Arya this paper we are performing comparative study

Arya K S, Dr. Murali P Computer Science EngineeringDepartmentAdi Shankara Institute ofEngineering and Technology, Kalady Abstract——Task scheduling plays a key role in cloud computing systems. Scheduling incloud is responsible for selection of best suitable resources for taskexecution, by taking some static and dynamic parameters and restrictions oftasks into consideration. The users perspective of efficient scheduling may bebased on parameters like task completion time or task execution cost etc. Inthis paper we are performing comparative study of the different Task Schedulingmethods.

Keywords— Cloud Computing, Edge Computing, Task Scheduling, Optimal Scheduling, Local Computing, I. INTRODUCTIONMobile devices can providecommunication for us almost anywhere and anytime, which are becoming animportant part of people’s daily lives 1. With the development of mobile information technology, thereare some new applications emerging and attracting wide attentions, such asspeech recognizer, natural language translator, image processor, augmentedreality.

These types of applications require a higher memory, battery energy, and computing power than that cannot be acquired on the resource-constrainedmobile devices. As there are many limitations on communication facilities andhardware resources in mobile devices, the gap between the need of performingcomplex tasks and the limited resource in mobile devices is increasing everyday2, 3. Cloud Computing is an essential ingredient of advancedcomputing systems. Computing concepts, technology and architectures havedeveloped and consolidated in the last decades.

Many aspects are subject totechnological evolution and revolution. Cloud Computing is a computingtechnology that is rapidly consolidating itself as the next step in thedevelopment and deployment of increasing the number of distributed application. To gain the maximum benefit from cloud computing, developers must designmechanisms that optimize the use of architectural and deployment paradigms. The goal of our work isto compare different task scheduling mechanisms. In this paper we are considering " Local computing without task scheduling", " Task schedulingwith randomly selected device", " Cross entropy based optimization scheme", " Multidevice task scheduling Strategy" .

II COMPUTATION MODEL 1) LOCAL EXECUTIONEach mobile device i can execute its own tasklocally. By using its own computational resources and processing power. 2) OFFLOADED EXECUTIONSuppose that a mobile device i (task owner) wishes to execute acomputation-intensive task while its computation resource is heavily occupiedby other applications currently. In this case, the mobile device i would publish the task to thesenearby mobile devices and requests for task offloading.

If the mobile device j currently possesses a largeamount of idle computation resource, it will reply the request. Once the mobiledevice i receives the reply message, thetask is offloaded to mobile device j through the wireless link 4. III Analysis of computation offloading •Avoid wasting energy. Whole systems orindividual components may enter standby or sleep modes to save power.

•Execute programs slowly. When a processor’sclock speed doubles, the power consumption nearly octuples. If the clock speedis reduced by half, the execution time doubles, but only one quarter of theenergy is consumed.•Eliminate computation all together. The mobile system does notperform the computation; instead, computation is performed somewhere else, therebyextending the mobile system’s battery lifetime. 7 IV TASK SCHEDULING MECHANISM There have been extensive studies onthe task scheduling mechanism for mobile edge computing.

In this section welook at some of them. A. Localcomputing without task scheduling Each mobile device chooses to executeits task by itself. , the total overhead in this scenario is depends onexecution time and energy consumption. This scenario provides a baseline fornetwork performance across all mobile devices. B.

Task scheduling with randomly selected device Each mobile device computes the execution time of the taskfirst. If the execution time is greater than the contact duration, the mobile device chooses tooffload its tasks to a randomly selected neighbour device without consideringthe impact to other mobile devices. In this case, the total overhead of amobile device can be expressed. This scenario provides a baseline for theperformance of task scheduling schemes. C. Crossentropy based optimization scheme We use the centralizedcross-entropy method to solve the task scheduling problem, which is astochastic search technique and has been proved to be effective in finding theapproximate optimal solution of the optimization problem 5. In this case, thetask scheduling strategy of each mobile device can be obtained

as a result ofthe optimization process which aims at maximizing the profit of the resourceprovider.

D. Multidevice task scheduling Strategy for ad-hoc based computing The model takes contact duration, opportunity consumption, energy consumption, time latency, and monetary cost into account, aiming atfinding an optimal solution. We consider the contact durationof the mobile devices. Suppose that mobile devices i and j are two neighbour devices, andthey both maintain a uniform linear motion in the recent time period. Therelative movement speed between them is v, the relative distance between the mobile devices can beobtained by measuring the signal strength. FIGURE 1 Illustration of therelative movement between mobile devices i and j. The relative movement betweenmobile devices i and j is shown in Fig.

