DIFFERENT BY DESIGN™

Next-Gen Warehouse

Streamline warehouse operations with a flexible private wireless network solution from JMA, supporting all the functions of the warehouse management system.

Warehouse Automation & AMR Support

Inventory Tracking

Employee Safety

IoT & Wearables

Security

CASE STUDY: NEXT-GEN WAREHOUSE

How has a Private Wireless Network solution improved the productivity of a warehouse?

OVERVIEW

Smart automation demands reliable connectivity

In Industry 4.0, smart automation is considered the fundamental requirement for improving the productivity and efficiency of a business. However, smart automation requires seamless, reliable, secure, and in specific cases instantaneous connectivity. There are different methods for delivering such connectivity, but it must also make commercial and practical sense for a business to deploy such a network. Fiber or ethernet connectivity can provide speed, reliability, and capacity. Still, it is not cost-efficient, flexible, and practical for an environment where we have mobile robots and other such applications which don't always allow for a tethered connection.

Private wireless networks (PWN) on the licensed or shared spectrum offer fiber-like speed, capacity, and reliability, enabling low-latency applications, automating operational processes, and delivering efficiencies not feasible with wired or other wireless networks.

SITUATION

A warehouse challenge

A tech-savvy manufacturing company was exploring its options to streamline its warehouse management system (WMS). Working with its partners, it decided to use the capabilities of 5G, such as machine-to-

Figure 1: Single rack carrying 4G/5G Core, baseband, power supply, and distribution switch.

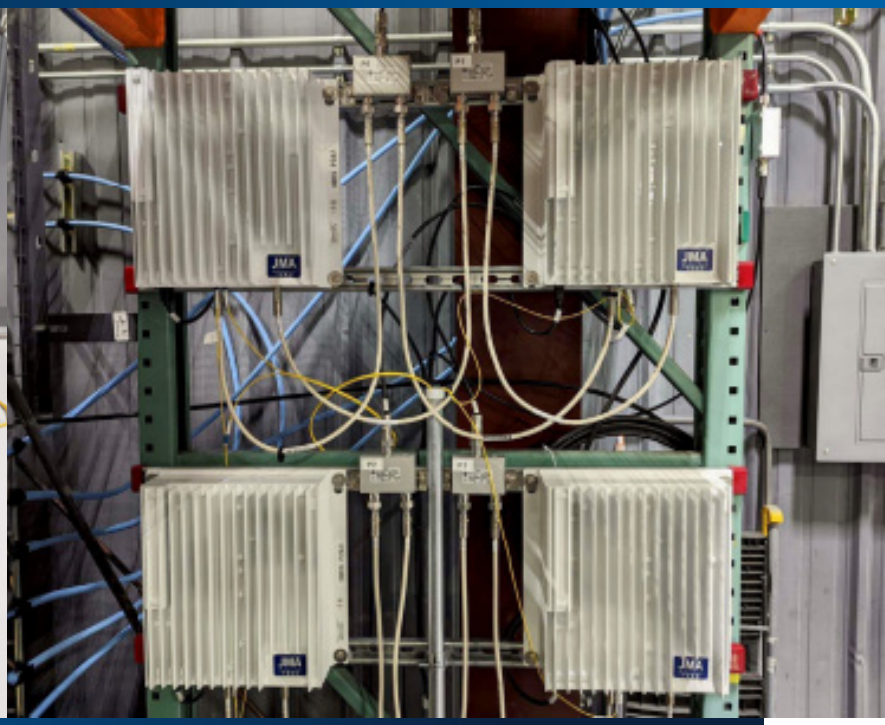

Figure 2: JMA Wireless software defined radio units

machine communication, ultra-reliability-low-latency communication, and location precision.

Warehouse's 45,000 square feet facility offered a few challenges as its operational growth demanded an increasing number of connected autonomous mobile robots (AMR). The existing network struggled to accommodate more than twenty AMRs due to the amount of data exchange between the AMRs to safely and autonomously move pallets around the warehouse. Weighted bins connected to WMS enabled accurate and timely inventory control. Other devices like cameras, tablets, and wearables, which were spread all around the warehouse, required reliable, low latency secure connection. Unfortunately, at the time of this deployment, not all devices and applications, such as asset tracking systems, were ready for 5G or could work on the citizen broadband radio system (CBRS) frequency band.

Additionally, the warehouse had floor-to-ceiling shelving against the wall, and the radio access network (RAN) design needed some finesse. Radio units (RUs), power sources, and antennae can't be installed on the walls, which was the original design assumption. However, after performing a physical walk test, it was obvious that antennas needed to be placed in the ceiling.

SOLUTION

An innovative RAN solution for a complex problem

During the network design phase, it was clear that a flexible RAN solution was needed that could work across multiple bands, supporting both 4G and 5G technologies, as some devices in the warehouse environment required LTE-M support on the licensed bands. In contrast, other applications would perform better on the 5G CBRS system.

