Porting Android to x86 MID: A BSD User's Wondering into Linux

Koan-Sin Tan

Aug 16, 2009

My Background

- Learned to use Unix on a VAX-11/780 running 4.3BSD around 1989
- Kinda familiar with various Unixes such as SunOS 4.x, Solaris, HP-UX, Sequent Dynix
- Used 386BSD and its derivatives (NetBSD and FreeBSD) on my own machines
- Bought my first Apple laptop in 2001
- Not a typical Linux user/developer

Shut the fuck up
and write some code.

Shut the fuck up and write some code

Too many interesting things

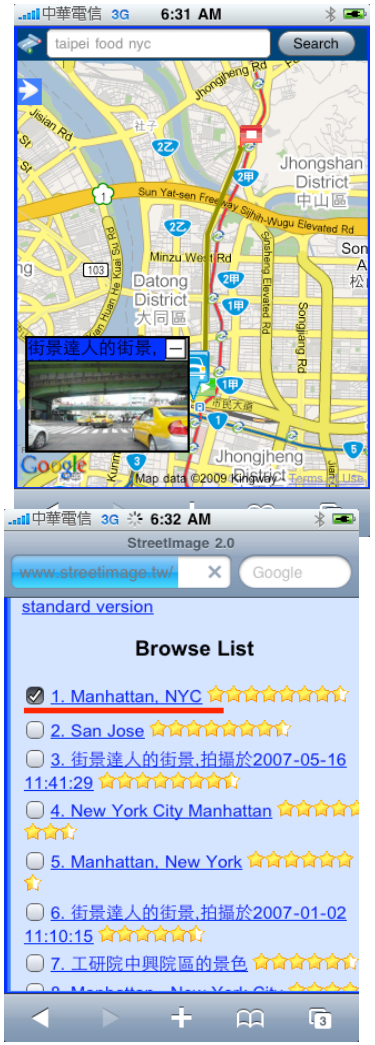
Outline

- Motivation
- Introduction of the Gigabyte M528: hardware spec and the software came with it
- Details of what problems I encountered and how did get stocked or solve them
- My 2 cents on what Android can do beyond cell phones and netbooks

Motivation

- We started building yet another web service last. And we wanna run it on some cool new phones such as iPhone and G1
- http://streetimage.tw/

Mobile Web Version



- We tried it on G1 and iPhone last year
  - Desktop version somewhat cluttered on phones with 320x480 pixels
- Mobile Web version
  - Boom!!
  - memory management problem of WebKit?
- Solutions
  - native application
  - Android on x86
    - From *Dima Zavin* of Google Dec, 2008

廣告

- http://www.streetimage.tw/ is open for public testing
- Mobile Client
  - Android App: ‘StreetImage’ on Android Market
  - iPhone App: ‘iStreetImage’ on App Store

Gigabyte M528

- Also known as, Compal Jax 10, Aigo MID P8880
- HW:
  - Processor:
    - Intel Atom Z500
      - FSB: 400 MH
      - zCore speed: 600 - 800 MHz
      - L1I cache:
        - 32K
      - D cache: 24K
    - L2 cache: 512K
  - Chipset: Poulsbo (SCH)
  - DRAM: 512 MiB
  - SSD: 2x2GB Intel SSD

Gigabyte M528

- Networking
  - WLAN: Marvel 88W8686 (SDIO)
  - 3G: Option's HSDPA/EDGE/GPRS module
  - Bluetooth
- Touch screen
  - touch screen controller: IdeaCom UTS6680
- Camera
- GPS

Old demo video clip here

http://www.youtube.com/watch?v=3znRGXUW_uI

Old demo video clip here

http://www.youtube.com/watch?v=3znRGXUW_uI

Boot up

- This is x86, we have BIOS, no boot loader troubles, that's great
- Started with Dima's compiled kernel
  - failed to boot
  - Kernel Configuration
    - Dima's released 2.6.25 kernel binary and kernel.config
    - The master $ANDROID_SRC/kernel is 2.6.27-based
    - Still failed
  - Stocked, went to something more interesting
  - Several weeks later… hey, maybe Moblin guy or Ubuntu guys had solution
  - Stole Poulsbo patches from Moblin 1, oh, yeah, it rocks

Display

- Display
  - Arrgh, Poulsbo driver is bloody messy
  - Stayed with VESA driver first, that's not my first priority
  - Two month ago, I found Ubuntu MID ported Moblin Poulsbo GMA500 driver to newer kernel
    - but there is no panning support which is required by Android
    - Maybe try it later, or work on it laster

Keyboard

- That's easy part, it almost works
- However
  - the keycode of the ENTER key is 96, which means we need add 'key 96 ENTER' to 'AT_Translated_Set_2_keyboard.kl'
  - we also need to map some key to be the "back button"

WLAN

- We need network
  - To connect to the internet
  - To run "adb shell" to debug
- How to make it work
  - libertas_sdio in Android 2.6.27 kernel doesn't work
    - loaded without problem, but when I tried 'iwconfig eth0 essid xxxx', the system just hung there
  - After several failed trials
    - Porting Moblin's modified Marvell 8688_a2 driver to the 2.6.27 kernel works

What remained to be done

- WCDMA/HSDPA modem
  - Kernel "Option" module
  - AT commands work
- GPS
  - minicom can see outputs
- Touch screen
  - The controller is attached PS/2 aux port
  - Snooping /dev/psaux and /dev/serio.... of running closed source Ubuntu driver
  - Proprietary (?) 5-byte format
    - The first byte indicates the status of buttons;
    - the second and third bytes reportY position;
    - the fourth and fifth bytes tell X position.
- Volume buttons, camera button, and smartkey:
  - It seems that they are controlled by the ACPI embedded controller

What I learned so far

- I like MID. I mean, I like seeing something between Notebook/netbook and cell phone getting popular, but is it gonna fly?
- Ubuntu guys and Moblin guys did some amazing work we can borrow some times
- Sync personal hobby effort with a group like android-x86.org is necessary

Android beyond Netbook and cell phone

- MID, or any other portable devices with larger screen
- Non-portable embedded devices
  - E.g., GUI and applications for NAS
- Android application running on x86, or say, everywhere
  - A Dalvik VM instance per Android application
  - Move an application to another Android machine means doing something like suspending your running vmware/xen image and resuming it on other machine

Thanks for you attention!