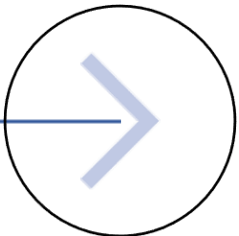


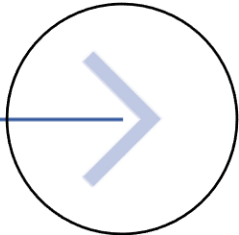
# SCADA

Customized Monitoring and Control



# OPC

Industrial Communication Technologies -  
UA, DA, HDA, A&E



# MES

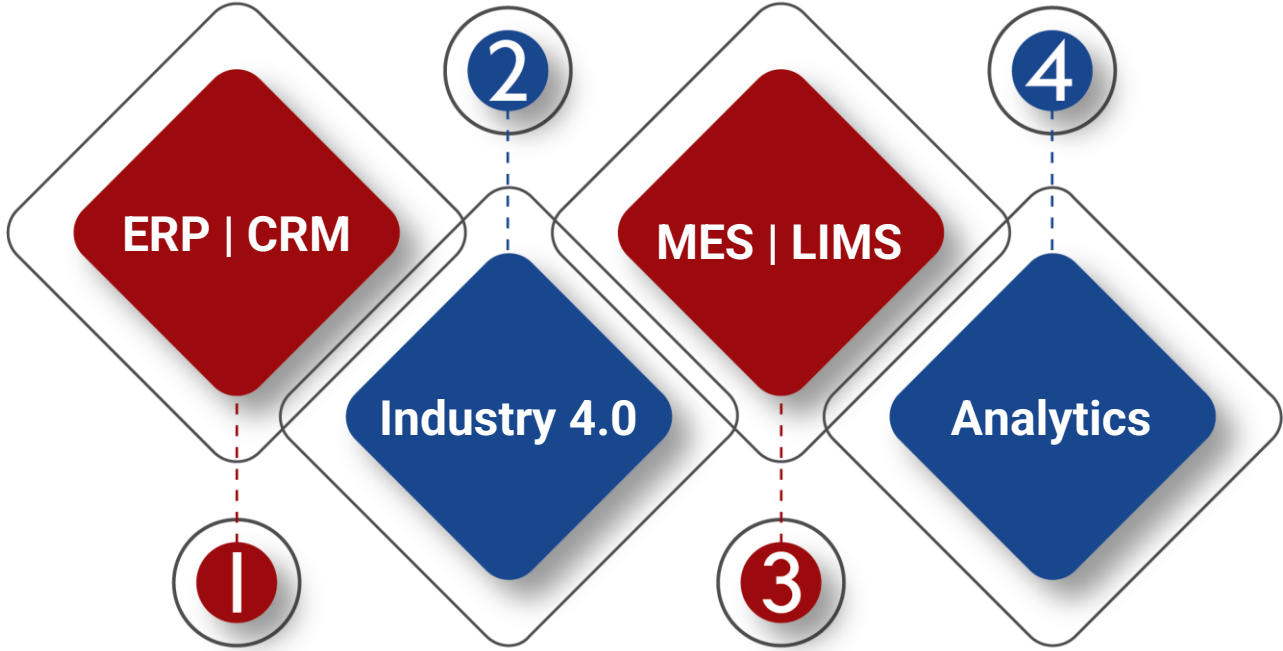
Real time Production, Planning,  
Quality and Maintenance  
Performance, OEE, Downtime  
Analysis, KPI's




# Focus

  
Industry Specific  
Solution

  
Strategic  
Consulting

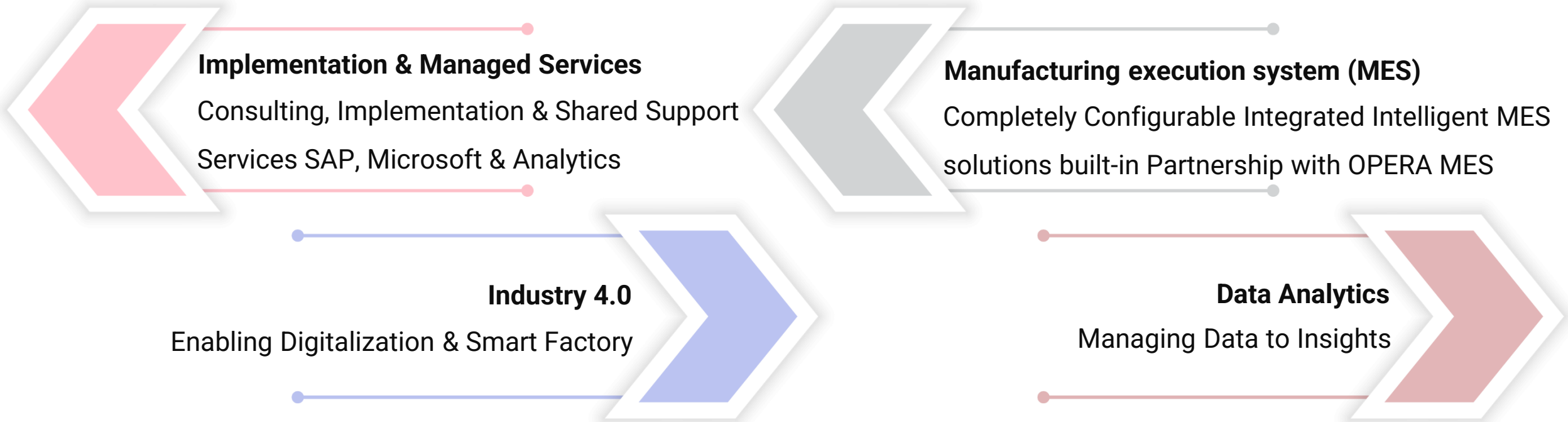


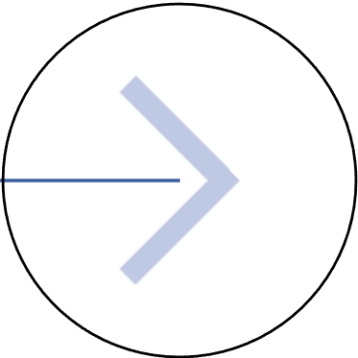
  
Implementation &  
Integration

  
SMART Factory  
Experience

# Service offering

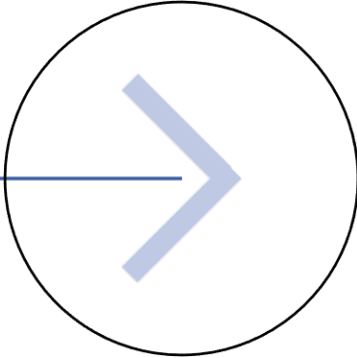
Comprehensive set of Services across the entire value chain





