

VORTEX

2023

ABRIDGED INDUSTRIAL
NETWORK SUPPORT REPORT



PREFACE

"With more than 40 network experts, we develop increasingly productive industrial services."



Dear customers,

Dear business partners,

Dear interested parties,

Industry is currently preoccupied with supply chain bottlenecks and price increases, due to the production and logistics restrictions caused by the Covid-19 pandemic as well as the war between Russian and Ukraine.

But even in this challenging production environment, the task of operators is first and foremost to ensure uninterrupted operation of plants and machinery. To do this, they need to keep an eye on the critical assets. The communication network itself is also increasingly becoming a critical asset whose smooth operation must be guaranteed. In the context of IEC 62443, there are also increasingly high requirements for OT security.

To support industrial companies pragmatically and effectively in achieving these goals, our more than 40 network experts are developing ever more productive industrial services. With increasing integration depth, more and more individual operator models between the field and control levels are coming into practical use every day, in addition to consulting and planning services.

I hope you will enjoy reading the new Vortex Report and the insights our network experts have gained from more than 380 assignments. Some of my colleagues have their say in this issue and have shared their daily challenges with you.

Bianca Körner,
Head of Service & Technology

TECHNICIANS REPORT



Florian Leffler
Service Account Manager

Customer satisfaction is important to us!

"The focus of my projects is the implementation, redesign and retrofit of IIT and OT networks. For a satisfactory end result, our service portfolio also includes the implementation of network planning, reconstruction and service support. The network solution guarantees a future-proof network.

The goal of offering the customer the best technical solutions is always the focus!

The consistently very good feedback shows me that our customers appreciate this service."

My favourite tool

"The EMCheck® measuring clamp is my daily and robust companion when I am working in our customers' plants.

The handling is very comfortable, the impedance measurement is always reliable and with the easy-to-read display I have all the important information at a glance."



Paul Pommer
Service Technician



SERVICE-INSIGHTS



Successful EMC training

On the basis of an EMC training course, a specially prepared pilot training course was initially created for one of the largest local passenger transport companies in Germany. The topic was the RS485-based BITBUS system and the EMC conditions close to the train bus.

The company's participants learned about the basics of the RS485-based field bus as well as practical examples. The main focus was on the existing BR 481 series.

To my personal delight, the feedback on the training was so positive that the customer decided to commission further training courses.

Furthermore, additional training courses focussing on PROFINET communication and its EMC compatibility were held and will be continued at a large scale in 2023.

Marco Allenstein

Team leader Field Services & Training



SERVICE INSIGHTS

Remote service deployment

In the summer of 2022, I was called to one of the leading pipe manufacturers for the fire safety industry.

The subject was a coating plant with sporadic downtimes with PROFINET application. The customer initially requested cable measurements of the network, but these did not produce the desired result. We were then able to convince the customer of a change in strategy and direct their attention towards optimising the network structure. The network was planned by us according to the individual needs of the facility and the necessary reconstruction measures were carried out by our team.



The result is a satisfied customer because the PROFINET communication on the plant is now significantly more stable thanks to the improved network structure. The availability of the plant is also secured by our remote service and professional cooperation with the maintenance team on site.

Björn Löffler,
Service Account Manager

Our remote service benefits:

- + Warning before failure
- + Permanent overview of the network
- + No need for in-house experts
- + No financial/material losses due to downtime



