Concept and Management Issues in Mobile Distributed Real Time Database

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ABSTRACT
The usability of portable and useful computers devices with wireless networks has been spread all over the world very rapidly. Most modern and advancement in computer networks and use of versatile computers have led to the emergence of a new investigation in Mobile Distributed Real Time Database System (MDRTDB). In the last few years, the use of portable computers and wireless networks has been widespread. The combination of both opens the door to a new technology: mobile computing. Although the wireless communication networks were designed for the transport of voice signals, their use for data transport is growing. The continued growth of tiny and portable, wireless enabled handy system with massive storage capacity and powerful CPUs are making the wide spread use of MDRTDB. Mobile An important part of the research conducted in mobile computing systems has been done on mobile data management. Mobile systems are increasingly used for database driven applications such as product information system and management. Mobility differs the from the conventional data management to advance data management that are used in Mobile Distributed Real Time database Systems. Availability of cheaper mobile systems is becoming more popular and it increased the use, more powerful, storing huge amount of data and lasting longer. In this paper we raise all the issue in data management problems and remedies to work more for new researchers.

KEYWORDS: *Management Issues; Transaction Scheduling; Mobility Constraints; Concurrency Control; Portability; Mobile Distributed Real Time Databases.*

I. Introduction

Progress in mobile hardware architectures and marvelous growth of high-speed wide-area cellular systems deliver anytime and anyplace availability of network-based information services to the owners of mobile computing devices. Ever-emergent popularity of mobile devices, such as smart phones and notebooks, drives the demand for the development of innovative software and hardware architectures, applications, and network services aimed at these devices. The combination of portability of computers and wireless network combines a new technology called Mobile Computing and the use of Mobile computing in all application opens doors for new challenges for researchers. Many current researchers in the mobile computing arena share the same vision: ubiquitous access to information, data, and applications. Ubiquitous access refers to the ability of users to access these computing resources from almost any terminal. The idea behind the research is to provide dissemination of larges amount of useful and needful information to different mobile user by designing the efficient data management policies. Recent developments relating to the Internet are establishing solid foundations for wide-area ubiquitous computing systems. Many current researchers in the mobile computing arena share the same vision: ubiquitous access to information, data, and applications. Recent developments relating to the Internet are establishing solid foundations for wide-area ubiquitous computing systems. [1, 2]

Distributed Data Base Management Systems, Federated Databases, Interoperable Databases and Global Information Systems are topics in which a great research effort is being made. The new framework of mobile computing can profit from some new proposals on those topics. However, specific problems related to this new framework must be taken into consideration. Some of these problems are intrinsic to portable computers, which generally provide fewer resources than fixed hosts because they must be small, light and consume little energy. Other problems are related to the

wireless connection, which presents a poor quality and is influenced by a multitude of factors that cause the wireless networks to have a high rate of errors and a limited bandwidth. It is also necessary to add to the previous problems the continuous disconnections that occur. One could say that mobile computing is the worst case of distributed computation since fundamental assumptions about connectivity; immobility and scale have lost their validity.[3]

The concept of wireless communication networks were designed for the voice communication signals but their use as transport all type of data format (text, sound, graphics and images) is growing very rapidly. Regardless of the network, one of the most important and challenging problems for join less communication and computing are mobility management. Mobility management enables telecommunication networks to locate roaming terminals for call delivery and to maintain connections as the terminal is moving into a new service area. Thus, mobility management supports mobile terminals, allowing users to roam while simultaneously offering them incoming calls and supporting calls in progress.[4]

Mobile computing and persistent computing represent foremost evolutionary steps in a row of research in past years. In addition, the solutions of many previously-encountered problems become more complex, this increase in complexity is multiplicative rather than additive. It is much more difficult to design and implement a mobile computing system than a distributed system of comparable robustness and maturity; a persistent computing system is even more challenging. The focus of Data Management for Mobile Computing is on the impact of mobile computing on data management beyond the networking level. The purpose is to provide a thorough and cohesive overview of recent advances in wireless and mobile data management. Data Management for Mobile Computing provides a single source for researchers and practitioners who want to keep abreast of the latest innovations in the field. [5]

