

A Community-Owned Internet of Things

EMC

13 June 2019

The IoT Concept

Basic idea: You can remotely monitor and control devices over the internet — from a smart phone, for example.

You can control:

Smart houses

Traffic systems

Real-time industrial processes

...and a million other things

You can monitor:

Temperature

Humidity

Power consumption

...and a million other things

A Grand Opportunity — for Whom?

- IoT is shaping up to be a major technology
- Large corporations (the usual suspects) are jockeying for control of this space

We appear to be headed toward dependence on yet another essential technology controlled by monstrous multinational corporate entities.

BUT.

Let's look at this from a purely functional point of view.

Two Kinds of IoT

High bandwidth, high power (4G, 5G, Fixed wireless, Wi-Fi)

Needed for:

- Any kind of real-time control
- Video or audio monitoring

Low bandwidth, low power

Needed for:

- Pretty much everything else!

*Battery- or solar-powered low-bandwidth wireless internet devices can **inexpensively** support a vast range of incredibly useful, practical, everyday applications.*

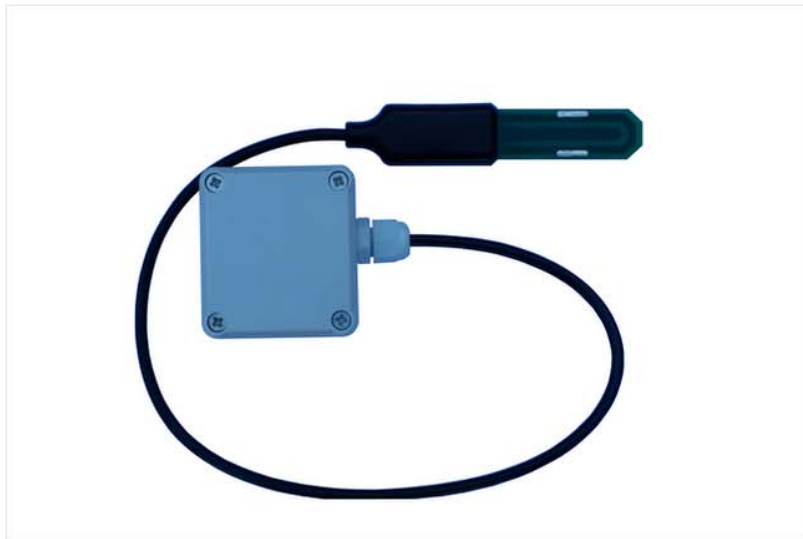
For Example

LoRaWAN Soil Moisture, Temperature sensor

PM-WCS-3-LORA LoRaWAN sensor features built-in transmitter. Which enables low cost, long range, long battery live wireless solution

Designed by [Tinovi](#), Ships from Latvia

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\$45.00

Ask a Question

Shipping to United States of America starts at \$11.00

Quantity*

1

LoRaWAN Frequency*

EU868 [18 in stock]

On request we may offer other regions

Add to Cart



About Seller

A Compelling New Technology

The availability of cheap, low-power wireless devices accessible over the internet will give us unprecedentedly close control of our environment. As the advantages become economically compelling and economies of scale kick in, we will see

