

CZ1

Device Software Optimization and Wind River Automotive

Presented by [Wind River Representative]

[title]

Wind River

CZ1

Does linuxdevices.com really ranks us as the leading supplier of commercial Linux? Aren't we loosing our credibility right there on Maybe "one of" the leading...
Chris Zapf, 2005-6-29

Wind River Today

- Incorporated 1983 – IPO 1993 – Nasdaq WIND
- 1100 employees worldwide
- Vertical market focus on
 - Aerospace/Defense
 - **Automotive**
 - Digital Consumer
 - Industrial
 - Network Infrastructure



Corporate Headquarters in Alameda

- Professional services team of 130 embedded systems engineers
- Over \$60+ million R&D investment Budget for FY'04
- Various reports estimate Wind River market share of embedded software is between 30% and 40%
- FY05 annual reported revenue increased 16% year-over-year to \$235.8 million

World Class Clients



Industrial

ABB
Agilent
Bosch
GE
Honda
Honeywell
Mitsubishi
National Instruments
Rockwell Automation
Samsung
Schneider
Siemens
Tektronix
Yaskawa
Yokogawa



Networking

Alcatel
Cisco
EMC
Ericsson
Fujitsu
Hewlett-Packard
Huawei
Intel
Juniper
Kyocera
LG Electronics
Lucent
Marconi
Motorola
NEC
Nokia
Nortel
Siemens



Automotive

BMW
Bosch/Blaupunkt
Daimler Chrysler
Delphi
GM
Harman/Becker
Hyundai
Magneti-Marelli
Nissan
Siemens VDO
VW
Audi
Opel
BMW
Xanavi
Visteon



Digital Consumer

Alcatel
Ericsson
Foxconn
Hewlett-Packard
Iwatsu
Konica Minolta
Matsushita
Mitsubishi
Motorola
Philips
Samsung
Sanyo
Sharp
Sony
Sumitomo
Thomson
Westell



Aerospace & Defense

BAE Systems
Boeing
EADS
European Space Agency
General Dynamics
Harris
Honeywell
IAI
KHI
LG Innotek
Lockheed Martin
L3
MHI
NASA
Northrop Grumman
Raytheon
Thales
Smiths Aerospace

300 Million devices worldwide use **Wind River** technology / **20,000** users

WIND RIVER

Wind River in Automotive



Sony DJ-Bank HDX-1000
Car Audio Player (VxWorks)



Xanavi Nissan CarWings
Telematics System



Maserati
Magnetti Marelli
Car Information System



BMW
5 series
Siemens VDO



Fujitsu-Ten Monet AVN-7710
Car Information System

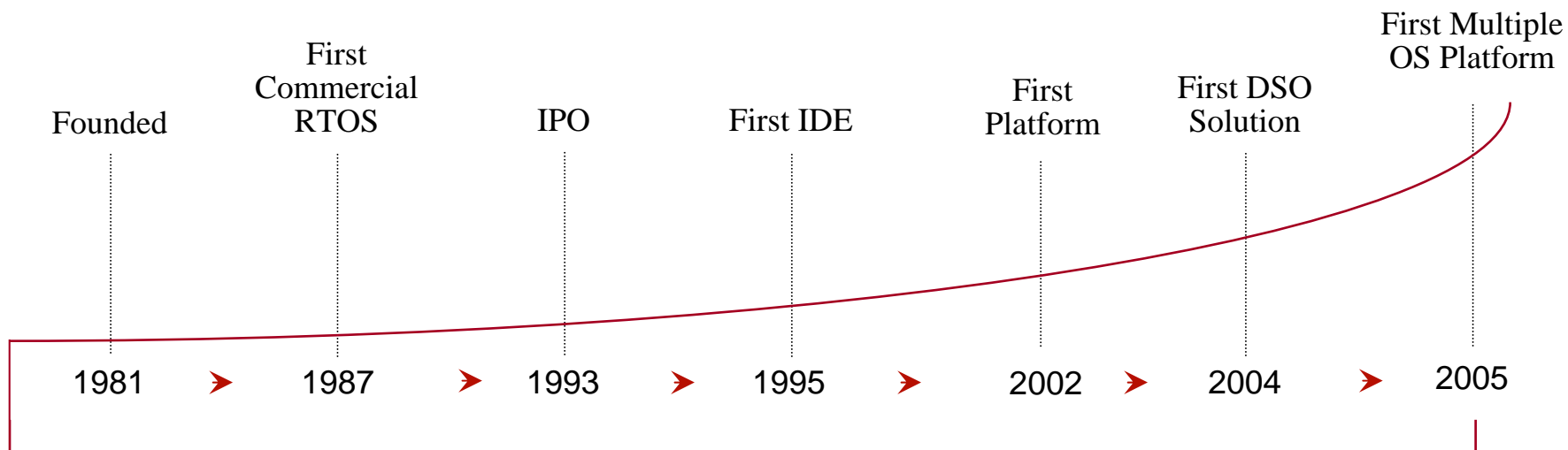
Alfa 147, Fiat Stilo, Fiat Ducato, Fiat Doblo,
Fiat Ulysse, Lancia Phedra, Peugeot 307,
Peugeot 807, Citroen C3, Citroen C5,
Citroen C8, Maserati Spyder, Maserati Coupe.



