SECURE HOME GATEWAY PROJECT

- PROTOTYPE VISION
- SYSTEM ARCHITECTURE
- DEMO
- NEXT STEPS

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BUILDING A BETTER ONLINE CANADA

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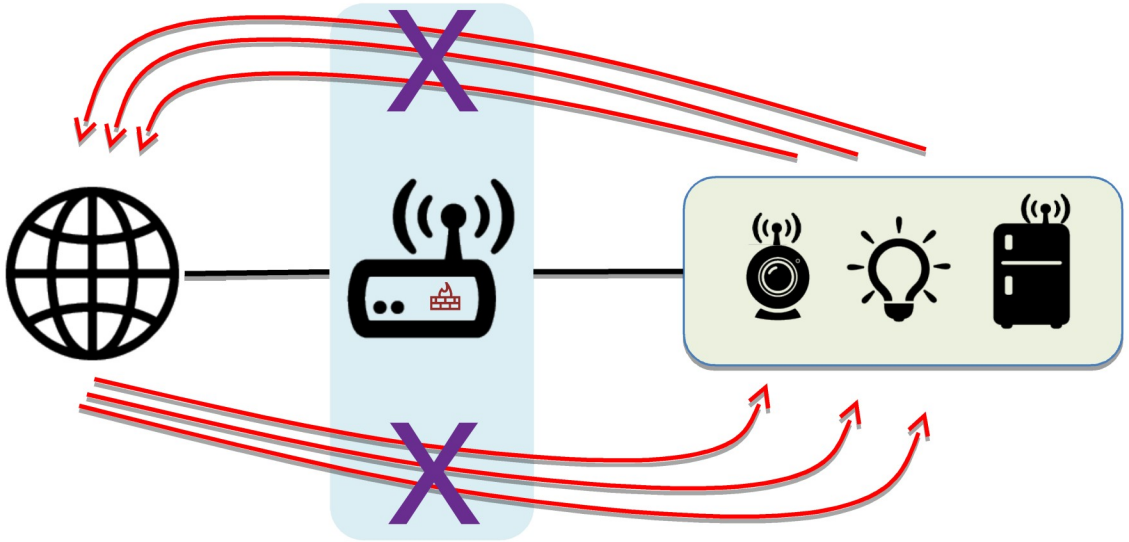
These slides at:
https://goo.gl/4q9RSX

Secure Home Gateway (SHG) Primary Project Goal

- The primary goal of this project is to develop a secure home gateway that;
  - **protects** the internet from IoT devices **attacks** and
  - **protects** home IoT devices from the internet **attacks**

