Raspberry Pi - Install GCC 9 and compile C++17 programs

Posted on December 8, 2017 by Paul

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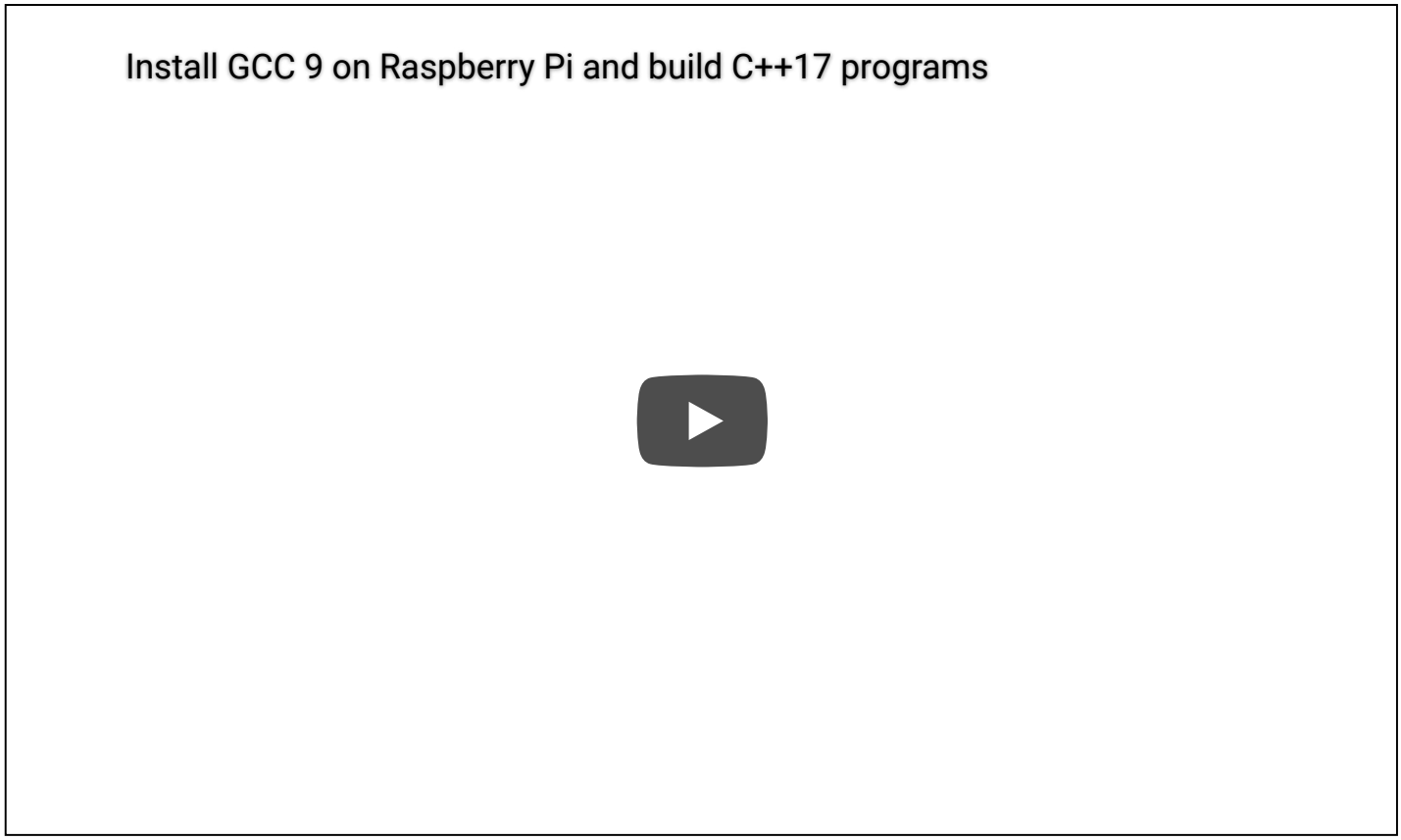
In this article I will show you how to install GCC 9 on your Raspberry Pi system and how to compile C++17 programs. At the time of this writing Raspbian is based on Debian Buster, which comes with the stable but slightly outdated *GCC 8.3* as the default C and C++ compiler.

There is also a video version of this tutorial:



If you want to compile *GCC 9* from sources check my article.

If also you want to install *Clang 8* on your Raspberry Pi, check my article.

