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Development of Cloud System for IoT Applications

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Abstract - *Internet of things (IOT) has become a huge opportunity. IOT has many useful applications. One of the major problems that IOT currently faces is the storage and management of the vast amounts of data that will be generated by the IOT enabled appliances/machines. This paper focuses on identifying the work already done for finding potential solutions by using cloud based storage in IOT system.*

Key Words: Internet Of Things (IoT), Cloud based Storage etc.

1. INTRODUCTION

One of the major problems that IOT currently faces is the storage and management of the vast amounts of data that will be generated by the IOT enabled appliances/machines.

There are many IoT platforms available in the market but have their own constraints like limited devices etc. **KAA** (http://www.kaaproject.org/) is an open source multipurpose middleware IoT platform for building smart, connected and end-to-end IoT solutions. But it bounds users for databases as it only support NoSQL and Big Data base applications. Also it supports Less hardware modules. **Temboo** (https://temboo.com) is a private cloud based application code generation platform. It only supports Choreos based applications. Also it is not suitable for resources intensive applications and device management.

With the advent of 5G, Internet of things (IoT) has become a huge opportunity. IoT has the potential to transform the way of living of millions of peoples. IoT has many useful applications. It is also one of the best technologies for industry 4.0. IoT requires very high speed internet and this problem can be solved by 5G.

One of the major problems that IOT currently faces is the storage and management of the vast amounts of data that will be generated by the IoT enabled appliances/machines.With the advent of 5G, IoT has become a huge opportunity.

IoT plays a very important role in smart agriculture. IoT sensors are capable of providing information about agriculture fields. This is an attempt to identify potential research gaps by studying the research done in this field.

2. LITERATURE REVIEW

[1] In the paper "A survey of IoT cloud platforms" the author Partha Pratim Ray Department of Computer Applications, Sikkim University has stated that, Internet of Things (IoT) envisages overall merging of several "things" while utilizing internet as the backbone of the communication system to establish a smart interaction between people and surrounding objects. Cloud, being the crucial component of IoT, provides valuable application specific services in many application domains. A number of IoT cloud providers are currently emerging into the market to leverage suitable and specific IoT based services. In spite of huge possible involvement of these IoT clouds, no standard cum comparative analytical study has been found across the literature databases. This article surveys popular IoT cloud platforms in light of solving several service domains such as application development, device management, system management, heterogeneity management, data management, tools for analysis, deployment, monitoring, visualization, and research. Thus the author has presented a comparison is presented for overall dissemination of IoT clouds according to their applicability. Further, few challenges are also described that the researchers should take on in near future. Ultimately, the goal of this article is to provide detailed knowledge about the existing IoT cloud service providers and their pros and cons in concrete form.

[2] In the paper "A Secure IoT Cloud Storage System with Fine-Grained Access Control and Decryption Key Exposure", the authors Shengmin Xu Et.al. have presented a practical attribute-based access control system for IoT cloud by introducing an efficient revocable attribute-based encryption scheme that permits the data owner to efficiently manage the credentials of data users. Our proposed system can efficiently deal with both secret key revocation for corrupted users and accidental decryption key exposure for honest users. We analyze the security of our scheme with formal proofs, and demonstrate the high performance of the proposed system via experiments.

[3] In the paper "New developments in cloud and IoT" the authors Muhammad Younas, Irfan Awan, George Ghinea, Tor-Morten Gr□nli from School of Engineering, Computing and Mathematics, Oxford Brookes University, Oxford, OX33 1HX, United Kingdom & Department of Electrical Engineering and Computer Science, University of Bradford, Bradford, BD7 1DP, United Kingdom. This paper has developed new models and techniques in order to

further enhance research and development in the areas of cloud and IoT. More specifically, the papers focus on crucial issues such as security, access control, and quality of service in cloud and IoT. These topics have practical applications in cloud and IoT.

[4] In the paper "An exploration of IoT platform development" the authors Mahdi Fahmideh Et.al from School of Computing and Information Technology, Faculty of Engineering and Information Science, University of Wollongong, Wollongong, Australia have stated that" IoT (Internet of Things) platforms are key enablers for smart city initiatives, targeting the improvement of citizens' quality of life and economic growth. As IoT platforms are dynamic, proactive, and heterogeneous socio-technical artifacts, systematic approaches are required for their development. Limited surveys have exclusively explored how IoT platforms are developed and maintained from the perspective of information system development process lifecycle. In this paper, we present a detailed analysis of 63 approaches. This is accomplished by proposing an evaluation framework as a cornerstone to highlight the characteristics, strengths, and weaknesses of these approaches. The survey results not only provide insights of empirical finding recommendations, and mechanisms for the development of quality aware IoT platforms, but also identify important issues and gaps that need to be addressed.

The survey provided a solid content of important features, recommendations, mechanism, and quality factors that are commonly incorporated into the development process of IoT platforms in one place. Such a comprehensive inventory, which sheds light into the essence of IoT platform development process and can be used by both platform providers and academia, is a significant contribution of this survey. The second contribution is the proposed evaluation framework. It supports well informed decision making on the analysing and selecting of IoT platform development approaches. Finally, another important utility of our work is that this survey is helpful for novice practitioners and researchers who are interested in understanding how an IoT platform should be developed.

[5] The paper by Zhou et al. reports that cloud computing provides organizations with benefits of minimizing operational and administrative costs. But at the same time it results in high consumption of energy that could adversely affect its benefits. This paper aims to minimize energy consumption and to ensure the required level of QoS which is defined as a part of SLA (Service Level Agreement). In other words, energy consumption should be reduced such that it has minimal effects on SLA violation. Accordingly, the paper proposes two adaptive energy-aware algorithms for cloud data centres —i.e., to maximize energy efficiency and to minimize SLA violation rate. The strategy employed in the proposed algorithms is to take into account application types, CPU and memory resources during the deployment of virtual machines (VMs). Evaluation is carried out using a number of Planet Lab VMs. Experimental results show that the proposed algorithms outperform existing energy-saving techniques in terms of (i) decreasing energy consumption, and (ii) minimizing SLA violation.

[6] Antunes et al. focus on the issue of data classification in IoT environment. The rationale given is that there exist billion of IoT devices which are used to generate, collect and share large volume of diversified data. However, this significantly complicates the process of managing data sources in IoT. The literature review reveals that there is no uniform way to represent, share, and understand IoT data which results in hindering the full realization of IoT potentials. The work presented in this paper identifies the limitations of current solutions. It describes the advantages of semantic approaches for context organization and extends an unsupervised model to learn word categories automatically. This is because full potential of IoT can be achieved when the devices work and learn together with minimal human intervention. The proposed solution is evaluated using Miller-Charles dataset and IoT semantic dataset. Experimental evaluation of the proposed technique yields promising results.

3. CONCLUSION

In this spirit, we presented a detailed review of 6 extant approaches for the development of IoT platforms and highlighted their key characteristics in the view of our proposed framework. A specific advantage of our framework is its usefulness as a tool to select approaches as to satisfy specific requirements of a given IoT platform development scenario.

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BIOGRAPHIES

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