

Cross-compiling OpenJDK with OpenEmbedded

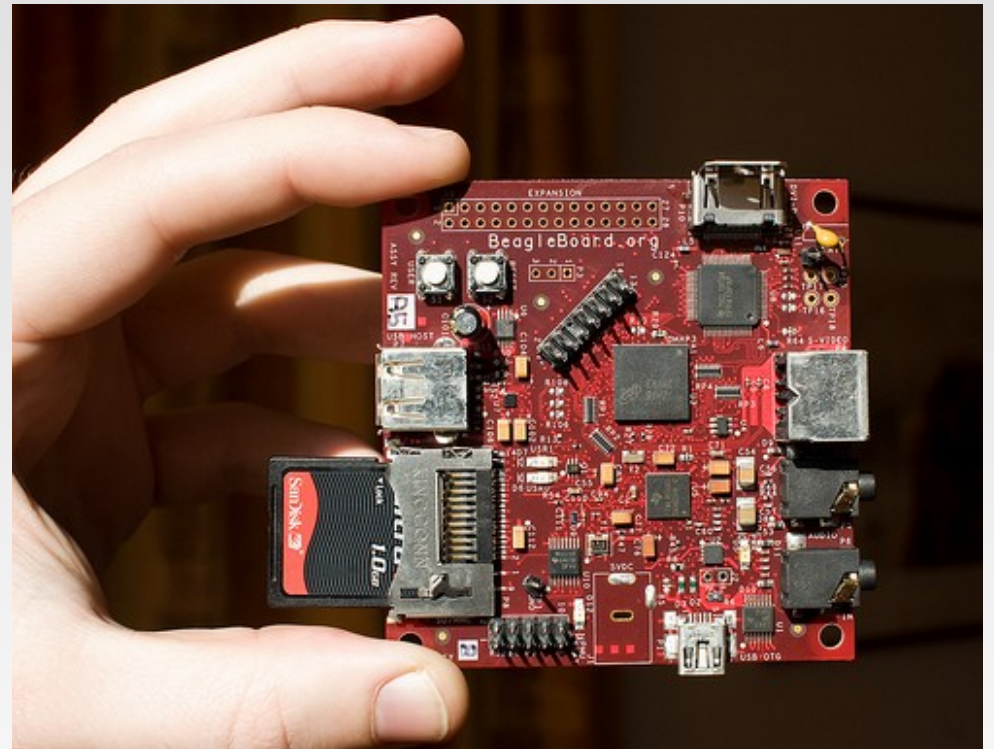
FOSDEM 2009

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Jalimo + OpenEmbedded

Why?

Beagleboard specs:

- 128 MiB RAM
- SDHC slot
- ~500 MHz
- Vector FPU



Why?

- Beagle's OMAP3 is a CPU for next generation Smartphones, PDAs, ...
- other armv7a implementations (e.g. i.MX51) going to be in the same league

Why?

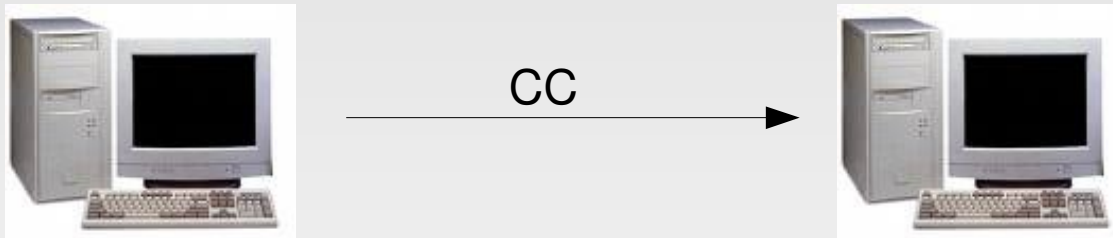
"We're trying to converge everything to the Java SE specification. Cell phones and TV set-top boxes are growing up,"

James Gosling in an CNet interview, 2007

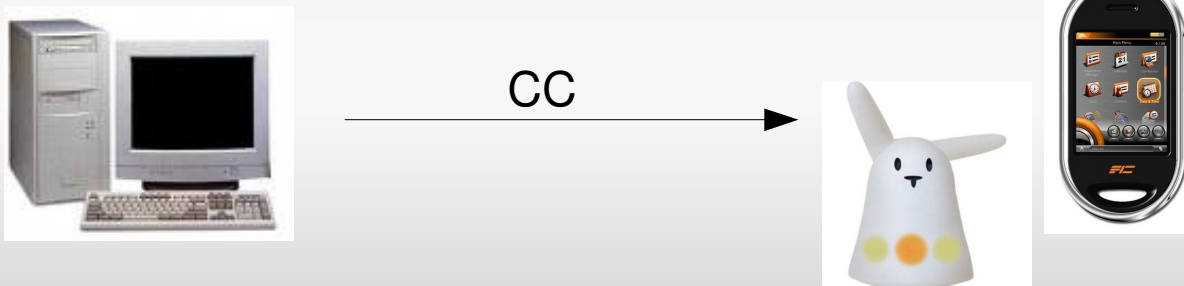
http://news.cnet.com/8301-13580_3-9800679-39.html?part=rss&subj=news&tag=2547-1_3-0-5

Cross-compiling?

