

A TECHNOLOGICAL SURVEY OF TELECOMMUNICATION SERVICES IN PAKISTAN

Naveed Alam, Adil Naseem

Faculty of Electrical Engineering, Department of Technology, The University of Lahore, Lahore, Pakistan.

nalamkhan@hotmail.com, adilnaseem.uol@gmail.com

*Corresponding Author: nalamkhan@hotmail.com

ABSTRACT- Communication has been a major resource to the human race by being able to transform information from one to another. Pakistan has remained as the fastest growing telecom market in Asia and now a days, there are several mobile operator provides the facilities including Zong , Telenor ,Ufone ,Mobilink , and Warid. Additionally, WLL (Wireless Local) operators are Worldcall and Telecard. Besides these operators, there are small operators which provide LL (Local Loop) on wired medium-PTCL is the largest among such operators. PTCL also provides dark fiber, multimedia services, and internet bandwidth. For internet bandwidth, Transworld is another growing operator.

Keywords: MMS, GPRS, MC, GSM, WiMAX, WiFi, Service Provider

1. INTRODUCTION

At the time of independence and telecommunication services were performed by a single department known as Pakistan post and telegraph first step toward in telecom sector was made in 1962. First network providing company is PTCL and it was established in January 1996. Insta phone introduced mobile telephony in Pakistan in 1991 with AMPS Technology.

Table1. GSM Operators in Pakistan

Operator	Technology	Current Technology
Instaphone	AMPS/D-AMPS	Dysfunctional
Mobilink	GSM on 900/1800	Using same(Previous) Technology no change occur
Telenor	GSM on 900/1800	Using same(Previous) Technology no change occur
Ufone	GSM on 900/1800	Using same(Previous) Technology no change occur
Zong	GSM on 900/1800	Using same(Previous) Technology no change occur
Warid	GSM on 900/1800	Using same(Previous) Technology no change occur
SCO	GSM on 900/1800	Using same(Previous) Technology no change occur

Table2. Services Provided by the GSM Operators in Pakistan

Company	Frequency	Founded	Services providing
Warid.	GSM 900 and 1800	2004	Telephony, WiMAX, EDGE, GPRS, GSM
Mobilink.	GSM 900 and 1800	1994	EDGE, GPRS, GSM, 3G, Telephony
Ufone.	Only GSM 900	2001	EDGE, GPRS, GSM, 3G, Telephony
Zong.	Only GSM 900		GPRS, GSM, 3G, 4G LTE, Telephony,
Telenor.	GSM 900 and 1800	1855	EDGE, GPRS, GSM, 3G, Telephony
Instaphone.	License cancelled	1991 (2008 License cancelled)	InstaXcite, InstaPhone Postpaid

2. INTERNET SERVICE PROVIDERS IN PAKISTAN

PTCL is acting like a leader in consumer broadband that are using internet in Pakistan and leading his country into 21st century. PTCL is also a broadband providing company is providing fastest internet services to their customer.

DSL Coverage Area, through using latest technology 3G EVDO 3.1 Rev A and 3G EVDO Nitro 9.3 Rev B [1]. PTCL is providing these services to their customer through Broadband DSL and EVO 3G Wireless broadband.

Wateen is one of the best Internet providers in Pakistan. It provides services on true standards of Broadband Internet. Wateen Broadband Internet using WiMAX and DSL technologies provide service to their customer [2]. Wateen is working in these cities Abbottabad, D.I. Khan, Bahawalpur, Faisalabad, Gujrat, Sheikhupura, Gujranwala, R.Y. Khan, Hyderabad, Sialkot, Sukhur, Okara, Jhelum, Mandi Bahauddin, KaraLahore, Multan, Peshawar, Quetta, Sahiwal, Sargodha, and Rawalpindi. It is using WiMAX Wireless broadband services.

Worldcall telecom limited provides a bundle of services. WTL is working in areas Islamabad, Faisalabad, Gujranwala, Gujrat, Karachi, Kasur, Bahawalpur, Kharian, Lahore, Peshawar, Multan, Sargodha, Sheikhupura, Hyderabad, Sialkot and Sukkur. Worldcall is using EVDO Wireless broadband services and Cable Modem Termination System (CMTS) internet on the Fiber to the Curb (FTTC) coaxial cable internet [3].

Wi-tribe is an international wireless broadband internet service company bringing a new technology of WiMAX in Pakistan. It is available only in major cities of Pakistan like Karachi, Lahore, Islamabad, Rawalpindi and Faisalabad. It is using WiMAX Wireless broadband services in Pakistan.

