Release Note for Arm GNU-A Toolchain

10.2-2020.11

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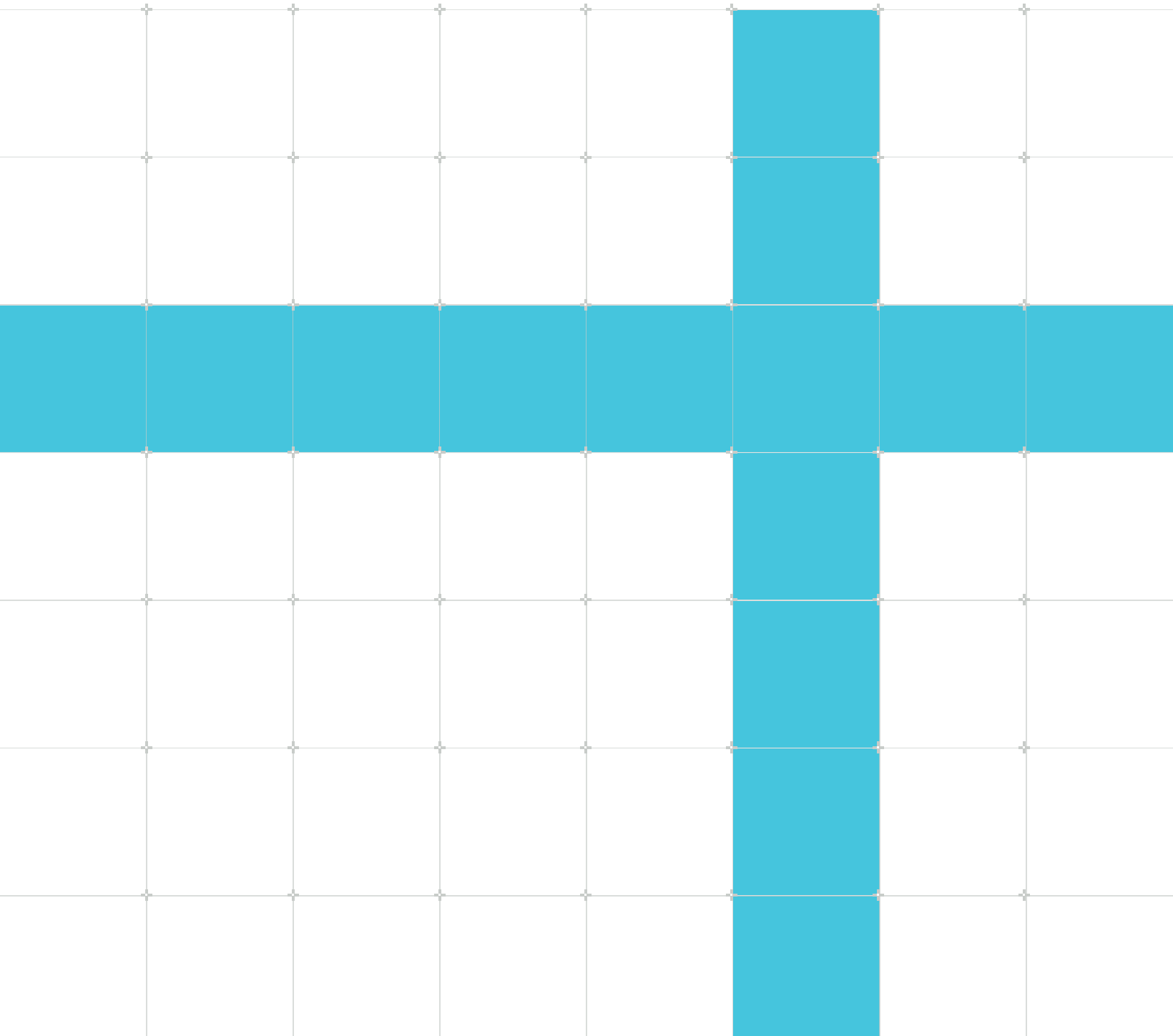

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Release information

Document history

Issue	Date	Confidentiality	Change
10.2_2020.11-01	27 November 2020	Non-Confidential	10.2-2020.11 release
9.2_2019.12-01	19 December 2019	Non-Confidential	9.2-2019.12 release
8.3_2019.03-01	29 March 2019	Non-Confidential	8.3-2019.03 release
8.3_2019.02-01	4 March 2019	Non-Confidential	8.3-2019.02 release
8.2_2019.01-01	15 January 2019	Non-Confidential	8.2-2019.01 release
8.2_2018.11-01	23 November 2018	Non-Confidential	8.2-2018.11 release
8.2_2018.08-01	31 August 2018	Non-Confidential	8.2-2018.08 release

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1. Release Note for Arm GNU-A Toolchain 10.2-2020.11

Version 10.2-2020.11. Released November 27, 2020.

