

Blue Pearl Installation Quick Start User Guide

Version 2021.3

Blue Pearl Software

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1. Introduction

This document is a guide to getting started with the Blue Pearl Software™ suite.

1.1 *Blue Pearl Overview*

The Blue Pearl Software suite (Blue Pearl) automatically checks your Verilog HDL and VHDL designs for compliance with user-selected and user-defined rules or properties. The supported properties range from synthesis compliance (including issues that could cause synthesis/simulation mismatches) and design re-use (for example: compliance with the requirements of the *Reuse Methodology Manual*) to complex properties such as analysis of clock domain crossings. In addition to Verilog and VHDL descriptions, Liberty format (.lib) is supported for large macros such as memory blocks. Additional licensing levels are available to automatically analyze your HDL and determine if paths that might be analyzed by timing analysis tools are false.

1.2 *Who Should Use Blue Pearl*

Blue Pearl is intended for use by designers and verification engineers who are verifying digital logic designs written primarily in synthesizable Verilog and VHDL RTL code. Companies that are committed to creating re-usable code, designs that are testable and designs that have high MTBF requirements will benefit from using Blue Pearl. Also companies that are interested in reducing cycle times by spotting problems early on will find Blue Pearl's advanced analysis a great addition to their capabilities.

Blue Pearl is not intended for use on non-synthesizable test-bench code.

2. Supported Platforms, HDLs, FPGAs, and Licensing

2.1 Supported Platforms

The supported platforms are Linux (CentOS/Red Hat Enterprise 6.x, 7.x, and 8.x, Ubuntu 16.04, SLES 11.4) and Windows 7, 8.1 and 10 (64 bit).

2.2 System Requirements

System requirements for the software are relatively modest. Above the normal requirements for your operating system, you should have at least 1GB free non-swapping memory and 1GB of hard drive space for designs up to one million gate-equivalents.

Beyond that, system requirements are a function of design size. For a five million gate-equivalent design, we recommended 1G of free disk space and 4G of free non-swapping memory. Please note that this is only an estimate, and design style and architecture also affect overall performance.

Recommended vertical screen resolution for the GUI is 1080 or greater. Less than 800 limits usability.

2.3 Licensing

You will need a license in order to execute Blue Pearl. Contact a Blue Pearl Software Support Representative for your license file. Blue Pearl Software uses FlexNet Publisher™ from Flexera™ Software for licensing. Please refer to the instructions in the *installation/doc/fnp_LicAdmin_11.16.1.pdf* document supplied as part of the Blue Pearl download for information on installing licenses.

Note: Blue Pearl has different licensing levels, and extra capabilities are provided in the more advanced levels. The base Blue Pearl Analyze license includes only lint-style rule checks. Blue Pearl CDC adds Clock Domain Crossing (CDC) checks. Please contact your Blue Pearl Software representative for details of additional licensing level options.

2.4 Phone Home System

Blue Pearl's **Phone Home** is an HTTP (Hyper Text Transfer Protocol) system which transmits the following information to Blue Pearl Software each time the Visual Verification Suite is invoked:

1. Exact version, build date, and build platform (Windows or Linux) of the Blue Pearl tool run.
2. IP address. (Typically, this is the IP address of the customer's Internet gateway)
3. Operating system version on which the Blue Pearl tool is run
4. Date and time the feature was checked out.
5. User name as given by the licensing software (for a floating license environment this may show the user names of all users who have currently checked out the same Blue Pearl feature)
6. Blue Pearl License information (typically the file name where the customer has stored their license, or the value of the LM_LICENSE_FILE environment variable)
7. Maintenance date in the license file (year, month)
8. Expiry date of the license (year, month, day)
9. Feature checked out (such as "CLI", "GUI", etc.)
10. Customer ID

For the Starter Edition to invoke, the computer or server must have direct connection to the internet. Paid licensees have the option to turn off the Phone Home feature where an internet connection is not available.

If your internet connection is slow, a BPS-0945 message will be generated advising you to set the `BPS_PHONE_HOME_MAX` environmental variable to a value larger than the current timeout setting for your system. This variable is not set by default.

2.5 Starter Edition

VVS has an option for a Starter Edition, which is a no-cost, restricted use license that allows you to “test drive” the tool.

The restrictions are:

- 45-day license duration
- SDC and Custom UGC (User Grey Cell) capabilities are not included
- Designs larger than 1000 Source Lines of Code (SLOC), as counted by the tool, will not load
 - The SLOC count does not include comments, blank lines, or disabled code
 - The SLOC Report and Analysis Report are still available to assist in diagnosing the reason for a refusal to load
- Internet connection is required

2.6 Supported HDLs

Blue Pearl supports synthesizable Verilog, SystemVerilog and VHDL RTL design descriptions. In addition, hard macros such as memory cells may be described using Liberty format (lib) files. *It is not intended for use on test-bench or behavioral code.*

It is recommended that memory models implemented using behavioral RTL code be replaced by Liberty library models.

See the *Blue Pearl Analyze and Blue Pearl CDC Reference Manual* for details of supported Verilog and VHDL constructs and limitations of the tool.

