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CloudMoV: A Mobile Cloud-based Social TV

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Abstract

The rapidly increasing power of personal mobile devices (smart phones, tablets, etc.) is providing much richer contents and social interactions to users on the move. This trend however is throttled by the limited battery lifetime of mobile devices and unstable wireless connectivity, making the highest possible quality of service experienced by mobile users not feasible. The recent cloud computing technology, with its rich resources to compensate for the limitations of mobile devices and connections, can potentially provide an ideal platform to support the desired mobile services. Tough challenges arise on how to effectively exploit cloud resources to facilitate mobile services, especially those with stringent interaction delay requirements. In this paper, we propose the design of a Cloud-based, novel Mobile social TV system (CloudMoV). The system effectively utilizes both PaaS (Platform-as-a-Service) and IaaS (Infrastructure-as a-Service) cloud services to offer the living-room experience of video watching to a group of disparate mobile users who can interact socially while sharing the video. To guarantee good streaming quality as experienced by the mobile users with time varying wireless connectivity, we employ a surrogate for each user in the IaaS cloud for video downloading and social exchanges on behalf of the user. The surrogate performs efficient stream transcoding that matches the current connectivity quality of the mobile user. Given the battery life as a key performance bottleneck, we advocate the use of burst transmission from the surrogates to the mobile users, and carefully decide the burst size which can lead to high energy efficiency and streaming quality. Social interactions among the users, in terms of spontaneous textual exchanges, are effectively achieved by efficient designs of data storage with Big Table and dynamic handling of large volumes of concurrent messages in a typical PaaS cloud. These various designs for flexible transcoding capabilities, battery efficiency of mobile devices and spontaneous social interactivity together

provide an ideal platform for mobile social TV services. We have implemented CloudMoV on Amazon EC2 and Google App Engine and verified its superior performance based on real world experiments.

INTRODUCTION

Media research has shown that people enjoy watching television as a part of socializing in groups. However, many constraints in daily life limit the opportunities for doing so. The Social TV project builds on the increasing integration of television and computer technology to support sociable, computer-mediated group viewing experiences. In this paper, we describe the initial results from a series of studies illustrating how people interact in front of a television set. Based on these results, we propose guidelines as well as specific features to inform the design of future "social television" prototypes.

AREA OF RESEARCH

The investigation a fascinating issue of prescribing items from internet [business] sites to clients at person to person communication locales who don't have authentic buy records, i.e., in "cool begin" circumstances. This issue cross-site frosty begin item suggestion. Albeit online item proposal has been broadly examined some time recently, most investigations just concentrate on building arrangements inside certain internet business sites and for the most part use clients' verifiable exchange records.

Objectives

Input Design is the process of converting a user-oriented description of the input into a computer-based system. This design is important to avoid errors in the data input process and show the correct direction to the management for getting correct information from the computerized system. It is achieved by creating user-friendly screens for the data entry to handle large volume of data. The goal of designing input is to make data entry easier and to be free from errors. The data entry screen is designed in such a way that all the data manipulates can be performed. It also provides record viewing facilities. When the data is entered it will check for its validity. Data can be entered with the help of screens. Appropriate messages are provided as when needed so that the user will not be in maize of instant. Thus the objective of input design is to create an input layout that is easy to follow.

Motivation

Smartphone's have exploded in popularity in recent years, becoming ever more sophisticated and capable. As a result, developers worldwide are building increasingly complex applications

that require ever increasing amounts of computational power and energy. In this paper we propose a framework that makes it simple for Developers to migrate their Smartphone applications to the cloud. Exploits the concept of Smartphone virtualization in the cloud and provides method-level computation offloading. Advancing on previous work, it focuses on the elasticity and scalability of the cloud and enhances the power of mobile cloud computing by parallelizing method execution using multiple virtual machine (VM) images. We implement and evaluate it with a range of benchmarks starting from simple micro-benchmarks to more complex applications. First, we show that the execution time and energy consumption decrease two orders of magnitude for a N-queens puzzle application and one order of magnitude for a face detection and a virus scan application. We then show that a parallelizable application can invoke multiple VMs to execute in the cloud in a seamless and on-demand manner such as to achieve greater reduction on execution time and energy consumption. We finally use a memory-hungry image combiner tool to demonstrate that applications can dynamically request VMs with more computational power in order to meet their computational requirements.

