COMPARATIVE STUDY OF EMAIL APPLICATIONS PERFORMANCE FOR MULTI-PROTOCOLS ON WIRELESS NETWORK
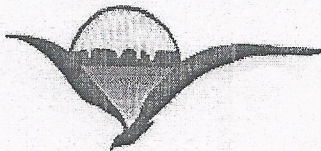
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ABSTRACT

In today's world, the email is most frequently used application for communication through internet for heavy data usages. There is a need to use the appropriate applications with cost effective solution. In this paper, the end-to-end data usages are measured for email application on wireless network. The comparative study is done between the web (browser based) and desktop application using a Gmail account. The success story of result shows that high Bandwidth data usagesis consumed in Browser (web based) email as compared to Desktop based email application. The bandwidth requirement forDesktop email Application is 40% lesser compare to Web based Application.

Key words: Email, application, bandwidth, cost-effective, Internet usage.

A Monthly Double-Blind Peer Reviewed Refereed Open Access International e-Journal - Included in the International Serial Directories

International Journal in Management and Social Science

Adoption and Performance Analysis of Wireless WAN Technologies for Multi-Scale Applications: Users Perspective in 'Pune City, India'

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ABSTRACT

The Wireless WAN is being considered as most significant revolutionary technology for anyone, anytime, anywhere (3A). It offers the end user with fast and always access to new services, applications and contents for their lifestyle and productivity benefits.. This survey is for Wireless WAN technologies adoption trends and their performance for the applications run. The information gathered in this study is to explore the current state of wireless WAN services, needs and expectation of WWAN users in the 'Pune city, India'. The result shows that Wireless WAN technology adoption is growing every year by three folds. More than 90% Wireless WAN users are switching and adopting upward wireless technology for the reasons of higher bandwidth and better performance for multi-scale applications run. The 66% of Wireless WAN users are satisfied with the current state of wireless technology performance.

Keywords--- Wireless WAN, Adoption, Bandwidth, multi-scale applications, 2G, 3G, Broadband

I. INTRODUCTION

The convergence of communication, mobility[1] and internet has immerged as the standard mode of wireless communication. Since the beginning of this millennium, there has being an extraordinary growth of broadband wireless network technologies. This technology is flexible in communication for associations among peoples. An uninterrupted access to network services can gives remarkable growth to business and lifestyle of peoples. The Wireless technology guarantees for information exchange of voice, data and video for 3A irrespective of whether the person is static or mobile. The major challenges of wireless communication providers are to balance the load on the network for effective and efficient use of applications, during all the time of the day irrespective of day, week, and session or a particular location.

The Wireless WAN subscribers are increasing day by day and it is being seen as integral part of day to day life and also improving socio economic performance

of counties. There were 14.98 million Broadband subscribers in the country by the end of December 2012, 55.20 million by the end of December 2013, 82.22 million by the end of December 2014, (TRAI reports)[15]. The Wireless WAN services have empowering students to access new career and educational opportunities, helped businesses to reach new markets and improving the efficiency in business, has also enhanced the Government's capacity to deliver critical services like health, banking, commerce etc. to all of its citizens. This technology has also captured the urban areas of India and spreading in rural areas for country economic growth. Wireless WAN is considered to be a technology that will offer end users with fast and always-on access to new services, applications and content to improve real lifestyle and for productivity benefits (Sawyer et al. 2003) [14].

The nature of the content, geographic scope, and amount and urgency of the data to be transmitted will have direct bearing on the particular wireless WAN service deployed. Unfortunately, no single wireless WAN service fits all application and data needs. Once a wireless WAN service is chosen, compatibility with existing network architectures and technology must be assured. The Wireless WAN subscribers do not understand regarding their WWAN service, specifically, the amount of bandwidth advertised in their service plan and the actual bandwidth they receive. This information is necessary for WWAN user to adequately determine to which level of service they need to subscribe to match their bandwidth needs for a particular applications they want to run for better performance.

According to Broadband telecommunication commission report, over one-third of respondents did not know amount of bandwidth they have subscribed. Nearly half did not know their provisioned upload speed; roughly 38% did not know their typical download speed and over two third did not know their service plan included in data plan [8].

