Major multinational retailer chooses EXFO to help automate its supply chain

success story

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Challenges

- Validating signal quality of unlicensed spectrum like CBRS at installation
- Ensuring seamless deployments without failures during activation
- Integrating system components within tight timelines

EXFO solution

EXFO Exchange: Collaborative software platform interconnecting all parts of a customer's field test ecosystem

FIP-435B: Wireless scope enables connector certification in one step

FTB 5GPro: 5G and 4G/LTE tester including CPRI/eCPRI BERT, to validate links between a BBU/DU and radio (RRH/RU), Available with:

- iOptics: Automated application, efficiently validates the proper operation of optical transceiver interfaces from 1G to 400G
- 5GPro Spectrum Analyzer: Coverage mapping and transmission validation, followed by RF spectrum clearing and interference hunting. Covers FR1 (sub-6 GHz) and FR2 (mmWave)

Benefits

- Streamlined testing processes enabling rapid deployment and quicker troubleshooting of private 5G networks
- User-friendly, automated testing solutions delivering accurate results
- Consistent, repeatable results, supported by advanced monitoring and analytics technologies

Introduction

The push for supply chain automation is gaining momentum in the retail sector, driven by technologies like large-scale warehouse data-entry machines, delivery route optimization systems, and robots designed to sort and pack orders efficiently. These advancements are aimed at enhancing operational efficiency while delivering a superior customer experience.

Customer challenge

WiFi isn't enough anymore

Traditionally, warehouses and distribution centers have depended on WiFi to meet their needs. However, as businesses advance their efforts to automate and modernize, WiFi's limitations become apparent. Being a best-effort service, WiFi doesn't provide guaranteed bandwidth or quality, which are crucial for the reliable operation of robots on an automated order fulfillment floor. A fully automated supply chain environment demands robust network connectivity, where low latency, high throughput, and network performance are critical. A private wireless network offers a more advanced solution, driving innovation and proving to be more cost-effective over time.

Transitioning to a 5G standalone network

Recently, a leading multinational retail corporation began incorporating advanced automation technologies into its e-grocery services. During the deployment of an automated system using mobile robots for store-level fulfillment, it quickly became apparent that a robust network with minimal latency was essential. This was necessary for real-time data processing and uninterrupted connectivity across all robotic systems.

Initially, the company implemented a WiFi network. However, with strict latency requirements as a key performance factor, they quickly recognized the need to upgrade to a 5G standalone (5G SA) network that uses the CBRS spectrum band. With advantages such as enhanced reliability, security, reduced latency, and greater customization, private 5G networks are becoming the go-to choice for businesses embracing Industry 4.0 and automating their operations.

EXFO's cloud-hosted, collaborative test-results platform, EXFO Exchange, allowed for comparative analysis of network test results, ensuring compliance and identifying any system degradation over time. Plus, monitoring every step with EXFO Exchange will help make scaling easier and more efficient.

EXFO's solution

Automating the "Add to cart" process

Before the new network went live, the retailer required comprehensive testing. EXFO provided the necessary testing equipment to the integrator responsible for deploying the private 5G network, ensuring seamless signal transmission across network components. After deployment, the equipment was transitioned over to the IT manager for ongoing troubleshooting support.

Advancing e-grocery with automation

The retailer faced several testing challenges, including validating the CBRS spectrum and signal quality at installation, ensuring seamless deployments without failures during activation, and integrating system components within tight timelines. Every element of the 5G network was meticulously tested and validated. The simplicity-of-use of EXFO test solutions ensured that technicians at any skill level could efficiently use the provided tools. Additionally, EXFO's cloud-hosted, collaborative test-results platform, EXFO Exchange, allowed for comparative analysis of network test results, ensuring compliance and identifying any system degradation over time. Plus, monitoring every step with EXFO Exchange will help make scaling easier and more efficient. Adhering to stringent industry standards, EXFO's solutions delivered reliable, repeatable results, enabling technicians across various locations to maintain the same high level of accuracy as the e-grocery chain expanded its automation initiatives.

Implementation

The EXFO equipment was pivotal in validating the private wireless network at the retailer's initial warehouse location, covering every component—from the core network and fiber optic infrastructure to the radio access and backhaul networks, and IoT devices.

Step one: fiber inspection and spectrum clearing

The testing process began by inspecting all fiber connections using EXFO's FIP-435B wireless inspection probe to ensure proper installation. Technicians also conducted spectrum clearing using the 5GPro Spectrum Analyzer, part of the FTB 5GPro all-in-one 5G and 4G/LTE tester. They checked for any interference from neighboring networks that were using the same band.

Step two: deploying radios

Following the fiber inspection and interference checks, radios were deployed. Technicians then validated optical transceivers using EXFO's iOptics test application, the industry's first automated validation tool for optical transceivers. Next, they tested the fiber backhaul using the FTB 5GPro Ethernet test suite and validated that the service provider link was functional. Additionally, the radio link was validated using eCPRI BERT, and a discovery tool was used to both verify that MAC and IP addresses were configured correctly and to ensure fibers were not crossed.

Step three: final check and activation

After the network was activated, technicians conducted a final walk-through to check signal levels and ensure there were no dead zones. They verified power levels to confirm proper network transmission, ensuring uninterrupted operation for the robots, which were then activated to begin their tasks within the warehouse like starting to load inventory.

Additional references

Application note
The importance of interference hunting in 5G network deployment and operation

Flyer
Quickly resolve issues, lower operating costs and improve 5G network performance

Results

The shift toward Industry 4.0 and operational automation is driving a growing demand for private 5G network solutions. These networks deliver clear benefits over their public counterparts, such as increased reliability and security, reduced latency, and customization to meet specific business needs. Companies implementing private 5G networks and automated e-commerce systems have reported a significant return on investment, with order fulfillment speeds up to 200 times faster.

EXFO enabled this customer's rapid deployment of private 5G networks with user-friendly testing solutions that deliver consistent, repeatable results, supported by advanced monitoring and analytics technologies.

Conclusion

EXFO enhances the network testing process for fixed and mobile network operators, hyperscalers, and companies in manufacturing, development, and research. Through a combination of cutting-edge equipment, software, and services, EXFO empowers customers to confidently deploy 5G, cloud-native, and fiber optic networks swiftly and efficiently. EXFO Exchange's cloud reporting empowers IT managers to closely monitor each step, ensuring rapid and efficient scaling. This real-time oversight helps them make informed decisions such as optimizing resource allocation. These streamlined testing processes and cloud-reporting capabilities accelerate deployments and enable quicker troubleshooting with intuitive, automated solutions that provide precise, reliable results every time.