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Comparisons of TCP and UDP protocol using Fast Registration Mobile IP Method for Wireless Communication

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***Abstract* - The main purpose of Fast Handoff is to provide high data rate and reduce the association time between Base station (BS) and Mobile station (MS). If handoff process is not efficient, it may cause delay. This delay does not affect the non real time application like file transferring etc. but this delay may seriously causes the real time application like voice, video conferencing etc. In this paper, we propose an algorithm for the wireless network that offer seamless, fast handoff, supporting VoIP and other real time application traffics for any type (802.11) devices and compare TCP and UDP protocol. The performance of these algorithms will be verified using NS2 tool.**

Keywords* - *Wireless Mesh network; fast handoff VoIP; DHCP; MAHO

I. INTRODUCTION

Mobility is the most important feature of a wireless cellular communication system. Usually, continuous service is achieved by supporting handoff (or handover) from one cell to another. Handoff is the process of changing the channel (frequency, time slot, spreading Code or combination of them) associated with the current connection while a call is in progress. It is often initiated either by crossing a cell boundary or by deterioration in quality of the signal in the current channel. Poorly designed handoff schemes tend to generate very heavy signaling traffic and, thereby, a dramatic decrease in quality of service (QoS). The Coverage areas are irregular because of the radiation pattern of the base station antenna, buildings, trees, mountains and other terrain features. Adjacent coverage areas may overlay considerably. Some overlay is desired because handoff is required when an MS moves from one BS coverage area to another during the course of a conversation. To continue the conversation, the handoff procedure should be completed while the MS is in the overlay region.

As the MS moves toward the edge of the BS coverage, the signal strength and quality begin to deteriorate. At some point the signal from neighboring BS becomes stronger than the signal from the serving BS. Additionally, the new BS receives a stronger signal from the MS than that received by the old BS. The conversation needs to be handed over to the new BS before the link between the old BS and the MS becomes unusable. Otherwise, the call is lost. Several issues need to be considered for handoff management:

-handoff initiation
-channel assignment
-radio link transfer

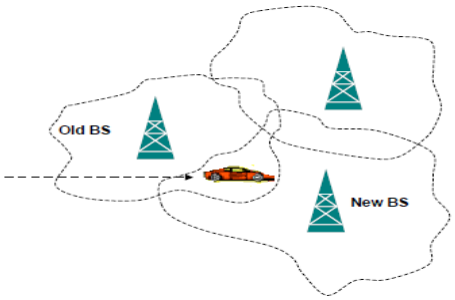

Figure: 1 Handoff process

II. RELATED WORK

Ramani and Savage [7] have y demonstrated that a quick handoff is possible on 802.11 networks when the client monitors the signal quality of access points and uses a fast scanning mechanism to listen to all APs in range to choose the best one. Sync Scan system proposed in the paper has achieved an impressive handoff as low as 5 ms. The fast scanning is achieved through driver modifications to a client's network adapter. In contrary, our approach uses any unmodified 802.11 client. In [6] the architecture and protocol of Smesh provides a fast handoff for any 802.11 device. A DHCP protocol along with gratuitous ARP protocol which continuously monitoring the link quality measure for the best access point. Any modification in the network topology, the information update between BS through LSP and the network operated in "ad-hoc mode". In [8] A cross-layer Handoff protocol (CFHP) which take into account the single strength, hops and link state which improves the system throughput and the delivery ratio significantly. In the next section, we introduce the related work on handoff. In Section III, we describe handoff initiation. Proposed MAHO Fast Handoff algorithm described in section IV. Comparison of presents technique for handoff are described in Section V Finally, Section VI summarizes the paper.

III. HANDOFF INITIATION

Handoffs are expensive to execute, so unnecessary handoff should be avoided. Inappropriate handoff may result in handing back and forth several time in the overlapping region between the two BS coverage areas. Handoff detection is based on link measurement. Each BS continuously monitor the link quality measure and DHCP [2][3] daemon is also continuously running. Three measurements are used to determine the quality of channel:

1. Word error indicator (WEI)
2. Received signal strength indicator (RSSI)
3. Quality indicator (QI)

Handoff may depend more reliably on WEI (based on the compilation of the measured data for the desired signal over a period of time) of the current channel rather than RSSI. If WEI is good then handoff is not performed. To make the handoff decision accurately and quickly, it is desired to use both WEI &RSSI.

