



# ICExplorer XTime

Silicon accurate sign-off with advanced BIG data analysis

## Benefits

- Enable Monte Carlo SPICE accurate timing sign-off for critical paths
- Improve design PPA and Yield for advanced process and ultralow power design (IoT)
- Significantly reduce the efforts and TAT of timing closure
- Accurately pinpoint design bottleneck with advanced BIG data analysis ...

## Key Features

- Timing paths SPICE signoff
- Fast Monte Carlo critical path analysis
- Design margin recovery
- V/T sweeping for low power limitation and sensitivity analysis
- Advanced timing ECO integrated with ICExplorer™

## Overview

For today's SOC design below 28nm, corner based delay calculation is not accurate due to non-Gaussian delay variation distribution. Also due to Miller capacitance effect and big process variance, the traditional STA tools cannot get the correct timing any more. The conservative over-design method will waste power and area, and always leads to great efforts for timing sign-off and miss the time-to-market, which is prominent especially for the low voltage design.

XTime™ can provide Monte Carlo SPICE accurate sign-off with an advanced SPICE engine, which has been certified at 28nm, 20nm, 16nm, 7nm..., also it is specially designed to run SPICE simulations for critical path analysis at speed 5-10X faster than the other simulators on the market. Its supper parallel architecture and advanced Fast Monte Carlo algorithm make SPICE accurate sign-off possible.

XTime™ opens up a new range of design sign-off solutions by BIG data analysis. Based on the SPICE simulation, more advanced sign-off analysis, for example, voltage sweeping for low voltage limitation analysis, fast Monte Carlo for yield analysis, timing calibration for extra margin analysis, can be done. Using the XTime™, you'll be equipped to finish the sign-off jobs on schedule with really silicon success.

## Built-in Fast and Accurate SPICE Engine

Under the hood of XTime™, there is a built-in certified super-fast, accurate, high-capacity, parallel SPICE engine ALPS™. Its advanced Smart Matrix Solver technology can speed up 5-10X than the traditional SPICE simulators, and has been certified at all of the major processes, such as 28nm, 20nm, 16nm, 10nm, 7nm ..., on all of the major models (BSIM4, BSIMSOI, PSP, BSIMCMG, etc.).

XTime™ is natively distributed and multi-threading parallel architected, it can run tens of thousands of paths for design variance. And the advanced fast Monte Carlo algorithm adopted ensures efficient and effective convergence and greatly improves total performance, 1000+ path fast Monte Carlo analysis can be done within 1 day.

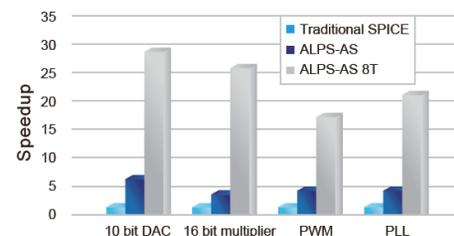


Figure1. High performance SPICE engine inside XTime™



XTime™ takes the timing paths generated by golden STA tools to run SPICE simulation, and generates the big timing data for each process, voltage and temperature. Based on the big simulation data, many advanced analysis functions have been done, such as yield analysis with fast Monte Carlo, V/T sensitivity analysis with V/T sweeping, aging analysis, etc.

### Low Voltage Limitation Analysis

For IoT designs, low power consumption is the key. Designer usually reduces the voltage supply of circuit to save the power. But too low voltage will cause timing problems, so that user needs to know the low bound of voltage .

XTime™ can perform voltage-sweep simulation for paths. Through the relative frequency behavior of paths, user will have an accurate evaluation of the design low bound on voltage for low power optimization.

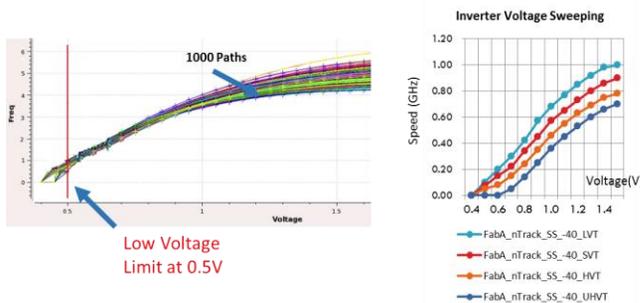


Figure2. Low voltage analysis

### High Yield Analysis

Process variation will increase exponentially as voltage is reduced and yield is going down. XTime™ can perform high yield analysis with advanced fast SPICE Monte Carlo for 1000+ critical paths, which allows designer quickly know the yield before tape-out.

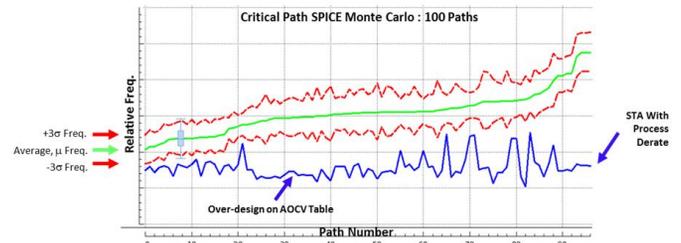


Figure3. Fast Monte Carlo analysis

### ECO with ICExplorer

During timing closure, the variations make it difficult to calculate the right timing, too many corners, too much pessimistic. XTime™ can calculate the accurate timing with local variations and IR-drop, and back annotate the accurate timing to ICExplorer™, a high efficiency and physical-aware timing ECO solution, to do more accurate and lower power and area penalty timing fix.

### Supported Platforms

x86 64-bit:

- Red Hat Enterprise V4, V5, and V6
- SUSE Linux 9 and 10

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