



CAPABILITY
BRIEF

RTI Connex Drive for Software-Defined Vehicles

REAL-TIME DATA TRANSPORT FOR TOMORROW'S SDVs

RTI Connex Drive® is the communication framework that helps automakers to evolve their electric vehicles (EVs) to a software-defined vehicle architecture. Tomorrow's vehicle designs must be able to overcome communication constraints while providing flexibility, scalability, compatibility and upgradability on different hardware components. To streamline production readiness, EV manufacturers need a proven pathway to safety certification for their next-generation software-defined vehicles.

HIGHLIGHTS

- » Enables reliable, real-time data transport for the architecture components of software-defined vehicles (SDVs), from ECUs to zonal gateways to high-performance compute
- » Offers an automotive-grade, data-centric software framework to help optimize cost, network distribution, safety and security
- » Supports broad integration of different automotive platforms in a common architecture, including Time-Sensitive Networking (TSN) support
- » Provides a safety certification pathway to achieve ISO 26262 ASIL D compliance
- » Offers cloud-based communications to enable and support the addition of new functionality, such as teleoperations, continuous validation and over-the-air (OTA) updates

The First Step: Transitioning to the Electric Era

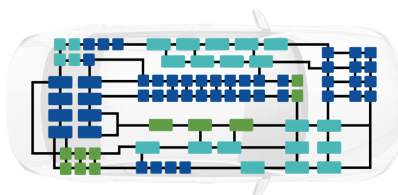
The rise of electric vehicles (EVs) and the definition of the software-defined architecture (SDA) is even more disruptive to the automotive industry than the introduction of autonomous vehicles (AVs).

Unlike the slower progress of AVs, EVs are taking over: The SDV disruption is happening now, and it's poised to transform the industry. Today's SDVs are predicted to be the pillars of the new electric era. For automakers, the software-defined approach provides innovations that can open up new business opportunities.

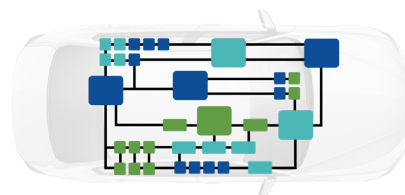
However, next-generation EVs will require significant upgrades to move beyond traditional vehicle architecture in order to address and overcome the major limitations faced by the automotive industry today.

Connex Drive provides the data-centric software framework needed to efficiently manage complexity to integrate new and evolving technologies. Connex can seamlessly support a number of individual solutions, ranging from **zonal architecture** to **high performance compute** and **cloud-based communications**.

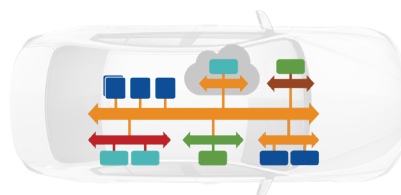
Distributed ECUs

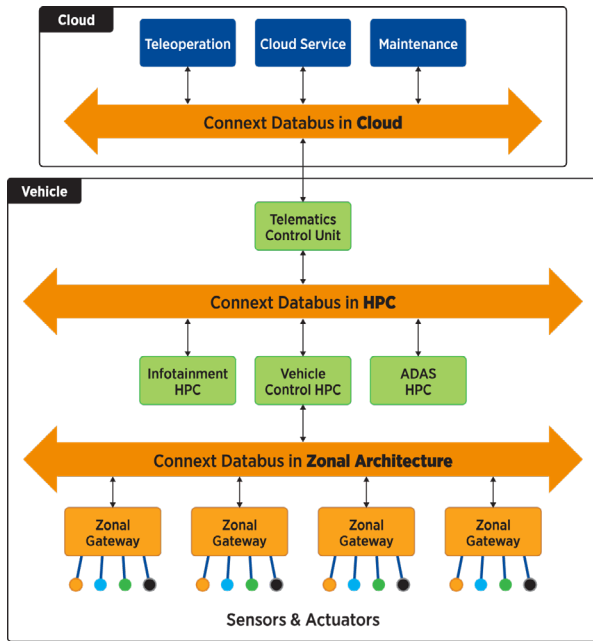


Domain Centralization



Software-Defined Vehicle





The Future of SDVs: ECU Consolidation and Computing Centralization

Centralizing the computing capabilities in one high-performance ECU is enabled by end-to-end communication and data-centric software components. Based on the Data Distribution Service (DDS™) standard, Connex Drive offers a variety of advantages for manufacturers engaged in creating scalable and future-proof SDVs. These benefits include:

- Enabling the given functionality for each vehicle zone: ECUs, central gateway and zonal gateway.
- Simplifying the overall wiring harnesses (currently the third-highest component cost) through TSN support.
- Providing communication libraries certified to the highest functional safety standards (ISO26262 ASIL D).
- Evolving from traditional automotive products into new architectures that include ADAS and telematics applications, making it possible to compete in new markets with dedicated product offerings.

- Providing a proven connectivity framework that is used by ROS 2, AUTOSAR Classic/OSEK and AUTOSAR Adaptive for autonomous vehicles.

The Benefits of Cloud-based Communications

The foundational enabler for SDVs is the ability to add new, unplanned functionality, as needed, using cloud-based communications. The cloud provides a cost-effective and readily-available communications channel for SDV applications, especially teleoperations, continuous validation and update capabilities. However, challenges abound. Since the cloud is a shared resource, it is expensive to guarantee dedicated bandwidth for individual endpoints. Meanwhile, the absence of deterministic bandwidth can result in large transmission delays between endpoints. Unbounded latency can add risk for assets and safety.

Connex Drive makes cloud-based communications work to a manufacturer's advantage. It is designed to enable consistently secure communications across public and private networks with ultra-low latency. Connex Drive easily accommodates and supports the demanding communications requirements of cloud-based applications, opening the door to live data streams, such as video from the peripheral sensors or streaming radar and camera data. Connex Drive is an open, interoperable framework that includes all the necessary platform integration tools so that developers can easily interface with market-leading cloud services providers.

Real-World Example

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 at the outset of the project. The Connex Drive connectivity framework helps to accelerate Li Auto's EV development in this challenging landscape.

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 Connex 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 Connex Drive for free at rti.com/drive.

RTI, Real-Time Innovations and the phrases "RTI Runs a Smarter World" and "Your systems. Working as one," are registered trademarks or trademarks of Real-Time Innovations, Inc. All other trademarks used in this document are the property of their respective owners. ©2025 RTI. All rights reserved. CB-020 V3 0825

2 • rti.com