DEPLOYMENT DISTRIBUTION

20 years of industrial services

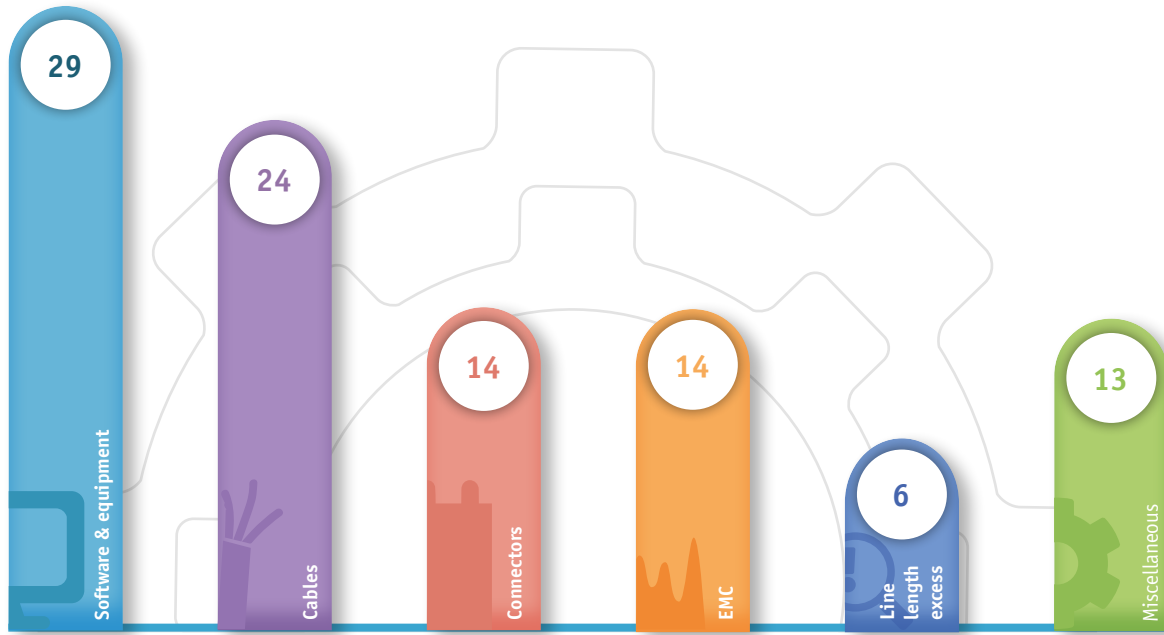
Five figures that really surprised us:

1. More than **1,750 assignments** by our technicians resulting from total breakdown on the operator side.
2. On average, it takes about **2.3 working days** to stabilise the process again.
3. Indirect maintenance costs of **Ø € 30.000/hour**, (due to loss of material, lost profits, cleaning and disposal costs, etc.).
4. More than **€ 2.9 billion** have been lost to industrial customers through total breakdowns that called our technicians to SOS operations during this period.
5. Many companies are taking these drastic experiences as an opportunity to establish a proactive maintenance regime. But what is surprising is that about **62 % of companies** continue to rely on reactive maintenance and call in SOS operations.

And another surprising figure:

The reasons for more than **90 % of these downtime costs** could have been detected and prevented in time with **proactive condition monitoring** and **predictive maintenance**. This also applies to the reasons shown in the diagram (p. 7).

CHART



	2015	2016	2017	2018	2019	2020	2021	2022
Software & equipment	21 %	20 %	16 %	4 %	13 %	28 %	27 %	29 %
Cables	15 %	14 %	31 %	28 %	18 %	21 %	27 %	24 %
Connectors	11 %	18 %	20 %	30 %	18 %	14 %	16 %	14 %
EMC	36 %	24 %	23 %	20 %	15 %	20 %	10 %	14 %
Line length excess	4 %	9 %	4 %	10 %	4 %	6 %	7 %	6 %
Miscellaneous	13 %	15 %	6 %	8 %	32 %	11 %	13 %	13 %

SERVICE INSIGHTS

Integrated network planning

In our role as measurement technicians and network experts, we were called in by one of Germany's leading recycling companies to analyse the current state, troubleshoot and determine the network topology. The operator had no topology plan from the installer, so there was no overview of which participants were in the network or which participants had no place in the network in terms of OT security. The switch cabinets were neither labelled nor were the IP addresses integrated into a comprehensible structure. Even the maintenance management could not name all the positions of the participants.

Most of the switches were either unmanaged or manageable but not configured. Therefore, it was not possible to create a topology plan digitally. By replacing the existing switches with high-performance switches from our PROmesh P family with condition monitoring

functions, the data for the topology scan could be made available immediately and the topology plan could be created with the PROnetplan software. Incidentally, a security company had also sold what we offer as networks in the system as a security audit.


