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PERFORMANCE ON GPRS SERVICE

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Abstract: Today's generation is the Internet Generation. Number of people can't spend his life without Internet connection. In this paper we show different technique on second generation mobile technology to get good performance during accessing Internet. We will also show that why this technique has its own importance in today's rapid growing technology. In this paper we will study the speed of packet switched from end server to end host. By using some specific technique we can get good performance of GPRS.

Keywords: GPRS,Performance,Data speed,channel,packet-switched.

I. INTRODUCTION

Every common man in developing country wants to access internet at low cost. He wants to access internet average speed on 2G technology. Global system for mobile communication (GSM) became the most popular 2G standards. The success of 2G technology provided the necessary thrust to mobile wireless communication and provides the way for enhanced networks in the future. Common man can get recharge its plan and access internet for long time.

A. Problem: Person of developing countries can't get quality of service on internet instead of giving enough money to their service provider. Its reason is that there are no clear flow of packets between mobile equipment and server. In 2G networks, by using some special techniques he can access good quality internet service. Unfortunately these techniques are kept secret from common man who have so much requirement of it.

B. Aim: we provide some technique that can be in user control to speedup to internet. Its never means that we oppose 3G technology. We are trying to develop better utilization of 2G network.

C. Scope: About 87 percent of world population is now using mobile phones [1]. If we will provide such technique that is useful to common man, then this will drastically increase the number of internet user on 2G technology .As we know that 3G can provide better service from 2G,but it has certain drawbacks .So to get quality of service of internet on 2G technologies is better alternatives of 3G technology.

II. INTRODUCTION OF GPRS

A. What is GPRS?
B. How this technology works?
C. How does GPRS achieve high data speeds?

A.GPRS Description: The GPRS (General Packet Radio Service) is a new bearer service of GSM that improves and simplifies wireless access to packet data networks, e.g, to the Internet. It applies a packet radio principle to transfer user data packets in an efficient way between GSM mobile station and external packet data networks. Packets can be directly routed from the GPRS mobile station to packet switched networks .Networks base on the Internet Protocol (IP) and X.25 networks are supported in the current version of GPRS. Users of GPRS benefit from shorter access times and higher data rates than they have now. In conventional GSM, the connection set-up takes several seconds and rates for data transmission are restricted to 9.6 kbps. GPRS in practice offers session establishment times below one second and ISDN-like data rates up to several 10kbps.In addition, GPRS packet transmission offers a more user-friendly billing than that offered by circuit switched service, billing is based on the duration of the connection. This is unsuitable for applications with burst traffic. The user must pay for the entire airtime, even for idle periods when no packets are sent (e.g. when the user reads Web Pages) .In contrast to this, with packet switched services, billing can be based on the amount of transmitted data. The advantage for the user is that he or she can be "online" over a long period of time but will be based on transmitted data volume.

To sum up, GPRS improves the utilization of the radio resources, offers volume-based billing, higher transfer rates, shorter access time and simplifies the access to packet data networks.

B. How GPRS does works?

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In order to offer GPRS services operators must install a new network overlay to allow migration to packet switching. The key new elements in a GPRS network are:

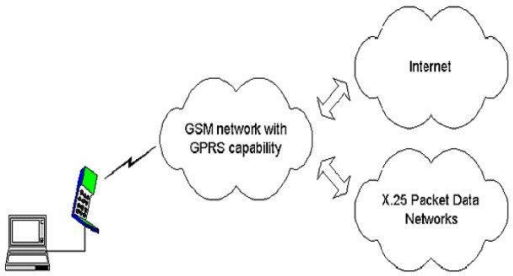

Fig 1. GPRS Network

(1) SGSN (Serving GPRS Support Node): the node within the GSM infrastructure that sends and receives packet data to and from the mobile station and keeps tracks of the mobiles within its service area. SGSNs send queries to Home Location Registers(HLRs) to obtain profile data of GPRS subscribers and detects new GPRS mobile stations in a given service area. The SGSN performs the functions include mobility Management (tracking a mobile location), user verification and collection of billing data.

