» d-automation

D-PRODUCTION

MESSAGE FROM
THE CEO

The majority of SMEs only reach an overall equipment efficiency of 50%. By logging the key performance indicators of your line and the health levels of your machinery you can not only measure the results of your production steps but also take strategic decisions regarding staff and resources on a valid database. Increased efficiency of your line up to 25% is achieved through of a drastic reduction of unplanned downtimes.By constantly measuring the output rates at critical points within the production cycle the source problem can be identified easier than ever before.

Our Mission is to deliver the tools necessary to increase your flexibility and efficiency!

Daniel Vöckler

Founder & CEO d-automation

Welcome

In this rapidly changing time the proper control of time and data are becoming more important every day. Many SMEs already recognize the importance of big data but suffer in regards to the missing opportunities to drive their own business via this data. Our Mission is to deliver the tools necessary to increase flexibility, the efficiency of processes and to reduce unplanned down-times!

In my last Position as COO in a fast growing mid-sized production company we often found ourselves in the situation of very tight capacities and in a rush to finish production orders. Unexpected machine break downs and the need to reallocate staff, talk to customers, get service technicians and spare parts with each unexpected break-down was very exhausting and kept us from focusing on our core mission of producing for our customers. Furthermore, we had to plan extra shifts and overtime to prevent contract penalties for late deliveries. The production manager easily lost the overview in such cases and time was missing for other re-occurring problems which might halt production even further. Even with additional staff, the problem rarely changed. Therefore, I developed a simple and easy to use real-time health and KPI monitoring system: d-production. d-production does KPI Logging and provides a dashboard to enable your production managers, your controllers and you to keep track of all your lines.

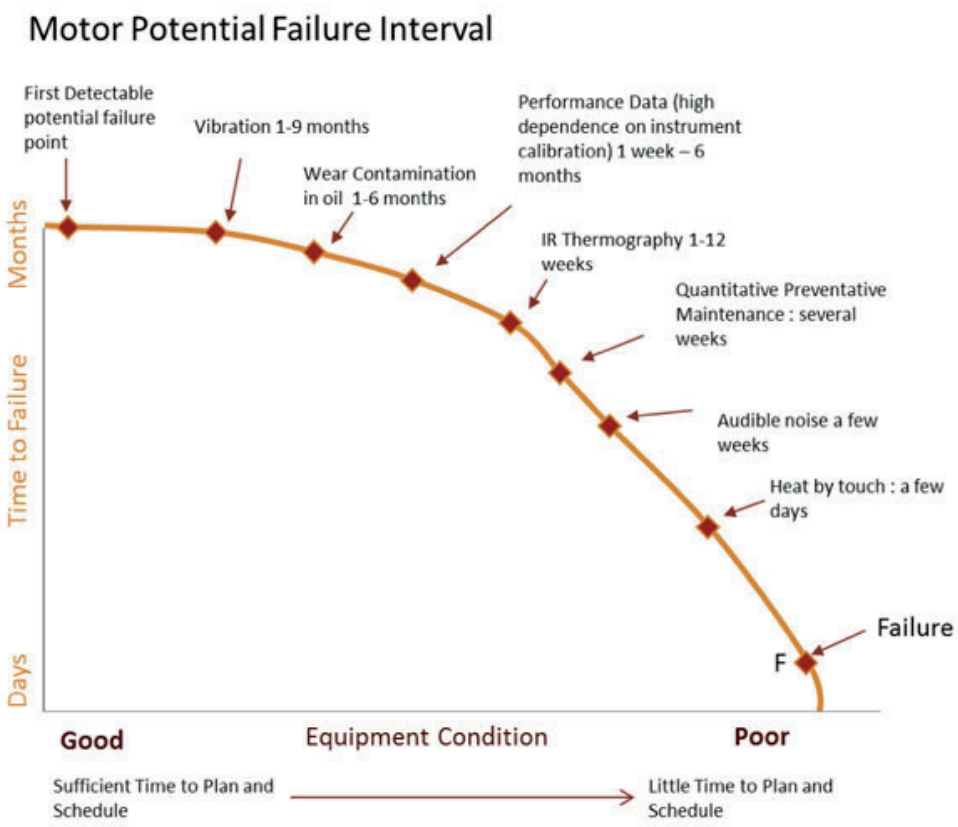
Daniel Vöckler

Founder & CEO d-automation

DETECT ERRORS
BEFORE CAUSING FAILURES

As one of the core components of Industry 4.0, Predictive Maintenance (PdM) takes a proactive approach to maintain machinery and equipment in order to minimize downtime.
Predictive Maintenance (PdM) allows error detection long before an un-planned outage occurs.

