White Paper

360 Degree View of Telematics in Fleet Management

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OVERCOMING LIMITS

Transportation and Logistics organizations need to focus on the integration of all functions, and convergence of processes. This requires contemporary telematics and other technical solutions, with the ability to not only automate and shorten processes but also improve safety, offering greater flexibility and reliability.

The term “telematics” comes from a blend of telecommunication and informatics sciences. Telematics refers to the use of wireless devices and “black box” technologies to transmit data in real time back to an organization. In automobiles, factory installed or aftermarket boxes collect and transmit data related to vehicle use, maintenance requirements or automotive servicing. Telematics can also provide real-time information on airbag deployments or car crashes and locate stolen vehicles by using GPS technology. In addition, telematics can serve as the platform for usage-based insurance, pay-per-use insurance, pay as you drive (PAYD) insurance, pay how you drive (PHYD) programs for fleet insurance, or teen driving programs.

Data collected by onboard devices is called telemetry. Telemetry is read-only data about the environment, usually collected through sensors. Each source of telemetry results in a channel. Telemetry data might be preserved on the device or in the cloud. Although each device might send only a single data point every minute, when you multiply that data by a large number of devices, you quickly need to apply big data strategies and patterns. For example, a highly intelligent computer in a vehicle that is able to report on nearly every detail — from speed and idling, to fuel use, tire pressure, and more, This can mean saving on maintenance costs by better monitoring of vehicles. It could also help to improve fuel efficiency by tracking driving habits. All of this describes the universe of telematics, also known as GPS fleet tracking.

How Telematics Works

Data collected by the telematics device, like the GPS position, speed of the vehicle, and the g-force measured by the built-in accelerometer, are sent in a packaged format to a data center. The data then gets decoded.

A vast amount of data can be collected via the telematics device and other connected hardware or sensors, such as position, speed, trip distance/time, idling, harsh braking and driving, seat belt, fuel consumption, vehicle faults, battery voltage, and other engine data.

This information is stored in the cloud and brought into a fleet management software system, accessible from a desktop computer or a mobile device like a smartphone or tablet. Using the software, users are able to view, prepare reports, and gain business intelligence such as the top 10 drivers with the highest number of speeding incidents or vehicles that are due for scheduled maintenance.

