

# PGDBG Installation Guide

Version 2017



**PGI Compilers and Tools**

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# Chapter 1.

## RELEASE 2017 INTRODUCTION

Welcome to Release 2017 of the PGDBG® for x86-compatible processor-based workstations, servers, and clusters running versions of the Linux, Apple macOS, and Microsoft Windows operating systems. This installation information applies to the PGDBG installation package available from The Portland Group.

### 1.1. Product Overview

PGDBG is licensed software available from The Portland Group. You must agree to an End-User License Agreement when you install the software.

PGDBG supports debugging programs running on local and remote systems.

#### **Local debugging**

If you want to debug a program running on the system where you have launched PGDBG, you are doing local debugging and you need license keys on that local system.

#### **Remote debugging**

If you want to debug a program running on a system other than the one on which PGDBG is launched, you are doing remote debugging and you need license keys on both the local and the remote systems.

### 1.2. Release Components

Release 2017 of PGDBG includes PGI's multi-thread graphical debugger.

#### 1.2.1. Co-installation Requirements

If the program to be debugged is running on the same system as PGDBG all you need to debug locally are valid license keys.

If the program to be debugged is running on a different system than PGDBG, then a PGI license must be installed on that remote system and valid license keys must be in placed there. The remote system must be running a Linux operating system. The license required to launch PGDBG on your local system (before beginning a remote debug session) is freely available as part of the PGI Community Edition.

## 1.3. Supported Operating Systems

PGDBG supports Linux, Apple macOS, and Microsoft Windows operating systems.



[www.pgroup.com/support/install.htm](http://www.pgroup.com/support/install.htm) lists any new operating system distributions that may be explicitly supported by PGDBG. If your operating system is newer than any of the operating systems in the preceding list, the installation may still be successful.

### Linux

Linux operating systems with support for x86-64 compatible processors are designated 64-bit. These are the only distributions on which the PGI compilers and tools will fully install.

Most modern operating systems include support for Intel Hyper-threading (HT). Further, most modern Linux distributions support the *Native Posix Threads Library (NPTL)*. Parallel executables generated using the *OpenMP* and auto-parallelization features of the PGI compilers will automatically make use of NPTL on distributions where it is available. In addition, the *PGDBG* debugger is capable of debugging executables built using either NPTL or earlier *pthread* implementations.

Many modern multi-socket AMD Opteron processor-based servers use a *NUMA* (Non-Uniform Memory Access) architecture in which the memory latency from a given processor to a given portion of memory can vary. Newer Linux distributions include NUMA libraries that can be leveraged by a compiler and associated runtime libraries to optimize placement of data in memory.

### Windows

PGI 2017 for Windows supports most of the features of the version for Linux environments.

### Apple macOS

PGI 2017 for macOS supports most of the features of the version for Linux environments. Except where noted in PGI documentation, the PGI compilers and tools on macOS function identically to their Linux counterparts.



Support for 32-bit development was deprecated in PGI 2016 and will no longer be available as of the PGI 2017 release. PGI 2017 will only be available for 64-bit operating systems and will not include the ability to compile 32-bit applications for execution on either 32- or 64-bit operating systems.

## 1.4. Product Support

All new PGI licenses include free PGI Support Service during the money-back guarantee period.

The PGI Support Service provides access to technical support and other benefits including:

- ▶ Technical support requests may be sent in a number of ways:
  - ▶ Faxed to +1-503-682-2637
  - ▶ By using the online support request form available at:

[www.pgroup.com/support/support\\_request.php](http://www.pgroup.com/support/support_request.php)

Phone support is not currently available.

- ▶ Release upgrades for licensed product(s) at no additional cost, except for any administrative fee that may apply.
- ▶ Notification by email when maintenance releases occur and are available for download and installation.
- ▶ Full license fee credits on Product upgrades, except for any administrative fee that may apply. "Product upgrades" refer to exchanging one Product license for a more expensive Product license, and is not the same as a Version or Release upgrade previously referenced.
- ▶ Full license fee credits on user-count upgrades, except for any administrative fee that may apply.



**Important** To continue receiving these benefits after the money-back guarantee period days, you can purchase an extension to your PGI Support Service. Extensions are available in yearly increments.

Contact [sales@pgroup.com](mailto:sales@pgroup.com) if you would like information regarding the support service for the PGI products you have purchased.

