

APRS iGATE su Linux Direwolf
<https://github.com/wb2osz/direwolf>

Hardware & Software Required:

- RaspberryPi Versione p2
- SO Raspbian Jessie
- Scheda SDR - E4000 USB DVB-T+ RTL-SDR Realtek RTL2832U+ R820T DVB-T Stick Tuner

Linux raspberrypi-igate 4.4.21-v7+ #911 SMP Thu Sep 15 14:22:38 BST 2016 armv7l GNU/Linux

Premesso che la nostra directory di lavoro sarà /home/pi/direwolf

```
pi@raspberrypi-igate:~/direwolf $ mkdir /home/pi/direwolf
pi@raspberrypi-igate:~/direwolf $ cd /home/pi/direwolf

pi@raspberrypi-igate:~/direwolf $ sudo apt-get install libasound2-dev           ok
pi@raspberrypi-igate:~/direwolf $ git clone https://www.github.com/wb2osz/direwolf   ok
pi@raspberrypi-igate:~/direwolf $ cd direwolf                                     ok
pi@raspberrypi-igate:~/direwolf $ git tag                                         ok
```

output:

```
1.0
1.1
1.2
1.3          -- versione selezionata
1.3-beta
1.3-dev-F
1.3-dev-I    -- versione selezionata
1.3-dev-K
1.4-dev-D
```

```
pi@raspberrypi-igate:~/direwolf $ git checkout 1.3
pi@raspberrypi-igate:~/direwolf $ git checkout 1.3-dev-I
pi@raspberrypi-igate:~/direwolf $ git checkout dev
```

```
# -----
# COMPILAZIONE E INSTALLAZIONE DEL SOFTWARE
# -----
```

```
pi@raspberrypi-igate:~/direwolf $ make
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o direwolf.o direwolf.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o config.o config.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o recv.o recv.c
echo " " > tune.h
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -DGEN_FFF -o gen_fff demod_afsk.c
dsp.c textcolor.c -lm -lpthread -lrt -lasound
./gen_fff > fsk_fast_filter.h
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o demod.o demod.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o dsp.o dsp.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o demod_afsk.o demod_afsk.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o demod_psk.o demod_psk.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o demod_9600.o demod_9600.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o hdlc_rec.o hdlc_rec.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o hdlc_rec2.o hdlc_rec2.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o multi_modem.o multi_modem.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o rdq.o rdq.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o rrb.o rrb.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o dlq.o dlq.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o fcs_calc.o fcs_calc.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o ax25_pad.o ax25_pad.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o ax25_pad2.o ax25_pad2.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o xid.o xid.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o decode_aprs.o decode_aprs.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o symbols.o symbols.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o server.o server.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o kiss.o kiss.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o kissnet.o kissnet.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o kiss_frame.o kiss_frame.c
```

