

Reflections on IBIS

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January 27, 2003

***IBIS Summit Meeting
Santa Clara, California***

**Mentor
Graphics®**

Agenda

- **IBIS Membership and Changing Industry Tidbits**
- **IBIS Infrastructure**
- **Keys to Success**
- **Future Challenges**



EIA IBIS Open Forum Membership

- 1995 - 20
 - 1996 - 23
 - 1997 - 22
 - 1998 - 27
 - 1999 - 33
 - 2000 - 35
 - 2001 - 34
 - 2002 - 31
 - 2003 - (25 - 30)
- 1993 Initial Support (10)
 - EDA - 9
 - Semiconductor - 1
 - 2002 Membership Breakdown (31)
 - EDA - 10
 - Semiconductor - 10
 - EDA & Semiconductor Users - 7
 - EDA & Design Consultants - 3
 - Connector - 1

1993 Sponsors & 2003 Companies

- **Cadence**
- **Contec**
- **HyperLynx**
- **Integrity Engineering**
- **Intel**
- **IntuSoft**
- **Meta-Software (HSPICE)**
- **Microsim (PSPICE)**
- **Quad Design**
- **Quantic**

- **Cadence**
- **Applied Simulation Technology**
- **Mentor (thru Pads, Innoveda)**
- **Mentor**
- **Intel**
- **{IntuSoft}**
- **{Synopsys (thru Avant!)}**
- **Cadence (thru Orcad)**
- **Mentor (thru Viewlogic, Innoveda)**
- **Quantic-EMC**

■ **9 EDA, now 4 +{2} EDA**

■ **{...} means no longer member**

Mentor Graphics: 9 Parsers, Now 1

■ Acquisitions:	V2.1(26)	V3.2(17)	V4.0(10?)
■ Mentor Graphics		x	x
— Anacad	x		
— Interconnectix	x		
— VeriBest (Intergraph)	x	x	
— Viewlogic		x	
— Quad Design	x		
— HyperLynx	x	x	
— (Also as members and participants: Innoveda, Pads, Integrity Engineering, Zeelan Technology)			

- 11 Mentor Graphics companies in IBIS, now 1

IBIS & Other Organizations, Documents

- **EIA (GEIA), ANSI, IEC** - for IBIS standardization
- **EDIF 4 0 0** - includes **IBIS 2.1** buffers & package
- **JEITA (IMIC)** - expanded table model (Japan)
- **JEDEC** - IBIS Tables in various specifications
- **NCITS/T10** - SCSI document references IBIS
- **IEC, UTE (ICEM)** - IBIS and EMC (France)
- **XML** draft - **Apt Software Avenues**, others
- **SPICE** - about 5+? IBIS implementations
- **VHDL-AMS, Verilog-AMS, SPICE** - multi-lingual
- **CMC - BSIM3/4** (under **GEIA**, same as **IBIS Forum**)
- **Touchstone** format (S-parameters) - public under **IBIS**

Industrial IBIS Involvement

- **IBIS East Users Group**
 - Accuracy Report
 - Started Interconnect Specification
- **IBIS Quality Committee**
 - Model guidelines
- **Arpad Muranyi's IBIS Classes**
- **Free SPICE to IBIS, IBIS to SPICE, graphing tools, information tools (from NCSU and companies)**
- **Cookbooks**
- **Vendor, commercial and consultant modeling development**

Industrial Acceptance

- Recent SI reflector archives (8351 messages)
 - **IBIS OR HSPICE** - 36.8%
 - **IBIS** - 22.7%
 - **HSPICE** - 21.9%
 - **IBIS AND HSPICE** - 7.8%
- Semiconductor vendor IBIS models - **70++** vendors
- EDA IBIS support - including **5+** SPICE vendors
- IBIS reflectors - about **400** world wide
- Ongoing magazine article references
- Books - just starting (Hall ..., Young, ...)

IBIS not Perfect

- **Features:** Component centric, model types, tables relative to rails, accurate simulation with waveform tables, C_comp included in waveforms, ... & **driven by practical needs**
 - **Mistakes?** : I-V table (polarity reversal, ranges, and gaps), C_comp corners by value, specification data relative to absolute voltages, loose syntax guidelines, ...
-
- **IBIS still solves the industrial modeling problem (IP protection, efficient, vendor neutral format, available, and sufficiently accurate)**

Keys to Success

- **Provide satisfactory technical/business solution (right place, right time)**
- **Maintain formal standards body affiliation**
- **Enable industry and make IBIS models a requirement for semiconductor device purchase**
- **Track related activities**
- **Keep the Forum efficient and open**
 - **Low cost by leveraging support**
 - **Easy access and sharing of information**
- **Get others involved and spread the work and credit**

Future Challenges

- **Industrial support** (& source of IBIS funding) - keep IBIS relevant to commercial needs
- **Industrial infrastructure** - take advantage of it
- **Changing environment** (economic, consolidations and new companies, technology advances) - be responsive
- **Technical advances** - leverage new opportunities
 - **Multi-lingual** direction for digital/analog interfaces & broader language base
 - **Interconnect Specification** advances
- **Success exists when others promote IBIS**