MODERN
MATERIALS HANDLING

MAKING THE CASE FOR
The Connected Distribution Center

The unrelenting pace and complexity of modern commerce are pushing distribution operations beyond the limits of their current capabilities. Here's how a connected distribution center provides a new level of digital transformation that increases reliability, reduces reliance on labor, improves utilization, and maximizes productivity.

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The Support Structure for Fulfillment's
Much-needed Digital Transformation

The boom in e-commerce, proliferation of SKUs, and packaging variability are all making it harder to run efficient fulfillment operations from traditional facilities that rely on manual processes.

CURRENTLY GROWING AT AN ANNUAL PACE OF 25 PERCENT, e-commerce and e-retail fulfillment are literally pushing traditional warehouses and distribution centers (DCs) to their limits. Add industry growth—which is outpacing labor pool availability by a 6:1 ratio—to the mix, plus the fact that 60 percent of supply chain jobs require skills that just 20 percent of the workforce possesses, and the challenges get even more complex.

The obstacles don't end there. SKU proliferation, flash promotions and seasonal offering variability are also introducing unprecedented complexities into fulfillment activities. With 50 percent of consumers saying that they won't go back to a business after a negative experience, and 73 percent promising *repeat business* after having a positive delivery experience, accurately and quickly fulfilling smaller orders across a wider swath of SKUs—all within shorter delivery time frames—is both relevant and necessary.

"Companies are under pressure from all sides," said Eric Harty, Honeywell Intelligrated's vice president of marketing. "The customers want everything fast and free. They want the ordered item to appear on their doorsteps as soon as they click 'buy.' The industry is challenged with figuring out how to balance shipping costs, labor costs, a lack of workers, and DC space that wasn't built to handle these pressures."

Put simply, distribution facilities that were built to orchestrate the movement of palleted goods weren't designed to manage single-item orders. Fast-forward to 2019. The amount of packaging variability that these operations are being asked to manage can range from a single tube of ChapStick® to a full pallet-load of generators—and everything in between.

"We're seeing a lot of variability in packaging type, materials, sizing, weights and shapes. They literally change daily," said Matt Wicks, Honeywell Intelligrated's vice president of product development. "The robotic and automation systems we're designing today are extremely flexible in nature and can adapt to those variations."

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>
> *— Eric Harty, vice president of marketing, Honeywell Intelligrated*

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72 PERCENT OF BUILDINGS ARE MORE THAN 20 YEARS OLD

As warehouse and DC operators across all industries grapple with capacity constraints and weigh tough decisions about whether to invest in the capital expansion of existing facilities or build new greenfield sites, their current operations are aging and becoming less useful. Considering that 72 percent of the nation's commercial buildings are more than 20 years old (and aging), retrofitting these facilities to bring them up to today's standards has become an ongoing imperative for many companies.

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>
> *— Eric Harty*

The problem is that most U.S. warehouses and DCs rely on legacy processes, systems and infrastructure that simply don't support efficient order picking and fulfillment processes. "We continue to see a lot of DCs that are manually operated in a world where, as consumer demands and complexities increase, automation becomes a necessity," said Harty. Eighty percent of DCs are manually operated, with little to no supporting automation.

"By creating a 'connected DC' where you have high levels of visibility over what's going on with your systems," said Harty, "companies can speed up operations without the need for additional human resources—something that manual and/or antiquated systems can't promise."

At the same time, competition in the retail space is getting fiercer. Retail and e-commerce players are all chasing after the same "wallet share" from the customers and vying for the same shrinking labor pool to run their DCs. And because labor costs directly impact cost per unit, more of them are turning to automation, robotics and advanced technologies to help augment their current resources and optimize their fulfillment operations.

THE NEED FOR GREATER CONNECTIVITY AND AUTOMATION

The current state of DC operations won't keep pace with the speed and complexity of modern e-commerce requirements.

