

BRL-CAD
Release 7.28.0
<http://brlcad.org/>

BRL-CAD is a powerful cross-platform open source combinatorial Constructive Solid Geometry (CSG) solid modeling system that includes an interactive 3D solid geometry editor, a network-distributed symmetric multiprocessing high-performance ray-tracer, network-distributed framebuffer support, image and signal-processing tools, ray-tracing support for rendering and geometric analysis, path-tracing and photon mapping support for realistic image synthesis, animation capabilities, ray-tracing and numerical processing libraries, a system performance analysis benchmark suite, an embedded scripting interface, and a robust high-performance geometric representation and analysis library.

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GETTING STARTED

This README file exists only to provide you a brief roadmap to the contents of the BRL-CAD distribution.

Some platforms have additional platform-specific documentation that should be consulted after reading this file:

doc/README.AIX	-- IBM's Advanced Interactive eXecutive OS
doc/README.BSD	-- FreeBSD, NetBSD, OpenBSD, etc.
doc/README.IRIX	-- SGI IRIX and IRIX64
doc/README.Linux	-- Various Linux distributions
doc/README.MacOSX	-- Apple Mac OS X
doc/README.Solaris	-- Oracle Solaris, OpenIndiana (Illumos), etc.
doc/README.Windows	-- Microsoft Windows

The information on how to install and operate the software, to become involved with the development of the package, or to run the benchmark performance test suite have each become sufficiently large that their details are covered in more detail in standalone documents. For more details on what BRL-CAD provides, see the documentation provided on

the website at <http://brlcad.org/>.

Information relevant to those interested in the source code is contained in the HACKING and COPYING files. See doc/benchmark.tr file for benchmark suite information. There is a variety of other documentation and information also available in the doc/ directory.

Please note that this distribution package does not include the various military-specific model analysis tools such as MUVES, GIFT, SAR, SLAVE, VAST, etc., nor does it include any military geometry databases. If you desire to have access to this material, please contact one of the BRL-CAD developers.

COMPILE AND INSTALL

See the INSTALL file for details on configuring, compiling, and installing BRL-CAD. In order to compile and install BRL-CAD from a source distribution, the build tool CMake is required (minimum version currently required is 2.8.4) - see the website at <http://www.cmake.org> for source and binary installers. CMake is also available in many Linux and *BSD distributions.

Once CMake is installed, the following steps may be taken for a full default install (starting with a source tarball):

```
tar -xvzf brlcad-X.Y.Z.tar.gz
mkdir brlcad-build
cd brlcad-build
cmake ../brlcad-X.Y.Z
make
make install
```

where "X.Y.Z" is the version number of BRL-CAD. For those who prefer a curses interface, substitute ccmake for cmake above. If the graphical interface available from CMake is installed cmake-gui may be substituted for cmake. These interfaces will display the various configuration options available when building BRL-CAD, or the options may be set directly via command line -D options. The configure wrapper script may be substituted for cmake in the above steps for a more autotools-like configuration experience.

Users on multiprocessor systems will be able to speed up their builds by passing the -j option to make (e.g. make -j4, assuming GNU make).

Once the build completes and assuming you have proper filesystem permissions, you should be able to begin the installation by running the "make install" . By default, the package is configured to install entirely into /usr/brlcad/.

You will need to add /usr/brlcad/bin to your path (or whatever path the variable CMAKE_INSTALL_PREFIX was set to during configure) in order for the BRL-CAD binaries to be in your path.

BENCHMARK

After the build successfully completes, you will be able to verify basic functionality by running the BRL-CAD Benchmark. Running the benchmark suite is integrated into the build system such that any time after running CMake (in the cmake gui, configure and generate must both be performed) you may run:

```
make benchmark
```

If the build is successful, you will see "CORRECT" numbers and a performance summary at the end. The "vgr" line effectively shows you approximately how much faster your machine is to a VAX 11/780. After installing BRL-CAD, you may run the 'benchmark' tool as well to run the BRL-CAD Benchmark.

See the paper in doc/benchmark.tr for information on analyzing and comparing the results of the benchmark tests in more detail.

COMMUNICATION

You are invited to participate in the InterNet (aka "ARPANET") electronic mailing list on the BRL-CAD software. There are various BRL-CAD mailing lists available on the project website at http://sourceforge.net/mail/?group_id=105292 including three developer-oriented lists, a user list, and a read-only news announcement list. See the posted archives to get a feel for the volume of list traffic for each list and to read/search past discussions.

On-line web forums are likewise available on the project site at http://sourceforge.net/forum/?group_id=105292

A variety of information on BRL-CAD is available via the World-Wide-Web. Papers, documentation, and the software repository may be found at:

```
http://brlcad.org
```

In addition to the above, there is an official BRL-CAD IRC channel on the Freenode network that may be reached by joining #brlcad on irc.freenode.net connecting via port 6667. For first-time users, there is a web-based IRC client available for certain browsers at:

```
http://irc.brlcad.org
```

IRC is the preferred method of communication to interact with the BRL-CAD developers, to get involved with the project, obtain support, or provide direct feedback.

