

SDSoC Development Environment

Release Notes, Installation, and Licensing Guide

UG1294 (v2018.3) January 24, 2019



Revision History

The following table shows the revision history for this document.

Section	Revision Summary
1/24/2019 Version 2018.3	
Chapter 2: SDSoC Development Environment Requirements and Setup	Restructured and updated entire section.
Chapter 3: Create a Licensing File to Enable Software	Updated for 2018.3.
Installing the SDSoC Environment	Restructured and updated entire section.
12/5/2018 Version 2018.3	
What's New and Changed for 2018.3	Added new and changed features introduced in the 2018.3 release.
Known Issues	Updated answer record number and link.
Supported Hardware	Updated requirements.
Supported Operating Systems	Updated requirements.
General Updates	Updated screenshots for 2018.3.
07/02/2018 Version 2018.2	
Initial Xilinx release	This document contains SDSoC™ release information. It was branched from the <i>SDAccel Environments Release Notes, Installation, and Licensing Guide (UG1238)</i> , which now provides release information specific to SDAccel™.

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Release Notes

What's New and Changed for 2018.3

The following updates to the SDSoC™ development environment are included in the 2018.3 release:

Platforms

For a list of all supported platforms and devices, see the [SDSoC Product Page](#).

- Sysroot support has been enhanced to be a part of platforms. For example, users can create platforms with an embedded sysroot folder and metadata that enable SDx™ to automatically insert compiler and linker options that reference that sysroot folder. This reduces the complexity of the C++ build settings. For more information on platforms, see *SDSoC Environment Platform Development Guide (UG1146)*.
- When creating a hardware platform, it is now easier to define the DSA and `pfm.name` properties in the IP integrator block design. All previous requirements correlating with the naming of a Vivado® project (such as a block diagram name, dsa name, and platform name) have been removed.
- Cache-coherent support for HPC ports on Zynq® UltraScale+™ devices: Platforms that use HPC ports assuming 2018.2 behavior (non-coherent with cache flushing) must label the ports with the type `S_AXI_HP`, instead of `S_AXI_HPC`. Both will behave as though they are HP ports. However, ports labeled `S_AXI_HPC` will be handled to enable coherence. The platform author should also follow step 5.2.2, as described here: [Zynq UltraScale MPSoC Cache Coherency](#). All other required steps are performed by SDSoC linking or the SDSoC run time.
- Platform authors can now label system ports with an `sptag` using the Vivado tool command language (Tcl) during DSA creation. This is done by setting the `PFM.AXI_PORT` or `PFM.AXI_PORT` property on the port, and specifying an `sptag` that can be used from software to reference the port by a chosen name, rather than referencing by a fully qualified instance and port name. This is optional functionality, and is intended to simplify software authorship.
- Platforms with system ports require the addition of system port tags. In the tool command language (Tcl) file used to create the DSA platform metadata, the `set_property PFM.AXI_PORT` command will need to specify for each port attribute information with the "memport" name (such as `M_AXI_GP`, `S_AXI_HPC`, or `S_AXI_HP`, etc) and "sptag" name (`GP`, `HPC`, `HP`, etc).

- In addition to user-defined PL ports, the system compiler supports the following PS ports:
 - **Zynq®-7000:**
 - `M_AXI_GP`: Masters for control
 - `S_AXI_HP` and `S_AXI_APC`: Slaved
 - **Zynq UltraScale:**
 - `M_AXI_GP`: Masters for control
 - `S_AXI_HP` and `S_AXI_HPC`: Slaved

For more information on the ports, naming, and details for using HPC ports in legacy platforms, see *SDSoC Environment Platform Development Guide* ([UG1146](#)).

Project merge

- New feature to merge multiple hardware systems. Develop and debug hardware functions in separate projects before combining them into a single system. Software libraries and applications from the dependent projects are rebuilt in the resulting project with updated address maps.
- Supports hardware projects with software targeting the Linux operating system.

