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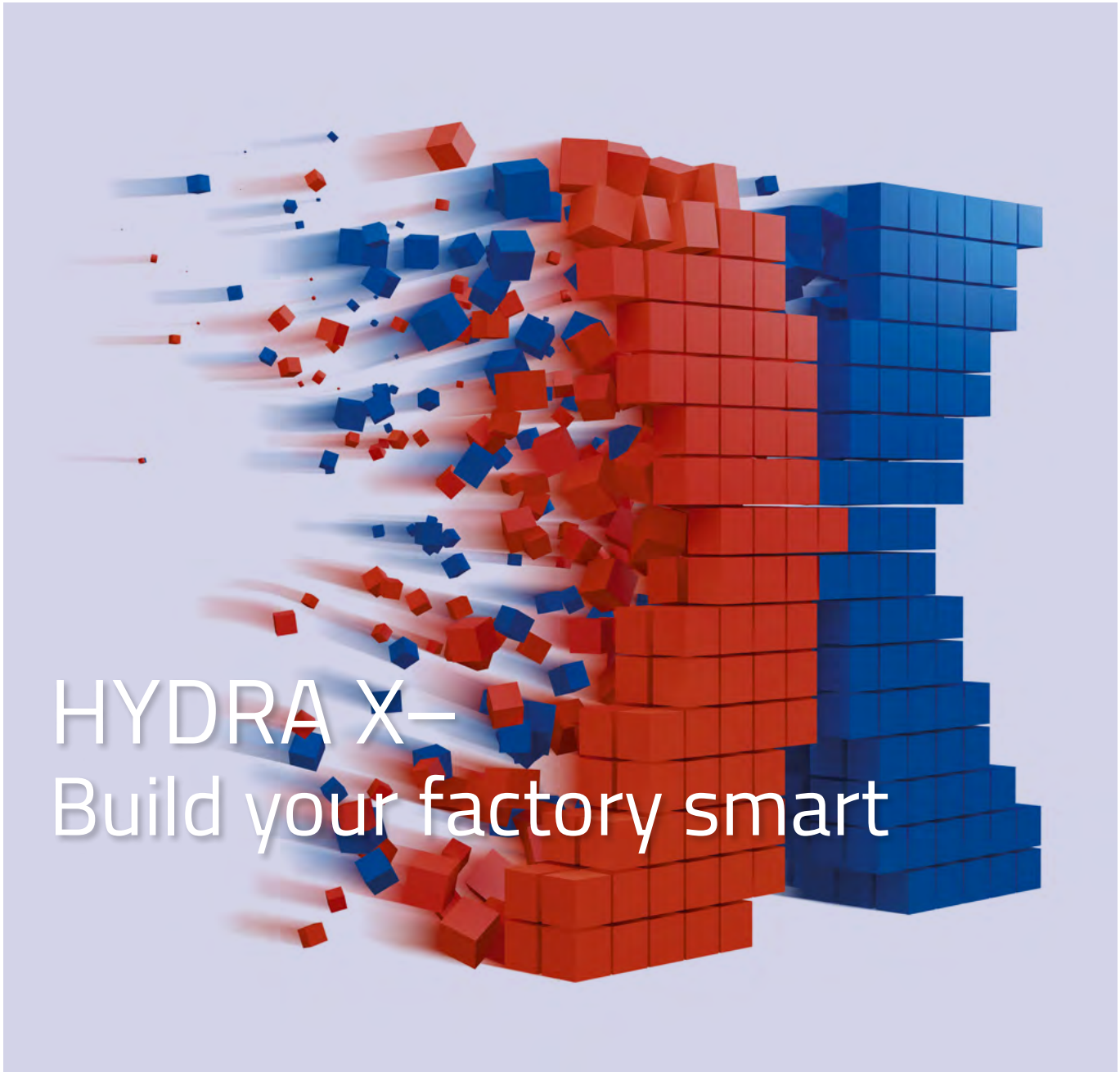
# MPDV NEWS

SPECIAL NEWS 2021



# HYDRA X – Build your factory smart

## MILESTONE IN THE PRODUCTION IT
mApps For The Smart Factory

## INCREASED FLEXIBILITY
Appification as Foundation Stone

## BOUNDLESS FREEDOM
HYDRA X and the Cloud

HYDRA X

SNAPSHOT

## HYDRA X – WHAT THE SMART FACTORY NEEDS…

The Smart Factory needs innovative IT – there's no question about it. What sets a state-of-the-art MES apart from conventional manufacturing IT? Thorsten Strebel, CTO Products & Services at MPDV, explains in this interview why it should in fact be called Beyond MES and what standards HYDRA X is defining.

**Find out more in the interview on page 12**

EDITORIAL

## Dear reader,

A „Technological Leap in Manufacturing IT" – that's how the trade press referred to HYDRA X. Reason enough for us to publish a special edition of MPDV NEWS on the new generation of our Manufacturing Execution System.

Software as a Service (SaaS), edge computing, artificial intelligence, low code and flexible web client technologies: you will quickly discover that HYDRA X's features go beyond what we know and value. HYDRA X is customizable, scalable and can be modeled. HYDRA X is platform-based and open to applications of other providers. It is simply much more than an MES as you know it as HYDRA X is Beyond MES.

Get inspired for your journey to the factory of the future.

Have fun reading!

Yours sincerely,
Jürgen Kletti


HYDRA X – MORE THAN AN MES


5 FACTS FOR THE IT DEPARTMENT

WHAT DO YOU EXPECT FROM HYDRA X?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MANUFACTURING APPS FOR THE SMART FACTORY

# HYDRA X

# A MILESTONE IN MANUFACTURING IT

**HYDRA X IN THE SHOP FLOOR:** Maximum operator acceptance thanks to ergonomic application design.
(Source: MPDV, Adobe Stock, industrieblick)

**Industry 4.0 was originally heralded as a revolution. After a while, people talked increasingly about evolution. But MPDV is taking a more revolutionary approach with HYDRA X – this is why the company is presenting the new MES solution as a milestone in manufacturing IT. But what is actually so special about HYDRA X?**

The Smart Factory is on everyone's lips today, but there is no consistent definition. However, there is a growing consensus that the Smart Factory needs standardized solutions, while being highly individual itself. This leaves software providers with no other option but to develop solutions that are maximally flexible and give users every freedom to combine elements of the solution with elements from other providers. The previous approach of „everything from a single source" is becoming more and more marginalized. MPDV has anticipated this market development and, by launching HYDRA X, has created a product that will meet the requirements of the Smart Factory in the future.

HYDRA X, the innovative successor of the HYDRA family, offers a wide range of supporting applications for state-of-the-art manufacturing beyond the classic functional range of a Manufacturing Execution System (MES). Among these applications are functions to control intralogistic processes or a step-by-step operator guidance for assembly processes. The new applications also intervene more profoundly in the process control than was ever envisaged for a classic MES. HYDRA X therefore ushers in the era of „Beyond MES".

