Westernacher
NONSTOP INNOVATION

WESTERNACHER WHITE PAPER

A day in an Industry 4.0 Warehouse.

An intelligent enterprise is one that integrates business processes with data to measure and improve performance of business operations. With the increasing maturity of Internet of Things technologies, companies can collect and leverage data like never before.

Let us take you through a day in the life of NI Corporation (a multinational conglomerate) employees in and around warehouse processes – from the warehouse picker, to the warehouse manager, to the CEO, and everything in-between – as they execute, improve, and optimize warehousing operations. We will show you how technologies are leveraged to improve safety, performance, and decision-making. While it could take you years to implement all the technologies applied on this day, we want to inspire you to embark on the journey of developing your company into an intelligent enterprise.

With the increasing maturity of Internet of Things technologies, companies can collect and leverage data like never before.

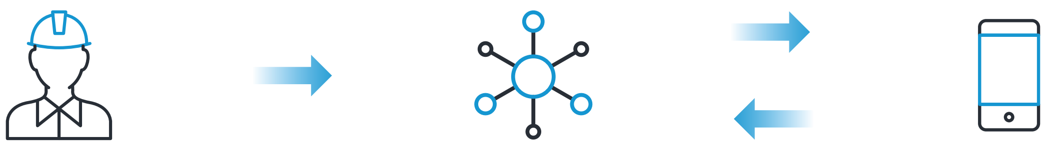
Warehouse picker.

John is a warehouse picker at NI Corporation. When John scans his fingerprint to clock in for his shift at the central distribution center, he is handed a small square beacon to wear for indoor location tracking. John scans the beacon to assign it to himself and places it in a pocket of his safety vest. He then proceeds to the warehouse office, where he collects his picking equipment.

Today he is working as a picker, so the picking equipment consists of a voice-picking device, a barcode scanner, and a headset. To start picking, John selects a pick cart, turns on the voice picking device, and is prompted with the first order. He scans the appropriate number of pick totes for the pick run, as specified by the voice-picking device. Then he is directed the first bin to pick from. John confirms the pick with his voice and places the picked items in the assigned tote. He goes from bin to bin, as directed by the voice-picking device, and completes the different picks in the warehouse order. The next pick is an aisle

over. When John approaches the end of the aisle, a light blinks indicating that a forklift is about to cross his path. It alerts the forklift that it must slow down and John is extra cautious before he crosses into the next aisle to complete the next picks.

As John is about to complete the warehouse order, a single-line urgent order comes in from a customer. To ship the order out in time, it must be picked within the next hour-and-a-half. It so happens that John is right next to the bin required to complete the pick. The existing warehouse order he is working on is put on hold while he is presented with the pick task to fulfill the urgent order. John then finishes the rest of the picks for the first warehouse order, and the contents of all the picks are taken to the consolidation area where orders are grouped together for packing. The original warehouse order was completed, and the single-line order was picked in time—all without interrupting the pick path of the original warehouse order.



