

# Vertical Handoff Using the Application of Spanning Tree in 4 G

Khaleel Ahmad<sup>1</sup>

CSE & IT Deptt, Swami Vivekananda Subharti University, Meerut, U.P., India

Swati Garg<sup>2</sup>

M.TECH IVth Sem (CSE), Swami Vivekanand Subharti University, Meerut, U.P., India

## 1. Abstract

Today mobile communication has an important place in every person life in their all business and non-business task. So it will be right to say there is some requirements such type of network. That would be credible or reliable and without the reliable network there can arise many conflictions in communication in daily. These conflictions may be caused of: (a) Waste of time (b) Security (c) Cost of service (d) More power requirements. Telecommunication companies are using handoff techniques to make proper communication in roaming area or in local area. But in these handoff techniques there is one most challenging problems which are known as "selection of network". There is a problem in selection of smooth network for smooth service. When any one user is moving from one place to another. We know that, now day's virtual handoff technique is in use which is based on received signal strength comparisons. In this paper, we want to propose a technique to resolving this problem with the spanning tree. We can manage the network handoff by using spanning tree application when a user moves from one region to another.

**Keywords-vertical handoff, heterogeneous wireless networks, spanning tree algorithm**

## 2. Introduction

In fourth generation wireless networks service continuity is a main goal i.e. when a user moves from one region to another region, then continuous service must be need so the technique "HANDOVER" is done. The handover technique is mainly used to redirect the mobile user's service network from current network to new network or one base station (BS) to another BS with same or different network in local or roaming area.

The problem arising in handoff technique is that "selection of appropriate network" in roaming area, so we are using the application of spanning tree to remove this ambiguity. By using the applications of minimum spanning tree we will able to find all the aspects: (a) No Time loss (b) Maintaining Security (c) Low cost of service (d) Low power requirements [1]. The handoff technique is mainly used to redirect the mobile user's service network from current network to a new network with same or different network in local or roaming area.

There are two types of handoff techniques had been introduced.

(a) Horizontal handoff. (b) Vertical handoff.

**A. Horizontal Handoff:** In this technique handoff is perform between same networks.

**B. Vertical Handoff:** In this technique handoff is perform between different networks.

## 3. Related work

A handoff technique is used to handle the network in roaming area. Many related work on vertical hand off has been done. In [2] a comparison done among SAW, Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), Grey Relational Analysis (GRA) and Multiplicative Exponent Weighting (MEV) for vertical handoff decision. Vertical handoff [3] is formulated as a fuzzy multiple attribute decision making (MADM) problem, and fuzzy logic application is applied [4]. After a systematic analysis of various fuzzy MADM methods, a feasible approach is also presented. The sensitivity of the methods is also analyzed [5] [6], a performance comparison among SAW [7], TOPSIS, and Grey Weighting (MEW) for vertical handoff is presented. In this mechanism he formulates the handoff decision mechanism as an optimization problem [8]. Each candidate network is associated with a cost function which depends on a number criterion, including the bandwidth, delay, and power requirements [9].He used [10] three schemes in this mechanism

- (a) Centralized Vertical handoff decision(C-VHD),
- (b) Distributed Vertical handoff decision (D-VHD)
- (c) Trusted - Distributed Vertical handoff decision

In a multi-operator environment, it is common that two neighboring domains do not have a trust relation. In such a case, Home AAA server (HAAA) is always relied on for identity verification during a handover as specified in 3GPP AKA [11] and EAP-AKA.

