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Performance Evaluation Using J2ME with Android over Cloud Services: A Simulation Approach

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Abstract

Proposed paper is concerned with two mobile development environments i.e. J2ME and Android which were further implemented. Through platform performance behaviour comparison, the different environments are examined closely with strengths and weaknesses which were evaluated further. In both environments experimental applications are written to compare with the environments in action on particular devices. Environment specific deployment files are created in J2ME with enhanced feature of Connected Device Configuration (CDC) and Connected Limited Device Configuration (CLDC). MIDlet and Android are used. Other file and Image files are stored on cloud. They are used through cloud services on any handheld device and mobile. Different key areas such as implementation aspects, memory aspects, execution time and response time are compared to give an in depth overview of the status of the two platforms. Results revealed that although the two environments are similar in some aspects but still represent two distinctive fields each with their individual property. Through our code examples and platform comparison Android platforms are suitable for use for high cost devices. While J2ME use for low cost mobile devices because J2ME is open source technology use free application and provide cloud service facility.

Keywords

Cloud Services, Java 2 Micro Edition, Connected Device Configuration (CDC) and Connected Limited Device Configuration (CLDC), Open Source Technology.

I. Introduction

J2ME is a portable solution for creating various mobile applications downloadable from mobile devices. Java Platform, Micro Edition (Java ME or previously J2ME) specifies a standardized collection of Java APIs for the development of software for small and resource-constrained devices. Commonly used devices include consumer devices such as home appliances such as security, defense, automotive, industrial, industrial control and multimedia. A Java ME configuration specifies the virtual machine and the core libraries. There are two main configurations, namely Connected Device Configuration (CDC) and Connected Limited Configuration (CLDC). For high end PDAs is intended for mobile phones and other small devices. The configurations are then improved by profiles, which define additional APIs for applications. The most familiar profile is the Mobile Information Device Profile (MIDP) aimed at mobile phones. Another well-known profile is the individual profile, aimed at consumer products and embedded devices. The Java ME platform's Mobile Service defines a standard set of application functionality for mobile devices, covering also interactions between various technologies associated with the MIDP and CLDC specifications. To summarize, the Java ME is evolving into a versatile platform for mobile application development. Growing vendors support for the newer specifications. Moreover, software portability challenges between CLDC and CDC are being addressed in MIDP version 3.For mobile computing, Mobile Sensor API, Contactless Communication API and Location API support applications that are aware of their surroundings and context and compatible with adaptable and tailored content. For instance, Mobile Broadcast Service API supports the delivery of streaming multimedia to mobile phones. Converged communications support is provided by the XML API [1] The computation pattern, offloading configuration, and execution environment [2] there are three main optimization approaches in Mobile Cloud Computing (MCC), which are focusing on the limitations of mobile devices, quality of communication, and division of applications services.[3] Internet services over lightweight portable devices [4] cloudlet infrastructure is achievable through dynamic Virtual Machine (VM) synthesis [5] cloud computing can potentially save energy for mobile users [6] Mobile applications are supported by the mobile cloud service[7] We believe cloud computing will surely improve the current system of education and improve Quality at an affordable cost [8] we present a middleware platform that can automatically distribute

different layers of an application between the phone and the server[10] The issues, existing solutions and Approaches are presented. In addition, the future research directions of MCC are discussed [11].

II. Analysis Prepared

In this section of paper we provide the complete analysis based on proposed architecture of the system required to design which involves the basic strategy of system design the complete system contains j2me based mobile users sent request for service to the design cloud server. The designed server gets the information from the client using web service this service upload user file to server. Server execute the request and convert file to extract image and text information form of file after that server system write into html file using provided text and image. The below given diagram provide the basic flow of the system designed [9].