SDx™ Integrated Development Environment

- **Platform project:**
 - New feature to generate pre-built data. Assemble platform projects in a single step with a bitstream and metadata used to reduce build time for software-only applications that use the platform.
 - Ability to load an existing platform project.
 - Create a new platform from a template.
- **Assistant View:** Updated functionality and guidance to improve usability.

C-Callable IP libraries

- C-Callable IP libraries can be created using a new SDx project type.
- Improved error checking for multi-function accelerator C-Callable libraries. Additional checks for unmapped input ports, unused input ports, and function invocation.
- Enhanced support for machine learning with the DeePhi data-processing unit (DPU) that includes support for multiple software entry points to control the DPU and tool flow updates.
- Enhanced support for the DeePhi ML stack as a C-Callable IP library.
- C-Callable IP library creation improvements:
 - Improved ease-of-use.

- Function map creation provides selections to minimize user data entry.
- Configurations for protocol selection and clock specification.
- Makefile enhanced to avoid unnecessary project rebuild.

New Datamover: FASTDMA support

- Supports Zynq-7000 SoC and Zynq UltraScale+ MPSoC.
- Wider direct memory access (DMA)
- High-bandwidth bus support with auto-configuration to DDR width
- Reduced programmable logic resources
- Helps facilitate timing closure

Note: FASTDMA only supports memory data width aligned access. To use FASTDMA, you must opt-in by explicit pragma.

Hardware Access API

- **Shared library support:**
 - Hardware access and datamover control API software was implemented using shared libraries, facilitating the startup of multiple hardware subsystems without conflicts, which is required to enable systems created using the multi-project build feature.
 - Base platform images updated to include SDSoC control API shared libraries:
 - `libsds_lib.so`
 - `libsds_lib_dbg.so`

Custom platforms that support Linux must include those libraries, or all applications targeting the custom platform must explicitly use static linking. For more information, see: *SDSoC Environment Platform Development Guide* ([UG1146](#)).

- Legacy support for static library implementation.

Known Issues

Known Issues for the SDSoC and SDx development environment are available in [AR#71223](#).

SDSoC Development Environment Requirements and Setup

The 2018.3 SDSoC™ development environment software release consists of the SDx™ IDE and command-line tools for developing and delivering hardware accelerated embedded processor applications using standard programming languages.

The SDSoC environment also includes the Vivado® Design Suite, which is used for programming the target devices and for developing custom hardware platforms.

Supported Hardware

The 2018.3 SDSoC environment release includes support for the following development boards:

- ZC702, ZC706, and ZedBoard development boards featuring the Zynq®-7000 SoC
- ZCU102, ZCU104, and ZCU106 development board featuring the Zynq UltraScale+ MPSoC

Additional platforms are available from partners. SDSoC also comes with everything you need to author custom platforms targeting any Zynq-7000 and Zynq UltraScale+ MPSoC board. For more information, visit the SDSoC Developer Zone: <https://www.xilinx.com/products/design-tools/software-zone/sdsoc.html>.

Note: You will need cabling for communicating with the board (for example, USB or Ethernet cables).

Supported Operating Systems

- Windows 7 Service Pack 1 (SP1) Professional (64-bit)
- Windows 10 Professional (64-bit) Versions 1803 and 1809
- Red Hat Enterprise Linux 6.6-6.9
- Red Hat Enterprise Linux 7.2-7.3
- Red Hat Enterprise Linux 7.4-7.5

- CentOS Linux 6.6-6.9
- CentOS Linux 7.2-7.3
- CentOS Linux 7.4-7.5
- Ubuntu Linux (64-bit) Versions 16.04.3 LTS and 18.04 LTS
 - Linux kernel 4.4.0 is supported
 - Ubuntu LTS enablement (also called HWE or Hardware Enablement) is *not* supported

