

ISE Spartan-6 VM for Windows 10

Installation, Licensing and Release Notes for Virtual Machine Installation

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Revision History

The following table shows the revision history for this document.

Date	Version	Revision
12/07/2017	1.0	Initial Xilinx release.

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Introduction

ISE® Spartan®-6 Virtual Machine (VM) for Windows 10 extends the ISE Design Suite 14.7 product for the latest Microsoft Windows offering. This solution is enabled for the Xilinx® Spartan-6 devices. Spartan-6 devices are cost-optimized FPGAs, offering industry leading connectivity features such as high logic-to-pin ratios, small form-factor packaging, and a diverse number of supported I/O protocols. Built on 45 nanometer technology, the devices are ideally suited for a range of advanced bridging applications found in automotive infotainment, consumer, and industrial automation.

ISE Spartan-6 VM for Windows 10 executes on a virtualized environment. The ISE tools execute on an Oracle Linux Virtual Machine.

Release Notes

Supported Flows

The majority of the standard flows supported with ISE® 14.7 tools are supported with this solution as well. Following are the list of exceptions.

- Design entry is supported via Project Navigator only. The PlanAhead™ tool as a design entry environment is not supported in this release.
 - Synplify, ModelSim and Mentor Graphics Questa Advanced Simulator integration are not supported.
 - SmartXplorer and System Generator are not supported.
 - Only Spartan®-6 devices are supported.
-

Known Issues

ISE VM is a Single-User Solution

The ISE VM installed can only be used by the user who installed it and cannot be shared with other users with access to the same Windows 10 host machine.

The ISE Virtual Machine Does Not Have Internet Access Enabled by Default

You can give Internet access to the ISE VM by upgrading the networking configuration. See [Enabling Full Networking in Chapter 6](#) for details.

Converting Windows Batch Script to Linux Bash Script

Because ISE runs in a Linux environment, existing Windows batch scripts must be converted to Linux bash syntax.

The syntax is similar and a simple batch file can be easily converted.

Here are a few key differences that will help you convert your existing scripts.

Description Windows Batch Syntax Linux Bash Syntax

Directory path separator \ /

Variable %VAR% \$VAR or \${VAR}

Executable name (typical) EXECNAME.exe EXECNAME

Comments REM #

For additional details, refer to the following document, which covers most commands:
<http://www.tldp.org/LDP/abs/html/dosbatch.html>

Windows Batch Script Example

Here is a simple example of a Windows batch script, designed to implement a simple project, and its equivalent in Linux bash.

```
REM variables

set PRJ_NAME=MYPROJECT

set DEVICEICE=xc6slx9-csg324-3

REM generate IP

coregen.exe -b "ipcore_dir\CORE_NAME.xcp" -p
"ipcore_dir\coregen.cgp"

REM Synthesis

xst.exe -ifn "%PRJ_NAME%.xst" -ofn "%PRJ_NAME%.syr"
```

REM Implementation

```
ngdbuild.exe -dd _ngo -sd ipcore_dir -nt timestamp -uc
"%PRJ_NAME%.ucf" -p %DEVICE% "%PRJ_NAME%.ngc" "%PRJ_NAME%.ngd"

map.exe -p %DEVICE% -w -logic_opt off -ol high -t 1 -xt 0
-register_duplication off -r 4 -mt off -ir off -pr off -lc off
-power off -o "%PRJ_NAME%_map.ncd" "%PRJ_NAME%.ngd" "%PRJ_NAME%.pcf"

par.exe -w -ol high -mt off "%PRJ_NAME%_map.ncd" "%PRJ_NAME%.ncd"
"%PRJ_NAME%.pcf"
```

