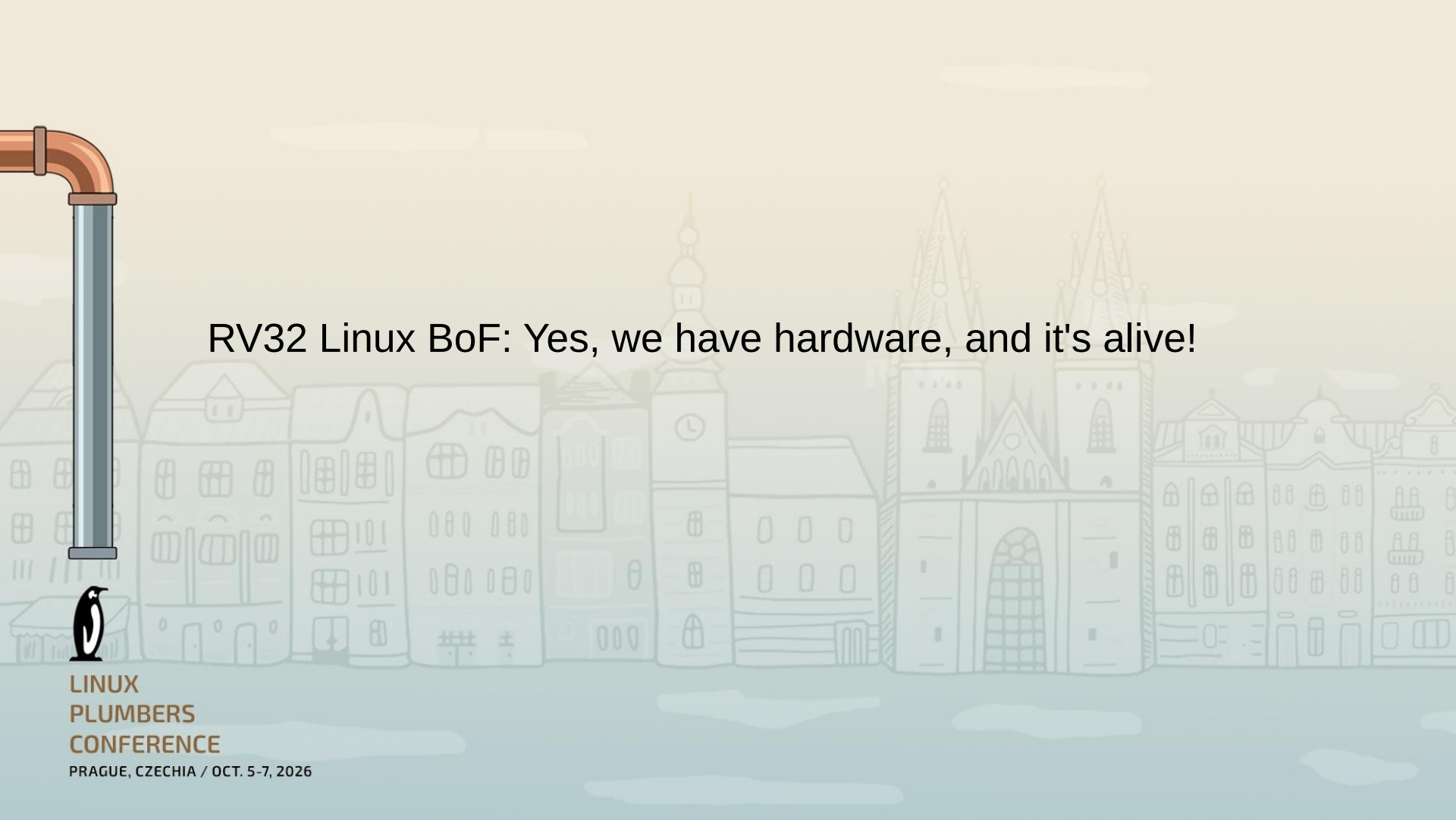




RV32 Linux BoF: Yes, we have hardware, and it's alive!



