Wired Network Services in Mobile Phones

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***Abstract*— Mobile communication in today's world means a lot to the human kind, many deals are made and others are broken, within seconds. That is because of our sophisticated methods of transporting the data at very high speeds and to very long distances. That is also because we kept on improving the method of serving the connections as the no of connections kept on increasing. Methods like TDMA, CDMA, and FDMA, etc. are few basic techniques in communication. Also the architecture of wireless communication shows the areas where connections are provided are divided into CELLS, which are the basic blocks for wireless communication. With the intervention of the wireless system for making calls, the wired communication, to which CELL has no relation has almost been neglected. This also forced the communication giants to upgrade to wireless service along with the existing wired networks.**

Keywords—GSM, Mobile Communication, cells.

I. Introduction

Communication has always been the central focus of the human kind. Marked by replacing the then fastest means of sending and receiving information, i.e. telegrams and letters, now centralized by the mobile phones, the communication science has come up with so many changes to live up to the expectations. Out of them, the introduction of 'CELL', in BELL LABORATORY was the crucial step on which the whole mobile communication even today depends on [1].

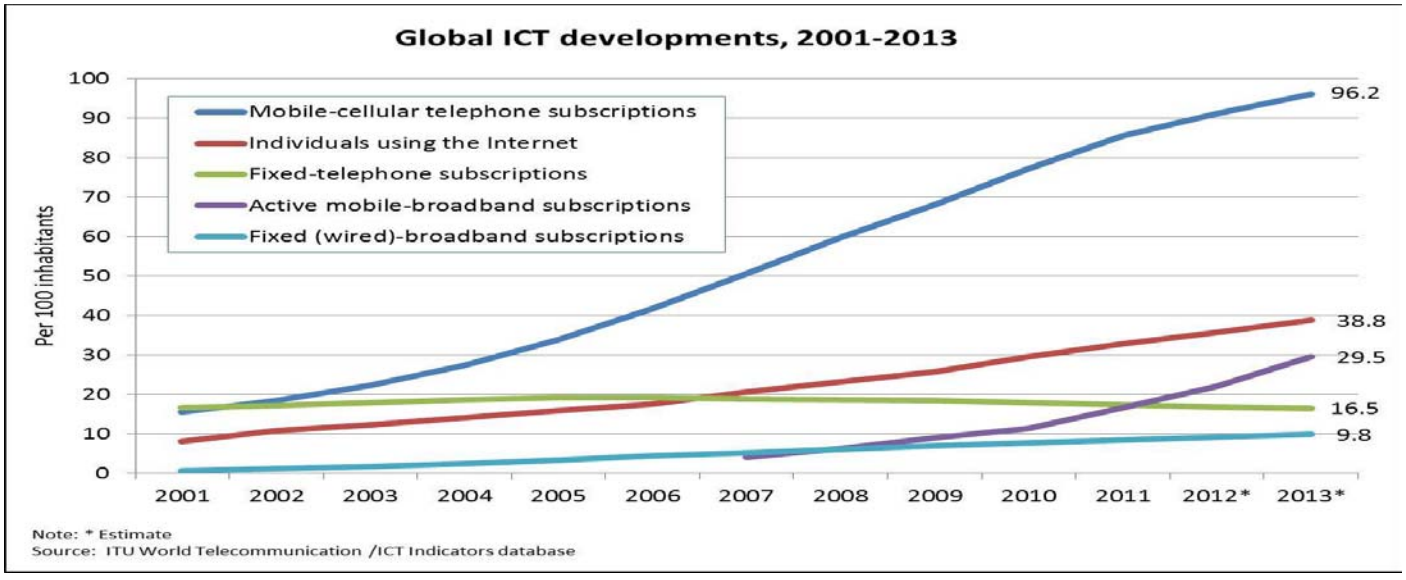

Figure 1. Global data of different subscriptions from 2001 [8].

However, with the development of newer and better technologies, the number of cellular telephone users grew almost exponentially from 2002 to 2013 and the demand is increasing day by day.

As it is very clear from the statistics given below, the fixed line phones have gone down from 2005, whereas the fixed broadband connections kept increasing, in spite of a constant increase in the mobile broadband subscriptions. This clearly signifies the uniqueness of the fixed broadband services.

II. Cellular System

The mobile phone communicates with the base station [BTS], within an area around it called as a CELL. The shape

of cells are never perfect circles or hexagons as shown in

Figure 2, but depend on the weather conditions, and sometimes even on system load [2]. Size can vary from tens of meters in cities, and hundreds of meters in urban areas, up to tens of kilometers in the countryside, depending on the no of subscribers in that area. [3] This refers to the further division of the cell, into smaller parts and uses the principle of 'Frequency Reuse'.

