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Radio Network Planning for 2G And 3G System

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ABSTRACT

The term 3G Internet alludes to the third era of cell telephone norms, as said by the universal telecom union (ITU).3G innovations permit versatile administrators to offer more administrations alternative to their clients including portable wide band. 3G innovation is intended for mixed media correspondence it gives administrations like higher information exchange rates. One of its key vision is to give is to consistent worldwide wandering, empowering clients to move crosswise over fringes while utilizing the same number and handsets. The general strides and strategies for remote radio system arranging are initially tended to, and then four streamlining techniques utilized for off-the-rack recreation based assessments. The radio get to part of the remote system is considered of crucial significance as it is the direct physical radio association between the portable hardware and the center part of the system. Keeping in mind the end goal to meet the prerequisites of the versatile administrations, the radio system must offer adequate scope and limit while keeping up the most minimal conceivable organization costs. The radio system arranging procedure can be isolated into various stages. Toward the starting is the Preplanning stage. In this stage, the fundamental general properties without bounds system are researched. The second stage is the principle stage. A site review is done about the to-be-secured territory, and the conceivable destinations to set up the base stations are researched. In the third stage, steady modification will be made to enhance the system arranging, through driving tests the reproduced results will be inspected, then the last radio arrangement is prepared to be conveyed in the territory to be secured and served.

Keywords: 3G Internet, Multimedia Communication, Radio Network, Network Planning.

I. INTRODUCTION

The radio get to part of the remote system is considered of crucial significance as it is the direct physical radio association between the portable hardware and the center part of the system. Keeping in mind the end goal to meet the necessities of the portable administrations, the radio system must offer adequate scope and limit while keeping up the most minimal conceivable sending costs.

3G remote innovation is the meeting of different 2G remote information transfers frameworks into a solitary worldwide framework which incorporates both physical and satellite parts. 3G remote innovation has capacity to bring together existing cell principles with CDMA, GSM, and TDMA. 3G has the accompanying improvements more than 2.5G and past systems, Higher information speed, Video-conferencing bolster, Enhanced sound and video spilling, Web and WAP perusing at higher velocities, IPTV (TV through the Internet) bolster exchange rate for 3G systems is somewhere around 128 and 144 kbps for gadgets that are moving quick and 384 kbps for moderate ones. For settled remote LANs, the velocity goes past 2mbps.

3G remote systems comprise of a Radio Access Network (RAN) and a center system. The center system comprises of a parcel exchanged space, which incorporates 3G SGSNs and GGSNs, which give the same usefulness that they give in a GPRS framework, and a circuit-exchanged area, which incorporates 3G MSC for exchanging of voice calls. Charging for administrations and access is done through the Charging Gateway Function (CGF), which is likewise part of the center system. RAN usefulness is free from the center system usefulness. The entrance system gives a center system innovation free access for portable terminals to

various sorts of center systems and system administrations. Either center system space can get to any proper RAN administration; e.g. it ought to be conceivable to get to a "discourse" radio access conveyor from the packet switched area.

II. METHODS AND MATERIAL

1. Main Part

A) General Approach for Radio Network Planning

The radio system arranging procedure can be partitioned into various stages.

The principal stage is the Preplanning stage. In this stage, the essential general properties without bounds system are researched, for instance, what sort of versatile administrations will be offered by the system, what sort of necessities the distinctive administrations force on the system, the fundamental system design parameters et cetera.

The second stage is the primary stage. A site overview is done about the to-be-secured territory, and the conceivable locales to set up the base stations are researched. Every one of the information identified with the land properties and the assessed activity volumes at various purposes of the territory will be consolidated into a computerized map, which comprises of various pixels, each of which records all the data about this point. In view of the proliferation show, the connection spending plan is figured, which will characterize the cell reach and scope limit. There are some essential parameters which incredibly impact the connection spending plan, for instance, the affectability and recieving wire addition of the versatile gear and the base station, the link misfortune, the blur edge and so on. In view of the computerized map and the connection spending plan, PC reproductions will assess the diverse potential outcomes to develop the radio system part by utilizing some streamlining calculations. The objective is to accomplish however much scope as could reasonably be expected with the ideal limit, while lessening the expenses likewise however much as could be expected. The scope and the scope organization are of fundamental significance in the entire radio system arranging. The scope arranging decides the administration range, and the scope organization decides the quantity of to-be-utilized base stations and their separate limits.

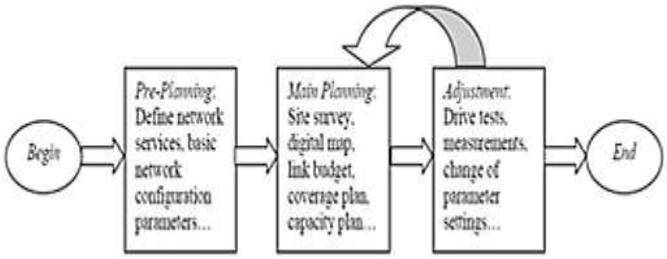

Figure 1. Radio Network Planning Process

In the third stage, consistent change will be made to enhance the system arranging. Through driving tests the reproduced results will be inspected and refined until the best trade-off between the greater part of the realities is accomplished. At that point the last radio arrangement is prepared to be conveyed in the range to be secured and served.

