

ON MOBILE CLOUD FOR SMART CITY APPLICATIONS

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Abstract - In recent years, the Smart City approach has become trendy for its assurance to develop the quality of life of urban citizens. This approach involves multiple preparations, such as Smart healthcare, smart transportation, and Smart community. Most benefit in Smart Cities, especially in the Smart healthcare domain, requires the real-time distribution, processing and inspect of Big Healthcare Data for deep decision-making. In this scenario, mobile cloud computing (MCC) can play a basic role by offloading Big Healthcare Data associated tasks such as partition; deal with analysis, from mobile applications to cloud effect, ensuring quality of service (QoS) demands of end-users. Such resource transfer, who is also termed Virtual Machine (VM) transfer, is very powerful in the Smart healthcare scenario in Smart Cities. In this project, I proposed an Ant Colony Optimization (ACO) based joint VM transfer model for a heterogeneous, MCC-based Smart Healthcare system in Smart City environment. In this model, the user's mobility and procure VM resources in the cloud address the VM transfer problem. I also present a thorough performance evaluation to probe the performance of our proposed model compared to state-of-the-art approaches.

1. INTRODUCTION

Due to recent advancements in Information and Communication Technology, the Smart City concept has become an excellent opportunity to improve the quality of everyday urban life activities. By connecting Smart objects, people, and sensors various services can be provided, such as Smart health-care, Smart transportation, and Smart community. Most Smart City services, especially emerging Smart healthcare services, demand anywhere, anytime real-time computation. Critical patient monitoring, telemedicine, patient data collection, and personalized medical services are major applications in this domain. These healthcare services and applications generate copious amounts of Big Healthcare Data in real-time. However, without a strong wireless and mobile communication infrastructure, it is difficult to connect and access computational resources for processing, sharing, and analyzing of Big Healthcare Data with minimum latency. Several terms for Mobile Cloud Computing (MCC) such as Mobile Edge Computing (MEC), fog computing, dew computing and mist computing have been introduced recently to promote the idea of pushing the computing resources from the core of the network to the "edge." The proposed platforms revolve around the basic idea that (mobile) devices with limited capabilities can get access to more powerful resources of nearby devices without incurring the cost of reaching the resources at the core. However, these platforms differ in certain things such as the notion of a

network edge. The goal of this paper is to develop cloud support data management infrastructure for upcoming smart cities using a multitier cloud system infrastructure. The proposed system computes the end-to-end delay, from the application level to the global cloud of the city service provider in real-time manner, minimizing the data processing delay by choosing different cloud providers in different tiers so that the overall delay is minimized. Of course, we need to save data from mobile sensors. It means that mobile cloud should be an important part of Smart City platform. It could bring the following benefits for Smart Cities.

- Reduced cost as the need to recollect and verify data is removed.
- Integrated city systems and data-driven services.
- A common understanding of the needs of communities.

2. RELATED WORK

Monitoring activities detect changes in the environment and can be used for several purpose. To develop new advanced services for smart environments, data gathered during the monitoring need to be stored, processed and correlated to different pieces of information that characterize or influence the environment itself. In this paper we propose a Cloud storage solution able to store huge amount of heterogeneous data, and provide them in a uniform way. In this paper, we present the architecture design and discuss some implementation details in the development of the architecture within a specific use case. The growing exploitation of smart environments and audio video streams is causing a massive generation of complex and pervasive digital data. Sensing equipment and sensor networks are deployed to monitor phenomena of interest providing many heterogeneous measurements and multimedia data. However, a new trend is arising, where data production, information management and application development are decoupled, thus giving to business companies different roles in the market. In such a scenario, flexible solutions to merge activities of vendors, manufacturers, service providers, and retailers are necessary. In this projects we focus the attention on data storage services, and we present a new storage architecture specifically aimed to monitoring activities in smart environment.

In the Internet of Things (IoT) perspective, billions of physical sensors and devices are interconnected through the

Internet to provide many heterogeneous, complex and unstructured data. Many effort in the industry and in the research community have been focused on the storage of IoT data, in order to balance costs and performance for data maintenance and analysis. Indeed, the design of powerful storage systems can efficiently handle the requirements of big data applications and Cloud computing is expected to play a significant role in IoT paradigm. Cloud storage offers huge amount of storage and processing capabilities in a scalable way. Thus, we designed a monitoring-oriented Cloud architecture for the storage of big data, that can be exploited for the development of application and services useful in many different applications for smart environments (e.g., smart cities, homeland security, disaster prevention, etc.)

3. EXISTING SYSTEM:

This technology introduces a middle layer between the hardware and software layers in a cloudlet, allowing the hardware resources to be shared by means of VM. Re-sources (e.g., CPU, memory, network bandwidth, etc.) in a cloudlet are provisioned to these VMs. Resource provisioning in cloud computing is a well-studied area. However, the mobility in MCC introduces several challenges to maintain an acceptable Quality of Service (QoS) when provisioning cloud resources. Mobile users may move from one Access Point (AP) to another, increasing their distances between current locations and the cloudlet, where the tasks are provisioned. This increases the task-execution time. To address this issue, we propose a VM migration technique for a heterogeneous MCC system following the user's mobility pattern. That is, when a user moves from one cloudlet to another cloudlet, the resource or VM must be migrated to the cloudlet that is nearest to the user.