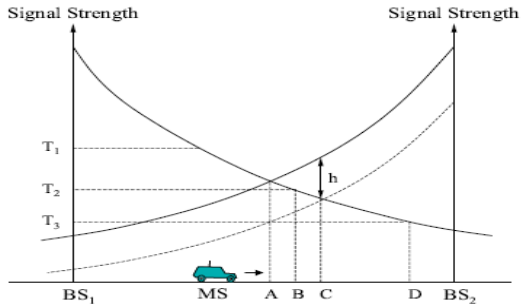

Figure: 2 Signal strength between two adjacent BSs for potential handoff.

This method allows a MS to hand off only if the current signal is sufficiently weak (less than threshold) and the other is the stronger of the two. The effect of the threshold depends on its relative value as compared to the signal strengths of the two BSs at the point at which they are equal. If the threshold is higher than this value, say T_1 in Figure 2, this scheme performs exactly like the relative signal strength scheme, so the handoff occurs at position A. If the threshold is lower than this value, say T_2 in Figure 2, the MS would delay handoff until the current signal level crosses the threshold at position B. In the case of T_3, the delay may be so long that the MS drifts too far into the new cell. This reduces the quality of the communication link from BS_1 and may result in a dropped call. In addition, this results in additional interference to co channel users. Thus, this scheme may create overlapping cell coverage areas. A threshold is not used alone in actual practice because its effectiveness depends on prior knowledge of the crossover signal strength between the current and candidate BSs.

IV. PRAPOSED MAHO FAST REGISTRATION ALGORITHUM

There are numerous methods for performing handoff, at least as many as the kinds of state information that have been defined for MSs, as well as the kinds of network entities that maintain the state information [1]. The decision-making process of handoff may be centralized or decentralized (i.e., the handoff decision may be made at the MS or network). From the decision process point of view, one can find at least three different kinds of handoff decisions. Mobile controls the handoffs are called mobile-controlled handoff (MCHO). Scheme whereby the network handle the handoff are called network-controlled handoff (NCHO). A third scheme whereby the network controls the handoff but the MS assists with measurement of the link is called mobile-assisted handoff (MAHO).

In this paper we are working only on the mobile-assists handoff, MAHO is variant of network-controlled handoff whereby the network asks the MS to measure the signal strength from surrounding BSs and reported those measurements back to the old BS so that the network can decide whether a handoff is required and to which BS. In MAHO, the handoff process is more decentralized. Both the MS and the BS supervise the quality of link (RSSI and WEI). RSSI measurements of neighboring BSs are done by the MS. In GSM (Global system for mobile), the MS transmits the measurement result to the BS twice a second. The decision as to when and where to execute the handoff is still made by network that is the BS and the MSC or BSC. The GSM handoff execution time is approximately 1 second. Routing update information and new BS join or old BS leaves the network information shared through the link-state protocol (LSP).