As a next step, we are now moving into holistic network planning, creating clear structures for our clients, free of redundancy, with optimised network load and overall performance. Why? Because that is the demand that our clients rightly place on us.

Marcel Hartmann,
Service Technician



SERVICE INSIGHTS

From detection to retrofitting the superordinate network structure



Last year, a long-time business partner, the operator of a large paper mill, had noticed some anomalies in the area of the paper machines last year. We quickly realised that these anomalies were based on errors in the LON-BUS communication of the existing paper machines. Using oscilloscope technology, we investigated the fieldbus signal physics and detected and eliminated some of the reasons for the anomalies.

The successful troubleshooting was then the starting point for a comprehensive retrofit at the higher network level of the paper machines. The powerful switches of the PROMesh P family were integrated into the existing condition monitoring system, thus achieving the objective: a preventive maintenance strategy that reliably protects against machine failures in practice.

Jan Roeder,
Service Account Manager

DEPLOYMENT DISTRIBUTION

A trend is also continuing in 2022:

Our network experts confirm:

PROFINET is the leading technology for industrial networking, increasingly replacing PROFIBUS. PROFINET offers the user more flexibility, performance and security for the network. Experts expect that, for the first time, this year will see more nodes using PROFINET than PROFIBUS.

The generation change is continuing and the challenges are changing. While physical factors (connectors, cables, etc.) are responsible for 90% of failures with PROFIBUS, with PROFINET it is more logical anomalies that upset network communication.




But one thing is clear: every logical anomaly has a physical cause that must be found and eliminated. This is part of the daily business of our measurement technicians. Failed machines can then be quickly put back into operations and processes run without interruption.

Please refer to the adjacent chart to see how the generation change among the applications is progressing.

CHART

The generational change in applications continues to progress



	2015	2016	2017	2018	2019	2020	2021	2022
	28 %	32 %	36 %	38 %	37 %	55 %	45 %	48 %
	55 %	49 %	45 %	43 %	43 %	30 %	37 %	33 %
ASi	5 %	5 %	5 %	3 %	3 %	7 %	6 %	6 %
	0,07 %	0,2 %	0,3 %	4 %	5 %	3 %	5 %	4 %
Other	5 %	4 %	3 %	4 %	6 %	5 %	7 %	9 %



SOS

Don't let it come to a total breakdown first.

It takes an average of 2.3 days for complex systems and processes to run smoothly again.

D*BRIDGES

The bridge to digitalisation

The D*Bridge is an intelligent bridge device that connects two or more fieldbuses at the OT level to form a network. The device is used without configuration and is therefore ideal for users who don't have thorough knowledge of IT. From the PLC and also view and via its own interface, the D*Bridge effortlessly forwards the relevant data traffic, thus enabling continuous horizontal communication.

The D*Bridge increases the performance and security of the network by forwarding only the relevant data packets and discarding unwanted or faulty packets. Any additional data traffic is blocked, which stabilises the network and ensures availability. The D*Bridge has a significantly higher range of functions than the usual fieldbus couplers.

