Adaptive Multi-Resource Allocation for Cloudlet-Based Mobile Cloud Computing System

Project Submission by:

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PROJECT TOPIC

Mobile cloud computing utilizing cloudlet is an emerging technology to improve the quality of mobile services. The major problem delimiting the cloudlet, is it's computational capability, and the wireless bandwidth between mobile devices and cloudlet. In order to provide a feasible solution to this problem we consider the multi-resource allocation problem for the cloudlet environment with resource-intensive and latency-sensitive mobile applications. A joint multi-resource allocation framework in the cloudlet system based on semi-Markov Decision Processing (SMDP) is proposed in an attempt to provide more feasibility to this existing technology.

IMPORTANCE

The importance of the selected paper is:

1. To obtain the optimal decision of computing and wireless bandwidth resource allocation among multiple mobile users in cloudlet-based mobile cloud computing environments, by maximizing the overall benefits of the whole system to consequently enhance the quality of service for mobile users

2. It shows a method to utilize the computing resource at both the cloudlet server and the distant cloud coordinately to fully exploit the system capabilities.

3. The project helps in performing multi-resource allocation jointly considering both the wireless bandwidth and the computing resource.

SALIENT FEATURES

The features of Adaptive Multi-Resource Allocation are:

1. A simple model of cloudlet-based mobile cloud computing system is shown in figure 1.

2. Upon arrival of a mobile service request, the system decides whether to run it at the mobile device or offload it to the cloudlet according to the offloading decision that has already been made based on the network performance and the characteristics of the application.

3. The computing resource of the cloudlet is adequate for running multiple mobile applications simultaneously, but not as sufficient as that of the remote cloud data center

4. The wireless bandwidth resource in the model refers to the WLAN connections between the mobile devices and the cloudlet, and one wireless bandwidth unit refers to the minimum bandwidth required to support mobile computing offloading
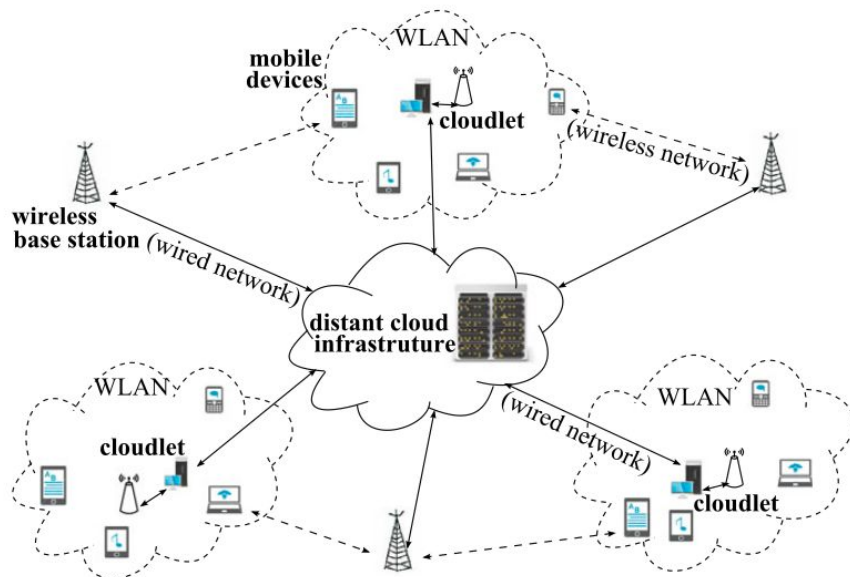

Fig. 1. The model of cloudlet-based mobile cloud computing system.

ASSUMPTIONS

The important assumptions are:

- For calculation of probability of actions we haven't used linear programming model but instead of that we have calculated it using reward corresponding to each action.
- There are total M VM's and B bandwidth units while each user can have maximum of W bandwidth units and T cloudlet VM's.

RESULTS

We have generated a graph between probability of actions against the ongoing service.