Worldwide access and management of information has been one of the driving forces in the evolution of computer technology. Central computing gave the ability to perform large and complex computations and advanced information manipulation. Advances in networking connected computers together and led to distributed computing. The real global network can be achieved only via the ability to compute and access information from anywhere and anytime. This is the fundamental wish that motivates mobile computing. This evolution is the cumulative result of both hardware and software advances at various levels motivated by tangible application needs.[6] Infrastructure research on communications and networking is essential for realizing wireless systems. Equally important is the design and implementation of data management applications for these systems, a task directly affected by the characteristics of the wireless medium and the resulting mobility of data resources and computation. Although a relatively new area, mobile data management has provoked a proliferation of research efforts motivated both by a great market potential and by many challenging research problems.

II. Management in MDRTDB

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Mobile computing is a revolutionary technology, born as a result of remarkable advance in the development of computer hardware and wireless communication. It enables us to access information anytime and anywhere even in the absence of physical network connection. More recently, there has been increasing interest in introducing ad hoc network into mobile computing, resulting in a new distributed computing style known as peer-to-peer (P2P) computing. In this paper, we discuss the data management issues in mobile and P2P environments. The use of wireless communication makes the data availability the most important problem here, so we focus on the problem of data availability and provide detailed discussion about replicating mobile databases. Not only that, we extend our discussion to mobile-P2P environment. At the end, we discuss the general data management issues in P2P environment. To design efficient data management policies to support the dissemination of large amount of information to different mobile users are the big issues.

The use of laptops, mobiles and PDAs is increasing and likely to increase in the future with more and more applications residing in the mobile systems. While that same analyst s can't tell us exactly which applications will be the most popular, it is clear that a large percentage will require the use of a database of some sort. Many applications such as databases would require the ability to download information from an information repository and operate on this information even when out of range or disconnected. [7]

The development and availability of a relatively low-cost wireless digital communication infrastructure is required. This infrastructure is based on wireless local-area networks, cellular digital packet networks, and other technologies. The rapid advancements of wireless communication technology and computer miniaturizing technology have enabled users to utilize computing resources anywhere in the computer network. For example, you can even connect to your Intranet from an aero plane. Mobile database are the database that allows the development and deployment of database applications for handheld devices, thus, enabling relational database based applications in the hands of mobile workers. The database technology allows employees using handheld to link to their corporate networks, download data, work offline, and then connect to the network again to synchronize with the corporate database. For example, with a mobile database embedded in a handheld device, a package delivery worker can collect signatures after each delivery and send the information to a corporate database at day's end.[8]

III. Concurrency Issues

The work in distributed systems relies upon exploiting or further development of concurrency control techniques. The current approach is to aim for loosely coupled systems rather than the tightly couple client/server paradigm traditionally used. The expansion of interest in web services is fully incorporated into the research work. All topics from the field of database technology and theory are of interest for the Ph.D. Work including the transfer of database technologies, algorithms and theories to new problem domains.

Mobile computing has proved useful in many applications. Many business travelers are using laptop computers to enable them to work and to access data while traveling. Delivery services may use/ are using mobile computers to assist in tracking of delivery of goods. Emergency response services may use/ are using mobile computers at the disasters sites, medical emergencies, etc. to access information and to provide data pertaining to the situation. Newer applications of mobile computers are also emerging.

One of the issue relating to wireless computing is that creates a situation where machines no longer have fixed locations and network addresses. This may complicate query processing for the cases where location plays a key role, since it becomes difficult to determine the optimal location at which to materialize the result of a query. This may happen only for the cases where the location of the user is a parameter of the query. Another issue relating to mobile computing is the energy (battery power). It is a scarce resource for mobile computers. This limitation influences many aspects of system design. Can we reduce the requirements of data transfer for the sake of energy efficiency? Yes, by doing scheduled data broadcasts, we may reduce the need for mobile systems to transmit queries.[9.10]

A. Fundamental of Mobile and Wireless

Wi-Fi is the most popular wireless communication protocol for local area networks. Private home and business networks, and public *hotspots*, use Wi-Fi to networks computers and other wireless devices to each other and the Internet. *Bluetooth* is another wireless protocol commonly used in cellular phones and computer peripherals for short range network communication. Today, competitive pressures, changing market conditions, and the availability of mobile and wireless services for the first time are forcing businesses to shift automated business processes into the mobile workforce. Managing the complexities of the mobile workforce and their need for mobile applications requires a platform specifically designed for the task. Building an integrated platform to manage these complexities demands a scalable, robust environment providing the following fundamental services:

data management, connection management, integration management, system administration, mobile application development, and production-quality mobile services.

