Comparison of Load Balancing Performance in Cloud Computing Using Honeybee And Threshold Algorithm

Aditya Efrian, Sri Chusri Haryanti, Sri Puji Utami Atmoko, Ridho Yanevan Pratama

Faculty of Information Technology, Universitas YARSI, Indonesia

adityaefrian@gmail.com , sri.chusri@yarsi.ac.id , puji.atmoko@yarsi.ac.id ,ridhoyanevan@gmail.com

ABSTRACT

Cloud computing is currently developing rapidly. Load balancing technique is very crucial to balance the load in the cloud. Load balancing is needed to distribute dynamic workload across resources in the cloud. In this study, we employ Honeybee and Threshold algorithms for balancing load in the cloud. We implement them in CloudAnalyst simulator. One advantage of CloudAnalyst is it applies a GUI. Honeybee and Threshold algorithms are put into CloudAnalyst. We examine Honeybee and Threshold algorithms implementation for Indonesian e-Health cloud model. There are 4 data center and 34 users based on the number of regions and provinces in Indonesia. Two data center selection policies are used, i.e. closest data center and optimized response time policy. The average response time is investigated for different user data sizes. The simulation result shows that Threshold algorithm gives average response time that is faster than the Honeybee. Nevertheless, Honeybee algorithm delivers better performance for data size smaller than 80 bytes, and Threshold algorithm tends to give smaller response time for data size 100 bytes.

Keyword : CloudAnalyst, Honeybee algorithm, load balancing, Threshold algorithm
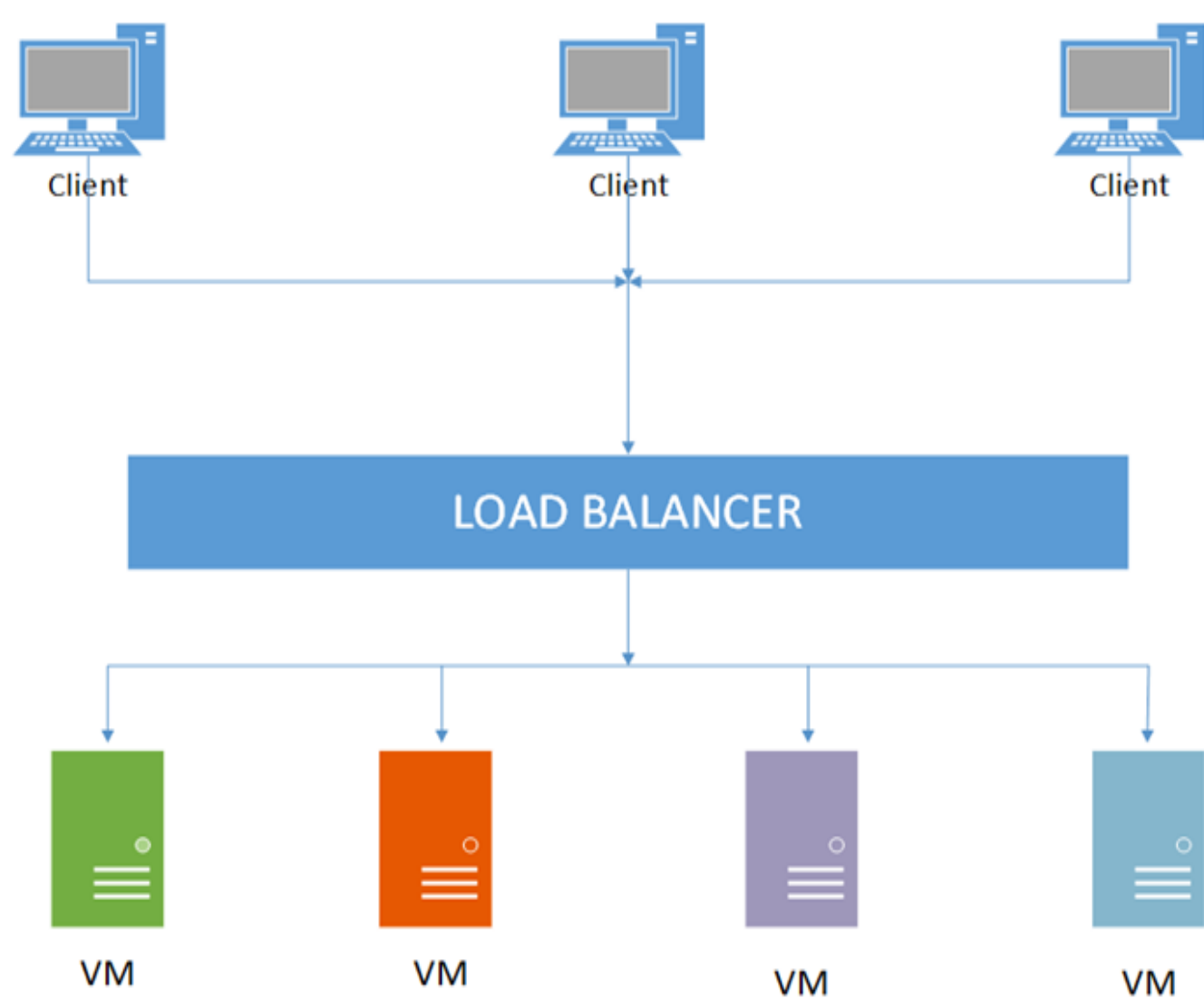
TOPOLOGY

