

**DEVICE
INSIGHT**

FOR
RAFI

CASE STUDY

HOW PRODUCTION AND LOGISTICS PROCESSES ARE BECOMING SMART

Shopfloor Management at the
Touch of a Button Together With IoT

www.device-insight.com

As shown by RAFI's solution suite KIS.ME (short for: KEEP IT SIMPLE. MANAGE EVERYTHING), digitization does not have to mean a total revamp. Using networked signal lights, button boxes and the new IoT portal designed together with Device Insight, employees can quickly and independently optimize their production and logistics processes.

KEEP IT SIMPLE.
MANAGE
EVERYTHING.



☰ CASE STUDY

RAFI, a global manufacturer of components and systems for human-machine communication and EMS service provider, enables industrial companies to digitize manual processes quickly and easily thanks to a sophisticated combination of networked signal lights, switches and a smart IoT solution from Device Insight. RAFI is implementing an IIoT-based business model and launching a SaaS offering that will not only enable employees from production and logistics to better interlink their analogue work processes, but also to make them more transparent and efficient.



RAFI GROUP

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Focus:

Manufacturer of electromechanical and electronic components and systems for human-machine communication, EMS service provider

Founded: 1900

Employees: approx. 2,000

Headquarters: Berg / Ravensburg, Germany

Locations: Germany, USA, China, Italy, Hungary, Poland

www.rafi.de/en · kisme.rafi.de/en

INITIAL SITUATION

These days, many manufacturing industry companies continue to face the same problem: manufacturing and logistics are not fully automated and still rely on manual sub-steps, resulting in valuable time and resources being lost as work processes do not mesh seamlessly. Parts and components are not in the right place at the right time on the shopfloor, employees still have to communicate by calling to each other and there is a general lack of human-machine interaction. Industry 4.0 – a distant future scenario?

To help companies across all industries visualize and accelerate their analog manufacturing workflows with the simplest of tools and take production efficiency to a new level, RAFI has developed a universal solution for smart industrial workflow management with the support of IoT specialist Device Insight: KIS.ME – "KEEP IT SIMPLE. MANAGE EVERYTHING."

Founded in 1900 as the "Institute for Electrical, Optical & Mechanical Engineering", the RAFI Group is today a leading manufacturer of electromechanical and electronic components such as buttons, switches, touch screens, joysticks and input systems. In addition to standard components, RAFI offers individual complete solutions when it comes to input systems and operator panels at the human-machine interface. To implement its IIoT-based business model using a SaaS solution, RAFI was looking for a smart IoT solution that would enable its production and logistics staff to make their manual work processes more transparent and efficient, as well as better interlink individual processes.

The goal was to provide an IoT portal as the core of the holistic KIS.ME solution that is easy and flexible to use, offering rapid added value in terms of efficiency gains and return on investment (ROI). For its development and implementation, RAFI, itself an expert in hardware and firmware, was looking for an experienced IoT partner.

From production data acquisition to material handling and warehouse management – RAFI's solution package for digital shopfloor management covers every application scenario.



TECHNOLOGICAL IMPLEMENTATION

KIS.ME



RAFI'S SOLUTION PACKAGE FOR DIGITAL SHOPFLOOR MANAGEMENT KIS.ME CONSISTS OF THREE COMPONENTS:

1. the smart KIS.LIGHT signal light, already award-winning for its design,
2. the KIS.BOX button box with two buttons, standardized according to industry standards, and
3. the cloud-based KIS.MANAGER portal, developed in cooperation with Device Insight.



// As simple as it is ingenious: signal light, switches and an IoT portal optimize industrial processes

A small computer is installed in both the signal light and button box, making them WLAN-capable and establishing a connection to the cloud. Once powered, both components can be wirelessly **connected and networked to the KIS.MANAGER platform without any additional installation**. They don't even have to be on the corporate network to do this. In addition, it is also possible to attach them directly to a device, such as a forklift truck, via a USB power supply.



