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Cloud of Things: Anintegrated Model For Cloud Computing and Iot

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Abstract: In the recent trends, Cloud computing has taken the computing from a desktop to the whole world wide web.In the current scenario the users need not to worry about the maintenance and management of all the resources. Whereas, IoT is no more a buzzword in today's world. It has gained a lot of importance and therefore in the future the data produced by IoT will be too large in term of storage, so to maintains such data there is a need of integration of IoT with cloud computing.Cloud of Things is anIoT connected merchandise management that allows its customers to attach any device to any cloud. This article studies the various perspective related to cloud of things.This article also explains the layered architecture which is used for representing the integration of cloud computing with IoT. At the end the author has purposed a model for the integration of cloud computing with the IoT for providing efficient user services.

Keywords: layered architecture, merchandise, cloud services, models of computing

1. INTRODUCTION

In the advancement of the web a large number of devices are ready to connect among themselves.This evolution of the web has given the interesting idea of connecting various objects together.

Kevin choreographer [1] additionally visualised that imminent technology of commuting would be additional addicted to computer-enabled objects or things that generate huge information, instead of information originated by societies. therefore, the thought of the web of Things is originated. The primary objective of this idea is the perception and clarity of encompassing information. Ultimately, this might be ready to track and count every object within the world [2]. This article refers to the web of Things and cloud domains that area unit operated with Web-based services.It have a tendency to use the web of Things with cloud domains presents widened prospects, together with sensible grids to boost potency and responsibility of power supplies; intelligent transportation to optimize traffic management and scale back traffic accidents, and monitor setting or management of medical data, hospital wards, patient care, and drug provision and to form the cities smarter and to assist them facing the rising challenges like economical energy management, economic process and development.

However, there are few challenges have been faced regarding the application development [3][4]. Some of them are subsequent wave within the era of computing. The developer must

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pay attention of running operational systems, networks, load equalisation, routers, firewalls, and storage, whereas desegregation these items and permitting them to act with the system. The developer additionally must take under consideration of quantifiability, or however the appliance may scale several geographically distributed users.

Cloud of things achieves reliable processing of IoTenables services. It alsoprovides storage of data on cloud which persist all information with efficiency and economically [5]. Cloud of Things may be a connected product management resolution that features a hardware-agnostic, platform freelance resolution of IoT

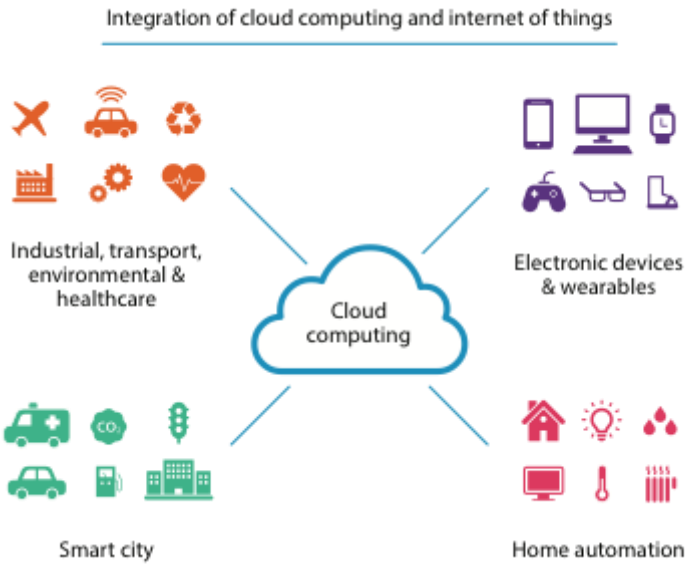

Fig 1: Representation of integration of Cloud computing and IoT

2. WHY DO WE NEED CLOUD OF THINGS?

Machines are going to be given informatics addresses and they communicate with one another. The Internet of Things, givingthese devices and other people sensors-based technology that creates plenty of information on usage. this is often known as huge knowledge.

