How Linux® Will Drive Technology Convergence: An Embedded Story

LinuxWorld Beijing Keynote
18 August 2005
Agenda

• Who is Freescale? A brief introduction

• Linux in embedded markets
  ▪ On mobile platforms
  ▪ On the PowerPC® architecture

• Technology convergence and Linux…the equalizer

• China: Re-envisioning computing and communications

• Conclusion
Who Is Freescale Semiconductor

• Semiconductor design and manufacturing company established in 1953
• Focused on the networking, automotive, wireless communications, industrial control and consumer electronics markets
• Engaged with 10,000+ customers globally; over 100 of the top electronic manufacturers
• $5.7 billion in revenue in 2004
• Headquartered in Austin, Texas
• 22,000 employees in over 30 countries
Operating Around the World

**World Headquarters**
- Ed Bluestein, Austin
- Oak Hill, Austin
- Chandler, Arizona
- Tempe, Arizona
- 9,500 employees
- 4 factories

**Americas**
- 4,600 employees
- 3 factories
  - Toulouse, France
  - East Kilbride, Scotland
  - Crolles2 Alliance, France
- 8 design centers

**EMEA**
- 8,100 employees
- 3 factories
  - Sendai, Japan
  - KLM, Malaysia
  - Tianjin, China
- 9 design centers

**Asia Pacific/Japan**
- 8,100 employees
- 3 factories
  - Sendai, Japan
  - KLM, Malaysia
  - Tianjin, China
- 9 design centers
**Examples of embedded Linux:**
- Carrier-Grade Linux
- Automotive-Grade Linux
- uClinux

**Benefits for embedded systems:**
- Cost-effective
- Streamlined code base
- Network-friendly
- Flexible
- Hardware agnostic
- Developer control

Source: Venture Development Corporation
Linux on Mobile Platforms

- **The Challenge:** Differentiating services while lowering costs

- What’s driving Linux growth in mobile platforms:
  - Customization of platforms and feature scaling...
    - GPS navigation
    - music playback
    - imaging
    - gaming
    - e-mail
    - V2IP
Linux on Mobile Platforms

- The Challenge: Differentiating services while lowering costs

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Smartphones plus Linux, the future is here
Freescale Mobile Multimedia Solutions

• **Mobile Extreme Convergence (MXC) platforms**
  - True Single core modem approach
  - Baseband, RF, PA, PM, memory in a postage stamp
  - Reduced cost, complexity, size and power consumption

• **i.MX multimedia applications processors**
  - Smart speed – low power consumption with MHz performance to spare
  - High degree of integration reduces design time

With MXC, high-performance mass-market mobile devices can be developed affordably on a platform the size of a postage stamp.
Linux on the PowerPC™ Architecture

• The Challenge: Increasing compute density without increasing cost and power

• What’s driving Linux growth on the PowerPC platform:
  ▪ home media
  ▪ web servers
  ▪ infrastructure capacity
  ▪ cluster computing
  ▪ automotive infotainment
Freescale PowerPC™ Solutions

- **PowerPC Microcontrollers**
  - For automotive and industrial applications

- **PowerQUICC™ I, II, and III Communications Processors**
  - On-chip integration of high-speed interfaces, network acceleration, security
  - SOHO, enterprise, wired and wireless infrastructure + storage, industrial, print/imaging

- **High-Performance PowerPC Processors**
  - Dual core processor on roadmap
  - Networking + home media, commercial robotics, blade servers, printers, gaming
Converging Technologies

Home PCs

Home media

Communications infrastructure

Servers

Mobile devices

Automotive Infotainment
Converging Technologies

Linux
the equalizer

Home PCs
Communications infrastructure

Home media

Servers

Mobile devices

Automotive Infotainment

LinuxWorld Beijing 2005 Keynote, Slide 12
Home Media Center

MPC7448

System Controller

DIMM

DDR/DDR2

Local bus

GigE

Flash

PHY

MPX Bus

PCI/PCI-X

South Bridge

IEEE 1394

IDE/SATA HDD

USB 2.0

IrDA

Slot

TV Module Expansion

Graphics

Video

TV
Home Media Center

- **Browser & E-mail**
- **DVD/VCD Movies**
- **Games**
- **Photo Album**
- **Personal Video Recorder**
- **Voice/Video Phone**
- **Connectivity / Router (UWB, WLAN, Ethernet...)**

- **MPC7448**
  - System Controller
  - DDR/DDR2
  - DIMM
  - Flash
  - PHY
  - Local bus
  - GigE

- **South Bridge**
  - IEEE 1394
  - IDE/SATA HDD
  - USB 2.0
  - IrDA
  - Slot
  - TV Module Expansion
China's top 50 OEMs outperform the market in 2004 with a 23% year-on-year increase in sales.

Source: iSuppli Corp. February 2005
Enabling a Connected World