

GNU Radio from Scratch

Martin Braun, Ettus Research

GNU Radio Conference 2015

Outline

- 1 Introduction
- 2 Installation
- 3 Resources
- 4 Starting to Code
- 5 Becoming a Developer
- 6 The Community

Allow me to introduce myself...

- Long-time GNU Radio enthusiast and contributor
- Community Manager, SoC Coordinator
- WG Leader “Community & User Experience”
- UHD Developer

A clean slate



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- 3 PyBOMBS
- 4 Source Builds

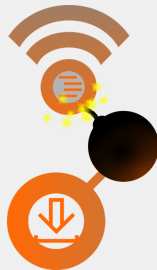


PyBOMBS — The apt-get of GNU Radio

- Installs GNU Radio, Hardware Drivers and OOTs for you!
- Sets up environment variables etc. for you!
- Currently available at:
`http://gnuradio.org/pybombs`
- Modules are added by PyBOMBS maintainers in form of lightweight recipes
- Rewrite happening, PyBOMBS 2.0 to be released this year

PyBOMBS 2.0

- Still Alpha
- Features:
 - Installable
 - Multiple prefixes, each with its own configuration
 - Multiple recipe remotes, per system, per user or per prefix
 - Easy cross-compiling
- Action happening at:
`github.com/gnuradio/pybombs2`



Source Builds

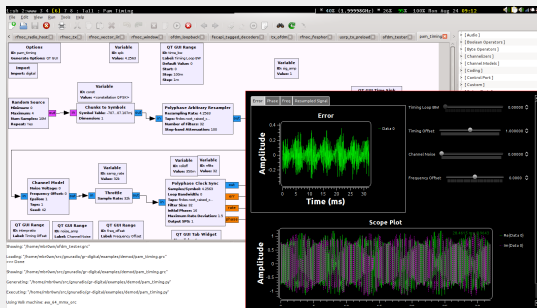
- Useful for development on GNU Radio itself
- Requirements:
 - 1 Install all dependencies (Boost, UHD, QT, ...)
 - 2 Run `cmake && make && make install`
 - 3 Et Voilà! You're done! (or not)

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GNU Radio Companion

- Graphical front-end for GNU Radio (its face)
- Powerful graphical widgets for live inspection of signals/data
- Ignore GRC at your own peril



CGRAN

- Spiritual Cousin of CTAN, CPAN. . .
- Recently rewritten by the CGRAN Special Forces (main contributors: Nathan + Ravi)
- Easy access to the entire free & open software radio ecosystem
- Automatically generated website listing most OOT modules
- Between CGRAN and PyBOMBS, finding and installing modules should be a simple task



First Steps: Guided Tutorials

- Gentle introduction to GNU Radio (and even some DSP)
- Find these online on our wiki
- Comes with a free set of codes: `gr-tutorial`

Where do I learn about these blocks?

- Read our fine manual!
 - `http://gnuradio.org/doc/`
- All blocks are browsable through several paths, and searchable
- GRC provides docs, too

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gr_modtool — The Swiss Army Knife of modules

- Modify and create your OOTs from the command line
 - Unfortunately, only the command line at this time
- Create, remove, disable, enable blocks
- Never write any boilerplate code again!

Writing blocks: A core skill of developing SDR

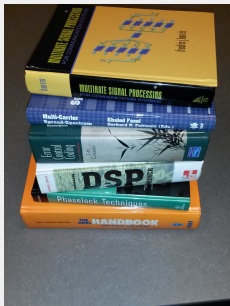
- `gr_modtool` tries to make this as easy as possible
- Languages available:
 - Python, for fast & easy dev
 - C++, for highest performance

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- Where do I learn how to do all this wireless communications stuff?
- Which codez do I put into my
`<+ do signal processing here +>?`

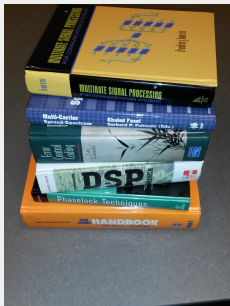
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- Well...
- Ask Jeff (next talk)



Getting Help — Interacting with other People

- discuss-gnuradio, usrp-users mailing lists
- Very responsive!
- IRC: #gnuradio on Freenode
- Join the discussions!
- But first, read the wiki page on reporting errors, etc.!

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Improving GNU Radio

- You've found a bug? Something's bothering you?
- Fix it!
 - Actual bugs
 - Missing features
 - Bad docs
 - Unintuitive coding

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The Community

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- No!
- See `gnuradio.spreadshirt.{com, de}`
- There's a big community, join it!
- There's the conference, and also local meetings, hackfests...

Conclusion

- SDR is a very hard topic
- But GNU Radio is there to make it easier
- Getting started with GNU Radio, writing first blocks etc. is well documented at this point
 - (and if it's not, maybe you can help us improve it!)
- And after that, we have a great community