Support for AUTOSAR Adaptive

INTRODUCTION

As vehicles become more complex and interconnected, the need for robust and efficient communication mechanisms becomes critical. In this era of innovation, technologies such as the Data Distribution Service (DDS™) and AUTOSAR Adaptive have emerged as critical enablers for building resilient and scalable automotive systems.

The DDS standard provides data-centric middleware that facilitates seamless communication between distributed systems, providing a reliable and scalable foundation for real-time data exchange.

The AUTOSAR Adaptive platform addresses the design challenges of in-vehicle high-performance computers and guarantees essential features for next-generation vehicles, such as connectivity and continuous software updates. It also supports methodologies and workflows integrating multiple suppliers.
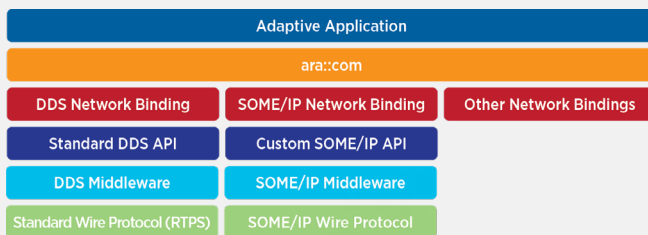
Adaptive Application		
ara::com		
DDS Network Binding	SOME/IP Network Binding	Other Network Bindings
Standard DDS API	Custom SOME/IP API	
DDS Middleware	SOME/IP Middleware	
Standard Wire Protocol (RTPS)	SOME/IP Wire Protocol	

Figure 1: The AUTOSAR Adaptive Communication Management architecture

RTI Connext Drive® is built on the DDS standard and offers users portable, scalable and performant DDS interoperability. Customers also have the opportunity to use the RTI Connext® Integration Toolkit for AUTOSAR Adaptive. The robust communication capabilities of DDS, coupled with the flexibility of AUTOSAR Adaptive's standardized software architecture, create a harmonious ecosystem that addresses the intricate challenges of modern automotive software development.

The RTI Connext Integration Toolkit for AUTOSAR Adaptive enables software engineers and system architects to harness the collective strengths of these technologies. Through this integration, real-time data distribution, scalability, and adaptability are seamlessly woven into the fabric of automotive software design.

BENEFITS

The RTI Connext Integration Toolkit for AUTOSAR Adaptive extends the AUTOSAR Adaptive software architecture and methodology with standards-compliant DDS connectivity.

This is made possible by enabling AUTOSAR ECU designers to define data types, service interfaces and their deployment using the AUTOSAR ECU design tools of their choice.

Once the design is ready for DDS integration, users only need an ARXML export of relevant Executable model elements and their dependencies, while the AUTOSAR Runtime Adaptive Code Generator produces all the necessary artifacts:

- DDS-compatible type and interface declarations (in either DDS-IDL or DDS-XML formats)

- Type conversion routines

- DDS Network Binding integration and deployment assets

This is an iterative, incremental process that can be repeated — and even automated — as the ECU design grows, allowing DDS interoperability to expand along with ECU design evolution.

The integration process is simple, scalable and efficient. The AUTOSAR Runtime Adaptive Code Generator can analyze the vehicle's data type catalog and produce optimized "zero-copy" marshaling routines for most AUTOSAR/DDS type combinations, which helps designers reduce execution time and code size.

FEATURES

RTI Connext Integration Toolkit for AUTOSAR Adaptive provides a code generator for application-specific DDS Network Binding assets, plus a source library implementing the AUTOSAR Communications Management DDS Network Binding.

The **RTI Connext AUTOSAR Runtime Adaptive Code Generator** and the **RTI Connext DDS Network Binding Library** work together, enabling applications in any platform with full support of AUTOSAR ara::com service-oriented communication semantics (service discovery and availability, triggers, events, methods and fields).

These two components can be used standalone, or in combination with existing AUTOSAR Adaptive solutions, as shown in figure 2 below (RTI components in blue).

INTEGRATION

AUTOSAR components of RTI Connext Drive have been designed to be easily integrated with both OEM applications and AUTOSAR solutions. Supported integration scenarios to date include the following:

- Direct, standalone integration in (Adaptive) Applications

- Integration in RTI's ara::com reference implementation

- Integration in supported AUTOSAR Adaptive solution, Vector MICROSAR Adaptive

RTI provides direct integration to AUTOSAR Adaptive via the **RTI Connext Integration Toolkit for AUTOSAR**, with code generation and templates to integrate DDS connectivity into AUTOSAR designs. Please contact your RTI sales representative or visit the **website** to learn more.
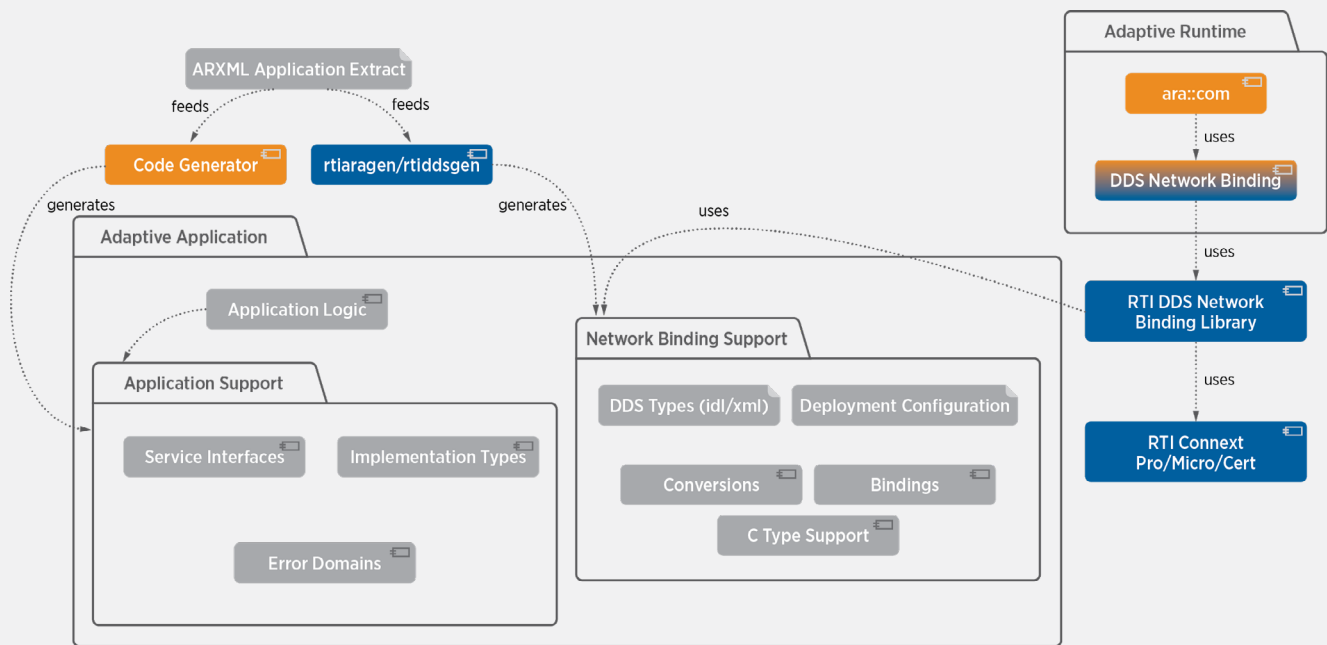

Figure 2: RTI Connext AUTOSAR Integration Toolkit integrates AUTOSAR Adaptive and DDS

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 2,000 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**.

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