Fab.da

Comprehensive AI-driven process analytics for faster ramp and efficient high-volume manufacturing

Benefits at a Glance

Operational Efficiency:

Synopsys Fab.da streamlines equipment monitoring and enhances data-driven decision-making, reducing operational inefficiencies and optimizing processes.

Cost Reduction:

By swiftly identifying and diagnosing faults, Synopsys Fab.da minimizes downtime and associated costs, maximizing equipment uptime.

Yield Improvement:

Synopsys Fab.da's robust analytics enable accurate root cause identification, improving yield through actionable insights.

Overview

Synopsys Fab.da is an AI-driven comprehensive process analytics and control solution. As part of the Synopsys.ai family of solutions, it is built upon Synopsys' vast expertise in chip design, mask synthesis, process and device modeling, process control, defect management, product testing, and cloud-based data analytics. Synopsys Fab.da enables customers to fully harness the immense potential of high volume of fab data. This is achieved through the generation of actionable insights, ultimately improving operational excellence within semiconductor fabs.
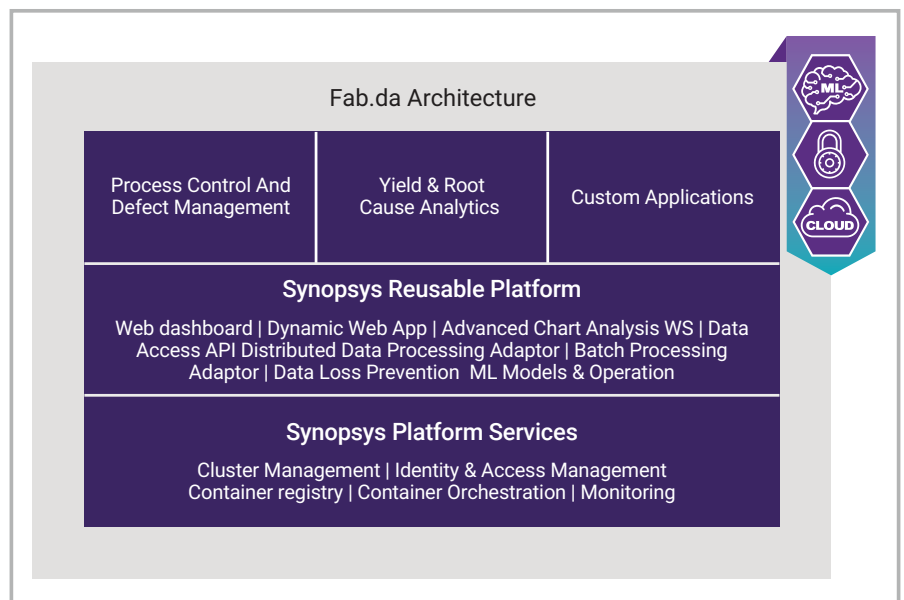

Figure 1: Synopsys Fab.da Architecture

Synopsys Fab.da serves as a catalyst for enhanced operational efficiency, cost reduction, and heightened quality in fabs. Synopsys Fab.da provides an adaptable and robust platform capable of scaling to collect, manage, analyze and adapt data. It is designed to seamlessly accept petabytes of data from diverse sources, encompassing product design, equipment sensors, fab operations, and product testing. This Data Continuum ensures a comprehensive and accurate foundation for analytics to simultaneously monitor equipment health, optimize process flows, rapidly identify underlying causes of failure, and predict outcomes to effectively mitigate manufacturing risks. As an advanced manufacturing platform, Synopsys Fab.da unifies disparate data elements into a singular, cohesive platform that continuously operates 24/7 avoiding the time-consuming and sub-optimal utilization of multiple analytics solutions. It adeptly meets the stringent data analytics demands of modern

semiconductor fabs while managing the complete data lifecycle to drive insightful and data-powered decisions. Synopsys Fab.da helps to achieve faster process ramp and higher fab yield.

