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Call Dropping Problems in Mobile Networks

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Abstract – Most of people using mobile phones today. Mobile phone is just like a partner for teenagers. There are many people facing problems such as network, calling, messaging & when downloading data through mobiles. The focus of this paper details the experiences and technical issues encountered in use of mobile handheld devices. Problems related to mobile network are day by day increasing. We studied mobile communication and various research papers. By studying we came to know about the call dropping related issues.

Keywords – MS, BS, BSC, MNC, STC, MSS.

I. INTRODUCTION

A Mobile network is collection of multiple nodes. It's having Mobile Stations, Base Station, Base Transceiver Station, and Mobile Switching Center etc. Mobile Station call to BS that is responsible for providing connection, Mobile switching Center having control on BS. It provides services of mobility management. Mobile architecture is designed by vendors. It consist specific hardware & software. A call made by mobile to mobile goes through many mobile network nodes than get connected. Sometimes people facing call dropping problem in mobile N/W.

Some cases call is disconnected unexpectedly before you or other party terminates the call as a result of many technical reasons. This scenario is known as drop call. A call may drop due to various reasons of mobile; sometime it may be due to configuration, traffic, congestion, signalling, power, or may be due to subscriber etc. Sometimes call drop occur due to handoff, internal inferences.

Now a day's mobile network service providers attempting & setup antennas on roads, parks, crowdie areas so they can solve some sort of problems. Range problem can be solved through this many rural or minimally inhabited areas lack a signal or have a very weak mobile signal, but many mobile network service providers are attempting & trying to set up antenna in parts of those areas most likely to be occupied by users.

In an area where the signal would normally be strong, certain other factors may have an effect on the reception. E.g. indoors and building walls may filter a mobile phone signal from being used. Many underground areas, such as tunnels and hills, mountains lack an obtained of signals. Moreover, the weather and heavy traffic in mobile network may impact on the power of the signal.

II. CAUSES THAT AFFECT ON CALL

There are various states effecting call & leads to congestion in mobile network. Following are some of them:

A. Traffic

Traffic jams are the most problematic situation in any case or area much and more time because of network traffic congestion occurs.

Increase in Internet connections to a network increases the network's complexity and opens the possibility for compatibility issues. The following antenna system problems may affect the call drop rate:

1. If the transmit antennas of two cells are improperly connected. So there call drops are likely to occur at places far away from the BS.
2. Directional change traffic in cell has main and diversity antennas, if the two antennas have different traffic channel angles or azimuths or the coverage areas of the two antennas are different. In this case, the following result may occur. MS can receive the signals from one antenna; when a call is made, the MS cannot seize the signal transmitted by the other antenna and thus a call drop occurs.
3. If the connector are not securely connected, both the transmit power and receiver sensitivity of the antenna are reduced. Thus, call drops may occur.

B. Increase of signaling load

On New Year and festivals when most of the people started to make call or started to send lots of wishing messages. Instant messaging or other push applications are running in the background but more and more people are doing that these days, too handed over to neighboring cells which creates quite a significant amount of signaling, hence the network needs to work more to maintain the established.

With the rising use of the mobile, the amount of signaling required to set-up and maintains radio bearers are changing. These numbers are obviously for someone who doesn't move a lot and who is in good coverage area. The young generation of now days often sends and receives more SMS messages a day. In total that's easily 100 signaling events on the PS (Packet Switching) side per day. Compared to the 15 signaling events on the CS (Circuit switching) side for voice and SMS, that's quite a difference, not only for the network but also for the mobile, i.e. the impact on the battery charging interval is significant.

C. Coverage problem

Coverage problems may also affect the call drop rate:

1. No coverage areas

The voice quality at BS is poor and calls cannot be handed over to other cells. In this case, call drops may occur. In some area such as mountains regions, the signals are blocked and thus the transmission is discontinuous, leading to call drops.

2. Poor indoor coverage

With in building and thick walls cause great affect and low in indoor signal level, which cause call drops.

3. Cross coverage area

The area of two BS cells of same provider causes cross coverage due to various reasons (such as excess power). A mobile station cannot be handed over to another cell due to no suitable neighboring cells. In this case, the signal level becomes low and the voice quality of the mobile station deteriorates. Thus, call drops occur.

4. Insufficient coverage

If the signal from an antenna is blocked or it is faulty, call drops may occur because of discontinuous coverage. In areas such as mountains regions, the signals are blocked and thus the transmission is discontinuous, leading to call drops.

D. Configuration Fault in mobile network

Network audit is necessary to judge the network performance and maintain QoS standards. The network audit identifies inconsistencies or limitations in current overall network design, helps to improve processes resulting in optimized network and improved quality of service. Radio Access Network audit includes many aspects of network like performance; neighbor Cell, RF parameter, frequency, competitive benchmark audits. In real GSM Radio Access network evaluated, and different issues, findings, trials and improvements have been summarized and observations/recommendations have been listed to correlate the practical aspects of reverse Frequency optimization, which affect the performance.