Installation Download Options

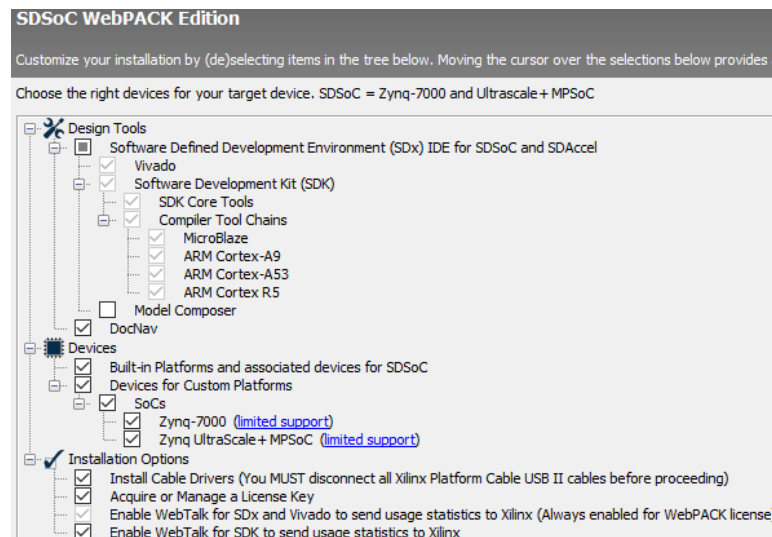
SDSoC WebPACK Edition

This is a free evaluation version of the design suite that delivers instant access to some basic features and functionality at no cost.

For more information, see [Vivado Design Suite Evaluation and WebPACK](#).

The following are the default options provided with this installation type:

Figure 1: Default WebPACK options



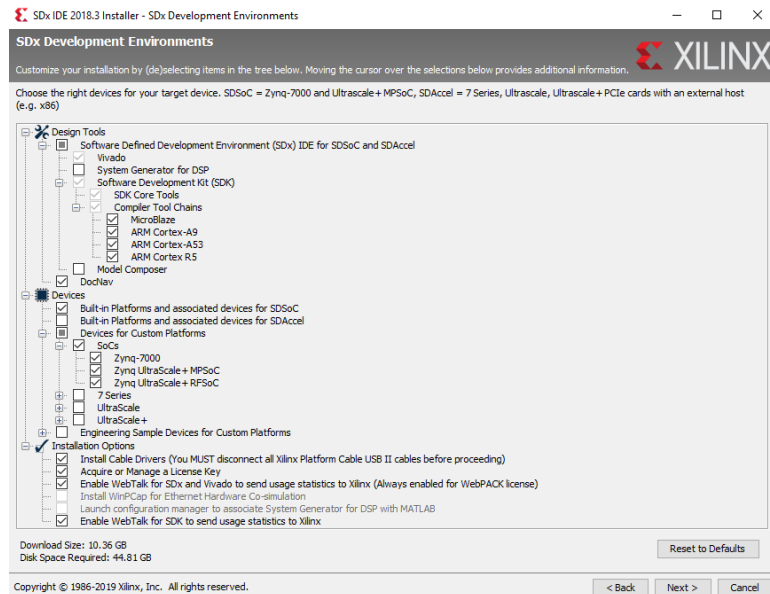
Web Installer

The Web Installer is the recommended installation method, because it reduces download time and saves significant disk space.

When you use the Web Installer, you choose the design tools, device families, and installation options at the time of installation. The only files that are downloaded and installed are files necessary to support those options.

This method also mitigates issues such as network outages by resuming installation from where it stopped, instead of starting over.

Figure 2: Default SDSoC Web Installer Options



Single File Download (SFD)

The SFD installation download is an image containing all devices and tool options that can be used for installation at a later time. This option is useful for installing all files on a network drive, or for providing maximum flexibility to users when they install the environment.

Create a Licensing File to Enable Software

This section describes the steps to obtain a license for the SDx™ development environment. The software tools and IP product entitlements you have purchased are presented as selectable options in a table to include for licensing.

1. To create or manage your licenses, go to [Product Licensing](#).

If prompted to, sign in with your Xilinx.com credentials and confirm any necessary information to continue.

