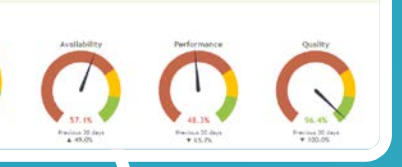
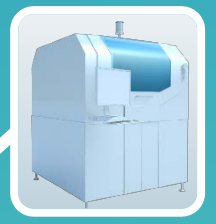
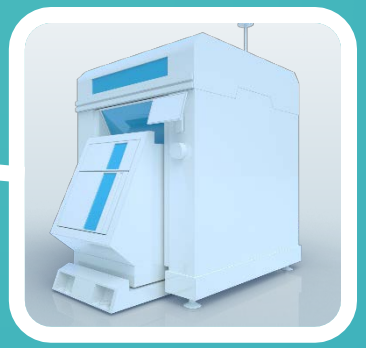
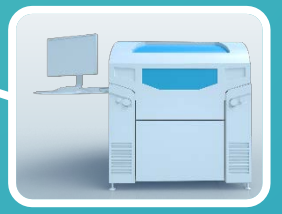
SIEMENS
Ingenuity for life





valor
IoT Solutions





Mentor®
A Siemens Business

Alignment with market standards

SIEMENS
Ingenuity for life

LEVEL 4
- Establishing the basic plant schedule – production, material use, delivery and shipping
- Determining inventory levels

Business planning & logistics

ENTERPRISE

LEVEL 3
- Workflow / recipe control – stepping the process through states to produce the desired end products
- Maintaining records and optimizing the process

Manufacturing **operations** mgmt.

MES

LEVEL 2
Monitoring, supervisory control and automated control of the production process