Qubee is WiMax internet services Provider Company and owned by Augere. It is available in Lahore, Karachi, Rawalpindi and Islamabad. Quebee is also using Imax Wireless and broadband services.

Mobilink Infinity is a Internet Service Provider through wireless broadband. The Service is currently available in Karachi only.

COMSATS Internet Services is the pioneer ISP of Pakistan. It is covering Islamabad, Peshawar, Rawalpindi, Hattar, Lahore,

Sialkot, and Faisalabad. It is providing broadband and DSL services.

3. TECHNOLOGICAL OVERVIEW

WiMAX and WiFi: WiMAX (Worldwide Interoperability for Microwave Access) is a technology that is used for long range wireless networking. It has two main stations one is base stations that installed on service providers end to deploy the technology in a coverage area, and second is receivers that installed on the customer end. WiMAX is a wireless communications standard that is designed to provide 30 to 40 Mbps (mega bits per second) data rates [4]. WiFi is an affordable broadband internet but it has a small range approximately ten to fifteen meter while WiMAX is designed to deliver the same access across tens of kilometers at same cost and WiMAX gives greater performance and speed than WiFi. In other words WiFi only provides high bandwidth but not provide long range or distance while WiMAX provide both bandwidth and range. WiMAX gives uninterrupted and undeterred access to their customer with high bandwidth services and speeds all around like offices, hotels, airports and in homes. For WiMAX operator, it is essential to purchase license while WiFi is free and useful for short ranges [5].

GSM: GSM (Global System for Mobile Communication) is used for transmitting mobile voice and data services. GSM is a standard that is made by ETSI (European Telecommunications Standards Institute). That describes protocols for second generation digital cellular networks that used in mobile phones. Basically GSM is a TDMA and FDMA combination. GSM users are identified through their SIM (Subscriber Identity Module) cards. The SIM cards are further used to allow GSM network users to quickly move their numbers from one GSM phone to another GSM phone by moving the SIM card. Currently GSM networks operate on the frequency band of 850MHz, 900MHz, 1800MHz and 1900MHz. If a Devices support all four bands of frequency called quad-band and if a device that support 3 or 2 bands of frequency are called tri-band and dual-band respectively. In the United States T-Mobile operates only on the 1900MHz band while Cingular operates on the 850 and 1900MHz bands .At Bell Laboratories in 1970, GSM came through the idea of cell based mobile radio systems. GSM is standardization group that established in 1982 to create a common European mobile telephone standard. The most widely accepted standard is GSM standard and implemented globally whereas with passage of time other technologies are taking over.

The GSM is a circuit-switched system that divides each 200 kHz channel into eight 25 kHz time-slots. In Europe, GSM operate on 900MHz and 1.8GHz bands while in the US GSM operate on 1.9GHz and 850MHz bands. The GSM owns a market share of more than 70 percent of the world's digital cellular subscribers.

Time Division Multiple Access (TDMA) technique is used for transmitting signals in GSM narrowband. Digital

technology is used to develop GSM and it can carry data rate from 64 kbps to 120 Mbps. Now GSM supports more than one billion mobile subscribers in more than 210 countries throughout the world.

The GSM provides advanced voice and data services including Roaming service. Ability to use one GSM phone number in another GSM network called roaming [6].

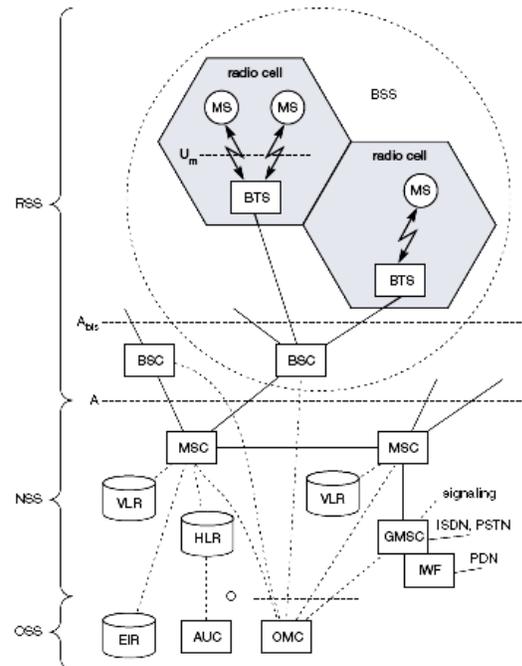


Figure 1: GSM Architecture

2G: It is known as second-generation, it was introduced in 1992 and 2G was first technology that used digital encryption of conversations. 2G networks were first that introduced data services and SMS (Short Messaging service) but the data transfer rates are lower than those of their successors [6].

