

SUPPORTING THE INDUSTRY THROUGH



AI-DRIVEN COLLABORATION & SMARTER DECISIONS

JOHN KIBARIAN

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2025 USERS
CONFERENCE

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ONSLAUGHT OF SEMICONDUCTOR MANUFACTURING CAPACITY

AI driving path to **\$1T** semiconductor revenue before 2030

2023 -2029
Semiconductor Industry

12.8% CAGR
Total Semiconductor Market

19% CAGR
Memory Market

23% CAGR
Compute/AI Market

30.6% CAGR
AI Hyperscaler Market

AI Driving Demand, In
Datacenter & At The Edge

“ Global data center
capacity could more
than triple by 2030,
with a CAGR of about 22% ”

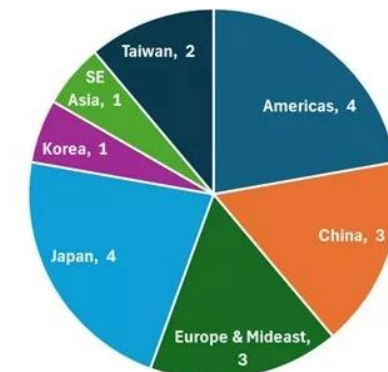
“ Edge AI accounts for
over 50% of the
semiconductor AI market ”

