SLN-IOT-GPI: Integrated Development Experience for IoT Systems

The SLN-IOT-GPI is a complete development platform for building secure IoT systems. It offers a pre-integrated configuration for hardware, software, connectivity, security, cloud services and NFC commissioning for popular IoT use cases. This solution platform speeds time-to-market, reduces risks associated with wireless connectivity and saves development costs in demanding commercial installations of large node networks (LNNs).

OVERVIEW

The SLN-IOT-GPI Integrated Development Experience (IDEx) combines the NXP Modular IoT Gateway supporting simultaneous ZigBee and Thread connectivity controlled by the energy efficient i.MX6UL processor and a Modular Edge Node controlled by a wireless SoC.

The optimized hardware is supported with pre-integrated production-ready Linux® and FreeRTOS-based BSPs. Out-of-the-box low-power wireless mesh connectivity, NFC-based commissioning and state-of-the-art security capabilities provide a solutions platform that is ideal for connected applications which need to combine management and control of large node networks with cloud connectivity.

Edge nodes can exchange data with the gateway through ZigBee or Thread and the gateway delivers data to the cloud over Ethernet or Wi-Fi®. An Android or iOS phone app enables users to easily set up their system, then monitor and control the edge nodes.

The provided level of hardware and software modularity offers developers the flexibility required to quickly build and iterate a range of potential IoT use-case-specific applications leveraging various configurations.

TARGET APPLICATIONS

- Smart Cities
- Lighting
- Building Automation
- Agriculture
- Oil/Gas

SIMPLIFIED NFC COMMISSIONING FOR LARGE NODE NETWORKS

Commercial installations with thousands of nodes can leverage the built-in secure NFC tap-to-connect capabilities through the gateway. Using a smartphone application, end nodes can be quickly and securely commissioned to the network, even when the device that is being installed is not powered, which is common in smart buildings and industries, smart connected cities, oil and gas fields and agriculture installations.

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SLN-IOT-GPI IDEX FEATURES

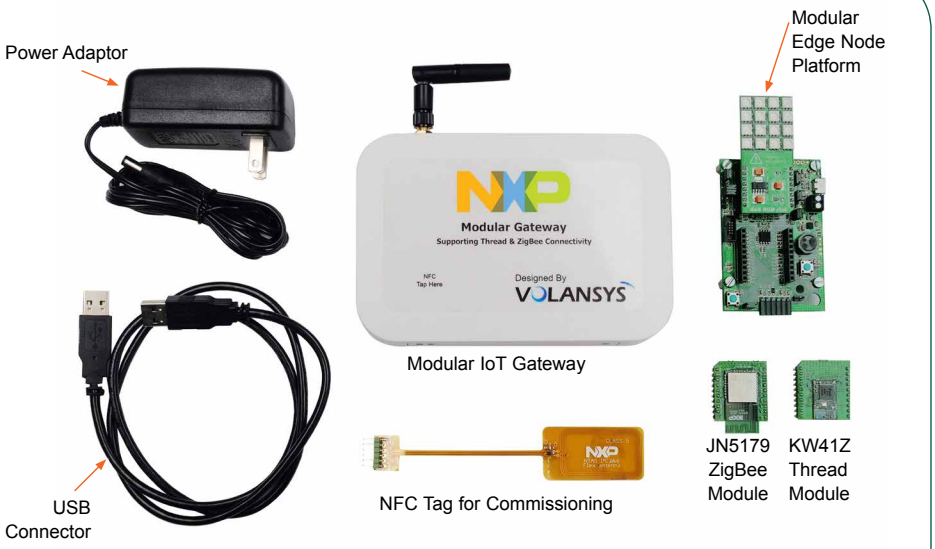
The SLN-IOT-GPI IDEx includes hardware and software, drivers, protocol and connectivity stacks as well as Linux BSP support.