It is important to explore the *Adoption trends* of the different types of Wireless WAN Technology. What are switching trends and what are the *reasons for*

"T-MANET Method for Identification of Appropriate Parameters for Best Performance to Design MANET in Particular Scenario"

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Abstract: T-MANET algorithm uses Taguchi Method that helps in selecting multiple feasible parameters to setup the MANET for an application performance. Parameters selected by T-MANET helps in obtaining the better than best performance of MANET routing protocol. The need, popularity and easy deployment of MANET with less cost has increase the area of applications in realistic environment from military to day-to-day life and research to business. The applications uses MANET need best performance where application performance is dependent on various factors. Routing Load, Delay and Throughput metrics are used to evaluate MANET performance using OPNET simulator for a realistic application environment for 'Number of Nodes', 'Routing Protocols' and 'Transmission Data Rate' factors. The result story shows that optimized throughput for MANET is obtained with the combination factors as 100 nodes, AODV routing protocol with 11 mbps 'Transmission Data Rate' without affecting noise factor as pause time. Optimizing delay response variable for MANET the T-MANET result suggest that for 25 numbers of nodes, GRP Routing Protocol is as significant factor with the 'Transmission Data Rate' 11 mbps. With one of the response variable it is observed that any 'Number of Nodes' and AODV routing protocol having 1 mbps 'Transmission Data Rate' will perform best routing.
Keywords: MANET, AODV, Taguchi, Orthogonal Array (OA), Routing Load, Throughput, Delay.

I.   INTRODUCTION

A Mobile Ad-hoc Network (MANET) is an autonomous system that is composed of mobile nodes which communicates through wireless links [8] without any preexisting infrastructure. Mobile nodes in ad-hoc wireless networks functions as a router and dynamically establishes routes among themselves by mean of a routing protocol. Therefore, selection of an appropriate routing protocol is an integral part of establishing a MANET in a scenario. The MANET environment is characterized by variables as "Number of Nodes", variable capacity wireless links and bandwidth constraints [6]. Due to infrastructureless, MANET topology is dynamic, in which the connectivity changes frequently and is unpredictable that makes routing complex [13] in MANET. The MANET performance is also dependent on Environment, Wireless Medium, Transmission Errors, Node Failures, Link Failures, Route Breakages, Congested Nodes or Links [9, 17, 22].

There are lots of 'Routing Protocols' have been proposed in the literature to solve the routing problem in MANETs and use different routing algorithms to accomplish the mission. A part from the

Performance analysis of MANET routing protocols considering mobility models

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Abstract: *Today MANET is not restricted to only military battlefield application where nodes are moving in like directed graph. Now MANET is used for various applications like disaster relief application, mobile classroom etc.. The mobility is important parameter to be considered while measuring or comparing the performance for various applications under MANET. The mobility parameters are the starting location of mobile nodes, their movement direction, velocity range, speed changes over time. The mobility of the nodes affects the number of average connected paths, which in Turn affect the performance of the routing algorithm. So, the performance of the MANET varies according to the applications as well as mobility model. This paper evaluates the performance of AODV routing protocol on mobility issue with Random Waypoint and Manhattan Grid mobility model using NS-2 simulator to measure the Routing Load, Average end-to-end delay and Throughput metrics. The simulation results show that AODV performance is better in Random Waypoint model than Manhattan Grid mobility model.*
Keywords: *End-to-End Delay, MANET, Manhattan Grid (MG), Random Way Point (RWP), Routing Load, Throughput.*

I. Introduction

Initially, MANETs was developed and deployed as per military needs. Today, MANET is applied in almost all fields such as emergency search-and-rescue operations, commercial environments, home and enterprise networking, entertainment, meetings or conventions in which persons wish to quickly share information, and data acquisition operations in inhospitable terrain with mobile nodes. The MANET is defined as a collection of mobile nodes where each node is free to move arbitrarily in an infrastructure-less environment. The nodes are mobile with random movements and varying speed can make the network topology very dynamic and complex.

The various factors such as transmission range, buffer space for message storage, battery power, computing power, data traffic and mobility cause variation in performance of MANET. The mobility [2, 6] is one of the factors affecting network performance in significant way. The movement of nodes in MANET causes link disconnections will be affecting the performance of the routing protocols. Therefore, there is a need to study mobility models to understand what degree of nodes mobility affecting routing protocol performance [4, 7]. The studies show that different mobility models have different characteristics and serve different purposes [19, 22].