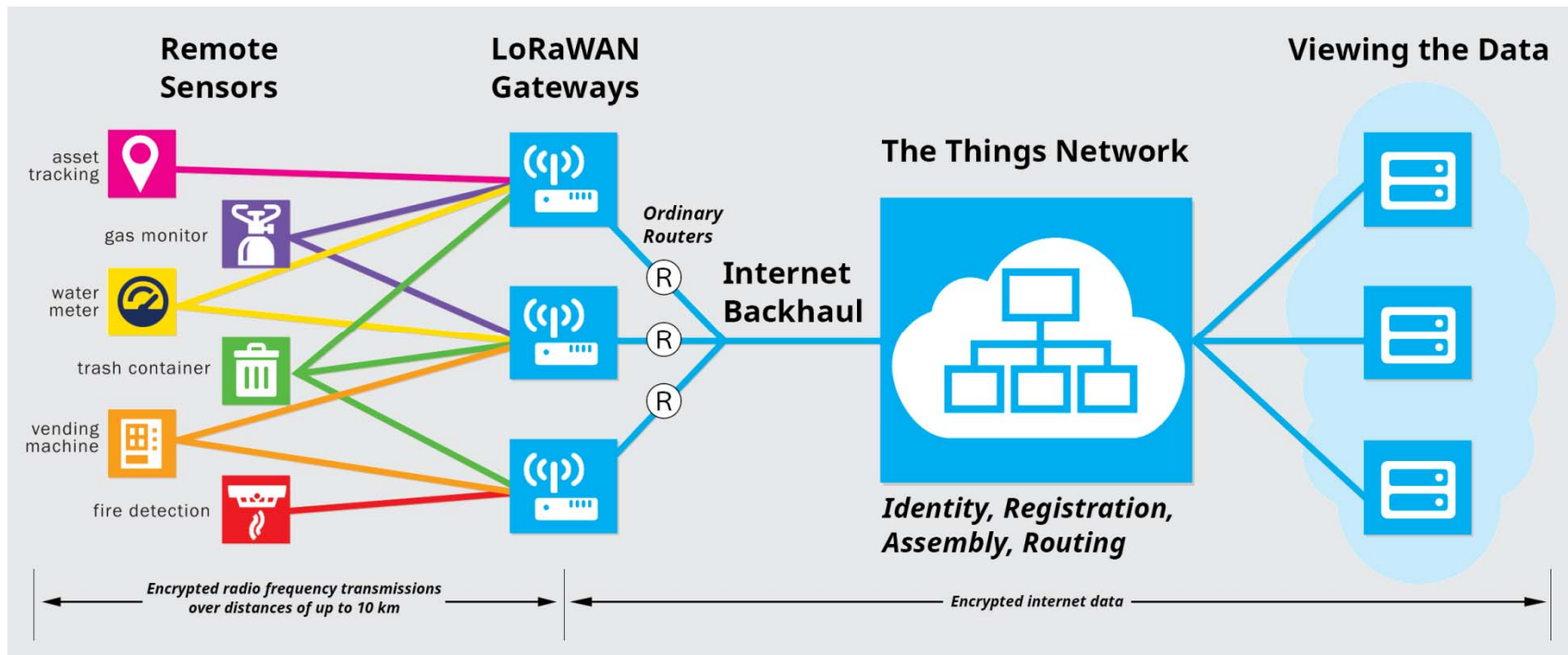
- A power monitor in every building
- A moisture sensor in every basement
- A soil monitor on every row in a vineyard
- A GPS locator on every steer in a herd
- A status indicator for every dumpster in a neighborhood
- An availability monitor for every parking space in a city

And we will be able to view and map and work with this data from anywhere that has an internet connection.

The interesting question is: *who will own the network that ties this all together?*

The Things Network (TTN)

- Started in 2015 in Amsterdam
- Purpose: Community ownership of low-power IoT
- Built on free open-source software
- Currently has 75,152 members and 7,827 gateways in 140 countries
- Uses low-power LoRa wireless and LoRaWAN networking technology



A Typical Gateway Installation



The Things Network Ithaca (TTNI)

- Local volunteer effort begun in 2016
- Corporate sponsor: MCCI (Trumansburg), CEO Terry Moore
- Actually a spinoff from MCCI's leadership of The Things Network NYC (the Borough of Manhattan has approved community-owned LoRaWAN coverage for the entire island of Manhattan)
- Co-sponsor: Cornell Cooperative Extension of Tompkins County
- Primary motivations:
 - ✓ free and open community ownership of an essential resource
 - ✓ county economic development
 - ✓ county youth development

