Tutorial de Embedded Linux

Primeiramente é necessário a definição da escolha do Toolchain, e no meu caso escolhi um pré-construido chamado CrossToll-NG:

- O clone do github:

```
guilherme@guilherme-VirtualBox:~$ git clone https://github.com/crosstool-ng/crosstool-ng.git
Cloning into 'crosstool-ng'...
remote: Enumerating objects: 41245, done.
remote: Counting objects: 100% (1950/1950), done.
remote: Compressing objects: 100% (1107/1107), done.
remote: Total 41245 (delta 902), reused 1572 (delta 798), pack-reused 39295
Receiving objects: 100% (41245/41245), 15.56 MiB | 1.09 MiB/s, done.
Resolving deltas: 100% (26115/26115), done.
```

- Abrindo diretórios doe encontrando o arquivo Dockerfile:

```
guilherme@guilherme-VirtualBox:~$ ls
a.out          code.c       Downloads   Public                            Templates
arquivo.txt    code.o       Pictures    SEI-GuilhermeVitorDosSantosRodrigues    teste.txt
beerme.sh      crosstool-ng programa    SEI-GUILHERMEVITORDOSSANTOSRODRIGUES    testeutf8.txt
code           Desktop      program.c   syscont.py                        Videos
code1          Documents    program.o   temp                              www.google.com.br
guilherme@guilherme-VirtualBox:~$ cd crosstol-ng
bash: cd: crosstol-ng: No such file or directory
guilherme@guilherme-VirtualBox:~$ cd crosstool-ng
guilherme@guilherme-VirtualBox:~/crosstool-ng$ ls
bash-completion  configure.ac  ct-ng.in  issue_template.md  licenses.d  Makefile.am  README.md  testi
bootstrap        contrib       debian    kconfig            m4          packages     samples    TODO
config           COPYING       docs      LICENSE            maintainer  paths.sh.in  scripts
guilherme@guilherme-VirtualBox:~/crosstool-ng$ cd testing
guilherme@guilherme-VirtualBox:~/crosstool-ng/testing$ cd docker
guilherme@guilherme-VirtualBox:~/crosstool-ng/testing/docker$ ls
alpine3.15   centos7         common-scripts  docker-remove-all.sh  gentoo-amd64  ubuntu18.04
archlinux    centos-stream9  dmgr.sh         fedora35              mint20-amd64  ubuntu21.10
guilherme@guilherme-VirtualBox:~/crosstool-ng/testing/docker$ cd ubuntu21.10
guilherme@guilherme-VirtualBox:~/crosstool-ng/testing/docker/ubuntu21.10$ ls
Dockerfile
```

- Checando as dependências do Dockerfile e verificando se todas as bibliotecas estão instaladas:

```
FROM ubuntu:21.10
ARG CTNG_UID=1000
ARG CTNG_GID=1000
RUN groupadd -g $CTNG_GID ctng
RUN useradd -d /home/ctng -m -g $CTNG_GID -u $CTNG_UID -s /bin/bash ctng

# Non-interactive configuration of tzdata
ENV DEBIAN_FRONTEND noninteractive
ENV DEBCONF_NONINTERACTIVE_SEEN true
RUN { echo 'tzdata tzdata/Areas select Etc'; echo 'tzdata tzdata/Zones/Etc select UTC'; } | debconf-set-sele
ons

RUN apt-get update
RUN apt-get install -y gcc g++ gperf bison flex texinfo help2man make libncurses5-dev \
    python3-dev autoconf automake libtool libtool-bin gawk wget bzip2 xz-utils unzip \
    patch libstdc++6 rsync git
RUN wget -O /sbin/dumb-init https://github.com/Yelp/dumb-init/releases/download/v1.2.5/dumb-init_1.2.5_x86_6
RUN chmod a+x /sbin/dumb-init
RUN echo 'export PATH=/opt/ctng/bin:$PATH' >> /etc/profile
