The SLN-NTW-GTWY modular IoT gateway solution is a pre-integrated IoT-based hardware and software solution platform that reduces time-to-market, reduces risks associated with wireless connectivity and saves development costs in demanding commercial installations using large-node networks (LNNs).

**OVERVIEW**

The modular IoT gateway combines advanced i.MX hardware capabilities, a pre-integrated production-ready Linux®-based BSP, out-of-the-box low-power wireless mesh connectivity, NFC-based commissioning and state-of-the-art security capabilities to provide a solutions platform that is ideal for connected applications which need to combine management and control of LNNs with cloud connectivity.

The robust modular IoT gateway does this by securely connecting LNNs via low-power wireless mesh networks such as Thread® and ZigBee® to an i.MX-based application logic and advanced capabilities solutions platform. That platform then connects northbound to the cloud through Wi-Fi® and Ethernet. The provided level of hardware and software modularity offers developers the flexibility required to quickly build and iterate a range of potential use-case-specific applications leveraging various configurations to provide the highest value to their customers.

**ROBUST SECURITY FOR PROTECTED WIRELESS CONNECTIVITY TO IoT DEVICES**

Addressing stringent network security requirements to protect user and system data, the modular IoT gateway solution uses encrypted wireless communications to prevent unauthorized access, interception, man-in-the-middle and replay attacks. Thread-based devices are authenticated to the network through the EC-JPAKE DTLS protocol which prevents passphrases from being leaked or reverse engineered. Thread and ZigBee messages use AES encryption for base level security at their respective mesh network layers, while offering flexible support for applications to add additional end-to-end security layers. The advanced security capabilities of the integrated i.MX application processor includes high assurance boot (HAB), secure key storage, secure JTAG, external tamper detection for passive and active events, and internal tamper detection for voltage, glitch and differential power analysis protection. Encryption software including OpenSSL is accelerated via the cryptographic acceleration and assurance module (CAAM). Trusted execution environment (TEE) support is available as an NXP Professional Services product.
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 phone 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.

A COMPLETE SOLUTION FOR QUICK DEPLOYMENT

NXP’s complete modular IoT gateway reference design provides a connected application solutions platform for quick customization and application deployment including production-ready hardware, schematics, bill of materials, protocol and connectivity stacks, Linux BSP support and fully documented software. Designers can evaluate, develop, prototype, iterate, field test, install and maintain LNNs for commercial settings starting with the modular IoT gateway solution platform.

MODULAR IoT GATEWAY SOLUTION FEATURES

The modular IoT gateway 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
- JN5169 ultra-low-power ZigBee wireless microcontroller
- PN7120 NFC controller
- A70CM secure element

SOFTWARE AND TOOLS TABLE

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ANDROID™ SMARTPHONE APP SOFTWARE | ANDROID PHONE

Android mobile app to control and commission ZigBee/Thread end device | Android

EDGE DEVICE Firmware

Thread K64F+MCR20 end device application for use with GTWY OOB demo | K64F
Thread KW2x end device application for use with GTWY OOB demo | KW2X
Thread KW41Z end device application for use with GTWY OOB demo | KW41Z
Thread KW41Z + MENP end device application for use with GTWY OOB demo | KW41Z
Thread KW22D + MENP end device application for use with GTWY OOB demo | KW22D
Zigbee JN5169 + MENP end device application for use with GTWY OOB demo | JN5169
MODULAR IoT GATEWAY SYSTEM BLOCK DIAGRAM

User Space
- Wi-Fi® Config
- NFC Commissioning
- Linux® Yocto BSP
- LED Control
- Thread Management
- ZigBee Control

Kernel Space
- Linux® Yocto BSP
- Thread Connectivity
- ZigBee Connectivity
- NFC Connectivity
- Cloud Connectivity
- Devices

DOCUMENTATION AVAILABLE ON NXP.COM
- VT-SOM-6UL SOM Data Sheet
- KW22D Module Data Sheet
- KW41Z Module Data Sheet
- Modular Gateway Hardware User’s Guide
- JN5169 Module Firmware Build Guide
- KW22D Module Firmware Build Guide
- KW41Z Module Firmware Build Guide
- FRDM-K64+MCR20 Firmware Build Guide
- KW22D512 + MENP Module Firmware Build Guide
- KW41Z + MENP Module Firmware Build Guide
- JN5169 + MENP Module Firmware Build Guide

GATEWAY DESIGN DOCUMENTATION
- i.MX6UL BASE BOARD
  - i.MX6UL Base Board BOM
  - i.MX6UL Base Board Schematic
- i.MX6UL SOM
  - i.MX6UL SOM BOM
  - i.MX6UL SOM Schematic
- KW22DS12
  - KW22DS12 Module BOM
  - KW22DS12 Module Schematic
- KW41Z
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  - KW41Z Module Schematic
- NFC MODULE
  - NFC PN7120 Module BOM
  - NFC PN7120 Schematic
- GateWay Box Design
  - Enclosure
  - Front Panel Design
  - Rear Panel Design
- Videos
  - Modular IoT Gateway Quick Start Video

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