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Why Your Warehouse Needs an OT Network to Meet Future Demands: It's Now or Never

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When it comes to the most "digitized" or "industrialized" sector of manufacturing and logistics, material handling falls to the bottom of the list. Although automation is often deployed in distribution centers and fulfillment operations, its functionality is fairly basic.

Up until this point, this lack of digital transformation in material handling has been understandable for many reasons.

Because material handling is often considered a cost center, leaders aim to reduce costs whenever and wherever possible. The market also typically sees slim profit margins and cost-sensitive competition, which makes leaders even more cautious about technology adoption. Will it pay off?

Although it's a simplified description, material handling involves the process of moving cardboard boxes and packages from point A to point B in a timely manner—it's not considered a true industrial production facility. Because of this, it's also considered less complicated than other sectors of the industry. Many leaders assume that a lower level of complexity means that technology isn't necessary or beneficial.

As a result, the vast majority of warehouses still lack dedicated OT networks because corporate initiatives simply don't focus on them as a priority. Instead, warehouse operations rely on IT networks. Operational decisions are often made in corporate settings that may be several cities or states away from the warehouse floor.

For years, this approach has worked well enough. Warehouses have been able to get by without dedicated OT networks. There hasn't been much automation to manage, and teams have been able to limp along with current processes. But what about now?

Change is coming—and fast. As the rise of e-commerce, tight labor markets, high real estate costs and increasing demand for speedier delivery are pushing warehouses to explore new technologies like autonomous robots, automated inventory identification systems and artificial intelligence, it's only a matter of time before warehouses will need OT networks to function.

Your material handling processes and systems can make the difference between success and failure for your customers. The work you do—and how you do it—matters now more than ever to ensure operational efficiency and positive customer experiences during last-mile delivery.

The Differences Between IT and OT Networks

If your warehouse floor still runs on an IT network, you may not realize the differences between an IT network and an OT network. After all, a network is a network—right? Not necessarily.

An OT network keeps your warehouse running smoothly, while an IT network keeps business applications operational.

What Is an IT Network?

IT networks support front-end business activities and involve the use of computers for information processing and management. They're designed to monitor, manage and secure information involving core enterprise functions and applications, such as email, enterprise software, accounting, sales, marketing, IT and HR, for business and management in the data center and/or cloud.

To meet the changing needs of users and applications, IT networks and the devices that connect to them are frequently updated and reprogrammed.

What Is an OT Network?

OT networks manage back-end business activities and support the devices, processes and infrastructure in industrial settings.

They're designed to connect, monitor, manage and secure the information that controls physical equipment processes. This includes real-time data processing and controlling physical access to devices for floor operations and warehouse management.

OT networks support applications like robots and cobots, control systems, your manufacturing execution system (MES) or scheduling system, SCADA software and CNC machines. Because these industrial systems aren't updated or upgraded as frequently as those managed by IT systems, OT networks remain more static than IT networks.

While it's important to understand the differences between IT and OT networks, it's also critical to realize that establishing a separate OT network and IT network doesn't mean the two should never interact. In fact, establishing the right level of convergence between OT and IT empowers the networks to function individually but also collaborate when it makes sense.

For example, OT data can be ingested and analyzed in conjunction with existing IT data to do many things:

- Reduce operating costs
- Pinpoint production issues so they can be addressed
- Scale production up or down as needed
- Optimize machine performance and maintenance
- Support real-time asset tracking

In an integrated environment, the IT department can help leaders understand the story behind OT data by tying that information to metrics like revenue, customer satisfaction and profit margins.

The Benefits of Deploying an OT Network in Your Material Handling Facility

Deploying a dedicated OT network can connect your warehouse to new opportunities. As your warehouse prepares to explore new possibilities enabled by automation technologies and workflows, there's never been a better time to take advantage of them.

Here are some examples of what you can achieve by implementing a dedicated OT network in your warehouse.

1. Gains in Operational Efficiency

Having a dedicated OT network gives your organization the ability to leverage even more automation technologies to support faster deliveries, reduce waste and optimize resources.