Magneti Marelli
Driver and Passenger Infotainment System

WIND RIVER

Why Wind River



Leader

- DSO Market Share
- RTOS Market Share
- IDE Market Share
- Reliable RTOS
- Technical Support

First

- “Plug-and-play” BSP
- Integrated network stack
- Interactive shell
- RISC support
- Multi-processor support
- Simulation environment
- Data profiling tool
- Visualization tool
- Dual IPv4/v6 stack
- Integrated Web Services
- Integrated security
- Integrated flash file system

- Integrated wireless
- Integrated management
- Subscription Licensing Model
- Safe and Secure Platform
- First Multiple Operating System Platform

A Seminal Shift in Device Development is Occurring

Device Requirements

- Increased Complexity
- Converging Technologies
- Multiple Ways to Connect

Competitive Pressure

- Faster time-to-market
- Lower Development Costs
- Higher Quality



Device Software Optimization Mandate

- Standardize
- Choice and Flexibility
- Partnering
- Global Best Practices

Trends in Automotive

Industry Trends

- **Increased complexity**
- **The networked or connected car**
- **Convergence of consumer technologies into automotive**
- **Need for increased reliability**
- **Drive to standardize to deal with complexity**
- **Drive to increased partnering**

Technology Trends

- **Increased electronics and software content in the car**
- **Connectivity: CAN, WiFi, USB, Bluetooth, 1394, MOST**
- **Much lower cost of LCD displays, spurring digital displays and entertainment**
- **Open standards: Eclipse, Linux, AutoSAR**

Platform for Automotive Devices

SW Partners

- NAND and fail safe: Datalight
- Advanced graphic UI: Tilcon
- OpenGL: ALT Software
- Bluetooth: StonestreetOne
- Java: Apogee, Aicas
- 1394: Vividlogic
- Speech: Fonix, Conversay
- Database: Encirq, Solid

Middleware

Networking

- PPP, Ethernet, CAN
- IPv4/v6

Security

- IPsec & IKE, Firewall, SSL/TLS

Wireless

- 802.1X, 802.11i

Management & Services

- Web server, SNMP, CLI, XMP/SOAP, DCOM, OPC
- Graphic Library, USB 2.0

Filesystems

- DOS FS
- Flash FS
- CD-ROM FS

Wind River Workbench 2.3

Integrated Partner Software

VxWorks based Middleware

VxWorks 6.1

Integrated Partner Hardware

Support, Training, Professional Services

Integrated Development

Eclipse Framework
Editor, compiler, system viewer
Build, source analyzer
Debugger
Scope tools

VxWorks 6.1

- Deterministic hard real-time OS
- VxWorks 5.5 Compatibility
- State-of-the-art memory protection
- Error detection and reporting
- POSIX compliance
- Common communications Interface
- Small footprint
- Scalable