The cloud of things helps in connecting machines. The Cloud of Things contribution to the engagement and management of connected devices. it's an IoT platform that collects sensing element knowledge from totally different machines and evaluates and visualizes them. A special mobile entrance is registered and designed on the Cloud of Things, reads out the machine knowledge and sends it to the cloud, wherever it's shown on the platform's dashboard.The flexibility to decide on multiple IoT hardware solutions and therefore the chance to simplydirect IoT electronic messaging from any device to any cloud exploitation any analytics engine unlocks IoT initiatives that are delayed because of long call processes.

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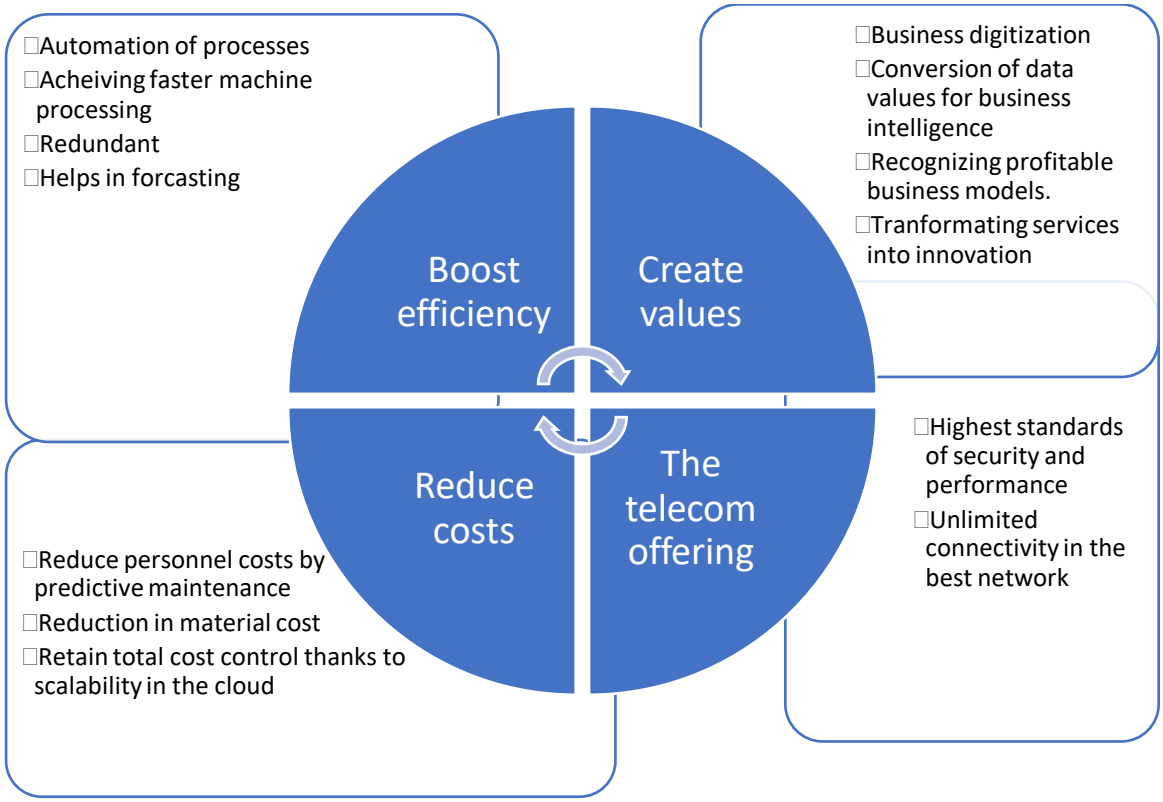

Fig2. The above diagram represents the benefits of integration of clout and IoT

As network will solely be universal if it is simple and economical to retrieve information from any physical item and place. This vast pool of information offers organizations visibility into elements of their operations antecedent thought-about "offline". Combined with real-time operation and prognosticative analytics, AnIoTbased capability deeply changes observation and management practices by sanctioning proactive resolution in response to period of time events, and ultimately, prognosticative capabilities[7].

3. PERSPECTIVE OF INTEGRATION OF CLOUD AND IoT

Many IoT cloud platform vendors seem to have adopted the "If we build it, they will come" mentality, meaning if the cloud platform is provided, then people will just plug their things into it. Unfortunately, in business, there are no whispers in beautiful fields of grain, just cold, hard facts. Even though a cloud platform can perform deep learning with neural networks using distributed elastic compute resources.

