

Improved Vertical Handoff in Heterogeneous Wireless Network

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Abstract— In traditional vertical handoff for individual user, is aware of the decision made by the other users which helps the user to make the choice accordingly. However in case of group vertical handoff decision, the decision to choose the best network will be made and it would be followed by other users at the same time, therefore leads to congestion in the network. Hence there is a need of acquiring a network selection method which will resolve the problem of network congestion in group vertical handoff.

Here more parameters are used for users to achieve the best network selection in Heterogeneous wireless network .For the network selection various network parameters will be taken into consideration for determining the need of handoff. This will reduce the network congestion problem in case of handoff and reduce the no. of handoff. The result will be obtained and analyzed with the help of simulation tool Network Simulation 2.

Keywords—Vertical Handoff(VHO) , 4G and LTE network, NS-2.

I. INTRODUCTION

A heterogeneous wireless network is a network connecting computers and new more devices with different operating systems or protocols. In Wireless heterogeneous Network there are various networks like WIFI, GPRS, WIMAX, UTMS, and WLAN Networks [1].

Need of Handoff:

When the mobile travels from one area to another area it might be possible that the coverage of that node or mobile may get lost so it is necessary to keep call active i.e. not to break the connection. This is possible because of handoff techniques.

When all the mobile comes to the area of multi-access network then the group of such mobile search for the best network at the same time in the same region this processor is called the group prediction, then the network congestion and degradation occurs and, how to improve such type of congestion thus we have described in this paper using the various parameters. Previously the network selection is done on the only RSSI and QoS [1] parameter but this parameter gives a rough approximation about the network state, thus even if the network is unable to handle the handoff request then too handoff occurs their by reducing the network efficiency and also the number of successful handoff per unit time.

In this paper we propose the base station doesn't have an authority to select the best network this is done on individual basis that the user mobile take the decision to choose the best network using the various parameter that will define in this paper. Here we are using two networks 4G and LTE .The paper ahead is organized as follows: Section II describes types of handoffs, Section III depicts the classification of VHO, Sections IV discuss the various parameters which should be

considered during vertical handoff decision making and Section V Showing the analysis and results.

II. TYPES OF HANDOFF

Handoff is divided into two types [8], i.e. Horizontal Handoff (symmetric), that means the handoff surrounded by the same wireless network technology. Vertical Handoff (Asymmetric) is the handoff among heterogeneous wireless access network technology. Because VHO [2] is an asymmetric process, the mobile terminal moves among two different networks with different uniqueness. So, it is required to select the best network which provides better performance. The VHO process should provide a smallest overhead and the connection should be maintained to reduce the packet loss and delay.

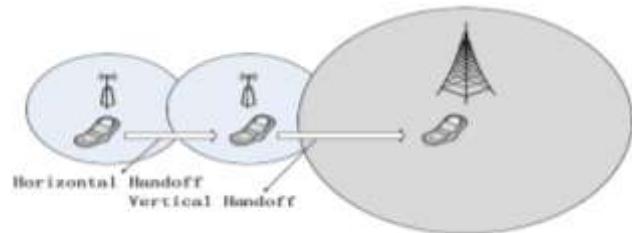


Figure 1. Horizontal handoff and vertical handoff

III. CLASSIFICATION OF VHO

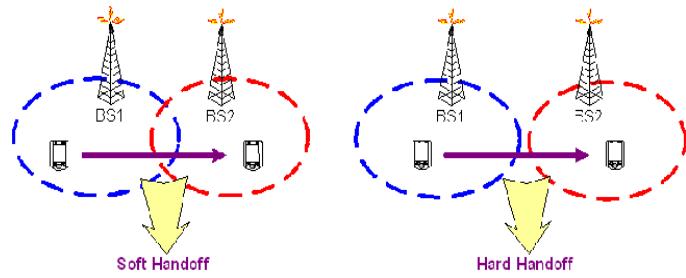
In vertical handoff there are different types:

Upward handoff: In case of vertical handoff when mobile node shift from one network of small coverage to another network of larger coverage it is called upward handoff.

Downward handoff: If the mobile shift from larger coverage of network to a smaller coverage of network than it is called as downward handoff.

Hard handoff: When the mobile node shift to target network after the extrication from current network is called as hard handoff.

Soft handoff: In case of soft handoff a mobile node keep the connection with the prior base station till its involvement with the new base station accomplished.



IV. PARAMETERS USED

In heterogeneous network, vertical handoff has a better performance more parameters are taken to decide for handoff.

BANDWIDTH

Bandwidth is used to define the range of frequency. If bandwidth will be high there will be lower call drop and call block probability. For defining the range of frequency there will be upper and lower frequencies in the sets. To provide faultless handoff for Quality of service (QoS) in wireless area, there is a want to control bandwidth constraint of mobile node during progress. Capacity of node is defined as bandwidth, higher the bandwidth lower the call drop and reduce the call blocking ; hence advanced throughput .Bandwidth managing should be an vital part of several of the handoff technique[8].

NETWORK INTEREST

The network interest define that each user not to depend on another user decision. The user has to take the individual decision that they search for the best network. This is the best option that each user has to take the choice of their network. The user may prefer the different network according to the network performance which is the benefit of heterogeneous wireless network.

SIGNAL TO NOISE RATIO

Signal to noise ratio is measure the quality of transmission channel over a wireless network channel. It is the ratio of max. signal strength that wireless network can achieve and the presence of noise in the wireless connection. It also defined as the power ratio among wanted signal information and the unwanted signal. For the better network the SNR will be as high as possible. If the value of SNR is high, the enhanced the signal strength and the quality of transmission [3].