2.7 Supported Xilinx Clock Models

FPGA users define clocks using the vendor's software to specify parameters that program clock generation and management cells such as PLLs. Blue Pearl extracts this critical information from the design HDL and processes it to facilitate CDC analysis, clock rule analysis, and the writing of complete `create_clock` and `create_generated_clock` SDC constraints.

Blue Pearl supports programmed instantiations of the following Xilinx cells:

- DCM, DCM_BASE, DCM_SP, DCM_PS
- MMCM_BASE, MMCM_ADV, MMCME2_BASE, MMCME2_ADV
- PLL, PLL_BASE, PLL_ADV, PLLE2_BASE, PLLE2_ADV

3. Installation

This section covers the installation of the Visual Verification Suite for both the Windows and the Linux environments.

3.1 Installing under Windows

Obtain the **BluePearl-VVE.<#>.exe** file and double-click on it. Follow the installation instructions to install the Visual Verification Suite. This is the first dialog you will see.

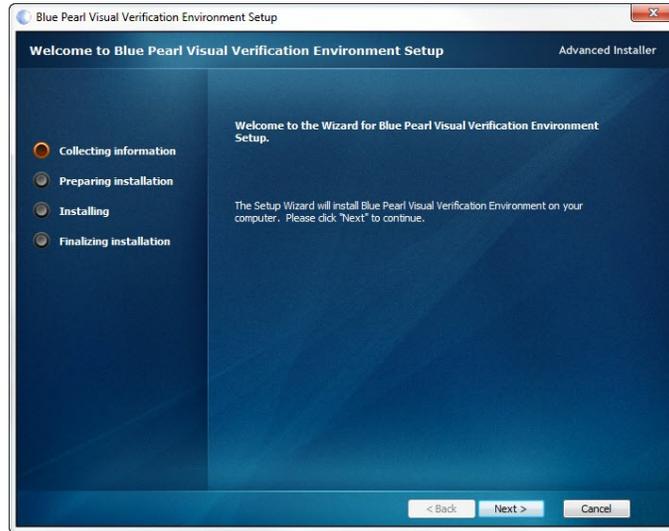


Figure 1: Blue Pearl VVE Setup Wizard

Please click **Next>**.

You may wish to read the licensing agreement.

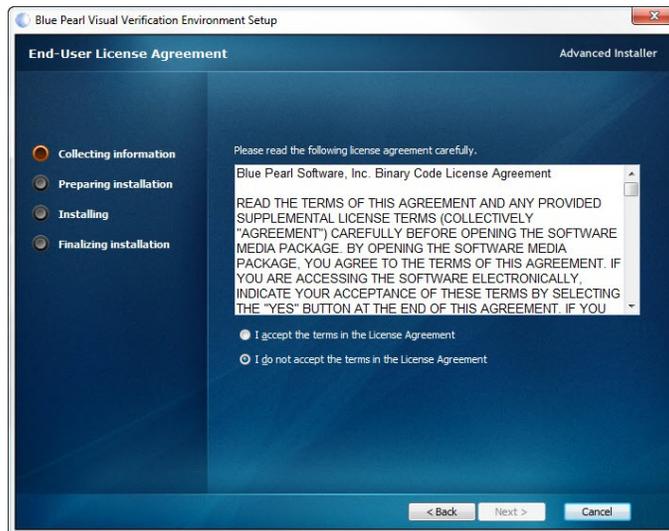


Figure 2: Blue Pearl VVE License Agreement

When you are satisfied with the agreement, click the check-box marked **I accept the terms in the License Agreement** and click **Next>**.

You can accept the default installation folder, or click **Browse...** to select another folder.

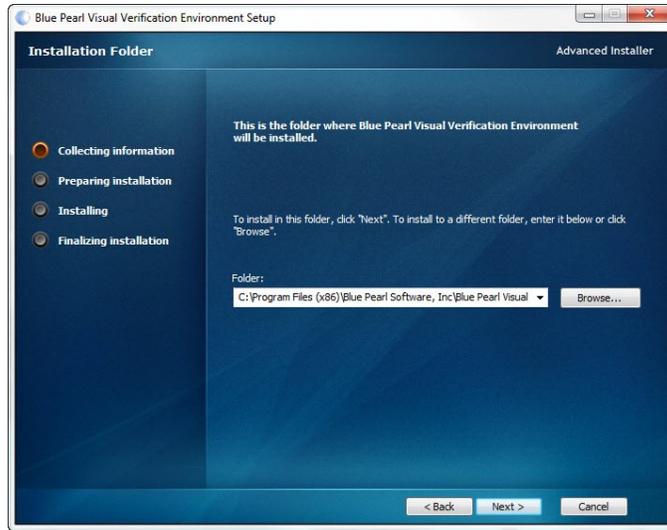


Figure 3: Blue Pearl VVE File Location

When you are satisfied with the installation folder, please click **Next>**.

Please note that installation requires you to have administrator privileges on your computer.

