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Load Balancing and Task Scheduling in Multi-Cloud System

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ABSTRACT: Cloud computing enables a large range of users to access scattered, scalable, virtualized hardware and/or software infrastructure over the Internet. Multi-cloud is a methodology to allocate workload across many computers, or other resources over the network links to achieve optimal resource utilization, make the most of throughput, minimum response time, and avoid overload. It presents a load balancing Task Scheduling algorithms or technique in cloud computing. Efficient task scheduling mechanism should meet users' requirements and improve the resource utilization, so as to enhance the overall performance of the cloud computing environment. In order to solve this problem, considering the new characteristics of cloud computing and original adaptive genetic algorithm, a new scheduling algorithm based on double-fitness adaptive algorithm-job spanning time and load balancing genetic algorithm is established.

KEYWORDS: Cloud, Multi-cloud, load balance, task schedule, genetic algorithms

I. INTRODUCTION

Cloud computing offers the dynamic scalable resources provisioned as a service over the Internet. The third party, on-demand, self-service, pay-peruse, and seamlessly scalable computing resources and services offered by the cloud paradigm promise to reduce capital as well as operational expenditures for hardware and software. Software, storage data and infrastructure are going toshared under the cloud environment. Cloud computing provides many benefits in terms of low cost and accessibility of data. Cloud provider manages data values from the data owners. Risks of service availability failure and the possibility of malicious insiders problems are raised in the single cloud. Multi-cloud environment control several clouds infrastructure and avoids dependency on any one individual cloud. Multi-cloud resource sharing scheme uses data and application partitioning mechanism. Four types of architectures are used to distributing resources to multiple cloud providers. They are Replication of applications, Partition of application System, Partition of application logic into fragments and Partition of application data into fragments. Replication of applications allows receiving multiple results from one operation performed in distinct clouds. Partition of application System into tiers allows separating the logic from the data. Partition of application logic into fragments allows distributing the application logic into distinct clouds. Partition of application data into fragments allows distributing fine-grained fragments of the data to distinct clouds. Data security and DDOS attack handling operation are managed by centralized or distributed manner in the cloud. Service and data management architectures are combined to provide a complete solution for security requirements. Multiparty communication based security system is used to improve the security over many different clouds. Integrity is provided for data and service components sharing the environment. An integrated intrusion detection system is proposed to handle malicious attacks. one idea for reducing the risk for data and applications in a public cloud is the simultaneous usage of multiple clouds. Several approaches employing this paradigm have been proposed recently. They differ in the partitioning and distribution patterns, technologies, cryptographic methods, and targeted scenarios as well as security levels.

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II. SYSTEM ARCHITECTURE

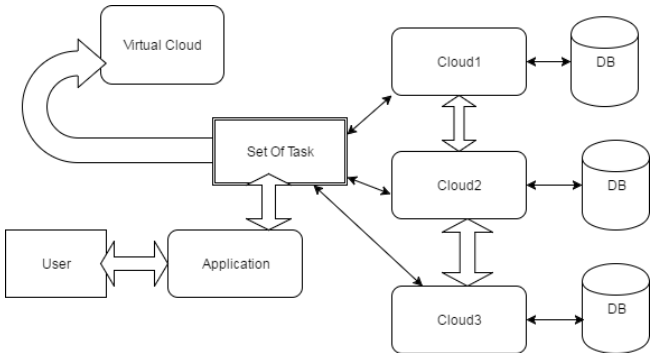

Fig.: 1 Architecture of Multi-cloud System

The distributed network may follow different topologies. The tasks are distributed over the whole network. One topological network connects with the other network through a gate-way. One of the physical topologies forming a cloud is shown in the diagram.This distributed network is a cloud, because some nodes are remote clients, some of them are Thin and some are Thick clients. Some of them are treated as masters and some are treated as slaves. There are one or more datacenters distributed among the various nodes, which keeps track of various computational details. Our aim is to apply the Divisible Load Scheduling Theory (DLT) proposed in for the clouds of different sizes and analyze different performance parameters for different algorithms under DLT and compare them.

