the system. In the purposed system the forth parameter redundancy is considered.

COMPARISON OF TECHNOLOGY

The purposed scheme considered number of factors which are used in order to analyze the performance of the system. The techniques which are used in the existing system will be described through the following table.

Paper	Area of Concern	Advantages/Disadvantages
Rural Wireless Mesh Network : A Design Methodology	WLAN is considered	Relatively cheaper in nature. No performance metric is considered
Statistical response time bounds in randomly deployed wireless sensor networks	Randomly deployed wireless mesh network is considered.	Computation is less. Only one performance parameter is considered which is response time
Capacity optimization for VoWiFi on the AIT Campus	Wi-Fi is considered in this case	No performance metric is considered. The CAN(Campus

Wireless Mesh Network Deployment		Area Network) is Considered in this case
On Profitability and Efficiency of Wireless Mesh Networks	Wireless Technology used to connect source with destination	Performance and efficiency is considered as performance metrics. The area of concern is not wide enough
RICE UNIVERSITY A Performance Study of Deployment Factors in Wireless Mesh Networks by Joshua Robinson A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree MASTER OF SCIENCE Approved , Thesis Committee : Houston , Texas ABSTRACT A	Wireless Mesh Technology	The set of four parameters are considered but redundancy is not considered as factor to measure the performance.
Rural Wireless Mesh Network : A Design Methodology	Wireless Mesh Technology	No particular parameters are defined in this case.
A Performance Study of Deployment Factors in Wireless Mesh Networks	Wireless Mesh Technology	The set of three parameters are considered. No redundancy factor is considered in this case.

CONCLUSION

In this work we have begun to take on some of the performance challenges facing in general wireless mesh networks. For this, we propose three metrics to capture four different components of a mesh network: coverage area, backhaul tier, capacity of the mesh topology and reduce redundancy. For coverage area, we find that the large amount of communication to be covered in large network and find the dead spots which areas are used very rarely. Backhaul tier connectivity depends upon to analyze the route present in wireless mesh network. There exist multiple route that we find all the exiting route with in the network from source to destination. In fair mesh capacity, find the throughput; that the amount of data can be transmitted from the network will depend upon the bandwidth. Finally, the redundancy is find the duplicate packets i.e in existing system, it detect and remove the redundancy so that same packet should not be transferred again and again. In our future work, we will concentrate on the initial interference estimation, which is a crucial factor of reduce redundancy assignment algorithm.

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