A Framework for Dynamic Relocation of Cloud Services

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Abstract- Cloud computing allows business customers to scale up and down their resource usage based on needs. Due to the nature of widely distributed service providers in clouds, cloud service Migration solves several problems but The problems that follow the migration of services are cloud providers are using own platforms or APIs so services have to be adapted to them and services cannot be migrated without an interruption. This paper proposes the dynamic framework, a new form of platform as a service provider that addresses these issues. This framework abstracts existing clouds, finds the optimal cloud for a service according to its requirements and provides transparency about the underlying clouds. The cloud model is expected to give decision making ability to customers where they don't have to spend a lot of time comparing different offerings and adapt their applications.

Keywords – Cloud, Computing, Services, Dynamic, Framework, Migration

I. INTRODUCTION

Cloud computing is a technology that uses the internet and central remote servers to maintain data and applications. Cloud computing allows consumers and businesses to use applications without installation and access their personal files at any computer with internet access. This technology allows for much more efficient computing by centralizing data storage, processing and bandwidth.
A simple example of cloud computing is yahoo email, Gmail, or Hotmail etc. All you need is just an internet connection and you can start sending emails. The server and email management software is all on the cloud and is totally managed by the cloud service provider. In cloud computing, the word cloud is used as a metaphor for "*the Internet*" so the phrase *cloud computing* means "a type of Internet-based computing" where different services such as servers, storage and applications are delivered to an organization's computers and devices through the Internet.
Cloud computing is a powerful and flexible software environment, which delegates the material‘s management and in which users pay as they go. The migration of enterprise applications on the cloud is increasing. Cloud computing is powered by the concept of virtualization technology. The virtual machines (VM) are hosted in servers so that user's requests are serviced in an optimal manner.

The process of moving a running virtual machine or application between different physical machines without disconnecting the client or application is referred to as live migration. System resources memory, storage, process and network resources like connectivity that are allocated to the virtual machine are transferred from the original host machine to the destination machine. Live migration is performed for achieving energy efficiency, load balancing and high availability of physical servers in cloud data center.

Cloud computing is an emerging paradigm where infrastructure, platform and software can be accessed as a service. The user accessing the service, pay for what they use. Cloud computing uses the concept of virtualization and utility computing. Virtualization enables multiple isolated and secure virtualized servers to run on a single physical server. Many virtual machines are hosted on the same physical server for optimal resource utilization thereby reducing the cost of deploying a datacenter. It also enhances the security of physical servers in data center.

Lately, cloud computing became very popular due to the numerous advantages like cost efficiency, convenience and continuous availability, good scalability and performance, etc. A rapid development of the cloud computing paradigm nowadays converges to the category of everything as a Service. A growing demand imposed by the number of new cloud providers and new forms of cloud offerings appeared. However, besides numerous advantages, the emergence of such a big amount of new providers has also negative sides. It becomes harder to compare the offerings and decide which provider is the best one for a specific demand, because of lack of unified ways to describe specific resources and services. There is a big need for standardization to guarantee interoperability and to avoid vendor lock-in. Due to the diversity of different offerings; private users and companies might have several reasons to switch providers of used cloud services. This is a problematic issue as most providers are using an own approach to do their work and do not offer that much support for migration in order to keep their customers. In general, difficulties in migration address two aspects:

- Technical: the service is built for a specific platform and it is not easy to change to another platform without an interruption of service.
- Economical: users/companies have to spend a lot of time comparing different offerings, to register themselves for every cloud interesting for usage.

Need for migration exits as users want to save money and get better quality of service. This paper proposes a generic framework that consists of pluggable modules and enables easy and dynamical migration of services between different environments, handles the parameters of services and clouds and reacts to their changes. It finds the optimal cloud for a service and migrates it automatically. If multiple services are included, the framework optimizes the distribution of services to the clouds. Discounts are used and services share resources to achieve better pricing.

The Paper has been organized as follows:
Section-2 “Related Work in Cloud service Migration" explains about the requirements of such a network, section-3 "system model" describes about the Architecture of the proposed method, section-4 "Experimental Results" we have discussed about Performance Metrics and the prototype measurement of proposed method

II. RELATED WORK IN CLOUD SERVICE MIGRATION

Current Weather in the Meta Cloud:

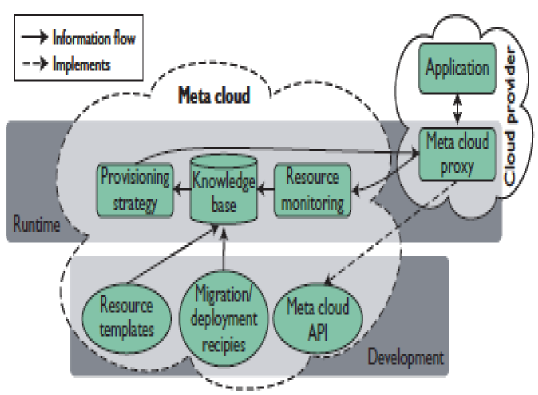

Fig1: Conceptual meta cloud overview.

