IOActive Inc Presents
Licensed by Sunshine
Cracked by:
Mad Brad.

Last year at Defcon 24 Acidgen presented Light Weight Protocol! Serious Equipment!
The findings where highly severe, however the initial response was weak.
Acidgen Pushed on, And got the worlds attention on the MQTT protocol...

For those who didn't read the bio:

Work for IOActive
Been breaking things since age 16
Was part of Corelan (Hi PVE!)
Pentests, Fuzzing, Exploit Dev, Webapps and IoT
Twitter: @acidgen

Who in here has heard bout MQTT before?
Who in here uses MQTT?

The easiest "Hack" on BlackHat this year
How people can do severe damage
What things I found

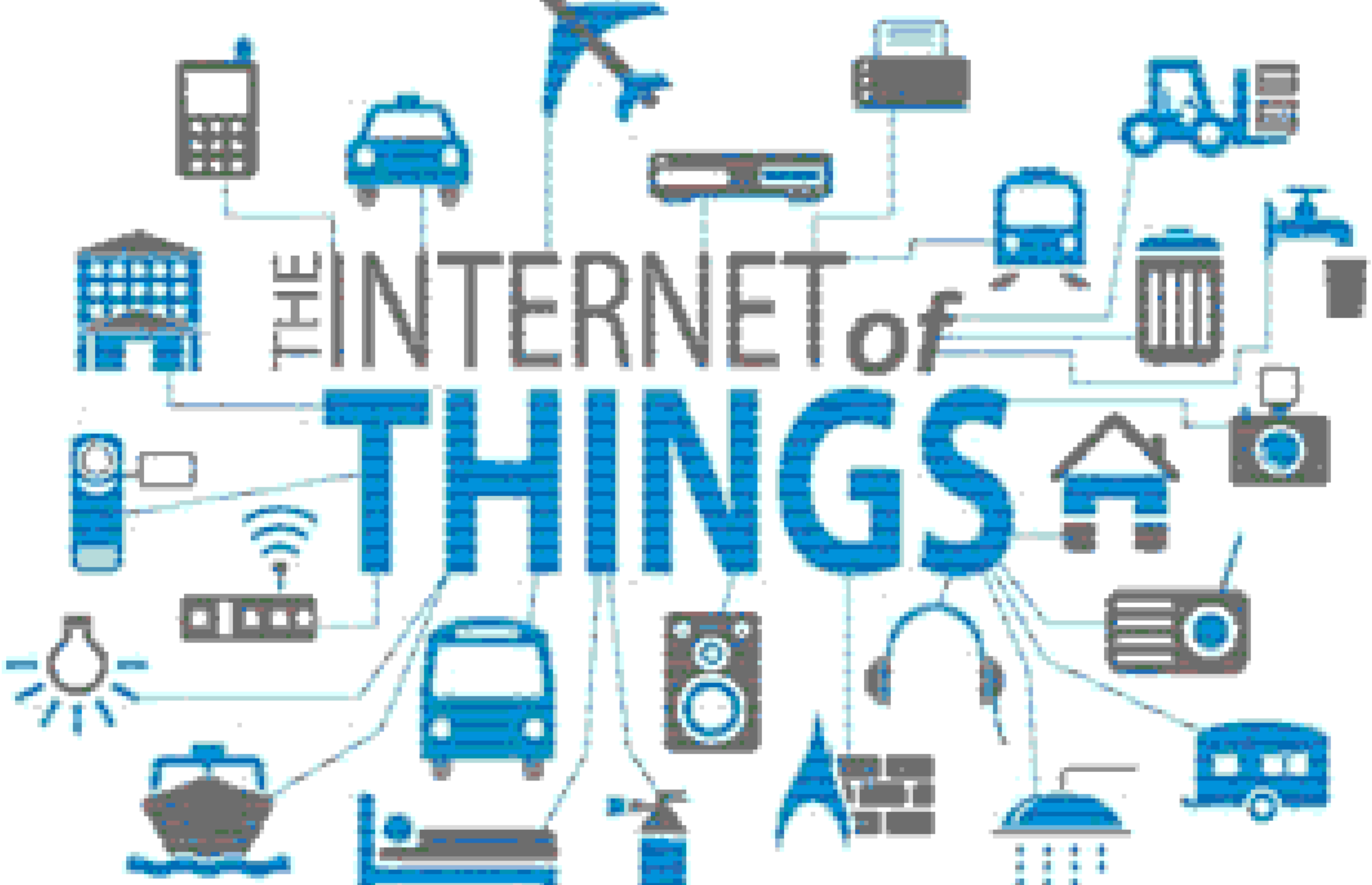
And how to use this protocol securely

Meanwhile....