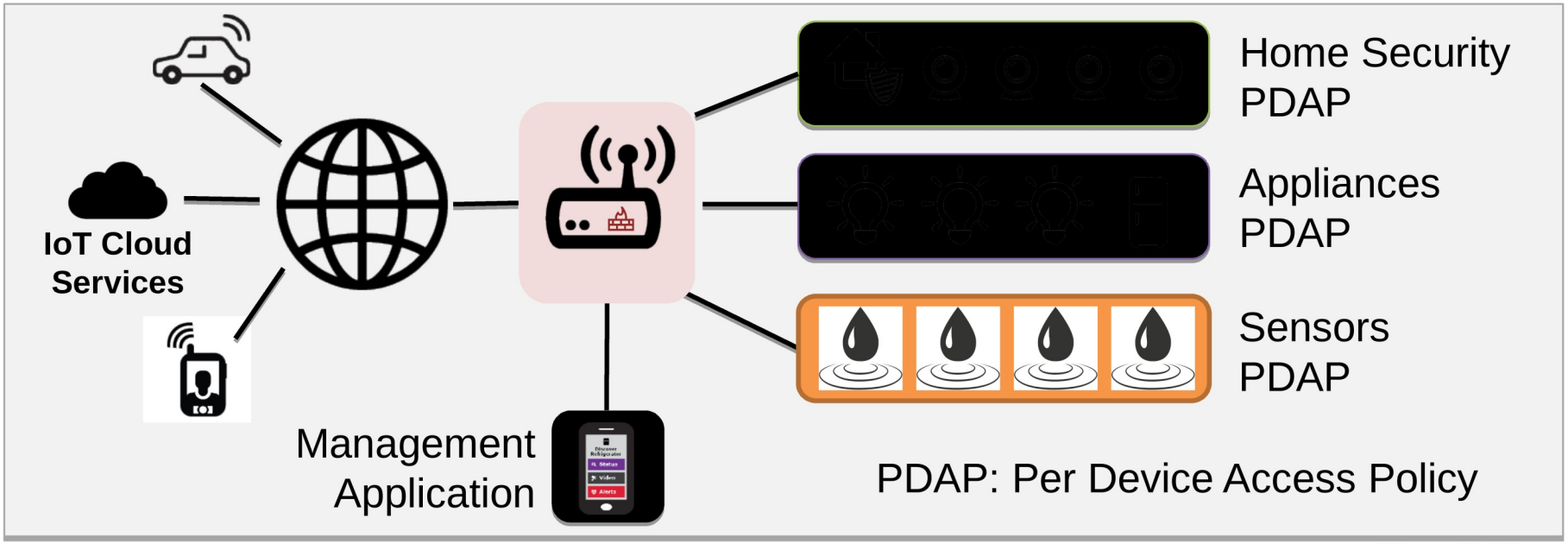


Why are we working on this?
-> Risk mitigation

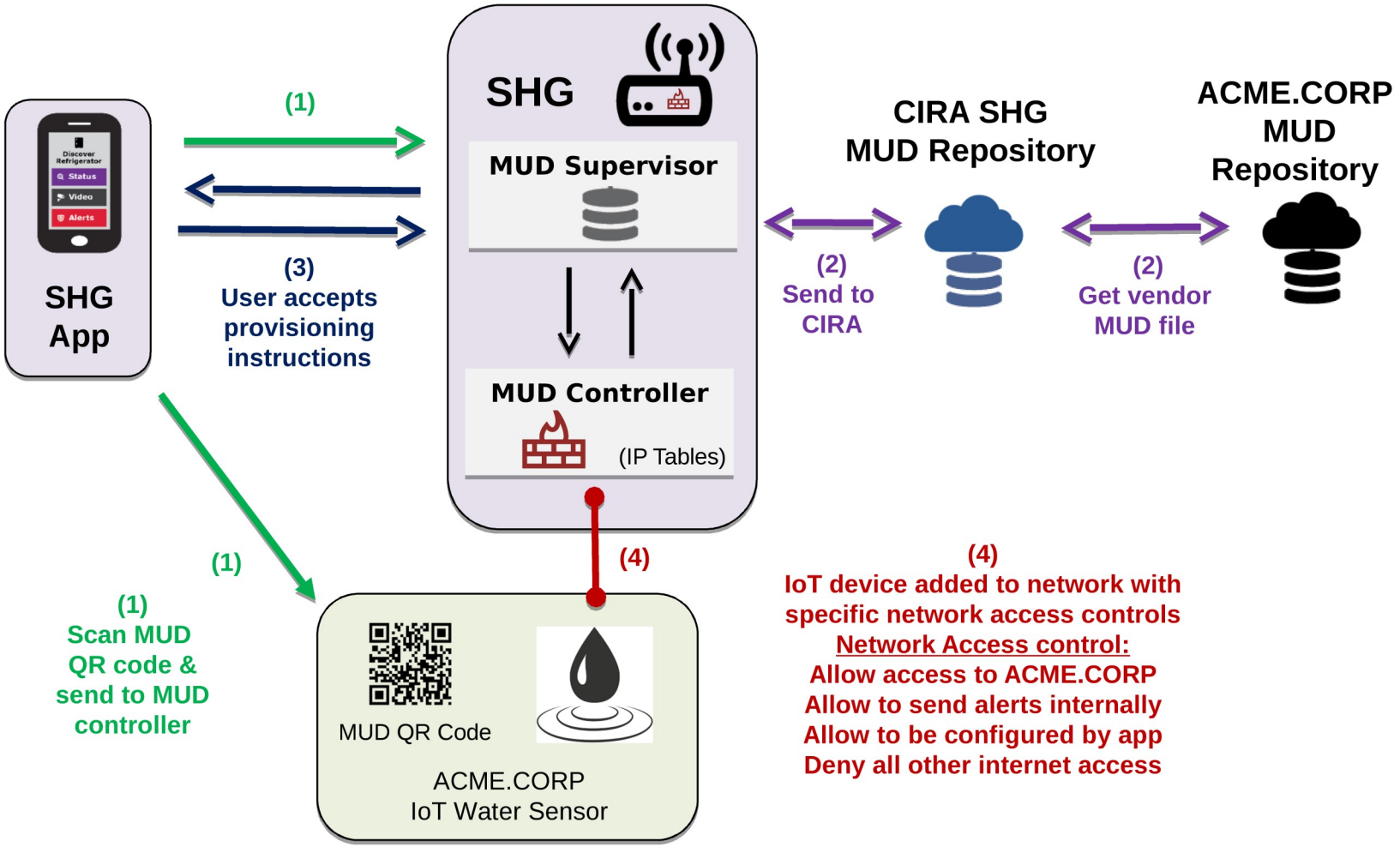
- For many internet organizations like CIRA the #1 risk on the risk register is a large scale (Dyn like) DDoS attack.
- One of the mitigation mechanisms for this risk is to prevent ‘weaponization’ of IoT devices
- Tightly controlling access ‘to’ and ‘from’ IoT devices inside the home or small office network is key to preventing ‘weaponization’ and causing harm on the internet.
- The **threat** that **IoT devices** bring is the **scale of attacks**. The uncontrolled access of million/billions of IoT devices to and from the internet is the threat we need to mitigate.

