

# A Review Paper on “Mobile IP Using TCP Protocol”

Komal Prasad Yadav

Asstt. Professor, CSE Department, Shri Rawatpura Sarkar University, Raipur (C.G.), [it.sruaripur@gmail.com](mailto:it.sruaripur@gmail.com)

**Abstract-** Mobile computing gadgets prepared with transceivers form Mobile AdHoc Networks (MANET) when or greater of these gadgets locate themselves inside transmission range. MANETs are stand-alone (no existing infrastructure needed), self reliant networks that utilise multi-hop verbal exchange to reach nodes out of transmitter range. Unlike infrastructure networks e.G. The Internet with fixed topology, MANETs are dynamic. Despite the heterogeneous nature of these two networks, integrating MANETs with the Internet extends the network insurance and provide application area of MANETs. One of the various ways of combining MANETs with the Internet involves using Mobile Internet Protocol (Mobile IP) and a MANET protocol to route packets between the Internet and the MANET through Gateway agents. In this paper, we examine the overall performance of Mobile IP on MANET in Network Simulator 2 (NS2). We have implemented Mobile IP on Ad hoc On-call for Distance Vector (AODV), Ad hoc On-call for Multiple Distance Vector (AOMDV) and Destination-Sequenced Distance Vector (DSDV) routing protocols and compared performances based totally on Throughput, End-to-End Delay (E2ED), Packet Delivery Ratio (PDR) and Normalized Packet Ratio (NPR). The simulation results recommend that on-call for routing inside the MANET better serves Mobile IP on MANETs.

**Keywords-** Mobile Ad Hoc Network, Mobile IP, AODV, AOMDV & DSDV

## I. INTRODUCTION

The technology standard permits the advent of highly flexible wi-fi LANs. This has brought about the current popularity of patron 802.eleven devices. As a result, there was a rapid deployment of small-scale wi-fi get entry to networks in airports or busy city areas. A cellular node wishing to connect with these wireless networks has to carry out an IP level configuration along with the challenge of a valid IP cope with to its wi-fi community interface and the configuration of a default router.

This IP configuration is simplest legitimate on a specific network. Should the cell node's wi-fi interface hook up with an adjoining network, the present IP configuration becomes invalid. Even though a physical connection to the adjacent community has been established, the cellular node will no

longer be able to send or obtain IP packets. Mobile IP allows a mobile node emigrate among different IP networks without breaking any upper-layer sessions. When a cell node moves from one community-level factor of attachment to another, a Mobile IP handoff takes place. This handoff is composed of a series of stages that consists of the detection of a mobile node's movement to the new network.

In the recent years with the development of cellular wireless technology, there's a massive shift inside the educational from traditional way of teaching and exam pattern to cellular getting to know environment. Several universities included the mobile era into their coaching and studying surroundings and acknowledges the potential of mobile technology as a powerful medium for teaching and assessment tools in particular while there are mass students appeared in an examination (as an example entrance examination for a university. There are already several research works published on on-line E-examination structures to simplify the evaluation technique by way of automatic marking which significantly reduce the complex paper assessment work specifically when there are mass students seemed in an examination. However, little studies has been completed on effect of the use of ubiquitous gadgets for coaching and mastering. Session preliminary protocol (SIP) based IP Multimedia Subsystem (IMS). The IMS platform is based totally on 3 layered structure designs, The IMS core community is composed of particularly Transport layer, Control layer and Application layer. SIP has emerged because the vital generation for controlling conversation in IP-based Networks. IMS is nice described as the glue between the —global applications world (Internet) and the mobile world. Using IMS 0.33 party developers can easy set up their programs over mobile networks [4]. According to the standards, IMS is defined inside the form of reference structure to permit transport of next-era verbal exchange services of voice, data, video, wi-fi, and mobility over an Internet Protocol (IP) network. Using IMS, programs can integrate voice, text, pictures, and video in seamless name sessions, offering tremendous ease-of-use to subscribers and allowing carrier vendors to drive branding through a common interface, at the same time as substantially decreasing operating costs [5]. Application development fee can dramatically lessen as IMS offerings are facilitated

through wealthy web development equipment inclusive of Java environments, Voice XML forms, and other XML (extensible Mark-up Language) derivatives.