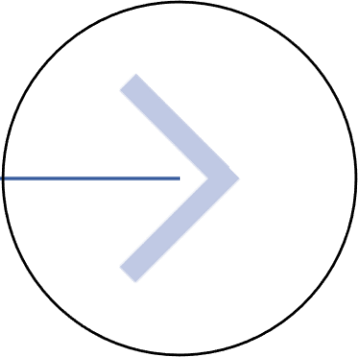
## IIoT

Custom built Industrial Internet of Things



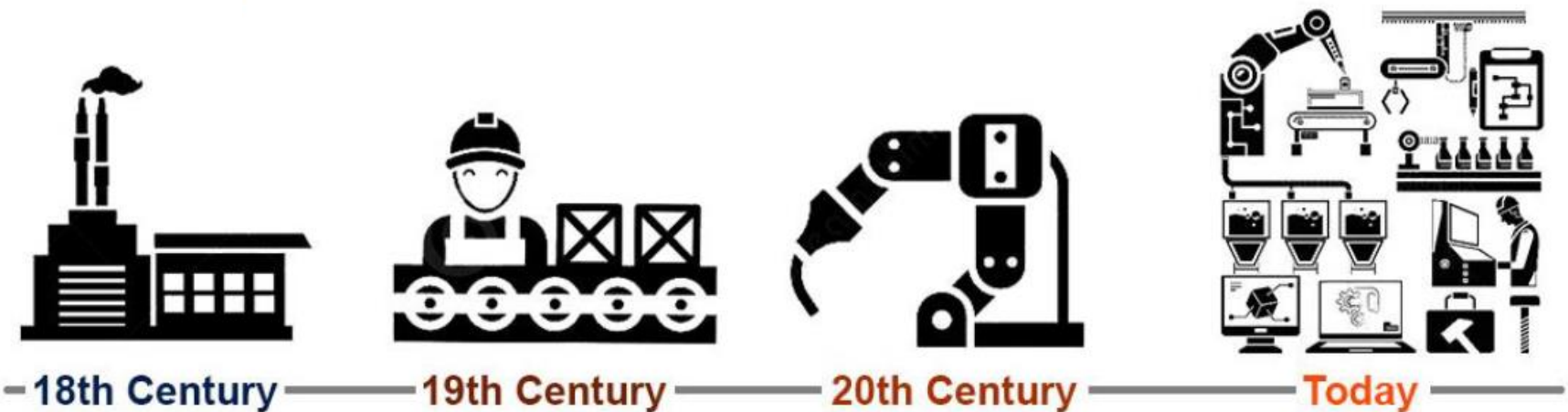
## Cyber Security

Industrial Cyber Security – OT / IT 100% Isolation



## Bridging IT-OT

Customized Data Transfer between IT & OT network



**Industry 1.0**  
Production machines powered by steam

**Industry 2.0**  
Mass production lines requiring labour and electrical energy

**Industry 3.0**  
Automated production using electronics and IT. First PC in the factories

**Industry 4.0**  
Connection between intelligent machines and Information Technology

MES



The MES (Manufacturing Execution System) is the information system suitable to communicate with the plant, by connecting all resources and digitizing the processes, in order to reach the integration that is the basis of Industry 4.0 concept. **MES becomes the information system for the management of the factory.**

New market trend....

IoT - Internet of Things

# IoT & DIGITAL FACTORY



IoT can be defined as a global and dynamic net infrastructure that can automatically configurate, basing on standard and interoperable communication protocols where physical and virtual objects have an identity, physical attributes, virtual personality and intelligent interfaces...

New market  
trend....

**BIG DATA**

## BIG DATA ANALYSIS



**Big Data means a large volume of data – structured and not – that daily overwhelm a company.** What matters is not the quantity of data but the way they are used: processing big data means analysing them in order to obtain necessary information to make the best decisions possible.

# WHAT ARE THE TYPICAL PROBLEMS?

Performance KPIs missing for manual (labour) activities



**Real time KPIs like OEE available for machine but missing for Department, Plant or a Line**



Poor response to

- Changing process events
- Customer requirements
- Market conditions
- Equipment failures



**Manufacturing is NOT agile (efficient enough)**



**Lack of traceability and reasons for rejects**



No Realtime Gap analysis for quick resolutions



**Lack of real data to ERP / BI Systems for accurate Cost Analysis**



No Realtime material consumption patterns available for just-in-time manufacturing



**Major breakdowns costs due to lack of effective preventive maintenance systems**





## INDUSTRY 4.0



Transformation



Interaction



Automation



Innovation



Strategy



Data

# Digitization

Automate the factory as much as possible



Opera MES



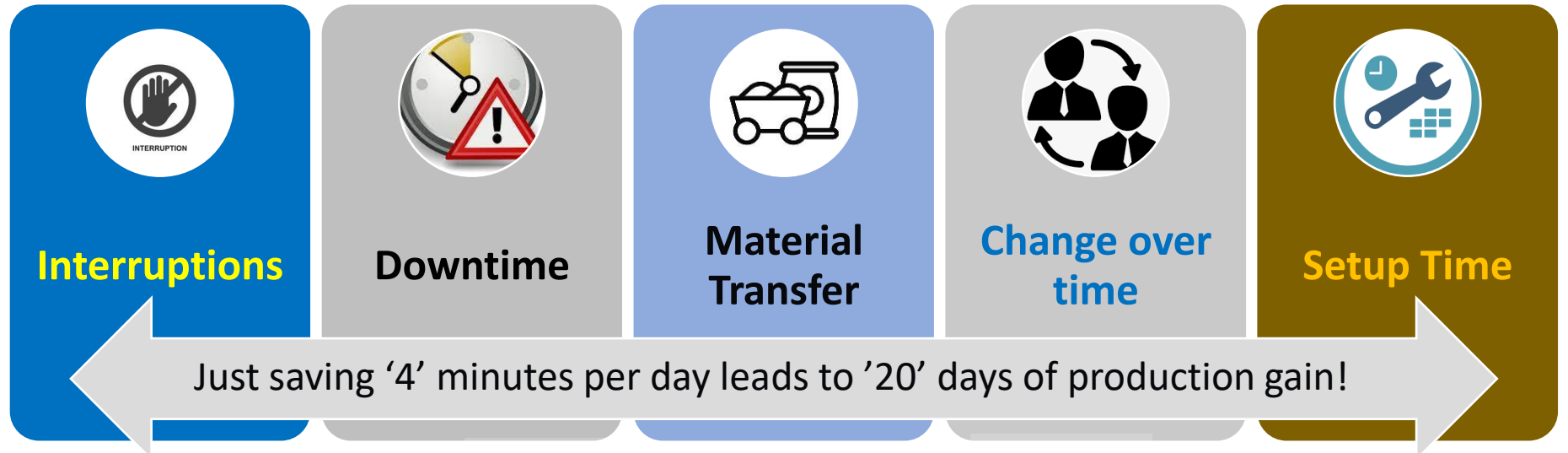
Time is Money

Time is Money

Time is Money

## Time is Money

Time is Money



Time is Money



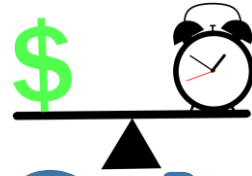
Time is Money



Time is Money



INDUSTRY 4.0



# TIME IS MONEY

Description	Per Machine / Process	Setup Time	Change Over Time	Material Transfer
<b>Downtime / Interruption (Secs)</b>	10			
<b>No. of Hours (Hrs in a day)</b>	24			
<b>No. of Interruptions in a day (Secs)</b>	240			
<b>Interruptions (in Mins) Per day</b>	4			
<b>Interruptions (in Hrs.) Per Month</b>	2			
<b>Interruptions (in Days) Per Year</b>	1			
<b>No. of Machines</b>	20			
<b>Total Interruptions (in Days) Per Year</b>	20			