U.S. ONLINE RETAIL GREW FASTER IN 2017 THAN IT HAS SINCE 2011

25%
E-COMMERCE AND E-RETAIL DISTRIBUTION VOLUME ANNUAL ACCELERATION

6:1
INDUSTRY GROWTH OUTPACES THE LABOR POOL BY A RATIO OF SIX TO ONE

60%
OF SUPPLY CHAIN JOBS REQUIRE SKILLS WHICH ONLY 20% OF THE WORKFORCE POSSESSES
— Supply chain jobs
— Qualified workforce

50%
OF CONSUMERS WILL NOT REPEAT BUSINESS AFTER A NEGATIVE EXPERIENCE

73%
OF CONSUMERS PROMISE REPEAT BUSINESS AFTER A POSITIVE DELIVERY

What's more, **LABOR COSTS ARE ON THE RISE**, and manual workers are **REACHING THE LIMITS** of their physical and cognitive abilities. Fulfilling the next generation of e-commerce expectations will require greater **DC CONNECTIVITY** and **AUTOMATION**.

"Everyone is looking at how they can drive down cost per unit when they're shipping products out the door," said Harty, "all while getting an accurate, dashboard view of exactly what's going on in their operations on a real-time basis."

IMPROVING UTILIZATION AND MAXIMIZING PRODUCTIVITY

Succeeding in today's complex fulfillment environment requires a connected, comprehensive approach to the management and execution of distribution, fulfillment and manufacturing operations. The Connected

Distribution Center by Honeywell Intelligrated is helping retailers of all sizes make the digital transformation from manual operations to highly automated processes that increase reliability, improve utilization, and maximize productivity.

In this Making the Case report, we explore effective solutions to these and other fulfillment challenges, show how companies are using The Connected Distribution Center to optimize their operations, and clearly outline the return on investment (ROI) that various operational and management roles will see from such initiatives.

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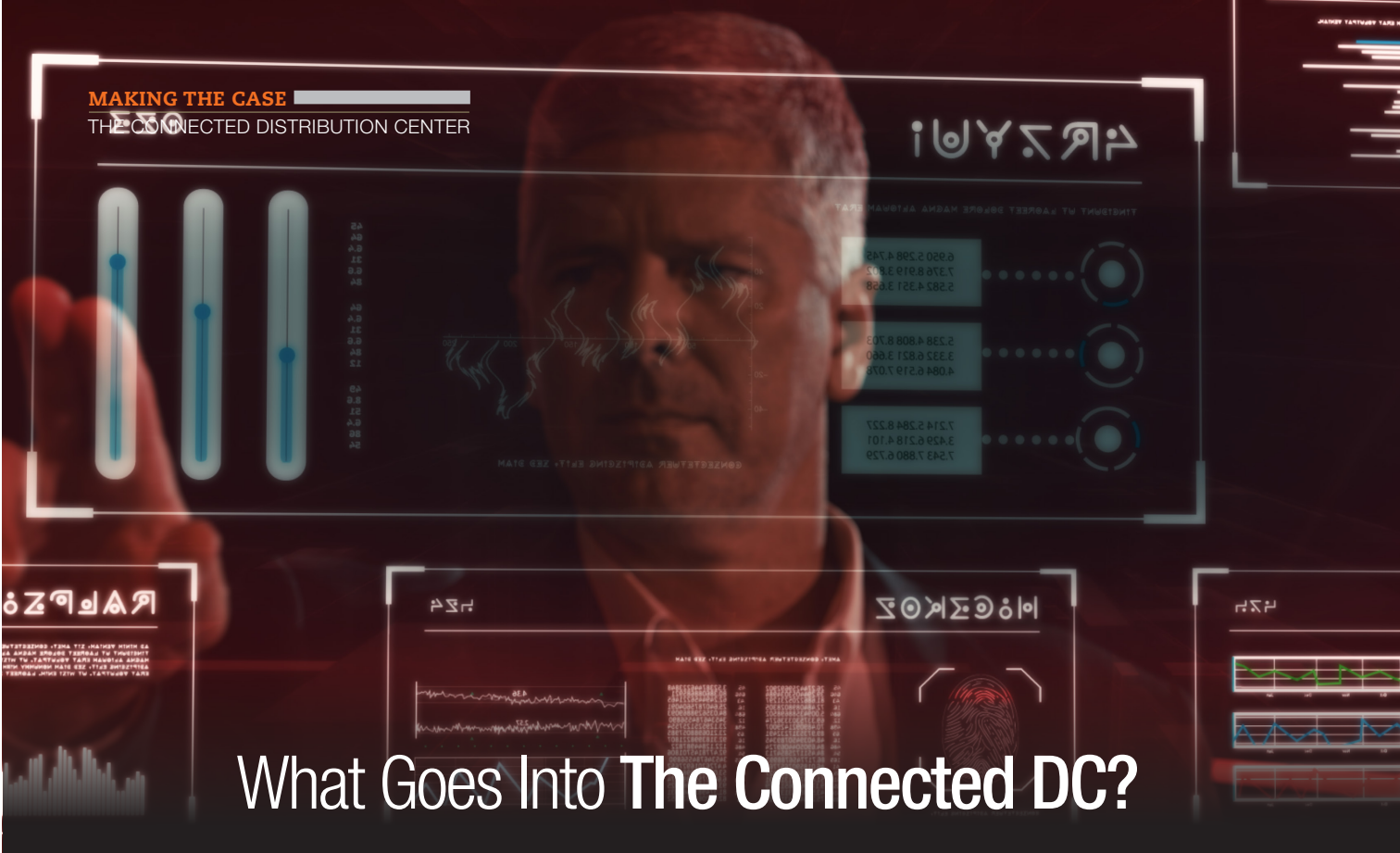
What Goes Into **The Connected DC?**

