

Smaller, faster, lighter: How line controllers compete with MES solutions

from Robin Schubert, Product Manager Manufacturing Automation at Kontron AIS GmbH

The big question for many companies who are considering the digitalization of production sites: Implement production control solutions in one go, or take it one step at a time? MES and line controllers provide different answers to this question, but which software is best for making processes more efficient and transparent?

There are two central solutions to choose from: the Manufacturing Execution System (MES) and the Line Controller (LC). While both pursue similar goals, they have fundamental differences in terms of scalability, flexibility, and complexity. In order to make the right decision, manufacturing companies need to take these points into consideration.



MES and line controller: similarities and definition

In discussions, the distinction between MES and line controller is clear. In practice, however, the boundaries are becoming increasingly blurred – particularly

because of hybrid solutions that also integrate functional modules from SCADA, ERP or maintenance planners. Despite these similarities, the core concepts have different definitions. »

Manufacturing Execution System

An MES is a comprehensive software solution that controls and monitors the entire manufacturing process across departments. It orchestrates production processes, optimizes work sequences and enables central control and monitoring of production machines. Typical functional modules include:

- › **Production control:**
coordination and planning of production processes
- › **Recipe management:**
administration and provision of process parameters

- › **Data acquisition:**

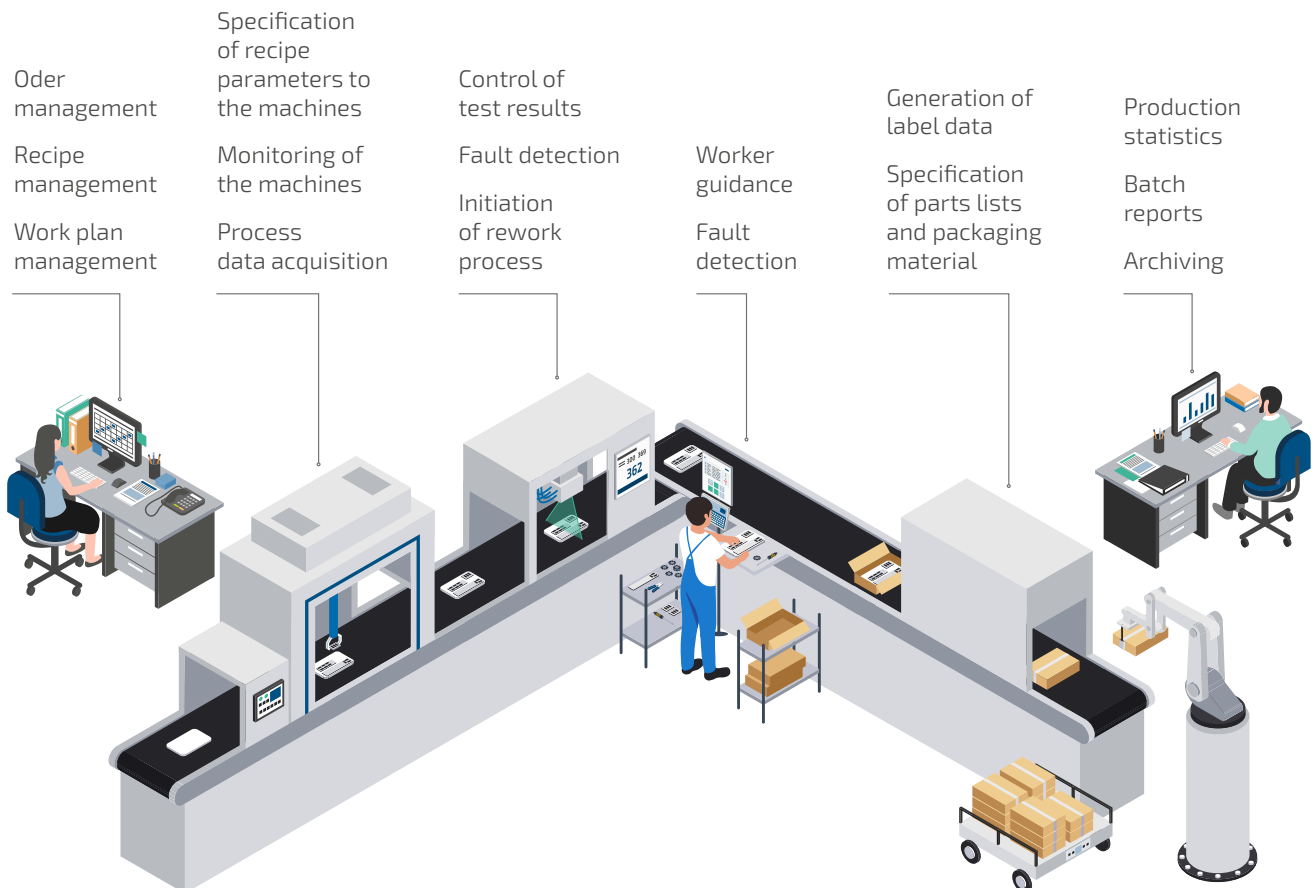
collection and analysis of production data in real time

- › **Visualization:**

presentation of machine status and production figures

Line controller

A line controller offers the same core production control functions as an MES, but is limited to a single production line or a single production cluster. The focus is on production-related process control with recipe management, product data acquisition and data visualization. »



Line controllers offer comprehensive MES functionalities for controlling individual production lines.

