SIERRA WIRELESS

White Paper

Leveraging the IoT Revolution in Fleet Management

A SIERRA WIRELESS WHITE PAPER

Current fleet management solutions aim to improve the efficiency and safety of fleet operations. But even as fleet owners manage the daily challenges of optimizing fleet operations, from fuel consumption to driver performance, they must meet new requirements.

Growing emphasis on energy savings and vehicle safety means fleet operators need more help to meet new government regulations while achieving their own business goals for reducing total cost of ownership (TCO).

A recent survey[1] of more than 130 fleet owners reported that Risk & Safety is the top priority, followed by Improving Data Management – a significant change since 2013 when this was ranked 6th overall. Reducing overall fleet budgets including maintenance costs and fuel spend are always priorities, while interest in telematics is increasing.

The Internet of Things (IoT) is widely regarded as a disruption in fleet management. The vehicle-to-cloud vision relies on wireless connectivity to enable a wide range of features that deliver benefits over the life cycle of a fleet, from vehicle acquisition to final depreciation. When vehicles are part of the IoT, real-time data can be collected to subsequently analyzed from the cloud to gain insights for both drivers and fleet operators that make operations safer, and more cost-effective.

1. Source: Element Fleet Management 2015 Fleet Policy Survey Results.

In bringing vehicles into the IoT, however, solution providers and fleet owners must consider a more complex scenario than a simple connected black box. They must address issues such as reliable connectivity across carrier coverage areas, compatibility with evolving networks, the ongoing cost of adding new functionality, and upgrading units in the field. As IoT-centric services mature, solutions should offer fleet operators the flexibility to select from bundled connectivity services that are suitable for both CAPEX and OPEX business models.

Introduction: Driving the IOT Revolution in Fleet Management

There are more than 330 million commercial vehicles on the road today. While these represent less than one-third of the 1.2 billion vehicles in use around the world, the average commercial vehicle travels greater distances than private cars and are responsible for a proportionately higher percentage of carbon emissions.[2] Governments are implementing stricter regulations aimed at reducing the environmental impact of commercial vehicles - a goal which is in alignment with fleet operators' own goals of reducing fuel consumption and improving driver safety.

If fleet operators are to meet timelines for more rigorous enforcement of emissions and safety standards, they must turn to the latest advances in fleet management solutions (FMS). Connectivity to cellular networks brings new capabilities to FMS by making it possible to collect vehicle data reliably and consistently. Applications can leverage historical and real-time data for powerful insights that can drive significant improvement in fleet management. From vehicle acquisitions and operations to final depreciation, every aspect of fleet operations stands to benefit. Only by bringing vehicles into the IoT can fleets comply with environmental regulations and drive more cost-effective operations.

The market for connected FMS is at a critical inflection point. Currently, just 14% of commercial vehicles use connected FMS, but Berg Insights forecasts substantially higher penetration rates by 2018 as follows:

- North America: 26%
- Europe: 23%
- China: 20%

While a smaller proportion of personal vehicles are connected, as more and more consumers lease vehicles, leasing companies will be connecting their vehicles to monitor location, vehicle health and driving behavior. With FMS collecting data, leasing companies can depreciate vehicles based on actual usage, and more accurately reflect vehicle valuation in their balance sheet, optimize preventive maintenance, and ultimately, alert leasing companies to reflect such improvements in leasing contracts.

To manage TCO and comply with stricter carbon emissions regulations, new commercial vehicles will come factory-equipped with connected FMS. There are also strong incentives to upgrade commercial fleets with aftermarket solutions since the

2. Example: Transportation activity contributes approximately 37 per cent to Canada's total energy-related GHG emissions inventory. Roughly half of Transportation emissions are attributed to freight transportation and over half of those emissions are attributed to trucking. Source: Industrial Transportation in Canada, Sustainable Development Technology Canada (2007)

average life cycle of a vehicle is 10 years. Applications ranging from cargo tracking, goods deliveries, vehicle monitoring, diagnostic and preventive maintenance to driver behavior improvement.