## MES Benefits

A well-run production plant can bring many benefits in a short time, with the sole implementation of a MES combined with performance measurement:

- 40%

Cycle times  
reduction

- 90%

Data entry  
reduction

- 30%

WIP  
reduction

- 75%

Paperwork in  
production

- 25%

Lead time  
reduction

- 28%

Non  
Compliance  
reduction

+ 30%

Efficiency  
Improvement

+ 40%

Quality  
Improvement

**Typically using an MES, you can look at a  
2% - 5% savings year on year**



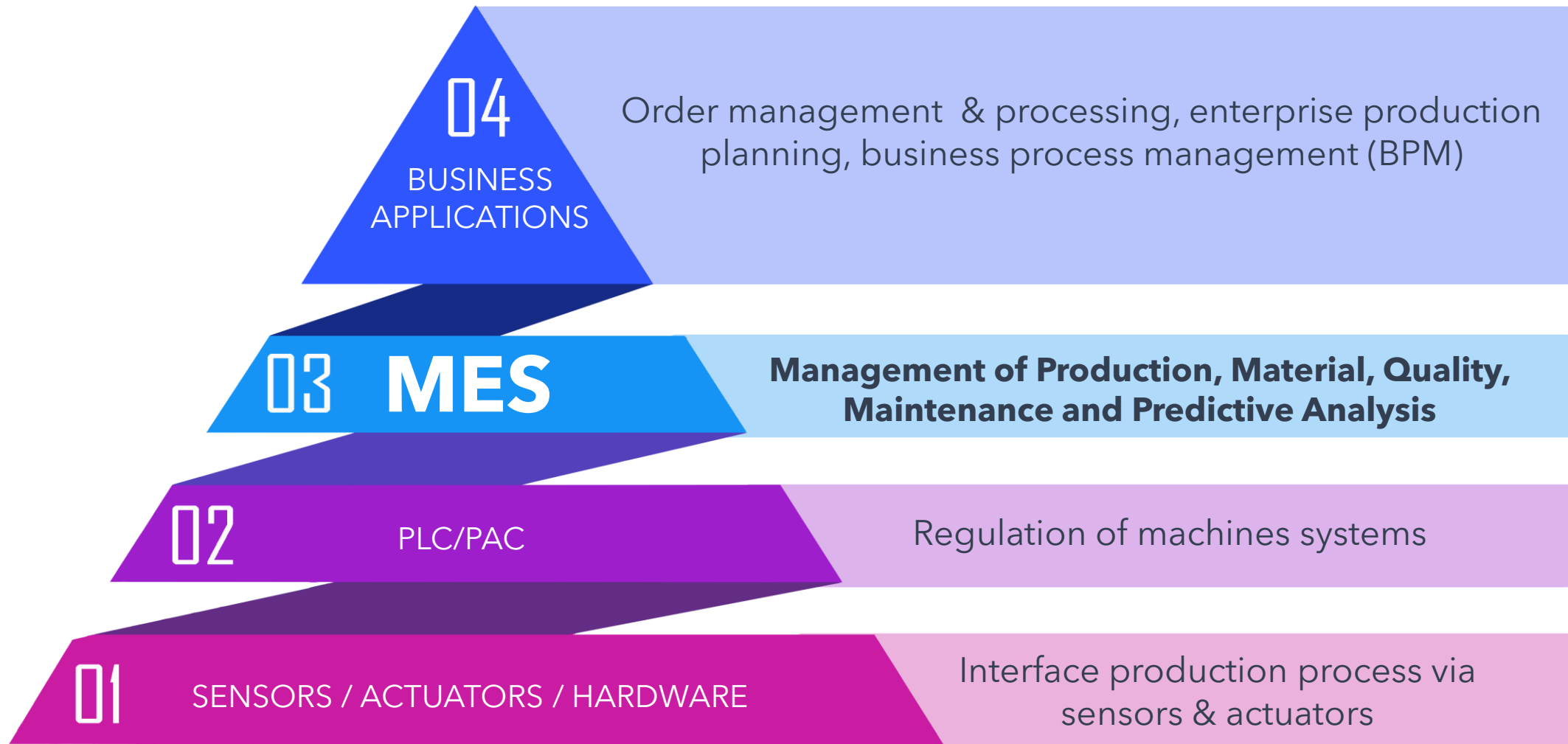
Opera MES

A person in a blue uniform is interacting with a tablet displaying a control panel interface. The background shows a robotic arm in a factory setting. The text is overlaid on a dark horizontal band across the middle of the image.

# **THE INTELLIGENT MES**

CONNECT . MONITOR . ANALYZE . PREDICT

# MES INFRASTRUCTURE



**"A MES represents the right balance between the plant level and the business level..."**

# WHAT PROCESSES ARE COVERED BY THE MES?

## ERP – ENTERPRISE RESOURCE PLANNING

LEVEL 4

*What and how to produce?*

*When and what to produce?*

*When, what and how was it produced?*

*How good it is what has been produced?*

*How did the machines produce?*

*How and which materials were used?*

Production Definition & Capability

Production Schedule

Production Progress & Performance

Quality Operations Management

Maintenance Operations Management

Material Operations Management

Production Resources Management

Detailed Production Scheduling

Production Execution

Tests Definition

Maintenance Plan

Materials Dispatching

Production Tracking

Tests Execution

Maintenance Execution

LEVEL 3

Product Definition Management

Production Dispatch

Production Performance Analysis

Tests Analysis

Maintenance Analysis

## CONTROL – AUTOMATION

LEVEL 1 & 2





# THE INTELLIGENT MES

## PRODUCTION & SEQUENCER

### PRODUCTION MANAGEMENT

Business model management  
 Product management  
 Work order management  
 Electronic dispatching of tasks/documents  
 Production data acquisition  
 Paperless factory management  
 Real-time monitoring and supervision  
 OEE calculation and performance analysis  
 Plant Analysis  
 Business Application Interface

