

## Connected Vehicle Solutions with CANect® Telematics

Vehicles and machinery are required to complete many jobs and in such provide a high rate of return to the companies despite their upfront cost, which is why fleet management solutions have become so common throughout the industry. But what makes a fleet management solution more than another set of eyes in the sky? It's about providing data driven value across the entire business chain. Manufacturing, service, prognostics, and maintenance processes can be optimized and expedited by smart connected technology. These are then used to drive utility by providing insight to manufacturers, equipment owners, fleet managers, dispatchers, service personnel, and even operators. Ultimately, connected equipment solutions provide multiple means benefits and operating outcomes to all parties involved.

### Connected System Methods

Connected equipment technology can be broken down into three different methods which allow personnel to manage equipment effectively. The first situation involves managing equipment on a worksite within a close proximity or simply in the vehicle. Next, manage independent equipment remotely through a virtual experience through an internet connection. Lastly, manage an entire fleet of equipment through live and historic metrics via a cloud-base web portal. Each method has its own advantages and limitations.

### Manage the Equipment on Site



Image 1: CANect View

Managing equipment in close proximity was traditionally done with wired connections to laptops. The more convenient and cost effective option is to perform such functions via local wireless connection using any device. These types of technologies utilize wireless connectivity such as Bluetooth or Wi-Fi to stream data between the equipment and an electronic interface.

The equipment side of the technical solution contains a device that is capable of connecting to common vehicle interfaces. The most prevalent physical vehicle interface today is the CAN bus (ISO 11898). The device uses the CAN bus to capture vehicle data and convert it into something that is interactive with remote devices or systems. Once the device converts the data, the objective is to off board it to another device for human to machine interaction.

Furthermore, the next step is to provide the customer with a graphical interface via a mobile phone, tablet, or PC. This requires application development and the application needs to reside on the vehicle electronics or the mobile devices. If the application resides on the mobile devices, the application needs to be authorized and maintained with the respective device app store. However, it does not need to be registered if it is natively resident on the equipment electronics and isn't reliant on the operating systems respective app store.

### Manage the Equipment from Anywhere

Managing equipment in remote locations is a common and frequent task for OEMs, dealerships, and service personnel. It is a typical practice to ship trained personnel to equipment sites in efforts to resolve issues and repair equipment that is out-of-service. Service teams are required to carry high-speed human to machine interfaces that provide complete insight into the equipment's system information and diagnostics.

Traditional tools require service personnel to be onsite. Newer technologies allow service personnel to perform the high-speed trouble shooting and plan service work remotely. Internet enabled service tools allow service personnel to virtually commute to the vehicle, troubleshoot it, and either send parts or show-up prepared with parts in advance – reducing cost of service.

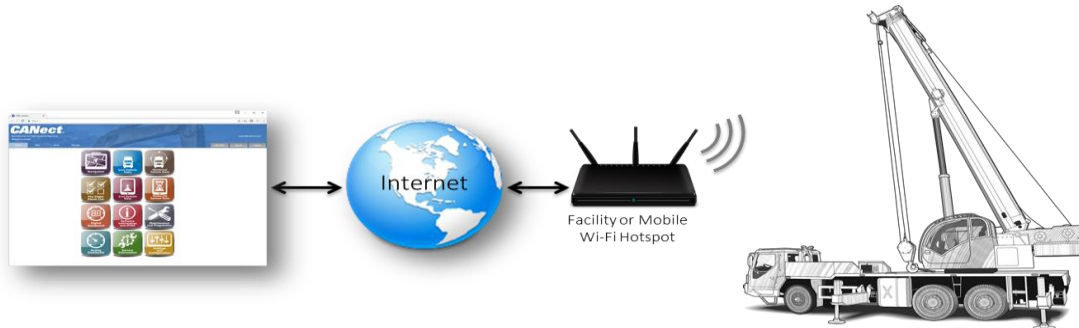


Diagram1: CANect Reflector Architecture

Embedded vehicle electronics that permit internet connectivity such as Wi-Fi permit remote service, maintenance, and diagnostic features. The software application to provide such utility is located on an equipment module and intently exposes valuable information via a secure tunnel and portal. Authorized personnel with respective credentials can remotely resolve equipment issues before dispatching any travelling service personnel.

### Manage the Entire Equipment Fleet

Managing an entire fleet without visiting every piece of equipment is possible with telematics. Telematics has been commercially available for multiple decades. Telematics has traditionally used cellular technology to remotely provide fleet wide visibility into equipment. There is a significant amount of features and benefits of fleet telematics.

Fleet telematics has been optimized throughout the years to accommodate mixed fleet equipment. Additionally, some industries have been able to cost reduce the connectivity by using local area networks like Wi-Fi – driving down connectivity costs. Other advancements include web portal dashboard capabilities, over-the-air system programming, and cloud-to-enterprise data export.