# Chapter 2.

## INSTALLATION OVERVIEW

This section provides an overview of the steps required to successfully install PGDBG. The remaining sections provide the details of each of the steps. Licensing was covered in [Release 2017 Introduction](#). [PGDBG Installations on Linux](#) describes how to install PGDBG in a generic manner on Linux, [Installations on macOS](#) describes how to install on an Apple macOS system, and [Installations on Microsoft Windows](#) describes how to install on a Windows system.

### 2.1. Before You Begin

Before you begin the installation, it is advantageous to understand the flow of the installation process. There are two stages of the process:

- ▶ Prepare to install – verifying that you have all the required information and software.
- ▶ Install the software – installing the software appropriate for your operating system.

The following illustration provides a high-level overview of the PGI installation process.

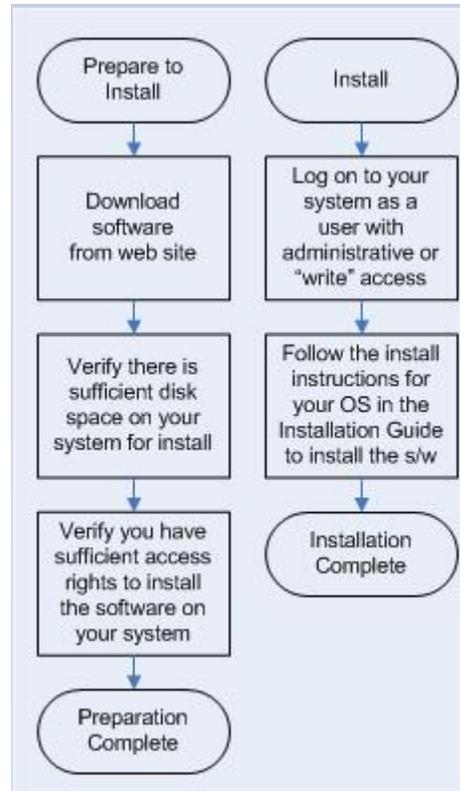


Figure 1 PGDBG Installation Overview

For more complete information on these steps and the specific actions to take for your operating system, refer to the corresponding sections in this guide.

## 2.2. PGI Network Installations

### Linux

On Linux, PGDBG may be installed locally on each machine on a network or it may be installed once on a shared file system available to each machine. If you select the second method, then after the first installation you can run a simple script on each machine in the group to add each new platform to the family of machines using the common installation. For more information on network installations, refer to [PGDBG Installations on Linux](#).

### macOS and Windows

On macOS and Windows, PGDBG must be installed locally on each machine. A network installation using a shared file system is not supported.

# Chapter 3.

## PGDBG INSTALLATIONS ON LINUX

This section describes how to install PGDBG in a generic manner on a Linux system. It covers local and network installs.

### 3.1. Prepare to Install PGDBG on Linux

In preparation for installing PGDBG on Linux, first study the overview of the Linux installation process illustrated in [Figure 2](#).



For Linux installations, each user needs to set their environment variables properly to access the software, as described in section 4.4, End-user Environment Settings on Linux.

In a typical local installation, the default installation base directory is `/opt/pgi`.

