

# ILDPUG

## i.MX Linux Distribution POC User Guide

Rev. LF6.1.1\_1.0.0-LDP — 10 May 2023

User guide

### Document Information

Information	Content
Keywords	i.MX, Linux, Linux distribution, LF6.1.1_1.0.0-LDP
Abstract	The i.MX Linux distribution build uses a Yocto-based meta layer to generate a desktop Proof of Concept (POC) image.



## 1 Overview

The i.MX Linux distribution build uses a Yocto-based meta layer to generate a desktop Proof of Concept (POC) image. It works together with i.MX release layer (`meta-imx`). It reuses the Linux BSP release framework to manage and generate the U-Boot bootloader, Linux kernel image, and i.MX root file system in desktop image build.

The i.MX desktop layer is named as `meta-nxp-desktop`. It is available in GitHub under the `nxp-imx` project (<https://github.com/nxp-imx>). The release version is managed by the [i.MX Release Manifest](#).

Similar to the i.MX release layer, to use the i.MX desktop layer, follow the instructions in the *Yocto Project Quick Start* found at [www.yoctoproject.org/docs/current/yocto-project-qs/yocto-project-qs.html](http://www.yoctoproject.org/docs/current/yocto-project-qs/yocto-project-qs.html).

`meta-nxp-desktop` inherits most of layer configuration from the i.MX release layer (`meta-imx`) directly. It also includes the required host tools and the compatible binary toolchains targeting on the desktop image.

The following is the information for the `meta-nxp-desktop` layer structure:

- `meta-nxp-desktop`
  - `classes`: The auxiliary installation tools running on host OS
  - `conf`: Desktop specific layer configuration beyond `meta-imx`
  - `dynamic-layer`: NXP additional update on open source tools and components
  - `recipe-xxx`: NXP-specific update on open source tools, applications, and libraries
  - `tools`: NXP desktop layer setup tool
  - `README.md`: i.MX desktop layer build instructions
  - `EULA.txt`: i.MX desktop demo license file
  - `SCR.txt`: i.MX desktop package and patch license description

## 2 Image Build

The i.MX desktop image build uses a similar method as the i.MX Yocto Project. For detailed information, see the *i.MX Yocto Project User's Guide* (IMXLXYOCTOUG).

Desktop image build uses different distro configurations. The syntax for the `imx-setup-desktop.sh` script is as follows:

```
$ DISTRO=<distro name> MACHINE=<machine name> source imx-setup-desktop.sh -b  
<build dir>
```

The only distro environment variable option is `imx-desktop-xwayland`. The `MACHINE` environment variable indicates the configuration file in the `conf/machine/${MACHINE}/desktop.conf` file in the `meta-nxp-desktop` repo.

### 2.1 Installing the repository utility

To get the BSP, you need to install the repository.

```
$ mkdir ~/bin  
$ curl https://storage.googleapis.com/git-repo-downloads/repo > ~/bin/repo  
$ chmod a+x ~/bin/repo  
$ PATH=${PATH}:~/bin
```

## 2.2 Downloading the Yocto Project BSP

To download the Yocto Project BSP:

```
$ mkdir desktop
$ cd desktop
$ repo init -u https://github.com/nxp-imx/imx-manifest -b imx-linux-langdale -m
  imx-6.1.1-1.0.0_desktop.xml
$ repo sync
```

## 2.3 Creating a new build folder

To create a *new* build folder:

```
$ DISTRO=imx-desktop-xwayland MACHINE=imx8mpevk source imx-setup-desktop.sh -b
  build-desktop
```

**Table 1. Target build machines**

Build machine	Target board
imx8mpevk	i.MX 8M Plus EVK
imx8mqevk	i.MX 8M Quad EVK
imx8mmevk	i.MX 8M Mini EVK
imx8mnevk	i.MX 8M Nano EVK
imx8qmmev	i.MX 8QuadMax MEK
imx8qxp0mek	i.MX 8QuadXPlus MEK with silicon revision C0 chip
imx8ulpevk	i.MX 8ULP EVK

## 2.4 Restarting a build environment

If a new terminal window is opened or the machine is rebooted after a build directory is set up, the setup environment script should be used to set up the environment variables and run a build again. The full `imx-setup-desktop.sh` is not needed.

```
$ cd desktop
$ source setup-environment <build-dir>
```

## 2.5 Building the image

To build the image:

```
$ bitbake imx-image-desktop
```

## 2.6 Building imx-boot and UUU

The build method is the same as the i.MX Yocto Project. For detailed information, see the *i.MX Linux User's Guide* (IMXLUG).

