Performance of Seamless Handoff Scheme with Fast Moving Detection

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Abstract: This paper describes a new approach to Internet host mobility. We argue that local mobility, the performance of existing mobile host protocol can be significantly improved. It proposes Fast Moving Detection scheme that based on neighbor AP channel information and moving detection table. And, it composes Local Area Clustering Path (LACP) domain that collected in AP's channel information and MN interface information. It stored the roaming table to include channel information and moving detection. Those which use the proposal scheme will need to put LACP information into the beacon or probe frame. Each AP uses scheme to inform available channel information to MN. From the simulation result, we show that the proposed scheme is advantageous over the legacy schemes in terms of the burst blocking probability and the link utilization.

1. INTRODUCTION

The rapidly advancing internet communication technology makes ubiquitous computing feasible where mobile users con have access to location independent information and computing resources. Multimedia networking is another emerging technological trend of the 2000s and there is an increasing demand or supporting multimedia traffic in the wireless LANs. Besides, Mobile Node (MN) offers mobility in networks.

If connection point of transfer MN is changed, method that can keep continuous connection is required. MN that is moving in transfer communication network environment need several technology elements to offer persistent service. Achieve frequent association procedure and reassociation procedure repeatedly between Mobile node (MN) and Access Point (AP) that is moving in transfer communication network. It is important that do to minimize delay of service that MN feels using fast hand off function to secure mobility for transfer MN. Must consider about several items for offer of such persistent service. Item that must consider first while MN achieves handoff process without being serviced, it is problem about abandoned packet. If handoff process has been prolonged, can produce qualitative problem of service by increase of have abolished packet without being serviced at handoff process. Therefore, handoff process quickly could achieve problem awareness about method and solvent by analysis of problem need. Delay time that happen at handoff procedure greatly channel search delay time and authentication procedure delay time and, is consisted of reassociation procedure delay time[1]. Component ratio of delay time channel search delay time about 95% of whole delay time occupy .And, authentication procedure and reassociation procedure are composed about 5% of delay time. Therefore, it is scheme that can do to minimize moved detection time of MN. Moving MN searches each channel that new AP uses. Because abandoned packets exist without being transmitted by MN during this search process, degradation of the transmission rate occurs. Institute of Electrical and Electronics Engineers (IEEE) establish Inter-Access Point Protocol (IAPP) that give a name by 802.11f and is studying scheme to transmit between AP to solve these problems. IAPP scheme is consisted of search process of all channels, authentication procedure, and reassociation procedure with figure 1[3]. reassociation is the process of moving an association from an old AP to a new one. when a MN moves form the coverage area of one AP to another, it uses the reassociation procedure to inform the 802.11 network of its new location. However, this scheme has shortcoming that do not secure mobility for MN handoff delay time.

In this paper, achieve simulation to propose seamless handoff by decrease during MN moving detection process time and analyze comparison about legacy scheme and proposal scheme. And, achieve performance analysis about transmission efficiency and loss of packet about legacy handoff scheme and scheme to propose that reduce channel search time.

Composition of this paper compares difference of existing handoff scheme with Fast Moving Detection (FMD) in 2 chapter continuously in introduction, and 3 chapter analyze simulation result about FMD scheme that use simulation model and propose with legacy handoff scheme. Finally, conclude conclusion in 4 chapter.

2. SUPPORTED FMD HANDOFF SCHEME

Existent channel search scheme searches all channels and collected channel information. However, FMD scheme to propose shares information of channel that adjacency AP using probe message. AP channel information that adjoins informs to MN using is Beacon, and MN searches relevant channel with beacon message. Also, if use FMD scheme to propose, can request information of all channels and reduce

responded channel search delay time. MN delivers through AP Beacon message that early channel information of adjacency AP to search is using present.

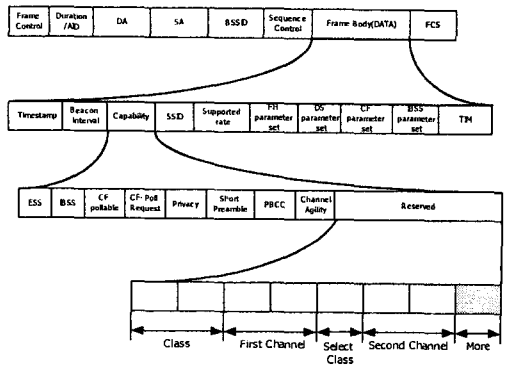

Fig. 1. Proposal beacon message.