ENTRYPOINT [ "/sbin/dumb-init", "--" ]
~
~
~
~
~
~
~
~
~
~
~
~
"Dockerfile" 20L, 853C                                                          1,1             A
```

- Executar o arquivo bootstrap

```
guilherme@guilherme-VirtualBox:~/crosstool-ng$ ./bootstrap
INFO  :: *** Generating package version descriptions
INFO  :: Master packages: android-ndk autoconf automake avr-libc binutils bison
cloog dtc duma elf2flt expat gcc gdb gettext glibc glibc-ports gmp gnuprumcu isl
 libelf libiconv libtool linux ltrace m4 make mingw-w64 moxiebox mpc mpfr musl n
curses newlib-nano newlib picolibc strace uClibc-ng zlib
INFO  :: Generating 'config/versions/android-ndk.in'
INFO  :: Generating 'config/versions/autoconf.in'
INFO  :: Generating 'config/versions/automake.in'
INFO  :: Generating 'config/versions/avr-libc.in'
INFO  :: Generating 'config/versions/binutils.in'
INFO  :: Generating 'config/versions/bison.in'
INFO  :: Generating 'config/versions/cloog.in'
INFO  :: Generating 'config/versions/dtc.in'
INFO  :: Generating 'config/versions/duma.in'
INFO  :: Generating 'config/versions/elf2flt.in'
INFO  :: Generating 'config/versions/expat.in'
INFO  :: Generating 'config/versions/gcc.in'
INFO  :: Generating 'config/versions/gdb.in'
INFO  :: Generating 'config/versions/gettext.in'
```

- Executando o configure

```
guilherme@guilherme-VirtualBox:~/crosstool-ng$ ./configure --enable-local
checking for a BSD-compatible install... /usr/bin/install -c
checking whether build environment is sane... yes
checking for a thread-safe mkdir -p... /usr/bin/mkdir -p
checking for gawk... gawk
checking whether make sets $(MAKE)... yes
checking whether make supports nested variables... yes
checking how to create a pax tar archive... gnutar
checking whether make supports nested variables... (cached) yes
checking whether to enable maintainer-specific portions of Makefiles... yes
checking build system type... x86_64-pc-linux-gnu
checking host system type... x86_64-pc-linux-gnu
checking whether ln -s works... yes
checking whether install takes --strip-program option... yes
checking for ggrep... no
checking for grep... grep
checking for absolute path to grep... /usr/bin/grep
```

- Executando o make e o make install

```
guilherme@guilherme-VirtualBox:~/crosstool-ng$ make
/usr/bin/make  all-recursive
make[1]: Entering directory '/home/guilherme/crosstool-ng'
Making all in kconfig
make[2]: Entering directory '/home/guilherme/crosstool-ng/kconfig'
  LEX      lexer.lex.c
  YACC     parser.tab.c
parser.y:103.1-11: warning: POSIX Yacc does not support %destructor [-Wyacc]
  103 | %destructor {
      | ^~~~~~~~~~~
/usr/bin/make  all-am
make[3]: Entering directory '/home/guilherme/crosstool-ng/kconfig'
  CC       conf.o
  CC       confdata.o
  CC       expr.o
  CC       symbol.o
  CC       preprocess.o
  CC       util.o
  CC       parser.tab.o
  CC       lexer.lex.o
```

```
  CC       nconf-expr.o
  CC       nconf-symbol.o
  CC       nconf-preprocess.o
  CC       nconf-util.o
  CC       nconf-parser.tab.o
  CC       nconf-lexer.lex.o
  CCLD     nconf
  CC       mconf.o
  CC       lxdialog/checklist.o
  CC       lxdialog/inputbox.o
