Optimized OEVMM With BFO And Prioritized Energy Efficient Vm Migration In Cloud Environment

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Abstract - In general, VMM is used in balancing the load, power reduction, dynamic change, and improved consistency. Live migration is essential feature of virtualized technology. Virtualization operates numerous virtual machines on unique bodily machine. VM is s/w element that is obstruction of the fundamental h/w presented by virtualization technology. VM is managed in an efficient way through the accessible approach. In existing research, a Coalitional Game Approach (CGA) for optimization of the power efficiency by consolidating VM in different cloud data centers. In proposed work, the two modules include the module and sub-module of the virtual machine migration. Initially, starting the module by using the load of the initial need of the simulation procedure and generate the surrounding atmosphere for performing the simulation. The computation procedures are maintained with the analysis of the load module that is accountable for the analysis of the VM and find the overload. However, the VM is validated through numerous parameters to search the load of the network.Generally, an optimum host is based on different parameters and processed situation through optimization procedure. Optimization of different resources helped to enhance the efficiency of the module. And, Optimization in virtualization is the process of storing server and work on demand computing. VM migrates an optimum host and compute the parameters, namely time and energy saving.

Keywords- VMM (Virtual Migration Machine), CGA, BFOA optimization algorithm and LVMM (Live Virtual Machine Migration).

I. INTRODUCTION

Cloud Computing is the new method that includes the resource outsource with the unlimited and consistent resource scalability. The present computing models have the perception of the structural design, developed method, and establishment of the S/W. The cloud computing has been used in the various applications that includes IBM, Microsoft, Google, and Amazon and so forth that provides services to the clients [1]. The network and utility computing inherited various features.

Virtualization is a procedure that empowers a few working frameworks to run all, while on a solitary physical machine [2]. It has become a center viewpoint in present day servers and server farms because of a few preferences, for example, adaptable and proficient sharing of assets, adaptation to internal failure, movability, and cost productivity. In a virtualized situation, Virtual Machines (VM) acting like genuine physical machines can run in equal and in separation from one another but then having the equivalent physical assets. It is the procedure of operating VM of the computer network in layer distant from real h/w. Commonly, it is related to the operating numerous operating system (OS) on a computer scheme concurrently. Such services working on VM and it work as dedicated device where the OS, libraries and other applications are specific to the virtualized scheme and not connected to the host system.A low-level middleware called a hypervisor abstracts these VMs from the physical equipment and decides the selective utilization of assets by each VM [3].

In the proposed model has implemented (EVMM+BFOA) Hybrid optimization algorithm. It has an enhanced version of the Virtual Machine Migration method. The main advantages have defined as: It permits various VM on the maximum capability server instead of the smaller servers running on the same machine. In addition, it is less costly and, decreases the requirement of the physical structure.

The energy efficiency has been maximized by the optimal migration of the VM and enhancing the resource usage rate. The huge amount of the heterogeneous [4] cloud hops are sustained the scalability by this method. The method tried to migrate the maximum data load of VM from the normal node that satisfied fewer criteria for the energy usage and other normal hops that consumes minimum energy [5]. This algorithm measured the load of the server, the amount of the virtual machine, hit count value, and other essential features for the selection of the migration of the virtual machine. The target server, where complete VM is selected for the migration, so that the specific server is disconnected for saving the energy.

II. RELATED WORK

The methods are based on neural networks, live virtual machine migration, coalitional game theory model. Moreover, the used parameters are accuracy, precision, recall, and so forth. Besides , the problems faced in research along with advantages and applications are also given in the related review.

Xiao, X et al., 2019 [6] proposed research on the new combine and split based coalitional game theory model for consolidation of VM in different clouds. They planned the initial segmenting the PM into various sets based on workload phase and then employed coalitional game dependent VM consolidation approach in the selection of the member from the sets to create efficient coalitions. However, VMM between coalitions stage to increase the