In this paper, we propose a new processing scheme using FMD detection. The scheme is performed with the following 4 procedures.

2.1. Probe Request Message

Legacy channel search scheme searches all channels and collected channel information. However, proposal FMD scheme shares neighborhood AP use channel information using Probe message. Therefore, MN searches relevant channel [4]. And, contents that transmit information of channel to terminal are consisted of figure one byte, and first two bit appears dividing each channel in four classes, and next two bit display channel information. If next one bit is class that information of supplied channel is different, it is offset channel setting bit that do set. Refer offset channel setting bit and pass second channel information to MN. Finally, more bit display uses of more channel except channel information that offer.

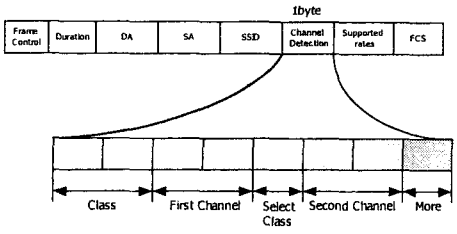

Fig. 2. Proposal probe request message.

Where channel detection search field composition by class division.

Table 1. Division of class by use channel number

Class	Bit	Channel numberLeft
One	1	1,2
Two	1	3,4
Three	2	5,6,7,8
Four	2	9,10,11,12

2.2 Probe Response Message

Channel information that initial channel number through beacon message is supplied, and offers in proposal scheme transmitting to new AP is probe request message to base channel search .And, information of channel that require by probe response message transmit .These proposal scheme reduces channel search delay time because search neighborhood AP use channel. And, unit of channel information that terminal offers accepts channel information two at once. If More flag that exist in each probe request message is set, AP that is received this message supplies additional channel search number transmitting channel information of that refer own neighborhood AP channel information table to MN.

If setting of More flag of is probe response message is removal, MN searches channel that is transmitted through probe response message. And, if channel of odd number is used, field that informs second channel information uses null.

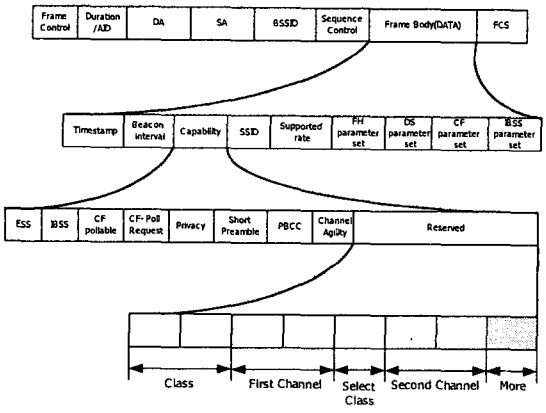

Fig. 3. Proposal probe response message.

2.3 Local Area Clustering Path (LACP) Setting

The Local Area Clustering Path (LACP) is a set of adjacent APs. It is determined by factors such as the APs location in a wireless LAN service area. To utilize the collected information in the neighbor selection algorithm, there are some considerations [4]. The geographical location of the APs is varying important. Although two APs may be adjacent in a distributed system, if they are installed on different floors and the user cannot easily move from one floor to the other, then they cannot be considered to be neighboring APs. Namely, LACP methods during neighborhood AP MN geographical path that do transfer possibility consider and forecast progress direction. For example, install many APs in building and set path, but path between adjoin AP because excepted case that can not move by obstacle in figure5 is established [5].

This LACP referring area each AP to MN channel number transmits. Each AP considers AP and geographical path that adjoin to position to secure information for transfer path and establish LACP. Therefore, LACP area decide path that MN does transfer possibility during abutting AP by Eq (1) and Eq (2).

$$LACP_{adj}(i,j) = \begin{cases} 0 \ (\text{AP(i) and AP(j) are not adjacent}) \\ \alpha \ (\text{AP(i) and AP(j) are adjacent}) \end{cases} \quad (1)$$

$$LACP_{geog}(i,j) = \begin{cases} 0 \ (\text{geographical no pass between AP(i) and AP( ))} \\ \beta \ (\text{geographical pass between AP(i) and AP(j))} \end{cases} \quad (2)$$

$$LACP(LACP_{adj}, LACP_{geog}) = \left\{ \begin{array}{l} LACP\ (0,0) \\ LACP\ (\alpha,0) \\ LACP\ (\alpha,\beta)\ \text{generateof LACP Table} \end{array} \right\} \quad (3)$$

Select AP that value of appropriate α and β exists to Eq (3) and compose LACP table.

