IBIS Open Forum Minutes

Meeting Date: **November 1, 2013**
Meeting Location: **Teleconference**

VOTING MEMBERS AND 2013 PARTICIPANTS

Agilent	Radek Biernacki*, Pegah Alavi, Heidi Barnes, Fangyi Rao, Colin Warwick, Tarun Kalwani, Ming Yan
Altera	David Banas*, Hsinho Wu
ANSYS	[Luis Armenta], Ben Franklin, Dan Dvorscak, Steve Pytel
Applied Simulation Technology	Fred Balistreri, Norio Matsui
Cadence Design Systems	[Terry Jernberg], Joy Li, Yingxin Sun, Ambrish Varma, Kevin Yao, Brad Brim*
Ericsson	Anders Ekholm, Martina Fiammengo
Foxconn Technology Group	(Sogo Hsu)
IBM	Greg Edlund, Adge Hawes*, Dale Becker
Infineon Technologies AG	(Christian Sporrer)
Intel Corporation	Michael Mirmak*, Mohammad Bapi, Stewart Gilbert, Ravindra Rudraraju
IO Methodology	Lance Wang
LSI	Brian Burdick, Sarika Jain, Xingdong Dai, Anaam Ansari*, Min Huang*
Maxim Integrated Products	Hassan Rafat, Mahbubul Bari, Ron Olisar
Mentor Graphics	Arpad Muranyi*, Ed Bartlett, Vladimir Dmitriev-Zdorov
Micron Technology	Randy Wolff*
Signal Integrity Software	Walter Katz*, Mike LaBonte*, Mike Steinberger, Todd Westerhoff
Synopsys	John Ellis, Ted Mido, Scott Wedge, Rinsha Reghunath
Teraspeed Consulting Group	Bob Ross*, Tom Dagostino
Toshiba	(Yasumasa Kondo)
Xilinx	(Raymond Anderson)
Zuken	Masaud Raeisi, Reinhard Remmert, Michael Schaeder, Alfonso Gambuzza

OTHER PARTICIPANTS IN 2013

Bayside Design	Elliot Nahas
Computer Simulation Technology	Heiko Grubrich
ECL Advantage	Thomas Iddings
Freescale	Jon Burnett
Granite River Labs	Vamshi Kandalla, Miki Takahashi
Hewlett-Packard	Yongjin Choi, Ting Zhu
KEI Systems	Shinichi Maeda
Molex	Davi Correia

National Instruments	Lee Mohrmann
Nvidia	Eric Hsu
Qualcomm	Scott Powers
QLogic	James Zhou
SAE	(Chris Denham)
TechAmerica	[Chris Denham]
Teradyne	Raymond Yakura
Université de Brest	Mihai Telescu
University of Illinois	Tom Comberiate, José Schutt-Ainé, Xu Chen
Vitesse Semiconductor	Sirius Tsang

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
November 15, 2013	Asian IBIS Summit (Shanghai) – no teleconference	
November 19, 2013	Asian IBIS Summit (Taipei) – no teleconference	
November 22, 2013	Asian IBIS Summit (Yokohama) – no teleconference	
December 6, 2013	205 475 958	IBIS

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 AM to 9:55 AM 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.

Two new attendees introduced themselves. Anaam Ansari is a system engineer at LSI. She was attending in place of Xingdong Dai. Min Huang is also a system engineer at LSI working

on SerDes modeling.

CALL FOR PATENTS
Michael Mirmak called for any patents or pending patents related to the IBIS 3.2, IBIS 4.2, IBIS 5.1, IBIS 6.0, Touchstone 2.0 or ICM 1.1 specifications. No patents were declared.

REVIEW OF MINUTES AND ARS
Randy Wolff called for comments regarding the minutes of the October 11, 2013 IBIS Open Forum teleconference. The minutes were approved without changes.

MISCELLANY/ANNOUNCEMENTS
Michael Mirmak noted that we need to discuss meeting scheduling for the rest of 2013.

CALL FOR NEW ISSUES
Walter Katz requested time to give a presentation on package and on-die interconnect modeling discussions occurring in the ATM task group.

MEMBERSHIP STATUS AND TREASURER'S REPORT
Bob Ross reported that we may have a new member joining for 2013. We have positive cash flow right now, with money coming in for the Summit sponsorships.

