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FLUKE

Supply chain

WHY SUPPLY CHAIN DIGITISATION IS NO LONGER OPTIONAL

Today's supply chains are undergoing a digital transformation into more data-driven, cloud-based processes.

In a data-driven world, navigating the challenges of today's supply chains requires an unprecedented level of agility. This calls for supply chain tools that deliver network-wide trading partner connectivity to enable real-time visibility, demand and supply planning, and production scheduling insights. Fortunately, modern tools deployed in an organisation's technology stack can digitally transform the supply chain, revealing new opportunities for innovation across the entire network.

At the same time, automation and advanced analytics delivered in a digital environment can synchronise production and distribution activities to match demand.

The network value for digitisation

Modern businesses run on data, and yet much of the data they need is stored outside their four walls. According to Ernst & Young, up to 80% of a large company's supply chain data is likely in the hands of other companies and the volume of data is growing exponentially, and this can be overwhelming to even the most successful operations.

When large volumes of data are left unmanaged, locked up in silos, or spread across disparate systems and partners, data and data insights can become incredibly complex to manage, even more so when data quality is lacking or impossible to decipher. For a digital transformation of the supply chain to succeed, organisations require data strategies that will unify these complex datasets under one integrated system with the proper visibility for relevant stakeholders so the data can be properly stored, organised, analysed and made actionable.

Unfortunately, many organisations report that a lack of proper visibility prevents them from tackling the challenges that stand in the way of digital transformation.

Understanding the need for end-to-end visibility

Today, a digital network of real-time information must be available in order to see, control, and proactively manage inventory and shipments from the production source to their final destination. But a lot can happen in between, especially when so much of an organisation's supply chain data resides with other companies and partners. Improving transparency, collaboration and visibility between stakeholders means accessing real-time information about all of the processes that occur before and during transit — including planning, sourcing, production, handling, transport and last-mile delivery.

Advanced, cloud-based, digitally transformed networks are connecting supply chain partners, events and devices, so stakeholders can respond quickly and decisively to disruptions, seize opportunities, and orchestrate and fulfil demand from anywhere along the supply chain. But getting to this point is a challenge. Organisations have long struggled with complex supply chain orchestration because they rely on disparate or legacy systems and disconnected, manual processes.

In a modern supply chain, these outdated ways of working can slow down the speed of communication, creating silos and bottlenecks, and straining supplier and trading partner relationships.

Aligning strategy with customer demand

Customers have always expected their products to be delivered on time and in full, and meeting this need builds customer trust. This has not changed. In a digitally enabled marketplace, however, the time to meet these expectations, generate trust and keep customers happy has accelerated to a point of almost total disruption. Though

Supply chain

online retailers can often absorb losses in their logistics costs, many organisations cannot say the same. The supply chain must meet a holistic balance between all relevant stakeholders to create and sell quality products, ensure profits, maintain sustainability and keep customer satisfaction levels high.

When new technologies and customer expectations disrupt industries — changing consumer markets for both B2B and B2C operations — supply chains often bear the brunt of the impact. Traditional supply chains must evolve alongside new technologies to meet the pressures demanded by more complex operations. Organisations must think in reverse — instead of forcing their traditional supply chains to keep up in a changing playing field, they should focus on aligning their supply chains with modern tools and business models, so they can deliver to customers better and more efficiently.

Making sustainability initiatives matter

Producing affordable, ethical and environmentally conscious goods or supplies has never been easy. As supply chains face more regulatory scrutiny — as well as evolving regulations across countries and borders — a digitally enabled and networked supply chain can be better positioned to make use of sustainable materials and produce less waste, while also sourcing these materials ethically. That's not to mention creating working environments, such as in warehouses or logistics operations, which put human welfare at top of mind.

There are three ways to reduce the impact of these challenges: Locate critical issues across the whole supply chain; link supply-chain sustainability goals to the global sustainability agenda; and assist suppliers with managing impact — and make sure they follow through. Technology is critical to achieving these goals. Modern supply chain tools can be used to analyse and understand production and distribution activities to match them with changing customer expectations as to where and how goods are produced. This allows the organisation to better understand what issues the supply chain faces — and where they're happening.

Supply chain visibility increases the opportunities for new programs to succeed, as well as the ability to view and understand working conditions to eliminate existing and potential partners if they cannot meet ethical standards. This is the objective of the UN Sustainable Development Goals that were established to help countries achieve sustainable development goals (SDGs) by using integrated solutions that



TODAY, A DIGITAL NETWORK OF REAL-TIME INFORMATION MUST BE AVAILABLE IN ORDER TO SEE, CONTROL AND PROACTIVELY MANAGE INVENTORY AND SHIPMENTS FROM THE PRODUCTION SOURCE TO THEIR FINAL DESTINATION.

can 'define development of the future' — and mobilise collective intelligence.

In supply chain terms, it's a matter of visibility and sharing it with all relevant stakeholders to create more collaborative and transparent processes.

Building a new foundation for change

Merely adopting modern, cloud-based solutions isn't enough to modernise a supply chain and create a more valuable digital network. Processes and systems must adapt as the solution (or solutions) streamlines old ways of working. Manual invoicing, spreadsheets and traditional control towers utilising outdated communication processes all reinforce silos throughout the network. If achieving end-to-end visibility is the goal, these silos must be broken down. Digital processes can automate these activities, while also making them more transparent, improving visibility and enabling stakeholders to manage the operation of their supply chain in real time.

Data management

Traditionally, managing large, complex datasets, while ensuring quality, was highly manual. It

required having the right people with the right skill sets to analyse data and create actionable insights to inform proactive decision-making. Modern business intelligence (BI) and data analytics tools have become much more user-friendly in recent years, democratising data and allowing every user — or at least every relevant user — access to the data they need, when they need it, so they can make timely decisions. These data management tools are cloud-based and device-agnostic, which means reports can be generated on the go for users on mobile devices in the warehouse, out in the fleet or back at the home office on desktop computers, without having to rely on IT or a dedicated analyst to run the reports. However, efficient data management begins at the source, which must guarantee better quality of data, provide the ability to filter out the noise from important data and facilitate actionable outcomes.

Warehousing

Warehouse operations have changed, which means warehouse management must change as well. Capacity challenges with warehouse space utilisation, increases in SKU counts, operational challenges in the e-commerce and



omnichannel realms, along with rising fulfilment costs and labour shortages, are only some of the challenges modern warehouse operations encounter. Global e-commerce retail sales have also consistently grown by 17 to 20% year over year, and capacity and fulfilment will only become more challenging in the years to come. This is where advanced warehouse management solutions (WMS) come into play.

Using a WMS is a fundamental building block for the adoption of many other technologies, and yet many warehouses do not use such a system. From picking and packing to utilising inventory space and optimising labour needs, the right WMS can orchestrate across a disparate network of facilities, synchronising B2B and B2C operations and dynamically adapting to constant change, which legacy systems simply cannot do. This approach to warehouse management requires advanced warehousing capabilities with highly configurable rules, built-in labour, task and inventory management, and 3D visualisation, which a modern WMS can provide.

Logistics

Moving the flow of goods from source, warehouse, distribution network and end customer can't be done with old-school logistics systems in a competitive marketplace where customers have come to expect next-day fulfilment. At the same time, the necessary skill sets to deliver on these operations are becoming hard to find. Adding to this is globalisation and the speed at which consumers can access and purchase products in omnichannel marketplaces.

Speed, accuracy and costs must be aligned to meet customer demand. That requires logistics solutions that can provide complete, multimodal, global visibility to stay on top of capacity uncertainty, as well as rate fluctuations and volatility. Organisations must be able to leverage WMS tools and processes to think and see beyond the four walls of their warehouse operations in order to improve performance. Warehouses and logistics centres can no longer operate in the silos that prevent end-to-end optimisation, but they must be integrated into the supply chain network for enhanced inventory visibility. By seeing what's available to ship at the factory, what's in transit and what's at the DC, scenarios can be tested to best align supply with demand, ensuring that shelves remain stocked and orders are fulfilled efficiently and cost-effectively.

Forecasting and demand planning

Keeping up with forecasting and demand planning challenges requires agile solutions that can anticipate and prepare for seasonality issues, promotions, stockouts and more. These efforts can no longer be managed with manual, disparate processes. Advancements in periodic item forecasting and intelligent baseline forecasting have helped to reduce the manual planning effort and smooth the impact of one-off events and sporadic demand. Meanwhile, periodic item forecasting provides a direct benefit to the user by factoring seasonal changes to decrease planning time and provide more precise statistical forecasts.

With a secure, cloud-based solution, users from every point along a supply chain can digitally share and align on plans, forecasts and orders to obtain early warnings of potential issues and help to assure supply. This can also improve logistics throughput, beginning at origin, with solutions that automate supplier packing, labelling and shipping processes. That way users can generate advance shipping notices to streamline receiving at distribution centres and warehouses to ensure packing and labelling accuracy to enable direct ship and cross-dock programs.

Communicating with the entire supply chain

Modern supply chain systems are built with the understanding that they will need to connect and integrate with other systems. Legacy systems and manual processes simply are not. A supply chain solution that provides this full integration across systems and partners can create the new foundational visibility and

end-to-end optimisation necessary to thrive in a modern, digitally enabled marketplace.

How technology helps optimise supply chain processes

True supply chain end-to-end optimisation requires global, highly available, highly responsible application services to manage the movement of materials across a digital network. These cloud-based, digitally-enabled solutions can be the foundation to creating a global network of supply chain partners. But to support collaboration and hand-offs between trading partners, organisations must be able to work with a wide range of systems, such as enterprise resource planning (ERP) software, transportation management solutions (TMS), warehouse management solutions (WMS) and supply chain planning solutions (SCP). Minimising information latency is crucial for creating true end-to-end visibility so stakeholders can make optimal decisions in real time, based on trusted data that can be accessed, updated and analysed as products move from order, to manufacturer, to shipment, to warehouse, to distribution centre or shelves, to customers.

These applications will need to support a wide range of interaction modes, including mobile devices, AI and machine learning-enabled digital assistants (for voice and process automation), as well as warehouse handhelds and other IoT-enabled devices for shipping and receiving, fleet tracking, container tracking and more.

