

i.MX 6 Series Wayland/Weston User Guide

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1 Overview

Wayland is a protocol that allows a compositor to directly communicate with a client. It has its own implementation of C library for executing the protocol. Wayland was designed to enhance the experience of X Window System users by providing support for direct rendering and direct compositing features, which were not available in X Window System.

Weston is a new display server and a compositor for Wayland. Weston can also be run on a client that implements small fraction of X server features. Weston is not just a rewrite of the current X server, rather it is a small server that is designed around some of the latest graphics technologies.

This document describes how to enable Wayland/Weston support on an i.MX 6 series device.

2 Wayland Version

This release is based on Wayland 1.0.3 version.

3 Supported Hardware SoC/ Boards

- i.MX 6Dual/6Quad SABRE-SD Board and Platform

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- i.MX 6Solo/6DualLite SABRE-SD Platform
- i.MX 6Dual/6Quad SABRE-AI
- i.MX 6Solo/6DualLite SABRE-AI

4 Freescale Packages to Support Wayland

The BSP release comes with the following three additional packages to support Wayland:

- gpu-viv-wl-bin-mx6q-<BSP-VERSION>.tar.gz
- gpu-viv-wl-bin-mx6s-<BSP-VERSION>.tar.gz
- weston-imx-bin-<BSP-VERSION>.tar.gz

The first two packages contain the i.MX 6Dual/6Quad and i.MX 6Solo/6DualLite Vivante GPU binaries, which provide support for Wayland.

The second package contains the pre-built Weston binaries based on Weston release from <http://wayland.freedesktop.org/releases.html>. This package contains GLES renderer, GAL2D renderer, and simple clients that come as part of Weston release. GAL2D renderer is a 2D renderer based on GC320 2D GPU.

5 LTIB Build Instructions

6 Build Host Prerequisites

To set up a Linux host for LTIB builds, see "Setting up a Linux Host for LTIB Builds on Ubuntu 9.04" document included in the i.MX 6Dual/6Quad L3.0.35_4.1.0 release.

6.1 Additional Host Packages Needed by LTIB

In addition to the host packages given in the "Install Host Packages Needed by LTIB" section of "Setting up a Linux Host for LTIB Builds on Ubuntu 9.04" document, install the following package:

```
$ sudo apt-get install xsltproc python-xcbgen scrollkeeper
```

6.2 Host Machine Configuration

If you are installing LTIBs on your host machine for the first time, you can skip this section and proceed with the next section. If you have some LTIBs already installed on your host machine, then may need to upgrade some host packages as shown below:

```
$ ./ltib --hostcf -p flex -f
$ ./ltib --hostcf -p autoconf -f
$ ./ltib --hostcf -p automake -f
$ ./ltib --hostcf -p bison -f
```

7 Wayland/Weston Support in LTIB

To install and build LTIB package, follow the steps given below:

NOTE

To run the LTIB package, some host packages are needed. If you get an error due to unavailability of some host packages, install the required host packages.

1. Remove all previously-installed packages from /opt/freescale/pkgs/ directory.
2. Remove all previously-configured packages from /opt/freescale/ltib/ directory.
3. Install the LTIB package in a location other than the root directory, such as /home/user/:

```
$ tar xzf <ltib_release>.tar.gz
$ ./<ltib_release>/install
```

Running these commands will install the LTIB package to the selected location.

4. To build the LTIB package, first run the following commands:

```
$ cd <LTIB directory>
$ ./ltib -m config
```

5. Select Freescale i.MX reference boards as platform and exit, saving the changes. On the next menu, select i.MX 6 x as platform type and package profile. Exit and save the new configuration.

7.1 Installing and Building LTIB Package

To install and build LTIB package, please refer to the Linux User Guide documentation for the respective i.MX 6 reference platform.

7.2 Enabling Wayland Weston Support in LTIB

1. Run the following commands:

```
$ cd <LTIB directory>
$ ./ltib
```

Running these commands will build the LTIB package.