Leading Edge Nodes Dominate
Foundry Market Growth

2030 - **40%** <2nm
2035 - **60%** <2nm

**Eighteen New Semiconductor Fabs to
Start Construction in 2025**

New Semiconductor Fabs Starting Construction in 2025 by Region



Source: SEMI World Fab Forecast, Q4 2024 Update

EXPLODING COMPLEXITY, 3 CHALLENGES



3D WORLD
CHIPLETS AND SYSTEMS

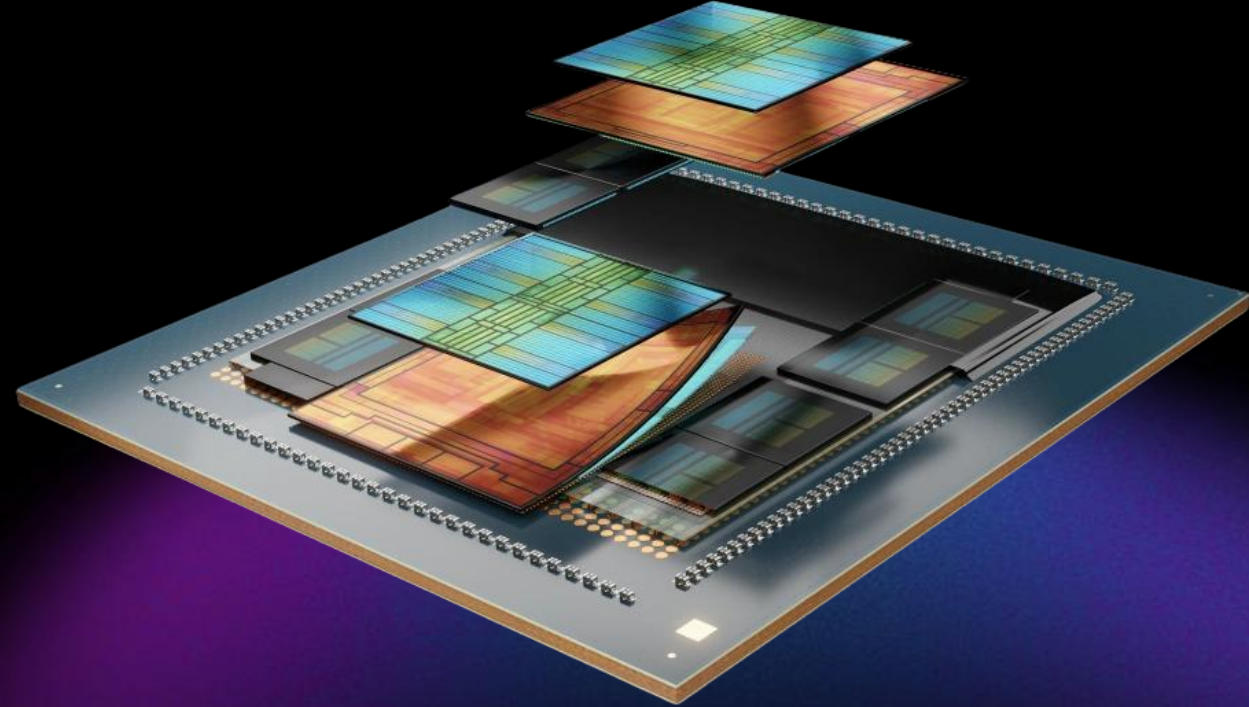
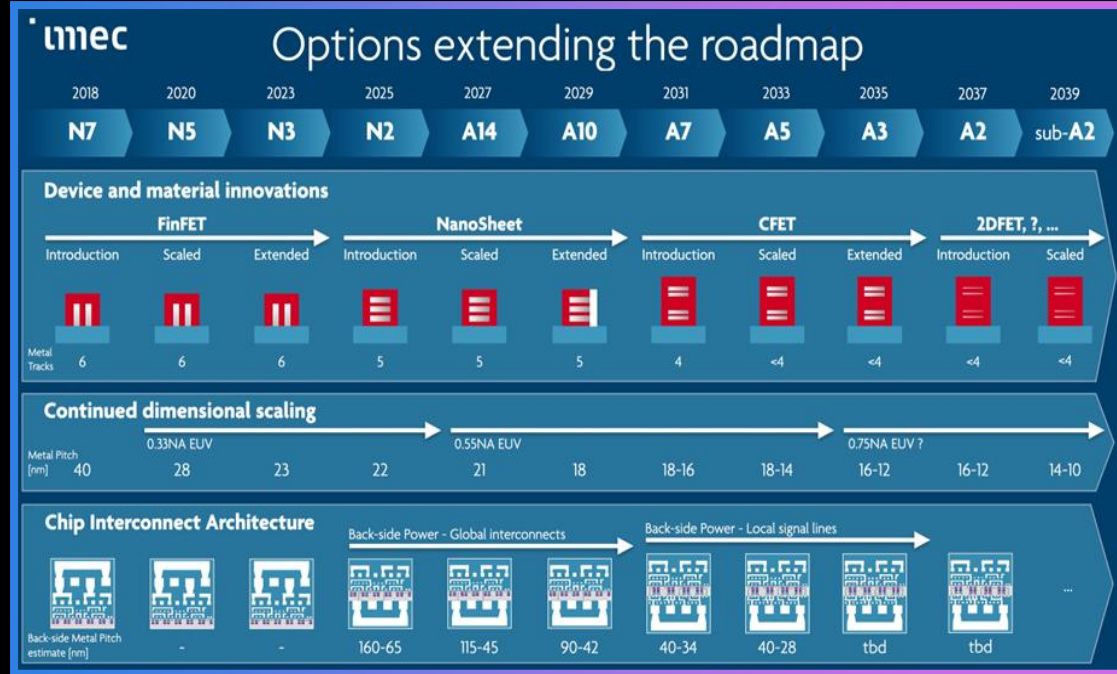