REM bitstream generation

```
bitgen.exe -w "%PRJ_NAME%.ncd"
```

Windows Bash Script Converted into a Linux Bash Script

```
#!/bin/bash

# variables

PRJ_NAME=ROM_display

DEVICE=xc6slx9-csg324-3

# generate IP

coregen -b ipcore_dir/CORE.xcp -p ipcore_dir/coregen.cgp

# Synthesis

xst -ifn ${PRJ_NAME}.xst -ofn ${PRJ_NAME}.syr
```

```
# Implementation
```

```
ngdbuild -dd _ngo -sd ipcore_dir -nt timestamp -uc ${PRJ_NAME}.ucf -p  
$DEVICE ${PRJ_NAME}.ngc ${PRJ_NAME}.ngd
```

```
map -p $DEVICE -w -logic_opt off -ol high -t 1 -xt 0  
-register_duplication off -r 4 -mt off -ir off -pr off -lc off  
-power off -o ${PRJ_NAME}_map.ncd ${PRJ_NAME}.ngd ${PRJ_NAME}.pcf
```

```
par -w -ol high -mt off ${PRJ_NAME}_map.ncd ${PRJ_NAME}.ncd  
${PRJ_NAME}.pcf
```

```
# bitstream generation
```

```
bitgen -w ${PRJ_NAME}.ncd
```

Additional Known Issues

Additional known issues are documented on the ISE Spartan-6 VM for Windows 10 lounge web page.

Architecture Support and Requirements

Operating Systems

This solution supports Windows 10 Professional and Windows 10 Enterprise.

System Requirements

Because this solution is enabled by virtualization, the processor of the Windows 10 machine must support virtualization technology.

This technology is called VT-x for Intel processors and AMD-V for AMD CPUs.

In addition to the CPU requirement, this virtualization technology also needs to be enabled in the BIOS setup. Note that in some cases this technology is not enabled by default and must be enabled by updating the BIOS settings.

Refer to your Windows 10 machine vendor documentation for instructions to access BIOS.

The ISE® Virtual Machine is deployed using Oracle VirtualBox hypervisor. Because only one hypervisor can be enabled on a system, you must disable/uninstall any other hypervisor, such as Microsoft Hyper-V, prior installation.

In order to run properly this solution has the following minimum hardware requirements:

- CPU: minimum of 2 cores
- RAM: 8 GB
- Disk Space: 85 GB

Xilinx recommends a minimum screen resolution of 1280 x 1024. Some GUI elements do not display properly at lower resolutions.

Architectures

The solution supports all Spartan®-6 devices. See the Spartan-6 product page [\[Ref 1\]](#).

Compatible Third-Party Tools

ISE Spartan-6 VM does not provide support for any integrated third-party tools.

Xilinx supports importing of EDIF files generated using any supported version of SynplifyPro. This can be from Windows 10 or any RHEL Linux environment. In ISE, the project setting is **Design Property > Top-Level Source type = EDIF**.

Installation

Installing the ISE Design Tools for Spartan-6 Designs

This chapter explains the installation process for ISE® 14.7 tools for Spartan®-6 devices on Windows 10.

Installation Preparation

Before starting installation the follow steps must be completed.

1. Make sure your system meets the requirements described in [Chapter 3, Architecture Support and Requirements](#).
2. Disable anti-virus software to reduce installation time
3. Disable/Uninstall any virtualization hypervisor software already installed on the Windows 10 machine. If Oracle VirtualBox is already installed and cannot be uninstalled then you can follow specific steps to install the ISE Virtual Machine using your existing Oracle VirtualBox installation.

Installation Steps

Decompress the downloaded installation zip file, and run **xsetup.exe** to launch the installation.

Note: The installation process also installs ISE and VirtualBox as a complete package.

Oracle VirtualBox is already installed on Windows 10 host machine

At the beginning of the installation process, the Xilinx® installer warns you if an existing installation of Oracle VirtualBox is detected. If you do not use Oracle VirtualBox, it is recommended to cancel the installation, uninstall the installed version Oracle VirtualBox, and restart the installation. The version of Oracle VirtualBox officially supported by Xilinx is 5.0.28. As part of the installation process, this version is installed.

