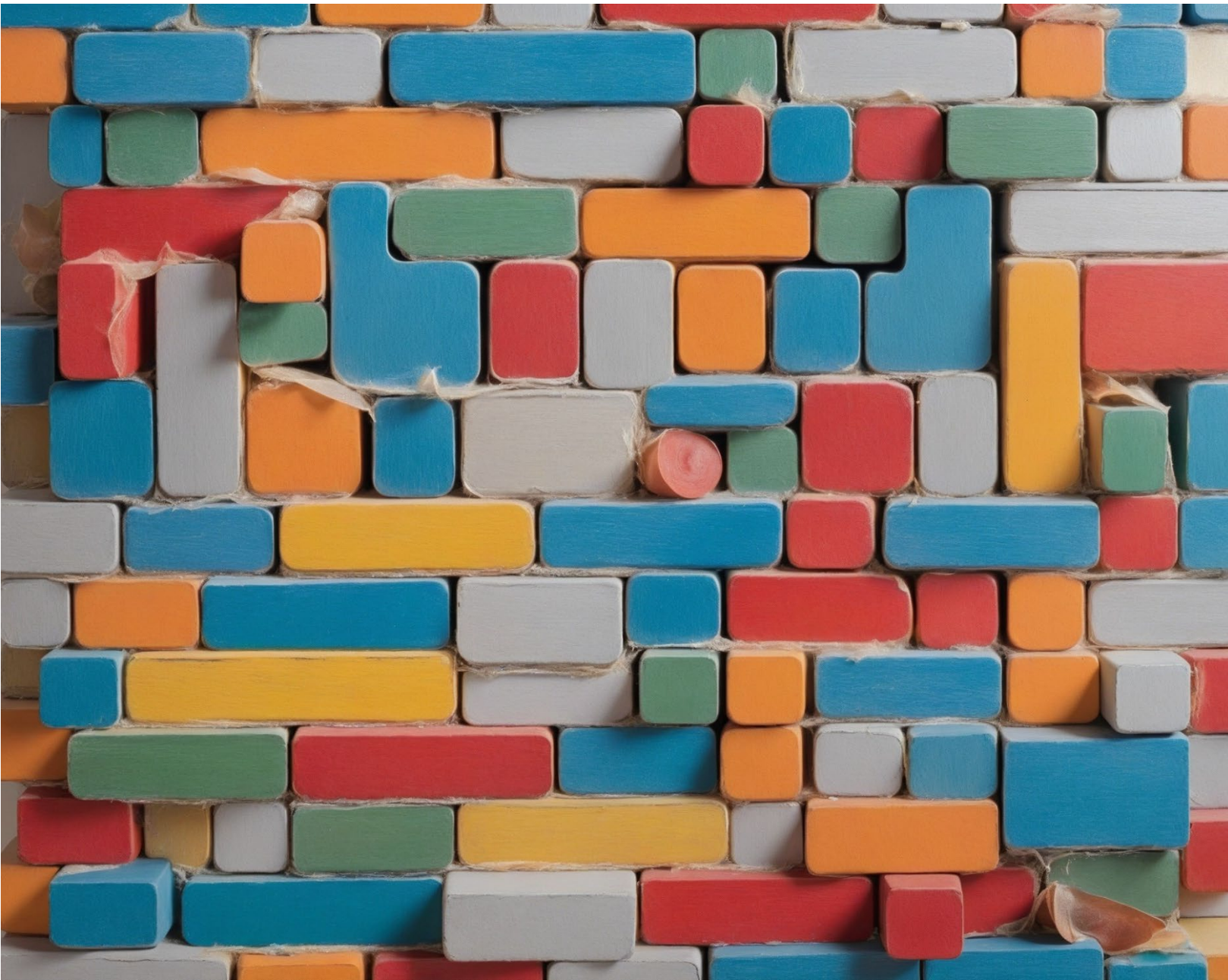
White Paper

WE CREATE SMART FACTORIES

More than one MES? This is how it works!

