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# CINT

## What is CINT?

CINT is an interpreter for C and C++ code. It is useful e.g. for situations where rapid development is more important than execution time. Using an interpreter the compile and link cycle is dramatically reduced facilitating rapid development. CINT makes C/C++ programming enjoyable even for part-time programmers.

CINT is written in C++ itself, with slightly less than 400,000 lines of code. It is used in production by several companies in the banking, integrated devices, and even gaming environment, and of course by [ROOT](#) <sup>[1]</sup>, making it the default interpreter for a large number of high energy physicists all over the world.

## Features

CINT covers most of ANSI C (mostly before C99) and ISO C++ 2003. A CINT **script can call compiled classes/functions and compiled code can make callbacks to CINT interpreted functions**. Utilities like `makecint` and `rootcint` automate the process of embedding compiled C/C++ library code as shared objects (as Dynamic Link Library, DLL, or shared library, .so). Source files and shared objects can be **dynamically loaded/unloaded** without stopping the CINT process. CINT offers a gdb like debugging environment for interpreted programs.

## Download

CINT is free software in terms of charge and freedom of utilization: it is licensed under the X11/MIT license. See the included [COPYING](#) <sup>[2]</sup> for details.

**The source of CINT 5.18.00 from 2010-07-02 is available here (tar.gz, 2MB)** <sup>[3]</sup>.

CINT 5.16.19 from 2007-03-19 is available via anonymous ftp:

- [Source package for all platforms \(2MB\)](#) <sup>[4]</sup> (with bash configure script for most of the platforms)
- [Binary package for Windows \(2MB\)](#) <sup>[5]</sup>.

To build the source package do:

```
$ tar xzf cint-5.16.19-source.tar.gz
$ cd cint-5.16.19
$ ./configure
$ gmake
```

The current sources of CINT can be downloaded via subversion. From a bash shell (the `$` is meant to denote the shell prompt), run

```
$ svn co http://root.cern.ch/svn/root/branches/v5-34-00-patches/cint [6] cint
$ cd cint
```

Once you have the sources you can simply update them by running `svn up`.

You can also download a certain version of CINT using subversion:

```
$ svn co http://root.cern.ch/svn/cint/tags/v5-16-19 [7] cint-v5.16.19
$ cd cint-v5.16.19
```

You can build CINT from these sources by running

```
$ ./configure
$ make -j2
```

For windows you will need to install the [cygwin](#) <sup>[8]</sup> package to build CINT from sources.

Before downloading check the [release notes](#) <sup>[9]</sup> of the latest version.

## Portability

CINT works on number of operating systems. Linux, HP-UX, SunOS, Solaris, AIX, Alpha-OSF, IRIX, FreeBSD, NetBSD, NEC EWS4800, NewsOS, BeBox, HI-UX, Windows-NT/95/98/Me, MS-DOS, MacOS, VMS, NextStep, Convex have all been reported as working at some point in time; Linux, Windows, MacOS and Solaris are actively developed. A number of compilers is supported, i.e. GCC, Microsoft Visual C++, Intel's ICC, HP-CC/aCC, Sun-CC/CC5, IBM-xlC, Compac-cxx, SGI-CC, Borland-C++, Symantec-C++, DJGPP, cygwin-GCC.

## The ROOT System

The [ROOT system](#) <sup>[10]</sup> embeds CINT to be able to execute C++ scripts and C++ command line input. CINT also provides extensive RTTI capabilities to ROOT. See the following chapters on how CINT is used in ROOT:

- [Adding Your own Classes to ROOT](#) <sup>[11]</sup>
- [CINT as Dictionary Generator](#) <sup>[12]</sup>
- [CINT as Command Line and Macro Interpreter](#) <sup>[13]</sup>

## The Authors

CINT is developed by [Masaharu Goto](#) <sup>[14]</sup>, who works for Agilent Technologies, Philippe Canal and Paul Russo at [Fermilab](#) <sup>[15]</sup>, and Leandro Franco, Diego Marcos, and Axel Naumann from [CERN](#) <sup>[16]</sup>.

## Limitations

CINT implements a very large subset of C++, but has also [some differences and limitations](#) <sup>[17]</sup>.

## CINT Mailing List

[root-cint@cern.ch](mailto:root-cint@cern.ch) <sup>[18]</sup> is the CINT mailing list. To join the mailing list do the following:

- If you don't have a CERN account, create a [light weight CERN account](#) <sup>[19]</sup>.
- Add yourself to the [root-cint mailing list](#) <sup>[20]</sup>, by clicking on the "Members" tab and then on the "Add me" button.
- To remove yourself from the mailing list click on the "Remove me" button on the same above "Members" page.

The [archive of the mailing list](#) <sup>[21]</sup> is also available; you can also find it on [Nabble.com](#) <sup>[22]</sup>.

