



Private
Networks

Private Cellular Networks

in Logistics & Distribution Facilities

Manufacturing, logistics, and distribution facilities have unique environments and challenges to understand when considering connectivity approaches in these spaces. Learn how private cellular can be a valuable addition to these facilities' IT infrastructure for improved network reliability, mobility, and coverage.

Cellular Networks in Logistics Facilities & Distribution Centers

It is crucial for logistics and distribution facilities to consider the various wireless technologies and their use cases — especially when developing a modular and scalable heterogeneous network strategy.

To ensure the best ROI on a network investment, a modern IT infrastructure will likely include a mix of technologies, dimensioned to fit the appropriate use cases and each playing their own role in enabling seamless connectivity within a facility.

Manufacturing, logistics, and distribution facilities have unique environments and challenges to understand when considering connectivity approaches in these spaces.

What Connectivity Problems Do Logistics & Distribution Facilities Commonly Face?

Logistics and distribution facilities feature a host of unique characteristics that might lead to connectivity gaps when not supported by the proper technology.

At the right are some specific characteristics of logistics and distribution facilities that can cause connectivity gaps, resulting in common pain points that can lead to a breakdown in operational efficiency.

Considering these challenges, logistics and distribution facilities need to leverage diverse technologies to solve the puzzle of facility-wide connectivity.

Logistics & Distribution Facilities Challenges & Pain Points

CONNECTIVITY CHALLENGES



Large open and/or highly reflective spaces.



Support for a wide variety of use cases — not just printers and laptops.



Focus on quality measurements for uptime and efficiency.



Increasingly mobile and modular use cases.



Staff composed of both humans and machines simultaneously.

COMMON PAIN POINTS

Signal obstruction and reflection, leading to lost connections, employee frustration and lower productivity.

Autonomous equipment stoppage due to "sticky" WiFi access points, causing brief disconnects that require human intervention to resolve, leading to safety issues and downtime.

Lower efficiency and greater cost when networks enable use cases they weren't designed to use.

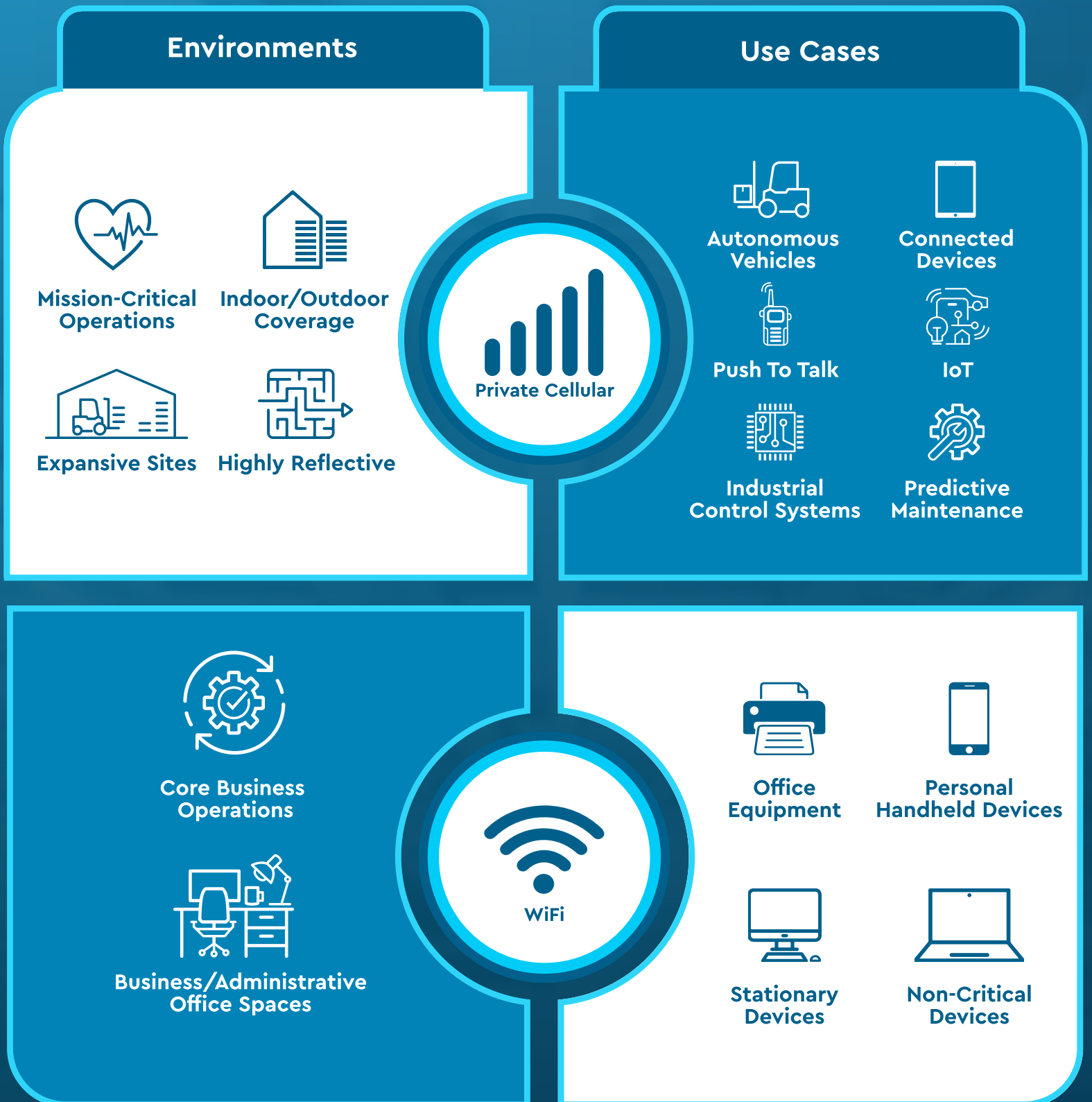
Comparing Private Cellular vs. WiFi Networks

