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Load Balancing in tasks using Honey bee Behavior Algorithm in Cloud Computing

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Abstract

Scheduling of tasks in cloud environment is a hard optimization problem. Load balancing of preemptive dependent tasks on virtual machines (VMs) is an important aspect of task scheduling in the clouds. In this paper the proposed an algorithm called honey bee inspired algorithm for load balancing which maximize the throughput of virtual machines in the cloud. The proposed model balances the priorities of tasks on virtual machines in such a way that waiting time of tasks in the queue is minimal. The proposed model is designed to calculate the CPU time in terms of earliest finish time (EFT).The execution is calculated on the basis of latter parameters, whereas the communication cost is evaluated by using process memory allocation, memory requirement, and data size, which is further used for final decision making by comparing the communication cost with the process cost. The experimental results have proven the effectiveness of the proposed model in comparison with the existing models.

Keywords: Load balancing, Honey bee Algorithm, Execution time, response time, cost evaluation.

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Introduction: Cloud computing is one of the fiercest, evolving technology in the IT world. But in the actual cloud computing model, this means that all the software and data held on a server and accessing them through the internet. The cloud computing provides on demand resources to users. [1]. Parallel and distributed computing has been entered into the era of cloud computing which provides highly secure and fast IT services through the internet. So it has captured the attention of big IT giant for availing readily elastic and cost effective economical IT operations [2]. Cloud computing provides on demand service which is based on a pay as you use model. The more time the user uses services or resources provided by cloud the more user has to pay, so users want to reduce overall execution times of tasks on the virtual machines .The processing units in the cloud environments are called as virtual machines (VMs). In a business point of view, the virtual machines, should execute the tasks as early as possible. Cloud load balancing becomes a very important research area. The cloud is based on the powerful data centers that handle the number of users, so there must be a load balancer to achieve improved performance and better resource utilization in the cloud environment [3]. In Cloud computing load balancing is required to distribute the load across all the nodes in a cloud environment. The proper load balancing technique results to the better user satisfaction and resource utilization [4]. An efficient load balancing algorithm will make sure that every node in the cloud enviroment has the same volume of work. Load balancing became one of the crucial concerns in the cloud computing since we cannot predict the number of requests that are received at each second in the cloud environment. The unpredictability is due to the ever changing behavior of the cloud. The main focus of load balancing in the cloud environments is allocating

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the load dynamically among the nodes in order to satisfy the user requirements and to provide maximum resource utilization by balance the overall load to all nodes [5].The load balancing problem of cloud computing is an important problem which becomes a hurdle between the rapid development of the cloud computing. The large number of clients from all over the world demanding services at rapid rate in every second from cloud service provider [6].

The features or advantages provided by the future intelligent Load balancing in tasks using Honeybee Behavior Algorithm in Cloud are improved resource utilization, improved overall cost, minimize energy consumption .The main objectives of the proposed model are to balance load between virtual machines using a honeybee behavior algorithm. The load balancing cloud computing can be achieved by modeling the foraging behavior of honey bees. This algorithm is derived from the behavior of honey bees that uses the method to find their food. The proposed model is designed to calculate the CPU time in terms of earliest finish time and it also minimize the overall execution time of tasks in virtual machines which also balances load in the cloud environment. The dynamic threshold is computed in the terms of parameters that are the communication cost, EFT and CPU cycles, which results the important role in taking the offloading decision. The experimental results have proven the effectiveness of the proposed model in comparison with the existing models.

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LITERATURE REVIEW

Elina Pacini, Cristian Mateos et al. (2015) worked upon the Balancing throughput and response time in scientific online cloud using ant colony optimization in cloud environment. The goal of this work is to study private Clouds to execute scientific experiments coming from large number of users i.e., this work focuses on the Infrastructure as a Service (IaaS) model .The correctly scheduling Cloud hosts is very important and it is necessary to develop efficient scheduling strategies to appropriately allocate VMs to physical resources to improve performance of overall cloud [1].