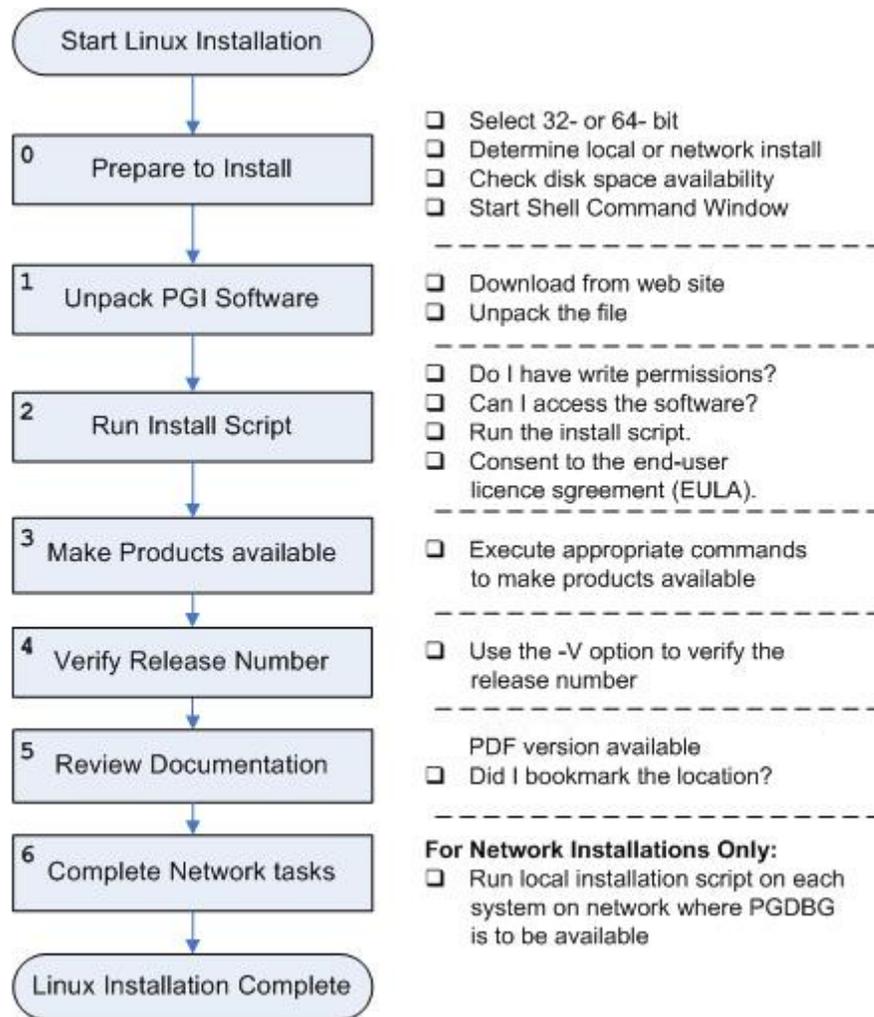


Figure 2 Linux Installation Overview

### Network Installations:

If you choose to perform a network installation, you should specify:

- ▶ A shared file system for the installation base directory.
- ▶ A second directory name that is local to each of the systems where PGDBG will be used. This directory selection approach allows a network installation to support a network of machines running different versions of Linux.

### To Prepare for the Installation:

- ▶ Bring up a shell command window on your system.

The installation instructions assume you are using csh, sh, ksh, bash, or some compatible shell. If you are using a shell that is not compatible with one of these shells, appropriate modifications are necessary when setting environment variables.

- ▶ Verify you have enough free disk space for the PGI installation.
  - ▶ The uncompressed installation package requires 70 MB of free disk space.
  - ▶ The linux86-64 platform requires up to 77 MB of free disk space.

## 3.2. PGI Installations on Linux - gcc Compiler Requirements

On Linux systems, PGDBG needs the gcc tool chain (ld,as,ar) and gcc libraries and header files to be compatible with your version of Linux. Therefore, to successfully install on a Linux system, the system must already have gcc compilers installed and in the user's path.

### 3.2.1. gcc Compiler Availability

To determine if gcc compilers are installed on the system, do the following:

1. Create a `hello.c` program.

```
#include <stdio.h>
int main()
{
    printf(" hello\n");
}
```

2. Execute the appropriate commands to determine if you have gcc support in your path.

```
% gcc -m64 -o ./hello_64 ./hello.c ! create a 64-bit executable
% file ./hello_64 ! does the file exist, and is it 64-bit?
```

Output should look similar to the following:

```
hello_64: ELF 64-bit LSB executable, AMD x86-64, version 1 (SYSV), for
GNU/Linux 2.6.9, dynamically linked (uses shared libs), for GNU/Linux
2.6.9, not stripped
```

## 3.3. Installation Steps for Linux

Follow these instructions to install the software.

1. Download the software from [www.pgroup.com](http://www.pgroup.com) or another electronic distribution site.
2. Unpack the PGI software.

In the instructions that follow, replace `<tarfile>` with the name of the file that you downloaded.

Use the following command sequence to unpack the tar file before installation.

```
% tar xpfz <tarfile>.tar.gz
```

3. Run the installation script.



The installation script for PGDBG is `install`. These instructions refer to this as the installation script.

The installation script *must* run to completion to properly install the software.

