

Study and Analysis of Call dropping and Handover Problem in cellular system

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Abstract— In cellular system, call dropping is a major problem, which is faced by a mobile user in network due to many reasons like availability of free channels, low level of system configuration, high traffic rate etc. In study, we analyzed that handover failure is the major reason for call drop. When a handover failure exist, call drop occurs. Many different techniques are proposed and introduced to remove call drop problem.

In this paper, our main goal is to investigate the root causes of handover failure and provide the solution with help of different techniques.

Index Terms— BS, cellular system, Handover, MS, MSC.

I. INTRODUCTION

Cellular network is designed to provide voice or message communication between two mobile stations or one mobile stations and one fixed station known as Base station. A geographical area which is controlled by a base station is known as Cell. Each cell has its own antenna to transmit and receive signals to other base stations.

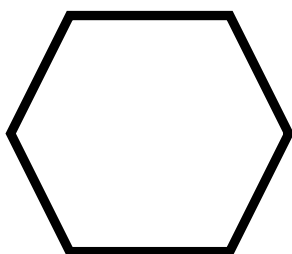


Fig-1 A single Cell

Each base station is a part of a large region which is controlled by a mobile switching center (MSC). MSC is responsible for providing communication between base stations and mobile stations. It is responsible to perform handover between Base stations.

Normally, a cell is considered as a circle but ideally the boundary portion of any radial cell cannot be captured easily due the gap remaining after combining more than two cells. So, a hexagonal shape is assumed to be the larger area covering the practical cell. [1]

In cellular network, call dropping occurs when a base station is failed to provide free channels to allocate users for calls. It may be for a new call tried by a mobile user or a call

which is ongoing and mobile station is in moving state and trying for handover for continuing of call [1, 2]. GSM (Global System for Mobile Communication) has become most used term in present world. This is because of communication is an important part of our life. Sometimes many problems plays a role for call disconnection. The delay between in identification of exact reason for a call drop result in low quality of service of network which may decrease the reputation of that network provider. The demand for GSM communication by peoples could make congestion and when congestion occurs call drop occurs. This is reported by GSM association. People expects from their network providers like maximization of service coverage area, network usage and minimization of congestion and the optimum traffic balancing among the different frequencies.

II. TYPES AND REASONS OF CALL DROP

Many reasons are identified for occurring of call drop as **Radio frequency call drop (RF call drop), Handover failure, low level of system configuration settings** etc.[2, 3]

A. RADIO FREQUENCY CALL DROP

RF call drop is due to downlink and uplink failure. As we know in presence of several interference in downlink and uplink, MS cannot decode SACCH (slow associated control channel). SACCH carries the system information message which necessary for call connection. When MS fails to decode the SACCH, it releases radio channel connection abruptly which results in call drop. [2, 3]

Reasons for RF call drop:

1. Weak coverage area and radio signal.
2. Intra-network interference.
3. Absence of proper radio parameter settings.
4. Hardware failure.
5. Power failure.

B. HANDOVER FAILURE

As we know that cell size is limited and an MS is always in moving state from one place to another. Sometimes it moves from one cell to another neighboring cell. To continue its call base station need to perform handover. In handover, base station transfers the active call from one cell to another cell without disturbing the call. Handover is based on signal strength received by MS from current base station.[1,7] When a mobile station is moving from one cell towards its neighboring cell the received signal strength of mobile station decreases as it is moving far from its base station.

If MS receives any handover command or instruction but it fails to perform handover to its neighboring cell and can't

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communicate with original cell, then it is considered as handover failure call drop. MS get disconnected from its network, then handover control timer of base station notify MSC as handover failure and to release the channel. MSC clears the channels from allocated mobile station and consider it as handover failure. Which result call drop and call disconnection.