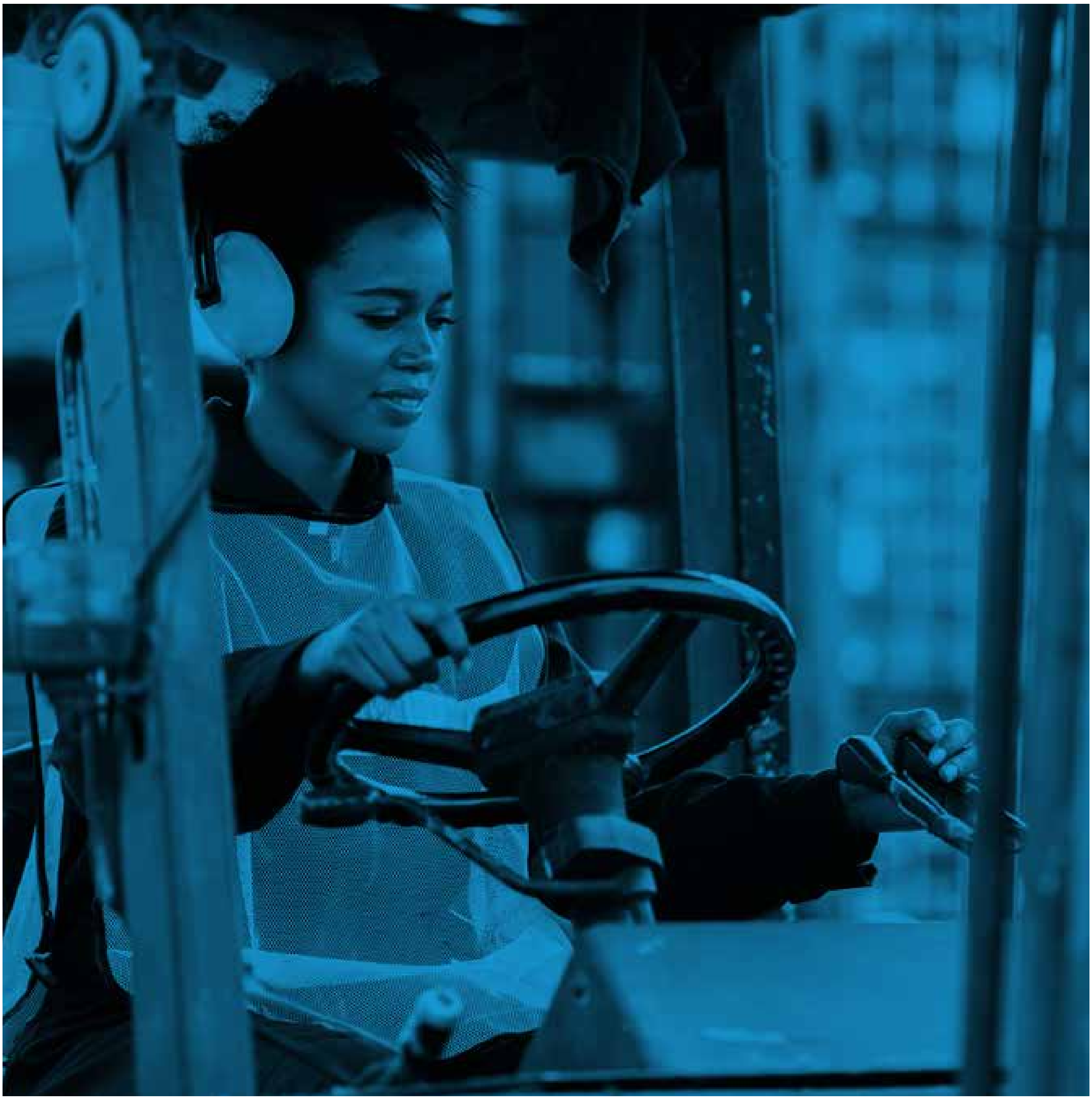
TECHNOLOGY DEEP-DIVE

Real-time location systems (RTLS) such as those leveraging ultra-wideband (UWB) technology enable knowing the precise location of workers and assets in a warehouse with centimeter accuracy. Knowing the location of workers in the warehouse enables safety improvements and process optimization.

For process optimization, by knowing John's location in the warehouse, the Warehouse Management System (WMS) was able to assign an urgent task to John, for completion, without interrupting the flow of his other work. This is very similar to the concept of waveless picking, where new orders are continuously assigned to user for execution. This is enhanced, however, by knowing the precise location of the picker, so the user continues to move in an optimized pick path.

Forklift operator.

Paula is a forklift operator at NI Corporation. She clocks into work the same way John does and heads to the bank of forklifts. Paula used to complete the forklift inspection half-heartedly. But now that it is tracked how long it takes her to complete it, she is much more thorough. Upon logging onto the forklift



terminal, Paula is presented with the first pallet she must pick. Before, Paula had to take the pallet down, climb out of the forklift, and scan the barcode on the pallet. Now, the pick task is confirmed with the press of a single button based on the location of the forklift. As Paula heads down the aisle on her way to the outbound staging area, a warning light turns on at the end of the aisle. The light turns on whenever a pedestrian approaches an intersection between aisles in the warehouse at the same time as a forklift. While Paula yields the way to the pedestrian crossing the aisle based on the light, she still sounds her horn to ensure the pedestrian knows she is approaching the end of the aisle.

