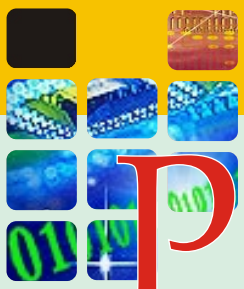
9 Trends in Telecom Technologies: Pakistan Scenario



PTA is well aware of new emerging technologies in the telecom sector globally and watching the trends carefully. Now license regime is based on technology neutrality. With the aim facilitating to introduce new technologies to provide better services to masses of Pakistan. Status of latest technologies is being given in ensuing pages.

Next Generation Networks

Telecommunication user requirements are rapidly changing particularly in the broadband domain forcing operators to transit from traditional circuit switched networks towards more broadband-based networks capable of delivering efficient and wider array of services. Next Generation Networks or as commonly abbreviated NGNs are the main focus of the telecommunication industry and poised to be the next technological frontier in today's World of telecommunications. The core and the access side of the operational industry is rapidly moving towards more and more deployment of Internet Protocol (IP) Networks in comparison to circuit switched networks, this phenomenon is prevalent in the fixed as well as wireless segments of the industry.

The International Telecommunication Union (ITU) defines NGN as a packet-based network able to provide telecommunication services and able to make use of multiple broadband, QoS-enabled transport technologies and in which service-related functions are independent from underlying transport-related technologies. It enables unfettered access for users to networks and to competing service providers and/or services of their choice. It supports mobility which will allow consistent and ubiquitous provision of services to users.

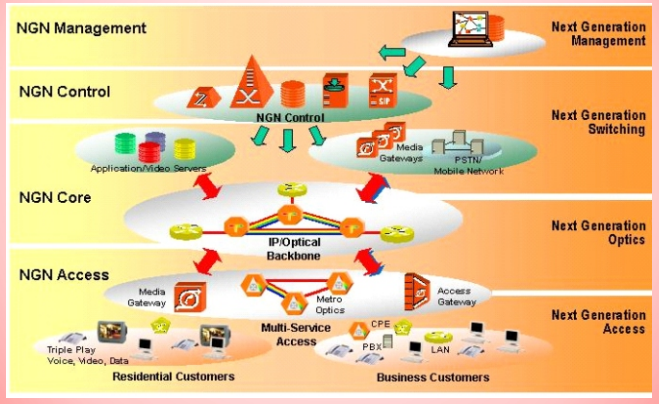
As ITU points out, the concept behind NGN is a shift away from an era of separate networks (such as narrowband fixed, broadband fixed, cellular mobile, cable TV), bearing different services (voice, video, text, data) to multiple devices, e.g. fixed handset, mobile handset,

PC. NGN moves towards a unitary IP-based network or a hybrid of networks in which the common features of the user environment (for example user preferences, contacts, databases, files etc) are accessible as the user moves around, say between home, car and office, or between desk and meeting room. The NGN functional architecture is embedded with the following principles.

- Support for multiple access technologies: The NGN functional architecture offers the configuration flexibility needed to support multiple access technologies.
- Distributed control: This will enable adaptation to the distributed processing nature of packet-based networks and support location transparency for distributed computing.
- Open control: The network control interface would be open to support service creation, service updating, and incorporation of service logic provision by third parties.
- Independent service provisioning: The service provisioning process is separated from transport network operation by using the above-mentioned distributed, open control mechanism. This is intended to promote a competitive environment for NGN development in order to speed up the provision of diversified NGN services.
- Support for services in a converged network: This is needed to generate flexible, easy-to-use multimedia services, by tapping the technical potential of the converged, fixed-mobile functional architecture of the NGN.
- Enhanced security and protection: This is the basic requirement of an open architecture. It is imperative to protect the network infrastructure by providing mechanisms for security and survivability in the relevant layers.

