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story of the

HARDWARIO

Lets come and see how we helped prominent companies
around the world connect and master their processes



October - 2024

What are we trying to achieve?

We are helping companies leverage innovative IoT solutions by providing open, modular platforms that enable easy customization for various applications. Our focus on wireless technologies like NB-IoT, LTE-M, and LoRaWAN allows us to support diverse industries, including agriculture, energy, and retail. We strive to create a comprehensive ecosystem that enhances data management and device control, ultimately empowering our clients to achieve their business goals efficiently.

BASED IN



Liberec (CZ)



London (UK)



Houston (Texas)

Established in 2016

TODAY A TEAM OF 28

- Electronics, firmware, and software engineers
- Sales, marketing, sourcing, and production managers
- Growth pillar = business partnerships
- Secondary revenue stream: SaaS subscriptions for the connected devices
- Publicly listed on Prague Stock Exchange since 2022

CHESTER PLATFORM

The most configurable industrial IoT gateway

- Comprehensive hardware and software ecosystem for industrial IoT applications
- Rugged waterproof design suitable for outdoor and harsh conditions
- Rich wireless connectivity (Nb / IoT / LTE / M, LoRaWAN, BLE)
- Optimized for multi-year battery lifespan
- High degree of hardware modularity through the extension modules and carrier boards
- Open to customization and white labeling
 - In-house UV printer for logo printing
 - In-house CNC milling machine



WIRELESS
CONNECTIVITY



LONG BATTERY
LIFESPAN



RICH SET OF
EXTNSIONS



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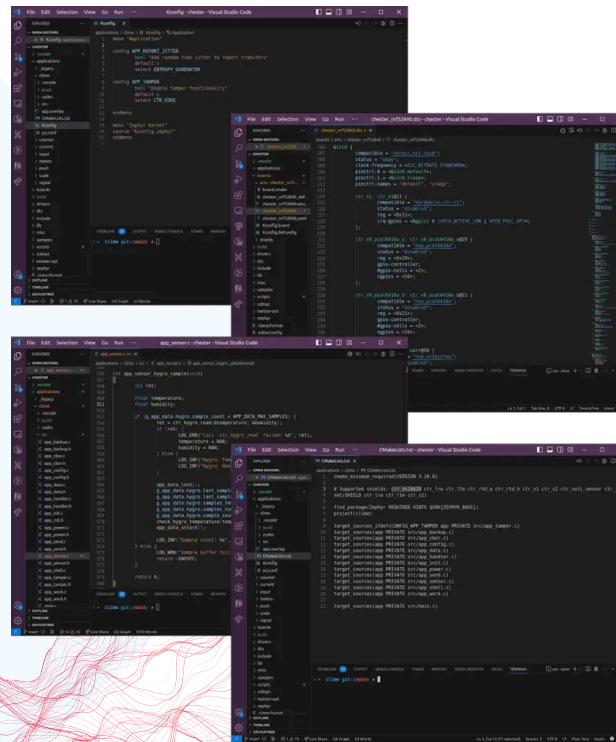
"Chester is a great asset to us, especially for monitoring key production processes"

— CTO Jakub M.

CHESTER FIRMWARE SDK

Ability to create your applications or update the existing ones

- Based on Zephyr RTOS and nRF Connect SDK
 - SDK is open-source - available on GitHub
- Significantly reduces development time of the product
- Seamless integration with HARDWARIO Cloud middleware
- Portfolio of tools, like HARDWARIO Manager mobile app
- Partners can write their own firmware applications, or HARDWARIO can help on contracted time & material basis
- Many open reference application implementations through the CHESTER catalog applications (explained later)



"Thanks to Chester openness we was able to easily implement company SW"

— CEO Petr Dvořák

CHESTER CATALOG APPLICATIONS

Immediate deployment for your specific needs

- Growing set of ready-made implementations
- Provide solid foundation for the final product
- Source codes are part of the CHESTER SDK
 - All applications receive continuous updates
- Immediate stock availability
- Examples applications:
 - CHESTER Push - push-button notification system
 - CHESTER Meteo - outdoor weather station
 - CHESTER Current - machine current monitoring



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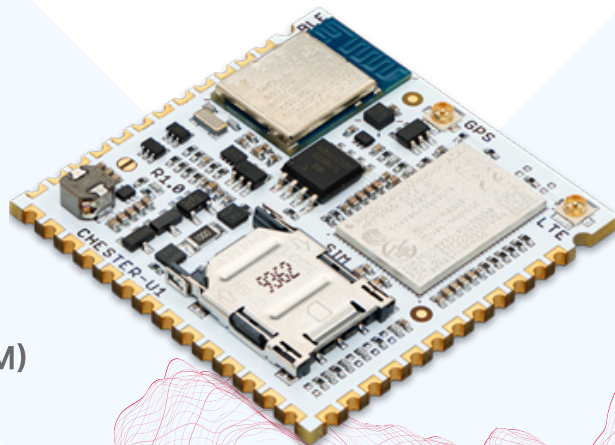
"HARDWARIO developed for us custom software solution"

