# Thunder™ - Ultimate System Integration Solution

OVERVIEW

Thunder™ is a unique tape-out level layout editor with built-in XOR, density and Boolean engine. It seamlessly combines an efficient database, powerful analysis engine with intuitive GUI. It handles huge layout data in excess of 500+GB of different formats, including GDS, OASIS, LEF/DEF, and OpenAccess, and performs complex geometrical operations accurately in a fast and robust manner. It provides C++/TCL/PYTHON/PERL interface for software developers to develop their own applications.

HIGHLIGHTS

- *Full-blown tape-out level layout editor*
- *Fastest XOR (LVL) comparison, highlight and synchronized display*
- *Fastest density map/checking*
- *Flexible IP merge, rename by layout comparison*
- *Interactive dummy fill patch generation*
- *Intuitive Boolean operations*
- *Powerful net tracing, fast DRC/LVS/defect result loading/browsing, and 3D layout view for short-locator*
- *Supports Perl/Python/TCL scripting languages*
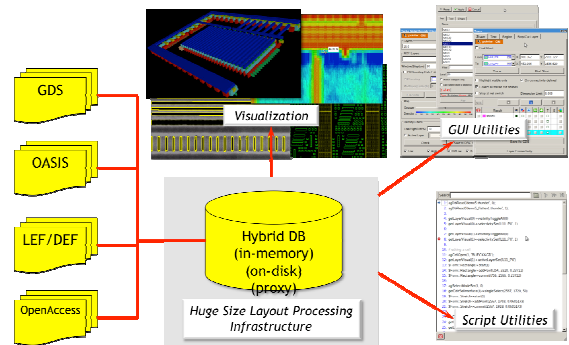
MAJOR FEATURES

Thunder™ has been tailored to help developing customized solutions in terms of performance and ease of use. AnaGlobe keeps expanding the state-of-the-art features into Thunder™. Thunder™ is architected to process very large size of IC/SOC with smallest DB at any technology node in the least amount of time.

FASTEST LVL COMPARISON

Thunder™ provides fastest LVL comparison, linear to data size, with GUI visualization to quickly identify differences of two designs. Customer benchmarks show that Thunder™ LVL requires minimum runtime memory usage and completes the comparison even for industry's biggest chips. (*Fig-1*)
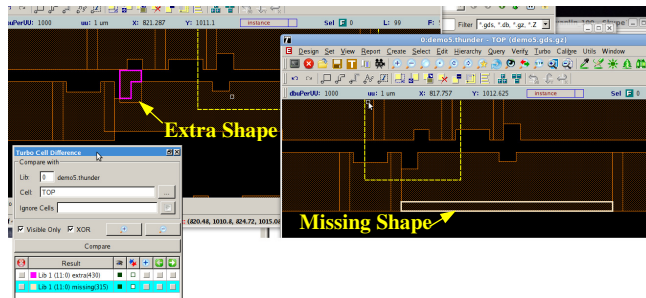

Fig-1. Interactive Layout Comparison

TAPE-OUT LEVEL LAYOUT EDITING

Thunder™ enables user to browse/edit several hundred gigabytes GDS/OASIS. The intuitive GUI is as friendly as popular layout editors. It provides advanced layout editing features, such as Smart Flatten and snapping to DRC marker, ideal for DRC bug fix.

BOOLEAN OPERATION

Thunder™ provides intuitive multiple-Boolean expression to generate shapes on original design directly.

DENSITY MAP GENERATION & CHECKING

Thunder™ provides fastest interactive density map generation and violation checking with GUI visualization. It provides density variation checking, which is critical for advanced technology node. (*Fig-2*)
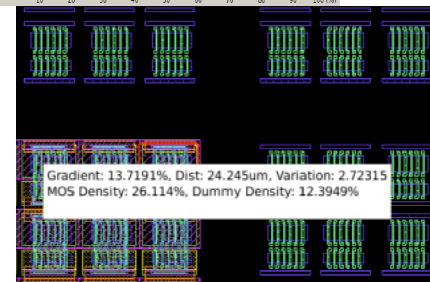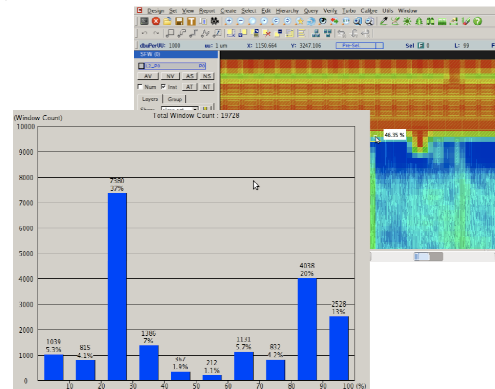

Fig-2. Interactive Density Checking

IP MERGE AUTOMATION

Thunder™ provides system integration for IP from GDS/LEF/DEF files with great flexibility such as standard cell replacement, don't-change list, etc. It performs layout comparison during renaming, which eliminates unnecessary renaming. It supports hierarchical IP merge with incremental change. It generates a summary of missing cells, renamed cells, identical cells, and cross-reference.

