

List of build automation software

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Build automation involves scripting or automating the process of compiling computer source code into binary code. Below is a list of notable tools associated with automating build processes.

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Make-based tools

- GNU make, a widely used make implementation with a large set of extensions
- make, a classic Unix build tool
- mk, developed originally for Version 10 Unix and Plan 9, and ported to Unix as part of plan9port
- MPW Make, developed for the classic Mac OS and similar to but not compatible with Unix make; the modern macOS (OS X) comes with both GNU make and BSD make; available as part of Macintosh Programmer's Workshop as a free, unsupported download from Apple
- nmake
- PVCS-make, basically follows the concept of make but with a noticeable set of unique syntax features^[1]

Non-Make-based tools

- Apache Ant, popular for Java platform development and uses an XML file format
- Apache Buildr, open-source build system, Rake-based, gives full power of scripting in Ruby with integral support for most abilities wanted in a build system
- Apache Maven, a Java platform tool for dependency management and automated software build
- ASDF LISP buildsystem for building LISP projects
- A-A-P, a Python-based build tool
- Bazel, Google's own build tool, now publicly available in Beta.
- BitBake, a Python-based tool with the special focus of distributions and packages for embedded Linux cross compilation
- Boot, a Java build and dependency management tool written in Clojure
- Buck, a build system developed and used by Facebook
- Buildout, a Python-based build system for creating, assembling and deploying applications from multiple parts
- Cabal, common architecture for building applications and libraries in the programming language Haskell
- FinalBuilder, for Windows software developers. FinalBuilder provides a graphical IDE to both create and run build projects in a single application. Final builder also includes the ability the execute unit test, deploy web projects or install and test applications.
- Flowtracer
- Gradle, an open-source build and automation system with a Groovy-based domain specific language (DSL), combining features of Apache Ant and Apache Maven with additional features like a reliable

incremental build

- Grunt, a build tool for front-end web development
- Gulp, another build tool for front-end
- IncrediBuild
- Leiningen, a tool providing commonly performed tasks in Clojure projects, including build automation
- MSBuild, the Microsoft build engine
- NAnt, a tool similar to Ant for the .NET Framework
- Ninja, a small build system focused on speed by using build scripts generated by higher-level build systems
- Perforce Jam, a generally enhanced, ground-up tool which is similar to Make
- Psake, domain-specific language and build automation tool written in PowerShell
- Rake, a Ruby-based build tool
- sbt (Scala Simple Build Tool), a build tool built on a Scala-based DSL
- SCons, Python-based, with integrated functionality similar to autoconf/automake
- Stack, a tool to build Haskell projects, manage their dependencies (compilers and libraries), and for testing and benchmarking.
- Tweaker, allowing task definitions to be written in any languages (or intermixed languages) while providing a consistent interface for them all
- Visual Build, a graphical user interface software for software builds
- Waf is a Python-based tool for configuring, compiling and installing applications. It is a replacement for other tools such as Autotools, Scons, CMake or Ant

Build script generation tools

- BuildAMation, a multi-platform tool, using a declarative syntax in C# scripts, that builds C/C++ code in a terminal using multiple threads, or generates project files for Microsoft Visual Studio, Xcode or MakeFiles.
- configure
- CMake, a cross-platform tool that generates files for the native build environment, such as makefiles for Unix or Workspace files for Visual Studio
- GNU Build System (aka autotools), a collection of tools for portable builds. These in particular include Autoconf and Automake, cross-platform tools that together generate appropriate localized makefiles.
- GYP (Generate Your Projects) - Created for Chromium; it is another tool that generates files for the native build environment
- imake
- Meson, a multi-platform build system optimized for performance and usability
- OpenMake Software Meister
- Premake, a Lua-based tool for making makefiles, Visual Studio files, Xcode projects, and more
- qmake

