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SOLUTION BRIEF

Distribution & Logistics

Distribution centers, warehouses, and logistics operations are essential elements of the global supply chain. Efficiently receiving pallets of goods, breaking the pallets into smaller sizes, storing the inventory, and building a mixed pallet for delivery require distribution center personnel to track inventory, operate forklifts, and move goods throughout the center. To manage increasing labor shortages and high volumes of shipments, distribution centers are turning to technology solutions and automation to address shortages and further scale operations. The use of tablets, computers, communication devices, Autonomous Guided vehicles (AGV), and robots require highly reliable wireless connectivity, without which problems can quickly mount.

Increasingly, private wireless networks are being called on to provide the level of reliable, interference-free wireless connectivity needed to power the smart warehouses of tomorrow.

Distribution center connectivity requirements

A distribution center typically includes an indoor warehouse – ranging in size from 100K square feet to over 500K square feet, a large outdoor yard with parking for trucks and trailers, and temporary storage for goods that can tolerate being stored outdoors.

- Coverage is required everywhere - indoors and out - with minimal interference from other signals
- The network must deliver guaranteed QoS with data prioritized based on devices/applications on the network
- All equipment must remain connected as they move around the property
- Critical applications such as collision avoidance require low latency networks
- Given the large footprint, the network must have low installation and TCO owning and scaling the network
- Connectivity that meets stringent security requirements

Use cases for distribution and logistics

Application	Use cases
Connected worker	Connected handhelds and tablets Bar code scanners Voice communications Worker safety
Forklifts	Onboard computers for business workflow Collision avoidance systems 25 mph+ Workflow management
Video surveillance & analytics	Security monitoring Video analytics PPE Compliance monitoring Connected helmet/smart glasses
Autonomous mobile robots (AMR) **Autonomous guided vehicles (AGV)**	Distribution center automation with robotics Material movement Fulfillment picking Micro fulfillment Inventory tracking robots Cleaning robots
Others	Asset tracking Remote equipment monitoring Digital twin IoT devices

When Wi-Fi is no longer up to the task

Wi-Fi has been the conventional choice for wireless connectivity in distribution and logistics. While Wi-Fi is a great fit for home or office environments, it doesn't perform as well in vast outdoor/ indoor areas like a distribution center. Their large footprints and need for pervasive connectivity pose specific challenges for Wi-Fi:

Spotty wireless coverage

Unreliable connectivity causes delays in gathering and transmitting data, often resulting in a loss of productivity. Wireless signal strength is often particularly patchy around temporary storage in the warehouse or parking lot.

Unreliable Quality of Service (QoS)

Wi-Fi is unable to guarantee throughput and latency levels for mission-critical business applications.

Mobility issues

The constant movement of personnel and equipment across a large area requires endpoints to move from one access point to another. As devices on the Wi-Fi network scan and connect to the nearest access point, connections often drop in motion. As a result, some applications constantly disconnect in this environment leading to a poor user experience and significant drops in productivity.

Total cost of operations (TCO)

To cover the footprint of a distribution center, Wi-Fi requires a large number of access points - especially in outdoor yards. Significant engineering resources are needed to undertake complex mesh deployments and install new cabling to connect the access points. Overall this leads to an extremely high total cost of ownership.

Future applications

Applications such as autonomous guided vehicles (AGV), high-def video surveillance, and automated gate check-in/exit of vehicles all require a far more reliable and consistent wireless link than Wi-Fi can deliver.

Celona Private wireless to the rescue

Private wireless offers a far better solution for dispersed industrial environments.

Celona Access Points

Comprehensive 4G, 5G portfolio

Celona Edge

Converged 4G & 5G core

Celona Orchestrator

Converged 4G & 5G ops

Widely considered the most comprehensive private wireless solution for today's enterprise, Celona private wireless promises industrial strength wireless connectivity, performance, and mobility.

The turnkey solution includes LTE/5G access points, a converged LTE/5G network edge hardware/software, radio resource management software, and cloud-based orchestration tools.

