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(57) Abstract :
 The proposed Throttled Adapted Load Balancing (TALB) strategy enhances VM allocation in cloud datacenters by leveraging a TreeMap data structure for efficient sorting and retrieval of VM details. This approach partitions VMs into available and busy lists, enabling quick identification and allocation of tasks based on VM capacity and current load. TALB reduces searching and response times, optimizes resource utilization, and prevents server overloading. Simulations using the CloudAnalyst tool demonstrate TALB's superior performance, scalability, and cost-efficiency compared to traditional algorithms like Round Robin, ESCE, and TLB. The innovation ensures high performance and reliability, making it suitable for dynamic and heterogeneous cloud environments, and paving the way for future advancements in cloud computing.

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