Batch control

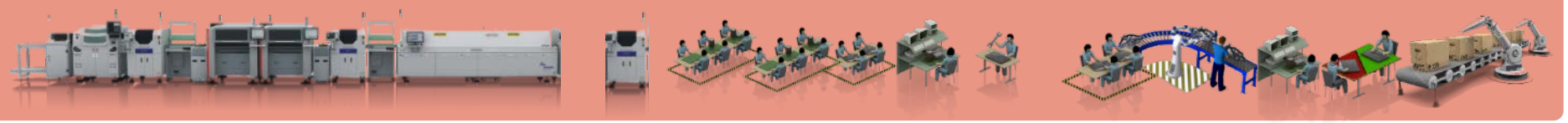
Continuous control

Discrete control

SCADA

LEVEL 1
Sensing & manipulating the production process

LEVEL 0
Actual production process



Valor: Intelligence from Shop Floor to Enterprise

SIEMENS
Ingenuity for life

LEVEL 4
- Establish
  producti
- Determin

LEVEL 3
- Workflow
  through s
- Maintain

LEVEL 2
Monitoring
automated

LEVEL 1
Sensing & r

LEVEL 0
Actual production process

BI - Business Reporting & Analytics

MSS - MES Applications

Valor IoT - Data acquisition & Control

OML
Data
Exchange

ENTERPRISE

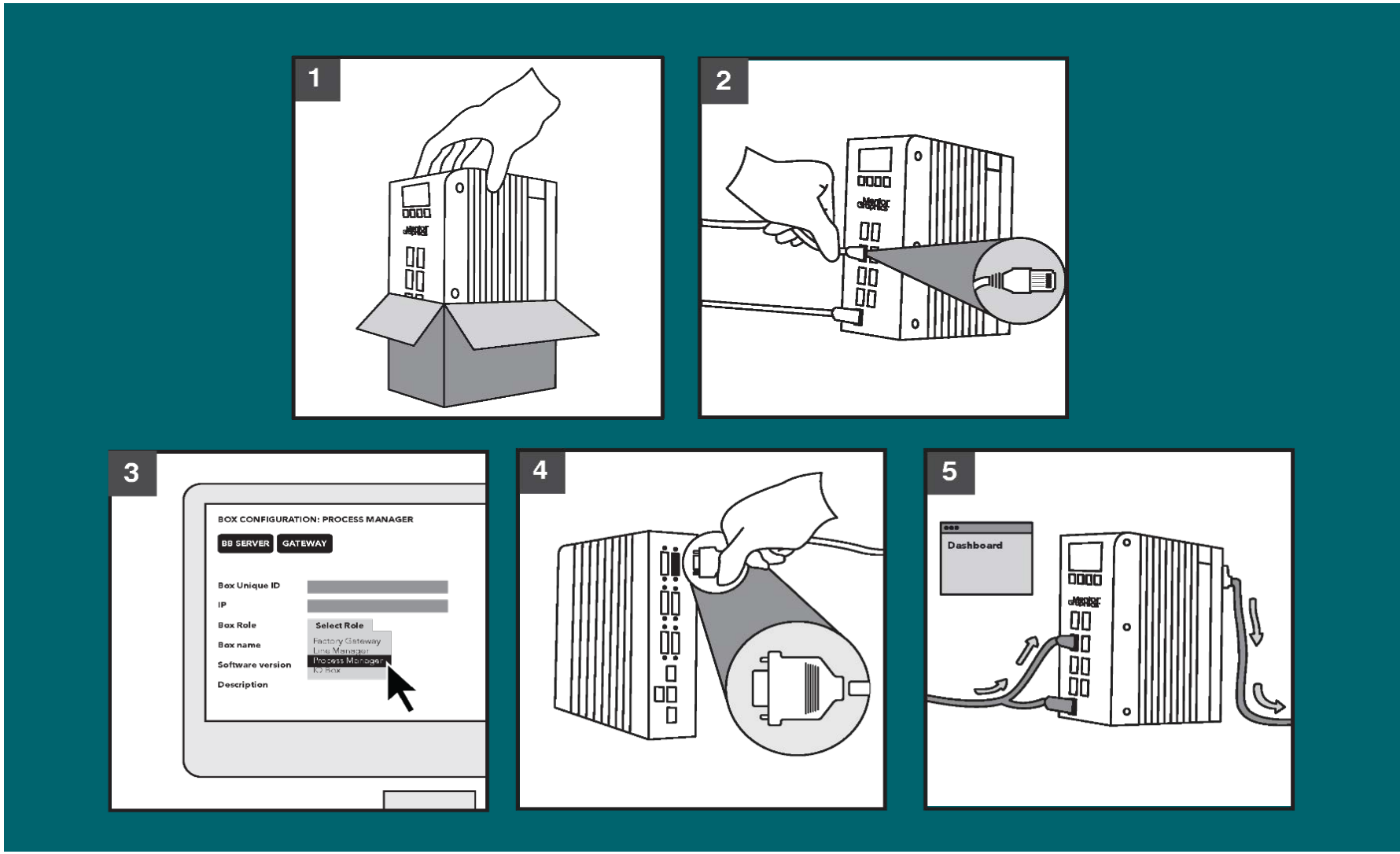
MES

SCADA

Data acquisition and normalization

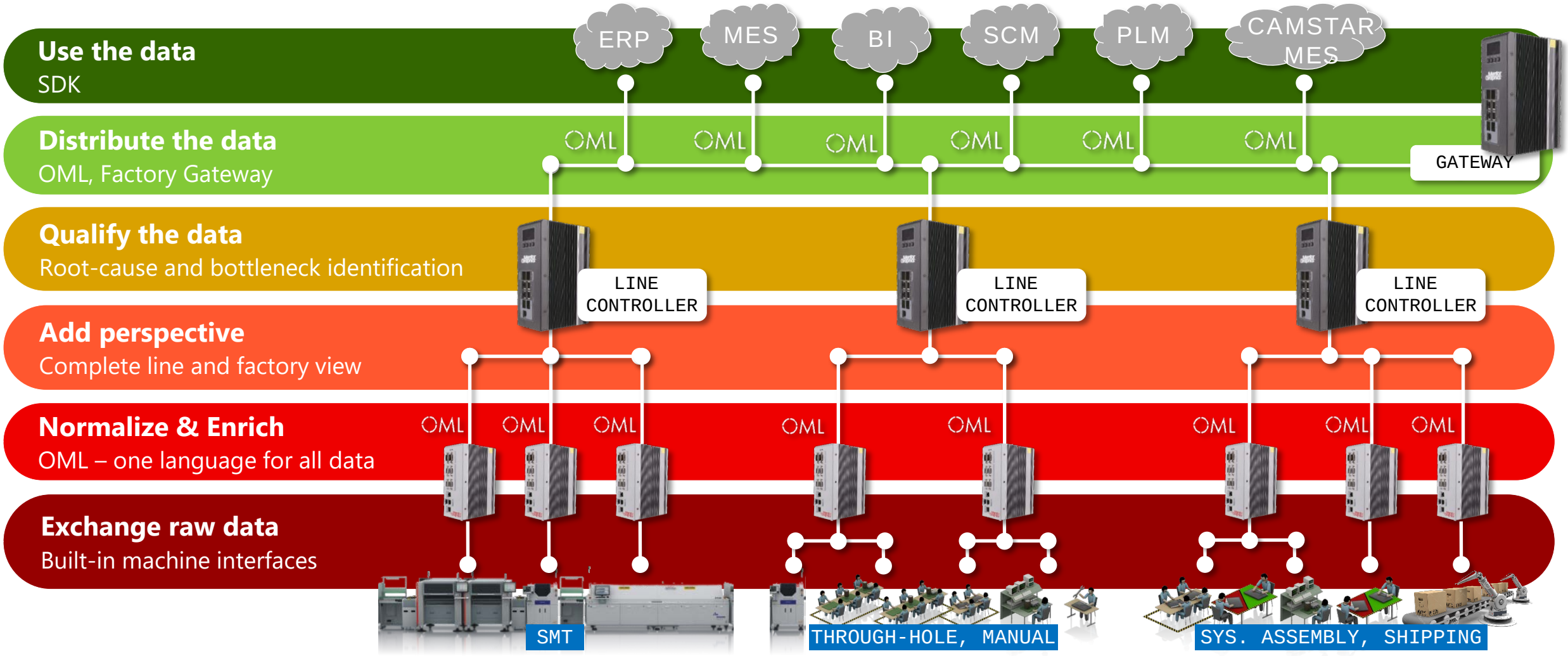
SIEMENS
Ingenuity for life

- Easy connection between enterprise solutions and the shop-floor
- Automatically normalizes data into Open Manufacturing Language (OML)
- Connect new and legacy machines
- Robust, with high data integrity and security
- Plug-and-play, independent, scalable
- Cost effective, easy deployment



Valor: Intelligence from Shop Floor to Enterprise

SIEMENS
Ingenuity for life



Valor IoT Manufacturing

Based on 15+ years of industry experience

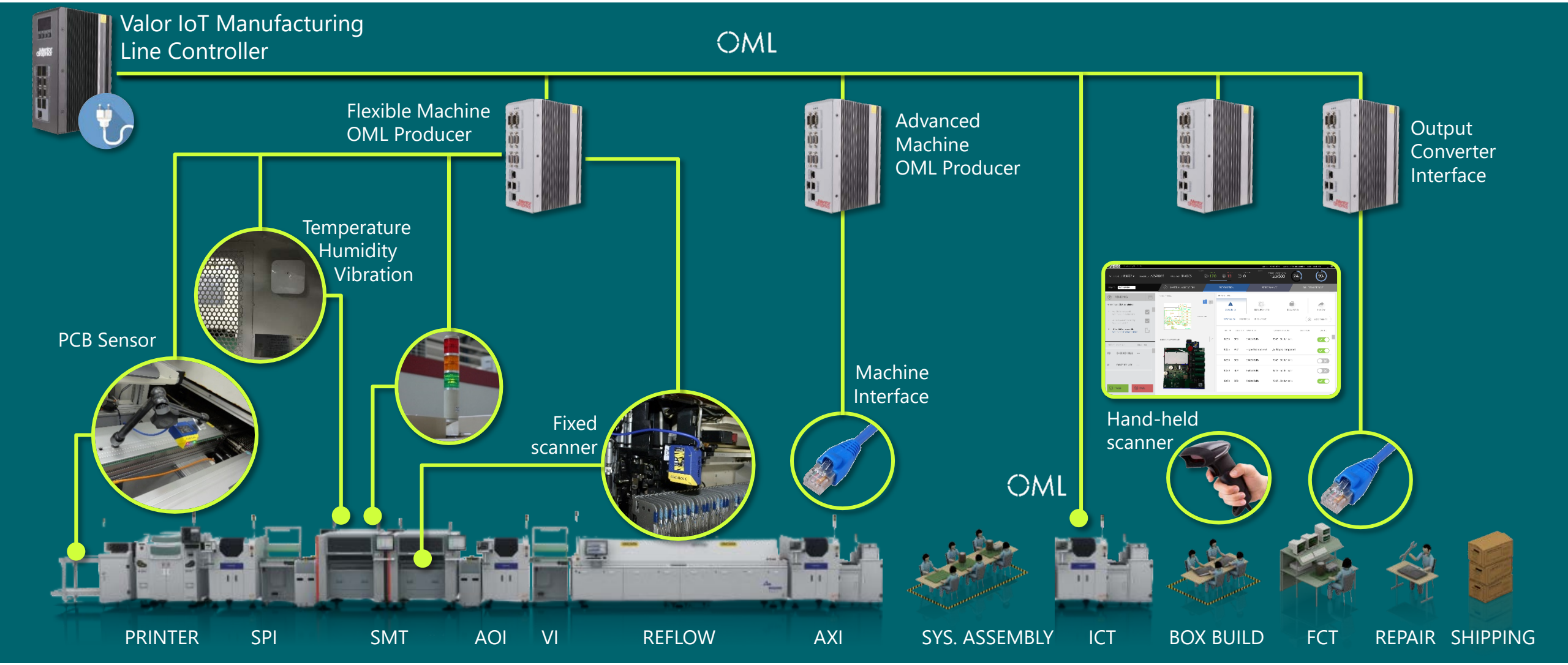
SIEMENS
Ingenuity for life

- ✓ **Built-in interfaces** to majority of automated & manual stations
- ✓ **Machine & process control**
- ✓ **Deliver complete, accurate data**
- ✓ **High data integrity & security:**
  - 3-day data retention
  - Built-in power reserve
  - Automated data recovery in case of application or network failure
- ✓ **Plug & Play deployment:**
  - Distributed architecture - Highly scalable
  - Built-in PoE
  - Built-in network switch

- ✓ **Open Manufacturing Language** – Free, open Internet of Manufacturing communication standard
- ✓ Features **bi-directional data flows** for real-time shop-floor data and process control
- ✓ www.omlcommunity.com

