All-Embracing Review of Wireless Network Protocol, Optimum Network Simulator

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ABSTRACT: - *Wireless connectivity is the new murmur utterance in computer networks. It involves connecting laptops, mobile libraries and even fridges to computer networks, without physical wire connections. Wireless connectivity means that individuals can potentially entrée the Internet, CD-ROM networks and office networks from anywhere and at any time. This issue paper highlights the key elements in wireless connectivity and the looming research required in this scorching area. This paper starts with the prologue of Wireless networks, followed by the simulation modus operandi of well known newly built wireless networking software OPNET. The paper also highlights delve into reviews of various researchers in this area and finally suggests the directions of research in this field of research.*

I.INTRODUCTION

A wireless network is like any other computer network. It connects computers to computer networks but without the need for physical wire connections. A wireless network can provide network access to computers, databases, the Internet and OPACs, both within and between buildings. The lack of a physical connection means that users are able to roam or work wherever they wish and still have access to the computer network. There are three main types of wireless network: Wide Area Networks (WANs), Local Area Networks (LANs), and Personal Area Networks (PANs).The hasty budding use of information and communication technologies has resulted in bridging the breach between the diverse areas of the world and the world is witnessing a revolution in the use of wherewithal around it. As the world has befall a global village, most of the countries are reaping the benefit of economies of scale, that is, the freights which are in abundance at one place are being transferred to other places where there is necessitate for those commodities. This has resulted in use of communication technologies for order dispensation, delivery and for the flat implementation of the whole supply chain. The call for of this communication technology has paying attention the various researchers to put a step forward to boost the competence of these networks. The different anxious issues include reliability, communication speed, better transfer rates, security etc.

II.NETWORK SIMULATOR OPNET

Optimized network engineering tool OPNET modeler is the profitable network simulator tool that works on pseudo random number generator (PRNG) algorithm for haulage out simulations. The tool provides a graphical user interface (GUI) and works on Windows and UNIX platforms. It supports three levels of modeling viz. process level for analyzing different networking objects, node level that helps to fix objects to form a communicating gadget, network level to erect network of communicating devices and project level that beholds diverse scenarios of same network and helps comparing them for most efficient and robust network designing. The parameters or attributes for comparison of different scenarios are selected after the conception of network model. Physical and logical attributes can be varied either for complete network or entity devices connected to it. The networks can be tested for different state of affairs by isolating some network part or by deactivating crucial network links. The simulation time can be adjusted for better understanding of parameters behavior and for desired performance of the network.

III. FUNCTIONING OF OPNET

The conniving and simulation of computer networks in OPNET modeler is divided into four detached stages that includes the deceitful, the assortment, the simulation and the analysis stage. The foremost work area or window is project editor. The fundamental facet of the project editor window can be selected on the basis of geographical distance of network to be modeled which ranges from worldwide network, office network to a logical network. The project editor window contains ingrained library of network models and their equivalent network components called the object palette. The network statistics, simulation criterion can be selected from radio buttons provided in the project editor window. The results of the simulation can be viewed and compared in statistical form. Project editor creates different scenarios of the same base network by varying some

of the physical and logical conditions for self comparison of network parameters.

