



# BUILDING A SCALABLE, SMART FACTORY ARCHITECTURE

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# The Era of Transformation - Automotive

Emissions and Fuel Economy



Connected Vehicles



Fully Autonomous



No Assistance

Feet Off

Hands Off

Eyes Off

Mind Off

Autonomous

# TECHNOLOGY DRIVES BUSINESS



# CooperStandard

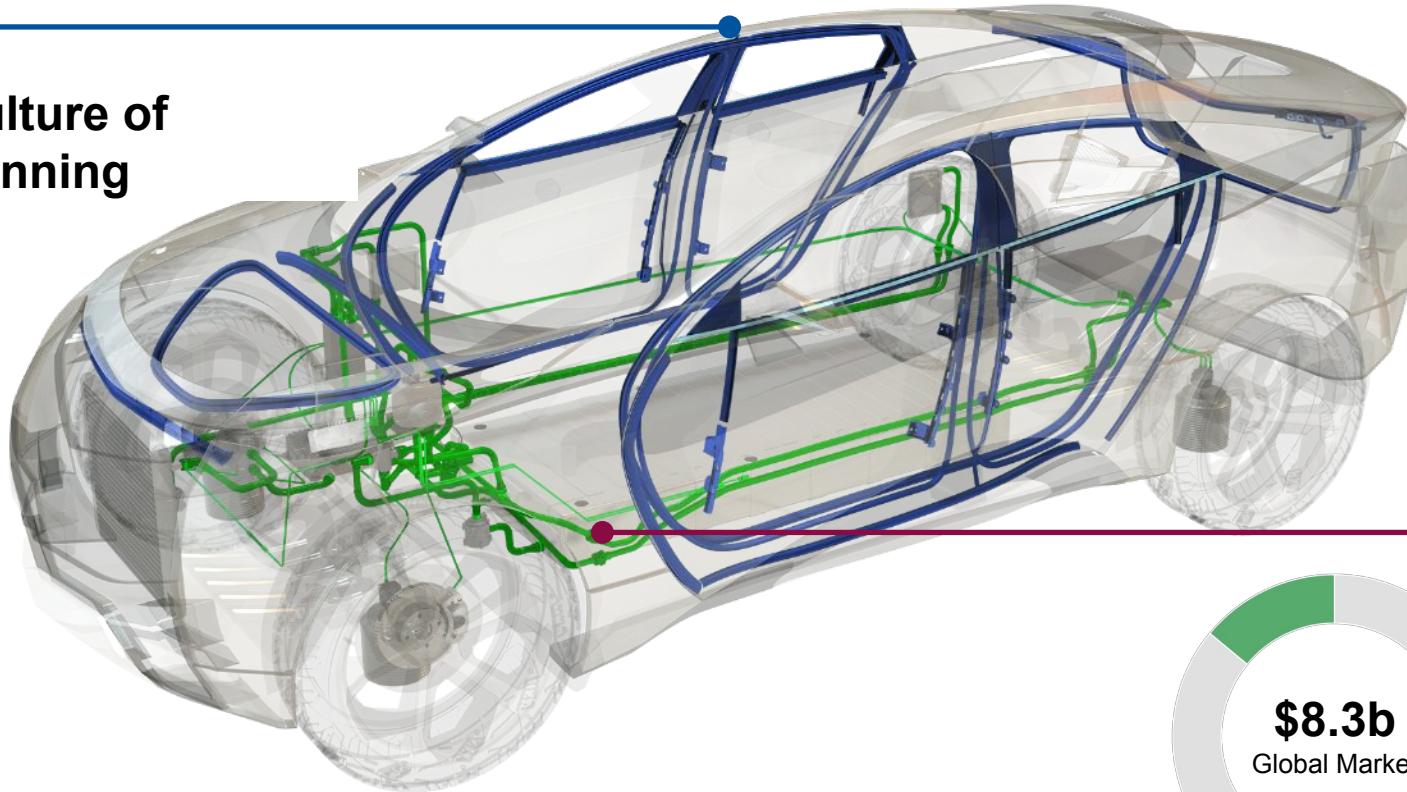
Creating Sustainable Solutions Together

# Leading Market Position Across Core Product Lines

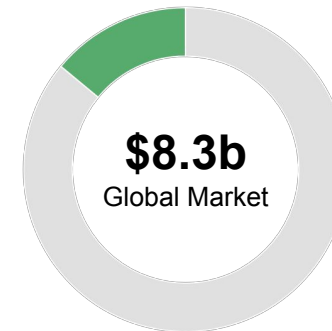
#1 GLOBAL LEADER<sup>1</sup>  
Sealing Systems



Culture of  
Winning



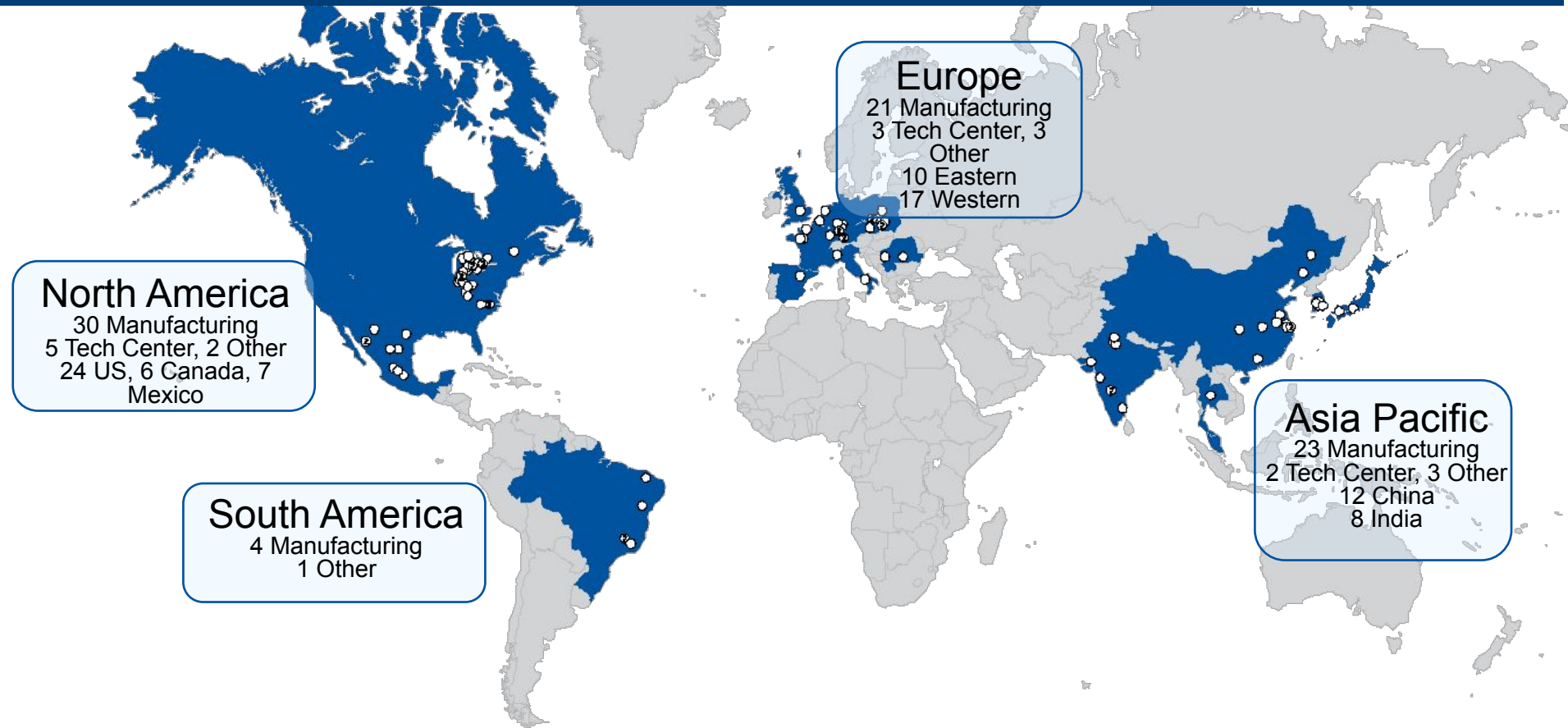
#2 GLOBALLY<sup>1</sup>  
Fluid Handling Systems



