

MOBILE COMPUTING: ANTECEDENT DELIVERABLES

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Abstract— *Technocrats have made an outstanding quantum leap in technology causation of which is the development of massive wireless networks, wireless application protocols and portable devices like ultra book, chrome book, laptop, hybrid, convertibles, two in ones, tablets etc. Ample rise in the usage of such devices over diverse sectors have been found. They have made the research prompt, authentic and eminent. The ultimate breakthrough was the development of ubiquitous environment for accessibility via countless computing devices, which enables to conquer the unconquered. This paper presents the various encountered muddled issues like security, network communication travel map etc and also hounds the generated solutions so far.*

Keywords — *Computing devices, issues, solutions, technology, ubiquitous etc.*

I. INTRODUCTION

Computers have a huge makeover as their dimensions have reduced but powers have increased. Internet, further, has created an enormous wave of transformation. Computing now-a-days have been touted as magnificent. New diverse forms of computing include:

- 1) *Ubiquitous Computing*: computing through devices having already an embedded technology for a special purpose, e.g. mobile sleeps when not in use for the last 10 seconds, oven turns off when the food is cooked etc.
- 2) *Pervasive Computing*: computing by the use of handheld mediums e.g. palmtop.
- 3) *Nomadic computing*: confined to a building or so, never yields mobility, as it is W-LAN dependent, and is operated by portable devices.
- 4) *Mobile computing*: on the other hand, also operated by portable devices, is more convenient. An outdoor wireless network is required and one network is handed over to another. This mobility will serve as one of the crucial computing medium for information exchange,

since the other modes possess invariant physical challenges drafting unique difficulties for unique task.

A. Why Mobile Computing has Gained Importance?

Earlier the proponent of TCP/IP Protocol suite believed that the users would always be coupled with the IP addresses, i.e. the location of device and user would always be same. As with the movement, the reconfiguration of DNS, IP addresses etc was a task of expertise. But when the task mobility gained momentum, work never confined within the four walls of office, the presence of internet cobweb then became essential. Owing to the need, engineers pioneered the topology and quested for the design suitable for nomads. Consequent operation over the network layer provided effective solutions.

Mobile network technology presents dynamic environment for connectivity, it automatically detects the situate, updates the address, do handoffs with the other mobile support units without any prior notifications as a resultant of which one can enjoy the network over the road, railway etc networks. A built in device for positioning system is a sine qua non due to which the device grabs the signal available in the periphery. The robustness of the network layer makes it possible. Mobile phones adaption rate have risen significantly due to the facility of vigorous networks. They have served as a favourite hotspot for next generation computing. But, these do require a mobile hardware, software and data.

Applications, earlier, which were designed for fixed position also needed to make a drift. The store applications have now introduced separate mobile web pages in line to the specifications of the mobile. Moreover the definite information regarding location, when coaxed with personal information, automatically generates then the interest based advertisements, which in case of fixed line would be possible only when supplied with the original spot.



II. LITERATURE REVIEW

Weiser et al (1999) researched that ubiquitous computing emerged only as a radical thought as PC was regarded as a complicated and isolated device. But the project landed them in massive difficulties. The infrastructure set up for an improved knowledge resource network, with more humanistic interaction was a challenge. Privacy, mechanism of interaction was left open for advanced research. Chen et al examined the significance of context aware computing and found that active context varies contextually and is location as well as user specific but for passive context the necessary updating are to be made manually. Summary of several surveys conducted by far have also been presented. Cisco Systems, DOD Muri, Microsoft Research and DARPA supported his research. Satyanarayanan conducted a research with the assistance of IBM and Intel Corp. and found that mobile technologies have to be adaptive at the two extremes; also an arbitrator is required to rule out disturbances, in any. CODA system was also found successful. It supported the disconnected, distributed UNIX system. The experimentation of how to exploit weak connectivity has also been elaborated. A replica control arrangement was also created. Odyssey has been under development during that time period. Laurila et al presented a review of Lausanne Data Collection Campaign (LDCC). Around 185 respondents yielded a differential data set about location, application usage, Bluetooth, audio environment etc. Privacy was another major concern, so arrangement in congruence to Nokia general policy was fabricated. For MDC, the training perspective, demographic aspect and a test set specifically for location test was prepared. Several tests for data anonymization were also stated. Viswanathan et al designed a framework which can easily process volume of data amounts in parallel. Mobile devices with varied capabilities, a mobile application i.e. distributed object recognition and Comet cloud- based on FCFS were the essentials of the models.

III. PROBLEMS WITH SOLUTIONS

Following are the main problems encountered along with quenched solutions:

A. Security

Security has always been an utmost concern. Enhancing portability makes the device prone to several incidents like hardware astray, data theft, vulnerability attacks, data mining etc. When connected to the wireless networks, security challenges tend to boil up. The movements along

the domains may easily cause the security breaches. Hackers propose another major threat.

Encryption serves as an apparent solution. Data available in removable flash memory must be encrypted. Encryption key management software which is interoperable with Key Management Interoperability Protocol and IEEE P1619.3 are suggested by IBM, Thales etc. SafeNet offers several tools like KeySecure etc which suffice these standards. nShield HSMs of Thales offers even the backup of keys. Kerberos of MIT allows mobile authentication over the new domains. While channelling through various networks, the network administrator must restrict the investiture to the fewer premises only. The congestion then would never be the issue. Now-a-days technologies prevail which allows the user to remove the data remotely. Further, any logged in sessions must never be left unattended. However, more pragmatic solutions for phishing links, packed files which may have multi packed files, adware, auto-diallers, Trojans, worms have to be considered. The security mechanisms need to be regulated as the attacks have become more potent.