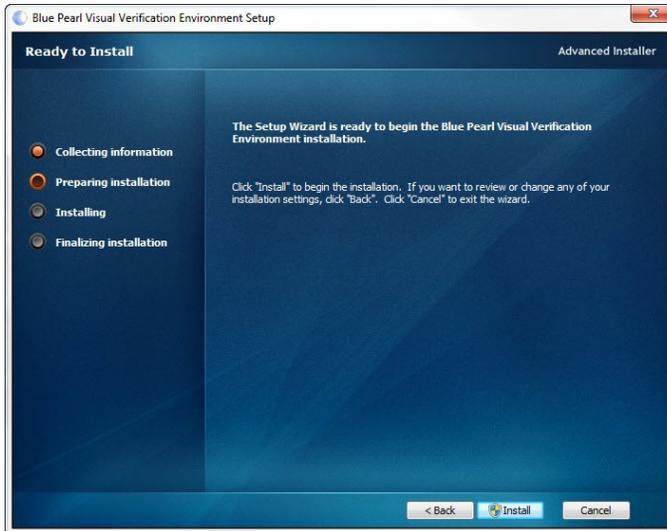


Figure 4: Blue Pearl VVE Install

Please click **Install**.

At this point, if your computer does not have **Microsoft Visual C++ 2013 Redistributable** installed, you will be asked to install it. There are separate versions for 32-bit (labeled x86) and 64-bit (labeled x64). Please agree to the terms and conditions, and click **Install**. Once this program is setup successfully, click **Close**.

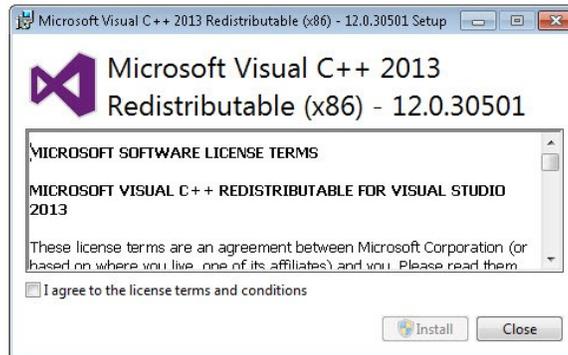


Figure 5: Microsoft Visual C++ Redistributable dialog (32 bit shown)

You may also see a **User Account Control** dialog from Windows, first for **Microsoft Visual C++** and then for the Blue Pearl VVE. In both cases, please click **Run**.

There will be another dialog, not shown here, that indicates the progress of the installation process.

You have successfully installed the software!

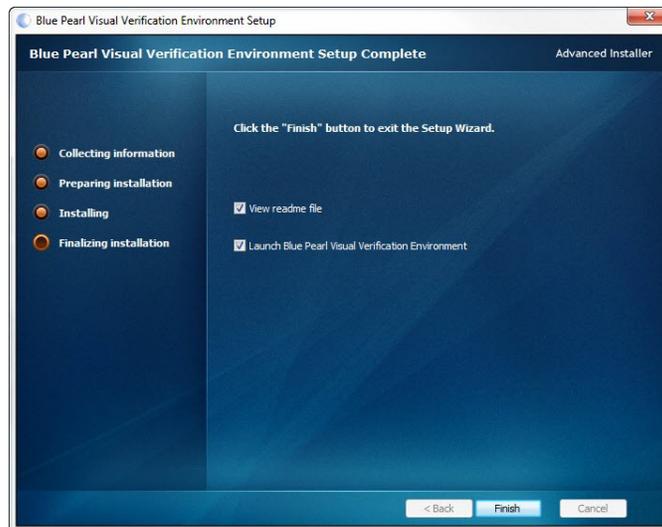


Figure 6: Blue Pearl VVE Installed

You may choose to whether you want to view the *readme file* (actually the HTML-format Release Notes) and start the tool. Please click **Finish**.

A shortcut is also created on your desktop.

3.2 Installing under Linux

Red Hat

On RedHat, the following package is required for the licensing to work:

`redhat-lsb 3.0-8.EL` or later

On RedHat /Centos 6, the following packages and all appropriate dependencies are required:

`libX11.so.6`

`libXrender.so.1`

`libfontconfig.so.1`

`libz.so.1`

`libXext.so.6`

`libSM.so.6`

We recommend the `yum install` command for RedHat, which handles dependencies automatically.

General

Obtain the **BluePearl-linux-`<#>`.tar** file and untar it:

```
tar xf BluePearlVVE-<#>-CentOS6.x86_64.tar
```

The tarball contains one file, a shell script. Run the shell script:

```
./BluePearlVVE-<#>-CentOS6.x86_64.sh
```

Follow the instructions to install the Visual Verification Suite.

First, the licensing agreement is displayed using a `more-type` command. Use the space bar to display as much of it as you wish. You can press `q` at any time to stop reading; this will not terminate the install script.

Next you will be asked to accept the license agreement. Enter `y` if you agree.

The next step is to specify the installation directory, or accept the default (`/opt/BluePearl`). Type in the desired directory name and hit the **<Enter>** key. You should see an indication that the installation was successful.

3.3 Your license file

The purpose of a license file is to give the vendor who sent the file control over how the software is used. Examine the license file. You should see a number of lines (that will probably be broken up into multiple lines by `"\"` characters) each starting with the keyword `FEATURE`. This is followed by the name of the feature being licensed on this line, such as `gui` or `analyze`. Next comes the vendor label, in this case `bluepsd`, followed by two numbers separated by a dot, then an expiration date like `31-dec-2013`. After that, there are other possibilities.

