Don't Be Afraid of the Kernel

From problem to mainline patch



OpenAlt konference 2026

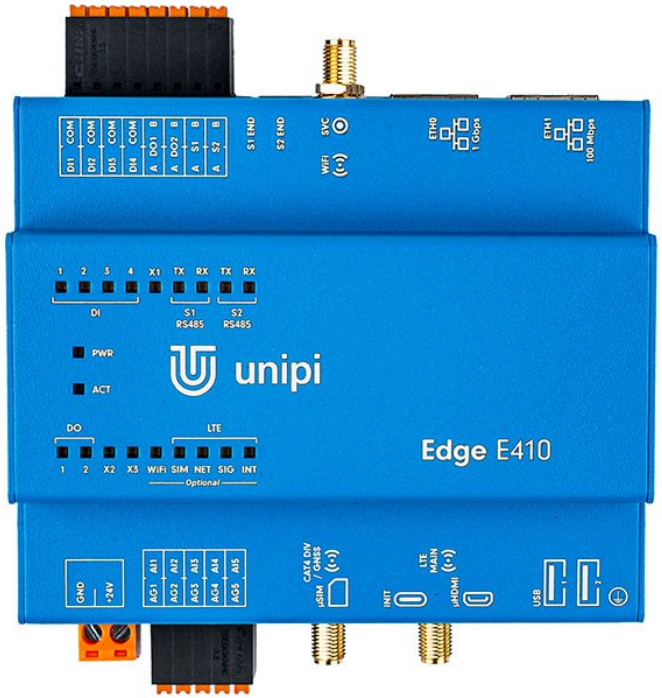
Kryštof Černý

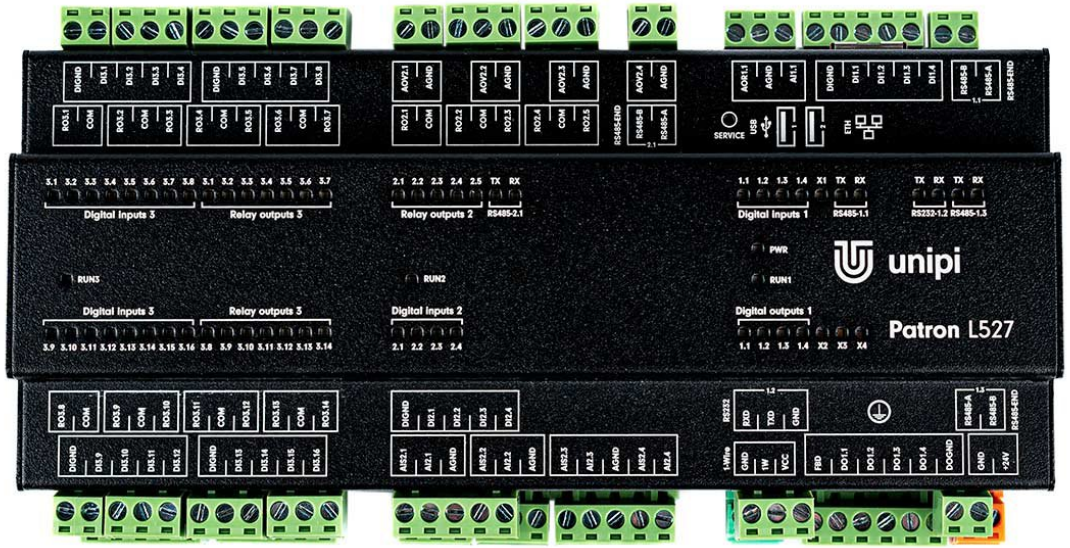
About me

- Open source and self hosting enthusiast
- Product Engineer @ Unipi Technology
- Aikido and bouldering

Unipi and its products

- No association with this presentation
- Manufacturer of Linux based “PLCs”

