

REVOLUTIONIZING SEMICONDUCTOR

COLLABORATION

**SEMICON
WEST**

PDF/SOLUTIONS

JOHN KIBARIAN

EMERGENCE OF ↗

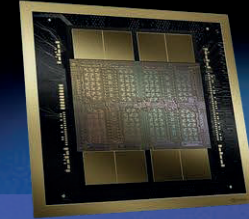
AI-DRIVEN

INDUSTRY PLATFORMS

SEMICONDUCTOR INDUSTRY THRIVES ON INNOVATION



intel | IBM | Microsoft



nvidia | SK hynix | tsmc



arm | Apple | SAMSUNG | Qualcomm | tsmc

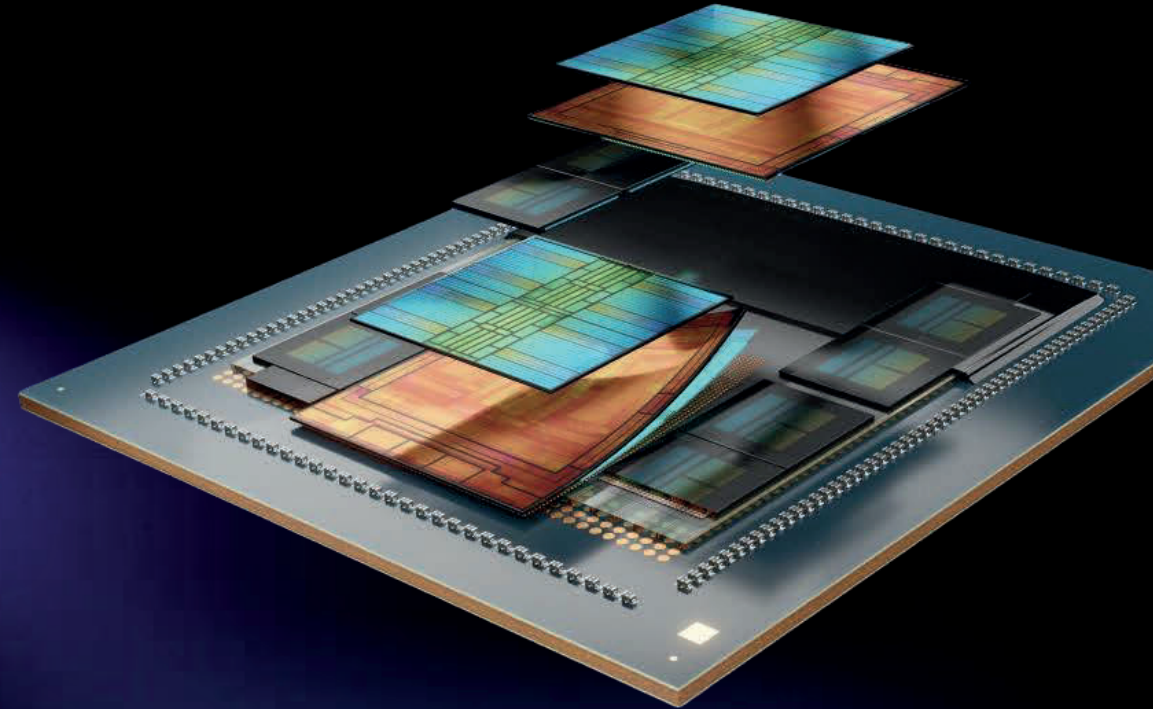
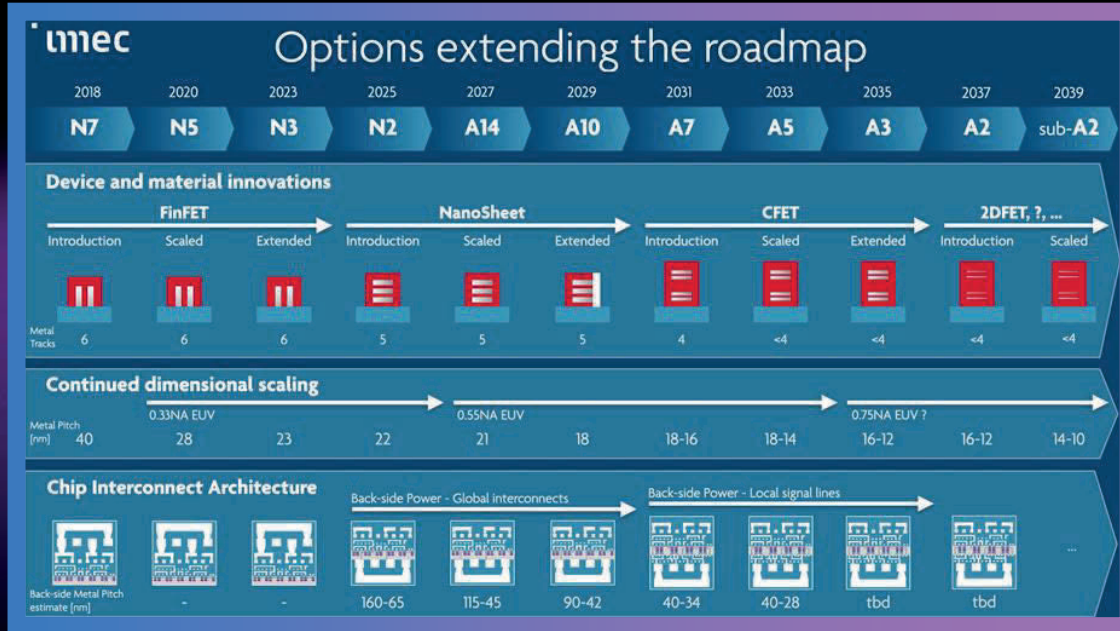
PDF/SOLUTIONS