2. To add Wayland/Weston support to the file system, run the following command:

```
$ ./ltib -m config
```

```

Freescale iMX6 Series-Based Boards
Arrow keys navigate the menu. <Enter> selects submenus --->. Highlighted letters are
hotkeys. Pressing <Y> selects a feature, while <N> will exclude a feature. Press
<Esc><Esc> to exit, <?> for Help. Legend: [*] feature is selected [ ] feature is
excluded

(imx6q) latform
--- LTIB settings
--- System features --->
--- Choose the target C library type
target C library type (glibc) --->
library package (from toolchain only) --->
toolchain component options --->
--- Toolchain selection.
toolchain (ARM, gcc-4.6.2, multilib, neon optimized, gnuabi/eglibc2.13) --->
(-O2 -march=armv7-a -mcpu=cortex-a9 -mfloat-abi=softfp) enter any CFLAGs for gcc/g++
--- Choose your bootloader for U-Boot
bootloader (u-boot) --->
--- Choose your board for u-boot
board (imx6q-arm2) --->
--- Choose your kernel
kernel (Linux 3.0.35-imx) --->
[ ] always rebuild the kernel
[ ] produce cscope index
--- include kernel headers
[ ] configure the kernel
--- leave the sources after building
[ ] build mfg firmware
--- Package selection
Package list --->
--- Target System Configuration
options --->
--- Target Image Generation
options --->
---
load an Alternate Configuration File
Save Configuration to an Alternate File

[Select] < Exit > < Help >

```

Figure 1. i.MX 6 Series-Based Boards

```

Package List
Arrow keys navigate the menu. <Enter> selects submenus --->. Highlighted letters are
hotkeys. Pressing <Y> selects a feature, while <N> will exclude a feature. Press
<Esc><Esc> to exit, <?> for Help. Legend: [*] feature is selected [ ] feature is
excluded

--- Platform specific package selection
--- firmware-imx
[*] mx-test
[*] mx-lib
[*] cbs-ng
[ ] tp_imx
[*] pa_supplicant
[*] pu-viv-bin-mx6q
[ ] uc
[ ] theora-wifi
[*] elf
--- m dev
--- pu-viv-wl-bin-mx6q
[*] weston-wl-bin
--- Freescale Multimedia Plugins/Codex --->
--- Common package selection list
[ ] asterisk
--- tk
[ ] utocconf
[ ] utomake
--- lsa-lib
[*] lsa-utils
--- ash
[*] can't link bash to /bin/ash
[ ] bind
--- binutils
[ ] build binutils documentation.
[ ] lson
[ ] luez-hcidump
[ ] luez-libc
[ ] luez-utils
[ ]

[Select] < Exit > < Help >

```

Figure 2. Package List

- Run the following commands to build Weston and its dependencies:

```

$ cd <LTIB directory>.
$ ./ltib

```

Running these commands will install Weston and all its dependencies.

NOTE

The only supported profile is Freescale Gnome Release package.

8 Enabling Wayland/Weston Support for Prebuilt rootfs in LTIB File System

The prebuilt root file system (rootfs) comes with prebuilt GPU driver. By default, it is set to EGL framebuffer. To enable Wayland/Weston support, make EGL and GAL point to correct binaries as shown below:

```
$ ls -l $(ROOTFS)/usr/lib/libEGL.so
    libEGL.so -> libEGL-wl.so
$ ls -l $(ROOTFS)/usr/lib/libGAL.so
    libGAL.so -> libGAL-wl.so
    libEGL.so.1 -> libEGL-wl.so
$ rm /etc/rc.d/init.d/filesystems
```

9 Enabling Wayland/Weston Support for rootfs in File Systems other than LTIB

Wayland is dependent only on libffi but Weston has many dependencies. Following is a list of packages on which Wayland and Weston have dependencies. These packages need to be installed on your root file system. Ensure that you install the same version as given below for each package because the weston-imx-bin was built based on these versions.