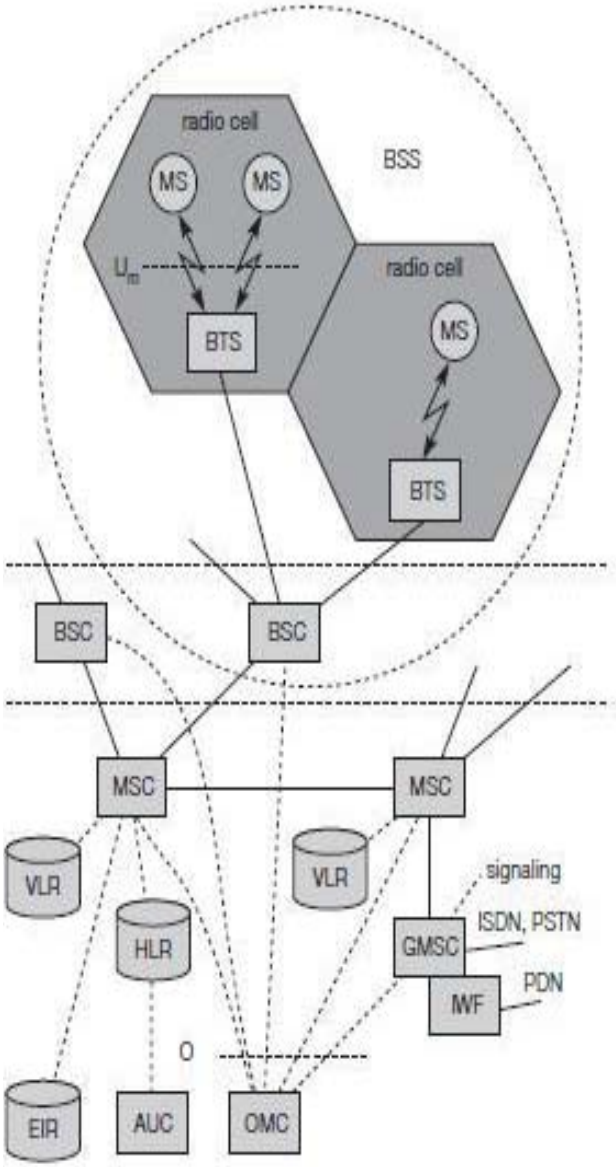

Figure.2. Architecture of GSM mobile.

As shown in the figure 3, the hexagonal cells are further divided and different frequencies are used in a single cell. The same frequencies are not used in the neighboring cells, so that there is no interference. As per the figure 3, (f1, f2, f3) and (h1, h2, h3) are the frequencies used by dividing the area into cells and further dividing them into smaller parts as the no of subscriptions in that particular region keep increasing.

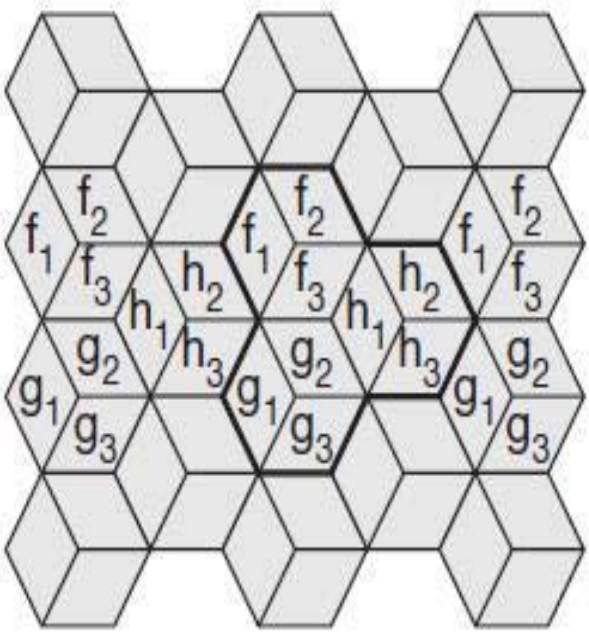

Figure 3. Division of CELL, into smaller parts i.e. three sectors per cell.

A. *Advantages of cellular systems with small cells*

1. Frequency Reuse: Same frequency can be repeated after a very small distances, as the neighboring frequencies would be different [1].
2. Less Transmitting Power: As the cells are very small, the distances between the transmitter and receiver is less, thus reduces the transmitting power [3].