TODAY'S STAGE-GATE AND CRISIS DRIVEN COLLABORATION

CONVENTIONAL MODEL

- **Isolated** development and manufacturing
- **Simple, linear handoffs** between partners
- Small amount of data shared in **spreadsheet and graphs**

In a 3D world what **TYPE OF COLLABORATION** IS NEEDED?



TEST INSERTION
EXPLOSION



MULTI-VENDOR
CHIPLETS INTEGRATION



TIGHT ASSEMBLY
PROCESS TOLERANCE

PDF/SOLUTIONS®

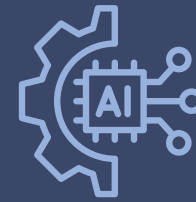
THE INDUSTRY IS CHANGING



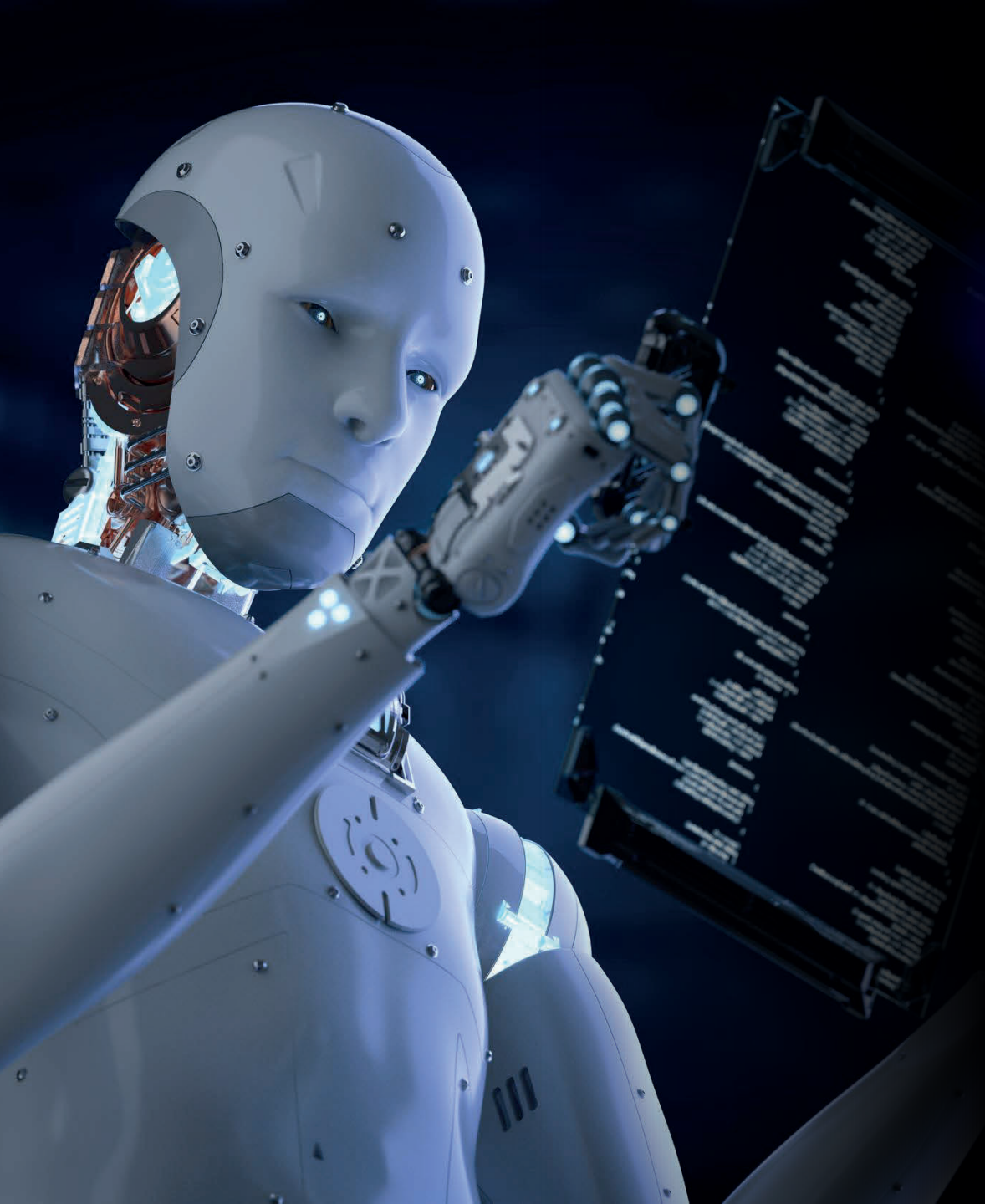
innovations in **3D**



operating
through a
**complex global
supply chain**



**leveraging AI at
all levels** to drive
