



**Unicam MJML**

# SIMATIC IT Unicam

Answers for industry.

**SIEMENS**

## Introduction

Established Electronics Manufacturing Supplier (EMS) companies, young or mature, often have inconsistent, ill-defined processes and a variety of software for building products. More precisely, mistaken operational decisions made on a minimal local data and rough rules of thumb, inconsistent planning, and unavailability or miss-tracking of material and resources are the primary root causes of downtime. One case study of an electronics assembly plant found production lines were operating at a severely inefficient rate and being non-productive 48% of staffed time.

## Planning pains and requirements

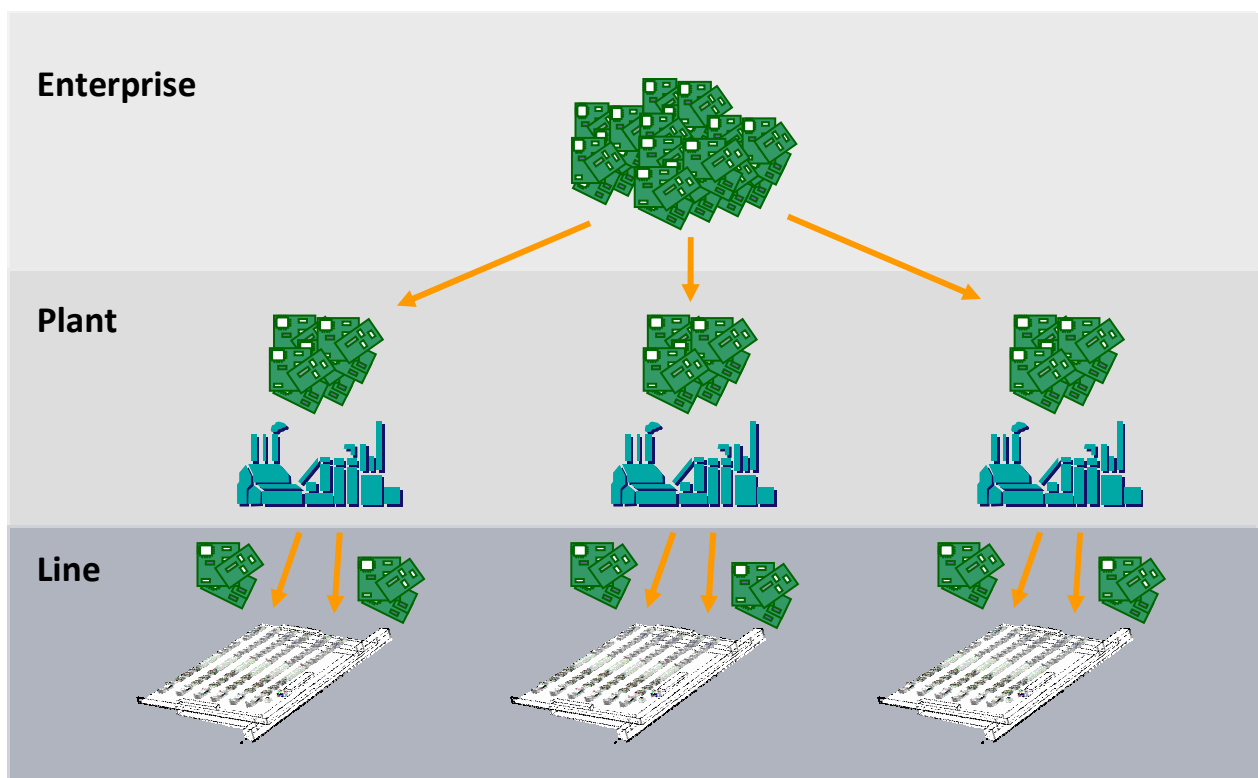
Reduce Downtime! Most companies have their planning focus in the Enterprise Resource Planning systems (ERP) like SAP. These systems are working nearly decoupled from the shop floor so that the SMT lines are treated as a “black box”. The detailed knowledge is missing to answer the most critical questions like:

- Does a product fit on a line in terms of feeder space?
- Could you group products from product families saving change-over time?
- Does a line provide the technical requirements like needed: nozzle types, feeder types, cameras, etc.?
- 

Streamline planning and improve Operational Efficiency! It is impossible to close the gap between the ERP system and the Shop floor without the detailed technical knowledge of the product data and equipment used. Lacking this information makes it very hard to do precise capacity and resource planning.

