ICT-eMuCo

Embedded Multi-Core Processing for Mobile Communication Systems

Enabling Energy Efficiency on High-Performance Mobiles

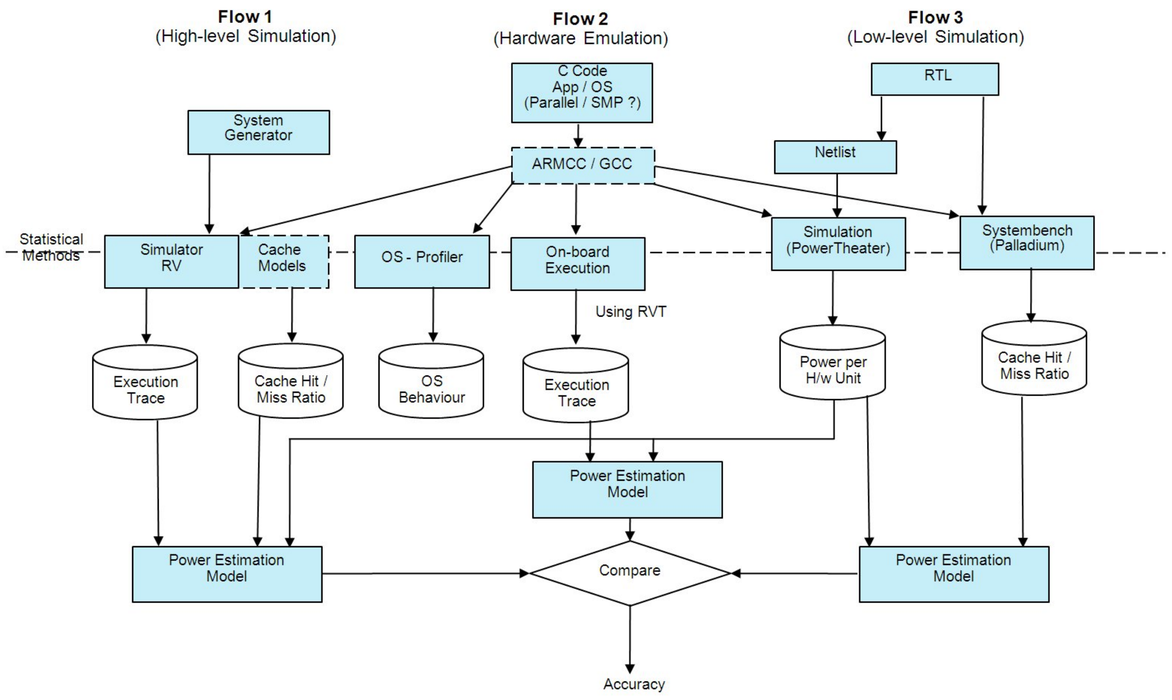
eMuCo

SEVENTH FRAMEWORK PROGRAMME

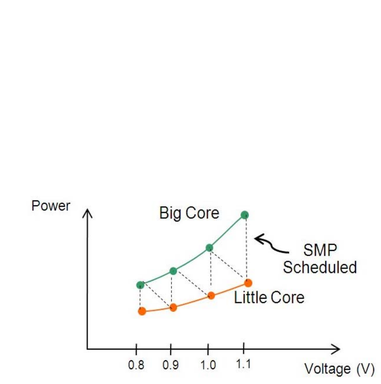
Big-Little Multicores

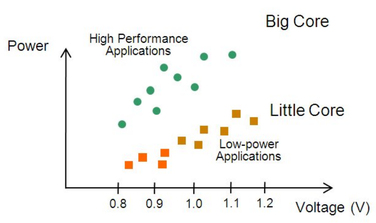
- Heterogeneous Multicores
  - Cores having different sizes (silicon area)
  - Can have different micro-architecture
  - Typically operate at different clock frequency ranges
  - Have different power footprints
- Uniform ISA (Instruction Set Architecture)
- Achieves High-performance
- Can operate at Low-power states