operational
efficiency

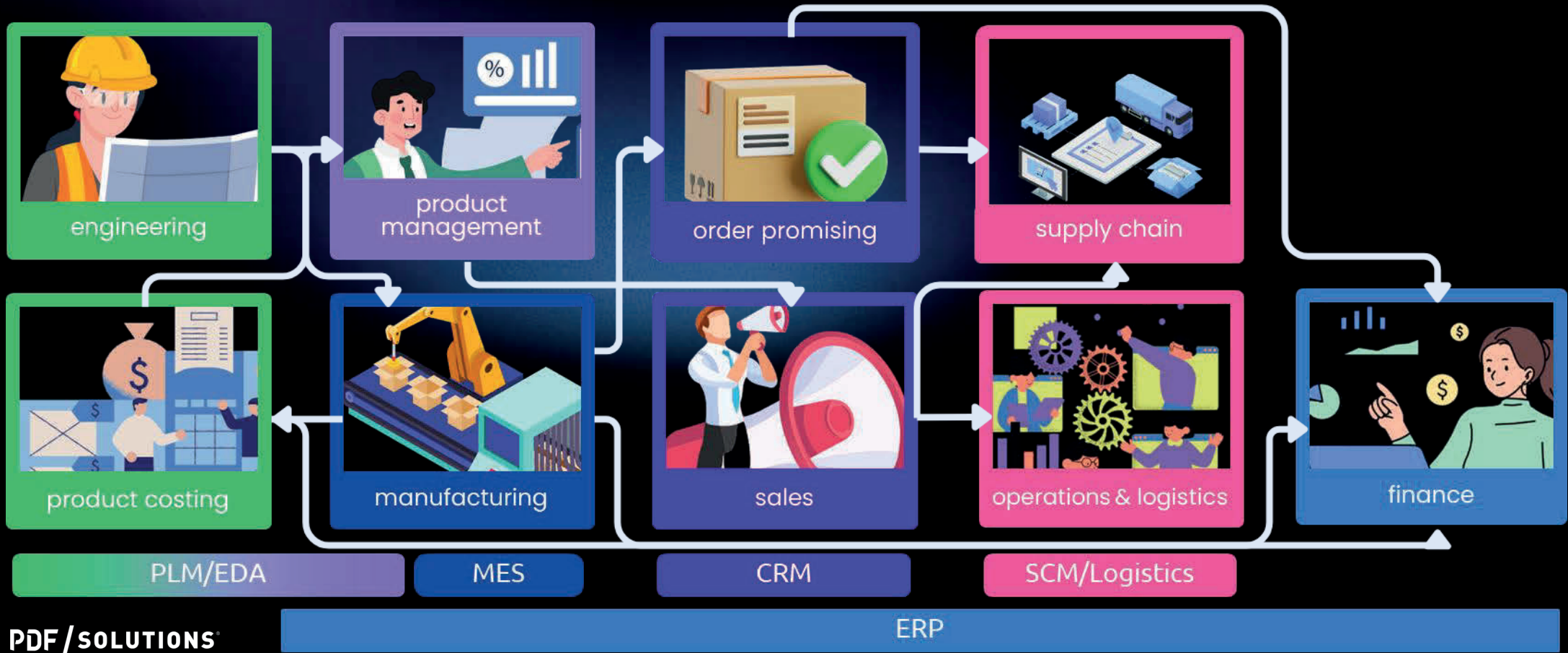


AI-DRIVEN COLLABORATION

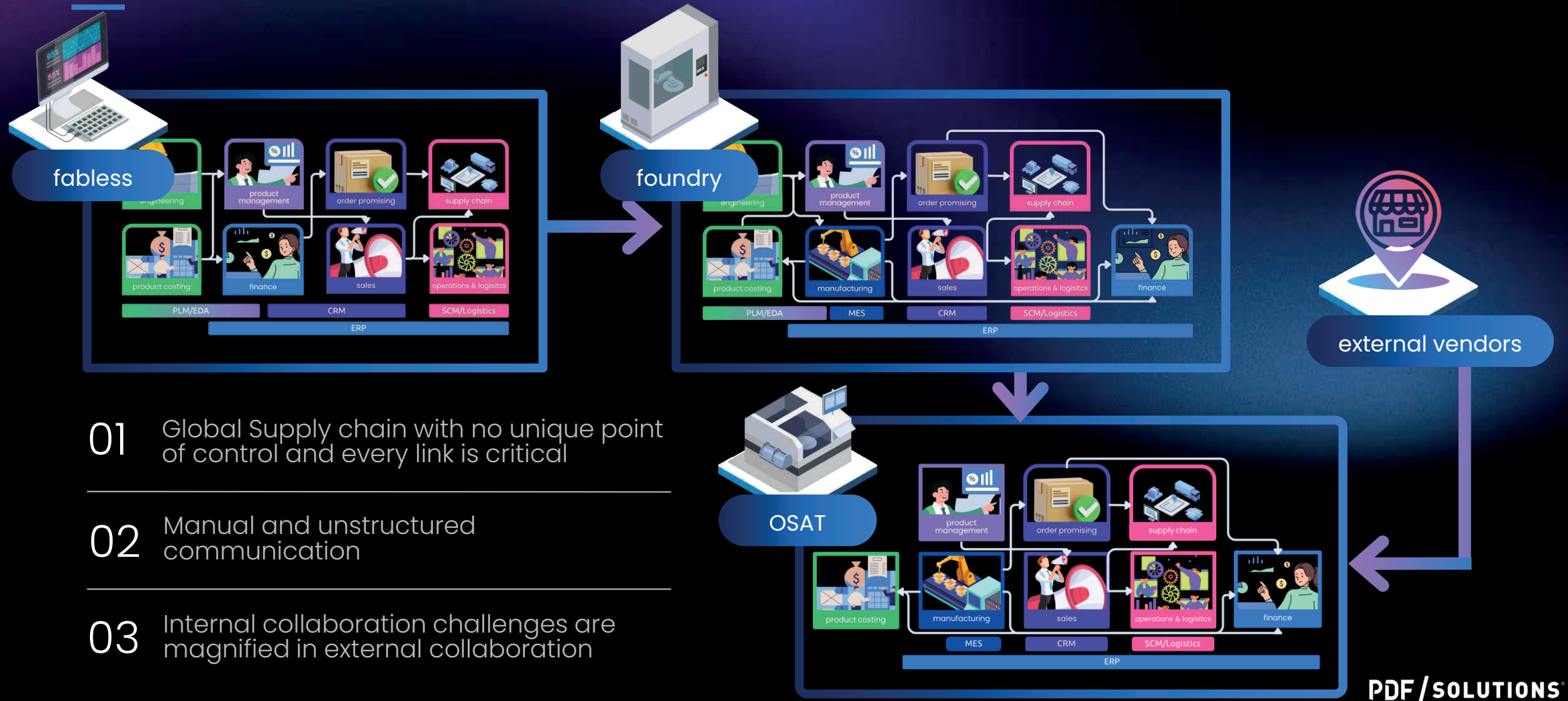
NEW REALITY

- **Real-time data sharing** across value chain
- **Complex, multi-party** orchestration
- **Ongoing**, automated by **AI**, operational **collaboration**