Innovation is in  
the DNA

# GLOBAL Footprint

Located in all Major Regions and Further Expanding in Emerging Markets



Both Organic and Inorganic growth through 65 years of thriving

# Award Winning Innovations

Driving New Business Wins



## Sealing

- Enhanced aesthetics
  - FlushSeal™ movable glass sealing system
  - Frameless sealing system
  - Hidden outer waist belt
- Sustainable / lightweight options
  - EPDM MicroDense material
  - TP MicroDense material
  - Fortrex® materials platform



## Fluid Handling

- Optimized thermal management
  - PlastiCool® portfolio (smooth, convoluted, multi-shape)
  - Integrated sensors
  - eCoFlow™ fluid control technologies
- Connection assurance / ease of assembly
  - Ergo-Lock® QC
  - Easy-Lock® QC
  - Eco-Snap™ QC



# Strong Commitment to Core Values and Sustainability

Dedicated to Strong Environmental, Social and Governance (ESG) Initiatives

- Recognized for world-class integrity and ethics
  - America's Most Responsible Company (6 consecutive years)
  - EcoVadis® Silver Status (7 consecutive years)
- Strategic integration of sustainability into the business
  - Committed to doing business the right way
  - Innovating materials, processes and products with reduced environmental impact
  - Executive oversight of sustainability strategy





# Data Drives – The AI Era

# Why Now?

4.5 quintillion bytes of data are created per day.

90% of the data in the world today has been created in the last two years alone.



SENSORS



ASSETS



LOGISTICS



GEOLOCATION



SENTIMENT

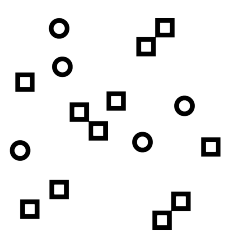


WHAT'S NEXT?

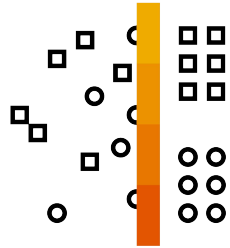
The ability to **make sense of data quickly and effectively** will be critical to the success of an organization in the coming years.

By opening the communication between business and IT in an effective way now, you will **be better prepared to face more challenging demands** later.

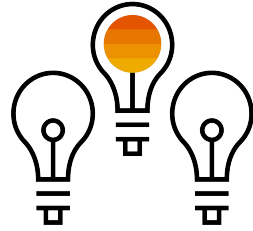
# The Shift from Data to Intelligence



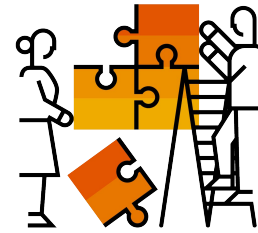
Data



Information



Insight



Action



**VALUE**

Organizations that provide people with the **intelligence** to make **better decisions** and enable them to **act in the moment**, will outperform.

# AI Backbone

## NO AI without IA Information Architecture

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AI isn't just a workload — it's an architectural requirement

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Embed AI-readiness into data, application, and infrastructure layers

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Use AI to optimize architectural decisions: predictive modeling, anomaly detection, and cost trade-offs

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Leverage GenAI to support real-time governance and design assistance

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Architect for AI at scale: ModelOps, ethical AI, and data pipelines

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Organizations must ensure AI is secure, explainable, and enterprise-aligned