  CC       lxdialog/menubox.o
  CC       lxdialog/textbox.o
  CC       lxdialog/util.o
  CC       lxdialog/yesno.o
  CCLD     mconf
make[3]: Leaving directory '/home/guilherme/crosstool-ng/kconfig'
make[2]: Leaving directory '/home/guilherme/crosstool-ng/kconfig'
make[2]: Entering directory '/home/guilherme/crosstool-ng'
  GEN      ct-ng
  GEN      bash-completion/ct-ng
  GEN      docs/ct-ng.1
make[2]: Leaving directory '/home/guilherme/crosstool-ng'
make[1]: Leaving directory '/home/guilherme/crosstool-ng'
```

```
guilherme@guilherme-VirtualBox:~/crosstool-ng$ make install
Making install in kconfig
make[1]: Entering directory '/home/guilherme/crosstool-ng/kconfig'
/usr/bin/make  install-am
make[2]: Entering directory '/home/guilherme/crosstool-ng/kconfig'
make[3]: Entering directory '/home/guilherme/crosstool-ng/kconfig'
 /usr/bin/mkdir -p '/usr/local/libexec/crosstool-ng'
/usr/bin/mkdir: cannot create directory '/usr/local/libexec': Permission denied
make[3]: *** [Makefile:502: install-pkglibexecPROGRAMS] Error 1
make[3]: Leaving directory '/home/guilherme/crosstool-ng/kconfig'
make[2]: *** [Makefile:874: install-am] Error 2
make[2]: Leaving directory '/home/guilherme/crosstool-ng/kconfig'
make[1]: *** [Makefile:868: install] Error 2
make[1]: Leaving directory '/home/guilherme/crosstool-ng/kconfig'
make: *** [Makefile:2485: install-recursive] Error 1
```

- Utilizando o distclean e o list-samples do ct-ng

```
guilherme@guilherme-VirtualBox:~/crosstool-ng$ ./ct-ng distclean
  CLEAN scripts
  CLEAN log
  CLEAN build dir
  CLEAN .config
```

```
guilherme@guilherme-VirtualBox:~/crosstool-ng$ ./ct-ng list-samples
Status   Sample name
[L...]    aarch64-ol7u9-linux-gnu
[L...]    aarch64-rpi3-linux-gnu
[L...]    aarch64-rpi4-linux-gnu
[L..X]    aarch64-unknown-linux-android
[L...]    aarch64-unknown-linux-gnu
[L...]    aarch64-unknown-linux-uclibc
[L...]    alphaev56-unknown-linux-gnu
[L...]    alphaev67-unknown-linux-gnu
[L...]    arc-arc700-linux-uclibc
[L...]    arc-archs-linux-gnu
[L...]    arc-multilib-elf32
[L...]    arc-multilib-linux-gnu
[L...]    arc-multilib-linux-uclibc
[L...]    arm-bare_newlib_cortex_m3_nommu-eabi
[L...]    arm-cortex_a15-linux-gnueabihf
[L..X]    arm-cortexa5-linux-uclibcgnueabihf
[L...]    arm-cortex_a8-linux-gnueabi
[L..X]    arm-cortexa9_neon-linux-gnueabihf
[L..X]    x86_64-w64-mingw32,arm-cortexa9_neon-linux-gnueabihf
[L...]    armeb-unknown-eabi
[L...]    armeb-unknown-linux-gnueabi
[L...]    armeb-unknown-linux-uclibcgnueabi
[L...]    arm-multilib-linux-uclibcgnueabi
[L...]    arm-nano-eabi
[L...]    arm-ol7u9-linux-gnueabi
[L...]    arm-ol7u9-linux-gnueabihf
[L...]    arm-picolibc-eabi
[L...]    arm-unknown-eabi
[L...]    arm-unknown-linux-gnueabi
```

```
[L...]    arm-unknown-linux-gnueabi
[L..X]    arm-unknown-linux-musleabi
[L...]    arm-unknown-linux-uclibcgnueabi
[L..X]    arm-unknown-linux-uclibcgnueabihf
[L...]    armv6-nommu-linux-uclibcgnueabi
[L...]    armv6-unknown-linux-gnueabi
[L...]    armv6-unknown-linux-gnueabihf
[L...]    armv7-rpi2-linux-gnueabihf
[L...]    armv8-rpi3-linux-gnueabihf
[L...]    armv8-rpi4-linux-gnueabihf
[L...]    avr