2. Under Certificate Based Licenses, select an environment product license.

Certificate Based Licenses

Product	Type	License	Available Seats	Status	Subscription End Date
<input type="checkbox"/> Model Composer : 90-day Evaluation License	Certificate - Evaluation	Node	1/1	Current	90 days
<input type="checkbox"/> Vivado Design Suite: 30-Day Evaluation License	Certificate - Evaluation	Node	1/1	Current	30 days
<input type="checkbox"/> SDSoC Environment, 60 Day Evaluation License	Certificate - Evaluation	Node	1/1	Current	60 days
<input type="checkbox"/> SDAccel OpenCL Development Environment: 30 Day Node Locked Evaluation Lice...	Certificate - Evaluation	Node	1/1	Current	30 days
<input type="checkbox"/> Vivado Design Suite: HL WebPACK 2015 and Earlier License	Certificate - No Charge	Node	1/1	Current	None
<input type="checkbox"/> ISE WebPACK License	Certificate - No Charge	Node	1/1	Current	None
<input type="checkbox"/> Xilinx MicroBlaze/All Programmable SoC Software Development Kit – Standalone	Certificate - No Charge	Node	1/1	Current	None
<input type="checkbox"/> PetaLinux Tools License	Certificate - Evaluation	Node	1/1	Current	365 days
<input type="checkbox"/> Vivado HLS Evaluation License	Certificate - Evaluation	Node	1/1	Current	30 days

Note: The table displays options based on what licenses you have purchased or redeemed. Xilinx also offers an evaluation license for the SDSoC development environment, which you can see in your available license list.

3. After selecting the environment, generate a license.

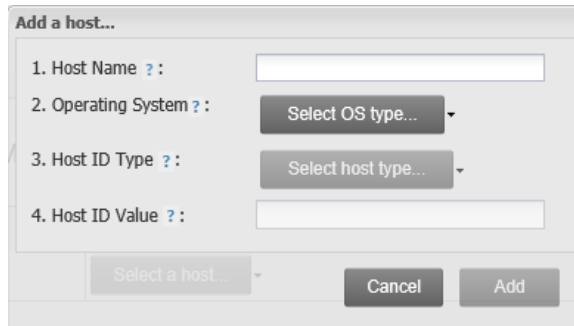
A new window is displayed where you define the product and system that you are generating the license for.

4. Under System Information, click **Select a host**, and then click **Add a host**.

2 SYSTEM INFORMATION

License	Node
Host ID * ?	Select a host... ▾

5. Enter information about the host.



- a. Enter a host name.
- b. For Operating System, select **Windows 64-bit** or **Linux 64-bit**.
- c. Select the host identification type.
- d. Enter the Host ID.

The easiest way to obtain the Host ID of your machine is to run Xilinx® License Configuration Manager on the machine you want to license.

- e. Click **Add**.

6. Accept the licensing agreement.

You will receive an email from `xilinx.notification@entitlenow.com` with the license file, which you must save to your machine.

7. To enable the software, set the `XILINXD_LICENSE_FILE` environment variable to point to the location of the license file on your system.

SDSoC Environment Installation

The installation of the SDSoC™ tool suite includes the following:

- SDSoC environment, including an Eclipse/CDT-based GUI, high-level system compiler, and Arm[®] GNU toolchain
- Vivado[®] System Edition, with the High-Level Synthesis (HLS) tool, and the Xilinx[®] Software Development Kit (SDK)

The SDSoC environment uses the same GNU Arm toolchain included with the Xilinx SDK, which also provides additional tools used by the SDSoC environment. The SDSoC environment setup script sets PATH variables to use this toolchain.