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```
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o hdlc_send.o hdlc_send.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o gen_tone.o gen_tone.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o audio.o audio.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o audio_stats.o audio_stats.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o digipeater.o digipeater.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o cdigipeater.o cdigipeater.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o pfilter.o pfilter.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o dedupe.o dedupe.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o tq.o tq.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o xmit.o xmit.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o morse.o morse.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o ptt.o ptt.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o beacon.o beacon.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o encode_aprs.o encode_aprs.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o latlong.o latlong.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o textcolor.o textcolor.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o dtmf.o dtmf.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o aprs_tt.o aprs_tt.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o tt_user.o tt_user.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o tt_text.o tt_text.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o igate.o igate.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o waypoint.o waypoint.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o serial_port.o serial_port.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o log.o log.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o telemetry.o telemetry.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o dwgps.o dwgps.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o dwgpsnmea.o dwgpsnmea.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o dwgpsd.o dwgpsd.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o dtime_now.o dtime_now.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o mheard.o mheard.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o ax25_link.o ax25_link.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -I. -c -o strlcpy.o misc/strlcpy.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -I. -c -o strlcat.o misc/strlcat.c
ar -cr misc.a strlcpy.o strlcat.o
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o error_string.o
geotranz/error_string.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o mgrs.o geotranz/mgrs.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o polarst.o geotranz/polarst.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o tranmerc.o geotranz/tranmerc.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o ups.o geotranz/ups.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o usng.o geotranz/usng.c
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o utm.o geotranz/utm.c
ar -cr geotranz.a error_string.o mgrs.o polarst.o tranmerc.o ups.o usng.o utm.o
gcc -o direwolf direwolf.o config.o recv.o demod.o dsp.o demod_afsk.o demod_psk.o demod_9600.o
hdlc_rec.o hdlc_rec2.o multi_modem.o rdq.o rrb.o dlq.o fcs_calc.o ax25_pad.o ax25_pad2.o xid.o
decode_aprs.o symbols.o server.o kiss.o kissnet.o kiss_frame.o hdlc_send.o gen_tone.o audio.o
audio_stats.o digipeater.o cdigipeater.o cdigipeater.o pfilter.o dedupe.o tq.o xmit.o morse.o ptt.o beacon.o
encode_aprs.o latlong.o textcolor.o dtmf.o aprs_tt.o tt_user.o tt_text.o igate.o waypoint.o
serial_port.o log.o telemetry.o dwgps.o dwgpsnmea.o dwgpsd.o dtime_now.o mheard.o ax25_link.o misc.a
geotranz.a -lm -lpthread -lrt -lasound
```

This does NOT include support for gpsd.

```
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -DDECAMAIN -o decode_aprs
decode_aprs.c dwgpsnmea.o dwgps.o dwgpsd.o serial_port.o symbols.o ax25_pad.o textcolor.o fcs_calc.o
latlong.o log.o telemetry.o tt_text.o misc.a -lm -lpthread -lrt -lasound
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -DENC_MAIN -o text2tt tt_text.c misc.a
-lm -lpthread -lrt -lasound
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -DDEC_MAIN -o tt2text tt_text.c misc.a
-lm -lpthread -lrt -lasound
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -o ll2utm ll2utm.c geotranz.a
textcolor.o misc.a -lm -lpthread -lrt -lasound
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -o utm2ll utm2ll.c geotranz.a
textcolor.o misc.a -lm -lpthread -lrt -lasound
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -g -o aclients aclients.c ax25_pad.c
fcs_calc.c textcolor.o misc.a
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -o atest atest.c demod.o demod_afsk.o
demod_psk.o demod_9600.o dsp.o hdlc_rec.o hdlc_rec2.o multi_modem.o rrb.o fcs_calc.o ax25_pad.o
decode_aprs.o dwgpsnmea.o dwgps.o dwgpsd.o serial_port.o telemetry.o dtime_now.o latlong.o symbols.o
tt_text.o textcolor.o misc.a -lm -lpthread -lrt -lasound
```

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```
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -o log2gpx log2gpx.c textcolor.o  
misc.a -lm -lpthread -lrt -lasound  
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -o gen_packets gen_packets.c  
ax25_pad.c hdlc_send.c fcs_calc.c gen_tone.c morse.c textcolor.c dsp.c misc.a -lm -lpthread -lrt  
-lasound  
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -c -o ttcalc.o ttcalc.c  
gcc -O3 -pthread -Igeotranz -ffast-math -mfpu=neon -DUSE_ALSA -g -o ttcalc ttcalc.o ax25_pad.o  
fcs_calc.o textcolor.o misc.a  
Generating customized direwolf.desktop ...  
egrep '^C|^L' generic.conf | cut -c2-999 > direwolf.conf
```

