The Impact of Soft Resource Allocation on n-tier Application Scalability

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The paper studies the performance impact as a function of soft resources allocation measured and quantified using the n-tier benchmark RUBBoS. The paper further discusses the challenge of choosing a reasonable soft resource allocation to match the hardware configuration. The main focus of the authors are on the evaluation of two soft resources - Threads and Database connections. The authors carried a series of experiments and found that Over-allocation of soft resources causes waste of critical hardware resources while Under-allocation of soft resources causes inefficient utilization of hardware resources.

The key strength of this paper is the quantitative evaluation based on measurements of RUBBBoS benchmark with analysis of the impact of soft resource allocation on application performance. Another key point presented in this paper is the two naive soft resource allocation strategies: conservation allocation of soft resources and liberal (high) allocation of soft resources. The `soft resource allocation algorithm` given by the authors is promising but will fail in case of a multi-bottleneck scenario as the saturation of hardware resources may oscillate among multiple servers locating in different tiers. The algorithm is also unable to determine the critical hardware resource since no single hardware resource in fully utilized in case the system is saturated.

Achieving good performance by scaling n-tier applications in Cloud requires a unified exploration of both hardware and software. Although the algorithm proposed is efficiently able to improve the performance, we still need more efficient ways to find proper soft resource allocation. Also, the paper doesn't discuss the impact of soft resource allocation in case of virtualized environment so this can be another an area to explore and see the usefulness of the algorithm proposed in this paper.