# ACCELERATING TIME-TO-MARKET WITH OPEN SOURCE FOR CAR SYSTEMS

## Wind River Helps Automakers Innovate and Get to Market Faster

No longer are cars simply gas-powered vehicles; they are intelligent, connected systems that require an entire team dedicated to developing, integrating, and managing multiple systems composed of thousands of software components. And while no one ever decided to buy a car because of its operating system, carmakers are keenly aware of how embedded systems play a key role in safety, communications, comfort, driver convenience, and overall experience, which all factor heavily into a customer's buying decision.

Most proofs of concept (POCs) for embedded systems start with open source Linux. And no wonder—at a robust 20 years in market, the Linux kernel has reached a level of stability, flexibility, and security that makes it a viable starting point for many industries. And Linux Foundation initiatives, such as the Yocto Project, have helped increase the pace of innovation.

Many cars on the road today already use embedded systems based on Linux for in-vehicle infotainment, heads-up driving displays, and dashboard systems. These systems are constantly being improved by the greater Linux community through projects such as the Linux Foundation's Automotive Grade Linux (AGL), an open source initiative that builds on a Yocto Project foundation and brings together automakers, suppliers, and tech companies to accelerate the development and adoption of a fully open software stack for all in-vehicle technology.

**WHAT IS AUTOMOTIVE GRADE LINUX (AGL)?**

- 150+ member companies
- 11 automotive manufacturers, including the top three producers by worldwide volume (Volkswagen, Toyota, and Daimler), according to the AGL website
- Supported by a global ecosystem of developers and suppliers
- Using millions of dollars of industry investment in Linux and open source
- 30+ products and services on the market already use AGL technology
- Yocto Project Gold Member

Learn more at www.automotivelinux.org.

## WHY LINUX MATTERS FOR AUTOMOTIVE

Industry-wide efforts such as AGL are helping jump-start the next generation of in-car designs with pre-validated, open source specifications. But making the move from POC to actual deployments of complex embedded systems requires more. In-car systems are typically developed as closed systems. The hardware and software are developed, tested, and deployed with the expectancy that the entire system will work as intended from the time of manufacture to end-of-life. For a car, this lifespan could easily be 10 to 15 years.

However, consumers today expect any computing system to work like their smartphones and laptops, with a regular cadence of updates and new features. Security is paramount, too. Car-embedded systems are typically connected to the Internet, which makes them vulnerable to attacks. Carmakers must consider the ever-changing and dynamic series of new requirements for embedded systems, especially when it comes to security and safety. Fortunately, the Linux open source community is highly effective at providing regular updates and developing and distributing security patches quickly. The challenge is monitoring these community updates and applying them to existing platforms in deployed products.

## ADOPTING A CI/CD CADENCE

Because of cyberthreats and changing customer expectations, it is important for car companies to re-think their approach to embedded systems, because these connected systems must be updated frequently. Without a CI/CD approach, incorporating constant security and kernel updates is extremely difficult. If a system's kernel is already two to three years in the market, updating the entire kernel with what amounts to hundreds of updates can be an onerous task.

Adopting a DevOps and continuous integration/continuous delivery (CI/CD) model, as much of the IT industry has done, is a step in the right direction. CI/CD puts a process in place for companies to make continuous smaller kernel and application updates that are easier to manage and distribute. Frequent updates also enhance brand loyalty by getting new features to market faster, ensuring quality of service (QoS), and reducing business risk.

## WIND RIVER IS READY TO HELP

Wind River® Linux is developed to support CI/CD specifically for the embedded community. While Linux is freely available for anyone to use, Wind River Linux takes on the burden of building, managing, and maintaining an open source platform so companies can focus on innovation. Wind River can optimize the Linux platform to address the unique requirements of the automotive industry, such as performance, footprint, longer lifespan, and secure over-the-air updates.

With the Yocto Project as its genesis, Wind River Linux provides validated source code, tools, and technologies that automakers need to customize a distribution for their purposes. Automakers can even use Wind River Linux to define, optimize, and build a Linux platform to meet the specific needs of a car's design. Wind River Linux is available in several options: as a freely available distribution, with long-term support, via continuous delivery, and as a managed platform service.

## EXPERT SUPPORT FOR THE AUTO INDUSTRY, TODAY AND TOMORROW

With 5G on the horizon, connectivity will be ubiquitous and much faster, requiring automakers to adopt a more cloud-native stance and cloud-scale thinking to support the vast amounts of data that will be generated and transferred from the car. Wind River is able to help the auto industry make the transition to 5G with solutions that require high-performance and mixed-criticality systems. Wind River Helix™ Virtualization Platform delivers the best of both worlds, with VxWorks®, the embedded industry's leading real-time operating system, running with a guest operating system such as Wind River Linux. Using a virtualization platform allows a carmaker to consolidate embedded systems and deliver controlled, safer foundations alongside innovative applications that are essential to autonomous driving, where the stakes are much higher than for current car-embedded systems.

The future of connected car systems is exciting, but it comes with accompanying complexities. Automakers that are already realizing new opportunities are partnering with Wind River to help speed time-to-market and reduce the daunting overhead of maintaining their software platforms. Wind River, with its 40 years of expertise in enabling developers to build mission-critical embedded applications, is ready to help the auto industry with whatever comes next.

## DISCOVER HOW WIND RIVER CAN HELP YOU WITH YOUR AUTOMOTIVE EMBEDDED NEEDS

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