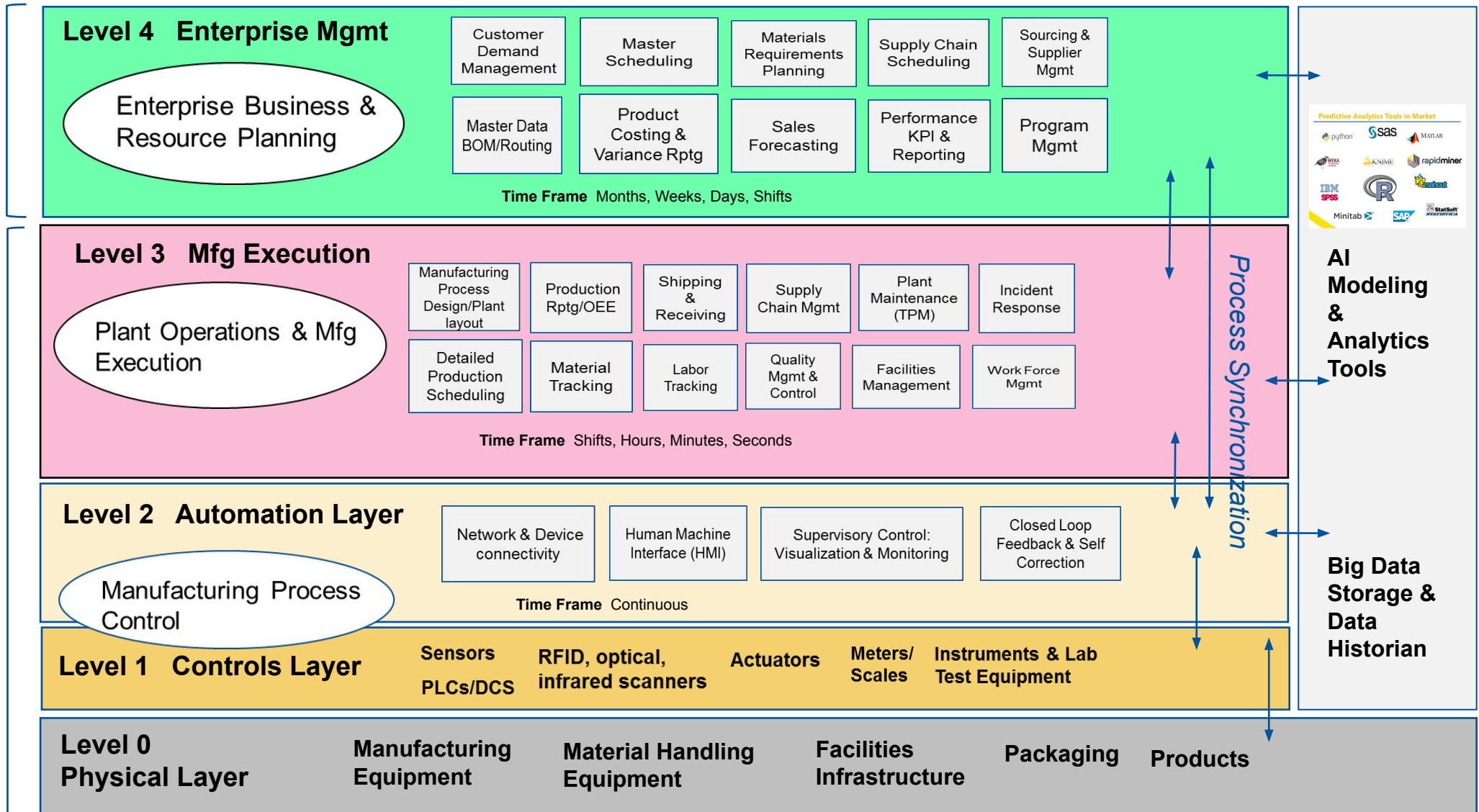


# Digital Manufacturing Architecture

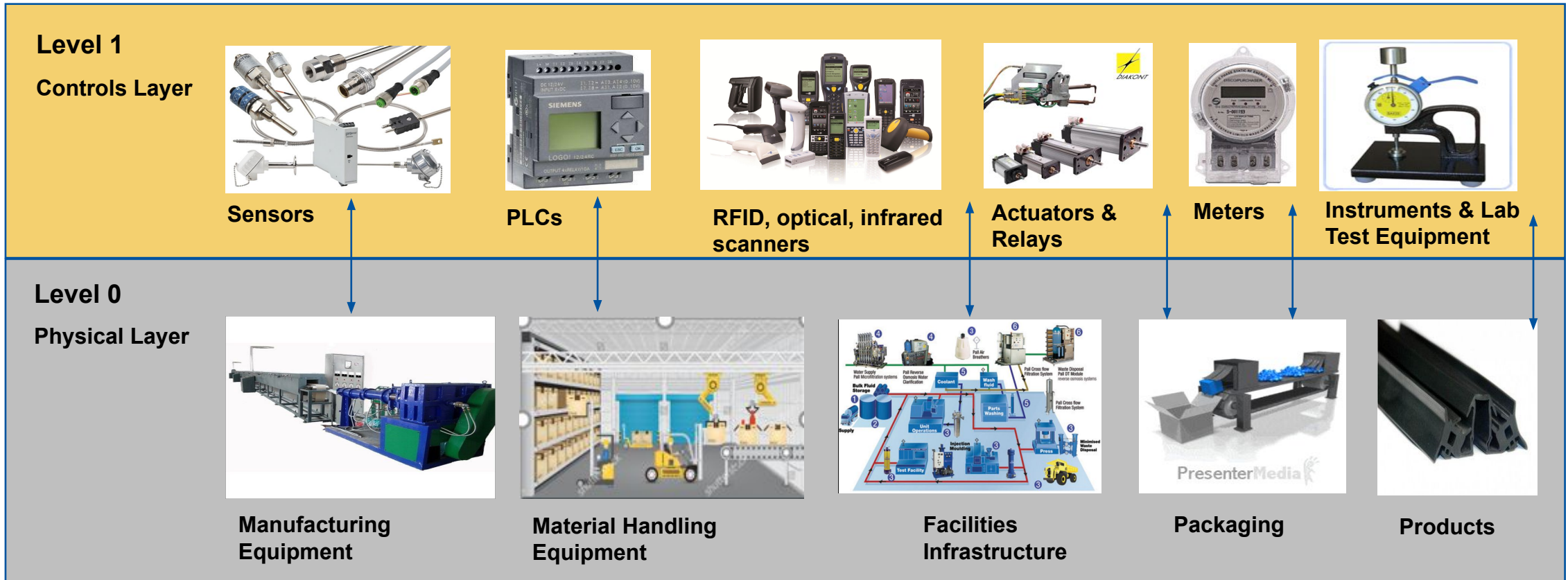
# ISA Framework for Digital Factory

Enterprise Processes

Plant Processes



# Connected Factory Floor (IOT) – Level 1

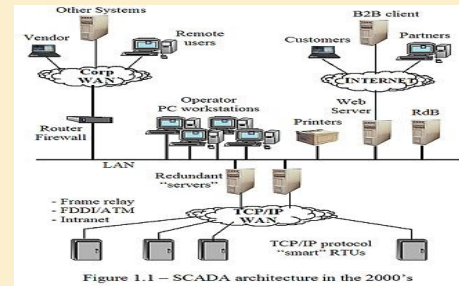


**Modular architecture helps build a strong foundation.  
AI, Robots, Cobots, AGV etc etc.. can grow on this strength**

# Manufacturing Process Automation & Control – Level 2

## Level 2 Automation Layer

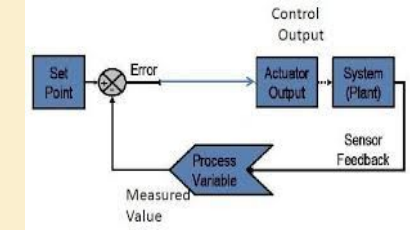
Process monitoring,  
supervisory control



Human Machine Interface (HMI)



Supervisory Control (SCADA) monitoring & synchronization



Closed Loop feedback & self correction

Manufacturing Process Control

## Level 1 Controls Layer



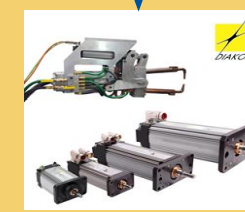
Sensors



PLCs/DCS



RFID, optical, infrared scanners



Actuators



Meters/ Scales



Instruments & Lab Test Equipment

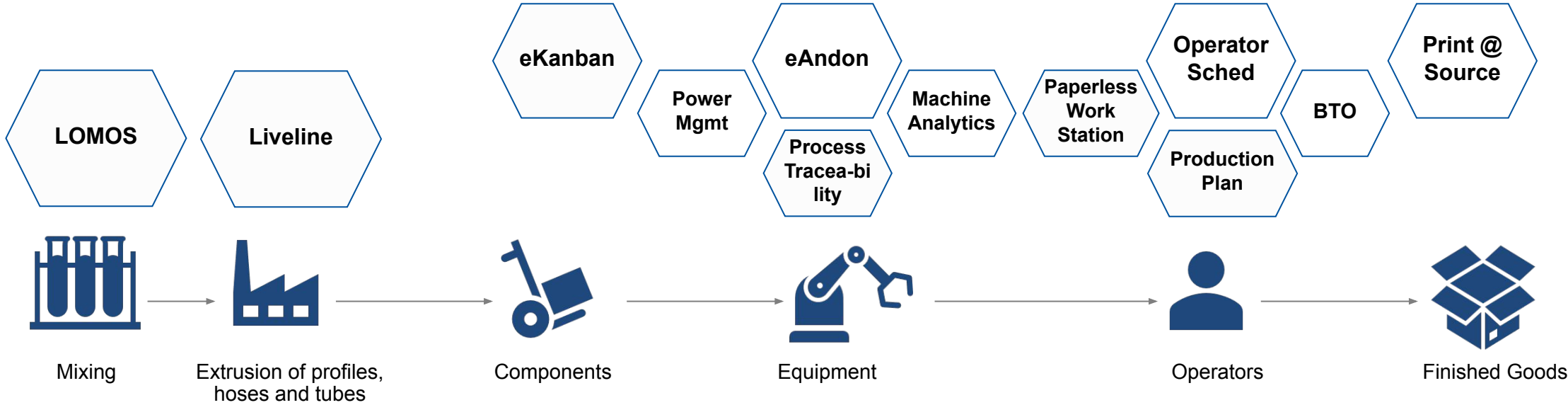
Process performance of existing manufacturing assets becomes known and controllable resulting in new levels of process reliability and improved quality. Need top down COC/AME strategy to accelerate

# Align it with your Business Needs

Global platform implementation to digitalize and optimize Manufacturing



**Hourly Dashboard**  
Cell efficiency  
Labor efficiency



# Cloud leveraged hybrid CS Factory Architecture



CS Factory

Externally Available (via SSO)



**Machines Level**  
Operational Technology  
(OT)

- PLC
- Camera
- WAT
- Sensors

**Plants Level**  
Edge  
Computing



- Edge of network
- PLC data
  - Camera data
  - WAT data

OPC UA  
(comm.  
protocol)

MQTT  
(comm.  
protocol)



- Historian

- Camera,  
PLC Data
- WAT Cycles

CS Factory App services  
(ECS Container)

- CS Factory  
database

Master data  
mgmt.  
(MDM)

Load Balancer

boomi

**Enterprise Level**  
ERP / Business  
process



- Profit Center
- Person Responsible
- Work Center
- Part number
- Routing
- Shift
- Scrap Reason Code
- Equipment



