

Handover Schemes in Heterogeneous LTE Network

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Abstract—An infrastructure build in the LTE platform which is reliable to challenge the commercial and non-commercial IT development communities of data streams in high dimensional data cluster modeling. This project is mainly focuses that to satisfy rapidly increasing data rates at hotspots and enhancing coverage in buildings, small cells, such as femtocells, picocells, and microcells, are deployed in LTE-A. Picocells are typically installed at hotspots and overlay with the macrocell to improve energy efficiency and data rates. In macro-pico HetNets, the handover issue is more important than that in macrocell networks. On one hand, more frequent handovers are triggered because the coverage range of a picocell is small. On the other hand, some schemes, such as load balancing, aimed at improving network performance, will also cause frequent handover in macro-pico HetNets. Therefore, handover has a significant impact on the performance of macro-pico HetNets. In this article, we first survey the state-of-the-art handover techniques that are aimed at keeping ongoing connections uninterrupted or ensuring the quality of service of mobile users. Then we introduce load-balance-related handover schemes. Moreover, an energy-efficient handover scheme is presented. At last, we point out interesting research issues on handover schemes in macro-pico HetNets.

Keywords—Data Rates; Energy Efficiency; Frequent Handover; Load Balancing; LTE Network.

Abbreviations—Base Station (BS); Quality of Service (QoS); Signal-to-Interference-plus-Noise Ration (SINR).

I. INTRODUCTION

ALTE network is a radio frequency that can be programmed and configured dynamically to use the best wireless channels in its vicinity. Such a radio automatically detects available channels in wireless spectrum, then accordingly changes-its transmission or reception parameters to allow more concurrent wireless communications in a given spectrum band at one location [Byungjin Jeong et al., 9]. This process is a form of dynamic spectrum management. Nowadays the transmission data rate is increased, to cope with the exponential increase of mobile traffic, one of the solutions is to use highly spectrum-efficient wireless transmission techniques, such as OFDM and MIMO, to increase the capacity of wireless links [Chowdhury & Jang, 10]. Another efficient way to increase the system capacity and reduce the energy consumption of cellular networks is to bring the base station (BS) closer to users by deploying small cells, such as femtocells, picocells, and microcells, which migrate the LTE toward heterogeneous networks [Tiantian Bai et al., 2]. In mobile wireless networks, the traditional purpose of handover is to keep ongoing connections

uninterrupted, which is a very important function for ensuring the service continuity and quality of a mobile user, and also it can improve the performance of the whole network and the user's quality of service (QoS).

II. EXISTING SYSTEM

In an existing system, the massive deployment of femtocells is expected to form networked femtocells to face the explosive growth of mobile broad band usage in cellular networks [Yiqing Zhou et al., 1]. Instead of implementing the path switch operation at core network entity for each handover, a local traffic forwarding chain is constructed to use the existing Internet backhaul and the local path between the local anchor femtocell and the target femtocell for ongoing session communications [Tao Guo et al., 4].

2.1. Disadvantages of Existing System

- It has more data delivery cost when the threshold of forwarding chain is small.

- It has more signaling cost when the threshold is large.
- Due to the small coverage range of femtocells, it increases the frequent handover.
- Increased frequent handover will deteriorate the network performance.

III. PROPOSED SYSTEM

Compared to femtocells, Macrocell and picocell have a large coverage distance [Wu, 3; Abhishek Roy et al., 7]. Instead of deploying the femtocells, we deploy macro and picocell together means it will increase the distance coverage as well as it decrease the frequent handovers [Jun Wang et al., 5; Cai Liu et al., 6]. In addition, some energy efficient schemes such

as dynamic sleeping and power control will decrease the energy consumption in the network. It also plays a major role in load balancing handover schemes [Jae-In Choi et al., 8].

3.1. Advantages

- It will increase the performance of the whole network and the user’s Quality of Service (QoS).
- It will reduce the interference problem.
- It will decrease the signal-to-interference-plus-noise ratio (SINR).
- It will reduce the energy consumption in the network

