

Generation of IBIS models
at STMICROELECTRONICS
IBIS-Forum 99/03/09

Generation of IBIS Models

- ❑ 1. Introduction
- ❑ 2. Generation of IBIS IO models
 - flow
 - adaptation of S2IBIS with ELDO
- ❑ 3. Integration of IBIS Asic models
 - Flow
 - Packaging models
- ❑ 4. Validation

Introduction

Target :

- Provide in UNICAD Corporate CAD platform a solution for the integration of IBIS Asic models to the applications design groups.
- Generate IBIS IO models IO libraries for standard CMOS processes (0.35um, 0.25um, 0.18um...).
- Validate the methodology.

Generation of IBIS IO models

Need an automatic way to generate IBIS model of the IO cell of CRD standard. The job has started with a standard 80um iolib (80 cells) in HCMOS7 (0.25um).

Definition of the Flow :

- Based on S2IBIS v1.1 of NorthCarolina University
- Use ELDO (reference simulator in ST) with same model as in timing characterization
- IbisGeneration.pl script file configures S2IBIS by analyzing IOcell characteristics.
- LSF distributes the job on different machines.
- CheckAndCorrect.pl analyzes results :
 - + corrects non-monotonicity
 - + checks wrong values
 - + shows graphically the difference between original model and corrected one.
 - + checks syntax with ibischk3

Adaptation of S2IBIS :

