

Low Power System Design Hardware Related Security and Trust

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Low Power and Energy Efficient System Design and Prototype

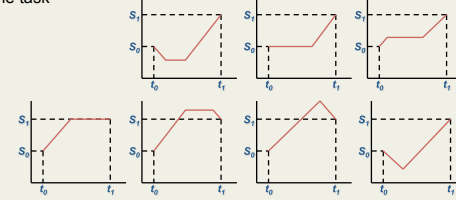
Scope of work and key ideas:

- System level: cut off unnecessary service, resource management.
- Circuit level: new technologies to reduce leakage (dual Vt, temperature issues).
- New energy source: energy harvesting.

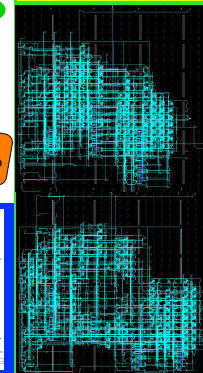
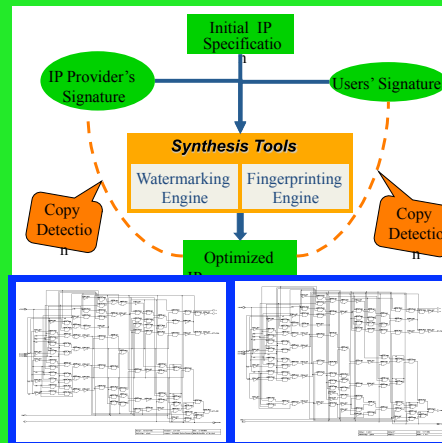
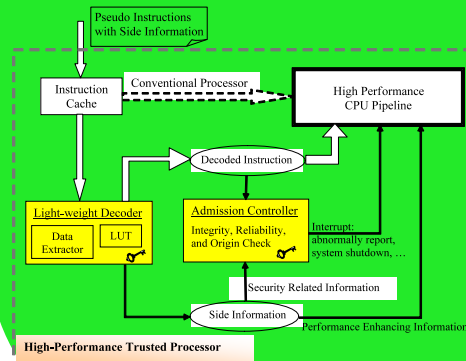
Applications:

embedded systems,
portable devices,
real time systems,
sensor network, etc.

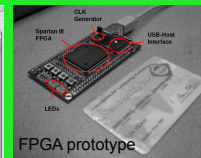
Most energy efficient clock frequency profiles to complete a real time task



Watermark-based
VLSI Design IP
protection:
Overall paradigm:
watermarking,
fingerprinting, and
copy detection.
Original and protected
design: IIR filter on
FPGA; 4-bit ALU



Hardware Related Security and Trust



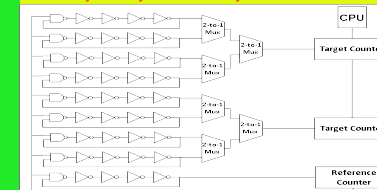
Goal and impact:

- Enhance system security with hardware components.
- Ensure system/chip is trustable, or does exactly what it is designed for.
- Improve reliability of system/chip.

Approaches:

- Utilize hardware features (e.g. PUF) for security.
- Study basic computation models (e.g. graph, Boolean satisfiability).
- Design practical techniques at all design levels.
- Hardware prototype/implementation of security primitives.

Architecture of a PUF to improve hardware efficiency and system security



Students:

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