

Lab Setup Guide – Customer Academy

LAB SETUP GUIDE

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Introduction

This lab setup guide helps you get your local environment configured for running the Customer Training labs. You must have a working installation of the required software and necessary licenses.

AMD Official Policy

Instructor/classroom-led customers are provided with a Linux virtual machine (CustEd VM) for performing the labs through the Authorized Training Providers.

On-Demand users perform the labs in the same VM implemented through the CloudShare environment.

No support is provided for users running Linux natively, nor (except in rare instances) is Windows supported.

While some labs run equally well under Windows as under Linux, many labs run only under Linux. Please review the guidance provided with each course or topic. AMD does not officially support local execution in either Linux or Windows.

That said, many labs will run under Windows, although Windows users will need to translate the instructions from the provided Linux format into Windows. Some labs require Linux and simply cannot be run under Windows (e.g., PetaLinux, Vitis™ AI, AI Engine labs, and others). This document is meant only to help users configure their local environment and should not be construed as official support.

Note: Each lab file set is designed to run under a specific version of the tools. Please ensure that the lab file set, lab instructions, and tool versions match. For example, the version 2024.1 tools will likely not work with the 2023.1 lab files when you are following the 2023.2 instructions.

Note that this guide is for the 2024.2 release of the classes under the Ubuntu® 22.04.2 LTS (64-bit) environment.

Version Information

Each lab file set is designed to run under a specific version of the tools. Please ensure that the lab file set, lab instructions, and tool versions match.

Note that this guide is for the 2024.2 release of the classes under Ubuntu 22.04.2 LTS (64-bit) environment. Other platforms may be able to use the solutions provided in this guide; however, only this one configuration is supported by Customer Training.

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Setup Instructions

Follow these steps to configure your system.

1. Download the lab files from the [downloads page](https://www.amd.com/en/training/customer/adaptive-computing/downloads.html):
<https://www.amd.com/en/training/customer/adaptive-computing/downloads.html>. Browse to find your course.
Select the version of the zip file that matches the PDF lab guide version number.
Note that a registered user ID is required.

2. Extract the lab files so that they match the following directory structure:

Windows: `C:\training`

Linux: `/home/<username>/training`

Here, `<username>` is the username for your Linux machine.

You should remove unnecessary directory hierarchies, if any, to reflect the above structure. This is especially critical in the Windows environment as Windows limits path names to 160 characters. While this seems like a lot, the tools often create verbose hierarchy paths.

3. Ensure that the proper tools are installed for the selected course.

You can refer to the Software Tools section from the course description.

Note: During the installation process, you will be invited to install the cable drivers, which are required to connect to the evaluation boards.

The following is a list of the tools used by our courses. Not every tool is required for every course. Refer to the release notes in the tool's user guide for specific OS requirements.

Tool Name	Documentation	Notes
Vitis™ Unified Software Platform	UG1416 (https://docs.amd.com/v/u/en-US/ug1416-vitis-documentation)	The Vitis option in the installer includes the Vivado Design Suite, Vitis Model Composer, HLS, and AIE tools. For the Vitis - Application Acceleration Development Flow, refer to UG1393 (https://docs.amd.com/r/en-US/ug1393-vitis-application-acceleration/Getting-Started-with-Vitis). For the Vitis - Embedded Software Development Flow, refer to UG1400 (https://docs.amd.com/r/en-US/ug1400-vitis-embedded).
Vivado™ Design Suite	UG973 (https://docs.amd.com/r/en-US/ug973-vivado-release-notes-install-license/Release-Notes)	The Unified Installer allows access to the Vivado Design Suite separately from the Vitis tools.
Power Design Manager (PDM)	UG1556 (https://docs.amd.com/r/en-US/ug1556-power-design-manager)	
PetaLinux (Linux only)	UG1144 (https://docs.amd.com/r/en-US/ug1144-petalinux-tools-reference-guide/Oview)	

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4. Verify that all tools are properly licensed. See the "Acquiring and Installing Licenses" section at the end of this document.
5. One environment variable (`TRAINING_PATH`) is required so that the lab instructions can generalize paths. This allows us to support multiple operating systems using the same set of lab instructions.

