

Distributed Systems and Databases of the Globe Unite! The Cloud, the Edge and Blockchains

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Abstract

Significant paradigm shifts are occurring in Access patterns are widely dispersed and large scale analysis requires real-time responses. Many of the fundamental challenges have been studied and explored by both the distributed systems and the database communities for decades. However, the current changing and scalable setting often requires a rethinking of basic assumptions and premises. The rise of the cloud computing paradigm with its global reach has resulted in novel approaches to integrate traditional concepts in novel guises to solve fault-tolerance and scalability challenges. This is especially the case when users require real-time global access. Exploiting edge cloud resources becomes critical for improved performance, which requires a reevaluation of many paradigms, even for a traditional problem like caching. The need for transparency and accessibility has led to innovative ways for managing large scale replicated logs and ledgers, giving rise to blockchains and their many applications. In this talk we will explore some of these new trends while emphasizing the novel challenges they raise from both distributed systems as well as database points of view. We will propose a unifying framework for traditional consensus and commitment protocols, and discuss novel protocols that exploit edge computing resources to enhance performance. We will highlight the advantages and discuss the limitations of blockchains. Our overall goal is to explore approaches that unite and exploit many of the significant efforts made in distributed systems and databases to address the novel and pressing needs of today's global computing infrastructure.

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