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Crabro Power - Secure & Customizable Platform for the Energy Industry

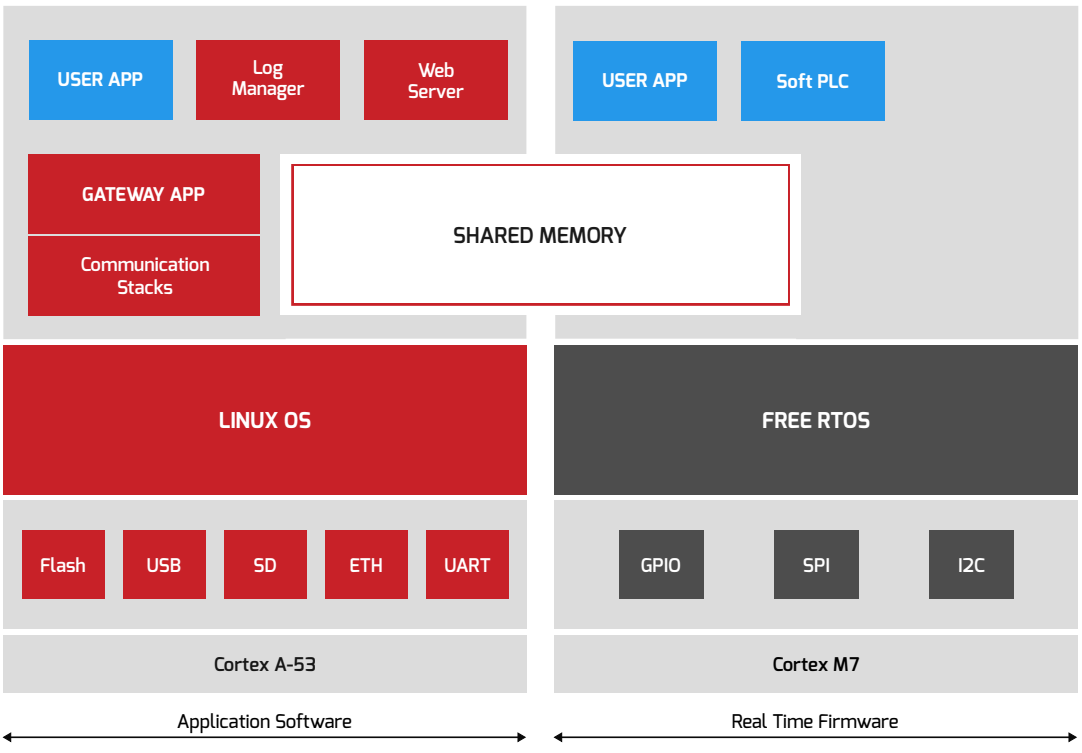
SOLUTION OVERVIEW

Crabro Power is a dedicated platform designed to facilitate the development of technologically advanced products for smart energy grids. This is a comprehensive solution that seamlessly integrates essential communication protocols, including IEC 61850 and DNP3, along with robust cybersecurity support compliant with IEC 62351 standard. With OpenPLC integrated on the separate core of the device, user can program dedicated, product specific logic. Built-in web server and intuitive engineering tool makes programming, customization and configuration of the device very simple.

With these foundational features already in place, developers can focus on creating their own custom applications on top of the Crabro Power platform. The use of Crabro Power significantly reduces development costs and accelerates time-to-market for Intelligent Electronic Devices (IEDs).

SOFTWARE OVERVIEW

Crabro Power SOM utilizes an ARM Cortex-A53 processor along with a Cortex-M7 co-processor. The solution offers a high degree of configurability, encompassing supported peripherals, applications, and protocols. Simplified of software architecture is shown in the image below.



The Cortex-A53 processor handles application software. It is responsible for running the Linux operating system, hosting all communication, data recording, and device configuration applications and components. Crabro Power's communication features rely on the Gateway Application, Shared Memory, and a set of communication protocols.. This design enables developers to create application (user) specific firmware which can communicate to external world via Shared Memory mechanism without having deep knowledge of protocol specifications.

Additionally, a dedicated Shared Memory API grants access to all device data, which can be harnessed in custom applications developed by the customer's programmers. The Gateway application is designed to facilitate the seamless integration of new protocols, ensuring software flexibility and scalability. The cybersecurity aspects are also addressed. Communication using protocols such as IEC 61850, DNP3, or IEC 60870-5-104 can be encrypted in accordance with the guidelines of the IEC 62351 standard.

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The built-in Web Server allows users to manage configuration as well as real time state of Crabro Power SOM. The Web Server application is white-label, allowing customization to align with the client's branding. On both cores, developers can implement user applications, incorporating functionalities tailored to specific Intelligent Electronic Device requirements, such as security or metering functions.

The Cortex-M7 core is dedicated for support of real-time applications. It may manage both analog and binary input and output signals. Depending on the intended IED functionality, customers can adjust the number and type of supported signals. The Cortex-M7 processor runs OpenPLC software compliant with the IEC 61131-3 standard, facilitating the implementation of custom logic and tailoring device functionality to specific field application conditions. This processor runs FreeRTOS and offers access to the shared memory allowing to exchange real time and application data between processors as well as communicate over peripherals like SPI, I2C and GPIO. On the Cortex-M7 developers also can develop custom applications.

CRABRO POWER SOM OVERVIEW

The Crabro Power SoM is based on NXP's i.MX 8M Nano, 1.5GHz Quad-core Cortex-A53™ plus 650MHz Cortex-M7™ in industrial grade. The SoM offers an ideal solution for cost-sensitive designs that require resource-efficiency in the power system applications.

Hardware supports 10/100/1000Mbps Ethernet, USB 2.0 OTG, and other interfaces like I2C, GPI GPIO.

MAIN FEATURES

Supported protocols:

- IEC 61850
- IEC 60870-5-101
- IEC 60870-5-103
- IEC 60870-5-104
- DNP3 TCP or serial
- ModbusTCP/RTU
- MQTT
- PUB/SUB (used by Google Cloud Platform)
- PRP & HSR redundancy

Cybersecurity:

- Protocol encryption (as defined by IEC 62351-3)
- Secure authentication (IEC 62351-4)
- Role Based Access Control (IEC 62351-8)
- OAuth.2 (Google Cloud Platform authorisation)
- Comprehensive event logging

Programmable logic:

- Support for OpenPLC engine
- Integration of external field devices
- Protocol conversion (Gateway functionality)
- Programming of user specific logic based on measurements and input signals

Configuration:

- Customized OpenPLC Editor
- Webserver

Hardware:

- Dimensions: 67.8 mm x 33.0 mm x 4.7 mm
- Temperature range -40 to 85C (Industrial grade)

EXAMPLE APPLICATIONS

The Crabro Power platform can be used as a basis to create your products such as Remote Terminal Units, Smart Meters, Distributed Energy Resources Controllers, Digital Protective Relays, Transformer Monitoring Units, Fault Recorders, etc.

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