- Parses correctly ELDO results
- Step of 0.1V

IOcell_netlist

eldo model

IbisGeneration.pl

IOcell.S2I

S2IBIS2

eldo

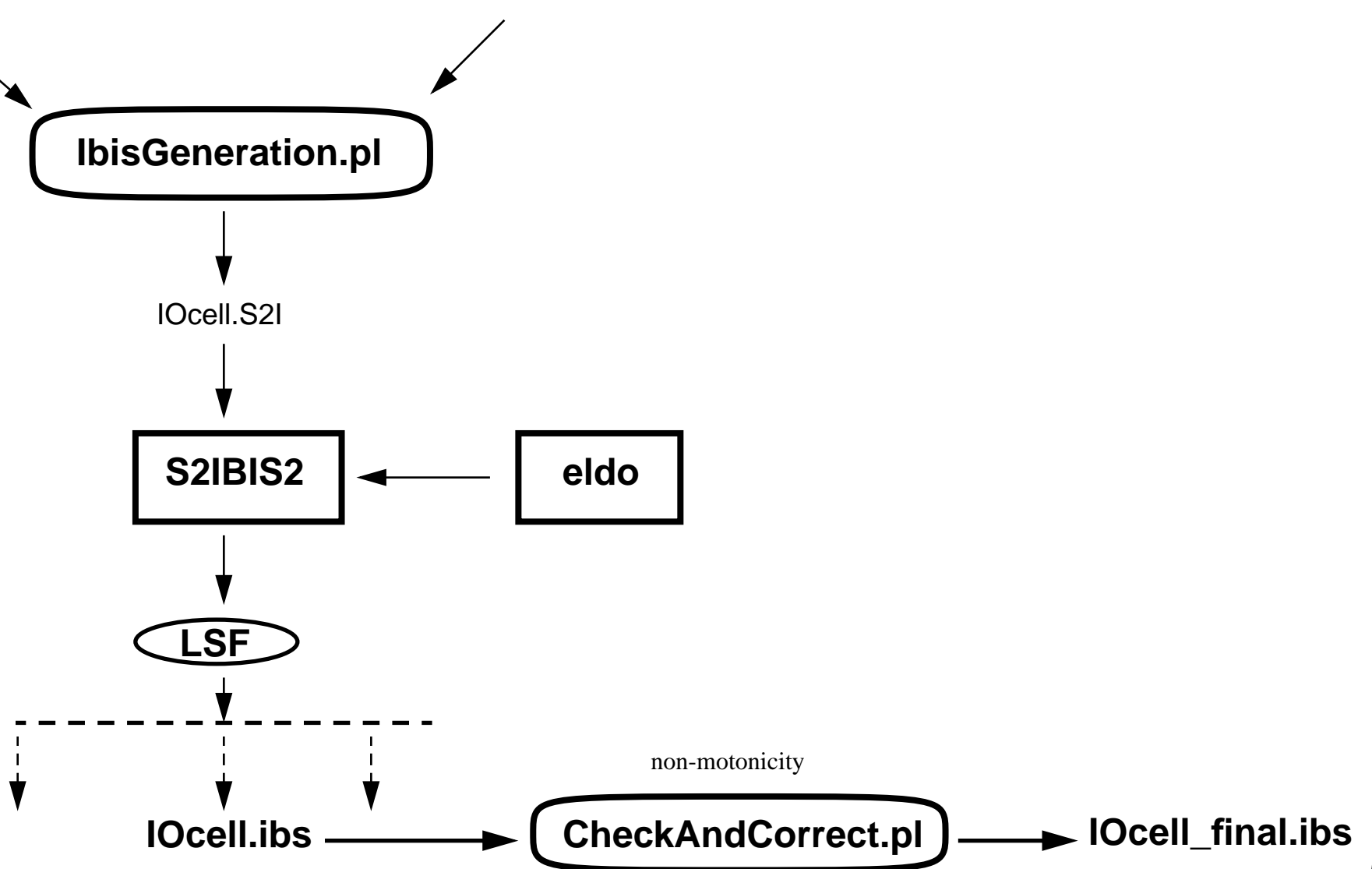
LSF

IOcell.ibs

CheckAndCorrect.pl

IOcell_final.ibs

non-monotonicity



Integration of IBIS Asic Models

The integration of IBIS Asic models is based on our internal bounding manager ICPack.

Explanation of the flow:

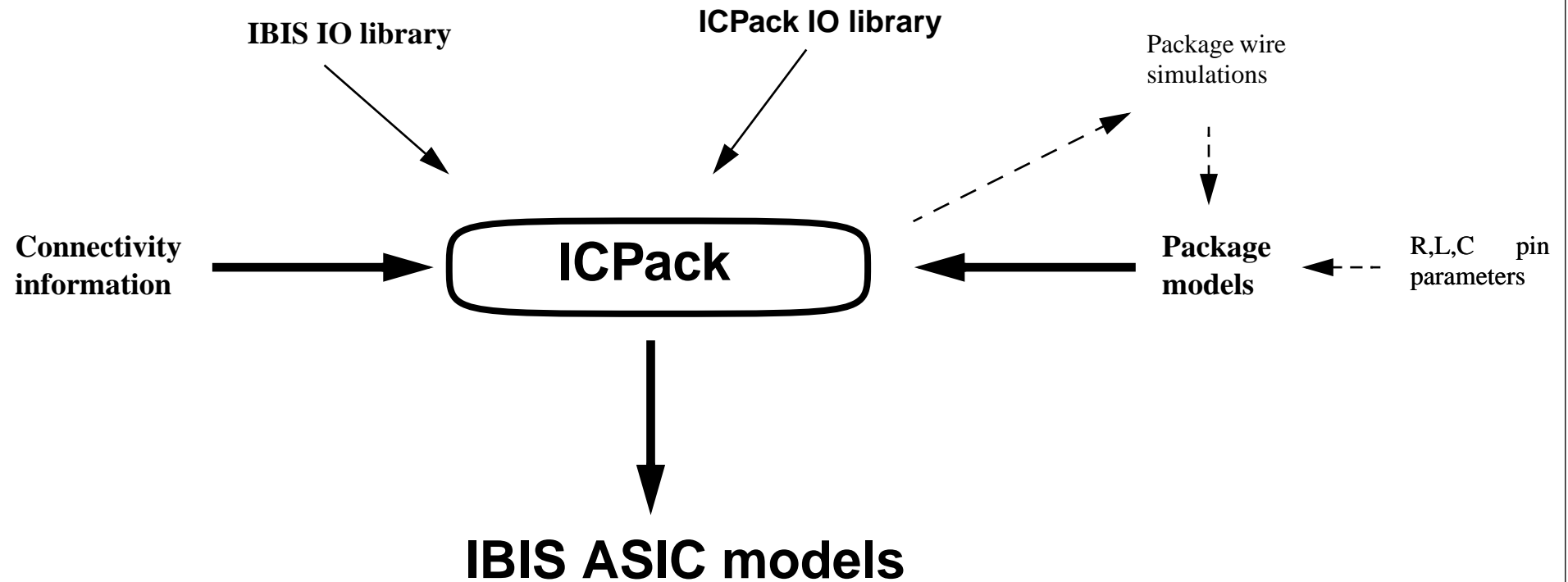
- ICPack has all chip/package connectivity informations needed by IBIS
- ICPack will take the IBIS IO library and the package information to produce ASIC models.
- ICPack will allow package simulations linked to the connectivity.

Packaging information :

Different levels of complexity can be defined , linked to the application accuracy requirements.

Two families can be defined :

- ☐ Lead length is important compared to wire length:
 - Estimated R,L,C parameters are given.
 - Measurements or simulations give R,L,C parameters
 - Matrix models
- ☐ Wire length is not negligible :
 - mutual inductance is taken into account by simulation.



Validation

The objective of this new part is to have an estimation of the accuracy of the IO models.

Current work :

- Simulation with IBIS simulator against ELDO on different testcases.
- Testcases definition is not completed (capacitor, open transmission-line, closed transmission-line)
- Check of slope, overshoot and undershoot values.
- Automatic way to validate each cell.
- Cooperation with an CAD-Vendor.

Future work:

- Comparision of V/I table against silicon measurements.
- Check behaviour of model on the other simulators.