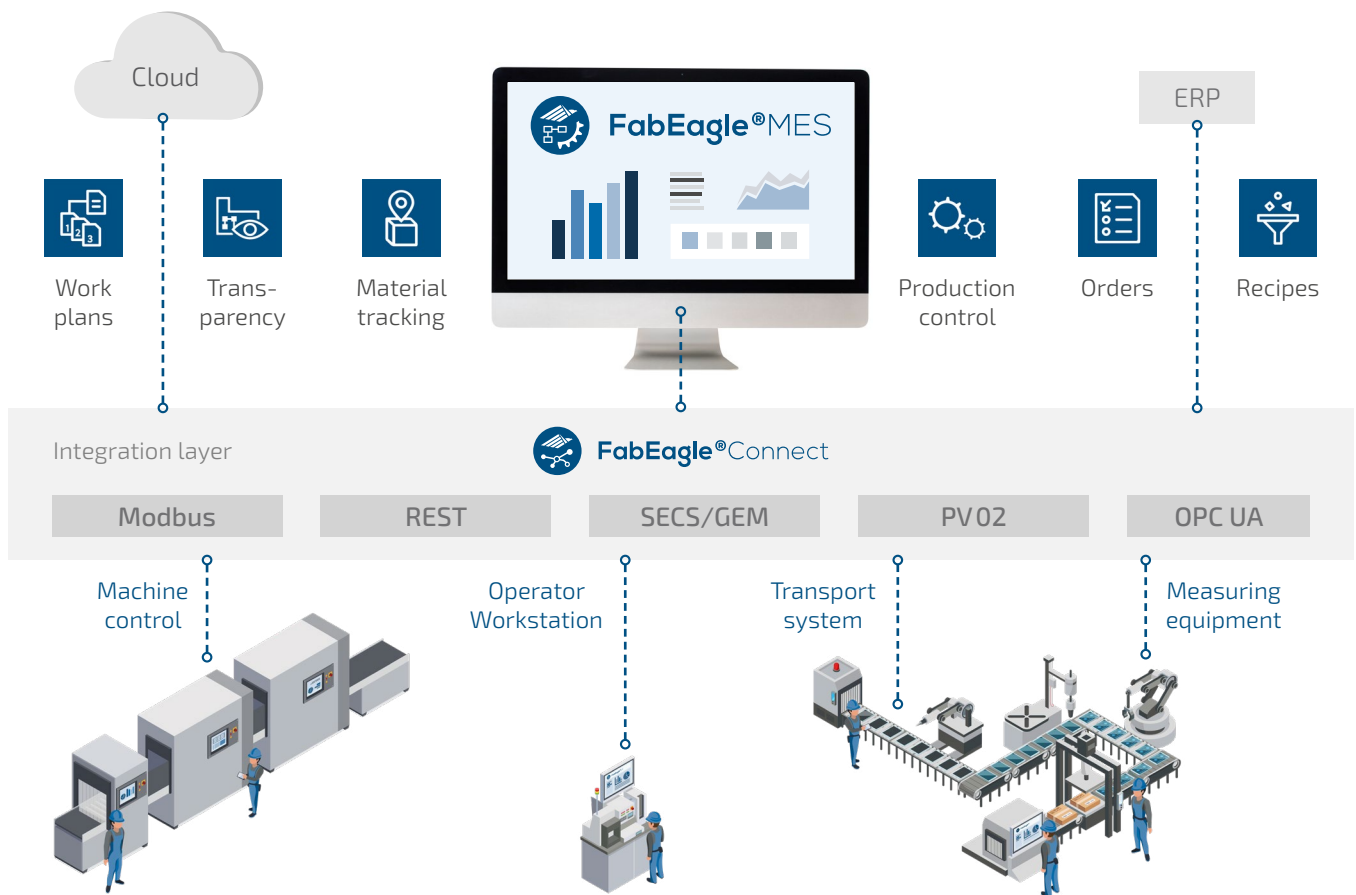
Fundamental differences between line controllers and MES

Choosing between an MES and a line controller is not an easy decision, but is determined by factors such as scalability, flexibility, speed and complexity. Both software solutions have their strengths. The extent to which those strengths can be used in production depends on the specific requirements of the companies.

