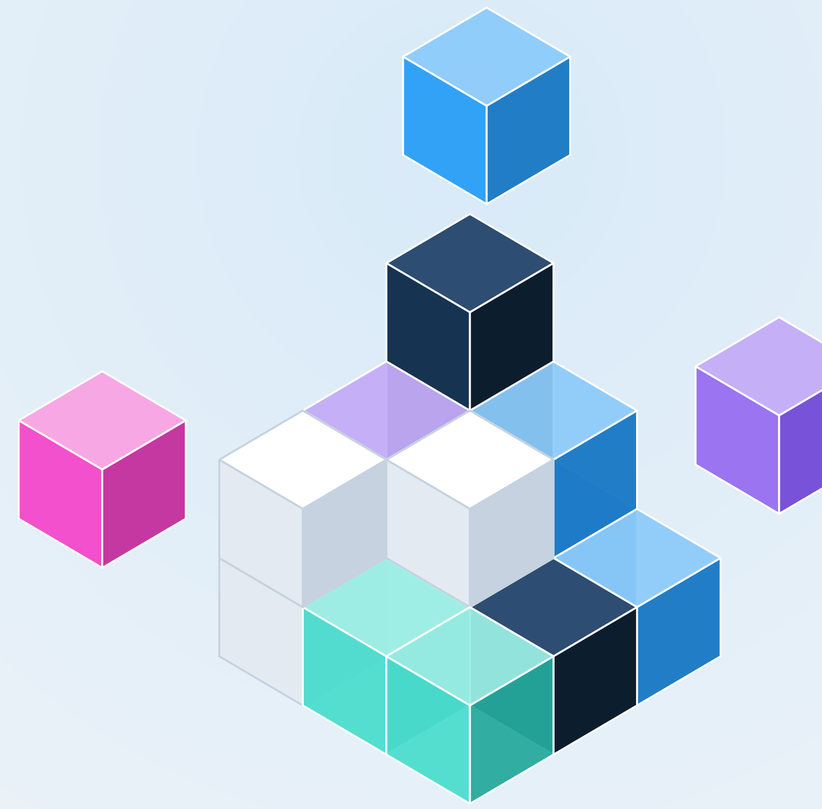
DIGITAL OPERATIONS

The Industrial Systems Landscape



The industrial systems landscape is the set of software layers that run a manufacturing business, from ERP, CRM and PLM at the top to MES, WMS and the controls on the shop floor.

01 THE CORE MODEL

ENTERPRISE ARCHITECTURE · ISA-95 LEVELS

LEVEL 4	**ERP · CRM · PLM/PDM**	Orders, finance, customers, product data
LEVEL 3	**MES · WMS · QMS**	Execution, warehouse, quality records
LEVEL 2	**SCADA · HMI**	Monitoring and control of lines
LEVEL 1	**PLC · drives · robots**	Machine control in real time
LEVEL 0	**Sensors and actuators**	The physical process

STATUS AND DATA ↑

ORDERS AND RECIPES ↓

ERP

Business backbone: orders, materials, finance and capacity planning.

MES

Executes and tracks production orders on the shop floor in real time.

PLM / PDM

Owns product data: CAD, BOMs, revisions and change control.

02 INTEGRATION

Value comes from clean interfaces, not from the number of systems.

ISLANDS — INTEGRATED

SYSTEM ISLANDS

- − Data typed twice between systems
- − Different part numbers per system
- − No single source of truth

INTEGRATED LANDSCAPE

- + One master system per data object
- + Standard interfaces, such as ISA-95
- + Shop-floor status visible in ERP

03 WORKED EXAMPLE

ENGINEERING CHANGE FOR A GEARBOX · THE SYSTEMS INVOLVED

PLM
New BOM revision
released by engineering

→

ERP
Material plan updated
purchasing reacts

→

MES
New work instruction
at the line

→

CONTROLS
New torque values
loaded to the PLC

04 MANAGEMENT TAKEAWAYS

01
Define a master per data object
Decide which system owns BOMs, routings, stock and orders.

02
Map interfaces before buying
Much of the cost and risk sits in the integrations.

03
Keep the shop floor in view
Systems should serve operators, not add data entry.

05 COMMON MISTAKE

LIMITATION

Customizing every system

Heavy customization makes upgrades and integration expensive. Adapt the process where the standard fits.