International Journal of Engineering Technology, Management and Applied Sciences

IJETMAS

www.ijetmas.com August 2017, Volume 5, Issue 8, ISSN 2349-4476

Fog Computing : A way for IoTs to communicate.

M.Sanju
Information Technology, Final year
Sri Sai Ram Engineering College,
Chennai, India

Abstract— Fog computing or fog networking, also known as fogging, is an architecture that uses a lot of end-user clients or near-user interface devices to log a substantial amount of storage (rather than storing it primarily in cloud servers), communication (rather than routed over to the cloud server), and control, configuration, measurement and management (localized to the grid control device rather than managing at server side).

I. INTRODUCTION

The **Internet of Things** (**IoTs**) is the network of physical objects and devices, and other items in the form of an embedded system with electronics, software, sensors, and network connectivity that enables these objects to collect and exchange data. When an IoTs device is augmented with sensors and actuators which also encompasses technologies such as smart grids, smart homes, intelligent transportation and smart cities. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing Internet infrastructure. Experts estimate that there will be 50 billion IoTs working seamlessly by year 2020.

II. IMPLEMENTATION METHODS

A. IoT and Cloud

Cloud computing offers services for analytics and storage of big data. When coupled with IoTs, it helps IoTs to communicate amongst each other.

B. IoT and Fog

Fog computing allows interaction between IoTs to happen at a local level i.e., using a 'Private Cloud'. Fog is nothing but a network switch which routes the messages to and from IoTs.

III. COMPARISON

Cloud Computing	Fog Computing
Data and applications are processed in a cloud which is a time consuming task for large data	Rather than working in a cloud, fog operates on network switch. So time consumption is less.
Problem of bandwidth as a result of sending every bit of data over cloud channels	Less demand for bandwidth as every bit of data's were aggregated at certain access points instead of sending over cloud channels
Slow response time and scalability problems as a result of depending servers that are located at remote places.	Bye setting small servers called edge severs in a visibility of users, it is possible for a fog computing platform to avoid response time and scalability issues.

IV. WORKING OF THE SYSTEM

C. Process involved in Fog Computing

a) Data is collected from sensors, devices to the network switches, routers, access points or a set top box.

b) Data is collected from heterogeneous sources.

c) Data gathered is organized and based on the rules, then actions are taken.

d) The data is computed at the access point itself and the action to be taken is communicated back to the sensors.

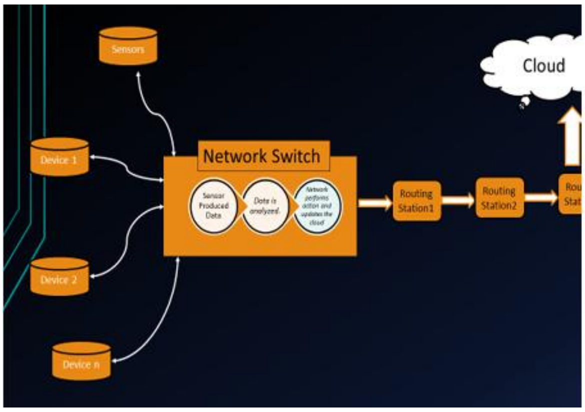
e) Secure, end-to-end Communication is ensured.

f) Link Layer security for sensor nodes.

g) Transport layer security for controller to cloud communication.

h) Aggregation and compression is done.

i) Data is uploaded to cloud periodically to reduce bandwidth usage.



The network switch (or) access point is connected with IoT devices and sensors, both forward and backward. The network switch collects the sensor produced data and messages from the devices, then the data is analyzed and necessary actions are performed and finally the switch decides whether to store it locally or upload to the cloud. If to be uploaded to the cloud, it does multiple hops through several routing stations and finally is uploaded to the cloud.

V. Applications

- Smart Traffic Monitoring
- Smart buildings
- Self-monitoring trains
- Temperature monitoring scenarios

D. Smart Traffic Monitoring

A smart traffic monitoring system based on IoTs would consist of dynamic traffic light switching, speed monitoring and pedestrian detection etc.

All of these monitoring packages would be controlled by WAPs which would then send the collective data back to the cloud server.

E. Smart Building

A grid based control system for smart buildings allows devices, machinery etc. to converse with each other and increase performance, productivity of the given building.

F. Self-Monitoring Trains

Since trains run on predefined tracks, self-monitoring trains using IoTs can be effectively implemented, IoTs present on train can control the speed, AC etc. in the train and contact the cloud in need of necessary instructions. In case of line signals, IoTs can be implanted on those signal posts itself and thereby when in range, signals can be given to the train.

VI. Advantages

- Bandwidth usage reduction due to periodic polling.
- Reduced congestion on network, thus freeing up network for users.
- Data is processed closer to its source, Fog Computing can expedite computations and processes enabling organizations to go from chimeric 'near real-time' processing speeds to true real-time processing.
- Data security is uncompromised, since almost all transfer is local.
- Low failure rate since processing is local.
- Elimination of bottlenecks due to network crash.
- Increased integration of inanimate objects.

VII. Disadvantages

- Limited processing power at access points.
- Localization of data is variable, since parts of data can be stored in cloud whereas the rest is kept local.
- Security is a big concern in fog computing. Certain organizations feel more comfortable having their data in a centralized location rather at a remote location.
- There is a perspective Fog Computing merely adds to the number of Cloud options (public, private, hybrids, cloudlets, etc.) and is needlessly complicating the existing architecture that is already complex enough. Conceivably, such pundits would harbor the same opinion about the IoTs in general.
-

VIII. Scope

In future many models for Fog devices can be developed. Independent Fog devices consult directly with the Cloud for periodic updates for messages and instructions, while interconnected Fog devices may consult each other. The following are some systems that have a scope for implementation of fog computing:

- Smart Grid.
- Smart Buildings.
- Emergency Services.
- Utility Service.
- Environment Monitoring.
- Transportation.
- Park irrigation.

IX. REFERENCES

- en.wikipedia.org
- FOG COMPUTING DISTRIBUTING DATA AND INTELLIGENCE FOR RESILIENCY AND SCALE - Charles C. Byers, **PATRICK WETTERWALD** (http://ubiquity.acm.org/article.cfm?id=2822875)
- **Forget 'the Cloud'; 'the Fog' Is Tech's Future - CHRISTOPHER MIMS.**