Users

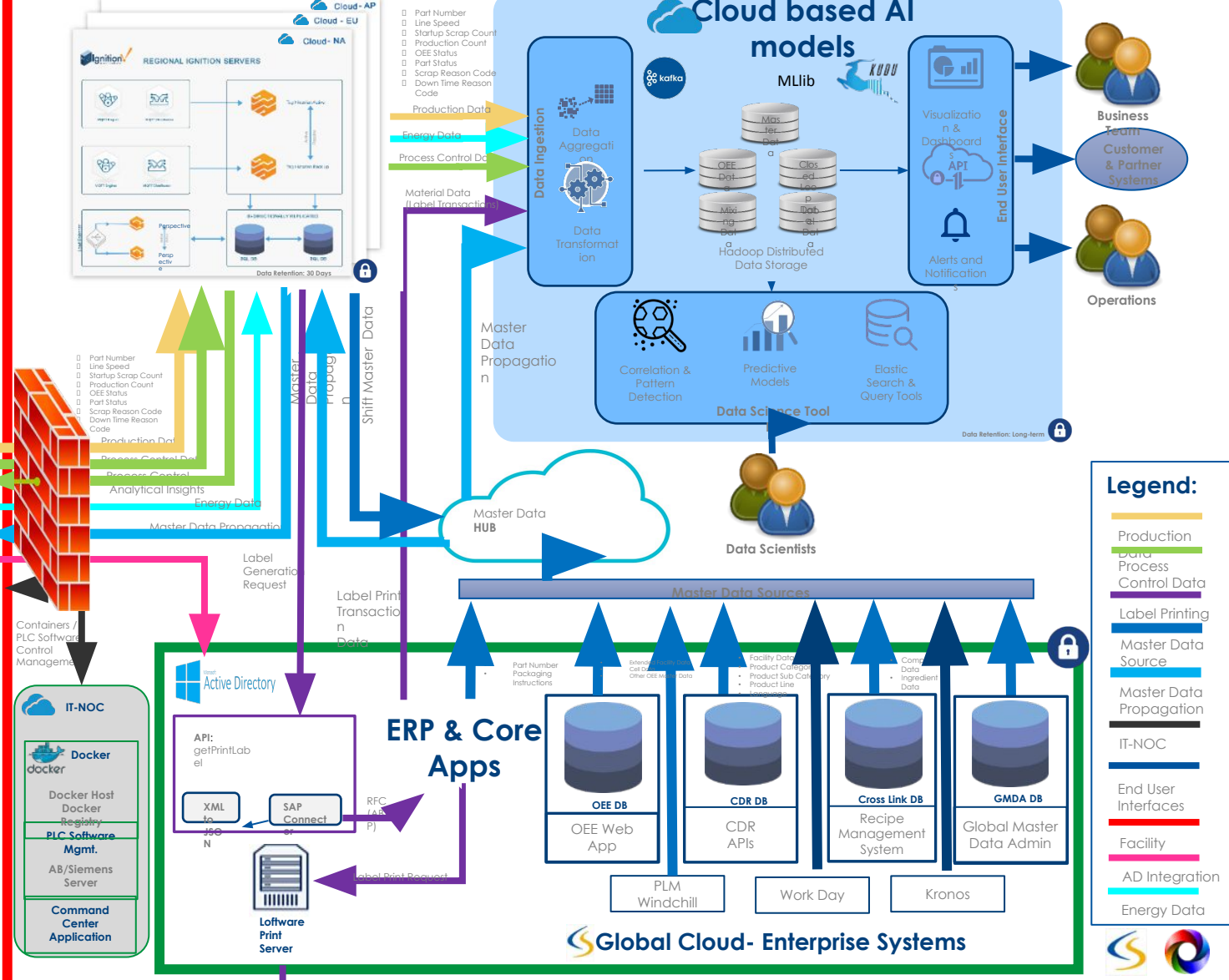
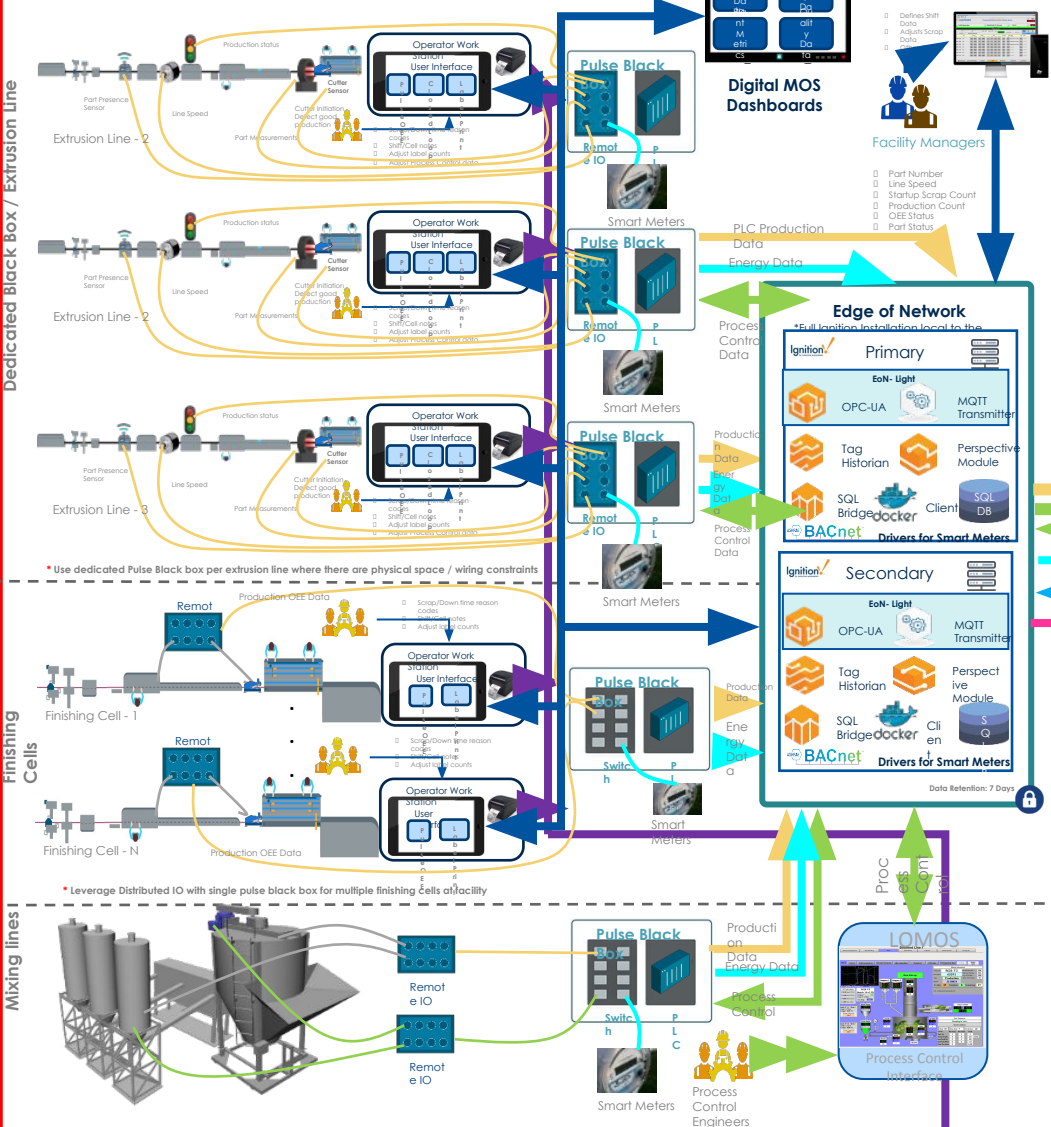


AI / ML Models

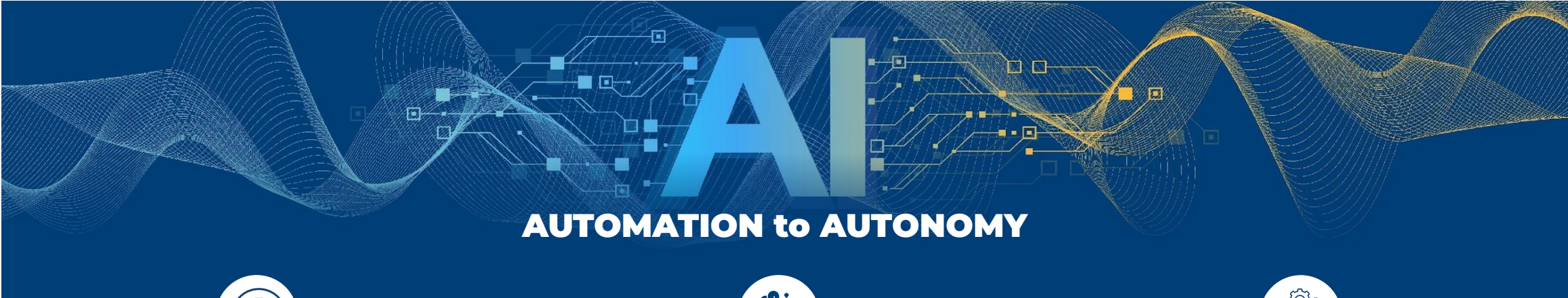
Cooper Standard Network

# SIMPLE DOES NOT MEAN TRIVIAL

## Facility IoT V-LANs\*



# Architecting the Digital Foundation



## STANDARDIZE

Common processes and data across the enterprise



## DIGITIZE

All product and process data captured in one source of truth



## INNOVATE

Launch value creating new solutions ahead of peers



## ARCHITECTURE, SECURITY & COMPLIANCE

Manage risk and provide safe digital environment

## TALENT

Collaborate / Accelerate / Energize



# Keep it simple



CLOUD FIRST



API FIRST



MOBILE FIRST



AI FIRST

- ❑ 5 Data centers to Cloud - AWS (some Azure)
- ❑ 23+ ERP's to Single instance global SAP
- ❑ Point2Point to single integration hub
- ❑ MobileFirst... Any language, Any where, Any time
- ❑ Over 200 RPA bots..