III. IMPLEMENTATION

We have elected following algorithms for implementing the proposed system:

1.DES Algorithm:

- The Data Encryption Standard (DES) is a symmetric-key block cipher published by the National Institute of Standards and Technology (NIST).
- DES is an implementation of a Feistel Cipher. It uses 16 round Feistel structure. The block size is 64-bit. Though, key length is 64-bit, DES has an effective key length of 56 bits, since 8 of the 64 bits of the key are not used by the encryption algorithm (function as check bits only). General Structure of DES is depicted in the following illustration –

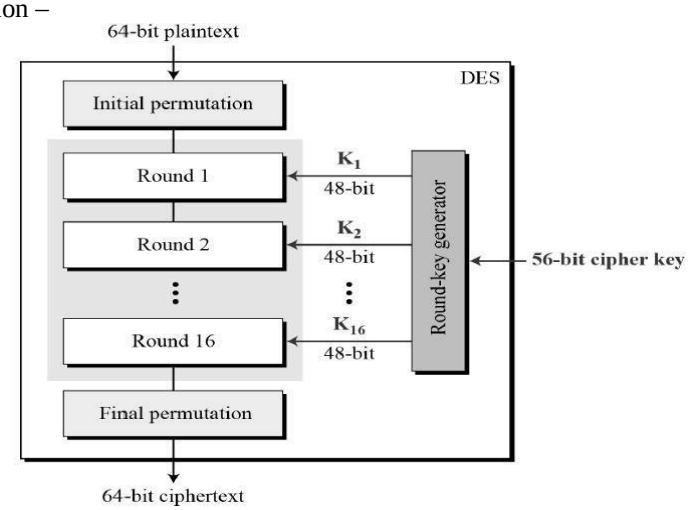

Fig. 2 : DES Algorithm

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Since DES is based on the Feistel Cipher, all that is required to specify DES is −

- Round function
- Key schedule
- Any additional processing − Initial and final permutation

Initial and Final Permutation

The initial and final permutations are straight Permutation boxes (P-boxes) that are inverses of each other. They have no cryptography significance in DES. The initial and final permutations are shown as follows

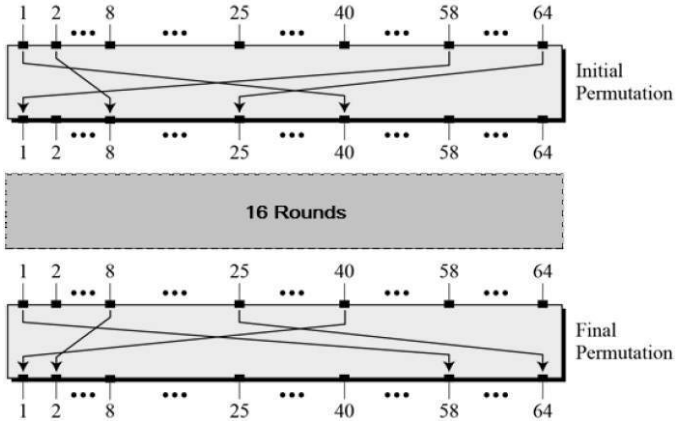

Fig. 3: Initial and Final Permutation

Algorithm:

1. Create a Key from a given byte array for a given algorithm.
2. Get an instance of Cipher class for a given algorithm transformation. See document of the Cipher class for more information regarding supported algorithms and transformations.
3. Initialize the Cipher with an appropriate mode (encrypt or decrypt) and the given Key.
4. Invoke doFinal(input_bytes) method of the Cipher class to perform encryption or decryption on the input_bytes**,** which returns an encrypted or decrypted byte array.
5. Read an input file to a byte array and write the encrypted/decrypted byte array to an output file accordingly.

2.SHA Algorithm :

Algorithm to embed text message:

Step 1: Read the text message which is to be hidden in the cover image.

Step 2: Convert text message in binary.

Step 3: Calculate LSB of each pixels of cover image.

Step 4: Replace LSB of cover image with each bit of secret message one by one.

Step 5: Show decrypt text.

Algorithm to retrieve text message:

Step 1: Read the Encrypt text.

Step 2: Calculate LSB of each text.

Step 3: Retrieve bits and convert each 8 bit into character.

3. Scheduling Algorithm:

1. CPU scheduler picks the process from the circular/ready queue, set a timer to interrupt it after 1 time slice / quantum and dispatches it.
2. If process has burst time less than 1 time slice/quantum.

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3. Process will leave the CPU after the completion.
4. CPU will proceed with the next process in the ready queue / circular queue.
5. Else process has burst time longer than 1 time slice/quantum
6. Timer will be stopped. It cause interruption to the OS.
7. Executed process is then placed at the tail of the circular / ready queue by applying the context switch.
8. CPU scheduler then proceeds by selecting the next process in the ready queue.

IV. CONCLUSION

Now-a-days, clouds computing a most effective technique for data storage are used. This technology is accepted and used, worldwide. We proposed a security system which provides a security to data store on a cloud in effective way. An important usability and security goal is data on a cloud is not secure as it can be easily hacked. So it is difficult if we store a data in encrypted format and thus it decreases possibility that any other can access data. As an example we designed this system. In our system, we provide authentication that services of our system can be access only for registered user. Our Load balancing algorithm can effectively balance data among different cloud servers and schedule the task according to request.

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