Platform-based multi-MES scenarios



Motivation

It is not unusual that large industrial groups or even smaller companies use a combination of Manufacturing Execution Systems (MES) at the same time to monitor and control their production. But why is that? What challenges do the companies have to face and how can they be overcome? These are the questions that Chief Digital Officers (CDO) must deal with time and again. Find out in this technical article how an integration platform can help connect and manage different systems.

What seems like a motley collection of different plants at several locations is actually one and the same company spanning multiple sites and operating different MES systems. A diverse conglomeration of systems that is supposed to work together and support each other. “We are currently running three MES systems. How can we handle this?” Project managers are looking for help in view of this challenge. “The existing systems must be connected, we cannot just switch them off,” others report. They need a space where they can connect, network, improve. A task that companies are increasingly having to face.

„We need transparency about what happens in all our plants and areas, but how?“

„With each additional system, the number of interfaces grows dramatically!“

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Why do companies run different systems?

Takeover, acquisition, restructuring measures, and bankruptcy: the reasons why companies operate different MES systems are manifold. The world of manufacturing IT providers is increasingly complex. Machine manufacturers buy MES providers, new software start-ups enter the market, and some providers just disappear. Manufacturing companies are confronted with the task of connecting different systems and integrating them into an existing IT structure. Many such scenarios are conceivable — let us have a closer look.

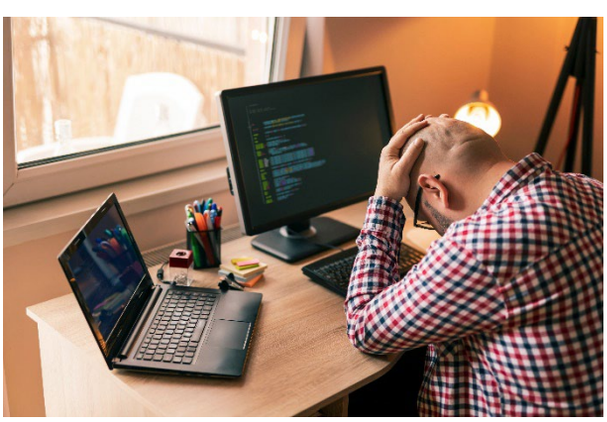
Use Case 1: Integrating a new location

A company buys another company or two competitors merge. It is most uncommon that both companies have used the same IT systems. At best, the same ERP system (Enterprise Resource Planning) is operated and even then, adjustments are probably necessary.

They normally run different MES systems at the sites. In most cases, it is neither feasible nor economic to implement the existing MES at the new location. Both MES are usually operated in parallel. But to seamlessly integrate the system of the new location, interfaces are required.

Use Case 2: Replacing a discontinued MES

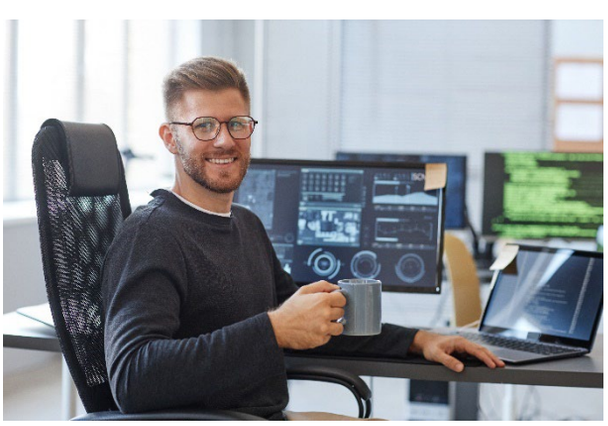
A provider of manufacturing IT is being taken over and will not further develop its existing MES solution in the medium term. However, the MES customer still wants to connect new production units and implement further MES functions. But the company is not planning to completely replace its existing production IT for the time being.



The company is therefore forced to search for new solutions on the market. They want to implement the new software step by step in further areas or connect new machines. Again, it is important to create interfaces between the old and the new system.

Use Case 3: Integrating in-house manufacturing IT

Self-developed software needs to be maintained, and everybody who uses custom solutions knows this. But if employees who have developed such a solution leave the company, the required know-how is often lost. Continuing to use this software poses major risks for a company.



