Analysis of Handoff execution in Network Simulation-2

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***Abstract*: Handoff is the procedure providing the connection to the backbone network while a mobile terminal is moving across the boundaries of coverage of two wireless points of connection. The complexity of the handoff decision process has led to the examination of a number of traditional and pattern recognition handoff decision algorithms for wireless networks. Traditional algorithms use a received signal strength measurement and an optional threshold, hysteresis, or a dwell timer to determine the handoff decision. Degradation of the signal level, however, is a random process, and simple decision mechanisms result in a ping–pong effect whereby several consecutive handoffs degrade the service provided by the network. In recent the lack of infrastructure of mobile network due to government directive it has to be limited number of base station available. As the rise of demand grows for mobile it need to have same rise in base station for controlling the signal. It is observed that the mobile node moving in one cluster to another it is dropped out the signal. So this paper just explore the implementation of hand off technique in NS2 and profound same kind of results for further research.**

***Keywords*: Handoff, wireless networks, NS2, MSC (Main Switching Center)**

1. Introduction

Over the past decade a number of wireless communication networks have emerged for urban and indoor areas to complement the traditional cellular networks. The services provided by these networks are geographically selective. As a result, a wireless communication terminal needs to connect to multiple points of connection and perhaps multiple networks as it moves from one location to another. The method of using different networks with the same terminal for inter-network mobile communications is often referred to as inter technology, heterogeneous, or non-homogeneous networking.

1.1 Handoff issues

In order to provide ubiquitous network access for mobile communication devices, service providers have to build networks that deploy several points of connection. In cellular voice telephony and mobile data networks, such points of attachment are referred to as base stations (BSs) and in Wireless Local Area Networks (WLANs), they are called access points (APs) (Fig. 1). Since usually there is more than one BS/AP available for a mobile user, it is most beneficial for overall network performance that each active mobile station is connected to the most suitable BS/AP while accessing the services provided by the network. Determining which one of these points of connection is the most suitable one for a given application at any particular location and moment of time depends on the chosen criteria that full fill the quality of service requirements of that particular application. One such criterion is for the mobile terminal to select a BS/AP that gives the maximum received signal level. This selection usually also maximizes the quality of the connection provided that no other signal degrading impairments exist.

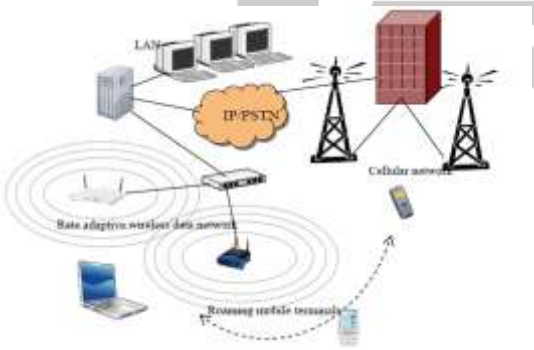

Fig. 1. Cellular and WLAN network architectures

1.2 Handoff Process

When a user moves from one cell to the other, to keep the communication between the user pair, the user channel has to be shifted from one BS to the other without interrupting the call, i.e., when a MS moves into another cell, while the conversation is still in progress, the MSC automatically transfers the call to a new FDD channel without disturbing the conversation. This process is called as handoff. **Processing** of handoff is an important task in any cellular system. Handoffs must be performed successfully and be imperceptible to the users. Once a signal level is set as the minimum acceptable for good voice quality (Prmin), then a slightly stronger level is chosen as the threshold (*PrH*) at which handoff has to be made. A parameter, called power margin, defined as

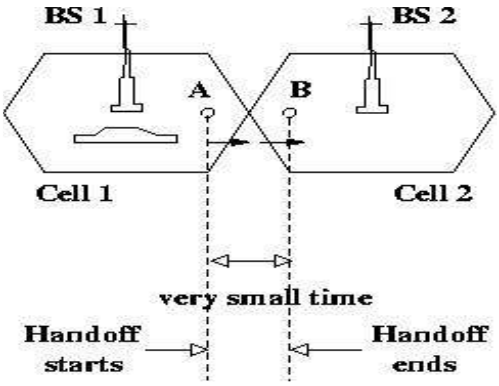

Fig 2: Handoff Technique

Handoff scenario at two adjacent cell boundary.