(2) GGSN(Gateway GPRS Support Node): The node that interface to external public data networks(PDNs) such as the Internet and X.25.GGSNs maintain routing information that is necessary to tunnel the Protocol Data Units (PDUs) to the SSGNs that Service particular mobile stations. Other functions include network and subscriber screening and address mapping.

(3) Charging Gateway: An interface between the charging gateway functionality and the billing data being transferred, the charging terms changing (peak/off-peak), an alteration in the quality of service or if a GPRS session ends (known as a packet data protocol (PDP) context).The main functions of the charging gateway are the collection of GPRS data records from the GPRS nodes, intermediate data record storage, buffering and transfer of data records to the mediation/billing systems.

(4) GPRS Tunneling Protocol (GTP): A specialized protocol that operates over the top of standard TCP/IP protocol to encapsulate IP or X.25 packets so that they can be forwarded between the SGSN and GGSN. In addition two network elements must also be enhanced in order to support GPRS:

(a)Base Station System (BSS):-must be enhanced to recognize and send user data to the SGSN that is serving the area.

(b)Home Location Register (HLR):- must been enhanced to register GPRS user profiles and respond to queries originating from SGSNs regarding these profiles.

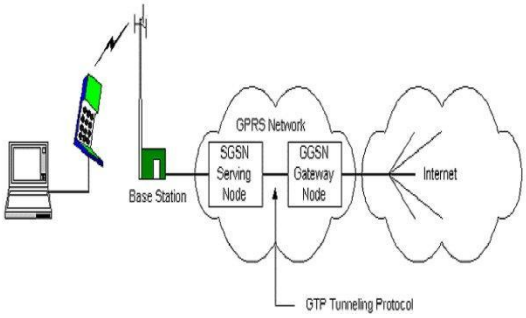

Fig 2.GPRS to Provide Internet

To provide an overview of how these elements fit together it is useful to use an example of a business person with a laptop connected to a GPRS cellular phone. The GPRS phone communicates with a GSM base station that sends the data packets to the SGSN (whereas a
Circuit-switched data calls are connected to voice networks by the mobile switching centre.) The SGSN communicates with the GGSN, a system that maintains connections with other networks such as the internet,X.25 networks or private networks. A GPRS network can use multiple serving nodes, but requires only one gateway node for connecting to an external network such as the internet. IP packets from the internet addressed for the mobile station are received by the GGSN, forwarded to the SGSN and then transmitted to the mobile station.

To forward IP or X.25 packets between each other, the SGSN and GGSN encapsulate this packet using a specialized protocol called the GPRS tunnel protocol (GPT) which operates over the top of standard TCP/IP protocols. The user experiences a straightforward IP or X.25

C. How does GPRS achieve high data speeds?

GPRS uses the same radio channel as voice calls, a channel that is 200 kHz wide. This radio channel carries a raw digital radio stream of 271 kbps which, for voice calls, is divided into 8 separate data streams; each carrying approximately 34kbps.After protocol and error correction overhead, 13kbps is left for each voice connection or about 14kbps for data.

Circuit-switched data today uses one voice channel. GPRS can combine up to 8 of these channels, and since each of these can deliver up to 14kbps of data throughput, the net result is that users will be able to enjoy rates over 100 kbps. But not all eight-voice channels have

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to be used. In fact, the most economical phones will be ones that are limited to 56 kbps. The GPRS standard defines a mechanism by which a mobile station can request the amount of bandwidth it desires as the time it establishes the data session.