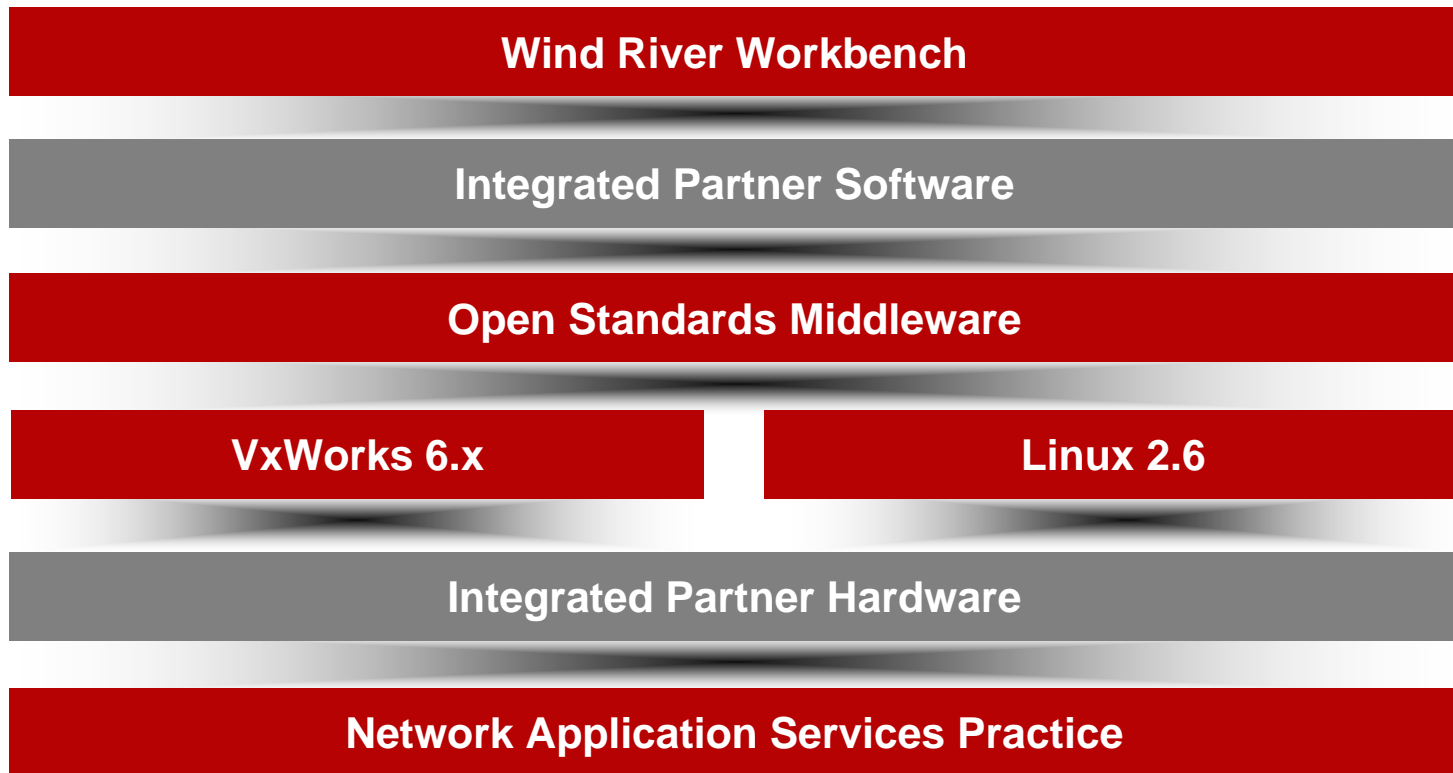
Processors & BSPs

Cores and Silicon

- PowerPC
 - SH4
 - Xscale IXP
 - ARM 9/11
 - SH4
 - x86/Pentium
- ### Board Support
- Freescale Lite5200
 - Freescale Media5200
 - Renesas SH7770
 - Renesas SH7751R

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Wind River and Linux – The Advantages of a Multiple OS Strategy



VxWorks legacy application re-use
High performance
Real-time determinism
Low memory footprint
OS Scalability

Linux/UNIX legacy applications
Open source ecosystem
Advanced file-systems

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Automotive Solutions – HW Partner Integrations

- **Platform AD and GPP support the following architectures:**
 - PowerPC, SuperH, ARM, MIPS, Pentium, XScale
- **Enhanced BSP support for the Freescale MPC5200**
 - Freescale Lite5200 Board and Media5200 Board
- **BSP Support for the Renesas SH4 and SH4a**
 - Platform AD and GPP include BSP support for the SE SH7751R (Solution Engine) and SH 7770 (Lambic) boards
 - BSP support for SH7780* on Fall roadmap
- **Custom or additional BSPs available through WR Services**
- **How: Available on Wind River BSP web site**

* Not officially locked in yet. Waiting for confirmation.

