RAJANT

RAJANT KINETIC MESH®

The Autonomous M2M Network Made to **Advance Industrial Wi-fi Indoors**

From warehouses to manufacturing, indoor industrial enterprises today must operate at peak efficiency, 24/7, to keep up with growing customer demands. Many are turning to robotics and automation to optimize workflows and drive higher levels of throughput. These technologies are proving to have a transformative impact on indoor operations, giving new ability to automate repetitive tasks, augment worker productivity, improve picking and sorting accuracy, and speed

However, the more automated and autonomous warehouse systems become, the more demand they have for continuous mobile connectivity. If these machines lose communication even momentarily, they will stop running, which greatly impacts fulfillment workflows and productivity. This is a challenge for traditional wireless networks which rely on fixed infrastructure. They can't easily work around obstacles commonly found on the warehouse floor, like metal pallet racks that cause interference and signal blockage. Further, when mobile robots are moving between the racks, operators have no way to keep them connected without adding additional costly network infrastructure.

That's where Rajant Kinetic Mesh® comes in solving industrial Wi-Fi problems. Our network enables warehouse operations to become smarter, more autonomous, and more mobile because the network itself is intelligent, self-optimizing, and uniquely able to support machine-to-machine (M2M) communications between equipment on the move.

Rajant Solves Wi-Fi Problems: **The Network to Optimize Automated Processes & Workflows**

Rajant's Kinetic Mesh private wireless network is built to perform exceptionally in busy warehouses, where fast-paced fulfillment is crucial and mission-critical connectivity is required to keep automated processes running. BreadCrumb® nodes, which comprise the network, can be deployed directly on warehouse machinery – like mobile robot pickers – providing adaptive coverage across the indoor space, personnel, and machines need to get their jobs done. **Here's how.**

Multi-radio, multi-frequency network nodes ensure connectivity.

Rajant BreadCrumbs can hold many connections over multiple frequencies simultaneously. These nodes work peer-to-peer to form robust and redundant links, creating hundreds of potential paths over which to direct traffic. All BreadCrumbs are infused with the intelligence of Rajant's InstaMesh® networking software, and Kinetic Mesh is the only network that can continuously and instantaneously route traffic via the fastest path for real-time delivery. If a path becomes unavailable due to signal blockage or interference – for example when a delivery robot moves behind a metal forklift – InstaMesh will instantly redirect communications over the next-best available path(s) or frequency. It does this without outside intervention, maintaining optimal packet delivery and constant communication needed for the complex automation and robotics equipment in an automated indoor facility.

Compact, lightweight nodes enable fast and flexible deployment.

Built to operate reliably in industrial environments, compact Rajant BreadCrumbs can be deployed on fixed infrastructure or as mobile nodes, bringing ubiquitous coverage to every corner of the indoor space. They can also transform robotic assets into network infrastructure, with nodes easily deployed on autonomous robots, automated guided vehicles, and other machinery that roam the warehouse floor – enabling them to take coverage with them wherever they go. What's more, instead of having to piggyback off fixed infrastructure, BreadCrumb-equipped machines can communicate directly. In fact, Rajant is the only wireless network to enable M2M communications, providing a robust solution to connect equipment between the racks using minimal infrastructure.

The self-optimizing network provides an easy-to-scale solution.

Kinetic Mesh networks are readily scalable to hundreds of high-bandwidth nodes, and only grow stronger as more nodes are added because more paths become available. Plus, there is total flexibility to add or move nodes easily and quickly because the network is able to dynamically self-optimize. After initial configuration, when new BreadCrumbs are turned on, they automatically begin communicating with other nodes in the area. This makes it fast and easy to increase capacity or extend coverage where needed throughout the indoor environment without frequent engineering intervention.

Powering Indoor Systems Wirelessly:

What's Enabled with Kinetic Mesh

Rajant's intelligent network supports automation platforms with the adaptable, flexible, and secure coverage needed to run next-gen indoor industrial applications that transform operational effectiveness and generate increased ROI.

Ensure indoor-Wide, Mission-Critical Coverage

Overcome Wi-Fi problems with 'never-break' wireless communications that autonomous systems demand. Remove the concerns metal shelving and equipment bring to unblock RF signals with a mesh that is genuinely redundant and scalable. Wi-Fi has a limited range and eventually loses connectivity, which we deal with in our homes daily. It's ill-suited for industrial operations requiring modernized on-the-move automation to maximize productivity, speed, and accuracy.

Proactively Optimize Equipment Health and Performance

The continuous mobile connectivity provided by Rajant Kinetic Mesh can provide telemetry to monitor equipment health dynamically. Supervisors can predict maintenance needs to minimize disruptions and downtime with proactive insight into the status and performance of machines throughout the operations, even as they roam the floor.

Telemetry from onboard sensors on automated or autonomous platforms is also needed to remotely guide these systems with the utmost accuracy, avoiding collisions or compromising safety. Kinetic Mesh ensures high throughput with low latency, providing the bandwidth required to support the tremendous input and output data volumes constantly being transmitted as it performs tasks.