- FCC/CE/IC certified
- Multi-protocol support for Thread, ZigBee, Wi-Fi and Ethernet
- Supports large node networks (>= 250 nodes)
- Commissioning through NFC and Smart App
- Wi-Fi and Ethernet northbound to the cloud
- Over-the-air programming via Multicast
- Smartphone app support
- i.MX6UL SOM
- Kinetis® KW22D512 or KW41Z Thread microcontroller
- JN5179 ultra low power ZigBee 3.0 and IEEE802.15.4 Module
- PN7120 NFC controller
- A70CM secure element

DOCUMENTATION TABLE

Out of the Box Set up Guide
Hardware and Software User's Guides
Module Data Sheets
Firmware Flashing Guides
Source build Instruction Guides
Design Package (schematics, layout, BOM)
Enclosure Design Files

FIGURE 1: SLN-IOT-GPI: IDEX FOR GENERAL PURPOSE IOT SYSTEMS



SOFTWARE AND TOOLS TABLE

SLN-IOT-GPI IDEX SOFTWARE	DEVICE
Linux® Yocto BSP with full drivers and connectivity	i.MX6UL MCUs
MQTT client library	i.MX6UL MCUs
Thread Linux host software SDK	i.MX6UL MCUs
Gateway and end device registration with cloud	i.MX6UL MCUs
Start-up script for Wi-Fi® client service	i.MX6UL MCUs
Config file to load Wi-Fi firmware	i.MX6UL MCUs
Controls front panel LEDs	i.MX6UL MCUs
Communication bridge between cloud and end device	i.MX6UL MCUs
NFC commissioning of gateway and end devices	i.MX6UL MCUs
Thread end device controller	i.MX6UL MCUs
ZigBee end device controller	i.MX6UL MCUs
Black box Thread stack for KW41Z on gateway	Kinetis W series MCUs
Black box ZigBee stack for JN on gateway	JN MCUs
Black box stack for NFC on gateway	PN7120 NFC controller
SMARTPHONE APP SOFTWARE	
Pre-compiled Android and IoS applications to manage gateway	Smartphone
END DEVICE FIRMWARE	
MENP-KW41Z, MENP-KW22D, MENP-JN5179, MENP-JN5169, FRDM-K64F+MCR20, FRDM-KW41Z, FRDM-KW22D	Multiple

