Wireless Developer Network

Linux® Tech Zone
Freescale Partners
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Freescale and Linux

Building a mobile device presents a host of engineering challenges, including more features in smaller form factors, low power consumption and great performance for mobile multimedia and other processor-intensive tasks. Freescale can help you meet those challenges with a wide range of components for the wireless communications and mobile entertainment markets. With the most mature communications and applications software suites in the industry, Freescale delivers a comprehensive portfolio of fully integrated platforms and components for cellular, mobile consumer and converged devices.

Wireless Developer Network
Combining resources from Freescale and industry leaders, our Wireless Developer Network offers advanced, pre-integrated platforms and solutions that work out-of-the-box, accelerating your business and giving you a competitive advantage. The Freescale Wireless Developer Network is a global program designed to bring complete platforms to market that include hardware and software solutions, tools, systems integration, consulting and other services. With early access to improved tools, Freescale Wireless Developer Network members are better equipped to deliver mobile wireless solutions to a global audience in less time, with less effort and at a lower cost.

Linux Support
Freescale and our partner companies support Linux on a number of components including the i.MX family of applications processors. This brochure highlights the innovation of Freescale Wireless Developer Network partners who use Linux to strengthen each company’s portfolio.

Freescale is pioneering and perfecting the wireless technologies behind your next great design. Few companies have the legacy and experience that we do, and we continue to invent and innovate. Our strong and deep semiconductor platform portfolio leads the way with innovative solutions for cellular, mobile multimedia, infotainment and wireless connectivity.
Redefining Linux Debug

American Arium offers embedded Linux developers working with Freescale i.MX processors hardware-assisted debug solutions designed to minimize the debug process. Engineered to run on both Linux and Microsoft® Windows® hosts, Arium’s debug tools deliver first-of-their-kind features and functionality found nowhere else in the industry.

The LC-500 is American Arium’s most popular JTAG emulator for targets utilizing ARM® architecture cores. The LC-500 offers reliable run control and intuitive stepping features. It is designed for speed too, with fast file and image downloads and quick stepping through code. When coupled with SourcePoint™, Arium’s flagship debugging software, the LC-500 provides debug of Linux kernel, device driver and application source code. Offering non-intrusive debug, real-time event management, multi-threading support, and independent processor control, this Linux debug solution delivers superb visibility and manipulation of code.

Key Linux OS-aware features include:

- Full symbolic, source-level debugging of Linux kernel code
- Source-level debugging of Linux embedded applications
- Code debug on initial target bring-up immediately from board reset
- Launch of or attachment to processes with seamless transitions to and from the kernel and each process
- Dynamically loaded module debug (insmod)
- Linux shared libraries debug
- Threaded application debug support
- An intuitive Windows-like debug environment
- Specialized breakpoints to stop the execution of a process without stopping the processor or causing it to enter debug mode
- Flash programming for kernel and file system download
- Linux console hosting devices from within SourcePoint, eliminating the need for a serial port or video device on the target

Arium, a Freescale Alliance member, provides validated debug tools for Freescale i.MX21, i.MX31, i.MXL and i.MX1 applications processors. Working closely with this global leader in embedded semiconductor design and manufacture, Arium offers the LC-500MX21 development support kit for the Freescale M9328MX21ADS application development system board. The advantages of bringing up and debugging your prototype code in this kind of environment include:

- Feature-rich, validated software and hardware for a positive initial out-of-box experience on a Linux platform
- Fast and simple installation and configuration for system bring-up
- A smooth, reliable evaluation experience
- Full, source-level, seamless Linux kernel, driver and application debug in a GUI environment, including Linux and POSIX thread support
- Easy-to-read documentation that takes users through code changes and rebuild

It’s hard to compete without the right tools. American Arium debug solutions—reliable, robust and ready to use—deliver the power you want with the flexibility you need to help you launch a quality product on time and within budget. And at the end of the day, that’s what success is all about.
Certicom Security Architecture

With wide support for Linux platforms and board support packages (BSP) that expose the cryptographic functionality available in Freescale hardware, the Certicom Security Architecture (CSA) consists of a portable, modular set of software cryptographic providers and security services such as SSL, IPSec, PKI, DRM and Embedded Trust Services (ETS).