On a virtual shopfloor plan, you can see digital twins of production devices in the IoT portal KIS.MANAGER. Their status can be tracked live at any time and from anywhere in the world.

The functional principle is very simple: if a plant employee presses a button to signal that certain components have been used up and need to be brought from the warehouse to production, the signal light in the corresponding logistics area lights up red. And not only there: **a digital twin reflects the production's structure, including all physical devices in the IoT portal KIS.MANAGER**. The operator's button press can also be simulated by mouse click, so that the connected signal lights can also be controlled in the portal to trigger actions. The breakthrough to (at least partially) digitized production has been made – retrofitting made easy.

Based on the elementary **if-then-or logic of KIS.ME**, all process architectures of industrial production can be digitally mapped. It does not matter whether the production is very finely structured and consists of an abundance of individual steps and interdependencies – or not. Any number of combinations of predefined triggers, networked signal lights and button boxes, and actions triggered automatically via the IoT portal cover literally any scenario.

APPLICATION EXAMPLES FOR INDUSTRIAL COMPANIES



QUALITY INSPECTION

Challenge: A lean-oriented manufacturer of sensor products and electromechanical components set itself the goal of digitizing the manual quality inspection of individual production islands on a KPI basis. Both on-site employees and decentralized production controllers were to be given insight into four selected key figures: 1. productivity, 2. first-pass yield, 3. output in pieces and 4. malfunctions, stating the reasons for the malfunction and an integrated notification function. In addition, substitution arrangements should be possible.

Solution: Input per production island is transmitted to the KIS.MANAGER platform via the connection of test device with the button box KIS.BOX. Information on good parts is recorded via a light barrier on the button box. This allows the FPY value and the output to be calculated and mapped. The button box can also be used to select the cause of interference: one button is used to select the appropriate color code for the fault, the other to trigger notification of the service technician by e-mail. In addition, both key figures productivity and malfunctions can be calculated via the duration of the color state and displayed in the portal, broken down by malfunction reason. Finally, the multi-tenancy capability and the sophisticated role and rights management of the IoT portal allow for uncomplicated user administration. All the prerequisites are therefore in place for the manufacturer to make its previously manual work processes more transparent and "smarter" in the future.



MATERIAL SUPPLY

Challenge: A leading manufacturer of hydraulic presses, electric press drives, and special-purpose machines wants to control material transport in production in a more targeted manner and utilize it more efficiently. Interruptions should be avoided.

Solution: After the quick and easy setup of the KIS.ME solution, tigger train drivers now recognize by light signal that new information is available on the logistics dashboard. Additionally, equipped with a mobile device, such as a tablet, the drivers get an overall view of the current material requirements in the KIS.MANAGER portal even when on the road and can sensibly clock in and prioritize the stations to be approached. This means that route planning is no longer done ad-hoc according to demand, but efficiently and with foresight. Empty runs and detours are a thing of the past. In the case of decentralized and large building structures, the associated gain in time and productivity is particularly noticeable.