Execute the following script in the directory where you unpacked the tar file:

```
% ./install
```

To successfully run this script to completion, do the following:

- ▶ Consent to the End-User License Agreement (EULA).
- ▶ Determine whether to perform a local installation or a network installation.
- ▶ Define where to place the installation directory.

After the software is installed, the installation script performs system-specific customization.

If you are performing a network installation for PGDBG, you are asked for a common local directory on each system. The network installation uses this local directory, or creates it if it does not exist, on each system to store system-specific header files and libraries.

#### 4. Make PGDBG accessible.

After software installation is complete, each user's shell environment must be initialized to use PGDBG.

In `csh`, use these commands:

```
% setenv PGI /opt/pgi
% set path = ($PGI/linux86-64/17.1/bin $path)
```

In `bash`, `sh`, or `ksh`, use these commands:

```
$ PGI=/opt/pgi; export PGI
$ PATH=$PGI/linux86-64/17.1/bin:$PATH; export PATH
```

#### 5. Verify the release number of the installed software.

To verify the release number of the products you have installed, use the `-V` option.

```
pgdbg -V
```

#### 6. Review documentation.

All documentation for PGI compilers and tools is available online at <http://www.pgroup.com/resources/docs.htm>

#### 7. Complete network installation tasks. [Network Installations only]

For a network installation, you must run the local installation script on each system on the network where PGDBG will be available for use.

If your installation base directory is `/opt/pgi` and `/usr/pgi/shared/17.1` is the common local directory, then run the following commands on each system on the network.

```
/opt/pgi/linux86-64/17.1/bin/makelocalrc -x /opt/pgi/linux86-64/17.1 \
-net /usr/pgi/shared/17.1
```

These commands create a system-dependent file `localrc.machinename` in both of these directories: `/opt/pgi/linux86/17.1/bin` and `/opt/pgi/linux86-64/17.1/bin`. The commands also create the following three directories containing libraries and shared objects specific to the operating system and system libraries on that machine:

```
/usr/pgi/shared/17.1/lib
/usr/pgi/shared/17.1/liblf
```

```
/usr/pgi/shared/17.1/lib64
```



The `makelocalrc` command does allow the flexibility of having local directories with different names on different machines. However, using the same directory on different machines allows users to easily move executables between systems that use PGI-supplied shared libraries.

Installation of PGDBG for Linux is now complete.

# Chapter 4.

## INSTALLATIONS ON MACOS

This section describes how to install PGDBG on a computer running Apple macOS.



PGI products for Apple macOS are supported on Intel processor-based computers running OS X version 10.9 or greater; PGDBG is not currently supported on 10.12. PGI products are compatible with Apple Xcode 5.1.1 through 8.x installed. Xcode is available from <http://developer.apple.com>.

### 4.1. System Configuration to Enable Debugger ‘Attach’

The PGDBG debugger can debug programs that are launched by the debugger, either by specifying the program on the PGDBG command line, using the `debug` or `load` commands, or by specifying a program in the Connections tab of the PGDBG GUI.

Apple macOS security features prevent PGDBG from attaching to a running program unless some configuration is performed. Users who need to attach PGDBG to a running program must be able to enter the authentication credentials for a user that is a member of the `_developer` group. Users can be added to a group using the following command:

```
sudo dseditgroup -o edit -a usernametoadd -t user _developer
```

### 4.2. Installation Steps for Apple macOS

Once you have prepared for the installation, follow these instructions to install the software:

1. Access the installation package.

Download the software from [www.pggroup.com](http://www.pggroup.com) or another electronic distribution site. The file you download is `PGI-171.dmg`. If it does not mount automatically, open this file to mount it.

2. Install the software.

Double-click the `PGI 17.1.pkg`, which is part of the mounted disk. Follow the installation instructions.

1. When you see the initial system check dialog, click continue to allow the installation script to check that your system has the required components for installing the software, such as Xcode 5.1.1 or greater (through 8.x) and `gcc`.
2. Select the installation drive. The compilers will be automatically be installed into the default directory: `/opt/pgi`.

After the software is installed, the installation script performs some system-specific customization and then initializes for licensing.

### 3. Make PGI products accessible.

To initialize the PGI compilers and tools, import the `PGI 2017` terminal settings file located in the PGI installation directory using Terminal's `Shell | Import` command. You can access the installation directory in the Open file dialog by typing `Command-Shift-G` and entering the path, for example `/opt/pgi`.