M.Ajit, G.Vdiya et al. (2013) Cloud load balancing becomes a very important research area. The cloud is based on the powerful data centers that handle the number of users. The proposed work presents the analysis of three algorithms in cloud analyst tool to resolve the issue of cloud load balancing. A Weighted Signature based load balancing (WSLB) algorithm is proposed to minimize user's response time [3].

G.Soni, M.Kalra et al. (2014) proposed the Proper load balancing that aids in minimizing resource consumption, implementing fail-over, improve scalability, Minimize bottlenecks. In this paper, researchers propose "Central Load Balancer" a load balancing algorithm to balance the load among virtual machines in the cloud data center. Results show that proposed algorithm can achieve better load balancing as compared to previous load balancing algorithms [4].

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Kousik Dasgupta, Brototi Mandal et al. (2013) worked upon the load balancing in the cloud computing paradigm, load balancing is one of the challenges, with rapidly increase users and their demand of different services on the cloud computing platform, proper use of resources in the cloud environment became a critical issue. The performance metrics of load balancing algorithms in cloud are response time and waiting time. In the proposed work there are mainly two load balancing algorithms in cloud, Min-Min and Max-Min algorithm, which results in better response time of tasks in a cloud environment [5].

R.Panwar, B.Mallick et al. (2015) proposed a dynamic load management algorithm for distribution of the entire incoming request among the virtual machines effectively to balance load between cloud environments. Further, the performance is simulated by using Cloud Analyst simulator based on various parameters like data processing time and response time, execution time etc. and compared the result with previous algorithm VM-Assign [6].

Liu, X. Wang, et al. (2012) defined a new task scheduling model in this paper. In the proposed model, author optimizes the task execution time to interpret both the job running time and the resource utilization to balance load between jobs. So, a PSO-based algorithm is proposed based on the model. The proposed model works to solve the load balancing problem in VMs of Cloud Computing environment [7].

PROBLEMS FOUND IN EXISTING MODELS

This existing algorithm is designed to solve the problem of load balancing in tasks in the cloud environment. The existing model considers the priorities of the

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VOL. 2(2),2015

tasks as a main key factor to increase their throughput. The existing algorithm improves the overall throughput of processing. The priority based balancing focuses on reducing the amount of time a task has to wait in a queue of the VM in a cloud environment, so the task completed as soon as possible. Thus, it reduces the response time of VMs. This load balancing technique works well for non-preemptive independent tasks in cloud computing systems.

The proposed model evaluates the load balancing for workflows with dependent tasks in a cloud environment. The proposed model considers Execution time, Failure rate, Turnaround time as the main QoS parameters. The experimental results have proven the effectiveness of the proposed model in comparison with the existing models.

SUMMARY OF THE TECHNIQUES SURVEYED

Authors and Year	Problem Addressed	Techniques Proposed	Experimental Results	Expected Outcome
Elina Pacini, Cristian Mateos et al. (2015)	Load balancing in cloud	Honey-bee algorithm for independent tasks.	The proposed algorithm minimizes the response-time of tasks on VM's in the cloud environment.	Minimize response time, Improves overall throughput.
M.Ajit, G.Vdiya et al. (2013)	Load balances between data-centers.	Weighted Signature based load balancing (WSLB) algorithm	The proposed algorithm minimizes the user's response time	Improved response time with WSLB algorithm.

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G.Soni, M.Kalra et al. (2014)	Resource consumption in cloud	Central load balancer to minimize resource consumption.	The proposed algorithm minimize the resource consumption, improve scalability, Minimize bottlenecks	Improved resource consumption, Scalability.
Kousik Dasgupta, Brototi Mandal et al. (2013)	Waiting time of tasks in cloud environment	Max-Min and Min-Min algorithm To minimize waiting time between tasks on VM's.	The Max-Min and Min-Min algorithm improves waiting time between tasks.	Minimizes waiting time and response time.
Liu, X. Wang, et al. (2012)	Response time between tasks	Task Scheduling PSO based Model to Improve task response time	The proposed algorithm improves the response time between tasks and resource utilization	Improved response time, resource utilization

METHODOLOGY

In proposed model the Honeybee foraging algorithm balances the load between tasks in cloud environment. The honey bee foraging algorithm was originated from the behavior of honey bees in finding their food. The specific focus of this paper includes:

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- An algorithm and load balancing of dependent tasks in cloud environments inspired by honey bee behavior algorithm.