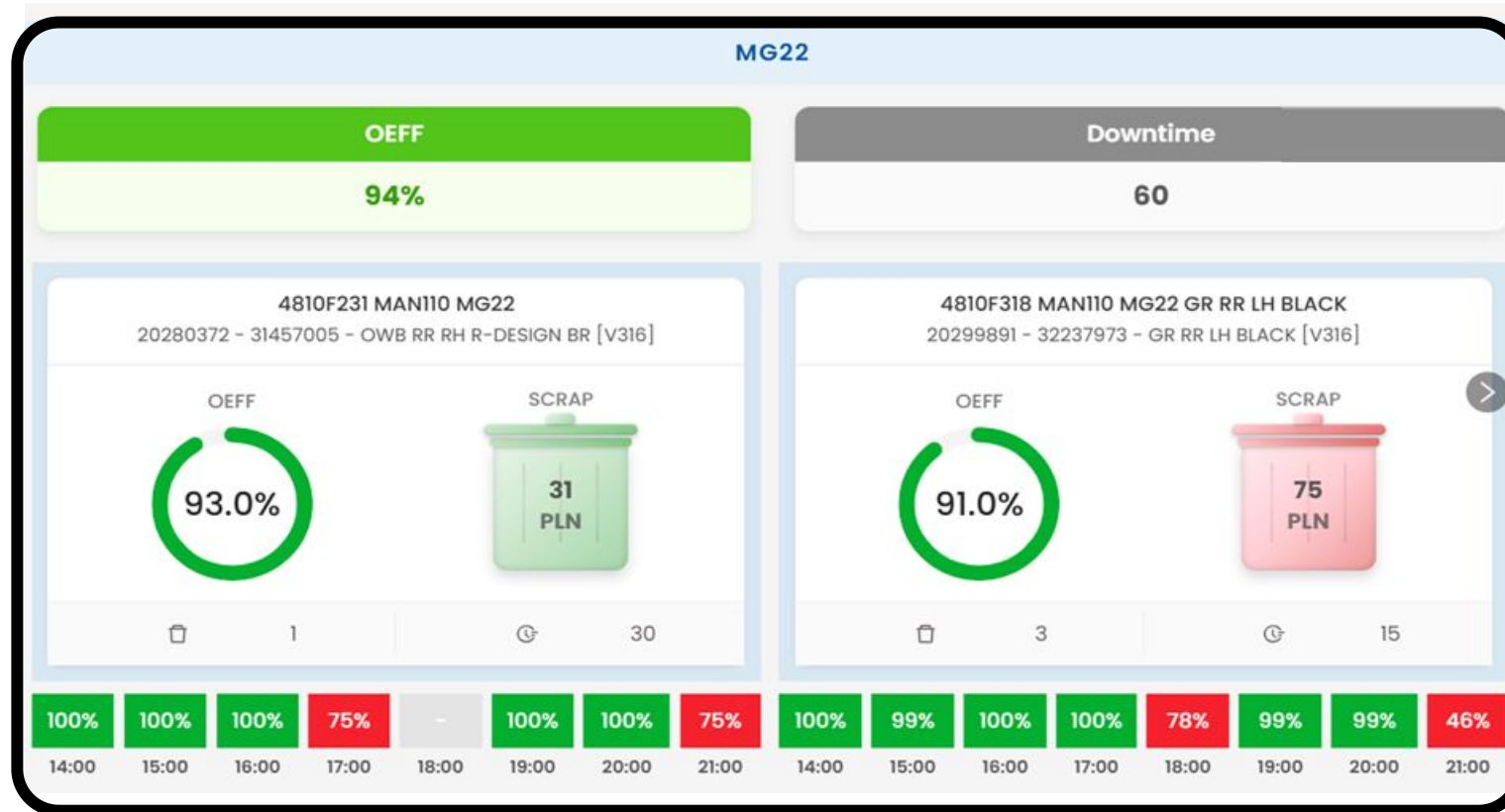


# Results

# Labor Efficiency: Hourly Dashboard

## GAMIFY

- Efficiency percentage based on **Good Pieces vs Standard**
- **Scrap** in pieces and currency
- **Downtime** in minutes



## Mobile App



## Data Sources

- 'Good Pieces' Automated from machine (e.g. PLC or WAT nodes)
- Manual on screen if no automation available
- Downtime from eAndon module
- Master data from SAP (work centers, part numbers, routings...)

# CS Factory SCADA on Extrusion Line

The ability to monitor production at machine parameter level visually and in real-time

Level 2

CS FACTORY | CHANGCHUN SCADA

rcruzlop

Piece Count: 0 Un Prod. Length: 0 m Speed: 20.29 m/min FCT End Time: 0 Profile Nr: 37211019 Changeover: 0 min Setup: 0 m Scrap: 0% Downtime: 0 min

NOK: 0 Pc NOK: 0 m AVG: 0 m/min Prog: 0% Part Nr: 0 Target: 0 min Target: 0 m Target: 0% Target: 0 min

Level 1

3450EX01  
OFFLINE

17 m/s

Prod. Nr.: 310025797B

OK Cnt: 0 Pc

NG Cnt: 0 Pc

Level 3

CC-A02-07

PARAMETER	ACTUAL	SET	LOW	HIGH
Speed - 转速:	Null	0.00	Null	Null rpm
Pressure - 压力:	Null	Err	Null	Null Bar
Temperature1 - 温度1:	31.90	50.00	40.00	60.00 °C
Temperature2 - 温度2:	31.40	50.00	40.00	60.00 °C
Temperature3 - 温度3:	30.30	50.00	40.00	60.00 °C
Temperature4 - 温度4:	31.00	50.00	40.00	60.00 °C
Temperature5 - 温度5:	39.70	50.00	40.00	60.00 °C

Display Path	Priority	State	Name
SCADA/Asia Pacific/Changchun/Extrusion/3450EX02/Equipment/Extruder_3/...	Medium	Active, Unacknowledged	Alarm
SCADA/Asia Pacific/Changchun/Extrusion/3450EX02/Equipment/Extruder_2/...	Medium	Active, Unacknowledged	Alarm
SCADA/Asia Pacific/Changchun/Extrusion/3450EX02/Equipment/Extruder_3/...	Medium	Active, Unacknowledged	Alarm
SCADA/Asia Pacific/Changchun/Extrusion/3450EX02/Equipment/Extruder_3/...	Medium	Active, Unacknowledged	Alarm

