ARTICLE

SECURE DATA STORAGE AND SHARING IN CLOUD: VM SCHEDULING

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ABSTRACT

Performance of cloud storage is comparatively high compare to other storage devices in terms of consistency, efficiency improvement and execution time. Based on workflow application VM resource type is chosen dynamically in the cloud. A pure isolation hypervisor simply divides a machine into partitions, and permits sharing of resources between the partitions, a load balancing scheme is based on dynamic resource allocation policy for virtual machine cluster, running under para virtualization mode on a cluster of physical machines (PM) in shared storage architecture. In this paper we proposed a mechanism that makes possible for the data owners to enforcement their security policies to ensure data confidentiality and integrity, which enable trusted data sharing through untrusted cloud providers. The computation time for PSO technique is calculated and is compared with various scheduling algorithm such as Round Robin (RR), Random, Heros, Green, Randens and Bestdens.

INTRODUCTION

Workflow applications evolved as an eye-catching paradigm for programming in distributed computing, it is widely used in bioinformatics, scientific computing and physics [1]. Workflow application emerged as a huge data application, due to raising problems of scientific computing systems, leading to vast infrastructures for executing the application within a stipulated time [2]. Thus cloud computing infrastructures pays a special need [3], distributed computing focusing on efficient and cost-effective system operation. Cloud infrastructure is provided on the basis of pay-per-use, facilitating dynamic scaling for large workflow applications. Cloud storage performs well compare to other storage in terms of consistency, efficiency improvement and execution time [4]. Based on workflow application VM resources and its type are chosen dynamically in the cloud. Even though huge amount of resources are available in the cloud, users need to focus on economical cost and its policy [5]. Cost is calculated using time unit model and not on the basis of usage of resources [6, 7]. Generally task of all real world applications differs a lot, exhibiting heterogeneous behaviors (Memory-intensive, data-intensive and computation-intensive) leading to choose an unique VM types [8,9] example E2C of Amazon delivers various instance of VM, such as computing optimized, storage optimized and memory optimized thereby rendering various VM types [10]. Security arise a major concern for various application on cluster [11, 12, 13] heterogeneous distributed computing systems [14, 15], grid computing [16] and cloud computing [17]. International Data Corporation states that cloud security arise as a major concern [18]. This is mainly due to huge amount of user is allowed to execute various untested third party applications, thus applications and users need to be scrutinized [19]. Still many cloud computing environments yet to apply security to tackle the security threats [20]. Hence there is an emerging need to implement security and privacy in cloud data center.

There are very few studies regarding the wearing and laundering of lab coats in hospitals and medical practice. This study highlights the role of lab coats acting as vector for transmitting health care infections to the patients and the common areas where contamination occurs.

RELATED WORKS

Task scheduling is a basic functional unit of cloud architecture from security aspect, it consider various security requirements mainly due to sensitivity of the data such as medical image analysis, image storage and stock photo service. Very high security level is needed in medical image analysis, where as in traditional scheduling consider only makespan and minimizing energy consumption for optimized load balancing [21, 22]. As a result complexity of problems increases gradually; a model encompassing various approaches is stated for security based scheduling [23]. Cloud security services is grouped into three types, application service in the application layer, secure process enabling service (infrastructure layer) and secure physical service (physical layer) based on tools ensuring security (security as a service) [24].

Hypervisor which reduce the overhead of virtualization and provide security: There are two classes of hypervisors that must be considered when examining the technical implications of MLS for hypervisors; they are pure isolation hypervisors and sharing hypervisors. A pure isolation hypervisor simply divides a machine into partitions and permits no sharing of resources between the partitions (other than CPU time and primary memory). Implementing a pure isolation hypervisor is very easy, because the only security policy to be enforced is isolation. IBM's EAL5- evaluated PR/SM system [25] for the z/Series mainframes and it is a good example of a pure isolation hypervisor. The idea of a secure sharing hypervisor originated with Madnick and Donovan [26]. The best examples of such secure sharing hypervisors are KVM/370 [27] and Digital's A1-secure VMM [28, 29, 30]. The most critical feature of a secure sharing hypervisor is a secure shared file store11. The secure shared file store allows a high level partition to have read-only

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THE IIOAB JOURNAL

COMPUTER SCIENCE

186

access to low-level data, while a low-level partition gets read-write access to the same data. This avoids the clumsy one-way networking approaches only a single copy of the data is required and updates are visible immediately to all partitions [31, 32, 33].

