A COMPARATIVE STUDY OF CHALLENGES IN IMPLEMENTATION OF 2G & 3G TECHNOLOGY IN INDIAN TELECOM

Archana Verma[1],Dr. BalKishan[2] and Rishabh Jain[3]
[1]M.techStudent, Department of Computer Science and Applications,
M. D. University, Rohtak-124001, Haryana, India
[2]Assistant Professor, Department of Computer Science and Applications,
M. D. University, Rohtak-124001, Haryana, India
[3]Assistant Professor, Northeren India Engg. College
GGSIP University,New Delhi,India

Abstract
Chief among them is the need for greater discipline in understanding the economic benefit of Network monitoring, management and enhancement of 2G and 3G networks in context of broader business strategy. While tradition method fail to account for growth opportunities flexibility generated by investment in Network monitoring and management, the introduction of tools and macros enhance the performance and evaluation of 2G and 3G networks. We can use the tool M2000 for monitoring of alarms and calculate the network availability with the help of outage and number of sites. 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.
Keywords: VLR, CDMA, GSM, MTNL, DOT

INTRODUCTION

India's telecom sector has been doing exceptionally well in past decade. India has nearly 250 million telephone lines making it the largest network in the world after China and USA. With a growth rate of 45%, Indian telecom industry has the highest growth rate in the world. The first reforms in Indian

Telecommunications sector began in 1980s when the private sector was allowed in telecommunications equipment manufacturing. In 1985, Department of Telecommunications (DOT) was established. 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]. The Network Management Subsystem (NMS) is the third subsystem of the GSM network in addition to the Network
Switching Subsystem (NSS) and Base Station Subsystem (BSS).

INDIAN TELECOM POLICY

After 1991's liberalization in Government's policies, the telecom sector has allowed various private players to enter into Indian market. Earlier, sector was operating under public sector giants like Bharat Sanchar Nigam Limited (BSNL), Mahanagar Telephone Nigam Limited

(MTNL) and Videsh Sanchar Nigam Limited (VSNL) but after the National Telecom Policy (NTP) by Government in 1994 many private players enter in Indian telecommunication market.

Year	History of Indian Telecommunications
1851	First operational land lines were laid by government near Calcutta
1881	Telephone service introduced in India
1883	Merger with the postal system.
1923	Formation of Indian Radio Telegraph Company (IRT)
1932	Merger of ETC and IRT into Indian Radio Cable Communication Company (IRCC)
1947	Nationalization of all foreign telecommunication companies to form the posts, Telephone and Telegraph.
1985	Department of Telecommunications established an exclusive provider of domestic and long distance service.
1986	Conversion of DOT into two wholly government owned companies: the Videsh Sanchar Nigam Limited for services in metropolitan areas.
1997	Telecom Regularity Authority of India (TRAI) created.
1999	Cellular services are launched in India.
2000	DoT becomes a corporation, BSNL.

Table 1: Evolution of the industry –Important Milestones

NETWORK MONITORING

In short, network monitoring is the ability to collect and analyze network traffic. Most intelligent networking devices offer analysis of layer 1 traffic. At this level, the analysis typically focuses

on physical network problems such as link status, CRC errors, bipolar violations, and framing errors.

The latest generation of network monitoring products is designed to support very specific applications. For example, some monitoring products are designed to help network administrators identify security threats; some are designed to provide law enforcement officials with tools for real-time surveillance; some are designed to analyze the performance of specific applications; and some are designed to collect raw data for intensive out-of-band analysis. Each of these specializations can yield a focused solution that is designed to address the specific requirements of a vertical market.

Passive Monitoring

Passive or "non-intrusive" monitoring uses equipment that taps into a network and does not interfere with the flow of network traffic. Passive monitoring must be used in applications where a monitoring station will be moved to different locations where multiple taps are permanently installed.

The monitoring products marketed today reflect end user requirements for the network to continue operating even when the monitoring system is off-line. This means you can adopt passive or active monitoring systems as needed, but they must sustain network data flow under all conditions, and preserve the reliability of the network infrastructure. At the bottom line, monitoring devices must not bring down the network, and Image Stream offers both passive and active monitoring solutions that will satisfy these requirements.

Active Monitoring

Active or "intrusive" monitoring uses equipment that divides the circuit into two segments and allows the flow of traffic to be monitored, and actively transmitted from one side of the monitor point to the other. This topology must be used when a monitoring application requires active manipulation of the data stream before the data stream is transmitted across the monitor point.

Active monitoring involves equipment that not only taps the network link, but it must actively transmit the data stream from one side of the monitor point to the other. In this monitoring topology, the data flows through the equipment where it can be analyzed, processed, and modified in real time before flowing out of the device to the end point destination.

