Innovating, Integrating, and Improving the Next Generation of Mobile and Multimedia Devices

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Agenda

What We Do

Trends in Smartphone Market and Mobile Software

Challenges for Linux in Mobile

Enabling the Developer Community
Texas Instruments and Linux
Texas Instruments wireless overview

We build chipsets and provide system solutions that enable device manufacturers to build mobile phones.

TI delivers broad product portfolio

- Radio Frequency
- Bluetooth®
- Wireless LAN
- GPS
- 2G, 2.5G and 3G modem
- OMAP™ Application Processor
- Power Mgmt.
- Display
- Speaker
- Microphone
- Camera
- Battery
Texas Instruments wireless overview

TI delivers broad product portfolio

Proven and widely adopted technology
- 18+ years wireless experience
- OMAP is the market leading application processor –
  - 3rd generation technology shipping today
  - Hundreds of millions of units sold
- 5 of top 5 OEMs chose TI Bluetooth®
- #1 WLAN technology in cellular market
OMAP system-on-chip architecture
Texas Instruments and Linux in Mobile

- TI has delivered OMAP™ platform-based Linux solutions since 2001
- More than 15 million Linux smartphone & mobile products are enabled by TI OMAP processors
- TI offers open source BSP & multimedia solutions and collaborates with Linux OS vendors to provide commercial Linux products
Trends affecting Linux in Mobile and Multimedia Devices
Smartphones see strong market growth

Worldwide Converged Mobile Device Shipments “Smartphones”

Smartphones in 2011 ~ 21% of global mobile phone shipments


Texas Instruments
Linux in mobile expected to continue growth

- Expecting growth in both total size of Smartphone market and Linux share

Source: Strategy Analytics, April 2008
Ease of use drives an increase in consumer usage

Intuitive interfaces increase user interaction

Huge growth opportunity!

Source: M:Metrics, 2008
Trends in mobile software development

Handset manufacturers demand complete software solutions
- Reduces software system cost and complexity
- Supports differentiation

Easy access to hardware acceleration is a requirement
- Multimedia acceleration not just for the high-end – needed across multiple markets

Collaboration groups creating open software solutions
- Speeds development time when leveraging common platform
- Supports scalability and software reuse, reducing costs
- Standards bodies and foundations
Khronos® standards ecosystem

The Khronos embedded media acceleration APIs attempt to provide a flexible interface to Hardware Accelerators on mobile and multimedia devices.

Embedded Media Acceleration APIs

“DirectX-like” set of native APIs
Includes mixed media acceleration and OS portability APIs
Adoption of multimedia open standards

- OpenGL ES 1.1 is widespread
- OpenVG is in adoption ramp
- OpenMAX is in adoption ramp

Mid-2004
OpenGL ES 1.1 Spec release
Mid-2005
OpenVG 1.0 Spec release
Beginning-2006
OpenMax IL 1.0 Spec release
OMAP™ Platform Software Stack

Legend:
- 3rd Party
- Texas Instruments
- Hardware Component
OpenMAX IL example graph

- Standardized component interfaces enable flexible media graphs
- Includes multi-stream synchronization
- Allows for custom plug-ins

Example: MPEG-4 video synchronized with AAC audio decode
Some challenges for Linux in mobile

• Difficult to achieve full processor entitlement on production mobile Linux devices
  – Desktop and Laptop focused software solutions are trailing behind mobile hardware in some key areas
    • Aggressive power management architectures
    • Web cam frameworks are repurposed for digital camera
  – Khronos’ open standards are not yet widely supported by existing Linux-based multimedia frameworks

• True collaborative development is not (yet) wide spread across mobile industry

• Must be able to support multiple application suites
  – Market is large enough for multiple solutions
Improving access to hardware acceleration

- Provide developers with a realistic low-cost system for development and validation
  - Logic PD’s Zoom Mobile Development Kit, based on TI’s OMAP3430 Processor
- Make OpenMAX IL and OpenGL® ES libraries available to enable integration and UI innovation
- Promote collaboration on new solutions enabled by current-generation mobile hardware
  - 3D Graphics
  - Multimedia Accelerators
  - Telephony
  - Application UI Integration
  - Camera and Camcorder Applications
  - Gaming Development
What is available today for the Zoom MDK?

• OMAP3430 processor technical reference manuals
• Zoom MDK and Beagle Board hardware platforms are available through distributors
• OpenMAX IL library released under LGPL (v2.1)
  – An evaluation package for testing MPEG4 H264 and AAC codecs are also available
• Linux kernel git tree with latest developmental support for OMAP platform
  – Aggregation of patches we are working to push upstream
  – Enhanced power management

• Software and more details are on http://omapzoom.org

• Feedback is welcome for future releases
Summary

Growth of Smartphones is driving need for multimedia rich mobile experiences

Additional native support for mobile centric solutions is needed within Linux frameworks

TI is openly providing the resources needed to innovate with Linux for mobile
THANK YOU!

Visit opensource.ti.com and omapzoom.org for more information