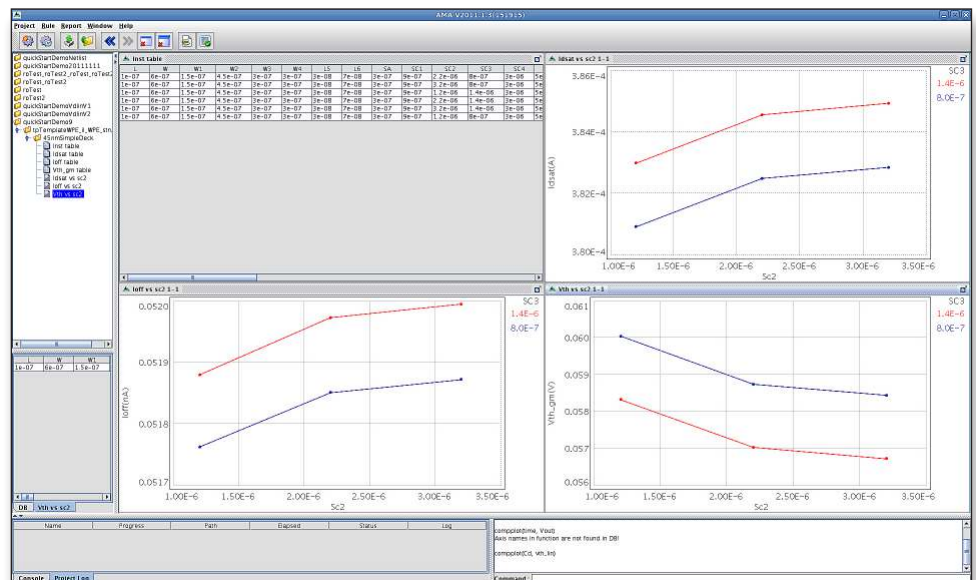


# Keysight Technologies

## Advanced Model Analysis (AMA)

Layout Dependent Effects  
Model Validation Software



# Introduction

Advanced Model Analysis (AMA) performs model validation and analysis functions related to layout dependent effects (LDEs) in cutting-edge process technologies. It provides the solution for co-validation of SPICE models and LVS decks. AMA integrates a complete flow including layout generation, layout extraction, SPICE simulation, data analysis and reporting.

The AMA platform consists of all the blocks needed for process design kit (PDK) verification including test structure generation, layout extraction, SPICE simulation and data analysis. The platform can be tuned for different applications. For example, MQA is focused on the last two blocks, SPICE simulation and Data Analysis, and if no simulation is needed, the user can tune the platform for verifying the extraction decks. Normally when running AMA, all the four blocks are included and each block is independent of each other. The four blocks are:

## Layout Generation Block

- To generate the test structures Design of Experiments (DOE) automatically according to user specification.

## Layout Extraction Block

- To extract the generated layout into a SPICE netlist. Extraction decks can be decks with or without a Design for Manufacturing (DFM) implementation, with or without parasitic extraction.

## SPICE Simulation Block

- To plug in the SPICE model and call SPICE simulators to run the simulation.

## Data Analysis Block

- To plot and analyze the data generated by the previous blocks.

## Key Features

### Rule Driven

- All the involved blocks are driven by simple rule files

Built-in layout generator based on SKILL language

Powerful graphics and analysis functions

### Flexible tool interface

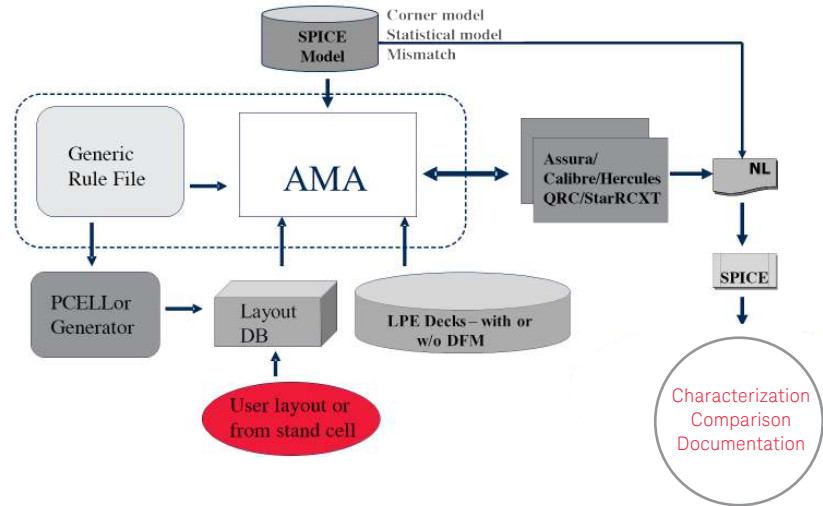
- Including interface of physical verification tools, DFM tools and SPICE simulators

