

Solving Connectivity Gaps and Device Reliability Issues with Sparro Adaptive Route Control

In industries like fleet management, logistics, smart manufacturing, healthcare, retail, and hospitality, mobile devices are essential tools for efficient, real-time data capture. Analysts project continued rapid growth in the use of these tools:

- Analysts estimate the 2024 market for industrial tablets at USD 1.05 billion. By 2029, that market is expected to increase to USD 1.44 billion.
- Market Research Intellect anticipates that the global market for fleet management tablets will grow at a CAGR of 11.93% between 2024 and 2031.

Fleet drivers, logistics operators, and factory floor workers all depend on tablets to log data, track assets, and manage routes. Yet, these devices often struggle with connectivity gaps and reliability issues, especially in remote or high-demand environments. Although many fleet management connectivity and device management solutions claim to solve these challenges, gaps remain, particularly in providing seamless, adaptive connectivity and long-lasting device performance.

In this white paper, we describe the most common issues and gaps that exist today and address how Sparro Adaptive Route Control (ARC) fixes these gaps seamlessly. We also discuss Sparro ARC's unique approach to connectivity and device health and how ARC enables actionable insights that help transform your business operations.

Connectivity Struggles: A Pain Point Across Industries

For teams operating in areas with spotty connectivity, unreliable devices can mean delayed updates, incomplete data, and disrupted workflows. Whether fleet drivers on the road, logistics teams coordinating from remote warehouses, or factory workers on the shop floor, each relies on stable, reliable connectivity for efficient operations. However, connectivity gaps in fleet and logistics lead to manual workarounds and operational inefficiencies:

- For **fleet management**, spotty connectivity affects real-time data logging and route tracking, posing compliance risks and potentially incurring penalties.
- In **logistics**, poor connectivity complicates delivery schedules, asset tracking, and inventory management.
- For **smart factories** using IIoT (Industrial Internet of Things) devices, limited connectivity can disrupt automated systems and create costly downtime.
- Across industries, connectivity issues can result in data gaps, hindering the real-time decision-making that is necessary to stay competitive.

Battery Life and Device Durability

Maintaining battery life and ensuring device durability are universal issues across the sectors noted above. These environments demand high performance from devices in often rugged conditions. For fleet drivers, dead or near-dead batteries can mean lost data and compliance issues. In logistics, operators need reliable tablets that will continue operating even under heavy usage and unpredictable warehouse conditions. Factory workers, too, depend on tablets to keep assembly lines moving, but intense usage and the increasing number of IIoT devices can result in quickly draining batteries.

Device failure not only slows down workflows but also places added strain on IT teams, who must troubleshoot hardware and software issues. Traditional mobile device management (MDM) solutions can help, but they often lack the comprehensive diagnostics IT teams need to identify root causes efficiently, leading to time-intensive manual problem-solving.

Current Gaps in Traditional Solutions

While many MDM and traffic-steering tools offer basic connectivity and battery features, few are designed to meet the unique demands of fleet, logistics, and smart factory environments. Traditional solutions often lack features like adaptive signal optimization and remote device diagnostics. These gaps can lead to costly downtime as teams troubleshoot unknown issues manually. Workers also may lose time as they struggle to maintain the connectivity needed to meet the requirements of their jobs. Most existing solutions aren't robust enough to handle operational challenges and provide remote diagnostic support, let alone actionable insights to improve operations.



How Sparro ARC Stands Out

Sparro ARC approaches these challenges differently, achieving better results and seamless operation by combining optimization and intelligence to meet the needs of sectors like fleet management, logistics, and smart manufacturing. Our designers engineered these features to maximize uptime, connectivity, and resilience across environments.