- wayland.tar.xz (version 1.0.3)
- libffi.tar.gz
- mtdev-1.1.3
- libpng-1.2.50
- libxkbcommon-0.2.0
- pixman-0.28.0
- zlib-1.2.7.tar.gz
- expat-2.1.0.tar.gz
- cairo-1.12.8.tar.xz
- jpegsrc.v8b.tar.gz

Once the above packages are installed, extract gpu-viv-wl-bin-<SOC-BSP_VERSION>.tar.gz as shown below:

```
$ tar xvvf gpu-viv-wl-bin-<SOC-BSP-VERSION>.tar.gz
$ cp -rf gpu-viv-wl-bin-<SOC-BSP-VERSION>/* $ROOTFS/.

$ tar weston-imx-bin-<SOC-BSP-VERSION>.tar.gz for weston binaries.
$ cp weston-imx-bin-<SOC-BSP-VERSION>/* $ROOTFS/.
```

10 Running Weston

After the Wayland/Weston packages are installed to the file system, follow the steps given below to run Weston:

1. Boot the i.MX 6 series device.
2. Connect mouse and keyboard to the i.MX 6 series device (you cannot connect them once the Weston server has started, current Weston version does not support hot plug).
3. Start Weston server by running the following command in the target terminal:

```
$ start-weston
```

You will see a dark blue screen with a red bar at the top. This indicates that the Weston server has started.

4. Now, you can use the mouse to open the terminal and run the applications, as required.
5. Run the following commands to start a Wayland application from the console terminal or from a remote terminal:

```
$ export LD_LIBRARY_PATH="/usr/lib"
```

```
$ export XDG_RUNTIME_DIR="/tmp"
$ simple-shm
```

11 Customizing Weston

The script, start-weston, in \$(ROOTFS)/usr/bin/start-weston is preconfigured to run GAL2D compositor. This can be verified and used as a reference by running the following command in the target terminal:

```
$ cat /usr/bin/start-weston
```

You can customize Weston according to your requirements. Customizing Weston is explained below:

- Starting Weston manually: If you want to start the Weston server manually, you need to set the following environment:

```
$ export LD_LIBRARY_PATH="/usr/lib"
$ export XDG_RUNTIME_DIR="/tmp"
```

- Selecting backend to start Weston: Currently, two backends are supported to start the Weston server. These are GAL2D backend and framebuffer backend. The GAL2D backend, gal2d-backend.so, uses the GC320 GPU and Linux framebuffer. The framebuffer backend, fb-backend.so, uses the GC2000/GC880 and Linux framebuffer. Only one backend configuration can be supported at a time, not both.

To run GAL2D accelerated Weston, use the following commands:

```
$export GAL2D_DISPLAY=1
$ weston &
```

To run 3D or GC2000/GC880 accelerated Weston, use the following commands:

```
$export FB_DISPLAY=1
$ weston &
```

In either case, the Weston server will start showing a dark blue screen with a red bar at the top.

- Single buffering and multi buffering: The Weston server supports both single buffering and multi buffering. In single buffering, the damage area is rendered to offscreen surface and blits to front buffer. Offscreen surface is used to avoid flickering. By default, the Weston server starts with single buffering.

In multi buffering, instead of rendering to offscreen, the damage area is rendered to back buffer and does the flip, but the frame rate will be restricted to the display rate. Maximum of three buffers are supported.

Before starting the Weston server, export FB_MULTI_BUFFER to control the number of buffers to be used.

For single buffering, use the following command:

```
$ export FB_MULTI_BUFFER=1
```

For double buffering, use the following command:

```
$ export FB_MULTI_BUFFER=2
```

- Running applications: The release package includes the following applications that you can run on the Weston server:

- simple-egl
- simple-shm
- weston-info

12 Support

If you face any problem in following the steps given in this document, post a question on <https://community.freescale.com/>.

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for weston egl-ext.h:

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