### Independent blocks

- All the involved blocks are independent in order to improve running efficiency

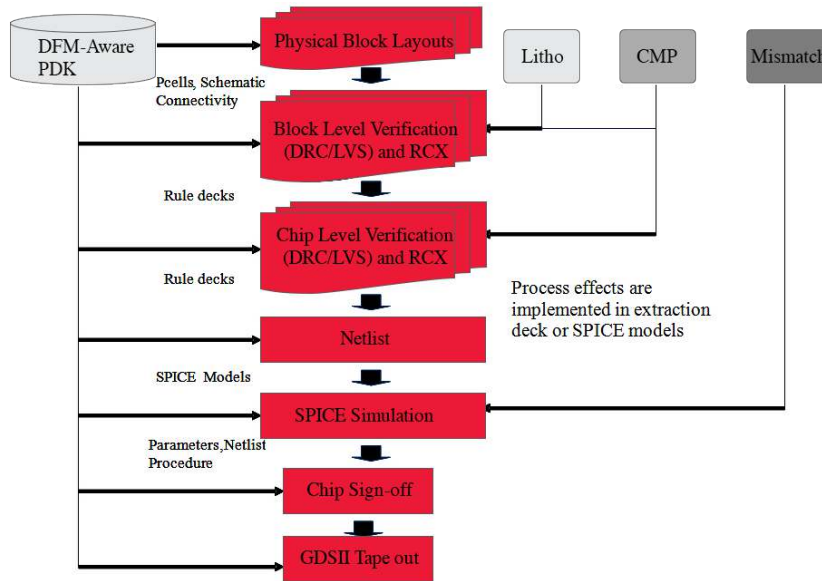
## DFM-aware PDK Verification Platform's Merit

- Easy assessment of foundry's DFM-aware process design kit (PDK) or other "Models" in the PDK with a comprehensive yet automatic set of QA procedures.
- Rule driven, flexible interface enables you to support all commercial tools.
- Built-in "rule driven" layout generators.
- Powerful graphic and report capability.
- Easy to expand to other applications. Can be customized to a complete platform for analyzing foundry PDK and predicting future results.



Layout Generator automatically generates test structure from:

- Foundry PCELL
- SKILL based layout generator
- Existing or user layout



## AMA Features

### Rule driven

All the blocks are driven by Rule files.

The Rule file contains simple syntax that defines the following:

- Design of Experiments (DOE) of the test bench.
- "Path" to layout generator, foundry PCELL, standard cell or user layout.
- SPICE Model.
- "Analyzed Target": Idsat, Vth for transistors and delay/slew for simple circuits.
- "Action": "Comparison" or "Analysis functions" or "Analytical".