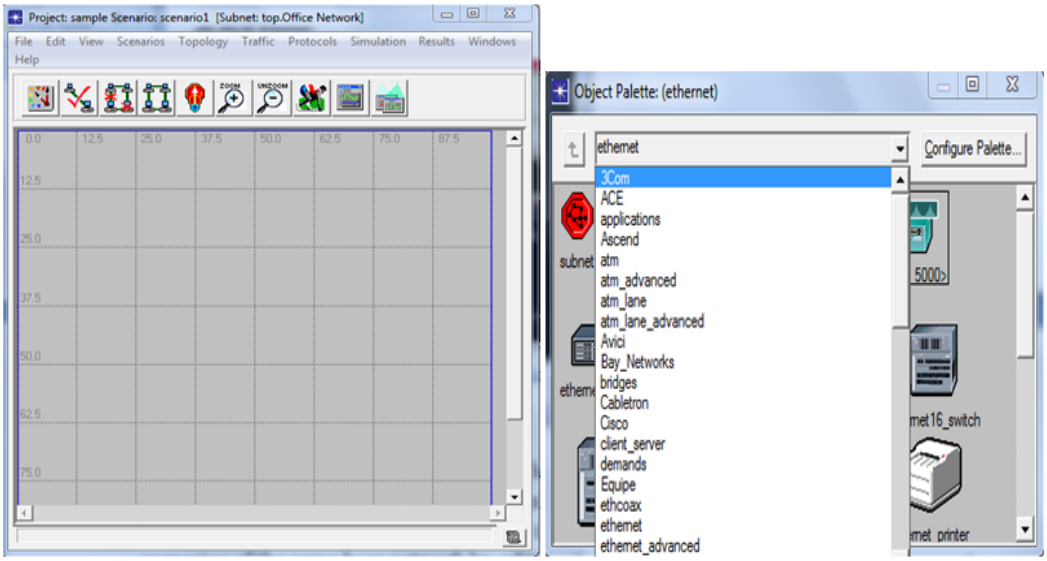

Figure 1.1 Introduction to OPNET modeler

The Project Editor

Figure1.2 Project editor radio buttons

The radio button is use to open object palette which is the library of different network types and their associated networking components that can be modeled in OPNET.

1. This radio button provides the object palette as shown in figure 1.2.
2. This radio button is used to check consistency of the network links for the network designed manually on project editor window.
3. It is use to deactivate the selected links from the network designed for analysis of the network in worst conditions.
4. It is use to reactivate the deactivated links of network.
5. This button is used to return to parent subnet in large networks where network constitutes multi subnets.
6. This button enlarges the work area for better view of dense networks.
7. It is used to disable the zoom in option and return to normal view layout.
8. This radio button is used to select configuration for simulation process like duration of simulation, number of discrete values to be recorded of parameter under study.
9. The button is to view results of the simulation process in statistical form.
10. This button is used either display or hide all the results associated with the network or recently computed results. The operation displays the results of simulations performed recently in active network window.

IV. OVERVIEW OF LITERATURE SURVEY

F.Cali et.al (1998) discussed the efficiency related issues of the IEEE 802.11 standard for wireless LANs. The study derived an analytical formula for the protocol capacity and determined the theoretical upper bound of the institute of electrical and electronics engineering IEEE 802.11 protocol capacity. The paper also proposed a distributed algorithm that enables each station to tune its backoff algorithm at run-time, resulting in enhancement in

the performance of the IEEE 802.11 protocol. The findings results were verified by simulation process.
Sanjay Kumar Pal et.al (2010) discussed the contribution of different computer network topologies towards the performance improvement factor of the networks. The study proposed a new characteristic for pascal graph model that aims to provide optimum reliability to the computer networks. The property was established using appropriate algorithm and optimum results.
The minimization n of communication cost of distributed packet switched networks by taking into account constraints like delay and reliability have been discussed by *Pierre, S et.al* (1998) The study proposed a genetic algorithm (GA) for generating low-cost feasible computer network topologies subject to the above constraints. The study was concluded by results depicting the efficiency of genetic algorithm (GA) in minimizing the communication cost for medium-sized computer networks.

Kamoun, F et.al (2003) surveyed the nodal storage limitations leading to blocking and degradation of network performance in a store and forward computer network. The paper discussed about five sharing schemes for sharing a pool of buffers among a set of communication channels. The sharing schemes were examined, analyzed and displayed in a fashion that establishes the tradeoffs among blocking probability, utilization, throughput and delay.

The discussion about the quality of service (QoS) in providing internet protocol (IP) based service in wireless and wired networks have been carried by *Jukka Manner* et.al (2002). The study focused on the shortcomings of real time transport protocol (RTTP), insiginia and itsumo protocols. The study focused on the methodologies like strict flow shaping at the network edge, coupling of micro-mobility and quality of service (QoS) protocols, advanced reservations, pre handover negotiations and context transfer methodologies were adopted for improvement in quality of service (QoS).