When evaluating the characteristics of a logistics, manufacturing, or distribution facility, it's important to consider the specific environment and desired use cases. **When considering private cellular and WiFi, it's important to understand that many businesses will benefit from both technologies for a holistic connectivity solution.**

WiFi will always be the workhorse of indoor environments thanks to its ability to support stationary use cases, such as printing and connecting to the internet. Private cellular can be a valuable addition to these environments, providing connectivity for critical business operations and high-mobility use cases. Here are some key differentiators to consider between WiFi and private cellular networks for logistics and distribution facility pain points.

Pain Points	 WiFi Networks	 Private Cellular
SIGNAL POWER & COVERAGE FOR LARGE, OPEN SPACES	Has a limited output power, mandated by the FCC to avoid interfering with surrounding radios.	A coordinated spectrum approach enabling a much higher output power (4x – 200x greater than WiFi) without risk of interference.
EFFICACY IN REFLECTIVE & MULTI-PATH ENVIRONMENTS	Reflectivity causes interference and signal degradation.	Reflectivity is leveraged to bend the signal around corners and improve the quality via multi-path connections.
SUPPORTING BEST-EFFORT VS. MISSION-CRITICAL USE CASES	A "best-effort" connectivity methodology. Packets are treated equally and without respect to the applications they're coming from.	A mission-critical connectivity method under which packets can be assigned specific performance characteristics based upon the applications they're supporting.
ABILITY TO ENABLE HIGH-MOBILITY ENVIRONMENTS	Designed to support stationary users at desks — NOT to support technology with rapid handovers in mind, leading to a problem commonly known as the "sticky client issue".	Designed to go 70+ MPH down a highway without a lapse in connectivity by initiating new connections via a methodology called a "neighbor list".

Where to Use Private Cellular or WiFi Networks in Logistics & Distribution Facilities



Operational Benefits of Private Cellular Networks in Logistics & Distribution Centers

Private cellular technology offers a range of benefits that make it a valuable component in the wireless ecosystem of logistics and distribution facilities.

Increase Worker Mobility

Private cellular networks can provide seamless connectivity while on the move, enabling mobile devices and vehicles to stay connected even when transitioning between different coverage areas.

Increased mobility is particularly beneficial for applications that involve transportation, fleet management and mobile workforces.