TOOLS USED

There are various tools are available to perform such type sytem.So,we describe three tools:

iManager T2000

Huawei's iManager T2000 (the T2000 for short) provide single-layer solutions small- and medium-sized transmission networks. It can also form multi-layer management networks with higher-level network management systems (NMS) through standard external interface, to assist the higher-level NMS and the service-layer management system in managing large transmission networks.[3] The T2000 manages Huawei optical transmission equipments of OptiX series, including SDH, WDM, MSTP, ASON, and SONET in a unified manner. The T2000 provides all

NE management functionalities (fault management, configuration management, communication management, performance management, security management, topology management and system management), and also provides some network-level management functionalities, including:

- End-to-end service maintenance
- Unified management of network resources through sub-networks
- Data communication network (DCN) management of the entire network
- Hybrid networks(ASON and traditional network) management
- Ethernet OAM management
- GE ADM management
- RPR management

iManager N2000

iManager N2000 is designed to work with performance graphs to find out congestion in the network between various routers.[8]

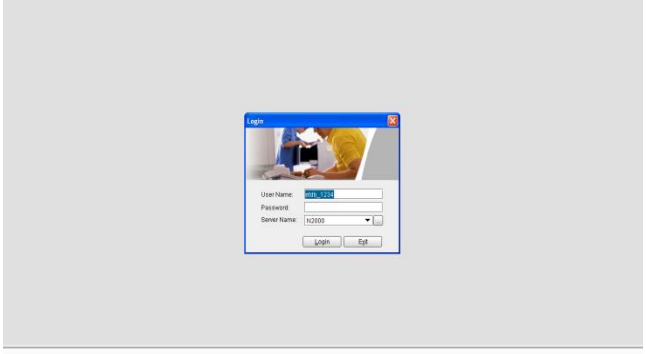

Fig 1 N2000 DMS tool

After filling the user name and password you are able to see the following loading window of N2000.

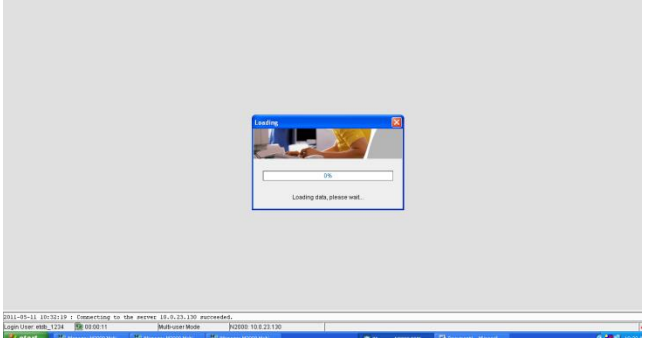

Fig 2 N2000 loading

iManager U2000

The U2000 is an integrated and unified management platform for all the network equipment provided by Huawei. It inherits the functions and operation modes of the T2000, N2000 BMS, and N2000 DMS, and can manage transport equipment, access equipment, and IP equipment (including switches and PTN equipment) in a unified manner. With powerful management functions at the element management layer (EML) and network management layer (NML), the U2000 is designed as the network management system for Huawei equipment. In the telecommunication management network (TMN) hierarchy, the U2000 is located between the EML and NML, and supports all the functions at the EML and NML. The following figure shows the position of the U2000 in a network.[13]

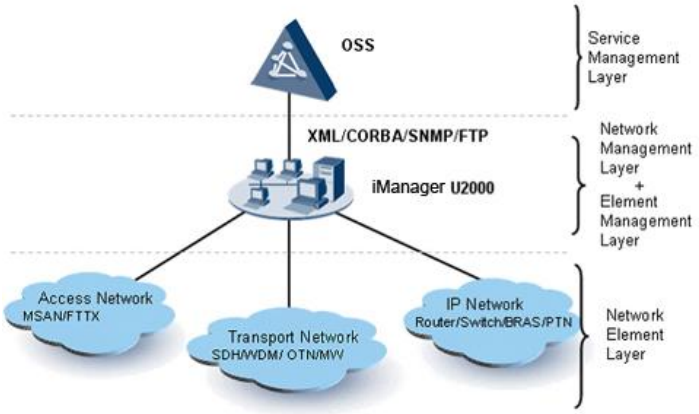

Fig 3 iManager U2000 tool [13]

OBJECTIVES

In recent years, the management and enhancement of the network have become one of the primary concerns. In the Network monitoring we watch out the network by the alarms coming against the traffic. If the alarms are not coming for any time then TT (trouble ticket) will be raised for that particular 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. There are several template used such as BSC traffic for Cell NBH, Radio KPI BBH1, Radio KPI BBH2, Radio KPI NBH1, Radio KPI NBH2, Cell Utilization report, KPI as per Cell NBH, CP load, BHCA Hourly, EOS report, VLR Subscriber, Paging Success report, Data KPI, Data KPI 1,Data KPI 2, POI report, SMS Success report, Location Update report, MSC Hourly report, SD report and TRX TA Measurement report etc. Firstly we calculate BSC traffic for Cell NBH and then calculate the NBH (Network Busy Hour) by applying the pivot table. NBH is the hour at which largest traffic is there among 24 hours. After that we make reports to analyze the performance of the network so that network can be managed by the operator. These reports will help you much information such as total number of sites, number of active sites, number of locked sites, number of in roamers, number of out roamers, VLR subscribers. 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.