offer for coalition with maximum efficiency. Simulation outcomes showed that clear approach was suggested to improve the performance that performed better the previous method in term of energy saving and acquire a fair amount of load balance. **Gonçalves, D et al., 2018 [7]** developed research on the pro-active VMM algorithm to recognize the group of the applicant cloudless to get virtual machine operators. For the enhancement of the maintenance of the computing sources used by mobility operators interconnected to fog users, this research planed a virtual machine storage and migration selection method that depends on the mobile forecast. Simulation outcomes had demonstrated that the motion of Virtual machine to fog hop in the forward direction of the operator of the route by using the planned mode that reduce about 50% amount of the migration required by the operator. The fog structure presents a sum of latency of about 15 millisec for the services of the operators and planned model presented the minimum latency compared to the greedy algorithm for the VMM storage issue. **Daradkeh, T et al., 2016 [8]** developed a pre-copy live VM migration through dispersed shared memory calculation method. The arrangement was constructed through the binary calculation hops to build the environmental application structure mainly virtualized structured that the mutual server and the DSM and high performance computed clusters. The tradition DSM background was dependent on the minimum latency storage updating Grappa. HPC cluster along with OPENMPI and MPI public library provides parallel and auto parallel load by the usage of CPU calculation hops. The DSM permits the cluster CPU for accessing the similar storage -pages those results in minimum storage information that depends on the local attributes updating, that decreases the quantity of minimum information transmitted through the system. This method received a better performance of the VMM parameters. The downtime was decreased by 50% in the indolent load of the work of the windows VM and 66.6% of the data at the time of the Ubuntu Linux lazy workload. The method did not decrease the downtime and the average amount of the information forwarded, but it may not degrade other parameters such as average migration time and service performance level. **Noshy, M et al., 2018 [9]** proposed research on the improved appreciation of the live-migration (LM) of the VM and the major models. It concentrated on the surveyed optimization methods concerned for the establishment of the live VMM in accordance to the storage migration. It audits, examines, breaks down, and looks at these methods to understand their enhancement and their difficulties. This work additionally features the open research gives that require further examination to enhance the procedure of live movement of virtual machines. **Kortas, N. et al., 2019 [10]**focused on the influence of various system structural designs and virtualization on the method to decrease the power usage by VMM. They announced the simulated situation for the power aware employed green cloud simulation. The green cloud simulation was considered to identify the data of the used power of the information center elements like as VM, servers and connections. Simulation outcome provided the debug and a maximum speed structure design that showed the rate of every network employing the energy maintenance model by usage of data network service through voltage scaling and dynamic closed models. **Zhou, X. et al., 2019[11]** employed a diverse heuristic method to optimize the binary parameters on the diverse stage maintenance method below different cloud situations. Initially, they detected if the bodily hop was regularly overloaded, they presented an empirical forecasting approach, that expects the further group stage of the host in statistical usage of historic- information of the host. In addition, they developed a weigh priority VM selection approach . For every VM stored on the overloaded host, they weigh various usage influences and compute the re-location priority. Finally, they simulate the planned model and, compared the approach with the current overloaded host detection approaches along with various selection strategies below various workloads.

III. RESEARCH METHODOLOGY

In this section, the main motive of the research work is described as point wise.

To study and analysis the various VMM methods, advantages and disadvantages. It develops the OEVMM with enhanced algorithm with page prioritization [12] in Virtual Migration. It evaluates the performance metrics and compared it.

The following steps will be performed to complete this research work:

Step I: The proposed flow chart shows the modules and sub-modules of the virtual machine migration process. Here the start module used to load the initial requirements of the simulation process and create an environment to perform simulation.

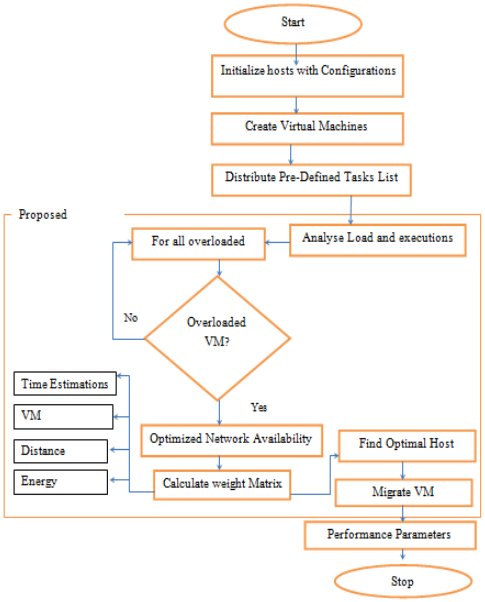

Fig 1. Research Model Flow Chart

Step II: Once the execution modules loaded into the environment, the second step of the flow makes the hosts and virtual machines. The hosts and virtual machines are used to simulate tasks and find the performance of the proposed architecture in heavy load.
Step III: After successful deployment of the PMs and the virtual machines, the pre-defined task list is used to distribute on the network.
Step IV: The execution process is managed by the load analysis module, which is responsible for the analysis of virtual machines and find the overloaded VMs. The overloaded VMs are validated via various parameters to find the load on the network.
Step V: The optimized process-handling module provides optimal migration on PMs. The optimal hosts are based on various parameters and condition, processed by the optimization process. The VMs migrate on the optimal hosts and evaluate various parameters like time, energy saving etc.