COMPLEX GLOBAL
SUPPLY CHAIN



BOOSTING OPERATIONAL
EFFICIENCY WITH AI

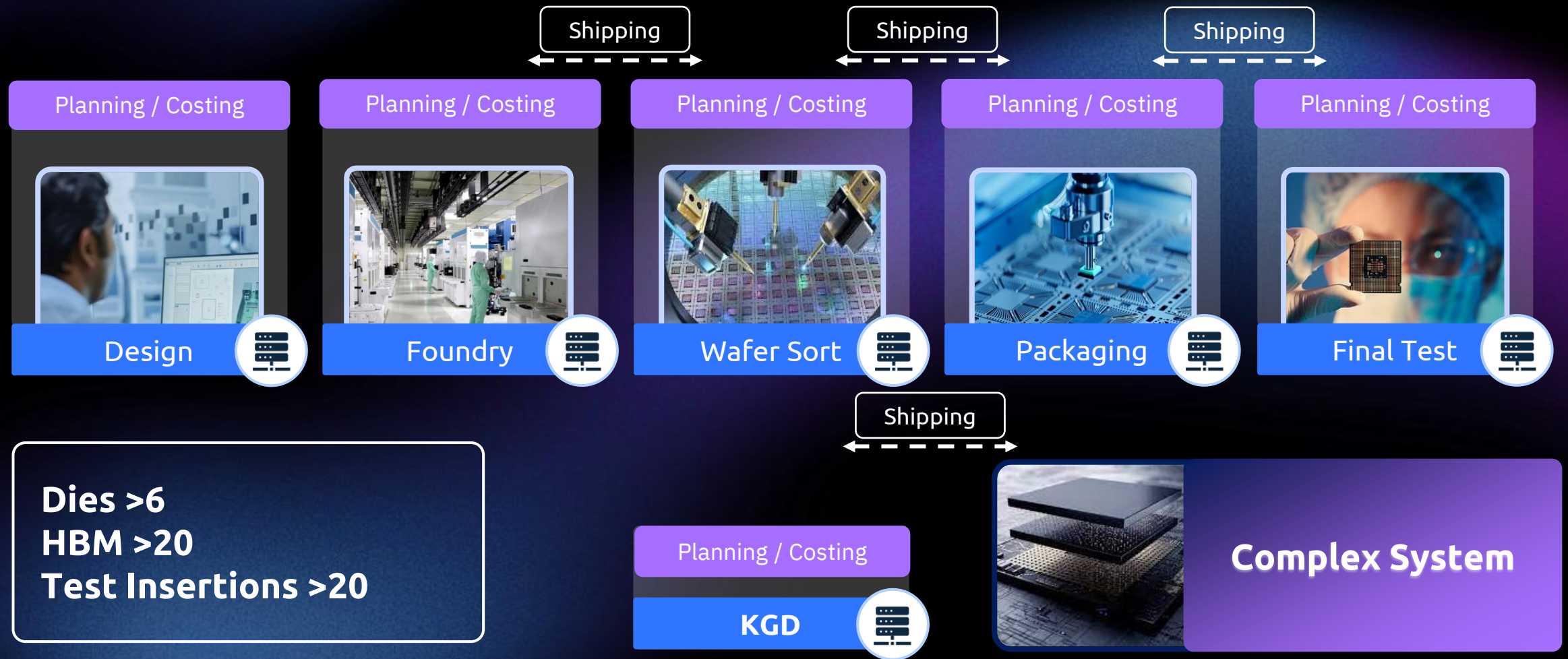
3D: FROM WAFER PROCESSEING TO CHIPLET BASED SYSTEM



“We’ve moved from **scale complexity** to **systemic complexity** – it’s multi-dimensional and involves more parties.”

Aart de Geus, 2024

COMPLEX GLOBAL SUPPLY CHAIN



BOOSTING OPERATIONAL EFFICIENCY WITH AI

Operational Efficiency

Economies of scale are harder to achieve with **globally distributed** manufacturing

Skills Shortage

80% of US graduates with a MS in semi engineering **leave the country.**

90% of companies in **APAC** consider talent acquisition and development a top priority.

Deloitte 2025

Leverage AI

“ By 2029, AI automation will touch **~80% of workflows**, fundamentally reshaping how work gets done. ”

