

What is PostgreSQL?

PostgreSQL is a powerful, open source object-relational database system. It has more than 15 years of active development and a proven architecture that has earned it a strong reputation for reliability, data integrity, and correctness. It runs on all major operating systems, including Linux and Windows. It includes most SQL:2008 data types. It also supports storage of binary large objects, including pictures, sounds, or video. It has native programming interfaces and exceptional documentation.



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About PostgreSQL

An enterprise class database, PostgreSQL boasts sophisticated features such as Multi-Version Concurrency Control (MVCC), point in time recovery, tablespaces, asynchronous replication, nested transactions (savepoints), online/hot backups, a sophisticated query planner/optimizer, and write ahead logging for fault tolerance. It supports international character sets, multibyte character encodings, Unicode, and it is locale-aware for sorting, case-sensitivity, and formatting. It is highly scalable both in the sheer quantity of data it can manage and in the number of concurrent users it can accommodate. There are active PostgreSQL systems in production environments that manage in excess of 4 terabytes of data.

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PostgreSQL 9.0 • Server Administration



PostgreSQL 9.0

Server Administration

Volume II



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Abstract

Welcome to the *PostgreSQL 9.0 Official Documentation*! After many years of development, PostgreSQL has become feature-complete in many areas. This release shows a targeted approach to adding features (e.g., authentication, monitoring, space reuse), and adds capabilities defined in the later SQL standards.

Part III.

Server Administration

This part covers topics that are of interest to a PostgreSQL database administrator. This includes installation of the software, set up and configuration of the server, management of users and databases, and maintenance tasks. Anyone who runs a PostgreSQL server, even for personal use, but especially in production, should be familiar with the topics covered in this part.

The information in this part is arranged approximately in the order in which a new user should read it. But the chapters are self-contained and can be read individually as desired. The information in this part is presented in a narrative fashion in topical units. Readers looking for a complete description of a particular command should see *Part VI* – Vol.IV.

The first few chapters are written so they can be understood without prerequisite knowledge, so new users who need to set up their own server can begin their exploration with this part. The rest of this part is about tuning and management; that material assumes that the reader is familiar with the general use of the PostgreSQL database system. Readers are encouraged to look at *Part I* – Vol.I and *Part II* – Vol.I for additional information.

Chapter 16.

Installation from Source Code on Windows

It is recommended that most users download the binary distribution for Windows, available as a one-click installer package from the PostgreSQL website. Building from source is only intended for people developing PostgreSQL or extensions.

There are several different ways of building PostgreSQL on Windows. The simplest way to build with Microsoft tools is to install a modern version of the Microsoft Platform SDK and use the included compiler. It is also possible to build with the full Microsoft Visual C++ 2005 or 2008. In some cases that requires the installation of the Platform SDK in addition to the compiler.

It is also possible to build PostgreSQL using the GNU compiler tools provided by MinGW, or using Cygwin for older versions of Windows.

Finally, the client access library (libpq) can be built using Visual C++ 7.1 or Borland C++ for compatibility with statically linked applications built using these tools.

Building using MinGW or Cygwin uses the normal build system, see *Chapter 15* (page 21) and the specific notes in *Section 15.8.5* (page 47) and *Section 15.8.2* (page 44). These builds cannot generate 64-bit binaries. Cygwin is not recommended and should only be used for older versions of Windows where the native build does not work, such as Windows 98. MinGW is only recommended if you are building other modules using it. The official binaries are built using Visual Studio.

16.1. Building with Visual C++ 2005

PostgreSQL can be built using the Visual C++ compiler suite from Microsoft. These compilers can be either from Visual Studio, Visual Studio Express or recent versions of the Platform SDK. If you do not already have a Visual Studio environment set up, the easiest way us to use the compilers in the Platform SDK, which is a free download from Microsoft.

PostgreSQL supports the compilers from Visual Studio 2005 and Visual Studio 2008. When using the Platform SDK only, or when building for 64-bit Windows, only Visual Studio 2008 is supported.

The tools for building using Visual C++, are in the `src/tools/msvc` directory. When building, make sure there are no tools from MinGW or Cygwin present in your system PATH. Also, make sure you have all the required Visual C++ tools available in the PATH. In Visual Studio, start the Visual Studio Command Prompt. In the Platform SDK, start the CMD shell listed under the SDK on the Start Menu. If you wish to build a 64-bit version, you must use the 64-bit version of the command, and vice versa. All commands should be run from the `src\tools\msvc` directory.

Before you build, you may need to edit the file `config.pl` to reflect any configuration options you want to change, or the paths to any third party libraries to use. The complete configuration is determined by first reading and parsing the file `config_default.pl`, and then apply any changes from `config.pl`. For example, to specify the location of your Python installation, put the following in `config.pl`:

```
$config->{python} = 'c:\python26';
```

You only need to specify those parameters that are different from what's in `config_default.pl`.

