IBIS Open Forum Minutes

Meeting Date: **April 8, 2016**
Meeting Location: **Teleconference**

VOTING MEMBERS AND 2016 PARTICIPANTS

ANSYS	Curtis Clark*, Toru Watanabe
Applied Simulation Technology	(Fred Balistreri)
Broadcom (Avago Technologies)	Bob Miller
Cadence Design Systems	Ken Willis, Brad Brim
Cisco Systems	Giuseppi Selli, Brian Baek
CST	Stefan Paret
Ericsson	Anders Ekholm, David Zhang, Zilwan Mahmod
GLOBALFOUNDRIES	Steve Parker*
Huawei Technologies	(Jinjun Li)
IBM	Adge Hawes*, Luis Armenta
Infineon Technologies AG	(Christian Sporrer)
Intel Corporation	Hsinho Wu*, Mohammad Bapi, Michael Mirmak*, Masahi Shimanouchi, Todd Bermensolo, Zao Liu, Gong Ouyang, Udy Shrivastava
IO Methodology	Lance Wang
Keysight Technologies	Radek Biernacki*, Heidi Barnes, Jian Yang, Fangyi Rao, Stephen Slater, Pegah Alavi, Edwin Young
Maxim Integrated Products	Yan Liang, Don Greer, Thinh Nguyen, Joe Engert, Hock Seon
Mentor Graphics	Arpad Muranyi*, Vladimir Dmitriev-Zdorov, John Angulo
Micron Technology	Randy Wolff*
Signal Integrity Software	Mike LaBonte*, Walter Katz*, Todd Westerhoff
Synopsys	Ted Mido*, Kevin Li*
Teraspeed Labs	Bob Ross*
Toshiba	(Yasumasa Kondo)
Xilinx	(Raymond Anderson)
ZTE Corporation	(Shunlin Zhu)
Zuken	Michael Schaeder, Amir Wallrabenstein

OTHER PARTICIPANTS IN 2016

eASIC	David Banas*
Fujitsu Advanced Technologies	Shogo Fujimori
H3C	Bin Cheng, Mao Jun
Independent	Carl Gabrielson
JEITA	Yosuke Kanamaru
John Baprawski, Inc.	John Baprawski
KEI Systems	Shinichi Maeda
Lattice Semiconductor	Dinh Tran, Maryam Shahbazi

MathWorks	Mike Mulligan, Corey Mathis
Northrup Grumman	Alex Golian
NXP	Jon Burnett
Rambus	John Yan
Raytheon	Joseph Aday
SAE International	(Logen Johnson)
SILABTECH	Biman Chattopadhyary
Signal Metrics	Ron Olisar
SPISim	Wei-hsing Huang

In the list above, attendees at the meeting are indicated by *. Principal members or other active members who have not attended are in parentheses. Participants who no longer are in the organization are in square brackets.

UPCOMING MEETINGS

The bridge numbers for future IBIS teleconferences are as follows:

Date	Meeting Number	Meeting Password
April 29, 2016	205 475 958	IBIS
May 11, 2016	European IBIS Summit – no teleconference	

For teleconference dial-in information, use the password at the following website:

https://ciscosales.webex.com/ciscosales/j.php?J=205475958

All teleconference meetings are 8:00 a.m. to 9:55 a.m. US Pacific Time. Meeting agendas are typically distributed seven days before each Open Forum. Minutes are typically distributed within seven days of the corresponding meeting. When calling into the meeting, follow the prompts to enter the meeting ID. For new, local international dial-in numbers, please reference the bridge numbers provided by Cisco Systems at the following link:

http://www.cisco.com/web/about/doing_business/conferencing/index.html

NOTE: "AR" = Action Required.

INTRODUCTIONS AND MEETING QUORUM
Randy Wolff declared that a quorum was reached and the meeting could begin.

CALL FOR PATENTS
Mike LaBonte called for declaration of any patents or pending patents related to the IBIS 3.2, IBIS 4.2, IBIS 5.1, IBIS 6.1, Touchstone 2.0, IBIS-ISS 1.0 or ICM 1.1 specifications. No patents were declared.

