

A New Initiative for ERP System Architecture with Mobile Cloud Aspects of Bangladesh

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Abstract—Enterprise Resource Planning (ERP) system in Mobile is a new application mode in the world of Business and Technology. With ERP system one can manage an organization or a company easily. In this paper the ERP system is integrated with mobile cloud. That is why now all resources are on the cloud and people can manage ERP system from their mobile devices. A new method for accessing ERP system regarding with foreign network have been proposed in this paper.

Keywords—ERP system, T-3 Architecture for mobile application, Mobile cloud computing, a new method for cloud based ERP.

I. INTRODUCTION

The world is moving fast with its mobility of Technology. Nowadays mobile is a necessary commodity of all sort of communication. In business perspective ERP module is focused on an area of business process such as development or marketing. A business can use ERP software to manage back-office activities. In traditional ERP system, there is need of a physical resource for the system. But now it is easy to get the information with the help of cloud.

ERP system is integrated with mobile as a result the ERP user can easily get access. But there are some security issues for getting access to the ERP system. When a mobile goes out of a home network an authentication process is applied by using IMEI number. If the user is verified then he or she can get access to the system. Otherwise no one can get access to the system.

II. ERP SYSTEM FOR MOBILE

Enterprise Resource Planning (ERP) is business management software which is an integrated system. It may help to store and manage data from every phase of business.

ERP has a purpose to make the information easier between all business functions within the boundaries of the organization and manage the organizations connections with its outside system.[1]

The Enterprise Resource planning (ERP) software helps to integrate all the different departments and functions of an organization into a single system to serve the various needs of that organization [2]. With an integrated solution, different departments can easily share information and communicate with one another.

If ERP system is considered with mobile devices then it would be more attractive. By this, the ERP user would get access from anywhere at any time.

III. T-3 ARCHITECTURE OF ERP FOR MOBILE APPLICATION

There are lots of limitations of T-2 architecture, so people are willing to prefer T-3 architecture. The components of T-3 architecture are user interfaces, process management and database management [3].

User interface layer is used for user service as like text input and display management. The processing management is used for the processing management services which are united by various clients.

There is a difference between T-2 and T-3 structure as the connections between the different stratification can change dynamically according to client request. [4]

ERP is a highly integrated system providing management information. To accomplish the functionalities of the ERP system requires a high data transmission rate and fast response capacity [3].

Data transmission speed is a vital fact in ERP system. T-3 architecture presents the concept of application server. Associated with the two-tier structure, it has made great performance, management and development. But there are also some difficulties in security segment which is a long time downloading program and network resources.

In ERP user interface can be used for user request. Users can connect with the system with user interface. The users request is being processed on process management and then it is sent to database management. Database management gives a response with that user request.

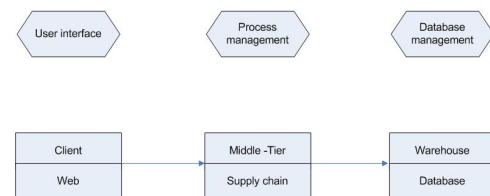


Fig. 1: T-3 architecture of ERP

IV. MOBILE CLOUD COMPUTING

Mobile computing is a technology for sharing resources and data of computers or other intelligent device like cell

phones. Mobile cloud computing is that any intelligent device such as cell phones can get services in wireless environment. The advantage of cloud computing is providing large storage and computing ability.

The Mobile cloud computing is changed from PCs or fixed devices to mobile devices, but the main thought is cloud computing [5]. Mobile users send service requests to the cloud through a web browser then the management module of cloud allocates resources to the request to establish connection.

Mobile devices are connected to the mobile networks via base stations or an access point that establish and control the connections and functional interfaces between the networks and mobile devices. Mobile users requests and information are transmitted to the central processors that are connected to servers providing mobile network services.

Mobile network operators provide services to mobile users as authentication, authorization, and accounting based on the home agent (HA) and subscribers' data stored in databases. After that, the subscribers' requests are dispersed to a cloud through the Internet. Cloud controllers process the requests to provide mobile users with the corresponding cloud services [6].

A. The working technique of mobile cloud

In mobile cloud computing, mobile users get service by interfaces, then the requirements of clients are sent to the managing system. The managing system catches the precise data resources by configuration tools and uses proper system services. These services make separation for necessary resources from the cloud.

Afterward web application has begun, the monitoring and calculating function of the system will monitor the using situation of the cloud [6].