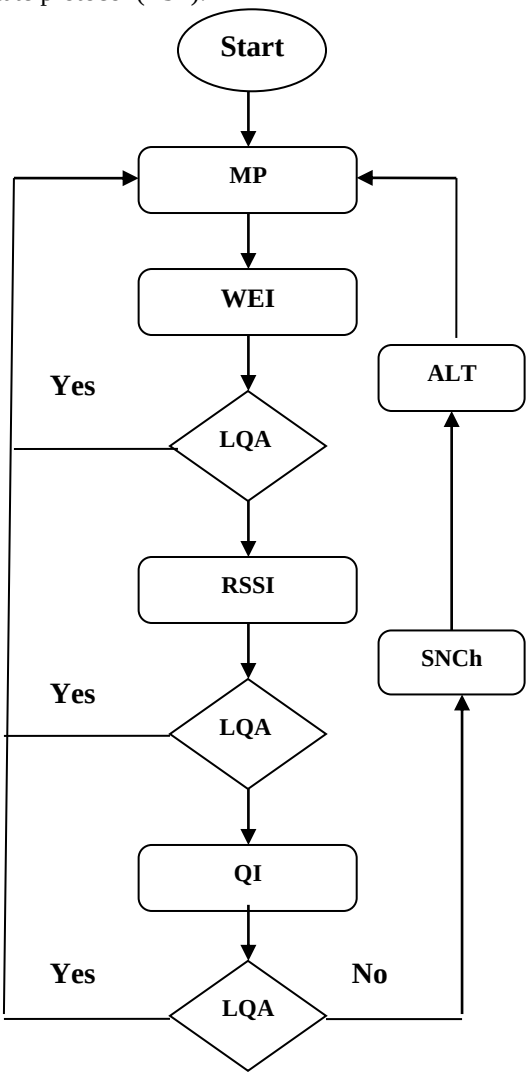

Figure: 3 MS- quality maintenance processing

MP:-Measurement process
LQA:-Link Quality Acceptable
SNCh:-Select New Channel
ALT: - Automatic Link Transfers

V. SIMULATION METHOD

We used network simulator NS-2.34. The network we simulated consists of different scenarios, which contain different number of nodes randomly placed on 300m*300m topological grid. The position of Home Agent (HA) is 1.00, 2.00 meter and Foreign Agent (FA) is 100, 300 meter in grid, simulation time is 30 seconds. We utilize mobility pattern that is based on random waypoint model. The speed of mobile nodes is uniformly distributed between 5m/s to 25m/s. we used different link capacity include 1Mb, 2Mb, 5Mb, 11Mb and 30Mb. Every link capacity for both TCP and UDP is used for various mobile nodes speeds, in order to determine which one is better in particular case. In the simulation scenario the agent perform the function at following way in give below table:

TABLE I.

Sr. No.	Simulation Scenario	Simulation Time
1	Remote host start FTP file transfer at	5 second
2	Mobile nodes start move away from HA	10 second
3	Mobile reach at FA with 20m/s	20 second
4	Mobile start move toward HA with 20m/s	25 second
5	Simulation stop at	30 second

We simulate the steady state condition of network with various background traffics. UDP packet size is fixed 200 bytes with CBR Traffics as compared to TCP with packet size1000 bytes with FTP traffic. The CBR and FTP traffic Data flow start at time 5 second. Also mobile start move toward FA at 5 sec and back toward HA at 25sec. In each simulation scenario, we evaluate through put, good put and packet loss rate.

VI. SIMULATION SCENARIO BY NS2

It is a screen shot of the simulation topology implemented with NS-2 network simulator. Animator window has two domain wired and wireless domain. Node (0) and node (1) in the wired node and node (2), node (3) and node (4) in wireless node.

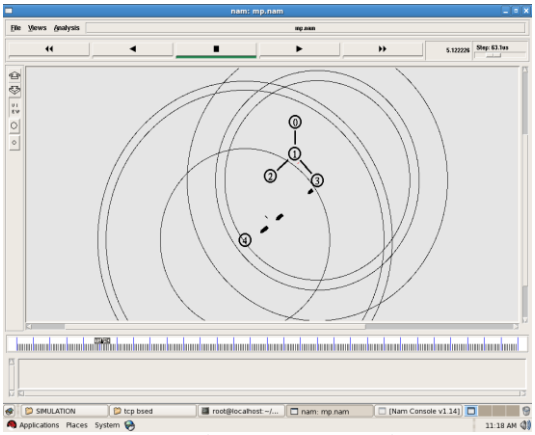

Fig: 4. Screen shot of simulation scenario for TCP/UDP

VII. ENVIRONMENTAL PARAMETERS FOR SIMULATION

Below the table show the needed parameter for our simulation.

TABLE II.

Sr. No.	Parameter	Value
1	Transmission power(Pt)	0.281838W
2	Receivingthreshold (RXThresh)	2.62861e-09 W
3	Propagation model	Two-Ray Ground
4	Frequency	2.4GHz
5	Transmit antenna gain	1
6	Receive antenna gain	1
7	Transmit antenna height	1.5
8	Receive antenna height	1.5

VIII. PERFORMANCE RESULTS

We use FTP for TCP and CBR for UDP traffics. One Remote Host communicates with one mobile Host. During the communication mobile host move from HA to FA.