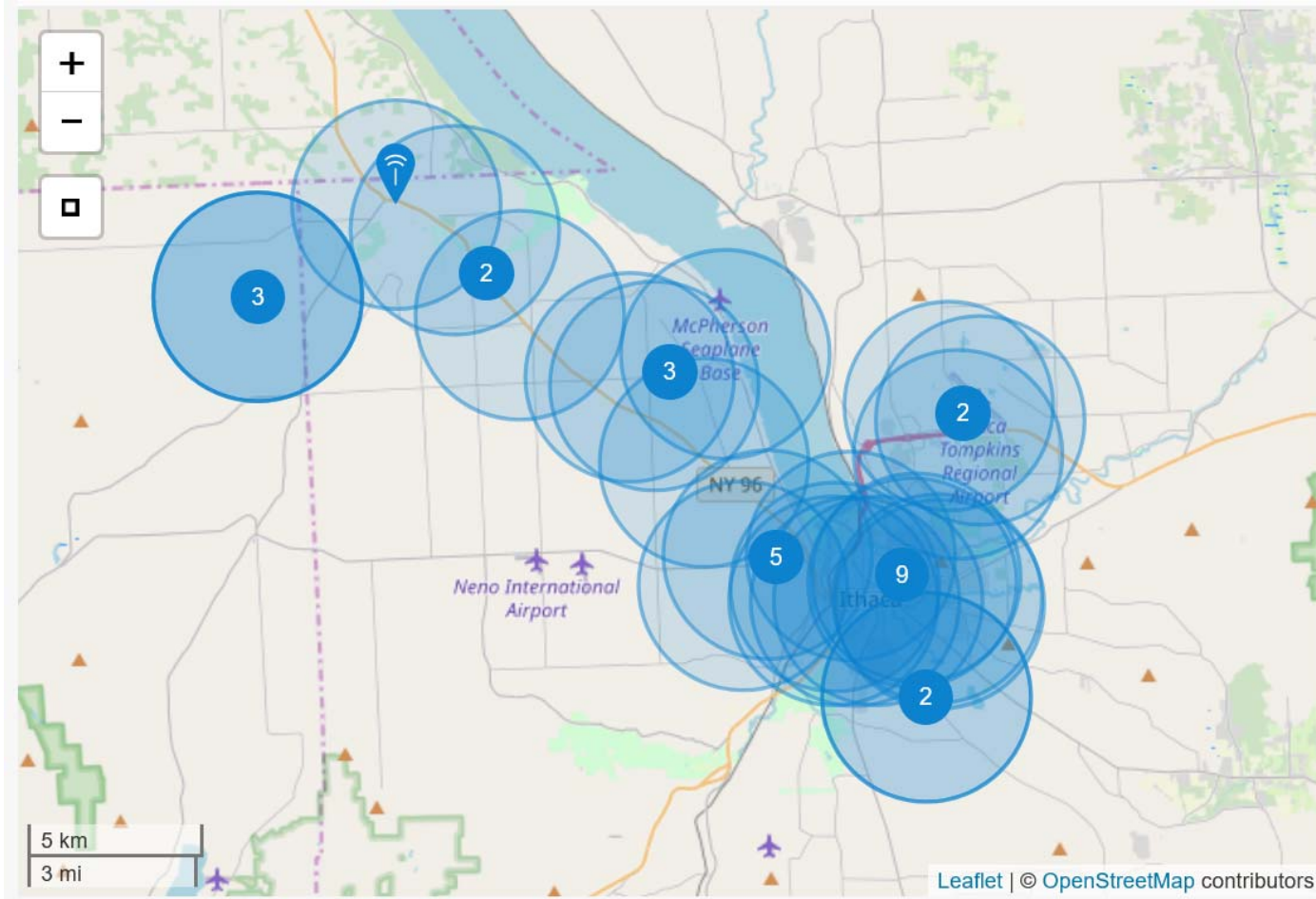
TTNI and Local Economic Development

We're at about the same place with cheap IoT that we were with the World Wide Web in 1994: We can see that it's going to be huge even if we can't see all the applications yet