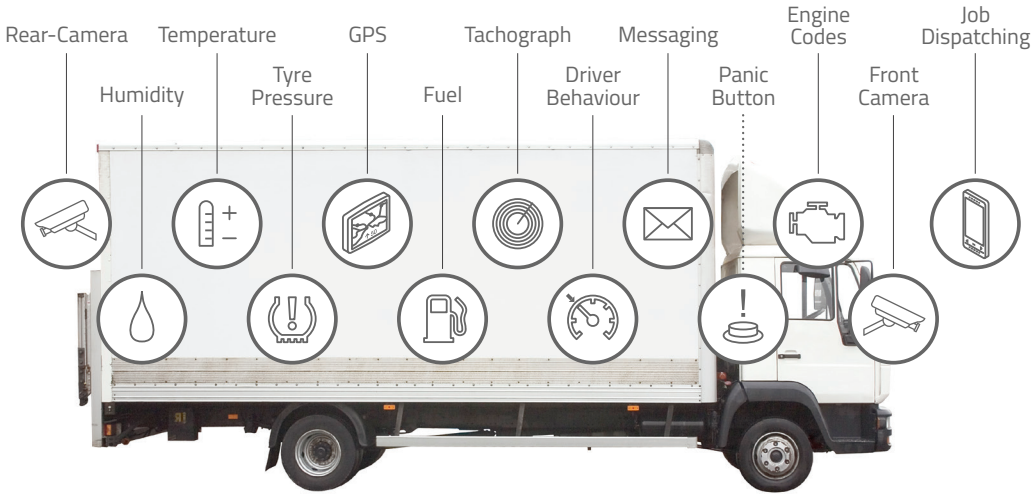

FIGURE 1: FLEET MANAGEMENT APPLICATIONS

All of this highlights the huge potential for FMS vendors, from telematics service providers (TSPs) to Original Equipment Manufacturer (OEMs).

Connected Services for Fleet Management

For fleet owners, there are four main benefits that result from using "Connected FMS" to manage vehicle operations.

INCREASED DRIVER SAFETY

Connected services can detect speeding, rapid acceleration and braking and other aggressive driving behaviors. When vehicles are equipped with telematics, drivers know there is data which can improve their driving efficiency and holds them accountable for driving.

In a recent study, 67% of connected fleets[3] noted improved driver safety behavior, 37% saw improved fuel efficiency, and 33% noticed improved driver efficiency and productivity.

LOWER FUEL COSTS

Fuel usage affects both operating costs and carbon emissions. FMS functionality can help reduce fuel usage through:

- **Route optimization:** Real-world data used to plan vehicle routes minimizes overall mileage and left turns, both of which affect idle times and fuel consumption.
- **Anti-idling policies and technology:** According to the U.S. Environmental Protection Agency (EPA), a typical commercial truck can waste 0.5 gallons of diesel fuel per hour

3. Source: Element Fleet Management 2015 Fleet Policy Survey Results.

while idling. With the right policies and technology in place to support those policies, fleets can achieve significant fuel savings with minimal impacts on operations.

- **Driver behavior:** Aggressive driving lowers fuel economy by 33% on highways and 5% on urban streets. By monitoring driver behavior - ensuring drivers stay within speed limits, and avoid rapid acceleration and sudden braking, and other forms of poor driving - fleet owners can save fuel.
- **Tire pressure monitoring:** Gas mileage can be improved by up to 3.3% by keeping tires inflated to the proper pressure.[4] Connected FMS systems can monitor tire pressure and alert both drivers and fleet managers.

"Sierra Wireless delivered the expertise and global scale we needed, delivering a full solution that integrates the devices, the device data, our mobile network operator's infrastructure, and our back-end IT systems.

This solution vastly simplified the process of bringing our new services to market and will enable us to scale rapidly as we deploy internationally."

- Paul Gourlet, Technology Director, Arval

PREVENTATIVE MAINTENANCE

With the latest engine oils and technologies, many fleets are able to extend their oil change cycles from the once-standard 3,000 miles to up to 10,000 miles or more. Solutions that constantly monitor vehicle health help fleet operators schedule oil changes and other preventative maintenance tasks as needed, rather than relying on mileage alone. Lengthening the interval between preventative maintenance contributes to:

- Lower tire replacement[5] costs
- Lower oil change costs
- Increased ability for technicians to work on more urgent repairs
- Reduced vehicle downtime
- Increased productivity of maintenance staff
- Avoidance of costly unplanned repairs by ensuring maintenance actually gets done when needed

MINIMIZING TOTAL COST OF OWNERSHIP (TCO)

A vehicle's TCO encompasses the acquisition cost, operational costs and depreciation. Fleet operators can't manage all the complexities of calculating TCO. A connected FMS allows fleet owners to understand the TCO of each type of vehicle and makes it easier to decide on the best long-term strategy for the overall fleet.

The latest generation of fleet management solutions have migrated to the IoT. FMS collects performance metrics, analyzes current and historical trends for both fleets and individual vehicles, and provides data that optimizes logistics and ensures compliance with environmental and safety regulations.

