

Low Power Wide Area Network (LPWAN) Feature Comparison

Category	Generic Feature	Feature Requirements	6lowPAN	LoRaWAN	Actility	LinkLabs	Haystack (DASH7)	Comments
Real-time Data	Real-time, Two-Way Endpoint Queries	Query 1 or more LPWAN endpoints & receive response in <10 seconds	No	No	No	No	Yes	
	Real-time, Two-Way Query From Mobile Base Station	Query 1 or more LPWAN endpoints & receive response in <10 seconds w/ mobile base station	No	No	No	No	Yes	
	Real-time, Two-Way RTLS Queries	Query the real-time location of an endpoint being tracked using RTLS	No	No	No	No	Yes	
	Real-time, Two-way Query of 300,000 devices	Query specific criteria from dense environment of LPWAN endpoints	No	No	No	No	Yes	
	Real-time Device Management	Change the parameters of an endpoint in <10 seconds	No	No	No	No	Yes	
	Device Filesystem	Distributed "Hadoop"-like filesystem for easy storage and retrieval of sensor and other data	No	No	No	No	Yes	
Message Architecture	"Long Range" Error Correction	1% Packet Error Rate at 6 dB Eb/N0	No	Yes	Yes	Yes	Yes	Haystack/DASH7 can provide an additional 3-4dB improvement on top of LoRa PHY
	Header Compression	Allow for sufficient message header compression to allow long range messaging	No	Yes	Yes	Yes	Yes	
	Message Structure Flexibility	Support for variable message/payload sizes	Yes	Yes	Yes	Yes	Yes	
	Supports IP addressing	Support for IPv4 and/or IPv6	Yes	No	Yes	Yes	Yes	
Power Management	Extended battery life	Improves battery life on most LPWAN endpoints	No	No	No	Yes	Yes	
	Multi-year AA battery life	Multi-year battery life while supporting real-time queries	No	No	No	No	Yes	
	Multi-year AA battery life	Ultra-low < 100uW average system power	No	Yes	Yes	Yes	Yes	
Networking Features	Improves Network Capacity	Added capacity with faster throughput without compromising range or power	No	No	No	Yes	Yes	
	No beacon required	No discovery beacon is required to quickly connect to an endpoint	Yes	No	No	No	Yes	Beacons are the primary method of communication for LoRaWAN and its derivatives
	Fast Device Discovery	<10 second discovery	Yes	Yes	No	No	Yes	
	Networking Options	Peer-to-peer networking	Yes	No	Yes	Yes	Yes	
	Networking Options	Create ad-hoc networks that "hop" and communicate between endpoints	Yes	No	Yes	No	Yes	Endpoints must have the option of communicating to other endpoints
	2-way messaging	Fully bi-directional messaging with no material impact to power consumption vs. one-way	Yes	No	Yes	Yes	Yes	
	Sensor-event driven messaging	Real-Time notification of sensor events (e.g. a limit is breached)	No	No	Yes	Yes	Yes	
	Broadcast addressing	Broadcast addressing	Yes	No	Yes	Yes	Yes	
Networking Options	Support fast queries in dense deployments (hundreds of thousands of units)	No	No	No	No	Yes		
Security & Privacy	Device "cloaking"	Listen-before-talk to prevent unwanted detection	No	No	No	No	Yes	
	Security	Encryption + Authentication: AES, RSA, ECC	Yes	No	Yes	No	Yes	
	Security	Source and target address encryption at MAC	No	No	No	No	Yes	Masks source & target address @ MAC layer, avoiding a common vulnerability
	Public Key Security	Support for integral public key exchanges below the application layer	Yes	No	Yes	No	Yes	
Application Support	Precision RSSI-based Location	± 1m indoor, ± 20m wide-area location	No	No	No	No	Yes	Haystack/DASH7 provides high precision RTLS using optional location engine
	Application Support	UDP-style application support	Yes	Yes	Yes	Yes	Yes	
	Spider & Search	Spidering and searching of LPWAN endpoints across WAN providers	No	No	No	No	Yes	
	Device Management	Over-the-air Firmware and App downloads, patches, updates	No	No	No	No	Yes	
Other	Global Frequency Availability	Supports multiple ISM (license-free sub-1GHz) regions worldwide	Yes	Yes	Yes	Yes	Yes	
	Can use proprietary LoRa PHY	Hardware compatibility with existing LoRa deployments	No	Yes	Yes	Yes	Yes	
	Can use non-proprietary PHY	Not tied to a single vendor of semiconductor parts	Yes	No	No	No	Yes	
	Portability to non-LPWAN use cases	Protocol can also be deployed against LAN or PAN applications	Yes	No	Yes	No	Yes	Can the protocol be deployed efficiently in LAN or PAN environments?
	Small (<20kb) ROM footprint	Stack can be integrated into compact, inexpensive MCU cores	No	Yes	No	No	Yes	
	Open Source Firmware Stack	Free to download and use with common open source license	Yes	Yes	No	No	Yes	