[L...]    i586-geode-linux-uclibc
[L...]    i686-centos6-linux-gnu
[L...]    i686-centos7-linux-gnu
[L...]    i686-nptl-linux-gnu
[L...]    i686-ubuntu14.04-linux-gnu
[L...]    i686-ubuntu16.04-linux-gnu
[L..X]    i686-w64-mingw32
[L...]    m68k-unknown-elf
[L...]    m68k-unknown-uclinux-uclibc
[L...]    powerpc-unknown-linux-uclibc,m68k-unknown-uclinux-uclibc
[L...]    mips64el-multilib-linux-uclibc
[L...]    mips64-unknown-linux-gnu
[L...]    mips-ar2315-linux-gnu
[L...]    mipsel-multilib-linux-gnu
[L...]    mipsel-sde-elf
[L...]    mipsel-unknown-linux-gnu
[L...]    mips-malta-linux-gnu
[L...]    mips-unknown-elf
[L...]    mips-unknown-linux-gnu
[L...]    mips-unknown-linux-uclibc
[L..X]    moxie-unknown-elf
```

```
[L...]    mips-unknown-linux-uclibc
[L..X]    moxie-unknown-elf
[L..X]    moxie-unknown-moxiebox
[L..X]    x86_64-multilib-linux-uclibc,moxie-unknown-moxiebox
[L..X]    msp430-unknown-elf
[L...]    nios2-altera-linux-gnu
[L..X]    i686-w64-mingw32,nios2-spico-elf
[L...]    nios2-unknown-elf
[L...]    powerpc-405-linux-gnu
[L...]    powerpc64le-unknown-linux-gnu
[L...]    powerpc64-multilib-linux-gnu
[L...]    powerpc64-unknown-linux-gnu
[L...]    powerpc-8540-linux-gnu
[L...]    powerpc-860-linux-gnu
[L...]    powerpc-e300c3-linux-gnu
[L...]    powerpc-e500v2-linux-gnuspe
[L...]    x86_64-multilib-linux-uclibc,powerpc-unknown-elf
[L...]    powerpc-unknown-linux-gnu
[L...]    powerpc-unknown-linux-uclibc
[L...]    powerpc-unknown_nofpu-linux-gnu
[L...]    pru
[L..X]    riscv32-hifive1-elf
[L..X]    riscv32-unknown-elf
[L..X]    riscv64-unknown-elf
[L..X]    riscv64-unknown-linux-gnu
[L..X]    s390-ibm-linux-gnu
[L..X]    s390-unknown-linux-gnu
[L...]    s390x-ibm-linux-gnu
[L...]    s390x-unknown-linux-gnu
[L...]    sh-multilib-linux-gnu
[L...]    sh-multilib-linux-uclibc
[L...]    sh-unknown-elf
[L...]    sparc64-multilib-linux-gnu
[L...]    sparc-leon-linux-uclibc
```

```
[L...]    sparc-unknown-linux-gnu
[L..X]    tic6x-uclinux
[L...]    x86_64-centos6-linux-gnu
[L...]    x86_64-centos7-linux-gnu
[L...]    x86_64-multilib-linux-gnu
[L..X]    x86_64-multilib-linux-musl
[L...]    x86_64-multilib-linux-uclibc
[L..X]    x86_64-w64-mingw32,x86_64-pc-linux-gnu
[L...]    x86_64-ubuntu14.04-linux-gnu
[L...]    x86_64-ubuntu16.04-linux-gnu
[L...]    x86_64-unknown-linux-gnu
[L...]    x86_64-unknown-linux-uclibc
[L..X]    x86_64-w64-mingw32
[L..X]    xtensa-fsf-elf
[L...]    xtensa-fsf-linux-uclibc
 L (Local)        : sample was found in current directory
 G (Global)       : sample was installed with crosstool-NG
 X (EXPERIMENTAL): sample may use EXPERIMENTAL features
 B (BROKEN)       : sample is currently broken
 O (OBSOLETE)     : sample needs to be upgraded
```

- No menuconfig desse arquivo, retirar o read-only

- Construir toolchain

```
guilherme@guilherme-VirtualBox:~/crosstool-ng$ ./ct-ng build
[INFO ]  Performing some trivial sanity checks
[WARN ]  Number of open files 1024 may not be sufficient to build the toolchain; increasing to 2048
[INFO ]  Build started 20220312.233029
[INFO ]  Building environment variables
[WARN ]  Directory '/home/guilherme/src' does not exist.