In the cloud to achieve service migration. The computation resources in the cloud need to be able to support execution of dynamically migrated services. We develop a virtual machine environment and corresponding infrastructure to provide such support. It is also essential to have a strong decision support to help determine whether to migrate some services and where to place them. The consideration involves the service migration cost, consistency maintenance cost, and the communication cost gains due to migration. We develop a cost model to correctly capture these costs and help determine the tradeoffs in service selection and migration in clouds. Then, we use a dynamic platform which helps customers to search the decision space and make service selection and migration decisions based on the cost tradeoffs.

First, standardized programming APIs must enable developers to create cloud-neutral applications that aren't hardwired to any single provider or cloud service.Cloud provider abstraction libraries such as libcloud, fog, and jclouds provide unified APIs for accessing different vendors' cloud products. Using these libraries, developers are relieved of technological vendor locking because they can switch cloud providers for their applications with relatively low overhead. As a second ingredient, the metacloud uses resource templates to define concrete features that the application requires from the cloud.

In addition to resource templates, the automated formation and provisioning of cloud applications also depends on sophisticated features to actually deploy and install applications automatically. Predictable and controlled application deployment is a central issue for cost-effective and efficient deployments in the cloud, so for in the meta cloud. Several application provisioning solutions exist, enabling developers and administrators to specify deployment artifacts and dependencies to allow for repeatable and managed resource provisioning.

Notable examples include Opscode Chef Puppet, and juju. At runtime, an important aspect of the metacloud is application monitoring, which enables the metacloud to decide whether it's necessary to provision new instances of the application or migrate parts of it.

III. SYSTEM MODEL

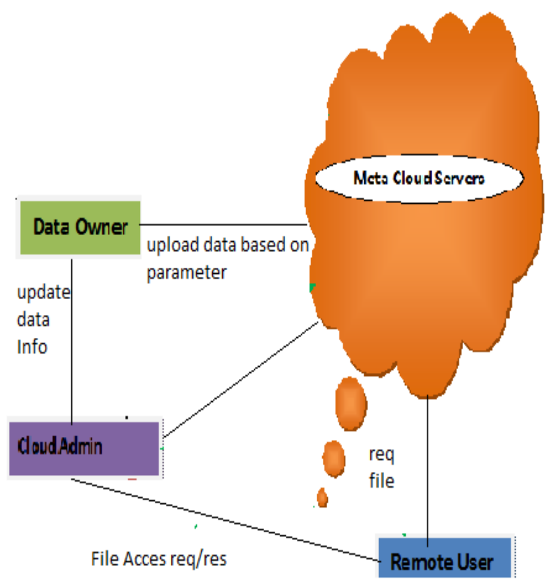

Fig2: System Architecture

Figure 1 illustrates a descriptive network architecture for cloud storage. It relies on the following entities for the good management of client data:
Cloud Service Provider (CSP): a CSP has significant resources to govern distributed cloud storage servers and to manage its database servers. It also provides virtual infrastructure to host application services. These services can be used by the client to manage his data stored in the cloud servers.
Client: a client makes use of provider's resources to store, retrieve and share data with multiple users. A client can be either an individual or an enterprise.

Users: the users are able to access the content stored in the cloud, depending on their access rights which are authorizations granted by the client, like the rights to read, write or re-store the modified data in the cloud. These access rights serve to specify several groups of users. Each group is characterized by an identifier IDG and a set of access rights.

IV. EXPERIMENTAL RESULTS

The dynamic framework is implemented in JAVA/J2ME, Swing is used to implement the graphical user interfaces, HTML,JSP,Jquery is used for Front End, Database used is Mysql And Technology/Framework: spring 3.1 or Hibenate 1.0.

Two types of benchmarks are performed to evaluate the proposed concept and the implemented system. The first type measures the overhead of migrations and showed that the system is capable to perform migrations without completely interrupting the service. The second benchmark is a cost optimization for the clouds and for the services. It represents the basic idea of the optimization. A set of 2 clouds, several users and services with different parameters are used. The target for the choice of parameter values was to offer clouds and services with each combination of parameters supported by the prototype. It is assumed that a cloud with each combination exists and that each cloud offers the optimal conditions for at least one service. The used parameters for the clouds are costs per instance, validity per instance, memory threshold, File locking, and security based on Attackers details. As it is assumed that there is one service for each of the clouds, the prices of the services are adjusted to achieve that. Five scenarios are used to evaluate the optimization. With service optimization according to their actual parameters and with the optimization of the used cloud instances.