*A holistic solution that improves warehouse and DC operations from top to bottom,
The Connected Distribution Center relies on these enabling technologies.*

AS RETAILERS, DISTRIBUTORS AND
MANUFACTURERS embark on digital
transformation journeys designed to take their
operations out of the Dark Ages and into today's
connected fulfillment environment, many are
incorporating automation, robotics, the Industrial
Internet of Things (IIoT), predictive analytics and other
advanced technologies into their operations.

From machine-level sensors, smart controllers and
devices to workers, automation systems, robotics and
the cloud, The Connected Distribution Center provides
an accessible, end-to-end capability that connects
the operational assets contributing to DC productivity
and effectiveness. This helps companies of all sizes
and across all industries make the leap from manual
operation to highly automated processes that increase
reliability, improve utilization, and maximize productivity.

"The Connected Distribution Center lets companies collect
data and see what's ahead, instead of just being reactive," said
Joe Carelli, vice president and general manager for lifecycle
services at Honeywell Intelligrated. "It helps companies really
get in front of what's happening in their facilities and provides
high levels of visibility over the operation."

KEY ENABLING TECHNOLOGIES
A multipronged solution, The Connected Distribution Center
uses these key technology pieces to create a holistic solution:
Honeywell IIoT Platfom: This is the backbone of The
Connected Distribution Center's solutions that deliver
operational intelligence with data-driven insights to
help companies optimize facility management and
maintenance. This allows companies to capitalize on real-
time information, improve operational reliability, and reduce
operational expenses.

Honeywell Uniformance®: Analysis software that allows users to set asset limits, track trends, and determine asset issue criticality while providing in-depth details of trending conditions, letting them quickly identify asset and system performance anomalies.

Honeywell's Industrial Cyber Security Solutions: This component helps plants, distribution and fulfillment centers, and critical infrastructure sectors ensure the availability, reliability and safety of their industrial control systems (ICS) and plant operations. From assessments and audits to response and recovery, this solution leverages Honeywell's expertise and experience defending companies from threats to their cybersecurity.

Momentum™: A warehouse execution system (WES) that was purpose-built for modern retail challenges, Momentum offers unparalleled configurability, stability and extensibility to help organizations run, coordinate and manage their operations. Simplifying even the most complex fulfillment operations, this WES incorporates multiple warehouse functionalities into a common software platform and integrates seamlessly with The Connected Distribution Center.

Voice-directed Picking (Voice): The industry's preferred voice-picking technology for hands-free, eyes-up operation, delivering transformative productivity, accuracy and efficiency gains. This voice-directed picking solution integrates seamlessly with most enterprise resource planning (ERP) and warehouse management systems (WMS).

Robotics and Automation: Honeywell Intelligrated delivers advanced warehouse automation capabilities that require minimal human intervention. By leveraging the power of artificial intelligence (AI) and machine learning (ML), these robotic solutions support continuous improvement while deftly managing increasingly complex tasks, which include palletizing/depalletizing, truck unloading, each picking, sortation induction and mobile robotic point-to-point transportation.