**FIND OUT MORE ABOUT HYDRA X: HX.MPDV.COM**



## FROM THE MONOLITH TO THE ECOSYSTEM

» THE RESULT IS AN ECOSYSTEM OF APPLICATIONS THAT ARE ALL INTEROPERABLE AND TRANSCENDS SUPPLIER BOUNDARIES. «

Many MES systems are monolithic systems, but HYDRA X is not. It is much more a collection of manufacturing apps (mApps), which can be flexibly combined in a platform such as the Manufacturing Integration Platform (MIP) by MPDV. Last year, MPDV launched the Advanced Planning and Scheduling System (APS) FEDRA, which has already implemented this approach. The result is an ecosystem of applications that are all interoperable and also transcends supplier boundaries. It is precisely this interoperability based on a platform that the Smart Factory of the future needs.

## LATEST TECHNOLOGIES FOCUSING ON THE USER

It goes without saying that HYDRA X uses cutting-edge technologies and principles. In addition to the open platform architecture, MPDV's standard portfolio also includes Software as a Service (SaaS), edge computing, artificial intelligence, low code and flexible web client technologies. Usability in particular is the focus of HYDRA X. The new HTML5-based web client is responsive and can be used on any device. In addition, the user interface itself is very flexible. The users can select widgets and arrange them in any way they like.

» THE USER CAN EXECUTE THE CHANGES THEMSELVES. «

## FLEXIBILITY, REAL TIME AND OFFLINE CAPABILITY

Things have also changed with regard to connecting the shop floor. The MIP add-on called Distributed Edge Computing (DEC) connects machines of all types and ages to HYDRA X. A new feature is not only the lean architecture for data collection, but also the option to preprocess data locally. This provides the necessary real-time capability in the shop floor and at the same time reduces the load on the network infrastructure – completely in line with the concept of edge computing. Both the data collection and the local data preprocessing are offline-capable and even work if there is no connection to the server or the cloud.

Simple configuration options allow each user to decide what data to collect, what preprocessing or aggregation is required, and how the data is then posted in accordance with its intended purpose. For example, when an order is logged on to a machine, the system first posts the order times. In the background, HYDRA X automatically logs the machine history. Each type of data collection can be configured according to the user's needs. Again, the low code principle applies, which means that all relationships are modeled and not programmed.

## HYDRA X – DESIGNED FOR THE CLOUD

MPDV also takes an innovative course when it comes to operating HYDRA X. Since running your own servers is time-consuming and distracts from the actual value creation, an increasing number of manufacturing companies are asking for cloud services such as SaaS. Cloud operation was a key design feature in the development of HYDRA X and as a result the software is offered as part of the Smart Factory Cloud Services. The user can now focus on production and work with the system in the shop floor. MPDV takes care of the reliable and secure operation of the manufacturing IT. It goes without saying that each user decides for themselves whether they want to use the SaaS services or operate HYDRA X in their own data center.

## THE NEXT STEP TO THE FUTURE

Today, hardly any production company is competitive without manufacturing IT. The integration of the complex requirements in terms of product variety and process quality alone makes the use of a future-proof manufacturing IT system indispensable – especially in a Smart Factory. HYDRA X and the underlying open platform architecture of the MIP also enable companies with existing systems to gradually migrate and ultimately use innovative applications.

HYDRA X THINKS AHEAD

# BEYOND MES

The German guideline VDI 5600 has been for a long time the source describing the functional scope of a Manufacturing Execution System (MES). But is this still sufficient today to keep a Smart Factory running? Or do we have to think outside the box in terms of Beyond MES? Why the MES HYDRA X by MPDV deserves to be called Beyond MES.

## NINE CURRENT REQUIREMENTS

HYDRA X takes processes beyond the scope described in the VDI 5600 guideline. Manufacturing companies benefit in many respects: real-life processes can be integrated digitally in even more detail and can thus be optimized further. The Smart Factory will thereby guarantee more productivity and more competitiveness.
The VDI 5600 stipulates ten tasks for an MES in order to support production processes, but they are not enough for the Smart Factory. The description of the tasks is now somewhat outdated and the tasks at hand would be formulated differently today. Let us look at nine current requirements that a Smart Factory must meet to illustrate this theory.

## 1. TRACKING AND TRACING EVERYTHING

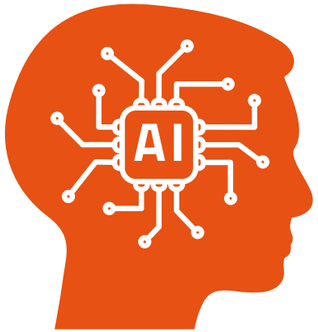
The primary goal of HYDRA X is complete transparency and efficiency in the Smart Factory. Transparency is one of the cornerstones of the Smart Factory. It requires an integral production controlling including KPIs, dashboards and overviews providing a clear view of the current situation in production. This can only work if a large and up-to-date data basis is available.
HYDRA X and its manufacturing apps (mApps) of the Order Management category make sure that production runs smoothly. HYDRA X supports all workflows with digital information and collects all relevant data from the generation or transfer of the orders to the completion of the finished products. Numerous interfaces to ERP systems and Business Intelligence (BI) solutions integrate the mApps perfectly into the existing IT and process landscape.

## 2. TRANSPARENCY AND EFFICIENCY ARE PARAMOUNT

Transparency and efficiency are top priorities in the Smart Factory and this is where digital shop floor management comes in. Everything is seamlessly connected and ideally neither pencil nor paper are needed. All this is achieved by data collection and evaluation, checklists and regular meetings in production.

>> ALL INFORMATION IS RELIABLY TRANSMITTED TO THE RECIPIENT AND MISUNDERSTANDINGS ARE AVOIDED. <<

HYDRA X and the mApps of the Information Management category provide numerous options promoting digital shop floor management. One example is the Digital Production Meeting. The solution provides clear structures and consistent contents for regular meetings. Digital Checklists are another example: Well-organized digital applications replace paper. In addition, HYDRA X provides the Shop Floor Messaging Services that can perfectly replace other messenger services.




## 3. NO MEDIA DISRUPTION

The order of the day in digitalization is to avoid media disruptions. Paper always means media disruption as it cannot be integrated automatically and efficiently. And at the same time, it is all about collecting data directly where the data is generated and transmitting it to the system. After all, detours via interfaces delay availability and imply greater risk of error.
HYDRA X automatically collects data and saves it directly in the Manufacturing Integration Platform (MIP). To cope with the often adverse conditions in the shop floor, HYDRA X collects data locally. The system thereby ensures that data is not lost even in case of network failures. Meanwhile, the semantic data model of the MIP guarantees that all mApps have a common understanding of the data: a temperature is always read as temperature and a number of pieces is always a number of pieces. This is important when HYDRA X interacts with mApps of other providers.

