WIND RIVER

Mobile Handsets

How will you accelerate time-to-market and avoid the cost and compatibility issues caused by Linux fragmentation? Suddenly there's a simple answer.

The mobile handset market continues to grow at a torrid pace. More than 3.5 billion people are mobile phone subscribers, and the average U.S. consumer is in search of a new handset within 18 months of buying their previous handset. New business models are evolving based on rapidly improving technologies, making room for new entrants and more innovative features.

However, this dynamic marketplace is also growing more complex. Core technologies such as Linux are fragmenting as they evolve, leading to excessive development cycles, high costs, and compatibility problems. Multiple vendors and consortia are battling over standards. Each OEM seems to be working on its own tooling solution.

What does it take to leapfrog the challenges? Suddenly the answer is surprisingly simple. It takes a comprehensive, Linux-compliant mobile platform with tightly integrated tools. It takes a partner that can deliver an ecosystem, not just a product. It takes an open-solutions approach as advocated by the LiMo Foundation and the Open Handset Alliance. It takes world-class service and comprehensive support. It takes Wind River.

Smartphone

- *Wind River Linux*
- *Layered build / pristine source*
- *Fast boot, power management, multimedia, secure device (SD), security, Bluetooth™*

Feature Phone

- *Wind River Linux*
- *Layered build / pristine source*
- *Fast boot, small footprint, power management, multimedia, secure device (SD), graphics*

Basic Phone

- *Wind River Linux and Wind River Real-Time Core for Linux*
- *Layered build / pristine source*
- *Fast boot, small footprint, power management, 100% real-time determinism*

A Complete, Compliant Linux Platform Solution

It's easy to see why mobile handset providers have embraced Linux. It offers a common standard easily adoptable by OEMs, operators, ISVs, and new market entrants alike. It promotes software reuse across handset SKUs. And a broad ecosystem has already developed to provide extensive hardware support for Linux.

However, the appeal of Linux has led to a fragmented evolution with significant industry challenges:

- There are more than 900 carriers in the world operating networks in 200 geographies—each of which has unique proprietary requirements that impact a pristine kernel.
- There are dozens of OEMs, hundreds of chip variants, and thousands of handset models, each driving unique kernel requirements.
- There are hundreds of software vendors who must meticulously port to each of the kernel variants.

The results for the mobile handset industry are painfully obvious. Semiconductor vendors find that development cycles are slow and preproduction hardware is not application-ready on time. OEMs spend too much time integrating device drivers or hardware-specific features and risk missing market windows. ISVs are constantly porting and recompiling for each new hardware/OS platform combination.

Wind River offers a compelling solution that helps end the fragmentation issues and reduce development time scale and costs while improving quality and preserving the benefits of open source technology. We bring together a combination of tools and technologies, partners, leadership in industry associations such as LiMo and OHA, and services and support that no other vendor can match. All from a solid, stable market-leading company that device software developers have trusted for decades.

Wind River Linux in Mobile Handsets

Wind River Linux provides mobile handset OEMs and ISVs with a robust, standards-based foundation for device software development across product lines and a common integration environment. It is based on a Linux 2.6 kernel implementation and offers a "pristine source" distribution that gives maximum visibility into which packages and patches have been applied. It includes the following:

Layers: The platform is based on a Linux build system that delivers component version control and transparent traceability of source code origin.

Tightly integrated tools: The Eclipse-based Wind River Workbench development suite is integrated with Wind River Linux and serves the full device development life cycle—from hardware bring-up to platform and application development. Workbench enables standardization on one common development suite across the enterprise. It is extensible and scalable, allowing developers to meet specific project needs, and can seamlessly integrate hundreds of third-party plug-ins.

An OEM-grade kernel: The platform is specifically designed for silicon vendors and OEMs who need specialized Linux capabilities for mobile handset projects, with a broad range of packages optimized for mobile phones.

Hardware optimization: The platform enables custom hardware optimization, with support for board support packages (BSP) and device-driven integration and testing, including multimedia, SD, Bluetooth™, keypad, touch screen, headset, audio, video, power management, camera, Wi-Fi, and more.

Additional solution components include the following:

Wind River Real-Time Core for Linux: The platform offers a real-time executive that delivers 100% real-time determinism for high-performance applications such as radio control. Wind River Real-Time Core for Linux is applicable in single-core 2G/3G Linux platforms, offering best-in-class performance and a noninvasive architecture that is integrated with Wind River Linux.

On Chip Debugging: Wind River standards-based, on-chip debugging solutions expedite the hardware development process and support life cycle debug and analysis.

Virtualization: Open source and proprietary solutions leverage the benefits of virtualization solutions for mobile handsets.

Wind River Device Management: An integrated, enterprise-wide diagnostics suite improves device quality, minimizes support costs, and extends the revenue-generating life of products.

Security: Robust security options secure handsets and enforce enterprise security policies.

The Foundation: OEM-Grade Linux

Wind River Linux is tailored for silicon vendors and OEMs who need specialized Linux capabilities for mobile handset projects.

