OpenHardware Meetup-IIT Mumbai
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OpenSource Hardware -Debian way

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HARDWARE MECHANICAL DIAGRAMS

Dimensions for enclosures, mechanical subsystems, etc.

For 2D models, preferred document type is vector graphics file, with dimension prints,DXF, or AI, etc.

SCHEMATIC & CIRCUIT DIAGRAMS

Symbolic diagrams of electronic circuitry, includes part-list.
Preferred document type is any sort of image (PDF, BMP, GIF, PNG, etc).

Often paired with matching layout diagram.

Ref:Open Hardware Presentation by Limor Fried-Philip Torrone

COMPONENTS/ MATERIAL LIST

What parts are used, where to get them, part numbers, etc.

Ideally - have data sheets, generic, easy to get, notes and specifications.

Standard format is a text file, BOM (bill of materials).

LAYOUT DIAGRAM

Dimensions for enclosures, mechanical subsystems, etc.

For 2D models, preferred document type is vector graphics file, with dimension prints,DXF, or AI, etc.

Ref:Open Hardware Presentation by Limor Fried-Philip Torrone

CORE FIRMWARE

BSP (Board support packages)

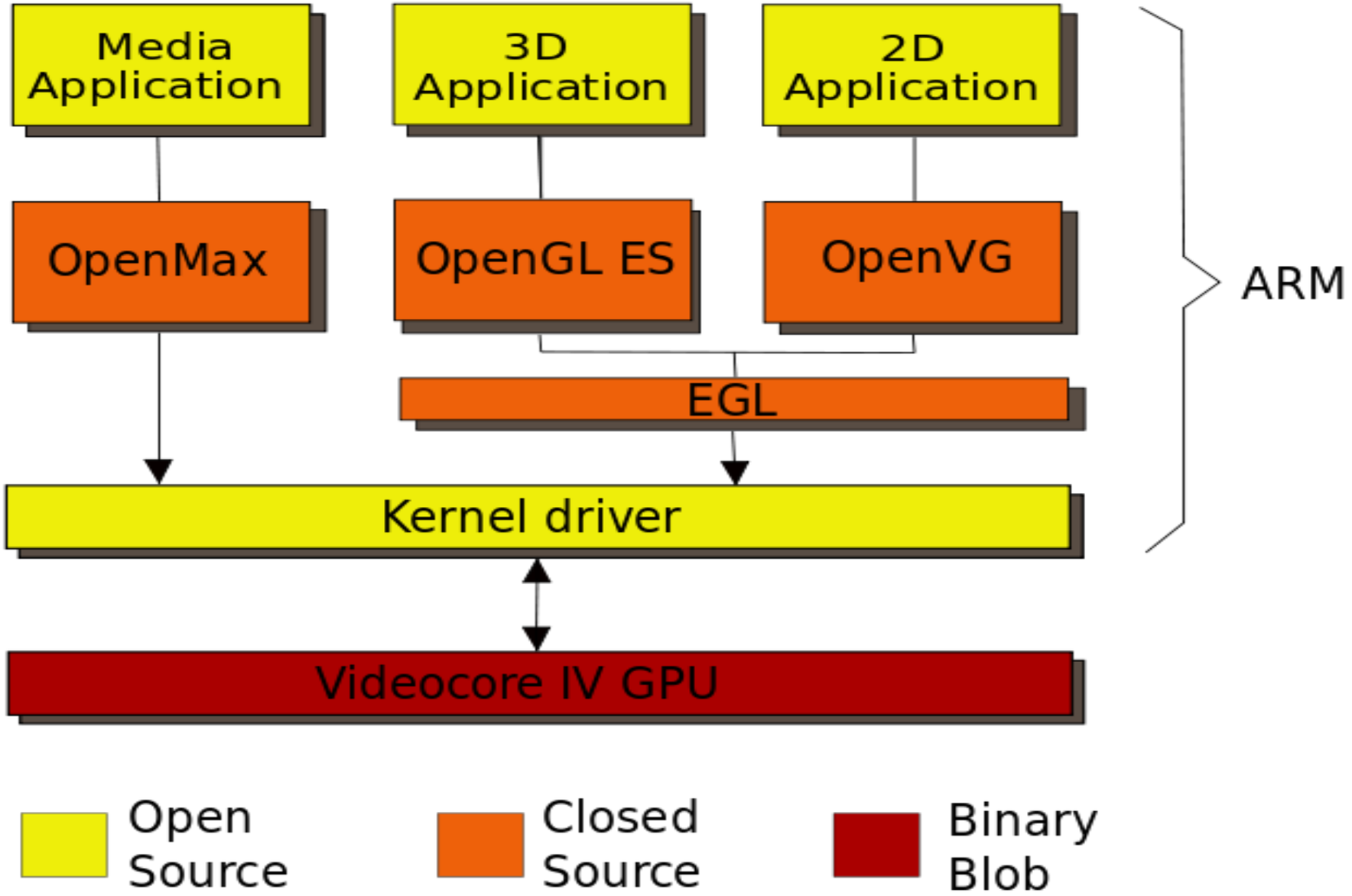
Uboot (Bootloader) binary and sources
Kernel Source with necessary drivers

