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

- 9 EDA, now 4 +{2} EDA

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

{...} means no longer member
<table>
<thead>
<tr>
<th>Acquisitions:</th>
<th>V2.1(26)</th>
<th>V3.2(17)</th>
<th>V4.0(10?)</th>
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<tr>
<td>Mentor Graphics</td>
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<td>— Anacad</td>
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<td>— Interconnectix</td>
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<td>— VeriBest (Intergraph)</td>
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<td>— Viewlogic</td>
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<td>— Quad Design</td>
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<td>— HyperLynx</td>
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<td>(Also as members and participants: Innoveda, Pads, Integrity Engineering, Zeelan Technology)</td>
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| 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, ...)

Reflections on IBIS, IBIS Summit Meeting, Bob Ross January 27, 2003
IBIS not Perfect

- **Features:** Component centric, model types, tables relative to rails, accurate simulation with waveform tables, $C_{\text{comp}}$ included in waveforms, … & driven by practical needs

- **Mistakes?** : I-V table (polarity reversal, ranges, and gaps), $C_{\text{comp}}$ 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**