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The Power of IoT

Explore the Kontron Group

We are a fast-moving multinational technology leader.

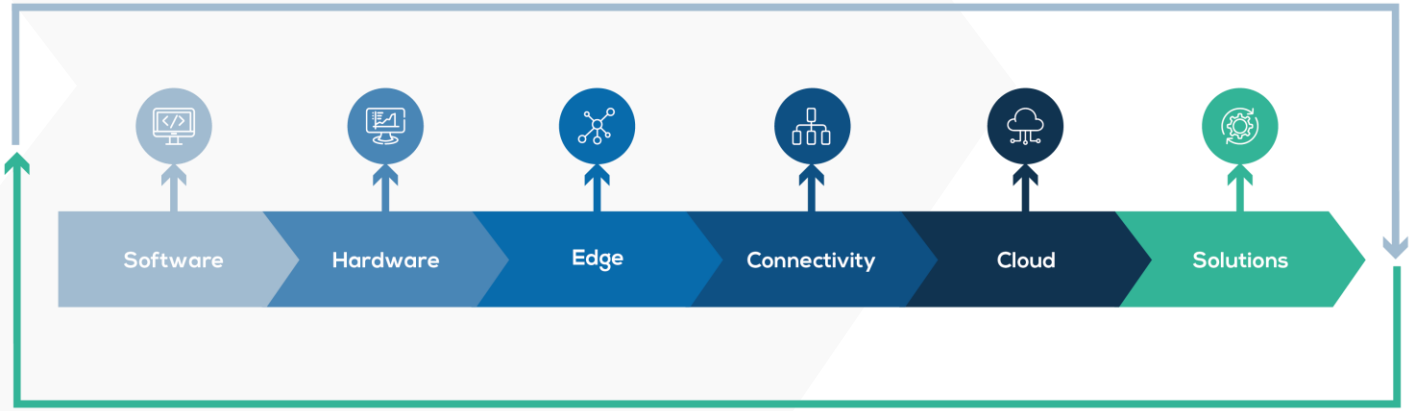
KontronOS

December 2025

Kontron susietec®

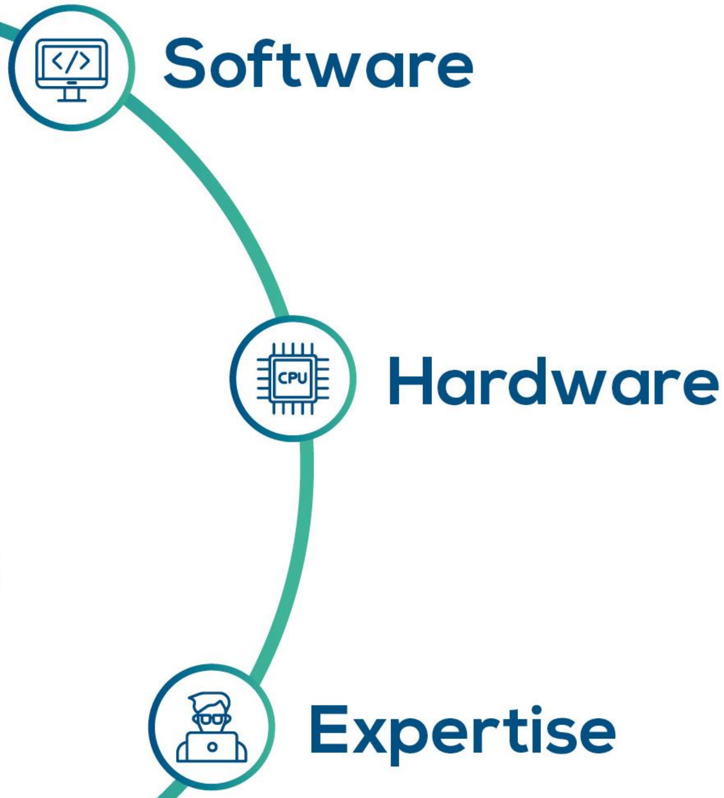
The toolset of software, hardware and expertise

- Facilitated access to digitalization with the smart solution approaches from the kontron susietec® toolset
- susietec® brings together software, hardware and expertise - with the aim of exploiting the potential of IIoT and Industry 4.0 in a new way
- Support for and collaboration with customers from the high-tech, automotive and pharmaceutical industry and thus facilitated access to future-oriented business models



Holistic digitization solutions

With susietec®, we provide you with the tools you need in the age of digitalization. This is how we create the basis for digital growth and success - sustainably, efficiently and future-oriented.



The Challenge NIS2 and CRA

- The vast majority of EU companies have been compromised by cyberattacks in the last 3 years.
- The growing number of autonomous devices without an operator represent a significant attack surface for companies.

- The government wants to ensure that the critical infrastructure can continue to operate and that only secured devices will be used in the field in future.
- Therefore, the EU has released NIS2 (Network & Information Security) , RED and CRA (Cyber Resilience Act). Red came into force 1st August 2025. Germany will release NIS2 End of 2025, CRA 11th Sept 2026 (reporting incedents) and 11th Dec 2027 (CE).
- These regulation will lead to national laws and industry-specific requirements.
- NIS2 is mandatory for critical facilities of energy, water, transportation, digital services and more

- So many Kontron customers will face discussion about NIS2 and cybersecurity and these tasks:
  - How ensuring the operation of a system and restoring its function?
  - How to prevent foreign software from running on my device?
  - How do I ensure that the devices can be updated in the long term?
  - How can I ensure that I receive regular updates of my system
  - How to implement intrusion detection and notifications?