WEB PAGE AND MAILING LIST ADMINISTRATION
Mike LaBonte reported that he upgraded the wiki software. He is working on updating an unpublished wiki page. He is also adding BIRDs and BUGs to the MANTIS database. The website can be cut over to use the wiki and MANTIS once those pages are good enough. He plans to keep the legacy pages in place.

Bob Ross noticed problems in the PDF version of the IBIS 6.0 specification, so he created a new PDF, and it was published on October 21. Members should download the new copy.

Mike reported that Bob had trouble sending out one of the Asia IBIS Summit announcements. The message was marked as spam. Mike has worked with the administrators to prevent this issue in the future. The name of a hotel in the email had caused the spam filter to kick in.

MODEL LIBRARY UPDATE
No update.

INTERNATIONAL/EXTERNAL ACTIVITIES
- Conferences

None.

- Press Update

Will Hobbs sent out notice of an article by Bonnie Baker. The article in EDN on-line describes how to use IBIS models to find input and output resistance. At the end of the article are links to other related IBIS articles. The article can be found at:

> http://www.edn.com/electronics-blogs/bakers-best/4422569/Find-input-and-output-resistance-with-IBIS

Bob Ross mentioned an IEEE paper. Some of the information in the paper was presented by Wael Dghais at the European IBIS Summit in May 2013.

W. Dghais, T. R. Cunha, J.C. Pedro, "A Novel Two-Port Behavioral Model for I/O Buffer Overclocking Simulation", IEEE Trans. on Components, Packaging, and Manufacturing Technology, October 2013, pp. 1754-1763.

SUMMIT PLANNING AND STATUS

- Asia Events

Bob Ross reported that most presentations are being reviewed. Handouts and booklets are being prepared. More participation is encouraged. Agendas need to go out soon. Dates of the Summits are November 15 in Shanghai, November 19 in Taipei and November 22 in Yokohama.

Sponsors of the Shanghai event include Huawei as the major sponsor and cosponsors including Agilent, ANSYS, Cadence, Intel, IO Methodology and Synopsys. For the Taipei event, ANSYS is the major sponsor and cosponsors include Cadence, Intel, IO Methodology and Synopsys. For the Yokohama event, JEITA and the IBIS Open Forum are major sponsors and cosponsors include ANSYS, Cadence, Mentor Graphics and Zuken.

- DesignCon 2014

Michael reported that the Summit is scheduled for Friday, January 31, 2014. IBIS is an official co-sponsor of DesignCon.

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 recent meetings continue to be about ibischk. The group is continuing to meet weekly on Tuesdays at 8:00 am PT. One must be on the ibis-quality@freelists.org mailing list to receive announcements.

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

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

ADVANCED TECHNOLOGY MODELING TASK GROUP
Arpad Muranyi reported that the group is meeting regularly on Tuesdays at 12:00 p.m. PT.
They are discussing directions to take in IBIS to improve packaging and on-die interconnect modeling. They are looking at options to add new keywords for some modeling or move all modeling in the direction of EMD. The existing IBIS specification cannot address stacked dies or splits/forks in packaging as well as on-die interconnect. The capabilities for modeling these things need to exist somewhere in IBIS.

Task group material can be found at:

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

INTERCONNECT TASK GROUP
Arpad Muranyi requested that the task group report be reassigned to Michael Mirmak. Michael questioned if the task group will need to be reconvened after discussions in the ATM task group. The task group is currently not meeting.

The task group documents can be found at:

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

NEW ADMINISTRATIVE ISSUES
None.

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

BIRD128: 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.

BIRD157: PARAMETERIZE [DRIVER SCHEDULE]
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.

IBISCHK5 PARSER AND BUG STATUS
Bob Ross reported that a new bug, BUG148 was entered by Michael Mirmak. Michael added that the bug is a parser compilation warning that appears for most UNIX/Linux variants related to package modeling. The behavior was noted in BUG137 but was not addressed in the resulting fix. The bug was classified as annoying severity, low priority and open status. Bob noted that the bug would be a better candidate for fixing in the ibischk6 parser.

IBISCHK6 PARSER PLANNING
Michael Mirmak noted that we need to discuss the funding model for ibischk6. After discussions with SAE and the board, he would like to propose the technical content of the parser include parsing as normal, and funding will come from parser license purchasing separate from membership dues. A contract and statement of work are in preparation.