Employing MES software is essential in manufacturing to guarantee competitive production processes. A smooth transition from the in-house manufacturing IT to a standard system is therefore imperative. For this to work, additional interfaces are required.

Use Case 4: Implementing best-of-breed strategy

Companies do not always operate diverse IT solutions for external reasons, sometimes they deliberately decide so. Because the market of manufacturing IT has grown to offer versatile software where everybody can choose the best possible solution. In line with the best-of-breed strategy: the best software for each area.

If companies do not want to use the comprehensive solution of one vendor but prefer to select the best components for each specific requirement, then the following situation ensues: Different systems need to be coordinated under one roof — a solution for the management of customer data, another for payroll accounting, and a third system for HR management. In such cases, a solution is needed that integrates all systems and makes it possible to access data.

Interim conclusion: Conventional solutions are reaching their limits

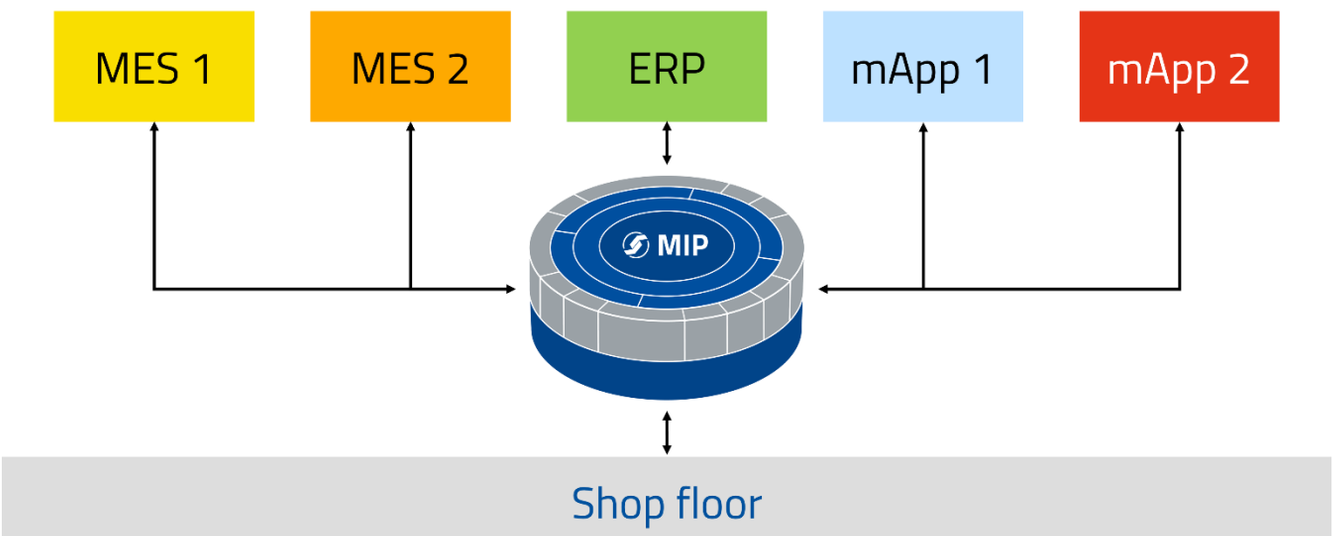
The requirements for manufacturing IT can be summarized as follows:

- Machines and production units of different manufacturers and age need to be connected digitally.
- Existing IT systems (hardware, software, and infrastructure) must work together as efficiently as possible.
- Higher-level IT systems such as the ERP must be connected.
- Interfaces to legacy and existing systems are needed.
- Companies have custom and isolated solutions that need to be integrated.
- Company agreements on the use of manufacturing IT exist that must be respected.
- Employees have acquired valuable know-how over the years that companies want to use also in future.

“We need transparency about what happens in all our plants and areas, but how?” This is a frequent question of project managers. They are also worried about additional systems increasing the number of interfaces. In short: A pragmatic approach is needed integrating the existing environment and opening up opportunities for new solutions. Conventional approaches such as direct and bidirectional interfaces reach their limits if the number of solutions to be combined is greater than four. Because all systems have to be interconnected by interfaces, and the number of interfaces increases disproportionately with each further system that is implemented.