Wicks, said that today's robotics that operate within the warehouse need to be built to handle a high degree of variability.

"Robotic systems have traditionally been optimized to solve very specific sets of SKUs. The variability seen in warehouses requires extreme flexibility and adaptability across a much wider range

of products," he said. A DC picking items that abruptly changes the shape of its packaging, for example, needs to be able to accommodate these changes or be able to quickly adapt to that dynamic environment.

Machine Vision is an enabling technology that is allowing robots to see what's happening on a DC floor. With the cost of sensors dropping—mainly due to the uptick in autonomous vehicle production—robotic systems that may have been excessively costly in the past are now much more affordable and accessible. This, in turn, is helping companies hit their return on investment (ROI) targets faster and making robotics feasible for a wider swath of companies.

BRINGING VISIBILITY TO NEW HEIGHTS

When they integrate, The Connected Distribution Center's enabling technologies create extremely high levels of visibility while supporting full usage of equipment within the four walls of a DC or warehouse.

"When you have all of the control data in front of you, you can use that intelligence to improve operation during production," Carelli explained. Using sensors installed on motors (i.e., to measure vibration, temperatures and currents), for example, operators can quickly assess, measure and act on equipment issues that would typically go unnoticed until a breakdown occurred.

These and other advantages help companies tackle some of the toughest fulfillment challenges that are being placed in front of them right now. "It's about avoiding downtime and missed shipments while driving down your cost per unit," said Eric Rice.

Once in place, The Connected Distribution Center provides users with intelligent, data-driven, high-speed execution; automated, adaptable processes for both machines and users; optimized utilization (with the ability to seamlessly adapt and expand); real-time alerts and notifications; and predictive analytics capabilities that extend from sensors to the cloud.

"When warehouse managers can quickly view KPIs, maintenance data and see what's actually going on with certain systems—those really detailed measurements," Rice continued, "they can predict when an asset is going to fail, mitigate the problem, and avoid the downtime that no one can afford to have right now."

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> *— Joe Carelli*

How The Connected Distribution Center Users Improve Performance and Minimize Downtime

By combining machinery, robots and software, The Connected Distribution Center is helping companies solve their most pressing fulfillment challenges in today's fast-paced distribution environment.

WHEN A LARGE RETAILER CALLED ON HONEYWELL INTELLIGRATED to help it solve its critical operational downtime challenges, Joe Carelli, knew The Connected Distribution Center would solve that company's problems.

"The company was really struggling with downtime," said Carelli. "It was really impacting their operations."

As a first step, the retailer focused on optimizing efficiency during the production process in order to minimize downtime. It's now installing sensors on its equipment and, in turn, cutting down on the amount of downtime associated with those machines. The company has already seen its operational uptime numbers jump to 99.97 percent in some cases. Now, it's rolling out The Connected Distribution Center across those operations.

Eric Rice, said that the system has been in place for about five months now, and that it's already producing results. For example, the company had several sortation systems that were about 10 years old and hadn't been rebuilt in a while.

"We went in and rebuilt those sorters and put an equipment monitoring package in place," said Rice. "We immediately noticed huge decreases in amp draw for the sorters, which is something companies don't always consider. That's a big ROI on power savings."

The Connected Distribution Center also monitors read rates and picks up on performance gaps at the main sortation system level. Instances were observed where the sorters were running with an 11 percent no-read rate and a 5 percent gap error rate. The system was basically not processing 16–17 percent of all cartons. "For a sorter that's running 300 cartons a minute, that's a lot of cartons which aren't getting to their destinations on time," Rice explained.

"The real magic happens when the software is able to capture and learn from events that occur. This allows the robotic system to improve the way it sees or on the decisions it makes, which results in improved actions and more successful operations."

