Embedded Linux Arch

SOC RK3399
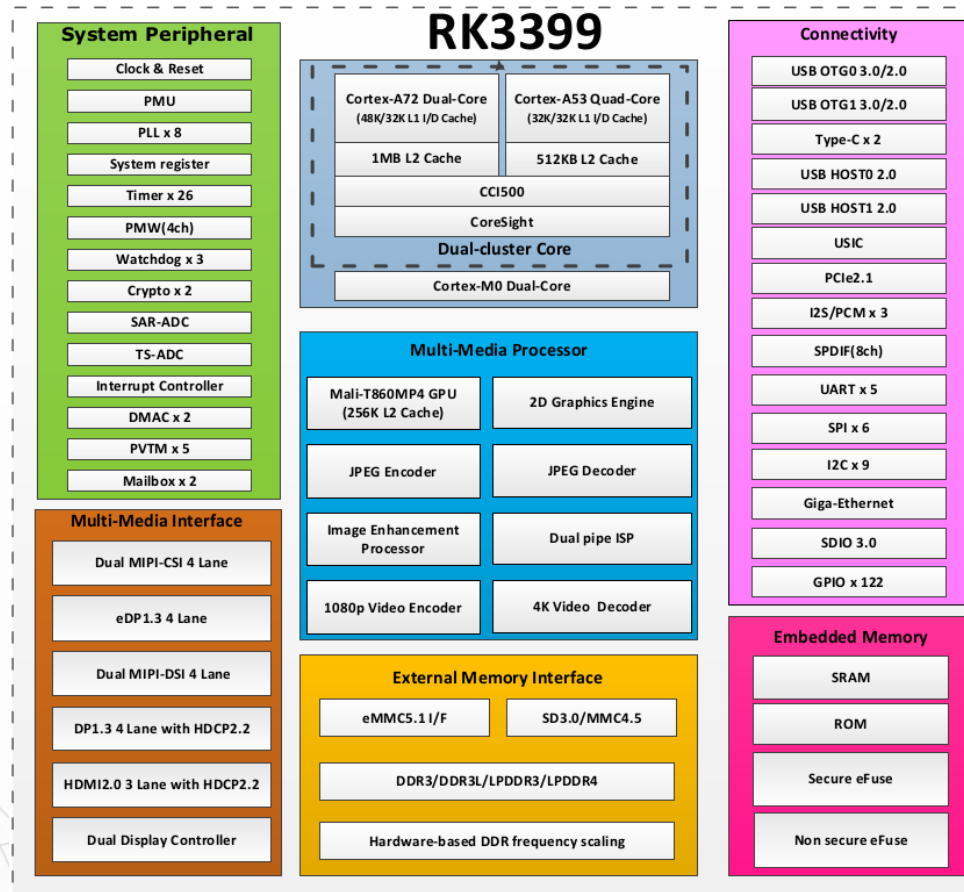
Embedded Linux System Booting

