



INDUSTRY 4.0
WHITEPAPER

Step 2 | How Do I Find the Right Partner
on the Way to Industry 4.0?

Find the Right MES Partner – but How?

In the previous “Whitepaper Step 1,” we took a critical look at the topic of Industry 4.0 and found that a large number of publications are already devoted to this topic. However, two considerations have encouraged us to present our view of the topic:

1) Companies Lack Realistic Guidelines for Implementing Industry 4.0:

Many production companies are put off by target scenarios and procedural concepts for Industry 4.0 because they do not match the experiences made in their company. Exactly that is the problem: If target scenarios and procedural concepts deviate too much from reality, they are difficult to implement. The result is that they are therefore not addressed at all. This whitepaper series is a realistic guide and road map to successful implementation for manufacturing companies of all sizes and industries. The necessary condition for this is:

2) A Realistic Goal:

A problem with many publications at the beginning were promises that could not be kept. This discouraged many companies. Today, we can already look back on notable progress in terms of digitalization, Industry 4.0, etc.; however, there is still a long way to go for many companies. The MES (Manufacturing Execution System) is a central building block in the Industry 4.0 concept – perhaps even

the most important one. An MES solution should never be considered separately from its provider, because the MES must be adapted to a company like a tailor-made suit, otherwise a lot of potential is wasted. Unfortunately, it is not easy to find the right MES provider, as there are many parameters to consider. Selecting an MES provider is perhaps best compared to choosing a wine to match a menu. Why? Imagine you are at the wine merchant and you are standing in front of a well-assorted shelf. There are more than 300 types of wine in front of you, but you need exactly the type that goes with your dish. However, you would not call yourself a wine connoisseur ... Compared to finding the right type of wine, investing in an MES is much more costly, time-consuming and labor-intensive.

What Aspects Do Companies Need to Consider When Looking For the Right MES Solution?

There are basically two aspects to consider: The solution itself and its provider. Both must suit you so that you can achieve the greatest benefit for your company with an MES solution.



Dr. Karl-Heinz Gerdes, Founder of FASTEC GmbH



About the Author

Dr. Karl-Heinz Gerdes is the founder and former Managing Director of FASTEC GmbH and has been active in the field of computer-integrated production for over 30 years. During his studies he was already working on microprocessor-controlled automation solutions. The development of decentralized control and networking solutions for interlinked plants with master computers was ultimately the guiding principle for the founding of FASTEC GmbH. The MES solution FASTEC 4 PRO, which is distributed by FASTEC today, was developed on this basis and has become even more sophisticated due to the experience gained from many complex customer projects.

Finding MES Providers – Why the Internet Is Not Always Helpful In the Search

If you have already looked around for MES solutions and have also looked for others' experiences with MES providers, you will probably have noticed that relevant information for selecting a suitable system or provider is not that easy to find.

- **Provider Websites**

You quickly find a number of MES providers, visit their websites and collect your first impressions. The arguments in favor of an MES solution are understandable, the systems seem usable, the companies seem reputable – but did you see whether the MES solution from MES provider XY is the right one for your requirements and goals? Probably not. The problem here is not with the MES providers, but with the complex and broad spectrum that is covered by MES. To find out whether an MES provider and its solution are a good fit for your company, it helps to take a look at their references for initial orientation. You may find parallels to your own production in user reports. It is also helpful to take a look at an industry overview, because there are often industry-specific solutions and similarities in the companies (e.g. ERP systems, machines or production processes used).

The valuable experience that an MES provider has gained with customers in your industry can also benefit you.

- **Community Experience**

The Internet offers unique opportunities to exchange ideas with others around the world on a wide variety of topics. You can benefit from the knowledge of others or share your own knowledge. Most of the time, the Internet has answers to every question. However, if you enter the keywords "experience with MES providers" in a search engine, you will get consulting offers, market overviews from IT magazines or press releases from MES providers. Why is it that you do not get customer reviews about the services of MES providers as you would expect? Since MES is a complex niche topic, it is only relevant to a few people. Even in production companies that use MES software, there are only a few employees who deal intensively with the topic. Since search results are based on statistics, they only show their users the most relevant answers. Since there are few search queries regarding MES in relation to other topics, the statistical evaluation of the most frequently clicked links is not very meaningful.

