



---

# Visualizing the Future: How Indium Developed an Analytics Product for Predictive Maintenance & Data Visualization in the Semiconductor Industry

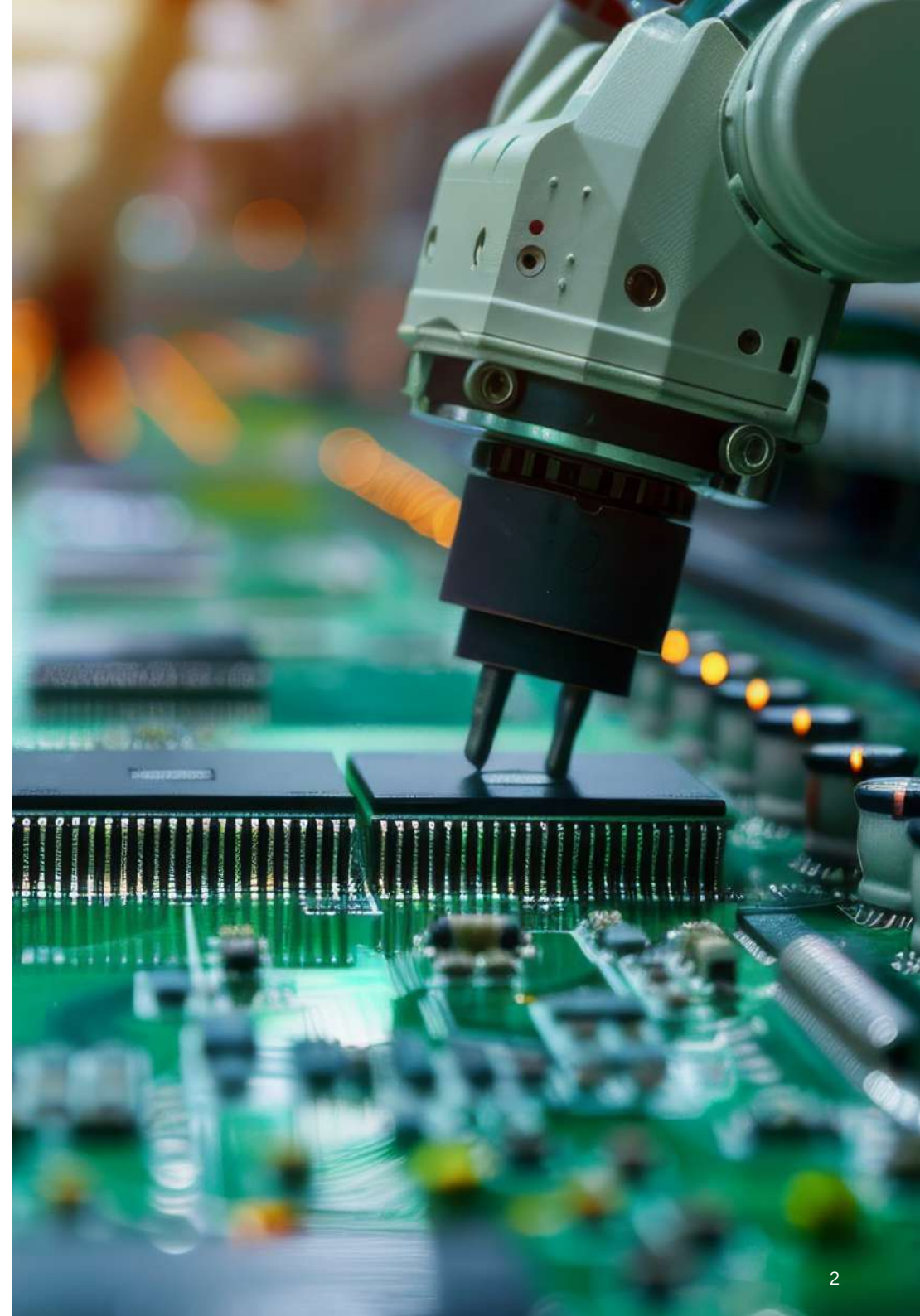
SUCCESS STORY



## Client Overview

The client is one of the world's leading enablers of advanced semiconductor manufacturing, with its technology playing a crucial role in nearly every innovative chip produced today. Headquartered in California, the company provides value-added services to semiconductor manufacturers, specializing in the development and supply of wafer fabrication equipment and services.

With manufacturing centers across the Americas, Europe, and Asia, the client supports semiconductor production worldwide. Their chip-making process involves a complex sequence of individual steps, where each process module fabricates multiple wafers under precisely controlled conditions of temperature, pressure, and other critical parameters. Through its innovative solutions, the client empowers semiconductor manufacturers to push the boundaries of technology and innovation.