WASTE MATERIAL

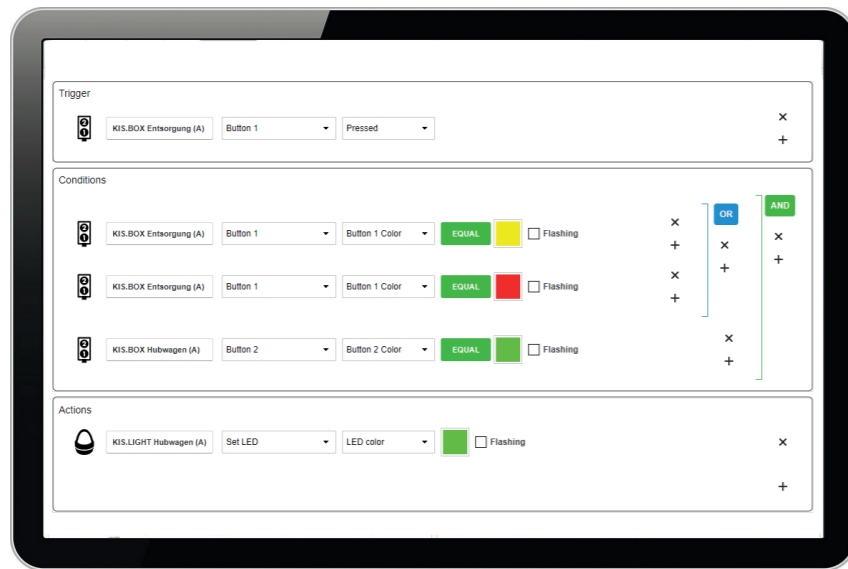
Challenge: Waste is an integral part of intralogistics in manufacturing companies. As the amount of waste varies depending on the production cycle and waste disposal is usually decentralized across the plant site, demand-driven optimization has a direct impact on profitability. An internal RAFI application scenario shows how to save time and costs with a smart solution for industrial workflow management.

Solution: If a KIS.BOX button is used to send information which bin is currently full and is ready for exchange, a transporter can take an empty bin from the warehouse at the same time and thus save an outward and return journey on their route. The advantage is even greater for waste that requires a special transport vehicle, such as a forklift or pallet truck. There are also efficiency gains to be had from "smart" trash compactors that use GPIO signals to tell you when they are 80% full. For example, a signal in the IoT portal KIS.MANAGER can trigger an automated message to the responsible special waste disposal company, thus eliminating the need for human intervention. Another advantage: with the help of evaluations of when which transport order took place and how long it lasted, shift scheduling for employees can be planned precisely according to requirements.

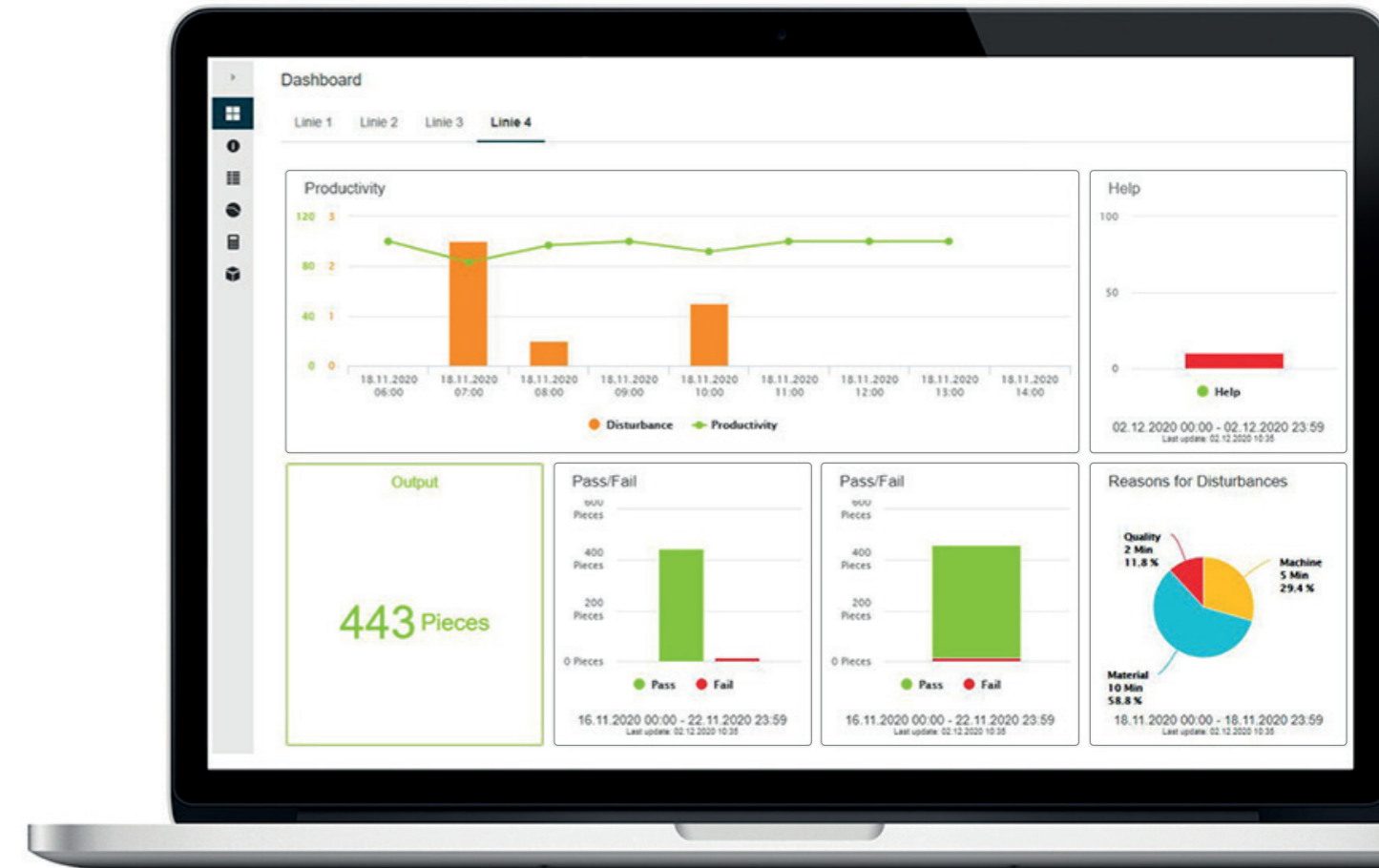
// Buy instead of Make: IoT Portal at the Heart of the Solution