B. Linking the Unlink

Disconnection is other severe problem. Signals versatility depends upon the network availability. Data safety becomes cumbersome. Detached data packets abate. Sometimes the presence of other electronic devices halts the performance of the mobile. Hence, these temporary dislocation problems need to be handled carefully.

File systems like CODA (Constant Data Availability) has addressed the requisition of the time. It employs both first and second class applications to offer uninterrupted solutions over the fragmented network. So, when disconnection occurs the client system is provided with critical cache file data and is available even during disconnection, but when connection is retrieved back, necessary crucial information is added and is reconsidered in the next search. Communication over a network via CODA through a remote procedure call can be described as:

Fig. 1 Communication through CODA

Venus incorporated in it acts as a manager of cache. It caches the present information as well as necessary cache for performance during disconnection. An algorithm in it prioritizes among the information sets and hence refurbishes the broken link as shown:

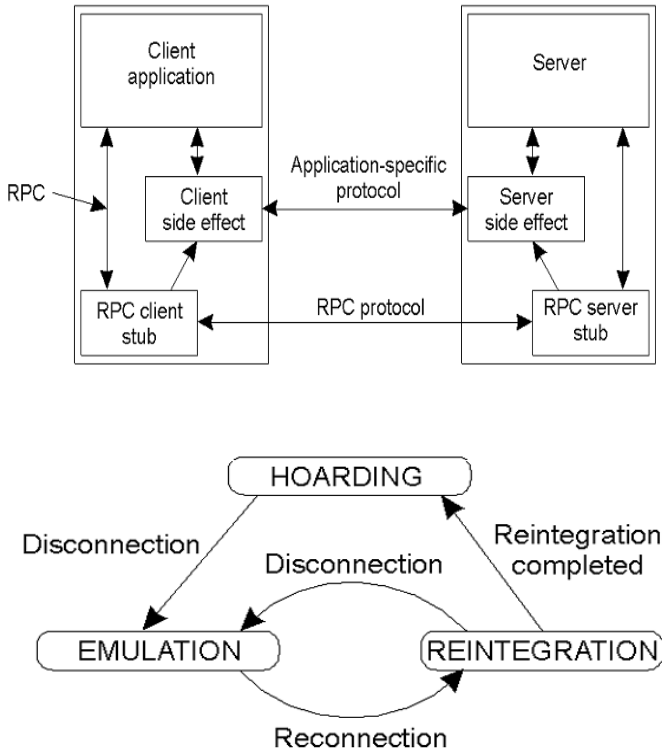


Fig. 2 Mechanism during disconnection

Another possible solution is the sharing of confidential key between the device and mobile support. Once the codes are exchanged under a secured channel, the transitions should begin.

C. Network Communication

The mobile units encompass the convenience of movability. Its handy arrangement allows the user to retrieve the network over different avenues, which necessitates shaking hands over different protocols as well as transmission rates. Similarly motion across different states i.e. from indoor to outdoor also requires intelligible network cover. Further, moving from a satellite coverage city towards another cellular arrangement city dissembles the adaption of network. This accessibility problem has been huge.

Proper infrastructural layouts are vital. Now-a-days mobile units are normally GPS enabled. Such arrangements transmit the true geographic location coordinates. The connection of the unit with the base station provides the lucid description of location. Data is accessible to the service provider and is maintained across the database. So the explicit detailed information can be easily retrieved. Also, a mobile unit normally catches the signals as per the available strength and priority. For a moving one, if in case

two base transceiver station exists, then the device automatically establishes connection with higher signal strength. Hence, the device can easily respond to the queries about static location places like, where is the nearest Indian cuisine hotel? etc. But meticulous consideration of privacy is prior. The location convenience must not endow burglar information regarding the current location of the residents.

D. Power

Excessive power consumption by mobile units has always been alarming. Batteries are the sole power reservoir of the units. Unavailability of chargers diminishes their performance. Although they serve as a portable agents, but an emphatic research on making their specifications richer is desired.

However, prominent solutions have also been casted. Task Manager endows a provision to evacuate the memory, by wiping out the unnecessary, unused applications with a single touch access. Further, to withdraw RAM from music players, internet explorers etc a separate app is given, which directly seizes its backward operations. Cache clean-up is another feature. Screen lock out is also an excellent utility. Screen brightness must be kept appease, to save battery from drain out. Power management software erases the idle tasks i.e. when they have not been in use for long. These are among the few noble gestures, which saves battery. Other static devices still poses a threat in this regard.

E. User Interface

Mobile unit's diminutive size makes it portable. However, this miniaturization requires a small interface, due to which it becomes difficult to work with it. The touch pad design also lack sturdiness. The devices lack clarity of display. However, several developments in this regard with the stretch of time have been made. Amoled displays yield a finer detail. Mobile units can be further extended through a wireless or wired keyboard. Speech recognition system enables the user to access various applications through voice commands. Efforts have also been made to understand the user's writing i.e. an intended word list always exist, facilitating the user with ease of writing. Also, a mammoth of software have been designed to support language translations. These possess globally acceptable utility. 360 degree rotation of screen makes inscription more easy and interesting.

IV. CONCLUSION

Technology progressions have been testing the viability of available computing mediums. Range of new paradigms for computing has been generated. New

generation have convulsed static designers to address their demands and this is how mobile computing emerged. Developing engineered solutions for the network and application layer was a challenge. Robust infrastructure development was also not a meagre issue. But the development persisted and changed the scenario. The paper presents major transitions through the review of the work of previous researchers and delineated certain important conclusions. Also it elaborates the issue with colossal importance and also describes the solutions which have been generated so far. Security risk did not exist in isolation, other threats include disconnections, network communication for heterogeneous service providers, battery consumption and user interface. But the concrete steps have been taken to resolve such problems.

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