PGI® 2014
Installation Guide

Version 14.3

The Portland Group®

PGI® 2014 Installation Guide

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Chapter 1. Release 2014 Introduction

Welcome to Release 2014 of *PGI Workstation*™, *PGI Server*™, and *PGI CDK*® *Cluster Development Kit*®, a set of compilers and development tools for 32-bit and 64-bit x86-compatible processor-based workstations, servers, and clusters running versions of the Linux operating system. *PGI Workstation* and *PGI Server* are also available on Apple OS X operating systems.

This installation information applies to all PGI products from The Portland Group.

Product Overview

The *PGI Workstation, PGI Server,* and the *PGI CDK* include exactly the same compilers and tool software. The difference is the manner in which the license enables the software.

PGI Workstation and PGI Server Comparison

- All *PGI Workstation* products include a node-locked single-user license, meaning one user at a time can compile on the one system on which the *PGI Workstation* compilers and tools are installed. The product and *license server* are on the same local machine.
- *PGI Server* products are offered in configurations identical to *PGI Workstation*, but include network-floating multi-user licenses. This means that two or more users can use the PGI compilers and tools concurrently on any compatible system networked to the *license server*, that is, the system on which the *PGI Server* license keys are installed. There can be multiple installations of the *PGI Server* compilers and tools on machines connected to the license server; and the users can use the product concurrently, provided they are issued a *license seat* by the license server. The license server manages seats sharing among compiler users.

PGI CDK Cluster Development Kit

A cluster is a collection of compatible computers connected by a network. The *PGI CDK* supports parallel computation on clusters of 64-bit x86-compatible AMD and Intel processor-based Linux workstations or servers interconnected by a TCP/IP-based network, such as Ethernet.

Support for cluster programming does not extend to clusters combining 64-bit processor-based Linux systems with 32-bit processor-based Linux systems.

Note

Compilers and libraries can be installed on other platforms not in the user's cluster, including other clusters, as long as all platforms use a common floating license server.

The *PGI CDK* supports 64-bit x64 (AMD64, Intel 64) processor-based Linux systems, with large array addressing in PGF77, PGF95, PGFORTRAN, PGC++, and PGCC. These systems can utilize a 64-bit address space while retaining the ability to run legacy 32-bit x86 executables at full speed.

Release Components

Release 2014 includes the following components:

- PGFORTRAN™ native OpenMP and auto-parallelizing Fortran 2003 compiler.
- PGCC® native OpenMP and auto-parallelizing ANSI C99 and K&R C compiler.
- PGC++® native OpenMP and auto-parallelizing ANSI C++ compiler.
- *PGPROF*® MPI, OpenMP, and multi-thread graphical profiler.
- *PGDBG*® MPI, OpenMP, and multi-thread graphical debugger.
- MPICH MPI libraries, version 3.0.4 for 64-bit development environments (Linux and OS X only).
- Microsoft HPC Pack 2012 MS-MPI Redsitributable Pack (version 4.1) for 64-bit and 32-bit development environments (Windows only).
- LAPACK linear algebra math library for shared-memory vector and parallel processors, version 3.4.2, supporting Level 3 BLACS (Basic Linear Algebra Communication Subroutines) for use with PGI compilers. This library is provided in both 64-bit and 32-bit versions for AMD64 or Intel 64 CPU-based installations running Linux, OS X, or Windows.
- ScaLAPACK 2.0.2 linear algebra math library for distributed-memory systems for use with MPICH, Open MPI, MVAPICH, and the PGI compilers on 64-bit Linux for AMD64 or Intel 64 CPU-based installations.
- A UNIX-like shell environment for 32-bit and 64-bit Windows platforms.
- FlexNet license utilities.
- Documentation in PDF and man page formats.

Additional components for PGI CDK

The *PGI CDK* includes these components which are available for download from the PGI website, but *not* contained in the installation package:

- MVAPICH2 MPI libraries, version 1.9 available for 64-bit development environments.
- Open MPI libraries, version 1.7.3 for 64-bit development environments.

MPI Support

You can use PGI products to develop, debug, and profile MPI applications. The PGPROF® MPI profiler and PGDBG® debugger included with *PGI Workstation* are limited to eight local processes. The versions included with *PGI Server* are limited to 16 local processes. The MPI profiler and debugger included with *PGI CDK* supports up to 64 or 256 remote processes, depending on the purchased capabilities.

Terms and Definitions

These release notes contain a number of terms and definitions with which you may or may not be familiar. If you encounter an unfamiliar term in these notes, please refer to the online glossary at

www.pgroup.com/support/definitions.htm

These two terms are used throughout the documentation to reflect groups of processors:

- AMD64 – a 64-bit processor from AMD designed to be binary compatible with 32-bit x86 processors, and incorporating new features such as additional registers and 64-bit addressing support for improved performance and greatly increased memory range. This term includes the AMD Athlon64, AMD Opteron, AMD Turion, AMD Barcelona, AMD Shanghai, AMD Istanbul, and AMD Piledriver processors.
- Intel 64 – a 64-bit IA32 processor with Extended Memory 64-bit Technology extensions designed to be binary compatible with AMD64 processors. This includes Intel Pentium 4, Intel Xeon, Intel Core, Intel Core 2 (Penryn), Intel Core i3, i5, i7 (Nehalem), Sandy Bridge, Ivy Bridge, and Haswell processors.

Supported Processors

Table 1.1 lists the processors on which Release 2014 of the PGI compilers and tools is supported. The table also includes the CPUs available and supported in multi-core versions.

The `-tp <target>` command-line option generates executables that utilize features and optimizations specific to a given CPU and operating system environment. Compilers in a 64-bit PGI installation can produce executables targeted to any 64-bit target, including cross-targeting for AMD64 and Intel 64-bit compatible CPUs. Compilers in a 32-bit PGI installation can produce 32-bit executables targeted to any 32-bit target, including 32-bit operating systems and 64-bit operating systems (Linux, OS X, WIndows).

PGI products have the capability to generate binaries optimized for specific AMD or Intel processors. The PGI 2014 compilers can produce PGI Unified Binary™ object or executable files containing code streams fully optimized and supported for both AMD and Intel x64 CPUs and NVIDIA GPUs.

Tip

To determine what CPU you have, use one of the following commands:

```
pgfortran -V
```

or

```
pgcc -V
```

To produce *PGI Unified Binary* files, use one of the following `-tp` command-line options, where <target> is any of the valid values in Table 1.1.

```
-tp x64
```
or
```
-tp <target1>,<target2>,<target3>…
```

Table 1.1. Processors Supported by PGI 2014

Brand	CPU | Micro-Architecture	Target Processor –tp <target> [,target...]	
		32-bit	64-bit
AMD			
	Opteron Piledriver	piledriver-32	piledriver-64
	Opteron Bulldozer	bulldozer-32	bulldozer-64
	Opteron Six-core Istanbul	istanbul-32	istanbul-64
	Opteron Quad-core Shanghai	shanghai-32	shanghai-64
	Opteron Quad-core Barcelona	barcelona-32	barcelona-64
	Opteron Quad-core	k8-32	k8-64
	Opteron Rev E?F	k8-32	k8-64e
	Turion / Turion 64	k8-32	k8-64e
	Athlon64	NA	k8-64e
	Athlon	athlon	NA
	Athlon XP/MP	athlonxp	NA
Intel			
	Haswell	haswell-32	haswell-64
	Ivy Bridge	ivybridge-32	ivybridge-64
	Sandy Bridge	sandybridge-32	sandybridge-64
	Nehalem	nehalem-32	nehalem-64
	Penryn	penryn-32	penryn-64
	Core	core2-32	core2-64
	P4/Xeon EM64T	p7-32	p7-64
	Xeon Pentium4	p7-32	NA
	Pentium III	piii	NA
	Pentium II	p6	NA
Generic			
	Generic x86	px or px-32	NA

The compilers do work on x86 CPUs not listed in the table.

Supported Operating Systems

PGI supports Linux, Windows, and Apple operating systems:

- Linux:

  Most Linux operating systems with GLIBC 2.3.4 and above:

  - RHEL 4.8+, including RHEL 6.5
  - Fedora 4+, including Fedora 20
  - SuSE 9.3+, including SuSE 13.1
  - SLES 10+, including SLES 11 SP 3
  - Ubuntu 8.04+, including Ubuntu 13.10

  Version differences in some operating system components may cause difficulties, but often these can be overcome with minor adjustments to the PGI software installation or operating system environment.

- Windows:

  Windows XP 32/64-bit and newer, including Windows 8.1 and Windows Server 2012.

  Note

  Beginning January 2015, PGI releases will no longer include support for WIndows XP, Windows Server 2003, or Windows Server 2008.

- Apple:

  OS X Snow Leopard and newer, including OS X Mavericks.

  Note

  www.pgroup.com/support/install.htm lists any new operating system distributions that may be explicitly supported by the PGI compilers. If your operating system is newer than any of the operating systems in the preceding list, the installation may still be successful.

Hyperthreading and Numa

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, including SuSE 9/13 and SLES 10/11, include NUMA libraries that can be leveraged by a compiler and associated runtime libraries to optimize placement of data in memory.

Java Runtime Environment (JRE)

The PGI debugger and profiler use Java. To use these tools, a version of the Java Runtime Environment (JRE) must be installed. On 64-bit systems the tools use a 64-bit JRE; on 32-bit systems they use a 32-bit JRE. The correct JRE is important because the tools make calls to native code, which must be of compatible "bitness" to function properly.

The tools are compatible with Java 1.6 and later versions. The PGI 14.3 release includes the JRE version 1.7 update 45. On Linux and OS X, this version of the JRE is installed in the same location as the compilers and does not affect the default Java. On Windows, the JRE is installed to Java's default install location.

One can opt out of the JRE installation on both Linux and Windows. Without Java, however, the profiler is unavailable and the debugger defaults to command-line mode.

Product Support

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

The PGI Subscription Service provides the following benefits:

- Ongoing technical support. Support requests may be sent in a number of ways:

  By electronic mail to trs@pgroup.com
  Faxed to +1-503-682-2637
  By using the online support request form available at www.pgroup.com/support/support_request.php
  Phone support is not currently available.

- Notification by email when maintenance releases occur and are available for electronic download and installation.
- Release upgrades for licensed Product(s) at no additional cost, except for any administrative fee that may apply.
- 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 Service Subscription. Extensions are available in yearly increments.

Contact sales@pgroup.com if you would like information regarding the subscription service for the PGI products you have purchased.