The potential of predictive maintenance can best be explained by the graph on the right.
After an initial defect on one of the components, in this case, an electric motor, the defect can be detected very earlyon the basis of slight changes to the machine's vibrations, found within the infrasound range. It is only at a later, more damaged stage that a change in oil temperature or other thermal changes can be measured. Through vibration measurement in the infrasound range, a defect can be detected days, weeks and sometimes months in advance of part or machine breakdown.
In addition, consecutive damage can be detected early. If, for example, the water pump fails on your car, the enginge will overheat. The damage resulting from not repairing the water pump is significantly higher than the pure cost of a water pump.



This graphic illustrates the relationship predictive maintenance, preventive maintenance, and autonomous maintenance have on the time to detect a potential failure interval. It stands to reason that there will be resulting lost financial opportunity (energy saving, lost productivity, etc.) and increasing cost to repair as the time interval to failure decreases .

Reference: Machine Monitoring Systems Ltd.

In order to avoid these issues at the source, vibration sensors and light barriers are attached to existing systems in order to analyze clock rates, good and bad parts and vibrations of all components that are transmitted via metallic connections. Taking into account the possible sensor values, timely maintenance planning for operation can be derived (ex-ante instead of ex-post). As a result, there is a reduction in unplanned downtime, as well as a reduction in scheduled downtime due to extended maintenance cycles. Further value is driven by using modern big data technology and analytic methods, such as artifical intelligence. The vibration and fault history of each machine is evaluated. The basis for this can be both relevant sensor data and external influences, and associated optimization potentials, such as shortening the restarting times through a change in the allocation of necessary operating resources. All of these data points can be input, derived from and are presented clearly within the d-production dashboard.

THE BENEFITS
OF D-PRODUCTION

Although industry 4.0, predictive maintenance and artificial intelligence are frequently spoken about within industry news and innovation sectors, most of these solutions have proven to be very complicated and expensive for SMEs.

Our solution to get your lines digitalized is simple and cost-efficient. We will equip your production lines with a small unit. This box will deliver PdM together with AI, KPI logging and the measurement of output rates of healthy and broken parts, all of which are sent to a central database. The same unit scans RFID-Tags of your employees, so you know how many people are working on your lines.

KEY PERFORMANCE INDICATORS

Key performance indicators (KPI) measure against a benchmark to provide clear data. d-production logs KPIs such as the overall equipment effectiveness, quality rate, availability, performance rate, runtime, cycle rates, medium time to failure and many more.

PREDICTIVE MAINTENANCE

Predictive maintenance evaluates the condition of your production lines by continuous equipment condition monitoring. Therefore, you can perform maintenance at a scheduled point in time before your machine breaks down and plan for maintenenance days in advance.

DASHBOARD

Dashboards provide a central location for users to access, interact and analyze up-to-date information so they can make smarter, data-driven decisions. d-productions dashboard enables you to monitor and measure performance and metrics in real-time.