— CEO Anders Danielsson

CHESTER FOR OEM

We do not let you down with specific needs

- The CHESTER platform can be embedded using the System-on-Module CHESTER U1 (38.1 / 38.1 mm)
 - Full software compatibility with the standard CHESTER mainboard
- Based on Nordic Semiconductor silicon:
 - nRF52840 - Bluetooth Low Energy (1 MB flash / 256 kB RAM)
 - nRF9160 - Cellular IoT System-in-Package
- Integrated Nano SIM holder, 8 MB SPI NOR flash memory, digital thermometer, 3-axis MEMS accelerometer, DC/DC + LDO
- Operating voltage range: 1.7 V to 5.5 V
- Operating temperature span: -40 °C to +85 °C



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"HARDWARIO helped us when we needed to quickly expand existing functionality"

— Member of board David Šafář



overview of

SERVICES

Connecting industries with smart IoT solutions
for a more efficient and sustainable future



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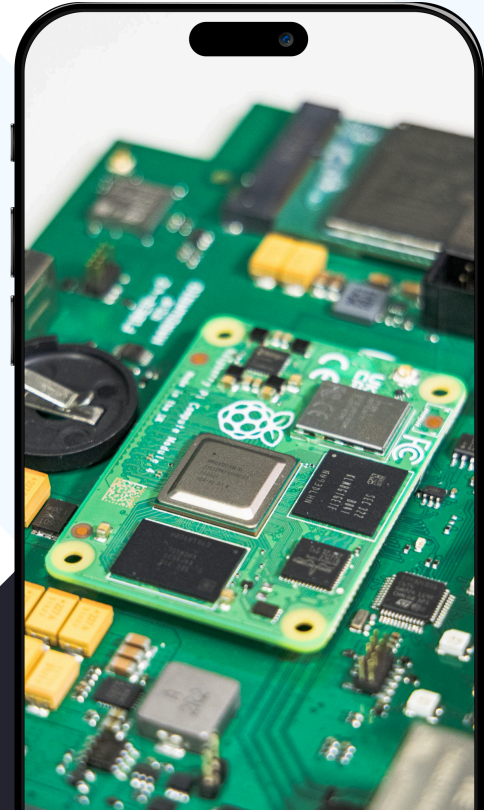
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EMBEDDED SYSTEMS ENGINEERING

Innovative, reliable embedded systems to transform your products

- From the initial product idea to mass production
- Expertise in wireless technologies and low-power designs
 - NB-IoT / LTE-M, LoRaWAN, proprietary sub-GHz, BLE
- Design-in experience with NFC, WiFi, Ethernet
- Experience with the following MCU vendors:
 - Nordic Semiconductor, Espressif, STMicroelectronics, Texas Instruments, Silicon Laboratories, etc.
- Zephyr RTOS (preferred choice), Azure RTOS, FreeRTOS, bare metal programming, embedded Linux systems - Yocto, Buildroot



BACKEND SERVICES DEVELOPMENT

Building scalable, high-performance back-end systems

- Experience with programming languages:
 - Go, Python, TypeScript (Node.js / Deno runtime)
- Experience with the optimization and implementation of database systems:
 - PostgreSQL, ClickHouse, MongoDB
- High-availability infrastructure operations using Kubernetes clusters (on-premise or through cloud services like Azure Kubernetes Services)
- Experience with data streaming via RabbitMQ, JetStream, MQTT, etc.
- Orchestration of cloud infrastructure using Terraform and Ansible tools
- Deployment of services using the GitOps tool ArgoCD



PRODUCTION AND LOGISTICS SERVICES

Efficient for seamless operations and optimized workflows

- Component sourcing handled by HARDWARIO in full
 - Authorized channels only + traceability
- Cooperation with top-notch EMS partners for SMT process
- Plastic enclosure post-processing (UV printing, CNC milling)
- In-house testing and assembling
- Climatic test chamber with controlled temperature and humidity
- Warehouse + fulfillment services
- Warranty / service repair / technical support



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example

USE-CASES

Tailored use cases for everything from energy
monitoring to predictive maintenance



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AXILERA / GRAIN SILO ANALYTICS

Seamless reporting of silo statistics

- **Objective:** The partner from California had to deliver grain silo monitoring solution deployed in Canada
- HARDWARIO and the partner cooperated closely to deliver the solution
- CHESTER platform was a perfect fit, as the project needed a high degree of customization
 - Up to 150 temperature sensors connected to a single CHESTER gateway
 - LTE-M technology provides a far-field communication range leap over a traditional LTE
- Partner developed a complete analytics platform with dashboards and reporting capabilities
- **Result:** A completely validated solution delivered in just 8 months from the initial contact with HARDWARIO
 - No prior implementation existed; a custom carrier board, firmware, and analytics platform were created



"HARDWARIO automate reporting of our silo and it is awesome!"

