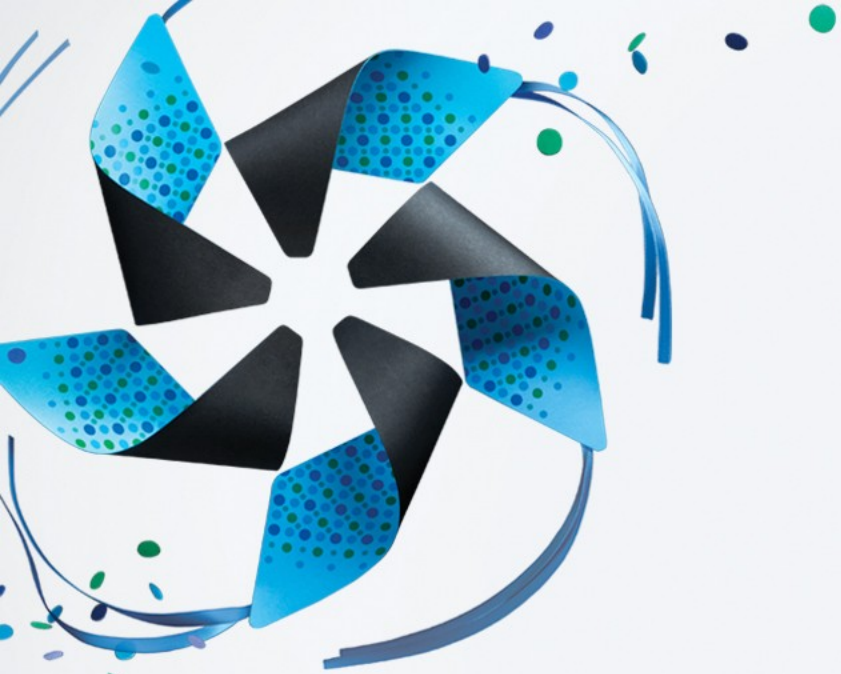




How to port Tizen:Common to open source hardware devices?

Leon Anavi
Philippe Coval



Agenda

- **Context**
 - Who are we ?
- **Definitions**
 - Tizen:Common
 - Open Source Hardware
- **Case #1 : Tizen-sunxi**
- **Case #1 : Minnowboard max**
- **Q & A**

Who are we ?

- **Leon Anavi**
 - Software engineer
 - Open source enthusiast
 - E-mail leon@anavi.org
- **Philippe Coval**
 - Software engineer
 - Member FLOSS communities (Maemo, Qt, Debian, MeeGo)
 - Works in France for Eurogiciel as Intel contractor
 - E-mail philippe.coval@open.eurogiciel.org



Definitions

Tizen:Common

- **Profile Agnostic**
 - Tizen:IVI is based on it (90%)
- **Features**
 - Security using SMACK
 - Long term support (Linux 3.14)
 - Accelerated Graphics
 - Application Framework (Native or WebApps)
 - Inclusive platform : EFL, Qt ..
 - Cross Arch : x86 or ARM
 - Cross Display : Wayland or X11

Open Source Hardware

- **What ?**
 - **Same as FLOSS but different**
 - **Licenses : OpenSource Hardware Association**
 - **Need Accessible Tools**
 - **Examples : Arduino, OLinuxIno**
- **Why ?**
 - **Customization**
 - **Focus on your features, innovate !**
 - **Community**
 - **Feedback, experiences, improvement**
 - **System Integrity : FLOSS**