### PRODUCTION SEQUENCER

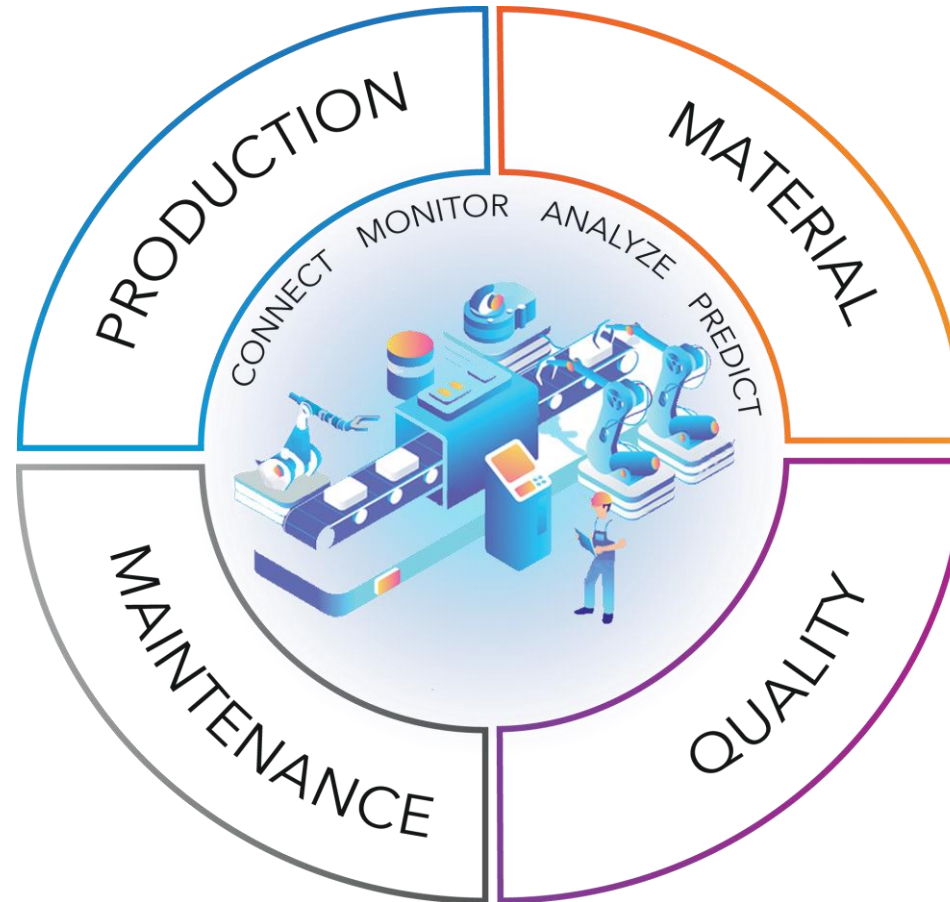
Finite Capacity Sequencing

## MAINTENANCE

Asset maintenance management  
 Preventive Maintenance  
 Breakdown Maintenance  
 Autonomous Maintenance  
 Predictive Maintenance  
 Spare parts/Materials consumption  
 Maintenance Performance Analysis

## DEVICE CONNECTION

Protocol & device connection logic management  
 Automatic data acquisition from device  
 Automatic dispatching of data to device  
 Machine Monitoring



## PREDICTIVE ANALYTICS

AI Integration (ANN)  
 Predictive Condition Monitoring  
 Predictive Maintenance  
 Predictive Quality  
 Dashboard in real time/predictions  
 Alarm and notification management

## AI COMPUTER VISION

Facial recognition  
 Temperature screening  
 Monitoring interpersonal distance  
 Monitoring number of people in an area  
 Monitoring use of personal protective equipment

## MATERIAL & TRACKING

### MATERIAL MANAGEMENT

Automatic identification of materials  
 Warehouse/location/lot management  
 Acceptance/Shipping of goods  
 Management of material pickings  
 Material handling  
 Stock levels monitoring and analysis  
 Electronic Kanban  
 Interfacing with automatic warehouse

### PRODUCT TRACKING & GENEALOGY

Generation and Management of lot/serial no.  
 Tracing and monitoring of lot/serial no.  
 Tracking/genealogy of lot/serial no.  
 Automatic identification of lot/serial no.

## QUALITY CONTROL

Test orders/quality checks management  
 Instrumental/visual tests management  
 Collection and Management of test results  
 Monitoring serial numbers/lots/quality checks

## PROCESS CONTROL

Process data management  
 Automatic collection of process data  
 Condition Monitoring  
 Real time monitoring of process data  
 SPC/Control chart analysis



# OPERATOR WORKSTATION (MULTI-RESOURCE)

Production control dashboard with 18 numbered buttons for various activities:

- 1 Start Activity
- 2 Suspend Activity
- 3 Start Setup
- 4 End Setup
- 5 Start Indirect Activity
- 6 End Indirect Activity
- 7 Entrance/Exit
- 8 Close Work Stage
- 9 Start Machine Downtime
- 10 End Machine Downtime
- 15 Start Rework
- 16 End Rework
- 18 Output
- 50 Create Team
- 51 Change Team Activity
- 52 Enter Team
- 53 Exit Team
- 54 Remove Team

Operator roster grid showing 15 operators:

Badge	Machine	Work Stage
002 Andrew	001 Ariel	006 Bruce
005 Colbert	004 Corin	
030 Daniel	007 Evelin	029 Fred
012 Jason	010 Joseph	
025 Kevin	015 Leonardo	014 Luc
027 Luisa	026 Maikol	

Machine status dashboard for Badge 001 showing 14 machines:

Machine ID	Machine Name	Status
001	Cutting Machine	Active
002	Welding Machine	Active
003	Bending Machine	Setting up
004	Assembling Machine	Idle
005	Welding Machine	Idle
006	Assembling Machine	Active
007	Injection Machine	Idle
008	Tires Assembling Machine	Down
009	Vulcanization Machine	Down
010	Finishing Machine	Idle
011	Packing Machine	Down
012	Painting Machine	Idle
013	Polishing Machine	Idle
014	Metal Processing Machine	Idle

Work stage details dashboard for Work Stage 005 showing 5 work orders:

Work Order ID	Product	Status
22000659	021 - Headlights	Operation...
22000657	021 - Headlights	Operation...
22000607	028 - Electric Motor	Operation...
22000608	028 - Electric Motor	Operation...
22000679	021 - Headlights	Operation...

Web-based operator workstation to manage activities on multiple machines. Easy to use, graphical, user-friendly and interactive interface to send and receive data in real time.



# OPERATOR WORKSTATION (MONO-RESOURCE)

The screenshot displays the Opera MES Operator Workstation interface for a machine in production. The interface is divided into several sections:

- Ongoing Activities:** A table showing current production tasks.
- Planned Activities:** A table showing future production tasks.
- Energy Consumption:** A section for monitoring energy usage.
- Production Metrics:** Large digital displays for Required speed, Current speed, Produced quantity, Left quantity, and Time left.
- Control Buttons:** A row of buttons for machine control.

ID number	Operator	Product	Operation	WO
1000033	Daniel	Headlights	Welding	Sales_Order_0140002
1000004	Ariel	Electric Motor	Electrical Wiring	Sales_Order_0140002
1000007	Davide	Headlights	Electrical Wiring	Sales_Order_0140002

Status	Product	Operation	Expected Start Date	Expected End Date
	Headlights	Electrical Wiring	4/21/2020 12:33:31 PM	4/21/2020 12:33:31 PM
	Headlights	Welding	4/21/2020 12:33:31 PM	4/21/2020 12:33:31 PM
	Electric Motor	Electrical Wiring	4/21/2020 12:33:59 PM	4/21/2020 12:33:59 PM
	Electric Motor	Welding	4/21/2020 12:33:59 PM	4/21/2020 12:33:59 PM

Required speed	Current speed	Produced quantity	Left quantity	Time left
6.00 Pieces/hour	0.00 Pieces/hour	0.00 Pieces	1000.00 Pieces	166.67 Hours

1	2	3	8	9	18
Start Activity	Suspend Activity	Start Setup	Close Work Stage	Start Machine Downtime	Output

Single-resource web-based operator workstation dedicated to the machine. Easy-to-use, graphical, user-friendly and interactive interface to send and view real-time data on machine status, productivity and efficiency.