Sparro ARC supports significantly improved device performance by focusing on three factors:

- Adaptive signal optimization Sparro ARC continuously adapts to find the most stable network, seamlessly steering and switching traffic between networks according to application needs and network conditions. This minimizes connectivity gaps even in remote or high-traffic areas, ensuring fleet drivers, warehouse operators, and factory workers stay connected for efficient operations. Using QoS policies, Sparro ARC can proactively make network switching decisions before a failure occurs for improved performance.
- In-depth health monitoring For teams with demanding usage, Sparro ARC's in-depth battery and network health monitoring ensures device uptime. Management and workers receive real-time alerts, as well as information highlighting patterns over time that can be detrimental to battery and network health. This proactive approach catches potential failures before they occur, keeping devices running smoothly through long shifts and challenging environments.

Comprehensive diagnostic support for IT teams -Unlike traditional MDM solutions, Sparro ARC provides detailed diagnostic insights so IT teams can remotely identify and address device reliability issues. The ability to review contextual information is invaluable, particularly in fleet tracking, where IT needs these greater insights to troubleshoot quickly. Sparro ARC's remote view and control capabilities empower teams with seamless workflows and actionable insights.



We describe each of these three aspects in more detail below.

Sparro ARC Optimizes Traffic Steering for Superior Quality of Service

Despite the necessity and ubiquity of industrial mobile devices, they often struggle with connectivity gaps, especially in remote or high-demand environments. Some solutions claim to solve these challenges, but they haven't all been able to ensure seamless, adaptive connectivity.

Sparro ARC goes beyond existing solutions to ensure seamless, adaptive connectivity and fewer business interruptions.

The importance of traffic steering in modern networks

Unreliable connectivity for mobile devices in industry means delayed updates, incomplete data, and disrupted workflows. Fleet drivers, logistics teams, and factory workers all rely on stable, reliable connectivity for efficient operations:

- Spotty connectivity in fleet management affects real-time data logging and route tracking. This results in compliance risks and potentially costly penalties.
- Poor connectivity in logistics settings complicates delivery schedules, asset tracking, and inventory management, increasing costs and decreasing the quality of service provided.
- In smart factories using IIoT (Industrial Internet of Things) devices, limited connectivity can disrupt automated systems, resulting in costly downtime.

Connectivity gaps often lead to manual workarounds, creating operational inefficiencies. These issues also result in data gaps, hindering the real-time decision-making that is necessary to stay competitive.

How ARC enhances traffic steering

Sparro ARC offers uninterrupted connectivity across all devices. To accomplish this, ARC creates a VPN tunnel that sends all traffic through the ARC application. This application is smart enough to steer traffic from one wireless medium to another – for example, from Wi-Fi to cellular or other licensed networks and vice versa. In Q2 of 2025, ARC will add satellite/LEO mobility.

ARC complements 3GPP Access Traffic Steering, Switching & Splitting (ATSSS) with additional features for improved performance and flexibility:

- ARC supports application-based traffic steering & switching, with a network-controlled steering policy per data flow. It also supports uplink and downlink on different network interfaces.
- ARC routes Wi-Fi traffic through the provider's network. (In traditional ATSSS, Wi-Fi traffic traverses the 5G 3GPP core, which is not useful for MVNOs (Mobile Virtual Network Operators).)
- While Wi-Fi & mobile traffic can be anchored to a network server, ARC can provide local breakout for specified traffic to bypass the ARC tunnel for improved battery life and cost savings.
- ARC classifies data flows in application types without any DPI (deep packet inspection) or packet marking.
- Whereas traditional ATSSS requires a 5G standalone core network (user & control plane), ARC works with any mobile network, including 3G, LTE, and 5G networks.
- ARC does not require 5G standalone headsets.
- ARC network components (containers) can be deployed in a central location (as in traditional ATSSS) or distributed at the edge where low latency or geographical load balancing is required.

Quality of Service (QoS): Ensuring seamless performance

Enhanced traffic steering is crucial for improved and seamless connectivity, but another important aspect is quality of service (QoS). QoS uses traffic steering to prioritize critical applications and services. This network management approach improves reliability and performance by reducing latency and congestion.