Any drivers necessary for the chipset.

Software API's

THE FACT

Raspberry Pi -Scheme of the implemented



Ref: Wikipedia
http://en.wikipedia.org/wiki/Raspberry_Pi

WHY DEBIAN

It is maintained by its users.

Unparalleled support

The best packaging system in the world

Incredible amounts of software

Bug tracking system

Packages well integrated

Multiple architectures and kernels

Stability

Fast and easy on memory

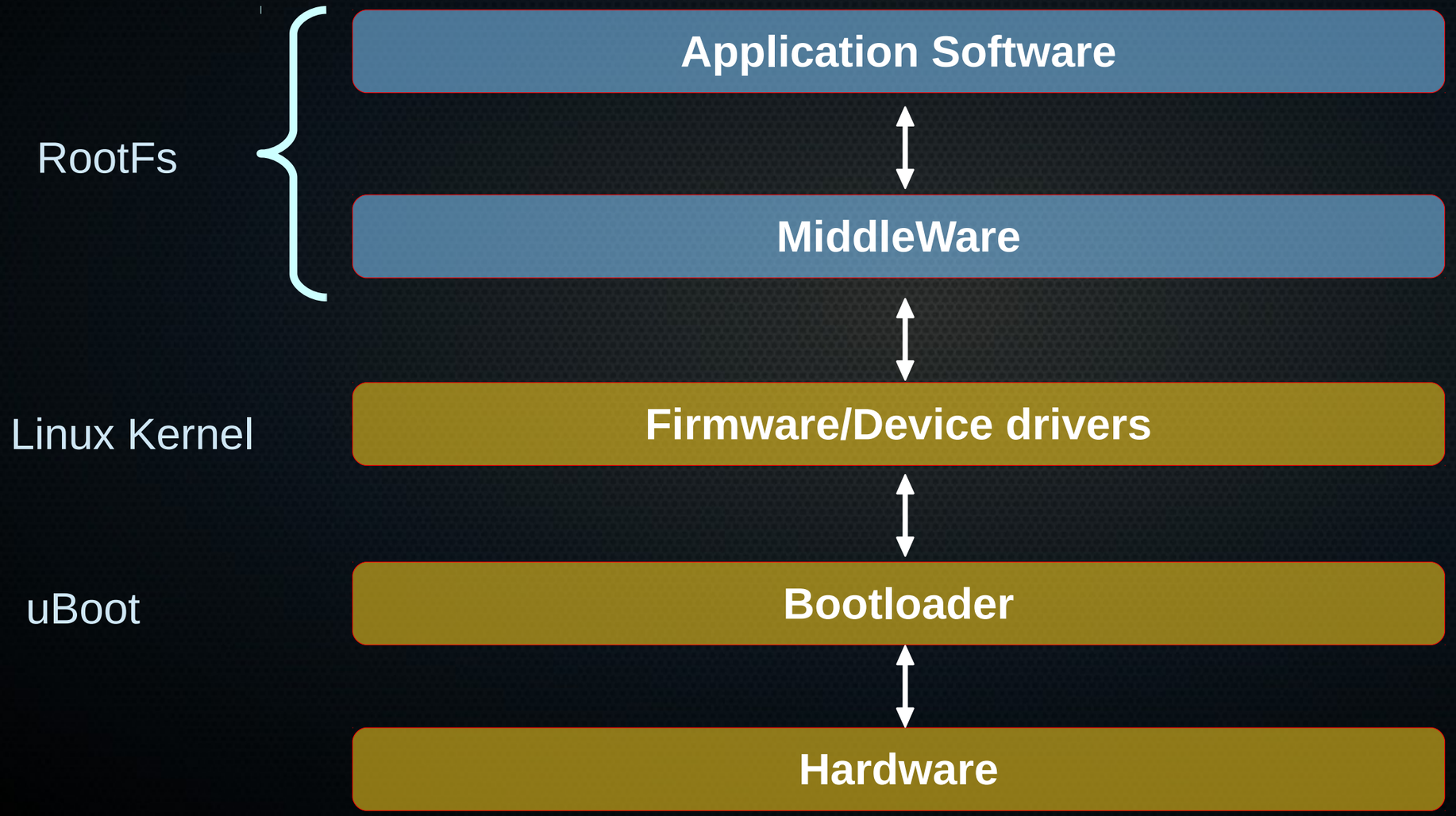
Good system security

Ref :https://www.debian.org/intro/why_debian

Debian ARM ports

Port	Architecture	Description	Status
armel	EABI ARM	Debian fully supports a port to little-endian ARM.	released
armhf	Hard Float ABI ARM	Supports floating-point unit (FPU) The Debian armhf port requires at least an ARMv7	released
arm64			

EMBEDDED OPERATING SYSTEM ARCHITECTURE



EMBEDDED DEBIAN -EMDEBIAN

“ Emdebian is a bunch of debian tools so you can build/cross-compile Debian packages or adapted packages with info on how to cross-build “

Port the linux kernel to their hardware (including writing any specific device drivers)

Select the prebuilt emdebian packages needed to support their application

Package their application as Debian package(s) using Debian and Emdebian tools

Build a root filesystem using Emdebian tools from the steps above

EMDEBIAN DISTRIBUTIONS

Emdebian Grip

A smaller Debian-compatible distro