IDC 2025

DATA, ANALYTICS, AND MISSION CRITICAL PLATFORM SPANNING THE SEMICONDUCTOR INDUSTRY

PDF/SOLUTIONS®

manufacturing

supply chain

AI ready Big Data Infrastructure • Analytics • Mission Critical Actions

characterization
vehicle infrastructure



Characterization
& Technology
Development

exensio
cimetrix



Smart
Manufacturing &
Analytics

sapience
secureWISE



Supply Chain
Orchestration

product lifecycle

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KEY THEMES



DIFFERENTIATED
DATA & PROCESS
CHARACTERIZATION



COLLABORATION &
SUPPLY CHAIN
ORCHESTRATION



GLOBAL SECURE
CONNECTIVITY
PLATFORM



AI READY DATA
PLATFORM TO
SCALE ANALYTICS

PDF/SOLUTIONS™



TM



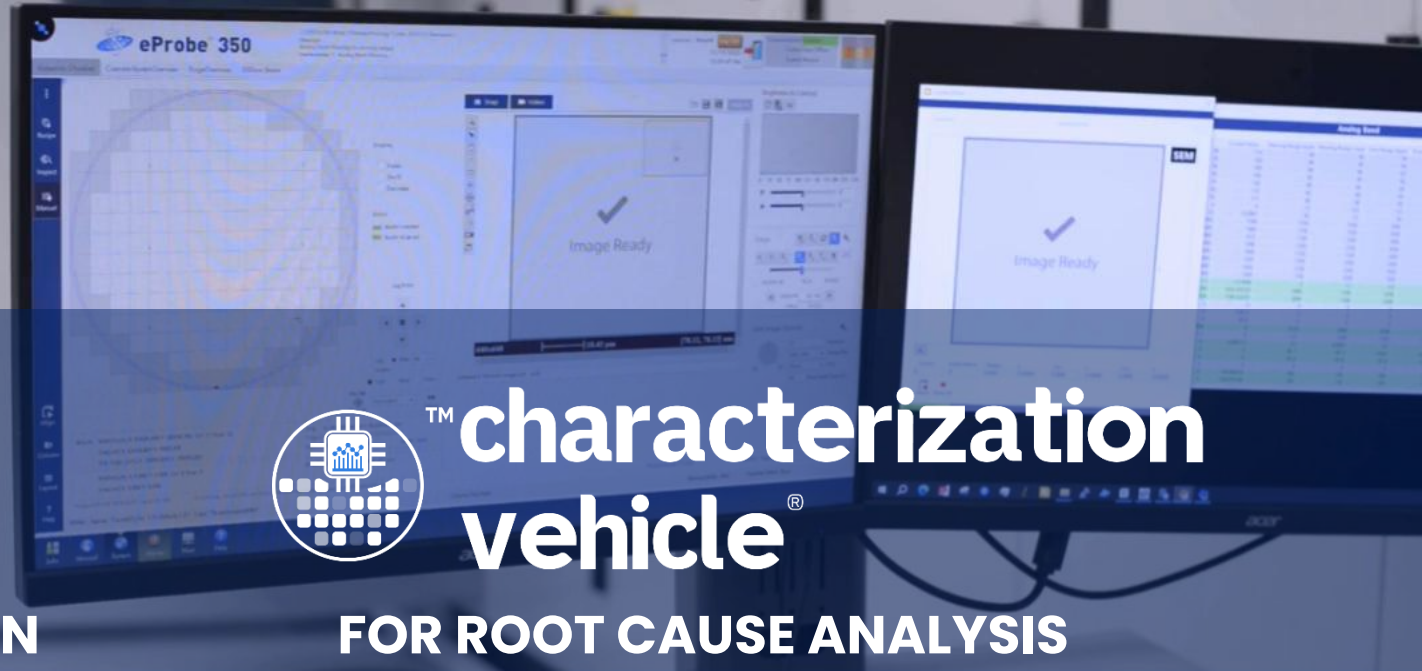
eProbe

DIRECTSCAN E-BEAM INLINE INSPECTION

**RAPID YIELD DIAGNOSTIC
TO ACCELERATE RAMP**

**EPROBE INLINE INSPECTION &
LAYOUT ANALYSIS TO IDENTIFY
SYSTEMATIC FAILURES**

**CAPABLE OF OVER 60
TRILLION VIA TEST PER YEAR
PER Machine**



characterization
vehicle®

FOR ROOT CAUSE ANALYSIS

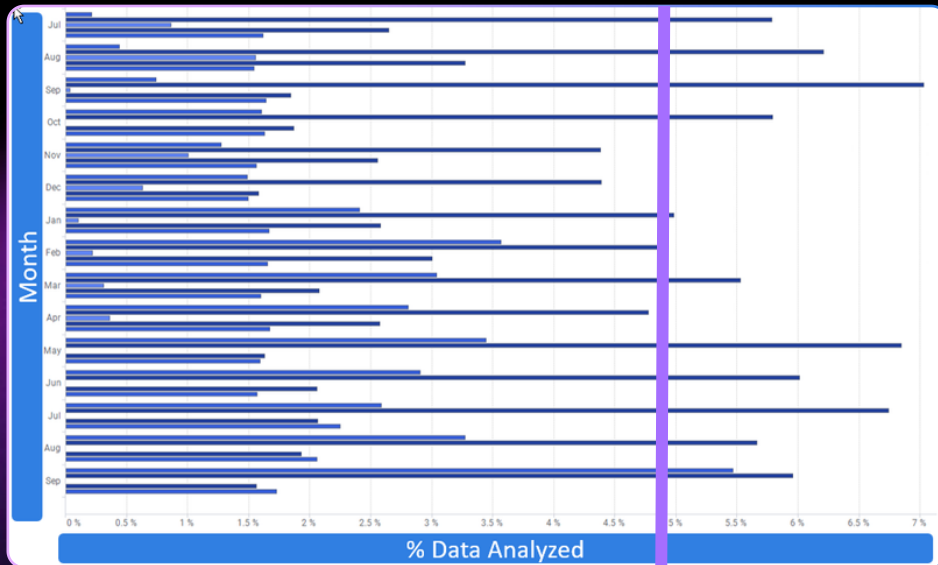


DIFFERENTIATED DATA & PROCESS CHARACTERIZATION



5%-10% OF SEMICONDUCTOR MANUFACTURING DATA IS ANALYZED USING CONVENTIONAL METHODS

THE AVALANCHE OF DARK DATA



% OF MANUFACTURING DATA USED IN ANALYTICS **5%**

80%