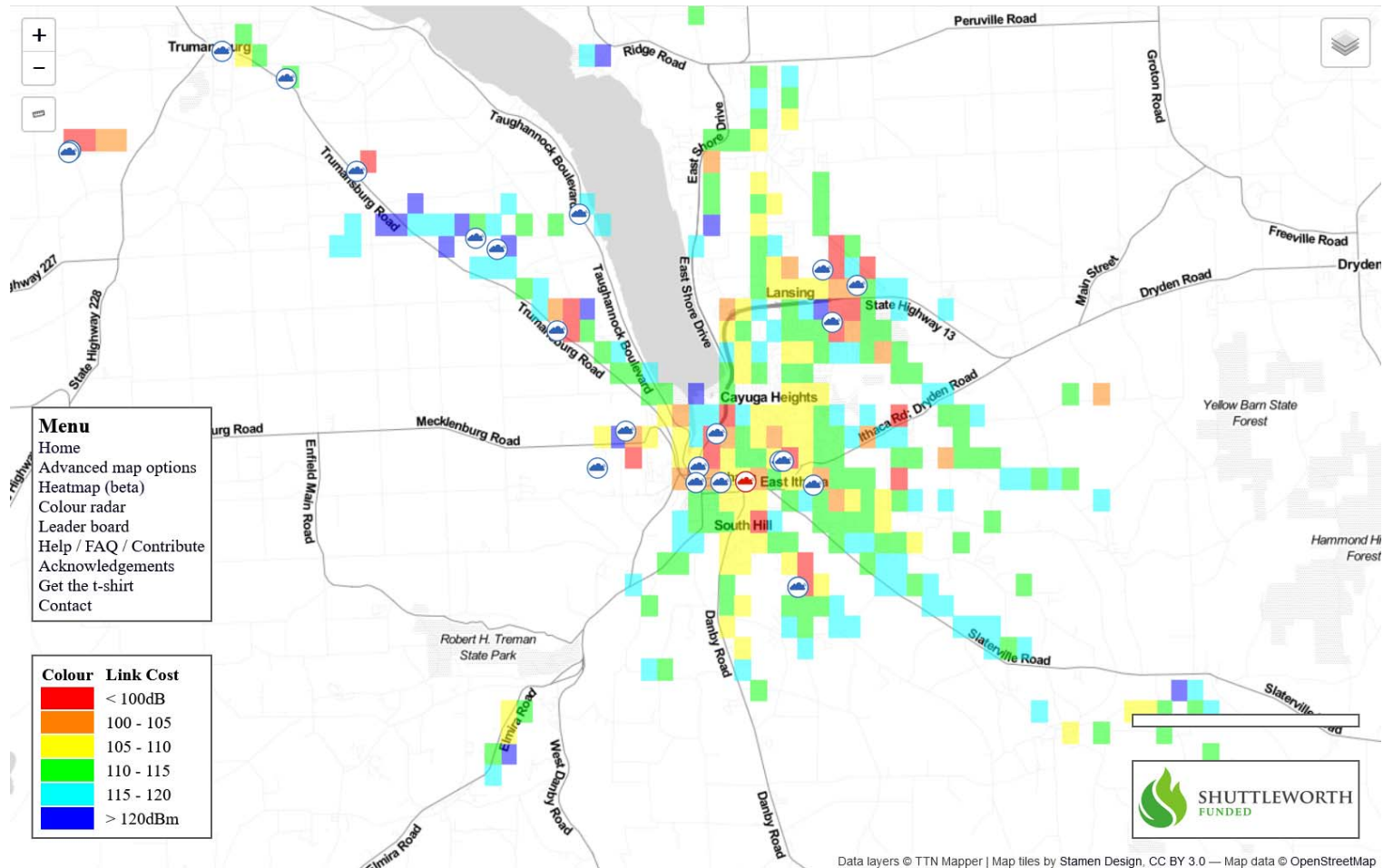
Our leadership role with this particular technology means that we stand a good chance of becoming a national center of entrepreneurial development if we play our cards right

The free and open nature of the TTN architecture makes it possible to create a perfect technical ecosystem for the entrepreneurial development of this technology just by putting the network up

Current TTNI Coverage (Calculated)



Current TTNI Coverage (Actual)

