(intel®)

Intel Brings Robust Data Analytics to Vehicles, Faster

Robust, application-ready platform offers exceptional connectivity and security at the edge, for immediate driver feedback and a wealth of data for new services.

By 2020 more than 90 percent of new cars sold will be connected to the cloud.[1]
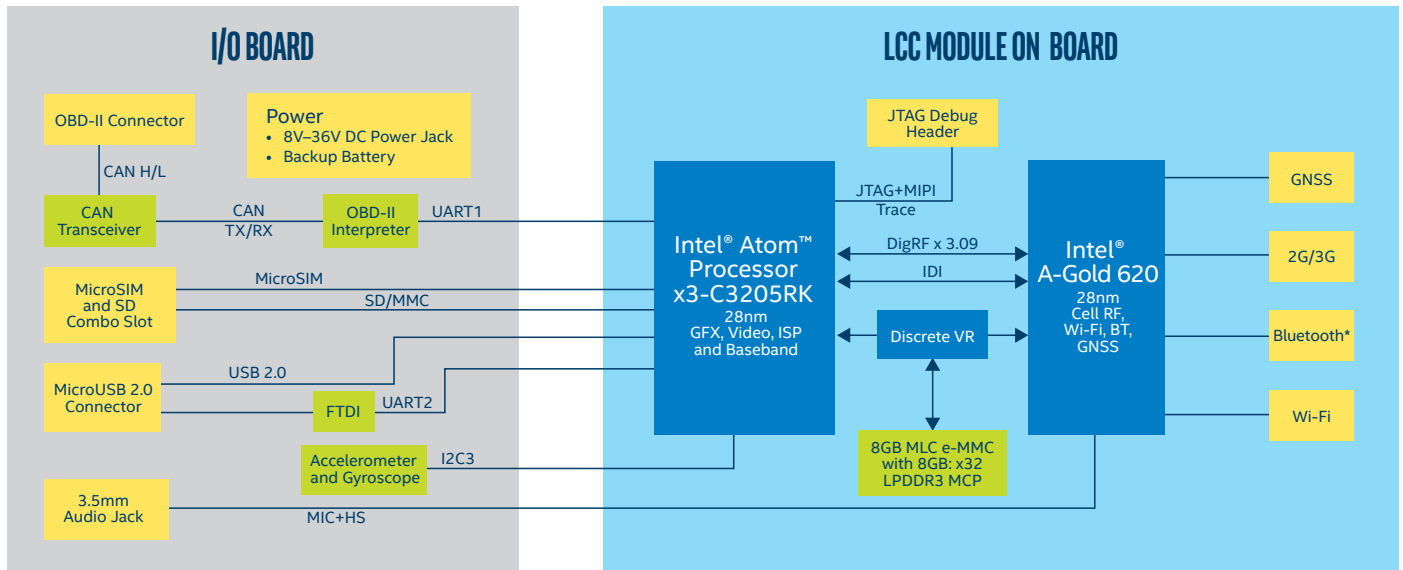
Changing Driving with Better Data

The Internet of Things is rapidly changing many aspects of how each of us operate day-to-day, including the way we drive. The rapid convergence of the physical and digital worlds is reshaping how we operate and manage vehicles. In fact, by 2020 more than 90 percent of new cars sold will be connected to the cloud.[1] Intel is helping organizations engaged in developing telematics solutions deliver them faster with a solution that harnesses Intel compute power and scalable cloud technology to enhance safety, security, productivity, and profitability.

Powering the dynamic intelligence of this telematics solution is the new On-Board Diagnostics II (OBD-II) dongle featuring the Intel® Atom™ processor x3-C3205RK. The Intel®-based OBD-II dongle is a highly refined system specifically designed to collect data streams from an array of vehicle buses and more securely aggregate, analyze, filter, and report that information to drivers, fleet managers, insurance companies, and even private vehicle owners. Built on an open Android* system, complete with a robust telematics software development kit, the analytics the dongle makes possible will open new worlds of opportunity for software developers and service designers. With this platform, they will be able to more quickly create solutions for fleet management businesses of all types and sizes and for the mass market.

Getting the Most out of Every Mile

Every time a fleet vehicle is dispatched, it is constantly consuming fuel, accumulating wear and tear, and the safety and security of the driver, passengers, and cargo are at risk. Continually tracking the status of the vehicle—its location, condition, speed, and more—is crucial to understanding how to get the most short- and long-term profit and productivity out of every job and route.

Bringing data capture and analytics to the edge offers trucking companies and fleet operators the ability to reduce fuel costs, track assets, and manage employee performance in near-real time. This connected technology also enables longer-term data analysis to impact critical business decisions. Gaining the insights and advantages offered by advanced telematics will soon become an industry standard. As this technology and global connectivity continue to rapidly advance, speed to market with these solutions will be a key differentiator for OEMs, system integrators, and application developers. Private automobile owners will also expect the features of advanced telematics and connected technology to manage their own vehicles and driving.