Anyone who wants to browse online platforms, read product information and reports on user experiences, and is looking for buyer reviews before making a purchase will therefore find plenty of information on consumer products – but this is hardly the case for company-relevant topics.

- **What Makes the MES Selection Particularly Difficult**

Each MES is customer-specific, every production environment is unique. The number of functional modules of the systems offered also varies from provider to provider. In addition, the functions within modules with the same name are sometimes very different; for example, a Machine Data Acquisition (MDA) module from one provider can be much more extensive than that of another. All of this makes the comparison complicated and time-consuming.

▶ **Information that you can collect online about different MES providers is not necessarily target-oriented and self-explanatory. But how do you assess which provider can implement the right solution for your production?**

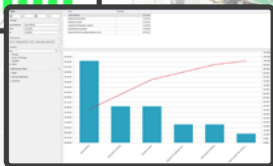
Does the MES Meet Your Special, Production-Specific Requirements?

Almost every MES project is unique in terms of its requirements and conditions (e.g. due to special machine connections, interfaces to ERP systems, etc.). Therefore, the main arguments in favor of a provider are its many years of experience and expertise gained in implementing a wide variety of customer solutions. For example, production companies often have a heterogeneous machine park, which means that a mixture of different machine interfaces has to be implemented in the MES projects. This task alone can hardly be realized with a lack of experience, and if it is, then only with a high expenditure of time and money.

In order not to be disappointed or surprised by exploding costs in the project phase, it is important to discuss all requirements and boundary conditions with the MES provider in advance, as well as to name all machines to be taken into account, the existing ERP or other systems that are still to be integrated.



OEE Evaluation



Maintenance: Pareto Report

• Relevant Questions – Overview:

Before you start looking at MES providers, you need to be clear about what features you need and what goals you want to achieve.

1) What Requirements Does the MES Have to Meet?

In advance, clarify as precisely as possible what requirements you have for an MES solution.

- For example, do you have specific problems in mind that you encounter on a regular basis?
- Where do these problems occur?
- Which departments do they affect and what are the consequences?

First, describe the tasks and problems that are to be solved by an MES in detail. Then use this self-assessment to seek advice from potential MES providers. During these discussions, you should determine for all points written down whether or to what extent the offered MES solution meets your requirements.

2) What Costs Can Be Expected?

Is the MES project within the budget you calculated or does it exceed the budget? Plan a safety buffer for your project expenses.

3) Does the System Also Support Functions That You Would Like to Introduce In the Future?

Also think about long-term project goals. You may want to automate your manufacturing planning in a few years. Then you should keep in mind that not every MES provider offers a module for this. In order to avoid having to change the MES in the worst case or having to live with an isolated solution – which prevents consistent processes – you should clarify in advance whether such functions are supported by the system that you might want to introduce in the future.

4) Is the MES Suitable For Industry 4.0?

Today, no MES provider can reliably say what developments can be expected in a few years in view of this Industry 4.0 trend. However, it is clear that production companies should opt for an MES solution that is future-proof in the long term. To ensure that an MES solution is also sustainable in the long term, it must be continuously developed. That is why you should trust an MES provider that deals with your ideas constructively and permanently adapts its solutions to new requirements. Your provider will accompany you as a competent partner on your way to Industry 4.0.

In Detail – What Is Important?

Modularity and Interfaces

- **Seamless Integration Required**

The efficiency, acceptance and ergonomics of a Manufacturing Execution System are largely determined by its seamless integration into the manufacturing environment.