Next step - install with:

```
sudo make install
```

```
pi@raspberrypi-igate:~/direwolf $ sudo make install  
install direwolf /usr/local/bin  
install decode_aprs /usr/local/bin  
install text2tt /usr/local/bin  
install tt2text /usr/local/bin  
install ll2utm /usr/local/bin  
install utm2ll /usr/local/bin  
install aclients /usr/local/bin  
install log2gpx /usr/local/bin  
install gen_packets /usr/local/bin  
install atest /usr/local/bin  
install ttcalc /usr/local/bin  
install dwespeak.sh /usr/local/bin  
install telemetry-toolkit/telem-balloon.pl /usr/local/bin  
install telemetry-toolkit/telem-bits.pl /usr/local/bin  
install telemetry-toolkit/telem-data.pl /usr/local/bin  
install telemetry-toolkit/telem-data91.pl /usr/local/bin  
install telemetry-toolkit/telem-eqns.pl /usr/local/bin  
install telemetry-toolkit/telem-parm.pl /usr/local/bin  
install telemetry-toolkit/telem-seq.sh /usr/local/bin  
install telemetry-toolkit/telem-unit.pl /usr/local/bin  
install telemetry-toolkit/telem-volts.py /usr/local/bin  
install -D --mode=644 tocalls.txt /usr/share/direwolf/tocalls.txt  
install -D --mode=644 symbols-new.txt /usr/share/direwolf/symbols-new.txt  
install -D --mode=644 symbolsX.txt /usr/share/direwolf/symbolsX.txt  
install -D --mode=644 dw-icon.png /usr/share/direwolf/dw-icon.png  
install -D --mode=644 direwolf.desktop /usr/share/applications/direwolf.desktop  
install -D --mode=644 CHANGES.md /usr/local/share/doc/direwolf/CHANGES.md  
install -D --mode=644 LICENSE-dire-wolf.txt /usr/local/share/doc/direwolf/LICENSE-dire-wolf.txt  
install -D --mode=644 LICENSE-other.txt /usr/local/share/doc/direwolf/LICENSE-other.txt  
install -D --mode=644 doc/README.md /usr/local/share/doc/direwolf/README.md  
install -D --mode=644 doc/User-Guide.pdf /usr/local/share/doc/direwolf/User-Guide.pdf  
install -D --mode=644 doc/Raspberry-Pi-APRS.pdf /usr/local/share/doc/direwolf/Raspberry-Pi-APRS.pdf  
install -D --mode=644 doc/Raspberry-Pi-APRS-Tracker.pdf /usr/local/share/doc/direwolf/Raspberry-Pi-  
APRS-Tracker.pdf  
install -D --mode=644 doc/Raspberry-Pi-SDR-IGate.pdf /usr/local/share/doc/direwolf/Raspberry-Pi-SDR-  
IGate.pdf  
install -D --mode=644 doc/APRStt-Implementation-Notes.pdf /usr/local/share/doc/direwolf/APRStt-  
Implementation-Notes.pdf  
install -D --mode=644 doc/APRStt-interface-for-SARTrack.pdf /usr/local/share/doc/direwolf/APRStt-  
interface-for-SARTrack.pdf  
install -D --mode=644 doc/APRS-Telemetry-Toolkit.pdf /usr/local/share/doc/direwolf/APRS-Telemetry-  
Toolkit.pdf  
install -D --mode=644 doc/A-Better-APRS-Packet-Demodulator-Part-1-1200-baud.pdf  
/usr/local/share/doc/direwolf/A-Better-APRS-Packet-Demodulator-Part-1-1200-baud.pdf  
install -D --mode=644 doc/A-Better-APRS-Packet-Demodulator-Part-2-9600-baud.pdf  
/usr/local/share/doc/direwolf/A-Better-APRS-Packet-Demodulator-Part-2-9600-baud.pdf  
install -D --mode=644 direwolf.conf /usr/local/share/doc/direwolf/examples/direwolf.conf  
install -D --mode=644 dw-start.sh /usr/local/share/doc/direwolf/examples/dw-start.sh  
install -D --mode=644 sdr.conf /usr/local/share/doc/direwolf/examples/sdr.conf  
install -D --mode=644 telemetry-toolkit/telem-m0xer-3.txt  
/usr/local/share/doc/direwolf/examples/telem-m0xer-3.txt  
install -D --mode=644 telemetry-toolkit/telem-balloon.conf  
/usr/local/share/doc/direwolf/examples/telem-balloon.conf
```