Once initialized, you can open a Terminal session preconfigured with the PGI environment directly from within Terminal. To do this, bring up a PGI window by using either the `Shell | New Window` or `Shell | New Tab` menu commands; and then select `PGI 2017`.

### 4. Verify the release number.

To verify the release number, use the `-V` option with the debugger command:

```
pgdbg -V
```

### 5. Review documentation.

The documentation is in PDF format and located online at <http://www.pgroup.com/resources/docs.htm>

## 4.3. End-user Environment Settings on macOS

Once software installation is complete, and PGI Terminal settings are imported, whenever you bring up a PGI command window from within Terminal by choosing the `PGI 2017` terminal option, `PGDBG` is accessible and your environment is pre-initialized. If you prefer to manually initialize your Terminal shell for use of the PGI products, use the following information.

In `bash`, `sh`, or `ksh`, use this commands:

```
$ export PATH=/opt/pgi/osx86-64/17.1/bin:$PATH
```

In `csh`, use these commands:

```
% setenv PATH /opt/pgi/osx86-64/17.1/bin:$PATH
```

# Chapter 5.

## INSTALLATIONS ON MICROSOFT WINDOWS

This section describes how to install PGDBG on a system running a Microsoft Windows operating system.

### 5.1. Preparing to Install on Windows

Verify you have enough free disk space. PGDBG requires 150 MB of free disk space during the installation.

### 5.2. Installation Steps for Windows

Once you have prepared for the installation, follow these instructions to install the software:



Administrator privileges are required to install PGI software.

**1.** Log in as Administrator.

Download the software from [www.pgroup.com](http://www.pgroup.com) or another electronic distribution site.

**2.** Start the installation.

If you obtained your software from PGI, run the installation executable file on the target machine. The installation executable is `pgdbg64-171.exe`.

**3.** Review documentation.

You can view the online documentation which is included with your installation and is also available by using any web browser and going to [www.pgroup.com/resources/docs.htm](http://www.pgroup.com/resources/docs.htm)

## 5.3. Windows Firewall and PGI Debugging

Microsoft Windows Firewall runs by default on some Windows systems. Unless the PGI debugger is included in the Windows Firewall Exceptions list, Windows Firewall may try to block the PGI debugger engine when you debug a program.

### 5.3.1. Automatic Additions to Windows Firewall Exceptions List

#### **When PGI software is installed**

If Windows Firewall is enabled when PGI software is installed, certain components are automatically added to the Exceptions list. These components appear as follows:

PGI Debugger 2017

#### **When PGI software is uninstalled**

If Windows Firewall is enabled when PGI software is uninstalled, the components previously listed are automatically removed from the Exceptions list.

#### **When using PGDBG to Debug**

If PGDBG is not listed in the Exceptions list and Windows Firewall is enabled when you use PGDBG to debug, the Firewall displays a dialog that allows you to Unblock the application named `pgdebug`. If you choose the Unblock option, Windows Firewall adds the debugger (`pgdebug`) to its list of Exceptions and you do not see the pop-up dialog again unless you reinstall.



On rare occasions, this pop-up may prevent the debug session from starting correctly. If this occurs, use the Task Manager to end the debug session.



You can manually add these components to the Windows Firewall list of Exceptions.

## Chapter 6. CONTACT INFORMATION

You can contact PGI at:

20400 NW Amberwood Drive Suite 100  
Beaverton, OR 97006

Or electronically using any of the following means:

Fax: +1-503-682-2637

Sales: [sales@pgroup.com](mailto:sales@pgroup.com)

WWW: <http://www.pgroup.com>

The PGI User Forum is monitored by members of the PGI engineering and support teams as well as other PGI customers. The forum newsgroups may contain answers to commonly asked questions. Log in to the PGI website to access the forum:

<http://www.pgroup.com/userforum/index.php>

Many questions and problems can be resolved by following instructions and the information available at our frequently asked questions (FAQ) site:

<http://www.pgroup.com/support/faq.htm>

Submit technical support requests through the online form at:

[https://www.pgroup.com/support/support\\_request.php](https://www.pgroup.com/support/support_request.php)

PGI documentation is available at <http://www.pgroup.com/resources/docs.htm>.

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