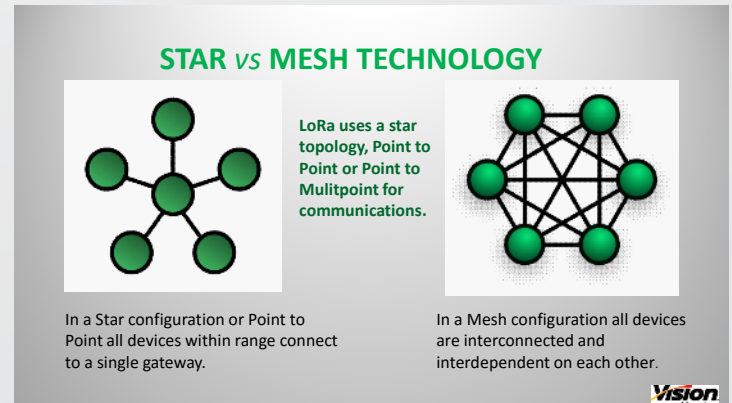# LoRa IoT
A Truly Open System

Mesh systems are dependent on other devices to provide a communications path and are often limited in range. Point to Point and Point to Multipoint systems allow multiple pathways to achieve maximum performance.

STAR *vs* MESH TECHNOLOGY

LoRa uses a star topology, Point to Point or Point to Mulitpoint for communications.

In a Star configuration or Point to Point all devices within range connect to a single gateway.

In a Mesh configuration all devices are interconnected and interdependent on each other.

LoRa uses a Star Technology to achieve robust communications. Up to 20 miles can be achieved with great repeatability using LoRa.
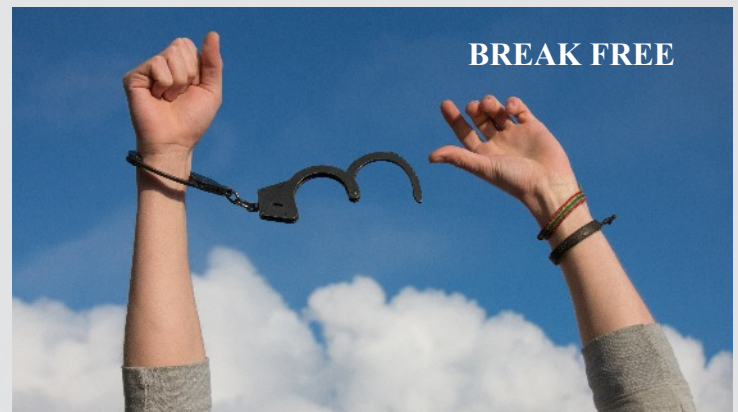
LoRa is a long range Internet of Things (IoT) system designed for the ever expanding IoT. LoRa is an open system that allows anyone to manufacture devices which can communicate over a LoRa network. The openness of the system removes the hand-cuffs that restrict you to a particular vendor. No longer are you required to buy meters, gateways, relays, head-ends and other devices to fill out your AMI system.

LoRa is designed for low power, long range applications for which AMI fits perfectly. It operates in the 900 Mhz ISM bands but the technology allows its signals to transmit above the noise in these bands.

The LoRa Alliance is comprised of over 500 companies all working in concert to develop the absolute best IoT system in the World. The technology deployed with LoRa is second to none and creates independence for its users. There are no monthly fees associated with data and no restriction on the amount of data you can accumulate.

LoRa is scalable to the size of your requirement. You can choose from 8 channel gateways to 64 channel gateways. Thus allowing 1,500,000 messages per day up to 12,000,000 messages per day from a single gateway.

BREAK FREE

If you buy an AMI system with proprietary technology, you will be handcuffed to that vendor for 15 to 20 years and maybe longer. In order to achieve competitive prices for meters, gateways and head-end systems, LoRa is your only choice.

There are multiple vendors for meters, gateways, head-end systems and other distribution automation devices. More are being developed everyday.

Vision uses gateways from various vendors to match the unique requirements of each system to the best solution provider. The customer then chooses the vendors equipment that best suits them.

Why LoRa® ?

1. Highly Robust - LoRa signal is very resistant to both in-band and out-of-band interference mechanisms due to a BT > 1 and fully asynchronous nature.

2. Multipath / fading Resistant, the chirp pulse is relatively broadband and thus LoRa offers immunity to multipath and fading, making it ideal for use in urban and suburban environments, where both mechanisms dominate.

3. Long Range Capability, for a fixed output power and throughput, the link budget of LoRa exceeds that of conventional FSK.

4. Doppler Resistant, Doppler shift introduces a negligible shift in the time axis of the baseband signal.

5. Enhanced Network Capacity, orthogonal spreading factors enables multiple transmissions at the same time and on the same channel.

6. Ranging / Localization, inherent property of LoRa is the ability to linearly discriminate between frequency and time errors

7. Constant Envelope Mod Scheme, same low-cost and low-power high-efficiency FSK PA stages can be re-used without modification.

Narrow band signal

NOISE LEVEL

Spread signal

FREQUENCY
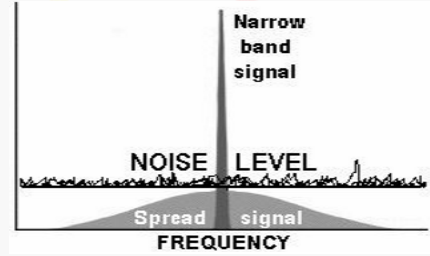
Most reliable ultra low power radio solution available!

App
LoRaWAN
LoRa
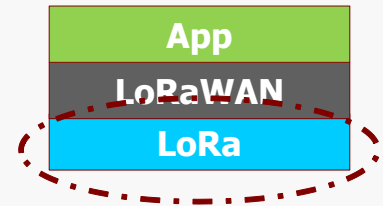
Technology Comparison Summary

Feature	LoRaWAN	Narrow-Band	LTE Cat-1 2016 (Rel12)	LTE Cat-M 2018 (Rel13)	NB-LTE 2019(Rel13+)
Modulation	SS Chirp	UNB / GFSK/BPSK	OFDMA	OFDMA	OFDMA
Rx bandwidth	500 - 125 KHz	100 Hz	20 MHz	20 - 1.4 MHz	200 KHz
Data Rate	290bps - 50Kbps	100 bit/sec 12 / 8 bytes Max	10 Mbit/sec	200kbps – 1Mbps	~20K bit/sec
Max. # Msgs/day	Unlimited	UL: 140 msgs/day	Unlimited	Unlimited	Unlimited
Max Output Power	20 dBm	20 dBm	23 - 46 dBm	23/30 dBm	20 dBm
Link Budget	154 dB	151 dB	130 dB+	146 dB	150 dB
Batery lifetime - 2000mAh	105 months	90 months		18 months	
Power Efficiency	Very High	Very High	Low	Medium	Med high
Interference immunity	Very high	Low	Medium	Medium	Low
Coexistence	Yes	No	Yes	Yes	No
Security	Yes	No	Yes	Yes	Yes
Mobility / localization	Yes	Limited mobility, No loc	Mobility	Mobility	Limited Mobility No Loc