Typical questions of the different planning departments are:

- How to run my equipment in the most efficient way?
- Do we have enough production capacity?
- What's the best line configuration for my products?
- Where and when to produce?



## Unicam MJML-the solution

The Unicam MJML is a standalone software solution, supporting you in your most critical planning questions and activities for your SMT lines. The system was developed in cooperation with our existing UniCam and Assembly Expert customers. The core of Unicam MJML is the simulation and optimization engine with over 20 years of history and experience use in the market. The main data sources for the Unicam MJML are these NPI systems providing job, machine, line and library data to the simulation tool. In addition, order data is required which is typically coming from an ERP system.

The first version of the Unicam MJML contains the following modules:

### Order Manager

The Order manager allows the user to maintain the orders and the order properties such as Qty. The module allows you to change the job data and gives an overview about the products and the basic data.

### Line Manager

The line manager enables the user to define and manage several lines for different simulation purposes. Adding new machines or changing line configurations can be done very easily.

### Similarity Check

This module analyses the entered products in terms of part similarities, overlapping, number of parts and part types etc. The simulation results can be displayed in various reports including export functionalities to Excel, PDF or Word.

	Order21	Order22	Order23	Order24	Order25	Order26	Order27	Order28	Order29	Order30	Order31
Order21		100.00%	62.50%	62.50%	62.50%	62.50%	62.50%	62.50%	62.50%	62.50%	62.50%
Order22	100.00%		62.50%	62.50%	62.50%	62.50%	62.50%	62.50%	62.50%	62.50%	62.50%
Order23	31.25%	31.25%		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Order24	31.25%	31.25%	100.00%		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Order25	29.41%	29.41%	94.12%	94.12%		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Order26	26.32%	26.32%	84.21%	84.21%	89.47%		100.00%	100.00%	89.47%	89.47%	100.00%
Order27	26.32%	26.32%	84.21%	84.21%	89.47%	100.00%		100.00%	89.47%	89.47%	100.00%
Order28	26.32%	26.32%	84.21%	84.21%	89.47%	100.00%	100.00%		89.47%	89.47%	100.00%
Order29	29.41%	29.41%	94.12%	94.12%	100.00%	100.00%	100.00%	100.00%		100.00%	100.00%
Order30	29.41%	29.41%	94.12%	94.12%	100.00%	100.00%	100.00%	100.00%	100.00%		100.00%
Order31	26.32%	26.32%	84.21%	84.21%	89.47%	100.00%	100.00%	100.00%	89.47%	89.47%	

## Assignment Check

This tool analyzes the selected products and assembly lines. It checks for all technical restrictions to see whether products fit on selected lines. It calculates the production time per panel and order for each technically possible product-line assignment. The so called “DeRating” factor shows the difference between the actual and normal capacity per line and is a good indicator to judge how good a job fits to a line. The results are presented again in various reports with the already mentioned export functionalities.

The screenshot shows the 'ReportView' application window. The main content area displays a 'Hauptbericht' (Main Report) with a table of order assignments and a 'Simulation Results' section. The 'Simulation Results' section is divided into two parts: 'Line-1' and 'Line-7'. Each part contains a table with columns for Order, Panel, t Panel, t Order, DeRating, and Setup Time.

