THE CONNECTED
DISTRIBUTION
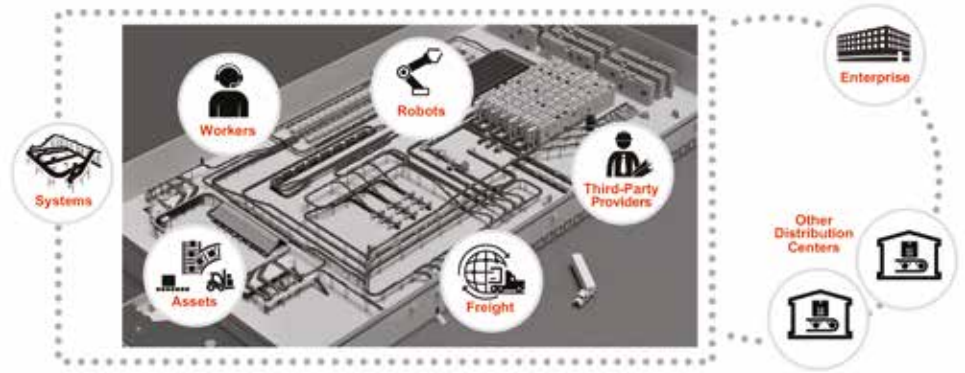# CENTER

Honeywell

Intelligrated

ARE YOU MANAGING TODAY'S FULFILLMENT CHALLENGES?

The unrelenting pace and complexity of modern commerce are pushing distribution, fulfillment and manufacturing operations beyond the limits of their current capabilities. Retailers must not only contend with the ever-increasing speed and volume of online transactions; they're also in a never-ending struggle to meet rising consumer expectations for faster delivery and order accuracy. SKU proliferation, flash promotions and seasonal offering variability are introducing unprecedented complexities into fulfillment activities.

All these factors chip away at retailer profit margins and reveal a need for greater distribution center (DC) efficiencies. The reality is that 80 percent of DCs are manually operated with little to no supporting automation. With industry growth outpacing the labor pool at a rate of six to one, DC operators simply don't have access to the resources they need; even if they did, manual labor alone can't address the extent of their fulfillment challenges.

It seems that everywhere DC operators look, they're experiencing capacity constraints and weighing tough decisions about whether to invest in the capital expansion of existing facilities or build new systems.

If these challenges sound familiar, then The Connected Distribution Center is for you.

ENTER THE CONNECTED DISTRIBUTION CENTER

Succeeding in this complex 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 operation to highly automated processes that increase reliability, improve utilization and maximize productivity.

The Connected Distribution Center Delivers

- Intelligent, data-driven, high-speed execution to maximize throughput
- Automated, adaptable and flexible processes for machines and workers
- Future-proof scalability with the ability to seamlessly expand and adapt
- Access to actionable intelligence via real-time and historic insights, predictive analytics and machine learning

How It Works

From machine-level sensors, smart controllers and devices to workers, automation systems, robotics and the cloud, The Connected Distribution Center provides an end-to-end capability that connects the operational assets contributing to DC productivity and effectiveness.

- Aggregating data from all inputs to deliver vital information on asset health and facility performance in real time
- Driving efficiency and optimized decision-making through unparalleled visibility and agility, from a single asset to the entire enterprise
- Enabling optimal DC utilization by unlocking the hidden potential of existing facilities
- Scaling to solve business expansion challenges

ENABLING TECHNOLOGIES

Honeywell Forge — The Honeywell Forge industrial internet of things (IIoT) platform is the backbone of The Connected Distribution Center's solutions. Forge delivers operational intelligence with data-driven insights to help companies optimize facility management and maintenance. Combined with The Connected Distribution Center, Forge allows you to:

- Capitalize on real-time information to holistically manage, control and accelerate every aspect of your operation, within individual facilities and across the enterprise

- Improve operational reliability by preventing and predicting equipment failure

- Reduce operational expenses while delivering the highest customer service levels

- Connect to a full suite of Honeywell logistics services with package tracking and condition monitoring capabilities to reduce product loss and waste throughout the supply chain