COLLABORATION WITHIN THE ENTERPRISE



COLLABORATION ACROSS THE SUPPLY CHAIN



FOUNDATION FOR AI-DRIVEN COLLABORATION



01 Secure data
infrastructure



02 Automated
orchestration



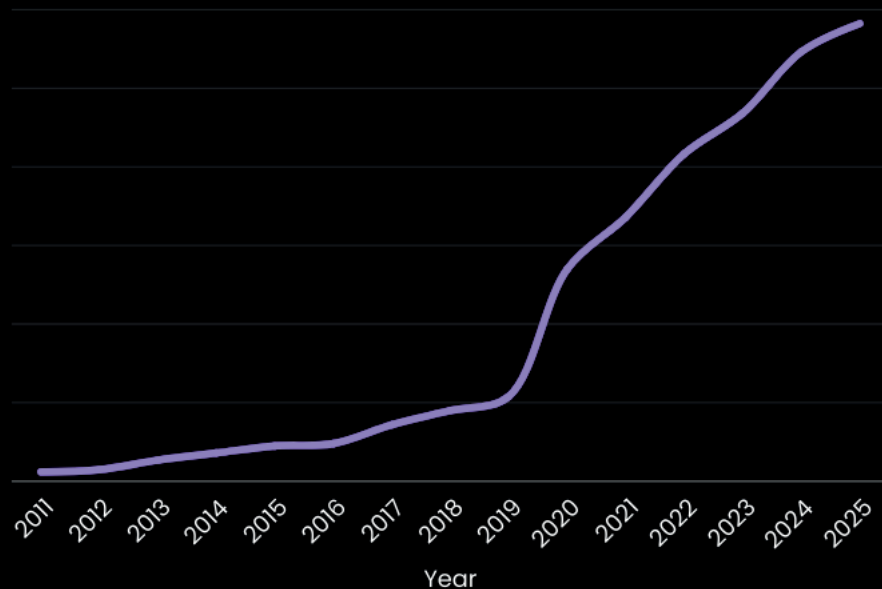
03 AI agents

01

SECURE DATA INFRASTRUCTURE

Exabytes of data exchanged
between **Fabs and OEMs** on the

 **secureWISE**™ network



**Data exchange
across the global
semiconductor
industry is
exploding**

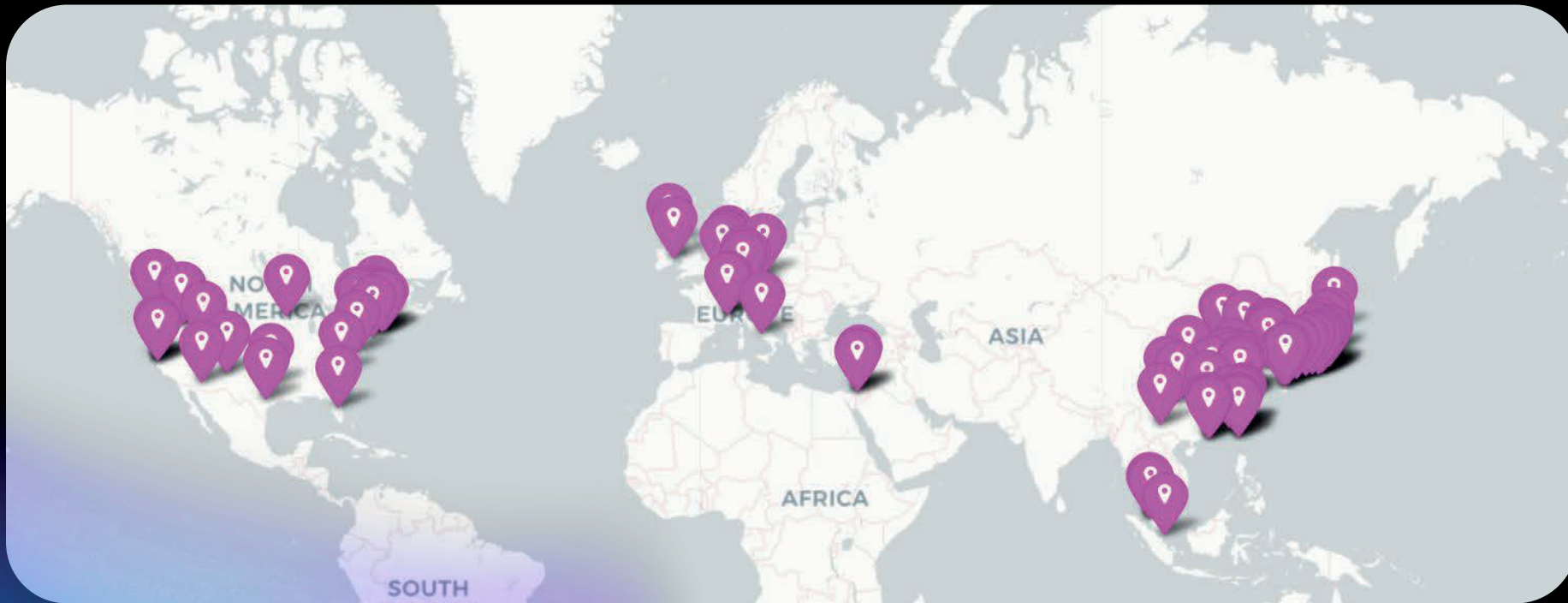
PDF/SOLUTIONS®

01

SECURE DATA INFRASTRUCTURE

THE SECURED DATA ACQUISITION NETWORK IS ALREADY IN PLACE

+300 manufacturing locations



OVER **100** OEMS
CONNECTED

ISO: **27001**

0 SECURITY BREACH
IN OVER **20** YEARS

PDF/SOLUTIONS®

01

SECURE DATA INFRASTRUCTURE

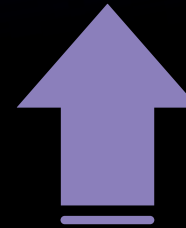


Secure remote connectivity for the semiconductor industry

01 End-to-end secure access
across private networks

02 Virus scan for secure equipment
