

Chapter 14

Some Aspects of Data Engineering for Edge Computing Using Microservice Design Pattern

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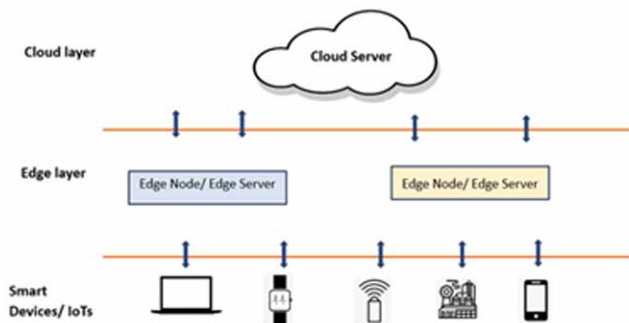
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ABSTRACT

With the rapid advancement and usage of technology like smart devices, sensors, IoT devices etc. the cloud computing technology is facing challenges of high response time, latency, high load on network due to explosion of data in the recent times. Edges computing technology emerges as solution for this down sides of Cloud computing by bringing the computation and processing of Cloud computing to the edge of the network i.e closer to the source of data. The application developed to run in Edge computing uses Microservices due to its advantages of lightweight, independent deployment, loosely coupled and scalability characteristics. In the research community, the deployment of microservices using microservice design patterns and analysis of performance metrics is an important discussion point. Here, a novel methodology will be proposed in edge computing environment using microservice orchestration. Here, the details of Edge computing and microservice architecture using microservice design patterns will be discussed.

DOI: 10.4018/979-8-3693-2260-4.ch014

Figure 1. Basic edge computing architecture



1. INTRODUCTION

With fast pace of advancement of information Technology and 5G communication, smart phones, IoT devices and sensors are becoming more and more popular and important part of our daily life. And that lead to huge increase of data generation and transmission in the network. The role played by centralised data centre or cloud and different services of cloud computing such as google cloud, Microsoft Azure, Amazon Web Services are amazing. Cloud computing has changed the way of our living and working, since its inception around 2005 (Shi et al., 2016). Software-as-a-service(SaaS), Plateform-as-a-service and Infrastructure-as-a-service of cloud computing changed dramatically how we use data and how we work. However, recent advancement of delay sensitive and resource-intensive Internet of Things (IoT) applications like high-definition videos, virtual reality, augmented reality, face recognition etc. are creating difficulty to maintain scalability and resiliency of traditional cloud computing paradigm. In recent times, there is a continuous increase of data generations and the requirement of processing of data in the cloud are diversified, leads to requirement of high transmission bandwidth, minimum response time, energy consumption, latency etc. In this scenario, it is difficult to meet requirements of users maintaining quality of service by cloud (B. Liu et al., 2022). The challenges faced by cloud computing for high responds time, latency and high load in the virtually unlimited resources to delay sensitive applications are reduced by the emergence of edge computing paradigm (Wang et al., 2019).

Edge computing is a recent technology that brings services of cloud computing closer to the end user i.e closer to the source of data and is characterised by fast processing and application response time. The advantage of edge computing is that data generated from the sensors, IoTs or smart devices does not required to transmit to cloud continuously to process and respond, which lowers the bandwidth

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