In other words, an OT network helps you control the physical operations of your warehouse because it's designed for your warehouse's specific processes, culture and outcomes.

Sensors, equipment and automated devices, as well as asset management, MES and other systems, can use the OT network to transmit the data they collect so it can be analyzed per device and holistically to reduce downtime and make adjustments to improve production.

To optimize uptime and repair costs, this information can also be used to enable predictive maintenance, which tracks when routine maintenance needs to be performed based on equipment monitoring instead of performing maintenance only after an issue arises. These operational efficiency gains not only reduce costs, but also maximize lean labor resources.

2. A Potential Increase in Revenue Capture

The performance of your warehouse's operational technology is what ultimately determines whether you gain or lose revenue.

If your operational processes and systems are streamlined and allow materials to flow quickly, then you can increase revenue by lowering costs and reducing total production time. If your operational processes and systems are slow, then revenue suffers.

A dedicated OT network can capture valuable data points, such as temperature, vibration and energy use—all clues to help uncover inefficiencies so you can better understand how equipment and processes are working and make adjustments to improve operations.

These improvements help you increase revenue capture and boost profits.

3. Better Cybersecurity Posture

Establishing an OT network provides better protection against the consequences of cyberattacks. By separating IT and OT, you decrease your organization's potential attack surface by reducing the number of access points to the network.

If a threat actor gains access to the IT network, for example, they won't have access to the OT network or operations—and vice versa. If a back-office employee unknowingly opens and responds to a phishing email that installs malware on their computer and spreads it across the entire IT network, that malware stays contained to the IT network. Despite IT network interruptions, your team's work on the floor can continue.

Running a separate IT and OT network also lets you grant workers and third parties access only to the parts of the network they need. For example, service contractors only require access to perform equipment maintenance and monitoring. They don't need access to your IT network or data!

The two networks can also be monitored more efficiently, eliminating unnecessary traffic and making it easier to pinpoint unusual behavior on the OT network that may indicate malice, such as unusual increases in network activity, multiple repeated failed access attempts or unrecognized logins.

4. The Ability to "Sync" with IT to Extract Value from Data

As we mentioned earlier, creating an OT network doesn't mean that IT and OT must always run separately. IT-OT convergence allows the two to come together when necessary, supporting data flow between production automation and enterprise information systems.

When they're connected to the right tools and equipment, OT networks can help you acquire and transmit large amounts of data. Then, relevant data from an OT system can be sent back to the IT network for monitoring and analysis purposes. What it discovers can be passed back to OT to enhance quality and accuracy, improve maintenance and increase uptime.

Consider some of the online suppliers you work with, for example. In many instances, they're requesting that more information be printed on products and packaging. Some of this data lives with OT in warehouse management systems, but some lives with IT in an ERP system. To provide the data these suppliers need, IT and OT data must be able to collaborate.

5. Real-Time Visibility into Key Metrics and KPIs

If you want to improve performance, you must start by measuring it. An OT network provides the backbone to drive efficiency and reach your targets. It gives you a way to gain real-time visibility into critical infrastructure to detect anomalies, vulnerabilities and equipment failure so you can take action to prevent disruption.

When an anomaly, vulnerability or failure does occur, it allows you to quickly gather data about the event, whether it involves network traffic, system logs or equipment behavior, so it can be analyzed to determine corrective action.

Tracking and analyzing data about accuracy, reliability and costs can help you manage inventory shrinkage, order rate, cycle time, inventory carrying costs, accuracy rate, picking accuracy, lead time and many other metrics and KPIs.

6. Happier IT (and OT) Teams

Before you know how to use and manage OT systems and networks, training is necessary.

When OT data moves through the IT network, this puts additional strain and stress on the IT team. They aren't trained or educated on how to use or manage OT systems or networks.

But when the data generated on the plant floor flows through the IT network, it automatically becomes their concern, along with how to best manage the network and systems to support it—even though this isn't their area of expertise.

