CAPABILITY BRIEF

RTI Connext Micro for Automotive

SMALL-FOOTPRINT SOFTWARE FRAMEWORK FOR SOFTWARE-DEFINED VEHICLES (SDVs)

Connext® Micro is a small-footprint software framework that provides flexibility for developing resource-constrained systems, including software-defined vehicles (SDVs). It provides an embedded solution for zonal, high-performance compute (HPC), and other SDV use cases, offering developers the flexibility of a modular and user-configurable architecture. Connext Micro is included with Connext Drive®.

HIGHLIGHTS

- Scalability that ranges from embedded 16-bit microcontrollers to multi-core 64-bit CPUs
- Runs on bare metal devices and a wide variety of OS, including Linux, Windows, FreeRTOS, VxWorks, QNX, and ThreadX
- Improved performance with Zero Copy for large data transfers
- Simplified porting and customization with the Platform-Independent and Platform-Specific (PIL/PSL) libraries
- Supports interoperability with the OMG® DDS Security™ specification and pre-shared keys (PSK) for secure communication

Overview

Connext Micro supports the transition from legacy automotive architectures to next-generation models by providing a connectivity framework for resource-constrained systems. It provides both zonal controllers and gateway nodes with real-time, deterministic and resource-efficient communication, enabling development teams to consolidate local ECUs while managing sensors, actuators, and control logic within a given vehicle zone.

Connext Micro bridges legacy ECUs and communication patterns — such as CAN or proprietary messaging protocols — so that they can coexist and interoperate with newer, data-centric designs based on the popular Data Distribution Service (DDS™) standard. In addition, Connext Micro's small footprint enables reliable operations in highly-constrained embedded environments, while maintaining seamless integration with the broader in-vehicle data architecture.

Built on the Connext Drive databus — a data-centric framework for distributing and managing real-time data in SDVs — Connext Micro provides a high-level and standards-compliant alternative to in-house development. Connext Micro is included with Connext Drive, the leading production-grade, safety-certified communications framework that now runs in over 1 million vehicles.

Comprehensive Connectivity Solution

Plug-and-play communication

Devices and applications are automatically discovered and connected at run-time for faster setup and integration. No system administration or directory service is required, allowing use in autonomous, dynamic, and ad hoc intelligent systems.

Real-time Quality of Service (QoS)

Applications have comprehensive control over and visibility into real-time behavior, including timing, deadlines, resource utilization, and system state. QoS can be specified per-topic and per-subscriber, enabling fine tuning of the data distribution and ensuring that applications receive the right data at the right time, and in the right way, based on their specific requirements.

Wire efficiency

The Real-Time Publish-Subscribe (RTPS) protocol is extremely wire-efficient. Data is sent in a compact binary representation. Most metadata is only exchanged once, at discovery time. Content filtering capabilities through QoS enable delivery to be restricted to relevant subscribers, which optimizes bandwidth usage.

High portability

By abstracting out low-level networking and communication details and providing a flexible integration framework, Connext Micro minimizes the amount of device- or application-specific code that needs to be created. It removes source code and replaces it with a PIL/PSL model, which reduces development costs and system communication risks while enabling rapid prototyping and faster time to deployment.

Small-footprint application libraries

The PIL/PSL libraries allow development teams to easily port Connext Micro to new operating systems, compilers, or processor architectures. With no built-in dependency on operating system services, applications can be implemented on platforms with minimal operating system capabilities or no operating system at all. Processor support ranges from 16-bit microcontrollers with 32-bit integer support to multicore Arm, Intel, and PowerPC CPUs. This approach enables faster application development and testing on leading enterprise operating systems.

Enhanced performance

Connext Micro users experience enhanced performance from shared memory compatibility between Connext Micro and Connext Drive. Connext Micro's platform-independent code is modular and the core logic is decoupled from the OS and network stack integration. Zero Copy transfers are easily configured using the Micro Application Generator tool. Library builds are simplified by using Symlink-based build setup to manage configuration and source separation.

Networking

Connext Micro provides networking capabilities that reduce unnecessary traffic and optimize bandwidth. It provides easy configuration for improved flexibility while improving system reliability. Finely-tuned data distribution behavior to multicast groups is enabled by enhanced UDP Multicast controls and managed through updated UDP transport configuration. New Micro Application Generation (MAG)-enabled configuration features allow UDP transport-based applications. Advanced RTPS corruption detection identifies and drops corrupted RTPS messages before delivery.

ABOUT RTI

RTI delivers the real-time data communication that powers the next generation of Software Defined Vehicles (SDVs). RTI is the safety-certified communication framework leader for SDVs, trusted by OEMs to bridge from legacy to modern architectures, thereby accelerating development from simulation to production. RTI Connext Drive® powers over 1 million vehicles on the road today and is used by more than 25 automotive companies to accelerate their SDV programs and enable zonal, ADAS, and telematics architectures.

Experience the industry's leading solution and try Connext Drive for free at rti.com/drive.

Your systems. Working as one.

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