

The Birds Project

The libBirds Library, Software Life Cycle Environment Configuration Index

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Version 0.5

10/31/01

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1. Purpose of the SECI Document

This is a standard "Software Life Cycle Environment Configuration Index" document, corresponding to the guidelines in RTCA DO-178B. In the words of DO-178B, it "identifies the configuration of the software life cycle environment. This index is written to aid reproduction of the hardware and software life cycle environment, for software regeneration, reverification, or software modification."

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2. Development Environment

2.1. Recognized Tools

Only free software tools are recognized as acceptable.

2.1.1. Requirements Development Methods and Tools

The software application **Do178Builder** by Ronald Burkey is used in the Requirements Process. It is a documentation tool that helps to provide a structured approach towards developing the high-level requirements.

2.1.2. Design Methods and Tools

The software application **Do178Builder** by Ronald Burkey is used in the Design Process. It is a documentation tool that helps to provide a structured approach towards deriving low-level requirements from high-level requirements.

2.1.3. Coding Tools

Except where specified, refer to <http://www.gnu.org> for more information about all of the tools mentioned below.

The Red Hat **Source Navigator** program is used as an Integrated Development Environment (IDE) from which source-code may be edited and managed. Refer to <http://sources.redhat.com>.

The GNU **indent** program is used as a C-language source-code formatter.

The GNU **gcov** program is used for coverage analysis.

The **lclint** program is recognized as an acceptable static-code analyzer. Refer to <http://lclint.cs.virginia.edu/>.

The **cccc** program is recognized as an acceptable software-metric tool. Refer to <http://cccc.sourceforge.net/>. The GNU **wc** program is also acceptable, for getting simple line-counts and byte-counts.

The GNU **gdb** program is the debugger to be used. The GNU **ddd** program is the graphical front-end used with **gdb** (which by itself is a command-line oriented program). For Motorola 68K/Coldfire targets, a very desirable **gdb** patch is available from <ftp://www.cybertec.com.au/pub/bdm/> allowing use of the Motorola Background Debug Mode (BDM).

The GNU **cvs** program is used as a version-control system.

The GNU **make** program is used for managing software builds.

2.1.4. Compilers

The GNU **gcc** program is the only C compiler recognized. It is also used as a C++ compiler when required. Refer to <http://www.gnu.org> for more information.

The **gcc** compiler is available both as a native compiler for use when the target CPU is the same type as the CPU of the development system, and as a cross-compiler for use when the target CPU type differs from that of the development system. The compiler itself is provided by GNU as source code which can theoretically itself be compiled to support any given target/development CPU pairing. In practice this is somewhat difficult, and it is better to obtain a pre-built compiler in the desired configuration.

Here is a list of some recognized pre-built compiler configurations:

1. Native Intel 'x86 CPU. Usually provided automatically with any Intel-based Linux distribution.
2. Native PowerPC CPU. Usually provided automatically with any PowerPC-based Linux distribution.
3. Cross-compiler for Motorola 68K/Coldfire target from Intel 'x86 development platform. Available from <http://www.fiddes.net/coldfire>.

4. Cross-compiler for Motorola 68K/Coldfire target from PowerPC development platform. Available from <http://www.fiddes.net/coldfire>, but not as an executable -- it requires compiling.
5. Cross-compiler for ARM target from Intel 'x86 development platform. There are several distinct pre-built forms available. Here's one:
<http://www.lart.tudelft.nl/lartware/compile-tools/>.

2.1.5. Linkers

The GNU linker **ld** is used. Like the GNU **gcc** compiler, the linker is available in many forms, depending on whether it is used natively or as a cross-linker.

The linker is always provided from the same sources as the compiler.

2.1.6. Loaders

The libBirds library depends on no loader as such, since it is a reusable library rather than a stand-alone system. For native use, such as debugging/testing on a desktop computer, the program-loader of the desktop operating system suffices. For debugging/testing code in a target environment, the debugging tool (**gdb**) is used to load the program into the target.

For actual use in a target environment, the developer is expected to provide his own loader program, not a part of libBirds.

2.2. Hardware Platforms and Operating Systems

2.2.1. Source-Code Development

Source-code may be developed on any platform providing the 'Recognized Tools' listed earlier. These platforms include Microsoft Windows, UNIX, BSD, and Linux. However, it is **easier** to get some of these platforms set up than others. A Linux Intel-based platform is easiest to set up, and a Microsoft Windows platform is the hardest.

In practice, the libBirds development effort has used SuSE Linux PPC and Intel platforms interchangeably, and has not used the other platforms mentioned.

2.2.2. Documentation Development

The **Do178Builder** documentation development tool can be used on any version of Linux, or on Microsoft Windows, BSD, UNIX, or (theoretically) Mac OS X. In practice, the libBirds development effort has used only SuSE Linux PPC and Intel, and Microsoft Windows.

2.2.3. Test Environment

All testing is performed in an Intel-based SuSE Linux environment.

2.2.4. Target Platform

No official libBirds-related target development has been performed. No specific target platform has been specified by libBirds.

2.3. Qualified Tools

TBD

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Version 1.1, March 2000

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