Continuous integration tools

- AnthillPro, build automation with pipeline support for deployment automation and testing. Cross-platform, cross-language
- Apache Continuum - discontinued
- Bamboo, continuous integration software
- Buildbot, a Python-based software development continuous integration tool which automates the compile/test cycle
- BuildIT, a free graphical build or task tool for Windows with an emphasis on simplicity and ease of use
- CABIE Continuous Automated Build and Integration Environment, open source, written in Perl
- CruiseControl, for Java and .NET
- DeployBot, a hosted continuous integration service
- Go continuous delivery, open source, cross-platform
- Hudson, an extensible continuous integration engine
- Jenkins, an extensible continuous integration engine, forked from Hudson

- Shippable, a hosted cloud platform that provides hosted continuous integration, deployment, and testing to GitHub and Bitbucket repositories
- TeamCity
- Team Foundation Server, an extensible continuous integration engine from Microsoft
- Travis CI, a hosted continuous integration service
- Visual Studio Team Services, provides Azure hosted build capabilities

Configuration management tools

- Ansible (Python-based)
- CFEngine
- Chef (Ruby-based)
- Distelli
- OpenMake Software Release Engineer
- Otter
- Puppet (Ruby-based)
- Salt (Python-based)
- Rex (Perl-based)

Meta-build tools

A meta-build tool is capable of building many different projects using a subset of existing buildtools. Since these usually provide a list of packages to build, they are also often called package managers.

- Pkgsrc, package manager of NetBSD and other operating systems.
- Portage, package manager of the Gentoo Linux distribution
- Nix, functional package manager for the NixOS Linux distribution
- Guix, functional package manager for the GuixSD Linux distribution
- Collective Knowledge, cross-platform package manager to rebuild software environment for research workflows

Other tools

- checkinstall, checkinstall is a program that monitors an installation procedure, and creates a standard package for your distribution.
- Open Build Service, a hosted service to help build packages for various Linux distributions

Comparison of build automation software

Tool name	Description language	License
A-A-P	recipe	GNU GPL
Ant	XML	Apache License 2.0
AnthillPro	Wraps Make, Ant, Maven, MsBuild, Nant, etc. for controlled build, deploy, test processes.	Proprietary
Bamboo	continuous integration	Proprietary
BuildAMation	C# for build scripts, XML for high level dependencies	New BSD License
Buildr	Ruby	Apache License 2.0
Boot	Clojure	Eclipse Public License
Capistrano	XML	MIT License
CMake	uses CMakeLists.txt file	New BSD License
Collective Knowledge Framework	Python scripts with JSON API and JSON meta-description	New BSD License
Continuum	?	Apache License 2.0
CruiseControl	XML	BSD-style license
ElectricCommander	flexible including gmake, bmake, emake and ant scripts	Proprietary
FinalBuilder	graphical IDE with support for Ant/NAnt, MSBuild, JScript, VBScript, IronPython, PowerShell	Proprietary
Gradle	Groovy-based DSL	Apache License 2.0
Jenkins	continuous integration	MIT License
Leiningen	Clojure	Eclipse Public License
make	uses Makefile	Various
Maven	Project Object Model	Apache License 2.0
Meson build system	custom DSL	Apache License 2.0
MPW Make	?	?
MSBuild	XML	MIT
NAnt	XML	GNU GPL
nmake	uses Makefile	?
Open Build Service	uses various package and image description formats (spec, dsc, ARCH, kiwi)	GNU GPL
OpenMake Software Meister	ActivePerl	Proprietary with free license (Artistic License) for small teams
Perforce Jam	uses Jamfile	Proprietary, free license for open source projects
Rake	Ruby	MIT License
sbt (Simple Build Tool)	Scala-based DSL	New BSD License
SCons	Python	MIT License
Team Foundation Server	MSBuild, Windows Presentation Foundation, JSON - REST interfaces, Programmatic (Can generate definitions through code)	Proprietary
Tweaker (build tool)	Any (Ant, bash, batch, C, Erlang, Java, SQL, and VBScript by default, with 3rd party interface for extensions)	GNU GPLv3
Visual Build	XML	Proprietary
Waf	Python	New BSD License

References

1. mailing list discussion about porting PVCS-make scripts to GNU-make (<http://lists.gnu.org/archive/html/bug-make/2003-02/msg00019.html>), From: Paul D. Smith, Subject: Re: PVCS to GNU, Date: 2003-02-25

External links

- List of build automation software on Software Wiki, an external wiki

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