Therefore, instead of using same Mobility Model [3, 8, 10] for every instance, the researchers should select various mobility models to study its behavior and effects on Network performance [11, 13, 16]. Selecting mobility model that describes movements of the nodes is one of the important factor selections for simulating the MANET for comparative study [10, 20, 21].

II. Literature Review

Ashutosh [4] analyzed the behavior of MANET routing protocols under three mobility models with the varying nodes, have similar performance for all protocols. The result is decrease of the network performance in some models or some give excellent performance. There is optimum performance for small networks of around 50 nodes in an area of 700 m × 700m.

Bhavyesh [5], the performance of a routing protocol varies widely across different mobility models and one model cannot be applied to other model, as per his experimental study with Random Waypoint, Group Mobility, Freeway and Manhattan models for routing protocols DSR and DSDV.

M.K. Jeya [12], the routing protocol AODV perform better than DSDV, TORA and DSR protocols under Random based mobility models (Random Way Point model, Random Walk model, and Random Direction model).

Narinder [14], results show that, Vector Mobility Model performs better than Random Way Point Model for AODV, OLSR and GRP routing protocols for the network size of 25nodes and 50 nodes.

Performance Measurement and Analysis of MANET Routing Protocols on nodes Scalability

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Abstract: *Mobile Ad hoc Network (MANET) is one of the Ad hoc Wireless Networks. MANETs are autonomous and infrastructureless in which mobile nodes can move freely in arbitrary pattern, so topology is changing frequently. This dynamic nature of topology makes the routing protocol design complex. More and more applications are deployed in MANET in which nodes are in and out more frequently making the MANETs size scalable. This scalability is an important consideration while measuring the performance of MANET routing protocols. Selecting or measuring the efficient MANET routing protocol is a challenge for the application selected to deploy on MANET due to dynamic nature of topology and network size. This paper evaluates the performance of MANET Reactive Routing Protocols AODV and DSR while considering node scalability in the network using NS-2 simulator. The comparative analysis of the results are considered to understand the Routing Load, Average end-to-end delay and Throughput for AODV and DSR routing protocols for the selection of suitable routing protocol for different applications having varying nature of node density. It is observed that AODV perform better in scalable MANET than DSR where throughput is more important rather than load and end-to-end delay.*

Keywords: AODV, DSR, End-to-End Delay, MANET, Routing Load, Throughput.

INTRODUCTION

A MANET is infrastructureless wireless network in which each mobile node communicates with each other using multi-hop wireless links. The nodes in MANET act as a router as well as packet forwarding agency for each other. As the MANET environment is characterized by nodes (Mobile hosts), variables capacity wireless links, bandwidth constraints and due to infrastructure less dynamic topology in which the connectivity changes frequently and it is unpredictable. So, designing and selecting the efficient routing protocol is the challenge for the application selected for MANET deployment. Therefore, the traditional routing protocols already developed and named as Link-state or Distance-vector used for fixed and wired networks, will not be effective and efficient for MANET environment.

Now days, MANET is deployed to various areas where limited or no communication infrastructures exist but need a network for different business operations. The examples are emergency search-and-rescue operations, commercial environments, home and enterprise networking for enhancing lifestyle, entertainment, meetings or convention in which information is quickly shared, data are available to a operations in inhospitable terrain, military operations in battlefield, sensor networks for smarter rural and urban development, for managing quickly in disaster area network, personal area network, collaborative work, and educational applications like mobile classroom. In such applications MANET is the only solution but the main problem is varying number nodes. The node may be added or removed

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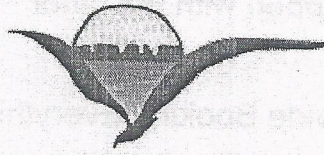
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End-To-End Application Performance Improvement on 2g Secure Network

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ABSTRACT

The need is to provide wireless with higher data rates, quality of service and adaptability within the same network or among networks of different technologies and service providers in the rapid growing area of wireless communication with mobility. Latency and Jitter are important in applications performance. The latency caused at host level and network level are due to packet creation delay, network delay, and propagation delay. In this paper, it has been considered that the transmission of data from client to server and vice-versa for data sharing applications such as file or database sharing are with optimum latency or maximum throughput. The experimental setup considered in this paper is on 2G network for Cost-effective communications. For improvising end-to-end application performance the dynamic Compression-Decompression method along with VPN is used to achieve better throughput. The Application performance is enhanced by 55%-60% in case of text data and overall throughput is improved by 56.5% in this experiment.