If you need to set any other environment variables, create a file called `buildenv.pl` and put the required commands there. For example, to add the path for bison when it's not in the PATH, create a file containing:

```
$ENV{PATH}=$ENV{PATH} . ';c:\some\where\bison\bin';
```

16.1.1. Requirements

The following additional products are required to build PostgreSQL. Use the `config.pl` file to specify which directories the libraries are available in.

Microsoft Platform SDK

It is recommended that you upgrade to the latest available version of the Microsoft Platform SDK, available for download from <http://www.microsoft.com/downloads/>.

You must always include the Windows Headers and Libraries part of the SDK. If you install the Platform SDK including the Visual C++ Compilers, you don't need Visual Studio to build.

ActiveState Perl

ActiveState Perl is required to run the build generation scripts. MinGW or Cygwin Perl will not work. It must also be present in the PATH. Binaries can be downloaded from <http://www.activestate.com/> (Note: version 5.8 is required, the free Standard Distribution is sufficient).

The following additional products are not required to get started, but are required to build the complete package. Use the `config.pl` file to specify which directories the libraries are available in.

ActiveState TCL

Required for building PL/TCL (Note: version 9.0 is required, the free Standard Distribution is sufficient).

Bison and Flex

Bison and Flex are required to build from Git, but not required when building from a release file. Note that only Bison 1.875 or versions 2.2 and later will work. Also, Flex version 2.5.31 or later is required. Bison can be downloaded from <http://gnuwin32.sourceforge.net>. Flex can be downloaded from <http://www.postgresql.org/ftp/misc/winflex/>.

Diff

Diff is required to run the regression tests, and can be downloaded from <http://gnuwin32.sourceforge.net/>.

Gettext

Gettext is required to build with NLS support, and can be downloaded from <http://gnuwin32.sourceforge.net/>. Note that binaries, dependencies and developer files are all needed.

MIT Kerberos

Required for Kerberos authentication support. MIT Kerberos can be downloaded from <http://web.mit.edu/Kerberos/dist/index.html>.

libxml2 and libxslt

Required for XML support. Binaries can be downloaded from <http://zlatkovic.com/pub/libxml> or source from <http://xmlsoft.org/>. Note that libxml2 requires `iconv`, which is available from the same download location.

openssl

Required for SSL support. Binaries can be downloaded from <http://www.slproweb.com/products/Win32OpenSSL.html> or source from <http://www.openssl.org/>.

ossp-uuid

Required for UUID-OSSP support (contrib only). Source can be downloaded from <http://www.ossp.org/pkg/lib/uuid/>.

Python

Required for building PL/Python. Binaries can be downloaded from <http://www.python.org/>.

zlib

Required for compression support in `pg_dump` and `pg_restore`. Binaries can be downloaded from <http://www.zlib.net/>.

16.1.2. Special considerations for 64-bit Windows

PostgreSQL will only build for the x64 architecture on 64-bit Windows, there is no support for Itanium processors.

Mixing 32- and 64-bit versions in the same build tree is not supported. The build system will automatically detect if it's running in a 32- or 64-bit environment, and build PostgreSQL accordingly. For this reason, it is important to start the correct command prompt before building.

To use a server-side third party library such as `python` or `openssl`, this library *must* also be 64-bit. There is no support for loading a 32-bit library in a 64-bit server. Several of the third party libraries that PostgreSQL supports may only be available in 32-bit versions, in which case they cannot be used with 64-bit PostgreSQL.

16.1.3. Building

To build all of PostgreSQL in release configuration (the default), run the command:

```
build
```

To build all of PostgreSQL in debug configuration, run the command:

```
build DEBUG
```

To build just a single project, for example `psql`, run the commands:

```
build psql
build DEBUG psql
```

To change the default build configuration to debug, put the following in the `buildenv.pl` file:

```
$ENV{CONFIG}="Debug";
```

It is also possible to build from inside the Visual Studio GUI. In this case, you need to run:

```
perl mkvcbuild.pl
```

from the command prompt, and then open the generated `pgsql.sln` (in the root directory of the source tree) in Visual Studio.

16.1.4. Cleaning and installing

Most of the time, the automatic dependency tracking in Visual Studio will handle changed files. But if there have been large changes, you may need to clean the installation. To do this, simply run the `clean.bat` command, which will automatically clean out all generated files. You can also run it with the `dist` parameter, in which case it will behave like `make distclean` and remove the `flex/bison` output files as well.