- ✓ Available for .Net and Java
- ✓ Includes samples, simulation tools, documentation
- ✓ Offers data subscription & filtering methods

Physical line connections



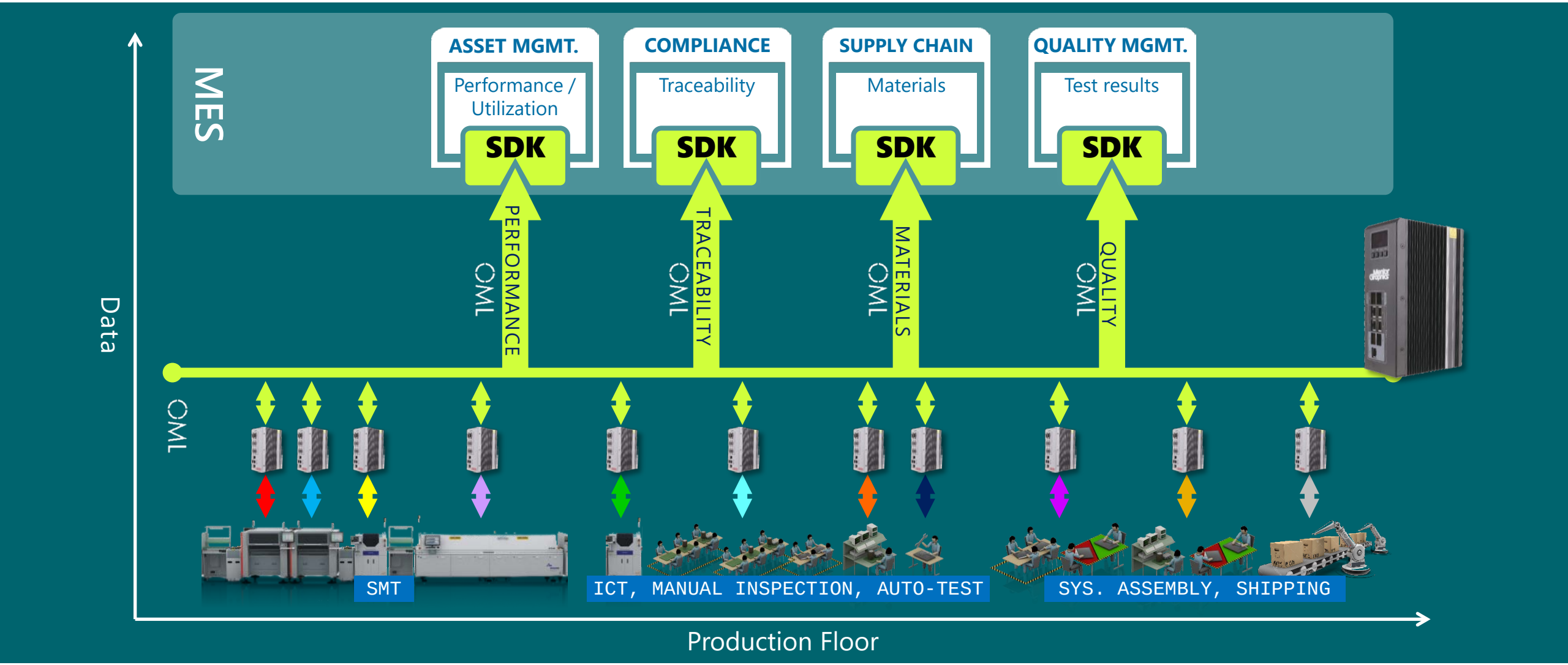
Advanced interfaces for majority of machines on the market

- Additional advanced interfaces are frequently added - contact us for the latest list
- Additional machines and manual processes are supported through flexible and generic interfaces (sensors, scanners, light towers, etc.)

Pick & Place	FUJI, Panasonic, Kulicke & Soffa, ASM Assembly Systems, Assembléon, SAMSUNG, MYCRONIC, JUKI, YAMAHA
Test & Inspection	Koh Young Technology, CyberOptics, TAKAYA, Orbotech, GOPEL electronic, SPEA, Agilent Technologies Innovating the HP Way, VISCOM vision technology, OMRON, YAMAHA, marantz, SIEMENS, Seica, KEYSIGHT TECHNOLOGIES, VI TECHNOLOGY, TRI innovation
Printers	DEK, NTN, Speedline technologies

Valor IoT Manufacturing: OML & SDK

SIEMENS
Ingenuity for life



Valor IoT Manufacturing & OML Applications

SIEMENS
Ingenuity for life

Closed-loop feedback systems
Quality, productivity, performance, flexibility

Opportunity to utilize live shop-floor data in “big data” applications –
Asset utilization, productivity, performance

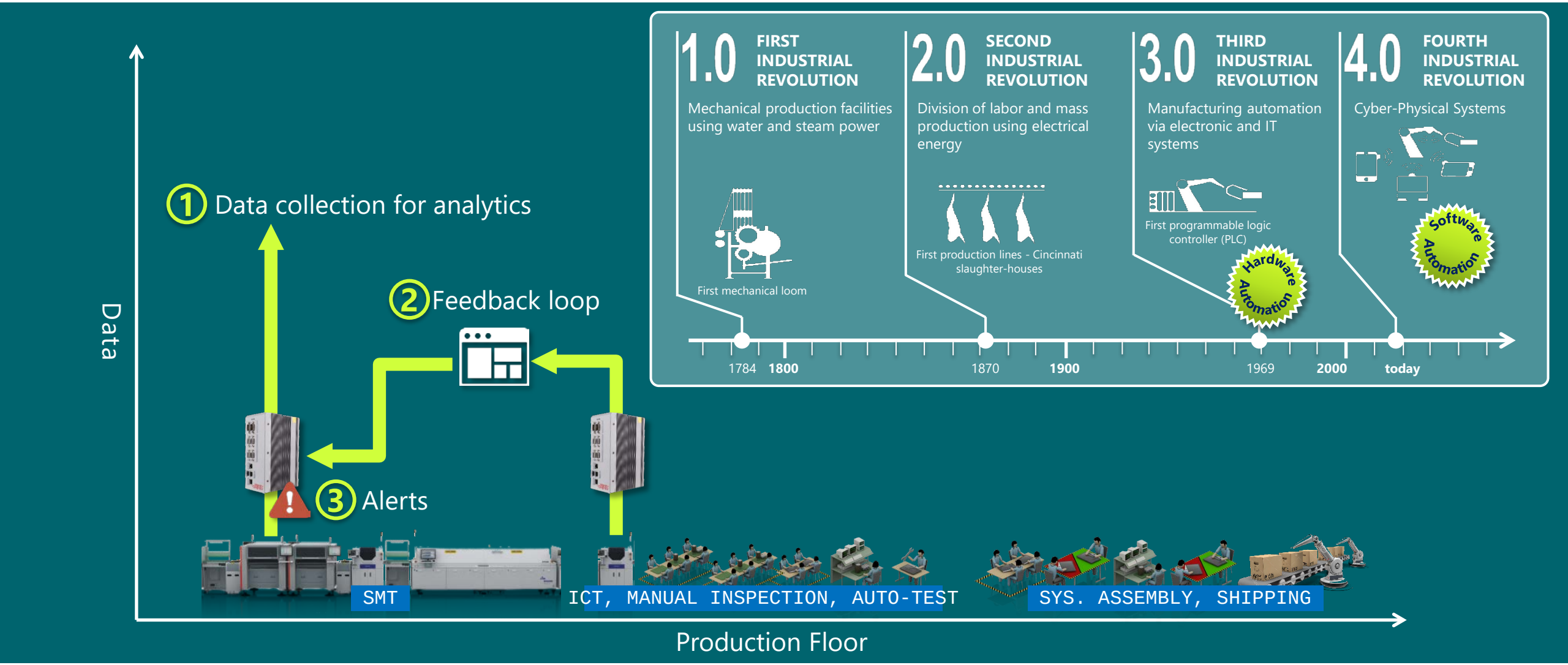
Accurate and live material consumption and spoilage
Inventory accuracy, Just in time logistics, full material traceability

