

OpenThread

OpenThread Shanghai Team

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Agenda

- ❖ **Fundamentals**
- ❖ **Performance**
- ❖ **Play with OpenThread**

Fundamentals

Open Source, Open Development















Hosted on **GitHub**

BSD-3 license

Anyone Can Contribute



Open Community

Ported on...	Adopted by...	
<div>GitHub, Inc. [US] https://github.com/openthread/openthread</div> <div><div>cc1352</div><div>cc2538</div><div>cc2650</div><div>cc2652</div><div>da15000</div><div>efr32</div><div>emsk</div><div>gp712</div><div>kw41z</div><div>nrf52840</div><div>posix</div><div>samr21</div></div>	<div>Development Kits</div> <div><div>ARM</div><div>Atmel</div><div>dialog SEMICONDUCTOR</div><div>intel</div><div>NORDIC SEMICONDUCTOR</div><div>NXP</div><div>QORVO</div><div>QUALCOMM</div><div></div><div>SYNOPSYS</div><div>TEXAS INSTRUMENTS</div></div>	<div>IoT Platforms</div> <div><div>Android Things</div><div>DSR dotdot</div><div>LoTivity LoTivity Lite (OCF)</div><div>Particle.io</div><div>RIGADO Rigado</div><div>RIOT OS</div><div>Runtime.io</div><div>Zephyr</div></div>

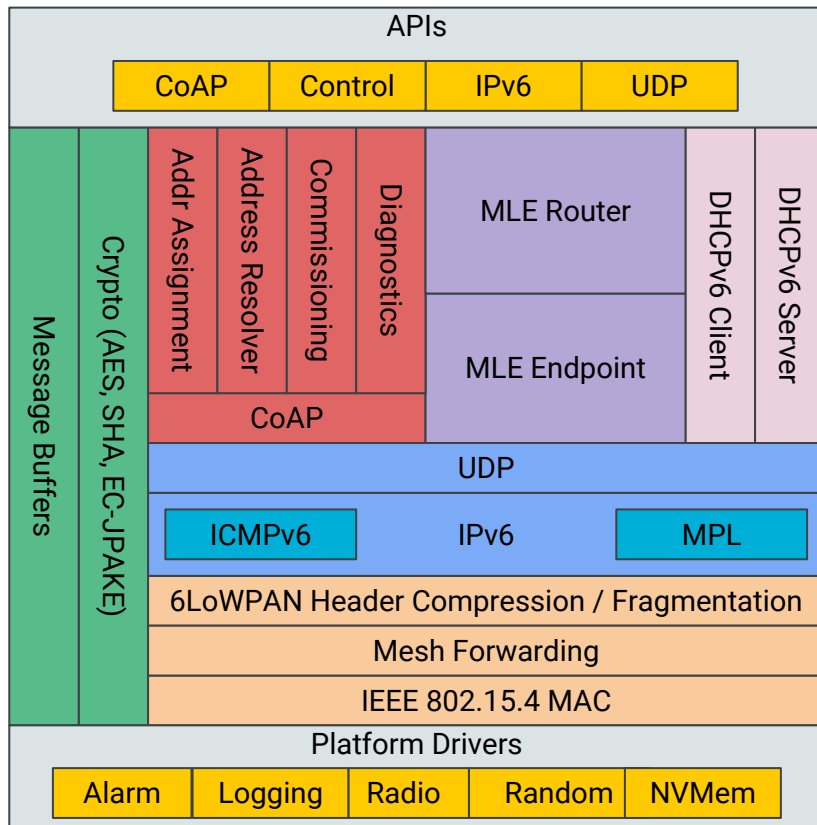
OpenThread Core Library

Portable C/C++ library (C99 and C++03)

Narrow platform abstractions

Full Thread 1.1.1 Features

Rich C API (include/openthread)