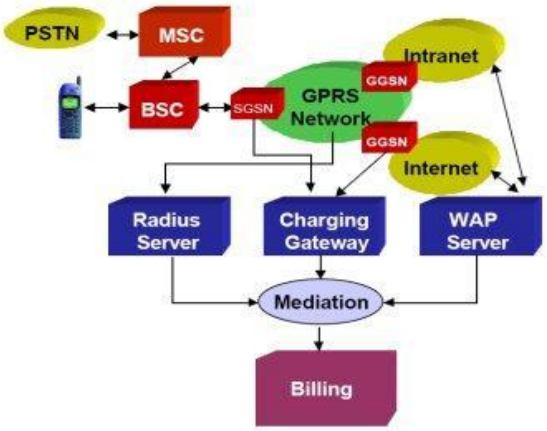

Fig 3.GPRS Architecture

III METHODS TO INCREASE SPEED OF "GPRS"

In GPRS system, there are 8 –PSK channels, from these 8-PSK channel only 2-3 channels are allocated to the GPRS data service instead of it performs well. If we allocate all remaining channel to data service of GPRS,then we can get good performance in GPRS.This type of technique implement in the "Enhanced Data Services in GPRS network via Auction based Prices for Admission"[2] The channel which are assigned to GPRS user i.e.8-PSK,from these user has its own control whether he want to assign it for voice call or for data service. In normal GPRS, 5 to 6-PSK are regularly scanning the voice channel for any voice call. In today's generation user has number of SIM (subscriber Identity Module) which he can hand over all voice call on another SIM number.

Methods:- From our test we perform some test in GPRS compatible mobile. Because we only want to improve performance on GPRS compatible mobile or GPRS service on computer. To apply both these test we use following two techniques:

A. *By diverting all voice calls to another number*: As we previously discussed, if we improve perfection on GPRS data service, then we have to use more channel. Sometimes we have one menu in the mobile equipment itself i.e. call divert. In a SIM card we get two types of performance statistics.

In below statistics, we can watch most of the time data transfer is above 50% of allocated bandwidth. In this graph we consider the percentage as a kbps speed. It means in one horizontal block we consider 6 kbps .By doing this we get approximately 236 kbps at the top of statistics. As we calculate the max kbps speed due to this we consider only 50%(114kbps) above statistics.

The following calculation of the call divert statistics we get following

Max kbps speed in fig 4 are as following –
120+144+178+150+162+152+115+144+120+195+122+144+126+168+192+180+156+126+150+204+168+144+144+123+123+123+174+168+156+174+180+192+120+129+130+122+114+132+124+186+209+220+132+198+189+158+180+125+119+143+116+180+162+128+180+174+150+150+172+168+165+128+178+132+158+156+170+188+174+133+120+120+144+214+198+122+122+142+178+152+162+144+144+133+114+150=13168

Now we calculate the average of the previous statistics

Average =13168/86=153.116 kbps

While in below statistics we can justify the following points

(a) when data is transferred its average speed is 153.116 kbps which is about 80 % of allocate GPRS Channel bandwidth .

(b) which proves that data transfer rate is definitely increases during the call diverting as compare to normal GPRS sevice.

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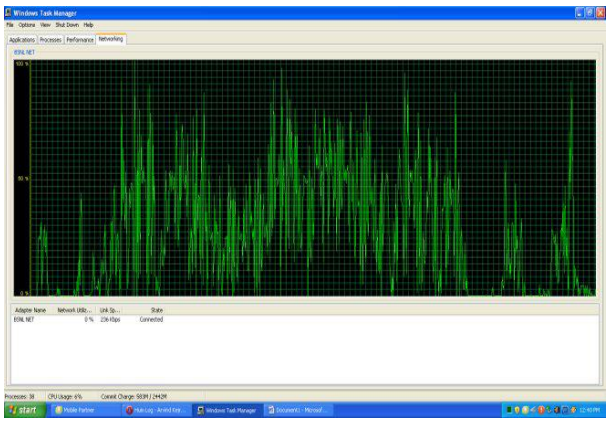

Fig 4.When we Divert Call

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B. *By without diverting voice call:* In below statistics, we get the following result during without call divert which is as follow