3.2. Block Diagram

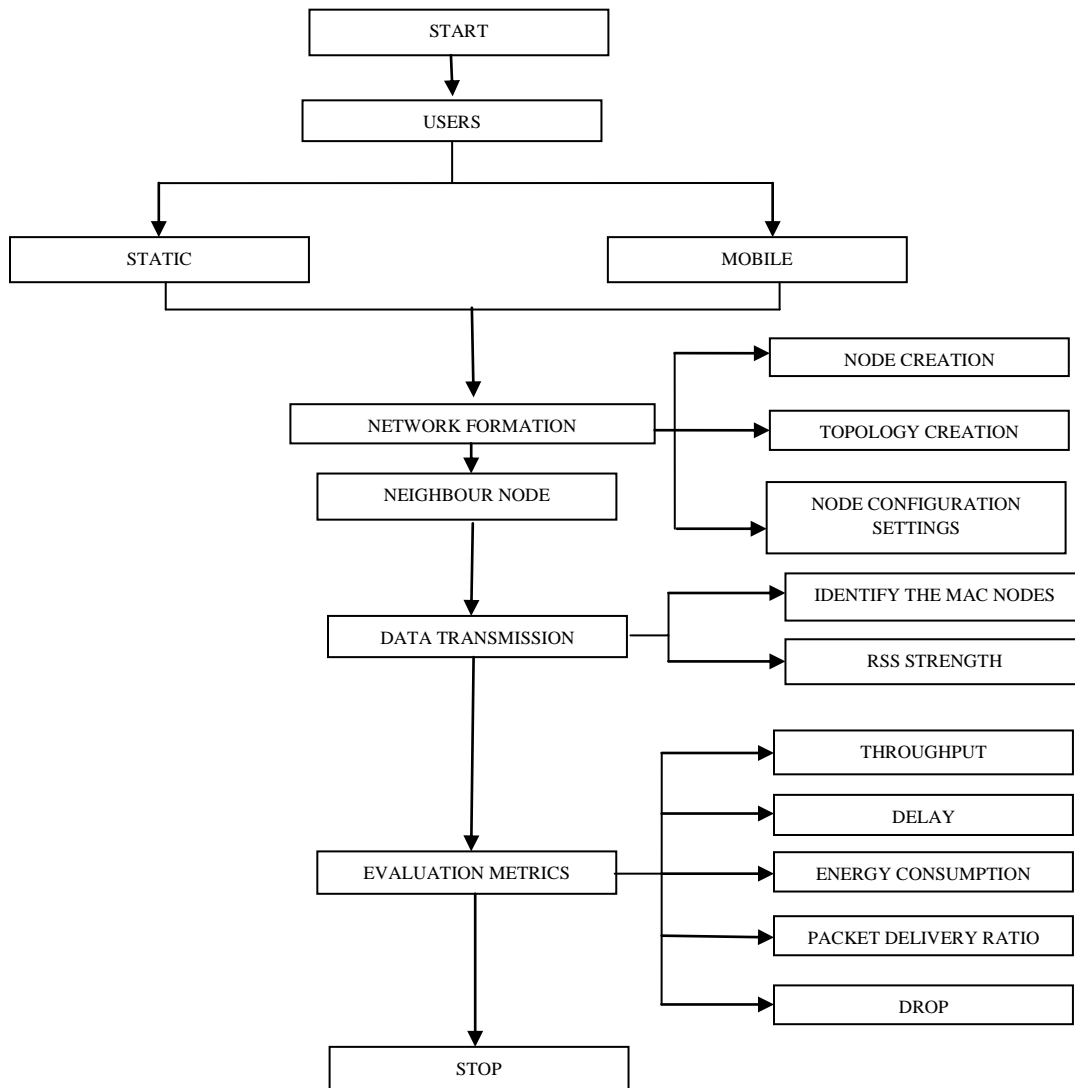


Figure 1: Block Diagram

IV. TOOLS AND ALGORITHM USED

4.1. Network Simulator 2.34 (NS2)

NS-2 is a packet-level simulator and essentially a centric discrete event scheduler to schedule the events such as packet

and timer expiration. Centric event scheduler cannot accurately emulate “events handled at the same time” in real world, that is, events are handled one by one. This is not a serious problem in most network simulations, because the events here are often transitory. Beyond the event scheduler,

ns-2 implements a variety of network components and protocols. Notably, the wireless extension, derived from CMU Monarch Project, has 2 assumptions simplifying the physical world: Nodes do not move significantly over the length of time they transmit or receive a packet. This assumption holds only for mobile nodes of high-rate and low-speed. Consider a node with the sending rate of 10Kbps and moving speed of 10m/s, during its receiving a packet of 1500B, the node moves 12m. Thus, the surrounding can change significantly and cause reception failure. Node velocity is insignificant compared to the speed of light. In particular, none of the provided propagation models include Doppler effects, although they could.

4.2. Algorithm

4.2.1. Karatsubha Algorithm

It is the fastest multiplication algorithm.