Integrity Using a Virtual Machine Verifier to assure the integrity during the Virtual Machine Mobility: Distributed computing architectures, such as grid and cloud computing, depend on the high integrity execution of each system in the computation [34, 35]. While integrity measurement enables systems to generate proofs of their integrity to remote parties, current integrity measurement approaches are insufficient to prove runtime integrity for systems in these architectures. Integrity measurement approaches that are flexible enough have an incomplete view of runtime integrity, possibly leading to false integrity claims and approaches that provide comprehensive integrity is used only for computing environments that is too restrictive. Proposed architecture is used to build comprehensive runtime integrity proofs for general purpose systems in distributed computing architectures [36, 37]. In this architecture, they strive for classical integrity, using an approximation of the Clark-Wilson integrity model as our target. Key for building such integrity proofs is a carefully crafted host system whose long-term integrity is justified easily using current techniques and few new component called VM verifier, which comprehensively enforces our integrity target on VMs. Building a prototype based on the Xen virtual machine system for SELinux VMs and to find the distributed compilation is implemented, thereby providing accurate proofs of our integrity target with less than 4% overhead [30].

PROPOSED WORK

Towards secure data storage and sharing in the cloud: End-users of the cloud store their data in the provider's infrastructure; a critical concern is the security and privacy of these data. End-users want to know where their data is stored and who has control of the data in addition to the owners. They also want to be protected against illegal access to the data by the cloud provider, or other third parties. Secure access and storage of data in the cloud is addressed through the following tasks.

Data leakage prevention and privacy with 3rd party service providers: Shifting data storage to off-premises providers has two consequences: First, data owners have only limited control over the data stored in the cloud. Second, cloud providers have excessive privileges, giving them extensive control over the cloud user's data. Combining, this leads to a low level of trust between the end-user and the cloud provider with respect to keeping and sharing business critical data in the cloud. Mechanisms that make it possible for the data owners to enforcement their security policies to ensure data confidentiality and integrity, mechanisms that enable trusted data sharing through untrusted cloud providers.

Information source authentication: Algorithms that guarantee the authenticity of data stored in the cloud. This provide authentication and trust in the acquired information to avoid situations where the user's data may be altered without the owner's consent.

Methods to enable free inter cloud data movement: End-users buy services offered by the cloud providers without knowing where the cloud resources are located. The location might be beyond the borders of a legislative entity and can cause problems when disputes happen, which might be beyond the control of cloud provider. Furthermore, entrusting significant amounts of data to a cloud provider creates a risk of data lock-in. Technical solutions that ease the implementation of free inter- cloud data movement and a policy specification to standardize that process between providers.

Policies for data retention: Data retention is defined as storing recorded data for a period of time that is longer than the time necessary to perform the tasks; this remains the reason for recording the data. E.g. Amazon stores the list of all previous purchases for each individual even though it is not necessary for practical or legal reasons (order completion, accounting etc.). Currently, data retention is usually regulated in the terms of a service agreement between the provider and the user. Due to the complexity and frequent changes of such agreements they are usually not read by the user before they are accepted, developed policies for data retention and technical tools for enforcing these policies.

End results and significance: The security solutions increase the trust between cloud customers and cloud providers, thereby increasing the security of the cloud services and infrastructure. Moreover, sensitive data can be securely stored, shared and processed in the cloud. This allows businesses to reap the full benefits of the cloud, and a business critical decision is made with all relevant data available.

