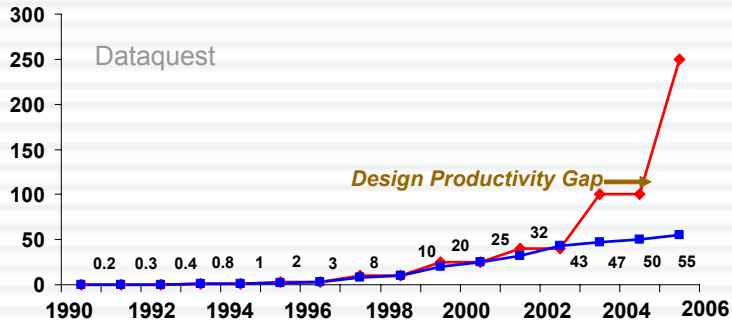


System Level Design Tools

Who needs them, who has them and how much should they cost?

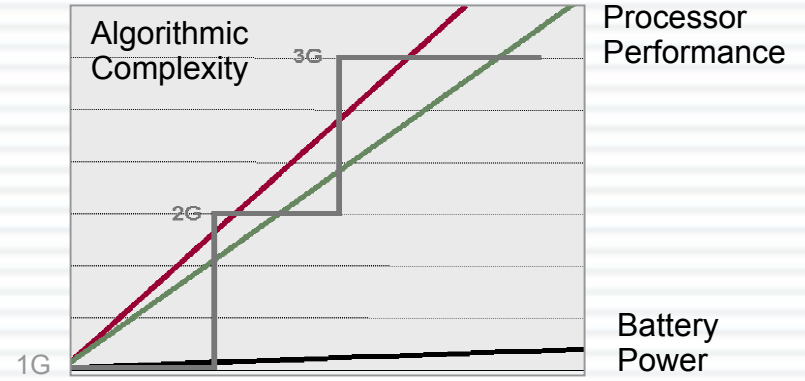
Pete Hardee
pete@coware.com
CODES/ISSS
October 1, 2003

The First Order SLD Trends



* Design gap is the difference between available gates and possible gates per silicon process.