Cyber Security

Steady increase of legal requirements

- 1990 BSI Errichtungsgesetz
  - Act on the Establishment of the Federal Office for Security in Information Technology
- 2004 ENISA
  - European Union Agency for Cybersecurity
- 2015 IT Sicherheitsgesetzt
  - Act to increase the security of information technology system
  - Inclusion of critical infrastructures
- 2016 NIS Directive
  - Directive on Security of Network and Information Systems
- 2016/ 2018 GDPR
  - DSGVO General Data Protection Regulation
- 2019 EU Cybersecurity Act
  - European cybersecurity certification framework
- 2021 IT-Sicherheitsgesetz 2.0
  - Second law to increase the security of information technology systems
- 2021 BSI-Kritisverordnung
  - Regulation on the designation of critical infrastructures
- 2023 NIS Directive II
  - Directive on Security of Network and Information Systems
  - Released March 25
- 2023 Maschinenverordnung (EU) 2023/1230
  - Applicable 20 January 2027
- 2024 EU Cyber Resilience Act
  - cybersecurity standards for hw & sw products in the EU
  - Appliccable Dec 27
- 2025 RED (EU) 2022/30EN18031
  - Appliccable 1. August 2025
- ISO/IEC 27001
  - Information technology – Security techniques – Information security management systems – Requirements
- IEC 62443
  - Industrial communication networks – Network and system security
- EN18031
  - Harmonized series of standards for cybersecurity in radio equipment

