

The Open Source Community: How GNU Radio Enhances the Science of Communicating

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A real-time, streaming signal processing platform.

Source

Source

Files

Micophone

Other programs

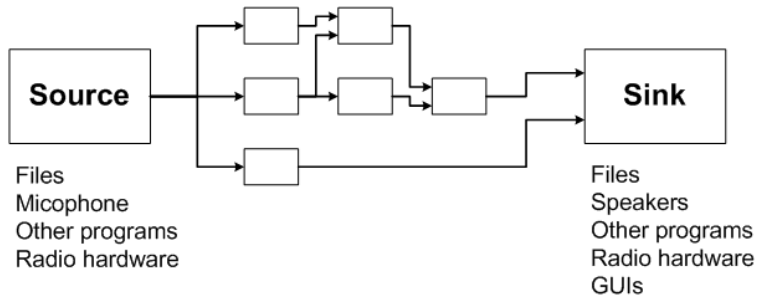
Radio hardware

Source

- Files
- Micophone
- Other programs
- Radio hardware

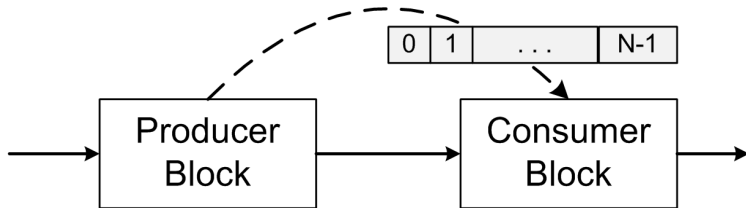
Sink

- Files
- Speakers
- Other programs
- Radio hardware
- GUIs



Optimized for throughput.
(An experimental add-on allows optimization for latency.)

Dynamic scheduler passes chunks of *items* between signal processing blocks.



- All low level work and signal processing is done in C++.
- Wrapped into Python for use as a scripting language.
- GNU Radio Companion: a graphical interface to build GNU Radio applications that sits on top of Python.

GNU Radio Processing Blocks

- Basic mathematical and logical operations.
- Large library of filter design and processing algorithms.
- I/O support for many domains.
- Type conversions.
- Analog (AM/FM) processing techniques
- Synchronization algorithms (PLL, Costas loop, etc.)
- Data and flow graph management blocks.
- Narrowband and OFDM digital modulation capabilities.
- Various audio vocoders.
- Trellis, convolutional coding, and similar algorithm support.
- Graphical visualization tools (oscilloscopes, PSD, and waterfall viewers).
- Many examples for all different areas of signal processing.

Community

- Active developer community producing examples.
- Large participation on our mailing list.
- The Complimentary GNU Radio Archive Network (CGRAN):
<https://www.cgran.org>.
- Growing list of projects on github.
- Large participation at conferenes like the Wireless Innovation Forum's WinnComm'11.
- Impressive turnout and participation at the 2011 GNU Radio Conference.

GR'11 Conference

<http://gnuradio.squarespace.com/gnu-radio-conference-2011/>

GNU Radio Applications

- Quantum Optical Communications
- An Open Source P25 Implementation
- ADS-B

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GNU Radio Developments

- Event-based Scheduler
- VOLK - Vector-Optimized Library of Kernels
- Introduction to Stream Tags
- Advance GNU Radio to the Network Level

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Available Hardware

- USRP product line
- UHD driver for USRPs
- The Symplex hardware platform
- Graphics Processor Acceleration

Improving the science of communications.

The open source exposes the inner workings of the algorithms.

More than a simulation engine. Prototyping, development, and real-world, real-time signal processing.

