TRIGENT

Increasing Reliability and Accuracy, Reducing Maintenance Costs of Telematics Solutions

Ashok Kumar
VP, QA & Testing

The fleet management industry today is very different from the one in the past. With the increased regulations, compliance, and safety needs and desire for higher operational efficiency, the demand and reliance on fleet management software has never been greater. The systems and technology are used to comply with ever increasing number of industry regulations, improve efficiency, and reduce cost. The fleet management systems are extensively used in the Cargo/Logistics industry to manage truck, driver, trailer, cargo and subcontractors. Fleet management systems are used in the school transportation industry to increase the student safety and provide better visibility to the school administrators.

The fleet management system today works with multiple complex and real-time data collection devices like:

- ❑ **Onboard computers:** Collect speed, braking, fuel level, door open or stop arm deployment;
- ❑ **GPS units:** Track location, directional heading;
- ❑ **Keyboard or other input devices:** Collect delivery details entered by drivers; and onboard printers.
- ❑ **Algorithmically complex backend systems:** Collect and collate all these real-time data for monitoring, operations and planning.

Independent testing of these fleet management system software is challenging due to the interplay between the telematics devices, onboard computers, GPS units and backend database and application software.

Modern Fleet Management System

The modern fleet management system relies on telematics, GPS, RFID or barcode readers – either combined into a single unit, called smart hub or individual onboard devices.
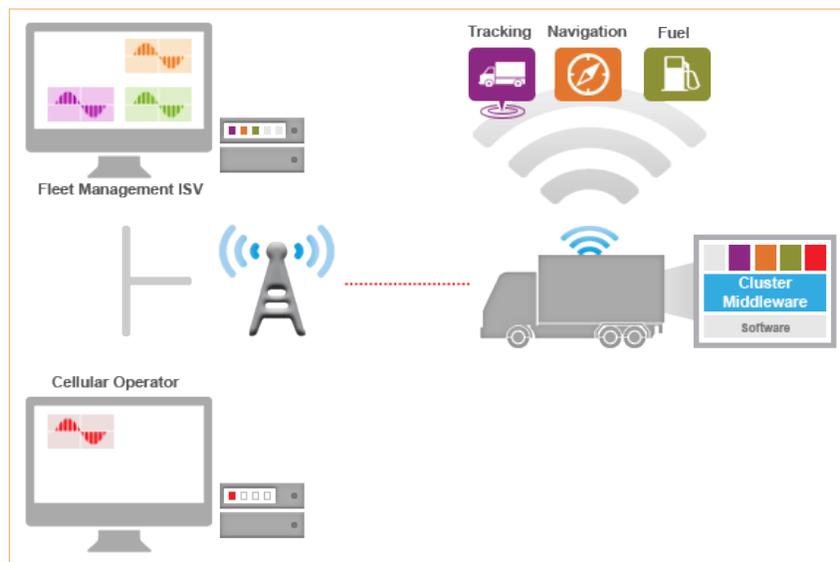
Challenges of Testing a Fleet Telematics Smart Hub

Testing a Fleet Management System requires a unique approach/test strategy, different from testing a web or a desktop business application. Some of the challenges faced in implementation and testing of a Fleet Telematics Smart Hub are:

❑ **Testing Infrastructure:** Testing the application in real time environment requires a complex infrastructure with many devices, their environment etc. It is expensive and time consuming to build such a complex infrastructure. Further :
  ➢ The application needs to be tested for support/compatibility on wide variety of devices, configurations.
  ➢ Fleets may have several versions of the device that are used. This raises other challenges such as testing software patches and new features for each version
  ➢ Support for different kinds of networks like Wi-Fi, 3G, 4G etc., including the ability to update fleet telemetry device software remotely.
❑ **Device Connectivity:** The onboard telematics devices needs to be thoroughly tested for integration with one another and for accuracy of data that is captured in real-time and transmitted back. Testing connectivity and integration with multiple devices, such as handhelds, tablets, in-cab printers, and trailer temperature-tracking monitors
❑ **Real-Time Data:** Generation of real-time data and testing the system for accuracy is challenging, considering the fact that the data has to be generated on the fly from a moving vehicle (i.e., the fleet telematics device) and has to be tested for alerts/notifications/engine on/off etc., simultaneously.
❑ **Domain Expertise and Turnaround Time:** One of the main challenge is to test all the features within a reasonable time and ensure that the end product is designed as per business/functional requirement. Further, any changes made to the product needs to be effectively tested including impact areas with a very short turnaround time.

