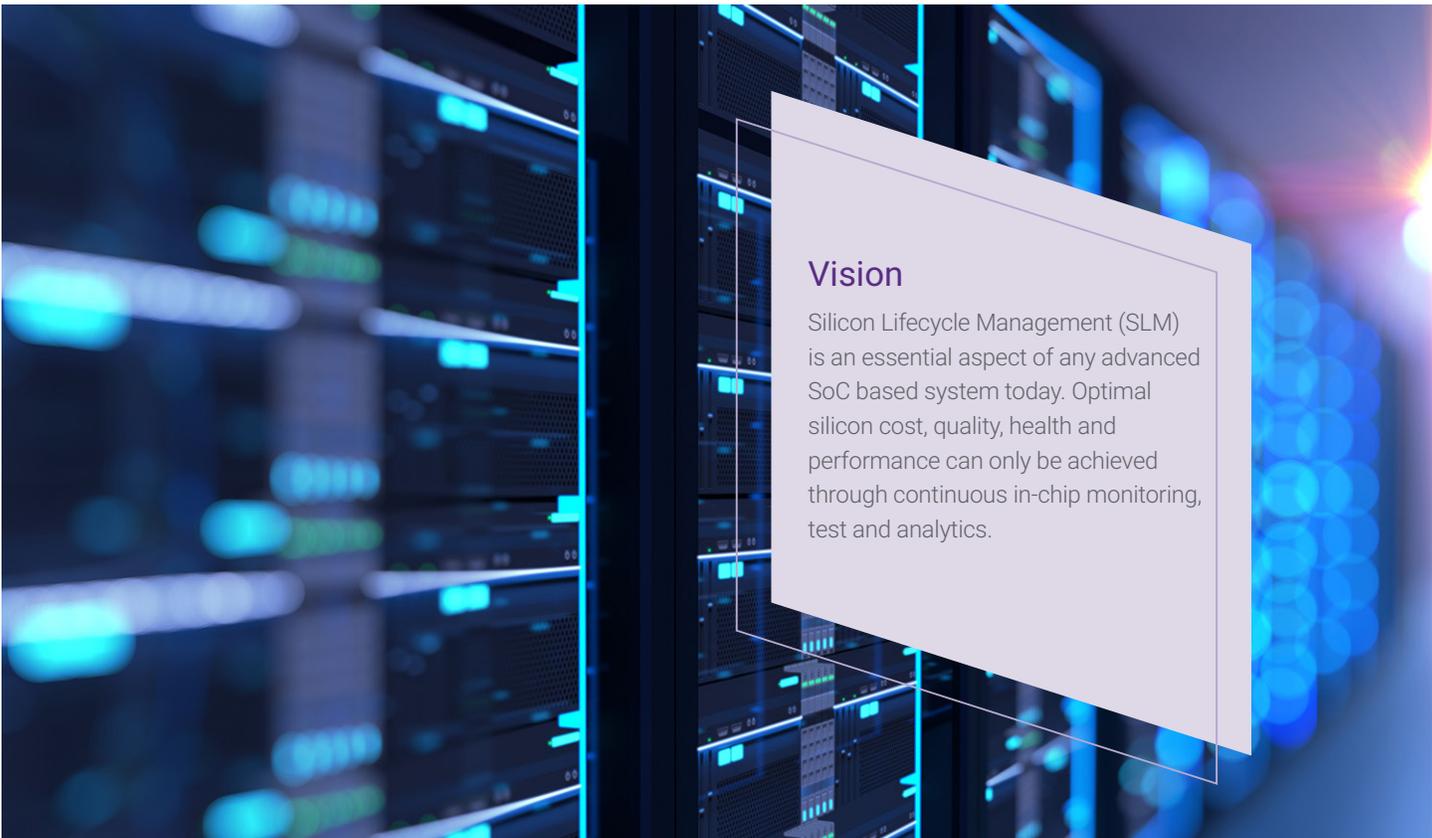


Silicon Lifecycle Management Family

Improving silicon health and operational metrics
at each phase of the system lifecycle