The base station area is a reasonable case of the unpredictability of arranging radio systems. Numerous variables must be considered, which makes the issue of system arranging hard (unrealistic to explain in re-enactment time). Underneath we will take the uplink of UMTS as a case to show how the cost capacities fuse the degrees of flexibility and are minimized.

In the computerized map, conceivable locales for base stations shape together an arrangement of hopeful destinations S={1,...,m}. Every hopeful site has an arrangement of setup parameters demonstrating properties like the radio wire sort and receiving wire bearing. We have additionally an arrangement of test focuses I={1,… ,n}. At every test point the versatile activity volume is researched and the radio sign qualities must meet the requested worth here. The movement volume can be basically identified with the action association numbers now and is indicated by i u . The P tar is the base required force got at the base station. The ij g is the spread element between point i and point j. So tar P/ij g turns into the transmission force of a portable gear. j c is, for this situation, the comparing expense of setting up a base station in point j, similar to establishment, renting and support costs. We characterize the accompanying variables.

B) Optimization methods for solving cost functions reliably and rapidly

With the computerized map, the required information and a legitimate scientific model, reenactments can be directed keeping in mind the end goal to decide the best plan of allotment of the base stations. The PC more often than not looks for the ideal result regulated all through the encompassing neighbors of an underlying arrangement, and the neighbor is characterized as the new estimation of the variable that has a Hamming separation of 1 from the present point. Neighboring arrangements for this situation are one extra base station in a conceivable position, or one less base station in another position. There are four techniques that are every now and again utilized here: Random Walk, Simulated Annealing, Tabu pursuit and Genetic Algorithms.

Arbitrary Walk: The Random Walk look technique creates new neighbors at every cycle. The cost capacity at the new neighbor is assessed and contrasted with the one at the present point. On the off chance that the new cost capacity is lower than the old one, then the neighbor will be genuinely acknowledged. What's more, if the new capacity is more terrible than the previous, it will be restrictively acknowledged with a likelihood of p, with p=0 turning into the ravenous inquiry calculation with no arrangement acknowledged unless it gives a more reasonable cost capacity, and p=1 prompting the completely arbitrary hunt, in this way assessing every single conceivable blend of base stations at all conceivable spots. From writing studies, the ideal estimation of the likelihood p of picking a more awful arrangement than the past one is p=0.03.

Recreated Annealing: The Simulated Annealing inquiry is like the arbitrary walk. It additionally figures the cost capacity of the created new neighbor, and contrasts the outcome and the as of now got old result. There is additionally restrictive and genuine acknowledge. The distinction is that the likelihood of tolerating restrictively is changing amid the inquiry system, while in arbitrary walk the likelihood p is altered from the earliest starting point to the end of one pursuit. The change of this likelihood is controlled utilizing some technique, which can be similarity to the cooling method of strengthening, so that the inquiry turns out to be increasingly insatiable.

Tabu Search: Tabu hunt is characterized as takes after: The officially chose base station positions in the last K cycles will be viewed as "tabu", thus won't be thought about for the era of new neighbors. Typically K is been 1. The extent of contender for every emphasis can be reset, and the bigger the span of applicants, the better the last result, additionally it takes more time for the reenactments to join. The best esteem for the hopeful size can be observed to be equivalent to 10 in the writing.

Genetic Algorithm: The possibility of Genetic Algorithm originates from the wonders of the human advancement initially proposed by Darwin. From an arrangement of guardian focuses, the youngsters can be produced. We select those kids focuses, that demonstrate the best results while assessing the cost capacity contrasted with the ones of their folks and their era. In the Genetic Algorithm, we utilize a change administrator that can be identified with the meaning of neighborhood. The meaning of populace size and eras are additionally like the hopeful size and cycles specified some time recently.

III. RESULTS AND DISCUSSION

1. A Flow Diagram for the Network Planning

Requirement analysis is the principal stage being developed procedure. Framework necessity ought to set out what the framework ought to do instead of how it is finished. A prerequisite might be utilitarian necessity, which portrays a framework administration or capacity. On the other hand it might be a non-capacity prerequisite. A non-capacity necessity is a requirement set on the framework or on improvement process.

Alongside necessity a spread model test is to be done which has Addition of quick and moderate blurring, Tuning the model utilizing center estimation of got recorded quality ,and Using of constrained test tests to foresee the engendering model of the entire arranging area,along with this locales determination is likewise done where Test site ought to be in run of the mill proliferation environment, Attempting to cover however much jumble as could reasonably be expected no deterrent adjacent is permitted. Testing of reception apparatus is done in this stage.