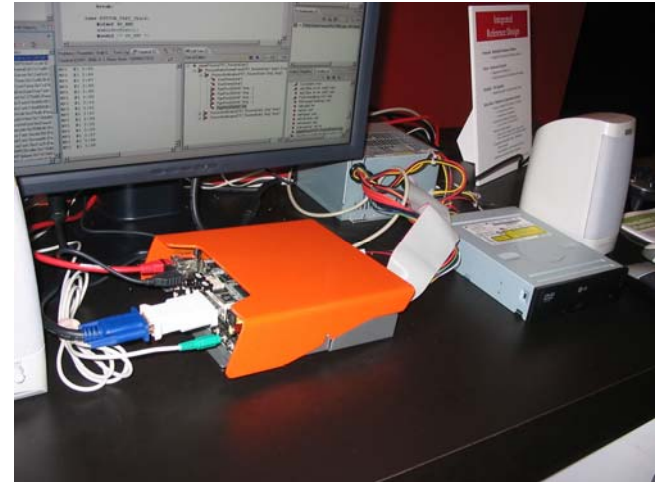
Platform AD Reference Design Demo

Description: An automotive dashboard with rich graphics and working mp3 and CD players.

Wind River Products and components:

Platform AD 3.1 including:

- Workbench 2.3
- VxWorks 6.1
- WIND RIVER Probe
- Multi Media Framework application (written by Peter Kleiner)
- WIND RIVER Media Library middleware
- USB Stack
- Media5200 BSP (includes AC97 sound driver and ATAPI CD driver)



Partners:

Freescale – Media5200 Reference Board

Fujitsu – Coral P graphics processor

Tilcon – IDS 5.3.1

Datalight – Reliance File System and Flash FX
(Flash Manager)

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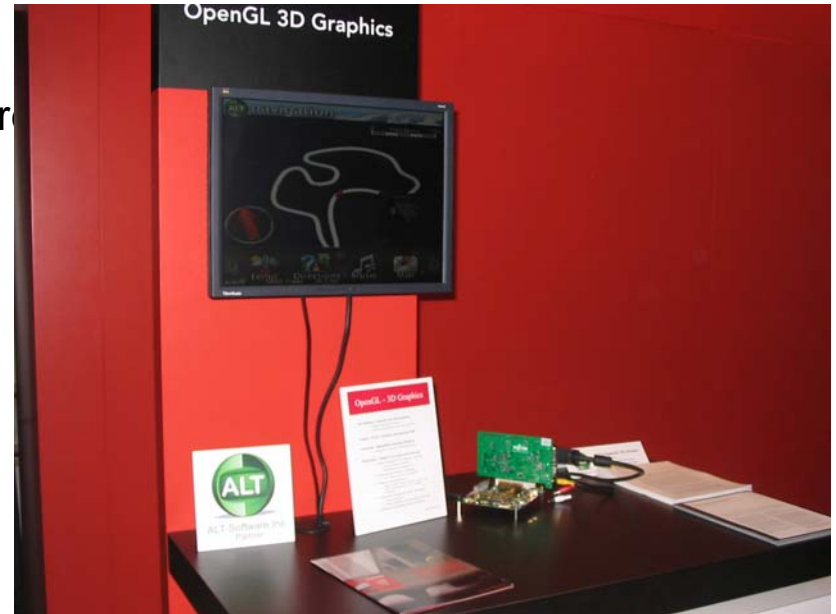
3D OpenGL Demo

Description: A 3D navigation application highlighting cutting edge OpenGL middleware running on Platform for Automotive Devices

Wind River Products and components:

Platform AD 3.1 including:

- VxWorks 6.1
- USB Stack
- Media5200 BSP (includes Coral P graphics driver)



Partners:

Freescale – Lite5200 Reference Board

Fujitsu – Coral P graphics processor

ALT Software – OpenGL software stack

Lectronix Automotive Integrated Application Framework Demo

Description: This demo uses Lectronix's R5000 Platform to showcase elements of their integrated application framework (AFrame). The demo includes a working FM radio, mp3 player, and CD player with a rich graphical interface.