How can we protect IoT devices?
-> Best practice & new standards

- Rule #1: Identify IoT devices on your home network
- Rule #2: Place a policy around the IoT device that restricts it to a specific function (default is no access)
- Rule #3: Monitor for behavioural changes in the device and quarantine at the first sign of change.

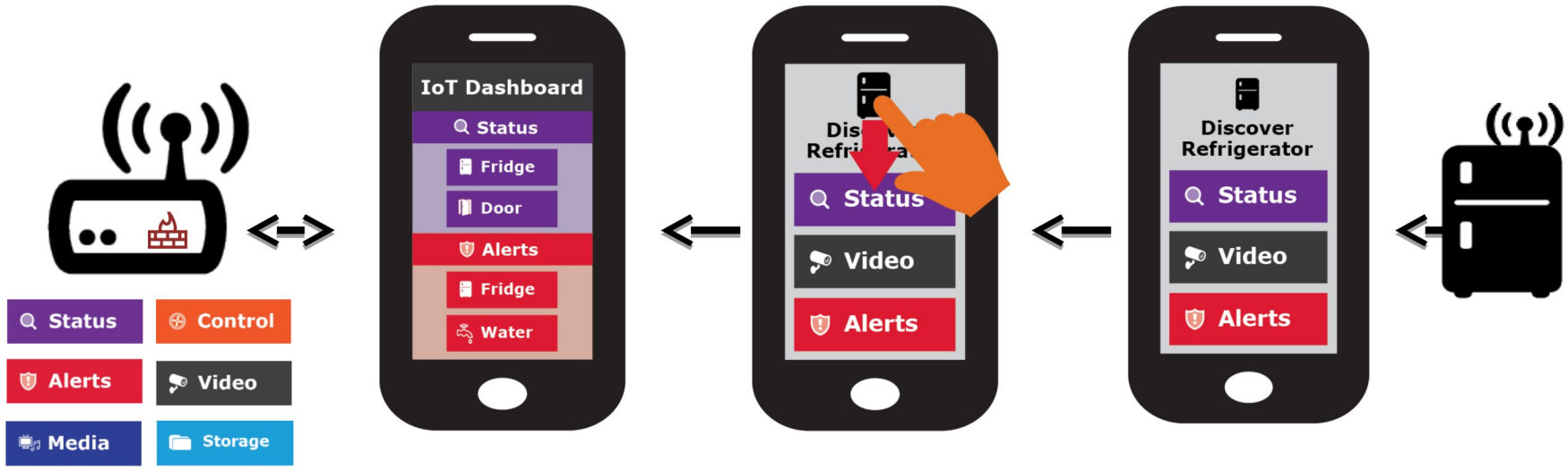


High Level MUD & IoT Device Provisioning Workflow



Simple user interface is key to this project: **Swipe UP, DOWN, LEFT and RIGHT**

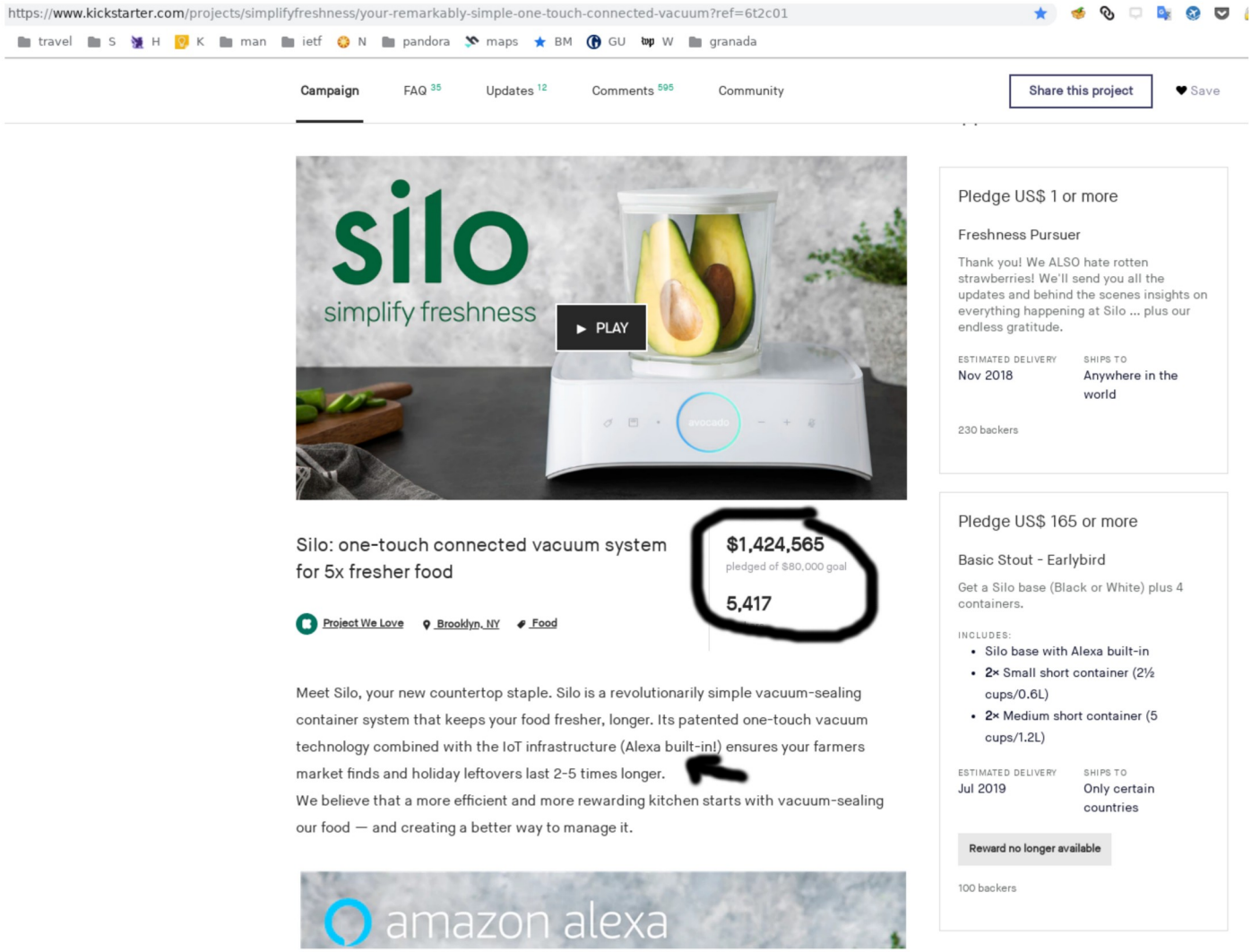
- Gateway provisioning, device discovery, device provisioning must be as simple as possible, intuitive for non experienced users, available as framework for default open source app.



Tinder for IoT Devices!

You guess it! That's why we need a **simple provisioning interface** this stuff is complex!

DEMO VIDEO:
https://www.youtube.com/watch?v=LauvEBa4Z4s



Real IoT Device:
https://www.kickstarter.com/projects/simplifyfreshness/your-remarkably-simple-one-touch-connected-vacuum

Next Steps

- Move from hydrid OpenWRT/CZ.NIC firmware to pure OpenWRT firmware on Omnia Turris.
  - Look for alternate (cost-reduced) device platforms
- Integrate .NL Labs (SIDN) SPIN code, which does more behaviour based analysis of code.
  - Look at integration with NTOP's nDLP as well.

Risk of too many chefs in kitchen!

