Implementation of Fog Computing in Cloud Enterprise for Data Security and Privacy Management

Poorva Khemaria, Shiv Kumar, Babita Pathik

Abstract: advancement of cloud technology named as fog computing. The process of fog computing faced a problem of latency and internet connectivity. The access of data over the fog computing need some trust based authentication and authorization process. In fog computing environment two major issue one is data leakage and other is location privacy. The location privacy preserve the user access and authentication process. The location privacy in fog computing is major issue. For the location privacy used various authentication and authorization process. To address these dangers, auditable information stockpiling administration has been proposed with regards to distributed computing to secure the information. Strategies, for example, holomorphic encryption and searchable encryption are consolidated to give uprightness, confidentiality and variability for distributed storage framework to permit a customer to check its information put away on untrusted servers. In this paper used Bloom filter data structure for the location privacy in fog computing model. The fog computing model work very efficiently in terms of low latency and high speed.

Keywords: - WSN, AOI, POI, SA, BM, CEP.

I. INTRODUCTION

Distributed computing liberates the undertaking and the end client from the particular of many subtle elements. This ecstasy turns into an issue for inactivity delicate applications, which require hubs in the region to meet them postpone necessities. A rising rush of Internet arrangements, most quiet the Internet of Things (IoTs), requires portability bolster and geo-appropriation notwithstanding area mindfulness and low inactivity. They contend that another stage is expected to meet these necessities; a stage they call Fog Computing, or, quickly, Fog, basically in light of the fact that the mist is a cloud near the ground. They likewise guarantee that as opposed to tearing apart Cloud Computing, Fog Computing empowers another type of uses and benefits, and that there is a productive interaction between the Cloud and the Fog, especially with regards to information administration and examination [1].

This execute is sorted out as takes after. In the second segment, they present the Fog Computing worldview, outline its qualities, and those of the stage that backings Fog administrations. The accompanying area investigates a couple key applications and administrations of premium that substantiate their contention for the Fog as the regular part of the stage required for the support for the Internet of Things. In the fourth segment, they look at investigation and enormous information with regards to utilizations of premium. The acknowledgment that some of these applications request constant examination and in addition long haul worldwide information mining represents the interaction and correlative parts of Fog and Cloud [1].

The first Wireless Sensor Nodes (WSNs), nicknamed bits, were intended to work at to a great degree low energy to stretch out battery life or even to make vitality gathering doable. The vast majority of these WSNs include an extensive number of low data transmission, low vitality, low preparing power, little memory bits, working as wellsprings of a sink (gatherer), in a unidirectional manner. Detecting nature, straightforward handling, and sending information to the static sink are the obligations of this class of sensor systems, for which the open source TinyOS2 is the true standard working framework. Bits have demonstrated helpful in an assortment of situations to gather ecological information [1].

Vitality obliged WSNs progressed in a few headings: numerous sinks, portable sinks, different versatile sinks, and portable sensors were proposed in progressive incarnations to meet the necessities of new applications. However, they miss the mark in applications that go past detecting and following, yet oblige actuators to apply physical activities[2].

Actuators, which can control either a framework or the estimation procedure itself, convey new measurements to sensor systems. The data stream is not unidirectional, but rather bi-directional. In a subtler, yet huge way, it turns into a shut circle framework, in which the issues of strength and potential oscillatory conduct can't be disregarded [10].

The rest of paper discuss as in section 2 discuss the Complex Event Processing. In section 3 discuss the Problem Formulation. In section 4 discuss proposed Work. In section 5 discuss the experimental result and analysis. finally discuss conclusion & future work in section 6.

II. COMPLEX EVENT PROCESSING

Complex Event Processing (CEP) is a key worldview to acknowledge such applications. Changes in sensor estimations are demonstrated as occasions,

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while the application is displayed as set of occasion driven administrators. Such administrators take surges of occasions as info, process them and create new occasion streams [5].