You can also continue the installation process if you desire to keep using your version of Oracle VirtualBox already installed and that the version installed is the same or more recent than the version supported by Xilinx.

If the version of Oracle VirtualBox installed is older than the version supported by Xilinx, you must first upgrade to the supported version (recommended) or higher in order to continue with the installation process.

If the version of Oracle VirtualBox installed is more recent than the version supported by Xilinx, Xilinx recommends that after the installation process is completed that you re-install the Guest Additions corresponding to the installed version of Oracle VirtualBox. See the Oracle VirtualBox documentation, *4.2.2. Guest Additions for Linux* [Ref 2] for details.

License Agreements

Carefully read the license agreements before continuing with the installation. If you do not agree to the term and conditions, cancel the installation and contact Xilinx.

Installation Options

Unlike in a typical ISE 14.7 tools installation process, you are not provided with any options to select from.

This is mostly the case because options have already customized for this solution.

- ISE Design Suite System Edition is installed. Only Spartan-6 devices are supported.
- ISE tools for all Spartan-6 devices are already licensed.
- Cable drivers are already pre-installed.

Shortcuts

You can customize the creation of desktop and program group shortcuts. Xilinx highly recommends installing shortcuts; these shortcuts greatly facilitate the access to ISE tools from the Windows 10 machine. By default ISE tools shortcuts are provided on the Virtual Machine.

Shared Folder

In order to facilitate the sharing of files between the Windows 10 host machine and the Virtual Machine running ISE tools, you are provided with an installation option to specify a shared folder. See the Oracle VirtualBox documentation. *4.3 Shared folders* [Ref 3].

IMPORTANT: *Keep all user data files, such as project source files, in the shared folder. That allows them to be accessible from both operating systems and will not be lost if ISE is uninstalled.*

The directory that you specify will be available on the virtual machine under `/home/ise/<shared folder name>`.

For instance, if you specify the Windows 10 host directory `c:\xilinx_projects\spartan6_design` at installation time, its content will be accessible on the ISE Virtual Machine under `/home/ise/spartan6_design`.

The installation process only allows you to specify one shared folder, but it is possible to configure additional shared folders post installation. See [Chapter 6, ISE Virtual Machine Configuration](#) for more details.

