ICExplorer XTop

Complete Timing/ECO Closure Solution

Benefits

- Fix large number of violations (> 50k) faster
- Accelerate timing closure process
- Cut down ECO iterations to 2-4
- Advanced process node proven down to 10nm
- Handle 100+ MCMM scenarios in one session

Key Features

- High correlation physical-awareness (placement and routing) in timing ECO
- Simultaneous MCMM timing fixing on signal and clock paths
- Fix setup, hold, max transition/capacitance and SI violations
- Proprietary timing graph-based / path-based optimization
- Timing debug /Manual ECO
- Supports physical hierarchy and multi-power/voltage domains
- Multi-threading capable
- Plug-and-play with existing flows through standard interfaces

Overview

Timing closure is a major problem with today's SOC designs impacting time to marketand cost of design. This trend is getting worse with each new process node.

XTop™ is a complete timing/ECO closure solution across all process nodes. It is specially designed to consider the physical placement and routing effects while delivering best-in-class timing optimization solutions for flat and hierarchical designs.

XTop™ provides new capabilities in both automatic and interactive ECO operations. Its unique architecture enables complex MCMM timing fix with many scenarios. Using the XTop™, you'll be able to finish timing closure with less design power and area penalty and risk.

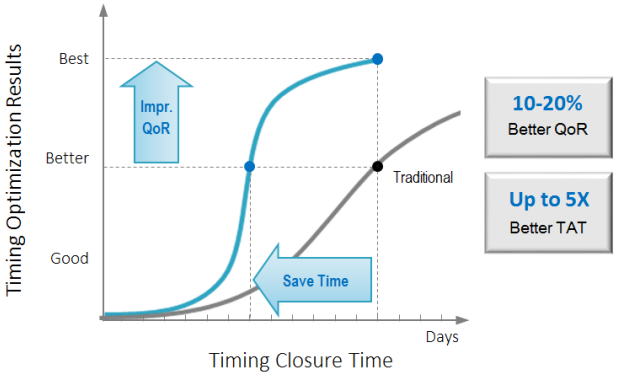

Figure1. XTop™ achieves effective timing closure

MCMM Timing Optimization

XTop™ is natively multi-corner multi-mode (MCMM) aware and can simultaneously handle all MCMM scenarios by efficient use of memory. It can effectively use timing data from sign-off STA tools and achieve faster timing convergence with minimal impact to power and area.

Other benefits are:

- Superior correlation with sign-off STA
- Timing fix with low buffer count
- Fast runtime, scaling linearly with number of scenarios
- GBA and PBA supported to fix violations

Physical Awareness Technique

With built-in STA and incremental engines for placement, routing and extraction, XTop™ is placement and routing aware.
This enables:

- Very high timing and layout correlation with implementation and sign-off tools in the flow
- Fewer number of ECO iterations
- ECO operation on nets crossing physical hierarchy
- Best QoR with low buffer count

XTop™ is designed to fix timing violations on multi-corner, multi-mode (MCMM) timing scenarios (setup, hold, max transition, max capacitance, and SI violations). Physical hierarchy and multi-voltage domains can be handled and ECO operations are performed on signal and clock paths.

New Infrastructure

Architected from the ground up for unsurpassed scalability, XTop™ features a brand new design infrastructure that can simultaneously handle all MCMM scenarios and enable faster runtimes.

It is natively multi-thread parallel processing. Input files can be loaded much faster during design setup. The design is supported to be imported incrementally. The multi-threading capability maximizes timing/ECO closure performance and throughput.

XTop™ has a more flexible flow control. Current session can be saved any time and restored later. ECO operations can be also restarted from any step. It makes ECO trial-run much easier and faster.

Advanced Timing Analysis

XTop™ has embedded a new module-based STA engine, which is completely compatible with timing sign-off tools. It will be more convenient for user to specify the hierarchical objects.

New path-based analysis algorithm in XTop™ can support AOCV/POCV/SBOCV, which provides more accurate timing propagation, separately from GBA.

With new timing data generation method, both the data file size and the runtimes are reduced. It is much easier for design setup and data preparation.

New GUI for Ease of Use

XTop™ has re-designed the whole set of graphic user interfaces. The new GUI system allows user to browse the layout, inspect the timing paths, and perform interactive ECO more easily and naturally.

The windows/panels/tables are optimized for increased user observability, controllability and productivity. Pins, cells, nets and timing paths can be cross-referenced and highlighted on the canvas as user wants.

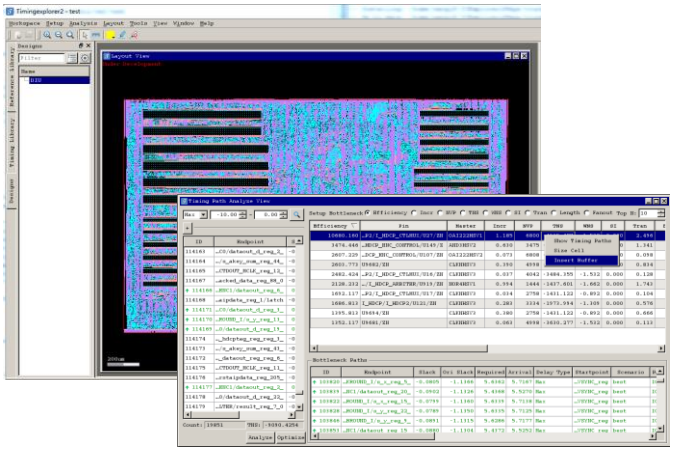

Figure2. XTop™ layout GUI and timing path analysis table

Manual ECO Capability

XTop™ provides manual ECO capability that fixs corner case violation that would not be easy to handle by automatic tools. It gives flexibility for timing ECO and thus speed up the closure.

Timing path bottleneck analysis will help user with candidates and strategies. ECO action can be performed directly on the analysis table. The affected timing slack values will be updated immediately (WYSIWYG).

Common manual ECO actions are supported, such as gate sizing, buffer insertion and removal, split net, etc. Undo is also supported to allow cancelling ECO actions.

Plug-and-play into Existing Flows

XTop™ supports to generate ECO output results in either atomic and macro commands, or incremental DEF for P&R tools.

It can be plugged into current design flows seamlessly, complementing the sign-off static timing and P&R tools.

Supported Platforms

x86 64-bit:

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