Design Gap

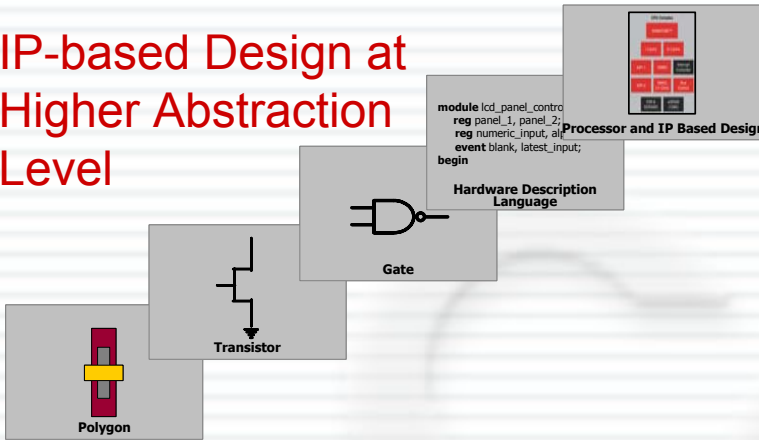


Software Complexity

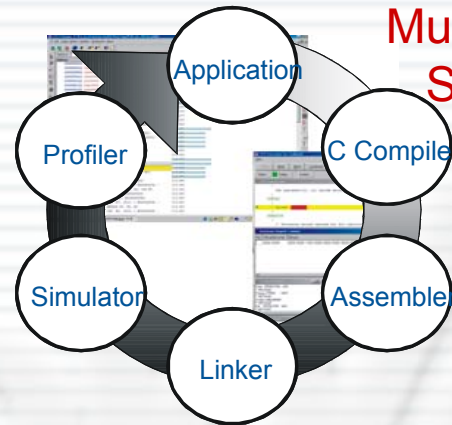
Moore's Law

Embedded SW & Processors

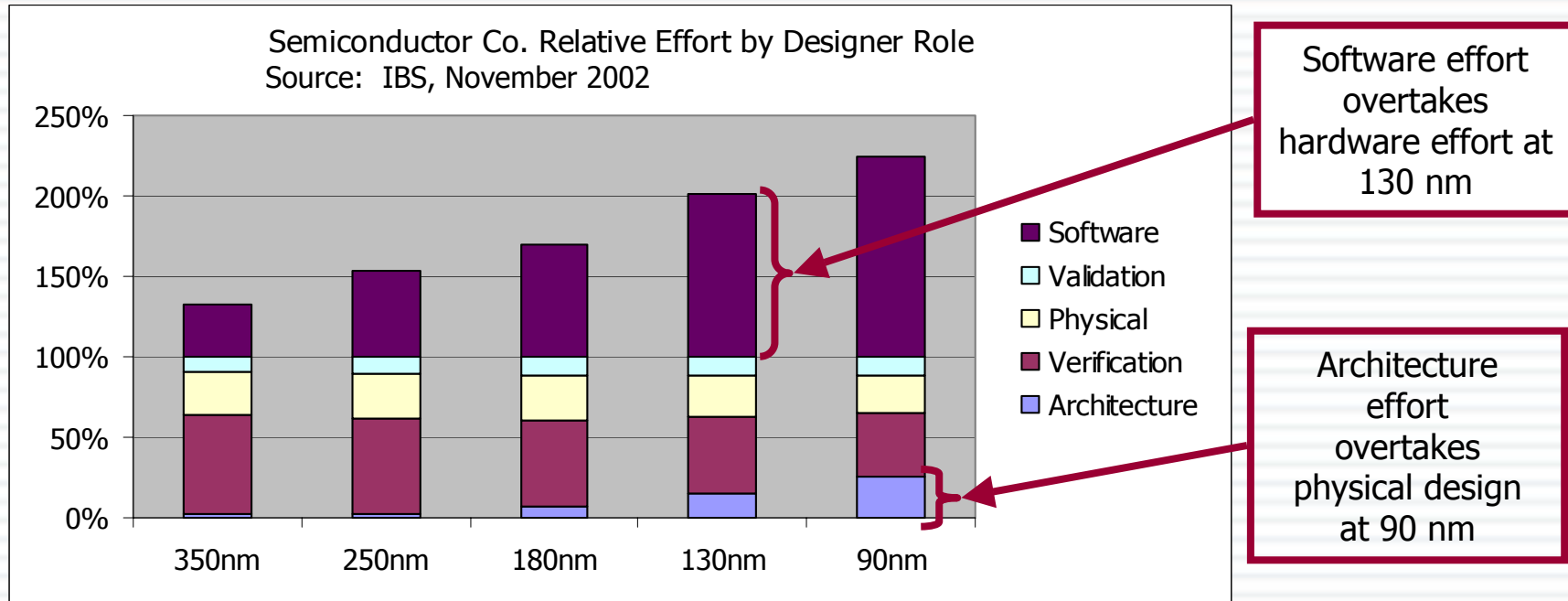
IP-based Design at Higher Abstraction Level



Multiple, Application-Specific Processors



Who Needs SLD Tools?



Who:

- Algorithm Developers
- System Architects
- Embedded software developers/
System Integrators

For what:

- ⇒ Functional validation of the system specification
- ⇒ Architecture optimization and IP integration
- ⇒ Firmware development and HW-SW co-verification

Semiconductor Co's Using SLD Tools

2002 Rank	Supplier	2002 Sales (Billions)	SLD In Production Flow	2002 Rank	Supplier	2002 Sales (Billions)	SLD In Production Flow
1	Intel	\$25.26	Yes	11	Mitsubishi	\$3.55	Yes
2	Samsung	\$8.63	Yes	12	Fujitsu	\$3.23	Yes
3	Toshiba	\$6.45	Yes	13	Matsushita	\$3.14	Yes
4	ST Micro	\$6.35	Yes	14	IBM	\$2.95	Considering
5	TI	\$6.24	Yes	15	Micron	\$2.94	No
6	NEC	\$5.69	Yes	16	Sony	\$2.71	Yes
7	Infineon	\$5.25	Yes	17	AMD	\$2.66	Considering
8	Motorola	\$4.78	Yes	18	Sharp	\$2.66	Considering
9	Philips	\$4.36	Considering	19	Sanyo	\$2.50	Yes
10	Hitachi	\$4.12	No	20	Rohm	\$2.39	No

Source: Dataquest, 2003 and CoWare data

Who Has SLD Tools?