Popular Single Board Computers

Rank	SBC	CPU
1	Raspberry Pi Model B	ARM1176JZF-S @ 700MHz
2	BeagleBone Black	AM335x 1GHz ARM® Cortex-A8
3	Odroid-U3	1.7GHz Exynos4412 Prime Cortex-A9 Quad-core
4	CubieTruck	Allwinner A20 ARM Cortex-A7 @ 1GHz dual-core
5	Banana Pi	Allwinner A20 ARM Cortex-A7 @ 1GHz dual-core
6	Parallella	Zynq Z7010 / Zynq Z7020 Dual ARM Cortex
7	Cubieboard2	Allwinner A20 ARM Cortex-A7 @ 1GHz dual-core
8	A10-OLinuCino-Lime	Allwinner A10 Cortex-A8 @ 1GHz
9	Galileo	Intel Quark X1000 @ 400MHz
10	Udoo Quad	Freescale i.MX 6 ARM Cortex-A9 Quad core @ 1GHz

Show case #1 :
Tizen-Sunxi

Tizen-sunxi

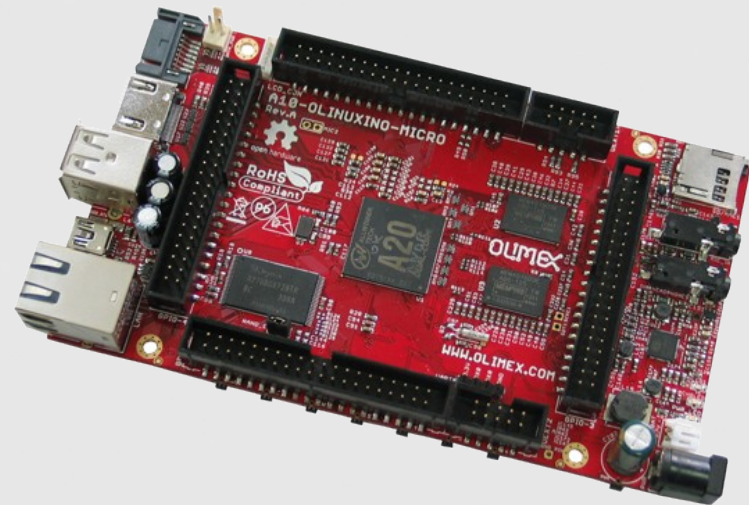
Community open-source port of Tizen with Linux-sunxi kernel for devices with Allwinner SoCs.

<https://github.com/leon-anavi/tizen-sunxi>



Compatible Sunxi Devices

- A1X – A10-OLinuXino-LIME, A10S-OLinuXino-MICRO
- A20 – [A20-OLinuXino-MICRO](#)
- A33 – work in progress
- A80T – work in progress
- A83T – work in progress



Configure display options for Sunxi devices

- The easy way: **uEnv.txt**, for **OLinuXino** boards
set **disp.screen0_output_type** to:
 - 0 - no display
 - 1 - LCD
 - 2 - TV
 - 3 - HDMI
 - 4 - VGA
- The hard way: compile FEX to binary configuration file

Building Tizen-sunxi image from scratch

- Build **Das U-Boot**
- Build **Linux-sunxi** kernel
- Get **Tizen:Common** source code using Git
- Build RPM packages using Git Build System (GBS)
- Prepare kickstarter file and create Tizen platform image
- Create bootable microSD card with a FAT and an ext4 partition