REVIEW OF MINUTES AND ARS
Randy Wolff called for comments regarding the minutes of the March 18, 2016 IBIS Open Forum teleconference. Michael Mirmak moved to approve the minutes. Curtis Clark seconded the motion. There were no objections.

Randy reviewed ARs from the previous meeting.

1. Mike LaBonte to look into updating the meeting URL for the teleconference [AR].
   The meeting invitation was amended for this week with a new URL.
2. Mike LaBonte to add Zuken as SPI summit sponsor on events web page [AR].
   Done.
3. Mike LaBonte to announce BIRD template vote [AR].
   Done. It is scheduled for today.
4. Mike LaBonte clarify Policies and Procedures language about designated representatives [AR]
   There was some board discussion, but it is still in progress.
5. Bob Ross ask parser developer about Mac OSX support [AR].
   Done.
6. Mike LaBonte update BUG 174 status on bug web page [AR].
   Done.

ANNOUNCEMENTS, CALL FOR ADDITIONAL AGENDA ITEMS
Bob Ross noted a presentation that Walter Katz would like to give.

Radek Biernacki asked for time to discuss an error in an example he found in the IBIS specification.

MEMBERSHIP STATUS AND TREASURER'S REPORT
Bob Ross reported that per SAE accounting we are at $13,076, but per his accounting we are at $8,765. We have 16 paid members for 2016. We had 24 paid members last year, so he needs to remind at least 8 members about payment. We got substantial sponsorship money from Huawei for the 2016 Shanghai Summit.

WEBSITE ADMINISTRATION
Mike LaBonte reported that a comment was received that a lot of items that are commonly sought after don't have top-level menu items. Mike edited the webpage to add second-level menu entries for the minutes, the four task groups, the BIRDs page and the IBISCHK6 parser and bugs pages. Bob Ross noted this was a great improvement but there could be some fine tuning later to help find more items quickly without cluttering the page too much.

Mike reported that eda.org went dark on March 31, 2016. This means that eda.org/ibis redirects have stopped working. Old URLs will become 404 pages (page not found). Mike asked the Accellera server administrator if a redirection page could be added to their server.

MAILING LIST ADMINISTRATION
Curtis Clark reported that freelists did a system upgrade about a week ago that briefly caused administrator login issues. That has been fixed. He is seeing more spam messages showing up on the list, but he is able to keep these messages from getting emailed out.

LIBRARY UPDATE
No update.

INTERNATIONAL/EXTERNAL ACTIVITIES
- Conferences
None.

- Press Update
None.

- Related standards
Michael Mirmak reported that DASC met yesterday. IEEE 1666.1, the System-C AMS extensions, has been approved as an official standard by the IEEE. This is available through the IEEE Get program free of charge. Mike LaBonte commented that this may mean that analog and algorithmic portions of an AMI model could be written in System-C. The standard can be found at:

https://standards.ieee.org/findstds/standard/1666.1-2016.html

SUMMIT PLANNING AND STATUS
- European IBIS Summit at SPI 2016
An IBIS Summit will be co-hosted with the IEEE Workshop on Signal and Power Integrity (SPI). The Summit will be a half day event on May 11, 2016 in Turin, Italy. Bob Ross reported that planning is going well. The SPI schedule of speakers has been posted. The Sunday tutorial features Heidi Barnes of Keysight with a power integrity talk. An announcement went out today, although it mistakenly included a draft agenda. There will be a full program. Arpad Muranyi will be doing a one hour basic IBIS tutorial. Zuken, Mentor Graphics and CST are sponsors. Some sponsors have asked about making presentations, and Bob responded that these are acceptable if they are not marketing presentations and are technical in nature. We may be able to start earlier than 2:00 pm which would help fit in extra presentations.

Sponsorship opportunities for all upcoming IBIS summits are available, with sponsors receiving free mentions in the minutes, agenda, and other announcements. Contact the IBIS Board for further details.

