MaaXBoards

(iMX8M, iMX8mini and iMX8nano)

Yocto Kirkstone 5.15 User Manual iMX

Desktop PoC

Contents

1 Introduction

This document demonstrate how to build the meta-nxp-desktop layer BSP for the Avnet three MaaXBoard's (MaaXboard , MaaXboard mini and MaaXboard nano).

The i.MX desktop 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.

Information:

1. Built using Yocto Project
2. Updated quarterly
3. All source code is located on codearuror.org
4. This is a Linux distribution that uses the Canonical Ubuntu aarch64 repositories
5. The bootloader and kernel are identical to the standard Yocto project builds
6. The root filesystem and user space toolchain are based on Ubuntu
7. User account is "user" with password "user"

The present version from NXP iMX desktop for Kirkstone is L5.15.52_2.1.0.0 this document applies for this version and may also work for future versions. User may check the lates version on:

https://github.com/nxp-imx/meta-nxp-desktop/tree/lf-5.15.52-2.1.0-kirkstone

Documentation NXP:

L5.15.52_2.1.0-desktop GA Release

Repository to maaxboard

HinoAM/meta-maaxboard at kirkstone (github.com)

2 Host setup

This chapter will introduce the setup host and Yocto project build as described in NXP desktop documentation.

2.1 Operating system

Yocto project supports very specific Linux distributions and version:

https://docs.yoctoproject.org/ref-manual/system-requirements.html#supported-linux-distributions

But for these instructions assume that you are using one of these versions of standard desktop Ubuntu:

- Ubuntu 18.04 LTS
- Ubuntu 20.04 LTS
- Ubuntu 22.04 LTS

These instructions also assume that you are using the default Bash shell that comes with Ubuntu.

2.2 Host packages

Install the following packages

```
~$ sudo apt install gawk wget git-core diffstat unzip texinfo gcc-multilib
~$ sudo apt install build-essential chrpath socat cpio python python3 python3-pip python3-pexpect
~$ sudo apt install xz-utils debianutils iputils-ping python3-git python3-jinja2 libegl1-mesa libsdl1.2-
dev
~$ sudo apt install pylint3 xterm
~$ sudo apt install curl
```

Repo is a tool built on top of Git that makes it easier to manage projects that contain multiple repositories, which do not need to be on the same server

```
~$ mkdir ~/bin (this step may not be needed if the bin folder already exists)
~$ curl https://storage.googleapis.com/git-repo-downloads/repo > ~/bin/repo
~$ chmod a+x ~/bin/repo
~$ export PATH="${HOME}/bin:${PATH}"
```

3 Yocto setup

This section will introduce all the needed setup we will need in order to build all the MaaXboard versions recipes we choose.

3.1 Configure git

List present configuration

```
~$ git config --list
```

If the above command demonstrates that you already have a username and email configured, then you can skip the remainder of this section and continue with configuring Repo.

Configure Git

```
~$ git config --global user.name "Firstname Lastname"
~$ git config --global user.email "EmailAddress@Domain.com"
```

Confirm that Git is configured properly

```
~$ git config --list
```

You should see at least these two lines with your name and email address

```
user.name=Firstname Lastname
user.email=EmailAddress@Domain.com
```

3.2 Download meta layers from NXP

The very first thing you need to do is to create your work directory:
Workdirectory/maaxboard/

Create a new directory called imx-yocto-bsp-desktop. We'll be downloading the board support package (BSP) and other meta layers here:

```
Workdirectory/maaxboard$ mkdir imx-yocto-bsp-desktop
Workdirectory/maaxboard$ cd imx-yocto-bsp-desktop
Workdirectory/maaxboard/imx-yocto-bsp-desktop$
```