Disadvantage:

- VM migration methodologies do not effectively consider user mobility alongside load condition of cloudlet servers in a heterogeneous MCC system.
- GAVMM fails to minimize resource over-provisioning in the cloudlets.

4. PROPOSED SYSTEM:

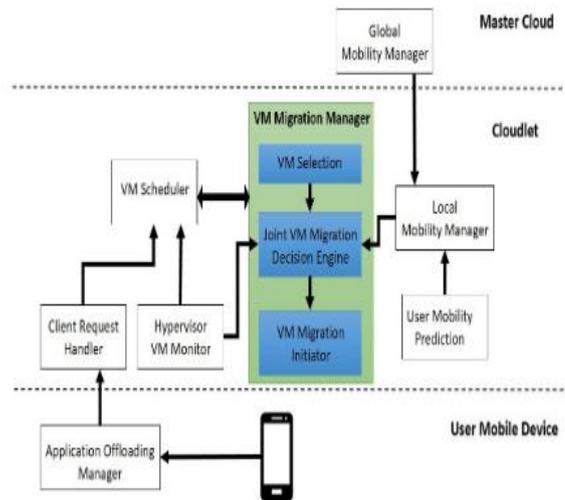
I proposed a VM migration (VMM) model based not only on user mobility but also on load of cloudlet resources. The objective is to select the optimal cloud server for a mobile VM in addition to minimizing the total number of VM migrations, reducing task-execution time. I developed an load balancing based VM migration model, in which VM are migrated to candidate cloud servers so as to maximize the total utility of the MCC system. Mobility-aware selection of cloudlets for VM provisioning in our proposed Load balancing algorithm system helps significantly to reduce service provisioning time. I introduced a joint VM migration approach to optimize both the resource utilization and task execution time,

diminishing the shortcomings of a single VM migration approach.

Advantage:

- Load balance algorithms are proposed through which load can be distributed equally and with minimum Response time.

SYSTEM MODEL



5. MODULES

USER INTERFACE AGENT (UIA):

The UIA is a type of stationary agent that is used as a bridge to interface with host computers and applications. The UIA acts as an interpreter of heterogeneous agent and applications communications. It receives the requests from UI/application to invoke internal services. The UIA is responsible for the final presentation of results by mobile agent or by diagnostic agent before passing data to the application layer.

AGENT SERVICE:

An agent service is interpreted as some kind of agent execution environment as described earlier. It provides base services which agent-based applications may utilize such as inter-agent communication. The agent API will examine the submitted code to guarantee that it conforms to the relevant protocols and does not violate security policy. Based on the identity of the agent creator, a set of credentials for the agent may also be generated at this time. These are transmitted as part of the agent, to allow other entities to identify it unambiguously. The mobile agents, which implement applications, can then be prevented from accessing system resources like the file system.

RESOURCE AGENT

Resource agent is another type of stationary agent and conventionally, resource agent operates at a higher level of trust and mediates access resources from mobile agent to host computers. Resource agents are “static” because they do not have the ability to migrate. In the proposed platform resource agent plays an important role to dynamically interface with host’s resources. It is through resource agent that mobile agent can have access to resources of the host system. The resource agent would take the place of the web sites to bridge the users to the databases.

PHYSICIAN AGENT

The physician agent is a mobile agent used by medical staff. The physician agent is a computer program that can help medical staffs to perform their tasks. The physician agent enables medical staffs to virtually monitor the conditions of patients and/or elderly in real time. In this unit, medical staffs may use their mobile devices (e.g., PDA, smart phone, etc.) to trigger physician agents as delegates for them. For activating a physician agent, it must be dispatched to a specific agent platform. The agent platform authenticates the incoming physician agent using its credentials and determines the privileges to be granted to it.

DIAGNOSTIC AGENT

Diagnostic agent in the proposed platform can be treated as a data analysis engine. It is capable of analyzing data collected from a vital sign monitor or other forms of electronic monitoring devices. The first task of diagnostic agent is to check the collected data against the patient’s personal profile that stores the criteria of abnormality for the patient, associated physician(s), history of medical treatment and other personal data.

6. CONCLUSIONS

In this project, I have proposed a mobility- and resource-aware joint virtual-machine migration model for heterogeneous mobile cloud computing systems to improve the performance of mobile Smart health care applications in a Smart City environment. Here, we address research challenges to reduce task-completion times as well as to reduce resource over-provisioning in mobile cloud computing that executes both computationally and Big Data-intensive healthcare tasks. The proposed Load balancing initiates VM migration by considering user mobility and computational load of a cloudlet. As load balance exploits users’ mobility in achieving an optimal solution, it effectively brings cloud resources closer to the user. At the same time, PRIMIO considers the load of the cloudlet to which the system wants to migrate the VM, thereby reducing total number of migrations across the entire task-execution time.

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