All your base are belong to us....

```
sensor/radiation/cpm: 33
sensor/radiation/uSv: 0.18
```

http://bit.ly/1NJ6CtA


THE INTERNET of THINGS

Invented 1999-2000
Andy Stanford Clarke + Arlene Nipper = MQTT
Was IBM, Given to OASIS 2013 - OPEN SOURCE
Port 1883 and 8883 (Secure-MQTT)

Fast
Bandwidth Efficient
QoS
Able to deliver messages for offline clients
M2M Coms

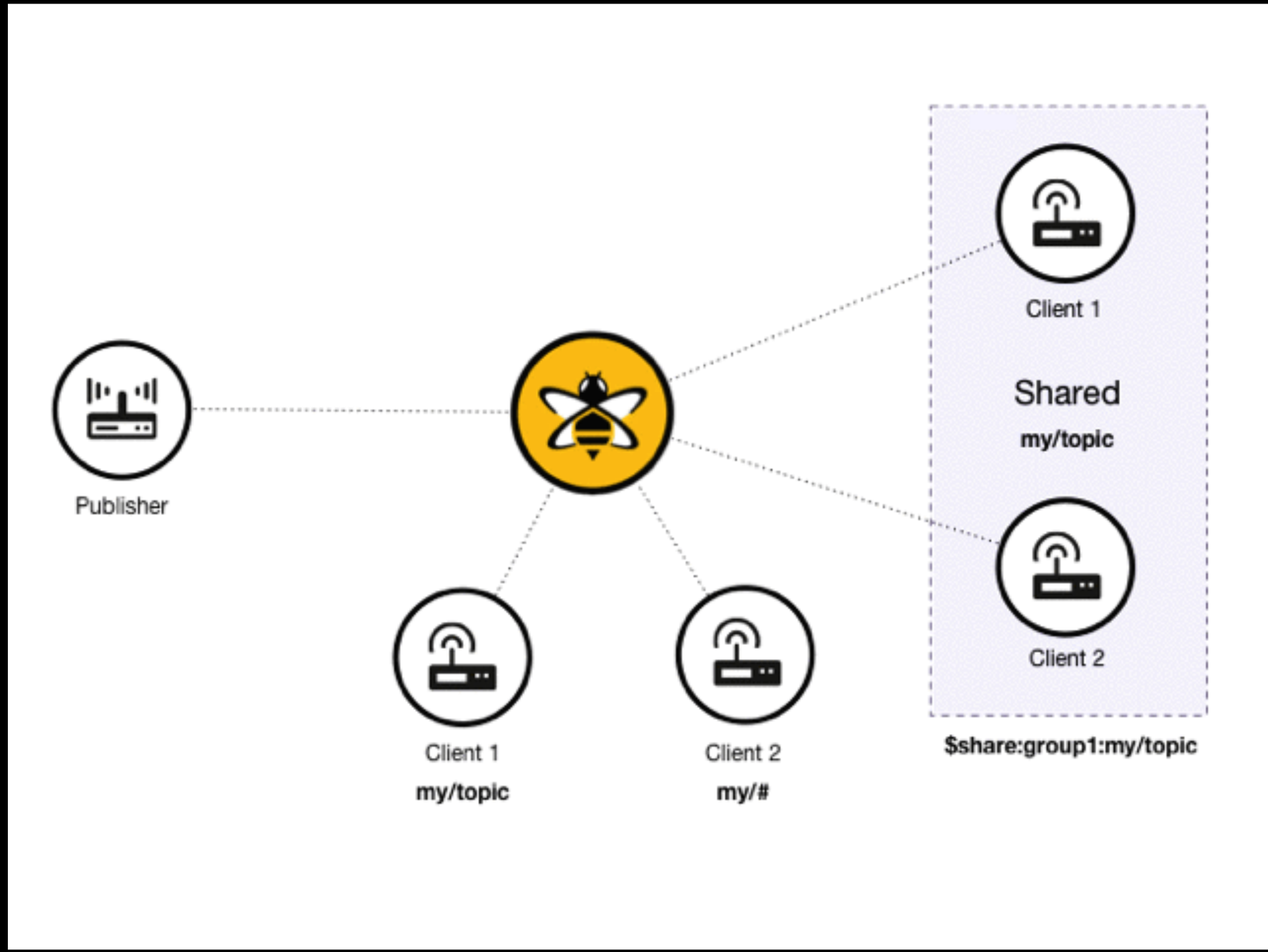