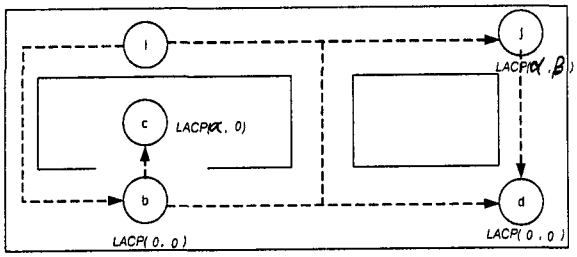

Fig. 4. Figure shows an example placement of APs and generate of LACP table

And, is beacon message, probe request message that introduce composed LACP channel information before, it reduces channel search delay time is probe response message. Compare existent handoff scheme and FMD scheme to propose and express in figure5. Proposal scheme offers faster handoff than existent scheme by difference of channel search latency of two schemes [1].

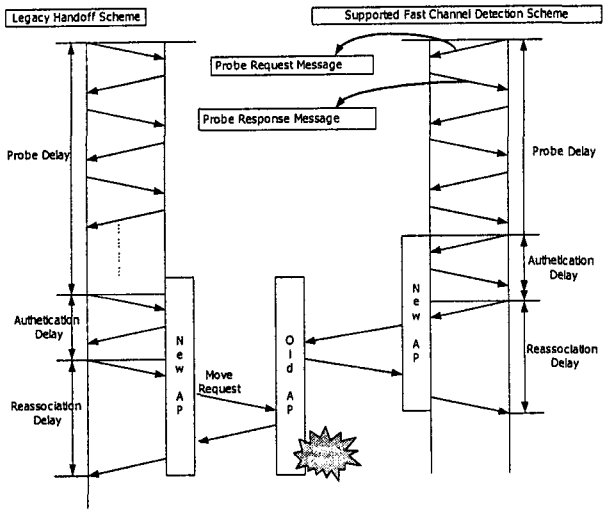

Fig. 5. Existent scheme and proposal scheme handoff process

2.4 Using of LAC2T Table

To offer data transmission that proposal scheme is seamless during hand off latency transfer of MN more fast AP data loss problem that happen during hand off latency recognizing solve. And, AP makes out roaming table.

Table composes in two columns. Firstly, we display SSID and AP MAC address that displays each AP, Secondly displays Association ID (AID) of MN and MAC address that use each AP. If hand off arises with figure6, FMD scheme recognizes MN difference at probe procedure. Therefore, we secure data that happen in handoff procedure using new roaming buffer.

As, AP stores data using imagination Buffer about MN refer roaming table. And, if hand off process is completed by reunion request, we transmit to handoff buffered data from old AP to new AP [7].

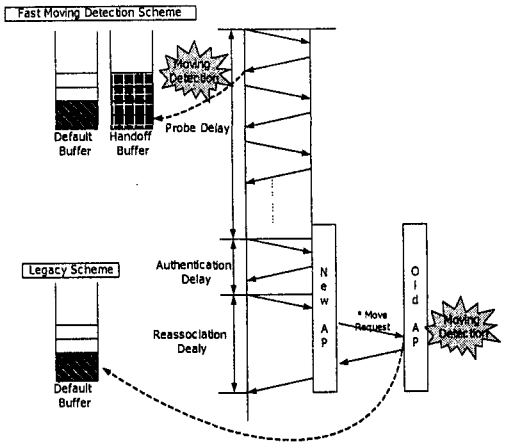

Fig. 6. Proposal scheme handoff process with handoff buffer

3. EXISTENT HANDOFF SCHEME AND PERFORMANCE ANALYSIS OF PROPOSAL FMD SCHEME

For Performance analysis existing hand off way and proposal way SIMULA that is object-oriented simulation program use. MN composes form that receive real time streaming service with figure8 while handoff process. Form of packet is UDP, and length of average packet is 1500byte, and each cell use different channel and SSID. Channel search delay time has average 48ms delay time per each channel, reassociation request and response time delay time by 2.3ms, authentication request by 1.3ms establish. And, 802.11b uses 11 channels by standard, and transmission speed is 11 Mbps[4]. Number of channel that delivers by LACP in simulation environment composes by 4. Handoff arises to 10 seconds space, all 9th repeatedly achieve. In figure 7 with suppose form that server was receiving multimedia Streaming service that transmit continuous data about terminal and established environment [6]. Server in interval that handoff arises MPGE-2 service continuously 4 Mbps to terminal transmit.

