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IoT Light Bulb Covert Channel

Extended Functionality Attack on Smart Lights

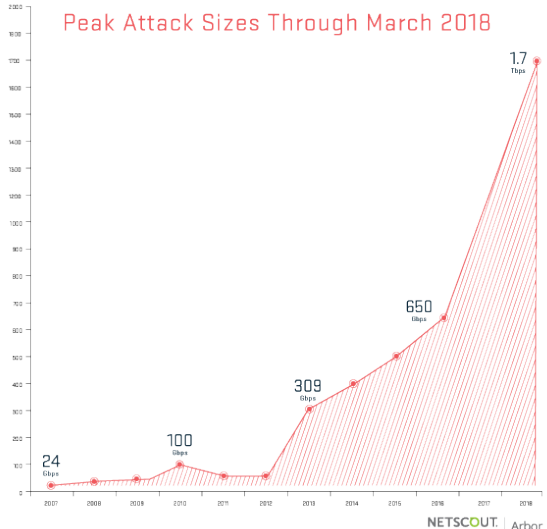
Julia Wanker, Bennett Piater

Taxonomy of IoT Attacks

1. Ignoring Functionality
2. Reducing Functionality
3. Misusing Functionality
4. Extending Functionality

Ignoring Functionality

Ignoring Functionality



Reducing Functionality

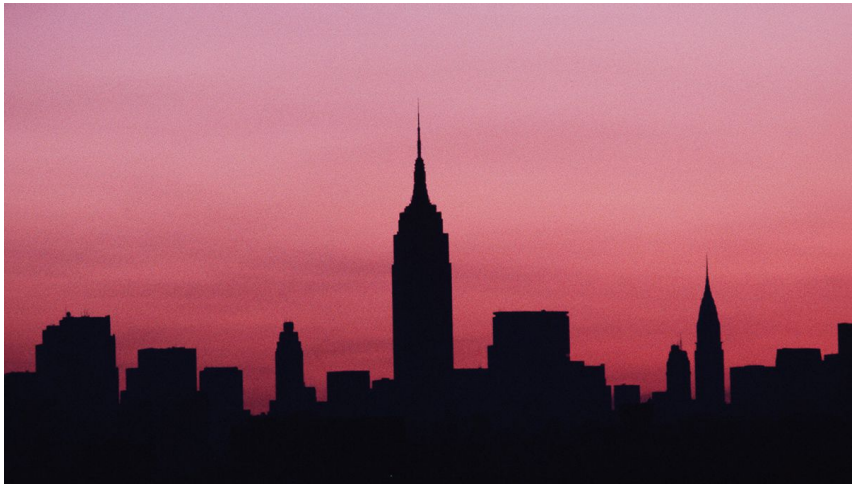


Figure: NYC Blackout of 1977 (Allan Tannenbaum/Getty Images)

Misusing Functionality

Create Discomfort

- Heat in summer, AC in winter
- Flash bedroom lights at night
- Turn on AC in bathroom in the morning

Generally be Annoying

- Turn on lights
- Open Faucets
- Run Washing Machine

Misusing Functionality

Create Discomfort

- Heat in summer, AC in winter
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Generally be Annoying

- Turn on lights
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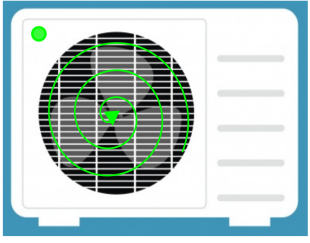
. . . when the owners leave for vacation.