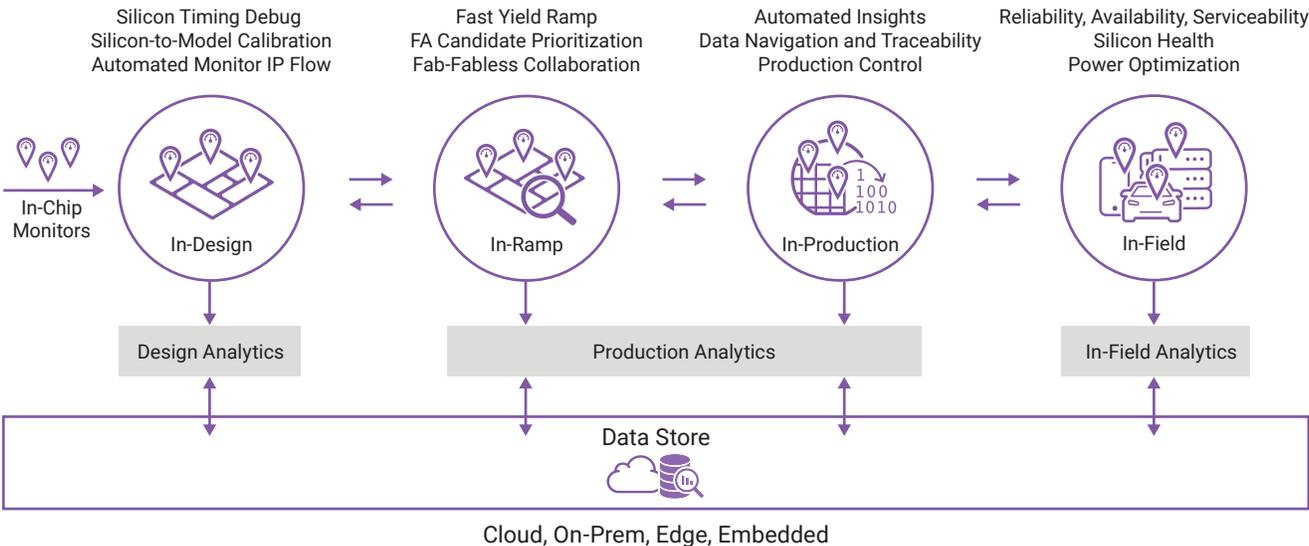
Vision

Silicon Lifecycle Management (SLM) is an essential aspect of any advanced SoC based system today. Optimal silicon cost, quality, health and performance can only be achieved through continuous in-chip monitoring, test and analytics.

Synopsys SLM Family

The Synopsys SLM family is designed to improve silicon health and operational metrics at every phase of the system lifecycle. SLM is built on a foundation of in-chip IP, data analytics and design automation. Environmental, structural and functional monitors enable deep insights from SoC manufacturing to In-Field systems. Meaningful data is gathered at every opportunity for continuous analysis and actionable feedback. SLM fully leverages Synopsys' solutions for design automation.

Actionable Insights Through Silicon Lifecycle Monitoring and Analytics



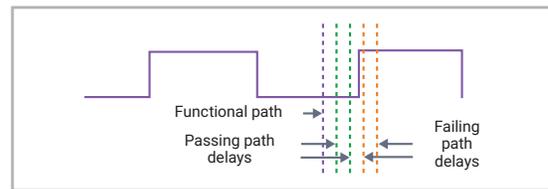
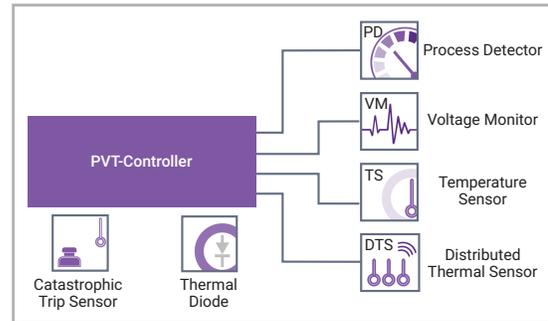
SLM IP

The Synopsys SLM family is built on the objective of monitoring silicon health and reliability. They are classified as: environmental, structural and functional monitors. They gather relevant data throughout the silicon lifecycle.

