

CATS

The MDP Standard

Overview

CATS™ is the most advanced and full featured mask data preparation (MDP) software available for semiconductor photomask manufacturing. This powerful and flexible solution is the standard for data fracturing, photomask inspection and metrology. Providing state-of-the-art data compression algorithms, scalable distributed processing, hierarchical and flat fracturing, and output for all mask writer formats, CATS is the industry's best performing, most trusted MDP solution.

Emerging MDP Challenges

The relentless march to smaller technology nodes has opened up significant challenges for MDP solutions, including:

- ▶ Restricted CD control: 1nm by 22nm
- ▶ Data volume explosion: 1TB file size
- ▶ Long design to mask cycle times: weeks

A modern MDP solution is expected to deliver very high level quality of fracture, while reducing overall mask throughput time for the latest technology nodes.

CATS Delivers

Unmatched Quality of Results

Mask manufacturers demand MDP software to deliver uniformity and symmetry in the fractured design. This is directly responsible for tight CD control which is critical in ensuring that final design performs to specification. CATS' advanced fracture engine delivers:

- ▶ Superior slicing quality
- ▶ Uniformity and symmetry
- ▶ Advanced sliver control

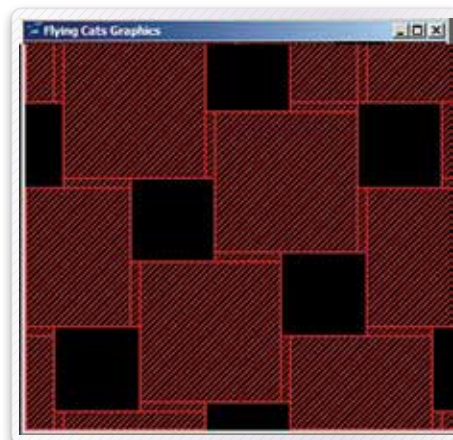


Figure 1: Unmatched quality of results (QoR)

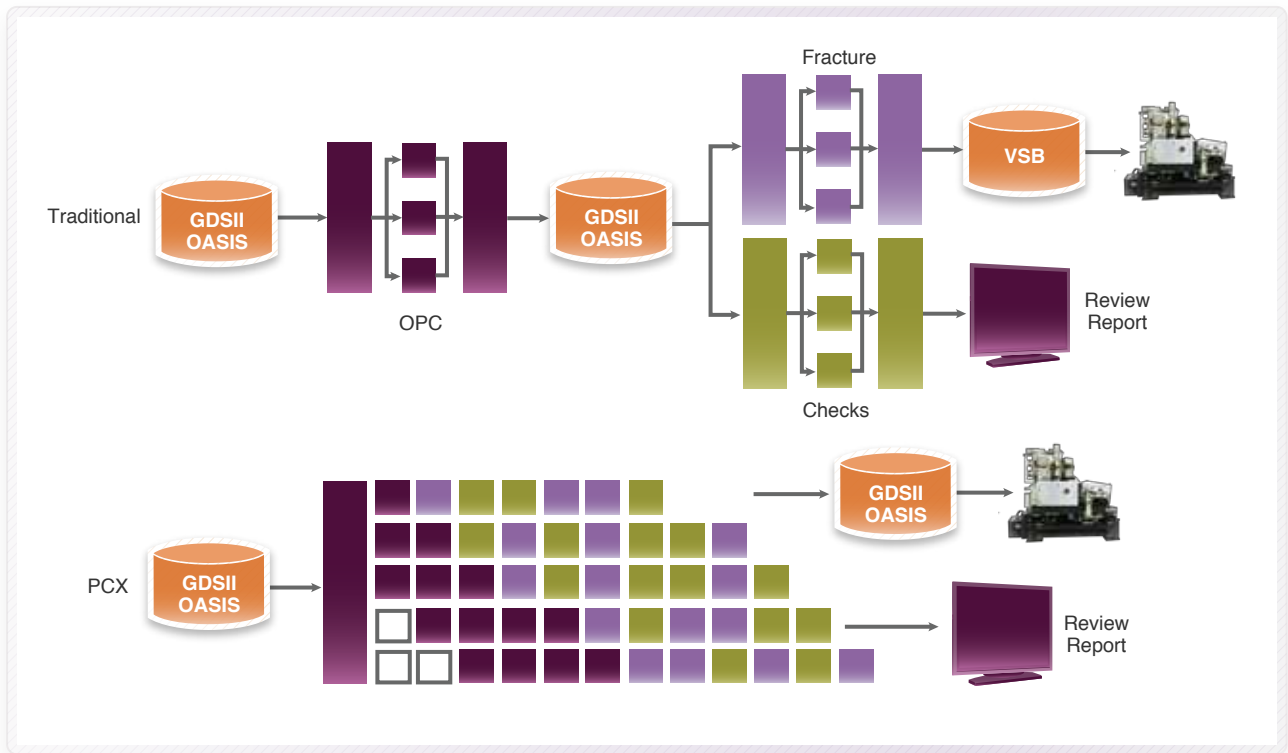


Figure 2: PCX delivers dramatic turnaround time (TAT) savings

Fastest Mask Throughput

Product teams are under constant time to market pressure. In addition to reducing the overall design time, it is critical for these teams to transfer designs into manufacturing as quickly as possible. To achieve these faster cycle times, it is necessary that all steps in converting a design into accurate mask data that leads to a high yielding manufacturing process, are efficient. These steps are:

- ▶ Resolution enhancement technique (RET) application (Optical proximity correction (OPC), Assist Features, Double Patterning, etc.) and verification (Lithography rule check (LRC), manufacturing rule check (MRC))
- ▶ Mask data preparation (Fracturing, Scaling, Biasing, Marking, etc.) and verification (XOR, MRC)
- ▶ Mask manufacturing
- ▶ Mask inspection and metrology

CATS delivers a highly efficient single step solution which combines Synopsys' OPC and MDP. The Proteus CATS Exchange (PCX) technology pipelines OPC, Fracture and verification steps in delivering dramatic savings in mask throughput.

