New IoT standards, products and small form factors at embedded world

By Norbert Hauser, Kontron S&T AG

Kontron presents a multitude of new products at embedded world, including a Fog Computing starter kit, scalable IOT-/Edge gateways, Fog computers and HMIs, the Embedded Server ZINC Cube with latest Intel processors, Computer-on-Modules, motherboards, and single board computers.

■ Visitors will learn how Kontron together with S&T supports enterprises with the latest technologies, products, and services in their digitalization and IoT strategies from the Cloud to the field level. A highlight is the availability of the new Time Sensitive Networking starter kit. The starter kit consists of a KBox C-102 as an industrial computer/ Fog computer for central control through the integrated networking card for TSN, as well as the corresponding software. This allows for enterprises to create seamless connections between the field level, Operational Technology (OT), and Information Technology (IT), making possible real IIoT or Industry 4.0 based on the Ethernet Protocol standard. For the configuration and the monitoring of their TSN networks, users require the suitable tools. Existing prototypical implementations facilitate the configuration of the appropriate TSN streams and offer graphical user interfaces. For monitoring and debugging purposes, the common tools can be employed, as long as they cover the features specific to TSN, such as synchronization status.

The Kontron solution offers accuracies of under 100ns for clock synchronization among its networking elements. Packet jitter typically doesn't rise above 1µsec. Packet-length-dependent latencies are around 2.5µs (64 Byte) for the TSN switches. These characteristics already cover a lot of applications at the field level well. In parallel, new solutions expanding the new OPC UA standard by adding real time capabilities over TSN are being developed. They are based on running TSN switches in what is called cut through mode for minimal latency. This procedure potentially satisfies the highest demands for control technology.

The global OPC UA interoperability standard enables the seamless, secure, and reliable flow of information among the devices of various manufacturers and thus significantly drives convergence of industrial infrastructures. OPC UA is an ideal choice for meeting the new demands in security, data modeling, scalability, and expandability. With the standard PCI Express network card and the associated network and switch drivers for Linux, industrial computers can be connected through redundant ring-, line-, daisy-chain-, or star-shaped TSN networks. The Kontron TSN network card includes an integrated switch for redundant networks with two (PCIE-0200-TSN) or four (PCIE-0400-TSN) gigabit ethernet ports. It meets all specifications of IEEE 802.1, such as timing and time synchronization, traffic scheduling, frame preemption, stream reservation protocol, and others (via update where applicable). Future extensions of the TSN specifications can be integrated through software updates in the FPGA (Field-Programmable Gate Array). For OEM customers, Kontron offers a private labelling version of the networking card with software services included. This enables OEM customers to expand their portfolio with TSN-connected products. Like all Kontron products, the TSN network card is especially suited for rough industrial environments and can be run in industrial temperature ranges from -40 to +85 ° C. Kontron will present an Embedded Cloud live demo based on the TSN system and OPC UA in combination with various IoT- and TSN devices such as an Embedded Server. In this scenario, it implements the use of Embedded hardware and cloud elements in a Time Sensitive Network.

Tailored for its vision of the Embedded Cloud, Edge, and Fog Computing, Kontron introduces its first Embedded Server available as a product. The successor to the Cube evaluation platform offers a Single Intel Xeon processor with a compact, cost-optimized design type with expanded storage functionality.

In assembly lines and production facilities, the trend is towards machine and plant control through touch-controlled visual user interfaces. To suit the harsh conditions of

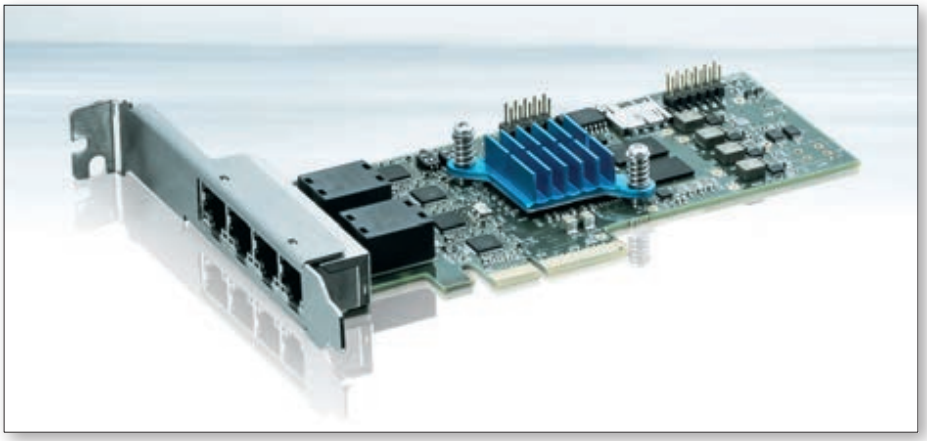

Figure 1. The new Kontron TSN standard networking card. As a stand-alone networking card, it renders every compatible device Time Sensitive Networking (TSN)-ready. The TSN specifications guarantee timely, high availability delivery of data packets.

industrial settings, Kontron offers two product families of industry-grade HMI (Human Machine Interface): FusionClient and FlatClient. Both families are equipped with the latest generation of Intel Core i7 processors. All HMIs of the FusionClient family are IP65 protected at the front and designed specially for use in industrial environments. They have an extremely high shock and vibration resistance and can be run in temperature ranges from 0 to +50 °C. All FusionClient models feature an easy-to-clean, scratch-resistant, anti-glare front glass, and are available with our without a PCAP Multi-Touch screen.