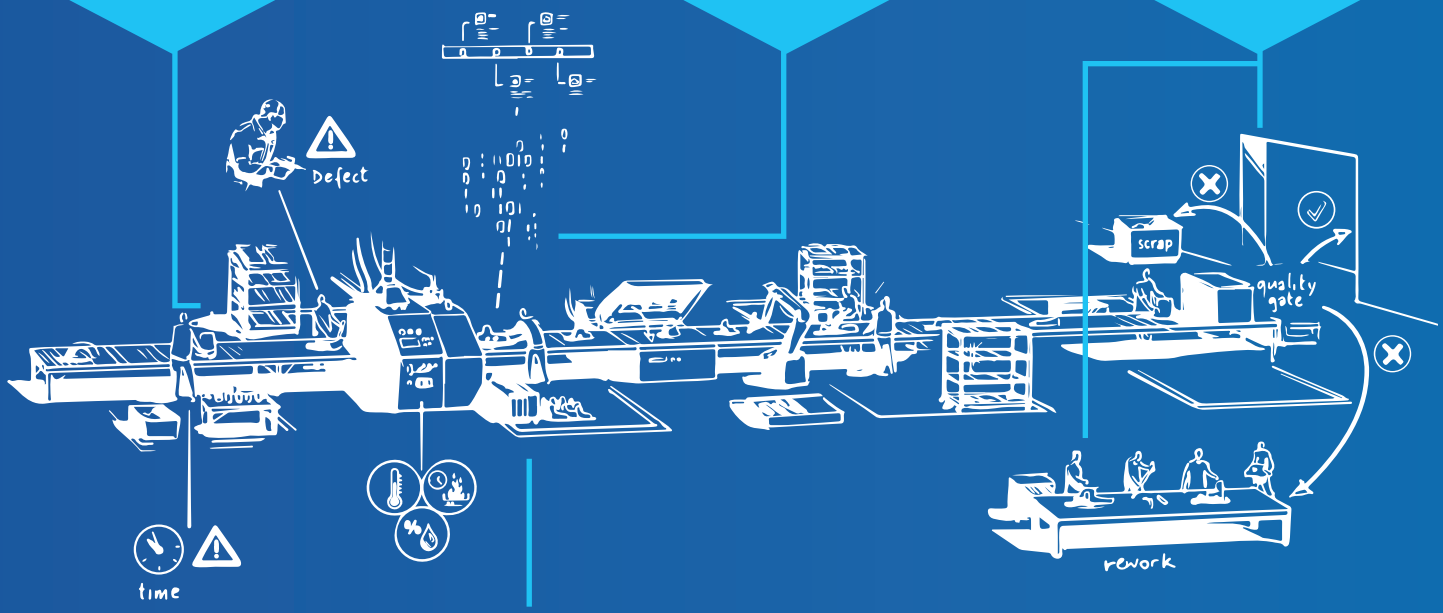
PREDICTIVE MAINTENANCE
A BUZZWORD

A poll by Staufen-Neonex among 394 manufacturing companies on the status of Predictive Maintenance brought sobering results. Two-thirds of companies claim to use such a solution - or at least believe they do. On closer examination however, many implementations turn out to be condition monitoring at best, i.e. as a mere observation of the operation of a machine without sensors and predictive algorithms. Sometimes the only sensor on the machine is the ear of the operator.

84% discuss PdM only 25% start a Project

24% collect machine-relevant data for PDM

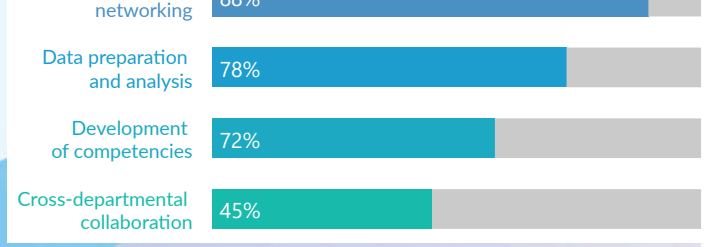
13% record consequential damage (customer and machine)



61% deem the implementation effort too high

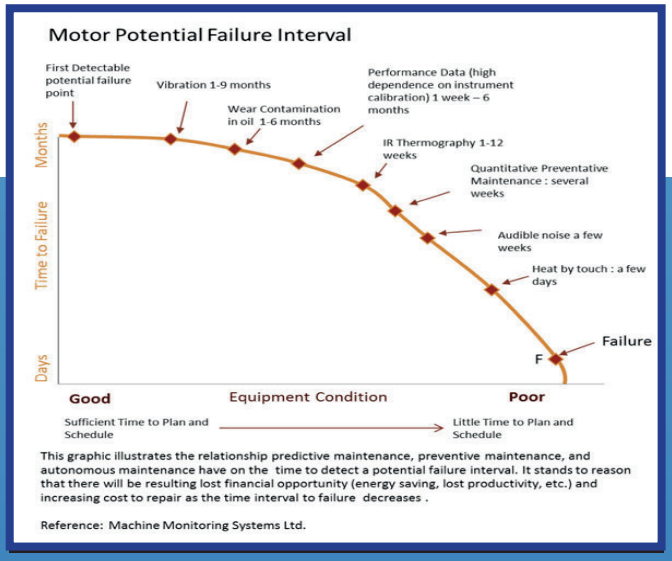
21% evaluate processes , measuring and machine data with regard to PDM

