

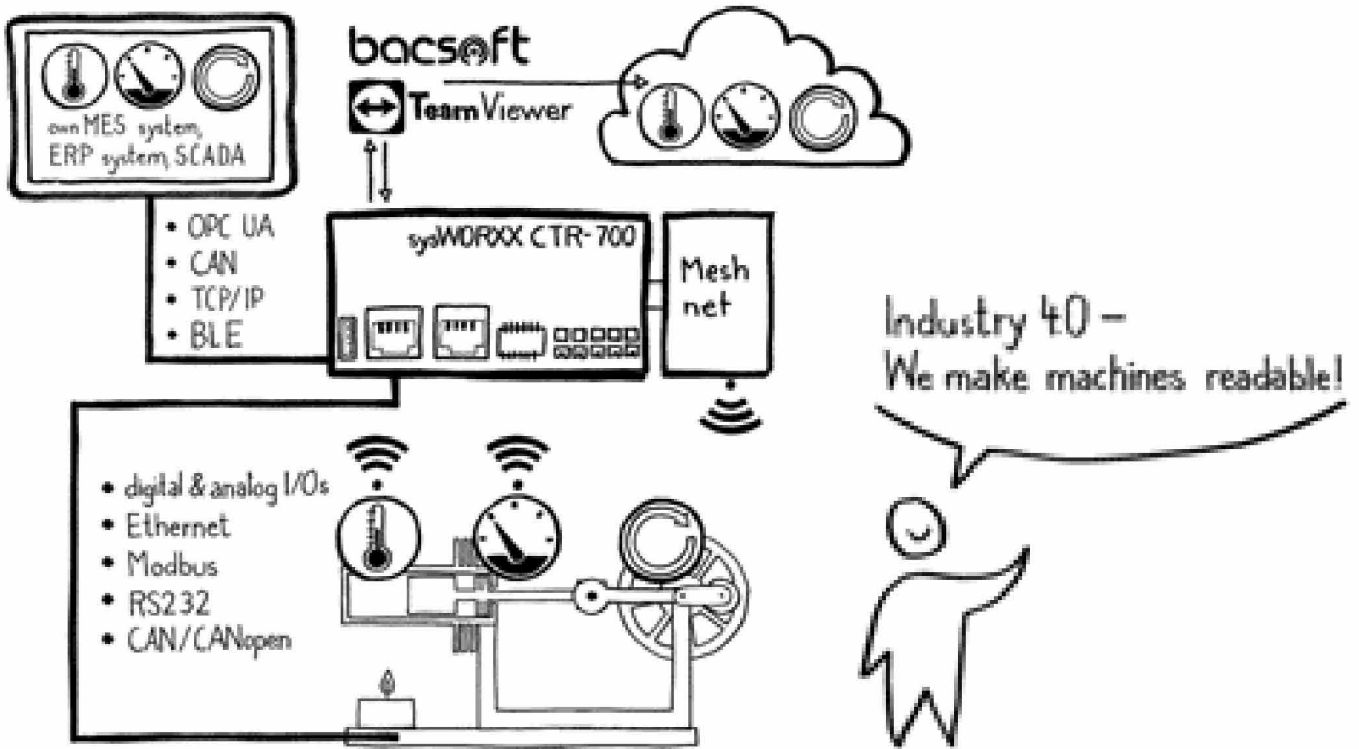


LIVE MONITORING & PREDICTIVE MAINTENANCE

Fields of application: energy management, asset/personnel tracking, production monitoring

sysWORXX CTR-700 – a combination of a freely programmable edge controller & IoT gateway with direct mesh network connectivity

WE MAKE MACHINES READABLE!



Wired and wireless sensors
(e.g. mesh networks)



Fieldbus sensors

- CAN/CANopen
- Modbus
- Ethernet Powerlink

```

1100101
110010111001
5B1 h
1010 100100
01100010
6E5 h
1000111000111
1010
8G3 h
    
```

Raw sensor data

(digital & analogue I/Os, Ethernet, Modbus, RS232, CAN/CANopen)



```

JSON {
  type: "temperature",
  value: 22.5,
  unit: "°C"
}
    
```

```

JSON {
  type: "humidity",
  value: 84,
  unit: "%RH"
}
    
```

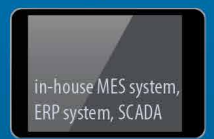
```

JSON {
  type: "acceleration",
  value: { x: 0.2,
          y: 1.2,
          z: 2.0 }
  unit: "g"
}
    
```



Cloud

MQTT, OPC UA, {Rest},
CAN, TCP/IP, BLE



in-house MES system,
ERP system, SCADA



- Node-RED
- C#
- Java
- IEC 61131-3, etc.