Figure 1 Load Balancing Topology

SIMULATION

The average response time is examined for 4 data centers and 34 users (based on the number of provinces in Indonesia). The data center selection used closest data center and optimized response time policy with simulation parameters follow Table 1 and Table 2. The average response time is investigated for different data sizes.
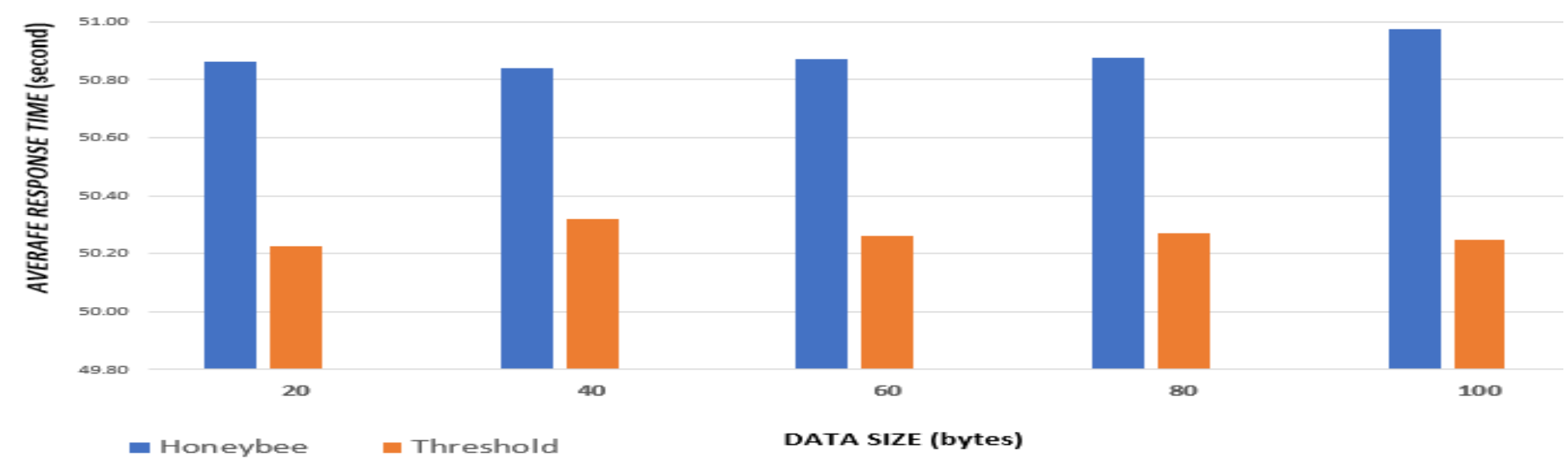
RESULT