Expand Coverage Area

Private cellular networks offer broad coverage, encompassing large geographical areas.

Expansive coverage helps ensure connectivity across the entire logistics facility — including indoor and outdoor spaces — enabling reliable communication and data exchange throughout the operation.

Uncoordinated spectrum (WiFi) is limited on output power to mitigate interference; private cellular employs a coordinated spectrum and has multifactorial higher output power because interference is managed at the channel level over large areas.



Gain Application-Level Control

Private cellular networks provide application-level control, allowing organizations to prioritize critical data traffic, manage Quality of Service (QoS), and helps ensure optimal performance for mission-critical applications.

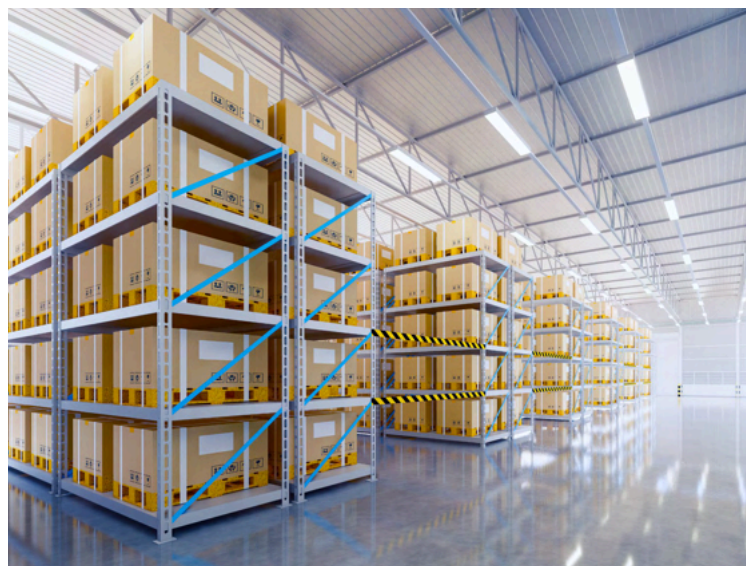
Higher levels of control are essential for logistics and distribution facilities that rely on real-time communication and require consistent connectivity for time-sensitive operations.



Overcome Highly Reflective Environments

With its ability to penetrate obstacles and handle highly reflective environments, private cellular technology can effectively address connectivity challenges and pain points commonly found in logistics and distribution facilities with:

- metal structures
- high-density storage areas
- complex layouts



Support Mission-Critical Use Cases

Private cellular networks are well-suited for mission-critical use cases that demand high reliability, low latency and secure communication.

In logistics and distribution facilities, for example, applications like real-time tracking of high-value assets, remote monitoring of critical equipment, and secure data transmission can be effectively supported by cellular technology.