Keywords--- Compression, throughput, latency, 2G, Performance, http, ftp, VPN

I. INTRODUCTION

The world is moving to the age of velocity in every field especially the wireless network. The need is to provide wireless with higher data rates, quality of service and adaptability within the same network or among networks of different technologies and service providers in the rapid growing area of wireless communication with mobility [6].Speed and Security with cost effective solutions are the needs over the wireless network for file sharing between client and server are the challenges in today's business environment. The mobile wireless technologies have experienced the various generations of technological revolution & evolution from0G to 4G. With this wireless technology evolution the cost of usage has increased in file sharing applications environment as it goes to higher generations.

Latency and Jitter are important in applications. Latency is the elapsed time between events A to B. The latency refers to the delay between sending and receiving a message over a network. The overall application latency is comprised of the time to process messages at both the sending and receiving hosts which is called host latency and the delays which occur inside the network which is measured as network latency. It can be also caused by a number of factors such as packet creation delay, network delay and propagation delay. The standard recommendation for delay sensitive application is the one way latency should not exceed 150 ms, if it exceeds than it will cause the degradation of application performance. In some applications the throughput is important such as email applications where the need is to transfer data in less than 60 seconds [9].

The most critical part in File sharing system processes is to send and receive the Files in the least time with Security. The HTTP or FTP are File Sharing protocol used to retrieve the Files from the File server. The VPN (Virtual Private Network) Protocol is used as Security measure. The performance of File downloading is acute in the 2G network. The aim of this proposed study is to improve the application performance on wireless WAN 2G network by introducing the dynamic compression method for End-to-End Data / File transfer.

File Transfer Protocol (FTP) is one of the simplest methods to transfer data over the Internet. Today, enterprises still rely heavily on FTP for multi-scale data
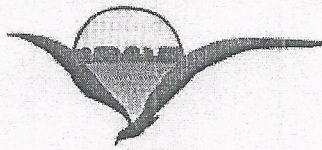
Performance Comparison of MANET Routing Protocols (*OLSR, AODV, DSR, GRP and TORA*) Considering Different Network Area Size

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ABSTRACT

The need, popularity and easy deployment of MANET with less cost has increase its application areas from military to day-to-day life and research to business. The application uses MANET need best performance. MANETs are autonomous and infrastructureless in which nodes are free to move arbitrary, makes network topology unstable and the routing become complex in such dynamic nature of topology. The set of applications for MANETs is diverse, ranging from small to large-scale networks. The network area scalability is an important consideration while measuring the performance of MANET routing protocols. This paper evaluates the performance of MANET Routing Protocols OLSR, AODV, DSR, GRP and TORA on varying network area size using OPNET simulator. The performance of these routing protocols are measured and compared on 'Average Routing Load', 'Average end-to-end delay' and 'Average Throughput' metrics. The performance rank tables give insight to select better then the best routing protocol for application scenario.

Keywords---- AODV, DSR, GRP, OLSR, TORA, End-to-End Delay, MANET, Routing Load, Throughput.

I.   INTRODUCTION

A Mobile Ad-Hoc Network (MANET) is an autonomous system composed of the mobile nodes, which communicates through wireless links without any preexisting infrastructure. In MANET, each mobile node is free to move independently in any direction, and frequently changes its links to other mobile nodes. The MANET is highly dynamic network [3][16] in that topology changes frequently and unpredictable. Ad hoc network have no fixed routers and all nodes are mobile in which they are connected dynamically in an arbitrary manner. Mobile nodes in ad-hoc networks function as a router and can dynamically establish routes among themselves by means of a routing protocol. The primary challenge in building a MANET is equipping each mobile node to continuously maintaining the destination node reachability information for properly routing the traffic.

The MANET could be used in situations where no infrastructure is available. The set of application for MANETs is diverse, ranging from small to large scale networks. Due to its flexibility, mobility and portability MANET is widely accepted for different application scenario and day-by-day its usability and popularities are increasing. A few examples of its applications are rescue operations for earthquake prone areas, emergency services, battlefield applications and a remote construction site where local coverage must be deployed quickly. Some other applications are exchanging data or playing electronic games; ship-to-ship communication; civilian environment like taxicab, sports stadium, boat and small aircraft, virtual classrooms etc.