— *Matt Wicks*
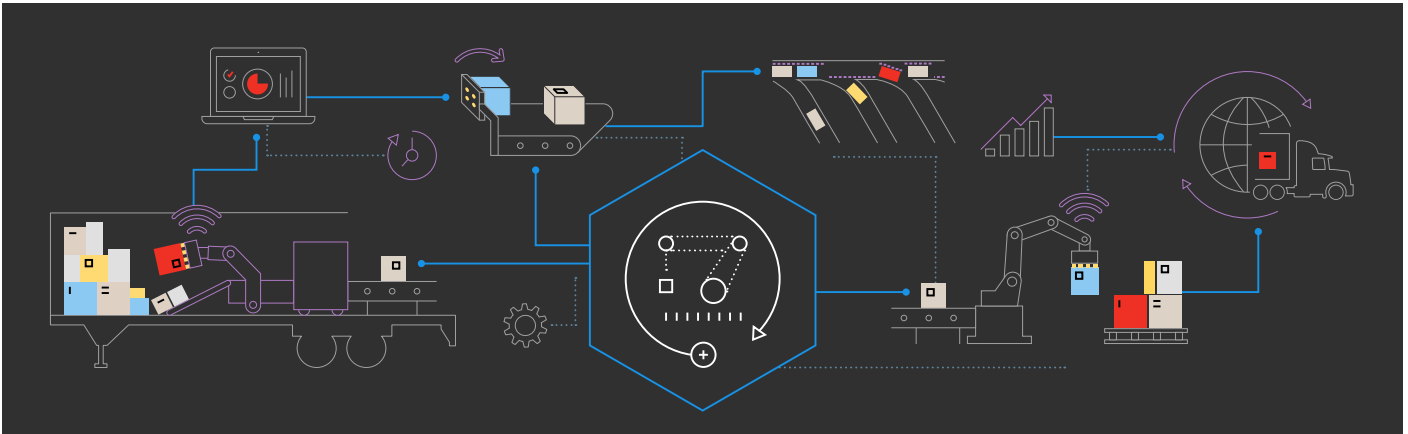
To help bring those numbers down by nearly 10 percent, Honeywell Intelligrated alerted the retailer to the problem and helped pinpoint the main culprit: a bad label printer and improper placement of cartons on the conveyor. "Those two basic issues translated into thousands of dollars every few hours spent having someone juggle those cartons around," said Rice, "trying to get stuff out the door."

On the robotics front, Wicks, saw an opportunity for improvement regarding improvements to how the machine sees, thinks and acts.

"It's not so much about the robot arm itself, or the physical ability of the machine," said Wicks. "The real magic happens when the software is able to capture and learn from events that occur. This allows the robotic system to improve the way it sees or on the decisions it makes, which results in improved actions and more successful operations."

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MAKING THE CASE FOR
The Connected Distribution Center

When companies use The Connected Distribution Center to streamline their warehouses and DCs, everyone wins.

FOR THE WAREHOUSE OR DC MANAGER: Having data at your fingertips is imperative for today's DC managers, who are tasked with making key decisions on the fly in an environment where a higher velocity of smaller shipments moves through their facilities on a daily basis. The manager of multiple DCs, for example, needs to know how all of the operations are doing and then coordinate that data for good, streamlined decision making.

When questions—such as, "Is this DC doing better than another one?" and "Why does this specific location have so much downtime?"—can be answered by simply glancing at a laptop, tablet or mobile phone, then issues can be addressed and performance levels maintained without the need for in-person visits, phone calls or emails.

The Connected Distribution Center can tell a warehouse manager how many jams per day are occurring in the facility and how long those issues will take to correct. For example, a repeat problem that creates one minute of downtime—but that's solved by an operator hitting a "reset" button every time—can turn into throughput issues that are never fully recognized for what they are.

"You'll think, 'Well great, we met our throughput requirement and here's our cost per unit. We did really well,'" said Harty. "What you didn't know was that the line was stopping every 15 minutes throughout the day."

By providing alerts that can be investigated and acted upon, The Connected Distribution Center helps companies avoid these costly, repetitive issues. "When you can proactively find hidden problems and figure out how to address them before the machine goes down," said Harty, "you can manage your system and overall operation much better."

Other common areas where the system uncovers utilization improvements include deteriorating system KPIs and critical path inefficiencies. "Using traditional systems, DC managers can't pull up reports and pinpoint issues in real time; they're doing it after the fact," said Harty. "That's what The Connected Distribution does. It gives them visibility in real time across one or more DCs, and then allows them to dig down into each DC."