IoT Security by Design

NIS2 and CRA compliant

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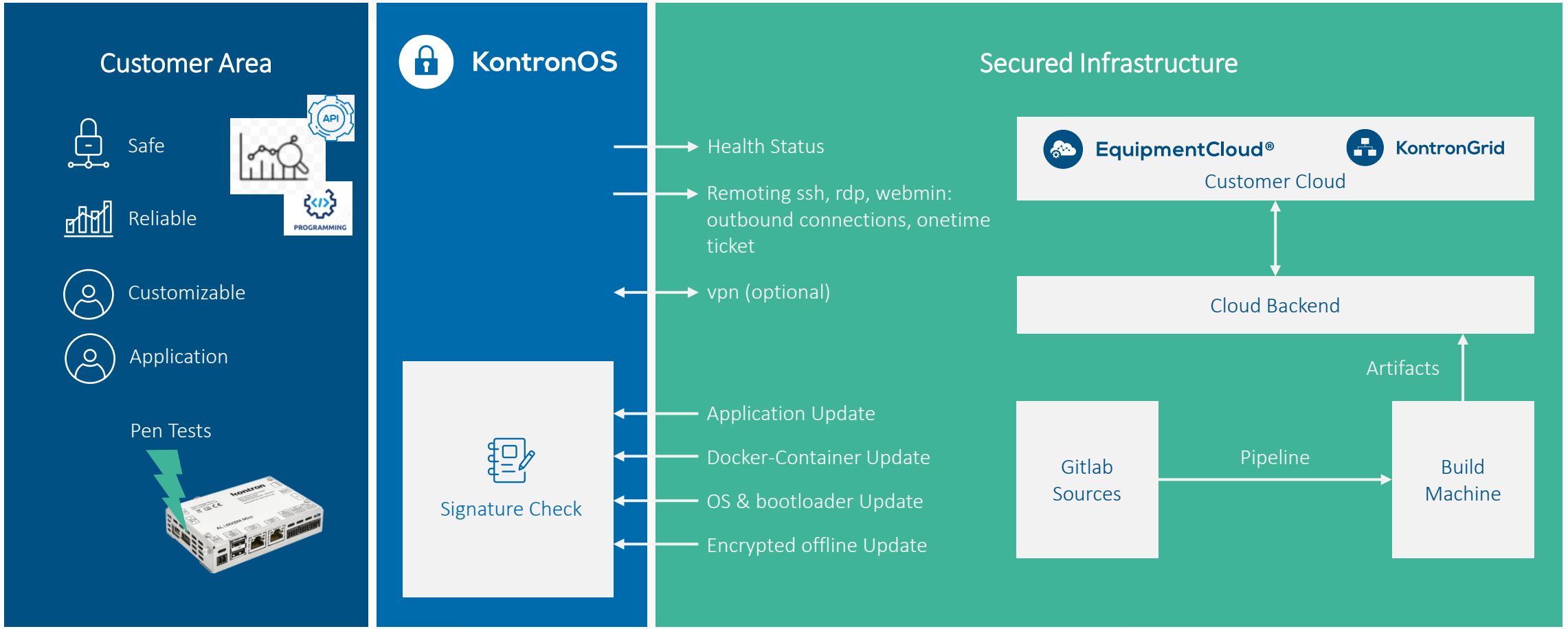
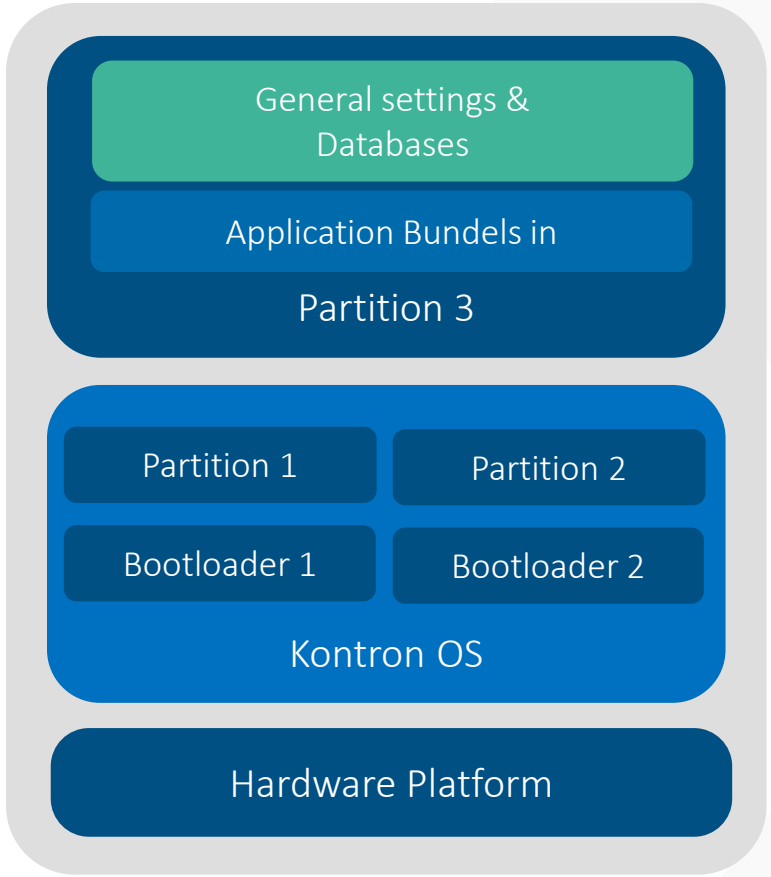
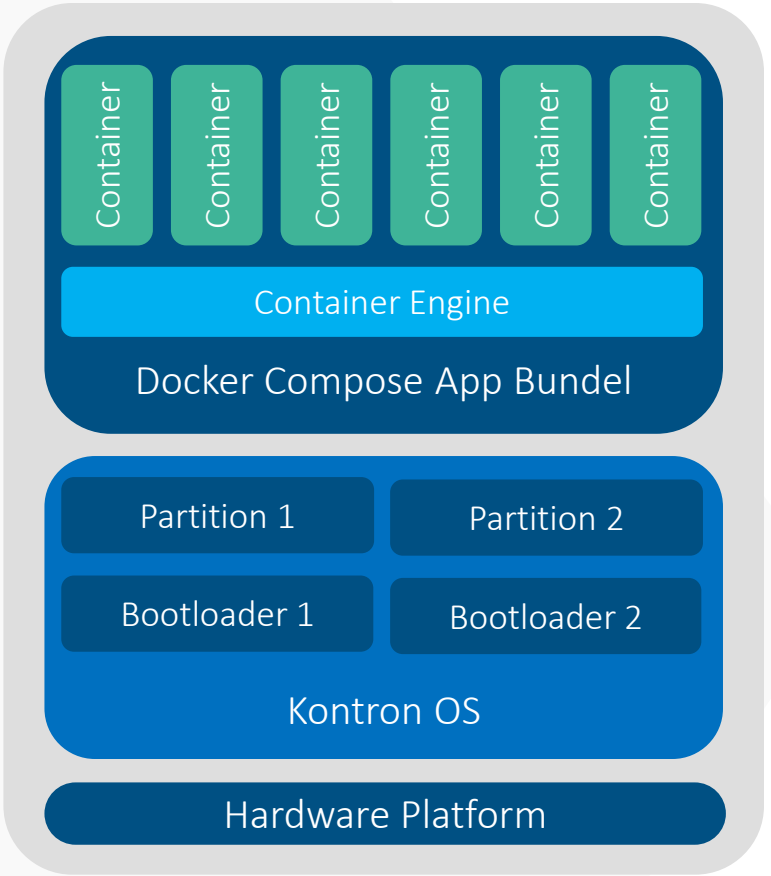


KontronOS Setup



Native Applications



Docker Container

KontronOS: Application Bundles

Why?

› Deployment of custom applications, which are not suitable for containers: Hardware access, realtime requirements, …
› Deployment of custom system settings

How?