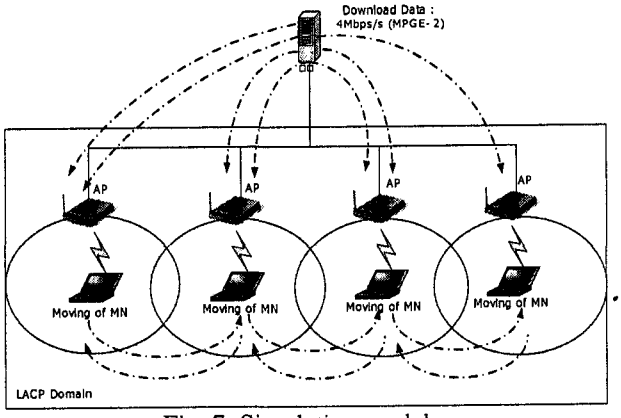

Fig. 7. Simulation model.

In figure7 with hand off leave fixed interval and executes and Throughput decrease happens in interval that hand off arises. Because delay time of reason of this throughput decrease happens. As delay time refers before, channel setting delay time and reassociation connection delay time and, he is consisted of necessary delay time in authentication process. Proposed FMD scheme information that MN refers LACP table contents and need in channel search because search channel that is beacon and AP that adjoin using probe request/response message use latency about channel search delay time reduce.

Therefore, figure9 handoff to space existent handoff scheme and throughput difference of proposed FMD scheme show. Each throughput output writes in graph by 1 second. Hand off arises 9 times in simulation, and hand off expresses link efficiency in figure7 during delay time. Therefore, it breeds problem that efficiency drops during hand off period.

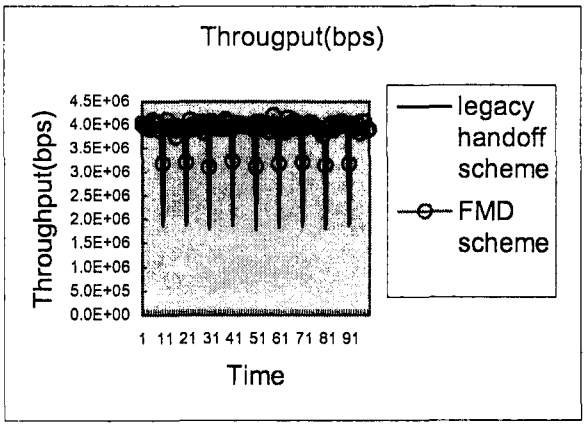

Fig. 8. Handoff throughput

However, in figure8 because search channel that FMD scheme does not search all use possibility whole channels and neighborhood AP uses with efficiency of link that improve appear .

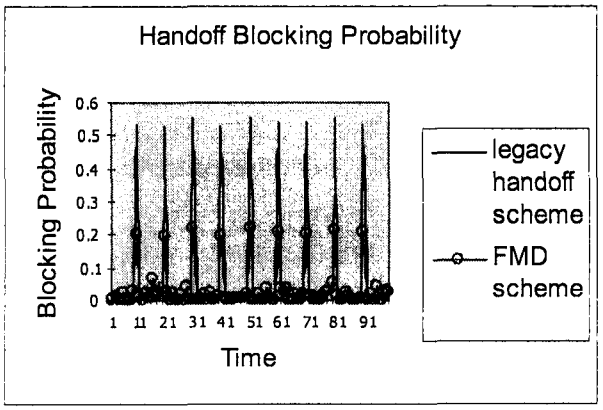

Fig. 9. Handoff blocking probability

Figure9 of while hand off arises blocking probability that happen appear. Difference with simulation result that throughput decrease or blocking probability increase improves more much than existing scheme because use handoff delay time that FMD scheme to search limited channel is less relatively.

4. CONCLUSIONS

FMD scheme that propose must possess following two constituents channel information and MN interface information in neighbor AP roaming table. The roaming table consists of two elements. Firstly, each AP must adjoin. Secondly, geographical connection setting between adjoining AP must exist. Therefore, LACP domain is consisted along transfer path between neighbors AP. Because store channel information in roaming table from APs that exist to LACP domain, and include is Beacon, probe request/response message, each AP uses scheme to inform available channel information to MN. And we offer compensation to seamless function about packet abolished during handoff latency because using roaming buffer. If handoff arises, proposal scheme improves link efficiency and reduce blocking probability cloud because reduce delay time that need in channel search. If achieve research about scheme that process putting predictive Authentication or context information additionally in decrease of delay time about channel search at the same time, it may get better result.

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