QUALITY TASK GROUP
Mike LaBonte reported that the group is meeting on Tuesdays at 8:00 a.m. PT. The group's main focus is issues related to IBISCHK. There has been some activity with posting new

IBISCHK6 executables and bugs. Michael Mirmak noted he sent an email out about changing the language in the specification related to the use of the term sub-parameter referring to column headings. Should they be reclassified as column headers? He would like the Quality task group to look into how this change could affect the parser.

The IBISCHK6 user guide work in progress can be reviewed at:

http://www.ibis.org/ibischk6/ibischk_6.1.1_UserGuide_wip1.pdf

The Quality Task Group checklist and other documentation can be found at:

http://www.ibis.org/quality_wip/

ADVANCED TECHNOLOGY MODELING TASK GROUP

Arpad Muranyi reported that the group is meeting regularly on Tuesdays at 12:00 p.m. PT. The group has been discussing ground referencing in the specification as well as the redriver flow corrections proposal made by Fangyi Rao. He is hoping for an update soon on the backchannel BIRD147 proposal.

Task group material can be found at:

http://www.ibis.org/macromodel_wip/

INTERCONNECT TASK GROUP

Michael Mirmak reported that the group is meeting on Wednesdays at 8:00 a.m. PT. The group is reviewing draft 31 of the interconnect modeling proposal. The impact of referencing is being discussed as well as minor editorial fixes.

Task group material can be found at:

http://www.ibis.org/interconnect_wip/

EDITORIAL TASK GROUP

Michael Mirmak reported that the group is meeting on Fridays at 8:00 a.m. PT on weeks the Open Forum teleconference is not held. The group is discussing ground reference language cleanup in the IBIS specification. Walter Katz's presentation on Device-Under-Test versus Device-In-Action has a strong impact on editorial and other task group work.

Task group material can be found at:

http://www.ibis.org/editorial_wip/

NEW ADMINISTRATIVE ISSUES

- BIRD template revision 1.3

Bob Ross noted that a comment was added to the template to delete the IBIS BIRD INSTRUCTIONS page before submission. He thought this was a good addition. Bob commented that in Appendix A, "subparameter" should be "sub-parameter" based on Michael Mirmak's recent comment. If column headings are mentioned in a BIRD, we may need to update language in the instructions in a new revision about the labeling of such headings.

Radek Biernacki moved to vote to accept the new BIRD template. Michael Mirmak seconded the motion. The vote passed with the following vote tally:

ANSYS – yes
GLOBALFOUNDRIES – yes
IBM – yes
Intel – yes
Keysight – yes
Mentor – yes
Micron – yes
SiSoft – yes
Synopsys – yes
Teraspeed Labs – yes

Mike will post this template on the webpage [AR].

- Second revision of IBIS Policies and Procedures

Mike reported that in final board review, there has been a lot of discussion, and other changes will be made. Some discussion items were about the minutes as well as reporting of results of officer elections. Bob noted that the IBIS membership year ends on June 1, but the officer voting period starts on June 1 and ends on June 14. In the next revision we want to extend the membership period to June 15, so that previous year's members can officially vote on the new officers. We are also discussing having two returning officers for the voting so that no mistakes are made if emails are missed. Bob asked Radek if he would be a returning officer for the upcoming election. Radek agreed to do this.

The document can be found at:

> http://www.ibis.org/policies/

BIRD125.1: MAKE IBIS-ISS AVAILABLE FOR IBIS PACKAGE MODELING

Discussion was tabled.

BIRD128.2: ALLOW AMI_PARAMETERS_OUT TO PASS AMI_PARAMETERS_IN DATA ON CALLS TO AMI_GETWAVE

Discussion was tabled.

BIRD145.3: CASCADING IBIS I/O BUFFERS WITH [EXTERNAL CIRCUIT]S USING THE [MODEL CALL] KEYWORD
Discussion was tabled.

BIRD147: BACK-CHANNEL SUPPORT
Discussion was tabled.

BIRD158.3: AMI TOUCHSTONE ANALOG BUFFER MODELS
Discussion was tabled.