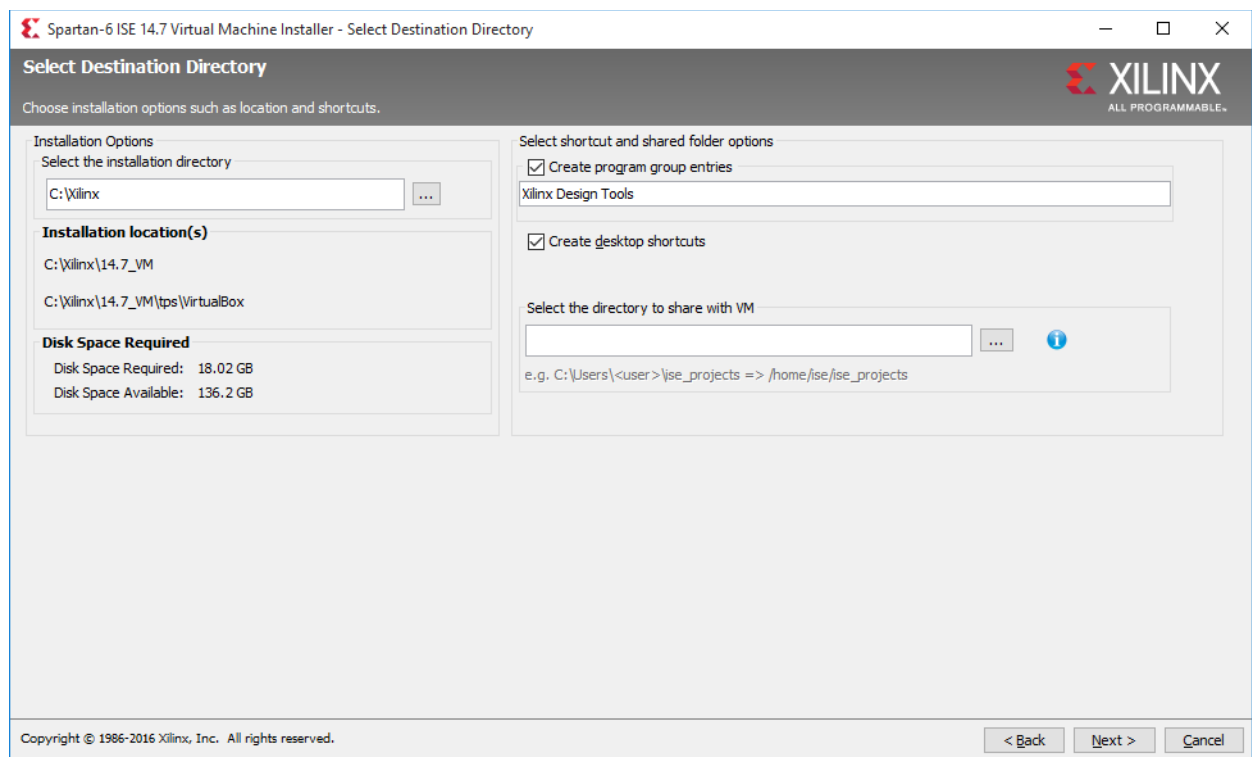


Figure 4-1: Installer Select Destination Directory Window

Configuring the Virtual Machine Time Zone

After the installation is complete, most users will need to manually update the Virtual Machine time zone. The time of the Virtual machine is automatically synchronized with the Windows 10 host machine, but the time zone must be initialized manually.

By default, the ISE Virtual Machine time zone is set to UTC. Users outside of the UTC time must follow the steps below to update the time zone:

1. Start the ISE Virtual Machine using the ISE Project Navigator desktop shortcut.

2. Right-click the Virtual Machine desktop and select **Open in Terminal** to open a new terminal window.
3. In the terminal window type the following command to launch the Linux utility tool to adjust the time:

```
sudo system-config-date
```

The Date/Time Properties dialog box opens.



Figure 4-2: Date/Time Properties Dialog Box

4. In the utility time tool, click the **Time Zone** tab, select your local time zone, and click **OK**.

Batch Mode Installation Flow

The installer can be run as an unattended batch process. To run unattended, a configuration file must be present that tells the installation location and options you wish to install.

The installer has a mode in which it can generate a reference option file for you based on common configurations, which you can further edit to customize your installation.

To begin, open a command prompt as administrator and change the working directory to the bin directory of the unzipped installer.

Generate Configuration File

1. Run **xsetup.bat -b ConfigGen**
After selecting the edition you want to install, the default configuration file is generated.
2. Edit the file to specify the installation location and the path of the Shared Folder and any other installation option you wish to customize. See Oracle VirtualBox documentation, *4.3 Shared folders* [Ref 3] for details.

Run the installer

Now that you have edited your configuration file to reflect your installation preferences, you are ready to run the installer. As part of the installer command line, you will need to indicate your acceptance of the Xilinx and Third Party license agreements.

Xilinx End-User license Agreement (EULA)

See the "Xilinx End-User License Agreement (EULA)" [here](#).

Third Party End-User License Agreement (EULA)

See the "Third Party End-User License Agreement (EULA)" [here](#).

Example Command Line

This is an example of the command line for a typical new installation using a configuration file.

```
xsetup.bat -- agree XilinxEULA,3rdPartyEULA --batch Install --config  
install_config.txt
```

For the full list of the installer batch options run **xsetup.bat --help**

Uninstalling the ISE Design Suite Tools for Spartan-6 Devices



CAUTION! *Before uninstalling, make sure to move all important files located on the Linux guest Virtual Machine you want to keep on the Windows 10 host. You might also want to make sure that you do not have any important files under the ISE VM installation directory (typically under C:\Xilinx\14.7_VM).*

To uninstall, launch the uninstaller from the **Control Panel > Uninstall a program** or from the **Add or remove programs** application.