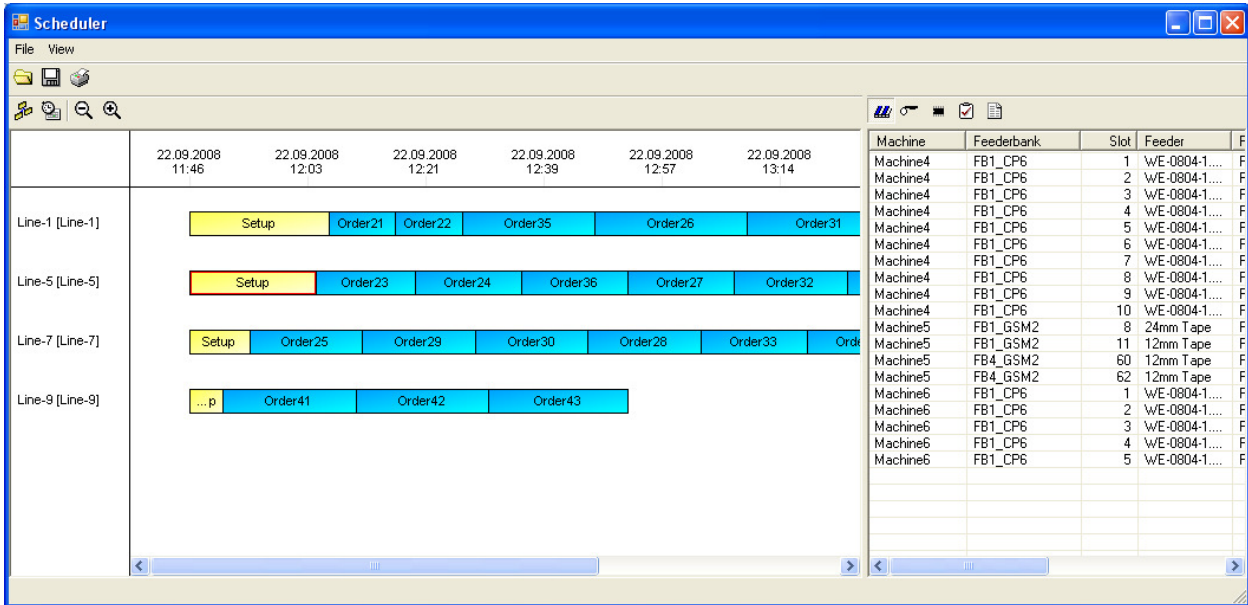
Order	Panel	t Panel	t Order	DeRating	Setup Time
Order31	PCB_31		Bottom	100	
Order41	PCB_41		Top	100	
Order42	PCB_42		Top	100	
Order43	PCB_43		Top	100	
<b>Line-1</b>					
Order21	PCB_21	8,9s	0,2h	81.8%	180,0s
Order22	PCB_22	8,9s	0,2h	81.8%	180,0s
Order41	PCB_41	14,1s	0,4h	76.2%	180,0s
Order42	PCB_42	14,2s	0,4h	76.7%	180,0s
Order43	PCB_43	13,1s	0,4h	76.2%	180,0s
<b>Line-7</b>					
Order21	PCB_21	6,3s	0,2h	65.5%	180,0s
Order22	PCB_22	6,3s	0,2h	65.5%	180,0s
Order23	PCB_23	9,2s	0,3h	31.4%	330,0s
Order24	PCB_24	9,2s	0,3h	31.4%	330,0s
Order25	PCB_25	12,3s	0,3h	43.6%	390,0s
Order26	PCB_26	12,2s	0,3h	43.6%	390,0s
Order27	PCB_27	12,2s	0,3h	43.6%	390,0s
Order28	PCB_28	12,5s	0,3h	41.5%	390,0s
Order29	PCB_29	8,8s	0,2h	29.0%	390,0s
Order30	PCB_30	8,8s	0,2h	29.0%	390,0s
Order31	PCB_31	12,6s	0,3h	44.6%	390,0s
Order41	PCB_41	12,7s	0,4h	64.8%	210,0s
Order42	PCB_42	12,4s	0,3h	64.6%	210,0s
Order43	PCB_43	11,0s	0,3h	62.3%	240,0s

