Smart City Networks

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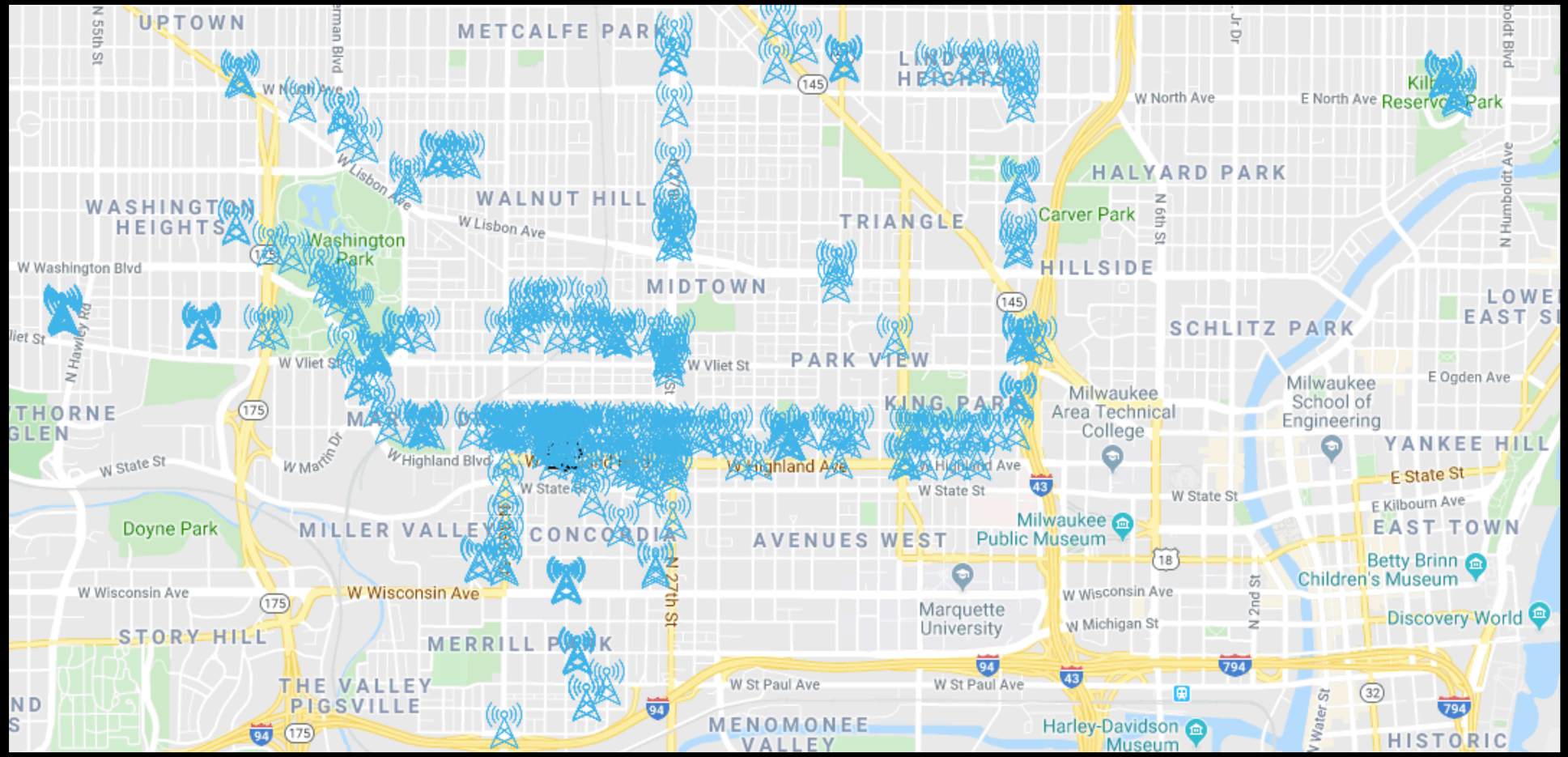
Quick Definitions

- **LoRa** - a low-power long range network technology. Utilizes low power long range technologies often through batteries or solar power using unlicensed bands. No approval needed here.
- **Cellular** - common method to deliver voice, video, text message, etc. using licensed communication radio. Examples are 3G, 4G, 5G, GSM…
- **Sensor** - a device which detects or measures a physical property and records, indicates, or otherwise responds to it.
- **Gateway** - allows sensor to send and receive data to the Internet or another network.



What is a Smart City Network?

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- Examples of Smart City Networks center around data collection and the sensors involved in this collection.

- The sensors need to be everywhere with the ability to send this information "off device". To get this data, a network of gateways need to be deployed and maintained within the coverage area.

