How an App gets into F-Droid

From source code to an app on your Phone

Walkthrough

- What’s F-Droid
- App submission
- Packaging
- Building
- Updating
- Distribution

F-Droid

- F-Droid is an App Store
- F-Droid is an installable catalogue of FOSS applications for the Android platform.
- Modeled after Debian

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F-Droid cont.

- F-Droid as an ecosystem
  - F-Droid Client app
  - F-Droid server tools
  - F-Droid main repository
  - Guardianproject repo
  - f-droid.org website
  - Repomaker
  - ...

App submissions

- Rfp (Request for packaging) issue tracker
  - https://gitlab.com/fdroid/rfp
- We need
  - Link to source code
  - License
  - Descrition/Summary/etc.
  - Build instructions

Packaging

- Current fdroiddata maintainers:
  - @relan
  - @mimi89999
  - @Bubu
  - @Rudloff
  - Others for certain apps

Packaging cont.

- **OR:** package it yourself
- You’ll need the fdroidserver tools and either:
  - Fdroid buildserver VM (> 100 GB req.)
  - Existing android dev setup (with some caveats...)
- Create a txt (old) or yml (preferred) metadata file
- Submit a merge request to fdroiddata

Packaging cont.

- Clone fdroiddata
- Run `fdroid init` inside the fdroiddata repo
- Edit `config.py`
  - Path to `gradle` needs to be set (needs to be the correct version, this is a bit of a PITA still)
  - Android SDK and NDK paths
- fdroid init will also generate some signing keys for you for testing the built apps on a real device

Demo Time!

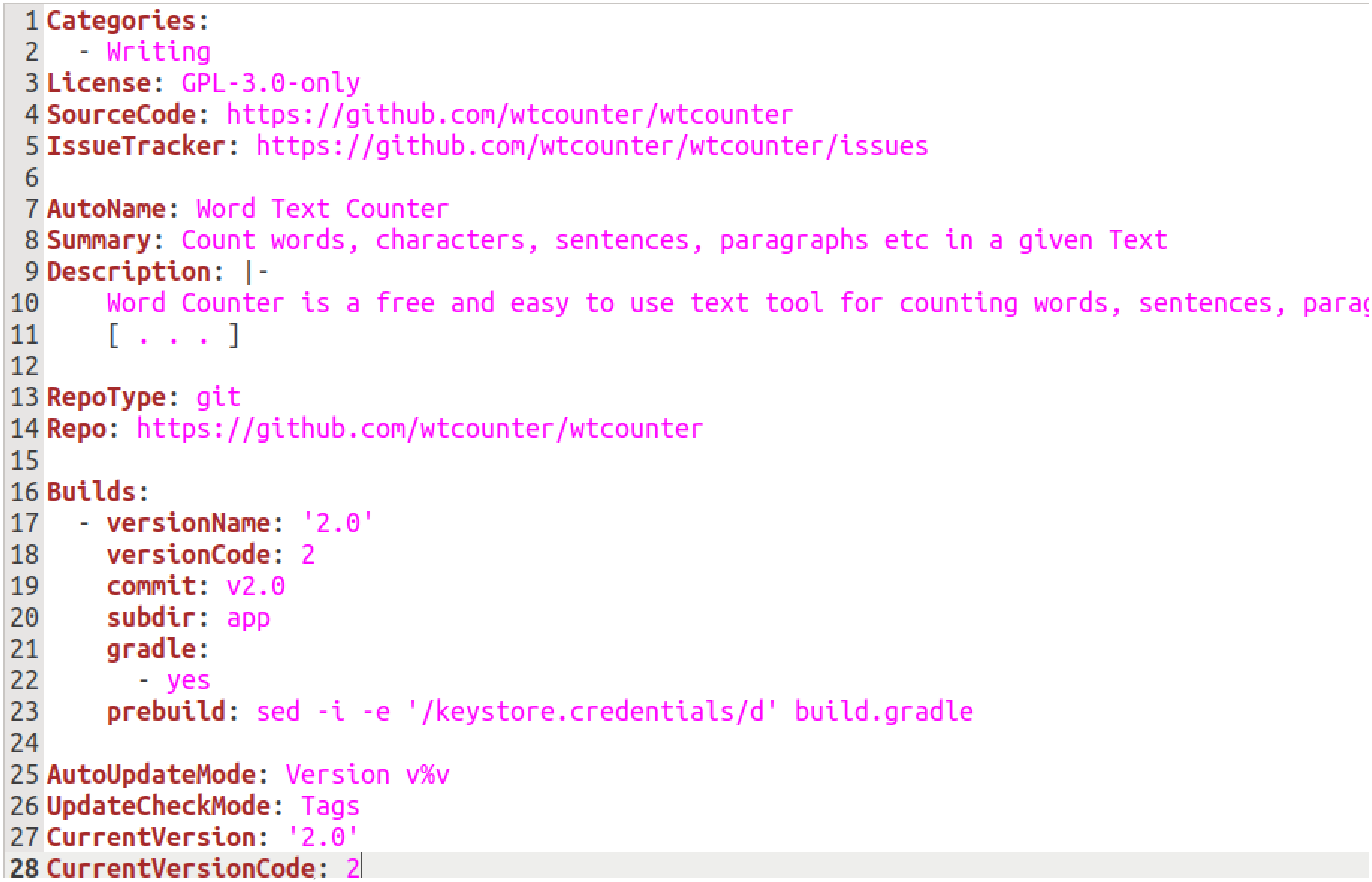
Packaging cont.