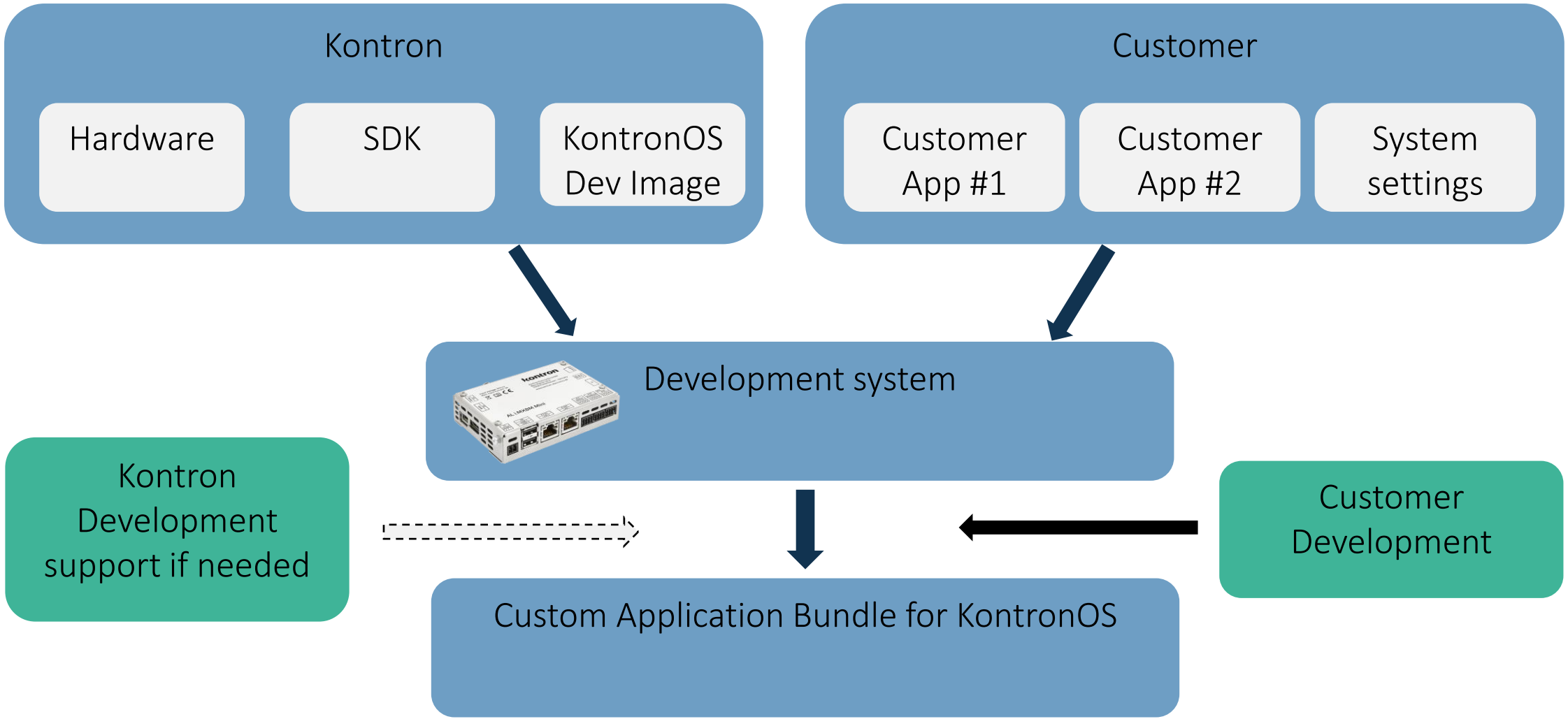
› Kontron provides KontronOS Dev/ Prod Image + SDK + Documentation
› Customer can setup SDK container on host PC
› Customer is able to create own Application Bundle for target hardware
› App Bundle can be deployed via KontronGrid, local Network or USB stick (Web Interface)

Note!

› Application Bundles can be used in parallel to containerized Applications!

