

## Abstract

Under current development of semiconductor technology, there is an exponential increase in [transistor](#) density on a single processing chip. This aggressive transistor integration significantly boosts the computing performance. However, it also results in a power explosion, which immediately decreases the system reliability. Moreover, some well-known power/energy reduction techniques, i.e. [Dynamic Voltage and Frequency Scaling](#) (DVFS), can cause adverse impact on system reliability. How to effectively manage the power/energy consumption, meanwhile keep the system reliability under control, is critical for the design of [high performance computing](#) systems. In this paper, we present an online power management approach to minimize the energy consumption for single processor [real-time scheduling](#) under reliability constraint. We formally prove that the proposed algorithm can guarantee the system reliability requirement. Our simulation results show that, by exploiting the run-time dynamics, the proposed approach can achieve more energy savings over previous work under reliability constraint.