Chapter 2. PGI 2014 Installation Overview

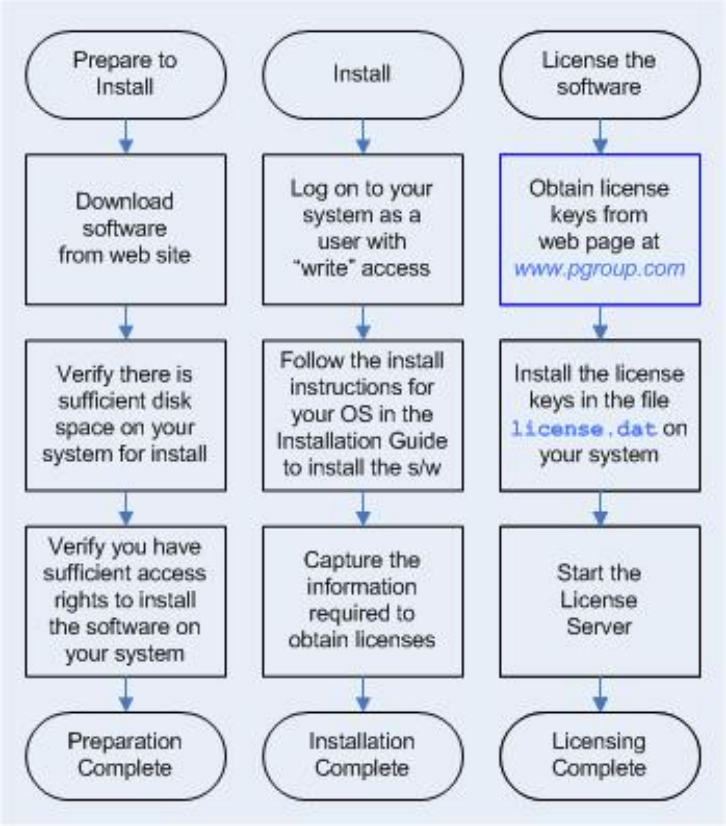
This chapter provides an overview of the steps required to successfully install *PGI Workstation*, *PGI Server*, or the *PGI CDK*. The remaining chapters provide the details of each of the steps. Specifically, "*Licensing*" describes licensing. Chapter 4, "*PGI Installations on Linux*" describes how to install *PGI Workstation*, *PGI Server* or *PGI CDK* in a generic manner on Linux, including how to install and run a FlexNet license daemon on Linux. Chapter 6, "*Installations on Microsoft Windows*" describes how to install on a Windows system, and Chapter 5, "*Installations on Apple OS X*" describes how to install on an Apple OS X system.

Before You Begin

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

- Prepare to install – verifying that you have all the required information, that the correct PGI software is downloaded, and any other non-PGI software that is needed is available and/or installed.
- Install the software – installing the software appropriate for your operating system
- License the Software – generating of license keys using the PGI website, installation of the license keys, and starting the license server.

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



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

PGI Server Network Installations

Linux

On Linux, *PGI Server* 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 compiler installation. For more information on network installations, refer to Chapter 4, "*PGI Installations on Linux*".

Apple OS X and Windows

On Apple OS X and Windows, *PGI Server* must be installed locally on each machine. A network installation using a shared file system is not supported.

PGI Installations Preparation

PGI compilers need various components installed prior to installing the PGI products. The operating system determines which components must be present before installation.

Linux Installations

Linux installations require these components:

- Linux Standard Base, *lsb*, must be present for the license utilities to work properly. Enter the command `lsb_release` to see if you have *lsb*, and, if so, which version. PGI installations require version 3.0 or newer.
- Some version of *gcc* must already be installed and in the user's `$PATH` prior to installing PGI software.
  - 64-bit PGI installations require support for 64-bit executables in gcc which is only available on 64-bit Linux systems.
  - 32-bit PGI installations require support for 32-bit executables in gcc. These are available on both 32-bit Linux systems and 64-bit Linux systems, though on 64-bit Linux systems, 32-bit is not usually installed by default.

Note

Any changes to your gcc compilers requires you to reinstall your PGI compilers.

To determine if 32-bit or 64-bit gcc compilers are installed on your 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:

For 64-bit gcc support:

```
% 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
```

For 32-bit gcc support:

```
% gcc -m32 -o ./hello_32 ./hello.c   ! create a 32-bit executable
% file ./hello_32    ! does the file exist, and is it 32-bit?
```

Output should look similar to the following:

```
hello_32: ELF 32-bit LSB executable, Intel 80386, version 1 (SYSV), for
GNU/Linux 2.6.9, dynamically linked (uses shared libs), for GNU/Linux
2.6.9, not stripped
```

Windows

Windows installations on Windows 7, Windows 8, and Windows 8.1 require that Windows SDK 8.1 be installed prior to installing PGI Workstation or PGI Visual Fortran.

OS X

OS X installations require these components:

- An installation of Xcode must be present, including the Xcode Command Line Tools. You must also first assent to any Xcode license agreements before using your PGI product.
- Enable remote login in the Sharing System Preference to enable the license server to operate

PGI CDK Installation Overview

The following sections contain the information needed for you to successfully prepare to install the *PGI CDK* software.

As stated earlier, a cluster is a collection of compatible computers connected by a network. The *PGI CDK* software is installed on a working cluster. It is not the purpose of this product to create a cluster, or to troubleshoot one. The *PGI CDK* release can be installed on a single node, and the node can be treated as if it is a cluster.

Support for cluster programming is limited to clusters combining AMD64 or Intel 64 CPU-based systems.

For multi-process programming of message-passing applications that execute on a cluster, the *PGI CDK* includes a 64-bit set of MPICH3 libraries. These libraries include versions that can collect additional information useful with the cluster debugger *PGDBG* and the *PGPROF* cluster profiler, and they implement the MPI inter-process communication standard.

Additional MPI libraries are available for PGI CDK from the PGI website at `www.pgroup.com/support.downloads.php`.

Cluster Configurations

Clusters are typically configured with two types of nodes:

- A "master" node from which jobs are launched
- "slave" nodes that are used only for computation

The *PGI CDK* is always installed by users on the master node, and the compilers and tools are installed to run from the master node only.

Typically, the master node is accessible from the general-purpose or "public" network and shares a file system with the other computers on your network using NFS. The master node and all of the slave nodes are interconnected using a second "private" network that is only accessible from computers that are part of the cluster.

There are two common cluster configurations:

1. The master node is used only for compilation and job submission, and only the slave nodes are used for computation.
2. All nodes are used for computation, including the master node.

One way to use MPICH in the first configuration is to manage job scheduling. By default, the `mpirun` command uses the master node as one of the computation nodes. It is possible to exclude the master node as a computation node in the second configuration if `mpirun` is invoked with the `-nolocal` option. For more information, refer to the man page for `mpirun`.

Typically, a master node has two network cards to allow communication to the outside network as well as to the cluster nodes themselves, which may be on their own subnet. If this is the case on your cluster, then when the installation script prompts you for the name of the master node, you should use the name associated with the network card connected to the same network as the cluster nodes.

For MPICH to run correctly, access from each node to every other node must be available via the `rsh` or `ssh` command. For example, if a 3-node cluster consists of a master, named *master*, and two slaves named *node1* and *node2*, then from *node1* as a user you should be able to issue the commands:

```
% rsh master date
% rsh node2 date
```

or

```
% ssh master date
% ssh node2 date
```

You can issue similar commands from *node2* using *master* and *node1*.

By default, all of the PGI compilers and tools will be installed on your system. You will select which of the open source components to install.

At this point, before you start the installation, you must determine:

- Which *PGI CDK* open source components – MPICH, Open MPI, and/or MVAPICH2 – are best suited for CDK development. All three are available, and the standard MPICH installation is a common library well suited for portability and availability.
- The hostnames of all the nodes that will be included in your cluster. You need a list of these during the installation.
- The type of cluster configuration – that is, whether the master node will participate as a compute node or will be strictly a front-end for compilation, job launching, and so on.
- Whether the compute nodes can share files with the master node, which is strongly recommended.
- The location of a commonly mounted disk that all nodes can access via the same pathname. This disk is very helpful for installing runtime libraries and storing executables created.

Chapter 4, "*PGI Installations on Linux*" describes how to install the PGI Fortran, C and C++ compilers and tools on Linux using the *installcdk* script from PGI.

The PGI compilers and tools are license-managed, which is described in the next chapter. Further, "Installation Steps for Linux," on page 21 provides specific information about how to use your personalized account to generate trial or permanent license keys.

Open Source Component Overview

The *PGI Compiler User's Guide* describes basic usage of the open source components of the *PGI CDK*, including the MPICH and ScaLAPACK libraries, and the example benchmark programs and tutorials.

MPICH, Open MPI, MVAPICH, and ScaLAPACK are all open source software packages that are not formally supported by The Portland Group. Support for these products is generally provided by their respective user communities, which you can learn more about at the following URLs:

- MPICH3 – www.mpich.org
- MVAPICH2 – www.mvapich.cse.ohio-state.edu/overview/mvapich contains a wealth of information, including online documentation, tutorials, FAQ files, patch distributions, and information on how to submit bug reports to the MPICH2 developers.

  ### Note

  To use the *PGI CDK* version of MVAPICH2, the prerequisite OpenFabrics (OFED) software must be installed. See www.openfabrics.org for details on OFED.

- Open MPI – www.open-mpi.org is a source for the OpenMPI information about building and using the library.
- ScaLAPACK - www.netlib.org/scalapack contains FAQ files and current distributions of ScaLAPACK, which is in the PGI CDK.

Further Considerations

There are a number of additional things you might consider prior to installation.

- A PGI Account

  All users installing the compilers benefit by having an account at www.pgroup.com. Go to www.pgroup.com/register to create an account.

  Once you have a web account, your account should be tied to any PIN that you will use to license the compilers. A PIN is connected to a permanent license, as described in Chapter 3, "*Licensing*".

- Downloading the proper package

  When ready, you can download the proper package(s) at www.pgroup.com/support/downloads.php. The file sizes can be large. To help avoid problems, a checksum is displayed for all downloaded files. After downloading `file.tar.gz`, use the command `md5sum file.tar.gz` to displayed checksum value. The two values should match.

- Permissions

  You will need root, sudo, or Administrator access to install the compilers and/or to set up the license service for auto restart. File ownership or permission issues are a common source of unexpected behavior.

- Firewall Issues

  Systems with firewalls may encounter two problems. First, the hostname used in the license file may not be mapped properly to the IP address of your machine. Second, the license server (lmgrd) and license daemon (pgroupd) each need an assigned port to allow them access through the firewall. For the lmgrd the default port is 27000. pgroupd does not have a default port assigned. With a firewall, you may need to change and/or specifically assign another port number.

- Laptop Installations

  For PGI Workstation laptop installations, consider using localhost as the hostname, mapped to the loopback interface 127.0.0.1. Test this by pinging localhost. Also consider looking for hostids (lmutil lmhostid) in all three laptop environments (network, wi-fi, on none), and look for hostids persistent in all three environments.

Chapter 3. Licensing

The PGI compilers and tools are license-managed. PGI software licensing uses the FlexNet Publisher (FNP) license management system from Flexera Software (www.flexerasoftware.com).

Licensing Terminology

Before discussing licensing, it is useful to have common terminology.

- **License** – a legal agreement between NVIDIA and PGI end-users, to which users assent upon installation of any PGI product. The terms of the License are kept up-to-date in documents on pgroup.com and in the $PGI/<platform>/<rel_number> directory of every PGI software installation.
- **License keys** – ASCII text strings that enable use of the PGI software and are intended to enforce the terms of the License. License keys are typically stored in a file called `license.dat` that is accessible to the systems for which the PGI software is licensed.
- **PIN** – Personal Identification Number; a unique 6-digit number associated with a license. This PIN is included in your PGI order confirmation. The PIN can also be found in your PGI license file after `VENDOR_STRING=`.
- **License PIN code** – A unique 16-digit number associated with each PIN that enables users to "tie" that PIN to their pgroup.com user account. This code is provided by PIN owners to others whom they wish tied to their PIN(s).

License Keys

License Key Options

There are three types of license key options: starter, trial, and permanent.

Starter License Keys
: When you first register for a PGI web account, your account activation email includes *starter* license keys. Starter keys are valid for 30 days from the date the account activation email is sent.

Trial License Keys
: If you already have a PGI web account, you can use it to generate *trial* license keys. Trial license keys are valid for 15 days from the date on which they are generated.

