Research Paper – Phase II

Topic: **4G**

What is 4G?

4G (or 4-G) is short for fourth-generation cellphones or/and hand held devices. It is a wireless access technology. It will be the successor of 3G. Currently we are undergoing a transition between 2G and 3G which is also known as 2.5G. This paper is a visualization as to how 4G would be, what features will be provided in it, how succesful can it be and other similar aspects.

First I would write about the expectations from 4G such as various features and limitations, then the paper would talk about the regions of the world which would deal with development of 4G, after that its relation with other wired and wireless devices will be discussed and finally the paper would mention the business model which might be adopted for 4G.

I chose this topic for a research paper because I have been really fascinated by the latest technology being released in the market in the form of 2.5G phones. I wanted to know more about the future of the tiny wireless devices.

As described above, 4G is not a technology which is available in the market or being produced right now. It will be available in near future but there is not a fixed date or time for it. Some experts believe that 4G products would appear in China in 2008, during the Olympics, while a few others think that 2010 would be the time when 4G will hit the markets. According to an article published on Computerweekly.com, Ulf Wahlberg, Ericsson's vice president of research claims that "Four years from now, radio frequencies will be assigned, and in 2012 there will be 4G products on the market."

What will be the features provided?

These days most of the things are going wireless and wireless is the future. Currently 2.5G provides WAP and access to the internet from a mobile phone, but the data rate is a big resistance to the development of better features. We will definetly see very high data rates in 4G phones. According to Ulf Wahlberg 4G as mobile telephony will have a data rate of 100Mbps globally, that is, between any two points in the world. Locally, 1G bps will be possible. He claims "Transmitting a hundred megabits per second between two points at short range is not difficult" but explains that it is hard to get these data rates globally with the present day radio frequencies.

Acc. To Business Week, NTT DoCoMo, Japan's premier mobile communications company, conducted a test on a new 4G system and according to the test results they hit a peak of 300Mbps, with an average rate of just 135Mbps in a car moving at 30kph at a distance of 800m to 1km from base stations.Though they are looking for data rates about 1Gbps which is defined by ITU (International Telecommunication Union). According to ITU's definition, 4G systems should have data rates as low as 1Gbps standstill and 100Mbps when moving at train-like speeds.

Pervasive networks. An amorphous and presently entirely hypothetical concept where the user is simultaneously connected to several wireless access technologies and can seamlessly move between them. These access technologies can be Wi-Fi, UMTS, EDGE or any other future access technology. Included in this concept is also smart-radio technology to efficiently manage spectrum use and transmission power as well as the use of mesh routing protocols to create a pervasive network.

Apart from all these technical aspects, we can also expect 4G to provide an array of commericial services, including the ones which are already available, such as Internet access but with broadband like speeds, ringtone/graphics download sites, messaging, image transfer, Multimedia Messaging and the ones which are not availabe currently, such as live video conferencing, large video downloads/streaming of movies or may be TV shows, news in the form of video and live broadcast of sports.

Where will 4G hit the markets first?

Currently Asia and Europe are leading the mobile technology and USA is lagging. So it is expected that the very first 4G devices will be available in Japan, other Asian and European countries. According to an article at Linuxdevices.com, there are 3 new 3G cellphones embedded with Linux operating system are hitting Japanese markets. The devices of the future will use complete operating systems like computers and would be as powerfull as the computers are these days. They might have upgradation slots, such as upgrading RAM or Hard Drive.

The demand in mobile phones have increased a lot world wide, but has sharply risen in Asia. In an article published at Hindustantimes.com ITU claims that India has doubled its mobile consumers since year 2000. It alo concludes that the mobile development has been more in the developing nations. "By July this year, China was reporting 310 million users -- about one-quarter of its total population and more than the entire population of the United States, the ITU said." While India has about 44.5 million subscribers and Russian share was about 60 million by the end of september.

All these facts show that Asia is leading the mobile growth, followed by Europe, thus 4G is being researched and developed mainly in Asia. ITU says that India would take a leap and step into 4G directly from 2.5G and would not go into 3G as it hasn't been proved cost effective.

How will it affect wired devices?

802.15, commonly known as Bluetooth is very popular these days. A lot of people buy Bluetooth dangles and transfer data from their PCs or Laptops to their cellphones. Infrared is also used to connect PCs with cellphones. Currently the connectivity between wired and wireless devices is bit painful as the vendors are reluctant in providing a bridge between both the technologies. But I think in 4G we would definetly see a change in this attitude as it will be very easy to transfer huge files or other data from a PC to wireless devices. Email messages, contacts, remainders, etc will synchronize in no time and thus giving more power to the users. Products like Apple's ipod and ipod photo will be an integral part of the 4G devices. Simputer like products will also integrate to 4G phones

thus providing them more power.

It is unrealistic to think that 4G devices will overtake PCs or Laptops, but they will certainly complement them by synchronizing features, acting as high speed modems while one can surf higher data rates than the current 802.11 on their Laptops.

What will be the business model?

The big networks such as Cingular, Verizon have already started surveying and planning for the 4G business models. The mobile producers such as Nokia, seimens, motorola are also taking initiatives and trying to get feedback on what the consumer expects from 4G devices.

According to me, 4G will have a i-mode like business model, where they will charge the consumers for internet access monthly, as compared to USA's per minute or per KB current charges. Moreover the sites would charge the users for their individual services. Mobile advertising will evolove and most of the things would be available on the cellphones, such as bill pay, buying movie tickets, watching the evening news, etc. Services like mobile dating and bluejacking (which is popular in Europe) would emerge and will be successful.

I think it is the technology that the world is looking forward to. The amazing high data rates can revolutionaize the ways we define network speeds right now. An integration of a lot of different devices into one would be definetly part of 4G.

CS - 4596

Sources Used

Apple ipod (http://www.apple.com/ipod/)

Computer Weekly

(http://www.computerweekly.com/articles/article.asp?liArticleID=130472)

Hindustantimes (http://www.hindustantimes.com/news/181_1144505,0003.htm)

ITU (http://www.itu.int)

Linuxdevices (http://www.linuxdevices.com/news/NS8113334316.html)

NTT DoCoMo (http://www.nttdocomo.com/)

Simputer (http://www.simputer.org/)

Slashdot (http://www.slashdot.org/)