Migrations are only profitable for services in following conditions:

• *cost considerations.* Cost per VM is less in one cloud than another
• *Security*. The Attacker details shows which cloud would be more secured
• *File Locking*. Cloud server should allow data owner to give access permissions to end users on files uploaded
•*Memory Threshold:* When threshold is reached and data owner wish to migrate
• *Validity:* When validity of the cloud resource expired and data owner wish to migrate

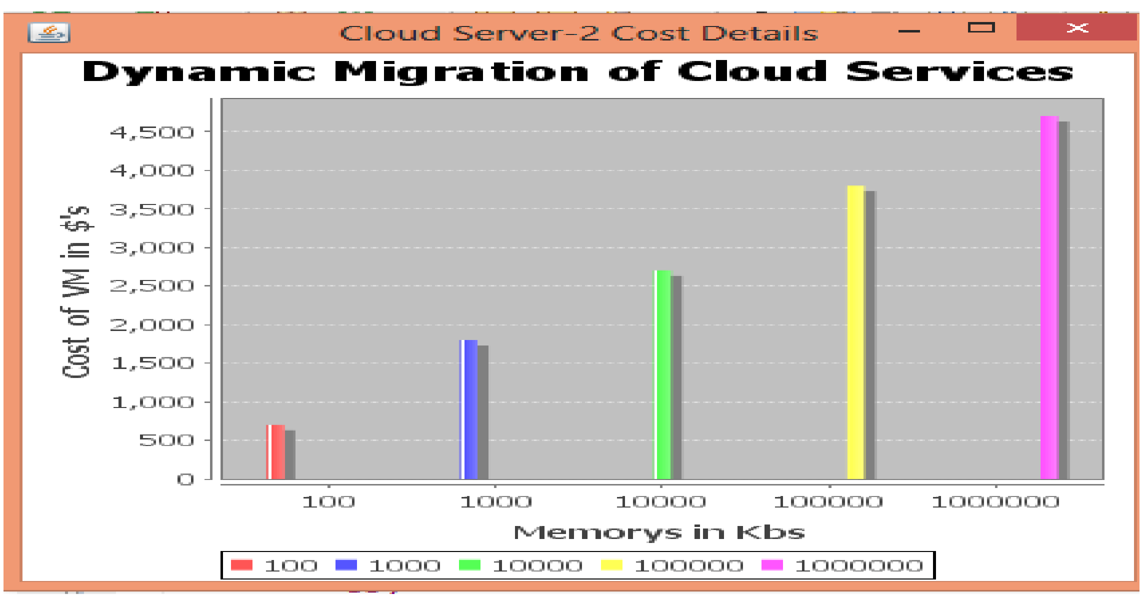

Fig3: cost details of VM purchase

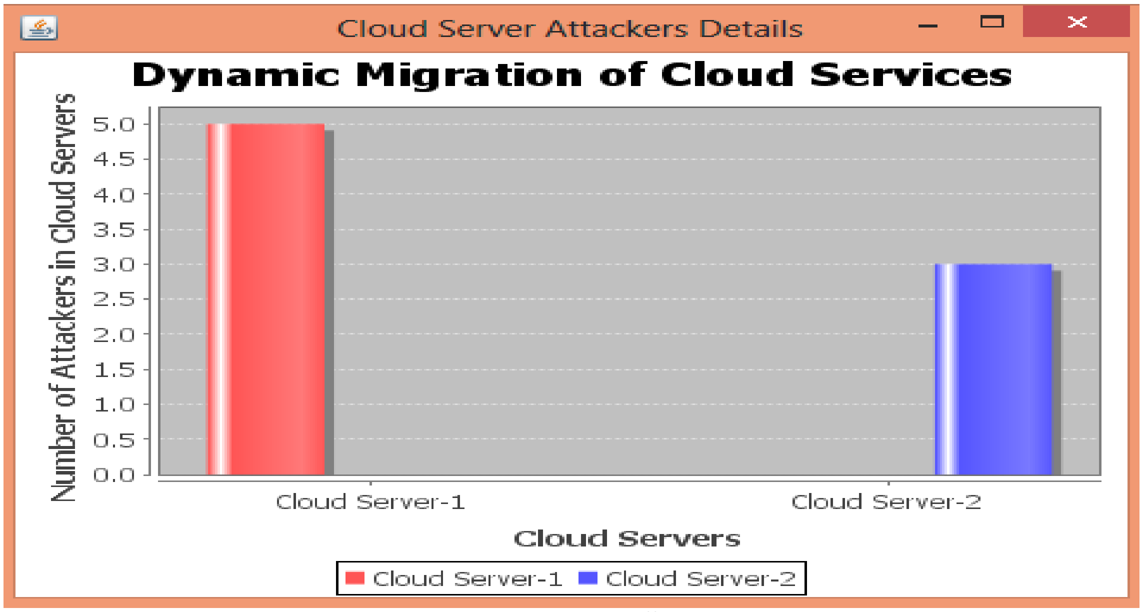

Fig4: Attacker Details on 2 different clouds

V. CONCLUSION

The proposed generic framework that consists of pluggable modules and enables easy and dynamical migration of services between different environments, handles the parameters of services and clouds and reacts to their changes. It finds the optimal cloud for a service and migrates it automatically. If multiple services are included, the framework optimizes the distribution of services to the clouds. Discounts are used and services share resources to achieve better pricing.

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