

It is increasingly challenging to improve single thread performance because power/energy consumption becomes a major barrier to achieve significantly higher performance for general purpose cores. General purpose processors are designed to perform well in a wide variety of market segments, at the cost of having significantly lower performance-per-watt than special purpose processors targeting limited applications or market segments. In this paper, we propose a HW/SW co-designed heterogeneous multi-core virtual machine, called TwinPeaks, which integrates a set of less general but power efficient cores and uses dynamic binary optimization to schedule code regions to run on the most efficient cores. Our experiment and analysis indicate that TwinPeaks with a wide in-order core and a narrow out-of-order core may achieve 108% performance at ~71% energy of a big 4-wide out-of-order core.