At the core of the platform is the kernel.org Linux 2.6 kernel implementation. Wind River Linux 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 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 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.

All open source and integrated components—including the kernel, patches and packages, 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.

Leadership in LiMo and Open Handset Alliance

Fragmentation in mobile Linux has significantly deterred the rate of open source adoption by OEMs and operators. Since theoretical standards alone could not improve the fragmentation issue, market leaders from the OEM, operator, and ISV ranks have banded together to create market-ready solutions for Linux handsets. These solutions standardize the mobile handset stack, from the Linux distribution to application framework.

Wind River has taken the leadership role in the LiMo Foundation and Open Handset Alliance, the key industry associations that are actually advancing the creation, evolution, and support of a standards-based platform and cultivating an ecosystem of complementary products, capabilities, and services.

In joining the LiMo Foundation as a Core Member, Wind River became the first commercial Linux platform and tools provider in the consortium, demonstrating its leadership in Linux for mobile handsets. LiMo selected Wind River to provide the foundation for its Common Integration Environment (CIE). The CIE includes Wind River's unique build and configuration system with layers, mobile-optimized kernel distribution, and toolchain.

Wind River has also joined the Open Handset Alliance as the first Linux commercialization partner and plays a critical role in helping companies bring their mobile products to market based on Android, the platform announced by the Alliance. Android was built from the ground up with the explicit goal to be the first open, complete, and free platform created specifically for mobile devices.

Today Wind River is the only commercial Linux vendor with a leadership role in both the LiMo Foundation and the Open Handset Alliance. This makes Wind River an indispensable ally for mobile handset OEMs, ODMs, operators, and ISVs. With experience using Android and support for both LiMo and Open Handset Alliance solutions, Wind River is the one vendor that can support mobile handset development—from hardware all the way through to the user experience—no matter which market-making consortium you choose for your next handset design.

Global Service and Support

Wind River offers support for Wind River Linux from our Support Center Practices (SCP)-certified Customer Support organization. Internet-based support is available 24/7, augmented by the industry's leading online knowledgebase. 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.

Wind River's Mobile Handset Services Practice helps handset OEMs and operators quickly prototype their application suite on a new platform or roll out new features across multiple units. Wind River's solutions are augmented by handset- and Linux-savvy services engineers, building on the collective expertise of our Professional Services engineers to speed time-to-market for new handset designs or features.

With tailored services that deliver cost-effective design, integration, migration, and performance optimization, our Professional Services team will ensure that you achieve maximum return on investment in Wind River platforms and our ecosystem technology.

A Broad Ecosystem of World-Class Partners

Wind River's world-class partner ecosystem ensures tight integration between our core technologies and those of the premier hardware and software companies we've chosen to build out our solutions.

Our partners help to extend the capabilities of Wind River's development and run-time platforms by offering out-of-the-box integration and support for key technologies. Our Customer Support team is trained to troubleshoot partner technologies in use with Wind River products, making ours the most comprehensive and best-supported partner ecosystem in the Device Software Optimization (DSO) industry.

Silicon Partners

ARM
Broadcom
Freescale
Infineon
Marvel
MIPS
Texas Instruments

Platform Partners

ACCESS
Azingo
Mizi Research
Trolltech

Independent Software Vendor Partners

ALT Software
AMG
Aplix
Datalight
Digital Airways
Esmertec
Gracenote
Hitachi Entier
Insignia
Opera Software
Rational Software
Skelmir
SoftFront
Solid Information Technology
Taproot
Tilcon Software
Virtutech

Wind River Linux Core Handset Offering

Userland	hotplug	Ipsec-tools	mtd	usbutils	busybox	boa	eject	others...
Automotive Connectivity	MOST	CAN	others...					
CE Connectivity	IP Pkt Filter	UDP	ppp	DHCP	FTP	IPv4/6	MIPv6	TCP
	SCTP	TFTP	TFTP	Ping	DNS	BGP	NTP	ARP
	RARP	RIP	OSPF	PPPoE	VLAN	SNMP	SSL	SSH
Application Libraries	glib	glibc 2.3.6	uclibc	Open SSL	zlib	GetText	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 PCD-LE with optional Linux Tiny Patch)							
Hardware Drivers	OneNAND	NAND Driver	NOR Driver	UART Driver	Video Driver	USB Driver	LED Driver	LCD Driver
	Touchscreen Driver	Power Mgmt. Driver	Sound Driver	Keypad Driver	12C Driver	UART Driver		
	Framebuffer Driver	SD/MMC Driver	Ethernet Driver	Camera Driver				
	Real-Time Core for Linux/Device Management							
	PARTNER HARDWARE							

Workbench:

- Project System
- Build System
- Profiles
- Editor
- Patch Manager
- Source Code Analyzer
- Wind River Debugger
- QEMU Debug
- Virtual I/O
- Kernel Configuration
- User Space Configuration
- Host Shell
- System Viewer
- Profile Scope
- MemScope
- StethoScope
- CoverageScope

Host Tools:

- QEMU
- gcc 4.1
- gdb
- kgdb
- kgdboE
- Prelink
- Squashfs
- Other...