# OPERA PLANT MANAGER

The screenshot displays the Opera MES web-based workstation interface. The dashboard is divided into several sections:

- Left Sidebar:** A navigation menu with categories: Production, Maintenance, Quality, Materials, and Monitoring. Below the menu is a 'Creation panel' with a 'CREATE' button and input fields for Machine id, Instrument Code, and Channel code.
- Top Header:** Includes the Opera MES logo, a search bar, and an 'Actions menu'.
- Main Dashboard:**
  - Welcome:** A central area with a search bar and a '+'
  - Machine activity time - Machine i...:** A donut chart showing activity breakdown: Direct activity (69.6%), Downtime (17.7%), Setup (7.44%), and Maintenance (5.24%).
  - OEE - Overall Equipment Effectiv...:** A bar chart showing OEE metrics: Availability (80), Performance (75.1), Quality (68.8), and OEE (40.8).
  - Test control chart - Machine id: 004:** A line chart showing samples over time (Feb 2, 9, 16, 2020) with control limits (LCL 0.000, UCL 1.150, CL 0.480) and a violation point.
  - Scheduled vs tracked man hours ...:** A horizontal bar chart comparing 'Done' and 'Scheduled' hours across various tasks like Pressing, organization, cal Wiring, Painting, Cutting, pounding, assembling, Welding, and Bending.
  - Machine downtimes by operator:** A stacked bar chart showing downtime for operators Ariel, Nicolas, Evelin, Joseph, and John.
  - Scheduled vs tracked man hours ...:** A horizontal bar chart showing 'Done' and 'Scheduled' hours for tasks: Pressing, organization, cal Wiring, Painting, Cutting, pounding, assembling, Welding, and Bending.
  - Machine downtimes by operator:** A stacked bar chart showing downtime for operators Ariel, Nicolas, Evelin, Joseph, and John, categorized by causes like Generic breakdown, Tool problem, Automatic Warning Signal, Shortage of lubricants, Not coloured, Electrical problem, Not homogenous compound, and Lack of material.
  - MTBF - Mean time between failur...:** A line chart showing MTBF over time (Feb 2, 9, 16, 23, 2020).

Web-based workstation for data management, analysis & supervision. Powerful & visually striking analytics features. Dashboards & layouts for monitoring & supervising production.



# PRODUCTION MANAGEMENT

## KEY FEATURES

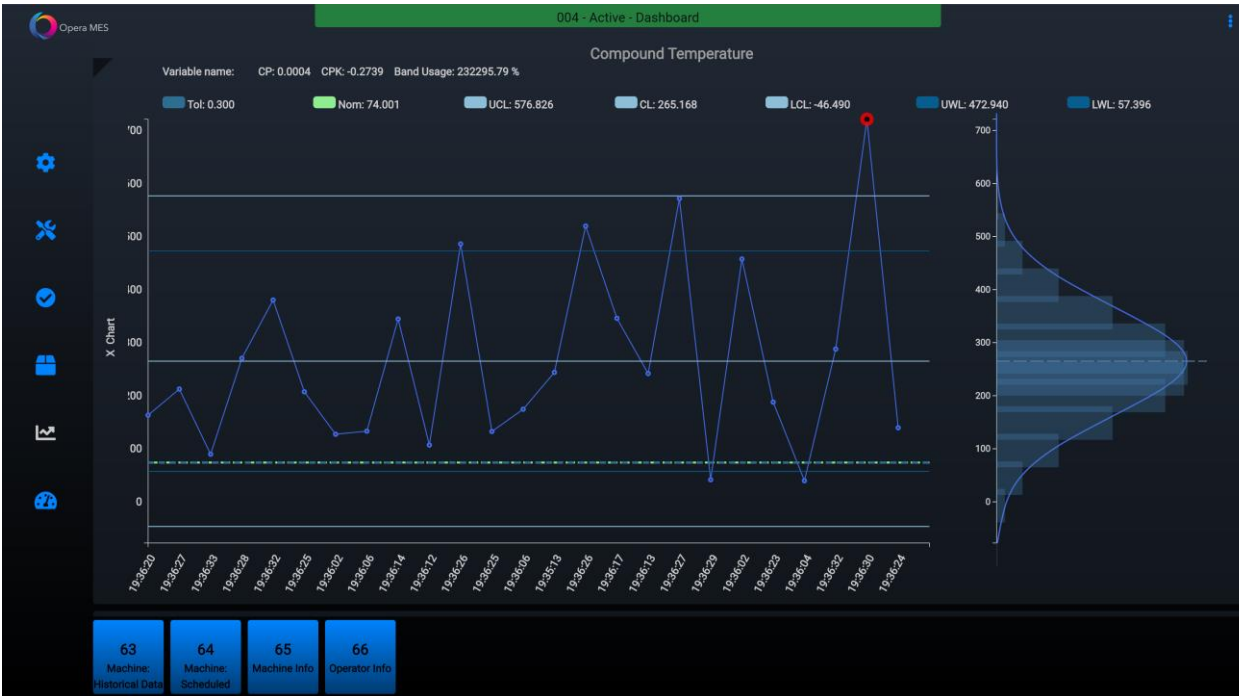


- Master data management
- Product Management
- Work order management
- Dispatching of tasks/documentation
- Production data acquisition
- Paperless factory management
- Real-time monitoring and supervision
- OEE & Performance Analysis
- Plant Analysis
- Interface with Business Applications



# DEVICE CONNECTION

## KEY FEATURES



- Protocol & device connection logic management
- Automatic data acquisition from device
- Automatic dispatching of data to device
- Machine Monitoring



# INTERCONNECTION TO ANY DEVICE

## **Supported protocols**

- OPC DA (Classic)
- OPC UA
- MTConnect
- MQTT
- Euromap63 - Euromap 77
- GPIO (Android/Linux)
- OPC DB
- SQL
- Broker Message
- Viox-XML
- TCP/IP configuring the decode driver

## **Native Drivers**

- Fanuc
- Siemens S7

## **Supported architectures**

- Rest - XML
- Rest - JSON



# OPERABOT

## Opera Chat for the Social Factory



- Integration between Opera & Telegram messaging app
- Tool for communicating with resources (machines and operators)
- Sending information from the app to users (text messages, videos, pdf files etc.)
- Access to factory information (info request on machine status, activity in progress, process parameters, etc.)
- Sending commands to resources