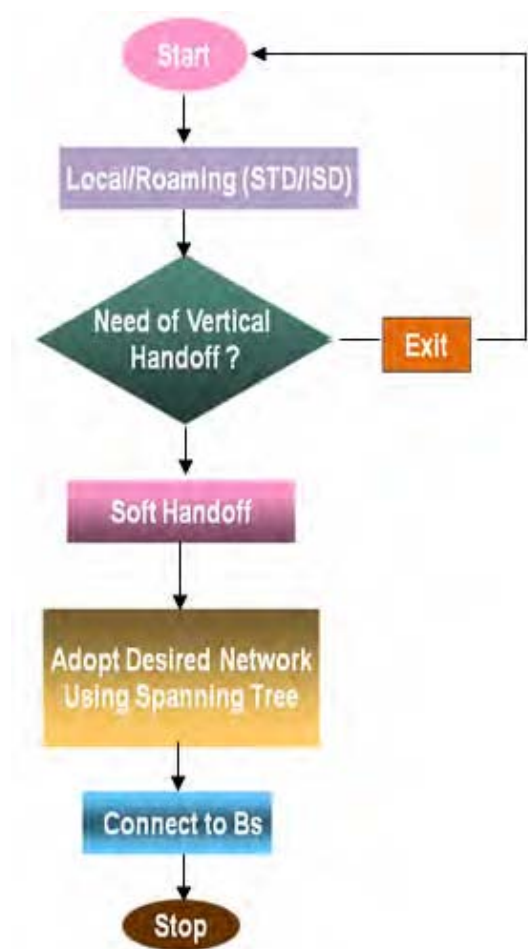
**4. Proposed Work:**

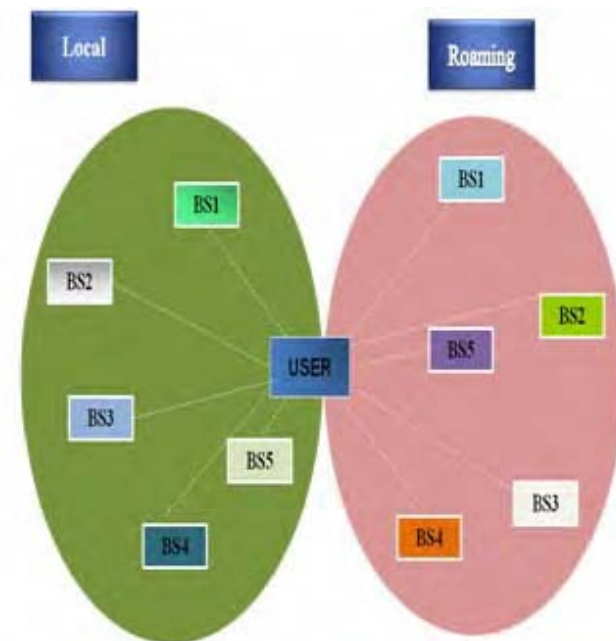
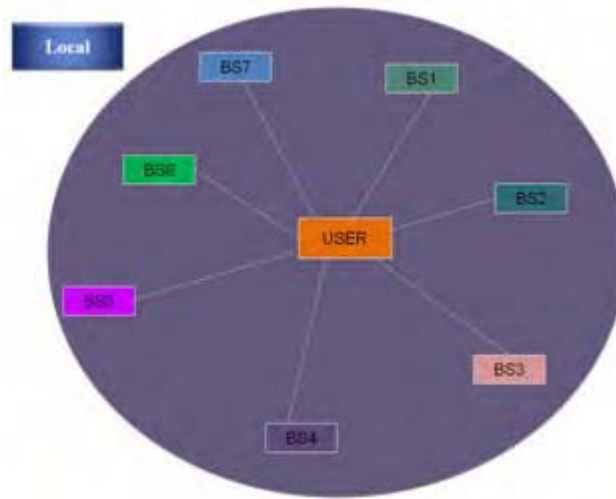
According to the scenario the communication on mobile is very important in today life. Today the person can handle any task through talking on mobile with present one place. Than according to this reason the service provided by the network should be very consist n reliable. There are many techniques which are used by numerous communication companies for handling the network in roaming areas but there is a lack still now. If any user is in roaming area than a big problem is arise that which network will be provided to the services to the user on the replacement of current network. So to improving decision mechanism of handoff we are introducing a new approach to solve handoff problem by using the application of spanning tree

**4.1- Spanning Tree:** A spanning tree is a connected graph G contains the vertices and the edge connects all the vertices.

- a) Connected: Every node is linked from one node to another node.
- b) Undirected: Edges do not have an associated direction.

**4.3Flow Chart:**





**4.5 Algorithm:**

L → Location, O<sub>s</sub> → Operator Service, Bs → Base Station

- **Step1:** Starting service.
- **Step2:** Connecting to current region network.

**Step3:** If (L → Local)

Then “No need of handoff”

Else If (L → Local) But O<sub>s</sub> → Not available, hence

Handoff to available desired network.

- **Step4:** If (L → Roaming)

Then “No need of handoff”

Else If (L → Roaming) But O<sub>s</sub> → Not available, hence

Handoff to available desired network Using Spanning Tree.

- **Step5:** Connect to BS

**Step6:** End

**5. Future Work:** Mobile communication is very exciting technology in today time for communication and internet access. As the mobile technology has grown exponentially in future, the user will be totally depending on the mobile. So due to this reason, we have required such kind of technology that a user can easily use it as much as possible. The problem raised in today time is if the network is not reliable then many conflicts can be arise in communication. So, our future work will be implementing to make proper communication in all regions such as roaming area or in local area.

#### **6. Conclusion:**

In this paper we are working to resolve the solution of problem “selection of network” in outer region. We has also proposed a technique to avoiding this problem with the help of minimum application spanning tree, when a user moves from one region to another region, which network will be assigned to user in outer region.

#### **7. References:**

- [1] K. Savitha and C. Chandrasekhar, “Trusted Network Selection using SAW and OPSIS Algorithm for Heterogeneous Wireless Network,” International Journal of Computer Application, ISSN: 0975-8887, Page 22-29, Volume 26-No. 8, July 2011.
- [2] N.D.Tripathi, J.H.Reed and H.F.VanLandinoham, “Handoff In cellular System,”IEEE Personal Communications, Volume 49, 2000.pp.2276-2285.
- [3] K.Savitha and C. Chandrasekhar, “An Overview of Vertical Handoff Decision Based On MADM For Heterogeneous Wireless Network,” International of Computer Application, Vol-III, No.3, July-Sept2010.
- [4] Nidal Nasser, Ahmed Hasswa and Hossam Hassanein, “Handoffs in Fourth Generation Heterogeneous Networks”, IEEE Communications Magazine, ISSN: 0163-6804, page 96-103, October2006.
- [5] Yaw Nkansa-Gyekye and I.Agbinya, “Vertical Handoff Decision Algorithm for UMTS-WLAN”, AusWireless 2007, IEEE Computer Science.
- [6] W.Zhang, Handover Decision using Fuzzy MADM in Heterogeneous Networks, in: IEEE Wireless Communications and Networking Conference (WCNC2004), 2, pp.653-658, 2004.
- [7] Jong Chan Lee and Seong-Moo Yoo, “Intelligent cell selection satisfying user requirements for inter –system handover in heterogeneous networks”
- [8] Enrique Stevens-Navarro and Vincent W.S Wong, “Comparison between Vertical Handoff Decision Algorithm for Heterogeneous Wireless Networks”, IEEE-VTC2006.
- [9] K. Savitha and C. Chandrasekar, “Comparison of Vertical Handoff Decision Scheme in Heterogeneous Wireless Networks”, IEEE International Conference on Computing intelligence and Computing Research, 2010, pp.1-6
- [10] M. Li, K. Sandrasegaran, and T. Tung, "A Multi-Interface Proposal for IEEE 802.21 Media Independent Handover," presented at The Sixth International Conference on Mobile Business (ICMB), Toronto, Ontario, Canada, July 2007