Cybersecurity — Honeywell's Industrial Cybersecurity Solutions 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, our portfolio leverages Honeywell's expertise and experience defending companies from threats to their cyber security:

- Delivered more than 1,000 projects globally

- Certified experts to improve your cyber security posture

- Designed specifically for mission-critical DC operations

Momentum™ — Momentum is a software suite of products for warehouse execution functionality that is purpose-built for

modern retail challenges, offering unparalleled configurability, stability and extensibility to help you run, coordinate and manage your operations the way you know best. Momentum simplifies complex fulfillment operations by incorporating multiple warehouse functionalities into a common software platform. Its seamless integration with The Connected Distribution Center gives you real-time order fulfillment status and greater visibility to in-process work for:

- Maximum fulfillment flexibility

- Improved equipment and space utilization

- Increased throughput and labor productivity

Honeywell Voice — Honeywell Voice is the industry's preferred voice-picking technology for hands-free, eyes-up operation, delivering transformative productivity, accuracy and efficiency gains in critical fulfillment operations:

- Seamless integration with most ERP and WMS systems

- Accelerated training and on-boarding

- Improved workplace safety

Honeywell Robotics — Honeywell Robotics solutions from Honeywell Intelligrated deliver advanced warehouse automation capabilities, which require nominal human intervention. Our robotics leverage the power of artificial intelligence and machine learning for continuous improvement and the adaptability to handle increasingly complex tasks. Robotics application examples include:

- Each picking and product induction

- Driverless, point-to-point load transportation

- Palletizing via robotic arm and gripper

- Robotic unloading

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.
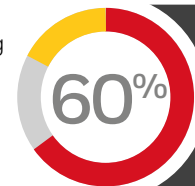
U.S. online retail grew faster in 2017 than it has at any point since 2011

E-commerce and e-retail distribution volume is accelerating 25 percent annually
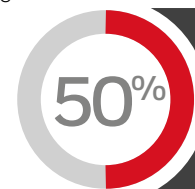
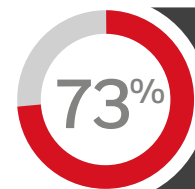**6:1** **Industry growth outpaces the labor pool by a ratio of six to one**

60% **of supply chain jobs require skills which only 20% of the workforce possess**
- ■ 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.

PROVING THE CASE FOR
THE CONNECTED DISTRIBUTION CENTER

INCREASE ASSET RELIABILITY WITH PREDICTIVE MAINTENANCE

By moving from a reactive, calendar-based model to a predictive, condition-based approach, we believe that the average DC has the potential to significantly reduce its annual maintenance and downtime costs. You can see how this predictive approach can quickly add up to $350k in annual benefits:

- $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

With The Connected Distribution Center, your teams receive alerts when the system detects trends or conditions that indicate potential asset failure, such as: increased motor vibration, decreased sorter rates and excessive power consumption. Then, you can access detailed asset condition information and respond quickly to avoid downtime.

UNCOVER DC UTILIZATION IMPROVEMENTS

Consistent throughput is the key to maintaining profitability. We believe that even incremental throughput improvements can achieve labor savings and revenue gains. In a typical 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 notifies you when your systems are underutilized and helps you uncover the root causes for inefficiencies. For example, operators can learn how many jams per day are occurring, how long they'll take to correct, and how much additional runtime is required to meet throughput targets.

CORE APPLICATIONS

The Connected Distribution Center employs user-friendly mobile apps and data visualization software to help end users manage their operations.

Pulse — Trends and Alerts

Asset Sentinel — Asset Performance Management

Insight — Control Panel and Ambient Conditions

- *Pulse — mobile device app that alerts users of system-level trends and out-of-tolerance conditions based on user-defined parameters*

- *Uniformance Asset Sentinel — management tool that allows users to set asset limits, visualize trends, and determine issue criticality*

- *Uniformance Insight — analysis software that provides in-depth details of trending conditions; allows users to visualize baseline asset performance and quickly identify performance anomalies*