The logical components of the network topology define a number of important elements:

- Speed of the network.
- Type of switch traffic channeling that occurs.
- Media that will be utilized.
- Type of connections that can be formed.

E. Overloading of network Equipments

Due to on broadband services for so many aspects of their lives, including public safety and national security, it is critical for the Forward Connection Control to gain a better understanding of the survivability of existing networks and explore potential measures to reduce network failures in network equipment or severe overload conditions in emergencies. Some festival season / New Year when most of the people started to make call or started to send bulk wishing messages. The ability of existing broadband networks to withstand significant damage or severe overloads as a result of natural disasters, terrorist attacks, pandemics or other major public emergencies, as recommended in the National Broadband Plan.

F. Mobile subscriber is moving with high speed

Mobile subscriber moving on fast speed then sometimes it goes beyond coverage area. When send and receive fewer SMS messages text messaging distributed throughout the world and these exchanges are usually also not required to be had in real time. But usually make and receive more than two calls, try to minimize calls when moving it impolite to talk on the phone while on a public transport and also prefer some privacy when calling. Handed over to neighbouring cells which creates quite a significant amount of signaling, hence the network needs to work more to maintain the established.

G. Installed software is not compatible with hardware

After the BS version is upgraded, the one BS version may be incompatible with another BS version, and the parameters and algorithms in the new version may be changed. In this case, the call drop rate increases

H. transmitter and receiver problems

The difference between the uplink signal and the downlink signal level may be high in the following situation:

1. The Transmit power of the BTS is high.
2. The tower mounted amplifier (TMA) or BTS amplifier does not work as they desired.
3. The antenna and the connector are not properly connected.

If a repeater is installed in a cell, network coverage problems may occur in the case that the repeater has any fault or that the uplink and downlink gain is inappropriately set. Therefore, the traffic channel call drop rate increases. If a wide-frequency repeater is used and the gain is set to a great value, strong disturbance may be caused. As a result, the network quality is affected and the call traffic channel drop rate increases.

I. Handoff Problem

The basic different between mobile network and fixed network is the mobility. When you move from one place to another place, your call will be handoff to another base station from your current base station to avoid a drop call. As a result of that you can move here and there while calling to your colleagues. But sometimes this handoff process may not work properly. Then your call will hang in present base station until coverage of present base station vanishes. Finally your call will be disconnected due to no coverage. When you check coverage just before the call drop you can see very bad signal, but if you check coverage just after the drop call you can see mobile shows a very good coverage in this kind of drop calls.

III. SO HOW TO REDUCE DROP CALL?

To avoid the negative effects of network congestion is implementing priority schemes, so that some packets are transmitted with higher priority than others. Priority schemes do not solve network congestion by themselves, but they help to alleviate the effects of congestion for some services.

A. Moving network to LTE

Move the mobile network to new configurations such as LTE provides better solution for calling, web, messaging. According to the survey of PRNEWSWIRE Wireless customers who use 4g LTE can have fewer problems like data related issues, slow connection Speed than people who using 3g, 4g. LTE having some problems as at both ends it requires LTE enabled devices.

B. Stopping some types services

Stop providing the some services for a moment like we can withdraw the sending delivery report of message during busy hours. Voice call need bandwidth of 64 kbps per call which can offer by reserving one channel into network but a data subscriber always need more bandwidth than a voice call which need to reserve more than one traffic channel. Voice call is also more expensive as compare to data call. So, if we give priority to voice call then we can make more satisfaction in subscriber & get more money as network operator.

C. Multiple routes for same call

To avoid network congestion is the explicit allocation of network resources to specific flows. One example of this is the use of Contention-Free Transmission Opportunities. We would like to set that all calls to a specific destination, were commuted to a Gateway A, and if all lines are busy, these calls are routed by Gateway B.

D. Providing call priority

The customer behaviors require an extraordinary amount of service. It starts with the realization that what is the need of that time. Choose the priority of work. By applying Priority load can be balanced.

E. Multiple Databases for signaling

The growth in file size was entirely predictable, but someone failed to plan for it. Predictable growth patterns are something that should be analyzed right at the start. A mobile phone signal (also called reception) is the strength of the connection to the mobile phone with its network. Depending on various factors, such as proximity to a tower, obstructions like buildings or trees etc. day to day maintenance required.

F. Assign priority to expensive call

We can give priority to expensive call particularly in busy hour. Give priority to ISD call or call to value added services.

IV. CONCLUSION

It provides various reasons of call dropping and basis for resolving the same. I have gone through various document based on books, Internet, research papers to present a summarize material over call dropping & methods of their reductions. It may be helpful to various people who are working in mobile telecom sector. Almost every telecom operator worldwide is facing problem of call dropping & they are upgrading their network at hardware & software level for reducing the call drop as much as possible. In future mobile networks moving their network to LTE based.

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