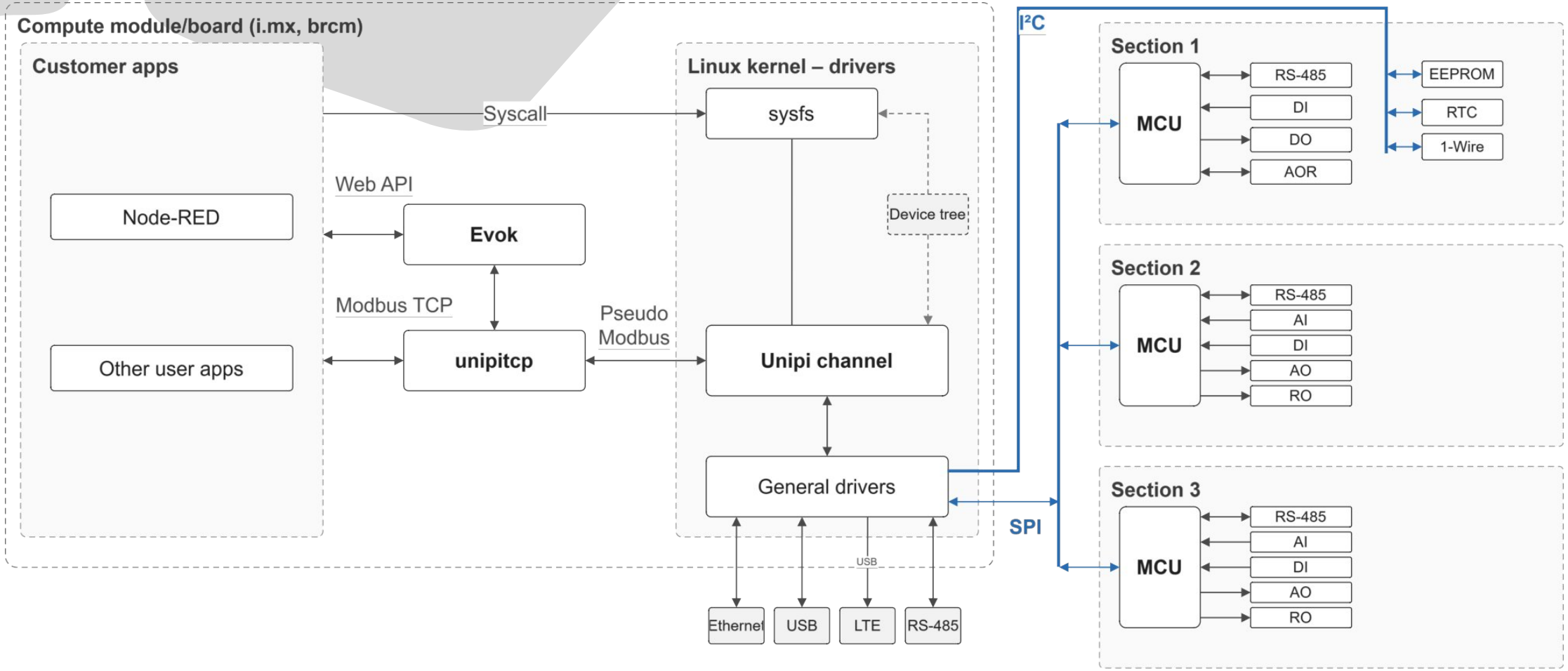




About you

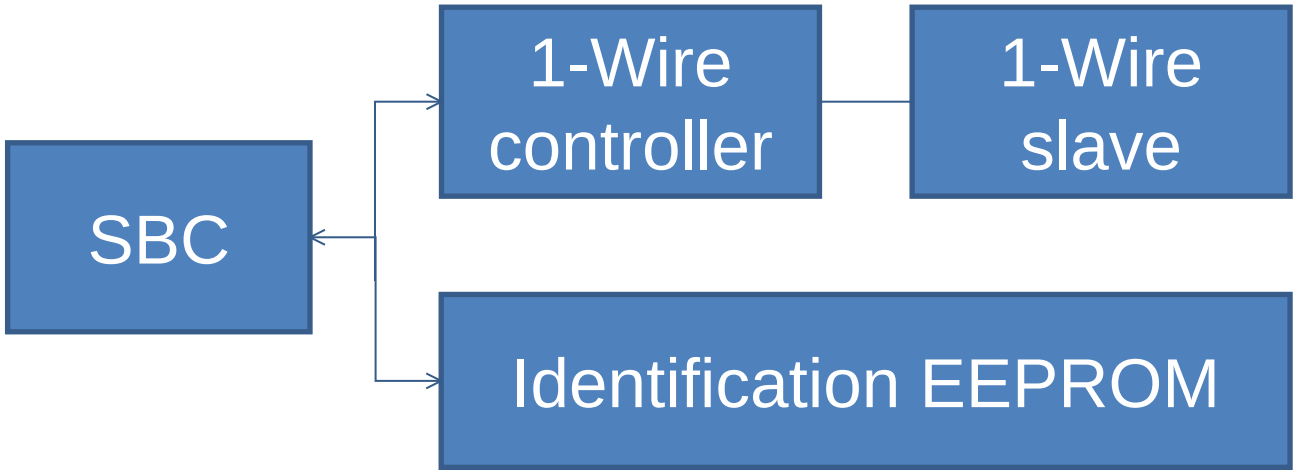
- Who compiled their own Linux binary?
- Who made their own patch?
- Who mainlined their patch?
- What would you like to learn?