Install the i.MX BSP repo and download the Yocto Project Layers. I'll be using kirkstone here:

```
Workdirectory/maaxboard/imx-yocto-bsp-desktop$ repo init -u https://github.com/nxp-imx/imx-manifest.git -
b imx-linux-kirkstone -m imx-5.15.52-2.1.0_desktop.xml
Workdirectory/maaxboard/imx-yocto-bsp-desktop$ repo sync
```

You should now see the following folders / files

```
Workdirectory/maaxboard/imx-yocto-bsp-desktop$ ls
imx-setup-release.sh
README
README-IMXBSP
setup-environment
sources
imx-setup-desktop.sh
```

3.3 Setup the Yocto build environment

i.MX provides a script, imx-setup-release.sh, that simplifies the setup for i.MX machines. To use the script, the name of the specific machine to be built for needs to be specified as well as the desired graphical backend. The script sets up a directory and the configuration files for the specified machine and backend.

Note: Each build folder can only support a single DISTRO

Setup the Yocto build environment

```
Workdirectory/maaxboard/imx-yocto-bsp-desktop$ MACHINE=imx8mqevk DISTRO=imx-desktop-xwayland source imx-setup-desktop.sh -b maaxboard-desktop
```

This operation will generate two conf files under the path maaxboard-desktop

```
Workdirectory/maaxboard/imx-yocto-bsp-desktop/maaxboard-desktop/conf$ ls
local.conf
bblayer.conf
```

3.4 Clone meta-maaxboard git repository

All the needed files to build the kernel and universal bootloader can be downloaded from github:
[HinoAM/meta-maaxboard: Yocto meta-layer for MaaXBoard/Mini/Nano (github.com)]

Go to sources folder

```
Workdirectory/maaxboard/imx-yocto-bsp-desktop$ cd sources
```

Clone the meta-maaxboard layer

```
Workdirectory/maaxboard/imx-yocto-bsp-desktop/sources$ git clone https://github.com/HinoAM/meta-maaxboard.git
Workdirectory/maaxboard/imx-yocto-bsp-desktop/sources$ cd meta-maaxboard
Workdirectory/maaxboard/imx-yocto-bsp-desktop/sources/meta-maaxboard$ git checkout kirkstone
```

At the end of this steps, you will have some repository like below:

```
Workdirectory/maaxboard/imx-yocto-bsp-desktop/sources/meta-maaxboard$ ls
conf    README.md    recipes-connectivity    replace-conf.sh
docs    recipes-bsp    recipes-kernel
```

You will need to modify local.conf and bblayer.conf (created before by the imx-setup-release.sh) files according to your settings. Inside meta-maaxboard folder you will find a script that you can run and replace the files. You need to put the folder destination and the type of maaxboard desktop you want, for example:

```
Workdirectory/maaxboard/imx-yocto-bsp-desktop/sources/meta-maaxboard$ ./replace-conf.sh maaxboard-desktop maaxboard-desktop
bblayers.conf maaxboards-desktop copied ... [OK]
local.conf maaxboard desktop copied ... [OK]
Done
```

Options are:

Maaxboard = maaxboard-desktop
Maaxboard mini = maaxboard-mini-desktop
Maaxboard nano = maaxboard-nano-desktop

3.5 Build Yocto

For all maaxboard versions we will be using the imx-image-desktop, is highly recommend fetching the sources first:

```
$ bitbake imx-image-desktop --runall fetch
```

Then run bitbake:

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

3.6 Build output

Once it's done building, the build output is located under path:

```
Workdirectory/maaxboard/imx-yocto-bsp-desktop/maaxboard-desktop/tmp/deploy/images/maaxboard-ddr4-2g-sdcard$
```

You will find a wic file which is the needed file to flash into the SD card.

3.7 Returning to this project at later date

Bitbake will not run if the environment is not configured. If you close the present shell (terminal) then you will lose the environment set up by imx-setup-release.sh. To set up our environment again:

```
Workdirectory/maaxboard/imx-yocto-bsp-desktop$ source setup-environment maaxboard-desktop
```