At the heart of RAFI's retrofitting approach KIS.ME is the IoT portal KIS.MANAGER. Device Insight developed this **intuitive and flexibly configurable IoT solution**, which consists of a middleware and a front-end, based on its flexible IoT solution stack. For this purpose, ready-made IoT components were **combined with suitable Azure IoT services** and extended by services in the front-end framework designed specifically for RAFI.

The middleware handles data and device management and contains the crucial software component of the **rule engine**. This ensures the management and execution of the if-then-or rules and the automated triggering of actions, such as the colored alarms at the workstations or the sending of e-mail notifications. Predefined actions can be extended precisely and at will, covering each and every logic of a production process across cells, lines, and plants.



With the Rule Engine, companies can define their own rules for their process workflows. The intuitive if-then-or scheme allows devices to communicate with each other and react to certain events.



Thanks to the digital dashboard in the IoT portal KIS.MANAGER, you can always keep an eye on the most important key figures and the status of production.

For example, it would be conceivable for a worker to signal that the scrap container is full by pressing a button or clicking a mouse, whereupon a lamp lights up red, which in turn sets a robot in motion to rush over and remove the container. As soon as the emptied container is back in its place, the signal light is set to green again by the worker – no single step, phone call or call through the hall are required for this.

In addition to increased efficiency, retrofitting is always about increased transparency. The IoT portal KIS.MANAGER middleware makes it possible to view current production status, **monitor process quality** and evaluate collected key figures. In this way, knowledge gained from **condition monitoring** can be translated into **forecasts for maintenance and service** as well as into targeted optimization measures to increase the **availability and productivity of machines and systems**.

// Integration of Components from the Microsoft Azure IoT Hub

To ensure rapid **market maturity and maximum scalability** of the IoT solution KIS.MANAGER, Device Insight integrated selected services of the Azure IoT Hub into the portal. For example, direct method calls via the Azure IoT Hub are used to keep latencies to a minimum during bidirectional communication. Data ingress from devices and authentication in the portal is also ensured through Azure IoT Hub, making it easy to scale. For this, RAFI supplied the hardware and firmware.