Permanent License Keys

When you purchase a PGI license, your email order confirmation includes complete instructions for logging in to the pgroup.com web page and generating *permanent* license keys. Permanent license keys are perpetual meaning they remain valid indefinitely with eligible versions of PGI software.

License Key Capabilities

At the conclusion of the starter license key or trial license key evaluation interval, the PGI compilers and tools and any executable files generated cease to function. To retain functionality, any executables, object files, or libraries created using the PGI compilers with starter or trial license keys must be recompiled once permanent license keys are in place.

Executable files generated using permanent license keys are unconstrained, and run on any compatible system regardless of whether the PGI compilers are installed.

License Key Comparisons

Table 3.1. License Key Comparisons

License Key Type	Starter	Trial	Permanent
Node-locked	No	Yes	Yes
Limited duration	Yes - 30 days	Yes - 15 days	No
Limited functionality	Yes	Yes	No

License Key Dependencies

When using trial or permanent license keys, you must install the PGI software before obtaining your license keys. The license key generation process requires information generated during software installation. Starter license keys do not have this dependency.

Important

If you change the configuration of your system by adding or removing hardware, your license keys may become invalid. Please contact license@pgroup.com if you expect to reconfigure your system to ensure that you do not temporarily lose the use of your PGI compilers and tools.

PGI License Setup Tool

PGI 2014 includes the PGI License Setup tool to help automate your license retrieval and installation process. You can use this tool to obtain both trial and permanent license keys.

For more information on using the PGI License Setup Tool on windows, refer to "Installation Steps for Windows," on page 44.

PGI Product Licensing

PGI Workstation

PGI Workstation is node-locked to a single system in a way that allows any user of the system to use the PGI compilers and tools. However, only a single user is allowed to run any of the PGI compilers or tools at a given time.

PGI Server

PGI Server supports multi-user, network floating licenses. Multiple users can use the PGI compilers and tools simultaneously from multiple systems on a network when those systems have a properly configured version of *PGI Server* installed. The number of seats purchased for the license determines the limitation on the number of concurrent users.

The license server for *PGI Server* can run on any of these supported systems: Linux, Windows, and OS X.

PGI CDK

The *PGI CDK* supports multi-user, network floating licenses. Multiple users can use the PGI compilers and tools concurrently from multiple systems on a network when those systems have a properly configured version of the *PGI CDK* installed. The number of seats purchased for the license determines the limitation on the number of concurrent users.

Note

We recommend the license servicer run on the cluster master node.

PGI Licensing Consideration

PGI licensing is the common method used by all PGI products to control access. The License Service is made up of two components:

- The `lmgrd` daemon is the common license manager component used by all FlexNet license. It oversees the distribution of license 'seats'.
- The `pgroupd` daemon is unique to PGI and reads and decodes the PGI license file.

A license is created using the *hostname* and the *hostid* of the license server. These "rules" apply:

- Only one copy of `lmgrd` runs on the license server, and is used by all the FlexNet type licenses. For both floating or node-locked licenses, only a single license server is required.
- Only one PGI license per license server. You may have FlexNet licenses for other non-PGI software packages, but you may only have one PGI license per server. More than one causes the license server to malfunction.
- The *hostname* used in the license file should be understood by all the systems using the compilers. Entering the command `ping hostname` should result in the same IP address on all the systems, including the license server itself.

- The *hostid* is usually the MAC of a device (`/sbin/ifconfig` on Linux and OS X, `ipconfig /all` on Windows), which can be detected by the FlexNet utilities. It is usually best to choose the MAC (inet address) associated with the IP address of the server.
- PGI Workstation licenses are limited to allow the compilers to work only on the machine running the license service. This is a node-locked license.
- PGI Sever and PGI CDK licenses allow any machine that can communicate with the license server in a timely manner, (i.e. distance relative), to run the compilers. This is a floating license.
- The PGI CDK package does not install compilers on the 'slave' nodes. The 'master' node usually is on both the private and public networks, so the master node is the only node that needs access to the license service. (The master node may even be the license server). Multiple clusters can share a single PGI CDK floating license by having all the master nodes communicate with the license service. The PGI CDK license allows the PGDBG debugger and PGPROF profiler to run distributed across all the cluster nodes.
- The PGI compilers look first at the environment variable $PGROUPD_LICENSE_FILE for the location of the PGI license. This variable is set in the registry on Windows machines, and is specific to PGI products.
- The PGI compilers next will look at the environment variable `$LM_LICENSE_FILE` for the location of the PGI license. This is a generic variable used by every FlexNet licensed product.
- The PGI compilers will then look at the default location for $PGI/license.dat.
- On the license server itself, `$PGROUPD_LICENSE_FILE` and/or `$LM_LICENSE_FILE` must be the full license pathname, as in `/opt/pgi/license.dat` on Linux and OS X, or `C:\Program Files\PGI\license.dat` on Windows.
- On machines other than the license server, `$PGROUPD_LICENSE_FILE` and/or `$LM_LICENSE_FILE` can either be a full pathname to the license file, or *port@host* (as in 27000@hostname).
- When changing a license file, take care to ensure the license software can read the new license. On Windows and OS X, this means having Admin privileges or 'sudo' capability to copy the license file to its destination. If the license service is already running, you may need to STOP and START it again to make sure the new file is read and not the old file stored in cache.
- When the FlexNet license service detects a problem or an event, it will record it in either the `flexlm.log` file (Linux) or the `License.log` file (Windows, OS X). If you're having licensing problems, check this file for information.

The FlexNet License Manager

As part of the process of installing the PGI compilers and tools, you install and configure the FlexNet license management software. The instructions in the following chapters of this guide describe how to configure license daemons for Linux, Windows, or OS X, including installation and start-up of the license services, and proper initialization of the LM_LICENSE_FILE and, for Windows, FLEXLM_BATCH environment variables.

License Support

All new PGI licenses include free PGI Subscription Service during the money-back guarantee period. For more information about this service and how to extend it, refer to "Product Support," on page 6.

Chapter 4. PGI Installations on Linux

This chapter describes how to install *PGI Workstation*, *PGI Server*, or *PGI CDK* in a generic manner on a Linux system. It covers local and network installations and is applicable for permanent or trial installations.

- For installations of PGI compilers to create 32-bit executables on either 32-bit or 64-bit Linux systems, a download file for 32-bit PGI compiler installation is provided.
- For installations of 64-bit PGI compilers on 64-bit x86-64 systems, a download file for 64-bit PGI compiler installation is provided.

The 32-bit and 64-bit compilers, tools, and supporting components have the same command names, and the environment you target by default (linux86-64 or linux86) depends on the version of the compiler that comes first in your $PATH settings.

Prepare to Install PGI Workstation or PGI Server on Linux

Preparation for installing *PGI Workstation* or *PGI Server* on Linux requires:

- For 32-bit PGI compilers, support for compiling and linking 32-bit executables with `gcc` must be in your $PATH. This is available on 32-bit and 64-bit Linux systems.
- For 64-bit PGI compilers, support for compiling and linking 64-bit executables with `gcc` must be in your $PATH. This is only supported on 64-bit Linux systems.
- For PGI licensing to work properly, Linux Standard Base (`lsb`) must be installed on your system.
- For PGI CDK installations, access to all the nodes is required. In addition, you should be able to connect between nodes using `rsh` or `ssh`, including to/from the same node you are on. The hostnames for each node should be the same as those in the cluster machine list for the system (`machines.LINUX` file)

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

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

- A shared file system for the installation base directory. All systems using the compilers should use a common pathname.
- A second directory name that is local to each of the systems where the PGI compilers and tools are used. This local directory contains the libraries to use when compiling and running on that machine. Use the same pathname on every system, and point to a private (i.e. non-shared) directory location.

This directory selection approach allows a network installation to support a network of machines running different versions of Linux. If all the platforms are identical, the shared installation location can perform a standard installation, that all can use.

To Prepare for the Installation:

- Download the PGI compilers at http://www.pgroup.com/support/downloads.php.

  To download you must either registration or log in. Then, under the Target option, choose 64-bit only or 32-bit only. If you need both packages, download them each separately.

- 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 packages require 1.2 GB of total free disk space.
  - The linux86 platform requires up to 450 MB of free disk space, depending on the number of packages installed.
  - The linux86-64 platform requires up to 1.54 GB of free disk space, depending on the number of packages installed.
- If you plan to create a permanent license, your computer must be able to access the Internet. You also need to know your IP address and whatever hostname is mapped to that IPaddress.

  Note

  If this computer is behind a firewall at your site, make sure it can access the Internet.

  If a proxy server is used, you need this additional information:
  - The address (URL) of the proxy server.
  - Whether the proxy server requires authentication and if so, the username and password.
- To generate license keys, log in to and account on the PGI website at `www.pgroup.com/login`. From this page you may also create an account or reset your password.
- To debug 32-bit applications on 64-bit Linux systems, the 32-bit `ncurses` libraries must be installed. The name of this package varies across the Linux distributions, but it contains a file with a name like `libncurses.so.5`.

Installation Steps for Linux

Follow these instructions to install the software:

1. Unpack the PGI software.

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

   ### Note

   The PGI products cannot be installed into the same directory where the tar file is unpacked.

   If you are installing both 64-bit and 32-bit products, unpack each tar file into a separate temporary directory.

   Use the following command sequence to unpack the tar file into a temporary directory before installation.

   ```
   % mkdir /tmp/pgi
   % mv <tarfile>.tar.gz /tmp/pgi
   % cd /tmp/pgi
   % tar xpfz <tarfile>.tar.gz
   ```

2. Run the installation script(s).

   Install the compilers by running **install** from the temporary directory where you unpacked the tar file. If you're installing both 32-bit and 64-bit compilers, you may install them in either order.

   For the PGI CDK, after the compilers are installed, install the additional CDK components by running the **installcdk** script. While you do not need root-level access permission to install the PGI CDK, you must have permissions to create and copy files on the cluster nodes.

   ### Important

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

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

   - Consent to the PGI end-user license agreement (EULA).
   - If you are installing *PGI Server* or PGI CDK, determine whether to perform a local installation or a network installation.
   - Determine whether to install the optional components:
     - ACML math library
     - NVIDIA CUDA components
     - AMD OpenCL components
     - MPICH library
   - Define where to place the installation directory. The default is `/opt/pgi`.

- Determine whether to use the built-in utility to generate license keys.

The PGI installation scripts install all of the binaries for the PGI compilers, tools and libraries in the appropriate subdirectories within the specified installation directory. This main directory is defined during installation as $PGI and the $PGI environment variable should be set to the path of this directory before using the compilers.

Important

If you choose not to generate license keys at installation time, record the FlexNet hostid and hostname that are echoed to the screen. This information is also saved to the file `/opt/pgi/license.info`, where `/opt/pgi` is the installation directory.

3. Make PGI products accessible.

When the installation script has completed, execute the following commands to make the PGI products accessible and to initialize your environment for use by FlexNet.

Note

Each user must issue the follow sequence of commands to initialize the shell environment prior to using the PGI compilers and tools.

For linux86-64:

To use the linux86-64 version of the compilers and tools, execute the following commands, assuming you have installed in the default `/opt/pgi` directory.

In csh, use these commands:

```
% setenv PGI /opt/pgi
% set path=(/opt/pgi/linux86-64/14.3/bin $path)
% setenv MANPATH "$MANPATH":/opt/pgi/linux86-64/14.3/man
% setenv LM_LICENSE_FILE /opt/pgi/license.dat:"$LM_LICENSE_FILE"
```

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

```
$ export PGI=/opt/pgi;
$ export PATH=/opt/pgi/linux86-64/14.3/bin:$PATH;
$ export MANPATH=$MANPATH:/opt/pgi/linux86-64/14.3/man;
$ export LM_LICENSE_FILE=$LM_LICENSE_FILE:/opt/pgi/license.dat;
```

For linux86:

To use only the linux86 version of the compilers and tools, or to target linux86 as the default, use a setup similar to the previous one, changing the path settings as illustrated in the following commands.