Blue Pearl Software issues two kinds of license files: floating and node-locked. The `FEATURE` lines of a node-locked license file will have either `0` or `uncounted` after the expiration date, and will also include `HOSTID=longhexcode` where `longhexcode` is typically the MAC address and identifies the computer for which the file was issued. If the `FEATURE` lines do not include this information, you have a floating license file. A node-locked license file should never be edited.

A floating license file has three lines near the top which are not included in a node-locked license file:

```
#Replace $nodename with the name of your server
SERVER $nodename hostid [portname]
DAEMON bluepsd [path_to_bluepsd_daemon]
```

The SERVER line of a floating license file must be edited, usually by a system administrator, to change \$nodename to the proper *hostname* and, optionally, to set or change *portname* and *path_to_bluepsd_daemon* on the DAEMON line.

If you are acting as the system administrator, refer to the **License Administration Guide** (<installation directory>/doc/fnp_LicAdmin_11_11_1.pdf) for information on running the license server software. The Blue Pearl daemon can be found in Linux installations at <installation directory>/FLEXnet/i86_lsb/bluepsd for 32-bit license servers or <installation directory>/FLEXnet/x64_lsb/bluepsd for 64-bit license servers and in Windows installations at <installation directory>\FLEXnet\win32\bluepsd.exe.

Troubleshooting license issues under Linux

Please note that to actually use the bluepsd license daemon, it must be run through the lmgrd daemon and not executed directly. The following commands are only to be used to troubleshoot licensing issues.

Also, please note that you may experience issues with floating licenses if the clocks are not synchronized between the license server and the client.

Running Blue Pearl's license daemon (bluepsd) requires the installation of the appropriate Linux Standard Base (LSB) package. The current status of the system with respect to LSB compliance can be established by running the command "lsb_release". A typical response to this command is given below:

```
$ lsb_release
LSB Version:      :core-4.0-amd64:core-4.0-ia32:core-4.0-
noarch:graphics-4.0-amd64:graphics-4.0-ia32:graphics-4.0-
noarch:printing-4.0-amd64:printing-4.0-ia32:printing-4.0-noarch
```

Commands for installing the available LSB packages differ from one Linux variant to the next. In all cases, make sure that you have the latest LSB package.

For Red Hat/CentOS 6.x and 7.x use:

```
# yum install redhat-lsb
```

For Ubuntu use:

```
# apt-get install lsb
```

To test that the necessary packages are installed, you can run the daemon from the command line and observe the messages returned. The result may be similar to:

```
# ./bluepsd
bluepsd: /lib64/ld-lsb-x86-64.so.3: bad ELF interpreter: No such
file or directory
```

However, some Linux distributions may give less information:

```
# ./bluepsd
bluepsd: No such file or directory
```

If the necessary packages are installed, the response should be similar to:

```
# ./bluepsd
13:58:21 (bluepsd) FlexNet Licensing version v11.11.0.0 build 106800
x64_lsb
```

13:58:21 (bluepsd) Vendor daemons must be run by the license server manager (lmgrd)

3.4 Floating License Servers under Windows

Please use **lmtools.exe** as provided in the Visual Verification Suite installation to install your license server.

The license daemon will require you to have **Microsoft Visual C++ 2013 Redistributable** installed. See: <https://www.microsoft.com/en-us/download/details.aspx?id=40784>

3.5 Licensing under Linux

Blue Pearl Software uses FlexNet Publisher™ from Flexera™ Software for licensing. You need to properly set the environmental variable `LM_LICENSE_FILE` to use the Visual Verification Suite.

If you have a node-locked license file, set `LM_LICENSE_FILE` to the path for that file. If you have a floating license, set it as directed by your system administrator, usually to `port@host`, where `host` can be found as the first argument on the `SERVER` line of your license file, and `port` is either the optional third argument or is determined by the system administrator.

3.6 The Licensing Wizard – Requesting a License

Blue Pearl Software uses FlexNet Publisher™ from Flexera™ Software for licensing. Once you enter a license server or file name, you should not have to do it again. The path to your license file is stored in your PC's Registry under `Software\Blue Pearl Software, Inc\Blue Pearl Visual Verification Environment\BLUEPSD_LICENSE_FILE`, or in the environmental variable `LM_LICENSE_FILE`.

If you start the tool without an installed license, or if you start the Licensing Wizard application, you will see a dialog similar to the following:

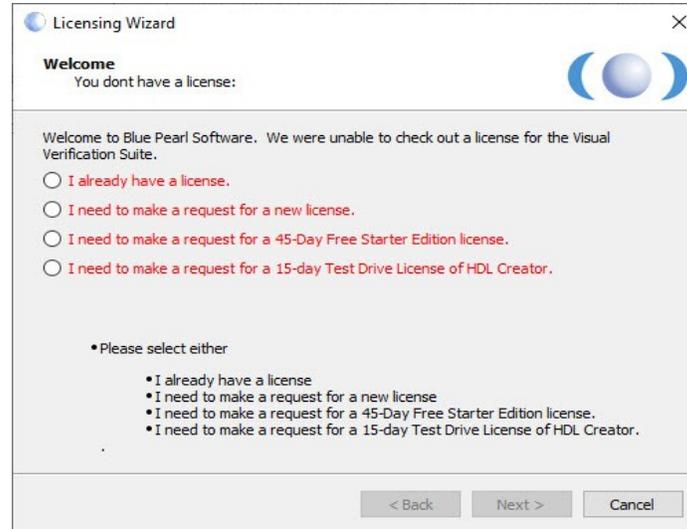


Figure 7: Licensing Wizard

This gives you three options. You can request a new license or a 45-day Starter Edition license, or the tool will guide your installation of the license you receive.