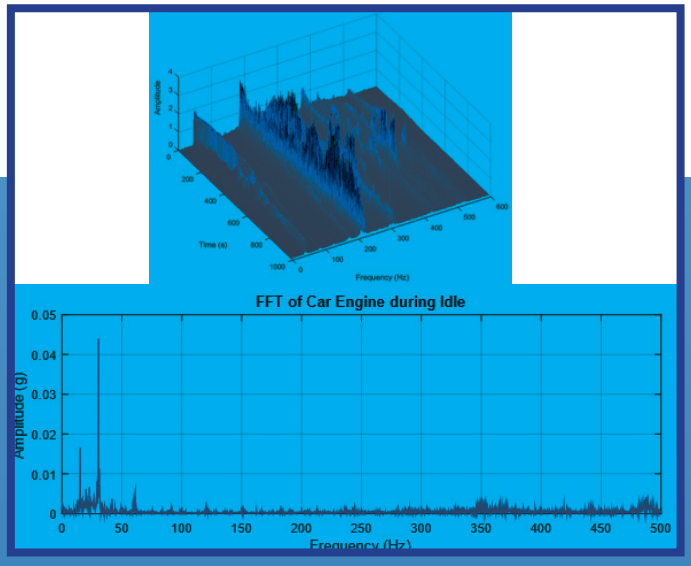
BEST STEPS TO PREDICTIVE MAINTENANCE



TECHNICAL EXPLANATION
PREDICTIVE MAINTENANCE

Each machine with one or several drives generates a specific vibration and noise within each part. By usage of vibration detection, a specific frequency for each part con be recognized and faulty parts can be identified.





Detection potential

Between the initial failure point and the actual failure of parts or the machine as a whole often times weeks or even months pass. The point in time in which a trained operator could ostensibly recognize forthcoming machine failure via increased machine temperature, audible noise or even infrared thermography is usually only briefly before the machine completely shuts down due to the malfunctions. Vibration analysis warns you from two days in advance and up to nine months in advance of machine or part break down. Analysis and prediction of d-production can determine the exact source of the problem due to its ability to recognize the unique frequency of individual parts.

Vibration detection

With spectrum analysis of the vibration profile you can, for example, determine the engine's crankshaft rotation speed. In the image above is the vibration spectrum of a 4-cylinder, 4-cycle engine. The engine operates with two pairs of pistons moving out of phase with each other and two piston combustions per crankshaft rotation; so the dominant frequency of the engine's vibration will be twice the crankshaft rotation speed. In the fast fourier transformation (FFT) there is a dominant frequency at 30 Hz or 1,800 RPM . Therefore, at idle the crankshaft will rotate at 900 RPM (or 15 Hz) where there is also a peak in the FFT. If the frequencies are not aligned at a 2:1 ra-

DESCRIPTION OF **WORKFLOW**

d-production integrates into your workflow seemlessly without changes to your operational and organisational processes.

LOAD TASKS/ORDER FROM ERP

Your production order is loaded by a push of a single button directly from your main ERP-System such as SAP S4/Hanna, Oracle or My-Factory (further Systems on request).

AUTOMATIC CHECK

As soon as you select a machine and scanned the barcode of the production order the status of the machine and all details are checked with the database.

START

Start your machine as usual. Our sensor will recognize the start automatically.

REAL TIME OVERVIEW

Check the progress, current speed, health level and output in real-time on the monitor at the line unit or on the d-production dashboard.

PREDICTIVE MAINTENANCE

The health-level of your machines is constantly updated. Get automatic warnings via artificial intelligence if actions are required. Label events to further increase performance so that the AI continues to learn.