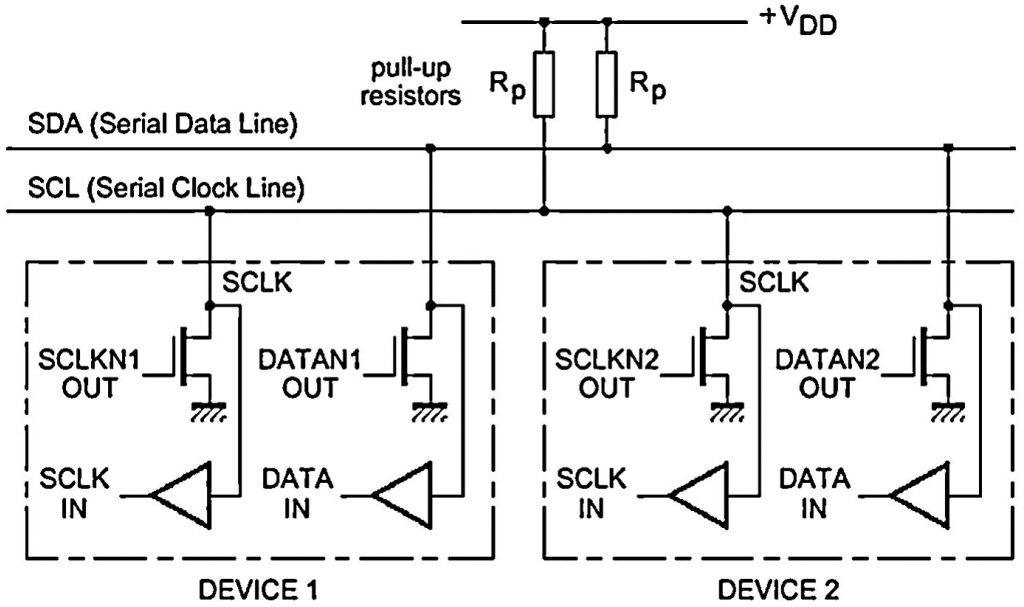
Unipi architecture



The problem

- EMI from 1-Wire bus jams the 1-Wire controller
- The controller pulls down SDA of the I2C bus
- Identification EEPROM on the same I2C bus
- Undefined behavior after restart





Solution?

- Any ideas?
- Unipiid (historical kernel module for parsing EEPROM) could restart the 1-Wire
- User space daemon monitoring health of the 1-Wire/I2C buses

The solution

- Adding power management support to ds2482

Plan

- I‘m no C programmer
- But I can read and write English
- The easiest way is to get inspiration from other drivers