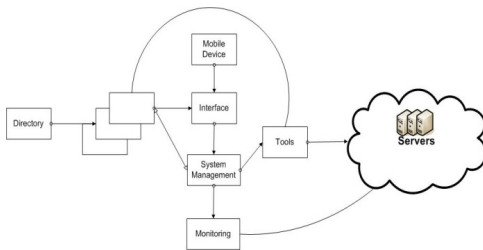


Fig. 2: Working technique of mobile cloud

B. Offloading

Offloading application is able to reduce the pressure of mobile device and save energy. Offloading from client to cloud can decrease energy consumption of mobile [7]. There is problem for choosing offloading method that is whether one should put all application to cloud. Byung-Gon and Petros first introduced offloading execution from the smart phone to a computational structure hosting a cloud of smart phone replicas [8]. The concept is to clone the entire set of data and applications from the smart-phone onto the cloud and selectively perform some operations on the replicas, assimilating the results back into the smart-phone.

Eduardo Cuervo et al. described MAUI, a system that enables fine-grained energy-aware offload of mobile code to the infrastructure [9]. It maximizes the potential for energy savings through fine-grained code offload while it minimizes the changes required to applications. MAUI's main objective is to reduce the energy problem for mobile handhelds.

At first, two versions of a smart phone application is created by MAUI using code portability, one of them application runs locally on the smart phone and the another one runs remotely in the infrastructure. Then MAUI uses programming reflection shared with type safety to automatically identify the remote methods and then it extracts only the program state required by those methods. After that, MAUI profiles each method of an application. It uses serialization to control its network shipping costs [9].

Using MAUI it is easier to reduce the energy problem for mobile device. So it is preferable to use.

V. ARCHITECTURE OF MOBILE CLOUD

Mobile cloud computing can be divided into four layers, namely access layer, managing layer, virtual layer and physical layer, which is shown in Figure 3 [4].

Access Layer	Management Layer	Virtual Layer	Physical Layer
Interface	User	Computing resource	Mobile
Registration	Task	Software resource	Storage
Access	Security	Data storage resource	Cloud
	Resource	Network resource	

Fig. 3: Architecture of mobile cloud

A. Access layer

Access layer is an access control layer, which contains service interface to the client, service registration and make necessary service access. It makes all kinds of rules, service principles in mobile cloud that is the access to cooperation between client and cloud. It can complete user registration or service registration. So access layer is used for requirement of service.

B. Managing layer

Managing layer is located between service and server group that provides management service and managing system. Managing layer can take typical actions to services such as noticing, acknowledgement, security and so on.

C. Virtual layer

Virtual layer is a layer that is designed with virtual component such as computing pool, storage pool and network pool. By software realization one can understand the virtual functions. It comprises virtual environment, virtual system, and virtual platform.

D. Physical layer

Physical layer precisely specifies the hardware equipment that maintains mobile cloud service, it can be cheap CPU or an unintelligent cell phones. A cloud with great service can be provided by distributed computers by present network technique, parallel technique and distribution technique. For mobile cloud there only need some network equipment and basic input output equipment.

VI. ERP ARCHITECTURE WITH MOBILE

At first a mobile device is checked whether it is in home network or foreign network through its network. At the time of home network it makes a simple authentication that is user ID and password authentication from the database of the ERP system. The database returns an authentication information to the cloud then the user of home network can get access to the interface of ERP.

When considering foreign network there is an additional authentication for IMEI number. The IMEI number is checked with the database of ERP and then an authentication information is sent to the cloud. By this the authorized user of ERP system can easily get access to the interface of the system which is shown on figure 4.

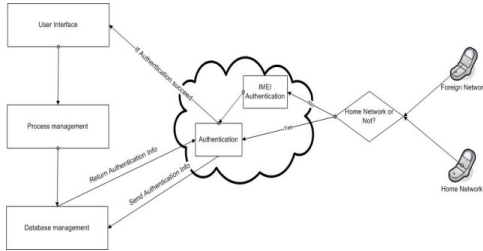


Fig. 4: ERP Architecture with mobile cloud

VII. SCOPE OF ERP WITH MOBILE

ERP is a latest initiative in the field of computer management information system in business. It is a new management model and opens a new era in information system. The new thoughts of ERP system are more advanced and reliable than traditional system. ERP systems main features are as follows. [3]

A. Comparing with traditional Information System

Traditional Information systems had few functions on manufacturing, marketing and other field. ERP introduces other functions, such as quality management, analytical processing, sales service, raw materials management, enterprise investment operation, investment management, inventory etc. That means there are lots of things now ERP system manages.

B. ERP goes with the supply chain management

Enterprise can not only depend on its resources. It must bring the entire supply chain. That means the suppliers, manufacturing plants, customers, distribution network etc. So in this way one can effectively design enterprise's production, supply, and marketing activities to meet the requirement of the enterprise and take advantage of the global market.

C. Business process reengineering by ERP System

By using ERP systems, companies or organizations can solve a specific task efficiently and productively by reorganizing the business processes and adjusting production. In this way, companies can make quick decisions about market changing aspects and get desirable advantages.