- More work at IETF: need some MUD extensions for firmware update, bandwidth quotas.
- Enrollment and bootstrap of devices: working with WiFi Alliance on making DPP deployable

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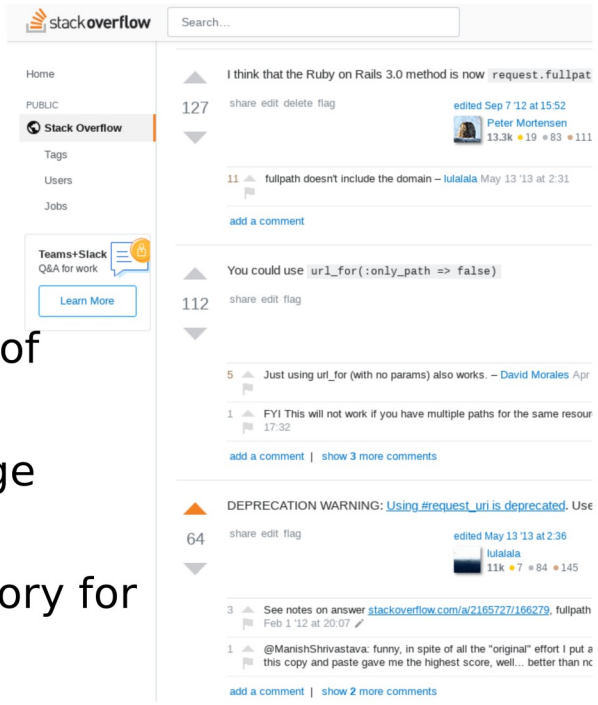
Things we need help with



- We need MUD profiles to be created for a wide variety of devices.
  - Can not depend upon manufacturer to provide usage descriptions.
  - Need to create a **curated, crowd sourced** repository for MUD profiles
    - Could be as simple as github repo.
    - Better if it is uservoice, or stack-overflow like.
    - Curators will need to be compensated.
  - Need a visual MUD file editor (single page browser app)
    - And a way to compare to MUD files visually
    - (good job for a Co-OP, but needs ongoing support)
- There is an open question about liability for DDoS attacks.
  - Figuring out who pays will determine who is going to make the investments above!

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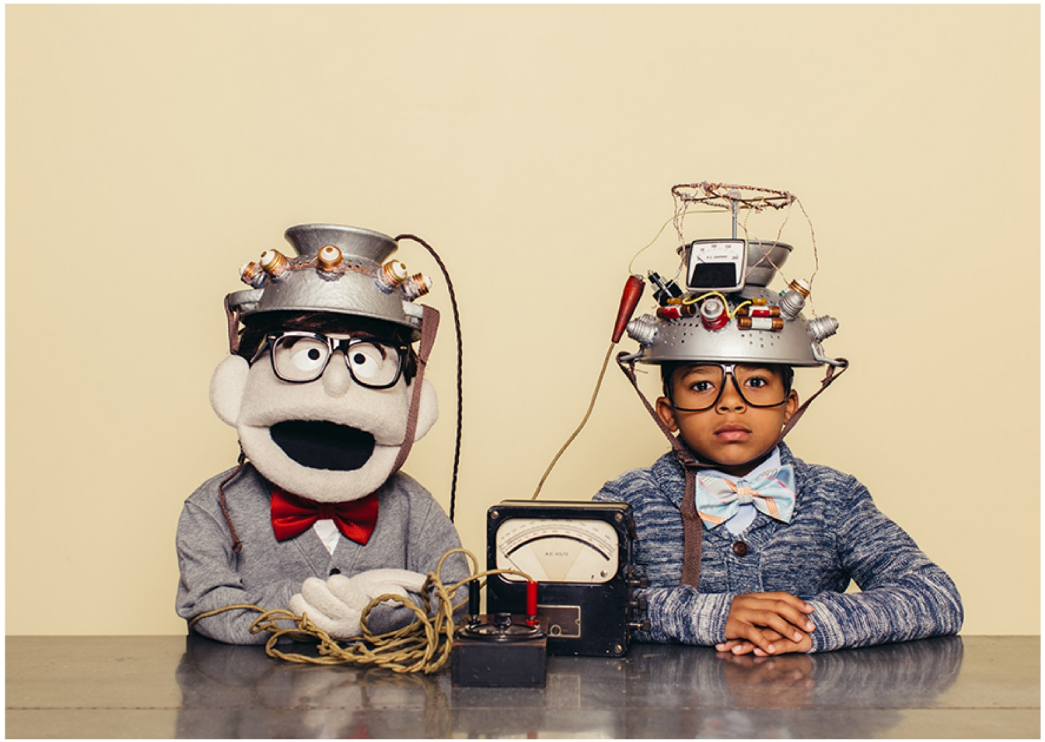
What do you think?

https://goo.gl/4q9RSX



Project Information
https://github.com/CIRALabs/Secure-IoT-Home-Gateway

Prototype code
https://github.com/CIRALabs/