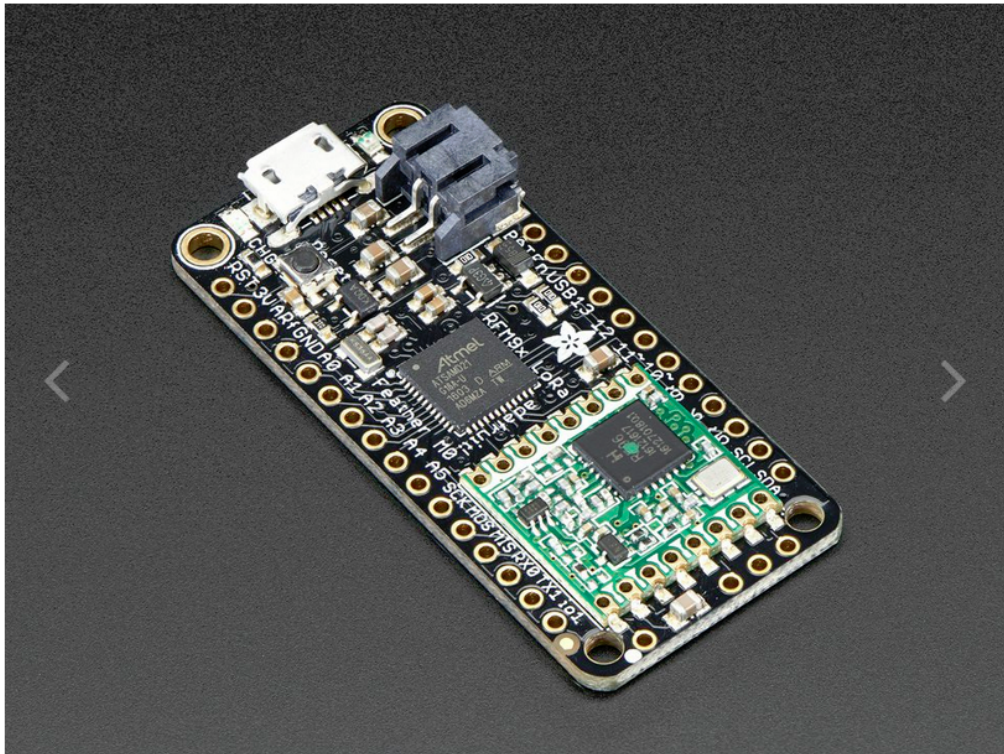


TTNI and Local Youth Development



A Tompkins County 4-H member assembles a prototype LoRaWAN sensor module (Cooperative Extension, 2016)

First Piece



Adafruit Feather M0 with RFM95 LoRa Radio - 900MHz - RadioFruit

PRODUCT ID: 3178

\$34.95
IN STOCK

1 [ADD TO CART](#)

- Also include 1 x Header Kit for Feather - 12-pin and 16-pin Female Header Set **(\$0.95)**
- Also include 1 x Stacking Headers for Feather - 12-pin and 16-pin female headers **(\$1.25)**
- Also include 1 x Lithium Ion Polymer Battery - 3.7v 1200mAh **(\$9.95)**
- Also include 1 x Lithium Ion Polymer Battery - 3.7v 350mAh **(\$6.95)**
- Also include 1 x Lithium Ion Polymer Battery - 3.7v 500mAh **(\$7.95)**
- Also include 1 x Short Headers Kit for Feather - 12-pin + 16-pin Female Headers **(\$1.50)**

QTY	DISCOUNT
1-9	\$34.95
10-99	\$31.46
100+	\$27.96

[ADD TO WISHLIST](#)

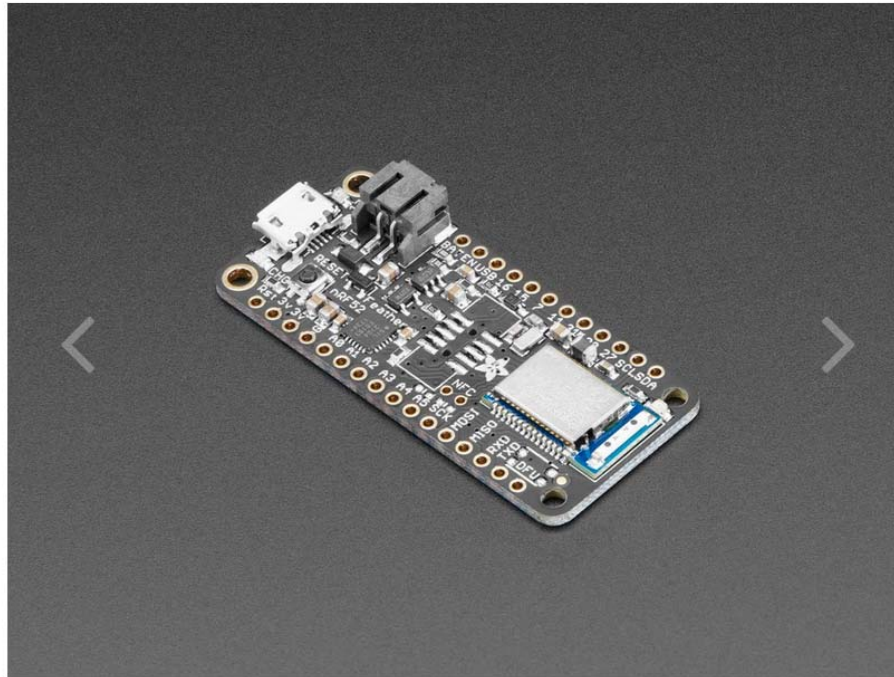
[DESCRIPTION](#)

