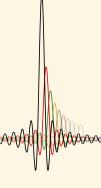
GNU Radio Tech Update

Marcus Müller





Development Velocity

GNU Radio since FOSDEM 2020

GNU Radio 3.9

Going Forward

State of GNU Radio 2021

- ► GNU Radio 3.7 released June 2013
 - → Still in legacy maintenance!
- ► GNU Radio 3.8 released August 2019
 - → Stable and available on all major OSes
- ► GNU Radio 3.9 released January 2021
 - → Stable, available in next Debian stable (hence Ubuntu), Fedora 34

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Development Velocity

- $3.7.0 \rightarrow 3.8.0.0$: 5732 commits
 - ▶ 73 per month
- $3.8.0.0 \rightarrow 3.9.0.0$: 879 commits
 - ► "only" ca. 52 per month
 - ▶ did we become slower?
 - ► no, but slightly saner
 - ▶ shorter time-to-feature
 - less external backlog that as already merged into 3.8

Developer Certificate of Origin (DCO)

- ► Replaces the *Contributor License Agreement*
- ► Self-certification of **Yes, I'm allowed to contribute that code**
- ► Author retains "ownership"
- ► Less bureaucratic overhead
 - ► No paper involved
 - ▶ No keeping track of who's allowed to contribute larger pieces of code
 - ► Absolutely no waiting on any OKs
 - ► Just a simple -s on your git commit is all it needs:
 Signed-off-by: Ada Lovelace <rage_using_a_machine@gmail.com>
 - ► Github action checks for that sign-off line!
 - ▶ Downside: Graphical git clients notoriously bad at this
- ► Formally written down: CONTRIBUTING.md and DCO.txt

GNU Radio Releases

3.8.0.0: 2019-08-09

▶ 3.7.14.0: 2020-02-15

3.8.1.0: 2020-04-08

▶ 3.8.2.0: 2020-08-20

▶ 3.9.0.0: 2021-01-17

Realizations:

- ▶ If you fit a 4th order polynomial, you can see that by GRCon'21, we'll have GNU Radio 4.3.8.6 (we're slightly behind on that schedule)
- ► Release cadence hasn't become stable
 - too many external, human factors
- ► Development is indeed steady; no real slowdown

Why GNU Radio 3.9?

- ▶ 3.8 was a great future-proofing step
 - ► Can't rely on Qt4, Py2, Cheetah, etc. anymore
 - ► Linux Distros were simply dropping GNU Radio due to impossible dependencies
 - ► GRC was stuck in 3.7 (and it's the main user experience!)
- ► We do **stable** releases
 - ► Can't change the API and still call it 3.8!
 - ► Versioning purpose: Communicate API & Dependency state
- ▶ So, we needed to release 3.9 to be able to change a few things in 3.8
 - good for users and developers
- ▶ ... which in turn allows us to also change dependencies
 - good for developers and maintainers

What's new in GNU Radio 3.9?

Human Things

- ► DCO
- ► Well-oiled Continuous Integration
- Availability through more channels (PPA, anaconda soon, macports, standalone installers...)

Things that totally break GRC workflow

► Seriously, 3.8 flowgraphs just work

Functionality

- Whole new gr-network: Much better networking!
- ► wavfile sink/source: Reading/Writing of compressed audio
- ▶ gr-qtgui: Azi/Ele, autocorr, eye diagram plots

What's new in GNU Radio 3.9?

cont. Programming Languages

- ▶ Python > 3.6.5, **no** Python2
 - ► Greatly reduces OOT pitfalls
 - Reduces maintenance effort
 - ► Can use Pv3 features
- ► C++14
 - ► Better smart pointer handling, lambdas, constexpr
 - ► Makes for potentially cleaner code

Language Binding

- ightharpoonup SWIG ightharpoonup pybind11
- ► Requires touching of OOT code :(
- ► Most bindings can be generated, but

Dependencies

- ► VOLK not build as submodule anymore
 - ► More compatible with many Linux distro packaging guidelines
 - ► Benefit: stable VOLK packaging
 - ► VOLK is a software project in its own right, treat it as such
- \triangleright For C++14, need one of
 - ► GCC > 8.3
 - ▶ clang > 11
 - ► MSVC > 1910 (Visual Studio 2017 15.0)
- ► Boost, numpy, make bump (modest)

Should I Be Switching to GNU Radio 3.9?

Well, yes! But.

Users

- ➤ Your Linux distro offers GNU Radio 3.8: that's great, stick with it. You can get 3.9 when you update your Linux distro in half a year.
- ▶ If it offers 3.7: Update it! (you can also use our PPA if it's Ubuntu and not ancient)

OOT Developers

- ► Add your currently supported versions to your Manifest: gr_supported_versions: v3.7,v3.8
- ▶ maint-3.X branches make it clear which branch to build for which GNU Radio version
- pybind11 is the main difference, we've got bindtool!

Software Distributors / People with legacy systems

- ▶ Not dropping support for 3.8 soon, and not touching 3.7
- ► Consider migrating to 3.9 for Py2 reasons

Keeping Release Series Alive

Problem:

- ► Development happens on master branch
- ▶ Problem: Backporting to three release series now.
- ► Solution: Be selective

Solution:

- ► Contributor opens PR, ideally notes whether backporting seems reasonable
- Core contributors tag accordingly:
 - ▶ no tag: Things that break API, make no sense on backport
 - ▶ backport-3.9: Bugfixes (all), Features where sensible
 - ▶ backport-3.8: Bugfixes (all that don't hurt), Features on request
 - backport-3.7: Probably won't apply (wrong version of everything). Extreme caution to not break existing system
- ▶ after backporting PR got merged, ported-x.y tag is added
- ▶ regular checks for PRs with backport-, but without ported- tag

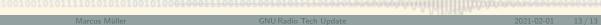
Current Developments

Things that 3.10 will bring (most likely)

- ► C++17
- ► Logging overhaul
- ► Better RPC/messages



Questions?



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