Precise control and visibility for planning and resource management –
Management and automated decisions based on facts

Process level conformance, compliance and process traceability, poka-yoke control
Automated, accurate, timely and precise, active quality management

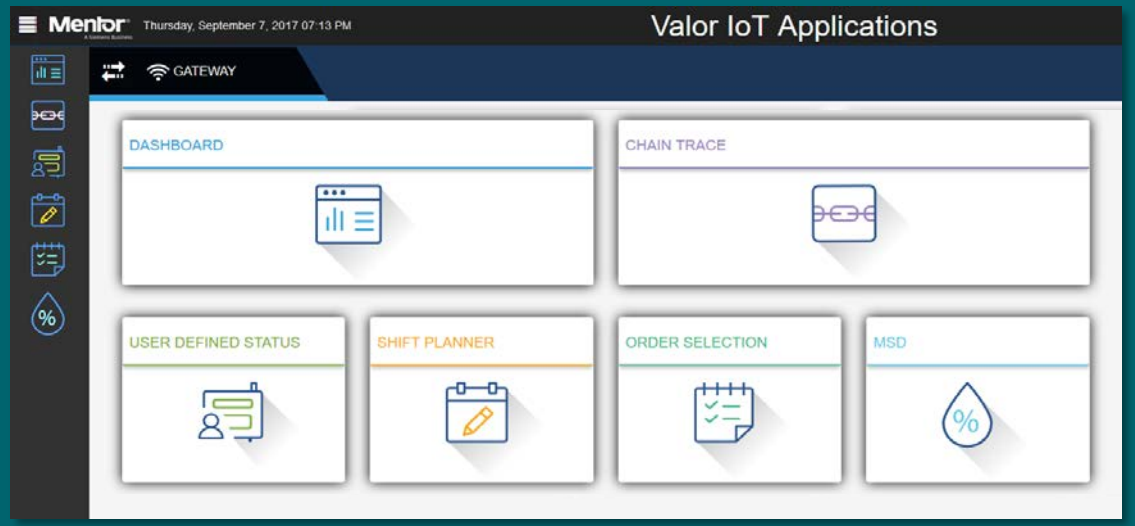
Enabling *Industry 4.0* implementation

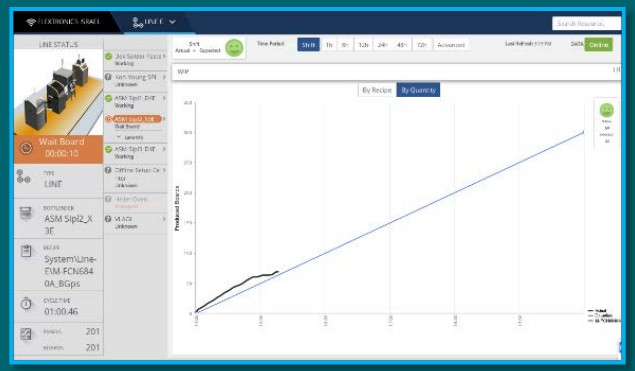
SIEMENS
Ingenuity for life

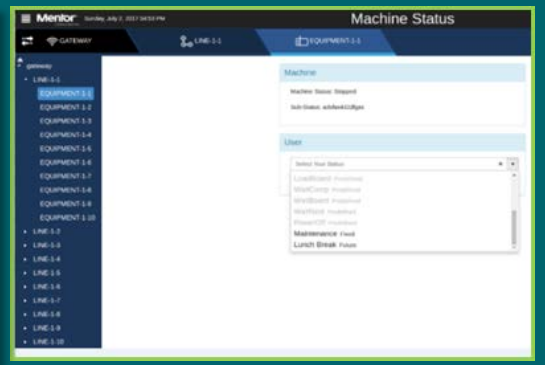


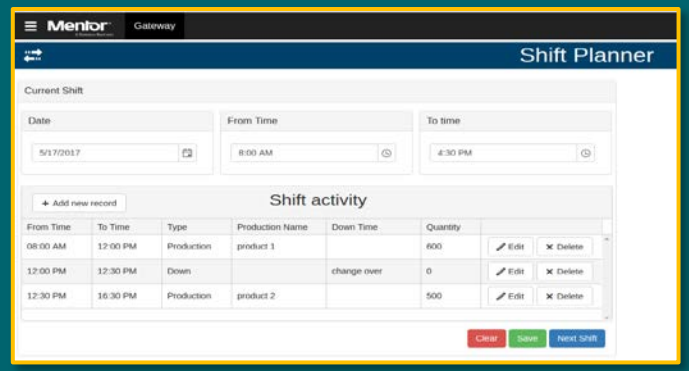
IoT Applications

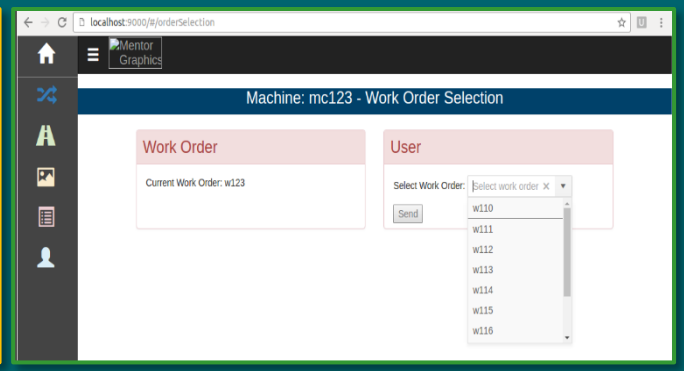
IoT Application Portal











Live shop-floor performance monitoring

SIEMENS
Ingenuity for life

Real-time collection of event data from machines and processes

- ✓ Robust connection to hundreds of machine models and manual processes (including flexible interface for non-mainstream machines)
- ✓ Advanced API allows data access by 3rd-party applications