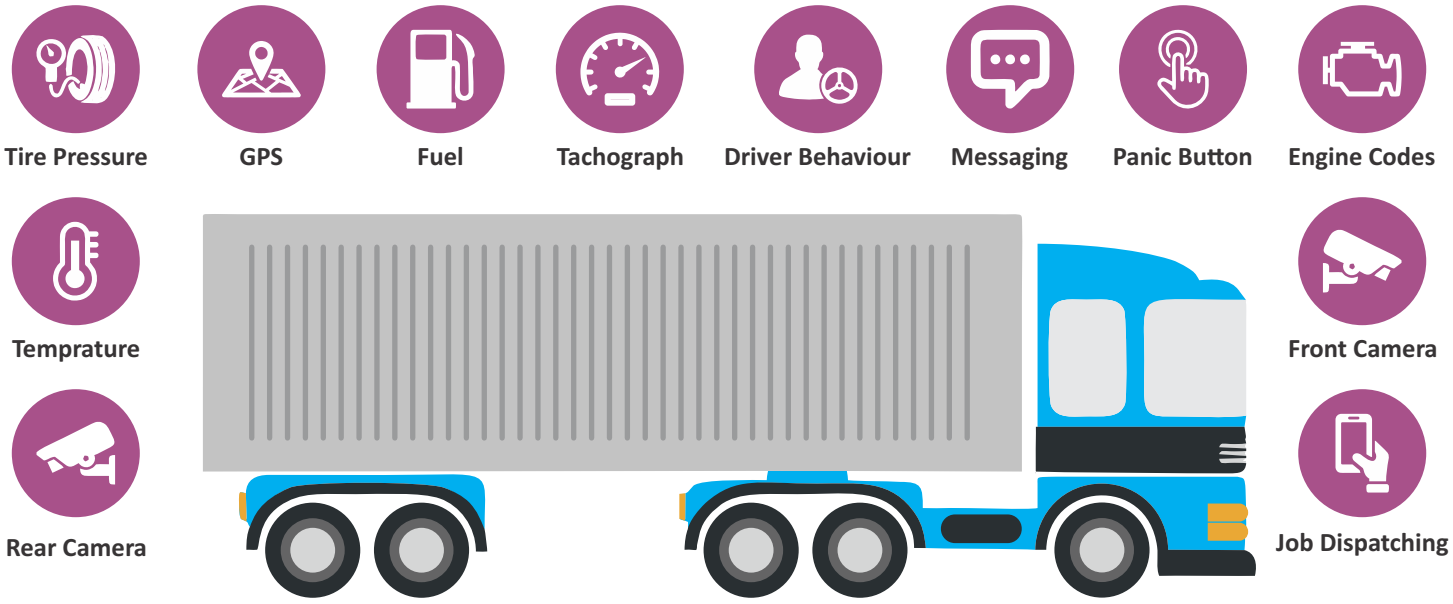
360 Degree View of Telematics

Taking a 360-degree approach to telematics, we have **Sensors** which perform the duty of capturing data. We then have the data from the sensors which is called **Telemetry Data** and finally, we look at the **benefits of telematics.**

Sensors

Heavy-duty vehicles have pervaded all areas of business from commercial trucking to agriculture and construction. These vehicles are not cheap and their maintenance costs can escalate up to 30 percent of a vehicle's lifetime cost. As a result of this but also mainly to improve overall efficiency, truck owners are constantly looking at innovation to improve productivity and profitability.

Telematics using sensors, which is a standardized set of hardware, is actively being used to track all aspects of a vehicle's movement and performance. Telematics sensors can provide data on so many aspects of a vehicle. See image below:

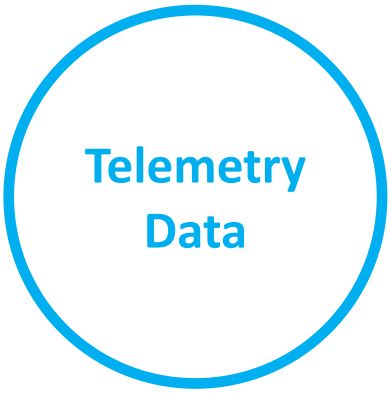


By using GPS technology, for example, telematics is providing vehicle owners with pertinent information, which leads to business efficiency. A lot of this information makes perfect business sense. Here's an example, Trigent's client, a company that provides technology solutions for commercial and school bus fleet tracking, safety and optimization had to ensure safe, efficient and convenient school bus-riding experience students and parents. The company wanted an application to effectively track buses, and thereby help schools manage their bus fleet, large or small, at an affordable cost. The client also wanted a mobile app to help parents and their bus riders know precisely when the bus will arrive at their stop. It helps the bus drivers with scheduled and alternate routes and also helps by showing details of students to be picked up or dropped at each bus stop. Using GPS and a telematics sensor device, Trigent has been able to help the client with real-time route information. *Read more about our customer success story*

Much like specific satellite navigation devices, telematics devices and smartphones utilize GPS technology to figure out just where you are in the world. Sensors called accelerometers are used to track acceleration and braking. Sensors as simple plug-ins in a vehicle's diagnostics port track information such as fuel economy. Not stopping there, telematics devices factor in all the things that can negatively impact fuel economy including speeding and harsh braking. Along with the above, one of the critical advantages of sensors is safety assurance. Sensors warn the driver of vehicle malfunction, gas leakage, and smoke warning.

Telemetry Data

Sensors, as mentioned above, are devices. Collecting the data from devices and analyzing it is critical to improved user experiences, and to make informed business decisions.



- Miles per hour
- Hard braking incidents
- Lane departure warnings
- Seal belt usage
- After-hours vehicle usage
- Roll stability engagement warnings
- Collision mitigation engagement warnings
- CO2 emissions
- Time spent in cruise control
- Idling time
- Speeding
- Sharp corner
- Over acceleration
- Braking habits
- Battery voltage
- Drive hours
- Out of route miles
- GPS location
- Oil pressure
- Fuel consumption
- Distance travelled
- Road condition
- Failing parts
- No. of times reversed
- Cargo status
- Engine operating hours
- RPM
- Tire pressure
- Capture driver behaviour
- Ignition On/Off
- Cargo Temperature

The derived data from sensor devices called data sources is transmitted to data centers. Managing data transmission from point to point, and then integrating and analyzing data is the most important aspect of telematics.

