

# Better Smart Seals with IoT

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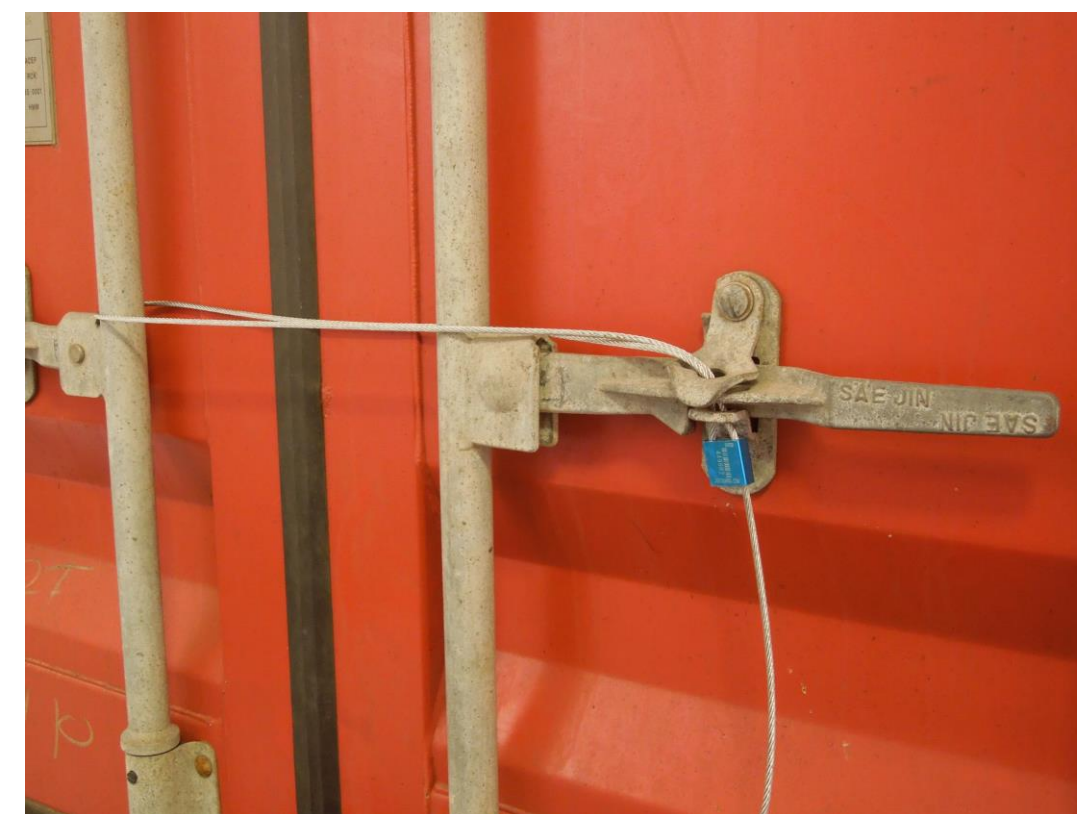
# Seals, not locks





# Traditional plastic or bolt seals

- Store evidence of opening
- Easy to fool
- Tamper indication misses time or place