DATA RATE

Data rate is the term defines the rate of transferring data among two wireless networks. It depends on bandwidth of the

wireless network. Higher the bandwidth data rate will be high but data rate never be high as compare to bandwidth.

V. PROPOSED ALGORITHM

In this paper we consider game theory for selection of network. Game theory [7] is a technique or model to develop in economics to analyze the interactive decision process. Game theory is a mathematical tool used in under modeling and understanding competitive situations. In the wireless network, game theory has been used in order to solve resource management and dynamic pricing related problems. In the past year game theory has been used for science and biological research. In the game theoretical model the decision made by each user on individual basis they do not depends on another node path. In game theory each node has an efficiency to choose best network.

We anticipated a no. of parameters value they are collected on score and then compare the score and select the best network in his choice. In this node does not depend on the information broadcasted by the base station for network selection based on game theory. We use a parameters bandwidth, network interest, SNR, and data rate the value of such parameters is collected on score and compare the score for both the network then choose the network that has best for that node. The problem in previous proposed paper is that they use only two parameters for handoff then if network not has an capacity for new node then also handoff will done since no of handoff increases hence we use more parameters to do the proper handoff and thus decrease the no of handoff.

VI. SIMULATION ENVIRONMENT

In this paper the evaluation is done using Network Simulator-2 (NS-2) in the version 2.34, and it is open source free software in which various terms in the environment can basically customized and altered. The network consists of 50 nodes placed randomly in a terrain 300m*300m with flat grid topology and take packet size of 1000 bytes and having packet interval 0.01 second. Constant Bit Rate (CBR) traffic is exchanged between the nodes with transport layer protocol being UDP. All the nodes in the simulation has Omnidirectional antenna. In CBR the packet size remains constant during the packet transmission where the source is not busty, and the source is dynamic during the connection. In figure 1 it shows the division of two network 4G and LTE in which if we take 50 nodes then 25 nodes comes consider in 4G and rest in LTE network and in figure 2 it shows the movement of the nodes from one network to another network and takes the handoff if necessary.

In this paper we show the comparison of no of handoff using two parameters and using four parameters. If we use only two parameters for handoff then node will check only two parameters for handoff and if the network does not have and capacity to handle a node then unnecessary handoff is taken by node it will increase the no of handoff hence we are using the more parameters to reduce the no of handoff and showing the result in figure 3.

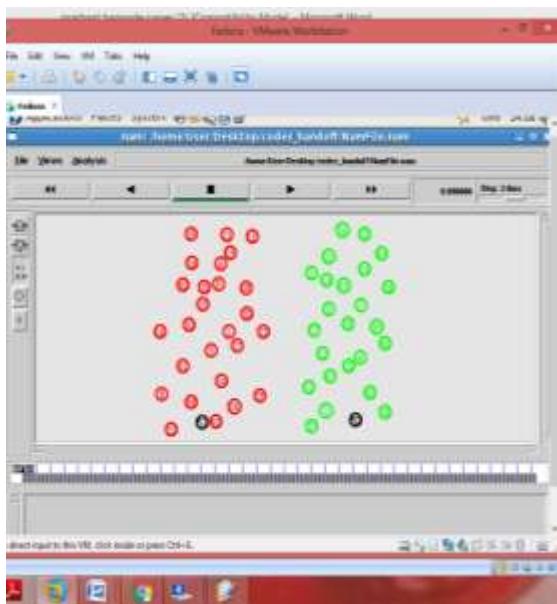


Figure 1. Formation of network



Figure 2. Movement of node

SIMULATION PARAMETERS

Sr. No.	Parameter	Values
1	Number of nodes	30-100
2	Routing protocol	AOMDV
3	Traffic source	TCP
4	Tool	NS-2.35
5	MAC Type	MAC/802_11
6	No of Packet	1000
7	No of Network	2

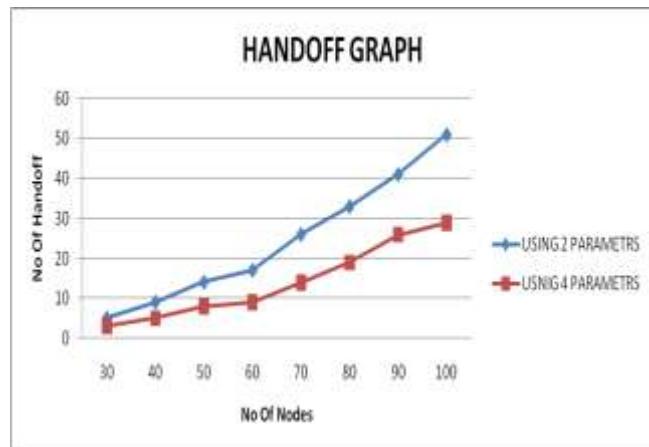


Figure 3 Comparison of no. of handoff using 2 and 4 parameters

VII. CONCLUSION

We have studied the problem with regard to network choice for each mobile node resolve tend to select individually the best network without charming into consideration the other nodes decisions, it is liable that individual selection occurs degradation and network congestion of user function. In this paper there a prophecy done by each node that they had used game theoretical model and without any single information broadcasted by the Base Station and comparing the parameters so that the mobile use the best network. These results in solving the trouble of network congestion and performance degradation and using more parameters the no of handoff will be less.

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