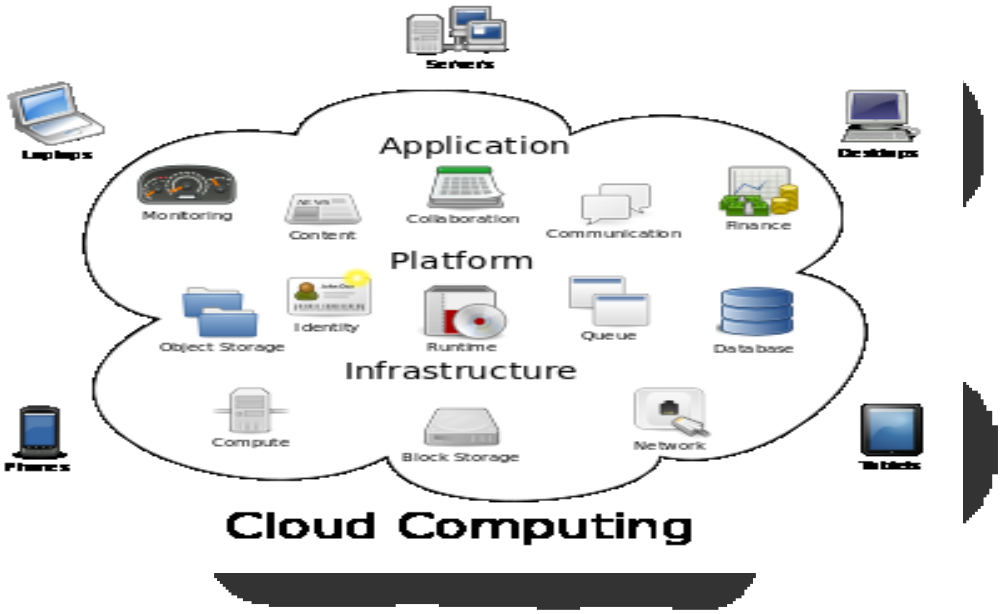
LITERATURE SURVEY

Mobile computing continuously evolve through the sustained effort of many researchers. It seamlessly augments users' cognitive abilities via compute-intensive capabilities such as speech recognition, natural language processing, etc. By thus empowering mobile users, we could transform many areas of human activity. This article discusses the technical obstacles to these transformations and proposes a new architecture for overcoming them. In this architecture, a mobile user exploits virtual machine (VM) technology to rapidly instantiate customized service software on a nearby cloudlet and then uses that service over a wireless LAN; the mobile device typically functions as a thin client with respect to the service. A cloudlet is a trusted, resource-rich computer or cluster of computers that's well-connected to the Internet and available for use by nearby mobile devices. Our strategy of leveraging transiently customized proximate infrastructure as a mobile device moves with its user through the physical world is called cloudlet-based, resource-rich, mobile computing. Crisp interactive response, which is essential for seamless augmentation of human cognition, is easily achieved in this architecture because of the cloudlet's physical proximity and one-hop network latency. Using a cloudlet also simplifies the challenge of meeting the peak bandwidth demand of multiple users

interactively generating and receiving media such as high-definition video and high-resolution images. Rapid customization of infrastructure for diverse applications emerges as a critical requirement, and our results from a proof-of-concept prototype suggest that VM technology can indeed help meet this requirement.

What is cloud computing?

Cloud computing is the use of computing resources (hardware and software) that are delivered as a service over a network (typically the Internet). The name comes from the common use of a cloud-shaped symbol as an abstraction for the complex infrastructure it contains in system diagrams. Cloud computing entrusts remote services with a user's data, software and computation. Cloud computing consists of hardware and software resources made available on the Internet as managed third-party services. These services typically provide access to advanced software applications and high-end networks of server computers.



How Cloud Computing Works

The goal of cloud computing is to apply traditional supercomputing, or high-performance computing power, normally used by military and research facilities, to perform tens of trillions of computations per second, in consumer-oriented applications such as financial portfolios, to deliver personalized information, to provide data storage or to power large, immersive computer games.The cloud computing uses networks of

large groups of servers typically running low-cost consumer PC technology with specialized connections to spread data-processing chores across them. This shared IT infrastructure contains large pools of systems that are linked together. Often, virtualization techniques are used to maximize the power of cloud computing.