In csh, use these commands:

```
% setenv PGI /opt/pgi
% set path=(/opt/pgi/linux86/14.3/bin $path)
% setenv MANPATH "$MANPATH":/opt/pgi/linux86/14.3/man
% setenv LM_LICENSE_FILE "$LM_LICENSE_FILE":/opt/pgi/license.dat
```

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

```
$ export PATH=/opt/pgi/linux86/14.3/bin:$PATH;
$ export MANPATH=$MANPATH:/opt/pgi/linux86/14.3/man;
$ export LM_LICENSE_FILE=$LM_LICENSE_FILE:/opt/pgi/license.dat;
```

Note

You should add these commands to your shell startup files to ensure that you have access to the PGI products in future login sessions.

4. Verify the release number of the installed software.

To verify the release number of the products you have installed, use the `-V` option on any of the compiler commands, as illustrated in the following examples. If you use `–v` instead, you can also see the sequence of steps the compiler uses to compile and link programs for execution on your system.

Note

These commands can be successfully executed even if the files `x.f` or `x.c` do not exist and you have not completed the licensing phase of the installation. Use them to check that you have installed the proper version of the compilers and have initialized your environment to enable access to that version.

5. Generate and install license keys.

Note

This step is necessary only if you chose not to allow the installation script to perform these tasks for you.

All of the PGI compilers and tools are license-managed and require installation of license keys to make the PGI software operational. The other components, including MPICH, LAPACK, and ScaLAPACK, are open source products that are not license-managed.

To obtain license keys, you need the following information:

- An account on the PGI website.

  You probably created this account when you downloaded the PGI software. If you wish to generate a permanent license, you need to know your PGI license Product Identification Number (PIN) found in your original PGI order confirmation.

- The FlexNet hostid and hostname of the computer on which the software is installed, which was echoed to your screen by the installer and stored in the installation directory as the file: `license.info`.

Note

You can also obtain your FlexNet hostid by using the following command after you have installed the products and initialized the environment variables:

```
% lmutil lmhostid
```

You should see a message similar to the following message with one or more hostids displayed.

```
The FlexNet host ID of this machine is "12345678abcd edcba9876543".
```

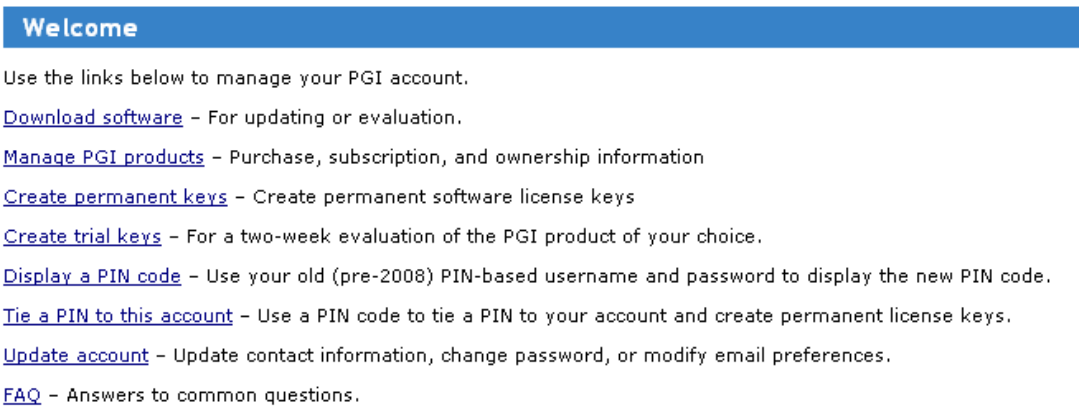
In this example you can use either `12345678abcd` or `edcba9876543`, but not both, as the hostid.

Tip

Hostids come from configured network cards. If you use your computer in multiple environments, you may want to run the following command in each environment to see what hostids are configured. Then, to reduce potential license problems, choose the hostid that occurs in *all* your environments.

Generate License Keys

Log in to your PGI web account at www.pgroup.com/login. You should see a screen similar to the following:



To generate permanent license keys:

1. Click Create permanent keys.
2. Click the PIN associated with the product for which you wish to generate license keys. If you don't see any PINs listed, you first need to tie one to your account.
   a. Obtain your PIN code from your original PGI order confirmation email, in the section labeled: 'SHARING ADMINISTRATION' or contact trs@pgroup.com.
   b. Click the link: Tie a PIN to this account.
   c. Enter the 16-digit PIN code and follow the instructions provided.

3. Click License keys to generate the keys.

To generate trial license keys:

1. Click Create trial keys.
2. Accept the terms of the agreement.
3. Enter the hostid exactly as it appears in the message that is displayed during installation or when you issue the command:

```
% lmutil lmhostid
```

   If multiple host ids are displayed, select any *one* of them to use as the hostid.

4. Click the *Generate license key* button.

Install License Keys

Once you have generated your trial or permanent license keys, copy, and then paste them into the file: `/opt/pgi/license.dat`, substituting the appropriate installation directory path if you have not installed in the default `/opt/pgi` directory.

The `license.dat` depends on the product you are installing,. However, each `license.dat` file looks somewhat similar to the following sample file from a PGI Fortran Workstation installation:

```
SERVER <hostname> <hostid> 27000
DAEMON pgroupd
PACKAGE PGI2014-workstation-complete pgroupd 2014.1231 8FE2A7F11183 \
   COMPONENTS="pgi-hpf-lin64 pgi-f95-lin64 pgi-f77-lin64    \
   pgi-cc-lin64 pgi-cpp-lin64 pgi-hpf-lin32 pgi-f95-lin32  \
   pgi-f77-lin32 pgi-cc-lin32 pgi-cpp-lin32 pgi-hpf-lin32  \
   pgi-f95-lin32 pgi-f77-lin32 pgi-cc-lin32 pgi-cpp-lin32  \
   pgi-prof pgi-dbg pgi-dbg-gui   " \
   OPTIONS=SUITE SIGN="08AF B25A 295F BB3A CA7D \
   F564 0973 BB69 2B66 187A 1BE6 6E65 BC95 2152 9E75 03BC A41D \
   3422 52DF 15C4 37BB 0D7A 7F65 47E7 8B70 0F5B 987D 9A69 1FFC 2270"
FEATURE PGI2014-workstation-complete pgroupd 2014.1231 permanent 1 \
   EA26405D17C1 VENDOR_STRING=523456:4:ws:accel \
   HOSTID=001ec960ef1c DUP_GROUP=U SUITE_DUP_GROUP=U SIGN="0667 \
   D67C 3E9E A935 287A AE93 035B 8316 CC01 F035 80CD 57E1 9F6A \
   1E01 BD51 09DE 3BB6 6467 432E ADAF A9D7 E9B8 1E08 BF8F D7C5 \
   E3F2 F458 8779 2420 2F97"
PACKAGE PGI71-workstation-complete pgroupd 7.1 4663E4ABD89E \
   COMPONENTS="pghpf-linux86-64:7.1 pgf90-linux86-64:7.1 \
   pgf77-linux86-64:7.1 pgcc-linux86-64:7.1 pgcpp-linux86-64:7.1 \
   pghpf-linux86:7.1 pgf90-linux86:7.1 pgf77-linux86:7.1 \
   pgcc-linux86:7.1 pgcpp-linux86:7.1 pghpf-linux86:7.1 \
   pgf90-linux86:7.1 pgf77-linux86:7.1 pgcc-linux86:7.1 \
   pgcpp-linux86:7.1 pgprof:7.1 pgdbg:7.1 pgdbg-gui:7.1 \
   pgdbg-linux86-64:7.1" OPTIONS=SUITE SIGN="07C2 DA82 2505 0A20 \
   B51E B86F D47E 2765 BB92 5EF7 0756 A652 8B80 1E2B A299 18D5 \
   F82F 243B 0368 D580 9E0B 99DF A989 D202 3AAD BCC6 1A3C F517 24C6 013B"
FEATURE PGI71-workstation-complete pgroupd 7.1 permanent 1 \
   35CB2A57B14C VENDOR_STRING=523456:4:ws HOSTID=001ec960ef1c \
   DUP_GROUP=U SUITE_DUP_GROUP=U SIGN="023C A239 D028 AC2C 7CDF \
   74C2 B32A 0E9D C68C FFAB FF8D 25CE BA74 E8C6 CCA1 076B 3560 \
   4720 9A82 53F0 C1A6 1811 35D4 F8C2 A8D2 4427 4478 EB44 76E5 FCE1"
```

In your license file:

- `<hostid>` should match the hostid you submitted above when you generated your license keys. You should see it on the SERVER line.
- If necessary, you can enter or edit the `<hostname>` entry manually, but you cannot edit the `<hostid>` entry or you will invalidate the license keys.
- The date in the file, in this example 2014.1231, represents the expiration date for your subscription service.

  For example, if your subscription date for your PGI PIN (Product Identification Number) is August 1, 2014, then the date in your file is 2014.0801. For information on how to renew your subscription, refer to "Product Support," on page 6
- The six digits immediately following the VENDOR_STRING = in the feature line component, `523456` of `VENDOR_STRING=523456:4` in this example, represent the PIN for this installation.

  You have a similar unique PIN for your installation.

  Note

  Please include your PIN when contacting PGI for technical support for the products you have purchased. This PIN is also in your order confirmation email.

6. Start the license manager daemon.

   Important

   If you used the installation script to do this or if you are evaluating PGI software with trial license keys, you do not need to perform this step and can proceed to Step 7.

Installations in a directory other than the default `/opt/pgi`

Note

The following refers to the shell script template for linux86-64. If you have installed only linux86, please substitute linux86 for linux86-64.

If you installed the compilers in a directory other than `/opt/pgi`, do this:

1. Edit the shell script template `$PGI/linux86-64/14.3/bin/lmgrd.rc`.
2. Substitute the correct installation directory for `/opt/pgi` in the section of the script entitled *Where to find the PGI Software*.
3. Save the file and exit the editor.

Issue the following command to start the license server and pgroupd license daemon running on your system:

```
% cd $PGI/linux86-64/14.3/bin/
% ./lmgrd.rc start
```

Tip

To use the more restrictive access of invoking lmgrd with the -local switch, refer to the lmgrd.rc file for a description of the -local switch and how to use it.

If you wish to stop the license server and pgroupd license daemon at a later time, you can do so with the command:

```
% cd $PGI/linux86-64/14.3/bin/
% ./lmgrd.rc stop
```

Start license server upon reboot:

To start the license server and pgroupd license daemon each time your system is booted:

1. Log in as root.

   ### Note

   You **must** be logged in as root to successfully execute these commands.

2. Verify you have set the PGI environment variable as described in Step 3 of this installation process.
3. Execute the following two commands:

   ```
   % cp $PGI/linux86/14.3/bin/lmgrd.rc  /etc/init.d/lmgrd
   % ln -s /etc/init.d/lmgrd  /etc/rc.d/rc3.d/S90lmgrd
   ```

There are two values in this example that may be different on your system:

- Your rc files may be in a directory other than the one in the example: /etc/init.d. If the rc files are in a directory such as /etc/rc.d/init.d, then substitute that location in the example.
- Your system's default runlevel may be something other than '3', the level used in this example. You can run /sbin/runlevel to check the system's runlevel. If the runlevel on your systems is different, then you must set the correct subdirectory; use your system's runlevel in place of the "3" in the preceding example.