Other things also encourage Paula to operate her forklift more safely. A score is calculated based on her driving behavior and she is awarded quarterly bonuses if her average is above 80%. She and the rest of her team regularly attend shift meetings where they are informed of accident hotspots within the warehouse. A combination of increased operational efficiency and safety evaluation has enabled Paula to focus and improve on safe forklift operation.

At the end of her shift when Paula logs off her driver app, she sees she scored a 90% for the day. A couple of harsh turns resulted in the lower score, and she now knows how she should adjust her driving behavior the next shift.

TECHNOLOGY DEEP-DIVE

Real-time location systems (RTLS) such as those leveraging ultra-wideband (UWB) technology enable knowing the precise location of forklifts in the warehouse. As demonstrated above, this can serve purposes in improving safety and operational efficiency. In combination with a driver app, we are able to automate pick task confirmation and provide feedback about their driving behavior.

Inventory manager.

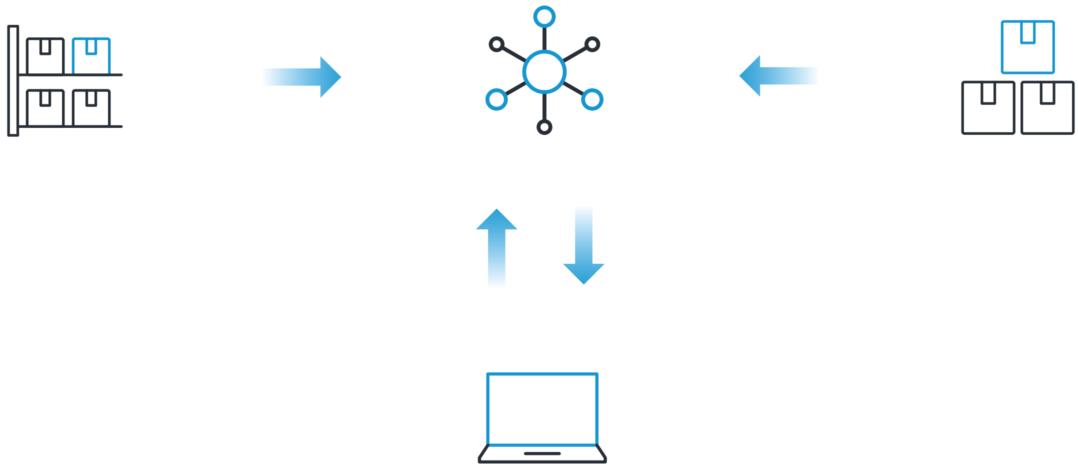
Sarah is the inventory manager at NI Corporation. She is responsible for ensuring the proper handling of stock in the warehouse. This includes products that may be kept under certain conditions, management of valuable assets/ products, and physical inventory checks.

NI Corporation has a product line that must be kept refrigerated throughout the supply chain. Excessive time without refrigeration results in quality issues which will lead to customer complaints. There are numerous failure points in the process from the storage of the product in cold storage in the warehouse, to staging of the product to shipping, and lastly loading of product into the trailer. To monitor the storage of the product in the warehouse, thermometers in the cold storage room record the temperature. Sarah receives alerts when temperature thresholds are exceeded and she is able to take the corresponding action. Trends are identified so Sarah can take preventative action instead of only responding when the temperature is too high. A temperature sensor is also placed on pallets removed from the cold storage room to measure exposure to higher temperatures and the amount of

time the pallet spends outside of refrigeration before loading. If the time allowed is approached or exceeded, Sarah receives an alert and appropriate action is taken to ensure quality of product is maintained. The sensor data from the pallet is used throughout the transportation of the pallet and ensures the product arrives at the customer with the expected condition.

NI Corporation also stores valuable assets and products in the warehouse. Despite all efforts taken, they sometimes disappear in the warehouse and they are hard to trace. Using the same indoor location tracking technology used to track warehouse operations, Sarah is able to locate these assets when they go missing.

Physical Inventory used to take extensive staffing. A check of every bin in the warehouse was carried out every quarter to ensure inventory accuracy and maintain legal compliance. Empty bin checks during picking were used. After installing weight-sensitive film, sensors in the bins send empty bin notifications completing zero stock checks automatically.