Whether it's OEMs, TSPs, or IT departments of large fleet operators providing the FMS, all need reliable monitoring and data collection in order to deliver a 360° view of fleet performance to help operators manage today's issues and create long-term strategies for their business. This underscores how dependent fleet management solutions are on resilient mobile communications.

4. US Department of Energy
5. Tires underinflated by 20% reduce lifetime use by 30% according to Technology & Maintenance Council (TMC)

FLEET MANAGEMENT SOLUTIONS WILL GROW TO ACCOMMODATE A RANGE OF SPECIFIC NEEDS SUCH AS:

- Automatic Vehicle Tracking
- Preventive Maintenance
- Cargo Monitoring
- Route Optimization
- Job Scheduling
- Driver Management
- Driver Behavior Improvement

"Our mobile workforce platform is tightly integrated with AirLink gateways. With the GX450 telemetry feature, our utility customers can take advantage of robust vehicle diagnostic capabilities, in addition to the reliability and ease-of-use of our integrated solutions."

- Edna Menon, Senior Product Marketing Manager, Clevest

Multi-Operators Connectivity and Smart Network Selection

Commercial fleets, especially those whose routes are cross-country or international, face challenges when it comes to reliable mobile communications.

Over the course of a few hours, drivers could pass through areas where coverage changes by carrier, network type, or both. For driver safety, convenience, and lower deployment costs, the OBU's SIM should not need to be swapped out in the field. A SIM should switch seamlessly between accessible networks, always selecting the best available network.

It is not enough to deploy SIMs that only work with networks currently active along vehicle routes. Once installed, a FMS should support 3 – 7 years of constant use in commercial vehicles. During this time, coverage areas can change. 2G and/or 3G are being phased out in many regions, as carriers begin 4G reframing. As networks migrate, the best way for fleet operators to achieve long-term ROI is to use solutions based on SIMs designed to scale from 2G/3G to 4G/LTE which can be upgraded over-the-air to handle new network configurations.

Future-proofing does not end with network compatibility. Over the lifetime of an FMS, there will be customer demand for additional functionality. These can be new features developed by the FMS providers or functionality enabled by integration with third-party solutions.

A solution that begins as a vehicle-centric application can evolve to interoperate with a cargo tracking solution, or incorporate monitoring for driver behavior. Enabling such additional functionality requires:

- Integration of additional accessories such as cameras or portable navigation devices
- An efficient way to download new applications to vehicles in the field
- Consolidation and/or integration of data from diverse sources

FMS providers must take a long-term view and build solutions based on open application frameworks. This simplifies development, data collection, integration and data consolidation.

Last, but not least, as connected services become a significant factor for business success, fleet operators will want solutions that support their revenue streams through flexible connectivity services that favor either OPEX or CAPEX models.

How Sierra Wireless Enables Connected Services for Fleet Management End-To-End

Sierra Wireless SIM, modules, gateways, and platforms are designed to address the challenges faced by solution providers when building connected services for the IoT. Not only do fleet management solutions depend on reliable connectivity at all times, they must also select technologies that accommodate changing networks and market demands as much as possible over a fleet's long life cycle, if they are to achieve the best possible TCO.

Our modules simplify development and help fleet management solutions get to market faster. Pre-integrated with an open application framework and pre-configured with profiles of all major cellular carriers, Sierra Wireless modules are designed to support the most sophisticated IoT applications. Our modules are also scalable, eliminating the need to swap out modules as carriers upgrade from 2G/3G to 4G/LTE.

As vehicles travel across rural areas and multiple carrier boundaries, our Smart SIM with its patented 'smart steering' feature leverages multi-operator footprints and selects the best possible network based on data QoS parameters, not just signal availability, to achieve the reliable, extended coverage needed for telematics solutions.

Solution providers require cost-effective ways to build new value-add services, and manageable ways to deploy them to assets in the field. Sierra Wireless' unique IoT Acceleration Platform reduces TCO over the lifetime of a solution by reducing system integration time. Developers don't need to interface with multiple platforms; the platform makes it easy to provision for cloud-based services via over-the-air software updates.