More information about the SDSoC installation:

- The provided toolchains contain 32-bit executables, requiring your Linux host OS installation to include 32-bit compatibility libraries.
- RHEL 6 and 7 64-bit x86 Linux installations might not include the 32-bit compatibility libraries, and might need to be added separately. For more information, see [\[RHEL6\] 32-bit libraries are not installed on 64-bit OS by default](#).
- On RHEL, 32-bit compatibility libraries can be installed by becoming a superuser with root access privileges and running the `yum install glibc.i686` command.
- On Ubuntu, 32-bit compatibility libraries can be installed by becoming a superuser with root access privileges and running the following commands.

```
sudo dpkg --add-architecture i386
sudo apt-get update
sudo apt-get install libc6:i386 libncurses5:i386 libstdc++6:i386
sudo apt-get install g++-multilib
sudo apt-get install libgtk2.0-0:i386 dpkg-dev:i386
sudo ln -s /usr/bin/make /usr/bin/gmake
```

- The version of the toolchain can be displayed by running the `arm-linux-gnueabihf-g++ -v` command. The last line of the output printed in the shell window should be: `GCC version 4.9.2 20140904 (pre-release)(crosstool-NG linaro-1.13.1-4.9-2014.09 - Linaro GCC 4.9-2014.09)`.

Installing the SDSoC Environment

There is no separate Vivado version of the SDSoC development environment. There are only two styles of installation: stand-alone and SDx™ installations. Any difference in the installation process happens if you use a *different* xsetup installer than the ones from SDx or Vivado Design Suite tools.

Note: The SDx xsetup installer is a super-set of Vivado System Edition. When you use the SDx xsetup installer, it includes all of the programs and options that the 2018.3 Vivado xsetup installer has.

Setting Up the Environment to Run SDSoC

To set up the environment to run the SDx tools, source the file below so that the `sdx` command is in the `PATH`.

Linux

```
C Shell: source <SDX_INSTALL_DIR>/SDx/2018.3/settings64.csh
Bash: source <SDX_INSTALL_DIR>/SDx/2018.3/settings64.sh
```

Windows

```
C:> <SDX_INSTALL_DIR>\SDx\2018.3\settings64.bat
```

Prepare to Install the Tools

You *must* perform these actions prior to installation.



TIP: To reduce installation time, disable anti-virus software.

1. Ensure your system meets the system requirements, as described in previous topics:
 - [Supported Hardware](#)
 - [Supported Operating Systems](#)
2. Close all open programs.

Download the Installation File

1. Go to the [Xilinx Downloads Website](#).
2. Click an installation file to download it.
 - **WebPACK:** Free version of the tools delivers instant access to some basic Vivado features and functionality at no cost.
 - **Web installer:** Recommended installation method, because it reduces download time and saves significant disk space. With this option, you choose design tools, device families, and installation options at the time of installation.
 - **Single File Download (SFD):** Provides an image containing all devices and tool options that can be used for installation at a later time.

Related Information

[Installation Download Options](#)

Use the Single File Download

If you downloaded the full product installation, decompress the file, and then run `xsetup` (for Linux) or `xsetup.exe` (for Windows) to launch the installation.



RECOMMENDED: On Windows, you can use 7-zip or WinZip (v.15.0 or newer) to decompress the downloaded `tar.gz` file.

Batch Mode Installation Flow

The installer can run in an unattended batch process. To run the installer unattended, you must do one of the following.

- Specify a standard edition and installation location
- Include a configuration file that provides the installer with the install location and the tools, devices, and options you want to install



RECOMMENDED: Generate this reference for each new release, so that new devices, tools, options, or other changes will be accounted for in your options file.

To begin using batch mode, open a command shell, and change to the directory where you have stored your extracted installer.

For Windows, open the command window with administrator privileges, and run `xsetup.bat`, found in the `\bin` directory, and not `xsetup.exe` with the options below.

Generate a Configuration File

1. Run `xsetup -b ConfigGen`.

This will put you in an interactive mode where you will see the following menu:

```
1. SDx Development Environments
Please choose:
```

Type 1, and then press **Enter**.