TECHNOLOGY DEEP-DIVE

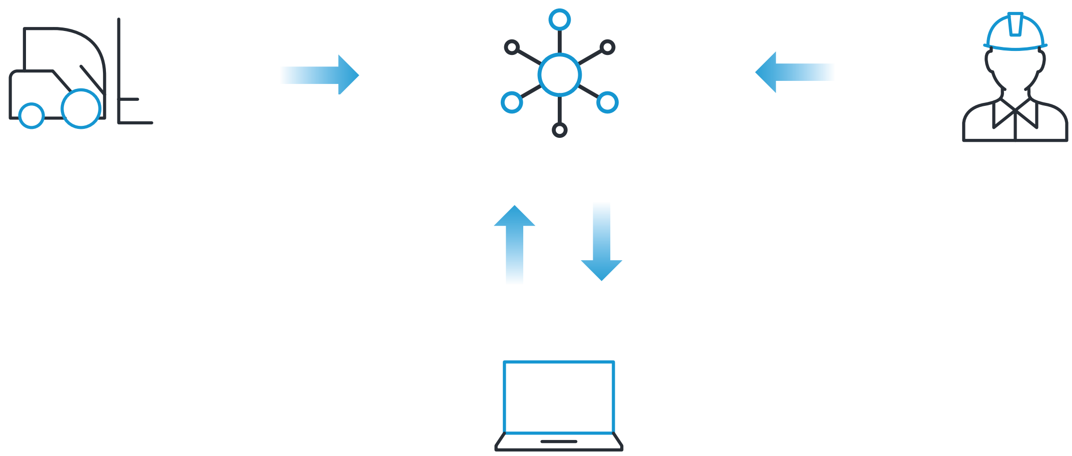
The variety of sensors available to track stock, assets, and bin situations in a warehouse enable solving common inventory problems. Real-time location systems (RTLS) track valuable assets to prevent them from getting lost. This information can be combined with GPS information when using a common IoT platform, so they can also be tracked outside the warehouse. The quality of stock can also be maintained through sensors such as temperature, humidity, and other relevant parameters. Lastly, weight-detecting foil can identify when bins have been emptied and enables automating low-stock checks.

Warehouse manager.

Jared is a warehouse manager at NI Corporation. His responsibility is to maintain safe and efficient warehouse operations. When Jared first started working at NI Corporation, he evaluated the safety and efficiency of the employees on his team through observation. Accidents were addressed after they happened and relied on employee reports of unsafe working behaviors. Jared had a good grasp of how efficiently teammates were working with labor management and engineered labor standards, but it was hard to find the root cause of inefficiencies.
A few months ago, Jared started using a dashboard that provided him with safety and efficiency metrics for evaluating warehouse operations.

In addition to the driver score used to evaluate the safe operations of forklifts, Jared uses a heatmap to identify risky areas in the warehouse. So far, he identified aisle intersections with high instances of harsh braking. Based on this, NI Corporation installed warning lights at the identified intersections, and this has helped reduce the risk of collisions between forklifts and pedestrians.

The dashboard has also been useful in evaluating and improving operational efficiency. Understanding productive forklift utilization, with relation to tasks executed in the Warehouse Management System, has given Jared a greater insight into operator behavior. Additionally, Jared was able to identify high congestion areas in the warehouse and rearrange the flow of traffic throughout the warehouse to address them.