Final takeaway

A digitally transformed supply chain is one that has not only adopted modern technology tools but is also data-driven — leveraging predictive and prescriptive analytics for optimal decision-making. Organisations must begin their digitalisation strategy with tools that can intelligently sense and respond to changing supply chain needs in competitive marketplaces, while also integrating data, processes, systems and visibility across sourcing, warehouse and distribution operations — from end to end. This requires agile solutions that can deliver enhanced performance in markets where customer demand is continually evolving.

End-to-end supply chain optimisation does not end with adopting the right digital technology solutions for supply chain processes. Needs will change over time. Instead, it begins when the networked enterprise integrates supply chain partners together.

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Seiko packs its machines with added value

Located in the prefecture of Shizuoka in Japan, Seiko Corporation has been manufacturing packaging and bottling machines for more than 70 years. Its machines benefit from these long years of experience and technological innovation and are recognised for their high quality. Seiko has gained the trust of numerous customers in a wide range of industrial applications such as food, drinks, cosmetics, toiletries, chemicals and pharmaceuticals. One of its best-selling products is the BTW-602, a compact liquid filling and bottle capping machine highly reputed on the market for being very easy to use. The company is also well known for the design of its order-made packaging lines.

But even the very best machines can occasionally require an unplanned maintenance operation. When this happens, Seiko's automation engineers would have to stop their daily tasks and rush to the rescue of their customers, even when the factory is located abroad.

Early on, these engineers realised how powerful it would be to have the possibility to remotely troubleshoot their machines. A huge amount of time, effort and money could be saved, while providing better and faster support for their customers.

About 20 years ago, there were no broadband telecommunications, so they started by using landline phone technologies such as PSTN and ISDN modems. Those proved useful when they worked, but only allowed a slow, unreliable and costly communication. More recently, they experimented with a well-known IT remote desktop solution, which offered better performance thanks to broadband Internet, but had important drawbacks in terms of usability and cost.

Experimentation with this remote desktop solution came to an abrupt stop when Seiko's IT department discouraged its usage, due to the security risks it posed.

"A few years ago, we tried using a famous remote desktop solution, but our IT department required that we switch to a more secure solution," said Iga Hisato, Head of the Technology Development Division at Seiko. "That is when we discovered Ewon. It was exactly what we had been looking for over all these years, and fulfilled all our needs in terms of convenience, performance and security."

Seiko now equips its machines with a secure remote connectivity solution, approved by the company's IT department. It is also accepted by the company's customers, who are reassured by the fact that the security of Ewon's solution is regularly audited and certified by several specialised third-party organisations.

Seiko found it was easy and fast to get up and running with the solution. The complete installation of an Ewon gateway and its registration to Ewon's Talk2M global VPN service can be done in a few minutes. It became even easier since the introduction of the Easy Setup feature, which allows for automatically configuring a gateway through a USB drive or SD card.



All Ewon gateways can connect to the internet via an Ethernet LAN if available, but Seiko usually selects an Ewon gateway with backup Wi-Fi connectivity. By doing this, the company is assured that even if using a LAN is not possible, a successful wireless connection will be possible by asking someone on site to turn on the hotspot feature of a smartphone or mobile router.

Using Ewon's solution, Seiko remotely connects to the Mitsubishi Electric PLCs and HMIs controlling its machines for troubleshooting.

"Thanks to Ewon, we can easily carry out remote diagnostics and maintenance of our machines, avoiding every month several service trips. It is extremely convenient and allows us to be more efficient and reduce costs," said Hisato.

End customers can also greatly benefit from this remote support, since it translates to an important reduction of downtime in the factory. Recently, Seiko has gone on further to build a remote monitoring service based on Ewon's Talk2M service, allowing the company to easily visualise the performance of the machines at any time, from anywhere and from any device — even a smartphone. This is a perfect match with Mitsubishi Electric's GOT Mobile service, if the machine is equipped with a compatible HMI. Seiko is also exploring the advanced features of the Ewon Flexy gateway, which can collect data from PLCs or sensors and display it on a local web dashboard or make it available to an IT system. With this remote monitoring service, Seiko's customers can check the performance of their equipment, analyse the cause of failures and optimise their production and processes, as well as the quality of their products.

For Hisato, this is just the start: "Thanks to Ewon, it is really easy to make our machines IIoT ready. In the short term, it immediately provides an excellent return on investment for us and our customers. In the long run, our machines equipped with an Ewon Flexy are ready to support any future IIoT projects we might decide to build."

Global M2M
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STAINLESS STEEL PANEL PC

The Winmate W24IW3S-SPA269 is a 23.8" Intel Core i5 IP69K stainless steel chassis panel PC. It includes M12 connectors, a fanless cooling system, low power consumption and various connectivity options designed with industrial applications in mind.

It also offers a variety of I/O ports, including USB 2.0, RS232 and RJ45-10/100/1000 LAN.

The W24IW3S-SPA269 fully complies with IP69K water and dust resistance to survive splashing conditions during washdown processes and strict hygiene demands in the food, beverage and pharmaceutical industries.

The 1920 x 1080 touch screen and PCAP multi-touch support make it easy for users to key in data, rotate images, drag and drop files, and zoom in with two or more fingers, and supports the use of gloves. The 316 stainless steel housing is designed to withstand harsh chemicals without corroding over time. Temperature changes can accelerate the corrosion process, hence stainless steel is a suitable option for heat-sensitive environments.

Backplane Systems Technology Pty Ltd

www.backplane.com.au

EDGE AUTOMATION CONTROLLER

Part of the FlexEdge range from Red Lion, the DA50A edge automation controller provides secure networking, protocol conversion, cloud connectivity and IEC61131 automation capabilities in a modular design that is backward compatible.

A plug-in sled caters for varying communication interfaces such as USB, serial, Ethernet, 4G, Wi-Fi and GPS, while simplifying future upgrades when newer technology is available. AN LED bezel surrounding the unit lights up blue, red or green depending on system status.

With four levels of software, the DA50 can be tailored to specific applications or it can be supplied as the fully loaded Group 4 which caters for OPC, SQL, data logging, virtual web server HMI capabilities, routing, firewall, secure VPN tunnels and IEC control. Local monitoring can be enabled with onboard I/O and control capabilities, and notification of status changes.



The FlexEdge DA50 supports over 300 industrial drivers and is powered by Crimson 3.2 software to support protocol conversion of any brand of PLC as well as a variety of additional industrial equipment. In addition, real-time events can be passed to an IIoT cloud platform to securely transmit data to wherever it is required, making it highly scalable, yet easily deployed.

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THERMAL CAMERAS

The FLIR A50 and A70 thermal cameras come in three options — Smart, Streaming and Research & Development — to fit the needs of professionals across a variety of industries, from manufacturing to utilities to science. The cameras offer improved accuracy of $\pm 2^{\circ}\text{C}$ or $\pm 2\%$ temperature measurement, compared to the previous accuracy of $\pm 5^{\circ}\text{C}$ or $\pm 5\%$ temperature measurement. The cameras include an IP66 rating, along with a small, compact size with higher resolution options compared to previous versions. Featuring a thermal resolution of 464 x 348 (A50) or 640 x 480 (A70), users can deploy the cameras in a variety of capacities.

Designed for condition monitoring programs to reduce inspection times, the Smart cameras introduce 'on-camera/on-edge' smart functionality. This means temperature measurement and analysis can be done on the camera, easily and effectively without the need for a PC.

Built for process and quality control, the Streaming cameras improve throughput time and the quality of what is being produced, all while reducing operating costs. With GigE Vision and GenICam compatibility, users can simply plug the camera into their PC and choose their preferred software.

Primarily used as a research and development solution, the Research & Development Kit provides an easy entry point into thermal imaging analysis for applications within academia, material studies, and electronic and semiconductor research.

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REAL-TIME LOCATION FOR FOOD SAFETY

HOW REAL-TIME LOCATING SYSTEMS CAN DELIVER A NEW LEVEL OF FOOD AND EMPLOYEE SAFETY

*Ulli Thornton, Product Marketing Manager,
Identification and Locating Systems, Siemens Industry, Inc.*

Current events are creating a new urgency around the topic of food and employee safety within the food and beverage industry.

Every manufacturer wants to return to full capacity in production but also to mitigate employee harm, costly partial or full shutdowns, production spoils, recalls and loss of trust from the public consumer. This particular current health threat is, without question, going to shape key trends in your food and employee safety investments, and likely some investments will even be required by regulations meant to alleviate public concern.

Real-time locating systems (RTLS) can deliver significant value that comes from not only knowing the real-time location of employees and products, but also being able to correlate current and historical data to trace the proximity of assets and personnel. Let's take a deeper look at the value this location intelligence offers to deliver an entirely new level of food and employee safety and mitigate risks.

Is there a new normal required for safety F&B facilities?

A good question to consider today is whether there are new expectations for food and employee safety that are emerging as a result of the 2020 pandemic. Possible food product contamination from employee contact has certainly been a consideration, but prior to recent events,

most of the attention has been given to contaminants in food products and ingredients and in the plant environment itself (eg, surfaces, equipment, cleaning products). This latest high-profile event is creating new visibility and attention internally and externally from the public, employees and governance organisations regarding both food and employee safety. It will likely lead to more regulatory requirements that address protecting both employees and products from human pathogens that could be introduced into plant operations. RTLS offers real solutions that can address these new needs.

Key food safety questions that RTLS can potentially address are:

- How can you easily review which food products were exposed to possible contaminants in any location and specific times?
- How can you mitigate revenue loss by isolating and discarding only those food products exposed to possible contaminants by identifying exact locations and times of exposure?
- How can you prevent a total plant shutdown by having access to real-time location data of contaminated products, people and equipment?

RTLS starts with the value of being able to locate and track (in real time or historically) the position of employees, ingredients, food products, tools, robots, or anything else coming in and out of a plant.



THE FACT THAT MANUFACTURERS CAN TRACK THE LOCATION OF EMPLOYEES, TOOLS, ROBOTS AND EQUIPMENT SUCH AS FORKLIFTS IN REAL TIME OPENS THE DOOR FOR NEW APPLICATIONS...

Manufacturers the insight to identify, test and quarantine personnel while the plant continues to operate safely.

Compliance with government and employer guidelines

Guidelines from government authorities and even employers can vary by location. Production processes and workflows are documented, and reports with reliable data can be generated to respond to inquiries and reduce exposure to compliance violations and fines.