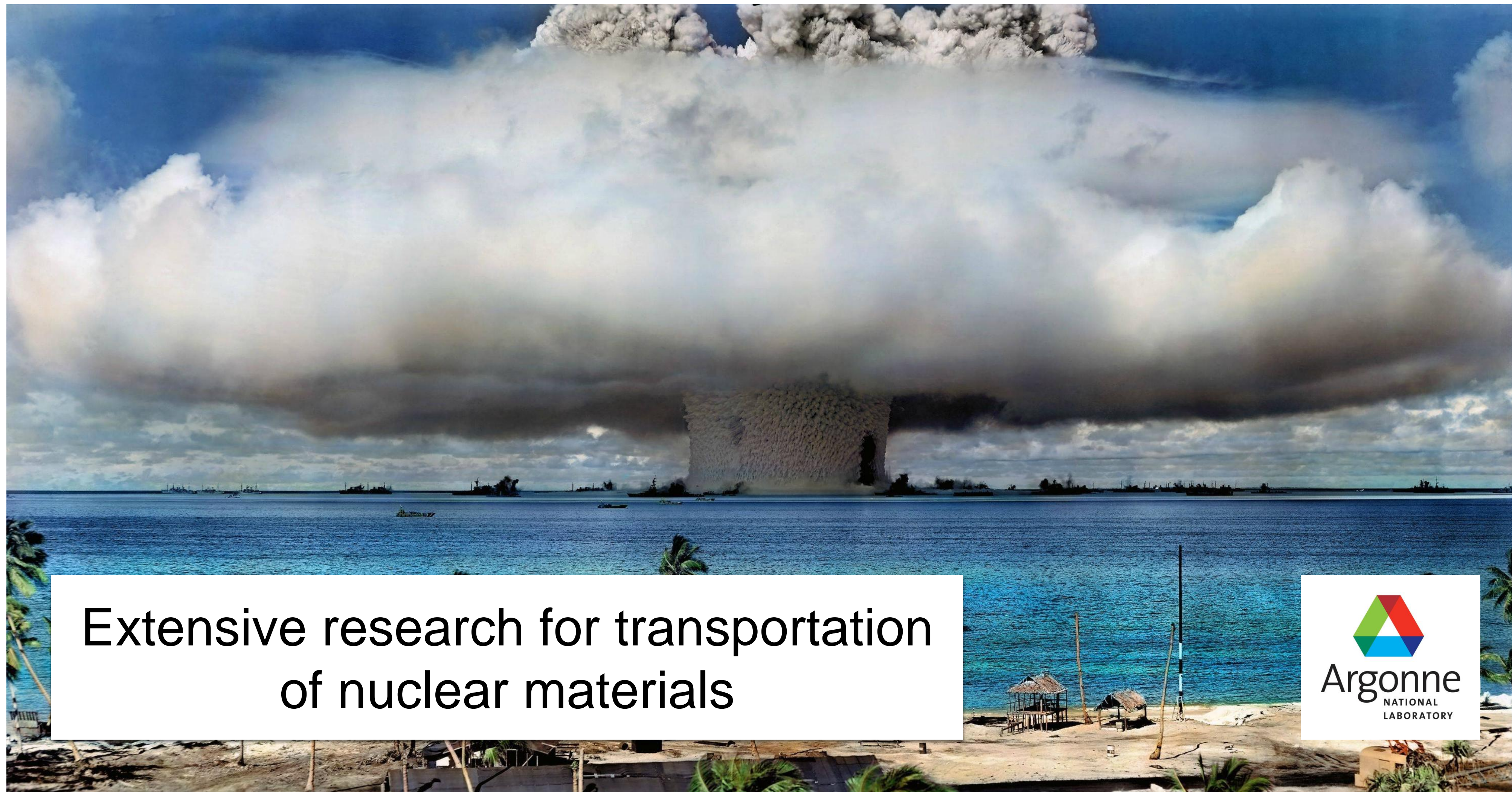
# Traditional electronic seals

- Expensive, proprietary
- Power hungry
- Asset based, requiring installation





# How good are traditional seals?



Extensive research for transportation of nuclear materials





# Not great...

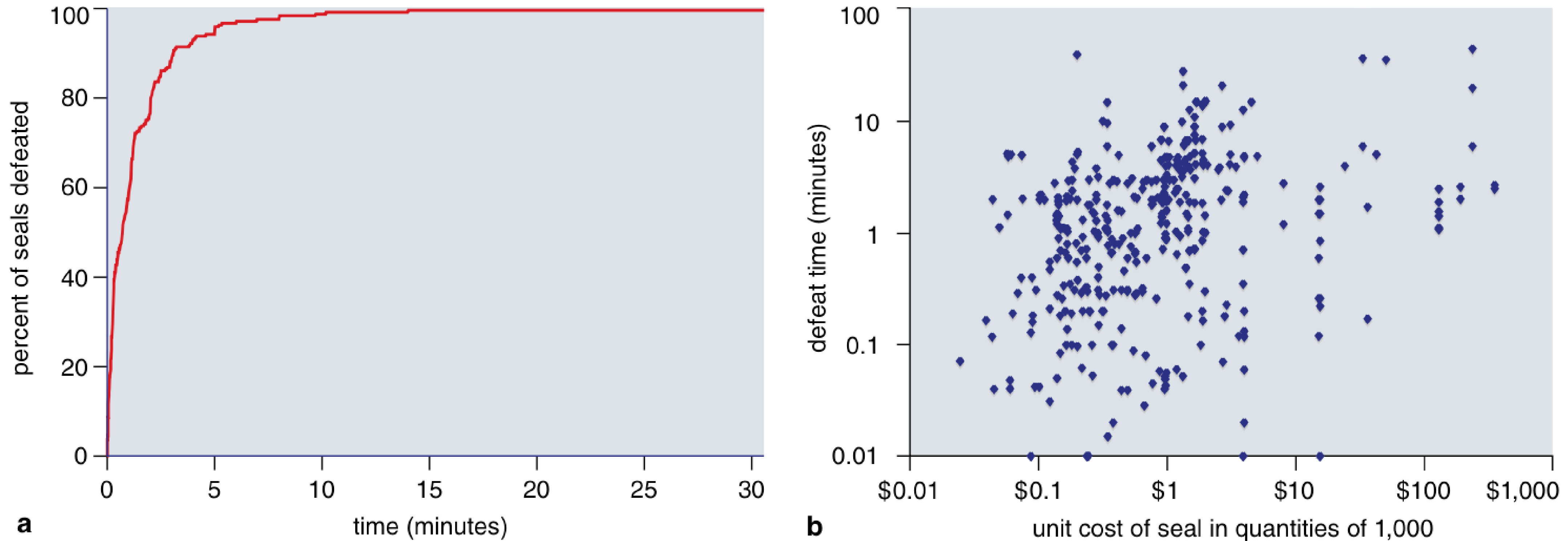


Figure 6. Tests of 244 different seal designs showed that most were relatively easy to attack. The majority could be defeated—removed and replaced without evidence—by one person working alone within about two minutes, and all of these devices could be thwarted within about 30 minutes (*left*). More expensive seals were not less vulnerable. A plot of 393 different attacks on these 244 seals shows very weak correlation between defeat time and cost (*right*). On average, spending an extra dollar per seal only increased the time to defeat the seal by 0.3 seconds.

# The internet...

This YouTube video player shows a presentation titled "Metal Cable Seal" from DEF CON 19. The video content includes a close-up of three different types of metal cable seals: one with a pink label "GUSTAV 147155", one with a blue label, and one with a blue label "SAMPLE 00000000". A presenter is visible in the background. The video player interface shows a progress bar at 2:54 / 14:30.

DEF CON 19 Hacking Conference Presentation By datagram Introduction to Tamper Evident Devices Video clip2

This YouTube video player shows a technical demonstration titled "Method of unlocking the mechanism without changing the seal number". The video content features a close-up of a hand using a needle to pierce a plastic pane on a security mechanism. A red arrow points to the needle's tip. Text on the right explains: "To get access to the loading platform, the driver pierces with needles the plastic pane protecting drums with numbers. This way the drums are prevented from rotation while the seal number does not change." The video player interface shows a progress bar at 0:39 / 1:11.

Pickina. tamperina and hackina: Secureseal Reusable Seals

This YouTube video player shows a close-up of a high-security tamper-proof bolt being manipulated with a tool. The video content is a 3D-rendered or high-quality close-up shot of the bolt's mechanism. The video player interface shows a progress bar at 0:10 / 0:16.