If you have a license, select the first button and skip to **Section 3.7**. If you need a license, select the second or third button. Then click **Next>**.

If you are requesting a license, you will see a dialog similar to the following:

Licensing Wizard

Welcome
Please fill out the form to request a new license.

U.S. Government Export Approval

- U.S. export regulations require that your First Name, Last Name, Company Name, and Shipping Address be verified before Blue Pearl Software can fulfill your download request. Please provide accurate and complete information.
- Addresses with Post Office Boxes and names/addresses with Non-Roman Characters with accents such as grave, tilde or colon are not supported by the U.S. export compliance systems.

First Name*: Last Name*:

Email Address*:

Business Name*:

Address 1*:

Address 2:

City*: State*:

Country*: Zip Code*:

Phone Number*:

Job Function*:

Primary Market*:

I agree that I do not work for a competitor of Blue Pearl Software, nor am I engaging in this activity on behalf or for the benefit of a competitor of Blue Pearl Software*

< Back Next > Cancel

Figure 8: Licensing Wizard: Requesting a new license

The first page of the form has a number of pieces of required information. On the second page (not shown), the wizard looks up possible node IDs (also known as MAC address or HostID) and provides a pull-down list to choose from.

Also included is support for the FLEXid-9 or -10 USB Dongle. If you are requesting a Dongle-controlled license, please be sure the Dongle is plugged in to your machine before you start the Licensing Wizard. Windows users can take advantage of the **FLEXid_Dongle_Driver_Installer** and **Imtools** executables found in the *installation/FLEXnet/win64* directory.

Click **Next>** after you have filled out everything required.

If you have entered the correct information, you should see the dialog pictured on the left in Figure 9.

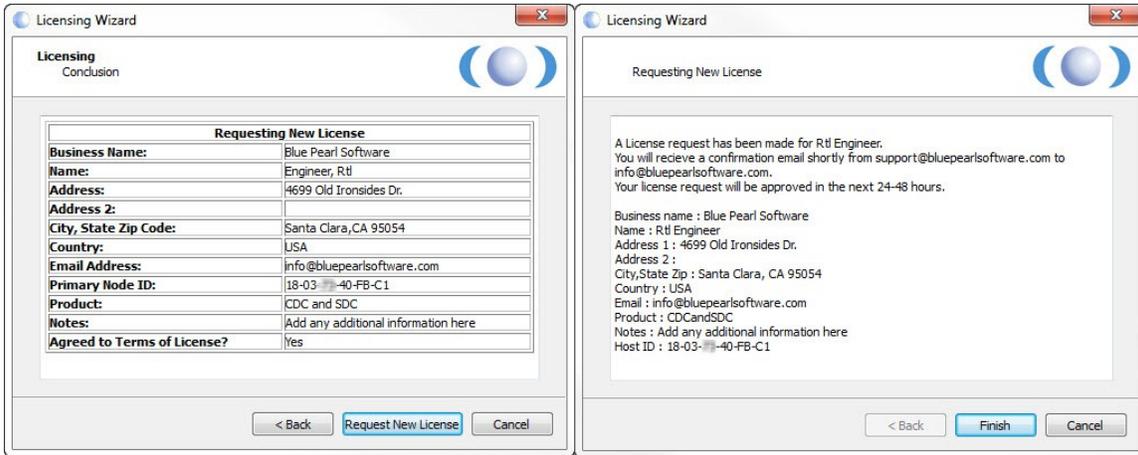


Figure 9: Licensing Finished

Click **Request New License** or go **Back**, then in the final dialog, shown on the right, click **Finish**. The next thing you should see is the Blue Pearl banner, followed by the GUI with only **Help** and **Settings** → **Preferences** enabled, and you may see the **Select Latest Version to Download** dialog.

