nixCraft
Linux and Unix tutorials for new and seasoned sysadmin

How To Compile And Run a C/C++ Code In Linux

last updated December 11, 2017 **in BASH Shell, Debian / Ubuntu, GNU C / C++, Linux, Programming, RedHat and Friends**

I am a new Linux user and student who used to write C or C++ programs on MS-Windows. Now, I am using Ubuntu Linux. How can I compile a C or C++ program on Linux operating systems using bash Terminal application?

To compile a C or C++ program on any Linux distro such as Ubuntu, Red Hat, Fedora, Debian and other Linux distro you need to install:

1. GNU C and C++ compiler collection
2. Development tools
3. Development libraries
4. IDE or text editor to write programs

Step #1: Install C/C++ compiler and related tools

If you are using Fedora, Red Hat, CentOS, or Scientific Linux, use the following yum command to install GNU c/c++ compiler:

```
# yum groupinstall 'Development Tools'
```

If you are using Debian or Ubuntu Linux, type the following apt-get command to install GNU c/c++ compiler:

```
$ sudo apt-get update
$ sudo apt-get install build-essential manpages-dev
```

Step #2: Verify installation

Type the following command to display the version number and location of the compiler on Linux:

```
$ whereis gcc
$ which gcc
$ gcc --version
```

Sample outputs:

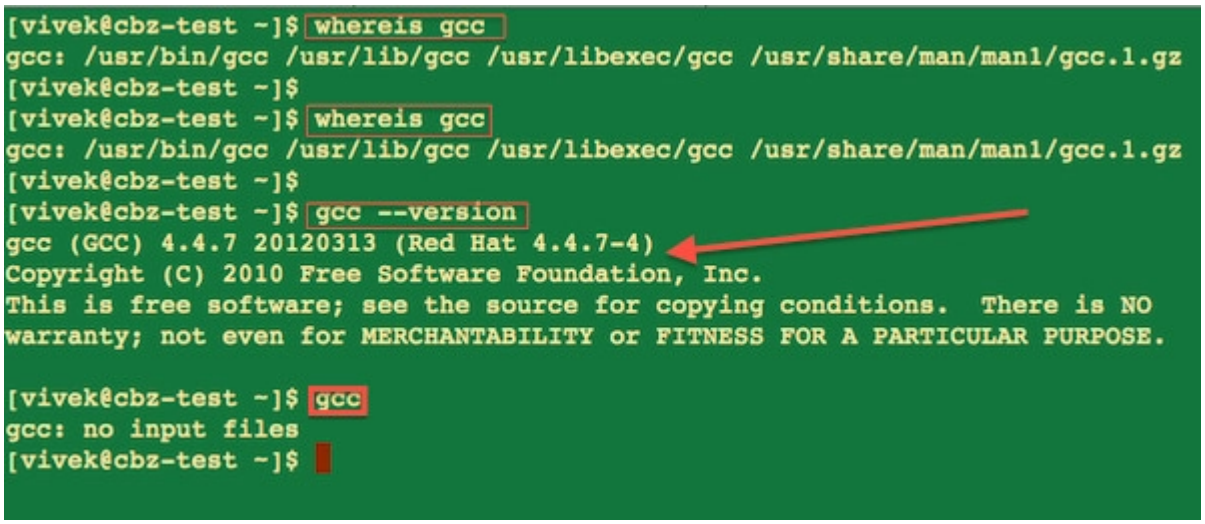

Fig. 01: GNU C/C++ compilers on Linux

How to Compile and Run C/C++ program on Linux

Create a file called demo.c using a text editor such as vi, emacs or joe:

```
#include<stdio.h>
/* demo.c:  My first C program on a Linux */
```

```
int main(void)
{
 printf("Hello! This is a test prgoram.\n");
 return 0;
}
```

How do I compile the program on Linux?

Use any one of the following syntax to compile the program called demo.c:

```
cc program-source-code.c -o executable-file-name
```

OR

```
gcc program-source-code.c -o executable-file-name
```

OR

```
## assuming that executable-file-name.c exists ##
make executable-file-name
```

In this example, compile demo.c, enter:

```
cc     demo.c   -o demo
```

OR

```
## assuming demo.c exists in the current directory ##
make demo
```

If there is no error in your code or C program then the compiler will successfully create an executable file called demo in the current directory, otherwise you need fix the code. To verify this, type:

```
$ ls -l demo*
```

How do I run or execute the program called demo on Linux?