software updates

03 Granular user permission for
remote control & optimization



OEM BENEFIT

**INCREASE SERVICE
REVENUE WITH AI**

**SECURE SOFTWARE
UPGRADES FOR EQUIPMENT**



FAB BENEFIT

INCREASE FAB UPTIME

**OPERATIONAL
EFFICIENCY**

PDF / SOLUTIONS

01

PDF/SOLUTIONS

SECURE DATA INFRASTRUCTURE

DATA FEED FORWARD



CAPTURE & TRANSPORT



DATA RECALL & ENGINEERING



TRANSFER



EDGE INTEGRATION

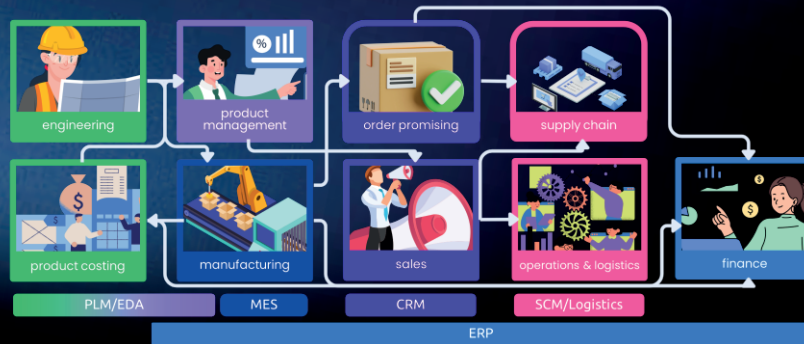
02

AUTOMATED ORCHESTRATION

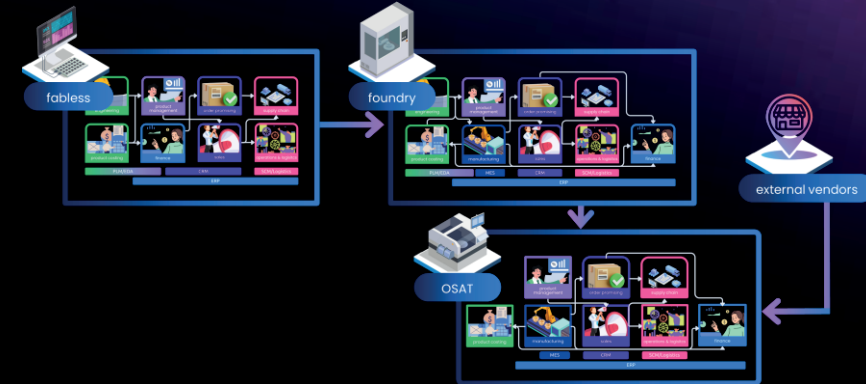
ORCHESTRATIONS

PDF/SOLUTIONS®

INTERNAL OPERATIONS



EXTERNAL OPERATIONS / OSAT



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.

01 **Test Flow:** automate test flow management

02 **Quality:** Streamline & automate quality assurance

03 **WIP:** real time WIP tracking & management



02

AUTOMATED ORCHESTRATION

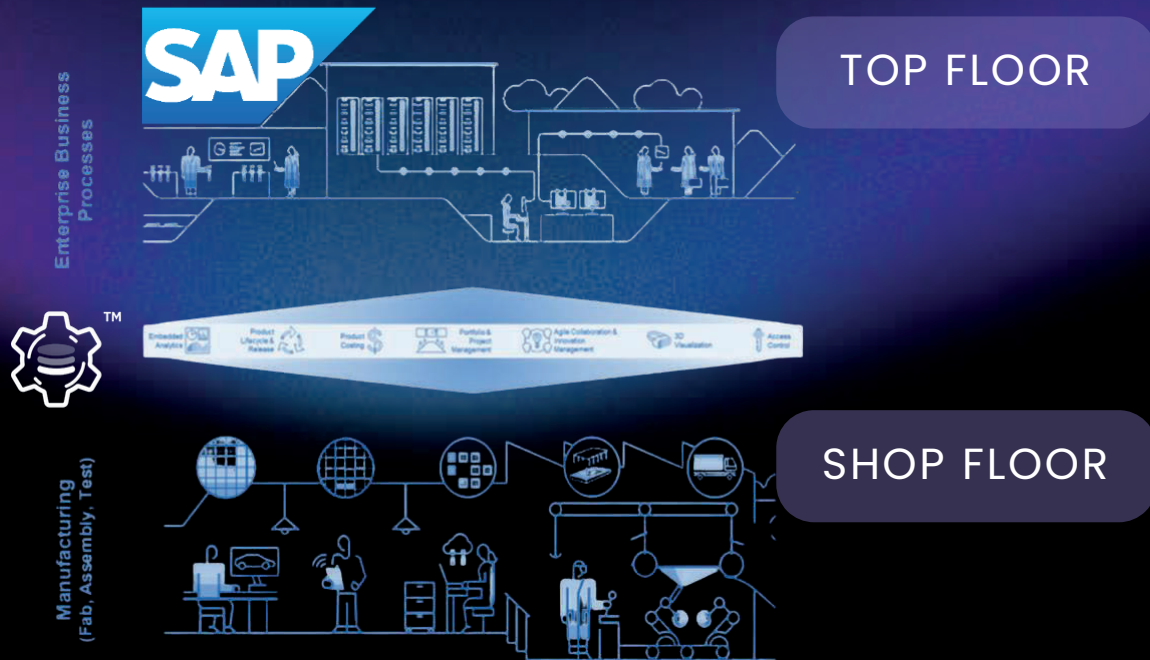
ALIGN & ABSTRACT DATA TO ACCELERATE DECISIONS