PVT Monitors

Process, Voltage and Temperature (PVT) monitoring is critical for optimal operation and performance in today's SoCs

- Maximizes performance, power, reliability
- Highly accurate, distributed monitoring throughout the die
- Available on process nodes from 28nm to 2nm



Path Margin Monitors (PMM)

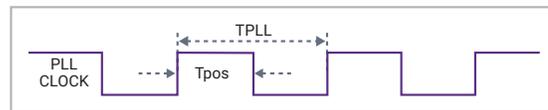
Measure timing margin of actual functional paths In-Test and In-Field

- Monitor 1000s of synthetic and functional paths
- Optimize silicon performance based on actual margins available
- Automated path selection, IP insertion, and scan generation

Clock and Delay Monitors (CDM)

Measure delay between edges of a signal(s)

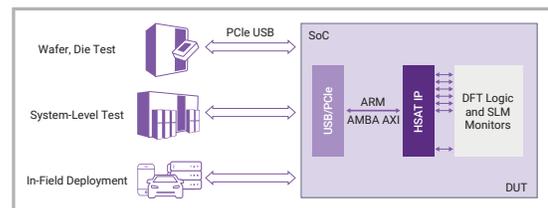
- Clock duty cycle quality check
- Clock frequency measurement
- Memory access time tracking with and without BIST



High Speed Access and Test (HSAT)

Enable testing over functional interface (PCIe, USB, SPI, ...)

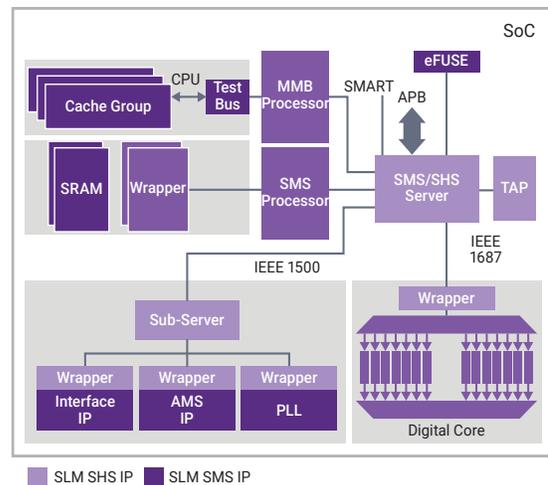
- Used during In-Field operation as well as WS, FT, SLT
- Supported by instruments from leading ATE providers
- Reduced pin count and test hardware saves cost



STAR Hierarchical System (SHS)

Automated DfX NoC (network on chip) solution for SoC's

- Hierarchical observability and control for all SLM IP
- Automated test integration of all IP/cores with in-system scheduling via APB
- Pre-validated ready ATE patterns with pattern porting



STAR Memory System (SMS)

Comprehensive silicon proven test, repair and diagnostics solution

- Supports Synopsys and 3rd party SRAM/RF-ROM, CAM, eMRAM and eFlash
- High Performance core support
- FinFET specific memory test algorithm programmability



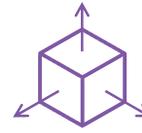
Productivity

- Actionable insights out-of-the-box
- Automated root cause analysis
- Accurate FA candidate selection