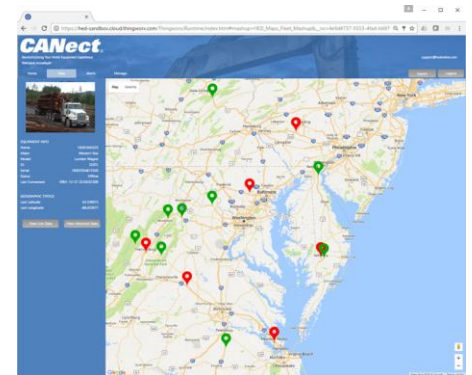


Image 2: CANet Portal

### The CANect® Solution

HED® developed the CANect® solution to provide all members of the equipment lifecycle with value added services, convenience, and return on investment. The CANect® solution is a comprehensive product offering that provides an end to end solution which includes hardware, software, a configuration tool, and connected services. The CANect® solutions include CANect® View®, CANect® Reflector®, CANect® Portal®, and CANect® Composer®.

CANect® View® was created to satisfy a complete on-equipment experience. CANect® View® is a web application that resides on a CANect® module and promotes a highly functional and secure customer experience with equipment. CANect® View® allows machine operators and service personnel to use their mobile devices to diagnose, service, maintain, and even operate peripheral equipment functions.

CANect® Reflector® was developed to improve total cost of ownership and decrease the cost to service the vehicle. This allows you to view and communicate directly with the CANect® module on your vehicle from any internet-enabled mobile module or PC world-wide. This provides the capacity to view and troubleshoot real-time equipment functionality as if the equipment was in a local area.

CANect® Portal® provides users with the ability to manage their fleet remotely. By creating a payback on your telematics investment you'll be getting critical information to the right people, from anywhere, at any time. This data needs to be presented in an easy to consume, get-me-to-the-issue-quickly format. The CANect® Portal® solution allows you to create straightforward dashboards for all system users. Maintenance techs can view data trends and prognostics, while fleet managers can view operator performance and machine utilization. With HED's web portal solution, data is cloud based, completely secure and redundant. This capability works with CANect® GSM and/or Wi-Fi products.

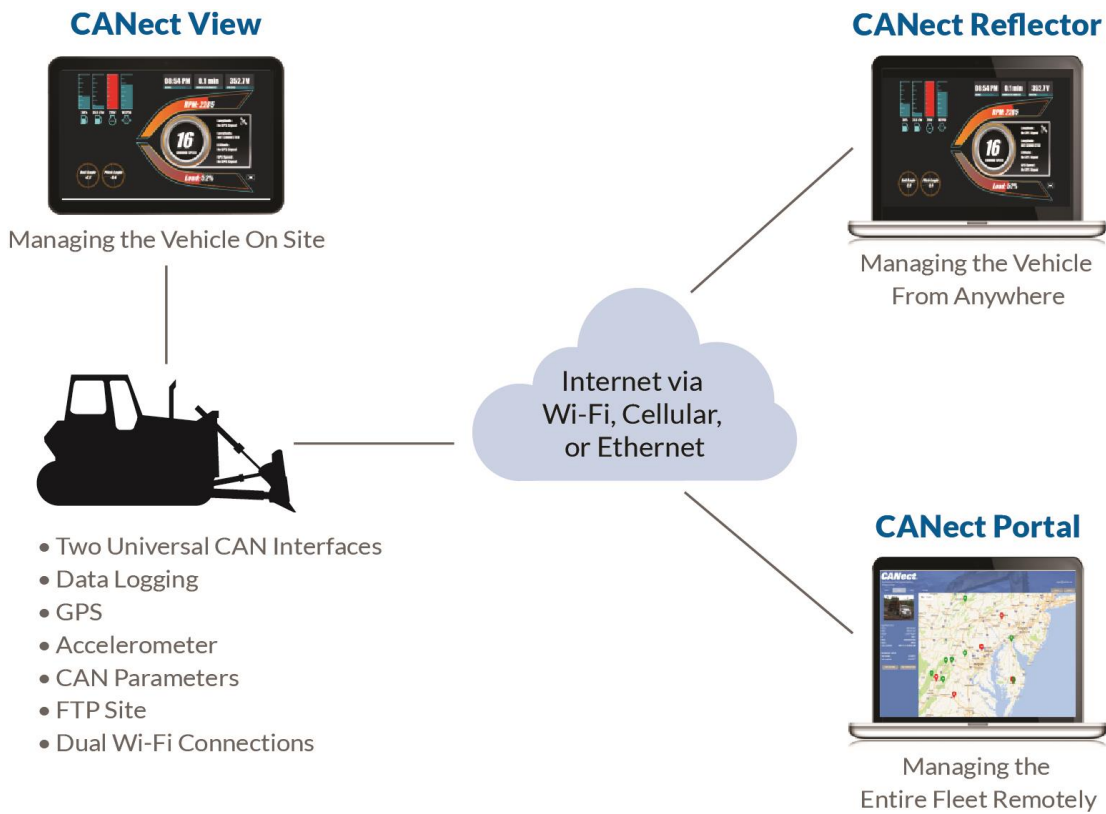


Diagram 1: CANect Solution Architecture

CANect® Composer® was developed to provide a simple way to configure an asset. This is a FREE utility that allows customers to develop and maintain projects without conducting a ground-up development. HED has streamlined the process to interface with your equipment. CANect Composer allows you to select your hardware, configure connectivity, interface with your equipment CAN buses, and enable your choice of connected features.

Ultimately, HED's CANect® Telematics portfolio lets you create a complete telematics strategy that suits your customer base, all customized to your application. The CANect® family is a full portfolio of hardware, software and web portal tools that give you complete control of your assets in the field.