- 01 Use actionable manufacturing data to drive business decisions
- 02 Automate business processes within and across enterprises
- 03 Deploy and orchestrate AI agents to automate and accelerate decisions

PDF/SOLUTIONS®

AUTOMATED ORCHESTRATION

DRIVE ENTERPRISE PROCESSES WITH MANUFACTURING DATA



- 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

ORCHESTRATION EXAMPLES

PRODUCT COSTING

- 01. Monitor actual cost at process and equipment level
- 02. Reduce cost of non quality



Product
Costing
Dashboard

Consumable
Variance



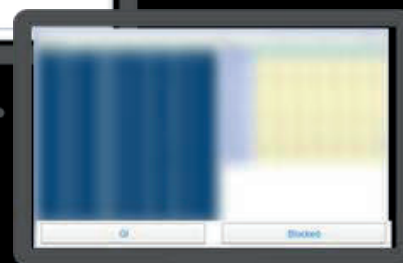
QUALITY SHIELD & RMA

- 01. Reduce defect root cause identification time
- 02. Contain risky material and Improve customer satisfaction



Lot
Genealogy
& RMA

Lot
Containment



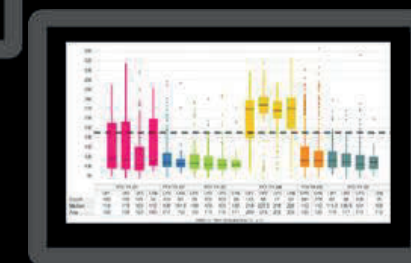
WIP MANAGEMENT

- 01. Real-time production control with integration to MES
- 02. Identify bottle-neck operations and improve on-time order fulfillment