[WARN ]  Will not save downloaded tarballs to local storage.
[EXTRA]  Preparing working directories
[EXTRA]  Installing user-supplied crosstool-NG configuration
[EXTRA]  ==================================================================
[EXTRA]  Dumping internal crosstool-NG configuration
[EXTRA]    Building a toolchain for:
[EXTRA]      build  = x86_64-pc-linux-gnu
[EXTRA]      host   = x86_64-pc-linux-gnu
[EXTRA]      target = alphaev4-unknown-elf
[EXTRA]  Dumping internal crosstool-NG configuration: done in 0.14s (at 00:02)
[INFO ]  ==================================================================
[INFO ]  Retrieving needed toolchain components' tarballs
[EXTRA]    Retrieving 'zlib-1.2.11'
[EXTRA]    Verifying SHA512 checksum for 'zlib-1.2.11.tar.xz'
[EXTRA]    Retrieving 'gmp-6.2.1'
[EXTRA]    Verifying SHA512 checksum for 'gmp-6.2.1.tar.xz'
[EXTRA]    Retrieving 'mpfr-4.1.0'
[EXTRA]    Verifying SHA512 checksum for 'mpfr-4.1.0.tar.xz'
[EXTRA]    Retrieving 'isl-0.24'
[EXTRA]    Verifying SHA512 checksum for 'isl-0.24.tar.xz'
[EXTRA]    Retrieving 'mpc-1.2.1'
[EXTRA]    Verifying SHA512 checksum for 'mpc-1.2.1.tar.gz'
[EXTRA]    Retrieving 'binutils-2.38'
[EXTRA]    Verifying SHA512 checksum for 'binutils-2.38.tar.xz'
[EXTRA]    Retrieving 'gcc-11.2.0'
```

```
[EXTRA]    Verifying SHA512 checksum for 'gcc-11.2.0.tar.xz'
[EXTRA]    Retrieving 'newlib-4.1.0'
[EXTRA]    Verifying SHA512 checksum for 'newlib-4.1.0.tar.gz'
[INFO ]  Retrieving needed toolchain components' tarballs: done in 244.17s (at 04:06)
[INFO ]  ==================================================================
[INFO ]  Extracting and patching toolchain components
[EXTRA]    Extracting zlib-1.2.11
[EXTRA]    Patching zlib-1.2.11
[EXTRA]    Extracting gmp-6.2.1
[EXTRA]    Patching gmp-6.2.1
[EXTRA]    Extracting mpfr-4.1.0
[EXTRA]    Patching mpfr-4.1.0
[EXTRA]    Extracting isl-0.24
[EXTRA]    Patching isl-0.24
[EXTRA]    Extracting mpc-1.2.1
[EXTRA]    Patching mpc-1.2.1
[EXTRA]    Extracting binutils-2.38
[04:10] | /home/guilherme/crosstool-ng/scripts/functions: line 298: printf: write error: No space left on devic
e
/home/guilherme/crosstool-ng/scripts/functions: line 298: printf: write error: No space left on device