Set the environment variable:

Windows:

From a DOS shell:

```
setx TRAINING_PATH <path to location of extracted files> (typically C:\training)
```

Linux:

From a terminal window:

```
[host]$ "export TRAINING_PATH <path to location of extracted files, typically  
/home/<username>/training>" >> ~/.bashrc
```

6. Verify the environment variable:

The environment variables used in the instructions can be expanded as follows—for example, when you encounter `$TRAINING_PATH`:

Windows:

`$TRAINING_PATH` expands to: (assuming default value)

C:\training

Linux:

`$TRAINING_PATH` expands to: (assuming default value)

/home/<username>/training

7. Find the value for the `TRAINING_PATH` environment variable using the DOS command shell or terminal window:

Windows:

```
echo %TRAINING_PATH%
```

Linux:

```
[host]$ echo $TRAINING_PATH
```

8. Follow the lab instructions.

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9. The following courses require additional setup:

- *Vitis Model Composer: A MATLAB and Simulink-based Product*
- *Designing with Versal AI Engine: Quick Start*
- *Designing with Versal AI Engine: Graph Programming with AI Engine Kernels - 2*
- *Designing with Versal AI Engine: DSP Applications*
- *Developing AI Inference Solutions with the Vitis AI Platform*

For these courses, continue below. Otherwise, stop here.

Instructions for Vitis Model Composer, Versal AI Engine: Quick Start, Versal AI Engine: Graph Programming with AI Engine Kernels - 2, and Versal AI Engine: DSP Applications Courses

Follow the instructions below for these courses:

- *Vitis Model Composer: A MATLAB and Simulink-based Product*
- *Designing with Versal AI Engine: Quick Start*
- *Designing with Versal AI Engine: Graph Programming with AI Engine Kernels - 2*
- *Designing with Versal AI Engine: DSP Applications*

If you are using the CustEd VM, install the following tools:

- Licensed version of MATLAB® with Simulink® software R2024a with the following toolboxes:
 - MATLAB
 - Simulink
 - Computer Vision System Toolbox
 - DSP System Toolbox
 - Signal Processing Toolbox
 - Image Processing Toolbox

Note: A license for Vitis Model Composer is required.

If you are running the labs in the Windows environment, the following tools are required:

- Vitis Unified IDE 2024.2
 - Vitis Model Composer (make sure it is enabled)
- Vivado Design Suite 2024.2
- MATLAB with Simulink software R2024a

Note: The Versal AI Engine blocks are not supported on the Windows platform, so you will not be able to perform the AI Engine labs in the Windows environment.

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1) Install the MATLAB software using a downloaded installer file.

1. Download the MATLAB R2024a installer file from the following location:

<https://in.mathworks.com/downloads>

2. Copy the downloaded installer zip file to the `/home/amd` directory.
3. Press **<Ctrl + Alt + T>** to open a terminal.
4. Unzip the installer zip file:

```
[host]$ cd /home/amd
```

```
[host]$ sudo unzip -X -K matlab_R2024a_Linux.zip -d matlab_R2024a_installer
```

5. Create a `matlab` directory:

```
[host]$ mkdir /home/amd/matlab
```

This is where the MATLAB software will be installed.

6. Launch the MATLAB software installation:

```
[host]$ sudo chmod 777 -R /home/amd/matlab_R2024a_installer
```

```
[host]$ cd /home/amd/matlab_R2024a_installer
```

```
[host]$ ./install
```

7. Log in and select the license from the account or use your license key.
8. Select the destination folder for the MATLAB software installation to be `/home/amd/matlab`.
9. Complete the installation.

GUI Compatibility Issue Between MATLAB and Ubuntu 22.04.2 LTS

There is a known GUI compatibility issue between the MATLAB and Ubuntu 22.04.2 LTS environments. When the Vitis Model Composer blocks are opened from the Simulink environment, all the options can be seen, but the drop-down options and fields are not editable. This issue is because of the display driver.

To resolve this issue, follow the workaround below, which switches the default display driver from Wayland to Xorg (X11) in the Linux Ubuntu 22.04 LTS environment.

- Press **<Ctrl + Alt + T>** to open a terminal.

- Enter the following command to open the `custom.conf` file:

```
[host]$ sudo nano /etc/gdm3/custom.conf
```

- Find the line with **WaylanEnable=false** and uncomment the line by removing the `#` from the start.

- Press **<Ctrl + X>**, press **<Y>**, and press **<Enter>** to save the changes.

- Enter the following command to restart the `gdm3` service:

```
[host]$ sudo systemctl restart gdm3
```

- Enter the following command to verify that you are using the X11 display server:

```
[host]$ echo $XDG_SESSION_TYPE
```

- Close the terminal.

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MATLAB Error When Launching Vitis Model Composer-based Labs for the First Time

If you get "cannot locate or initialize class com/mathworks/jmi/OpaqueJavaInterface" error when launching MATLAB for the first time, this may be due to some corrupted MATLAB installation files.

- If so, enter the following command:

```
[host]$ sudo /home/amd/matlab/bin/glnxa64/registerWithOS.sh
```

- Relaunch the Vitis Model Composer tool.