- **Interface Competence Is Crucial**

Today, many machines, plants, scales, etc. are already capable of automatically recording and storing process and operating data. However, it is often a challenge to access the information from the controls, especially with the older equipment that is available. Since different machines are used in every production, an MES project often requires a mixture of different interfaces to be implemented in order to record the relevant machine signals. Especially for companies with established structures, a broad know-how about the communication protocols to be found there is therefore an important factor. Therefore, when choosing an MES provider, pay attention to interface competence.

- **Which Standards Does Your MES Provider Support?**

Thanks to a manageable number of control systems established on the market by major manufacturers, the associated company-specific communication protocols, and increasingly widespread standardized communication protocols, such as OPC-UA, the effort is fortunately reduced through the use of „standardized“ interface modules, so to speak. Find out which machine interfaces the MES provider has already gained experience with or whether, ideally, the provider even has a standard interface module in a modular system that can be used. But what happens if your machines cannot be integrated using standard interface modules?

- **Who Is Responsible – Customer or Provider?**

With some MES providers, it is unfortunately common practice to instruct the customer to contact the machine manufacturers or a consulting company; a task that is time-consuming or costly and not always productive. To avoid unpleasant surprises, find out about the appropriate procedure in advance, because not every MES provider acts according to the same scheme. Instead of assuming certain signals, some MES providers support and relieve their customers of the interface problems and communicate directly with the machine manufacturers. In doing so, some MES providers try to find a suitable solution together with their customers.

- **How Functional and Modular Is the MES?**

The core attributes of an MES include functionality and modularity. Functionally, an MES should include all the functions required on the shop floor, but bundle them into modules (e.g. Detailed Scheduling, Traceability, Maintenance or Energy Monitoring).

Benefits:

- ✓ **Step-by-step implementation:**

The MES can be introduced step by step according to the requirements. This prevents the introduction of an MES from overwhelming employees with changes that are too rapid and too complex as a result.

- ✓ **Future-proof due to flexible expandability:**

If the requirements and production conditions of your company change (e.g. due to new legal regulations, an expansion of the machine park or developments in the course of Industry 4.0), the system can be expanded accordingly.

- ✓ **A common database for all modules:**

This means that there are no interfaces between modules and no double data storage. You can access the data added by new modules in the same way, include them in evaluations and work with them.

- ✓ **Standardized user interface:**

Your employees will have to get used to new functions, but not to a new system or a different interface when the system is expanded.

In Detail – What Is Important?

Basic Criteria for the Selection of a Provider ^(1/2)

- **With Which ERP Systems Does the MES Communicate?**

Manufacturing companies need an ERP and an MES system. The ERP system takes over the business functions of the company (e.g. information for management, financial accounting, controlling and other business applications), whereas the focus of an MES is on production. The system provides the company with a technical data image of the processes, which brings transparency to production, increases efficiency, improves planning quality, and can also be used to implement process traceability. These functions are not or only incompletely covered by an ERP; which is why a combination of both systems is necessary. A seamless exchange of information between the ERP system and the MES is of paramount importance, because only when both systems work together they can provide their complete added value for the company.

- **Does the MES Provider Have Experience With Connecting Your ERP System?**

There are many stumbling blocks with regard to the interface to ERP systems, which is why you should know what experience the MES provider has with connecting your ERP system. Consequently, find out how familiar the MES provider is with the machines and systems in your production environment.

- **Are There Entry-Level Solutions?**

The decision for an MES should never be made recklessly – the expenditure of time and money is too high. It is therefore important to intensively familiarize oneself with the functions of an MES and slowly, but surely, to delve deeper and deeper into the subject of MES. Once you have an MES provider in mind, ask them about a possible entry-level solution.

- **Is the MES Provider a Good Fit For You?**

An entry-level solution not only provides the opportunity to familiarize yourself more intensively with the topic, but also to get to know the MES provider behind the solution better.

Ask yourself the two questions:

- Can you work comfortably with the system? Remember: You will spend part of your working hours with it in the future.
- Can you also imagine a long-term, joint collaboration? Remember: Both the MES rollout and further joint collaboration will require some of your working time in the long run.

