RVSC2023

RISC-V EDK2 Reference Solution

Evan Chai (evan.chai@intel.com)
Andrei Warkentin (andrei.warkentin@intel.com)
Sunil V L (sunilvl@ventanamicro.com)

intel®

Legal Notices and Disclaimers

Statements in this document that refer to future plans or expectations are forward-looking statements. These statements are based on current expectations and involve many risks and uncertainties that could cause actual results to differ materially from those expressed or implied in such statements. For more information on the factors that could cause actual results to differ materially, see our most recent earnings release and SEC filings at www.intc.com.

All product plans and roadmaps are subject to change without notice. Any forecasts of goods and services needed for Intel's operations are provided for discussion purposes only. Intel will have no liability to make any purchase in connection with forecasts published in this document. Code names are often used by Intel to identify products, technologies, or services that are in development and usage may change over time. No license (express or implied, by estoppel or otherwise) to any intellectual property rights is granted by this document.

(RISC-V Software Ecosystem)

https://riseproject.dev/

RISE is dedicated to enabling a robust software ecosystem specifically for application processors that includes compilers, toolchains, system libraries, kernel, virtualization, programming languages, Linux distribution integration, and tools for debug and profiling.

Areas the RISE TSC targets to focus on over time:

- Compilers & Toolchains
- Linux Distro Integration
- System Libraries
- Debug & Profiling
- Kernel & Virtualization
- Simulator/Emulators
- Language Runtimes
- System Firmware

RISE Firmware WG
https://wiki.riseproject.dev/display/HOME/Firmware+WG

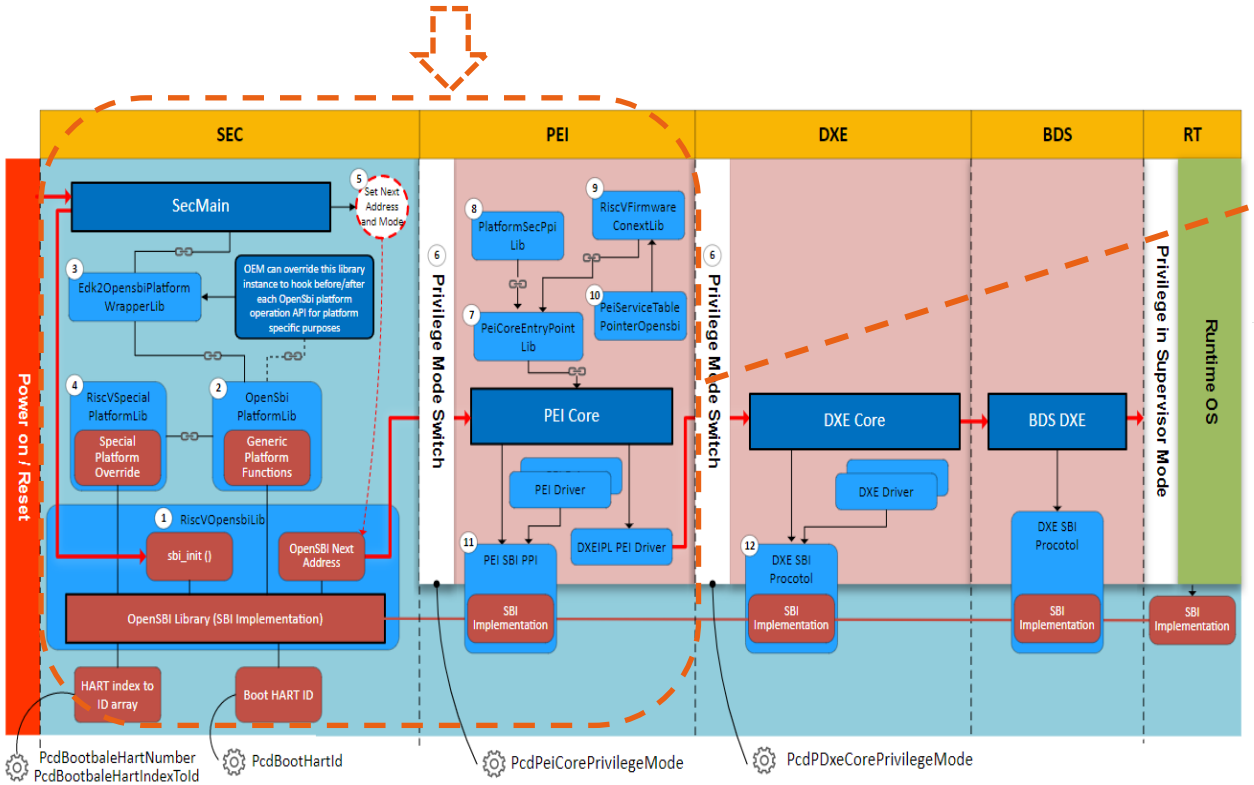
UEFI on RISC-V Firmware Mailing List
https://groups.google.com/a/riscv.org/g/fw-exchange