Synopsys Fab.da architecture is designed to provide users with unparalleled insights using a big data platform driven by an AI/ML engine. Whether it's sensor data, semi-structured file data, or machine learning, Fab.da platform can manage it all. Customers may connect different data sources to gain insights that boost productivity and help them continue their journey to becoming data-driven organizations
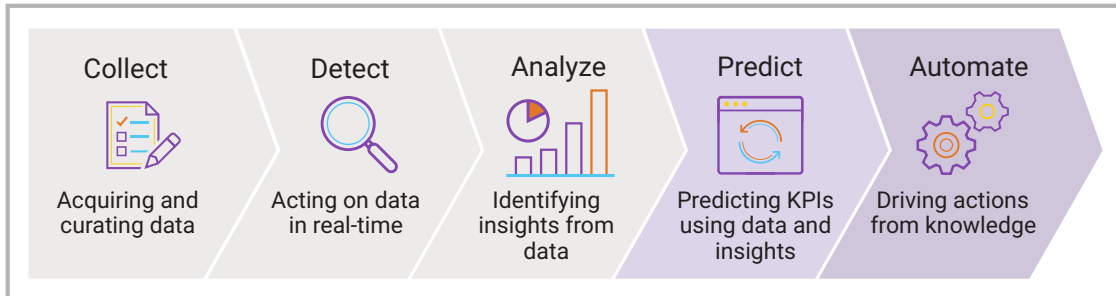

Figure 2: Fab.da Data Flow

Key Benefits

- Improved Turn-Around-Time: Faster process ramp improves time-to-market for semiconductor chips.
- Higher Yield: Operational excellence by maximizing product quality and fab yield.
- Lower Cost: Efficient high-volume manufacturing reducing fab operation cost.
- Faster Time to Results: AI/ML driven modeling and analytics removes time-consuming, error-prone manual methods
- Highly Scalable: Platform architecture built for scalability of compute power and storage to meet all future needs.
- Cloud Ready: Flexibility for fabs to deploy on-premises, public cloud or private cloud
- Secure: Industry best security practices incorporated into the platform

Advanced Analytics for Higher Yield

Synopsys Fab.da helps customers achieve higher fab yield through its advanced analytics capabilities. Fab.da takes the vast amount of data generated in semiconductor manufacturing and transforms it into actionable insights. With Synopsys Fab.da's AI-driven analytics, semiconductor fabs gain the ability to swiftly pinpoint yield-limiting factors, conduct detailed root cause analyses, and predict potential yield challenges. By integrating these advanced analytics, Fab.da empowers manufacturers to optimize processes, fine-tune equipment performance, and make informed decisions that directly impact yield improvement.

- Achieve pinpoint accuracy by identifying issues down to the parameter and recipe step level.
- Correlate Defect, Test, and FDC (Fault Detection and Classification) data for insightful analysis.
- Implement high-yield/low-yield analysis to effectively identify yield-related challenges by correlating defect data with test data.

Equipment Performance Optimization

Synopsys Fab.da optimizes equipment performance by implementing a sophisticated blend of cutting-edge technologies. Through meticulous equipment monitoring and precise control, Synopsys Fab.da ensures equipment functionality operates at its full potential. By integrating an advanced FDC system with a robust Statistical Process Control (SPC) solution, Synopsys Fab.da empowers engineers to effectively monitor, detect, and classify anomalies in real-time. This real-time vigilance allows for swift identification and diagnosis of potential issues, fostering preemptive actions and minimizing downtime. Furthermore, Synopsys Fab.da's innovative Automatic Defect Analysis and Management application propels yield learning cycles by rapidly identifying excursion points, which expedites troubleshooting and rectification processes. By maximizing equipment performance, Synopsys Fab.da directly contributes to the overarching goal of operational excellence within semiconductor fabs.

- Expedite identification of yield-restricting equipment or chambers using Lot History or Wafer History Equipment data via commonality analysis.
- Achieve in-depth root cause analysis, pinpointing exact root causes with AI-driven trace analytics.
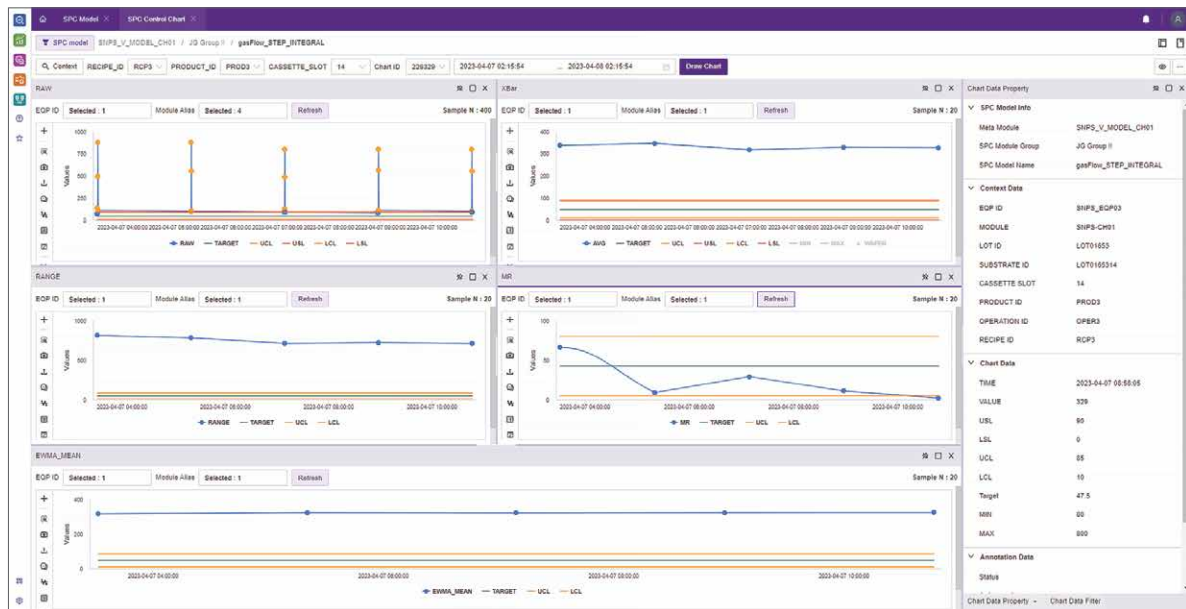