B. Data Management

Today's mobile applications require more than simple data synchronization. They require a complete set of data management services, including strong data modeling, mobile and server-side support for schema deployment and versioning, rules-based data distribution, bi-directional data transfers that are fast and secure, mobile device-based database services, and tight transaction-level integration with multiple enterprise information sources.

C. Connection Management

Today, mobile connection management is technically complex and esoteric, and it varies widely as you travel across the globe. Newcomers to mobile computing must wrestle with the plethora of emerging communication protocols, standards, and low-level operational aspects of wireless connectivity. However, a mobile platform should provide the ability to seamlessly service multiple connection methods, wireless connectivity service options, and handheld device types at the same time. Load balancing and scalability options should be provided to handle volume and frequency spikes as they occur, and connections between mobile devices and the enterprise should be secure, efficient and extremely reliable.

D. Integration Management

In a mobile platform approach, integration management services provide flexible and robust methods for tying into multiple back-end information sources. The requirement for data transformation and business data processing before entry into the back-end source is a key issue. Perhaps the most important aspect of integration management from the mobile platform perspective is the ability to extend the investment made in large corporate information systems (ERP, CRM, SFA) to the mobile workforce in an efficient, transparent and meaningful way. To the mobile worker, their mobile interface into the corporate computing world is simply an automation of previously revered pencil and paper-based procedures.

E. Mobility management

Location management on mobile devices will become increasingly important in the new future, considering the increasing number of location-enabled mobile devices and location-based services. On the technical side, location-enabled devices and location-based services have been deployed and used for a number of years already. However, two issues discussed in this paper have not been investigated in greater detail, the rest one being how to make location information openly available on the Web, and the second one being the question of how to provide users with privacy control in such an environment. Location management is a two-stage process that enables the network to discover the current attachment point of the mobile user for call delivery. The first stage is location registration (or location update). In this stage, the mobile terminal periodically notifies the network of its new access point, allowing the network to authenticate the user and revise the user's location file. The second stage is call delivery. Here the network is queried for the user location profile and the current position of the mobile host is found.[11].

F. Handoff Management

Handover management enables the network to maintain a user's connection as the mobile terminal continues Mobility Management in Next-Generation Wireless Systems to move and change its access point to the network.[12] The three-stage process for handoff first involves initiation, where either the user, a network agent, or changing network conditions identify the need for handoff. The second stage is new connection generation, where the network must find new resources for he handoff connection and perform any additional routing operations. Under network-controlled handoff, or mobile-assisted and off, the network generates a new connection, finding new resources for the handoff and performing any additional routing operations. For mobile-controlled handoff, the mobile terminal

finds the new resources and the network approves. The final stage is data-flow control, where the delivery of the data from the old connection path to the new connection path is maintained according to agreed upon service mobile terminal finds the new resources and the network approves. [13] The final stage is data-flow control, where the delivery of the data from the old connection path to the new connection path is maintained according to agreed-upon service guarantees. Handoff management includes two conditions: intra-cell handoff and inter-cell handoff. Intra-cell handoff occurs when the user moves within a service area (or cell) and experiences signal strength deterioration below a certain threshold that results in the transfer of the user's calls to new radio channels of appropriate strength at the same base station (BS) [14]. Intercell handoff occurs when the user moves into an adjacent cell and all of the terminal's connections must be transferred to a new BS. While performing handoff, the terminal may connect to multiple BS's simultaneously and use some form of signaling diversity to combine the multiple signals. This is called soft handoff. On the other hand, if the terminal stays connected to only one BS at a time, clearing the connection with the former BS immediately before or after establishing a connection with the target BS, then the process is referred to as hard handoff.