The uninstall process will destroy the ISE Virtual Machine and will uninstall Oracle VirtualBox unless you installed it prior to initial installation.

Licensing

Licensing Overview

The ISE® Virtual Machine solution is installed licensed; it is ready to use as is.

IP Licensing

Pointing to IP Licenses Available on the License Server

In case your design is using an IP that is licensed and that IP license is hosted on a license server, perform the following instructions to make that license accessible to ISE tools on the Virtual Machine.

Because the default ISE Virtual Machine network configuration limits it to have access only to the Windows 10 host, its network configuration must be updated. Enable external networking as detailed in [Enabling Full Networking in Chapter 6](#).

After the ISE VM has full networking enabled, you need to point the ISE tools to your existing IP license server.

1. Open a terminal window on the ISE VM guest, **Applications > System Tools > Terminal**.
2. Type the following:

```
export LM_LICENSE_FILE= <port>@<license server>
```

For example **export LM_LICENSE_FILE=2100@pikachu**.

3. Verify that the IP licenses are accessible to ISE tools by launching Project Navigator from the same terminal by typing **ise** and go to **help->Manage Licenses**.

Deploying/Using new IP license

Deploying a new IP license requires attaining a floating license that will be hosted on the Windows 10 host computer.

1. To attain the hostid of the Windows 10 computer, open a Windows Command Prompt and navigate to the `tps\FlexLM` directory of the install. By default this is `C:\Xilinx\14.7_VM\tps\FlexLM`.
2. Issue the following command: **lmutil lmhostid**. This command generates at least one hostid, multiple ones are separated by spaces, to use when requesting a floating license for the paid IP. Additionally run **lmutil lmhostid -hostname** to get the hostname of the Windows 10 host computer used when generating the license.
3. After all information has been collected, request a floating license from Xilinx.
4. After the IP license is acquired from Xilinx, put the file somewhere on the Windows 10 host computer file system. Then, open a new Command Prompt and again navigate to the `tps\FlexLM` directory of the install and launch **lmgrd -c <license file location> -z**.



IMPORTANT: The `lmgrd` command must be active. Rather than closing the command window, you can minimize it.

5. To connect the Virtual Machine to the `lmgrd` instance running on the Windows 10 host, the IP address of the VirtualBox Host-Only Network must be known. To determine this run **ipconfig** from a Windows Command Prompt, and look for the Ethernet adapter VirtualBox Host-Only Network entry. Use the IPv4 Address to access the license. For example:

```
Ethernet adapter VirtualBox Host-Only Network:
Connection-specific DNS Suffix . . . :
Link-local IPv6 Address . . . . . : fe80::7063:d9ad:d6b9:a7e9%30
IPv4 Address. . . . . : 192.168.56.1
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . :
```

Figure 5-1: IPv4 Address

6. In the ISE Virtual Machine open a Linux terminal window, **Applications->System Tools->Terminal**, in the window type:


```
export XILINXD_LICENSE_FILE=2100@192.168.56.1
```
7. To verify that the IP license is available to ISE tools, open Project Navigator and go to **Help->Manage Licenses** to determine if the license is available.
8. If the license is not available, close Project Navigator. In a Windows 10 command window, change the directory to `c:\Xilinx\14.7_VM\tps\FlexLM` and type:

```
lmutil lmstat -a -c 2100@192.168.56.1
```

or the appropriate IP address listed in [Figure 5-1](#) to see if the license is being served by the server. If it is not, there might be a problem with the firewall on the host. One way to circumvent this is to open the license file in a text editor and where the hostname is given as the SERVER, change that to the IP address, save the file, and relaunch **Imgrd**.