Figure 2 Comparison of Average Response Time for Load Balancing Using Honeybee and Threshold Algoorithm with Closest Data Center Service Broker Policy for Different Data Size
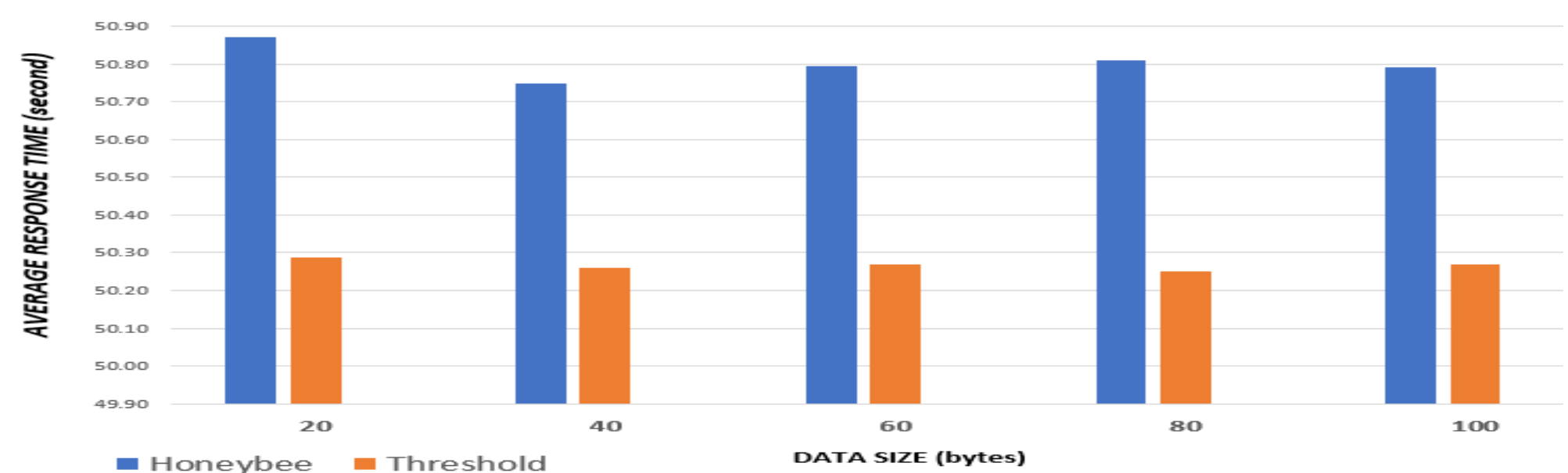

