Belden

Why Wi-Fi?
4 advantages over 5G in the next-gen warehouse

Guide

Today's fast-paced business environment requires warehouses to handle larger volumes of material at an accelerating rate. Forward-looking material handling businesses need to adapt and evolve to survive. The solution? Automation and a robust warehouse network that seamlessly connects robots and devices to data, systems and people throughout the warehouse.

Recently, industrial 5G networks (especially private 5G) have been discussed as potentially better-performing alternatives to Wi-Fi. The truth is, while 5G holds immense promise, it isn't yet the right solution to support today's dynamic warehouse environments.

Real-world deployments show that Wi-Fi networks deliver the ultra-reliable, low-latency connectivity that boosts throughput and productivity, creates safer work environments and increases ROI on IT investments.

Let's explore four ways Wi-Fi currently offers better performance than 5G in material handling scenarios.

ADVANTAGE 1   Up and running with ease in any warehouse

The unique mix of systems and architecture in a warehouse can complicate network deployments. From PDAs to autonomous mobile robots and guided vehicles to sophisticated automated storage and retrieval systems, all require reliable connectivity to a robust network. Using Wi-Fi makes this easier.

Wi-Fi offers protocol- and device-agnostic connectivity and flexible hardware options. Add in evolving Wi-Fi capabilities and expanding bandwidth, which deliver increased uptime and boosted system throughput, and you have powerful tools to implement, grow and maintain any network configuration.

And the best part? It's accomplished without the complications of 5G licensing and data charges. Scaling 5G in worldwide regions presents tough infrastructure and regulatory challenges, and customers must purchase data capacity on a recurring basis — issues that don't affect Wi-Fi.

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Licensing and data costs for Wi-Fi networks

ADVANTAGE 2   Release the robots

In a next-gen warehouse where numerous robots circulate at high speeds, network lag time and blind spots can cause robot bottlenecks, increase the risk of damage and overwhelm access points. A single robot performance interruption can cause operations across the entire facility to grind to a halt.

Wi-Fi and its expanding bandwidth mean more resilient, robust networks that can accommodate increasing demands — including a growing, automated robot workforce. Belden clients report that our latest Wi-Fi 4 low latency and roaming capabilities still exceed those of competitors' more modern Wi-Fi 5 technologies. With our Wi-Fi 6 solution, warehouse data networks can boost efficiency even further, handling more data without additional channels. And warehouses can increase the number of robots that connect to a single access point without degrading the signal or requiring additional bandwidth.

The latest Wi-Fi standards are focused not only on speed but on enhanced data quality as well. With a Wi-Fi 6 technology called orthogonal frequency-division multiple access or OFDMA, devices can transmit more data in parallel, which reduces latency. The resulting precision and the faster, more reliable data flow on the warehouse floor will enhance worker safety.

ADVANTAGE 3   Better network coverage, easier on the budget

Wi-Fi networks can be significantly less expensive than private 5G networks. Their cost advantage over private 5G is based on the critical need for redundancy. If a portion of the network is overloaded, Wi-Fi can automatically and seamlessly shift to a different channel or access point and keep the data flowing.

With a 5G deployment, the base cost does not include redundancy — just a primary network and one server. It takes an additional investment for 5G to match Wi-Fi's redundancy. And while you may expect a considerable jump in performance along with that investment, reality doesn't yet meet those expectations.

5G   Wi-Fi

A flexible, resilient network generally costs less with Wi-Fi than equivalent 5G.
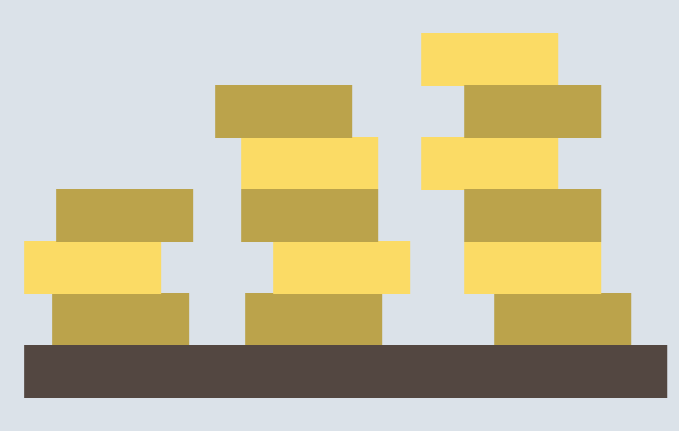
$3M

Wi-Fi's lower costs and superior performance produce higher ROI faster. One material handling organization reported a $3 million potential revenue increase with an ROI of less than 1.5 years.

