Approximation Design Scheme for Vertical Handover in Next Generation Wireless Network

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Abstract— **Vertical handover is defined as seamless connection to different network in Next generation network . Traditional vertical handovers schemes lack performance due to single criteria and therefore maximization of system performance becomes critical in such scenario. Various schemes are very famous by the method employed to give correct decision on vertical handover. These schemes are all designed in mobile terminal whic makes the implementation complexity another issue in small device. This work propose and efficient selection of mobile node into target network with Approximation design scheme incorporated in Zone gateway node. The network are divided into zones to perform optimal selection of network. The optimal selection of target network is associated to nodes connected into zone gateway. The simulation is carried by NS2 tool for WiMax and 3G network scenario. The proposed work outperforms with effective handover with call drop probability reduced considerably to 18% improvement compared to existing system.**

Index Terms— **Vertical handover, Next Generation Network, Approximation Design, Hand over call drops.**

I. INTRODUCTION

Heterogeneous network allows mobile user to switch from one network to other network when in interconnected.

This paper presents approximation design scheme pertaining to vertical handover decisions in wireless next generation network. This paper propose an efficient method with three phase of vertical handover decision brings improved results compared with the detailed work overviewed by various researchers . The research initiatives under vertical handover decision mechanism are designed for heterogeneous wireless network [1] The quality of an approximate solution here states the bandwidth that can be defined in terms of the "distance" of its measure from the optimum path . Next generation wireless network promise to offer enhanced data services compared to its precedence generation in mobile communication. Since NGN are all IP based networks, challenges drive towards providing quality of services to handover process. The basic necessity of handover process is seamless connection. The handover operations that minimizes or even target the elimination of delay in connection establishment to new network are most welcomed .However, frequent disconnection and inefficient seamless handover results failure in handover operations.

The objective of this work is reduce unnecessary handover and avoid call drop by method of approximation through three phases

1.Nearby neighbor search
2 Partitioning mobile allocation to candidate network
3. Avoidance of Identical network by zone gateway

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II. RELATED WORK

Traditional vertical handovers using single criteria are common [2]. Authors presents handover failure probability increases when either velocity or handover signalling delay upsurges the fixed value of RSS threshold. The simplest schemes are all based on single parameter such as RSS, Bandwidth, and Cost[3][4]. However to assure seamless connection effective vertical handover emerge in literature.

Author in [5] state exhaustive work on network selection with the availability of a rich variety of context information show the revelation user preference plays major role in QOS. However network coverage information updates still lack during the decision process. Context based schemes gives importance in context discovery to have all related information for handover.

In [6] state that the while appropriate decision processes should allows effective determination of the appropriate time and the appropriate wireless access network to handover. However the richness and the complexity of the parameters and decision measurements are challenging. Multi attribute scoring methods [7] widely used are the Simple Additive Weighting method (SAW), the Weighted Product Method (WPM), and the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS). Although the benefits of multi criteria exploit performance of the selection in greater extend. The uncertainty and abnormality in ranking of the network

appear when parameter are not weighed properly. This effect the system performance.

Fuzzy logic based decision available in literature by [8][9] collects all related information for handover. Therefore overhead in gathering decision information and feeding them back to the mobile terminal creates delay and makes the system unsuitable for new connection. Also training the data set for imprise information is an challenging problem.

To resolve imprise information literature [10] show Fuzzy-MADM schemes developed for network selection. Though the system performs stable in heterogeneous network. Linear scale normalization is applied for weight computation in Fuzzy method. This effect the creditability of the parameter. Moreover the complexity of the system still exist.

Context aware along with Multi attribute [11] also shows direction for vertical handover decision. The user preference is highly satisfied . Detailed network information management is unreliable due to lack of location information . High signalling exist due to centralized control and the whole system is designed for mobile terminal . Handling complex design by small device is inefficient..

III. SYSTEM MODEL

A. *System design for Approximation Scheme*

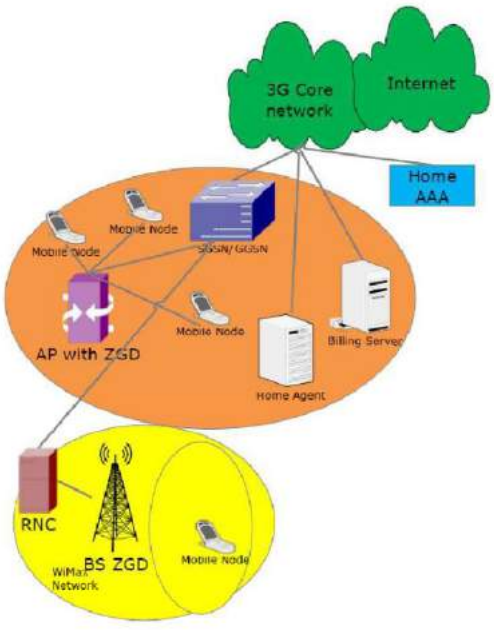

Fig 1 Architecture of proposed System.