CSA components are unified by a common API that sits between the security services or applications and the cryptographic providers. The API accesses the fastest and strongest security available, whether it resides on the Freescale chipset or in the software cryptographic provider. By standardizing on a cryptographic API, manufacturers maximize portability and code re-use in products with different Freescale chipsets.

The Certicom Security Architecture includes:

- Security Builder Crypto™: Optimized for constrained environments, includes a broad range of state-of-the-art and legacy algorithms that provide proven cryptographic security.
- Security Builder GSE™: Build FIPS 140-2 validated applications without having to undergo the lengthy and costly FIPS approval process.
- Security Builder PKI: Add robust, standards-based digital certificates and key management to applications and devices, ensuring trust and non-repudiation.
- Security Builder IPSec: Build applications to provide standards-based VPN access into constrained devices with a high-performance client-side virtual private network module. Ideal for application vendors who need IPsec for secure transport, VoIP vendors who want to secure communications, device manufacturers who want to create IPsec-based VPN for constrained devices, and advanced network applications such as UMA or IMS.
- Security Builder SSL: Optimized for a variety of environments including constrained devices and wireless applications, Security Builder SSL adds complete SSL or TLS to Internet communications—an ideal way to offload intensive cryptographic functions to Freescale hardware accelerators and to enable secure communications between popular browsers on handhelds and mission-critical applications.
- Security Builder ETS: An embedded trust services module that offers secure key storage, key management, and authentication services and provides the basis for a variety of trust services such as secure boot, code signing, authentication and anti-cloning.

As a proven technology that has been widely deployed on Linux-based applications and devices, CSA works with Freescale’s i.MX applications processors to provide robust security for digital rights management, cellular, sensors and wireless connectivity solutions.

As close partners, Certicom and Freescale collaborate to optimize the integration of our technology and deliver leading-edge solutions that meet customer requirements.
Logic Product Development

Product-ready i.MX embedded computing modules

Your intellectual property, plus Logic’s products and services, give you an accelerated market launch. We fast forward product design, engineering and manufacturing with affordable, easy-to-use development kits and product-ready system on modules. By providing tools that let engineers begin writing software immediately, Logic helps your company stay focused on its high-value core technologies.

Logic has been helping fast forward thinking in product development for over forty years. We integrate user research and advanced technologies to deliver innovative, cost-effective solutions for high-performance products and industries. By providing a single point of contact from concept to fulfillment, we’re helping clients realize greater efficiencies and see a return on investment from their new products ahead of schedule.

Logic’s System on Module moves you from development kit to final product—easily, efficiently and without redesign.

The development kit simplifies:

• Application-specific software development
• Evaluation of the processor and SOM
• Transfer of application software to production
• GUI development with optional Display Kit

Logic’s line of product-ready SOMs are complete with:

• Common footprint for easy migration to next generation Freescale microprocessors
• Linux Software Board Support Packages available from Wind River and the open source community
• Bootloader that provides in-field device management, manufacturing and test capabilities

Custom baseboards and peripheral boards provide:

• Power
• Connectors
• Custom peripherals
• Custom form factor

To learn more about Logic’s low-cost i.MX31 platforms, visit www.logicpd.com.
Microcross GX-Linux™ for i.MX Platforms

Open-Source, Ready-to-Run™

Microcross GX-Linux™ platforms are making embedded Linux easier to develop than ever before. GX-Linux features a complete embedded Linux development platform for many of Freescale’s i.MX microprocessors.

Microcross offers two platform solutions geared to almost anyone’s budget and needs: Enterprise and Professional editions. Above all competing solutions, GX-Linux offers structure and uniformity, flexibility to modify and a guarantee to build out-of-the-box and run on the target board.

In addition to a great product, Microcross offers world-class technical support from seasoned embedded engineers with real-world application experience.

Features

- GNU X-Tools Toolsuite with Visual GDB debugger and GDB Server
- Visual X-Tools™ IDE
- Linux v2.6.16 or newer BSP
- uClibc shared and static library for Professional edition and glibc with stdc++ for the Enterprise edition
- ROM or remote NFS file system
- BusyBox utilities
- Excellent documentation
- Linux drivers:
  - I²C
  - TCP/Ethernet
  - Serial I/O
  - Video
  - USB host
  - Audio
  - SD/MMC
  - Touch screen

Why Microcross?