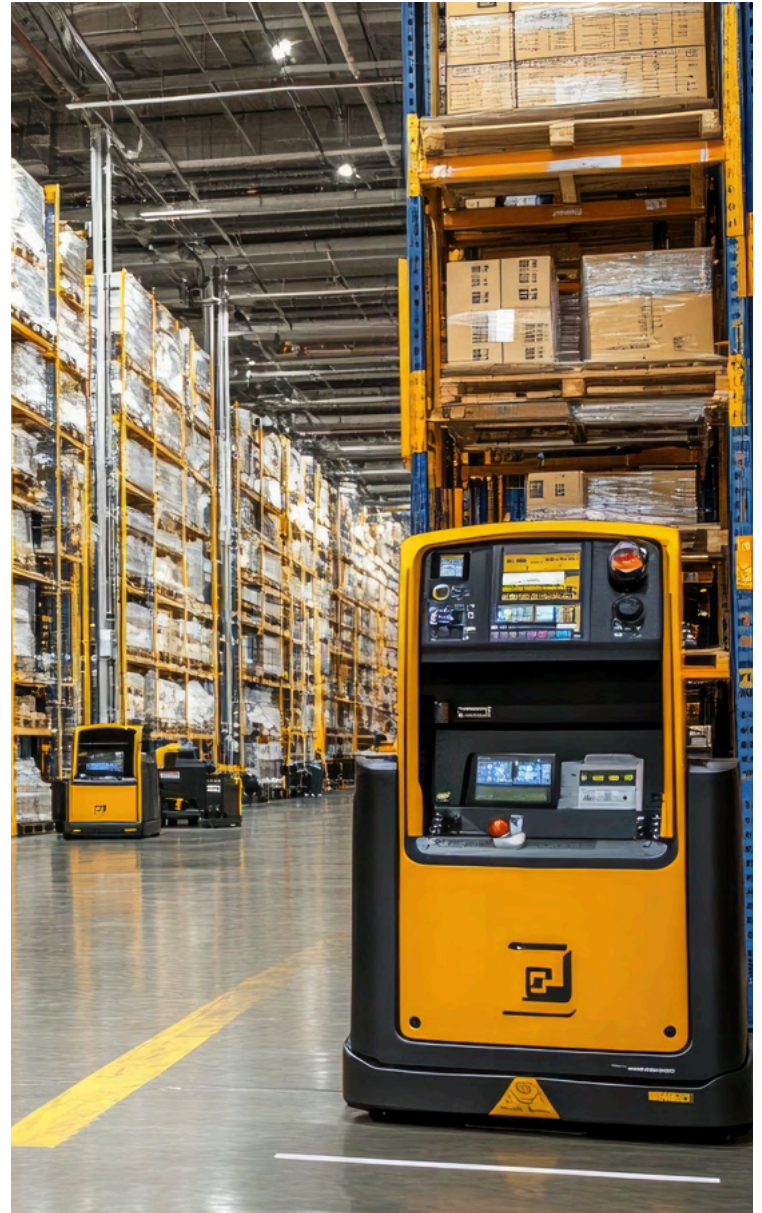
4G vs. 5G Cellular: Which Should You Choose?

While newer generation technologies like 5G offer additional capabilities, it's important to note that not all enterprises may require or benefit from these features at present. For example, a key benefit of 5G is ultra-low-latency. However, 5G comes at a price premium compared to 4G/LTE. Many businesses can accomplish their goals with 4G/LTE for a more cost-effective solution.

Consider this example: a manufacturer wants to connect Autonomous Guided Vehicles (AGVs). These AGVs do not need to be connected to 5G to operate in a facility. All the AGVs need is seamless, reliable connectivity to provide their heartbeat back to the network, so they can stay in motion. The ultra-low-latency that 5G provides is not needed for AGVs to stay connected and perform their tasks. In this case, private LTE will keep these AGVs connected at a more cost-effective price than 5G.

Building network solutions based on specific use cases and requirements of distribution and logistics facilities — rather than the newest technology available — is essential to lasting success.

Enterprises should evaluate the actual needs of their operations, considering factors such as data requirements, latency sensitivity, mobility, and coverage. By building network solutions based on use cases and prioritizing the features that truly provide value, logistics and distribution facilities can avoid unnecessary investments, optimize costs, and help ensure that the implemented technologies deliver practical benefits that align with their operational needs.



KEY INSIGHT

Building network solutions based on the specific use cases and requirements of logistics and distribution facilities — rather than the newest technology available — is essential to lasting success.

CASE STUDY

Private Cellular Network Boosts Coverage & Mobility for Bottling Facility

A large bottling facility with over 1 million square feet in the U.S. needed their connectivity solution to extend to the loading yard to enable employees to process inventory on their handheld tablets and scanners, where historically workers had trouble staying connected as they moved around.

By adding in a private cellular network, the facility expanded coverage and enabled seamless mobility for the people and machines moving around the site.

EXAMPLE USE CASES



Connected Worker



Inventory Management



911 Calling



AGV / Robotics



Visitor Connectivity



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Spectrum Private Networks Builds Industrial Cellular for Manufacturing, Distribution, & Logistics

Spectrum Private Networks delivers reliable and seamless connectivity with our managed private wireless network solutions. As a one-stop network operator, our team builds networks based on your specific use cases, always aiming for the power of practical rather than the art of possible.

Contact us today and jumpstart connectivity within your logistics & distribution facility.

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