RTLS and employee safety

RTLS can also contribute to employee safety by using location and proximity to prevent or reduce safety incidents. The fact that manufacturers can track the location of employees, tools, robots and equipment such as forklifts in real time opens the door for new applications that can deliver key functions such as real-time alerts, equipment shutdown and geo-fencing (eg, for robots) that can truly reduce or prevent incidents.

Key employee safety questions that RTLS can potentially address are:

- How can you keep employees safe using real-time proximity and time alerts?
- How can you easily trace employee contacts to isolate only those employees in contact with potential health dangers?
- How can you control employee access and traffic in areas where potential danger exists during plant operation?
- How can you ensure only employees with qualified training can operate potentially dangerous equipment?
- How can you reduce cost and time by identifying areas that need to be sanitised after an employee has been fallen sick?
- How can you more easily track actual employee work hours to prevent overwork/exhaustion?

Alerting employees about social distancing

Real-time location tracking enables real-time alerts (eg, wearable flashing RTLS tags with customisable alert messaging) to warn employees that they are violating social distancing protocols by standing too close together; for too long.

Creating trust with employees through contact tracing

Quick and effective contact tracing brings assurance to employees that they are being protected by quickly isolating employees with potential health issues so that the rest of the workforce remains healthy.

Optimising facility layout

During times when social distancing and low safety risk scenarios (people and moving equipment) are essential, RTLS provides the key tracking data to evaluate and optimise facility layout, resource management and production flow.

Protecting employees from hazardous equipment

RTLS provides the real-time location data for applications that limit risk of physical harm. For example, robots can be deployed within a geofenced area (limited to a physical area) and employees can receive an alert when entering that area. Forklifts can be controlled based on

In terms of food safety, this makes it possible to create a system that can track and associate specific employees or ingredients along with possible contaminant sources with a day, time and duration of exposure. This opens the door to valuable applications that can mitigate risks and loss of production and profits.

Isolating contaminated products

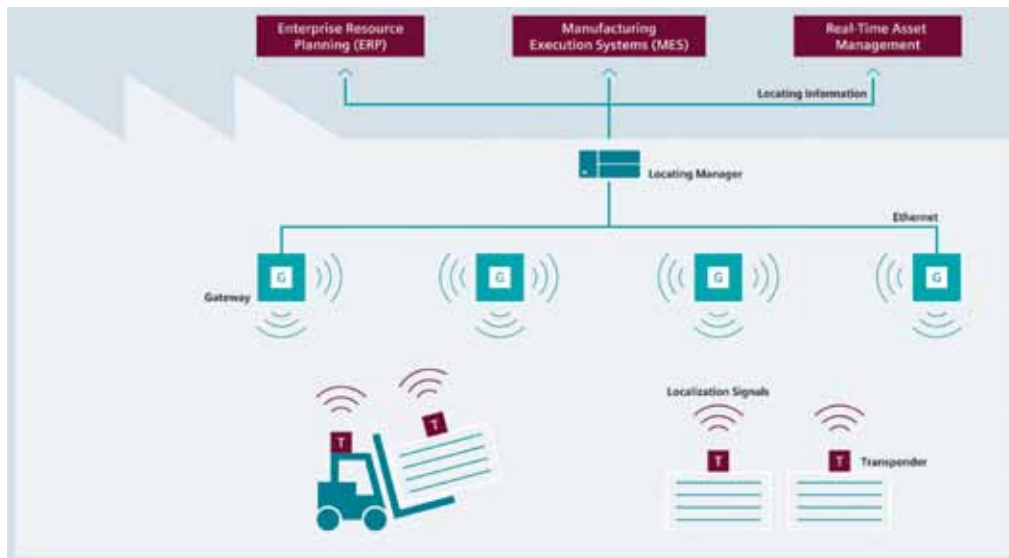
When an employee infection of any type is detected, products can be quickly isolated that may have been contaminated by the employee (or other potentially infected employees) based on specific locations and time windows.

Mitigating potential loss

The ability to isolate specific products makes it possible to only dispose of items or ingredients that have been cross-contaminated, which will save money and also time in resolving issues more quickly. Losses can be limited to products that have been exposed during a certain time period, and reliable data can be supplied to maintain trust and integrity.

Avoiding entire plant shutdowns

The fact that RTLS can quickly perform contact tracing between infected employees and others that have not been exposed provides manufac-



Overview of a real-time-location system.

location data that allow RTLS to work in concert to 'slow down' the forklift if in specific proximity to other workers (eg, rounding a blind corner or simply when too many people are present in the nearby area).

Preventing untrained employees from operating specific equipment or systems

RTLS can be deployed to either directly prevent workers from operating equipment without proper training or to generate an alert of such activity. An RTLS transponder can be programmed with the employee profile and training record and then compared with the requirements for operating the equipment or system in real time.

Log and monitor actual work hours and employees on premise

With RTLS, manufacturers can track workers who are tardy or absent. It can track overtime to avoid exhaustion and eliminate on-the-job accidents. The system can generate an alert when someone enters an unsafe or unauthorised area, when accidents occur because a worker hasn't moved for a prolonged period of time (lone-worker safety) or when employees and authorised visitors on site need to be located in case of an emergency.

How RTLS works

For intelligent systems like mobile robots, automated guided vehicles (AGVs) and state-of-the-art automation software to be able to focus and respond autonomously, they need to know at any time what's where and when. RTLS locating platforms achieve this by locating objects with accuracy measured in centimetres and makes the positioning details available to higher-level systems in real time.

RTLS systems thus make a precise digital twin of all processes possible — from delivery to further processing and final assembly. The relevant objects are fitted with a transponder and transponder signals are picked up by a higher-level system, which calculates their position and provides the information to the intelligent automation systems and manufacturing units.

Transponders

Transponders are fitted to workpieces, robots, vehicles, etc, and transmit a wireless signal at defined intervals. They can also be equipped with data interfaces, and transmit location details directly to the local control system or make them accessible for higher-level systems.

Gateways

Gateways are fixed reference points in the local infrastructure for real-time locating. They record the transponder signals and give them

a fixed position stamp. The positioning data is bundled and transmitted to the locating server.

Locating Manager

The Locating Manager is a software system that calculates the real-time position of the individual transponders and passes the details on to the higher-level systems via defined interfaces.

Other RTLS benefits

The location data provided by RTLS can be used to gain a number of other advantages:

- **Elimination of search time for assets:** Cost savings can be achieved through the elimination of time-consuming search procedures within the facility, and employee productivity can be better optimised.
- **Elimination of material loss:** Optimal inventory utilisation is made possible by leveraging first-in and first-out principles, and additional mark-up costs due to replacing lost inventory can be avoided.
- **Automated documentation:** Cost savings can be found through the elimination of manual documentation procedures related to tracking/flow-in production, and documentation errors can be reduced.
- **Lower maintenance cost and improved uptime:** RTLS can help reduce maintenance time by directing maintenance to the exact location of affected equipment, achieving a faster response to reduce downtime.
- **Optimisation of production and quality:** Identifying historical or real-time production bottlenecks can be used to optimise production, while tracing back production errors can prevent the repeating of errors and improve quality.
- **Controlling automated manufacturing:** In the future, TRTLS could help enable self-organising production and logistics concepts, and help with collision and accident avoidance.

RTLS and the future of plant operations

The focus on safety that the COVID-19 pandemic has delivered is not going to subside. There is a spotlight on the food and beverage manufacturing industry and manufacturers have new business risks to contend with. At the same time, with demand increasing, there is more reason to ensure that shutdowns can be avoided and operations even expanded if necessary. Information is an important competitive tool that can provide the advantage of being able to make decisions sooner than the competition.

Siemens Ltd
www.siemens.com.au



PARALLEL ROBOTS

OMRON's iX3 and iX4 parallel robots have been designed with high payload and high speed for fast and flexible picking and packaging applications.

The iX3-565 offers a payload of 8 kg, and is suitable for high-speed applications in the packaging, food and beverage, manufacturing and pharmaceutical industries.

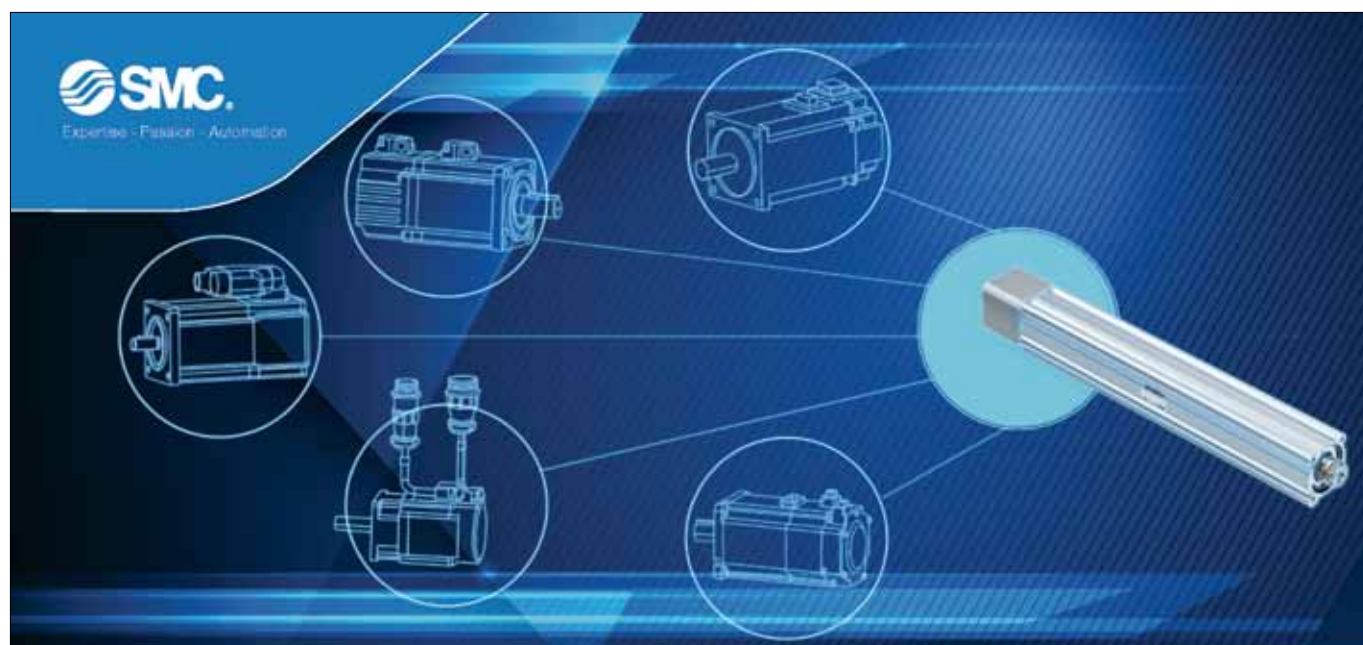
It supports integrated high-speed conveyor tracking, vision guidance and easy-to-use application software created specifically for packaging applications. It can be used for multi-picking and for fast pick-and-place. With a hygienic design that minimises contamination risks, including a standard IP65-rated work area and corrosion-resistant materials for easy washdown, it is suitable for use in both primary and secondary food and beverage packaging.

