A REVIEW ON MOBILE COMPUTING AND ITS FUNCTIONALITY USING TEMS

M.A Siddique[1], Sarah Khan[2]

Abstract: Technology has developed rapidly over the last twenty years. This development in technology resulted in the development of communication. For example : Internet, email, Voice mail, etc. This development has still not given the user the freedom to access data anywhere or anytime he wants because of the limitations like the change in location resulted in either routing problems or connection breaks. The advent of Mobile Computing has given birth to hopes of overcoming the above limitations. These mobile networks have facilitated communication anywhere in the world at any time. These mobile networks provide communication even when the source and destination are constantly changing their location.

Keywords: mobile computing situated learning, field study, TEMS Investigation.

1. INTRODUCTION

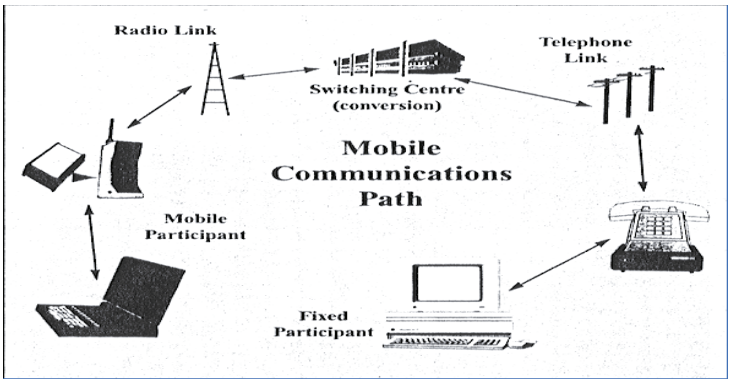
Don Ring of Bell Labs, USA in 1947, invented the cellular concept. The first commercial mobile communications were in the form of radio paging networks. Advanced Mobile Phone System (AMPS) is a major cellular networks established in America using analog cellular technology.

Total Access Communication System (TACS) is a major system use in Europe. Recently a number of digital communications are also introduced. The present trend is to cover communications anywhere in the world and at any time of the day. Cellular concept based on the concept of network of cells, which covers a large geographical area to communicate over the world.

Mobile Computing is a program that allows user to access wireless network. This is done by using Radio Frequency (RF) technology to transmit data through the air without wired cabling. Mobile Computation is provided by means of TEMS Investigation software which traces and records all existing campus network, but without the limitations of being tethered to a cable. The goals of this service are to provide expanded wireless coverage for the campus.

2. IMPORTANCE OF MOBILE COMPUTING

Mobile Computing is becoming increasingly important due to the rise in the number of portable computers and the desire to have continuous network connectivity to the Internet irrespective of the physical location of the node. The Internet infrastructure is built on top of a collection of protocols, called the TCP/IP protocol suite.



The Mobile Internet Protocol (Mobile IP) is an extension to the Internet Protocol proposed by the Internet Engineering Task Force (IETF) . It enables mobile computers to stay connected to the Internet regardless of their location and without changing their IP address. More precisely, Mobile IP is a standard protocol that builds on the Internet Protocol by making mobility transparent to applications and higher level protocols like TCP.

3. HOW MOBILE IP WORKS

IP routes packets from a source endpoint to a destination by allowing routers to forward packets from incoming network interfaces to outbound interfaces according to routing tables. The routing tables typically maintain the next-hop (outbound interface) information for each destination IP address, according to the number of networks to which that IP address is connected. The network number is derived from the IP address by masking off some of the low-order bits. Thus, the IP address typically carries with it information that specifies the IP node's point of attachment.

Whenever the mobile node moves, it registers its new care-of address with its home agent. To get a packet to a mobile node from its home network, the home agent delivers the packet from the home network to the care-of address. The further delivery requires that the packet be modified so that the care-of address appears as the destination IP address. This modification can be understood as a packet transformation or, more specifically, a redirection. When the packet arrives at the care-of address, the reverse transformation is applied so that the packet once again appears to have the mobile node's home address as the destination IP address. When the packet arrives at the mobile node, addressed to the home address, it will be processed properly by TCP or whatever higher level protocol logically receives it from the mobile node's IP (that is, layer 3) processing layer.

