Utilization-based admission control for aperiodic tasks under EDF scheduling.

Summary: Utilization-based admission control policies for processors executing aperiodic tasks are often favored due to their low overhead. This paper investigates utilization-based admission control for uniprocessor systems executing aperiodic tasks following the earliest deadline first priority assignment. We first propose a new constant time utilization-based admission control policy, CTAC. We prove that CTAC is safe and will admit any task instance that can be admitted by the best existing utilization-based admission control policy, ASL, given the same processor state. We also introduce an optimal utilization-based admission control policy, OPAC. It is proved that given the same processor state, a newly arriving task instance that can be admitted by any other safe utilization-based admission control policy can also be admitted by OPAC. We also show that OPAC cannot be implemented in constant time. Simulation results show that CTAC indeed outperforms ASL with constant time complexity and achieves performance close to OPAC in terms of various metrics.

Keywords: admission control; utilization; scheduling
doi:10.1007/s11241-014-9216-6