BIRD161.1: SUPPORTING INCOMPLETE AND BUFFER-ONLY [COMPONENT] DESCRIPTIONS
Discussion was tabled.

BIRD163: INSTANTIATING AND CONNECTING [EXTERNAL CIRCUIT] PACKAGE MODELS WITH [CIRCUIT CALL]
Discussion was tabled.

BIRD164: ALLOWING PACKAGE MODELS TO BE DEFINED IN [EXTERNAL CIRCUIT]
Discussion was tabled.

BIRD165: PARAMETER PASSING IMPROVEMENTS FOR [EXTERNAL CIRCUIT]S
Discussion was tabled.

BIRD166: RESOLVING PROBLEMS WITH REDRIVER INIT FLOW
Discussion was tabled.

BIRD180: REQUIRE UNIQUE PIN NAMES IN [PIN]
Discussion was tabled.

IBISCHK6 PARSER AND BUG STATUS
Bob Ross reported that Mac OSX and Windows 64-bit executables have been added to the webpage. Mike LaBonte noted that the makefile package included with the parser worked to create the Mac OSX executable.

Bob introduced BUG175 reported by Walter Katz. An error should be reported for a [Model Selector] list with a mixture of Series and non-Series models. Another error is that Series

models in [Model Selector] should not be allowed to be assigned directly to a pin in the [Pin] list. Bob moved to classify the bug as moderate severity, medium priority and open status. Radek Biernacki seconded the motion. There were no objections.

Mike LaBonte will update the BUG175 status on the webpage [AR].

Bob noted that we may need to pay the parser developer for the fix, as it is a bug that has been around since IBISCHK3.

NEW TECHNICAL ISSUES
Radek Biernacki noted that in the examples of IBIS-AMI parameters spanning pages 235-236 in the IBIS 6.1 specification, the last two examples are missing the Format, such as Value, shown in the first three examples. Mike LaBonte will add this error to the known issues document on the webpage [AR].

Walter Katz shared a presentation "DUT vs DIA". He stated that IBIS is a behavioral model of a Device Under Test (DUT). Conditions of a DUT are that rail voltages are kept constant relative to a test fixture reference node. I-V and V-T tables are measured at the I/O buffer and exclude all package parasitics required to perform the test. If only [Voltage Range] is specified, then [Pullup Reference] and [Power Clamp Reference] are equal to [Voltage Range] and [Pulldown Reference] and [GND Clamp Reference] have values of 0. All these are relative to a test fixture reference point.

A Device In Action (DIA) is a buffer model being simulated. Walter stated that the IBIS specification does not tell the EDA tool how to use IBIS models when simulating in non-DUT conditions. Arpad Muranyi commented that the power aware keywords do contain information for the EDA tools on how to simulate under non-ideal voltage supply conditions. Radek commented that the topology for simulation is spelled out in the specification. Walter commented that all the information is about a DUT and doesn't state exactly what to do in a simulator for a DIA. Curtis Clark commented that [ISSO PU] and [ISSO PD] state how to compute a scalar modulating the currents based on how the rails are varying from ideal. This is an example of specifying what the simulator should do.

Walter continued, noting that some IBIS members say that an EDA tool is free to extrapolate a model to other operating conditions. Others think that the specification should document exactly what an EDA tool should so when the device is operating in other operating conditions, so that results can be compared from different EDA tools. Bob noted that C_comp is an example of where we are not clear what to do with the capacitance when the model is simulated. Mike LaBonte noted how two simulators could apply different algorithms for interpolating operating voltages in between voltages specified in the model. Mike LaBonte wondered why we are not seeing greater adoption of the split C_comp values. Walter Katz commented that model makers don't know how to calculate the values.

NEXT MEETING
The next IBIS Open Forum teleconference meeting will be held April 29, 2016. The European IBIS Summit will be held May 11, 2016. The following IBIS Open Forum teleconference meeting will be held May 20, 2016.

Michael Mirmak moved to adjourn. Arpad Muranyi seconded the motion.