VIII. INTEGRATION OF ERP SYSTEM WITH MOBILE CLOUD

The entire ERP system is integrated with Mobile cloud. A mobile device is connected with an internet access point. The request from the mobile device goes to the mobile network and passing the mobile network the request pass a firewall via internet and enter into the cloud to get access to the desired ERP system which is connected through a data center.

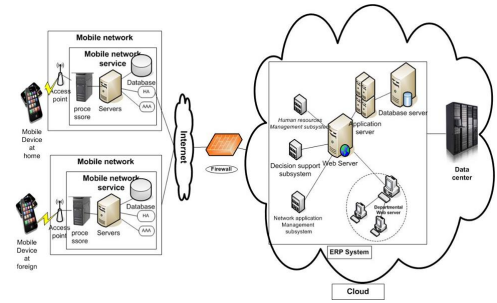


Fig. 5: Integration of ERP system with mobile cloud

A. At Home Network

Considering mobile device from home network, it connects with its access point. The access point can be a base station. Then it goes to the mobile network through a processor and a server. Then via internet it goes to the cloud. There is an authentication process to enter the ERP system for authorized user.

ERP system only gives access to the authorized user to the specific portion of system that the user have right to access.

B. Connect A Mobile Device From Foreign Network

Each mobile have a unique IP address. Once a mobile is out of home network it gets a new IP which is CoA (Care of address)[10]. By this IP address the mobile device can make connection with ERP system.

C. Proposed method for an ERP system with mobile cloud on foreign network

When a mobile device moves from a home network to foreign network there would be a problem to connect with that network and getting access to the ERP system. We proposed a process how authorized people get access to their desired ERP system in foreign network. The process is described by a flow chart as follows in figure 6.

In foreign network an information packet is sent to correspondent node from mobile node on foreign agent. Then the packet is sent to Mobile node on home agent. Then via

internet and a firewall the request goes to the mobile cloud. Before entering ERP system there are some tight checks for the authorized user of ERP system. At first it will check that the mobile is authorized from the company that provides the ERP system.

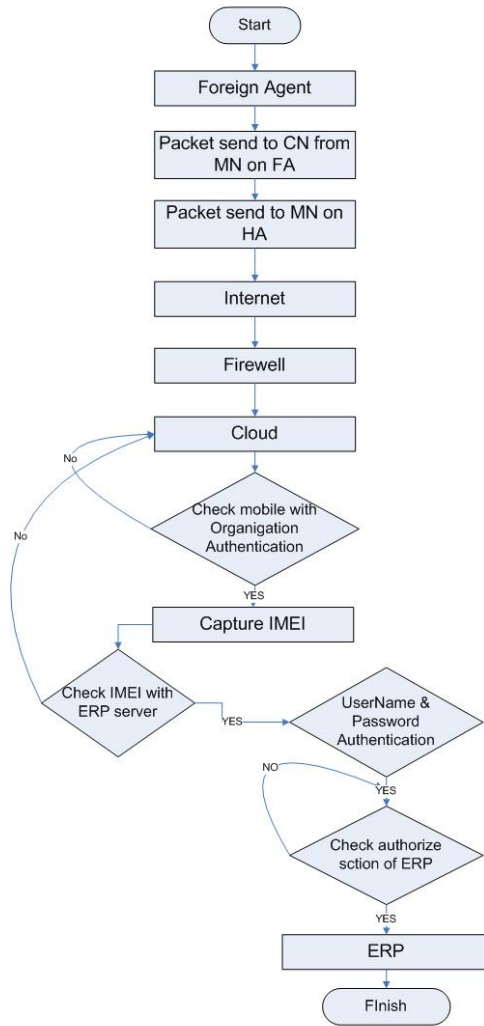


Fig. 6: ERP system with mobile at foreign network

If it is authorized from the company, then the fifteen digit IMEI number of his or her mobile device is captured and that is unique for each mobile. Then it will check the captured IMEI number with the ERP system server whether it is included or not. If the IMEI number is included in ERP server, then it will go for user name and password authentication otherwise it go back to the cloud. If the given user name and password for specific user is authorized then it will again check for the specific section in ERP system for specific user. Only specific portion of ERP system can be accessible by a specific user granted by predefined security authorizations.

IX. CONCLUSION

The number of mobile device user is increasing exponentially day by day. People want each and every facility which is given by PC or other device from a mobile, because it is easy to use and access anywhere at any time. ERP system is a vital information system in the field of technology and business. In this paper the ERP system is integrated with mobile and an authorization system is proposed for ERP user. One can easily get access to ERP system from foreign network .Moreover there will be specific module checking for ERP. In near future we would try to analysis how enterprise system could work more effectively with mobile.

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