

Data on wheels and in the cloud

Trucks have become mobile data centers. Their CAN in-vehicle networks are things in the Internet, when they are linked to the IT world. B-Plus is setting the data course to bring fleet management to the driver cabin.

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Refrigerated truck is equipped for data flow in logistics (Photo: B-Plus)

If the focus is increasingly on digitalization in road logistics, the hardware bundling, sorting, and transmitting information bears an important responsibility. It is necessary to bring fleet management to the driver cabin and the data regarding the vehicle configuration to the head office. The freight traffic industry has linked itself to the data traffic: time pressure and intense traffic have digitalized logistics in the age of the Internet of Things (IoT). And that's just the start as the future of mobility offers further data-based visions whose possibilities are nowhere near exhausted.

For data management, telematic systems, and networked trucks need platforms and devices supporting this communication and taking responsibility for it. The example of temperature-controlled transportation vehicles illustrates the scenario: as for quality control, the cooling chain of the cargo must not be interrupted and shall be documented. Fleet and order administration can be optimized by a fusion of logistics and digitalization. Connection with the ERP system provides information about the order situation and route. For security reasons, in transportation, a theft prevention system as well as GPS monitoring and a door safety mechanism have to be provided.

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The b-CANCubeMini control unit is suitable for vehicle body applications (Photo: B-Plus)

B-Plus offers suitable devices and system solutions meeting the requirements of specialized equipment control in utility vehicles. The b-CANCubeMini controller allows onboard control of e.g. the data on a monitoring function. Bus interfaces to the truck and I/Os for sensors and actuators as well as communication with the IoT Gateway via CAN are provided. For local data storage as well as Edge Analytics in connection with the Internet, the Gatebox gateway can be added. One of the strengths is to combine the two product ranges to one "Online Automation System" which provides, from the point of view of the driver, advantages towards the head office and towards the truck body.

The b-CANCubeMini multi-functional compact controller has been tested in practice, e.g. for the reading-out of door sensors, monitoring of temperature sensors, and control of the cargo hold lighting. This device acts as a gateway to the vehicle via the CAN-based J1939 interface of the bodybuilder control device. Thus, warnings indicating an open door or a too low temperature can be displayed in the original instrument cluster of the truck and lighting can be controlled e.g. from the cockpit. The high-current carrying capacity of the outputs allows a direct control of the cargo hold lighting. The outputs can be charged with up to 4 A. The individual outputs can be individually parameterized.

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The Gatebox 100 LTE gateway links the in-vehicle networks to the cloud (Photo: B-Plus)

The two CAN interfaces provided on the b-CAN-CubeMini can be used for connection to the IoT gateway as well as for communication with further CAN-connectable devices on the vehicle body network or for communication with the truck or industrial engines. The control device based on a 32-bit micro-controller comes with C-libraries for various trucks and industrial engines.

Gateways provide connectivity. Such devices link the commercial vehicle to the infrastructure and ensures the data flow between the device and the cloud. As a platform for IoT applications, the Gatebox 100 performs the Fog Computing. Furthermore, it locally stores operational data, thus, not requiring a permanent access to the Internet. In addition to this "operational data logger" function, the gateway takes on Edge Analytics features allowing an analysis directly on the vehicle, wherein errors are pre-analyzed and reported to the head office.

In order to interconnect the data with the cloud, the gateway offers WWAN, WLAN, or LTE as well as CAN interfaces or digital I/Os for interconnection with sensors and mobile controllers. The standard version includes two USB 2.0 ports, one HDMI connector as well as four 9-pin D-sub connectors, which can be used for CAN, EIA 232, or EIA 485 interfaces.

By means of this gateway, also the status of other devices in addition to a connection to the cloud can be monitored. It is for example able to initiate a restart or an update without being on location. For collecting data, a customized complete solution is required including an IoT framework, which can, subsequently, also take on analysis and long-term documentation. This framework also allows a direct transmission of orders to the vehicle by using CAN or general purpose I/O ports. It supports administration, up-dating, addressing, or configuration of nodes. The gateway can be integrated into an existing IoT framework and delivers available data to the complete system.

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