Wind River Products and components:

Platform AD 3.1 including:

- VxWorks 6.1
- WIND RIVER Media Library middleware
- USB Stack
- Media5200 BSP (includes AC97 sound driver and ATAPI CD driver)



Partners:

Freescale – Lite5200 Reference Board

Fujitsu – Coral P graphics processor

Lectronix – R5000 Hardware Platform

Tilcon – IDS 5.3.1

Automotive Solution – Partner Commitment

3D graphics ALT	Graphics hardware Fujitsu	Database Solid/Encirq
Bluetooth Stonestreet One	Browser Access / Espial	GPS Trimble
Java/OSGI Aicas/Apogee / Skelmir / Prosyst / IBM	Speech Fonix / Scansoft / Conversay	MOST Oasis
IEEE 1394 Vividlogic	Advanced FS Datalight	Advanced UI Tilcon
Platform AD		
BSP & Drivers		
Hardware Platform		

Platform for Automotive Devices Where it is going?

Platform AD 3.1

VxWorks 6.1

- Configurable memory protection
- Error detection and reporting
- Sockets-based messaging
- File system enhancements
- Backwards compatibility

Workbench 2.3

- Eclipse based, open, extensible, and scalable
- Processor support: Freescale, SH, ARM, MIPS, XScale, x86/Pentium
- On-chip debugging
- Additional test phase capabilities

Middleware Components

- Migrated all existing middleware
- Expanded security features

Platform AD 3.2

VxWorks 6.2

- Improved footprint and performance
- File System Framework and enhancements
- Power Management framework
 - Device Software Management
- Additional processor Support

Workbench 2.4

- Workbench for OCD enhancements
- Workbench for VE Platforms
- Customer ready kit for 3rd party OS integration
- SNIFF+ replacement