NGN assists by clearly separating of services and the associated transport technologies to give an advantage towards seamless delivery of services to end users. Many applications are under review and being analyzed as a measure of competitive edge over other operators in a global telecommunications market that is becoming increasing competitive and is creating pressures for the vendors as well as the operators. NGN is an effective way to deal with future telecommunications markets that demand much more capacities and high end user services in an efficient manner. Figure-66 is an illustration of NGN services and transport abilities that provides an ease to operators

Figure 65
Separation of Access, Core, Control & Management in Next Generation Networks

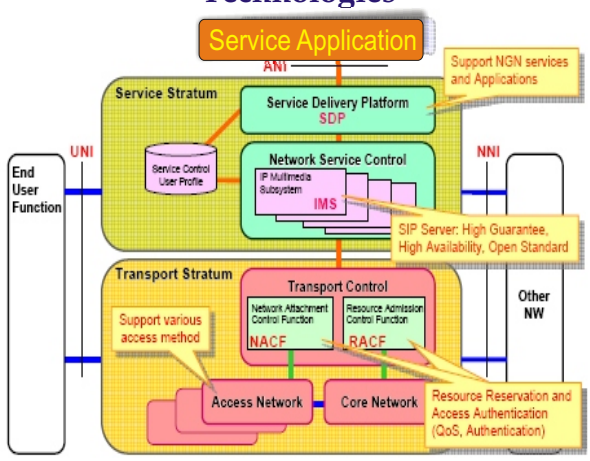


Source: *Huawei Technologies*

to deal with future IP based telecommunications and broadcasting markets.

NGNs deployment status in Pakistan is satisfactory and significant investments have been made in various segments of the industry, in particular the cellular mobile segment. The core networks are being replaced and/or integrated with NGN switches by the incumbent (PTCL) and NGN switching platforms have been added to the core switching to provide flexibility and ease in delivery.

Figure 66
Separation of Services and Transport Technologies



Source: *International Telecommunication Union*

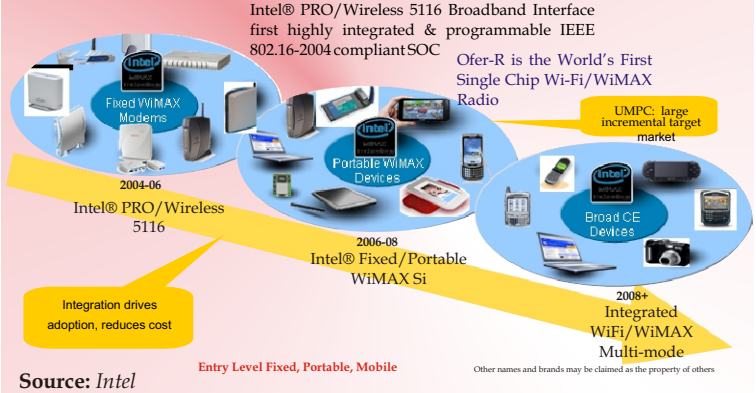
Alcatel, Nortel, Huawei, Siemens and Cisco are a few of the major companies whose equipment dominate domestic NGN deployments. The licensed service providers in the LDI segment including PTCL, Burraq, Wateen, Link Direct are deploying NGN and have awarded major contracts to these vendors and suppliers of NGN equipment.

Table - 28
Network by Technology in Pakistan

Operators	Type	Description
Callmate	IP	Class iv(Transit)
Wisecom	IP	Class iv(Transit)
Dancom	ATM	Class iv(Transit)
Telenor	IP +ATM	Class iv(Transit)
World call	IP	Class iv(Transit)
Link Direct	IP+ATM	Class iv(Transit)
Redtone	IP	Class iv(Transit)
Telecard	IP	Class iv(Transit)
Burraq	IP	Class iv & v(Transit & local)
Wateen	ATM+IP (MPLS)	Class iv & v(Transit & local)
DV Com	IP +ATM	Class iv(Transit)

The situation on the NGN access side is being focused by major players of the Industry with the extensive deployment of fiber in access networks. Nayatel, a licensed Local Loop provider besides PTCL, and Worldcall, is laying fiber in the Access Network for provisioning of converged services in Islamabad.

