Automotive Safety

THE FIRST AUTOMOTIVE-GRADE SAFETY-CERTIFIED DATA-CENTRIC SOFTWARE FRAMEWORK FOR NEXT-GENERATION VEHICLES

HIGHLIGHTS

Supports communication libraries certified for systems up to ISO 26262 ASIL D

Includes all necessary Safety artifacts, including the Safety Manual

Provides a path for Functional Safety (FuSa) standard certification

Supports Next-Generation Electrical/Electronic (Next Gen E/E) Zonal Architecture and off-vehicle communications

Offers high diagnostic coverage for safety mechanisms, including fault detection and data protection

In today's software-defined era, RTI Connext Drive® is the first automotive-grade safety-certified data-centric software framework for Next Gen E/E vehicles. Connext Drive supports all Safety Life Cycle requirements, and offers a standards-based safety certification path for electric and autonomous vehicle production.

MEETING STATE-OF-THE-ART FUNCTIONAL SAFETY REQUIREMENTS

The stakes are high for autonomous and electric vehicle production. To start with, Next Gen E/E Zonal Architectures require safety critical software up to ASIL D to meet the state-of-the-art safety requirements set forth in the Functional Safety (FuSa) standard, ISO 26262 certification, which is now essential in most automotive designs. Currently, automotive safety applies to every step of the vehicle development process, from system design to vehicle design to vehicle production.

Certifying the system is only the beginning. Because to be truly competitive in today's market, production-grade vehicles are also going to need safety certification, as well as real-time connectivity to support on- and off-vehicle communications for Advanced Driver Assistance Systems (ADAS), remote operations, telemetry, and more.

ACHIEVING SAFETY LIFE CYCLE CERTIFICATION

Enter Connext Drive, which supports functional safety for Next Gen E/E networks. Connext Drive supports communication libraries certified for systems up to ISO 26262 ASIL D and provides a proven path to the certification needed to put autonomous and electric vehicles into production and on the road. Connext Drive includes all the necessary Safety artifacts and the Safety Manual, which can significantly reduce FuSa Life Cycle efforts for systems integrators.

Connext Drive is compliant with the concept of Safety Element out of Context (SEooC), which is defined in ISO 26262-10 as the method for using components in a vehicle that were not originally designed for that specific project. SEooC compliance not only allows for the reuse of embedded software, but also protects a certified environment from disruption, even if individual software elements or components are discontinued.

Because Connext Drive is TÜV SÜD-certified to ASIL D, system integrators can build and strengthen their production systems, enabling them to be both future-proof and scalable. Easier integration can help systems integrators streamline the product development process and simplify the effort to leverage certification artifacts. Choosing a software framework that is in full compliance with ISO 26262 means lower risk and lower costs at each stage of the Safety Life Cycle.

REAL-TIME CONNECTIVITY TO GO

Connext Drive is the place where safety and functionality meet. An important feature of Connext Drive is its ability to enable real-time connectivity for on- and off-vehicle communication, remote operations and telemetry. This functionality is vitally important for Next Gen E/E vehicles, both in driverless and driver-assisted scenarios.

Another crucial capability Connext Drive supports is over-the-air software updates for the vehicle, even after it's already on the road. Because Next Gen E/E allows manufacturers to reduce the reliance on electronic control units (ECUs) and wiring, these new cutting-edge vehicles increasingly need to share Lidar and other data and communicate securely in real-time.

To accomplish this, Connext implements a new concept called data centricity, based on the Data Distribution Service™ (DDS) standard. Instead of sending messages, a data-centric system makes all data available to every device and algorithm in local memory with controlled timing. It is especially useful for autonomous vehicles, because artificial intelligence (AI) algorithms often require huge amounts of data with very specific delivery requirements.

FAULT DETECTION AND DATA PROTECTION

Due to the non-deterministic nature of Ethernet networks, on-vehicle networks can pose risks in the form of various data errors. Fortunately, Connext Drive offers mechanisms to protect against faults that could occur during exchange of information over an unsafe network, as identified in the ISO 26262 standard.

Connext Drive's Quality of Service (QoS) settings offer high diagnostic coverage for safety mechanisms, providing end-to-end protection within the required fault detection and handling time interval. Connext Drive can natively address the following common communication failure modes:

- **Repeated Information**: Processing duplicate information by a data sender or data receiver can negatively impact system performance or functionality. Connext Drive can monitor network data traffic and discard duplicate information, and QoS settings can be applied so that senders can minimize or eliminate the publication of redundant information.

- **Lost or Delayed Information**: In the event that data is delayed or lost due to a network error, Connext Drive can notify the application and re-send the data as required.

- **Information That is Out of Order**: When network traffic pushes the bounds of network capacity, it is possible for pieces of information to be received in a different order than was sent. In these instances, Connext Drive will collect data fragments and re-assemble them in the correct order so that the information can be processed correctly.

- **Corrupted Information**: Electrical interference can corrupt data in transit, potentially disrupting normal functions of the receiving application. Connext Drive enables users to configure Cyclic Redundancy Checks (CRCs) to detect data corruption and notify the sender to re-transmit data.

ABOUT RTI

Real-Time Innovations (RTI) is the largest software framework company for autonomous systems. RTI Connext® is the world's leading architecture for developing intelligent distributed systems. Uniquely, Connext shares data directly, connecting AI algorithms to real-time networks of devices to build autonomous systems.

RTI is the best in the world at ensuring our customers' success in deploying production systems. With over 1,700 designs, RTI software runs over 250 autonomous vehicle programs, controls the largest power plants in North America, coordinates combat management on U.S. Navy ships, drives a new generation of medical robotics, enables flying cars, and provides 24/7 intelligence for hospital and emergency medicine. RTI runs a smarter world.

RTI is the leading vendor of products compliant with the Object Management Group® (OMG®) Data Distribution Service™ (DDS) standard. RTI is privately held and headquartered in Sunnyvale, California with regional offices in Colorado, Spain and Singapore.

Download a free 30-day trial of the latest, fully-functional Connext software today: https://www.rti.com/downloads.

Your systems. Working as one.

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