

WIND RIVER

Automotive Solutions

In-vehicle devices are changing the way you interact with your car. Wind River is changing the way you build in-vehicle devices.



Pop-up navigation screens. In-dash MP3 players. Rear-seat entertainment systems. Digital rear-view cameras. There's no question that in-vehicle devices have fundamentally changed the relationship between cars and consumers.

The question is how to deliver the in-vehicle devices consumers want, when they want them. The key challenge, in a word, is flexibility. How will you create a platform that's adaptable enough to handle the ever-accelerating rate of change in technology? How will you differentiate your model in an increasingly commoditized market? And how will you remain agile enough to deliver compelling new features, comply with automotive requirements, and respond to your competitors' offerings?

Wind River has your answer. Open technology, advanced automotive connectivity, a dynamic partner ecosystem, and world-class support. We reduce your integration efforts so you can focus on higher-level innovation, hit the accelerator on time-to-market, and adapt on the fly.

Navigation: Turn-by-Turn, Map-Based

- Wind River Linux
- CAN gateway, MOST, 3D graphics, voice recognition, power management

Entertainment: Audio, DVD Systems

- Wind River Linux and VxWorks
- MOST, Flash memory, USB, codecs, small footprint

On the Go: Dockable, Mobile Infotainment Systems

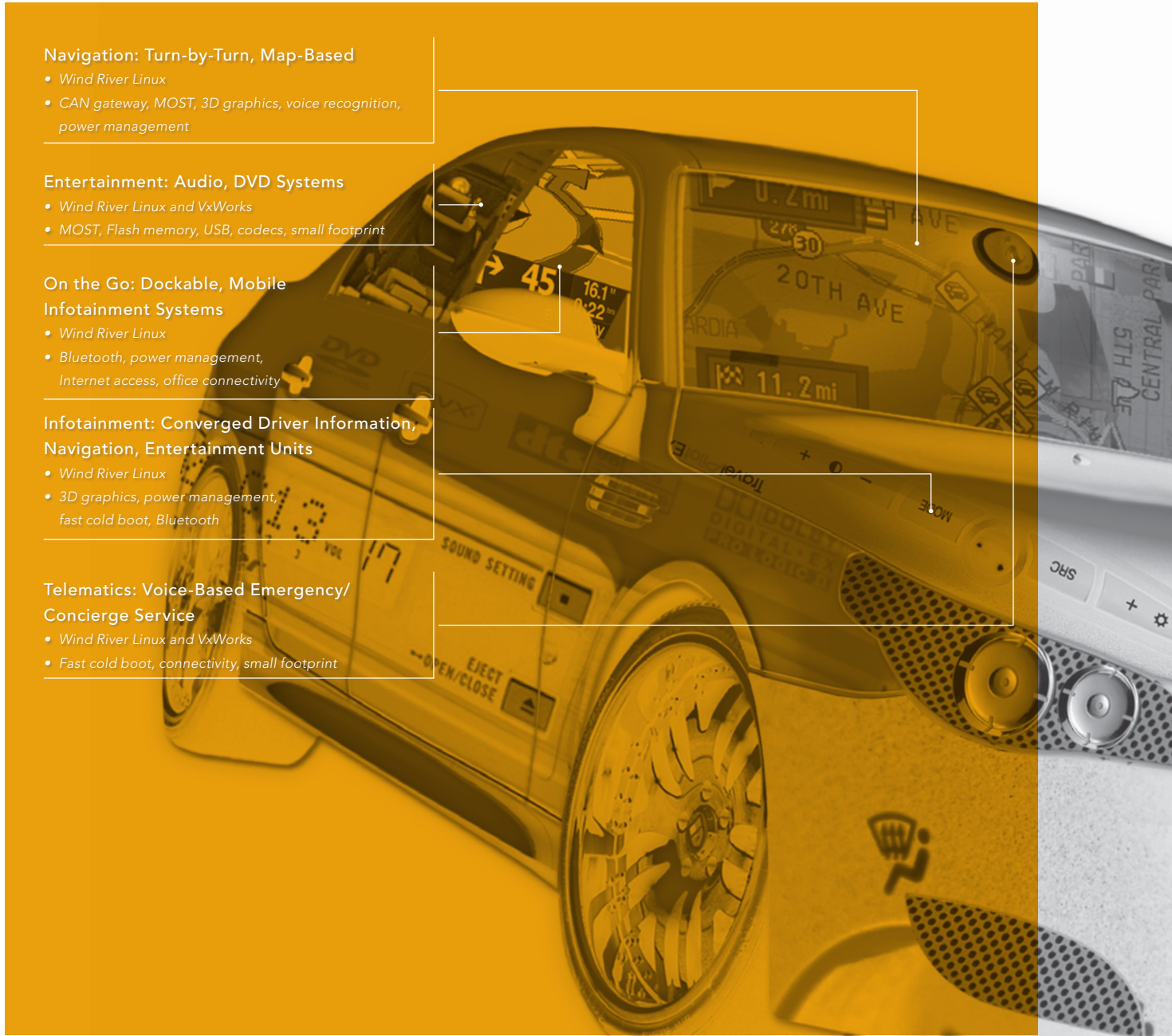
- Wind River Linux
- Bluetooth, power management, Internet access, office connectivity