# Building a Smarter Future: Data-Driven Goals for Semiconductor Excellence

The client sought a data-driven solution to enhance operational efficiency, ensure quality control, and drive predictive insights across the wafer fabrication process. The key business requirements included:

## **Optimizing Wafer Production Efficiency:**

Utilizing data-driven insights to measure and enhance the efficiency of wafer fabrication processes. Also implement a system to record and store process chamber conditions in real-time using sensor data, enabling continuous tracking of wafer fabrication.

## **Real-Time Production Line Monitoring:**

Ensuring continuous oversight of the wafer production line to detect and address inefficiencies.

## **Identifying Anomalies in Process Modules:**

Detecting outlier process modules to prevent deviations and maintain production consistency.

## **Predicting Defects Before They Happen:**

Leveraging advanced analytics to forecast defects in process modules and reduce yield loss.

## **Proactive Maintenance for Uninterrupted Operations:**

Implementing predictive maintenance strategies to minimize downtime and enhance equipment longevity.

# Transforming Semiconductor Manufacturing with Advanced Data Analytics

Indium analyzed the data collected from sensors installed on process modules and designed a solution that transformed the data for business use, enabling it to describe, predict, and prescribe insights for operational efficiencies. By leveraging our expertise in Big Data, Predictive Analytics, and Visualization, Indium met all requirements and delivered additional value-added features, enhancing overall business impact.

## Data into Actionable Insights:

A data science solution, integrated with a powerful visualization layer, was implemented to aggregate vast data volumes from process chambers and present them through an intuitive, actionable interface for key business users.

## Scalable Data Management for Continuous Insights:

The constant influx of process data demanded a robust database capable of handling both raw and processed (aggregated) data. A Hadoop-based solution was introduced to ensure efficient data storage and management.

## Unlocking Actionable Insights from Processed Data

The processed data enabled key functionalities, including:

- Identifying outlier or anomalous process modules in regular production.
- Flagging defects in the manufacturing process for immediate action.
- Providing wafer-level insights, ensuring the highest possible resolution.
- Monitoring adherence to production guidelines to maintain quality and efficiency.

## Visual Intelligence:

Bringing Data to Life: Data insights were visualized using advanced visualization tools, making analysis intuitive and user-friendly. Charts delivered quick response times, allowing users to analyze large datasets without delays.

## Advanced Data Exploration Features:

Enabled interactive capabilities such as zoom-in, brush & deselect, simulations, pop-ups, and drill-downs for in-depth analysis.

## Seamless End-to-End Analytics:

From selecting specific Customers, Labs, and Process Modules to model building, the entire analytics process was streamlined into a single, actionable view.

## Transformative Impact: Driving Efficiency, Cutting Costs, and Elevating Performance

- ▶ **3X Savings, Triple the Uptime:** Achieved enormous reduction in repair and maintenance costs, significantly minimizing downtime and enhancing the operational efficiency of process modules.
- ▶ **20% More Efficiency, Same Time—More Wafers:** Boosted process module efficiency, enabling higher wafer production without increasing operational time.
- ▶ **A Game-Changer in Semiconductor Solutions:** Developed a highly sought-after product that has become an essential offering for our clients, adding value to their customers and driving business success.





## About Indium

Indium is an AI-driven digital engineering company that helps enterprises build, scale, and innovate with cutting-edge technology. We specialize in custom solutions, ensuring every engagement is tailored to business needs with a relentless customer-first approach.

Our expertise spans Generative AI, Product Engineering, Intelligent Automation, Data & AI, Quality Engineering, and Gaming, delivering high-impact solutions that drive real business impact.

With 5,000+ associates globally, we partner with Fortune 500, Global 2000, and leading technology firms across Financial Services, Healthcare, Manufacturing, Retail, and Technology—driving impact in North America, India, the UK, Singapore, Australia, and Japan to keep businesses ahead in an AI-first world.

### USA

Cupertino | Princeton  
Toll-free: +1-888-207-5969

### INDIA

Chennai | Bengaluru | Mumbai | Hyderabad | Pune  
Toll-free: 1800-123-1191

### UK

London  
Ph: +44 1420 300014

### SINGAPORE

Singapore  
Ph: +65 6812 7888

[www.indium.tech](http://www.indium.tech)



For Sales Inquiries  
[sales@indium.tech](mailto:sales@indium.tech)



For General Inquiries  
[info@indium.tech](mailto:info@indium.tech)

