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An Extensive Survey for Context Aware Framework Based Scheduling in Cloud Computing

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Abstract—

Cloud Computing is a vast paradigm to operate on remote devices using which one can access any data, platform or any kind of infrastructure.In this paper we have done a survey on the context aware framework that is used in the smart cities. In this paper CAMELO framework is studied along with the advantages and ease of use in it. A context-aware service discovery framework based on mobile cloud computing environment is reviewed in this paper.

Keywords— cloud computing, task scheduling; mobility; bandwidth

I. INTRODUCTION

Cloud computing is a well established term for the delivery of the hosted servicing over the internet. Cloud computing facilitate companies to consume a compute resource, such as a virtual machine VMs, an applications or depot, as a service utility (just like a electricity) rather than having to frame and maintain infrastructures of computing in the house[1].The various services offered by cloud computing such as application, platform, infrastructure and as shown in Fig 1

Three of the main aids of cloud computing that boast attractive benefits for end users and businesses are as follow:

Scalability :- End users and companies employees can scale up and scale down as the computing needs increases or decreases[1]. This removes the need for huge investments in regional infrastructure which may or may not remain in service.

Pay per service:- Its easier and more cost effective , delivers best results .You only pay for what you use and there is no need to manage power on or cool down the servers .

Self Service Provisioning:- This eradicate the traditional need for IT administrators to arrange and manage compute resources. In the midst of this we tend to think about programing parameters like execution, time interval, holding up time, throughput, make traverse and so on the Cloud architecture appeared through the figure 1.

Context-aware computing is defined by Gartner [17] as "a style of computing in which situational and environmental information about people, places and things is used to anticipate immediate needs and proactively offer enriched, situation-aware and usable content, functions and experiences."The life cycle of context management systems spins generally across four stages, (1) Collecting and Aggregating Phase, (2) Modeling and Storing Phase, (3) Reasoning and Processing Phase and (4) Dissemination and Integration Phase. The first phase concerns the ways of acquiring the context data around an entity and aggregating it to provide more accurate data. The third phase is responsible for processing the data stored to harvest better knowledge and more meaningful information. The fourth phase specifies the way the context information gathered is provided to the interested parties (e.g. services, events, reactions, etc.).

Cloud Computing has faced number of challenges to implement the context aware frameworks. In this paper we have reviewedthe study related to context aware frameworks[9]. The challenges faced in the existing techniques for context aware frameworks include application partitioning,timeconsumption,energy consumption and offloading time.

Application Partitioning: Application partitioning is main factor in the offloading so to identify resources consuming components are need to be identified so that these services may be available to all resources in a fair manner.[9]

Time Consumption: In this part the hardware dependency is there. Time taken may depends upon the hardware configuration so to give equal time share or to develop a system that may operate with equal speed on all the operators is a tedious task.[9]

Energy Consumption: Energy consumption may also depends upon the hardware configuration. In this way this is also not much possible to run an application with same energy consumption on all devices.[9]

Offloading Time: The offloading time may be vary on different IoT devices. So the challenge for this is the aforementioned delays on the smartphone and cloud can vary with time. In this the offloading time should be same in ideal case[9]

Application Support: Another challenge in this framework is the application support. In this framework every device need to support all kind of applications which is not much easy.

The limitations faced in [1] are overcome in CAMELO framework. This framework was developed to provide the cloud services to the smart cities projects. CAMELO is the context aware framework that is supposed to fulfill most of the challenges that are described above in the challenges. This framework may assign various types of applications and this can tackle and run all the processes that are feeded to it.