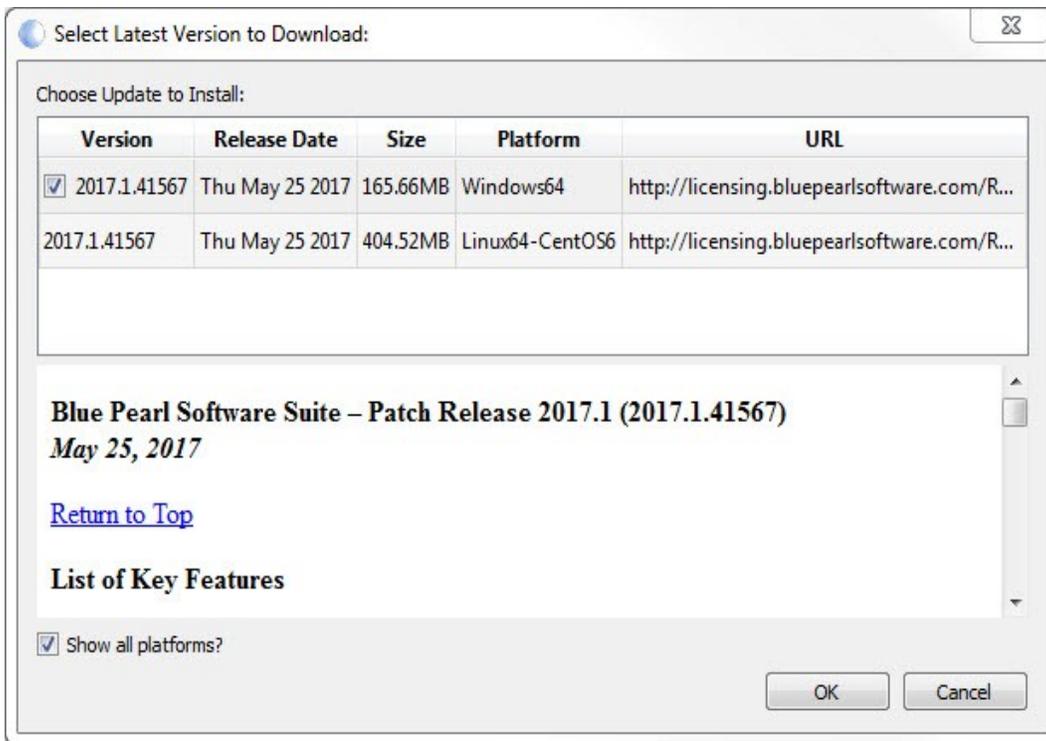


Figure 10: Select Latest Version

3.7 The Licensing Wizard – Installing a License

Once you have received a license, you need to install it. Start the tool again, and you will once again see the Licensing Wizard dialog box as shown in **Figure 7**. Select **I already have a license** and click **Next>**. A new dialog box will appear.

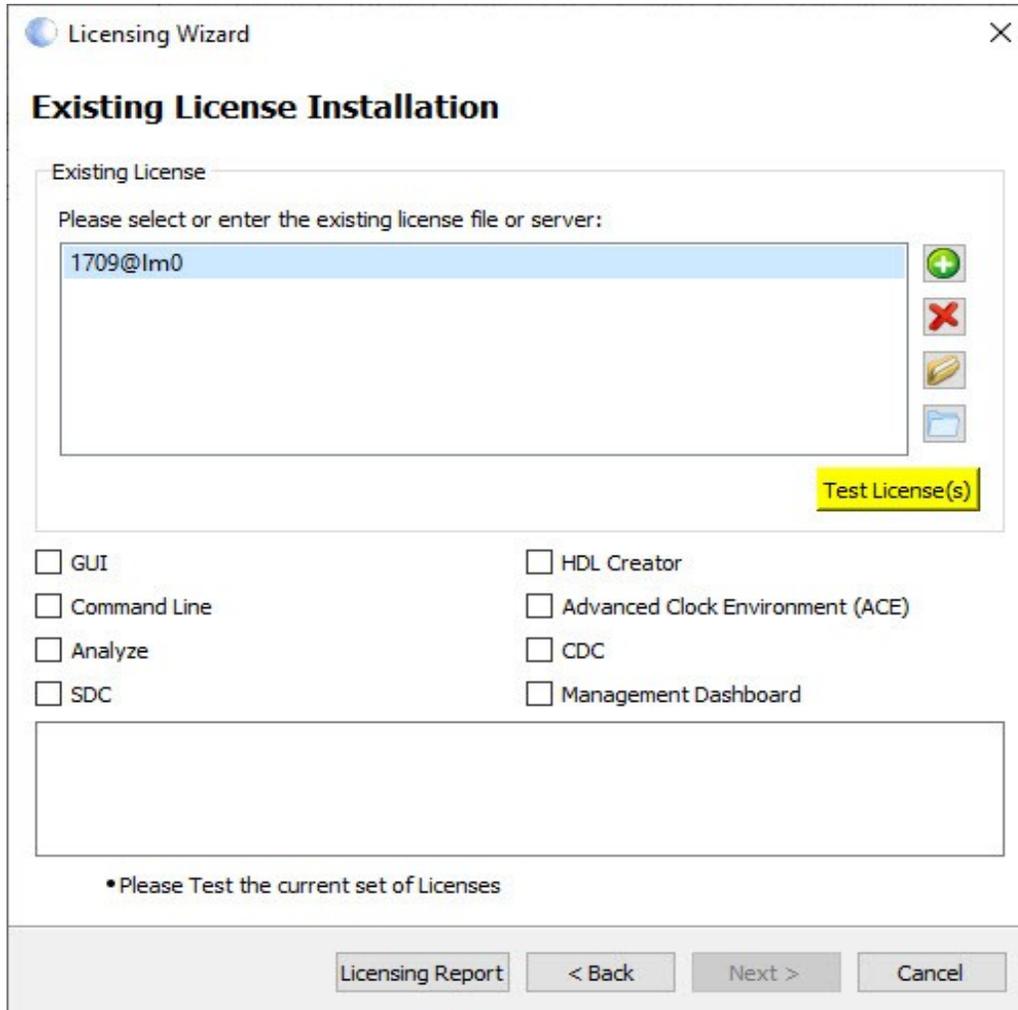


Figure 11: Licensing Wizard – Existing License Installation

Click the folder to navigate to the location of your license file. If your license file is on a server, click on the existing entry and enter the correct path information. You can also specify multiple licenses using the green Plus sign.