Middleware Components

- Updates to IPv6, wireless, security, SNMP management, incl. MLDv2/IGMPv3

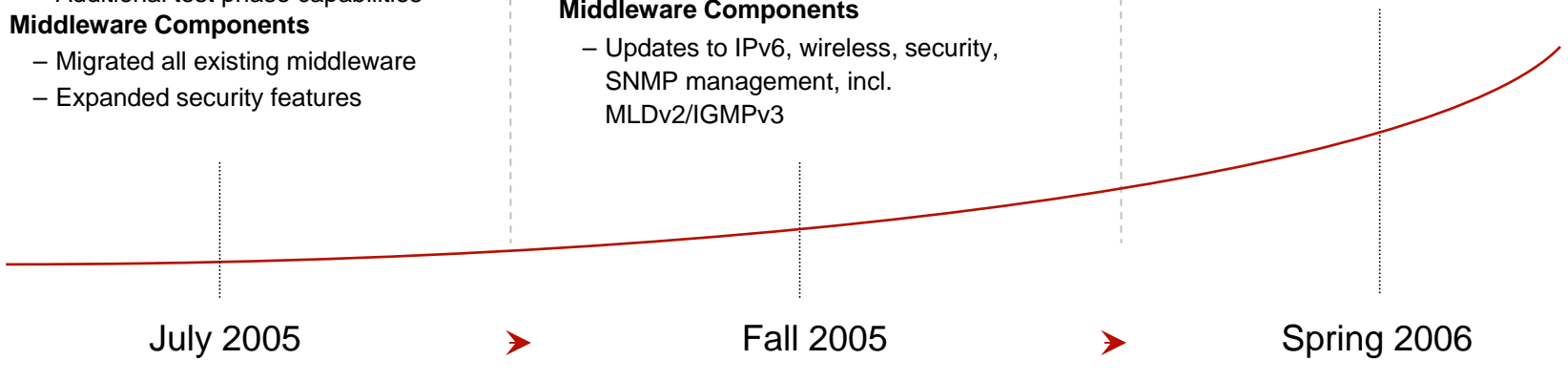
Platform AD 3.3

VxWorks 6.3

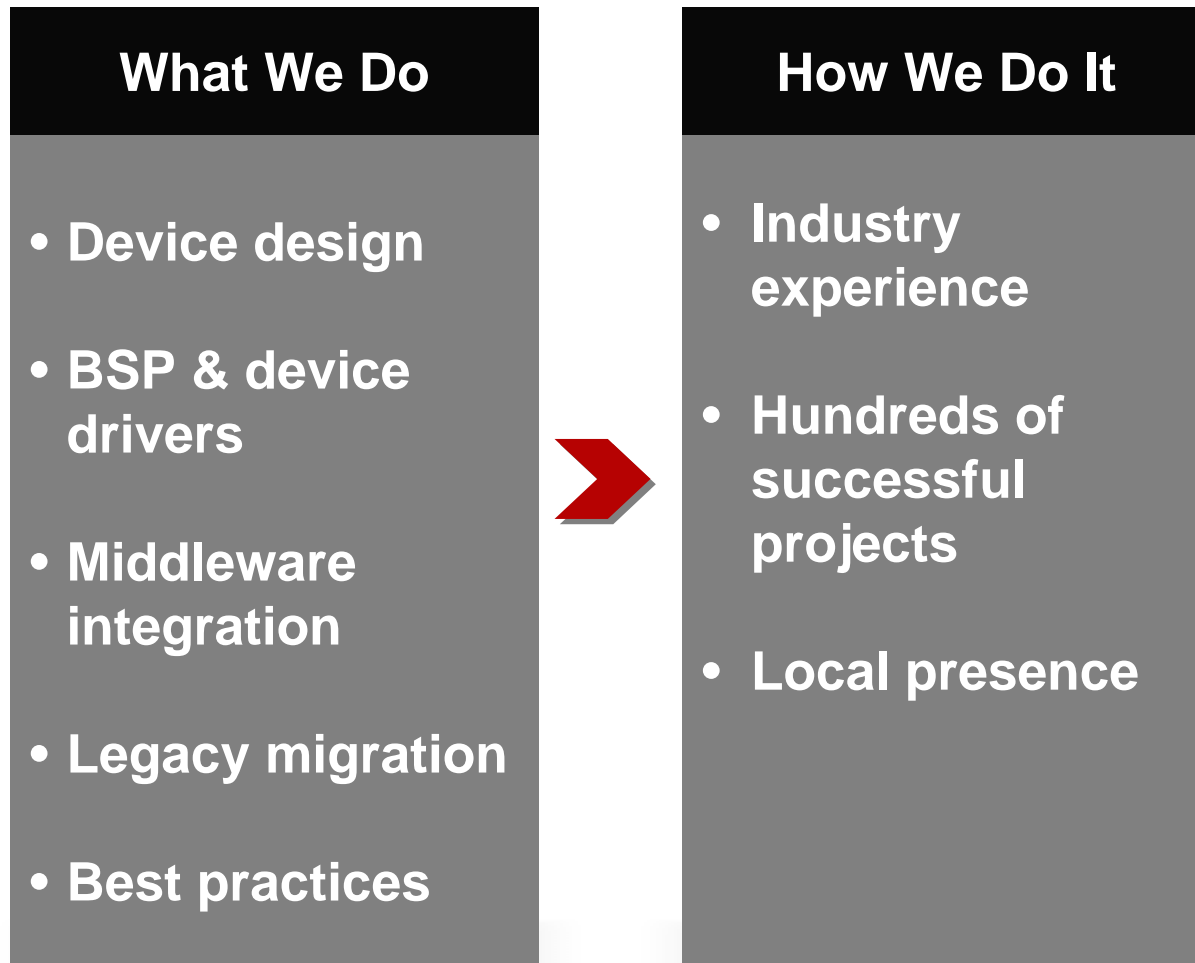
- Management Improvements
- USB On the Go
- Security Updates
- Wireless Mobile Access, new EAP methods, Protocol Updates
- Additional Hardware Support
- Partner validation kit

