Practical Measurement vs. Simulation
Correlation with DDR2 667 Interface

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People say:
IBIS model is NOT accurate.

Is that really TRUE?
People say:
HSPICE model is essential for design.

Is that really TRUE?
Let’s see what’s happening in the real world and make wise decisions!!
Experiments

Step 1
For a given target system, prepare following;
1. Measurement waveforms
2. Simulated waveforms using IBIS model
3. Simulated waveforms using HSPICE model

Step 2
Verify accuracy with figure of merit method
(100% is perfect match)

Step 3
Compare simulation time
Target System

Digital consumer system
Point-to-point application
Memory interface with 333MHz (DDR2 667)

Parameters extracted from real design using Cadence Allegro
Simulation condition

**Models**

Memory device:
- DDR2-667 333MHz DRAM
- IBIS model created by *HITACHI ULSI systems*

Receiver:
- ASIC Model
  provided from system vendor

**Tool**

Synopsys HSPICE 2005.3 SP1
Measurement equipments

Oscilloscope:
Agilent technologies
Infiniium54855A 6GHz 20GSa/sec
InfiniiMax1134 probe
Single-End Solder (E2679A)
IBIS vs. Measurement

DRAM IBIS model

Measurement waveforms

Good match with Figure Of Merit of 96%
HSPICE vs. Measurement

DRAM HSPICE model

Measurement waveforms

Close match with FOM of 96%
IBIS vs. HSPICE

DRAM HSPICE model

Nearly equal with FOM of 98%

DRAM IBIS model
Simulation time comparison

HSPICE model

IBIS model

Simulation CPU time

4 times FASTER!
Summary

1) Simulation results of DDR2 667 system shows IBIS & HSPICE DDR2 memory model simulation Correlation with measurement within FOM of 96%

2) IBIS model simulation faster than HSPICE model by four times.

3) Using IBIS model simulation is fairly accurate and fast. Good choice for practical purpose.
Thank you!