

Intrepid Control Systems Creates a Cloud-connected Vehicular Network Interface Device Using TI's SimpleLink™ Wireless MCU and Amazon FreeRTOS



Nick Lethaby

Vehicular network interfaces (VNIs) are dongles that plug into a vehicle's onboard diagnostics (OBD) port to facilitate communication with electronic subsystems such as the engine control unit. Automotive manufacturers and fleet operators use VNIs for developing and testing vehicle subsystems and for data logging.

The neoOBD2 Pro product from Intrepid, a VNI solutions provider, enables its customers to develop Internet of Things (IoT)-enabled VNI-based applications that use the cloud for storage, analysis and visualization of vehicle data. The neoOBD2 Pro adds Wi-Fi® and Amazon Web Services (AWS) IoT connectivity to traditional VNI capabilities, and includes a software development kit (SDK) for custom application development. See [Figure 1](#).



Figure 1. The neoOBD2 Pro Enables Wireless and Cloud Connectivity to VNIs

Why Intrepid Chose the CC3220SF and Amazon FreeRTOS

Intrepid had an existing OBD product and wanted to add Wi-Fi and IoT connectivity without an extensive redesign. TI's SimpleLink™ CC3220SF microcontroller (MCU) includes a dedicated network processor with a built-in Transmission Control Protocol/Internet Protocol and Wi-Fi stack, making it easy to add these capabilities to a new design (see [Figure 2](#)). Intrepid chose the CC3220SF module, since it was already Wi-Fi and Federal Communications Commission-certified.

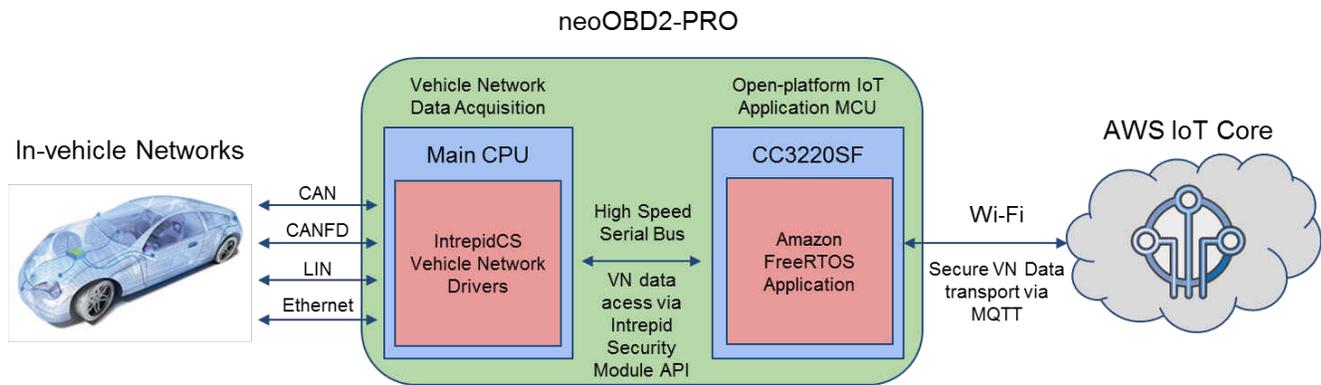


Figure 2. Using the TI CC3220SF Enabled Intrepid to Add Secure Wi-Fi and AWS IoT Access to Vehicular Network Data without a Significant Redesign of Existing Hardware

The CC3220SF's end-to-end security enablers and low-power performance addressed two key requirements in the neoOBD2 Pro. First, the product allows remote access to and control of essential vehicular subsystems and therefore should be able to prevent attacks from hackers. Second, since the neoOBD2 Pro typically operates for weeks at a time and draws its power from the vehicle's battery, low-power consumption is critical.

To differentiate from existing connected VNI dongles, which return a fixed limited data set, the neoOBD2 Pro offers an SDK to create custom applications that can return any possible data or perform any possible control operation. Intrepid was able to develop its SDK much more quickly by reusing the existing open-source example applications and documentation in the CC3220SF SimpleLink SDK and Amazon FreeRTOS SDK. These SDKs offered comprehensive collateral and Intrepid found that the SimpleLink MCU platform and AWS had strong reputations with customers.

Intrepid's SDK customers can use existing CC3220SF or Amazon FreeRTOS examples to quickly build a sample network application or connect to the cloud without needing to be experts in Message Queuing Telemetry Transport or Wi-Fi. To support the development of custom VNI applications, the SDK includes the Intrepid Security Module – a library that executes on the CC3220SF MCU and enables developers to access VNI functions through an underlying Serial Peripheral Interface (SPI) connection.

Designing an IoT application requires developers to work with more vendors than a traditional embedded design. TI works closely with AWS to ensure that companies like Intrepid Control Systems can successfully deliver highly differentiated products.

Additional Resources

- Get more information about Intrepid's [VNI and OBD-II dongle products](#).
- Download the [SDK for the neoOBD2 Pro](#).
- Start developing your IoT project with a [SimpleLink Wi-Fi device](#).
- Discover more about [AWS IoT](#) and [Amazon FreeRTOS](#).

IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATA SHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES "AS IS" AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, regulatory or other requirements.

These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI's products are provided subject to [TI's Terms of Sale](#) or other applicable terms available either on [ti.com](https://www.ti.com) or provided in conjunction with such TI products. TI's provision of these resources does not expand or otherwise alter TI's applicable warranties or warranty disclaimers for TI products.

TI objects to and rejects any additional or different terms you may have proposed.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2023, Texas Instruments Incorporated