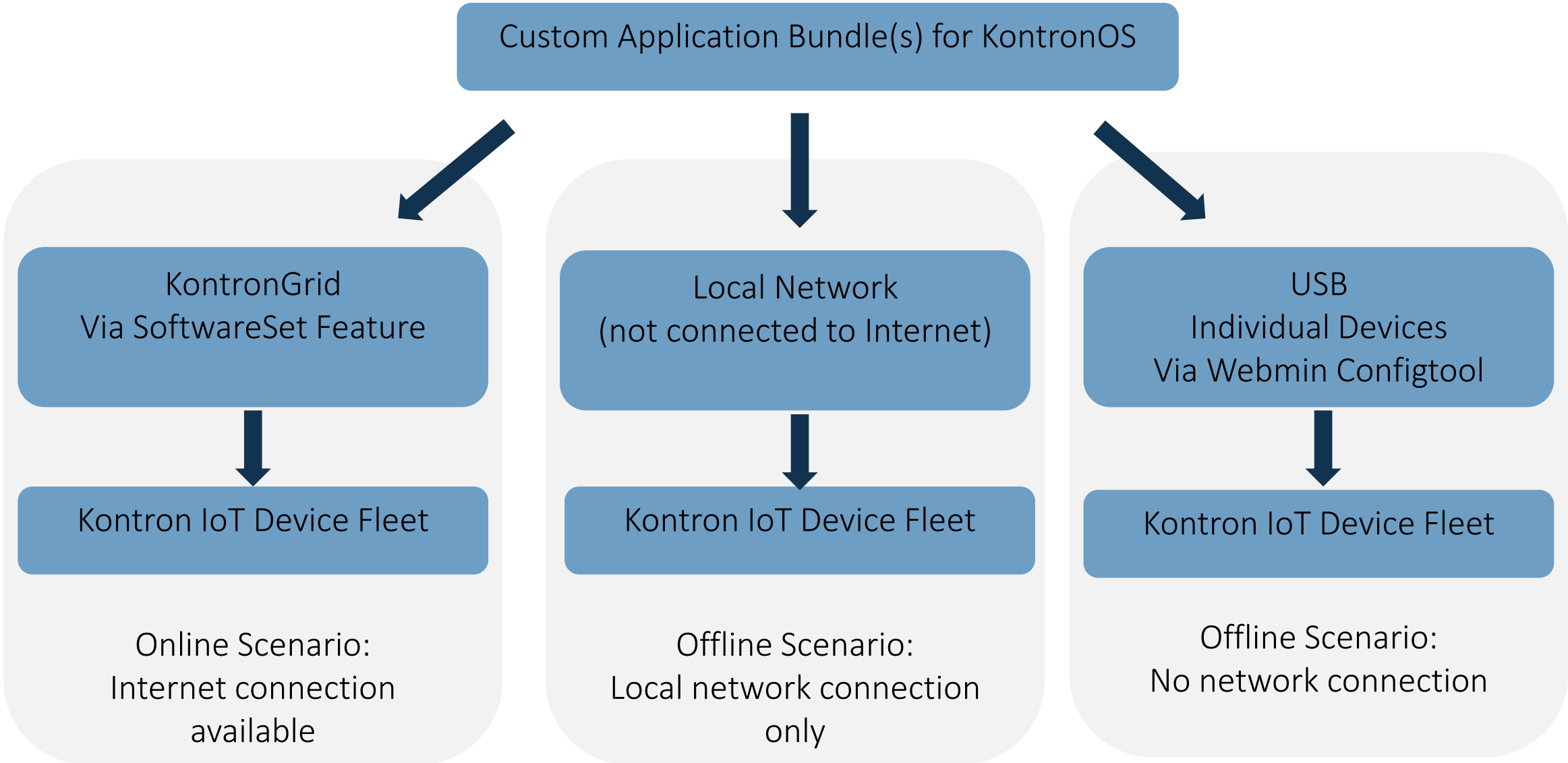
KontronOS: Application Bundles

Creation

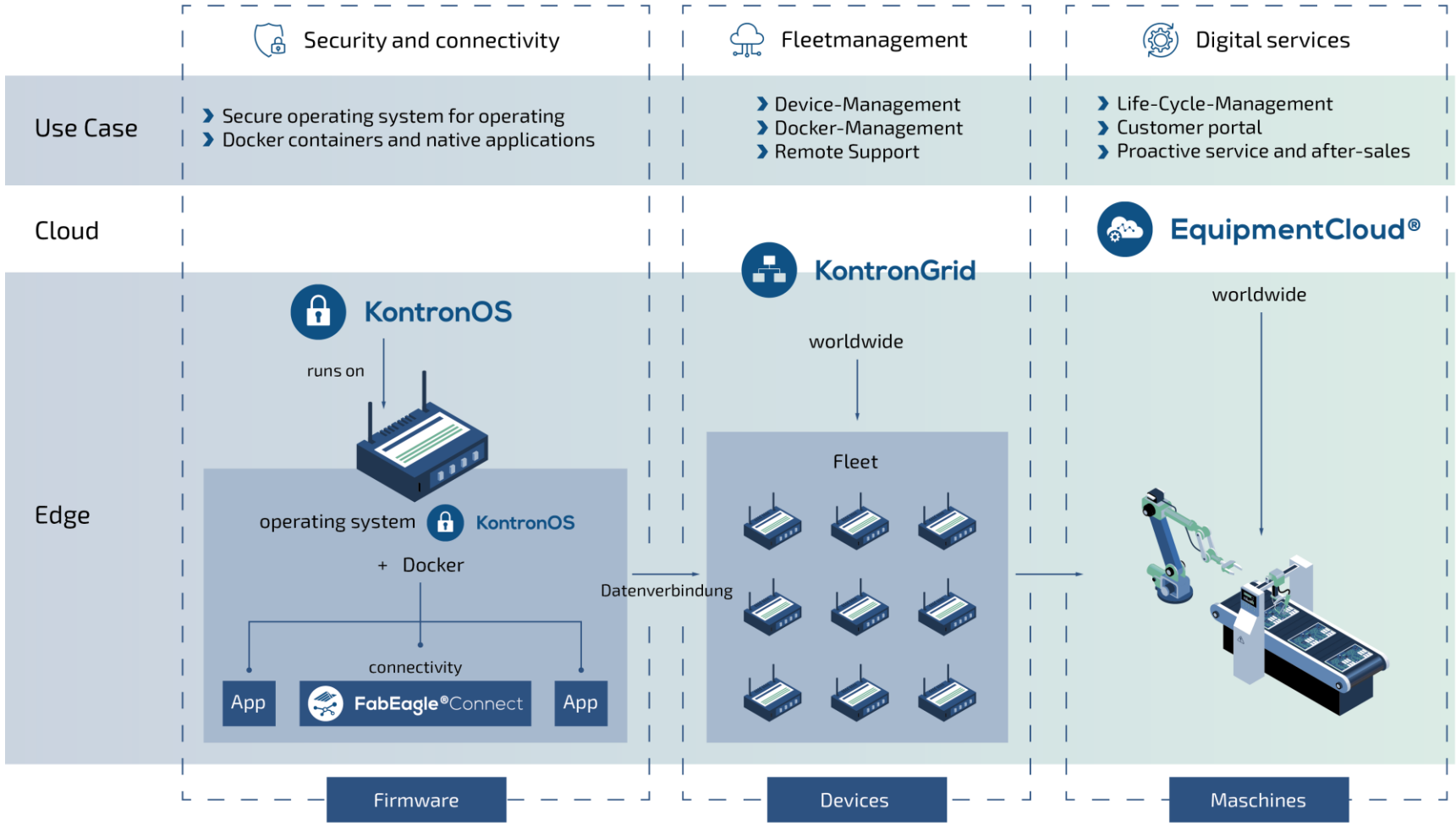


KontronOS: Application Bundles

Deployment



Interplay of susietec® products



Major Benefits of KontronOS

Security at the highest level

Cyber Security

- Tailored to use case, hardened and reliable Operating System
- Quarterly KontronOS Security Release Cycles with Pen-Tests
- Secure Boot / HAB and encrypted OS Partition
- iptable based firewall
- All connections are encrypted

Update Mechanism

- Redundant bootloader and OS Partition updateable
- In addition encrypted offline updates
- delta updates for low bandwith transfer
- Customer containerized or native application can be updated

Fail Safe Mechanism