Simply type the the program name:

```
$ ./demo
```

OR

```
$ /path/to/demo
```

Samples session:

Animated gif 01: Compile and run C and C++ program demo

Compiling and running a simple C++ program

Create a program called demo2.C as follows:

```
#include "iostream"
// demo2.C - Sample C++ program
int main(void)
{
    std::cout << "Hello! This is a C++ program.\n";
    return 0;
}
```

To compile this program, enter:

```
g++ demo2.C -o demo2
## or use the following syntax ##
make demo2
```

To run this program, type:

```
./demo2
```

How do I generate symbolic information for gdb and warning messages?

The syntax is as follows C compiler:

```
cc -g -Wall input.c -o executable
```

The syntax is as follows C++ compiler:

```
g++ -g -Wall input.C -o executable
```

How do I generate optimized code on a Linux machine?

The syntax is as follows C compiler:

```
cc -O input.c -o executable
```

The syntax is as follows C++ compiler:

```
g++ -O -Wall input.C -o executable
```

How do I compile a C program that uses math functions?

The syntax is as follows when need pass the `-lm` option with gcc to link with the math libraries:

```
cc myth1.c -o executable -lm
```

How do I compile a C++ program that uses Xlib graphics functions?

The syntax is as follows when need pass the `-lX11` option with gcc to link with the Xlib libraries:

```
g++ fireworks.C -o executable -lX11
```

How do I compile a program with multiple source files?

The syntax is as follows if the source code is in several files (such as light.c, sky.c, fireworks.c):

```
cc light.c sky.c fireworks.c -o executable
```

C++ syntax is as follows if the source code is in several files:

```
g++ ac.C bc.C file3.C -o my-program-name
```

See gcc(1) Linux and Unix man page for more information.

This entry is **7** of **13** in the **Linux GNU/GCC Compilers Tutorial** series. Keep reading the rest of the series:

1. Ubuntu Linux Install GNU GCC Compiler and Development Environment
2. Debian Linux Install GNU GCC Compiler and Development Environment
3. CentOS / RHEL 7: Install GCC (C and C++ Compiler) and Development Tools
4. Download and Install C, C++ Compiler on Red Hat Enterprise Linux 5 (RHEL)
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Posted by: Vivek Gite

The author is the creator of nixCraft and a seasoned sysadmin, DevOps engineer, and a trainer for the Linux operating system/Unix shell scripting. Get the **latest tutorials on SysAdmin, Linux/Unix and open**

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37 comment

pavi April 28, 2014 at 3:10 pm

thank you so much ur solution gave a relief...
it made my gcc command to work

Amani Musomba May 24, 2014 at 1:58 pm

Very nice article.....

Ravi June 18, 2014 at 4:36 pm

In Fig. 01, you did â€œwhereisâ€□ twice. Shouldnâ€™t it be â€œwhichâ€□ the second time?
Thanks for the tut though. Big fan!

Ravi June 18, 2014 at 4:56 pm

Another mistake, please change the following comment:
assuming that executable-file-name.c exists
to
assuming that program-source-code.c exists in the current directory

Eliphaz July 9, 2014 at 1:44 pm

how to compile a program that use math functions and other things?

> **GK** January 13, 2016 at 2:23 am

For the sake of supplying an example, let's say you want to use the cosine function. This is supplied in the Linux math library. The cosine function is called 'cos()'. Similarly, the sine function is called 'sin()'.

First, to find information about how to use them, type "man cos" in a terminal session. This gives you the manual page for the cosine function. The output from 'man' may vary for your system, but it likely tells you three things: 1. first, include the math.h header, 2. cos() takes a 'double' as its argument and it returns a double as its output, 3. to build your program, tell the C compiler to include the math library (-lm).

Here's a sample program that does all of this:

```
#include <stdio.h>   /* provides printf() */
#include <math.h>  /* provides cos() */
/* cosine.c: A sample C program on Linux that calls the cosine function. */
/*   use "cc cosine.c -o cosine.c -lm"   */
int main( void )
{
  printf( "Hello! This program calls the linux cosine function." );
  double intput = 0;
  double output = cos( 0 );  /* get the cosine of zero */
  printf( "The cosine of %f is %f\n", input, output );
  return 0;
}
```

thaidn August 15, 2014 at 3:16 am

Love it!
Thank you. I have a trouble in doing step 1 and 2. But they are fixed.

kameswar September 6, 2014 at 1:38 pm

thank u ,
need pdf of the commands guide to access the c/c++/java.

Jitendra singh October 1, 2014 at 4:57 am

to compile and run a c++ program in ubuntu follow these simple steps:
1 open terminal window.
2 type “gedit” .
3 A gedit window will appear whereyou can write your program.
4 save your program as “filename.cpp” on desktop, “.cpp” is compulsory.
5 open terminal again and type “cd Desktop”.
6 In second line type “g++ filename.cpp”.
7 Type “./a.out”.
NOW YOUR WILL RUN.

