Introduction

High Performance Computing (HPC) is the primary computing area which has taken advantage of massive heterogeneous multicores architectures systems and has proposed many approaches in order to overcome the growing difficulty of development face the architecture complexity. Meanwhile, no approaches are targeting heterogeneous embedded systems. The newest HPC approaches rely on a unified run-time system which allows programmers to seamlessly exploit dynamically all available computing units and take more advantage from irregular applications. This aspect is very interesting for embedded systems that feature high level interactivity with irregular systems. This on going work models a run-time system targeting embedded heterogeneous architectures. Also, it establishes the basis of adaptive process migration technique that is proposed to adjust automatically the grain size of processes performed in each processor unit, in order to achieve better performance attributes face an irregular application.

Methodology

H.264 video decoding example

Figure 1a shows the basic building blocks of the application; these building blocks correspond to compute process in runtime model. The complete application is shown in Figure 1b, where the large blocks represent system process and control decisions, and the smaller blocks represent global variables (the darker variables represent inputs and the lighter variables represent outputs).

Figure 2 shows the functions blocks compiled for each processor unit. The runtime resource manager system can chose any function but have to deal with throughput and availability of each one in order to achieve the better processing options (speed-up, or lower communications process or lower power consume, etc.).

Conclusion

The present on going work includes code migration model over runtime manager processing resources system targeting embedded heterogeneous multiprocessor. The solution allows an adaptive control of processing granularity and achieves better throughput, reduced communication, and better energy performance.