The iX3 can track up to a conveyor speed of 1.4 m/s and has an extended vertical reach that allows for a 3.9 m workspace, enabling a wide variety of packages to be used. It also offers EtherCAT connectivity to the OMRON NJ501-R controller and programming through the familiar IEC 61131-3 programming language or scripting.

The iX4 is a four-axis parallel robot with a payload capacity of 15 kg. It is said to be the company's fastest parallel robot yet, and the only parallel robot in the world with a four-arm rotational platform. The four arms help evenly distribute the load on the robot and support multi-picking.

The iX4 robot meets the sanitary standards of the US Department of Agriculture and the Food and Drug Administration for prevention of product contamination, allowing it to be accepted for meat and poultry processing.

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CIRCUMFERENTIAL PISTON PUMP

Engineered for durability and efficiency, the DuraCirc circumferential piston pump features a high-efficiency design, wide performance envelope and low net positive suction head (NPSH) requirement. With flow rates up to 150 m³/h, the pump is capable of handling operating pressures up to 40 bar. Optional ports make it easy to replace existing pumps from Alfa Laval and other brands, without having to adapt pipework.

Certified to meet EHEDG guidelines and 3-A Sanitary Standards, the pump has a crevice-free design with no dead zones. All product-wetted elastomers are made of FDA-conforming materials with profiled and defined compression, reducing contamination risks and cutting both cleaning time and costs.



Seal positioning with seal faces fully immersed in the pumped media further boosts cleaning efficiency. Heavy-duty bearings support rigid shafts located in a solid stainless steel gear case, which reduces shaft movement, minimising pump-head contact and therefore the risk

of media contamination. Additionally, the all-stainless steel construction, suitable for hygienic washdown, results in a clean environment.

Pump options make the product adaptable, increasing application scope. Available options include a wide range of sealing alternatives, an aseptic model, a heating/cooling jacket, horizontal and vertical mounting, and a rectangular inlet for high-viscosity products.

Alfa Laval Pty Ltd
www.alfalaval.com.au



ETHERCAT TERMINAL FOR INDUCTIVE DISPLACEMENT SENSORS

Displacement measurement is one of the most important metrological tasks, both in the industrial production environment and in infrastructure monitoring. Examples include the measurement and inspection of workpiece geometry, the monitoring of press-fit and joining processes, inline quality assurance and building monitoring. The Beckhoff EL5072 EtherCAT terminal is designed to allow all commercially available inductive measuring probes to be integrated into the standard control platform and evaluated without great effort.

The integrated excitation source of the terminal provides a wide range of parameterisable excitation frequencies and voltages. Further features include an automatically adapted measuring signal range, switchable input impedances for different probe types, and one digital input per channel for setting and storing the position value (including time stamp). The measured value is determined with high precision by a 24-bit A/D conversion and output directly as a 32-bit position value that can be integrated into the control program. In addition, the terminal features diagnostics for short circuit and overload of the excitation source as well as amplitude errors of the measuring signal per channel.

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HOW TO STRENGTHEN OT CYBERSECURITY FOR CRITICAL INDUSTRIES

Despite the growing awareness of cyber threat, some organisations remain unaware of the nuances involved in creating a strong cybersecurity strategy.

The Australian federal budget has allocated \$42 million for building security defences around critical infrastructure assets, including those deemed of national significance. This funding would also assist critical infrastructure owners and operators to respond to the increasing number of cyber-attacks.

However, despite the growing awareness of cyber threats and understanding of the importance of maintaining a strong security posture, some organisations remain unaware of the nuances involved in creating a strong cybersecurity strategy. In particular, businesses are failing to grasp the potential risks introduced by the convergence of information technology (IT) and operational technology (OT).

This lack of awareness is one of the biggest threats to OT security. Without understanding the different needs of OT and IT, businesses will fail to efficiently defend their systems and critical assets against cyber criminals. For organisations that operate in critical infrastructure sectors, this can have far-reaching impacts on wider society, including national security concerns.

Traditionally, OT and IT environments have been separated by an 'air gap', or lack of a physical connection between them to completely isolate and secure the OT network. With the integration of OT and IT technologies the air gap that once protected OT environments has been erased increasing the security risks for OT significantly. Moreover, since OT systems have a decade-long life, they are infrequently replaced. As a result, many OT systems are missing modern capabilities that could make them more secure as the air gap evaporates.

The question is how to strengthen OT cybersecurity? What security approach accommodates the unique character of OT devices and systems, while supporting maximised uptime and minimised costs?

The first line of defence in preventing cyber criminals from reaching SCADA, ICS, and critical infrastructure assets is

to understand the differences between IT and OT, and their specific security-related needs. Whereas IT systems are largely concerned with cyber activity, and primarily require security focused on confidentiality and data protection, OT systems operate more in the physical world and interact with real-world assets, making safety and productivity a priority.

Too often, business leaders may incorrectly assume that implementing cybersecurity strategies for corporate IT tools and networks will be sufficient to also protect OT systems and processes. But IT-focused security solutions aren't suitable to secure the unique features of OT systems.

Fortunately, chief information security officers (CISOs) can assist boards of critical infrastructure organisations to better understand the critical assets in their OT environment and the risks associated with the convergence of IT and OT to develop an efficient security strategy.

To develop an effective cybersecurity strategy, organisations in critical infrastructure industries must have a comprehensive understanding of what assets they have, who has access to these assets, and who controls the access. Understanding the flow of information and access is a fundamental step in developing an effective cybersecurity strategy and strengthening the organisation's security posture.

Cybersecurity is a constantly changing and evolving landscape, and it is crucial that organisations in critical industries continuously assess their OT and IT systems against the effectiveness of the organisation's security approach.

To learn more about how to develop an effective strategy to protect your critical infrastructure assets download Fortinet's report, *Protecting Plant and Manufacturing Operations from the Expanding Attack Surface – Critical Elements of a Sophisticated Security Architecture*, [click here](#).

Fortinet International Inc
www.fortinet.com

FORTINET



ANALOG ENCODERS WITH REMOTE TEACH-IN

TR-Electronic is offering analog encoders with a multifunctional analog interface. A 16-bit D/A converter processes the multiturn position signal and supplies an analog output signal proportional to the angle of rotation. The speed signal can also be used, with which a speed feedback can be implemented.

The position signal is scaled by setting the start and end point fitting to the mechanics — meaning the maximum bandwidth of the analog signal is always used for the desired mechanical movement range. Up to now, such a teach-in has taken place with a button on the device. Programming the encoder is achieved via a teach-in button on the encoder or remotely via two digital inputs on the M12 connecting cable.

The signal output is either a voltage or a forced current. The current interface with a minimum current of 4 mA ('live zero') is said to offer the highest reliability by compensating for voltage drop detecting interruptions in the line.

The analog interface with teach-in function is available in all mechanical versions of the company's current generation of encoders: size 58 with solid shaft, blind and hollow shaft up to 15 mm, in size 80 with through hollow shaft up to 27 mm, and in size 110 with through hollow shaft up to 50 mm.

Leuze electronic Pty Ltd
www.leuze.com.au

ENERGY-EFFICIENT MOTORS

The DRN series of AC motors from SEW-Eurodrive are compact and easy to integrate with industrial machines and systems. Ensuring all components are compatible — and therefore customisable — makes them highly adaptable. This adaptability means they are suited to a wide range of applications and any industrial sector that requires the movement of material and automation.

They are suitable for many applications: from lifting applications such as forklifts, to roller conveyors on food and beverage production lines, to airport conveying services, to packaging.

Users can also benefit from customisation in their motor selection, such as optimising weight, dimensions and performance, which translates to time savings and efficiency gains. Their compact design also means they save on operational costs and space.

Users can also add options such as a mechanical failsafe brake or built-in encoders to better integrate the motors.

The DRN motors now come with a higher efficiency rating of IE3, not only providing more energy savings, but also futureproofing the asset, making it a safer investment option.

Besides offering flexibility and a modular system, these units are said to be built with high-quality components.

SEW-Eurodrive Pty Ltd
www.sew-eurodrive.com.au



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NEW PRODUCTS

WIRELESS CONDITION MONITOR

The Alfa Laval CM monitors the operating condition of rotating equipment, such as pumps, mixers and agitators, used in hygienic process environments. Compact and easy to use and install, it tracks equipment vibration, temperature and total run time to detect and diagnose equipment faults. This should enable manufacturers in the dairy, food and beverage industries to protect critical assets, ensure process uptime, improve worker safety, reduce maintenance costs and gain competitive advantage.

Powering the monitors are equipment sensors that transmit data to a connected compatible mobile device for predictive maintenance analysis, thereby supporting decision-making with diagnostics such as trend monitoring. Maintenance staff can check equipment vibration and temperature — either by visible notification on an LED indicator on the monitor or through an intuitive mobile app on a connected iOS or Android device within a 20 m range during a periodic walk around.

Trend analysis and FFT (fast Fourier transform) vibration data assist in diagnosing faults. These also enable operators to use the monitors to make informed decisions on scheduling maintenance and process shutdown based on actionable information in addition to actual run time and time to next service.

Alfa Laval Pty Ltd

www.alfalaval.com.au



CIP AND SIP SYSTEMS

HRS Heat Exchangers is offering cleaning-in-place (CIP) and sterilisation-in-place (SIP) systems for cleaning and disinfection for all hygienic industries, including food and pharmacy industry systems. The single- and multi-tank CIP and SIP systems are supplied complete with a control system to enable automated cleaning cycles.