LINUX
PLUMBERS
CONFERENCE

PRAGUE, CZECHIA / OCT. 5-7, 2026

Credits

GrieverPig :

<https://github.com/GrieverPig/esp32-s31-linux>

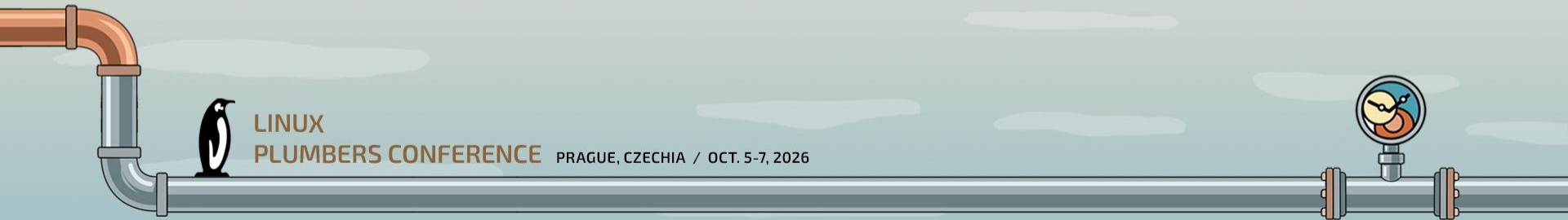
SMP enabled ESP32-S31 Linux system

Shreyash Bubane and Mahavir Jain :

<https://github.com/espressif/esp-buildroot-external/>

<https://github.com/espressif/linux/commits/integration/v6.18-esp32s31/>

Espressif Official Linux Buildroot SDK



Voila.

It boots, dual core is online, working just fine as it should !

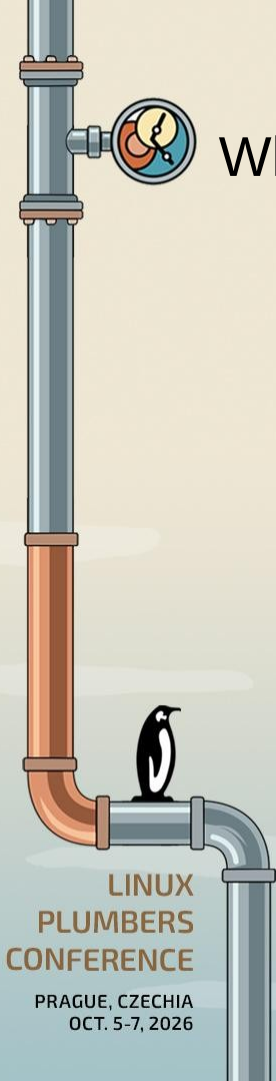
```
ESP32-S31 Linux (Buildroot)
esp32-s31 login: root
~ # uname -a
Linux esp32-s31 6.18.0 #1 SMP Sat Oct  3 09:01:36 UTC 2026 riscv32 GNU/Linux
~ # dmesg | grep -i clic
[ 0.000000] esp-clic: 32 external slots (IDs 16-47), chained on /cpu00/interrupt-controller
[ 0.000000] esp32s31-smp: hart0 CLIC mintstatus=0x0 minthresh=0xf mip=0x0 mie=0x0
[ 0.111367] esp32s31-smp: hart1 CLIC mintstatus=0x0 minthresh=0xf mip=0x0 mie=0x0
[ 11.458345] esp32s31-radio: IDF source 127 routed by INTMTX to CLIC21/IRQ15
[ 20.223578] esp32s31-radio: IDF source 124 routed by INTMTX to CLIC22/IRQ22
[ 22.454723] esp32s31-radio: IDF source 133 routed by INTMTX to CLIC23/IRQ24
~ # cat /proc/cpuinfo
processor       : 0
hart           : 0
isa            : rv32imafo_zicntr_zicr_zifencei_zaamo_zalrsc_zca_zcf_zba_zbb_zbc_zbs
mmu            : sv32
uarch          : espressif,esp32s31
mvendorid     : 0x612
marchid        : 0x80000003
mimpid         : 0x1
hart isa       : rv32imafo_zicntr_zicr_zifencei_zaamo_zalrsc_zca_zcf_zba_zbb_zbc_zbs

processor       : 1
hart           : 1
isa            : rv32imafo_zicntr_zicr_zifencei_zaamo_zalrsc_zca_zcf_zba_zbb_zbc_zbs
mmu            : sv32
uarch          : espressif,esp32s31
mvendorid     : 0x612
marchid        : 0x80000003
mimpid         : 0x1
hart isa       : rv32imafo_zicntr_zicr_zifencei_zaamo_zalrsc_zca_zcf_zba_zbb_zbc_zbs

~ # free -m
total        used        free      shared  buff/cache   available
Mem:          15           5           7           0           3           9
Swap:          0           0           0
```