The screens are available in display sizes from 12.1 inches (30,7 cm) to 21.5 inches (55 cm). Individual options can be integrated to expand the range of functions. For instance, an RFID reader mounted invisibly behind the front glass can be used for implement authorization and security levels for comprehensive access control. An LED alarm rail, optionally available as well, offers high user friendliness and optimized visualization of processes and machine state. For an even easier integration into existing nework structures, Wi-Fi can be integrated as well. On demand, Kontron FusionClient series supports Kontron WideLink, a technology that implements video and telemetry data communication through a standard CAT6a Ethernet cable at up to 100 meters distance, remotely connecting control computers free of interference.

Figure 2. The modular FusionClient HMI combines an edgeless, easy-clean, IP65 protected and anti-glare pure glass interface with the industry proven performance and flexibility of the Kontron COM Express Computer-on-Module.

Kontron FlatClient PCs are designed for industrial applications. They offer maximum flexibility at attractive pricing. Through the update to the latest Intel processor technology, users benefit from marked graphics- and computing performance increases. The FlatClient family panel PCs have proven themselves successful in high-volume implementations in industrial applications. They are available in numerous versions covering four display sizes from 10.1 inches (25,7 cm) to 23.8 inches (60,5 cm) screen diagonal. They are available in both 16:9 and 16:10 widescreen format, as well as 4:3 and 5:4 standard format. Kontron is one of a select few manufactures in the marketplace offering up-to-date processor and display technology in 4:3 and 5:4 regular format devices. FlatClients feature a full-metal casing and are available in versions for independent operation with VESA mount or as built-in devices. They are optionally available with PCAP, resistive touch screen or safety glass and can be equipped with RFID readers.

The FlatClient panel PC family is structured in two distinct lines: the ECO Line features Intel Atom processors, while the PRO Line is based on Intel Core CPUs. The ECO Line devices are equipped with two Gigabit Ethernet (GbE)-, one HDMI, one VGA, two USB 2.0 and one USB 3.0 port. The PRO Line offers three Gigabit Ethernet (GbE), two DisplayPort and four USB 3.0 interfaces. Optionally, both lines can

Figure 3. COM Express Type 7 with latest Intel Xeon processor: Typ 7 Module with carrier board

Figure 4. Tailored for its Embedded Cloud vision and Edge- and Fog computing, the first available embedded server from the Cube evaluation platform already unveiled with a Single Intel Xeon processor in a compact, cost-optimized design with extended storage functionality will be presented

be equipped with serial interfaces (RS232, RS422, RS485), an audio output, and an RFID module with a CF/SD card reader. Depending on the processor used, FlatClient PCs support the Windows 7 and Windows 8.1 operating systems including Embedded versions, Windows 10 IoT, and Linux. The design of the FlatClient models can be customized to meet customer requirements, for example by freely choosing the color of the front and back of the devices and adorning them with individual logos. All devices are characterized by their fanless design, are highly shock- and vibration resistant, and feature an easy-to-clean, anti-glare and scratch-resitant front glass with IP65 protection. All FlatClient panel PCs are CE and cULus certified. The latest Kontron KBox A-250 is based on a PicoITX-2.5"-SBC and comes equipped with the latest Intel Atom processors. Their favorable price makes them especially suited to use as an entry IoT gateway and when requirements for additional interfaces are low. The new KBox A-150 is based on 3.5"-SBCs with scalable performance from Intel Atom, Intel Celeron, Intel Pentium up to Intel Core i processors.

At embedded world, Kontron will present, for the first time ever, Computer-on-Modules with a Q7 form factor, which will be offered alongside the COM Express and SMARC 2.0 form factors going forward. These modules are already available with NXP i.MX low-performance processors optimized for networking tasks, and Intel Atom processors for SMARC. With its new Q7 form factor products, Kontron addresses customers using products of this format already, opening a migration path to the SMARC 2.0 standard. All new SMARC 2.0 modules can be equipped with the original security solution APPROTECT which protects data and application integrity end to end. With APPROTECT LICENSING, new business models such as licensing or pay-per-use can easily be implemented. ■