- In fdroiddata:
- `fdroid import -u https://github.com/wtcounter/wtcounter -l GPL-3.0-only -s app`
- Edit `metadata/wordtextcounter.details.main.yml`
  - Add description, summary and categories
  - Fill in commit/tag
  - Add Auto Update Mode
  - Test fdroid checkupdates
- Test the build
- Fix build errors

Packaging cont.

- Run `fdroid lint` and `fdroid rewritemeta` to discover possible problems
  - Careful with `rewritemeta` for yml, it will swallow unknown keys (typoes...)
  - Run `git add <file>` first
- Finally create a merge request!

Finished metadata



```yaml
Categories:
  - Writing
License: GPL-3.0-only
SourceCode: https://github.com/wtcounter/wtcounter
IssueTracker: https://github.com/wtcounter/wtcounter/issues

AutoName: Word Text Counter
Summary: Count words, characters, sentences, paragraphs etc in a given Text
Description: |-
    Word Counter is a free and easy to use text tool for counting words, sentences, parag
    [ . . . ]

RepoType: git
Repo: https://github.com/wtcounter/wtcounter

Builds:
  - versionName: '2.0'
    versionCode: 2
    commit: v2.0
    subdir: app
    gradle:
      - yes
    prebuild: sed -i -e '/keystore.credentials/d' build.gradle

AutoUpdateMode: Version v%v
UpdateCheckMode: Tags
CurrentVersion: '2.0'
CurrentVersionCode: 2
```

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Packaging Gotchas

- Common problems:
  - Jar or aar files inside the repo
    - Everything must be build from source or pulled from a trusted maven repository (jcenter, mavencentral and a few others)
    - Trusted here means they require a source jar to be uploaded alongside the binary

Packaging Gotchas

- Common problems (cont.):
  - Using proprietary dependencies (“usual suspects”)
    - Firebase/GCM
    - Crashlytics
    - Google play services
  - Best solution is contributing a build flavour that doesn’t need these dependencies upstream.

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Packaging Gotchas

- Common problems (cont.):
  - No tags
  - No commit messages (!)
  - No license
  - Incompatible license (GPL-2.0 vs Apache2 from Android support libraries)
  - Source code is only updated occasionally
  - ...

Building

- Started with `fdroid build -v <appid:vercode>`
  - Get’s the source
  - Always resets to target commit
  - Scans for common problems
  - Applies patches/prebuild commands
  - Runs commands specified in build:
  - Runs `gradle assemble<Flavour>Release`
  - Verifies resulting apks VersionName and VersionCode match

Updating

- Server runs `fdroid checkupdates --auto` ~once a day
  - Generates new build entries if an update is detected.
- There is `UpdateCheckMode` (UCM) and `AutoUpdateMode` (AUM)
  - UCM is for detecting new versions
  - AUM generates the build entries
- Most common method is `UCM:Tags, AUM:Version %v`

Updating cont.

- Needs versions to be correctly tagged and VersionName correspond to the tag name
  - there can be a prefix like `v%v`
- Additionally VersionName and VersionCode need to be statically set in build.gradle or AndroidManifest.xml
- Dynamically calculated Versionnames/codes are not supported for auto update yet.
  - They'd require running gradle to handle correctly

Distribution

- `fdroid build` generates unsigned apks
- They are signed with `fdroid publish`
  - This happens on a seperate offline signing machine for f-droid.org
- fdroid generates one signing key per app, unless explicitly configured otherwise in config.py
  - Apps sharing a signature have a weaker isolation
  - This is required i.e. when one app needs to access accounts from another app
- Optional gpg signing of apks

Distribution cont.