IV. RESULT ANALYSIS

This section, described the simulation tool with MATLAB. The research, analysis used the GUIDE framework and proposed methods with BFOA (Bacterial Foragining Optimization Algorithm) and EA-VMM (Energy Aware Virtual Machine Migration) method. The proposed method has improved the performance of the VM system and, reduces the energy consumption. After that, research parameters have compared with existing EA-VMM (Energy aware Virtual Machine Migration) parameters.

A. Mathematical Expression

This section includes the parameters used in the proposed research. The parameters are time consumed and energy saved in the proposed work.

Time Consuming : It is defined as the time consumption means extract the time, meaning the time required for obtaining the feature extraction and total_time for complete computation taken.

$$\text{Time consumption} = \frac{\text{Exact Time}}{\text{Complete time for Feature Extraction}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\text{(i)}$$

Energy Saving: It is defined as the ratio of the difference between the energy efficiencies with the product of the power value.

$$E = P\left(\frac{1}{\varepsilon_1} - \frac{1}{\varepsilon_2}\right) \quad \ldots\ldots\ldots\ldots\ldots\ldots\text{(ii)}$$

In equation (ii), ε_1 and ε_2 is the energy efficiencies, P is the power value and E is energy saving.

B. Research Parameters in EVMM

The below fig 2 shows the migration time is the overall time consumption of the system to migrate a virtual machine from one to another PM. The process will be high time consuming, if the configuration and size of the virtual machine to become larger. Here in the figure 2 various size of virtual machines and their migration time is compared. The larger VM takes more time to migrate as compared to the smaller one.

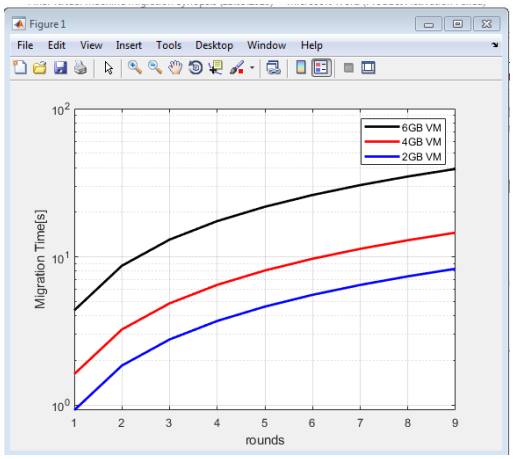

Fig 2. Migration Time (Seconds)

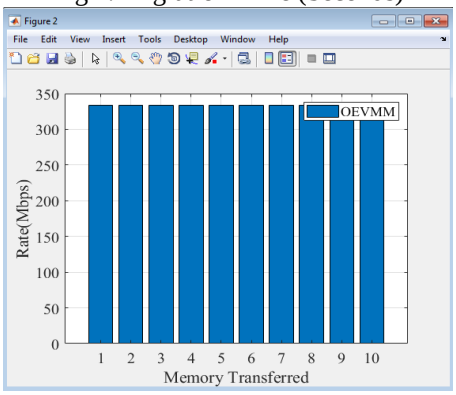

Fig 3. Optimized Data Rate

Above fig 3 shows an optimal data rate is used to measure the transmission time in the simulation process. To check the stability of the system, it's showing in various rounds and provides stable speed of transfer in the simulation. High transfer rate shows better performance in the virtual machine migration process.

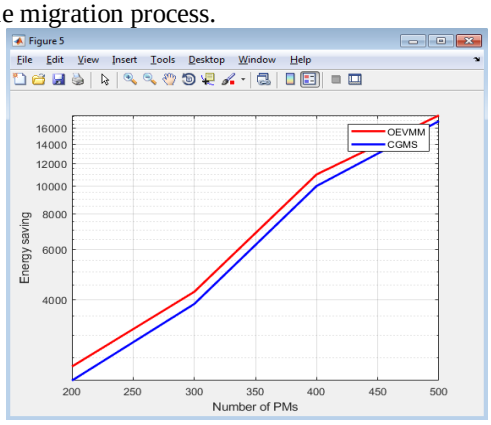

Fig 4. Energy Saving

Above fig 4 shows the energy is the most important parameter in the VM migration process. The energy is basically the cost of the overall execution. Less energy consumption shows the best performance of a virtual machine migration process. It shows the energy saving

while the simulation of virtual machine migration in different scenarios. The more saving here shows the best performance of the proposed approach. The proposed approach, giving the stable and more are saving in all the cases.