Virtualized registering situations, i.e., mists or mists, give flexible assets, which is exceptionally speaking to bolster substantial scale CEP frameworks. Cloud server farms offer for all intents and purposes unlimited assets to execute a tremendous measure of administrators, in any case, force high correspondence idleness since it requires exchanging occasions from a client through the center system to the server farm. Mist figuring, an asset worldview proposed by Cisco, takes into consideration handling on asset compelled gadgets close clients, similar to switches, for low end-to-end latencies. An alliance of both mists and hazes can bolster profoundly heterogeneous frameworks, where arrange escalated administrators are set on disseminated mist hubs and computational-concentrated administrators in the cloud [5].

III. PROBLEM FORMULATION

The spillage of private data, for example, information, area or use, are picking up considerations when end clients are utilizing administrations like distributed computing, remote net-work, IoT. There are additionally challenges for safeguarding such protection in mist processing, since haze hubs are in region of end clients and can gather touchier in-development than the remote cloud lying in the center system. Protection safeguarding procedures have been proposed in numerous situations including cloud [4], shrewd matrix [28], remote system [7], and online informal organization [14].

A. Data Privacy

In the mist organize, protection saving calculations can keep running in the middle of the mist and cloud while those calculations are typically asset denied toward the end gadgets. Mist hub at the edge as a rule gathers touchy information produced by sensors and end gadgets. Strategies, for example, holomorphic encryption can be used to permit security safeguarding collection at the neighborhood doors without decoding.

B. Location Privacy

In mist processing, the area security essentially alludes to the area protection of the haze customers. As a haze customer, ordinarily offloads its errands to the closest mist hub, the haze hub, to which the undertakings are offloaded, can deduce that the haze customer is adjacent and more remote from different hubs. Besides, if a haze customer uses different mist administrations at numerous areas, it might uncover its way direction to the mist hubs, expecting the mist hubs intrigue. For whatever length of time that such a haze customer is joined on a man or a vital protest, the area security of the individual or the question is at hazard.

IV. PROPOSED METHODLOGY

In this section discuss the improved bloom filter for the Fog severs location privacy preservation. Here modified the vector counter of the location the value of M-counter stored in the vector with the index value of an incoming query and server proceeds data. The value of query generated transforms location of same query and send to server for the processing. Transform location is basically a validation point of area of interest and position of interest. The size of LBP vector is subtracted by the size of M*k matrix. it is a maximum limit for accepting query. After getting the value of transform counter check the maximum frequent change value of transform. In this time duration compute the maximum change frequent value of the M-counter and generate the near location according to the query.

Let us assume that

e= frequent change value of M-counter

H(x) = index of query

LBP = reduce bloom vector

T= time duration hop of frequent counter value

SA= result query

Now generating the value of transform query

$$SA= \sum_{i=0}^{F(e)} (hf(e) \times ti)$$

A. Process Flow Diagram of Model

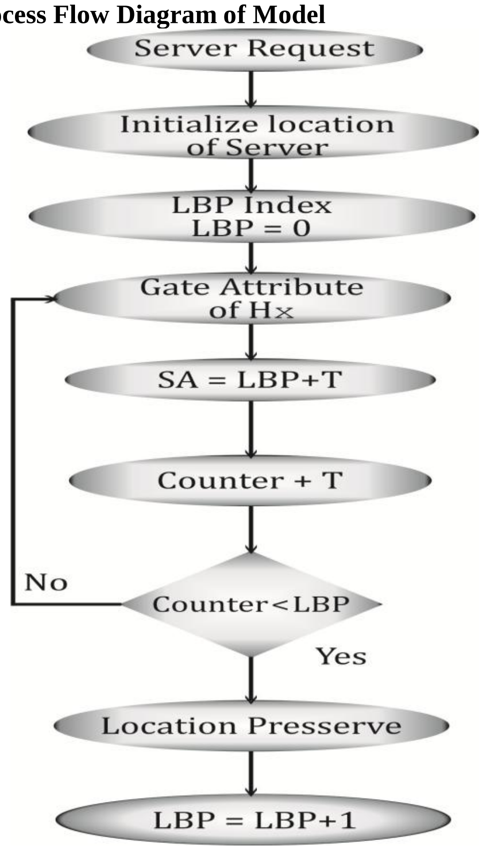

Figure1: Process of Proposed Algorithm

B. Algorithm for Frequent Vector Value: -

When a counter value of filter (M) is turn on and turn off the frequency of counting e is coming .it is necessity to insert e into LBP data structure. When the value of e generates query massage then the value of e is removed from the LBP data structure.