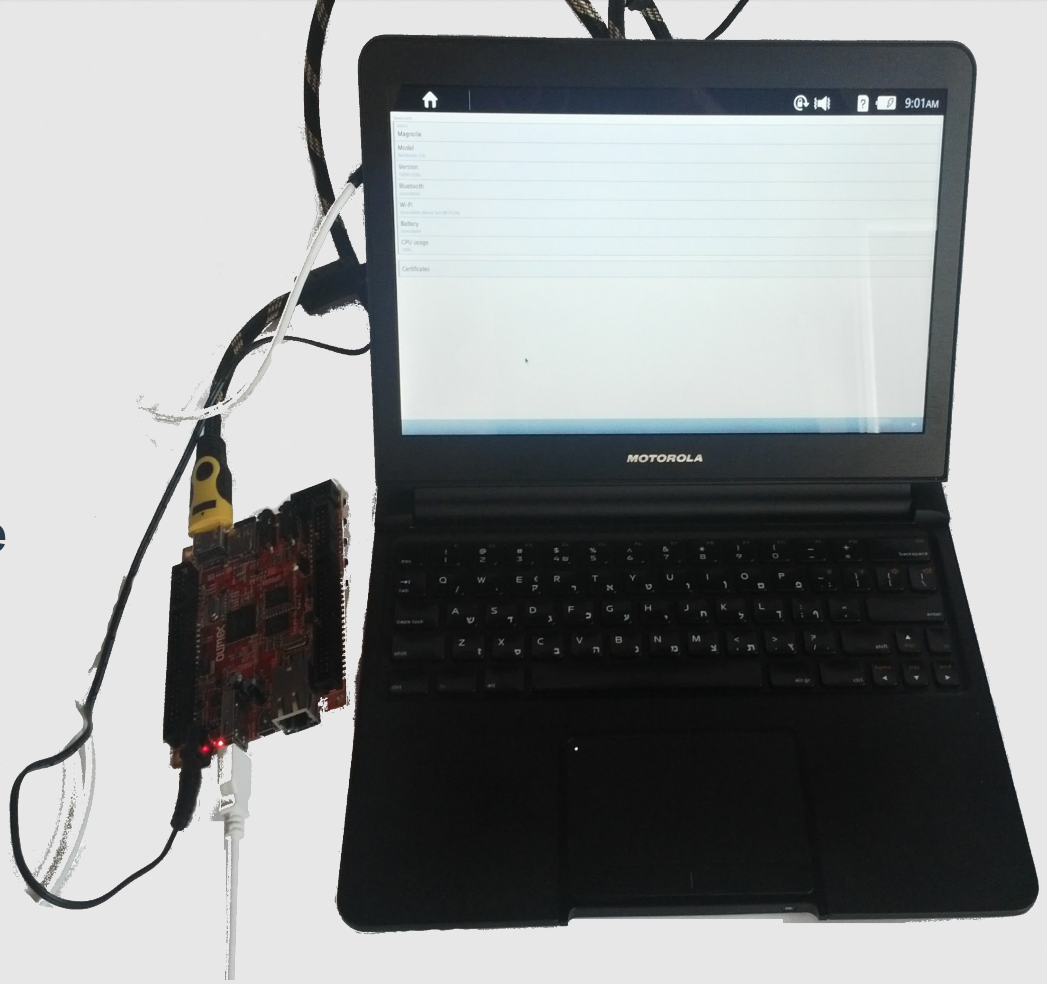
Debugging the boot process with UART cable



```
sudo screen /dev/ttyUSB0 115200
```


DIY Tizen Laptop

- Single board computer
- Motorola lapdock
- USB male to male cable
- Adapters



DIY Tizen Tablet

- Single board computer
- Display
- Power supply or a battery



Booting Tizen on an Android Sunxi tablet

- Get Android tablet with Allwinner **A1X** or **A20** SoC
- Prepare microSD card with Tizen image
- Extract **script.bin** from the Android tablet
- Replace **script.bin** on the microSD card and boot the tablet

```
$ adb shell
# mkdir /sdcard/nanda
# mount -t vfat /dev/block/nanda /sdcard/nanda
# exit
$ adb pull /sdcard/nanda/script.bin script.bin
```

The background is a dark grey/black surface. On the left, a stylized city skyline is visible, featuring a prominent tower with a sphere (resembling the Oriental Pearl Tower) and other skyscrapers. Below the skyline are blue wavy lines representing water. Scattered across the dark background are numerous small, colorful circles and dots in shades of blue, green, and teal, resembling confetti or digital particles. In the bottom left corner, there are two overlapping circles: a large dark grey one and a smaller light blue one.

