

# CONTEXT-AWARE MODELING OF DYNAMIC RESOURCE MANAGEMENT IN CLOUD INFRASTRUCTURE

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**Abstract.** *Dynamic resource management in cloud environments is crucial for maintaining efficient service delivery and performance. This study models the dynamic allocation of resources in cloud systems, where resources are distributed based on current server load, network conditions, and user request patterns. The proposed model utilizes the Calculus of Context-aware Ambients (CCA) to simulate interactions between different entities (ambients) within the cloud environment, including Cloud Service Manager, Servers, Services, User Requests, and Network conditions. This model demonstrates how adaptive and dynamic resource management in cloud environments can be optimized. By allowing servers and network components to adapt to changing conditions, resources can be reallocated and workload redistributed in real time, leading to improved efficiency and performance across the cloud system.*

**Key words:** Cloud Computing, Dynamic Resource Management, Cloud Resource Allocation, Calculus of Context-aware Ambients (CCA), CPS, CPSS, ViPS.

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