First, make sure that your Raspbian is updated:

```
sudo apt update && sudo apt upgrade -y
```

If you don't have *git* on your Raspbian, you can install it with:

```
sudo apt install git
```

Let's start the *GCC* installation process. Open a Terminal and download a binary of *GCC 9*:

```
git clone https://bitbucket.org/sol_prog/raspberry-pi-gcc-binary.git
```

Next, extract the archive, move the extracted compilers to */opt* and remove the repository:

```
cd raspberry-pi-gcc-binary
tar -xjvf gcc-9.1.0-armhf-raspbian.tar.bz2
sudo mv gcc-9.1.0 /opt
cd ..
rm -rf raspberry-pi-gcc-binary
```

Next, we are going to add the new compilers to the path and create a few symbolic links:

```
echo 'export PATH=/opt/gcc-9.1.0/bin:$PATH' >> ~/.bashrc
echo 'export LD_LIBRARY_PATH=/opt/gcc-9.1.0/lib:$LD_LIBRARY_PATH' >> ~/.bashrc
. ~/.bashrc
sudo ln -s /usr/include/arm-linux-gnueabihf/sys /usr/include/sys
sudo ln -s /usr/include/arm-linux-gnueabihf/bits /usr/include/bits
sudo ln -s /usr/include/arm-linux-gnueabihf/gnu /usr/include/gnu
sudo ln -s /usr/include/arm-linux-gnueabihf/asm /usr/include/asm
sudo ln -s /usr/lib/arm-linux-gnueabihf/crti.o /usr/lib/crti.o
sudo ln -s /usr/lib/arm-linux-gnueabihf/crt1.o /usr/lib/crt1.o
sudo ln -s /usr/lib/arm-linux-gnueabihf/crtn.o /usr/lib/crtn.o
```

At this point, you should be able to invoke the compilers with *gcc-9.1*, *g++-9.1* or *gfortran-9.1*.

You can check if everything is properly setup by printing the version of the installed compiler:

```
gcc-9.1 --version
```

This is what I see on my Pi:

```
pi@raspberrypi:~ $ gcc-9.1 --version
gcc-9.1 (GCC) 9.1.0
Copyright (C) 2019 Free Software Foundation, Inc.
This is free software; see the source for copying conditions.  There is NO
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.

pi@raspberrypi:~ $
```

If, at some point in the future, you'll want to get rid of *GCC 9* from your system, all you have to do is to remove the *gcc-9.1.0* folder from */opt*, example:

```
sudo rm -rf /opt/gcc-9.1.0
```

The above procedure will keep *GCC 8.3* as the default C and C++ compiler for any package that depends on it. If you want to compile C programs you could use *gcc-9.1* and for C++ *g++-9.1*.

Let's try to compile and run a C++17 code that uses an if block with init-statement (the example is a bit silly, but it will show you how to compile C++17 programs):

```
#include <iostream>

int main() {
    // if block with init-statement:
    if(int a = 5; a < 8) {
        std::cout << "Local variable a is < 8\n";
    } else {
        std::cout << "Local variable a is >= 8\n";
    }
    return 0;
}
```

Save the above code in a file named *if_test.cpp* and compile it with:

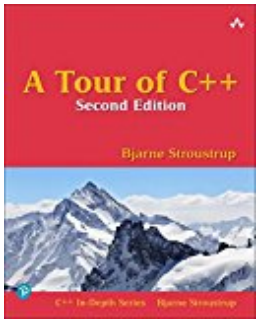
```
g++-9.1 -std=c++17 -Wall -pedantic if_test.cpp -o if_test
```

This is what I see on my Pi:

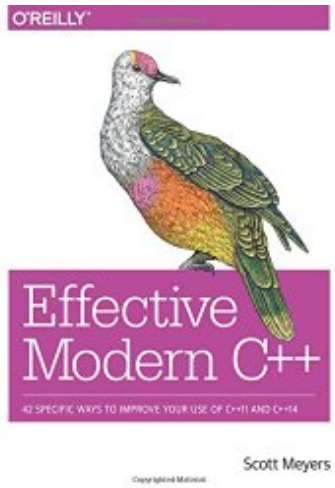
```
pi@raspberrypi:~ $ g++-9.1 -std=c++17 -Wall -pedantic if_test.cpp -o if_test
pi@raspberrypi:~ $ ./if_test
Local variable a is < 8
pi@raspberrypi:~ $
```

For an overview of C++17 support in GCC see https://gcc.gnu.org/projects/cxx-status.html.

If you are interested to learn more about modern C++ I would recommend reading A Tour of C++ by Bjarne Stroustrup.



or Effective Modern C++ by Scott Meyers.



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