OF DATA SCIENTIST TIME IS SPENT ON DATA ALIGNMENT & PREPARATION

"Gartner predicts that through 2026, organizations will **abandon 60% of AI projects** unsupported by AI-related data."

Gartner, 2025



AI READY DATA PLATFORM TO SCALE ANALYTICS

PDF/SOLUTIONS® REIMAGINING DATA ANALYTICS IN THE AI ERA



AI-NATIVE, ENTERPRISE-SCALE DATA PLATFORM



NEXT-GEN, USER-CENTRIC ANALYTICS—CUSTOMIZABLE & FLEXIBLE



SEAMLESS INTEGRATION WITH ADVANCED SEMICONDUCTOR ANALYTICS & VISUALIZATION



DRIVING INNOVATION THROUGH SUPERIOR DATA QUALITY & AI-POWERED EFFICIENCY



REINVENTED **ARCHITECTURE** TO DELIVER BREAKTHROUGH PERFORMANCE AND USABILITY IMPROVEMENTS



ARCHITECTURE



Scales **linearly**



Data sizes only limited by **size of analytics cluster**



Combination of **static compute nodes** as well as **burst(cloud) compute** for cost effective scaling to extremely large data sets



USABILITY



Designed to handle **semiconductor specific** extremely wide datasets



Parallelizable performance across rows (die) and columns (tests)

25x

improvement on **analytics loading & generation** using large test program datasets

42x

improvement on **data loading** to perform TSR analysis

1M

Test items to **work interactively** with - beyond what has ever been done before