For example, Sparro ARC's QoS capabilities prioritize time-critical information such as GPS data for fleet drivers. ARC can determine which traffic needs to be prioritized and rerouted to avoid lag – like an emergency vehicle taking a service road to bypass stuck traffic on the freeway.

Why is ARC the smart choice for network connectivity?

While other solution providers have discussed the importance of QoS for network traffic steering applications, few have demonstrated proof of concept. With its combination of traffic steering and QoS, Sparro ARC is unique in the industry. Our combination of features allows ARC to make network-switching decisions before a failure occurs, yielding the stable, reliable connectivity that fleet drivers, logistics teams, and factory workers rely on for efficient operations.



Sparro ARC Enhances Network Performance with Advanced Device Health Monitoring

For businesses that depend on connected devices, maintaining performance and reliability is essential. Whether it's ensuring handheld scanners in a warehouse stay operational or keeping tablets functioning for fleet and logistics tracking, device health directly impacts productivity and customer satisfaction.

Sparro ARC takes device monitoring to the next level for improved performance and faster problem solving. By providing detailed, actionable insights into device and network health, ARC empowers businesses to anticipate and resolve problems before they cause downtime. More than just data collection, it's a smarter way to manage the tools that keep your operations running.

What makes Sparro ARC's monitoring unique?

Sparro ARC delivers a comprehensive view of device health and performance, offering much more than typical solutions. It monitors critical metrics like battery health, connectivity, and network performance. For example, it tracks charging patterns, apps draining power, and temperature and voltage fluctuations to help prevent unexpected device failures. With this level of visibility, businesses can extend the life of their hardware while improving overall efficiency.

Connectivity is another area in which ARC shines. It maps when and where devices lose connections, highlighting issues like VoIP call failures or prolonged downtime due to signal loss. Teams can use these insights to address weak points in their networks and optimize workflows.

ARC's network health tools go even further, analyzing packet loss, latency, and data usage. ARC pinpoints inefficiencies or problem areas in real time so teams can act fast and maintain uninterrupted service.

ARC improves uptime by analyzing data usage patterns and health stats over time and per site for insights into potential problems before devices fail.

Examples of industry use cases

ARC's advanced monitoring capabilities are useful in many sectors where operational efficiency and uptime are non-negotiable.

For example, in **logistics**, reliable devices keep supply chains moving. ARC helps track battery life and connectivity, ensuring tablets and scanners stay functional throughout long shifts. Such information can also help management plan for device charging and swapping between shifts rather than having devices fail unexpectedly and halt operations.

Device uptime is crucial for **fleet tracking**, where real-time information is required not only for route and shipment planning but also for regulatory compliance.

Healthcare teams rely on connected devices to manage workflows and patient care. ARC ensures these tools perform reliably, reducing disruptions that could impact critical tasks and patient care.

Retailers benefit from consistent device performance, particularly for handheld POS systems. With ARC, businesses can prevent unexpected failures that could slow down checkout lines and create inventory tracking issues.

Even in **hospitality**, where guest satisfaction is key, ARC monitors devices such as tablets used by front desk staff and check-in kiosks that support customer-facing services, ensuring smooth operations and an enhanced guest experience.

Why choose ARC over other solutions for device health monitoring?

Many existing monitoring solutions stop at basic metrics, leaving businesses with gaps in their understanding of device performance. Sparro ARC closes those gaps. By offering in-depth insights like battery temperature and voltage trends, connectivity loss stats, and network health analysis, ARC gives businesses the tools to act proactively.

ARC's user-friendly dashboards further set it apart, making it easy to turn complex data into actionable strategies. Unlike other platforms that require technical expertise, ARC empowers every team member to contribute to improved device performance.

The Sparro ARC advantage

ARC isn't just a monitoring tool; it's a strategic advantage. By providing deep insights into device and network health, it helps businesses avoid downtime, reduce costs, and maintain seamless operations.



