VarMan for Libraries

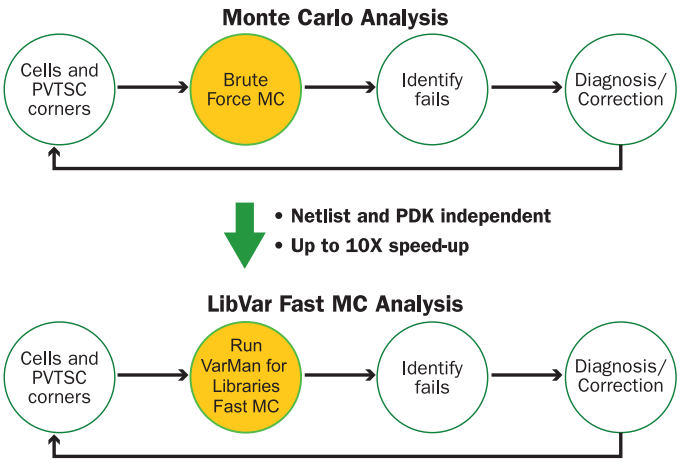
SILVACO

Library Statistical Functional Verification

Process variability at advanced technology nodes has become a key challenge for standard cell library designers. VarMan for Libraries is a new generation tool that provides efficient and reliable solutions for standard cell statistical functional verification while preserving brute force Monte Carlo (MC) accuracy. VarMan for Libraries allows designers to accurately address statistical variation analysis 10 times faster than MC reducing global verification time from months to days.

Key Features

- Breakthrough analysis technique: Impressive simulation speed-up and unique engine for standard cells statistical verification
- Reliable and mature technology: Tested and validated by major players on most advanced technology nodes
- Non-intrusive tool: Designed to be simply integrated into golden characterization flow without any modification
- Smart simulation manager: Simulation results management and high simulation throughput through LSF/SGE cluster
- SPICE simulator and environment independent: Supports all golden SPICE simulators and design environments, supports most advanced market design kits, batch mode supports
- DK independent
- Batch scripting language



VarMan for Libraries Fast Monte Carlo.

VarMan for Libraries Fast Monte Carlo

Analysis Overview

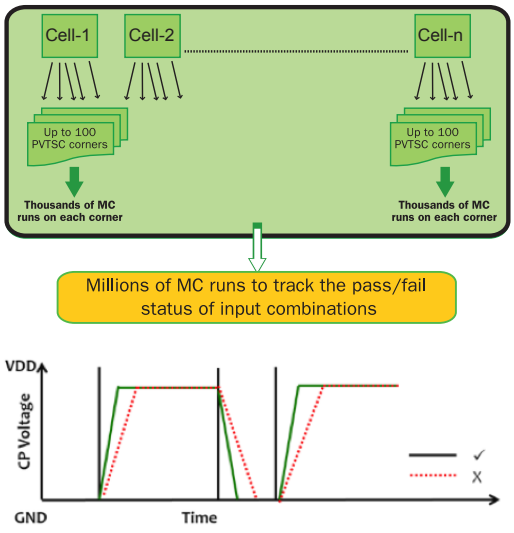
- Explore parameter space to generate fails
  - o Search simulations of PVTSC's that trigger fails
  - o Adaptive exploration
- Estimate failure zones of each measurements
  - o Fast statistical capture of failure zones
  - o Robustness against noisy/spurious simulations
- Simulate fail/near fail candidate samples of Monte Carlo

Performance

- Adaptive search, cover & simulation of the MC fails
- No need to change design flow
- Multi-CPU, Multi-Machine (LSF/OGE)

Speed up

- Customer achieves faster verification up to 10x while keeping full exhaustive corners coverage
- Impressive simulation time speed up



Customer achieves faster verification (10x) while keeping full exhaustive corners coverage.

Application

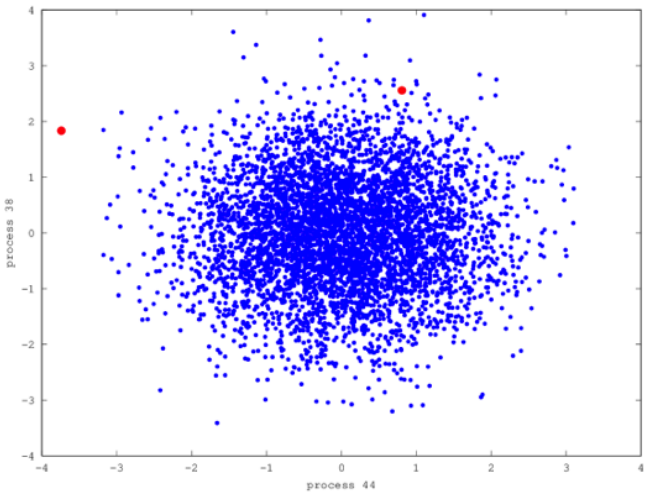
- Statistical functional verification of full standard cell library with Monte Carlo (MC) simulation

Success story: Major Customer

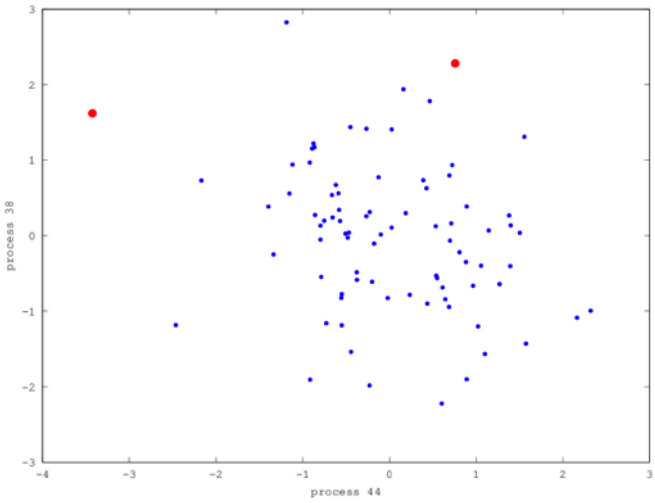
FlipFlop – 28nm FDSOI

Measurements: 278

Global speedups: 9x



MC 5k #Fails: 2



VarMan for Libraries 554 runs #Fails: 2

Digital library, 28nm FDSOI

- 40 cells with parasitic elements, up to 100 PVTSC corners per cells
- 100's of performance (output voltages/digital levels)
- Simulation time: from 1min to 4min

Solution	SPICE MC	VarMan for Libraries
Number of MC simulations	**4,000**	**475**
Number of detected fails	9	9
Analysis time (min)	173	19

SILVACO
HEADQUARTERS
4701 Patrick Henry Drive, Bldg #23
Santa Clara, CA 95054

NORTH AMERICA sales@silvaco.com
BRAZIL br_sales@silvaco.com
EUROPE eusales@silvaco.com

JAPAN jpsales@silvaco.com
KOREA krsales@silvaco.com
TAIWAN twsales@silvaco.com
SINGAPORE sgsales@silvaco.com
CHINA cn_sales@silvaco.com

WWW.SILVACO.COM

Rev 050120_03