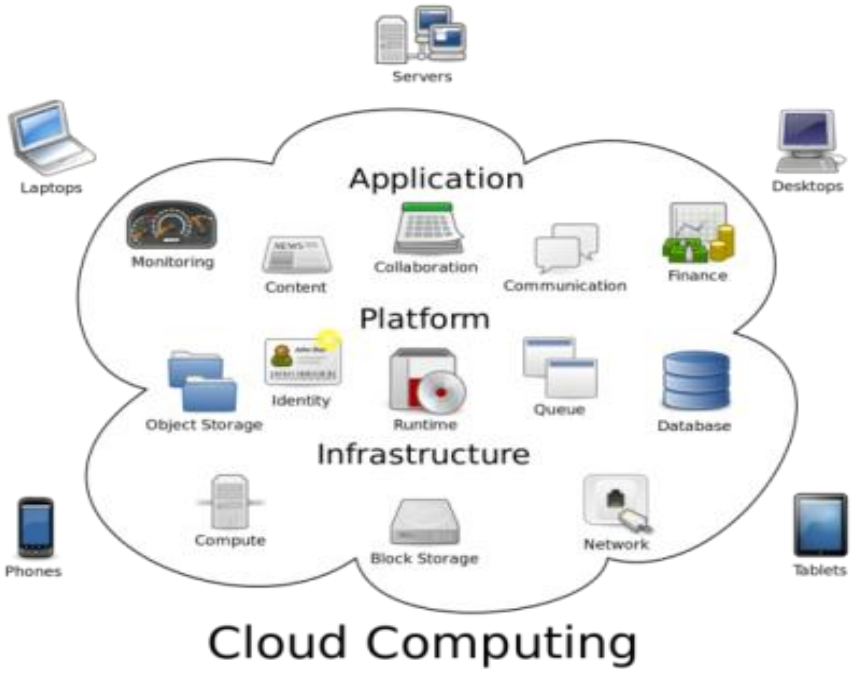

Figure 1 Cloud Computing

The rest of the paper organized as follows. 2nd section described about the related study regarding the context aware frameworks. IN the 3rd section the CAMELO framework is described along with the architecture. 4th section is about the various optimization scheme that are to be used for QoSmaintainance in context aware frameworks.5th section concludes the paper.

II. RELATED STUDY

Aymen El Amraoui and KaoutharSethom [1] presented a new context aware framework based on cloud computing to offer converged infrastructure and shared services which in turns improved efficiency, reduce cost and raise environmental awareness when building adapted city services such as healthcare, traffic, police and municipal operations. In this new context, Cloud computing is expected to play a significant role in providing QoS to a new services such as Smart Cities.

Zhanghui Liu et al. [2] presented a framework for context-aware computation offloading. First, a design pattern was proposed to enable an application to be computation offloaded on-demand. Second, an estimation model is presented to automatically select the cloud resource for computation offloading. Runtime data about computation tasks, contexts of the mobile device and possible cloud resources is collected and modeled at client side, in order to make an optimal offloading decision.

David Gil et al. [3] reviewed the current IoT technologies,approaches and models in order to discover what challenges need to be met to make more sense ofdata. The main goal of this paper is to review the surveys related to IoT in order to provide wellintegrated and context aware intelligent services for IoT. Moreover, we present a state-of-the-art ofIoT from the context aware perspective that allows the integration of IoT and social networks in theemerging Social Internet of Things (SIoT) term.

CharithPerera et al. [7] examined a variety ofpopular and innovative IoT solutions in terms of context-awaretechnology perspectives. More importantly, we evaluate these IoTsolutions using a framework that we built around well-knowncontext-aware computing theories. This survey is intended toserve as a guideline and a conceptual framework for context-aware product development and research in the IoT paradigm. Italso provides a systematic exploration of existing IoT products inthe marketplace and highlights a number of potentially significantresearch directions and trends.

SeblewongelEsseynewet al. [8] presented different architectural approaches that are used in the envisioning of context-aware systems are presented to highlight the functionalities and quality concerns which dictate their choice. Moreover, Context-aware frameworks and middleware which facilitate the efficient development of Context-aware applications are highlighted as instantiations of various architectural styles

Atta urRehman Khan et al. [9]provided an overview of mobile cloud computing technology, focusing on its context-awareness aspects and challenges. Considering these benefits, researchers envision the usage of cloud computing for mobile devices to overcome the ever-increasing computational and energy demands of smartphone applications. However, this requires specialized context-ware application development models that can facilitate the development of cloud-enabled applications capable of making context-aware computation offloading decisions.