The system design and integration team looked at different RAN options and chose JMA wireless XRAN system because of the strength and flexibility of the RAN solution offered by JMA. The solution's critical components, 4G/5G core, virtual baseband, i.e., centralized unit (CU), and Distributed unit (DU), edge computing platform supporting smart warehouse applications, a distribution switch, and power supply, were installed in a single rack. The rest of the infrastructure, including backhaul, used the warehouse operator's existing IP network, as shown in **Figure 1.**

Due to the characteristics of the JMA wireless radios, only four RUs were used, two for the 1900/2500 MHz licensed band and the other two for the CBRS band. The RUs were placed close to the server rack, allowing easy access and installation as shown in **Figure 2.**

JMA XRAN private wireless solution is a fully virtualized Open RAN distributed system built on an SW-based architecture over standard commercial-of-the-shelf (COTS) IT infrastructure. Being cloud-native and supported on COTS, it offers flexibility and agility in deployment. It supports both the licensed band and the entire 150 MHz of the CBRS band. It is a scalable solution that can grow based on capacity demand and new use cases. Our software-defined RUs are upgradeable and don't need to be replaced when upgrading them from 4G to 5G, which offers an easy, zero downtime upgrade path compared to

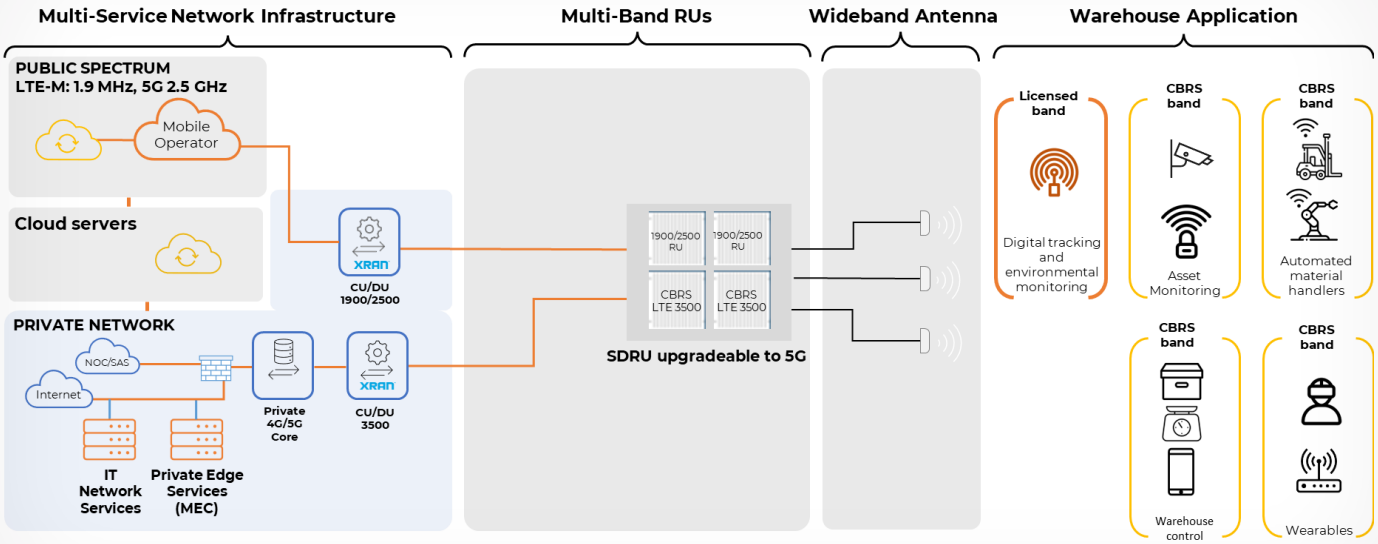

Figure 3: Smart warehouse network architecture

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frozen-in-time, chipset-based legacy RAN solutions. XRAN-based PWN is always current, evolving with 5G standards enabling new functionality in a much shorter time frame.

RESULT

Hybrid PWN boosts warehouse efficiency

The implementation of a hybrid PWN, a network that utilizes both licensed spectrum and shared CBRS spectrum for the different use cases built on the same RAN infrastructure, enabled the WMS to track and locate hundreds of thousands of items with accuracy no matter where they are in the warehouse, improving pick accuracy, reducing inventory loss and human errors.

CONCLUSION

Enterprises are looking for connectivity solutions for their unique business challenges and opportunities. PWN can deliver on those. Having the right end-to-end solution is critical to ensure enterprises get a quick return on their investment by improving productivity and efficiency. That is why JMA offers a complete end-to-end PWN solution focused on solving today's enterprise problems, with a software-based architecture that can evolve to provide the connectivity that will enable those current and future applications.

About JMA Wireless

JMA Wireless is the leading global innovator in mobile wireless connectivity solutions that ensure infrastructure reliability, streamline service operations, and maximize wireless performance. Employing powerful, patented innovations their solutions portfolio is proven to lower the cost of operations while ensuring lifetime quality levels in equipment and unrivaled performance for coverage and high-speed mobile data.

JMA Wireless solutions cover macro infrastructure, outdoor and indoor distributed antenna systems and small cell solutions. JMA Wireless corporate headquarters are located in Syracuse, NY, with manufacturing, R&D, and sales operations in over 20 locations worldwide.

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