$\Delta = Pr_H - Prmin$

It is quite an important parameter during the handoff process since this margin Δ can neither be too large nor too small. If Δ is too small, then there may not be enough time to complete the handoff and the call might be lost even if the user crosses the cell boundary.

If Δ is too high the other hand, then MSC has to be burdened with unnecessary handoffs. This is because MS may not intend to enter the other cell. Therefore it should be judiciously chosen to ensure imperceptible handoffs and to meet other objectives.

2. Review of Literature

M. Antoniou, M.C. Boon, P.N. Green, P.R. Green studied on Wireless Sensor Networks for Industrial Processes in the year 2009 and described our work to explore the use of wireless sensor networks for industrial processes. Long term challenges including communication in a hostile environment, ad hoc networking, computing platforms, process imaging, sensing, miniaturization, compliance, micro-electromechanical systems and power harvesting are introduced. The issues are generic for applications to industrial process but the present work is targeted at monitoring grain storage. One requirement is to provide estimates of local position in a vessel and the paper describes progress towards using RF signal strength in the network for this purpose. **Qian Dong, and Waltenegus Dargie** studied on a Survey on Mobility and Mobility-Aware MAC Protocols in Wireless Sensor Networks and stated that In wireless sensor networks nodes can be static or mobile, depending on the application requirements. Dealing with mobility can pose some formidable challenges in protocol design, particularly, at the link layer. These difficulties require mobility adaptation algorithms to localize mobile nodes and predict the quality of link that can be established with them. This paper surveys the current state-of-art in handling mobility. It first describes existing mobility models and patterns; and analyzes the challenges caused by mobility at the link layer. It then provides a comparative study of several mobility-aware MAC protocols. **Shantidev Mohanty and Ian F. Akyildiz** studied on the Cross-Layer (Layer 2 + 3) Handoff Management Protocol for Next-Generation Wireless Systems in October 2006 and stated that Next-generation wireless systems (NGWS) integrate different wireless networks, each of which is optimized for some specific services and coverage area to provide ubiquitous communications to the mobile users. **Shantidev Mohanty, Member, IEEE, and Ian F. Akyildiz** studied on the Performance Analysis of Handoff Techniques Based on Mobile IP, TCP-Migrate, and SIP and stated that the Mobility management protocols operating from different layers of the classical protocol stack (e.g., link, network, transport, and application layers) have been proposed in the last several years. These protocols achieve different handoff performance for different types of applications. **Rosy Pillay Narrainen and Fambirai Takawira** studied on the Performance Analysis of Soft Handoff in CDMA Cellular Networks in NOVEMBER 2001 and stated that a unique feature of code division multiple access (CDMA) systems is the use of soft handoff between cells. Soft handoff, in general, increases the system capacity because while the link between a mobile and one base station is poor, it might be better between the same mobile and some other base station. This paper proposes a traffic model for a DS-CDMA cellular network that includes both soft capacity and soft handoff. Network performance is then computed in terms of call blocking. **Gayathri Vijay, Elyes Ben Ali Bdira, and Mohamed Ibnkahla,** studied on cognition in wireless sensor networks. They hold the promise of delivering to a smart communication paradigm which enables setting up an intelligent network capable of handling applications that evolve from user requirements. The main contribution of this paper is providing the vision and advantage of a holistic approach to cognition in sensor networks, which can be achieved by incorporating learning and reasoning in the upper layers, and opportunistic spectrum access at the physical layer. Rather than providing an ostensive survey of cognitive architectures applicable to sensor networks, this paper provides the reader with a framework based on knowledge and cognition that can help achieve end-to-end goals of application-specific sensor networks. **Jeremiah O. Abolade, Olasebikan A. Fakolujo, and Abidemi Orimogunje** studied on the handover in mobile wireless communication network. The whole world is now engaging in wireless communication as it provides users' ability to communicate on-the-go. This is achieved by transferring users from a radio network to another. This process is called handover. Handover occurs either by cell crossing or by deterioration in signal quality of the current channel. The continuation of an active call is a critical characteristic in cellular systems. Brief overview of handover, handover type, commonly used handover parameters, some methods employed in the literature and we present the convergent point for furtherance in the area of mobile wireless communication Handover. **Y. Zaki** studied on Mobile Communication Systems and proposed a paper and gave the views on it. The specifications were finalized by the end of the 1990s and this system was called International Mobile Telecommunication-2000