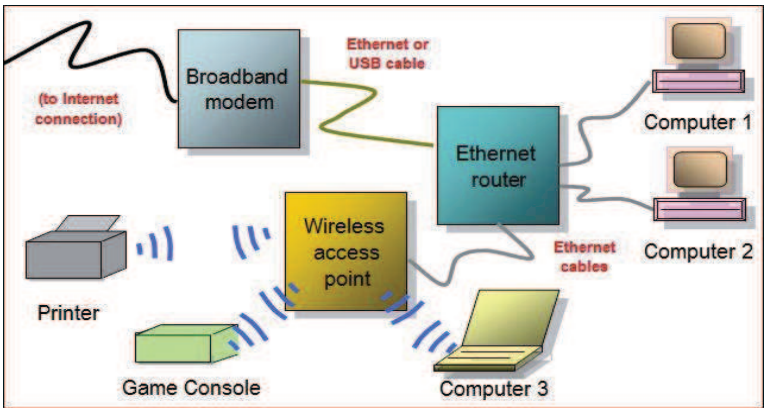
4. DIFFERENT TYPES OF MOBILE SYSTEMS

In many ways mobile computing has several characteristics of distributed systems. Here we explain the different types of distributed systems ranging from the traditional type to nomadic, ad-hoc and finally ubiquitous ones.

(a) Traditional Distributed Systems: Traditional distributed systems consists of a collection of fixed hosts that are themselves attached to a network- if hosts are disconnected from the network this is considered to be abnormal whereas in a mobile system this is quite the norm. These hosts are fixed. The bandwidth in traditional systems is very high too. The execution context is said to be static as opposed to a dynamic context whereby host joined and leave the network frequently. in a traditional system ,location rarely changes as well and hosts are much less likely to be added or deleted from the network, Traditional distributed systems also need to guarantee non-functional requirements such as scalability, openness, heterogeneity, fault tolerance and finally resource sharing.

(b) Nomadic Distributed System: This kind of system is composed of a set of mobile devices and a core infrastructure with fixed and wired nodes. Mobile devices move from location to location while maintaining a connection to the fixed network. There are problems that arise from such shifts in location. The mobile host has a home IP address and thus any packets sent to mobile host will be delivered to the home network and not the foreign network where the mobile host is currently located. Such problem can be solved by forwarding packets to the foreign network with the help of mobile IP.

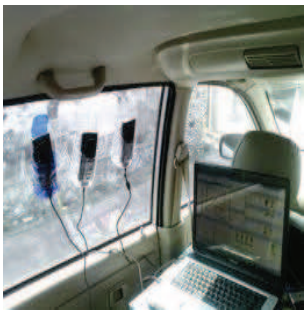
These systems are susceptible to the uncertainty of location, a repeated lack of connections and the migration into different physical and logical environments while operating. However, compared to ad-hoc networks, nomadic systems still have comparatively reliable connections and services since most of these are actually supported by the fixed infrastructure of the network.



(C) Ad-hoc Mobile Distributed System: Ad-hoc distributed systems are possibly the only type of network that comes close to mobile networks in the sense that every node is literally mobile. It is these networks that are very much seen as the systems of the future, whereby hosts are connected to the network through high-variable quality links) e/g/ from GPS to broadband connection) and executed in an extremely dynamic environment

Ad-hoc systems do not have any fixed infrastructure which differs them both from traditional and nomadic distributed systems. In fact, ad-hoc networks may come together as needed, not necessarily with any assistance from the existing (e.g. Internet) infrastructure. When nodes are detached from the fixed/mobile network they may evolve independently and groups of hosts opportunistically from "clusters" of mini-networks. The speed and ease of deployment make ad-hoc networks highly desirable.

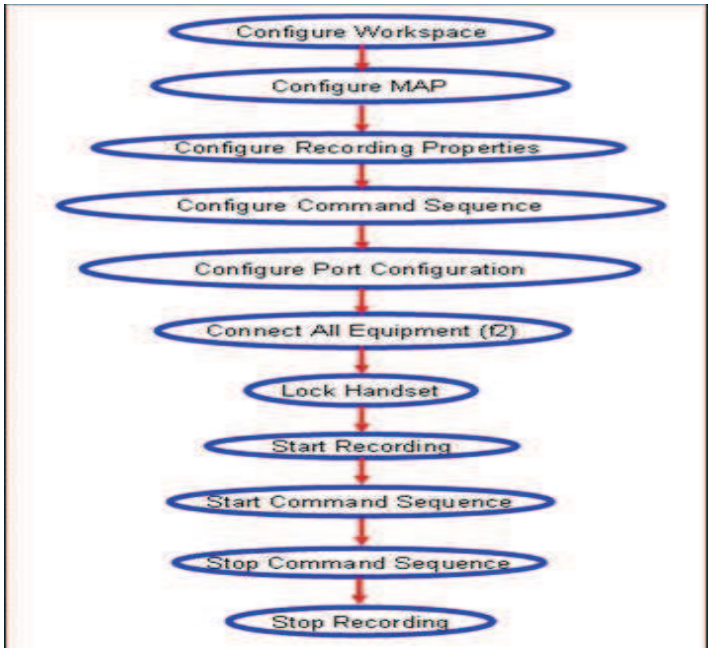
5. Method of Mobile Computing via TEMS Investigation Software: TEMS Investigation supports more than 200 phones, scanners, PC cards, USB modems, and Fixed Wireless Terminals from all major vendors across multiple technologies, which can be used to collect geographically, positioned data from a user's perspective.