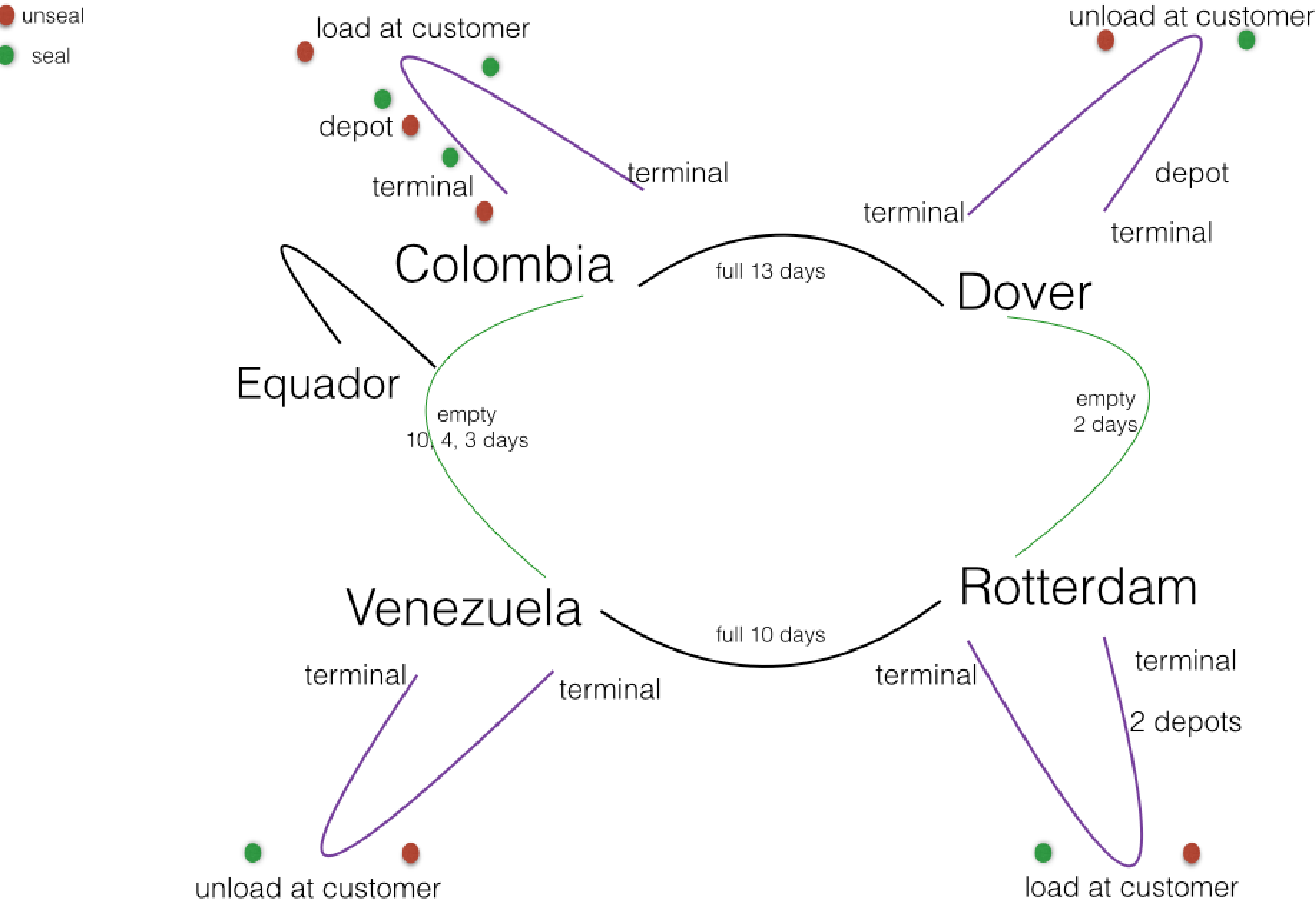
Tampering and Opening a High Security Tamper Proof Bolt

This YouTube video player shows a person using a tool to open a metal container. The video content is a close-up of the person's hands and the tool interacting with the container's locking mechanism. The video player interface shows a progress bar at 1:04 / 4:01.