OpenThread Core Library

Flexible System Architecture

	Radio-only	MTD*	FTD*	mbdTLS
Code (KB)	10	82	114	78
RAM (KB)	1.6	10	14	6

** MTD: Minimal Thread Device*

** FTD: Full Thread Device*

OS agnostic

bare-metal, FreeRTOS, RIOT-OS, Zephyr OS,
Linux, MacOS, Windows

Toolchain agnostic

GNU, IAR, VS, Keil etc

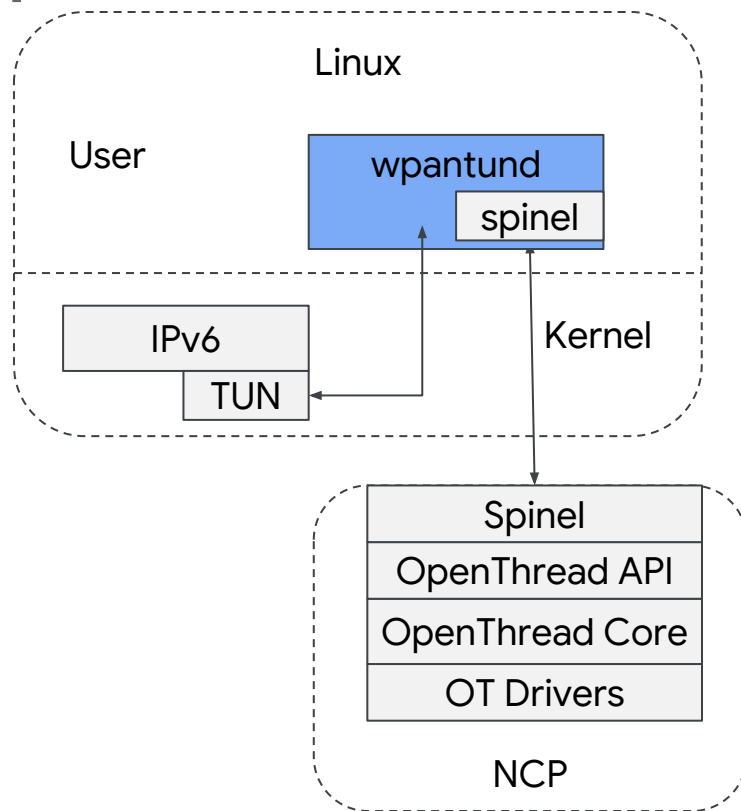
OpenThread sub-project: Wpantund

User-space NCP network interface driver

Standard Linux network interface

Convenient command-line interface

DBus-based management API



OpenThread sub-project: Border Router

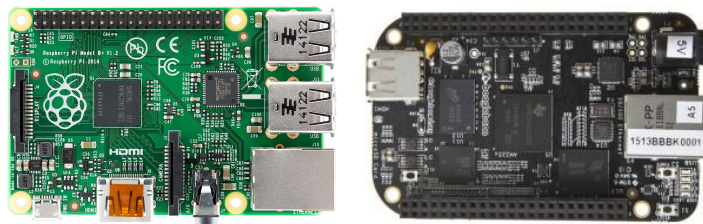
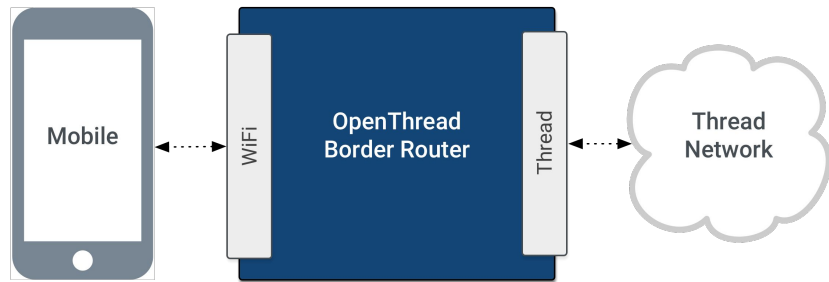
Connect Thread network to WiFi/Ethernet

IPv6 autoconfiguration with DHCPv6-PD

IPv4 with NAT64 and DNS64

External Thread Commissioning

Raspberry Pi 3B or BeagleBone Black



OpenThread

OpenThread Border Router ★



Nordic Semiconductor – nRF52840 (OpenThread)



Qorvo GP712 System-on-Chip



Qualcomm Atheros, Inc.(QCA 4020/4024/4025)











Synopsys DesignWare Combo 802.15.4/BLE Wireless IP



TI OpenThread (CC2652)