I/O BOARD

- OBD-II Connector
- Power
  - 8V–36V DC Power Jack
  - Backup Battery
- CAN Transceiver
- OBD-II Interpreter
- MicroSIM and SD Combo Slot
- MicroUSB 2.0 Connector
- FTDI
- Accelerometer and Gyroscope
- 3.5mm Audio Jack

CAN H/L · CAN TX/RX · UART1 · MicroSIM · SD/MMC · USB 2.0 · UART2 · I2C3 · MIC+HS

LCC MODULE ON BOARD

- JTAG Debug Header
- JTAG+MIPI Trace
- Intel® Atom™ Processor x3-C3205RK — 28nm, GFX, Video, ISP and Baseband
- DigRF x 3.09 · IDI
- Discrete VR
- Intel® A-Gold 620 — 28nm Cell RF, Wi-Fi, BT, GNSS
- 8GB MLC e-MMC with 8GB: x32 LPDDR3 MCP
- GNSS
- 2G/3G
- Bluetooth*
- Wi-Fi

Diverse Market Opportunity

Every entity that owns and utilizes vehicles—from managers of massive rental fleets to small trucking companies to individual families—will benefit from solutions for edge data analysis and cloud connectivity.

Trucking

Trucking companies can achieve greater fuel efficiency and driver safety by tracking a wide array of driver behaviors, including acceleration, braking, shifting, and cornering, and use that data to provide feedback and coaching to drivers in near-real time. In a recent study, it was found that data-based driver coaching reduced fuel costs up to 17 percent in just 12 months.[2] Trucking fleet managers will also be able to deliver messages and alerts to drivers, and they'll have a better picture of the location of their assets and customers' cargo to make improvements in route planning and workflow that can have an immediate effect on bottom-line profitability. Remotely monitoring vehicle diagnostics also creates opportunities for incident recreation and predictive maintenance of vehicle fleets. What's more, by collecting this data and managing it via cloud apps, service-hour logging and compliance reporting can become fully automated—meeting new electronic logging regulations with less effort.

Taxis and Buses

Those operating transit and transportation systems (such as taxi companies and bus lines) can employ driver monitoring to track performance and detect unsafe driving habits. They can also monitor their vehicles to not only protect them from theft, but to deliver better service and to increase operational efficiency. Connected vehicle technology can even improve results for advertisers working with transit companies. Tracking a vehicle's location via GPS can trigger advertisements in targeted geographical areas, greatly improving the relevancy of local ad content.

Private Owners

Aftermarket telematics products can also provide private vehicle owners with a wide range of support. Smartphone apps can be created that interpret diagnostics for vehicle owners in real time. Telematics applications can remotely monitor vehicle diagnostics for predictive maintenance, and to offer service reminders. Owners can monitor the driving style of family members, and set up geofencing and acceleration parameters that can notify them if their vehicles travel too far, or too fast. And, in the case of a stolen vehicle, the remote vehicle disabling system (RVDS) can be triggered. This technology can also provide reliable data for usage-based automobile insurance, which for some drivers can result in significant savings.

INTEL IN TRANSPORTATION

For more than a century, motor vehicle research and development has concentrated on engineering mechanical systems. Automatic transmissions. Air conditioning. More efficient engines. But that emphasis is shifting away from hardware to focus on software and connectivity.

Because we have created a refined platform for the management of collections of sensors and data streams, Intel® IoT is uniquely situated to play a central role in developing connected vehicles. Based on the Intel® IoT Platform, our end-to-end telematics architecture leverages powerful and efficient computing and networking and can help to enhance safety and security. Intel IoT has been utilized in mission critical systems all over the globe and we believe the technology has the ability to drive innovation across the automotive industry.
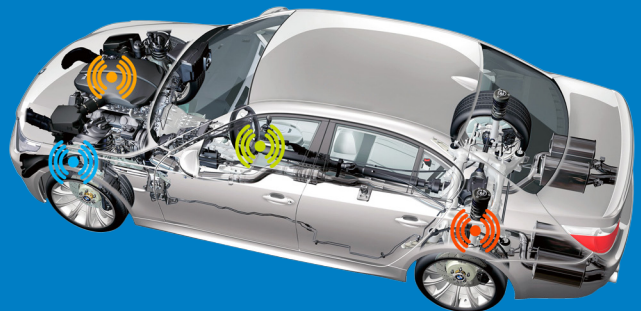
FLEET MANAGEMENT SOLUTION

