

# An In-Depth Review of Cost Optimization Tactics in Multi-Cloud Frameworks

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**Abstract:** *The emergence of multi-cloud architectures, which rely on a heterogeneous combination of cloud providers to ensure resiliency and flexibility, has been of paramount concern to contemporary enterprise IT strategy. The present paper includes a literature overview of cost optimization strategies in the case of multi-clouds, their scales of balance between best performance and scalability, and cost-effectiveness. While multi-cloud computing offers more flexibility in terms of resource convergence between providers, it also introduces numerous obstacles to cost management strategies. Research delves into important cost aspects including Total Cost of Ownership (TCO) and Transaction Cost Economics (TCE), while also exploring different cloud deployment alternatives like public, private, hybrid, and multi-cloud strategies. Discussed are methods for lowering operational and capital costs, such as downsizing, properly acquired servers, virtual machines, and migration capabilities. The thorough literature review evaluates heuristic algorithms, online optimization tools, and the prediction models that enhance the better usage of resources and cost-effective performance. Another prevailing issue addressed in the paper is that of dependence on the heuristics, the problem of scalability, and complexity of the models. Lastly, it highlights why there is an urgent necessity to drive cost management practice into multi-cloud environments and thus to improve the efficiency of operations.*

**Keywords:** Multi Cloud, Cost Optimization, Total Cost of Ownership (TCO), Transaction Cost Economics (TCE), Virtual Machine Migration