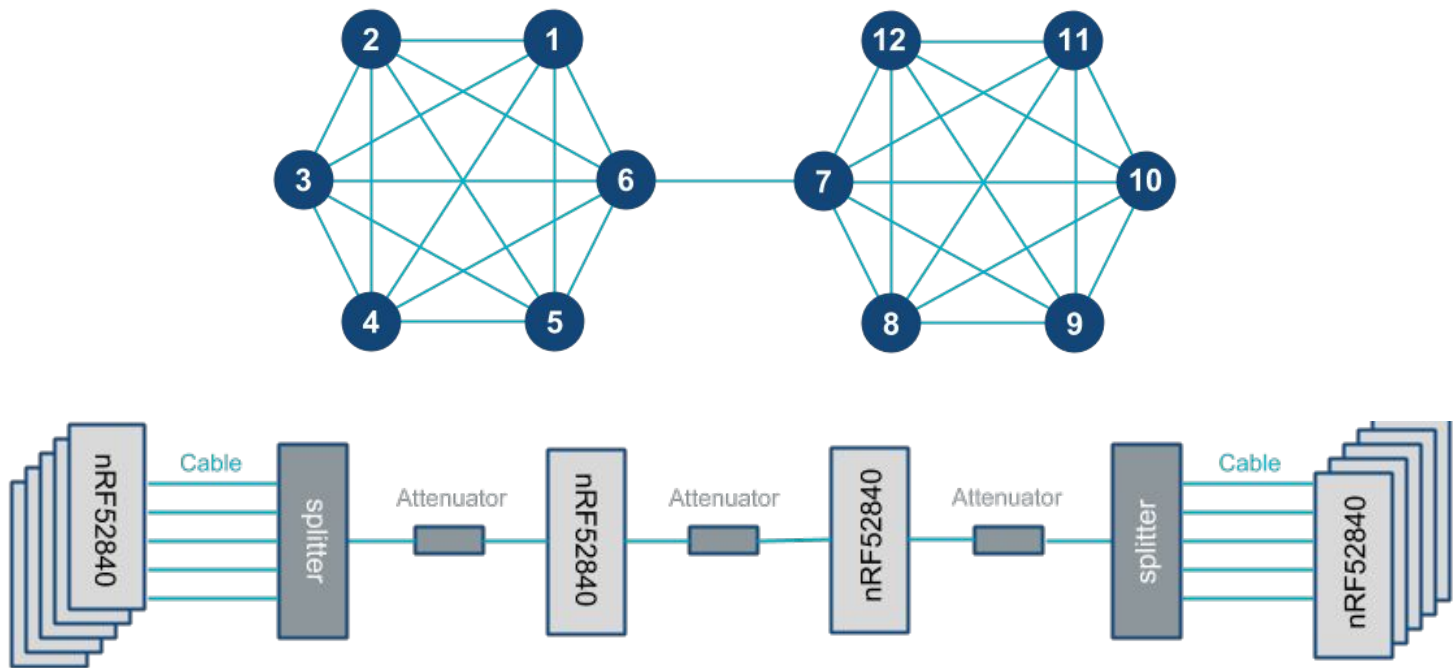
* <https://www.threadgroup.org/What-is-Thread#certifiedproducts>

OpenThread is on Google/Nest Products

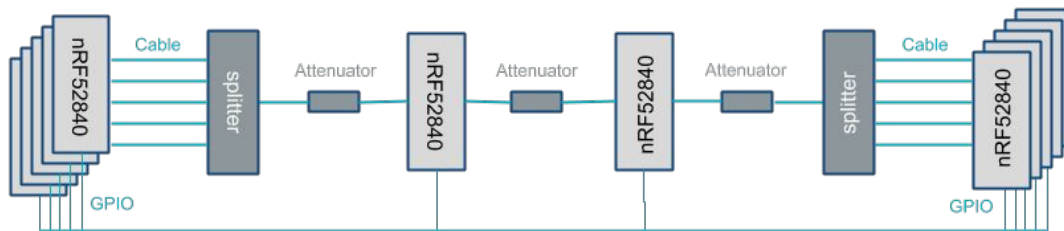
 <p>Nest Secure</p> <p>The Nest Secure alarm system, featuring Nest Guard and Nest Detect. Thread Ready.</p>	 <p>Nest Cam IQ Indoor</p> <p>A best-in-class security camera with top-of-its-class brains.</p>	 <p>Nest Cam IQ Outdoor</p> <p>A weatherproof and tamper-resistant outdoor security camera.</p>	 <p>Nest Hello</p> <p>The doorbell that lets you know who's there.</p>
 <p>Nest x Yale Lock</p> <p>A tamper-proof, key-free deadbolt that can be locked and unlocked from anywhere.</p>	 <p>Nest Connect</p> <p>Connects the Nest x Yale Lock to the internet, and serves as a range extender for the Nest Secure system.</p>	 <p>Nest Thermostat E (EU)</p> <p>It's easy to save energy. Place it wherever you like in your home.</p>	 <p>Nest Heat Link E (EU)</p> <p>Connects to your heating system and works with the Nest Thermostat E to turn on and off or modulate the heat.</p>