- A literature survey about various load balancing techniques/algorithms and review the merits and demerits of these techniques.
- An analysis and systematic study to show how honeybee foraging algorithm is better for balances load between dependent tasks in the cloud environment.

In case of load balancing the servers are grouped into virtual servers. Each Virtual servers will have its own Virtual Server (VS) request queue. A server provides a request, compute its profit and evaluate it with the bees algorithm profit, if profit was high, then the server lives at the existing virtual server and on the other hand, if profit was low, then the server returns to the hunt or survey behavior, thus balancing the load with the server.

EXPERIMENTAL RESULTS

The results of the proposed model have been obtained in the form of various performance parameters. The performance evaluation has been performed on the basis of accuracy of the system to offloading the processes. The following table indicates the performance of the proposed model in terms of early finish time.

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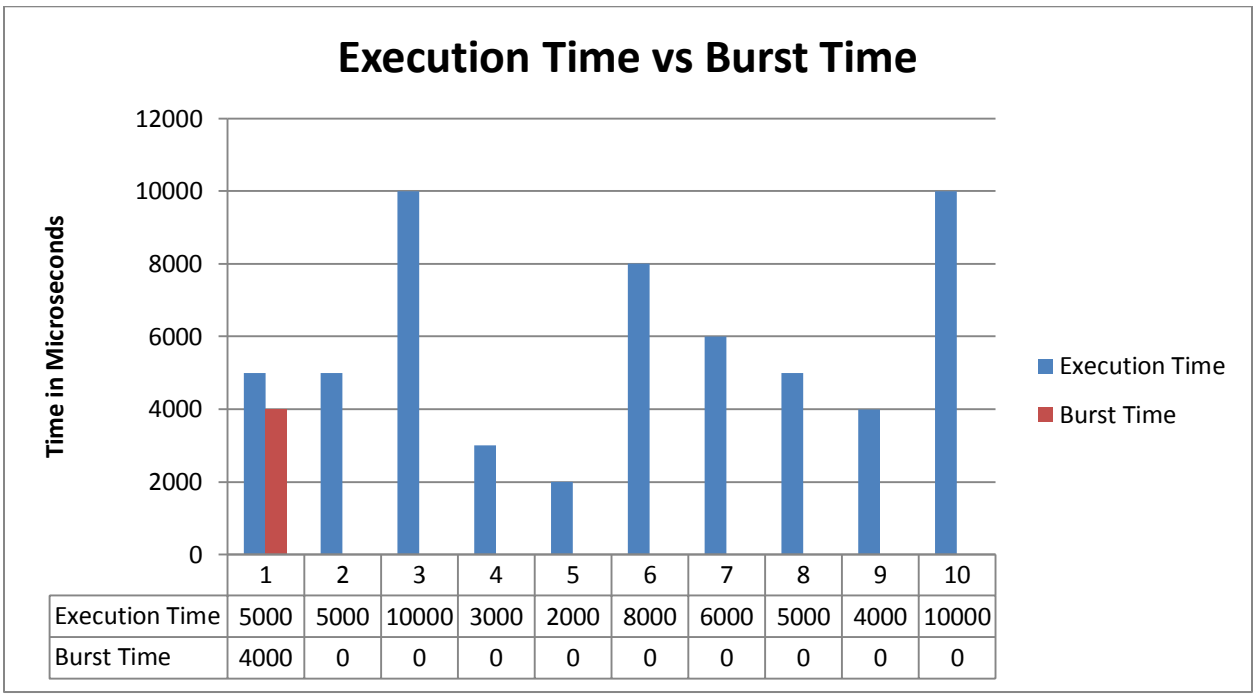

	1	2	3	4	5	6	7	8	9	10
Execution Time	5000	5000	10000	3000	2000	8000	6000	5000	4000	10000
Burst Time	4000	0	0	0	0	0	0	0	0	0