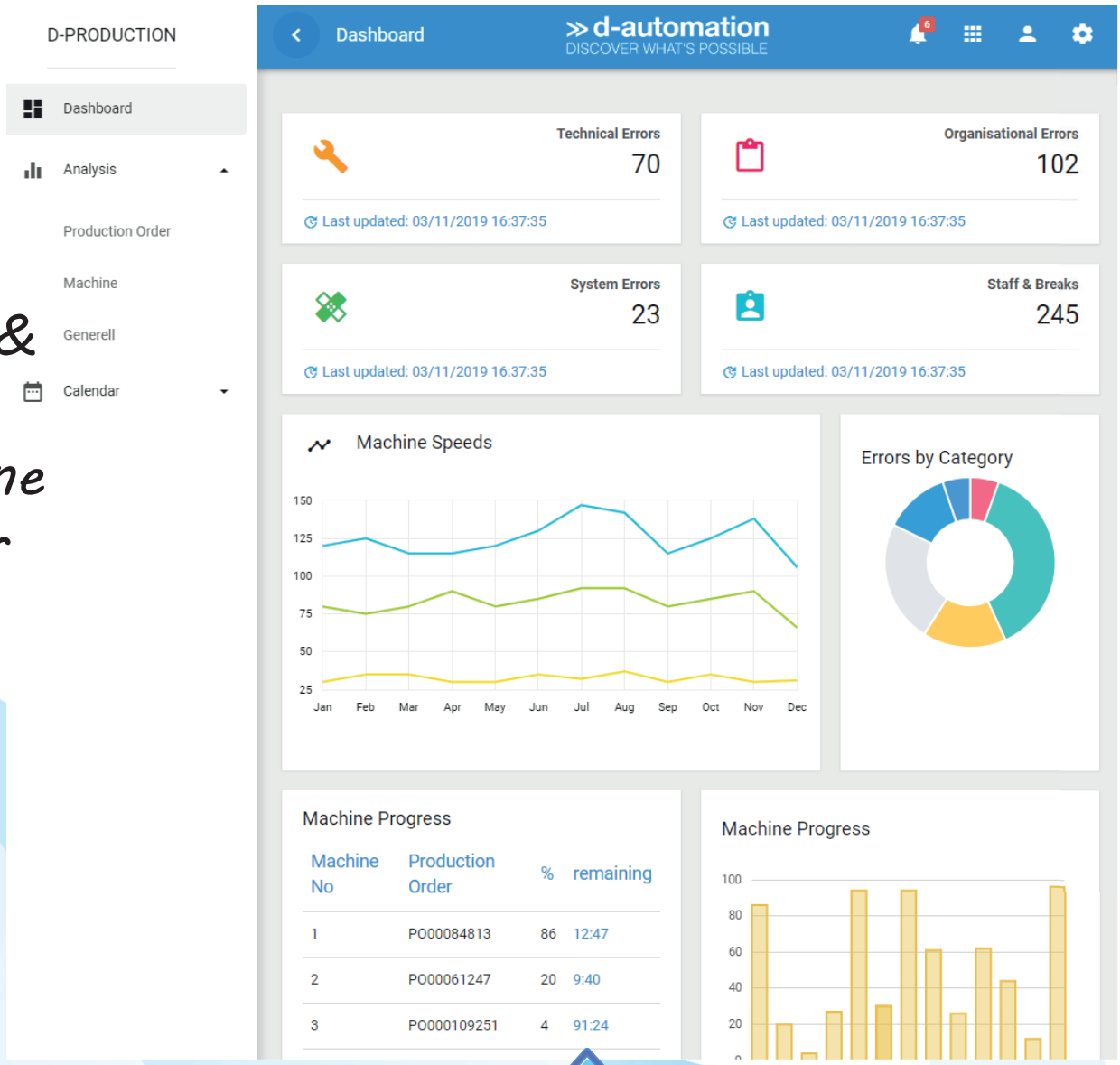
TRACEABILITY

Each line is logged in a database. E.g. health levels, average speed, output, employees at the line, production order. This data can easily be imported to excel, calculation files or any further analytic program by CSV-Files.

DASHBOARD
HAVE A LOOK

Notifications & quick overview

Reports & Analysis by machine or order



KPI & Health Level

HARDWARE
HAVE A LOOK

the hardware of d-production will be mounted directly to your current manufacturing line. The unit is a fully customized mainboard which enables you a plug-and-play functionality.