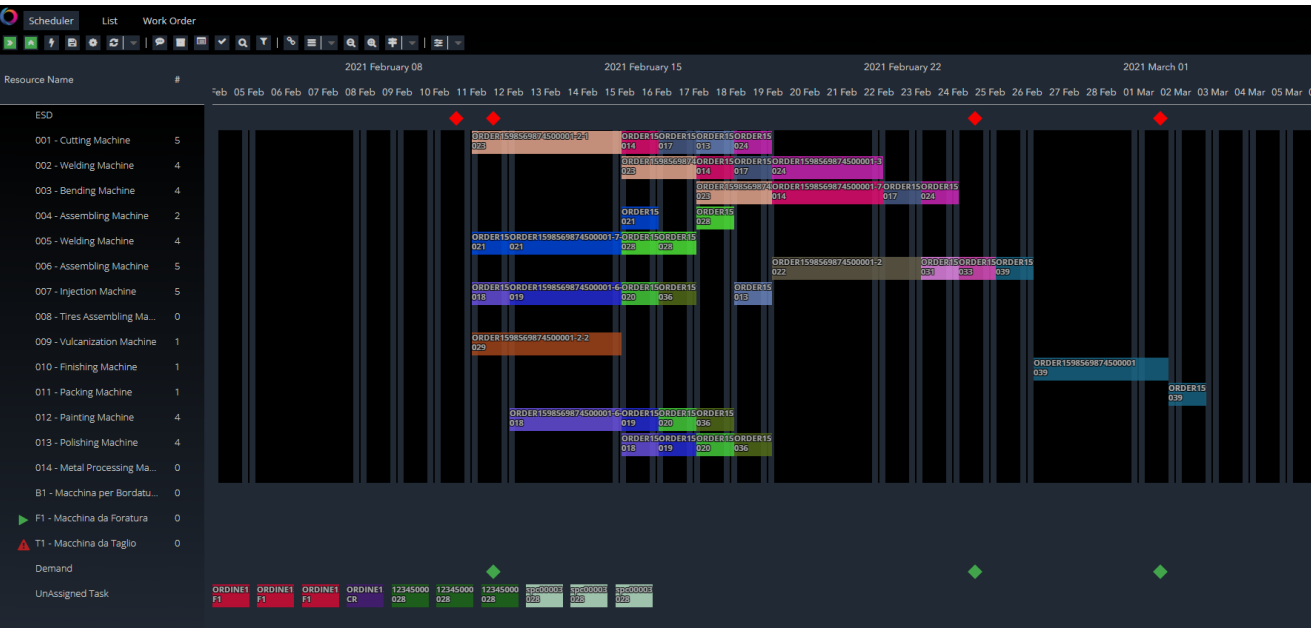




# PRODUCTION SEQUENCER

## KEY FEATURES

- Order/production phase scheduling
- Finite capacity scheduling
- Check material availability
- Material pegging
- Graphical and interactive Gantt chart
- Drag & drop functionality & graphic tools for data visualization on the Gantt
- Graphic histogram of resource workload
- Real-time synchronization with production progress





# QUALITY CONTROL

## KEY FEATURES



- Test orders/quality checks management
- Instrumental/visual tests management
- Collection and Management of test results
- Monitoring serial numbers/lots/quality checks



# PROCESS CONTROL

## KEY FEATURES



- Process data management
- Automatic collection of process data
- Condition Monitoring
- Real time monitoring of process data
- SPC/Control chart analysis



# MATERIAL MANAGEMENT

## KEY FEATURES

The screenshot shows the Opera MES interface for material management. At the top, it displays '005 - Active - Materials'. Below this, there are several data sections:

- BOM Table:**

Sta	Product I	Product Desc.	Total Qty.	Qty. Warehous	Qty. On mach	Necessary Qt
005	Wires		1000.0000	4000.0000	807.0000	809.0000
008	Motherboard		1000.0000	38000.0000	853.0000	809.0000
- Left time:** 134.83 Hours
- Alarm:** ALARM Motherboard 008
- Batches Produced Table:**

Statu	Handling Unit ID	Batch ID	Product ID	Product Desc.	Quai
- Batches Picked Table:**

Handling Unit ID	Batch ID	Product ID	Product Desc.	Quant
220000003	-	005	Wires	147.000
220000004	-	008	Motherboard	147.000
- Histogram:** A bar chart showing production quantities for 'Wires' and 'Motherboard'. The x-axis ranges from 0 to 35,000. The 'Wires' bar is approximately 1,000 units, and the 'Motherboard' bar is approximately 1,500 units.

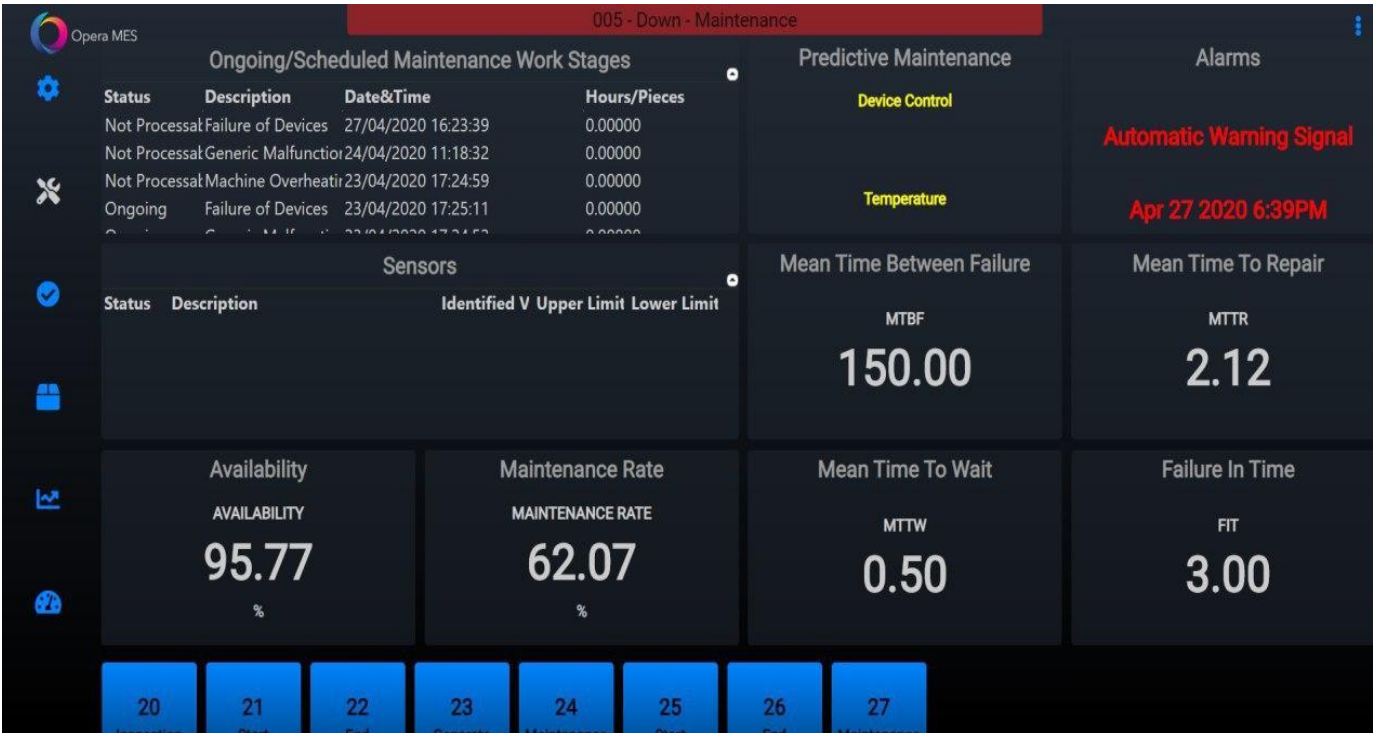
At the bottom, there are several blue buttons with numbers: 40, 41, 42, 49, 30, 31, 35, 34.