Graph 1: The execution time v/s burst time evaluation of proposed model

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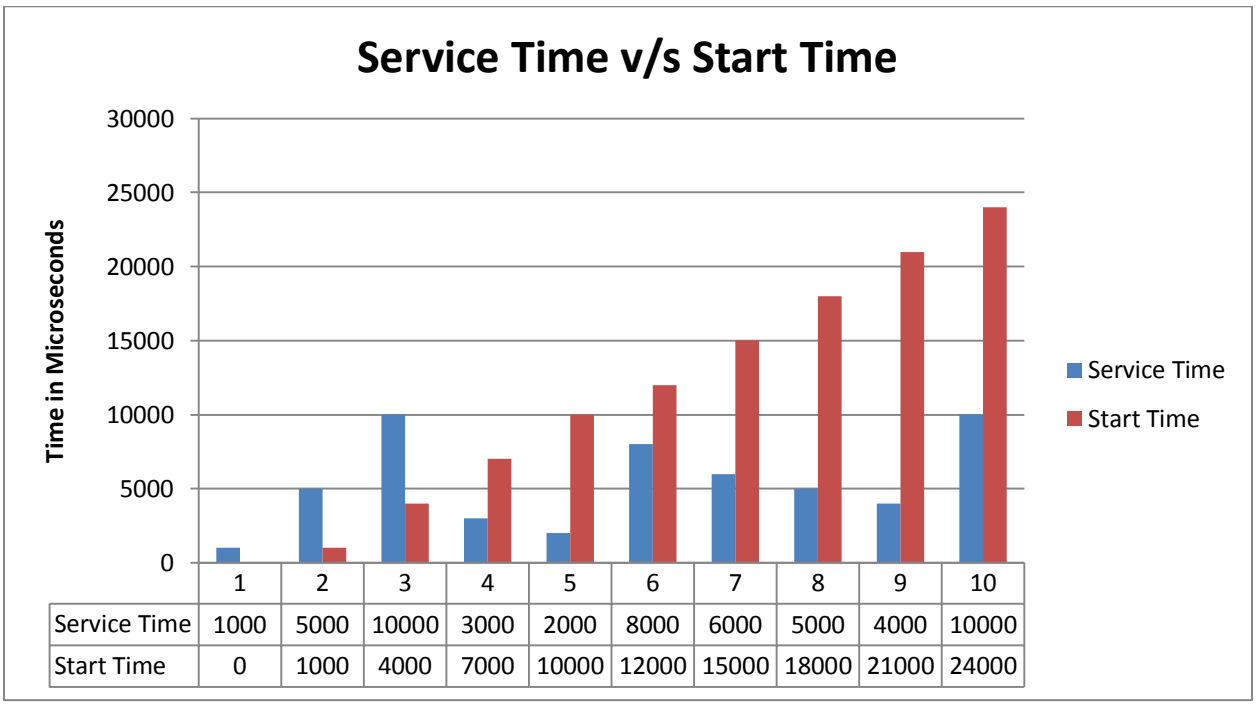

	1	2	3	4	5	6	7	8	9	10
Service Time	1000	5000	10000	3000	2000	8000	6000	5000	4000	10000
Start Time	0	1000	4000	7000	10000	12000	15000	18000	21000	24000

Graph 2: Service time v/s start time evaluation for the proposed model using honeybee foraging algorithm

