3rd National Conference on Green Technology and Science for Sustainable Development
© 2020 IJSRST | Volume 5 | Issue 6 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X
International Journal of Scientific Research in Science and Technology

A Review On FOG Cloud Environment

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ABSTRACT

The past few years IoT had been deployed in various area of application. Fog computing is latest addition in the environment of cloud computing which mainly brings cloud resources closer to the client. The main aim is to solve the problems faced cloud computing during IoT data processing and executing small Sensitive task, an intermediate layer between cloud and devices, execute the small tasks of smart devices at the edge devices where as to put away the main intensive and non-sensitive Tasks for the remote execution on the cloud. In this paper focus on Task Scheduling between Fog as well as Cloud, which is load distributed equally, energy Consumption and Network use.

Keywords : Cloud computing, Fog computing, Internet of things, Task scheduling.

I. INTRODUCTION

Fog computing is a service started by CISCO and is also called as fogging. Fog computing is defined on cloud computing because it is a basic extension of the cloud. Cloud computing is the process of running IoT tasks and services and storing computer resources over the Internet. This makes it possible for peoples and businesses to make use of third-party hardware and software hosted online [3] To access information and computer resources from the internet, cloud computing is the easiest way. With the all-round availability of shared/pooled computing resources, cloud computing offers advantages over traditional on-site hosted services regarding speed, cost, and efficiency. Fog Computing smoothly supports the Emerging Internet of Things (EIoT) properties (vehicles, home appliances, and even clothes) that are embedded with sensors to enable them to send or receive data. Either using a heavy backbone network, fog computing can be implanted on a basic communication system. Fog computing can support billions of nodes in highly diverse and dynamic environments, it easily makes big data operations run in less time. Cloud technology we needed both fog and cloud along with the IoT devices and the architecture [1] Fog computing can be perceived both in large cloud systems and big data structures, referring to the increasing difficulties in accessing information accurately. This gives a lack of quality in content. Fog computing has both data and control planes. For example, in data canter servers are opposed for services but fog computing makes computing services enable. Compared to other computing, fog computing is user-friendly. It achieves better by reducing the time and saving the backbone bandwidth. In the cloud and Fog-cloud computing model, scheduling of a task is the main point to look after, that whether the task should run on cloud wholly or the Fog environment and what are the

advantages of Fog over the cloud. In this paper, we present the algorithm that schedules the tasks Based on few parameters like energy consumption, time and bandwidth. And provide the offloading policy Based on the minimization of these parameter values used. [3]

Cloud Computing services can be produced by Fog computing at lower costs and much better response times. For instance, some tasks such as data analysis and reports based on historical data can still find in Cloud Computing their main support. Reduce the latency processes is the main purpose of fog computing and to support Cloud Computing in online computations wherein response times are critical [8].

II. RELATED WORK

In 2010, the need to extend cloud computing with fog computing emerged, to cope with a huge number of IoT devices and big data volumes for real-time low-latency applications.

On November 19, 2015, an Open Fog Consortium was created with founding members ARM, Cisco, Dell, Intel, Microsoft and Princeton University, and additional contributing members including GE, Hitachi, and Foxconn. IBM introduced the near allied, and mostly synonymous (although in some situations not exactly) term 'edge computing' [11].

Er. Pummy Dhiman, published a paper on fog cloud named as "Shifting from Cloud to Fog" in 2017. In this paper researcher gives the Fog computing resides closer to the IoT devices/sensors and extends the Cloud-based computing, storage, and networking facilities

T. A. Bhat, J. S. Saini, published a paper on fog cloud named "Load balancing in Fog-Cloud Environment". In this paper, the researcher gives the task through the experimental simulation which shows a significant decrease in the parameter values for local tasks at the fog computing.

Aarti, Supreet Kaur, published a paper on fog computing named as" A Survey in fog Computing". In this paper, the researcher gives a view on the flow best in class exploration in the region of fog computing and IoT innovation.

III. WORKING

Fog computing operates by deploying fog nodes throughout your network. Devices from controllers, switches, routers, traffic signals, and video cameras can act as fog nodes. These fog nodes can then be used in target areas such as your office floor or within a vehicle. When an IoT device makes data, this can then be interpreted via one of these nodes without having to be sent all the way back to the cloud. The main contrast between cloud computing and fog computing is that the above provides centralized access to resources whereas the latter provides decentralized local access. It refers to the number of applications or network traffic among many servers in order to improve the capacity and security of the applications [10].

