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A STUDY OF COMPARISON ON COMPUTATIONALOFFLOADINGSERVICES IN MOBILE CLOUD COMPUTING

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ABSTRACT- This paper considers a mobile computation offloading problem where multiple mobile services in workflows can be invoked to fulfill their complex requirements and makes decision on whether the services of a workflow should be offloaded.The offloading uses the quality of services concept toremove mobile application limitations. Cloud services are the application programmingplatform where users can create new applications and mashup their functionalities. The development of cloud computing and virtualization techniques enables mobile devices to overcome the severity of insufficient resource constrained by allowing them to offload computation and migrate several computation parts of an application to powerful cloud servers. A mobile device should determine whether to offload computation as well as what portion of an application should be offloaded to the cloud.Thepaper describes the quality of services parameters used for offloading in mobileapplications and also describes the existing approaches for mobile cloud computing.

Keywords: Mobile cloud computing, Computation offloading, Mash up services, Service Workflow.

Introduction:

Computing resources like networks, servers, storage, applications, and services that can bereleased with minimal management effort or service provider interaction [1].The mobile cloud computing is the combination of cloud computing and mobilecomputing. MCC (mobile cloud computing) integrate the cloud computing into mobiledevices and overcome the problems in mobile computing like performance and securityetc., [2]. With the rapid progressof mobile computing, mobile services are also developedand provided with a significant rate. This iswhen requirements for mobile users are also becomingmore complicated, i.e., more complicated applications areneeded to be run on mobile devices such as video processingon mobile phones or object recognition on mobilesensors [3].

Augmentation approaches can increase computing capabilities of mobile devices andconserve energy

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capabilities of mobile devices by leveraging variedfeasible approaches, such as hardware and software. Hardware approaches are high-endphysical components, particularly CPU, memory, storage, and battery. Softwareapproaches can be computation offloading, remote data storage, wireless communication,resource-aware computing, fidelity adaptation and remote service request but they are notlimited [4].The offloading is needed mainly for two purposes:improved performance and to save energy[5]. Offloading can improve performance whenexecution time includes computation and communication both and thus they can performfaster at the server. The offloading can be used on mashupservices.They are as follows:

Infrastructure-as-a-Service (IaaS):It is anoutsourced service, which gives the infrastructurei.e.servers, software, data center, networkinfrastructure to the customers, who rent themfrom the cloud providers that it owns: computer hardware,firewalls, routers, Internet connectivity, servicelevelagreements and utility billing.

Platform as a Service (PaaS):The infrastructureis provided to customers by this cloud service,where they could deploy the software and thetools supported by the service provider. Thecustomers had to look over the deployed software,but they don't need to take control over theInfrastructure.

Software-as-a-Service (SaaS):It is a Cloud model which provides usage of softwarethrough Internet to the users and users have to pay for the applications they are using, but they don't have to tackle with theproblems ofinstallation and maintenance of the software.

1.1 Related work:

1)Roelof Kemp in [8] presented Cuckoo framework for computation offloading forsmart phones, a recently rediscovered technique, which can be used to reduce the energyconsumption on smart phones and increase the speed of compute operations.Cuckoo integrates with the popular open source Android framework .

2)Juntunen Antero in [9] define the mobile cloud computing, may result in transferringdata and computation from mobile devices into the cloud using either browser-basedapplications residing in the cloud or native mobile applications that may be partlyoffloaded into the cloud. Author examined which is realized by anenabling technology called mobile computation offloading (MCO).

2. MOBILE CLOUD COMPUTING MODEL

A mobileservice workflow defines the execution sequence of a setof mobile services to achieve the overall goal of a mobileapplication.In a mobile cloud computing platform, mobile devicesconnect to base stations to establish and deploy servicesfrom cloud servers.In thispaper, we mainly focus on the offloading plannerof this framework and aim to propose optimal offloadingstrategies to concurrently

2.1 Use of Offloading in Mobile Cloud Computing

The battery life of mobile devices remains a key limiting factor in the design of mobileapplications. The two main contributors are limited battery capacity and an increasingdemand from users for energy-hungry applications. Several solutions have

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been proposed to enhance the CPU performance andto manage the resources available optimally in order to reduce power consumption such as 3GPP Long Term Evolution (LTE) that are instrumental forthe viability of mobile offloading. WLAN (Wireless LAN) access points and local can help provide excellent conditions for offloading but the availability ofthese access points is currently limited.

2.2 Need of Mashup in MCC

Mashup is a Web-based network resource that composes existing services resources. Itis content, data or application functionality from more than one resource in enterpriseenvironments by allowing the actual end-users to create the individual information centricand situational applications. In internet there are many available web services withvarious QoS (Quality of Service) providing the same functionality to specific tasks. So aselection needs to be made service and result in a best QoS. Servicemash up requires communication with web services and processing power. In cloudcomputing cloud services have application program platform .