Figure 3 Comparison of Average Response Time for Load Balancing Using Honeybee and Threshold Algoorithm with Optimize Response Time Service Broker Policy for Different Data Size
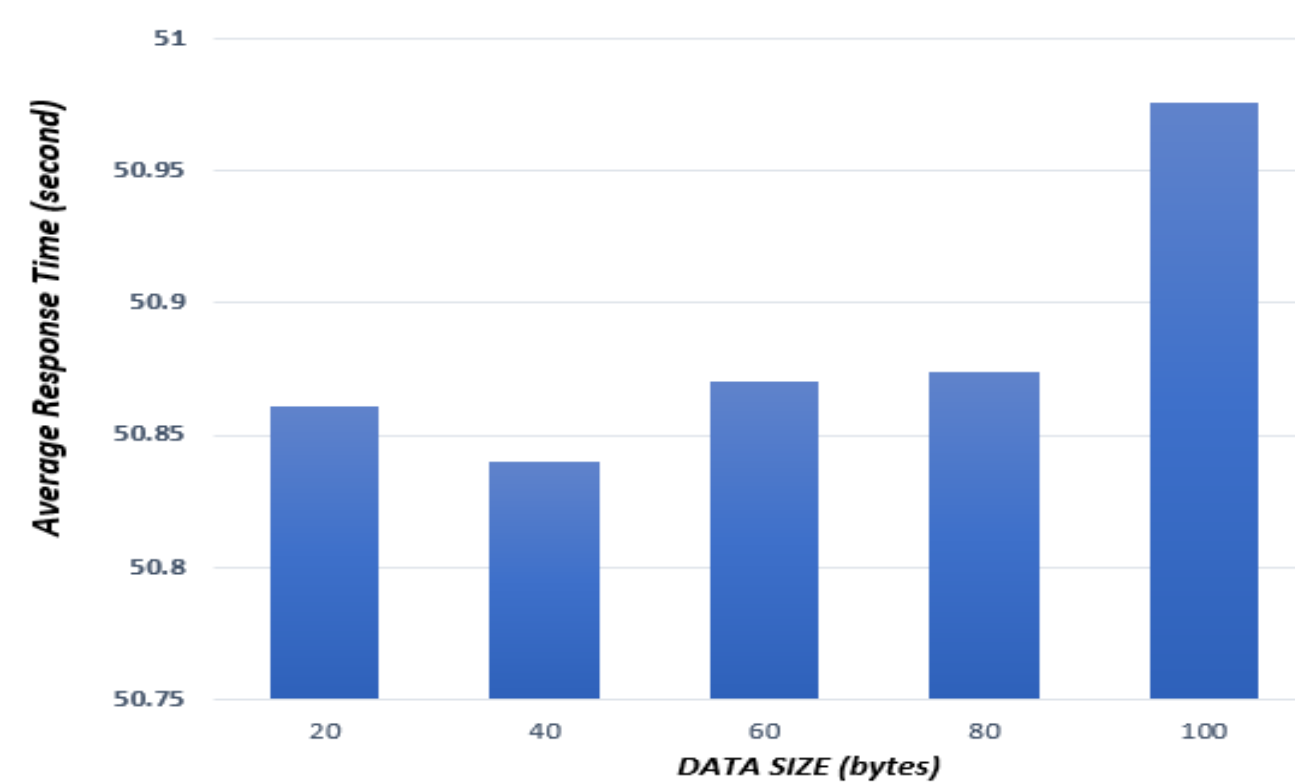