Component based development (CBD) is ideal picks for developing cellular application, as CBD model encourage assemblies of components for systems improvement rather than building the entirety from scratch. CBD technology comprised of enforcing a issue into a machine through its well defined interfaces [6]. Using well-defined interfaces, a issue have interaction with other additives to perform a partial characteristic of the device. The internal shape of the element and the implementation of the interfaces are hidden to the outside. Therefore, CBSE enables a dispensed and independent improvement of additives in addition to a truthful substitute of a thing with the aid of a different aspect in large-scale systems [7]. CBD support the development of additives as reusable entities and software developers need not to reinvent the wheel if wheel is already to be had in the market which allows in lowering the software improvement time and fee as well. We practice this model on Mobile Mass Examination (MoMEx) system that is an utility attracting the hobby of educational authorities around the world due to its capability convenience. MoMEx also includes an hobby management application for the school that lets in them to manipulate the exam system in actual time and to view all scholar data.

## II. RELATED WORK

In order to know the usage of smart phone in universities to support education, authors [8] designed and implemented several mobile based educational services at VaExjoÈ University. The aim of the research is to know which content and services could be delivered to the smart phones for learning and communication in context of university studies, In their project 41 students from two different courses participated for a period of three months, a survey was conducted to know the support of the services provided on smart phone, results indicated that students perceived the services as useful to learning; interestingly, and helpful in their learning. In the paper the author [8] recommended mobile services to be implemented in higher education to improve the usability, institutional support and tailored educational content purposes.

Accomplished some simulations to validate their study. In this proposal, the authors used Mobile IP with Foreign Agent care-of-addresses to reach Mobile Nodes from the Internet. Packets were exchanged between Home Agent and the Mobile Node via reverse tunnelling to reduce the necessities on AODV. A novel Internetworking unit changed into added between Mobile IP and

AODV to ensure that no adjustments be made to Mobile IP outdoor the MANET. The emphasis of the thesis changed into now not on performance assessment and so the simulations were not quite extensive. Also, the Internet draft "Global Connectivity for IPv4 Mobile Ad Hoc Networks" [5] sometimes known as Global4, presented a solution which involves the usage of Mobile IP with foreign agent care-of-addresses and AODV just as became done in MIPMANET. However, foreign agent discovery become made part of AODV while cell node registrations with the overseas agent via Mobile IP is maintained. In the paper titled "Wireless Multi hop Internet Access: Gateway Discovery, Routing and Addressing" [6], an alternative technique to offering Internet Access for MANETs is describes. In this method, Mobile IP is eliminated. The use of precise routers that serve as gateways resolve the heterogeneity between the constant Internet and the MANET. Although the solution looks promising, it was based on IPv6 networks which has not gained recognition over IPv4 networks.

In the paper the author [8] recommended mobile services to be implemented in higher education to improve the usability, institutional support and tailored educational content purposes.

The author [9] in his research finds the state of art tools and benefits of mobile wireless technology usage in higher education across the globe. Three popular mobile wireless technologies are used in higher education and identified that each one requires different technical infrastructure to access to network resources, the three technologies they explored were wireless computers, PDAs, and web-enabled mobile phones. Issues related to each three technologies must be study before it implemented in the higher education and one such issue is security. How to achieve educational goals administrators, educators, and students must think critically to determine how to use the new technologies without it is virtually impossible to study any subject of mobile wireless technologies in higher education [9].