Therefore, the interaction should be both pleasant and purposeful.



In Detail – What Is Important?

Basic Criteria for the Selection of a Provider (2/2)



- **What Support Does the MES Provider Offer?**

Starting with the consultation, through the workshop, MES rollout, training and support – an MES project is a long-term endeavor in which you depend on the support of an experienced MES partner. Ask your provider in advance about the support that will be available to you during the implementation of the project, but also after completion, so that you can achieve the greatest possible benefit from your MES and maintain it in the long term.

- **How User-Friendly Is the User Interface?**


Many employees will use the MES. Among them are both computer enthusiasts and those who are rather less fond of such topics. However, both user groups must be able to operate the system for the MES solution to be successful. The solution is obvious: The easier a software is to use, the less time staff needs to make entries, the more willing employees are to make these entries, and the better the quality of the data recorded. In a multinational workforce, the language of the user interface should not be a problem. Therefore, make sure that the MES provider offers different language settings so that every employee can operate the MES solution in their familiar language.

Summary:

The MES solution must meet the specific requirements of your industry in order to achieve maximum success:

What to keep in mind when choosing your MES partner:

- Which reference customers does the provider have?
- Did you discover competitors among them?
- Are there any reference reports?
- Do you find your company and your requirements reflected in the solutions described?
- Is it possible to visit reference sites and see the software in action?
- Which company sizes come into question as customers? Small businesses, medium-sized companies or even corporations?
- Which industries are addressed?
- Are there any industries that the MES provider specializes in?
- How long has the provider been selling MES solutions?

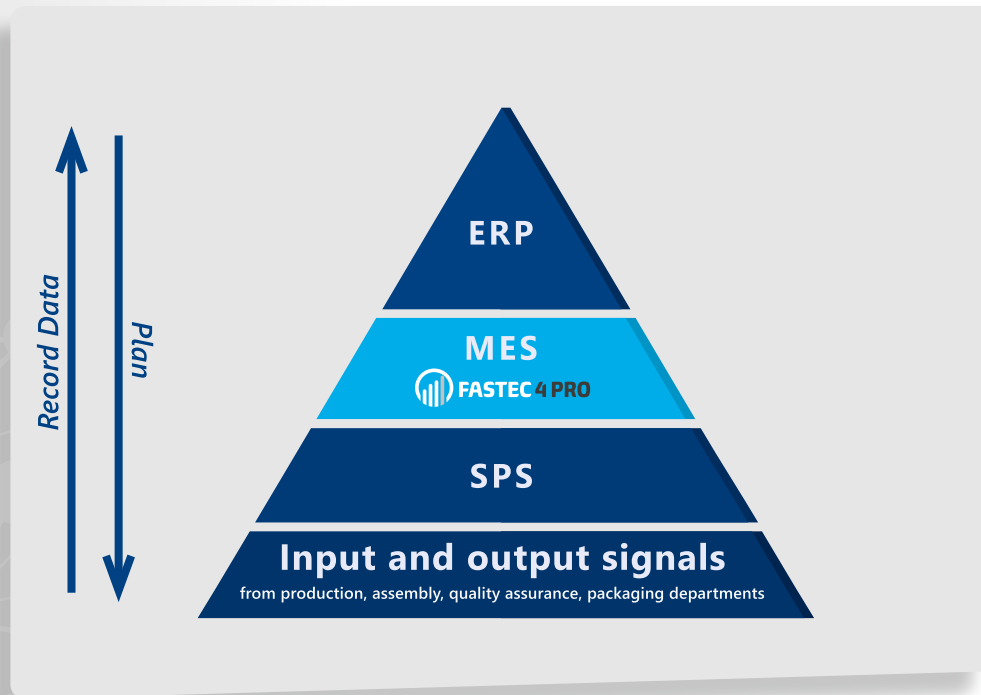
 **Get an idea of the provider's experience and reliability.**



Digital Transformation – Where Is the Journey Heading?