As Freescale’s Wireless Developer Network Partner of the Year in 2006, Microcross has proven itself in customer satisfaction by providing joint Freescale and Microcross solutions for i.MX applications processor platforms, including the i.MXL and i.MX21 LiteKits and i.MX21 ADS/ADSE boards, as target development systems. Microcross’ tools have been tested and validated independently by Synchromesh Computing, and its Linux solutions by tier-one customers embedding their applications on GX-Linux and Freescale i.MX microprocessors.

Customer satisfaction is job priority one at Microcross, and we enjoy more repeat business than the competition. We listen to the customer and create solutions that make a compelling business model for the price and quality of service. Freescale has been a leader in the embedded market space longer than any of their competition, and Microcross will continue to place its loyalty and focus on a strategic partnership that is business win, win, win—customer, Freescale and Microcross.

Future editions of GX-Linux are planned to support the i.MX31 and i.MX27 target platforms. Microcross’ core competencies span from open-source GNU tools to development of onboard Linux drivers and boot ROM support.

To learn more about Microcross and its solutions, please visit or contact us:

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Freescale Wireless and MontaVista Software

Laying the foundation for next-generation devices
As the daily use of mobile phones and other wireless devices continues to increase at an exponential rate, the demand for innovative new multimedia features and services to further monetize these platforms has dramatically increased as well. Wireless devices such as cellular phones, portable media players (PMP), personal data assistants (PDA) and other handheld devices are continually pushing the envelope of software and multimedia complexity within a resource constrained environment. The intensive software requirements driven by these new feature sets have heightened the need for a powerful operating system and semiconductor platform combination that can lay the groundwork for innovation at the application layer. MontaVista Linux delivers the foundation modern device manufacturers need to build differentiated and cost-effective designs.

Mobilinux: The First Optimized Linux Platform for Mobile Devices
Through its Mobilinux edition operating system platform, MontaVista Software is at the forefront of addressing the key areas of development for mobile and wireless devices. The successful deployment of open source software into the market has been predicated on MontaVista's strong relationship with the open source community. MontaVista leads numerous open source projects and holds over 600 copyrights in the Linux kernel source code, which is second only to IBM. MontaVista is directly responsible for delivering key technical requirements into the open source community that have enabled the adaptation of Linux for resource constrained devices that need to run cutting edge multimedia applications. These advancements include:

• Accelerated Boot Time: Responsive user experience is a mandate for mobile devices. For example, users can place a call within 10 seconds from “power on” which is more than 2x faster than other comparable open OS platforms.
• Dynamic Power Management (DPM): Mobilinux includes comprehensive power management infrastructure to address minimum “talk time” and “stand by” requirements to help maximize the use of available power resources. DPM enabled device drivers provide fine grained control over the power usage of individual components, while the MontaVista Power Manager controls overall output and performance.
• Fully Preemptive Kernel: Developments out in the Linux community, initiated by MontaVista, have resulted in dramatically improved response time. These improvements have enabled optimized versions of the platform to meet the hard real-time requirements while also delivering rich application capabilities.
• Memory Architecture Optimization: MontaVista has dramatically reduced the footprint of the Linux operating system thus optimizing it for maximum performance.

The MontaVista and Freescale Advantage
MontaVista's Mobilinux combines the perfect blend of performance, features and low power sensitivity to enable OEMs to significantly reduce the overall cost and time-to-market of cutting edge wireless devices.
Build Your Own Linux Distribution with LinuxLink

LinuxLink by TimeSys is a continuously updated, Web-based resource for embedded Linux development with several different subscription levels available to match your project requirements. With LinuxLink, you get everything you need to quickly build a customized Linux platform. LinuxLink subscriptions include access to:

- **Processors**: We offer comprehensive LinuxLink subscriptions for dozens of Freescale processors, including the i.MX21 and i.MX31.
- **Kernels**: A LinuxLink subscription includes the latest kernel optimized for your processor.
- **Toolchains**: Several toolchains are included, allowing you to build your own Linux distribution.
- **Packages**: Hundreds of cross-compiled packages are available with each LinuxLink.