PSO VM scheduling algorithm is used for optimal scheduling not only focusing on makespan and energy efficient scheduling but also on the security and privacy principles. The number of servers is given as input keeping the fixed number of user and specific topology. The first step starts with the initialization of server, user, topology and data center components. The second step is setting of parameters such as power models, core switch and aggregate switch. The execution of task is taken place using PSO scheduling algorithm and with other scheduling algorithm the performance of proposed scheduling algorithm is compared. The computation time and energy is calculated.

187

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PSO_VMscheduling_Algorithm
Input: No. of servers, topology, user.
Output: Energy, computation time, memory.
Step 1: Initialization
        Server, topology, user, data center
components.
Step 2: Parameters Setting
        Non-linear power model, core switch,
        aggregation switch, task.
Step 3: Execution
        Scheduler
                PSO, Round Robin, Random,
Heros,
                RandDENS, BestDENS
        Topology
                Three-tier debug
        Energy model
                eDVFS, DNS.
Step 4: Report
                Data center load
                Individual server load
                Individual VM load
                Load of individual links
Step 5: Display
                Total energy consumed
                Energy of servers
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EXPERIMENTAL EVALUATION AND ANALYSIS

The experiment is carried out using the green cloud simulation tool, the input is given as number of server, for a given fixed number of user and topology of the network, the computation time for PSO technique is calculated and is compared with various scheduling algorithm such as Round Robin (RR), Random, Heros, Green, Randens and Bestdens. It is clear that computation time for green scheduling is minimum compared to the all other scheduling algorithm at minimum number of server (tasks), whereas as the number of server increases PSO really out performed well. The [Table 1] shows the computation time for various scheduling algorithm. [Fig. 1] show the comparison of the computation time for various scheduling algorithm and thus PSO really out performed well, underlying below the all scheduling algorithm with minimum computation time.

Table 1: Computation time comparison of various scheduling algorithm

Sl. No.	Server	RR	Random	Heros	Green	Randens	Bestdens	PSO
1	30	0.5	0.41	1	0.36	0.81	0.89	0.42
2	60	1	1	2	1	1	2	1
3	90	2	2	4	2	2	3	2
4	120	3	3	7	4	3	5	3
5	150	4	4	10	5	4	8	4
6	180	4.5	5	13	6	5	10	4.4
7	210	5	5.7	17	8	6	13	5
8	240	6	6	22	9	8	16	6
9	270	7	7	28	11	9	20	7
10	300	8	9	35	13	10	23	8
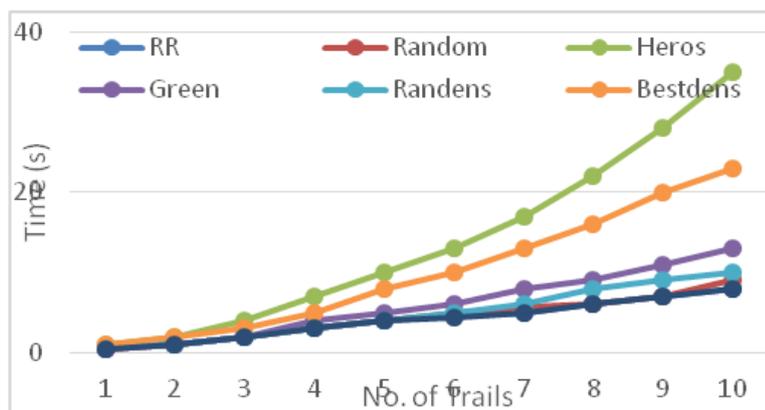
Fig. 1: comparison of scheduling algorithm.

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CONCLUSION

Cloud infrastructure is provided on the basis of pay-per-use, facilitating dynamic scaling for large workflow applications. Secure access and storage of data in the cloud is addressed by Data leakage prevention and privacy with 3rd party service providers, Information source authentication, various methods to enable free inter cloud data movement, Policies for data retention and End results significance. The computation time for PSO technique is calculated and is compared with various scheduling algorithm, green scheduling has minimum computation time compared to the all other scheduling algorithm with minimum number of server (tasks), whereas as the number of server increases PSO really out performed well.

CONFLICT OF INTEREST
There is no conflict of interest.

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189

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