Image by HiveMQ

Topics are like small channels
These channels can work as identifiers

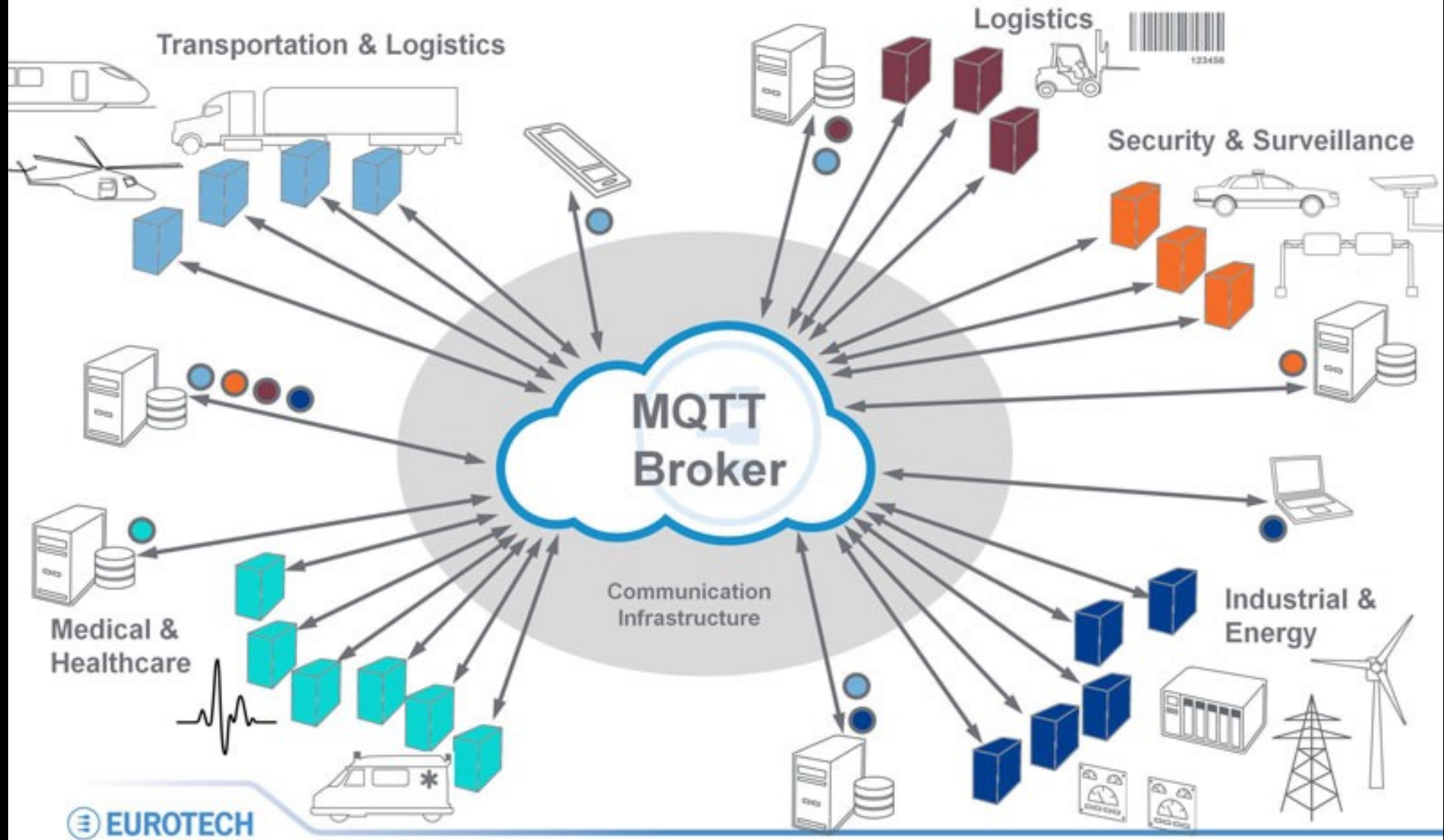
Sensor in Attic might send to:
myhome/Attic/temp
You phone listens to:
myhome/Attic/temp
And gives you the last know temp reading


CAN YOU DEMO THE BASICS?


sheepfilms.co.uk

The Internet of Things

Decoupling Producers & Consumers of M2M Device Data



From the manual:

- Devices could be compromised
- Data at rest in Clients and Servers might be accessible
- Protocol behaviors could have side effects (e.g. "timing attacks")
- Denial of Service (DoS) attacks
- Communications could be intercepted, altered, re-routed or disclosed
- Injection of spoofed Control Packets

MQTT solutions are often deployed in hostile communication environments

Protection:

- Authentication of users and devices
- Authorization of access to Server resources
- Integrity of MQTT Control Packets and application data contained therein
- Privacy of MQTT Control Packets and application data contained therein

Protection is rarely used....
What did Shodan say way back?
Around 17.000 Brokers with data:

1883
tcp
mqtt

```
MQTT Connection Code: 0

Topics:
ActiveMQ/Advisory/MasterBroker
ActiveMQ/Advisory/Consumer/Topic/#
```

Scanning the entire internet. There is an increase..

Defcon24: Around 59.000
Blackhat 2017: Around 87.000

Then again; Robust increase, or more temporary devices available at that exact moment

Using Masscan, subscribing to the #
Listening for 10 seconds....

Due to the sensitive nature of the findings they have been redacted from online view

What happens if you take data from MQTT,
And just place that on a Webpage?

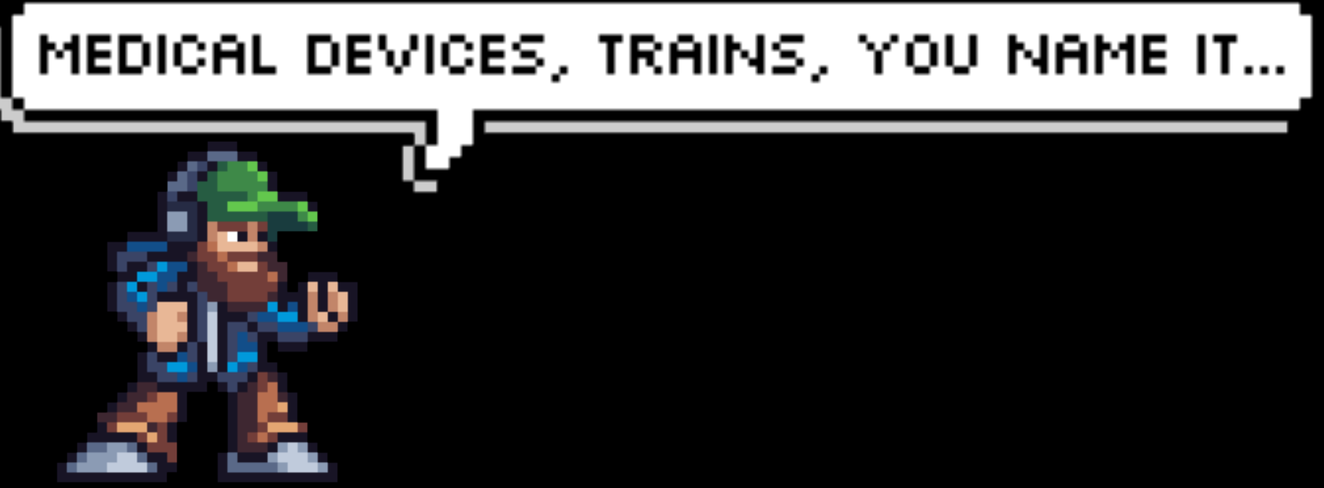
THIS EXAMPLE HAS BEED REDACTED FROM ONLINE VIEW, WILL ONLY BE SHOWN LIVE

THIS EXAMPLE HAS BEED REDACTED FROM ONLINE VIEW, WILL ONLY BE SHOWN LIVE

PARTICLE ACCELERATOR LIVE DEMO

Joffrey alex@0xdeadcode.se

The MQTT Bruteforcer
DEMO



REDACTED 4 SLIDES

What can you possibly do?
1) Are you sure you want to expose this?
2) Are you sure you want to expose this?
3) Are you su.....
4) Encryption
5) Username / Password
6) Unique Device ID
7) Pinned Certificates

Reversing Hardware
Stealing Certificate
Stealing Username / Password
Connecting to the Broker
Subscribing to #

There are people / Services forcing you to do it right.
Amazon, IBM Watson
I want to FORCE U/P/E

Did a small test on a Device hooked to the Amazon Cloud. It threw me out head first.

This is for IoT in General
Don't just set it up
Don't just follow the N N N F
Think about WHAT you are doing
Or...

Internet of Things Teddy Bear Leaked 2 Million Parent and Kids Message Recordings

THANK YOU

Twitter: @acidgen