(IMT-2000). Then the 3GPP finalized the first version of their mobile communication system following GSM which was known as Universal Mobile Telecommunication System (UMTS). In 2004 the 3GPP started working on the next mobile system which is called Long Term Evolution (LTE). A mobile radio communication system by definition consists of telecommunication infrastructure serving users that are on the move (i.e., mobile). **Charu Chawla, Dr. Dinesh Arora, and Dr. Hardeep Singh** Studied on Hand-Off Techniques for Cellular Mobile Network and stated that In a cellular system handoff process provide a facility by transferring an active call from one cell to another. When the user is moves around, handoff is the process of changeover of signal transmission from one base station to a geographically adjacent base station. In this paper, they focus on basics and different technique of handoff process for cellular mobile network.

3. Simulation & Result

The simulation for hand off technique is executed in NS2. The proposed layout is designed in NS2 that facilitate the mobile nodes in a cluster. The desired process is that the mobile node enter into one cluster from other cluster. This paper focus on the implementation of hand off in NS2. The result coming out in graphical pattern which represents the basic technique of Hand off.

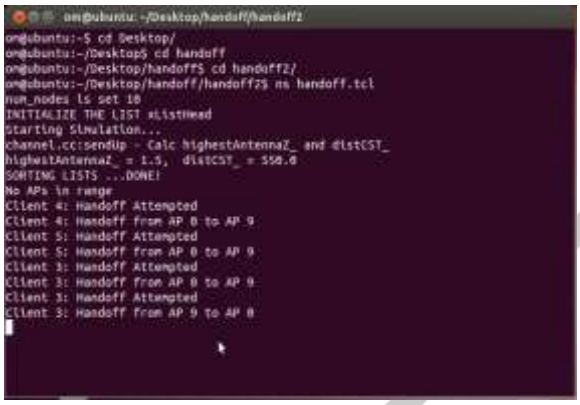

Fig 3: Basic Processing In NS2

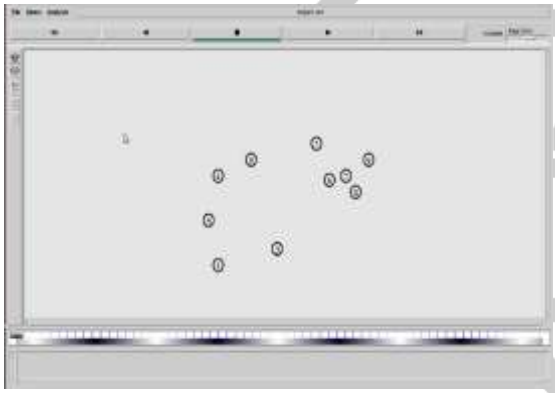

Fig 4: Node Construction in Proposed Area

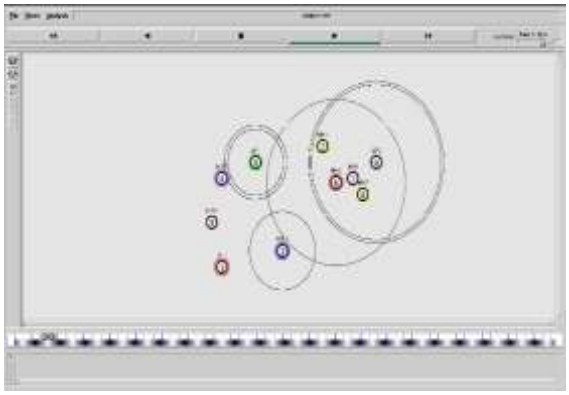

Fig 5: Nodes communicate with each other via base station

The service of wireless communication depends on the handoff strategy. The proposed handoff required suitable parameters to minimize the handoff. It has been cleared that hand off technique could be implement in NS2.

4. Conclusion

It is very essential research in the field of communication and is attracting a great interest in the automotive and telecommunications industry. Mobile communications has attracted a lot of research driven by public and private organizations, but mainly oriented to enhance safety in the mobile network. Nowadays there is lack of dense infrastructure for base station (Mobile tower), so this will be an issue to deploy new mobile towers for enhancing the current drop in signal due to hand off. So the proposed idea work is to investigate the way to perform the hand off situation in NS2 platform.

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