Figure - 67
Wireless Fixed Broadband: Wimax



Source: *Intel*

The Pakistan Telecommunication Authority (PTA) is preparing itself to handle the issues arising out of transition of networks from circuit switching to NGN enabled platforms based on IP systems. The adoption of technology neutrality in

deployment of telecommunication networks provided a free choice to operators without burdening them financially and assisted in creating a healthy competition in the industry. The PTA will be analyzing the accounting mechanism for the NGN in the new paradigm and appropriate measures will be taken on traffic and billing processes in a fully enabled NGN.

Broadband Wireless Technologies

Wireless Broadband is a fairly new trend that provides high-speed wireless internet and data network access over a wide area. Recent wireless broadband trends exhibit speeds roughly equivalent to wired broadband access, such as that of ADSL or a cable modem. Consumers can purchase a PC-card, laptop-card, or USB port interface equipment to connect their PC or laptop to the internet via cellular/WLL networks. This type of connection would be stable and provide high data rate in areas where signals are strong. An estimated number of over 400 million broadband subscribers are currently being served worldwide by more than 400 commercial wireless broadband networks.

Various wireless broadband technologies are rapidly growing throughout the world each having its own pros and cons. The choice of technology solely depends upon the operators' commercial decision. Some commonly used technologies include CDMA 2000, WCDMA, WiMax and Media flow, which are discussed.

CDMA 2000(EVDO)

This Technology has captured over 400 Million subscribers worldwide. Code Division Multiple Access communication networks have been developed by a number of companies over the years, but development of cell-phone networks based on CDMA was dominated by Qualcomm (USA), the first company to succeed in developing a practical and cost-effective CDMA implementation for consumer cell phones, also known as IS-95.

After few revisions, IS-95 was superseded by the IS-2000 standard (CDMA2000). This standard was introduced to meet some of the criteria laid out in the IMT-2000 specification for third generation (3G) cellular. It is also called 1xRTT which means "1 times Radio Transmission Technology" because IS-2000 uses the same 1.25 MHz carrier shared channel as the original IS-95 standard. A related scheme called 3xRTT uses three 1.25 MHz carriers for a 3.75 MHz bandwidth that would allow higher data burst rates for an individual user, but the 3xRTT scheme has not been commercially deployed. More recently, QUALCOMM has led the creation of a new CDMA-based technology called Evolution-Data Optimized (1xEV-DO, or IS-856), which provides the higher packet data transmission rates required by IMT-2000 and desired by wireless network operators. The EV-DO feature of CDMA2000 networks is significantly faster than the Enhanced Data Rates

for GSM Evolution (EDGE) used by GSM networks. It provides access to mobile devices with air interface speeds of up to 2.4 Mbit/s with Rev. 0 and up to 3.1 Mbit/s with Rev. A.

CDMA Technology along with its features has already been introduced in Pakistan without imposing a limit to its emerging trends like EVDO etc to enhance the data rate and efficiency. 18 WLL operators were granted License in 2004 on Telecom region basis, 4 out of which are currently operational using 450 and 1900 MHz band with approximately 1.87 Million subscriber base. One of the existing operators has upgraded its system to EVDO in Lahore Telecom region and two are in process of up gradation.

WCDMA (UMTS)

Over 180 WCDMA operators are currently serving more than 120 Million subscribers worldwide. ITU has accepted W-CDMA as part of the IMT-2000 family of 3G standards and was selected as the air interface for UMTS, the 3G successor to GSM.

This WCDMA system is frequently confused with similar but incompatible CDMA 2000 technology. UMTS, using W-CDMA, supports up to 14.0 Mbit/s data transfer rates in theory (with HSDPA), although at the moment users in deployed networks can expect a performance up to 384 kbit/s for R99 handsets, and 3.6 Mbit/s for HSDPA handsets in the downlink connection.WCDMA is evolving to LTE standard for higher data through put.

The deployment of this technology in Pakistan is still under discussion. PTA has prepared a comprehensive Information Memorandum (IM) document for 3G spectrum auction in Pakistan. The IM was forwarded to all cellular mobile operators, who are the eligible candidates for the 3G spectrum auction. The mobile operators have not shown enthusiasm in the 3G spectrum. The PTA is however planning to introduce the 3G technology for proliferation of wireless broadband services in the country as per policy of the Government.