D*Bridge H

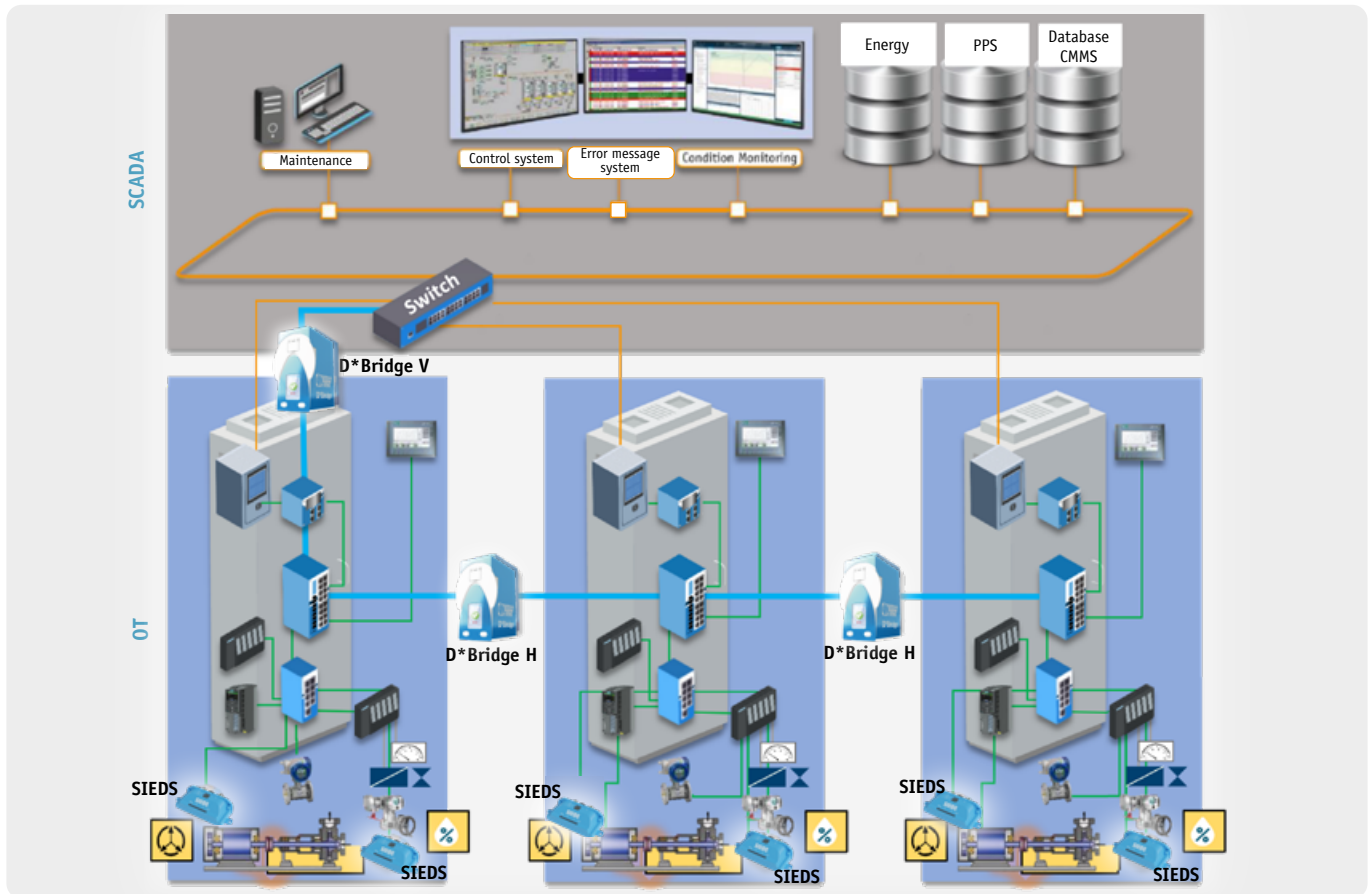
Creates secure, homogeneous convergent network structures for the digitalisation between fieldbuses on the shop floor.

D*Bridge V

Creates the secure connection of the homogeneous-convergent network structures for processing smart sensor data from the shop floor directly to the SCADA level.

PRACTICAL EXAMPLE

The closed, open network



With the D*Bridge, homogeneous fieldbuses are safely combined into networks. Simple, pragmatic, effective. This creates the basis for significant automation gains at the maintenance level.

SERVICE4LIFE

Maintenance strategies at a glance



1. Breakdown maintenance

Maintenance measures are only carried out when damage has already occurred to the maintenance object or the object has failed completely.

A failure of the maintenance object is consciously accepted with this strategy. No preventive maintenance measures take place - the primary focus is on damage repair.



2. Time-based maintenance

Describes the maintenance of equipment based on a calendar schedule. In this maintenance strategy, time is the trigger for maintenance. TBM maintenance is therefore also called planned maintenance because it must be scheduled in advance.



3. Condition-based maintenance

With this maintenance strategy, the component or tool is only changed when the highest degree of wear has been fully reached. For this purpose, the actual condition of a system is constantly monitored to determine which maintenance measures are required.