Once you have entered all the information, click on the **Test License(s)** button to see what products your licenses cover. The information will appear in the window shown. Then click **Next>**.

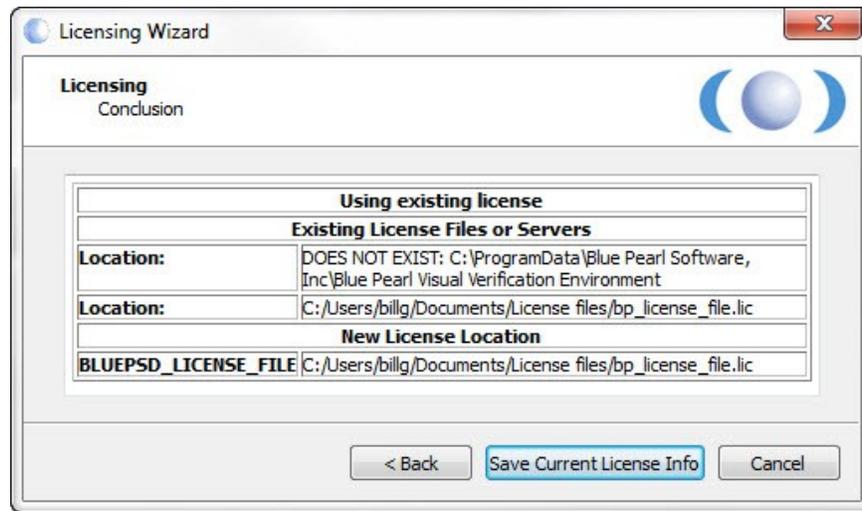


Figure 12: Licensing Conclusion

You should see a summary similar to that shown here. Click **Save Current License Info** and the GUI will appear with all the licensed features enabled.

3.8 Special note for latest FlexLM and older floating licenses

Licensing for Visual Verification Suite Releases 2018.3 and higher must use FlexLM version 11.16 or higher. Use of a floating license with this version of FlexLM requires use of the latest **bluepsd** and **lmgrd** daemons. These can be found in the `<installation directory>/FLEXnet/<platform>/` directory.

Use of the **bluepd** license daemon under Windows will require installation of the appropriate Visual C++ Redistributable Packages for Visual Studio 2013. The link to download these packages is [here](#).

If you have a floating license generated prior to August of 2018, these updates will cause an error in the FlexLM log that looks similar to:

```
15:10:51 (bluepsd) Invalid license key (inconsistent authentication code)
15:10:51 (bluepsd) ==>FEATURE gui bluepsd 2019.11 31-nov-2019 4 69A3B800F92A \
    VENDOR_STRING=CUSTOMER_ID=0x0F0F0F0F SIGN="172C 9BE0 C8A3 CE3C \
    FC7A 39DA FF3A 67CF A1F2 1F3C 6298 CD0E EA6E 32FF F0AC 1634 \
    1E51 0DF6 F008 159F B059 D6BB E5E0 2D84 30F5 1282 406A 1A29 \
    1353 EF3D"
```

Instructions on finding the FlexLM log can be found in Chapter 20 of the FlexLM Administrator Guide.

The solution is to obtain a new license, or to edit your existing license as follows:

On the `FEATURE gui` line, delete the string just before the final backslash, shown in bold in this example:

```
FEATURE gui bluepsd 2019.01 31-jan-2019 1 69A3B800F92A \
```

Note that license file editing may require system administrator privileges.

Please contact Blue Pearl Software support if you have further difficulties.

4. Verifying your Installation with the Blue Pearl GUI

The installation includes a sample design that you can use to verify that the Blue Pearl Software Suite works in GUI mode.

4.1 Initial GUI window

1. Start the Blue Pearl GUI under Linux by invoking the executable BluePearlVVE (for Visual Verification Environment) found in the `<installation directory>/BluePearl/bin/` directory. Under Windows, select **Start** → **All Programs** → **Blue Pearl Visual Verification Environment** → **Blue Pearl Visual Verification Environment** or double-click the **Blue Pearl Visual Verification Environment** desktop shortcut created by the installation script. A GUI window will appear as shown below.