Trigent's Solutions for Testing Fleet Telematics Smart Hub

Trigent has successfully developed and implemented an approach to overcome the challenges in Fleet Telematics testing. This approach tests the Fleet Telematics and all the integration points to ensure the end product is adequately tested and released to the market with confidence.

Fully Equipped Lab
Setting up a fully equipped test lab consisting of:
  ➢ Different versions of Fleet telematics devices
  ➢ Hand held devices like Tablets, printers etc., for testing communication with the OBC
  ➢ High speed internet/Wi-Fi and cellular network coverage

Our Test lab can help set up your test environment for various Fleet Management devices, minimizing the need for investing in a comprehensive test lab. Since the lab and processes are time tested across scenarios and different sets of devices, the risk of failure is minimized.

Customized Fleet Telematics

Set-up different versions of the customized Fleet Telematics for testing purpose which includes changes to the regular device for testing purpose like:
- Switches to test for real-time scenarios like Engine On/Off, PTO-Power Take Off, Remote shutdown etc.,
- Lights representing:
    - Throttle disabled
    - On Override
    - Started disabled
    - Coolant is shut down etc.,

The customized telematics devices help's in testing complex user actions which can otherwise be triggered only from a vehicle. This customization helps in triggering user actions similar to those from a moving vehicle and hence enabling the application to be fully tested for real-time events.

Use of Simulators

To simulate and generate test data for real time conditions like:
- Capture & Validate Driving and idling activity: Miles Driven, Fuel usage, Expenses, Shifts status etc.
- Validate violations like: Speed, Over RPM, Excess Idle, Unknown stops etc.
- Validate Incidents like: Accident, Panic, Sudden Braking etc.,
- Capture Route info like: On/Off Road, Toll Road, Pickup & Delivery
- Border crossing & related IFTA Tax calculation

The simulators enables user actions like driving, violations, routes etc., thereby enabling generation of test data for testing different driving conditions and boundaries.

Develop Automated Regression Suite

Developing an Automated Regression Suite for all the business flows & the related functional and integration points along with test data ensures adequate coverage, shorter turnaround time and lowers the risk of failure. These tests can further be upgraded and executed based on the changes in the application.

Trigent has extensive experience of over a decade in developing and testing on-board products. We have expertise in automation of telematics testing with both Open Source & Licensed tools like Selenium, Sikuli & Silk Test to name a few. Our QA and Testing services for Fleet Management Companies come with a bundle of benefits. Here are some:

- ➢ Shorten product release cycle
- ➢ Increased test coverage
- ➢ Lower risk of failures
- ➢ Improved GPS Validation
- ➢ Reduced preventive cost by identification of holistic test cases
- ➢ Reduced detection cost by performing pre-emptive tests like integrations testing etc.
- ➢ Increased confidence of customers in the quality of the on-board devices

Call us for a free consultation on Fleet Management Solutions for quality compliance and independent validation.

About Trigent Software Inc.

Trigent is a privately held, professional IT services company and a Microsoft Gold Partner with its U.S. headquarters in the greater Boston area and its Indian headquarters in Bangalore. We provide consulting services in various technologies including Microsoft Solutions. Our operating model is to conduct sales, customer relationships and front-end consulting (e.g., business case, requirements, architecture) onsite with our clients and perform the detail design, development, integration, testing and quality assurance offshore at our world class development and support center in Bangalore. We are a SEI CMM Level 4 company and is ISO 9001:2000 TickIT certified organization.

For sales contact sales@trigent.com or call 508-490-6000.