Efficiency

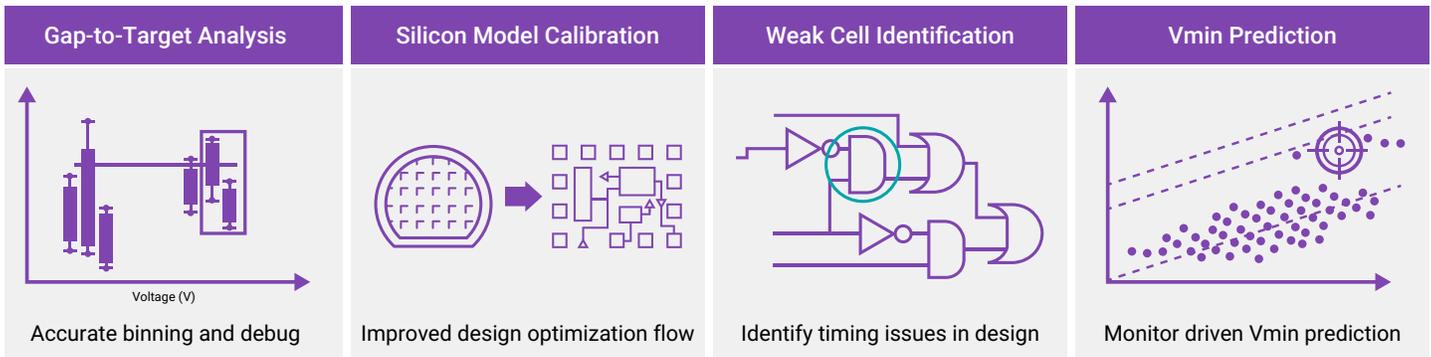
- Power and performance optimization
- Quality, yield, throughput optimization
- Machine Learning/AI Applications



Scalability

- Petabytes of data
- Multi domain support
- Cloud enabled

Below are several popular SLM monitor-aware analytics use cases:



SLM In-Field Analytics

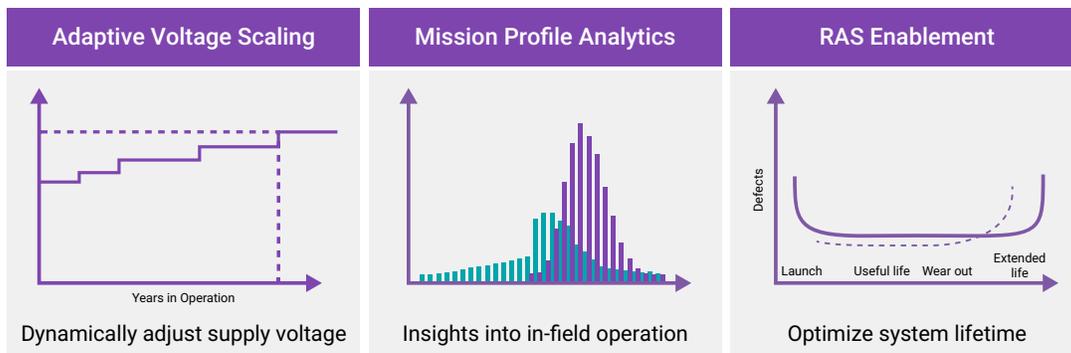
Once a device is deployed into the field it is essential that it is continually monitored, tested, analyzed and potentially adapted.

On-chip or cloud-based analytics can be used for predictive maintenance, aging identification, and fault detection in order to mitigate the risk of catastrophic system failures.

Monitor data can also enable real-time analytics and optimization schemes, such as Adaptive Voltage Scaling (AVS) resulting in lower power and extend device lifetime.

