NETWORK MONITORING, MANAGEMENT AND ENHANCEMENT USING VPN

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Abstract- **In previous years, A Method fail for increasing opportunities created by devoted in Network monitoring and management. To overcome this type of situation we introduce some Tools and macros to improve the performance.We can use the tool M2000 for monitoring of alarms and calculate the network availability with the help of outage and number of sites. If the alarms are not coming then we raise trouble ticket (TT) for missing alarms. There are several optimization tools for improving KPI (Key Performance Indicator).KPI depends upon several things such as Call Setup Success Rate (CSSR), Answer to seizure to seizure ratio (ASR), Paging Success Rate (PSR). The value of KPI determines the performance and availability of network and is agreed with the customer (operator). To improve the KPI firstly PM team sends the reports to RF team. If the RF team validates the reports then it will be circulated to customers of the project. If the RF team found any problem then they contact to Technical Assistance Centre(TAC). Circle team needs the permission of Circle head for any critical activity such as LAC(location area code) updation, site migration etc. We also calculated the number of VLR(Visitor Location Register), MOU(Minutes of Usage) in a day, BHCA(Busy Hour Call Attempt, number of incoming and outgoing sms and network traffic also.**

Keywords- **Trouble Ticket, Call Setup Success Rate, Paging Success Rate, Location Area Code, Visitor Location Register**

I. INTRODUCTION

The term network monitoring describes the use of a system that constantly monitors a computer network For slow or failing components and that notifies the network administrator (via email, pager or other alarms) in case of outages. It is a subset of the functions involved in network management. [20]

Virtual Private Network (VPN) is the concept of using the internet as transit for private network traffic, usually in encrypted form. It is also sometimes referred to as a data network that uses the Internet rather than leased lines for connections. Security is guaranteed by means of a tunnel connection in which the entire information packet (content and header) is encrypted and encapsulated. As it is most commonly defined, virtual private network (VPN) allows two or more private networks to be connected over publicly accessed network. In a sense, VPNs are similar to wide area networks (WAN)or a securely encrypted tunnel, but the key feature of VPNs is that they are able to use public networks like the Internet rather than rely on expensive, private leased lines. Atthat same time, VPNs have the same security and encryption features as a private network, while taking the advantage of the economies of scale and remote accessibility of large public networks.[5]

II. SUBSYSTEM AND NETWORK ELEMENTS IN GSM

The GSM network is divided into three subsystems: Network SwitchingSubsystem (NSS), Base Station Subsystem(BSS) and Network Management Subsystem (NMS). The three subsystems, different network elements, and theirrespective tasks are presented in the following.

A. Network Switching Subsystem

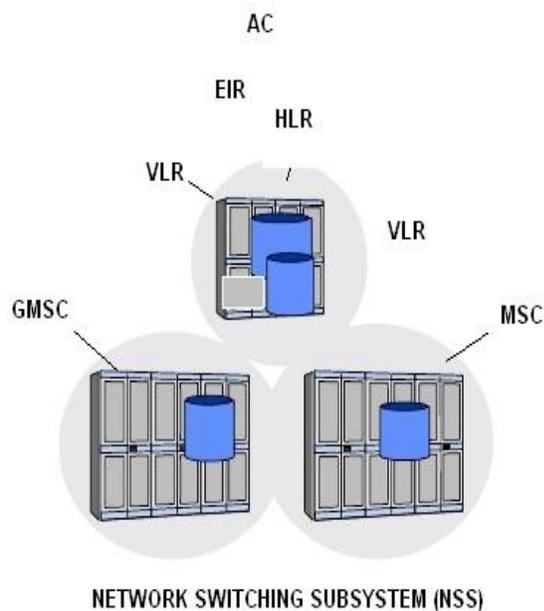The Network Switching Subsystem (NSS) contains the network elements MSC,VLR, HLR, AC and EIR.

Fig. Elements of NSS [6]

B. Mobile Services Switching Centre (MSC)

The MSC is responsible for controlling calls in the mobile network. It identifiesthe origin and destination of a call (mobile station or fixed telephone), as well asthe type of a call.An MSC acting as a bridge between a mobile network and afixed network is called a Gateway MSC.