Edge Computing:

- M2M communication
- Pushing to Cloud
- Local Persistence

INDUSTRY 4.0 APPLICATION EXAMPLES

PRODUCTION MONITORING

Live monitoring & control of machinery/plant data



sysWORXX CTR-700 SOFTWARE DETAILS

SYSTEM SOFTWARE

Operating system	Linux / Debian
PLC runtime	OpenPCS – IEC 61131-3
Wiring editor	Node-RED
Other programming languages	C#, C/C++, Java, Python

COMMUNICATION PROTOCOLS

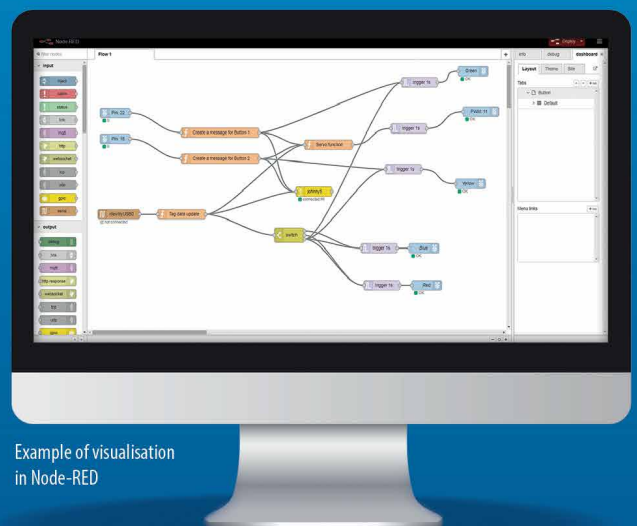
IoT data protocols	OPC UA, MQTT, TCP/IP
Fieldbus protocols	CANopen, CAN Layer 2, Modbus & more
Mesh network	Wirepas via extension module

VISUALISATION

PLC default	SpiderControl / IniNet (<i>commercial license</i>)
Alternative visualisation	Node-RED (<i>free license</i>)

REMOTE ACCESS

System services	SSH / Telnet, SFTP / FTP, HTTPD
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Example of visualisation
in Node-RED

INDUSTRY 4.0 APPLICATION EXAMPLES

ENERGY MANAGEMENT

Intelligent meters & reduction/smoothing of electrical load peaks



sysWORXX CTR-700 BENEFITS

- Combined edge controller & IoT gateway
- Edge controller: local pre-processing of data from various fieldbuses & wireless networks
- IoT gateway: data forwarding to the cloud and HMIs
- Freely programmable in the following languages
 - OpenPCS – IEC 61131-3
 - Node-RED
 - Java
 - Python
 - C#
 - C/C++
- Various different digital & analogue interfaces
 - Direct connection of sensors and actuators
 - See hardware details
- Direct connectivity to mesh network module
- Transmission via Wirepas wireless technology
- Can also be fitted with wireless modems from a wide range of manufacturers
- Suitable for DIN top-hat rail mounting
- Strict separation of enterprise IT & shop floor OT