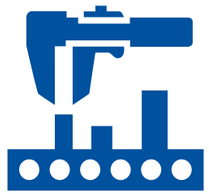
## 4. NO WASTE

The requirement to avoid waste can only become reality with an efficient resource management: a resource management monitoring all resources and providing a clear overview of their use. Digital is the only way to do this including a consistent and automatic data collection.
HYDRA X and its mApps of the Resource Management category offer various functions to process and evaluate data from the shop floor. HYDRA X visualizes the data and automatically keeps resource histories to replace the tool book. The system also documents the use of every resource thereby enabling tracability in product manufacturing at all times. Analytics applications in HYDRA X help to uncover waste and identify savings potential. At the same time, HYDRA X keeps an eye on energy management and correlates energy and production data.

» ANALYTICS APPLICATIONS HELP TO UNCOVER WASTE AND IDENTIFY SAVINGS POTENTIAL. «

## 5. ZERO-DEFECT MANUFACTURING

A Smart Factory cannot do without reliable quality management. The aim is to detect defects, to identify potential failures as early as possible and to initiate countermeasures in the run-up. Defects have to be dealt with consistently. Ideally, the quality management is integrated in the production processes and data of both areas are fed into the same database.
HYDRA X and the mApps of the Quality Management category meet the demands of zero-defect manufacturing. HYDRA X covers all areas from transfer of inspection characteristics from CAD drawings to inspection planning and actual inspection. The software also integrates the complete value-added process including goods receipt, production and goods issue. The parts returned are dealt with by the HYDRA X complaint management.



## 6. PREDICTIVE MAINTENANCE

Perfect maintenance strategies can be a decisive factor in competition, in particular if manufacturing processes leave little room for optimization. It is then essential to get the maximum out of the machines and tools without putting too much strain on a resource's lifespan. This can only be achieved by transparency about the past and planned use of resources as well as experience in dealing with maintenance and servicing.
HYDRA X and the mApps of the Resource Management category help to keep an eye on all machines and tools. The condition of a resource can be easily integrated in planning as trigger for an upcoming maintenance. Useful solutions are classic applications such as the maintenance calendar or modern methods like Predictive Maintenance based on artificial intelligence (AI). All measures planned can be included in the detailed scheduling. At the same time, the completed measures are documented in the digital resource history.

## 7. PRODUCTION AND INTRALOGISTICS WORK HAND IN HAND

Complex production processes ask for effective intralogistics. It is essential to know the material currently used and required in the shop floor, and to manage logistics efficiently. Typical tasks are the timely provision of the material to the machine and the collection of the produced items. At the same time empty pallets need to be provided and tools must be transported to the place where they are needed and back to the warehouse. Efficient workflows are required.
HYDRA X and the mApps of the Material Management category cover intralogistic requirements. They focus on the material circulating in production. In general, ERP systems hardly monitor material. Therefore, a warehouse management system (WMS) is required. HYDRA X provides field-tested interfaces to WMS systems. Transport orders can be generated directly with regard to order progress and forwarded to the driverless transport system by the WMS. Traceability of the used material is also an important issue. HYDRA X documents all information on batches, shelf life and quality and can provide this data for subsequent evaluations.

## 8. FOCUS ON THE EMPLOYEES

The idea of a factory devoid of people does not correspond to the vision of the Smart Factory. On the contrary, people will always play the leading role and will be supported in their work by intelligent systems. The Smart Factory consequently asks for a personnel management focusing on the employees. This may include the collection of working and break times, planning and approval of leave as well as incentive payment or access control.

HYDRA X provides several mApps in the HR Management category for the classical time and attendance and personnel time management. The system uses production data to calculate incentive pay and bonuses. Employees will also trust in payroll accounting as they recorded the data themselves. The integration of a digital access control system offers further advantages. Versatile ID cards can be used to access the building and to record times and postings in the shop floor.

» HYDRA X PUTS EMPLOYEES AT EASE IN THE SMART FACTORY. «

## 9. IN ASSEMBLY, EVERYTHING RUNS ACCORDING TO PLAN

Assembly is a particularly labor-intensive activity in the Smart Factory. Despite an increasing use of machines, people are still an essential part of the process. An operator guidance focused on the processes is very important. If the product portfolio includes many variants, it is necessary to provide specific information on the currently produced item. In some cases, every assembly step needs to be monitored. Finally, principles such as just-in-time (JIT) and just-in-sequence (JIS) are gaining in importance in some industries.
HYDRA X and the mApps of the Assembly Management category offer a wide range of functions to digitally integrate assembly processes. A simple modeling of workstations and worksteps is key. Programming is no longer needed in case of changes. Operators are guided step by step through the process with texts, images and videos. As a result, employees can achieve high quality products within a very short time.

INTERVIEW
WITH
THORSTEN STREBEL

# HYDRA X – WHAT THE SMART FACTORY NEEDS…

The Smart Factory needs innovative IT – there's no question about it. What sets a state-of-the-art MES apart from conventional manufacturing IT? Thorsten Strebel, CTO Products & Services at MPDV, explains in this interview why it should in fact be called Beyond MES and what standards HYDRA X is defining.

## WHAT'S NEW ABOUT HYDRA X?

Thorsten Strebel: "Unlike a conventional MES, HYDRA X is completely appified, which means that all applications are subdivided into smaller units and the functions are bundled in so-called manufacturing apps (mApps) that run on a common platform – the Manufacturing Integration Platform (MIP). The previous classification of industry sectors is outdated. The classic metal processor no longer exists today. Indeed, the number of different manufacturing processes that can be combined in a company is almost infinite. Hence, the software will also need to be more flexible in the future. At the same time, standardization is essential to keep the software landscape manageable: Individual standard solutions are called for, and HYDRA X offers exactly these. With HYDRA X interfaces can be reduced and standardized.

The functional scope has also been significantly expanded. The aim here is to map the lived processes more precisely. Things are getting more detailed, and that's exactly what HYDRA X can handle. Production can now be mapped digitally in its entirety thanks to an increasing level of decentralized intelligence and thus be monitored and controlled more effectively. With HYDRA X, we focus not only on the processes, but also on individual process steps.