Source: "Market and Markets"
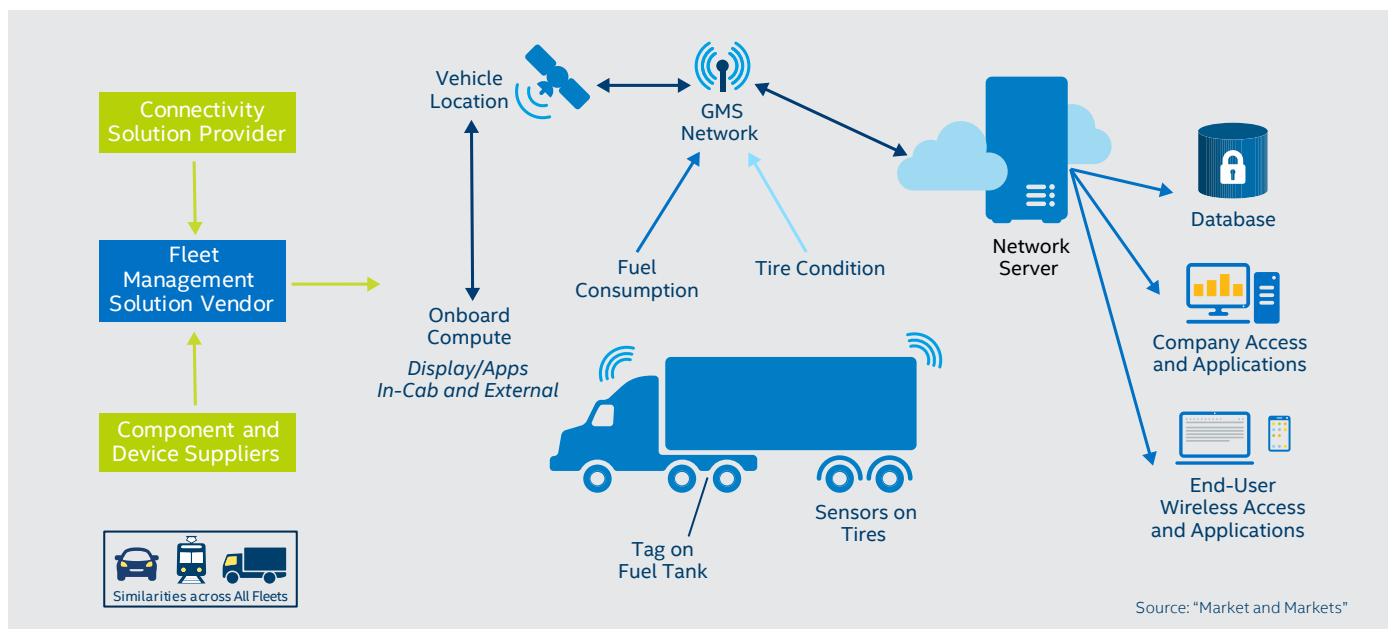
Getting You to Market Faster

With integrated connectivity, rich performance, and a feature set specifically tuned for in-vehicle use, the Intel-powered OBD-II dongle provides an open platform that is ideal for the rapid development of dynamic telematics solutions of all sizes. It can collect and aggregate a large suite of data from the vehicle's OBD-II, vehicle sensors, sensors on board the dongle itself, and peripherals. This information can be sent to the cloud via a cellular or Wi-Fi connection, or directly to the driver's smartphone or tablet via Bluetooth*.

This dongle is the key piece in Intel's expanding end-to-end telematics solution based on the Intel IoT Platform, which can make creating solutions that deliver key insights easier, faster, and more reliable than it has ever been. As developers create cloud and edge apps, they won't have to also create middleware or design custom frameworks. OEMs and developers taking advantage of the Intel-based OBD-II dongle and Intel's telematics SDK will enjoy high-performing rich applications, an accelerated time to market, and excellent security.

A Purpose-Built Hardware and Software Telematics Solution

Intel® Atom™ x3 Processor

The heart of the Intel-based OBD-II dongle is the Intel Atom processor x3-C3205RK, which features a 1.2 GHz quad-core CPU running on 64-bit architecture. Its highly compact system-on-a-chip (SoC) design incorporates a host of connectivity and peripheral features. It offers efficient control of power-supply domains and power subdomains, and several system low-power (sleep) states. It also offers a digital microphone, stereo headset, and loudspeaker interfaces, and an array of I/O devices, including a mini USB 2.0 and SD card.