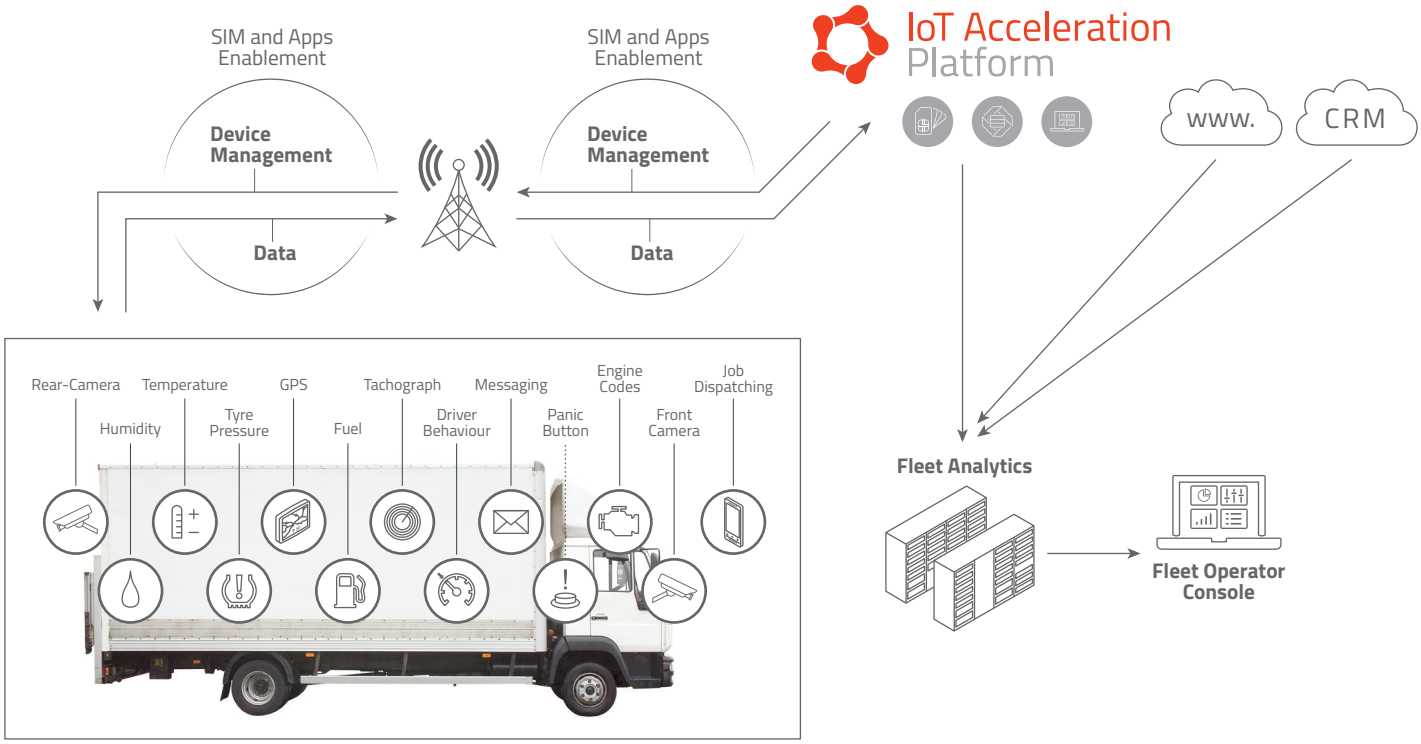

FIGURE 2: IOT ACCELERATION PLATFORM FEATURING DEVICE AND SUBSCRIPTION MANAGEMENT, AND APPLICATION ENABLEMENT.

The IoT Acceleration Platform also handles subscription management, allowing FMS providers to enable flexible business models. Our multi-operator connectivity service is available on a single SIM, allowing seamless access to more networks than traditional mobile services can provide. FMS providers and fleet operators can select from data, SMS and voice services specifically designed for IoT applications, with options ranging from pay-as-you-go plans to pooled subscriptions and specific bundles for data and messaging. Whether a business operates on an OPEX or CAPEX basis, the flexibility exists to choose subscriptions that contribute to the lowest possible TCO.

Sierra Wireless handles the complexities of the IoT so that FMS providers can focus on building applications.

Conclusion

Connected fleet management solutions help fleet operators manage widely-dispersed, highly-mobile assets. Sierra Wireless provides connectivity solutions to support FMS requirements for today, with open, secure, and scalable wireless communications that are future-proof to meet evolving needs. Open standards and interoperability are fundamental to the vehicle-to-cloud vision as FMS providers create innovative new applications to help fleet managers improve safety, comply with environmental regulations, optimize logistics and maintenance, reduce costs and improve operational efficiencies.

About Sierra Wireless

Sierra Wireless is building the Internet of Things with intelligent wireless solutions that empower organizations to innovate in the connected world. We offer the industry's most comprehensive portfolio of 2G, 3G, and 4G embedded modules and gateways, seamlessly integrated with our secure cloud and connectivity services. OEMs and enterprises worldwide trust our innovative solutions to get their connected products and services to market faster. Sierra Wireless has more than 950 employees globally and operates R&D centers in North America, Europe, and Asia.

For more information, visit www.sierrawireless.com.

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