// Flexible Subtenancy Model for SaaS

RAFI distributes KIS.ME as a SaaS (Software as a Service) solution based on a subscription model. To enable such use, the IoT portal had to cover and automate various user-relevant criteria such as customer access, data access rights, role and rights concept, different depths of information depending on status (free vs. premium access), and firmware updates. This was achieved through Device Insight's **transparent and flexible subtenancy model**. By granting so-called subtenancies, a type of usage license for third parties, RAFI now has the opportunity to connect its corporate customers to the portal itself and, as a result, to scale itself.



EASY DATA = EASY OPTIMIZATION



In order to calculate the availability and added value of machines and systems (OEE), factory operators need live data from their production processes – a classic case for the Internet of Things. The more well-maintained and complete IoT data is, the more precisely KPIs can be evaluated and optimization measures can be taken. With the IoT solution KIS.MANAGER, Device Insight enables the collection, analysis, and visualization of all production-relevant data at RAFI and its customers. An excerpt of the most important key figures:

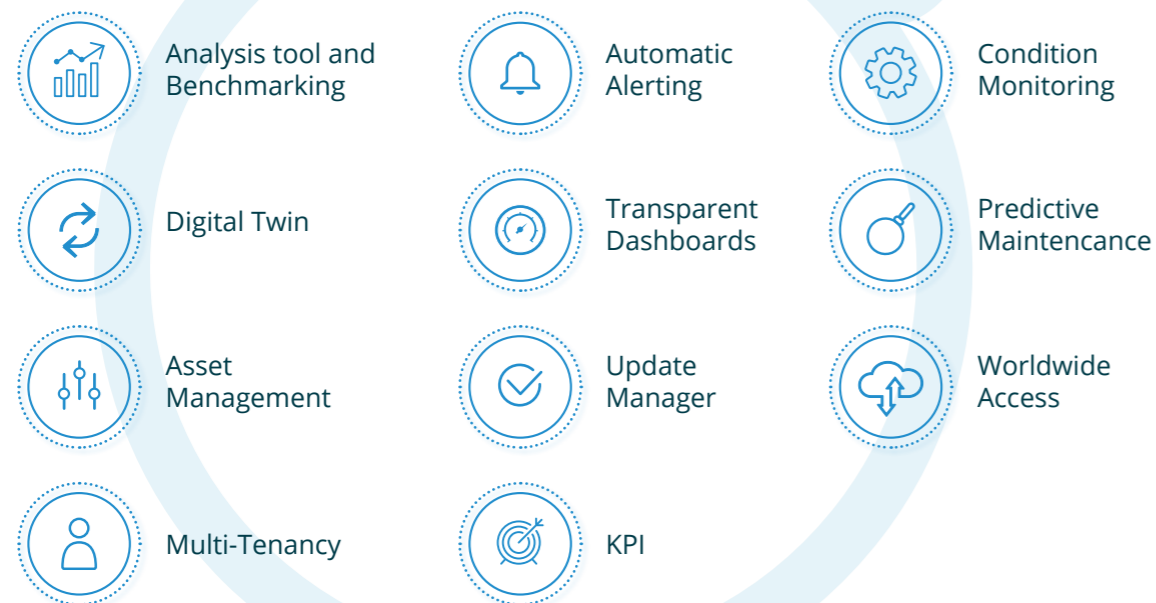
- **Quality Control**
productivity, number of pieces, first-pass yield, fault duration, and fault reasons
- **Order Times**
duration of work on the order, duration of interruptions
- **Machine Availability**
duration of availability, duration and time of day of a fault, interval between faults
- **Material Supply and Waste Logistics**
milkrun station frequency, duration between request and collection

The gain in knowledge is immense: in this way, data obtained provides information as to why the actual production times deviate from the planned times. It can also be seen whether manual production cycles of production islands are being adhered to or whether there are waiting times and downtimes. Ultimately, any faults that occur can be identified and rectified systematically.