[ERROR]
[04:10] / /home/guilherme/crosstool-ng/scripts/functions: line 298: printf: write error: No space left on devic
e
[ERROR]  >>
[04:10] / /home/guilherme/crosstool-ng/scripts/functions: line 298: printf: write error: No space left on devic
e
[ERROR]  >>  Build failed in step 'Extracting and patching toolchain components'
[04:10] / /home/guilherme/crosstool-ng/scripts/functions: line 298: printf: write error: No space left on devic
e
[ERROR]  >>        called in step '(top-level)'
[04:10] / /home/guilherme/crosstool-ng/scripts/functions: line 298: printf: write error: No space left on devic
e
[ERROR]  >>
[04:10] / /home/guilherme/crosstool-ng/scripts/functions: line 298: printf: write error: No space left on devic
```

- Executando o programa construído

```
CT_BINUTILS_later_than_2_30=y
CT_BINUTILS_2_30_or_later=y
CT_BINUTILS_later_than_2_27=y
CT_BINUTILS_2_27_or_later=y
CT_BINUTILS_later_than_2_26=y
CT_BINUTILS_2_26_or_later=y

#
# GNU binutils
#
CT_BINUTILS_LINKER_LD=y
CT_BINUTILS_LINKERS_LIST="ld"
CT_BINUTILS_LINKER_DEFAULT="bfd"
# CT_BINUTILS_PLUGINS is not set
CT_BINUTILS_RELRO=m
CT_BINUTILS_DETERMINISTIC_ARCHIVES=y
CT_BINUTILS_EXTRA_CONFIG_ARRAY=""
CT_ALL_BINUTILS_CHOICES="BINUTILS"
# end of Binary utilities


#
# C-library
#
CT_LIBC_NEWLIB=y
# CT_LIBC_NONE is not set
CT_LIBC="newlib"
CT_LIBC_CHOICE_KSYM="NEWLIB"
CT_THREADS="none"
CT_LIBC_NEWLIB_SHOW=y

#
# Options for newlib
#
CT_LIBC_NEWLIB_PKG_KSYM="NEWLIB"
CT_NEWLIB_DIR_NAME="newlib"
CT_NEWLIB_PKG_NAME="newlib"
CT_NEWLIB_SRC_RELEASE=y
# CT_NEWLIB_SRC_DEVEL is not set
CT_NEWLIB_PATCH_ORDER="global"
CT_NEWLIB_V_4_1=y
# CT_NEWLIB_V_3_3 is not set
# CT_NEWLIB_V_3_2 is not set
# CT_NEWLIB_V_3_1 is not set
# CT_NEWLIB_V_3_0 is not set
# CT_NEWLIB_V_2_5 is not set
CT_NEWLIB_VERSION="4.1.0"
CT_NEWLIB_MIRRORS="ftp://sourceware.org/pub/newlib"
CT_NEWLIB_ARCHIVE_FILENAME="@{pkg_name}-@{version}"
CT_NEWLIB_ARCHIVE_DIRNAME="@{pkg_name}-@{version}"
CT_NEWLIB_ARCHIVE_FORMATS=".tar.gz"
CT_NEWLIB_SIGNATURE_FORMAT=""
CT_LIBC_NEWLIB_TARGET_CFLAGS=""
# CT_LIBC_NEWLIB_IO_C99FMT is not set
# CT_LIBC_NEWLIB_IO_LL is not set
# CT_LIBC_NEWLIB_IO_FLOAT is not set
```