Description

GNU 10.2 cross-toolchain for the A-profile processors

Features

This release includes the following features:

- Based on GCC 10.2 (See https://gcc.gnu.org/gcc-10/changes.html for details).
- Supported targets on Windows(x86_64): AArch64 (bare-metal and Linux), AArch32 (bare-metal, Linux hard-float).
- Supported targets on Linux(x86_64): AArch64 (bare-metal, Linux, Linux big-endian), AArch32 (bare-metal, Linux hard-float).
- Supported targets on Linux(AArch64): AArch64 (bare-metal), AArch32 (bare-metal, Linux hard-float).

Changes since Arm release GCC 9.2-2019.12

This release contains the following changes since Arm release GCC 9.2-2019.12:

- Added support for Arm Neoverse V1.
- Fixed issue where the compiler was generating a conditional branch in Thumb2, which was too far for b{cond} to handle.
- Fixed issue where assembling code containing the UDF instruction results in “unknown mnemonic error” when targeting the AArch64 platform.
- Fixed issue https://gcc.gnu.org/bugzilla/show_bug.cgi?id=96191, where the -fstack-protector option was leaving the canary value in a temporary register on return from the function.

Content

This release includes the following items:

Component	Description
GCC 10.2.1	Repository: git://gcc.gnu.org/git/gcc.git Revision: 3b91aab15443ee150b2ba314a4b26645ce8d713b Release note Sources provided in release source tar ball.
glibc 2.31	Repository: git://sourceware.org/git/glibc.git Revision: 8dc76056654f8013a54678461fb023e988a17256 Release note

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Component	Description
binutils 2.35.1	Repository: git://sourceware.org/git/binutils-gdb.git Revision: d9a444bca66bf4b0d328acb547ca114081f3fd87 Release note
GDB 10.1	Repository: git://sourceware.org/git/binutils-gdb.git Revision: f3fb4a77f29a99ffa2e1460dfa652081cdbd38be GDB-with-python support for Python 2.7.6 (x86_64 builds). GDB-with-python support for Python 2.7.13 (mingw-w64-i686 builds). Release note
libexpat 2.2.5	Repository: https://github.com/libexpat/libexpat.git Revision: Release note
Linux Kernel	Repository: git://git.kernel.org/pub/scm/linux/kernel/git/stable/linux-stable.git Revision: v4.20.13 Release note
libgmp 4.3.2 libisl 0.15 libmpfr 3.1.6 libmpc 1.0.3 libiconv 1.15	Sources provided in release source tar ball.

Known dependencies

Known dependencies are as follows:

- GDB's Python support requires Python compiled with UCS-4 support (built with –enable-unicode=ucs4) for Linux (x86_64) and Windows hosts.
- GDB's Python support requires Python DLL dependencies for Windows host.
- Toolchains dedicated for Windows host require mingw-w64 library, a complete runtime environment for GCC.
- The following executables in the Windows hosted toolchains:
  - aarch64-none-linux-gnu-dwp.exe
  - aarch64-none-linux-gnu-ld.gold.exe
  - arm-none-linux-gnueabihf-dwp
  - arm-none-linux-gnueabihf-ld.gold.exe

  have additional dependencies on the following dlls:

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- libwinpthread-1.dll
- libgcc_s_sjlj-1.dll
- libstdc++-6.dll
- libgcc_s_dw2-1.dll

You can obtain the required dlls from the MinGW-W64 GCC-8.1.0 packages from SourceForge:

- i686-posix-sjlj
- i686-posix-dwarf

The GNU Toolchains

The package names of the released GNU toolchain binaries have the following naming convention:

```
gcc-arm-<Release Version>-<Host>-<Target Triple>.tar.xz
```

Toolchain Package Name	Host OS	Target Description
gcc-arm-10.2-2020.11-aarch64-aarch64-none-elf.tar.xz	AArch64 Linux	AArch64 ELF bare-metal target.
gcc-arm-10.2-2020.11-aarch64-arm-none-eabi.tar.xz	AArch64 Linux	AArch32 bare-metal target.
gcc-arm-10.2-2020.11-aarch64-arm-none-linux-gnueabihf.tar.xz	AArch64 Linux	AArch32 target with hard float.
gcc-arm-10.2-2020.11-mingw-w64-i686-arm-none-eabi.tar.xz	Windows	AArch32 bare-metal target.
gcc-arm-10.2-2020.11-mingw-w64-i686-aarch64-none-elf.tar.xz	Windows	AArch64 ELF bare-metal target.
gcc-arm-10.2-2020.11-mingw-w64-i686-arm-none-linux-gnueabihf.tar.xz	Windows	AArch32 target with hard float.
gcc-arm-10.2-2020.11-mingw-w64-i686-aarch64-none-linux-gnu.tar.xz	Windows	AArch64 GNU/Linux target.
gcc-arm-10.2-2020.11-x86_64-aarch64-none-elf.tar.xz	x86_64 Linux	AArch64 ELF bare-metal target.
gcc-arm-10.2-2020.11-x86_64-aarch64-none-linux-gnu.tar.xz	x86_64 Linux	AArch64 GNU/Linux target.
gcc-arm-10.2-2020.11-x86_64-aarch64_be-none-linux-gnu.tar.xz	x86_64 Linux	AArch64 GNU/Linux big-endian target.
gcc-arm-10.2-2020.11-x86_64-arm-none-eabi.tar.xz	x86_64 Linux	AArch32 bare-metal target.
gcc-arm-10.2-2020.11-x86_64-arm-none-linux-gnueabihf.tar.xz	x86_64 Linux	AArch32 target with hard float.

