

# FUNDAMENTAL CONCEPTS & CHALLENGES OF MOBILE COMPUTING

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**Abstract—** Mobile Computing came when computer machinery decreases in size and increases in computing power then people demanded these to be part of their life. They want to connect with this World 24\*7. They want ease in their life. These could happen by carrying this machinery with their everyday tasks. This is achieved by technology called “Mobile Computing”. It is basically advancement in wireless technology and portable devices. We can connect to anyone at anytime from any place via networked devices. Using this technology, users are independent from their physical locations but at the same time there are many challenges we face in this technology like limited battery life of mobile, mobility of nomadic users, less bandwidth of wireless etc. This paper is a review of Mobile Technology. This describes “What is Mobile Computing? What are the challenges and issues we face in this?”

**Index Terms—** Mobile Computing, Wireless Network, WLAN (Wireless Local Area Network), WPAN (Wireless personal area network), Wired LAN.

## I. INTRODUCTION

A technology which allows transmission of data, via a computer, and we need not to connect with a fixed physical link or users can get data anytime, anywhere at any place is known as “Mobile Computing”.

This technology has become more popular in business people by giving solution of the problem of mobility, as it provides accessing of data from remote locations to other. In mobile computing environment, users carry portable devices which have access to data and information services regardless of their physical location or movement behavior.

Mobile Computing comprises of mobility of data, hardware and software from one location to other. It has become possible with assemblage of mobilecommunications and computer technologies, which include mobile phones, personal digitalassistants (PDA), handheld and portable devices, wireless local area networks (WLAN), wireless wide area networks and wireless ATMs.

## II. CHARACTERISTICS

Some of the characteristics of mobile computing are based on following:

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### A). *Mobile Hardware:*

Mobile hardware includes mobile devices or device components that receive the service of mobility. They would range from portable devices, Smartphones, Tablet Pc's, Personal Digital Assistants. This hardware can be defined by the size, weight, microprocessor, primary storage, secondary storage, screen size and type, means of input, means of output, battery life, communications capabilities, expandability and durability of the device

### B). *Software:*

Mobile software is the actual application which runs on mobile hardware. This is the heart of mobile by using, people access various facilities. The most common system software and operating systems used on mobile computers includes MSDOS, Windows 3.1/3.11/95/98/NT, UNIX, android etc.

### C) *Communication:*

The ability of a mobile computer to communicate in some fashion with users. It includes protocols, bandwidth, services, access points etc.

## III. REQUIREMENTS

The major requirements for a mobile computing environment are:

1. Mobile host should be connected with various access points to stay connected while on movement.
2. As mobiles have less battery life, so we need some kind of technologies to save power and will permit disconnection without affecting communication.
3. Greater speed in term of high bandwidth requirement.

## IV. WIRELESS NETWORKING IN MOBILE COMPUTING

Wireless networking has greatly contributed to the use of portable computers. It allows users to communicate with other people and provides convenient access to current information. It also enables continuous access to the services and resources of computer networks. In mobile Computing, we use WLAN because Wireless personal area networks (WPANs), covers smaller areas (from a couple of centimeters to few meters) with low transmission rate Basically, WPAN is a Bluetooth based network. However, WPANs are constrained by short communication range and cannot work very well for a longer distance. Wireless local area networks (WLANs) provide a wider coverage range and an increased transfer rates rather than WLAN. WLANs are based on the standards IEEE 802.11.

## V. CHALLENGES / SECURITY ISSUES IN MOBILE COMPUTING

### 1. Security Issues

#### A. Confidentiality

Preventing unauthorized users from gaining access to critical information of any particular user.

#### B. Integrity

Ensures unauthorized modification, destruction or creation of information cannot take place.

#### C. Availability

Ensuring authorized users getting the access, they require.

#### D. Legitimate

Ensuring that only authorized users have access to services.

#### E. Accountability

Ensuring that the users are held responsible for their security related activities by arranging the user and his/her activities are linked if and when necessary.

### 2. Insufficient Bandwidth

Direct cable connections provide greater speed than mobile. In such case, mobiles require higher bandwidth for fast accessing but higher speed wireless LANs has very limited range.

### 3. Battery Life / Power consumption Issues

If users need 24\*7 data accessibility, they have to be connected with network all the time but mobiles have less battery life. There is no portable generator available for power. They could connect for less time, depends on configuration and power of mobile devices. In such a way, mobile computing should adopt Green IT to save power.

### 4. Multiple Network Connections

A mobile platform consists of a wired LAN and wireless LAN, and both of these connections can be active simultaneously or only one of them may be active. So management of network traffic on this connection requires more attention.

### 5. Transmission Interferences

As Signals are basis of mobile computing. Weather, terrain, and the range from the nearest signal point can all interfere with signal. Poor signals often in tunnels, some buildings and rural areas.

### 6. Human interface with device

Screens and keyboards tend to be small, which may cause hard to use. Alternate input methods such as speech or handwriting recognition require training.

### 7. Require More Security in a Wireless Environment

we use wireless technology in Mobile Computing, and Wireless traffic requires more protection than wired LAN. Unauthorized users may attempt access to a wireless network, and wireless traffic is subject to interdict by unauthorized platforms.

## CONCLUSION

This paper provides an overview of concepts, characteristics, research issues and challenges in Mobile computing. Mobile computing, as it stands today, offers many opportunities. But, the challenges are quite significant. These challenges include security issues, power consumption, less battery life, frequent connections/disconnections, bandwidth, limitations, cost factors, wireless traffic management etc.

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