ISE Virtual Machine Configuration

ISE Virtual Machine Environment and its Customization

ISE Virtual Machine Default Configuration

The ISE® tools run on an Oracle Linux 6.4 Virtual Machine (VM) and that Virtual Machine is deployed on the Windows 10 host machine using Oracle VirtualBox hypervisor.

The ISE Virtual Machine is deployed by default with the following configuration

- OS: Oracle Linux 6.4 64 bit
- Processor: 1 CPU
- Base Memory: 6144 MB
- Internal Disk Space: 64 GB

This configuration should be considered as the minimum configuration but is sufficient for Spartan®-6 device development. You can change post-installation based on your needs and the capability of your Windows 10 host machine. See Oracle VirtualBox documentation, *Chapter 3 Configuring virtual machines* [Ref 6] for details.

Enabling Full Networking

The virtual machine ships with Host-only-Networking mode enabled by default. This means that the ISE Virtual Machine does not have Internet access and can only access the Windows 10 host machine. If full access is needed, perform the following instructions.

Xilinx recommends using NAT networking, followed by bridged. However, some network adapters and most wireless cards do not support bridged networking.

To enable NAT networking follow these simple steps.

1. Close the ISE VM if it is open.
2. On the Windows 10 host, open Oracle VM VirtualBox from the Start Menu.
3. Click **Settings > Network**.
4. Select **NAT** from the drop-down options under **Attached to:** and click **OK**.
5. Restart the ISE VM.

For full instructions and more information see the Oracle VirtualBox documentation, *Chapter 6. Virtual networking* [Ref 4].

ISE Virtual Machine Login and Permissions

The ISE Virtual Machine is setup to automatically log in as user **ise**, password **xilinx**.

You may need root access for some actions in the ISE Virtual Machine, in most cases you can use **sudo** which does not require a password. For instance, type the following command in a command shell to create a directory as root.

```
%sudo mkdir /opt/mydir
```

Accessing Additional Shared Folders and Network Storage on an ISE Virtual Machine

To mount more than one shared folder into the VM after installation, you must follow the instructions in Oracle VirtualBox documentation, *4.3 Shared folders* [Ref 3].

Note that the mountpoint referred to in the instructions must be created on the virtual guest prior to mounting. For example, if you have shared the `C:\projects` folder with the shared name of "projects" using the preceding instructions, you need to open a terminal window in the Virtual Machine from **Applications > System Tools > Terminal** and create a directory with the following command: **mkdir -p /home/ise/projects**. Then the mount command is **sudo mount -t vboxsf projects projects**.

USB Pass-Through for Unrecognized Programming Cables

The virtual machine contains out-of-the-box support for the Xilinx® and Digilent programming cables. If further support is needed, you need to pass through the USB cable to the guest to make it available to the Impact and ChipScope™ tools.

To configure the machine to capture USB devices while the machine is not running you can follow the instructions in the Oracle VirtualBox documentation, *3.10. USB support* [Ref 5]. If the machine is running, the previous instructions will work, or you can use the menu in the status bar of the VM to attach USB devices through to the guest.

Right-click the USB icon located in the of the VirtualBox window in [Figure 6-1](#).



Figure 6-1: USB Icon

Then click the device you would like the guest to have access to. This operation will transfer the device to the Virtual Machine. Keep in mind that the guest will need drivers for the device in some cases. Please follow the cable manufacturer's instructions for installing the Linux drivers.

Additional Resources and Legal Notices

References

1. Spartan®-6 Product Page:
<https://www.xilinx.com/products/silicon-devices/fpga/spartan-6.html>
 2. Oracle VirtualBox documentation: [4.2.2. Guest Additions for Linux](#)
 3. Oracle VirtualBox documentation: [4.3 Shared folders](#)
 4. Oracle VirtualBox documentation: [Chapter 6. Virtual networking](#)
 5. Oracle VirtualBox documentation: [3.10. USB support](#)
 6. Oracle VirtualBox documentation: [Chapter 3 Configuring virtual machines](#)
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