Como abren los contenedores



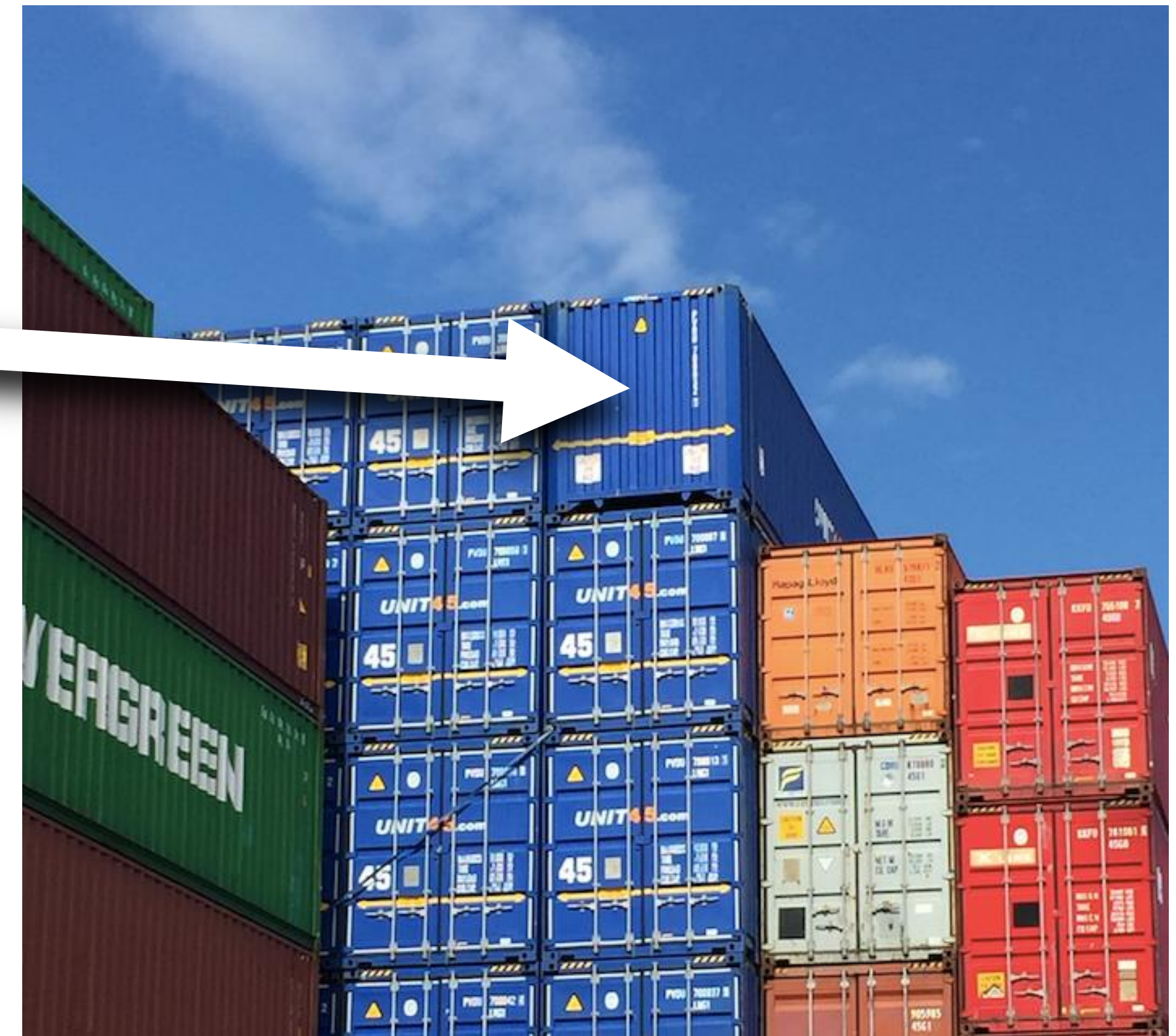
# Complicated tradelanes make matters worse





# Anti evidence seals are better

- Device is inside the container
- Stores evidence of staying closed
- Wipes evidence when container opened





# Using new technology

- Internet of things
  - ARM chips
  - Bluetooth chips
  - LoRaWan



telecompaper

HOME MOBILE & WIRELESS INTERNET : GENERAL : FIXED : IT :

MOBILE & WIRELESS

## KPN tests LoRa amid metal sea containers

Thursday 9 July 2015 | 20:52 CET | News

KPN and developer Itude said they have tested the LoRa network at a container depot Tweede Maasvlakte. LoRa is the 868 MHz mobile network for Machine-to-Machine (M2M) applications developed by KPN. The test revealed that radio signals can pass through steel sea containers. The results show possibilities for logistics applications. Itude is a specialised developer of mobile applications for the industry.