Most of the Mobile Learning Applications uses multimedia data such as video clips, images and documents, the authors [8] in their research analyzed and investigated for a need of fast and reliable data storage and retrieval. [10] proposed a Database Management Architecture for an Innovative Evaluation System based on Mobile Learning Applications for faster data storage and retrieval. Emphases of the investigation were for high throughput so as to support multimedia for Mobile Learning Applications development. Reference [11] designed and implemented Online Scoring System and the concept can be helpful in designing mobile based assessment system or online examination system. How to design and implement scoring system and various functionality required for scoring system were also discussed in the paper. The system was practically implemented and provided satisfactory positive result [11].

Reference [12] implements a prototype system named Mobile Exam System (MES) is implemented on Apple iOS and Google Android OS. The aim of the research is to simply the examination management and assessment process in the universities. The verification and validation studies of MES can be said to be successful [12]. MES was well designed and developed some of the features of the system as reported in the paper are, Interface designed for MES was simple, and easy to use, System was Efficiency and secured as the main security concerns of the system were the authentication, privacy, and information encryption [12]. Jiang and Yang [13] used a component-based service framework for mobile applications. The objective of this research is to develop a service creation framework using the domain of mobile service engineering. Im [14] conducted a research in support of CBD technology in mobile applications.

Maria Is Po. [15] studied delay-sensitive and non-sensitive applications performance such as chat and messaging services in UMTS system mainly focusing on the UMTS SIP-based service. [15] presented a performance analysis of IP based packet-switched UMTS services. The results presented in the paper showed SIP signaling introduces a large transmission delay in the network, to reduce the transmission delay authors [15] suggested decrease number of messages exchanged during the SIP procedures and reduction in number of network elements by collocating them.

The author [16] proposed IMS and SIP based prototype framework for sensor based application development , the aim of the research is to study the appropriateness of IP Multimedia Subsystem for sensor-based applications and the framework was analyzed on medical observing aid prototype such as distance monitoring of vital medical parameters , real-time medical data transfer (telemedicine). The prototype is used for measurement of time dependency of sent, received and played packets [16]

### III. EXPERIMENTAL SETUP

This paper analyses the overall performance of TCP over MIP.

It focuses on the impact of the triangle routing and MIP handoff overheads to TCP performance. For the latter only MIP handoffs with LCS and ECS help are studied because it is assumed that within the absence of true overlapping the PM method functions the same as the LCS method. For each take a look at series, either triangle routing or MIP handoffs a exclusive MIP implementation is used. The first take a look at collection is executed over version 2.0 beta of the National University of Singapore (NUS) Mobile IP implementation for the Linux Kernel 2.zero.24 that is compliant with. For the second series the Sun labs Mobile IP implementation for Red hat 5.X Linux is used. It is absolutely compliant with [1] and [2] and implements all 3 movement detection methods. Figures three and 4 gift the test bed topologies for each take a look at series. They encompass Pentium PCs that are running Red Hat 5.2 Linux. All community connection is

provided with Ethernet. The tool used for the era and benchmarking of TCP visitors is the public-domain tcp benchmarking software.

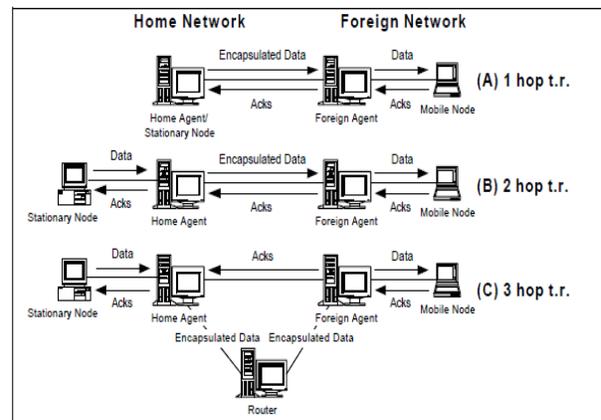


Figure 1: A TCP communication with (A) 1 hop (B) 2 hops (C) 3 hops triangle routing