- A perfect low-power solution is using LoRa (short for: long range), a low power, low data rate, unlicensed band technology. Thousands of off the shelf LoRa devices already support LoRa technology and legacy and new sensor can easily be developed to support it.

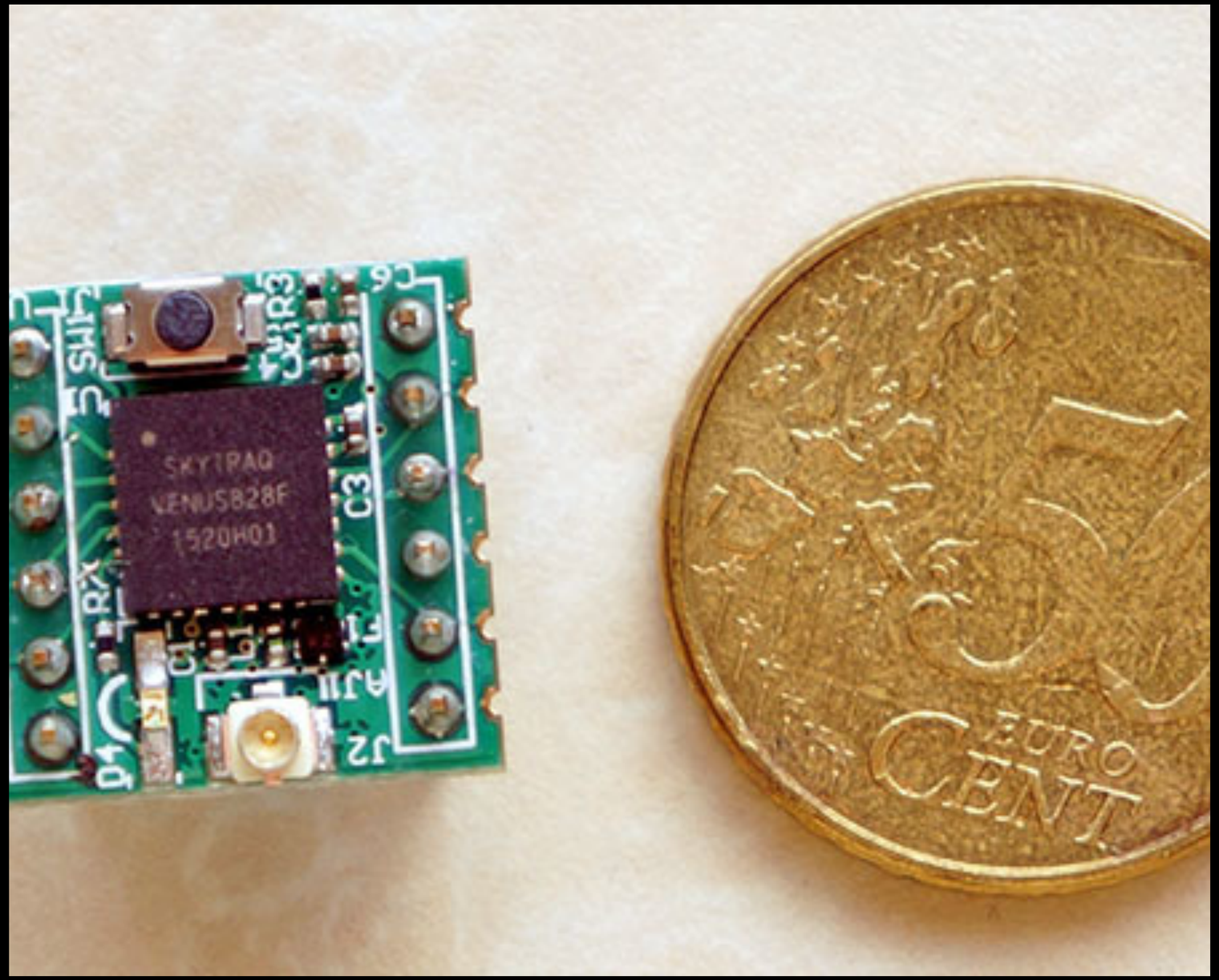
- Analysis and visualization of the data this network provides is the key goal.

Why?!

- To gather and perform analysis on the thousands of new data points provided to help in the gathering of information for new previously unattainable purposes.
- To open data collections up to that are now unavailable.
- To come up with unique solutions to problems that were previously not possible due to cost and power maintenance.
- To not be bound to single vendor solutions that might go away or change.
- To increase coverage of sensors in areas they currently are not feasible.