3G: 3G networks offers faster data transfer rates than 2G networks and 3G networks are first that enable video calls to their customer. This technology make them suitable for use in modern smart phones which required high speed internet connection to run many advance applications.

4G: 4G stands for fourth generation in communications standards. It commits up to 1 Gbps speed.

GPRS : GPRS (General Packet Radio Service) is a bearer service for GSM that greatly improved and simplified wireless access to packet data networks GPRS applies packet radio principal to transfer user data packets in an efficient way between MS (Mobile Station) and external packet data network [6]. It provides high speed data rate from 14.4 – 115 kbps. It is an important step on the same path of 3G. It utilizes existing GSM authentication and privacy procedures.

EDGE: EDGE (Enhance data rate for GSM evolution) is a radio signaling technology that used in 3G mobile networks.

EDGE is used in mobile service to download video and provide multimedia messaging on high speed internet access. It is generally classified as a 2.75G network technology. In 2003, North America EDGE was introduced into GSM network. It is used for packet switching application like internet connection EDGE circuit switching future development is possible in Edge [7]. Typically EDGE enhances the performance of GPRS, achieving data rates of 80 to160 kbps per user with mobile terminals. In addition to GMSK (Gaussian minimum shift keying), EDGE uses higher order 8-PSK (phase shift keying). It has fast transfer rate up to 384 kbps.

EVDO: EVDO (Evolution Data Only) is a telecommunications standard, which is an evolution of the CDMA2000 (IS-2000) standard. It uses advanced multiplexing techniques including CDMA (Code Division Multiple Access) as well as TDMA (Time Division Multiplexing) to maximize throughput [8]. EVDO has a peak data rate of 3 Mbps but realistic speeds average around 600Kbps-1400Kbps download with bursts to 2Mbps and 500Kbps to 800Kbps upload with bursts to 1.8Mbps. EVDO (Evolution Data Only) was introduced by PTCL in Pakistan. It is the first Wi-Fi USB (Universal Serial Bus) dongle that provides perfect work and travel companion providing powerful Wi-Fi speeds of up to 9.3 Mbps and support both Wi-Fi and 3G. Worldcall is another operator which provides these services in Pakistan.

3G: 3G networks offers faster data transfer rates than 2G networks and 3G networks are first that enable video calls to their customer. It is suitable for modern smart phones which require high speed internet connection to run many advance applications. This is based on a set of standards that comply with the IMT-2000 (International Mobile Telecommunications-2000).

3G telecommunication networks support services that provide an information transfer rate of committed 200 Kbit/s. Importantly, the later 3G releases were often denoted with 3.5G and 3.75G and these also provided mobile broadband access of several Mbps to mobile modems, smart phones and laptops. This ensures that it can be applied to wireless voice telephony, internet access, fixed wireless internet access, different types of video calls, and especially to mobile TV technologies. Typical applications are mobile TV, VoD (Video on Demand), and location based services like GPS (Global Positioning System).

4G: 4G Network provides ultra broadband internet for mobile users. Due to high data transfer rate 4G networks used wireless USB to provide internet access for laptops even in home. The 4G LTE stands for Long Term Evolution. It is used for the particular 4G protocols that deliver the fastest mobile Internet services. It commits peak data rates of 1Gbps, and 100 Mbps between two 4G nodes in any location throughout the world [8].

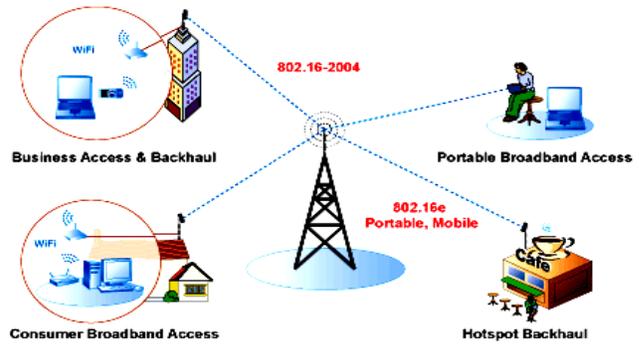


Figure 2: Typical Internet Service Provisioning

IV. CONCLUSION

These companies provide great services but there is still a long way to go for Pakistan telecom industry. As a matter of fact, Pakistan needs to increase telecom research and development work within the country. The level of telecommunication development is a determining factor for economy social and cultural development of a country. Another important point is that after the advent of mobile operator a decade ago, power crises have become crucial. Reason being, electrical consumption has increased but no additional effective power generating projects have been started so far. Moreover, the telecommunication companies have transferred operational knowledge to the locals but no one has set up their manufacturing plants.

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