>>
WE BUILT AI INTO THE FOUNDATION. THAT MAY SOUND INNOVATIVE TODAY, BUT IN FIVE YEARS, AI WILL BE INTEGRATED EVERYWHERE AS A MATTER OF COURSE.
<<

Needless to say, artificial intelligence (AI) also plays an important role in HYDRA X. We built AI into the foundation. That may sound innovative today, but in five years, AI will be integrated everywhere as a matter of course – as is the case today in many everyday applications. I'm thinking about navigation, voice recognition and the like. The Smart Factory features predictive maintenance, as well as anomaly detection in process data collection and experience-based workforce scheduling. Anomaly detection avoids the loss of material or energy as they can be detected at an early stage. If the system knows from experience how much energy is normally consumed, then it is easy to report deviations directly. This will help to fix the problem faster. AI has also learned that sick leave is typically higher in winter and can take this into account when scheduling staff by creating buffers. Since we have already integrated AI methods into HYDRA X, such application scenarios are very easy to implement."



## WHAT IS THE ADVANTAGE OVER OTHER MANUFACTURING EXECUTION SYSTEMS??

Thorsten Strebel: "HYDRA X combines proven functions with new technologies. You also won't find the functional scope of HYDRA X with any other provider. A solution that spans multiple industries is simply unique on the market in this form – and even more so because it is based on an open semantic model. Along with our Advanced Planning & Scheduling System (APS) FEDRA, the applications of our subsidiary FELTEN and all the mApps from the MIP ecosystem, we cover virtually everything that can possibly arise in the Smart Factory – both in discrete manufacturing and in the process industry. HYDRA X also stands out for its broad integration of quality applications, HR management and support for regulated processes."

## BEYOND MES – AT WHICH POINT DOES HYDRA X EXCEED THE LIMITS OF VDI GUIDELINE 5600?

Thorsten Strebel: "A good example is the Digital Production Meeting. MPDV simply takes the process a step further and goes beyond the MES tasks stipulated by VDI 5600 – a collection of applications to support assembly processes. This significantly refines the digital image of the processes. The goal here is to bring the process knowledge from the heads of the people or the PLC programs into the semantic model.

We have continued to reflect on existing VDI tasks in other areas and have developed target-oriented control loops from them. For example in the area of quality. Here we take characteristics from the CAD drawing, generate inspection plans from them and make the inspection results available to the development department in order to continuously improve the product. For us, Beyond MES means not only going beyond the boundaries of VDI 5600, but more or less dissolving them." HYDRA X thinks processes through and digitizes end-to-end."

>>
FOR US, BEYOND MES MEANS NOT ONLY GOING BEYOND THE BOUNDARIES OF VDI 5600, BUT MORE OR LESS DISSOLVING THEM.
<<

## WHAT ABOUT THE ECOSYSTEM AND INTEROPERABILITY? DOESN'T MPDV CREATE ITS OWN COMPETITION WITH THIS?

Thorsten Strebel: "On the one hand, that is of course true. On the other hand, it is no longer possible to cover the technical touch of the Smart Factory otherwise. Many people expect a generalist to be at least as good as a specialist in a particular case – and that, again, is almost impossible. However, not everyone needs the entire range. We therefore see the ecosystem more as an enhancement to our portfolio. The future project Industry 4.0 states: Former competitors become partners – and this is exactly what we live with the MIP ecosystem. In short, diverse requirements can be mapped by specialists in the ecosystem in combination with standardized applications. We need such collaborations for the Smart Factory."

## HOW DOES HYDRA X DEAL WITH SPECIFIC SMART FACTORY REQUIREMENTS?

Thorsten Strebel: "Our motto is modeling instead of programming. Our products were customizable for a very long time, but now it will be much easier. Individuality is often the deciding factor in competition. The only way a manufacturer can be better than its competitor is if they do something differently. However, flexibility cannot always be completely thought out in advance. Imagine all the combinations that would need to be thought through and tested in interaction. That's why we are relying more and more on modeling – there are fewer side effects, or ideally none at all. Low code replaces customizing. This reduces costs and complexity enormously. Let me use the example of Assembly Management again: Every process is different, every part is different – that can only be modeled. If you had to program every single option, it would take far too long. We use low code and modeling to raise the flexibility of processes to a much higher level and thus make the diversity manageable."

» WE PLACED GREAT EMPHASIS ON SECURITY, SCALABILITY, AND VERSATILITY IN THE INSTALLATION INFRASTRUCTURE EARLY IN THE DESIGN PHASE. AS A RESULT, HYDRA X IS EVEN BETTER POSITIONED FOR USE IN THE CLOUD. «

INTERVIEW WITH THORSTEN STREBEL

# HYDRA X – WHAT THE SMART FACTORY NEEDS...

## MANUFACTURING IT IN THE CLOUD – HOW DOES IT WORK?

Thorsten Strebel: "Currently, IT applications for manufacturing such as MES are still rarely operated in the cloud. There are certainly various reasons for this, such as the issue of data sovereignty, security, but also the fact that applications are often used very close to the process with extremely high availability and short response times.
Over the next few years, improvements in the infrastructure and technology will result in a rethink among companies. We expect a clear trend towards the cloud or software as a service (SaaS) – in manufacturing IT as well. In line with this trend, we have placed great emphasis on security, scalability and versatility in the installation infrastructure early in the design phase of HYDRA X. As a result, HYDRA X is even better positioned for use in the cloud. However, availability as well as real-time capability will continue to be required in manufacturing in the future. Requirements will even increase as a result of growing digitalization.
This doesn't really align with a centralized IT in the cloud as there are too many variables in access times and bandwidth. HYDRA X's architecture solves this by moving critical functions to local components that can be operated in a decentralized fashion – in edge computing. This decentralization makes it possible to continue production virtually offline even in the event of a network failure. Especially in places where the Internet is not very reliable, manufacturing IT can still be operated in the cloud. In a nutshell: If you say cloud in manufacturing, you also have to say edge!"

Whether it's an operator on the machine or a manager in the office, each user interface can be geared to meet the specific needs of the user and works on any device. (Source MPDV, Adobe Stock, i-picture)

## LET'S VENTURE INTO THE FUTURE – WHAT'S NEXT??

Thorsten Strebel: "Hm, I think what we started with HYDRA X will be further developed for a while. I'm talking here in particular about appification and the platform economy. In combination, this will bring us significantly more application diversity in the near future. The focus will be on material management as well as end-to-end planning from the supply chain to the processes. Artificial intelligence is also becoming increasingly important. We will at some point be talking about an AI that works alongside the user, monitors everything and immediately detects irregularities. Everybody can then decide for themselves whether they just want to be informed about the anomaly, whether the AI should suggest measures, or whether everything should regulate itself straight away [Strebel smiles].

I also expect a successive further refinement of the digital image in manufacturing – both in processes and for individual resources. The platform economy will help us get interoperability all the way into the machine. Everything becomes even more closely intertwined and we will all profit in the end. It will be more than a mere stringing together of applications. Network effects ensure that added value grows at a much faster rate – following the principle that 1 plus 1 equals at least 3, if not more."