```
# CT_LIBC_NEWLIB_IO_C99FMT is not set
# CT_LIBC_NEWLIB_IO_LL is not set
# CT_LIBC_NEWLIB_IO_FLOAT is not set
# CT_LIBC_NEWLIB_IO_POS_ARGS is not set
CT_LIBC_NEWLIB_FVWRITE_IN_STREAMIO=y
CT_LIBC_NEWLIB_UNBUF_STREAM_OPT=y
CT_LIBC_NEWLIB_FSEEK_OPTIMIZATION=y
# CT_LIBC_NEWLIB_DISABLE_SUPPLIED_SYSCALLS is not set
# CT_LIBC_NEWLIB_REGISTER_FINI is not set
CT_LIBC_NEWLIB_ATEXIT_DYNAMIC_ALLOC=y
# CT_LIBC_NEWLIB_GLOBAL_ATEXIT is not set
# CT_LIBC_NEWLIB_LITE_EXIT is not set
# CT_LIBC_NEWLIB_REENT_SMALL is not set
CT_LIBC_NEWLIB_MULTITHREAD=y
# CT_LIBC_NEWLIB_RETARGETABLE_LOCKING is not set
# CT_LIBC_NEWLIB_EXTRA_SECTIONS is not set
CT_LIBC_NEWLIB_WIDE_ORIENT=y
CT_LIBC_NEWLIB_ENABLE_TARGET_OPTSPACE=y
# CT_LIBC_NEWLIB_LTO is not set
# CT_LIBC_NEWLIB_NANO_MALLOC is not set
# CT_LIBC_NEWLIB_NANO_FORMATTED_IO is not set
CT_LIBC_NEWLIB_EXTRA_CONFIG_ARRAY=""
CT_ALL_LIBC_CHOICES="AVR_LIBC BIONIC GLIBC MINGW_W64 MOXIEBOX MUSL NEWLIB NONE UCLIBC_NG"
CT_LIBC_SUPPORT_THREADS_NONE=y
CT_LIBC_PROVIDES_CXA_ATEXIT=y

#
# Common C library options
#
CT_THREADS_NONE=y
# end of C-library

#
# C compiler
```

```
CT_THREADS_NONE=y
# end of C-library

#
# C compiler
#
CT_CC_CORE_NEEDED=y
CT_CC_SUPPORT_CXX=y
CT_CC_SUPPORT_FORTRAN=y
CT_CC_SUPPORT_ADA=y
CT_CC_SUPPORT_OBJC=y
CT_CC_SUPPORT_OBJCXX=y
CT_CC_SUPPORT_GOLANG=y
CT_CC_GCC=y
CT_CC="gcc"
CT_CC_CHOICE_KSYM="GCC"
CT_CC_GCC_SHOW=y

#
# Options for gcc
#
CT_CC_GCC_PKG_KSYM="GCC"
CT_GCC_DIR_NAME="gcc"
CT_GCC_USE_GNU=y
CT_GCC_USE="GCC"
CT_GCC_PKG_NAME="gcc"
CT_GCC_SRC_RELEASE=y
# CT_GCC_SRC_DEVEL is not set
CT_GCC_PATCH_ORDER="global"
CT_GCC_V_11=y
# CT_GCC_V_10 is not set
# CT_GCC_V_9 is not set
# CT_GCC_V_8 is not set
# CT_GCC_V_7 is not set
# CT_GCC_V_6 is not set
```

```
# CT_GCC_V_10 is not set
# CT_GCC_V_9 is not set
# CT_GCC_V_8 is not set
# CT_GCC_V_7 is not set
# CT_GCC_V_6 is not set
# CT_GCC_V_5 is not set
# CT_GCC_V_4_9 is not set
CT_GCC_VERSION="11.2.0"
CT_GCC_MIRRORS="$(CT_Mirrors GNU gcc/gcc-${CT_GCC_VERSION}) $(CT_Mirrors sourceware gcc/releases/gcc-${CT_GCC_V
ERSION})"
CT_GCC_ARCHIVE_FILENAME="@{pkg_name}-@{version}"
CT_GCC_ARCHIVE_DIRNAME="@{pkg_name}-@{version}"
CT_GCC_ARCHIVE_FORMATS=".tar.xz .tar.gz"