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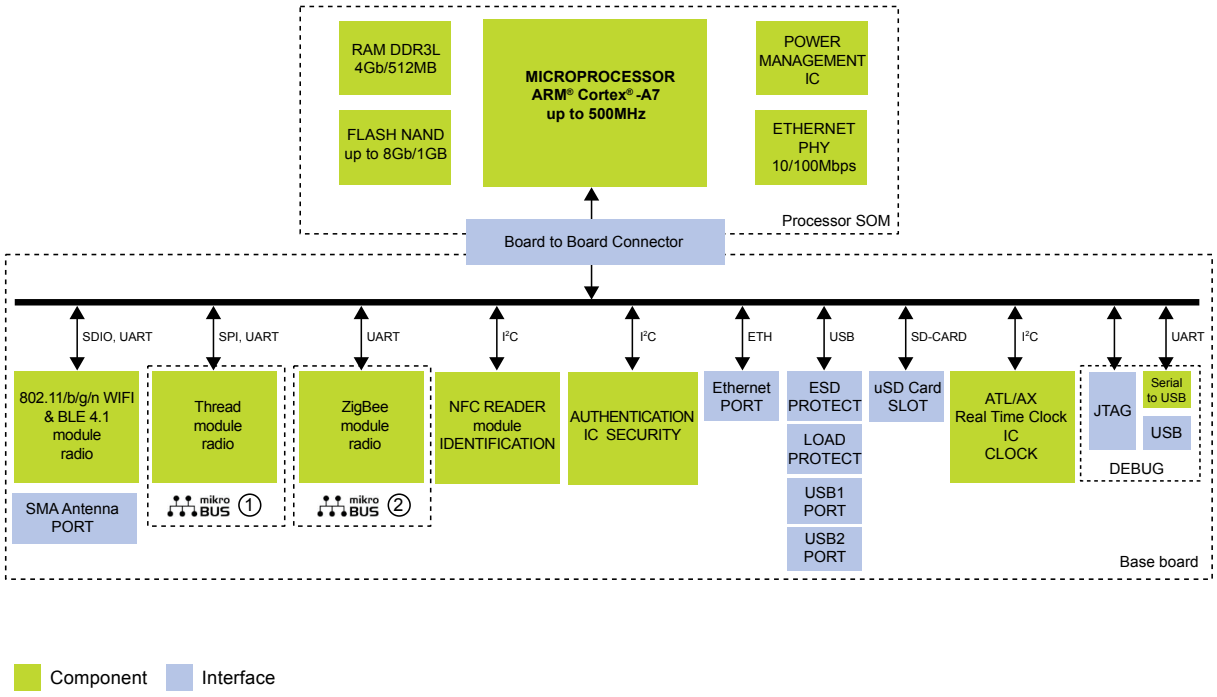
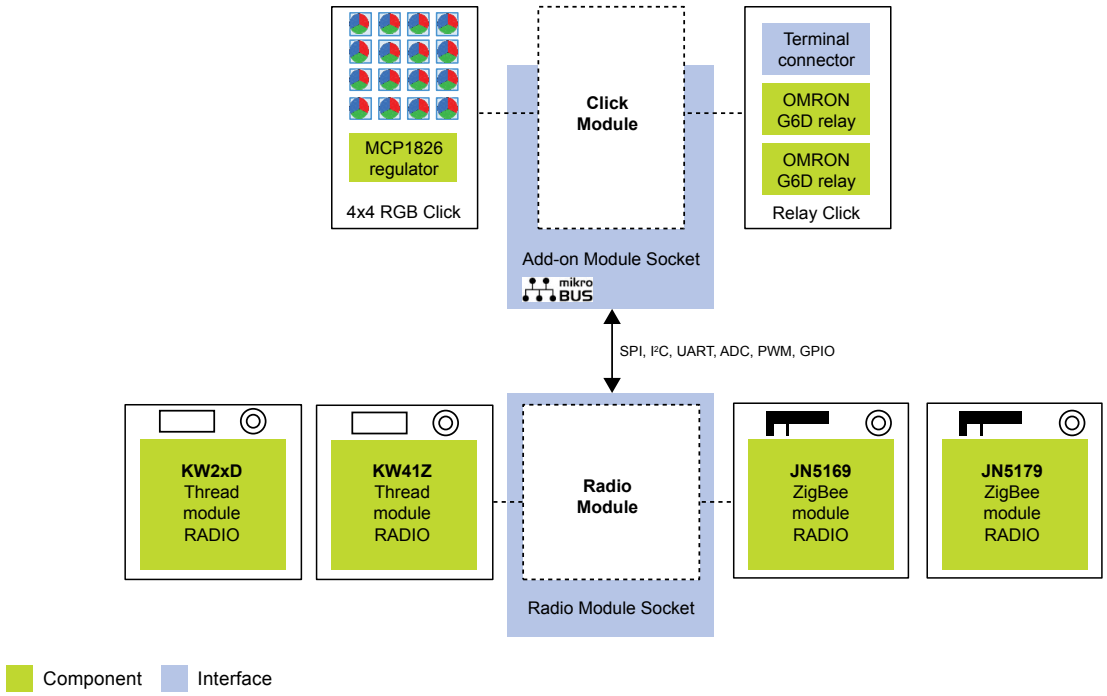
SLN-IOT-GPI HARDWARE BLOCK DIAGRAMS