Figure 3: Fab.da Statistical Process Control

Unparalleled Visibility and Control

Synopsys Fab.da provides a comprehensive overview of critical manufacturing processes, enabling engineers to monitor, analyze, and optimize operations with precision. At the heart of this functionality lies Synopsys Fab.da's customizable dashboard, an intuitive interface that empowers users to tailor their data visualization according to their specific needs. This dynamic feature allows for the seamless integration of charts, wafer maps, reports, and image galleries, facilitating a holistic understanding of manufacturing dynamics. The easy-to-use interface ensures that users can swiftly create complex workflows, set proactive alerts, and troubleshoot issues enhancing operational efficiency. Synopsys Fab.da's unparalleled visibility and control, coupled with its user-friendly interface, revolutionize semiconductor manufacturing by providing engineers with the tools they need to drive continuous improvement and achieve optimal yield.

- Benefit from state-of-the-art data visualization and reporting capabilities.
- Facilitate advanced drill-down for accelerated root cause analysis.
- Embrace univariate and multivariate analysis.
- Leverage advanced SPC models.
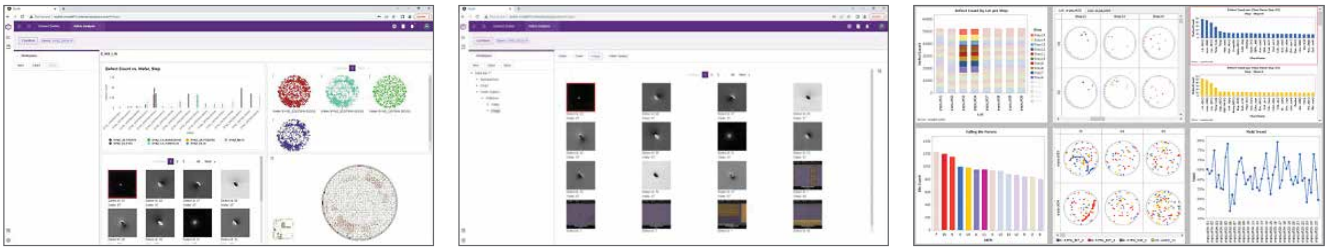- Achieve auto-generation and auto-tuning of SPC models according to user-defined criteria

Figure 4: Fab.da drilldown & comprehensive analytics

Automatic Defect Analysis and Management

Synopsys Fab.da introduces a new era in semiconductor manufacturing with its Automatic Defect Analysis and Management capabilities. This cutting-edge feature accelerates the identification and rectification of defects, playing a pivotal role in yield enhancement. Leveraging Spatial Signature Analysis and AI/ML models, Fab.da empowers manufacturers to automatically detect and classify defect signatures and automatically link to potential process or equipment issues. By swiftly identifying defects and categorizing them for future reference, Fab.da ensures efficient troubleshooting and process optimization. This innovative approach not only expedites yield learning cycles through real-time excursion identification, but also equips engineers with tools for creating custom dashboards, enabling lot disposition, defect source analysis, and offline review analysis. With Synopsys Fab.da's automatic defect analysis and management, semiconductor fabs gain a powerful toolset to achieve operational excellence and elevate product quality.

- Employ ML models for automatic detection and classification of systematic wafer map patterns.
- Utilize spatial correlation for comprehensive wafer signature analysis.
- Realize cross-product pattern recognition for an enhanced perspective.