III. PROPOSED SCHEME TO CONTROL CALL DROP

Many schemes are proposed to control handover failure and call drop as:

A. GUARD CHANNEL PRIORITIZATION SCHEME

By simply resolving a number of channels for especially for handover, we can improve the probability of successful handovers. Remaining channels can be shared equally for calls and handover. Guard channels are established only when equal number of channels are present. New calls are less sensitive to delay than handover calls because handover calls need continuity for voice and message transfer. [3]

B. USING AUXILIARY STATIONS

In this scheme, a base station will consist two or more auxiliary stations. Whenever a call arrives to base station, first it is serviced by auxiliary station if there are channels available on auxiliary station then call is connected otherwise call is engaged by auxiliary station till base station get free and the call is transferred to base station. If base station find free channel it allocate that channel to mobile station and call get connected else call is disconnected by base station. As we know new calls are less sensitive to disconnection than handover calls. [8]

C. HANDOVER QUEUING PRIORITIZING SCHEME

Queuing the handover calls became more popular and most preferred scheme because it decreases the call drop rate because of handover failure. In this scheme, we make a queue of handover calls, whenever a BSC get a channel released by a call, it is assigned to a handover call from the queue. It decreases the drop rate because all calls are served on FIFO method. [3]

A call will be added to queue when its RSS (received signal strength) reaches to a predefined threshold. If a call is added to queue but no channel is free or released then call is blocked by base station. All calls are served according to their arrival at queue. [9]

Queuing handover is possible due to regions which are overlapping with the adjacent cells in which mobile station and base station can communicate with more than one base stations. [9]

IV. CONCLUSION

Call drop is major problem in cellular system. Study on call drop problem introduce the causes which are responsible for call drop or call blocking or call disconnection. Here in this paper we realize that handover failure is a major reason for call drop. The main goal of decreased call drop rate can be achieved with the help of schemes that are proposed in it. Many handover schemes used like guard channel, auxiliary stations etc. decrease the probability of handover failure and

call drop. We can say that decrease the number of handover failures proportionate decreased call drop rate.

REFERENCES

- [1]. Vinay Prakash Sriwastva, Jalnesh Singh, Vinay Kumar Verma, "Decreasing Call blocking rate by using optimization technique" International Journal of Science and Research Publications, Volume 4, Issue 6, June 2014
- [2]. K.R Sudhindra, V. Sridhar, "Root cause detection of call drops in live GSM", IEEE TENCON 2011
- [3]. Miss. Poonam B. Bhilare Prof. Santosh Sambare "Seamless handoff in Next Generation Wireless System" International Journal Of Computer Science And Technologies -vol.2(6),2011,2525-2530
- [4]. Alarape Moshood Alabi, Akinwale Adio Taofiki, Folorunso Olusegun "A Combined Scheme For Controlling GSM Network Calls Congestion" International Journal Of Computer Applications(0975-8887)Volume14-no.3 January2011
- [5]. Mrs.Mahalungkar Seema Pankaj, Prof.Santosh S Sambare "Survey of Call Blocking Probability Reducing Techniques in Cellular Network" International Journal of Science and Research Publications, Volume2, Issue 12 December 2012
- [6]. S.Malathy,G.Sudhasadasivam,K.Murugan,S.Lokesh "Addaptive Slot Allocation And Bandwidth Sharing For Prioritized Handoff Calls In Mobile Networks" (IJCSIS)International Journal of Computer Science and Security, Vol.8,NOo. 1,2010
- [7]. Jahagir Khan, Ali Abbas, Khisro Khan "Cellular Handover Approaches in 2.5 to 5G Technology" International Journal of Computer application (0975-8887)Volume 21-No. 2,May 2011
- [8]. Praveen Kumar ,Vinay Prakash Sriwastava, Rishi Srivastava "Decreasing Call Blocking and Dropping Rate by Implementing Resource Planning Model Through Auxiliary Station in Search MODE" "Computer Science and Engineering BBD University Lucknow, India " I JIRSE Journals Vol 2, Issue-5-May 2014
- [9]. Allam Moousa, n-Najah National University, Palestine, "Prioritization Schemes in Queuing Handoff and New Calls to Reduce Call Drops in Cellular System" 52 International Journal of Mobile Computing and Multimedia Communications-3(2),52-61, April-june 2011