From Monitoring to Insight: Sparro ARC's Unique Approach to Mobile Device Management (MDM)

Managing a fleet of devices at scale is no small task. From troubleshooting issues to maintaining optimal performance, IT teams often face challenges that slow down operations. The task becomes ever more challenging as the use of tablets in industrial settings continues to grow quickly. Sparro's ARC solution changes the game by offering advanced tools that provide not just oversight but actionable insights.

ARC vs. traditional MDM solutions

Most MDM solutions only handle basic tasks like monitoring and updates. ARC takes it further by offering tools built to solve the real challenges businesses face at scale:

- 1. One dashboard, total control Manage every device across your organization from one simple, centralized platform. No guesswork, no complexity just full visibility and control.
- 2. Deploy in hours, not weeks Eliminate the chaos of manual steps. ARC streamlines the deployment of thousands of devices with tools designed specifically to handle large fleets of devices.
- **3.** Secure, tailored updates Push updates to devices safely, ensuring every team member has what they need to perform without risking security.
- **4. Scale with confidence -** ARC doesn't just adapt to your business it grows with it. Customize your strategy to manage hundreds or thousands of devices without disruption.
- 5. Solve problems in real-time With remote view and control, your team can troubleshoot and fix issues instantly no downtime, no delays. This Instant-Replay capability is a game changer for device management, supporting fleets, logistics, airlines, and industrial factories.

ARC isn't just another average MDM – it's a smarter, more flexible way to handle fleet management.

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Instant replay makes ARC's MDM unique

One of ARC's standout features is the ability to create instant replays, offering a detailed look at what led to device issues.

To support this, ARC captures screenshots and even video, along with key device health metrics, at the time of a device failure. This aids in faster problem resolution by providing a more complete picture of what was happening at the time of failure. IT teams can analyze this data to pinpoint the root cause, whether it's a failing component, a network hiccup, a misconfigured app, or user error.

MDM with instant replay offers unparalleled visibility into device performance issues. This unique capability, combined with ARC's comprehensive MDM toolkit, helps organizations resolve problems faster, optimize performance, and avoid recurring issues.

Examples of industry use cases

ARC's MDM capabilities are ideal for industries where uninterrupted device performance is crucial. For example:

- **Logistics** Keep delivery route trackers and warehouse devices running efficiently. Analyze replays to identify network or hardware bottlenecks.
- **Healthcare** Diagnose and resolve issues with tablets or diagnostic devices remotely before they can disrupt patient care. Instant replays can identify why a critical device failed, allowing teams to act swiftly.
- **Retail** Monitor and maintain POS devices to avoid customer-facing delays. Replay insights help uncover connectivity or software issues impacting transactions.
- **Hospitality** Manage in-room tablets and service devices to ensure a seamless guest experience. Proactively resolve issues that could affect operations without requiring technicians on-site.



Smarter device management starts with Sparro ARC's MDM

ARC's mobile device management capabilities empower organizations to move from reactive troubleshooting to proactive management. With ARC's instant replays and actionable insights, IT teams can identify, resolve, and prevent issues more efficiently than ever before.

Sparro ARC: A Solution Built for Demanding Environments

Sparro ARC's combination of adaptive connectivity, proactive device management, and diagnostic support gives fleet, logistics, and smart factory managers the confidence that their devices will stay connected and operational. For drivers, warehouse operators, and factory workers, Sparro ARC keeps devices operating reliably. For IT teams, it streamlines troubleshooting and reduces downtime with comprehensive remote diagnostics. By addressing connectivity gaps, battery challenges, and durability issues, Sparro ARC delivers a reliable solution for even the toughest environments.



Need reliable and adaptive connectivity and device management for industries like fleet, logistics, or smart manufacturing? Contact Sparro to discover how Sparro ARC helps transform the way you manage your operations.



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