Boot → Initialize HW

Loader → Load OS to memory

Linux | DTB → OS initial / load driver

RootFS → OS running (Debian)
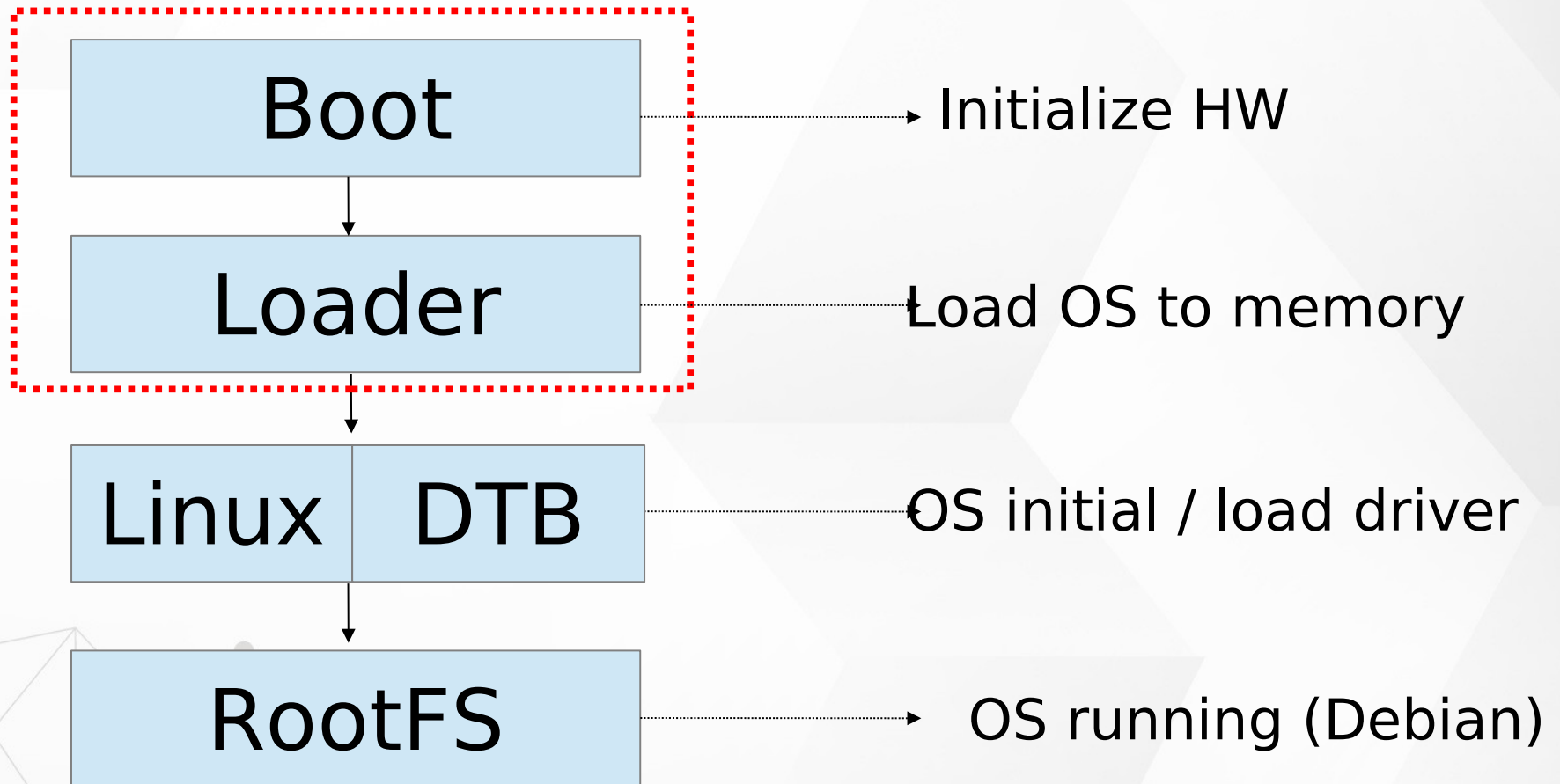
System Start Up