It is the division of the task performed by a single computer into many computers so that more work gets done at the same time. By this number of workloads and the computing devices, we can manage the workload requirements in a better way by allocating resources (requests in this case) among multiple servers and will serve users fast. This will lead to high availability and increased reproduction rates.

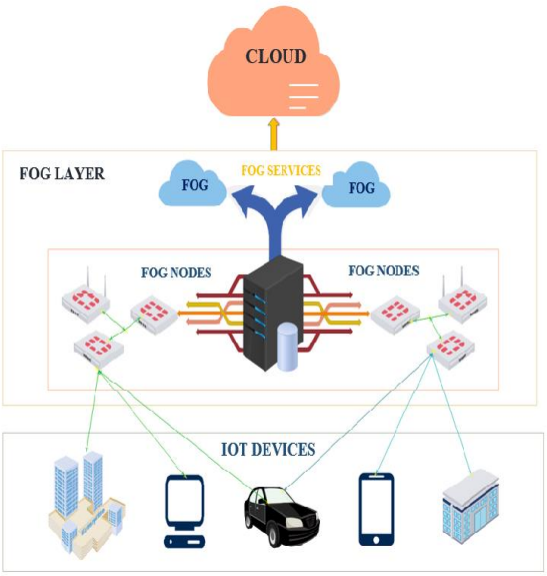

Fig1. - Fog Computing architecture.

Transporting data through fog computing has some following steps:

- Signals from IoT devices are wired to an automation controller which then executes a control system program to automate the devices.
- The control system program sends data through to an OPC server or protocol gateway.
- The data is then converted into a protocol that can be more easily understood by internet-based services (Typically this is a protocol like HTTP or MQTT) [11].
- Finally, the data is sent to a fog node or IoT gateway which manages the data for further study. This will clean the data and, in some cases, save it to deliver over to the cloud later.

Advantages of Fog Computing

- It provides better security. Fog nodes can be protected using the same procedures followed in the IT environment.
- It processes selected data locally instead of sending them to the cloud for processing. Hence it can save network bandwidth. This leads to lower operational costs.
- It reduces latency requirements and hence quick decisions can be made. This helps in avoiding accidents.
- It is easy to develop fog applications using right tools which can drive machines as per customers need.
- Fog nodes are mobile. Hence, they can join and leave the network at any time.
- Fog nodes can withstand harsh environmental conditions in places such as tracks, vehicles, under the sea, factory floors, etc. Moreover, it can be installed in offers remote locations.
- Fog computing offers a reduction in latency as data are analysed locally. This is due to less round-trip time and less amount of data bandwidth.
- It prohibits accidents, quick processing of decision and gets less time.
- It provides better privacy than the others, where each industry can store their confidential data servers.

Advantages of Fog Computing

- Encryption algorithms and security policies make it more challenging for arbitrary devices to exchange data. Any mistakes in security algorithms guide to exposure of data to the hackers.
- Other security issues are IP address spoofing, a man in the center attacks, wireless network security, etc.
- To achieve high data elasticity in fog computing is exciting and requires more efforts.
- Fog computing will realize the global storage concept with unlimited size and speed of local storage but data management is a challenge.
- Trust and authentication are essential concerns.
- Scheduling is difficult as tasks can be moved between client devices, fog nodes, and back end cloud servers.
- Power consumption is high in fog nodes connect to centralized cloud architecture.

Limitation of Fog Computing

Physical location – Perhaps the most significant condition of fog computing is that it is much larger geographically restrictive than a cloud service. A cloud service can be accessed from everywhere whereas fog computing is used to communicate with devices on a social level. It doesn't have any centralized access [10].