The proposed work is designed with architecture shown in figure 1 [12] is taken for interconnected network between WiMax and 3G network. The Zone Gateway node computes the selection scheme to facilitate seamless connection to the candidate network.

B *(i) Nearest neighbour search scheme*

In order to find the nearest network for feasible connection during vertical handover, nearest neighbour network search is carried. The first step The gateway node find the candidate network ,make the vertex point $N(c_{i1}, c_{i2})$. The node computes other vertex with weights assigned by other candidate network. The network with minimum weights at edge (c_{i1}, c_{i2}) is selected. Thereby the complete path is calculated from $(c_{i1} \ldots\ldots\ldots\ldots c_{in})$.The bandwidth factor is added to compute the path weight for the nodes based on the traffic classes such as conventional and streaming in this paper.

$$m\_(x) \geq 2 \sum_{i=k+1}^{\min(2k,n)} l(c_i). \qquad (1)$$

The bandwidth is computed for k nodes with n iteration.
The minimum value at gateway node is edge value c_i *to* c_{in} for two different network. *This* phase of the design find the nearest network as access selection.

(ii) Partitioning mobile allocation to candidate network

The second phase of the design scheme allocates *I* mobile nodes into the selected network based on the sequence of traffic classes assigned . The steps are listed below

input Set *I* of mobile nodes;
output Partition *PN* of *I*;
begin
Sort mobile nodes I (according to traffic criterion);
(* Let $(x_1, x_2 \ldots, x_n)$ be the obtained ordered sequence *)
P := {{x_1}};
for *i* := 2 **to** *n* **do**
if x_i can be added to a set *pN* in *P* **then**
add x_i to *p*
else
P := *P*[{{x_i}};
return *P*
end.

(iii) Avoidance of Identical network by Compound Poisson Process

To avoid the selection of identical network during vertical handover process an efficient Compound Poisson process defines *the* counting process for set of mobile nodes $\{X(t), t \geq 0\}$ if

$$X(t) = \sum_{i=1}^{N(t)} Y_i, t \geq 0 \qquad (2)$$

Where

$\{N(t), t \geq 0\}$ is a Poisson process for selection and $\{Y_i, i = 1, 2 \ldots\}$ are independent, identically distributed random variables that are independent of $\{N(t), t \geq 0\}$. On condition of $N(t)$, The Expected occurrence and variance for network selection are obtain by

$$E\left[X(t)\right] = \lambda t E\left[Y_1\right] \quad (3)$$

$$\mathrm{Var}\left[X(t)\right] = \lambda t E\left[Y_1^2\right] \quad (4)$$

This avoids the mobile node to be selected into identical network

IV. SIMULATION RESULTS

The two traffic class for the system is considered and the simulation is made with Ns2 [13] and The weight computation is generation as presented in Table 1. The probability of network selection is shown by zone gateway node.

TABLE 1

NEAREST NEIGHBOUR SEARCH WEIGHT DISTRIBUTION

Zone Gateway Mobile set	Vertex Ratio	Network Selection
10	10,	WiMax
20	56.20	WiMax
30	78.30	3G
40	82.23	WiMax
50	6710	3G
60	87.95	WiMax

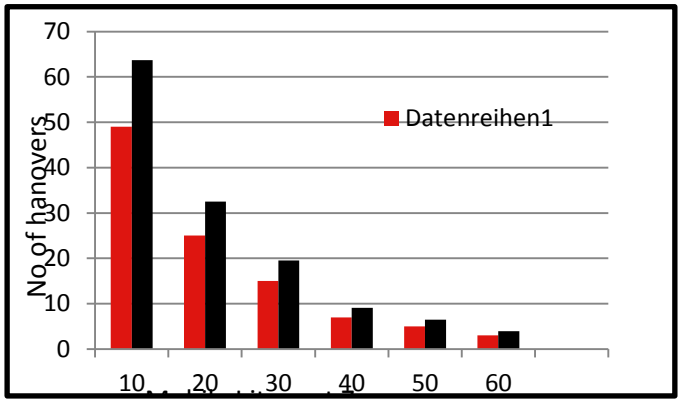

Figure 2 Handover measure in Zone gateway Zone

Analysis of Vertical handover call is provides numerical results discussion for two network selection schemes. With 100 handover events, Zone gateway selects handover decision for 100 mobile node items and the 62 % of calls execute handover decision where as it is 48 in proposed system. The weight metrics are used to find the edge vertex value listed in Table 1.The decision for Conventional traffic class is presented in this paper. The preferred network selection is carried by zone gateway node with identical selection between WiMax and 3 G network through bandwidth optimal value.

V. CONCLUSION

Decision on vertical handover calls and design of decision on vertical handover call is an challenge ing problem in next generation network. The accuracy of finding the decision optimal is desirable feature. The paper brings approximation design scheme in heterogeneous network when the handover with two traffic class (Conversational, Streaming) are carried by mobile node of 100 numbers. the initial comparison of existing work presented in [14] is made. The result outperforms with reduced unnecessary handover.

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