Creating a dedicated OT network lets IT focus on IT systems and OT focus on OT systems while also working together so that both sides can make the most of the data these systems present.

The Power of an OT Network: An Example in Action

We've seen many material handling environments suffer real consequences when they don't have a robust, dedicated OT network in place.

For example, after a Fortune 500 industry supply company opened a new distribution center, it immediately began experiencing network failures multiple times every day—even though the company was operating at only 20% capacity.

The cost of this network downtime was adding up fast: Automation platforms didn't work, so employees had to fulfill orders by hand, which slowed down deliveries and negatively impacted the customer experience.

To keep up with demand, the distribution center needed to ramp up capacity to 100%. With these ongoing network problems, however, the company knew its facility couldn't handle the increase.

Belden's team of experts led a thorough network assessment to find out what was going on—and find ways to fix the problem. The analysis revealed that the network infrastructure created an environment that breeds downtime and operational challenges. Its flat design contributed to suboptimal network and component performance and magnified network-related outages.

Because IT and OT devices were connected to a single network, with no segmentation between the two areas, devices had to constantly contend with irrelevant network traffic. There was no network monitoring in place, so OT teams were unable to quickly detect or address network issues, resulting in disruptions and downtime.

By connecting IT devices to an IT network and OT devices to an OT network, and segmenting the network into smaller, more manageable subnets by control area, the company could improve overall network performance, limit unnecessary traffic, improve its security posture and contain network outages when they occur. To further prevent downtime, a properly segmented network with consistent configuration settings would also eliminate traffic floods to unrelated sections of the network.

By following these recommendations, the company's new distribution center reliably and safely fast-tracked its path to 100% capacity without continued network downtime.

Get the Support You Need on Your OT Network Journey

Most organizations don't have in-house resources to tackle the design and deployment of an OT network.

Belden's in-house team of digital automation and solution consultants has decades of combined experience in industrial automation and material handling environments, so we understand the challenges you encounter—and the impact it would make on your revenue if these obstacles could be eliminated.

We will work closely with you to craft a tailored, step-by-step process to design and deploy an OT network that works for your unique material handling environment. We do this by:

- Helping you identify your goals

- Conducting assessments and analyses of what we see and hear

- Presenting what we uncover, how to address network issues and expected ROI after making suggested changes

- Making recommendations on how and where to get started when you're ready

Together, we can create a blueprint that acts as your guide to achieving your material handling KPIs and requirements—and helps you increase revenue while reducing costs.

This blueprint isn't an impossible plan. Instead, it's a practical roadmap full of solid strategies to overcome challenges like aggregating data from different systems and enabling remote monitoring so that, no matter where you are, you'll know the status of your facility operations in real-time.

In this industry, leaders perform better than followers. We'll help you stay ahead of the competition by designing and deploying your OT network. Visit belden.com/markets/material-handling to learn more, and then contact one of our material handling experts.

Benchmarking Your Warehouse's Automation Capabilities

Leaders perform better than followers. Do you know what other warehouses are planning?

According to Modern Materials Handling magazine's 2023 Annual Warehouse and Distribution Center (DC) Equipment Survey:

- Measurement of on-time shipment is an automated process for 42% of material handlers today, but another 58% want to automate it within the next two years

- Order fulfillment cost tracking is automated for 36% of material handlers today, but another 50% want to automate it within the next two years

- Inventory accuracy is monitored through automation for 38% of material handlers today, but another 56% want to automate it within the next two years

- Daily throughput monitoring is automated for 30% of material handlers today, but another 48% want to automate it within the next two years

About Belden

Belden Inc. delivers the infrastructure that makes the digital journey simpler, smarter and secure. We're moving beyond connectivity, from what we make to what we make possible through a performance-driven portfolio, forward-thinking expertise and purpose-built solutions. With a legacy of quality and reliability spanning 120-plus years, we have a strong foundation to continue building the future. We are headquartered in St. Louis and have manufacturing capabilities in North America, Europe, Asia, and Africa. For more information, visit us at www.belden.com; follow us on Facebook, LinkedIn and Twitter.

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