



Red River

# THE BUILDING BLOCKS OF A SMART WAREHOUSE



Strong connectivity, efficient communication, better logistics and faster fulfillment — there are many extraordinary benefits to smart warehouses. Smart warehouses track products, chart out logistics and even analyze employee productivity.

The very idea of upgrading a warehouse to a “smart warehouse” can be intimidating and many organizations don’t know where to start. The term “smart” implies cutting-edge, high-tech applications that require significant investment and a deep understanding of how they work. What if the wrong technologies are deployed from the start? What if the technologies that are deployed quickly become deprecated?

Preparing for a smart warehouse may feel unapproachably complex. But the right partner will greatly simplify the process and help jump start your journey to a smart warehouse. We’ll explore the building blocks of a WLAN-enabled smart warehouse and how to build a strong foundation for your business needs using one of our successful case studies.



## THE FOUNDATION OF A SMART WAREHOUSE

A large auto parts dealer, with over 60 warehouses throughout North America, needed an integrated, smart solution across its warehouse. They had already deployed one hardware refresh, plugging in access points across the warehouse — but coverage was inadequate, and issues were becoming rampant.

Red River suggested a redesign and refresh of their hardware. We surveyed 12 million square feet of design work, to support massive forklifts, employees with scanners and connectivity back to company resources on-prem and in the cloud. In the end, we rolled out 4,000 access points, fully deployed, validated and configured.

### CLIENT CHALLENGES AND PAIN POINTS

The client had a few specific challenges that they needed to address:

- They were using an outdated system that could not support their new technologies.
- They had limited visibility and control over the new devices on their network.
- They needed to future-proof their system for additional IoT (Internet of Things) devices in the future.
- Their warehouse had zones that required signal boosters (which weren't working optimally).
- They had to improve their overall network performance.

In short, they were the ideal client for a smart warehouse solution — their needs could be met through the improvement and management of their network infrastructure.



## PROPOSED SMART WAREHOUSE SOLUTION

We proposed a full redesign and refresh of the hardware, software, and security of the customer's warehouse. This included:

- A new WIFI6 LAN (Local Area Network) infrastructure, which could support their new hardware, applications and use cases.
- Improved visibility and control over their smart warehouse system, which also improved their security.
- Enhanced speeds, which wouldn't just support their current hardware, but future hardware.

Operating piecemeal and conducting partial upgrades would not have worked. It would have ultimately cost them more — in terms of intermittent upgrades, lost productivity and disruption.



## PROJECT SUMMARY, IN BRIEF:

After we implemented the new solution, the customer saw:

- A drastic improvement in network performance.
- A more reliable end-user experience.
- The ability to enable new applications and use cases.
- Improved visibility and control of devices on the network.

A smart warehouse can bring many benefits to a business. Still, it's important to have a clear understanding of the customer's needs and challenges, rather than just trying to create an out-of-the-box solution.



## STEP 1: ASSESSMENT

We start with an inventory of what the organization has already deployed. Controllers, access points, configuration settings — every component of the organization’s current infrastructure. We compare this with a best-practices assessment, verifying configurations and identifying gaps.

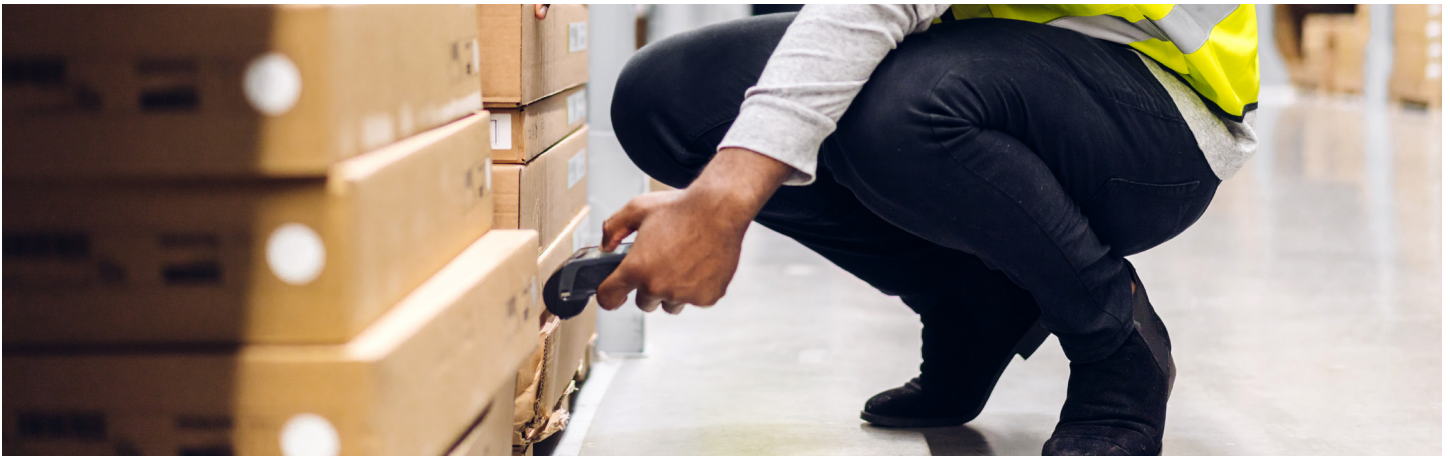
From there, we take a passive survey of the customer warehouse — walking around floors and collecting wireless coverage data. From here, we are able to build a complete map of the organization’s current wireless coverage: where it’s strong, where it’s weak and how loud it is.