Algorithm: - inserting frequency of counter e

Input LBP, e, T

Outputs update LBP and SA

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(1) i<-0;
(2) while (i<T(e))
(3) temp<-LBP(e)
(4) if(temp<Ti) then
(5) LBPi.add(e)
(6) Return LBP,T
(7) End if;
(8) LBPi. remove (e,temp)
(9) T.increase(e);
(10) i++
(11) end while
(12) LBP.add(e);
(13) T.add(e,i);
(14) Return LBP, T

Now the result query is captured and transforms result of frequent element e value from LBP vector

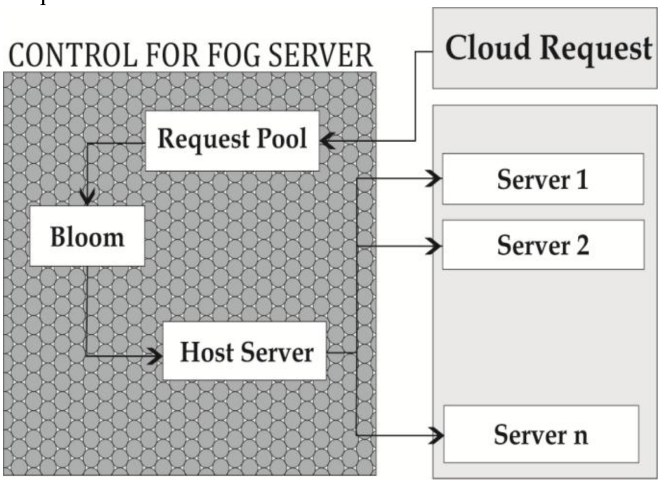

Figure.2: Process Block Diagram of Fog Server with Proxy Server.

V.RESULT ANALYSIS& DISCUSSION

To interact with various services in the Fog computing and to maintain the privacy of server location in cloud environment. To evaluate the performance of cloud computing techniques in cloud computing environment for the extension of server, here we are using various numbers of fog based computing topology for the purpose a simulation with a proposed method. For the further implementation and comparison for performance evaluation we used java programming languages with Net Beans IDE 8.0.1 tools for complete implementation/results process.

Frequent element e value from LBP vector.

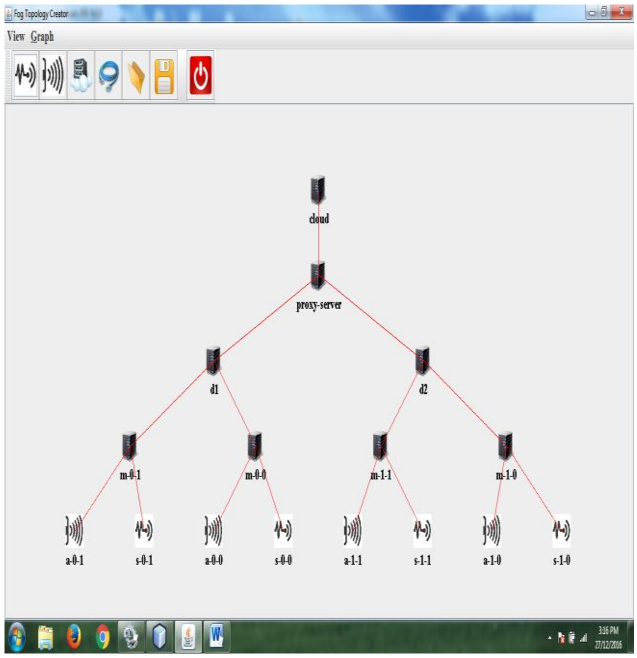

Figure.3: Window Show The Browsed Topology After Importing Physical Topology In The Implementation Work. This Topology Consists of Proxy Fog Server and Intermediate Server for Location Preservation with Data Actuator.

Table 1: Performance Evaluation for BM Method of Random, Lowest Latency and Maximum Capacity Basis on Node Value. The Different Vlue of Llantency Shwos the Behaviours of Fog Node Conntected with the Server.

