Communication from CAN to IoT

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The Internet of Things (IoT) is driver for new business models and their implementation. Many companies want to realize innovative applications using data communication, but a variety of devices and protocols give distinction to the modern IT infrastructure: These so-called multi-protocol environments form new challenges for data communication. Insys Icom has created a flexible, adaptable system with its Insys Smart IoT Ecosystem that is able to collect and process data via various protocols like CAN or CANopen – also using CAN Universal Gateways of MBS.

The characteristic feature of the "new industrial world", also called Industry 4.0, is the integration and connectivity of different devices, sensors or actors, controls, web cams, measuring or monitoring relays. The range of serial or IP field devices that provide data to the operators, manufacturers, and service providers is wide. The devices often communicate via various protocols. If these coincide, so-called multi-protocol environments arise, which make data exchange and processing difficult. This is, because not each device "talks" in the same protocol as its counterpart – "language barriers" arise. The challenge for IoT solution developers is therefore to handle the variety of protocols that exist in the professional field, and avoid communication problems.

Insys Icom, supplier of professional data communication solutions, has found a possible solution with the Insys Smart IoT Ecosystem. It is a highly pre-integrated end-to-end ecosystem and contains all necessary elements to gather, process, and provide data from distributed applications quick and easy. The professional routers of Insys Icom, the so-called Smart Devices, themselves speak some common protocols like for Logo!, S7, MQTT, or Modbus TCP/RTU connections. So-called Destination Connectors are available with HTTP, e-mail, and SMS amongst others for transmitting data to customer-specific infrastructures like clouds, ERP, or Scada systems. Many protocols have already been implemented in projects: A Smart Device of the modular router series MRX is in theory able to realize each protocol technology using an extension card for example. Various serial or IP-capable devices and I/O peripheries can be connected easy, quick and, in particular, flexible with many different protocols accordingly.

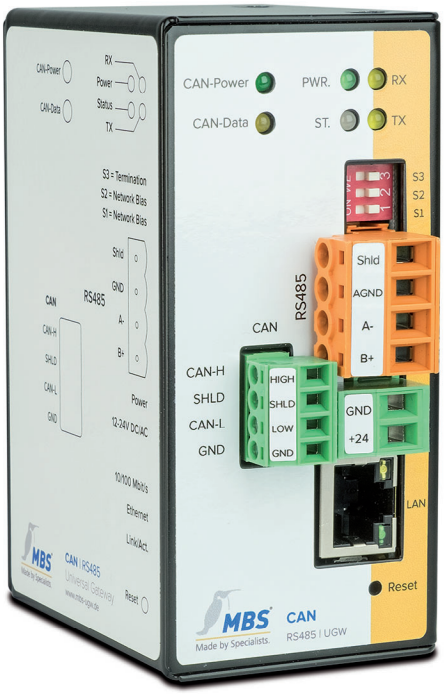

Figure 1: CAN protocol converter (Photo: MBS)

Nevertheless, field devices of Insys Icom customers that are connected to the Smart Devices sometimes use a protocol that is not known by the router. Then, an "interpreter" between customer device and industrial router will be used: The Application Connector as it is called by Insys Icom converts ("translates") the protocol into a protocol that is understandable by the router. Depending on the customer application, a suitable "Connector" will be prepared that can also be a combination of software and hardware. The company often resorts to the know-how of partners for such projects, like for the CAN and CANopen protocols: These are often used in applications for buildings, machine controls, or in the automotive industry. They can be integrated in the Insys Smart IoT Ecosystem using the CAN Universal Gateways of MBS.

CAN and CANopen for buildings and industry

CAN is used for wired, digital data exchange. Developed in the 1980s for the automotive industry and standardized as ISO 11898, CAN is also used in industrial applications for machine controls. The standard is also basis for CANopen, a protocol for modern automation technology (EN 50325-4). It is often used for the communication between field devices and process control in Europe. In the field of building automation, these are virtually the building's lifelines – air conditions, lifts, or energy supply systems that are interconnected for control and monitoring purposes.

Basically, the benefit of using communication protocols is that different devices of different manufacturers can act in concert in a network. This interoperability is ensured by the CAN Universal Gateways of MBS. They can be used for CANopen data exchange as quick and ▷

Figure 2: One of the Insys Icom Smart Devices (Photo: Insys Icom)

easy as for manufacturer-specific communication protocols with their integrated protocol-hardware-adapter – without the otherwise usual bus couplers and complex wiring. Moreover, the quick connection to serial or network-based communication protocols becomes possible. Data of the individual building systems will be collected locally and transmitted via CAN. The CAN Universal Gateways convert this information for data exchange in the building automation so that it can be evaluated by the staff in the control centers – transmitted and, if required, pre-processed by routers like the Insys Icom Smart Devices.

A fundamental security aspect is important here: The information to be collected and its use can be defined exactly to prevent manipulation of important building infrastructures. Security and control data can be excluded; values to be read and changed can be defined explicitly. Moreover, the amount of data to be collected will be reduced to the minimum. Benefits can be generated by using the IoT: The CAN Universal Gateways of MBS collect the previously defined data of the field level, convert, and forward them. Professional routers of Insys Insys Icom can pre-process these data locally and transmit them flexible to cloud services or Scada systems for example thanks to their integrated Linux environment and the software package Icom Data Suite. Moreover, the values can be visualized on a dashboard directly on the router or in the cloud.

Theoretically, a connection to each third party solution is possible and expressly desired with this system. The customer himself shall decide how to set up his infrastructure and which elements are ideal for it. The technical implementation of Industry 4.0 is very important since ideas have to be turned to sales in permanently decreasing periods. It is obvious that multi-protocol environments that can be found in M2M or IoT applications require complete solutions that adapt to the individual requirements of the users. A highly pre-integrated end-to-end ecosystem like the Smart IoT Ecosystem and the gateways of MBS allow to realize applications across various protocols. Such solutions become more and more important for the overlap of humans, data, and intelligent machines in the age of industrial Internet of Things and as long as there is no uniform standard.

Author

Katrin Geier
Insys Icom
kgeier@insys-tec.de
www.insys-icom.de