Network availability = (Total sites*3*1440-Total outage (minutes))/ (Total sites*3*1440)*100

Circle	Date	Total sites	Total Outage Minutes	Total site outage incidents	Unique Outage incidences	Outage (mins)									
						Shared Site-Power Issue	Mains Fail No Power Backup	Access Issues/ Natural Disaster/ Calamity	Theft	Reliance Media	BTML	BTSDL	RAILTEL	MTNL	BSNL
TNCH	7-Apr-2012	51	0	0	0	0	0	0	0	0	0	0	0	0	0
Kerala	7-Apr-2012	41	301	1	1	0	0	0	0	0	0	0	0	0	0
Andhra Pradesh	7-Apr-2012	29	80	7	1	80	0	0	0	0	0	0	0	0	0
Karnataka	7-Apr-2012	21	9	4	4	0	0	0	0	9	0	0	0	0	0
			100.00												
			99.83												
			99.94												
			99.99												

Fig 4 Network Availability

In above figure Network availability = 100 or approx. 100 as calculated by the formula depends upon Outage.

CONCLUSION AND FUTURE SCOPE

The proposed system is the implementation of 2G and 3G networks such as Tata Docomo, Airtel, Aircel, Uninor, Etisalat etc. 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 and MOS5200. After that we calculate the network traffic and availability and thus able to improve KPI. The proposed system is defined for business purpose and customer satisfaction.

- Now we are working on 2G and 3G networks but in future we use it for 4G networks.
- Improve KPI for 4G networks also.

REFERENCES

[1] Daniel Collins, "3G Wireless Networks" page 136,2000 Clint Smith.]
[2] Arti Rana, Kamaljeet Kaur, Anuj Aggarwal “Wireless network (3G & 4G) Department of Computer Science, AIMT,Ambala,(Kurukshetra University).
[3] http://www.huawei.com
[4] Security for the Third Generation (3G) Mobile System Colin Blanchard Network Systems & Security Technologies BTexaCT. MLB1 PP8 Adastral Park
[5] ITU. "ITU Radio communication Assembly approves new developments for its 3G standards". press release. Retrieved 1 June 2009.
[6] http://www.google.co.in
[7] AIRCOM initial 3g rf opt training 3G RF Optimisation Basics Robert Joyce
[8] ITU. "What really is a Third Generation (3G) Mobile Technology" (PDF). Retrieved 1 June 2009.
[9] ITU-D Study Group 2. "Guidelines on the smooth transition of existing mobile networks to IMT-2000 for developing countries (GST); Report on Question 18/2". Retrieved 1 June 2009. p:91 – 101
[10] Qualcomm halts UMB project, Reuters, 13 November 2008

[11] 3GPP notes that "there currently existed many different names for the same system (eg FOMA, W-CDMA, UMTS, etc)"; "Draft summary minutes, decisions and actions from 3GPP Organizational Partners Meeting#6, Tokyo, 9 October 2001"(PDF). p. 7.
[12] "The history of UMTS and 3G development".
[13] "World's first 3G launch on 1 October severely restricted (hktdc.com)".
[14] "broadbandmag.co.uk/3G grinds to a start".
[15] "DoCoMo Delays 3G Launch".
[16]K.R.Santhi,Prof.V.K.Srivastava, G.SenthilKumaran, "Goals of True Broad band's Wireless Next Wave (4G-5G)" 0-7803-7954-3/03/2003 IEEE.
[17] 4G as a Next Generation Wireless Network
[18] Afaq H. Khan, Mohammed A. Qadeer, Juned A. Ansari, Sariya Waheed Department of Computer Engineering
[19] Zakir Husain College of Engineering & Technology Aligarh Muslim University, Aligarh, India p.25
[20]K.R.Santhi,Prof.V.K.Srivastava, G.SenthilKumaran, "Goals of True Broad band's
[21] S. Chatterjee, W. A. C Fernando, M. K.. Wasantha, "Adaptivemodulation based MC-CDMA systems for 4G wireless consumer applications," Consumer Electronics, IEEE Transactions on, Volume: 49,Issue:4, Nov.2003, pp:995 – 1003
[22] ESnet Network Monitoring Task Force (NMTF), "Network Monitoring Tools"