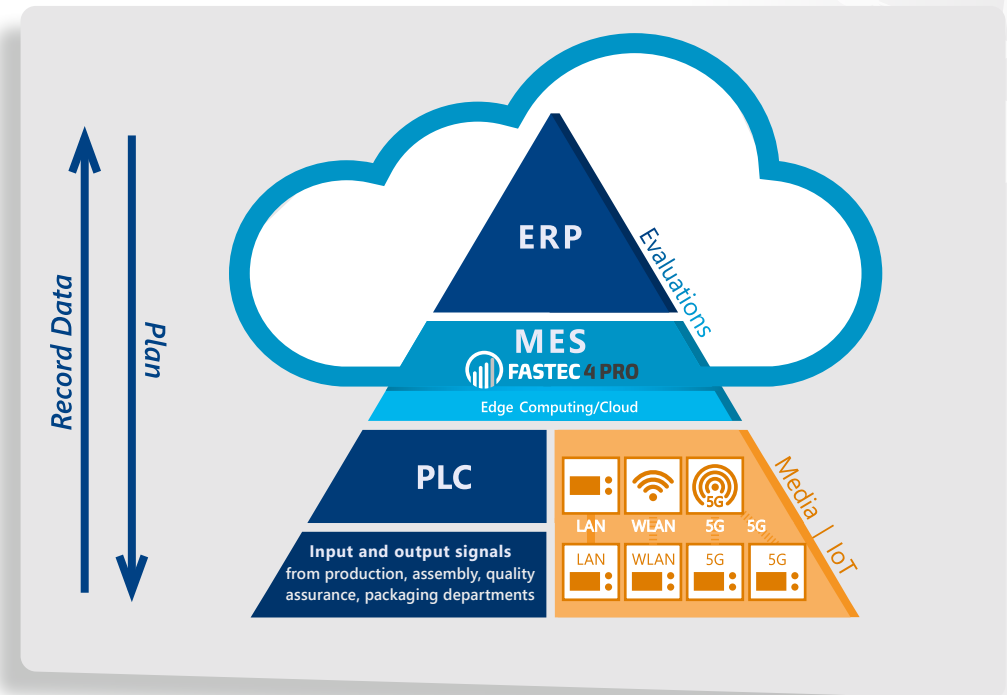
Today

The automation pyramid represents the different levels in industrial production companies. The drawing illustrates the hierarchical structure, at the top is the ERP system. As the central IT system for production, the MES ensures vertical integration and is thus the link between machine controls and the enterprise resource planning (ERP) system.



Tomorrow

The new automation pyramid integrates IoT devices either wired or wireless via WLAN and 5G. The MES functionality is divided into edge computing for data acquisition and local control and cloud computing for cross-plant evaluation, planning and synchronization.



From MES to Industry 4.0: Is the MES Provider Ready For Industry 4.0?

To make the transition to Industry 4.0 a success, you need a provider who can support you in this transition. What are the requirements for this?

In an Industry 4.0 application, the MES becomes the central data platform in production. This is where all the information comes together and is further distributed. In plain language, this means that the interface problem that has already been discussed takes on a new dimension: The integration of the machines and plants goes far beyond what is required for a pure MES project and requires much deeper know-how from your MES provider in terms of automation and interfaces. Control loops must be created that consider the processes in production as a whole. This view requires a much more intensive cooperation between the MES provider and machine and system manufacturers. This is the only way to successfully implement an Industry 4.0 concept.

In order to use the MES as a tool for Industry 4.0, it is important to choose a provider that has the necessary expertise. What has already been mentioned several times in this whitepaper should be emphasized again clearly at this point: The understanding of Industry 4.0 varies greatly from MES provider to MES provider and is often shaped by its origins. This raises the following problem: How is a goal to be achieved if there is no uniform definition for it? What if providers who promise you Industry 4.0

don't even know exactly what this requires of their software? What if they don't have the capabilities or experience to implement these functions? There is a great risk that such providers will make promises that cannot be kept.