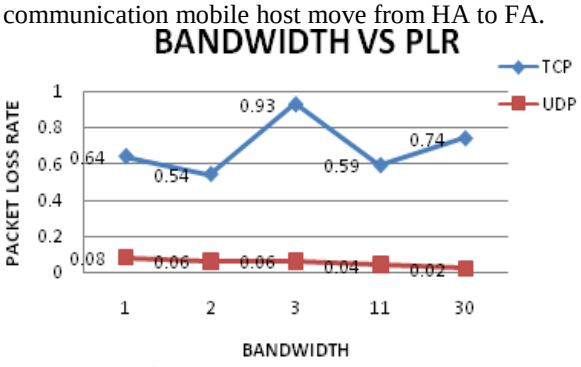

Fig. 5. Comparison of TCP and UDP w.r.t Link Capacity and Packet Loss Rate having only mobile

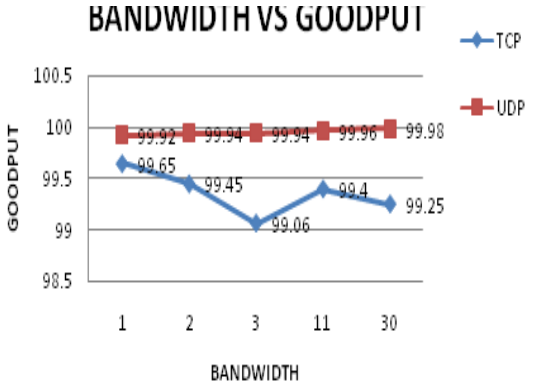

Fig. 6. Comparison of TCP and UDP w.r.t Link Capacity and Good Put having only mobile

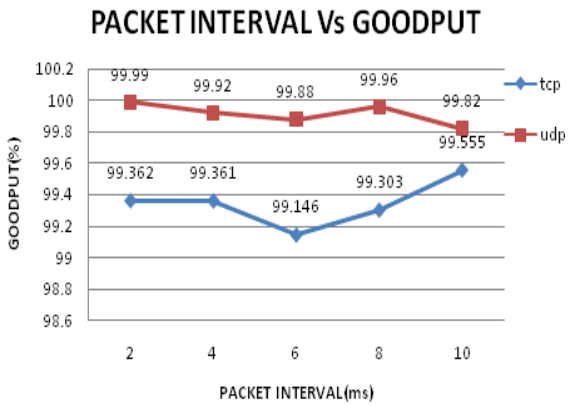

Fig. 7. Comparison of TCP and UDP w.r.t Packet interval (Delay) and Good Put having only mobile host

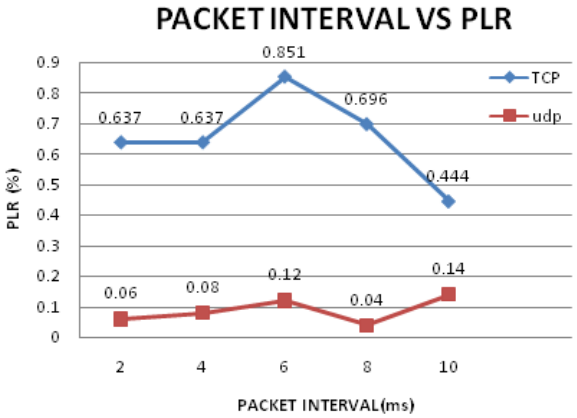

Fig. 8. Comparison of TCP and UDP w.r.t Link Capacity and Packet Loss Rate having only mobile host

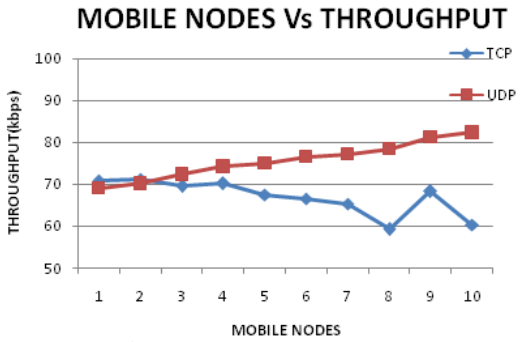

Fig. 9. Throughput of TCP, UDP with speed 20m/s link capacity 20 Mb

IX. CONCLUDING REMARKS

In this paper we have used MAHO fast handoff process and compare packet loss rate, throughput and good put of TCP and UDP protocol and found that UDP gives better perform than TCP for wireless communication and reduce the handoff latency between MS and BS. Also link measurement technique RSSI & WEI employ, which control packet loss and the propagation delay in MAHO. MAHO is the best technique for handling the proper handoff. The performance of MAHO may be implemented through NS2 simulator.

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