High-level simulators used in EU-MULTICUBE project, enable a multi-abstraction-level system specification and modeling framework to provide static and dynamic evaluation of the system-level performance metrics (e.g. execution time, energy consumption). These simulators are coupled with Design-Space Exploration (DSE) tools (using a common XML interface) to generate Pareto set of optimum system configurations for a specified application on a specified platform. This Pareto set (of optimum configurations) is used by a Run-Time Manager during the application run to optimize platform resource usage.

Motivation for various abstraction levels of simulation:

- DSE for an application running on a specific platform requires a large number of application runs (typically on platform simulator).
- There is a trade-off between the accuracy of the simulation results and the time taken for simulating the application.
- Using multiple simulators at various abstraction levels enables DSE to be done with faster higher-level simulators (e.g. IMEC-HLsim and MultiCube-SCoPE). The DSE end results (Pareto set of optimum points) are verified using more accurate platform simulator (i.e. cycle-accurate simulator e.g. CoWare Virtual Platform).
- To maintain interoperability of the application code across various abstraction levels, a Run-Time Library (RTLlib) API is defined to specify platform-dependent part of the application e.g. thread spawning, communication, synchronization. Each abstraction level simulator links its own implementation of RTLlib with the application.

References:

This work is part of the ICT-FP7 EU project MULTICUBE: www.multicube.eu