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A PATH FOR HORIZING YOUR INNOVATIVE WORK

GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS

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Abstract

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This paper presents the Global System for Mobile Communications, originally Group Special. Basically GSM system that mobile phones connect to it by searching for cells in the immediate vicinity. The coverage area of each cell varies according to the implementation environment. GSM was designed with a moderate level of service security. The GSM standard is succeeded by the third generation (or "3G") UMTS standard developed by the 3GPP. GSM networks will evolve further as they begin to incorporate fourth generation (or "4G") LTE Advanced standards. "GSM" is a trademark owned by the GSM Association. The GSM Association estimates that technologies defined in the GSM standard serve 80% of the global mobile market, encompassing more than 1.5 billion people across more than 212 countries and territories, making GSM the most ubiquitous of the many standards for cellular networks. General packet radio service (GPRS) is a packet oriented mobile data service, it is a best-effort service. GPRS extends the GSM Packet circuit switched data capabilities and advantages of GSM system.

1. INTRODUCTION

Mobile computing is the discipline for creating an information management platform, which is free from spatial and temporal constraints. The freedom from these constraints allows its users to access and process desired information from anywhere in the space [1].

GSM (Global System for Mobile Communications, originally Group Special Mobile), is a standard set developed by the European Telecommunications Standards Institute (ETSI) to describe technologies for second generation (or "2G") digital cellular networks. Developed as a replacement for first generation analog cellular networks, the GSM standard originally described a digital, circuit switched network optimized for full duplex voice telephony. The standard was expanded over time to include first circuit switched data transport, then packet data transport via GPRS. Packet data transmission speeds were later increased via EDGE. The GSM standard is succeeded by the third generation (or "3G") UMTS standard developed by the 3GPP. GSM networks will evolve further as they

begin to incorporate fourth generation (or "4G") LTE Advanced standards. "GSM" is a trademark owned by the GSM Association.

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2. TECHNICAL DETAILS OF GSM

GSM is a cellular network, which means that mobile phones connect to it by searching for cells in the immediate vicinity. There are five different cell sizes in a GSM network—macro, micro, Pico, Femto and umbrella cells. The coverage area of each cell varies according to the implementation environment.

Macro cells can be regarded as cells where the base station antenna is installed on a mast or a building above average roof top level. Micro cells are cells whose antenna height is under average roof top level; they are typically used in urban areas. Pico cells

are small cells whose coverage diameter is a few dozen meters; they are mainly used indoors. Femto cells are cells designed for use in residential or small business environments and connect to the service provider's network via a broadband internet connection. Umbrella cells are used to cover shadowed regions of smaller cells and fill in gaps in coverage between those cells.

Cell horizontal radius varies depending on antenna height, antenna gain and propagation conditions from a couple of hundred meters to several tens of kilometers. The longest distance the GSM specification supports in practical use is 35 kilometers (22 mi). There are also several implementations of the concept of an extended cell where the cell radius could be double or even more, depending on the antenna system, the type of terrain and the timing advance.

Indoor coverage is also supported by GSM and may be achieved by using an indoor pico cell base station, or an indoor repeater with distributed indoor antennas fed through power splitters, to deliver the radio

signals from an antenna outdoors to the separate indoor distributed antenna system. These are typically deployed when a lot of call capacity is needed indoors; for example, in shopping centers or airports. However, this is not a prerequisite, since indoor coverage is also provided by in-building penetration of the radio signals from any nearby cell.

3 STRUCTURE OF GSM NETWORK

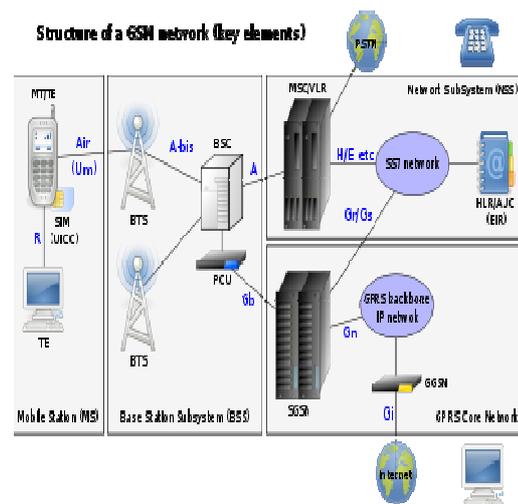


Fig 1. Structure of GSM Network

The network is structured into a number of discrete sections:

- The Base Station Subsystem (the base stations and their controllers).