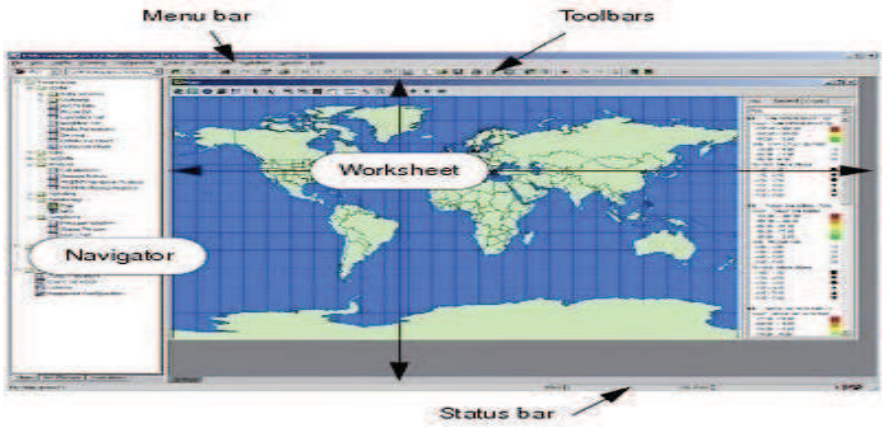
Features such as automatic detection of devices, customizable workspaces that can be shared between users, device control functionality, powerful command sequences to control and automate data collection, event audio indications, and real-time data presentation make data collection simple and effective.

In TEMS Investigation, multiple devices can be connected and can run simultaneously to minimize the time spent collecting data. In addition to traditional RF data, L2/L3 messages, and IP information collection, TEMS Investigation supports testing of CS and PS services including voice, video telephony, FTP, HTTP, Ping, e-mail, WAP, MMS, SMS, and video streaming over a given Cellular mobile network.

6. TEMS MOBILE COMPUTATION FLOW DIAGRAM:



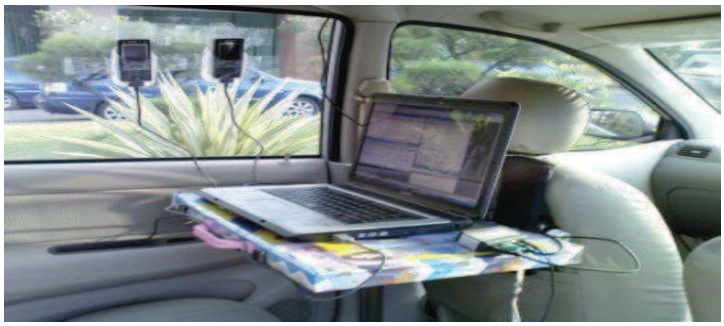
TEMS Investigation and its integrated TEMS Discovery post-processing application can be used to process and analyze log files from TEMS investigation, TEMS™ Pocket, and TEMS™ Automatic.



WORK SPACE OF TEMS INVESTIGATION

6. Applications & Benefits: The benefits of automating data collection applications with mobile computing are the reduction of hard and soft costs, enhancement of revenue potential, and a distinct competitive advantage through:

- improving the data collection process
- improving data accuracy
- facilitating collection of more useful information
- eliminating redundant data entry
- improving information flow
- providing access to previously unavailable information
- Reduced radio congestion.
- Improved supervision and resource management.
- Less time in data transformation.



7. CONCLUSION

There is a little doubt that mobile computing will enhance many aspects of lives of humans. One must wonder though whether or not everyone will want to have such an "invading" technology, especially when it comes to ubiquitous computing .some people may be scared with regards to health issues as well as privacy ones. However these worries are more ethical and social than technological. Mobile computing offers a potential large economic market in networks as software's like TEMS are been used for mobile computation. Nevertheless the greatest challenges that are to be solved are namely security, portability, and scalability and power control issues.

8. ACKNOWLEDGMENT

The authors gratefully acknowledge the work and assistance of our colleagues and students: TVS Prasad Gupta, Aishwarya vayu, Priya Raja, Divya Raja, Nandini. "Authors are thankful to there parents for there love and affection".

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[1]***Author 1:*** *Mohammed Ahtesham Siddique, Associate Professor, Dept of CSE,*
Vijay rural Engineering college, Nizambad (Dist), A.P, India.
Ph.no:7382101380
Ahtesham.siddique@gmail.com
[2]*Author 2:Sarah Khan, Associate Professor, Dept of CSE,*
Vijay college of engineering for women, Nizamabad (Dist), A.P, India.
Ph.no:9492867480
Siddiqui.sarah04@gmail.com