**LoRaWAN Overview**.

**LoRaWAN** is a media access control (MAC) **protocol** for wide area networks. It is designed to allow low-powered devices to communicate with Internet-connected applications over long range wireless connections. **LoRaWAN** can be mapped to the second and third layer of the OSI model.

LoRaWAN is a newly arising wireless technology designed for low - power WAN networks with low cost, mobility, security, and bi-directional communication for IoTapplications.It is a low-power consumption optimized protocol designed for scalable wireless networks with millions of devices. It supports redundant operation, location free, low cost, low power and energy harvesting technologies to support the future needs of IoTwhile enabling mobility and ease of use features.

At the most fundamental level, radio protocols like LoRaWAN are fairly simple. The way star networks converse is similar to a professor and students in a lecture. The gateway (the professor) speaks to end nodes (the class), and vice versa. This is an asymmetric relationship in terms of communication. Everyone in the class could be trying to communicate with the professor at the same time, but the professor would not be able to hear or understand them all at once. Albeit extremely oversimplified, many elements of star topologies go back to this analogy.

[See example LoRaWAN Gateway for developers.](https://amzn.to/2QpV7mQ)

Here’s what that looks like in practice: Let’s say, for example, you have four gateways and one node. The node transmits into the radio spectrum blindly, and any gateway lucky enough to hear the transmission can take it and send it up to the cloud. It’s possible that all four gateways might hear that message and send it. (The one advantage to this: Messages can still be transmitted despite very weak links. If a node transmits five messages and only one makes it, your message has still gone through.)

Once a message has been delivered, there is no acknowledgement of receipt. However, nodes in LoRaWAN can request acknowledgements. If acknowledgement is requested and all four gateways pick up the same message, the cloud chooses one gateway to respond at a fixed time, usually a couple of seconds later. The problem then, is this: When that gateway is transmitting back to the node, it stops listening to everything else. So if your application needs a lot of acknowledgements, it will very likely spend more time transmitting acknowledgements than listening, which will eventually lead to a network collapse.