- Automatic fallback process
- Signature check of all updates

An operating system tailored to the smooth operation of Docker Containers

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Highest operating time

› Two redundant partitions (active and passive) ensure maximum uptime in the event of a failure, an interruption or a failed update, the uptime is maximized

Reduced to the essentials

› A minimal Linux®-operating system with all the necessary functions it needs to ensure a smooth operation

Tailored for Costumer Applications

› Containerized applications are lightweight and ideal for connected devices, KontronOS creates a secure environment for them

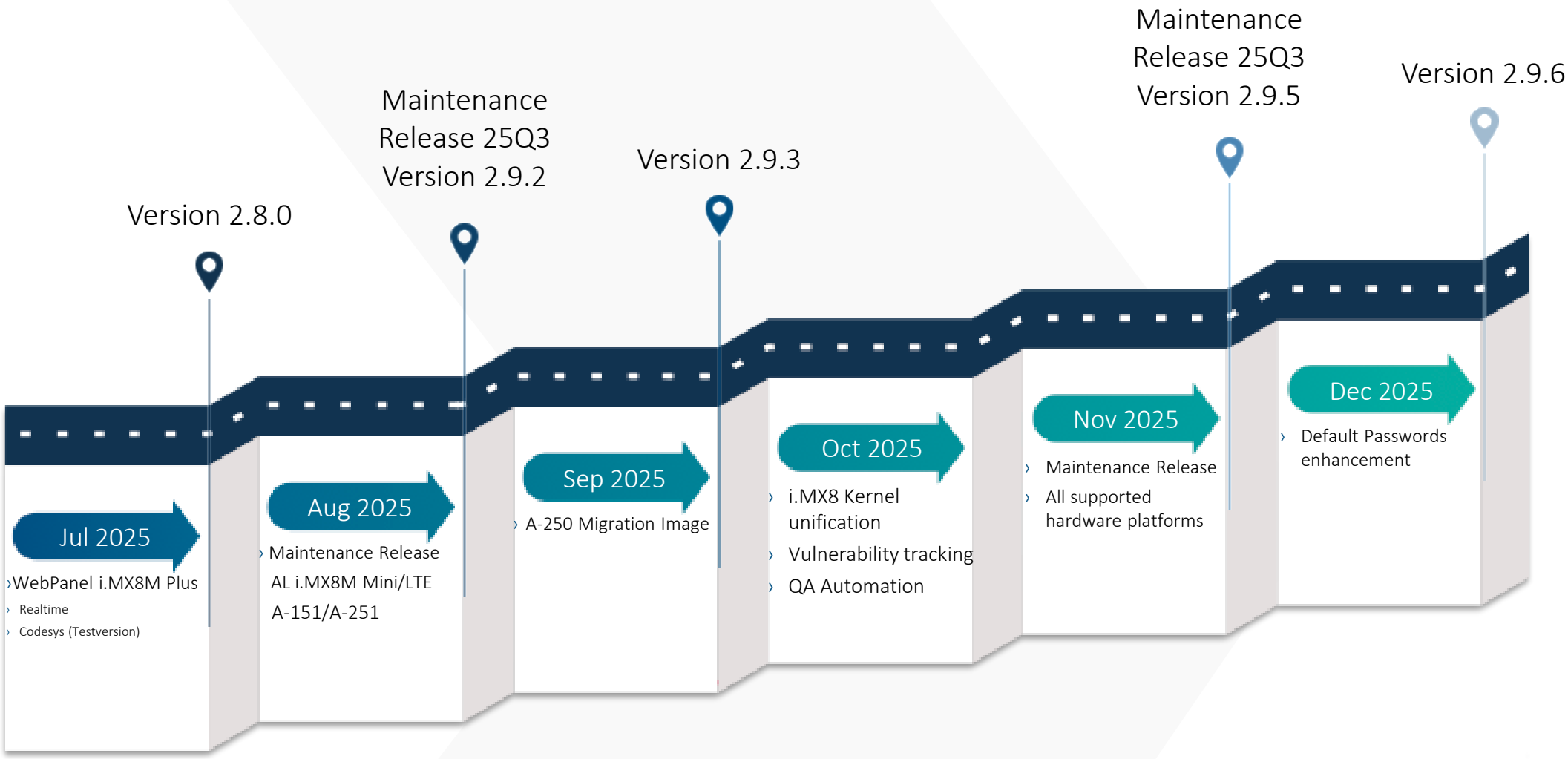
Hardware-independent and easily customizable