4·3 inch touch screen

symbols instead of text for easier visibility

ocatacore CPU (8x1·4Ghz)

Connectors for power, sensors, gigabit ethernet, micro HDMI

D-PRODUCTION

KEY PERFORMANCE INDICATORS

01 PREDICTIVE MAINTAINANCE

02 HEALTH INDICATOR OF YOUR LINES

03 CONTINUOUS EQUIPMENT CONDITION MONITORING

04 CONSTANT KPI LOGGING

05 REAL-TIME OUTPUT RATE OF ALL YOUR LINES

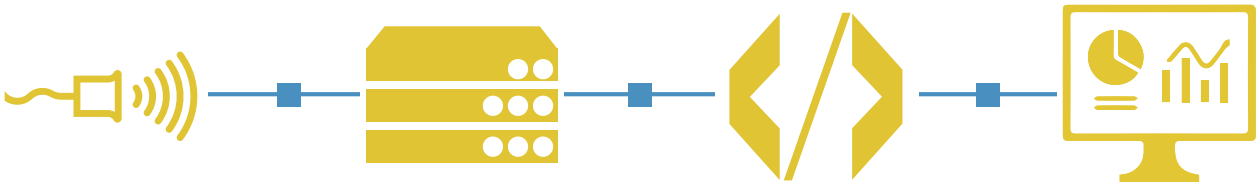
06 DETAILED ANALYSIS OF ALL YOUR LI-NES

07 DIGITALIZE YOUR PRODUCTION COST EFFICIENT

08 SEAMLESS INTEGRATION INTO YOUR IT-STRUCTURE

SEAMLESS
INTEGRATION

d-production seamlessly integrates into your existing IT-system. We offer a cloud-solution as well as a non-cloud system. With the non-cloud version all your data will stay on your own servers without any backlinks.



SENSOR DATA

The vibration and oscillation data, as well as the KPI measurement data, can be stored on your servers, in the cloud (AWS, Microsoft, etc.) or on-premise.

DATABASE

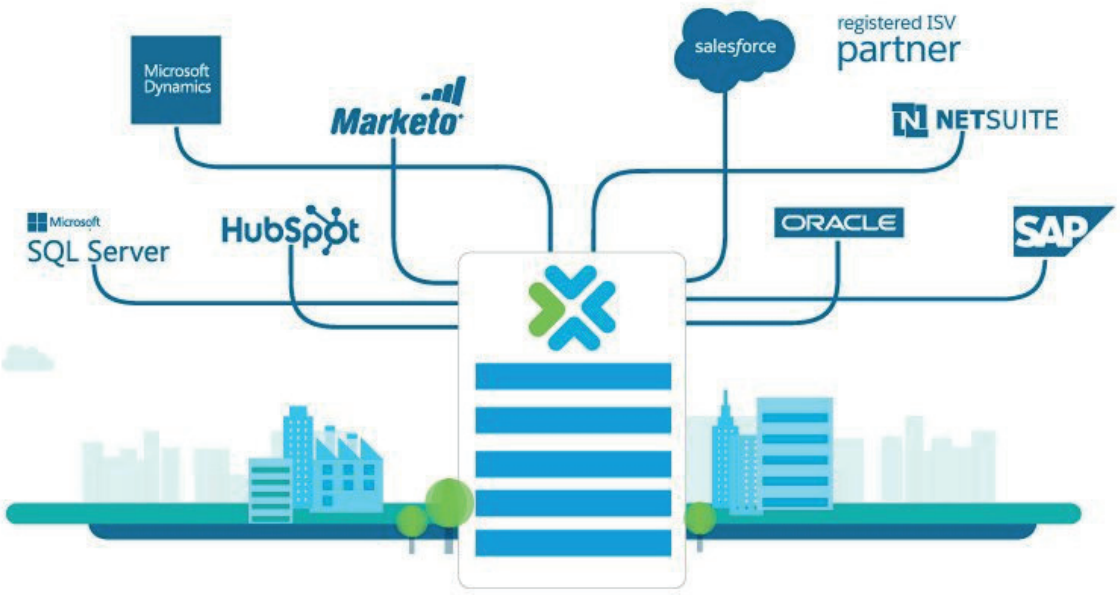
d-production can store all collected and calculated data in your database, your ERP system or on the integrated database.

PROCESSING

The calculation of the individual values and characteristics as well as the forecast of the probability of default takes place on-premise and does not burden your server systems with high-performance requirements.

DASHBOARD

d-production has an integrated dashboard that collects data from multiple units and groups them according to your wishes. If you already have a dashboard, we can easily integrate our data into your system.



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DISCOVER WHAT'S POSSIBLE