



AsteroidOS under the hood

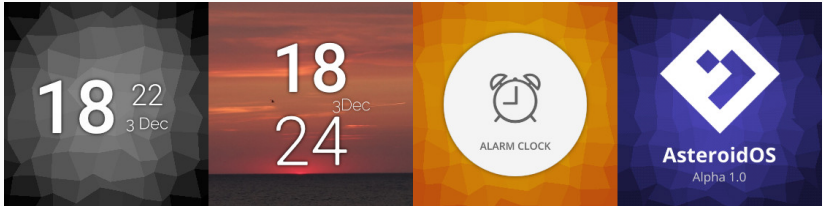
Architecture of an embedded Linux system

Florent Revest

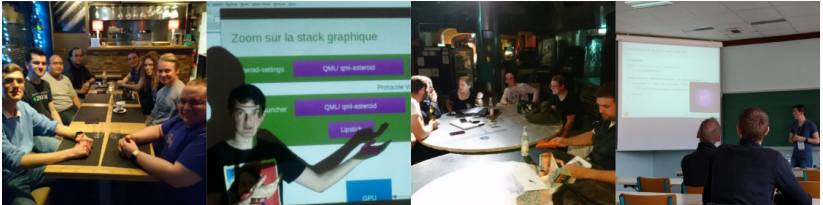
April 26, 2017

OVERVIEW

An operating system



And a community

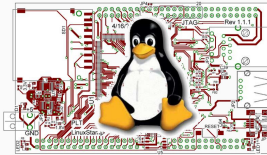




Embedded Linux System

Linux Kernel & Standard Daemons (*systemd, udev, bluez, connman...*)

GENERAL PRESENTATION



Embedded Linux System

Hardware specificities: *UI, Bluetooth LE, Sensors, Battery, USB, CPU...*

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Graphic Stack



- Declarative QML
- Imperative JavaScript
- Known by mobile Linux devs
- QML-Asteroid provided
- Extended with Qt modules

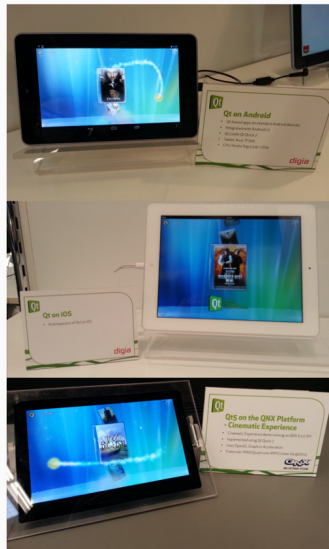




- Apps using Wayland-EGL
- Wayland Compositor = Display Server + WM + Desktop
- asteroid-launcher compositor
- QtWayland Compositor API

QT PLATFORM ABSTRACTION

- No FB, KMS, DRM etc...
- QPAs plugins since Qt5
- HWComposer from SailfishOS
- Uses Android drivers





- Dirty hack... But works
- Bionic linker in a glibc lib
- Loads Android HALs for ex.
- → Android blobs and kernel
- Used by SailfishOS, LuneOS, Ubuntu Touch & others...

Bluetooth Stack

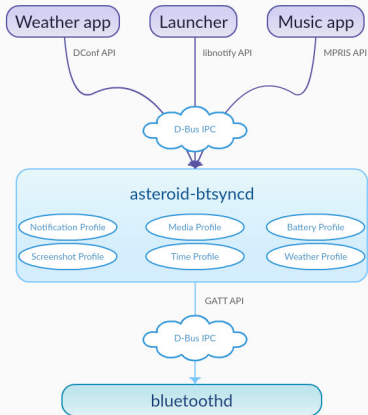
BLUETOOTH SERVICES



- Notifications sync.
- Music remote control
- Weather forecast
- Remote screenshots
- Time sync.



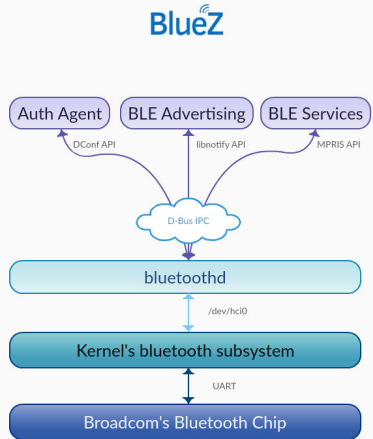
ASTEROID-BTSYNCD, DBUS



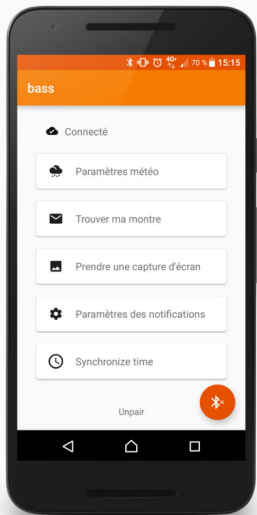
- DBus Multiplexer
- MPRIS, libnotify or DConf
- Uses BlueZ's BLE DBus API

BLUEZ, LINUX BT SUBSYSTEM

- Services API
- Characteristics API
- Descriptor API
- Advertisement API
- Agent API
- bluetoothd and Linux's HCI



