Superior Wi-Fi for Warehouses

RUCKUS DELIVERS BEST-IN-CLASS WAREHOUSE CONNECTIVITY

Overview

Ruckus Wireless is a leading global Wi-Fi infrastructure vendor with a strong focus on the warehouse and logistics market, including a global Alliance Partnership with Intermec to provide the best possible workflow performance solutions for warehouses, DCs, terminals and similar logistics facilities. Intermec provides the leading data capture and information management devices, including mobile computers and terminals, label printers, voice-driven AIDC and RFID. The majority of these devices require good Wi-Fi connectivity. Through its Ruckus alliance, Intermec is helping its reseller partners and customers leverage Ruckus’s superior wireless performance to optimize the productivity and effectiveness benefits from their Intermec devices. Together, Ruckus and Intermec enable high performance warehouse applications, hassle-free operations, and low total cost of ownership (TCO).

The Challenge

Originally developed as a technology of convenience, Wi-Fi is often ill-equipped to provide reliable, enterprise-class connectivity and performance to support mission-critical processes. Interference, along with constant changes in the RF environment, makes it difficult to prevent or troubleshoot Wi-Fi problems. Inadequate range, spotty coverage, and erratic behavior remain fundamental issues to wireless deployments. As warehouses deal with greater volumes of smaller, just-in-time orders, or more reverse logistics activity related to online consumer purchases, fast and accurate AIDC is critical to meeting cost and performance targets.

The Solution

Ruckus Wireless invented Smart Wi-Fi technology that, for the first time, brings range and reliability to Wi-Fi environments. It has developed and patented several RF technology breakthroughs that enable Wi-Fi signals to be focused and directed in real time over the best performing signal paths. Ruckus Smart
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“Warehouses are brutal on Wi-Fi because everything is always changing and these spaces are full of materials that just kill Wi-Fi signals.”

Dave Christianson, Network Administrator, WOW Logistics

“One of the most important lessons that we’ve learned is that within our environments, the fewer access points the better, not just from a capital expense perspective but relative to delivering better performance. Our previous system required more APs to provide greater coverage. This caused co-channel interference and performance problems. For us, Ruckus Smart Wi-Fi has been the ideal solution to addressing all of these problems.”

Ian De Winter, Telecom Director, Katoen Natie

Wi-Fi technology delivers extended range and reliable signals that automatically adapt to environmental changes. Patented technology steers signals around interference, obstruction and obstacles, including floor-to-ceiling metal racks, varying inventories and automated equipment, ensuring unprecedented coverage and performance.

The Technology

Smart Wi-Fi is a collection of unique technology breakthroughs including adaptive RF control (BeamFlex), sophisticated application-aware QoS (SmartCast), resilient Wi-Fi meshing (Smart Mesh Networking) and dynamic channel management (ChannelFly). Integrated within Ruckus Smart Wi-Fi systems, these technologies ensure reliable and predictable performance essential for supporting the most challenging applications in the harshest warehouse environments.

BeamFlex represents the industry’s most advanced Wi-Fi smart antenna system. Combining a compact internal antenna array with expert control software, BeamFlex continuously ranks the antenna configurations for each receiving device and reconfigures itself in real-time to bypass interference and physical barriers.

BeamFlex steers Wi-Fi signals around interference to ensure predictable performance at a greater range. It also eliminates dead spots, increasing the range and performance of the Wi-Fi network from 100 to 200 percent. High-gain directional antennas provide up to 9dBi of antenna gain and -17dB of interference rejection. Highly sensitive antenna elements also deliver the industry’s most sensitive Wi-Fi receiving capabilities. This results in the most reliable Wi-Fi systems available today.

SmartCast is a sophisticated traffic management engine that provides a number of unique functions to deliver appropriate quality of service for distinct application needs. In other words, it recognizes if a particular client is transmitting data or trying to support a Voice-over-WiFi call and prioritizes traffic accordingly, without requiring any configuration.
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Smart Mesh Networking changes the fundamental economics of WLAN deployment. Smart Mesh Networking uses Ruckus-patented Smart Wi-Fi and expert RF routing technologies for creating long-range, reliable and adaptive Wi-Fi trunk connections between mesh APs — obviating the need for cabling Ethernet to every AP. This can dramatically decrease implementation costs and also enable great wireless coverage in hard to reach areas, both indoors and outdoors.

Another Smart Wi-Fi innovation, Ruckus BeamFlex+ makes Wi-Fi “polarization-agnostic” and automatically adjusts to deliver the best performance, even when users change their device orientation.

Traditional access points typically don’t have the ability to optimize or adapt as mobile devices change their orientation, such as when a worker reaches up to read a label on a high shelf or sets a device flat on a table. Simply altering the orientation of a mobile device or laptop can cause dramatic changes in Wi-Fi performance and degrade connectivity.

BeamFlex+ uniquely leverages maximal ratio combining (MRC) technology in combination with polarization diversity to improve the reception of signals from different orientations for more reliable communication. This enables BeamFlex+ enabled Ruckus Smart Wi-Fi access points to “listen” to Wi-Fi transmissions that are sent in different ways from client devices, ensuring more consistent Wi-Fi connections. With BeamFlex+, customers can effectively optimize the signal strength to realize significant improvements in performance and reliable connectivity.

The Proof

Recently, Ruckus worked with Intermec Technologies to compare Ruckus performance versus the current leading Wi-Fi vendor for warehouses. Conducting tests in a live, working warehouse packed full of oatmeal and similar products, the Ruckus AP demonstrated dramatically stronger coverage.