Many times, this new level of visibility ferrets out problems that DC managers were unaware of, mainly because they lacked a holistic view of their operation. "When you add the totality together," said Harty, "that's when you really start to see issues and learn how to best address them."

FOR THE CFO: Consistent throughput is the key to maintaining profitability for companies that rely on efficient distribution and fulfillment operations. Even incremental throughput gains in an average DC can dramatically increase annual revenue.

In a facility that operates 5,200 hours per year, processes 300 cases per minute, and earns $10 in revenue per case, increasing output by 10 cartons per hour delivers the potential for more than $1M in annual gains:

- $720k in additional throughput revenue
- $330k in recovered labor costs from driving down common error rates

By monitoring real-time activities occurring in all fulfillment systems and processes, The Connected Distribution Center sends out notifications when a DC is not hitting its targeted throughput rates. It evaluates trending data to detect when systems are underutilized, uncovering the root causes for inefficiencies and revealing error conditions.

This helps operators make the necessary adjustments to improve these conditions and ensures a consistent, predictable experience across the entire fulfillment operation—all of which are music to a CFO's ears.

"When you put The Connected Distribution Center in place, you can optimize your existing systems and recognize potential savings that you didn't even know you had," said Harty. Armed with real-time labor and productivity data, for example, companies can make better use of expensive human resources, more efficiently meet targeted metrics and KPIs, and ultimately drive down the cost per unit on orders.

FOR THE CEO: Tasked with maximizing productivity and operational efficiencies, CEOs understand the value of improving performance while reducing downtime. Offering intelligent, data-driven, high-speed execution that maximizes throughput; automated, adaptable processes for both machines and workers; and access to actionable intelligence, The Connected Distribution Center helps CEOs get the highest level of production out of their existing assets.

Considered the most expensive part of running a fulfilment operation, labor is one area where the Connected Distribution Center can have a significant impact. Finding, training and retaining qualified employees are among the most common problems that plague DC operators right now. According to the Bureau of Labor Statistics, the estimated annual employee turnover rate in the warehouse sector is 40 percent.

The Connected Distribution Center can help reduce employee turnover by 10 percent and deliver $420,000 in annual cost reduction pertaining to labor. By analyzing labor activity data, the system can detect changes in resource behavior that indicate issues in job satisfaction and an increased probability of leaving.

THE CONNECTED DISTRIBUTION CENTER can help reduce employee turnover by **10%** delivering **$420,000** in annual **COST REDUCTION** pertaining to labor
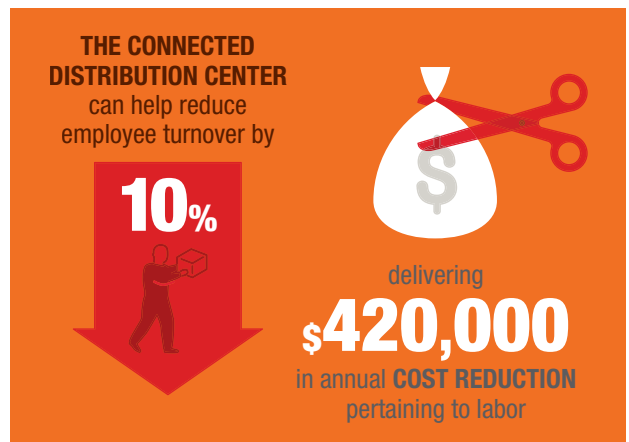
Using a proprietary data model, the system examines the large and small changes in performance, time utilization, and a host of other metrics to determine the risk of attrition. As such, it's able to predict walk-offs within two weeks, and with an accuracy rate greater than 80 percent, allowing supervisors to determine the best course of action.

So, in an average DC staffed with 400 direct labor resources across three shifts, and a loaded wage of $15 per hour, a 10 percent attrition reduction can save the operation $420,000 annually.

"We're seeing a big push to do more things digitally, and The Connected Distribution Center allows the sharing of data across multiple organizational levels—from the warehouse manager to the vice president of supply chain to the CFO and CEO," said Harty. "Because they're getting the information faster, they can react quicker and make decisions that help their companies run more profitably."