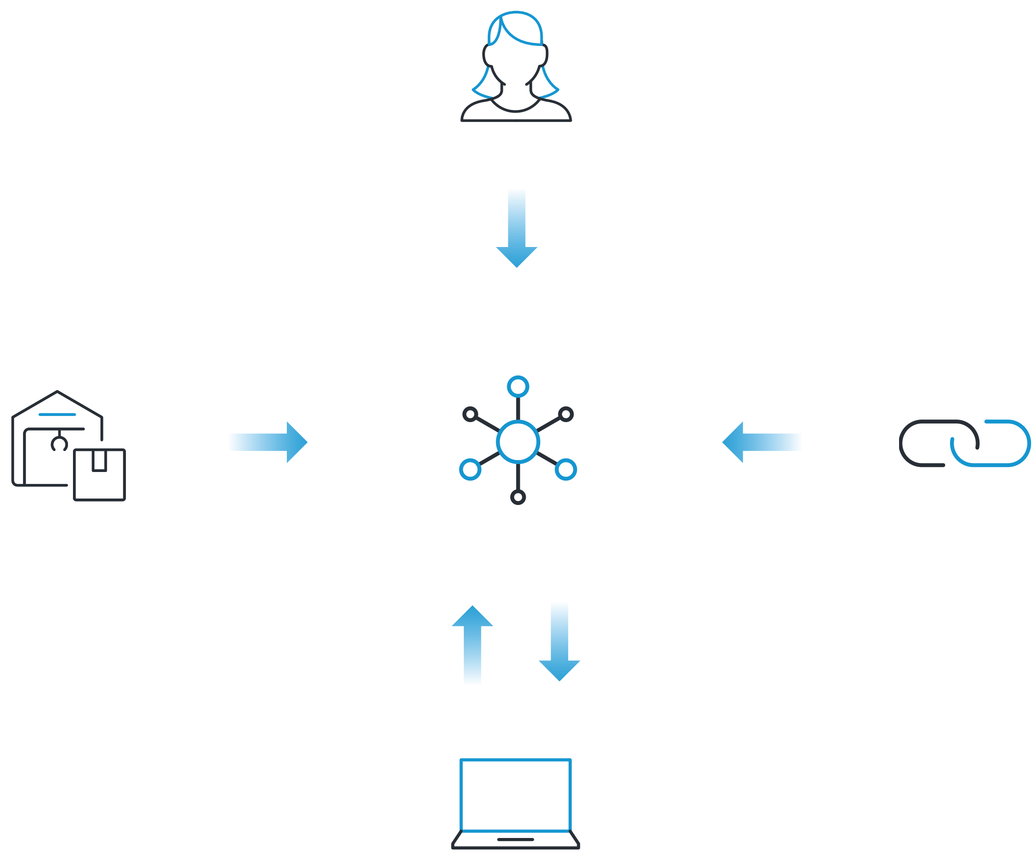
TECHNOLOGY DEEP-DIVE

Real-time location tracking systems (RTLS) enable proactive prevention of safety risks and operational inefficiencies. Rather than wait for issues to manifest themselves as collisions/accidents or missed shipments, it is possible to observe and react to trends that result in undesired outcomes. The data collected by location tracking, be it in context of forklift utilization or driver behavior provide insights that were previously unknown and allow for prevention of issues instead of reaction.

CEO.

Emily is the CEO of NI Corporation. Every morning, she logs into the company-wide KPI dashboard. In addition to Warehousing information, it displays key metrics including customer satisfaction, supply chain service levels, and employee performance. Positive trends are identified to highlight good company performance, while negative trends are emphasized to enable quick decision making and corrective action. Issues that used to take weeks or months to manifest themselves are identified before company performance is affected.

As Emily attends to the different KPIs, she drills down into the data behind the metrics. Based on this, she identifies the root cause of positive and negative trends. When required, Emily instructs members of her team to identify and execute required corrective action. As a follow-up, she evaluates the effectiveness of any corrective action that is taken.



TECHNOLOGY DEEP-DIVE

By combining Enterprise Resource Planning, Digital Supply Chain, and Internet of Things data, the CEO gets a holistic view of an entire company's operations. An integration platform is used to combine and contextualize data from different sources—the combination of which enable the advanced analytical insights that facilitate problem solving and decision-making. Analytics dashboards display information from different data sources and present it in such a way for users to gain deeper insights and make decisions based on available data.

Start your digital transformation with Westernacher.

Westernacher has been innovating business and IT for more than 50 years. We are successful in helping our customers with many different transformation initiatives by providing solutions for operational, organizational and technical issues:

- **Technical:** from implementing EWM, S/4HANA, SCE and other SAP solutions to developing custom ABAP and Fiori solutions.
- **Organizational:** supporting businesses in the transformation to becoming a merchandise focused retail organization. Providing an engaging vision and training to realize quick wins and removing (cultural) barriers.
- **Operational:** developing innovative business processes to make the most of the new technology and information. Improving KPIs and creating KPPs to move the company from a reactive stage to an orchestrating stage.

To provide you with a better understanding, we offer an Inspiration Day, where we show you what an IoT centered Industry 4.0 landscape looks like and how it might impact your company. This is achieved through demonstrations and by discussions with our IoT experts.

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