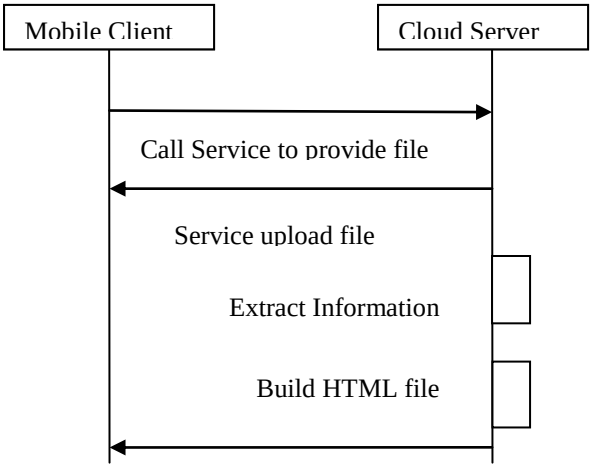

Figure 1: Working of System

III. Implementation

The implementation here we include the hardware and software dependencies, system classes, user designed classes and libraries, and methods that are helpful to creating and implementation of the system. Some supportive tools used as JDK, Net bean, J2ME tool kit and Android simulator. These tools create a environment give all Application Programming Interface (API).

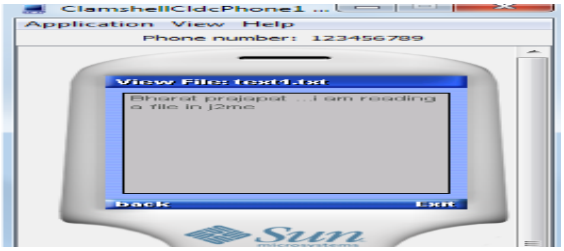

Figure 2: Show Implementation Screen

A) User Defined Classes

In this section we provide the classes implemented by us, there are we include some important classes that are necessary for describe here.

Table 1: User Defined Classes

Class name	Description
myTest	It is an J2me midlet and used to provide the user interface for mobile user and in same way provide the interface for selecting the file for open
UploadService	That is server side java web service class and help to upload files selected
DoHTMLService	This services are convert data from one format to other
DoConvert	This service is used to combine data which is accepted by the client
LoginService	This service is used to provide authentication for mobile client

B) Method Signature

This section contains the methods functions and other important members of the system with their description.

Table 2: Method Signature

Method	Signature
ValidateLogin()	That function work with client GUI and enable mobile user to authenticate
FileBrow()	This function help the user to create a file browser
showFile()	After conversion from cloud server this function help mobile user to view any file over local browser
traverseDirectory()	That is a mobile user function to traverse selected directory and its contains
showCurrDir()	This function help user to explore directories of mobile
readDocFile()	This function helps to read document or extract text and image from file
mergeFile()	This function used when the file is large and file is read in chunks after that chunks are recombine using this function

IV. Results

In this section we include some results that are related after the evaluation of our model.
Basically this work is related to the performance testing of designed system and evaluated through below given performance parameters.

1. Memory consumed: This parameters is indicates the memory resource consumption during execution of a submitted task. And in our case it is directly dependent over the size of data which is required to consume. This parameter is evaluated from both ends mobile device and server end. Additionally for android mobiles are also used to evaluate this the android mobiles are fast and their processing capability is also much higher than the normal mobiles thus android mobiles are works better than normal mobile.