LINUX
PLUMBERS





What are missing / in jeopardy for such kind of new ports ?

XIP Kernel for RV32 : <https://www.phoronix.com/news/RISC-V-XIP-Being-Removed>

=> Kunit and a bunch of testing and maintenance is missing

"F" for single precision floating point instead of "D", there's no such combination before.

=> toolchain and (g)libc requires a profile to target with !

CLIC as irqchip driver

=> Source-wise, might be the easier one, just try to upstream.

=> Policy-wise, RVM profile ?

OpenSBI call for PSRAM cache management

=> Not that easier, need alternative to insert sbicall when doing fence.i

=> Palmer is open for discussion at this point.

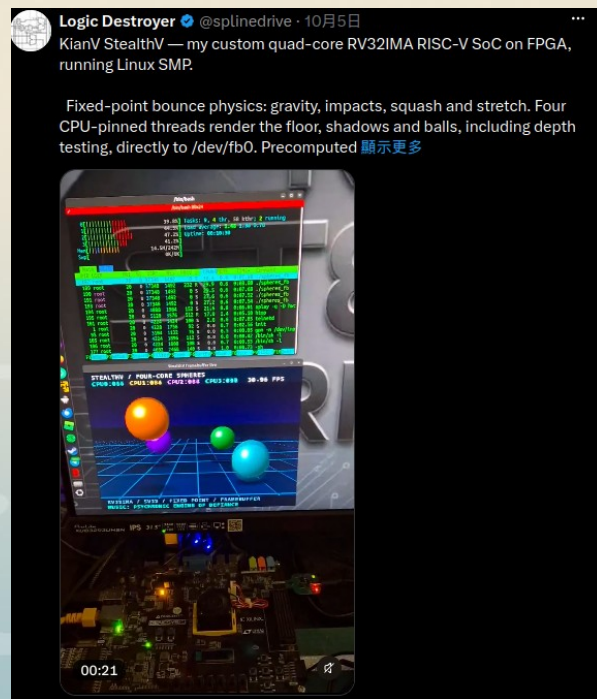
RP2350 styled "SMP", namely, mailbox and fifo msgq to call each other.

=> `driver/soc` should be okay with this

Hobby works also matter !

<https://x.com/splinedrive/status/2106790941960937805> credit : Hirosh Dabui

A fully open source manufactured CPU runs Linux :



LINUX
PLUMBERS
CONFERENCE

PRAGUE, CZECHIA
OCT. 5-7, 2026



What is needed

Profile, profile, profile.

Maintenance, maintenance, maintenance.

Upstream, upstream, upstream.



LINUX
PLUMBERS
CONFERENCE

PRAGUE, CZECHIA
OCT. 5-7, 2026



Backup

Lorem ipsum.



LINUX
PLUMBERS
CONFERENCE

PRAGUE, CZECHIA
OCT. 5-7, 2026