SYNOPSYS®

SUCCESS STORY

Synopsys and M31

M31 Achieves 15x Faster Characterization with 77% Higher Accuracy for 12nm IP on Synopsys Cloud with PrimeLib

"M31 enables chip designers to deliver cutting-edge products faster by providing ready to use high quality IP. The Synopsys Cloud platform helped us design our advanced node 12nm IP months ahead of planned schedule through the novel FlexEDA per-minute licensing for library characterization."

~Patrick Lien, Vice President of R&D, M31

M31

Business

M31 Technology Corporation (6643-TW) is a professional silicon intellectual property (IP) provider. The company was founded in July 2011 with its headquarters in Hsinchu, Taiwan. M31's strength is in R&D and customer service. With substantial experiences in IP development, IC design and electronic design automation fields, M31 focuses on providing high-speed interface IPs, memory compilers and standard cell library solutions.

M31 has close collaboration with world-class semiconductor companies. It has been aggressively investing in developing and validating different silicon IPs. Most IPs are targeted at advanced process technologies in various foundries. M31 provides customers with differentiated IP solutions. These solutions help customers grasp market opportunities in short design cycles, low manufacturing costs, and high product competitiveness. M31's vision is to be the most trustworthy IP company in the semiconductor industry.

Challenges

M31 was unable to meet their accuracy needs on standard cell library design from the tool they were utilizing to do library characterization on a cloud-based deployment. They needed to ensure that they achieved greater than 90% passing rate for a majority of the data types while characterizing mixed types of cells. The design included Combinational, Sequential and MBFF (Multi-bit Flip-flop) cells. Their main requirements were:

- Ensure high accuracy library characterization at advanced node for first-pass silicon success of the IP
- Employ a best-in-class characterization EDA tool supporting seamless compute elasticity and scalability
- Leverage massive compute scalability for parallel characterization while staying within budget
- Deploy a user friendly, secure, and stable IP design environment in the cloud

> *"We wanted an EDA tool that can generate accurate characterized data with LVF for our most advanced-node IP. PrimeLib scored maximum marks in our selection criteria giving up-to 100% passing rates for the majority of library data types. On top of this, Synopsys Cloud FlexEDA model unleashed full potential of elastic nature of PrimeLib and PrimeSim HSPICE by providing on-demand, unlimited licenses by the minute running on 8000 CPUs. This massive parallelization capability accelerated characterization completion by 15x."*
>
> ~Patrick Lien, VP of R&D at M31

Engaging Synopsys Solutions

M31 decided to use Synopsys PrimeLib for its advanced node IP characterization project and try out using the Synopsys Cloud SaaS deployment model. Synopsys Cloud offers a complete IP design environment providing end-to-end design flows and EDA tools for IP development through the Cloud SaaS model.

Synopsys and M31 agreed on the following objectives to ensure a successful engagement:

1. Reliability testing with 8000 CPUs running PrimeLib in parallel
2. Accurate LVF results that closely correlate with the SPICE (Monte Carlo) data
3. Intuitive and user-friendly design environment for complete IP development
4. Instant availability of scalable and cutting-edge compute and storage resources in the cloud

M31 identified 30 key cells in its design to evaluate the accuracy of the characterized data generated by PrimeLib including LVF.

Astounding PrimeLib Results

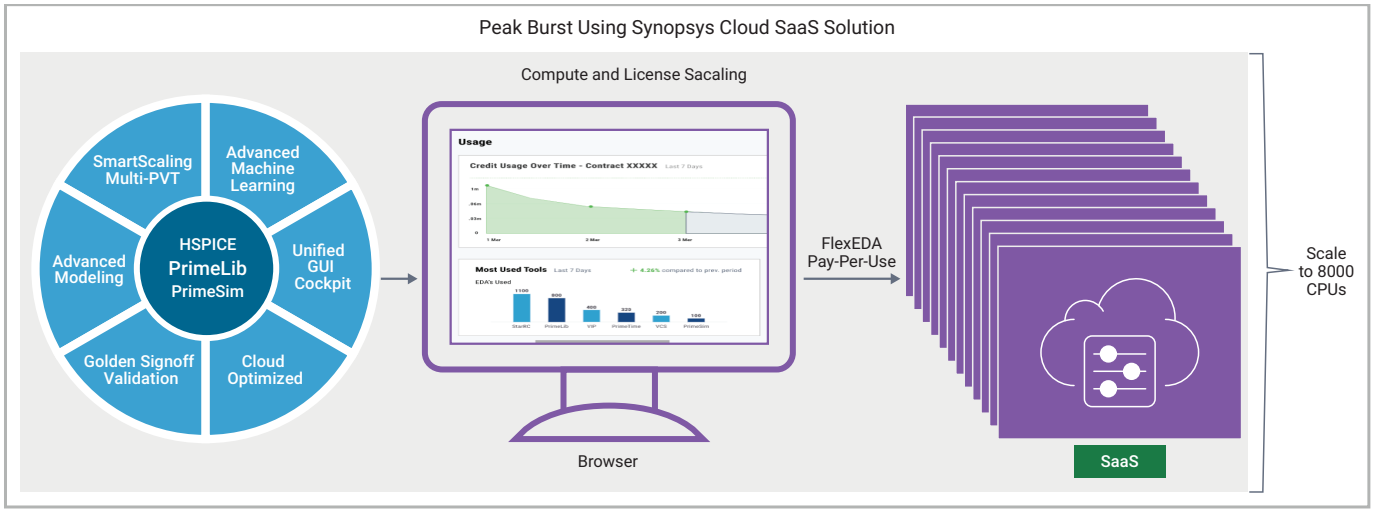
1. The default passing rate observed by M31 was 60% better
2. Using ML-based high-sigma characterization with PrimeSim™ HSPICE® AVA, M31 saw 77% better passing rates
3. Scaling seamlessly to 8000 CPUs with stability and completing characterization jobs successfully

M31 was convinced about the accuracy of data generated using PrimeLib and its reliability to scale.

The Added Value of Deploying on Synopsys Cloud

Enhanced Reliability: M31 saw massive parallelization of PrimeLib enabled by the robust of the Synopsys Cloud design platform including redundant license servers resulting in continuous uptime for characterization jobs.

Increased Scalability: M31 realized this massive parallelization using Synopsys Cloud FlexEDA pay-per-use licensing of PrimeLib, with automatic provisioning of cloud compute resources and auto-scaling of license servers. This helped PrimeLib and PrimeSim HSPICE to complete characterization 15x faster and Monte Carlo simulation in 1 day.



Unleash speed and accuracy of PrimeLib and PrimeSim™ HSPICE® with Synopsys Cloud FlexEDA model

Dependable Security: M31 required a secure environment to design their 12nm IP using foundry collateral. Synopsys Cloud provided a secure SOC 2® Type II compliant design platform that enabled M31 to upload their design and the foundry spice models with ease.

"M31 plans to further explore how Synopsys Cloud can help with several other IP design flows to accelerate time to market and deliver better quality IP. We look forward collaborating with Synopsys and adopting other EDA design flows available on Synopsys Cloud platform."

~Patrick Lien, VP of R&D at M31