

GREEN COMPUTING BY PUTTING IDLE SERVERS IN SLEEP

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Reducing the power consumption while maintaining the response time constraint has been an important goal in server system design. One of the techniques widely explored in the literature to achieve this goal is dynamic voltage/frequency scaling (DVFS). However, DVFS is not efficient in modern systems where the overall power consumption includes a large portion of static power consumption. In this talk, we aim to address how to reduce the static power consumption by dynamic power management (DPM) with sleep model in addition to DVFS. To maximize the sleep efficiency, we propose PowerSleep, a smart power-saving scheme by carefully choosing an execution speed for the server with DVFS and sleep periods while putting the system in the sleep power mode with DPM. By modeling the system with M/G/1/PS queuing model and further significant extensions, we present how to minimize the mean power consumption of the server under the given mean response time constraint. Simulation results show that our smart PowerSleep scheme significantly outperforms the simple power-saving scheme which adopts sleep mode.