FAILURE ANALYSIS

Thunder™ provides a series of functionality to assist the tedious defect inspection job, such as KLA result viewing, image overlay and extraction, pattern grouping and matching, voltage contrast analysis, FinFET 3D view, cross-section, etc. (*Fig-3*)
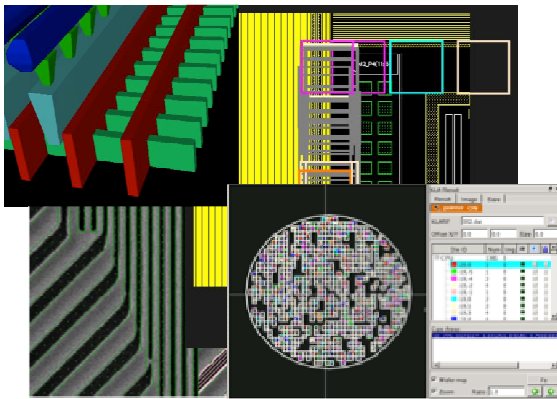

Fig-3. Failure Analysis Related Functionality

PHYSICAL NET TRACER

Thunder™ powerful net tracer provides both tracing and find short, with routing highlight and 3D display visualization. It supports both location based and pin text based tracing. Other debugging functions such as stop layer, net switching detection, and power/ground short detection. (*Fig-4*)
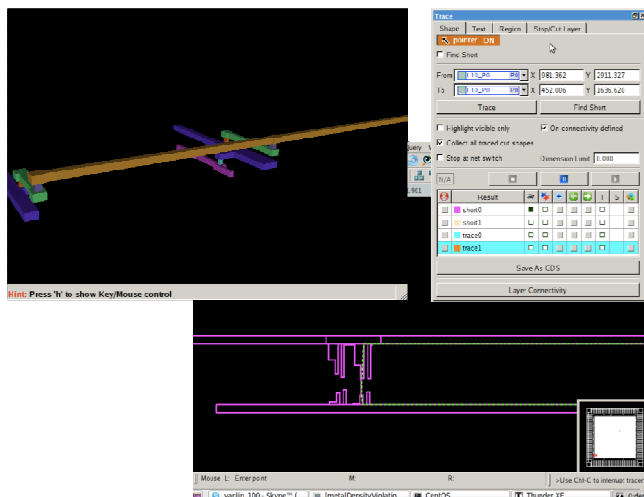

Fig-4. Physical Net Tracer & Short Locator

HUGE CAPACITY DRC/LVS/DEFECT EXPLORER

Thunder™ provides seamless integration with 3rd party layout verification and wafer inspection tools. It helps the user to navigate and debug DRC/LVS errors and defects efficiently (opens 5G+ DRC results in 7 minutes). It also supports Calibre short isolation result with 3D display and cross probing. (*Fig-5*)
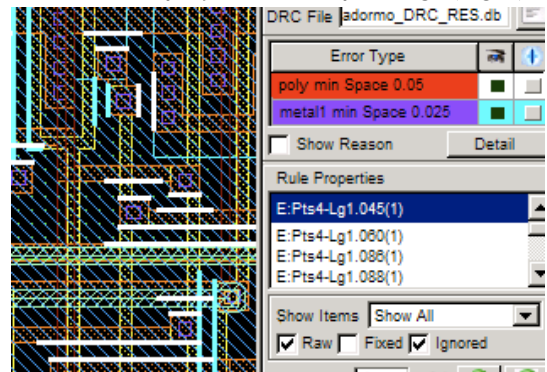

Fig-5. DRC Result Viewer

DUMMY FILL PATCHING

Thunder™ can fill dummy patterns to low density area interactively with target percentage. It creates vertical/horizontal patterns with offset. It can also take Calibre DRC marker as the target area. (*Fig-6*)
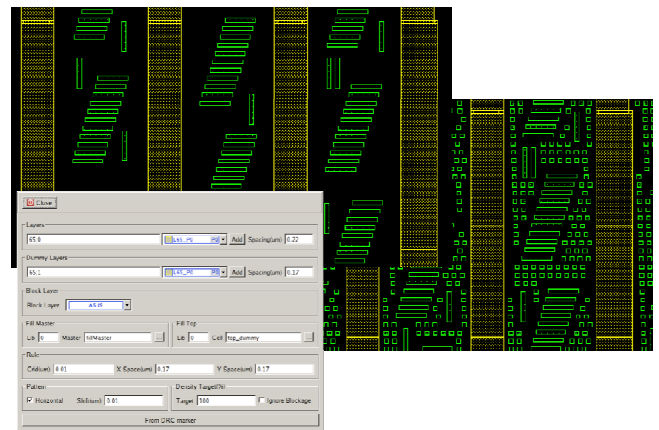

Fig-6. Interactive Dummy Fill Patching

HIGHLIGHT MISSING VIAS ON POWER/GROUND NETS

To eliminate IR-Drop effect, Thunder™ can perform a quick analysis on power/ground nets to highlight areas with missing vias and fix them by inserting vias.
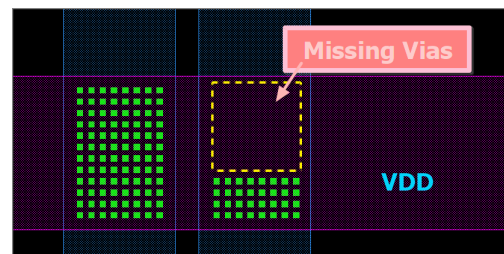

Fig-7. Fix Missing Vias

AnaGlobe Technology, Inc.
615R, Innovation & Incubation Hall, National Tsing Hua University
No.101, Sec. 2, Kuang-Fu Road
Hsinchu 30013, Taiwan
Phone: +886-3-5613650
Email: sales@anaglobe.com
http://www.anaglobe.com

AnaGlobe