The LinuxLink Advantage

LinuxLink subscriptions provide much more than simply access to code. With LinuxLink, you get:

- **Support**: We support the developer, not just a distribution. Interact directly with TimeSys engineers for help with your project.
- **Education**: Hundreds of documents are available to help you improve your embedded Linux development skills.
- **Simplicity**: Develop your Linux applications and root file system in TimeStorm, an easy-to-use graphical Integrated Development Environment (IDE).
- **Flexibility**: Customize your Linux platform to build the distribution that is right for you.
- **Choice**: Access to continuously-updated code means that you can choose when you want to add the latest update from the open source community into your project, rather than wait for a commercial distribution to catch up.
- **Freedom**: Avoid lock-in by proprietary products and vendor-built distributions.

With LinuxLink, customers typically accelerate their development cycle by 40 to 90 percent, depending on the project, significantly reducing time to market.

Freescale and TimeSys

Freescale and TimeSys enjoy a close partnership designed to benefit embedded Linux developers. The companies collaborate to ensure that customers using Freescale processors have access to the latest technology from Linux and the general open source community. “LinuxLink subscriptions deliver the latest Freescale Linux optimizations to developers in a commercially-supported resource that evolves with the rapid pace of open source development,” said Monica Hamilton, director of the Wireless Developer Network at Freescale Semiconductor. “LinuxLink provides developers creating their own Linux platform with a range of resources optimized for their Freescale processor of choice.”

Visit www.timesys.com/products to learn more about LinuxLink and try the service for yourself.
VeriCall Edge™: A High-Fidelity Voice- + Video-over-IP Platform

Embedded voice- and video-over-IP (V2IP) software for the i.MX family of processors

The challenge for consumer electronics manufacturers is to rapidly deliver high-quality and feature-rich devices at price points that support mass markets. OEMs designing voice/video phones and other IP-enabled communication devices turn to Trinity Convergence for its comprehensive voice- and video-over-IP (V2IP) embedded software solutions.

VeriCall Edge software provides a comprehensive “end-point” solution that supports converged voice and video over IP services.

It runs natively on a variety of embedded Linux distributions from companies such as MontaVista and Timesys. As a result, OEMs and ODMs can rapidly develop and deploy new products by leveraging the robust development environments for embedded Linux, in conjunction with the complete V2IP platform provided in VeriCall Edge.

VeriCall Edge software is already ported to a variety of processors in the Freescale i.MX family (i.MXL, i.MX21, i.MX21s, i.MX27 and i.MX31), enabling OEMs to accelerate product development and cost-effectively bring new IP-enabled products to market.

The VeriCall Edge platform supports advanced features including H.264 video and high-fidelity (wideband) audio. VeriCall Edge software integrates a highly interoperable SIP stack and all of the media processing, packet handling and network services required to build consumer-ready VoIP and V2IP devices quickly.

Target Devices and Applications
- VoIP Phones
- Voice over Wi-Fi Handsets
- Video Phones
- Dual-Mode Handsets (cellular + Wi-Fi)
- Personal Communication Devices

Benefits of VeriCall Edge software:
- Streamlines product development cycles
- Accelerates product delivery and time to market
- Extensive network and device interoperability testing ensures reliability/service
- Allows OEMs to standardize on a single VoIP software platform

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Qtopia®—One Platform. No Limits.

Qtopia by Trolltech® is unrivaled as the application platform and user interface for Linux, allowing efficient creation of graphical user interfaces (GUI) for Freescale processors running embedded Linux. The Qtopia 4 Series is the latest generation of Trolltech’s Qtopia product family, and provides a robust and proven development environment, which consists of Qtopia Core, Qtopia Platform and Qtopia Phone Edition. Qtopia Phone Edition is a comprehensive application platform for Linux-based mobile phones, including integrated video, phone, VoIP capabilities and a number of other applications that run on Freescale’s i.MX21 and i.MX31 platforms.