The systems are fully skid mounted and have modular designs for quick and easy site installation. The single-tank system is designed for simple cleaning applications where recovery of the cleaning fluid is not required, while multi-tank systems are suitable for more complex situations.

For small, portable applications the tank can be heated to 85°C using electric heating elements, but steam heating using a HRS K Series multi-tube heat exchanger is also available. Units start at 500 L capacity, and single-tank systems are available up to 2500 L. Larger systems can be provided using multiple tanks and centrifugal sanitary pumps are fitted.

Systems are fully automated using PLCs and an HMI, which can be standalone or integrated into the factory's main control system.

HRS Heat Exchangers Australia New Zealand

www.hrs-heatexchangers.com/au/

www.ProcessOnline.com.au

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AN ACTION PLAN FOR UNPRECEDENTED TIMES

NINE TIPS FOR THRIVING OR RESTARTING OPERATIONS

Food and beverage is often referred to as the “fast-moving consumer goods industry” — and that was before the worldwide health crisis created an economic disruption on a scale unseen for generations. Now ‘agility’ has taken on a whole new meaning as we navigate highly-unusual working conditions, unprecedented market dynamics, and disrupted supply chains.

You may be asking yourself some of the same questions we are:

- How can we do a better job operating remotely when facility access is restricted?
- Where should we adjust systems to reduce downtime and optimise efficiency and throughput?
- What can we do to become more resilient and immune to global disruptions in the future?

We're in this together

Collaboration during crisis helps us all weather the storm. This guide gives practical steps you can take right now to increase resiliency and agility. If you need help, we are ready to share best practices, experiences, and tools and techniques to rise to these unprecedented challenges together.

Tip 1: Protect health and safety

We know your first concern is to secure the health and safety of your employees and customers. While your workforce is scrambling to react to dynamic conditions,

you'll need to continually assess and respond to changes in health and government authority rules and guidelines.

Tip 2: Remotely manage operations

Take advantage of remote management software solutions trial periods so your operators can continue to adjust processes, conduct maintenance and make operational decisions to drive efficiency even when access to the physical plant is restricted or not desired.

Tip 3: Empower your workforce

Join Schneider Electric Exchange to learn and share best practices with your food and beverage peers and industry experts. Empower your workforce to make fast, informed decisions with digital technologies



© Stock: Adobe.com/au/Steve Oliver

that put real-time plant operating information in a form they can readily use to improve productivity and operational profitability.

Tip 4: Practise good cybersecurity hygiene

Unfortunately, would be cyber-attackers ramp up activity in times of crisis. Food safety and cleaning processes continue to be cyber-targets for disruption. Conduct a comprehensive cybersecurity assessment and analysis and visit the Schneider Electric Cybersecurity Virtual Academy to learn what you can do to secure your operations.

Tip 5: Deploy OEE quick wins

Now more than ever, you need to make sure assets are always available for production when needed, avoid unplanned downtime, and use maintenance resources efficiently. Asset management solutions and modernisation services can improve the overall equipment effectiveness (OEE) of your plant and extend asset lifecycles. Analytics, which can be installed without stopping the plant, increase OEE, reduce operating costs, and shorten the time required for maintenance operations.

Tip 6: Improve agility

As market dynamics and consumer behaviour undergo drastic changes, you may need to adjust your product mix to accommodate shifts in demand. You may even have to suspend normal production in favour of making high-demand essential products. Use recipe and batch management to improve agility and reduce set up and changeover time. Digitising formula management and recipe execution can help you successfully manage flexible, multi-stream and multi-production operations.

Tip 7: Safeguard profitability

To offset revenue loss, look for places to reduce energy

consumption, waste, and labour costs. You'll need to understand the intricacies of your operations like never before to eke out every bit of production efficiency while you also streamline maintenance efforts. This will protect cash flow for financial continuity and resilience so you can positively impact profitability when economic and world conditions return to more predictable levels.

Tip 8: Increase supply chain flexibility and visibility

New digital technologies are available to help your supply chain more easily pivot to where it's needed. If you don't have it already, now is the time to look at end-to-end traceability and transparency across your supply chain. Transparency ensures full visibility on all information related to a product, proving their origin and highlighting information about ingredients, allergens, physical characteristics and other key attributes.

Tip 9: Future-proof operations to increase resiliency and agility

If these recent events have exposed problems — aging equipment, outdated processes, lack of digital talent, the need for real-time data to increase flexibility and make better decisions — the good news is that it has also uncovered opportunities. Create a prioritised list of where you need to make automation and digitisation improvements to become future-ready. We see digitisation as the path forward for F&B manufacturers to better align with modern customer needs and expectations.

To learn more, visit <https://www.se.com/au/en/work/solutions/for-business/food-and-beverage>.



Schneider Electric
www.se.com/au





Souping up savings

A soup production facility was looking to replace its unreliable surface aerators to save maintenance costs and improve efficiency at its facility. The facility environmental engineer installed the Hydro Innovations Venturi-Aeration solution, which has resulted in improved efficiency and cost savings.

The facility's previous aerators had been in operation for several years and were not achieving the desired conditioning objectives. Furthermore, whenever one of the submersible pumps plugged or failed, the company had to rent a crane to remove the pump for repairs and then had to use the crane for removal and repair, and to reinstall the repaired pump at additional costs on each occurrence.

As one or more of the submerged pumps was failing at least once if not twice a year, the company began to look for a more viable aeration, mixing and equalisation solution to keep them in compliance.

The facility environmental engineer decided to replace the existing aerators with a Venturi-Aeration Model VA-1400 aerator and a T8 Gorman-Rupp pump.

The Venturi Aeration line of wastewater treatment products was introduced into Australia after its successful application by food processors in the US and Europe. The aerators are used in conjunction with Gorman-Rupp pumps and can be mounted on the banks of basins and lagoons instead of being installed within them.

The former system added dissolved oxygen to mix and equalise the contents in the equalisation tank using submerged aerators. The addition of the dissolved oxygen would cause fats, oils and grease to float so they would not be discharged with the plant's effluent into the publicly owned treatment works. The submerged aerators were also supposed to provide cooling of the influent process washdown water (at around 40°C).

Since the Venturi aerator is designed to handle 82 L/s, the contents of the equalisation tank can now be recirculated four times over a 24-hour period, achieving greater oxygen transfer and better mixing and equalisation.

The soup production facility is happy with its results since changing over to the Venturi Aerator. The installation is reported to have resulted in annual operating cost savings of more than \$112,000.

According to the company, the system has improved the overall equalisation tank performance to produce clearer effluent, while controlling odours, settling solids, cooling the water and hydrolysing fats, oils and greases — causing them to float for better removal efficiency.



With better circulation and cooling in the EQ tank the fats, oils and grease are floated for separation and treatment and are not being discharged with the effluent to the local treatment works, reducing surcharges.

The plant was able to achieve a \$6000 annual energy cost reduction, an \$89,000 annual reduction in chemical costs, a \$12,000 annual reduction in non-compliance charges and further maintenance cost reductions.

The facility environmental manager now has a system that allows him to achieve his discharge permit parameters and he has less concern over maintenance issues and costs.

Hydro Innovations
www.hydroinnovations.com.au

UNMANAGED ETHERNET SWITCH

IDEC Corporation has announced the SX5E-HU085B 8-port unmanaged industrial Ethernet switch, said to provide managed-switch features to support the rapidly expanding quantity of Ethernet, IoT and IIoT devices used in critical and challenging commercial and industrial locations. No software configuration is needed, and the device offers flexible installation options.

Features normally found on managed switches include QoS, IGMP snooping and broadcast storm protection.

QoS is a networking feature, usually only available on managed switches, for prioritising specified network traffic so the most critical packets are handled first. The QoS function in the unmanaged switch automatically guarantees priority for EtherNet/IP packets.

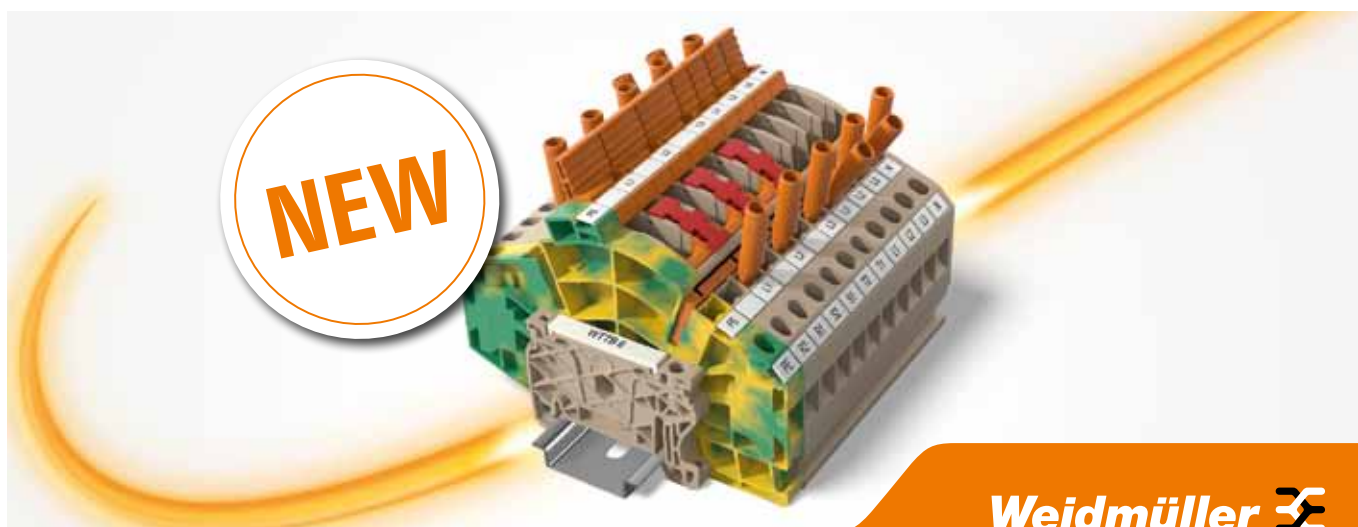
IGMP snooping allows a switch to monitor conversations between hosts and routers, and to create and maintain a map or filter of which links need which transmissions. By delivering messages only where they are needed, IGMP snooping reduces networking traffic and required resources.