- Non-cross:
 - Build for the machine the compiler is running on (build machine)

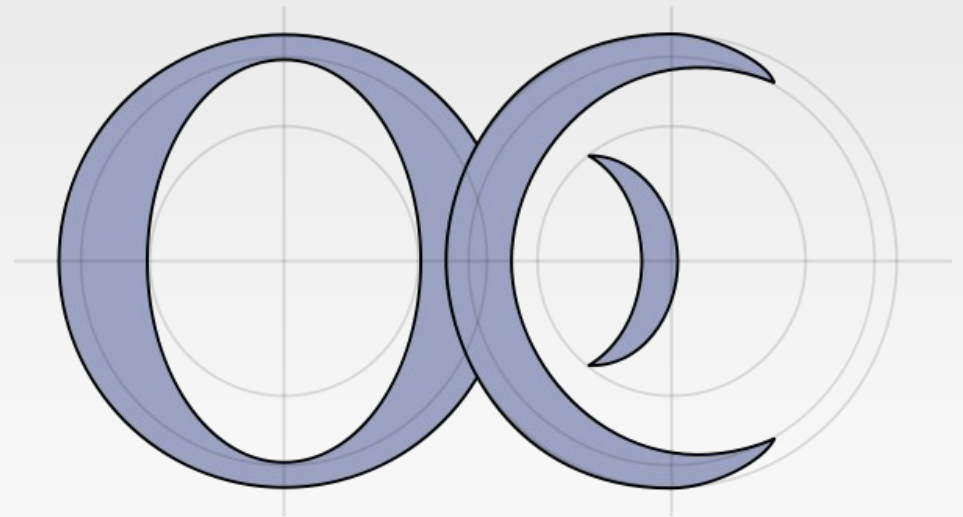


- Cross:
 - Build for a different system than the compiler is running on (target machine)



OpenEmbedded

OE is a build environment that provides the necessary metadata to automate the tasks in the generation of a cross-compiled GNU/Linux distribution.



open embedded

Normal OpenJDK build

JDK 1.5 (proprietary)
builds
OpenJDK

IcedTea's main contribution

GNU Classpath/GCJ

builds

Bootstrap JDK

builds

OpenJDK

Cross-Compilation approach

GNU Classpath/GCJ (build machine)

builds

Bootstrap JDK (build machine)

builds

Bootstrap JDK (target machine)

is a linker target for

OpenJDK (target machine)

(Each box is one separate build process.)

Main build hack (target)

```
# Builds bootstrap JDK  
make icedtea-ecj
```

```
# Pull in java, javac, javah, jar and  
# sizer.32 from bootstrap JDK (build)  
ln -sf ....
```

```
# Keep jre/lib/arm directory intact  
# (contains various shared libraries)
```

```
# Builds OpenJDK  
make icedtea
```

Smaller hacks

- enforce cross-compiler usage (sed is your friend)
- disable sanity checks
- replace ``uname -m`` in makefiles with a variable
- disable building `sizer.32` binary (and use a pre-built one instead)

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And some other things I don't remember now ...

You really want all the details?

Full guide:

jalimo.org/index.php/CrossCompilingOpenJDK

Also linked from within IcedTea and

OpenEmbedded Wiki

Guide contents

- prerequisites
- different builds (Zero, Shark, Cacao)
- all patches
- build steps

Things done

- building and packaging
 - OpenJDK with Zero
 - OpenJDK with Shark*
 - OpenJDK with Cacao
- tested only for ARM

* not fully working, due to issues in LLVM

Outstanding issues

- patches need to be adjusted and pushed upstream
 - disable sanity checks, replacement of ``uname -m``
- Shark is pre-alpha
 - LLVM shows issues
- Swing is not fully usable on touchscreen-only devices yet
 - no right-click (popup menu)
 - no virtual keyboard activation (also affects AWT)
 - no mouse move possible, only drag

Demo time!

Summary

- cross-compiling OpenDK possible
 - tested on ARM
- full guide in the making
 - jalimo.org/index.php/CrossCompilingOpenJDK
- things will get easier in the future because of patch integration



Thank you
for listening
and
many many
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