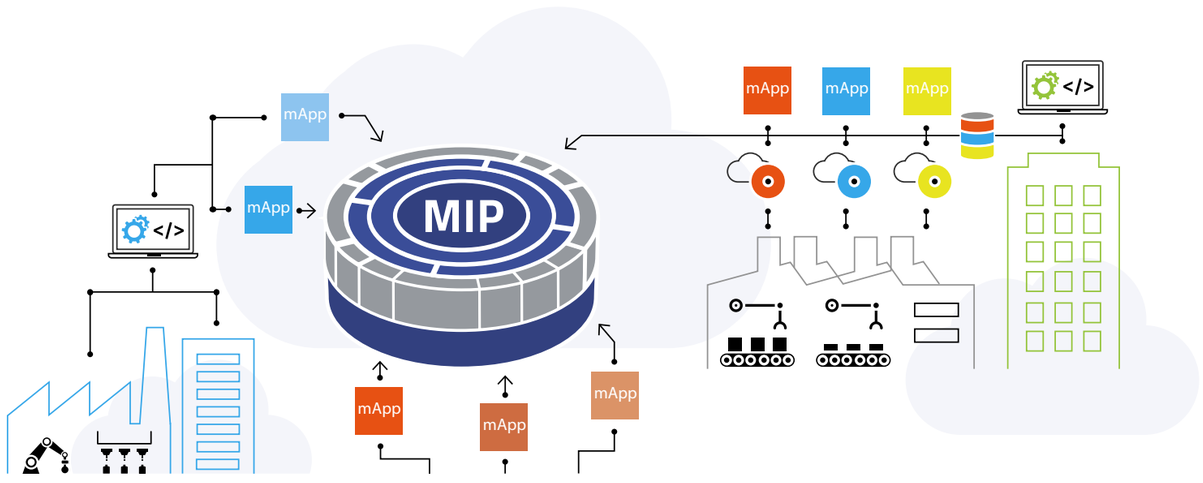
THANK YOU FOR THE INTERVIEW.

HYDRA X

## mApps FOR INCREASED FLEXIBILITY

# APPIFICATION AS FOUNDATION STONE

Unlike other Manufacturing Execution Systems (MES) on the market, HYDRA X comprises a number of so-called Manufacturing Apps (mApps). These can be combined with each other in any way – even with applications from other providers. The buzz word here is appification. But what is appification?




Appification always requires a platform to operate apps and exchange data The open and integrative platform approach of the MIP offers the possibility to combine applications from different providers.
(Source: MPDV)

While the complexity increases, requirements for the manufacturing IT grow at the same time. We also observe a rising number of specialized software solutions being offered to the market. With appification there is no need to program new interfaces and it also prevents media disruptions. Appification is a method to divide functions into smaller units as apps. This enables users to decide which functions they really need. Up to now the user had to buy complete modules.

### APPIFICATION NEEDS A PLATFORM

Appification always requires a platform to operate apps and exchange data. After all, this is the only way to turn a formerly monolithic system into an ecosystem consisting of many suppliers, service providers, and users. The goal is for users to pick only the apps needed, for developers to develop just specific apps, and system integrators to offer customer-specific solutions. For this to work, an integrative platform with a semantic information model is needed. One example is the Manufacturing Integration Platform (MIP) by MPDV.

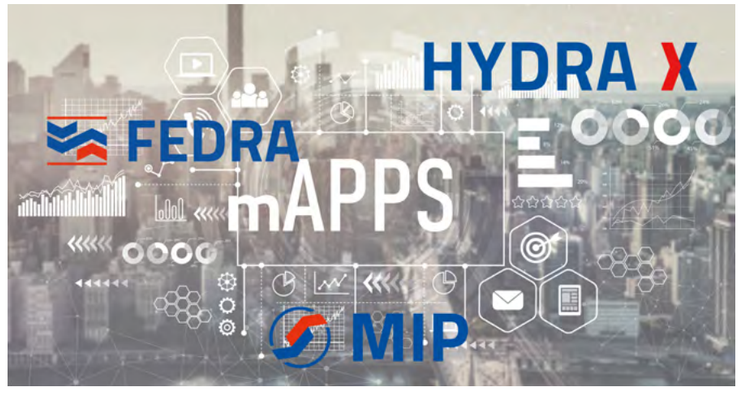
### APPIFICATION AT WORK

MPDV has already applied the principle of appification for some of their own applications. Functions of the shop floor and personnel scheduling were removed from the established MES HYDRA, and new features were added. Several so-called manufacturing apps (mApps) were generated integrating these functions and were altogether transformed into the Advanced Planning and Scheduling System (APS) FEDRA. The main advantage is that FEDRA can be used independently of the MES HYDRA as a stand-alone solution. The basis for this is the MIP, which allows MPDV's planning solution to be combined with other systems for order management or machine monitoring.

### HYDRA X

HYDRA X consists of many mApps and is thus the prime example of a successful appification. MPDV makes a modular system available to customers and partners, allowing individual solutions to be easily arranged and implemented. Other ecosystem contributors offer solutions that extend the functionality of HYDRA X, cover additional use cases, and also provide custom-fit solutions for specific deployments required by different industrial sectors. MPDV deliberately takes on the competition in order to offer customers the best overall solution. HYDRA X categories have been created to keep track of the the numerous mApps, and all mApps are assigned to these categories.

## »IT'S A MATCH!«




### INDIVIDUAL STANDARD SOFTWARE

If you think about appification and platforms further, then the step to individual standard software is only a short one. The key is interoperability. This in turn requires standards that can be achieved with semantic information models. Separate functions can then work with the same data independent of each other. By the way, dependencies are reduced to a minimum or completely avoided. So each app can be regarded as standard software, which becomes part of an individual solution when interacting with the platform and other apps.

### IT'S A MATCH!

MPDV has been in the process of developing an ecosystem based on the MIP for some time now, which is the foundation for such an individual standard software. MPDV also acts as an application provider with APS FEDRA and HYDRA X as part of this ecosystem, aligning the manufacturing IT market with the platform economy. Or to put it in other words: It's a match – applications and integration platform are a perfect fit. This allows each user to combine exactly what they need. If required, applications from other providers can be simply added. To round off the package, MPDV offers a wide range of services that guide and support manufacturing companies on their way to the Smart Factory.

Operation and Maintenance of HYDRA X

# 5 FACTS FOR THE IT DEPARTMENT

HYDRA X focuses primarily on the requirements of modern production, but IT departments have also demands on a software. HYDRA X is a powerful production tool with many advantages that will make the hearts of IT staff beat faster. HYDRA X simplifies software operation, administration and extension for IT departments.

## 1. HYDRA X HAS THE PERFECT ARCHITECTURE

HYDRA X is platform based and open: Operating on the Manufacturing Integration Platform (MIP), HYDRA X consolidates everything that the Smart Factory needs. The solution consists of many so-called manufacturing apps (mApps), which can be combined in any way. Users can integrate mApps from other providers with the MIP, which eliminates the vendor lock-in. Thanks to the new interoperability, each company decides for themselves which applications they want to use.