Qtopia is optimized for constrained memory and power, and it includes its own windowing system to minimize footprint. Qtopia is successfully working in a wide range of products including wireless phones, PDAs, media players and other consumer electronic devices as well as automotive, medical and industrial electronic equipment.

Qtopia 4 Series

- Qtopia Core provides the foundation for the entire Qtopia product family. It is the leading application framework for single-application devices powered by embedded Linux.
- Qtopia Platform, built upon Qtopia Core, enables the productive creation of Linux devices with a rich multi-application user experience. It is designed to benefit from the highly optimized and memory efficient capabilities of embedded Linux.
- Qtopia Phone Edition is a comprehensive application platform and user interface for Linux-based mobile phones. It is enhanced with pre-integrated applications allowing manufacturers and designers to build feature-packed phones.

Qtopia Greenphone™ is a Linux mobile development device open for unlimited software innovation. Offered as part of the Greenphone SDK, it makes Linux-based applications easier to build and faster to bring to market. This powerful GSM/GPRS device provides the perfect platform for creation, testing and demonstration of new mobile technology services and ships loaded with Qtopia Phone Edition.

Continuous and Efficient Innovation

Qtopia’s rich toolkit, intuitive API and comprehensive documentation reduce time to market. With Qtopia and Linux, development accelerates across device types.

Freedom to Customize

With full source code and documentation available, developers can easily modify Qtopia and integrate other technologies to create distinctive devices.

Proven Technology

Qtopia inherits the proven strengths of Qt, Trolltech’s industry-leading cross-platform application framework. Qtopia is the preferred application development platform for embedded Linux devices.
Wind River Linux Solutions: Platform for Consumer Devices—for Freescale Wireless

Wind River Platform for Consumer Devices, Linux Edition, is a commercial-grade Linux solution for the development and deployment of software for mobile handhelds, home entertainment devices, digital video devices and automotive and infotainment systems. The platform contains a fully tested and validated distribution based on Linux 2.6 kernel technology, the Eclipse-based Wind River Workbench development suite, customer education, 24/7 global technical support and specialized professional services.

The platform is an ideal fit for customers who need special Linux capabilities for memory-constrained, high-performance devices. It is optimized for small footprint, but contains all the necessary Linux capabilities developers require, as well as support for leading next-generation processors and reference boards.

Commercial-Grade Linux Technology
At the core of Platform for Consumer Devices is the kernel.org Linux 2.6 kernel implementation, with integrated patches and packages for enhanced networking and security requirements. Wind River’s “pristine-source” distribution guarantees maximum visibility, allowing you to see exactly which patches and packages have been included, in addition to easily incorporating new ones as they become available through the Linux community. The platform's distribution also provides a unique, intuitive build system that makes it simple to install and modify the kernel and root file system.

Integrated and Validated Run-Time Technologies
All components of Platform for Consumer Devices, including the kernel, integrated patches and packages, Wind River Workbench, and supported hardware architectures and boards, have been exhaustively tested and validated. In addition to our Linux test harnesses, we have performed extensive use-case validation to ensure the platform is optimized for common device applications.

Optimized Development Suite
Platform for Consumer Devices includes the industry-leading Wind River Workbench development suite, which offers deep capability across the development process in a single environment, with complete platform integration and powerful tools for debugging, code analysis and test. Based on the Eclipse framework, Workbench can be extended through in-house, third-party, open-source and commercial plug-ins. Its support for multiple OSs, architectures, and programming languages allows unprecedented enterprise-wide flexibility.

Advanced On-Chip Debugging (JTAG)
Wind River's advanced on-chip debugging solution simplifies the hardware development process and seamlessly integrates hardware, firmware and software debugging. Based on industry standards (Eclipse) and patent-pending hardware diagnostic capabilities, Wind River on-chip debugging combines hardware debugging with an end-to-end development suite to reduce costs and complexity.

Global Services and Support
Platform for Consumer Devices includes full access to Wind River worldwide 24/7 product support. Customers can use the education credits included with the platform to bring engineering teams up to speed on the latest DSO technologies and tools. Wind River also offers a Linux Services Practice—our team of engineers has wide-ranging experience delivering design, integration and optimization services tailored to the needs of the open-source community.