Solution: Integration platform enabling interoperability

Contrary to classic interfaces, an integration platform has many advantages. Above all, each system only requires one single bi-directional interface. A system only needs to be connected to the integration platform regardless of the number of systems communicating with the platform. This means that existing systems can successively be connected to the integration platform. The connection itself is made via standardized web services. With this technology, the complexity of interfaces is minimized, and companies can continue to run existing applications and preserve their know-how. This saves costs and effort. Even the licenses of existing systems can still be used.



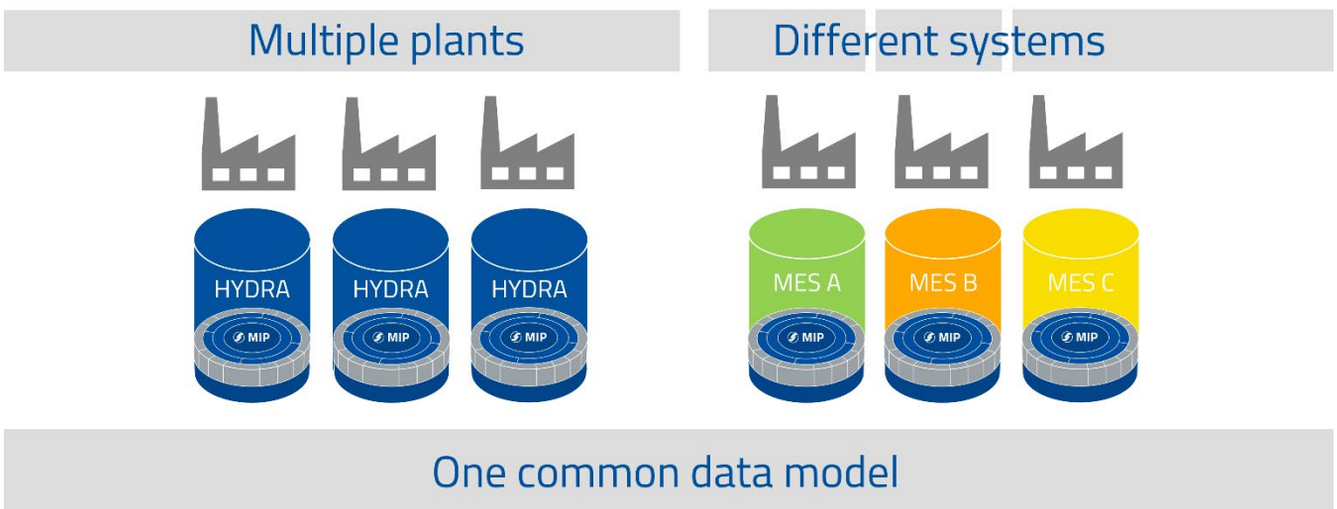
Simple multi-MES scenario: Several applications of different providers interact via the MIP integration platform and access the same shop floor data. (Source: MPDV)

If at some point in the future the manufacturing IT needs to be extended or implemented in a new business area, it is advisable to opt for a provider from the ecosystem of the integration platform offering interoperable solutions. The company can decide on the applications that best fulfill their requirements, and thus implement the best-of-breed approach. Thanks to the integration platform, all connected applications are interoperable. According to the architecture of the applications used, separate functions can even be specifically selected and replaced, if required. This gives the often criticized custom software a technological edge: with the integration platform, specialized applications can be operated together with standard software without creating unnecessary dependencies.

Semantics as basis: An integration platform can only operate successfully if it is based on a common semantic information model. This way, the platform can ensure that each application can process the common data. The semantic model can be implemented by using business objects, for example, where each artifact in production is assigned a separate object. As a result, the integration platform provides a digital image of production — the digital twin.

Working examples: From the idea to the integration platform

The example of a large German manufacturer of innovative glass solutions illustrates how the integration platform turned out to be the perfect solution. The company's objective was to evaluate and compare the data from multiple sites using different MES solutions. They wanted transparent production data in one system where the data could be compared.