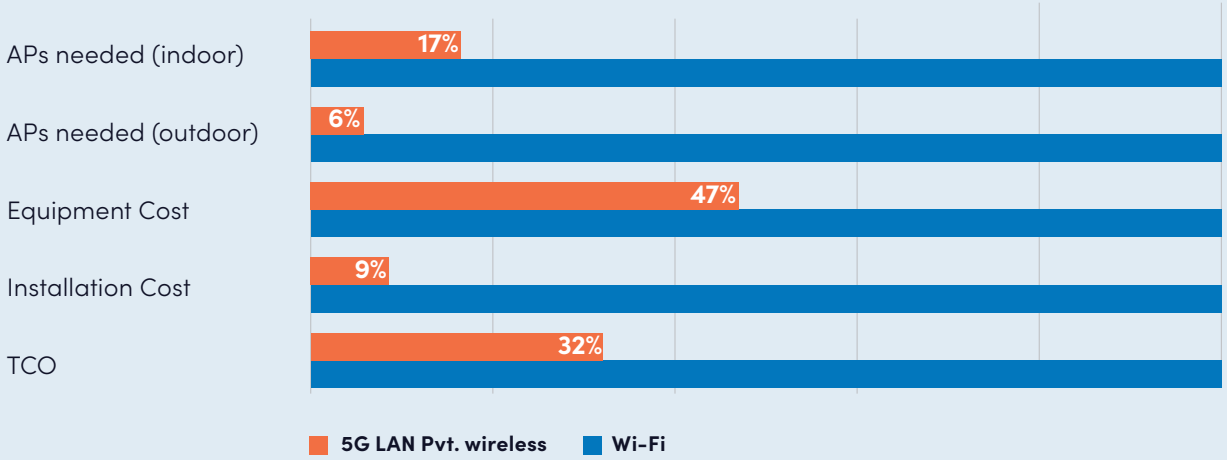
Wi-Fi woes addressed by Celona Private wireless

	Wi-Fi technologies	Celona private wireless
Coverage	Poor network coverage due to lower transmit power and susceptibility to spectrum noise and co-channel interference.	More pervasive wireless due to higher transmit power, lower noise floor and low wireless interference spectrum.
QoS	No guarantee on throughput and latency since Wi-Fi does not support deterministic QoS with strict priority. While Wi-Fi 6/6E APs can use OFDMA to schedule packets to multiple mobile devices for download, APs still need to use contention-based (CSMA-CA) requiring devices to "fight" for access, making prioritizing challenging.	Guaranteed SLA for critical applications. 5G LAN features MicroslicingTM technology that enables deterministic QoS with strict priority on a per device, per application basis. Guaranteed bit rate and guaranteed latency values can be configured for each device and application.
Mobility	Not designed for seamless mobility. Wi-Fi requires the client to perform off-channel scanning to connect to APs. The roaming decisions are controlled by the client rather than infrastructure.	Cellular networks are designed natively for seamless mobility. The network infrastructure controls handover decisions that are precisely timed.
TCO	More APs are required due to lower coverage range of Wi-Fi. Outdoor installs require expensive installation, trenching and cabling.	Fewer APs due to higher coverage range of Private Wireless. Outdoor APs can be roof mounted to provide very large outdoor coverage, avoiding cost of trenching, cabling etc.
Security	Many Wi-Fi networks utilize pre-shared keys and open SSIDs to allow for IoT and/or guest device connectivity – opening doors to additional risk factors for critical enterprise infrastructure.	End-end security for data in-flight and at rest secured using SIM/eSIM technology.

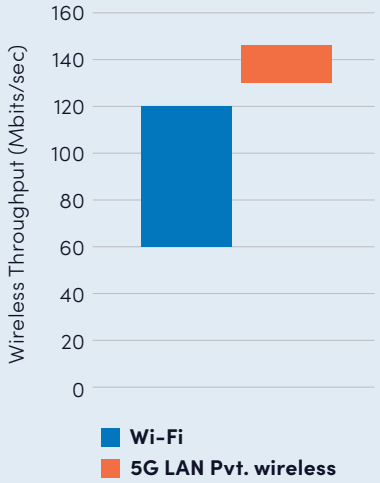
Performance of private wireless vs. Wi-Fi

Comparing Wi-Fi and Pvt. Cellular

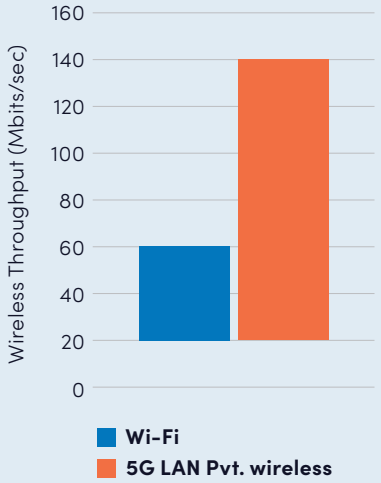
(Based on data from an actual Distribution Center)