Our technicians analyze everything within the building: routers, switches and WLAN configuration. We validate based on the organization’s requirements, which can include different connectivity requirements for voice devices, handheld scanners, laptops and IoT solutions.

Ultimately, we begin with a complete assessment of where the organization is and where it needs to be. We identify the areas that need to be improved to provide the organization with the results that it wants. But that all starts with a thorough understanding of the organization’s current infrastructure and technology.

### KEY TAKEAWAYS:

- A comprehensive assessment of the current infrastructure is necessary to understand what needs to be done to upgrade to a smart warehouse.
- The assessment should include a survey of the current wireless coverage, an analysis of the existing hardware and configurations, and a validation of the requirements.



## STEP 2: PREDICTIVE DESIGN

An assessment collects raw data, but it isn't everything that is needed to create a smart, functional warehouse design.

In our client's case, for instance, aisles filled to the brim with engine oil wouldn't let clear signals through; air fresheners would. In other words, the environment of the warehouse may fluctuate in a way that isn't easy to simulate or predict.

Our technicians have years of experience. They deeply understand a wide variety of systems and have encountered many scenarios; they are therefore able to come up with solutions that fit an organization's unique warehousing needs.

However, this highlights the importance of really digging in, assessing and creating a predictive design. If an organization simply tries to create a smart warehouse based on a uniform, basic template, they will encounter issues that are unique to their own warehouse.

The better the understanding of the technicians, designers and developers involved, the better the performance of the warehouse. We work to deeply understand not only our client's needs but their current position and environment. This is how we are able to develop a design that isn't just theoretically useful but efficient and operable.

### KEY TAKEAWAYS:

- A good design can't just be based on a generic template — it needs to be customized to the specific warehouse.
- The technicians need to have a deep understanding of many types of systems to be able to come up with solutions that fit the client's needs.



### STEP 3: INSTALLATION

Once the assessment and design are completed, it's time for the installation. With this client, we needed to replace the CAT cable. Like many other warehouses, they were using older CAT cables. We needed to install CAT6 ethernet cable, running new cables from the IDF (Intermediate Distribution Frame) closest to the drops.

Once the physical installation was complete, we fine-tuned things on the controller and ensured that they were handling the information as effectively as possible and tuning the noise out. Minor adjustments to power and RF settings are crucial to getting the network working as designed in step two.

In some respects, the physical installation stage is the "easiest" stage. While it's the most physically time-consuming, everything has already been plotted. This is by design. Intentionally, everything is charted out before the warehouse itself is ever touched — leading to substantially less disruption.

But though the physical installation stage may be the most straightforward, it's still critical to have the right technicians. Skilled technicians will perform installation faster, with fewer disruptions, and with fewer potential errors.

#### KEY TAKEAWAYS:

- The physical installation is the most time-consuming stage, but it's also arguably the easiest because everything has been mapped out in advance.
- It's important to have skilled technicians so that the installation is done quickly and correctly.





## STEP 4: VALIDATION

Now, we complete the assessment stage again... but with the newly updated infrastructure. Once again, we walk through the system to ensure that the design is working as predicted. We make sure that the system meets the needs of the client and the design that we outlined.

This critical stage lets us detect and mitigate any potential issues before they can impact the client. In this case, we upgraded the WLAN and LAN infrastructures only. But we could have just as easily upgraded the smart warehouse to run entirely 5G. Our goal is to meet the customer's demands with the technology that best suits them.

### KEY TAKEAWAYS:

- The validation stage is critical to ensure that the system is working as predicted and that there are no potential issues.
- The goal is to meet the customer's demands with the technology that best suits them.

# THE ADVANTAGES OF SMART WAREHOUSE INFRASTRUCTURE

For this client, a smart warehouse infrastructure made sense — even though the client was not yet using AI (Artificial Intelligence), automated logistics or advanced robotics.

A “smart warehouse” is not necessarily a technologically complex warehouse. In fact, frequently the ultimate goal is to reduce management and simplify the warehouse system.

In this case, the client had outgrown their old system and needed an upgrade. The new system allowed them to run their business more effectively and with less downtime.