- Automatic identification of materials
- Warehouse/location/lot management
- Acceptance/Shipping of goods
- Management of material pickings
- Material handling
- Stock levels monitoring and analysis
- Electronic Kanban
- Interfacing with automatic warehouse



# MAINTENANCE MANAGEMENT

## KEY FEATURES



- Asset maintenance management
- Preventive Maintenance
- Breakdown Maintenance
- Autonomous Maintenance
- Predictive Maintenance
- Spare parts/Materials consumption
- Maintenance Performance Analysis



# PREDICTIVE ANALYTICS

## KEY FEATURES



- AI Integration (ANN)
- Predictive Condition Monitoring
- Predictive Maintenance
- Predictive Quality



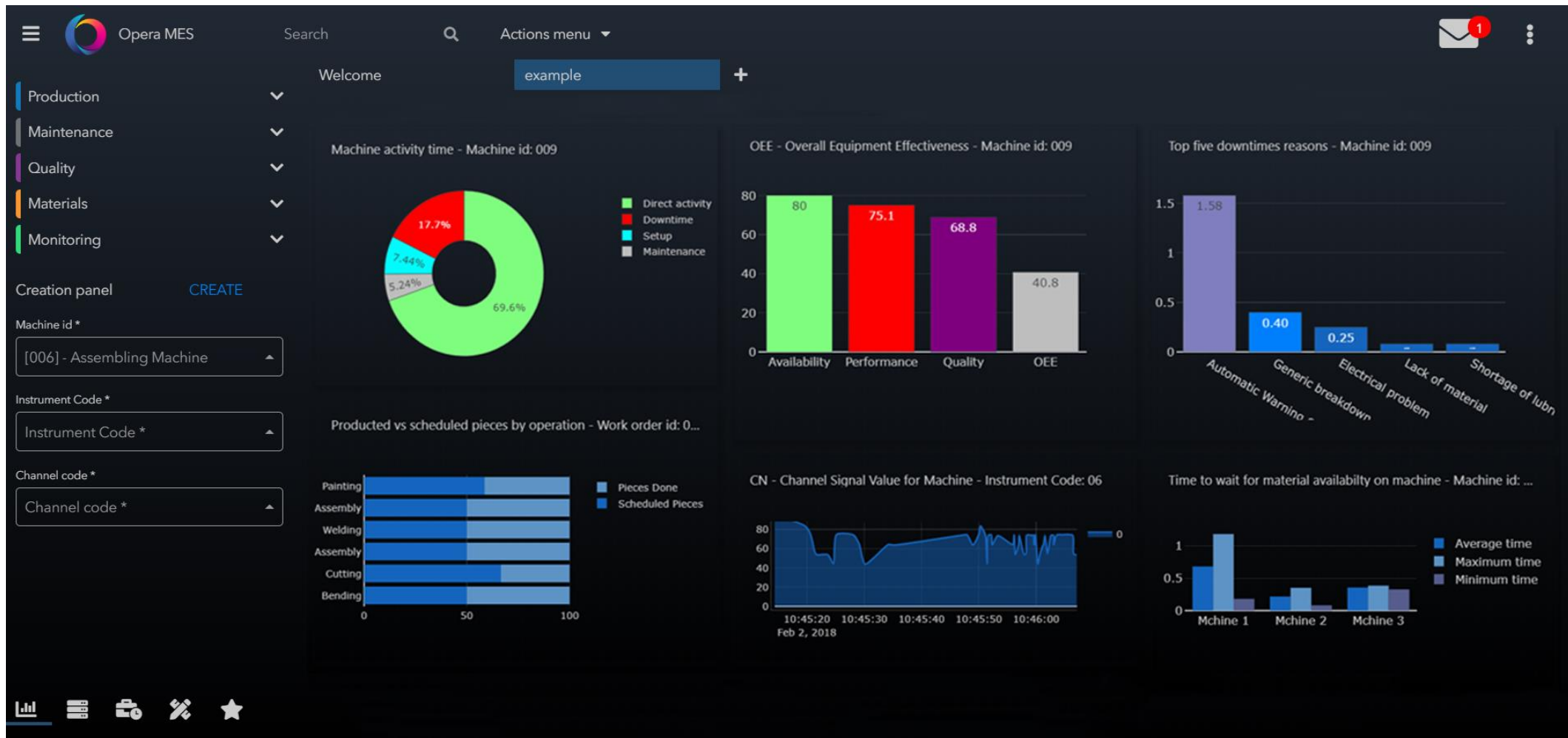
# PLANT MANAGER

The screenshot displays the Opera MES Plant Manager interface. At the top left is the Opera MES logo and a search bar. A navigation menu on the left lists categories: Production (with sub-items: Resource analysis, Quick comparisons), Maintenance (with sub-items: Maintenance KPI, Quick comparisons, Incidental on scheduled maintena..., Sensor Tracking), and Quality (with sub-item: Statistical Process Control). Below the menu is a 'Creation panel' with a 'CREATE' button. The main content area features a 'Welcome' card, a 'Get Started' section with links for 'Load layout', 'Open settings', and 'Open Configuration', and a 'Recents' list including 'Work center machine status', 'Work center OEE', 'Machine activity time', 'Machine Setup Tools', 'Monitors', 'MntrUsers', 'Actions', 'Warehouses', 'Departments', 'Plants', 'Products', 'Inspections', 'Shipping', 'Production Orders', 'Maintenance Requests', and 'Purchase Orders'. To the right, there is a 'Learn More' section with links for 'User Documentation', 'Web Api List', and 'Technical Documentation', and a 'News' section with a message: 'Apparently there are no news at the moment'. A bottom toolbar contains icons for a bar chart, a list, a factory, a wrench, and a star.

Opera Plant Manager is the interface dedicated to data management & analysis.



# PLANT ANALYSIS / PRODUCTION LAYOUT



Sample machine layout for data analysis: Machine Uptime, Machine OEE, Pareto Top5 Losses, Downtime Analysis, Work Order Analysis, etc.