By default, all files are written into a subdirectory of the debug or release directories. To install these files using the standard layout, and also generate the files required to initialize and use the database, run the command:

```
install c:\destination\directory
```

16.1.5. Running the regression tests

To run the regression tests, make sure you have completed the build of all required parts first. Also, make sure that the DLLs required to load all parts of the system (such as the Perl and Python DLLs for the procedural languages) are present in the system path. If they are not, set it through the `builddenv.pl` file. To run the tests, run one of the following commands from the `src\tools\msvc` directory:

```
vcregress check  
vcregress installcheck  
vcregress plcheck  
vcregress contribcheck
```

To change the schedule used (default is parallel), append it to the command line like:

```
vcregress check serial
```

For more information about the regression tests, see *Chapter 29* (page 270).

16.1.6. Building the documentation

Building the PostgreSQL documentation in HTML format requires several tools and files. Create a root directory for all these files, and store them in the subdirectories in the list below.

OpenJade 1.3.1-2

Download from http://sourceforge.net/projects/openjade/files/openjade/1.3.1/openjade-1_3_1-2-bin.zip/download and uncompress in the subdirectory `openjade-1.3.1`.

DocBook DTD 4.2

Download from <http://www.oasis-open.org/docbook/sgml/4.2/docbook-4.2.zip> and uncompress in the subdirectory `docbook`.

DocBook DSSSL 1.79

Download from <http://sourceforge.net/projects/docbook/files/docbook-dsssl/1.79/docbook-dsssl-1.79.zip/download> and uncompress in the subdirectory `docbook-dsssl-1.79`.

ISO character entities

Download from <http://www.oasis-open.org/cover/ISOEnts.zip> and uncompress in the subdirectory `docbook`.

Edit the `buildenv.pl` file, and add a variable for the location of the root directory, for example:

```
$ENV{DOCRROOT}='c:\docbook';
```

To build the documentation, run the command `bulddoc.bat`. Note that this will actually run the build twice, in order to generate the indexes. The generated HTML files will be in `doc\src\sgml`.

16.2. Building libpq with Visual C++ or Borland C++

Using Visual C++ 7.1-9.0 or Borland C++ to build `libpq` is only recommended if you need a version with different debug/release flags, or if you need a static library to link into an application. For normal use the MinGW or Visual Studio or Platform SDK method is recommended.

To build the `libpq` client library using Visual Studio 7.1 or later, change into the `src` directory and type the command:

```
nmake /f win32.mak
```

To build a 64-bit version of the `libpq` client library using Visual Studio 8.0 or later, change into the `src` directory and type in the command:

```
nmake /f win32.mak CPU=AMD64
```

See the `win32.mak` file for further details about supported variables.

To build the `libpq` client library using Borland C++, change into the `src` directory and type the command:

```
make -N -DCFG=Release /f bcc32.mak
```

16.2.1. Generated files

The following files will be built:

```
interfaces\libpq\Release\libpq.dll
```

The dynamically linkable frontend library

`interfaces\libpq\Release\libpqdll.lib`

Import library to link your programs to `libpq.dll`

`interfaces\libpq\Release\libpq.lib`

Static version of the frontend library

Normally you do not need to install any of the client files. You should place the `libpq.dll` file in the same directory as your applications executable file. Do not install `libpq.dll` into your `Windows`, `System` or `System32` directory unless absolutely necessary. If this file is installed using a setup program, then it should be installed with version checking using the `VERSIONINFO` resource included in the file, to ensure that a newer version of the library is not overwritten.

If you are planning to do development using `libpq` on this machine, you will have to add the `src\include` and `src\interfaces\libpq` subdirectories of the source tree to the include path in your compiler's settings.

To use the library, you must add the `libpqdll.lib` file to your project. (In Visual C++, just right-click on the project and choose to add it.)

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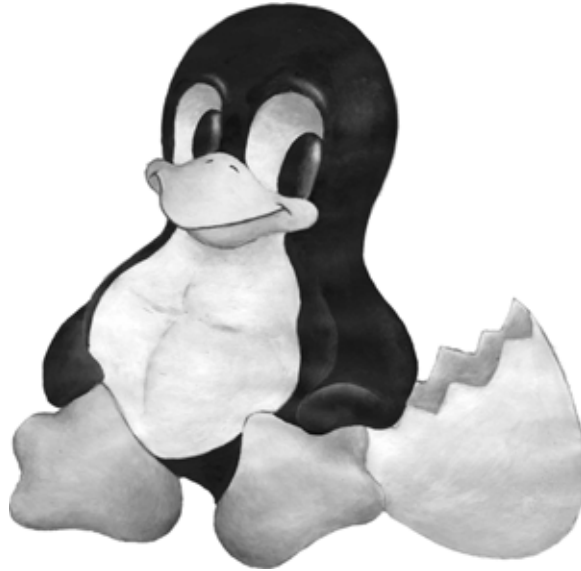
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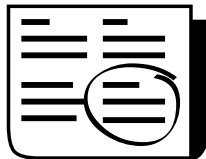


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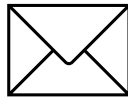


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