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```
install -D --mode=644 telemetry-toolkit/telem-volts.conf
/usr/local/share/doc/direwolf/examples/telem-volts.conf
install -D --mode=644 man1/aclients.1 /usr/local/man/man1/aclients.1
install -D --mode=644 man1/atest.1 /usr/local/man/man1/atest.1
install -D --mode=644 man1/decode_aprs.1 /usr/local/man/man1/decode_aprs.1
install -D --mode=644 man1/direwolf.1 /usr/local/man/man1/direwolf.1
install -D --mode=644 man1/gen_packets.1 /usr/local/man/man1/gen_packets.1
install -D --mode=644 man1/ll2utm.1 /usr/local/man/man1/ll2utm.1
install -D --mode=644 man1/log2gpx.1 /usr/local/man/man1/log2gpx.1
install -D --mode=644 man1/text2tt.1 /usr/local/man/man1/text2tt.1
install -D --mode=644 man1/tt2text.1 /usr/local/man/man1/tt2text.1
install -D --mode=644 man1/utm2ll.1 /usr/local/man/man1/utm2ll.1
```

If this is your first install, not an upgrade, type this to put a copy of the sample configuration file (direwolf.conf) in your home directory:

```
make install-conf
```

```
pi@raspberrypi-igate:~/direwolf $ make install-conf
cp direwolf.conf ~
cp sdr.conf ~
cp telemetry-toolkit/telem-m0xer-3.txt ~
cp telemetry-toolkit/telem-*.conf ~
```

This will add a desktop icon on some systems:

```
make install-rpi
```

```
pi@raspberrypi-igate:~/direwolf $
pi@raspberrypi-igate:~/direwolf $ make install-rpi
cp dw-start.sh ~
ln -f -s /usr/share/applications/direwolf.desktop ~/Desktop/direwolf.desktop
```

procedere con questi step:

```
pi@raspberrypi-igate:~/direwolf $ git clone git://git.osmocom.org/rtl-sdr.git
pi@raspberrypi-igate:~/direwolf $ cd rtl-sdr
pi@raspberrypi-igate:~/direwolf $ mkdir build
pi@raspberrypi-igate:~/direwolf $ cd build
pi@raspberrypi-igate:~/direwolf $ cmake ../ -DINSTALL_UDEV_RULES=ON -DDETACH_KERNEL_DRIVER=ON
pi@raspberrypi-igate:~/direwolf $ make
pi@raspberrypi-igate:~/direwolf $ sudo make install
pi@raspberrypi-igate:~/direwolf $ sudo ldconfig
pi@raspberrypi-igate:~ $ git clone git://git.osmocom.org/rtl-sdr.git
Cloning into 'rtl-sdr'...
remote: Counting objects: 1622, done.
remote: Compressing objects: 100% (716/716), done.
remote: Total 1622 (delta 1186), reused 1213 (delta 898)
Receiving objects: 100% (1622/1622), 346.28 KiB | 0 bytes/s, done.
Resolving deltas: 100% (1186/1186), done.
Checking connectivity... done.
```

```
pi@raspberrypi-igate:~ $ cd rtl-sdr
pi@raspberrypi-igate:~/rtl-sdr $ mkdir build
pi@raspberrypi-igate:~/rtl-sdr $ cd build
pi@raspberrypi-igate:~/rtl-sdr/build $ cmake ../ -DINSTALL_UDEV_RULES=ON -DDETACH_KERNEL_DRIVER=ON
```

output:

```
-- The C compiler identification is GNU 4.9.2
-- Check for working C compiler: /usr/bin/cc
-- Check for working C compiler: /usr/bin/cc -- works
-- Detecting C compiler ABI info
-- Detecting C compiler ABI info - done
-- Build type not specified: defaulting to release.
-- Extracting version information from git describe...
-- Found PkgConfig: /usr/bin/pkg-config (found version "0.28")
-- checking for module 'libusb-1.0'
-- found libusb-1.0, version 1.0.19
```

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```
-- Looking for libusb_handle_events_timeout_completed
-- Looking for libusb_handle_events_timeout_completed - found
-- Looking for libusb_error_name
-- Looking for libusb_error_name - found
-- Found libusb-1.0: /usr/include/libusb-1.0, /usr/lib/arm-linux-gnueabi/libusb-1.0.so
-- Looking for include file pthread.h
-- Looking for include file pthread.h - found
-- Looking for pthread_create in pthreads
-- Looking for pthread_create in pthreads - not found
-- Looking for pthread_create in pthread
-- Looking for pthread_create in pthread - found
-- Found Threads: TRUE
-- Building with kernel driver detaching enabled
-- Building for version: v0.5.3-13-ge3e6 / 0.5git
-- Using install prefix: /usr/local
-- Configuring done
-- Generating done
-- Build files have been written to: /home/pi/rtl-sdr/build
```

```
pi@raspberrypi-igate:~/rtl-sdr/build $ make
Scanning dependencies of target convenience_static
[ 5%] Building C object src/CMakeFiles/convenience_static.dir/convenience/convenience.c.o
Linking C static library libconvenience_static.a
[ 5%] Built target convenience_static
Scanning dependencies of target rtl_sdr_shared
[ 10%] Building C object src/CMakeFiles/rtl_sdr_shared.dir/librtlsdr.c.o
[ 15%] Building C object src/CMakeFiles/rtl_sdr_shared.dir/tuner_e4k.c.o
[ 20%] Building C object src/CMakeFiles/rtl_sdr_shared.dir/tuner_fc0012.c.o
[ 25%] Building C object src/CMakeFiles/rtl_sdr_shared.dir/tuner_fc0013.c.o
[ 30%] Building C object src/CMakeFiles/rtl_sdr_shared.dir/tuner_fc2580.c.o
[ 35%] Building C object src/CMakeFiles/rtl_sdr_shared.dir/tuner_r82xx.c.o
Linking C shared library librtlsdr.so
[ 35%] Built target rtl_sdr_shared
Scanning dependencies of target rtl_adsb
[ 40%] Building C object src/CMakeFiles/rtl_adsb.dir/rtl_adsb.c.o
Linking C executable rtl_adsb
[ 40%] Built target rtl_adsb
Scanning dependencies of target rtl_eeprom
[ 45%] Building C object src/CMakeFiles/rtl_eeprom.dir/rtl_eeprom.c.o
Linking C executable rtl_eeprom
[ 45%] Built target rtl_eeprom
Scanning dependencies of target rtl_fm
[ 50%] Building C object src/CMakeFiles/rtl_fm.dir/rtl_fm.c.o
Linking C executable rtl_fm
[ 50%] Built target rtl_fm
Scanning dependencies of target rtl_power
[ 55%] Building C object src/CMakeFiles/rtl_power.dir/rtl_power.c.o
Linking C executable rtl_power
[ 55%] Built target rtl_power
Scanning dependencies of target rtl_sdr
[ 60%] Building C object src/CMakeFiles/rtl_sdr.dir/rtl_sdr.c.o
Linking C executable rtl_sdr
[ 60%] Built target rtl_sdr
Scanning dependencies of target rtl_tcp
[ 65%] Building C object src/CMakeFiles/rtl_tcp.dir/rtl_tcp.c.o
Linking C executable rtl_tcp
[ 65%] Built target rtl_tcp
Scanning dependencies of target rtl_test
[ 70%] Building C object src/CMakeFiles/rtl_test.dir/rtl_test.c.o
Linking C executable rtl_test
[ 70%] Built target rtl_test
Scanning dependencies of target rtl_sdr_static
[ 75%] Building C object src/CMakeFiles/rtl_sdr_static.dir/librtlsdr.c.o
[ 80%] Building C object src/CMakeFiles/rtl_sdr_static.dir/tuner_e4k.c.o
[ 85%] Building C object src/CMakeFiles/rtl_sdr_static.dir/tuner_fc0012.c.o
[ 90%] Building C object src/CMakeFiles/rtl_sdr_static.dir/tuner_fc0013.c.o
[ 95%] Building C object src/CMakeFiles/rtl_sdr_static.dir/tuner_fc2580.c.o
[100%] Building C object src/CMakeFiles/rtl_sdr_static.dir/tuner_r82xx.c.o
Linking C static library librtlsdr.a
```