## Flexible Target, Device and Circuit Definition

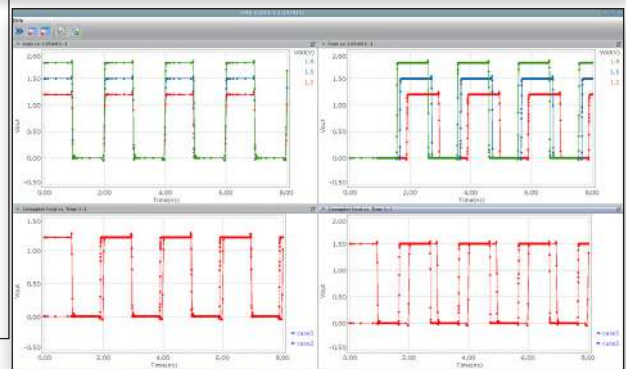
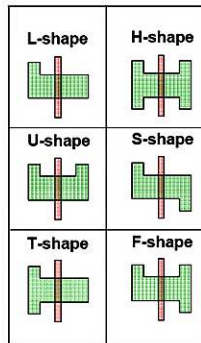
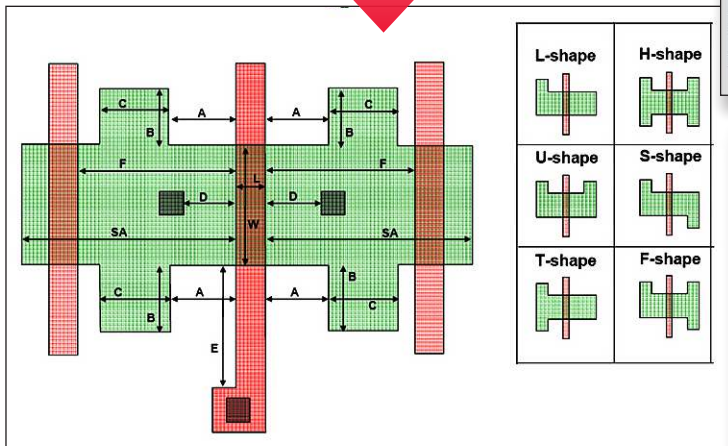
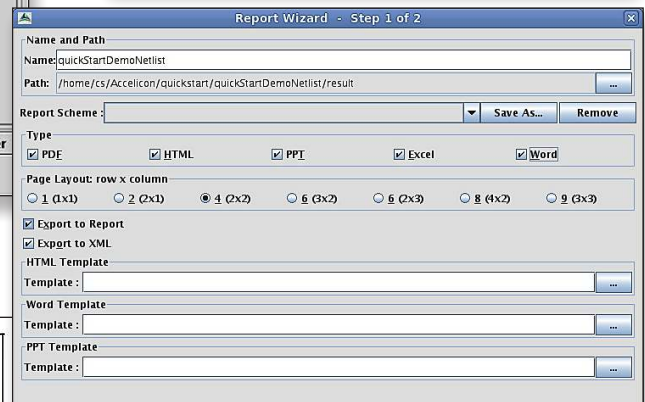
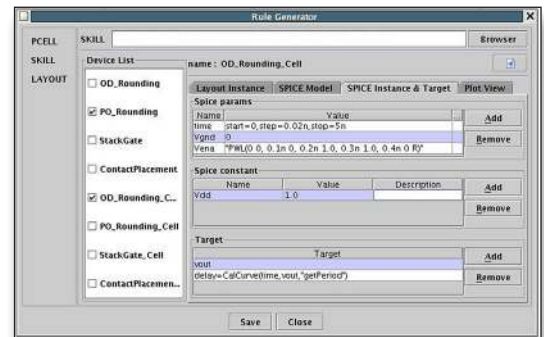
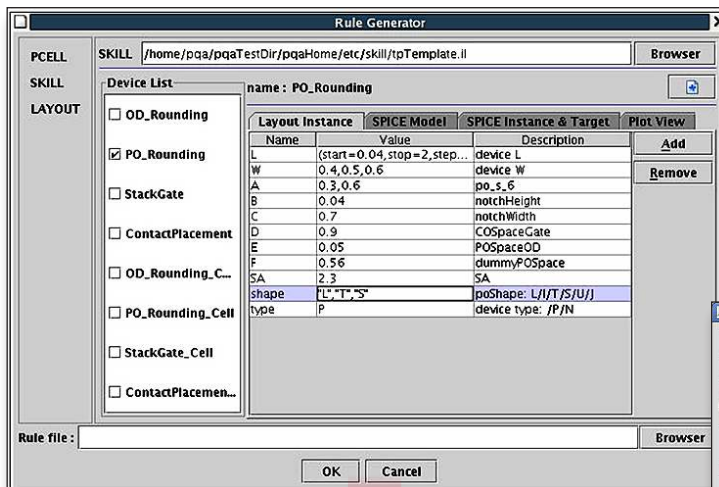
- Device type, ports and targets are controlled by the ICF file.
- AMA adopts a "Black Box" approach for defining circuits.
- User is able to define targets and check functions.
- This mechanism enables the user to easily expand and customize what to see and what to check in AMA