Based on Debian installer (standard debian iso)

Almost ceased - There will be no further updates and no further stable releases

The last release of Emdebian Grip is 3.1, based on Debian GNU/Linux Wheezy 7.1

EMDEBIAN DISTRIBUTIONS

Emdebian Crush

Emdebian cross-builds packages using the composite method using emdebian-tools

- emdebian diff contains changes that are implemented via patch files kept in svn superimposed on the Debian diff, managed with emdebian-tools
- standard build tools can be used

Busybox based root filesystem and packages to support

Emdebian Crush development has stalled and can no longer be built.

BUILDING DEBIAN ROOT FS

Debootstrap - install Debian in a system without using an installation disk.

Run a different Debian flavor in a chroot environment.

This way you can create a full (minimal) Debian installation which can be used for testing purposes".

INSTALL THE TOOLKIT AND OTHER PREREQUISITES

root@melabs_devpc:~# apt-get install libc6-armel-cross libc6-dev-armel-cross

root@melabs_devpc:~# apt-get install binutils-arm-linux-gnueabi

root@melabs_devpc:~# apt-get install gcc-4.7-arm-linux-gnueabi

root@melabs_devpc:~# apt-get install g++-4.7-arm-linux-gnueabi

root@melabs_devpc:~# apt-get install uboot-mkimage

root@melabs_devpc:~# apt-get install libncurses5-dev

root@melabs_devpc:~# apt-get install git bc cur
l
root@melabs_devpc:~#apt-get install debootstrap dpkg-dev