Improvement of asset utilization through bottleneck identification

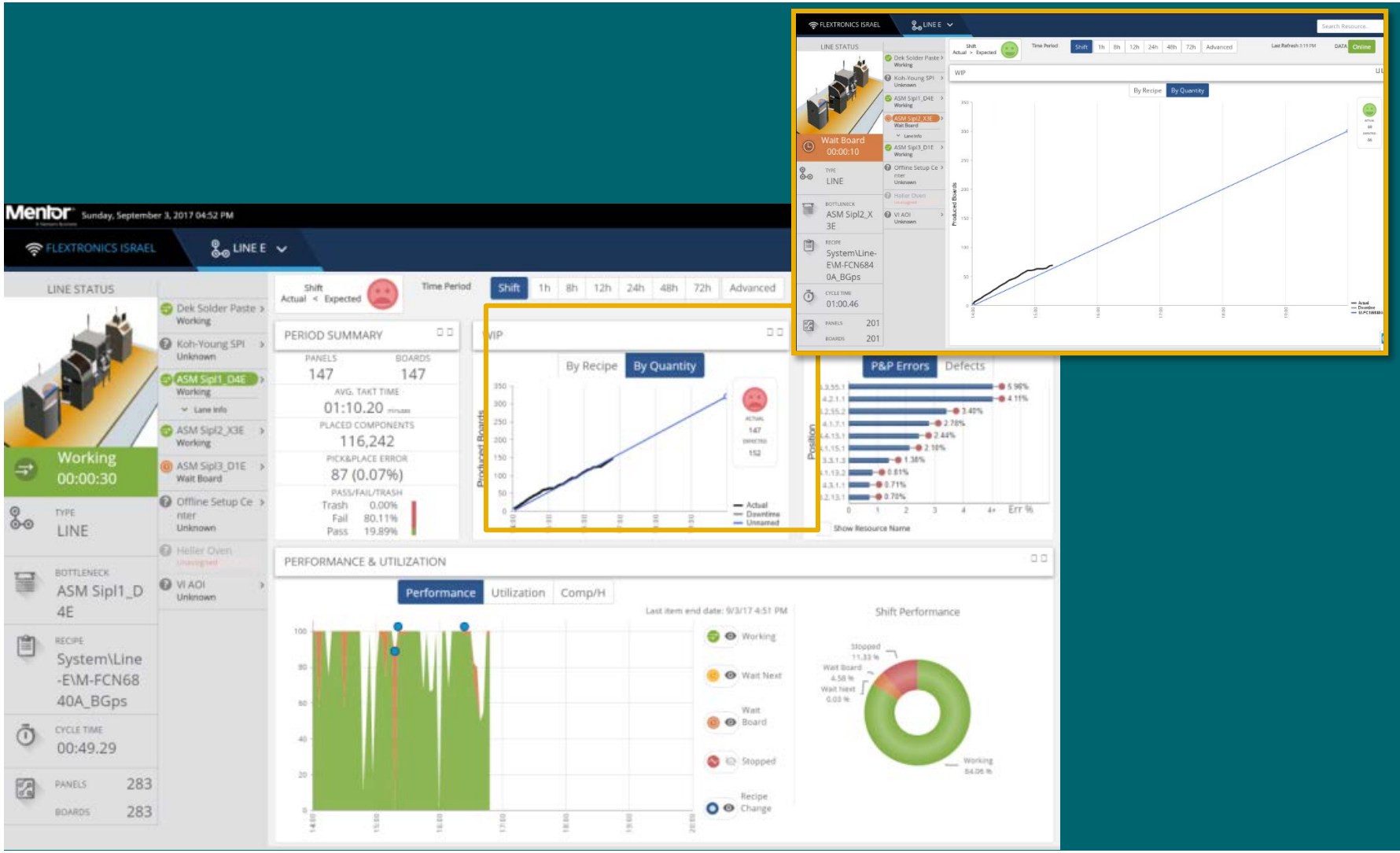
Processes can be stopped automatically if feeder performance drops below predefined threshold

Normalized key performance indicators (KPIs) for all lines and machines

- ✓ Customizable real-time reports and dashboards
- ✓ Optional Business Intelligence reporting (OEE, Yield, etc.)

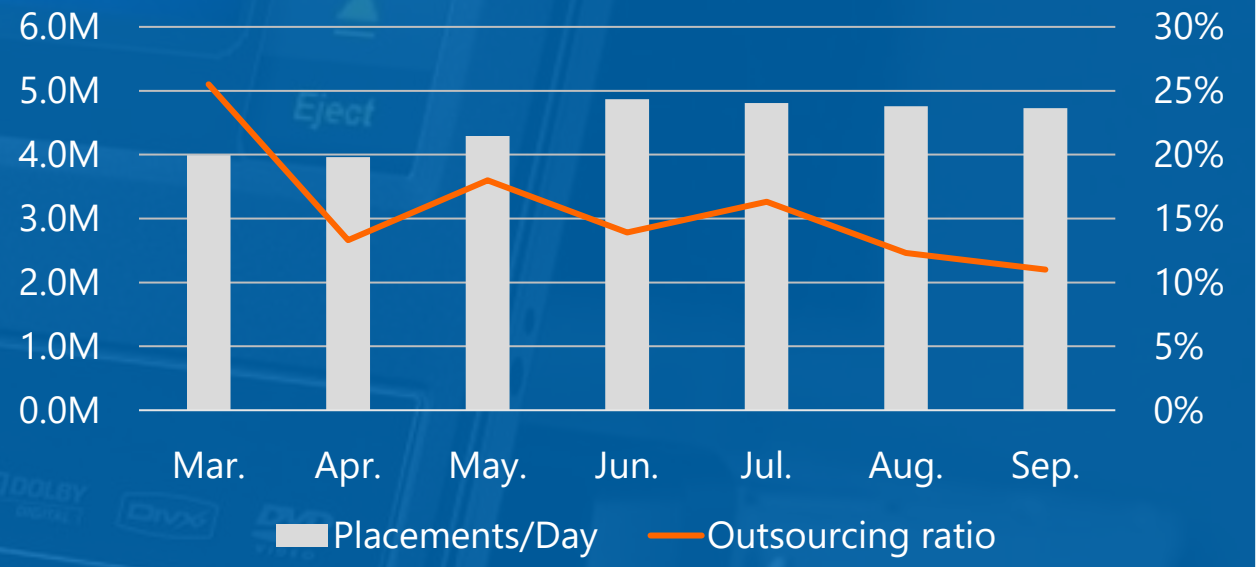
Real Time Performance Dashboard

- Factory/Line/Machine/module
- Fully configurable
- Performance KPIs
- Product flow visibility
- Test results & statistics
- Process status



Japanese Automotive Electronics OEM

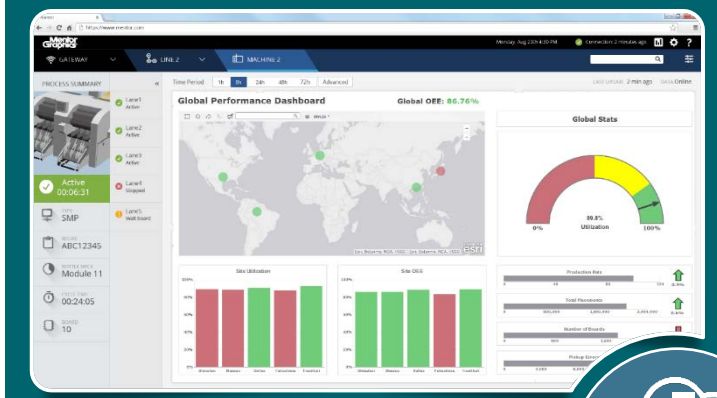
- ✓ 20% increase in asset utilization
- ✓ 45% increases in production capacity (reduction in outsourcing)
- ✓ Potential savings of ~$1M per year