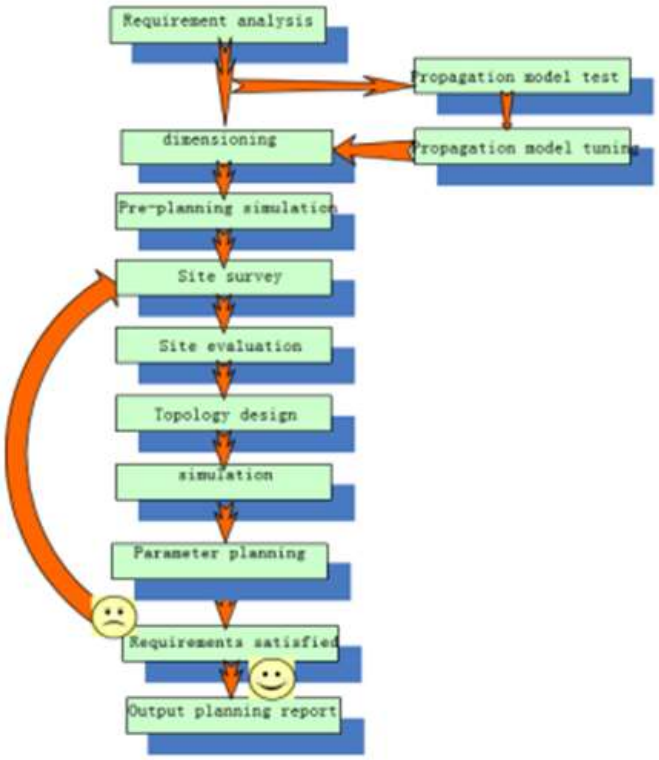

Figure 2. Flow Diagram for Network Planning

Next is dimensioning which ought to has Coverage estimation, Capacity estimation, and Get number of base stations that fulfill necessities on scope, limit, and quality. Alongside this is pre arranging reenactment the motivation behind this is to Verify size of estimation, Guideline for the topology plan, Guideline for site study and determination.
Site overview is finished by Getting the contribution for arranging and reenactment, Know about geographic and radio environment of site, Know about states of common work, Traffic conveyance in arranging zone, Provide applicant locales in arranging territory .

Correlation of different arrangement is finished by reproduction and Simulation results gives a favored arranging plan. Power assignment for DL channels, scrambling code arranging, Frequency distribution is done in parameter arranging, by this stage necessities must be fulfilled or else the stream needs to convey again from the site review lastly yield arranging report is finished.

2. GSM Planning

In GSM, the system is separated into a great deal of cells, and more often than not a base station is planted in the focal point of every cell. For simple investigation, the phones are spoken to as neighboring hexagons, while actually they can be of any sort of structures and cover with each other. The span of every cell, when altered, will as a rule stay stable. There is one imperative element in GSM system arranging, the scope arranging and scope quantification are free. The scope arranging relies on upon the got signal quality, that is to say, the secured zone is almost just constrained by the base sign quality at the phone territory, while the later scope quantification depends for the most part on the recurrence allotment. The connection spending plan is the table recording the force misfortune in the uplink or downlink of the system. The connection spending plan results can be enhanced by embracing a few methods like recurrence jumping or utilizing collector assorted qualities.

The recurrence is an alarm asset in GSM framework, and the recurrence must be deliberately wanted to be reused. The recurrence reuse variable is characterized as the quantity of base stations that can be actualized between the present base station and the ones before the same recurrence is reused. The radio wire tallness can likewise impact the reuse component, since the higher the reception apparatus is, the more noteworthy the likelihood that the sign causes more impedance. Recurrence arranging is done utilizing one of the beforehand said advancement calculations, by setting a sufficient cost capacity to expand the limit of the system while minimizing the quantity of recurrence sub groups utilized.

3. UMTS Planning

The fundamental strategies of UMTS are fundamentally the same as that of GSM, and the scope and scope quantification assume likewise critical parts in the entire radio system arranging. They are both firmly related, and the scope is an element of the limit. Since UMTS is obstruction restricted, a major number of clients will lessen the force accessibility at the base station to battle impedance, and along these lines diminish the phone site in what is known as the cell breathing impact.

In UMTS, the recurrence reuse component is 1, and in every cell the entire data transfer capacity is utilized. So there is no recurrence task in UMTS. UMTS utilizes WCDMA as its multiplex access technique, which confirms that the obstruction assumes a crucial part in

the scope arranging and limit planning.The cell size in UMTS is not altered. At the point when the obstruction emerges, the SIR break down, which makes the versatile hardware at the old cell periphery difficult to speak with the base station? So the cell size therapists. The subsequent swinging of the phone size in UMTS because of the changing obstruction is called "cell relaxing". The system upper limit breaking point can likewise be effortlessly achieved when an excess of obstruction prompts the cutoff of the force at the base station through the component of force control circle. So in UMTS the scope arranging and scope organization can't be autonomously made like in GSM, they are firmly related. The higher the scope, the lower is the limit, and the other way around.

IV. CONCLUSION

In this paper we have experienced the general procedure for radio system arranging, the enhancement techniques, GSM arranging and UMTS arranging. The scope arranging and scope organization are the most framework, while they are related to each other in UMTS framework because of the huge part of impedance in UMTS.

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