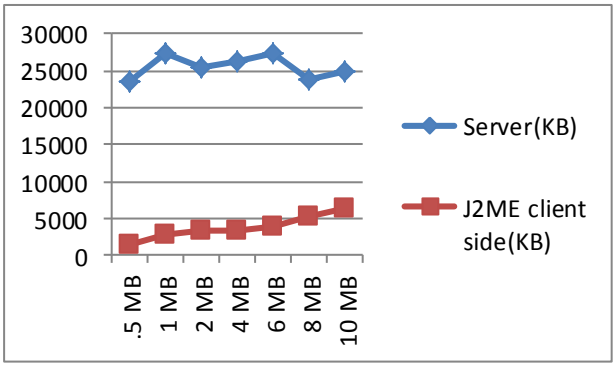

Figure 3: Graph shows memory consumption of Server side and J2ME Client side

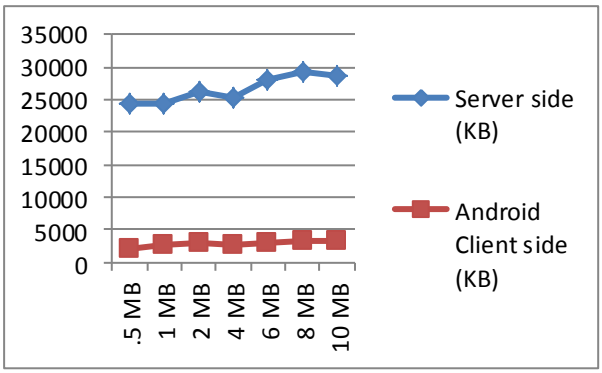

Figure 4: Graph shows memory consumption of Server side and Android Client side

Job execution time: this is a time defined as the total time required producing result after execution this calculation is derived over server end. This experiment is derived for server end thus no need to evaluate this factor for android mobiles

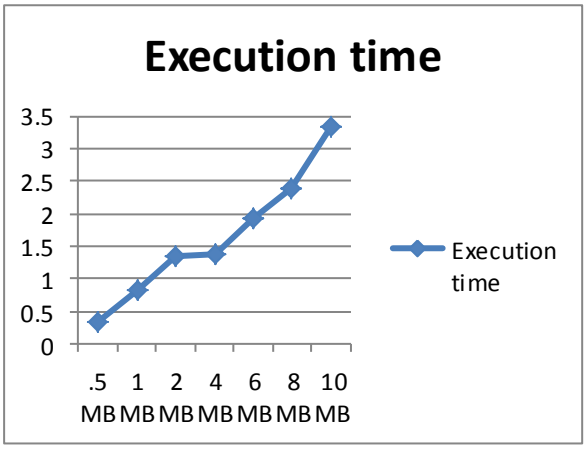

Figure 5: Graph shows the execution time

Response time: response time is given as the time required finding output after job submission, and here it is calculated at the client end. Due to analysis we found that android machine computing capability is higher than the j2me mobiles and these devices are developed for internet interaction thus the response time for android is quite low and it is fastlly accessible using android machines

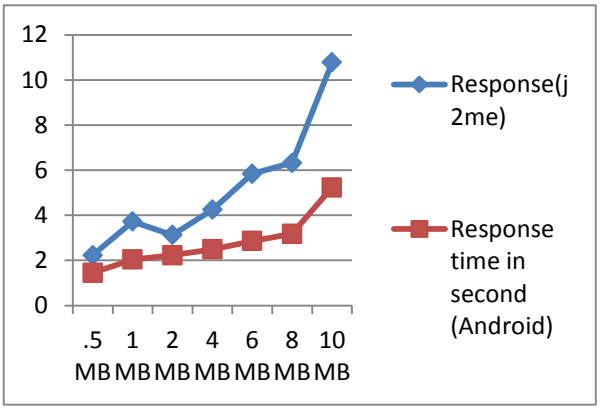

Figure 6: Graph shows the response time for different size of files

V. Conclusion and Future work

The ease of development in different areas will have potentially a large influence over the choice of development platform for creating novel assistive mobile environment applications. One of the interesting future research targets for this comparison which includes the iPhone. This would give a more composite additional utility of the mobile phone platforms. Comprehensive performance test reveals that performance of Android platform is much better. Execution is performed over server side which saves memory of mobile end. This is however, a difficult task due to the wide range of different hardware and phone models that implements the different platforms. Memory resource and power utilization is reduced. Response time is enlarged as the size of file is increase. Memory uses in server and client side increases according to the file size. Cloud is used as a library services which are created with cloud and other architecture for processing large data in cloud for data mining, web mining and other applications. Above suitable application have wide prospects while, proposed work is concerned with smart devises which are favourable as hand held devices, such as ipad, tablet etc.

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