2. After you make a selection, you will be prompted with the location/file name for your configuration file and the interactive mode exits. Below is a sample configuration file:

```
Edition=SDx Development Environments

# Path where Xilinx software will be installed.
Destination=/opt/Xilinx

# Choose the Products/Devices the you would like to install.
Modules=Built-in Platforms and associated devices for SDSoC:1,Zynq
UltraScale+ MPSoC:1,Virtex UltraScale+ HBM ES:0,Zynq-7000:1,Kintex
UltraScale+ ES:0,Kintex UltraScale+:1,ARM Cortex-A53:1,Spartan-7:1,ARM
Cortex-A9:1,ARM Cortex R5:1,Virtex UltraScale+ ES:0,System Generator for
DSP:0,Artix-7:1,Built-in Platforms and associated devices for
SDAccel:1,DocNav:1,Kintex-7:1,Virtex UltraScale+:1,Model Composer:0,Zynq
UltraScale+ RFSoc ES:0,Kintex UltraScale:1,Engineering Sample Devices
for Custom Platforms:0,Virtex UltraScale:1,Zynq UltraScale+ MPSoC
ES:0,MicroBlaze:1,Virtex-7:1

# Choose the post install scripts you'd like to run as part of the
finalization step. Please note that some of these scripts may require
user interaction during runtime.
InstallOptions=Acquire or Manage a License Key:0,Enable WebTalk for SDK
to send usage statistics to Xilinx:1,Enable WebTalk for Vivado to send
usage statistics to Xilinx (Always enabled for WebPACK license):1

## Shortcuts and File associations ##
# Choose whether Start menu/Application menu shortcuts will be created
or not.
CreateProgramGroupShortcuts=1

# Choose the name of the Start menu/Application menu shortcut. This
setting will be ignored if you choose NOT to create shortcuts.
ProgramGroupFolder=Xilinx Design Tools

# Choose whether shortcuts will be created for All users or just the
Current user. Shortcuts can be created for all users only if you run the
installer as administrator.
CreateShortcutsForAllUsers=0

# Choose whether shortcuts will be created on the desktop or not.
CreateDesktopShortcuts=1

# Choose whether file associations will be created or not.
CreateFileAssociation=1
```

Each option in the configuration file matches a corresponding option in the GUI. A value of 1 means that option is selected; a value of 0 means the option is unselected.

Note: In this configuration file, by default, there are no devices selected for installation (that is, all devices have a value of 0). To install a device, you *must* change the value to 1.

Running the Installer

After editing your configuration file to reflect your installation preferences, you can run the installer. As part of the command line installer, you must indicate your acceptance of the [Xilinx End-User License Agreement](#) and [Third Party End-User License Agreement](#), and confirm you understand the WebTalk Terms and Conditions.

WebTalk Terms and Conditions

The WebTalk Terms and Conditions, which you must agree to when running the installer, is below:

By indicating I AGREE, I also confirm that I have read Section 13 of the terms and conditions above concerning WebTalk and have been afforded the opportunity to read the WebTalk FAQ posted at <https://www.xilinx.com/webtalk>. I understand that I am able to disable WebTalk later if certain criteria described in Section 13(c) apply. If they don't apply, I can disable WebTalk by uninstalling the Software or using the Software on a machine not connected to the Internet. If I fail to satisfy the applicable criteria or if I fail to take the applicable steps to prevent such transmission of information, I agree to allow Xilinx to collect the information described in Section 13(a) for the purposes described in Section 13(b).

When using the command line, use the command-line switch, `-a` or `--agree`, to indicate your agreement to each of the above. If one of the above is left out of the list, or the agree switch is not specified, the installer exits with an error and does not install.

Batch Mode Installation

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

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

If you want to use one of the Xilinx default edition configurations, you do not have to specify the `--config` option, but since the destination directory is included in the configuration file, you will be required to specify this on the command line.

