A Survey on Load Balancing in Cluster Environment

D. Santhana Lakshmi[1], J. Sangeetha[2], P. Isabella[3]

[1,2,3]UG Student, Dept. of Computer Science, Idhaya College of Arts & Science for Women, Puducherry, India

Abstract: **A computer cluster is grouping of similar things or data that are positioned closely together so that, they can be viewed as a single system. A network is grouping of two or more computer systems linked together. Network security is act of running or jumping about playfully in our whole world. To overcome this an efficient load balancing system is an essential part. The main goal of load balancing algorithm is to distribute the jobs (workloads) across multiple computing resources, such as a computer, computer cluster, network links, central processing unit or disk drives. In this paper we are going to address about clusters network in load balancing, and various types of load balancing, types of networks, advantages and disadvantages. Though load balancing has many advantages it equally has disadvantages. Through this survey we are going to collect various algorithms in load balancing this makes the researchers to understand the concept of load balancing and encourage them to develop more efficient load balancing algorithm. Our future work is to develop an algorithm to overcome the disadvantages of load balancing**

Keywords: **Cluster, Network, Nodes, Protocols.**

1. Introduction

A computer network is the processes of connecting many computers together that can communicate with one another to share data and resources. In computer network, computes exchange data with each other using connections (data links) between nodes. The data links are established over cable such as wires or optic cables, or wireless media such as Wi-Fi. Networking enhance communication availability of information as it allows access to a vast amount of useful information, including traditional reference materials and timely facts, such as news and current events. It allows more convenient resource sharing particularly for large companies that really need to produce huge numbers of resources to be shared to all the people. The networking technology is known for its flexibility as it gives users the opportunity to explore about essential things, such as software without affecting their functionality. People will have accessibility to all information they need to get and share. As large amount of information's files and resources are being shared by many people. Users have to ensure all the data and content are properly stored in the system. With networking technology, one can do all of this without any hassle, If a computer network's main server break down the entire system would become useless. If it has a bridging device a central linking server that fails, the entire network would become to a standstill. There would be a single

occurrence that the stored files are corrupt due to computer viruses. Thus, the network administrators should conduct regular checkups on the system and stored files at the same time. Computer networking will always be a fast and convenient means of transferring and sharing information, but people have to be aware of its consequences. They should remember that often relaying on this system can put them at certain risks that can be cause by its flaws and other malfunctions. Clustering is a main task of exploratory data mining, and a common technique for statistical data analysis used in many fields, including machine learning, pattern recognition, image analysis, information retrieval, data compression and computer graphics.

2. Load balancing

Load balancing is a technique of distributing the user request over a network when your server is maximum out the cpu\disk\database Io rate. In Load Balancing setup clients send their request to the IP Address of a virtual server configured on the Net scalar application. The virtual server distributesthem to the Load balanced application servers according to a present pattern called Load balancing algorithm. The Load balancing algorithm determines the selection of backend servers to forward the traffic. This is based on:1) server health 2) predefined conditions. Some of the efficient load balancing algorithms include:

- Round Robin
- Least connection
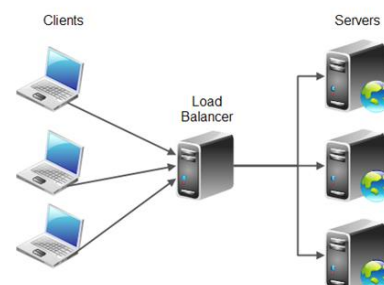- Agent based adapture Load Balancing
- URL hash
- Source IP hash

Fig. 1. Load balancing

International Journal of Research in Engineering, Science and Management
Volume-2, Issue-1, January-2019
www.ijresm.com | ISSN (Online): 2581-5792