The charts above show coverage area by dBm down to -70 dBm, which is the minimum recommended signal strength for Intermec devices before they try to roam to a stronger signal. Ruckus covered nearly the entire 70,000 square foot test area with a single AP compared to only about two-thirds coverage by the other AP. In general, Ruckus increased signal strength by more than 5dB compared to the leading vendor, which translates to over 150% stronger signal. While any warehouse installation will still require a site survey to determine appropriate AP placements, it is a much easier task when there is dramatically more signal strength available from each AP.

The Benefits

Better signal strength and coverage are the key attributes to enabling new and more effective mobile workflows. Improved connectivity enables better application performance driving improved workflows and higher employee morale. A recent Intermec study found that a typical warehouse worker lost 15 minutes of productivity per day due to inefficient workflows or other impediments such as poor connectivity. Consistent wireless performance improves productivity and eliminates the hassle and frustration of slow response times or lost data. It can also extend battery life since the device isn’t working so hard to stay connected.
Superior RF performance enables superior coverage with fewer APs. In addition to reducing equipment costs, this lowers installation costs since there are fewer APs to install and placement is easier since they provide better reach. Better yet, APs can be meshed together in one or two hop meshes, completely eliminating the need to run Cat 5 cabling to many APs and potentially enabling companies to expand coverage into new areas that were previously unreachable such as outdoors or in outside buildings.

This improved wireless network performance translates directly into better business results. The Intermeo survey of 250 supply chain and warehouse and distribution managers found that over 60% agree that savings seconds in operating workflows can drive large time and cost savings from saving steps for workers, faster label printing, quicker barcode label scanning and eliminating battery changes mid-shift, especially in labor-intensive activities such as packing and loading, picking and inventory control.

**Real World Results**

Ultimately, the most important measure of Wi-Fi performance is its proven ability to support business needs at the lowest cost. Ruckus Wi-Fi has been deployed by some of the largest companies in the warehouse/logistics market. Here are two examples.

**Katoen Natie**

Katoen Natie is a leading international logistics service provider and port operator for a wide range of clients ranging from consumer goods & industrial manufacturers to chemical companies. It operates in over 154 locations across 34 countries and employs more than 10,000 people worldwide.

Katoen Natie’s legacy Wi-Fi system suffered a number of problems, including spotty coverage, erratic performance, dropped connections and the inability to adapt to obstacles and interference. “Given today’s warehousing environments where time is money, a reliable wireless system is no longer negotiable,” said Ian De Winter, Telecom Director for Katoen Natie. “Moreover, we found that conventional Wi-Fi technology was simply unable to adapt to our constantly changing RF environments.

Katoen Natie is using Ruckus indoor and outdoor Smart Wi-Fi products to support its in-house warehouse management system. Reliable Ruckus SmartMesh™ Networking technology allows Katoen Natie to reduce cabling costs and provide on-demand Wi-Fi services in areas where cabling is non-existent or cost prohibitive. Ruckus Smart Wi-Fi system is also supporting outdoor port operations, and Ruckus point-to-point/multipoint...
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Wi-Fi devices are used to extend broadband connectivity between buildings to reduce recurring broadband costs.

With the Ruckus system in place, De Winter estimates a 2X improvement in client performance and Wi-Fi signal range, despite reducing the total number of deployed APs from 1500 with their old vendor to just over 800 from Ruckus.

WOW Logistics

WOW Logistics owns 24 locations totaling nearly 7 million square feet. WOW’s material handlers, forklift drivers and truck loaders rely on Wi-Fi to gain ubiquitous access to real-time inventory information and eliminate counting and picking errors. The Wi-Fi network also supports low-powered push-to-talk communication badges as well as wireless humidity and temperature sensors and high speed guest access for customers to access corporate applications.

Throughout the warehouses five-pallet high, four-pallet deep, drive-through steel racks are used to store everything from engines to cheese, which averages 40% water—a notorious RF enemy. WOW’s ever-changing warehouses, filled with RF-unfriendly obstacles and steel racking, caused extensive radio frequency (RF) shadowing or signal loss. As inventory continually enters and exits WOW’s facilities, the RF environment is in constant flux, causing dropped connections, packet loss, unresponsive scanners, spotty coverage, interference and poor performance of only 1 Mbps throughput.

“Price wasn’t the lone consideration,” said Christianson. “It was imperative that we solve our wireless problems or our business would falter. Without a good Wi-Fi system our business literally stops. So we went looking for a wireless solution specifically designed to adapt and deal with RF ambiguities. We only found one. That said, we were astounded at the hidden costs we discovered in other vendors systems to the point where it didn’t even make sense to consider them. While the vendors had comparable controller and management capabilities, only one combined them with a well-thought out AP for truly harsh RF situations both indoors and out.”

With Ruckus’ high-gain, directional adaptive antenna array integrated into every AP, its system typically requires 30 to 40% fewer APs. In addition to avoiding purchase and installation costs for hundreds of additional APs that would have been required with other vendors, the price points for the Cisco, Aruba and Motorola APs were “outrageously” expensive with the most costly option being 68% higher than the Ruckus system. And it wasn’t just the cost of the APs that was giving Christianson sticker shock.

With initial and reoccurring licensing costs quoting in the $20 to $25K range for just one controller to manage 60 APs, with two controllers per location, WOW was looking at spending over a $500,000 dollars on controllers alone. The Ruckus system came in at 1/5th the price.

Conclusion

Deploying Ruckus Smart Wi-Fi provides critical advantages in deploying and operating the most effective workflows and getting the full benefit from Intermec and other mobile computing devices.

Ruckus’ adaptive, high performance Wi-Fi infrastructure ensures optimal connectivity in even the most challenging warehouse environments.