MONTAVISTA SOFTWARE

Application:
Industrial Gateway
for Industrial Pump
Controllers

CGX
MontaVista

Introduction

With a history of more than 20 years, MontaVista is proud of empowering millions of devices across industries worldwide. Grundfos - the world's largest industrial pump manufacturer has integrated MontaVista's Carrier Grade eXpress (CGX) Linux into their multi pump controller, utilizing its technical system design which emphasizes robustness, connectivity, and security in an industrial environment (Read press release).

This document presents an application of MontaVista's CGX Linux in a system design for a pump controller use-case. Due to confidentiality reasons, MontaVista cannot provide the exact details of the customer case. Nevertheless, we ensure the validity in the presented application and solution despite not depicting the actual joint design.

Solution Description

The hardware of a pump controller is typically built around a powerful ARM or embedded x86 processor, as its balance of performance and power efficiency is essential for continuous industrial operations. This processor is efficiently coupled with sufficient RAM and high-bandwidth flash storage to support the CGX Linux operating system and application software, ensuring swift processing of control algorithms and data handling.

The controller system integrates various sensors, including pressure, flow rate, and temperature, and actuators directly connected to the controller via industry-standard electronic buses like I2C, SPI, and Modbus. These connections facilitate real-time monitoring and control of pump operations by actuators that control pump flow hardware and enable precise adjustments to pump speed, pressure, and other operational parameters.

Ethernet and Wi-Fi modules provide network connectivity, which is vital for the Internet of Things (IoT) and Edge computing features, enabling remote monitoring, control, and data analysis via a secure cloud connection. Generally, industrial controllers like the Grundfos pump controller example are controlled via a www-user interface hosted on the device itself, and as well as specific applications that connect over Ethernet or wireless interfaces like Bluetooth.

MontaVista's CGX Linux, with its secure boot and system-wide security features, forms the software backbone, ensuring a secure operating environment. This includes kernel-level security mechanisms and user-space security tools to protect against unauthorized access and ensure data integrity.

The system's software architecture is modular, with a clear separation between the operating system, application software, and real-time control tasks, facilitating easy updates and maintenance. MontaVista's CGX provides an unique operating environment for such a design, allowing both the RTOS-level real-time support and the full, secure reuse of the joint development from the Open Source community and ecosystem built around GNU/Linux distributions.
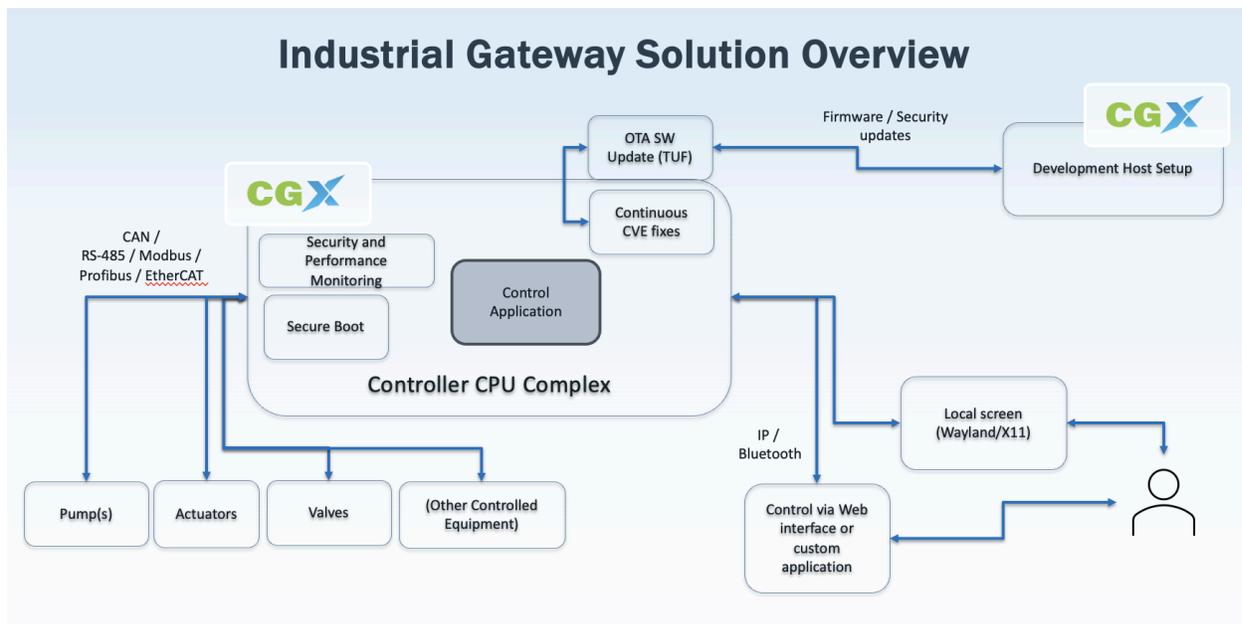
This embedded system design, leveraging MontaVista's CGX Linux on Grundfos' and other world leading manufacturers' pump controller platforms, represents a state-of-the-art solution for industrial pump control, combining high reliability, advanced connectivity, and stringent security measures to meet the stringent demands of modern industrial applications.

Built-in Secure Design

MontaVista has provided Linux and Common Vulnerabilities and Exposures (CVE) maintenance support with a wide range of security features for over 20 years. As a leader in embedded Linux, we have noticed the escalating cybersecurity risks and the growing demands for robust solutions in different vertical markets, such as industrial IoT, robotics and smart infrastructure.

Under the "security-first" strategy, we are implementing a Secure by Default configuration based on Zero Trust and Secure By Design principles in MontaVista's CGX Linux, allowing powerful security features to be available upon installation with no additional costs to the standard CGX license.

Furthermore, we are incorporating a scorecard on the supply chain trust for software components used by our customers in our product line to support Software Bill Of Materials (SBOM) generation and validation as well as CVE reporting and scanning. The scorecard follows the Open Vulnerability and Assessment Language (OVAL) descriptions to support scanners such as Tenable Nessus, CIS-CAT and OpenSCAP.

Customers using a CGX-enabled board support package (BSP) will benefit from a proactive approach to securing their devices against common threats and reduce the risk of security incidents resulting from misconfigurations or delayed patching. The security enhancements will make it easier for our customers to secure their entire software supply chain and comply with the complex regulatory requirements on embedded products from the FDA and CISA.

Summary

MontaVista's CGX Linux enhances embedded industrial systems with unmatched robustness and connectivity, designed for rigorous industrial needs.

For a typical industrial platform like a pump controller and a modular architecture, this ensures efficient operation, seamless integration with standard electronic buses and easy maintenance, which are all key to long-term viability.

The secure environment of MontaVista's CGX, supported by secure boot and comprehensive security features, guarantees robust protection and data integrity. Furthermore, network connectivity for IoT and Edge computing is enabled through Ethernet and Wi-Fi, facilitating remote operations.

If you are looking for a secure, reliable, and connected industrial embedded system solution, MontaVista's CGX Linux meets all of these demands and more. Please get in touch with MontaVista today to harness the unique benefits for your embedded applications.

We invite all interested parties to visit www.mvista.com and/or contact us at sales@mvista.com or by any of the means listed below.

MontaVista Software, LLC, is a leader in embedded Linux commercialization.

For over 20 years, MontaVista has been helping Linux developers get the most out of open source by adding commercial quality, integration, hardware enablement, expert support, and the expert resources of the MontaVista development community. Because MontaVista customers enjoy faster time-to-market, more competitive device functionality, and lower total cost, more devices have been deployed with MontaVista than with any other Linux.

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