Start license server upon reboot on Ubuntu

To start the license server and pgroupd license daemon each time your system is booted:

1. Log in as root.

   ### Note

   You **must** be logged in as root to successfully execute these commands.

2. Verify you have set the PGI environment variable as described in Step 3 of this installation process.
3. Execute the following two commands:

```
% cp $PGI/linux86/14.3/bin/lmgrd.rc  /etc/init.d/lmgrd
% ln -s /etc/init.d/lmgrd  /etc/rc.d/rc3.d/S90lmgrd
```

There are two values in this example that may be different on your system:

- Your rc files may be in a directory other than the one in the example: `/etc/init.d`. If the rc files are in a directory such as `/etc/rc.d/init.d`, then substitute that location in the example.
- Your system's default `runlevel` may be something other than '3', the level used in this example. You can run `/sbin/runlevel` to check the system's runlevel. If the runlevel on your systems is different, then you must set the correct subdirectory; use your system's runlevel in place of the "3" in the preceding example.

chkconfig(8) Utility

Most Linux distributions include the **chkconfig(8)** utility which manages the `runlevel` scripts. If your system has this tool and you wish to use it, then run the following commands:

```
% cp $PGI/linux86/14.3/bin/lmgrd.rc /etc/init.d/
% /sbin/chkconfig --add lmgrd
```

These commands create the appropriate links in the `/etc/init.d` directory hierarchy. For more information on **chkconfig**, please refer to the manual page.

Important

You can co-install Release 2014 with Release 2011, 2010, 9.x, 8.x, 7.x, 6.x and/or 5.2; and you can use any of these versions of the compilers and tools with the latest versions of `lmgrd` and `pgroupd` and a single Release 2014 license file.

If you use the `lmgrd.rc` file to start `lmgrd` automatically after a reboot of your system, you need to modify your `lmgrd` script in the `/etc/rc.d` or `/etc/init.d` directory to use the latest `lmgrd` daemon.

For example, your `lmgrd` script may look like this, where <target> is replaced appropriately with linux86 or linux86-64.

```
## Path to master daemon lmgrd
# Commented out previous path to 11.8:
#LMGRD=$PGI/<target>/11.8/bin/lmgrd
LMGRD=$PGI/<target>/14.3/bin/lmgrd

## Command to stop lmgrd
#Commented out previous path to 11.8:
#LMUTIL=$PGI/<target>/11.8/bin/lmutil
LMUTIL=$PGI/<target>/14.3/bin/lmutil
```

7. Review documentation.

   You can view the online HTML and PDF documentation using any web browser by opening the file:

   ```
   $PGI/linux86-64/14.3/doc/index.htm
   ```
   or
   ```
   $PGI/linux86/14.3/doc/index.htm
   ```

   You may want to bookmark this location for easy future reference to the online manuals.

8. Complete network installation tasks.

   Note

   Skip this step if you are not installing *PGI Server* using a network installation.

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

   If your installation base directory is `/opt/pgi` and `/usr/pgi/shared/14.3` is the common local directory, then run the following commands on each system on the network.

   ```
   /opt/pgi/linux86/14.3/bin/makelocalrc  -x /opt/pgi/linux86/14.3 \
        -net /usr/pgi/shared/14.3
   /opt/pgi/linux86-64/14.3/bin/makelocalrc  -x /opt/pgi/linux86-64/14.3 \
        -net /usr/pgi/shared/14.3
   ```

   These commands create a system-dependent file `localrc.machinename` in both of these directories: `/opt/pgi/linux86/14.3/bin` and `/opt/pgi/linux86-64/14.3/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/14.3/lib
   /usr/pgi/shared/14.3/liblf
   /usr/pgi/shared/14.3/lib64.
   ```

   Note

   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 the PGI products for Linux is now complete. For assistance with difficulties related to the installation, send email to trs@pgroup.com.

The following two sections contain information detailing the directory structure of the PGI installation, and instructions for PGI end-users to initialize environment and path settings to use the PGI compilers and tools.

End-user Environment Settings

PGI Workstation and PGI Server

After software installation is complete, each user's shell environment must be initialized to use the PGI compilers and tools. Assume the license file is in `/opt/pgi/license.dat`, and the `lmgrd` license manager is running.

Note

Each user must issue the following sequence of commands to initialize the shell environment before using the PGI compilers and tools.

64-bit as default

To make the 64-bit PGI compilers and tools the default:

In csh, use these commands:

```
% setenv PGI /opt/pgi
% setenv MANPATH "$MANPATH":$PGI/linux86-64/14.3/man
% setenv LM_LICENSE_FILE $PGI/license.dat
% set path = ($PGI/linux86-64/14.3/bin $path)
```

Once the 64-bit compilers are the defaults, you can make the MPICH commands and MPICH man pages accessible using these csh commands:

```
% set path = ($PGI/linux86-64/14.3/mpi/mpich/bin $path)
% setenv MANPATH "$MANPATH":$PGI/linux86-64/14.3/mpi/mpich/man
```

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

```
$ PGI=/opt/pgi; export PGI
$ MANPATH=$MANPATH:$PGI/linux86-64/14.3/man; export MANPATH
$ LM_LICENSE_FILE=$PGI/license.dat; export LM_LICENSE_FILE
$ PATH=$PGI/linux86-64/14.3/bin:$PATH; export PATH
```

Once the 64-bit compilers are the defaults, you can make the MPICH commands and MPICH man pages accessible using these commands.

```
$ export PATH=$PGI/linux86-64/14.3/mpi/mpich/bin:$PATH
$ export MANPATH=$MANPATH:$PGI/linux86-64/14.3/mpi/mpich/man
```

32-bit as default

To make the 32-bit PGI compilers and tools the default:

In csh, use these commands:

```
% setenv PGI /opt/pgi
% setenv MANPATH "$MANPATH":$PGI/linux86/14.3/man
% setenv LM_LICENSE_FILE $PGI/license.dat
% set path = ($PGI/linux86/14.3/bin $path)
```

Once the 32-bit compilers are the defaults, you can make MPICH commands and MPICH man pages accessible using these csh commands.

```
% set path = ($PGI/linux86/14.3/mpi/mpich/bin $path)
% setenv MANPATH  "$MANPATH":$PGI/linux86/14.3/mpi/mpich/man
```

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

```
$ export PGI=/opt/pgi;
$ export MANPATH=$MANPATH:$PGI/linux86/14.3/man;
$ export LM_LICENSE_FILE=$PGI/license.dat;
$ export PATH=$PGI/linux86/14.3/bin:$PATH;
```

PGI CDK

With either the trial or permanent license keys in place, choose the applicable commands from the following lists and execute them to make the products you have purchased accessible.

Important

Each user must issue the appropriate following sequence of commands to initialize their shell environment before using the PGI compilers and tools.

Important

For the following path settings, the installation is in the default directory: `/opt/pgi`

Set Environment Variables for Licensing

Execute the following commands to initialize your environment for use of FlexNet licensing.

In csh, use these commands:

```
% setenv PGI /opt/pgi
% setenv LM_LICENSE_FILE "$LM_LICENSE_FILE":/opt/pgi/license.dat
```

In bash, sh or ksh, use these commands:

```
$ PGI=/opt/pgi; export PGI
$ LM_LICENSE_FILE=$LM_LICENSE_FILE:$PGI/license.dat; export LM_LICENSE_FILE
```

Set End-user PATH Variables

This section describes the commands required to access MPICH and MVAPICH as well as the man pages associated with each of these.

Note

If you install only the linux86 versions of the compilers or wish to target linux86 as the default, use a setup similar to the x64 linux86-64 one shown here, substituting *linux86* in place of *linux86-64* in all path settings.

MPICH access

To access MPICH and the MPICH man pages for x64 linux86-64, execute these commands:

In csh, use these commands:

```
% set path = (/opt/pgi/linux86-64/14.3/bin  \
      /opt/pgi/linux86-64/14.3/mpi/mpich/bin $path)
% setenv MANPATH  "$MANPATH":/opt/pgi/linux86-64/14.3/mpi/mpich/man
```

In bash, sh or ksh, use these commands:

```
$ export PATH=/opt/pgi/linux86-64/14.3/bin:/opt/pgi/linux86-64/14.3/mpi/mpich/bin:$PATH
$ export MANPATH=$MANPATH:/opt/pgi/linux86-64/14.3/mpi/mpich/man
```

MVAPICH access

To access MVAPICH2 and the MVAPICH2 man pages for x64 linux86-64, execute these commands:

In csh, use these commands:

```
% set path = (/opt/pgi/linux86-64/14.3/bin   \
      /opt/pgi/linux86-64/14.3/mpi/mvapich/bin $path)
% setenv MANPATH  "$MANPATH":/opt/pgi/linux86-64/14.3/mpi/mvapich/man
```

In bash, sh or ksh, use these commands:

```
$ export PATH=/opt/pgi/linux86-64/14.3/bin:/opt/pgi/linux86-64/14.3/mpi/mvapich/bin:$PATH
$ export MANPATH=$MANPATH:/opt/pgi/linux86-64/14.3/mpi/mvapich/man
```

Common Linux Installation Issues

If you are having problems executing the debugger or profiler, you might want to check out the Java Runtime Environment.

Java Runtime Environment (JRE)

The PGI debugger and profiler use Java. To use these tools, a version of the Java Runtime Environment (JRE) must be installed. On 64-bit systems the tools use a 64-bit JRE; on 32-bit systems they use a 32-bit JRE. The correct JRE is important because the tools make calls to native code, which must be of compatible "bitness" to function properly.

The tools are compatible with Java 1.6 and later versions. The PGI 14.3 release includes the JRE version 1.7 update 45. On Linux and OS X, this version of the JRE is installed in the same location as the compilers and does not affect the default Java. On Windows, the JRE is installed to Java's default install location.

One can opt out of the JRE installation on both Linux and Windows; without Java, however, the profiler is unavailable and the debugger defaults to command-line mode.

Chapter 5. Installations on Apple OS X

This section describes how to install PGI software on an Apple computer running Apple OS X. It covers local installs, and is applicable to permanent or trial installations.

Note

PGI Workstation and *PGI Server* for Apple OS X are supported on Intel processor-based Macintosh computers running OS X version 10.6.0 or greater with Apple Xcode 3.2 or greater installed. Xcode is available from http://developer.apple.com.

- For installations on 32-bit x86 systems, the PGI installation process installs only the osx86 versions of the PGI compilers and tools.
- For installations on 64-bit x64 systems running an osx86-64 execution and development environment, the PGI installation process installs the osx86-64 version of the PGI compilers and tools.
- If the 32-bit gcc development package is already installed on the system, the 32-bit osx86 tools are installed on a 64-bit x64 system.

The 32-bit and 64-bit compilers, tools, and supporting components have the same command names, and the environment you target by default, either osx86-64 or osx86, depends on the version of the compiler that comes first in your path settings.

The default installation base directory is `/opt/pgi`.

Preparing to Install on Apple OS X

To prepare for the installation:

- Verify you have enough free disk space.
  - On the osx86 platform, PGI installation requires 650 MB of free disk space.
  - On the osx86-64 platform, PGI installation requires 1.75 GB of free disk space.

In addition, the download file requires approximately 600 MB.

- Verify that Xcode 3.2 or greater is installed.
  - If you know how to run Xcode, start Xcode and click About Xcode to verify the version is 3.2 or greater.
  - If you do not know how to run Xcode or are uncertain if it is installed on your system, do the following:
    1. From the Apple Menu, select About This Mac.
    2. Click More Info.
    3. Select System profiler | Software | Applications.
    4. Scroll through the alphabetical list and verify Xcode is in it.
    5. Verify the version is 3.2 or greater.

Note

PGI software for OS X requires the Xcode application, which provides several components of the tool chain, including the system assembler, linker, and runtime libraries. However, PGI software runs in Terminal, not in the Xcode IDE, and the *PGDBG* debugger and *PGPROF* profiler have their own GUIs.

In preparation for installing PGI software on OS X, first review Figure 5.1, an overview of the installation process.

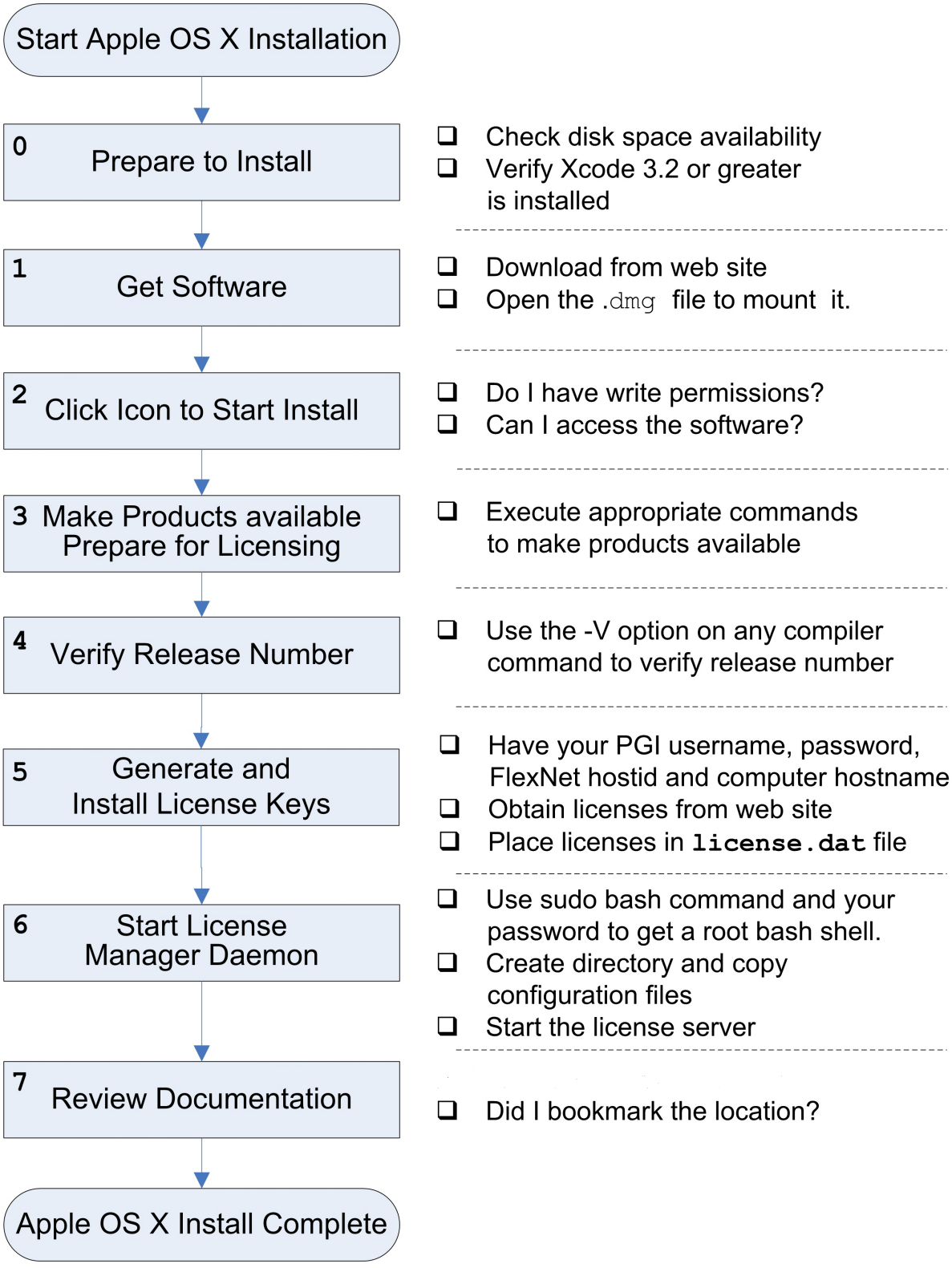
System Configuration to Enable Debugger ‘Attach’

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.

OS X 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
```

Figure 5.1. OS X Installation Overview



Installation Steps for Apple OS X

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

1. Access the installation package.

   Download the software from www.pgroup.com or another electronic distribution site. If it didn't mount automatically, open this file to mount it.

2. Install the software.

   Double-click the `PGI Workstation 14.3.pkg`icon, 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 3.2 or greater and `gcc`.
   2. Select the drive and, if you want, also select an installation directory other than 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 and prepare for licensing.

   To initialize the PGI compilers and tools, import the PGI 2014.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 by choosing the PGI 2014 option from the Shell | New Window or Shell | New Tab menu commands.

   For more information on configuring to make either 32-bit or 64-bit compilers the default, refer to "End-user Environment Settings on OS X," on page 40.

4. Verify the release number.

   To verify the release number of the products you have installed, use the `-V` option on any of the compiler commands, as illustrated in the following examples. If you use `–v` instead, you also see the sequence of steps the compiler uses to compile and link programs for execution on your system.

For Fortran 77, use:	**pgf77 -V x.f**
For Fortran 2003, use:	**pgfortran -V x.f**
For C++, use:	**pgcpp –V x.cc**
For ANSI C, use:	**pgcc -V x.c**

   ### Note

   These commands can be successfully executed even if the files `x.f` or `x.c` do not exist and you have not completed the licensing phase of the installation. Use it to check that you have installed the proper version of the compilers and have initialized your environment to enable access to that version.

5. Generate and install license keys.

   All of the PGI compilers and tools are license-managed and require the installation of license keys to make the PGI software operational. To obtain license keys, you need the following information:

   - An account on the PGI website. You probably created this account when you downloaded the PGI software.
     - If you purchased a license without creating an account, one was created for you when your order was processed. Please check for an activation email from accounts-noreply@pgroup.com or contact license@pgroup.com about activation.
     - If you don't have an account, you can create one at: www.pgroup.com/register
   - The FlexNet *hostid* and *hostname* of the computer on which the software is installed. The installer echoes this information to your screen.

     Note

     You can obtain your FlexNet hostid by using the following command in a PGI Terminal window.

     ```
     % lmutil lmhostid
     ```

     You should see a message similar to the following with one or more hostids displayed.

     ```
     The FlexNet host ID of this machine is "12345678abcd edcba9876543".
     ```

     You can use either `12345678abcd` or `edcba9876543`, but not both, as the hostid.

     Tip

     Hostids come from configured network cards. If you use your computer in multiple network environments, you may need to run the following command in each environment to see which hostids are configured. Then, to reduce potential license problems, choose the hostid that occurs in *all* your environments.

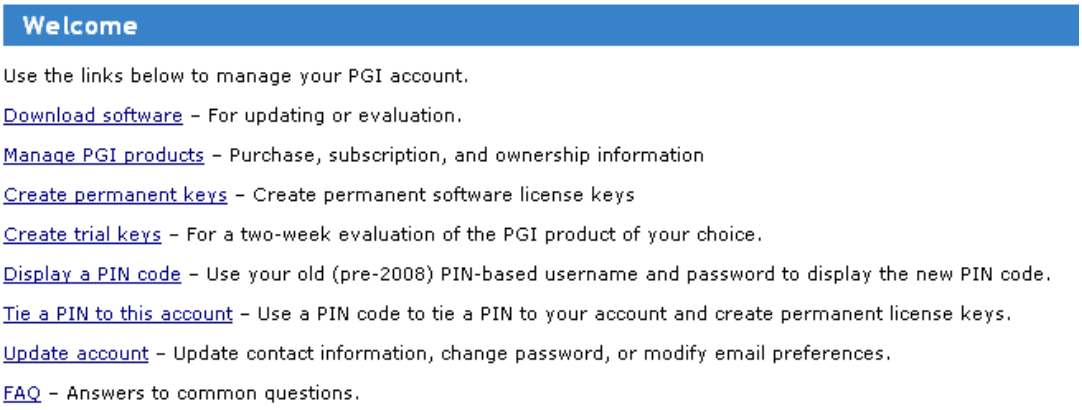
     To locate your hostname, use this command:

     ```
     % lmutil lmhostid -hostname
     ```

     The preceding command returns output in the form: `HOSTNAME=xxxxx`. However, when you create a license, use only the actual hostname, that is xxxxx in the hostname field. For example, if the information displayed is `HOSTNAME=abcd1234`, then use only `abcd1234`. The goal is to have the hostname map to the IP address of the license server. Every system on the network should be able to *ping hostname* and get the correct IP address.

Generate License Keys

Log in to your PGI web account at www.pgroup.com/login. You should see a screen similar to the following:



To generate permanent license keys:

1. Click `Create permanent keys`.
2. Click the PIN associated with the product for which you wish to generate license keys. If you don't see any PINs listed, you first need to tie one to your account.
   a. Obtain your PIN code from your original PGI order confirmation email, in the section labeled: 'SHARING ADMINISTRATION.' The 16-digit PIN code is used to tie PINs to pgroup.com accounts.
   b. Click the link: Tie a PIN to this account.
   c. Follow the instructions provided.
3. Click License keys to generate the keys.

To generate trial license keys:

1. Click `Create trial keys`.
2. Accept the terms of the agreement.
3. Enter the hostid exactly as it appears in the message that is displayed during installation or when you issue the command:

   ```
   % lmutil lmhostid
   ```

   If multiple host ids are displayed, select any *one* of them to use as the hostid.
4. Click the *Generate license key* button.

Install License Keys

Once you have generated your starter, trial or permanent license keys, copy and paste them into the file `/opt/pgi/license.dat`, or substitute the appropriate installation directory path if you have not installed in the default `/opt/pgi` directory.

