FOG COMPUTING AND ITS IMPLEMENTATION WITH CLOUD

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Abstract – Distributed computing is utilized as a conveyance stage which is a promising way forstoring client information and gives a secureaccess to individual and business information. The clients are furnished with on-demand services through the Internet. Fog Computing stretches out the Cloud Computing paradigm to the edge of the system, along these lines Empowering another type of utilizations and services. The mist registering gives theservices like information, process, stockpiling andapplication to end client. Mist Computing isnot a substitution of cloud, it just extendsthe distributed computing by giving security in the cloud condition.

Keywords: Fog Computing, Sensors,Actuators, Smart Traffic Light

INTRODUCTION

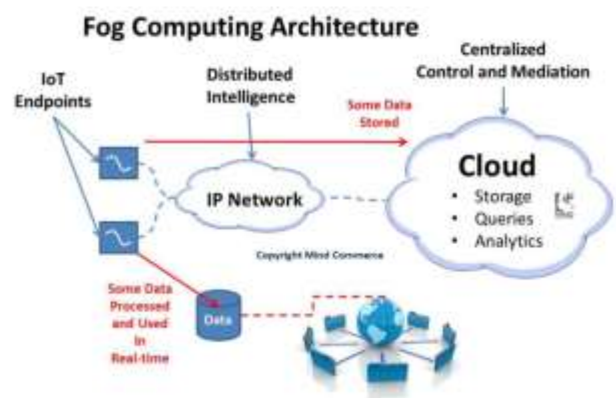
Fog computing also known as fogging is a distributed computinginfrastructure in which some applicationServices are handled at the network edge in a smart device. Fog is another layer of a distributed network environment and is closely associated with cloud computing and the internet of things (IoT). Public infrastructure as a service (IaaS) cloud vendors can be thought of as a high-level, global endpoint for data; the edge of the network is where data from IoT devices is created.

Importance of Fog Computing:

1. Efficiency: Pooling of local resources. There are typically hundreds of giga byte sitting idle on tablets, laptops and set-topboxes in a household every evening, oracross a table in a conference room, oramong the passengers of a public transitsystem. Similarly, idle processing power,sensing ability and wireless connectivitywithin the edge may be pooled within a Fognetwork.

2.. Agility: Rapid innovation and affordablescaling. It is usually much faster and cheaperto experiment with client and edge devices. Rather than waiting for vendors of largeboxes inside the network to adopt an innovation, in the Fog world a small team may take advantages of smart phone APIand SDK, proliferation of mobile apps, and offer a networking service through its ownAPI.

Schematic Diagram:



II. LITERATURE SURVEY

Fog computing is an architecture that extends the paradigm of cloud computing to Internet of Things by placing higher-powered nodes between smart object (SO) networks and the cloud computing and data storage backbones.

The fog placed at the perfect position: IoT nodes are closer to the action, but for the moment, they do not have the computing and storage resources to perform analytics and machine learning tasks. Cloud servers, on the other hand, have the horsepower, butare too far away to process data and respond in time. The fog layer is the perfect junction where there are enough compute, storage and networking resources to mimic cloud capabilities at the edge and support the local ingestion of data and the quick turn around of results.A study by IDC estimates that by 2020, 10percent of the world's data will be produced by edge devices. This will further drive the need for more efficient fog computing solutions that provide low latency and holistic intelligence simultaneously.
Fog computing has its own supporting body, the Open Fog Consortium, founded in November 2015, whose mission is to drive industry and academic leadership in fog computing architecture. The consortium offers reference architectures, guides, samples and SDKs that help developers andIT teams understand the true value of fogcomputing.
Analytics software companies are alsoscaling products and developing new tools for edge computing. Apache Spark is an example of a data processing framework based on the Hadoop

ecosystem that issuitable for real-time processing of edge generated data. Insights obtained by the cloud can help update and tweak policies and functionalityat the fog layer.