Nirbhay K. Chaubey andDarshan M. Tank [10] presented a review of MCC, its security & privacy issues and vulnerabilities affecting cloud computing systems, analysed and compared various possible approaches proposed by the researchers to address security and privacy issues in MCC.

Mohammad Mehedi Hassan et al. [11] presented experimental results of most important benchmark function i.edejong function by genetic algorithm. The genetic algorithm is Search and optimization techniques that generate solutions to optimization problems using techniques inspired by natural evolution. Optimization is the central to any problem involving whether in engineering or economics.

Table I. Research Findings.

RESEARCHER	*METHOD*	*BASED ON*	*FINDINGS*
TarunGoyal&AakankshaAgrawal[12] [2013]	Host Scheduling Algorithm	Genetic Algorithm	A scheduling model based on minimum network delay using suffrage heuristic coupled with genetic algorithms for scheduling sets of independent jobs algorithm is proposed, the objective is to minimize the make span.
SourabhBudhiraj et. Al. [13] [2014]	Task Scheduling	Objective Genetic Algorithm	For task scheduling, a multi-objective genetic algorithm is implemented and the research is focused on crossover operators, mutation operators, selection operators and the pareto solutions method. The experimental results show that the proposed algorithm can obtain a better solution.
A.kaleeswaran et. Al. [14] [2013]	Dynamic Scheduling Of Data	Genetic Algorithm	Using genetic algorithm the tasks are scheduled according to the computation and memory usage. The tasks are scheduled dynamically. The execution time is reduced by parallel processing. The scheduled data is stored in cloud. By using ga we obtain global optimization.
Mdwhaiduzzaman et. Al. [15] [2014]	Strategic Provisioning	Service Provisioning	We aim to review the state-of-the-art service provisioning objectives, essential services, topologies; user requirements, necessary metrics, and pricing mechanisms. We synthesize and summarize different provision techniques, approaches, and models through a comprehensive literature review. A thematic taxonomy of cloud service provisioning is presented after the systematic review.
Luiz f. Bittencourt et. Al. [16]	Scheduling In Hybrid Clouds	Concept Of Schedulers	This paper introduces the scheduling problem in hybrid clouds presenting the main characteristics to be considered when scheduling workflows, as well as a brief survey of some of the scheduling algorithms used in these systems

III. CAMELO FRAMEWORK

The motivation behind introducing this environment is to develop a roadmap for the development of smart cities context aware applications. The framework attempts to determine the what, why, how and who characteristics of the relevant are facts and associated components or procedures shown in figure 2. Context-aware database, access harsh operating standards, cloud manager and smart city applications are the main framework modules. There are some algorithms that have a go to be executed to offers enhanced services to city users. The system inside in it,is committed to other than cooperate with respect to the cloud to put colleague about the cloud, especially about the server location, fees charged by

the cloud operators, the networks coverage, the quality of service, and so on. These data are stored in the Context-aware database. Various others parameters like delays, server's availability, bandwidth fluctuation would be found out in real-time. This accepts the drawbacks for to continue these mobile systems' capabilities by migrating computation to more resourceful computers (i.e., servers). This is option from the regular client-server architecture, where a thin client always migrates computation to a server. Even so, this each depends on other parameters such as the network bandwidths and the amounts of data exchanged through the networks. Many algorithms have been proposed to make offloading decisions to improve performance or save energy. The decisions are in any case forced by analyzing parameters including bandwidths, server speeds, available memory, server loads, and the amounts of data exchanged between servers and mobile systems [3].

