

# Android GPL license compliance

Armijn Hemel

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# About Armijn

- ▶ using Open Source software since 1994
- ▶ MSc Computer Science from Utrecht University (The Netherlands)
- ▶ core team `gpl-violations.org` since 2005
- ▶ ex-board member at NLUUG (<http://www.nluug.nl/>)
- ▶ sysadmin, developer and consultant at Loohuis Consulting (2006 - May 2011)
- ▶ May 2011 - present: owner Tjaldur Software Governance Solutions

# Talk overview

- ▶ GPL enforcement
- ▶ license violations in Android
- ▶ license violation discovery
- ▶ license violation resolution
- ▶ license violation prevention
- ▶ Q&A

I will not talk about software patents. Focus of this talk is on GPL version 2.

# GPL enforcement

- ▶ is real
- ▶ is happening in Europe and US
- ▶ happens mostly for GPLv2 and LGPLv2/2.1
- ▶ is being done by both companies and individuals
- ▶ is easy to avoid

Harald Welte founded `gpl-violations.org` in 2004 to tackle GPL license violations through education, documentation and, as a last resort, legal action.

I joined in October 2005.

`gpl-violations.org` has solved several hundreds of cases through legal action and informal action.

# License violation life cycle

Mistakes happen, but they need to be resolved.

1. understanding the problem
2. acknowledging the problem
3. fixing the problem
4. preventing the problem

# Violations in Android

There are two main areas where things go wrong:

- ▶ devices
- ▶ Android marketplace

I will not talk (much) about applications in marketplaces, but focus on devices.

Note: it is a myth that Android user space does not contain GPL code. Google ships Android userspace without GPL code, but many manufacturers put GPL code back in (like BusyBox)!

# Notable examples

Two cases of (alleged) GPL violations were very visible in the last year:

- ▶ HTC
- ▶ Android tablet noncompliance



HTC assembles software themselves, using a SDK from upstream (Qualcomm).

HTC has consistently stepped on people's toes:

- ▶ standard response: "Please wait 60 to 90 days"
- ▶ persistent, even after being asked to fix this, leading to bad PR

HTC needs to fix their software release processes.

# Android tablets

Kernel developer Matthew Garrett got quite angry in late 2010 and assembled a list of Android tablets that are not in compliance.

The companies on his list don't do development, but only rebadge and resell.

Funny responses `gpl-violations.org` got:

- ▶ “Our device is based on Android, not on Linux”
- ▶ “You can get the source code from Google”
- ▶ “We made some changes specifically for our tablet hardware, so you can't have the source code”
- ▶ “we think the kernel code is under GPLv3 so we have 60 days to fix the issue”

The problem is not these companies, but the whole supply chain that does not implement proper software governance.

# Discovering violations

Important: violating a license is not a technical issue, but a legal issue. Technical measures ( “GPL compliance engineering” ) are only used to obtain evidence.

Two steps need to be taken:

1. documentation analysis
2. technical analysis

# Documentation analysis

The GPLv2 license needs:

1. copy of the license text
2. complete and corresponding source code for programs distributed under GPLv2, or
3. written offer for the complete and corresponding source code

Points 1 and 3 can easily be checked by non-technical people.

Note: the “legal information” tab in the Android user interface *usually* fullfills point 1.

# Technical analysis

Technical analysis consists of two parts:

- ▶ determining the presence of GPL licensed software in binaries
- ▶ check source code if it matches said binaries

Sometimes hardware needs to be modified to get access to the juicy bits (like adding a serial port).

# Analysing binaries

- ▶ extract programs from binary blobs using various techniques
- ▶ extract human readable strings from binary programs and match with source code
- ▶ look at meta information (file names, package meta data, etc.)

If you can match a significant number of specific strings it becomes statistically hard to deny reuse of GPL licensed software.

You can do this by hand using many standard Linux tools, or use an automated tool like the Binary Analysis Tool.

# The Binary Analysis Tool

The Binary Analysis Tool (BAT) is a tool that automates detection of Open Source software in a binary (firmwares, installers, etcetera).

Goals:

- ▶ demystifying compliance engineering by codifying processes
- ▶ creating a reproduceable process and results
- ▶ creating a common set of tools and language for looking at binaries
- ▶ taking away excuses for companies (“it is difficult to find out”)

BAT is currently maintained by Tjaldur Software Governance Solutions and can be found at <http://www.binaryanalysis.org/>.

# The Binary Analysis Tool - facts

- ▶ Apache 2 licensed
- ▶ lightweight
- ▶ wraps around standard Unix tools plus a bit of custom code
- ▶ spawned academic research (presented at Mining Software Repositories 2011 conference)
- ▶ just examines binaries, but draws no legal conclusions from findings

Analysis of Android application files was added last month.

Want a demo? Ask me later in the hallway.



# Analysing source code

1. find out what is in the binary
2. check for every binary that contains GPL licensed code if there is matching source code, under a GPL compatible license
3. check if there are no accidental leftover binaries without sources in the source code archive itself

# Source code scanning versus binary scanning

So what about using source code scanning tools to ensure the binary does not contain unwanted surprises?

Unless you build the binaries yourself using the provided source code you will *never* be able to tell what is in a binary using only a source code scanning solution!

I am working on tools for combining license checking with information from build systems.

# Handling violation reports

A problem is the way violation reports are handled, or rather: are not handled.

This leads to:

- ▶ angry people
- ▶ bad PR
- ▶ unnecessary misunderstandings
- ▶ long term damage with upstream projects (HTC was told to “wait 60 to 90 days” when they needed help on LKML)

# Fixing communications

- ▶ instruct support staff to hand off requests for source code. Don't let them just come up with something.
- ▶ establish a separate point of contact regarding open source license questions, preferably a team (to avoid “single point of failure”) and advertise this on your website/in documentation.
- ▶ record all cases in a request tracker or CRM system, so there is a history.

# Fixing a violation

Ideally:

- ▶ make complete and corresponding source code available
- ▶ inform customers of their rights
- ▶ take preventive measures so it never happens again

If this is not possible:

- ▶ stop distribution completely
- ▶ take preventive measures so it never happens again

# License violation prevention

The best way to solve a license violation is to have never have it happen in the first place!

There are two components:

- ▶ technical process improvements
- ▶ non-technical process improvements

# Technical process improvements

- ▶ check releases (source code and binary) from upstream. Trust, but verify!
- ▶ provide compliant releases downstream
- ▶ integrate compliance into your development process
- ▶ actively teach your engineers about licensing and when it is OK to combine/reuse software
- ▶ push your changes to upstream projects, so you cannot accidentally forget to include them the next time (plus all the other advantages!)

# Non-technical process improvements

- ▶ push compliance upstream (if you source from companies) through contracts
- ▶ demand a “software bill of materials” in SPDX (Software Package Data Exchange) or another format and verify it with a checker
- ▶ check and record every release that is distributed, including beta/test versions
- ▶ use SPDX (Software Package Data Exchange) or another format to clearly indicate what you are shipping



# Q&A

Remember: no questions about software patents

# Contact

- ▶ `armijn@gpl-violations.org` for `gpl-violations.org` related questions
- ▶ `info@tjaldur.nl` for consultancy questions

or just talk to me in the hallway.