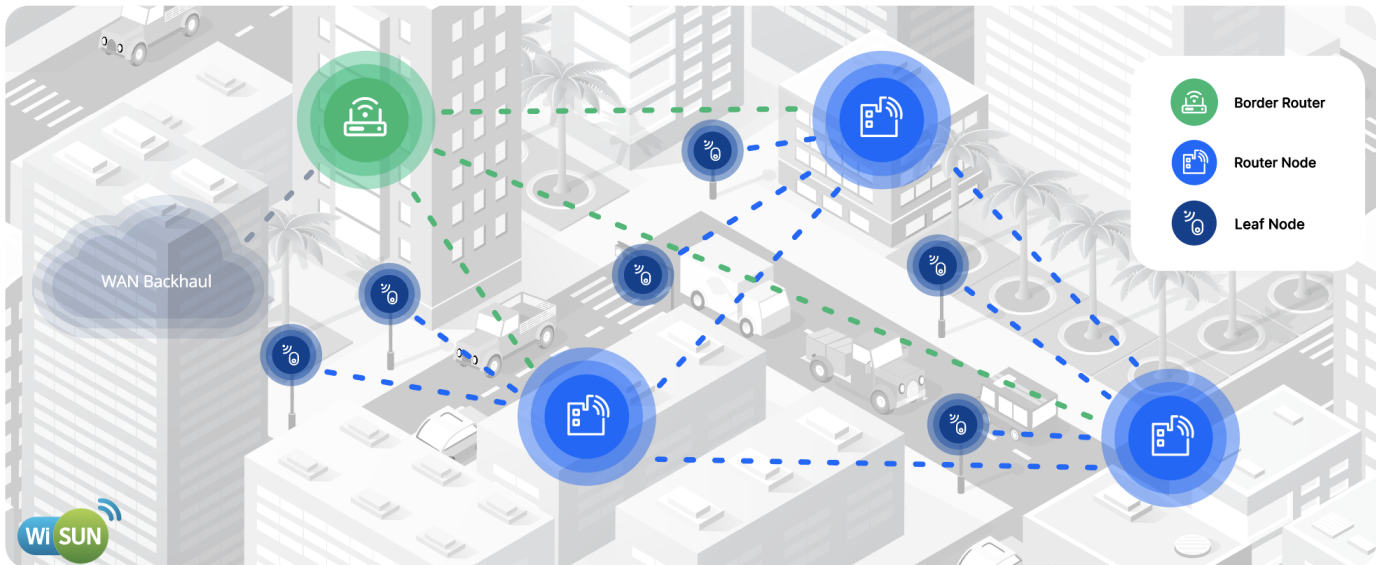# Silicon Labs Wi-SUN Linux Border Router Reference Solution

Silicon Labs recently extended its portfolio to include a fully integrated field area network (FAN) certified Wi-SUN® Border Router Reference solution. The Wi-SUN Border Router speeds time to market by quickening the pace of development, certification, and deployment in Smart Cities. With Linux Host and Radio Co-Processor (RCP) architecture, the Wi-SUN Border Router enables robust, long-range sub-GHz wireless communication based on IPv6 sub-GHz mesh networking. Applications range from smart metering, street lighting, municipal infrastructure, building and industrial automation.

A border router manages the Wi-SUN mesh network, overseeing the network management (node authentication, source routing, etc.) and providing internet connectivity to other devices in the FAN network via wide area network (WAN) backhaul.

This scenario features:
- EFR32xG12 based router nodes
- A scalable Linux host-based Wi-SUN border router reference

The Border router component of the solution includes a radio co-processor (RCP) image running on an EFR32xG12 and a Wi-SUN network stack running on the Linux host. The EFR32xG12 and the border router are connected over a serial communication bus. Because of the Linux host+EFR32xG12 RCP architecture, the Linux border router solution offers an easy-to-use and scalable solution to address various Wi-SUN network deployments.