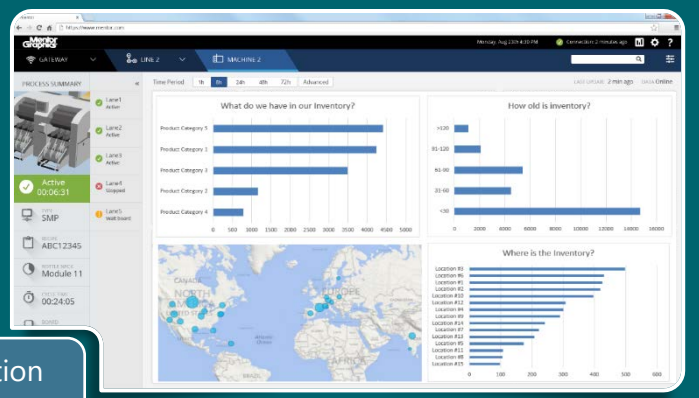
Manufacturing Analytics

SIEMENS
Ingenuity for life

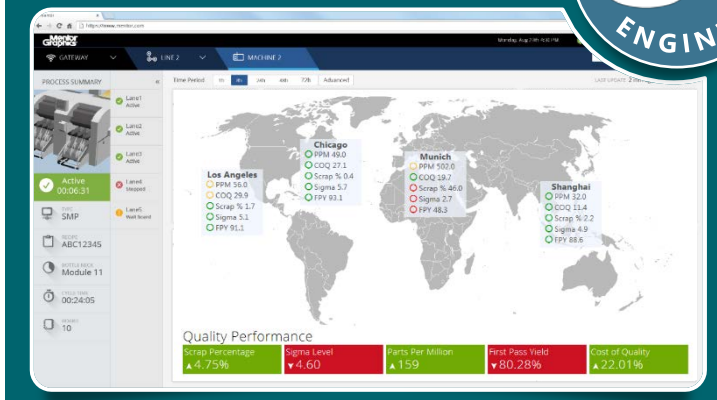
- **Asset Management** - Accurate, real-time utilization and OEE
- **Traceability** – Capture and investigate complete material and process traceability data for individual PCBs as well as full system assemblies, using high-availability big-data storage
- **Operation & Labor** – Measure and analyze how resources are spent, and track WIP in real-time
- **Quality control** – Identify and analyze process and material failures and drive continuous improvement
- **Design-to-Manufacturing flow** - Detect factors affecting yield and point out areas for improvement



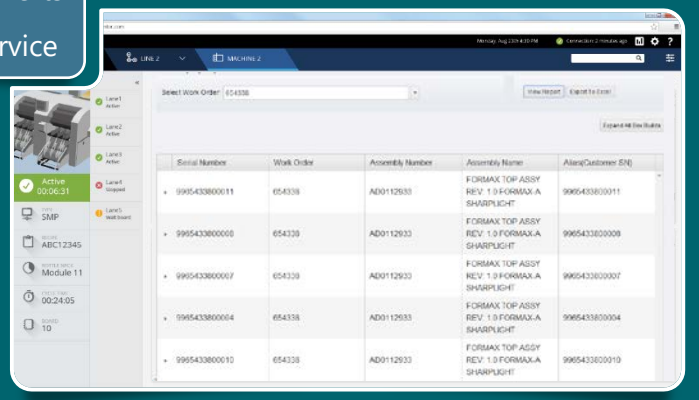
PERFORMANCE



SUPPLY CHAIN



QUALITY



TRACEABILITY

ENGINE

- ✓ Enterprise solution
- ✓ Big-Data analytics
- ✓ Forecasting & Alerts
- ✓ Intuitive self-service

Manufacturing Analytics - Performance and OEE

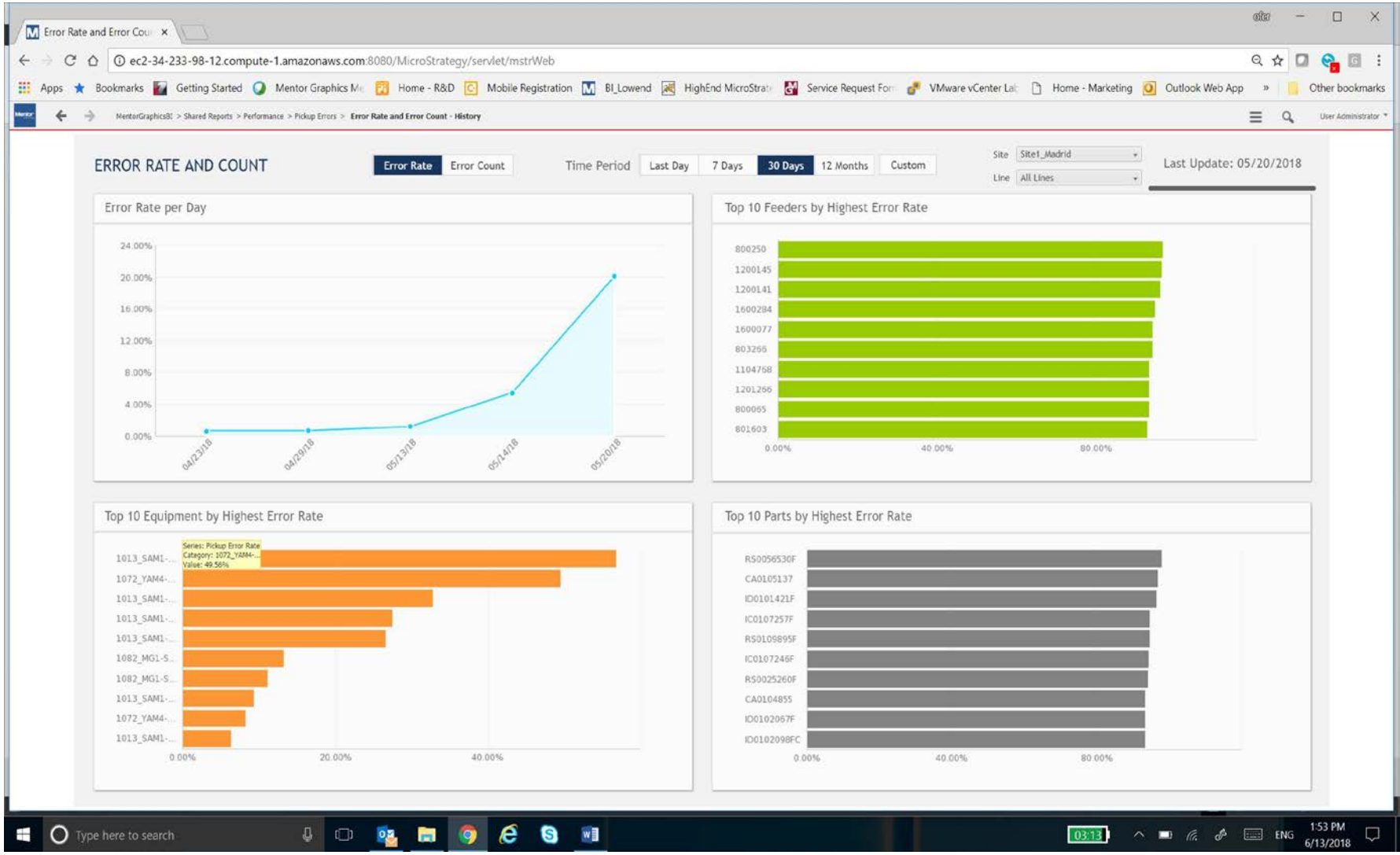
SIEMENS
Ingenuity for life

- Site/line/machine performance and utilization
- Calculated OEE dashboards
- Drill-down capabilitaies
- Trend analysis

Feeder performance fully integrated to Feeder Maintenance solution

SIEMENS
Ingenuity for life

- Monitor real time feeder performance, provide operator with alert and guidance
- Automatically stop the machine if feeder error rate exceeds predefined threshold
- Historic view of feeder performance, error code, etc.