**BENEFITS FOR IT DEPARTMENTS:** Less work is required in the event of functional extensions. New mApps are simply added to the existing system landscape and operate on the available database.

## 2. MODELING INSTEAD OF PROGRAMMING

In an environment as complex as the Smart Factory, it is crucial for companies to be able to customize their manufacturing software to meet specific requirements. In many software solutions, certain program components can be customized or supplemented by your own programming. However, this assumes that the necessary programming skills are available in the IT department or are outsourced.

That's totally different in HYDRA X – key word is here low code. This involves the modeling of processes and modifications achieved by using graphical wizards or description languages. Predefined function blocks can be arranged and connected with each other via drag-and-drop. No programming skills are required! HYDRA X integrates this low code principle in the collection of shop floor data, the modification and creation of custom web interfaces, the calculation of KPIs and the display of assembly processes.

**BENEFITS FOR THE IT DEPARTMENT:** Programming resources are eased or no longer need to be set up in the first place.

## 3. INTEGRATION INTO EXISTING LANDSCAPE

Greenfield projects, which start implementation from scratch in a greenfield environment, are rather rare in manufacturing. This makes it all the more important that new software solutions can be integrated into the existing IT landscape in brownfield environments – like HYDRA X. The software is compatible with the common databases and can use existing structures. For example, integration into the Active Directory is possible for an overall user management. HYDRA X's service-oriented architecture makes it easy to connect existing IT systems, which is achieved with web services that communicate by means of standardized methods such as https and JSON. A standardized connection of machines and shop floor equipment via OPC UA also simplifies the integration of HYDRA X. MPDV offers a wide range of driver modules to connect machines of all types and ages.

**BENEFITS FOR THE IT DEPARTMENT:** Reduced time and effort required for the connection. Existing resources can then be used for other tasks.

## 4. SECURITY, STABILITY & MAINTAINABILITY

There are huge advantages of a standard software, especially in terms of documentation, maintenance, reliability and releasability. Security is also playing a key role these days. HYDRA X serves all of these needs with integrated tools that make life easier for IT staff. For instance, HYDRA X comes with a repository client that allows to manage self-developed and third-party services. An integrated load balancer ensures that the overall system is stable and performs well at all times. HYDRA X's security is also state of the art. Access to the shared database is provided by Content Access Services (CAS), which guarantee the integrity of the data during each operation. Users can only access CAS through Global Security Services (GSS). These check the user's identity as well as their access rights. The GSS also make sure that accesses are encrypted.

**BENEFITS FOR THE IT DEPARTMENT:** Less customization is required in the backend, as HYDRA X provides its own tools for the most important tasks. Ultimately, this also leads to reduced efforts and less hassle in running the system.

## 5. SAAS REDUCES OPERATING EFFORTS

Software as a Service (SaaS) options deliver more flexibility for users and open up new opportunities to use existing resources even more profitably. HYDRA X is designed to run in the cloud. Although operation on premise is also possible, manufacturing companies should examine whether using SaaS is more effective so they can focus on their core business: production.

The operation of the manufacturing IT is handled by specialists with the right skills. From a business perspective, SaaS are rewarding because they reduce fixed costs for in-house IT specialists to operate the servers by up to 50 percent. SaaS also eliminates large one-time investment in software licenses and infrastructure. Instead, smaller sums are due on a regular basis. Companies can choose the terms and the payment frequency themselves. This makes manufacturing IT affordable, especially for smaller companies.

**BENEFITS FOR THE IT DEPARTMENT:** The effort required to operate HYDRA X can be reduced to a minimum. Only the local shop floor components need to be taken care of.

## YOUR IT DEPARTMENT WILL LOVE HYDRA X!

- ... is compatible with all major databases.
- ... can be used and operated as Software as a Service (SaaS) or on premise.
- ... can be perfectly integrated into the Active Directory structure.
- ... uses web services and a modern platform architecture.
- ... offers many valuable tools when it comes to stability, maintainability and security.
- ... is flexible and customizable – modeling using low code is the norm.
- ... is scalable for the best possible performance and comes with its own load balancer.

**MORE INFO SEE OUR YOUTUBE VIDEO**

NEW FLEXIBILITY, NEW CHANCES

# BOUNDLESS FREEDOM: HYDRA X AND THE CLOUD

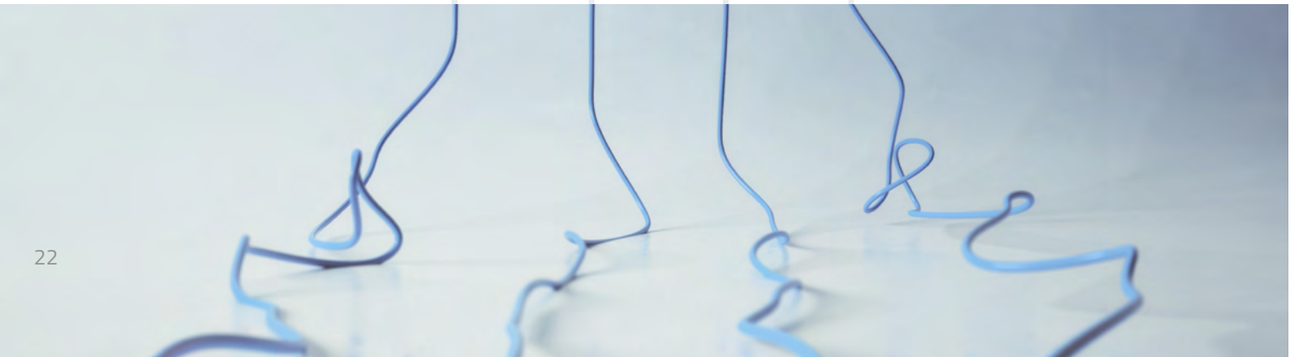
Cloud computing and manufacturing IT: Both are application fields of information technology that have an interesting history. However, they have only appeared in combination for a relatively short time. The reasons are manifold: Firstly, the general fear of change resonates. And secondly, there are concerns that production will suddenly come to a standstill – and that this mystical cloud will be out of physical reach. But there are good examples as to why this interaction is now increasingly successful and why HYDRA X is perfectly suited for this purpose.

Both manufacturing IT and cloud computing have evolved in pursuit of cost and resource efficiency. When it comes to manufacturing IT, the focus is on production with its complex processes. As we are dealing with a competitive environment, the privacy and security of the collected data is essential for companies. The system must also be available at all times and be intuitive to operate. And most importantly, manufacturing IT is the basis for the Smart Factory, which is simply not possible without manufacturing IT.