Multi-MES scenario with several sites: A separate MES is operated in each plant and at every location. Each MES is based on its own integration platform. But thanks to the common data model, comparable evaluations are possible. (Source: MPDV)

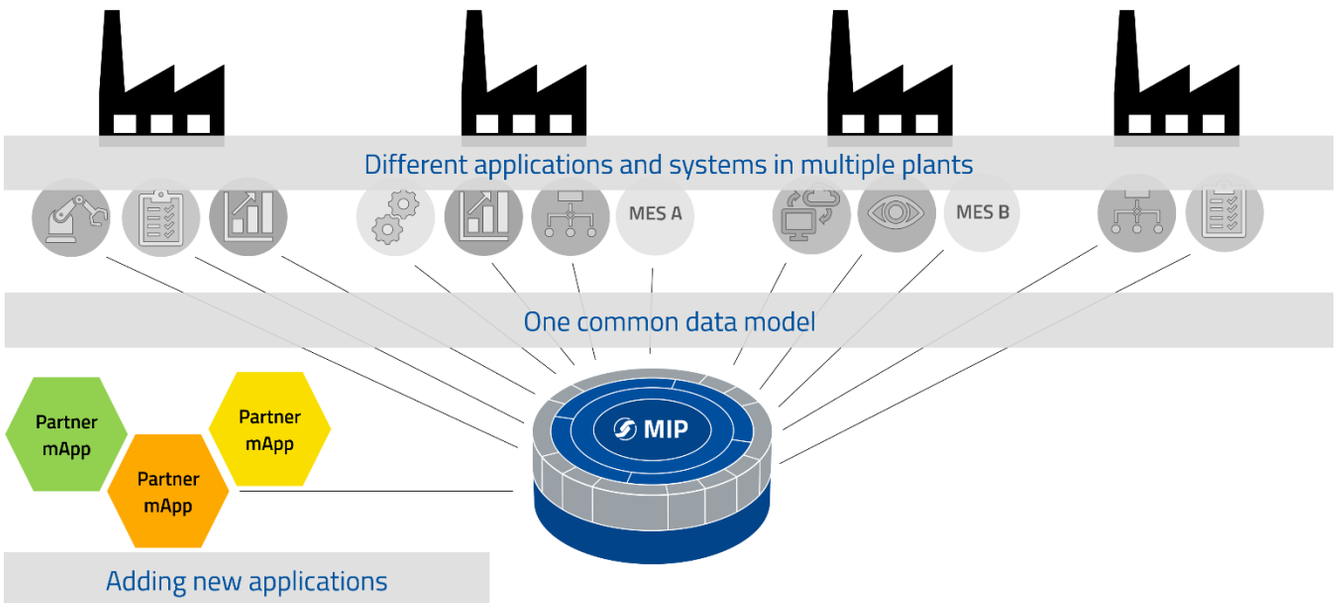
The Manufacturing Integration Platform (MIP) of the software provider MPDV had the required semantic structures and service-based architecture needed for this endeavor. In the past, an MES was used as interface between ERP system and shop floor. This role is now taken over by the MIP that ensures interoperability across all sites. Existing MES applications of other providers are still used, but the glass manufacturer opted for MPDV's MES applications to extend the system with further functions. The company also decided to implement a manufacturing app (mApp) for operator guidance from the MIP ecosystem.

Another example is provided by a well-known manufacturer of household devices: They have been using the MES solution HYDRA by MPDV for many years. Since the last migration, the HYDRA installation is based on the MIP. By implementing the integration platform, they can now operate applications from the MIP ecosystem. The company opted for a solution that allows to create dashboards in no time. The dashboards use the data from the MIP that is directly available thanks to the semantic data model. The combination of HYDRA, MIP, and the solution from the ecosystem makes it possible to quickly create new dashboards and display them in the shop floor.

In other examples, the MIP integration platform was implemented as basis to connect the data collection functions of one MES provider to the evaluations of another software vendor. It was also possible to connect several production sites and realize a comprehensive production planning for all sites. These integration projects offer different opportunities, while aiming at the same target: increasing efficiency and effectiveness in production.