Bob Ross noted that several IBIS version 6.0 BIRDs require parser changes. We need to sell a small number of licenses to fund the parser development. Getting commitments early will ensure we can fund the parser in a short period of time. If we use a model where we fund the parser development through dues increases, the parser will be delayed due to waiting for the 2014 membership cycle to begin. Brad Brim asked when invoices might go out. Bob responded that we first need to decide on the funding model, and then invoices could go out within a week. Brad commented that some people may want to pay early, but it could be difficult to budget for earlier than one quarter out. Also, some companies may need to receive something when an invoice is paid. Mike LaBonte added that the parser development will not take very long. Language in the parser development contract is being defined as to when the developer will be paid. Bob noted that this funding model has been used for previous parsers, and only three companies are needed to pay ahead of time to get the parser paid for. Brad suggested companies inquire immediately about whether they can pay before delivery of the code.

Michael noted there has been discussion of integration of executable or dll parsing code into ibischk. This idea is desired but is being delayed currently. Discussion is needed of what exactly could be parsed in dll code.

Walter Katz asked what the estimated delivery of an ibischk6 parser is. Michael noted that if all goes on schedule, it would be 2.5-3 months to delivery of the code from when the contract is

signed.

Bob moved to set the license fee for the ibischk6 parser to $2500 US. Randy Wolff seconded the motion. There were no objections.

NEW TECHNICAL ISSUES
Walter Katz gave a presentation titled "Package and On-Die Interconnect Decision Time". The current IBIS Component assumes a single die in the package and one-to-one correspondence between pins, die pads and buffer instances. There is no information on supply die pads. The Component is limited because it can't support power distribution models and can't support IBIS-ISS subcircuit package models. EBD is also limited and not very useful for package modeling. The proposed EMD specification supports multi-chip modules and is awaiting further discussions of the Component modeling. Requirements of a power distribution model are different numbers of supply pins and supply die pads. Component could be enhanced to include a separate list of supply die pads, or the PDN model could be implemented with EMD using an IBIS Component where the pins are really die pads. Stacked memories are increasingly common, where multiple die in the package are connected together to single external pins. Other special cases exist where package pins connect to more than one buffer or two or more package pins connect to a single buffer. These cases can be handled using an EMD-like solution or by enhancing the Component in IBIS.

Walter recommended proceeding with EMD and making it a new IBIS specification. He also recommended enhancing the IBIS Component to support a list of supply die pads, stacked memory components, IBIS-ISS package and on-die interconnect subcircuits, and no longer enforcing the pin/pad/buffer hierarchy but treating pins, pads, buffers, package interconnect and on-die interconnect as relational objects instead of hierarchical objects. He recommended supporting special cases of signal pins not mapping 1:1 with die pads and buffer pins with EMD.

Walter noted that the ATM task group is currently discussing these options, and he expects the group will report its recommendations to the next Open Forum meeting. The task group really needs more input from IC vendors.

Michael Mirmak wondered what we need to do to get more participation, especially in the survey recently sent out to the ATM task group. Arpad Muranyi thought the survey questions were not clear enough to get us to the answers we want. Mike LaBonte agreed and thought the survey could ask the questions differently, and maybe solicit a wider audience. In response to a question from Arpad, he noted that there are over 100 people on the ATM task group email list. Only four responses were received to the survey.

Bob Ross asked why we wouldn't support the special cases in Component instead of in EMD. Walter noted one main difference is EMD supports different die within a component, and Randy Wolff objected to modeling multiple different technologies within the same component. Also, EMD supports forking of paths. He doesn't think we should enhance Component to the point that it has the same functionality as EMD.

Brad Brim cautioned the group with widening the scope of IBIS too much for full system modeling, keeping IBIS models to the component level. Michael noted there is interest in having an overarching specification to describe systems. Walter noted that EMD is designed to

model anything with external pins and internal connections.

Arpad summarized that so far Walter showed that limitations of Component exist. Should we solve the issue within the IBIS file or move the solution outside of the IBIS file? We haven't discussed on-die interconnect much yet. How are we modeling on-die interconnect between pads and buffers, since the same problems exist with forking, etc. that exist at the packaging level. If package modeling moves out of the IBIS file, we would have to move on-die interconnect out of the IBIS file. Walter asked Arpad to provide an example where multiple buffers connect to a single die pad. Arpad felt that a specification should have a general approach, and it doesn't necessarily have to be complicated as described by Walter.