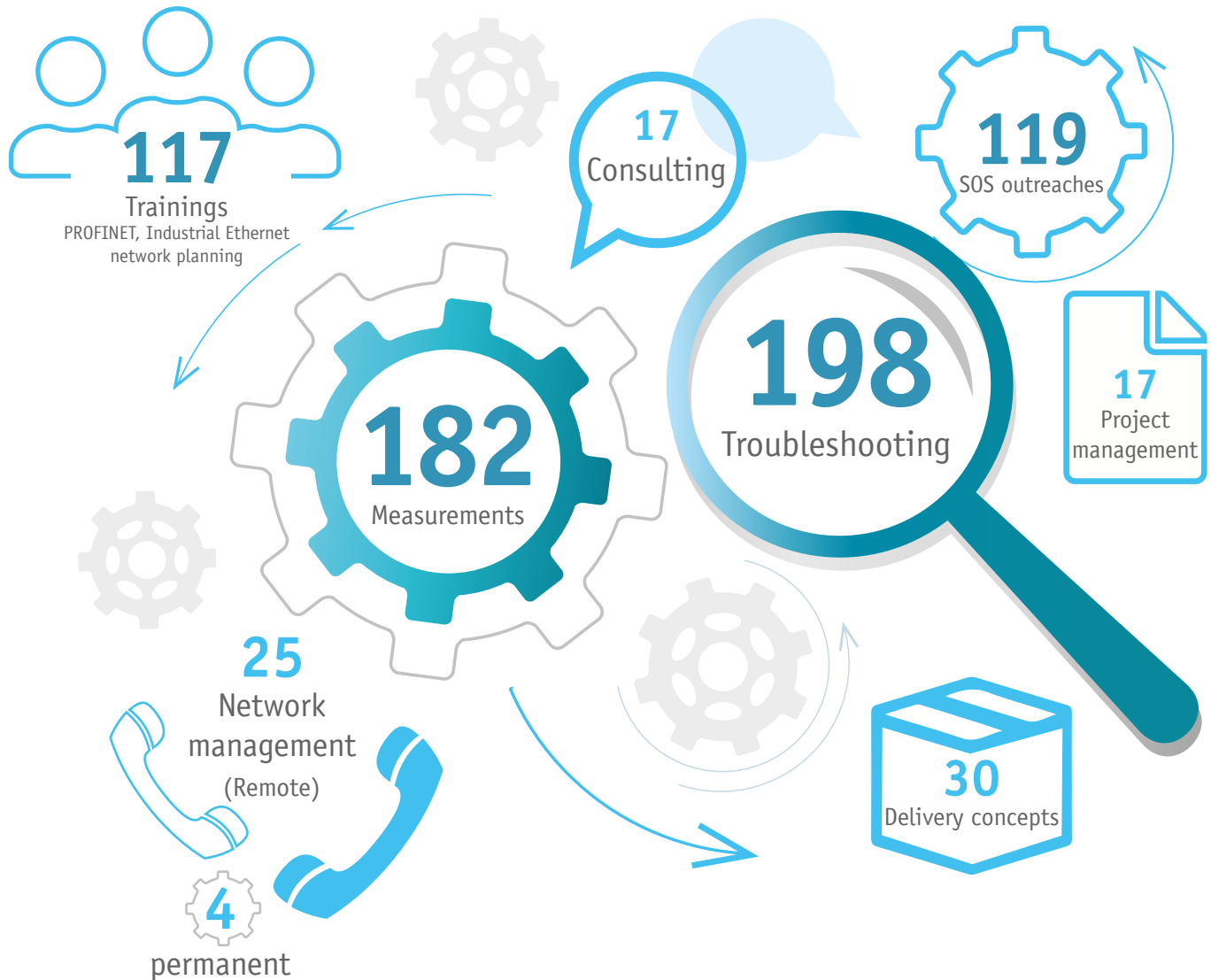


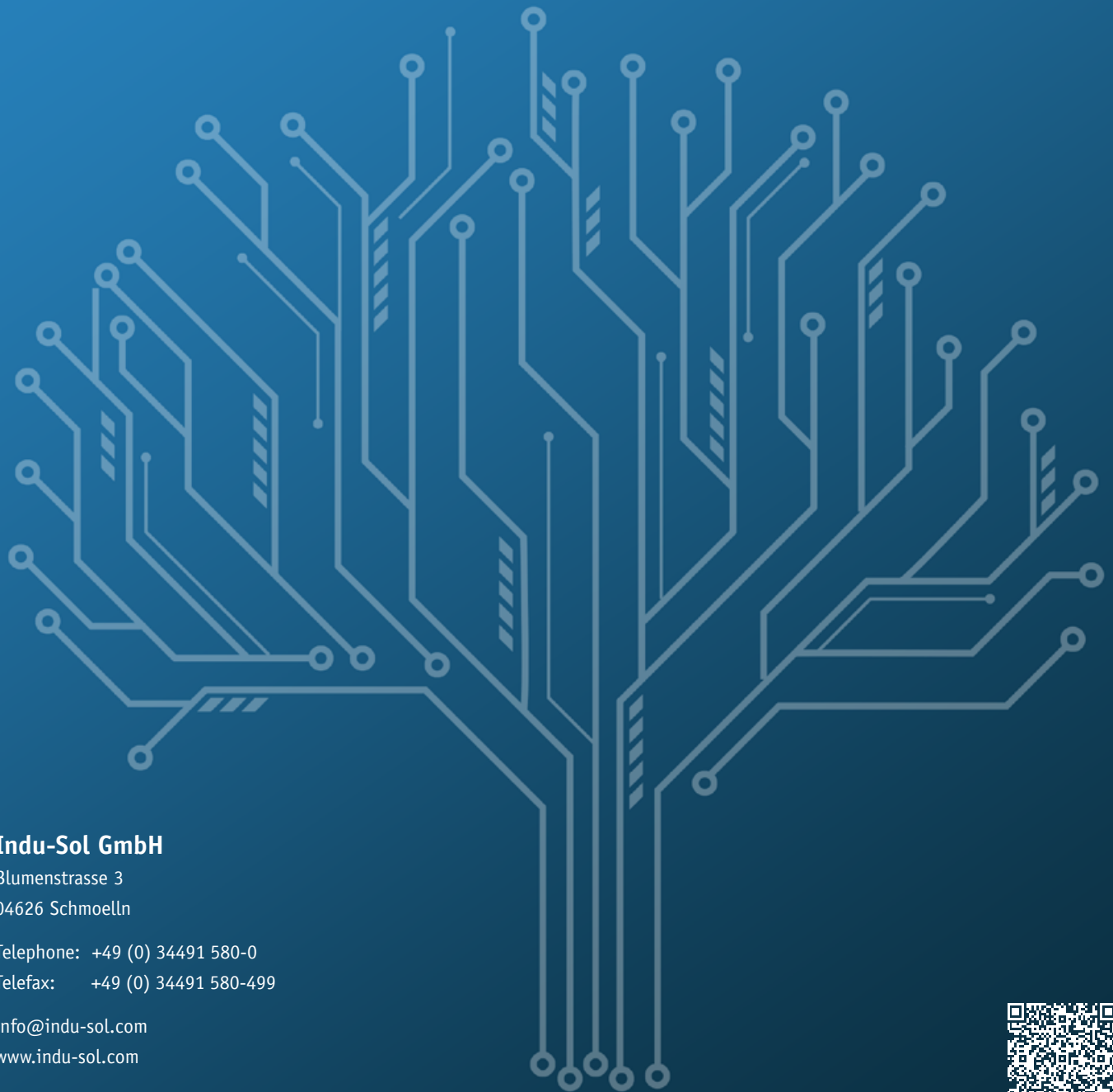
4. Predictive maintenance

Takes a predictive approach and proactively maintains machines and equipment. This maintenance strategy uses current and historical data to determine the appropriate time and action required to change the component or tool.

CHART

The performance data of our measuring technicians in action





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