Scaling: From the first machine to the entire factory

The biggest difference between MES and a line controller is scalability. Companies that are not able to completely digitalize their manufacturing processes overnight have an advantage if digitalization can be implemented step-by-step. However, not every software solution supports this.

- › **Think Big:**
MES solutions can be modularly expanded as monolithic systems, but cannot be dismantled into autonomous units. MES implementation requires long-term planning and a clear definition of requirements for the entire production process. Expansions and scaling are only possible within the existing system architecture, which requires predictive integration. This approach also involves high initial investment costs.
- › **Scale Easy:**
Line controllers are used for individual production lines. More line controllers can be implemented independently and in stages for additional production lines without affecting ongoing production at other lines. In contrast to an MES, implementing a line controller involves lower initial investment costs. »



MES systems provide comprehensive control for the entire production landscape.

Flexibility:**adaptability to current requirements**

Regardless of whether MES or line controller – the flexibility of a production control system to adapt to changes in production or to new requirements is decisive for remaining competitive over the long term. Aspects such as connectivity, visualization, and migration need to be taken into consideration when evaluating adaptability in dynamic production environments.

› **Connectivity:**

Production control systems often rely on integrated interface configurations, which are made available by each software provider. However, external software such as the FabEagle®Connect low-code integration solution offers additional flexibility as a standardized integration layer between machine and production IT for adapting to different machine interfaces.

› **Visualization:**

Line controllers have the advantage of intuitive and clearly structured visualizations in the dashboard and at manual workstations. Users can configure individual views that are tailored exactly to their tasks. An MES, on the other hand, usually offers complex overviews that provide detailed information about a variety of processes with a more holistic perspective.

› **Integration:**

Line controllers can be easily moved with the production line to a new location and integrated into existing IT structures there. MES solutions are not suitable for handling the relocation of some of the production lines because they are comprehensively connections across all production areas.

Complexity:**Understanding and user-friendliness of the solution**

The acceptance of production control software depends heavily on its user-friendliness. MES solutions are impressive due to their versatility, but can be

challenging in practice due to their complexity. Because an MES controls the entire production process, cross-departmental knowledge is required to operate it. This requires training and comprehensive user management to avoid errors.

Line controllers, on the other hand, are often more intuitive to operate because of their clear focus on a single production line. Their reduced complexity generally increases acceptance by the operators. Users can also act faster and more independently, which also speeds up the launch of the system.

Speed:**How quickly can a system be launched**

Launching a new production control system requires careful planning, which depends heavily on the chosen system. MES solutions need an in-depth, cross-departmental specification to integrate the processes and requirements of the whole production process. This requires long-term planning and intensive coordination between all departments and stakeholders – it usually takes between six and nine months from specification to integration.

Line controllers, on the other hand, focus on individual production lines. Their specification and planning are carried out specifically in cooperation with the machine supplier, which simplifies and speeds up implementation – this often only takes between three to five months.

There are also significant differences between the two systems during commissioning: line controllers facilitate rapid implementation, while an MES requires many interface tests and functional tests due to extensive integration, which can delay the start of production.

The choice of the most suitable system therefore depends on the specific requirements and goals of the manufacturing company – in particular with regard to the time it takes to carrying out the specification, implementation, testing and ramp-up.

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Trends and conclusion:

Choosing between an MES and a line controller

The future of production control systems lies in modular and scalable architectures. Platform-based approaches are at the heart of this development because they enable greater flexibility and interoperability. These are properties that are becoming increasingly important in view of increasing demands for agility and sustainability. Modular software such as FabEagle®Connect, which acts as a standardized bridge between machines and IT systems, supports this trend. However, the decision between MES and line controller still depends on the manufacturing company's specific requirements.

An MES is the ideal solution for companies that require end-to-end, factory-wide integration, following a holistic automation strategy. It enables the overall coordination of processes and departments and provides a powerful platform for increasing efficiency.

For companies that want digital transformation flexibly, quickly and cost-effectively, however, line controllers are the better choice. They focus on optimizing individual production lines and can be easily expanded or adapted to new conditions as required.

Today, when agility and sustainability are decisive competitive factors, line controllers are a robust and cost-effective alternative to an MES. Companies need to carefully analyze their specific requirements and resources to make the right decision as to which software solution accompanies them on their journey to digital manufacturing. ■

About Kontron AIS GmbH

Kontron AIS GmbH sets the benchmark in industrial software – for more than 30 years and with an experienced team of over 250 employees. The proven software products and customized digitalization solutions enable machine and equipment builders as well as factory operators to break new ground in automation and secure long-term competitive advantages. Together with its customers, Kontron AIS implements worldwide cross-industry, intelligent digitalization strategies and solutions for the smart manufacturing of tomorrow.

As a subsidiary of the Kontron AG, Kontron AIS offers integrated, end-to-end IoT concepts consisting of hardware and software as well as worldwide project management, service, and support thanks to a global network.

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