# Digitizing plant ops

BEFORE



AFTER

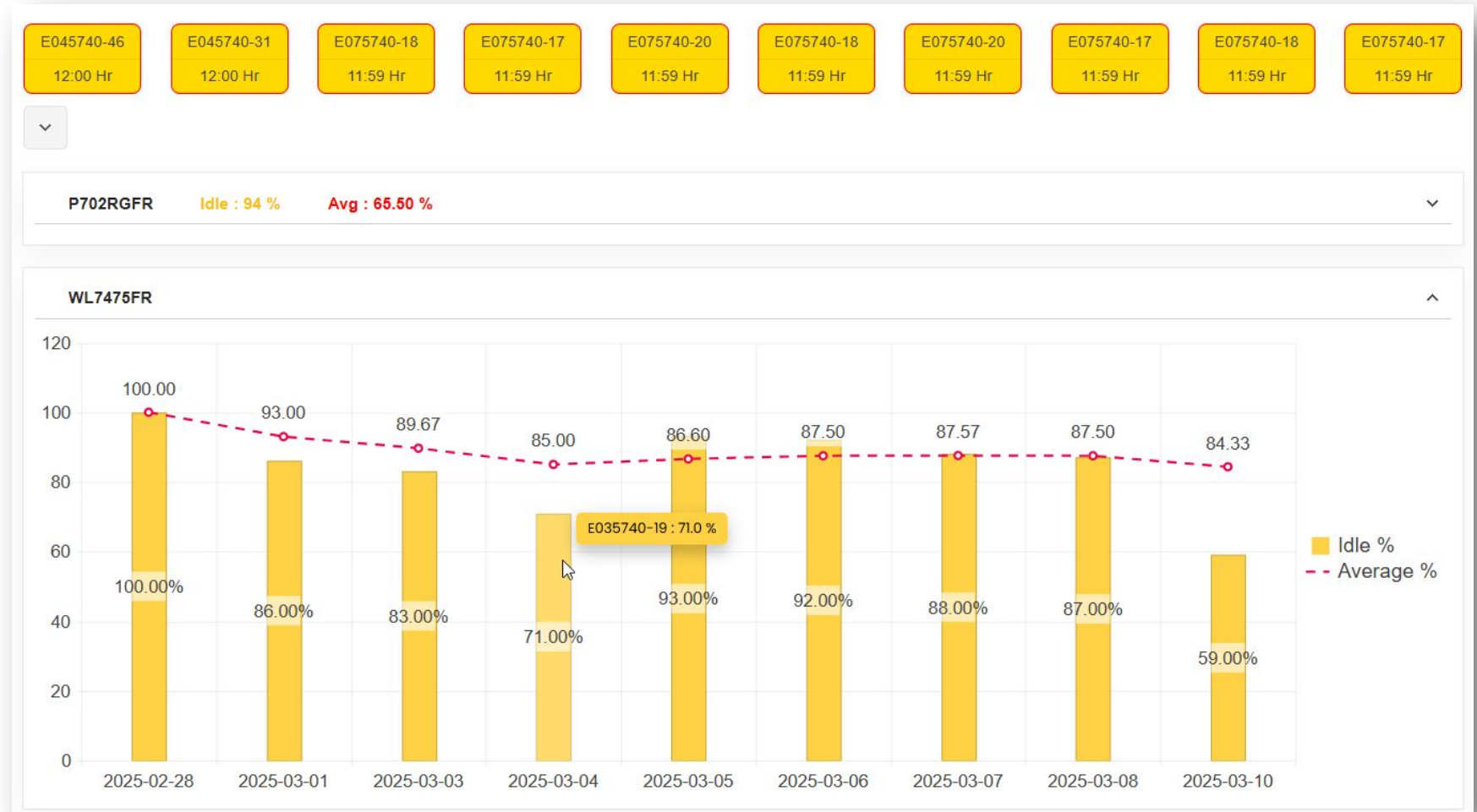


# Asset Power Management Reporting

## Sustainability


Idle time gap % used to identify equipment that is outside the acceptable threshold.

- Displays Idle time gap % bar graph Gap % = Idle time > acceptable idle threshold
- Gap % rules out machines that require a warmup time
- Allows plant managers the opportunity to turn off machines that are unnecessarily consuming power



# eKanban – Real-time view of Picking \ In Process















Ties to SAP for Workorder and Plant Maintenance.

 English Kevin Diedrich

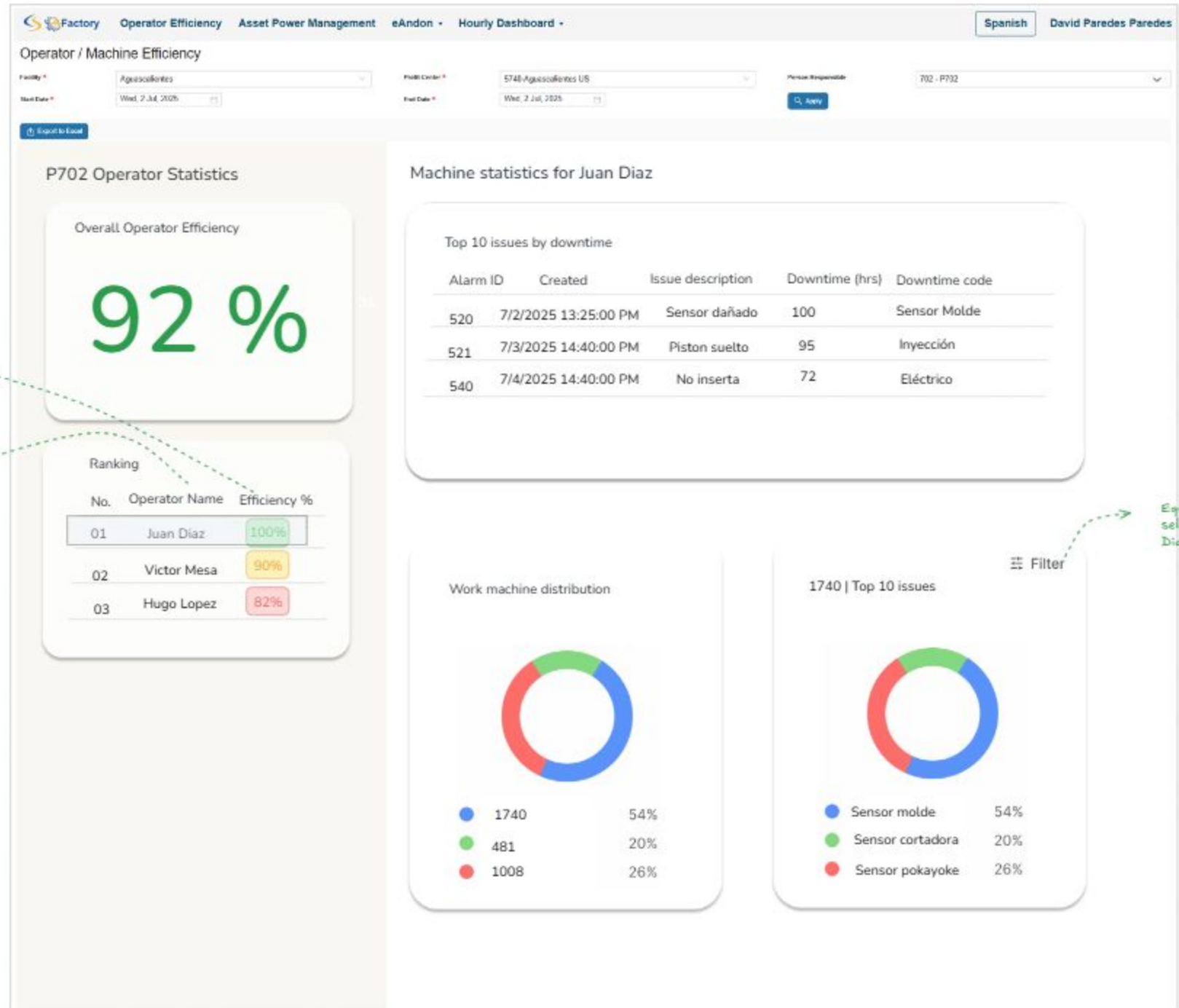
eKanban Active Orders Confirm Delivery Order History

Facility  Person Responsible

In Progress

	Time Since Order Creation	Part Number	Person Responsible	Quantity			Status	Details	<input type="checkbox"/>
	 17 min ago	11453802 DENSE 9704-60	C223	1000.00	X	1.00	<span>Open</span>	Details 	<input type="checkbox"/>
	 17 min ago	31585886 B299 SECONDARY RR 3010 mm	C223	0.00	X	1.00	<span>Open</span>	Details 	<input type="checkbox"/>
	 17 min ago	11453802 DENSE 9704-60	C223	1000.00	X	2.00	<span>Open</span>	Details 	<input type="checkbox"/>
	 18 min ago 	10935376 03003770 COATING STAHL WT-091-076	P702	440.00	X	2.00	<span>In Progress</span>	Details 	<input type="checkbox"/>

# Efficiency Analytics



# CS Factory Front-Line Training

eLearning modules status

## eLearning Path (Draft):

- I. **Introduction to CS Factory**
  - a. Definition
  - b. Purpose
- II. **System Navigation**
  - a. Core Modules
  - b. PC Navigation
  - c. Mobile App Navigation
- III. **Supervisor Responsibilities**
  - a. On Demand KPIs monitoring
  - b. Actions to address gaps
  - c. Identifying trends
- IV. **Hourly Employee Management**
  - a. Employee Engagement
  - b. Performance Conversations
- V. **Closing Message**



An Introduction to CS Factory    Current Version ▾

## An Introduction to CS Factory

START COURSE

CS Factory is an application that provides a unified dashboard that integrates data from multiple sources into a single, centralized view. It

The image shows a course preview for 'An Introduction to CS Factory'. At the top, there is a header with the course title and 'Current Version' with a dropdown arrow. The main content area features a dark background with a blurred image of a computer keyboard. The title 'An Introduction to CS Factory' is prominently displayed in white. Below the title is a white button with the text 'START COURSE'. At the bottom of the image, there is a short introductory paragraph about the CS Factory application.