A smart warehouse infrastructure has many advantages:

- **It’s easier to scale up or down as needed, since the infrastructure is already in place.** Smart warehouses can be intentionally designed to scale as the organization requires, from software to hardware.
- **It can be customized to the specific needs of the client.** Clients all have different needs in terms of products, physical space and logistics. Some clients may have extensive warehouses that frequently drop Wi-Fi connections — others may have small warehouses but an extensive lattice of IoT devices that all need bandwidth.
- **It’s more efficient and less likely to experience downtime.** Smart warehouses are designed with failover systems in place. As companies become more reliant upon their warehouses themselves for their logistics and tracking, it becomes essential that warehouses do not experience any major downtime. Smart warehouses can course correct for these issues.
- **It can be used with a variety of technologies, including AI (Artificial Intelligence), automated logistics and advanced robotics.** Warehouses are going to see that automated logistics systems, advanced robotics, and AI will come to the forefront of the industry. Creating a smart warehouse system now ensures that an organization can make that important transition when needed.

Importantly, a smart warehouse infrastructure will serve an organization in the future. When properly designed, this warehouse can be upgraded, scaled and used with next-generation technologies. A smart warehouse is remarkably resilient and can evolve and grow with the organization.



## RESULTS: A FUTURE-PROOFED INFRASTRUCTURE THAT WILL LAST

Our client didn't yet have any advanced robotics — but that doesn't mean that they will not need them in the future. In addition to improving their warehousing capabilities and logistics, we future-proofed their organization, providing an infrastructure that they can build on.

On the floor plan, there are mezzanines; a solid floor that is expandable shelving. As the company grows, its warehouse space will actually be able to grow with them. Likewise, we built our client's technology not only to meet their needs today but also tomorrow. Our client will be able to scale their technology easily, without having to invest a tremendous amount of money (and time) into upgrading their on-premises and off-premises systems.

But it does not stop there. There are several additional technologies and other options to consider to future proof your warehouse and address your technology pain points.



## THE BENEFITS OF PRIVATE LTE

Private LTE solutions operate very much like Wi-Fi, but they have major advantages when it comes to geography and scale. Private LTE networks can provide complete, all-in-one, consolidated resources and applications for employees, eliminating the differences between distance.

Unlike public LTE networks, they are a single, protected network, like a WAN. Public LTE networks may have greater latency and lower speeds because they are serving the entirety of a community, whereas private LTE networks dedicate their resources to the organization — in this case, an entire warehouse. As internet speeds increase, technology advances, and 5G technology becomes more commonplace, the feasibility of larger-scale private LTE networks grows, too.

A few of the advantages of private LTE networks include:

- Private LTE networks have compelling advantages over outdoor Wi-Fi solutions
- Private LTE networks can provide better mobility and point-to-point connectivity
- Private LTE networks are more affordable for large institutions than public LTE
- Private LTE networks do not require advanced or unique technology
- Easy to consume and outcome based
- Purchased as a subscription
- Open API for integration
- Leverage IOT (Internet of Things) expertise with Control Center

To set up a private LTE system in a Smart Warehouse:

- Access points are deployed across the designated area
- Data and signaling may be deployed either locally or on the cloud
- Secured SIM cards or eSIM cards are used for end-user devices

When properly designed, a private LTE system should be no more complicated for the end-user than a traditional Wi-Fi system, but it will be more secure and stable.



## BETTER TOGETHER WITH CBRS AND WLAN

5G and Wi-Fi 6e should be deployed together for a variety of reasons. They both allow for devices and users to connect seamlessly and reliably. It would be an ongoing headache to manage these separate access technologies as integrated systems. Devices and users will need to rotate back and forth between 5G and Wi-Fi 6 systems, and a smart warehouse would want this to be as smooth as possible.

An extension of LTE, called CBRS (Citizens Broadband Radio Service), is a great addition to Wi-Fi 6e for a smart warehouse. CBRS is backed by spectrum in the 3.5Ghz range that is not used by Wi-Fi or existing LTE/5G services. This means that it is less likely to be affected by general-access devices. For warehouses that are operating with things like advanced devices and robots, CBRS will help increase connectivity and mobility. A smart warehouse can mean many things: inventory management technologies, 5G systems, W-LAN (Wireless Local Area Network) systems, Internet of Things devices, predictive analytics, AI-driven logistics, robotics, modeling, simulation — even augmented reality.

Our four-step process involves first assessing the needs of our clients and creating an effective design to jump start your smart warehouse journey. From there, we can progress to installation and validation — ensuring that our clients' needs are fully met. Through this four-step process, we turn what could be an overwhelming project into a simple solution that sets your warehouse up for success.



## ABOUT RED RIVER

Red River brings together the ideal combination of talent, partners and products to disrupt the status quo in technology and drive success for business and government in ways previously unattainable. Red River serves organizations well beyond traditional technology integration, bringing more than 25 years of experience and mission-critical expertise in data center, security, networking, analytics, collaboration, mobility and cloud solutions. To learn more, visit [redriver.com](http://redriver.com).