Integrated Connectivity

The Intel-based OBD-II dongle features a highly integrated dedicated modem hardware unit, which offers all of the necessary features to enable multimode, multiband mobile cellular devices. For communication with the cloud while in route, it offers 2G (GSM/GPRS/EDGE) and 3G (HSPA+/UMTS) connectivity that achieves high data rates in downlink (HSDPA 21 Mbit/s) and uplink (HSUPA 5.7 Mbit/s). Onboard GPS1 locates the vehicle, while Bluetooth (BT*4.0) connectivity allows pairing to a smartphone so vehicle operators can access and leverage near-real-time OBD-II data. A 2.4 GHz spectrum Wi-Fi connection allows for the transmission of larger amounts of data—such as engine or diagnostic data that can be used in predictive maintenance applications. What's more, integrated Wi-Fi hotspot technology transforms the vehicle into a mobile wireless local area network (WLAN), via the device's 3G connection.
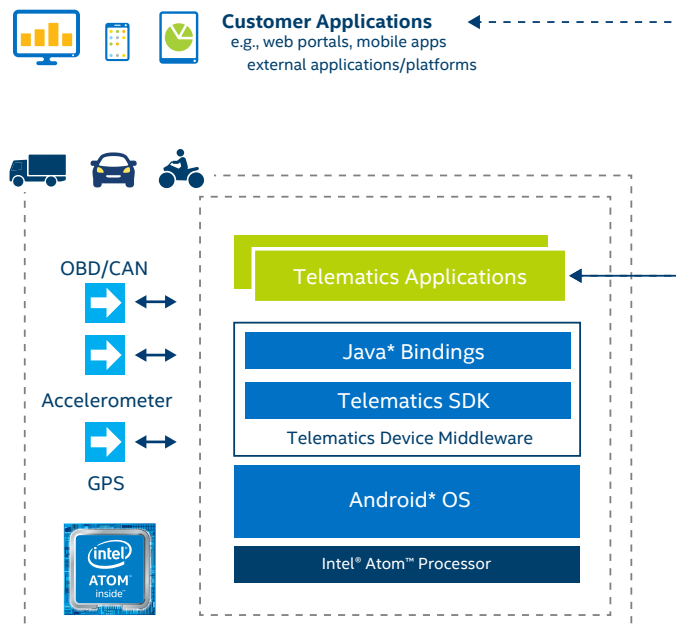
Security and Stability Features

Whether the driver of a vehicle is a private owner or an employee of a major corporation, the data streams produced by the OBD-II connection and the sensors on board the dongle will often be of a highly sensitive nature. Therefore, the Intel-based dongle incorporates unique solutions to help ensure data security. MobileVisor is a veneer layer of system software that runs on the Intel Atom processor x3-C3205RK. It is used to share the physical CPU between multiple OS stacks. It configures guest OSs independently, including managing boot parameters, memory partitioning, and devices. MobileVisor also enables secure VM, which allows developers to run applications or an entire OS in a separate virtual machine, isolating secure data stream from risk of breach. The Intel Atom processor x3-C3205RK also incorporates support for quick and in-depth verification and enhancement of a cellular platform, as well as powerful methods for debugging and trace.

Intel® Telematics Software Development Kit (SDK)

To support this OBD-II dongle, Intel is introducing an Android-based telematics SDK, which provides reference APIs for accessing the vehicle's stream of diagnostic and sensor data and sensors on board the dongle, including an accelerometer and 3-axis gyroscope. It manages functions like initializing hardware, registering PGNs, and configuring the cloud. It also incorporates algorithms to analyze driving style—such as hard braking and cornering—and fuel consumption. This powerful kit can allow developers and designers to quickly develop or port telematics applications out of the box. It also makes the most of connectivity, using the Store-and-Forward Service for caching outbound messages in case of network unavailability and utility classes for managing device profiles to minimize battery power consumption.

End-to-End Telematics Architecture

As a fully enabled gateway, the Intel-based OBD-II dongle will be a key feature of Intel's developing end-to-end telematics architecture. This architecture will allow the ongoing connection between the sensors and capture devices aboard each fleet vehicle, the cloud, databases, and end-user interfaces. This architecture is going to move fleet and vehicle telematics away from a siloed model—one that requires original device manufacturers (ODMs) to develop every aspect of the architecture themselves—and toward a scalable, open model that creates more flexibility and opportunities for a broader array of products and solutions.

Customer Applications
e.g., web portals, mobile apps
external applications/platforms

OBD/CAN

Accelerometer

GPS

intel ATOM inside

Telematics Applications

Java* Bindings

Telematics SDK

Telematics Device Middleware

Android* OS

Intel® Atom™ Processor

Advancing the Connected Vehicle Journey

Smarter, connected fleets of vehicles are already providing powerful insights for trucking companies, insurance companies, and fleet managers. They are also helping control fuel emissions for a greener planet, and keeping drivers safe. But we've only just begun to tap the opportunity. Powerful analytics like those enabled by the Intel-based OBD-II dongle can help get you to market faster with innovative products and applications to make roadways safer and more efficient. We are excited to be at the forefront of this new way of driving and look forward to taking the journey with you.

intel.com/automotive

(intel®)

1. http://www.zdnet.com/article/by-2020-90-percent-of-cars-will-be-connected/

2. Vnomics. "Ronald Gross, Inc. Improves Fleet Efficiency with Vnomics System." 2014.