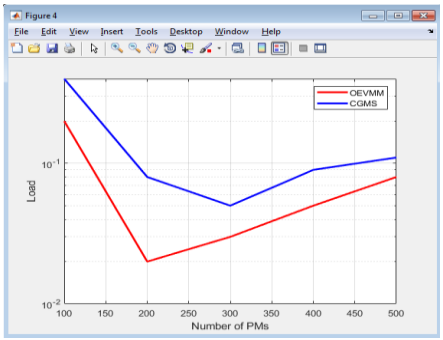

Fig 5. Load

Above figure 5 Load management is also an important parameter of the virtual machine migration process. The proposed algorithm showing the high performance with better management of the load in physical machines and provide smooth execution of the tasks. The less loaded machine shows the proper utilization of all the machines and better performance. The proposed approach provides high performance in the variations as shown in the figure.

Algo/PMs	100	200	300	400	500
CGMS	1055	2080	3860	10000	16880
OEVMM	1258	2330	4258	10980	17684

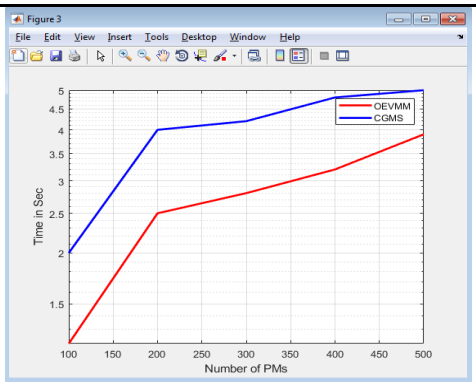

Fig 6. Time (Sec)

Fig 6 shows the computation time is a parameter, which shows the speed of processing and finding the faults in the simulation process. The computation time in the above figure shows better performance than existing approaches. The lesser time shows better performance of the algorithm and shows the high processing speed of the algorithm. The proposed approach gives higher performance of the execution in all the executed cases with less time consumption.

TABLE I
COMPUTATION TIME IN SEC

Algo/PMs	100	200	300	400	500
CGMS	2	4	4.2	4.8	5
OEVMM	1.2	2.5	2.8	3.2	3.9

Algo/PMs	100	200	300	400	500
CGMS	0.4	0.08	0.05	0.09	0.11
OEVMM	0.2	0.02	0.03	0.05	0.08

The table shows comparison of various test cases of computation time with 100 to 500 PMs. The time increases while the number of PM increases in the environment. The overall performance of the proposed architecture shows better performance in all the tests with less time consumption.

TABLE II.
LOAD IN % OUT OF 1

The table shows load in the network with various test cases. The fewer loads shows the better management of the environment in the simulation. In the above test cases, proposed approach, showing better performance as less load in all the cases from 100 to 500 PMs.

TABLE III.
ENERGY SAVING

More energy is saved during the simulation. The given table has different test cases and monitors the saved energy of the previous and proposed method. In planned model more energy is saved that is compared to previous methods. These tests showed the proposed approach better performance in all the executed cases.

V. CONCLUSION AND FUTURE SCOPE

In the conclusion, Virtual machine migration (VMM) is gaining more significance to enhance the use of the resources, load balancing of dispensation hops, tolerate errors in the virtual machine, to enhance the portability of the hops. The main feature of the virtualization is the virtual machine migration. Generally, the feature of the operating stage is transferred from one computing hop and other bodily machine node.

In proposed research, different new virtual machine migration algorithms have studied. An optimized BFO-EVMM with improved weigh-fit execution and page – priority virtual machine migration process has implemented.

During the initialization of the module there is need of the simulation process and, then create an environment for simulation process. When the model is executed in environment, the other phase with the flow of the information makes host and virtual machine. A host virtual machine in server element of the virtual machine and original h/w presents the computing resources for supporting a specific visitor virtual machine. Hence, host and virtual machine are used for simulating the task and analyzed the performance of the proposed infrastructure in extreme load. Moreover, task record disseminates on the system during the deployment of the physical and virtual machine. The computing process is managed by analyzing the load module which is accountable for experiencing the VM. In addition, validate the virtual machine using different parameters for finding the load of the system. In addition, optimal host depends on various parameters that is based on the optimization process. Optimization is the procedure of improving the efficiency of module. An optimization in virtualization is the process of placing server and work on demand computing. Lastly, optimum host is migrated and compute the parameters, namely time and energy saving.

The further research work, may try their hand at performing crossbreed over SI (Swarm Intelligence) and NN (Neural Network) computing methods. The further methods can also contain the change of NA (Neural Architecture) in the proposed ML (Machine Learning) methods to schedule the VM tasks and improved the system performance.

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