### 3 Feature Integration

The i.MX desktop image integrates the following components (not limited to):

- i.MX kernel/boot-loader/connectivity integration  
All the information about the Linux Standard BSP features can be found in the *i.MX Linux User Guide* (IMXLUG).
- GPU hardware integration for desktop graphics  
Includes OpenGL ES, OpenGL, Vulkan, DRM, and GPU profiling and memory tool.
- GPU/NPU integration for compute, vision, and ML  
Includes OpenCL, OpenVX, and TensorFlow-Lite
- VPU/GStreamer integration for video player
- Audio codec integration
- ISP integration

### 4 Questions & Answers

#### 4.1 How to obtain the desktop build image?

NXP does not release desktop images due to the license. Users can build it with `meta-nxp-desktop`.

#### 4.2 How to solve the failure of fetching image or Git source?

Check if the host build machine can connect to the external website, or can export a proxy as follows:

```
$ export http_proxy=<your proxy address:port >  
$ export https_proxy=<your proxy address:port >
```

#### 4.3 How to update the SD image size in Yocto configuration?

You can add the following setting in `<build_dir>/conf/local.conf` to specify the image size:

```
IMAGE_ROOTFS_SIZE = "8388608"
```

#### 4.4 How to log in to the desktop system?

The default build creates the "user" account with the password "user". To change the account or password, uncomment and update `APTGET_ADD_USERS` in `<build_dir>/conf/local.conf`.

To add multiple user accounts, set in `<build_dir>/conf/local.conf` as follows (Each user setting should be split by a space):

```
APTGET_ADD_USERS = "alex:${USER_PASSWD_USER}:${USER_SHELL_BASH}  
alex1:${USER_PASSWD_USER}:${USER_SHELL_BASH} user:${USER_PASSWD_USER}:  
${USER_SHELL_BASH}"
```

Then log in with `<account>:user`, such as `alex:user`. The password for all accounts is "user". You can change the password after login.

```
$ sudo passwd <account>
```

## 4.5 How to enable Wi-Fi connection on desktop image?

Currently, Wi-Fi needs manual enablement with the following command:

```
sudo modprobe moal mod_para=nxp/wifi_mod_para.conf
```

After that, the user can configure Wi-Fi connection in desktop setting.

## 4.6 How to test GPU integration?

The test procedure is as follows:

1. Synchronize the board time. For example, to set new data to 12 May 2022 18:00:00, execute the following command as root user:

```
$ sudo date -s "12 MAY 2022 18:00:00"
```

2. Add an apt proxy if needed.

Add the following two lines to /etc/apt/apt.conf.d/proxy.conf.

```
Acquire::http::Proxy "http://username:password@address:port/";  
Acquire::https::Proxy "https://username:password@address:port/";
```

3. Use apt to install the OpenCL demo, and then perform it. Check the output from the terminal.

```
sudo apt install clinfo -y && clinfo
```

4. Use apt to install the OpenGL demo, and then perform it. The display then shows the 3D object.

```
sudo apt install glmark2-es2-wayland -y && glmark2-es2-wayland
```

## 5 Note About the Source Code in the Document

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## Revision History

This table provides the revision history.

**Table 2. Revision History**

Revision number	Date	Substantive changes
L5.10.9_1.0.0-desktop-alpha	05/2021	Initial release
L5.10.35_2.0.0-desktop-beta1	07/2021	Desktop Beta1 release
L5.10.52_2.1.0-desktop-beta2	11/2021	Desktop Beta2 release
L5.10.72_2.2.0-desktop	01/2022	Desktop GA release
L5.15.5_1.0.0-desktop	05/2022	Desktop GA release
L5.15.32_2.0.0-desktop	08/2022	Desktop GA release
L5.15.52_2.1.0-LDP	11/2022	Linux distribution POC GA release
L5.15.71_2.2.0-LDP	02/2023	Linux distribution POC GA release
LF6.1.1_1.0.0-LDP	05/2023	Linux distribution POC GA release

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