

Linux Graphics For Small Devices

Tiago Vignatti
vignatti@freedesktop.org
tiago.vignatti@nokia.com



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DISCLAIMER: The opinions expressed herein are my own personal opinions and do not represent my employer's view in any way.



Who's playing?

Platforms running Linux kernel*

big players: Nokia/Intel (MeeGo), Google (Android), HP/Palm (webOS)

others coming: LiMo Foundation, Samsung (Bada), Linaro, Openmoko, etc.

**** people complain about some platforms not being Linux (e.g. Android) as in the normal usage of the word (Linux + whole userspace ecosystem).***



Who's playing?

CPU

ARM (70%)

It's all about battery's life

Coming

Intel Atom-based

Motorola M-Core

ARM Cortex A9 (2Ghz)



Who's playing?

3D (and 2D) chipsets

SGX

Samsung, Texas Instruments, Nokia

(Other non linux: HTC, DEC, Sony, Apple's)

“can push up to 28 million triangles per second”

Coming

NVIDIA Tegra Two

what else?



Which Platform I choose?

Phone-centric Vs Mobile computing



Phone-centric (1/2)

webOS

"On(ly) February, 2010, Adobe demonstrated a Flash Player for webOS"

Android

usually small screens, 3 MP camera (terrible quality), google-centric, etc.

unable to drive high res (320x480 on G1)

G1: no VKB, no multitouch (MT), no flash (and video?!), google-centric, no PC ↔ phone synching

Bada

"the Wave is powered by Samsung's Hummingbird CPU (S5PC110), which includes 1GHz ARM Cortex-8 CPU" → allows one Bada application at a time! :(

something is coming: E17



then... drive me!!!



Mobile Computing

***Sorry, I'm old fashion, I'd go for 80's:
X11 together with QT + EGL: MeeGo***

multitask*, true browser, flashplayer, multi-touch, support a very high resolution, etc....

very close from a regular Linux desktop

****iPhone iOS 4, iPad cry! They CANNOT multitask
(switch applications)***



Phone-centric Vs Mobile computing

obscure GUI systems Vs X11 based (FOSS)?



X11 Vs. All (1/2)

Xorg is the X.Org's X11 sample server

Xorg is going well, thanks

memory footprint shrinking: ~ 4.3 MB of RSS

true modularization: chopping off Xorg in pieces that interest for small devices

development process now works

wannabe devs can play: it's open-source (MIT)

unix-like distributions help with development

stills exist a lot of X11 apps

“run arbitrary Linux-based X11 apps on our phones – OpenOffice, etc”



X11 Vs. All (2/2)

All (aka not-Xorg)

they use not mainstream things

obscure (if not closed)

not fully featured (phone-centric):

lacking external monitor, MT, HD, \$YOU_NAME_IT

**** people have been porting those to X11!***



yeah yeah yeah, X11 sucks, I know...



MeeGo is not perfect (1/3)

X role bulk: buffer management (DRI2), input device and user interaction (Xi and event handling)

X is undersused nowadays: ~15 % of the core protocol is used in MeeGo

(BTW, STOP TO BLAME X FOR POOR PERFORMANCE. X BASICALLY DOES **NOT** RENDER ANYMORE IN MEEGO. HINT: BLAME DRIVERS!)



MeeGo is not perfect (2/3)

X upstream development arm-wrestling

I want one single purpose Xorg

mostly want general purpose Xorg

results in a build configuration disaster, hard maintenance, etc.



MeeGo is not perfect (3/3)

QT graphics system

native (XRender), raster or OpenGLES?

CPU or GPU? 1.0 Ghz CPU often produces better results than accelerated hw. Fail!

"composite with software or with OpenGL". Sigh.
some GPU is claimed to run 1600 threads; CPU 8
or so. Sigh.

NEON (equivalent of MMX/SSE) optimizations



Can we do better?



A: maybe! (1/2)

Wayland? QT only (Qt/Embedded: whaz te namef dat?)?

too much focus on rendering only

what about: multi-touch (Xi), keyboard mapping (xkb), configuration and device hotplug (RandR), ...

not ready to go for for any product

wayland needs GEM/TTM buffers

Intel and AMD only



A: maybe! (2/2)

bump the protocol version and, hurray, come with X12?

X11 mandatory extensions: XKB, Xi, RandR, DRI2, composite, Xfixes, Damage

Provide mechanism rather than policy:
compositor and display manager in the same side is a no-no.

distros won't like it due old compat preservation:
may not run X clients remotely, old chipsets, etc.



As a side note

DirectFB: DEAD.

Kdrive (Tiny-X): DEAD.

Gnome, KDE:

who uses *only* one of those nowadays?

VLC, mplayer, multimedia codecs, camera
working by default, skype-like?

</rant> :)



FOSS?

can I develop on Linux Mobile?

MeeGo's open-source: YES

...well, almost → driver mess

developers want opensource and companies not
compositor, and a few other apps which are being
released slowly

Closing Remarks

Who's doing right? Which device I want buy now? Or which SDK is trendy for development?

A: hard to say - blond or brunettes?

A2: phone only? pad? full desktop? automotive and avionics? advanced digital TVs, and game consoles? It depends.

I bet in X11 with true Linux

MeeGo-like

Full OS and desktop capabilities



Questions?



Questions?

Thanks.

vignatti@freedesktop.org
tiago.vignatti@nokia.com