Characteristics of Fog Computing

Fog Computing is a highly virtualized platform that provides compute, storage, andnetworking services between end devicesand traditional Cloud Computing DataCenters located at the edge of network.
Edge location, location awareness, andlow latency: Fog computing supportsendpoints with finest services at the edge ofthe network.
Large-scale sensor: Networks to monitor the environment and the Smart Grid areother examples of inherently distributed systems, requiring distributed computing and storage resources.
Very large number of nodes: As a consequence of the wide geo-distribution, as evidenced in sensor networks in general and the Smart Grid in particular.
Support for mobility: It is essential formany Fog applications to communicatedirectly with mobile devices, and therefore support mobility techniques, such as the LISP protocol, that decouple host identity from location identity, and require adistributed directory system.
Real-time interactions: Important Fogapplications involve real-time interactionsrather than batch processing.
Heterogeneity: Fog nodes come in differentform factors, and will be deployed in a widevariety of environments.

III. PROPOSED SYSTEM

The architecture shows relationship between fog and Cloud. We can develop any application based on this model.

With comparisons to other computing technologies, the definition and architecture of FC are presented in this paper. The framework of resource allocation for latency reduction combined with reliability, fault tolerance, privacy, and underlying optimization problems are also discussed. We then investigate an application scenario and conduct resource optimization by formulating the optimization problem and solving it via a genetic algorithm. The resulting analysis generates some important insights on the scalability of the FC systems.

IV APPLCATIONS OF FOG COMPUTING:

Smart Grid : The smart grid is an electricity distribution network, with smart meters deployed at various locations to measure the real time status information.
A centralized server called SCADA system gathers and analyzes the status information, and sends commands to respond to any demand change or emergency to stabilize the power grid. Fog computing can benefit the smart grid greatly. With fog computing, SCADA can be complemented by a decentralized model with micro-grids, which can not only improve scalability, cost efficiency, security, and rapid response of the power system but also integrate distributed power generators (wind farms, solar panels, and PHEVs) with the main power grid. With fog computing, the smart grid will turn into a multitier hierarchical system with the interplay between the fog and SCADA [2], [27].

In such system, a fog is in charge of a micro-grid and communicates with neighboring fogs and higher tiers. The higher the tier, the larger the latency, and the wider the geographical coverage

Self Maintaining Train: Another application of fog computing is selfmaintaining trains. A train ball-bearing monitoring sensor will sense the changes in the temperature level and any disorder will automatically alert the train operator and make maintenance according to. Thus we can avoid major disasters.

Smart Traffic lights: Fog enables traffic signals to open lanes on sensing flashing lights of the ambulance. It detects presence of pedestrian and bikers, and measures the distance and speed of the close by vehicles. Sensor lighting turns on, on indentifying movements and vice-versa. Smart lights serves as fog devices synchronize to send warning signals to the approaching vehicles. The interactions between vehicle and access points are enhanced with WiFi, 3G, road side units and smart traffic lights.

V.CONCLUSION

Fog computing, the new concept of thecloud at the edge of the network, is considered the appropriate platform formany Internet of Things services and applications along with virtualization of AAWSN/WSAN. Fog computing gives the cloud a companion to handle the extra bytes of data generated daily from the Internet of Things. Processing data closer to where it is produced and needed to solve the challenges of exploding data volume, variety, and velocity. It avoids the need for costly bandwidth additions by offloading giga bytes of network traffic from the core network. It also protects sensitive IoT data by analyzing it inside company walls. Ultimately, organizations that adopt fog computing gain deeper and faster insights, leading to increased business agility, higher service levels, and improved safety.
Hence, we can come to the conclusion that fog computing and cloud computing will complement each other while

having their own advantages and disadvantages. Fog computing will grow in helping the emerging network paradigms that require faster processing with less delay and delay jitter, cloud computing would serve the business community meeting their high end computing demands lowering the cost based on a utility pricing mode.

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