Optimizing Cloud-Based Computational Systems for Energy Efficiency

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Abstract. This article investigates methods to optimize cloud-based computational systems with a focus on energy efficiency. It discusses various strategies including virtualization, workload management, and data center design. The paper also examines the role of machine learning in predicting energy demands and optimizing resource allocation. The findings offer insights into reducing energy consumption while maintaining high-performance levels in cloud environments.

Keywords: cloud computing, energy efficiency, virtualization, machine learning, data centers

Introduction

Cloud computing has revolutionized the way data is processed and stored, offering scalable solutions for various computational needs. However, the energy consumption of cloud-based systems has become a critical concern. This paper explores strategies to enhance energy efficiency in these systems. It examines the impact of virtualization technologies and effective workload management on reducing power usage. Additionally, the role of machine learning in forecasting energy demands and optimizing resource allocation is analyzed. The study highlights the importance of designing energy-efficient data centers and implementing predictive analytics to maintain performance while minimizing energy costs. Recommendations are provided for future research and practical implementations.

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