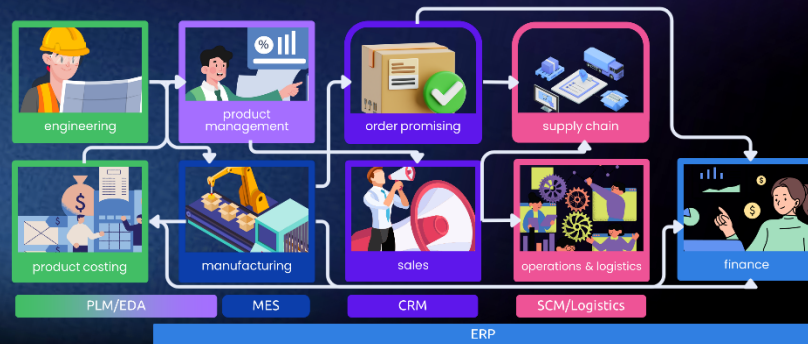




ORCHESTRATIONS, INTERNAL & EXTERNAL

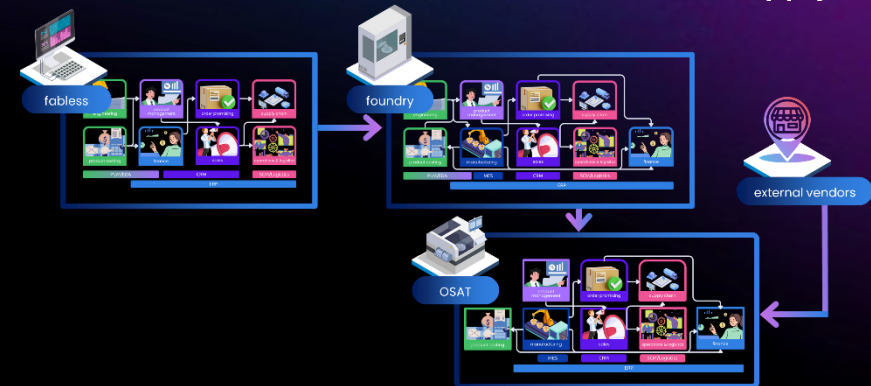


INTERNAL OPERATIONS



- 01 **Product Costing:** Accurate and up-to-date costing information based on actual resource consumption
- 02 **Order Status:** Real-time updates on order status and yield
- 03 **Quality:** Rapid identification and isolation of at-risk materials.

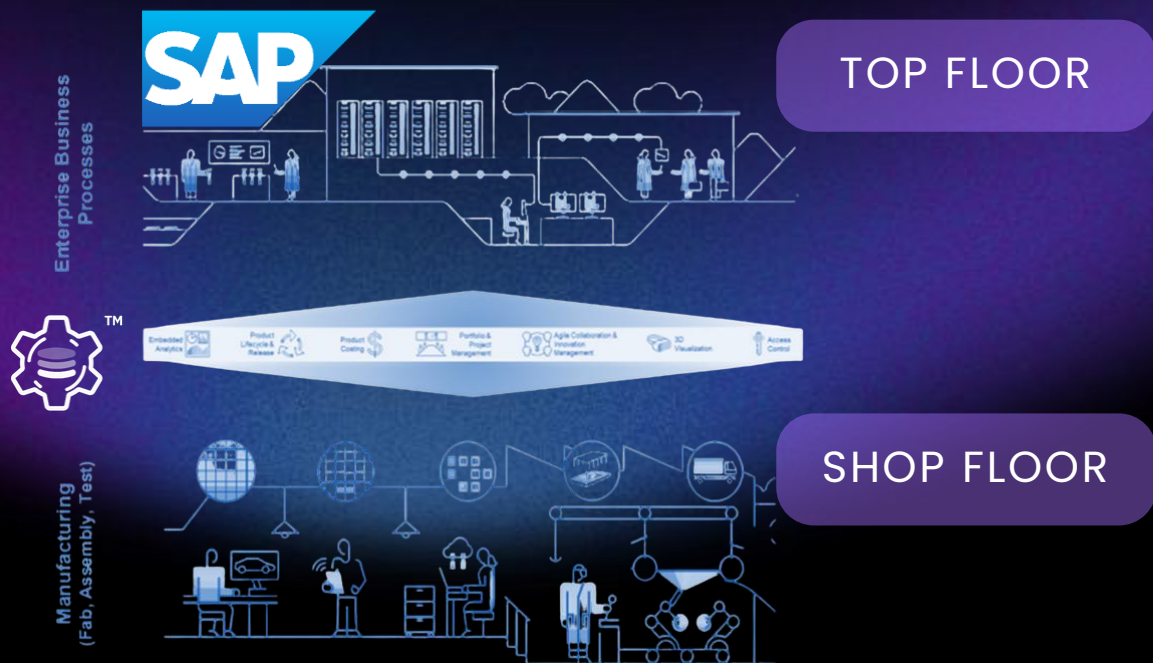
EXTERNAL OPERATIONS/OSAT



- 01 **Test Flow:** automate test flow management
- 02 **Quality:** Streamline & automate quality assurance
- 03 **WIP:** real time WIP tracking & management



DRIVE ENTERPRISE PROCESSES WITH MANUFACTURING DATA



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- 01 A common data & logical model for Products / Assets
- 02 Extend business processes, logic, and data to the manufacturing edge
- 03 Derive business Insights directly from manufacturing
- 04 Connect, transform, manage, & orchestrate MES & Manufacturing data
- 05 AI-ready manufacturing data repository to accelerate decision making



