NXP Semiconductors

Layerscape Software Development Kit 18.09 Documentation

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About this document

About QorIQ Layerscape Software Development Kit (LSDK)

LSDK is a complete Linux kit for NXP QorIQ ARM-based SoC's and the reference and evaluation boards that are available for them.

It is a *hybrid form* of a Linux distribution because it combines the following major components to form a complete Linux system.

- NXP firmware components including:
    - PPA, a resident EL3 privilege secure firmware for ARMv8A.
    - NXP peripheral firmware components for DPAA1, DPAA2, and PPFE.
- NXP boot loaders. Two are offered:
    - U-Boot, based on denx.de plus patches.
    - UEFI, based on TianoCore.
- NXP Linux kernel, based on kernel.org upstream plus patches.
- NXP added user space components.
- Ubuntu standard user space file set (user land), including compilers and cross compiler.

The use of Ubuntu user land is what makes LSDK a hybrid. It is not entirely an Ubuntu distribution because it uses an NXP kernel, but it still uses Ubuntu user space files. This hybrid is possible because NXP ARM SoC's are standards-based so programs like bash and thousands of others run without being recompiled.

The benefit of using Ubuntu user land is the easy availability of thousands of standard Linux user space packages. The experience of using the LSDK is similar to using Ubuntu, but the kernel, firmware, and some special NXP packages are managed separately.

Accessing LSDK

LSDK is distributed via git. See https://lsdk.github.io/.

There are two ways to use the LSDK, as an integration and as a source of individual components.

LSDK as an integration

Using the link above, notice the `flexbuild` component. You can clone it and run a script to create and install LSDK onto a mass storage device as an integration, ready for use on an NXP reference or evaluation board. You can build NXP components from source using a script called flex-builder or install from binaries of NXP components using flex-installer. See Layerscape SDK user guide.

LSDK as components

The same link shows git repositories for individual components, for example the LSDK Linux kernel. If you clone and examine this git, you will see a conventional kernel source tree. You can compile the kernel using `make` in the normal way, like a kernel.org kernel. However, notice the configuration fragment in `arch/arm64/configs`. See Linux kernel.

Having git access to components is helpful if you assemble your own Linux distribution or wish to form a hybrid with a user land other than Ubuntu's.

LSDK git tags

LSDK git repositories use git tags to indicate component revisions that have been release tested together. Use the `git tag` command to examine them and chose a tag to check out.

LSDK Relies on Mass Storage Devices

Ubuntu user land is very convenient for evaluation because it is possible to use the command `apt-get install` on the standard Ubuntu components you need. It also provides native development tools.

But this richness means that the user space file is large, too large for RAM disks.

Therefore, LSDK requires installation to and use of a mass storage device such as

- SD card
- USB flash drive
- USB hard drive
- SATA drive, spinning, or SSD (for boards with a SATA port)
- eMMC flash (when available on board)

LSDK provides scripts that populate a mass storage device with the needed files. These scripts can run on a Linux PC. It is especially simple to use an SD card or USB flash drive because they are the easiest to move between a Linux PC and the NXP board.