Lattice Watering: Second Status Report

Christian Müller, Jonas Heinemann, Kaan Dönmez, Valentin Pickel

Software Project on Internet Communication
Summer Term 2022
Freie Universität Berlin
Institute for Computer Science

June 13, 2022

Updates

- The NIB did not seem to work last week, but we finally got around it on the 1st of June. So we were able to send CoAP packets from the BR to the host and, naturally, from the BR to nodes. What did not work was sending a packet to the host. The network setup is now automated and the routes are properly configured. Additionally, we setup RPL.
- We added the use of GCoAP.
- We added DTLS support.
- We properly documented how the hardware is setup, especially how one can wire a node themselves.
- Added documentation on how to setup the hardware.

RPL Topology

RPL (RFC 6550) states that for a home automation solution like ours, one root suffices:

```
3.1.3.  Instances, DODAGs, and DODAG Versions

A RPL Instance contains one or more DODAG roots. A RPL Instance
may provide routes to certain destination prefixes, reachable
via the DODAG roots or alternate paths within the DODAG. ...

A RPL Instance may comprise:

o  a single DODAG with a single root

   *  For example, a DODAG optimized to minimize latency rooted
      single centralized lighting controller in a Home
      Automation application.
...
RIOT: gnrc_rpl_root_init(0, &ieee802154_ip, true, true);
```

Documented the HW Setup

HWSETUP.md

...

To build one of the node we used, you require:

1. One personal computer with the software set up.
2. Two SAMR21-XPRO boards, one bourder router and one node.

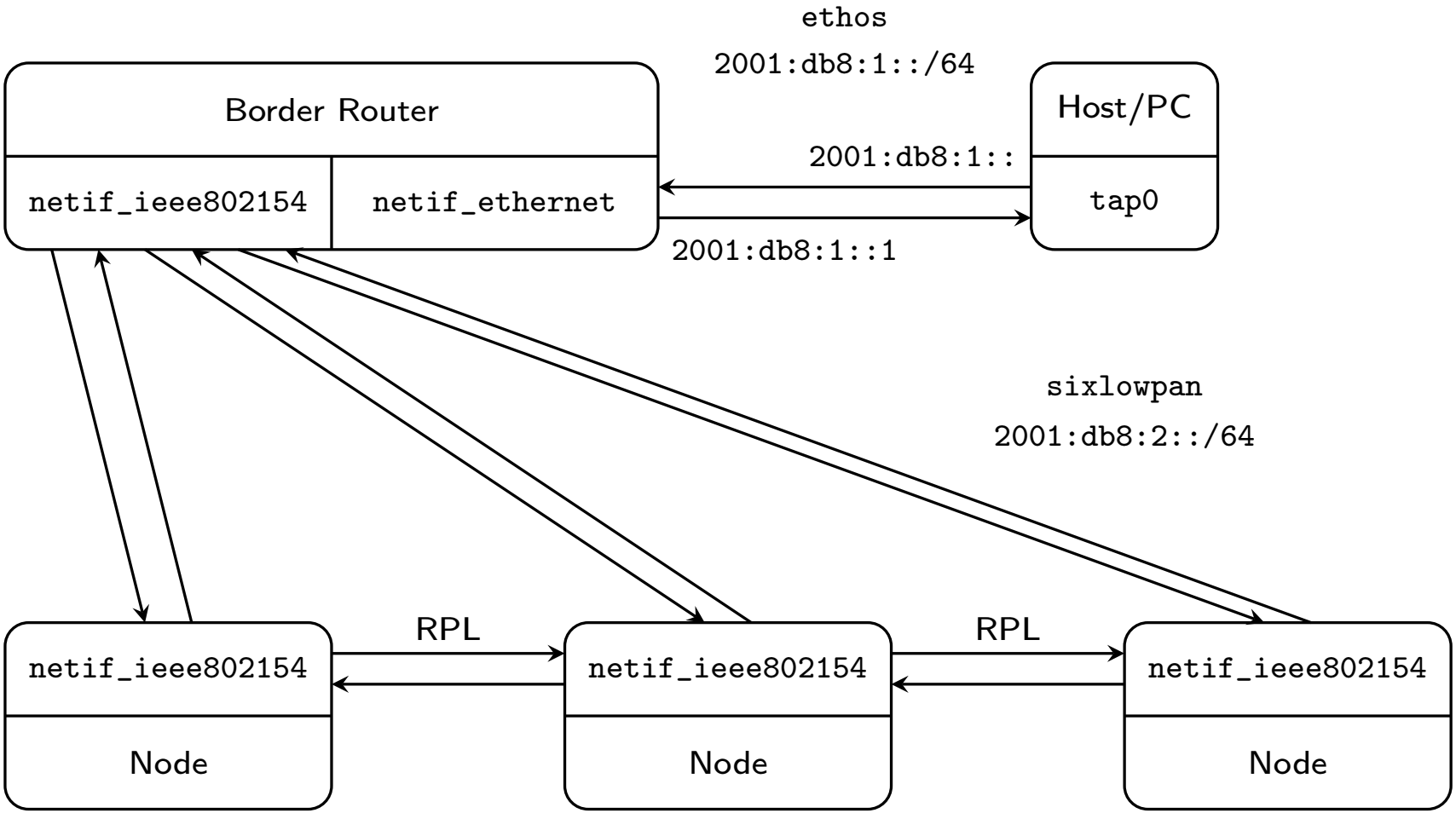
...

Connect the female jumpers the following way:

Device 1	Connection 1	Connection 2	Device 2
SAMR21XPRO	5V0	VCC	DRV883
SAMR21XPRO	GND	GND	DRV883
SAMR21XPRO	PA13	IN1	DRV883
SAMR21XPRO	PA13	EEP	DRV883

...

The Final Network Architecture



RIOT Proves to be a Bit Limited

- The border router setup is still very unintuitive and documentation for it is not very well written. At least there is some.
- WolfSSL is not supported for GCoAP, so we are limited here practically, since only using DTLS sockets makes the task harder.
- For TinyDTLS, the only allowed pseudorandom generators are `prng_sha1prng`, `prng_sha256prng` and `prng_hwrng`, despite standardized ones existing. (see `prng_tinymt32` from RFC8682)
- Many interfaces still seem to lack features, according to documentation. See e.g. `adc.h`.