International Journal of Computer Science and Mobile Computing

A Monthly Journal of Computer Science and Information Technology

MOBILE COMPUTING and SNAPDRAGON

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Abstract- Recent years show the new phase of computing. There is shift from desktop to hand-held devices. These devices have changed the era of computing, with the aim of supporting "portability, mobility" to the users, it comes with extensive research issues to the scientists, engineers and other concerned people. In this paper, I have tried to focus on mobile computing, its features, advantages, applications and various issues associated with it. In the subsequent section, Qualcomm's Snapdragon 820 is discussed with the aim of justifying that it would be best choice of processor selection for smart phones.

Keywords- mobile computing, Snapdragon 820, pervasive computing, distributed computing, Context-aware, Data mining.

I.   INTRODUCTION

The inventions of Computers have been done to improve computation and increase efficiency. The term Computation means solving out a task with the help of hardware and software in an elegant manner. Initial computation make use of centralised system, where the entire load of computing program was given to single processor. However, this approach came up with many disadvantages and the most common was frequent failing of this centralised system. To overcome this issue we came across the new term in 1970's known as Distributed Computing [2]. In this approach group of processors are employed that are linked via computer network, these processors communicate with each other and carry out a task. Hence, load of executing on single processor is decreased and efficiency is burgeoned. However, the recent decades show the size of computers scaling down to mobile phones that account for "mobility" of users. The extensive use of mobile phones has outdated distributed computing and have coined up new term of "mobile and pervasive computing".

A. Mobile Computing

The computation that accounts for the mobility of users, it means user should have access to the network anytime, anywhere and everytime. Hence, it is specialised class of distributed computing that accounts for making use of resources like hardware, software, network "At go". Hence, this is the era of mobile computing. Not only this, present scenario inculcates the need of embedding computation in day to day tasks that is embedding processors in real time objects to increase the quality of computation and also account for communication. This new term is based upon mobile computing but is characterized by the term known as "Ubiquitous computing"[3].

II.   ARCHITECTURE OF MOBILE COMPUTING

The architecture of mobile computing is 3-tier.This is somehow similar to Model-view-controller architecture (MVC) of web applications. The three layers are being separated from each other to easy the task of development, data storage, presentation and business logic. This 3-tier architecture has many advantages to offer when it comes to management, scalability and fleixibility.The three layers of mobile computing are-

A. Presentation Layer

This is Tier-1 of mobile computing architecture. As the name suggests, this accounts for the presentation of information to the end user. Video and audio means are used to convey information. To visualise information agents are used, these agents are web-browser and sometimes applets. They are generally J2ME enabled web browsers to render information. Various languages like HTML, XML are used for presentation of information in effective manner.[9]

B, Application Layer

This is middle tier or driving engine of mobile computing architecture .It mainly emphasises on software layer of architecture. It contains various middleware that act as interface between clients and business logics. They handle issues of communication, transaction, databases, transcoding, message synchronisations. It may include many technologies like –JSP,.NET services to communicated with databases for retrieval of information and other updates. It mainly accounts for the business logic application.

C. Data Layer

This is third layer of mobile architecture and is responsible for data storage and data management activities. Data plays an important role in any application. The database middleware's in application layer is responsible for retrieval of data, the act as connector between databases and application layer to carry out the tasks, various technologies like JDBC (java database connectivity); ODBC etc are used for information access.
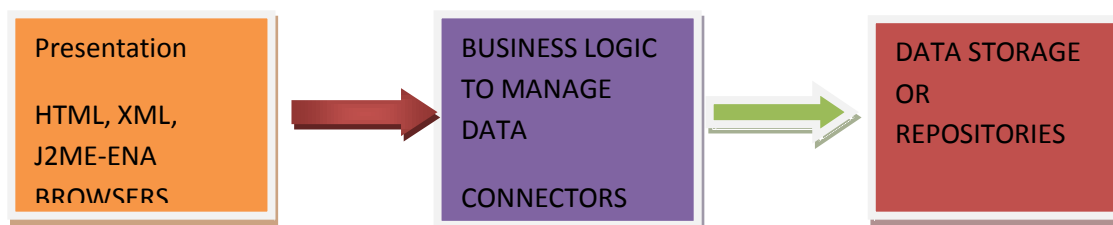

Fig1-3-Tier Architecture

III.   MOBILE COMPUTING ADVANTAGES

A. Mobility

This ensures user can access the network services from any device at any time and any-where. Hence; this is an advantage over conventional systems.

B. Easy Installation

Since, it involves wireless networks, it is easy to install these networks as compared to wired systems. Moreover, they can be installed in difficult terrains where installation of wired networks is not possible.

C .High Bandwidth Variability

Contrary to wired systems mobile systems offer greater bandwidth flexibility that would offer great flexibility and better utilisation of offered bandwidths. Hence, many operations can be done with low bandwidth.