Distance Formula: $\sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$

Derivatives

Step 1: Declaration globally for Nodes, max-energy, speed, sink(x and y axis) position

Step 2: Finding path from all the nodes to sink with distance formula generating the neighbor node coverage too.

Step 3: initialize the farthest node to be itself and compare the RTS and CTS range

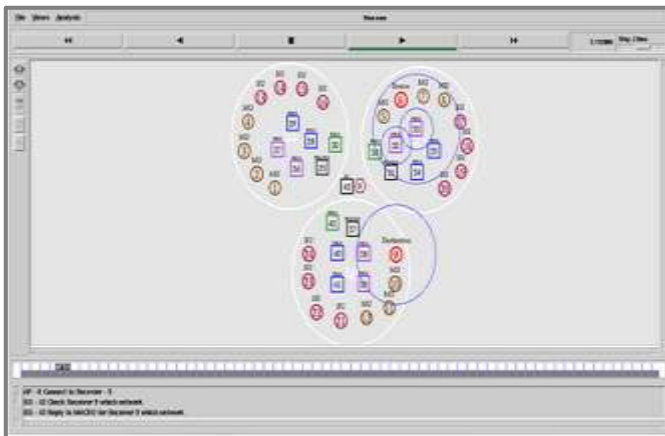
Step 4: apply the routing protocol

Step 5: Data transmission takes place for

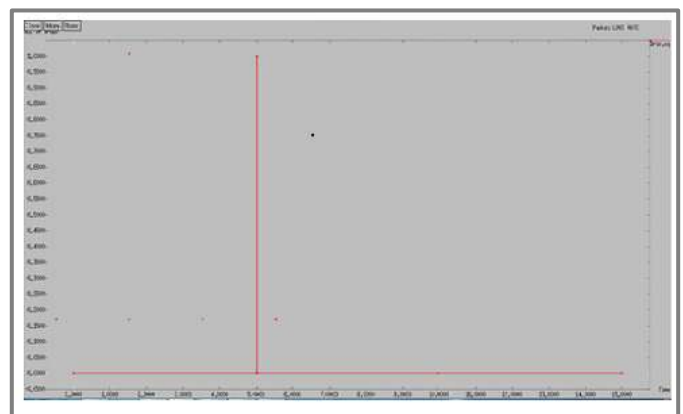
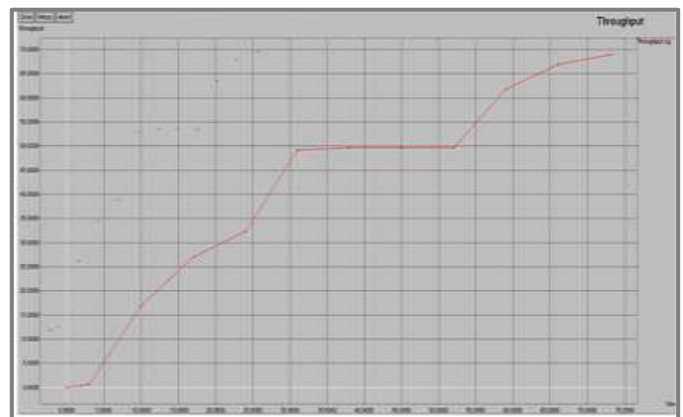
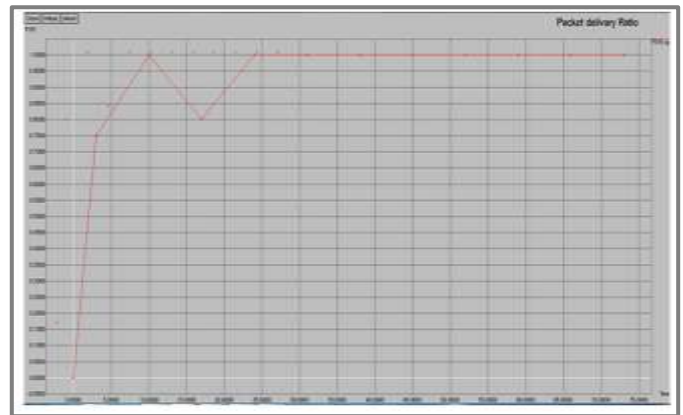
- 1) selecting cluster heads
- 2) finding size and loss factor
- 3) transmitting and monitor the parameters

V. OUTPUT AND GRAPH

5.1. Simulation Output



5.2. Output Graph



VI. CONCLUSION

Thus the data can be transmitted without any loss. And the energy consumption of the nodes is much reduced and also it satisfy the users quality of services.

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