> **j s rathore** August 12, 2015 at 4:25 am
>
> very nice to your step.
> thanks

Amber Michaud December 7, 2014 at 3:40 pm

Thanks! This article really helped me to find the GNU compiler in a Linux Operating System and showed me how to compile a C program.

prasanta mangar December 12, 2014 at 11:56 am

dear sir,
what is the procedure to run .cpp program in linux distro debian 5 ?

thank you

meowski January 8, 2015 at 7:49 pm

hello.

just about to get around to learning c along with teaching my sons it. i had no idea where to start, the first page i checked is a bumper bonanza.

thanks for sharing the information.

Amandeep January 10, 2015 at 9:20 am

Thanks Bro.

craaaaaaaig January 11, 2015 at 6:21 am

Very helpful. Thank you...

Rakesh Patni February 3, 2015 at 4:51 pm

Really helpful. Many Thanks

yogesh February 10, 2015 at 2:35 pm

yum groupinstall ‘Development Tools’
im using these command but not install the gcc ....
[samrat@localhost ~]$
[samrat@localhost ~]$ # yum groupinstall ‘Development Tools’
[samrat@localhost ~]$

nixCraft February 10, 2015 at 4:44 pm

First, use sudo or su to become the root and type:

```
yum groupinstall 'Development Tools'
```

OR

```
sudo yum groupinstall 'Development Tools'
```

brajeshtiwary February 22, 2015 at 10:02 pm

so thank

Fernando March 22, 2015 at 3:21 am

Life saver for new Linux/C++ developers. Thank you!!!!

pooyan June 11, 2015 at 3:42 pm

thank you so much for your guidance

Palartu June 16, 2015 at 7:27 pm

Thanky you very much for this description!

Chris S July 6, 2015 at 3:05 pm

Thank you!

Md.Ibrahim August 4, 2015 at 8:19 am

Hello Everyone,
I am Learning C++ in Linux and I am Getting an ERROR for the command or To compile this program as follow:
g++ demo2.c -o demo2
demo2.c:3: error: expected unqualified-id before Ã¢/Ã¢ token

Please give Solution for this.
Thanks in Advance

> **coder** January 12, 2016 at 6:04 pm
>
> You have a syntax error on line 3 of your file: demo2.c
> Make sure you have typed it in correctly.

GK January 13, 2016 at 2:26 am

You need to look carefully at the contents of your file “demo2.c”. From the error message you provided, it looks like there is something wrong on line 3 or otherwise near line 3. Look for this “Ã¢/Ã¢” charactger and remove it. Then retry the g++ command. Good luck to you!

Dileep August 7, 2015 at 10:54 am

Thanking you, awesome information

Sprite August 26, 2015 at 5:41 am

Very useful tutorial, thanks!

Midi September 23, 2015 at 5:05 pm

I have created a c program in which i have to display the contents of file but each time when i run the program it display the error that file can’t be opened the no such file exits.
i don’t know how to give the path of that text file in my c program i have to run this program on linux. please someone help me as soon as possible.
Regards

shelli October 3, 2015 at 6:36 pm

thank you

don bosco January 8, 2016 at 11:09 am

Thank you very much for this page Cyberciti’s team
My age is above 30 and i work a waiter .I learned very thing about computer from the INTERNET. I started using Linux from 2013 and this is the only website i found tutorials of g++ explained from the basics .

khush March 21, 2016 at 8:23 am

i did the same for c program
steps upto gcc progname.c -o prgnam work fine
but when i type ./executablefilename error with Bsh: ./hello permission denied appears.
i am not getting why is this happening.
I installed ubuntu alongside Windows two days ago and using ubuntu for programming for the first time.

sumit panwar July 10, 2016 at 10:12 am

thanks, this use full for me .....

sumit panwar July 10, 2016 at 10:16 am

what is diffrince b/w window and linux related to c .,, like if we creat a program in turbo c ,like if stetment.. are some deffrence to between both li & win////

ChainaT October 11, 2016 at 4:25 am

Thank you so much. I have been tryin to find the place to understand how to compile C++ file in Linux. Yours is the descriptive yet easy to read and follow. Thank so much!!!

ADHI P November 7, 2016 at 2:54 am

I am Learning C++ in Linux and I am Getting an ERROR for the command or To compile this program as follow:
g++ demo2.c -o demo2

Tommy November 9, 2016 at 2:28 am

when i want to display the output. it prints the printf content, but when i use scanner, i dont get an option to input data. Help??

Have a question? Post it on our forum!

Tagged as: c compiler, c compiler for RHEL, c compiler on centos, c compilers, cc command, CC compiler environment variable, g++ command, gcc command, make command, Easy