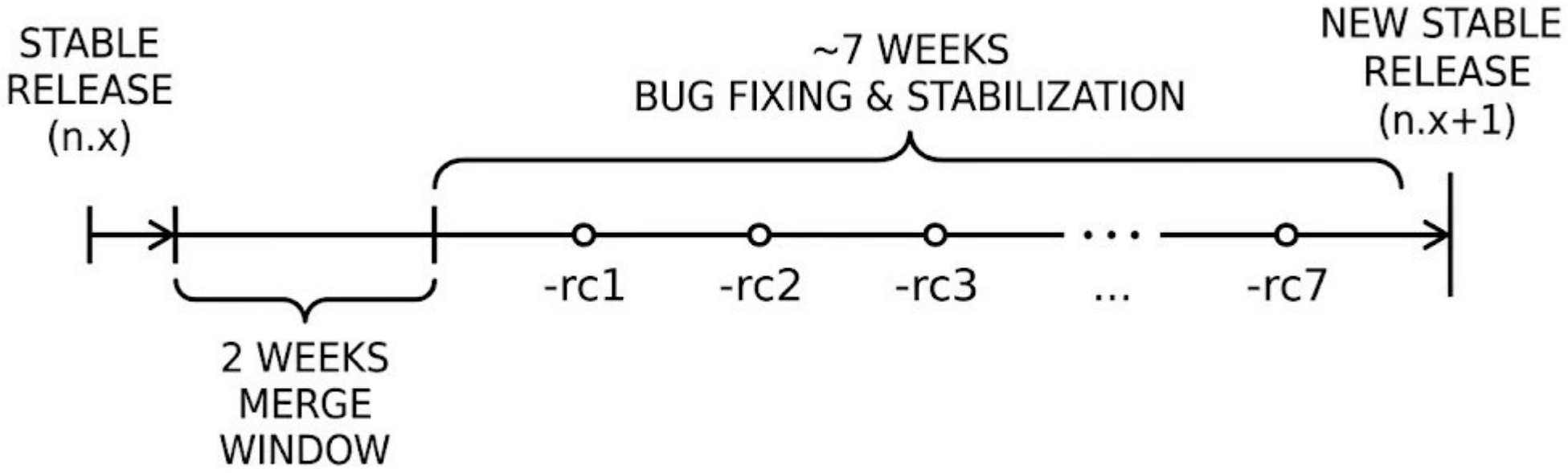
Implementation

- Our downstream 6.1 kernel first
- Testing on the real hardware – S107
- Porting for upstreaming

How is Linux developed

- Mailing lists
- Subsystems
- Maintainers
- Next, stable, LTS

Linux Release Cycle



B4 – your mailing list buddy

- Mailing lists - not great to work with manually
- B4 handles all of this for you

Patch was sent

- And now we wait

V1 Pitfall – commit message

>>>>>>> Adds the newly added vcc-supply property to bindings.
>>>>>> This commit message is a circular argument. You're adding it to the binding, which of course means it is newly added.
>>>>> You are right, I will replace with "Adds the vcc-supply property to bindings." in the next version.
>>>> No, please say why, e.g. because it was missing and device has it according to datasheet.
>>> Right, what about:
>>> Adds the optional vcc-supply property to bindings, informs if the device
>>> needs a regulator to be turned on for its operation
>> It does not inform at all. All devices needs power, don't they? And what operation?
> This is probably the best I can do:
> ds2482 has a VCC pin, accepting 2.9-5.5 V. Allow optionally specifying
> a voltage regulator to power the chip.
Keep only first sentence. Second is obvious, no need to repeat schema in free form text (and schema defines it is optional).

V2 Pitfall – copying from old drivers

> +	ret = regulator_enable(data->vcc_reg);

You wanted devm_regulator_get_enable().

... but your comment also suggests devm_regulator_get_enable_optional().

V3 Pitfall – wrong commit order

- Binding has to be first, then code implementation
- Finally some Acks and approves

V4 Pitfall – introduced a memory leak

- Ups…
- Refactored the driver from kzalloc() to devm_kzalloc() for next version

V5 Pitfall – too much cleanup

- Deleted probe exit path that should remain

V6 – victory

- Patches got accepted by the maintainer

Lessons learned

- It’s not that hard as it might seem
- Patch sending is not a race – think twice

Release to production

- Waiting for Debian 13
- Internal changes
  - Device tree
  - Kernel patch backport 6.14 ➔ 6.12
  - unipitcp (Modbus TCP) server
  - Documentation

Key improvements

- Standard API
- Better error handling
- Bigger user comfort

Room for improvements

- Single device restart instead of two
- Realtime bus monitoring and automatic restart

Why no AI?

- No access to good models 2 years back
- Less fun and gained knowledge

Q&A

- Time for your questions
- Feedback is appreciated

Question came up later? Write me an e-mail: cleverline1mc@gmail.com