Use Cases

- Traffic detection (parking, gate access, speed)
- Agriculture (ground moisture, water timing, light levels, air quality)
- Environmental systems (temperature, weather, air quality, sound)
- Absence detection (fire, theft, on/off)
- Polling (restroom quality, wear and tear of equipment, out of order, service quality)
- Signage (updates to messages, sign light notifications)
- Monitoring (is the light on the gas building correct, what color is it now?)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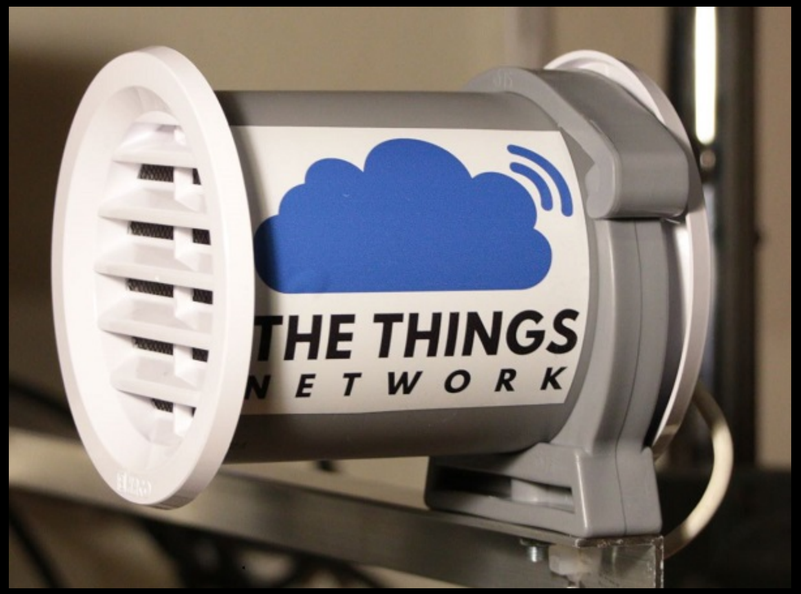
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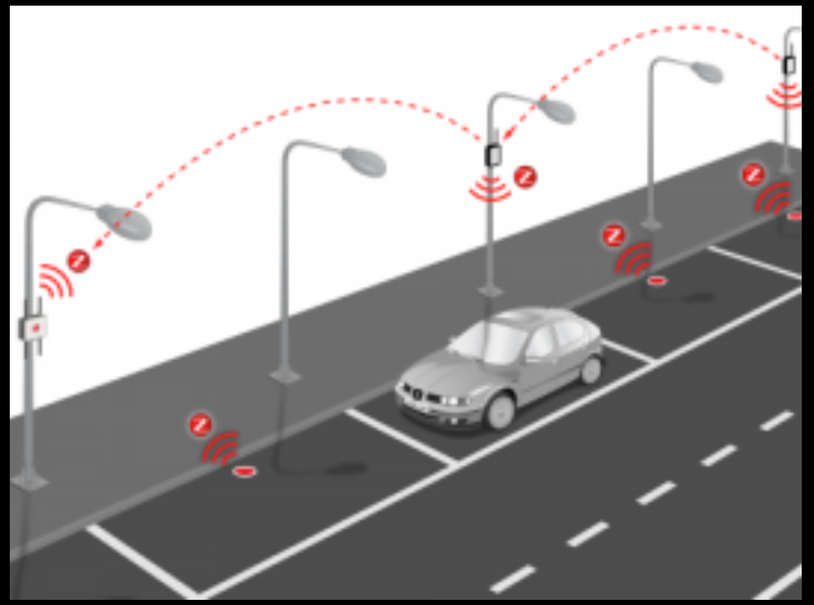

What exists now?

- Proprietary solution based on existing cellular (3G/4G/5G/GSM, etc…)
- Legacy wireless solution that are limited and end of life, they are going away.
- Emerging LoRa based networks that are starting to expand in the United States.
- US municipalities have not deployed widespread LoRa gateway networks.
- “Internet like” service is not available everywhere. Data needs to go somewhere.
- Overlay data from other traditional sources should be combined in the outcome.

Things you can do

- Think creative! What's not there yet?
- Think of open solutions, don't get data locked into a single repository or vendor. Don't let the data's delivery be locked in either.
- Make data available to others. Release data under GNU Public License (GPL) if applicable.
  - https://help.data.world/hc/en-us/articles/115006114287-Common-license-types-for-datasets
- Reevaluate previous ideas to see if they can be done now.
- Get data off sources aren't doing anything.
- Data and sensor people are your friends!

How do I do this?

- Build and maintain your own LoRa gateway network.
- Utilize a prebuilt network.
- Start small, grow.
- The roll-outs of these networks are accelerating.
- Be active in development and acceleration of LoRa.
- Work to make sensor networks more open.

Demo