# Lessons learned

# Key Lessons Summary



## Start Small and Scale

Pilot projects validate feasibility and ROI before enterprise-wide expansion, minimizing risk and building confidence.

## Align with Business Goals

Tie initiatives to measurable outcomes like OEE improvement, energy reduction, and product quality enhancement.

## Data Quality and Cybersecurity

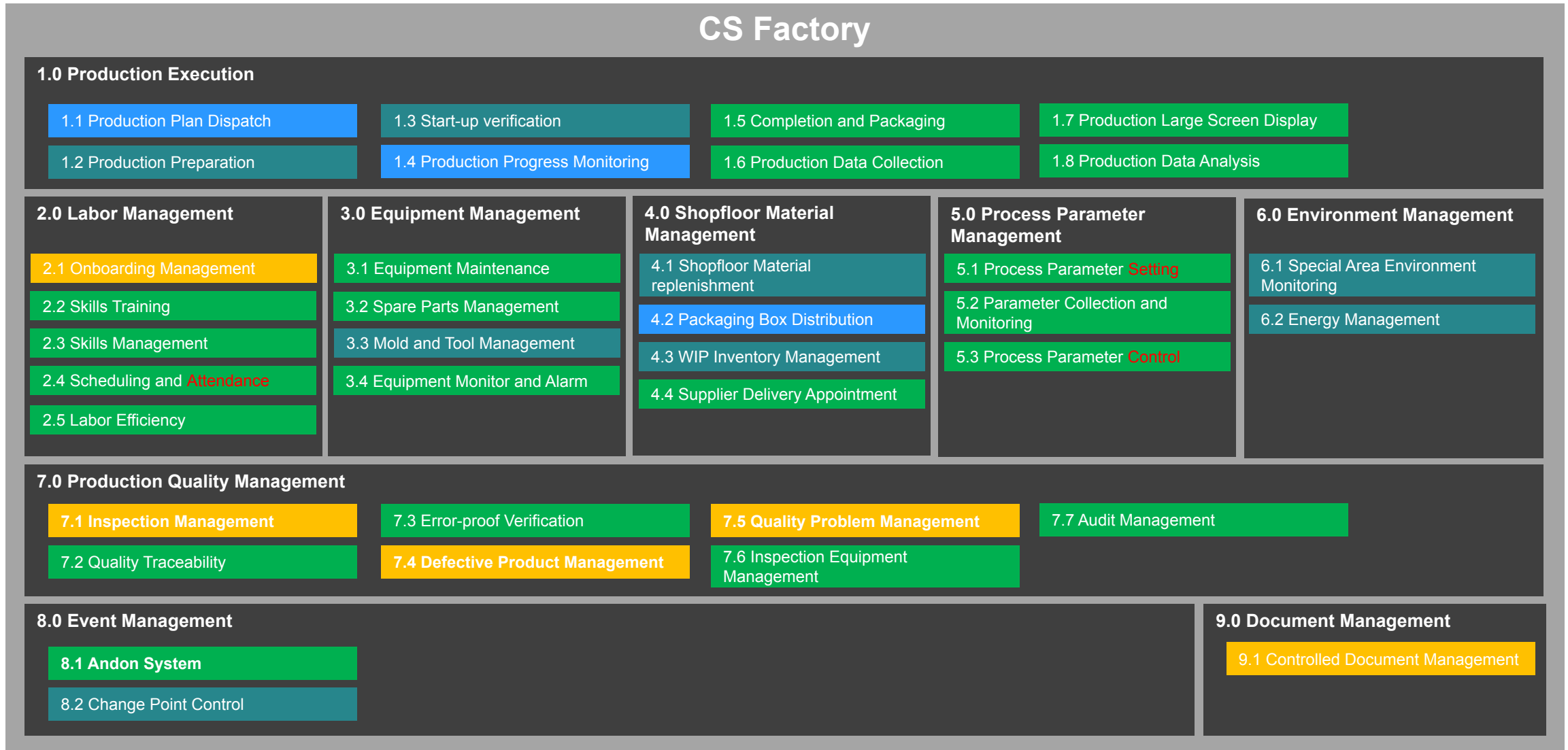
Focus on clean, actionable data and robust cybersecurity frameworks to ensure data-driven decisions and system safety.

## Change Management and Collaboration

Involve cross-functional teams early and manage change through training and communication for smooth digital transformation.

# Appendix

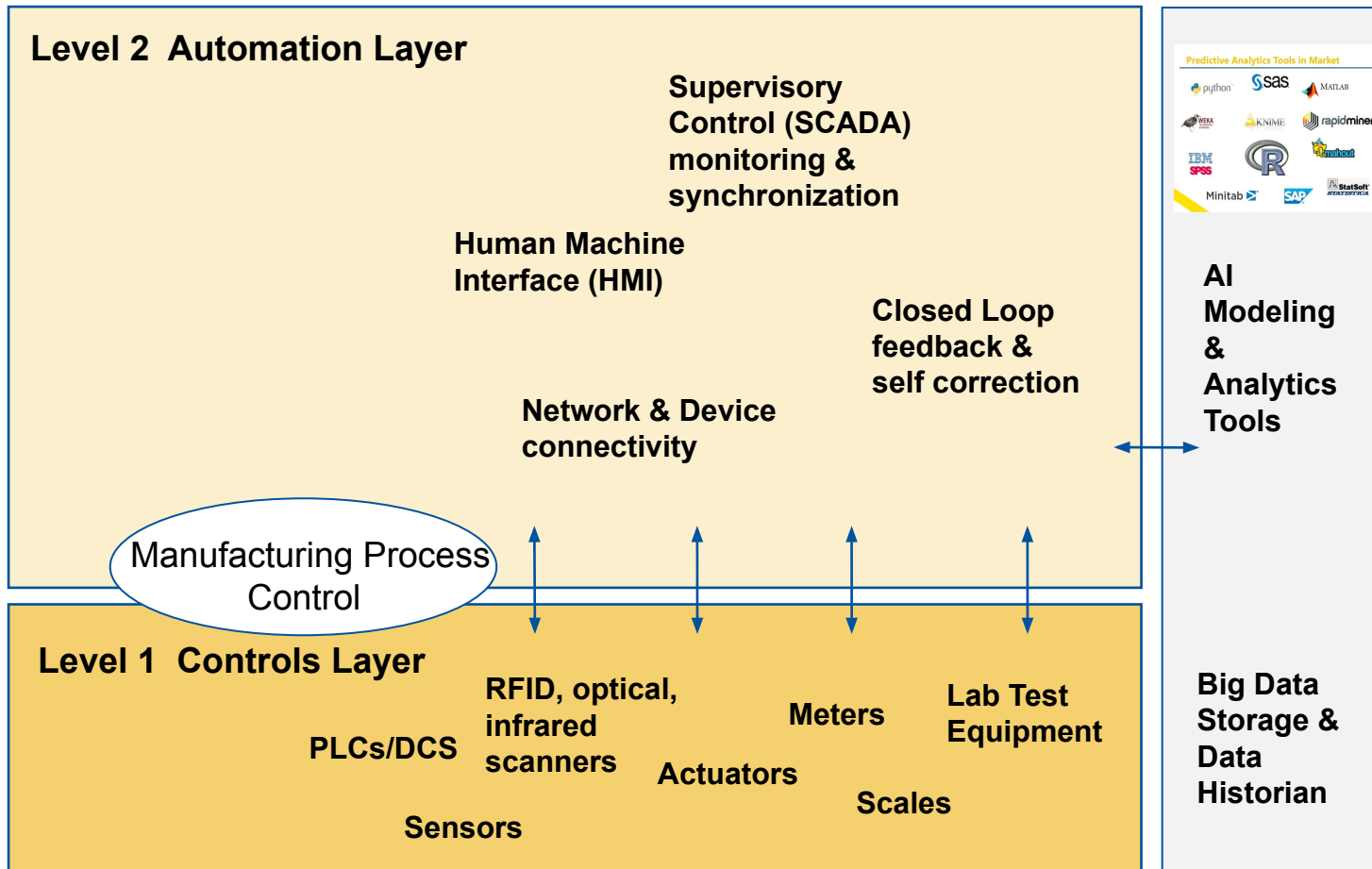
# Digital CS Factory– Create a business aligned blueprint