IV. Concern with Mobile Application Development

A mobile application platform should provide developers with an abstraction layer, shielding them from the intricacies imposed by the wireless and mobile computing phenomena. Mobile application development should leverage existing developer training and software source code libraries. Furthermore, mobile interfaces and integration into industry standard development environments (Microsoft Visual Studio, Metrowerks CodeWarrior, Satellite Forms) enables developers to quickly and easily craft rich mobile applications valuable of production use.[15]

To deal with the characteristics of mobile computing, especially with wireless connectivity and small devices, various extensions of the client/server model have been proposed. Such extensions advocate the use of proxies or middleware components. Proxies of the mobile host residing at the fixed network, called server-side proxies, perform various optimizations to alleviate the effects of wireless connectivity such as message compression and re-ordering. Server-side proxies may also perform computations in lieu of their mobile client. Proxies at the mobile client undertake the part of the client protocol that relates to mobile computing thus providing transparent adaptation to mobility. They also support client caching and communication optimizations for the messages sent from the client to the fixed server. Finally, mobile agents have been used with client/server models and their extensions. Such agents are initiated at the mobile host, launched at the fixed network to perform a specified task, and return to the mobile host with the results.

Another concern in terms of software architectures is adaptability. The mobile environment is a dynamically changing one. Connectivity conditions vary from total disconnections to full connectivity. The resources available to mobile computers are not static either, for instance a "docked" mobile computer may have access to a larger display or memory. Compared to commercially available applications, mobile applications are unique in a number of ways. Developers designing and building mobile applications cannot make any assumptions about connection types or how often users will connect. In addition, individual job roles and responsibilities, along with the appropriate mobile computing platform to perform the job, dictate how application software is designed and built. Finally, mobile applications must process only the essential subsets of mission-critical information and date from multiple back-end sources. The blending of data, device and application functionality presents considerable challenges for the developer of mobile applications.

A. Database

Database vendors have awakened to the reality of mobile computing and the automation the mobile workforce. Many database companies have responded with mobilized or stumpy versions of their databases available for handheld devices. To address the mobile space, database vendors are attempting to use database replication schemes between a mobile device and a corporate data source.

Similar in some regards to synchronization, database replication completely disregards the notion on an application front-end to drive the data. Furthermore, database replication is a constant struggle of

keeping ever-changing data in back-end sources in sync with constantly changing data on front-end devices. Scaling a database replication scheme across multiple front-end device types, hundreds of users, and multiple back-end sources presents considerable technical challenges to IT staffs. [16]

B. Platform Approach

The most striking difference between custom-built and tools-based approaches versus a platform-based approach is the focus. Whereas custom-built and tools approaches focus on the infrastructure, a platform-based solution removes infrastructure building from the equation. The platform approach instead focuses on high business value—the allocation of only the resources necessary to rapidly build and deploy mobile applications, automate existing procedures for field workers, and provide access to corporate information and data specifically for the job role and responsibility. To appreciate the advantages of a platform-based approach to mobile, it is useful to explore the challenges and demands that mobile places on organizations attempting to move in that direction.

V. Mobile Challenges and Demands

Computing in a mobile environment poses significant challenges in four distinct areas: Devices, Users, Applications, and Infrastructure.

A. Mobile Devices

Mobile devices vary dramatically from desktop and laptop computers. Handhelds and mobile devices appear in a variety of form factors and processor types. Screen sizes are quite different, input methods range from stylus and touch screen to barcode. The limitations in disk space, resident memory, and battery capacity exert considerable restrictions on the mobile applications development process. Yet, perhaps the most significant factor that differentiates handhelds from desktops is the intermittent connectivity to back-end business systems and the maze of connectivity options—wireless, LAN, dial-up, docking, and Internet. When moving to mobile, all of these factors make the mobile and handheld platform a considerable challenge.

B. Mobile Users

The mobile workforce represents an entirely new class of enterprise users. The mobile user is accustomed to rugged or isolated environments where weather conditions or connectivity coverage vary greatly. Furthermore, mobile workers are often technologically-challenged and unwilling or unable to perform local systems administration. Features such as instant-on and highly-tuned, task-specific applications are critical business requirements when deploying to mobile users.

C. Mobile Infrastructure

The challenge of building an infrastructure to manage mobile devices, users, and applications is more multi-layered than the desktop. Dealing with operational issues such as device connectivity, connection optimization, data and application versioning, tight security profiles, data modeling and management, and applications development in today's environments requires highly specialized personnel with expensive skill sets. Centralized administration and control of the mobile infrastructure is essential in this heterogeneous environment.