## Multi-job-Multi line (MJML) Optimizer

This module uses again products and lines as input. First a technical check is done, after that a complex optimization algorithm calculates the best order line assignment and the best order sequence per line, including cluster generation. Optimization goals are to minimize the overall production time, reduce the changeover time and to get a well balanced SMT plant. The user has an influence on the optimization goals through various settings like:

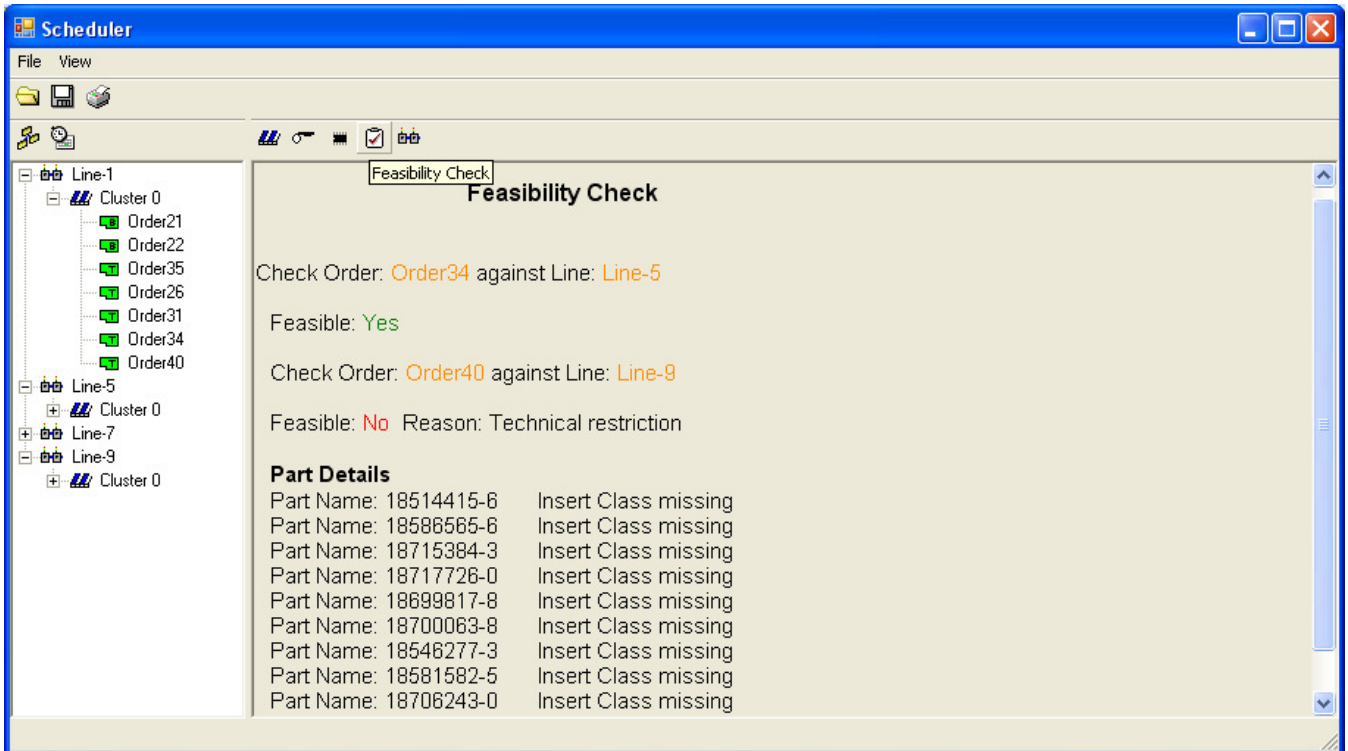
- Exclude orders from lines
- Fixed order group
- Fixed order sequences
- Group sequences
- High runner order in its own cluster etc.

The results will be presented in a graphical form with several sorting and filtering features.