› KontronOS on Yocto Linux® basis flexible for Intel® x86 & Arm® based devices applicable

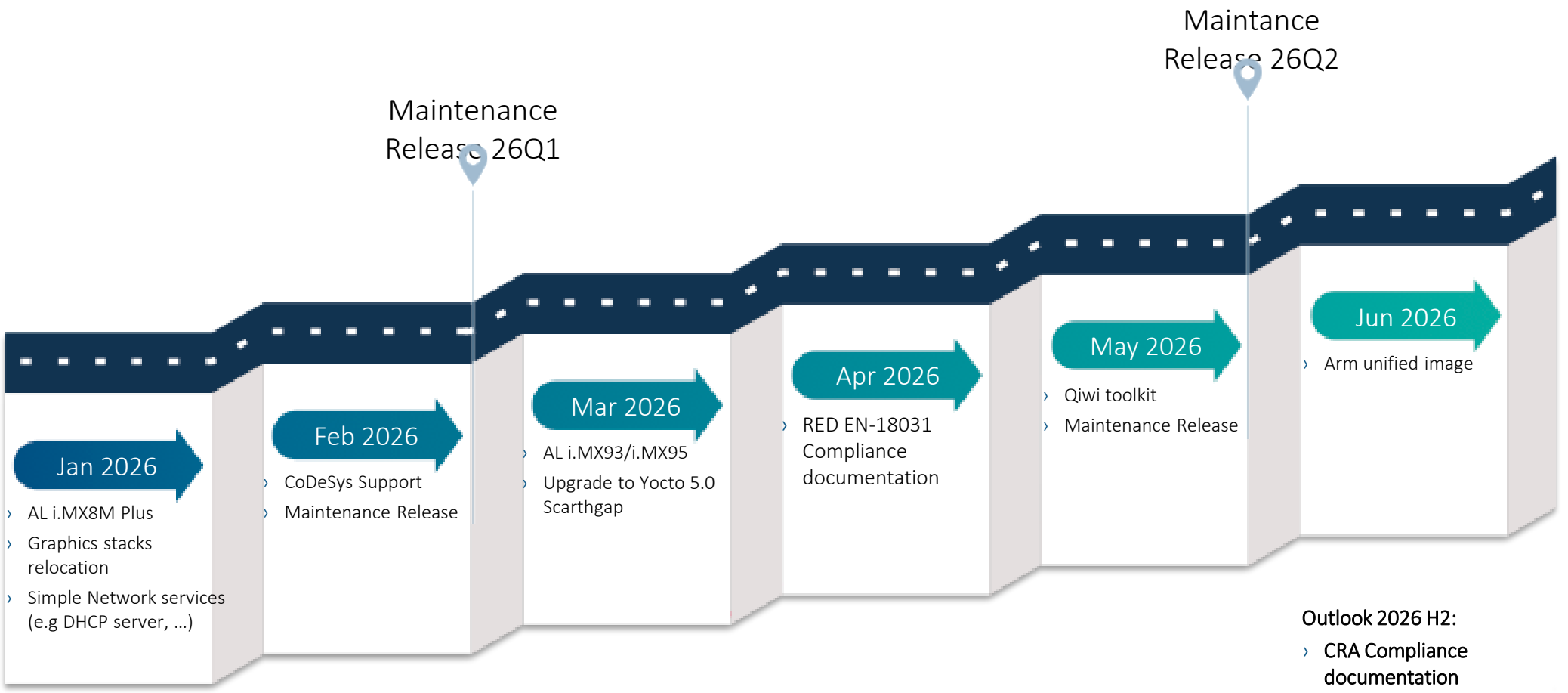
Pricemodel – Service Fee

- used or delivered devices during performance period
- performance period is normally annual
- Standard Product: no additional development costs
- Customized Product support: initial non-recurring engineering costs