B. *Disadvantages of having smaller cells*

1. Handover- This can be a serious issue, depending on the speed of the customer, this has to be performed at very high and precise manner. [3]
2. Frequency Planning- This also needs special and a properly planned approach, where frequencies of all service providers must be taken care of, so that no interference occurs.
3. Infrastructure- This requires a highly complex infrastructure, with so many switches, registers etc. to identify the mobile station, making the whole setup quite expensive.

III. View Points

- As depicted from the Figure (1), it is very clear that the fixed telephone subscriptions are getting depleted. So it is possible that the human kind may even bid a farewell to them, leaving the mobile phones as the only source of making calls.

- That would possibly require our wireless to face the challenge of providing efficient service.
- To make the wireless service more and more efficient, the service providers are forced to install more no of BTS and make as many as smaller cells, costing them more and more money.

IV. Rise of IPTV

"IPTV is as multimedia services such as television, video, audio, text, graphics or data delivered over IP based networks managed to provide the required level of quality of service and experience and reliability"[4][5]. The IPTV takes advantage of an already existing wired connection in the customer premises, such as power lines, fixed phone lines etc. and provides the television data through it [6]. This increase in % of the fixed broadband market also subscribing to IPTV also indicates that the market for fixed broadband services is also quite high.

This networking technology takes advantage of existing home wiring such as power lines, [7] phone lines or coaxial cables [7]. The phone line cables are much convenient as they are already used for the sake of transmitting data.

With all these applications, a residential gateway is formed at the home, through which different connections i.e. to the fixed line phone, Television, Wi-Fi routers are made.

Figure 4. Statistics for IPTV subscriptions.

V. Author's View

After the proper view of a CELL, and the way they are divided to tackle more no of customers with sophisticated call facilities, it is very clear that the fixed line/wired phones on the verge of becoming extinct. Thereby making the whole fixed line phone architecture fit for nothing, which is a very huge loss to the service providers. After standing stiff to the losses, the operators are also expected to invest in making a competitive mobile phone architecture, which meets all the expectations of the customers, according to the changing technology.

A. Change suggested & its Advantages

- Instead of the operators investing so much on upgrading the existing mobile phone architecture, they can use the existing fixed line architecture, after installing the necessary elements like HLR, VLR etc. at the fixed line phone stations, to identify and authenticate the SIM cards of the subscribers from the fixed line phone stations also.
- By doing this, we can make use of the architecture of the fixed line phone to handle the extra growth of the subscribers in a particular area.
- The same advancements of high data transfer, high voice quality etc. can be promised by this. The customer must be given a chance to ideally switch to the wireless system, when required, as per convenience.
- By this, only customers who really require the high speed data transfer, Internet etc. can be served according to their requirements and the others who require normal speeds for calls etc. will also be served better, as there is a diversion of high speed calls to the fixed phone architecture.
- We can also provide some additional features of providing the call facility in completely discharged mobile phones, by operating the mobiles in a special mode, where the customers will be able to access their call function and the contacts, messages.

B. Challenges

- The subscribers are expected to have an existing fixed line phone in their premises, in order to have an access through this wired network.
- The existing mobile phone architecture must be modified to provide a connection between the mobile and the fixed phone link.

VI. Conclusion

This whole idea of wired network in mobile phones will be a very good alternative to the existing wireless mobile phone. By doing this, the network operators can make use of initial investments on the fixed phone services and provide the latest technology to the mobile phone customers.

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References

[1] W. C. Lee, Mobile Communications Engineering, 2nd ed. New Delhi: Tata McGraw-Hill, 2008.

[2] Wesel, E. (1998) Wireless multimedia communications: networking video, voice, and data. Addison-Wesley Longman.

[3] Pahlavan, K., Krishnamurthy, P. (2002) Principles of Wireless Network. Prentice Hall.

[4] "IPTV Standardization on Track Say Industry Experts". ITU-T Newslog. 2006-10-27. Retrieved 2012-01-17. http://www.itu.int/ITU-T/newslog/IPTV+Standardization+On+Track+Say+Industry +Experts.aspx

[5] ATIS IPTV Exploratory Group Report and Recommendation to the TOPS Council. Alliance for Telecommunications Industry Solutions. July 2006. Retrieved 2012-01-17.

[6] IPTV distribution using DS2 power line networks.

[7] http://www.lightreading.com/cable-video/why-atandt-likes-homepna/d/d-id/638812.

[8] ITU (International Telecommunication Union) website. http://www.itu.int/en/about/Pages/default.aspx