Improper ring connections can result in duplicate messages that will cause the network to stall. Broadcast storm protection detects this issue and discards duplicate messages. It can be turned on or off with a single external DIP switch.

The switch operates at 10 and 100 Mbps, with auto negotiation of speed and full- or half-duplex mode, and every port automatically detects and adjusts for straight-through or crossover cable connections. Store-and-forward technology ensures each communication frame is fully received into memory and CRC checked for integrity before forwarding it to the destination. This feature introduces a small switching delay but secures high-quality communication.

IDEC Australia Pty Ltd

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FROM NAMEPLATE VIA DIGITAL TWIN TO ASSET HEALTH

It is frequently said that data is required in order to create valuable insights, but before this can happen, some important steps must be taken.



The typical domain of IIoT applications is manufacturing and production. Here the focus is on optimising installed assets, especially to increase efficiency and availability. The ultimate goal is to predict future asset behaviour based on historical data — often described as predictive maintenance or asset health monitoring. The majority of today's assets in processing plants already deliver much more information than just a single process value. This additional information can range from more process values to self-diagnosis about the asset's health or even the prediction, based on internally diagnosed device parameters, of potential problems that might occur in the near future.

This kind of information is often locked into the asset itself and can only be retrieved locally. The process automation plants that exist today are 5, 10 or even 20 years old and asset diagnostics was often not considered when they were planned. Although assets are replaced and new technology finds its way into existing

plants over years of operation, the original integration of these assets into a PLC or DCS is rarely touched.

As a result, all the new device features and functions are not accessible without direct interaction with the asset itself. By changing this situation, the digitisation and interconnection of all operational assets offers enormous potential for cost savings and optimisation in the process industry.

Accessing asset information in existing plants: unlocking the hidden potential

While the philosophy of IIoT is focused on unlocking the hidden potential of connected devices, that of existing plants is often exactly the opposite: locked down systems, with no means of connecting the installed assets. Furthermore, in order to make use of the features and functions of an asset, an overview about what is actually installed in the plant is required: where an asset is installed and what it can actually offer — although not all data provided is always of use.



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When talking about IIoT, it is frequently said that data is required in order to create valuable insights. Although this is true, it is often forgotten that before this can happen, some important steps must be taken. Prerequisites to analysing gathered data are knowing who or what the data provider is and what kind of data is to be accessed.

Without knowledge of the installed base and the data it will provide, analysis is practically impossible. In plants that have been around for a few years in particular, it is often not clear what the current installed base looks like.

- Who manufactured the devices installed?
- How many different device types are there?
- Are the devices still available or are some of them already obsolete?

Therefore, the first step into IIoT actually includes manual work: creating a list of all installed assets in a plant with at least some basic information such as manufacturer, asset type,



WHILE THE PHILOSOPHY OF IIoT IS FOCUSED ON UNLOCKING THE HIDDEN POTENTIAL OF CONNECTED DEVICES, THAT OF EXISTING PLANTS IS OFTEN EXACTLY THE OPPOSITE: LOCKED DOWN SYSTEMS, WITH NO MEANS OF CONNECTING THE INSTALLED ASSETS.

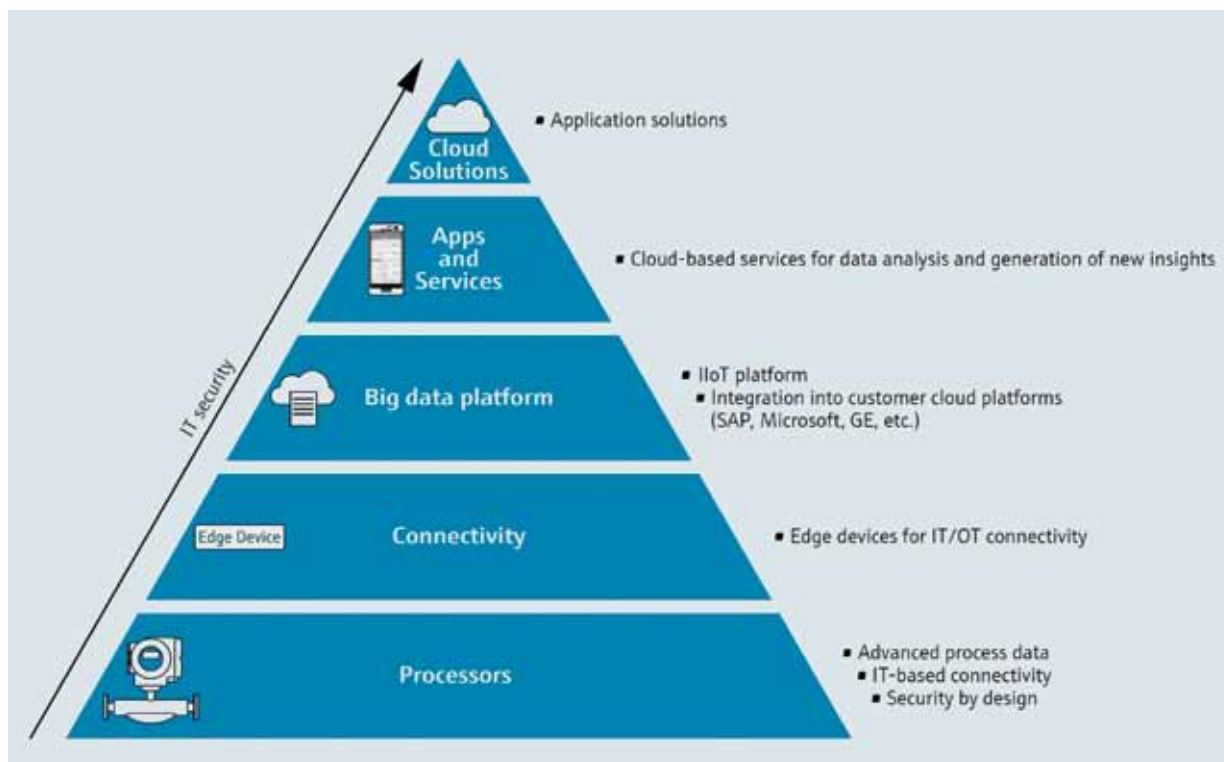
location and a unique identifier (usually the serial number). Traditionally, this is done by sending a technician into the plant with a pen and paper to document the serial numbers, the manufacturer, the asset type and other relevant information such as location, etc. Afterwards the data is collated in a list and then the real work starts.

Normally, reliance on existing plant documentation is not recommended: documentation on installed assets is often outdated or incomplete and can hardly serve as a basis for information gathering. There is usually no other way than to go through the system physically, to manually identify, capture and create a new database. Obviously, this method of creating the database requires a great deal of time, effort and human resources. In addition, neither the data consistency nor the validity of the data is guaranteed. Although documenting the installed base is a crucial step towards the world of data analytics and the IIoT, for many the entry hurdle is too high, as the time and money spent on manually creating a simple list of installed assets outweighs the benefits.

Automatic database creation and digital twins: it only takes a few steps

With the technology available today, this manual data gathering entry hurdle can be substantially lowered. Mobile devices can be used to create a device database with the help of a smartphone app. It takes just a few steps and can be done in a matter of seconds for each asset.

For the unambiguous identification of the devices, a combination of the serial number and manufacturer is usually used. These can be found on the respective markings of the devices, which may comprise metallic identification plates, QR codes or digital RFID tag labels, etc. After identification of the asset and entry into the app, further information can be attached to its 'digital twin'. This might be as geolocation (using the GPS functionality of the mobile device, for example), the tag of the



Digital service program for IIoT applications.

asset, criticality and similar information, comments as well as photos and drawings of the instrument and its location. From tests with participants of different ages and education levels, the average time it takes to gather all this information and create the database entry for a single asset can be less than a minute. Obviously, in a plant with hundreds of assets, this still might become a tedious task.

Since the arrival of digital communication protocols such as HART, Profibus and FOUNDATION Fieldbus, the goal has always been to provide the user with more information from the field and unlock the data and features that the manufacturers built into their devices. All these protocols provide a standardised means of reading the electronic nameplate of connected assets, so by using a modern edge device there is now a means of accessing this information and transporting it to the cloud. This automates a major part of the manual work, massively reducing the effort required to create a digital twin of the installed base.

In field trials, automatically generating an asset database in this way that included more than 800 assets in a single plant was found to be completed in less than four hours — from the installation of the edge device to the creation of the last digital twin.

But what happens next? How can the database be populated with additional data? Regardless of whether the database is created manually, via an app or via the edge device, today's technology allows it to be connected to other databases, such as the manufacturer's asset information system. This can mean device-specific documents such as manuals, certificates, etc are immediately at hand.

This is very important, as in today's process automation plants the installed base often contains a large number of field devices from different manufacturers. To operate and maintain

these plants economically, it is essential to have a comprehensive plant asset management system. Studies have shown that up to 70% of the time required to complete a maintenance job is spent on searching for information: only 30% is spent on actually doing it. Considering that in older plants up to 30% of the installed base could be already obsolete, not having up-to-date information on its current status represents a large obstacle to the smooth running of the plant.

A big step forward towards successful asset management would be to simply make the user aware of the obsolescence situation. Luckily, modern asset management systems can provide this information even in a mobile app. Here the obsolescence information is automatically generated in the database by cross-referencing the digital twin with data from the manufacturer's database. Having all this information at hand not only increases the efficiency of maintenance technicians, but also reduces the risk of faulty or inefficient maintenance, as the correct information is provided to the right person. This does, however, require a well-maintained and comprehensive device information database, which can be created as described above.

Asset health: from static to dynamic asset information

Once the connection to the field has been established (via the edge device) and a comprehensive overview on the installed assets is available, the next step can be performed: the visualisation of asset health. Many modern field devices are able to output diagnostic values and device-specific trend parameters.

This asset data can be visualised to give users an indication of the availability of their assets. Gathering this information over a longer period of time and cross-referencing it with other process variables or external factors can then ultimately be used in a predictive maintenance application.



CONSIDERING THAT IN OLDER PLANTS UP TO 30% OF THE INSTALLED BASE COULD BE ALREADY OBSOLETE, NOT HAVING UP-TO-DATE INFORMATION ON ITS CURRENT STATUS REPRESENTS A LARGE OBSTACLE TO THE SMOOTH RUNNING OF THE PLANT.