IDEAL BREADCRUMBS FOR WAREHOUSE NETWORKS

*Optimized for mobility, the **Hawk BreadCrumb** is a high-performance industrial-grade node gives higher throughput with enhanced security performance using 256QAM, 80 MHz channels, and hardware acceleration.*

*The **ES1 BreadCrumb** comes in a compact, lightweight, IP67 package ideal for deployment on forklifts and stackers as well as autonomous robots. It provides great flexibility with multiple mounting options.*

*Encased in magnesium and weighing in at only 123g, the **DX2 BreadCrumb** is the smallest, lightest node with a single 2x2 transceiver and is designed for lightweight autonomous vehicles, drones and robots.*

BreadCrumbs can be easily placed where needed to work around any obstructions. Dropped data is a thing of the past as nodes are deployed on mobile assets working between the racks to readily extend coverage in the hardest-to-network areas, keeping machines and people, people and people, and machines and machines all interconnected. BreadCrumbs can be easily placed where needed to work around those obstructions. Nodes deployed on robots and equipment working between the racks readily extend coverage in the hardest-to-network areas, keeping machines and people, people and people, and machines and machines all interconnected

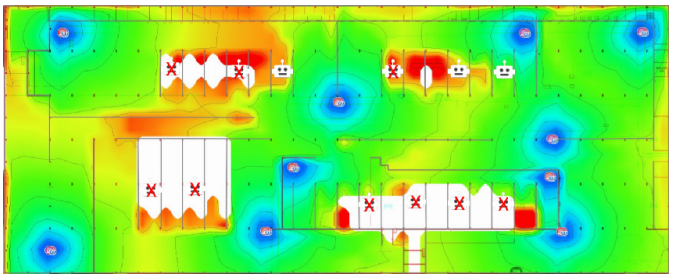

Figure 1. An enterprise Wi-Fi solution using 10 infrastructure pieces is unable to cover the entire indoor industrial space. Clients on mobile machines are unable to connect and entire corridors are left without coverage.

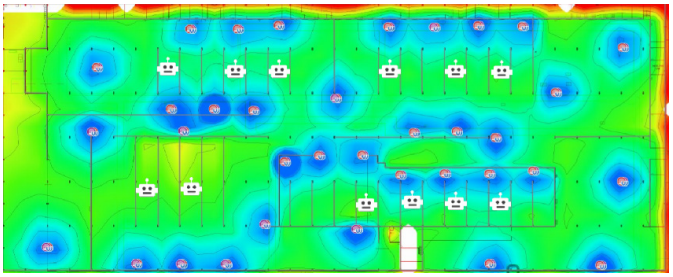

Figure 2. The solution to provide coverage for the entire floor of an indoor facility using a traditional enterprise Wi-Fi technology is to add in more nodes. The total number of infrastructure is now at 35 nodes to completely cover the area.

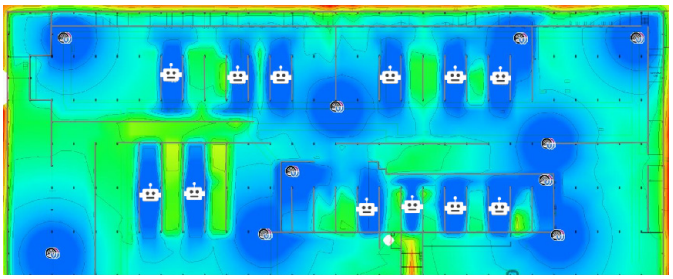

Figure 3. Utilizing the M2M communications, a Rajant solution only needs to utilize 10 infrastructure and a few mobile machine nodes to provide complete coverage to the entire indoor industrial space. Why? Because Rajant BreadCrumbs transmit at much higher Tx power than typical Wi-Fi, providing significantly better coverage while M2M allows robots, and anything mobile, to extend coverage and fill coverage gaps.

APPLICATIONS ENABLED

Kinetic Mesh supports all the intelligent equipment and applications used in indoor industrial settings to keep operations moving efficiently, reliably, and securely, including:

Automation & Remote Control

- Machine-to-Machine (M2M) Communications
- Process Monitoring & Automation
- Autonomous Mobile Robots

Asset Tracking & Optimization

- Telemetry from Sensor Networks
- Fleet Management
- Equipment Health Monitoring
- Real-Time Asset Tracking
- Predictive Maintenance Analysis
- Video Analytics (Temperature Monitoring and Asset Inventory Management)

Rajant Private Wireless Networks: **Ultra-Reliable Connectivity for Complex Indoor Wireless Automation**

Today's indoor operations – from farming to manufacturing to fulfillment– are under pressure to advance their efficiency and productivity while lowering overhead costs. Faced with a limited labor pool, many are turning to automation and autonomy to solve challenges. Kinetic Mesh's highly differentiated, fully mobile network, infused with the intelligence to continuously self-optimize, provides the everywhere coverage indoor industrial environments need to enable automated equipment and robotics to run without fail. With Rajant, operators can easily deploy the next-gen applications needed to modernize operations fast.

We'll show you the opportunities that a smart network can bring to your indoor environement. **Visit rajant.com/indoor-wifi** to get started and to **download a white paper**.

Tel: 484.595.0233 | **www.rajant.com**

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20+ Years OF GAME-CHANGING WIRELESS

RAJANT

*If it's **moving**, it's Rajant.*
*Industrial Wireless Networks **Unleashed.***