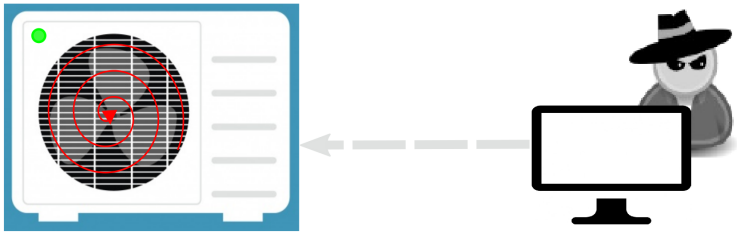
Extending Functionality

Possible Extending Functionality Attacks

- Open front door with smart household robots
- Start a fire with an AC

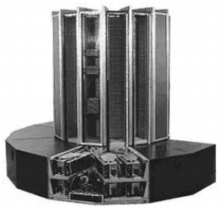


Extending Functionality

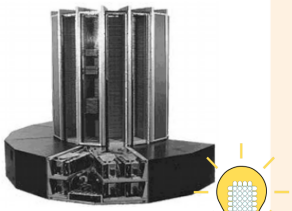


Extending Functionality

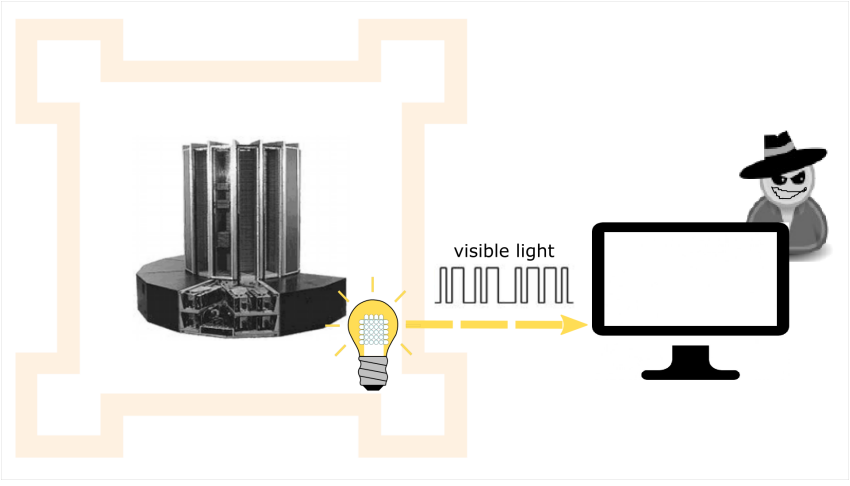
Extending Functionality - The Case of Smart Lights



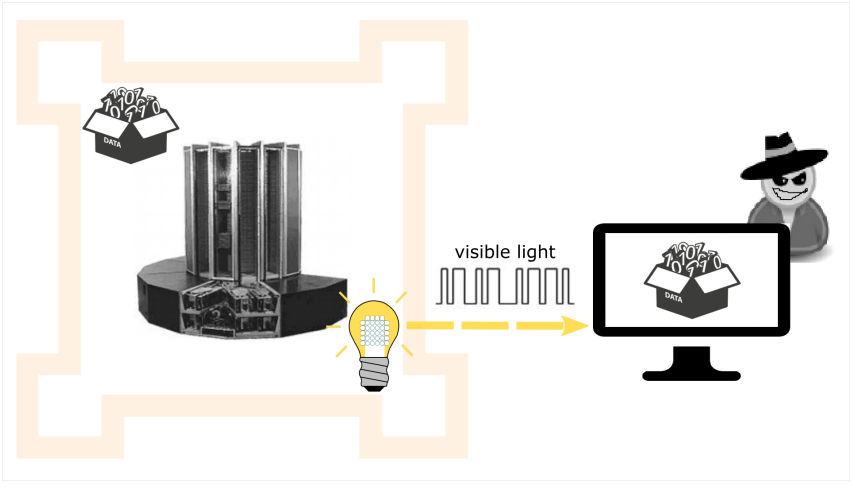
Extending Functionality - The Case of Smart Lights



Extending Functionality - The Case of Smart Lights



Extending Functionality - The Case of Smart Lights



Ronen, Shamir Paper

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Requirements for Covert Channel

Correctness

Switch between 2 brightnesses that can be robustly distinguished by a sensor.

Covertness

Use brightnesses so similar or switch so fast that a human cannot distinguish them.

Questions?

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