ADVANTAGES AND APPLICATION

Thanks to the IoT portal KIS.MANAGER developed by Device Insight, machines, devices, and equipment can be quickly and easily connected and managed. It is precisely this autonomous handling that constitutes the greatest strength of the IoT solution. **Without any installation effort, the KIS.MANAGER portal allows agile handling from day 1 of commissioning thanks to its clear user interface and intuitive functionalities.** In this way, plant employees can configure the processes relevant to them in the portal themselves. The simple no-code application operability enables every user to trigger standardized workflows individually and to interlock production steps independently. With this ease of use and quick results, Device Insight's IoT solution scores high on end-user adoption and delivers tremendous business value in a very short time.

FEATURES OF THE IOT SOLUTION KIS.MANAGER AT A GLANCE



Speaking of time, the development of the IoT portal from MVP (Minimum Viable Product) to official launch took place in just over a year – a key reason why RAFI decided to work with Device Insight and chose the **"buy instead of make" principle**. "We chose Device Insight to implement our SaaS solution because we were able to save a lot of development time thanks to the ready-made IoT building blocks from the Munich-based IoT specialist," confirms Maximilian Hämmerle, KIS.ME Project Manager at RAFI.

“ Together with our partner Device Insight, we succeeded in building an IoT solution ideally suited to our requirements within a very short time, forming the core of our retrofitting suite KIS.ME. The combination of Azure Cloud Services and Device Insight's IoT building blocks creates the foundation for a high-performance, flexible, and scalable IoT solution with tremendous business value. Our KIS.ME customers achieve great savings in production and are enthusiastic about its easy handling. A top feature is the Rule Engine, which ensures the execution of if-then-or rules and the automated triggering of alarms and notifications on the shopfloor.

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Moritz Futterer, Head of Product Management and Product Marketing at RAFI

THE DEVICE INSIGHT IOT FRAMEWORK – FAST, CUSTOM-FIT, SCALABLE

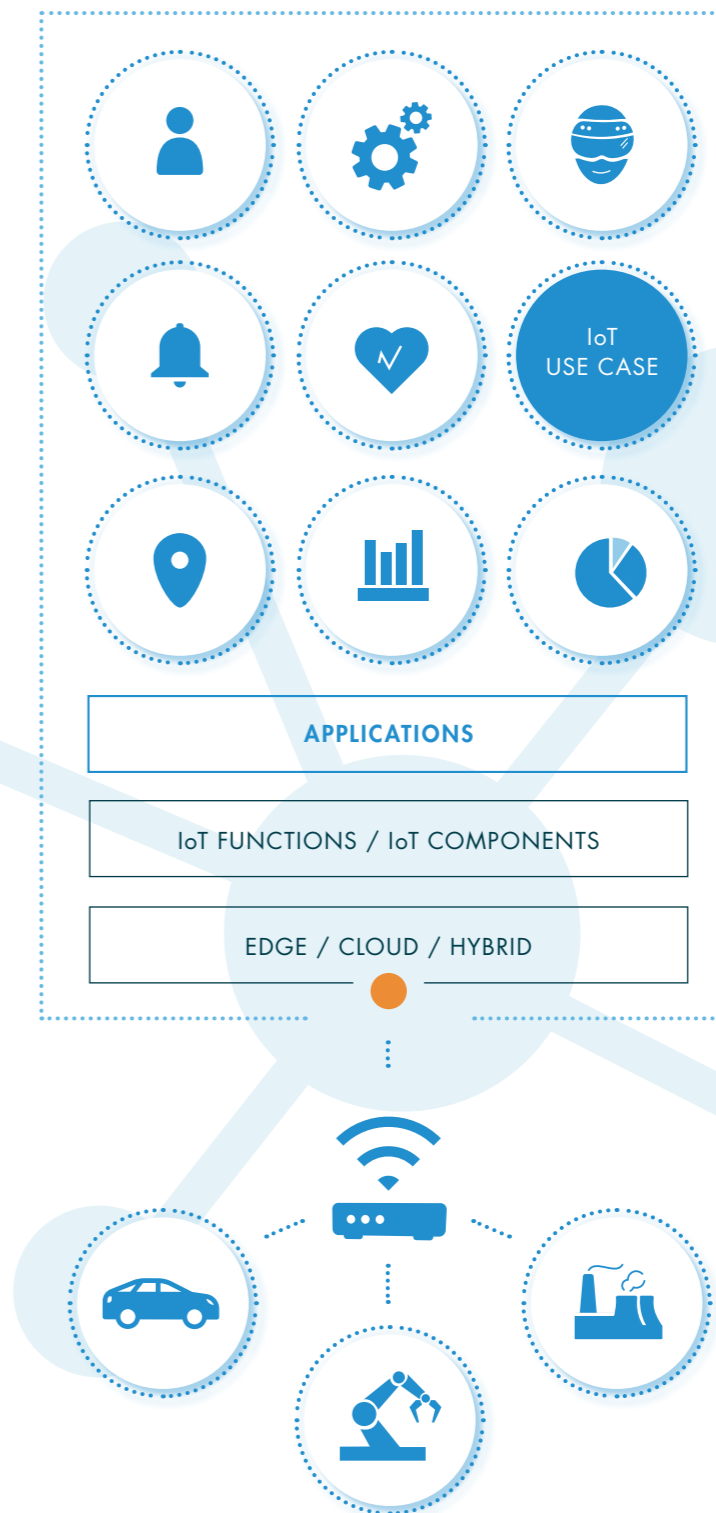
Our 360-degree service enables us to accompany companies from business case analysis and implementation to secure IT operations. For this, we rely on a flexible IoT framework: ready-made IoT components, system integration and software development are combined to create tailor-made and at the same time flexibly scalable IoT solutions.