Performance

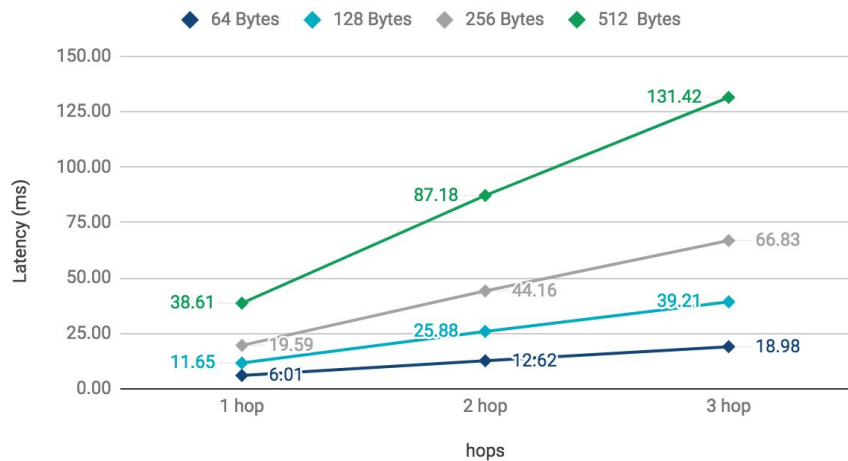
Latency/Throughput - Testbed



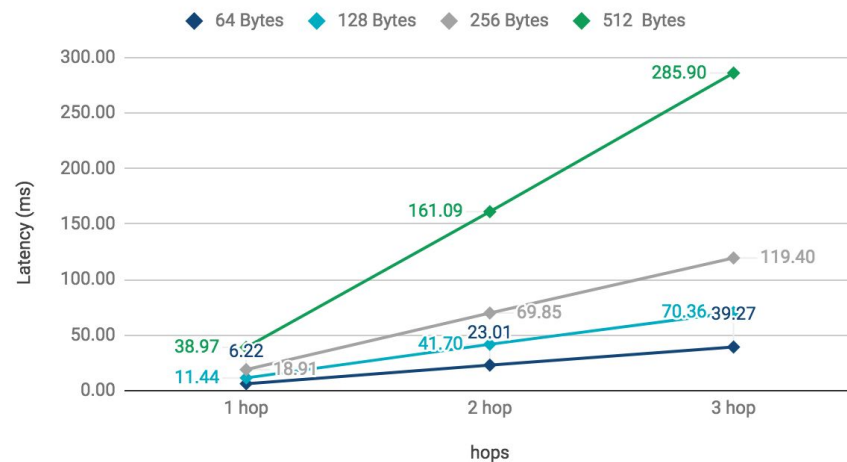
Latency



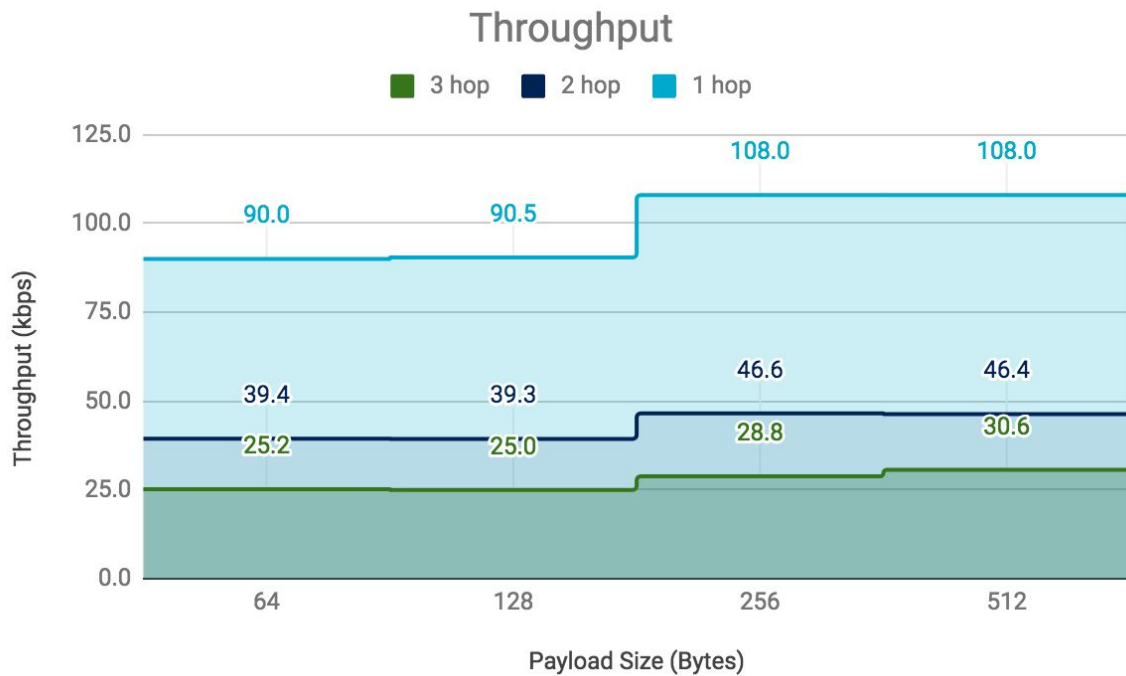
Unicast Latency



Multicast Latency



Throughput