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NOTES

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This meeting was conducted in accordance with ANSI guidance.

All inquiries may be sent to info@ibis.org. Examples of inquiries are:

- To obtain general information about IBIS.
- To ask specific questions for individual response.
- To subscribe to the official ibis@freelists.org and/or ibis-users@freelists.org email lists (formerly ibis@eda.org and ibis-users@eda.org).
- To subscribe to one of the task group email lists: ibis-macro@freelists.org, ibis-interconn@freelists.org, or ibis-quality@freelists.org.
- To inquire about joining the IBIS Open Forum as a voting Member.
- To purchase a license for the IBIS parser source code.
- To report bugs or request enhancements to the free software tools: ibischk6, tschk2, icmchk1, s2ibis, s2ibis2 and s2iplt.

The BUG Report Form for ibischk resides along with reported BUGs at:

http://www.ibis.org/bugs/ibischk/
http://www.ibis.org/ bugs/ibischk/bugform.txt

The BUG Report Form for tschk2 resides along with reported BUGs at:

http://www.ibis.org/bugs/tschk/
http://www.ibis.org/bugs/tschk/bugform.txt

The BUG Report Form for icmchk resides along with reported BUGs at:

http://www.ibis.org/bugs/icmchk/
http://www.ibis.org/bugs/icmchk/icm_bugform.txt

To report s2ibis, s2ibis2 and s2iplt bugs, use the Bug Report Forms which reside at:

http://www.ibis.org/bugs/s2ibis/bugs2i.txt
http://www.ibis.org/bugs/s2ibis2/bugs2i2.txt
http://www.ibis.org/bugs/s2iplt/bugsplt.txt

Information on IBIS technical contents, IBIS participants and actual IBIS models are available on the IBIS Home page:

http://www.ibis.org/

Check the IBIS file directory on ibis.org for more information on previous discussions and results:

http://www.ibis.org/directory.html

Other trademarks, brands and names are the property of their respective owners.

SAE STANDARDS BALLOT VOTING STATUS

Organization	Interest Category	Standards Ballot Voting Status	February 5, 2016	February 26, 2016	March 18, 2016	April 8, 2016
ANSYS	User	Active	X	X	X	X
Applied Simulation Technology	User	Inactive	-	-	-	-
Broadcom Ltd.	Producer	Inactive	-	-	-	-
Cadence Design Systems	User	Active	X	X	X	-
Cisco Systems	User	Inactive	-	-	-	-
CST	User	Inactive	-	-	-	-
Ericsson	Producer	Inactive	-	-	-	-
GLOBALFOUNDRIES	Producer	Active	X	X	-	X
Huawei Technologies	Producer	Inactive	-	-	-	-
Infineon Technologies AG	Producer	Inactive	-	-	-	-
IBM	Producer	Active	X	X	X	X
Intel Corp.	Producer	Active	X	X	X	X
IO Methodology	User	Inactive	X	X	-	-
Keysight Technologies	User	Active	X	X	X	X
Maxim Integrated Products	Producer	Active	X	X	X	-
Mentor Graphics	User	Active	X	X	X	X
Micron Technology	Producer	Active	X	-	X	X
Signal Integrity Software	User	Active	X	X	X	X
Synopsys	User	Active	X	X	X	X
Teraspeed Labs	General Interest	Active	X	X	X	X
Toshiba	Producer	Inactive	-	-	-	-
Xilinx	Producer	Inactive	-	-	-	-
ZTE	User	Inactive	-	-	-	-
Zuken	User	Inactive	-	-	-	-

Criteria for SAE member in good standing:
- Must attend two consecutive meetings to establish voting membership
- Membership dues current
- Must not miss two consecutive meetings

Interest categories associated with SAE standards ballot voting are:
- Users - members that utilize electronic equipment to provide services to an end user.
- Producers - members that supply electronic equipment.
- General Interest - members are neither producers nor users. This category includes, but is not limited to, government, regulatory agencies (state and federal), researchers, other organizations and associations, and/or consumers.