For example, if you have purchased *PGI Workstation* for OS X and generated a permanent licence key as previously described, the `license.dat` file should look similar to the following:

```
SERVER <hostname> 0123456789ab 27000 DAEMON pgroupd
PACKAGE PGI2014-workstation-complete pgroupd 2014.1231 49E1579B7BFA \
   COMPONENTS="pgi-f95-osx64 pgi-f77-osx64 pgi-cc-osx64 \
   pgi-cpp-osx64 pgi-gpp-osx64 pgi-f95-osx32 pgi-f77-osx32 \
   pgi-cc-osx32 pgi-cpp-osx32 pgi-gpp-osx32 pgi-prof pgi-dbg \
   pgi-dbg-gui" OPTIONS=SUITE SIGN="1E64 5B14 AC64 6D68 6204 45FA \
   9004 7137 1CD2 C086 7B1E 4FFF 6DE0 0090 72C4 1FB0 8A0E A02A \
   DA3F E277 1A0F F726 A7F6 0EA4 F47B 27F9 FB2F 2BAE EC94 6BC7"
FEATURE PGI2014-workstation-complete pgroupd 2014.1231 permanent 1 \
   3E65C5FF75F4 VENDOR_STRING=543210:8:ws HOSTID=0123456789ab \
   DUP_GROUP=U SUITE_DUP_GROUP=U SIGN="16DA D520 FD71 5112 F636 \
   52DC 4EC4 2D1C F75A 3EA6 4FDA 771D E1B2 3971 5D61 0A86 206F \
   6DEF 2E11 8E2E 5A3C E171 FB30 7F84 4D45 AE33 7E99 B6F1 9AA5 \
   AF18"
PACKAGE PGI71-workstation-complete pgroupd 7.1 583AC9A7E2F6 \
   COMPONENTS="pgf90-osx64:7.1 pgf77-osx64:7.1 pgcc-osx64:7.1 \
   pgcpp-osx64:7.1 pgf90-osx32:7.1 pgf77-osx32:7.1 pgcc-osx32:7.1 \
   pgcpp-osx32:7.1 pgprof:7.1 pgdbg:7.1 pgdbg-gui:7.1" \
   OPTIONS=SUITE SIGN="1503 6E30 B054 57FB E6DA 4CD0 0C11 7762 \
   F675 B4BB F789 22B5 70F8 F6A0 D018 1596 0604 0AEE 834F C8D9 \
   E14B DF85 D210 09A3 B363 B6F7 74B9 D9F3 6995 ADB5"
FEATURE PGI71-workstation-complete pgroupd 7.1 permanent 1 \
   4AEA13647DAA VENDOR_STRING=543210:8:ws HOSTID=0123456789ab \
   DUP_GROUP=U SUITE_DUP_GROUP=U SIGN="1F37 D288 7DB6 1388 4845 \
   ECD7 74CB E69F 0B25 4F9E 4E50 E6C0 760A CA09 0150 0EB0 BA02 \
   3531 86A1 0DEE C93A 574A 9EB6 54AB 14B9 62AC 240F 5FE0 D16D \
   BD3B"
```

In your license file:

- `<hostid>` should match the *hostid* you submitted above when you generated your license keys.
- If necessary, you *can* enter or edit the `<hostname>` entry manually, but you *cannot* edit the `<hostid>` entry or you will invalidate the license keys.
- The date in the file, in this example 2014.1231, represents the expiration date for your subscription service.

  For example, if your subscription date for your PGI Product Identification Number (PIN) is August 1, 2014, then the date in your file is 2014.0801. An active PGI subscription entitles you to free updates, technical support, and other benefits. For information on how to renew your subscription, refer to "Product Support," on page 6
- The six digits immediately following the = in the feature line component, VENDOR_STRING=543210:8 represent the PIN for this installation, in this example 543210. You have a similar unique PIN for your installation.

6. Start the license manager daemon.

   Important

   If you are evaluating *PGI Workstation* with starter or trial keys, you do not need to perform this step.

   If this is your first installation of PGI software, you need to configure and start up the license server. This is not a requirement for subsequent installations.

Follow these steps to start the license server and `pgroupd` license daemon running on your system:

1. In Terminal, use the **sudo** command to get a root bash shell; enter your password:

```
% sudo bash
 <password>
```

2. Create the directory `/Library/StartupItems/PGI`:

```
% mkdir /Library/StartupItems/PGI
```

3. Copy the PGI license configuration files:

```
% cp /opt/pgi/PGI /Library/StartupItems/PGI/PGI
% cp /opt/pgi/StartupParameters.plist \
      /Library/StartupItems/PGI/StartupParameters.plist
```

4. Start the license server:

```
% cd /Library/StartupItems/PGI
% ./PGI start
```

The license server should now be running. Enable remote access in the Sharing Systems Preference to have the license server restart automatically whenever you reboot.

Installation of your FlexNet licensing is now complete. For assistance with difficulties related to the installation, send email to trs@pgroup.com.

7. Review documentation.

The documentation is in PDF format and located in:

`/opt/pgi/osx86/14.3/doc/`
or
`/opt/pgi/osx86-64/14.3/doc/`

You may want to bookmark this location for easy future reference to the online manuals.

End-user Environment Settings on OS X

Once software installation is complete, each user must initialize their environment to use the compilers successfully. You can either use the PGI Terminal settings or you can initialize your Terminal shell manually.

Use PGI Terminal Settings

There are two methods to use the PGI Terminal Settings:

- Use the PGI Terminal Settings by bringing up a PGI command window by double-clicking on the `PGI2014.terminal` file. PGI compilers and tools are accessible and your environment is pre-initialized.
- Use the PGI Terminal Settings by launching the Terminal application located in the `Applications | Utilities` folder. Under the Shell menu, select either `New Window | PGI2014` or `New Tab | PGI2014`. Both commands open a bash shell that is preconfigured with the PGI environment.

Initialize your Terminal Shell Manually

To initialize your Terminal shell manually, for either 32-bit or 64-bit environments, you launch the Terminal application located in the `Applications | Utilities` folder and enter the commands described for the desired compilers.

Each of the following commands assume this:

The license file is in `/opt/pgi/license.dat`.
The `lmgrd` license manager is running.

Make 32-bit compilers the default

Launch the Terminal application located in the `Applications | Utilities` folder and enter the following commands to make the 32-bit compilers the default.

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

```
$ PGI=/opt/pgi; export PGI
$ LM_LICENSE_FILE=$PGI/license.dat; export LM_LICENSE_FILE
$ PATH=$PGI/osx86/14.3/bin:$PATH; export PATH
```

In csh, use these commands:

```
% setenv PGI /opt/pgi
% setenv LM_LICENSE_FILE $PGI/license.dat
% set path = ($PGI/osx86/14.3/bin $path)
```

Make 64-bit compilers the default

Launch the Terminal application located in the `Applications | Utilities` folder and enter the following commands to make the 64-bit PGI compilers and tools the default.

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

```
$ PGI=/opt/pgi; export PGI
$ LM_LICENSE_FILE=$PGI/license.dat; export LM_LICENSE_FILE
$ PATH=$PGI/osx86-64/14.3/bin:$PATH; export PATH
```

In csh, use these commands:

```
% setenv PGI /opt/pgi
% setenv LM_LICENSE_FILE $PGI/license.dat
% set path = ($PGI/osx86-64/14.3/bin $path)
```

Use MPICH

To use the version of MPICH that comes with *PGI Workstation*, use these commands:

For 32-bit compilers:

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

```
$ PATH=$PGI/osx86/2014/mpi/mpich/bin:$PATH
$ export PATH
```

In csh, use this command:

```
% set path = ($PGI/osx86/2014/mpi/mpich/bin $path)
```

For 64-bit compilers:

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

```
$ PATH=$PGI/osx86-64/2014/mpi/mpich/bin:$PATH
$ export PATH
```

In csh, use this command:

```
% set path = ($PGI/osx86-64/2014/mpi/mpich/bin $path)
```

Chapter 6. Installations on Microsoft Windows

This section describes how to install *PGI Workstation* on a system running a Microsoft Windows operating system. These instructions are valid for both 64-bit and 32-bit platforms, though supported platforms vary by product. Further, this installation information is applicable to both permanent and trial installations.

For installations on 64-bit x64 systems running a 64-bit operating system, the PGI installer installs the 64-bit and 32-bit versions of the PGI compilers and tools. For installations on 32-bit x86 systems, the PGI installer installs only the 32-bit versions of the PGI compilers and tools.

Preparing to Install on Windows

Prerequisite: Microsoft Windows 8.1 SDK

The Microsoft Windows 8.1 Software Development Kit (SDK) is a prerequisite for PGI Workstation when installing on these systems: Windows 2008 R2, Windows 7, Windows 8, Windows 8.1, and Windows Server 2012. You must install the Windows 8.1 SDK before PGI Workstation will install. The Windows 8.1 SDK includes tools and libraries required to compile, link, and execute programs on Windows. Download the Windows 8 SDK at pgroup.com/microsoft-sdk.

PGI products on all Windows systems include the Microsoft Open Tools. On some systems (Windows XP, Windows Server 2003, Windows Server 2008), these files are all the additional tools and libraries required to compile, link, and execute programs on Windows. On other systems (Windows 2008 R2, Windows 7, Windows 8, Windows 8.1, and Windows Server 2012), these files are required in addition to the files Microsoft provides in the Windows 8.1 SDK.

Note

Verify you have enough free disk space. PGI software requires 750 MB of free disk space during the installation. This does not include the space needed for the download file itself.

Edit the file `C:\Windows\System32\drivers\etc\hosts` and remove the comment characters from the lines:

```
127.0.0.1     Localhost::1 localhost
```

Installation Steps for Windows

Download the software from www.pgroup.com or another electronic distribution site. Select the install package appropriate for your OS.

Note

If you are using Internet Explorer 9, be sure to set the *compatibility mode* option when reading the download page, as it may look blank otherwise.

In the 2014 release cycle, there are separate packages for Windows XP/2003/2008 and Windows 2008R2/7/8/8.1/2012. PGI support for the former is deprecated and will not be supported in PGI 2015.

The installation executables are:

pgiws32-143.exe	32-bit Windows 2008r2/7/8/2012
pgiwsx64-143.exe	64-bit Windows 2008r2/7/8/2012
pgiws32-xp-143.exe	32-bit Windows XP/2003/2008
pgiwsx64-xp-143.exe	64-bit Windows XP/2003/2008

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

1. Log in as Administrator.

   Administrator privileges are required to install PGI software.

2. Start the installation.

   Administrator privileges are required to install PGI software.

   License Setup Tool:

   The installer runs the PGI Licensing Setup tool at the conclusion of the installation process. This tool automates steps three (3) through six (6) in this process. To use the PGI Licensing Setup tool, your computer must meet these requirements:

   - Be connected to the Internet.
   - Have Microsoft .NET Framework 2.0 or Microsoft .NET Framework 3.5 installed.
   - Have Internet Explorer Version 6.0 or higher installed and configured.

   If your computer does not meet these prerequisites, then you can either make any necessary changes to your system and run the PGI Licensing Setup tool later, or follow steps three through six in this process.

   ### Important

   If you choose to run the PGI Licensing Setup tool later, you can find it in the *PGI Workstation* folder under the Start menu or as an icon on the Start screen.

When you run the program, the PGI Licensing Setup tool walks you through the license generation and installation process. It prompts you for your PGI username and password as well as the type of license you wish to install, such as a trial license or a permanent license. The tool also informs you of any problems it experiences with installation and provides instructions on how to proceed.

Note

If the PGI Licensing Setup tool reports a successful license installation, then skip to step 7.

3. Make PGI products accessible and prepare for licensing.

   Once software installation is complete, whenever you bring up a PGI command window by double-left-clicking on the *PGI Workstation* desktop icon, PGI compilers and tools are accessible and your environment is pre-initialized.

4. Verify release number.

   Verify the release number of the products you have installed. Open *PGI Workstation* from your desktop by double-left-clicking the PGI icon and entering one of the following commands. The release number is in the first line displayed in the BASH shell window.

For Fortran 77, use:	**pgf77 -V**
For Fortran 95, use:	**pgfortran -V**
For C++, use:	**pgcpp –V**
For ANSI C, use:	**pgcc -V**

   Note

   These commands can be successfully executed even if you have not completed the licensing phase of the installation. Use it to check that you have installed the proper version of the compilers and have initialized your environment to enable access to that version.

5. Generate and install license keys.

   All of the PGI compilers and tools are license-managed and require installation of license keys to make the PGI software operational.

   To obtain license keys, you need the following information:

   - An account on the PGI website.

     You probably created this account when you downloaded the PGI software.