## For more detailed CINT information see below:

- [README](#) <sup>[23]</sup>: features, license condition, installation, etc...
- [Releases Notes](#) <sup>[24]</sup>: current revision, recent changes
- [ChangeLog](#) <sup>[24]</sup>: Subversion changes
- [FAQ](#) <sup>[25]</sup>
- [Cint man page](#) <sup>[26]</sup>: command line options, debugger commands
- [Reference](#) <sup>[27]</sup>: reference manual in alphabetical order
- [Commands](#) <sup>[28]</sup>
- [Bytecode compiler](#) <sup>[29]</sup>

- [CINT API](#) <sup>[30]</sup>
- [Error messages](#) <sup>[31]</sup>
- [Limitations \(concepts, ISO compatibility\)](#) <sup>[17]</sup>
- [Limitations \(sizes, lengths\)](#) <sup>[32]</sup>
- [Makecint](#) <sup>[33]</sup>: utility for embedding C/C++ library - reference manual
- [Adding External Libraries](#) <sup>[34]</sup>: embedding C/C++ library - user guide

### External References

A few random pointers concerning CINT:

- Louis Höfler has compiled a [summary on how to build CINT on Windows](#) <sup>[35]</sup>.
- Chris Brody implemented a CINT interface to [libevent](#) <sup>[36]</sup>: <http://code.google.com/p/event-hpp> <sup>[37]</sup>
- [The Computer Language Benchmarks Game](#) <sup>[38]</sup> has tested CINT: <http://shootout.alioth.debian.org/u32/compare.php?lang=cint> <sup>[39]</sup>
- CINT is used in a computer game's AI engine: <http://emergency4.com> <sup>[40]</sup>
- There is a nice how-to on building an [error-checking C++ editor](#) <sup>[41]</sup> with Scintilla and CINT.

### Attachment      Size

cint-5.18.00.tgz <sup>[3]</sup>    2.04 MB

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Source URL: <http://root.cern.ch/drupal/content/cint>

- Links:
- [1] <http://root.cern.ch>
  - [2] <http://root.cern.ch/viewvc/branches/v5-34-00-patches/cint/COPYING>
  - [3] <http://root.cern.ch/drupal/sites/default/files/cint-5.18.00.tgz>
  - [4] <http://root.cern.ch/root/cint-5.16.19-source.tar.gz>
  - [5] <http://root.cern.ch/root/cint-5.16.19-win32.tar.gz>
  - [6] <http://root.cern.ch/svn/root/branches/v5-34-00-patches/cint>
  - [7] <http://root.cern.ch/svn/cint/tags/v5-16-19>
  - [8] <http://www.cywin.com>
  - [9] <http://root.cern.ch/viewvc/branches/v5-34-00-patches/cint/RELNOTE.txt>
  - [10] <http://root.cern.ch/>
  - [11] <http://root.cern.ch/root/Using.html>
  - [12] <http://root.cern.ch/root/CintGenerator.html>
  - [13] <http://root.cern.ch/root/CintInterpreter.html>
  - [14] <mailto:gotom@hanno.jp>
  - [15] <http://fnal.gov>
  - [16] <http://cern.ch>
  - [17] <http://root.cern.ch/viewvc/branches/v5-34-00-patches/cint/doc/limitati.txt>
  - [18] <mailto:root-cint@cern.ch>
  - [19] <https://account.cern.ch/account/Externals/>
  - [20] [https://e-groups.cern.ch/e-groups/Egroup.do?egroupId=10060133&AI\\_USERNAME=RDM&searchField=0&searchMethod=0&searchValue=&pageSize=30&hideSearchFields=false&searchMemberOnly=false&searchAdminOnly=false&AI\\_SESSION=d2pfPsKDGpw5kQw5CvJnhT1GNPI7QkbMW7pyTctBLrXG3Q7vWkrTl-162506713611340887240667](https://e-groups.cern.ch/e-groups/Egroup.do?egroupId=10060133&AI_USERNAME=RDM&searchField=0&searchMethod=0&searchValue=&pageSize=30&hideSearchFields=false&searchMemberOnly=false&searchAdminOnly=false&AI_SESSION=d2pfPsKDGpw5kQw5CvJnhT1GNPI7QkbMW7pyTctBLrXG3Q7vWkrTl-162506713611340887240667)
  - [21] <http://root.cern.ch/root/cinttalk/AboutCint.html>
  - [22] <http://www.nabble.com/CINT-f13997.html>
  - [23] <http://root.cern.ch/viewvc/branches/v5-34-00-patches/cint/README.txt>
  - [24] <http://root.cern.ch/root/ChangeLog-cint.phtml>
  - [25] <http://root.cern.ch/viewvc/branches/v5-34-00-patches/cint/FAQ.txt>
  - [26] <http://root.cern.ch/root/Cint.phtml?man>
  - [27] <http://root.cern.ch/viewvc/branches/v5-34-00-patches/cint/doc/ref.txt>
  - [28] <http://root.cern.ch/root/CintCommands.html>
  - [29] <http://root.cern.ch/viewvc/branches/v5-34-00-patches/cint/doc/bytecode.txt>
  - [30] <http://root.cern.ch/viewvc/branches/v5-34-00-patches/cint/doc/cintapi.txt>
  - [31] <http://root.cern.ch/viewvc/branches/v5-34-00-patches/cint/doc/message.txt>
  - [32] <http://root.cern.ch/viewvc/branches/v5-34-00-patches/cint/doc/limitnum.txt>
  - [33] <http://root.cern.ch/viewvc/branches/v5-34-00-patches/cint/doc/makecint.txt>
  - [34] <http://root.cern.ch/viewvc/branches/v5-34-00-patches/cint/doc/extlib.txt>
  - [35] <http://www.awake24.de/documents/cint/Compiling%20CINT%20on%20Windows.htm>
  - [36] <http://monkey.org/~provos/libevent/>
  - [37] <http://code.google.com/p/event-hpp>
  - [38] <http://shootout.alioth.debian.org>
  - [39] <http://shootout.alioth.debian.org/u32/compare.php?lang=cint>
  - [40] <http://emergency4.com>
  - [41] [http://www.codeproject.com/KB/cpp/Personal\\_C\\_\\_\\_Compiler.aspx](http://www.codeproject.com/KB/cpp/Personal_C___Compiler.aspx)