[TECHNICAL DETAILS](#)

DESCRIPTION

This is the **Adafruit Feather M0 RFM95 LoRa Radio (900MHz)**. We call these *RadioFruits*, our take on a microcontroller with a "Long Range (LoRa)" packet radio transceiver with built in USB and battery charging. Its an Adafruit Feather M0 with a 900MHz radio module cooked in! Great for making wireless networks that are more flexible than Bluetooth LE and without the high power requirements of WiFi.

Second Piece



Adafruit Feather nRF52 Bluefruit LE - nRF52832

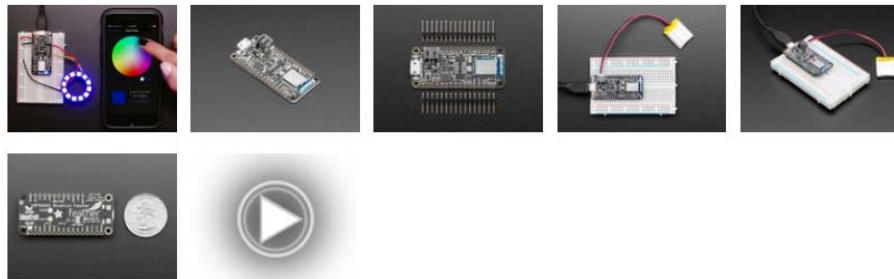
PRODUCT ID: 3406

\$24.95

IN STOCK

1 **ADD TO CART**

- Also include 1 x **Header Kit for Feather - 12-pin and 16-pin Female Header Set (\$0.95)**
- Also include 1 x **Stacking Headers for Feather - 12-pin and 16-pin female headers (\$1.25)**
- Also include 1 x **Lithium Ion Polymer Battery - 3.7v 100mAh (\$5.95)**
- Also include 1 x **Lithium Ion Polymer Battery - 3.7v 150mAh (\$5.95)**
- Also include 1 x **Lithium Ion Polymer Battery - 3.7v 350mAh (\$6.95)**
- Also include 1 x **Lithium Ion Polymer Battery - 3.7v 500mAh (\$7.95)**
- Also include 1 x **Short Headers Kit for Feather - 12-pin + 16-pin Female Headers (\$1.50)**
- Also include 1 x **SWD 0.05" Pitch Connector - 10 Pin SMT Box Header (\$1.50)**



DESCRIPTION

The Adafruit Feather nRF52 Bluefruit is another easy-to-use all-in-one Bluetooth Low Energy

QTY DISCOUNT

1-9 \$24.95

10-99 \$22.46

100+ \$19.96

A Bottomless Well of Local Possibilities

Local projects done or underway:

- Air pollution monitoring (Cornell)
- Air-source heat pump efficiency (Maplewood)
- Passive House efficiency (Ecovillage)

TTN NYC projects:

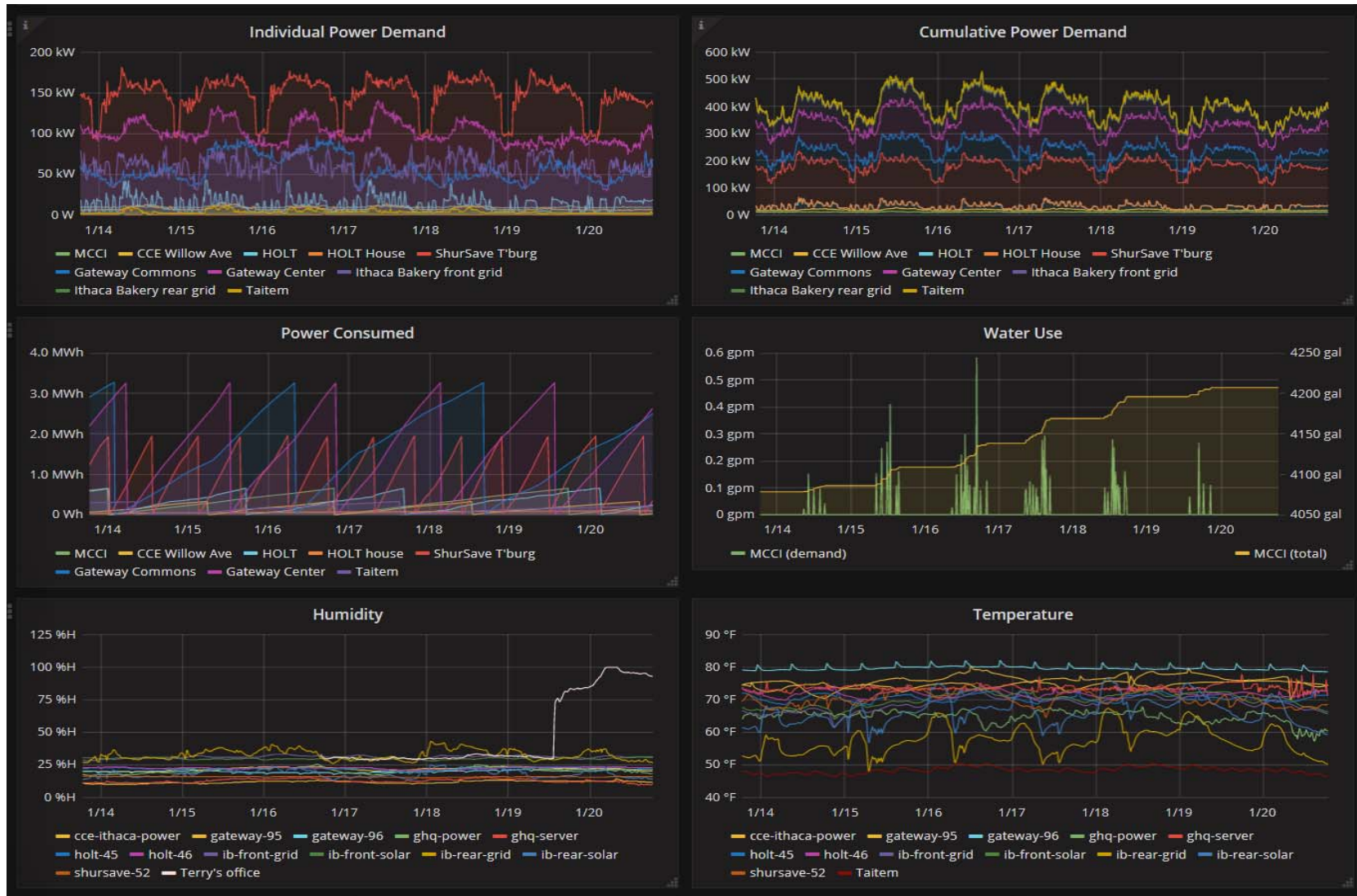
- Manhattan coverage (formally committed)
- Tenants' rights monitoring (heating, noise)

Local wish list:

- Road conditions (Danby)
- Ditch conditions (Trumansburg)
- All those agricultural applications

And then there's the big one so far....

Local Adoptions: Monitoring Energy Use



The County Gets Involved

- \$40,000 allocated in 2018 for 60 gateways
- Installations will include 11 county buildings
- The rest are to be distributed **free** in order to provide coverage over most of Tompkins County



Why Host a Gateway

- You will be inaugurating an important service at zero cost
- You will be promoting public ownership of the “internet of things”
- You will be fostering economic and youth development in our area
- The gateway is free
- If you have an internet router, no additional equipment is required
- We will install it
- It will have no impact on the performance of your network
- While perfect security can never be guaranteed, a gateway is vastly more secure than anything else you might have on your network
- Did I mention that it doesn't cost anything?

FYI

For further discussion, please contact me: bosak@pinax.com

To schedule a gateway installation, contact Terry Moore:
tmm@mcci.com

A brief overview of LoRaWAN technology applied to “smart city” initiatives can be found at

<http://ibiblio.org/bosak/opaque/IEEE-P2784-LoRa-draft.pdf>

For further information about The Things Network, see

<https://www.thethingsnetwork.org/>