Honeywell Intelligrated®

Make Your Digital Transformation Today
With The Connected Distribution Center

DID YOU KNOW THAT COMPANIES that use predictive maintenance in their DCs can save more than $1 million annually in maintenance and downtime costs? By moving from a reactive, calendar-based model to a predictive, condition-based approach, The Connected Distribution Center is helping them run their operations with more visibility and control, reducing downtime incidents and lowering maintenance costs.

This predictive approach delivers process and maintenance improvements that can quickly add up:

- $170k annual labor savings from reducing downtime by 40 percent
- $40k annual maintenance savings from cutting preventive maintenance spend by 20–35 percent
- $140k annual inventory savings from a 30 percent reduction in spare parts and a 20 percent inventory reduction
- Net annual savings of $350k

With The Connected Distribution Center, teams receive alerts when the system detects trends or conditions that indicate potential asset issues. Then, DC managers can access detailed information on what needs attention (e.g., increased motor vibration or decreased sorter rates) and thus prioritize accordingly—either responding quickly to avoid downtime or scheduling maintenance for less pressing concerns.

Of course, predictive maintenance is just one of many areas where The Connected Distribution Center shines. As you've read in this report, the solution is helping companies address today's key fulfillment challenges while keeping an eye toward the future. It's also helping companies rise to the challenges of modern commerce by beginning the digital transformation from manual processes to advanced automation.

The Connected Distribution Center is also helping companies prepare for a more connected future. On each day that the system accumulates data, for example, the potential for greater insights grows. Then, as intelligent

machine learning algorithms are applied to that historic data, the technology detects patterns of performance and asset fitness to enable the fine-tuning of DC operations in real time.
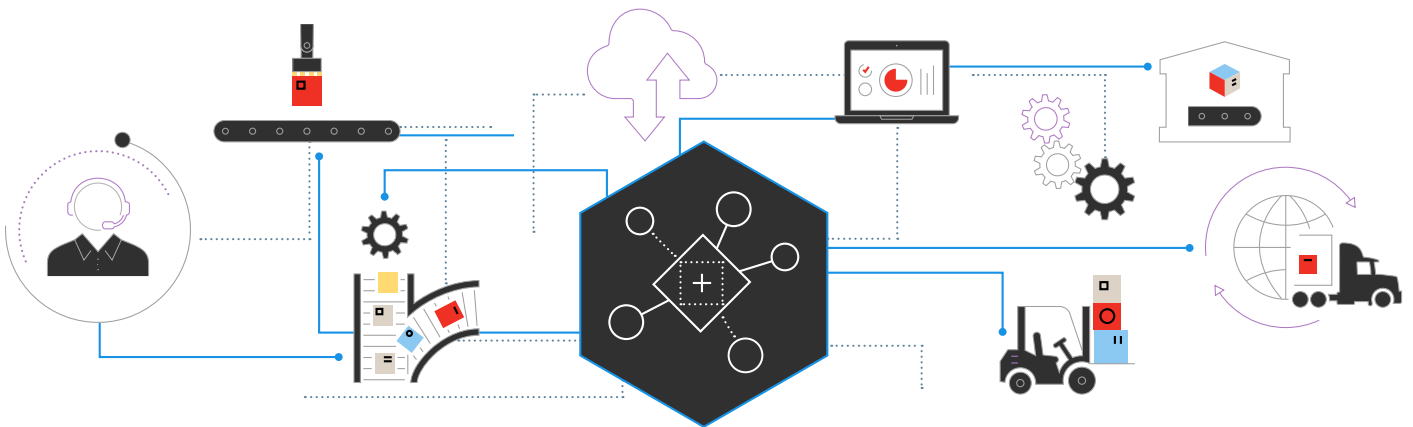
"With this solution, we're offering the end-to-end visibility of industrial data, DC data and other critical pieces of information," said Eric Rice. "This, in turn, translates into higher productivity rates, reduced errors, better labor utilization and many other wins."

And as companies create higher levels of visibility and more knowledge over what their systems are doing, they're making even more educated decisions about their operations.

"The world of distribution is only getting more complex," said Rice, "and The Connected Distribution Center gives you the intelligence that you need to learn that complexity, and then react to it in a very cost-effective way."

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