CT_GCC_SIGNATURE_FORMAT=""
CT_GCC_later_than_11=y
CT_GCC_11_or_later=y
CT_GCC_later_than_10=y
CT_GCC_10_or_later=y
CT_GCC_later_than_9=y
CT_GCC_9_or_later=y
CT_GCC_later_than_8=y
CT_GCC_8_or_later=y
CT_GCC_later_than_7=y
CT_GCC_7_or_later=y
CT_GCC_later_than_6=y
CT_GCC_6_or_later=y
CT_GCC_later_than_5=y
CT_GCC_5_or_later=y
CT_GCC_later_than_4_9=y
CT_GCC_4_9_or_later=y
CT_CC_GCC_HAS_LIBMPX=y
CT_CC_GCC_ENABLE_CXX_FLAGS=""
CT_CC_GCC_CORE_EXTRA_CONFIG_ARRAY=""
CT_CC_GCC_EXTRA_CONFIG_ARRAY=""
CT_CC_GCC_STATIC_LIBSTDCXX=y
```

```
#
# Optimisation features
#
CT_CC_GCC_USE_GRAPHITE=y
CT_CC_GCC_USE_LTO=y
CT_CC_GCC_LTO_ZSTD=m


#
# Settings for libraries running on target
#
CT_CC_GCC_ENABLE_TARGET_OPTSPACE=y
# CT_CC_GCC_LIBMUDFLAP is not set
# CT_CC_GCC_LIBSSP is not set
# CT_CC_GCC_LIBQUADMATH is not set


#
# Misc. obscure options.
#
CT_CC_CXA_ATEXIT=y
CT_CC_GCC_TM_CLONE_REGISTRY=m
# CT_CC_GCC_DISABLE_PCH is not set
CT_CC_GCC_LDBL_128=m
# CT_CC_GCC_BUILD_ID is not set
CT_CC_GCC_LNK_HASH_STYLE_DEFAULT=y
# CT_CC_GCC_LNK_HASH_STYLE_SYSV is not set
# CT_CC_GCC_LNK_HASH_STYLE_GNU is not set
# CT_CC_GCC_LNK_HASH_STYLE_BOTH is not set
CT_CC_GCC_LNK_HASH_STYLE=""
CT_CC_GCC_DEC_FLOATS_AUTO=y
# CT_CC_GCC_DEC_FLOATS_BID is not set
# CT_CC_GCC_DEC_FLOATS_DPD is not set
# CT_CC_GCC_DEC_FLOATS_NO is not set
CT_CC_GCC_DEC_FLOATS=""
CT_ALL_CC_CHOICES="GCC"
```

```
# Additional supported languages:
#
# CT_CC_LANG_CXX is not set
# CT_CC_LANG_FORTRAN is not set
# end of C compiler


#
# Debug facilities
#
# CT_DEBUG_GDB is not set
# CT_DEBUG_LTRACE is not set
# CT_DEBUG_STRACE is not set
CT_ALL_DEBUG_CHOICES="DUMA GDB LTRACE STRACE"
# end of Debug facilities


#
# Companion libraries
#
# CT_COMPLIBS_CHECK is not set
# CT_COMP_LIBS_CLOOG is not set
# CT_COMP_LIBS_EXPAT is not set
# CT_COMP_LIBS_GETTEXT is not set
CT_COMP_LIBS_GMP=y
CT_COMP_LIBS_GMP_PKG_KSYM="GMP"
CT_GMP_DIR_NAME="gmp"
CT_GMP_PKG_NAME="gmp"
CT_GMP_SRC_RELEASE=y
# CT_GMP_SRC_DEVEL is not set
CT_GMP_PATCH_ORDER="global"
CT_GMP_V_6_2=y
# CT_GMP_V_6_1 is not set
CT_GMP_VERSION="6.2.1"
CT_GMP_MIRRORS="https://gmplib.org/download/gmp https://gmplib.org/download/gmp/archive $(CT Mirrors GNU gmp)"
```