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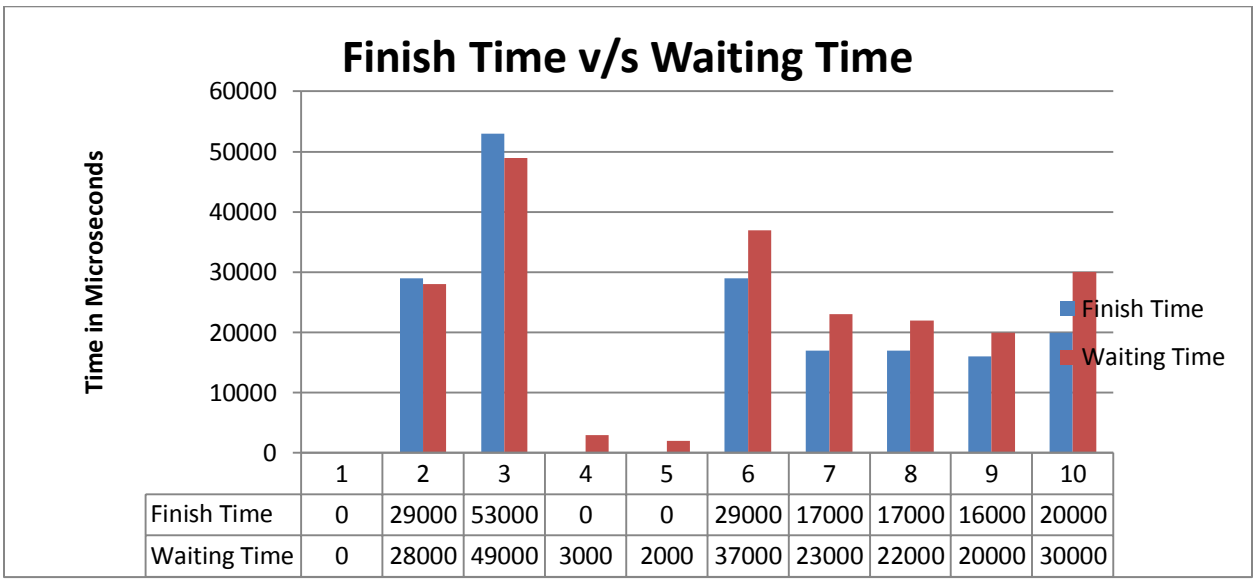

	1	2	3	4	5	6	7	8	9	10
Finish Time	0	29000	53000	0	0	29000	17000	17000	16000	20000
Waiting Time	0	28000	49000	3000	2000	37000	23000	22000	20000	30000

Graph 3: Finish time v/s waiting time evaluation

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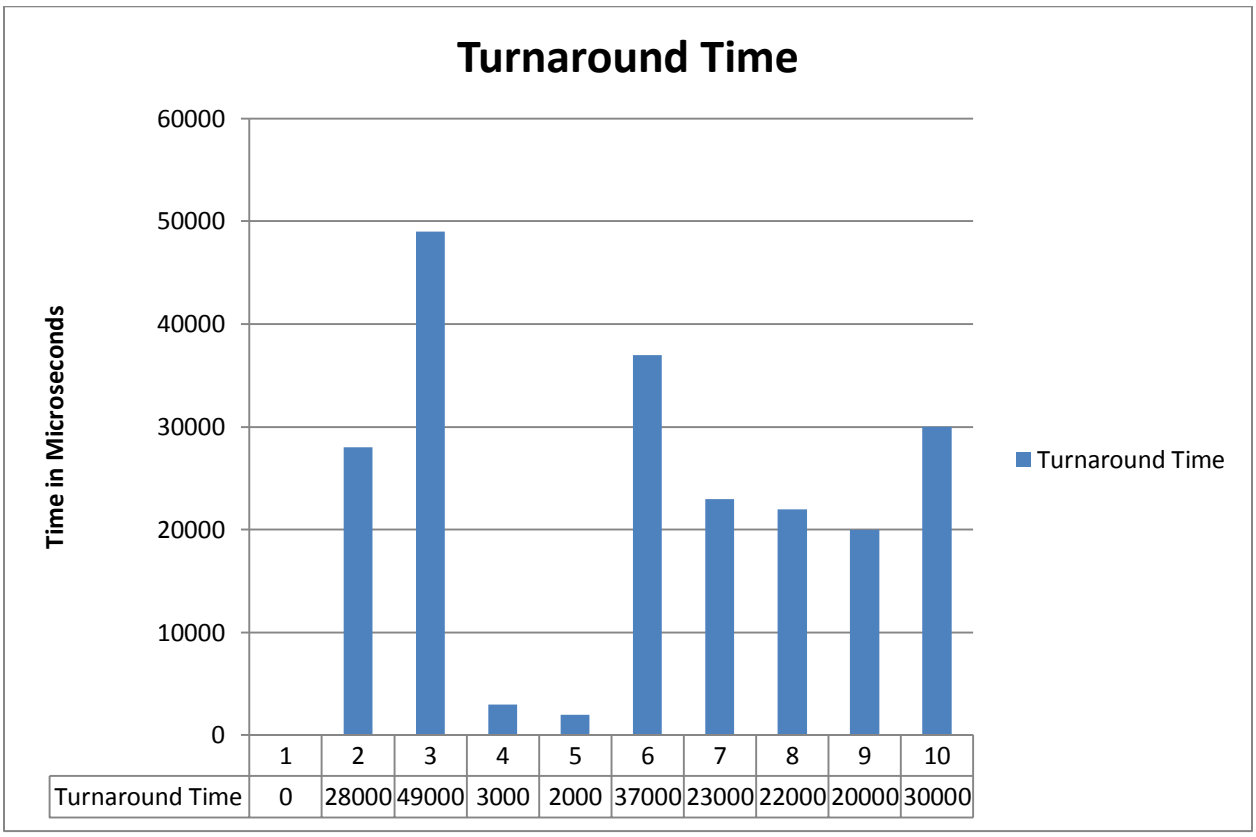