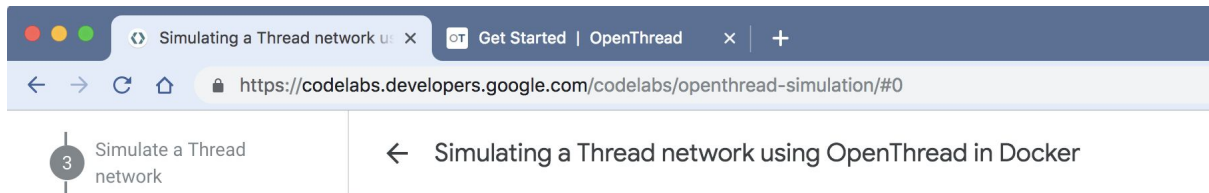


Play with OpenThread

If you want to play with OpenThread without hardware...

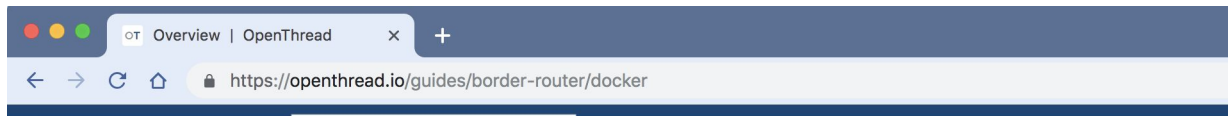
Simulation Codelab with OpenThread Docker

(openthread/codelab_otsim)