Node Value	1	2	3	4	5
Random	0.35	0.28	0.2	0.15	0.08
Lowest Latency	0.3	0.2	0.12	0.05	0.02
Maximum Capacity	0.35	0.28	0.2	0.15	0.08

Table 2: Performance Evaluation for SA Method of Random, Lowest Latency and Maximum Capacity Basis on Node Value. The Maximum Capacity of Fog Node Indicate The Performance Behaviors of Data Preservation During the Processing of Fog to Proxy Server.

Node Value	1	2	3	4	5
Random	0.35	0.28	0.2	0.15	0.08
Lowest Latency	0.25	0.17	0.08	0.04	0.001
Maximum Capacity	0.35	0.28	0.2	0.15	0.08

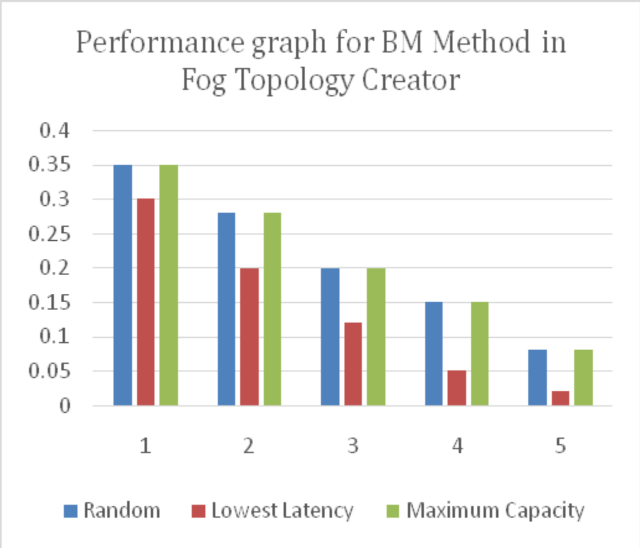

Figure 4: Shows t the performance evaluation graphs ofBM method for Random, Lowest Latency and Maximum Capacity in Fog Topology Creator. The variation of lantecy shows the capacity of og node extension for the processing of random view of topology.

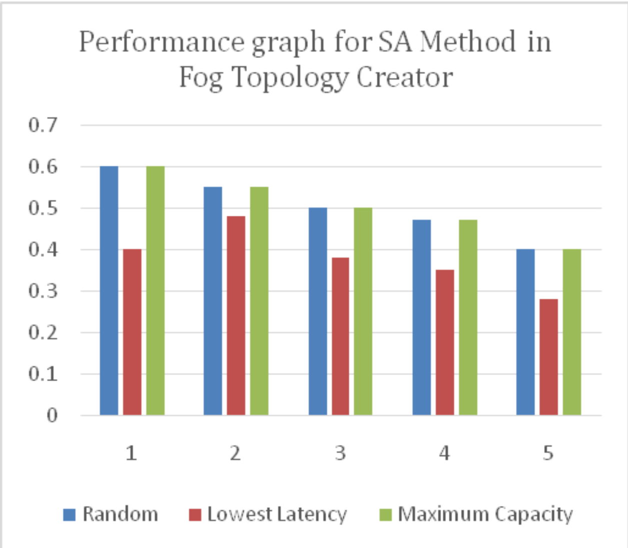

Figure 5: Graph Parameter Indicates the Capacity of Fog Nodes during the Communication Capacity of Topology Behaviors in Terms of Number of Nodes and Connection

VI. CONCLUSION AND FUTURE WORK

In this paper proposed location privacy preservation algorithm using improved bloom filter. Bloom filter is basically data structure and map the single bit information. The proposed method based on two basic processing feature of GPS area of interest (AOI) and position of interest (POI). The proposed algorithm validated the real location of privacy preservation. The proposed algorithm preserves location privacy at low computational and communication cost. In this dissertation modified the bloom filter for the processing of privacy preservation in location based services. The proposed method is very efficient for the location and position privacy. The proposed algorithm used the value of counter for the process of user location query according. The transform value of query produces the near value of user location and preserves the real location of user. A key feature of the system is that we get rid of the fully trusted entities to provide enhanced security. In our future work, we will improve our scheme by deploying multiple counters to avoid the potential bottleneck between the users and the spatial location and ensure the high security of the system.

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