1).Mobile Service:Workflow as users requirementsbecome more complicated, one single service can hardlysatisfy such requirement, and thus multiple servicesshould be composed in a workflow to execute complicatedtasks .

2) Users' Mobility: The main characteristic of mobileusers is their mobility, and thus offloading strategiesmust allow users to invoke mobile services whilst roamingin a network.

3. OFFLOADING ALGORITHM

In this section, we illustrate ourgenetic algorithm basedcomputation offloading algorithm (GACO) for making acomputation offloading plan for a mobile service workflowbased on a genetic algorithm. First, we give a basicoverview of genetic algorithm based solutions.

3.1 Encoding

A genetic algorithm (GA) is a population based optimizationmethod that uses a population of solutions towardfinding a globally optimized solution [10].

3.2 Optimality Evaluation

In order to evaluate the capability of finding the optimaloffloading plan for GACO, we compare our method withthe basic GA algorithm as well as a brute-force exhaustiveoffloading algorithm.

Algorithm 1: Our proposed method (GACO) .

Algorithm 2: The normal GA that uses uniformcrossover and uniform mutation.

Algorithm 3: A brute-force exhaustive algorithmthat traverses all feasible offloading strategies to
find the optimal solution.

The mashup servicesthrough create large scale internet services or web services.In mobile cloud computing offloading in some services are used which are calledquality of services.

3.3 Fault-tolerance Offloading

State transition of a mobile application running with the support of an offloadingsystem. For a non-offloading service, there isonly one state: non-offloading execution (SNE). While foran offloading service, there are four states: uploading input data (SU), offloading execution (SOE),

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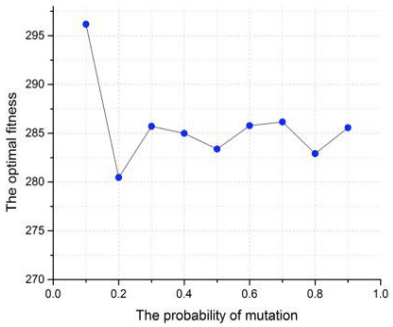
downloading output data (SD), and failure and recovery (SFR).

3.4 Offloading without fault-tolerance

Based on the failure recovery mechanism, the executiontime of offloading a service with a failure .



Probability

4.Methods of Mobile Cloud Computing

4.1 Mobile Agent Based

A mobile agent is a software program with mobility which can be sent out from acomputer into a network and range among the computer nodes in the network. When

mobile agents use an application then they send request for service to remote server.

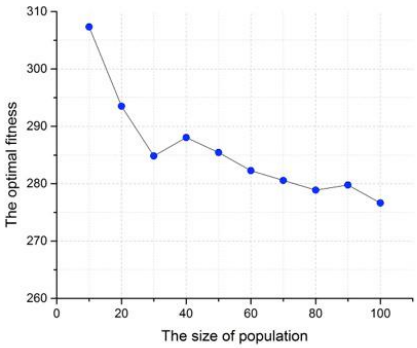


Fig4.1.1 : Impact of population size

Itcollect the required information and passes it to the agents execution environment.[11]Mobile agents have generally active in semantic web services, applications, sensor networks and wireless networks. Mobile agents can provide bettersolution for mobile cloud application in mobile cloud computing.Traditionally userrequests are sent directly from cloud to WWW which leads to increase in network trafficand increased response time. Mobile Agent can transmit over the network from one machine to the other andperform the operations locally on the distant machines rather than sending requests andwaiting for the response.

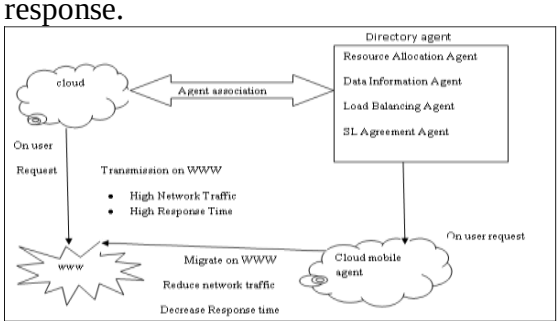


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Fig4.1.2 Combination ofMobile Agents in Cloud Computing

5. Conclusion:

This paper select the problem of computation offloadingfor mobile service workflows. We propose a mobilityenabledand fault-tolerance offloading system for making computation offloading strategies for service workflowsin a mobile cloud computing environment. The offloading algorithmbased on the genetic algorithm. The offloading technique is used for mashup services for preventmobile device and improve their performance and quality compared to high-end servers.

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