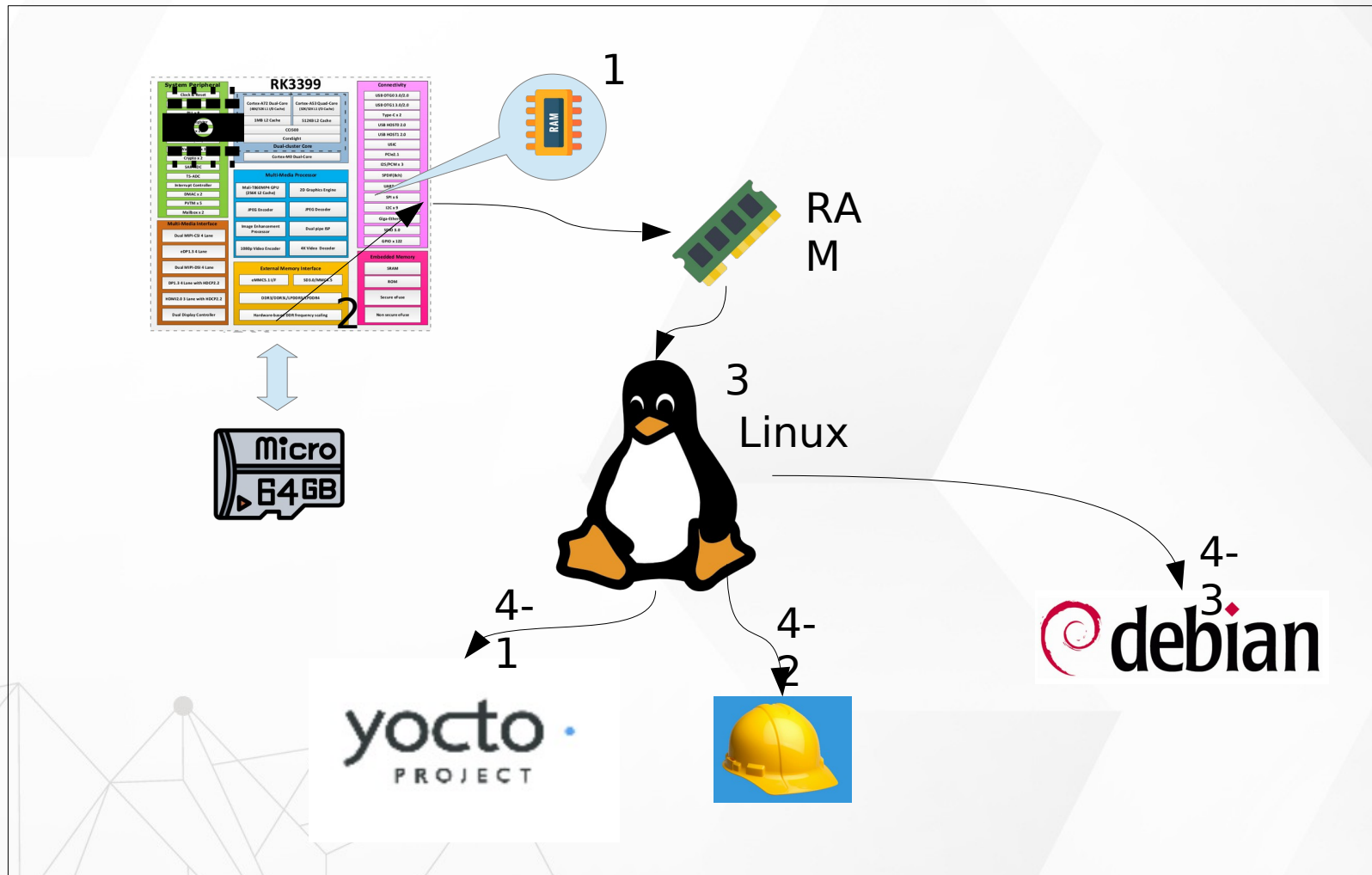# Boot

- Power On BootROM code (work in cache)

    – Load BL1

- BL1   (work in cache - IDB_Loader)

    – Initial simple exception vectors, PLL (clock)

    – Initial Multi-CPU

    – Load BL2

- BL2   (work in cache)

    – Initial DDR memory

    – Initial C environment (stack, heap,)

    – Load BL31

Boot

- BL31 (work in DDR)

