Nigerian Army University Biu.

Faculty:
Computing

Department:
Computer Science

Course:
Netcentric Computing (CSC-425)

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Mobile Computing:

Mobile Computing is a technology that allows transmission of data, voice and video via a computer or any other wireless enabled device without having to be connected to a fixed physical link. The main concept involves the following:-

- **Mobile communication**
- **Mobile hardware**
- **Mobile software**

- **Mobile communication**

The mobile communication in this case, refers to the infrastructure put in place to ensure that seamless and reliable communication goes on.

These would include devices such as protocols, services, bandwidth, and portals necessary to facilitate and support the stated services. The data format is also defined at this stage. This ensures that there is no collision with other existing systems which offer the same service.

Since the media is unguided/unbounded, the overlaying infrastructure is basically radio wave-oriented. That is, the signals are carried over the air to intended devices that are capable of receiving and sending similar kinds of signals.

- **Mobile Hardware**

Mobile hardware includes mobile devices or device components that receive or access the service of mobility. They would range from portable laptops, smartphones, tablet Pc's, Personal Digital Assistants.

These devices will have a receptor medium that is capable of sensing and receiving signals. These devices are configured to operate in full-duplex, whereby they are capable of sending and receiving signals at the same time.

They don't have to wait until one device has finished communicating for the other device to initiate communications.

Above mentioned devices use an existing and established network to operate on. In most cases, it would be a wireless network.

- **Mobile software**

Mobile software is the actual program that runs on the mobile hardware. It deals with the characteristics and requirements of mobile applications. This is the engine of the mobile device. In other terms, it is the operating system of the appliance. It's the essential component that operates the mobile device.

Since portability is the main factor, this type of computing ensures that users are not tied or pinned to a single physical location, but are able to operate from anywhere. It incorporates all aspects of wireless communications.

We have two types of mobile computing:

- **Portable Computing:** It needs wired communication. All the users have the freedom to move devices anywhere and at any time but they required access to make a connection within a network line.
- **Mobility Computing:** It refers to wireless communication and is also known as “Mobile Computing”. It provides a better environment for users to send data from one location to other anytime with the usage of these mobile computing devices, without any physical connections.

Some of the mobile computing devices are listed below:

- **Tablet:** It is a wireless portable computer with a touch interface. It is smaller than a notebook but larger than smartphone.
- **Laptop:** It is a portable computer usually with battery charged.
- **Smartphone:** It performs many functions of computer basically with a touchscreen interface, network access and Operating system which is capable of accessing or downloading applications.
- **Personal Digital Assistant (PDA):** It is a pocket computer and is capable of transmitting data from one terminal to other with synchronization. In PDA, user has access to video call, voice call, calendar, clock, etc. Nowadays, PDAs vary based on Operating systems. etc

Mobile computing has changed the complete landscape of our day-to-day life. Following are the major advantages of Mobile Computing:

- **Location Flexibility**

This has enabled users to work from anywhere as long as there is a connection established. A user can work without being in a fixed position. Their mobility ensures that they are able to carry out numerous tasks at the same time and perform their stated jobs.

- **Saves Time**

The time consumed or wasted while travelling from different locations or to the office and back, has been slashed. One can now access all the important documents and files over a secure channel or portal and work as if they were on their computer. It has enhanced telecommuting in many companies. It has also reduced unnecessary incurred expenses.

- **Enhanced Productivity**

Users can work efficiently and effectively from whichever location they find comfortable. This in turn enhances their productivity level.

- **Ease of Research**

Research has been made easier, since users earlier were required to go to the field and search for facts and feed them back into the system. It has also made it easier for field officers and researchers to collect and feed data from wherever they are without making unnecessary trips to and from the office to the field.

- **Entertainment**

Video and audio recordings can now be streamed on-the-go using mobile computing. It's easy to access a wide variety of movies, educational and informative material. With the improvement and availability of high speed data connections at considerable cost, one is able to get all the entertainment they want as they browse the internet for streamed data. One is able to watch news, movies, and documentaries among other entertainment offers over the internet. This was not possible before mobile computing dawned on the computing world.

- **Streamlining of Business Processes**

Business processes are now easily available through secured connections. Looking into security issues, adequate measures have been put in place to ensure authentication and authorization of the user accessing the services.

Some business functions can be run over secure links and sharing of information between business partners can also take place.

Limitations Mobile computing

- **Range and Bandwidth**: Mobile Internet access is generally slower than direct cable connections, using technologies such as GPRS and EDGE, and more recently HSDPA and HSUPA 3G and 4G networks and also upcoming 5G network. These networks are usually available within range of commercial cell phone towers. High speed network wireless LANs are inexpensive but have very limited range.

- **Security standards**: When working mobile, one is dependent on public networks, requiring careful use of VPN. Security is a major concern while concerning the mobile computing standards on the fleet. One can easily attack the VPN through a huge number of networks interconnected through the line.
- **Power consumption**: When a power outlet or portable generator is not available, mobile computers must rely entirely on battery power. Combined with the compact size of many mobile devices, this often means unusually expensive batteries must be used to obtain the necessary battery life.

- **Transmission interferences**: Weather, terrain, and the range from the nearest signal point can all interfere with signal reception. Reception in tunnels, some buildings, and rural areas is often poor.
- **Potential health hazards**: People who use mobile devices while driving are often distracted from driving and are thus assumed more likely to be involved in traffic accidents.(While this may seem obvious, there is considerable discussion about whether banning mobile device use while driving reduces accidents or not.) Cell phones may interfere with sensitive medical devices. Questions concerning mobile phone radiation and health have been raised.

- **Human interface with device**: Screens and keyboards tend to be small, which may make them hard to use. Alternate input methods such as speech or handwriting recognition require training.

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