Infotainment: Converged Driver Information, Navigation, Entertainment Units

- Wind River Linux
- 3D graphics, power management, fast cold boot, Bluetooth

Telematics: Voice-Based Emergency/Concierge Service

- Wind River Linux and VxWorks
- Fast cold boot, connectivity, small footprint



An In-Vehicle Device Solution Based on Linux

The automotive device game has changed—quickly and dramatically. The days of proprietary single-vendor solutions are coming to an end. Collaboration among vendors, open software, interoperable technologies, and connected deployment platforms are the new imperatives.

That's why Linux is a natural fit for in-vehicle devices. Open source Linux brings cost savings and vendor independence to automotive device development. With hundreds of developers contributing to the community, the engineering talent pool is huge. The core technology is mature and constantly evolving. Linux has proven to be a secure, reliable, and affordable operating system. It supports software reuse and multimedia extensions. And trusted vendors have added significant value with commercial-grade product offerings.

Wind River Linux Platform for Infotainment

Yes, Linux has a role to play in the in-vehicle device market. But not just any Linux. When you're serious about building in-vehicle devices based on Linux, you need a commercial-grade Linux solution fine-tuned for automotive device development and deployment—including infotainment, telematics, navigation, and external gateway devices. You need a platform that's optimized for the extreme requirements of in-vehicle systems. You need Wind River Linux Platform for Infotainment.

The platform begins with a fully tested and validated Linux distribution based on the latest Linux 2.6 kernel technology. Wind River Linux Platform for Infotainment includes the Eclipse-based Wind River Workbench development suite, access to a specialized professional services team, and 24/7 global support.

Wind River Linux Platform for Infotainment Enhanced for Automotive Requirements

- Automotive power or program state management, with a robust file system, "instant-on" fast boot, and an enhanced systems infrastructure
- Built-in support for 2D and 3D graphics, multimedia playback, automotive connectivity such as CAN and MOST, and connectivity for popular consumer electronics standards
- Rigorous engineering, integration, test, validation, and support
- Support by Wind River, the global leader in Device Software Optimization (DSO)

Wind River's platform is the only Linux-based solution that has been tuned specifically for the in-vehicle device market, adding features to support program state management, fast boot, 3D graphics, multimedia playback, automotive connectivity, consumer electronics connectivity, and an enhanced systems infrastructure.

The Foundation: Automotive-Enhanced Commercial Grade Linux

Wind River Linux Platform for Infotainment is specifically designed for in-vehicle device manufacturers and silicon vendors who need specialized Linux capabilities for automotive device projects.

At the core of the platform is the kernel.org Linux 2.6 kernel implementation, with integrated patches and packages for enhanced networking and multimedia requirements. Wind River Linux Platform for Infotainment includes an advanced cross-build system that incorporates a structured framework for managing device software components as independent "layers." These layers act as building blocks for developers to manage and organize Linux packages, patches, or board support packages (BSPs); Linux source code or binaries; metadata or configuration files; test suites; or even extra files. The layered cross-build system reduces complexity and delivers added flexibility.