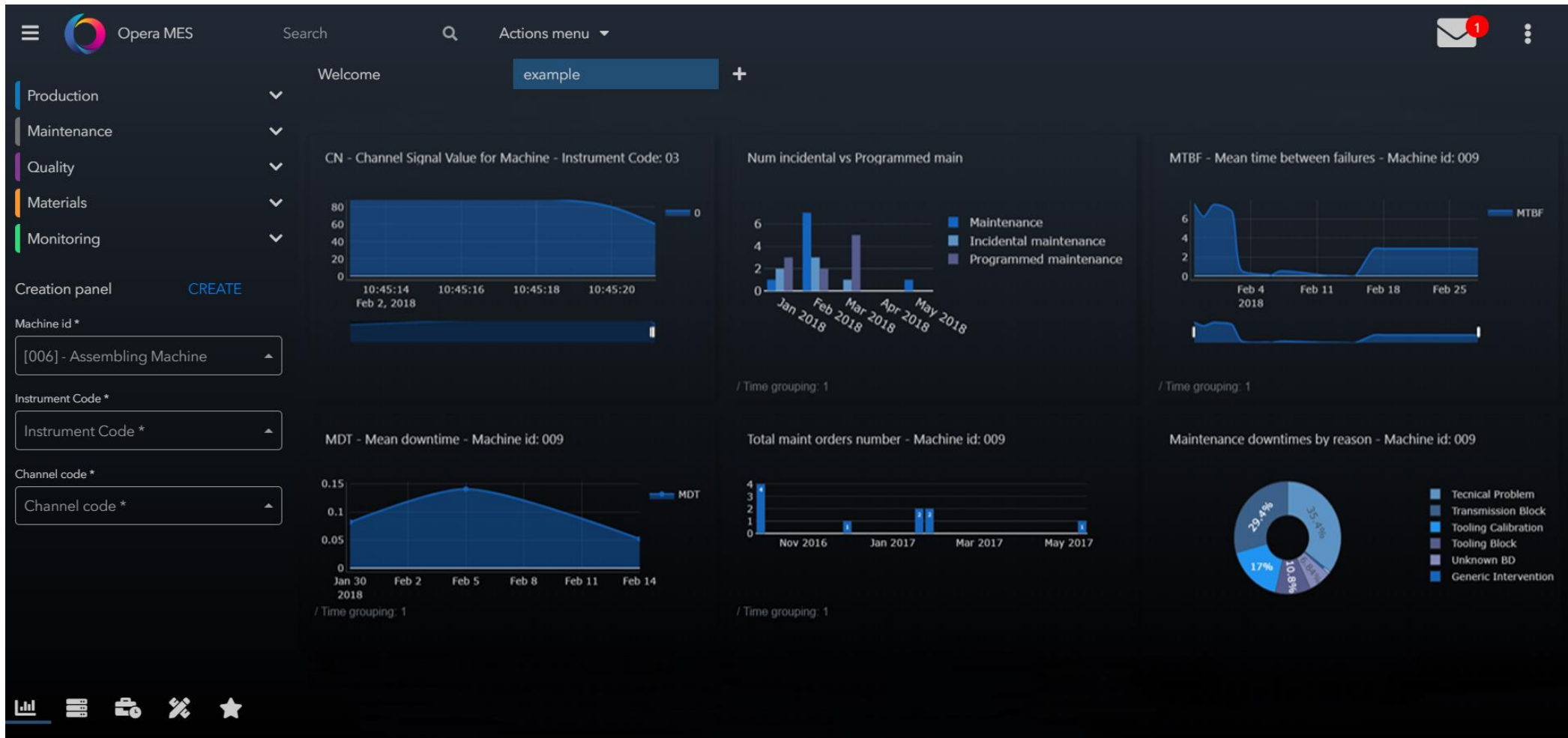
# PLANT MANAGER/QUALITY AREA



Sample layout for the Quality and SPC areas (Real-time control charts)



# PLANT MANAGER/MAINTENANCE LAYOUT



Sample layout for the Maintenance area (machine parameters in real time, downtime vs preventive maintenance, **MTBF**, **MTD**, **MTR**, **MTTF**, **MTTW**, total number of maintenance orders, main causes of downtime etc.)



# DATA MANAGER

The screenshot shows the Opera MES Data Manager interface. On the left is a navigation sidebar with categories: Company (Plants, Departments, Machines, Operators, Secondary Resources, Tools, Reasons, Target Work Center), Production, Materials, Quality, and Maintenance. The main area displays a table titled 'Machines' with 14 rows and 11 columns. The columns are: Number, Machine Status Color, Machine Status Descr., Machine, Machine Descr., Dept. Id, Cost Center, Work Center, and Alternative ma. The table contains data for 13 machines, with a 'Count: 14' at the bottom. The interface includes a search bar, an actions menu, and various icons for filtering and navigation.

	Number	Machine Status Color	Machine Status Descr.	Machine	Machine Descr.	Dept. Id	Cost Center	Work Center	Alternative ma
	1	●	Active	001	Cutting Machine	200	1	1	MAC.
	2	●	Active	002	Welding Machine	200	1	1	MAC.
	3	●	Setting up	003	Bending Machine	200	1	1	MAC.
	4	●	Idle	004	Assembling Machine	201	2	2	MAC.
	5	●	Idle	005	Welding Machine	201	2	2	MAC.
	6	●	Active	006	Assembling Machine	202	3	3	MAC.
	7	●	Idle	007	Injection Machine	201	4	4	MAC.
	8	●	Down	008	Tires Assembling Machine	204	5	5	MAC.
	9	●	Down	009	Vulcanization Machine	204	5	5	MAC.
	10	●	Idle	010	Finishing Machine	205	6	6	MAC.
	11	●	Down	011	Packing Machine	205	6	6	MAC.
	12	●	Idle	012	Painting Machine	203	7	7	MAC.
	13	●	Idle	013	Polishing Machine	203	7	7	MAC.

Data Manager: interface dedicated to master data management.  
Sample of machine list table, with functions such as Edit, Cancel, New.  
Interactive tables for data navigation (filters, aggregations, mathematical formulas etc.).



# PLANT ANALYSIS: PLANT OVERVIEW



Visualization of the map of the entire factory.



# OPERA PLANT MANAGER: DEPARTMENT OVERVIEW



Map of a specific department with production progress data for each machine in real time.



# OPERA PLANT ANALYSIS

Keep your factory under control

Anytime from anywhere



- Web-based tool for Smart & Digital Factories
- Compatible with any device & any operating system
- New generation Software (Angular, NetCore, Bootstrap)
- Cloud compatible
- Highly configurable to create new layouts & dashboards
- Easy Integration with other BI systems



# KEY FEATURES



Factory Information  
System Industry 4.0



International  
Multi- language  
MES Platform



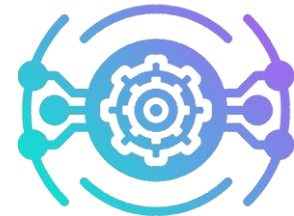
Modular & Highly  
Configurable



Easy Integration  
Any system  
Any device



Web-based &  
user-friendly interface



Intelligent MES  
towards the  
5<sup>th</sup> Revolution



# OPERA PLATFORM





# INTERNATIONAL NETWORK



ITALY  
SPAIN  
POLAND  
ROMANIA

BULGARIA  
HUNGARY  
GERMANY  
BELGIUM

FRANCE  
THE NETHERLANDS  
SERBIA  
**INDIA**

USA  
CANADA  
MEXICO  
CHINA

BRASIL  
SRI LANKA  
UK



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