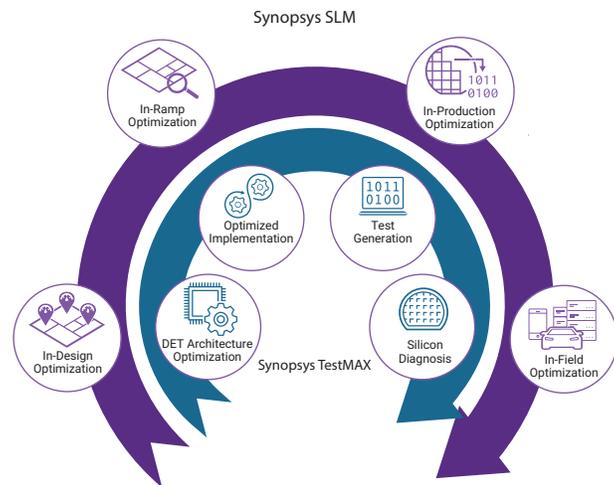
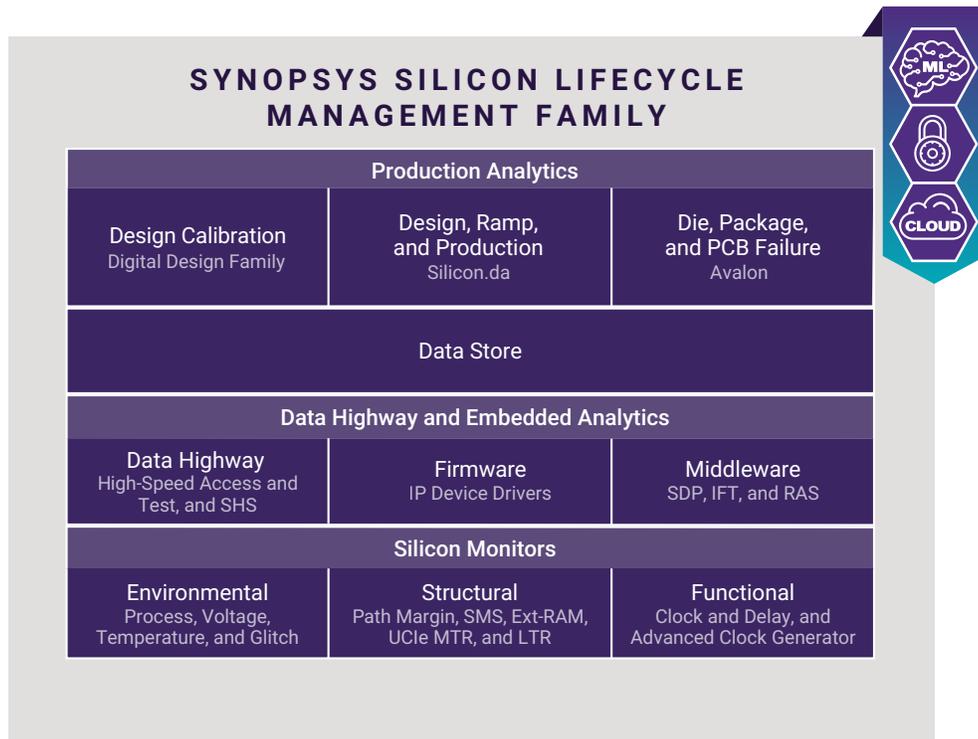
Finally, cloud-based analysis of data from design, manufacturing and in-field provides powerful insights into the health of a fleet of devices, enabling better informed decisions to address root cause analysis for traceability and RMAs.

Below are some of the most popular SLM In-Field Analytics Use Cases:



SLM Established Tool Solutions

The Synopsys Silicon Lifecycle Management Family includes multiple integrated products and capabilities. The key components of SLM are highlighted below:



SLM and Test Synergy

Synopsys SLM and Synopsys TestMAX™ solutions encompass integrated tools, IP and methodologies to test, monitor and analyze SoCs, providing actionable insights at every phase of the device lifecycle.

These innovative test and analytics tools enable a unified flow that is securely connected to Synopsys' Fusion Design Platform for deep insights, from in-design to in-field, meeting design, test, and operational goals concurrently for the entire lifespan of a silicon device.

For additional information on Synopsys Silicon Lifecycle Management and Synopsys TestMAX solutions, please visit our website or contact us.