WiMAX

WiMAX (the Worldwide Interoperability for Microwave Access) with just over 1 million subscribers worldwide, is a wireless technology aimed at providing wireless data over long distances in a variety of ways, from point-to-point links to full mobile cellular type access. It is based on the IEEE 802.16 standard, which is also called WirelessMAN. WiMAX allows a user, for example, to browse the Internet on a laptop computer without physically connecting the laptop to a wall jack. The name WiMAX was created by the WiMAX Forum, which was formed in June 2001 to promote conformance and interoperability of the standard. The forum describes WiMAX as "a standards-based technology enabling the delivery of last mile wireless broadband access as an

alternative to cable and DSL."Quite a few number of WiMAX standards have being developed worldwide and some are in the pipeline.

Pakistan being in track with emerging technologies, auctioned 3.5 GHz frequency bands in year 2004. This band was pretty much important for the operators for the introduction of broadband services. 14 operators hold license in this frequency band in all 14 Telecom Regions. Two are opertional and one more has been granted commencement certificate who would laucnh commercial services very soon while the rest are still in deployment process. The 3.5 GHz band was allocated to WLL operators and are required to provide services with limited mobility as per PTA determination. Since the license is technology neutral therefore the WLL operators may deploy any standard equipment but would need to restrict mobility to single cell as per PTA determinations.

Keeping in view the standards prevailing world-over at the time of auction, the band was planned for “FDD” however, due to frequent changes in the technology standards, operators requested PTA for adjustment in the allocated spectrum for TDD operation. After approval by the Board, the operators spectrum be changed from 10.5+10.5MHz FDD to contiguous 21 MHz TDD. This arrangement besides having maximum level of through put will make an additional chunk available for further auction.

MediaFLO

MediaFLO is Qualcomm's new technology to broadcast data to portable devices such as cell phones and PDAs. Broadcast data includes multiple real-time audio and video streams, individual non-realtime video and audio "clips", as well as IP Datacast application data such as stock market quotes, sports scores, and weather reports. The " F-L-O" in MediaFLO stands for Forward Link Only, meaning that the data transmission path is one-way, from the tower to the device and user can request on demand videos /channels through their operators. The MediaFLO system transmits data on a frequency separate from the frequencies used by current cellular networks. In the United States, the MediaFLO system uses frequency spectrum in the 700Mhz band, which was previously allocated to UHF TV Channel 55. It is a competitor to the Korean T-DMB standard and the European DVB-H standard. Devices including MediaFLO have been introduced at least by LG and Samsung at CES 2006 in Las Vegas. Qualcomm is also conducting MediaFLO technical trials internationally, with the intention of forming partnerships with existing multi-channel content providers/service operators.

This emerging technology is at its infancy and yet to be introduced in pakistan. The handsets currently available in our market do not support the FLO facility and the one available in the international market are very expensive. It is expected that in future low cost handset for FLO will be

available in the market and the mobile operators may find this feasible for the provision of good quality mobile TV services.

Voice over Internet Protocol

Telecommunication sector in Pakistan is rapidly migrating from circuit switching to packet switching. Almost all the long distance and international service providers have deployed Next Generation Network and operating in IP environment in the core network. PTA prefers to promote a policy and an approach towards IP Telephony ("Incremental Option"), which is initially differentiated with respect to distinct categories of IP Telephony service and to allow evolution over time because IP Telephony will eventually become the predominant platform for voice traffic, over mobile as well as fixed access networks.

Already, various PTA licensees are providing VoIP services for carrying long distance and international traffic in Pakistan. Keeping in view the rapid development in using IP for voice communication or IP telephony a consultation paper was published on various aspects of IP telephony in Pakistan. The consultation paper was sent to all stakeholders for comments. Valuable suggestions from industry had been included in the consultation process. The final version of the IP telephony draft is under consultation process and will be published shortly.

Conclusion

PTA is fully abreast of the rapidly developing technological advancements at the global telecom scene. The aim of the Pakistani Regulator is to foresee the trends and to provide conducive environment for the operators in order to facilitate them introduce state of the art telecom facilities in the country.