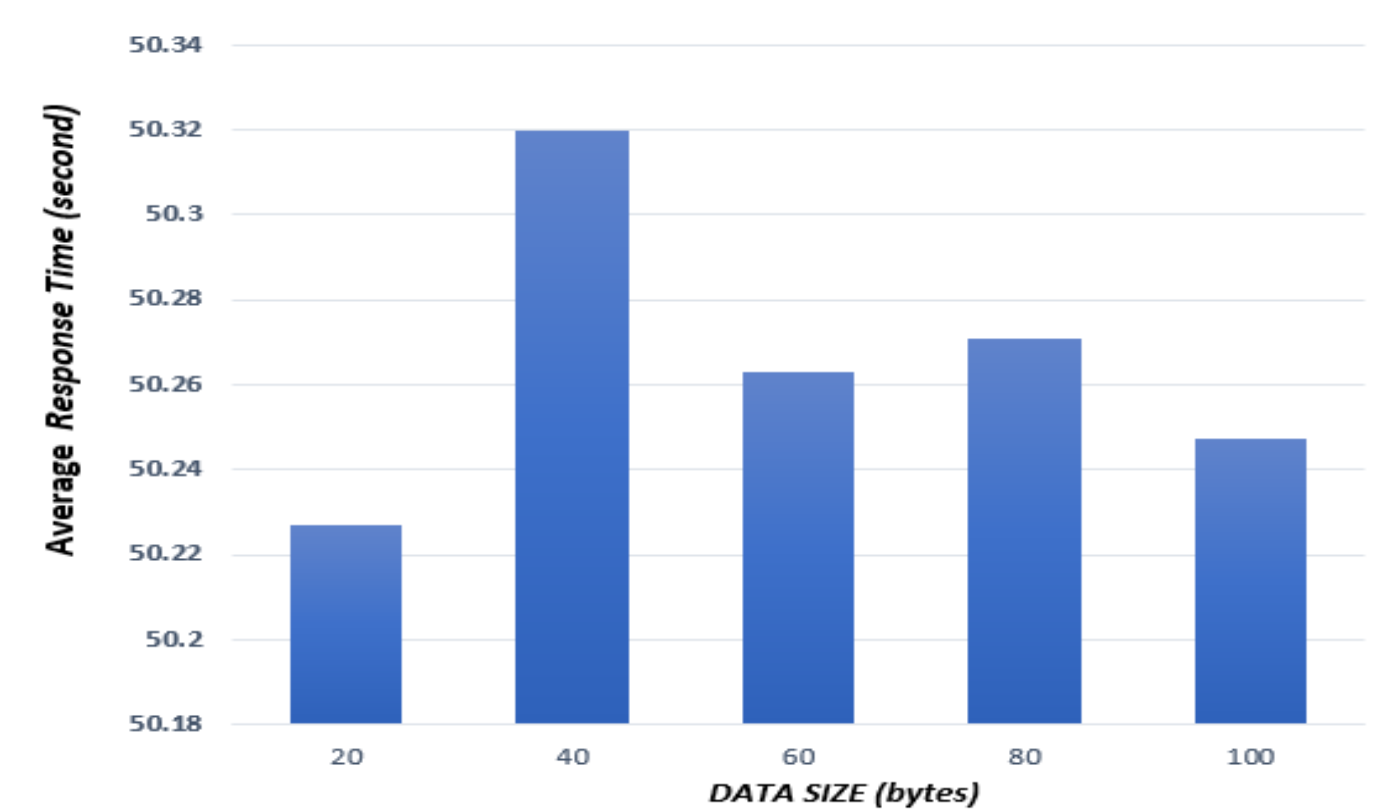**Figure 4 Comparison of Average Response Time for Load Balancing Using Honeybee for Different Data Size**

Figure 5 Comparison of Average Response Time for LoadBalancing Using Threshold for Different Data Size

USER & DATA CENTER CONFIGURATION

Table 1 User Base Configuration

UB Parameters	Value
Data Center	4
Jumlah UB	34
Request per User	60
Peak Hours Start-End	3 - 9
Data Size/Request	20, 40, 60, 80, 100
Average Peak User	1000
Average off-Peak User	100
Load Balancing Policy	Threshold dan Honeybee
Service Broker Policy	Closest Data Center dan Optimize Response Time
Simulation Duration	60 menit

Table 2 Data Center Configuration

Data Center	1, 2, 3, 4
Region	3
Memory	10000
Bandwith	512
Memory Cost	1000
Data Transfer	0,05
Cost per VM	0,1
Storage Cost	0,1
VM	5

CONCLUSION

For load balancing in cloud computing, Threshold algorithm gives better average response time than the Honeybee algorithm. Honeybee algorithm delivers better performance for data size smaller than 80 bytes, and Threshold algorithm tends to give smaller response time for data size 100 bytes.

REFERENCES

[1] Aswathi, M., Sharma, N. N. and Mahesh, A. S. (2016). A*n enhancement of Throttled load balancing algorithm in cloud using throughput.* International Journal of Control Theory and Applications, 9(15), pp. 7603–7611.

[2] Hashem, W., Nashaat, H. and Rizk, R. (2017). *Honey Bee Based Load Balancing in Cloud Computing*, 11(12), pp. 5694–5711.

[3] Mayanka Katyal, A. M. (2013). *A Comparative Study of Load Balancing Algorithms in Cloud Computing Environment.* International Journal of Distributed and Cloud Computing, 1 (2), p. 14.

[4] Nayak, S. (2015). *Analytical Study for Throttled and Proposed Throttled Algorithm of Load Balancing in Cloud Computing using Cloud Analyst*, 1(12), pp. 90–100.

[5] Gulshan, S. and Mala, K. (2014). *A novel approach for load balancing in cloud data center.* 2014 IEEE International Advance Computing Conference (IACC), pp. 807–812.