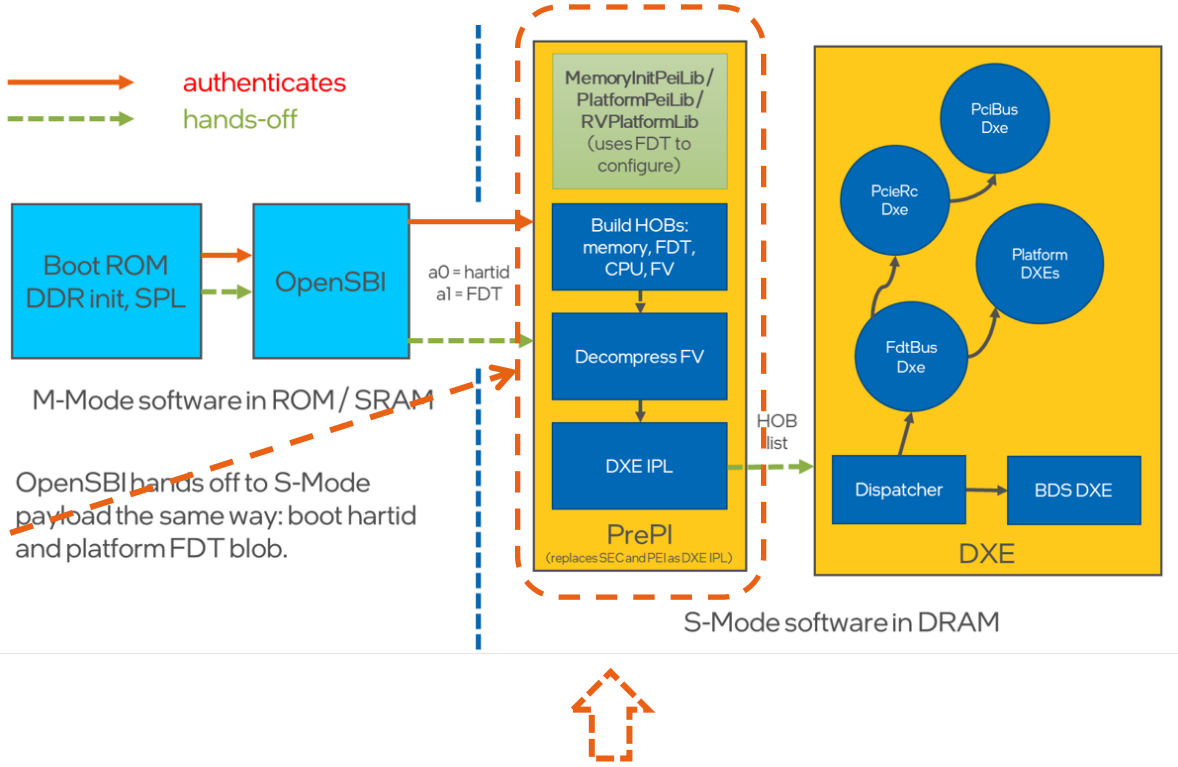
Background

- EDK2 is a mature firmware solution in x86/ARM PC and server product, which led the vertically-integrated market in past 20+ years.
- Based on EDK2, both upstream and downstream vendors can provide abundant reference implementations.
- We aim to reintroduce this proven firmware solution to the RISC-V community

The Change in EDK2 Boot Flow

- Traditional UEFI boot flow
- Using OpenSBI as a library
- Integrated DDR initialization code





- A reference UEFI boot flow in RISE project
- Modular OpenSBI outside of EDK2
- Modular DDR init outside of EDK2

Design of EDK2 for RISC-V QEMU Virt Machine

- EDK2 will be payload for previous stage M-mode firmware like OpenSBI. This is similar to ARM design with TF-A.
- Most of the common libraries and modules are copied to edk2 from edk2-platforms.
- SEC phase boots from XIP pflash of qemu in S-mode directly.
- Follows PEIless design

  SEC phase will uncompress and copy DXE FV to memory and launches DXE core.
- Separate code and variable storage images similar to other architectures.
- Since EDK2 is OpenSBI payload, latest OpenSBI can be used without changing the EDK2. Easier to support latest features.
- Supports KVM guests.
- Supports testing in CI.
- Supports several features including ACPI, graphics etc.

Progress and Achievements

- QemuVirt has been thoroughly validated, and it is recommended to be used in the early stages of firmware development
- The reference code based on QemuVirt has been uploaded to the main branch of edk2 in Feb 2023
- We keep a very closed cooperation with RISE and RVI community
- The solution porting work on 2+ HW platforms is WIP
- The splitting work of OpenSBI is WIP


intel