PREPARE YOUR ROOTFS

root@melabs_devpc:~# mkdir armel_bbb-root

root@melabs_devpc:~# armel_bbb-root

root@melabs_devpc:/ armel_bbb-root# debootstrap --foreign --arch armel wheezy

CONFIGURE YOUR ROOTFS

root@melabs_devpc:~# mkdir -p lib/modules/3.10.0-rc3

CONFIGURE YOUR NEW UNIX PASSWORD

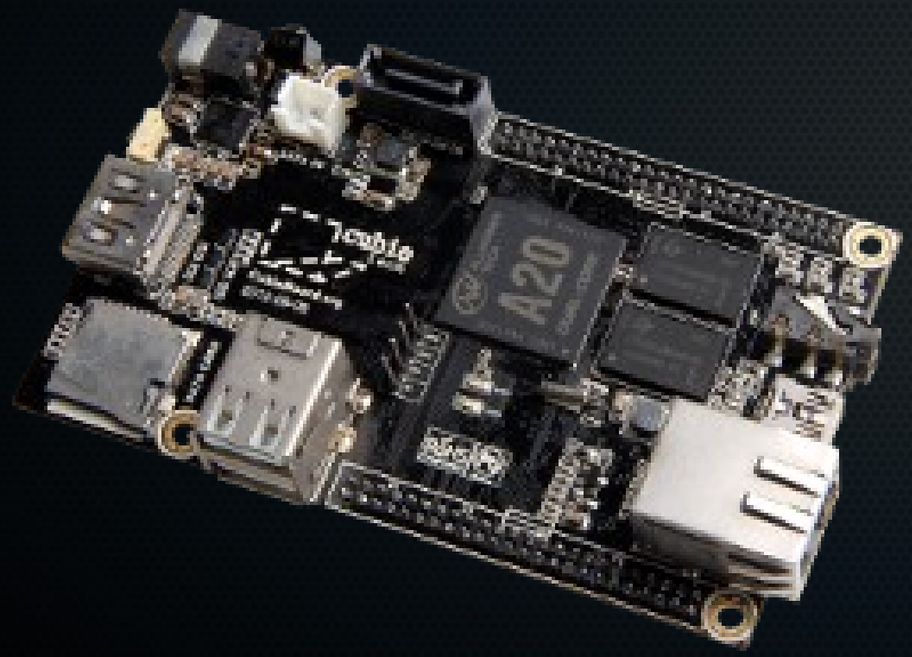
CPU : ARM11, 700 MHz

RAM : 256MB/512MB

Storage : SD Card slot

HDMI/TV out

USB ports -2, LAN-1



AllWinnerTech SOC A10 ， ARM® Cortex™-A8 ARM® Mali400 MP1 Complies with OpenGL ES 2.0/1.1

1GB DDR3 @480MHz

4GB internal NAND flash, up to 32GB on SD slot, up to 2T on 2.5 SATA disk

5VDC input 2A or USB otg input

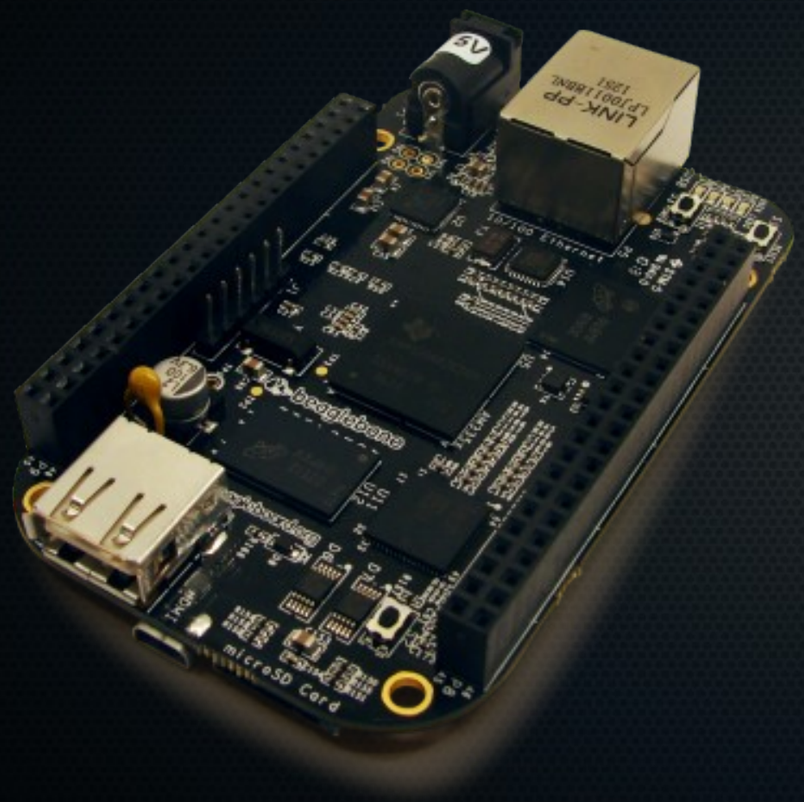
1x 10/100 ethernet, support usb wifi

2x USB 2.0 HOST, 1x mini USB 2.0 OTG, 1x micro sd

1x HDMI 1080P display output

1x IR, 1x line in, 1x line out

beagleboard.org



AM335x 1GHz ARM® Cortex-A8

512MB DDR3 RAM

4GB 8-bit eMMC on-board flash storage

3D graphics accelerator

USB client for power & communications

USB host

Ethernet

HDMI

OPTIMISED DEBAIN FOR OPENHARDWARES -COMMUNITY EFFORT

Raspbian -

Raspbian is a free operating system based on Debian optimized for the Raspberry Pi hardware.
http://www.raspbian.org/

Cubian -

Debian on cubieboard
http://cubian.org/

THANKS

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