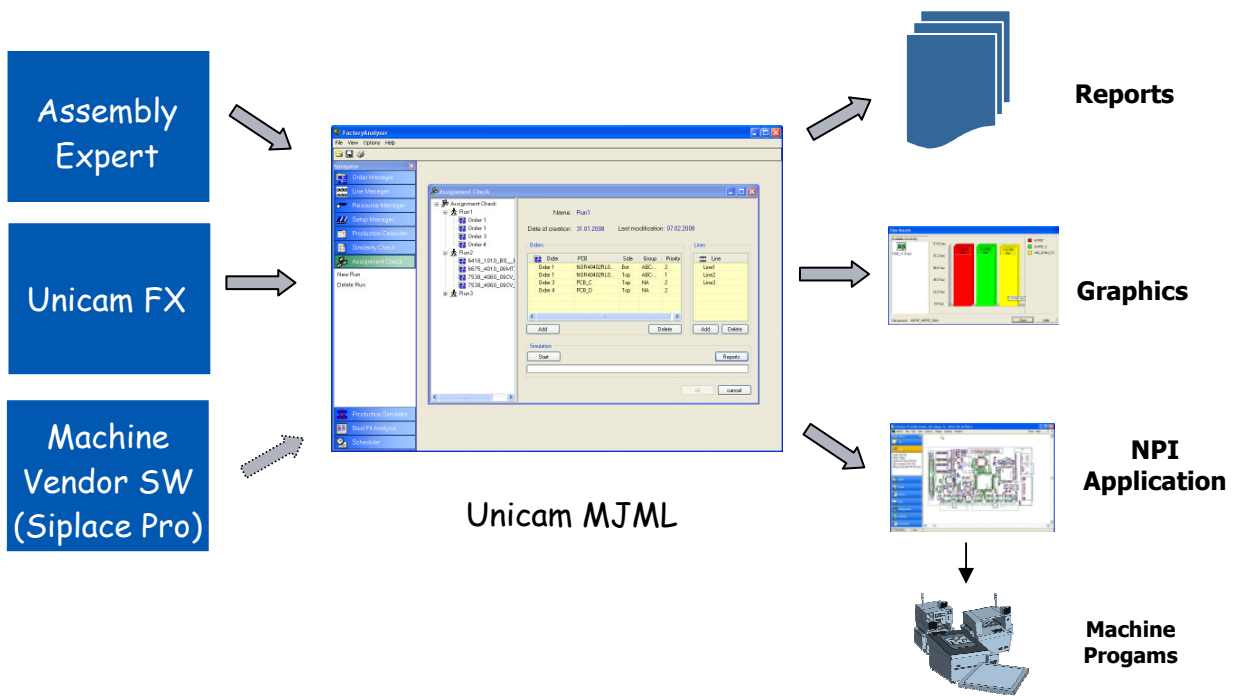
### Interactive Planner

The interactive planner enables the user to move orders between lines and setups (clusters). The planner checks right away the technical condition. The user will be informed directly if a requirement could not be fulfilled. (e.g. a feeder type on this line is not available, not enough loading capacity etc). If technically possible, the planner calculates the new scenario for that planning segment.



## The Unicam MJML in cooperation with the NPI product suite

The Unicam MJML is tightly linked with the Siemens NPI products Assembly Expert and UniCam FX. These systems are the main data source. Data about panels, circuits, parts, machines, lines and other resources are coming from these systems. The input of the Unicam MJML is a normalized format so that connections to other NPI systems, (e.g. to a machine vendor software like Siplace Pro) is possible without any problems.



## Conclusion

The Unicam MJML is the missing puzzle piece between the ERP system and the shop floor. Developed as a “bottom up approach”, the Unicam MJML owns the mandatory specific knowledge to do a detailed analysis and very precise planning. The user gets the needed overview about his products and assembly equipment. The user can plan through simulated; optimization runs of the production schedule and is well prepared for the upcoming tasks.

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