Application-Aware Power Capping using Nornir

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Power consumption of IT infrastructure is a major concern for datacenter operators. Since datacenter power supply is usually dimensioned for an average-case scenario, uncorrelated and simultaneous power spikes in multiple servers could lead to catastrophic effects such as power outages. To avoid such situations, power capping solutions are usually put in place by datacenter operators, to control power consumption of individual server and to avoid the datacenter exceeding safe operational limits. However, most power capping solutions rely on Dynamic Voltage and Frequency Scaling (DVFS), which is not always able to guarantee the power cap specified by the user, especially for low power budget values. In this work we propose a power-capping algorithm that uses a combination of DVFS and Thread Packing. We implement such algorithm in the Nornir framework and we validate it on some real applications by comparing it to the RAPL power capping algorithm and to another state of the art power capping algorithm.

Keywords: Power Capping, RAPL, Self-Aware Computing, Green Computing.