D. Low Power Consumption

Mobile computing infrastructure don't require very high power machines, this is advantage over existing high power consumption systems.

E. Exciting Research Area

Mobile computing is an exciting new area that can found applications in many areas like medical, banking, networks, m-commerce, Internet of things [1].Hence. it opens great scope of employment and research areas to work upon.

IV. APPLICATIONS

Mobile computing has advantages in many fields-

A. Banking

Mobile computing allow users to access their account from anytime, anywhere, banking operations have become distributed, thus fast access is possible within seconds. Large queues in banks are now diminished because of advent of mobile technologies.

B. Medical

Healthcare is now easily available as compared to previous time, Doctors can monitor patient's health from distance, instruct them. Hence, mobile computing has reduced distances and communication gaps.

C. Entertainment

People can now book movie tickets with sitting at their place in few seconds. This is done with hand –held devices not bulky systems; this is made possible by mobile computing.

D. Context-Aware Applications

Mobile applications can now used to control environment, produce results depending upon the context like switching off lights and increasing cooling of air-conditioners. This has been made possible by mobile and pervasive computing. Hence, automation is also supported.

Among other applications include military, security, business, surveillance systems, baby monitoring systems. Thus mobile computing offers wide range of applications.[4]

V. ISSUES OF MOBILE COMPUTING

A. Disconnected Operations

Since, mobile computing involves mobility and very often connected devices moves from one connected region to another region that is being supervised by another base station. Hence, hand-held devices face frequent disconnected operations and to provide service during these phases is itself a difficult task.

B .Security

Mobile computing involves wireless mediums and to attain security in this medium is somehow cumbersome task as compared to wired mediums. Hence, to prevent sensitive data from being hacked various mechanisms need to be look upon once again. Information management need to ensure confidentiality, authentication, integrity to ensure mobile computing must not suffer from security breaches, sophisticated algorithms and techniques must be develop. Hence, it is an important issue to work upon.

C .Privacy

This accounts for what information to be revealed to the user and to whom information has to be provided. To ensure privacy, great deed of work is required by security people. This helps in preventing unauthorised access and hence enhances security. [8]

D .Integration Of Heterogeneous Environment

Mobile computing involves various technologies like 2G, 3G, 4G, wired mediums, wireless mediums, so to account for this heterogeneity and to properly integrate them is itself difficult task. This is a research area to work upon.

E. Context Aware Computing

Mobile computing applications are develop to provide information suiting to the "context". This is defined as the task related information that is depending upon location, gestures, sensors, environment; results are given to the user. Context aware computing is the sophisticated form of mobile computing and requires significant work to be done for both hardware and software. Aura project of Carnegie Mellon's University is one such example of extreme computing.

F. Real Time Monitoring

Mobile computing involves real time monitoring of data, this is done often with the help of small intelligent devices called sensors or actuators. This collects real time data from the environment and then passes information to the server for further processing. This data gathering, acquisition and processing in real time scenario is difficult task to work upon.

G. Data Management

Mobile computing involves large data often known as "BIG-DATA", to store, manage and to retrieve this big data is very tough. Convential Data mining techniques won't work here, so training technical people about new data mining techniques, would not only increase expenditure but would also be time consuming. This is an issue that is still need to work upon. [5],[7]

VI.   SNAPDRAGON 820

Qualcomm's Snapdragon is the leader in the mobile industry to provide edge-cutting performance. Snapdragon processors are known for their tremendous performance offered over other processors. Snapdragon processors have evolved from series 200 to 400,600 and the latest is Snapdragon 800 series.