To get involved in the Advanced Technology Modeling task group discussions, subscribe to the email reflector and read the email reflector archives at:

> http://www.freelists.org/list/ibis-macro

Mike LaBonte reported that he got an email from Donald Telian related to the IBIS acronym. Donald proposed that the acronym be changed to "Interface Between ICs and Systems". He noted that the IBIS acronym has changed in the past.

Brad asked Michael if the JEITA group working on the LSI Package Board specification has a relationship to IBIS. Brad was curious if the group had disclosed any details of the specification to IBIS. Michael noted that there is consideration by DASC to take up the specification and form a working group within IEEE to standardize it.

NEXT MEETING
The Asian IBIS Summit in Shanghai will be held November 15, 2013. The Asian IBIS Summit in Taipei will be held November 19, 2013. The Asian IBIS Summit in Yokohama will be held November 22, 2013. No teleconferences will be available for the Summit meetings. The next IBIS Open Forum teleconference will be held December 6, 2013 from 8:00 a.m. to 10:00 a.m. US Pacific Time. The following IBIS Open Forum meeting is tentatively scheduled for January 10, 2014.

Brad Brim moved to adjourn. Bob Ross seconded the motion. There were no objections.

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NOTES

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This meeting was conducted in accordance with ANSI guidance.

The following e-mail addresses are used:

majordomo@eda.org
  In the body, for the IBIS Open Forum Reflector:
  subscribe ibis <your e-mail address>

  In the body, for the IBIS Users' Group Reflector:
  subscribe ibis-users <your e-mail address>

  Help and other commands:
  help

ibis-request@eda.org

> To join, change, or drop from either or both:
> IBIS Open Forum Reflector (ibis@eda.org)
> IBIS Users' Group Reflector (ibis-users@eda.org)
> State your request.

ibis-info@eda.org

> To obtain general information about IBIS, to ask specific questions for individual response, and to inquire about joining the IBIS Open Forum as a full Member.

ibis@eda.org

> To send a message to the general IBIS Open Forum Reflector. This is used mostly for IBIS Standardization business and future IBIS technical enhancements. Job posting information is not permitted.

ibis-users@eda.org

> To send a message to the IBIS Users' Group Reflector. This is used mostly for IBIS clarification, current modeling issues, and general user concerns. Job posting information is not permitted.

ibis-bug@eda.org

> To report ibischk parser BUGs as well as tschk2 parser BUGs. The BUG Report Form for ibischk resides along with reported BUGs at:
>
> http://www.eda.org/ibis/bugs/ibischk/
> http://www.eda.org/ibis/bugs/ibischk/bugform.txt
>
> The BUG Report Form for tschk2 resides along with reported BUGs at:
>
> http://www.eda.org/ibis/tschk_bugs/
> http://www.eda.org/ibis/tschk_bugs/bugform.txt

icm-bug@eda.org

> To report icmchk1 parser BUGs. The BUG Report Form resides along with reported BUGs at:
>
> http://www.eda.org/ibis/icm_bugs/
> http://www.eda.org/ibis/icm_bugs/icm_bugform.txt

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

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

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

http://www.eda.org/ibis

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

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

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IBIS – SAE STANDARDS BALLOT VOTING STATUS

I/O Buffer Information Specification Committee (IBIS)

Organization	Interest Category	Standards Ballot Voting Status	August 30, 2013	September 20, 2013	October 11, 2013	November 1, 2013
Agilent Technologies	User	Active	X	X	X	X
Altera	Producer	Active	-	-	X	X
ANSYS	User	Inactive	-	-	-	-
Applied Simulation Technology	User	Inactive	-	-	-	-
Cadence Design Systems	User	Active	X	X	X	X
Ericsson	Producer	Inactive	X	-	-	-
Foxconn Technology Group	Producer	Inactive	-	-	-	-
IBM	Producer	Inactive	X	-	-	X
Infineon Technologies AG	Producer	Inactive	-	-	-	-
Intel Corp.	Producer	Active	X	X	X	X
IO Methodology	User	Active	-	X	X	-
LSI	Producer	Active	X	X	X	X
Maxim Integrated Products	Producer	Inactive	-	-	-	-
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	Inactive	-	-	-	-
Teraspeed Consulting	General Interest	Active	X	X	X	X
Toshiba	Producer	Inactive	-	-	-	-
Xilinx	Producer	Inactive	-	-	-	-
Zuken	User	Inactive	-	-	-	-

CRITERIA FOR 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 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.