The promise of wireless and mobile computing presents a compelling opportunity to reap significant productivity gains. When attempting to exploit such an opportunity, organizations currently are forced to either custom-build infrastructure from scratch or cobble together disparate point products from multiple vendors. @hand now offers an alternative: the first end-to-end environment that provides the enterprise-class infrastructure specifically designed for mobile and wireless computing.

VI. A Model for Mobile System

The mobile-computing environment consists of mobile computers, which are referred to as mobile hosts, and a wired network of computers. The communication between the Mobile hosts and the wired network takes place through the computers referred to as mobile support stations. A mobile support

station manages the mobile hosts within its cell. But what is a cell? A cell is defined as the geographical area covered by a mobile support station. Mobile hosts may move between cells, thus, necessitating a transfer of control from one mobile support station to another. Since mobile hosts may, at times, be powered down, a host may leave one cell and re-materialize later at some distant cell. Therefore, moves between cells are not necessarily between adjacent cells. Within a small area, such as a building, Mobile hosts may be connected by a wireless local-area network within a small area, which may provide lower-cost connectivity than a wide-area cellular network. This will also reduce the overhead of transfer of control.

It is possible for mobile hosts to communicate directly without the intervention of a mobile support station. However, such communication can occur only between the nearby hosts.

The size and power limitations of many mobile computers have led to alterative memory hierarchies. Flash memories may be used in such systems to save power. If the mobile host includes a hard disk, the disk may be allowed to spin down when it is not in use, to save energy.

VII. Confront in Mobile Databases

Data management for mobile wireless networks is really a challenge task. A user would always need connection transparency with the server so as to complete the intended application. The challenges of data management system includes the points like, first it how to ensure data availability in spite of disconnections, second how to manage weekly connected mobile wireless links between clients and server and third how to support constant resource availability to complete the applications. Resource availability refers to battery power at the mobile node. The problems of limited power a mobile node has to be addressed carefully. Next important point is how to minimize the resource consumption i.e. bandwidth energy. The asymmetric nature of the wireless communication link is another challenge for data management in wireless links to ensure low consumption and data access latency. Lastly the mobile wireless computing environments has another characteristics to address is location and time-dependent nature. To maintain a location-dependant and time-dependant in formations some efficient techniques such as cache invalidation and pre-fetching has to be used in mobile wireless networks. The Future of Computing is not just desktop computers anymore. User wants to replace even more desktops with notebooks. Mobile computing is a building block for pervasive computing Calm Technology, Handheld, wireless connectivity, full multimedia capabilities, and support for programming.[17]

A. Managing Location

Since the location of distributed components is not fixed, identifying their current location is necessary to contact, use or invoke them. Solutions to the problem of locating or tracking mobile objects vary depending on the application domain. In general, such solutions rely on a combination of storing some information about the location of the objects at selected sites and on performing some form of searching. To locate a mobile object, the stored information about its location is retrieved. Such information may be unavailable, out-of-date or approximate, thus to track the object, its actual location must be found by searching or performing appropriate estimations. Searching may take the form of selective broadcasting at all potential sites or gradually contacting sites from the one most possible to currently host the mobile object to the less possible one.

The location of mobile units is an important parameter when locating a mobile station that may hold the required data and when selecting information especially for location dependent information services. But the search cost to locate mobile units is added to the cost of each communication involving them. Two solutions have been discussed in the literature [18] for the first problem. In one solution, each mobile unit has a home base station that keeps track of its location by receiving notifications of its movements. The second solution is based on restricted broadcast within the area of the mobile unit that wants to access.

Several data structures have been proposed for storing the location of moving objects. One approach is to store the location of all moving objects in a single centralized spatial database. Every time the location of an object changes, this central database needs to be updated. To handle the high update

rate in such databases, the location attribute is often represented as a function of time and thus is automatically updated with time without an explicit database update operation. Representing location as a function of time is possible, when objects follow pre-defined routes as is the case of vehicles moving in a highway. Such representations may also provide estimations for the future location of the objects.