This is the logical step from static to dynamic asset information. Collecting and trending asset health over specific periods of time and storing this information in a database can ultimately lead to a collection of data that can then be used to forecast an asset's health.

Of course, all these additional asset management features and functions should never compromise the security and integrity of the actual process. By adding a bypass channel (through the edge device and an Ethernet or fieldbus gateway) to the asset management database, the PLC or DCS remains untouched. This offers multiple benefits:

- No additional programming of the PLC/DCS is needed to unlock the asset features.
- Existing plants can be easily retrofitted without the fear of interfering with the existing process.
- A bypass establishes another level of security, as asset management data is clearly separated from process data.

Today's field devices often have the necessary connectivity to also transmit data directly to the database already built in. This can be done by connecting through Wi-Fi, Ethernet technologies or even a mobile connection.

Security aspects

In order to understand the relevant security aspects, it is necessary to take a look at the network architecture. This will give the entry points for the security discussion and show critical points of interest. The data flow starts in the field at the instruments. Via interfacing devices like edge devices these data are transmitted into the cloud, where they are then transformed into information. There, additional data sources may be injected to create even more information. These can be vendor systems or user environments such as engineering tools or ERP systems.

The connection to the asset management database has to be established in a secure manner. The edge device is located behind

the company's firewall, but as an additional security measure, the connectivity between edge device and asset management database should be a one-way street. In this way there is no direct connection possible between the asset management database and the field network.

As security, trust and compliance are sensitive topics, a quality audit is essential. When the decision is to go for an IIoT offering, an accountable quality assessment of cloud services through a transparent and reliable certification process should be part of the process.

Any quality audit needs to consider different frameworks, laws and regulations that should include at least:

- ISO 27001: Information Security Management
- IEC 62443: Security for industrial automation and control systems
- Contract and compliance
- Data privacy
- Operational processes
- Software-as-a-Service
- ISO 20000: Service Management System

Conclusion: Do things better

The IIoT offers innovative ways to do things better and utilise assets that already exist. The installed base of a system can be captured and analysed using current and historic data. Asset information in the field is often recorded with a mobile smart device using a scanner app that reads an RFID chip, QR code or tag — alternatively, the asset information can be captured automatically by an edge device. All data is saved to the cloud, visualised on a dashboard, and from there further asset management capabilities can be realised.

Endress+Hauser Australia Pty Ltd
www.au.endress.com

INCLINOMETERS

In its latest generation of inclinometers, Turck has combined accelerometer technology (MEMS) with gyroscope technology so that shocks and vibration can be masked out more effectively than with conventional signal filters. The B1NF and B2NF single- and two-axis inclinometers are said to thus enable a greater degree of dynamic measurement that allows for use in high-speed control circuits on moving or vibrating machines.

The robust IP68/69K sensors output their signal via IO-Link COM3, the latest and fastest version of the digital interface. IO-Link also enables the device to be adapted easily to application requirements. Additional information, such as the operating hours of the sensor or its ambient temperature, can also be provided for condition monitoring applications.

A built-in spirit level function simplifies device installation. The flashing of an LED is used to indicate the horizontal position of the sensor. This helps with the error-free installation of the sensor without any accessories before it is fully set up in the IO-Link master. The use of translucent plastic for the LEDs eliminates the potential weak points in the housing arising from LED lenses.

The devices can also be used for positioning and balancing applications, or for dancer arm monitoring in the textile, printing and packaging industries. Turck is initially offering four variants on the market: the B1NF single-axis and B2NF two-axis inclinometers for dynamic applications, and the B1N and B2N for static applications.

Turck Australia Pty Ltd
www.turck.com.au



CABLE REEL WITH SPIRAL GUIDE

The igus e-spool flex 2.0 is a cable reel that allows cables to be guided from start to end without slip rings or other connecting elements. This is made possible by a spiral guide which reels the cable in a controlled manner when it is rolled up. It can carry cables and hoses for the transmission of energy, signals, data, liquids, compressed air and vacuum without interruption. Fully harnessed cables can be used, and can be inserted into the drum in a few easy steps. The user simply inserts the cable into the spiral guide and fastens the cable stowed in the outer and winding housing of the e-spool flex.

The e-spool flex is available in three sizes for cables with a diameter of 5 to 15 mm and an extension length of 5 to 15 m. The cables can be quickly replaced at any time. In addition to a subsequent connection of the e-spool flex 2.0 with an existing cable, the cable reel solution is also offered as a 'readyspool', fully harnessed with chainflex cables specifically designed for moving applications and with cables of other manufacturers.

The e-spool flex 2.0 is available in four versions: a low-cost version with a hand wheel to rewind the cable; as a tool variant for cable reeling with cordless or pneumatic screwdriver; as an automatic solution with spring-operated retraction mechanism; or as a version with spring drive and additional brake (in development).

Treotham Automation Pty Ltd
www.treotham.com.au



SAFETY ENCODERS

The CD_582+FS series encoder by TR-Electronic is a compact safety-rated absolute rotary encoder for safe position and safe velocity over EtherNet/IP.

Encapsulated in a standard 58 mm housing, the two fully independent encoder cores use the latest ODVA protocol specifications for CIPsafety systems. Depending on the requirements of the application, the encoders are available with SIL2/PLd or SIL3/PLe.

The encoder supports DLR (device level ring) network architecture, said to increase the overall system reliability. In a DLR network, all devices are connected in a closed-ring topology rather than a string or star topology. If a single component or connection within the ring network fails, the remaining network will be fully functional, as each device can still complete a path back to the master controller.

The encoder design is based on a modular architecture that allows a large variety of options to be selected to meet individual hardware requirements. These options include a wide range of metric- and imperial-sized solid shaft options as well as hollow shaft and blind shaft versions with bores up to 15 mm in diameter. A large selection of different flange and mounting options are available, along with a choice of radial or axial M12 connections.

Leuze electronic Pty Ltd
www.leuze.com.au





AI SMART CAMERA

ADLINK Technology has launched the NEON-2000-JNX series, an industrial AI smart camera that integrates the NVIDIA Jetson Xavier NX module. The camera's high performance, small form factor and ease of development are said to open the door for innovative AI vision solutions in manufacturing and logistics, as well as other edge applications. The camera is an all-in-one solution, eliminating the traditional need for complex integration of the image sensor module, cables and AI box PC.

The NVIDIA Jetson Xavier NX provides more than 10 times the performance of its predecessor, the Jetson TX2. The NEON-2000-JNX series integrates the processor into an all-in-one device, designed to simplify the deployment process and speed up the time to market.

The series comes with all necessary components and an optimised OS already integrated. It supports six sensor configurations in total between 1.2 and 8 MP to deliver raw data and complete image detail for machine vision, including four image sensors. Two MIPI image sensors reduce CPU loading and support a high operating temperature range, and an embedded image signal processor (ISP) provides enhanced and environment-adaptive imaging to improve AI accuracy. Integration overcomes EMC, EDS, vibration and thermal problems, interface compatibility, image drops caused by faulty camera and OS settings, and other common reliability issues.

The AI smart camera is pre-installed with ADLINK's edge vision analytics software, EVA SDK (Edge Vision Analytics Software Development Kit), creating an optimised platform designed to reduce proof-of-concept (PoC) schedules and speed time to market.

ADLINK Technology Inc
www.adlinktech.com

WINDOWS-BASED PAC

The ICP DAS XP-9781-IoT is a 7-slot PAC with E3845 CPU and Windows 10 IoT Enterprise, combining computing, I/O and operator interface into a single unit.

The product is equipped with seven I/O expansion slots and a variety of ports including dual Gigabit Ethernet, VGA, USB, RS-232 and RS-485. Local I/O slots are available to use the company's I-9K and I-97K series I/O modules, and remote I/O expansions are available to use Ethernet I/O modules and RS-485 I/O modules. Windows 10 IoT Enterprise runs on a 64-bit x86 platform with support for both Universal Windows App and Classic Windows applications.

Windows 10 IoT leverages Windows' embedded experience, ecosystem and cloud connectivity, claiming to allow organisations to create their Internet of Things with secure devices that can be quickly provisioned, easily managed and seamlessly connected to an overall cloud strategy.

ICP Electronics Australia Pty Ltd
www.icp-australia.com.au



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ADSORPTION DRYERS

The adsorption dryers in the Boge DAV-2 range with high-performance pre-filters and after filters can achieve flow rates of 450–7302 m³/h at a maximum operating pressure of 11 bar. They come as standard fitted with a thermally insulating cover and protection against accidental contact. The thermal insulation reduces heat losses, resulting in improved operating safety and achieving energy savings of around 4%. Specific features include an updated PLC control with 7" touchscreen display for permanent monitoring, analysis and evaluation of all relevant parameters. The dewpoint control system permits switching between the receivers where necessary, meaning the drying phase can be lengthened and energy consumption reduced.

The dryer can be controlled via a range of different interfaces (Modbus, Profibus, etc) and the USB interface on the switch cabinet allows software to be updated or report logs to be downloaded for subsequent analysis. To simplify transport and installation, the height of the receivers has been reduced and their diameter increased. This has made it possible to reduce the differential pressure, and the low height means the dryer can be installed in a standard container.

Adsorption dryers are sometimes referred to as vacuum regeneration dryers, as ambient air is drawn over the desiccant bed via an external heating element with the help of a vacuum pump during the regeneration process. Unlike heatless adsorption dryers, which use ready dried process air to regenerate the desiccant, the 'zero purge' technology of the series requires nothing more than ambient air.

Boge Compressors Ltd
www.boge.net.au

AIR KNIVES

Paper, plastic, textiles or other materials are normally electrically balanced — that is, they contain an equal number of positive and negative charges. Friction can disturb

this balance, causing problems such as dust clinging to product; product clinging to itself, rollers, machine beds or frames; materials tearing, jamming or curling; sheet feeding problems; and hazardous sparks or shocks.

EXAIR's Gen4 Super Ion air knives remove static electricity by flooding an area with static eliminating ions from up to 6.1 m away. The laminar sheet of air sweeps surfaces clean of static, particulate, dust and dirt, improving production speed, product quality and surface cleanliness.

The Gen4 Super Ion Air Knife incorporates EXAIR's Super Air Knife that minimises compressed air use by inducing surrounding airflow at a ratio of 40:1. The amplified airflow carries the ions to the target, making it possible to eliminate static charges in less than a half second. Air volume and velocity are infinitely controllable from a 'breeze' to a 'blast' to gently wipe or forcefully blow away debris.