With the advancement of neural networks to generate the data, there is need of some intelligence – intelligence that requires software. For instance, the edge devices integrate with physical devices: with temperature sensors, light sensors, and vibration sensors, and legacy PLCs. These sensors have a variety of interfaces such as 0-10 Volt, 4-20 mA, and MODBUS over RS-232. This data could be communicated in its raw form to the cloud, but then the burden is on the cloud to understand a lot of detail about each and every device. Most IoT edge devices perform at least some of the conversion from the physical sensor/actuator to a

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logical set of information that is more generic for the cloud. For example, rather than interpret the voltage scale of a specific temperature sensor, the cloud platform can just read degrees Celsius.

Similarly,the edge-devices often manage the performance of the local network as well as the number of data points the gateway and cloud platform are exposed to by making some local decisions. For example, a fire-extinguisher monitoring application may only send the level of the fire extinguisher fluid when it drops below a certain amount rather than periodically. Some provide VM's for separating the core OS and networking functions (generally written in C) from the user application (written in a language such as Python). These also provide the added benefit of remotely upgrading the user application separate from the core OS and networking.There is need ofIoT cloud platforms to do much of the heavy processing, but also there is need for IoT Things platforms to answer the challenge of distributing intelligence to the Things.

4. ARCHITECTURE FOR CLOUD OF THINGS IMPLEMENTATION

The implementation of this technology offers a large number of benefits to the user. It offers the user with variety of services which helps in reducing the user efforts. IoT on Cloud Platform lets to include extraordinarily quick queries into the business and in operation surroundings, while not managing any infrastructure[9].It provides the worldwide service for time period and reliable electronic messaging and streaming information. There are various layers responsible for implementing this integration. Primarily there are four layers which are responsible for providing the services.

Network layer is responsible for receiving the information and transmit further to the next layer for processing. Ituses gateways for information collections. It uses two gateways which are responsible for sensing and collecting the information.The network layer makes use of several networks WSN or Wireless Sensor Networks, Body Sensor Network (BSN).

Control layer plays an important part in the architecture. This is the backbone of the layered architecture. This layer is responsible for analysing the data gathered from the network layer. It performs various computations on the data.

Service layer is responsible for providing a platform to various service providers to host their services. It offers a platform to handle the different services. All devices which are connected together provides services using this layer.

Actuation layer is used to represent the information which is received from control layer. There are two types of actuation manual or automatic. Manual actuation involves the human interaction where as in automatic it makes use of robotics.

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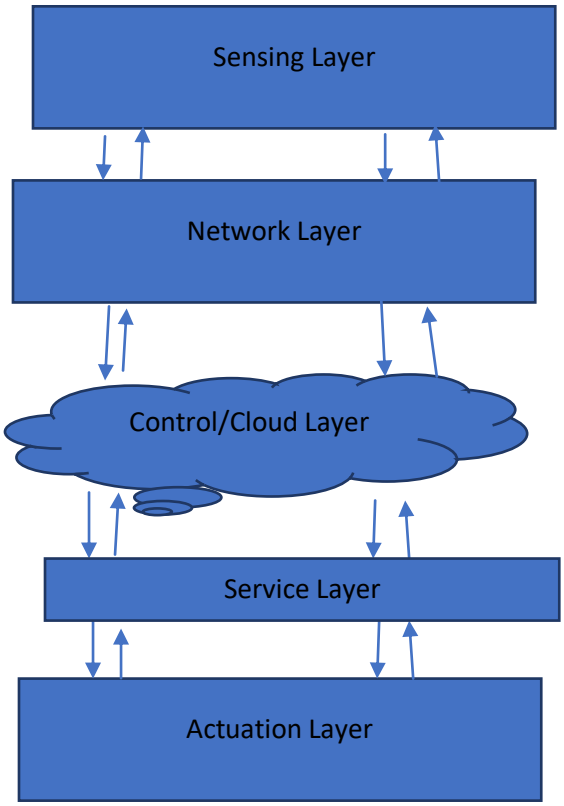

Fig 3: Represents role of multiple layers in Cloud of Things

5. PURPOSED MODEL

In the purposed model of integration of Cloud computing and IOT the author has given the secure communication model so that the huge data can be easily handled. In the today scenario as the large number of devices are already connected with each other so it can be expected that the data generated must be huge in volume [2]. The integration of Cloud computing and IoT is not a simple task, there are various security threats associated with this.