259

Table 1
Literature survey

S. No.	Title	Year	Author	Algorithm	Advantage	Disadvantage
1	Energy efficient load balancing clustering algorithm for wireless sensor network	2012	Pratyay kuila	Energy efficient load balanced clustering (eelbc) algorithm	To imporove the energy efficiency with respect to load balancing and energy consumption	Energy must be improved yet
2	Multi path routing with load balancing for internet access in wireless mesh network	2010	Vinh dien hoang	Reactive load balancing	To improve the reliablity of connection over internet	Must work on security issues in wireless mesh network as it has many threats
3	Traffic based load balancing in software defined networking	2017	Harkirat kaur	Software defined network	To build a load balancing application based on traffic	Uses less controller so as the functionality of the system is reduced
4	Load balancing in a network	2014	Rahul godha	The distributed load balancing algorithm	To achieve higher levels of fault tolerance and automatically detects unhealthy servers and it is secure	Reordering of heap is slower
5	Mobile data gathering with load balanced clustering and dual data uploading in wireless sensor network	2016	Shankargouda biradar	Load balancing clustering and dual data uploading	To increase the energy efficiency in transmission of data	Mobile data gathering is not suitable for lengthy or complex questions
6	Efficient load balancing routing technique for mobile ad hoc network	2016	Mahdi abdulkader salem	Energy efficient load aware routing Ad hoc on demand distance vector routing protocol	Improved quality of service(qos) performance when compared to existing eaodv and aodv routing protocols	Energy efficiency is out of range

3. Literature survey

Pratyay Kuila et al [2012]. To improve the scalability and life time of Wireless Sensor Network. An efficient clustering technique has been used. The fundamental growth in the fields of MEMS (Microsoft Electro-Mechanical System) Technology development of high speed broadband wireless technology and low power radio frequency (RF) have designed to the development of Wireless Sensor Network. In this paper a new technique like Energy Efficient Load Balanced Clustering (EELBC) Algorithm is used. This is to improve the energy efficiency of the load balancing and is based on min-heap clustering algorithm. An experiment has been done have proposed an algorithm to improve the efficiency with respect to load balancing and energy consumption. The future research will be towards the development of Load Balancing Energy Efficiency Clustering (or) energy Efficiency Load Balancing Cluster for sensor network with variable loads of sensor nodes and to make a scheme for Cluster Head Sensor (CHS). VinhDien HOANG et al [2010] in the paper, a novel framework for connection between Wireless Mesh Network (WMN) and the internet has been produced. The idea of this connection to use more than one Access Router (AR) or Mobile Gateway (MG) to provide attachment points to the internet service to mobile nodes in MANET for simultaneous network connectivity. And this improves the reliability of the connection over internet. This pose improvement in Accuracy of estimation and reduce the over headed network in connections. Thereby this connectivity provide a load balancing scheme called

Reactive Load Balancing (RLB). The future works will be towards works on security issues in the WMN as many threats have appeared to attack normal operations of the wireless network.

Harkirat Kaur[2017]. The increase in the usage of social network and social media have cause high volume of traffic and it is difficult for a single server to handle clients request with these fast growth of internet users and applications. To handle this problem Load Balance is used. But as the traditional vender specific load balancing is in-flexible and very expensive. Software Defined Networking based load balancing removes many limitations of traditional load balancing. Science software load balancer provides programming facility of control plane can convert a open flow switch into a powerful load balancing, and very cheaper when compared to the traditional load balancing. The software defined network load balancing algorithm is compared with round robin algorithm and the result has produced a better performance parameter when compared to round robin strategy. The future work is to use more controllers instead of one. In this case failure of one controller, the functionality of the controller is handled by another controller. Rahul Godha etal[2014]. This research introduces a new mechanism for load balancing network using heap. The imbalance in the traditional load balancer can reduce the performance of parallel application. This load balancing using heap will automatically distribute traffic across multiple server. It is used to achieve traffic tolerance and improved performance providing the required amount of load balancing capacity

International Journal of Research in Engineering, Science and Management
Volume-2, Issue-1, January-2019
www.ijresm.com | ISSN (Online): 2581-5792
260

needed to distribute network traffic. The distributed load balancing algorithm has maximum heap stores the threshold load information on the nodes of the heap. And the advantages and disadvantages of heap over traditional load balancing algorithm and its own are also listed.

