Microservices Architecture for Reducing the Complexity and Increasing the Scalability of IoT System/Data in the Ocean

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Abstract

This doctoral research symposium is prepared to address the challenges of IoT system and data in the Ocean. Managing and analyzing the Ocean's big data is difficult because of increasing the growth of big data. The use of IoT devices/sensors is becoming more complex day by day. The integration and scalability of IoT system devices/sensors in ocean have increased and more complexed. This research discusses the critical challenges of IoT devices and IoT data in Ocean, also will keep eyes on how microservice architecture plays essential roles in IoT applications. We intent to mitigate/reduce the complexity of IoT data and increase the scalability for IoT system in Ocean.

Introduction

The Internet of Things is likewise called the internet of objects which is a computing idea that describes the probability of ordered physical objects being associated with the web and having the volume to recognize themselves to different apparatuses. Internet of things includes an expanding number of shrewd, interconnected gadgets and sensors that are frequently nonintrusive, straightforward, and undetectable[1].

Software architecture is the primary artefact, which enables straightforward and predictive development of complex software systems[]. Microservice architecture helps to develop the complex application, and it distributes the application in chunks or units by composing it[2].

IoT systems are being more complexed and unable to reuse also by developing new technologies the interoperability is being more difficult. Interoperability problem can also be increased performance will be down if there a lot of services are connected without proper architecture design-based requirements. We aim to discover the architecture needs and microservices' roles in the internet of things.

Literature

➢To managing and analyzing the ocean's big data is difficult due to increasing the growth of big data and also devices/links heterogeneity issue[2].

➢In IoT, Scalability, Mobility, Interoperability, Data volume, Security, privacy, Implementation and competency issues have highlighted [2, 3].

➢The integration challenge of data from devices/sensors, new applications and services in ocean has increased and more complexed[3].

➢IoT needs architecture which should be flexible to cater for cases such as intelligent devices, smart objects (hardware and software solutions) and data integrations over different environments [1].

Research Objective

To reduce the complexity for IoT devices in the context of integration, scalability, reusability of data, independent storage of IoT data and to make the flexible system in Ocean by using MSA.

Research Problem

How can we reduce the complexity and increase the scalability of IoT system/data in the Ocean?

Research Questions

➢**RQ1.** What is the state of the art of IoT data managing strategies regarding MSA based systems in the Ocean?

➢**RQ2.** What is the state of the practice of IoT data managing strategies regarding MSA based systems in the Ocean?

➢**RQ3.** Does the microservice architecture design method exist for the internet of things applications in the Ocean?

➢**RQ4.** What is the state of the practice challenges are reported in the literature on the internet of things?

Research Method

(i) Literature review, (ii) Medium level Survey (in universities, where IoT is being used for Ocean), (iii) Interviews, (iv) Experiments by applying proposed model

Conclusion

➢In this research study, The expected contributions of this PhD research are; (i) A systematic mapping study on MSA for IoT in the Ocean, (ii) Microservice Architecture Design for IoT in the Ocean, (iii) Recommendations & Guidelines for developer, (iv) Empirical reports on MSA Design for IoT in the Ocean, (v) Recommendations for future work.

References

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