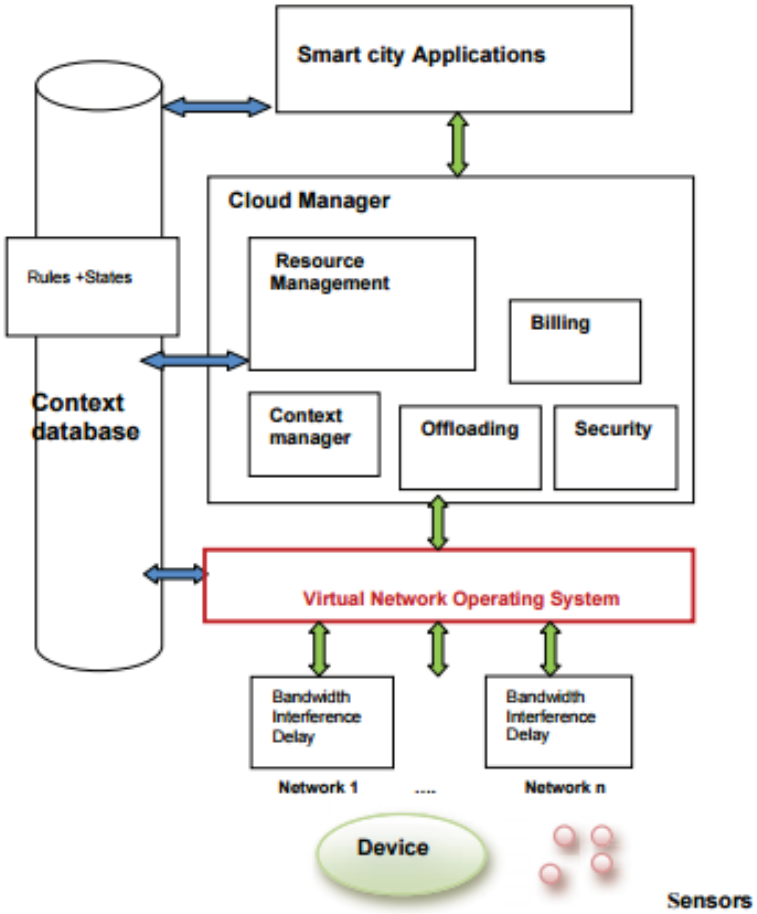

Fig 2: CAMELO Architecture

The cloud manager that is used by the context aware data base has many modules like offloading, resource management, storage and context management. Among these, offloading is a solution to augment these mobile systems and capabilities by migrating computation to more resourceful computers[1]. This is different from the traditional client-server architecture where thin client always migrate computation to server. Offloading making a decision regarding whether and what computations to migrate[1].

IV. EXISTING SCHEMES

This section defined about the various optimization schemes which support the context-aware frameworks to protect the QoS parameters.

A. Ant Colony Optimization

A substitution Cloud hardware reinforced hymenopteran Colony change is that the one loathed by Cristian Mateos. The goal of our hardware is to debilitate the weighted stream time of a gaggle of PSE businesses, however in light of present circumstances restricting Make traverse once using a Cloud. Among the ACO formula, the pile is discovered on each host examining the apparatus utilize made by all the VMs that unit of estimation train on each host.[13] This metric is helpful for Associate to pick the smallest sum stacked host to dole out its VM.Parameter Sweep Experiments (PSE) may well be a spread of numerical amusement that incorporates running Examination outcomes of this estimations show that ACO execution more than two altogether sudden (Random and Best effort) calculations.

B. Min-Min calculation

Min-Min begins with a gaggle of endeavors that unit of estimation all unassigned. In any case, it figures minimum satisfaction time for all endeavors on all advantages. By then among these base conditions the base regard is picked that

will be that the base time among each one of the errands on any advantages. By then that errand is typical on the advantage on it requires the base venture and in this way the accessible time of that benefit is invigorated for all the choice endeavors. it's invigorated all through along these lines; accept an errand is doled out to a machine and it takes twenty seconds on the distributed machine, at that point the execution times of all the alternative endeavors on this consigned machine square measure needing to be extended by twenty seconds. At the point when the consigned errand is not considered and along these lines a tantamount methodology is interminable until each one of the endeavors unit of estimation doled out resources[14].

