Gsm description to understand the technology

Technology

GSM Basics The basic architecture of the GSM network The GSM specifications define a specific set of functional entities or network elements that are Interconnected through Hellenized Interfaces to form a complete network. The whole GSM network consists off large number of user terminals called Mobile Stations (MS) connected to the core network via the air interface. The GSM core network is constructed, maintained and supervised by a GSM network provider or operator. The GSM operator provides a number of mobile services, to which the network subscriber or user must subscribe before being granted access to the service in question.

According to the GSM specifications, the GSM core network Is dwelled into three separate subsystems: Network Switching Subsystem (INS) Base Station Subsystem (BBS) Network Management Subsystem (MS) The actual network needed for establishing calls and performing mobile management functions is composed of the INS and BBS subsystems. The BBS is responsible for radio path control. The INS also takes care of location management, security and call control functions, but is only occasionally involved in radio path control (in fact only during handover between two separate BBS outworks).

The MS is the operation and maintenance related part of the network and is needed for the control of the whole GSM network. The network operator monitors and maintains the quality of the network through the MS . Mobile Station The Mobile Station (MS) is a combination of the terminal equipment and the mobile user separate module called the Subscriber Identity Module (SIMI). Using GSM terminology, the terminal equipment is designated Mobile Equipment (ME). Each ME is associated with a specific identification code,

the MIME (International Mobile Equipment Identifier). The ME in itself is a masterpiece of pesticides high-tech design.

However, without the SIMI - the " network brains" of the MS - the ME is of little value for the user. BBS (Base Station Subsystem) The Base Station Controller (BBS) is the central network element of the BBS and controls most of the signaling within the BBS. The main responsibilities of the BBS are: Management of radio resources (channel allocation and handover supervision), mobility management (paging, location registration and location updating), traffic connection establishment between MS and INS, Air and A interface signaling support in general, and collection of statistical data.

BITS (Base Transceiver Station) The BBS supervises the operation of one or several Base Transceiver Stations (BITS). The BITS is a network element involved with maintaining the Air interface. It takes care of Air interface signaling, Air interface ciphering, speech processing and signal formatting. In this context, speech processing and signal formatting refer to all the functions the BITS has to perform in order to guarantee an error-free, flexible and highly efficient radio connection between the MS and the BITS.

MASC. (Mobile Services Switching Centre) The Mobile Services Switching Centre (MASC.) is responsible for controlling calls in the bile network. It identifies the origin and destination of a call (either a mobile station or a fixed telephone in both cases), as well as the type of a call. The calls are then appropriately switched and routed in the GSM network. Fixed network is called a Gateway MASC. (GYMS). An MASC. is integrated with a BLUR that

maintains information related to the subscribers located in the service area of the MASC..

In case of a network originated call, the MASC. initiates the paging process required for locating and alerting the mobile station acting as the destination of the call. The paging of the mobile subscriber also involves outwork elements of the base station subsystem. HAL (Home Location Register) The Home Location Register (HAL) is a database (maintained by the " Home Operator") containing segregated information, such as a list of the services that the user has subscribed to, including a number of service attributes (detailed information about the service), and the current global location (BLUR address) of the subscriber.

Each time a GSM user is contacted from the outside fixed telephone network (EST.), an inquiry is first sent to the HAL to obtain the BLUR address. Also, each time the BLUR address changes due to movement of the GSM user, the HAL is resoundingly updated. BLUR (Visitor Location Register) The Visitor Location Register (BLUR) is a database containing user-related information of local interest. The BLUR is integrated into a telephone exchange known as a Mobile Services Switching Centre (MASC.). In the BLUR, the data of subscribers located within the BLUR area (the service area of the MASC.) is temporarily stored.

When a subscriber moves to another BLUR area, the user-related information is erased from the old BLUR and stored in the new BLUR. Consequently, the BLUR is involved in so-called location registration and location update operations, which he subscriber does not notice. The SIMI, HAL and BLUR

network elements together form a large distributed database containing the user-specific and constantly changing " intelligence" of the GSM network . AC and EIRE Also part of the INS are the Authentication Centre (AC) and Equipment Identity Register (EIRE), which are usually integrated number of security functions.

Such security functions are needed, since the mobile station and subscriber have to be identified and authorized before the user is granted access to the network. MS (Network Management Subsystem) The Network Management Subsystem (MS) is the third subsystem of the GSM outwork in addition to the Network Switching Subsystem (INS) and Base Station Subsystem (BBS) which we have already discussed. The purpose of the MS is to monitor various functions and elements of the network. MS consists of a number of Work Stations, Servers and a Router which connects to a Data Communications Network (DC).