

A new partnership, announced Monday, should put the company back on track for shipping gateways and nodes to backers worldwide.

By Mary Catherine O'Connor

Nov 08, 2016—In May 2015, Wienke Giezeman was running a small IT shop after selling his video-rental company to a publishing firm. Then, one day, he walked into a hacker space in Amsterdam, where he lives. "Someone showed me this [radio]," he says. "It had a range of six miles. The gateways cost around \$1,000. You could connect up to 10,000 [radio] devices to a gateway. [The radios] use low bandwidth and have a good battery life."

This technology is a type of low-power wide-area network (LPWAN) called LoRa. [IBM](#) and chipmaker [Semtech](#) co-developed the LoRa specification and introduced it to the marketplace, along with an industry group called the [LoRa Alliance](#), in early 2015. The technology is designed to support a network of remotely deployed devices that transmit small packets of data over long distances, while consuming little power. LoRa operates in the 868 and 900 MHz unlicensed ISM bands in Europe and in the United States, respectively, and transmits data at a rate of 0.3 kbps to 50 kbps over distances of up to 15 kilometers (9.3 miles) in rural areas in cities.



A LoRa sensor

"I was totally amazed by the technology," Giezeman says. "I [realized I] would only need 10 gateways to cover the whole city of Amsterdam."

Within a few months, Giezeman and a partner, Johan Stokking, had founded [The Things Network](#), a nonprofit foundation that aims to promote and support the deployment of LoRa networks that would be available to both individuals and commercial parties around the world. The group's first endeavor was to create a LoRa network, or a LoRaWAN (LoRa wide-area network), across Amsterdam. It succeeded in establishing this LoRaWAN within six weeks, Giezeman says, after finding 10 different companies, each of which paid for a single gateway. These companies include both small local IoT startups and large corporations, including consultancies [KPMG](#) and [Deloitte](#).

The Things Network also worked with various stakeholders in Amsterdam to illustrate how this public IoT network could be used. For example, one startup offered to place water sensors with integrated LoRa radios and GPS receivers in private boats moored in the city's canals. In the event of a leak or a large rain event, small boats are sometimes submerged. Under the pilot program,

sensors triggered alerts to a boat-maintenance company that automatically dispatched a crew to the location of a boat in danger of being submerged.

The Things Network grew quickly, and within two months, public LoRaWAN networks were also emerging in cities across the global, including Boston, Buenos Aires, Kochi, São Paulo and Sydney. But among the individuals and small groups building out those networks, the universal complaint was that the gateways needed to be more affordable and easier to install, and they also wanted help in creating and evaluating use cases.

So Giezeman and Stokking decided to launch [The Things Industries](#), a for-profit organization that creates open-source LoRaWAN back-end applications and generates revenue by providing consulting services, as well as conducting workshops and hackathons. The Things Industries is also a member of the LoRa Alliance.

To address the call for more affordable and easy-to-use hardware, The Things Network launched a Kickstarter campaign to raise funds needed to scale the production of LoRa gateways, LoRa development boards (which backers can use for prototyping) and battery-powered, weatherproof LoRa network nodes with integrated temperature, movement and light sensors, as well as an indicator light and a push button. The purpose of the light and button would depend on a particular application, but the light provides input to the user and the button allows a user a means of communicating something to the network.

The Kickstarter campaign launched in October 2015. Within its one-month duration, the campaign raised nearly double its original fundraising goal of €150,000, ending with a total of €295,331. The Things Network partnered with Dutch product design firm [Tweetonig](#) to develop the hardware, while the LoRa modules used in the hardware were to be sourced from chipmaker [Microchip](#).

But Kickstarter backers are still waiting for the products, which they were supposed to receive in July 2016. "The firmware ended up being harder to develop than expected," Giezeman says. Additionally, in order to meet the target costs of €200 for the gateway, €40 for the development board and €60 for the network nodes with integrated sensors, the group has struggled to source affordable components.



A LoRa gateway

On Monday, however, The Things Network made an announcement that Giezeman says will allow it to quickly overcome those production barriers. At the [Electronica](#) trade show in Munich, Germany, The Things Network announced a partnership with [Premier Farnell](#), a British distributor of electronics and components (through its Element14 brand, Premier Farnell is popular among hobbyists as a provider of [Arduino](#) boards). Through this partnership, Giezeman reports, The Things Network will work with [Embest](#), a Premier Farnell-owned company that outsources electronics manufacturing, and this partnership will enable the organization to expedite production of the LoRa hardware. In addition, by relying on Premier Farnell's distribution services, The Things Network will be able to begin shipping finished products to its Kickstarter backers more quickly and efficiently than it could on its own.

Giezeman describes these Kickstarter backers as "super diverse," ranging from individual tinkerers who want to make connected products for personal use while leveraging a LoRaWAN, to entrepreneurs who aim to sell a product or service based on LoRa technology, to mobile app developers who want to expand their offerings from software to complete solutions.

End users can choose to either use the public LoRaWAN network or create their own by purchasing and deploying their own private LoRa gateways with which only their sensors nodes can communicate. They can also operate it as a hybrid network, in which the sensor nodes can communicate with both existing gateways in the network and with gateways the user deploys.

To address security concerns, data is encrypted as it travels between the sensor node and the gateway. The node sends each packet of data to the nearest gateway, which forwards that information to The Things Network server via the internet. This server will decrypt just the packet's header so it knows to which application server it should transmit the data.

Giezeman notes that because LoRaWAN uses low bandwidth, it would be more difficult for a hacker to compromise a LoRaWAN gateway. However, because the gateways are connected to the internet, they are potential victims, so The Things Network can update the gateway firmware to address any future vulnerabilities, via an over-the-air interface. (Further details about the architecture of the LoRa protocol and how The Things Network has architected its LoRaWAN [are available here.](#))

In Amsterdam, Giezeman says, The Things Network is working with the city to create a new hardware kit and LoRaWAN application through which students would wear sensors for tracking air quality, noise and location, which would enable the city to map and manage the air and noise pollution to which the students or others who carry the sensor are exposed on a daily basis. "It will be like a Fitbit for the city," he states.