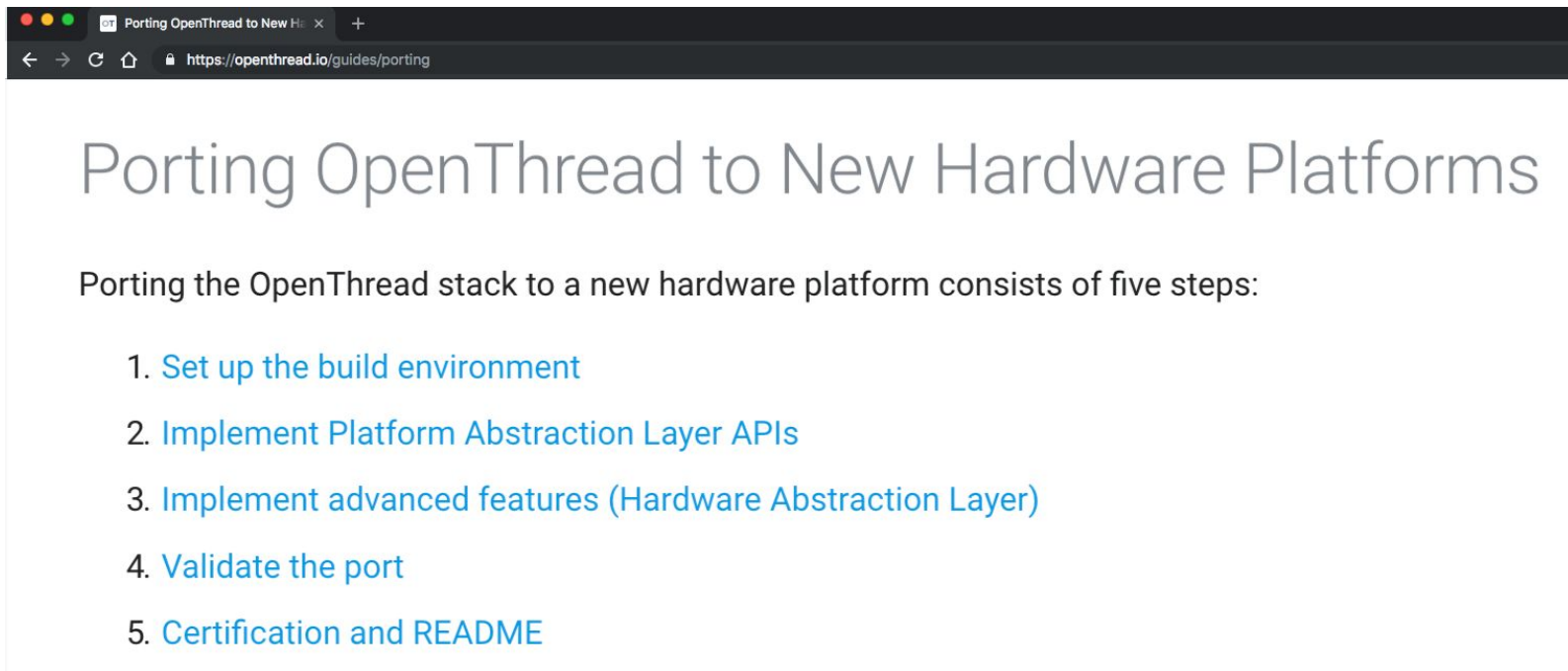
Border Router Guide with OTBR Docker

([openthread/otbr](https://openthread.io))



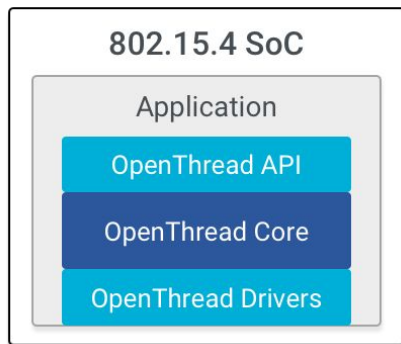
This guide focuses on running OTBR Docker on the Raspberry Pi 3B (RPi3B) or any Linux-based machine, and has only been tested on those platforms.

If you want to support OpenThread on your platform...

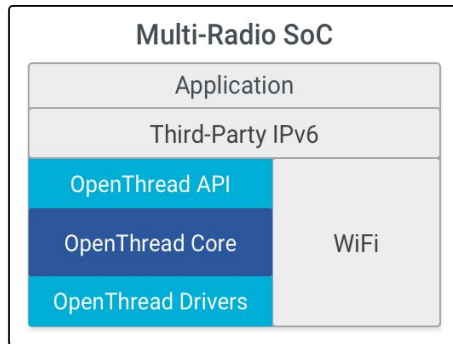


If you are wavering in the system architecture...

