

Product Brief – 6LoWPAN Network Protocol Stack

Low Power Wireless IP Connectivity Solution

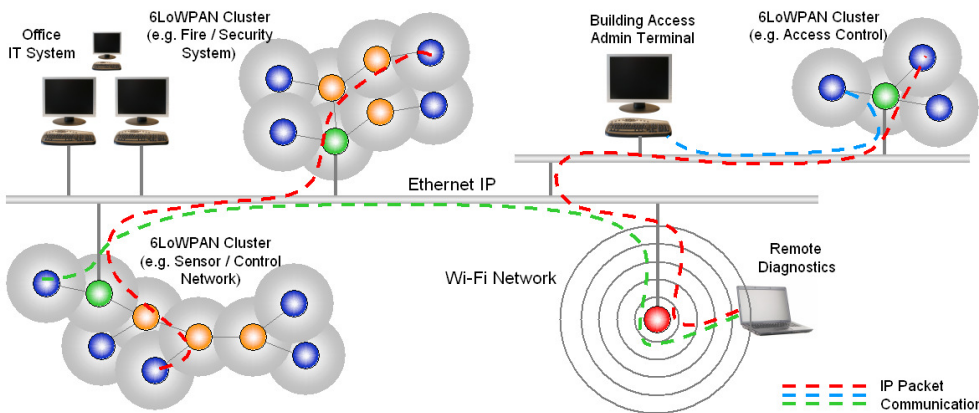
Overview

Jennic's 6LoWPAN network protocol stack provides a wireless connectivity solution based on the IEEE802.15.4 standard at 2.4GHz, to enable embedded devices to communicate wirelessly using the pervasive Internet Protocol (IP). Designed to work with Jennic's feature rich JN5139 wireless microcontroller, the IP connectivity solution provides a low power single chip implementation for the development of wireless networking products that offer multi-year battery life, which can communicate with other IP devices in an existing network.

Whilst point-to-point and star connectivity are supported as standard in IEEE802.15.4, developers can also choose to run 6LoWPAN over Jennic's JenNet networking stack, providing a self-healing cluster tree solution that is highly stable and field proven.

Application development is made easy through a series of highly abstracted programming interfaces (Jenie / SNAP), reducing the need for designers to understand the complexities of wireless networks, enabling them to focus on increased product functionality and quick time to market.

Network Diagram



Benefits

- Leverage existing IP infrastructure
- Seamless integration of low power wireless into existing IP networks
- Standards based on IEEE802.15.4 in 2.4GHz ISM band - global adoption
- Co-existence with other 2.4GHz wireless - example Wi-Fi, Bluetooth, ZigBee
- Multi-year battery life expectancy in embedded applications
- Simple software development APIs

Applications

- Building Automation: HVAC, lighting control, access control, security, fire detection and alarm
- Industrial Automation and Control: pressure, temperature, level sensing, flow control
- Home Control: remote security and surveillance, heating control, lighting control
- Medical: patient monitoring, asset tagging

Features:

- IETF standard IP networking
- Based on IEEE802.15.4 MAC and PHY
 - Data rate up to 250kbps
 - 16 channels in the unlicensed 2.4GHz band
- Works with Jennic wireless microcontrollers and modules
- Point-to-point, star and self-healing tree networks
- Typical clusters of 100 nodes
- Automatic route formation and repair
- End-to-end message acknowledgment

Jenie API:

- Application Programming Interface
- Highly abstracted 'C' based software API
- Designed to provide maximum ease of use
- Providing access to on-chip peripherals and system services

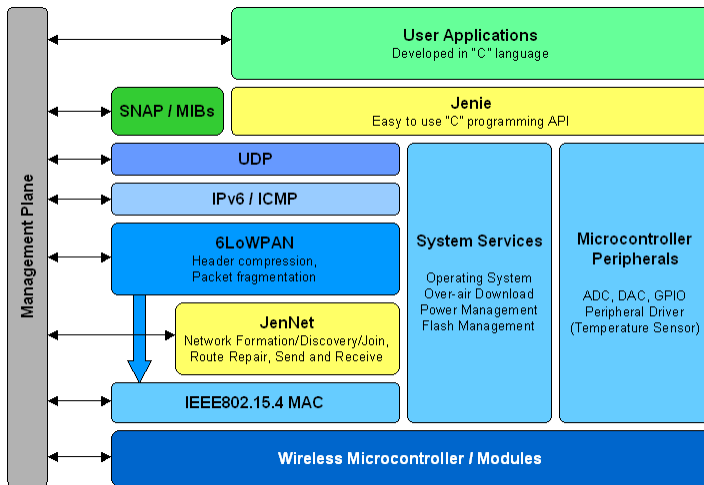
SNAP API:

- Simple Network Access Protocol (similar to SNMP)
- Provides data interchange between devices in an IP oriented manner
- Based on MIBs (Management Information Bases)
- Enables remote control, diagnostics and configuration of 6LoWPAN wireless networks

JenNet network layer

- Self-healing cluster tree networking component
- Manages: network formation, discovery, join and repair
- Sending / receive packets

6LoWPAN Network Stack Architecture



The 6LoWPAN network stack is architected to support multiple low power wireless clusters on a wired IP backbone. Clusters in RF proximity may share an RF channel or use different RF channels, to control and optimize networking loading.

The 6LoWPAN network stack automatically handles packet fragmentation to transport IPv6 packets (max 1280 bytes) over an IEEE802.15.4 network (max. 127 bytes).

It also implements a pay-as-you-go header compression technique to minimise packet size, for most effective use of RF bandwidth and use of battery power.

Specifications

Network Topologies

Point-to-Point, Star
Self-healing Cluster Tree

Device Types

End Device, Router, Coordinator
Router: wireless-to-wireless, wireless-to-wired

Network Formation

Automatic / Self Organizing
Self Healing

Network Size

Clusters up to 100 nodes typical

SNAP Data Interchange Services

Network configuration / management
User defined application variables / events
Types - Boolean, Integer, String, Event

Data Rate and Frequency Channels

IEEE802.15.4 compatible MAC layer
- Data rate up to 250kbps
- 16 channels in unlicensed 2.4GHz ISM band

Development Tools

GNU-based tool chain: ANSI C, C++ compiler,
Debugger, Flash programmer,
Code::Blocks IDE
Application examples

Supported Hardware Platforms

JN5139 Chips and Modules
JN5139 6LoWPAN Development Kit