COLLABORATION & SUPPLY CHAIN ORCHESTRATION

HUMAN GOVERNANCE WITH AI EXECUTION



ENFORCE DATA QUALITY



HUMANS SET COLLABORATION RULES



AI EXECUTES AT SCALE



CROSS-ORG GOVERNANCE

“By 2029, AI automation will touch **~80% of workflows**, fundamentally reshaping how work gets done.”
IDC 2025

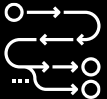
“A new class of software technologies, **Adaptive Process Orchestration**.”
Forrester 2025



MINES 100% OF THE DATA
100% OF THE TIME



AUTOMATES UP TO 90%
OF THE ANALYSIS



ISSUE-BASED FLOW



SEAMLESS INTEGRATION OF DATA TYPES
HARD BIN, SOFT BIN, PARAMETRIC, PCM, TEST TOOLS, UPH



AI/ML POWERED DIAGNOSIS



RENDERS DATA VISUALIZATION IN
SECONDS



Conferences > 2024 8th IEEE Electron Device... ?

Expediting manufacturing safe launch with Big Data AI/ML analytic solutions on the cloud

Publisher: IEEE

[Cite This](#)

[PDF](#)



DATA FEED FORWARD



CAPTURE & TRANSPORT



DATA RECALL & ENGINEERING



TRANSFER



EDGE INTEGRATION



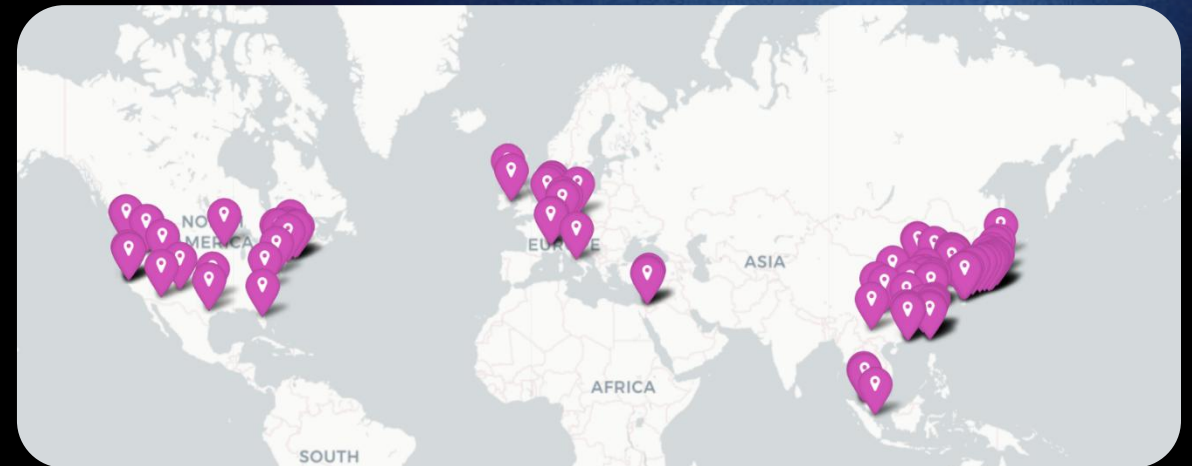
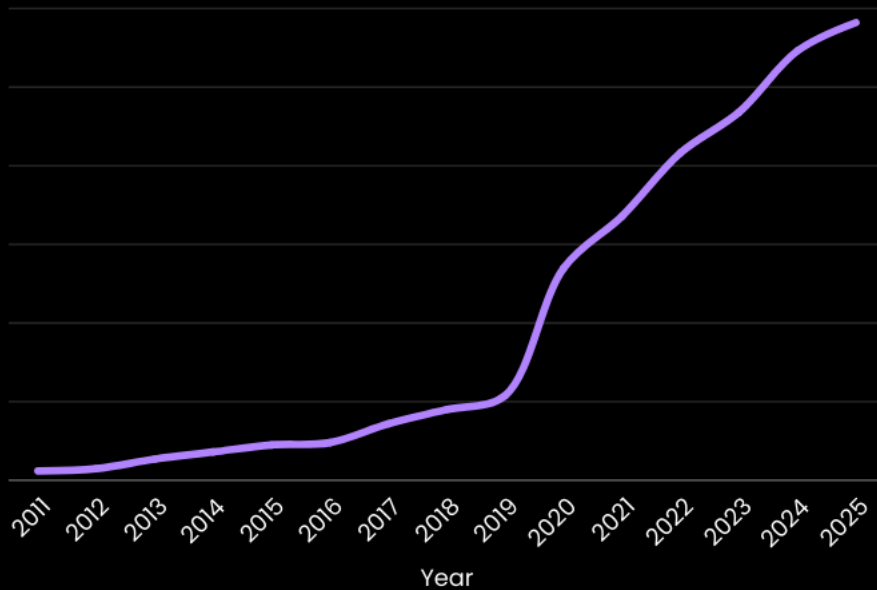
Data exchange across the global semiconductor industry is exploding on the  **secureWISE™** network