Yu-Chee Tseng et.al (2003) discussed the design of power-saving protocols for mobile ad hoc networks (MANETs). The study proposed power management protocols like dominating-awake-interval, periodically-fully-awake-interval and quorum-based protocols for mobile ad hoc networks (MANETs) with unpredictable mobility, multi-hop communication and no clock synchronization mechanism. The simulation results were presented to verify the effectiveness of the proposed protocols.

The discussion was made for the emergence of an international regime for control of computer network operations (CNO) by *Andrew Rathmell* (2001). The study showed that without trustworthy systems and survivable infrastructure, the information revolution will not progress and at the same time their investment in military technologies and doctrines design for disruption of the infrastructure of rival nation's will not come under scanner.

M. N. Akhtar et.al (2005) discussed the modification of transmission control protocol (TCP) Tahoe flavor for use in Wireless networks. The paper showed that by slightly modifying the algorithm of the Tahoe transmission control protocol (TCP), it can be made to respond better to wireless links while maintaining its advantages on the wired networks at the same time.
Kang et.al **(**2003**)** discussed low energy adaptive clustering algorithm (LEACH) which is simple but offers no guarantee about even distribution of cluster heads over the network and results in avoidable energy loss and resulting in degrading network performance. A new approach towards distribution scheme of cluster heads has been introduced and proved by the simulation results that the new algorithm reduces excessive energy loss by avoiding unnecessary redundancy of cluster heads.
The Media Gateway Control Protocol (MGCP) and Megaco/H.248 was simulated using the opnet modeler. In the simulation process they used one Media Gateway Control (MGC) and two Media Gateways (MGs) connected to a local hub by point-to-point duplex links to simulate three basic call flows and demonstrated Megaco/H.248 functionality. Data traffic between two MGs is simulated using the Real-Time Transport Protocol (RTP). Further scope of improvement in Megaco/H.248 OPNET model by implementing Full featured RTP, Multiple call scenarios & layered architecture have been discussed by *Riyadh et.al* (1998).

Several computer network simulators were compared by *chang* (1998). The two forms of network simulation models were discussed- analytical modeling and computer simulation. The first is by mathematical analysis that characterizes a network as a set of equations; second one comes with a set of predefined modules and user-friendly GUI. The former provides a simplistic view of the network and is unable to simulate the dynamic nature of a Network whereas the later is discrete event simulation package which can compute the time that would be associated with real events in a real-life situation.

Hnatyshin et.al (2008) discussed the role of simulation package in easing the design, modification and fault diagnosis in computer networks. The applications such as file transfer protocol (FTP) clients, electronic-mail transfer agents, web browsers, instant messengers were modeled by the OPNET simulation package. The comparison of results obtained via simulation with live packet traces was done and simulation configuration was adjusted accordingly. The paper described the methodology for development of modeling applications and user profiles in a computer laboratory and explained the steps for modeling a non-standard application such as AOL Instant Messenger using OPNET Modeler. The AOL instant messenger (AIM) application model has been validated against live traces. The future scope included further refinement of the AIM application model to include periodic business operating system (BOS) server message updates. The methodology used to develop the AOL instant messenger (AIM) Simulation model to create a simulation model for online gaming applications was also discussed.

V. PRESENT-DAY RESEARCH DIRECTIONS

New Directions in Wireless Communications

Research addresses critical issues in the design and performance analysis of current and future wireless system design.

The major ingredient of this research is to study the adhoc routing and its protocols. Further, it is vital to examine the recital of various adhoc routing protocols and to compare the results with the existing research. Versatile software's are available to evaluate the performance of routing protocols .Depending upon the suitability and applicability the required infrastructure will be taken up for the further study.

ANCKNOWLEDGEMENTS

The author feels appreciative to the prominent Guru Kashi University, Talwandi Sabo India to provide the podium to carry out the research in the modern research area. The author is beholden to his Supervisor(s) and other authorities, in inception, for proving infrastructure and other requirements time to time to carry out the work ahead.

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