There are lots of 'Routing Protocols' have been proposed in the literatures to solve the routing problem in MANETs and. The routing algorithm are classified as proactive (table driven), reactive (on-demand), geographical (position based routing) and hybrid (combination of best feature of proactive and reactive) [6][9]. Different Routing Protocols are suitable for different application scenarios having different conditions and environments like 'terrain or topography', 'node speed', 'pause time of nodes', 'Number of Nodes in a network', 'variable capacity wireless links or transmission range', 'transmission data rates', 'maximum connections for an instant' and 'bandwidth' [6][10][20][24]. Thus, selecting efficient MANET routing protocol for a realistic environment is the challenge.

The IETF, MANET working group had accepted

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Performance Analysis and Comparison of MANET Routing Protocols in Selected Traffic Patterns For Scalable Network

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Abstract: A MANET is autonomous Network of mobile nodes in which mobile nodes can communicate without any mean of infrastructure. Many routing protocols have been proposed for MANET, but none of them has good performances in all scenarios due to different variance. The variance can be network area size, node scalability, network traffic load, node mobility and node mobility pattern. The traffic model determines the reliability and capability of MANET. In the recent years, MANET has gained the popularity in many diverse applications having different mobility models and traffic patterns. This paper evaluates the performance of Reactive Routing Protocols AODV and DSR in traffic models CBR, Pareto and Exponential using Random Waypoint mobility mode for the scalable network of 10-200 nodes and compared on the basis of three performance metrics: 'Routing Load', 'End-to-End delay' and 'Throughput' using NS-2 simulator. The results story shows that, DSR routing protocol better perform in CBR, PARETO and EXPONENTIAL traffic pattern in terms of routing load and end-to-end delay. If MANET applications requirement is 'throughput' then AODV routing protocol is slightly better in all the three traffic patterns: CBR, PARETO and EXPONENTIAL.

Keywords- MANET; AODV; CBR; Pareto; Exponentia;, Random Way Point; Routing Load; Throughput; End-to-End Delay.

I. INTRODUCTION

A MANET is wireless network consists of wireless mobile nodes communicating with one another for ad hoc purpose [10]. It is a self creating, self organizing, self configuring and self administrating network of mobile nodes connected by wireless links in which topology changes frequently and it is unpredictable. Each node in the network behaves as router and forward packets for other nodes. When nodes act as routers, they discover and maintain the other nodes in the network. As MANET environment is characterized by frequently changing topology and varying channel conditions, routing is a challenging problem. Many routing protocols have been proposed for MANET, but none of them has good performances in all scenarios due to different variance. The variance can be network area size, node scalability, network traffic load, node mobility and node mobility pattern.

Application layer traffic analysis is important for a particular application on ad hoc network to understand the performance of ad hoc network. The type of resources in communication at application layer depends on type of applications used. For example video streaming over the network requires more resources than sharing a file, sending an email needs accuracy but it does not require bandwidth or delay. For these requirements careful analysis of application traffic in the various conditions is the requirement [7]. Also Traffic estimation reflects the volume of traffic that flows between all possible paths from source and destination in MANET [9]. Efficient routing is the current demand of a Mobile Ad-Hoc Network. In order to communicate well the routing algorithm needed to be the best in all the conditions and traffic environments [5]. Analyzing and understanding the traffic characteristics of the network is an important to understand applications performance.

In the recent years, MANET has gained the popularity in many diverse applications having different mobility models and traffic patterns. A few possible examples are earthquake hit areas, where infrastructure is destroyed; military soldiers in a destructive environment; virtual classrooms, biological detection, tracking of rare animal, space exploration, and undersea operations. Some more examples are as emergency situations like natural disasters, emergency and rescue operations, field applications etc. Each of these applications can potentially involve in different scenarios with different mobility patterns and traffic patterns.

Traffic behavior is one of the key factors for the performance of a network. The traffic patterns play an important role in the performance of routing protocols. In case of Constant Bit Rate (CBR) the traffic pattern generates data packets at a constant rate [1] and is good enough for text transmission. CBR does not accommodate the specific features of multimedia applications and video-conferencing services. Recently, multimedia applications have drawn the attention of researchers a lot in MANET. These multimedia applications have a radically different traffic pattern. The data rate in voice application increases till it reaches a maximum peak. The Exponential Traffic Pattern which is very useful for generating multimedia traffic such as audio, video and text traffic etc. This pattern of traffic can be captured by Exponential distribution