	# of Companies	Average % of Revenues Spent on EDA Tools
Top-tier IC Vendors	5	3.0%
Top-tier IC Vendors	8	1.9%
Bottom-tier IC Vendors	9	1.2%

Source: IBS, November 2002

- The most successful semiconductor companies
- (And, of course, the Systems Houses)

SLD Tools Deliver Business Value

Example – Sony

- Sony Micro-MV DCR IP7
 - First to Market
 - \$1699 Retail Price
 - Utilized CoWare
- Panasonic PV-DC252
 - 7 Months Behind
 - \$999 Retail Price
 - Did Not Use CoWare

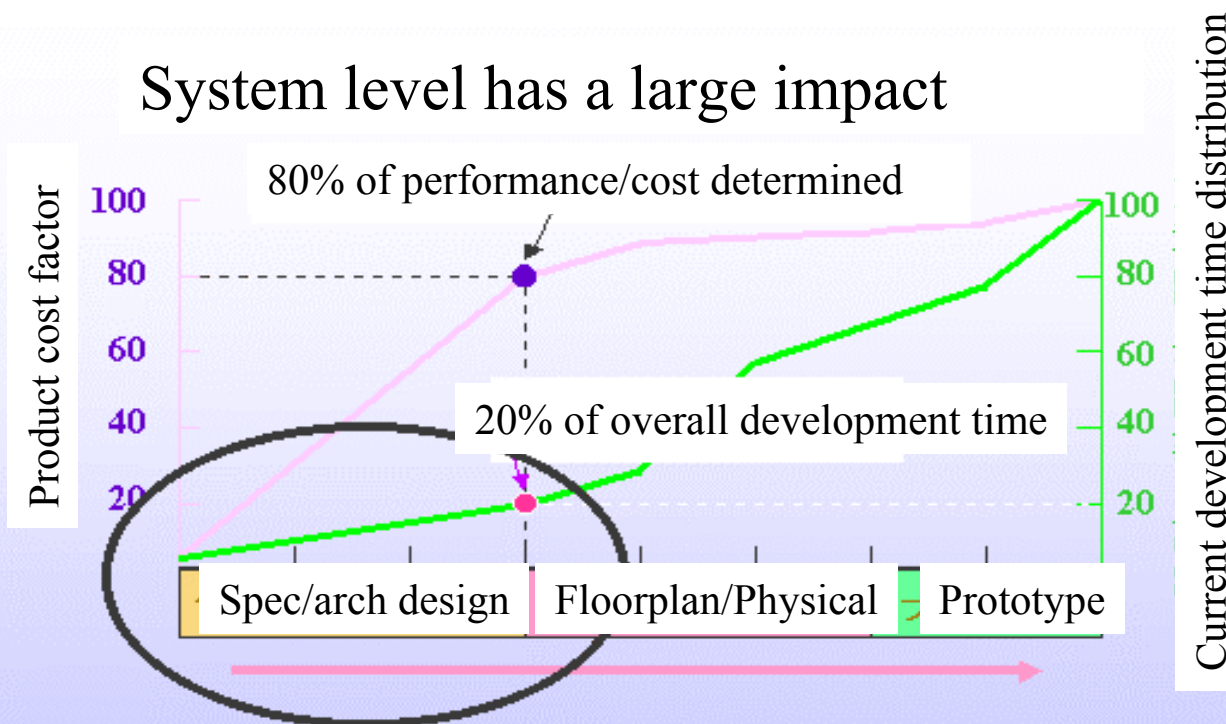


Greater Revenue, Increased Gross Profit, And
Reduced R&D Operating Expense



Performance, Cost, Design Cycle of System LSI

System level has a large impact

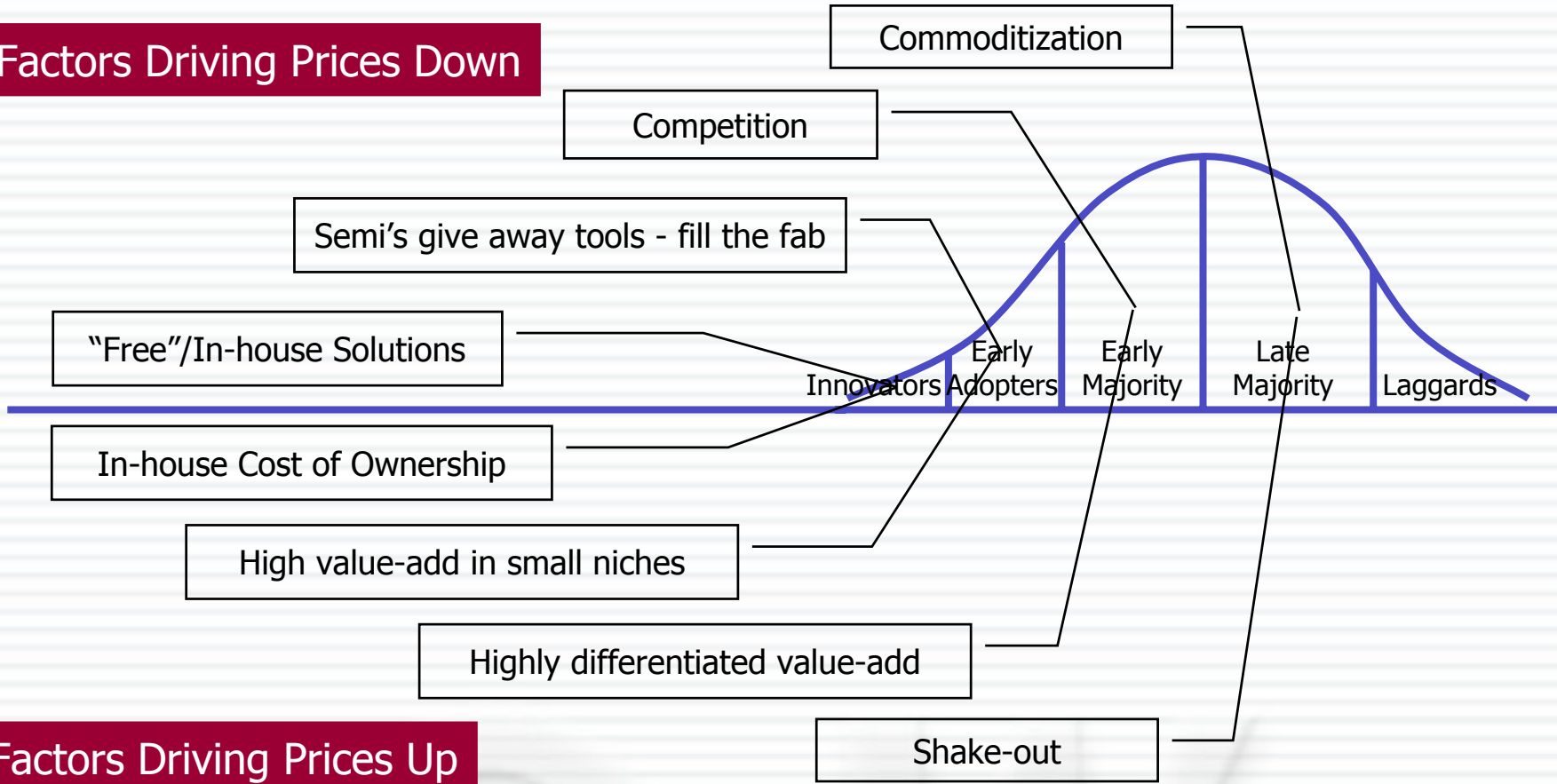


Source: Analyzing Packaging Trade-Offs During System Design, IEEE Design & Test of Computers, July-September 1998

2001.1.29
Matsushita
CoWare

How Much Should SLD Tools Cost?

Factors Driving Prices Down



You get what you pay for at every stage and nothing is "free"!