Conclusion: Integration platform makes companies fit for the future

An integration platform like MPDV's MIP can easily integrate existing systems in production. The open web service interface of the MIP makes it possible to connect a variety of systems. This paves the way for the gradual further development and the needs-based extension of the manufacturing IT — without interrupting ongoing production. Existing licenses, data collection structures, and knowledge of employees are safeguarded. An integration platform saves costs and makes manufacturing IT fit for the future.



Flexible multi MES scenario: All production related applications access a shared integration platform allowing global evaluations. (Source: MPDV)

If you would like to find out more about the **Manufacturing Integration Platform (MIP)**, please contact us: Phone +49 6261 9209-101 or mip@mpdv.com

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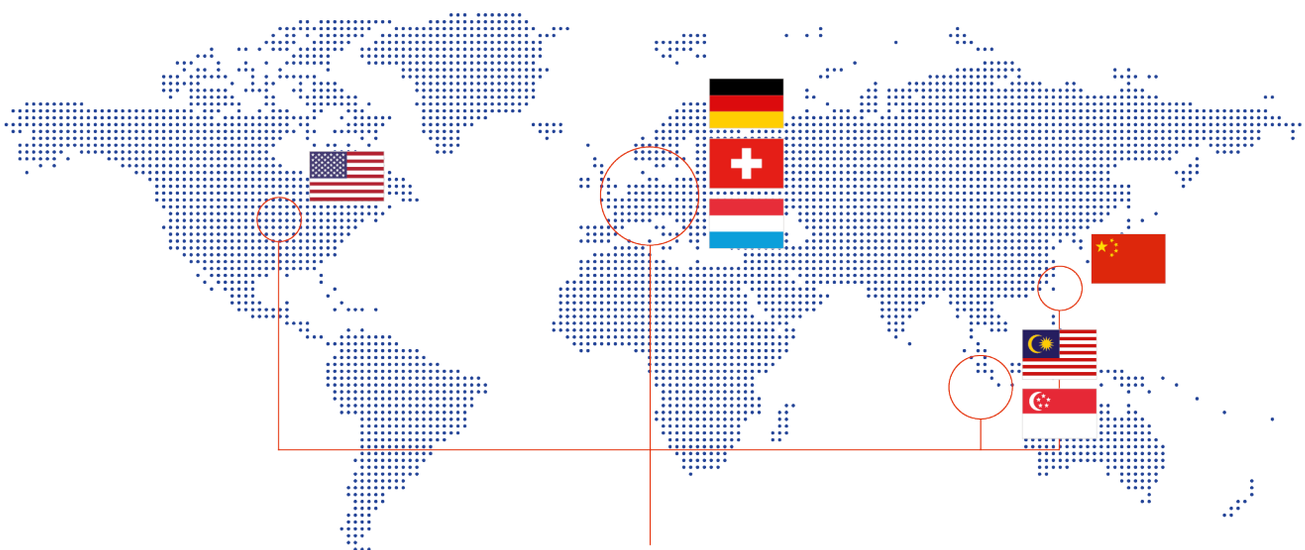
MPDV Mikrolab GmbH

headquartered in Mosbach/Germany, is the market leader for IT solutions in the manufacturing sector. With more than 45 years of project experience in the manufacturing environment, MPDV has extensive expertise and supports companies of all sizes on their way to the Smart Factory.

MPDV products such as the Manufacturing Execution System (MES) HYDRA, the Advanced Planning and Scheduling System (APS) FEDRA or the Manufacturing Integration Platform (MIP) enable manufacturing companies to streamline their production processes and stay one step ahead of the competition. The systems can be used to collect and evaluate production-related data along the entire value chain in real time. If the production process is delayed, employees detect it immediately and can initiate targeted measures.

Users of MPDV solutions include well-known companies from all industries. MPDV was founded in 1977 and is active worldwide at locations in Germany, China, USA, Malaysia, Singapore, Luxembourg and Switzerland.



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MPDV Mikrolab GmbH · Römerring 1 · 74821 Mosbach · Germany
+49 6261 9209-0 · info@mpdv.com · www.mpdv.com