ADVANTAGE 3   Fast times on the warehouse floor

When it comes to efficiency and safety, milliseconds matter. Latency, also known as stutter or jitter, refers to a tiny fraction of time during which big problems can occur. A network dropout of just 20 milliseconds can cause a warehouse robot to stop operating. The ripple effect from a single unit's dropout can halt operations for the entire warehouse. Even when a shutdown doesn't occur, warehouses may throttle robot performance to accommodate poor network connectivity.

Luckily, Wi-Fi's superpowers include fast roaming and accuracy made possible by redundancy and smart design. Disruption can be avoided by operating at a roaming time below 20 milliseconds, which results in fewer dropped data packets. Our Wi-Fi networks deliver this for the fast-paced warehouse, with intelligent, autonomous roaming capabilities as low as 10 milliseconds.[1]

[1] For RLX2 products

⟫ What's the future of 5G in warehouse networks?

Major wireless carriers are testing custom 5G networks in stadiums and other large venues, and the technology is improving. However, cellular companies are not adapting quickly to the needs of industrial clients. Tests conducted by a manufacturing partner found that for a comparable 5G network to match Wi-Fi for stability, it could operate at only about half the speed, making equivalent 5G performance much more expensive.

But 5G's day will come. Once private 5G is network ready — perhaps within the next five years — the winning formula will likely be a combination of private 5G blended with advanced Wi-Fi capabilities. This will enable warehouse owners and wireless-enabled technology providers to strategically allocate network capacity for maximum efficiency and speed. They may move applications that are most suitable for cellular, like data and some handheld devices, onto the 5G platform and free up Wi-Fi capacity for roaming functions and to avoid congestion. Wi-Fi will still have an important role in material handling, and the result will be a more robust overall warehouse network.

Better together: Choosing the right network partner

For many reasons — ease of implementation, lower costs, superior reliability and resilience — Wi-Fi remains the smart choice for today's next-gen warehouse networking and automation.

But designing a comprehensive network is more than plugging in some routers and repeaters. Each warehouse has its own automation and operational challenges. You need an expert partner with a complete, customizable solution: a combination of deep skills in network design and assessment plus cutting-edge hardware, backed with continuous service. We're here to answer all your questions and put you on the fast track to creating a truly intelligent, automated warehouse.

Ready to build data networks that power next-gen warehouses?
Let's work together on digital transformation projects that deliver scalable and more secure connected warehouse automation.

Belden clients have achieved:

10%–15% BOOST
in processing rates
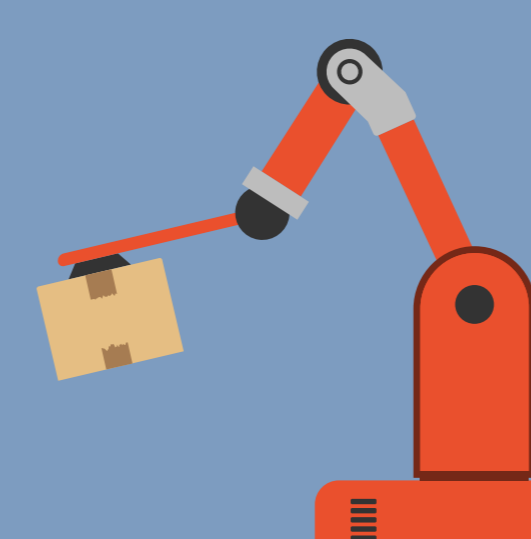
99% REDUCTION
in network disconnections

Explore Belden Wi-Fi capabilities →