Host requirements

The host requirements are as follows:

Description	Requirement	Host OS identifier in the toolchain package name
Linux on 64-bit Arm (AArch64)	Ubuntu 18.04 LTS or later RHEL 8 or later	aarch64
Windows on 64-bit x86 (x86_64)	Windows 10	mingw-w64-i686
Linux on 64-bit x86 (x86_64)	Ubuntu 16.04 LTS or later RHEL 7 or later	x86_64

Released files

This release contains the following files:

gcc-arm-*.tar.xz	Toolchain binaries
gcc-arm-src-snapshot-*.tar.xz	Toolchain sources
gcc-arm-src-snapshot-*-manifest.txt	Text manifest file with list of remote repositories for toolchain

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gcc-arm-*-abe-manifest.txt	Input files for Linaro ABE build system.
*.asc	MD5 checksum files for sources and binaries

Installation instructions

Extract XZ compressed release archive using TAR archiving utility:

```
$ tar -xJf <toolchain binary> -C <destination directory>
```

Example for Linux(x86_64) hosted for AArch64 Linux target

```
$ tar -xJf gcc-arm-10.2-2020.11-x86_64-aarch64-none-linux-gnu.tar.xz -C /path/to/
destination/directory
```

Compute and check MD5 checksum of XZ compressed release archives using md5sum utility:

```
$ md5sum --check gcc-arm-10.2-2020.11-x86_64-aarch64-none-linux-gnu.tar.xz.asc
gcc-arm-10.2-2020.11-x86_64-aarch64-none-linux-gnu.tar.xz: OK
```

The prebuilt binary bundles can be un-tarred and executed in place. Assuming a RHEL6 host. Unpack the Linux cross toolchain:

```
$ mkdir install-lnx
$ tar x -C install-lnx -f <filename>.tar.xz
$ PATH=`pwd`/install-lnx/<filename>/bin:$PATH
```

How to build the toolchain from sources

You can build GNU cross-toolchain for the A-profile from sources using Linaro ABE (Advanced Build Environment) and provided ABE manifest files.

Below example shows how to build gcc-arm-aarch64-linux-gnu toolchain from sources using Linaro ABE build system.

Instructions

ABE has a dependency on git-new-workdir and needs this tool to be installed in /usr/local/bin directory:

```
$ wget https://raw.githubusercontent.com/git/git/master/contrib/workdir/git-new-
workdir
$ sudo mv git-new-workdir /usr/local/bin
$ sudo chmod +x /usr/local/bin/git-new-workdir
```

Clone ABE one of the URL below and checkout the stable branch (see Getting ABE):

```
$ git clone https://git.linaro.org/toolchain/abe.git
```

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Create the build directory and change to it. Any name for the directory will work:

```
$ mkdir build && cd build
```

Configure ABE (from the build directory):

```
$ ../abe/configure
```

Download the toolchain manifest file from the GNU Arm toolchain page on developer.arm.com, for example: gcc-arm-aarch64-none-elf-abe-manifest.txt.

Build toolchain (from the build directory):

```
$ ../abe/abe.sh --manifest gcc-arm-aarch64-none-elf-abe-manifest.txt --build all
```

The built toolchain will be installed and available for use in the builds/destdir/x86_64-unknown-linux-gnu/bin/ directory.

Known issues

This release has the following known issues:

- When you decompress the windows packages, the decompression requests permission to overwrite certain files. This is because the files have similar names with different case, which are treated as identical names on a Windows host. You can choose to overwrite the files with identical names.
- When using the toolchains dedicated for the Windows host, if you invoke the compiler from the installed toolchain's bin directory and you use the -flto option without using the -c option, then the linker generates this error message:

  ```
  error: lto-wrapper failed
  collect2.exe: error: ld returned 1 exit status
  ```

  To avoid this error message, you must invoke the compiler from any directory other than the installed toolchain's bin directory.

Ask questions

For any questions, please use the Arm Communities forums.

Report bugs

Please report any bugs via the Linaro Bugzilla.

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