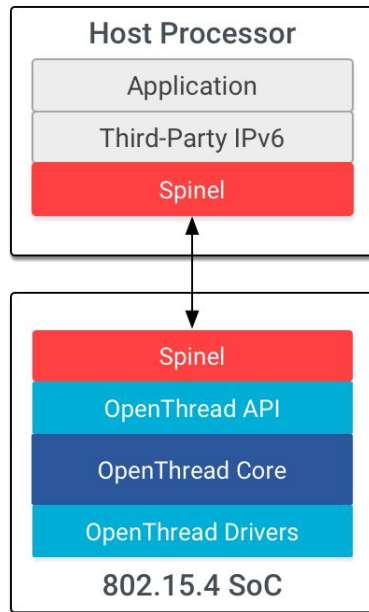
Single-Chip Thread-Only



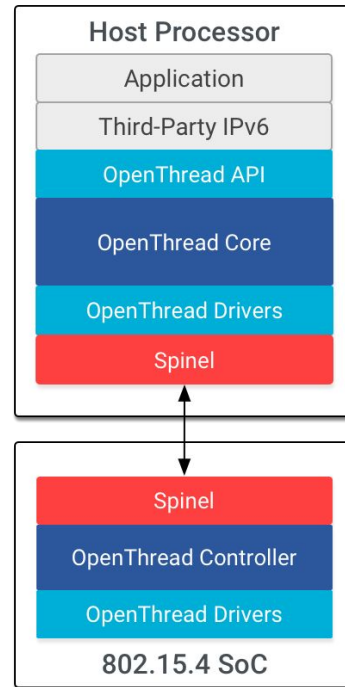
Single-Chip Multiple-Interfaces



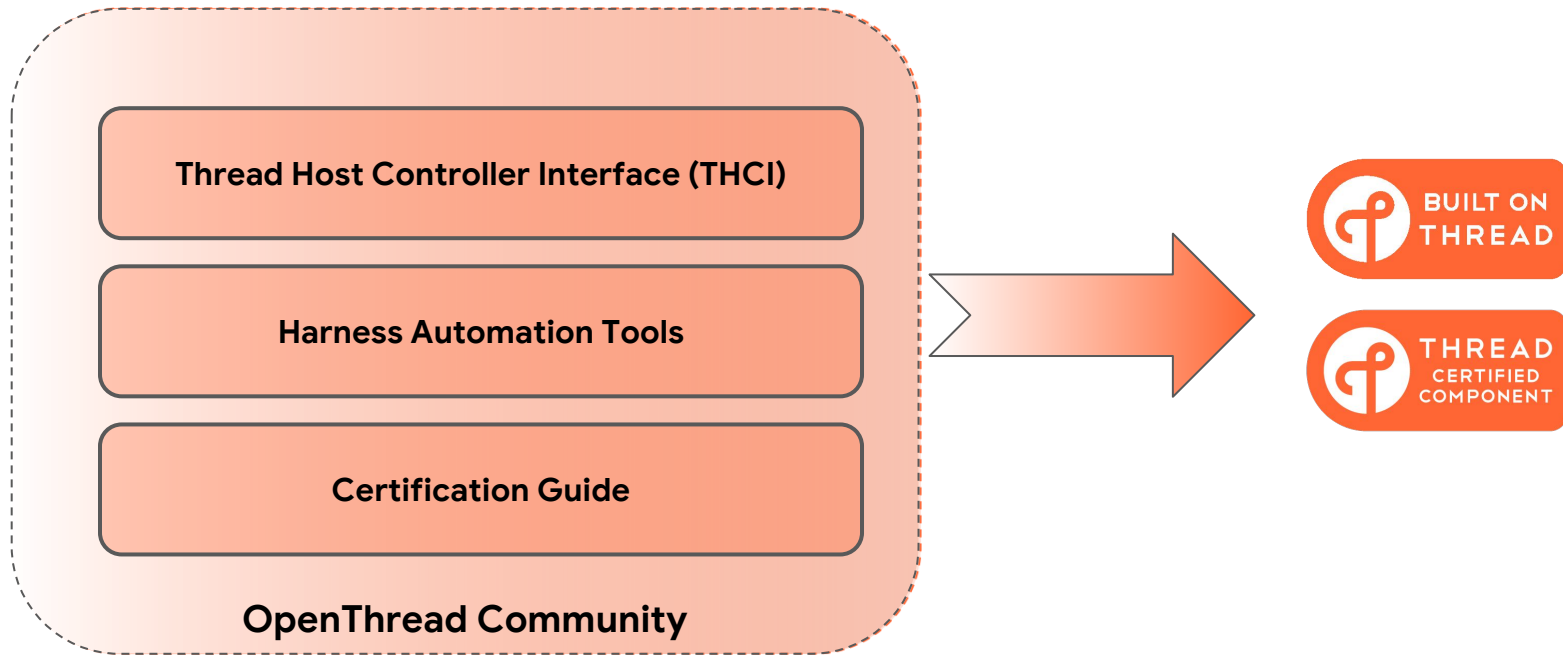
Network Co-Processor



Host/802.15.4 Controller



If you want to support/certify your platform/products...



OpenThread Community - Join Us



OpenThread Source Code

<https://github.com/openthread/openthread>

OpenThread Development Site

<https://openthread.io/>

<https://openthread.google.cn/> (For Users in China)



Thank you

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