

<u>Retrofitting for IIoT- How to digitize</u> <u>your analog systems</u>

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WURTH ELEKTRONIK MORE THAN YOU EXPECT

Agenda

- 1. Retrofit Make new from old
- 2. Benefits of Retrofitting
- 3. Wireless technologies for Retrofitting
- 4. Example use cases
- 5. Live demo
- 6. Q&A





Retrofit





Why Retrofit?

Retrofitting in numbers

Potential for retrofitting

- 20 years average useful life of factory equipment (Source: VDMA)
- 85% of all industrial plants in Germany are not digitally connected (Source: Accenture)

Benefits retrofitting

- The useful life of the system is extended by 5 10 years (Source: VDMA)
- Reduced training effort compared to new systems
- Reduce the fear of digitization
- Good on the environment
- The investment often pays off after 2 years
- Example: by investing only EUR 25,000 -> annual savings of EUR 200,000 (Source: Bosch Rexroth)



VDMA – Verband Deutscher Maschinen- und Anlagenbau



w/F

WIRELESS CONNECTIVITY FOR RETROFITTING



Wi-Fi for Retrofitting

Why Wi-Fi?









Reuse the exiting infrastructure

Cloud connectivity

Low power

Secure



Cordelia IoT Wi-Fi Module

lloT ready

- Fully featured 2.4 GHz Wi-Fi module (IEEE 802.11 b/g/n)
- Plug-and-Play Secure IoT connectivity
- Zero touch provisioning in the field using QuarkLink
- Small size and easy hardware integration
- Secure by design Secure boot, Secure storage, WPA3, TLS
- Low power optimized (1 mA current consumption when connected)
- Smart antenna configuration (2-in-1 module)
- Primary interface UART
- UART-to-Cloud bridge mode Ideal for retrofitting applications





Cellular connectivity for Retrofitting

LTE-M & NB-IoT





Adrastea-I cellular module

lloT ready

- Flexible mode selection between LTE Cat M and NB-IoT
- Integrated GNSS (Supports GPS & GLONASS)
- Integrated User MCU (ARM Cortex-M4, 1 MB Flash Memory, 256 KB RAM)
- Small form factor: 13.4 x 14.6 x 1.85 mm
- Protocols: IPv4/IPv6, TCP/UDP, HTTP/HTTPS, TLS/DTLS, MQTT, LWM2M
- Interfaces: USIM, UART, I2C Master, SPI Master, GPIO, ADC, JTAG
- Secure MQTT and LWM2M for cloud connectivity





RETROFITING REAL WORLD EXAMPLES





Real world example

- 15-year-old CNC machine from a hardware technology manufacturer
- Proprietary control software
- IoT incompatible control interfaces with proprietary software protocols
- Issues (when machines are not digitally connected ?)
 - Unplanned downtimes
 - stagnant material supply
 - increasing rejects
 - Expensive service/maintenance contracts
- Manual recording of faults and downtimes is not reliable
- Tampering with the internals of the machine will void the service contract





Need a non-invasive method to monitor & control the machine to pre-empt or plan down times



Real world example

Retrofitting to the rescue

- 1. Machine retrofitted with wireless connectivity to the cloud
 - Collect the machine data from the existing control system in the cloud
 - Enable remote control of the machine
- 2. Additional sensors mounted and connected to better interpret the status of the machine
 - Vibration sensors
 - Acoustic sensors
 - Optical sensors
 - Current sensors
 - ...
- 3. Data visualization Just looking at the data set leads to ideas for improvement
- 4. Potentially use AI/ML to enable predictive maintenance and process optimization

Retrofit – A non-invasive method to reap the benefits of IoT









<u>RETROFITTING – INDUSTRIAL CUTTER</u>





RETROFITTING – INDUSTRIAL CUTTER



Industrial cutter retrofitting

 Measuring current to detect irregularities and optimize usage





RETROFITTING – INDUSTRIAL CUTTER





<u>RETROFITTING – WELDING MACHINE</u>





Parameters Monitored:

- Machine load and utilization
- Cycle times
- Welding parameters

Results achieved:

- Longer lifetime of the thermode
- Better efficiency



RETROFITTING – WINDING MACHINE



Goal:

- Smart HMI for the old machine
- Save winding parameters digitally

Results achieved:

- Better planning
- Better efficiency







LIVE DEMO







THANK YOU!