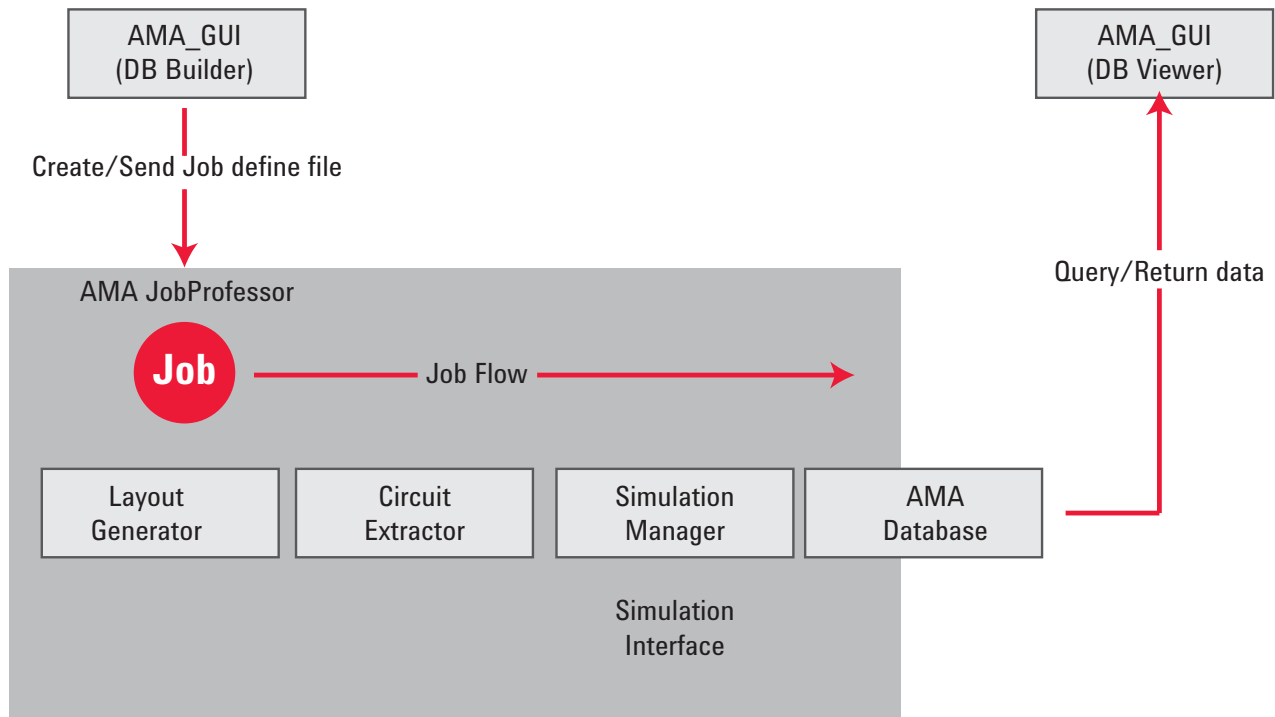
## Interactive Data Analysis Module

- The data analysis module works on a database.
- Users can interactively change the plot content and check the corresponding trend by inputting commands in the GUI.
- Users can preset the displayed items in the rule file.
- Users receive full data analysis and reporting capability as that of MOA.

## Independent Blocks

- Each block is independent from each other to improve efficiency.
- The interface of each block is customizable.





## Flexible Target, Device and Circuit Definition

- Running Environment: Red Hat Linux 7.0 or above, Red Hat Linux Enterprise
- Java Runtime Environment 1.6.0 or above
- Cadence DFII 5.0 or above
- Cadence Virtuoso with SKILL for Layout Generation
- Supported Layout Extraction Tools: Calibre, Assura, Hercules, QRC, and StarRCXT
- Supported SPICE Simulators: HSPICE and SPECTRE

## Products

The AMA Platform software provides model validation and analysis functions related to layout dependent effects (LDEs) in cutting-edge process technologies. AMA provides the solution for co-validation of SPICE models and LVS decks and integrates a complete flow including layout generation, layout extraction, SPICE simulation, data analysis and reporting.

- W8650EP/ET AMA Platform

## Web

For more information on Keysight EESof EDA's Advanced Model Analysis (AMA), visit:

[www.keysight.com/find/eesof-ama](http://www.keysight.com/find/eesof-ama)



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