— CEO Jméno a příjmení

AXILERA SHOWCASES



STATOTEST / BRIDGE MONITORING

24/7 monitoring and reporting of bridges

- **Objective:** Provide complete hardware and communication infrastructure for bridge monitoring
- The partner has been working with HARDWARIO for the past 5 years
- Integrated ultra-precise accelerometer (as an extension module) into the CHESTER platform
- Also, STATOTEST is the **first** adopter of the CHESTER SDK with the Zephyr RTOS
- Business model of the partner is to offer the **solution as a service**, the return of investment to the actual hardware is **less than 3 months**
- STATOTEST approaches primarily municipalities
- **Result:** A robust predictive maintenance solution for structures such as bridges, historical buildings, roads, and other **civil structures**.



"Thanks to this solution we have all day overview of our bridges"

— CEO Jméno a příjmení

STATOTEST SHOWCASE



VANEMA / WIRELESS M-BUS E-METERING

Perfect measuring of resource consumption

- **Objective:** Gather data from the wireless wM-Bus e-meters (measuring heat, gas, and water consumption, etc.)
- **Effortless and non-invasive installation** in residential buildings without any dependence on the local internet communication
- The solution responds to the incoming regulatory requirements
- **Result:** Battery-powered gateway device featuring battery lifespan of 7+ years with a twice-a-day listening period



TRIVIUM PACKAGING / ANDON SYSTEM

Notifications on another level

- **Objective:** Deliver a two-way push-button notification system for the leading packaging manufacturer
- **Two-way communication** on cellular IoT NB-IoT + LTE-M networks
- Custom Go backend + React-based dashboard frontend have been developed together with a PWA-based "mobile" app
- The complete solution was delivered in less than 2 months
- **Result:** Complete ANDON system based on the **CHESTER Push** devices reduced delays across the production process



O.K. SERVIS / TEMPERATURE LOGGING

Health care 2.0

- **Objective:** Deploy an industrial-grade temperature logging system in pharmaceutical and healthcare industry (for vaccine storage and similar)
- The partner has own analytics and visualization platform PROXIMOS
- Devices are connected via **cellular IoT** or local radio **LoRaWAN** network
- Possibility to connect wide range of temperature sensors (DS18B20, Pt 1000)
- The rugged and waterproof display unit with local acoustic alarm notification provides immediate feedback and reduces reaction time
- **Result:** Steadily growing deployment of hundreds of systems in hospitals



EKOTERM / BOILER ROOM MONITORING

Early alerts save lives

- **Objective:** Design a boiler room monitoring system for early alert detection
- Hardware unit based on CHESTER platform with two-way communication, **Modbus telemetry** from the control PLC unit
- Temperature, pressure, and water leak sensor interfaces with **optional remote controllable relay**
- Possibility to connect wide range of temperature sensors (DS18B20, Pt 1000)
- The partner integrates the device into their own analytics and ticker management software
- **Result:** Hundreds of boiler rooms are already monitored in the city of Prague





be our

PARTNER

**Partner with us to unlock innovative IoT solutions and
drive digital transformation across your business**



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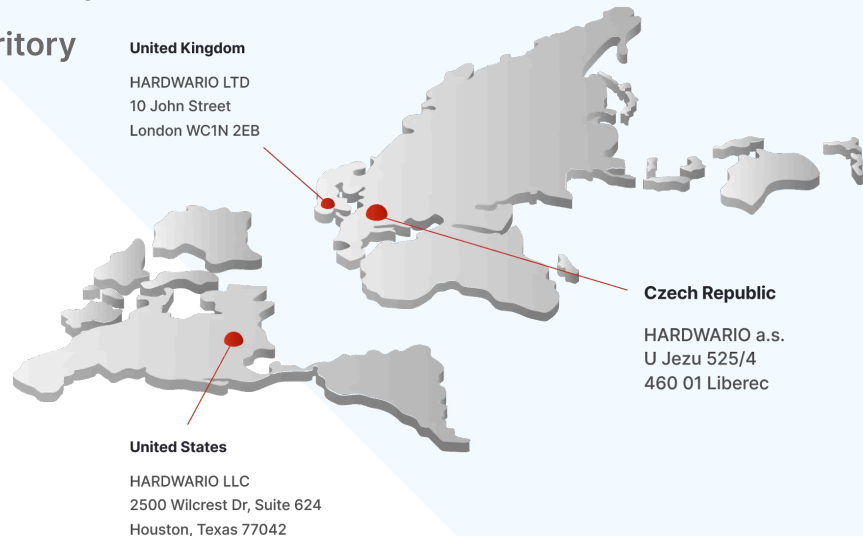
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BECOMING A PARTNER

Accelerate your journey towards smarter, scalable IoT solutions

- HARDWARIO helps their partners to deliver amazing hardware ecosystem, connectivity, and high-availability cloud middleware infrastructure
- The partners can focus on the added value of their businesses:
 - In the specific vertical with their domain knowledge and expertise
 - On a more generic level in a specific geographical territory
- Partnership is a long-term journey in a two-way street
 - HARDWARIO forwards incoming inquiries to solutions of its partners
- Non-obligatory agreement between the two parties
- Once-a-month update calls about the news and possible synergies on both sides are appreciated





HARDWARIO

Let's connect

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