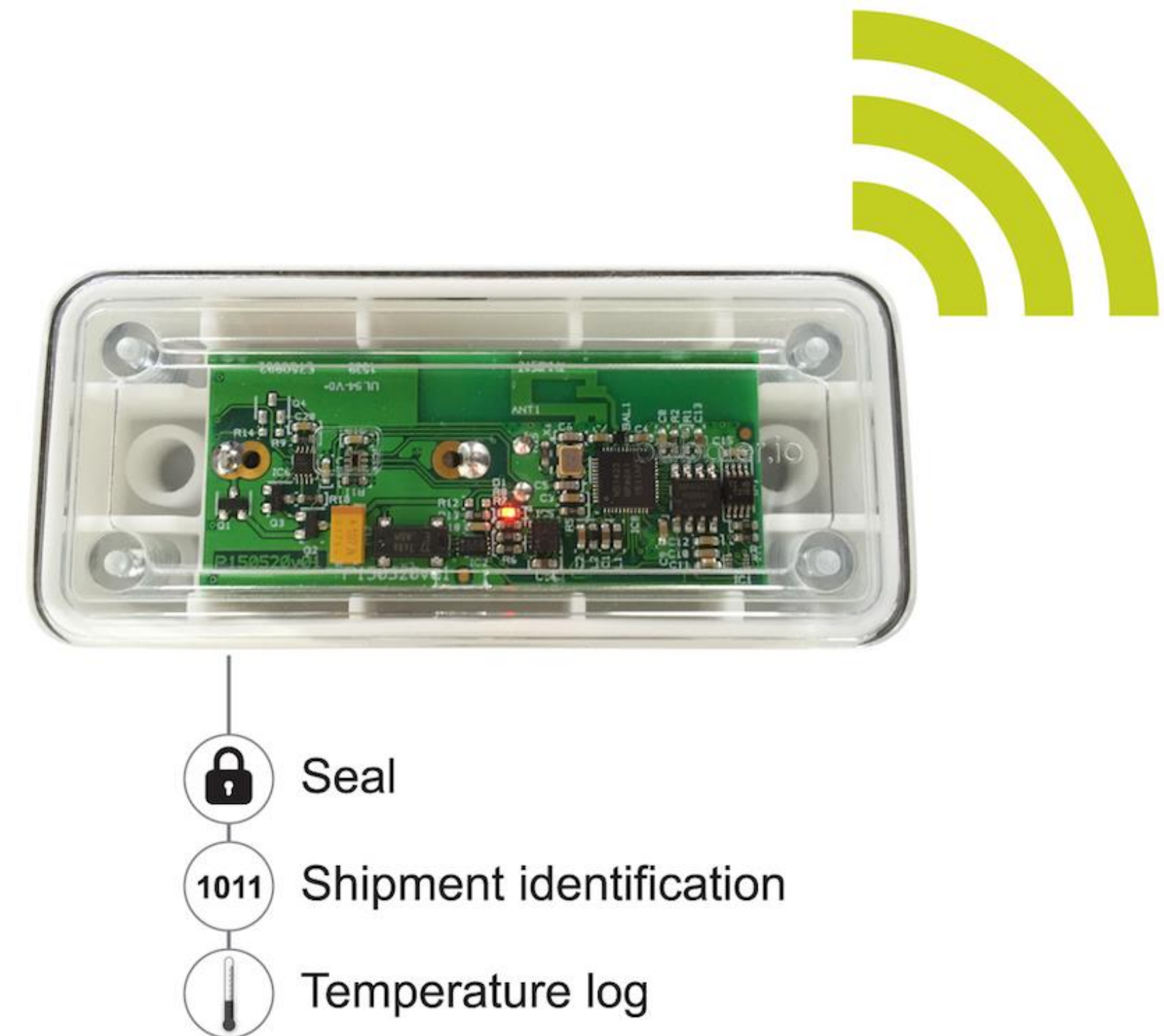
babbler

[www.babbler.io](http://www.babbler.io)



# Babbler

- Bluetooth / LoRa based low cost devices
- Can stay with cargo, end to end
- Smartphone and tablet access
- Inspect wirelessly from outside
- Worldwide online visibility





# Worldwide visibility

### My Babblers

<b>Id</b>	<b>Container</b>	<b>Shipment</b>
12104963	CSQU3054383	8751473987
12927463	CSQU3096383	8751478154
48641737	CSQU1257383	1983665181
52946472	CSQU2934877	3928749274
19745663	CSQU9817365	1983719276
83651819	CSQU3071893	1983652762

### Babbler 12104963



# Demo

- Banana's in the container
- Seal
- Narcotics smuggling
- Transport, detect opening
- Online view





## In Colombia

- Banana's in the container
- Seal
- Narcotics smuggling





# Meanwhile in Holland

- Transport, detect opening
- Online view

My Babblers

Id	Container	Shipment
12104963	CSQU3054383	8751473987
12927463	CSQU3096383	8751478154
48641737	CSQU1257383	1983665181
52946472	CSQU2934877	3928749274
19745663	CSQU9817365	1983719276
83651819	CSQU3071893	1983652762





# Babbler

- Penetration tests planned with Dutch Customs November 2015
- Pilots with international Fruit / Flower trade in November and December 2015
- Looking for customs organisations to participate



- Drop a business card to get a free sample (Jan 2016)