THE CONNECTED DISTRIBUTION CENTER | CONNECTED ASSETS DATA FLOW INFRASTRUCTURE
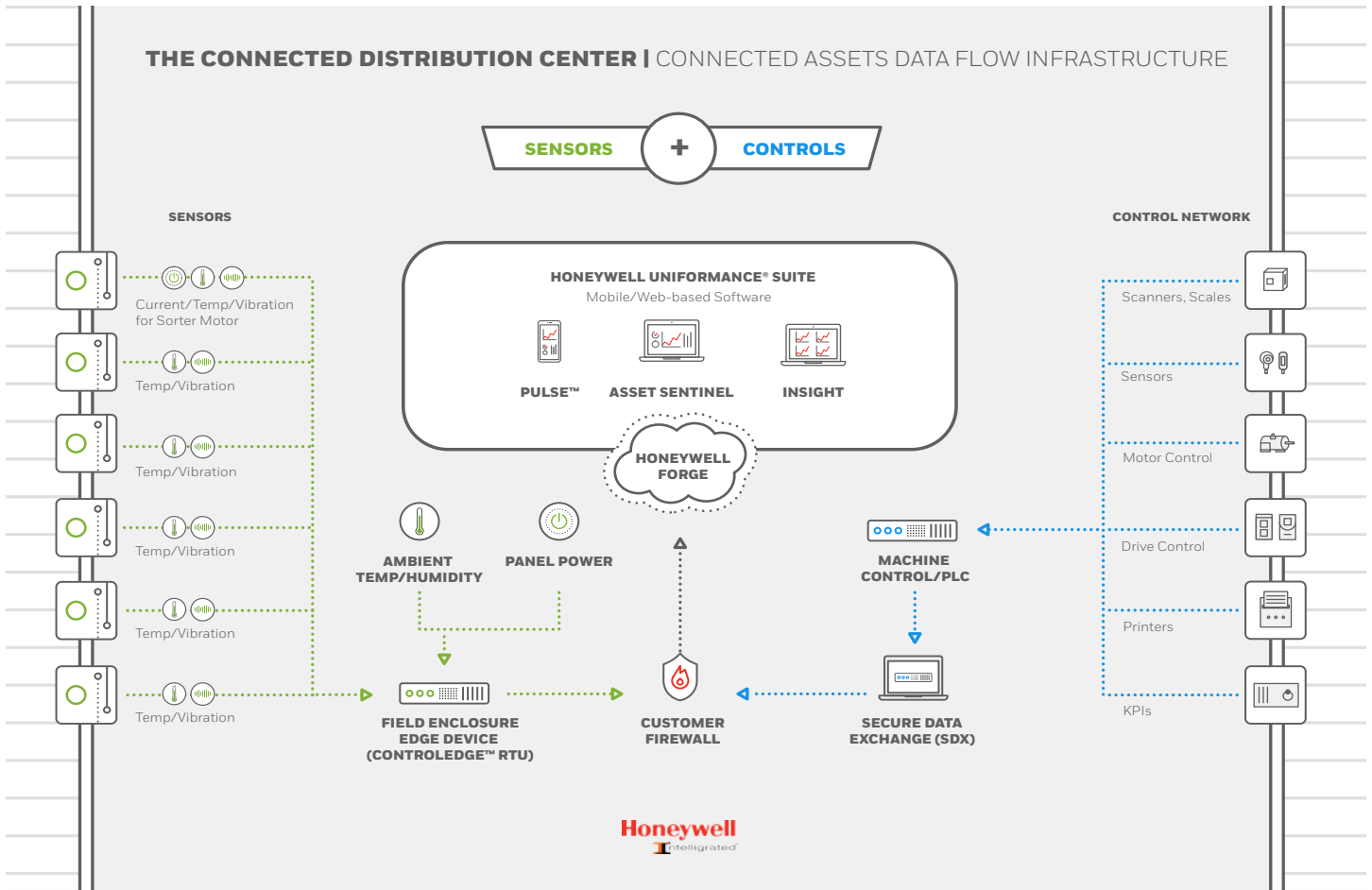
REDUCE ATTRITION, MAXIMIZE PRODUCTIVITY

Finding, training and retaining qualified employees are among the most common problems that plague DC operators. The Connected Distribution Center utilizes a patented labor management algorithm to detect changes in resource behavior that could indicate job dissatisfaction and an increased probability of leaving — at an 80 percent accuracy rate.