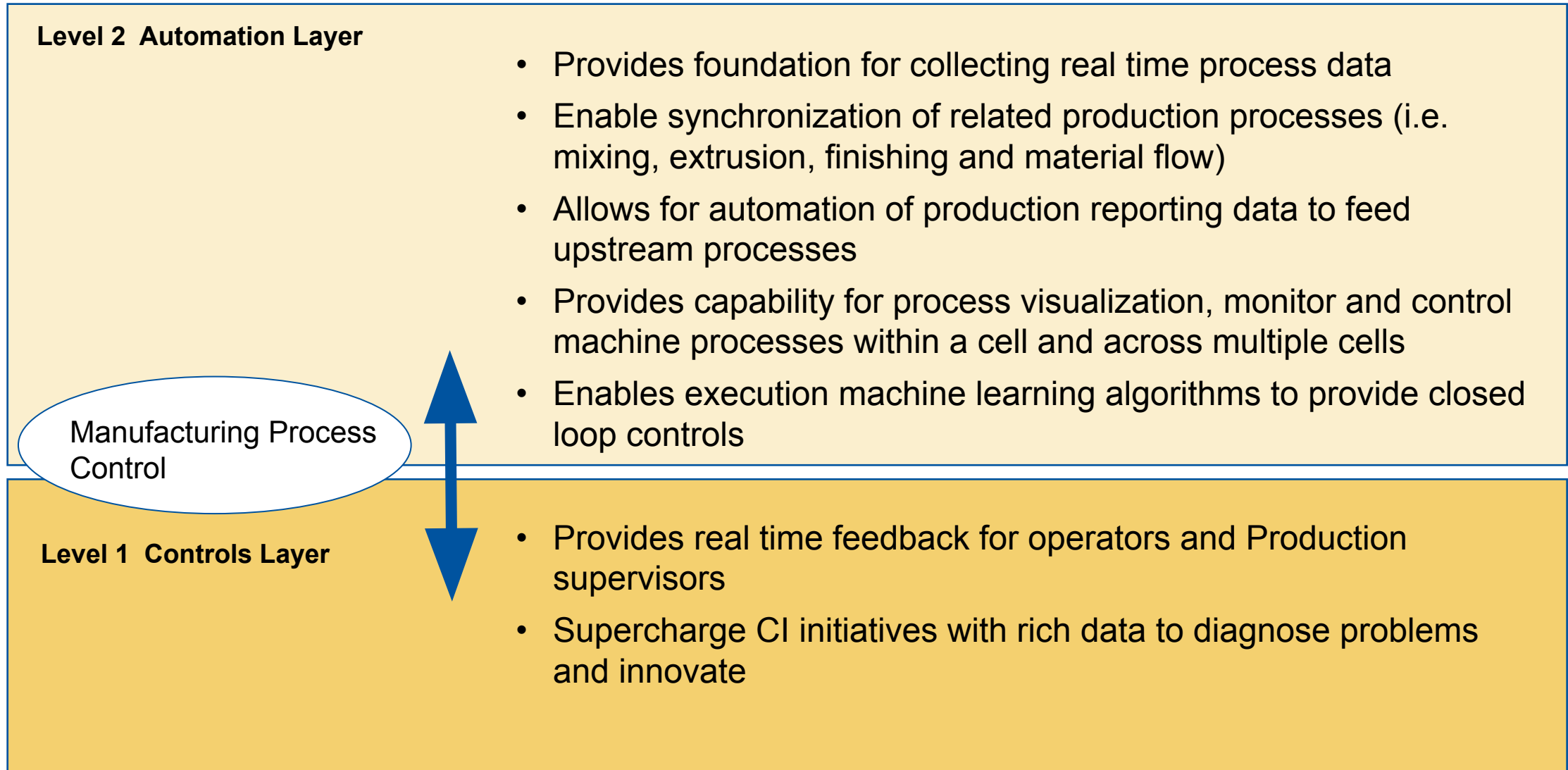
# Manufacturing Process Control – Level 2

## Path to Manufacturing Process Control

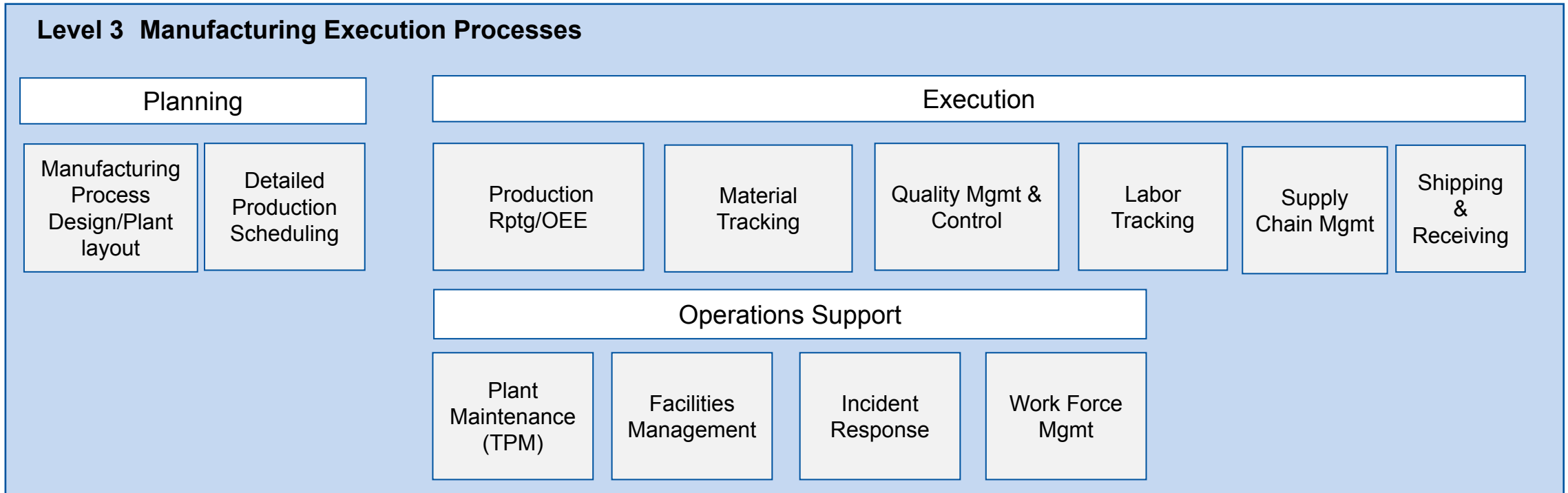
- Install PLCs & sensor controls for data collection on machines
- Build secure network infrastructure in plant
- Ignition application configured to connect controls to pull data to supervisory dashboard
- Process visualization & monitoring/alerting implemented
- Data historian and analytics tools in place
- Implement closed loop process controls/Machine learning



# Business Value Opportunities – Level 1 and 2



# Manufacturing Execution Processes – Level 3



Plant MES Processes - Limited global or regional strategy in place, incomplete & limited technology roadmaps, processes not synchronized. Bottoms up derived local point solutions prohibit scaling best practice for scale benefit realization