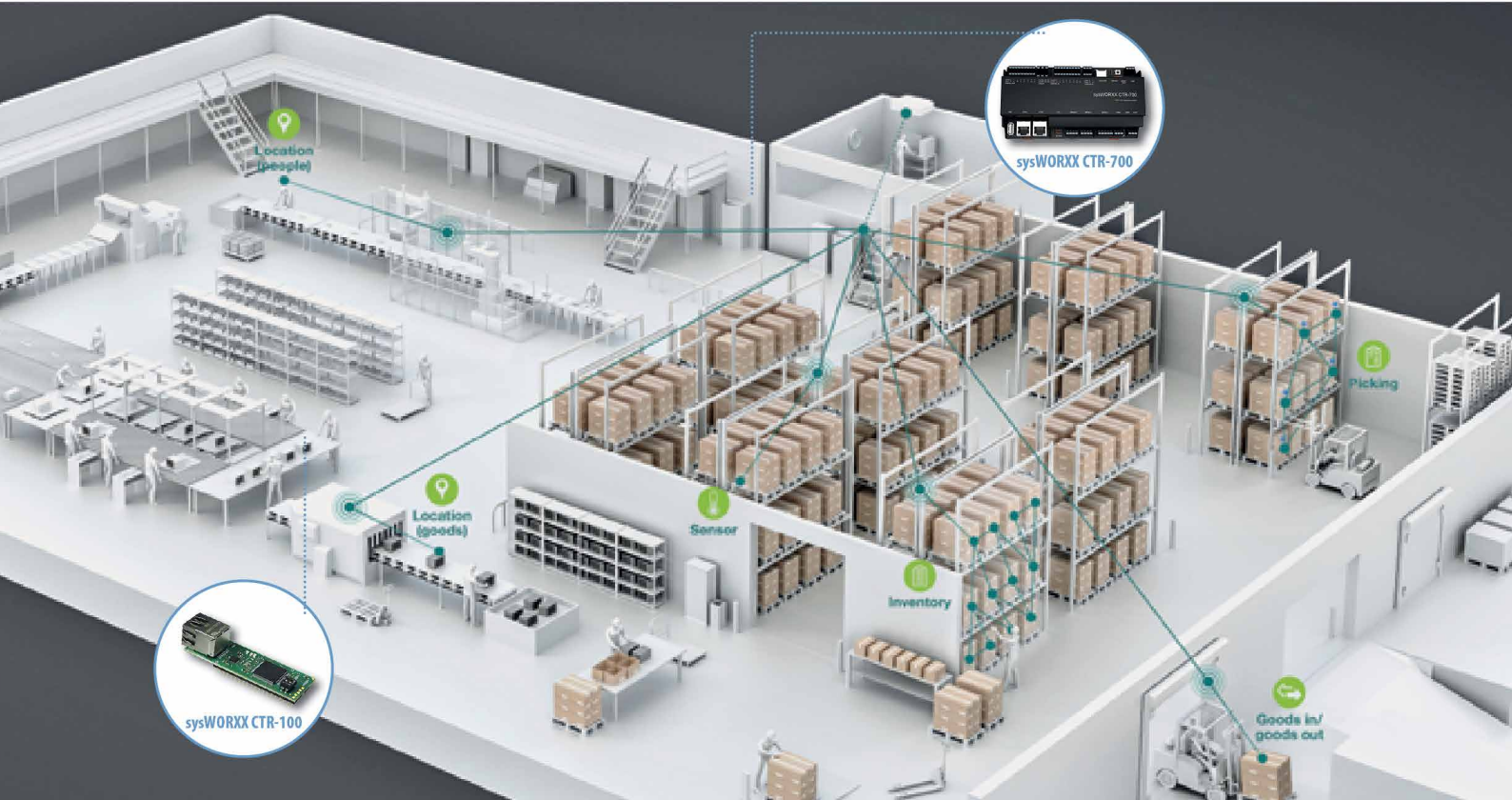
sysWORXX RFG-2.4 wireless extension module



INDUSTRY 4.0 APPLICATION EXAMPLES

GOODS TRACKING

Increased efficiency through monitoring in industry/production



sysWORXX CTR-700 HARDWARE DETAILS

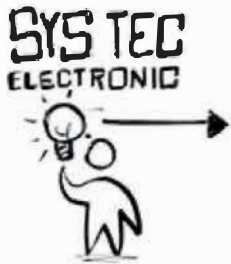
- Suitable for DIN top-hat rail mounting
- NXP i.MX 7 / Dual Cortex-A7
- 1024 MB RAM, 8 GB eMMC



Power supply 24V / 1.5A	SPT-THR 1.5 mm ² / 3-pin
Service (console)	USB 2.0 micro B
Ethernet 0	RJ45
Ethernet 1	RJ45
USB host	USB 2.0 type B
µSD card	µSD card holder
CAN 0	SPT-THR 1.5 mm ² / 3-pin
CAN 1	SPT-THR 1.5 mm ² / 3-pin
Serial interface 0	SPT-THR 1.5 mm ² / 4-pin
- RS232	
- RS485 (MODBUS)	
Serial interface 1	SPT-THR 1.5 mm ² / 4-pin
- RS232	
- RS485 (MODBUS)	
Serial interface 2	SPT-THR 1.5 mm ² / 5-pin
- RS232	
- RS485 (MODBUS)	
Backplane bus	SPT-THR 1.5 mm ² / 18-pin VCC / GND / signals
- UART	
- SPI	
4 analogue inputs	SPT-THR 1.5 mm ² / 6-pin 2GND / 4-ch.
- 0 to 20 mA / 4 to 20 mA	
- 0 to 10V	
16 digital inputs	SPT-THR 1.5 mm ² / 18-pin 24V / GND / 16-ch.
- 2 configurable as CNT	
16 digital outputs	SPT-THR 1.5 mm ² / 18-pin 24V / GND / 16-ch.
- 2 configurable as PWM	
2 relays	SPT-THR 1.5 mm ² / 6-pin COM / NO / NC
- Changeover contact	

sysWORXX CTR-700 block diagram

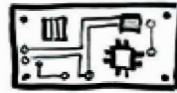
FROM CONCEPT TO PRODUCTION



1. Concept



2. HW-Design



3. SW-Design



4. Casing



5. Prototype



6. Series



7. EMS

