SFP modules on a board running Linux

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Created *06/04/2020 - 2:37pm*
Submitted by Roy Schestowitz on Monday 6th of April 2020 02:37:47 PM Filed under Linux [1] Hardware [2]

We had to overcome a few challenges to get this setup working, using a mainline Linux kernel.

As we discussed earlier, having SFP modules meant the whole MAC-PHY-SFP link has to be reconfigured at runtime, as the PHY in the SFP module is hot-pluggable. To solve this issue a framework called Phylink, was introduced in mid-2017 to represent networking links and allowing their component to share states and to be reconfigured at runtime. For us, this meant we had to first convert the CPSW MAC driver to use this phylink framework. For a detailed explanation of what composes Ethernet links and why Phylink is needed, we gave a talk at the Embedded Linux Conference Europe in 2018. While we were working on this and after we first moved the CPSW MAC driver to use Phylink, this driver was rewritten and a new CPSW MAC driver was sent upstream (CONFIG_TI_CPSW vs CONFIG_TI_CPSW_SWITCHDEV). We are still using the old driver for now, and this is why we did not send our patches upstream as we think it does not make sense to convert a driver which is now deprecated.

A second challenge was to integrate the 2-wire capability of the VSC8572 PHY into the networking PHY and SFP common code, as our SFP modules I2C bus is connected to the PHY and not an I2C controller from the system-on-chip. We decided to expose this PHY 2-wire capability as an SMBus controller, as the functionality offered by the PHY does not make it a fully I2C compliant controller.

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Linux Hardware

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