- The Network and Switching Subsystem (the part of the network most similar to a fixed network). This is sometimes also just called the core network.
- The GPRS Core Network (the optional part which allows packet based Internet connections).
- The Operations support system (OSS) for maintenance of the network.

3.1 . GSM SERVICE SECURITY

GSM was designed with a moderate level of service security. The system was designed to authenticate the subscriber using a pre-shared key and challenge-response. Communications between the subscriber and the base station can be encrypted. The development of UMTS introduces an optional Universal Subscriber Identity Module (USIM), that uses a longer authentication key to give greater security, as well as mutually authenticating the network and the user – whereas GSM only authenticates the user to the network (and not vice versa). The security model therefore offers confidentiality and authentication, but limited authorization capabilities, and no non-repudiation.

New attacks have been observed that take advantage of poor security implementations, architecture and development for smart phone applications. Some wiretapping and eavesdropping techniques hijack the audio input and output providing an opportunity for a 3rd party to listen in to the conversation. At present such attacks often come in the form of a Trojan, malware or a virus and might be detected by security software.

3.2 GPRS

General packet radio service (GPRS) is a packet oriented mobile data service on the 2G and 3G cellular communication systems global system for mobile communications (GSM). The service is available to users in over 200 countries. GPRS was originally standardized by European Telecommunications Standards Institute (ETSI) in response to the earlier CDPD and I-mode packet-switched cellular technologies. It is now maintained by the 3rd Generation Partnership Project (3GPP).

GPRS usage charging is based on volume of data, either as part of a bundle or on a pay-

as-you-use basis. An example of a bundle is up to 5 GB per month for a fixed fee. Usage above the bundle cap is either charged for per megabyte or disallowed. The pay as you use charging is typically per megabyte of traffic. This contrasts with circuit switching data, which is typically billed per minute of connection time, regardless of whether or not the user transfers data during that period.

GPRS is a best-effort service, implying variable throughput and latency that depend on the number of other users sharing the service concurrently, as opposed to circuit switching, where a certain quality of service (QoS) is guaranteed during the connection. In 2G systems, GPRS provides data rates of 56-114 Kbit/second. 2G cellular technology combined with GPRS is sometimes described as 2.5G, that is, a technology between the second (2G) and third (3G) generations of mobile telephony. It provides moderate-speed data transfer, by using unused time division multiple access (TDMA) channels in, for example, the GSM system. GPRS is integrated into GSM Release 97 and newer releases.

Services offered

GPRS extends the GSM Packet circuit switched data capabilities and makes the following services possible:

- "Always on" internet access
- Multimedia messaging service (MMS)
- Push to talk over cellular (PoC)
- Instant messaging and presence—wireless village
- Internet applications for smart devices through wireless application protocol (WAP)
- Point-to-point (P2P) service: inter-networking with the Internet (IP)
- Point-to-Multipoint (P2M) service: point-to-multipoint multicast and point-to-multipoint group calls

If SMS over GPRS is used, an SMS transmission speed of about 30 SMS messages per minute may be achieved. This is much faster than using the ordinary SMS over GSM, whose SMS transmission speed is about 6 to 10 SMS messages per minute.

4. ADVANTAGES

- **Improved decision making:** Mobile Computing lets you conduct business at the point of activity. The ability to collect, access and evaluate critical business information quickly and accurately means better decision making that can have a far-reaching effect on your company's ability to compete successfully.
- **Increased productivity and reduced cost:** Mobile computing can lead to increased individual productivity, increased sales per sales person, more service calls per repair person, less time spent by professionals on administrative work, and much more--all of which ultimately translates into higher sales at lower cost. And, on-the-spot invoice production in service vehicles can lead to shorter payment cycles and better cash flow.
- **Entertainment:** This contains a very large basket of applications starting from horoscopes to jokes. Many people in part of Asia decide their day based on the planetary position and horoscope information

5. CONCLUSION

Due to Mobile Computing Any portal system support user mobility. We can access any mail from anywhere. We may not be able to access the same mail through some other device like a fixed phone. As a result of mobility the attributes associated with devices, network, and users are constantly changing. These changes imply that context & behavior of applications needs to be adapted to suit the current environment. There are several ways in which Context and behavior can be adapted. One Way is to build applications without any context or behavior awareness.

The offline and real-time computing environment will move with the user. In real time mode user will be able to use all its remote data services online.

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