Snapdragon 820 series is perfect for the mobile devices compared to its predecessor. In this section, I discuss various features of snapdragon 820 that makes it apt choice for mobile phones.[6]
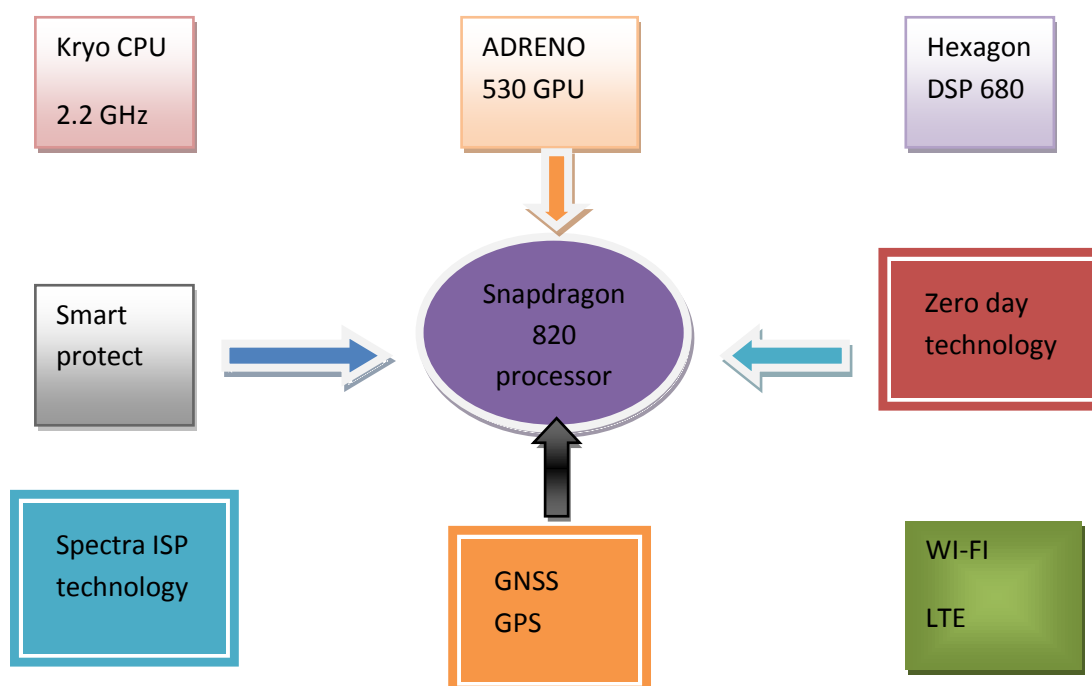
Fig 2-Features of Snapdragon Processor 820

A. Kryo-CPU

All the predecessors of Snapdragon have krait CPU but with snapdragon 820 series, Kryo CPU that is quite powerful processor, performance is enhanced approximately twice then its previous series. This makes selection of 820 snapdragons to be the best choice for mobile phones. This enhances efficiency of mobile phones. Kryo CPU comes with sophisticated power management techniques, hyper threading, and automatic shut down of caches, voltage scaling, frequency scaling and other software level management techniques to optimise power and to increase performance of processors. It has 64 bit dual core CPU that operates at 2.2 GHZ itself a tremendous features over other mobile processors.

B. Hexagon-DSP

Mobile computing involves "motion or mobility". Hence, communication plays an important role here. To supplement communication here, we make use of another proprietary processor called digital signal processor. Snapdragon 820 make use of hexagon DSP 680 that is embarked by high performance, supports enrich multi-media processing as well as longer battery life, that is the need of mobile devices.

C. Adreno-GPU

Graphics Processor Unit, this is the heart of display of smart phones. Mobile computing should support visualisation to the users otherwise lay man would not able to comprehend these systems. Hence, user-friendly interfaces should be built up. Not only this, smart phones should support excellent gaming experiences, rich video display that would inculcate users to use mobile devices with great interest. To provide this task, snapdragon 820 comes with adreno GPU that enhances almost 40% enhancement over predecessors. This enhances computing capabilities.

D. Spectra ISP Camera

Smart phones are known for the powerful camera features, present day users want their hand-held device to smart and powerful enough to capture good quality photos, videos whenever required and at the same time support more than one camera to take photographs from more than one view. Snapdragon 820 allows this feature by Spectra ISP technology that support 14 bit intra

spectra processor that supports cameras that are three in number that is one front camera and two rear cameras to support these technologies. They have been show to enhance picture quality a lot. Moreover, it also employs better data mining techniques to extract better face detection from the captured data. This is the feature that allows capturing images up to 25 pixels. This makes ideal choice to select this processor for smart phones.

E. Smart Protect

This allows some security mechanism to be enabled at the booting time also. This enables authentication mechanism to be employed at the time of booting. This increases protection of devices. Snapdragon 820 employs this smart protect technology.

F. Zero Day Technology

This technology makes snapdragon extremely distinguished from other processors, it make use of artificial intelligence to detect malwares that are previously not known. This employs data mining, knowledge learning to know the possible threats of new malwares. This enhances security a lot.

G .Wi-FI Technology

Snapdragon 820 series make use of high speed Wi-Fi with 802.11 a/c standards. This makes it quite apt for the mobile devices for better wireless connectivity.

H. Global Navigation Satellite System

Snapdragon 820 comes up with set of clusters of satellite that aims at providing more accurate locations than other GPS Systems available. Hence this is add on advantage for selecting snapdragon 820 for mobile devices.

VII.   CONCLUSION

The paper tries to explain mobile computing, its difference from the predecessors like centralised and distributed computing. The architecture is also explained. The paper also focuses on the issues that come into picture when mobile computing is actually used in the real time scenarios. Advantages of this computing over other computing have been also discussed. In the other section of paper I have justified use of snapdragon 820 processor for the smart phone. This processor extremely suits the need of present day smart devices. Snapdragon processors supports Inforce computing that is further enhanced version of mobile computing with loads of other exciting features.So.it can be concluded mobile computing has given paradigm shift to the era of computing.

ACKNOWLEDGEMENT

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