CIA1-IOT

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My views on research paper about Integration of Internet of Things and cloud computing: A SYSTEMATIC SURVEY

1 Introduction

IoT cloud systems describe how the Internet of Things (IoT) uses cloud computing technologies to store, process, and analyse massive volumes of data produced by IoT devices.

Data is gathered from IoT devices and delivered to the cloud in an IoT cloud system for storage, processing, and analysis. This enables scalability, real-time data processing, and simple data access from any location with an internet connection. Using cloud systems also makes it possible to utilise sophisticated analytics and machine learning algorithms to draw conclusions and make predictions from the data.

The following are some advantages of using IoT cloud systems:

Scalability: With cloud solutions, processing and storage capacity may be quickly increased or decreased as needed.

Real-time processing: By allowing for real-time data processing, cloud systems enable IoT systems to take prompt actions in response to the data they receive.

Cost-effectiveness: Because data is processed and kept off-site, cloud systems may be less expensive to maintain than on-premises technology.

Remote Access: From any location with an internet connection, data can be accessed remotely.

High Availability: Data is constantly accessible thanks to cloud systems' high availability.

Amazon Web Services (AWS), Microsoft Azure, and Google Cloud IoT are examples of popular IoT cloud platforms. These platforms offer a variety of services that can be used to create and implement IoT applications, including data storage, analytics, and machine learning.

2 My View

Cavalcante et al have presented an overview of development and investigation in a combination of cloud and IoT and presented direction for future researches. The results have presented that researches have been performed in the last three years. This shows increasing attention on this topic, therefore, new papers will be published in the upcoming years. In addition, the recently published papers do not have specific methods and develop deployments to prove the efficiency of suggested approaches. The selected researches by Cavalcante et al have been categorised into four main types:

(i) architecture (ii) platforms (iii) framework (iv) middleware

Another contribution of Cavalcante et al has shown that the combination of presented paradigms is limited. They are using their original purposes and new services grounded on the integration of cloud computing and IoT. Besides Cavalcante et al have presented the challenges of the studies to pave a way for future studies. These challenges are:

(i) presenting standardisation for cloud-based IoT services, data, and solutions

(ii) changing IoT devices to make a better usage of cloud applications

(iii) handling real-time and massive amount of data

(iv) how to handle embedded data

(v) lack of approaches for privacy and data security

(vi) paying attention to dynamicity and dependency

(vii) supporting deploy and developing of applications grounded on combination of cloud and IoT

(viii) presenting models for virtualisation of devices.

2.1 Background

A summary of the essential characteristics and basics of IoT and cloud computing has been presented.

2.2 Internet of Things

The development of the Internet of Things has been facilitated by recent advancements in the miniaturisation of electrical components and distant connections. Large-scale, scattered multi-factor elements that are situated in a dynamically changing environment that displays a remote network make up the Internet of Things. The functionality of millions of things spread across many different locations will be connected to each other to provide information for decision making. IoT devices have three features:

(i) the ability to communicate

(ii) the ability to be recognised

(iii) the ability to interact, sense, or act upon their surroundings.

2.3 Cloud computing

The "cloud" is made possible by the ubiquitous accessibility and availability of computing resources through Internet technology. The primary objective of cloud computing is to provide dependable, scalable, on-demand computing services accessible in distributed environments. As a relatively new technology, cloud computing offers a pool of computing resources that may be used on a pay-per-use basis. Through the use of remote software and servers, a shared network of resources and computing services is made available to online users through cloud computing. Cloud service providers make their products accessible to users through online portals. Serious scale compute is made available by virtualization. As a result, cloud computing offers dynamic computing resources that facilitate highly dynamic data fusion from numerous data sources.

2.4 Combination of cloud and IoT

Cloud computing has developed and grown to offer a platform that makes it easier for apps to store and analyse data. Cloud computing is typically used by IoT devices to store and process data. The cloud offers innovative business models and opportunity to showcase created solutions for enhancing present information systems. However, two topics are made possible by cloud computing technology: security and privacy. The combination of IoT with cloud computing aims to provide clients with trustworthy and adaptable decision-making tools by transforming some common resources like sensors, work processes, and machines into smart things. A logical foundation for the Health Level 7 protocol has been given by Plathong and Surakratanasakul, using cloud computing and the Internet of Things for real-time healthcare monitoring.

2.5 Research questions

Through the current research, the researcher is going to respond to the following research questions:

(i) Why did cloud computing and IoT integration show up? In addition, since when they have been merged together? How many papers focused on this combination?

(ii) What are the challenges regarding the integrating?

(iii) Which specific tools, techniques, or methods are applied for the implementation of the combination of IoT and cloud computing?

(iv) What are the open issues on this topic?

(v) What are the specific metrics in the combination of cloud computing and IoT?

2.6 Databases

The researcher has mainly focused on searching specified scientific databases. It is presumed that books have been covered by these articles. Thus, the books,

which describe the topics, have not been searched. Important databases used in this research are :

Google scholar
IEEE Xplore
ScienceDirect
ACM digital library
SPRINGER

To have a better analysis of the papers, the researcher has attempted to eliminate IEEE papers within ACM digital libraries.

3 Summary of the chosen papers

In the paper,they have systematically studied the past and the state of the art combinations of cloud computing and IoT. First, they have overviewed cloud computing, IoT, and their integration. After that, they have explained research methodology and explored the presented papers in three main categories including applications, platform, and the integrations with other technologies. Application articles have discussed the various type of applications presented by the combination of cloud computing and IoT. The platform category has presented the architecture and platforms presented for integration of cloud and IoT. Nevertheless, any standard platform has been presented for the integration of these technologies. The last category has discussed the combination of IoT and cloud computing with other innovative technologies such as big data, fog computing, and so on. For every one of them, they have studied and compared the presented papers and the main challenges. Also, they have presented the benefits and drawbacks of each class' techniques. our issues have been referred to, so as to more effective applications, platforms, and combinations can be developed in the future. The total gathered data are useful to familiarise scholars with the advanced integrations of cloud computing and IoT. After all, the responses to the queries have introduced briefly the goal of the combination and the current challenges.

Recent advancements that was mentioned :

Edge computing: This technology allows for processing of data closer to the source, rather than sending all data to a centralized cloud for processing. This can improve response time, reduce latency, and increase security.

5G networks: 5G networks provide faster and more reliable connectivity for IoT devices, enabling more data to be transmitted and processed in real-time.

Machine learning and AI: These technologies are being used to analyze and make sense of the vast amounts of data generated by IoT devices. This allows for more efficient and accurate decision making and automation.

Security and Privacy: As IoT and cloud systems become more widespread, there is an increasing need for robust security measures to protect against cyber attacks and breaches of personal data.

Blockchain: Blockchain technology is being explored as a way to secure and manage the vast amounts of data generated by IoT devices and cloud systems.

Low-power devices: Advancements in low-power devices allow for IoT devices to run for longer periods of time on a single battery charge, making them more practical for use in remote locations or in devices that are difficult to access.

Containerization and serverless computing: These technologies are being used to deploy, manage, and scale IoT applications more easily in the cloud.

Multi-access Edge computing (MEC): A new technology that brings cloud computing capabilities to the edge of the network, closer to the end-users. This allows for more efficient, low-latency data processing.