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CAPABILITY BRIEF

Zonal Architecture

ACHIEVING OPTIMAL COMMUNICATION THROUGH DATA CENTRICITY WITH CONNEXT DRIVE

HIGHLIGHTS

An automotive-grade data-centric software framework that optimizes cost, network distribution, safety and security

Enables reliable, real-time data transport for next-generation electrical/electronic zonal architecture components, from ECUs to central and zonal gateways

Supports broad integration of different automotive platforms in a common architecture, including AUTOSAR Classic and AUTOSAR Adaptive, ROS 2 and Time-Sensitive Networking (TSN) support

Provides a safety certification pathway to achieve up to ISO 26262 ASIL D compliance

Next-generation electrical/electronic (next gen E/E) zonal architecture calls for broad integration across the many different subsystems in a common architecture. Today, zonal architectures are helping software-defined vehicle architectures provide flexibility, scalability, compatibility and upgradability on different hardware components, while also fulfilling key technical and safety requirements. RTI Connext Drive® is the first software framework designed for demanding systems that require the evolution of the zonal architecture.

THE RISE OF NEXT GEN E/E ZONAL ARCHITECTURE

The automotive industry is undergoing an unprecedented shift as automotive manufacturers race to develop software-defined vehicles (SDVs).

This imperative has given rise to next gen E/E zonal architecture. The central aspect of this trend is transitioning towards consolidating vehicle computing capabilities for optimized cost, power distribution, security, flexibility and weight.

Connext Drive provides the data-centric software framework needed to efficiently manage this complexity and integrate new and evolving technologies to seamlessly support next gen E/E zonal architecture in tomorrow's autonomous vehicles.

ACHIEVING ECU CONSOLIDATION

The combination of zonal architecture with Connext Drive supports manufacturers who are trying to consolidate electronic control units (ECUs) and domains into zones. Connext Drive offers a variety of advantages for manufacturers engaged in creating scalable and future-proof vehicle architecture. These benefits include:

• Product components that enable the given functionality for each vehicle zone: ECUs, central gateway and zonal gateway.

• The simplification of the overall wiring harnesses (which is currently the third-highest component cost) through TSN support.

• Support for communication libraries certified for systems up to ISO 26262 ASIL D.

• Providing the only proven connectivity standard that is used by ROS 2, AUTOSAR Classic/OSEK and AUTOSAR Adaptive for autonomous vehicles.
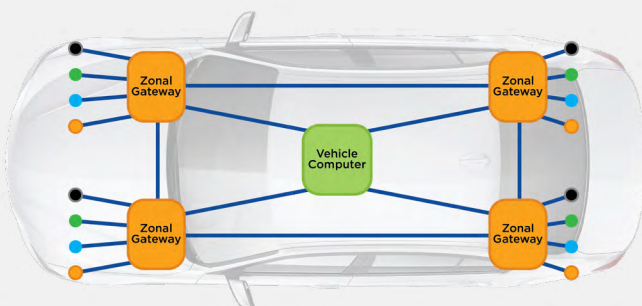
- Cost reduction, both in terms of components and labor, enabling manufacturers to prioritize overall scalability through a data-centric approach.

- Building next-generation in-vehicle architecture despite unknown requirements, such as hardware, autonomous functionality and dynamic updates at deployment.

- Evolving from legacy automotive products into new architectures that include ADAS and telematics applications, making it possible to compete in new markets with dedicated product offerings.

DELIVERING INTEROPERABILITY

Because modern vehicles often include over 100 ECUs, manufacturers are well aware of the interoperability challenges posed by ECUs and the need to integrate, simplify and free up space under the hood for new functionality.

Connext Drive reflects the capabilities of RTI's proven software communication framework and the commitment to support the collocation of different technologies: It can operate natively based on the Data Distribution Service (DDS™) standard, or by providing direct integrations within ROS 2, AUTOSAR Classic and AUTOSAR Adaptive.

The DDS standard is part of the AUTOSAR Adaptive specification, opening up the platform to a whole new level of integration to help OEMs meet the demanding requirements at the zonal gateway level. The RTI Connext® Integration Toolkit for AUTOSAR Classic bridges AUTOSAR Adaptive to Connext Drive. It supports automatic conversion of data type definitions across standard formats (OMG® IDL, OMG DDS-XML and AUTOSAR ARXML), as well as the generation of supporting C code for data conversion and marshaling between the Runtime Environment (RTE) and DDS communication frameworks.

RTI supports the ROS 2 open source project. Connext Drive provides the ROS community with a powerful connectivity framework that is scalable, has robust security properties, and is proven in mission- and safety-critical production environments. The RTI Connext Integration Toolkit for ROS 2 enables systems built on ROS 2 to take full advantage of Connext Drive and its ecosystem to quickly resolve problems of scalability, performance and operation in the most demanding environments, while retaining the use of familiar ROS 2 tools and packages.

RTI: DRIVING INNOVATION IN ZONAL ARCHITECTURE

RTI is active in many of the leading consortia that are working to solve critical problems and accelerate the Zonal Architecture era, such as AUTOSAR, COVESA and SOAFEE.

REAL-WORLD USE CASE

Li Auto: With the development of intelligent in-vehicle systems, communication between components has become more complex and critical. The adoption of advanced sensors such as lidar, radar, etc., alongside the need to support more sophisticated data models and application algorithms, have imposed tremendous challenges in the next gen E/E architecture. In addition, the requirements of functional safety (FuSa) and cybersecurity must also be considered from the outset of the project. The Connext Drive connectivity framework helps to accelerate Li Auto's development in this challenging landscape.

To learn more about Connext Drive, visit **rti.com/drive**.

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 1,800 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 Drive software today: **www.rti.com/downloads**.

Your systems.
Working as one.

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