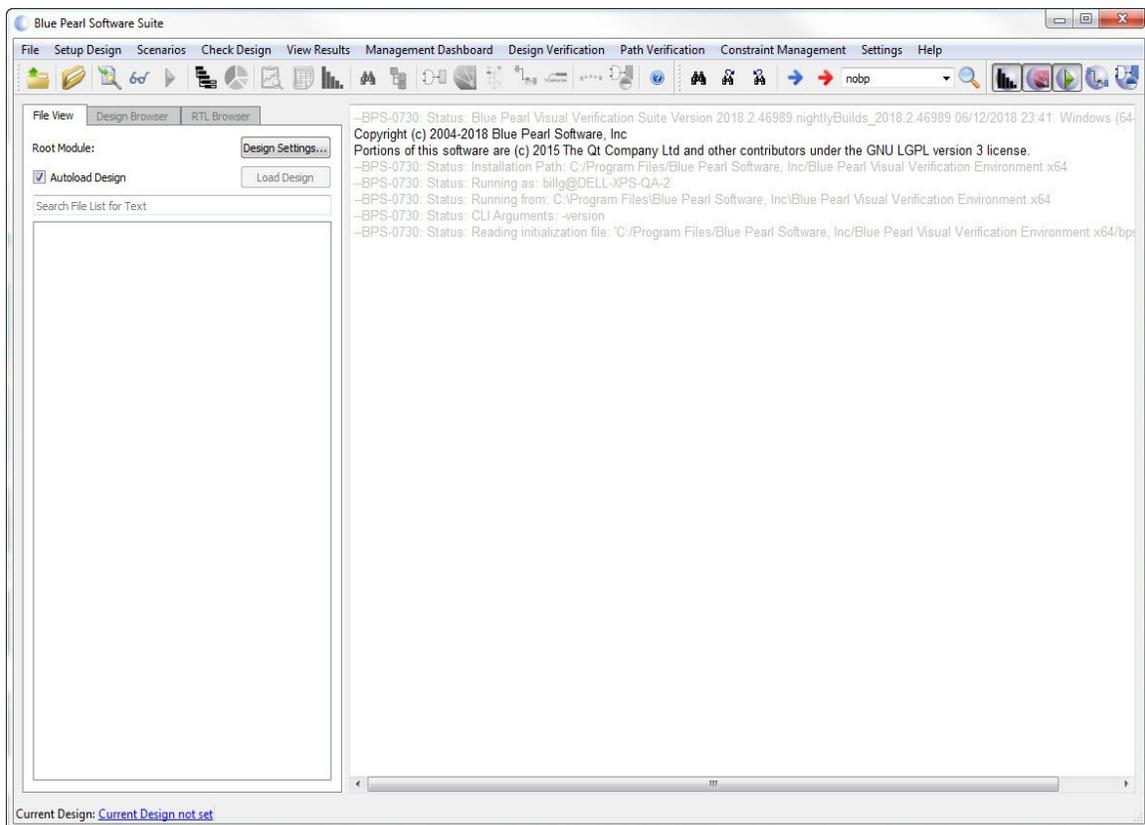


Figure 13: Initial GUI window

2. Inspect the five license buttons in the upper right of the main window. The second and third should be active and selected. The others will be active if you have the corresponding license.

4.2 Tool bar Shortcuts

Immediately below the menu bar is a set of tool bar icons. These icons provide shortcuts to various functions. You will use the fifth (the *Green Triangle*) and the sixth (the *Clipboard*).

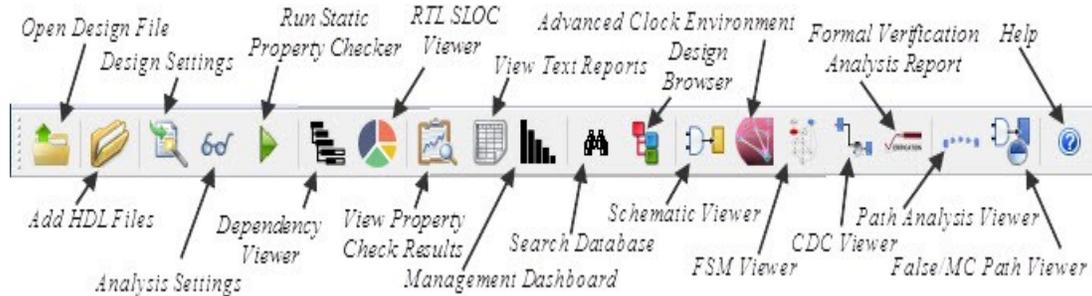


Figure 14: Tool bar Shortcuts

4.3 Run the Example

1. From the main menu, run the command **Help** → **Open Example Project** → **1-Rule Checking** → **1-Base Design**.
2. The design directory will be copied to the location specified under **Settings** → **Preferences**, and the project file will be opened. If no previous example has been run, the **Select Examples Directory** dialog box may appear. Select (or create) a directory and click *Open*.
3. Select all active license buttons.
4. Click the fifth icon (the *Green Triangle*) to run the analysis. Verify that the analysis runs to completion.
5. Click the eighth icon (the *Clipboard*) to open the **Analysis Results** window.
6. The number of messages will depend on the enabled licenses. With no CDC and no SDC, there are 0 errors, 0 warnings and 4 informationals. Enabling the CDC license will result in 2 additional informational messages for a total of 6 unfiltered messages, as shown in Figure 15. Enabling an SDC license will result in 4 more informationals, for a possible total of 10 with all licenses on.



Figure 15: Analysis Report window

That's it! The Blue Pearl Software suite has been successfully installed and verified.

7. Close all Blue Pearl windows.