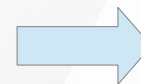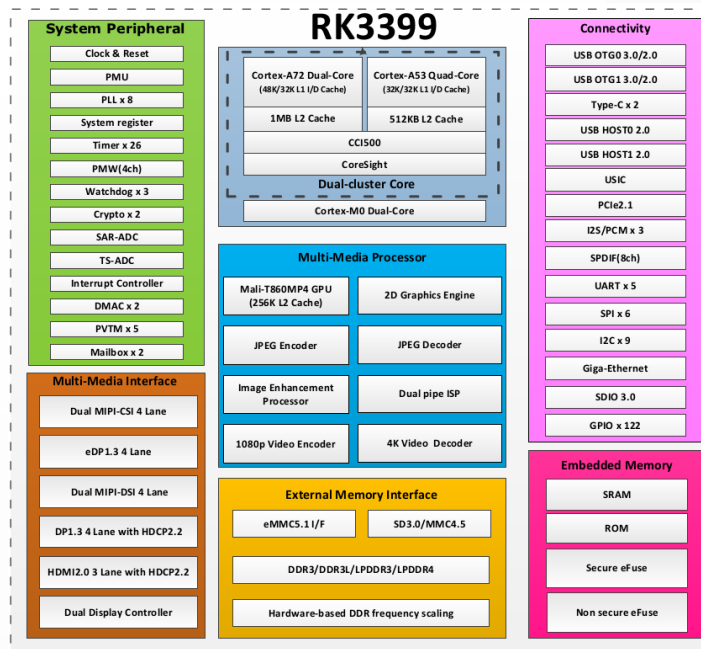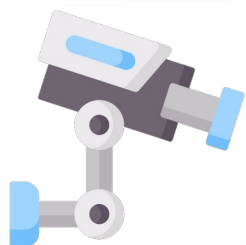 - Initial exception vectors

  - Load BL32 (u-boot)

- BL32 U-boot

  - Initial storage device

  - Load Linux Kernel

- Kernel

  - kernel/Documentation/arm64/booting.txt

  - Load RootFS

Embedded Linux System

RK3399

System Peripheral
- Clock & Reset
- PMU
- PLL x 8
- System register
- Timer x 26
- PMW(4ch)
- Watchdog x 3
- Crypto x 2
- SAR-ADC
- TS-ADC
- Interrupt Controller
- DMAC x 2
- PVTM x 5
- Mailbox x 2

Cortex-A72 Dual-Core (48K/32K L1 I/D Cache) | Cortex-A53 Quad-Core (32K/32K L1 I/D Cache)
1MB L2 Cache | 512KB L2 Cache
CCI500
CoreSight
Dual-cluster Core
Cortex-M0 Dual-Core

Multi-Media Processor
- Mali-T860MP4 GPU (256K L2 Cache)
- 2D Graphics Engine
- JPEG Encoder
- JPEG Decoder
- Image Enhancement Processor
- Dual pipe ISP
- 1080p Video Encoder
- 4K Video Decoder

Multi-Media Interface
- Dual MIPI-CSI 4 Lane
- eDP1.3 4 Lane
- Dual MIPI-DSI 4 Lane
- DP1.3 4 Lane with HDCP2.2
- HDMI2.0 3 Lane with HDCP2.2
- Dual Display Controller

External Memory Interface
- eMMC5.1 I/F
- SD3.0/MMC4.5
- DDR3/DDR3L/LPDDR3/LPDDR4
- Hardware-based DDR frequency scaling

Connectivity
- USB OTG0 3.0/2.0
- USB OTG1 3.0/2.0
- Type-C x 2
- USB HOST0 2.0
- USB HOST1 2.0
- USIC
- PCIe2.1
- I2S/PCM x 3
- SPDIF(8ch)
- UART x 5
- SPI x 6
- I2C x 9
- Giga-Ethernet
- SDIO 3.0
- GPIO x 122

Embedded Memory
- SRAM
- ROM
- Secure eFuse
- Non secure eFuse

Embedded Linux System

User land

Video Play	Read Image	Reocrd Image	Tool

C Library	Qt	OpenCV	GLib

Kernel

Virtual File System (VFS)

Linux System Call

Linux Device Driver

Hardware

Disk	Image Sensor	Keyboard	mouse	Panel