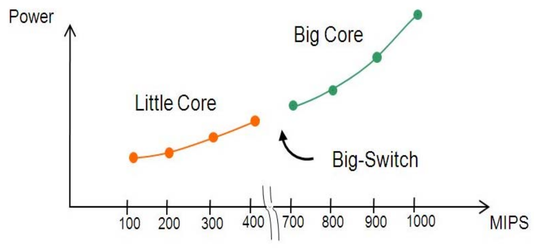
Methodology



Adressing Task Diversity



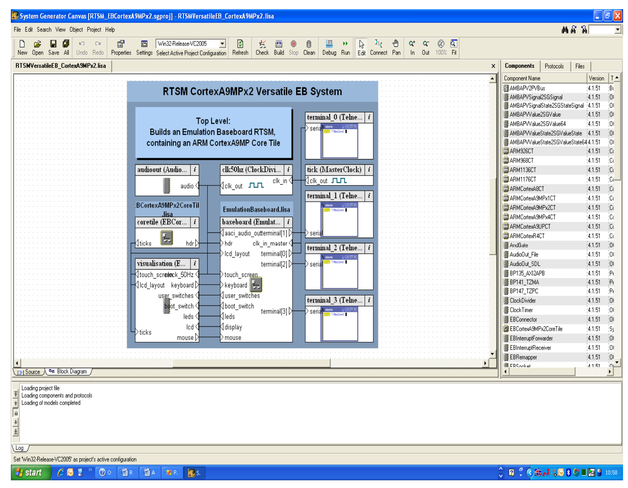




Tools

System Generator

The tool allows for hardware exploration. Hardware models created using the tool can be used for software simulation using Model Debugger. Multicore simulation and debug is supported in this framework.

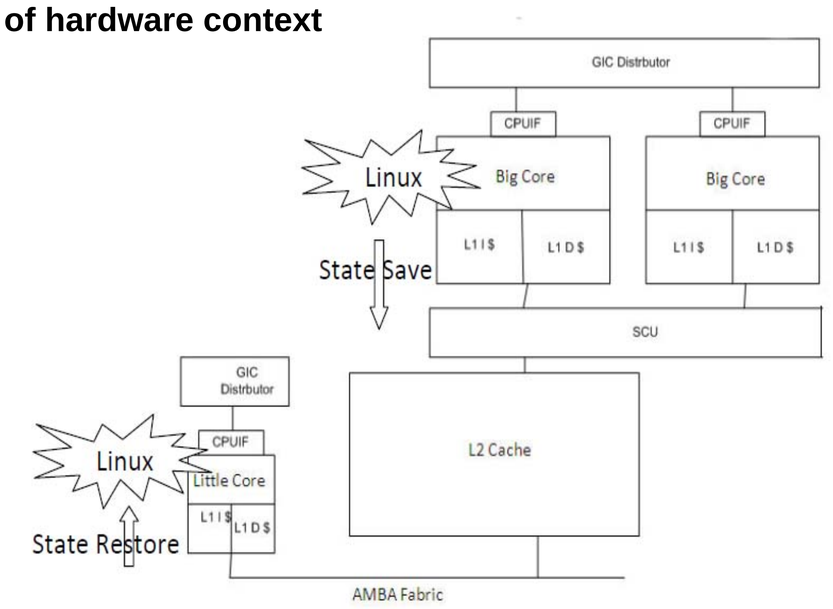


Software Paradigms

	Power Aware SMP	Big-Switch
Level of OS modification	Requires affinity to be driven by performance requirement	Potentially no changes required
Maximum power save	Can operate as big-switch too	Little and big core need performance continuum
Level of task diversity and peak performance	Enable better scalability	Limited to performance of single CPU
Implementation complexity	OS needs a speculative understanding of performance demands	Invisible to OS, operates similar to interrupt service routine
Management Responsibility	OS performance monitor	Application dependent
Flexibility	SMP / AMP designs	Single CPU only

Big-Switch OS Migration

- Much Faster than migrating processes between CPUs
- Does not assume memory coherency between CPUs
- Involves OS state save and restore
- Requires remapping of hardware context
- OS agnostic



Infineon IBM ARM GWT forschung+innovation TECHNISCHE UNIVERSITÄT DRESDEN THE UNIVERSITY of York DEPARTMENT OF COMPUTER SCIENCE

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