Modular IoT Gateway



Modular Edge Node Platform



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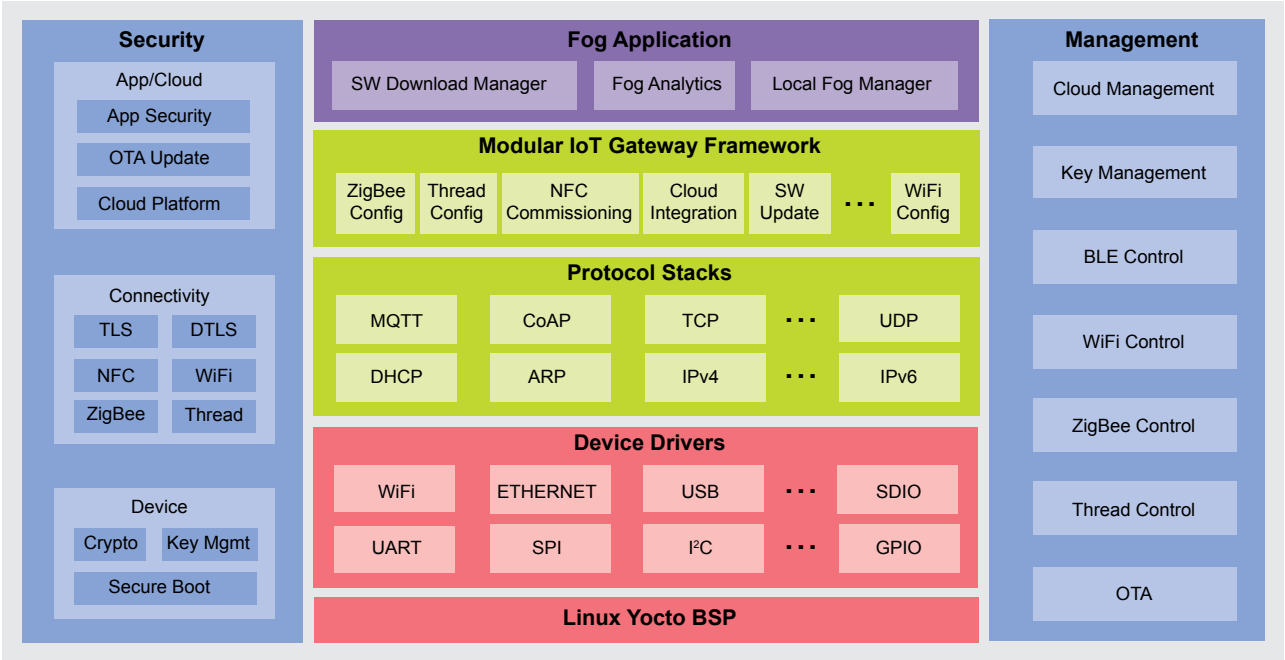
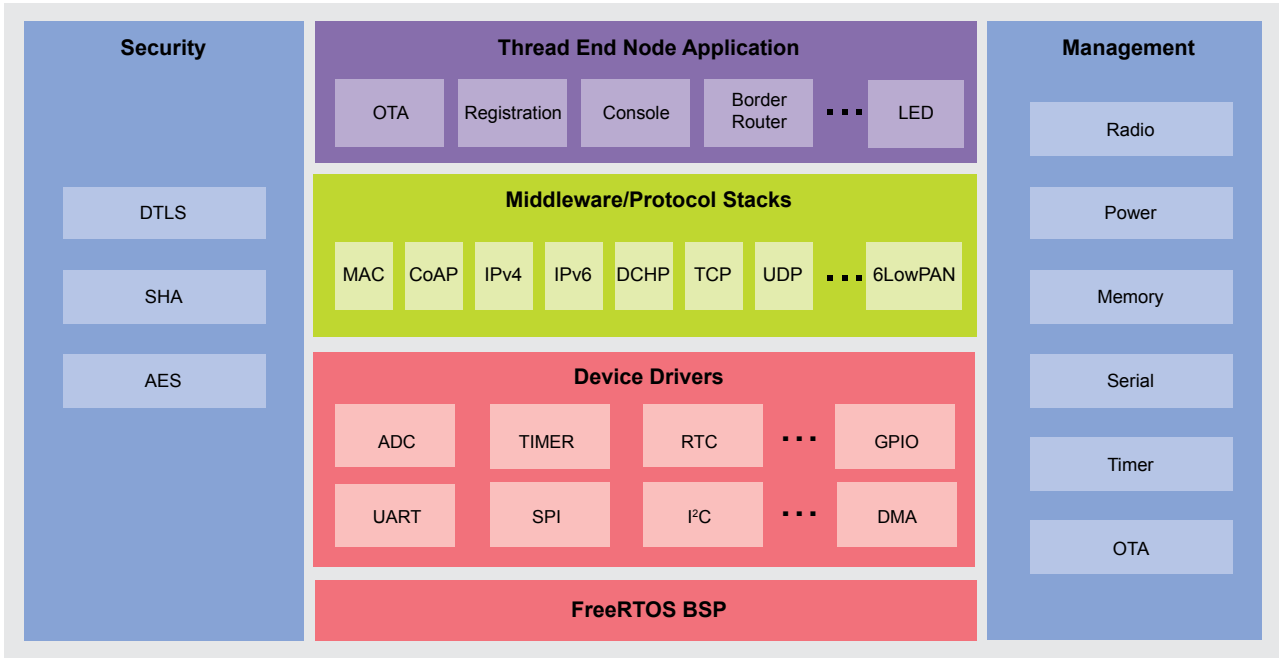
SLN-IOT-GPI SOFTWARE ARCHITECTURE

Modular IoT Gateway



Modular Edge Node Platform—Thread



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Document Number: MODIOTFRAMEWORKFS REV 0

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