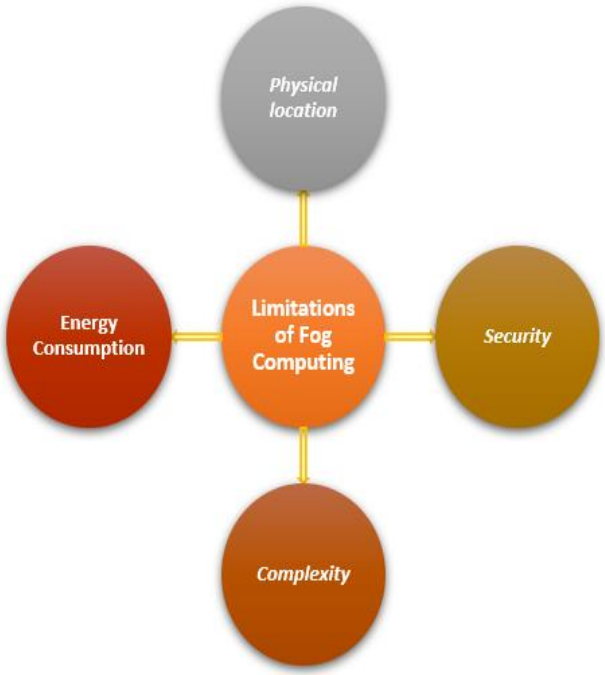

Fig 2. - Limitations of Fog Computing.

Security – Another key concern is one of security. Fog computing relies on advancing those close to the list of the network and the fog nodes to maintain them and protect them against malicious entities. The lack of clarity of these systems due to their physical location can transmit enterprises open to external threats.

Complexity – If you're using a network with traditional infrastructure, cloud services, and fog computing, things can get very complex quickly. All of this architecture needs to be sustained, and adding a patchwork of these complex technologies together makes this a very difficult task.

Energy Consumption- Since fog environments use large number of fog nodes, the computation is divided and can be less energy-efficient. Hence, reduction of energy consumption in fog computing is necessary.

IV. CONCLUSION

The various use of fog cloud, fog computing is use different field like Internet of Things and it's better to use fog with cloud to optimize the quality of service. It reduces the time, and less amount of network use and energy consumption also on running tasks on fog than cloud. In this paper we studied working of fog computing, architecture, challenges of Internet of Things. And it also helped to understand the way to researcher by their advantages and limitation. Fog computing has become in trend, which is used to find out and work as on latest research by providing advanced tools for the researcher to their respective field.

V. REFERENCES

[1]. T. A. Bhat, J. S. Saini," Load balancing in Fog-Cloud Environment" Vol. 7(5), May 2019, E-ISSN: 2347-2693

[2]. Stojmenovic, Ivan, "Fog computing: A cloud to the ground support for smart things and machine-to-machine networks", Telecommunication Networks and Applications Conference (ATNAC), Australasian, IEEE, pp.117-122, 2014.

[3]. V. Kumar, A. A. Laghari, S. Karim, M. Shakir, A. A. Brohi, "Comparison of Fog Computing & Cloud Computing", I.J. Mathematical Sciences and Computing, Vol. 1, pp.31-41, 2019.

[4]. S. Aguru, B. M. Rao, "Data Security In Cloud Computing Using RC6 Encryption and Steganography Algorithms" International Journal of Scientific Research in Computer

Sciences and Engineering, Vol.7, Issue 1, pp.6-9, 2019.

[5]. M.Q. Tran, D.T. Nguyen, V.A. Le, D.H. Nguyen T.V. Pham, “Task Placement on Fog Computing Made Efficient for IoT Application Provision”, Wireless Communication and Mobile Computing, Vol. 2019, pp.1–1, 2019.

[6]. M. Taneja, A. Davy, “Resource aware placement of IoT application modules in Fog-Cloud Computing Paradigm”, In the Proceedings of the 2017.

[7]. Shubha Brata Nath, Harshit Gupta, Sandip Chakraborty, Soumya K Ghosh; A survey of fog computing and communication: Current researches and future directions; IEEE Communication Surveys and Tutorials; April 2018

[8]. Sai Keerthi.Tulluru, Dr. Anuradha S.G. "Fog Computing a Paradigm: Scenarios and Security Issues"International Journal of Engineering Research in Computer Science and Engineering (IJERCSE) Vol 5, Issue 4, April 2018

[9]. Blesson Varghese, Nan Wang, Dimitrios S. Nikolopoulos and Rajkumar Buyya; Feasibility of Fog Computing; arXiv:1701.05451v1 [cs. DC]; 19Jan 2017.

[10]. Pengfei Hu, Sahraoui Dhelim, Huansheng Ning and Tie Qiu; Survey on Fog Computing: Architecture, Key Technologies, Applications and Open Issues; ELSEVIER Journal of Network and Computer Applications 98 (2017); DOI: 10.1016/j.jnca.2017.09.002; September 12, 2017

[11]. Chiang, Mung, and Tao Zhang. "Fog and IoT: An overview of research opportunities." IEEE Internet of Things Journal 3.6 (2016): 854-864.