     - If you purchased a license without creating an account, one was created for you when your order was processed. Please check for an activation email from accounts-noreply@pgroup.com .
     - If you don't have an account, you can create one at: www.pgroup.com/register.
     - The FlexNet hostid and hostname of the computer on which the software is installed. The installer echoes this information to your screen.

Note

Hostids come from configured network cards. If you use your computer in multiple network environments, you may need to run the following command in each environment to see which hostids are configured. Then, to reduce potential license problems, choose the hostid that occurs in all your environments.

```
% lmutil lmhostid -hostname
```

After you have installed the PGI software, you can obtain your FlexNet hostid by double-left-clicking on the *PGI Workstation* desktop icon to open a *PGI Workstation* command window, and typing these commands:

```
PGI$  cd $PGI
PGI$  cat license.info
```

You should see information similar to the following:

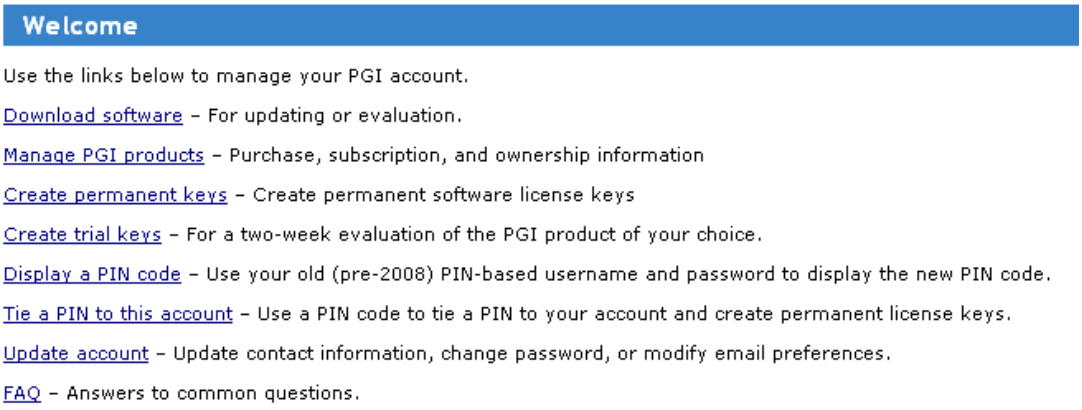
```
For a permanent license, please read the order acknowledgment that you
received. Connect to www.pgroup.com/login with the registered email and
password in your order acknowledgment.

   FlexNet Host ID:  0123456789ab
   Installation: C:\Program Files\PGI\
   PGI Release: 2014
```

You can also obtain evaluation license keys by logging in at www.pgroup.com/login with your existing PGI user account or by creating a new account if you have not previously registered.

Generate License Keys

Log in to your PGI web account at www.pgroup.com/login. You should see a screen similar to the following:



To generate permanent license keys:

1. Click Create permanent keys.
2. Click the PIN associated with the product for which you wish to generate license keys. If you don't see any PINs listed, you first need to tie one to your account.

a. Obtain your PIN code from your original PGI order confirmation email, in the section labeled: 'SHARING ADMINISTRATION' or contact trs@pgroup.com.

b. Click the link: Tie a PIN to this account.

c. Enter the 16-digit PIN code and follow the instructions provided.

3. Click License keys to generate the keys.

To generate trial license keys:

1. Click Create trial keys.
2. Accept the terms of the agreement.
3. Enter the hostid exactly as it appears in the message that is displayed during installation or when you issue the command:

```
PGI$  cd $PGI
PGI$  cat license.info
```

4. Click the *Generate license key* button.

Install License Keys

Once you have generated your trial or permanent license keys, cut and paste them into your `license.dat` file. In a typical configuration, where `C:\` is the system drive and you installed the software using the default location, this file would be found in `C:\Program Files\PGI\license.dat`.

- If you have not previously received license keys from PGI, replace the contents of the `license.dat` file created during installation with the license keys you generated using the preceding steps.

  Note

  You must have Administrator privileges to modify or replace the `license.dat` file.

- If your `license.dat` file already contains keys that you previously received from PGI, first make a copy of the existing `license.dat` file in case you encounter a problem with the new license. Then do one of the following:
  - If the license keys in the file are for a previous release of the same product, overwrite the keys.
  - If the license keys in the file are for different PGI products, append the new keys to the keys already in this file.

  Note

  While you may combine a license from PGI with other FlexNet-based licenses from another vendors, only one PGI license per license server is allowed.

6. Start the PGI license server.

   Note

   If you are evaluating a PGI product using trial or starter keys, you do not need to start the license server.

   The PGI License Server is a Windows Service. To start it, follow these steps:

   1. Open the Services dialog from the Control Panel:

      Control Panel | Administrative Tools | Services

   2. Select *PGI License Server*.

   3. Select *Start*, if the PGI service is stopped. If the PGI service is running, STOP and then START it. This process guarantees that the new PGI license is served and that the older, cached PGI license is no longer active.

      Note

      The PGI License Server service starts automatically on system reboot, provided that the `license.dat` file contains valid keys.

7. Review documentation.

   You can view the online documentation by using any web browser to go to:

   www.pgroup.com/resources/docs.htm

   Tip

   You may want to bookmark this location for easy future reference to the online manuals.

8. Customize *PGI Workstation*

   Optionally, customize the setup, as described in the next sections, "Customizing the Command Window" and "PGI Workstation Default Installation Directories".

Customizing the Command Window

By default, when you double-left-click on the *PGI Workstation* desktop icon, a standard black-background command window appears on your screen. This window is pre-initialized with environment and path settings for use of the *PGI Workstation* compilers and tools. If you prefer different background or text colors, font style, window size, or scrolling capability, you can customize the "shortcut" that creates the *PGI Workstation* command window.

To customize your window, right-click the *PGI Workstation* desktop icon, and select "Properties" from the pop-up menu. In the *PGI Workstation* Properties dialog box, select the tabs for the features you want to customize, and make the desired modifications.

PGI Workstation Default Installation Directories

This section contains information about the default installation directories. The default installation directory depends on your platform.

The following table lists the default installation directories, indicating the related platform or tool.

Default Installation Directories

Table 6.1. Default Windows Installation Directories

Platform or tool	Default Installation Directory
32-bit	`%SYSTEMDRIVE%\Program Files\PGI`
64-bit	`%SYSTEMDRIVE%\Program Files\PGI` `%SYSTEMDRIVE%\Program Files (x86)\PGI`
Cygwin	`%SYSTEMDRIVE%\cygwin`

Tool Default Versions

PGI ships a subset of Cygwin with its products on WIndows. In release 14.3, the version of Cygwin is Cygwin 1.7.27. This is the current version of Cygwin as of January, 2014. In general, PGI users should not notice significant differences in Cygwin behavior from the previous version, which was Cygwin 1.7.16. For information about configuring and troubleshooting Cygwin, you can visit the following websites:

Cygwin FAQ: http://cygwin.com/faq.html
Cygwin Users Guide: http://cygwin.com/cygwin-ug-net.html
Cygwin mailing lists and archives: http://cygwin.com/lists.html

PGROUPD_LICENSE_FILE and FLEXLM_BATCH

This section describes two environment variables that you can use with FlexNet:

PGROUPD_LICENSE_FILE
FLEXLM_BATCH

PGROUPD_LICENSE_FILE

PGI Compilers installed on Windows have fewer problems when you install in the default `C:\Program Files\PGI` folder, and store the license as `C:\Program Files\PGI\license.dat`.

The system environment variable `PGROUPD_LICENSE_FILE` is not required by PGI products on Windows but you can use it to override the default location that is searched for the `license.dat` file.

To use the system environment variable `PGROUPD_LICENSE_FILE`, set it to the full path of the license keys file. To do this, follow these steps:

1. Open the System Properties dialog from Control Panel | System.

2. Select the 'Advanced' tab.
3. Click the 'Environment Variables' button.
   - If `PGROUPD_LICENSE_FILE` is not already an environment variable, create a new system variable for it. Set its value to the full path, including the name of the file, for the license keys file.
   - If `PGROUPD_LICENSE_FILE` already exists as an environment variable, append the path to the license file to the variable's current value using a semi-colon to separate entries.

FLEXLM_BATCH

By default, on Windows, the license server generates interactive pop-up messages to issue warning and errors. This behavior is controlled by the environment variable `FLEXLM_BATCH`.

Although it is not recommended, you can prevent interactive pop-ups from appearing. To do this, set the environment variable `FLEXLM_BATCH` to the value of 1.

Windows Firewall and PGI Debugging

Microsoft Windows Firewall runs by default on some types of systems, such as Windows XP and Windows Vista. Suppose this application is running on your system. 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.

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 2014 (32-bit)
PGI Debugger 2014 (64-bit) - not added to the Exceptions list on 32-bit systems.

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.

Tip

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.

Note

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

Common Windows Installation Problems

The most common installation problems on Windows are related to licensing.

To troubleshoot your installation, first check that the `license.dat` file you are using contains valid license keys. Second, check that the PGI License Server, a Windows Service, has been started. (Control Panel > Admin Tools > Services > PGI

Typical FlexNet errors encountered may include the following:

- When using a PGI compiler or tool, a FlexNet License Manager dialog appears that states: `'LICENSE MANAGER PROBLEM: No such feature exists.'`

  This message may appear because the `license.dat` file accessed by the FlexNet License Manager does not contain valid license keys. Possible reasons for an invalid licence key include:

  - Bad format license file – if you stored it from Word, make sure it was stored in plain text format.
  - License does not support this release or this operating system. Make sure your license covers the release you are installing, and is a Windows license.

- When using a PGI compiler or tool, you may see one of the following FlexNet License Manager dialog messages: `'LICENSE MANAGER PROBLEM: Cannot connect to license server system.'` or `'LICENSE MANAGER PROBLEM: Failed to checkout license'`

  This message may appear as a result of one of the following conditions:

  - The PGI License Server is not running.
  - Firewall problems exist.
  - The Hostname in the license is not one the license server can locate.

  Refer to the information earlier in this section restarting the license server.

  The hostname must map to the IP address of the license server. You should able to `ping hostname` and find that it is mapped to the IP address of the license service. If not, double-check the hostname of the license server and/or your network configuration.

  Every machine using the license server, including the server itself, should be able to successfully ping the hostname and get back the IP address of the server. If your system is using a Firewall, you need to enable two ports for the licensing daemons `lmgrd` and `pgroupd` to communicate with the PGI compiles and tools. Edit or add these ports to the `license.dat` file.

  - On the SERVER line, change the default port 27000 to the `lmgrd` port.
  - On the DAEMON line, append PORT=### just after `pgroupd`, replacing ### with the port number `pgroupd` is allowed to use.

- By default, on Windows, the license server generates interactive pop-up messages to issue warning and errors. You can use the environment variable FLEXLM_BATCH to prevent interactive pop-up windows.

  To do this, set the environment variable FLEXLM_BATCH to 1.

For assistance with difficulties related to the installation, send email to trs@pgroup.com.

Chapter 7. Contact Information

You can contact PGI at:

Two Centerpointe Drive, Suite 320
Lake Oswego, OR 97035 USA

Or electronically using any of the following means:

Fax	+1-503-682-2637
Sales	sales@pgroup.com
Support	trs@pgroup.com
WWW	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:

`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:

`www.pgroup.com/support/faq.htm`

All technical support is by email or submissions using an online form at www.pgroup.com/support. Phone support is not currently available.

PGI documentation is available at www.pgroup.com/resources/docs.htm or in your local copy of the documentation in the release.

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