SYNCHRONIZATION CLIENTS



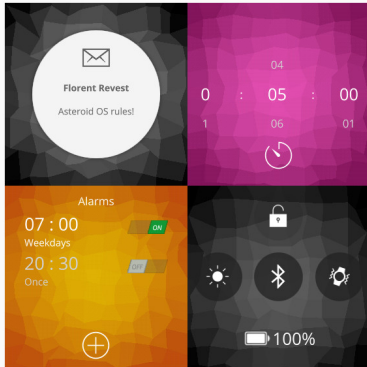
- AsteroidOSSync
- AsteroidOSLinux
- Others welcome
- Implements profiles

Other Stacks

SENSORS

- Accel., Gyro., Magneto. etc...
- QtSensors API
- SensorFW backend
- Hybris backends

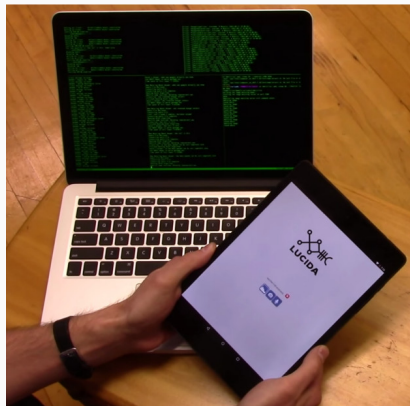




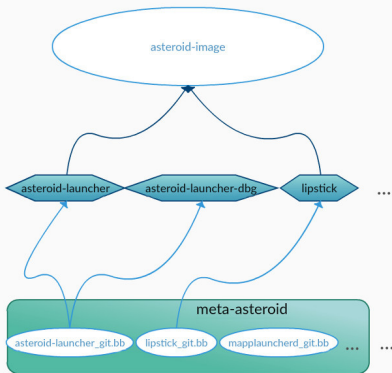
- NGFD API
- QtFeedback API
- Ffmemless backend
- Hybris backend



- Personal assistant ?
- QtMultimedia
- PulseAudio
- Hybris backend



Build System



- Yocto by Linux Foundation
- OpenEmbedded build system
- Images generated from
- Packages built from
- Recipes gathered in
- Layers (BSP or Apps)

APPS LAYERS

- meta-asteroid
- meta-qt5
- meta-smartphone
- meta-openembedded
- oe-core/meta

meta-asteroid

AsteroidOS is a free and open-source operating system for smartwatches. This layer provides recipes for building an AsteroidOS image.

Git repository

- <https://github.com/AsteroidOS/meta-asteroid> [view repo](#)

Last commit: 1 month, 1 week ago (master branch)

Maintainer

- Florent Revent [enueat](#)

Dependencies

The meta-asteroid layer depends upon:

- [openembedded-core](#)
- [meta-oe](#)
- [meta-android](#)
- [meta-g5](#)

meta-asteroid recipes (93)		
		<input type="text"/>
Recipe name	Version	Description
android-aid	1.0	This installs an android aid service which loads SystemDroid with the first aid file which loads legal and servicemanager
asteroid-alarmclock	>v05	Asteroid's alarm clock app
asteroid-blurred	>v05	Asteroid's BLE synchronization daemon.
asteroid-calculator	>v05	Asteroid's calculator app
asteroid-calendar	>v05	Asteroid's calendar app
asteroid-image 📷	1.0	Asteroid image for users
asteroid-image-chip 📷	1.0	Asteroid image for debuggers, contains debugging tools
asteroid-image-cli 📷	1.0	Asteroid image for developers, contains development and debugging tools
asteroid-launcher	>v05	Asteroid's launcher based on Spydial
asteroid-music	>v05	Asteroid's music app
asteroid-settings	>v05	Asteroid's system settings app
asteroid-stopwatch	>v05	Asteroid's stopwatch app
asteroid-timer	>v05	Asteroid's timer app
asteroid-wallpapers	>v05	Asteroid's default set of wallpapers, licensed under CC BY 2.0
asteroid-weather	>v05	Asteroid's weather app
dms-http	>v05	NemoModder's MTP Stack
fdaio-synctool	>v05	NemoModder's Bluesync Synchronization Daemon
cnc	>v05	NemoModder's Cnc
dmsc	>v05	NemoModder's DMSH
glacier-homey	>v05	Homescreen for the Glacier UX
gdi-droid	>v05	Droid plugin for GDIviewer
icobase	>v05	Mor's QIS fork of KDE FM-F's core component
libaccounts-glib	>v05	GLib-based client library for the accounts database
libaccounts-qtl	>v05	Accounts management library for Qt applications
libdms	>v05	NemoModder's libdms
libfdaio	>v05	NemoModder's libfdaio
libgls	>v05	NemoModder's libgls
libgl	>v05	NemoModder's libgl
libgl-gt	>v05	NemoModder's libgl-gt
libprofile-up	>v05	Device profile handling library for Qi
libstopwatch	>v05	Mor's Stopwatch
libtimebase	>v05	NemoModder's libtimebase
libtimesyncing	>v05	NemoModder's libtimesyncing
libsyncapi-glt	>v05	Single Sign On framework

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BSP LAYERS



- meta*-hybris BSP
- Provides /system and kernel
- anthias, bass, dory, sparrow, sprat, sturgeon, swift, tetra, wren...



Thanks! Questions?