Advantages

1. **Price:** Pay for only the resources used.
2. **Security**: Cloud instances are isolated in the network from other instances for improved security.
3. **Performance:** Instances can be added instantly for improved performance. Clients have access to the total resources of the Cloud's core hardware.
4. **Scalability:** Auto-deploy cloud instances when needed.
5. **Uptime:** Uses multiple servers for maximum redundancies. In case of server failure, instances can be automatically created on another server.
6. **Control:** Able to login from any location. Server snapshot and a software library lets you deploy custom instances.
7. **Traffic:** Deals with spike in traffic with quick deployment of additional instances to handle the load.

Services Models

Cloud Computing comprises three different service models, namely **Infrastructure-as-a-Service** (IaaS), **Platform-as-a-Service** (PaaS), and Software-as-a-Service (SaaS). The three service models or layer are completed by an end user layer that encapsulates the end user perspective on cloud services. The model is shown in figure below. If a cloud user accesses services on the infrastructure layer, for instance, she can run her own applications on the resources of a cloud infrastructure and remain responsible for the support, maintenance, and security of these applications herself. If she accesses a service on the application layer, these tasks are normally taken care of by the cloud service provider. Cloud computing is a colloquial expression used to describe a variety of different types of computing concepts that involve a large number of computers connected through a real-time communication network (typically the Internet).[1] Cloud computing is a jargon term [*citation needed*] without a commonly accepted unequivocal scientific or technical definition. In science, cloud computing is a synonym for distributed computing over a network and

means the ability to run a program on many connected computers at the same time.

Cloud stream Delivering high-quality streaming videos through a cloud-based svc proxy

Existing media providers such as YouTube and Hulu deliver videos by turning it into a progressive download. This can result in frequent video freezes under varying network dynamics. In this paper, we present Cloud Stream: a cloud-based video proxy that can deliver high-quality streaming videos by transcoding the original video in real time to a scalable codec which allows streaming adaptation to network dynamics. The key is a multi-level transcoding parallelization framework with two mapping options (Halls-based Mapping and Lateness-first Mapping) that optimize transcoding speed and reduce the transcoding jitters while preserving the encoded video quality. We evaluate the performance of Cloud Stream on our campus cloud tested.

Amigo TV towards a social TV experience

Amigo TV is a prototype implementation that combines broadcast television with rich communication and community support in order to leverage a rich social experience, and can been seen as a perfect example of where experience design can lead us to. Mass scale deployment urges the need for various network and application services to be deployed in service enabling platforms of operators.

Existing System

A number of mobile TV systems have sprung up in recent years, driven by both hardware and software advances in mobile devices. Some early systems bring the living room experience to small screens on the move. But they focus more on barrier clearance in order to realize the convergence of the television network and the mobile network, than exploring the demand of “social” interactions among mobile users.

Disadvantage of Existing System

Although many mobile social or media applications have emerged, truly killer ones gaining mass acceptance are still impeded by the limitations of the current mobile and wireless technologies, among which battery lifetime and unstable connection bandwidth are the most difficult ones.

Proposed System

We propose the design of a Cloud-based, novel Mobile social TV system. The system

effectively utilizes both **Platform-as-a-Service** (PaaS) and Infrastructure-as-a- Service (IaaS) cloud services to offer the living-room experience of video watching to a group of disparate mobile users who can interact socially while sharing the video. To guarantee good streaming quality as experienced by the mobile users with time varying wireless connectivity, we employ a surrogate for each user in the IaaS cloud for video downloading and social exchanges on behalf of the user.

Feasibility Study

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company. For feasibility analysis, some understanding of the major requirements for the system is essential.

Three key considerations involved in the feasibility analysis are

- ECONOMICAL FEASIBILITY
- TECHNICAL FEASIBILITY
- SOCIAL FEASIBILITY

Economical Feasibility

This study is carried out to check the economic impact that the system will have on the organization. The amount of fund that the company can pour into the research and development of the system is limited. The expenditures must be justified. Thus the developed system as well within the budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased.