Workbench 2.5

- Completed debugger scripting



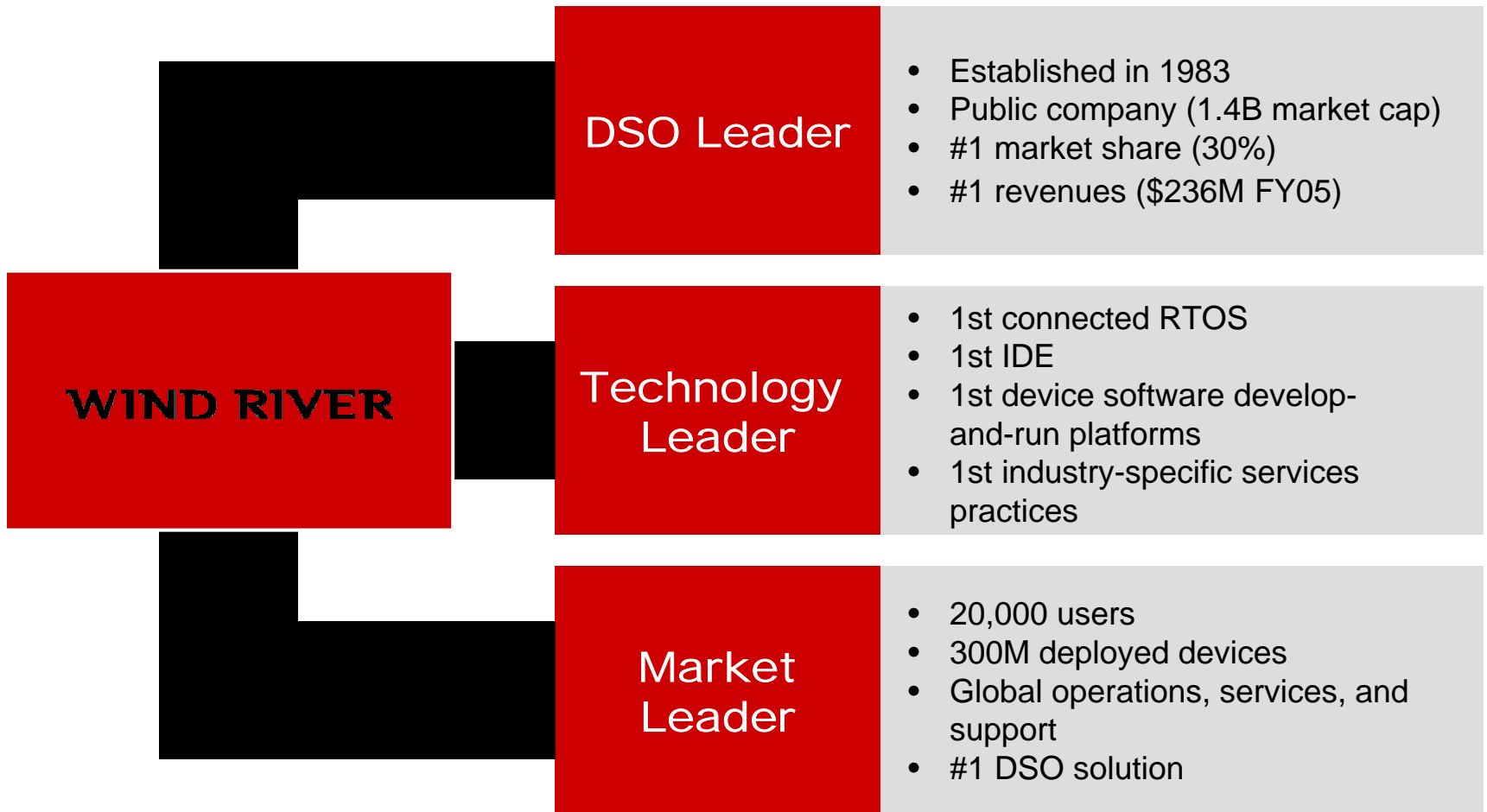
Automotive Services Practice



Wind River Automotive Initiatives

- **Automotive market is one of Wind River's five key strategic markets**
- **Strategic relationships with Freescale and Renesas in automotive**
- **Automotive Specific Platforms and Solutions**
 - Platform for Automotive Devices
 - General Purpose Platform (no middleware)
 - Workbench and Wind River Compiler
- **Wind River Automotive Services Practice**
- **Members of COMET and AutoSAR**
- **Extensive Automotive Partner Ecosystem**

Wind River Leading the DSO Industry



Summary

Wind River Automotive Platforms

Minimize the **inefficiencies** and complexities
of the device software development process

Maximize the **reliability, security, and interoperability**
of the device software production environment

Accelerate the **standardization** of device development,
release,
and **enhancement** across **multiple environments**

Device Software Optimization

Thank you.