We've seen the system deliver a 10 percent attrition reduction that can save an operation up to $420k annually — based on a DC staffed with 400 direct labor resources across three shifts, and a loaded wage of $15 per hour. This insight allows supervisors to determine the best courses of action:

- Intervene with the appropriate employee engagement model

- Take the necessary steps needed to retain key employees

- Proactively replace at-risk employees to limit production impacts

IMPROVE PRODUCTION PROCESSES — MANUFACTURING

Facility managers are always seeking ways to leverage automated palletizing equipment for increased productivity in end-of-line manufacturing environments. The Connected Distribution Center provides the real-time monitoring, diagnostics and asset-level insights to help them increase palletizer reliability and improve utilization.

By continually monitoring palletizer run times, The Connected Distribution Center detects when equipment is underutilized and gives facility managers visibility into:

- Daily throughput status
- Machine performance trends per SKU
- Barriers to palletizer productivity

Armed with this information, facility managers can quickly resolve palletizer issues, increase throughput rates, and reduce idle time.

YOUR FOUNDATION FOR GREATER AUTONOMY

At Honeywell Intelligrated, we designed The Connected Distribution Center to help you address today's challenges while keeping an eye toward the future. We've seen how connecting DC operations delivers immediate reliability, utilization and productivity gains. We're helping companies rise to the challenges of modern commerce by beginning the digital transformation from manual processes to advanced automation.

But we've also engineered The Connected Distribution Center to help you prepare for a more connected future. On each day that the system accumulates data, the potential for greater insights grows. As intelligent machine learning algorithms are applied to historic data, this technology will be used to detect patterns of performance and asset fitness to enable the fine-tuning of DC operations in real time.

It all starts by making the digital transformation today with The Connected Distribution Center.

For more information on Honeywell Intelligrated The Connected Distribution Center, visit **www.intelligrated.com.**
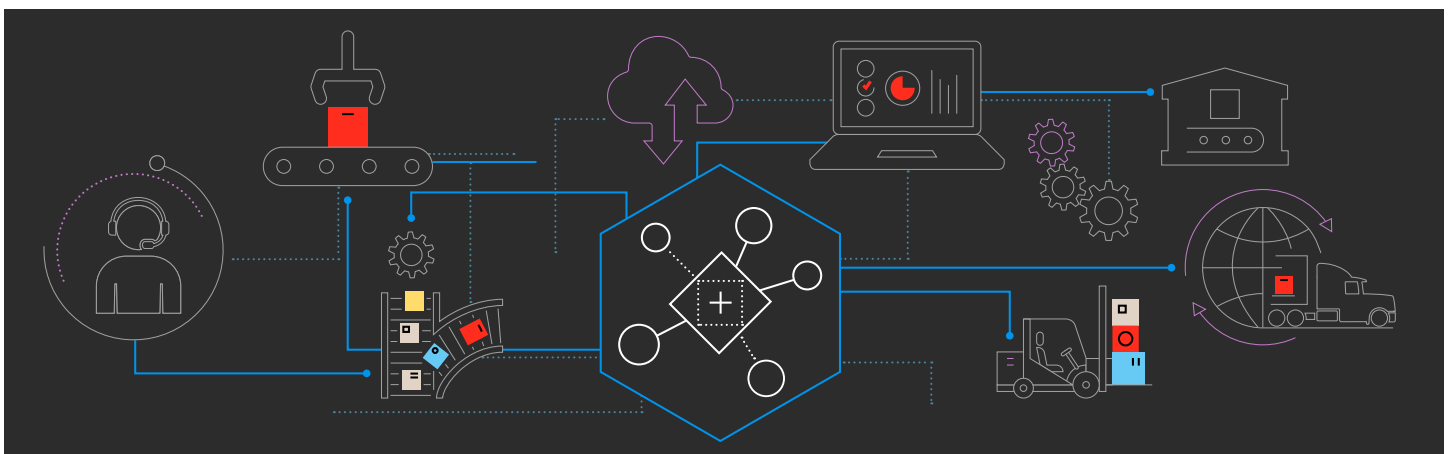
DETECT. PREEMPT. PREDICT.
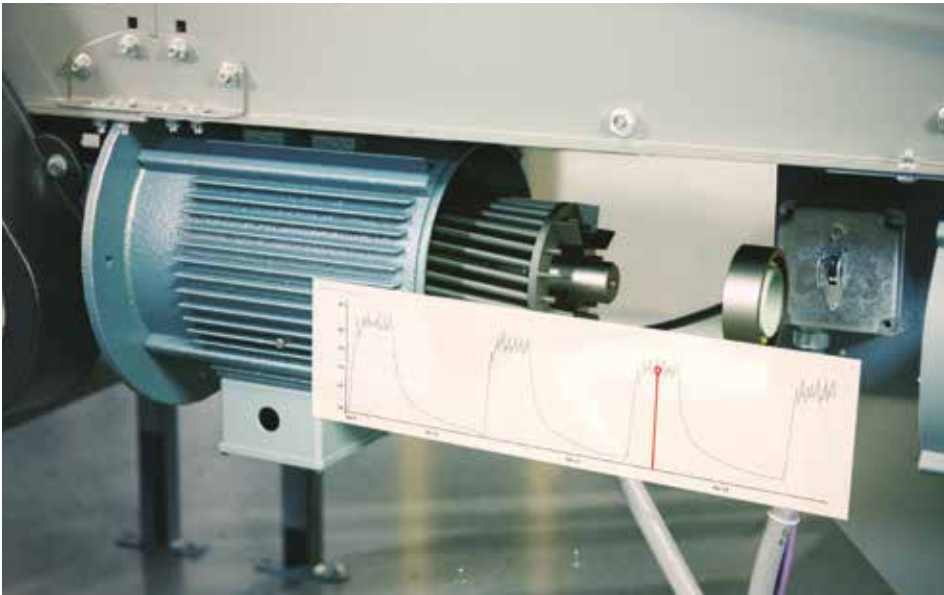
CONNECTED ASSETS — SORTATION