### IV. RESULT AND ANALYSIS

The modern-day infrastructure of Internet hosts does not comply with the considerations for routing optimisation to cell communications that removes the want for triangle routing. Consequently, until the wide deployment of next era Internet hosts, triangle routing can be a permanent impact to all Internet mobile communications. It is widely recognized that extending the direction of a verbal exchange with the aid of additional hops degrades overall performance. The triangle routing take a look at series do no longer aim in pointing this out, rather to raise consciousness on the impact of triangle routing to TCP performance. In this section the quantity through which TCP overall performance is degraded per single hop in the triangle route is identified. For this, 3 one of a kind exams had been achieved in which the triangle direction is increased through a single hop. TCP communiqué were examined with: (A) 1-hop triangle direction, (B) 2-hops triangle direction and (C) 3-hops triangle direction. In each test 1000 MB is transmitted over a "raw" TCP connection from a Stationary Node (SN) to a MN. The main characteristic of this switch is asymmetry to the quantity of traffic that the MN sends and receives. That is, the MN is the recipient of a bulk of statistics while it's miles required to reply with small acknowledgements. Only communications of this type are considered because it is predicted that MNs will normally participate in such communications (i.e. Web traffic). Each transmission is repeated for ten times to do away with randomisation. The experimental topology similar to each check is supplied in Figure 2. In all 3 checks the link among the HA and the FA is supplied with Ethernet links to put off Carrier

Sense Multiple Access/Collision Detection (CSMA/CD) collisions and preserve resemblance to real life scenarios.

Another TCP mechanism with resistance to mobile computing is the Path Maximum Transmission Unit (MTU) Discovery. The capability of this mechanism is to drop packets which are larger than the Path MTU. In these test series it is diagnosed that MIP suffers from this mechanism as MN movement is typically accompanied either by encapsulation packet size increase or Path MTU reduction due to change within the network path. In both case Path MTU Discovery causes lack of at least one TCP packet which can handiest be recovered via a TCP timeout. It is taken into consideration that because of Path MTU Discovery a TCP communiqué over MIP need to suffer a further TCP timeout with every MIP handoff. It is noted that TCP communications that suffer timeouts should begin the conversation with the slow-start algorithm.

Single hop triangle root	76.56
Double hop triangle root	<b>75.63</b>
Triple hop triangle root	75.67

Table 1: The efficiency of a TCP communication with an Increasing triangle route

## V. CONCLUSION

In this paper the overall performance of TCP over Mobile IP has been evaluated. The have a look at makes a speciality of the impact of triangle routing and Mobile IP handoffs to TCP performance. It is diagnosed that triangle routing degrades the efficiency of a TCP communication by 1% in line with intermediate hop within the triangle route. It is provided that a 20-hop triangle direction increases by way of 50% the put off of a TCP communiqué. The examiner of Mobile IP handoffs assumes single-agent sub networks and inability of cell nodes to contemporarily take part in multiple subnet networks. It is identified that the period of a Mobile IP handoff is immediately dependent on the motion detection technique. Under the assumed conditions it's far offered that the Prefix-Matching technique has a similar capability to the Lazy Cell Switching, therefore most effective the Lazy and the Eager Cell Switching strategies were considered. It turned into experimentally derived that Eager Cell Switching based Mobile IP handoffs entire 3 seconds quicker than their Lazy Cell Switching counterparts. It changed into additionally shown that for the duration of a MIP handoff TCP stories several successive timeouts that boom the timeout interval beyond the length of the handoff. This reasons the TCP verbal exchange to stay halted even

after the finishing touch of the MIP handoff. It was also recognized that motion is normally followed either by using packet size growth or Path MTU discount which leads to further packet loss by the Path MTU Discovery mechanism. In total it is experimentally identified that TCP recovery of a Mobile IP handoff with Lazy Cell Switching aid is 12.5 seconds even as the corresponding put off for Eager Cell Switching handoffs is 5-5 seconds.

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