In cloud computing, the costs of operating the IT play an overriding role. To reduce costs, applications were standardized and offered from a central place. Further advantages of cloud computing are the flexibility and scalability of cloud services as well as aspects of security, redundancy and availability. When using a cloud service, the customer no longer has to worry about how many users require access and how secure the system is. The cloud provides exactly what the user needs at the push of a button.

## FIND COMMON OBJECTIVES

Albeit with a different focus, there are overlaps in the cost aspect, reliability and availability. The idea of merging two fields of application is therefore obvious, but this is not as easy as it seems at first sight. The reason lies in the fact that the manufacturing industry is still far from being completely digitalized and there are often reservations about innovative IT solutions: Many production companies are skeptical about cloud computing and rarely consider it.





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MPDV NOW OFFERS THE HYDRA X MANUFACTURING EXECUTION SYSTEM (MES) AS A CLOUD-BASED MANUFACTURING IT SOLUTION. THE PRODUCT IS CALLED SMART FACTORY CLOUD SERVICES AND INCLUDES HYDRA X AND THE COMPLETE MPDV PRODUCT PORTFOLIO.
<<

Among the reasons are a lack of confidence in the technology and concerns about network infrastructure. Bandwidth, latency and availability are mentioned as possible disruptive factors.

Nevertheless, there is some momentum. We can observe that other business-relevant IT applications such as ERP systems are paving the way to the cloud. The ERP in the cloud is no longer a rarity, and the need for efficient operation has eased concerns. More and more companies are taking a close look at the technology.

Finally, the steadily growing supply of manufacturing IT from the cloud is benefiting the market itself. The product range of different providers increases the confidence of manufacturing companies in the technology and makes for healthy competition.

## EDGE SUPPORTS THE CLOUD

Manufacturing IT has additional requirements compared to ERP, for example, a suitable connection of the shop floor. At this point, a second technology comes into play: edge computing. Edge refers to the transition zone from the shop floor to IT and the cloud. Edge computing means that not all functions of an application are in the cloud. Parts of it can run locally on site or even next to the machine. These are primarily time-critical functions such as the collection of data, control and intervention in the production process. No business can afford the risk of a poor Internet connection or network failure in either area. Consequently, companies outsource these functions to the edge and ensure frequent synchronization with the cloud.

## SAAS IN THE PRODUCTION ENVIRONMENT

MPDV supports its customers with their Software as a Service (SaaS) package by providing and operating their own software solutions in the cloud. The customer installs and operates the clients and components for data collection locally at their company. In doing so, the cloud edge architecture comes into action. Since the servers operated in the cloud can be addressed separately, the connection of the client landscape and the integration into the ERP are not insurmountable issues.

In addition, with the so-called cloud adapter, MPDV offers the option to connect other cloud-based systems very easily. For the user, only one thing changes: They no longer have to worry about the operation of MPDV solutions on the server, because services typical of the SaaS services include the updating and maintenance of all system components operated in the cloud. Secure operation is thus guaranteed – also with regard to external attacks.

>>
SAAS OFFERINGS PROVIDE MORE FLEXIBILITY FOR USERS AND OPEN UP NEW OPPORTUNITIES TO USE EXISTING RESOURCES EVEN MORE PROFITABLY.
<<

## HYDRA X CAN DO EDGE AND CLOUD

As early as during the development of HYDRA X, cloud operation was a key design feature, which is why the software is offered as part of Smart Factory Cloud Services. The user can now focus on production and work with the system in the shop floor and MPDV takes care of a reliable and secure operation of the manufacturing IT.

MPDV also simplifies data collection in the shop floor by using edge computing. For this purpose, the HYDRA X component Distributed Edge Computing (DEC) features a data collection unit as well as a logic module. The latter can be used to process collected data locally – i.e., in the edge – and to send only significant or aggregate data to the cloud for storage..

## PROFIT ALL THE WAY

All in all, by using cloud services for manufacturing IT, manufacturing companies can once again focus more on their core business. The operation of the manufacturing IT is handled by specialists who have the right skills – sometimes the provider of the solution or specifically trained partners.

NATHALIE KLETTI, CHIEF EXECUTIVE OFFICER

# MILESTONE FOR OUR CUSTOMERS

First of all, I am convinced that HYDRA X is perceived as a worthy successor of today's solution HYDRA 8. HYDRA has been a renowned brand in manufacturing for more than 30 years. At this point, I would like to point out that our company and our employees have achieved a lot since the first version of HYDRA was launched.

For our customers, HYDRA X is a milestone on their way to the Smart Factory. With HYDRA X, manufacturing gets what many experts in the field of Industry 4.0 have long been calling for – a solution that combines manufacturing apps interoperating on a single platform. This platform is our Manufacturing Integration Platform (MIP). Things like ecosystem and interoperability come to life with HYDRA X.

Our partners also benefit from the open platform architecture. They can offer their apps in the ecosystem and access the apps of other providers at the same time thereby enriching their own portfolio.

The MIP ecosystem and HYDRA X create a win-win situation for all parties involved. On the one hand, HYDRA X contributes many field-tested apps to the MIP ecosystem. On the other hand, the ecosystem enhances HYDRA X because specialized applications can be connected more easily. Our customers benefit from it who can now select from a large range of functions thanks to the overall interoperability. HYDRA X brings a new serenity into the agitated world of manufacturing IT and Smart Factory. Individual requirements can be fulfilled efficiently with standard software and integrated digitally. I think it is really justified to speak of a milestone here.

» IN THE FUTURE, INDIVIDUAL REQUIREMENTS CAN BE FULFILLED EFFICIENTLY WITH STANDARD SOFTWARE AND DIGITAL INTEGRATION IS SIMPLE. «

System integrators also benefit from HYDRA X and the MIP ecosystem. Companies in this sector have specialized in combining applications or apps available on the market that are offered as individual solutions to their customers. Combining apps becomes very easy with the open platform architecture of HYDRA X and the MIP. As a result, we gain broader market access to the manufacturing sector.

I am absolutely convinced that HYDRA X is the perfect answer to the challenges of the age of Industry 4.0. Our ambition with the new solution was and still is to align with the market requirements of the current decade and the decades to come. We are right on track from today's point of view.





JÜRGEN PETZEL, CHIEF SALES OFFICER

# MORE FREEDOM FOR THE SMART FACTORY

With HYDRA X, we offer all companies a precise answer to their question on how to transform their production into a Smart Factory. The step into digitalization becomes now simpler and easier to accomplish. The task of assembling functions and costs are manageable, clear and transparent. Companies start where the need is most urgent and where the investment pays off quickly (ROI).