In the purposed model, the IoT enabled devices are linked to the edge computing where data is processed at the edge of the network connected. In other terms data processing occurs as soon as the data is generated by the IoT enabled devices. Once the data is processed it is further transferred to the next node in the network, which processes the data on the basis of fog computing. Fog computing is a decentralized computing interface in which data is stored and computed. It acts as an interface between the edge computing and cloud computing. Once the data analytics are performed, itproduces the more meaningful and secure form of data which is finally store in the cloud

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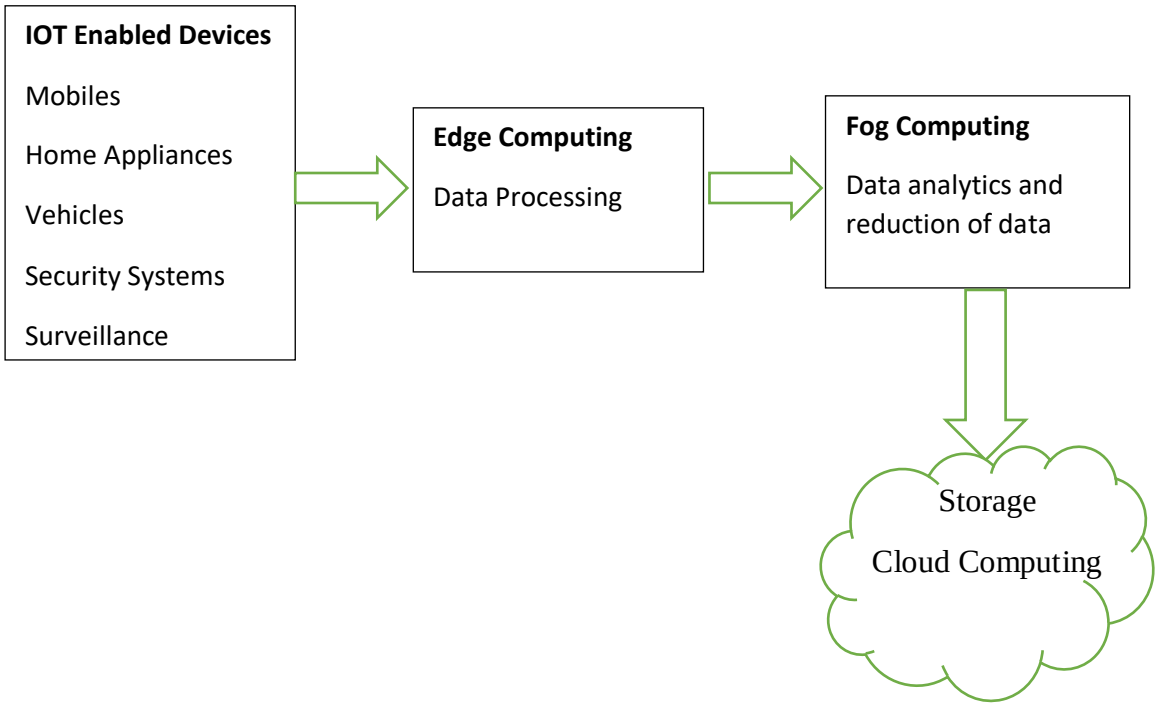

Fig 4: Purposed model for cloud of things

6. CONCLUSION

The integration of cloud computing and Internet of Things helps to reduce the human efforts. Cloud computing is responsible for providing the vast range of services to user like computing resources, storage capacity. It offers us platform, infrastructure and software as a service which helps in reducing the time for processing by the user. On the other side its integration with the IoT makes the task processing faster. It also ensures the security of the serviced provided. At the end we can say that cloud platform is the best integration with the IoTfor taking advantage of web-scale process, analytics, and machine intelligence. In future scope the data security algorithms can be implemented at the fog computing level so that the overhead of cloud can be reduced and it will offer more secure services to the user

6. REFERENCES

[1] Kevin Ashton, "That 'Internet of Things' Thing". In: RFID Journal, 22 July 2009; http://www.rfidjournal.com/article/view/4986/, retrieved by 20 July 2012.

