

Understanding and Minimizing Disk Contention Effects for Data-Intensive Processing in Virtualized Systems

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Abstract—Distributed computing systems (e.g., clouds) have been widely employed to support an expanding range of applications. As the scale of data generation grows in regards to volume, velocity and variety (3Vs of big data), data-intensive processing became essential to extract valuable information from complex datasets. In this scenario, the infrastructure needs to meet the scaling demand of applications and must use resource management techniques to avoid interference problems. Literature review mainly focuses on CPU and memory solutions to handle resource contention problems in data-intensive processing. Complementarily, this paper further analyses and proposes techniques to minimize disk contention effects in order to improve application performance in virtualized systems - technology that drives the cloud computing environment. For this objective, we present a general-purpose resource management strategy that adjusts dynamically disk I/O utilization rates. Results showed that the proposed approach improves application's performance by up to 26%.

Keywords— *Big Data, data-intensive processing, virtualization, resource contention, interference, disk contention.*

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