

COMPILING SOURCE CODE FOR SAFETY-CRITICAL APPLICATIONS

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A reliable, safety-certified compiler used to compile source code for safety-critical applications that can meet required safety standards

Choosing a compiler for automotive applications can be a difficult task, and choosing the wrong one can lead to pain and frustration. It could also lead to your product not working or not being able to meet safety certification. Sounds dire? It doesn't have to be that way.

The automotive industry has had an equally steep curve to navigate in terms of increasing product quality. On top of internally generated quality software and competitive pressures have come external quality standards, to which compliance must be demonstrated. The most relevant example is ISO 26262.

Quality in code compilation means, in a nutshell, an absence of bugs. Product quality is measured via comprehensive testing and comparison against the expected results and also the results obtained by other suppliers' toolsets. Compilers should generate the correct output in response to any reasonable input. Developing a bug-free product requires having mature processes in place; otherwise it is not possible to develop and maintain a product that is representative of the state of the art.

As we are not living in an ideal world where everybody writes perfect code, a capable compiler should also allow easy debugging. Most compilers require painful setup that often takes longer than actually running the debugger itself. A compiler that provides a quick and easy setup is a requirement.

Diab Compiler, an ISO 26262/ASIL-D Certified Compiler

Wind River Diab Compiler is a reliable, safety-certified compiler used to compile source code for safety-critical applications that can meet required safety standards. Diab Compiler is proven in use across multiple mission-critical aware markets and numerous safety applications. Select Diab Compiler instances are ISO 26262/ASIL-D and IEC 61508–certified. This supports customers working on safety automotive and industrial products with the generation of safety artifacts that meet their end product safety certification.

Why Diab Compiler?

Community effort does not include Long Term Support (LTS) or other requirements that are assumed for the automotive lifecycle. Bug tracking, monitoring, and fix investigation, along with certification, will be undertaken by the experienced Wind River Diab Compiler team. Wind River also delivers the familiarity of DIAB's front-end constructs backed by an award-winning global support team.

Equally important, Diab Compiler is a standalone compiler targeting customers in automotive, A&D, industrial, medical, and other safety conscious markets.

- Compiler engineering teams and their sourcing IT departments are based at these targets.
- SoC vendors coming out with new chipsets and tools partner with complimentary technologies (IDE/debugger, etc.).

Communication

- Diab Compiler 7 is a major iteration of the Wind River compiler product, targeting the latest ARM (64b and 32b) architectures that are becoming prominent in the safety-focused embedded markets.
- Diab Compiler is leveraging the LLVM community effort, providing access to the latest ARM SoCs coupled with the familiar Diab interface that customers are accustomed to.
- Diab Compiler allows Wind River to leverage the LLVM framework to provide other value-added functionalities and services.

Using Diab Compiler, Under the Hood

DIAB compiler technology, on which Diab Compiler is based, is widely used in the most demanding and mission-critical applications, such as automotive under-the-hood, industrial, and aerospace and defense systems. Given the critical nature of quality to the automotive industry, every release of Diab Compiler is tested for conformance and performance with more than half a million test cases.

Diab Compiler Top Features

- Support for the latest 64b ARM high-performance computer architectures and SOCs
- Faster and smaller code
- Low-level virtual machine (LLVM)-based technology combined with the familiar interface of DIAB, allowing us to stay in lockstep with latest SOC architecture advancements and be more responsive to customers' evolving embedded needs

Conclusion

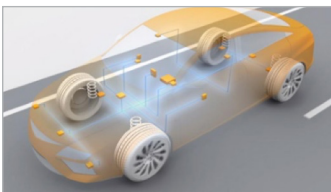
In the automotive industry, there is nothing more critical than safety. Products are already in production to take on several safe driving functions, such as following distance, emergency braking, or lane departure warning. Cars will soon incorporate more self-driving features than ever before. What does this mean? Both hardware and software pieces must meet high safety standards.

There are many standards that must be adhered to and safety requirements that must be met. And most of the time, it starts with the hardware. However, if your compiler is not aware of these safety features, you are—at best—left to write assembly code, or—at worst—unable to make the hardware function properly.

Primary Use Cases

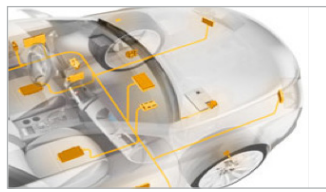
- Diab Compiler is ready to extend the robust, industry-leading Wind River compiler optimizations for code footprint, memory usage, and compute performance to the latest high-performance 64-bit computer platforms from ARM.
- Diab Compiler showcases the Wind River commitment and support for safety conscious, long-term support markets. The legacy Diab Compiler 5.9.6.x was recently certified to ISO 26262 TCL3.
- Diab Compiler is joining the LLVM community to accelerate inclusion of new innovative compiler features and to leverage the LLVM framework to allow easy inclusion of compiler add-ons.

Automated Driving



- Traffic Jam Assistant
- Parking Assistant
- Parking Pilot
- Highway Chauffeur
- Highway Pilot

Powertrain



- Engine Systems
- Hybrid and Electric Vehicles
- Transmission
- Sensors and Actuators
- Fuel Supply

Chassis and Safety



- Brake Systems
- Airbag
- Washer Systems
- ADAS
- Passive Safety

Interior



- Gateways
- Body Controller
- Visual Display Systems
- Control Elements
- Access Control

Learn more about [Wind River Diab Compiler](#) and our [TÜV Safety Certification](#).