[2] Nicholas Negroponte, "Wireless: Creating Internet of 'Things': A scary, but exciting", http://www.nytimes.com/2005/11/20/technology/20iht-wireless21.html, retrieved by 20 July 2012.

[3] TEKES, "Internet of Things Strategic Research Agenda (IoT--http:// www.internet-of-things-

ISSN: 0971-1260
Vol-22-Issue-17-September-2019

[4]N. Kumar, S. Zeadally, N. Chilamkurti and A. Vinel, "Performance analysis of Bayesian coalition game-based energy-aware virtual machine migration in vehicular mobile cloud," IEEE Netw., vol. 29, no. 2, pp. 62-69, Apr. 2015.

[5]J.Swetina, G. Lu, P. Jacobs, F. Ennesser and J. Song, "Toward a standardized common M2M service layer platform: introduction to oneM2M," IEEE Wireless Commun., vol. 21, no. 3, pp. 20-26, Jun. 2016.

[6]T.Taleb and A. Kunz, "Machine type communications in 3GPP networks: potential, challenges, and solutions," IEEE Commun. Mag., vol.50, no. 3, pp. 178-184, Mar. 2012.

[7]L.Atzori, A. Iera and G. Morabito, "The Internet of Things: A survey," Comput. Netw., vol. 54, no. 15, pp. 2787-2805, Oct. 2010.

[8]A. Al-Fuqaha, M. Guizani, M. Mohammadi, M. Aledhari and M. Ayyash, "Internet of things: A survey on enabling technologies, protocols and applications," IEEE Commun. Surveys Tut., vol. 17, no. 4, pp. 2347-2376, Nov. 2015.

[9]H. Zhang, P. Cheng, L. Shi and J. Chen, "Optimal DoS attack scheduling in wireless networked control system," IEEE Trans. Control Syst. Technol., vol. 24, no. 3, pp. 843-852, Aug. 2015.

[10] Aazam, Mohammad, et al. "Cloud of Things: Integrating Internet of Things and cloud computing and the issues involved." *Proceedings of 2014 11th International Bhurban Conference on Applied Sciences & Technology (IBCAST) Islamabad, Pakistan, 14th-18th January, 2014*. IEEE, 2014.

[11] Distefano, Salvatore, Giovanni Merlino, and Antonio Puliafito. "Enabling the cloud of things." *2012 Sixth International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing*. IEEE, 2012.

[12] Parwekar, Pritee. "From internet of things towards cloud of things." *2011 2nd International Conference on Computer and Communication Technology (ICCCT-2011)*. IEEE, 2011.

[13]Tei, Kenji, and LeventGürgen. "ClouT: Cloud of things for empowering the citizen clout in smart cities." *2014 IEEE World Forum on Internet of Things (WF-IoT)*. IEEE, 2014.

[14] Bhattasali, Tapalina, RituparnaChaki, and NabenduChaki. "Secure and trusted cloud of things." *2013 Annual IEEE India Conference (INDICON)*. IEEE, 2013.

[15]Sohal, Amandeep Singh, et al. "A cybersecurity framework to identify malicious edge device in fog computing and cloud-of-things environments." *Computers & Security* 74 (2018): 340-354.

[16] Wang, Xiaojie, et al. "A privacy-preserving message forwarding framework for opportunistic cloud of things." *IEEE Internet of Things Journal* 5.6 (2018): 5281-5295.

[17]Abdelwahab, Sherif, et al. "Cloud of things for sensing as a service: sensing resource discovery and virtualization." *2015 IEEE Global Communications Conference (GLOBECOM)*. IEEE, 2015.

[18] Stergiou, Christos, et al. "Secure integration of IoT and cloud computing." *Future Generation Computer Systems* 78 (2018): 964-975.