Shankargouda Biradar et al[2016] . This paper proposed the load balanced clustering - dual data uploading framework for data gathering in Wireless Sensor Network. It is a three layer framework for mobile data which includes sensor layer, cluster head layer and mobile collector (called SenCar) layer. This have a distributed Load Balanced Clustering and Dual Data Uploading which is referred as LBC-DDU concept for sensor self-organization, energy efficient transmission among cluster head groups, user's dual data uploading and optimize mobility. This concept is used to increase the effectiveness in the proposed framework and Load Balanced Clustering and Dual Data Uploading can reduce energy consumption by the use of routing burdens on nodes and make balanced workloads among cluster head. Mahdi Abdulkader Salem et al [2016] The MANET (Mobile Ad hoc Network) which is a type of ad hoc network that users wireless connections to connect to various networks as they can change locations and its configuration. The main goal here is to present a novel algorithm for efficient network. The MANET is mainly used for communication purpose in LAN's. The traditional routing protocol has been suffering from more routing overhead and decreases packet delivery ratio. And address about the problems in MANET and present different solutions for load balancing techniques and design new load balancing technique for achieving the Quality of Services (QoS). And also have produced comparative results of three routing protocols using AODV (Ad hoc on Demand Distance Vector Routing Protocol), EAODV and proposed EELAR (Energy Efficient Load Aware Routing) technique for load balancing with two network conditions to improve performance when compared to existing methods.

4. Conclusion

In this paper we have discussed about cluster and load balancing which were interrelated. High traffic in websites, servers are quite common these days because of the fast developing world. So in order to manage and avoid traffics the load balancing has been introduced which further proven that it gradually reducing the traffics. Here we have discussed about cluster and load balancing in detail and also did a literature survey on various load balancing algorithms and comparison table. The table shows that many algorithms has equal disadvantages. So our future work is to discover a efficient load balancing algorithm which avoid all those mentions disadvantages.

References

[1] Pratyay Kuila, PrasantaK.Jana. "Energy Efficient Load Balanced Clustering Algorithm for Wireless Sensor Network", 2nd International Conference on Communication, Computing & Secuity [ICCCS-2012]: Procedia Technology 6(2012), 771-777.

[2] Vinh Dien HOANG, Maode MA, and Hiroshi Harada. "Multi-Paths Routing with Load Balancing for Internet Access in Wireless Mesh Networks", International Journal of Wireless &Mobile Networks (IJWMN), vol. 2, No.1, February 2010.

[3] Harkirat Kaur, Navjot Jyoti." Traffic Based Load Balancing in Software Definition Networking", International Journal on Computer Science and Engineering (IJCSE).vol. 9, No.6, June 2017.

[4] Rahu Gadha, and Sneh Prateek. "Load Balancing in a Network", International Journal of Scientific and Research Publications, vol. 4, Issue 10, October 2014.

[5] Shankargouda Biradar, and Sarala D.V. "Mobile Data Gathering with Load Balanced Clustering and Dual Data Uploading in Wireless Sensor Networks", International Journal on Computer Science and Information Technology Research vol. 4, Issue 2,pp. 276-280, April-June 2016.

[6] Mahdi Abdulkader Salem, and Raghav Yadav, "Efficient Load Balancing Routing Technique for Mobile Ad Hoc Networks", International Journal on Computer Science and Applications (IJACSA), vol. 7, No. 5, 2016.

[7] Mojtaba Seyedzadegan, "Gobal Load Balancing Algorithm for Wireless Mesh Networks", International Journal of Electrical, Electronics and Data Communication, volume-3, Issue-8, Aug-2015.

[8] Tanuj Kumar Mishra, and Raj Kumar Paul, "A Survey on Load Balancing Techniques for Wireless Sensor Network", International Journal of Advanced Research in Computer and Communication Engineering,vol. 6, Issue 2, February 2017.

[9] Shilpi Pandey, Shivika Prasanna,Shreya Kapil, and Rajeshwari B. S, "A Comprehensive Study", International Journal of Advanced Research in Computer Science and Management studies(IJARCSMS), vol. 3, Issue 4, April 2015.

[10] P. Kumari, and D. Thakur, "Load Balancing In Software Defined Network", International Journal of Computer Science and Engineering, vol. 5, Issue 12, Dec. 2017

[11] S. Tamilarasi, and K. Kungumaraj, "A survey on a content Based Dynamic Load Balancing Algorithm for Heterogeneous Web Server Cluster", International Journal of Computer Science Trends and Technology (IJCST), vol. 4, Issue 4, Jul-Aug 2016.