Open Source BIOS at Scale

We gave it a try, it worked. You can jump in!
Hosting: Online, Dedibox
Cloud: Scaleway

We design our own servers

• ARM 32: C1 cloud offer
• X86: Intel Avoton C2000
  C2 cloud offer
  Dedibox SC/XC 2016
• X86: Intel Denverton C3000

Scaleway is growing and hiring 🚀
Develop an Open Source BIOS

We design our own servers: a custom BIOS is required

- Configure the SoC / board
- PXE Boot
- Local drive Boot
- Provide ACPI, SMBios tables …
- Interface with our BMC
- Secure update process
- Remote console (Serial)
Why Open Source

We tried BIOS vendors **but:**
- Some sources + some binaries
- Almost no documentation
- Pay extra for support
- Slow support
- Pay a fee by devices

➔ **Locked: no source, poor support!**

You ‘just’ get: Intel’s Init + UEFI + CSM (legacy) + a nice menu

Intel’s CRB reference BIOS
- Not allowed in production

No solution covers all our needs
- BMC interface not covered

➔ **Some development was needed!**

We design our own servers: let’s build our own BIOS
coreboot + FSP + TianoCore

coreboot: community driven
  • Early init
  • Multiprocessor init
  • ACPI, SMBios tables...

Firmware Support Package: by Intel
  • MRC
  • Silicon Init

TianoCore: (Intel's) Open Source
  • UEFI implementation
So we took everything from Intel and the community, compiled it and it worked!
Of Course not!
Just a few fixes

- CPU Cores were stuck at 800MHz
- Bad DDR4 SMBIOS info from FSP MRC code
- Undocumented GPIO Lock Interface
- Missing ACPI Tables (P-States, T-States and C-States)
- PCIe NVMe + FSP initialization failure
Pros / Cons

Cons

• A -little- longer to develop
• No nice graphical menu
• No legacy BIOS (seabios as CSM)
• Intel’s bugs hits us instead of our BIOS vendor
• No BIOS professional support, but no fee :)
• Early contribution is hard: Intel NDA + porting strategy

Pros

• 95% of existing code
• It fits our needs!
• Perf inline with reference BIOS
• Extra features with our BMC
• UART Verbosity rate config
• Low level Flash Protection
• Discussing with Intel support = influence on release content ex: MRC verbosity
Conclusion

It was an investment, but it was a useful one!

We’re happy to have full stack control.
We are producing tens of thousands of servers with this BIOS!
Questions?
So when will you do it?

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Open Source Bios at Scale
Julien Viard de Galbert <jviarddegalbert@online.net>