BUG REPORTS AND FEATURE REQUESTS

Please report any bugs encountered to the project bug tracker at http://sourceforge.net/tracker/?group_id=105292&atid=640802

Similarly, please post any request for feature enhancements or support request to http://sourceforge.net/tracker/?group_id=105292&atid=640805 and http://sourceforge.net/tracker/?group_id=105292&atid=640803 respectively.

DISTRIBUTION DETAILS

BRL-CAD is freely available and distributed in both binary and source code form through the BRL-CAD project website on Sourceforge:

<http://sf.net/projects/brlcad/>

The package is similarly available via a Subversion repository. To obtain the latest, follow the directions for anonymous checkout at:

http://sourceforge.net/svn/?group_id=105292

There is also a paid-for full-service support distribution available for those interested through SURVICE Engineering, Inc., and the Survivability/Vulnerability Information Analysis Center (SURVIAC).

SURVICE provides their own BRL-CAD distribution that comes with commercial support, documentation, and installation media. Full technical assistance is provided to their commercial distributions by phone, FAX, postal mail, or e-mail. Agencies of the Federal Government may acquire the full service distribution with a MIPR or OGA funds transfer.

For further details, contact:

BRL-CAD Distribution
SURVIAC Aberdeen Satellite Office
4695 Millennium Drive
Belcamp, MD 210017-1505 USA

BACKGROUND INFORMATION

BRL-CAD is the primary tri-service solid modeling CAD system used by the U.S. military to model weapons systems for vulnerability and lethality analyses. The solid modeling system is frequently used in a wide range of military and industrial application including in the design and analysis of vehicles, mechanical parts, and architecture.

The package has also been used in radiation dose planning, medical visualization, computer graphics education, CSG concepts and modeling education, and system performance benchmark testing among other purposes.

Actively developed since 1979, BRL-CAD is a collection of more than 400 tools, utilities, and applications comprising more than a million lines of source code. BRL-CAD supports a great variety of geometric representations including an extensive set of traditional CSG primitive implicit solids such as boxes, ellipsoids, cones, and tori, as well as explicit solids made from closed collections of Uniform B-Spline Surfaces, Non-Uniform Rational B-Spline (NURBS) surfaces, n-Manifold Geometry (NMG), and purely faceted mesh geometry. All geometric objects may be combined using boolean set-theoretic CSG operations including union, intersection, and difference.

BRL-CAD has been under active development for more than 20 years with a portability heritage that includes systems such as a DEC VAX-11/780 running 4.3 BSD; DECstations running ULTRIX; Silicon Graphics 3030, 4D "IRIS", O2, Onyx, and Origin systems running various versions of IRIX; Sun Microsystems Sun-3 and Sun-4 Sparcs running SunOS; the Cray 1, Cray X-MP, Cray Y-MP, and Cray 2 running UNICOS; DEC Alpha AXP running OSF/1; Apple Macintosh II running A/UX; iPSC/860 Hypercube running NX/2; the Alliant FX/8, FX/80, and FX/2800; Gould/Encore SEL PowerNode 6000/9000 and NP1; NeXT workstations; IBM RS/6000; HPPA 9000/700 running HPUNIX; Ardent/Stardent; Encore Multi-Max; and much much more. BRL-CAD's extensive portability of course also includes a plethora of common desktop and server versions of BSD, IRIX, Solaris, Mac OS X, Linux, and Windows.

The BRL-CAD package is intentionally designed to be extensively cross-platform and is actively developed on and maintained for many common operating system environments including for BSD, IRIX, Linux, Solaris, Mac OS X, and Windows among others. The entire package is distributed in binary and source code form as free open source software (FOSS), provided under Open Source Initiative (OSI) approved license terms. BRL-CAD was released as open source in December 2004. See the COPYING file for more details.

FUTURE EVENTS

It is expected that new releases of BRL-CAD will be issued approximately once a month. A new release is scheduled for distribution at the beginning of every month, usually being posted sometime within the first week of every month.

Depending on need, demand, and activity, additional releases may also be made. The additional releases will be heavily dependent upon the level of user involvement and contributions in particular. Information about new releases will be routinely provided by electronic mail to recipients of this software as well as to the BRL-CAD NEWS mailing list:

http://sourceforge.net/mail/?group_id=105292

Periodically, training and user group meetings are provided with announcements similarly posted to the BRL-CAD NEWS mailing list. Several BRL-CAD developers also regularly attend the ACM Siggraph conference, the ACM Solid and Physical Modeling conference, and other similar conferences, conventions, and symposiums as well.

GETTING HELP

Feel free to direct any unanswered questions relating to BRL-CAD via e-mail or to any of the other contact means described above in the COMMUNICATIONS section of this document.

Best Wishes,
The BRL-CAD Development Team
devs@brlcad.org