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APRS iGATE su Linux Direwolf
<https://github.com/wb2osz/direwolf>

```
[100%] Built target rtlsdr_static
pi@raspberrypi-igate:~/rtl-sdr/build $ sudo make install
[ 5%] Built target convenience_static
[ 35%] Built target rtlsdr_shared
[ 40%] Built target rtl_adsb
[ 45%] Built target rtl_eeeprom
[ 50%] Built target rtl_fm
[ 55%] Built target rtl_power
[ 60%] Built target rtl_sdr
[ 65%] Built target rtl_tcp
[ 70%] Built target rtl_test
[100%] Built target rtlsdr_static
Install the project...
-- Install configuration: "Release"
-- Installing: /etc/udev/rules.d/rtl-sdr.rules
-- Installing: /usr/local/lib/pkgconfig/librtlsdr.pc
-- Installing: /usr/local/include/rtl-sdr.h
-- Installing: /usr/local/include/rtl-sdr_export.h
-- Installing: /usr/local/lib/librtlsdr.so.0.5git
-- Installing: /usr/local/lib/librtlsdr.so.0
-- Installing: /usr/local/lib/librtlsdr.so
-- Installing: /usr/local/lib/librtlsdr.a
-- Installing: /usr/local/bin/rtl_sdr
-- Removed runtime path from "/usr/local/bin/rtl_sdr"
-- Installing: /usr/local/bin/rtl_tcp
-- Removed runtime path from "/usr/local/bin/rtl_tcp"
-- Installing: /usr/local/bin/rtl_test
-- Removed runtime path from "/usr/local/bin/rtl_test"
-- Installing: /usr/local/bin/rtl_fm
-- Removed runtime path from "/usr/local/bin/rtl_fm"
-- Installing: /usr/local/bin/rtl_eeeprom
-- Removed runtime path from "/usr/local/bin/rtl_eeeprom"
-- Installing: /usr/local/bin/rtl_adsb
-- Removed runtime path from "/usr/local/bin/rtl_adsb"
-- Installing: /usr/local/bin/rtl_power
-- Removed runtime path from "/usr/local/bin/rtl_power"
```

```
pi@raspberrypi-igate:~/rtl-sdr/build $ sudo ldconfig
```

verificare la presenza di questa libreria, diversamente installarla:

```
sudo apt-get install libusb-1.0-0-dev          INSTALLATA!
```

START di direwolf

```
*****
$sudo rtl_fm -f 144.80M -p 48 -o 4 - | direwolf -c /home/pi/direwolf/sdr.conf -t 0 -n 1 -r 24000 -b 16 -
*****
```

l'eseguibile che manderà in esecuzione direwolf è rtl_fm al quale daremo in pasto il file di configurazione sdr.conf

sdr.conf example

```
# sdr.conf
# Sample configuration for SDR read-only IGate.
#
# We might not have an audio output device so set to null.
# We will override the input half on the command line.
ADEVICE null null
CHANNEL 0
MYCALL IW9HHF
# First you need to specify the name of a Tier 2 server.
# The current preferred way is to use one of these regional rotate addresses:
#
#       noam.aprs2.net           - for North America
#       soam.aprs2.net          - for South America
```

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APRS iGATE su Linux Direwolf
<https://github.com/wb2osz/direwolf>

```
# euro.aprs2.net      - for Europe and Africa
# asia.aprs2.net     - for Asia
# aunz.aprs2.net     - for Oceania
```

```
IGSERVER euro.aprs2.net
```

```
# You also need to specify your login name and passcode.
# Contact the author if you can't figure out how to generate the passcode.
# inserire il passcode (fare riferimento al sito http://www.ir3ip.net/act/aprs.php per generarlo)
```

```
IGLOGIN IW9HHF XXXXXXXXXXXX
```

```
#
AGWPORT 8000
#KISSPORT 8001
```

```
# That's all you need for a receive only IGate which relays
# messages from the local radio channel to the global servers.
```

```
#
#Personalizzazione del BEACON APRS (impostare le proprie coordinate
PBEACON sendto=IG delay=0:30 every=15:00 symbol="igate" overlay=R lat=XX^XX.XXN long=XX^XX.XXE
comment="iGate APRS"
```