Valor Material Management

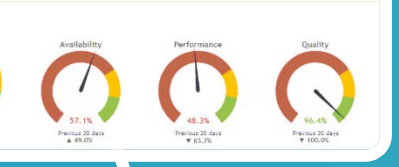
Industry-first integrated shop-floor and supply chain solution

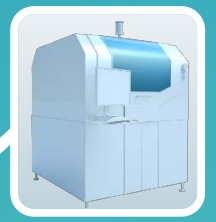
SIEMENS
Ingenuity for life

- Manage all material logistics in the factory: registration, storing, picking verification and traceability
- Deliver materials to the line when needed – eliminate excess WIP, improve inventory turnover
- Prioritize material selection at warehouse (open/older reels)
- Automatic communication with storage towers
- Group setup – minimize change-over of materials / feeders

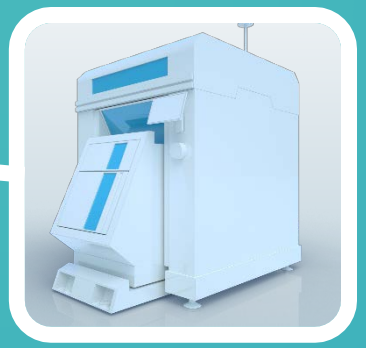
BEFORE

AFTER



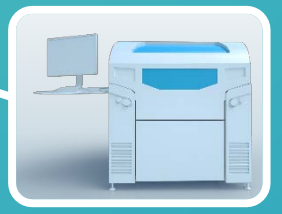


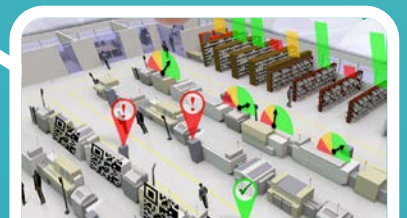
Thank You



Your business support team:

- **Business Development** - Oren Manor (oren_manor@mentor.com)
- **Product Management** - Ofer Lavi Ben David (ofer_lavibendavid@mentor.com)





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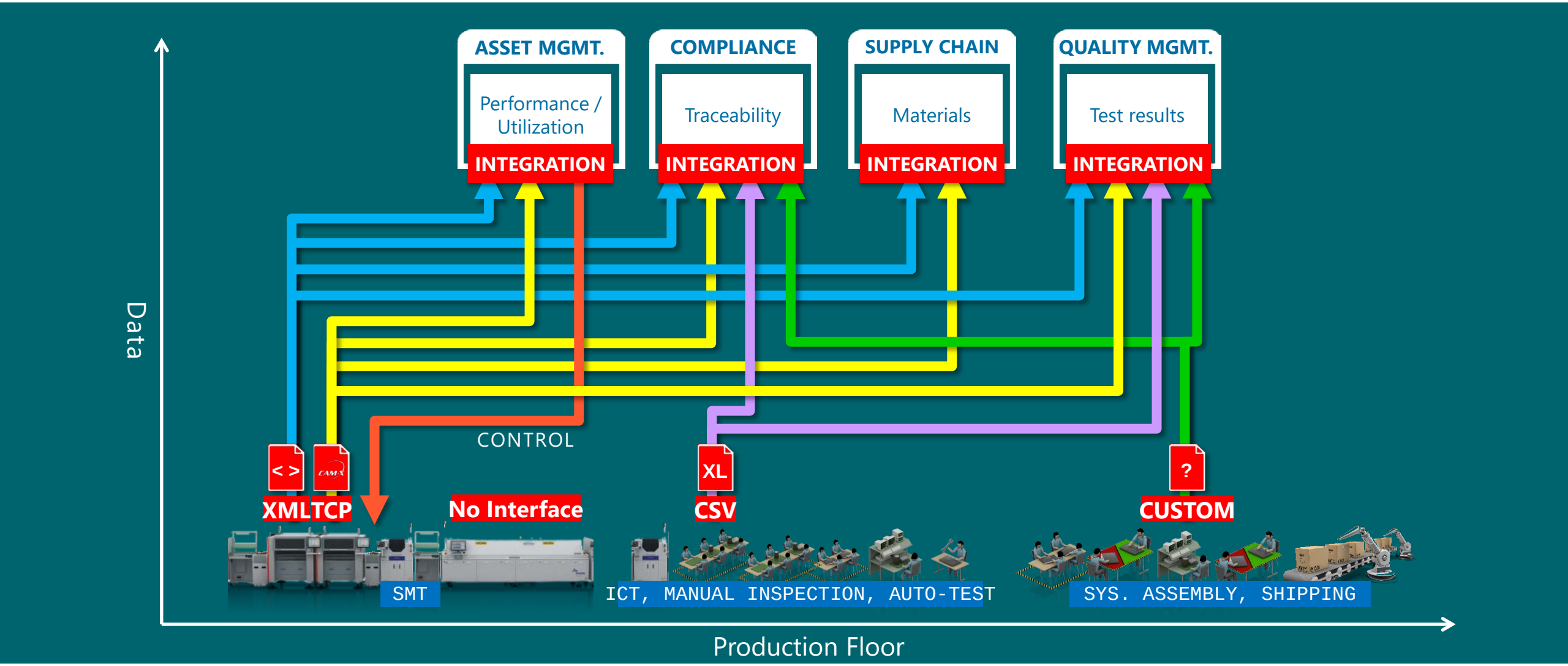
Mentor®
A Siemens Business

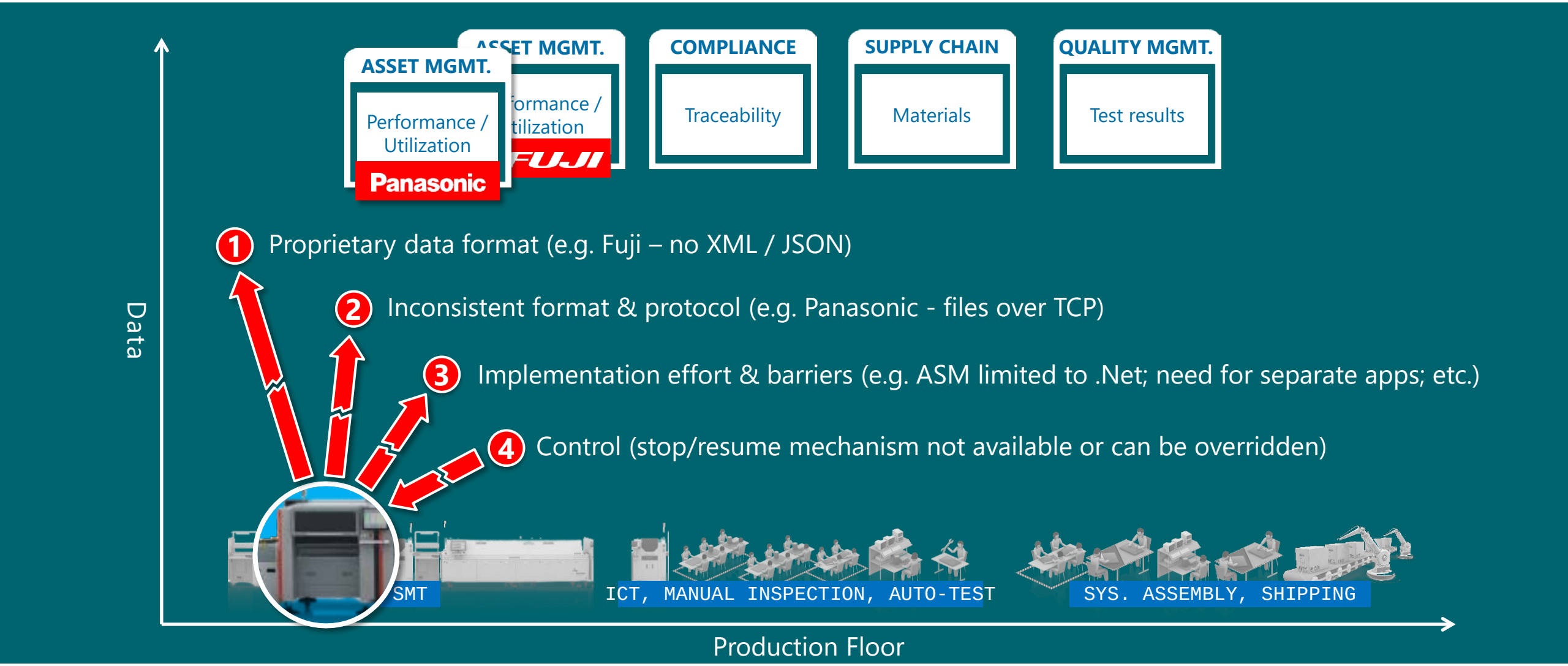
The complexity of existing shop-floor data delivery