Often information can run into thousands of data points. This volume of incoming data can run into gigabytes of data per hour, just coming off a single vehicle. Given a fleet of large number of vehicles, the amount of data to be transmitted and processed can be tremendous. The massive amounts of data will drive some data governance and data quality issues that must be addressed at the data integration layer. Data is typically not validated when it is generated by a device, but it must be checked at some point. Moreover, the complexity of these systems means that the use of data governance approaches and technology are imperative.

Adding complexity to telematics is technology innovations such as connected vehicles, cloud infrastructure, IoT, and mobile computing. These innovations are driving visibility, automation, and optimization in the Transportation and Logistics industry. While government regulations such as Hours of Services (HOS), Compliance Safety & Accountability (CSA), Electronic Logging Device (ELD) are ensuring safety in the transportation industry, there is a mandated need to make necessary changes to the software and systems.

Cloud-based big data and predictive analytics are empowering event-driven logistics which can help significantly reduce risk and increasing optimizations along the entire supply chain.

To ensure that the data derived is useful, relevant and accurate requires technology partners who are industry experts. Trigent helps Fleet Management Companies modernize and optimize their operations, comply with ELD and other regulations, develop, maintain and test onboard equipment (OBE) software and integrate IoT into their operations.

Key Benefits of Telematics

- Reduced claim costs
- Optimized productivity
- Fleet compliance
- Reduced out-of-route miles
- Improved driver experience, productivity, and reduced overall driver miles
- Fleet, driver and cargo KPIs
- Reduced emissions
- Manage maintenance schedules
- Real-time communication
- Improved CSA scores
- Remote diagnostics and reduced fleet risks
- Improved fleet performance and schedules with proof of delivery
- Reduced downtime
- Reduced fuel consumption

A telematics system that integrates easily with other TMS systems not only maximizes the investments that have been made in existing systems. It also provides future-proofing by ensuring integration with other systems that may be required down the road. What's more, an integration-ready telematics system will increase efficiencies and visibility by integrating all the data captured by all the systems in one centralized location, reducing the number of keystrokes it takes to get to the required information data.

Telematics that integrate with TMS systems provide expanded visibility to yards and trailer pools. It will be possible to see which trailers are at which location, whether those trailers are loaded or empty, and if they were emptied on time. One can also see when a trailer has been held at a customer's location for an extended period of time, an indication that it might be used as a storage facility.

With this increased visibility comes improved trailer utilization. One could see which trailers are sitting unused in a yard, and redirect those trailers to other customer locations with greater demand and revenue potential. This visibility also comes in

handy when renegotiating contracts. For example, a contract with a customer stipulates that there are five trailers at their location at all times. Data, however, shows that two of those trailers have not been reloaded in a while. One could use this information with customers to negotiate a better deal, freeing up these trailers and putting them to better use.

A telematics solution that's integrated with maintenance software can help in dramatically improving the efficiency and effectiveness of preventative maintenance, which also allows one to maintain a good score.

Historical views are also important to transport goods across the border. With an integrated solution, one can continue monitoring and tracking a trailer even after it's been handed over to another carrier licensed to haul.

True telematics integration involves linking all mission-critical systems so that vital information is shared in the best way.

Role of Telematics in Revolutionizing Fleet Management

Telematics has become a crucial technology for fleet management. Telematics supports these five core areas:

- Productivity and improved customer service by using real-time GPS tracking, trip reporting, and dispatching and routing tools. *Read our customer success story here*
- Safety with the availability of in-vehicle driver coaching, risk and driver behavior reporting, accident notifications and reconstruction, and the ability to locate a stolen vehicle. *Read our customer success story here*
- Optimization of vehicle maintenance with predictive maintenance abilities and remote diagnostics, and optimization of fuel management by tracking idling and other fuel-guzzling habits. *Read our customer success story here*
- Compliance with solutions for electronic logging and Hours of Service, IFTA reporting, and vehicle inspections. *Read our customer success story here*
- Integration of other software systems such as onboard camera technology or CRM software. *Read our customer success story here*

About Trigent

Trigent is a technology solutions company that provides comprehensive solutions for business problems via outsourced software product and applications design, development and quality assurance. Trigent serves customers like Independent Software Vendors (ISVs), enterprises and SMBs in the High Tech, Healthcare, Education, Ecommerce and Manufacturing areas. Trigent's solutions help clients overcome budget, schedule and resource constraints.
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