96Boards CE Software Compliance - How and Why it is needed?

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Software Compliance - Foreign for 96Boards? No!

[Link to the video]
Why Software Compliance?

Just to create a better Software story for 96Boards...

- Developer friendly
- Good upstream support
- Reduce SW fragmentation
- Provide seamless user experience
- And much more!!!
Software Compliance - Breakdown

- Pre-Lauch
  - Boot Architecture
    - EBBR
    - Board Recovery
  - Kernel/Bootloader Source
    - Kernel
    - Bootloader
    - Source code locations
  - Graphics Drivers
    - Acceleration support

Legend
- Green: Recommended
- Red: Mandatory
- Yellow: Highly Recommended
Software Compliance - Breakdown Contd...

- Operating System
  - Debian - OR
  - Android - OR
  - Fedora - OR
  - OE/Yocto - OR
  - Others

- Software License Compliance

- Functionality
  - Boot to GUI
  - On Chip GPU acceleration
  - Accelerated GPU compute (OpenCL/Renderscript)

Legend

- Green: Recommended
- Red: Mandatory
- Yellow: Highly Recommended
Software Compliance - Breakdown Contd...

- **Functionality**
  - MRAA library - IF
  - Video/Audio playback
  - Networking
  - HW accel. Video Encode/Decode
  - Activity LEDs

- **Documentation**
  - Board Schematics
  - Board User manual
  - SoC reference manual

Legend:
- Green: Recommended
- Red: Mandatory
- Yellow: Highly Recommended
Software Compliance - Breakdown Contd...

- Post launch
  - Upstreaming roadmap
    - Q1 - Kernel
    - Q2 - Kernel
    - Q3 - Kernel and Bootloader
    - Q4 - Kernel and Bootloader
Software Compliance - Deep Dive

● Pre launch
  ○ Boot Architecture
    ■ EBBR
      ● Aimed at standardizing boot process for ARM SoCs used in Embedded space
      ● Trusted firmware is mandatory
      ● UEFI implementation is mandatory (U-boot or Tianocore)
      ● No official major release yet (v0.6 is the current minor release till date)
Software Compliance - Deep Dive

● Pre launch
  ○ Boot Architecture
    ■ Board Recovery
    ● Possible to recover a “bricked” board
    ● Without specialized hardware like JTAG debugger
    ● Open or proprietary SW tools can be used
Software Compliance - Deep Dive

- Pre launch
  - Kernel/Bootloader
    - Kernel
      - Mainline or LTS kernel (last 3 releases at the time of board launch)
    - AOSP
      - Latest Google supported Android common kernel
    - Bootloader
      - Current LTS version of the supported bootloader
      - UEFI is recommended
  - Source code locations - Open environment
Software Compliance - Deep Dive

● Pre launch
  ○ Graphics Drivers
    ■ Either open source or royalty free binary drivers
    ■ For binary drivers, vendor has to provide updated drivers/libraries for supported kernel version
    ■ If mainline is supported, drivers shall be available within 4 weeks of the major release by kernel.org
  ■ Acceleration
    ● Userspace libraries for GPU acceleration depending on the supported distribution
Software Compliance - Deep Dive

- Pre launch
  - Operating system
    - At Least one of the below, depending on the use case
      - Debian
      - Android
      - Fedora
      - Ubuntu
      - OpenSUSE
      - Others
Software Compliance - Deep Dive

- Pre launch
  - Software License Compliance
    - All open source components shall comply with respective open source license(s)
Software Compliance - Deep Dive

- Pre launch
  - Functionality
    - Boot to GUI
    - On Chip GPU acceleration
    - Accelerated GPU compute (OpenCL/Renderscript)
  - Vulkan is highly recommended for Android supported boards
Software Compliance - Deep Dive

- Pre launch
  - Functionality
    - MRAA library
      - Required for all distributions except Android*
    - Video/Audio playback
    - Networking
    - HW accel. Video Encode/Decode
    - Activity LEDs
Software Compliance - Deep Dive

● Pre launch
  ○ Documentation
    ■ Board schematics
      ● Shall be available under CC by 4.0 at 96Boards site
    ■ Board user manual
      ● Necessary for getting started with the board
    ■ SoC reference manual
      ● Not the feature list 😁
      ● Should contain register info, application note
Software Compliance - Deep Dive

- Post launch
  - Upstreaming roadmap
    - Q1 - Kernel
      - **Objective**: Basic SoC and board support
      - **Outcome**: Board should boot into initramfs with all CPUs using mainline kernel
      - **Subsystems to be covered**: Arch, Common Clk, Pinctrl/GPIO, Serial.
Software Compliance - Deep Dive

- Post launch
  - Upstreaming roadmap
    - Q2 - Kernel
      - **Objective:** On-board memory support
      - **Outcome:** Board should boot a distro with mainline kernel from any one of the on-board storage mediums (eMMC, UFS, uSD, USB, PCI-E, Flash)
      - **Subsystems to be covered:** Memory, DMA, I2C/SPI, Regulators
Software Compliance - Deep Dive

● Post launch
  ○ Upstreaming roadmap
    ■ Q3 - Kernel and Bootloader
    ● **Objective:** Basic network access with special peripheral and initial bootloader support
    ● **Outcome:** Board should be able to access on-board networking interfaces (Wifi, BT) along with any special peripheral like PCI-E and USB if not enabled previously
    ● **Subsystems to be covered:** Networking, BT, PCI-E, USB
    ● **Bootloader:** Initial patches for adding SoC and board support
Software Compliance - Deep Dive

● Post launch
  ○ Upstreaming roadmap
    ■ Q4 - Kernel and Bootloader
      ● **Objective:** On board display and full bootloader support
      ● **Outcome:** Board should drive any on-board display interface (HDMI, LCD) with any means of audio out (HDMI, LS-I2S)
      ● **Subsystems to be covered:** Display, I2S
      ● **Bootloader:** Patches for booting Linux kernel from any storage medium supported
Thank you

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