KontronOS 2.0 – Roadmap – 2025 H2



KontronOS 2.0 – Roadmap – 2026 H1



Targeted Customer

- **Endproducts:** Customer who produce final end customer specific products
  e.g. manufacturing machines, wallboxes, coffee machines, children's toys
  Aim is to support customer with high volume of devices and include software smoothly into the product
- **Machine building products:** Customer who produce machines for a wide varity of markets
  e.g. surface hardening, injection molding machines, saw, drills, pumps, mechanical seals, robots
  Aim is that with each product an addition IoT Gateway will be supplied automatically
- **Support:** KontronOS will be adapted to customer specific requirements or support for software requirements
- **Customer specific development:** Software know how will be provided with development power

Children’s Toys with flexible programming of actuators and sensors

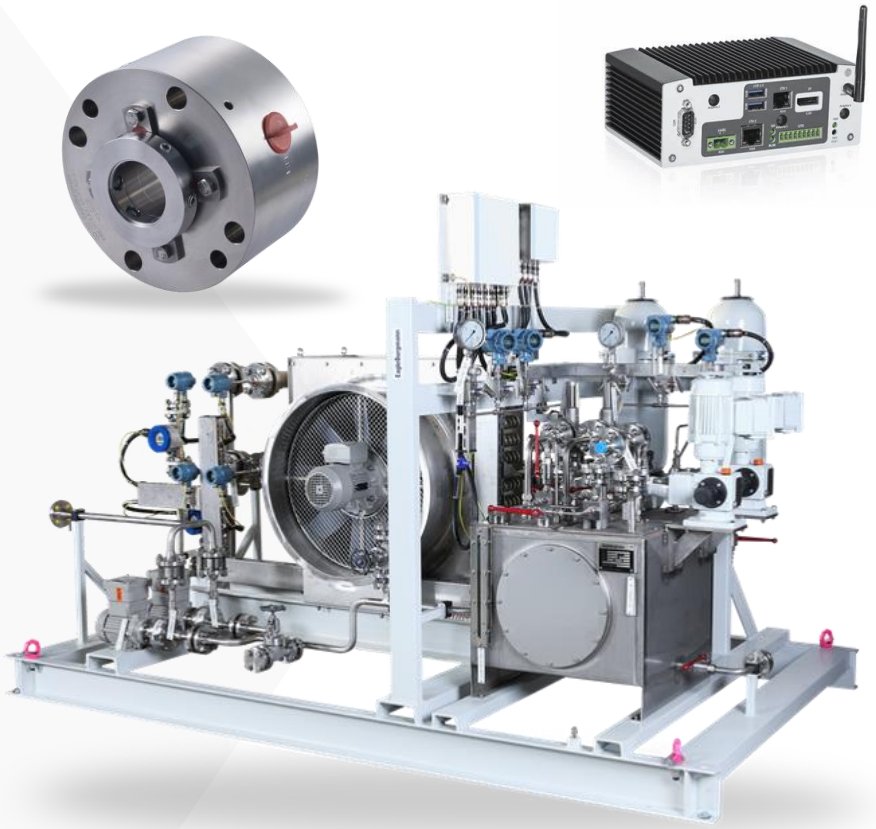
- Channel: Kontron Electronics
- Configuration: Customized STM with M4 including customer specific baseboard for flexible IO connection
- Volumen: 10.000 per year
- Customer product: children‘s toy, controller offers plenty of different connection options for actuators e.g. motors, servos, compressor, LEDs and sensors e.g. button, magnetic and light sensors, heat sensor, ultrasound sensor, usb camera
- Application: qt app for touch display and swipe gestures with the possibility to load and run self created programs to setup the own solution

- Customer Advantage
  - Complete customer specific solution including hardware and software parts with KontronOS bases
  - Implementation of a large number of actuators and sensors
  - Update of system software and customer application

Simplified handling of multiple customer applications

- Channel: Kontron Europe
- Configuration:
  - Customized KBox-A250 (IP54, OpenThread)
- Volume: 100 (2023) / 300 (2024)
- Customer Products: mechanical seals and seal supply systems, ATEX environment, Oil & Gas industry
- Application: OpenThread integration into the susietec® KontronOS. Handling of up to 30 dockers per IoT gateway. Managing setup-specific AI models using KontronOS with remoting and device management.

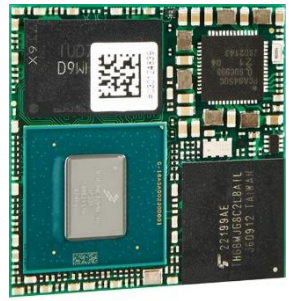
- Customer Advantage
  - Fast setup of complete solution with docker container management
  - Customized integration and modification of hardware and software
  - service for display pending service and recognize incorrect operation outside the spec



IoT device with docker management

- Channel: Kontron Electronics
- Configuration: Standard AL IMX8 box
- Volume: 150 installed base / 150 (2023) / 250 (2024) / 125 (2025)
- Customer product: Tool refinement for surface hardening and special applications
- Application: KontronOS, docker containers are configured in Docker Compose, management & update roll-out docker and images via Kontron-Grid, remoting access is being used very much

- Customer Advantage
  - Successful transfer from obsolete device management system to KontronOS & integration of existing Docker Compose configuration
  - Overview of all installed IoT devices and machines and its production data
  - Charge cost per workpiece
  - inform customers about service issue



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Thank you for your attention!