Max kbps speed in fig 4 are as following – 120+114+162+126+126+132+162+120+186+156+132+138+132+114+126+126+125+114+114+186+114+126+114+132+144+120+120+114+156+156+126+132+144+120+124+122+124+121+144+124+114+120+226+132+210+150+186+156+186+144+174+210+144+120+114+114+162+132+168+216+120+174+162+126+138+144=9330

Now we calculate the average of the previous statistics

Average =9330/66=141.3636 kbps

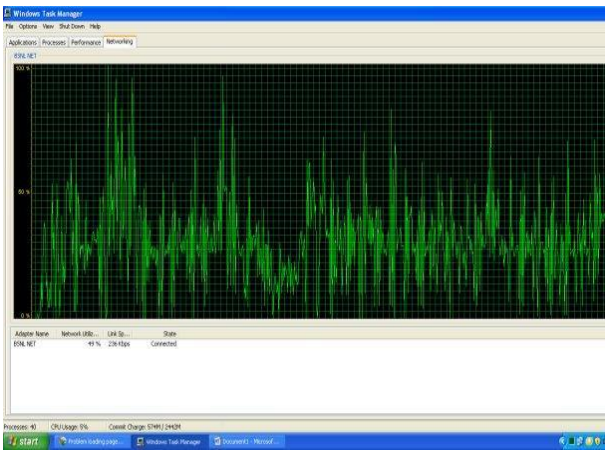

Fig 5.WHEN WE DO NOT DIVERT CALL

C. *By using some speed accelerator software:* As we know, that there are number of speed accelerator software .From these we use some effective software which are as follows

(1)Internet download Manager: By using this software we can get good download speed. The statistics show this is better than normal internet accessing. Because if we check the perform without using any technical term we get about 141.36 kbps speed. But by using this software we get following result which is as follow

Max kbps speed in fig 4 are as following – 132+126+192+138+196+186+168+162+120+120+162+160+138+192+174+145+114+114+114+186+192+138+132+120+125+142+133+133+127+114+114+142+120+132+160+132+120+174+114+138+116+192+168+204+120+120+132+150+114+114+138+126+114+144+114+138+156+150+168=8419

Now we calculate the average of the previous statistics

Average =8419/59=142.6949 kbps

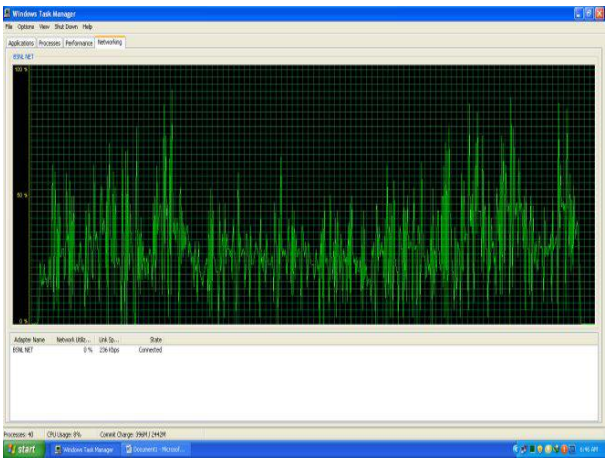

Fig 6.GPRS PERFORMANCE ON SOFTWARE

IV CONCLUSION

If we study 8–PSK channels then we get only 2 channels are allocated to data service. All the remaining channels free or scan the voice call service. If we allocate some specific channel to user for data service [2] we can get good speed. But from this type of system we have to handle voice call and data channel separately. From this technique it is more useful that user himself decide whether the voice channel is important or data service at particular time. In above three calculations, we get lowest average at normal performance 141.3636.After this some much better data speed i.e.0.704% more data speed on internet download manager speed from normal GPRS accessing. We get much better speed from both software and normal GRPS accessing. It means we get 7.18% much better speed from normal GPRS accessing. By applying some this type of user control technique .We can get better performance of GPRS data service. Absolutely, this can be done with the help of diverting all voice all to other number. Not only can this but if user access internet on morning form 3:00 a .m. to 8:00 a.m. get better data transfer also.

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