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# Opener: Towards an Open Reference Stack for NR+

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# Open Source: An Opportunity for Everyone

### Academia and standardization
Not a black box, but a playground for prototyping and benchmarking

### Conformance and interoperability
An open reference everyone can inspect and test against

### Stack vendors and integrators
A shared foundation for products, maintained and kept secure together (CRA)

### Vertical industries
Digital sovereignty instead of vendor lock-in

### The ecosystem
Incremental contributions lower the entry barrier and move NR+ beyond early adopters



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# Opener: Built to Be Built On

## Ready for commercial use

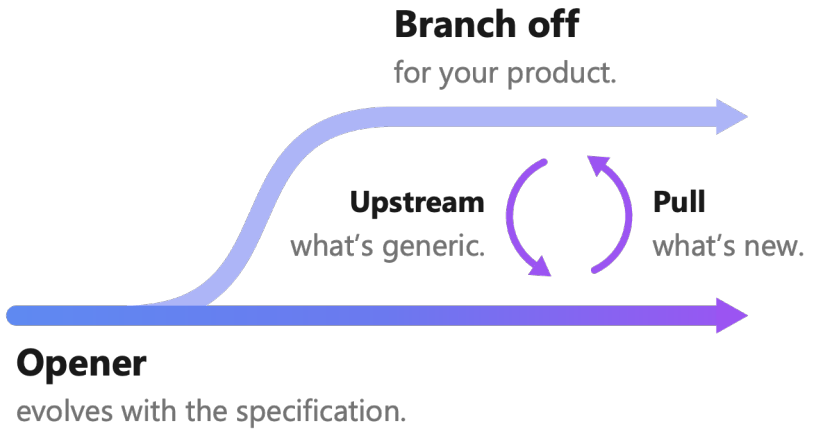
- Licensed under Apache 2.0
- Permissive, no copyleft, express patent grant

## Application- and vendor-agnostic

- Covers everything from the MAC and above
- Out-of-tree module, developed against vanilla Zephyr
- Not tied to a silicon vendor or ISA via generic driver API

## Interoperable and standards-compliant

- Aiming to pass ETSI-defined conformance tests






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# State of Play

## DECT NR+ driver API and nRF91x1 implementation

- “Hello World” ping-pong sample and Wireshark sniffer showing how to use Opener in your project

## Codium Electronique

- NR+Node: Battery-powered NR+ node with BLE connectivity and various onboard sensors
- NR+Gate: PoE-powered NR+ gateway with Ethernet/Wi-Fi/LTE in an IP44-rated enclosure

## deveritec

- dectnrPi: Raspberry Pi expansion board with SIM_DET and COEX1 accessible via pin headers



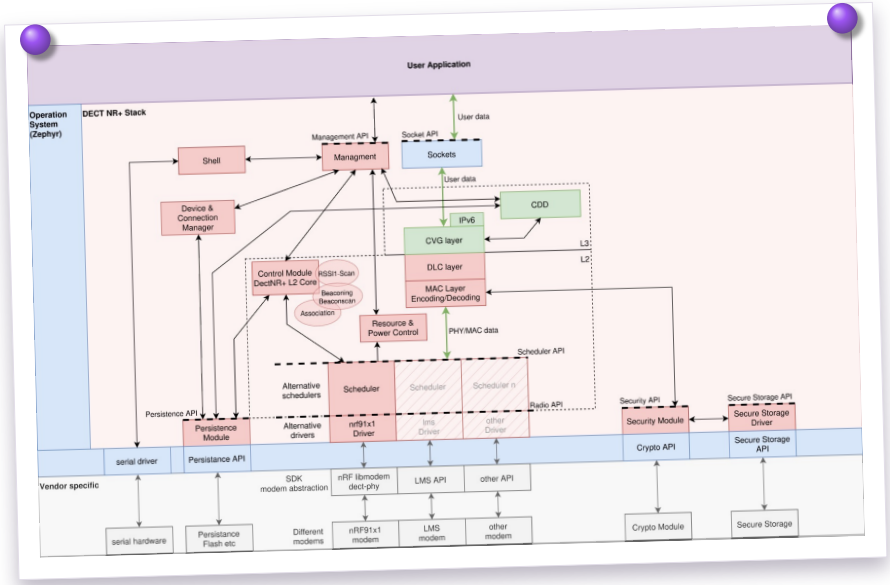
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# The Road Ahead




## Bottom-up approach

- Transparent MAC with raw net socket
- Spinel host interface (adapted from OpenThread)
- MAC PDU encoding/decoding for beacons and association IEs
- FT/PT basics: beaconing, scheduling, association
- Beyond: HARQ, DLC/CVG services, security

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Interested?

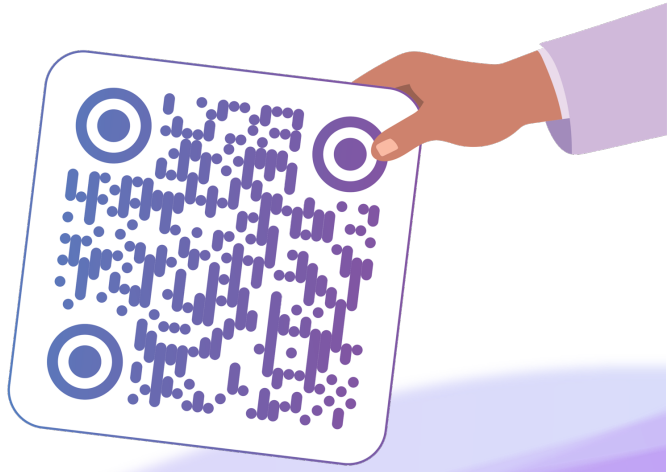
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# Help us build OPENER, an open NR+ reference implementation.

Join the **Opener Initiative**, a growing community for technical exchange around NR+ and stack development.

**Every contribution moves Opener forward.**

Code, expertise, feedback, testing support.




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