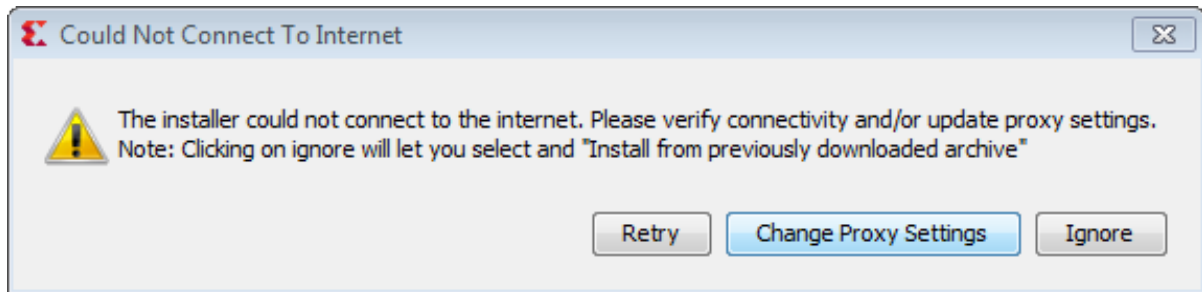
```
xsetup --agree 3rdPartyEULA,WebTalkTerms,XilinxEULA
--batch Install --edition "SDx Development Environments" --location "/home/
Xilinx"
```

The above command uses the default configuration options for the edition specified. To see the default configuration options, use the `-b ConfigGen` mode as described above. The batch mode of the SDx installer can also uninstall and upgrade (add additional tools and devices). For the full list of the options in the installer batch mode, run `xsetup -h` or `xsetup --help`.

Resolve Internet Connection Issues

The installer connects to the Internet through the system proxy settings in Windows. These settings can be found in **Control Panel** → **Network and Internet** → **Internet Options**. For Linux users, the installer uses Firefox browser proxy settings (when explicitly set) to determine connectivity.

Figure 3: Internet Connectivity Message Example



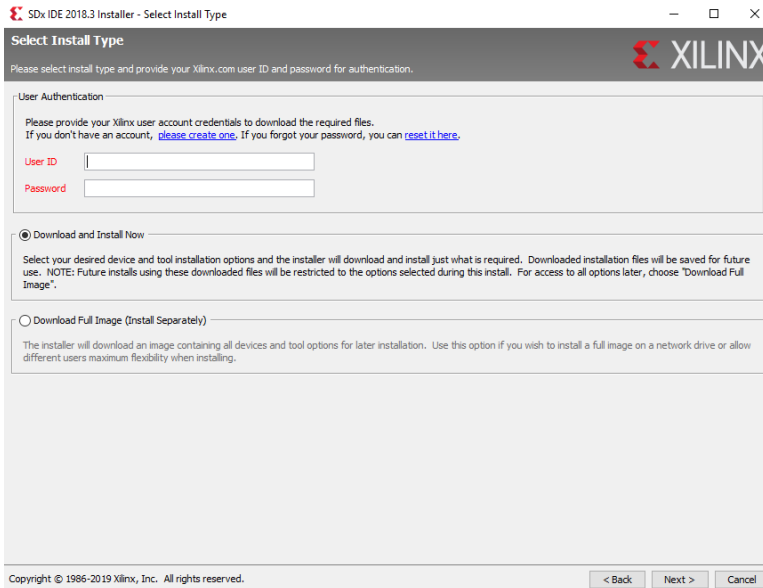
If there are connectivity issues, verify the following:

1. If you are using alternate proxy settings to the ones referred to, select the **Manual Proxy Configuration** option to specify the settings.
2. Check whether your company firewall requires a proxy authentication with a user name and password. If so, select the **Manual Proxy Configuration** option in the dialog box above.
3. For Linux users, if either the **Use System settings** or the **Auto detect settings** option is selected in the Firefox browser, then you must manually set the proxy in the installer.

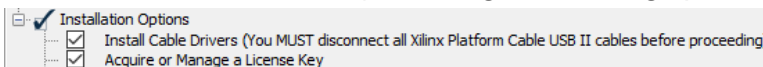
Run the Installation File

Use the installation file you downloaded to install the SDSoC development environment.

1. Run the installation file, which opens the SDx IDE 2018.3 Installer.
2. Click **Next**.
3. Enter your account credentials.
4. Select **Download and Install Now**, and then click **Next**.

