IntervalZero
Real-time for Industrial Control Systems

Product Release Notice

MaxRT wRTOS® 1.0

General Availability Release Date

March 2, 2026

Product Overview

IntervalZero announces the release of MaxRT wRTOS® 1.0, representing a significant advancement in the development of Industrial Control Systems (ICS). MaxRT consolidates and rebrands two IntervalZero product lines -- RTX64, which Transforms Windows into an RTOS and KINGSTAR, which is a Machine Automation Software product-- into a single all-software platform, which is designed to streamline engineering workflows that support a comprehensive Industrial Control System development and deployment environment.

Overview of Key Features and Technical Directions

- **Unified Architecture:** MaxRT integrates Windows, a deterministic RTOS scheduler and machine automation components into a single platform for developing Industrial Control Systems. Engineers can utilize core RTOS functions to build an ICS from the ground up or can leverage advanced machine automation components, such as EtherCAT fieldbus support to shorten their time to market.
- **Ease of Use:** The configuration tools have been redesigned to simplify user interaction, prompting for inputs only as necessary. This approach aims to reduce complexity and minimize user error. MaxRT updates compatibility with the latest Microsoft Windows and Visual Studio 22 releases , as well as Intel processors.
- **Networking Capabilities:** Recognizing the critical role of networking in contemporary Industrial Control Systems, MaxRT introduces both secure real-time and non-real-time features. Importantly, the Network Relay functionality allows a single NIC card to be used for both wRTOS and Windows.

- The Network Link Layer (NL2) allows for layer 2 Hardware queues and logical queues that allows for support of time sensitive and standard traffic
- This allows customers to address hardware constraints when they want deploy on a small form factor industrial PC. And to boast deterministic networks, this release offers support for Times Sensitive Networking(TSN)
- **Modularization:** The release initiates a modularization strategy to ensure source-code compatibility and to facilitate future enhancements, including the planned introduction of MaxRT vRTOS offers a Real-Time VM that contains the IntervalZero RTOS and that can run on a KVM Type 1 Hypervisor. Importantly, modularization is intended to simplify release procedures, improve quality, and prevent module contention.

Delivered Features & Enhancements

MaxRT wRTOS® 1.0 delivers a comprehensive set of features and improvements, including:

Network & Industrial Automation

- Redesigned Network Abstraction Layer (NAL) as Network Link Layer (NL2), supporting Layer 2 interfaces for EtherCAT and TSN. Even better, this is not just for EtherCAT and TSN, customers can write their own layer 2 application that sit on top of the NL2.
    - Transmit and receive raw Ethernet packets.
    - Configure and get the link status.
    - Configure hardware timestamping.
    - Configure hardware filters.
    - Configure QoS.
    - Read and adjust hardware clock(s).
    - Real-time NIC drivers. See wRTOS Supported NICs for a list of supported devices and their test status.

- Inclusion of EtherCAT MainDevice and KINGSTAR Fieldbus components
- Updated RT-TCP/IP stack to leverage NL2
- Network Relay supports the use of a single NIC on a controller to deliver deterministic traffic

Time Sensitive Networking Features

- Hardware timestamping of incoming and outgoing frames.
- Cross-timestamping of NIC hardware clock vs CPU clock (both in software and hardware with PTM).
- NIC hardware clock adjustments.
- Assign Transmit/Receive Queue interrupts to different cores.
- VLAN support.
- Ingress filtering based on PCP (Priority Code Point).
- Launch Time functionality.
- Credit-Based Shaper (Qav) functionality.

Licensing & Compatibility

- Support for time-limited retail.
- Continued support for perpetual licenses for runtimes and evaluation modes
- Source compatibility with RTX64 4.x, with documented breaking changes and porting guides

Development Tools & SDKs

- Visual Studio 2022, 2019, and 2017 support, with installation and testing on latest updates available at the time of release.
- Updated Windows SDK and C Runtime compatibility
- Multiple SDK support: coexistence with previous RTX64 and KINGSTAR SDKs

Operating System Support

- Installation on 64-bit Windows OSes, including Windows 11 (25H2, 24H2, 23H2, 22H2) and IoT Enterprise variants

Tools & Utilities

- Control Panel provides control for the wRTOS Subsystem and product components, including NL2, TCP/IP, and E-CAT. It also provides shortcuts to launch several commonly used wRTOS tools.
- Settings allows you to activate product components, set the RTSS boot configuration, and configure default behavior for the Real-Time Subsystem (RTSS), real-time applications, networking, and other features.
- Console allows you to view output from real-time applications.
- Message Viewer allows you to view debug and log messages generated during the execution of real-time applications.
- Monitor configures RTSS profiling.

- StampTool supports flags to handle multiple SDK licenses present on your system.
- Task Manager displays a list of running RTSS processes and Windows processes and drivers linked to wRTOS, and pre-process, -thread, and –processor CPU usage
- Latency View allows you to view and compare system timer response latencies on multiple cores simultaneously.
- Network Response Time Measurement (NRTM) measures an Ethernet frame's round-trip time (RTT) through a reflector.
- SRTM allows you to view system timer to timer handler response on a given core.
- KSRTM allows you to view system timer to interrupt service routine (ISR) response.
- RtMSpaces allows you to view internal memory allocations.
- RtObjects allows you to view internal objects and states.
- wRTOSProcHybridInfo displays core type, performance capability for each active system core, and thread class ID for different sets of assembly instructions when running on each RTSS core.

Fieldbus & EtherCAT

E-CAT provides support for CANopen over EtherCAT and simplified configuration of EtherCAT networks:

- Auto-Discovery & Auto-Configuration deliver true plug-and-play for EtherCAT Servos and I/Os.
- Tools:
- E-CAT Configuration allows you to configure the EtherCAT devices (SubDevices) connected to the E-CAT MainDevice within an E-CAT component instance and check their status.
- E-CAT ESI Import allows you to import EtherCAT SubDevice Information (ESI) files for your EtherCAT hardware devices and save the ESI data into the E-CAT component database. This enables the E-CAT component to connect to and interact with your EtherCAT hardware devices.
- Supports all Class A features (FoE, EoE…).
- C/C++ API.
- Process implementation approach supports debugging while the EtherCAT MainDevice is running.
- Multiple Master instances.
- Hot connect.
- Cable redundancy.
- High speed options down to 100 µs time cycle.

GigE Vision

GigE Vision provides functionality for using GigE Vision Cameras within the real-time wRTOS environment:

- **Real-time GigE Vision filter driver.**
- **GigE Vision Camera Setup tool.**
- **Real-time GigE Vision Interface and Communication library.**

Documentation & Support

- Comprehensive documentation, porting guides, and online help
- Updated support site and customer center utilities
- Sample code and expected output documentation for all features

Summary

MaxRT wRTOS® 1.0 is engineered to support the immediate and future needs of IntervalZero customers in building robust, adaptable Industrial Control Systems. The release underscores IntervalZero's commitment to technical excellence, operational efficiency, and forward-looking architecture.

Availability

MaxRT wRTOS® 1.0 is available beginning March 2, 2026 through Partners and by contacting Sales: sales@intervalzero.com.

We look forward to any comments and feedback. If you have any recommendations, or wish to suggest any product enhancements, please contact Product Management at: productmanagement@intervalzero.com