Available in lengths from 76 to 2743 mm, the electrical ion source is shockless and there is no radioactive element.

Applications include surface cleaning, neutralising plastics, bag opening, printing machinery, packaging operations and elimination of painful static electricity shocks.

Compressed Air Australia Pty Ltd
www.caasafety.com.au



ULTRASONIC SENSOR

The UC18GS ultrasonic sensor series from Pepperl+Fuchs combines the advantages of ultrasonic technology with features to create a sensor solution that meets a broad range of application needs. The adjustable beam width, small dead band and built-in interference target suppression enable optimal adaption of the UC18GS ultrasonic sensors to the application settings while helping to increase process reliability.

By means of an automatic synchronisation feature, the UC18GS series supports the easy synchronisation of multiple sensors without parameterisation. Whether traditional pushbuttons or interfaces like IO-Link or IrDA, the UC18GS sensors give users a choice of programming options. While the IrDA interface allows live data access in running applications for maintenance or analysis purposes, detailed configuration to meet each individual application can be performed via an IO-Link master or via DTM. The output configuration as well as the sound beam width can also be set directly on the sensor using the programming buttons.

Pepperl+Fuchs (Aust) Pty Ltd
www.pepperl-fuchs.com





PANEL PC FOR ATEX ZONE 2

The WinMate R19IHAT-66EX panel PC is an ATEX Zone 2 certified computer for remote data collection, process visualisation and control.

The R19IHAT-66EX includes an Intel Core i7 CPU for high performance and has a thermal system that is fan-less, featuring a streamlined enclosure for efficient heat dissipation. It also offers full IP66 protection against dust and water, withstands vibration and is compliant with MIL-STD-810F requirements. Suitable for in-vehicle applications and in potentially explosive environments, all the I/O ports are covered M16/M12 with EX-Type brass cable glands for maximum protection in wet and dusty operation conditions.

With the built-in intelligent heater that boosts from -40 to +70°C, the R19IHAT-66EX ATEX panel PC is suitable for operating in outdoor or hazardous environments in hot or cold temperatures.

Backplane Systems Technology Pty Ltd
www.backplane.com.au

FIREWALL WITH VPN

Software components of machines, PLCs etc are targets for attackers on the internet. Small compact firewalls can be used to isolate the machines or PLCs by segmenting traffic and thus increasing security in the control or corporate network.

The W&T Microwall VPN separates sensitive components or subnets into a separate island network and keeps them from being accessed via the higher level company intranet. For remote access, for maintenance and remote support, a WireGuard VPN server is available to provide selected VPN clients with secure and dedicated firewall-protected access to the island stations.

All connections between the networks must be given explicit permission via rules, based on source/destination IP and the TCP/UDP port numbers. Communication with undocumented or undesired services is prohibited and harmful events, such as overload, are kept from the island.



The firewall rules and VPN management are administered simply and clearly using the Microwall VPN web pages and are uniformly whitelist-based. Any communication that is not expressly permitted in the form of a rule is blocked.

TE Automation Pty Ltd
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Lion Australia futureproofs supply chain with AGVs

Lion Australia has futureproofed its supply chain and manufacturing operations at its Tooheys Brewery in Lidcombe, NSW, with Dematic automated guided vehicles (AGVs).

The Tooheys facility brews up to 300 million litres of beer per year and produces up to 120,000 cartons of product per day, which is equivalent to 2 million litres per day.

With the beverages supply chain running in a 24/7 cycle, Lion's core motivation for streamlining supply chain and manufacturing operations with AGVs was to help the company meet the needs of its consumers, while also looking after its own employees by providing a safe and well-managed workplace.

Tim Symonds, Packaging Manager at Tooheys, said the implementation of AGVs was part of a widespread initiative to optimise operations within the Tooheys Brewery and across the entire business.

"While the number of products we make across our beer business continues to grow, we needed a definitive way to improve our productivity to keep up with demand. To achieve this, we invested in AGV technology to better deliver services to our core assets — our people, brands, production facilities and suppliers — and to generate better value for our customers," Symonds said.

"The AGVs have helped give us real dependability for our end-of-the-line process. By deploying Dematic's AGVs, we are able to work within an area of operations that was once problematic — the transportation of pallets from palletising to despatch. With the AGVs, we know that they are reliable, and they have given us the confidence that our products are accurately and safely delivered to the end consumer with ease."

Since implementation, the AGV solution has supported Lion to provide a consistent measurement of product picking time, as well as eliminate any wastage, inaccuracies or mistakes made by human error throughout all phases of the product picking process.

Additionally, the AGV solution has enabled Lion to introduce a predictable logistics strategy. This has allowed the company to gain insights into the number of vehicles in action within the warehouse,



and how many pallets can be produced per day, per shift and per year.

Tony Raggio, Dematic's head of AGV sales, said using AGVs greatly improves reliability, as they are capable of working non-stop, 24/7, every day of the year, thereby streamlining operations to deliver a return on investment.

"The deployment of AGVs at the Tooheys Brewery has enabled Lion to improve the efficiency, productivity and accuracy of its operations, thus minimising mistakes, product damage and workplace accidents, which additionally provides significant improvements to occupational health and safety standards."

Following the successful launch of the Dematic AGVs at the Tooheys Brewery in Lidcombe, and the operational benefits and improved throughput already achieved, Lion will look to deploy more AGVs at other breweries across Australia in the near future.

Dematic Pty Ltd
www.dematic.com.au

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UNDERSTANDING INDUSTRIAL NETWORK REDUNDANCY

I've often been asked what is the 'best redundancy protocol' for industrial networks, and usually this question is posed by someone who wants an easy answer so that they can move forward with the comfort of knowing they are going to achieve the best outcome.

However, I think that this question itself poses an interesting thought process about how we should choose the redundancy protocols for our industrial networks. Or maybe a better question would be "how do we design the network so as to meet the requirements of the application(s) inside the industrial network?"

In the simplest terms, the way to go about this is to understand the application's communication requirements. In the case of a typical PLC, this is a cyclical process on a fixed timer with a number of faults (or retries) being allowed before the device stops the process to ensure the integrity of the process or safety of individuals. Knowing this information, we would then choose an appropriate redundancy protocol to achieve the goal of recovering the network before the PLC stops the process, so that in the event of a small network issue the process continues to operate.

Each standardised redundancy protocol has its own benefits over the others, so let's briefly touch on the common standardised protocols.

RSTP (Rapid Spanning Tree Protocol) offers a typical recovery time of 0-20 ms per node or switch and allows for any type of architecture you want — which has the advantage in some unique situations (such as redundancy in underground mining where power for some areas will come from another area) of providing additional redundancy paths

for multiple points of failure. The disadvantage of this protocol is that you will sometimes get a much higher recovery time if the root bridge (master switch) fails, which leads to it being hard to predict and therefore you cannot guarantee the process will not be hindered.

MRP (Media Redundancy Protocol) is a ring-based protocol offering a single point of failure with a guaranteed worst-case recovery time of 500 ms or 200 ms (configurable). The architecture used is a ring so it may not cater for every case, but the predictability makes its use very easy in an industrial network.

HSR (High-speed Seamless Redundancy) is also a ring-based protocol offering a single point of failure with a 0 ms recovery time guaranteed. Note that specialised hardware is required to support HSR, which can incur additional cost for the application.

PRP (Parallel Redundancy Protocol) is a dual bus architecture offering a single point of failure and also with a 0 ms recovery time guaranteed. There is duplication of some hardware required as well as specialised units that support PRP, so quite a large additional cost can be involved.

DLR (Device Level Ring) is another ring-based protocol offering a single point of failure with a guaranteed worst-case recovery time of as little as 3 ms. The architecture used is a loop or ring, so it may not cater for every case and the hardware has additional cost over typical MRP hardware.

After review of the requirements of the application and some knowledge on the standardised options available, it's just a matter of ensuring that whichever process is selected for the redundancy is compatible and will meet the requirements of the application.



Control Logic Application Engineer Adam Rickards is a passionate technology and communications professional with over 15 years' experience in industrial networking, with industry experience in design, implementation and investigation into complex faults in existing networks.

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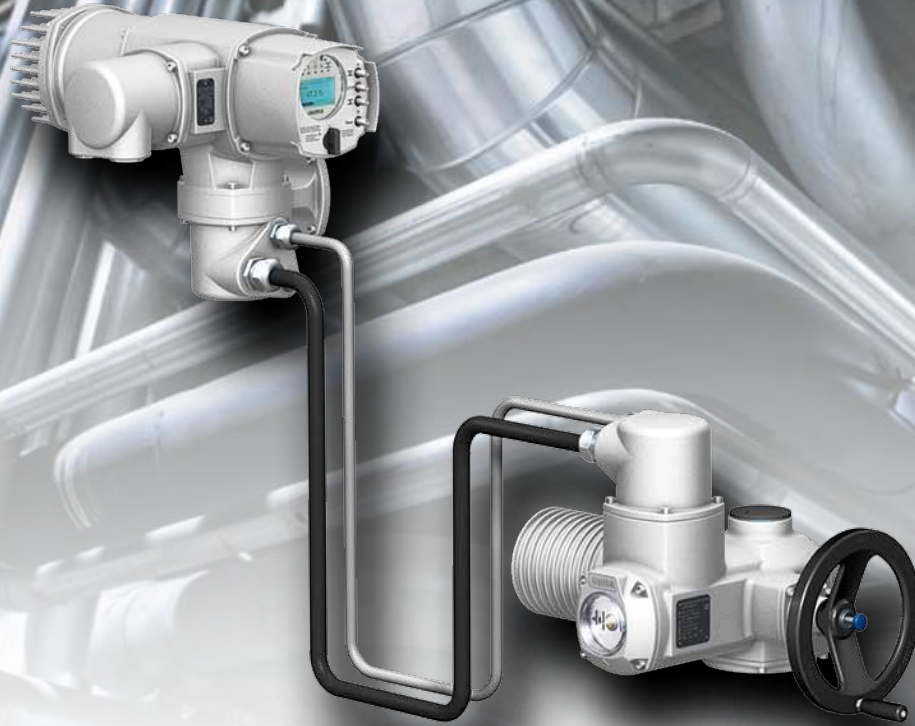
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