C. Max-Min formula

Max-Min is to some degree same consequently of the min-min condition beside the going with: all through this once scanning for the fulfillment time, the base execution times unit of estimation to a great degree prevalent for each and every task. By then among these base regard is picked that will be that the most time among each one of the errands on any advantages. By then that task is reliable on the benefit on it requires the base venture and along these lines the accessible time of that advantage is revived for all the choice errands. The change is done among a practically identical way concerning the Min-Min[14].

D. Particle Swarm Optimization (PSO) Algorithm

Molecule Swarm change (PSO) as a meta-heuristics framework may well be a self-flexible all inclusive interest based completely change technique displayed by Kennedy and Eberhart. The PSO formula is like completely unforeseen masses based computations like Genetic counts (GA) regardless; there is no quick recombination of individuals of the populace. The PSO formula focuses on constraining the estimation of figuring of Associate in nursing application movement. As a live of execution, Authors used worth for complete execution of usage as a metric. The goal is to debilitate the estimation of execution of use work forms on Cloud enlisting circumstances. Happens exhibit that PSO basically essentially {based} errand resource mapping square measure arranged to do in any event thrice worth hold stores when diverged from Best Resource assurance (BRS) based mapping for our application progress. additionally, PSO alters the stack on figure resources by scattering endeavors to accessible assets.

E. Round Robin Algorithm

The round Robin formula in the essential focuses on passing on the stack comparably to any or each one of the advantages. Abuse this condition, the agent apportions one VM to a center point all through a cyclic way. The roundabout robin arranging inside the disseminated figuring is uncommonly rather like the round robin delineating utilized inside the technique arranging. The hardware starts with a center point and continues ahead to future center, once a VM is apportioned to that center. Much of the time enduring until the point that each one of the center points square measure designated no less than 1 VM then the hardware returns to the central center over afresh. Accordingly, all through this case, the gear does not stay mix for the exhaustion of the benefits of a center point before continuing forward to future. tho' round robin counts unit of estimation maintained direct control, stacks of load is advanced toward servers and in this manner unbalancing the movement[15]. A result of roundabout Robin condition demonstrates higher total and payload deed when appeared differently in relation to the alternative equation.

F. Genetic Algorithm

Genetic formula may well be a strategy for considering among that the errands unit of estimation assigned resources per solitary courses of action (which unit of estimation called plans for setting of booking), that encourages concerning that benefit is to be consigned to it undertaking. Genetic condition relies upon the natural create of masses time. The vital terms utilized as a part of inherited condition are[14]:

Starting Population: Introductory people is that the course of action of all the unit of estimation utilized inside the genetic formula to pursue out the perfect assurance. Every assurance among the people is called as a private. Also, every individual is envisioned as a body for making it commendable for the genetic operations. From the hidden masses the general population unit of estimation picks and different operations unit of estimation associated on those to shape future time. The coupling chromosomes unit of estimation pick supported some specific criteria.

Fitness Function: A fitness function is used to evaluate the idea of the general population among the masses per the given change objective.

Assurance: We use the degree assurance head to take in the likelihood of various individuals innate to future time in masses. The relative decision chairman recommends that the prospect that is picked and innate to front line social affairs is comparing to the estimations of the person's wellbeing.

V. CONCLUSION

In this paper a review is done for the context aware frameworks in the cloud computing. There are number of problems in the context aware frameworks like offloading, energy consumption and time consumption that are defined in this paper to provide services to smart cities. To avoid these problems a context aware framework i.e. CAMELO is studied in which the services are provided to the smart cities.But this framework had also a drawback regarding the offloading time, so in the future the research may be done to reduce this problem in the CAMELO framework.

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