Preparing the Wi-SUN Linux Border Router Demonstration

Border router implementation, shown in Figure 1, relies on an external EFR32xG12 flashed with a dedicated Wi-SUN RCP firmware. The EFR32xG12 runs the time-constrained, low-level layers while the Linux host handles the memory-intensive, upper-level layers of the Wi-SUN stack. The solution can run on different Linux hosts, but Raspberry Pi is the default platform for the demonstration because it's an accessible and widely used Linux platform.
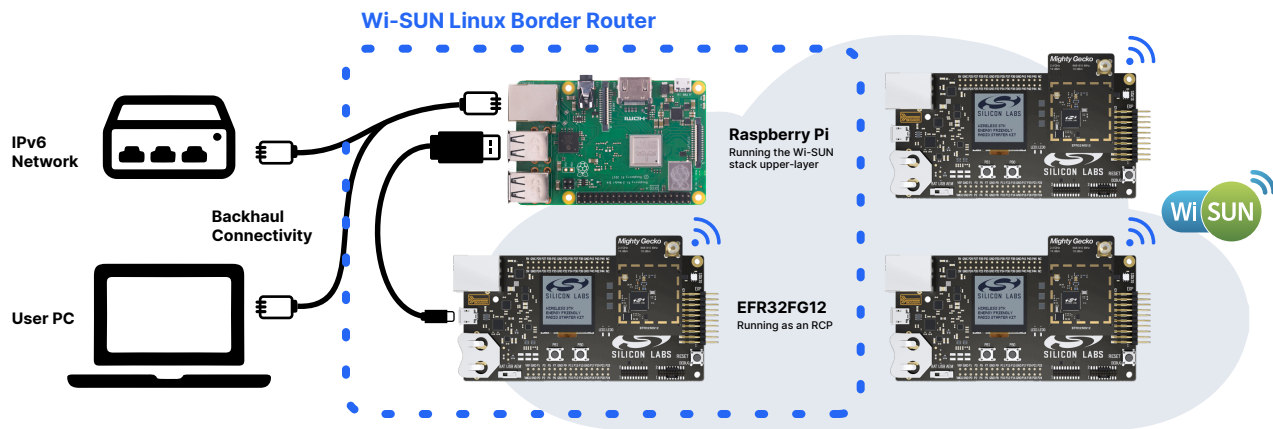
Figure 1. A demonstration of the communications and connections involved with implementing a Wi-SUN Border Router

Using a network with IPv6 connectivity is encouraged. If IPv6 isn't available, the Docker container image will automatically switch to "local" mode; in local mode, the Docker image and the Wi-SUN nodes can connect with each other, but communication outside the network is not possible. For this case, Silicon Labs provides a border router demonstration running on a standalone EFR32xG12. It provides a quicker way to evaluate the solution, but it can't scale into production like the main demonstration can.

Getting Started with the Wi-SUN Linux Border Router Reference Solution

To create a Wi-SUN Linux border router, you need the following hardware:
• Raspberry Pi 3 Model B+ or above with an Internet connection (another Linux host should also work)
• SD card (4 GB or more) and SD card slot/dongle
• 2 WTSK boards
• 2 EFR32xG12 radio boards with matching RF bands

And the following software:
• Simplicity Studio 5
• Raspberry Pi imager
• Wi-SUN Linux Border Router Reference Implementation
• Wi-SUN border router container

For more information, see AN1332: Silicon Labs Wi-SUN Network Setup and Configuration. You'll find:
• an introduction to the different Wi-SUN border router solutions maintained by Silicon Labs
• installation instructions for a Wi-SUN Linux border router

• a description of the Linux border router software architecture
• detailed steps to establish a connection between a Wi-SUN network and an external IP network

A Commitment to Wi-SUN

Silicon Labs' Wi-SUN hardware is certified by the Wi-SUN Alliance, a global industry association devoted to seamless LPWAN connectivity. Wi-SUN builds upon open standard internet protocols (IP) and APIs, enabling developers to extend existing infrastructure platforms to add new capabilities. With long range, high-data throughput, and IPv6 support, Wi-SUN simplifies wireless infrastructure for industrial applications and the evolution of smart cities.

About Silicon Labs

Silicon Labs is a leader in secure, intelligent wireless technology for a more connected world. Our integrated hardware and software platform, intuitive development tools, unmatched ecosystem and robust support make us an ideal long-term partner in building advanced industrial, commercial, home and life applications. We make it easy for developers to solve complex wireless challenges throughout the product lifecycle and get to market quickly with innovative solutions that transform industries, grow economies, and improve lives.