1. Where Ris the maximum distance for the wireless link betweenmobile devices i and j. suppose that mobile device iin point A and mobile device j in point S at the initial time, the distance between i and j is da. 1t time later, mobile device imoved to point B relatively, the distance between iand j is db. 21t time later, mobile device i moved to point C relatively, thedistance between i and j can be obtained by measuring the signal strength. Then, the contact duration between mobile devices i and j is calculated. Task is offloadedonly if the contact duration is greater than the time required to perform thetask.

6 V. COMPARISON To investigate the performanceof the overhead optimizing task scheduling mechanism, we consider to the mobileedge computing scenario as that 50 mobile devices are randomly distributedwithin

an area of 1000m * 1000m, the mobility model of each mobile device isthe random way-point model with the speed of 10m/s. Each mobile device canconnect to the nearby devices within 200 meters via a Wi-Fi network. 1.

No. oftask unsuccessfully completed Unsuccessfully completed task is the task whoseexecution time is longer than the time constraint of itself. We define thenumber of unsuccessfully completed tasks as UNIn the local computing scheme, if there are toomany tasks to be executed, at some point some tasks should wait to be executedand could not be completed in time due to the lack of computing resources. Those mobile devices in task scheduling schemes can use the resources of theneighbour resource-rich device, if there are too many tasks, they can offloadthe tasks to their neighbours, and complete the tasks quickly. Asthe Multi device task scheduling Strategy for ad-hocbased computing aims at reducing the overhead of mobile devicesand takes the contact duration, wireless accessing coordinating, andcomputational resource allocating into consideration, the mobile devices inthis scheme can have a stable high-speed wireless channel to transmit the dataof the task, the mobile devices in this scheme can complete the task in timeand has a better performance in UN. 2. Averageexecution time of task The local computing scheme has a much longerexecution time than that of task offloading schemes. In the task offloadingschemes, the scheme with a randomly selected mobile device has the longest executiontime, and the Multi device task scheduling Strategy for ad-hoc basedcomputing scheme has the shortest execution time.

In a local computing scheme, the execution time of a task is mainly the executing time. However, in themobile edge cloud computing schemes, the

time consumption of a task mainlyincludes the data transmitting time, and the task executing time in the neighbourresource-rich device. In general, the task executing time in the resource-richdevice is smaller than the local executing time. Multidevice task scheduling Strategy for ad-hoc based computingtakes the contact duration into consideration and can optimize the wirelesstransmission resources and computing resources at the same time, it has arelatively shorter execution time for one task than other task offloadingschemes. 3.

Averageoverhead for mobile device Local computing mechanism has the heaviest overhead, the overhead inour task scheduling scheme is a slightly lighter than the overhead in the crossentropy based scheme, and both the above two schemes have a lighter overheadthan that in the scheme of the randomly selected device. The reason is thatmobile devices in local computing scheme can not offload the tasks and have toexecute the tasks themselves. However, the mobile devices in task offloadingschemes can choose to execute the tasks locally or execute the tasks throughthe resource-rich device. In general, executing the task through theresource-rich device has a low overhead. In the scheme of the randomly selecteddevice, the mobile device regardless of the impact to others, which to acertain extent, increase the overhead of themselves. The cross entropy basedscheme take the profit of the resource provider into first consideration, andthe overhead of the mobile device is a little higher than our proposed taskscheduling mechanism.

VI. CONCLUSIONSTo solve the resource scarcity of mobile devices, we can utilize applications ofcloud computing. In order to provide low-latency and

reduce backbone traffic,” edge computing” platform is proposed. For better utilization of theavailable edge devices, task that are needed to be perform is shared among edgedevices(Ad-hoc)depending upon their constraints such as resource power, energy, latency etc. Task scheduling mechanism minimize the overhead formobile devices.

In Multi device task schedulingStrategy for ad-hoc based computing Mobile device performs scheduling decisions locallyand take mobility into consideration, thereby reduce control and signalling overhead, And No of unsuccessfully completed task, Average Execution time, Averageoverhead on devices are comparatively low . Among the different task schedulingmechanisms we consider Multi device task schedulingStrategy provides the optimal task scheduling.