Graph 4: Turnaround time evaluation of the proposed model

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CONCLUSIONS

In this paper, we have proposed a load balancing technique for cloud computing environments based on behavior of honey bee foraging strategy. This algorithm not only balances the load, but also takes into consideration the overall performance of cloud environment. Honey bee behavior inspired load balancing improves the overall execution time and response time. This algorithm considers execution time, turnaround time as the main QoS parameter. In the future, we plan to improve this algorithm by considering other QoS factors and also compare the result of the proposed algorithm with other algorithms.

REFERENCES

[1]Elina Pacini, Cristian Mateos, Carlos Garcia Garino. "Balancing throughput and response time in scientific online cloud using ant colony optimization."Advances in Engineering Software, ELSEVIER, vol. (84 /Issue C), 2015, pp.31-47.

[3]M.Ajit, G.Vdiya. "VM level load balancing in cloud environment Computing." Communications and Networking Technologies (ICCCNT), Fourth International Conference on, IEEE 2013, pp.1-5.

[4] G.Soni, M.Kalra**.** "A novel approach for load balancing in cloud data center.'' Advance computing Conference (IACC) on, IEEE 2014, pp. 807-812.

[5] Kousik Dasgupta, Brototi Mandal, Paramartha Dutta, Jyotsna Kumar Mandal, Santanu Dam. "An in- depth analysis and study of Load balancing techniques in the cloud computing environment." ELSEVIER, vol.10, 2013, pp.340-347.

International Journal Of Business Management
Available at www.ijbm.co.in
ISSN NO. 2349-3402
VOL. 2(2),2015

[6] R.Panwar, B.Mallick. "Load balancing in cloud computing using dynamic load management algorithm". Green Computing and Internet of Things (ICGCIoT), International Conference on IEEE 2015, pp. 773 – 778.

[7]Liu, Zhanghui, and X.Wang. "A PSO-based algorithm for load balancing in virtual machines of cloud computing environment." Advances in Swarm Intelligence, Springer Berlin, vol.7331, 2012, pp.142-147.

[8] Dhinesh Babu L.D. P. Venkata Krishna. "Honey bee behavior inspired Load Balancing of tasks in cloud computing environments." ELSEVIER, 2013, vol.13, pp. 2292- 2303.

[9] K.Li, G.Xu, G. Zhao, Y. Dong, and D. Wang "Cloud Task scheduling based on Load Balancing Ant Colony Optimization." 6th IEEE Annual China Grid Conference, 2011, pp 3-9.

[10]Chang, Haihua, and X.Tang. "A load-balance based resource-scheduling algorithm under cloud computing environment." 9th International Conference on Web-based Learning, Springer, Berlin, 2011, pp. 85–90.

[11]S.Cavić, Vesna, and E. Kühn, "Self-Organized Load Balancing through Swarm Intelligence." In Next Generation Data Technologies for Collective Computational Intelligence, Springer, Berlin,vol.352, 2011, pp. 195-224.