Our approach is based on the principle "think big, start small". Based on major hyper-scaler IoT platforms and using ready-made IoT building blocks, we enable companies to achieve a fast time-to-market for their IoT solution as well as measurable proof of value within the shortest possible time. At the same time, our open infrastructure enables us to flexibly expand IoT solutions and tailor them precisely to the respective requirements with new, individual applications.

YOUR ADVANTAGES

- Marketable**
 Fast time-to-market through turnkey IoT solutions
- Flexible**
 Flexibility and accuracy of fit thanks to individual functions and applications
- Scalable**
 Scalability and interoperability based on our high-performance IoT framework
- High Performing**
 Guaranteed security and long-term performance and stability
- Integrated**
 Single source system integration and software development

IOT SOLUTION STACK SCALABLE AND INTUITIVE IOT SOLUTIONS



DEVICE INSIGHT

FOR
RAFI

⋮ ABOUT DEVICE INSIGHT

Founded in 2003 in Munich, Device Insight GmbH is an IoT specialist, accompanying companies in their digitization in the fields of Internet of Things, Industry 4.0, and artificial intelligence. Based on a flexible IoT framework, Device Insight combines ready-to-use IoT building blocks and individual applications for customized IoT services. System integration based on common cloud providers and development are combined to create tailored solutions that are both fast and scalable. Device Insight supports global networking of machines, vehicles, plants, and devices and provides applications in the fields of data acquisition, condition monitoring, predictive maintenance, machine learning, industrial analytics, and AIoT (Artificial Intelligence of Things). Device Insight is active in more than 15 countries, working together with large enterprises and mid-size customers from various sectors, including machinery and plant engineering, HVAC, commercial vehicles, vending, transport, energy as well as the Connected Home environment. Services range from business case analysis and implementation to secure IT operations. The company has been awarded "Internet of Things (I4.0) Leader Germany" on numerous occasions by the ISG Provider Lens study. Since 2019, Device Insight has been a subsidiary of automation specialist KUKA AG.

www.device-insight.com