Besides tracking mobile objects, there are several other interesting queries that relate to location. Examples of such queries include finding the nearest service when the service or the user is mobile, or geographical multicasting - sending a message to all objects within a specified geographical area for instance to support geographically targeted advertising. Changing location also has important implications in distributed system design. Distributed systems have configurations that are no longer static. Thus, distributed algorithms and protocols can not rely on a fixed topology. Moreover, the center of activity, the system load, and locality change dynamically.

B. Wireless Mobile Commuting

The necessary networking infrastructure for wireless mobile computing combines various wireless networks including cellular, wireless LAN, private and public radio, satellite services, and paging. Wireless networks communicate by modulating radio waves or pulsing infrared light. Wireless communications add new challenges in several areas of distributed computing.[19].

Due to the immaturity of mobile products and services, combined with multiplicity of handheld devices, operating systems, form factors, connectivity options, and input methodologies, the web-centric notion of write-once, run anywhere is an alluring concept to explore. Unfortunately, it is simply a fallacy in the mobile world. At its core, web computing implies thin-client, browser-based interfaces operating in highly connection-dependent scenarios. Although the Internet and wireless web access philosophically represents the ultimate destination in client/server computing, mobile computing forces developers, administrators, and users to reach a compromise to support operational characteristics such as unfettered device usage, job-specific information and data access, and fully autonomous, application-driven automation.[20]

Computing in a mobile environment poses significant challenges in four distinct areas: Devices, Users, Applications, and Infrastructure. Wireless Communication Issues Lower bandwidth, higher error rates, signal path problems Increased communication latency, retransmissions, and timeout delays Mobility affords greater range of problems, e.g. moving from one coverage area to another Disconnection Two solution approaches: (1) Prevent disconnections (2) Cope with disconnections For mobile computers, allowing disconnections to happen and recovering from them is the better solution Asynchronous operation Caching and reconciliation.

VIII. Disconnection and Low Bandwidth

In general, wireless networks are more expensive, offer less bandwidth, and are less reliable than wire line networks. Consequently, network connectivity is often intermittent: there are short periods of burst connections followed by network disconnections. Such network disconnections are either forced by external factors, such as unavailability of the communication signal, or voluntary for example to save cost or energy.

The number of people who use or work with mobile computers is continuously increasing. Although the performance features of those kinds of computers when working disconnected (for example in the case of laptop) are equivalent to those offered by fixed computers, when working connected to a wireless network the same does not occur. The intrinsic features of wireless communications – poor quality, limited bandwidth, continuous disconnections – make working connected to a wireless network more difficult. However, one important wish of mobile users is to have the possibility of working connected to a wireless network in the same way as working connected to a fixed network or with at least better quality of service than that offered by existing networks. Different research projects consider that wish and try to build mobile systems that overcome the existing limitations [21,22]. All the previous works consider different aspects of mobile computing by using agent technology. In the same line, we present in [23] a system based on the use of the

client/intercept/server model which incorporates some modules and agents in the mobile computer as well as in an intermediary element situated in the fixed network. That element, called Gateway Support Node (GSN), is the intermediary element in the communication between the mobile computers under its coverage and all other hosts of the network (mobile or fixed). Its aim is to relieve mobile computers from many tasks and increase their capabilities, respecting, at the same, time their natural limitations and taking into consideration the problems of the mobile computing framework and trying to solve them.

A critical issue during hoarding is how to anticipate the future needs for data. While disconnected, the mobile unit can use only local data. All updates are locally maintained. Upon reconnection, any updates performed at the mobile host are reintegrated with updates performed at other sites, while any conflicting updates are somehow resolved.[24]

Weak connectivity is the connectivity provided by networks in which connection is often lost for short periods of time, is slow or expensive, making prudent use of bandwidth necessary. To handle weak connectivity, various optimizations have been proposed such as selective servicing of cache misses, compression techniques, background re integration of local updates, as well as compromising the quality of data provided to the mobile client. [25]

Low Bandwidth is a discernible difference in bandwidth between wireless and wired connections. Two techniques to improve bandwidth (1) Install more wireless cells by overlapping cells on different wavelengths, or (2) reduce transmission ranges Other techniques: compression and logging Available bandwidth is largely user-perceived, so tricks such as scheduling communication (lazy write-back and pre-fetching) to ``improve" bandwidth utilization Security Risks Greater security risks than wired communication The Solutions are first Hardware-based CLIPPER chip and second Software-based Kerberos authentication services Other Issues High bandwidth variability Applications should adapt to mobile devices changing from wired to wireless modes (and vice versa) Heterogeneous networks.