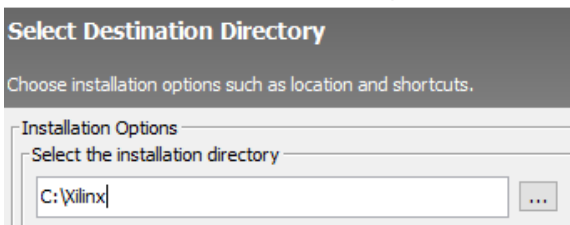


5. Read and accept the license agreements.
 - To indicate that you accept the Xilinx Inc. End User License Agreement, click **I Agree**.
 - To indicate that you understand and accept the WebTalk Terms and Conditions, click **I Agree**.
 - To indicate that you accept the Third Party Software End User License Agreement, click **I Agree**.
6. After accepting all license agreements, click **Next**.
7. Customize the installation by selecting and clearing options in the tree.



To add to this installation later, click **Vivado** → **Help** → **Add Design Tools or Devices**.

8. Click **Next**.
9. Select the installation directory.



CAUTION! *The installation directory path must not contain any spaces.*

10. Click **Next**.

An Installation Summary window is displayed, describing the following information:

- Devices
- Design tools
- Installation options
- Installation locations
- Download locations
- Disk space requirements

11. After reviewing the installation summary, click **Install**.

Additional Resources and Legal Notices

Xilinx Resources

For support resources such as Answers, Documentation, Downloads, and Forums, see [Xilinx Support](#).

Documentation Navigator and Design Hubs

Xilinx[®] Documentation Navigator (DocNav) provides access to Xilinx documents, videos, and support resources, which you can filter and search to find information. DocNav is installed with the SDSoc[™] and SDAccel[™] development environments. To open it:

- On Windows, select **Start** → **All Programs** → **Xilinx Design Tools** → **DocNav**.
- At the Linux command prompt, enter `docnav`.

Xilinx Design Hubs provide links to documentation organized by design tasks and other topics, which you can use to learn key concepts and address frequently asked questions. To access the Design Hubs:

- In DocNav, click the **Design Hubs View** tab.
- On the Xilinx website, see the [Design Hubs](#) page.

Note: For more information on DocNav, see the [Documentation Navigator](#) page on the Xilinx website.

References

These documents provide supplemental material useful with this guide:

1. *SDSoC Environments Release Notes, Installation, and Licensing Guide* ([UG1294](#))
2. *SDSoC Environment User Guide* ([UG1027](#))
3. *SDSoC Environment Getting Started Tutorial* ([UG1028](#))
4. *SDSoC Environment Tutorial: Platform Creation* ([UG1236](#))
5. *SDSoC Environment Platform Development Guide* ([UG1146](#))
6. *SDSoC Environment Profiling and Optimization Guide* ([UG1235](#))
7. *SDx Command and Utility Reference Guide* ([UG1279](#))
8. *SDSoC Environment Programmers Guide* ([UG1278](#))
9. *SDSoC Environment Debugging Guide* ([UG1282](#))
10. *SDx Pragma Reference Guide* ([UG1253](#))
11. *UltraFast Embedded Design Methodology Guide* ([UG1046](#))
12. *Zynq-7000 SoC Software Developers Guide* ([UG821](#))
13. *Zynq UltraScale+ MPSoC: Software Developers Guide* ([UG1137](#))
14. *ZC702 Evaluation Board for the Zynq-7000 XC7Z020 SoC User Guide* ([UG850](#))
15. *ZCU102 Evaluation Board User Guide* ([UG1182](#))
16. *PetaLinux Tools Documentation: Reference Guide* ([UG1144](#))
17. *Vivado Design Suite User Guide: High-Level Synthesis* ([UG902](#))
18. *Vivado Design Suite User Guide: Creating and Packaging Custom IP* ([UG1118](#))
19. [SDSoC Development Environment web page](#)
20. [Vivado® Design Suite Documentation](#)

Training Resources

1. [SDSoC Development Environment and Methodology](#)
2. [Advanced SDSoC Development Environment and Methodology](#)

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