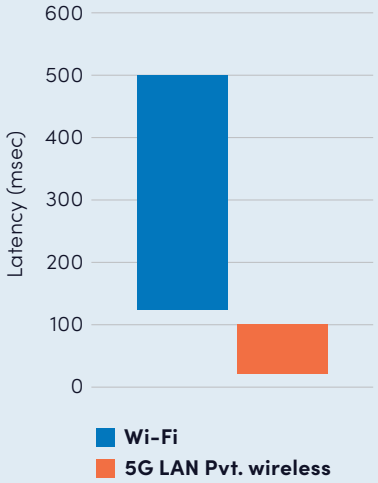
Throughput in a Loaded network



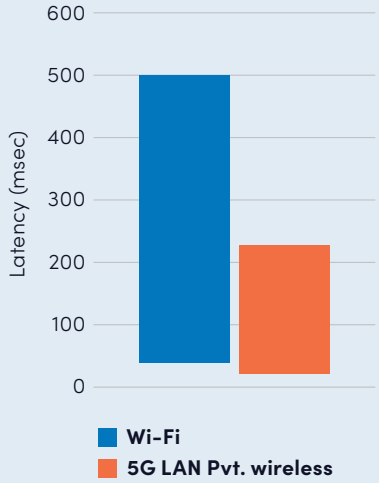
Throughput in motion



Latency in a Loaded network



Latency in motion



Why use Celona 5G LAN at distribution centers?

The industry's only turnkey private wireless expressly engineered for the enterprise

Celona 5G LAN delivers an end-to-end solution from the radio, core, and spectrum management to network and subscriber management systems. It's built from the ground up to create the best possible Day 0, Day 1, and Day N experience for customers at a lower TCO.

5GLAN ROUTING FEATURE BRIEF

Industrial strength private wireless designed for the most critical business apps

Business critical apps need deterministic performance from wireless, but the exact requirements vary from app to app. Celona 5G LAN features MicroSlicing technology for deterministic performance for all your mission critical applications.

MICROSLICING FEATURE BRIEF

Tight integrations to secure all wireless communications

A business-critical wireless network requires enterprise grade security to protect against cybersecurity threats. The Celona 5G LAN solution extends the inherently strong security architecture of cellular networks, such as support for eSIM and IMEI lock, with a tight integration between existing enterprise security systems to safeguard the network from edge-to-cloud.

5GLAN SECURITY WHITE PAPER

Enterprise friendly management and operations

Get unmatched simplicity and use-of use with Celona's cloud-based management system for deploying, configuring, and monitoring your private 5G network.

ORCHESTRATOR BRIEF

Global spectrum model support

A wide range of spectrum bands for LTE and 5G ensure Celona is an ideal fit for global facilities looking for a common networking infrastructure.

AP PRODUCT BRIEF

Device certification program eliminates guess work on compatibility

Many popular devices used at distribution centers are certified to work with Celona private wireless:

Zebra TC26, TC58, TC78
Zebra ET45, ET85
Zebra L10 Series tablet
Honeywell CT47
Getac: ZX10, F110G6
Digi: EX50, iX10
Sierra Wireless RV55
Cradlepoint R500
MultiTech MultiConnect rCell 600

SEE FULL LIST OF CERTIFIED DEVICES

Real-life case study: Celona in action

In a paid study conducted by Celona, several stakeholders at a functioning warehouse were asked about their wireless requirements and operational challenges associated with poor connectivity. With both the Wi-Fi and Celona's 5G LAN Private Cellular solution available at the warehouse, researchers performed a comprehensive analysis and comparison of the two wireless technologies in terms of network performance and Total Cost of Ownership (TCO).

Watch the webinar replay to learn the findings and recommendations for IT managers deploying wireless not only at Warehouses and distribution centers, but also at seaports, construction sites, oil and gas fields

WATCH WEBINAR

Learn more about the Celona Platform

Start your journey with Celona >

Custom demo >

Network Planner >

TCO and ROI Calculator >

Free Trial >

celona

celona.io

hello@celona.io
900 E Hamilton Ave Suite 200
Campbell, CA, 95008, United States