Take Control of Outbound Sortation Systems

Minimizing unplanned downtime in outbound sortation systems is essential to maintaining successful order fulfillment operations. Our Connected Assets offering builds upon The Connected Distribution Center's infrastructure to help you keep this critical function running at peak productivity levels. By connecting the control systems of line sorters, scanners, merge and transportation conveyors, Connected Assets allows you to monitor system status and throughput performance in real time:

- Mobile alerts of fault conditions via the Pulse app
- Dashboards of affected systems and sub-systems
- Trending graphs for easy visualization

Turn Information Into Actionable Insights

The addition of machine-level sensors on key equipment — such as motor gearboxes and control panels — gives enterprise managers and DC operators the tools to unlock the platform's full potential for performance and uptime improvements. By connecting assets on the outbound sortation system, the system delivers actionable insights into the following key performance indicators (KPIs):

- Motor temperature, vibration and current draw
- Scanner read rates and sortation performance indicators
- Flow balance of the main merge point

Preempt and Predict

As the platform accumulates data on each of these systems, sub-systems and KPIs, it's able to develop trending information on performance and asset health. Enterprise managers and DC operators can leverage these historic and real-time insights to preempt and predict equipment failures. Connected Assets utilizes the power of deep data analytics and intuitive software to help operators detect and resolve a variety of issues:

- Sortation scanner misreads and "bad gaps" that overload recirculation conveyors
- Excessive conveyor motor vibration, indicating imminent failure
- Inefficient, manual activation/deactivation of merge lanes

Drive Revenue Gains

By uncovering these previously hidden operational insights, Connected Assets helps DC operators limit unplanned downtime, maximize throughput, and improve utilization in their outbound sortation systems. Over the course of a year, these improvements drive significant revenue gains by lowering costs per case shipped and reducing labor expenditures.

But this outbound sortation system is just one of the many areas where enterprise managers and operators can utilize connected assets in the DC. As you integrate additional systems within The Connected Distribution Center data platform, you can expect ever-increasing asset reliability and performance gains in your operations.

THE
FUTURE
IS
WHAT
WE
MAKE IT

Honeywell
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