What Should You Look For in an MES Provider to Find Out Whether They Have the Potential to Become Your Industry 4.0 Partner?

A central condition for implementing Industry 4.0 efficiently, flexibly, sustainably and successfully in production is the integration of the automated operating equipment. This requires complete automation at every point in the manufacturing process. It starts and stops production processes, monitors operation, records process data, documents the entire manufacturing process, records equipment status, capacity utilization, etc. and provides production and quality key performance indicators (KPIs) in the form of comprehensive reports. All of these are functions that should be provided or supported by the MES solution.

A Seamlessly Automated Material Flow

In addition to automation and integration expertise, another crucial factor comes into play: In the first part of our whitepaper series, we described that the basic ideas for Industry 4.0 have already existed for several decades.

At that time, however, the necessary computer capacities limited the development, so that initially a collection of functional isolated solutions emerged, in which humans formed the central interface between the systems. The MES emerged from the integration of the systems. In the next step, Industry 4.0 integrates the information and material flow and thus raises the production process to a new level. For a modern and successful production, the automation and material flow networking of production is essential. The requirement for this is appropriate integration know-how on the part of the MES provider in order



*"The successful implementation of an Industry 4.0 project requires a suitable MES provider who can bridge the gap between the world of data and the world of automation.
Without this bridge, Industry 4.0 cannot succeed."*

Dr. Karl-Heinz Gerdes, Founder of FASTEC GmbH

The Complete Industry 4.0 Whitepaper Series From FASTEC

FASTEC provides manufacturing companies with MES solutions for discrete manufacturing. As a leading MES provider, FASTEC has implemented a wide range of customized solutions in many projects since it was founded in 1995 – each unique in terms of the production processes and manufacturing methods involved. Our systems are used nationally and internationally in various industries.

We work in a practice-oriented, efficient manner and ensure that our projects lead to lasting benefits for our customers. Together with you, we develop suitable solutions for your requirements, which we then implement precisely, quickly and cost-effectively on the basis of our MES standard software, which can be configured in many ways. Our customers benefit from our wide range of experience. In the end, there is a result that convinces our customers: A flexible and easily expandable system with sophisticated functions. FASTEC users are enthusiastic about the numerous features of the software and its usability in everyday use.

Decide on FASTEC 4 PRO – for a custom-fit MES solution with maximum customer benefit.

We take you on a journey into digital manufacturing; our whitepaper series serves as a guide.

- Step 1:** What Is Industry 4.0? Where Is the Journey Heading?
- Step 2:** **How Do I Find the Right Partner on the Way to Industry 4.0?**
- Step 3:** 10 Tips for MES Implementation – What You Should Keep in Mind.
- Step 4:** Focus on Transparency:
The Modules MDA, PDA, Monitoring Etc.
- Step 5:** Focus on Optimization:
Key Figures and How to Work With Them.
- Step 6:** Focus on Traceability:
The Many Unknown Benefits.
- Step 7:** Focus on Planning:
Save Time and Resources With Effective Planning.
- Step 8:** Functional Networking as the Basis of the Self-Regulating Factory.



Stay Competitive in the Long Term – With Us.

FASTEC GmbH is based in Paderborn, Germany and specializes in the digitalization of production processes based on the in-house developed Manufacturing Execution System (MES) FASTEC 4 PRO. The modular standard software can be configured across industries, is compatible with future releases and operated intuitively.

FASTEC has been accompanying its customers on their way to digital transformation since 1995. Around 400 companies in over 20 countries use FASTEC 4 PRO in over 10,000 production facilities. Work processes are optimized and costs are reduced in the long term thanks to the holistic digitalization of production.

We would also like to give you a good advice personally!

Our sales department will be happy to provide you with further user reports and information material! Or else, make an appointment with our sales department for a presentation at your location, in our company or via web. Of course, you can also experience FASTEC 4 PRO live and on site with our customers.

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Additionally, we offer videos of our software and customer solutions in our YouTube channel:

www.youtube.com/FASTECGmbH

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