Wind River Linux Platform for Infotainment includes the ability to customize the root file system for memory-constrained devices and accelerated kernel boot time for "instant-on" capabilities. It also contains all the essential capabilities for processing diverse multimedia applications and multiple networking interfaces. The platform offers support for specialized automotive device processors from leading providers including Freescale and Intel.

Focus Technologies

- Consumer electronic device connectivity: USB, Bluetooth, UPnP, DLNA
- Automotive connectivity: MOST, CAN, diagnostics
- Networking/telephony: 3GSM, Wi-Fi, WiMAX
- HMI and graphics: 2D/3D, voice recognition
- Navigation: GPS, LBS
- Media support: MP3, DRM, Internet access

All open source and integrated components—including the kernel, patches and packages, and the Wind River Workbench development suite and supported hardware architectures and boards—have been exhaustively tested and validated in our Linux test harnesses to deliver the highest quality, reduce your project risk, and ensure the shortest time-to-market.

Enabling a New Automotive Standard

Wind River Linux Platform for Infotainment sets a new standard in the automotive market, combining best-in-class open source Linux components and a superior build system with preintegrated automotive technologies from leading industry partners. These components have been optimized and integrated to provide a flexible, customizable, and open operating system software solution. It's a solution that allows automotive original equipment manufacturers (OEMs), Tier 1 suppliers, and third-party developers to deliver timely, innovative, cost-effective solutions.

Workbench: Tight Integration with Wind River Run-Times

Wind River Workbench unlocks the power of Wind River Linux Platform for Infotainment for automotive device development teams. Through tight integration with Wind River Linux, Workbench delivers increased productivity for reduced cost and improved time-to-market.

Benefits include the following:

- Eclipse-based to simplify application, OS, and hardware debugging
- Visual configuration, analysis, and testing tools to configure a Wind River Linux kernel with automatic import of dependent libraries

- Support for multiple target connections and process/task/thread debugging
- On-chip debugging capabilities for custom board bring-up, platform development, and application debugging
- Multicore support

Extensive Partner Ecosystem

To deliver a complete range of integrated technologies, Wind River has joined forces with world-class silicon and automotive software providers to integrate such technologies as speech recognition, GPS, navigation, and multimedia extensions. Wind River's select partners extend the capabilities of Wind River Linux Platform for Infotainment.

Technology	Partner
Speech	Nuance
Browser	ACCESS, Espial, ProSyst
GPS	Trimble
GUI	ALT, Tilcon
JVM	Apogee, Skelmir
Bluetooth	Parrot, Stonestreet One
Database	Encirq, Hitachi, Solid
Navigation	NAVTEQ, 3DVU, Planet 9
Content	AMG, Gracenote
File System	Datalight

This is Glenn

He's always on the run—figuratively and literally. When **Glenn Seiler** isn't rushing around evangelizing Wind River's Linux strategic initiatives, chances are he's out running a marathon in some far-flung country. Glenn has already run 26 marathons in six countries and has traveled to more than 45 other countries. No surprise that Lewis and Clark are his real-life heroes. We're proud to call him one of ours.



Strict Adherence to Industry Standards

Wind River is strongly committed to standards so that you can cut the cost, complexity, and time-to-market of in-vehicle devices. Wind River is leading the community effort to define automotive industry standards for open source Linux. In addition, Wind River's commitment to evolving existing standards includes the following automotive industry standards:

AUTOSAR: An open standard for automotive electrical/electronic (E/E) architecture (particularly for under-the-hood applications), this standard will serve as a basic infrastructure for management of functions in standard software modules and future automotive applications.

Connected Vehicle Trade Association (CVTA): Wind River heads up a CVTA working group for architecting service delivery and connectivity in devices and is contributing Wind River Linux and Wind River Workbench to the Connected Vehicle Proving Center in Ann Arbor, Michigan.

Consumer Electronics Linux Forum (CELF): This nonprofit corporation helps determine requirements and open source solutions for Linux-based consumer electronics products.

Eclipse Foundation: This open community of tool providers enables developers to gain ultimate flexibility and control over their software technology.

Media Oriented Systems Transport (MOST): The de facto standard for multimedia and infotainment networking in the automotive industry, this technology was designed from the ground up to provide an efficient and cost-effective fabric to transmit audio, video, and data, and control information between any devices, even when attached to the harsh environment of an automobile.