C. Visitor Location Register (VLR)

Visitor Location Register (VLR) is integrated with the MSC. VLR is a database which contains information about subscribers currently being in the service area of the MSC/VLR, such as:
• 	Identification numbers of the subscribers
• 	Security information for authentication of the SIM card and for ciphering
• 	Services that the subscriber can use

The VLR database is temporary, in the sense that the data is held as long as thesubscriber is within its service area. It also contains the address to everysubscriber's Home Location Register, which is the next network element to bediscussed.

D. Home Location Register (HLR)

HLR maintains a permanent register of the subscribers, for instance subscriberidentity numbers and the subscribed services. In addition to the fixed data, theHLR also keeps track of the current location of its customers. As you will seelater, the MSC asks for routing information from the HLR if a call is to be setup to a mobile station (mobile terminated call). In the Nokia implementation,the two network elements,

Authentication Centre (AC) and Equipment Identityregister(EIR) are located in HLR.

E. Base Station Subsystem (BSS)

The Base Station Subsystem is responsible for managing the radio network, andit is controlled by an MSC. Typically, one MSC contains several BSSs. A BSSitself may cover a considerably large geographical area consisting of many cells (a cell refers to an area covered by one or more frequency resources). The BSSconsists of the following elements:
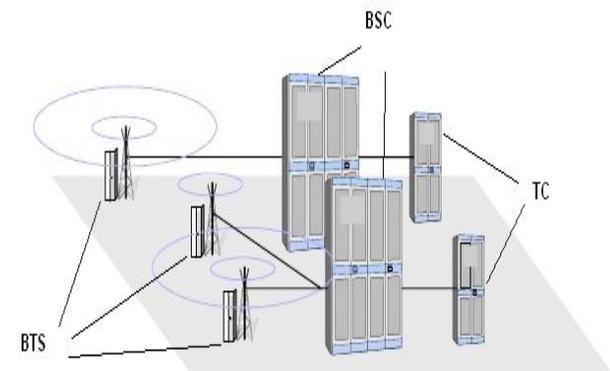

Fig. Base Station Subsystems (BSS) [6]

F. Base Transceiver Station (BTS)

The BTS is the network element responsible for maintaining the air interface and minimizing the transmission problems (the air interface is very sensitive for disturbances). This task is accomplished with the help of some 120 parameters. These parameters define exactly what kind of BTS is in question and how MSsmay "see" the network when moving in this BTS area.

III.   TOOL USED

There are various tools are available to perform such type system. But our main aim to implement by using iManager M2000.So, Let us see.

The iManager M2000 is a centralized network management system for Huawei's mobile networks. The M2000 provides a unified management platform for wireless access networks GSM, CDMA , UMTS , IP.[21]
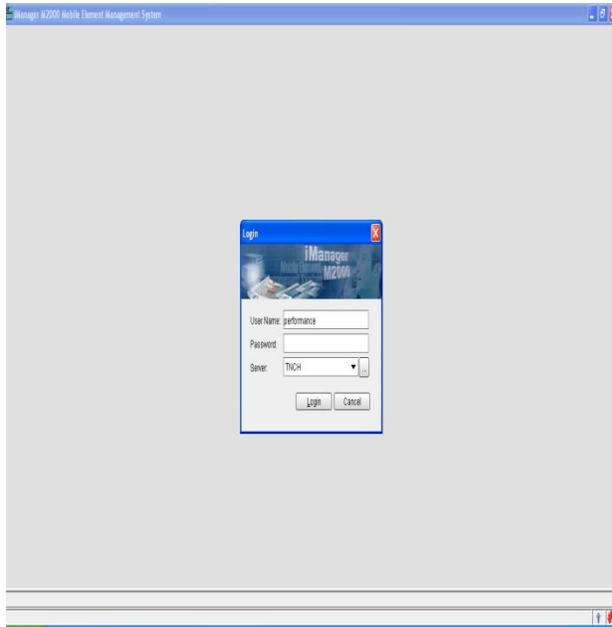
Fig. iManager M2000 tool

IV. NETWORK MANAGEMENT REPORTS

There are several BSC and MSC reports used such as:

A. *BSC Reports*

There are several BSC reports used for network management such as:

B. *Daily Data Performance*

It includes information about BSC Name, Cell Name, PDCH occupation rate, average number of occupied PDCH, average number of available PDCH, Uplink GPRS congestion rate, Uplink EGPRS congestion rate, Number of GPRS Uplink abnormal releases due to N3101 overflow, Number of Uplink EGPRS abnormal releases due to N3101 overflow, Number of failed Uplink GPRS TBF Establishments due to no channel, Number of failed Uplink EGPRS TBF Establishments due to no channel, Number of Uplink GPRS TBF Establishments attempts, Number of Uplink EGPRS TBF Establishments attempts, Downlink GPRS TBF congestion rate, Number of failed downlink GPRS TBF Establishments due to No Channel, Number of failed downlink EGPRS TBF Establishments due to No Channel, Number of Downlink GPRS TBF abnormal releases due to N3105 Overflow, Number of Downlink EGPRS TBF abnormal releases due to N3105 Overflow, Number of Downlink GPRS TBF Establishments attempts, Number of Downlink EGPRS TBF Establishments attempts, Number of Successful Uplink GPRS TBF Establishments attempts, Number of Successful Uplink EGPRS TBF Establishments

attempts, Number of Successful Downlink GPRS TBF Establishments attempts, Number of Successful Downlink EGPRS TBF Establishments attempts, Number of Downlink GPRS Intermit transfers, Number of Downlink EGPRS Intermit transfers, Percentage of TBF dropped, Average throughput of Uplink GPRS RLC, Average throughput of Downlink GPRS RLC, Average throughput of Uplink EGPRS RLC, Average throughput of Downlink EGPRS RLC, Average number of concurrent Downlink GPRS TBF, Average number of concurrent Downlink EGPRS TBF, Cell Payload GPRS downlink data blocks, Cell Payload EGPRS downlink data blocks, Hard blocking(UL),Hard blocking(DL), soft PDCH blocking.

V. PROPOSED SYSTEM

In recent years, the enhancements of the network have become one of the major problems in front of us, In the Network monitoring we will see the network by the alarms coming against the traffic. If the alarms are not coming for any particular time then trouble ticket will be raised for that few period. So we analyses the network by checking the outage report for that particular period. We also try to find out the reason for outage so that appropriate action can be taken place. In the Network management we try to manage the network by minimizing the traffic. In this firstly we get the data from the server with the help of M2000 tool. With this tool we fetch data from server. By finding out all the information we can manage the network. For the efficiency of the network we are likely to develop more and more macros and by the optimization of tools so that correct result is calculated in less time.
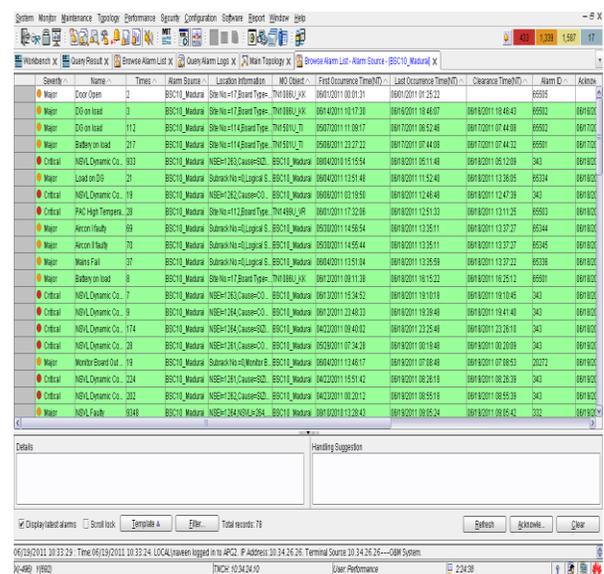

Fig. Network Monitoring

VI. CONCLUSION AND FUTURE SCOPE

The proposed system is the implementation of network monitoring, management and enhancement using VPN. The proposed system will accept the date from both BSC and MSC. We get the data from node with the help of tools such as M2000. After that we calculate the network traffic able to increase KPI. The proposed system is defined for business purpose such as product sales,customer satisfaction and purchasing.

- Now we are facing the problems network congestion and dropping the calls but in future we will improve by network monitoring, management and enhancement using VPN.

- Improve KPI for network monitoring, management and enhancement using VPN also.

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