We offer HYDRA X as Software as a Service (SaaS) for even more flexibility and freedom for users, the so-called Smart Factory Cloud Services. It goes without saying that each user decides for themselves whether they want to use the SaaS services or operate HYDRA X in their own data center. Furthermore, the customer can easily extend the solution by their own applications or by mApps from other providers of the ecosystem. The open platform architecture of HYDRA X and the Manufacturing Integration Platform (MIP) is the basis for this new freedom needed by the Smart Factory. Processes and workflows have become increasingly complex over the past years and no provider can offer everything from a single source. HYDRA X covers a range of functions that goes far beyond a classic Manufacturing Execution System (MES).

We focus on the standardized integration of production workflows and their support processes such as quality assurance, maintenance management, intralogistics and human resources. In many places, HYDRA X provides data and information that is required in other applications – ERP system, facility management or AI-based analytics tool to state a few. Thanks to the platform architecture, everything is almost automatically done.

» MODULARITY BECOMES INTEROPERABILITY. WE ARE EXPANDING THE FLEXIBLE RANGE OF FUNCTIONS AND OVERCOME SUPPLIER BOUNDARIES. «

When speaking with HYDRA users, we often heard that the HYDRA 8 modularity was an important feature setting us apart from other providers. With HYDRA X, we started at this point and took the concept even further. Modularity becomes interoperability. We are expanding the flexible range of functions and overcome supplier boundaries.

Interoperability is of particular benefit in so-called brownfield projects. Brownfield is common among manufacturing companies as industrial companies rarely start in greenfields. In most cases, existing systems must be replaced or integrated. Integration has become much easier with the MIP. And perhaps some manufacturing companies only want to use HYDRA X functions in the background and continue to use the implemented user interfaces at the front end. Staff in production will easily accept this approach. In a second step, a change to the new look and feel is then possible. A parallel operation of old and new operating concepts is another option facilitating migration. After all, I am delighted that we are now entering the age of Industry 4.0 and we can use HYDRA X to transform even more factories into genuine Smart Factories.

THORSTEN STREBEL, CHIEF TECHNICAL OFFICER

# A NEW ERA BEGINS

**With HYDRA X, we have arrived where the market needs us today and in the coming decades, which is the age of apps, platforms and ecosystems. The interim step taken with HYDRA 8 and the so-called MES-Weaver 4.0pe was important to create a link between the HYDRA world and the Manufacturing Integration Platform (MIP) ecosystem at an early stage.**

We no longer need this bridging technology. The individual manufacturing apps (mApps) of HYDRA X communicate directly with the MIP and can be flexibly combined with each other and with mApps from other providers. Needless to say, there is also interoperability with our APS FEDRA, which has already been running as mApps based on the MIP since its launch in 2020. The appification of manufacturing IT is a milestone we are setting with HYDRA X.

Beyond appification, we have focused even more on innovative technologies when developing HYDRA X. For example, we use a standardized client technology to offer the operator on the machine, the supervisor in the office or the manager on their tablet a consistent user experience (UX). At the same time, each user interface can be geared to meet the specific needs of the user. The use of widgets simplifies the design of dialogs and application interfaces immensely. We have seen many web clients on the market, but with our new client we are revolutionizing the usability in the Smart Factory – for the user and in the design of interfaces. For this purpose, we also involved external UX experts. I therefore expect a significantly higher acceptance by the users – no matter on which hardware HYDRA X is used.

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DATA IS THE GOLD OF MANUFACTURING, AND WITH HYDRA X, USERS CAN UNEARTH AND EXPLOIT MORE OF IT.
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The use of edge computing also makes it easier to collect data on the shop floor. Data is the gold of manufacturing, and with HYDRA X, users can unearth and exploit more of it. To be precisely, I expect more users to connect a greater numbers of machines, systems and sensors to HYDRA X – simply because it's possible. Our Distributed Edge Computing (DEC) product consists of a collection unit and a logic module. The latter can be used to process collected data locally, which means data is collected in the edge and only aggregate data is transmitted and stored. Bear in mind that it is important to use the available transmission bandwidth wisely, especially when HYDRA X is operated in the cloud.

Cloud operation was a key design feature in the development of HYDRA X and as a result the software is offered as part of the Smart Factory Cloud Services. The user can now focus on production, and work with the system in the shop floor and we take care of a reliable and secure operation of the manufacturing IT. On the functional side, HYDRA X brings a lot of new features, which also go beyond the functional scope of a classic MES. Customizations are also becoming easier thanks to principles such as „adaptability by design" and low code. That is why I am convinced that HYDRA X will meet the needs of the Smart Factory today and in the future. At this point I would like to quote our company founder: "Even today it is difficult to produce without HYDRA and if you don't have HYDRA X in a few years, you won't need it anymore."



## **HYDRA X** IN NUMBERS

PERFORMANCE ENHANCEMENT

HUMAN RESOURCES

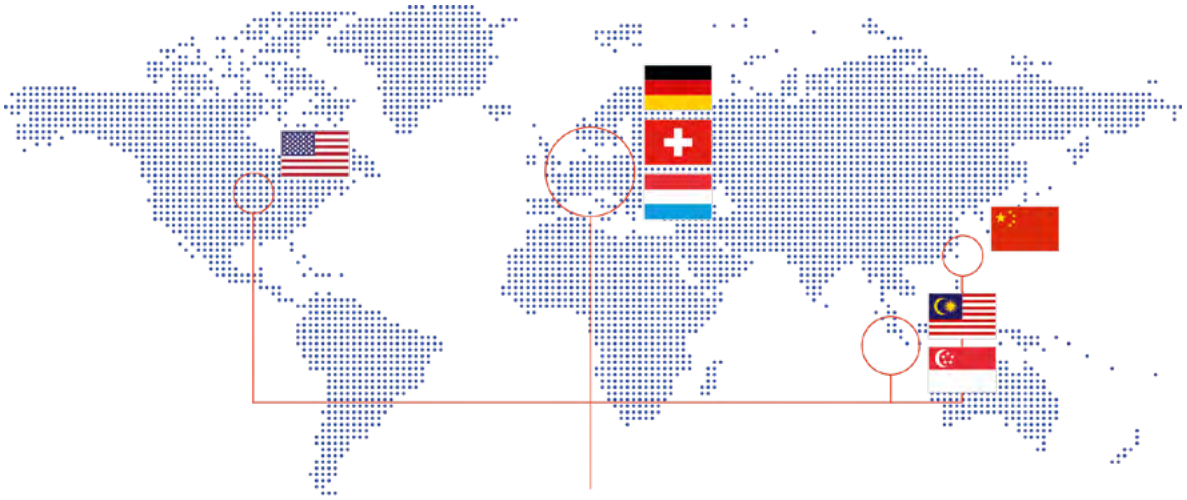
TIME

**48** MONTHS
DEVELOPMENT TIME

**60** INTERNATIONAL DEVELOPERS AND PRODUCT MANAGERS

**30.000** CUPS OF COFFEE

mpdv
*WE CREATE SMART FACTORIES*



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