In addition, latest technological innovations in CATS offer:

- ▶ Intelligent distributed processing which delivers impressive scalability for data fracture over large computer clusters
- ▶ Shot size optimization techniques which lead to significantly lower shot counts during the mask writing process
- ▶ Optimized file sizes which help reduce file write and transfer times

Comprehensive, Customizable Solution

CATS delivers a comprehensive solution for mask manufacturers. This includes support for the widest range of mask lithography, inspection and metrology equipment. Through years of strong relationships with partners in the equipment industry, CATS has developed a strong, worldwide installed base of customers. CATS is the most widely deployed and used MDP solution in the industry.

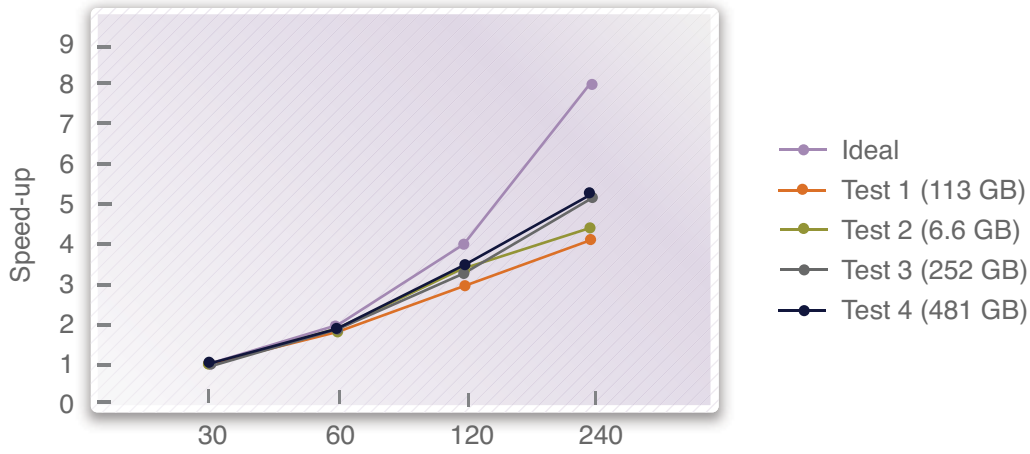


Figure 3: Scalability

CATS' macros and user-defined graphics menus enable different mask manufacturing sites to customize the software to meet their specific requirements. CATS' command language offers sophisticated functions for added flexibility and control. Customization can be per site, per group, per user, or per job. With both interactive and batch processing modes, fast response, high resolution, intuitive graphics and a host of query, data selection and fracture options, CATS is a powerful and flexible software package.

Standard Features

- ▶ Hierarchical and flat fracturing
- ▶ High-speed, intuitive graphical interface
- ▶ Advanced Fracture Options (VSB, MEBES, Laser Write)
- ▶ Comprehensive Boolean Operations
- ▶ Advanced Manufacturing Rule Checks
- ▶ Integrated Proximity Effect Correction
- ▶ Built in Data Compaction and Compression
- ▶ Rotation and Mirroring
- ▶ Healing and Overlap Removals
- ▶ Conditional Figure Assignment
- ▶ Advanced CD Metrology Support
- ▶ LSF and GRID Support
- ▶ Highly Scalable Distributed Processing
- ▶ CATS Scripting Language
- ▶ Jobdeck View and Editing
- ▶ Extensive Data Analysis Functions
- ▶ "Fracture Once" — FLEXWrite Capabilities
- ▶ Reverse Toning
- ▶ Advanced Sizing and Biasing Support
- ▶ Data Plotting Capability
- ▶ Frame Generation Option
- ▶ Vertex Correction Option
- ▶ Data Tiling "Dummy Fill" Option
- ▶ Comprehensive Data Selection Commands
- ▶ Multi Layer Overlay

Formats Supported

- ▶ OASIS
- ▶ GDS-II Stream™
- ▶ VSB11, 12
- ▶ JEOL™
- ▶ MEBES™
- ▶ Hitachi™
- ▶ Micronics
- ▶ Applicon™
- ▶ AutoCAD™ ASCII DXF
- ▶ Cal Tech Intermediate Format (CIF)
- ▶ CATS Text File Format
- ▶ Cambridge EBMF™
- ▶ Philips EBPG™
- ▶ Varian ALF™
- ▶ Electromask™
- ▶ Mann 3000™, 3600™
- ▶ ZBA
- ▶ JES

CATS Version 2009.03 Platform Support*

- ▶ RH 4.0 (EMT64, Opteron)
- ▶ Sun 5.9
- ▶ SuSE 9.0 (EMT64)
- ▶ AIX

(* Synopsys, Inc. reserves the right to change these as it sees appropriate in the future.

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