Japan Automotive Software Platform Architecture (JasPar): JasPar drives domestic collaboration in Japan to accelerate development and adoption of industry standards for automotive LAN-enabling technology, middleware, and software platforms.

Wind River Worldwide Support

Wind River offers support for Wind River Linux Platform for Infotainment from our Service Capability and Performance (SCP) certified Customer Support organization. Internet-based support is available 24/7, augmented by the industry's leading online knowledge-base. Additional support is available via telephone or email to ensure that your team's project stays on track. Long-term extended support can be arranged to accommodate the entire life cycle of your production model.

Professional Services

Wind River's Professional Services team offers extensive experience in automotive device systems integration. A CMMI Level 3-certified organization, Wind River applies expertise in graphics, digital media management, power management, and fast boot to offer services tailored to the needs of automotive device development, including subsystem integration, wireless technology integration, and legacy application migration. In addition, Wind River's Linux Services Practice has a proven track record of delivering design, integration, and optimization services that successfully apply Wind River technology to open source solutions. For automotive solution providers looking to speed time-to-market, Wind River Professional Services helps you deliver on time and on budget.

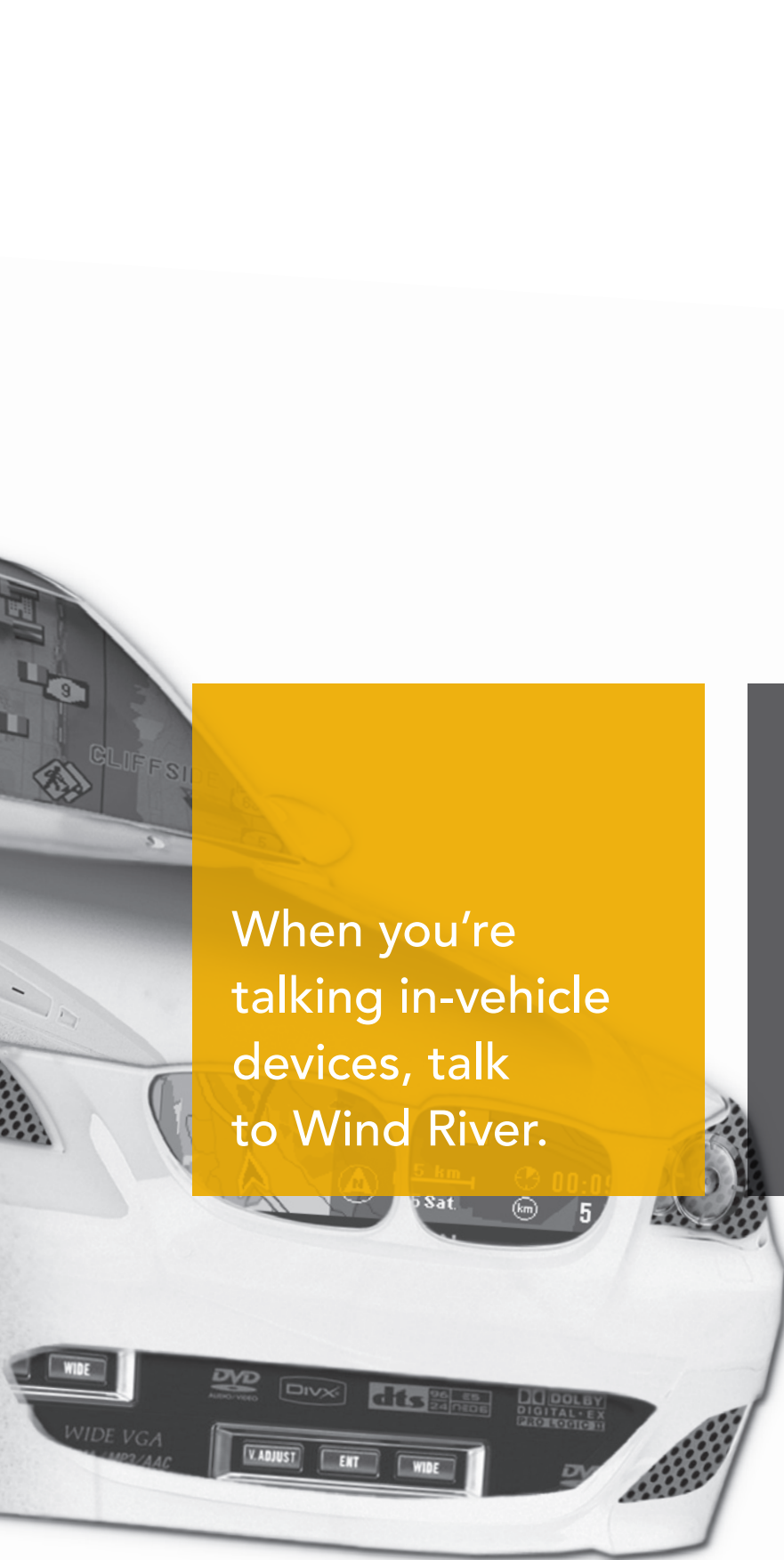
Real-World Results: Vehicle Infrastructure Integration