A. Communication Constraints

In the case of many wireless networks, such as in cellular or satellite networks, communication is asymmetric. In particular, server machines are provided with a relative high-bandwidth wireless broadcast channel to all clients located inside a specific geographical region. Furthermore, in general, it costs less to a client in terms of power consumption to receive than to send. These considerations favor push-based delivery. In traditional client/server systems, data are delivered on a demand basis. A client explicitly requests data items from the server. This is termed pull-based delivery. In contrast, with push-based data delivery, the server repetitively broadcasts data to a large client population without a specific request. Clients monitor the broadcast and retrieve the data items they need as they arrive on the broadcast channel.

Asymmetric nature of wireless communication link is another challenges for data management, I wireless links to ensure low resource consumption and data latency. The mobile wireless environment has another characteristics to address is location and time dependant nature. To maintain location-dependant and time-dependant information some efficient techniques such as cache invalidation and pre-fetching, has to be used in mobile wireless networks. [26]

B. Device Constraints

The limited screen sizes of many mobile computers have motivated the development of new interfaces for them and, in particular, the design of new database interfaces for mobile computers. In [27] there appears a query processing interface called Query By Icons that addresses the features of screen size along with the limitations in memory and battery power and the restricted communication bandwidth. In [28] the issue of how the pen and voice can be used as substitutes for the mouse and keyboard is addressed. Moreover, in [29] there appears an implementation of a pen-based graphical database interface on a pen computer. Because of the limited autonomy of the batteries, to optimize the energy consumption is generally a critical aspect in mobile computing. Even with the new advances in battery technology, the typical lifetime of a battery is only a few hours. This problem is

not likely to disappear in the near future. The use of asynchronous models allows the disconnection of the portable computer of the network while their requests are heeded in the server of the fixed network, and so these units can be in doze mode, which energy is saving mode.

In wireless mobile computing, to be portable, devices must be small, light and operational under wide environmental conditions. Also, in the context of ubiquitous or pervasive computing, computational power is embedded in numerous small devices. Portable devices have small screens and small, multifunction keypads; a fact that necessitates the development of appropriate user interfaces. Portable or embedded devices have fewer resources than static elements, including memory, disk capacity and computational power than traditional computing devices. Portable devices rely for their operation on the finite energy provided by batteries. Even with advances in battery technology, this energy concern will not cease to exist. The concern for power consumption spans various levels in hardware and software design. There are higher risks to data in mobile devices, since it is easier for mobile devices to be accidentally damaged, stolen, or lost. An additional issue is scalability. The number of portable computing devices is in the order of billions. Storing and managing information in such systems is a formidable task.

IX. Conclusion

In this paper the issues are to be raised the operation and management of application software and management services within the mobile distributed systems and the impact of advanced computing and networking technologies on management. The general problem of location management has been studied by many researchers. A distributed location management scheme is proposed that utilizes location database that form a virtual backbone, which is dynamically distributed among the network nodes. These databases serve as containers for the location storage and retrieval. However , there is an unsolved problem in this work which makes it unsuitable to provide location information for geographical routing, it assumes that the virtual backbone nodes maintain interconnections among themselves by a certain routing method; yet it is not clear what such routing protocol the problems becomes how locations of virtual backbone are required[30].

Consider the complete characteristics of wireless medium and mobile hosts provide typical performance related issues considered for mobile database design considerations to improve mobile database computing. In this paper we investigate the detailed issues that need to be addressed in mobile database development suitable for mobile computing environment. GSN based mobile network provided with data services to mobile clients accessing database server via small mobile phones. Limited bandwidth, instability of wireless environment and limited resourced mobile phones require light weight adoptable object oriented mobile database management system to manage mobile database. Keeping only frequently access objects at mobile phone to improve performance, reduce data transmission and provides high data availability for disconnected operations. Moreover, we have introduced the main features of the context, that in fact have a great influence on the performance of the mobile systems, focusing on the data management aspects. In summary we can conclude that mobile computing opens new expectations for data applications. However, mobile computing is not mature yet and many problems must be solved, so it is expected that new proposals will appear in the future.

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