- Now `fdroid update` can assembles the app index of all locally present signed apks.
  - It also copies together all app metadata which might come from upstream repos https://f-droid.org/en/docs/All_About_Descriptions_Graphics_and_Screenshots/
  - Also supports screenshots feature graphics and changelog entries
- Index gets signed with the repo signing key
  - It's a `.jar` file which contains the `index-v1.json`

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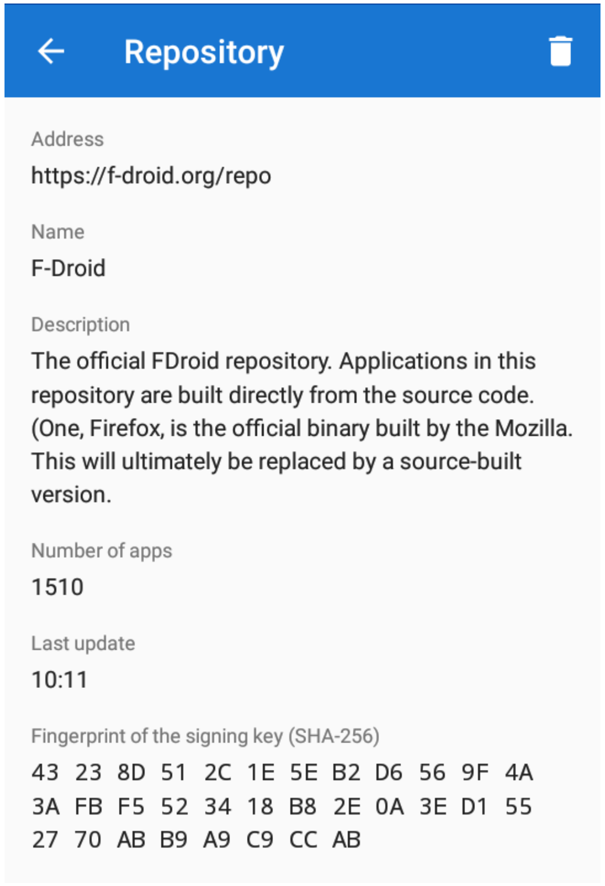
Distribution cont.

- The index contains the sha256sums of all apks distibuted in that repo
- The index signing certificate is pinned in the client:



Address
https://f-droid.org/repo

Name
F-Droid

Description
The official FDroid repository. Applications in this repository are built directly from the source code. (One, Firefox, is the official binary built by the Mozilla. This will ultimately be replaced by a source-built version.

Number of apps
1510

Last update
10:11

Fingerprint of the signing key (SHA-256)
43 23 8D 51 2C 1E 5E B2 D6 56 9F 4A
3A FB F5 52 34 18 B8 2E 0A 3E D1 55
27 70 AB B9 A9 C9 CC AB

Distribution cont.

- Client downloads the app index and verifies the embedded signature
- When you download an app the apk hash gets verified against the hash in the index
- Additionally android has a TOFU system for app signing keys

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Questions?

Talk to us on IRC/Matrix: #fdroid / #fdroid-dev (on freenode)

Command Summary

- `fdroid import` → creates a metadata template
- `fdroid lint` → spot metdata issues
- `fdroid rewritemeta` → bring metadata into canonical form (also converts between txt and yml)
- `fdroid build` → builds an unsigned apk
- `fdroid checkupdates` → checks for new versions && generates new build entries
- `fdroid publish` → signs all local unsigned apks
- `fdroid update` → creates and signs an index

Fdroid Buildserver

- A virtual machine used for building all apps in the main repo
- Libvirt or Virtualbox backed
- Based on Debian `jessie`, currently migrating to `stretch`
- Provisioned with vagrant
  - Installs all Android sdk tools/platforms
  - Most NDK versions
  - All gradle versions
  - Some more common dependencies

Buildserver cont.

- First you’ll need a vagrant basebox
  - Create one with `https://gitlab.com/fdroid/basebox/`
  - This will create a (mostly) vanilla Debian VM image usable by vagrant
- Then run `./makebuildserver` to run all the fdroid provisiong
  - This will download lots of stuff
  - And will temporarily consume up to 100 GB of disk space
  - The final buildserver image will be around 30 GB in size
- Needs to be rebuild whenever you’re missing a dependency (new NDK, gradle versions, ...)

Buildserver cont.

- Run builds with `fdroid build -v -server <appid:ver>`
- Will always start a fresh snapshot of the buildserver VM
- Copies currently used version of fdroidserver inside
- Copies all app source code and the metadata file
- Builds inside the VM with `fdroid build -on-server <app>`
- Copies resulting apk back if build was successful