Instructions for Designing with Versal AI Engine: Graph Programming with AI Engine Kernels - 2 Course

For the *Designing with Versal AI Engine: Graph Programming with AI Engine Kernels - 2* course, follow these additional instructions:

- 1) Install the following packages that are required to run Python functions. (Since Python 3 is being used, Python 2-related packages are not required.)

1. Enter the following commands to install the packages:

```
[host]$ pip install scipy
```

```
[host]$ pip install matplotlib
```

Vitis AI-Based Courses

The following courses require the Vitis AI tool installation:

- *Developing AI Inference Solutions with the Vitis AI Platform*
- *Using Vision-based Applications with the Kria KV260 Vision AI Starter Kit & System-on-Module (SOM)*

The Vitis AI tools operate only under the Linux versions listed at https://xilinx.github.io/Vitis-AI/<vitis_sAI_version>/html/docs/reference/system_requirements.html.

Two options are available to help you configure your environment: You can follow the instructions provided in the documentation (links provided below), or you can run the `AItoolsInstaller.sh` script provided in the student starting point files for the courses requiring Vitis AI.

Option 1 – Use the official documentation:

- Docker installation: <https://docs.docker.com/engine/install/ubuntu>
- Vitis AI tools installation: <https://xilinx.github.io/Vitis-AI/3.5/html/docs/install/install.html>

Option 2 – Run the script:

- Open a terminal window
- Navigate to the student starting point files (typically `~/training`)
- Enter `./AItoolsInstaller.sh`

Important: If there is an intention to build any of the hardware, then we've found that you need at least 12 cores dedicated to the VM to successfully run the makefile. If you have fewer than this number, then the build will fail.

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Additional Software Requirements for Developing AI Inference Solutions with the Vitis AI Platform

Both the Windows and Ubuntu software requirements are for the *Developing AI Inference Solutions with the Vitis AI Platform 3.5* course.

- Windows software requirements:
 - Tera Term for Windows
 - balenaEtcher or Win32DiskImager (both free open-source software) for Windows – instructions for installing balenaEtcher are included in the lab
- Native Ubuntu Linux software requirements (optional):
 - `gparted` application in the Ubuntu

Course-Specific Hardware Requirements

The courses below have specific hardware requirements.

All the *Designing with the Versal Adaptive SoC* courses:

- These courses use the VCK190 and VEK280 boards.

Zynq 7000 SoC Architecture:

- This course uses the ZC702 or ZedBoard.

Designing with the Zynq UltraScale+ RFSoC:

- This course uses the ZCU111 board.

Using Vision-based Applications with the Kria KV260 Vision AI Starter Kit and System-on-Module:

- This course uses the KV260 Vision AI Starter Kit.

Note: Due to the nature of this course, the following additional hardware is also required:

- MicroSD card (16 or 32 GB)
- Power supply (12V, 3A adapter)
- Camera module (AR1335 or USB webcam)
- 4K monitor as a display device
- USB microphone
- Cables such as Ethernet, micro-USB to USB-A, and HDMI or DisplayPort

Using Robotics Applications with the Kria KR260 Robotics Starter Kit:

- This course uses the KR260 Robotics Starter Kit.

Developing Multimedia Solutions with the Video Codec Unit Using the GStreamer Framework:

- Other additional required hardware for this course includes:
 - One HDMI-supported display monitor
 - Two HDMI cables
 - One streaming box (either Nvidia Shield or ABOX)

Embedded Linux Development Using Yocto:

- This course uses the ZCU104 and VEK280 boards.

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Developing AI Inference Solutions with the Vitis AI Platform

- U50 board files
 - <https://www.xilinx.com/products/boards-and-kits/alveo/u50.html#vivado>
 - Under the Vivado Design Flow tab, select "Download the board file"

Acquiring and Installing Licenses

Based on the course, generate the license and then apply the license to the OS.

- 1) Launch the Vivado License Manager (VLM).

This can be done or through the Vivado IDE or from the OS level.

[Vivado IDE]: Select **Help > Manage License** to open the Vivado License Manager.

[Linux OS]: Click the **Applications** icon in the lower-left corner to see the available applications, search for "License", and then click **VLM**.

- 2) When VLM opens, use the navigation pane on the left to select **Get License > Obtain License**, and then click **Connect Now**.
- 3) Log in using your AMD credentials and click **Next**.
- 4) Select the needed licenses and click **Generate Node-Locked Licenses**.
If you have not purchased a license, you can select **Start Now! 30 Day Trial**.
- 5) Specify your host information and click **Next** and then click **Next** to go to the next page to generate the license.
- 6) Download or extract the license from the email to the VM.
- 7) Add the license file by selecting **Load License** from the navigation bar and copying the license from its downloaded location.
- 8) Exit VLM.