Technical Feasibility

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. This will lead to high demands on the available technical resources. This will lead to high demands being placed on the client. The developed system must have a modest requirement, as only minimal or null changes are required for implementing this system.

Social Feasibility

The aspect of study is to check the level of acceptance of the system by the user. This includes the process of training the user to use the system efficiently. The user must not feel threatened by the system, instead must accept it as a necessity. The level of acceptance by the users solely depends on the methods that are

employed to educate the user about the system and to make him familiar with it. His level of confidence must be raised so that he is also able to make some constructive criticism, which is welcomed, as he is the final user of the system

Implementation Modules

1. Transcoder
2. Social Cloud
3. Messenger
4. Gateway
5. Subscribe

Transcoder

It resides in each surrogate, and is responsible for dynamically deciding how to encode the video stream from the video source in the appropriate format, dimension, and bit rate. Before delivery to the user, the video stream is further encapsulated into a proper transport stream. Each video is exported as MPEG-2 transport streams, which is the de facto standard nowadays to deliver digital video and audio streams over loss medium.

Social Cloud

Social network is a dynamic virtual organization with inherent trust relationships between friends. This dynamic virtual organization can be created since these social networks reflect real world relationships. It allows users to interact, form connections and share information with one another. This trust can be used as a foundation for information, hardware and services sharing in a Social Cloud.

Messenger

It is the client side of the social cloud, residing in each surrogate in the IaaS cloud. The Messenger periodically queries the social cloud for the social data on behalf of the mobile user and pre-processes the data into a light-weighted format (plain text files), at a much lower frequency. The plain text files are asynchronously delivered from the surrogate to the user in a traffic-friendly manner, i.e., little traffic is incurred. In the reverse direction, the messenger disseminates this user's messages (invitations and chat messages) to other users via the data store of the social cloud.

Gateway

The gateway provides authentication services for users to log in to the CloudMoV system, and stores users' credentials in a permanent table of a MySQL database it has installed. It also stores information of the pool of currently available VMs in the IaaS cloud in another in-memory

table. After a user successfully logs in to the system, a VM surrogate will be assigned from the pool to the user. The in-memory table is used to guarantee small query latencies, since the VM pool is updated frequently as the gateway reserves and destroys VM instances according to the current workload. In addition, the gateway also stores each user's friend list in a plain text file (in XML formats), which is immediately uploaded to the surrogate after it is assigned to the user.

Subscribe

In this module user can download the video. Subscribe module download video in high speed and clear video streaming. Authorized user every one download and watch the videos.

SYSTEM TESTING

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, sub-assemblies, assemblies and/or a finished product It is the process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of test. Each test type addresses a specific testing requirement.

TYPES OF TESTING

Unit Testing

Integration Testing

Functional Test

System Test

White Box Testing

Black Box Testing

CONCLUSION

This paper presents our view of what might become a trend for mobile TV, i.e., mobile social TV based on agile resource supports and rich functionalities of cloud computing services. We introduce a generic and portable mobile social TV framework, CloudMoV that makes use of both an IaaS cloud and a PaaS cloud. The framework provides efficient transcoding services for most platforms under various network conditions and supports for co-viewing experiences through timely chat exchanges among the viewing users. By employing one surrogate VM for each mobile user, we achieve ultimate scalability of the system. Through an in-depth investigation of the power states in commercial 3G cellular networks, we then propose an energy-efficient

burst transmission mechanism that can effectively increase the battery lifetime of user devices. We have implemented a realistic prototype of CloudMoV, deployed on Amazon EC2 and Google App Engine, where EC2 instances serve as the mobile users' surrogates and GAE as the social cloud to handle the large volumes of social message exchanges. We conducted carefully designed experiments on iPhone 4S platforms. The experimental results prove the superior performance of CloudMoV, in terms of transcoding efficiency, power saving, timely social interaction, and scalability. The experiments also highlight the drawbacks of the current HTTP Live Streaming protocol implementation on mobile devices [24] as compared to our proposed burst transmission mechanism which achieves a 29.1 % increase of battery lifetime. Much more, however, can be done to enhance CloudMoV to have product-level performance.

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