Show case #2 : MinnowBoard Max

MinnowMax : Hardware

- Created by CircuitCo Tx USA
- Copyleft : CC-BY-SA
- Intel based (BayTrail Atom E38xx)
 - GPU : Intel HD Graphics
- IO: usb3 hdmi sd sata ...
- Expansion cards called Lure
 - Display, Audio
 - CAN, ADC, PCIE ...



MinnowMax : Software

- **UEFI Firmware or CoreBoot**
- **Mainline Linux Kernel 3.14+ LTS w/ GPU support**
 - **Linux Distros : Mint, Fedora, Debian, Ubuntu, RHEL**
- **Tizen:Common**
 - **Uses Minnowboard Max as reference target along NUC**
 - **Download EFI images :**
 - **tizen-common_*_common-wayland-efi-x86_64-sda**

Minnowmax & Tizen Yocto Support

- **Yocto is a project to create :**
 - Custom Linux-based systems
 - for embedded products
 - Minnowboard is supported by yocto (meta-intel layer)
- **Tizen-Yocto goals :**
 - Rebuild tizen using yocto tools
 - Provide HTML5 App Framework to yocto
 - Multiple profiles : Common and IVI ...
 - Contacts : R. Le Martret, K. Thierry from Eurogiciel

MinnowMax : Community

- Check online resources :
 - Wiki hosted on elinux.org
 - Mailling lists, IRC
 - Yocto project
- And amazing demos :
 - Robotics (OpenCV)
 - LeapMotion
- Expect it to be popular in “Makers communities” :
 - 3d cases ready to be printed :)





More...



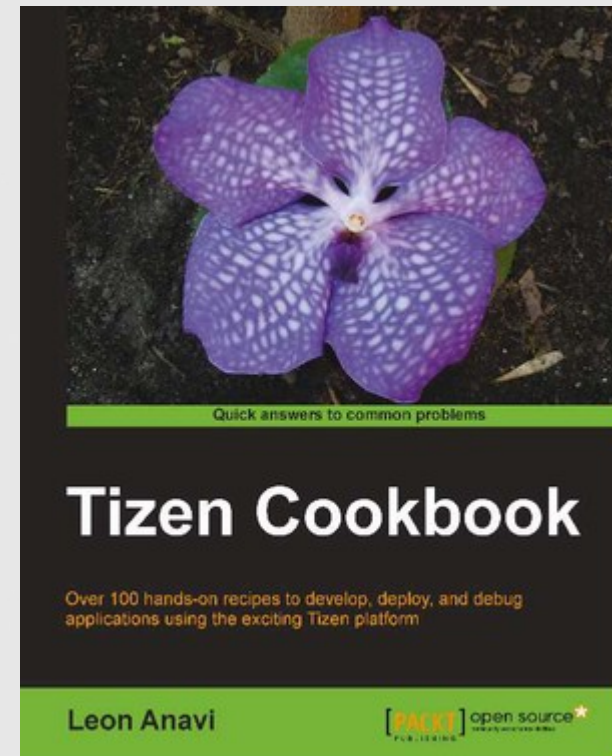
Resources

- Open Hardware
 - http://p2pfoundation.net/Open_Source_Hardware
- Tizen
 - <https://wiki.tizen.org/wiki/Common>
 - https://wiki.tizen.org/wiki/Build_Tizen_with_Yocto
- Tizen-Sunxi
 - <http://linux-sunxi.org/Tizen>
- MinnowBoard Max
 - <http://www.elinux.org/Minnowboard:MinnowMax>

Tizen Cookbook

30% discount codes:

- Book: **i9DqNlok**
- eBook: **J3LVVT1x**



<https://www.packtpub.com/>

Thanks

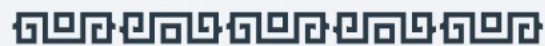
- **Linux Foundation**
- **Tizen Association**
- **Allwinner**
- **Circuit Co & Intel**
- **Olimex**
- **LabFabFr & Makerspace56**



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