Operation /
Step Time

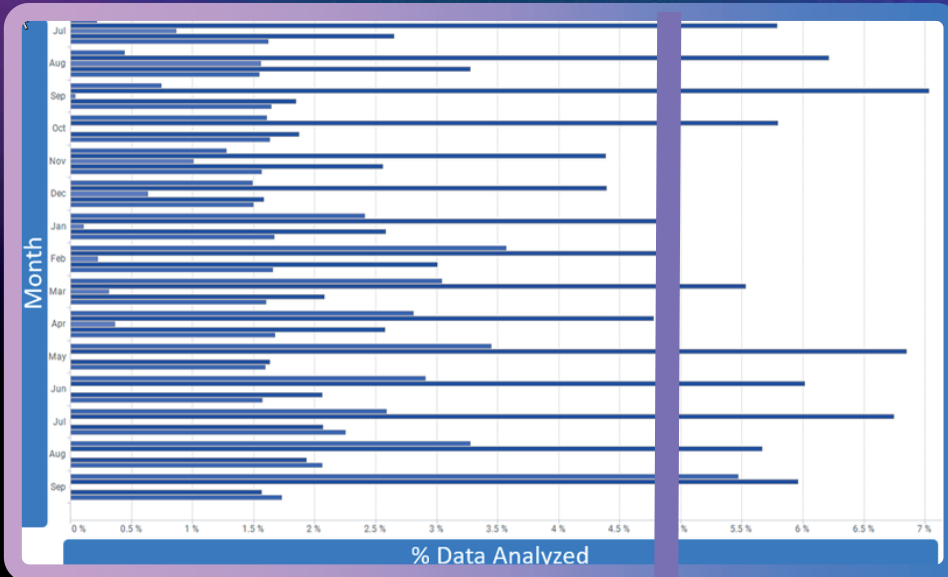
Operation /
Equipment /
Step Time



AI AGENTS

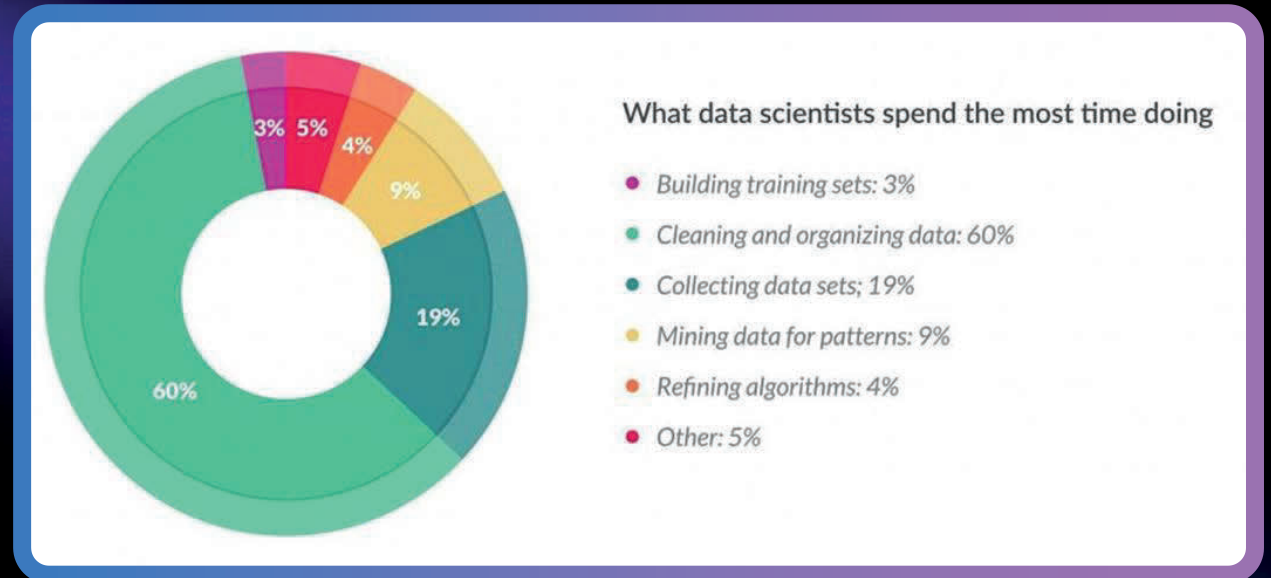
TODAY 5% TO 10% OF THE MANUFACTURING DATA IS ANALYZED USING CONVENTIONAL METHODS

THE AVALANCHE OF DARK DATA



% OF MANUFACTURING
DATA USED IN ANALYTICS

5%



80%
OF A DATA SCIENTIST TIME IS SPENT ON DATA
ALIGNMENT AND PREPARATION

03

AI AGENTS

HUMAN GOVERNANCE WITH AI EXECUTION



ENFORCE DATA QUALITY

Humans define standards; AI implements data quality



HUMANS SET COLLABORATION RULES

Define collaboration principles, data sharing, and security boundaries



AI EXECUTES AT SCALE

Operates autonomously within those boundaries, handling complex, high-volume tasks



CROSS-ORG GOVERNANCE

Fabs define vendor access and data protocols; AI manages daily execution

"Six out of ten enterprises plan to replace people-run services with software-run services before 2030"

HFS Study 2024

PDF/SOLUTIONS®

03

AI AGENTS

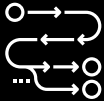
GUIDED ANALYTICS (GA)



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

RENESAS
PDF/SOLUTIONS®

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](#)

02

AI AGENTS

AI-DRIVEN TEST SOLUTIONS

PREDICTIVE TEST

PREDICT FUTURE
TEST RESULTS

Spend test \$ on units
that need them most

PREDICTIVE BURN-IN

PREDICT WHICH
BURN-IN WILL PASS

Eliminate costly
burn-in

PREDICTIVE BINNING

PREDICT WHICH
TESTS WILL FAIL

Find failures early

ENABLED BY SECURE INTEGRATED DATA FEED FORWARD INFRASTRUCTURE



Connect entire supply chain with existing global Data Exchange network infrastructure



Automate business processes, get humans out of the loop



Deploy **AI** close to the data, make use of **all the data** to drive **insights and actions**

Thank You

PDF/SOLUTIONS®

www.pdf.com



INSTAGRAM
@pdfs.Inc



TWITTER
@pdf_solutions



FACEBOOK
pdfsolutionsinc



LINKEDIN
@pdf-solutions



WECHAT
@pdfs_cn



YOUTUBE
@pdf_solutions