System Level Design Tools:  
Who needs them, Who has them and 
How much should they cost?  

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Outline

- What will SLD tools look like?
- Panel questions
  - Who needs them?
  - Who has them?
  - How much should they cost?
Key Industry SoC Trends

- Rising mask NRE: Over 1M$
- Rising design NRE: Over 10M$
  - ASICs replaced by programmable ASSP, FPGA’s
- Rising number of embedded processors
  - DVD/STB/HDTV, mobile phones: 5 to 8
  - Image proc, networking, basestation: 8 to 100+
- Rising eS/W complexity
  - Set-top box, audio: >1 million lines of code
  - DVD, HDD: Over 100 person-years effort
  - Networking: Intelligent edge, rising eS/W content
  - eS/W becoming essential part of SoC’s
Configurability Trade-offs

Standard Cell

Configurable H/W

Embedded S/W

Intrinsic efficiency

Years

Months

Weeks

Abstraction

Processor Platform (ISA)

Processor Platform

Cell Library

FPGA Fabric

Physical Design

RTL

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Flexible MP-SoC Platform Objectives

- Abstraction
- DSOC
- 1 month
- Platform Programming Model
- Connectivity Platform
- Weeks
- RTL
- SoG, FPGA
- ISA
- C
- Cell Library
- RTL (reuse)

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Flexible MP-SoC Platform

- MPU
- Co-proc.
- Mem
- App-spec
- Gen-purp
- Processor Array 1
- Processor Array N
- Conf. Proc.
- eRAM
- fpga/SoG
- eMEM
- H/W PE (eSoG)
- H/W PE (eFPGA)
- Network-on-Chip
- Packetization
- Soft H/W
- Mem
- ASIC

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Key MP-SoC Platform Tools

- 95% of functionality in S/W
- Real-time, distributed parallel S/W system
- (re)configurable H/W synth.

Executable Spec
- MP programming model(s)

Application to platform mapping

Analysis

Application S/W dbase
H/W IP dbase

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Results:

- 96% PE utilization
- Msg passing overhead 6%
Panel Q&A

—who needs them?
   — Those who plan to survive deep submicron

—who has them?
   — System houses have knowledge of needs
   — Aggressive semiconductor Cos, startups
     - Similar to 80’s with RTL synthesis

—How much should they cost?
   — Free now, means to sell Silicon
   — New model needed
   — Cost comparable to high-end synth tools
     - Participation to product revenues