Variety of machine interfaces, consistent & complete data delivery, bandwidth, integration effort



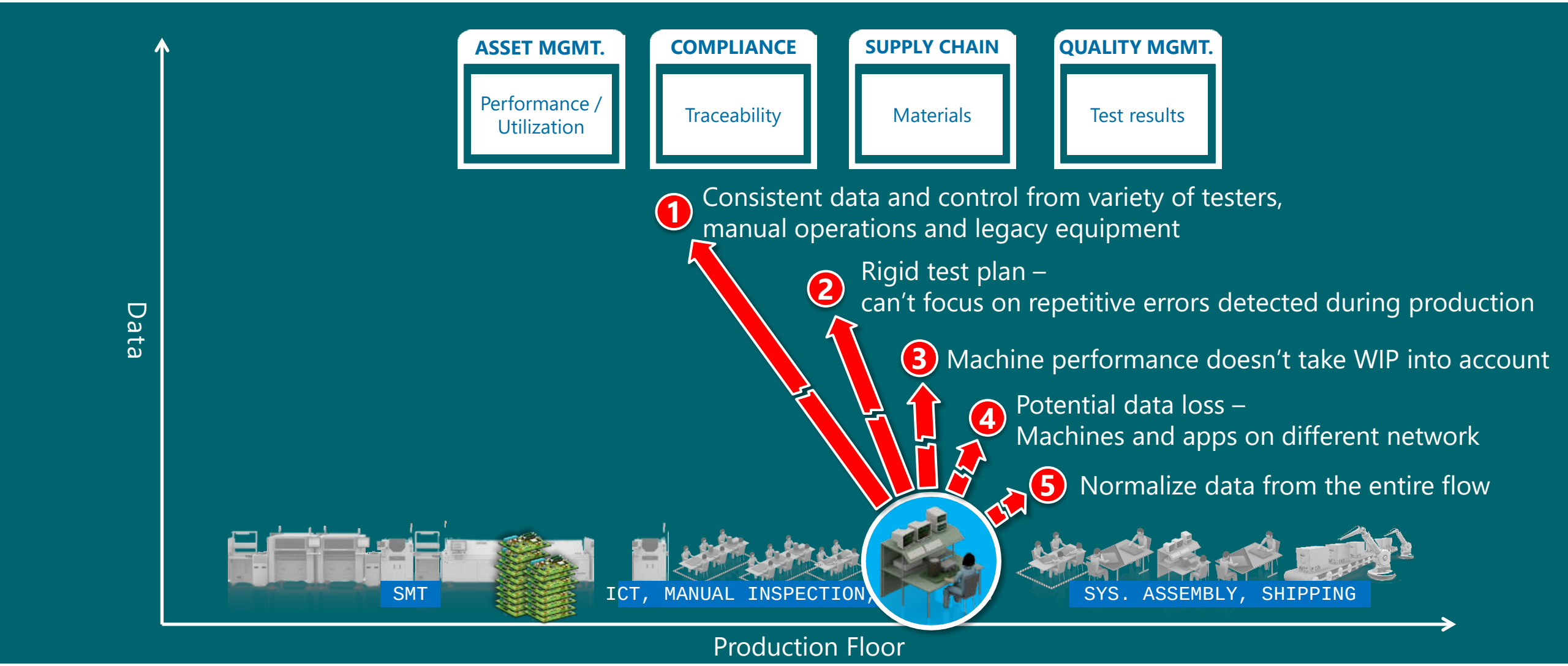
The complexity of existing shop-floor data delivery

SMT: data format, consistency, application integration, machine control



The complexity of existing shop-floor data delivery

Post-SMT: process traceability, rigid test plan, complete line performance, data loss



The complexity of existing shop-floor data delivery

Enterprise: data & application integration

SIEMENS
Ingenuity for life

Use the data (integration with applications)

Distribute the data

Qualify the data (what is the problem?)

Add perspective (where is the problem?)

Interpret and normalize the data

Capture raw data

ERP MES SCM PLM

ASSET MGMT.	COMPLIANCE	SUPPLY CHAIN	QUALITY MGMT.
Performance / Utilization	Traceability	Materials	Test results

SMT

ICT, MANUAL INSPECTION, AUTO-TEST

SYS. ASSEMBLY, SHIPPING

Production Floor

SPU hardware specification

Dimensions	185mm x 185mm x 60mm
Operating system	Linux
CPU	Intel® Celeron™ J1900 Quad core
Memory	8GB RAM + SD Card
LAN	6 x (10/100 Base-T), 3 x PoE SE
Wireless	WiFi (optional)
HDMI	Yes
Inputs/Outputs	No
USB	X2, 1 USB3
COM	No
Operating input	90V – 250V
LED status indicators	LCD Screen, External Power, Broadcast
Regulatory Approvals	EMC: CE (EN55022 Class A, EN55024) FCC (Part 15 Subpart A) Conducted EMI CISPR/FCC Class B ROHS II directive (2011/65/EC)

DAU hardware specification

Dimensions	125mm x 125mm x 40mm
Operating system	Linux
CPU	Intel Celeron™ Dual core N2807
Memory	2GB RAM + SD Card
LAN	2 x (10/100 Base-T); 2 x PoE SE
Wireless	Wi-Fi (optional)
HDMI	Yes
Inputs/Outputs	6 in / 6 out - optically isolated
USB	2 USB , 1 USB3
COM	x2 RS 232 optically isolated w. independent 12V power for peripherals
Operating input	PoE powered device + Optional 50V DC input
LED status indicators	External Power, IO, Error
Regulatory Approvals	EMC: CE (EN55022 Class A, EN55024) FCC (Part 15 Subpart A) Conducted EMI CISPR/FCC Class B ROHS II directive (2011/65/EC)