The Vehicle Infrastructure Integration Consortium (VIIC) needed to enable a standards-based communications infrastructure. With Linux as the foundation for its proof-of-concept device, the VIIC sought out a commercial vendor that understood both automotive devices and open source software. Wind River was selected for the strength and breadth of its Linux solutions, its extensive automotive expertise, and its in-depth global support services.

Wind River delivers VIIC an unmatched platform that combines flexibility with ease of integration, supporting a decentralized project like the VIIC's, reducing risk, and helping ensure VIIC meets its project goals.

Wind River Linux Platform for Infotainment

Userland	microperl	lpsec-tools	mtid	usbutils	busybox	boa	freetype	Others...
Automotive Connectivity	MOST	CAN	Others...					
CE Connectivity	USB	Bluetooth	usbutils	libusb	hotplug	SD Card	Others...	
IP Connectivity	TCP	UDP	IPv4	IPv6	MIPv6	FTP	Open SSL	DHCP
	SCTP	TFTP	PPPoE	Ping	DNS	Open SSH	NTP	Others...
Application Libraries	glib	glibc 2.3.6	uclibc	Open SSL	zlib	cairo	Readline	expat
	SQLite	Others...						
Utility Libraries	ProcPS	popt	hotplug	iproute2	ALSA lib	DirectFB	libsub	Others...
File Systems	YAFFS2	FAT32	PRAMFS	ext2	ext3	XFS	ReiserFS	JFFS2
	udev	CRAMFS	NFS					
Kernel	Linux Kernel 2.6.21 (Wind River Platform for Consumer Devices, Linux Edition with optional Linux-tiny patch)							
Hardware Drivers	MOST	CAN	USB	Bluetooth	NAND Driver	NOR Driver	UART Driver	LCD Driver
	Video Driver	Power Mgmt. Driver	Sound Driver	Touchscreen Driver	12C Driver	UART Driver		
	Framebuffer Driver	SD/MMC Driver	Ethernet Driver	Camera Driver	OneNAND	Wi-Fi		
<p>Your Hardware: Wind River supports all key automotive standards, and Wind River tools can be used to configure in-vehicle devices across the entire software stack.</p>								
<p>Wind River Workbench</p> <ul style="list-style-type: none"> • Project System • Build System • Profiles • Editor • Patch Manager • Source Code Analyzer • Workbench Debugger • QEMU Debug • Virtual I/O 				<ul style="list-style-type: none"> • Kernel Configuration • User Space Configuration • Host Shell • Wind River System Viewer • Wind River ProfileScope • Wind River MemScope • Wind River StethoScope • Wind River CoverageScope 				<p>Host Tools</p> <ul style="list-style-type: none"> • QEMU • gcc 4.1 • gdb • kgdb • kgdboE • Prelink • Squashfs • Others



When you're
talking in-vehicle
devices, talk
to Wind River.

Wind River puts it all together for you: industry-leading products tailored to the needs of the automotive industry, life cycle tools, best-in-class partnerships, and world-class expertise, best practices, and service capabilities.

So take the next step. Get more information about Wind River automotive industry solutions at www.windriver.com.

WIND RIVER

Wind River is the global leader in Device Software Optimization (DSO). We enable companies to develop, run, and manage device software faster, better, at lower cost, and more reliably. www.windriver.com

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