+300 manufacturing locations

OVER **100** OEMS CONNECTED

ISO: **27001**

0 SECURITY BREACH IN OVER **20** YEARS





GLOBAL SECURE CONNECTIVITY PLATFORM

THE EQUIPMENT SOFTWARE STACK FOR CONNECTIVITY & CONTROL

This year, **>8,000** semiconductor **manufacturing equipment** will ship enabled with PDF equipment software



Secure Connectivity



Automation & Control



Digital Intelligence



AI/ML-driven
Resilience



THE OPERATIONS OPERATING SYSTEM OF THE INDUSTRY

LEAD WITH INDUSTRY STANDARDS

SEMI INDUSTRY
Eg, E187, 188, 190, 191
Chair 10 committees

CYBERSECURITY

SOC2

ISO27001

NIS2

CRA

sox

end to end zero trust approach

ENTERPRISE READINESS

**ENTERPRISE APPLICATIONS
INTEGRATION**
MES, PLM, ERP, SCM

Petabytes
of cloud-managed data
Exabytes
Ready data exchange

99.9%
uptime across
all 8 regions

24/7
global support

ECOSYSTEM REACH

10s of Ks
tools

100+
equipment
OEMs

>300
manufacturing sites connected

1000
Process Characterizations

top 6
foundries



OUR PARTNERS - BASED ON INDUSTRY STANDARDS & INTEGRATED WITH LEADING SOLUTIONS PROVIDERS



Financial: Links business & supply chain data with E2E manufacturing data for automation/analysis of quality & cost

Collaboration with pT agents: monitors integrated for rapid diagnosis of chip product health

proteanTecs

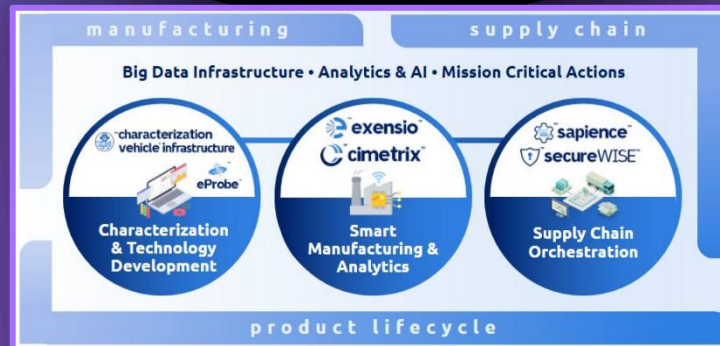


Assembly: Differentiated data & enhanced solutions

Design: E2E manufacturing data integration with test pattern layout & design

SIEMENS

PDF/SOLUTIONS®



MES: Integrated offering with PDF analytics

Test: Differentiated data and enhanced solutions for test

ADVANTEST
TERADYNE



Cloud platform: analytics partner for semiconductor supply chain solutions – over 78 products cloud ready.

Security: network, applications & edge server security

FORATINET

lavorro

Gen AI solution for fab systems performance and productivity improvement

Semiconductor industry-standard organizations





SERVING THE ENTIRE SEMICONDUCTOR ECOSYSTEM



Representative companies, not intended to disclose customers

OUR CALL TO ACTION

\$1T semiconductor industry
\$400–500B manufacturing cost
Tools operate at 60–80% efficiency

PDF/SOLUTIONS® MISSION:
Unlock \$140B in value through AI-driven collaboration and smarter decisions across the global semiconductor ecosystem.



PDF/SOLUTIONS® Thank You



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