Stepwise Exploration of the Design Space

Y-Chart Approach

High

Medium

Low

Platforms

Application Space (Features)

Application Instances

System Platform (no ISA)

Platform Design Space Exploration

Platform Specification

Architectural Space (Performance)

DAC System Level Design with Embedded Platforms Tutorial
Where do we stand?

Traditional approach

- "magic"
- Risky
- Big jump versus stepwise
- Potentially suboptimal
- No early feedback

Wireless Research

Where do we stand?

Challenge:
- Mapping

Exploration

Work in progress

Wireless Research

DAC System Level Design with Embedded Platforms Tutorial
Where do we stand?

- Abstract executable models
- Feedback on the methodology
- Functional partitioning
- KPN -> software + Coproc.

Verilog

Semiconductors

Mpeg Case

Research

Sanity Check

on the methodology

Verilog/VHDL (RTL)

Hand off

Cycle Accurate Models (TSS)

Back of the Envelop (Paper)

TriMedia Processor Case
Where are we going

System design needs

- library of functions (applications)
- library of architecture components at several levels of abstraction:
  - HW architecture IP components
  - SW architecture IP components
- System level design flow
- Industry standards for library modeling
Embedded System
Professional needs to know

1. Computer architecture: instruction sets, interrupts, pipelines, vector processing, DMA, bus protocols, cache coherency
3. Programming languages: PERL, Java, C++, design patterns
4. Core compiler technology and real-time operating systems: priorities, rate monotonic scheduling
5. Models of Computation and System Level Design Languages
6. Understanding Metrics, Design of Experiments
7. How to cooperate with hardware, software and colleagues: register settings, cvs, APIs, code reviews, ????

Transistor?

Y-Chart Check List
Where is your:

- architecture description file?
- applications in an implementation independent format?
- explicit mapping step?
- Retargetable Compiler?
- Retargetable Simulator?
- Design space exploration?
- Representation of the exploration data?
- Release policy and hand off?

Have a nice day